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CONTROLLER INSTALLATION MANUAL

VVMC-1000-SCR SERIES M
TRACTION CONTROLLER
WITH MAGNETEK DSD412 SCR DRIVE

Compliant with ASME A17.1 -2000 / CSA B44-00 and later codes

This manual is for VVMC-1000 Series M Controllers with Release 4 software

PART # 42-02-4022 REV. A .1 September 2008

Hook Up Schedule

For Temporary Operation of A17.1 -2000 Series M Traction Controllers

EXERCISE EXTREME CAUTION WHEN OPERATING THE ELEVATOR IN THIS MODE

Critical Safety Precautions:

1. ALWAYS connect an individual jumper for each device, so when the device is installed that jumper is removed. Note: NEVER jump out more circuits than necessary when preparing the car to operate or conduct a test.

2. ALWAYS connect the temporary run buttons in the CAR TOP INSPECTION circuits so they have top priority.

3. ALWAYS insert the temporary run button's EMERGENCY STOP SWITCH in the safety circuit between terminals 17 and 18. NOT in series with the ENABLE button.

4. ALWAYS get the GOVERNOR/GOVERNOR SWITCH and SAFETIES/SAFETY OPERATOR SWITCH (plank) operational as soon as possible.

If the door operator, fire service and emergency power are not yet wired:
Remove wire from panel mount terminal **DCL**
Remove wire from terminal **47** and on the SC-SB2K board
Jumper from **2 bus** to panel mount terminal **DPM**
Jumper from **2 bus** to terminal **36** and **36R** on the SC-SB2K board
Jumper from **2 bus** to panel mount terminal **EPI** (if present)
Jumper from **2F bus** to terminal **38** on the SC-SB2K board
Jumper from **2F bus** to terminal **FRSM** on the SC-SB2K board
Jumper from **2F bus** to terminal **FRSA** on the SC-SB2K board

Safeties, door locks and temporary run buttons, jump terminals as follows:
2 bus to 15, INCTI and 2 9 to 10 9 to 11 9 to 12 9 to 13 15 to 16 16 to 17
18 to 20 EB3 to EB4 2CT to CD 2CT to HD or IDL 75 to 85 77 to 87

If rear doors are present also jump:
2CT to CDR 2CT to HDR 2 bus to DPMR remove wires from 37R & 47R

If you have earthquake operation then jump CW1 to CW2 and SSI to EQ24

Install Temporary Run Buttons as follows (refer to area #6 of job prints):
Connect **EMERGENCY STOP SWITCH** between terminals **17 and 18**
Connect **ENABLE button** to terminal **INCTI**
Connect **UP button** to terminal **INCTU** and **ENABLE button**
Connect **DOWN button** to **INCTD** and **ENABLE button**
On the SC-BASE board, place the **PFLT Bypass** in the “**ON**” position

Refer to section 5.3.2 for A17.1-2000 bypass function

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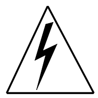
IMPORTANT PRECAUTIONS & NOTES

We strongly recommend that you read this manual carefully before proceeding with installation. Throughout this manual you will see icons followed by a WARNING, CAUTION or NOTE. These icons denote the following:



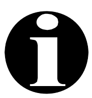
Operating procedures and practices which, if not done correctly, may result in personal injury or substantial damage to equipment.

Operating procedures and practices which, if not observed, may result in some damage to equipment.

Procedures, practices or information which are intended to be immediately helpful and informative.

The following general rules and safety precautions must be observed for safe and reliable operation of your system.

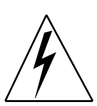
NOTE



This controller may be shipped without the final running program. However, you may install the unit, hookup and run your elevator on Inspection operation. Call MCE about a week before you are ready to turn the elevator over to full automatic operation so the running program can be shipped to you.

If you need to change a program chip on a computer board make sure you read the instructions and know exactly how to install the new chip. Plugging these devices in backwards may damage your chip.

WARNING



Elevator control products must be installed by experienced field personnel. This manual does not address code requirements. The field personnel must know all the rules and regulations pertaining to the safe installation and running of elevators.

This equipment is an O.E.M. product designed and built to comply with ASME A17.5, CAN/CSA-B44.1/ASME-A17.5 and National Electrical Code and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with any local codes and is installed safely.

The 3-phase AC power supply to this equipment must come from a fused disconnect switch or circuit breaker which is sized in conformance with all applicable national, state and local electrical codes, in order to provide the necessary overload protection for the Drive Unit and motor. Incorrect motor branch circuit protection will void warranty and may create a hazardous condition.

Proper grounding is vitally important to the safe and successful operation of your system. Bring your ground wire to the system subplate. You must choose the proper conductor size and minimize the resistance to ground by using shortest possible routing. See National Electrical Code Article 250-95, or the related local applicable code.

Before applying power to the controller, physically check all the power resistors and other components located in the resistor cabinet and inside the controller. Components loosened during shipment may cause damage. Please make sure that all the safety relays on the SC-SB2K board are properly seated in their sockets by pushing each relay into its socket.

CAUTION

You must *not* connect the output triacs *directly* to a hot bus (2, 3 or 4 bus). This can damage the triacs. PIs, direction arrows and terminals 40 & 42 are examples of outputs that can be damaged this way. Note: miswiring terminal 39 into 40 can damage the fire warning indicator triac.

NOTE

Your HC-PCIO and HC-CI/O-E boards are equipped with quick disconnect terminals. During the original installation, you may want to remove the terminal connector, hook up your field wires to it, test it for no shorts to ground (1 bus) and to 2, 3 and 4 terminals before plugging these terminals back into the PC boards.

WARNING

Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.

ENVIRONMENTAL CONSIDERATIONS:

Keep the machine room clean. Controllers are generally in NEMA 1 enclosures. Do not install the controller in a dusty area. Do not install the controller in a carpeted area. Keep room temperature between 32° F to 104° F (0° to 40° C). Avoid condensation on the equipment. Do not install the controller in a hazardous location and where excessive amounts of vapors or chemical fumes may be present. Make sure power line fluctuations are within $\pm$ 10%.

CONTROLLER OR GROUP ENCLOSURES WITH AIR CONDITIONING

If your controller or group enclosure is equipped with an air conditioning unit, observe the following precautions (failure to do so can result in water condensation inside the enclosure):

- Ensure the integrity of the NEMA 12 or 4 enclosure is maintained by using sealed knockouts and by sealing any holes created during installation.
- Do not run the air conditioner unit when the doors are open.
- To avoid damaging the compressor, if the air conditioner is turned off while it is running, wait at least five minutes before turning power on again.
- Observe the manufacture's recommended maintenance and optimum thermostat setting of 75° F (see Operator's Manual).
- Ensure the air conditioner unit's drain hose remains open.

LIMITED WARRANTY

Motion Control Engineering (manufacturer) warrants its products for a period of 15 months from the date of shipment from its factory to be free from defects in workmanship and materials. Any defect appearing more than 15 months from the date of shipment from the factory shall be deemed to be due to ordinary wear and tear. Manufacturer, however, assumes no risk or liability for results of the use of the products purchased from it, including, but without limiting the generality of the forgoing: (1) The use in combination with any electrical or electronic components, circuits, systems, assemblies or any other material or equipment (2) Unsuitability of this product for use in any circuit, assembly or environment. Purchasers' rights under this warranty shall consist solely of requiring the manufacturer to repair, or in manufacturer's sole discretion, replace free of charge, F.O.B. factory, any defective items received at said factory within the said 15 months and determined by manufacturer to be defective. The giving of or failure to give any advice or recommendation by manufacturer shall not constitute any warranty by or impose any liability upon the manufacturer. This warranty constitutes the sole and exclusive remedy of the purchaser and the exclusive liability of the manufacturer, AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY AS TO MERCHANTABILITY, FITNESS, FOR PURPOSE SOLD, DESCRIPTION, QUALITY PRODUCTIVENESS OR ANY OTHER MATTER. In no event will the manufacturer be liable for special or consequential damages or for delay in performance of this warranty.

Products that are not manufactured by MCE (such as drives, CRT's, modems, printers, etc.) are not covered under the above warranty terms. MCE, however, extends the same warranty terms that the original manufacturer of such equipment provide with their product (refer to the warranty terms for such products in their respective manual).

SECTION 1
PRODUCT DESCRIPTION

1.0 GENERAL INFORMATION

MCE's VVMC-1000 Series M Traction Controller for DC Elevators is designed to exhibit the characteristics listed below in a traction elevator installation. The controller has been designed to save time in installation and troubleshooting, but it is still very important that the field personnel who work with this equipment familiarize themselves with this manual before attempting to install the equipment.

PRINCIPAL CHARACTERISTICS	
Number of Stops	32
Number of Cars in Group	12
Car Speed Speed Regulation	350 fpm (Encoder feedback) less than ± 5%
Rotating equipment	DC machine with SCR Drive
Environment	32° to 104° F (0° to 40° C) ambient 12,000 ft altitude 95% humidity

EQUIPMENT CATEGORIES - The VVMC-1000 Series M traction controller consists of the following pieces of equipment:

- Controller Unit
- Car Top Selector (Landing system)
- Peripherals
- Group Supervisor (2 or more cars only)

1.1 CAR CONTROLLER PHYSICAL LAYOUT

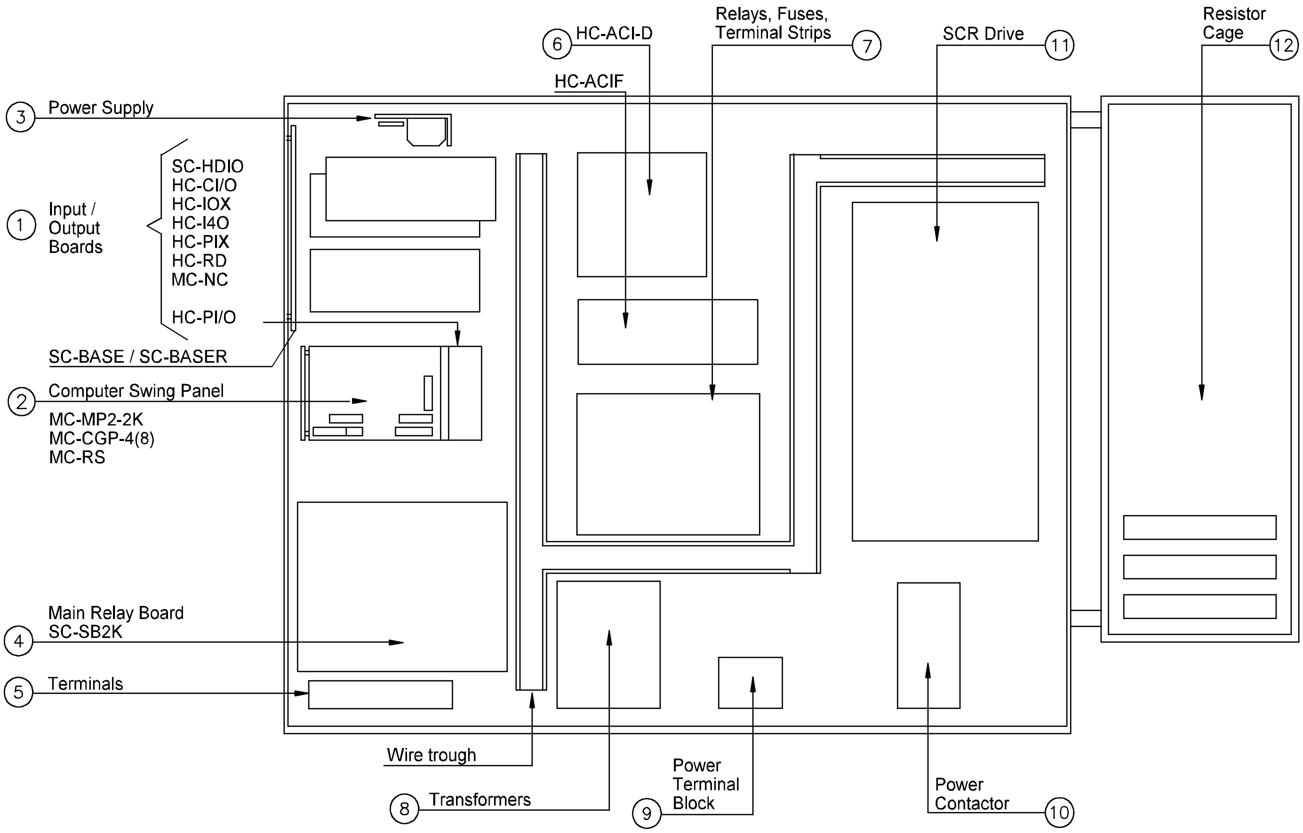
Figure 1.1 shows a typical layout of the Car Controller in a standard MCE traction cabinet. A brief description of each block follows:

1. **INPUT/OUTPUT BOARDS** - This block consists of a number of different Input/Output boards. The following is a list of boards that could be used in this block:

HC-PI/O	Power and Call Input/Output board
HC-CI/O	Call Input/Output board (optional)
HC-RD	Rear Door Logic board (optional)
HC-IOX	Input/Output Expander board (optional)
HC-I4O	Input/Output Expander board (optional)
MC-NC	Neuron Controller board (SmartLINK for Car Operating Panel option)
SC-BASE	Lock bypass, Access, Emergency Brake & Overspeed board
SC-BASER	Lock bypass, Access, Emergency Brake & Overspeed board with Rear Doors
SC-HDIO	High Density Input/Output board

Note that more than one HC-CI/O, HC-IOX and/or HC-I4O boards may be required depending on system requirements (i.e., number of landings served).

FIGURE 1.1 Typical Physical Layout



For jobs where all components will not fit in this enclosure, a differenct enclosure may be used or some of the components may be mounted externally.

2. **COMPUTER SWING PANEL** - The Computer Swing Panel (see Figure 1.2) houses the following:

- MC-MP2-2K Main Processor Board
- MC-CGP-4(8) Communication Processor Board (optional)
- MC-RS Communication Interface Board (optional)

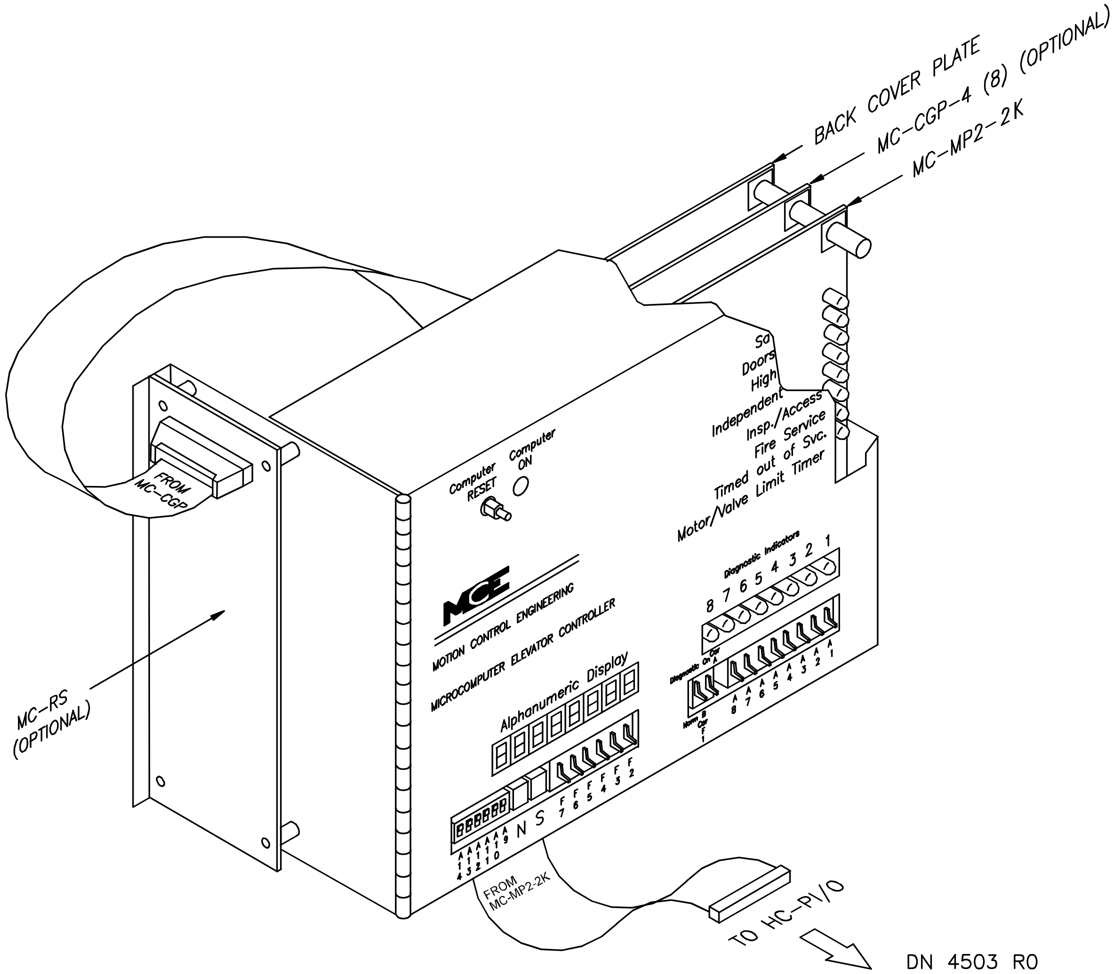
3. **POWER SUPPLY** - The power supply (single output linear) provides +5VDC power to the computer and its peripheral boards.

4. **RELAY BOARD (SC-SB2K)** - This board contains a TEST/NORMAL switch, MACHINE ROOM INSPECTION UP/DN switch and a MACHINE ROOM INSPECTION TRANSFER INSP/NORM switch.

5. **TERMINALS** - For Field Connections.

6. **HC-ACI-D Drive Interface Board** - Provides the interface to the SCR drive.
HC-ACIF Additional Drive Interface Board - This board contains the intermediate speed, ETS and Drive circuits.

FIGURE 1.2 Computer Swing Panel



7. **RELAYS, FUSES AND TERMINAL BLOCKS** - This block contains door operator circuitry, terminal blocks (for customer wiring), fuse holders, fuses, or any other circuitry needed for a specific job.

8. **TRANSFORMERS** - Transformers are provided, as necessary, according to the requirements of each individual car load and the available AC line voltage.

9. **POWER TERMINAL** - Input Power Connections.

10. **POWER CONTACTORS** - These contactors are a code requirement to disconnect the hoist motor from the Drive when the car is at the floor and stopped with the doors open.

11. **SCR DRIVE UNIT** - The SCR Drive Unit receives the direction(run) and speed command from the HC-ACI-D board, and provides the proper DC armature voltage and motor field voltage to create the required RPM and torque in the motor.

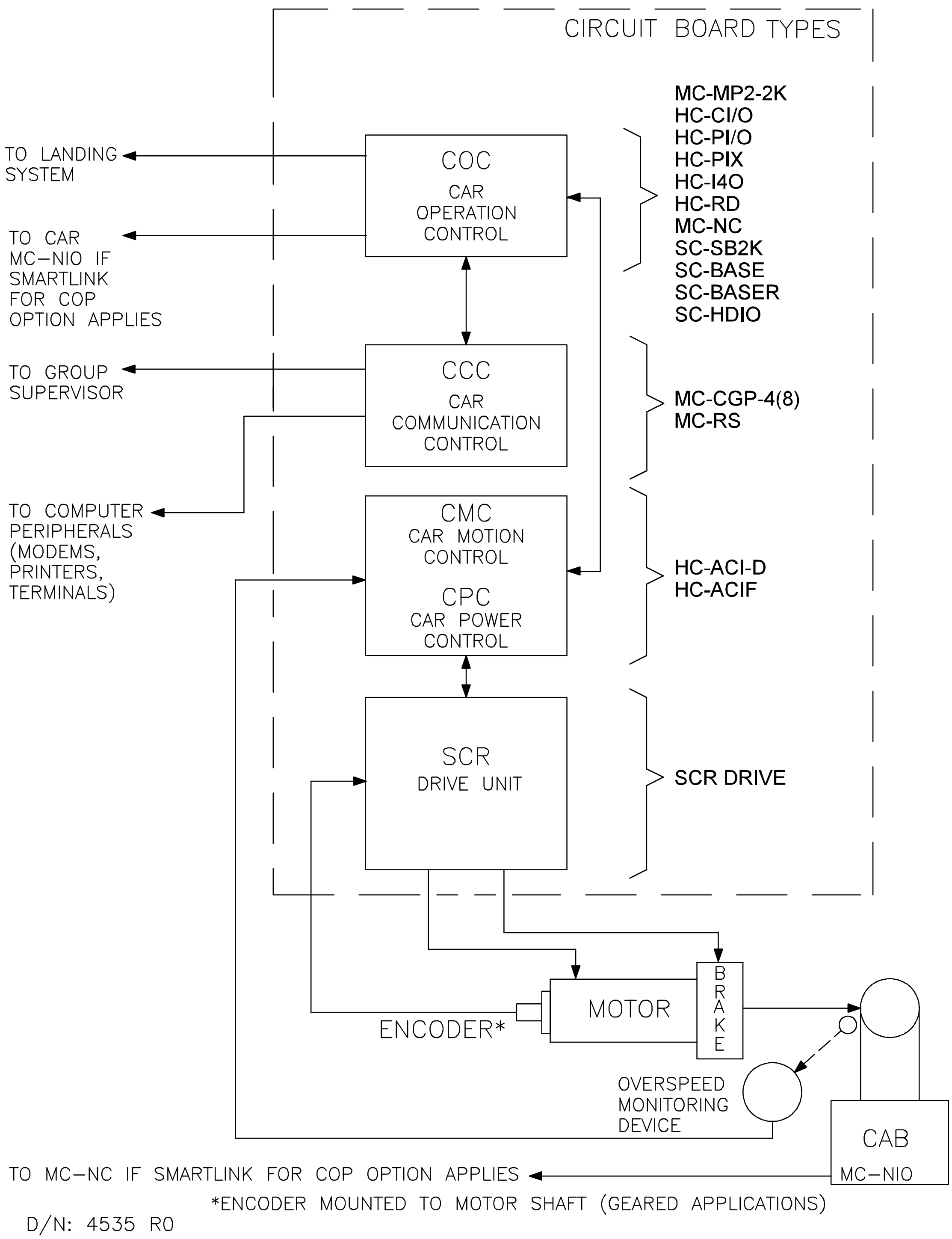
12. **POWER RESISTOR CAGE AND SCR FILTER** - Any power resistors that generate significant heat, such as door resistors or Drive system resistors, are located in the power resistor cage so their heat does not affect other electrical components. The SCR filter is included in the Power Resistor Cage.

1.2 CAR CONTROLLER FUNCTIONAL LAYOUT

The Control Unit is divided into four primary sections. Figure 1.3 shows these functional blocks and the printed circuit board types associated with each functional block:

- Car Operation Control (COC)
- Car Communication Control (CCC)
- Car Motion Control (CMC) - Car Power Control (CPC)
- SCR Drive

FIGURE 1.3 Car Controller Functional Layout



CAR OPERATION CONTROL (COC) - This functional block covers logical car operation and safety monitoring. An example of logical operation would be operation of the doors and response to hall and car call demands or special operations such as Inspection/Access, Fire Service, etc. Additional special operations are provided as required per specifications.

The heart of the COC is the SC-SB2K Main Relay board, which makes it possible to move the car without computers and satisfies code-required safety functions and redundant relay backup functions. All computer functions can fail in an ON condition and the car will not move if the door lock circuits are not closed. Except for calls, most of the individual elevator inputs and outputs are handled through the Main Relay board and are routed to the HC-PI/O board, which is the main interface to the computer.

Provisions for eight position indicator outputs are on the HC-PI/O board. If additional position indicators are required, HC-PIX boards are added. If independent (walk-through) rear doors are required, the HC-RD board acts as the interface between the computer and the Rear Door Relay board, which handles all functions associated with the rear doors. Some additional inputs and outputs, such as load weighers, are handled through the HC-IOX or HC-I4O board.

Hall calls are interfaced to the computer through the HC-CI/O boards which can handle up to 16 calls per board. Car calls are interfaced through the HC-CI/O boards or the MC-NC board if the controller is equipt with the SmartLINK for Car Operating Panel option. Therefore, all the input/output boards (HC-PI/O, HC-PIX, HC-RD, HC-IOX, HC-I4O, HC-CI/O and MC-NC) act as the interface between the MC-MP2-2K Main Computer board and the user. These input/output boards are linked to the Main Computer board through the ribbon cable attached to the MC-MP2-2K board, which plugs into the HC-PI/O board. The Main Computer board contains the main elevator logic program.

CAR COMMUNICATION CONTROL (CCC) - This functional block coordinates the flow of information between the car controller and other equipment such as terminals, modems, printers and the Group Supervisor in an M3 Group System.

CAR MOTION CONTROL (CMC) - Car Motion Control (CMC) develops the speed command which dictates the car's speed. The speed signal is in the form of step input signals which are applied to the drive unit. The drive responds to the commanded step inputs and runs the elevator at predefined speed settings stored in the drive unit. The CMC also provides Inspection/Leveling Overspeed (ILO) monitoring and Emergency Terminal Switch (ETS) monitoring. These functions are covered by the following devices:

- HC-ACI-D Drive Interface board
- HC-ACIF Additional Flux Vector Drive Interface board

The HC-ACI-D board creates the speed command, controls the brake, monitors overspeed conditions and is the interface between the COC, CPC and the power equipment such as the brake, SCR Drive Unit and supporting devices.

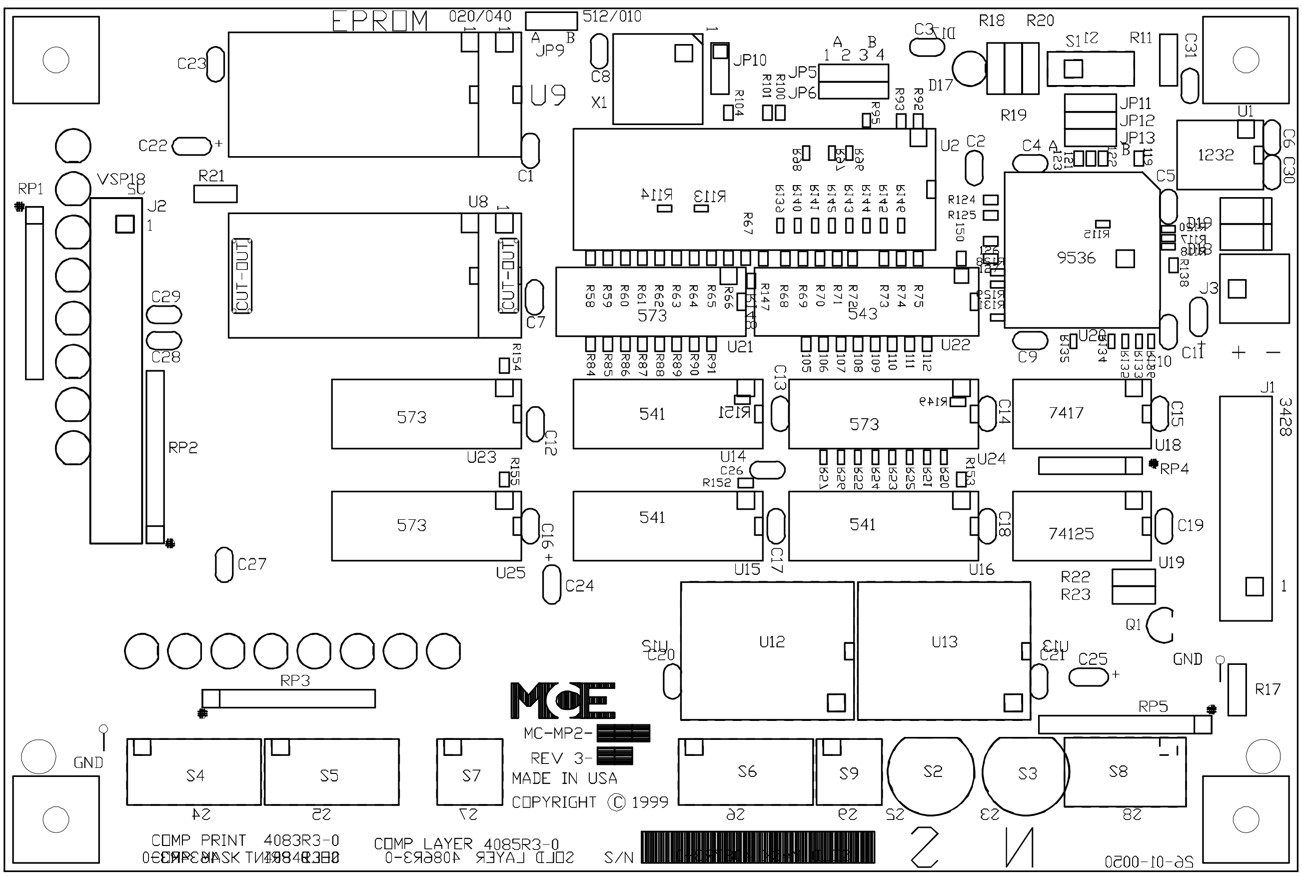
CAR POWER CONTROL (CPC) - SCR DRIVE - Car Power Control (CPC) receives the direction command and speed signal from the CMC and produces the necessary outputs to the rotating equipment to achieve the desired elevator movement. The SCR Drive Unit receives the direction(run) and speed command from the HC-ACI-D board, and provides the proper DC armature voltage and motor field voltage to create the required RPM and torque in the motor.

1.2.1 CAR OPERATION CONTROL (COC) COMPONENTS

Car Operation Control involves such things as door operation, response to hall and car calls, and special operations such as Inspection/Access and Fire Service. The following boards are involved in the COC functions:

- MC-MP2-2K, Main Processor Board
- SC-SB2K, Main Relay Board
- SC-HDIO, High Density I/O Board
- SC-BASE, Lock Bypass, Access, Overspeed and Emergency Brake Board
- SC-BASER, Lock Bypass, Access, Overspeed and Emergency Brake Board with Rear Doors
- HC-PI/O, Power Input / Output Board
- HC-PIX, Position Indicator Board
- HC-CI/O, Call Input / Output Board
- HC-IOX, Input / Output Expander Board
- HC-I4O, Input / Output Expander Board
- MC-NC, Neuron Controller Board

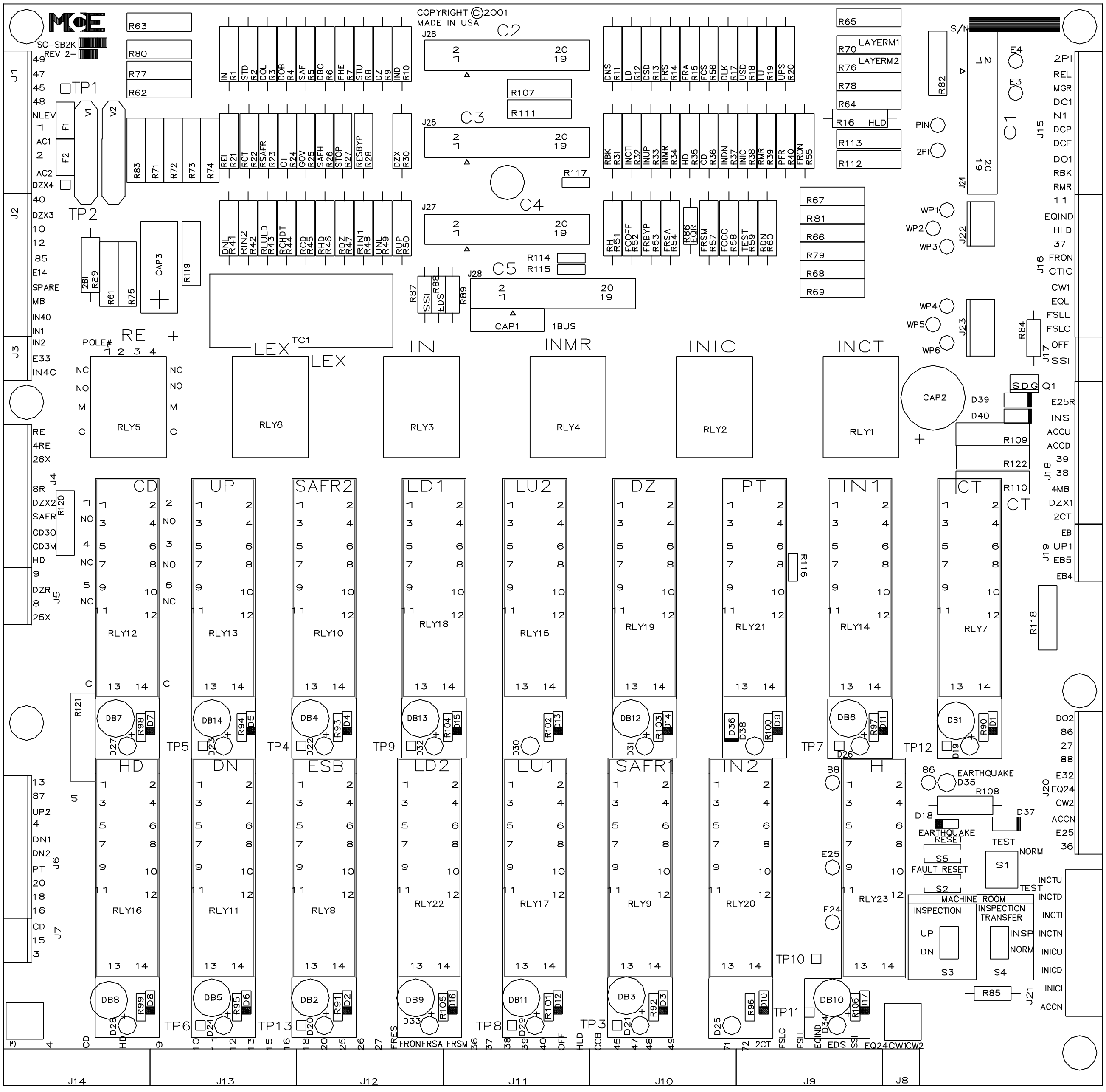
FIGURE 1.4 MC-MP2-2K Main Processor Board



MC-MP2-2K Main Processor board - The Main Processor board is located within the Computer Swing Panel and is responsible for Car Operation Control. This board is also responsible for the Onboard Diagnostics that provide interactive communication with the elevator mechanic. The board contains the alphanumeric display and all the LEDs, switches, and buttons found on the front of the Computer Swing Panel.

MAIN PROCESSOR SUBSYSTEM - This subsystem consists of many different input/output circuit boards. The layout and arrangement of these boards may vary from controller to controller. The following boards are typically included:

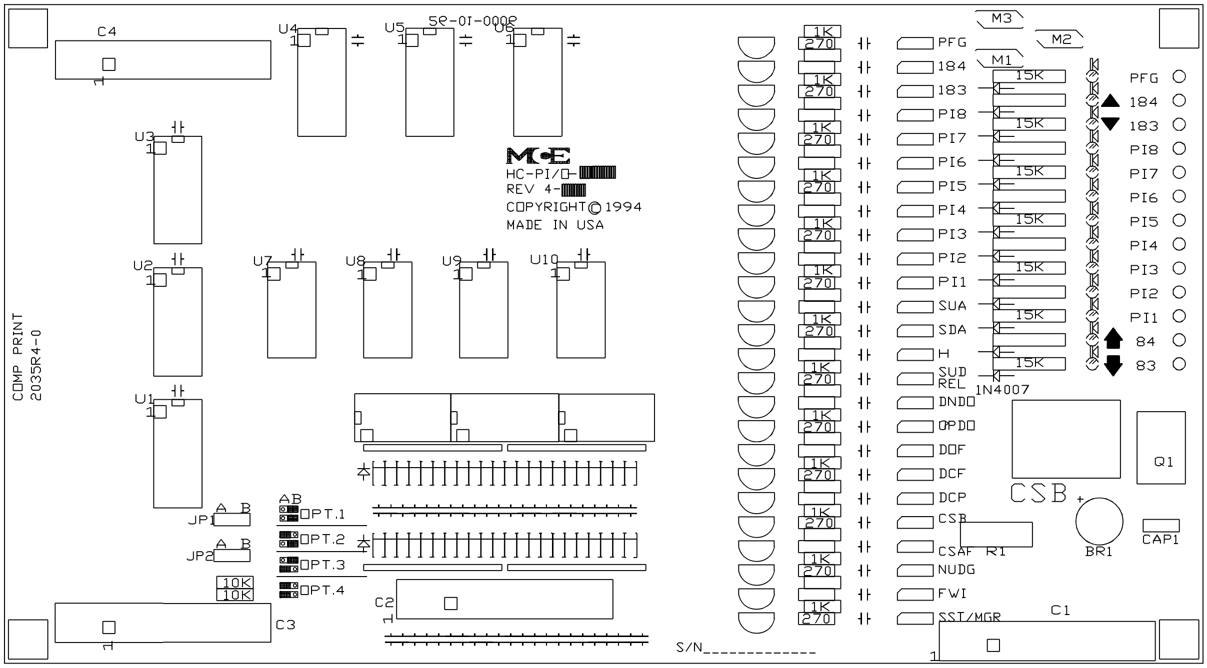
FIGURE 1.5 SC-SB2K Main Safety Relay Board



SC-SB2K Main Safety Relay board - This board satisfies many of the ASME A17.1 - 2000 code requirements. It also provides the necessary circuitry for running the car on Machine Room Inspection operation. This board, in conjunction with the HC-PI/O and SC-HDIO boards, comprises the high voltage interface between the MC-MP2-2K and the individual car logic functions such as door operation, direction outputs, direction sensing, main safety circuits, leveling circuitry, redundancy checking, etc.

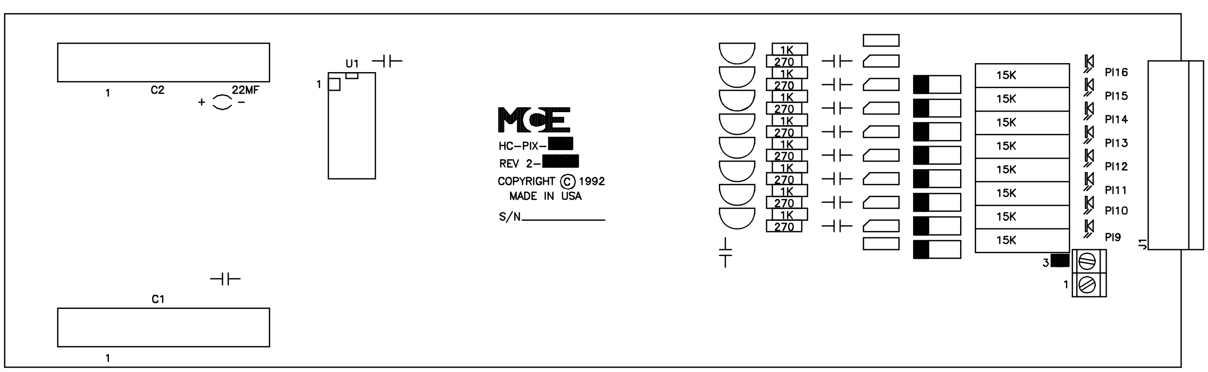
Where required we have implemented logic using force-guided safety relays. Each safety relay has a test pad designed to aid in the inspection-testing required for commissioning. There are terminals at the bottom of the board for field wiring. This board, located in the upper right corner of the controller cabinet, includes the MACHINE ROOM INSPECTION TRANSFER INSP/NORM switch, the MACHINE ROOM INSPECTION UP/DN switch, TEST/NORM and pushbuttons for Earthquake and Fault Reset.

FIGURE 1.6 HC-PI/O Power Input/Output Board

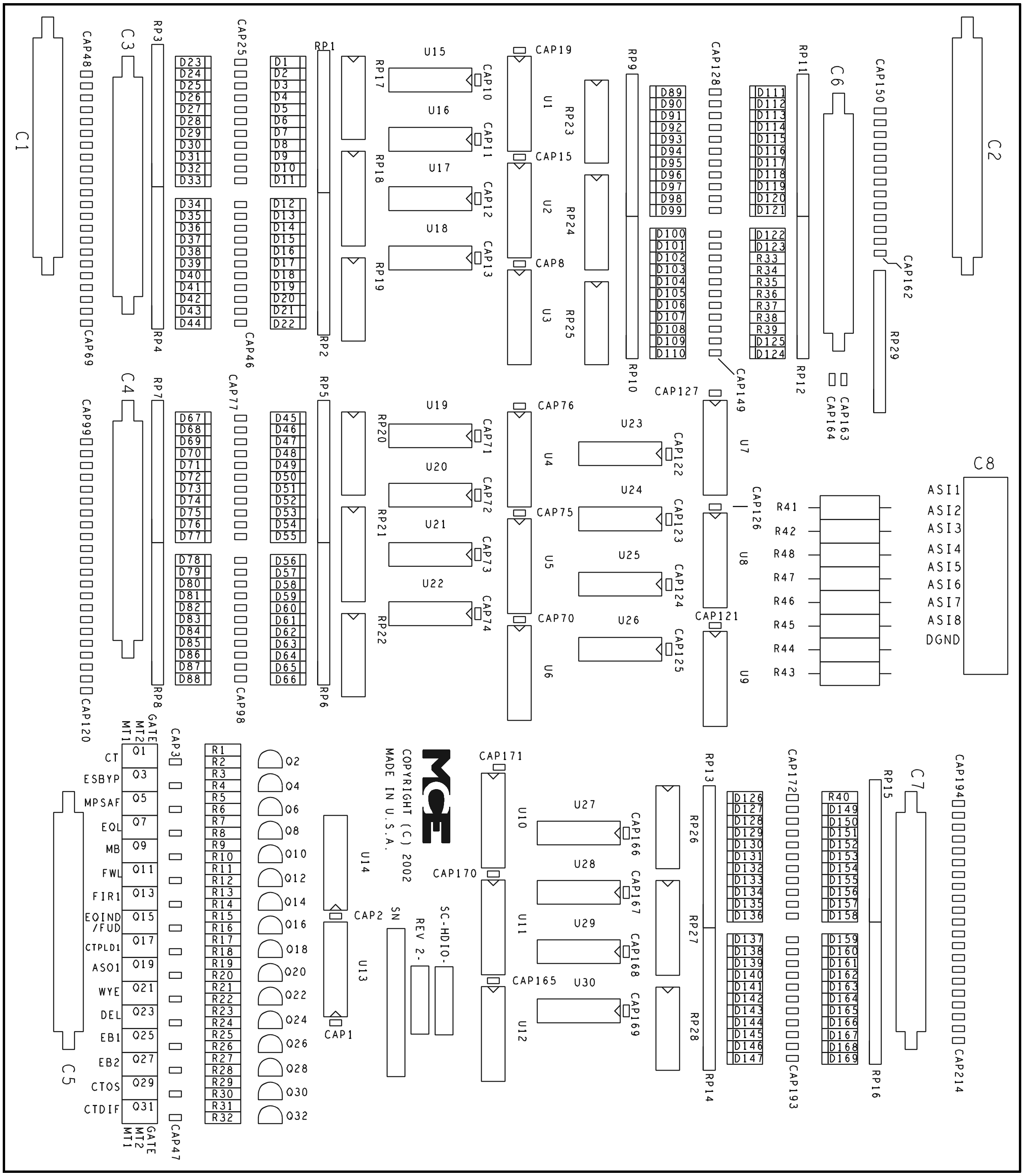


HC-PI/O Power Input/Output board - This board is typically located behind the Computer Swing Panel. The main function of this board is to receive inputs and provide outputs for individual car functions such as door operation, limit switches, direction sensing, position indicators, direction arrows and arrival gongs.

FIGURE 1.7 HC-PIX Position Indicator Expander Board

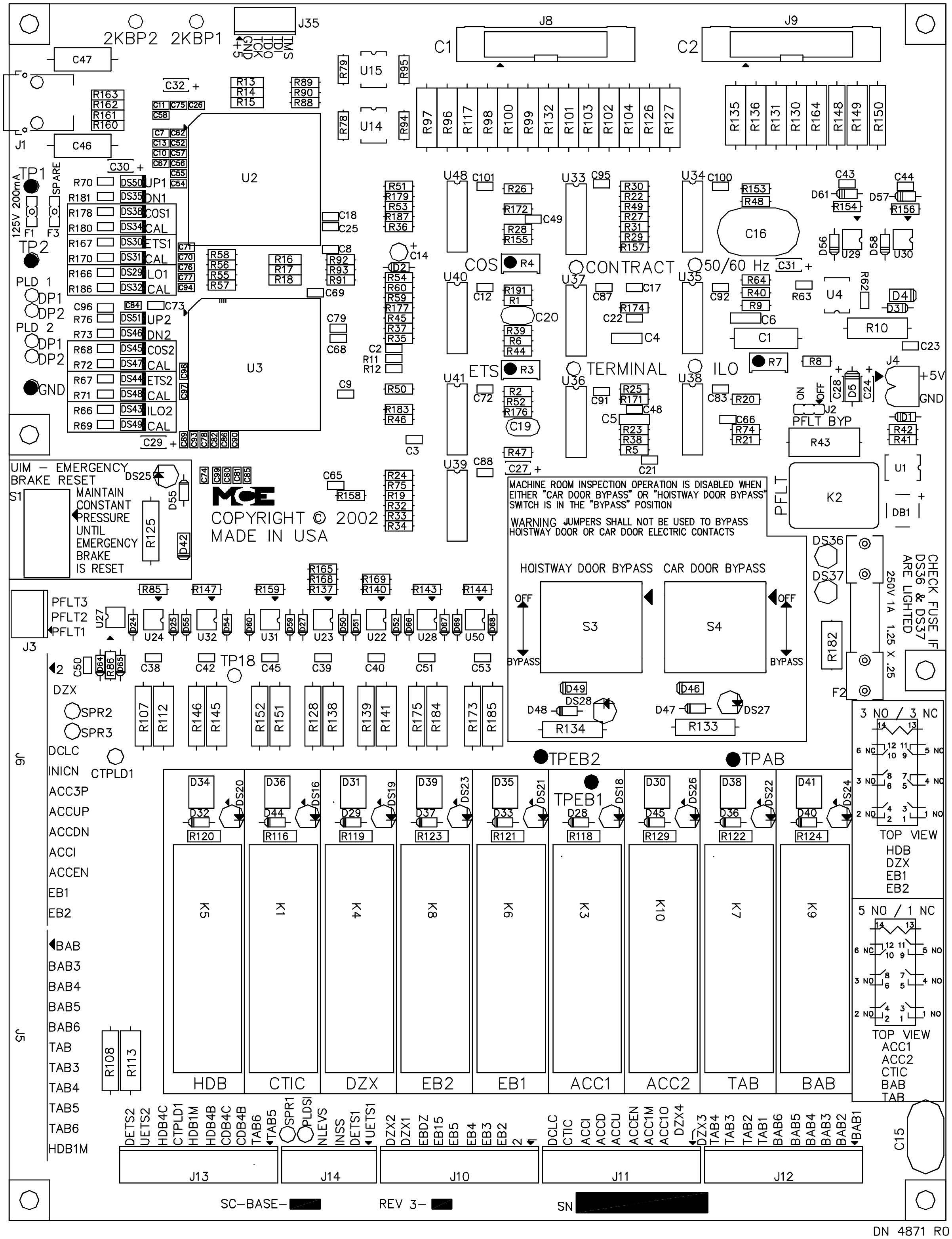


HC-PIX Position Indicator Expander board - This board provides additional PI outputs which are needed if there are more than eight floors in the building.



SC-HDIO High Density Input/Output board - This board is typically mounted behind PC Boards located near the Computer Swing Panel. The main function of this board is to receive inputs and provide outputs for the required safety functions carried out by the hardware located on the SC-BASE and SC-SB2K boards. There are no relays, switches or adjustments to be made on this board.

FIGURE 1.9 SC-BASE Bypass, Access, Overspeed and Emergency Brake board



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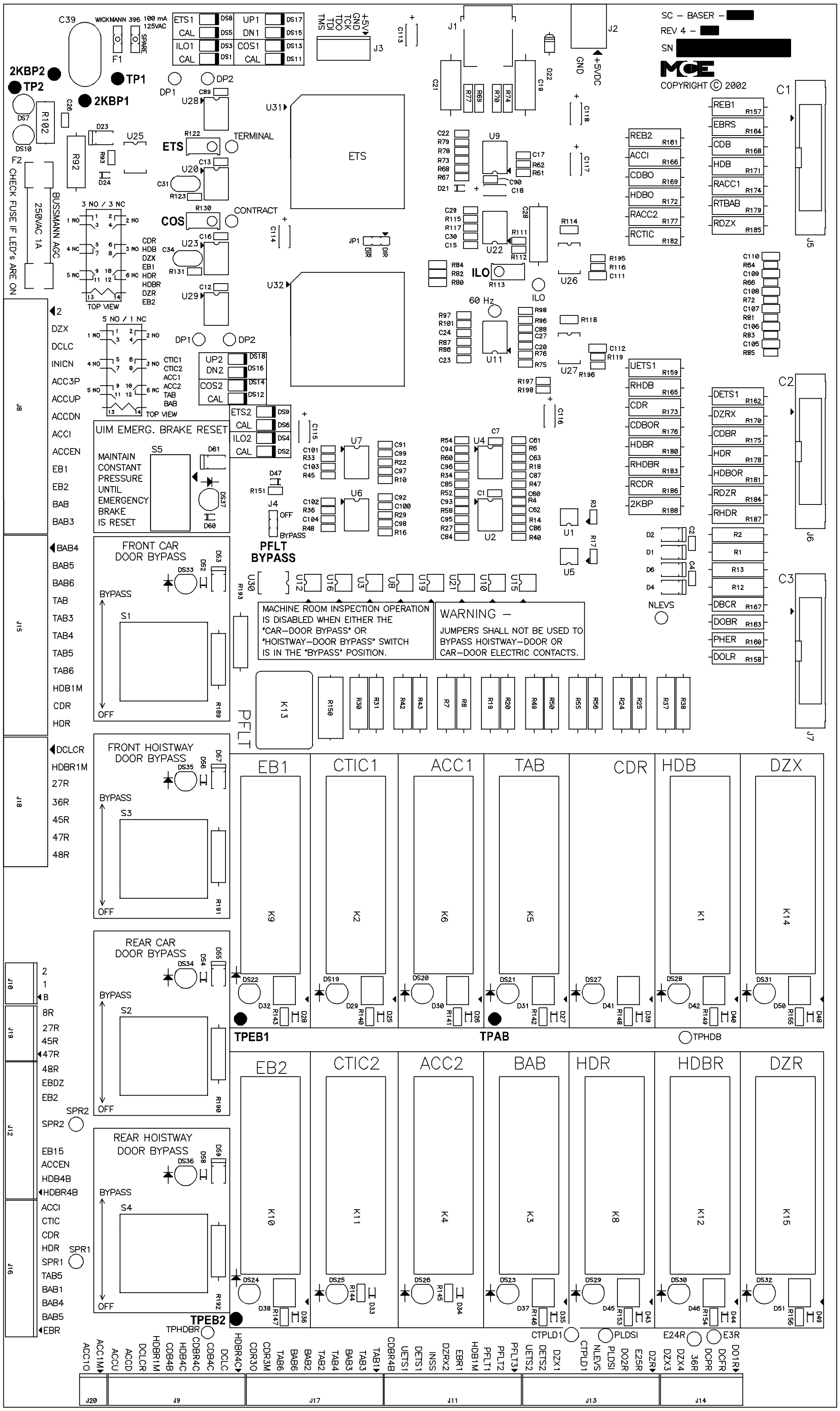
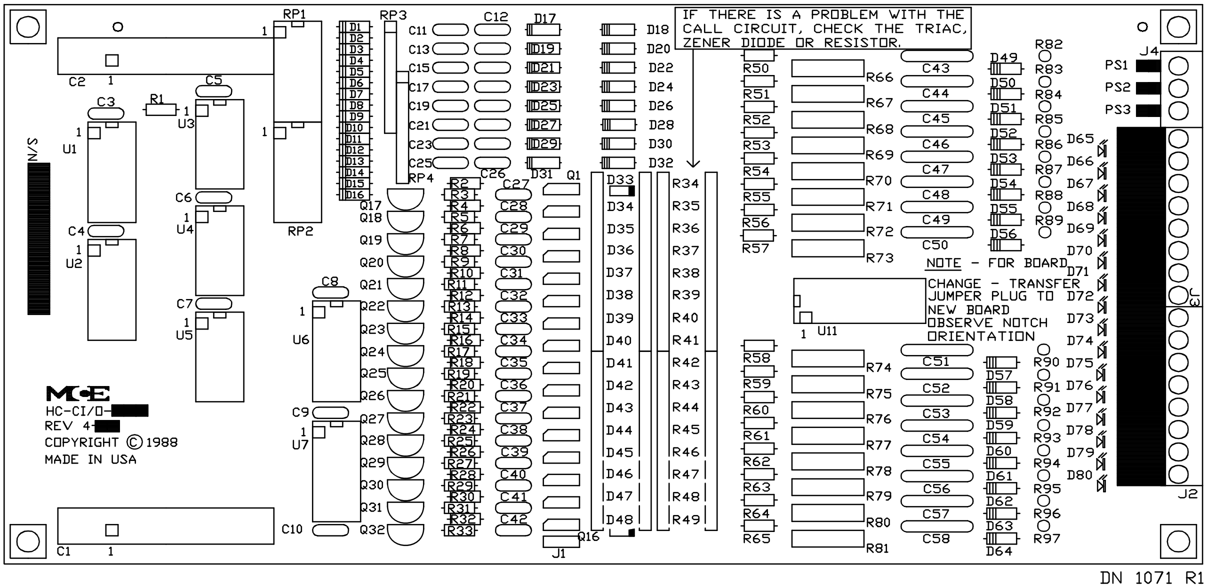
SC-BASE Bypass, Access, Overspeed and Emergency Brake board - This board has the necessary relays and hardware that is used to enable door lock bypass operation, inspection access, emergency brake activation and overspeed monitoring for access, inspection, leveling and emergency terminal speed limiting. Switches included on the board are for car and hoistway door lock bypass as well as emergency brake reset. Rear door bypass switches, if present, are located on the SC-BASER.

FIGURE 1.10 SC-BASER Bypass, Access, Overspeed, Emergency Brake Board with Rear Doors



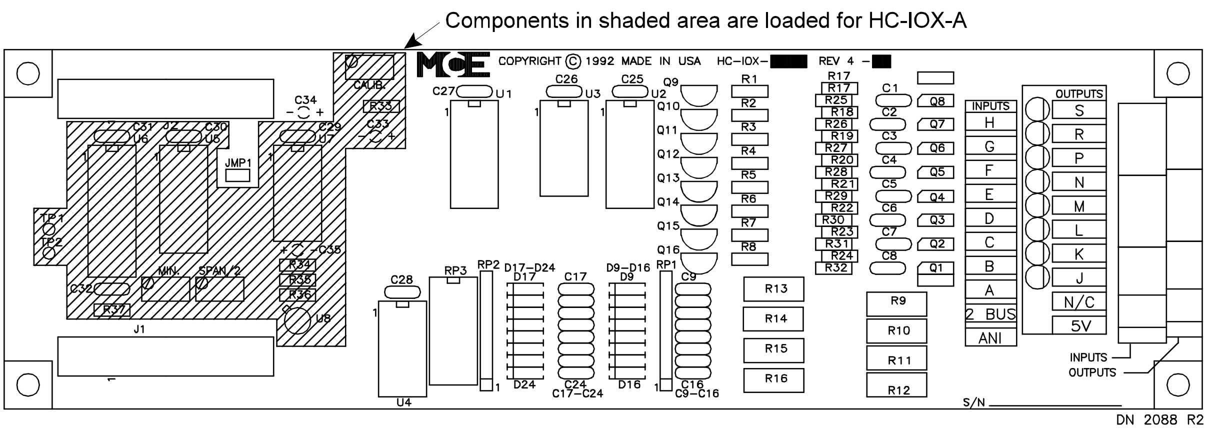
SC-BASER Lock Bypass, Access, Overspeed, Emergency Brake Board with Rear Doors - This board is used in place of the SC-BASE board when the job has rear doors.

FIGURE 1.11 HC-CI/O Call Input/Output Board



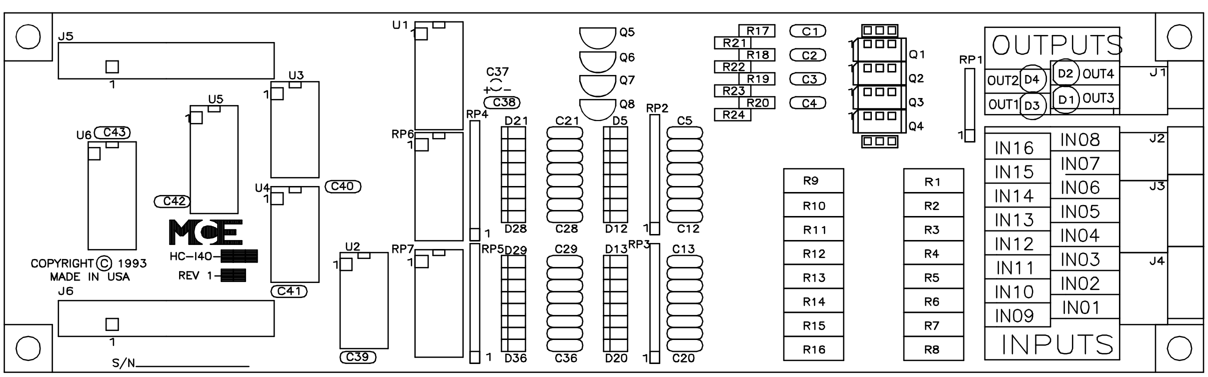
HC-CI/O Call Input/Output board - This board processes hall call and car call inputs, call acknowledgment outputs, and displays the status of each call.

FIGURE 1.12 HC-IOX Input/Output Expander Board



HC-IOX / HC-I4O Input/Output Expander board - The HC-IOX is a multipurpose input/output board (Figure 1.12). Some installations have the HC-I4O board instead (Figure 1.13. Its functions are similar to the HC-IOX and HC-IOX-A.

FIGURE 1.13 HC-I4O Input/Output Expander Board



HC-RD Rear Door board - This board provides the necessary logic required when an additional independent rear door is present (board not pictured).

MC-NC Neuron Controller board (optional) - Control board for the SmartLINK for Car Operating Panel option (board not pictured). See Appendix G, *Option* SmartLINK for Car Operating Panel if applicable.

MC-NIO Neuron Input/Output board (optional) (board not pictured) - Located in the car, the MC-NIO board transfers COP signal values to and from the car controller node as network packets. COP signals include call buttons, door open button, door close button, call lockouts, etc. See Appendix G, *Option* SmartLINK for Car Operating Panel if applicable.

1.2.2 CAR OPERATION CONTROL (COC) INPUTS AND OUTPUTS

COC INPUTS - This section describes the main signals received by the MC-MP2-2K Main Processor board.

The COC module is responsible for the “logical operation” of the elevator control system. For example, the COC may decide that the car should travel from one floor to another in response to a car call, but leaves the “speed control” (acceleration, deceleration, etc.) to the CMC module. The fundamental inputs that are required for the logical control of the elevator come to the Main Processor board through three boards: the SC-HDIO (high density I/O), the HC-PI/O board (power input/output board) and the HC-CI/O board (call input/output board). Each VVMC-1000 control system has one HC-PI/O board, and as many HC-CI/O boards as are required to accommodate the number of calls in the particular installation. Additional “miscellaneous” inputs come to the Main Processor board through the HC-IOX or HC-I4O board (I/O expansion board, also as many as needed).

Primary Power inputs - HC-PI/O board

- **Door signals** - The HC-PI/O board receives the door-related signals through the main relay board (SC-SB2K). The door related signals include the door reopening devices (photo eye, safe edge), car operating panel buttons (door open button, door close button), and the door position contacts (door open limit, door lock).

- **Landing system signals** - The HC-PI/O board receives some of the signals generated by the landing system through the SC-SB2K Main Relay board. The landing system signals read by the COC module are the door zone, level up and level down signals.

- **Operational mode signals** - The HC-PI/O board receives a few of the operational and safety mode signals through the SC-SB2K Main Relay board. These signals include the safety string status, the inspection operation status, and the independent service status. Additionally, some of the fire service signals are also received by the HC-PI/O board through the relay board (fire sensors, in-car fire service switch).

- **Direction sensing inputs** - Two direction sensing inputs (up sense and down sense) are read by the COC processor, again through the HC-PI/O and SC-SB2K, and are used to process the car position indicator logic and motor protection timing logic.

Call inputs (car call and hall call) - HC-CI/O board

The call buttons and call indicators are wired to the control system and read by the COC processor through the call board(s) (HC-CI/O and/or MC-NC). The connection to the HC-CI/O board is a single wire connection for both the button and the indicator (the terminal acts as both an input and output terminal). In multi-car group arrangements, “system” hall calls are wired to the Group Supervisor (also to HC-CI/O boards), but “swing car” hall calls are wired to the call board of the individual car controller, along with the car calls.

COC OUTPUTS - This section describes the main signals generated by the MC-MP2-2K Main Processor board.

The fundamental outputs that are required for the logical control of the elevator emerge from the Main Processor board through the same two boards described above: the HC-PI/O board (power input/output board) and the HC-CI/O board (call input/output board). Additional “miscellaneous” outputs emerge from the Main Processor board through the HC-IOX or HC-I4O I/O Expansion boards, as many as are needed, and some “specialty” output boards which may be used to drive specific devices.

Primary Power Outputs - HC-PI/O board

- **Position indicators, direction arrows, and arrival fixture signals** - Eight position indicator outputs are provided on the HC-PI/O board. Should the particular installation have more than eight landings, additional position indicator outputs are provided through the use of HC-PIX boards (position indicator expansion boards). The up and down direction arrow indicators and the up and down arrival lantern outputs are also provided on the HC-PI/O board. The output terminals for these indicator outputs are located on the HC-PI/O board.

- **Fire service operation signals** - Two outputs associated with fire service operation are generated on the HC-PI/O board, and are routed through the main relay board. The fire warning indicator output generates the visual/audible signal in the elevator during fire phase I recall, and the in-car stop switch bypass output is used for rendering the in-car stop switch inoperative, also during fire phase I recall.

- **Door control signals** - Four signals are generated by the COC module to control the operation of the doors. These outputs are generated on the HC-PI/O board, but are routed through the main relay board for connection to external relays. These signals are the door open function, door close function, door close power, and nudging outputs. Should the installation have a floor with both front and rear openings, a rear door logic board (HC-RD) is used to generate the corresponding outputs for the rear door.

- **Car movement signals** - Four signals are generated by the COC module to perform the *logical control* of car movement. In hydraulic applications these signals directly control the valve solenoids to cause the car to move up and down at high and low speeds. In VVMC-1000 applications, however, these outputs are read by the CMC module, which applies the proper speed input to the SCR drive. The four signals generated by the COC are up direction, down direction, high speed and relevel speed. As an example, a high speed run in the up direction would be *requested* by the COC by generating the high speed and up direction outputs.

Call outputs (car call and hall call) - HC-CI/O board

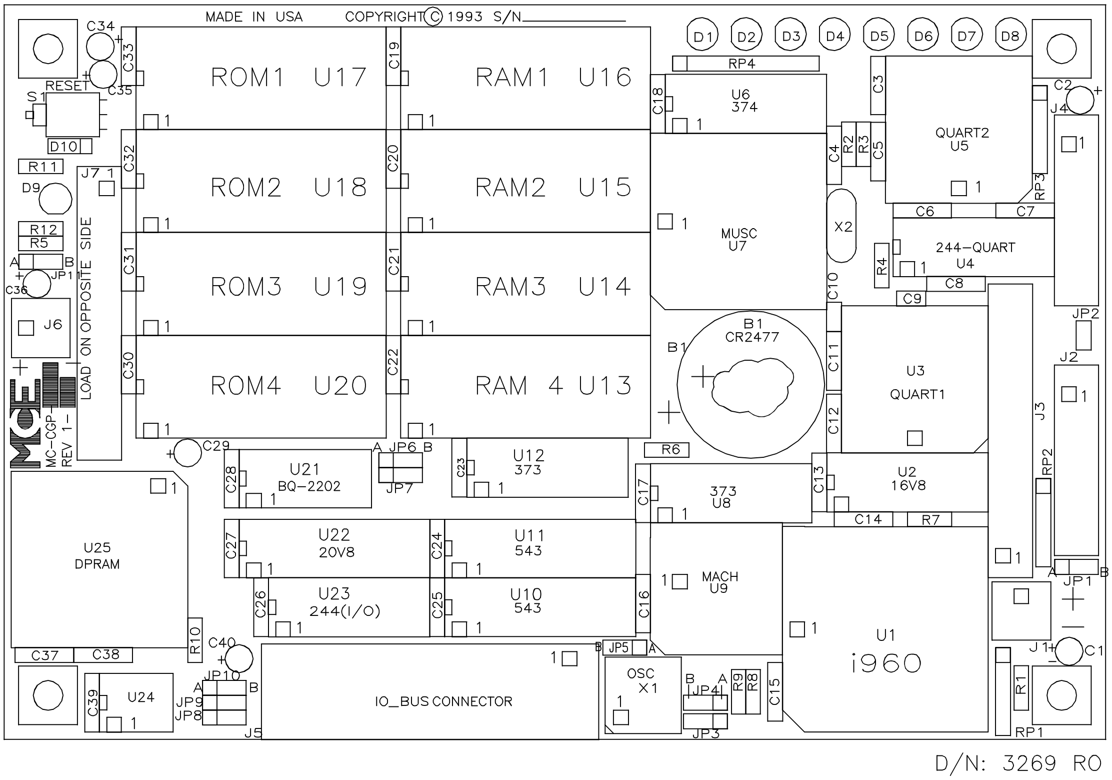
The call button indicators are wired to the control system and generated by the COC module through the HC-CI/O call board(s), or MC-NC and MC-NIO boards with the SmartLINK for COP option (see Appendix G). The connection to the HC-CI/O call board is a single wire connection for both the indicator and the call button (the terminal acts as both an input and output terminal). In multi-car group arrangements, “system” hall calls are wired to the Group Supervisor, but “swing car” hall calls are wired to the call board of the individual car controller, along with the car calls.

1.2.3 CAR COMMUNICATION CONTROL (CCC) COMPONENTS

The flow of information between the car controller and other equipment such as terminals, modems, printers or Group Supervisor is controlled by the following boards:

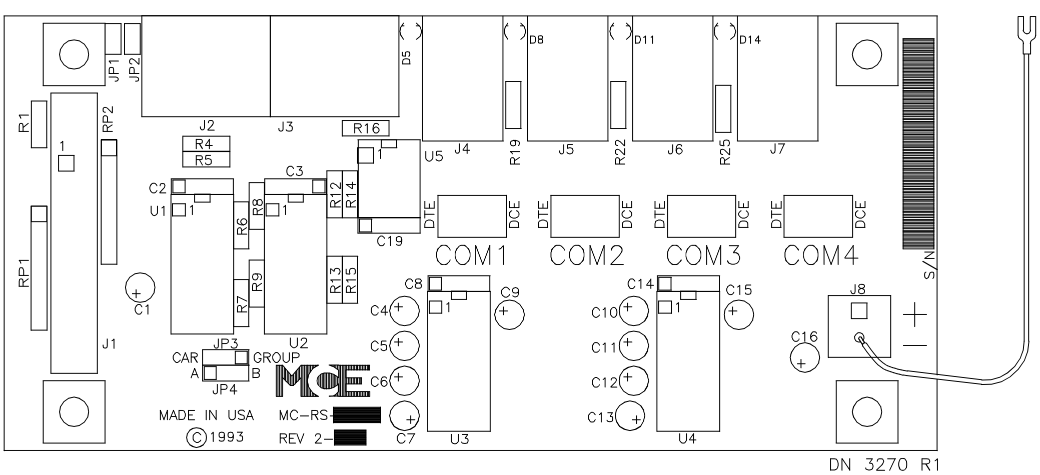
- MC-CGP-4(8), Communication Processor Board (optional)
- MC-RS, Communication Interface Board (optional)

FIGURE 1.14 MC-CGP-4(8) Communication Processor Board



MC-CGP-4(8) Communication Processor Board - This board contains a very powerful 32-bit embedded RISC microcontroller, and is located behind the Main Processor board inside the Computer Swing Panel. The primary function of this board is to co-ordinate the flow of information between the car controller and other equipment and peripherals, such as a CRT, modem, printer or a PC for diagnostics and data logging.

FIGURE 1.15 MC-RS Communication Interface Board



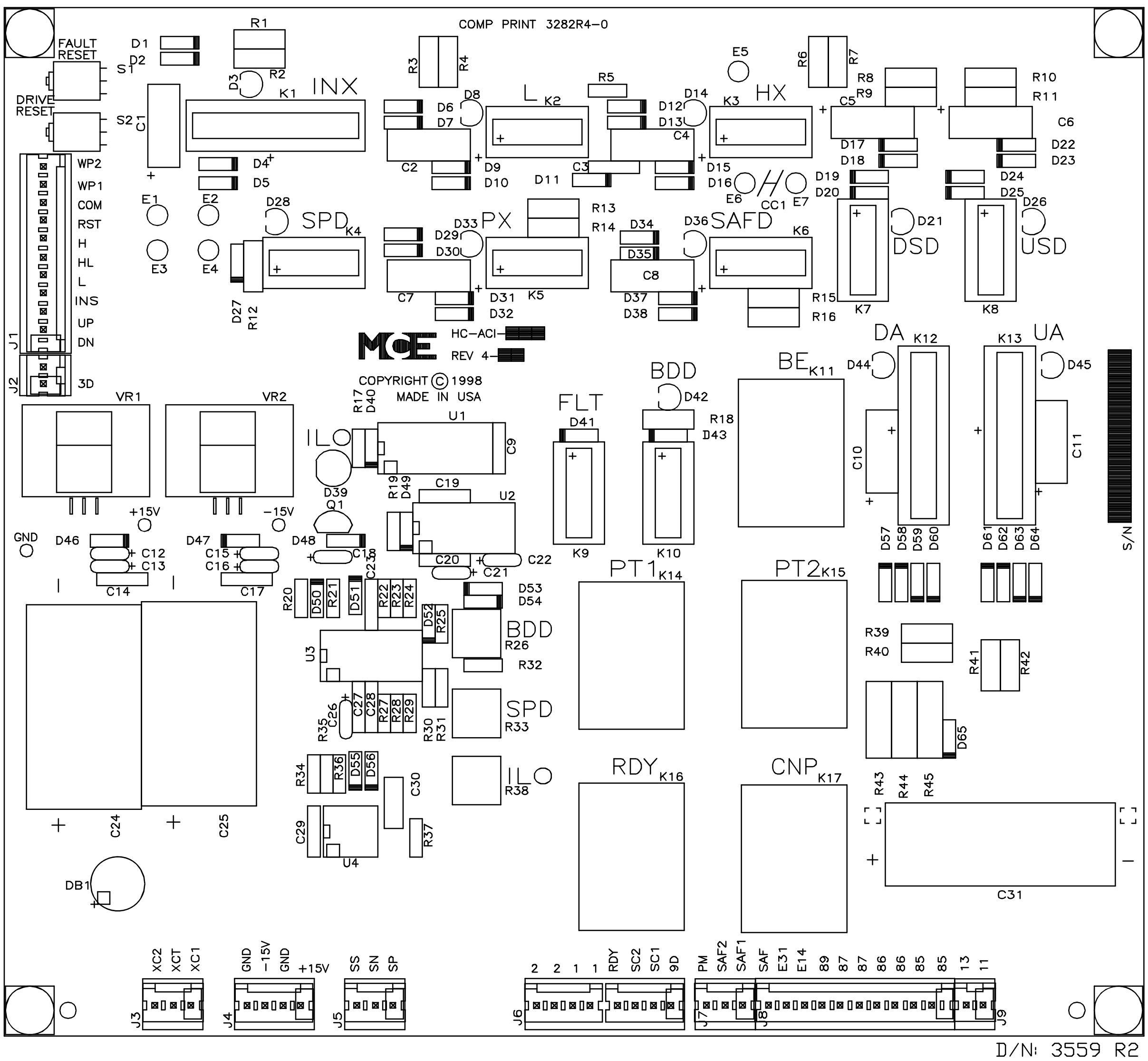
MC-RS Communication Interface Board - This board provides a high-speed RS-422 serial link between the individual car controller and the M3 Group Supervisor. It also provides four industry standard RS-232C serial ports to interface the car controller with a standard computer or data terminal, such as a printer, modem or CRT terminal.

1.2.4 CAR MOTION CONTROL (CMC) COMPONENTS

Car Motion Control involves a number of tasks including brake and speed signal coordination plus monitoring the car during Normal operation, Inspection operation and during slowdown at terminal landings, and stopping the car if a failure or unsafe condition is detected. The CMC components include the following boards:

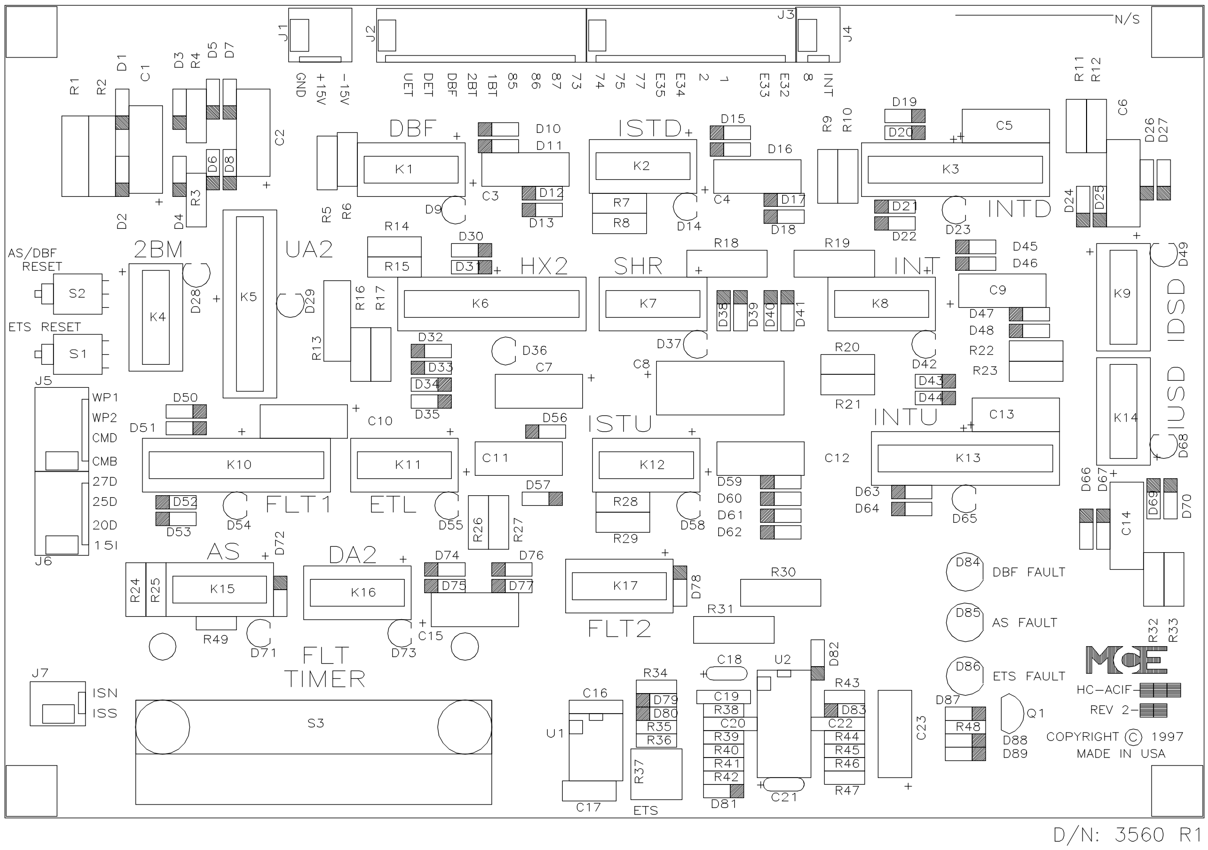
- HC-ACI-D, Drive Interface Board
- AC-ACIF, Additional Drive Interface Board

FIGURE 1.16 HC-ACI-D Drive Interface Board



HC-ACI-D Drive Interface Board - The HC-ACI-D board is the interface between the Main Relay board and the SCR Drive Unit. It performs a variety of functions including providing speed inputs and performing certain elevator code requirements such as Inspection/Leveling overspeed detection and motor and brake contactor monitoring. Other functions include an independent motor speed monitoring circuit plus brake and speed signal coordination.

FIGURE 1.17   HC-ACIF Additional Drive Interface Board



HC-ACIF Additional Flux Vector Drive Interface Board - This board is included when intermediate speed is required. It includes the intermediate speed, ETS and Drive circuits.

1.2.5 CAR POWER CONTROL (CPC) COMPONENTS

The voltages required by the motor and brake are generated by the Car Power Control components, including:

- SCR Drive Unit
- Power contactors
- Power resistors

SCR Drive Unit - The SCR Drive Unit receives the direction(run) and speed command from the HC-ACI-D board, and provides the proper DC armature voltage and motor field voltage to create the required RPM and torque in the motor.

Power contactors - These contactors are a code requirement to disconnect the hoist motor from the drive when the car is at the floor and stopped with the doors open.

Power resistors and SCR filter - Any power resistors that generate significant heat, such as door resistors or drive system resistors, are located in the power resistor cage so their heat does not affect other electrical components. The SCR filter is included in the Power Resistor Cage.

1.2.6 TYPICAL SEQUENCE OF OPERATION

To become familiar with the overall sequence of operation of this controller, we begin with a car call input and follow the signals as they progress through various parts of the control system.

A car call is registered by grounding an input on the HC-CI/O board or, with SmartLINK for COP, by serial data sent from the MC-NIO board in the COP to the MC-NC board in the controller. On the HC-CI/O board the 120VAC signal is converted to a + 5V logic signal and is then read by the MC-MP2-2K Main Computer board. The Main Computer board acknowledges this signal by sending a logic signal back to the HC-CI/O board which then turns on a triac to illuminate the call registered light in the car panel and an LED on the HC-CI/O board. With the SmartLINK for COP option the Main Computer sends data to the MC-NC board which, in turn, sends serial data to the MC-NIO board in the COP. The MC-NIO board then turns ON the call registered light in the COP.

The Main Computer board determines where the call is in relation to the car position and sends a direction arrow signal to the HC-PI/O board, which operates an up or down arrow triac output. This illuminates the correct direction arrow in the car position indicator. No further action can take place unless additional conditions are met. Then, if the doors are closed, the Main Computer board sends the correct direction output signal to the HC-PI/O board, which operates the correct direction triac. This signal is sent to the SC-SB2K Main Relay board which energizes the direction pilot relays. This direction signal then goes to the HC-ACI-D board and to one or more auxiliary running relays. The direction and high speed commands originate from the Main Computer board through the HC-PI/O and the Main Relay board. The CMC is ready to lift the brake and to provide control to the SCR Drive Unit in response to a speed command provided by the CMC.

In summary, the call signal entered the COC was processed into direction and high speed acceleration sequence commands. The SCR speed command and brake signals are then created by the CMC and the CPC moves the elevator according to the commanded speed.

1.3 LANDING SYSTEMS

There are two different types of landing systems that can be used with VVMC-1000-SCR controllers, depending on the customer's preference: LS-STANx-2K and LS-QUTE-X-2K. These landing systems are discussed separately throughout this manual.

1.3.1 LS-STANx-2K

This is a car top mounted vane-operated landing system, which uses the VS-1A infrared proximity switches. The vanes are to be mounted to the rails (see Figures 1.18 and 1.19).

FIGURE 1.18 LS-STAN5-2K Cartop Control Box

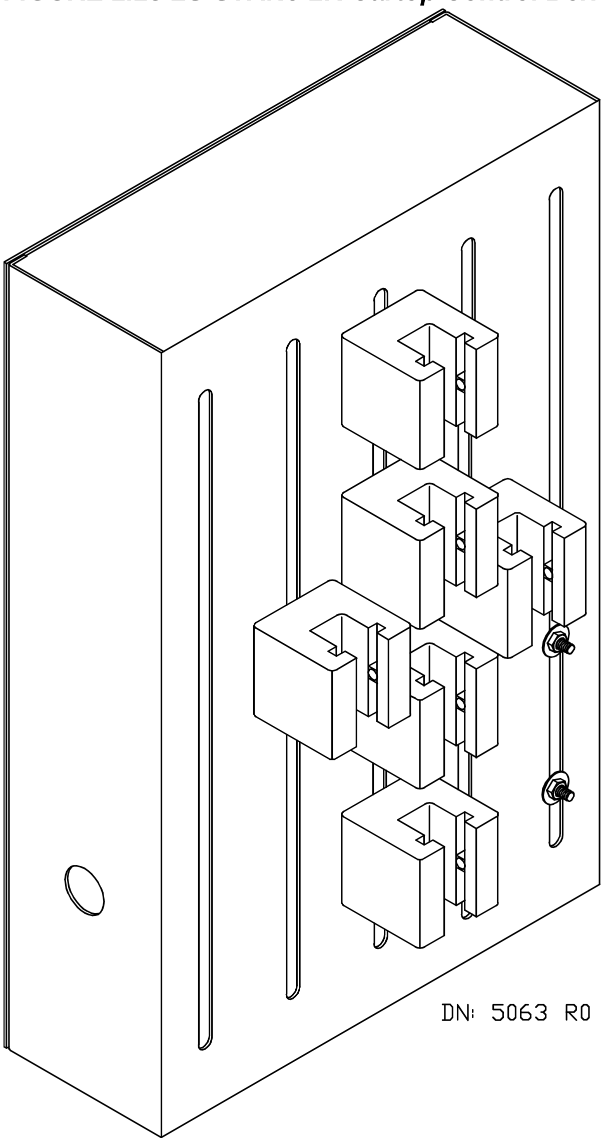
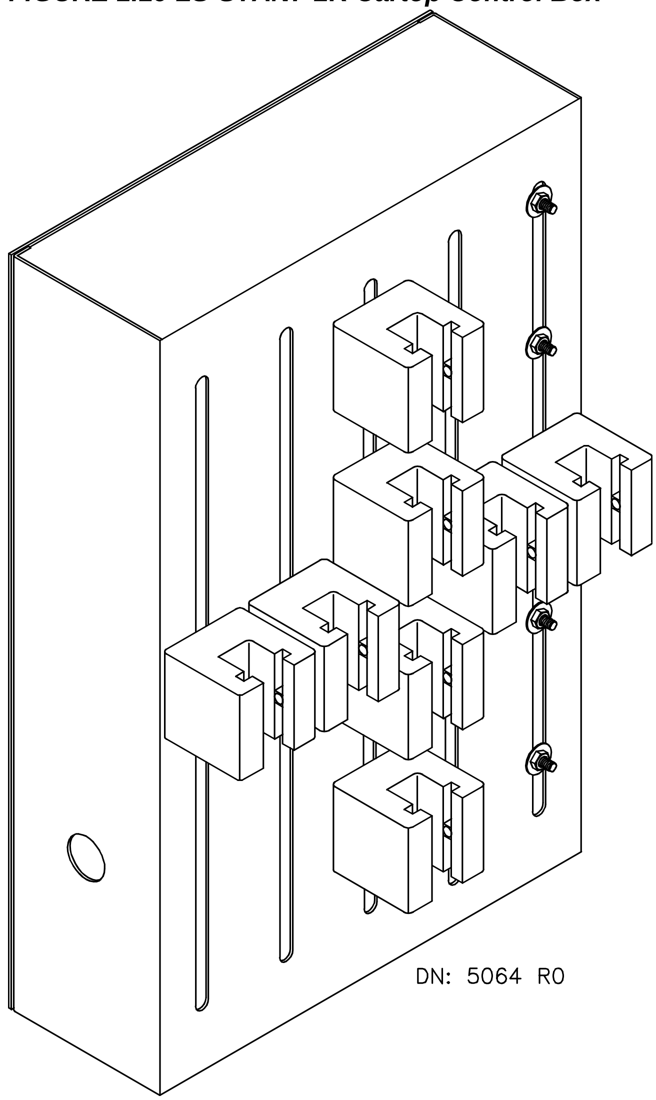


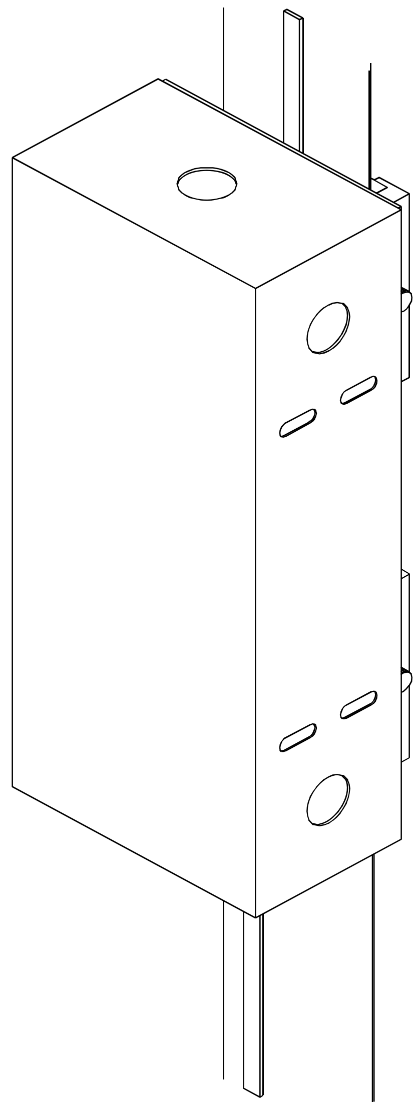
FIGURE 1.19 LS-STAN7-2K Cartop Control Box



1.3.2 LS-QUTE-X-2K

This is a tape-and-magnet-operated landing system, with a 3-inch steel tape mounted in the hoistway and an electronic box mounted on the car top (see Figure 1.20) More information is provided in Appendix F, LS-QUTE-X-2K Landing System Assembly Drawings.

FIGURE 1.20 LS-QUTE-X-2K Car Top Control Box



1.4 DIAGNOSTIC TOOLS AND PERIPHERALS

Refer to Section 5, Human Interface, for more information about the diagnostic tools available using the controller's Computer Swing Panel. Refer to the Computer Peripherals Manual, MCE part number 42-02-CP00, for more information about the diagnostic tools available using a CRT or PC.

1.5 GROUP SUPERVISOR (2 OR MORE CARS)

If this controller is part of an M3 Group System, refer to the M3 Group Supervisor Manual, MCE part number 42-02-G004, for more information about group operation.

SECTION 2
INSTALLATION

2.0 GENERAL INFORMATION

This section contains important instructions and recommendations pertaining to site selection, environmental considerations, wiring guidelines and other factors that will ensure a successful installation.

2.0.1 SITE SELECTION

In choosing a proper location for the control equipment, the factors listed below should be considered.

- Provide adequate working space for comfort and efficiency.
- Mount the controller in a logical location, taking into consideration the location of other equipment in the machine room and proper routing of electrical power and control wiring. Note that MCE controllers do not require rear access.
- Do not install equipment in a hazardous location.
- Provide space for future expansion, if possible.
- Install a telephone in the machine room. Remote diagnostics are available via the telephone which make start-up and adjustment assistance easier to obtain.
- If any areas in the machine room are subject to vibration, they should be avoided or reinforced to prevent equipment from being adversely affected.
- Provide adequate lighting for the control cabinets and machines. A good working space such as a workbench or table should also be provided.
- The location of the Drive Isolation Transformer is flexible, however, wiring is reduced if it is located near the controller.

2.0.2 ENVIRONMENTAL CONSIDERATIONS

The following are some important environmental considerations that will help to provide for the longevity of the elevator equipment and reduce maintenance requirements.

- The ambient temperature should not exceed 32° to 104° Fahrenheit (0° - 40° Celsius). Higher ambient temperatures are possible, but not recommended because it will shorten the life of the equipment. Adequate ventilation and possibly air conditioning may be required.
- The air in the machine room should be free of excessive dust, corrosive atmosphere or excessive moisture to avoid condensation. A NEMA 4 or NEMA 12 enclosure would help meet these requirements. If open windows exist in the machine room, it is preferable to place cabinets away from these windows so that severe weather does not damage the equipment.

- High levels of radio frequency (RF) radiation from nearby sources may cause interference to the computers and other parts of the control system. Using a hand-held communication device in close proximity to the computers may also cause interference.

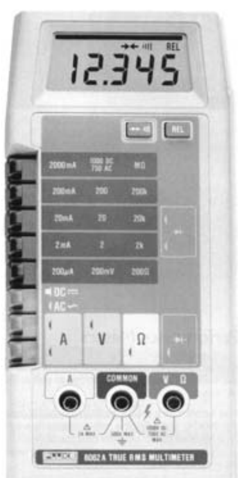
- Power line fluctuation should not be greater than ±10%.

2.0.3 RECOMMENDED TOOLS AND TEST EQUIPMENT

For proper installation, use the following tools and test equipment:

- A digital multimeter, Fluke series 75, 76, 77 or equivalent.
- An oscilloscope (preferably storage type) or a strip chart recorder.
- A hand-held tachometer.
- A clamp-on AC ammeter.
- A DC loop ammeter.
- Hand held radios.
- A telephone.
- Test weights.
- Assorted soldering tools, rosin flux solder, electronic side cutters and long nose pliers, a flashlight and the MCE screwdriver (provided with controller).

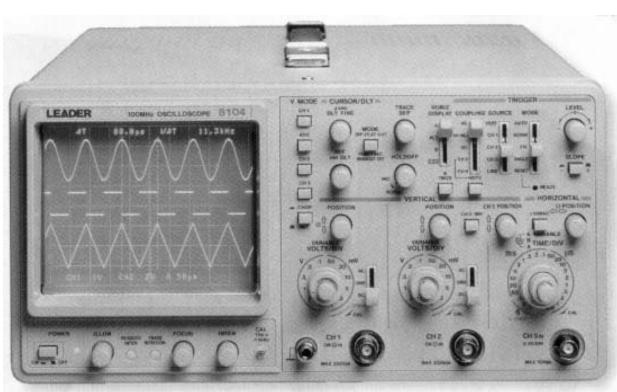
DIGITAL MULTIMETER



AMP-PROBE

MEGOHMETER

OSCILLOSCOPE

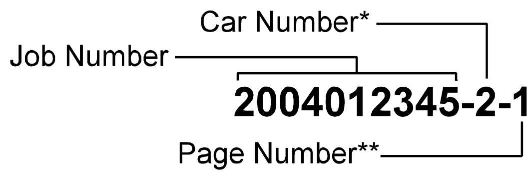


TELEPHONE

2.0.4 WIRING PRINTS

Become familiar with the following information as well as the wiring prints provided with this control system.

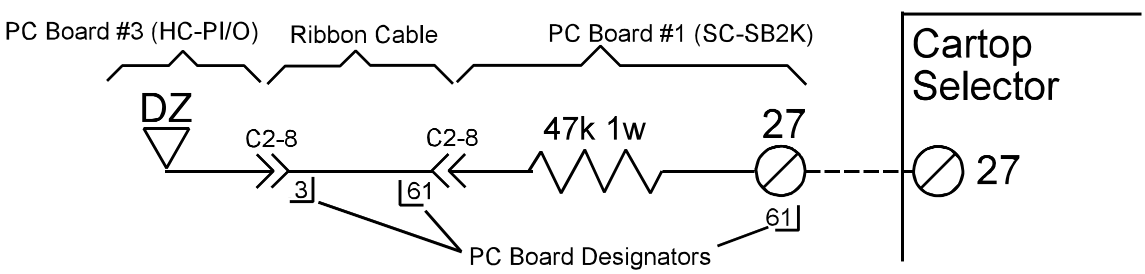
DRAWING NUMBER FORMAT - Each print has a drawing number indicated in the title block. The drawing number is comprised of the job number, car number and page number (see examples). In this manual the drawings will often be referred to by the last digit of the drawing number (page number). The following is the drawing number format currently in use.



* Car Number "G" = Group Controller
** Page Number "D" = Drive page
** an "X" after the page number = auxiliary page

> **NOTE:** DRAWING NAME - Some drawings have a drawing name directly above the title block or at the top of the drawing. The drawing name may be used to refer to a particular drawing.

NOMENCLATURE - The following is an example of the schematic symbols use to indicate that a signal either enters or exits a PC board.



A listing of PC boards and their designator numbers plus other schematic symbols used in the wiring prints can be found at the beginning of the Job Prints and in Appendix D of this manual.

- Become familiar with the "Elevator Car Wiring Print" drawing number -1.
- Become familiar with the "Elevator Hoistway Wiring Print" drawing number -2.
- The power connections are shown on drawing number -D.
- Group interconnects to individual car cabinets (two or more cars) are shown on the drawing titled "Group Interconnects to Individual Car Cabinets."
- Review any additional wiring diagrams and details as may be required.
- The remainder are detailed drawings of the VVMC-1000 SCR traction control system.
- A specific part of the schematic may be referred to by the *area number,* which will be found at the left-hand margin of the schematic.

2.1 CONTROLLER INSTALLATION

> **NOTE:** It is strongly recommended that you review the wiring guidelines in sections 2.1.1 and 2.2 before bringing wires into the controller.

Mount the controller(s) securely to the machine room floor and cut holes to permit bringing the wires into the cabinet as shown in Figure 2.2. There may be labels in the cabinet to help identify locations for wiring holes. Note that the standard MCE car control cabinet does not require rear access. Also, the doors are reversible and removable for ease of wiring.

> **CAUTION:** Do not allow any metal chips to fall into the electronics.
>
> Keep the covers on the SCR Drive while wiring to prevent damage to the components.

2.1.1 CONTROLLER WIRING GUIDELINES

> **CAUTION:** Power conductors from the fused disconnect, isolation transformer or other high voltage, high current conductors must be separated from the control wires. It is essential that the Encoder and Speed Sensor wires be placed in a separate conduit, away from high current conductors.

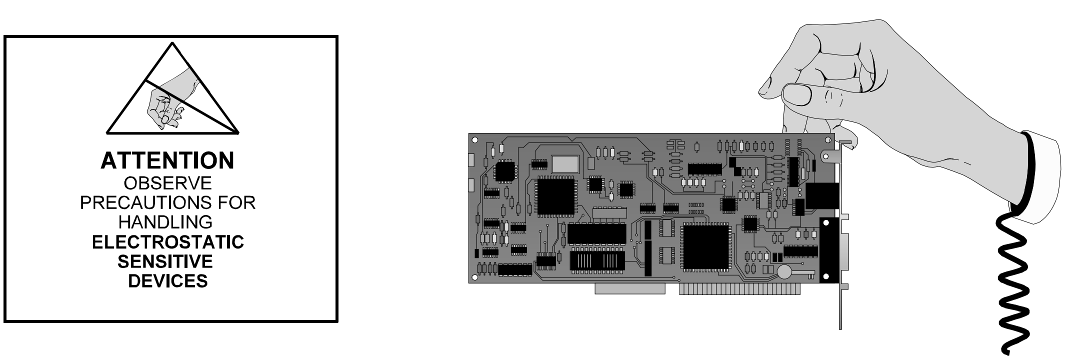
> **NOTE:** Pay very close attention to the hierarchy of the inspection inputs. In order to maintain safe operation of the lift while on access, car top or in car inspection, the inspection circuits must be wired as shown in the prints.

Figure 2.2 shows the recommended routing for the field wiring. Observe the following:

a. PC boards can be easily damaged by Electrostatic Discharge (ESD). Use a properly grounded wrist strap, as shown in Figure 2.1, when touching the PC boards.

FIGURE 2.1 ESD - Electrostatic Sensitivity of PCBs

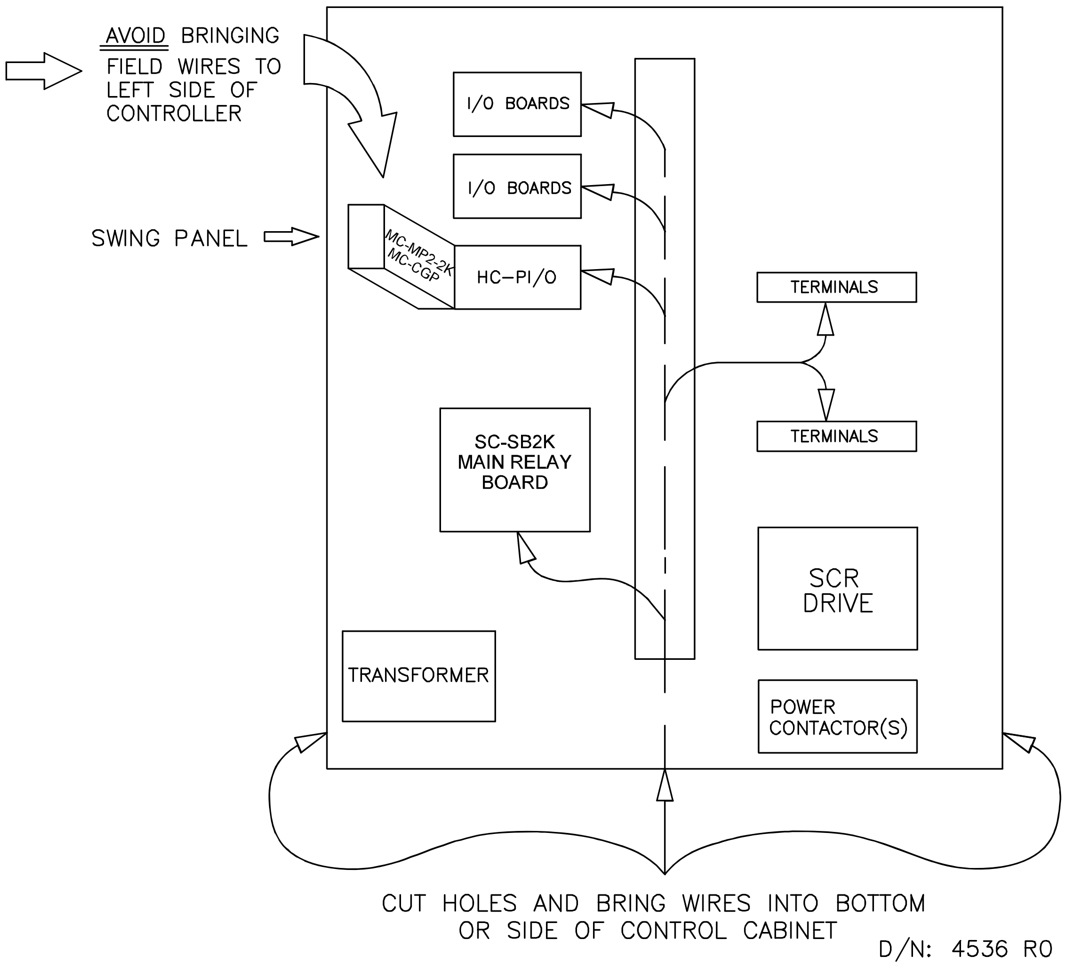
Do not touch PC Boards unless you are properly grounded.



b. Bring the wires in from a location that would allow use of the wiring duct inside the control cabinet. The terminals are located conveniently near wiring ducts.

c. When routing field wiring or power hookups, avoid the left side of the HC-CI/O-E and HC-PCI/O boards.

FIGURE 2.2 Field Wiring of Controller



- Call terminals are located on the HC-PCI/O board and, if more than four stops, on the HC-CI/O-E board.
- All position indicators, arrows and gong enable terminals are located on HC-PCI/O board and, if more than four stops, on the HC-CI/O-E board or, if a gong board is provided, position indicators are also provided on the gong board (HC-GB).
- Terminals 4-72 are located on the SC-SB2K Main Relay Board.
- Terminals for the door operator are on respective door boards or on separate terminal blocks.
- Several 1 and 2 bus terminals are provided in different locations.
- Other terminals may be supplied on separate terminal blocks.

d. When it is time to hook up the wires to the controller, proceed to interconnect wires according to the hoistway and car wiring prints.

e. If the car controller is part of a group system, a separate conduit or wiring trough must be provided for the high-speed serial link between the car controller cabinet and the Group Supervisor cabinet.

f. The main AC power supply wiring size must be determined by the electrical contractor. Proper motor branch circuit protection must be provided according to applicable electrical code by using a fused disconnect switch or a circuit breaker for each elevator. Each disconnect or breaker must be clearly labeled with the elevator number.

g. If the car is part of a group system, there are a number of details relating to the wiring of the interconnects between the individual cars. They are as follows:

- If a group controller cabinet is provided, refer to the drawing titled “Group Supervisor Field Wiring Print” in the job prints. Power for the M3 Group Supervisor cabinet comes from the local Car Controllers as shown in Controller drawing (-2). The main AC power supply wiring size must be determined by the electrical contractor.

WARNING: Connecting the Group Supervisor directly to the building AC supply may cause damage to PC boards. Also, **connecting out-of-phase power *will* cause damage**. Check the “phasing” of the individual car 2-bus lines before connecting them to the Group Supervisor. With a voltmeter set to AC Volts, measure between adjacent car 2-bus terminals. The meter must read less than 10 VAC. If the reading is higher, reverse the power leads going to the car's T1 transformer at L1 and L2, and measure again.

- A separate conduit or wiring trough must be provided for the high speed serial link from each car controller to the Group Supervisor cabinet. The wiring details for the high speed communication link are fully detailed in the print titled “Instructions for Connection of High Speed Communication Cables”. Follow these instructions exactly. Again, note the requirement for routing the high-speed interconnect cables through a separate conduit or wiring trough.

- If applicable, also wire according to the drawing titled “Group Interconnects to Individual Car Cabinets.” Make sure to ground all cabinets according to Section 2.2.1.

- The field wiring to the Group Supervisor cabinet is found in the drawing titled “Group Supervisor Field Wiring Print.”

2.2 GENERAL WIRING GUIDELINES

Basic wiring practices and grounding requirements are discussed in this section.

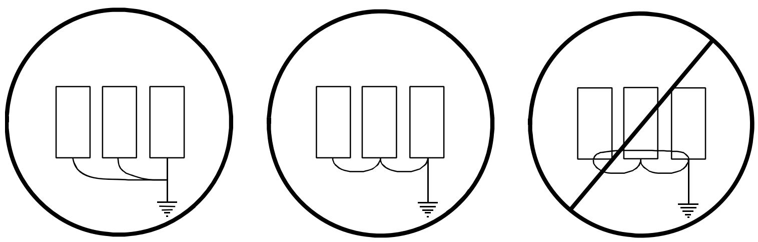
2.2.1 GROUND WIRING

To obtain proper grounding, quality wiring materials and methods should be used.

All grounding in the elevator system must conform to all applicable codes. Proper grounding is essential for system safety and helps to reduce noise-induced problems. The following are some grounding guidelines:

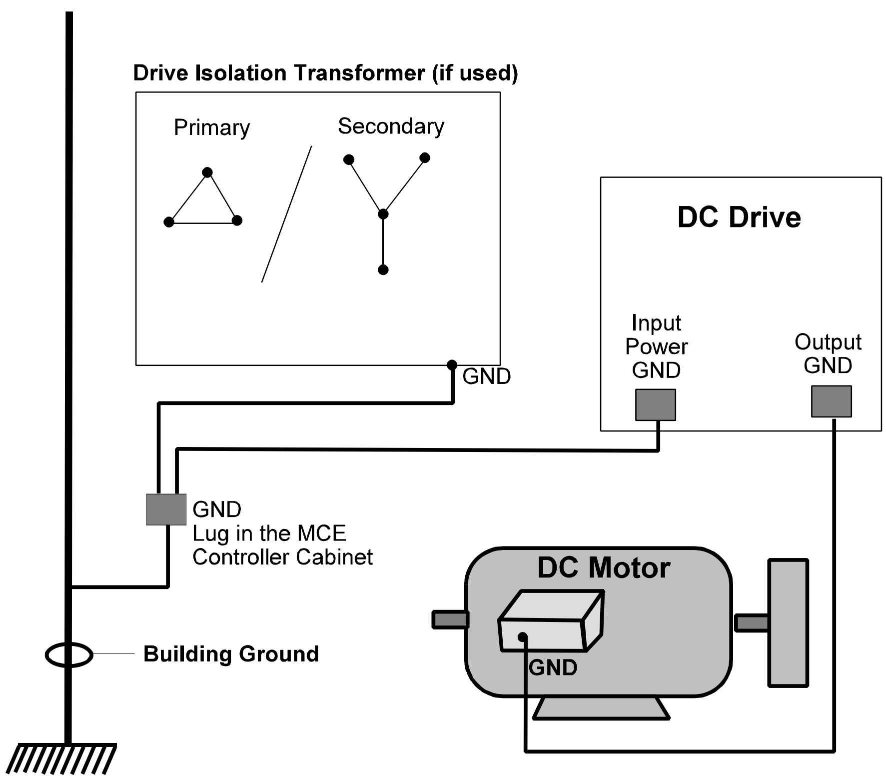
- The grounding wire to the equipment cabinet should be as large as, or larger than, the primary AC power feeders for the controller and should be as short as possible.
- The grounding between equipment cabinets may be branching or a daisy chain, but the wire must terminate at the last controller and NOT loop back (see Figure 2.3).
- Direct solid grounding must be provided in the machine room to properly ground the controller and the motor (see Figure 2.4). Indirect grounding, such as the building structure or a water pipe, may not provide proper grounding and could act as an antenna radiating RFI noise, thus, disturbing sensitive equipment in the building. Improper grounding may also render an RFI filter ineffective.
- The conduit containing the AC power feeders must not be used for grounding.

FIGURE 2.3 Ground Wiring to Controller Cabinets



(a) Acceptable *(b) Acceptable* *(c) Not Acceptable*

FIGURE 2.4 Ground Wiring to Drive and Motor



2.2.2 DC HOIST MOTOR, MOTOR FIELD AND BRAKE WIRING

a. If existing rotating equipment is being reused, it is strongly recommended to disconnect all of the wires from the terminals on the DC hoist motor armature, motor field and brake. This is to guarantee that the controller is dis-connected from the rotating equipment before the insulation test is performed.

Using a Megohmmeter, check for insulation breakdown between the frame of each piece of the motor and the armature, motor field and brake coil. A reading of 100K ohms or above is considered acceptable. Any insulation problems must be corrected before proceeding, as this may be an indication of a serious problem with the equipment.

> **NOTE:** Incoming power to the controller and outgoing power wires must be in their respective grounded conduit and must be separate from control wires both inside and outside the control enclosure. The Encoder and speed sensor wiring must use a separate grounded conduit.

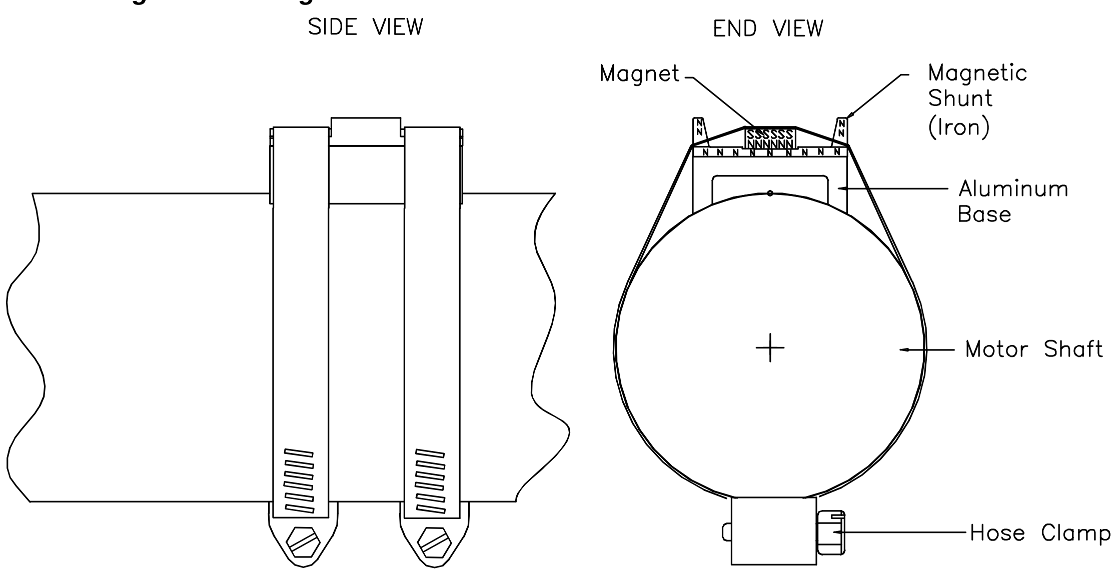
b The hoist motor shunt field and brake wiring must use #14 AWG wire (or larger) if current level requires it.

c. The motor wiring must be brought to terminal A1M and A2M in the control cabinet. For details of armature wiring, refer to drawing - D.

2.2.3 INSTALLING AND WIRING THE SPEED SENSOR

a. **Mounting the magnet** - The speed sensor detects a magnet that passes the face of the sensor. Mount the magnet on the motor shaft so that it passes the sensor once per revolution of the motor (see Figure 2.5).

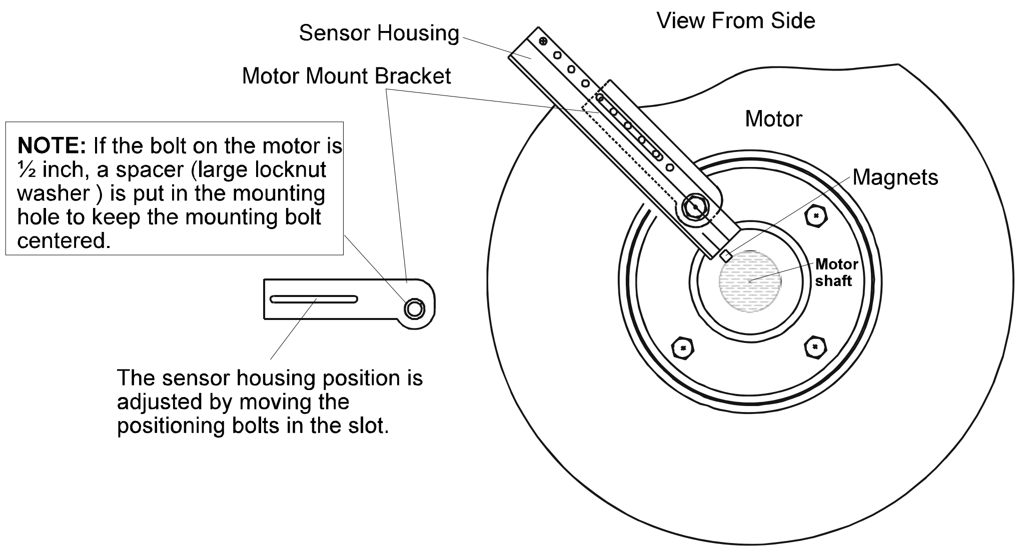
FIGURE 2.5 Magnet Mounting on the Motor Shaft



> **CAUTION:** ***Do not drill any holes in the motor shaft*** to mount the magnet. This will weaken the shaft.

b. **Mounting the speed sensor -** Mount the speed sensor as shown in Figures 2.6 and 2.7 using the hardware provided. Take care not to over-tighten the nuts on the sensor mounting apparatus. Position the face of the sensor so there is 1/16" to 1/8" (1.6 to 3.18 mm) clearance from the magnet.

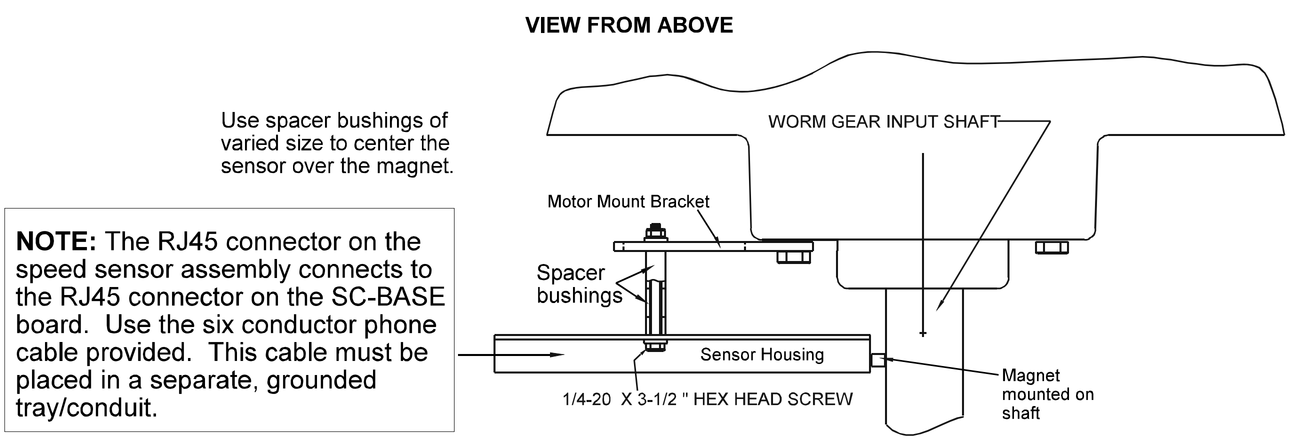
FIGURE 2.6 Speed Sensor Mounting Detail (side view)



NOTE: The speed sensor must be electrically isolated from the motor body. MCE has provided the required hardware to insulate the speed sensor from the motor body

CAUTION: Ensure that the speed sensor is perfectly perpendicular to and not more than 1/8" (3.18 mm) away from the magnet.

FIGURE 2.7 Speed Sensor Wiring Detail (view from above)



2.2.4 INSTALLING THE BRAKE SWITCH

> **NOTE:** All controllers have been set up with a BPS input that is fed directly by a Brake Contact or a Micro-switch. The purpose of this input is to monitor the brake status and not for the purpose of energy saving. This is an additional feature. It may enhance the reliability of the system. It prevents the operation of the elevator in the event that the brake fails to release in the intended manner. When this happens, the Brake Pick Failure message will scroll across the alphanumeric display.

A switch contact must be attached to the brake assembly if one does not already exist. This is needed for the brake monitor circuit that shuts down the car in the event of a brake failure. There are many types of switches that can be used and there is no way to anticipate all the methods of mounting them. Take all necessary precautions to not interfere with the normal brake design or operation. The contact must open when the brake is lifted and it should be rated for at least 1/4 amp 125VAC. There are many micro-switches suitable for this application.

2.2.5 INSTALLING AND WIRING THE ENCODER

a. The encoder must be mounted on the motor shaft and the encoder wiring should be completed according to the drawing. The purpose of the encoder is to determine the exact speed and position of the motor shaft. It is *very* important that the encoder does not slip, wobble, bounce, or vibrate due to a poor installation of the shaft extension, coupling, or encoder mounting. It is also important that the encoder housing be electrically insulated from the motor, machine or other grounds. An insulated encoder mount has been furnished with the BEI encoder. However, this type of mount may not be practical for your application. It is impossible to predict which type of mounting that will work best for all installations, therefore, the best method for mounting the encoder and coupling it to the motor can only be solved on the job site.

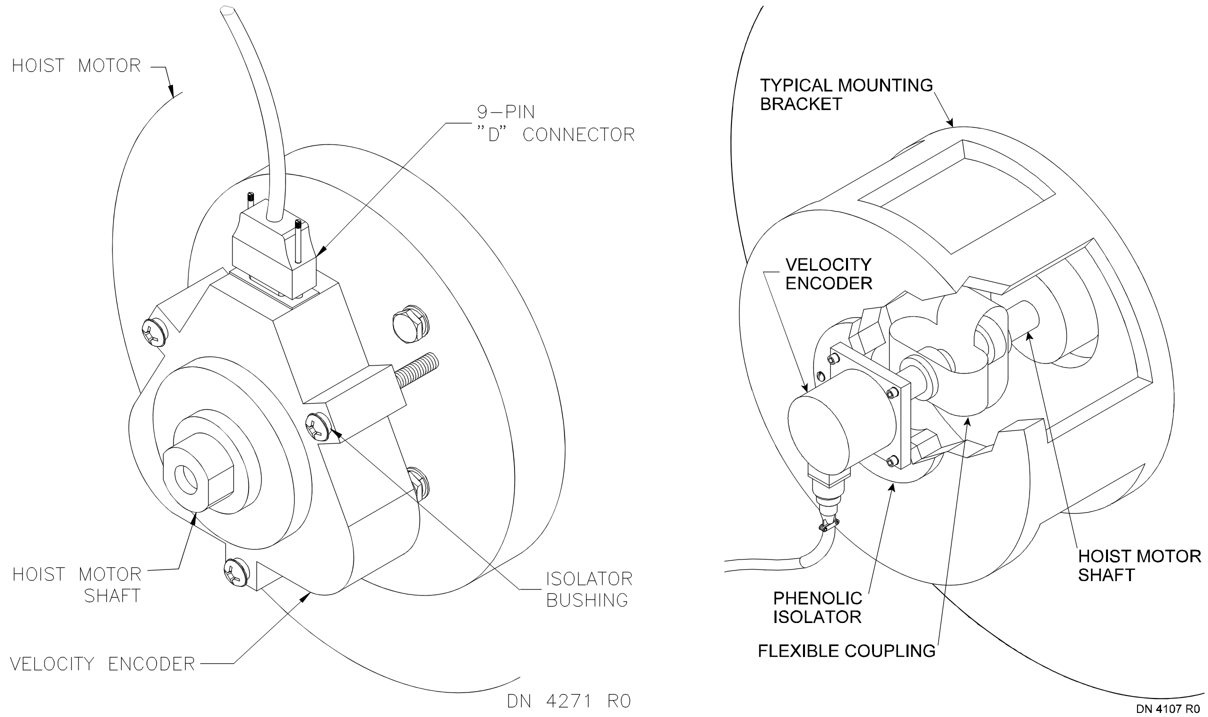
> **NOTE:** The Encoder wiring must use a separate grounded conduit. Make sure that the encoder housing is electrically isolated from the machine (ground). To check this, place one ohmmeter lead on the frame of the machine and one lead on the case of the encoder. The speed sensor wires can be routed with the encoder wires.

b. Connect the Encoder to the SCR Drive using the *shielded* cable provided (see drawing -D in the job prints). Run this cable to the controller in a *separate* conduit. Connect the cable to the Encoder using the connector provided. Connect the other end of the cable to the SCR Drive using the phoenix terminals provided. The cable shield will *not* be connected to any ground or case, but connected as shown on page -1-D of the job prints.

> **CAUTION:** Do not coil excess Encoder cable near high voltage components as noise may be induced. If necessary, shorten the cable at the Drive end. Do not cut and re-splice in the middle of the encoder cable or shorten at the Encoder end.

c. Do not mount the encoder or route the encoder wires close to a magnetized area (the armature, motor field or brake coil) as it may induce noise in the encoder signal output. This can cause the Drive to miscount and cause erratic speed control at lower speeds.

FIGURE 2.8 Typical Encoder Installations



2.3 HOISTWAY CONTROL EQUIPMENT INSTALLATION

This section covers the recommended procedures for installing the landing system, terminal slowdown switches, directional limit switches, hoistway access switches (if required), the hoistway access limit switch, and the emergency terminal slowdown switch.

2.3.1 INSTALLING THE LANDING SYSTEM - Refer to the installation drawings for the type of landing system provided.

2.3.2 INSTALLING THE HOISTWAY LIMIT SWITCHES

a. The terminal landing slowdown switches should be installed and adjusted to open approximately two inches beyond the point where a normal slowdown is initiated.

b. The direction limit switches should be installed and adjusted to open approximately one inch beyond the terminal landing.

c. The emergency terminal slowdown switch (if required) should open approximately 50% of the slowdown distance from the terminal. This switch should be installed and adjusted to achieve the required operation according to the applicable elevator code.

d. Make sure that the cam that operates the slowdown and limit switches maintains the terminal slowdown switch open until the direction limit switch and emergency terminal slowdown switches (if required) are open.

e. Make sure that the terminal slowdown, direction limit and emergency terminal slowdown switches are held open for the entire runby or overtravel of the elevator.

f. The hoistway access limit switch (if required) should be installed and adjusted to open and stop the elevator in the down direction when the top of the elevator is approximately level with the top landing (when the top hoistway access switch is activated while on Access or Inspection operation).

g. For faster geared elevators, the face of the cam operating the limit switches must be sufficiently gradual so that the impact of the switch rollers striking the cam is relatively silent.

2.3.3 INSTALLING THE LANDING SYSTEM CONTROL BOX (LS-QUTE-X-2K) - Refer to the drawings in the job prints.

- The location for the landing system box should have already been selected.

- Holes are available on both sides and on the bottom of the landing system box for mounting to any support brackets or structural channels. The mounting of the box should be very firm and solid so that knocking it out of alignment should be difficult. Use 1/4-20 hardware.

- To install the tape into the tape guides on the LS-QUTE-X-2K landing system box, remove the 2 thumbscrews on the 2 guide assemblies, insert the tape and reinstall the guides with the thumbscrews (tighten firmly). If the installation has the LS-QUTE-X-2K car top selector with the additional sensor bracket on the rear of the tape, first remove the three 8-32 screws holding the protective 1" wide channel. This channel covers the back of the Door Zone sensors on the upper tape guide bracket. Remove the single standoff that is in the way of the thumbscrew holding the tape guide. Remove the thumbscrews holding the upper and lower tape guides, insert the tape, and reinstall the guides with the thumbscrews (tighten firmly). Reinstall the standoff (do not over-tighten) and the protective channel.

- After inserting the steel tape into the tape guides, check the location of the landing system box. The car should be at the top of the hoistway to make it easier to see if the alignment is causing any stress or binding on the tape guides. Make sure that the box is *vertical* and plumb with the tape. This allows for easy tape movement and avoids excessive wear on the tape guides (using a level is helpful). *Be careful* so as to avoid premature failure of the tape guides.

- Move the elevator to the top and bottom of the hoistway to check for smooth tape movement and to make sure that there is no excessive pressure on the tape guides. Correct any problems immediately.

2.3.4 INSTALLING THE MAGNETIC STRIPS ON THE STEEL TAPE

a. Carefully, read and follow the Magnet Installation instructions in the job prints, but read the rest of these instructions before proceeding.

b. Before installing the magnets, clean the steel tape thoroughly with an appropriate solvent. No oil should be left on the tape as it will interfere with the adhesive backing on the magnets.

c. There are normally five lanes of magnets installed on the side of the tape facing the car. One lane consists of only the LU/DZ/LD and requires that a 6-inch magnet be installed at each floor. The other lanes have magnets which initiate slow downs.

d. If the installation has rear doors, it may have an LS-QUTE-X-2K landing system which has additional Door Zone sensors on the rear of the upper tape guide assembly. Follow the Magnet Installation instructions in the job prints and install the front and rear Door Zone magnets on the steel tape as shown.

2.3.5 DZX SWITCH

Depending on the type of landing system selector you have purchased we have installed a second door zone sensor called DZX. For the LS-STAN-X system a second vane switch is installed in the center door zone lane. On the LS-QUTE system a third door zone sensor is placed between the existing DZ sensors in the center lane. Since the DZX signal needs to be routed to the controller (SC-BASE board) you will need to connect DZX to your traveler.

2.3.6 TM SWITCH WIRING AND ADJUSTMENT (IF USED)

Refer to the drawing titled "Elevator Car Wiring Print" in the job prints for details on the wiring and setting of each contact in the TM switch. Carefully examine the functioning of this switch, especially if copper-to-carbon contacts are used. The current levels are quite low and may not be enough to burn the oxide off the contacts.

2.3.7 DOOR OPERATOR DIODE INSTALLATION (IF USED)

Certain door operators, such as G.A.L. models MOM or MOH, require the installation of diodes in the door operator on the car top. See the drawing titled "Elevator Car Wiring Print" in the job prints for any special instructions regarding these diodes.

2.3.8 DOOR POSITION MONITOR SWITCH (IF USED)

If you are in a jurisdiction where ASME A17.1 - 1996 or later is being enforced, Door Position Monitor switch(s) connected to the DPM and/or DPMR inputs, must be added to monitor the position of the closed doors. This must be a separate physical limit switch that makes up approximately 1 to 2 inches before the doors lock.

SECTION 3
START-UP

3.0 GENERAL INFORMATION

In this section, the car will be prepared for use by construction personnel so that they may complete the elevator installation. At this time the speed sensor must be properly installed as described in Section 2.2.3. This section will cover the sequence of applying power to the controller and associated components, DC hoist motor and brake, and completing the initial adjustment of the system to get basic car movement on Inspection operation.

3.1 GROUND CHECK

Conduct a ground test before powering up the system. Refer to Figure 1.1 and Figures 2.3 and 2.4 to help locate items as they are referred to in the ground check.

NOTE: A short to ground is defined as having a resistance of less than 20 ohms between the 1-bus (common) and the terminal being checked.

a. Remove fuse F4 in the individual car controller cabinet. If this is a group system, consult the schematics and remove the fuse that powers terminal 2H (and 2F, if present).

b. Check for shorts to ground on all terminals on the bottom of the SC-SB2K Main Relay board. The only terminals that should be grounded are terminals 1 and 89.

c. Check for shorts to ground on all terminals on the HC-PI/O and HC-CI/O-E boards.

d. Check for shorts to ground on terminals F1, F2, A1, A2, and D5. If a G.A.L. MOD door operator is provided, remove door fuses F7 and F8. For other door operators, consult the prints as to which fuses to remove, then check the appropriate terminals for shorts to ground.

e. Check for shorts to ground on terminals L1P, L2P, L3P, A1M, A2M, MF1, MF2, B1 and B2.

NOTE: If existing rotating equipment is being reused, it is strongly recommended to disconnect all of the wires from the terminals on the DC hoist motor armature, motor field and brake. This is to guarantee that the controller is dis-connected from the rotating equipment before the insulation test is performed.

Using a Megohmmeter, check for insulation breakdown between the frame of each piece of the motor and the armature, motor field and brake coil. A reading of 100K ohms or above is considered acceptable. Any insulation problems must be corrected before proceeding, as this may be an indication of a serious problem with the equipment.

3.2 BEFORE APPLYING POWER

In the following instructions it is assumed that the sling is suspended from the hoist ropes, all hoistway doors are closed (but not necessarily locked), and all hoistway and machine room wiring is complete. The car safety *must* be adjusted to the manufacturer's specifications and the governor installed and roped. Test the safety by hand to make sure that it will hold the car. Correct any malfunction before proceeding further.

> **WARNING:** These instructions assume the elevator mechanic has adequate electrical troubleshooting experience. Follow the procedures carefully and if the elevator does not respond correctly, check the circuits and use the troubleshooting section in this manual (Section 6). Proceed cautiously. To become familiar with the procedure, read these instructions all the way through before starting the work.

Before applying power to the controller, perform the following:

a. Physically check all of the power resistors and any other components located in the resistor enclosure and inside the controller. Any components loosened during shipment may cause damage.

b. Remove one side of the ribbon cable connecting the SC-SB2K board to the HC-PI/O board at connector C1 by pushing open the two latches.

c. Unplug the screw terminal blocks from the HC-PI/O and any HC-CI/O-E, HC-IOX or HC-I4O boards by moving the blocks to the right. This is done to avoid damaging the boards by accidentally shorting one of the output devices to one of the power buses (terminals 2, 3, or 4) during the initial power-up of the system.

MCE's VVMC-1000- SCR controller is designed to be able to operate on Inspection and Access without the computers hooked up during start-up.

At this point, it is strongly recommended to read the manual for the SCR Drive Unit. The MCE installation manual contains information from the SCR drive manual, but has been supplemented with additional information to clarify the installation and adjustment process. Therefore this manual should be used for installation and adjustments of the complete elevator control system. The original SCR Drive manual may be referenced, if necessary.

3.3 APPLYING POWER - PREPARING TO MOVE THE CAR ON INSPECTION

3.3.1 INITIAL ADJUSTMENTS AND SAFETY CONSIDERATIONS

WARNING: This equipment contains rotating parts on motors and machines and voltages that may be as high as 600V. High voltage and moving parts can cause serious or fatal injury. Only qualified personnel familiar with this manual and machinery should attempt to start-up or trouble-shoot this equipment. Observe these precautions:

a. USE EXTREME CAUTION: DO NOT TOUCH any circuit board, the SCR Drive, or a motor electrical connection without making sure that the unit is properly grounded and that no high voltage is present. DO NOT apply AC power before grounding per instructions herein.

b. Improper control operation may cause violent motion of the motor shaft and driven equipment. Be certain that unexpected motor shaft movement will not cause injury to personnel or damage to equipment. Peak torques of several times rated motor torque can occur during a control failure.

c. Motor Armature and Field circuits may have high voltage present whenever AC power is applied, even when the motor is not rotating.

d. Make sure to use SHIELDED CABLE for the speed sensor, and wire it exactly as shown. Make sure to ground the controller cabinet according to local code.

CAUTION: Do not open the hinge cover or the drive top cover when the power is ON. Turn OFF the main power before opening the drive covers. You may damage the top cover if it is not removed carefully . If top cover needs to be removed, first remove the small cover at the bottom front portion of the drive that covers logic terminals. Remove the two screws at the bottom front and gently pull (1/4th of an inch outward) and then push the cover in the UP Direction.

This control system uses an SCR drive to run the DC elevator motor. The SCR Drive supplies power to the motor armature and the motor field to run the DC elevator motor. Simplified instructions for getting the elevator moving are provided in this section. This assumes the SCR Drive has been set up at the factory to provide a satisfactory match to the motor characteristics.

3.3.2 VERIFYING THE MOTOR FIELD CONNECTION AND DIP SWITCH SETTING

1. Refer to the controller drawings and note the Motor Field voltage and resistance values.

2. Measure the motor field resistance. It should match the value on the drawings, assuming that correct motor field information was provided to MCE during the job survey.

3. Calculate the Motor Field current as follows:

   - Motor field current = Motor field voltage / Motor field resistance.

4. The DSD412 SCR Drive has a built in 0.2A - 40.0A motor field. Terminals MF1 and MF2 in the controller are provided for the motor field connections. Based upon the required current value, refer to Table 3.1 and verify that terminal **MF1** is connected to the proper **F1** drive terminal (1.9A or 6.9A or 16A or 40A) on connector TB4. Terminal **MF2** is always connected to drive terminal **F2-** on connector TB4.

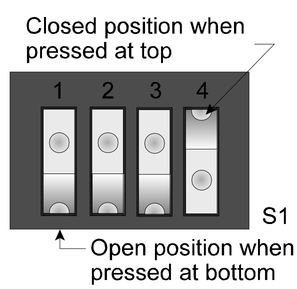
5. Refer to Table 3.1 and, based on the TB4 - F1 drive terminal connection, verify the **S1 Switch** settings in the DSD412 drive. The dip switches and a selection table are located on the motor field board which is close to the bottom of the DSD412 drive.

CAUTION:	Incorrect motor field connection and S1 switch settings may cause damage to the drive and/or equipment.

TABLE 3.1 DSD412 Wiring and Rocker Switch Settings

DSD412 Wiring and S1 Rocker Switch Settings ✳

Rated Motor Field Current Range	TB4 (MF1/F1) Connection	S1 Setting ✳✳			
		1	2	3	4
16.1 - 40.0	40A	Closed	Open	Open	Open
7.0 - 16.0	16A	Open	Closed	Open	Open
2.0 - 6.9	6.9A	Open	Open	Closed	Open
0.2 - 1.9	1.9A	Open	Open	Open	Closed



✳ ***Failure to follow this table may cause damage to the drive and/or equipment.***
✳✳ ***Press the bottom of the switch to open. Press the top of the switch to close.***

3.3.3 INITIAL POWER UP

a. On the SC-SB2K board, place the MACHINE ROOM INSPECTION TRANSFER switch in the INSP position and the TEST/NORMAL switch in the TEST position.

b. Verify that fuse F4 is removed to disable the primary controller relay voltage.

c. Check the line side of the main power disconnect switch to make sure that all three legs are at the correct voltage.

d. Turn ON the main power disconnect switch and verify that the proper voltages are at the power terminals L1P, L2P and L3P on the controller.

> **NOTE:** 1. Check for the proper voltage on the primary of the Drive Isolation Transformer (H1, H2 and H3 terminals) and on the secondary feeding AC power to the SCR drive (L1S, L2S and L3S in the controller).
>
> 2. Make sure that the voltage on L1, L2 and L3 on the SCR drive is correct according to the job prints. The Drive Isolation Transformer may have a specific voltage to be used in this installation.

e. The SCR Drive Unit provided with this controller should not display any fault. If a fault is indicated, refer to the SCR Drive Manual. The Drive Faults section of the Drive Manual provides a list of faults and recommended corrective action.

f. Turn OFF the power and install fuse F4. If door fuses are provided, DO NOT install them at this time.

g. Before moving the car, check for obstructions or hazards. Take whatever steps are necessary to make sure that there is sufficient brake tension to stop the car during any situation that may be encountered.

h. Check the pit switch, buffer switches (if present), car and cartop stop switches and any other safety switches to make sure that they are ON.

i. If a field wire is connected to terminal ACCN on the SC-SB2K board, temporarily remove the wire, label and insulate it. This will disable the Cartop Inspection switch. Close the car door. Leave the hall doors closed, and lock the doors that are accessible to the public.

j. Install a temporary jumper between terminals 18 and ACCN on the SC-SB2K board. Turn ON the power and verify that relay IN is picked, thereby placing the car on Inspection operation. If the IN relay is not picked check the connections in the Safety String.

k. Install a temporary jumper from 2 bus to terminal 38 on the SC-SB2K board and from 2 bus to panel mount terminal EPI (if present).

3.3.4 DRIVE INTERFACE BOARD DETAILS

The HC-ACI-D board is the interface between the SC-SB2K Main Relay board and the SCR Drive Unit. It performs a variety of functions including providing speed inputs and performing certain elevator code requirements such as Inspection/Leveling Overspeed detection as well as motor and brake contactor monitoring. Other functions include an independent motor speed monitoring circuit plus brake and speed signal coordination, see Figure 1.13, HC-ACI-D (SCR Drive Interface Board).

HC-ACI-D BOARD DETAILS

- **Trimpots:**

SPD - Speed Pick Delay. This trimpot controls the delay of the application of the Speed Command Signal any where from .002 seconds to .450 seconds. Clockwise (CW) rotation of the trimpot increases the time. This allows proper coordination of the acceleration of the car with the picking of the brake for minimum rollback and to prevent acceleration before the brake picks.

BDD - Brake Drop Delay. Dropping the brake at the end of the run is delayed for a short time to allow the operation of the electric stop feature. This delay is adjustable from a minimum of 0.1 second fully CCW to 0.7 second fully CW.

ILO - Inspection Leveling Overspeed. The ILO trimpot on the HC-ACI board is not used. Set the ILO trimpot (on HC-ACI) fully CCW. On ASME A17.1 - 2000 compliant controllers, the ILO trimpot on the SC-BASE or SC-BASER board is used to set the Inspection Leveling Overspeed threshold.

- **Indicator:**

  ILO - Inspection Leveling Overspeed indicator. With the ILO trimpot set fully CCW this indicator should never come

- **Push Buttons:**

  FAULT RESET - If the ILO indicator is ON, this push button turns the fault indicator OFF and drops out the FLT relay.

  DRIVE RESET - This push button, provided for convenience, resets many SCR drive faults. Drive faults are displayed on the drive keypad and can also be reset by pressing the drive reset button on the drive keypad. Some faults, which cannot be reset in this manner, require the power to be cycled OFF and then ON again.

HC-ACIF BOARD DETAILS - This board is only used for jobs with intermediate speeds.

- **Trimpots:**

  ETS - Emergency Terminal Limit Speed adjust. The ETS trimpot on the HC-ACIF board is not used. Set the ETS trimpot (on HC-ACIF) fully CW. On ASME A17.1-2000 compliant controller, the ETS trimpot on the SC-BASE or SC-BASER board is used to set the Emergency Terminal limit Speed threshold.

- **Indicators:**

  ETS FAULT - Emergency Terminal limit overspeed fault. With the ETS trimpot set fully CCW this indicator should never come

  AS FAULT - At Speed Fault indicator. This indicator will turn ON if the elevator's speed exceeds the maximum or minimum limits set for contract speed.

  DBF FAULT - Not applicable to the SCR drive.

- **Push Buttons:**

  ETS RESET - This switch resets the Emergency Terminal Switch (ETS) Fault.

  AS/DBF RESET - This switch resets the At Speed Fault.

ADDITIONAL RELAYS AND DRIVE INTERFACE -External relays, HC-ACI-D & HC-ACIF are used for the drive interface. The following is an explanation of the key interface connections between the MCE controller and the DSD412 drive.

TB1-9 (Field Enable) - Activated to bring the motor field to forcing value.

TB1- 51 (Ramp rate select) - When active, selects the 2nd ACC/DCC rate.

TB1-8 (Run UP) - When active, selects the up direction.

TB1-50 (Run Down) - When active, selects the down direction.

TB1-7 (Loop contactor) - When active, confirms that the main contactor is ON.

TB1-49 (Reset) - When active, resets the drive faults.

TB1-11, 12, 53 (High speed) - All three inputs are activated to select the High speed.

TB1- 12, 53 (Intermediate speed) - These two inputs are activated to select the One Floor speed.

TB1-12 (Level speed) - This input is activated to select the Level speed.

TB1- 54 (Inspection / Correction speed) - This input is activated to select Inspection / Correction speed.

TB1- 41, 42 (Drive fault contacts) - Normally closed, opens if there is a fault.

TB1- 78 (Speed Deviation) - This output is normally ON. It turns OFF if the drive detects an error between the commanded speed and the speed feedback.

TABLE 3.2 Speed Selection Table

Bit S0 Terminal 11	Bit S1 Terminal 53	Bit S2 Terminal 12	Bit S3 Terminal 54	Drive Parameter	Speed
1	1	1	0	156 - Preset Speed #7	H Speed
0	1	1	0	155 - Preset Speed #6	Intermediate Speed
0	0	1	0	153 - Preset Speed #4	Level Speed
0	0	0	1	157 - Preset Speed #8	Inspection/ Correction Speed
0	0	0	0	0	Zero Speed

3.3.5 DRIVE PARAMETER SETTINGS

Each controller is shipped with completed parameter sheets. Appendix C has a form which can be used to record changes and final parameter settings. All of the field adjustable parameters have been entered into the drive unit based upon the provided field information. However, **it is essential to verify all the drive parameter settings before start up.**

NOTE: The drive has custom MCE software. Therefore some of the parameters on the parameter sheet shipped with the controller are different from those shown in the drive manual. If a drive is replaced in the field, all of the drive parameters should be entered manually and should be verified according to the parameter sheet shipped with the controller.

Refer to the instruction manual for the SCR drive unit which is provided along with this manual. Specifically, refer to the section on the Digital Operator (drive keypad) to learn how to display the output current and output voltage. Also, learn how to display and set the parameter constants. Pages D and DX of the job prints show the drive interface and which external functions are being used.

3.3.6 VERIFYING THE CRITICAL SCR DRIVE PARAMETERS

Table 3.3 lists the critical drive parameters which must be verified before start up. A complete listing of drive parameters can be found in Appendix C.

WARNING: ***Do not change drive parameters when the elevator is running. The parameters in Table 3.3 are very critical DSD 412 SCR Drive parameters. Incorrect values for these parameters can cause erratic elevator operation.***

TABLE 3.3 Critical DSD 412 SCR Drive Parameters

CRITICAL SCR DRIVE PARAMETERS						
Parameter Number/ Drive Keypad Display	**Remote Digital Operator Display**	**Parameter Description**	**Units**	**Setting Range**	**Drive Default**	**Field/MCE settings**
3	Rated ARM I	Motor name plate current	A	0-1250	50	✳
7	Rated ARM V	Motor name plate voltage	V	150-550	240	✳
9	Nom AC Voltage	AC voltage applied to the drive	V	150-525	230	✳
10	Encoder Pulses/Rev	Encoder pulses per revolution per encoder name plate	P/R	600-19999	4096	✳✳✳ 4096
11	Motor RPM	Motor name plate RPM	RPM	0-2000	1150	✳
17	Rated FT/MIN	Rated car speed in FPM	FPM	5-2000	400	✳
40	Response	Speed regulator response	RAD	1-15	6.0	✳
41	System Inertia	System inertia	SEC	0.1- 9.99	2.0	✳
50	Rated Field Current	Rated motor field current per motor name plate	AMP	0.2-48	6.0	✳
52	Rated Field Voltage	Rated motor field voltage	V	50-525	240	✳
153	Preset speed #4	Leveling speed	FPM	0-(16%)**	0	4
155	Preset speed #6	Intermediate speed	FPM	0-(91%)**	0	✳
156	Preset speed #7	High speed	FPM	0-(100)**	0	✳
157	Preset speed #8	Inspection/correction speed	FPM	0-(66%)**	0	30
170	ACC Rate #1 Not used	S curve #1 total time in acceleration	SEC	0.0-25.0	5.0	Must be set equal to 171
171	ACC Rate #2	S curve #2 total time in acceleration	SEC	0.0-25.0	5.0	2.0 - 3.0

TABLE 3.3 Critical DSD 412 SCR Drive Parameters

CRITICAL SCR DRIVE PARAMETERS						
Parameter Number/ Drive Keypad Display	**Remote Digital Operator Display**	**Parameter Description**	**Units**	**Setting Range**	**Drive Default**	**Field/MCE settings**
172	DEC Rate #1	S curve #1 total time in deceleration	SEC	0.0-25.0	5.0	2.0 - 3.0
173	DEC Rate #2	S curve #2 total time in deceleration	SEC	0.0-25.0	5.0	2.0 - 3.0
174	ACC J% #1 Not used	S curve #1 acceleration jerk (% of ACC Rate #1)	%	0%-100%	25	Must be set equal to 175
175	ACC J% #2	S curve #2 acceleration jerk (% of ACC Rate #2)	%	0%-100%	25	0 - 25 ________
176	DEC J% #1	S curve #1 deceleration jerk (% of DEC Rate #2)	%	0%-100%	25	0 - 25 ________
177	DEC J% #2	S curve #2 deceleration jerk (% of DEC Rate #2)	%	0%-100%	25	0 - 25 ________

✳ **These parameters are specific to each controller. Verify the factory settings per the parameter sheet shipped with this controller.**

✳✳ **The actual speed value is entered in FPM. However, the speed range maximum value is described as a percentage of contract speed. Speeds in excess of the defined maximum will cause the drive to generate fault #450.**

✳✳✳ **Encoder RPM (P10) must be set correctly. Incorrect value of this parameter will cause under or over speed condition.**

NOTE: The drive parameters must be saved once they are updated, otherwise they will be lost when the drive power is cycled. Follow these steps to transfer (save) the ACTIVE parameters to NV RAM (non-volatile RAM) once the required parameters have been adjusted.

1. Turn the NV RAM switch, located on the top right side of the drive unit, to the UP position. The red LED on the drive key pad marked (NV RAM NOT PROTECTED) should turn ON. If the NV RAM switch is in the down position, “Prot” will be displayed on the drive key pad and drive will not save the parameters.

2. Access parameter #994 and press Data Function. Use Up arrow to display SAVE, then press Enter. The key pad will display 994. Turn the NV RAM switch to the DOWN position. The red LED (NV RAM NOT PROTECTED) should turn OFF.

The updated parameters are now saved in NV RAM in the drive.

3.4 MOVING THE CAR ON INSPECTION OPERATION

NOTE: Before initial inspection run, verify the following trimpot settings:
- COS trimpot on the SC-BASE or SC-BASER board fully CW
- ETS trimpot on the SC-BASE or SC-BASER board fully CW
- ILO trimpot on the SC-BASE or SC-BASER board fully CW
- ILO trimpot on the HC-ACI board fully CCW
- ETS trimpot on the HC-ACI board fully CW

NOTE: This installation is configured with an emergency brake (EB). The EB will apply when the car is away from door zone and both the doors are open. For access operation, move the lift to the desired location and then close and lock the car gate. Relay CD should pick and this will keep the emergency brake from applying while the car is away from DZ. If the car gate is left open, the emergency brake will apply every time direction is dropped while on access operation. This will result in a slight delay, before the car is allowed to move, every time direction is picked.

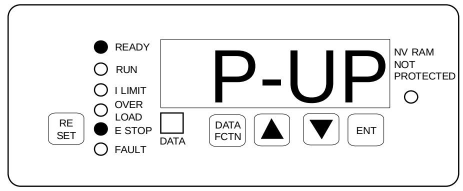
WARNING: The motor circuit may have high voltage present whenever AC power is applied to the controller, even when the motor is not rotating. After removing the AC power, wait for a few minutes before opening the drive cover. Use extreme caution. Do not touch any circuit board, power device or electrical connection without ensuring that high voltage is not present.

We must bypass the A17.1 - 2000 faults as these have yet to be adjusted. Place a jumper between the single pin terminals labeled 2KBP1 and 2KBP2 on the SC-BASE board. Also, invoke the software bypass by entering system mode. Once in system mode place the F6 function switch in the UP position (ON) and set software option ABYP=ON (see section 5.3.2). Now we have two hours to run the car without worrying about nuisance shutdown due to the as yet unadjusted fault monitors. Once two hours have expired simply toggle the MACHINE ROOM INSPECTION TRANSFER switch from NORM to INSP and back to NORM to get two more hours of run time. Note that when the system is on inspection operation, with the switches set as described above, there is no time limit to running the car with the bypass function invoked. Please exercise extreme caution when the fault monitors are bypassed.

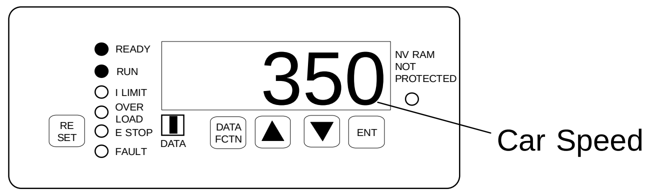
Once all the steps described in the Sections 3.3.1, 3.3.2, 3.3.4 and 3.3.5 are accomplished, then proceed with the following.

a. Verify that the MACHINE ROOM INSPECTION TRANSFER switch on the SC-SB2K board is in the INSP position. Turn ON the main disconnect. There should not be any fault message on the drive key pad display. If there is a drive fault message, refer to the fault section in the SCR drive manual. Upon power up, if the drive key pad displays ***Prot***, place the NV RAM PROTECTION switch to the UP position, press the drive reset button. After the reset is accomplished place the NV RAM PROTECTION switch in the DOWN position. The red LED on the drive key pad marked (NV RAM NOT PROTECTED) should turn OFF.

On power up the Drive Keypad should display :



Press the UP arrow to select P 600 or P 602 and press DATA FNC to display the Car speed or Speed reference respectively.



If a fault is present, refer to the troubleshooting section in the DSD412 SCR drive manual.

b. The IN relay should pick when the MACHINE ROOM INSPECTION TRANSFER switch is on INSP. After a few seconds the SAFR1 relay should turn ON (the LED on the relay will be lighted). If none of the relays are picked, inspect fuse F4 in the controller. Verify that there is 120 VAC between panel mount terminals 1 and 2.

If no problems are found, then briefly place a jumper between panel mount terminal 2 and terminal 20 on the SC-SB2K board and confirm that the SAFR1 relay turns ON after four seconds. If the SAFR1 relay turns OFF after removing the jumper, there is a problem with the safety circuit.

Relays RDY and CNP on the HC-ACI-D must turn ON. Note that the RDY relay will turn ON if there is no fault on the SCR drive and there is +/-15DVC present on the HC-ACI-D board. The N.O. fault contact in the SCR drive (TB1- 41& TB1- 42) is used to pick the RDY relay. This contact opens if there is a fault in the SCR drive. The fault can be reset by pressing the drive reset button on the HC-ACI-D board or by pressing the drive reset button on the drive keypad.

c. Verify that the encoder has been installed as described in Section 2.2.5 and the connections have been completed according to the job prints. For geared applications the encoder must be mounted on the motor shaft. Use MCE drawings to complete the encoder connections.

d. With the SCR drive powered up, verify that there is standing Motor Field voltage present between terminals MF1 and MF2 in the controller. A fault 905 (Field Loss Fault), can occur if the average field current feed back drops below the feed back settings. If the SCR drive trips on a fault 905, verify the following:

- Input AC voltage to the motor field terminals AC1 & AC2 on connector TB1 located on the motor field board (bottom of the drive).
- Refer to section 3.3.2 to verify the motor field connections and dip switch settings.
- The field feed back current setting is programed by parameters and depends on the condition of the drive. Higher or incorrect values of the following parameters may cause the 905 fault.

Parameter 53 - Standing field current mode (may be the cause).
Parameter 50 - Full field current mode (Accel/Decel)
Parameter 49 - Field weakening mode (High speed)

e. Verify that the speed commands, acceleration, deceleration and S curves parameters are set correctly. Appendix C contains a complete listing of the DSD412 SCR Drive Parameters. A completed parameter sheet with specific controller settings as programmed by MCE is shipped with each controller.

f. Connect a jumper wire between terminals 4 and 9 on the SC-SB2K board ***to override the gate switch and the door locks***. If the car is on a final limit switch, place a jumper between panel mount terminals 2 and 16. ***This bypasses the main safety circuit. Remove these jumpers as soon as possible, for safety reasons***.

g. Run the car by toggling the UP/DN toggle switch on the SC-SB2K board in the desired direction using constant pressure. When the UP/DN switch is in the UP position, relay U (SC-SB2K) and UA (HC-ACI-D), UAX, UAXD should pick. When the UP/DN switch is in the DN position, relay D (SC-SB2K) and DA (HC-ACI-D), DAX, DAXD should pick. The speed reference (Parameter 602) on the drive key pad should display the correct Inspection speed.

The M, BK and SAFR2 contactors should pick and the car should move. Make sure that the car moves in the appropriate direction and the brake works properly.

- If the car moves in the correct direction and speed, go to step 'i', Self Tune Test 1.
- If the car moves in the opposite direction, reverse the motor field connections.
- If the car does not move and the drive trips on **Fault 98**(Tach Loss Fault), verify the encoder connections.
- If the drive trips on **Fault 99**(Reverse Tach), the encoder connections are reversed. Switch A+ with B+ and A - with B -.
- **If the car does not move on Inspection, refer to Section 6.5 for more details.**

h. The Inspection Speed *(Preset speed #8)* is set by Parameter *157*. Verify that Parameter 602 displays the correct commanded speed and Parameter 600 displays the correct car speed when the car moves on Inspection operation.

i. **SELF TUNE TEST 1** (Parameter 997) - In the self tune test, the drive measures the total motor armature resistance, inductance, field L/R time. These values are used in conjunction with parameter *#8 - Crossover Frequency* to calculate the current and proportional gain of the speed regulator. Be sure to save the parameters and update the parameter sheet after completing the self tune.

1. Turn OFF the power. Remove fuses FB1 and FB2 and disconnect the brake coil wires connected to terminals B1 and B2 to prevent the brake from picking during this test.

2. Place a jumper across contact #3 (N.O.) of relay LPRM. This contact is in series with TB1-7 (loop contactor) circuit.

3. Place a jumper across contact #4 (N.O.) of relay MX.

4. Connect a jumper between terminal 2 and the right side of the MP1 coil **or** terminal 2 and PM on the HC-ACI-D Board**.** This will allow the SCR drive to pick the M

contactor during the self tune test. Disconnect and insulate the wire from the drive terminal TB1-9. This will prevent **Fault 403** during Auto Tuning.

5. Verify that the car is on Inspection. Turn ON the power. If a Fault 405 (Safety Circuit Fault) is displayed on the drive keypad it can be ignored.
6. On the SC-BASE board, install a jumper between pins 2KBYP1 and 2KBYP2. Also, enter System Mode, place the F6 function switch in the UP position (ON) and set software option ABYP=ON (see section 5.3.2) to bypass ASME A17.1-2000 faults.
7. Refer to Section 3.8 in the SCR drive manual and carefully follow the instructions to perform the SELF TUNE test (Function #997) *or follow the steps described below:*
   (a) Select Parameter 997. Press the DATA/FCTN key.
   (b) If the drive keypad displays PROT, turn the Protection switch to the UP position. This switch is located on the top right side of the drive cover. Then press the DATA/FCTN key.
   (c) ENTER will be displayed. Press the ENTER key.
   (d) The Drive will pick the M contactor and conduct the test. After the test is completed, PASS will be displayed on the drive keypad.
8. After completing Self Tune Test 1, record the values of the following:
   - Parameter 613 - Measured Motor Field Resistance
   - Parameter 614 - Measured Motor Inductance
   - Parameter 615 - Measured Field L/R Time Constant
9. SELF Tune Test 2 (Parameter 998) - This test verifies the SCR drive internal operation and armature feedback circuits. Refer to Section 3.9 in the SCR drive manual to perform the Power Unit Diagnostic (Function #998) or follow the steps described below:
   (a) Select Parameter 998. Press the DATA/FCTN key.
   (b) If the drive keypad displays PROT, turn the Protection switch to the UP position. This switch is located on the top right side of the drive cover. Then press the DATA/FCTN key.
   (c) ENTER will be displayed. Press the ENTER key.
   (d) The Drive will pick the M contactor and conduct the test. After the test is completed, PASS will be displayed on the drive keypad.
10. After completing Self Tune tests, ***MCE strongly recommends setting Parameter 2 = OFF. Then enter and SAVE the measured values of the following parameters. This will force the drive to uses the measured values and avoid the possibility of selecting an incorrect value if parameter 2 = ON .***
    - ***Set parameter 4 = the measured value of parameter 613.***
    - ***Set parameter 6 = the measured value of parameter 614.***
    - ***Set parameter 51 = the measured value of parameter 615.***
11. **Save the drive parameters before turning OFF the power, otherwise the new values will be lost when power is cycled**. Refer to the note in Section 3.3.6 which explains how to save the parameters.

12. Turn OFF the power. Install fuses FB1 and FB2 and re-connect the brake coil wires to terminals B1 and B2. **Remove the jumper** between terminals **2** and **PM or the right side of the MP1 coil. Reconnect the wire to terminal TB1-9**. Remove the jumpers across **contact #3 of relay LPRM** and **contact #4 of relay MX.** Also remove the jumper between **pins 2KBYP1 and 2KBYP2 on the SC-BASE board**. Then turn ON the power and verify that software option ABYP=OFF (see section 5.3.2)

j. **Inspection Speed Calibration** - Run the car on Inspection. Verify the Inspection speed using a hand held Tachometer. Compare the measured car speed with Parameter 602 (Reference speed) and then with Parameter 600 (car speed). These three values should match if the car is running at the correct Inspection speed. **Verify Parameter 10 (Encoder P/R)**. If the actual speed is slower than the requested speed, increase the Motor RPM Parameter 11 (Motor RPM/SPD). If the actual speed is higher than the requested speed, decrease the value of Motor RPM Parameter 11. Parameter 11 can be adjusted up to +/-5% of the motor rated F.L. RPM without having much effect on the performance.

   Now the correct Inspection speed (in feet per minute) should be displayed on the drive keypad (Parameter 600) whenever the car moves on Inspection. Adjust the Inspection Speed Parameter 157 (Preset Speed #8) for a comfortable Inspection speed. Then adjust the SPD trimpot on the HC-ACI-D board to coordinate the application of the speed command to the drive with the picking of the brake, so that the car does not move under the brake or rollback at the start.

k. At this time the adjustment of the BDD trimpot on the HC-ACI-D board is also necessary. Otherwise you may be stopping the car under the brake, causing a lot of current to be applied to the motor that might cause arcing on the main contactor during the stop.

NOTE: If an ILO (Inspection Leveling Overspeed) problem is detected by the HC-ACI-D board, the ILO indicator will turn ON and the FLT relay will pick, which will drop the RDY relay and shut down the controller. Reset the fault by pressing the Fault Reset button on the HC-ACI-D board and adjust the ILO trimpot fully CCW.

l. To make sure that the Cartop Inspection switch is working properly, turn OFF the main disconnect, remove the jumper between terminals 18 and ACCN from step 3.3.3 (j), and reinstall the wire into terminal ACCN. Turn ON the main disconnect. Make sure that there is 115VAC on terminal ACCN with respect to terminal 1 when the Cartop Inspection switch is in the NORMAL position. There should be no power on terminal when the Cartop Inspection switch is in the INSP position.

NOTE: This installation is configured with an emergency brake (EB). The EB will apply when the car is away from door zone and both the doors are open. For access operation, move the lift to the desired location and then close and lock the car gate. Relay CD should pick and this will keep the emergency brake from applying while the car is away from DZ. If the car gate is left open, the emergency brake will apply every time direction is dropped while on access operation.

m. Stop the car so that the car top is accessible from the top hall door. ***Remove all jumpers from the safety circuit. Run the car from the car top. Verify that the SAFR1 relay drops out and the car stops when the Cartop Emergency Stop Switch is opened. Also, by opening the Emergency Stop Switch while the car is moving up or down, verify that the brake stops and holds the car.***

n. Run the car through the hoistway, checking clearance and the door locks. When all of the doors are closed, ***remove the jumpers from terminals 4 and 9, and from terminals 18 and ACCN (if present).*** Correct any problem with the door locks.

o. Temporarily take the car off of Inspection operation. If the Diagnostic Indicators do not show Test Mode, see what message is being displayed and correct the problem. For example, if the indicators show that the car is on Fire Service Phase 1, a jumper must be connected between terminal 2 on the back plate and terminal 38 on the SC-SB2K board in order to run the car on Normal operation. Remove the jumper once the Fire Service input is brought into the controller. Place the car back on Inspection.

> **NOTE:** If the car is not completely wired (temporary), check the following:
> - wire removed from panel mount terminal DCL
> - wire connected between panel mount terminal DPM and 2-bus
> - wire removed from terminal 47 on the SC-SB2K board
> - jumper from 2 bus to terminal 36 on the SC-SB2K board
> - jumper from 2 bus to terminal 38 on the SC-SB2K board
> - jumper from 2 bus to panel mount terminal EPI (if present)

p. Check the counterweight balance. Verify that the counterweighting is as specified. Make whatever corrections are necessary to make the counterweight correct. If a drum machine is being used then follow the manufacturer's recommendations for counter weighing, and test the limit switch on the drum machine.

> **NOTE:** On modernizations it is easy to overlook the typical 40% counterweighting. Always put a 40% load in the car and check for equal motor current (up verses down) at Inspection speed in the middle of the hoistway. Equal current readings on the keypad display indicate that the counterweight is *close* to the correct value. Take whatever steps are necessary to achieve *proper* counterweighting. For a drum machine, follow the manufacturer's counterweighting recommendation and test the drum machine's limit switches.

q. Turn OFF the power. Reinstall the fuses that power terminals 2H and 2F. The elevator controller installation should now be completed.

r. Remove the temporary jumper between 2 bus and terminal 38 on the SC-SB2K board once the Fire Service input is brought into the controller.

s. Remove the temporary jumper between 2 bus and panel mount terminal EPI (if present) once the Emergency Power input is brought into the controller.

SECTION 4
FINAL ADJUSTMENT

4.0 GENERAL INFORMATION

At this point, all the steps in Section 3 should have been completed. Please read Section 5 before proceeding; it explains the adjustment and troubleshooting tools available with the computer. This section covers the final adjustment and testing procedures for controllers with the MagneTek DSD 412 drive.

4.1 PREPARING TO RUN ON HIGH SPEED AND AUTOMATIC OPERATION

Move the car to the bottom landing on Inspection operation and disconnect all power. Reinsert connector C1 into receptacle C1 on the HC-PI/O board (if previously removed).

NOTE: Pin 1 on both the ribbon cable connector and the header on the HC-PI/O board must match. These are designated with arrows on the connector and header. Press the connector in until the latches snap, securing the connector in place.

4.1.1 DOOR OPERATOR

If the door operator is not working, turn OFF the power, pull the door fuses and close the doors so the door clutch will not hit any of the door lock rollers. Take whatever steps are necessary to keep the installation safe, but make sure that the cartop is still accessible after closing all of the doors.

4.1.2 HC-ACI-D AND HC-ACIF BOARD ADJUSTMENTS - In the process of preparing for running the elevator on high speed and automatic operation the following trimpots may require adjustment.

- **SPD** trimpot (Speed Pick Delay) - This trimpot is located on HC-ACI-D board. It may need to be adjusted as described in Section 3 on Inspection operation to coordinate the application of the speed command with the picking of the brake. This trimpot may require readjustment when the car is adjusted for High speed in Section 4.3.5(g).

- **BDD** trimpot (Brake Drop Delay) - This trimpot is located on the HC-ACI-D board and it may need readjustment as described in Section 4.3.5(h). BDD controls the delay in dropping the brake so that the brake drops just as car motion ceases.

- **ILO** trimpot (Inspection Leveling Overspeed) on the HC-ACI board - **Not used on ASME A17.1-2000 compliant controllers.** Leave the ILO trimpot on the HC-ACI board fully CCW. Use the ILO trimpot on the SC-BASE or SC-BASER board to adjust the Inspection Leveling Overspeed threshold.

- **ETS** trimpot (Emergency Terminal Limit) on the HC-ACIF board - **Not used on ASME A17.1-2000 compliant controllers.** Leave the ETS trimpot on the HC-ACIF board fully CW. Use the ETS trimpot on the SC-BASE or SC-BASER board to adjust the Emergency Terminal Limit Speed threshold.

4.1.3 DIAGNOSTIC MESSAGES AND INPUT/OUTPUT SIGNALS

To speed up final adjustment and troubleshooting, become familiar with the Status and Error Messages (Table 5.1) and Input/Output signals (Computer Flags, Tables 5.9 and 5.10).

ON-BOARD DIAGNOSTICS - Section 5 of this manual is dedicated to system diagnostics and an explanation of the human interface tools that are available with the Computer Swing Panel. These diagnostic tools simplify the adjustment and troubleshooting of the system. It is extremely important that Section 5 be read and understood before proceeding.

When the *Diagnostics On/Norm* switch is in the Norm position, the Diagnostic Indicators indicate when the system is ready for Normal operation. The Diagnostic Indicators must be scanning from right to left one light at a time. If the diagnostic lights are flashing any other way, an abnormal or special condition exists and the fault name will scroll on the alphanumeric display in English text. Tables 6.12 and 6.13 provide fault descriptions and troubleshooting tips.

The computer displays abnormal conditions in the same priority as they are evaluated. For example, if the safety string is open and the system is in Fire Service mode, the computer will show that the safety string is open and will expect the mechanic to correct this problem first since it is a higher priority condition. Once the safety string has been made up and the computer recognizes this, then the computer will show that the car is on Fire Service mode. After successfully bringing in the Fire Service input, the computer will then start its normal scan. Once scanning normally, it is then possible to place calls and run the elevator automatically.

4.1.4 A FEW WORDS ABOUT ABSOLUTE FLOOR ENCODING

NOTE: To avoid conflicts between the A17.1 fault monitors and the next several tests, place a jumper between 2KBP1 and 2KBP2 on SC-BASE. Enter system mode on swing panel and set ABYP = ON (See Section 5.3.2).

Absolute floor encoding (AFE) allows the controller to read encoding vanes or magnets at each landing and thereby identify the floor. Absolute floor encoding is provided as a standard.

If the car is not at a landing when power is turned ON, the controller will generate a down direction command and the car will move toward the closest landing, provided that all abnormal conditions have been corrected. When the car reaches a landing and is within the Door Zone (relay DZ picked) with leveling completed (relays LU1, LU2, LD1 and LD2 not picked) the controller reads the floor code vanes or magnets and corrects the Position Indicator. If the car is on Automatic Operation, and if a home floor has been designated, the car will move to the home landing at this time. If the car is at a landing, within the Door Zone (relay DZ picked) with leveling completed (relays LU1, LU2, LD1 and LD2 not picked) when AC power is turned ON, the controller will read the floor code vanes or magnets at the landing and correct the Position Indicator. Again, if a home floor has been designated the car will move to this landing to park.

4.1.5 REGISTERING CAR CALLS

In the process of making final adjustments to the controller, periodically you will be asked to register car calls. A call or series of calls can be registered at the controller by momentarily placing a jumper between terminal 1 (system common) and the desired car call terminal or terminals on the HC-PI/O or HC-CI/O-E board, and then between terminal 2 and terminal 45 to allow the car to travel to each call. The car may move immediately after the first call is placed, or it may wait several seconds before moving.

CAUTION:	The call terminals on the HC-PI/O and HC-CI/O-E board should *never* be connected to any of the power terminals (such as 2, 3, 4, etc.). If this happens and the call is turned on, it will blow the resistor-fuse or triac which plugs into the board. Later versions of these boards may have plug-in zener diodes. These parts are designed to be field replaceable and spares are provided in unused positions on the board, or are available from MCE. DO NOT JUMPER THESE PLUG-IN COMPONENTS AS IT MAY DESTROY THE BOARD OR OTHER CONTROLLER COMPONENTS. If any of these components should blow, FIND OUT WHY instead of constantly replacing them, as the constant faults can eventually damage the board.

4.1.6 TEST MODE OPERATION

The purpose of TEST mode is to allow easy and convenient operation of the car so that the final adjustments can be made without cycling the doors. When the elevator is operated in the TEST mode, the elevator doors do not open. The door open relays are disconnected automatically during TEST mode operation.

The car is put into TEST mode by placing the TEST/NORMAL switch on the SC-SB2K (Main Safety Relay) board in the TEST position. Note that when the TEST/NORMAL switch is in the TEST position, it puts the car into Test Mode, provided that the Car Top Inspection and Relay Panel Inspection switches are in the OFF or normal positions. In that case, the Diagnostic Indicators should be showing TEST MODE. If the expected indication is not displayed, check to see what message is being displayed and correct the problem. Operation while in TEST mode should be easy to understand by knowing the following:

a. Every time the car stops, a non-interference timer *must* elapse before the car can move again (the car will not move unless there is another car call). Note that after the timer has elapsed, the car will move immediately as soon as the next car call is placed (the car will not move if the system is a single button collective system and there is no jumper from terminal 2 to terminal 45). Placing a car call right after the car stops will require the non-interference timer to elapse before the car can move again.

b. Simply having one or more car calls registered will not necessarily cause the car to move. It will be necessary to jumper terminal 2 to terminal 45 to create a Door Close Button input to get the car to move. If the car is not a single button collective but is a selective-collective, the jumper from terminal 2 to 45 will not be necessary. Leave a jumper connected from terminal 1 to the last car call in the line of calls that have been placed. This will create a constant pressure signal on the car call which is an alternate means of creating a Door Close Button signal to get a car that is on Independent Service to leave the landing. However, the jumper from terminal 2 to terminal 45 may be more convenient.

c. If a jumper from terminal 1 is touched to the car call input for the floor where the car is located, it will reestablish the non-interference timer and it must elapse before the car can move again.

d. If the elevator is trying to level, it will not pick high speed and leave the landing until it has completed the leveling process. Drive Unit speed adjustments and direction limits at terminal landings may cause this problem.

e. If any of the inputs that open the door are active (Safety Edge On, Photo Eye On, Car Call input grounded to 1 for the floor matching the Position Indicator, etc.) the car will not leave the landing.

f. Both slowdown switch inputs (terminals 11 and 13) should *never* be inactive at the same time when the doors are closed and locked and the safety circuit is closed.

4.2 EXPLANATION OF DSD 412 SCR DRIVE PARAMETERS AND S CURVES

Set **ABYP = ON** for two hours of run time with ASME A17.1-2000 functions bypassed while setting up drives. If necessary set **ABYP** to **ON** again for another two hours. See section 5.3.2 for instructions on setting up ABYP=ON.
Before attempting to bring the car up to contract speed, or making any adjustments, it is important to verify the following control parameters in the SCR Drive Unit. It is very important to become familiar with drive keypad operation to access the drive program.

NOTE: In order to access the parameter values, review Section *3, Standard Control / Display Unit Operation* in the MagneTek DSD 412 SCR Elevator Drive Technical Manual.

4.2.1 SETTING THE SPEED LEVELS

CAUTION: Verify the critical drive parameter settings as described in Section 3.3.6. Incorrect values for these parameters can cause erratic elevator operation.

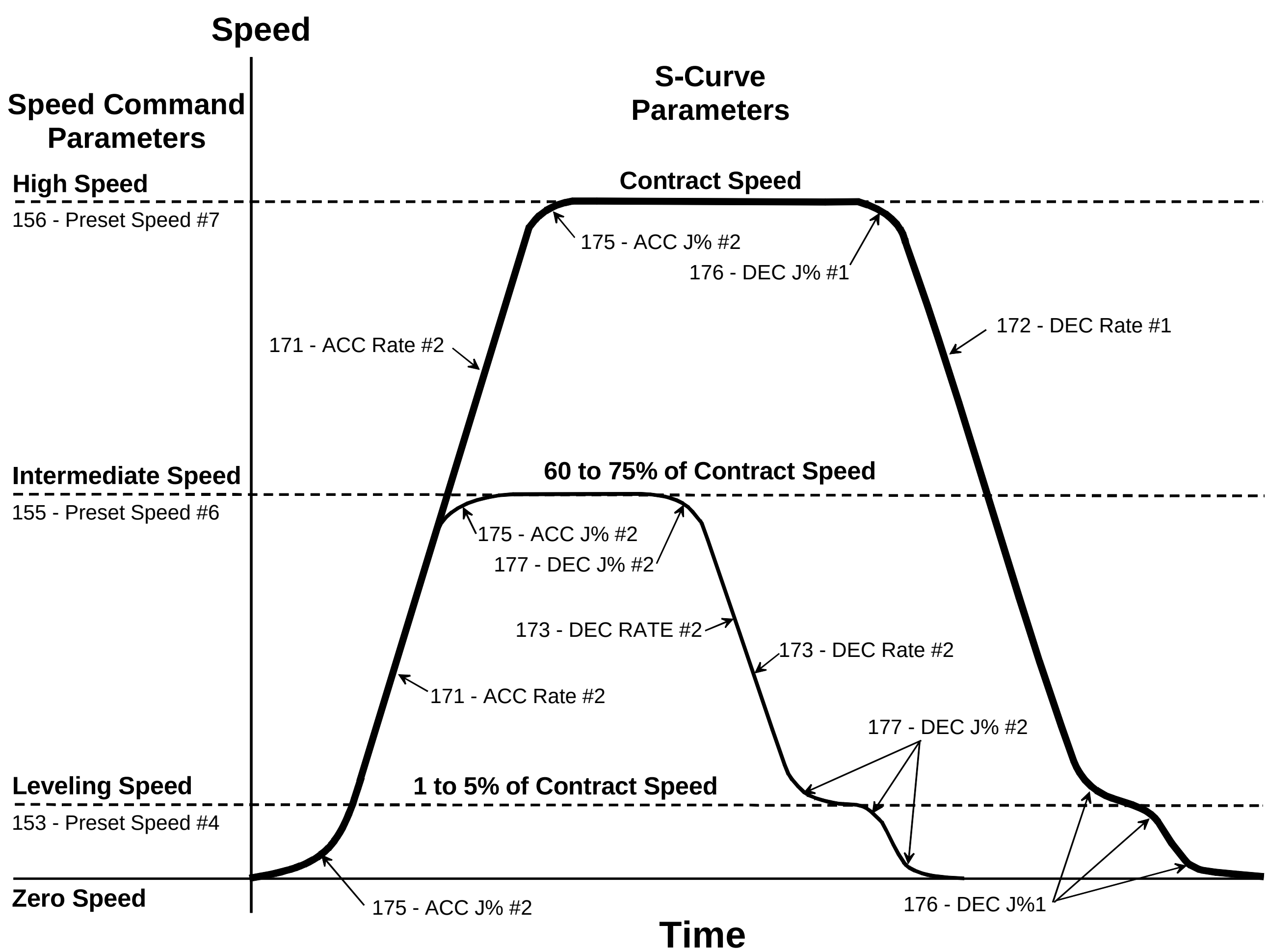
CAUTION: It is very important that drive parameters only be changed when the car is stopped and the elevator is on Inspection or Test operation.

The VVMC Series M controller uses the *Preset Speed* Parameters described in Table 4.1. The controller selects the desired speed using the DSD 412 SCR Drive Logic inputs as described on page -DX in the Job Prints . The Speed Command Parameters should be set as shown in Table 4.1 in preparation for running the elevator at high speed.

TABLE 4.1 DSD 412 Speed Command Parameters

DSD 412 SPEED COMMAND PARAMETERS				
Speed	**Parameter Number**	**Keypad Display**	**Preferred setting in preparation for running the car at High speed.**	**Unit**
High	156	Preset Speed # 7	**50% of Contract Speed (Parameter 17- Rated FPM)**. This parameter will be changed to Contract Speed during final adjustment.	ft/m
Intermediate	155	Preset Speed # 6	**42% of Contract Speed (Parameter 17- Rated FPM).** This speed can be increased to 91% if required, but must be less than Contract Speed.	ft/m
Leveling	153	Preset Speed # 4	1% to 3 % of Contract Speed (Parameter 17- Rated FPM)	ft/m
Inspection/ correction	157	Preset Speed # 8	Normal setting is 10% of the contract speed (Parameter 17 - Rated FPM).	ft/m

FIGURE 4.1 Velocity and S Curve Parameters (DSD 412)



4.2.2 ACCELERATION AND DECELERATION RATE PARAMETERS

Acceleration for both one floor and multi-floor runs is controlled by parameter 171 (ACC Rate #2). The value is in seconds and it determines the total time in acceleration from zero to steady speed, either Intermediate or High speed. The lower the value the faster the acceleration.

Deceleration for one floor runs is controlled by parameter 173 (DEC Rate #2). The value is in seconds and it determines the total time in deceleration from Intermediate speed to zero speed. The lower the value the faster the deceleration.

Deceleration for multi floor runs is controlled by parameter 172 (DEC Rate #1). The value is in seconds and it determines the total time in deceleration from High speed to zero speed. The lower the value the faster the deceleration.

4.2.3 JERK PARAMETERS

The jerk parameters adjust the rate of change transition (smoothness) at the start and end of acceleration and deceleration, known as jerk points (see Figure 4.1). The jerk parameter values are a percentage of the acceleration and deceleration rate parameters. Increasing the value causes a smoother (longer) transition. Acceleration Jerk for both one floor and multi-floor runs is controlled by parameter 175 (ACC J% #2). Deceleration Jerk for multi-floor runs is controlled by parameter 176 (DEC J% #1). Deceleration jerk for one floor runs is controlled by parameter 177 (DEC J% #2).

TABLE 4.2 DSD 412 Velocity Curve Parameters

Parameter Number/ Drive Keypad Display	Remote Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	Field/ MCE Set
	S-Curve Parameters					
170	ACC Rate #1 Not used	Acceleration rate #1 - Not used A higher value results in more time spent in acceleration (slower acceleration rate). Set Parameter 170 = Parameter 171	sec	0 - 25	5.00	Must be set equal to 171
171	ACC Rate #2	Acceleration rate #2 Total time in acceleration from 0 to contract speed. A higher value results in more time spent in acceleration (slower acceleration rate).	sec	0 - 25	5.00	2.0 - 3.00
172	DEC Rate #1	Deceleration rate #1 - Multi-floor runs Total time in deceleration from contract speed to stop. A higher value results in more time spent in deceleration (slower deceleration rate).	sec	0 - 25	5.00	2.0 - 3.00
173	DEC Rate #2	Deceleration rate #2 - One floor runs Total time in deceleration from one floor speed to stop. A higher value results in more time spent in deceleration (slower deceleration rate).	sec	0 - 25	5.00	2.0 - 3.00
174	ACC J% #1 Not used	Jerk rate 1: Not used Jerk rate at the start and end of acceleration (percentage of parameter 170). A higher value results in a smoother transition during acceleration. Set Parameter 174 = Parameter 175	%	0 - 100%	25	Must be set equal to 175

Parameter Number/ Drive Keypad Display	Remote Digital Operator Display	Parameter Description	Unit	Setting Range	Drive Defaults	Field/ MCE Set
175	ACC J% #2	Jerk rate at the start and end of acceleration on multi-floor and one floor runs (percentage of parameter 171).	%	0 - 100%	25	0 - 25
176	DEC J% #1	Jerk rate at the start and end of deceleration on multi-floor runs (percentage of parameter 172).	%	0 - 100%	25	0 - 25 20
177	DEC J% #2	Jerk rate at the start and end of deceleration on one floor runs (percentage of parameter 173). A higher value results in a smoother transition during deceleration.	%	0 - 100%	25	0 - 25 20
	Speed Reference Parameters					
153	Preset Speed #4	Leveling Speed	fpm	0 - (16%)*	0	2 - 5
155	Preset Speed #6	Intermediate Speed	fpm	0 - (91%)*	0	✳
156	Preset Speed #7	High Speed	fpm	0 - (100%)*	0	✳
157	Preset Speed #8	Inspection / Correction Speed	fpm	0 - (66%)*	0	20 - 40

✳ **The actual speed value is entered in FPM. However, the speed range maximum value is described as a percentage of contract speed. Speeds in excess of the defined maximum will cause the drive to generate fault #450 (Speed Setting Error).**

4.2.4 ADJUSTING THE S CURVE PARAMETERS

The output response of the drive can be seen on an oscilloscope, when the car is running, by looking at the voltage between terminals TB1-45 (Speed reference) and TB1-46 (Speed feedback) with respect to terminal TB1-80 (com) on the DSD 412 SCR drive. The output signal is ±10VDC.

Adjust the following parameters for correct approach to the floor (smooth transition from deceleration to Leveling speed and stop) on multi-floor runs:

- Level speed parameter153 (Preset Speed #4)
- Deceleration Rate parameter 172 (DEC Rate #1)
- Deceleration Jerk parameter 176 (DEC J% #1)
- Stability parameter 42 (adjust between 1 to 2)

Adjust the following parameters for correct approach to the floor (smooth transition from deceleration to Leveling speed and stop) on one floor runs:

- One floor speed parameter 155 (Preset Speed #6)
- Deceleration Rate parameter 173 (DEC Rate #2)
- Deceleration Jerk parameter 177 (DEC J% #2)
- Stability parameter 42 (adjust between 1 to 2)

The acceleration rate parameter 171 (ACC Rate #2), and the acceleration jerk parameter 175 (ACC J% #2) can be adjusted for smooth starting and transition to Intermediate and High speed. This will be further addressed in the final adjustment section.

NOTE: Parameter 170 must be set equal to Parameter 171 and Parameter 174 must be set equal to Parameter 175.

4.3 FINAL ADJUSTMENTS

4.3.1 FINAL PREPARATION FOR RUNNING ON AUTOMATIC OPERATION

a. Temporarily take the car off of Inspection operation. If the Diagnostic Indicators do not show Test Mode, then see what message is being displayed and correct the problem. For example, if the indicators show that the car is on Fire Service Phase I, a jumper must be connected between terminal 2 on the back plate and terminal 38 on the SC-SB2K board in order to run the car on Normal Operation. Remove the jumper once the Fire Service input is brought into the controller. Place the car back on Inspection.

b. Move the car to the bottom terminal landing. Check to see if the DZ relay is picked. If not, move the car on Inspection to place it in the Door Zone.

4.3.2 SWITCHING TO AUTOMATIC OPERATION

Place the Relay Panel MACHINE ROOM INSPECTION TRANSFER switch in the NORM position. If the car is not at a landing it will move to a landing. If the car is at a landing but not in the door zone, relays L and either LU1/2 or LD1/2 should pick and the car should relevel. If the relevel is not successful, check the following:

- If the brake picks and the car is trying to level but is not able to, it may be necessary to adjust the Level Speed parameter 153 (Preset Speed #4) on the SCR Drive to get the car to move.

- If relays L and LD1/2 are picked, but the brake and other relays are not, the down direction limit switch may be preventing the leveling down operation.

- If the car is trying to level, it will not leave the landing for a call until the leveling is complete. Move the directional (normal) limit switch if necessary.

The Status Indicator lights should now display the indication for Independent Service operation. At this time the Position Indicator should match the actual car location. Note that all of the Position Indicators and direction arrows are conveniently displayed on the controller. All the calls are also displayed on the controller.

4.3.3 BRAKE ADJUSTMENT FOR 125% LOAD

a Put the car on Inspection at the bottom landing. Put 2/3 of a contract load in the car.

b. Begin adding weights in 50 or 100 pound increments and move the car up and down on Inspection each time. Adjust the brake tension to stop and hold 125% of contract load while running down on Inspection. KEEP THE CAR NEAR THE BOTTOM AS IT IS LIKELY TO SLIDE THROUGH THE BRAKE ONTO THE BUFFERS.

c. If the SCR Drive Unit trips off when the car is going down, but not while it is going up, refer to the manual for the SCR Drive Unit and look up the failure indicated on the Drive display. If a fault is indicated, refer to the fault section. If this problem cannot be solved, call MCE Technical Support.

d. Remove all test weights from the car.

4.3.4 SELF TUNING OF DSD 412 SCR DRIVE

If the self tuning described in Section 3.4.'i' has not been performed, perform the procedure now. In the self tune test, the drive measures the total Motor armature resistance, inductance and field L/R time constant. These values are used in conjunction with parameter #8 - Crossover Frequency, to calculate the current and proportional gain of the speed regulator. **Refer to section 3.4 'i'** to perform the self tuning procedure.

4.3.5 BRINGING THE CAR UP TO HIGH SPEED

a. Verify that all the steps described in Section 4.1 and Section 4.2 regarding the adjustments, specifically the drive parameters, are complete.

> **NOTE:** It is very important that the drive parameters only be changed when the car is stopped and the elevator is on Inspection or Test operation so that there is no demand.

b. Register a car call one floor above the car. The High speed relay (H) should pick and the drive display for *parameter 600* (car speed) should read 50% of Contract Speed as the car attempts to start. If the car runs normally, commence multi-floor runs and slowly increase the High Speed parameter 156 (Preset Speed #7) to the Contract Speed value. Once parameter 156 is set at contract speed the car should run at contract speed. Verify contract speed using a hand held tachometer. The measured speed should be equal to the displayed value of Parameter 600 and Parameter 602 when the car runs at contract speed. If there is a problem reaching Contract Speed, see the following note and also refer to section 4.3.4. Adjust parameter #49 (Weak Field Amps) to obtain the rated armature voltage at contract speed (see Section 4.3.6).

> **NOTE:** **Drive gain adjustments** - The default values for parameter 40(Response), parameter 41(Inertia) and the motor field adjustment are sufficient to run the car on High Speed. However, for optimum performance, and to help in achieving Contract Speed, self tuning of the drive as described in Section 4.3.4 is strongly recommended.

c. At the slowdown distance from the next floor, the Position Indicator will step. After stepping occurs, High speed drops and the car should rapidly decelerate to Leveling speed.

The Leveling speed can be adjusted using parameter 153 (Preset Speed #4) so that the car levels into the floor and stops. Leveling speed should be 3 - 5 fpm, or use personal judgement in adjusting the leveling speed. If the car re-levels frequently, spread apart the LU and LD sensors or switches in the landing system to provide enough Dead Zone or lower the final leveling speed (Parameter 153).

d. Adjust the SPD (Speed Pick Delay) trimpot by first turning it far enough clockwise so that the car rolls back in the direction of the load before accelerating. Then adjust SPD so that the brake is fully picked just as the motor first moves. SPD is used to avoid moving the motor before the brake is fully lifted thus preventing rollback at the start of car motion.

e. Run the car again and verify that the car will start, accelerate, run at high speed, decelerate and run at Leveling speed into the floor and stop. Place calls for all of the landings. Verify that all of the calls work. Verify the operation and placement of all vanes or magnets and vane or magnet switches and verify that the car steps the Position Indicators correctly. The slowdown distance for the elevator is measured from the point where the STU sensor (or STD sensor, if going down) is activated by a metal vane or magnetic strip, to the position where the car is stopped at the floor with the DZ sensor centered on the leveling target with LU or LD sensors *not* engaged.

This slowdown distance was chosen to give a reasonable deceleration rate. Continue to make two-floor runs. If the car is not running at contract speed, slowly increase High speed parameter 156 (Preset Speed #7) until Contract Speed is reached. It may be necessary to adjust the deceleration rate parameter 172 (DEC Rate #2) and deceleration jerk parameter 176 (DEC J% #2) to get the car to approach the floor correctly as the car speed increases. Adjust the acceleration rate parameter 171 (ACC Rate #2) and acceleration jerk parameter 175 (ACC J% #2) until the desired acceleration is achieved. Several runs may be required to obtain optimum acceleration. The acceleration rate should be about the same as the deceleration rate.

If the job does not have Intermediate speed, set P177 = P176 and P173 = P172. If the job has Intermediate speed, go to step 'f'.

NOTE: To observe the commanded speed and the drive output with an oscilloscope or a chart recorder, monitor drive terminal TB1-45 and TB1-46 with respect to TB1-80. Take all necessary precautions while measuring the voltage signals.

CAUTION: Most oscilloscopes have a grounding pin on their power plug. We recommend defeating the grounding pin with one of the commonly available ground isolation adapter plugs so that the case of the oscilloscope is *not* at ground potential, but at the potential of the lead to which the negative probe is connected. TREAT THE CASE OF THE OSCILLOSCOPE AS A LETHAL SHOCK HAZARD, DEPENDING ON WHERE THE NEGATIVE PROBE IS CONNECTED. This recommendation is being made because the ground potential on the grounding pin of the power outlet may not be the same as the controller cabinet ground. If it is not, substantial ground loop current may flow between the negative probe and the power plug grounding pin which can ruin the oscilloscope

f. **Intermediate Speed** - If the job has Intermediate speed, first make the adjustments for multi-floor runs. Then make one floor runs and adjust the Intermediate Speed parameter 155 (Preset Speed #6) to reach the correct Intermediate speed. There may also be a need to adjust parameter 173 (DEC Rate #2) for the correct approach to the floor (refer to Figure 4.1 *Velocity and S Curve Parameters* described in Section 4.2.4).

If, after these adjustments, the car still takes a longer time in the approach to the floor on an Intermediate speed run, there is a possibility that the Intermediate Stepping vanes/magnets (ISTU/ISTD) are installed too far away from the floor. To verify this, reduce the ISTU/ISTD) distance for a middle floor (away from the terminal landings). Then adjust parameters 155 and 173 for the correct approach. If this is successful, implement the change in the ISTU/ISTD distances for the other floors. Note: Parameter 177 should be set between zero and three (0 - 3).

g. **Speed Pick Delay** - To achieve a proper start, without rollback or snapping away from the floor, a variable delay before applying the speed signal has been provided (trimpot SPD, Speed Pick Delay). This was adjusted previously; however, check trimpot SPD again and make adjustments if necessary. *Do this with an empty car*. SPD must be adjusted to let the brake just clear the brake drum before attempting to accelerate the car. The correct setting will be obvious by watching the drive sheave. The response of the car can also be monitored using an oscilloscope by measuring the voltage on the drive terminals TB1- 45 (Speed reference) and TB1-46 (Speed feedback) with respect to terminal TB1-80 (com) on the DSD 412 SCR drive. The output signal is 0, +/-10VDC.

h. **Brake Drop Delay** - When the elevator slows to leveling speed and enters the dead zone, the speed command drops to zero and the SCR Drive Unit causes the machine to stop electrically. The dropping of the brake must be delayed long enough to allow the sheave to stop turning before setting the brake firmly on the brake drum. This is adjusted using the BDD (Brake Drop Delay) trimpot. The idea is to hold the brake up long enough to allow the motor to be stopped electrically and then drop the brake the instant the motor has stopped.

If there is too much delay before dropping the brake, the SCR Drive will release control of the motor and the motor will drift briefly in the direction of the load before the brake is forced to drop by the PT relay. The BDD trimpot controls the dropping of the brake through the BE relay.

Move the LU and LD sensors or switches closer together (or further apart) so the car stops at the same location, up or down. Then move the floor (leveling) magnet strips or vanes so the car stops accurately at each floor.

I. The acceleration rate parameter setting should be at least as great as the deceleration rate parameter, but should not substantially exceed the value of the deceleration rate parameter. Excessive acceleration may cause the SCR Drive circuits to saturate and thereby lose control of the car. Ideally, the slope of the acceleration in volts per second should be equal to the slope of the deceleration.

Note the present value of the deceleration rate parameter 172 (DEC Rate #1). Continue to increase the value of parameter 172 until the car overshoots the floor on multi-floor runs, requiring a relevel operation. Observe the response of the car to verify a stable releveling operation. Return the parameter 172 value (DEC Rate #1) to its original value so that the approach to the floor is the same as before.

After the car stops, check the empty car releveling operation by placing a jumper between terminals 18 and 26 to cause an up level after which the car will stop due to picking the LD (Down Level) switch. Remove the jumper from terminals 18 and 26 and the car will level down against the counterweight. Make sure that it does not stall. If the car stalls, increase the leveling speed.

4.3.6 MOTOR FIELD AND ARMATURE VOLTAGE ADJUSTMENTS

The armature voltage is a result of the motor field current times the rotational speed. The goal is to have the armature voltage be equal to the name plate voltage while running at the name plate RPM and full load current. The following information is required to adjust the motor field correctly:

- Motor name plate Armature Voltage.
- Motor Field Voltage.
- Motor Field resistance.

Motor Field current = Motor Field Voltage / Motor Field Resistance.

The DSD412 SCR drive motor field voltage is adjusted by adjusting the motor field current values using the following drive parameters:

- 50 - Full Field Current (sets the forcing field current)
- 49 - Running Field Current (sets the weakening/running field voltage)
- 52 - Rated Motor Field Voltage
- 53 - Standing Field Current (sets the standing field Voltage)

Motor terminal voltage = CEMF + I x R
CEMF = Counter EMF
I x R = Voltage drop in the motor armature;
I = Parameter 3 (Armature current)
R = Parameter 4 (Armature resistance)

Note: Self tuning of the DSD412 drive as described in Section 4.3.4 should be complete.

Step 1: Calculate the CEMF voltage.
CEMF voltage = Motor name plate voltage - [Armature current P#3 x Armature resistance P#4]

Step 2: Select parameter 609 and press the Data FNCT Key . This parameter displays the CEMF voltage.

Step 3: Run the car at contract speed in both directions and the read the CEMF voltage displayed by parameter 609. If the value of CEMF is equal to the above calculated value then the adjustments are complete. At this time motor armature voltage displayed in parameter 610 should be equal to the motor name plate voltage. The displayed value will be equal to the motor name plate in the overhauling direction and a higher value in the motoring direction.

Step 4: If the displayed value of CEMF in parameter 609 is lower than the calculated value in step 1, increase the running motor field current (parameter 49) in small increments until the value of CEMF equals the calculated value in both directions. If the displayed value of CEMF in parameter 609 is higher than the calculated value in step 1, decrease the running motor field current (parameter 49) in small increments until the value of CEMF equals the calculated value in both directions.

4.3.7 SPEED CALIBRATION

At this time the motor should be running with correct armature voltage. If required, adjust the running motor field as described in step 4.3.6. Verify contract speed using the hand held tachometer. The measured value of speed should be equal to the displayed value of parameter 600 and parameter 602 when the car runs at contract speed. If the measured value is lower than the displayed values, increase parameter 11 (Motor RPM/SPD). If the measured value is higher than the displayed value, decrease the value of parameter 11. Parameter 11 can be adjusted to +/- 5% of the motor rated RPM without having much effect on the performance**.**

4.3.8 LOAD TESTING

a. Begin adding test weights to the car in 100 or 200 pound increments all the way up to the rated load. Observe the SCR Drive current (Parameter 611) on the display and check to see if there is a Fault 918 (IST Fault) as the car accelerates to full speed. If so, this indicates that the SCR unit is being pushed close to its limits and may require one or more of the following actions:

1. The requested acceleration rate may be excessive. Reduce the acceleration rate by increasing parameter 171 (ACC Rate #2). Increasing this parameter will lower the rate of acceleration, and reduce the current demand.

2. A more gradual transition from acceleration to high speed may be made by increasing parameter 175 (ACC J% #2) between zero and three (0 - 3).

3. The motor may be underrated. It may be possible to get excellent results if the acceleration is reduced slightly.

4. The elevator may be improperly counter weighted. This possibility should be thoroughly investigated by placing a balanced load in the car and verifying that the armature current is the same in both the up and down directions.

5. Make a copy of the table in Appendix C, *Quick Reference for MagneTek DSD412 SCR Drive Parameters* and use the digital operator on the drive unit to look up and write down every parameter value as programmed in the unit. Have this data in hand BEFORE calling MCE.

b. If there is a problem lifting the fully loaded car, adjust parameters 40 (Response) and 41 (System Inertia). If there is a problem slowing the car in the down direction, adjust the deceleration rate parameter 172 (DEC Rate #1).

4.4 FINAL ELEVATOR INSPECTION PROCEDURE

WARNING: The following tests should be performed only by qualified elevator personnel skilled in final adjustment and inspections.

4.4.1 INSPECTION LEVELING OVER SPEED TEST

Note: Before performing tests 4.4.1 and 4.4.3, please remove the jumper between pins labeled 2KBP1 and 2KBP2 on the SC-BASE board. Also rotate trimpots ILO, ETS and COS fully CW.

The SC-BASE board is equipped with an independent low speed monitoring system which can shut down the system if the car runs faster than a trimpot adjustable preset speed on Car Top Inspection, Hoistway Access or Leveling operation. The monitoring system is active when the Leveling (LU1/LU2, LD1/LD2) relays are picked or when the Access/Inspection relay (IN1) is dropped out. The trimpot is labeled ILO (Inspection Leveling Overspeed) and is located on the SC-BASE board. The circuit looks at pulses coming from the speed sensor, sensing a magnet on the motor shaft or brake drum, etc. Calibrate this circuit as follows:

a. An accurate representation of actual car speed is required for this test. If the calibration in Section 3.4 'j' was performed, then parameter 600 - Car Speed may be used. Otherwise a hand-held tachometer is required.

b. Place the car on Inspection operation by placing the MACHINE ROOM INSPECTION TRANSFER switch in the INSP position on the SC-SB2K.

c. Set the Inspection speed to 140 fpm (or the maximum Inspection speed available if less than 140 fpm) using the Inspection speed parameter 157 (Preset Speed #8). Run the car and verify the speed using either parameter 600 or a hand-held tachometer.

d. Move the car to a lower floor. Run the car in the up direction on Inspection while very slowly turning the ILO trimpot CCW until the ILO1/ILO2 indicators just turn ON, tripping the ILO Fault. The car should come to an immediate stop. The ILO fault will self reset in a moment.

e. Set the Inspection speed parameter 157 (Preset Speed #8) to a lower value. Then run the car again on Inspection, increasing the speed in increments of 2 fpm using Parameter 157. Verify that the low speed safety monitor circuit will trip the ILO Fault at no higher than 140 fpm (or no higher than the maximum available inspection speed if less than 140 fpm). Check this in *both* directions.

f. Set the Inspection speed Parameter 157 (Preset Speed #8) back to the original or desired value. Place the MACHINE ROOM INSPECTION TRANSFER switch on the SC-SB2K board in the NORM position.

4.4.2 TERMINAL SLOWDOWN LIMIT SWITCHES

Make sure that the terminal slowdown limit switches are working properly by performing the following steps:

a. Place the TEST/NORMAL switch, on the SC-SB2K board in the TEST position.

b. Disconnect and label the wires at terminals 71 (STU) and 72 (STD) on the SC-SB2K board.

c. Register calls for the terminal landings (top and bottom). The car should make a normal slowdown at both terminal landings, except that there may be a slight relevel (which is okay). If the car goes more than an inch past the floor, move the slowdown limit until the approach is normal.

d. Reconnect the wires to terminals 71 (STU) and 72 (STD) on the SC-SB2K board and return the TEST/NORMAL switch to the NORMAL position.

4.4.3 EMERGENCY TERMINAL LIMIT SWITCH MONITOR

All jobs under the requirements of ANSI A17.1-2000 Articles 2.25.4.1. or 2.25.4.2 must have a means to insure that the car speed is below contract speed after opening the associated ETS limit switches. The emergency terminal limit switch monitor performs this function.

The SC-BASE board carries out ETS monitoring functions via a speed senor that monitors a magnet installed on the motor shaft or brake drum as described in Section 2.2.3, *Installing and Wiring the Speed Sensor*.

a. Make sure that shielded phone cable from the sensor to the SC-BASE board is securely seated in the connectors at both ends and is also enclosed in conduit.

b. On the SC-BASE board, verify that the ETS trimpot is fully CW.

c. Record the value of the High Speed parameter 156 (Preset Speed #7). Then, on a multi-floor run, adjust the speed of the car to 95% of contract speed by adjusting the High speed parameter 156 (Preset Speed #7).

d. Remove the wire from the Up Emergency Terminal Limit Switch where it connects to the controller at terminal UETS1 and UETS2 on the SC-BASE board. Start the car at the bottom of the hoist way and while running the car in the up direction, slowly turn the ETS trimpot CCW until the ETS1/ETS2 indicators turn ON and the car stops. An "ETS Fault" message should be displayed on the MC-MP2-2K alphanumeric display.

e. Press the fault reset push button on the SC-SB2K board to reset the fault.

f. Repeat (d) and (e) in the down direction with the wire from the DETS terminal removed. When the calibration is complete, reconnect the wires removed from the UETS and DETS terminals and return the High Speed parameter 156 (Preset Speed #7) to its original value.

g. Verify the calibration by turning OFF the inspection transfer switch. Place a call, and with the car running at contract speed, remove the field wires from the UETS1 and UETS2 terminals on the SC-BASE board. The car must execute an emergency slowdown. To restore normal operation, replace the wires and press the Fault Reset pushbutton on the SC-SB2K board. Repeat for terminals DETS1 and DETS2.

4.4.4 CONTRACT SPEED BUFFER TEST:

4.4.4.1. COUNTER WEIGHT BUFFER TEST WITH EMPTY CAR GOING UP

NOTE: The car should be at the bottom landing with the TEST/ NORM switch on the SC-SB2K board in the TEST position.

To conduct the empty car buffer test going UP, a number of functions need to be bypassed using jumpers. Follow the steps below:

a. On the SC-SB2K board, install the jumper between pins 2KBP1 and 2KBP2. Also enter system mode and then select option **ABYP = ON** (See section 5.3.2).

b. On the SC-BASE board, place the PFLT Bypass jumper in the ON position to **bypass the PLD ILO, ETS and contract overspeed fault functions**.

c. Disconnect the Step Up (STU) input by removing the wire from terminal 72 on the SC-SB2K board. Tape the wire to prevent shorting.

d. ***Bypass the Emergency Terminal Up Limits***, if provided, by placing jumpers between terminals 2 and UETS1 / UETS2 on the SC-BASE board.

e. ***Bypass the Up terminal slowdown and Up Normal Limit*** by placing jumpers between terminals 9 and 10 and terminals 10 and 11 on the SC-SB2K board.

f. Register a car call for the top terminal landing from the controller. ***The counter weight will strike the buffer.***

g. Put the elevator on Inspection and pick the down direction to move the car.

h. Remove the jumpers between terminals 9 and 10, and terminals 10 and 11 and reconnect the wire to terminal 72 on the SC-SB2K board.

i. On the SC-BASE board, place the PFLT Bypass jumper in the OFF position to **enable the PLD ILO, ETS and contract overspeed fault functions**.

j. On the SC-SB2K board, remove the jumper between pins 2KBP1 and 2KBP2. Also enter system mode and then select option **ABYP = OFF.**

4.4.4.2 CAR BUFFER TEST WITH A FULL LOAD GOING DOWN

a. On the SC-SB2K board, install the jumper between pins 2KBP1 and 2KBP2. Also enter system mode and then select option **ABYP = ON** (See section 5.3.2).

b. On the SC-BASE board, place the PFLT Bypass jumper in the ON position to **bypass the PLD ILO, ETS and contract overspeed fault functions**.

c. Disconnect the Step Down (STD) input by removing the wire from terminal 71 on the SC-SB2K board. Tape the wire to prevent shorting.

d. ***Bypass the Emergency Terminal Down Limits***, if provided, by placing jumpers between terminals 2 and DETS1 / DETS2 on the SC-BASE board.

e. ***Bypass the Down terminal slowdown and Down Normal Limit*** by placing jumpers between terminals 9 and 12 and terminals 12 and 13 on the SC-SB2K board.

f. Position the elevator several floors above the bottom landing with a full load in the car. Then register a car call for the bottom landing. ***The car will strike the buffer.***

g. Put the elevator on Inspection and pick the up direction to move the car.

h. On the SC-BASE board, place the PFLT Bypass jumper in the OFF position to **enable the PLD ILO, ETS and contract overspeed fault functions**.

i. Remove the jumpers between terminals 9 and 12 and terminals 12 and 13 and reconnect the wire to terminal 71 on the SC-SB2K board. ***Remove all of the jumpers installed in this section.***

j. On the SC-SB2K board, remove the jumper between pins 2KBP1 and 2KBP2. Also enter system mode and then select option **ABYP = OFF.**

4.4.5 GOVERNOR AND CAR SAFETY TESTS

4.4.5.1 GOVERNOR ELECTRICAL OVERSPEED SWITCH TEST - Make sure that there are no jumpers between terminals 2 and 15. Trip open the electrical OVERSPEED switch contact manually and verify that the main safety circuit drops out. Use which ever method is most familiar to verify the actual electrical and mechanical tripping speeds.

4.4.5.2 GOVERNOR AND CAR SAFETY OVERSPEED TEST WITH FULL LOAD GOING DOWN.

a. Move the fully loaded car to the top terminal landing and turn power OFF.

b. On the SC-BASE board, place the PFLT BYP jumper in the ON position to **bypass the PLD ILO, ETS and contract overspeed fault functions.**

c. If the HC-ACIF board is used in this controller, remove relays AS and ETL from their sockets. Keep them separate! ETL is 48 VDC and AS is 12 VDC.

d. Connect a jumper between terminals EBS1 and EBS2 to ***bypass the governor overspeed switch***.

e. In order to observe the loss of traction (when the safety mechanism sets) connect a jumper between terminal 16 on the SC-SB2K board and panel mount terminal 17 to **bypass the safety plank (SOS) switch**.

f. Turn the power ON and verify that the controller is functional.

g. On the SC-BASE board, install the jumper between pins 2KBP1 and 2KBP2. Also, enter system mode and set option **ABYP = ON** to activate the ASME A17.1 - 2000 bypass function (see Section 5.3.2).

h. Set the SCR drive parameter **81 (Overspeed Mult) = 1.40** or to the required tripping speed. If the trip point is greater than 150%, skip steps (h), (i) (j) und (k) and use other means to overspeed the car.

i. Enable the overspeed test by setting parameter **80 (Overspeed Test) = ON**. This setting changes back to OFF immediately after the test run. It is necessary to repeat this step if another test run is required.

j. Set parameter **12 = 150.**

> **NOTE:** The following is required only if a drive fault is generated when the test is performed in step ‘k’.
>
> Note the values of parameters **49 (Weak Field Amps)**, **50 (Full Field Amps)** and **57 (Field Weaken Speed)**. Then set the parameters as follows:
> - **49 = 50% of its present value**
> - **50 = 50% of its present value**
> - **57 = 60% of its present value**
> - Verify that parameter **56 (Field Strength Speed) = 90%.**

k. Register a car call in the down direction, but not for the bottom landing. The car should exceed Contract Speed. The governor should trip and set the safety and stop the car.

l. Put the car on Inspection.

m. Reset the SCR drive parameters: **81 (Overspeed Mult) = 1.0**, **12 (Over Speed %) = 110** and verify that parameter **80 (Overspeed Test) = OFF**.

n. If any of the following parameters were changed, return them to their original values: **49 (Field Weakening Amps**, **50 (Full Field Amps)**, **57 (Field Weaken Speed)** and **56 (Field Strength Speed)**.

o. Reset the mechanical governor and inspect the hoist ropes to make sure they are in the proper grooves.

p. Move the car UP on Inspection to release the flexible guide clamp safety or release the car safety by hand if it is a wedge clamp type.

q. ***Remove the jumper between terminals EBS1 and EBS2 which bypasses the governor overspeed switch.***

r. ***Remove the jumper from PC board terminal 16 and panel mount terminal 17 which bypasses the safety plank (SOS) switch).***

s. Properly reinstall relays AS and ETL on HC-ACIF board (if used). These relays were removed or partially removed from their respective sockets. Remember AS and ETL are different!

t. **Remove the jumper between pins 2KBP1 and 2KBP2 on the SC-BASE board**. Also, enter System Mode and set **ABYP = OFF** (see Section 5.3.2).

u. On the SC-BASE board, place the PFLT BYP jumper in the OFF position to **enable the PLD ILO, ETS and contract overspeed fault functions.**

v. Put the car on Normal operation by taking the car off Inspection. After the elevator finds a floor, verify the operation of the elevator by registering calls and checking the speed.

4.4.6 MOTOR FIELD LOSS DETECTION TESTS

Put the car on Inspection. Turn OFF the controller power and disconnect the motor field wires at terminals MF1 and MF2. Turn ON the power. The SCR drive will detect the motor field failure fault. Place a call and observe that car does not run. Turn OFF the power and reconnect the wires at terminals MF1 and MF2.

The drive adjustments and tests are complete. Now complete the A17.1 Code Compliant Functions and Testing (Section 4.5) and then fine tune any areas that may require touching up. **Make sure that all of the appropriate data has been properly documented and that all of the jumpers have been removed before the car is returned to service.**

4.5 A17.1 - 2000 CODE COMPLIANT FUNCTIONS AND TESTING

This section of the manual outlines the calibration and testing of the portion of the control system used to meet the requirements of the ASME A17.1 -2000 code. First, verify that the overspeed functions for ETS and ILO have been calibrated as described in 4.4.

After completing the overspeed test, test both the ascending car overspeed and unintended car movement protection.

4.5.1 OVERSPEED CALIBRATION AND TESTING

Please refer to section 4.4 for calibration of the ILO and ETS overspeed detection logic.

On the SC-SB2K board move the MACHINE ROOM INSPECTION TRANSFER switch to the INSP position and place the TEST/ NORMAL switch in the TEST position.

4.5.2 ASCENDING CAR OVERSPEED PROTECTION

Prior to this test the governor overspeed switch velocity setting needs to be checked by whatever means is normally used. The emergency brake must be installed and adjusted per manufacturer's specifications. Note that it is especially critical for the "Rope Brake" style of emergency brake, that the brake shoes are properly "arced-in" to conform with the curvature of the ropes.

a. Refer to Section 5.3.2 ASME A17.1 - 2000 BYPASS FUNCTION and follow the instructions under *For bypass for 2 hours in Automatic Operation* to:

   1. On the SC-BASE board, place a jumper between 2KBP1 and 2KBP2.
   2. On the SC-SB2K board, place the TEST/NORM switch on TEST.
   3. Set the auto bypass function ABYP = ON.

b. Run empty car to bottom landing and have a technician monitor car speed with a hand operated tachometer. With doors closed, use what ever method you are familiar with to overspeed the car in the up direction. As the car accelerates have the technician call out car speed so that the car can be stopped if the governor overspeed switch does not activate when required.

c. Once the governor overspeed switch opens the Emergency Brake should immediately apply and bring the car to a rapid stop.

d. To restore normal operation, reset GOV overspeed switch, press and hold the Emergency Brake Reset pushbutton on the SC-BASE board. Remove all jumpers, set the auto bypass function ABYP = OFF and place the F6 down (OFF). Turn OFF inspection and place TEST/NORMAL on NORMAL.

4.5.3 UNINTENDED CAR MOVEMENT PROTECTION

a. For safety, station a mechanic at the landing where the test is to be performed.

b. Bring the car to the mechanic and arrange to open both the car and hoistway doors. Place barricades in front of the open car and hoistway doors.

c. Meanwhile, back in the machine room, use whatever method you are familiar with to allow the car to drift away from the landing with doors open.

d. As the car moves away from the floor, observe that the emergency brake stops and holds the car within 48" of floor level.

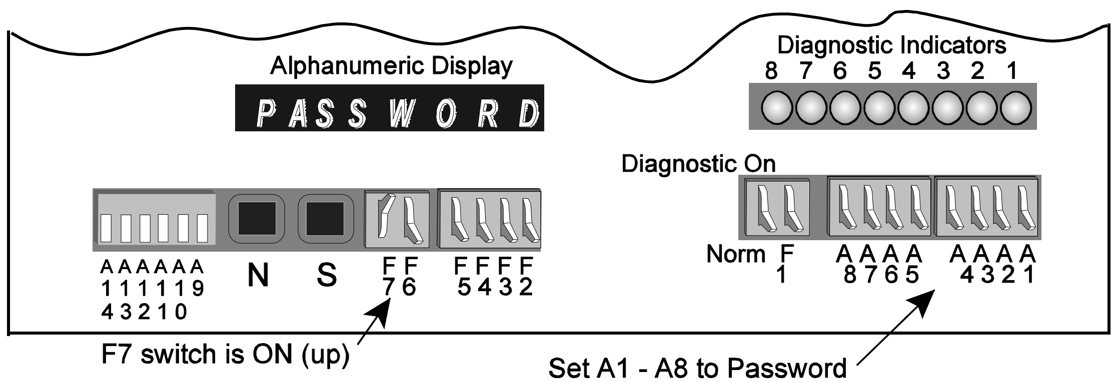
e. To restore normal operation, close and lock both the car and hoistway doors and then press and hold the Emergency Brake Reset pushbutton (SC-BASE board) until the emergency brake resets.

4.6 SETTING THE CAR NETWORK ID

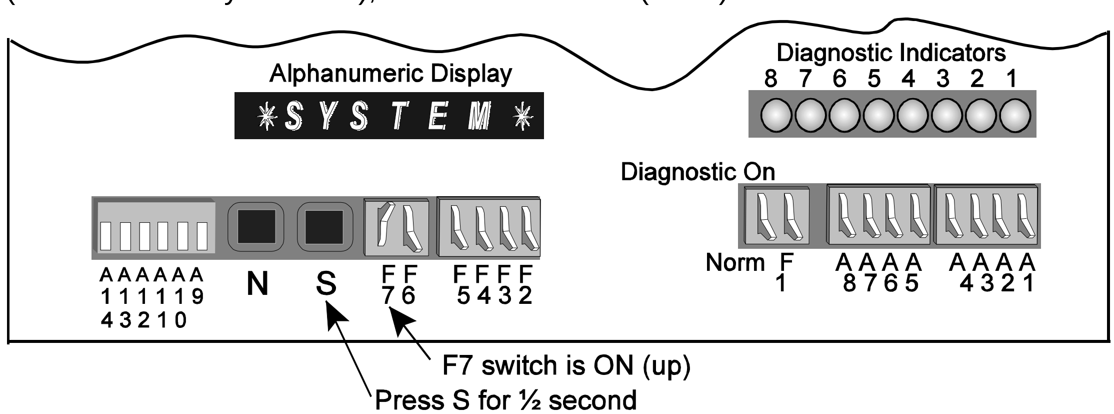
The Car Network ID identifies each local car controller to the Group Supervisor for communication purposes. With Release 4 Communication software this parameter is programmable and must be set for each local car in the Group System.

Using the optional CRT terminal - The optional CRT terminal connected to the local car controller may be used to set CNID Car Network ID. For instructions on using the CRT terminal, refer to the section in the Computer Peripherals Manual, MCE part #42-02-CP00 titled *Using the CRT Terminal*.

Using the Computer Swing Panel - The Car Network ID may be set using the Computer Swing Panel EOD in System Mode. To enter the System Mode, set the switches as follows:

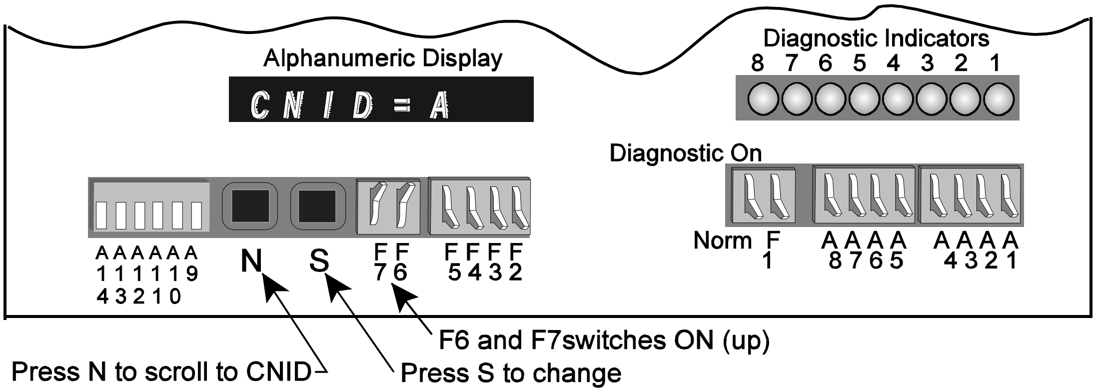


With the F7 switch in the ON position, the alphanumeric display shows **PASSWORD**. Set the A1 - A8 switches to the password value. If no password has been programmed for this job (which is normally the case), set A1 - A8 to OFF (down).



Press the **S** pushbutton for ½ second. The alphanumeric display changes to **SYSTEM**. While in System Mode, the group of eight vertical status LEDs scan from bottom to top indicating that System Mode is active.

SETTING THE CNID SOFTWARE OPTION - Once in System Mode, place the F6 switch in the ON (up) position. The first software option will be shown on the display. Press **N** to scroll to the CNID Car Network ID option. Then press **S** to change the setting.



Once the desired CNID setting is displayed, exit System Mode by placing switches F6 and F7 in the OFF (down) position.

WARNING: Before the Elevator can be turned over to normal use, it is very important to verify that no safety circuit is bypassed. The items to be checked, include, but are not limited to:

* Check that the hierarchy of the inspection inputs is correct. Car top inspection must take priority over in car, hoistway access and machine room inspection modes. In car must take precedence over hoistway access and machine room inspection. Hoistway access must take priority over machine room inspection.
* Relays FLT on HC-ACI board and AS and ETL on the HC-ACIF board (if provided) must be installed properly in their sockets.
* No jumpers between terminals 2 and UET or DET.
* No jumper between 2KBP1 and 2KBP2 on SC-BASE
* No jumper between terminals 2 and 15 (SC-SB2K).
* No jumper between terminals 4 and 9 (SC-SB2K).
* No jumper between terminals 9 and 10 or 12 (SC-SB2K).
* No jumper between terminals 10 and 11 (SC-SB2K).
* No jumper between terminals 12 and 13 (SC-SB2K).
* No jumper between terminals 16 and 17 (SC-SB2K).
* No jumper between terminal EBS1 and EBS2.
* Speed Command 9 and Overspeed Level parameters must be set to original value for high speed.
* Options LTAB and ABYP are set to OFF and the the controller is in normal mode.
* Parameters 156 must be set to original value.
* Parameter 81 (Overspeed Mult) = 1.0
* Parameter 80 (Overspeed test) = OFF.
* COS trimpot on the SC-BASE / SC-BASER board fully CW.

SECTION 5
ONBOARD DIAGNOSTICS

5.0 GENERAL INFORMATION

The VVMC-1000 Series "M" traction controller includes user-friendly diagnostic tools that help the mechanic install and service the equipment. The diagnostic tools available on the controller include an optional CRT terminal and the Enhanced Onboard Diagnostics (EOD). The CRT terminal provides the elevator mechanic with a set of easy-to-use menus for the purpose of servicing and troubleshooting the controller. More information about the CRT is available from the MCE Computer Peripherals manual. This section covers the Computer Swing Panel's Enhanced On-Board Diagnostics.

5.1 ENHANCED ONBOARD DIAGNOSTICS (EOD) OVERVIEW

The Computer Swing Panel provides the Enhanced Onboard Diagnostics (EOD). A quick look at the switches and LEDs provides an overview of the elevator and its functions. Once familiar with the equipment, an elevator mechanic can understand the current operating conditions of the elevator and diagnose a problem using the EOD. No external devices are required to view the status of the elevator and see what the elevator control system is actually trying to do. The Enhanced Onboard Diagnostics operate in three modes, Normal, System and Diagnostic. All three modes are discussed in detail in this section.

5.1.1 DESCRIPTION OF EOD LIGHTS AND SWITCHES

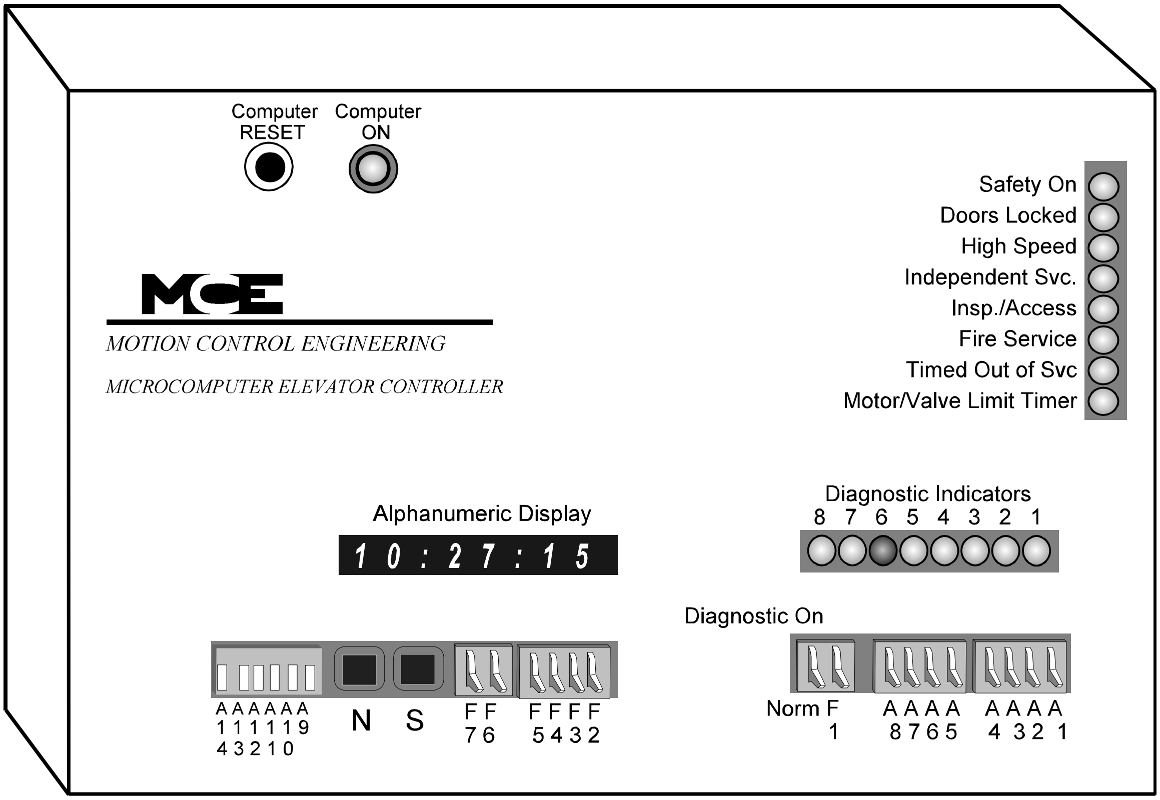
The following is a description of the EOD indicators and switches (see Figure 5.1)

COMPUTER ON LED - The Computer ON LED, when it is ON continuously, indicates that the MC-MP2-2K Main Processor board is functioning normally and is completing its program loop successfully. If the Computer ON LED flashes ON and OFF, it means that the program is not looping successfully and the Main Processor board is malfunctioning. When this happens the SAFR2 relay is dropped and all further operation is shut down. Make sure the EPROM chip is installed properly. Refer to Appendix A, *Disassembling the Computer Swing Panel* and Appendix B, *Changing PC Boards or EPROMS*.

COMPUTER RESET BUTTON - Pressing the Computer RESET button on the front of the Swing Panel causes the MC-MP2-2K Main Processor board and the optional MC-CGP-4(8) Communication Processor board to reset. If the elevator is running, resetting drops the SAFR1 and SAFR2 safety relays and brings the elevator to an immediate stop. After release of the reset button, the elevator then proceeds to the nearest floor to correct its position before responding to any calls. Existing call and PI information is lost when the microcomputer is reset.

Pressing the Computer RESET button on the Computer Swing Panel turns the Computer ON LED OFF and it will remain OFF while the RESET button is depressed. The Computer ON LED turns back ON when the RESET button is released. The Main Processor board is also equipped with a software system monitor that drops relay SAFR2 if for any reason, the software system fails to execute its program.

FIGURE 5.1 Computer Swing Panel, Front View



STATUS INDICATORS - (vertical LEDs on the front of the Swing Panel) - These lights indicate the elevator's status. When these lights are ON, they mean the following:

Safety On	-	the safety circuit is closed.
Doors Locked	-	the door lock contacts are closed.
High Speed	-	the elevator is running at high speed.
Independent Svc.	-	the elevator is on Independent Service.
Insp./Access	-	the elevator is on Hoistway Access, Car Top or Relay Panel Inspection operation.
Fire Service	-	the elevator is on Fire Service operation.
Timed Out of Svc	-	the TOS timer has elapsed.
Motor/Valve Limit Timer	-	the Motor or Valve Limit Timer has elapsed.

DIAGNOSTIC INDICATORS - The eight horizontal diagnostic indicator lights (MP Diagnostic Indicators) have two functions. When in Normal mode, they indicate the current status or error condition (see Section 5.2.2), and when in Diagnostic mode, they indicate the contents of computer memory (see Section 5.4.1).

ALPHANUMERIC DISPLAY - The eight character alphanumeric display is used to provide user friendly interaction between the control equipment and the elevator mechanic by displaying alphanumeric messages (see Section 5.2.1).

ADDRESS SWITCHES (A1 - A8) - These switches enable the mechanic to look at the memory on the MC-MP2-2K Main Processor board (see Section 5.4.1). They are also used for entering calls into the system (see Section 5.4.2). These switches are ON in the up position and OFF in the down position.

ADDRESS SWITCHES (A9 - A14) - These address switches, on the left side, are primarily used by the factory.

FUNCTION SWITCH F1 (CAR A/CAR B) - This switch is used to access the COM Ports when in SYSTEM mode. In a duplex configuration, this switch selects which car's information is being displayed and can be accessed by the A1 - A8 switches.

DIAGNOSTIC ON/NORMAL SWITCH - This switch puts the system in Diagnostic mode in the up position and in Normal mode in the down position (see Section 5.4).

FUNCTION SWITCHES (F2 - F7) - These switches are used to access diagnostic information for viewing and changing settings in the Normal and System modes of operation (see Sections 5.2 and 5.3).

PUSH-BUTTONS N AND S - These push-buttons are used in different diagnostic modes to scan through the choices available and to make selections.

CP COMPUTER ON INDICATOR LIGHT - The CP Computer ON LED on the optional MC-CGP-4(8) board indicates that the Communication Processor board is functioning normally and is completing its program loop successfully. The MC-CGP-4(8) board is equipped with an auto reset feature that will cause the elevator to go through a resetting process if, for any reason, the program loop cannot be completed.

5.2 NORMAL MODE (EOD)

The following is a description of the indicators and switches used in Normal mode, and the settings which can be viewed and changed. Begin with all switches in the OFF (down) position as shown in Figure 5.1. Specifically, the Diagnostic On/Norm and the F7 switches *must* be in the down position. In the Normal Mode, the F2, F4 and F5 switches are used to access and set the following:

F2 - Adjustment of Elevator Timers (see Section 5.2.3)
F4 - Setting the Real Time Clock (see Section 5.2.4)
F5 - Viewing the MP Internal Flags (see Section 5.2.5)
F2 thru F7 - Resetting the MC-CGP parameters (see Section 5.2.6)

5.2.1 ALPHANUMERIC DISPLAY (DEFAULT DISPLAYS)

> **NOTE:** Upon power up, controllers with the MC-MP2 board scroll the message ***MP2 VERSION NUMBER: 8.xx.xx*** across the alphanumeric display. If the message ***PASSCODE REQUEST...*** is then scrolled across the display, refer to Section 5.3.6 *Setting and Resetting the Passcode Option*.

The alphanumeric display is used for a number of special diagnostic functions that are available on the controller. Depending on the configuration of the control system, the available displays include the following:

- scrolling status and error messages
- temperature (Celsius)
- temperature (Fahrenheit)
- measured load
- trip counter
- software versions
- time of day

To scroll through the available displays (change what is currently being displayed on the alphanumeric display), press and hold the N push-button.

N O R M A L O P

STATUS AND ERROR MESSAGES - On controllers with the MC-MP2 Main Processor board, status and error messages are scrolled across the alphanumeric display. The message NORMAL OPERATION is scrolled when no other status or error condition(s) exist. Table 6.1 provides a list of standard messages and Table 6.3 *Status and Error Messages* provides descriptions and troubleshooting information. Table 6.4 provides a list of ASME A17.1-2000 status and error messages.

Note that at any time, more than one status or error condition may exist. But the Alphanumeric Display can show only one message at a time. The message considered to be of highest priority will be displayed first. For example, if the car is on Independent Service *and* the safety circuit is open, the display will scroll SAFETY CIRCUIT IS OPEN. Once the problem with the safety circuit is corrected, the display will scroll the message INDEPENDENT SERVICE OPERATION. When Independent Service is turned OFF, NORMAL OPERATION will again be displayed.

TEMPERATURE (CELSIUS) - This mode displays the temperature in degrees Celsius. This mode is available only if the controller has been configured with the ability to connect a temperature sensor. In the examples, 45C represents 45° Celsius and -15C represents -15° Celsius.

T M P = 4 5 C

T M P = - 1 5 C

TEMPERATURE (FAHRENHEIT) - This mode displays the temperature in degrees Fahrenheit. This mode is available only if the controller has been configured with the ability to connect a temperature sensor. In the examples, 104F represents 104° Fahrenheit and -27F represents -27° Fahrenheit.

T M P = 1 0 4 F

T M P = - 2 7 F

MEASURED LOAD - This feature is only available for controllers that use an analog load sensing device (load weigher). In the example on the right, the measured value is 100% of the learned value. If the load weigher learn process has not yet been successfully performed, the measured load will not be displayed; the computer has no reference values from which to calculate the load. Instead, the following status message will be displayed: **LOAD WEIGHER NOT YET LEARNED**.

L W = 1 0 0 %

TRIP COUNTER - This mode provides the ability to view and/or reset a six-figure trip counter. The trip counter records the number of high speed runs made by the elevator since the last time the counter was reset to zero. The example on the right indicates that the car has made two thousand runs since the counter was last reset.

T = 0 0 2 0 0 0

RESETTING THE TRIP COUNTER - A trip counter may be reset to zero by pressing and holding the S push-button while the trip counter is displayed. Once the S push-button is pressed, the alphanumeric display will display **CLEAR: 5**, indicating that the counter will be cleared in 5 seconds. If the button is held for 5 seconds, the timer will count down from 5 to 0 and the counter will be reset to zero. The 5-second delay is provided to prevent an accidental reset of the counter. Once cleared, the counter will display the value zero.

T = 0 0 0 0 0 0

SOFTWARE VERSIONS - On local car controllers the version number of the MP Main Processor and CGP Communication Processor software are displayed. The following messages are scrolled across the alphanumeric display:

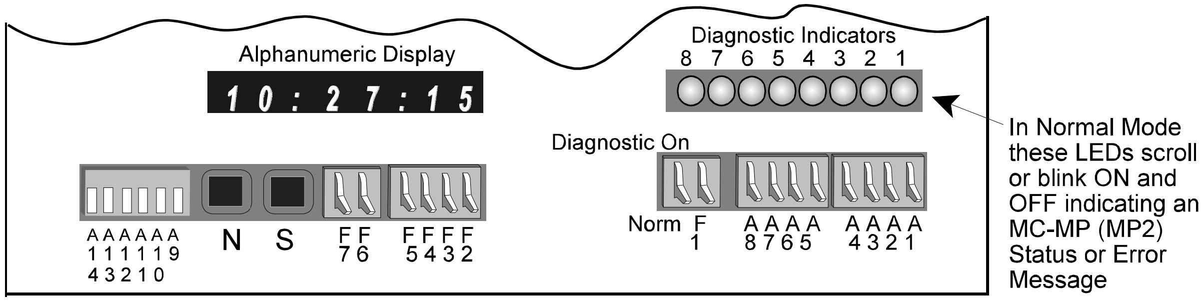
MP VERSION NUMBER:	X.XX.XX	(X.XX.XX is the version number)
CGP VERSION NUMBER:	X.XX.XX	(X.XX.XX is the version number)

TIME OF DAY - This mode displays the time of day in a 24-hour military format (hours, minutes and seconds). Refer to Section 5.2.4 to change or adjust the time. The example shown on the right represents the time 1:30 p.m.

1 3 : 3 0 : 0 0

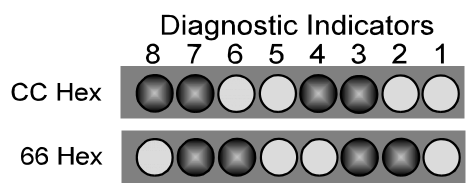
5.2.2 DIAGNOSTIC INDICATORS

The Diagnostic Indicators are located on the front of the Computer Swing Panel.

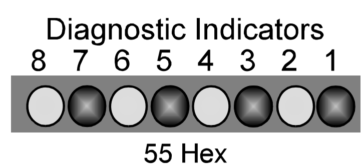


MP2 DIAGNOSTIC INDICATORS - The MP2 Diagnostic Indicators are located on the front of the Computer Swing Panel. During normal operation these lights scan from right to left (indicating that the MP program is looping properly) or flash ON and OFF to indicate an error or status condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

When a status or error condition exists, the Diagnostic Indicators flash one of several messages depending on the software version (MP2 version number scrolls on boot up):



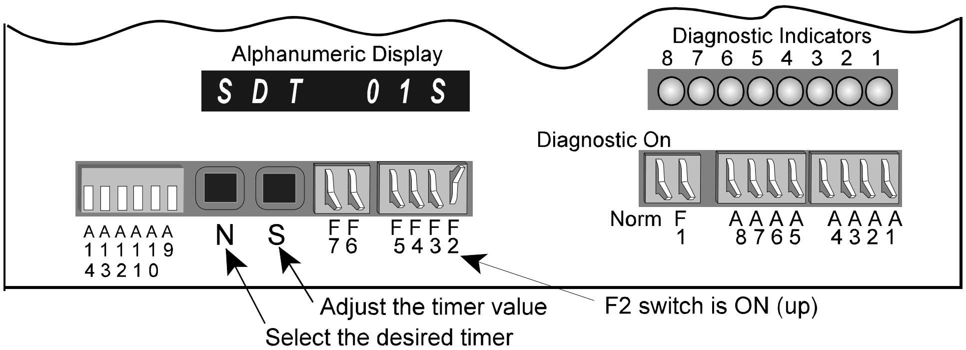
- Software versions 8.02.00 or earlier flash the MC-MP-1ES messages.
- Software version 8.03.00 flashes CC Hex.
- Software versions 8.04.00 or later flash 66 Hex. Set the alphanumeric display to scroll the status or error message. Refer to Table 6.1 *MC-MP2 Scrolling Messages Lookup* or find the message in the Index and then refer to Table 6.3 *Status and Error Messages* for a description and troubleshooting information for the scrolling message.
- ASME A17.1 - 2000 status and error conditions are indicated by the diagnostic indicators flashing 55 Hex. Set the alphanumeric display to scroll the status or error message. Refer to Table 6.4 *ASME A17.1 - 2000 Status and Error Messages* for a description and troubleshooting information for the scrolling message.



If the scrolling status or error message is not immediately displayed, press the N pushbutton until the scrolling message appears (see Section 5.2.1 ALPHANUMERIC DISPLAY - STATUS AND ERROR MESSAGES).

5.2.3 ADJUSTMENT OF THE ELEVATOR TIMERS

To view or adjust the elevator timing functions, set the switches as shown. When the F2 switch is ON the timer settings are displayed and the values can be changed.



For example, when the F2 switch is turned ON, the display reads **SDT 01S**. SDT is the flag for Short Door Dwell Timer. The number (01S) means that the Short Door Dwell Timer has been set for 01 second. If the value had been in minutes, the last letter displayed would be M instead of S. Pressing the N push-button (for next) advances the display to the next available programmable timer. Constant pressure on the N push-button causes the display to scroll through all the available programmable timers. Table 5.1 provides a listing of the programmable timers and their ranges.

Once a programmable timer has been selected using the N push-button, the timer can be adjusted to a desired value by using the S (for select) push-button. The adjustment range for each timer is pre-set (see Table 5.1). Constant pressure on the S push-button increases the timer value by one (second or minute) and causes the display to flash until the value reaches the upper limit, at which point it automatically starts over from the lower limit. When the A1 switch is placed in the ON (Up) position, pressing the S push-button causes the timer value to decrease. Release the S push-button when the desired value is displayed. When the S push-button is released, the display flashes for three seconds. After the display stops flashing, the new timer value has replaced the old value.

NOTE: Timers listed in Table 5.1 are not included if the corresponding inputs/outputs/options are not available on your controller.

TABLE 5.1 Timers and their Ranges*

Timer	Description	Timer Range
ADAC	**ADA Car Call Door Dwell Timer.** This timer provides the minimum door dwell time when responding to a car call, as required by the ADA. This timer is not shortened by the activation of a button or door reopening device.	01-120 seconds
ADAH	**ADA Hall Call Door Dwell Timer.** This timer provides the minimum door dwell time when responding to a hall call, as required by the ADA. This timer is not shortened by the activation of a button or door reopening device.	01-120 seconds
ASTP	**Automatic Stop Door Dwell Timer.** This timer defines the amount of time the doors will stay open when the car has performed an “automatic stop”. This timer will only appear if the controller software has been configured to perform the “auto stop” function.	01-30 seconds
CCT	**Car Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to a car call.	01-120 seconds
DHLD	**Door Hold Timer.** This timer defines the amount of time the doors will stay open when the door hold button is pressed. This timer will only appear if the controller has been configured with a door hold button (DHLD input).	01-240 seconds

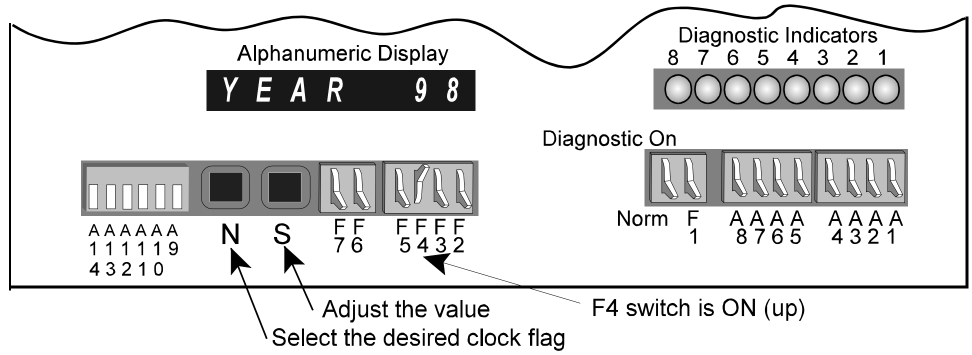
*TABLE 5.1 Timers and their Ranges**

Timer	Description	Timer Range
DRBZ	**Door Buzzer Timer.** This timer indicates the length of time that the door buzzer output should be active before door closing is initiated.	0-30 seconds
FLO	**Fan and Light Output Timer.** This timer defines the amount of time that the fan and light output (FLO) will keep the car fan and lights operative in the absence of demand on the car. This timer will only appear if the controller has been configured with a fan and light output (FLO output).	01-25 minutes
HCT	**Hall Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to a hall call.	01-120 seconds
HOS2	**In-car Hospital Service Timer.** This timer defines the amount of time that the car will remain at a floor in response to a hospital emergency call. If the timer elapses before the car is placed into “in-car hospital service”, the car will revert back to normal operation. This timer will only appear if the controller has been configured with hospital emergency service.	01-120 seconds
IDLE	**Idle Demand Timer.** This timer defines the amount of time that will pass before an idle car is automatically moved to the next floor. This feature is useful in applications in which it is desirable to lubricate the bearings and/or exercise the brake mechanism periodically to prevent friction at initial car movement. This timer may be turned OFF to disable this function.	01-60 minutes
LOT	**Lobby Call Door Dwell Timer.** This timer provides the door dwell time when the car is responding to either a car call or a hall call at the lobby landing (as specified by the adjustable control variable “LBBY”).	01-120 seconds
MGT	**Motor Generator Shut Down Timer.** This timer defines the amount of time that will pass before the motor generator is turned OFF on a car that is idle.	01-10 minutes
MBWR	**Motor Blower Output.** This timer defines the amount of time that the Motor Blower output (MBWR) stays on after the car has stopped running.	01 - 26 minutes
PHEB	**Photo Eye Bypass Timer.** This timer defines the amount of time that will pass before an active optical door reopening device is ignored and/or nudging is activated. The computer monitors the PHE input for continuous activation and, should the PHE input remain active for the amount of time defined by the PHEB timer, the PHE input is ignored and/or nudging operation invoked (depending upon the controller configuration).	10-240 seconds
PRIS	**In-car Priority Service Phase II Timer.** This timer defines the amount of time that the car will remain at a floor in response to a Priority Service call. If the timer elapses before the car is placed into “In-car Priority Service”, the car will revert back to normal operation. This timer will only appear if the controller has been configured with In-car Priority Service.	01-120 seconds
PRKD	**Parking Delay Timer.** This timer represents the amount of time that will pass before an idle car will park at the specified parking floor (if applicable).	01-120 seconds
SDT	**Short Door Dwell Timer.** This timer defines the door dwell time that will be provided when a door reopening device has been activated.	01-120 seconds
SEPT	**Mechanical Safety Edge Protection Timer.** This timer defines the amount of time that will pass before an active mechanical safety edge is ignored and/or nudging is activated. If a mechanical safety edge is used (as specified by the adjustable control variable MSAF), the computer monitors the SE input for continuous activation and, should the SE input remain active for the amount of time defined by the SEPT timer, the SE input is ignored and/or nudging operation invoked (if applicable).	01-240 seconds
TOS	**Time Out of Service Timer.** This timer is used to determine that a car has been prevented from responding to a car or hall call demand. Once this timer elapses, the car’s “in service” status is removed to allow hall calls assigned to the car to be reassigned to another car.	15-240 seconds

**Some timers are not included if the corresponding inputs/outputs are not programmed.*

5.2.4 SETTING THE REAL TIME CLOCK

To adjust the real time clock, set the switches as shown. The F4 function switch is used to access the clock parameters located on the Main Processor board.



Placing the F4 switch in the ON (up) position causes the alphanumeric display to show the current year. The following table lists all the clock parameters and their adjustment ranges.

TABLE 5.2 Clock Parameters and their Ranges

Parameter	Range	Parameter	Range
YEAR	00 - 99	DATE	01 - 31
MONTH	01 - 12	HOUR	00 - 23
DAY	MON. - SUN.	MIN (MINUTE)	00 - 59

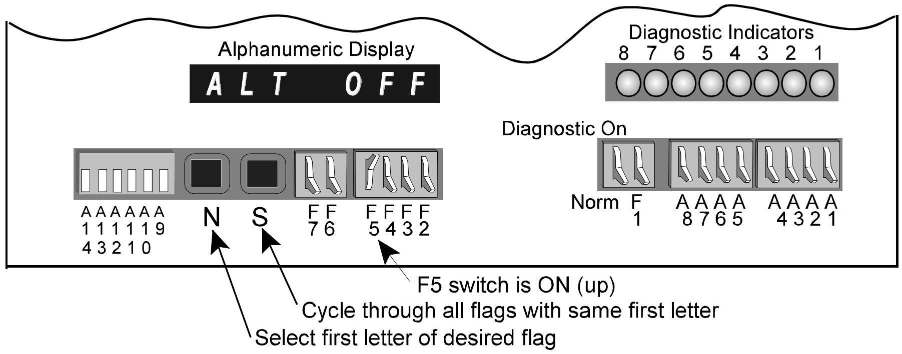
Press the N push-button to select the next parameter. Constant pressure on the N push-button causes the display to scroll through all of the real time clock parameters. Once a parameter has been selected, the value can be changed by pressing the S push-button. Constant pressure on the S push-button increases the value by one, until the value reaches the upper limit, at which point it automatically starts over from the lower limit. When the A1 switch is placed in the ON (up) position, pressing the S push-button causes the timer value to decrease. Release the S push-button when the desired value is displayed. The new value is saved immediately. Return the F4 switch to the OFF (down) position to exit the clock parameter adjustment menu.

5.2.5 ALPHANUMERIC DISPLAY - VIEWING THE MP COMPUTER VARIABLE FLAGS

This function is used to display the status of many of the input/output and internally generated flags related to the MC-MP2-2K computer. To access these flags, set the switches as shown.

MC-MP2-2K Flags - With the MC-MP2-2K software, after moving the F5 switch to the ON position, the alphanumeric display scrolls the message ***FLAGS STATUS...*** and then displays abbreviation and status of the first available flag beginning with the letter A.

To access the MC-MP2-2K flags, set the switches as shown.



Tables 5.8 and 5.10 provide a listing of the available flags. To select a flag, press the **N** pushbutton until the first letter of the flag displayed is the same as the first letter of the desired flag. Release the **N** pushbutton and press the **S** pushbutton until the desired flag is displayed. The flag's abbreviation and current status is displayed (0 = OFF, 1 = ON).

MC-MP2-2K Inputs - With the MC-MP2-2K software the status of many system inputs may be viewed on the alphanumeric display. To view the inputs, the F5 switch plus various additional switches must be placed in the ON (up) position as follows:

- F5, A9 HC-PIO board inputs
- F5, A10 HC-RD board inputs
- F5, A9, A10 HC-IOX / HC-I4O board inputs
- F5, A11 HC-CIO board inputs
- F5, A9, A11 MC-NC board inputs
- F5, A10, A11 SC-SB2K board inputs
- F5, A9, A10, A11 SC-BASE board inputs
- F5, A9, A10, A11, A12 SC-HDIO board inputs

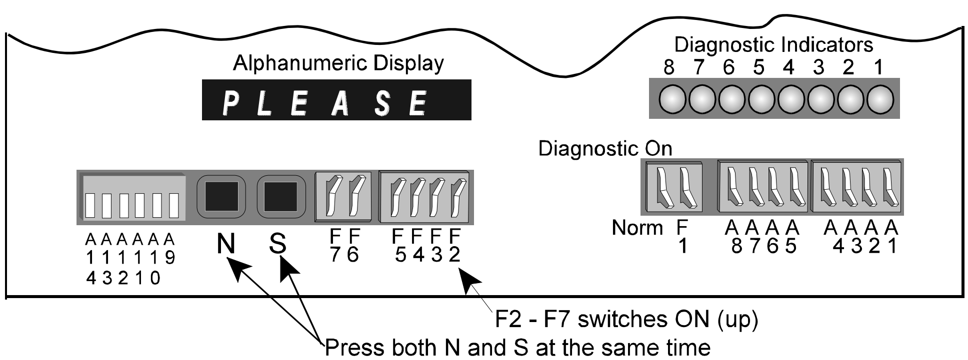
Press the **N** pushbutton to scroll through the inputs available for this job. They are displayed in the order they are arranged on the board. The abbreviation and status of each input is displayed (0 = OFF, 1 = ON).

5.2.6 RESETTING THE CGP PARAMETERS

When an MC-CGP-4(8) EPROM or PC board are changed it may be necessary to reset the CGP parameters to their default values. This can be done using either the optional CRT terminal or via the Computer Swing Panel.

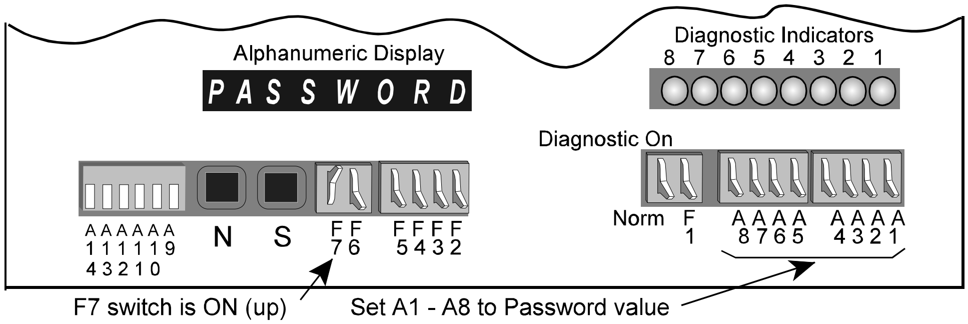
Using the optional CRT terminal - The optional CRT terminal connected to the local car controller may be used to reset the CGP parameters using ODPC Reset CGP Parameters. For instructions on using the CRT terminal, refer to the section in the Computer Peripherals Manual, MCE part #42-02-CP00 titled *Using the CRT Terminal*.

Using the Computer Swing Panel - The CGP parameters can be reset to their default values using the Computer Swing Panel. Set the toggle switches as shown, then press both the **N** and **S** pushbuttons at the same time.



5.3 SYSTEM MODE (EOD)

The System Mode provides a level of security (if programmed) so that an unauthorized person cannot modify or change the system parameters either intentionally or by mistake. To enter the System Mode, set the switches as shown



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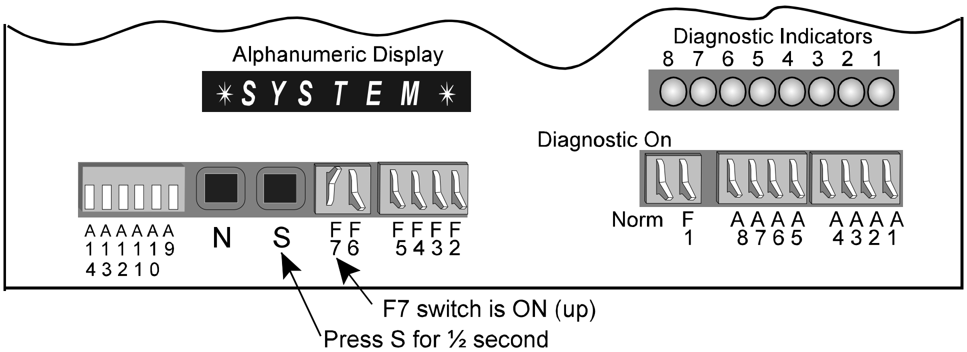
With the F7 switch in the ON position, the alphanumeric display shows **PASSWORD**. Set the A1 - A8 switches to the password value. If no password has been programmed for this job (which is normally the case), set A1 - A8 to OFF (down).



Press the **S** push-button for ½ second. The alphanumeric display changes to **SYSTEM**. While in System Mode, the group of eight vertical status LEDs scan from bottom to top indicating that System Mode is active. If no function switch is moved or push-button is pressed for a period of two minutes, the computer will automatically exit from System Mode and go into the Normal Mode of operation. Placing the F7 switch in the OFF (down) position also causes the EOD to exit the System Mode.

In System Mode, the Function Keys are used to access and set the following system parameters:

- F1 - Communication Port Settings (see Section 5.3.1)
- F3 - Security Codes (see Section 5.3.2)
- F4 - Not used
- F5 - MSK: Master Software Key (Simplex only) (see Section 5.3.3)
- F6 - Software Options - adjustable control variables (see Section 5.3.4)
- F7 - Turns System Mode ON and OFF
- Diagnostic On/Norm - Load Weigher Learn Operation (see Section 5.3.5)
- A8 - Setting and Resetting the Passcode Option (see Section 5.3.6)

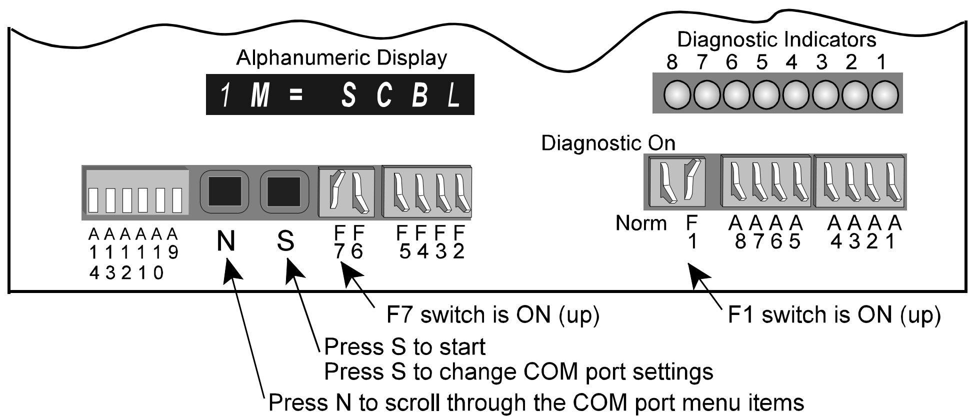
5.3.1 PROGRAMMING THE COMMUNICATION PORTS

The communication ports are field programmable through the Computer Swing Panel's Enhanced Onboard Diagnostics (EOD). MCE's Computer Peripherals Manual covers connecting a CRT terminal to a COM Port on the MC-RS board and set-up of the CRT terminal.

The communication ports were programmed (at the factory) for the original hardware, based on customer-provided information. It may be necessary to reprogram a communication port for one of the following reasons:

- changing from a monochrome to a color CRT
- adding a lobby CRT or CRT with keyboard.
- adding a modem.

The new hardware will not work correctly until the communication port is reprogrammed. To reconfigure the communication port, enter the System Mode as described at the beginning of Section 5.3 and set the switches as shown.



When the F1 switch is placed in the ON (up) position, the alphanumeric display shows the following scrolling message: **COMPORT MENU PRESS S TO START**. Press the **S** push-button for ½ second and the display will show the current setting for the first item on the COM port menu, in this case **1M=SCBL**. The *1M* stands for *COM Port 1 Media* and *SCBL* stands for *Serial Cable* (see Tables 5.3 and 5.4) To change a communication port setting, press the **N** push-button to scroll through the Communication Port Menu until the desired item is shown on the alphanumeric display. Table 5.3 lists the items on the COM port menu.

CHANGING THE MEDIA SETTING - To change the *media* setting for COM Port #2, press the **N** push-button to scroll through the items on the Communications Port Menu (see Table 5.3) and release N when **2M** is displayed. Then press the **S** push-button to scroll through the Media Menu (see Table 5.4). Release S when the desired media is displayed. After selecting the desired media, press N to again scroll through the Communications Port Menu.

CHANGING THE DEVICE SETTING - To change the *device* setting for COM Port #2, press the **N** push-button to scroll through the Communications Port Menu and release N when **2D** is displayed. Then press the **S** push-button to scroll through the Device Menu (see Table 5.5). Release S when the desired device is displayed. After selecting the desired device, press N to again scroll through the Communications Port Menu.

SAVING THE CHANGES - When you have finished making changes, press the N push-button until, ***SAVE?N/S*** is displayed. Pressing **S** will save the changes and ***SAVED...*** will be displayed. If **N** is pressed the program will continue to scroll through the Communications Port Menu. To exit the Communications Port Menu, place the F1 switch in the OFF (down) position. If you exit the Communication Port Menu without choosing SAVE?N/S and pressing S, any changes made to settings will be ignored.

TABLE 5.3 Communication Port Menu

EOD Display	Description
NO COM	No COM port option has been enabled
1M	COM Port 1 Media
1D	COM Port 1 Device
2M	COM Port 2 Media
2D	COM Port 2 Device
3M	COM Port 3 Media
3D	COM Port 3 Device
4M	COM Port 4 Media
4D	COM Port 4 Device
SEVEN/S	Save the changes? N for no or continue, S for save

TABLE 5.4 Media Menu

EOD Display	Description
NONE	NO MEDIA - Select when removing a computer terminal from a port.
SCBL	SERIAL CABLE - Select when setting up a CRT/terminal with a keyboard.
LDRV	LINE DRIVER - Used when setting up a CRT at a distance over 40 feet.
MODM	MODEM - Select when attaching a modem to a computer.

TABLE 5.5 Device Menu

EOD Display	Description
NONE	No Device
CRTMK	Use for these terminals or emulators with keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
CRTM	Use for these terminals or emulators without keyboard (Link MC5, Wyse WY-325ES, Esprit 250C Emulator or ADDS 260LF Emulator)
PC	Personal Computer with CMS / MSD
PCGD	Personal Computer Graphic Display (no longer used)
CRTCK	Use for these terminals with keyboard (Link MC-70, Wyse WY-370)
CRTC	Use for these terminals without keyboard (Link MC-70, Wyse WY-370)

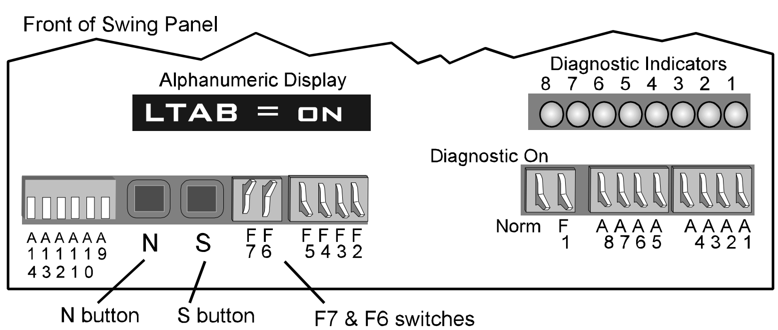
5.3.2 ASME A17.1 - 2000 BYPASS FUNCTION

To allow the car to run during construction and adjustment of the controller, we need to bypass several of the code required functions. Two modes of ANSI Bypass are available:

- One mode is for inspection operation only and provides for the bypass of the ANSI fault monitoring for an indefinite amount of time. Three steps are required to turn on this option.
- Another mode is for use on automatic operation and provides for two hours of bypass operation. Three steps are necessary to invoke this mode as well.

For bypass with unlimited time in Inspection mode:

1. Place a jumper between 2KBP1 and 2KBP2 on the SC-BASE board.
2. Place the MACHINE ROOM INSPECTION TRANSFER switch on the SC-SB2K board to the INSP position.
3. Enter system mode (**F7** switch up, press and hold **S** button for 1 second).
4. Access Software option LTAB (**F6** switch up, press **N** button to scroll to LTAB = OFF).
5. Change LTAB = ON (press **S** button)



For bypass for 2 hours in Automatic Operation:

1. Place a jumper between 2KBP1 and 2KBP2 on the SC-BASE board.
2. Place the TEST/NORM switch on TEST on the SC-SB2K board.
3. Enter system mode (**F7** switch up, press and hold **S** button for 1 second).
4. Access Software option ABYP (**F6** switch up, press **N** button to scroll to ABYP = OFF).
5. Change ABYP = ON (press **S** button)

Please exercise extreme caution when the 2000 bypass function has been invoked. Note that, regardless of this bypass function, the emergency brake still functions.

> **NOTE:** A jumper must be placed between terminals 2KBP1 and 2KBP2 on the SC-BASE board to bypass the ASME A17.1 - 2000 faults.

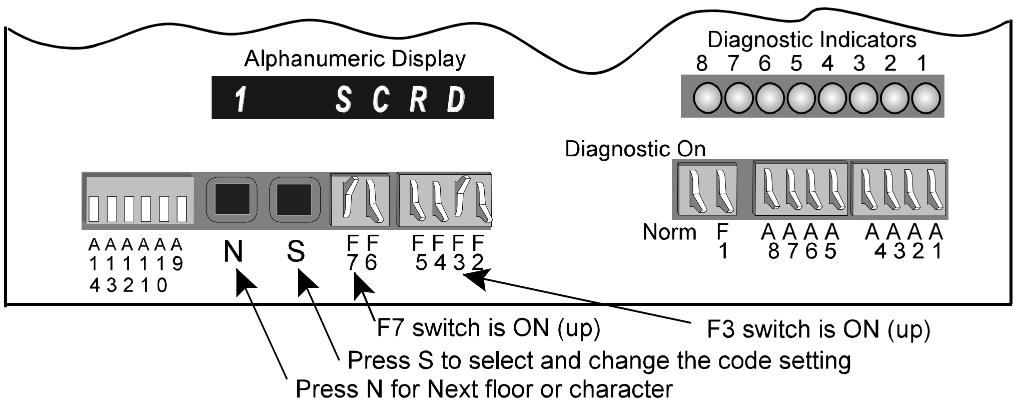
5.3.3 VIEWING AND CHANGING THE SECURITY CODES

For jobs with the MCE SECURITY, either Basic Security or Basic Security with CRT, this function allows the security codes to be viewed or changed. If the job does not have MCE SECURITY, the alphanumeric display will show **NOT USED**.

With MCE's Basic Security, the Building Security Input (BSI) is used to turn security ON and OFF. Refer to the job prints to find the BSI input. When *Security* is ON, all car calls are screened by the computer and become registered only if: (1) the call is to a floor that is not a secured floor, or (2) the floor is a secured floor and its Security Code is correctly entered within 10 seconds.

With MCE's Basic Security with CRT option, additional programming options are available via the CRT terminal. Refer to MCE part # 42-02-S024 Elevator Security User's Guide, Section 3, *Basic Security with CRT - Swing Panel* for additional information and programming instructions. For both Basic Security and Basic Security with CRT, the security codes for each floor are programmed as described below.

The Security Codes are viewed and changed using the Computer Swing Panel. To view and change the security codes, place the F3 Switch in the *On* or up position while in "System" mode. Not all elevator systems are equipped with the SECURITY option. If the system does not have MCE SECURITY, the Alphanumeric Display will show "NOT USED" when the F3 switch is turned On.



The security code for each floor may consist of from one to eight characters, where each character is one of the floor buttons found in the elevator car. Each floor may have a different length code. Table 5.6, *Changing Floor Security Status and Security Code*, describes the steps required to view and change a floor's security code. **A floor can not be *Secured* unless a *Security Code* has been programed.**

Appendix H, *Security Information and Operation*, provides instructions for elevator passengers who will be using the elevator while Security is ON. Space has been provided for listing the security codes for each floor.

TABLE 5.6 Changing the Floor Security Status and Security Code

Switch	Explanation	Alphanumeric Display
Step 1 **F3 *On***	**To begin, display the 1st floor's status** While in the *System* mode, turn function switch F3 *On, "Up".*	**Example:** B NSCR B = basement NSCR = not secured
Step 2 **Press N**	**To display another floor's security status** Steps to the next floor's security status. Press N again for the next floor, etc.	**Example:** 1 SCRD 1 = floor #1 SCRD = secured
Step 3 **Press S**	**To select a floor to view or change a code** With the floor's security status displayed, press S. The first character of the floor's security code is then displayed.	**Example:** 2 1 = 3 For floor 2, the first character in the code is 3.
Step 4 **Press S**	**To change a code character** Steps through the available code characters. When the desired character is displayed, go to Step 5.	**Example :** 2 1 = 5 For floor 2, the first security character is now 5.
Step 5 **Press N**	**To display the next code character** Steps to the next character in the code. To change more characters, repeat steps 4 and 5. The last character of a code must be the word END if the code is less than eight characters long.	**Example 1:** 2 2 = 4 For floor 2, the second character in the code is 4. **Example 2:** 2 1 = END For floor 2, the first character in the security code is the word END. Floor 2 is unsecured.
Step 6 **Press N**	**To end and save** If END is chosen as a code character or if this is the eighth character, when N is pressed the computer saves the code and displays the current floor's security status. To view or change the code for another floor, return to step 2.	**Example :** 2 NSCR If END was chosen for first character, this floor has no security code and is unsecured. Using END for any other character just ends that code, but the floor is still secured.
F3 and F7 switches *Off*, down position	**To exit System mode** Every security code must end with the word END or be 8 characters long. If not, the processor remains in System mode.	**Example:** 11:04:27 The time displayed

5.3.4 SETTING MSK: MASTER SOFTWARE KEY

On a simplex car, the Master Software Key is used in conjunction with the Basic Security with CRT option. To view or change MSK, log into System Mode as described at the beginning of Section 5.3 and then place the F5 switch in the ON (Up) position. If this is not a simplex car or if this job does not have Basic Security with CRT enabled, the alphanumeric display will show NOT USED. Additional information about the Master Software Key (MSK) can be found in MCE Part # 42-02-S024 Elevator Security User's Guide, Section 3, *Basic Security with CRT - Swing Panel*.

5.3.5 SETTING THE SOFTWARE OPTIONS - ADJUSTABLE CONTROL VARIABLES

Table 5.7 provides a listing of the software options - adjustable control variables. Not all of the options are available on all controllers. To view or set the adjustable control variables, log into System Mode as described at the beginning of Section 5.3 and place the F6 switch in the ON (Up) position.

The first available variable will be shown on the display. Press the S push-button to change the setting. Press the N push-button to scroll to the next available variable. Table 5.7 lists the variables in alphabetic order, not in the order in which they are displayed on the controller.

TABLE 5.7 Software Options

VARIABLE	NAME	DEFINITION
ABYP	*A17.1 - 2000 Bypass*	Allows the car to run without A17.1 - 2000 (monitor for 2 hours).
AFR	*Alternate Fire Floor Recall*	Determine the designated recall floor for alternate Fire Service Operation.
AFR2	*Second Alternate Fire Floor Recall*	Determine the designated recall floor for the second alternate Fire Service operation (Detroit Fire code).
AGNG	*Alternate Gong Option*	Causes an arrival lantern to be illuminated whenever the car's doors are open at a non-lobby landing. In the absence of actual call demand, the direction selected is a reflection of the car's last direction of travel. If the car is located at a terminal landing, the appropriate lantern will be illuminated.
APP1	*Alternate Primary (lower) Parking Floor*	When on, the car will no longer park at the original parking floor (PPF). Instead the car will park at the first alternate parking floor specified by the landing stored in this variable.
APP2	*Alternate Primary (lower) Parking Floor #2*	When ON, the car will no longer park at the original parking floor (PPF). Instead the car will park at the second alternate parking floor specified by the landing stored in this variable.
ASP1	*Alternate Secondary (upper) Parking Floor*	When ON, the car will no longer park at the original secondary parking floor (SPF). Instead the car will park at the secondary parking floor specified by the landing stored in this variable. This variable is only available on a duplex system.
ASP2	*Alternate Secondary (upper) Parking Floor #2*	When ON, the car will no longer park at the original secondary parking floor (SPF). Instead the car will park at the secondary parking floor specified by the landing stored in this variable. This variable is only available on a duplex system.
CCBC	*Cancel Car Call Behind Car Option*	If ON, and if the car has a direction arrow (SUA/SDA), no car calls can be registered behind the car's current position. For example, if a car is at the fifth floor, moving down, then no car calls can be registered for any floors above the fifth floor.
CNID	*Car Network ID*	(A thru L) The Car Network ID identifies this controller to the Group Supervisor.
CPPB	*Constant/Momentary Pressure Photo Eye/Safety Edge Bypass*	This option, when turned “OFF”, will disable photo eye/safety edge bypass logic for cars that are on Independent Service, Attendant Service, Hospital Service Phase 2, and any other non-automatic door closing conditions (CPCLOSE, MPCLOSE, etc.).
CSAR	*CSA Redundancy Check Option*	When ON, CSA redundancy checking logic is invoked. When OFF, the LSR, CNP and UDF inputs are ignored, and CSA redundancy checking logic is not performed.
DCFL	*Door Close Front Latch*	Maintains the Door Close Function on the front doors continuously as long as a door open command is absent.
DCRL	*Door Close Rear Latch*	Maintains the Door Close Function on the rear doors continuously as long as a door open command is absent.
DDOP	*Double Ding on Down Option*	When ON, the gong output dings twice for down direction travel and once for up direction travel. If OFF, the gong output will only ding once for both up and down direction of travel.

TABLE 5.7 Software Options

VARIABLE	NAME	DEFINITION
DDPO	*Door Lock Direction Preference Option*	Causes the car to hold its direction preference until the doors are closed. When OFF, the car will be allowed to change direction preference with the doors open (when the hall call door time elapses).
DGNG	*Door Lock Gong Option*	Determines when the arrival gong outputs are activated. The arrival gong outputs are activated after the doors begin to open. When OFF, the arrival gong outputs are activated when the car steps into the floor. This option should be OFF when hall mounted arrival fixtures are used and turned ON when car-riding arrival fixtures are used.
DOFL	*Door Open Front Latch*	Maintains the Door Open Function on the front doors continuously as long as a door close command is absent.
DORL	*Door Open Rear Latch*	Maintains the Door Open Function on the rear doors continuously as long as a door close command is absent.
FTLF	*Failure to leave the floor*	The value set ibn this option determines the maximum number of times High speed may "pick" consecutively at the same landing before the car is shut down with an MLT fault. Set this option to OFF if it is desired to disable the shutdown due to this fault.
HNDZ	*Initiate high speed run while releveling (high speed while not in “dead zone”)*	This option is only available on those controllers which have been designed with a “rope stretch relevel” relay (RSR), which actively manipulates the “dead zone” perceived by the controller. Enabling this option will allow the controller to initiate a run while the car is still in the “releveling zone” (it will not have to relevel to “dead zone” before initiating a high speed run). The run is initiated only if the doors are locked and a car call has been registered.
HREO	*Reopen doors with hall button*	If enabled, this option will allow the activation of a hall call button to cause a car’s doors to reopen (if in the process of closing). If the option is turned OFF, the doors will not reopen if the doors are closing and a car call has been registered for that car.
LTAB	*A17.1 - 2000 Bypass*	Allows the car to run on inspection without A17.1 - 2000.
KCE	*Keyboard Control of Elevators*	MCE’s Elevator Central Monitoring System software, CMS for Windows, allows monitoring of elevators and control of certain elevator functions using a PC. The CMS option, KCE can be enabled or disabled at the local car or group level by turning the controller’s Adjustable Control Variable, KCE, ON or OFF. Changing the KCE setting in the individual car’s controller affects only that car. Changing the KCE setting in the Group controller affects all of the cars in that group. Consult the CMS for Windows manual for additional information.
LBBY	*Lobby Floor*	Determines the location of the lobby floor in the building.
LGNG	*Lobby Alternate Gong Option*	Causes an arrival lantern to be illuminated whenever the car's doors are open at the lobby landing. In the absence of actual call demand, the up direction lantern will be illuminated.
LLCC	*Light Load Call Cancel*	When the light load input (LLI) is ON, this variable sets the threshold above which an additional car call will cause all previous calls to be canceled with the exception of the last call entered in the system.
MFR	*Main Fire Floor Recall*	Determine the designated recall floor for main Fire Service operation.
MSAF	*Mechanical Safety Edge*	Determine if the car has Mechanical Safety Edge. This option must be turned ON if the car has Mechanical Safety Edge, otherwise it should be OFF when an infrared detector is used.
NPRE	*No Pre-opening Option*	When ON, prevents pre-opening of the doors on an approach to any landing. When OFF, the doors will start to open as soon as the car is 3" (76 mm) from level at the target floor.
PECC	*Anti-nuisance Call Cancel*	Sets the threshold for the number of car call stops without an interruption of the photo eye. If no photo eye interruption is detected when the car answers the fourth car call, the controller will cancel any additional car calls registered in the system. This function is normally referred to as anti-nuisance.
PHEP	*Photo Eye Protection*	When this variable is set to ON, it will prevent the photo eye from ever being bypassed except on Fire Service. When set to OFF, this option will enable the stuck photo eye protection logic and the photo eye will be bypassed after the car times out of service. This option must be turned ON for all jobs that use the PHE input for the door hold key switch.
PPF	*Primary (lower) Parking Floor*	Determines where the car will park in the absence of call demand. In a duplex system, this variable must be programmed as one of the landings in the building, and is set at the factory before shipment. In group systems, this variable only takes effect when the car is operating independently of the group supervisor or if there is a loss of communication with the group supervisor.
RCCD	*Reversal CCD Option*	When ON, all registered car calls are canceled when the car reverses direction.
SPF	*Secondary (upper) Parking Floor*	Determines which landing is used as the second parking floor. This variable is only available on a duplex system.

5.3.6 LOAD WEIGHER LEARN OPERATION (CALIBRATION)

The load weigher (isolated platform or crosshead deflection) provides a signal that corresponds to the perceived load. This signal is brought to the control system where it is conditioned, sampled and digitized, and the value is used to calculate the actual load *inside* the elevator. This load value is then used for logical operations such as anti-nuisance and hall call bypass.

With the isolated platform load weigher (MCE), the system simply learns the reference values of the empty and fully loaded car weight, which are then used to calculate the current load (as a percentage of full load). However, with the crosshead deflection load weigher (K-Tech), the magnitude of the signal generated by the load sensor represents the perceived load *at the crosshead*, which includes the weight of the car itself, the load inside the car, the traveling cable, and any compensation cables that might be attached to the car. Therefore it is necessary for the controller to use the measured load value in a calculation to determine the load inside the elevator (the raw load value cannot be used as is).

Due to the dynamics of the elevator system, the load represented by the traveling cable and compensation cables will vary with the position of the car in the hoistway. The load weighing system accounts for these variances by performing a process which learns empty car and full car load values at each floor in the building. The load in the car can then be determined by reading the value at a given floor and, using the learned values for that floor, performing a linear interpolation to approximate the load inside the car (as a percentage of full load). The calculated load percentage is then used to initiate logical operations, i.e., hall call bypass at 80% of capacity.

Logical operations that use the load information include: light load weighing (anti-nuisance), advance car dispatch (reduction of door dwell time), heavy load weighing (hall call bypass), and overloaded car detection. Each threshold is user-programmable, and will determine when each of these logical operations should be performed.

The measurement of the load will only take place when the car is stopped at a landing with the doors open. This is the only time that we would anticipate a change in load upon which a logical operation should be initiated. The measurement is not taken when the car is running because the acceleration and deceleration of the car would be interpreted as a change in load.

Functional Description of Load Thresholds - The four load thresholds are:

- **LLW** (Light load weigher threshold): This threshold value is used to define the load at which a limited number of car calls is to be registered. If the programmed number of car calls is exceeded, all car calls will be canceled.

  Example: LLW=20%. If the measured load in the car is less than 20%, the computer will only allow a certain number of car calls to be registered (defined by a field-programmable value LLCC). If LLCC is programmed at a value of 3, the computer will only allow 3 calls to be registered if the load is less than 20%. If a fourth call is registered, all car calls will be canceled.

- **DLW** (Dispatch load weigher threshold): This threshold value is used to define the load at which the lobby landing door timer is reduced. This threshold should be set to a value (defined in many specifications as 60%) at which it is appropriate to initiate the process of moving the car out of the lobby.

- **HLW** (Heavy load weigher threshold): This threshold value is used to define the load value at which hall calls should be bypassed.

- **OLW** (Overloaded car threshold): This threshold value is used to define the load value at which it is considered unsafe to move the elevator. When this threshold is exceeded, the car will remain at the floor with doors open. Typically an application that requires OLW will use some type of visual and/or audible indicator to alert elevator passengers that the car is overloaded.

- **OLW2** (Overloaded car threshold 2): When on Fire Service, this threshold value is used instead of the OLW value (see OLW above).

Learn Modes - With the isolated platform load weigher (MCE), the system simply learns the reference values of the empty and fully loaded car weight. However, with the crosshead deflection load weigher (K-Tech), the system must learn the reference values of empty and fully loaded car weight at each floor. This is necessary because the perceived load at the crosshead varies with the position of the car in the hoistway due to the changing proportion of the traveling cable hanging beneath the car and the position of the compensation cables. Examples of the causes fo load variance include:

- The position of the traveling cable will present a varying load (a changing proportion of the traveling cable hanging directly beneath the car).

- The position of the compensation cables will present a varying load (a changing proportion of the compensation cable hanging directly beneath the car). Note that the compensation cables are intended to equalize the load at the motor sheave, not at the crosshead.

- Variances in the alignment of the hoistway guide rails will present varying amounts of resistance to elevator movement. An added amount of resistance or friction may result in an increased perceived load at the crosshead.

The values learned for the empty car and full car at a particular floor are used to calculate the load when the car is positioned at that floor.

The Learn Process - The learn process consists of three functions:

- Learning the measured load value for an empty car at each landing.

- Learning the measured load value for a fully loaded car at each landing.

- Establishing the load thresholds which will initiate the logical operations.

Each of these functions can be performed separately. All three functions must be performed before the load weigher system will perform properly. **To enter the learn function, the car must be placed on Independent Service.** If an independent service switch is available in the car, use it. If not, the car can be placed on Independent Service by connecting a jumper between terminals 2 and 49 on the controller main relay board. A further option is to use the TEST/NORM switch on the SC-SB2K relay board, but this will electrically disconnect the door open relays, and is therefore **not recommended**.

5.3.6.1 GETTING INTO LOAD WEIGHER LEARN MODE

a. Enter the SYSTEM mode of operation on the Computer Swing Panel by following the steps described at the beginning of Section 5.3.

b. Once in SYSTEM mode, access the load weigher learn function by turning the Diagnostic On switch ON (the F7 switch should remain in the ON position). The computer will respond with one of three scrolling messages:

- *NOT USED* - The software has not been configured to provide the “analog load weighing function”. Contact MCE if you believe this to be in error.

- *CAR NOT READY TO LEARN* - Verify that the car has been placed on Independent Service.

- *PRESS N FOR K-TECH CROSSHEAD OR S FOR MCE PLATFORM...* - Select the type of load weigher by pressing N for K-Tech crosshead deflection or S for MCE isolated platform load weigher.

The following message is then displayed:

- *ANALOG LOAD WEIGHER LEARN FUNCTION...PRESS N TO CONTINUE* - The system is ready to learn, you have successfully placed the elevator in “load weigher learn mode”.

c. Once the elevator has successfully been placed in “load weigher learn mode” one or all three of the learn functions can be performed as described in sections to follow. The system will display one of three main prompts:

- READY TO LEARN EMPTY CAR VALUES? PRESS S TO CONFIRM - Press the S push-button to begin this process. The car must be empty before beginning.

- READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM - Press the S push-button to begin this process. Place the full load weights in the car before beginning.

- ADJUST THE LOAD THRESHOLDS? PRESS S TO CONFIRM - Press the S push-button to adjust the load threshold values.

Press the N push-button to cycle through these three different prompts. To exit the load weigher learn mode, turn the Diagnostic On function switch on the computer Swing Panel to OFF.

5.3.6.2 LEARNING THE EMPTY AND FULLY LOADED CAR VALUES

Learning the empty and loaded car values is an automated process that requires only that the appropriate load be present in the car before beginning each process. **It is best to have two persons available, one in the machine room at the elevator controller and one positioned at a floor with test weights available.** The test weights must represent the full load value.

If the K-Tech crosshead deflection load weigher was selected, the learn process will automatically run the car from floor to floor, stopping at each landing. The car will first travel to the bottom landing, stop and pause there for a period of time. The car will then move in the UP direction, stopping at each floor on the way to the car's highest landing served. Each time the car stops at a landing a value is learned for that landing (either the empty or full load value). Once all floors have been learned, the car will automatically return to its point of origin and open its doors. The learn process must be performed twice, once for empty car load and once for full car load.

Learning the Empty Car Load Values:

a. With the system in “load weigher learn mode”, press the N push-button until the following prompt is displayed: “READY TO LEARN EMPTY CAR VALUES? PRESS S TO CONFIRM...”.

b. Verify that the car is empty.

c. Press the S push-button to begin the learn process.

1. When the S push-button is pressed, the car will automatically close its doors and commence the learn operation. During this process, the doors will remain closed and the car will not respond to car or hall call demand. If the K-Tech crosshead deflection load weigher was selected, the car will move to the bottom floor, record the empty car value and then move up, stopping at each floor to record the empty car value. When the top floor has been reached, the car will move back to the floor at which the Load Weigher Learn procedure was begun.

2. During the learn process the computer will display the scrolling message: *LEARNING EMPTY CAR VALUES...PRESS N TO ABORT....* The learn process may be aborted by pressing the N push-button any time during the process.

3. Once the learn process is completed for the empty car, the computer will briefly display the message: “EMPTY CAR LEARN PROCESS COMPLETED...”. At that time, the car should be positioned at the floor where the learn process was begun, with the doors fully open.

4. The computer will then display the message: “READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM...”. Refer to the next section if you wish to learn the fully loaded car values. **[Do not press the S push-button at this time!]**

Learning the Fully Loaded Car Load Values:

a. With the system in “load weigher learn mode”, press the N push-button until the following prompt is displayed: “READY TO LEARN FULL CAR VALUES? PRESS S TO CONFIRM...”.

b. Using a car call, call the car to the floor where the test weights are located. Load the test weights, that represent the full load value, into the car.

c. Once the test weights have been loaded, press the S push-button to begin this learn process. The process is identical to the empty car learn process described above. The computer will display the scrolling message: “LEARNING FULL CAR VALUES...PRESS N TO ABORT...”.

1. The learn process may be aborted by pressing the N push-button any time during the process.

2. Once the learn process is completed for the fully loaded car, the computer will briefly display the message: “FULL CAR LEARN PROCESS COMPLETED...”. At that time, the car should be positioned at the floor where the learn process began, with the doors fully open. The test weights may now be removed from the car.

3. The computer will then display the message: “ADJUST THE LOAD WEIGHER THRESHOLDS? PRESS S TO CONFIRM...”. Refer to the next section if you wish to adjust the load weigher threshold values.

5.3.6.3 ADJUSTING THE LOAD THRESHOLDS

The load thresholds are preset, at the MCE factory, to values based upon the job specification. However, these thresholds are user-adjustable and may be changed at any time. To adjust these thresholds, enter the SYSTEM mode of operation as described at the beginning of Section 5.3, and select the load weigher learn function. The car must be on Independent Service to enter the load weigher learn function.

a. With the system in the “load weigher learn mode”, press the N push-button until the computer responds with the scrolling message: “ADJUST THE LOAD WEIGHER THRESHOLDS? PRESS S TO CONFIRM...”.

b. Press the S push-button to adjust the thresholds.

c. Once the S push-button is pushed, the computer will respond by displaying mnemonics that represent the load values. The value shown next to the mnemonic is the current threshold value for that parameter expressed as a percentage of the full load value.

Dispatching Threshold	Typical Value	Range
• LLW = light load (anti-nuisance) threshold	20%	0 - 40%
• DLW = dispatch load threshold	50%	20 - 80%
• HLW = heavy load (hall call bypass) threshold	80%	50 - 100%
• OLW = overloaded car threshold	105%	80 - 125%
• OLW2 = overloaded car threshold 2	125%	100 - 140%

d. Choose the parameter to be adjusted by pressing the N push-button. The mnemonics and values will scroll as long as the N push-button is depressed.

e. The desired value may be adjusted by pressing the S push-button. The value will be incremented until the upper limit value is reached. The value will then roll over to the lower limit value. These limit values are predetermined at MCE, and must be modified with an EPROM change, if necessary.

f. After the last parameter is displayed, pressing the N push-button will cause the computer to display the prompt: DONE ADJUSTING THRESHOLDS? PRESS S TO CONFIRM... At this prompt, pressing the S push-button will exit the threshold adjustment function; pressing the N push-button will return the prompt to the first threshold parameter.

The thresholds can be set to the desired values, as a percentage of full load. Setting the value to 00% will disable the corresponding function. Example: setting the HLW threshold to 00% will disable the hall call bypass function.

Exiting the Load Weigher Learn Mode

Exit the load weigher learn mode by placing the Diagnostic On/Normal switch in the Normal (down) position. Exit System Mode of diagnostics by turning the F7 switch OFF (down).

5.3.7 SETTING AND RESETTING THE PASSCODE OPTION (NOT ALL CONTROLLERS)

The Passcode Requested option can be used to require that a passcode be entered in order to run the car on any mode of operation other than Inspection. If a passcode has not been pre-programmed for the controller, the Passcode Requested option is not available and will not appear.

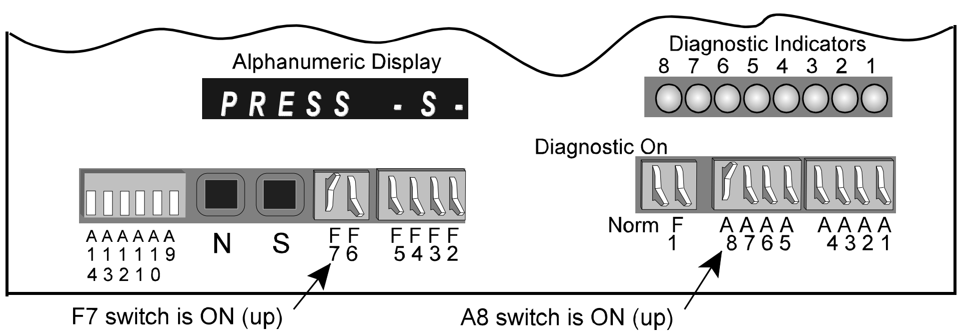
Upon power up, the message ***MP2 VERSION NUMBER: 8.00.0*** will scroll across the alphanumeric display. If a passcode has been pre-programmed and the Passcode Requested option has been activated, the message ***PASSCODE REQUESTED...*** is then scrolled. This means a passcode is required in order to run the elevator on any mode other than Inspection.

In order to set the passcode (to run the car on Normal operation) or reset the passcode (to disallow Normal Operation and run on Inspection only), the controller must first be placed in the System Mode as described at the beginning of Section 3.

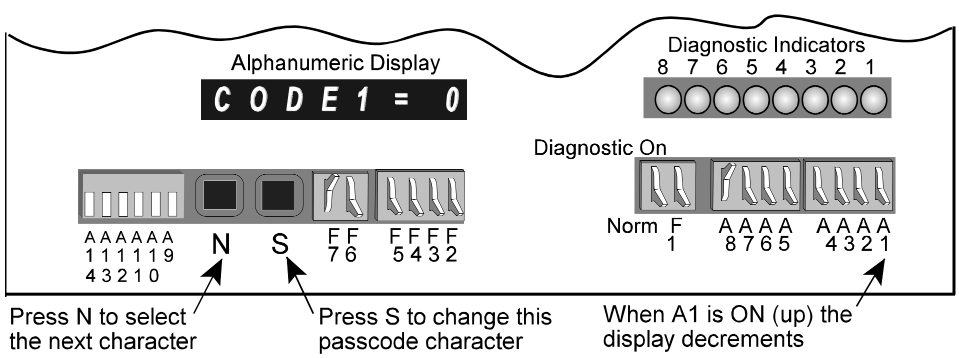
> **NOTE:** PASSWORD is not the same as PASSCODE. The PASSWORD is used to limit access to System Mode. The PASSCODE, when activated, requires that a passcode be set in order to run on any mode other than Inspection.

SETTING THE PASSCODE (to run the car on Normal operation)

Once in System Mode, place the A8 switch in the ON (up) position as shown.



The message ***PRESS -S- TO SET PASSCODE OR -N- TO CLEAR PASSCODE...*** will scroll across the display. Press the **S** pushbutton. The message ***CODE 1 = 0*** is displayed.



The passcode consists of eight alphanumeric characters. The display indicates the value of code character #1. Press the **S** pushbutton to change the value. Press the **N** pushbutton to select the next passcode character. When the A1 switch is ON (up) the display will decrement when either **N** or **S** are pressed.

When the eighth passcode character is displayed, pressing the **N** pushbutton causes the display to change to ***SAVE? N/S***. Press **N** continue setting / changing the passcode. Press **S** to save the passcode. If the passcode is set correctly the display will show ***SAVED...***. If the passcode is not set correctly the message ***INVALID PASSCODE. PRESS N TO CONTINUE*** is scrolled across the display. Pressing **N** causes ***CODE1= (x)*** to be displayed so that the passcode can be corrected.

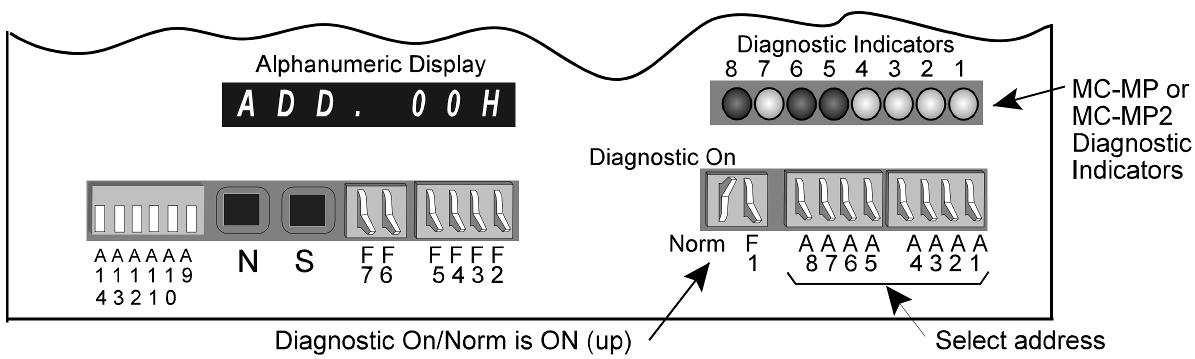
Once the passcode is set correctly and saved, exit System Mode by placing the F7 and A8 switches in the OFF (down) position. The car can then be run on Normal operation.

ACTIVATING THE PASSCODE REQUESTED OPTION (Disallows normal operation, run on inspection only)

The Passcode Requested option can be re-activated by clearing the valid passcode setting. To clear the passcode, enter System Mode as described in Section 0.1 and place the A8 switch in the ON (up) position. Press the **N** pushbutton while the message ***PRESS -S- TO SET PASSCODE OR -N- TO CLEAR PASSCODE...*** is being scrolled. The display changes to ***CLEARED***. Exit System mode by placing the F7 and A8 switches in the OFF (down) position. The message ***PASSCODE REQUESTED...*** is scrolled across the display and the car is only allowed to run on Inspection operation.

5.4 DIAGNOSTIC MODE (EOD)

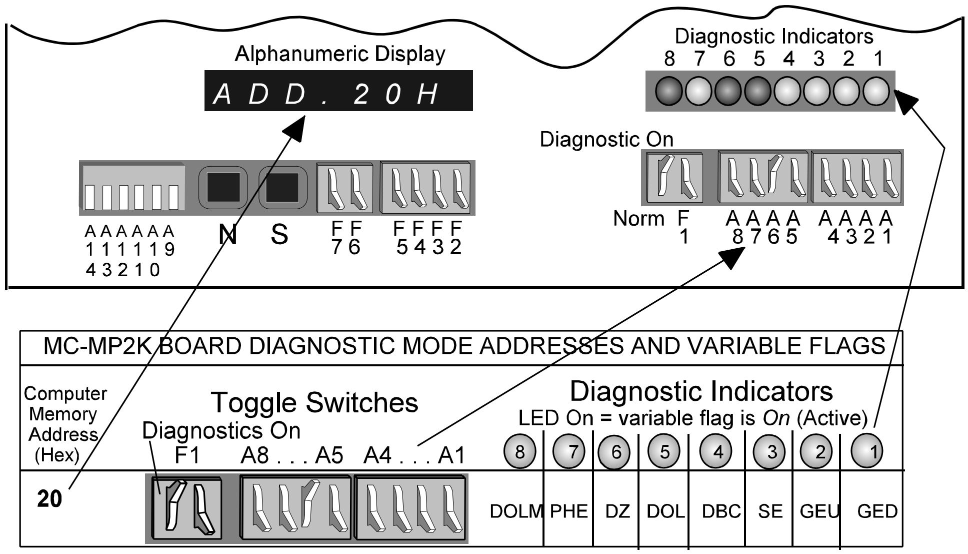
In the Diagnostic Mode, the A1 thru A8 switches allow the elevator mechanic to access the MC-MP2-2K computer memory locations. To access Diagnostic mode, set the switches as shown.



5.4.1 VIEWING THE MC-MP2 COMPUTER FLAGS

The A1-A8 switches enable an elevator mechanic to look at the MC-MP2 flags when troubleshooting a problem. Figure 5.2 describes the procedure for viewing the computer flags, in this case at address 20H (selected from 5.10). The MC-MP2 flags can also be viewed in Normal mode (see Section 5.2.5) *Alphanumeric Display - Viewing the MP Computer Flags*.

FIGURE 5.2 Viewing the flags at Address 20H (from Table 5.9)



In this example, address 20 has been selected from Table 5.9 in the back of this section. The Diagnostic On/Norm switch and the A6 switch are UP; all other A switches are down. The display reads ADD.20H. The flags that can be viewed from this address are listed on the right. A complete list of these flags can be found in Table 5.8. Check the Diagnostic Indicators on the front of the Swing Panel. If an LED is ON, it means that flag is ON. For example, if Diagnostic Indicator #6 is ON, this means the Door Zone Input (DZ) is ON.

LED	Flag	Description
8	DOLM	Door open limit memory flag
7	PHE	Photo eye input
6	DZ	Door zone input
5	DOL	Door open limit input
4	DBC	Door close button input
3	SE	Safety edge input
2	GEU	Gong enable up output
1	GED	Gong enable down output

Tables 5.8 and 5.10 provide a listing of the MC-MP2 flags and the abbreviation assigned to each flag. Tables 5.9, 5.11 and 5.12 show the memory address locations for the flags. Access a flag’s address by setting the A1 - A8 switches as shown in Table 5.9. Once an address has been selected, the diagnostic indicators, on the front of the Swing Panel, show the status of the flags at that computer memory address. Table 5.8 shows the abbreviations for the flags in the columns ➊ thru ➑ (corresponding to Diagnostic Indicators 1 thru 8) in each row.

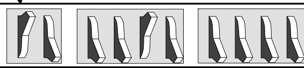
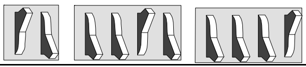
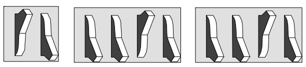
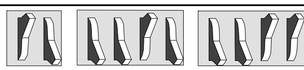
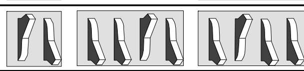
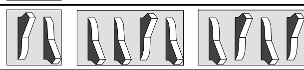
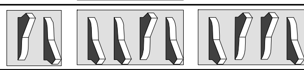
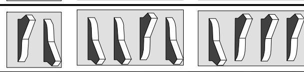
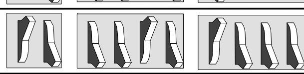
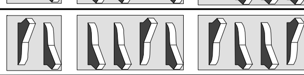
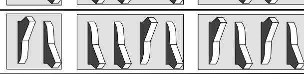
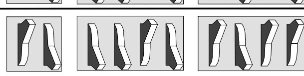
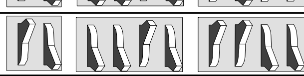
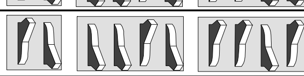
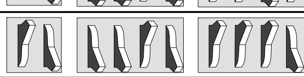
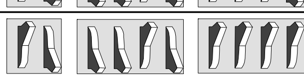
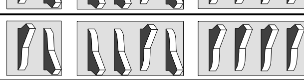
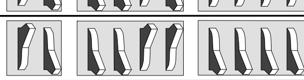
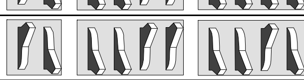
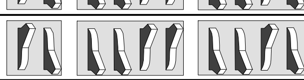
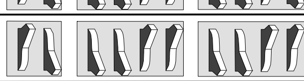
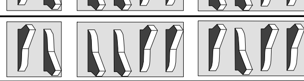
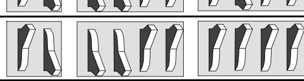
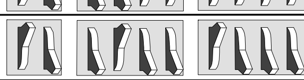
ALTERNATE ADDRESS SELECTION METHOD - There is an alternate way of selecting the computer memory address, without using the A1-A8 switches. To do so, regardless of the position of A1-A8 switches, press the N push-button. The alphanumeric display automatically reads **ADD. 20H**, which is the first diagnostic address for the MC-MP2 flags. The Computer Swing Panel's Diagnostic Indicators show the contents of the address displayed. Constant pressure on the N push-button automatically increases the address shown on the alphanumeric display, and the state of the indicator lights changes respectively. Once the address reaches 33H, it automatically goes back to 20H. Releasing the N push-button holds the last address displayed on the alphanumeric display for an additional 3 seconds before changing the display to reflect the address selected by the A1-A8 switches.

TABLE 5.8 MC-MP2 Computer Variable Flags

ABBREV	FULL NAME	ABBREV	FULL NAME
ADAC	ADA Car Call Timer	FRA	Alternate Fire Phase I Input
ADACR	Rear ADA Car Call Timer	FRC	Fire Phase II
ADAH	ADA Hall Call Timer	FRM	Fire Service Phase I
ADAHR	Rear ADA Hall Call Timer	FRS	Fire Phase I Input
ALT	Alternate Service	FWI	Fire Warning Indicator Output
ATS	Attendant Service Input	GED	Gong Enable Down Output
ATSF	Attendant Service Function	GEU	Gong Enable Up Output
BFD	Bottom Floor Demand	H	High Speed Output
CAC	Car Above Counterweight	HCDX	Hall Call Disconnect
CBC	Car Below Counterweight	HCR	Hall Call Reject
CC	Car Call	HCT	Hall Call Door Time
CCA	Car Call Above	HLD	Hold Input Fire Phase II
CCB	Car Call Below	HLI	Heavy Load Input
CCD	Car Call Disconnect	HLW	Heavy Load Weigher
CCT	Car Call Door Time	HML	Home Landing Select Input
CD	Car Done	HSEL	Hospital Emergency Select
CODE 3	Third Bit in Absolute PI Code	IN	Inspection or Access Input
CSAF	Computer safe	IND	Independent Service Input
CSB	Car Stop Switch Bypass Output	INT	Intermediate Speed Input
CTL	Car to Lobby Input	ISR	In Service and Ready
CTLF	Car to Lobby Function Flag	ISRT	In Service Truly
CWI	Counterweight Input	ISV	In Service
CWIL	Counterweight Input Latch	LD	Level Down Input
DBC	Door Button Close Input	LFP	Lower Floor Parking
DC	Down Call	LLI	Light Load Input
DCA	Down Call Above	LLW	Light Load Weigher
DCB	Down Call Below	LOT	Lobby Door Time
DCC	Door Close Complete	LU	Level Up Input
DCF	Door Close Function Output	MGR	Motor Generator Run Output
DCL	Door Close Limit	MLT	Motor Limit Timer
DCLR	Rear Door Close Limit	NSI	Non-Stop Input
DCLC	Door Closed Contact	NUDG	Nudging Output
DCLCR	Rear Door Closed Contact	PFG	Passing Floor Gong
DCP	Door Closed Power Output	PHE	Photo Eye Input
DDP	Down Direction Preference	PK	Parking
DELSIM	Delta Simulation	PSTX	Preliminary Stepping Function Complete
DHO	Door Hold Open	PTR	Permission To Run *(from Supervisor)*
DLK	Door Lock Input	PTS	Permission To Start *(from Supervisor)*
DMD	Demand Down	PUSD	Earthquake Power Up Shut Down
DMU	Demand Up	REL	Releveling Output
DNDO	Down Direction Output	RUN	Run
DNI	Down Direction Input	SAF	Safety String Input
DNS	Down Direction Sense Input	SD	Supervisory Down
DOF	Door Open Function Output	SDA	Down Direction Arrow Output
DOI	Door Open Intent	SDT	Short Door Time
DOL	Door Open Limit Input	SE	Safety Edge Input
DOLM	Door Open Limit Memory	SLV	Slaved
DPM	Door Position Monitor	STC	Stepping Complete
DPMR	Rear Door Position Monitor	STD	Step Down Input
DSD	Down Slow Down Input	STU	Step Up Input
DSH	Door Shortening (Car Call Button Pushed)	SU	Supervisory Up
DSHT	Door Shortening (Final)	SUA	Up Direction Arrow Output
DZ	Door Zone Input	TFD	Top Floor Demand
DZORDZ	Door Zone or Rear Door Zone	TOS	Timed Out of Service
ECRN	Emergency Power Running Car	UC	Up Call
EDS	Earthquake Direction Switch	UCA	Up Call Above
EPI	Emergency Power Input	UCB	Up Call Below
EPR	Emergency Power Return Function	UDP	Up Direction Preference
EPS	Emergency Power Select Input	UFP	Upper Floor Parking
EQA	Earthquake Function Active	UPDO	Up Direction Output
EQI	Earthquake Input	UPI	Up Direction Input
EQIND	Earthquake Indicator Output	UPS	Up Direction Sense Input
EQN	Earthquake Normal	USD	Up Slow Down Input
ESTE	Earthquake Stop Time Elapsed	YRQ	Wye Request
FCS	Fire Phase II Input	YSIM	Wye Simulation

TABLE 5.9 MC-MP2 Diagnostic Mode Addresses and Computer Variable Flags

MC-MP(2) DIAGNOSTIC MODE ADDRESSES AND COMPUTER VARIABLE FLAGS

Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
20		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
21			DC	UC	CC			DHO	DOI
22		DCF	DCP	DOF	LOT		HCT	CCT	SDT
23				HSEL	CSB	DCC	NUDG		DSHT
24		INT/ DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
25				HLW	HLI			FWI	
26		LFP	UFP						
27				EQI	IND	IN		DEL SIM	YSIM
28		LLW	DLK		DZO RDZ			PK	LLI
29		DNDO	LD		DDP	UPDO	LU		UDP
2A		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
2C			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
2D						FRM			FRC
2E		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F*		HLD		EQA	ATSF		ECRN	CD	EPR
2F		HLD	EPI	EPR	SLV	ISR	YRQ	PTR	PTS
30						EPS	EPI	HML	ALT
32*		CAC	CBC	CWI		EDS	ESTE	EQN	PUSD
32		CAC	CBC	CWI	EQA	EDS	ESTE	EQN	PUSD
33			CWIL						
3B**				DCLR				DCL	
3F**				ADAHR	ADACR			ADAH	ADAC
48**				DPMR	DCLCR			DPM	DCLC

* Simpex Ver. 3.59 or earlier software ** MC-MP2 Ver. 8.0 or later software. DNmd 033

TABLE 5.10 ASME A17.1 - 2000 Variable and Flag Descriptions

2BI	2 Bus Input	HDBR	Hoistway Car Door Rear Bypass Switch - Bypass Position
2KBP	ANSI 2000 Bypass Input	HDR	Hoistway Door Rear
ACCI	Inspection Access	ILO1	Overspeed - Inspection / Leveling, Pld #1
ASI	Assigned	ILO2	Overspeed - Inspection / Leveling, Pld #2
ASI1	Assigned	IMEM	Inspection Memory
ASI2	Assigned	INCTI	Inspection Car Top
ASI3	Assigned	INDN	Inspection Down Input
ASI4	Assigned	INICI	Inspection in Car
ASI5	Assigned	INMR	Inspection Machine Room
ASI6	Assigned	INUP	Inspection up Input
ASI7	Assigned	MB	Motor / Brake Output
ASI8	Assigned	MPSAF	Main Processor Safety Output
CD	Car Door Closed	ONE 2TWO	Indicates Switching from Eb1 to Eb2
CDB	Car Door Bypass Switch - Bypass Position	RACC1	Redundancy Access Inspection Relay #1
CDBO	Car Door Bypass Switch - off Position	RACC2	Redundancy Access Inspection Relay #2
CDBR	Car Door Rear Bypass Switch - Bypass Position	RBK	Redundancy Brake Relay
CDR	Car Door Rear	RCD	Redundancy Car Door Closed Relay
COS1B	Overspeed - Contract, Pld #1	RCDR	Redundancy Car Door Rear
COS2	Overspeed - Contract, Pld #2	RCHDT	Redundancy Car / Hoistway Door Timed Relay
CT	Cycle Test Output	RCTIC	Redundancy Car Top/ in Car Inspection
CTDIF	Cycle Test - Dp Differential	RDN	Redundancy down Relay
CTOS	Cycle Test - Overspeed	RDZ	Redundancy Door Zone Relay
CWI	Counterweight Input	RDZR	Redundancy Door Zone Rear Auxiliary
DCBOR	Car Door Rear Bypass Switch - off Position	RDZX	Redundancy Door Zone Auxiliary
DETS	Down Emergency Terminal Switch	REB1	Emergency Brake Relay #1
DNDIR	Down Direction Detected	REB2	Emergency Brake Relay #2
DNL	Down Normal Limit	REI	Run Enable Input
DZRX	Door Zone Rear Auxiliary	RESBYP	Redundancy Emergency Stop Switch Bypass Relay
DZX	Door Zone Auxiliary	RFR	Redundancy Fault Reset
EB1	Redundancy Emergency Brake Relay #1	RFRM	Redundancy Fault Reset Memory
EB2	Redundancy Emergency Brake Relay #2	RGOV	Redundancy Governor Relay
EBR	Emergency Brake Reset	RH	Redundancy High Speed Relay
EBRM		RHD	Redundancy Hoistway Door Closed Relay
EDS	Earthquake Direction Switch	RHDB	Redundancy Hoistway Door Bypass
EQIND	Earthquake Indicator	RHDBR	Redundancy Hoistway Door Bypass Rear
EQL	Earthquake Latch	RHDR	Redundancy Hoistway Door Rear
EQLED	Earthquake Light	RIN1	Redundancy Inspection Relay #1
EQR	Earthquake Reset Switch	RIN2	Redundancy Inspection Relay #2
EQRM	Earthquake Memory Switch	RLULD	Redundancy Level up / Level Down Relays
ESBYP	Emergency Stop Switch Bypass	RMR	Redundancy Motor Relay
ETS1	Overspeed - Emergency Terminal Switch, Pld #1	RSAFR	Redundancy Safety Relay Input
ETS2	Overspeed - Emergency Terminal Switch, Pld #2	RTBAB	Redundancy Top / Bottom Access Buttons Relay
FCCC	Fire Phase 2 - Car Call Cancel	RUP	Redundancy up Relay
FCOFF	Fire Phase 2 Switch - off Position	RUPM	Redundancy up Relay Memory
FIR1	Fire Phase 1 Active - Main or Alternate	SAFC	Safety Circuit Car
FRBYP	Fire Phase 1 Switch - Bypass Position	SAFH	Safety Circuit Hoistway
FRSA	Fire Phase 1 - Mr / Htw Sensor - Alternate Recall	SSI	Seismic Switch Input
FRSM	Fire Phase 1 - Mr / Htw Sensor - Main Recall	STOP	Stop Switch Input
FWL	Fire Warning Light	TEST	Test Input
GOV	Governor Switch Input	TWO2ONE	Indicates Switching from Eb2 to Eb1
HD	Hoistway Door Closed	UETS	Up Emergency Terminal Switch
HDB	Hoistway Door Bypass Switch - Bypass Position	UNL	Up Normal Limit
HDBO	Hoistway Door Bypass Switch - Off Position	UPDIR	Up Direction Detected
HDBOR	Hoistway Car Door Rear Bypass Switch -Off Postion		

TABLE 5.11 MC-MP2 ASME - 2000 Flags and Variables **[F2, A9, A10 and A11 must also be ON *(up)*]**

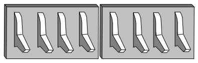
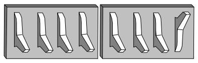
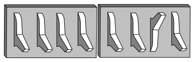
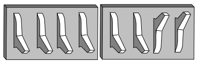
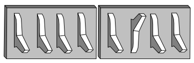
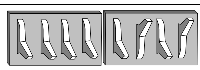
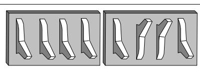
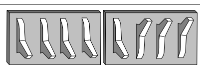
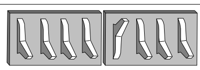
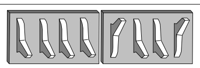
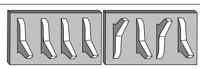
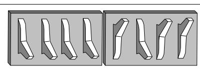
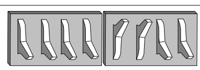
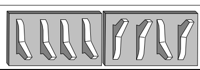
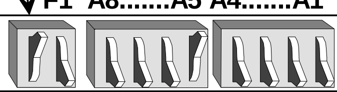
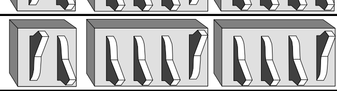
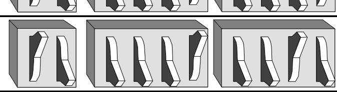
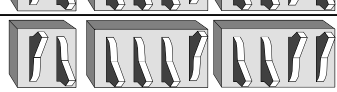
ADDR	Switch Setting A1 - A8	LED8	LED7	LED6	LED5	LED4	LED3	LED2	LED1
0700H		2 BI M	MPSAF	STOP	SAFC	SAFH	GOV	RSAFR	2 BI
0701H		TEST	INDN	INUP	RIN2	RIN1	INMR	INICI	INCTI
0702H		IN M TRUE			RTBAB	RACC2	RACC1	ACCI	RCTIC
0703H		EQL	EQRM	EQLED	EQIND	SSI	CWI	EQR	EDS
0704H		HDBO	HDB	CDBO	CDB	RHD	RCD	HD	CD
0705H			FIR1	FWL	FRSA	FRSM	FRBYP	FCCC	FCOFF
0706H		CTDIF	CTOS	ILO2	ETS2	COS2	ILO1	ETS1	COS1
0707H		RESBYP	ESBYP		RMR	RBK	RPT	REI	MB
0708H		TWO 2 ONE	ONE 2 TWO	EB2	EB1	EBRM	EBR	REB2	REB1
0709H		DNDIR	UPDIR	CTPLD1	RUPM	RDN	RUP	DNL	UNL
070AH		RFR	RFRM	A2KBP	CT	RCT	RH	RLULD	RDZ
070BH		HDBOR	HDBR	CDBOR	CDBR	RHDR	RCDR	HDR	CDR
070CH		DETS1	UETS1	RHDBR	RHDB	RDZR	DZRX	RDZX	DZX
070DH		ASI8	ASI7	RUDX2	FUDX1	ASI4	DETS2	UETS2	PFLT

TABLE 5.12 MC-MP2 Diagnostic Mode Rear Door Addresses and Computer Variable Flags

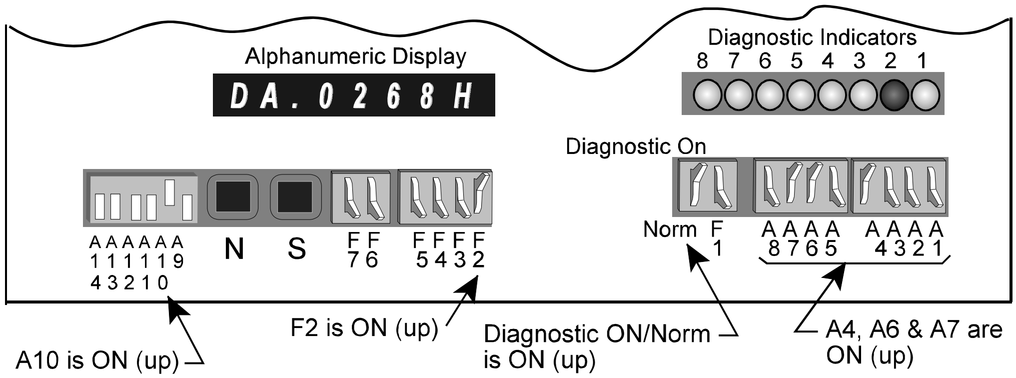
MC-MP DIAGNOSTIC MODE REAR DOOR ADDRESSES AND VARIABLE FLAGS									
Computer Memory Address (Hex)	**Toggle Switches** Diagnostic On F1 A8.......A5 A4.......A1	**Diagnostic Indicators** LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
10		**DOLMR**	**PHER**	**DZR**	**DOLR**	**DBCR**	**SER**	**GEUR**	**GEDR**
11			**DCR**	**UCR**	**CCR**			**DHOR**	**DOIR**
12		**DCFR**	**DCPR**	**DOFR**	**LOTR**		**HCTR**	**CCTR**	**SDTR**
13						**DCCR**	**NUDGR**		**DSHTR**

DNmd 011

5.4.2 VIEWING EXTERNAL MEMORY (EXAMPLE: DOOR CLOSED LIMIT (DCL) FLAG)

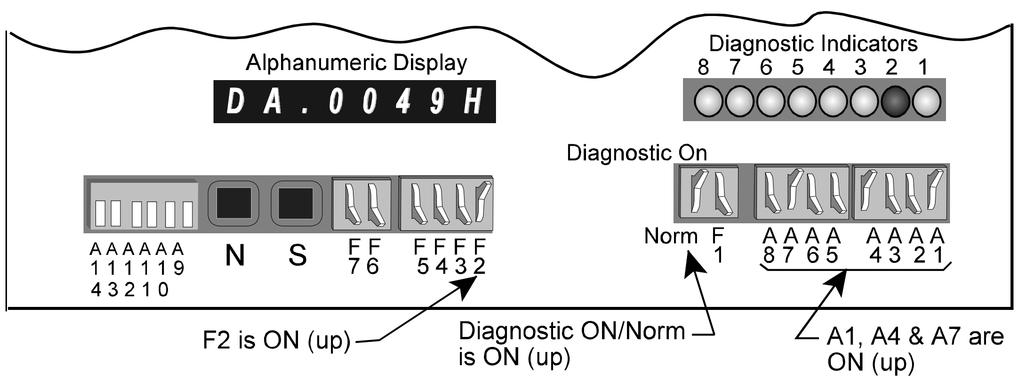
> **NOTE:** With the MC-MP2 Main Processor board these flags may be viewed using the Alphanumeric Display as described in Section 5.2.5.

DCL INPUT - LOCAL TRACTION (MPOLTM software) - The memory flag for DCL is at external memory address 0268 Hex, Diagnostic Indicator #2. Set the switches as shown.



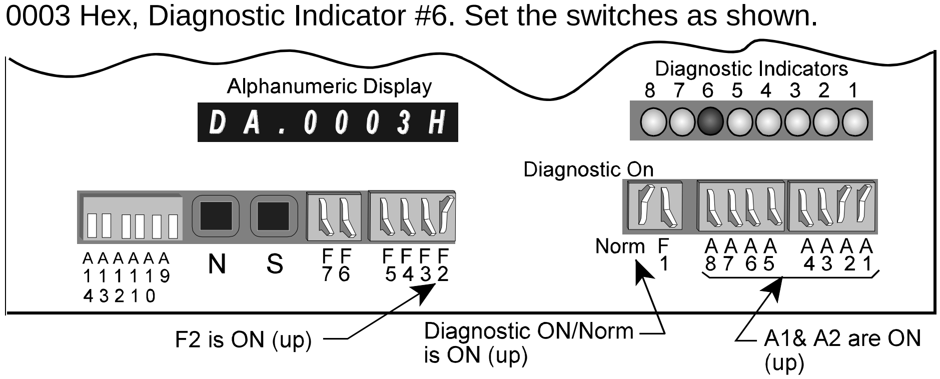
Switch F2 selects external memory. Switches A13 and A14 select the first digit (0), A9 thru A12 select the second digit (2), A5 thru A8 select the third digit (6) and A1 thru A4 select the last digit of the address (8). The Alphanumeric Display indicates that external memory address 0268 Hex is selected (DA.0268H). Diagnostic Indicator #2 shows the status of the DCL input (LED ON = high, LED OFF = low).

DCL INPUT - SIMPLEX TRACTION (MPODT software) - The memory flag for DCL is at external memory address 0049 Hex, Diagnostic Indicator #2. Set the switches as shown.



EXAMPLE: REAR DOOR CLOSED LIMIT (DCLR) FLAG

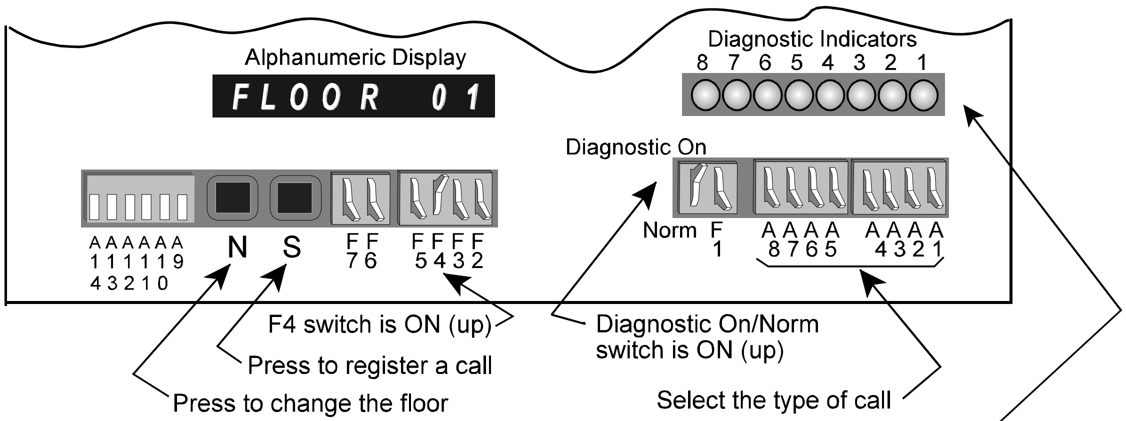
DCLR INPUT - (all software) - The memory flag for DCLR is at external memory address 0003 Hex, Diagnostic Indicator #6. Set the switches as shown.



5.4.3 VIEWING AND ENTERING CALLS

This function allows the user to view all the calls registered per floor, and to enter calls as desired. To view or enter calls, set the switches as shown.

FIGURE 5.3 Viewing and Entering Hall & Car Calls via the EOD



Diagnostic Indicators show current calls	**Diagnostic Indicators**							
	❽	❼	❻	❺	❹	❸	❷	❶
Call type ➪	Hall Call UP Rear	Hall Call UP Front	Hall Call DOWN Rear	Hall Call DOWN Front			Car Call Rear	Car Call Front
To register calls, turn the address switch ON and press "S"	A8	A7	A6	A5	A4	A3	A2	A1
	Address Switches							

VIEWING CALLS - With the F4 switch in the ON position, the alphanumeric display shows **FLOOR 01** and the Diagnostic Indicators light up with the calls that have been registered. The format for the call indication is shown in Figure 5.3. To advance the floor number press the **N** push-button. The Diagnostic Indicator LEDs will show the calls entered at the floor shown in the alphanumeric display. When the top floor number is displayed, pressing N will cause the display to cycle to the bottom floor.

ENTERING CALLS - To enter calls, select the desired floor as described above. Use the A1-A8 switches to select the type of call to enter (see Figure 5.3). For example, set the A1 switch up to register a front car call. Then press and hold the ***S*** push-button until the call has been registered. Notes: (1) A call type which does not exist in the system cannot be entered, (2) if this car is part of a group, only car calls can be entered.

SECTION 6
TROUBLESHOOTING

6.0 GENERAL INFORMATION

VVMC-1000-Series M controllers are equipped with certain features that can help speed up troubleshooting. Often the controller will indicate the nature of the problem in the form of a status or error message scrolling on the Computer Swing Panel's display. The optional CRT terminal connected to either the car controller or the Group Supervisor can provide useful diagnostics in the form of View Hoistway (F3 screen) messages and/or Special Events Calendar Fault Log (F7, 1 screen) messages. Tables 6.3 and 6.4 provide a complete listing of these messages, a description and recommended corrective actions to be taken.

Troubleshooting often involves determining the status of specific inputs, outputs or computer variable flags. This information is stored in the controller's memory and the status of these memory locations can be viewed using the Computer Swing Panel's Enhanced Onboard Diagnostics (EOD), described in Section 5. In addition, the system is designed so that tracing signals from the field wires onto various boards and into the computer can be achieved without the need for mechanical removal of any components or for rear access to the boards.

The troubleshooting section is arranged as follows:

Troubleshooting Topic:	**Go to:**
Status and Error Messages table and look-up table for the MC-MP2-2K Diagnostic Indicator and F3 screen messages.	Section 6.1
How to use the Special Events Calendar and setup for reporting emergency messages to a PC running CMS software.	Section 6.2
Using the Controller Diagnostics screens	Section 6.3
Troubleshooting Car Operation Control (COC), Door Logic, Call Logic, and Quick References for the HC-PI/O and HC-CI/O boards.	Section 6.4
PC Board Quick References	Section 6.5
Troubleshooting the MagneTek DSD 412 SCR Drive	Section 6.6
Troubleshooting Using the DSD412 Control Display Unit	Section 6.7
DSD412 Drive Troubleshooting Flowcharts	Section 6.8
ASME A17.1 - 2000 Fault Troubleshooting Tables	Section 6.9
Using the MLT Data Trap	Section 6.10

6.1 STATUS AND ERROR MESSAGES

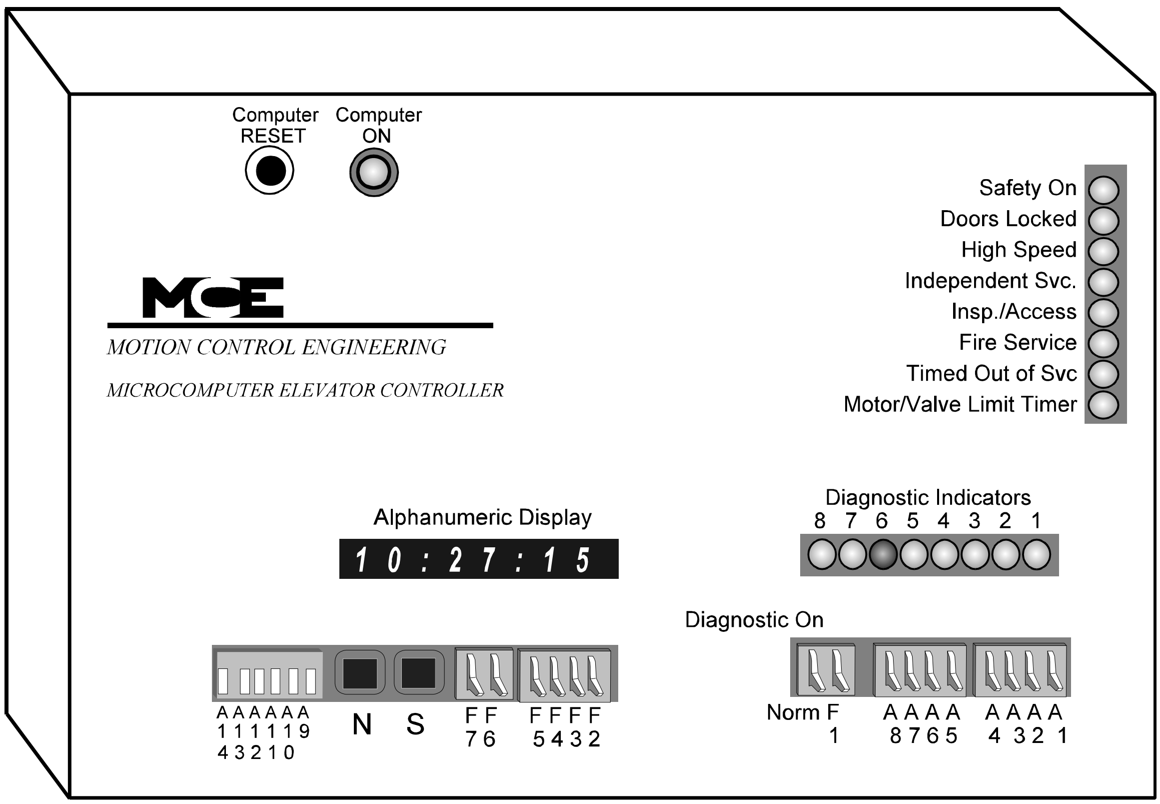
There are five locations where status and error messages are reported. They are:

- The Computer Swing Panel Status Indicators (Section 6.1.1)
- The Computer Swing Panel (MP2) Diagnostic Indicators (Section 6.1.1)
- The Computer Swing Panel Alphanumeric Display (Section 6.1.2)
- The Special Events Calendar Fault Log (Section 6.1.3)
- The View Hoistway (F3) screen (Section 6.1.4)

6.1.1 COMPUTER SWING PANEL STATUS AND DIAGNOSTIC INDICATORS

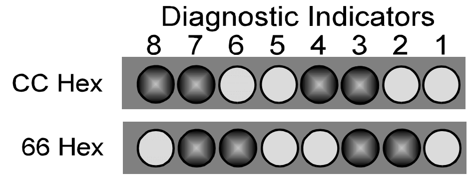
The Computer Swing Panel has two sets of eight indicators that can provide status and error information (Figure 6.1). The Status Indicators (vertical row of eight LEDs) provide information on the current status of the controller.

FIGURE 6.1 Computer Swing Panel, Front View

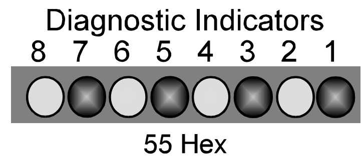


MC-MP2 DIAGNOSTIC INDICATORS - During normal operation these lights scan from right to left (indicating that the MP2 program is looping properly) or flash ON and OFF to indicate a status or error condition. If the car is connected to a Group Supervisor in a multi-car group system, the lights will scan from right to left, then left to right, indicating proper communication between the Car Controller and the Group Supervisor.

When a status or error condition exists, the Diagnostic Indicators flash one of several messages depending on the software version (MP2 version number scrolls on boot up):



- Software versions 8.02.00 or earlier flash the MC-MP-1ES messages.
- Software version 8.03.00 flashes CC Hex.
- Software versions 8.04.00 or later flash 66 Hex. Set the alphanumeric display to scroll the status or error message. Refer to Table 6.3 *Status and Error Messages* for a description and troubleshooting information for the scrolling message.
- ASME A17.1 - 2000 status and error conditions are indicated by the diagnostic indicators flashing 55 Hex. Set the alphanumeric display to scroll the status or error message. Refer to Table 6.4 *ASME A17.1 - 2000 Status and Error Messages* for a description and troubleshooting information for the scrolling message.



If the scrolling status or error message is not displayed on the Alphanumeric Display when the Diagnostic Indicators flash, press the N pushbutton until the scrolling message appears (see Section 5.2.1 ALPHANUMERIC DISPLAY - STATUS AND ERROR MESSAGES).

6.1.2 ALPHANUMERIC DISPLAY - STATUS AND ERROR MESSAGES

Status and error messages are scrolled across the alphanumeric display. Table 6.1 provides a list of standard status and error messages and their associated Special Event Message names. A description and troubleshooting information for the scrolling message is listed in Table 6.3 under the Special Event Message name. Table 6.4 provides a list of ASME A17.1-2000 status and error messages, including descriptions and troubleshooting information.

> **NOTE:** There are two ways to access detailed information about the scrolling Status and Error messages:
>
> - Look for the message in the Index to find the page on which the message description and troubleshooting information is located.
> - Refer to Table 6.1, *MC-MP2 Scrolling Messages Lookup* to find the message being scrolled on the Alphanumeric Display. Then look for the message by the Event Message name in Table 6.3 *Status and Error Messages.* Look for messages not found in Table 6.1 in Table 6.4 *ASME A17.1 - 2000 Status and Error Messages*.

TABLE 6.1 MC-MP2 Scrolling Messages Lookup

Scrolling Message	Event Message (see Table 6.3)
2ND LANDING AUX. ACCESS FAULT *(non ASME-2000 only)*	
ATTENDANT SERVICE OPERATION	Attendant Service Operation
AUX. INSPECTION ACCESS FAULT *(non ASME-2000 only)*	
BOTH LEVELING SWITCHES ARE ON (SETUP ERROR), LEARN MODE (*IMC only*)	Both Leveling Switches are ON (Learn Mode Setup Error)
BOTH USD AND DSD INPUTS ARE ACTIVE	Both USD and DSD are Open
BOTTOM FLOOR OR TOP FLOOR DEMAND	Bottom Floor Demand Top Floor Demand
BOTTOM LANDING AUX. ACCESS FAULT *(non ASME-2000 only)*	
BRAKE PICK FAILURE *(Traction only)*	Brake Pick Failure
CAR CALL BUS IS DISCONNECTED	Car Call Bus Fuse Blown
CAR IN TEST MODE	Test Mode Operation
CAR NOT AT BOTTOM LANDING (SETUP ERROR), LEARN MODE *(IMC only)*	Car not at Bottom Landing (Learn Mode Setup Error)
CAR NOT BELOW DOOR ZONE (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not Below Door Zone (Learn Mode Setup Error)
CAR NOT ON INSPECTION (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not On Inspection (Learn Mode Setup Error)
CAR NOT ON LEVEL DOWN (SETUP ERROR), LEARN MODE (IMC only)	Level Down ON (Learn Mode Setup Error)
CAR NOT ON LEVEL UP (SETUP ERROR), LEARN MODE *(IMC only)*	Car Not On Level Up (Learn Mode Setup Error)
CAR SAFETY DEVICE OPEN	Car Safety Device Open
CAR TO LOBBY OPERATION	Car To Lobby
CONTACTOR PROOFING REDUNDANCY FAILURE	Contactor Proofing M Contactor Proofing Redundancy Failure MX and PT1 Redundancy Failure PT2 & PT3 Redundancy Failure
DIRECTION RELAY REDUNDANCY FAILURE	Direction Relay Redundancy Failure
DOL AND DLK BOTH ACTIVE	Doors Open and Locked
DOOR CLOSE FAILURE	Door Close Protection
DOOR LOCK FAILURE	Door Lock Failure
DOOR LOCK SWITCH FAILURE	Door Lock Contact Failure
DOOR OPEN LIMIT FAILURE	Door Open Limit Failure
DOOR ZONE SENSOR FAILURE	Door Zone Sensor Failure - On position
DOOR ZONE SENSOR FAILURE - OFF POSITION	Door Zone Sensor Failure - Off position
DPM REDUNDANCY FAULT	DPM Redundancy Fault
DPMR REDUNDANCY FAULT	DPMR Redundancy Fault
DRIVE FAILED TO RESPOND	Drive Failed to Respond
DRIVE FAULT 2 *(IMC only)*	Loss of Position Feedback Parity Sensor Failure (Floor Code) Pattern Door Zone Failure Position Error at DETS Position Error at DNTx Position Error at UETS Position Error at UNTx Read Sensor Failure (Floor Code)
DRIVE FORCED MOTOR LIMIT TIMER *(Traction only)*	Brake Failure Brake IGBT Failure MLT - Drive Forced MLT-Drive Forced (ALT) Pattern Detected Overspeed
DRIVE TEMPERATURE SENSOR FAULT *(IMC Traction only)*	Drive Temperature Sensor Fault
EARTHQUAKE OPERATION *(Traction only)*	Earthquake
EARTHQUAKE - REDUCED SPEED OPERATION *(Traction only)*	Earthquake Normal Operation
ELEVATOR SHUTDOWN SWITCH OR POWER TRANSFER INPUT ACTIVE	Elevator Shutdown or Power Transfer
EMERGENCY POWER OPERATION	Emergency Power
EMERGENCY POWER SHUTDOWN	Emergency Power Shutdown
EMERGENCY STOP INPUT 1 ACTIVATED	Emergency Stop Input 1 Activated
EMERGENCY STOP INPUT 2 ACTIVATED	Emergency Stop Input 2 Activated
ENTER SECURITY CODE	Security
EXCESSIVE HEAT IN SMB UNIT *(IMC Performa only)*	Excessive Heat in SMB Unit
EXCESSIVE HEAT IN SYSTEM 12 *(IMC SCR only)*	Excessive Heat in System 12
FAILURE TO LEAVE THE FLOOR	MLT - Failed to Leave Floor
FIRE SERVICE PHASE 1 - ALTERNATE	Fire Service Alternate

TABLE 6.1 MC-MP2 Scrolling Messages Lookup

Scrolling Message	Event Message (see Table 6.3)
FIRE SERVICE PHASE 1 - MAIN	Fire Service Main
FIRE SERVICE PHASE 2	Fire Service Phase 2
FLT RELAY DROPPED	FLT Relay Dropped
FRONT DOOR IS LOCKED BUT NOT FULLY CLOSED	Doors Locked but not fully Closed - Front
GATE SWITCH FAILURE *(non ASME-2000 only)*	Gate Switch Failure
GOVERNOR SWITCH OPEN *(Traction only)*	Governor Switch Open
HALL CALL BUS IS DISCONNECTED	Hall Call Bus Fuse Blown
HEAVY LOAD WEIGHER CONDITION	Heavy Load
HOISTWAY SAFETY DEVICE OPEN	Hoistway Safety Device Open
HOSPITAL PHASE 1 OPERATION	Hospital Service
HOSPITAL PHASE 2 OPERATION	Hospital Service Phase 2
IMC SUB-SYSTEM NOT READY *(IMC only)*	IMC Sub-System Not Ready
IN CAR STOP SWITCH ACTIVATED	In-car Stop Switch
INDEPENDENT SERVICE OPERATION	Independent Service
INSPECTION / LEVELING OVERSPEED FAILURE *(IMC Traction only)*	Inspection/ Leveling Overspeed
INSPECTION OPERATION	Inspection
LANDING SYSTEM REDUNDANCY FAILURE *(non ASME-2000 only)*	Landing System Redundancy Failure
LEVELING DOWN	Level Down
LEVELING SENSOR FAILED - OFF POSITION	Leveling Sensor Failure (Inactive State)
LEVELING SENSOR FAILED - ON POSITION	Leveling Sensor Failure (Active State)
LEVELING SENSOR FAILURE	Leveling Sensor Redundancy Failure
LEVELING UP	Level Up
LIGHT LOAD WEIGHER CONDITION	Light Load
LOSS OF INSPECTION DURING LEARN MODE *(IMC only)*	Loss of IN During Learn (Learn Mode Setup Error)
MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED	MLT - Excessive PI Correction (*Traction*) MLT - Excessive Releveling at Floor- MLT - Timer Expired Motor Limit Timer (*Traction*) Motor Limit Timer (INT) (*Traction*) Motor Limit Timer (LI) (*IMC Traction*) Motor Limit Timer (LI & INT) (IMC *Traction*) External Motor Limit Timer (*Hydro*) Low Oil Switch (*Hydro*)
NO RESPONSE FROM PATTERN GENERATOR (SETUP ERROR), LEARN MODE (*IMC only)*	No Response from Pattern Generator (Learn Mode Setup Error)
NORMAL OPERATION	
OVERLOAD CONDITION	Car is Overloaded
PASSCODE REQUEST	Passcode Requested
PG NOT READY *(IMC Traction only)*	Pattern Generator not Ready
PHOTO EYE FAILURE	Photo-Eye Failure (Front) Photo-Eye Failure (Rear)
PRESSURE SWITCH ACTIVATED (*Hydro only*)	Pressure Switch Activated
PRE-TEST MODE	Pre-test Mode
PRIORITY / VIP SERVICE - PHASE 1	Priority/VIP Service Phase 1
PRIORITY / VIP SERVICE - PHASE 2	Priority/VIP Service Phase 2
REAR DOOR IS LOCKED BUT NOT FULLY CLOSED	Doors Locked but not fully Closed - Rear
REDUNDANCY DOOR LOCK RELAY FAILURE	Door Lock Relay Redundancy Failure
REDUNDANCY GATE SWITCH FAILURE *(non ASME-2000 only)*	Gate Switch Relay Redundancy Failure
SAFETY CIRCUIT IS OPEN	Safety Relay Circuit Open
SHUTDOWN OPERATION	MG Shutdown Operation/Shutdown Switch
TIME OUT OF SERVICE	Timed Out of Service
VALVE LIMIT TIMER ELAPSED *(Hydro only)*	Valve Limit Timer Elapsed
VISCOSITY CONTROL FUNCTION ACTIVE *(Hydro only)*	Viscosity Control Function

5-12-04

6.1.3 SPECIAL EVENTS CALENDAR FAULT LOG

The Special Events Calendar can document the most recent 250 important fault conditions or events and display them in chronological order. They can be viewed on the **optional** CRT terminal connected to either the car controller or the Group Supervisor. The data displayed includes the type of event or fault, the date and time the fault/event occurred, the date and time the fault/event was corrected, as well as other information about the status of the elevator when the fault or event occurred.

The Special Events Calendar is accessed from the Special Events Calendar Menu. Press the **F7** key while the Main Menu is displayed.

View Fault Log (F7, 1 or F7) - From the Special Events Calendar Menu (F7) screen press **1** or **F7** to display the events logged to the Special Events Calendar (Figure 6.2). This screen makes it possible to examine the documented faults and events. The latest 14 faults and events are displayed in the bottom half of the screen, including the date and time the event occurred.

FIGURE 6.2 Special Events Calendar (F7 - 1) screen

```
                                  12/4/2000, 10:25:30 AM,   F4=Main Menu

                        Special Events Calendar (F7, F7)
 ---------------------------------------------------------------------------
 STATUS                    SPEED (ft/Mmin)  VOLTAGE (volts)   CURRENT (amps)
 Direction   : N/A         Command  : N/A   Armature : N/A    Armature : N/A
 High Speed  : N/A         Tach/Enc : N/A   Motor Fld: N/A    Command  : N/A
 Start Floor : N/A         Terminal : N/A   Brake    : N/A
 Stop Floor  : N/A         Safety   : N/A
 Step Floor  : N/A         Pattern  : N/A   SENSOR (volts)    POSITION (ft)
 Switch      : N/A                          Motor Fld: N/A    Absolute : N/A
 PI          : 3                            Brake    : N/A
 Event Code  : 0x03 ( Communication )
 ---------------------------------------------------------------------------
 This fault indicates that the car was previously communicating with the Group
 Supervisor but is now unable to communicate.



 ---------------------------------------------------------------------------
 DATE            TIME            DESCRIPTION
 ---------------------------------------------------------------------------
 12/4/2000       10:05:28 AM     Communication Loss
                 10:07:37 AM     Communication Loss [OFF]
                 2:36:18 PM      Sub-System(s) Reset






   ARROWS: Move Cursor, HOME: Oldest, END: Newest,  CTRL-T: Troubleshoot
                                                                 dnID208c
```

When this screen is first displayed, the most recent event is displayed at the bottom of the screen. Use the **Up / Down Arrow** keys to scroll one event at a time, the **Page Up / Page Down** keys to scroll a page at a time, or the ***Home / End*** key to scroll to event 1 or 250.

As each event is selected (reverse video), the description of the event and any other logged data is displayed in the top half of the screen. Additional troubleshooting information for each event can be displayed by pressing **Ctrl + T**.

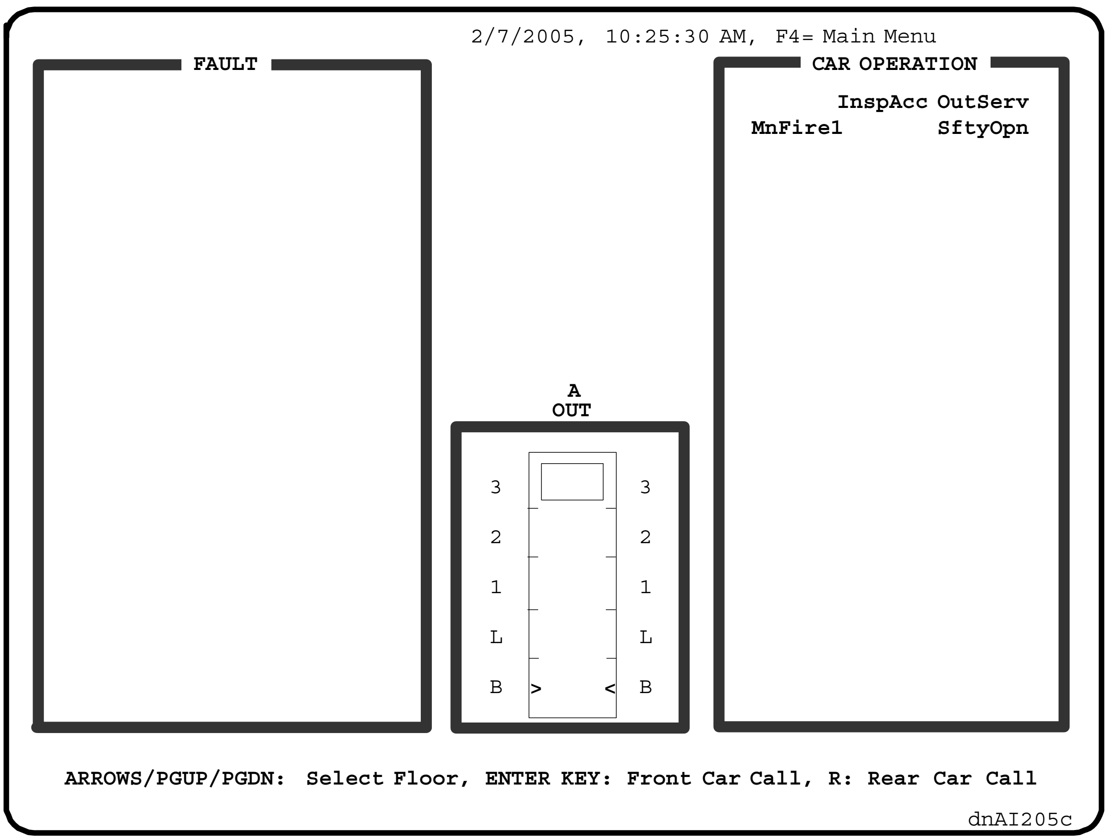
> **NOTE:** Tables 6.3 and 6.4 list all of the events which can be recorded in the Special Events Calendar Fault Log, with a description of the event and the recommended troubleshooting actions to be taken.

Clear Fault Log (F7, 2) - While the Special Event Calendar Menu (F7) screen is displayed, if the **2** key is pressed, the message `Delete All Events? (Y/N)` is displayed. Press **Y** to clear the Special Events Calendar Fault Log of all events.

6.1.4 VIEW HOISTWAY (F3) SCREEN FAULT FLAGS

The View Hoistway (F3) screen provides information about the status of the controller. The messages in the CAR OPERATION section of the F3 screen are listed in Table 6.2. and a description and recommend troubleshooting actions can be found in Tables 6.3 and 6.4, *Status and Error Messages*.

FIGURE 6.3 View Hoistway (F3) Screen



> **NOTE:** Table 6.3, *Status and Error Messages*, provides a description of the messages shown in the CAR OPERATION section of the View Hoistway (F3) screen, including recommended troubleshooting actions to be taken. Refer to Table 6.2, *View Hoistway (F3) Screen - CAR OPERATION* to find the desired flag, then look for the fault message by name in Tables 6.3 and 6.4.

TABLE 6.2 View Hoistway (F3) Screen - CAR OPERATION

The flags appear only when the car condition exists.			
FLAG	**FAULT MESSAGE**	**FLAG**	**FAULT MESSAGE**
AlmNoDZ	Alarm - No Door Zone	**IndSrv**	Independent Service
AlmNoMv	Alarm - No Car Movement	**InServ**	In Service
AltFir1	Fire Service Alternate	**InspAcc**	Inspection
AntiNui	Anti-Nuisance Operation	**MLT**	MLT - Timer Expired
AttnSrv	Attendant Service Operation	**MnFire1**	Fire Service Main
AutoOps	Automatic Operation	**Nudging**	Nudging
BflrDem	Bottom Floor Demand	**OutServ**	Out of Service
Byp-HLW	Hall Call Bypass Operation	**SftyOpn**	Car Safety Device Open
EmrgPwr	Emergency Power	**SwngOpr**	Swing Car Operation
Eqactv	Earthquake	**TflrDem**	Top Floor Demand
FirePh2	Fire Service Phase 2	**TOS**	Timed Out of Service
HospEmr	Hospital Service		

6.1.5 STATUS AND ERROR MESSAGES TABLE

Table 6.3 *Status and Error Messages* and Table 6.4 *A17.1 - 2000 Status and Error Messages* provide a listing of the status and error messages from the following:

- Computer Swing Panel (MP2) Scrolling messages
- Special Events Calendar Fault Log
- View Hoistway (F3) Screen - CAR OPERATION section

FIGURE 6.4 Legend for Table 6.3, Status and Error Messages

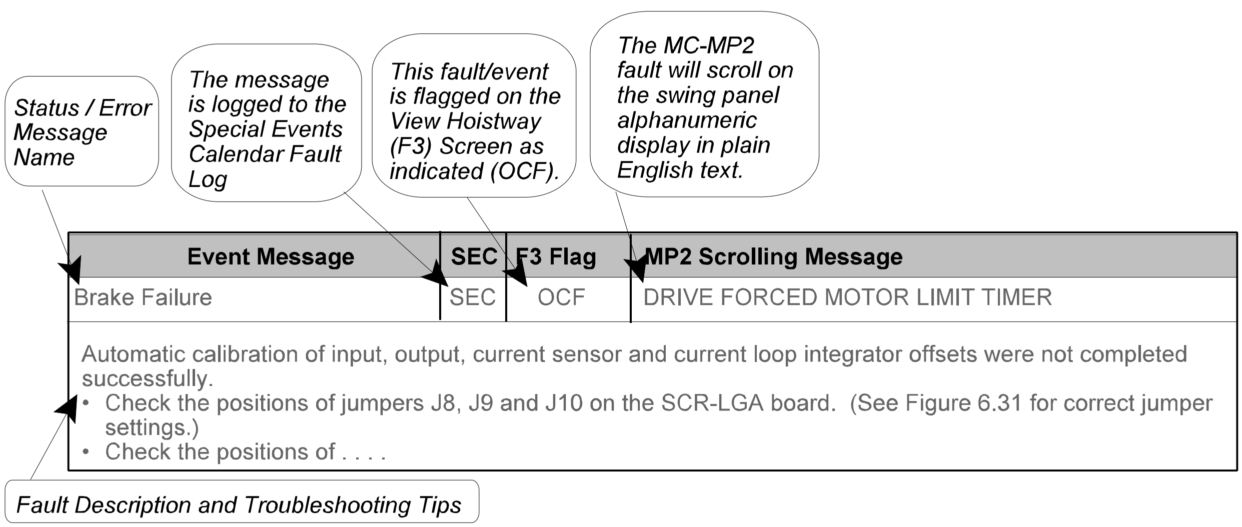


TABLE 6.3 Status and Error Messages

<table>
<tr><th>Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th></tr>
<tr><td>2nd Landing Aux. Access Fault</td><td></td><td></td><td>2ND LANDING AUX. ACCESS FAULT</td></tr>
<tr><td colspan="4">The inputs “Second Landing Access Bypass” (2AB) and “Redundant Second Landing Access Bypass” (R2AB) are compared. The car is shut down and this fault is generated if both inputs have the same status.</td></tr>
<tr><td>Alarm - No Car Movement</td><td>SEC</td><td>AlmNoMv</td><td></td></tr>
<tr><td colspan="4">This status indicates that the alarm bell pushbutton was pressed when the car was not moving (ABI).</td></tr>
<tr><td>Alarm - No Door Zone</td><td>SEC</td><td>AlmNoDz</td><td></td></tr>
<tr><td colspan="4">This status indicates that the alarm bell pushbutton was pressed when the car was not in door zone (ABIZ).</td></tr>
<tr><td>Anti-Nuisance Operation</td><td></td><td>AntiNui</td><td></td></tr>
<tr><td colspan="4">This status indicates that the load weigher is detecting a minimal load in the car; therefore anti-nuisance logic is in effect allowing only a few car calls to be registered.</td></tr>
<tr><td>Attendant Service Operation</td><td></td><td>AttnSrv</td><td>ATTENDANT SERVICE OPERATION</td></tr>
<tr><td colspan="4">This status indicates that the attendant service input (ATS) is activated. Attendant service is maintained as long as the ATS input is activated, and there are no “emergency service” (e.g., fire service) demands.
• Check the status of the ATS input. When the car is in Attendant Service operation the input should be high.</td></tr>
<tr><td>Automatic Operation</td><td></td><td>AutoOps</td><td></td></tr>
<tr><td colspan="4">This status indicates that the car is running on Automatic Operation.</td></tr>
<tr><td>Aux. Inspection Access Fault</td><td></td><td></td><td>AUX. INSPECTION ACCESS FAULT</td></tr>
<tr><td colspan="4">The inputs “Inspection Access” (INA) and “Redundant Inspection Access” (RINA) are compared. The car is shut down and this fault is generated if both inputs have the same status.</td></tr>
<tr><td>Both USD and DSD Are Open</td><td>SEC</td><td></td><td>BOTH USD AND DSD INPUTS ARE ACTIVE</td></tr>
<tr><td colspan="4">This fault indicates that the Up Slow Limit Switch (USD input) and Down Slow Limit Switch (DSD input) are simultaneously open. This usually indicates a problem with one of the terminal landing limit switches. The MP detects this condition when USD=0, DSD=0, DLK=1.
• Inspect both limit switches and associated wiring.
• Measure voltages at relay board terminals 11 (USD) and 13 (DSD). Reference the job prints and verify measured voltages against the status of the limit switches.
• If voltages are appropriate, possible causes may be a defective:
1. 47Kohm resistors on top of the main relay board, HC-RB4-x (for USD/DSD inputs).
2. C2 ribbon cable between HC-RB4-x and HC-PI/O boards.
3. Input circuit on the HC-PI/O board.</td></tr>
<tr><td>Bottom Floor Demand</td><td>SEC</td><td>BflrDem</td><td>BOTTOM FLOOR OR TOP FLOOR DEMAND</td></tr>
<tr><td colspan="4">This status is generated either when the established PI value corresponds to the top terminal landing, but the Up Slow Limit Switch is closed or when a valid PI value can not be found. A Bottom Floor Demand is generated to move the car away from the landing and establish a car position. Possible causes are:
• The COMPUTER RESET button was pressed.
• Initial Power-up.
• The state of the limit switch contacts do not correspond to the current PI value (example: the car is in door zone and the PI value corresponds to the bottom terminal landing, but the Down Slow Limit Switch is closed).
• The car was placed on Inspection (the computer does not attempt to maintain the PI value while the car is being moved in a “manual” fashion; Bottom Floor Demand is declared when the car is placed back into automatic operation).
Troubleshooting:
• If the floor encoding is invalid, the car should move to one of the terminal landings to establish car position.
• If the floor encoding is valid and the car is level at a landing, check the floor encoding magnets or vanes (perhaps a valid code cannot be read).
• If the floor encoding is invalid, check the terminal limit switches and associated wiring.
• Verify that the input circuits for USD and DSD are not failing by checking for defective:
1. 47Kohm resistors on top of the main relay board, HC-RB4-x.
2. C2 ribbon cable between HC-RB4-x and HC-PI/O boards.
3. HC-PI/O board.
4. Short circuit on HC-RB4-x board.</td></tr>
<tr><td>Bottom Landing Aux. Access Fault</td><td>SEC</td><td></td><td>BOTTOM LANDING AUX. ACCESS FAULT</td></tr>
<tr><td colspan="4">The inputs “Bottom Landing Access Bypass” (BAB) and “Redundant Bottom Landing Access Bypass” (RBAB) are compared. The car is shut down and this fault is generated if both inputs have the same status.</td></tr>
<tr><td>Brake Pick Failure (Traction only)</td><td></td><td></td><td>BRAKE PICK FAILURE</td></tr>
<tr><td colspan="4">This fault indicates that the Brake Pick Sensor (BPS) input was high (indicating the brake was not fully picking) during three consecutive runs. The car is shut down.
• Check the brake pick switch for proper operation (the contact should open when the brake is fully picked).
• Check the status of the BPS input. It should be low when the brake is picked.</td></tr>
</table>

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Car Call Bus Fuse Blown	SEC		**CAR CALL BUS IS DISCONNECTED**
This fault indicates that there is no power to the car call circuits on the HC-CI/O board(s). A problem may exist with the Car Call Bus fuse (F2CC) or the car call common wiring (bus 2CC). • Check the Car Call Bus fuse (F4) in the controller. • Check the wires that go to the Car Call Power inputs (labeled PS1/PS2/PS3) on the HC-CI/O board(s) in the controller. • Check for the proper installation of the call board "jumper plug" on the HC-CI/O board(s). Look at the notch on the chip and match it up according to the notch orientation label on the HC-CI/O board.			
Car is Overloaded			**OVERLOAD CONDITION**
This status indicates that the Overload input (OLW) is activated, or the perceived load in the car has exceeded the threshold value set for an overload condition. • For a discrete OLW input: check the status of the OLW input (wired to a load weigher contact), and determine if the status of the input is appropriate relative to the load in the car. • For an analog load weigher: check the perceived load percentage using the on-board diagnostic station. Determine if the value displayed (percentage) is appropriate relative to the load in the car.			
Car Out of Service with Doors Locked	SEC		
This fault indicates that the car was shut down because it was delayed from leaving the landing for a predetermined time (default 5 minutes) after it timed out of service. The doors were locked when the timer elapsed. • Correct the problem that caused the car to time out of service. Refer to the Special Event Calendar for the event name, then troubleshoot that event.			
Car Out of Service without Doors Locked	SEC	SftyOpn	
This fault indicates that the car was shut down because it was delayed from leaving the landing for a predetermined time (default 5 minutes) after it timed out of service. Doors were not locked when the timer elapsed. • Suspect an obstruction that has kept the doors from closing, thus preventing the car from leaving. • Verify that controller terminal #48, on the HC-RB4-x board, has zero voltage. • Correct the problem that caused the car to time out of service. Refer to the Special Events Calendar for the event name, then troubleshoot that event.			
Car Safety Device Open	SEC		**CAR SAFETY DEVICE OPEN**
This fault indicates that one or more of the car safety circuit devices is open (e.g., emergency exit contact, safety clamp switch, car-top emergency stop switch). This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened "upstream" of the SAFC input. • Check the applicable car safety devices. Refer to controller wiring prints for applicable devices.			
Car to Lobby			**CAR TO LOBBY OPERATION**
This status indicates that the Car To Lobby input (CTL) has been activated. • Check the status of the CTL input. It should be high.			
Communication Loss	SEC		
This fault indicates that the car was previously communicating with the Group Supervisor but is now unable to communicate. • Verify that the RS-422 communication cable is not removed from the Car's MC-RS board. • Verify the jumpers on all of the controllers' MC-RS boards. • Check for a defective MC-RS board on any of the controllers.			
Contactor Proofing Redundancy Failure	SEC		**CONTACTOR PROOFING REDUNDANCY FAILURE**
This fault indicates that one (or more) of the main power contactors has not dropped out properly after the car stopped moving. The computer generates this error when either the CNPB or CNPM input remains low after the car has stopped. • This failure is only logged on the Group CRT and will occur in conjunction with one of the three local redundancy failures: PM Contactor Redundancy Failure, MX & PT1 Redundancy Failure, or PT2 & PT3 Redundancy Failure. • Verify that the CNP input is high when the car is not in motion. • Look for troubleshooting tips in the description of these specific redundancy failures.			
Direction Relay Redundancy Failure	SEC		**DIRECTION RELAY REDUNDANCY FAILURE**
This fault indicates that one of the direction relays appears to have failed in the picked state. The computer has detected that the Direction Pilot input (UDF) is high without a direction output. Ensure that, when the car is not in motion, the UDF input is low.			
Door Close Protection	SEC		**DOOR CLOSE FAILURE**
This fault indicates that the doors were unable to close in. typically. 60 seconds. • Check door lock contacts for proper closure and conductivity. • Check individual doors and door tracks for physical obstructions. • Verify that the Door Close Limit contact functions properly. • Check for a faulty Door Lock Sensor input (DLS) or Door Close Limit input (DCL).			

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Door Lock Contact Failure	SEC		**DOOR LOCK SWITCH FAILURE**
This fault indicates that a door lock contact appears to have failed in the closed state. The computer compares the state of the landing Door Lock Sensor input (DLS or DLSR) with the state of the Door Close Limit input (DCL). If DLS or DLSR remains high after the doors have opened (DCL=1), this failure will be declared. (It appears that the door lock contact is shunted or has remained closed). • Measure the voltage on the DLS or DLSR input, with doors open. • If voltage exists on DLS or DLSR while the doors are open, trace the source of the voltage. • If no voltage exists on the DLS or DLSR, suspect faulty DLS or DLSR input circuit. Check the HC-IOX and HC-I4O boards.			
Door Lock Failure	SEC		**DOOR LOCK FAILURE**
This fault indicates that the doors have closed, DCL = 0 (or DCLC = 1 if retiring cam), a demand exists for the car to move (DCP = 1), but the doors did not lock (DLK = 0) within 80 seconds with the door close power output (DCP) turned on. • If no Retiring Cam is used, verify that the door lock contacts are closed to provide power to the door lock input (DLK = 1). • If the Retiring Cam option is set: 1. Verify that the Retiring Cam relay is activated (DCP=1, DCL=0 or DCLC=1) and the doors are locked (DLK=1). 2. Momentarily place the car on Inspection to reset the Door Lock Failure. 3. Verify the proper operation of the Retiring Cam circuitry and mechanism.			
Door Lock Relay Redundancy Failure	SEC		**REDUNDANCY DOOR LOCK RELAY FAILURE**
This fault indicates that one of the door lock relays has failed to drop out. • Verify that, with the hoistway doors open, there is no power on the Door Lock Sensor Relay input (RDLS or RDLSR, if the car has rear doors). • If the RDLS or RDLSR input is high and the doors are open, then a door lock relay has failed to drop. • Verify that the door lock relay(s) operates properly. • If no voltage appears on the RDLS (or RDLSR) input, suspect a faulty RDLS (or RDLSR) input circuit. Replace the HC-IOX and/or HC-I4O boards.			
Door Open Limit Failure	SEC		**DOOR OPEN LIMIT FAILURE**
This fault indicates that a door open limit contact appears to have failed in the open state. This means that the Door Open Limit input (DOL or DOLR) is low--indicating an open door--while the Gate Switch (GS) or Door Lock Sensor (DLS) inputs are high--indicating a closed and locked door. • Verify that, with the doors closed, there is power on the Door Open Limit input (DOL or DOLR). DOL or DOLR must be high when DLS and/or GS is high. • Check the wire, in the controller, to terminal #36 on HC-RB4-x to verify DOL. • If there is a rear door, check terminal #36 on the rear door board to verify DOL.			
Door Open Protection	SEC		
This fault indicates that the doors were unable to open in typically 12 seconds. • Check door lock contacts for proper closure and conductivity. • Check individual doors and door tracks for physical obstructions. • Verify that the Door Open Limit contact functions properly.			
Doors Locked but not fully Closed - Front			**FRONT DOOR IS LOCKED BUT NOT FULLY CLOSED**
This fault indicates that the Door Lock input (DLK) was high (doors locked) and the Door Closed Limit input (DCL) was high (doors not fully closed). DCL should be low when doors are locked. • Determine the state of the doors. • If the doors are closed, check the voltage on the DCL input terminal. If the voltage is high, adjust the Door Closed Limit switch so the switch opens prior to DLK. • Check for a faulty door close limit contact or associated wiring.			
Doors Locked but not fully Closed - Rear			**REAR DOOR IS LOCKED BUT NOT FULLY CLOSED**
This fault indicates the Door Lock input (DLK) was high (doors locked) and Door Closed Limit Rear input (DCLR) was high (doors not fully closed). DCLR must be low when doors are locked. • Determine the state of the doors. • If the doors are closed, check the voltage on the DCLR input terminal. If the voltage is high, adjust Rear Door Closed Limit switch so the switch opens prior to DLK. • Check for a faulty door close limit contact or associated wiring.			

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Doors Open And Locked	SEC		**DOL AND DLK BOTH ACTIVE**
This fault indicates that the Door Open Limit input (DOL) was low while the Door Lock input (DLK) was high. The leveling inputs (LU and LD) must also be low to log this fault. • Determine the state of the doors. • If the doors are open, check the voltage on terminal #8 (DLK), on the HC-RB4-x board. • If voltage exists, determine source of voltage (there should be no voltage on terminal 8 if doors are open and car is not leveling). • If the doors are closed, check the voltage on terminal #36 (DOL), on the HC-RB4-x board. The voltage should be high. • If voltage does not exist, check for faulty door open limit contact (contact should be closed if doors are not fully open) or associated wiring. • If voltages are appropriate, suspect faulty input circuit (either DLK or DOL input circuit). Check the 47Kohm resistors on the HC-RB4-x and HC-PI/O boards.			
Door Zone Sensor Failure (active state)			**DOOR ZONE SENSOR FAILURE**
This fault indicates that the Door Zone input (DZ) did not deactivate during the run. Probable causes are: shorted door zone sensor or associated circuitry (within the landing system assembly); faulty wiring from the landing system to the controller; or a faulty computer input circuit (main relay board or HC-PI/O board). • Check the operation of the door zone sensors and associated wiring (place the car on inspection, move the car away from the floor, noting the transitions in the door zone signal(s) coming from the landing system). • Verify that the computer diagnostic display of DZ (or DZ rear) matches the state of the sensor signals at the main relay board (or rear door relay board).			
DPM Redundancy Fault	SEC		**DPM REDUNDANCY FAULT**
A failure of a front door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPM (door position monitor) input. • Valid when SAF=1. When DLK is ON (1) then input DPM must also be ON (1). When DOL=0, DPM=0. If this is not the case, then a DPM redundancy fault is recorded and the car is prevented from operating			
DPMR Redundancy Fault	SEC		**DPMR REDUNDANCY FAULT**
A failure of a rear door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPMR (door position monitor rear) input. • Valid when SAF=1. When DLK is ON (1), input DPMR must also be ON (1). When DOLR=0, DPMR=0. If not, a DPMR redundancy fault is recorded and the car is prevented from operating.			
Drive Failed to Respond			**DRIVE FAILED TO RESPOND**
Monitors the Drive On status of the drive. The DRON input must be ON when the elevator is stopped and OFF when the elevator is in motion. If this condition is not true, the Drive Failed To Respond fault will be logged. The elevator will attempt to recover from this fault up to four consecutive times after which this fault will latch and require a manual reset by toggling the inspection switch. • Check the circuitry associated with the DRON input for proper operation.			
Earthquake *(Traction only)*	SEC	Eqactv	**EARTHQUAKE OPERATION**
This fault indicates that one or both of the earthquake inputs (EQI, CWI) is high. The appropriate code-mandated earthquake operation is applied, for ANSI and California Earthquake Operation the car is brought to a floor and then shut down. • The elevator may be returned to normal service by means of momentary reset button on the earthquake board (HC-EQ2). This should be done by authorized personnel, after it has been determined that it is safe to do so. • Should the system remain in this mode of operation after the reset button has been pressed, check the status of the earthquake sensing devices (seismic switch or counterweight derailment device).			
Earthquake Normal Operation *(Traction only)*			**EARTHQUAKE- REDUCED SPEED OPERATION**
This status allows the car to run after an Earthquake fault. To run at reduced speed on Earthquake Normal Operation the Earthquake fault timer must expire and the counterweight must **not** be derailed during the earthquake. (EQI is high, CWI is low; used for ANSI earthquake operation only.) Otherwise, the car remains shut down. • The elevator may be returned to normal service by pressing the RESET button on the earthquake board (HC-EQ2). This should be done by authorized personnel, after it has been determined that it is safe to do so. • Should the system remain in this mode of operation after the RESET button has been pressed, check the status of the EQI input.			
Elevator Shutdown or Power Transfer			**ELEVATOR SHUTDOWN SWITCH OR POWER TRANSFER INPUT ACTIVE**
This status indicates that either the Elevator Shutdown input (ESS) has been activated or the Power Transfer input (PTI) has been activated. The car is stopped at the next available floor and then shut down. • Verify that the status of the computer inputs (ESS) and (PTI) is appropriate relative to the status of the switch or contact that feeds the input.			

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Emergency Power	SEC	EmrgPwr	**EMERGENCY POWER OPERATION**
This event indicates that the system is on Emergency Power operation. The Emergency Power input (EPI) is low, which indicates that the system is being powered by an emergency-power generator. • If system is not running on an emergency-power generator, check the voltage on the EPI terminal (this terminal is generally found in the group supervisor controller in multi-group applications). • If voltage does not exist on EPI, check contact and associated wires that feed the EPI input. • If voltage does exist on the EPI terminal, suspect faulty EPI input circuitry (HC-IOX or HC-I4O board). [Note: In some applications, the EPI input resides in the individual elevator controller. Refer to specific job prints for details.] • If this is a group system with emergency power, and the Group Supervisor has yet to be installed, place a jumper from the 2 bus to the EPI input on each local car's HC-IOX board. Remove the jumper when the Group Supervisor is installed.			
Emergency Power Shutdown	SEC		**EMERGENCY POWER SHUTDOWN**
This status indicates that the car is shutdown during Emergency Power Operation when the controller is unable to communicate with the Group Supervisor. When the Group Supervisor is unable to coordinate running the elevators on Emergency Power, this shutdown occurs in order to prevent the cars from running all at the same time and possibly overloading the generator.			
Emergency Stop Input 1 Activated			**EMERGENCY STOP INPUT 1 ACTIVATED**
This message is displayed when the Emergency Stop Input 1 (ESTP1) goes high.			
Emergency Stop Input 2 Activated			**EMERGENCY STOP INPUT 2 ACTIVATED**
This message is displayed when the Emergency Stop Input 2 (ESTP2) goes high.			
External Motor Limit Timer (Hydro only)	SEC		**MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED**
This fault indicates that the EXMLT input is active. This is an MLT shutdown wtih an External Motor Limit Timer (EXMLT).			
Fire Service Alternate	SEC	AltFir1	**FIRE SERVICE PHASE 1 - ALTERNATE**
This event indicates that the system is on Fire Recall Operation (Fire Service Phase I), using the alternate fire recall floor. This recall is generally initiated by the activation of a smoke detector at the main fire recall floor. In some applications, an alternate fire recall switch may be specified (FRAON input). • Inspect the fire sensors (especially the main floor sensor) and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status, if activated by a smoke sensor. • If this is a group System and the Group Supervisor has yet to be installed, make sure the 2-bus is jumpered to terminal #38 on the HC-RB4-x. Remove the jumper when the Fire Service wiring is complete.			
Fire Service Main	SEC	MnFire1	**FIRE SERVICE PHASE 1 - MAIN**
This event indicates that the system is on Fire Recall Operation (Fire Service Phase I), using the main fire recall floor. This recall is generally initiated by the activation of a smoke detector at a landing other than the main fire recall floor. Fire recall operation to the main floor can also be initiated by the activation of the fire recall switch (input FRON or FRON2). • Inspect the fire sensors and the Fire Phase I switch wiring. For some fire codes including ANSI, the Fire Phase I switch must be turned to the BYPASS position and then back to OFF to clear the fire service status if activated by a smoke sensor. • If this is a group installation and the group has yet to be installed, make sure the 2-bus is jumpered to terminal #38 on the HC-RB4-x. • If this installation must comply with the requirements of the 1998 Addendum to the ASME A17.1-1996 or later code, and the machine room and hoistway sensors have not yet been installed, or if this is a group system and the Group Supervisor has yet to be installed, make sure the FRMR and FRHTW inputs on the HC-IOX boards in each simplex or local car controller are jumpered to the 2/2F bus, as applicable			
Fire Service Phase 2	SEC	FirePh2	**FIRE SERVICE PHASE 2**
This event indicates that the car is on In-car Fireman's Service (Fire Phase 2). The in-car fire service switch has been placed in the on (FCS) or hold (HLD) position. • Inspect the phase 2 switch and wiring. In most fire jurisdictions, the car must be returned to the fire floor at which Fire Phase 2 was activated, the doors must be fully open, and the phase 2 switch must be turned OFF to remove the elevator from Fire Phase 2 operation.			
FLT Relay Dropped			**FLT RELAY DROPPED**
The FLT relay is dropped as a result of one or more of many possible fault conditions. • Check the Event Calendar to determine what has caused the FLT Relay Dropped message. Then look up that message or messages in this table to determine the appropriate troubleshooting and/or corrective action.			
Gate Switch Failure	SEC		**GATE SWITCH FAILURE**
This fault indicates that a car gate contact failed to open when the car doors opened. The computer checks the gate switch contact input (GS or GSR) against the door close limit input (DCL). If the gate switch contact remains closed (GS=1 or GSR=1) while the door is open (DCL=1) the fault is logged. Such a state would indicate that the gate switch contact has been shunted, or a contact or associated wiring is faulty. • Verify that, with the doors open, there is no power on the GS input (GS must be low when DCL is high). • If no voltage exists on the GS input, suspect a faulty GS input circuit (HC-IOX or HC-I4O board). • If there is a rear door perform the same tests for the GSR input.			

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Gate Switch Relay Redundancy Failure	SEC		**REDUNDANCY GATE SWITCH FAILURE**
This fault indicates that a car gate switch relay failed to release when the doors opened. • Verify that, with the car gate open, there is no power on the RGS input (or RGSR, if rear doors). • If the RGS input is high, suspect a stuck or welded gate switch relay. • Verify that the gate switch relay(s) operates properly. • If no voltage appears on the RGS (or RGSR) input, suspect a faulty RGS (or RGSR) input circuit.			
Governor Switch Open (Traction only)	SEC	SftyOpn	**GOVERNOR SWITCH OPEN**
This fault indicates that the governor switch is open. This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened “upstream” of the GOV input. • Check the governor overspeed switch.			
Hall Call Bus Fuse Blown	SEC		**HALL CALL BUS IS DISCONNECTED**
This fault indicates that there is no power to the hall call circuits on the HC-CI/O board(s). A problem may exist with the Hall Call Bus fuse or the hall call common wiring. • Check the Hall Call Bus fuse in the controller. • Check the wires that go to the Hall Call Power inputs on the HC-CI/O board(s) in the controller. • Check for proper installation of the call board “jumper plug” on the HC-CI/O board(s).			
Hall Call Bypass Operation		Byp-HLW	
This status indicates that the load weigher is detecting a significant load in the car so hall calls will be bypassed.			
Heavy Load			**HEAVY LOAD WEIGHER CONDITION**
This status indicates that the Heavy Load (HLI) input has been high. • For a discrete HLI input (wired to a load weigher contact): Check the status of the HLI input, and determine if the status of the input is appropriate relative to the load in the car. • For an analog load weigher: Check the perceived load percentage using the on-board diagnostic station. Determine if the value displayed (percentage) is appropriate relative to the load in the car.			
Hoistway Safety Device Open	SEC	SftyOpn	**HOISTWAY SAFETY DEVICE OPEN**
This fault indicates that one or more of the Hoistway Safety Circuit Devices is open (e.g., pit stop switch, car and cwt buffers switches, up/down final limit switches). This error is generated when the safety string input (SAF) is low, and the safety circuit has been opened “upstream” of the SAFH input. • Check the applicable items (e.g., pit stop switch, car and cwt buffers switches, up/down final limit switches). Refer to the specific controller wiring prints for applicable devices.			
Hospital Service	SEC		**HOSPITAL PHASE 1 OPERATION**
This status indicates that the car was placed on Hospital Service. • Hospital Service can be initiated by the registration of a hospital call, or by the activation of the in-car Hospital Service switch (HOSP input). • Verify that the status of the in-car hospital switch computer input (HOSP) is appropriate relative to the status of the key-switch.			
Hospital Service Phase 2	SEC		**HOSPITAL PHASE 2 OPERATION**
This status indicates that the car has answered a hospital emergency call or the in car hospital emergency key switch has been activated (HOSP2 is high). • The car has been placed on in-car Hospital Emergency Service. The car will remain in this mode until the in-car Hospital Service key-switch is turned off. • Verify that the status of the in-car hospital switch computer input (HOSP2) is appropriate relative to the status of the key-switch.			
In-car Stop Switch	SEC	SftyOpn	**IN CAR STOP SWITCH ACTIVATED**
This fault indicates that the in-car stop switch has opened the safety circuit. • Check the status of the in-car emergency stop switch and associated wiring.			
Inconspicuous Riser	SEC		
This event indicates that the System is on Swing operation or the Inconspicuous Riser is functional. • Check Swing Car Operation. • Inspect the SWG switch on the controller.			

TABLE 6.3 Status and Error Messages

<table>
<tr><th>Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th></tr>
<tr><td>Independent Service</td><td>SEC</td><td>IndSrv</td><td>INDEPENDENT SERVICE OPERATION</td></tr>
<tr><td colspan="4">This event indicates that the Independent Service switch has been turned on, or the TEST/NORMAL switch on the Relay board is in the TEST position.
• Check the Independent Service switch.
• Inspect the TEST/NORMAL switch on the Relay board on the controller.
• Check the wiring to the relay board (HC-RB4-x) terminal #49.</td></tr>
<tr><td>Inspection</td><td>SEC</td><td>InspAcc</td><td>INSPECTION OPERATION</td></tr>
<tr><td colspan="4">This event indicates that the hoistway access, car top inspection or relay panel inspection switch is ON or the hoistway and/or car-door bypass switch is on bypass. The Inspection input (IN) is low.
• Check all of the inspection switches and associated wiring.
• Check the wiring to the relay board (HC-RB4-x) terminal #59.</td></tr>
<tr><td>Landing System Redundancy Failure</td><td>SEC</td><td></td><td></td></tr>
<tr><td colspan="4">This fault indicates that one of the landing system sensors or associated relays has malfunctioned. A Landing System Redundancy Failure will be declared if the LSR input remains high throughout a run.
• Verify proper operation of the Door Zone (DZ), Level Up (LU) and Level Down (LD) relays while the car is moving in the hoistway.
• The LSR signal must go low at least once during a run.</td></tr>
<tr><td>Level Down</td><td></td><td></td><td>LEVELING DOWN</td></tr>
<tr><td colspan="4">This status is normally on when the car is just above a floor. If the car is level with the floor and this message appears, it is usually the result of a switch or sensor problem.
• Inspect the LD switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.</td></tr>
<tr><td>Level Up</td><td></td><td></td><td>LEVELING UP</td></tr>
<tr><td colspan="4">This status is normally on when the car is just below a floor. If the car is level with the floor and this message appears, it is usually the result of a switch or sensor problem.
• Inspect the LU switch or sensor on the landing system and the placement of the landing system vane or magnet for that floor.</td></tr>
<tr><td>Leveling Sensor Failure (Active State)</td><td></td><td></td><td>LEVELING SENSOR FAILED - ON POSITION</td></tr>
<tr><td colspan="4">This fault indicates that the MP detected a LU or LD input that is stuck in the active state.
• Computer input circuit (main relay board or HC-PI/O board).
Troubleshooting tips:
• Verify that the computer diagnostic display (ADDR 29H bits 3 & 7) of LU and LD matches the state of the sensor signals at the main relay board (terminals 25X and 26X).
• Check also the operation of any contacts that may be placed at the “low side” (the “1-bus” side) of the LU and LD relay coils (e.g., H, INT). Check that such contacts close properly when appropriate.</td></tr>
<tr><td>Leveling Sensor Failure (Inactive State)</td><td></td><td></td><td>LEVELING SENSOR FAILED - OFF POSITION</td></tr>
<tr><td colspan="4">This fault indicates that the MP detected a LU or LD input that is stuck in the inactive state.
• Check operation of the leveling sensors and associated wiring.
• Move above and below a landing, noting the transitions in the leveling signal(s) coming from the landing system.
• Verify that the computer diagnostic display of LU and LD matches the state of the sensor signals at the main relay board.</td></tr>
<tr><td>Leveling Sensor Redundancy Failure</td><td>SEC</td><td></td><td>LEVELING SENSOR FAILURE</td></tr>
<tr><td colspan="4">This fault indicates that one of the LU or LD sensors appears to have failed.
The MP has observed one of the following faults:
• One of the leveling inputs was active continuously throughout a floor-to-floor run
• The appropriate leveling input was not seen prior to the arrival of the car at a door zone
Troubleshooting Tips:
• Verify the proper operation of the leveling sensor signals when moving the car in the hoistway.
• Check for a LU or LD input circuit failure by looking for defective:
  • 47kohm resistor on top of the main relay board, HC-RB4-x.
  • C2 ribbon cable.
  • HC-PI/O board input circuit.
  • Inputs at terminals 25 and 26 on the HC-RB4-x board.</td></tr>
</table>

TABLE 6.3 Status and Error Messages

<table>
<tr><th>Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th></tr>
<tr><td>Light Load</td><td></td><td></td><td>LIGHT LOAD WEIGHER CONDITION</td></tr>
<tr><td colspan="4">This status indicates that the Light Load Weighing (LLI) input is activated. The Light Load error message is generated whenever the load inside the car is less than the threshold specified to activate Anti-Nuisance operation, and car calls are registered.
• Response is only required if the anti-nuisance function (cancellation of car calls) appears to activate even when the car is loaded to a value above the threshold load value.
• For a discrete (LLI) input (wired to a load weigher contact): check the status of the (LLI) input and determine if the status is appropriate relative to the load in the car.
• For an Analog Load Weigher: check the perceived load percentage using the on-board diagnostic station. Determine if the percentage displayed is appropriate relative to the load in the car.</td></tr>
<tr><td>Lost Door Lock During Run</td><td>SEC</td><td></td><td></td></tr>
<tr><td colspan="4">This fault indicates that the Door Lock input was lost while the car was traveling through the hoistway.
• Check door lock adjustment to prevent clipping of door lock mechanism when car passes a floor.
• If logged with another fault, this event may be a side effect of the other fault.</td></tr>
<tr><td>Low Oil Switch (Hydro only)</td><td>SEC</td><td></td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">This fault indicates that the Low Oil Switch (LOS) input is active. This MLT shutdown gets latched until the car is momentarily on Inspection or reset.</td></tr>
<tr><td>MG Shutdown Operation/ Shutdown Switch</td><td></td><td></td><td>SHUTDOWN OPERATION</td></tr>
<tr><td colspan="4">This status indicates that the car is on MG Shutdown Operation or that another Shutdown Switch is activated. If the MGS input is high see job prints to determine what switch is connected to the input. This shutdown will bring the car to the lobby first then shut down the car.
• Check the status of the Motor Generator Shutdown Switch input.
• Verify that the status of the computer input (MGS) is appropriate relative to the status of the switch or contact that feeds the input (see job prints).</td></tr>
<tr><td>MLT - Excessive PI Correction (Traction only)</td><td>SEC</td><td></td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">This fault indicates that the logical PI value (obtained from the landing system) and the floor encoding are inconsistent.
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• Call MCE for troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
<tr><td>MLT - Excessive Releveling at Floor</td><td>SEC</td><td>MLT</td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">This fault indicates that the car has releveled 25 times at the same floor.
• Check the brake releveling motor adjustment.
• If the job is using a sleeve bearing motor, turn the Idle option ON. (See Timers and their Ranges, in Section 5 for details on the Idle option).
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
<tr><td>MLT - Failed to Leave Floor</td><td>SEC</td><td>MLT</td><td>FAILURE TO LEAVE THE FLOOR</td></tr>
<tr><td colspan="4">This fault is generated when the controller has picked high speed a number of times but failed to leave the floor. The number of tries allowed is a field-programmable value, programmed through the MC-MP2 enhanced on-board diagnostics (“System Mode”).
• The field adjustable option FTLF in the MP2's EOD may be used to turn the option OFF or to change the number of times H picks before shutdown.
• Check for an intermittent Door Lock.
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
<tr><td>MLT - Timer Expired</td><td>SEC</td><td>MLT</td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">The motor limit timer has elapsed before the car has completed its movement. This condition can occur because the MC-MP computer receives a direction sensing (UPS or DNS) input for a sufficient amount of time to cause the MLT timer to elapse. This usually happens due to the system's failure to respond to a 120 VAC direction signal appearing on terminals 85(up) or 87 (down) on the HC-RB4-X Relay board.
• Check Up and Down Sense inputs.
• If the OLM, DZ, or LEV input signal is stuck on during a correction run, the car may not be able to reach the next landing before the Motor Limit Timer elapses. Check these input signals.
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
</table>

TABLE 6.3 Status and Error Messages

<table>
<tr><th>Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th></tr>
<tr><td>Motor Limit Timer (Traction only)</td><td>SEC</td><td></td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">The motor limit timer has elapsed before the car completed its movement. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”.
• Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
<tr><td>Motor Limit Timer (INT) (Traction only)</td><td>SEC</td><td></td><td>MOTOR LIMIT TIMER (ANTI-STALL) ELAPSED</td></tr>
<tr><td colspan="4">This fault indicates that the intermediate speed flag (INT) was active when the Motor Limit Timer elapsed. This fault is logged with an explanation of the type MLT, which is in the form “MLT - XXX”.
• Verify that the INT relay is dropped(on the SCR-RI board) and the MP status flag for INT is low, once the car drops below the speed set by the MINT parameter, on the Pattern (Shift F4) page.
• Check the Special Event Calendar for the additional MLT - XXX fault information and troubleshoot that specific type of MLT.
• See “Using the MLT Data Trap” in Section 6, Troubleshooting.
• To clear the condition, the car can be placed momentarily on Inspection.</td></tr>
<tr><td>Nudging</td><td></td><td>Nudging</td><td></td></tr>
<tr><td colspan="4">This status indicates that the door nudging operation has commenced. Doors will be closed with reduced speed and torque as required by code.</td></tr>
<tr><td>Out of Service</td><td></td><td>OutServ</td><td></td></tr>
<tr><td colspan="4">This status indicates that the car is not available for normal passenger service.</td></tr>
<tr><td>Passcode Requested</td><td>SEC</td><td></td><td>PASSCODE REQUEST</td></tr>
<tr><td colspan="4">This status indicates that the Passcode Requested option has been activated and that a passcode is required in order to run the car on any mode other than Inspection. Refer to the instructions titled Setting the Passcode in Section 5.</td></tr>
<tr><td>Photo-Eye Failure</td><td>SEC</td><td></td><td></td></tr>
<tr><td colspan="4">This fault indicates that the one of the photo-eye inputs has been active for a considerable amount of time.
• Check for abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHE or PHER) circuit.
• Ensure that the safety edge has power.</td></tr>
<tr><td>Photo-Eye Failure (Front)</td><td>SEC</td><td></td><td>PHOTO EYE FAILURE</td></tr>
<tr><td colspan="4">This fault indicates that the front-door, photo-eye input (PHE) was activated during a run.
• Check for abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHE) circuit.
• Ensure that the safety edge has power.</td></tr>
<tr><td>Photo-Eye Failure (Rear)</td><td>SEC</td><td></td><td>PHOTO EYE FAILURE</td></tr>
<tr><td colspan="4">This fault indicates that the rear-door, photo-eye input (PHER) was activated during a run.
• Check for abnormal blockage of the optical device.
• Check for a failure of the device itself, or of the photo-eye input (PHER) circuit.
• Ensure that the safety edge has power.</td></tr>
<tr><td>Pre-test Mode</td><td></td><td></td><td>PRE-TEST MODE</td></tr>
<tr><td colspan="4">This status indicates that the car is bypassing hall calls and disabling the gongs. However, car calls may still be entered and will be answered. Once the last car call is answered, the car will park with doors closed. This function is normally used to capture a car.</td></tr>
<tr><td>Power Down</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">This event indicates that the entire controller lost power or was manually reset. This event is logged when the MC-CGP-4P board loses power or is reset while running.</td></tr>
<tr><td>Priority/VIP Service Phase 1</td><td></td><td></td><td>PRIORITY VIP SERVICE - PHASE I</td></tr>
<tr><td colspan="4">This status indicates that a Priority/VIP Service momentary call switch was activated at any floor.
• The car has been assigned a Priority/VIP Service call. The car can be removed from Priority/VIP Service by toggling (On-Off) the in-car Priority/VIP Service key-switch. The car should automatically return to normal service after a pre-determined period of time (typically 60 seconds) if the in-car switch is not activated.</td></tr>
<tr><td>Priority/VIP Service Phase 2</td><td></td><td></td><td>PRIORITY VIP SERVICE - PHASE II</td></tr>
<tr><td colspan="4">This status indicates that the car has answered a Priority/VIP call or the in car Priority/VIP Service key switch has been activated (PRIS is high).</td></tr>
</table>

TABLE 6.3 Status and Error Messages

Event Message	SEC	F3 Flag	MP2 Scrolling Message
Releveling	SEC		
This event indicates that the car has traveled through the Dead Zone on an approach to the floor, and has had to relevel. • The drive must be properly adjusted to track the velocity profile. • Widen the dead zone by moving the LU and LD sensors farther apart.			
RS-422 Network Down	SEC		
This fault indicates that the Group Supervisor was previously communicating with one or more local cars but is now unable to communicate with any cars. • Verify that the RS-422 communication cable is not removed from the Group's MC-RS board. • Verify the jumpers on all of the controllers' MC-RS boards. • Check for a defective MC-RS board on any of the controllers by replacing it.			
RS-422 Network OK	SEC		
This event indicates that the Group Supervisor has recovered from an RS-422 Network Down event.			
Safety Relay Circuit Open	SEC	SftyOpn	**SAFETY STRING OPEN**
This fault indicates that a contact in the safety relay circuit is open. This message is generated when the safety string input (SAFR1) is low and all safety devices through the in-car stop switch are closed (STOP=1). This indicates that a device "below" terminal #20 has opened. • Refer to the job prints to determine all components that make up the safety relay circuit (between terminal 20 and the CSAF output device). • Check each of these devices to determine the cause of the fault.			
Security	SEC		**ENTER SECURITY CODE**
This event indicates that the secured car call button has been pressed, and the controller is awaiting proper security code to be entered through the car call buttons. A 10-second period of time is allowed to enter the correct code. • Enter floor pass code with car call buttons on COP. • See Section 5.3.3 or the appropriate security appendix for instructions on how to program or change security pass codes.			
Swing Car Operation		SwngOpr	
This status indicates that the car is operating as a swing car, independently from the Group Supervisor. This car should be servicing a riser of hall calls dedicated to that car.			
Synch Function (Hydro only)			
This event indicates that the SYNCI input has been momentarily activated and the car will be taken to the buffer in order to equalize the hydraulic pressure in systems that use more than one piston to move the car. The down normal limit switch is bypassed (by activation of a relay connected to the SYNC output) and the car is moved at slow speed in the down direction. The down slow valve circuits are energized for 30 seconds to ensure that the car has been lowered all the way to the buffer. Once this timer elapses, the car is moved back up to the bottom landing.			
System Power Up/Reset	SEC		
This event indicates that the Communication processor detected that all the individual system processors successfully powered up. If one or more processors fail to successfully power up, then this event will be replaced by one or more Sub-System Reset events detailing which individual processors successfully powered up.			
Test Mode Operation			**CAR IN TEST MODE**
This status indicates that the TEST/NORM switch on the HC-RB4-SCRI board is in the TEST position. • Check the TEST/NORM switch on the HC-RB4-x board.			
Timed Out of Service	SEC	TOS	**TIME OUT OF SERVICE**
This fault indicates that the car delayed reaching its destination (direction arrow established - SUA/SDA). In most cases, the car is delayed at a floor because the doors are prevented from closing. When the timed out of service (TOS) status is generated, the car is removed from hall call service until it is allowed to leave the landing. • The timer is used to take the car out of service when the car is held excessively. Typically this occurs when the doors are held open by continuous activation of the photo-eye, a call button, or another reopening device. The TOS timer is a field-adjustable timer, which can be lengthened or shortened to suit the specific installation (via the MP diagnostics).			
Timed Photo-Eye Failure	SEC		
The photo-eye was on longer than the predetermined time (default 60 seconds). • Check for an abnormal blockage of the optical device. • Check for a failure of the device itself, or of the photo-eye input (PHE or PHER) circuit.			

TABLE 6.3 Status and Error Messages

<table>
<tr><th>Event Message</th><th>SEC</th><th>F3 Flag</th><th>MP2 Scrolling Message</th></tr>
<tr><td>Top Floor Demand</td><td>SEC</td><td>TflrDem</td><td>BOTTOM FLOOR OR TOP FLOOR DEMAND</td></tr>
<tr><td colspan="4">This status is generated either when the established PI value corresponds to the bottom terminal landing, but the Down Slow Limit Switch is closed or when a valid PI value can not be found. A top-floor demand is generated to move the car away from the landing to establish car position. Possible causes are:• The COMPUTER RESET button was pressed.
• Initial Power-up.
• The state of the limit switch contacts do not correspond to the current PI value (example: the car is in door zone and the PI value corresponds to the bottom terminal landing, but the Dn Slow Limit Switch is closed).
• The car was placed on Inspection (the computer does not attempt to maintain the PI value while the car is being moved in a “manual” fashion (Top Floor Demand is declared when the car is placed back into automatic operation).
Troubleshooting tips:
• If no floor encoding exists, car should move to one of the terminal landings to establish car position.
• If floor encoding system exists and car is level at a landing, check the floor encoding magnets or vanes (perhaps a valid code cannot be read).
• If floor encoding does not exist, check the terminal limit switches and associated wiring.
• Verify the input circuits for USD and DSD by looking at:
  • 47Kohm resistors on top of the HC-RB4-x.
  • C2 ribbon cable on top of the HC-RB4-x.
  • HC-PI/O board.
  • Short circuit on relay board.</td></tr>
<tr><td>Valve Limit Timer Elapsed (Hydro only)</td><td></td><td></td><td>VALVE LIMIT TIMER ELAPSED</td></tr>
<tr><td colspan="4">The Valve Limit Timer starts whenever the controller attempts to move the car in the down direction. The timer is reset when the car reaches its destination floor. This message is generated if the timer expires before the car reaches its destination, and the controller will stop trying to move the car in order to protect the valves.
Verify that the Down Sense Input (DNS) is high when the car moves in the down direction.
Inspect the valves, valve solenoids and associated wiring.</td></tr>
<tr><td>Viscosity Control Function (Hydro only)</td><td>SEC</td><td></td><td>VISCOSITY CONTROL FUNCTION ACTIVE</td></tr>
<tr><td colspan="4">This message indicates that the VCI input is activated and the car is executing the Viscosity Control Function. The car is moved to the bottom landing and the computer periodically runs the motor (not the valves) to warm the oil in the system. The pump is turned ON for three minutes, OFF for nine minutes, ON for three minutes, etc. until the VCI input is deactivated. Registration of any call will preempt the Viscosity Control Function, as will any special operation, e.g., fire service, independent service, etc.
Check the device that is wired to the VCI input (usually an oil temperature sensor.</td></tr>
</table>

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6.1.6 ASME A17.1 - 2000 STATUS AND ERROR MESSAGES

The following Note Boxes apply to the messages listed in Table 6.4 *ASME A17.1 - 2000 Status and Error Messages*.

NOTE: Remember that 90% of the redundancy faults are the result of a relay failing to release. A normally closed (NC) contact of each critical relay is monitored, and after a run has been completed, is expected to drop out (release). The normally closed monitoring contact must make up. This means that the redundancy inputs should be ON (1) when the car has stopped at a landing. Relays that are normally picked, are “cycle-tested,” forcing them to drop after every operating cycle.

For troubleshooting the redundancy faults, the first few letters of the fault name are the same as the input terminal or dropping resistor designation. Use the prints to locate the board. For example, if the RBK redundancy fault is displayed, measure the voltage at resistor RBK on the SC-SB2K-x (board #61) and expect, when stopped at a floor, at least 100 VAC on the input side and close to 5.0 volts on the output side of the resistor.

If the voltage at the associated terminal or resistor is as expected, try swapping the ribbon cable connectors. If the voltage is low at the 47K dropping resistor then replace the board (SC-SB2K-x or SC-BASE). If the problem persists replace the SC-HDIO signal processing board.

For outputs, if the fault doesn’t clear, swap out associated output TRIACs and finally replace the offending board. Because the code required force-guided relays are soldered to the boards and cannot be replaced individually, the board must be replaced when the relay fails. Sockets for these code-required relays are as yet, unavailable.

The redundant “force-guided” relays are loaded on the two primary boards called the SC-SB2K-x and the SC-BASE. A third board, the SC-HDIO processes the input and output signals that go to and from the two primary boards and is located behind boards in the upper left of the control enclosure.

NOTE: The term “operating cycle” is used to define a complete run. After a call is placed, the time between the picking of direction to dropping direction at the target floor, is defined as an operating cycle. This could be either a one-floor or multi-floor run.

NOTE: Many of the inputs are checked via process called “Cycle Testing”. If any of the inputs tested fail the fault is termed a “cycle test” fault. Cycle testing is simply cycling a portion of the hardware to ensure that the input structure (solid state devices and software) are still operational. Cycle tests are performed at the end of an operating cycle when we turn OFF relays SAFR1, SAFR2 (the four bus is turned OFF) and output CT. Thus all of the devices associated with the four bus and Triac CT (GOV) must go low (OFF). If any input fails to transition *OFF,* a cycle test fault is logged.

NOTE: **PFLT Relay:** The PFLT relay is mounted on the SC-BASE-x board and has a single normally open contact in the safety string, immediately following IDC 20 and before the OL contact which feeds the power to the SAFR1 & SAFR2 relays. The normally open contact of the PFLT relay is directly monitored by the Main Processor board (MC-MP2-2K or MC-PCA-OA2K) through the PFLT input from and through the SC-HDIO board on IDC ASI1. The PFLT relay should remain energized during Normal operation. This relay drops and causes the Emergency shut down and stops the car under the following conditions: ILO, ETS and contract overspeed. This relay also turns *OFF* during PLD1 cycle testing.

In Table 6.4, *ASME A17.1 - 2000 Status and Error Messages,* the faults are listed alphabetically as they would appear on the Swing Panel Alphanumeric Display. The Special Event Calendar event name (sometimes different) is in the right column. If the SEC name is different, then the fault is one of several that share that Special Event name as part of a logical group. The SEC event names are listed in the manual index for easy location in this table.

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
2BI REDUNDANCY FAULT	**2BI Redundancy Fault**
Description: If the F4 fuse blows, inputs GOV (0700 bit 3) and RSAFR (0707 bit 8) should be 0. If either of these two inputs fail to go low, this fault is generated. ASME 2000 event. **Troubleshooting Tips:** • Check fuse F4 if OK swap ribbon cable at C3 on SC-SB2K(-H). If problem persists, replace SC-SB2K(-H) and then SC-HDIO. • Also check input resistor 2BI at top left of the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if 2BI resistor is defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
4 BUS CYCLE TEST FAULT	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. At the end of an operating cycle, outputs MPSAF and CSAF are cycled OFF. This removes power from the four bus. ASME 2000 event. Troubleshooting: The following inputs must respond as listed or the 4 bus cycle test fault will be logged and further operation of the lift will be prohibited. Note that 0 = OFF and 1 = ON SAF = 0 RMR = 0 RBRK = 0 REI = 0 RIN1 = 1 RIN2 = 1 UPS = 0 USD = 0 DNS = 0 RPT = 1 DSD = 0 RH = 1 UNL = 0 DNL = 0 • Cycle testing is simply cycling a portion of the hardware to ensure that the input structure (solid state devices and software) are still operational. Cycle tests are performed at the end of an operating cycle when we turn OFF relays SAFR1, SAFR2 (the four bus is turned OFF) and output CT. Thus all of the devices associated with the four bus and Triac CT must go low (OFF). If any input fails to transition OFF, a cycle test fault is logged. • Also check input resistors ASI1/PFLT, SAF, STOP, REB1, REB2 or RSAFR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
ACCI REDUNDANCY FAULT	**Hoistway Access Input Fault**
Description: This verifies that all inspection inputs downstream of ACCI (hoistway access inspection is third highest priority) are OFF (0) when this input is ON (1). ASME 2000 event. **Troubleshooting:** If you have this fault logged use the controller prints to locate input resistors IN and INMR on the SC-SB2K(-H) board, voltage must be OFF when ACCI is ON otherwise the ACCI redundancy fault is logged and the system is shut down.	
CAR TOP INSPECTION	**Car Top Inspection**
Description: The Car Top Inspection switch has been activated. ASME 2000 event. **Troubleshooting:** • Confirm that INCTI = 1 (0701 bit 1). • Check input resistor INCTI on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistor are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
CD REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door lock input, relay or associated circuitry has been detected. The status of the car door lock input CD is constantly monitored. CD and DPM must be ON (1) when DLK is ON and the car is not in door zone. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Expect CD to be ON when hoistway access has been activated (input ACCI is ON) and either the top (TAB) or bottom (BAB) access switches are activated. If the Car Door Bypass switch is turned to the bypass position during car top or in car inspection, expect CD = ON also. If the above conditions are not true, the CD redundancy fault is logged. Check the voltage on the terminals used by the offending fault to determine the problem. If terminal voltages are correct, first swap the ribbon cables connected between the SC-SB2K(-H) board and the SC-HDIO board, then swap out the board; first try SC-SB2K(-H) followed by the SC-HDIO.	
CDB REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door input, relay or associated circuitry has been detected. Both the OFF and BYPASS positions of the Car Door Bypass switch are monitored. The OFF position feeds input CDBO and the BYPASS position feeds input CDB. If the CDB switch is OFF the CDBO input will be ON (1) and the CDB input will be OFF (0). In effect CDB = not CDBO. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. NOTE: This redundancy fault detects the failure of an input by comparing two inputs against each other. In every case the inputs have opposite polarity (when one is ON the other must be OFF). Check the voltage on the terminals used by the offending fault to determine the problem. If terminal voltages are correct, try swapping the ribbon cables connecting the SC-BASE(-D) to the SC-HDIO board. Finally replace SC-HDIO or SC-BASE(-D).	
CDBR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. Both the OFF and BYPASS positions of the Car Door Bypass switch are monitored. The OFF position feeds input CDBOR and the BYPASS position feeds input CDBR. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. If input CDBR switch is OFF then input CDBOR will be ON and the CDBR input will be OFF (0). If CDBOR does not reflect the opposite state of CDBR then the CDBR redundancy fault is logged and the car shut down. NOTE: This redundancy fault detects the failure of an input by comparing two inputs against each other. In every case the inputs have opposite polarity (when one is ON the other must be OFF). Check the voltage on the terminals used by the offending fault to determine the problem. If terminal voltages are correct, try swapping the ribbon cables connecting the SC-BASE(-D) to the SC-HDIO board. Finally replace SC-HDIO or SC-BASE(-D).	
CDR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. The status of the car door lock input CDR is constantly monitored. CDR should be ON (1) when rear DLK is ON and the car is not in the rear door zone. Expect CDR to be ON when hoistway access has been activated (input ACCI is ON) and either the top (TAB) or bottom (BAB) access switches are activated. If the Car Door Bypass switch is turned to the bypass position during car top or in car inspection, expect CDR = ON also. If these conditions are not true, the CDR redundancy fault is logged. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Expect CD to be ON when hoistway access has been activated (input ACCI is ON) and either the top (TAB) or bottom (BAB) access switches are activated. If the Car Door Bypass switch is turned to the bypass position during car top or in car inspection, expect CD = ON also. If the above conditions are not true, the CD redundancy fault is logged. Check the voltage on the terminals used by the offending fault to determine the problem. If terminal voltages are correct, first swap the ribbon cables connected between the SC-BASE(-D) board and the SC-HDIO board, then the SC-BASE(-D) followed by the SC-HDIO.	
CONTACTOR FAILURE TO PICK *(Hydro only)*	**Contactor Failure to Pick**
Description: Indicates that one or more contactors have failed to energize when the car attempted to move in the UP direction. **Troubleshooting:** Reset this fault by pressing the Fault Reset button. Place the car on Inspection and move the car in the up direction. Watch the contactors to determine which one is failing to pick. Inputs RWYE, RDEL and RM are monitored and expected to go low when the contactors pick.	
COS1 FAULT (Future Use) *(Traction only)*	**Overspeed Fault**
Description: Contract overspeed 1 fault. The main processor monitors the COS1 signal coming from PLD1. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. On SC-BASE(-D) try turning COS trimpot fully clockwise.	
COS2 FAULT (Future Use) *(Traction only)*	**Overspeed Fault**
Description: Contract overspeed 2 fault. The main processor inspects the COS2 signal coming from PLD2. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. On SC-BASE(-D) try turning COS trimpot fully clockwise.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
CT CYCLE TEST FAULT	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. This fault signifies that the functionality of the circuitry associated with the CT relay has failed to operate correctly. ASME 2000 event. **Troubleshooting:** At the end of an operating cycle, output CT is cycled OFF. Relay CT should drop out, this functionality is monitored via inputs CD/HD and DLK. When output CT is OFF, inputs CD, HD and DLK will be OFF. If not, the CT cycle test fault will be logged and further operation of the lift will be suspended. • Cycle testing is simply cycling a portion of the hardware to ensure that the input structure (solid state devices and software) are still operational. Cycle tests are performed at the end of an operating cycle when we turn OFF relays SAFR1, SAFR2 (the four bus is turned OFF) and output CT. Thus all of the devices associated with the four bus and Triac CT must go low (OFF). If any input fails to transition OFF, a cycle test fault is logged. • Also check input resistors PFLT, SAF, or RSAFR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
CTDIF REDUNDANCY FAULT *(Traction only)*	**CTDIF Redundancy Fault**
Description: An internal check performed by the software system to ensure that the differential cycle-testing (CTDIF) flag is only turned ON at the end of an operating cycle. ASME 2000 event. **Troubleshooting:** • If CTDIF (0706 bit 8) is turned ON any time other than at the end of an operating cycle, the system is shut down with the CTDIF redundancy fault. • NOTE: This fault would indicate a failure of the software system or SC-BASE(-D) board. So first try swapping SC-BASE(-D) ribbon cables then replace SC-BASE(-D), SC-HDIO and finally the MC-MP2-2K or MC-PCA-OA-2K.	
CTOS REDUNDANCY FAULT *(Traction only)*	**CTOS Redundancy Fault**
Description: An internal check performed by the software system to ensure that the overspeed cycle-testing (CTOS) flag is only turned ON at the end of an operating cycle. ASME 2000 event. **Troubleshooting:** • If CTOS (0706 bit 7) is turned on any time other than at the end of an operating cycle, the system is shut down with the CTOS redundancy fault. • This fault would indicate a failure of the SC-BASE(-D) board. First swap out ribbon cables and then try swapping SC-BASE(-D) and then SC-HDIO.	
CYCLE TEST	**Cycle Test**
Description: Indicates the car is performing the end of run cycle test. **Troubleshooting:** Verify the car is in door zone and does not relevel during the cycle test.	
DCL REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front doorlock input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DCL (door close limit) input. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. When DLK is ON (1) then input DCL must be OFF (0). When DOL=0, verify DCL=1. If not, then a DCL redundancy fault is recorded and the car is prevented from operating. Check voltages on associated dropping resistors, swap ribbon cables and swap SC-SB2K(-H) or SC-HDIO.	
DCLR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. Detects the failure of the input structure and hardware associated with the DCLR (door close limit rear) input. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. When DLK is ON (1) then input DCLR must be OFF (0). When DOLR=0, verify DCLR=1. If this is not the case then a DCLR redundancy fault is recorded and the car is prevented from operating. Check voltages on associated dropping resistors, swap ribbon cables and swap SC-SB2K(-H) or SC-HDIO.	
DETS REDUNDANCY FAULT	**DETS Redundancy Fault**
Description: This fault is displayed when an inconsistency is detected between the Down Emergency Terminal Switches. ASME 2000 event. **Troubleshooting**: • Check the condition of the ETS switches. The DETS1/2 limit switches must operate simultaneously!!! . • Check the wiring to the relay board (SC-SB2K) and IO board (SC-HDIO). • Verify DETS1 (070C bit 8) equals DETS2 (070D bit 3) and the car is in door zone. • Also check input resistors DETS1 and ASI3/DETS2 on the associated board (refer to prints). Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
DFV REDUNDANCY FAULT *(Hydro only)*	
Description: Input DFV checks the status of the down terminal speed reducing switches. We simply compare input DFV against input DTSRL. IF DFV not equal to DTSRL we assert this fault. Hence these switches must open up simultaneously. ASME 2000 event. **Troubleshooting:** Check that the limit switches are opening within one second of each other as the car approaches the bottom terminal landing. If they are, then use diagnostics to determine the status of the inputs. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON expect 5 VAC. When OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	
Direction Input Fault (not scrolled, Event Calendar only)	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Look to the scrolling message to see which fault is active: RDN, DNS, UPDIR, UPS, RUP, DNDIR REDUNDANCY FAULT or UP / DOWN NORMAL LIMIT SWITCH OPEN. ASME 2000 event. **Troubleshooting:** Once the scrolling message is identified, look up that message in this table.	
DLK REDUNDANCY FAULT	**DLK Redundancy Fault**
Description: A failure of the DLK input or associated circuitry has been detected. ASME 2000 event. **Troubleshooting Tips:** • DLK should be high (28 bit 7) when we are leveling and in door zone [DZ is high (20 bit 6) or DZR is high (10 bit 6) and either LU (29 bit 3) or LD (29 bit 7)is high]. • DLK should also be high when all of the car and hoistway door lock inputs are made active [CD is high (0704 bit 1) and HD is high (0704 bit 2) and CDR is high (070B bit 1) and HDR is high (070B bit 2)]. If DLK is ON and any of these other relationships are not true, the DLK redundancy fault is set and disables further operation of the lift. Note that DLK is high when either or both of the car door or hoistway door lock bypass functions are active. • Also check input resistors DLK, DZR, CD, HD, CDR and HDR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) or SC-BASER(-D) (for DZR) board. Otherwise replace SC-HDIO board.	
DNDIR REDUNDANCY FAULT	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Valid when SAF=1. Input DNDIR is created by the SC-BASE(-D) board and represents resolved direction from the speed sensor. Input DNDIR must always be the opposite of RDN. If the main processor detects that the resolved direction (DNDIR from BASE board) does not agree with the intended direction (RDN from MP2 / PCA), the system is shut down with the DNDIR redundancy fault. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. • Verify that the UP LED on the SC-BASE(-D) is ON when car motion is up and OFF when car motion is down. If not, the speed sensor is reversed (rotate the sensor 180 degrees with respect to the magnet). • Swap Ribbons, check 95 and 96 signals (0 to 55VDC) swap SC-BASE(-D) or SC-HDIO.	
DNS REDUNDANCY FAULT	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Valid when SAF=1. Verifies that the down sense input DNS is valid. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Once DLK is ON (1), if DNS is ON (1), then RDN must be OFF (0). Check associated input resistors, swap boards or ribbon cables to correct.	
Door Zone Input Fault (not scrolled, Event Calendar only)	**Door Zone Input Fault**
Description: A failure of a door zone related input, relay or associated circuitry has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: DZX, DZRX, RDZ, RDZX, or RDZR REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, find that particular fault in this table. See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table.	
DOWN NORMAL LIMIT SWITCH OPEN	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. A failure of a direction related input, relay or associated circuitry has been detected. If SAF=1 and DLK=1 and the car is below the Down Normal Limit Switch (DNL=0), then this status is displayed. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Verify SAF=1 and DLK=1 and move the car above the Down Normal Limit (DNL=1). Car should never automatically travel on to this limit switch. Possibility that switch is not far enough into terminal.. Please move limit switch.	
DP SENSOR / DIFFERENTIAL FAULT *(Traction only)*	**DP Sensor / Differential Fault**
Description: This fault indicates that one of the PLDs (on the SC-BASE/SC-BASER) has detected a count difference in the pulse signal generated from Speed Sensor and magnet mounted on the motor. **Troubleshooting:** Verify that for up direction travel, LEDS UP1 and UP2 turn ON, and for down direction, that LEDs DN1 and DN2 turn ON. If not: • Verify that the sensor is 1/16" away from the magnet on the motor shaft. Also verify that the magnet assembly is perpendicular to the sensor. • Check the shielded cable that connects sensor assembly to SC-BASE/R board. Swap the cable. • Replace the sensor, followed by the SC-BASE/R board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
DPM REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPM (door position monitor) input. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Valid when SAF=1. When DLK is ON (1) then input DPM must also be ON (1). When DOL=0, DPM=0. Make sure that DPM makes (120 VAC) 1 to 2" prior to door lock. If this is already the case then check associated input resistors, ribbon cable or boards and replace as deemed necessary.	
DPMR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door input, relay or associated circuitry has been detected. This logic detects failure of the input structure and hardware associated with the DPMR (door position monitor rear) input. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Valid when SAF=1. When DLK is ON (1), input DPMR must also be ON (1). When DOLR=0, DPMR=0. Make sure that DPMR makes (120 VAC) 1 to 2" prior to door lock. If this is already the case then check associated input resistors, ribbon cable or boards and replace as deemed necessary.	
DRIVE FAULT / REI REDUNDANCY FAULT *(Traction only)*	**REI Redundancy Fault**
Description: A failure of the RE relay has been detected. ASME 2000 event. **Troubleshooting:** If FLT relay is picked, then check the following: • If SAF is low (2C bit 6), REI should be low (0707 bit 2), otherwise this fault is generated. • If UPS is high (24 bit 3) or DNS is high (24 bit 4), REI should be high (0707 bit 2), otherwise this fault is generated. • Verify REI = 0 (0707 bit 2), otherwise this fault is generated. • Also check input resistor REI at top left of the SC-SB2K board. Swap ribbon cables between SC-SB2K and SC-HDIO. If swapping ribbons has no effect or if REI resistor is defective, replace SC-SB2K board. Otherwise replace SC-HDIO board. • Confirm FLT relay is picked when a run is initiated. If not, then a DDP generated failure has occurred. Bypass ASME A17.1 faults and initiate a run. Check event calendar to determine which DDP fault has occurred and troubleshoot accordingly.	
DZRX REDUNDANCY FAULT *(Traction only)*	**Door Zone Input Fault**
Description: A failure of rear door zone input, relay or associated circuitry has been detected. This logic checks the integrity of the relay used for the auxiliary rear door zone function (DZX). ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Note that one DZX relay is used for both front and rear auxiliary door zone sensing. If DZR input is OFF, the DZX relay should be dropped out, which is checked by inspecting a NC contact of relay DZX with input RDZX. If input DZR is OFF and the "checking" input RDZX is ON, all is well. If this relationship is not true, the DZRX redundancy fault is logged and the car is shut down. Check associated input resistors, ribbon cable or boards and replace as deemed necessary.	
DZX REDUNDANCY FAULT *(Traction only)*	**Door Zone Input Fault**
Description: A failure of a door zone related input, relay or associated circuitry has been detected. Verifies that the "standard" door zone input DZ and the "auxiliary" door zone input DZX both agree. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. If DZX is ON, then DZ should be ON and RDZX should be OFF. When DZX = OFF, DZ will also be OFF and RDZX will be ON. Check associated input resistors, ribbon cable or boards and replace as deemed necessary.	
EBR Button Fault (not scrolled, Event Calendar only)	**EBR Button Fault**
Description: A failure of the Emergency Brake Reset Pushbutton or EBR input has been detected. Look at the Swing Panel Alphanumeric Display to see what fault is active, EBR STUCK or EBR FLICKERING FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that particular fault in this table.	
EBR FLICKERING FAULT *(Traction only)*	**EBR Button Fault**
Description: A failure of the Emergency Brake Pushbutton or EBR input has been detected. If the EBR input transitions from low (0) to high (1) six times or more per second, the EBR flickering fault will take the car out of service. ASME 2000 event. **Troubleshooting:** Check the EBR input (0708 bit 3) and confirm that it is changing state rapidly. If so, replace the SC-BASE(-D) board. If this does not correct the problem, then replace the SC-HDIO board. Otherwise press the Redundancy Fault Reset pushbutton to clear the fault.	
EBR STUCK FAULT *(Traction only)*	**EBR Button Fault**
Description: A failure of the Emergency Brake Pushbutton or EBR input has been detected. If the EBR input remains high (1) continuously for 30 seconds the EBR stuck fault will take the car out of service. ASME 2000 event. **Troubleshooting:** Confirm that EBR = 1 (0708 bit 3). The EBR input must be continuously active for 30 seconds to generate this fault. To determine which board has failed, check the EBR resistor on the SC-BASE(-D) board for 0 VAC on the bottom end, if so then replace SC-HDIO board. If there is 120 VAC, then inspect the EBR reset pushbutton and determine if it is truly stuck. If stuck replace SC-BASE(-D), otherwise swap out associated ribbon cable.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
EMERGENCY BRAKE ACTIVATED *(Traction only)*	**Emergency Brake Activated**
Description: The Emergency Brake has been activated. ASME 2000 event. **Troubleshooting:** • Due to ascending car overspeed (GOV=0, RUP=0) or unintended motion (car out of floor zone with both doors open) this fault is logged and the car is shutdown. Note that there is separate hardware that can set the emergency brake by removing power from the emergency brake power supply. The software system can also set the Emergency Brake by monitoring the same logic (DZ, LU, CD, etc) by dropping the outputs labeled EB1 and EB2. This fault can only be reset by pushing the Emergency Brake Reset pushbutton on the SC-BASE(-D) board. • Also check input resistors GOV, REB1, REB2, RDZX, RDZ, RDZR, RLU, RLD, RCD, RHD, RCDR and RHDR on the associated board (refer to prints). If both relays EB1 and EB2 are dropped try replacing the EB1/EB2 triacs on the SC-HDIO board. Swap ribbon cables between SC-SB2K and SC-HDIO as well as the ribbons between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if input resistors are defective, replace SC-SB2K board or SC-BASE(-D). Otherwise replace SC-HDIO board.	
EMERGENCY BRAKE CYCLE TEST FAULT *(Traction only)*	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. Indicates that either the input or output structure associated with the emergency brake has failed. At the end of an operating cycle, outputs EB1 and EB2 are sequentially cycled OFF (one at a time). During this process inputs REB1 and REB2 are checked. ASME 2000 event. **Troubleshooting:** If EB1 output is OFF, then input REB1 will be ON. If not, the Emergency brake cycle test fault is generated and further operation of the lift is prevented. The same test is repeated for EB2 and REB2. Check input resistors ASI1/PFLT, SAF, STOP, REB1, REB2 or RSAFR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K, SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K board. Otherwise replace SC-HDIO or SC-BASE(-D) board.	
End of Run Cycle Test Fault (not scrolled, Event Calendar only)	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. Look at the Swing Panel Alphanumeric Display to see which faults is active (PLD, CT, ESBYP or EMERGENCY BRAKE CYCLE TEST FAULT or RSAFR CYCLE TEST FAULT or 4 BUS CYCLE TEST FAULT). ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
EQR Button Fault (not scrolled, Event Calendar only)	**EQR Button Fault**
Description: A failure of the Earthquake Reset Pushbutton or EQR input has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: EQR STUCK or EQR FLICKERING FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
EQR FLICKERING FAULT	**EQR Button Fault**
Description: A failure of the Earthquake Reset Pushbutton or EQR input has been detected. If the EQR input transitions from low (0) to high (1) six times or more per second, the EQR flickering fault will take the car out of service. ASME 2000 event. **Troubleshooting:** • Check the EQR input (0703 bit 2) and confirm that it is changing state rapidly. If so, replace the SC-HDIO board. If this does not correct the problem, then replace the SC-SB2K(-H) board. Otherwise press the Redundancy Fault Reset pushbutton to clear the fault. • Also check input resistors CWI, EQR, SSI and EDS on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
EQR STUCK FAULT	**EQR Button Fault**
Description: A failure of the Earthquake Reset Pushbutton or EQR input has been detected. The Earthquake Reset pushbutton input is constantly monitored for correct functionality. If the EQR input remains high (1) continuously for 30 seconds the EQR stuck fault will take the car out of service. ASME 2000 event. **Troubleshooting**: • Confirm that EQR = 1 (0703 bit 2). The EQR input must be continuously active for 30 seconds to generate this fault. • To determine which board has failed, check the EQR resistor for 0 VAC on the bottom end, if so then replace SC-HDIO board. If there is 120VAC, then inspect the EQR reset pushbutton and determine if it is truly stuck, otherwise replace the SC-SB2K(-H) board. • Also check input resistors CWI, EQR, SSI and EDS on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
ESBYP CYCLE TEST FAULT	**End of Run Cycle Test Fault**
Description:. This fault indicates that either the output, relay or input associated with ESBYP has failed to function as required. At the end of an operating cycle, output ESBYP is cycled ON and then OFF. We expect that relay ESB will pick and drop and we monitor this functionality via input RESBYP. ASME 2000 event. **Troubleshooting:** When ESB is OFF, expect that input RESBYP will be ON and visa versa. If not, the ESBYP cycle test fault will be logged and further operation of the lift will be prevented. Check input resistors ASI1/PFLT, SAF, STOP, REB1, REB2 or RSAFR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
ESBYP REDUNDANCY FAULT	**ESBYP Redundancy Fault**
Description: A failure of emergency stop bypass (the ESB relay or ESBYP output) has been detected. ASME 2000 event. If both the ESBYP output (picks relay ESB) and the SAFC input are activated (both ON), the input STOP will be ON (1). If not, an ESBYP redundancy failure is logged. ASME 2000 event. **Troubleshooting:** • If ESBYP = 1 (0707 bit 7) and SAFC = 1 (0700 bit 5), STOP should be 1 (0700 bit 6), otherwise this fault is generated. • Also check input resistors RESBYP and SAFC on the associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H), SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
ETS1 FAULT *(Traction only)*	**Overspeed Fault**
Description: Emergency terminal overspeed fault 1. The main processor monitors the ETS1 signal coming from PLD1. If this signal, which is normally high goes low, the MP2 / PCA looks at its ETS limit switch inputs to determine if a fault should be logged. If so, the carshuts down and logs the ETS1 fault. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. The UETS1/2, DETS1/2 limit switches must operate simultaneously!	
ETS2 FAULT *(Traction only)*	**Overspeed Fault**
Description: Emergency terminal overspeed fault 2. The main processor inspects the ETS2 signal coming from PLD2. If this signal, which is normally high goes low, the MP2 / PCA looks at its ETS limit switch inputs to determine if a fault should be logged. If so, the car shuts down and logs the ETS2 fault. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. The UETS1/2 , DETS1/2 limit switches must operate simultaneously!	
Front Door Input Fault (not scrolled, Event Calendar only)	**Front Door Input Fault**
Description: A failure of a front door input, relay or associated circuitry has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: DCL, DPM, CD, RCD, CDB, HD, RHD, HDB or RHDB REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting Tips:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table.	
GOV REDUNDANCY FAULT *(Traction only)*	**GOV Redundancy Fault**
Description: A failure of the safety string between input GOV and input SAFH has been detected. ASME 2000 event. **Troubleshooting Tips:** • If GOV = 0 (0700 bit 3), SAFH should be 0 (0700 bit 4), otherwise this fault is generated. • Check wiring connections to terminals 15, 15A, 15B and 16. • Check wiring connections to all safety devices between terminals 15, 15A, 15B and 16. • Also check input resistors GOV and SAFH. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
H REDUNDANCY FAULT	**H Redundancy Fault**
Description: Checks the status of the H (high speed) output against the RH input. ASME 2000 event. If relay H is OFF, then the back contact of the H relay, used for monitoring purposes, should close power into input RH (ON). **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Use diagnostics to determine which is the offending input. Look at the top of the input resistor and measure either 0 or 5 VAC. If voltage is wrong replace SC-SB2K(-H). If OK swap C1 or C4 ribbons, H triac on HC-PI/O or SC-HDIO.	
HD REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door lock input, relay or associated circuitry has been detected. HD should be ON (1) when DLK is ON and the car is not in door zone. And, if HD is ON (1) DPM must also be ON (1). ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Expect HD to be ON when hoistway access has been activated (input ACCI is ON) and either the top (TAB) or bottom (BAB) access switches are activated. If the Hoistway Door Bypass switch has been turned to the bypass position, expect HD = ON also. If the above conditions are not true, the HD redundancy fault is logged. First swap the ribbon cables connected between the SC-BASE(-D) board and the SC-HDIO board, then replace the boards SC-BASE(-D) followed by the SC-HDIO (if the problem persists).	
HDB REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door input, relay or associated circuitry has been detected. The OFF position feeds input HDBO and the BYPASS position feeds input HDB. So if the switch is OFF, the HDBO input will be ON (1) and the HDB input will be OFF (0).ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. First swap the ribbon cables connected between the SC-BASE(-D) board and the SC-HDIO board, then replace the boards SC-BASE(-D) followed by the SC-HDIO.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
HDBR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door input, relay or associated circuitry has been detected. Both the OFF and BYPASS positions of the Rear Hoistway Door Bypass switch are monitored. The OFF position feeds input HDBOR and the BYPASS position feeds input HDBR. So if the switch is OFF, the HDBOR input will be ON (1) and the HDBR input will be OFF (0). ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. First swap the ribbon cables connected between the SC-BASE(-D) board and the SC-HDIO board, then replace the boards SC-BASE(-D) followed by the SC-HDIO.	
HDR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. The status of the rear hoistway door lock input HDR is constantly verified. HDR should be ON (1) when DLK is ON and the car is not in door zone.Expect HDR to be ON when hoistway access has been activated (input ACCI is ON) and either the top (TAB) or bottom (BAB) access switches are activated. If the Hoistway Door Bypass switch has been turned to the bypass position, expect HDR = ON also. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. First swap the ribbon cables connected between the SC-BASER(-D) board and the SC-HDIO board, then swap out the SC-BASER(-D) followed by the SC-HDIO.	
HOISTWAY ACCESS	**Hoistway Access**
Description: The hoistway access switch has been activated. ASME 2000 event. **Troubleshooting:** • Confirm that ACCI = 1 (0702 bit 2). • Also check input resistor ACCI on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistor are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
Hoistway Access Input Fault (not scrolled, Event Calendar only)	**Hoistway Access Input Fault**
Description: A failure of the Hoistway Access input or an Inspection input has been detected. Two Inspection Inputs should never be active at the same time. ASME 2000 event. **Troubleshooting Tips:** • Confirm ACCI = 1 (0702 bit 2), INMR = 0 (0701 bit 3) and IN = 0 (27 bit 4), otherwise this fault is displayed. • Also check input resistors ACCI, INMR and IN on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
ILO1 FAULT *(Traction only)*	**Overspeed Fault**
Description: Inspection leveling overspeed 1 fault. The main processor monitors the ILO1 signal coming from PLD1. If ILO1 = OFF and IN or LEV are ON we log this fault. ILO stands for Inspection Leveling Overspeed. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. Also check for noise on 95/96 (DP1/2) is shield grounded?	
ILO2 FAULT *(Traction only)*	**Overspeed Fault**
Description: Inspection leveling overspeed 2 fault. The main processor monitors the ILO2 signal coming from PLD2. ASME 2000 event. **Troubleshooting:** Run the car and observe if the car does indeed overspeed. If no overspeed condition is truly present we need to re-calibrate the overspeed function that is tripping (ILO, COS, ETS). For the SC-BASE(-D) simply check the 120 Hz reference test point with a scope. For the SC-BASE(-D), simply follow directions in section #4 of the adjustment manual. If neither of these attempts proves fruitful at eliminating the fault then first swap out the ribbon cable between the SC-BASE(-D) and SC-HDIO and finally replace the SC-BASE(-D). If the fault still occurs replace the SC-HDIO. Also check for noise on 95/96 (DP1/2); is shield grounded at the controller?	
IN CAR INSPECTION	**In Car Inspection**
Description: The In Car Inspection switch has been activated. ASME 2000 event. **Troubleshooting:** • Confirm that INICI = 1 (0701 bit 2). • Also check input resistor INICI on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistor are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
IN REDUNDANCY FAULT	**Inspection Input Fault**
Description: A failure of the Inspection Inputs has been detected. Two Inspection Inputs should never be active at the same time. ASME 2000 event. **Troubleshooting:** If IN = 1 (27 bit 4) and SAF = 1 (2C bit 6), INUP should be 1 (0701 bit 6) and INDN should be 1 (0702 bit 7), otherwise this fault is generated. Locate dropping resistor INMR on the SC-SB2K(-H) board. INMR must be at zero volts when IN is ON. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
INCTI REDUNDANCY FAULT	**Inspection Input Fault**
Description: A failure of the Inspection Inputs has been detected. Two Inspection Inputs should never be active at the same time. ASME 2000 event. **Troubleshooting:** Confirm INCTI = 1 (0701 bit 1), INICI = 0 (0701 bit 2), ACCI = 0 (0702 bit 2), INMR = 0 (0701 bit 3) and IN = 0 (27 bit 4), otherwise this fault is displayed. Use the controller prints to locate dropping resistors IN, INMR and INICI on the SC-SB2K(-H) board and ACCI resistor on the SC-BASE(-D) board, voltage must be OFF when INCTI is ON otherwise the INCTI redundancy fault is logged and the system is shut down. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
INDN REDUNDANCY FAULT	**INDN Redundancy Fault**
Description: A failure of the INDN input has been detected. It may either be high when expected low or low when expected high. ASME 2000 event. **Troubleshooting Tips:** • If IN is high (27 bit 4) and SAF is low (2C bit 6), INDN should be low (0701 bit 7), otherwise this fault is generated. • If IN is high (27 bit 4) and SAF is high (2C bit 6), INDN should be high (0701 bit 7), otherwise this fault is generated. • If RDN is low (0709 bit 3), INDN should be high (0701 bit 6), otherwise this fault is generated. • If RDN is high (0709 bit 3), INDN should be low (0701 bit 6), otherwise this fault is generated. • Also check input resistors DLK, SAF, IN and INDN on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
INICI REDUNDANCY FAULT	**Inspection Input Fault**
Description: A failure of the Inspection Inputs has been detected. Two Inspection Inputs should never be active at the same time. ASME 2000 event. **Troubleshooting:** Confirm INICI = 1 (0701 bit 2), ACCI = 0 (0702 bit 2), INMR = 0 (0701 bit 3) and IN = 0 (27 bit 4), otherwise this fault is displayed. Use the controller prints to locate dropping resistors IN and INMR on the SC-SB2K(-H) board and ACCI input resistor on the SC-BASE(-D) board. Voltage must be OFF when INICI is ON, otherwise the INICI redundancy fault is logged and the system is shut down. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
INMR REDUNDANCY FAULT	**Inspection Input Fault**
Description: A failure of the Inspection Inputs has been detected. Two Inspection Inputs should never be active at the same time. ASME 2000 event. **Troubleshooting:** If IN = 1 (27 bit 4) and SAF = 1 (2C bit 6), INUP should be 1 (0701 bit 6) and INDN should be 1 (0702 bit 7), otherwise this fault is generated. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if associated 47 K dropping resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
Inspection Input Fault (not scrolled, Event Calendar only)	**Inspection Input Fault**
Description: A failure of the Inspection Inputs has been detected. Two Inspection Inputs should never be active at the same time. Look at the Swing Panel Alphanumeric Display to see which fault is active: INCTI, INICI, INMR or IN REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
INUP REDUNDANCY FAULT	**INUP Redundancy Fault**
Description: A failure of the INUP input has been detected. It may either be high when expected low or low when expected high. ASME 2000 event. **Troubleshooting:** • If IN = 1 (27 bit 4) and SAF = 0 (2C bit 6), INUP should be 0 (0701 bit 6), otherwise this fault is generated. • If IN = 1 (27 bit 4) and SAF = 1 (2C bit 6), INUP should be 1 (0701 bit 6), otherwise this fault is generated. • If RUP = 0 (0709 bit 3), INUP should be 1 (0701 bit 6), otherwise this fault is generated. • If RUP = 1 (0709 bit 3), INUP should be 0 (0701 bit 6), otherwise this fault is generated. • Also check input resistors IN, SAF, RUP and INUP on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
MOTOR UP TO SPEED FAILURE *(Hydro only)*	**Motor Up to Speed Failure**
Description: Indicates that the solid state starter failed to detect the motor was up to speed. ASME 2000 event. **Troubleshooting:** For Solid State Starters Only. Increase the Up to Speed Timer in the ASME A17.1 Options Menu. Verify UTS is programmed as a spare input and that it is connected to the proper terminal on the starter.	

TABLE 6.4   ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
MPSAF REDUNDANCY FAULT	**MPSAF Redundancy Fault**
Description: A failure of the SAFR1 relay has been detected. ASME 2000 event. This verifies that when output MPSAF has turned OFF, that relay SAFR1 and TRIAC MPSAF have both released as intended. **Troubleshooting:** If the relay and triac have released then input SAF will be OFF(0). If input SAF = ON, the car is shut down with the MPSAF redundancy fault. Verify MPSAF output = 0 (0700 bit 7) also verify SAFR1 relay is dropped und finally verify SAF input = 0 (2C bit 6). If swapping ribbons has no effect or if associated 47 K dropping resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
Overspeed Fault (not scrolled, Event Calendar only)	**Overspeed Fault**
Description: Look at the Swing Panel Alphanumeric Display to see which fault is active: IL01, IL02, ETS2, ETS1, COS1, or COS2 OVERSPEED FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
PFLT FAULT *(Traction only)*	**PFLT Relay Dropped**
Description: Indicates that PLD1 has dropped the PFLT relay. ASME 2000 event. **Troubleshooting Tips:** • If STOP = 1 (0700 bit 6) and PFLT = 0 (070D bit 1), then this fault is generated and PLD1 has dropped the PFLT relay. • Swap ribbon cables between SC-BASE-(D) and SC-HDIO. If swapping cables has no effect, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
PFLT RELAY DROPPED *(Traction only)*	**PFLT Relay Dropped**
Description: Indicates that PLD1 has dropped the PFLT relay. ASME 2000 event. **Troubleshooting Tips:** • If STOP = 1 (0700 bit 6) and PFLT = 0 (070D bit 1), then this fault is generated and PLD1 has dropped the PFLT relay. • Swap ribbon cables between SC-BASE-(D) and SC-HDIO. If swapping cables has no effect, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
PLD CYCLE TEST FAULT *(Traction only)*	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. At the end of an operating cycle outputs CTOS and CTDIF are activated in sequence. Inputs COS1, COS2, ETS1, ETS2, ILO1 and ILO2 must go low. ASME 2000 event. **Troubleshooting:** If any of the listed inputs fail to transition to *OFF*, the PLD cycle test fault will be logged and further operation of the lift will be suspended. If the PFLT Bypass Jumper on the SC-BASE(-D) board is left in the ON position and the controller is switched to normal operation, then the controller will find the landing and then during the cycle test it will latch this fault to prevent the system from running. Make sure the PFLT Bypass Jumper is in the OFF position. Check input resistors ASI1/PFLT, SAF, STOP, REB1, REB2 or RSAFR on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RACC1 REDUNDANCY FAULT	**Redundancy Access Input Fault**
Description: A failure of a hoistway access related input, relay or associated circuitry has been detected. The RACC1 input monitors an NC contact of relay ACCI. If ACCI input is OFF (0) the input RACC1 should be ON (1). Hence RACC1 is not equal to ACCI. ASME 2000 event. **Troubleshooting:** • If ACCI = 1 (0702 bit 2), RACC1 should be 0 (0702 bit 3), otherwise this fault is generated. • Or if ACCI = 0 (0702 bit 2), RACC1 should be 1 (0702 bit 3), otherwise this fault is generated. • Check input resistors RTBAB, RACC1, RACC2, INUP, INDN, ACCI on associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H), SC-BASE(-D) and SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) or SC-BASE(-D) (for RACC1, RACC2) board. Otherwise replace SC-HDIO board.	
RACC2 REDUNDANCY FAULT	**Redundancy Access Input Fault**
Description: A failure of a hoistway access related input, relay or associated circuitry has been detected. The RACC2 input monitors an NC contact of relay ACC2. If ACCI input is OFF (0) the input RACC2 should be ON (1). Hence this fault indicates that RACC2 is not equal to ACCI, not a good thing. ASME 2000 event. **Troubleshooting:** • If ACCI = 1 (0702 bit 2), RACC2 should be 0 (0702 bit 4), otherwise this fault is generated. • If ACCI = 0 (0702 bit 2), RACC2 should be 1 (0702 bit 4), otherwise this fault is generated. • Check input resistors RTBAB, RACC1, RACC2, INUP, INDN, ACCI on associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H), SC-BASE(-D) and SC-HDIO. • If swapping ribbons has no effect or if associated 47 K input resistors are defective, replace SC-SB2K-(H) or SC-BASE(-D) (for RACC1, RACC2) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RBRK REDUNDANCY FAULT *(Traction only)*	**RBRK Redundancy Fault**
Description: A failure of the BK relay or RBK input has been detected. This means a failure to activate when expected or a failure to drop when expected. ASME 2000 event. **Troubleshooting:** • If SAF = 0 (2C bit 6), RBK should be 1 (0708 bit 4), otherwise this fault is generated. • If MB = 0 (0707 bit 1), RBK should be 1 (0708 bit 4), otherwise this fault is generated. • If REI = 1 (0707 bit 2) and RPT = 0 (0707 bit 3) and RMR = 0 (0707 bit 5), RBK should be 0 (0708 bit 4), otherwise this fault is generated. • Check the NC aux contact of relay BK. It must make up when the relay drops out. • Also check input resistors RBK, REI and RPT on the SC-SB2K board. Swap ribbon cables between SC-SB2K and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K board. Otherwise replace SC-HDIO board.	
RCD REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door lock input, relay or associated circuitry has been detected. The RCD input monitors a normally closed contact of relay CD. If the CD input is OFF (0), then the NC contact of CD will be made up and input RCD will be ON. If CD is ON, RCD will be OFF. (CD = not RCD). CD should always be the opposite of RCD. If not, the RCD redundancy fault is logged and the controller is shut down. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RCDR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. The RCDR input monitors a normally closed contact of relay CDR. If the CDR input is OFF (0), then the NC contact of CDR will be made up and input RCDR will be ON. If CDR is ON, RCDR will be OFF. (CDR = not RCDR). ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RCT REDUNDANCY FAULT *(Traction only)*	**RCT Redundancy Fault**
Description: A failure of the CT (Cycle Test) relay has been detected. ASME 2000 event. **Troubleshooting Tips:** • If CT = 1 (070A bit 5), RCT should be 0 (0704 bit 4), otherwise this fault is generated. • If CT = 0, RCT should be 1, otherwise this fault is generated. • Check the condition of the CT relay. Replace if defective. • Also check input resistor RCT. Swap ribbon cables between SC-SB2K and SC-HDIO. If swapping ribbons has no effect or if relay CT is defective replace SC-SB2K board. Otherwise replace SC-HDIO board.	
RCTIC REDUNDANCY FAULT	**Redundancy Inspection Input Fault**
Description: A failure of a redundancy inspection related input, relay or associated circuitry has been detected. ASME 2000 event. **Troubleshooting:** • If INCTI = 0 (0701 bit 1) and INICI = 0 (0700 bit 2), RCTIC should be 1 (0702 bit 1), otherwise this fault is generated. • Otherwise RCTIC should be 0 (0702 bit 1) if not this fault is generated. • Check input resistors RCTIC, RIN1, RIN2, IN, SAF, INCTI and INICI on the associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H),and SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RDEL1, RDEL2, RDEL3 REDUNDANCY FAULT *(Hydro only)*	**RDEL1, RDEL2, RDEL3 Redundancy Fault**
Description: Only for WYE-DELTA starters. This function checks the status of a normally closed auxiliary contact of relay DELTA. When the car is not running we expect input RDELX to be active (1). When we are running we expect input RDELX to be OFF (0). A few jobs may have more than one DELTA contactor (DELTA1, DELTA2, DELTAX, etc) in this case, when a failure occurs, we display the number of the problematic contactor, ie. RDEL3 Redundancy Fault. ASME 2000 Event. **Troubleshooting**: First check the contacts of the normally closed auxiliary that feed the associated input. The logic is written to check for input RDELX to be OFF (0, that is RDEL1 =0) when we have a valid run command as determined by checking that inputs RPM= UNL=SAF= RWYE= DEL1= 1 and RM1 = WYEX = RDELX =0. If no run command, then RDELX had better be = 1. Check voltage at top of associated input resistors on SC-SB2K-H. For those inputs that are ON expect 5 VAC. For those inputs that are OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
RDFV REDUNDANCY FAULT *(Hydro only)*	**RDFV Redundancy Fault**
Description: Only for jobs with multiple valves. This logic checks input RDFV = 0 when DSD = VEU = FUD = 1 and RDN = RH = 0. It also checks that RDFV = 1 when there is no demand to run the car Down. ASME 2000 Event. **Troubleshooting:** Use diagnostics to check on status of above signals. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON expect 5 VAC. When OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RDN REDUNDANCY FAULT	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Verifies the DN relay, DN relay activation circuits and RDN input are functioning as required. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. If a direction is not invoked on either automatic or inspection operation, then the NC contact of the DN relay, that feeds input RDN, should be closed. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RDSV REDUNDANCY FAULT *(Hydro only)*	**RDSV Redundancy Fault**
Description: Only for jobs with multiple valves. This logic checks input RDSV = 0 when SU, SD or RLULD = 1 and DNS = 1. It also checks that RDSV = 1 when there is no demand to run the car Down. ASME 2000 Event. **Troubleshooting.** Use diagnostics to check on status of above signals. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON expect 5 VAC. When OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	
RDZ REDUNDANCY FAULT	**Door Zone Input Fault**
Description: A failure of a door zone related input, relay or associated circuitry has been detected. The RDZ input monitors an NC contact of relay DZ. If the DZ input is OFF (0), the NC contact of DZ will be made up and input RDZ will be ON. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RDZR REDUNDANCY FAULT	**Door Zone Input Fault**
Description: A failure of the rear door zone related input, relay or associated circuitry has been detected. This logic checks the integrity of the relay used for the rear door zone function (DZR). If DZR input is OFF, the DZR relay should be dropped out, which is checked by inspecting a NC contact of relay DZR with input RDZR. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-BASER(-D) board. Swap ribbon cables between SC-BASER(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASER(-D) board. Otherwise replace SC-HDIO board.	
RDZX REDUNDANCY FAULT *(Traction only)*	**Door Zone Input Fault**
Description: A failure of a door zone related input, relay or associated circuitry has been detected. The RDZX input monitors a NC contact of relay DZX. If the car is not located in either a front or rear door zone (flag DZORDZ = OFF), the NC contact of DZX will be made up and input RDZX will be ON. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-BASE(-D) board. Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
Rear Door Input Fault (not scrolled, Event Calendar only)	**Rear Door Input Fault**
Description: A failure of a rear door input, relay or associated circuitry has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: DCLR, DPMR, CDR, RCDR, CDBR, HDR, RHDR, HDBR or RHDBR REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
REB1 REDUNDANCY FAULT *(Traction only)*	**Redundancy Emergency Brake Fault**
Description: A failure of relay EB1 has been detected. REB1 Redundancy Fault is generated if EB1 = 0 (0708 bit 5) and REB1 is not 1 (0708 bit 1) OR if EB1 = 1 (0708 bit 5) and REB1 is not 0 (0708 bit 1). Also, if GOV = 0 (0700 bit 3), REB1 should be 1 (0708 bit 1) and REB2 should be 1 (0708 bit 2), indicating both relays are dropped. ASME 2000 event. **Troubleshooting Tip:** • Check input resistors REB1 and REB2 on the SC-BASE(-D) board. Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
REB2 REDUNDANCY FAULT *(Traction only)*	**Redundancy Emergency Brake Fault**
Description: A failure of relay EB2 has been detected. REB2 Redundancy Fault is generated if EB2 = 0 (0708 bit 6) and REB2 is not 1 (0708 bit 2) OR if EB2 = 1 (0708 bit 6) and REB2 is not 0 (0708 bit 2). Also, if GOV = 0 (0700 bit 3), REB1 should be 1 (0708 bit 1) and REB2 should be 1 (0708 bit 2), indicating both relays are dropped. ASME 2000 event. **Troubleshooting Tips** • Check input resistors REB1 and REB2 on the SC-BASE(-D) board. Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
Redundancy Access Input Fault (not scrolled, Event Calendar only)	**Redundancy Access Input Fault**
A failure of a hoistway access related input, relay or associated circuitry has been detected. Look to the Swing Panel Alphanumeric Display to see which fault is active: RACC1, RACC2 or RTBAB REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
Redundancy Emergency Brake Fault (not scrolled, Event Calendar only)	**Redundancy Emergency Brake Fault**
Description: A failure of EB1 relay or EB2 relay has been detected. Look at the Swing Panel Alphanumeric Display to see if REB1 or REB2 REDUNDANCY FAULT is active. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
Redundancy Inspection Input Fault (not scrolled, Event Calendar only)	**Redundancy Inspection Input Fault**
Description: A failure of a redundancy inspection related input, relay or associated circuitry has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: RIN1, RIN2 OR RCTIC REDUNDANCY FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
REI REDUNDANCY FAULT *(Traction only)*	**REI Redundancy Fault**
Description: A failure of the RE relay has been detected. ASME 2000 event. **Troubleshooting:** If FLT relay is picked, then check the following: • If SAF is low (2C bit 6), REI should be low (0707 bit 2), otherwise this fault is generated. • If UPS is high (24 bit 3) or DNS is high (24 bit 4), REI should be high (0707 bit 2), otherwise this fault is generated. • Verify REI = 0 (0707 bit 2), otherwise this fault is generated. • Also check input resistor REI at top left of the SC-SB2K board. Swap ribbon cables between SC-SB2K and SC-HDIO. If swapping ribbons has no effect or if REI resistor is defective, replace SC-SB2K board. Otherwise replace SC-HDIO board. • Confirm FLT relay is picked when a run is initiated. If not, then a DDP generated failure has occurred. Bypass ASME A17.1 faults and initiate a run. Check event calendar to determine which DDP fault has occurred and troubleshoot accordingly.	
RESBYP REDUNDANCY FAULT	**RESBYP Redundancy Fault**
Description: A failure of the ESB relay has been detected. The fault will be generated if SAFC = 0 (0700 bit 5) and RESBYP is not 1 (0707 bit 8), OR if ESBYP = 1 (0707 bit 7) and RESBYP is not 0 (0707 bit 8), OR if ESBYP = 0 (0707 bit 7) and RESBYP is not 1 (0707 bit 8). ASME 2000 event. **Troubleshooting:** Check input resistor RESBYP on SC-SB2K(-H). Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistor is defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RFR Button Fault (not scrolled, Event Calendar only)	**RFR Button Fault**
Description: A failure of the Redundancy Fault Reset Pushbutton or RFR input has been detected. Look at the Swing Panel Alphanumeric Display to see which fault is active: RFR STUCK or RFR FLICKERING FAULT. ASME 2000 event. **Troubleshooting:** Once the Swing Panel Alphanumeric Display fault is identified, look up that fault in this table.	
RFR FLICKERING FAULT	**RFR Button Fault**
Description: A failure of the Redundancy Fault Reset Pushbutton or RFR input has been detected. If the RFR input transitions from low (0) to high (1) six times or more per second, the RFR flickering fault will take the car out of service. ASME 2000 event. **Troubleshooting:** Check the RFR input (070A bit 8) and confirm that it is changing state rapidly. If so, try swapping the ribbon cables between the SC-SB2K(-H) and SC-HDIO. If this does not correct the problem, then replace the SC-HDIO / SC-SB2K(-H) board. Otherwise reset the swing panel to clear the fault.	
RFR STUCK FAULT	**RFR Button Fault**
Description: A failure of the Redundancy Fault Reset Pushbutton or RFR input has been detected. If the RFR input remains high (1) continuously for 30 seconds the RFR stuck fault will take the car out of service. ASME 2000 event. **Troubleshooting:** Confirm that RFR = 1 (070A bit 8). To determine which board has failed, check the RFR resistor on board SC-SB2K(-H) for 0 VAC on the bottom end, if so then replace SC-HDIO board. If there is 120 VAC, then inspect the EBR reset pushbutton and determine if it is truly stuck, if so replace the SC-SB2K(-H). Try swapping the ribbon cables between the SC-SB2K(-H) and SC-HDIO. Otherwise replace the SC-SB2K(-H) board.	
RH REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of the H relay or RH input has been detected.When output H is OFF (2B bit 4), input RH should be 1 (070A bit 3). If relay H's NO contacts weld closed, the monitoring contact will not make up when the H output is turned OFF at the end of a run. If this happens the RH redundancy fault will be logged and the system shut down.If SAF = 0 (2C bit 6) and DLK = 0 (28 bit 7), RH should be 1 (070A bit 3), otherwise this fault is generated.If H = 1 (2B bit 4) and RLULD = 1 (070A bit 2) and RIN2 = 0 (0701 bit 5)AND there is an intent to move up/down UP - if UNL = 1 (0709 bit 1) and RUP = 0 (0709 bit 3) and USD = 1 (2E bit 2)DOWN - if DNL = 1 (0709 bit 2) and RDN = 0 (0709 bit 4) and DSD = 1 (2E bit 6)RH should be 0 (070A bit 3), otherwise this fault is generated. If RH should be 1 (070A bit 3), otherwise this fault is generated. **Troubleshooting:** Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K(-H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RHD REDUNDANCY FAULT *(Traction only)*	**RHD Redundancy Fault**
Description: A failure of a front door lock input, relay or associated circuitry has been detected. The RHD input monitors an NC contact of relay HD. If the HD input is OFF (0), the NC contact of HD will be made up and input RHD will be ON. If HD is ON, RHD will be OFF (HD = not RHD). HD should always be the opposite of RHD. Otherwise, the RHD redundancy fault is logged and the controller is shut down. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K(-H) board. Otherwise replace SC-HDIO board.	
RHDB REDUNDANCY FAULT	**Front Door Input Fault**
Description: A failure of a front door bypass input, relay or associated circuitry has been detected. The RHDB input monitors an NC contact of relay HDB. If the HDB input is OFF (0), the NC contact of HDB will be made up and input RHDB will be ON. If HDB is ON, RHDB will be OFF (HDB = not RHDB). HDB should always be the opposite of input RHDB. Otherwise, the RHDB redundancy fault is logged and the controller is shut down. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-BASE(-D) board. Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
RHDBR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door bypass input, relay or associated circuitry has been detected. The RHDBR input monitors an NC contact of relay HDBR. If the HDBR input is OFF (0), the NC contact of HDBR will be made up and input RHDBR will be ON. If HDBR is ON, RHDBR will be OFF (HDBR = not RHDBR). HDBR should always be the opposite of input RHDBR. Otherwise, the RHDBR redundancy fault is logged and the controller is shut down. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Check associated input resistors on the SC-BASER(-D) board. Swap ribbon cables between SC-BASER(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASER(-D) board. Otherwise replace SC-HDIO board.	
RHDR REDUNDANCY FAULT	**Rear Door Input Fault**
Description: A failure of a rear door lock input, relay or associated circuitry has been detected. The RHDR input monitors an NC contact of relay HDR. If the HDR input is OFF (0), the NC contact of HDR will be made up and input RHDR will be ON. If HDR is ON, RHDR will be OFF (HDR = not RHDR). HRD should always be the opposite of RHDR. Otherwise, the RHDR redundancy fault is logged and the controller is shut down. If HDR input is OFF the HDR relay should drop out. This is checked by inspecting a normally closed contact of relay HDR with input RHDR. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table.Check associated input resistors on the SC-BASER(-D) board. Swap ribbon cables between SC-BASER(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASER(-D) board. Otherwise replace SC-HDIO board.	
RIN1 REDUNDANCY FAULT	**Redundancy Inspection Input Fault**
Description: A failure of a redundancy inspection related input, relay or associated circuitry has been detected. If SAF = 0 (2C bit 6), RIN1 should be 1 (0701 bit 4), otherwise this fault is generated. Or if IN = 1 (27 bit 4), RIN1 should be 0 (0701 bit 4), otherwise this fault is generated. Or if IN = 0 (27 bit 4), RIN1 should be 1 (0701 bit 4), otherwise this fault is generated. ASME 2000 event. **Troubleshooting:** • Check input resistors RCTIC, RIN1, RIN2, IN, SAF, INCTI and INICI on the associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H),and SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RIN2 REDUNDANCY FAULT	**Redundancy Inspection Input Fault**
Description: A failure of a redundancy inspection related input, relay or associated circuitry has been detected. If SAF = 0 (2C bit 6), RIN2 should be 1 (0701 bit 4), otherwise this fault is generated. Or if IN = 1 (27 bit 4), RIN2 should be 0 (0701 bit 4), otherwise this fault is generated. Or if IN = 0 (27 bit 4), RIN2 should be 1 (0701 bit 4), otherwise this fault is generated. ASME 2000 event. **Troubleshooting:** • Check input resistors RCTIC, RIN1, RIN2, IN, SAF, INCTI and INICI on the associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H),and SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RLULD REDUNDANCY FAULT	**RLULD Redundancy Fault**
Description: A failure of the LU1, LU2, LD1 or LD2 relays or associated circuitry has been detected. If both of the LU and LD inputs = 0, input RLULD should be 1 (070A bit 2). RLULD is also verified "OFF" when running at high (RH = 0, 070A bit 3) or intermediate speed (INT = 1, 02DC bit 1) or the car is on any form of inspection operation as all of these conditions prevent the LU/LD family of relays from picking. Basically, if the leveling inputs are OFF the NC monitoring contacts of these relays should be MADE or the RLULD redundancy fault is logged. ASME 2000 event. **Troubleshooting:** Check input resistors LU, LD and RLULD on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RM1, RM2, RM3 REDUNDANCY FAULTS *(Hydro only)*	**RM1, RM2, RM3 Redundancy Faults**
Description: Only for jobs with M contactors. This function checks the status of a normally closed auxiliary contact of relay MX. When the car is not running we expect input RMX to be active (1). When we are running we expect input RMX to be OFF (0). A few jobs may have more than one M contactor (M1, M2, MX, etc) in this case, when a failure occurs, we would display the number of the problematic contactor, ie. RM2 Redundancy Fault. ASME 2000 Event. **Troubleshooting**: First, check the contacts of the normally closed auxiliary that feed the associated input. The logic is written to check for input RMX to be OFF (0, that is RM1=0) when we have a valid run command as determined by checking that inputs RPM=UNL=SAF= M1 = 1. If no run command, then RMX must = 1. Check voltage at top of associated input resistors on SC-SB2K-H. For those inputs that are ON expect 5 VAC. For those inputs that are OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
RMR REDUNDANCY FAULT *(Hydro only)*	**RMR Redundancy Fault**
Description: A failure of the M1, M2 or M12 relays or RMR input has been detected. This means a failure to activate when expected or a failure to drop when expected. If SAF = 0 (2C bit 6), RMR should be 1 (0708 bit 5), otherwise this fault is generated. If MB = 0 (0707 bit 1), RMR should be 1 (0708 bit 5), otherwise this fault is generated. ASME 2000 event. **Troubleshooting:** • Check the NC aux contacts of relays M12, M1 and M2. They must make up when the contactor drops out. • Also check input resistor RMR on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K(-H) board. Otherwise replace SC-HDIO board.	
ROFRT REDUNDANCY FAULT *(Hydro only)*	
Description: Monitors the OFRT relay for proper operation. If the OFRT relay is ON , the ROFRT input will be OFF. ROFRT should always be the opposite of OFRT, otherwise the ROFRT Redundancy Fault is logged and the elevator shuts down. The elevator will attempt to recover from this fault up to four consecutive times after which this fault will latch and require a manual reset by pressing the fault reset button. **Troubleshooting Tips:** Check the OFRT relay for proper operation (Some times we relabel the spare relay on the SC-BAH or SC-BAHR and some times we use a small contactor mounted on backplate). Also check the prints to see where the input ROFRT comes in and check 47 K resistor, swap ribbon cable and finally try replacing the associated board (w/ relay) or SC-HDIO.	
RPLT REDUNDANCY FAULT *(Hydro only)*	**RPLT Redundancy Fault**
Description: Only for jobs with multiple starters. This function checks the status of a normally closed contact of starter pilot relays PLT. When the car is not running, we expect input RPLT to be active (1). When we are running, we expect input RPLT to be OFF (0). ASME 2000 Event. **Troubleshooting**: First, check the normally closed contact of relay PLT that feeds the input RPLT. Check voltage at top of associated input resistors on SC-SB2K-H. For stopped condition (no demand), expect 5 VAC. For running, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
RPM REDUNDANCY FAULT *(Hydro only)*	**RPM Redundancy Fault**
Description: Verifies that input RPM is OFF when it should be by comparing RPM to inputs SAF=0= DLK= UNL=RPM. Also, if VC=1, RPM should also =1. Finally, we verify that RPM=1 when RUP=0 and either SU=1, RLULD=0 or VEU=0 or INUP=1 and IN=0. ASME 2000 Event. **Troubleshooting:** Use diagnostics to verify the status of the above mentioned inputs. For those inputs that should be OFF, check for 0 VAC at top of associated resistor on SC-SB2K-H and check for 5 VAC at top of resistors for active (ON) inputs. If not present, replace SC-SB2K-H. Otherwise swap associated ribbon cable or SC-HDIO.	
RPT REDUNDANCY FAULT	**RPT Redundancy Fault**
Description: A failure with the RPT input, PT relay or associated circuitry has been detected. If SAF = 0 or DLK = 0 or REI = 0 (0707 bit 2) then verify RPT = 1 (0707 bit 3). If RUP = 1 (0709 bit 3) and RDN = 1 (0709 bit 4) then verify RPT = 1. Else verify RPT = 0. ASME 2000 event. **Troubleshooting Tip:** • Check input resistors SAF, DLK, REI, RUP, RDN, and RPT on the associated board (refer to prints). Swap ribbon cables between SC-SB2K(-H), SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RSAFM REDUNDANCY FAULT *(Traction only)*	**RSAFM Redundancy Fault**
Description: Monitors the SAFM relay for proper operation. If the SAFM relay is ON , the RSAFM input will be OFF. RSAFM should always be the opposite of SAFM, otherwise the RSAFM Redundancy Fault is logged and the elevator shuts down. The elevator will attempt to recover from this fault up to four consecutive times after which this fault will latch and require a manual reset by pressing the fault reset button. **Troubleshooting Tips:** Check the SAFM relay for proper operation. Also check the prints to see where the input RSAFM comes in and check 47 K resistor, swap ribbon cable and finally try replacing the associated board (w/ relay) or HC-IOX.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RSAFR CYCLE TEST FAULT	**RSAFR Cycle Test Fault**
Description: RSAFR Redundancy Fault; A failure of the either the RSAFR1 or RSAFR2 relays has been detected. ASME 2000 event. **Troubleshooting:** During cycle test check operation of RSAFR1/2 relays. Next check for 5 VAC at top of RSAFR resistor on the SC-SB2K(-H) board when both are dropped and 0 VAC when either picks. If not present replace SC-SB2K(-H). If present swap C3 ribbon cable or SC-HDIO.	
RSAFR REDUNDANCY FAULT	**End of Run Cycle Test Fault**
Description: A failure of the End of Run Cycle Test has been detected. A failure of the SAFR1 or SAFR2 relays, OR a failure of the CSAF or MPSAF outputs, OR a failure of the RSAFR input has been detected. ASME 2000 event. **Troubleshooting Tips:** • If MPSAF = 1 (0700 bit 7 and 0 VAC @ TP3) and 120 VAC is present at terminal 20, then verify relay SAFR2 is picked. If SAFR2 is not picked, then check devices between terminal 20 and right coil side of relay SAFR2 for continuity. • If CSAF output is active (0 VAC @ TP4) and 120 VAC is present at terminal 20, then verify relay SAFR1 is picked. If SAFR1 is not picked, then check devices between terminal 20 and right coil side of relay SAFR1 for continuity. • If relays SAFR1 and/or SAFR2 are picked, RSAFR should be 0 (0700 bit 2), otherwise this fault is generated. • Also check input resistor RSAFR. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect, swap triacs on SC-HDIO labeled MPSAF. Or, if RSAFR resistor is defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
RSTOP REDUNDANCY FAULT	**RSTOP Redundancy Fault**
Description: A failure of the In Car Stop Switch has been detected. If RSTOP = 0 (070D bit 4 for Tractions / 070D bit 1 for Hydros) and SAFC = 1 (0700 bit 5), STOP (0700 bit 6) should be 1, otherwise this fault is generated. If RSTOP = 1 (070D bit 4 for Tractions / 070D bit 1 for Hydros) and ESBYP = 0 (0707 bit 7), STOP (0700 bit 6) should be 0, otherwise this fault is generated. ASME 2000 event. **Troubleshooting Tips:**• If the In Car Stop Switch is in the RUN position, then the expected results are SAFC = 1, STOP = 1 and RSTOP = 0. • If this is not the case, then trace the signal from the source to determine the failed component. • Begin at the input terminal. If the voltage here is not correct (120VAC for high signals and 0VAC for low signals), then the problem lies outside of the controller equipment. • Next check the voltage at the similarly named input resistor. If the voltage here is not correct (5VAC for high signals and 0VAC for low signals), then the problem lies on this board. If the resistor is still good (typically 47kOhms), then the board should be replaced. • Check for a defective ribbon cable by swapping it. • Finally, replace the input board (HC-PIO, SC-HDIO, IOX, I4O depending on the input). • If the In Car Stop Switch is in the STOP position, then the expected results are ESBYP = 0, STOP = 0 and RSTOP = 1. • Follow the above checks with the additional step for validating ESBYP. ESBYP must be low for this event to occur so, confirm that relay ESBYP is dropped. If it isn't, then replace the ESBYP triac, ribbon cable, SC-HDIO board, or SC-SB2K(-H) board one at a time until the problem is corrected.	
RSYNC REDUNDANCY FAULT *(Hydro only)*	
Description: Monitors the SYNC relay for proper operation. If the SYNC relay is ON , the RSYNC input will be OFF. RSYNC should always be the opposite of SYNC, otherwise the RSYNC Redundancy Fault is logged and the elevator shuts down. **Troubleshooting Tips: :** Check the SYNC relay for proper operation (Some times we relabel the spare relay on the SC-BAH or SC-BAHR and some times we use a small contactor mounted on backplate). Also check the prints to see where the input RSYNC comes in and check 47 K resistor, swap ribbon cable and finally try replacing the associated board (w/ relay) or SC-HDIO.	
RTBAB REDUNDANCY FAULT	**Redundancy Access Input Fault**
Description: A failure of a hoistway access related input, relay or associated circuitry has been detected. The RTBAB input monitors NC contacts of relays TAB and BAB. If RACC1 input is ON (1) then input RACC2 should be ON (1). Hence RACC1 = RTAB. If RACC1 = 1 (0702 bit 3), RTBAB should be 1 (0702 bit 5), otherwise this fault is generated. If INUP = 0 (0701 bit 6) and INDN = 0 (0701 bit 7), RTBAB should be 1 (0702 bit 5), otherwise this fault is generated. Else RTBAB should be 0 (0702 bit 5), otherwise this fault is generated. ASME 2000 event. **Troubleshooting:** • Check input resistors RTBAB, RACC1, RACC2, INUP, INDN, ACCI on associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H), SC-BASE(-D) and SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) or SC-BASE(-D) (for RACC1, RACC2) board. Otherwise replace SC-HDIO board.	
RUDX1 REDUNDANCY FAULT *(Traction only)*	**RUDX1 Redundancy Fault**
Description: Monitors the UP2 and DN2 relays. When the elevator is in motion either the UP2 or DN2 relays will be picked, depending on the direction of the car. Therefore the RUDX1 input must be active while the car is in motion and inactive when the car is stopped. **Troubleshooting Tips:** Check UP2 and DN2 relays. Also check RUDX1/ASI5 input resistor on the SC-HDIO board (refer to prints). If 47 K resistor is defective, replace SC-HDIO board. Otherwise replace UP2 or DN2 relays.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
RUDX2 REDUNDANCY FAULT *(Traction only)*	**RUDX2 Redundancy Fault**
Description: Monitors the UP2 and DN2 relays. When the elevator is in motion either the UP2 or DN2 relays will be picked, depending on the direction of the car. Therefore the RUDX2 input must be active while the car is in motion and inactive when the car is stopped. **Troubleshooting Tips:** Check UP2 and DN2 relays. Also check RUDX2/ASI6 input resistor on SC-HDIO board (refer to prints). If 47 K resistor is defective, replace SC-HDIO board. Otherwise replace UP2 or DN2 relays.	
RUDX3 REDUNDANCY FAULT *(Traction only)*	**RUDX3 Redundancy Fault**
Description: Monitors the UP2 and DN2 relays. When the elevator is in motion either the UP2 or DN2 relays will be picked, depending on the direction of the car. Therefore the RUDX3 input must be active while the car is in motion and inactive when the car is stopped. **Troubleshooting Tips:** Check UP2 and DN2 relays. Also check RUDX3/ASI7 input resistor on SC-HDIO board (refer to prints). If 47 K resistor is defective, replace SC-HDIO board. Otherwise replace UP2 or DN2 relays.	
RUDX4 REDUNDANCY FAULT *(Traction only)*	**RUDX4 Redundancy Fault**
Description: Monitors the UP2 and DN2 relays. When the elevator is in motion either the UP2 or DN2 relays will be picked, depending on the direction of the car. Therefore the RUDX4 input must be active while the car is in motion and inactive when the car is stopped. **Troubleshooting Tips:** Check UP2 and DN2 relays. Also check RUDX4/ASI8 input resistor on SC-HDIO board (refer to prints). If 47 K resistor is defective, replace SC-HDIO board. Otherwise replace UP2 or DN2 relays.	
RUFV REDUNDANCY FAULT *(Hydro only)*	**RUFV Redundancy Fault**
Description: Only for jobs with multiple valves. This logic checks input RUFV = 0 when USD = VEU = FUD = 1 and RUP= RH = 0. It also checks that RUFV = 1 when there is no demand to run the car Up. ASME 2000 Event. **Troubleshooting:** Use diagnostics to check on status of above signals. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON, expect 5 VAC. When OFF, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	
RUP REDUNDANCY FAULT	**Direction Input Fault**
Description: A failure of a UP direction related input, relay or associated circuitry has been detected. Checks that the UP relay, UP relay activation circuits and RUP input are functioning as required. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. If a direction is not invoked on either automatic or inspection operation, then the NC contact of the UP relay, that feeds input RUP, should be closed. Thus RUP = ON. Check associated input resistors on the SC-SB2K(-H) board. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K(-H) board. Otherwise replace SC-HDIO board.	
RUSV REDUNDANCY FAULT *(Hydro only)*	**RUSV Redundancy Fault**
Description: Only for jobs with multiple valves. This logic checks input RUSV = 0 when SU, SD or RLULD = 1 and UPS = 1. It also checks that RUSV = 1 when there is no demand to run the car Up. ASME 2000 Event. **Troubleshooting.** Use diagnostics to check on status of above signals. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON, expect 5 VAC. When OFF, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
RWYE1, RWYE2, RWYE3 REDUNDANCY FAULTS *(Hydro only)*	**RWYE1, RWYE2, RWYE3 Redundancy Faults**
Description: This function checks the status of a normally closed auxiliary contact of relay WYE (or A for Across the Line Starters). When the car is not running, we expect input RWYEX to be active (1). When we are running we expect input RWYEX to be OFF (0). A few jobs may have more than one WYE contactor (WYE1, WYE2, WYEX, etc). In this case, when a failure occurs, we display the number of the problematic contactor, ie. RWYE2 Redundancy Fault. ASME 2000 Event. **Troubleshooting**: First check the contacts of the normally closed auxiliary that feed the associated input. The logic is written to check for input RWYEX to be OFF (0, that is RWYE1=0) when we have a valid run command as determined by checking that inputs UNL=SAF= M1 = WYEX = RDELX (if wye-delta starter) = 1. If no run command, then RWYEX had better be = 1. Check voltage at top of associated input resistors on SC-SB2K-H. For those inputs that are ON, expect 5 VAC. For those inputs that are OFF, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
SAFC REDUNDANCY FAULT	**SAFC Redundancy Fault**
Description: A failure of the safety string between input SAFC and input STOP has been detected. If SAFC = 0 (0700 bit 5), STOP should be 0 (0700 bit 6), otherwise this fault is generated. ASME 2000 event. **Troubleshooting Tips:** • Check wiring connections to terminals 18 and 20. • Check wiring connections to the IN-CAR STOP SWITCH. • Also check input resistors STOP and SAFC. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
SAFH REDUNDANCY FAULT	**SAFH Redundancy Fault**
Description: A failure of the safety string between input SAFH and input SAFC has been detected. If SAFH = 0 (0700 bit 4), SAFC should be 0 (0700 bit 5), otherwise this fault is generated. ASME 2000 event. **Troubleshooting Tips:** • Check wiring connections to terminals 16, 17 and 18. • Check wiring connections to all safety devices between terminals 16, 17 and 18. • Also check input resistors SAFH and SAFC. Swap ribbon cables between SC-SB2K(-H) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
STARTER FAULT RELAY DROPPED *(Hydro only)*	**Starter Fault Relay Dropped**
Description: Indicates that the solid state starter has dropped the fault relay. ASME 2000 Event. **Troubleshooting:** For Solid State Starters Only. Confirm that the Fault Relay has truly dropped. If not, then check the wiring. Otherwise refer to the Starter Manufacturers manual.	
TEST REDUNDANCY FAULT	**TEST Redundancy Fault**
Description: A failure of the TEST/NORMAL switch, input or associated circuitry has been detected. ASME 2000 event. **Troubleshooting:** The switch can't be in the NORMAL and TEST positions at the same time. • If TEST = 0 (02D9 bit 7), meaning the switch is in the TEST position, IND should be 1 (27 bit 5), otherwise this fault is generated. • Check input resistors TEST and IND on the associated board (refer to prints). • Swap ribbon cables between SC-SB2K(-H), SC-HDIO. • If swapping ribbons has no effect or if resistors are defective, replace SC-SB2K-(H) board. Otherwise replace SC-HDIO board.	
UETS REDUNDANCY FAULT *(Traction only)*	**UETS Redundancy Fault**
Description: This fault is displayed when an inconsistency is detected between the Up Emergency Terminal Switches. ASME 2000 event. **Troubleshooting**: • Check the condition of the ETS switches. The UETS1/2 limit switches must operate simultaneously. • Check the wiring to the relay board (SC-SB2K(-H)) and IO board (SC-HDIO). • Verify UETS1 (070C bit 7) equals UETS2 (070D bit 2) and the car is in door zone. • Also check input resistors UETS1 and ASI2/UETS2 on the associated board (refer to prints). Swap ribbon cables between SC-BASE(-D) and SC-HDIO. If swapping ribbons has no effect or if resistors are defective, replace SC-BASE(-D) board. Otherwise replace SC-HDIO board.	
UFV REDUNDANCY FAULT *(Hydro only)*	**UFV Redundancy Fault**
Description: Input UFV checks the status of the up terminal speed reducing switches. We simply compare input UFV against input UTSRL. If UFV is not equal to UTSRL, we assert this fault. Hence these switches must open up simultaneously. ASME 2000 event. **Troubleshooting:** Check that the limit switches are opening within one second of each other as the car approaches the top terminal landing. If they are, then use diagnostics to determine the status of the inputs. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON, expect 5 VAC. When OFF, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO.	
UNL REDUNDANCY FAULT *(Hydro only)*	**Direction Input Fault**
Description: Input UNL checks the status of the UNL relay against the up normal limit switch when the doors are locked. We simply compare input UNL against input UNLS. If UNL is not equal to UNLSL, we assert this fault. Hence these switches must open up simultaneously. ASME 2000 Event. **Troubleshooting:** Check that both the limit switch and relay are activating/deactivating within one second of each other as the car approaches the top terminal landing. If they are, then use diagnostics to determine the status of the inputs. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON expect 5 VAC. When OFF expect 0 VAC. If this is not the case replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	
UP NORMAL LIMIT SWITCH OPEN	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. If SAF=1 and DLK=1 and the car is above the Up Normal Limit Switch (UNL=0), then this status is displayed. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Verify SAF=1 and DLK=1 and move the car below the Up Normal Limit (UNL=1). In most cases we simply need to move the limit switch further into the terminal.	

TABLE 6.4 ASME A17.1 - 2000 Status and Error Messages

Scrolling Message	Special Event Message
UPDIR REDUNDANCY FAULT *(Traction only)*	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Valid when SAF=1. Input UPDIR is created by the SC-BASE(-D) board and represents resolved direction from the speed sensor. Input UPDIR must always be the opposite of RUP. If the main processor detects that the resolved direction (UPDIR form SC-BASE(-D)) does not agree with the intended direction (RUP from MP2 / PCA), the system is shut down with the UPDIR redundancy fault. ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. • Verify that the UP LED on the SC-BASE(-D) is ON when car motion is up and OFF when car motion is down. If not, the speed sensor is reversed (rotate the sensor 180 degrees with respect to the magnet). • Swap associated Ribbons cables between SC-BASE(-D) and SC-HDIO, check 95 and 96 signals (0 to 55VDC), swap SC-BASE(-D) or SC-HDIO.	
UPS REDUNDANCY FAULT	**Direction Input Fault**
Description: A failure of a direction related input, relay or associated circuitry has been detected. Valid when SAF=1. Determines if the up sense input (UPS) agrees with the intended direction (RUP) once the doors are closed and locked (DLK). ASME 2000 event. **Troubleshooting:** See the note, GENERAL TROUBLESHOOTING TIPS, just prior to this table. Once DLK is ON (1), if UPS is ON (1), then RUP must be OFF (0). If this is not the case, the system is shut down with the UPS redundancy fault. Check associated input resistors, swap boards or ribbon cables to correct.	
UTS REDUNDANCY FAULT *(Hydro only)*	**UTS Redundancy Fault**
Description: Only for solid state starters. This input validates that the “Up To Speed” (UTS) signal is low (OFF) when either WYE or DEL are OFF (0). If UTS is ON, we set this fault. For jobs with multiple starters, we have UTS1, UTS2, etc. ASME 2000 Event. **Troubleshooting.** Use diagnostics to check on status of WYE, DEL and UTS as above. Check voltage at top of associated input resistors on SC-SB2K-H. When the inputs are ON, expect 5 VAC. When OFF, expect 0 VAC. If this is not the case, replace the SC-SB2K-H. If voltages are good, swap associated ribbon cable and finally swap the SC-HDIO	

4-19-04

6.2 USING THE SPECIAL EVENTS CALENDAR

The Special Events Calendar documents the 250 most recent fault conditions or events and displays them in chronological order. They can be viewed on the optional CRT terminal connected to either the car controller or the Group Supervisor. The data displayed includes the type of event or fault, the date and time the fault/event occurred, the date and time the fault/event was corrected, as well as other information about the status of the elevator when the fault or event occurred.

The Special Events Calendar Fault Log is accessed from the Special Events Calendar Menu (Figure 6.5). Press the **F7** key while the Main Menu is displayed.

VIEW FAULT LOG

From the Special Events Calendar Menu (F7) screen press **1** or **F7** to display the events logged to the Special Events Calendar. This screen makes it possible to examine the documented faults and events. The latest 14 faults and events are displayed in the bottom half of the screen, including the date and time the event occurred.

FIGURE 6.5 Special Events Calendar Menu (F7) screen

```
                         12/10/2002, 10:25:30 AM, F4=Main Menu



              Special Events Calendar Menu (F7)

                 F7 or 1 -  View Fault Log
                       2 -  Clear Fault Log
                       3 -  Configure by Type
                       8 -  Print Events



                                                      dnID209c
```

When this screen is first displayed, the most recent event is displayed at the bottom of the screen. Use the **Up / Down Arrow** keys to scroll one event at a time, the **Page Up / Page Down** keys to scroll a page at a time, or the ***Home / End*** key to scroll to event 1 or 250. As each event is selected (reverse video), the description of the event and any other logged data is displayed in the top half of the screen. Additional troubleshooting information for each event can be displayed by pressing **Crtl + T** (see Figure 6.6). Tables 6.3 and 6.4, *Status and Error Messages* lists the faults or events which are recorded, including a description and recommended troubleshooting actions.

FIGURE 6.6 Special Events Calendar (F7 - 1) screen

```
                                    12/4/2000,  10:25:30 AM,    F4=Main Menu

                    Special Events Calendar (F7, F7)
STATUS                     SPEED (ft/Mmin)   VOLTAGE (volts)    CURRENT (amps)
Direction   : N/A          Command   : N/A   Armature : N/A     Armature : N/A
High Speed  : N/A          Tach/Enc  : N/A   Motor Fld: N/A     Command  : N/A
Start Floor : N/A          Terminal  : N/A   Brake    : N/A
Stop Floor  : N/A          Safety    : N/A
Step Floor  : N/A          Pattern   : N/A   SENSOR (volts)     POSITION (ft)
Switch      : N/A                            Motor Fld: N/A     Absolute : N/A
PI          : 3                              Brake    : N/A
Event Code  : 0x03 ( Communication )
This fault indicates that the car was previously communicating with the Group
Supervisor but is now unable to communicate.

DATE            TIME            DESCRIPTION
12/4/2000       10:05:28 AM     Communication Loss
                10:07:37 AM     Communication Loss [OFF]
                2:36:18 PM      Sub-System(s) Reset

    ARROWS: Move Cursor, HOME: Oldest, END: Newest,  CTRL-T: Troubleshoot
                                                                  dnID208c
```

FIGURE 6.7 Special Events Calendar Troubleshooting (F7 - 1 - Crtl +T) screen

```
                                    2/16/2000,  10:25:30 AM,  F4= Main Menu

          Special Events Calendar Troubleshooting Tips

          12/4/2000,  10:05:28 AM, Communication Loss
--Verify that the RS-422 communication cable is not removed from the Car's
MC-RS board.
--Verify the jumpers on all of the controllers' MC-RS boards.
--Check for a defective MC-RS board on any of the controllers.

                 ESC or CTRL-T: Special Events Calendar
                                                                  dnID248b
```

CLEAR FAULT LOG

While in the Special Event Calendar Menu (F7) screen is displayed, if the **2** key is pressed, the message **`Delete All Events? (Y/N)`** is displayed. Press **Y** to clear the Special Events Calendar of all events.

SPECIAL EVENTS - CONFIGURE BY TYPE

In order to aid in troubleshooting, the list of events which are logged to the Special Events Calendar can be configured based on the event type.

While in the Special Event Calendar Menu (F7) screen is displayed, press the **3** key to access the Special Events - Configure by Type (F7, 3) screen (see Figure 6.8). The ***Log*** column controls which events are logged to the Special Events Calendar Fault Log. Place an 'X' in this column if you want the event type listed in the selected row to be logged to the Special Events Calendar. When the Event Description is highlighted, a description of the event type is displayed above the column headings (see Figure 6.9). Tables 6.3 and 6.4, *Status and Error Messages* provides a complete listing of events. The event messages that are logged to the Special Event Calendar are shown with SEC in the *Location* column.

FIGURE 6.8 Special Events - Configure by Type (F7, 3) screen

```
                              12/5/2000, 10:25:30, F4= Main Menu

                     Special Events - Configure by Type (F7, 3)
The Log column controls which events are logged to the Special Events
Calendar. Place an X in the Log column to have events of the type specified by
this row to be logged to the Special Events Calendar. Events with a "." in the
Log column will not be logged.

Log          Process         Event Description                    1 of 39
X            Communication   Alarm - No Car Movement
X            Communication   Alarm - No Door Zone
X            Communication   Both USD and DSD Are Open
X            Communication   Bottom Floor Demand
X            Communication   Car Call Bus Fuse Blown
X            Communication   Car Out of Service with Doors Locked
X            Communication   Car Out of Service without Doors Locked
X            Operation       Car Safefy Device Open
X            Communication   Communication Loss
X            Communication   Contactor Proofing Redundancy Failure
X            Communication   Direction Relay Redundancy Failure
X            Communication   Door Close Protection
X            Communication   Door Lock Contact Failure
X            Communication   Door Open Limit Failure
X            Communication   Doors Open and Locked
X            Operation       Earthquake
X            Communication   Fire Service Phase 2
X            Communication   Gate Switch Relay Redundancy Failure
X            Operation       Governor Switch Open
X            Operation       Hoistway Safety Devide Open

             ARROWS: Select,   ENTER KEY: Edit,   S: Saves
                                                                  dnID239d
```

FIGURE 6.9 Special Events - Configure by Type - Event Description (F7, 3) screen

```
                              12/5/2000, 10:25:30, F4= Main Menu

               Special Events - Configure by Type (F7, 3)

This event indicates that one or more of the car safety circuit devices is
open (e.g., emergency exit contact, safety clamp switch, car-top emergency
stop switch). This error is generated when the safety string input (SAF) is
low, and the safety circuit has been opened "upstream" of the SAFC input.

Log            Process          Event Description                1 of 39
 X             Communication    Alarm - No Car Movement
 X             Communication    Alarm - No Door Zone
 X             Communication    Both USD and DSD Are Open
 X             Communication    Bottom Floor Demand
 X             Communication    Car Call Bus Fuse Blown
 X             Communication    Car Out of Service with Doors Locked
 X             Communication    Car Out of Service without Doors Locked
 X             Operation        Car Safefy Device Open
 X             Communication    Communication Loss
 X             Communication    Contactor Proofing Redundancy Failure
 X             Communication    Direction Relay Redundancy Failure
 X             Communication    Door Close Protection
 X             Communication    Door Lock Contact Failure
 X             Communication    Door Open Limit Failure
 X             Communication    Doors Open and Locked
 X             Operation        Earthquake
 X             Communication    Fire Service Phase 2
 X             Communication    Gate Switch Relay Redundancy Failure
 X             Operation        Governor Switch Open
 X             Operation        Hoistway Safety Devide Open

          ARROWS: Select,   ENTER KEY: Edit,   S: Saves

                                                               dnID239e
```

FIGURE 6.10 Special Events - Print Events (F7, 8) screen

```
                              12/19/2002, 10:25:30, F4= Main Menu

                    Event Calendar Print Setup (F7, 8)

                       Print Range: ALL EVENTS

                       Start Date:  -- N/A --
                         End Date:  -- N/A --

                       Events Per Page:  8

     ARROWS: Select Item,   +/- KEYS: Change Value,   P: Print

                                                               dnID272
```

6.3 USING THE DIAGNOSTICS

System diagnostics are available using the optional CRT terminal with Release 4 Communication software. Diagnostics are accessed via the Diagnostics Menu (F11) screen.

FIGURE 6.11 Diagnostics Menu (F11) screen

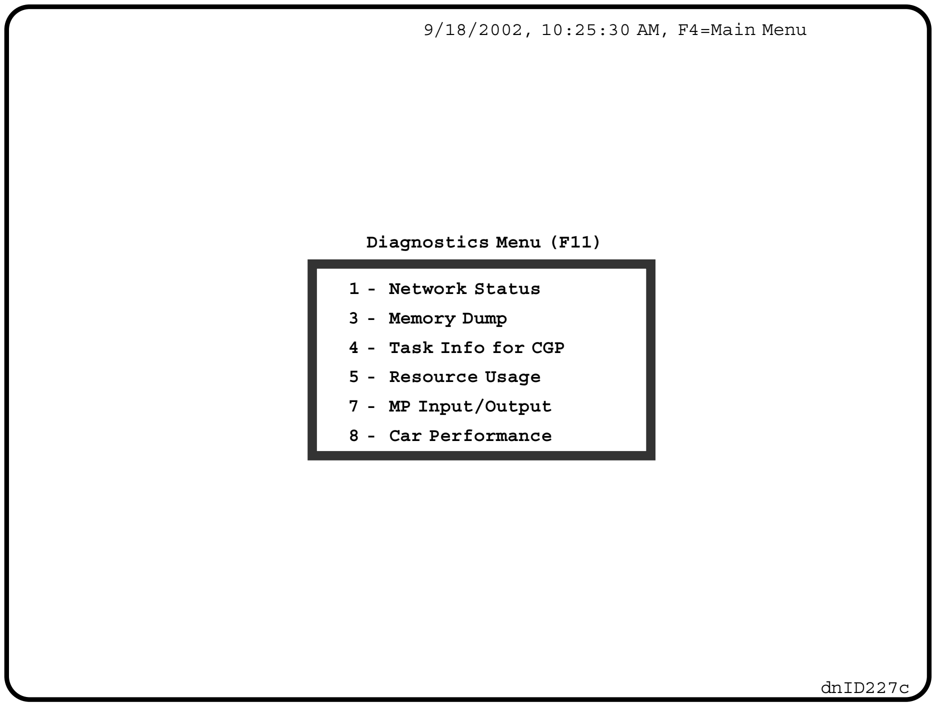
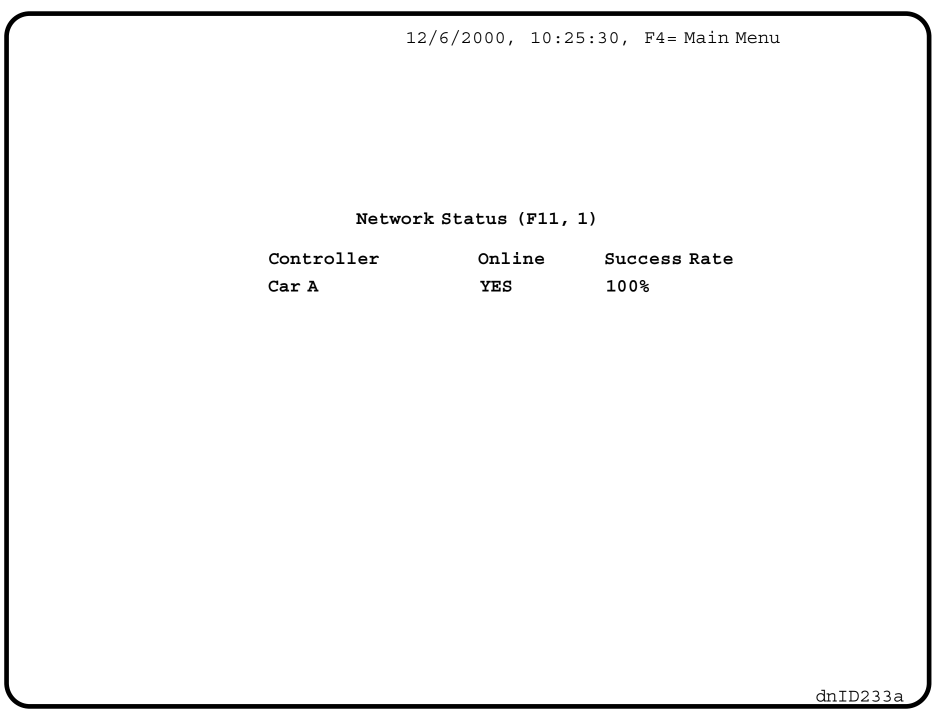


FIGURE 6.12 Network Status (F11, 1) screen



Network Status - The status of communication between the car controller and the Group Supervisor can be verified using the Network Status (F11, 1) screen. A Success Rate of less than 100% indicates possible improper termination of the High-Speed Serial Communication Link. Proper termination is achieved by installing or removing shunts on jumpers JP1 and JP2 on the MC-RS Communication Interface boards at the ends of the communication chain while observing the Success Rate percentage for each local Car. The goal is to achieve 100% Success Rate for each car, or the highest percentage possible. This diagnostic screen is also available on the M3 Group Supervisor (see Section 3.9.2 *Using the Network Status Diagnostics Screen* in the M3 Group Supervisor manual, part #42-02-G004)

Memory Dump - (screen not shown) This diagnostic screen shows the status of memory locations within the controller's computers. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

Task Info for CGP - (screen not shown) This diagnostic screen shows the status of various tasks performed by the MC-CGP-4(8) Communication Processor Board. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

Resource Usage - (screen not shown) This diagnostic screen shows resource usage in the MC-CGP-4 Communication Processor Board. MCE Technical Support personnel may request information from this screen while troubleshooting a problem.

MP Input / Output - Displays the status of the MP inputs and outputs (Figure 6.13).

FIGURE 6.13 MP2 Input/Output (F11,7) screen

7/19/2000, 10:25:30 AM, F4=Main Menu

MP Diagnostic Input/Output Flags

20	DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
21		DC	UC	CC			DHO	DOI
22	DCF	DCP	DOF	LOT		HTC	CCT	SDT
23			HSEL	CSB	DCC	NUDG		DSHT
24	INT	FRA	FCS	FRS	DNS	UPS	STD	STU
25			HLW	HLI			**FWI**	
26	LFP	UFP						
27			EQI	IND	IN		DEL	YSIM
28	LLW	DLK		DZORDZ			PK	LLI
29	DNDO	LD		DDP	UPDO	LU		UDP
2A	DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
2B	TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
2C		STC	SAF	**HCR**	**HCDX**	**CCD**	ISV	ISRT
2D					**FRM**			FRC
2E	SD	SDA	DSD	BFD	SU	SUA	USD	TFD
2F	HLD		EQA	ATSF		ECRN	CD	EPR

dnID265

FIGURE 6.14   Car Performance Graph (F11, 8) screen

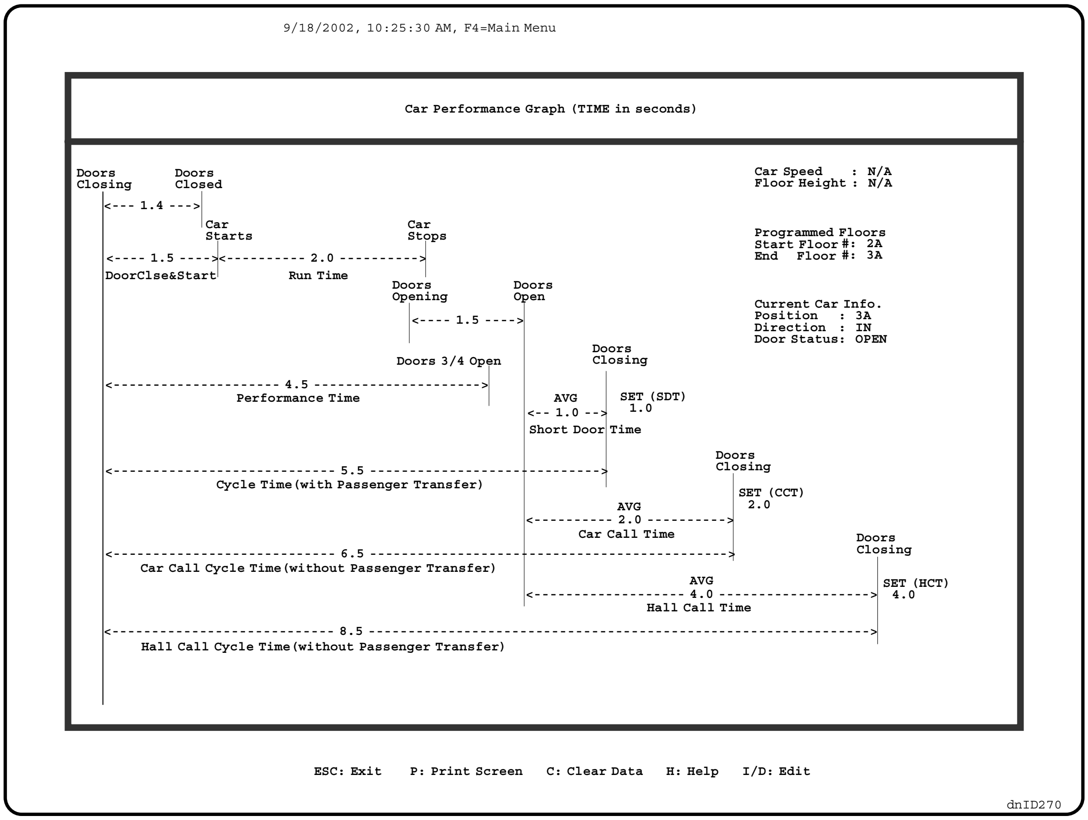
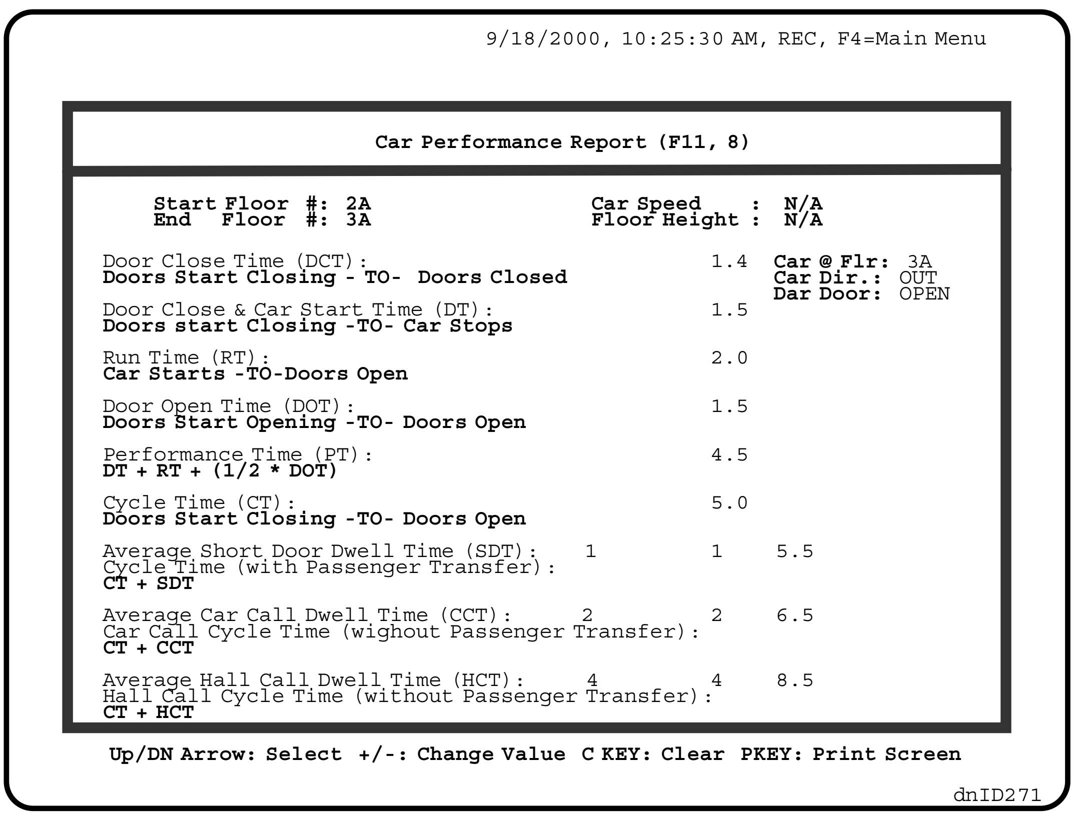


FIGURE 6.15   Car Performance Report (F11, 8, H) screen



9/18/2000, 10:25:30 AM, REC, F4=Main Menu

Car Performance Report (F11, 8)

Start Floor #: 2A **Car Speed : N/A**
End Floor #: 3A **Floor Height : N/A**

Door Close Time (DCT): 1.4 **Car @ Flr:** 3A
Doors Start Closing - TO- Doors Closed **Car Dir.:** OUT
Dar Door: OPEN

Door Close & Car Start Time (DT): 1.5
Doors start Closing -TO- Car Stops

Run Time (RT): 2.0
Car Starts -TO-Doors Open

Door Open Time (DOT): 1.5
Doors Start Opening -TO- Doors Open

Performance Time (PT): 4.5
DT + RT + (1/2 * DOT)

Cycle Time (CT): 5.0
Doors Start Closing -TO- Doors Open

Average Short Door Dwell Time (SDT): 1 1 5.5
Cycle Time (with Passenger Transfer):
CT + SDT

Average Car Call Dwell Time (CCT): 2 2 6.5
Car Call Cycle Time (wighout Passenger Transfer):
CT + CCT

Average Hall Call Dwell Time (HCT): 4 4 8.5
Hall Call Cycle Time (without Passenger Transfer):
CT + HCT

Up/DN Arrow: Select +/-: Change Value C KEY: Clear PKEY: Print Screen

dnID271

Car Performance - The Car Performance Graph (F11, 8) screen and the Car Performance Report (F11, 8, H) screen provide car performance data including:

- Door Close Time (DCT)
- Door Close & Car Start Time (DT)
- Run Time (RT)
- Door Open Time (DOT)
- Performance Time (PT)
- Cycle Time (CT)
- Average Short Door Dwell Time (SDT)
- Average Car Call Dwell Time (CCT)
- Average Hall Call Dwell Time (HCT)

6.4 TROUBLESHOOTING CAR OPERATION CONTROL (COC)

Usually, a malfunction is due to a faulty input or output signal. Inputs are signals generated outside the controller cabinet that connect to terminals inside the cabinet, and are subsequently read by the computer during its input scan. Outputs are signals generated by the computer that energize relays or turn on indicators during the computer's normal output scan. Since an incorrect input or output can cause a system malfunction, tracing these signals to find the source of the problem is essential. Read the example problem under *Tracing Signals in the Controller* to become familiar with signals generated in the system.

6.4.1 DOOR LOGIC

As complex as it is, the door logic basically answers one simple question; should the doors be open? The computer looks at certain inputs and then calls upon specific logic to answer this question. All of the inputs and flags generated by the specific logic are available for viewing through the EOD. When troubleshooting a door problem, inspecting the action and sequence of these flags and inputs is important. The status of these logic flags will generally point toward the root of the problem. Once the computer has determined the answer to the door status question, the appropriate outputs are turned ON or OFF, so the doors are in the desired state.

The computer looks at the following inputs:

- DBC - Door Close Button input
- DCLC - Door Closed Contacts input (Retiring Cam only)
- DLK - Door Locks input
- SE - Safety Edge input
- DOL - Door Open Limit input
- DZ - Door Zone input
- PHE - Photo Eye input

The computer generates the following outputs:

- DCF - Door Close Function output
- DCP - Door Close Power output
- DOF - Door Open Function output

NUDG - Nudging output

TRACING SIGNALS IN THE CONTROLLER

The following example shows how an input signal can be traced from its source (field wire) to its destination inside the computer (EOD). Monitor the Door Zone (DZ) flag. The DZ flag can be monitored using the Computer Swing Panel Diagnostic Indicators as described in Section 5.4.1, *Viewing the MC-MP2-2K Computer Variable Flags.* The door flags can also be viewed on the MP2 Input/Output (F11, 7) screen (see Figure 6.13) Moving the car in the hoistway should cause this flag to turn ON and OFF whenever the car goes through a floor. If the flag (LED) does not turn ON and OFF, the following could be causing the problem.

1. Defective Door Zone sensor.
2. Incorrect hoistway wiring.
3. Faulty termination of hoistway wiring to the (DZ) terminal inside the controller.
4. Defect on the SC-SB2K or HC-PI/O board.

NOTE: If this installation has rear doors and at least one floor where both openings exist, look up the rear door zone flag (DZR). To do so, the Diagnostic On/Norm switch and the A5 switch must be up. All other switches are down. Diagnostic Indicator 6 shows the status of DZR.

First, determine whether the problem is inside or outside the controller. With a voltmeter, probe the Door Zone terminal (27). This terminal is in Area 3 of the job prints. Moving the car in the hoistway should cause the voltmeter to read 120VAC when the car is in the door zone. If when the car passes through the door zone the voltmeter does not read 120VAC the problem is external to the controller (see items 1, 2, and 3 above). If the voltmeter does read 120VAC when the car passes through the door zone the problem is internal to the controller (see item 4 above). The job prints show the DZ signal goes to the right hand side of the DZ relay to a 47K 1W resistor, to pin 8 of connector C2 on the SC-SB2K Relay board, and then to pin 8 of connector C2 on the HC-PI/O board.

Figures 6.16 and 6.17 show the HC-PI/O and SC-SB2K boards and the location of the DZ signal in the controller. Notice that if terminal 27 is powered, approximately 120VAC will be present at the bottom of the 47K 1W resistor corresponding to DZ. The top of the same resistor should read about 5VAC with respect to COM.

The SC-SB2K board has test pads on the front of the board which surround every relay and connector. Relays IN2 and SAFR1 each have a legend that indicates which pad corresponds to which contact or its coil on this board. To be sure that the input from terminal 27 is making its way to the relay coil, probe the test pad on the lower right hand side of the DZ relay.

It is not necessary to remove the relay or get to the back of the SC-SB2K board to trace signals on the board. Signals can be traced on the HC-PI/O board. If the signal gets to the HC-PI/O board but does not get to the computer, it is safe to assume that the problem is on the HC-PI/O board.

Important computer-generated logic flags:

- CCT - Car Call Time flag
- DOI - Door Open Intent flag
- DSH - Door Shortening (Intermediate) flag
- DSHT - Door Shortening (Final) flag
- HCT - Hall Call Time flag
- LOT - Lobby Time flag
- SDT - Short Door Time flag

Using the logic flags listed above, the computer makes a decision regarding the doors. The Door Open Intent flag's (DOI) status reflects the computer's decision. If the computer recognizes the necessity of either opening the doors or keeping the doors open, this flag will come ON. This flag can be found using the EOD. When viewing this flag, the corresponding Diagnostic Indicator will turn ON when the computer decides that the doors should be open.

The DOI flag is a useful flag to inspect when troubleshooting door problems. Remember if DOI is ON, it will turn the DOF output ON which should pick the DO relay. The door should stay open until the DOL (Door Open Limit) turns OFF. The absence of DOL will turn the DOF output OFF. DOI will remain ON for the door dwell time (CCT, HCT, etc.). When DOI turns OFF, the DCF output turns ON and the DC relay will close the car doors. The signal that turns the DCF output OFF is DLK (Doors Locked) or possibly DCLC if the car has a retiring cam. After the doors are locked there is approximately a two-second delay before the DCF output turns OFF.

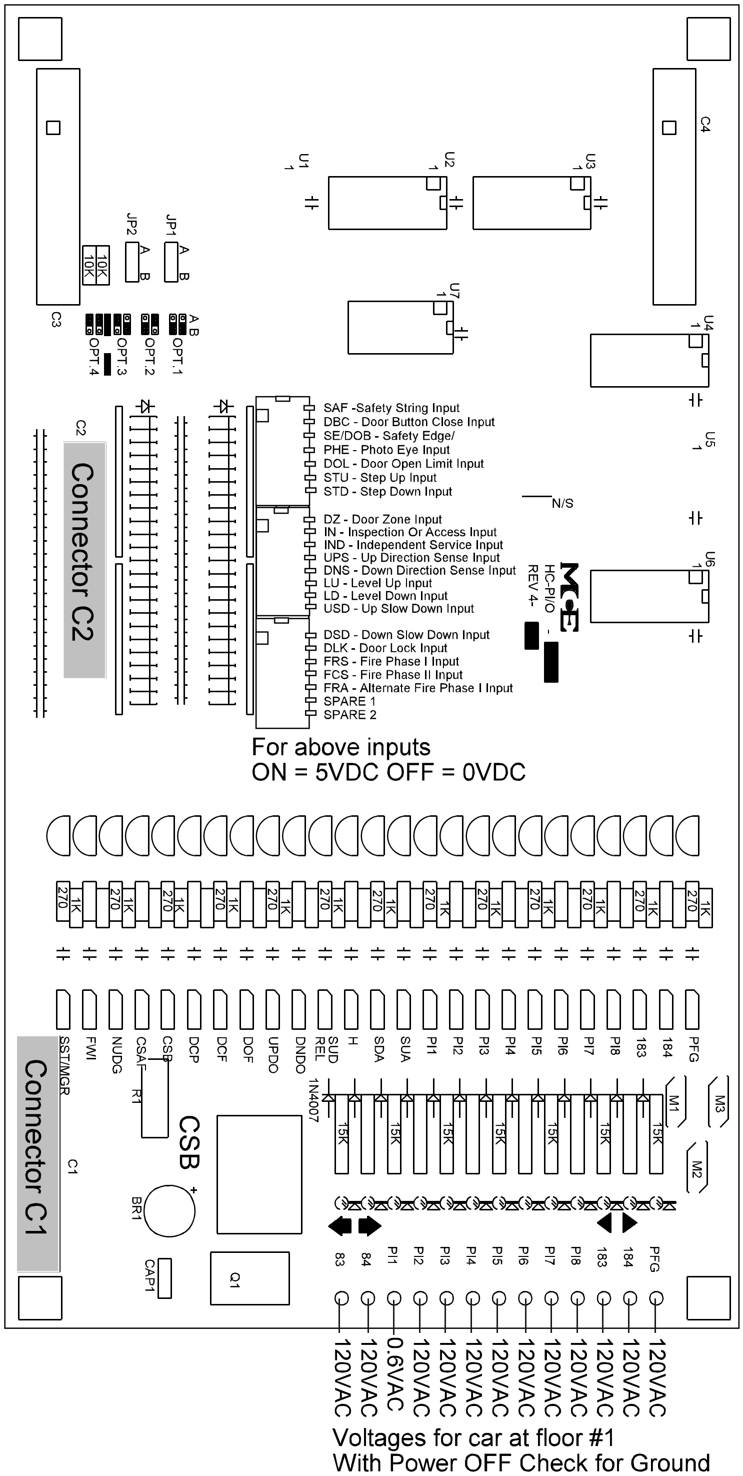
If there is a demand for the car (as is evidenced by the DMU or DMD flags being on) and if the DOI flag is *not* ON, then the DCP (Door Close Power) output will be turned ON regardless of the position of the door. The DCP output is used to provide door closing power while the car runs through the hoistway for those door operators requiring it, such as those made by the G.A.L. corporation.

If the doors get stuck because the door interlock keeper failed to lift high enough to clear the door interlock during the opening cycle, then the doors cannot complete opening, which could damage the door motor. The Door Open Protection Timer will eventually stop trying to open the doors and the car will then go on to the next call. Similarly, if the doors do not close all the way, the computer recycles the doors at a programmed interval in an attempt to clear the problem.

FIGURE 6.16 HC-PI/O Power Input/Output Board Quick Reference

42-QR-HC-PI/O Rev. 1

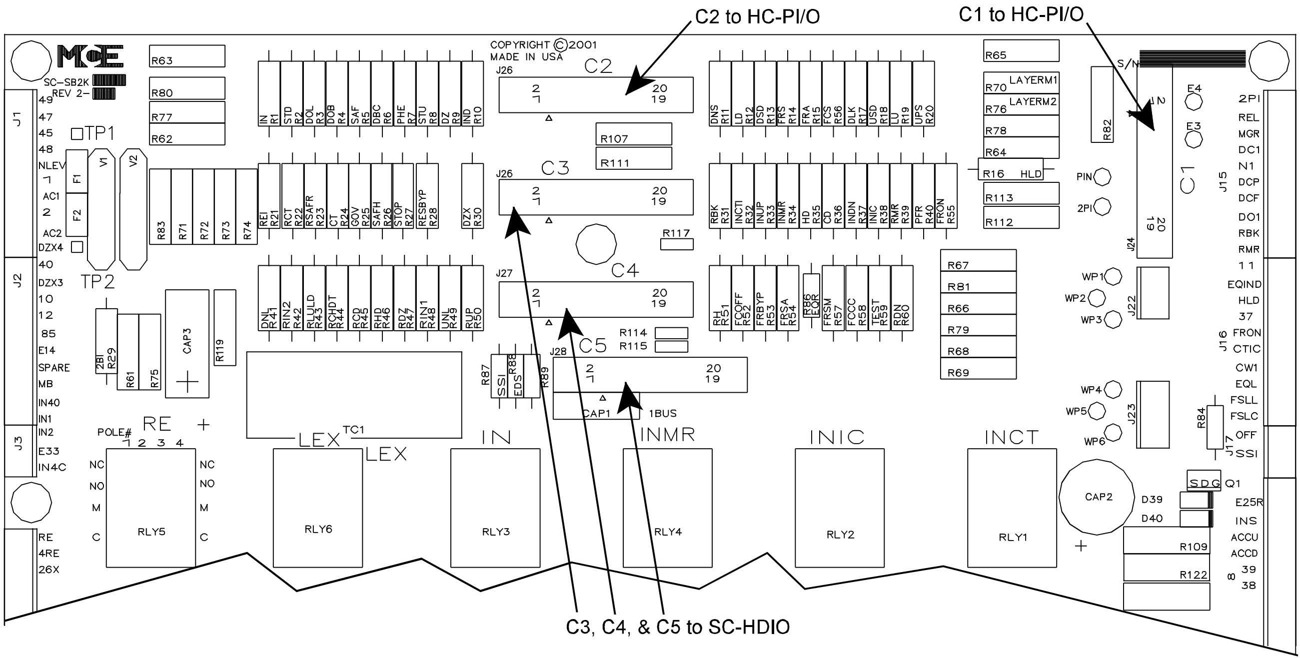
HC-PI/O QUICK REFERENCE CARD (Board 3)



Connector C2	
INPUT	**PIN**
SAF	1
DBC	2
SE/DOB	3
PHE	4
DOL	5
STU	6
STD	7
DZ	8
IN	9
IND	10
UPS	11
DNS	12
LU	13
LD	14
USD	15
DSD	16
DLK	17
FRS	18
FCS	19
FRA	20
SPARE 1	21
SPARE 2	22

Connector C1	
OUTPUT	**PIN**
SST/MGR	1
FWI	2,4
SPARE 2 input	3
SPARE 1 input	5
NUDG	6
Lamp Common	7
CSAF	8
SUB/REL	9,11
DCP	10
DCF	12
Stop SW Out	13,15
DOF	14
UPDO	16
DNDO	18
Stop SW Source	17,19
H	20

FIGURE 6.17   SC-SB2K Main Relay Board Details



The computer basically looks for a reason to open the doors. If a valid reason to open the doors is *not* found, or if conditions are detected that prohibit the opening of the doors, the logic will close the doors (reset, or turn DOI OFF). To open the doors, the car must be in a door zone and not running at high or intermediate speed. Once the car has settled into a proper position to open the doors, a condition must exist that indicates that the doors should be open. Some of these conditions are listed below:

- Call demand at the current landing (or a call has just been canceled)
- Safety Edge/Door Open Button (DOB) input
- Emergency/Independent Service conditions
- Photo Eye input

When a call is canceled, one of the following door time flags should be turned ON: CCT, HCT, or LOT. When one of the reopening devices (SE or DOB) is active, the SDT flag is turned ON. When an Emergency or Independent Service condition exists, the presence of the particular condition will cause the DOI flag to be set. Some of these conditions include: Fire Service, Emergency Power operation, Independent Service, Attendant Service, etc.

Once the state of the computer flags has been determined, inspect the high voltage hardware to see if the appropriate functions are being carried out. For example, if the doors are closed and the DOI flag is set, the doors should be opening (the DO relay picked). If the doors are open and the DOI flag is cleared (turned OFF), the doors should be closing (the DC relay picked).

It is vital to determine whether or not *the control system* is doing what *its* logic determines it should be doing. If the control system is doing what the logic intended it to do, then it is important to determine how the logic came to its conclusions. If the control system is *not* doing what the logic intended it to do, then it is important to determine what is preventing the desired function from being carried out. The diagnostics on the Computer Swing Panel and/or the CRT can help determine which situation is present. The output flags will show which outputs the computer is attempting to turn ON/OFF. Compare the flags with what is actually happening in the high voltage hardware.

Door Sequence of Operation

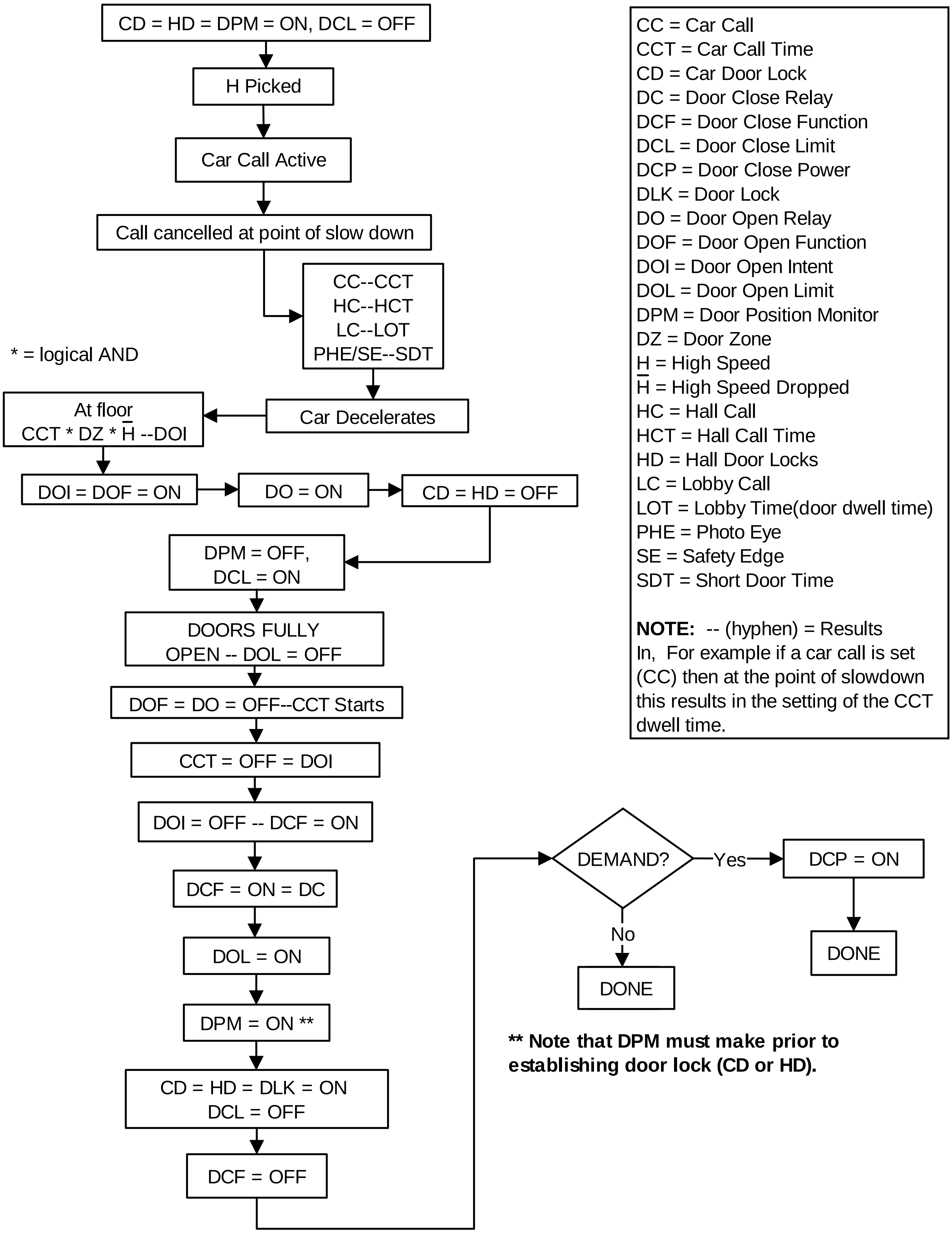
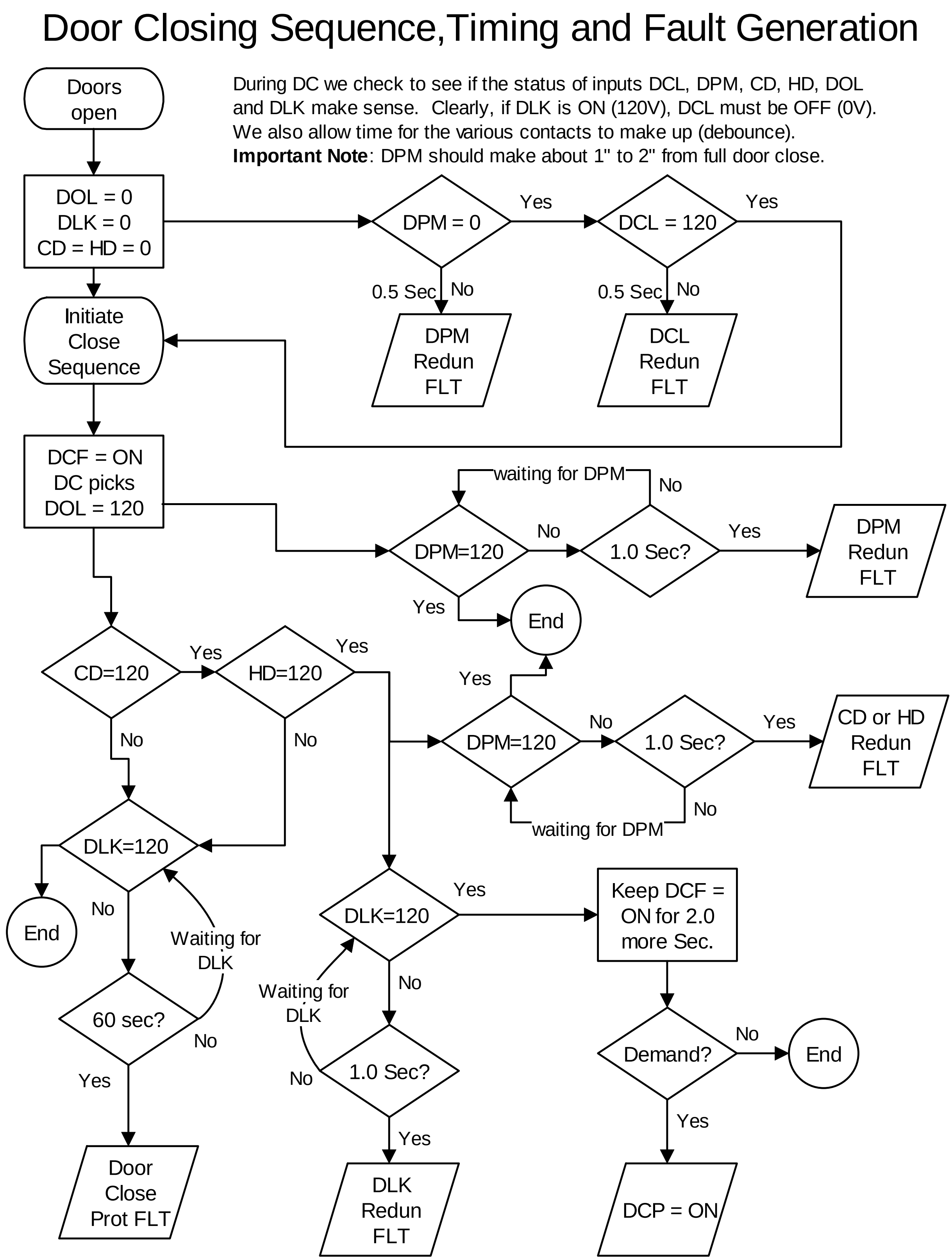
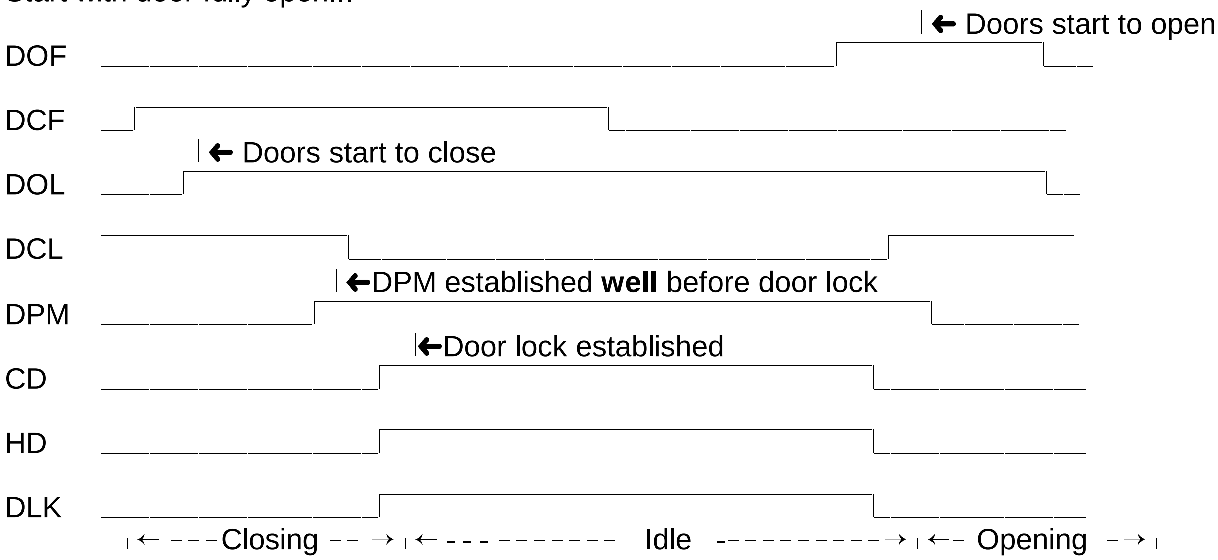


FIGURE 6.19 Door Closing Sequence, Timing and Fault Generation Flowchart



Door Operation Timing Diagram

Start with door fully open...



6.4.2 CALL LOGIC - NORMAL OPERATION

> **NOTE:** If the controller is equipt with the SmartLink for Car Operating Panel option, see Appendix G, *Option* SmartLink for Car Operating Panel, for troubleshooting information.

Calls are input to the system by grounding the appropriate call input, as labeled on the Call Input/Output board (Figure 6.20, HC-CI/O Call Input/Output Board Quick Reference). The act of physically grounding the call input terminal turns on the corresponding LED on the Call board. Recognition and acceptance of the call by the computer will cause the indicator to remain lit on the board. Cancellation of the call turns the indicator off. The single input/output terminal on the Call board accepts call inputs from the call fixture pushbuttons, and also serves as the output terminal illuminating the call fixtures to indicate registration of a call. This means that the field wiring is identical to that used for a standard relay controller.

The computer may intentionally block call registration. When the computer prevents car call registration, it turns ON the Car Call Disconnect flag (CCD) for that car. Inspection of this flag in the diagnostics (ADDR 2C, Diagnostic Indicator #3) will tell if the computer is preventing the acceptance of calls. If the CCD flag is ON, the reason for this condition must be discovered. CCD condition is caused by: Fire Service, motor limit timer elapsed, bottom or top floor demand, etc.

A corresponding flag exists for hall call registration prevention. The computer may detect conditions that prevent hall calls from registering, and set the Hall Call Disconnect Flag (HCDX). This is a system flag (as opposed to a per car flag) but is available for viewing in the diagnostic display along with each car's operating flags. There are many reasons for the computer to reject hall call registration: Fire service, a hall call bus problem, no available cars in service to respond to hall calls, etc.

If a call circuit becomes damaged or simply stuck ON as the result of a stuck push-button, the elevator will release itself from the stuck call automatically. If the pushbutton remains stuck, the car will stop at the floor each time it passes. Again, the computer will release itself automatically, thereby allowing continued service in the building.

6.4.3 TROUBLESHOOTING THE CALL CIRCUITS

If there is a problem with a call, first disconnect the field wire or wires from that call terminal to determine if the problem is on the board or in the hoistway wiring or fixtures. Disconnect the calls by unplugging the terminals, or removing individual wires. If the individual field wire is disconnected, lightly tighten the screw terminal since it may not make contact if an attempt is made to ground the terminal using a jumper when the screw on the terminal is loose.

> **NOTE:** Call terminal voltage must be $\geq$ 85% of call supply voltage.
> *Example:* If supply is 100VAC, terminal voltage may be 85VAC to 100VAC. 80VAC is insufficient.

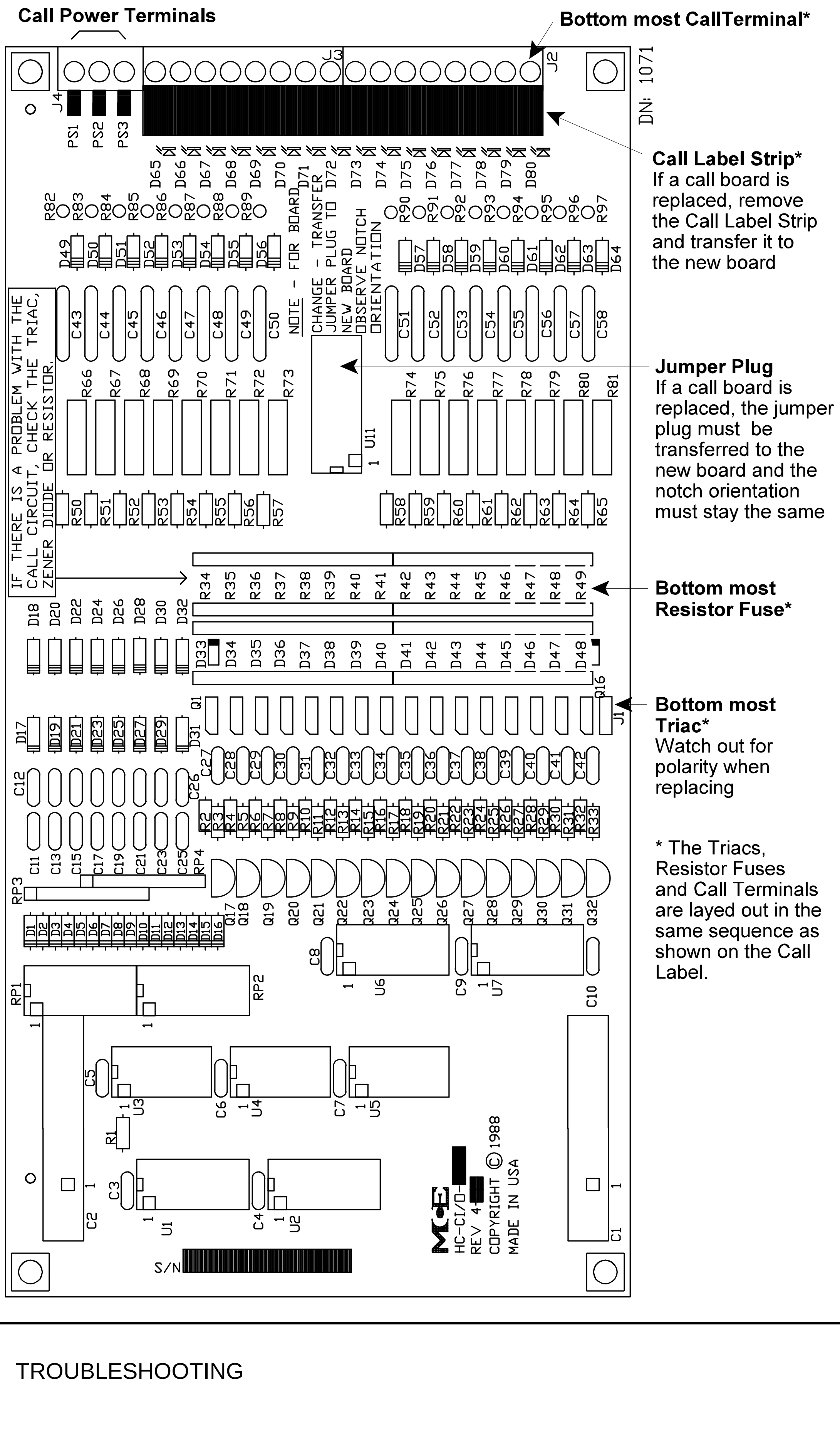
TABLE 6.5 Call Board Troubleshooting

Problem	**Recommended steps to resolve the problem**
Call Terminal Voltage is insufficient	1. Turn OFF the power and remove the resistor fuse associated with that terminal. 2. Turn ON the power and check terminal voltage again. 3. If no voltage is present on the terminal: a. Check the jumper plug (header) on the HC-CI/O Call board. The jumper plug socket is located on the right hand side near the call indicators. If a Call board is replaced, this jumper plug must be transferred to the new board and stay in the same board position (more than one Call board on the controller). b. Verify that the correct incoming power is on terminals marked PS1, PS2 and PS3. NOTE: Power will exist on *at least one* and possibly more of these terminals.
Call LED is ON even though the field wire is removed	1. Reset the computer (Computer Reset pushbutton on Swing Panel). 2. Run the car to the nearest landing to reset PI. 3. It may be necessary to reset the computer in the Group Supervisor in order to reset a latched hall call. 4. If the call does not cancel under these conditions--replace the call board
Cannot register a hall call at the call board	To discover whether the problem is with the call board or the field wiring: 1. First remove the resistor fuse and disconnect the field wire(s). 2. Verify that the HCDD, Hall Call Disconnect Computer Variable Flag is OFF (Address 2C, LED 6). 3. Verify that there is proper voltage on the call terminal. 4. Register a call by shorting the call terminal to terminal 1 or GND and verify with EOD as described in Section 5.4.3, *Viewing and Entering Calls* (the call registered light on the call board may not work correctly). 5. If the call does not register under these conditions--replace the call board. 6. If the call circuit works with field wires removed, before connecting wires, jumper the wire(s) to ground or terminal 1 and press the call pushbutton. If a fuse blows, there is a field wiring problem. If connecting the call wires causes a problem, the call board may be damaged.
Call remains latched even though the car arrives at that landing	Remove the associated resistor fuse. If the call cancels, replace the bad resistor fuse.

FIGURE 6.20 HC-CI/O Call Input/Output Board Quick Reference

42-QR-HC-CI/O Rev. 2

HC-CI/O QUICK REFERENCE CARD (BOARD 2)



6.4.4 TROUBLESHOOTING THE CALL INDICATORS

When working correctly, a call indicator glows brightly when a call is registered and glows dimly or not at all when a call is not registered.

> **NOTE:** Before troubleshooting the call indicators, ensure that the call circuit is working correctly, the field wires are connected and the resistor fuses are plugged in. If the board is arranged for neon (or LED) indicators (HC-CI/O-N), the board indicators are not affected by the fixture bulbs.

TABLE 6.6 Call Indicator Troubleshooting

Problem	Recommended steps to resolve the problem
With a call registered, the Call Indicator is dimly lit (Call Board is HC-CI/O)	Incandescent bulb in the fixture for the call is burned out or missing. Replace the bulb.
Indicator glows bright whether or not there is a call registered	Bad triac or triac driver transistor. Check triac with power OFF and field wire removed. Failed triac usually measures a short circuit from the metal back (collector) to terminal 1. If board is not in system, measure short between metal back and pad area around mounting hole. Be careful, the metal back of the triac is connected to AC when power is ON. NOTE: bottom triac corresponds to bottom terminal.

6.5 PC BOARD QUICK REFERENCES

This section contains a quick reference for the PC boards found in the typical VFMC-1000 Series M controller. They are as follows:

- Standard Board Layout . . . . Figure 6.21
- MC-MP2 Main Processor Board Quick Reference . . . . Figure 6.22
- HC-PI/O Power Input/Output Board Quick Reference . Figure 6.16 in Section 6.4.1
- HC-CI/O Call Input/Output Board Quick Reference . . . Figure 6.20 in Section 6.4.2
- MC-CGP-4 Communication Processor Board Quick Reference . . . . Figure 6.23
- MC-RS Communication Interface Board Quick Reference . . . . Figure 6.24
- SC-SB2K Main Safety Relay Board . . . . Figure 6.25
- SC-HDIO High Density I/O Board . . . . Figure 6.26
- SC-BASE Lock Bypass, Access, Overspeed, Emergency Brake Bd . . . Figure 6.27
- SC-BASER Lock Bypass, Access, Overspeed, Emergency Brake board with Rear Doors . . . . Figure 6.28
- HC-ACI-D Drive Interface Board Quick Reference . . . . Figure 6.29
- HC-ACIF Additional Drive Interface Board . . . . Figure 6.30

FIGURE 6.21 Standard Board Layout

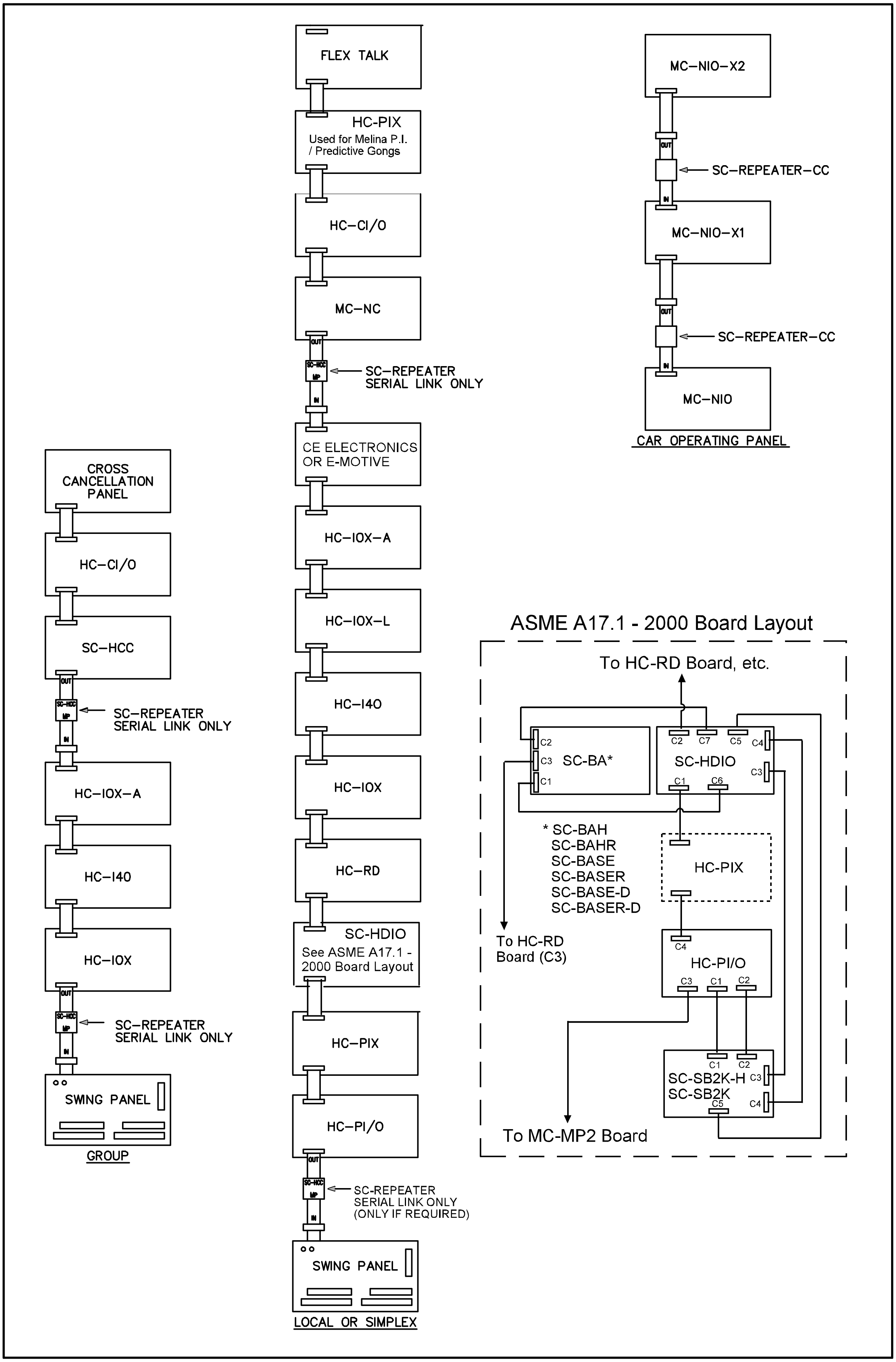
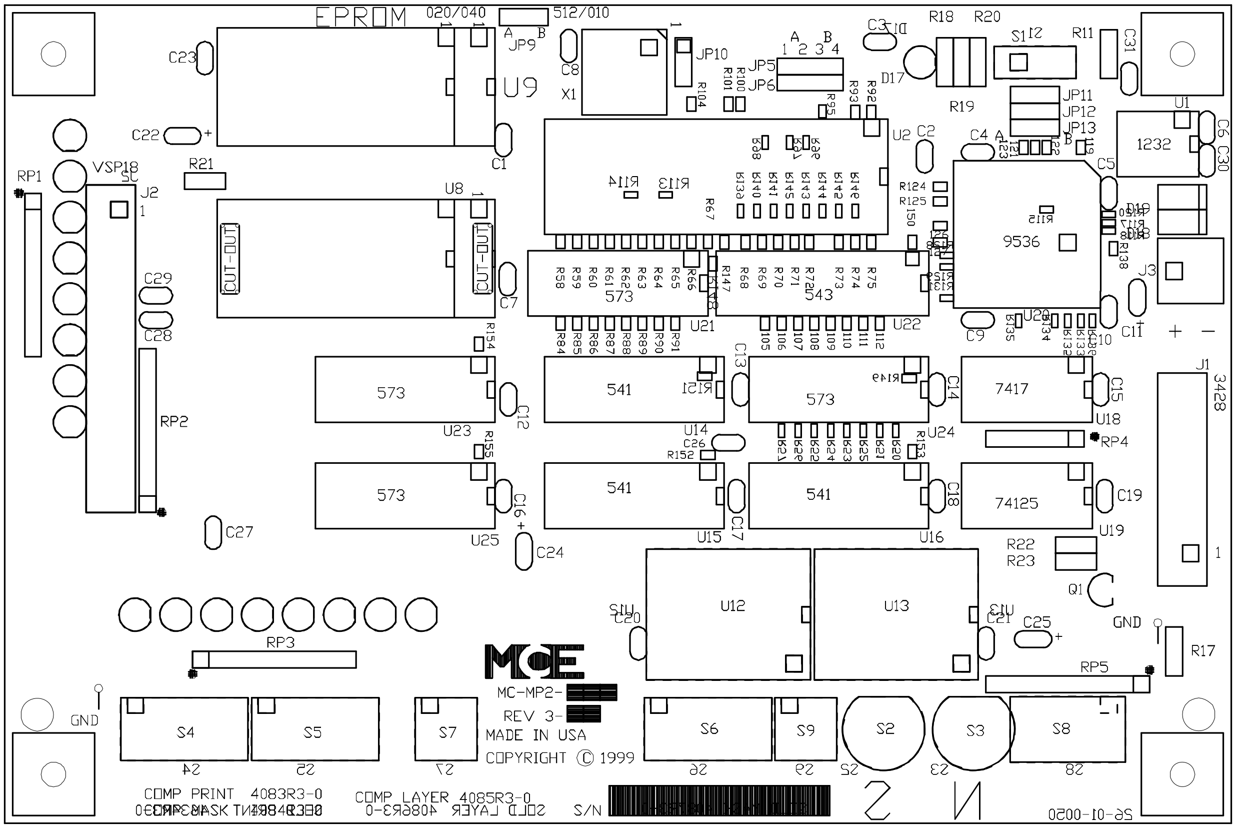


FIGURE 6.22 MC-MP2 Main Processor Board Quick Reference

42-02-MC-MP2-2K

MC-MP2-2K QUICK REFERENCE

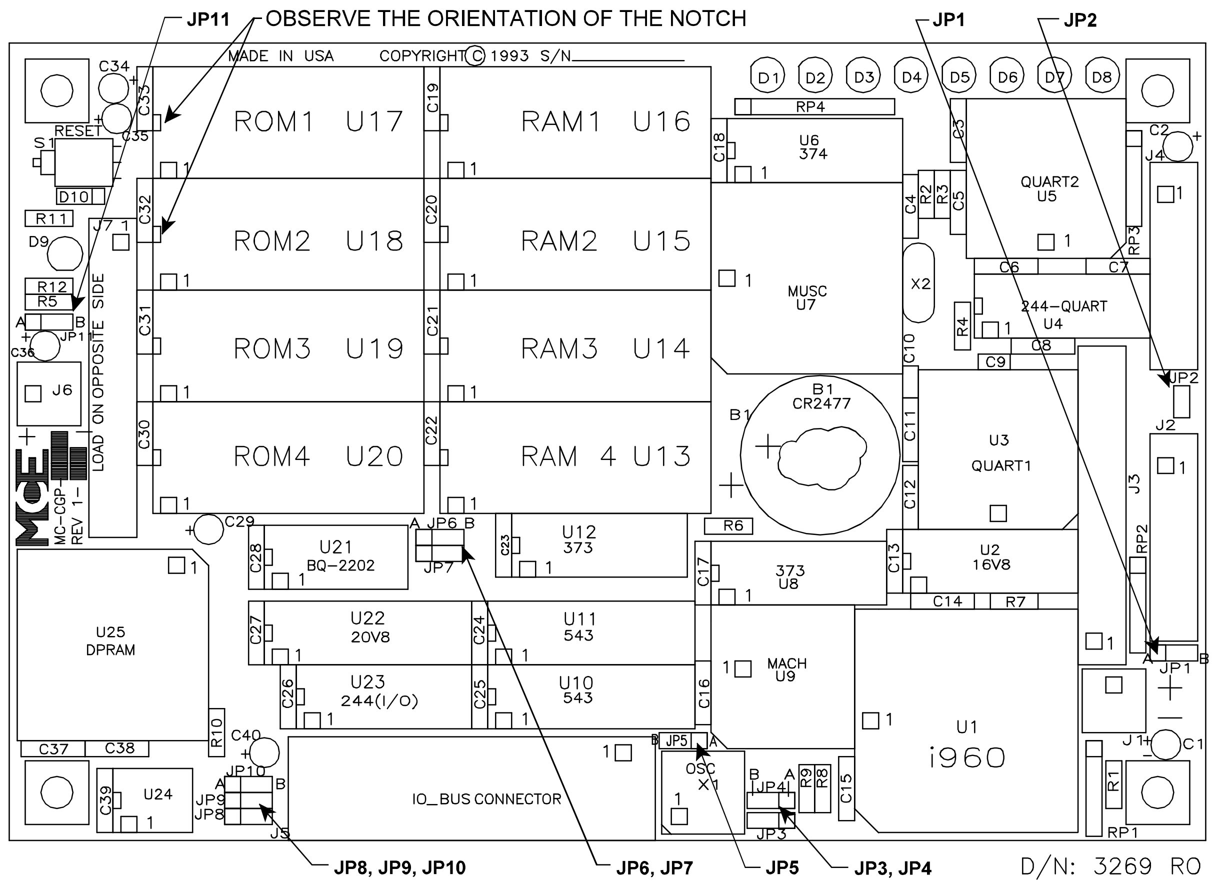


JUMPER	TYPICAL SETTING	DESCRIPTION
JP5	see Description	N/C = Car Controller A pins 1 & 2 = M3 Group Supervisor
JP6	N/C	Jumper not loaded
JP9	A	A = 27C020 or MC27C2001 EPROM B = 27C512, 27C010 or MC27C1001EPROM
JP10	N/C	Jumper not loaded
JP11	A	A = SRAM A16 Bank select enabled, B = Bank select disabled
JP12	A	A = ROM A17 Bank select enabled, B = Bank select disabled
JP13	A	A = ROM A16 Bank select enabled, B = Bank select disabled

FIGURE 6.23 MC-CGP-4 Communication Processor Board Quick Reference

42-QR-MC-CGP Rev 3

MC-CGP-x QUICK REFERENCE CARD



JUMPER TABLE

JUMPER	CGP	CGP-4 CGP-8	DESCRIPTION
JP1	A	A	Communication Clock Rate: set to A if JP4 = B, set to B if JP3 = A or B or if JP4 = A.
JP2	ON	ON	Master Clock Rate: ON = Enabled, N/C = Disabled. Set to ON if JP4 = B. Set to N/C if JP3 = A or B or if JP4 = A.
JP3	N/C	N/C	Communication Clock: A = 16 MHz, B = 4 MHz (if JP3 = A or B, JP4 must = N/C).
JP4	B	B	Communication Clock: A = 8 MHz, B = 2 MHz (if JP4 = A or B, JP3 must = N/C).
JP5	B	B	This jumper relates to the I/O Bus Connector (J5), which is currently not used. I/O Connector J5 Pin 38 function: A = i960 Interrupt INT3# input, B = IO_CS1# output.
JP6	B	B	EPROM Size (27Cxxx): set to A for xxx = 512, set to B for xxx = 010, 020, 040 or 080.
JP7	A	A	Off Board Reset Signal: A = Enabled, B = Disabled.
JP8	A or hard wired	A or hard wired	EPROM Size (27Cxxx): set to A for xxx = 010, 020, 040 or 080, set to B for xxx = 512.
JP9	B	B	EPROM or Flash Memory: A = Flash, B = EPROM.
JP10	B	B	EPROM or Flash Memory: A = Flash, B = EPROM.
JP11	B or hard wired	B or hard wired	SRAM Size (68xxx): set to A for 1Mb SRAM, set to B for 4Mb SRAM.

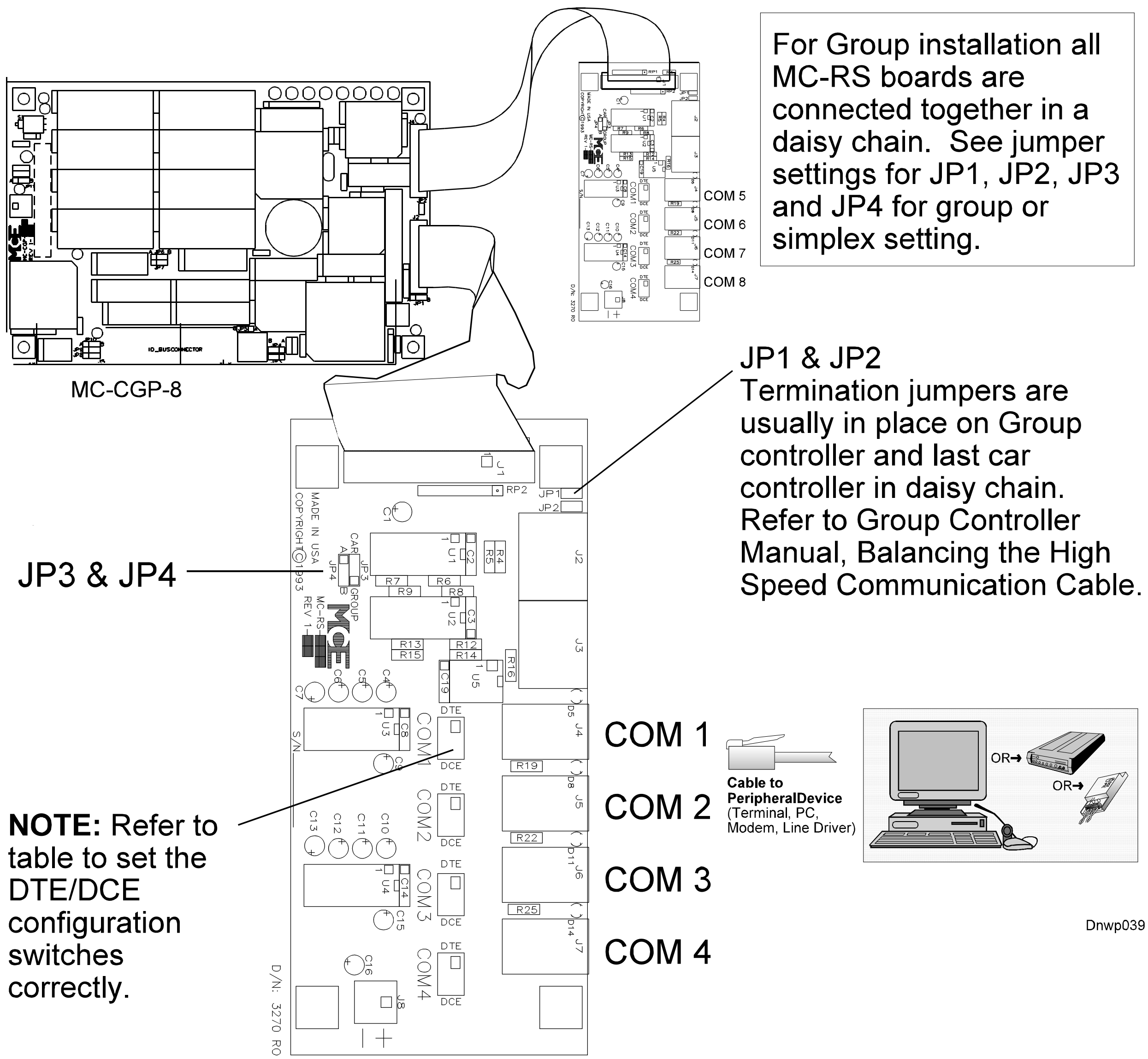
FIGURE 6.24 MC-RS Communication Interface Board Quick Reference

42-QR-MC-RS Rev.3

MC-RS QUICK REFERENCE CARD

MC-RS COM Port Toggle Switches

Port Switch Setting	Cable Connects to
DCE	CRT Terminal or PC
DTE	Line Driver or Modem

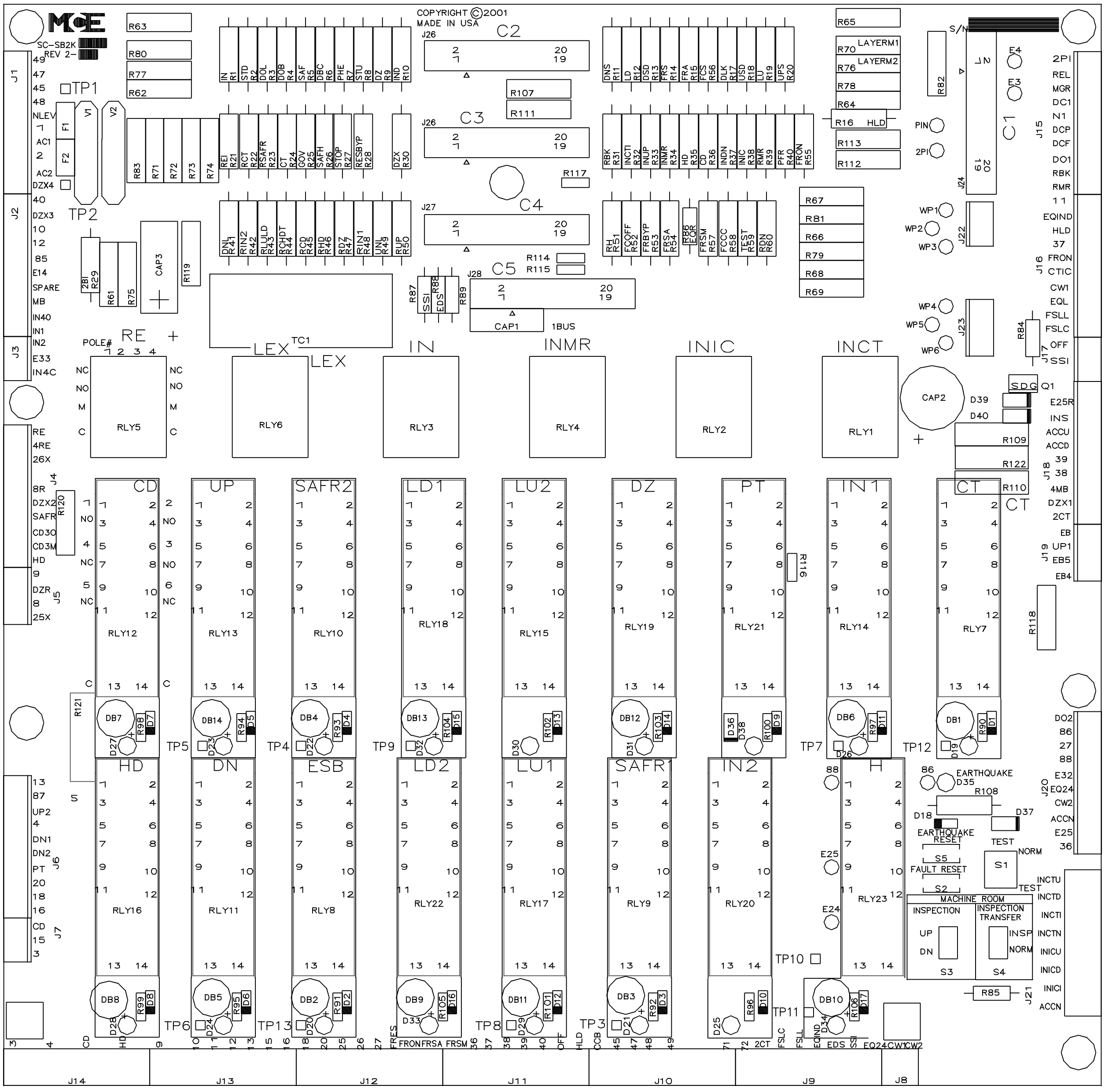


Jumper	Setting	Description
JP3	Car	Setting for car controllers (Simplex or Local).
	Group	Setting for Group controller. **Only the Group MC-RS board should be set to Group.**
JP4	B	Set to B on all car controller MC-RS boards.
	B	Set to B on the Group controller MC-RS board.

FIGURE 6.25 SC-SB2K Main Safety Relay Board Quick Reference

42-QR-SC-SB2K Rev. 2

SC-SB2K QUICK REFERENCE



INDICATORS	TROUBLESHOOTING TEST POINTS		
Earthquake:	CT: TP1 and TP12	IN1, IN2: TP7 and TP2	H: TP1 and TP11 and TP10 and screw terminal 11
SWITCHES	ESB: TP1 and TP13	LU1, LU2: TP8 and TP2	EB1: TP1 and TPEB1
Earthquake Reset Pushbutton:	SAFR1: TP1 and TP3	LD1, LD2: TP9 and TP2	EB2: TP1 and TPEB2
Fault Reset Pushbutton:	SAFR2: TP1 and TP4	CD: TP1 and TP12, with CD and TP2	CTIC: terminal INCTI and TP2
Machine Room Inspection Transfer INSP/NORM:	UP: TP1 and TP5	HD: TP1 and TP12, with HD and TP2	TAB: TP1 (fused 1-bus) and TPAB, with TAB and TP2
Machine Room Inspection Up/Dn:	DN: TP1 and TP6	CHDT: terminal 9 and TP2	BAB: TP1 (fused 1-bus) and TPAB, with BAB and TP2
Machine Room Inspection Up/Dn:	DN: TP1 (fused 1-bus) and TP6	PT: terminal 9 and TP2 (fused 2-bus)	BAB: TP1 (fused 1-bus) and TPAB, with BAB and TP2 (fused 2-bus, 120VAC)

FIGURE 6.26 SC-HDIO High Density I/O Board Quick Reference

42-QR-SC-HDIO

SC-HDIO QUICK REFERENCE

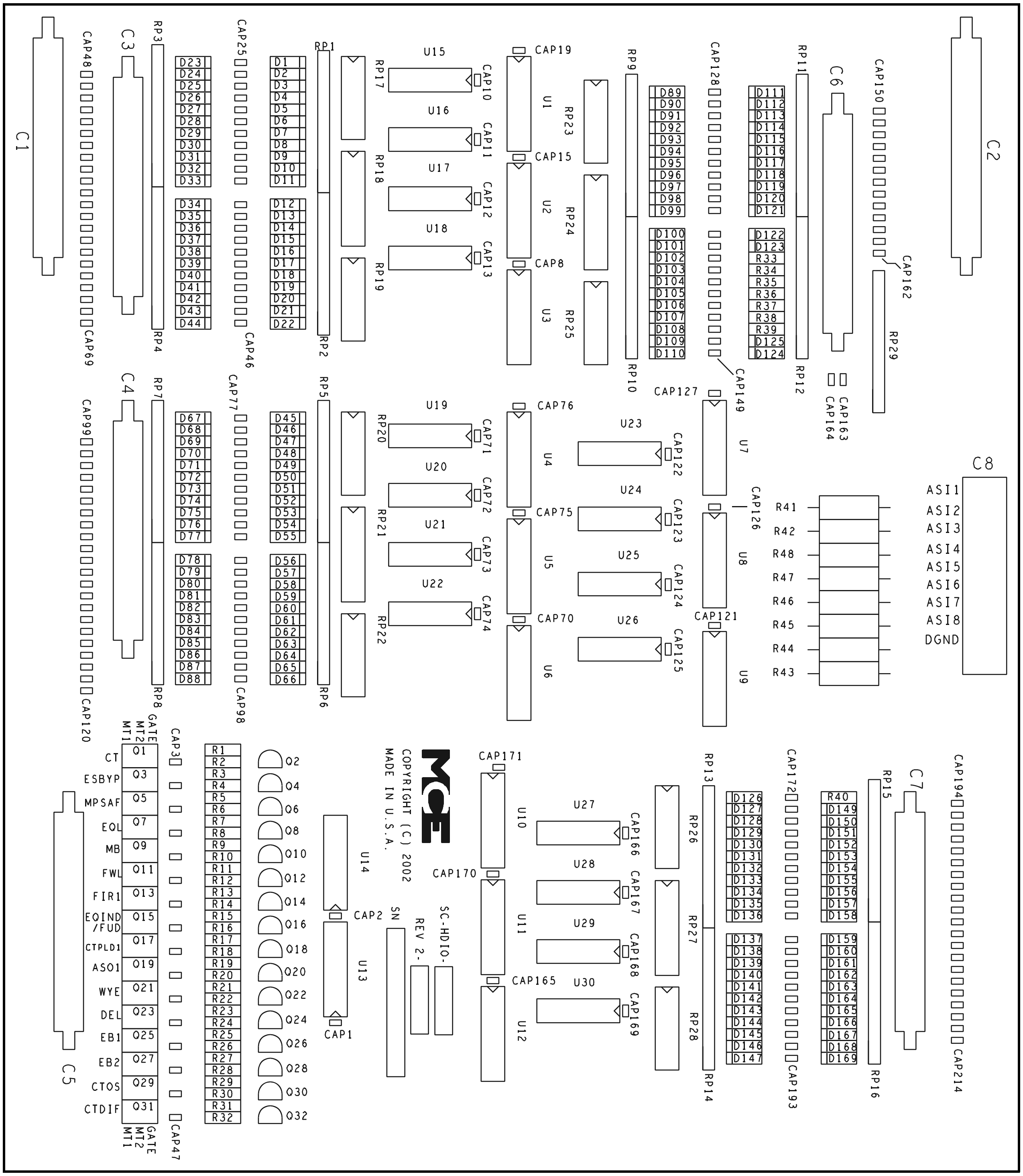
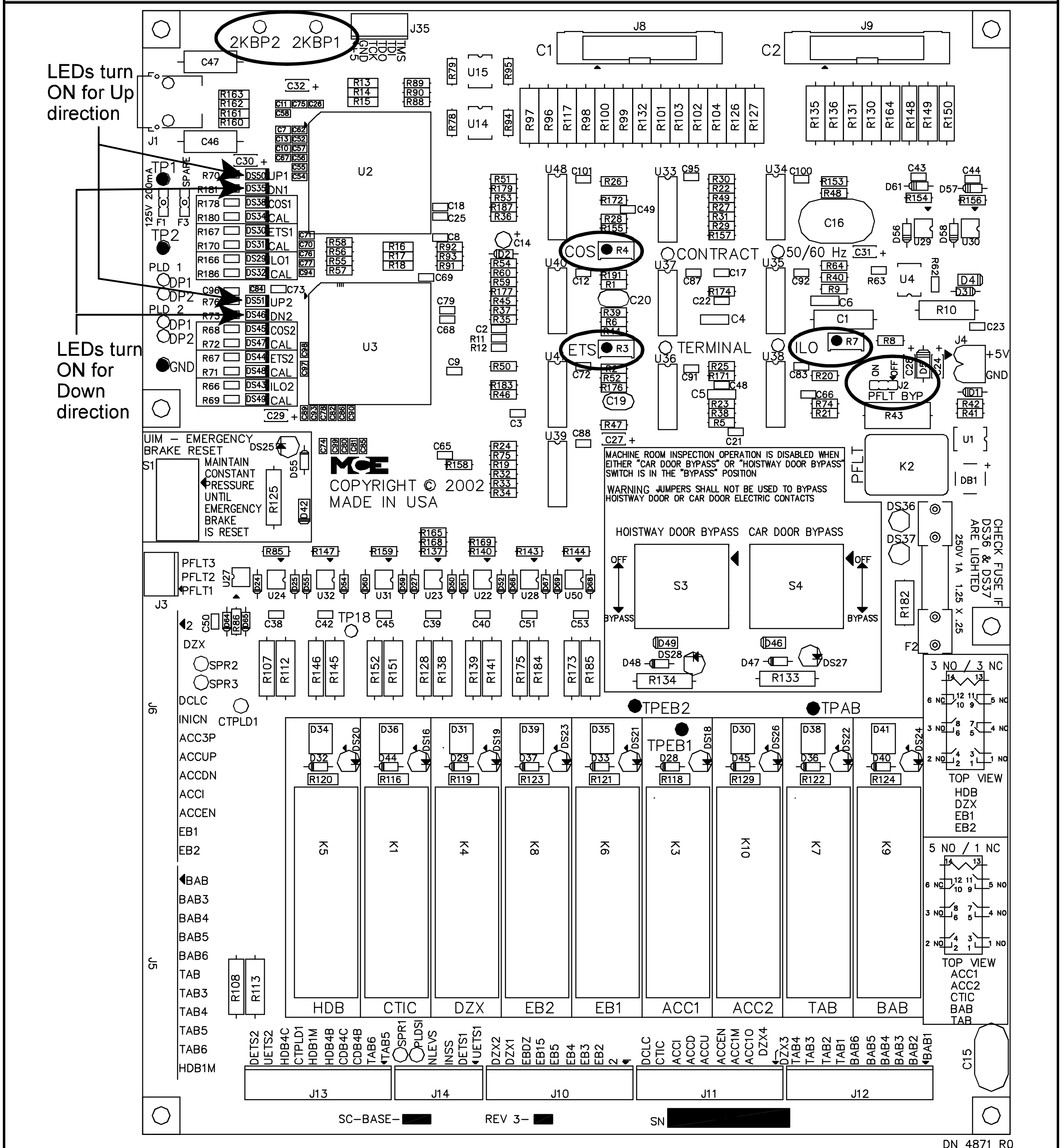


FIGURE 6.27 SC-BASE Board Quick Reference

42-QR-SC-BASE Rev. 2

SC-BASE QUICK REFERENCE

Board 64



JUMPERS
2KBP1, 2KBP2, PFLT BYP - Used when performing the buffer and overspeed tests.

SWITCHES	TRIMPOTS	
Emergency Brake Reset	COS	Contract Overspeed - **Not used, set fully CW**
Car Door Bypass Switch	ETS	Emergency Terminal Limit Speed (CW raises threshold)
Hoistway Door Bypass Switch	ILO	Inspection Leveling Overspeed (CW raises threshold)

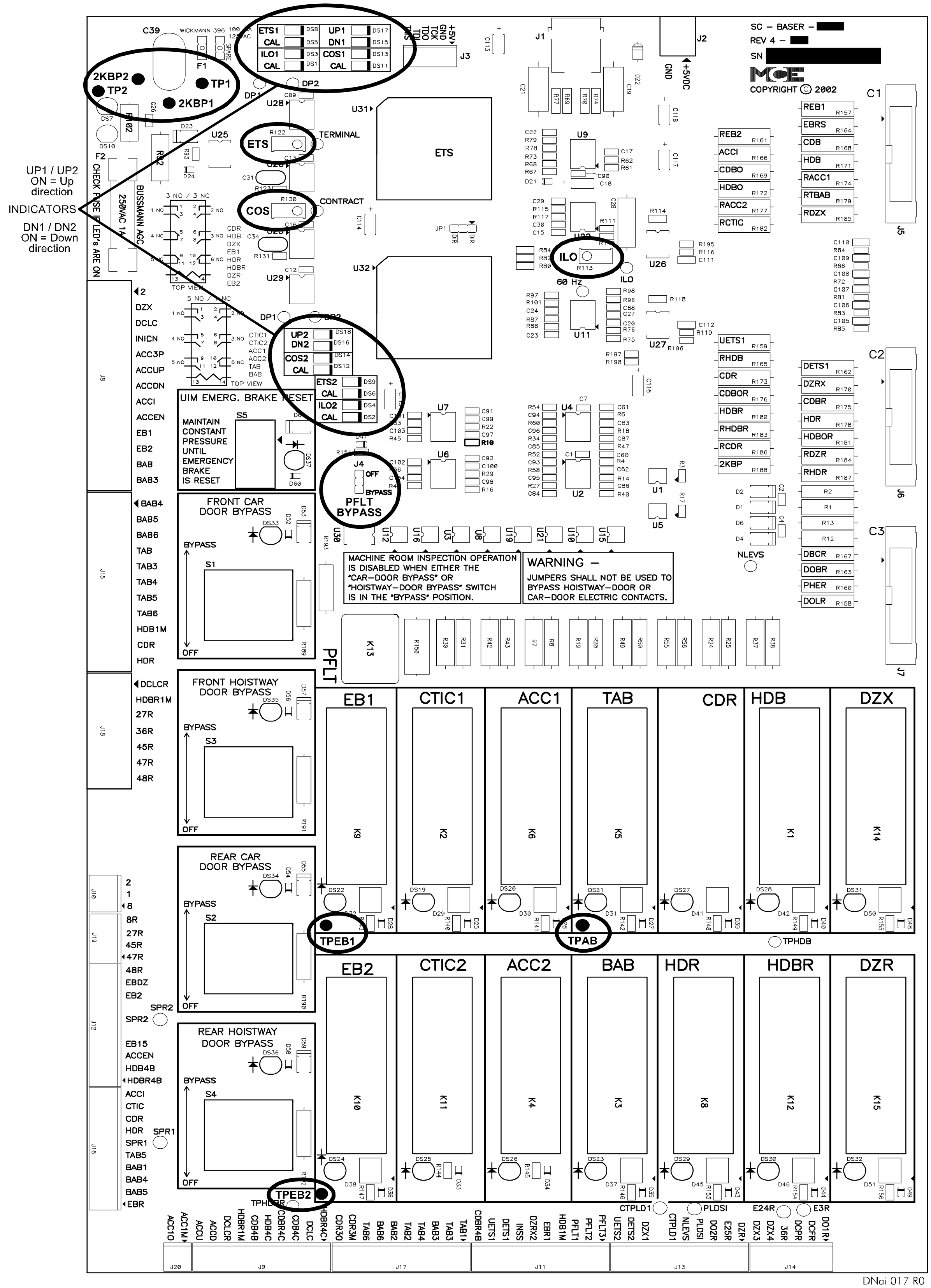
INDICATORS			
UP1 - UP2	ON = Up direction	ETS1 - ETS2	ON = Emergency Terminal Overspeed
DN1 - DN2	ON = Down direction	ILO1 - ILO2	ON = Inspection Leveling Overspeed
COS1 - COS2	ON = Contract overspeed		

FIGURE 6.28 SC-BASER Board Quick Reference

42-QR-SC-BASER Rev. 2

SC-BASER QUICK REFERENCE

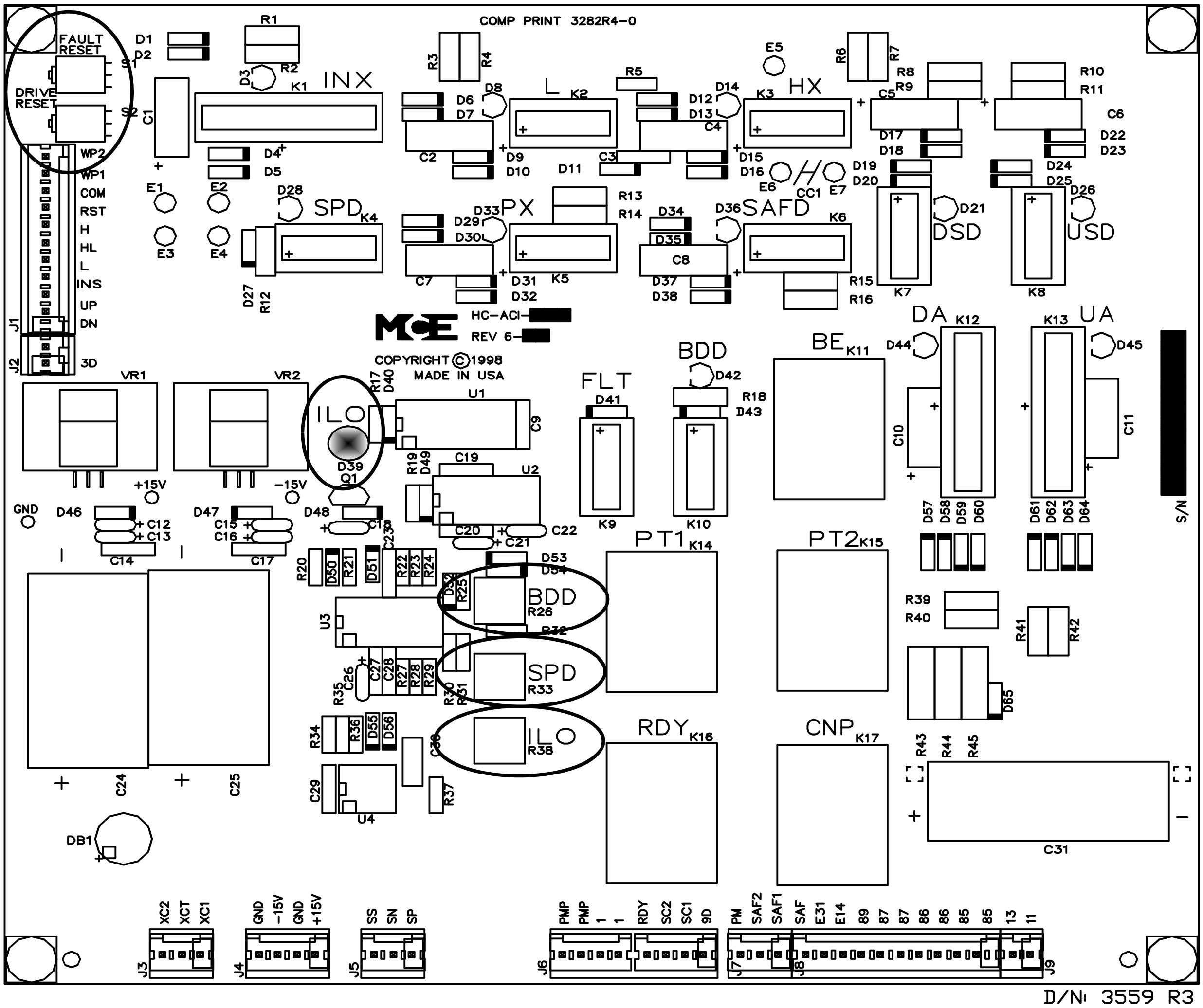
Board 66



See SC-BASE Quick reference for a description of switches, jumpers, test points and settings.

FIGURE 6.29 HC-ACI-D Drive Interface Board Quick Reference

42-QR-HC-ACI **HC-ACI QUICK REFERENCE** BOARD 51



SWITCHES	
Falt Reset	If the ILO indicator is ON, this push button turns the indicator OFF and drops out the FLT relay.
Drive Reset	This pushbutton resets VFAC drive faults.

INDICATOR

ILO Inspection Leveling Overspeed - Turns ON when the car speed exceeds the threshold set by the ILO trimpot.
Not used on ASME A17.1-2000 compliant controllers

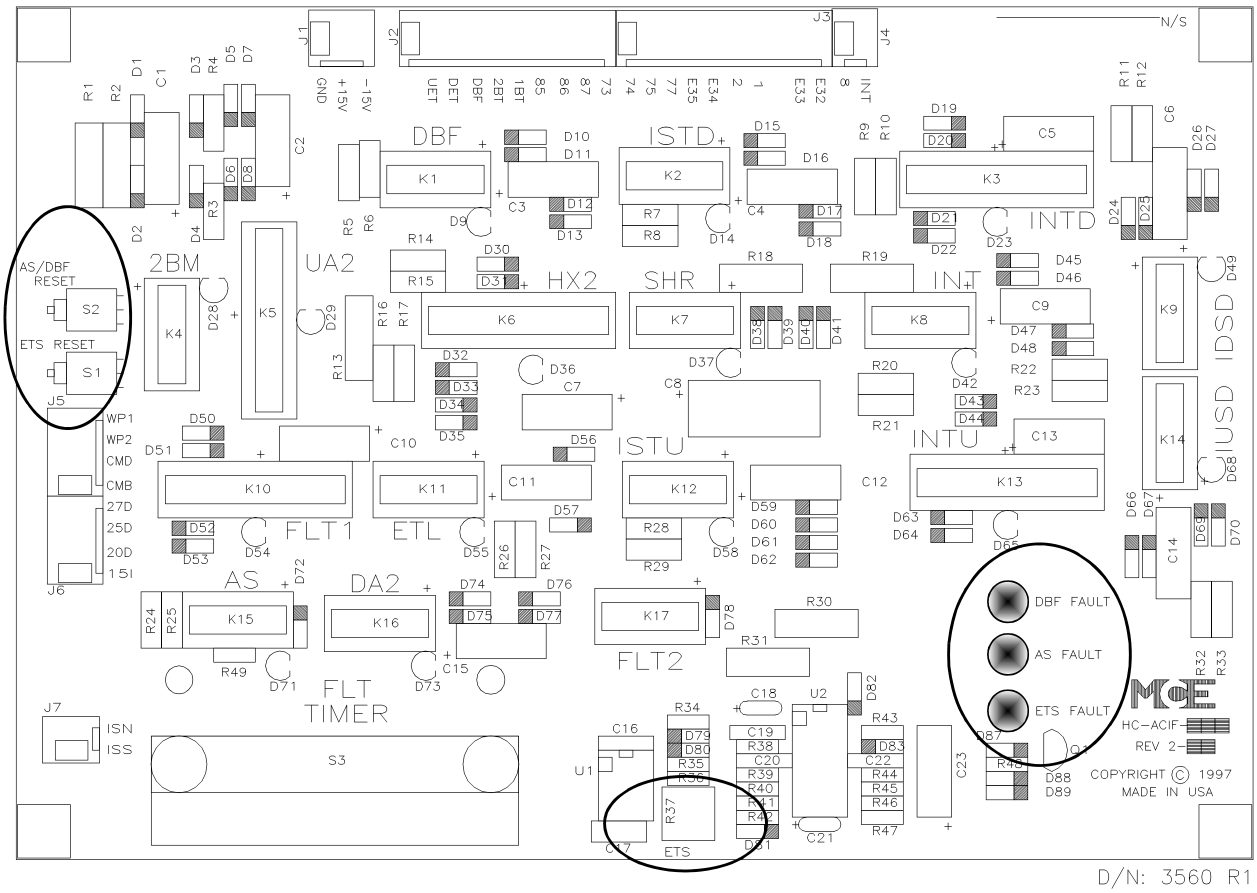
TRIMPOTS	
BDD	Brake Drop Delay - CW increases delay (fully CCW = 0.1 sec., fully CW = 0.7 sec.)
SPD	Speed Pick Delay - CW increases delay (fully CCW - .002 sec., fully CW = 0.450 sec.)
ILO	Inspection Leveling Overspeed - CCW sets the speed threshold higher. **Not used on ASMEA17.1-2000 compliant controllers** - Set the ILO trimpot on the HC-ACI board fully CCW. Use the ILO trimpot on the SC-BASE or SC-BASER board to adjust the ILO speed threshold.

FIGURE 6.30 HC-ACIF Additional Drive Interface Board Quick Reference

42-QR-HC-ACIF

HC-ACIF QUICK REFERENCE

BOARD 52



SWITCHES	
AS/DBF Reset	Resets the At Speed Fault (AS) and/or the Dynamic Braking Fault (DBF).
ETS Reset	Resets the Emergency Terminal Switch Fault (ETS).

TRIMPOT

ETS	Emergency Terminal Switch speed threshold adjust - (CW sets the speed threshold higher) **Not used on ASME A17.1-2000 compliant controllers.** - Set the ETS trimpot on the HC-ACIF board fully CW. Use the ETS trimpot on the SC-BASE or SC-BASER board to adjust the ETS speed threshold.

INDICATORS	
ETS Fault	Emergency Terminal Switch overspeed Fault - Turns on when the car speed exceeds the threshold speed set by the ETS trimpot. **Not used on ASME A17.1-2000 compliant controllers.**
AS Fault	At Speed Fault - Turns on if the car speed exceeds the maximum or minimum limits set for contract speed. Increase the speed error threshold to desensitize this fault, provided that the Speed Proportional Gain is set correctly: G5 / GPD515 Drive - verify / adjust L4-01 and L4-02 HPV 900 Drive - verify / adjust A1 Drive parameters “Spd Dev Lo Level” and Spd Dev Time” TORQMAX - verify / adjust LF.58 and LF.59
DBF Fault	Dynamic Braking Fault - Turns on if the dynamic braking temperature exceeds its threshold.

6.6 TROUBLESHOOTING THE DSD 412 SCR DRIVE

6.6.1 IF THE CAR DOES NOT MOVE ON INSPECTION

NOTE: The drive software has been modified for this application. Some of the parameters in the parameter sheet are different and are not available in the drive manual. If a drive has been replaced in the field, all of the drive parameters should be entered manually and should be verified according to the parameter sheet shipped with the controller.

Pick or Picked = relay energized
Drop or dropped = relay de-energized

If the car does not move on INSPECTION, check the following:

1. Verify that the M contactor, relays BK & SAFR2 and the brake pick when the direction relays, U or D, are picked. If M, BK and SAFR2 do not pick, check the related circuit as shown in the controller drawings. Relays CNP and RDY on the HC-ACI-D board should also be ON. These relays will turn OFF if there is a drive fault.

   Verify that relays PT1 and PT2 on the HC-ACI-D board and MP1, MP2, LPR & LPRM, (UAX, UAXD or DAX, DAXD) in the controller pick when the direction is picked. If these relays are not picked, check for 120VAC on terminals 9, 10 and 12 on the SC-SB2K Main Relay Board. If there is no voltage on these terminals, refer to the controller drawings to find the problem.

2. Verify that relays CNP and RDY are picked. If relay RDY is not picked then check the drive keypad to see if there is a drive fault. If there is no fault in the drive unit, check the wiring for the RDY circuit. Relays PT1, PT2, UA or DA on the HC-ACI-D board should pick when the direction relays are picked. If the relays are not picking, check for 36VAC between terminals XC1, XC2 and +15 and -15 on the HC-ACI-D board. If there is no voltage, check the fuse on the primary side of the 30 VA transformer shown in drawing -3 of the job prints. Also check the wiring from the secondary of the same transformer to terminal XC1, XC2 on the HC-ACI-D board.

Verify that the drive receives the Field Enable (TB1-9), direction (TB1- 8 or 50), inspection speed command (TB1-54) and Loop contactor confirm (TB1-7) inputs. To check these signals, measure the DC voltage on the above terminals with respect to TB1- 44 (24 VDC = ON, 0 VDC = OFF).

The <u>Ready</u> and <u>Run</u> Green LED on the drive key pad should turn ON, ***Parameter 602 value*** should display the commanded inspection speed when direction is picked.

If all the functions described in the above steps are working properly and the car still does not move, verify the drive parameters and compare them with the drive parameter sheet which was shipped with the controller. The motor name plate values should match the entered motor parameters. Some of the following parameters, if not set properly, can prevent the car from moving on Inspection.

4. If the car moves in the <u>reverse direction</u> or trips a <u>Fault 98</u>: **Refer to section 3.4 (g)**

If the parameters are set to the correct values and the Motor Armature, Motor Field and Brake connections are correct, and if the car still does not move on inspection, call MCE Technical Support**.**

DRIVE PARAMETERS		
Parameter Number/Drive keypad Display	**Description**	**Setting value**
1	Rated ARM Current	Motor rated current.
2	Rated ARM Voltage	Motor rated voltage.
9	Nominal AC voltage	AC voltage applied @ Drive terminals L1,L2, L3.
10	Encoder P/R	4096 (MCE supplied encoder)
11	Motor RPM	Motor rated RPM
17	Rated FT/M	Rated car speed in FPM
40	Response	6 .0 - 8.0
41	Inertia	1.5 - 2.0
50	Rated Field Current	Motor rated field current. (Voltage / Resistance)
52	Rated Field Voltage	Motor rated Field Voltage.
157	Preset speed #8 (Inspection/correction speed)	10% of the contact speed (10% of Parameter 17).

6.6.2 IF THE CAR DOES NOT REACH CONTRACT SPEED

1. Verify the following parameters:

   P 10 (Encoder Pulses/Rev.)
   P 11 (Motor RPM)
   P 17 (Rated FPM)
   P 156 (Rated FPM)

2. Verify that drive receives the H speed command:

   Select drive Parameter 602 (Reference speed) and register a multi-floor run. Parameter 602 should display the contact speed value on the drive display. If the displayed value is zero, this indicates that the drive is not getting the High speed command from the controller (go to step 3).

3. To determine why the drive is not getting the H speed command from controller:

   Verify that relays H on the SC-SB2K board and HX3 in the controller turn ON. When relays H and HX3 are ON, verify the following:

   There is 24 VDC between (TB1-11, TB1-12, TB1-53) and TB1- 44.
   There is zero volts between TB1-54 and TB1-44.

   If the correct voltage is not present, refer to MCE's drive interface drawing (Page 1-DX).

4. If the car moves slower or faster then the required contract speed, refer to section 4.3 of the manual. Sections 4.3.2 thru 4.3.5 describe the steps required to reach the correct contract speed

6.6.3 IF THE CAR DOES NOT REACH INTERMEDIATE SPEED

1. Parameter P155 = Intermediate speed value.
2. Parameter P602 displays the correct value of intermediate speed.
3. Relays H and HX3 drop after the car begins to move on one floor runs.
4. Relays SHR and INT on the HC-ACIF board are picked on one floor runs.
5. There is 24 VDC between (TB1-12, TB1-53) and TB1-44.

6.6.4 IF THE DRIVE TRIPS ON FAULT 923 (MOTOR CURRENT FAULT)

1. Verify the value of parameter 3 (Rated ARM Amp).
2. Verify the value of parameter 1 (Current Limit).
3. Reduce the acceleration rate by increasing parameter 171 (ACC RATE #2).

6.6.5 IF THE CAR OVERSHOOTS ON DECELERATION

1. Verify that the drive gains are adjusted correctly (parameters 40 and 41).
2. If the car overshoots on multi-floor runs, decrease the value of parameter 172 (DEC Rate #1).
3. If the car overshoots on single floor runs, decrease the value of parameter 173 (DEC Rate #2).

6.6.6 IF OSCILLATIONS OCCUR IN THE CAR AT CONTRACT SPEED

1. Verify that the parameters 40 (Response) and 41 (System Inertia) are set to the correct values. A high value of parameter 40 can cause oscillations in the car.
2. There might be a need for reduce the gain at high speed. Gain reduction can be achieved by decreasing the values of parameter 105 (Gain Switch Speed) and parameter 108 (Gain Reduce) in small increments as descried in the parameter sheet or the drive manual.

6.6.7 DRIVE ALARMS AND FAULTS

Table 6.7 provides a list of faults which are not listed in the MagneTek DSD 412 Drive manual. For other faults, refer to the fault section in MagneTek DSD 412 Drive manual.

TABLE 6.7 DSD 412 Drive Faults (not listed in the drive manual)

DSD 412 Drive Faults (not listed in the drive manual)	
Fault #	**Description**
406	**10% Line Dip Detected** Line voltage input was detected as being less than 90% of nominal (Parameter #9). A non-critical fault.
407	**DCU CEMF Fault** Measured CEMF was greater than 1.09 x measured line volts.
408	**PCU CEMF Fault** Measured CEMF was greater than 118% of Rated Line Volts (Parameter #9).

411	**Maximum Auto-Resets Attempted** An accumulation of 5 critical faults has occurred. No further Auto-Resets can be performed. Requires power OFF-ON cycle to clear.
450	**Speed Setting Error** Parameter #156 is greater than Rated Speed (Parameter #17); OR Parameter #155 is set greater than 91% of Rated Speed; OR Parameter #157 is set greater than 66% of Rated Speed; OR Parameter #153 is set greater than 16% of Rated Speed.
906	**Drive Control Unit Failure Fault** (DSD power down is required.) The update of the Dual Port RAM from the Drive Control Unit is unreliable. This requires the replacement of the Main CPU Control PCB or components on it. ***This Fault will shutdown the Drive.***
916	**Forcing Fault** (not applicable to MCE controllers)

6.6.8 OPERATIONAL FLOW CHARTS

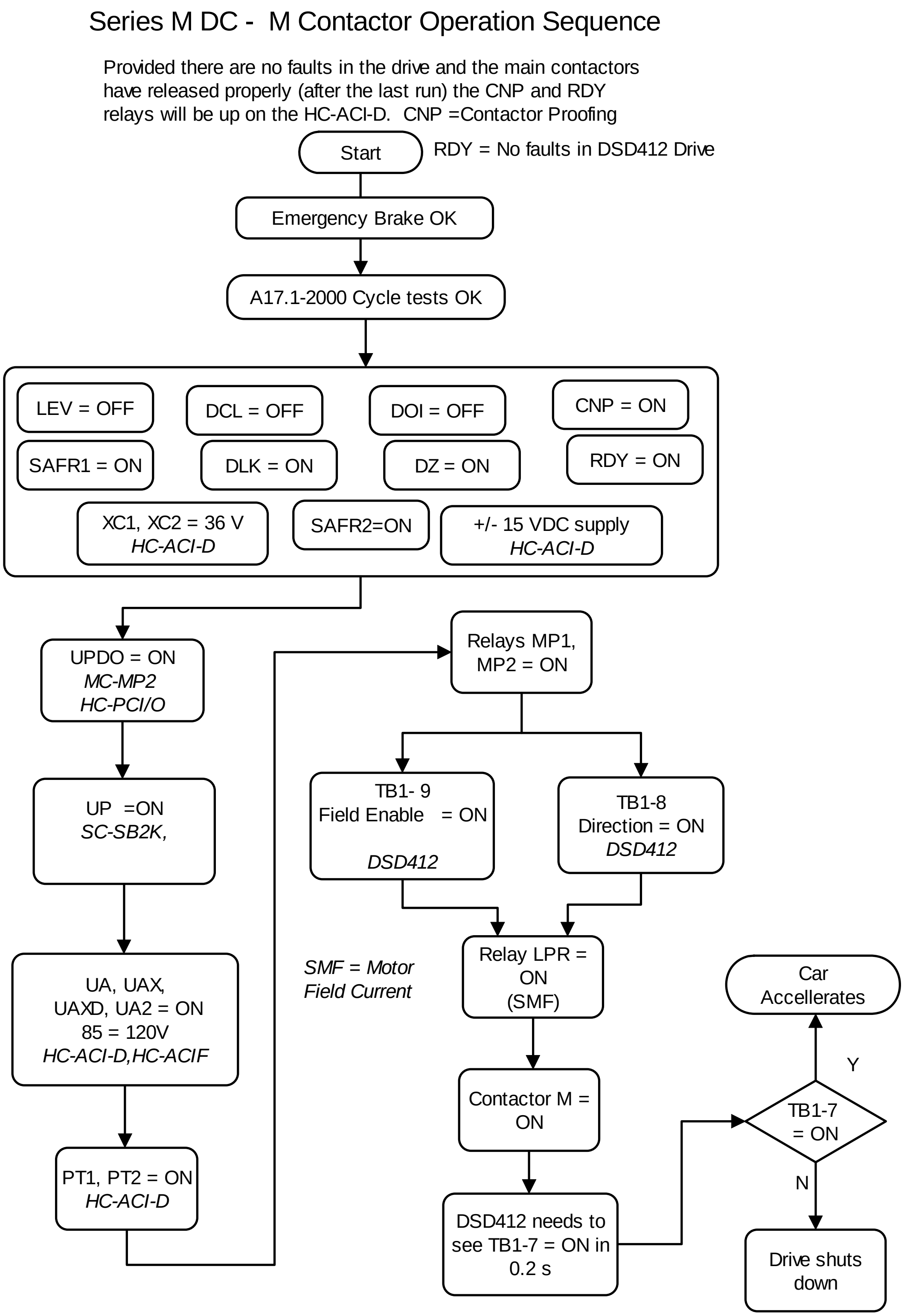
Figure 6.31 describes the controller's operational flow with regard to the M Contactor. Figure 6.32 describes the operational flow of the brake.

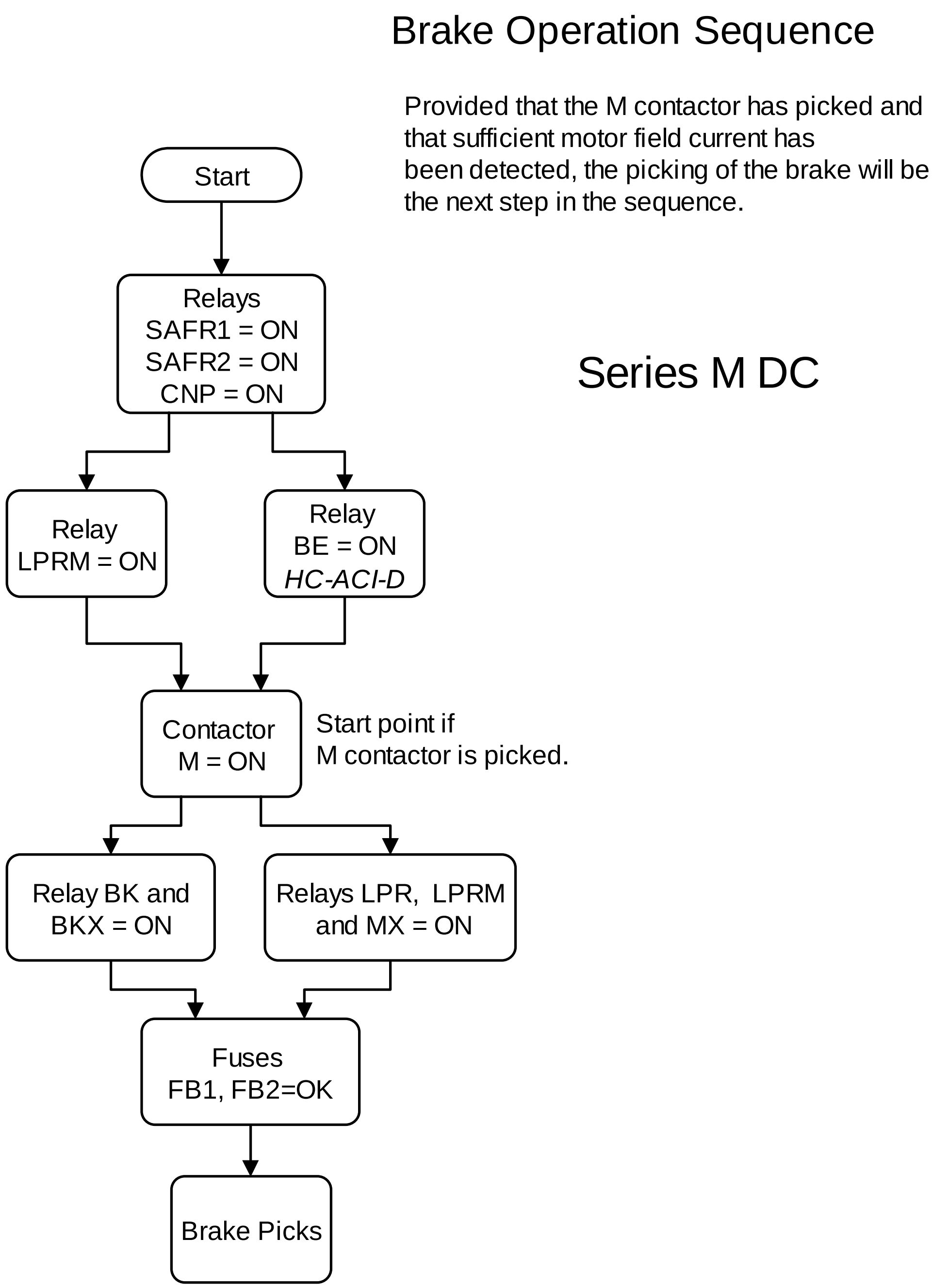
6.6.9 TROUBLESHOOTING SPEED DEVIATION FAULTS AND AS OR ASPR RELAYS DROPPING

Parameters 120 (Time Speed Deviation) and 121 (Speed Deviation Level) set the time and level that the speed feedback (encoder) and speed dictation can vary from one another. These parameters are typically set at 0.50 seconds and 5.0%, respectively. This means that if the speed dictation and speed feedback vary from one another by 5.0% for a period of one half second the ASPR relay will be dropped out, stopping the car. The fault automatically resets in 5 seconds.

If the AS or ASPR relays are dropping first increase the Response parameter (parameter #40). Factory default is 8.2, but you can go as high as 12. If increasing Response does not rid the system of nuisance AS/ASPR faults, then the next step to try is to increase parameters 120 and 121. First increase parameters 121 from 5% to 10% and then try increasing parameter 120 from 0.5 to 1.00 seconds.

FIGURE 6.31 M Contactor Operation Sequence

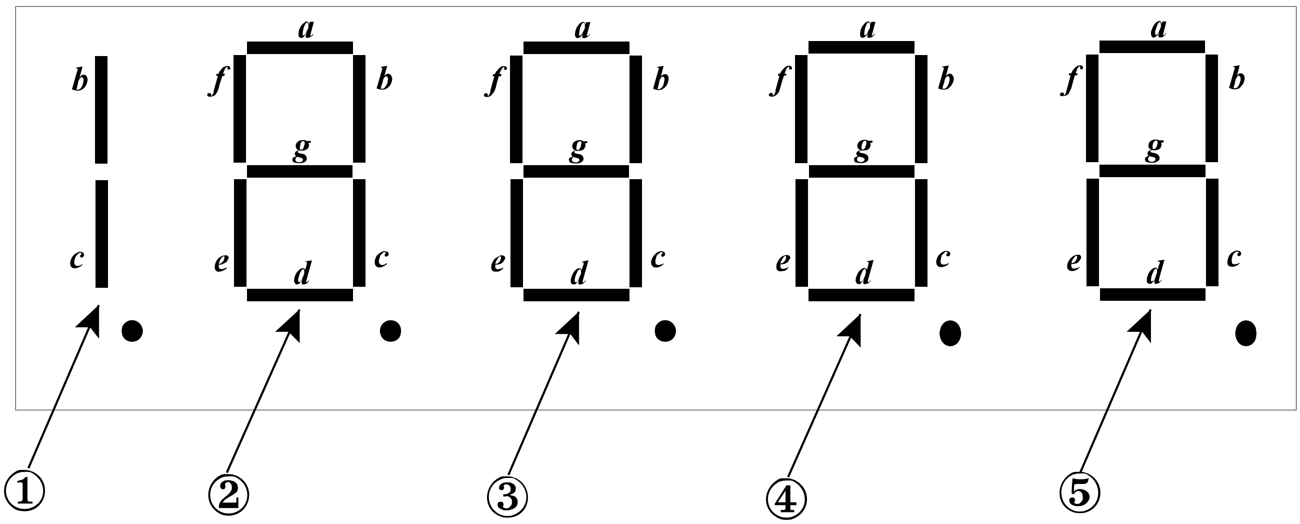



Brake Operation Sequence
Provided that the M contactor has picked and that sufficient motor field current has been detected, the picking of the brake will be the next step in the sequence.
Series M DC
Start
Relays
SAFR1 = ON
SAFR2 = ON
CNP = ON
Relay
LPRM = ON
Relay
BE = ON
HC-ACI-D
Contactor
M = ON
Start point if
M contactor is picked.
Relay BK and
BKX = ON
Relays LPR, LPRM
and MX = ON
Fuses
FB1, FB2=OK
Brake Picks

6.7 TROUBLESHOOTING USING THE DSD 412 CONTROL DISPLAY UNIT

By using **F#981**, the Control Display unit (CDU) LED segments can be used to verify/troubleshoot the DAD 412. Here's how to use this troubleshooting tool:

1. Press the Up or Down keys and go the **F#981**.
2. Press the **DATA FUNCT** key.
3. The **Control Display Unit** will show ***lit segments*** indicating which logic inputs/outputs are active. Use the Interconnection Diagram 23Y00274-0001 to correlate the lit segments with the inputs and outputs.



① ***b.*** TB1-7, Loop Contactor Aux
c. TB1-53, S1 (S curve)

② ***a.*** TB1-40, 41, 42 Critical Fault Relay
b. TB1-8, Hw Run
c. TB1-54, S3 (S curve)
d. Not used
e. TB1-12, S2 (S curve)
f. TB1-49, Flt Reset
g. TB1-79, Speed Reg released

③ ***a.*** TB1-38, 39, Non-Critical Fault Relay
b. TB1-9, Field Enable
c. Mtr Thrmst Open, TB3-2, 8
d. Not used
e. ESTOP (Safety chain)
f. TB1-50, Fwd/Rev
g. TB1-83, Car Up

④ ***a.*** TB1-36, 37, Excess Fld Flt
b. TB1-10, Pretorque
c. Not used
d. Not used
e. Not used
f. TB1-51, Ramp Rate Select, S4 (S curve)
g. TB1-84, Car Down

⑤ ***a.*** TB1-78, CEMF Flt or 10% Line Droop
b. TB1-11, S0 (S curve)
c. Not used
d. Not used
e. Not used
f. TB1-52, Mtr Fld Shutdown
g. Loop Pick Up

6.8 DSD412 DRIVE TROUBLESHOOTING FLOWCHARTS

FIGURE 6.33 Drive Key Pad

Drive Key Pad

Series M DC DSD412 Drive
ASME A17.1-2000

How to change drive parameters.

Start

There are Five push buttons on the drive key pad

.

1. ENT: This is used to enter the selected parameter value.
2. UP : Increases the selected parameter value. In addition it is also used to find the parameter number.
3. DN : Decrease the selected parameter value. In addition it is also used to find the parameter number.
4. FUNC: Displays (reads) the value of selected parameter.
5. Reset: This pushbutton resets the drive computer.

1. To select a parameter (Press the **Enter** key)
2. Use **UP** or **DN** arrow to select the desired parameter.
3. Press the **FUNC** key to see the parameter value.
4. Use the **UP** or **DN** arrow to change the parameter value.
5. Press **Enter** to enter and temporarly save a parameter.

(Note: If this parameter is not saved, then upon power loss, the drive will default to its original parameter setting.) To save parameter, refer to the next flow chart.

There are eight LEDs

1. Ready: Drive is ready to operate.
2. Run: Drive is running (Main contactor is closed and Drive is in controll of motor speed) .
3. I limit: Drive has reached the Current limit.
4. E-STOP: Drive is in not running.
5. Overload: Motor armature current is in the O/L region and drive fault has occured.
5. Fault: Drive fault.
6. DATA: Green - Parameter is selected. RED - Parameter is not selected.
7. NV RAM not protected: ON - Drive parameters can be saved.

Stop

How to Save Drive Parameters

Series M DC DSD412 Drive
ASME A17.1-2000

Start

Once the drive parameters are adjusted or changed, they must be saved other wise they will be lost once power is lost. Follow the steps described below to save the parameters.

1. If the NV RAM NOT PROTECTED indicator is ON, go to step 3 other wise go to step 2.

2. Turn the NV RAM Protection switch to UP (ON) position. This switch is located on the right side of drive cover which is next to drive display. Once the switch is turned to ON position, the "NV RAM NOT Protected" indicator will turn ON.

3. Access drive parameter 994 and press data function. Use the up push button to display SAVE and press ENT. After the parameters are saved, the display will change to 994. Turn the NV Ram Protection switch to the OFF (down) position. The NV Ram Not Protected light should turn off.

Stop

FIGURE 6.35 Critical Drive Parameters

Critical Drive Parameters

Series M DC DSD412 Drive
ASME A17.1-2000

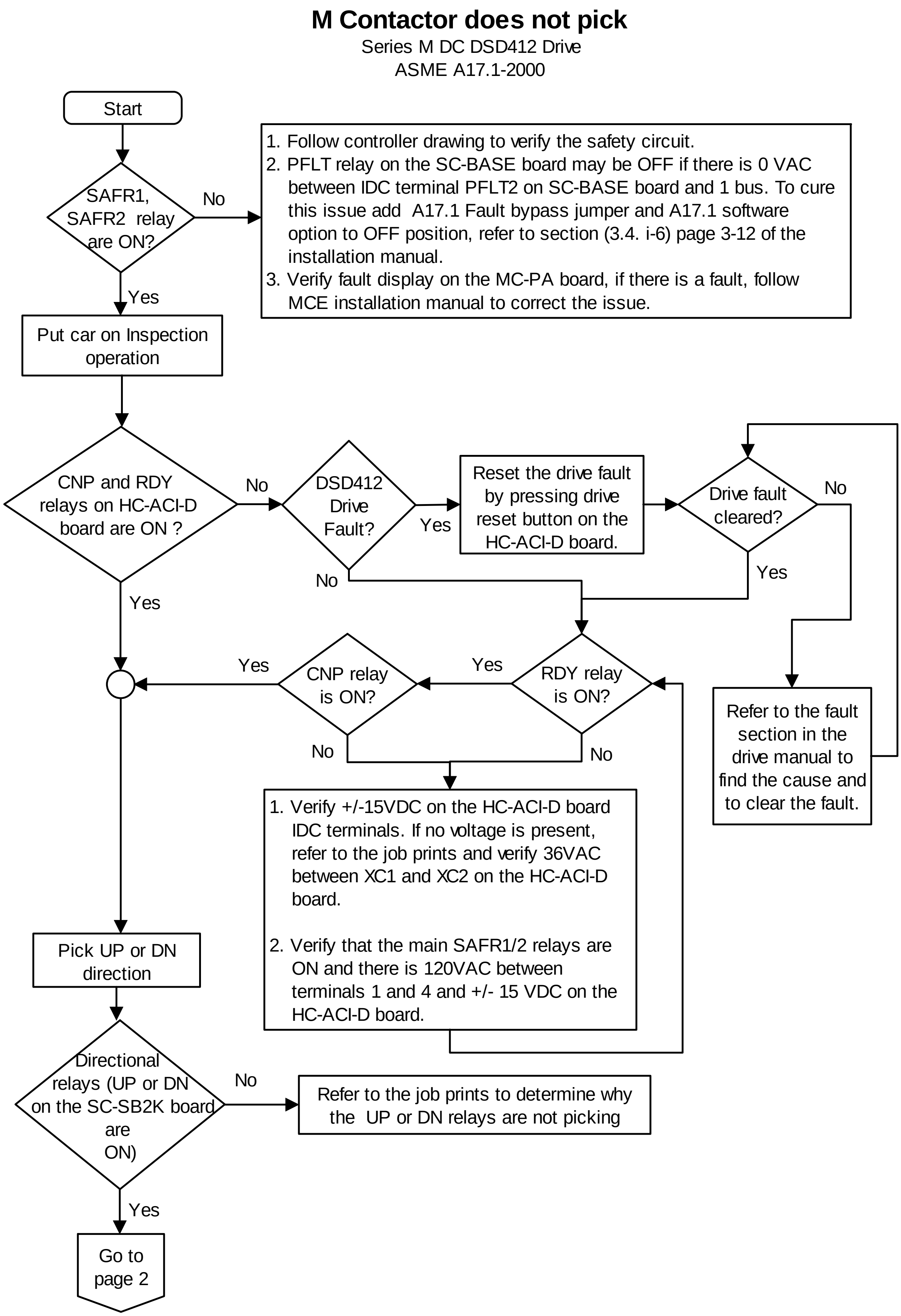
Start

Write down the motor name plate information.
(Armature Voltage, FLA., RPM, MF resistance and voltage)

It is always best to write down the values of all drive parameters. This will ensure that the drive parameter settings are not the cause of the problem.

- Parameter 3, 4, 6, 7, 10, 11 - Motor and Encoder data
- Parameter 49, 50 through 59 - Motor field information.
- Parameter 40, 41, 42 - Drive gains.
- Parameter 153 through 177 - Speed and S curves.
- Parameter 120 through 123 - Speed deviation (AT Speed)

Stop


M Contactor does not pick
Series M DC DSD412 Drive
ASME A17.1-2000
Start
SAFR1, SAFR2 relay are ON?
No
1. Follow controller drawing to verify the safety circuit.
2. PFLT relay on the SC-BASE board may be OFF if there is 0 VAC between IDC terminal PFLT2 on SC-BASE board and 1 bus. To cure this issue add A17.1 Fault bypass jumper and A17.1 software option to OFF position, refer to section (3.4. i-6) page 3-12 of the installation manual.
3. Verify fault display on the MC-PA board, if there is a fault, follow MCE installation manual to correct the issue.
Yes
Put car on Inspection operation
CNP and RDY relays on HC-ACI-D board are ON ?
No
DSD412 Drive Fault?
Yes
Reset the drive fault by pressing drive reset button on the HC-ACI-D board.
Drive fault cleared?
No
Yes
No
Yes
Refer to the fault section in the drive manual to find the cause and to clear the fault.
Yes
CNP relay is ON?
Yes
RDY relay is ON?
No
No
1. Verify +/-15VDC on the HC-ACI-D board IDC terminals. If no voltage is present, refer to the job prints and verify 36VAC between XC1 and XC2 on the HC-ACI-D board.
2. Verify that the main SAFR1/2 relays are ON and there is 120VAC between terminals 1 and 4 and +/- 15 VDC on the HC-ACI-D board.
Pick UP or DN direction
Directional relays (UP or DN on the SC-SB2K board are ON)
No
Refer to the job prints to determine why the UP or DN relays are not picking
Yes
Go to page 2

M Contactor does not pick

Series M DC DSD412 Drive
A 17.1 controller
Page 2

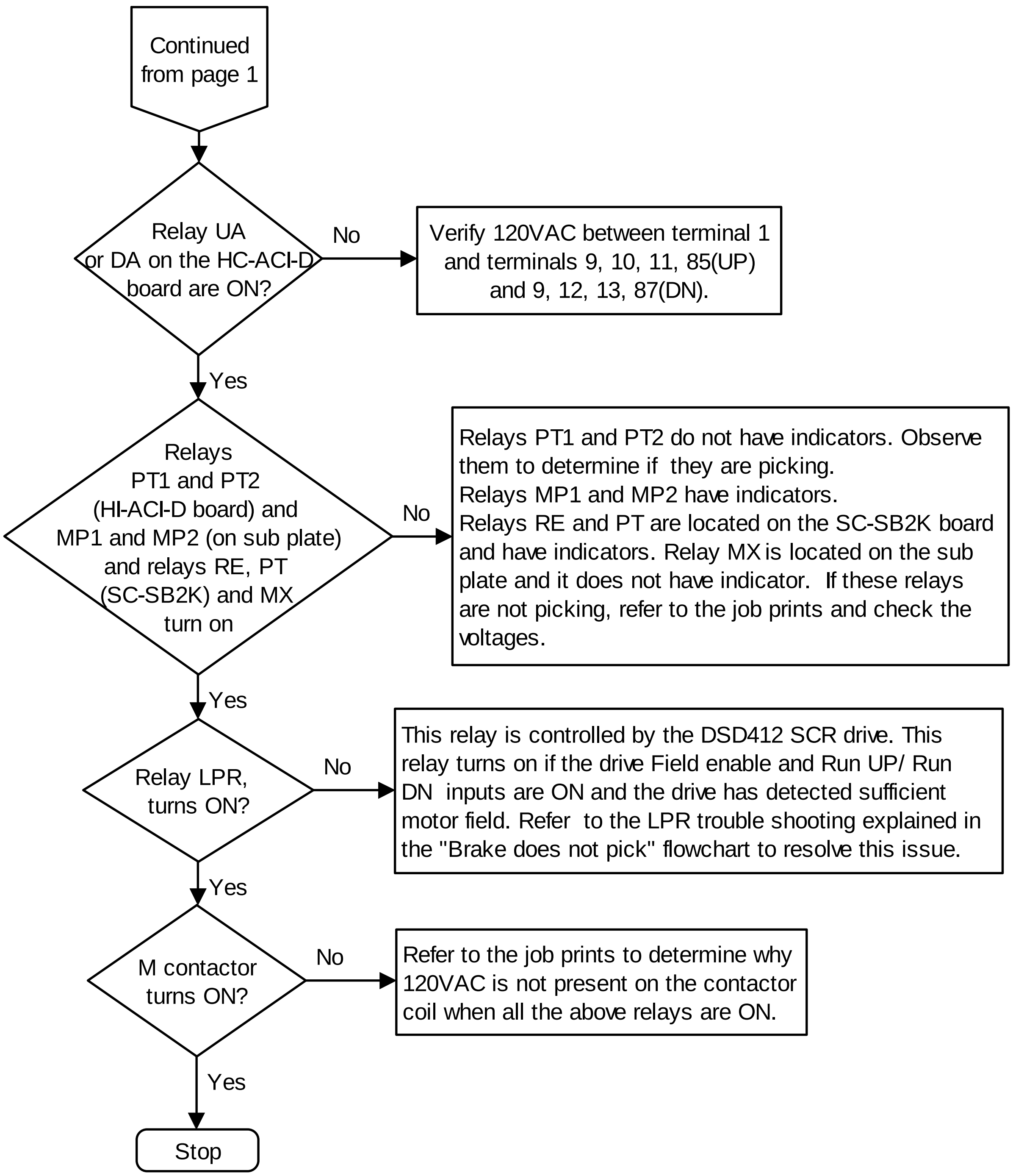
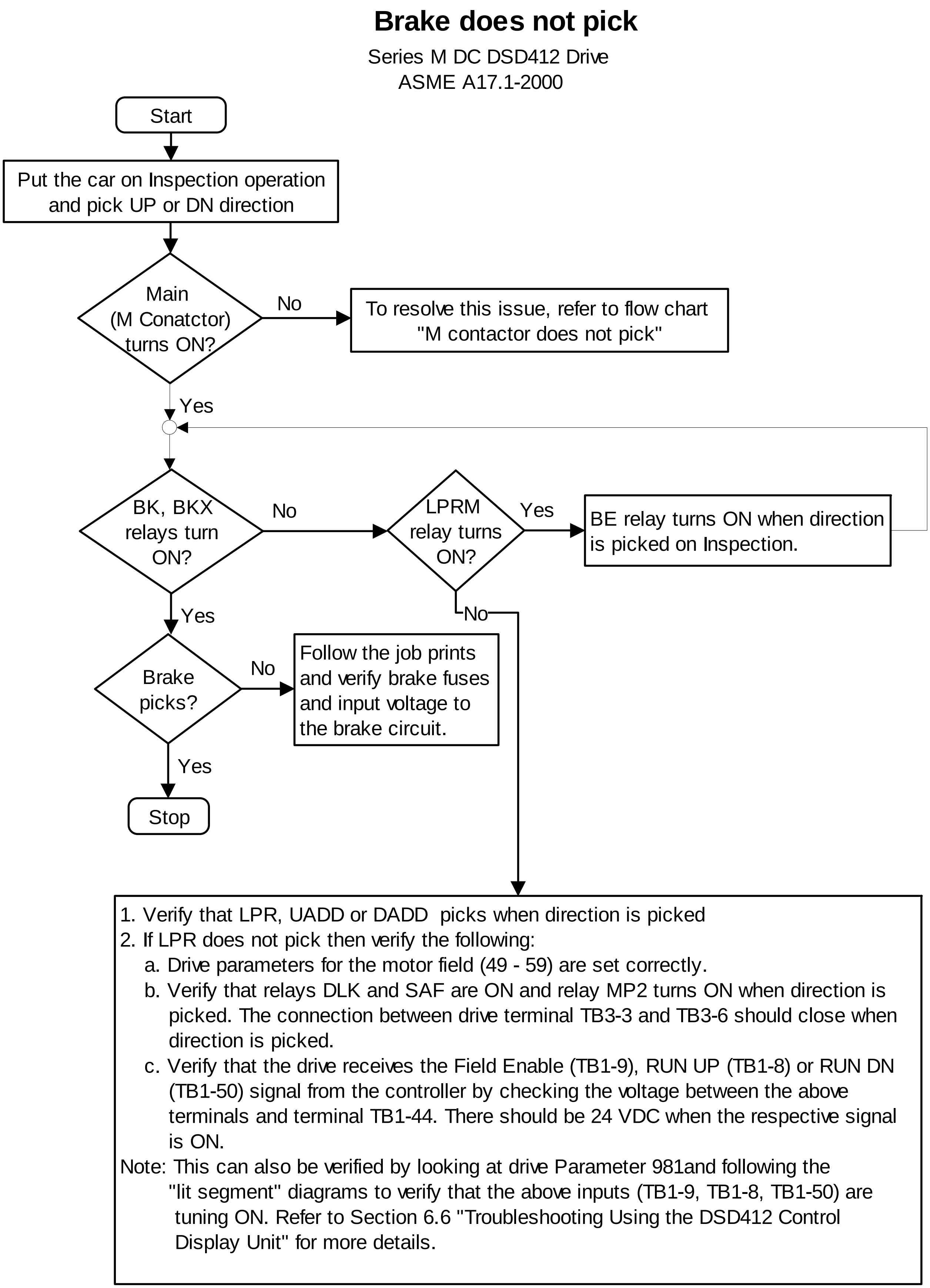
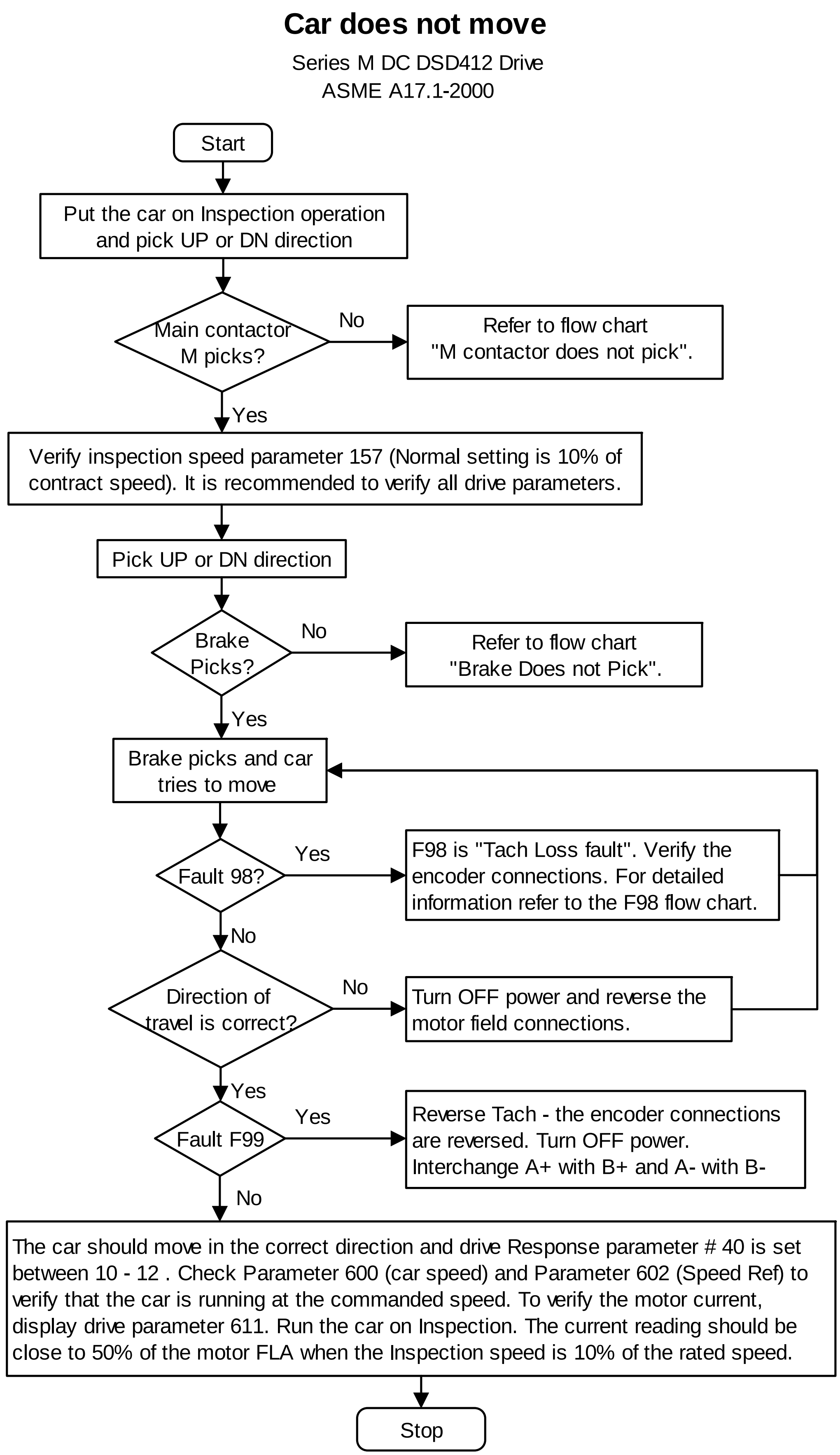


FIGURE 6.37 Brake does not pick




Car does not move
Series M DC DSD412 Drive
ASME A17.1-2000
Start
Put the car on Inspection operation and pick UP or DN direction
Main contactor M picks?
No
Refer to flow chart "M contactor does not pick".
Yes
Verify inspection speed parameter 157 (Normal setting is 10% of contract speed). It is recommended to verify all drive parameters.
Pick UP or DN direction
Brake Picks?
No
Refer to flow chart "Brake Does not Pick".
Yes
Brake picks and car tries to move
Fault 98?
Yes
F98 is "Tach Loss fault". Verify the encoder connections. For detailed information refer to the F98 flow chart.
No
Direction of travel is correct?
No
Turn OFF power and reverse the motor field connections.
Yes
Fault F99
Yes
Reverse Tach - the encoder connections are reversed. Turn OFF power. Interchange A+ with B+ and A- with B-
No
The car should move in the correct direction and drive Response parameter # 40 is set between 10 - 12 . Check Parameter 600 (car speed) and Parameter 602 (Speed Ref) to verify that the car is running at the commanded speed. To verify the motor current, display drive parameter 611. Run the car on Inspection. The current reading should be close to 50% of the motor FLA when the Inspection speed is 10% of the rated speed.
Stop

Self Tuning

Series M DC DSD412 Drive
ASME A17.1-2000

This test measures the armature resistance, motor inductance, motor field time constant and armature feedback verification.

Start

1. Turn OFF the power at the main disconnect.
2. Remove the brake fuse or disconnect the brake coil.
3. Jumper N.O. contact number 3 of relay LPRM.
4. Connect a jumper between the 2 bus and the right side of the relay MP1 coil.
5. Disconnect and insulate the wire from drive terminal TB1-9.
6. For ASME 2000 controller ONLY: Jumper the MX relay N.O. contact # 4 which picks the SAFD relay".
7. Place the NV Ram protection switch in the ON (Up position).
8. Bypass A17.1 Faults, Refer to section 3.4-i.6, Page 3-12 in MCE installtion manual.

Self Tune Test #1: This test calculates the motor armature resistance, motor inductance and Field L/R time constant.

1. Select parameter 997 and Press Data Func KEY. ENTER will display on the screen. Press Enter.
2. The Drive will pick the main contactor a couple of times. Then it will display PASS or FAIL. If the test failed message appears, refer to the fault number to resolve the problem.
3. For test Passed: Record the value of Parametesr 613, 614, 615.

Self Tune Test #2: This test verifies the drive internal function and armature feedback circuits.

1. Select parameter 998. Press the Data Fun Key.
2. Enter is displayed on the key pad. Press Enter.
3. The Drive will pick the main contactor and conduct the test. PASS or FAIL will appear on the display.

1. Enter the recorded values for 613, 614and 615 in parameters 4, 6 & 51 respectively. Save new parameters.
2. Turn OFF the power. Install the brake fuse. Connect the brake coil. Remove the jumper across the LPRM relay contact number 3. Remove the jumper between the 2 bus and the right side of the MP1 relay coil and jumper across the relay MX N.O. contact #4.
3. Run the car on Inspection to verify the car operation.

Stop

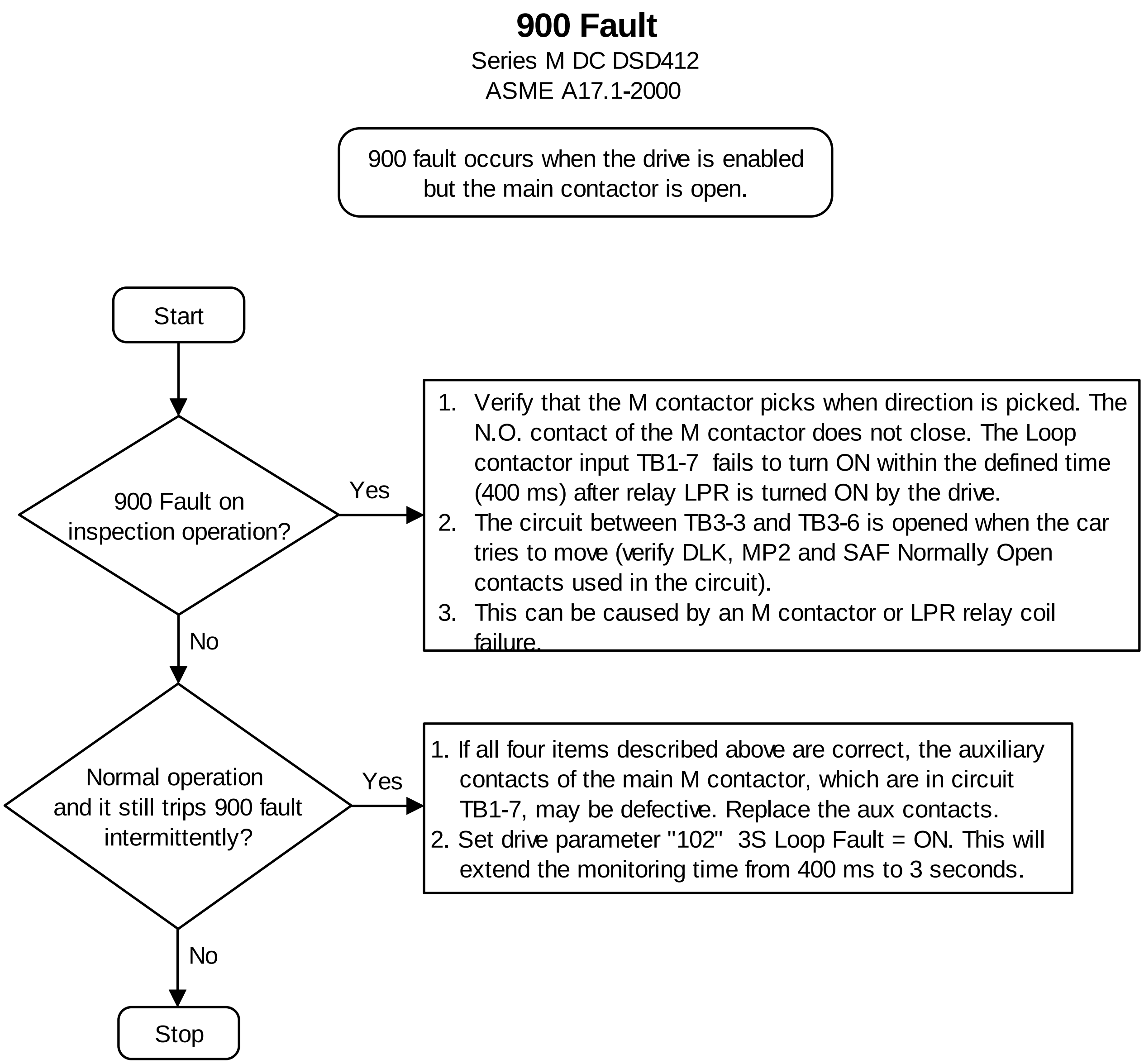
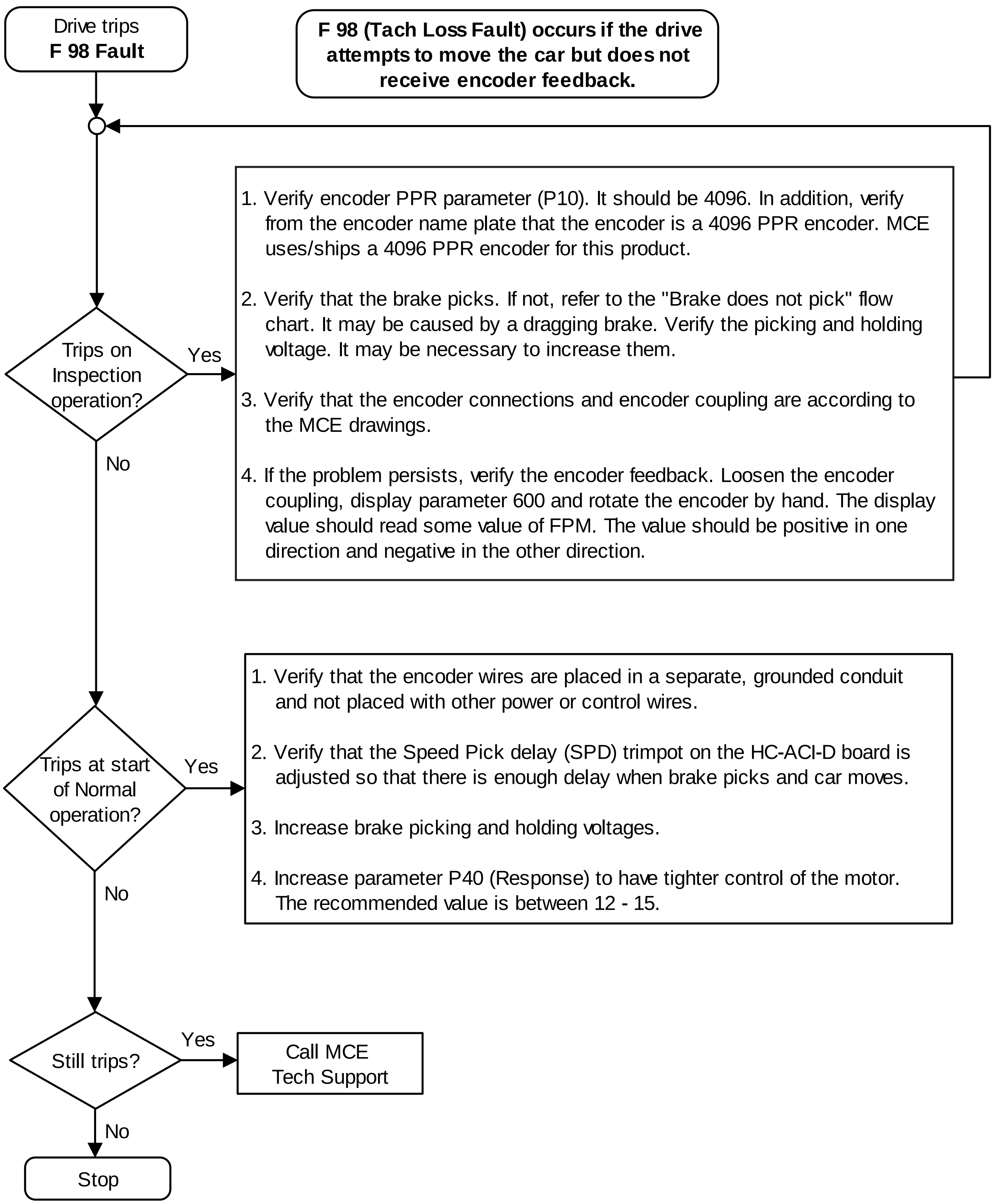

900 Fault
Series M DC DSD412
ASME A17.1-2000
900 fault occurs when the drive is enabled but the main contactor is open.
Start
900 Fault on inspection operation?
Yes
1. Verify that the M contactor picks when direction is picked. The N.O. contact of the M contactor does not close. The Loop contactor input TB1-7 fails to turn ON within the defined time (400 ms) after relay LPR is turned ON by the drive.
2. The circuit between TB3-3 and TB3-6 is opened when the car tries to move (verify DLK, MP2 and SAF Normally Open contacts used in the circuit).
3. This can be caused by an M contactor or LPR relay coil failure.
No
Normal operation and it still trips 900 fault intermittently?
Yes
1. If all four items described above are correct, the auxiliary contacts of the main M contactor, which are in circuit TB1-7, may be defective. Replace the aux contacts.
2. Set drive parameter "102" 3S Loop Fault = ON. This will extend the monitoring time from 400 ms to 3 seconds.
No
Stop

FIGURE 6.41 F 98 (Tach Loss Fault)

F 98 (Tach Loss Fault)

Series M DC DSD412 Drive
ASME A17.1-2000



Motor Field Adjustment

Series M DC DSD412 Drive
ASME A17.1-2000

To resolve motor field faults:

↓

1. Measure the motor field resistance and verify that it is according to the prints.
2. From the motor name plate, write down the Full, running and standing field voltage values. Calculate the motor field current values by dividing the motor field voltage / motor field resistance.
3. Enter calculated values of the motor field current in drive parameter 49 (Weak Field), 50 (Full Field current), 53 (Standing Field).
4. Verify that Drive parameters 52 (Rated field voltage)and 55 (AC input for Motor Field) are set correctly.

↓

1. Motor field module in the drive can supply 0.2 to 40.0 A. Verify that the motor field connections on the drive terminals are according to the measured values of current.
2. Verify that Motor Field Dip switches are set correctly (Refer to section 3.3.2 in the MCE installation manual) .
3. Verify that the motor field power AC1, AC2 are in phase with the L1, L2.

↓

STOP

407 , 408 CEMF Faults. Motor field and Armature Voltage Adjustments

Series M DC DSD412 Drive
ASME A17.1-2000

How to adjust motor field armature voltage to eliminate 407, 408 CEMF faults

Fault 407: This fault occurs when CEMF exceeds 108% of the input AC line voltage (Parameter 9). This fault will not shut down the drive.
Fault 408: This fault occurs when CEMF exceeds 114% of the input AC line voltage (Parameter 9). This fault will shut down the drive.

1. Verify that the motor data (Armature voltage, Field voltage and resistance, RPM etc.) is set correctly per motor name plate.
2. Verify that Self Tune Tests 1 and 2 are complete, the drive gains are adjusted and the car is running on Inspection or Normal operation.
3. Verify that the critical drive parameters are set correctly.

407 fault?

Yes:

1. Three phase input line voltage is low? Increase the input AC voltage by adjusting the (5%) taps on the drive isolation transformer. Verify that parameter 9 matches with the input AC Voltage. This fault can be caused by a soft line or undersized isolation transformer.
2. Verify the motor name plate and parameter 7 setting.
3. Field cross over is set to high? Check function 56 (Field Strength Speed) and adjust its value to between 60 to 90%.
4. If fault 407 is still present, increase the value of parameter 9 by 5%.

No: 408 fault?

Yes: This fault will shut down the drive. Refer to the action items for 407 fault.

No: Stop

If the car is running on normal operation:
1. Set parameter 156 (High Speed) to half speed. Verify that the value of parameter 155 (Intermediate Speed) is lower than parameter 156, other wise the drive may trip.
2. Read parameter 610 (Armature Voltage), when the car is running at half speed. This voltage should be 1/2 of the rated armature voltage. If this voltage is high, adjust the motor field current to a lower value until parameter 610 equals 1/2 of the armature voltage.
2. Once the armature voltage is adjusted, run the car at high speed and verify the armature voltage and current by monitoring drive parameters 610 and 611.

6.9 ASME A17.1 - 2000 FAULT TROUBLESHOOTING TABLES

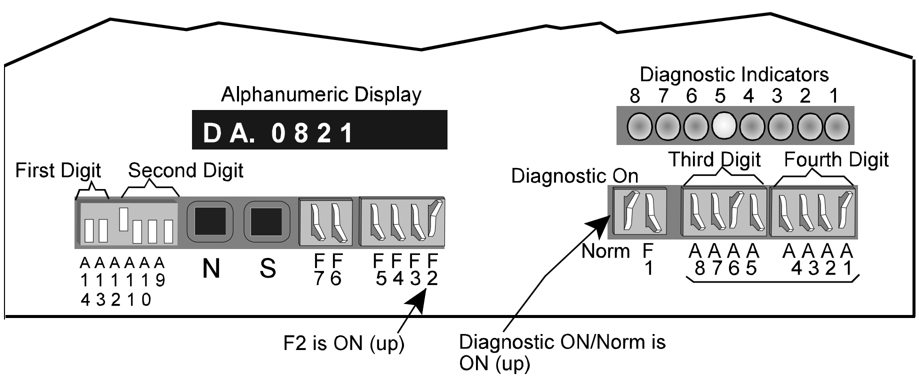
Refer to Section 5.4 *Diagnostic Mode* for detailed information. Diagnostic mode is initiated by placing the Diagnostics On switch up with all other switches down.

TABLE 6.8 ASME A17.1 - 2000 Redundancy Fault Established Map

HEX ADDRESS	FAULT							
0800	PFLT	RESBYP	RSAFR	RSTOP	GOV	SAFH	SAFC	RCT
0801	RFR_FLKR	RFR_STK	EBR_FLKR	EBR_STK	REB2	REB1	REI	2BI
0802	INUP	IN	INMR	ACCI	INICI	INCTI	RMR	RBK
0803	RHD	RCD	DLK	HDB	CDB	HD	CD	INDN
0804	RACC1	RIN2	RIN1	RLULD	DZX	RDZX	RDZ	RPT
0805	ETS2	COS2	ILO1	ETS1	COS1	RCTIC	RTBAB	RACC2
0806	RUP	DNS	DNL	UNL	UPS	DNDIR	UPDIR	ILO2
0807	MGR	MPSAF	ESBYP	TEST	DCL	DPM	RH	RDN
0808	DPDIF	EQR_FLKR	EQR_STK	RHDB	H	CTDIF	CTOS	REL
0809	--	--	--	--	RUDX2	RUDX1	DETS1	UETS1
080A	DZRX	RDZR	RHDR	RCDR	HDBR	CDBR	HDR	CDR
080B	--	--	--	RUDX4	RUDX3	RHDBR	DCLR	DPMR
080F	PLD	CT	ESBYP	EB	4BUS	RSAFR	--	--

6.9.1 ASME A17.1 - 2000 REDUNDANCY FAULT DATA TRAP (F2 is UP)

This Data Trap records the state of the Redundancy Fault Established Map and the SC-HDIO Board Input Map when the MPSAF Output is turned OFF, indicated by the SAFR1 Relay.



Switch F2 selects external memory. Switches A13 and A14 select the first digit (0), A9 thru A12 select the second digit (8), A5 thru A8 select the third digit (2) and A1 thru A4 select the last digit of the address (1). The Alphanumeric Display shows the address 0821 and the diagnostic indicators show the state (on or off) of the data at that address. Looking at the table below note that Diagnostic Indicator 5 (which is on in this example) stands for EBR_STK data.

TABLE 6.9 Redundancy Fault Established Data Trap

HEX ADDRESS	FAULT DATA SHOWN ON DIAGNOSTIC INDICATORS 8	7	6	5	4	3	2	1
0820	PFLT	RESBYP	RSAFR	RSTOP	GOV	SAFH	SAFC	RCT
0821	RFR_FLKR	RFR_STK	EBR_FLKR	EBR_STK	REB2	REB1	REI	2BI
0822	INUP	IN	INMR	ACCI	INICI	INCTI	RMR	RBK
0823	RHD	RCD	DLK	HDB	CDB	HD	CD	INDN
0824	RACC1	RIN2	RIN1	RLULD	DZX	RDZX	RDZ	RPT
0825	ETS2	COS2	ILO1	ETS1	COS1	RCTIC	RTBAB	RACC2
0826	RUP	DNS	DNL	UNL	UPS	DNDIR	UPDIR	ILO2
0827	MGR	MPSAF	ESBYP	TEST	DCL	DPM	RH	RDN
0828	DPDIF	EQR_FLKR	EQR_STK	RHDB	H	CTDIF	CTOS	REL
0829	--	--	--	--	RUDX2	RUDX1	DETS1	UETS1
082A	DZRX	RDZR	RHDR	RCDR	HDBR	CDBR	HDR	CDR
082B	--	--	--	RUDX4	RUDX3	RHDBR	DCLR	DPMR
082F	PLD	CT	ESBYP	EB	4BUS	RSAFR	--	--

6.9.2 ASME A17.1 - 2000 SC-HDIO BOARD INPUT DATA TRAP

TABLE 6.10 ASME A17.1 - 2000 SC-HDIO Board Input Data Trap

HEX ADDRESS	INPUT DATA (1 = ON, 0 = OFF)							
0830	2BI	RCT	RESBYP	RSAFR	STOP	SAFC	SAFH	GOV
0831	INUP	INICI	INCTI	RMR	RBK	RFR	DZX	REI
0832	--	--	RHD	RCD	CD	INDN	INMR	HD
0833	RUP	DNL	UNL	RIN2	RIN1	RLULD	RDZ	RPT
0834	FRSA	FRSM	FRBYP	FCCC	FCOFF	TEST	RH	RDN
0835	--	--	--	--	SSI	CWI	EQR	EDS
0836	HDBO	HDB	CDBO	CDB	ACCI	EBR	REB2	REB1
0837	ILO1	ETS1	COS1	RDZX	RCTIC	RTBAB	RACC2	RACC1
0838	--	--	UETS2	PFLT	ILO2	COS2	ETS2	UPDIR
0839	CDBOR	CDBR	CDR	DZRX	RHDB	DETS1	UETS1	DNDIR
083A	A2KBP	RHDR	RCDR	RDZR	RHDBR	HDBOR	HDBR	HDR
083B	--	--	DETS2	RSTOP	RUDX2	RUDX4	RUDX3	RUDX1

6.9.3 RAW ASME A17.1 2000 SC-HDIO BOARD INPUT MAP

The *RAW* data for the ASME A17.1 - 2000 HDIO Board Input Map table that follows, is data that has not been modified by the controller. To see these inputs select the address in Diagnostic mode (refer to Section 5.3.1)

TABLE 6.11 RAW ASME A17.1 2000 SC-HDIO Board Input Map

HEX ADDRESS	INPUTS							
03E0	2BI	RCT	RESBYP	RSAFR	STOP	SAFC	SAFH	GOV
03E1	INUP	INICI	INCTI	RMR	RBK	RFR	DZX	REI
03E2	--	--	RHD	RCD	CD	INDN	INMR	HD
03E3	RUP	DNL	UNL	RIN2	RIN1	RLULD	RDZ	RPT
03E4	FRSA	FRSM	FRBYP	FCCC	FCOFF	TEST	RH	RDN
03E5	--	--	--	--	SSI	CWI	EQR	EDS
03E6	HDBO	HDB	CDBO	CDB	ACCI	EBR	REB2	REB1
03E7	ILO1	ETS1	COS1	RDZX	RCTIC	RTBAB	RACC2	RACC1
03E8	--	--	UETS2	PFLT	ILO2	COS2	ETS2	UPDIR
03E9	CDBOR	CDBR	CDR	DZRX	RHDB	DETS	UETS	DNDIR
03EA	2KBP	RHDR	RCDR	RDZR	RHDBR	HDBOR	HDBR	HDR
03EB	--	--	DETS2	RSTOP	RUDX2	RUDX4	RUDX3	RUDX1

6.9.4 FORMATTED ASME A17.1 - 2000 SC-HDIO BOARD INPUT / OUTPUT MAP

Refer to Section 5.4 *Diagnostic Mode* for detailed information about Diagnostics mode. Diagnostic mode is initiated by placing the F1-F8 switches in the down position.

TABLE 6.12 Formatted ASME A17.1 - 2000 SC-HDIO Board Input / Output Map

HEX ADDRESS	INPUTS / OUTPUTS							
0700	2_BI_M	MPSAF	STOP	SAFC	SAFH	GOV	RSAFR	2_BI
0701	TEST	INDN	INUP	RIN2	RIN1	INMR	INICI	INCTI
0702	IN_M_TRUE	--	--	RTBAB	RACC2	RACC1	ACCI	RCTIC
0703	--	EQR_M	EQLED	EQIND	SSI	CWI	EQR	EDS
0704	HDBO	HDB	CDBO	CDB	RHD	RCD	HD	CD
0705	--	FIR1	FWL	FRSA	FRSM	FRBYP	FCCC	FCOFF
0706	CTDIF	CTOS	ILO2	ETS2	COS2	ILO1	ETS1	COS1
0707	RESBYP	ESBYP	–	RMR	RBK	RPT	REI	MB
0708	TWO_2_ONE	ONE_2_TWO	EB2	EB1	EBRM	EBR	REB2	REB1
0709	DNDIR	UPDIR	CTPLD1	RUP_M	RDN	RUP	DNL	UNL
070A	RFR	RFRM	A2KBP	CT	RCT	RH	RLULD	RDZ
070B	HDBOR	HDBR	CDBOR	CDBR	RHDR	RCDR	HDR	CDR
070C	DETS1	UETS1	RHDBR	RHDB	RDZR	DZRX	RDZX	DZX
070D	RUDX4	RUDX3	RUDX2	RUDX1	RSTOP	DETS2	UETS2	PFLT

TABLE 6.13 Mnemonic Definitions for Tables 6.8 thru 6.12

A2KBP	ANSI 2000 Bypass Input	INICI	Inspection - In Car Inspection
ACCI	Inspection Access	INMR	Inspection - Machine Room
ASI4		IN_M_TRUE	True Inspection Memory
ASI7		INUP	Inspection - Up Input
ASI8		MB	Motor / Brake Output
CD	Car Door	MPSAF	Main Processor - Safety Output
CDB	Car Door Bypass Switch - Bypass Position	ONE_2_TWO	Indicates Switching from EB1 to EB2
CDBO	Car Door Bypass Switch - Off Position	PFLT	PLD Fault Input
CDBOR	Car Door Rear Bypass Switch - Off Position	RACC1	Redundancy Access Inspection Relay #1
CDBR	Car Door Rear Bypass Switch - Bypass Position	RACC2	Redundancy Access Inspection Relay #2
CDR	Car Door Rear	RBK	Redundancy Brake Relay
COS1	Overspeed - Contract, PLD #1	RCD	Redundancy Car Door Relay
COS2	Overspeed - Contract, PLD #2	RCDR	Redundancy Car Door Rear Relay
CT	Cycle Test Output	RCT	Redundancy Cycle Test Relay
CTDIF	Cycle Test - DP Differential	RCTIC	Redundancy Car Top / In Car Inspection Relay
CTOS	Cycle Test - Overspeed	RDN	Redundancy Down Relay
CWI	Counterweight Input	RDZ	Redundancy Door Zone Relay
DETS1	Down Emergency Terminal Switch #1	RDZR	Redundancy Door Zone Rear Auxiliary Relay
DETS2	Down Emergency Terminal Switch #2	RDZX	Redundancy Door Zone Auxiliary Relay
DNDIR	Down Direction Detected	REB1	Emergency Brake Relay #1
DNL	Down Normal Limit	REB2	Emergency Brake Relay #2
DZRX	Door Zone Rear Auxiliary	REI	Run Enable Input
DZX	Door Zone Auxiliary	RESBYP	Redundancy Emergency Stop Switch Bypass Relay
EB1	Emergency Brake Relay #1 Output	RFR	Redundancy Fault Reset
EB2	Emergency Brake Relay #2 Output	RFRM	Redundancy Fault Reset Memory
EBR	Emergency Brake Reset	RH	Redundancy High Speed Relay
EBRM	Emergency Brake Reset Memory	RHD	Redundancy Hoistway Door Relay
EDS	Earthquake Direction Switch	RHDB	Redundancy Hoistway Door Bypass Relay
EQIND	Earthquake Indicator	RHDBR	Redundancy Hoistway Door Bypass Rear Relay
EQLED	Earthquake Light	RHDR	Redundancy Hoistway Door Rear Relay
EQR	Earthquake Reset Switch	RIN1	Redundancy Inspection Relay #1
EQRM	Earthquake Reset Switch Memory	RIN2	Redundancy Inspection Relay #2
ESBYP	Emergency Stop Switch Bypass	RLULD	Redundancy Level Up / Level Down Relays
ETS1	Overspeed - Emergency Terminal Switch, PLD #1	RMR	Redundancy Motor Relay
ETS2	Overspeed - Emergency Terminal Switch, PLD #2	RPT	Redundancy Car / Hoistway Door Timed Relay
FCCC	Fire Phase 2 - Car Call Cancel	RSAFR	Redundancy Safety Relay Input
FCOFF	Fire Phase 2 Switch - Off position	RTBAB	Redundancy Top / Bottom Access Buttons Relay
FIR1	Fire Phase 1 Active - Main or Alternate	RUDX1	Redundancy Up/Down Auxiliary #1
FRBYP	Fire Phase 1 Switch - Bypass Position	RUDX2	Redundancy Up/Down Auxiliary #2
FRSA	Fire Phase 1 - MR / HTW Sensor - Alternate Recall	RUP	Redundancy Up Relay
FRSM	Fire Phase 1 - MR / HTW Sensor - Main Recall	RUP_M	Redundancy Up Relay Memory
FWL	Fire Warning Light	SAFC	Safety Circuit - Car
GOV	Governor Switch Input	SAFH	Safety Circuit - Hoistway
HD	Hoistway Door	SSI	Seismic Switch Input
HDB	Hoistway Door Bypass Switch - Bypass Position	STOP	Stop Switch Input
HDBO	Hoistway Door Bypass Switch - Off Position	TEST	Test Input
HDBOR	Hoistway Door Rear Bypass Switch - Off Position	TWO_2_ONE	Indicates Switching from EB2 to EB1
HDBR	Hoistway Door Rear Bypass Switch - Bypass Position	TWO_BI	2 Bus Input
HDR	Hoistway Door Rear	TWO_BI_M	2 Bus Input Memory
ILO1	Overspeed - Inspection / Leveling, PLD #1	UETS1	Up Emergency Terminal Switch #1
ILO2	Overspeed - Inspection / Leveling, PLD #2	UETS2	Up Emergency Terminal Switch #2
INCTI	Inspection - Car Top Inspection	UNL	Up Normal Limit
INDN	Inspection - Down Input	UPDIR	Up Direction Detected

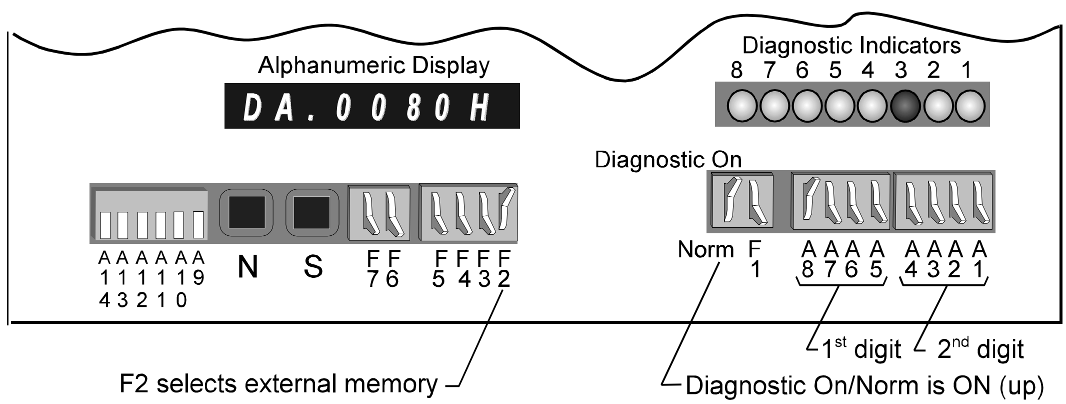
6.10 USING THE MLT DATA TRAP

The MLT "data trap" records many of the controller's operation “flags” at the moment the MLT occurs. This allows you to see what flags led up to the fault. Note: Direction must be on (inputs UPS or DNS) for two minutes before MLT will occur.

Once an MLT shuts down the car, use these steps to look at the stored flags.

1. Do not reset the computer, as this will clear the data trap on controllers with older software versions.* To return the car to service and not harm the data, simply toggle the relay panel inspection switch from OFF to ON and back to OFF.

2. On the Computer Swing Panel, place the Diagnostic On/Norm switch and the F2 switch up (ON) as shown.



3. Use the DATA TRAP MEMORY CHART to look at the saved MLT data. Set the address switches A1 thru A8 as shown in the Data Trap Memory Chart which is appropriate for your controller type (Local, Simplex). Switches A5 thru A8 select the first digit and switches A1 thru A4 select the second digit of the Hex address. The picture above shows the switches set for the first address in the local controller chart.

4. Record the data displayed on the Diagnostic Indicators for all rows (addresses) shown on the chart. It helps if you have a few photocopies of the chart. Simply mark the positions in the chart for the Diagnostic Indicators that are ON. The first 20 addresses contain car status flags. The last four addresses contain the car's position indicator value at the instant the MLT condition occurred, MLT counter, PG flags and MLT Code number. Only the labeled positions are important to mark.

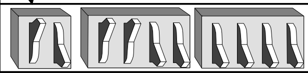
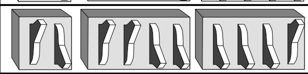
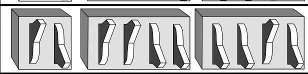
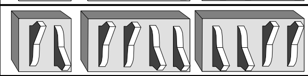
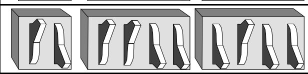
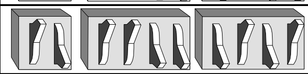
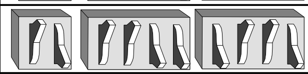
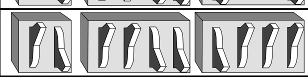
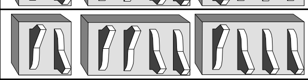
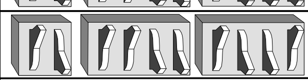
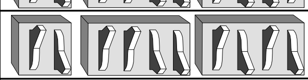
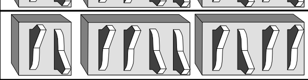
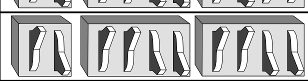
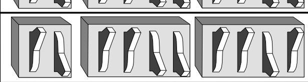
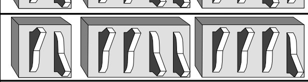
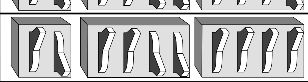
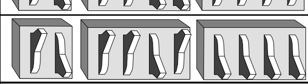
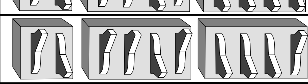
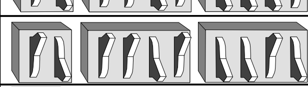
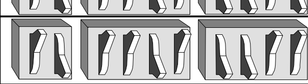
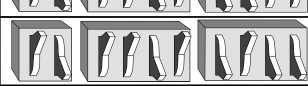
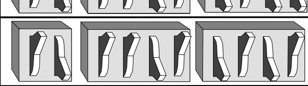
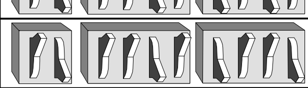
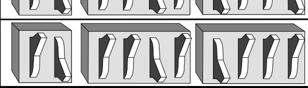
5. Use the recorded values to help determine the root of the problem. Call MCE for assistance if any is needed.

   * Note: If the data trap has been cleared and/or no MLT has occurred, all of the flags in the data trap memory addresses will be set (LEDs will be ON). Each time a new MLT occurs, the new data overwrites the old data.

TRACTION (LOCAL) MLT DATA TRAP MEMORY CHART									
Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active							
		8	7	6	5	4	3	2	1
80		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
81			DC	UC	CC			DHO	DOI
82		DCF	DCP	DOF	LOT		HCT	CCT	SDT
83				HSEL	CSB	DCC	NUDG		DSHT
84		INT/DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
85				HLW	HLI			FWI	
86		LFP	UFP						
87				EQI	IND	IN		DELSIM	YSIM
88		LLW	DLK		DZORDZ			PK	LLI
89		DNDO	LD		DDP	UPDO	LU		UDP
8A		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
8B		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
8C			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
8D						FRM			FRC
8E		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
8F		HLD	EPI	EPR	SLV	ISR	YRQ	PTR	PTS
90								HML	ALT
91		ATSF	NSI	DNI	UPI	ATS	CTLF	CTL	PFG
92		CAC	CAB	CWI	EQA	EDS	ESTE	EQN	PUSD
93			CWIL						
94		PI	PI	PI	PI	PI	PI	PI	PI
95		Counter	Counter	Counter	Counter	Counter	Counter	Counter	Counter
96		LRARN	IN	CORR	SHRTRUN	DANGER	PH2	PH1	PHS0
97		CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #

DNmd 025

TRACTION (SIMPLEX CAR A) MLT DATA TRAP MEMORY CHART

Computer Memory Address (Hex)	Toggle Switches Diagnostic On F1 A8.......A5 A4.......A1	Diagnostic Indicators LED *On* = variable flag is On or Active 8	7	6	5	4	3	2	1
C0		DOLM	PHE	DZ	DOL	DBC	SE	GEU	GED
C1			DC	UC	CC			DHO	DOI
C2		DCF	DCP	DOF	LOT		HCT	CCT	SDT
C3				HSEL	CSB	DCC	NUDG		DSHT
C4		INT/DCLC	FRA	FCS	FRS	DNS	UPS	STD	STU
C5				HLW	HLI			FWI	
C6		LFP	UFP						
C7				EQI	IND	IN		DELSIM	YSIM
C8		LLW	DLK		DZORDZ			PK	LLI
C9		DNDO	LD		DDP	UPDO	LU		UDP
CA		DMD	DCB	UCB	CCB	DMU	DCA	UCA	CCA
CB		TOS	MLT	PSTX	MGR	H	REL	DSH	RUN
CC			STC	SAF	HCR	HCDX	CCD	ISV	ISRT
CD						FRM			FRC
CE		SD	SDA	DSD	BFD	SU	SUA	USD	TFD
CF		HLD		EQA	ATSF		ECRN	CD	EPR
D0					ESP2	EPS1	EPI	HML	ALT
D1		SDAM	CTLM	SUAM	DOLL	RDEMD	CTLF	CTL	PFG
D2		CAC	CBC	CWI	EQA	EDS	ESTE	EQN	PUSD
D3			CWIL						
D4		PI	PI	PI	PI	PI	PI	PI	PI
D5		Counter	Counter	Counter	Counter	Counter	Counter	Counter	Counter
D6		LEARN	IN	CORR	SHRTRUN	DANGER	PH2	PH1	PHS0
D7		CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #	CODE #

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APPENDIX

APPENDIX A
DISASSEMBLING THE COMPUTER SWING PANEL

MCE Technical Support may advise an installer to remove a circuit board from the Computer Swing Panel (Figure 1.2) for troubleshooting, replacement of the board or an EPROM. If so, remove the thumbscrew holding the Swing Panel to the bracket on the back plate. Rotate the Swing Panel so that the boards are accessible.

Loosen and remove the four nuts securing the back cover plate. This may require the use of a 11/32 nut driver.

> **CAUTION:** Components on the PC boards can be damaged by ESD. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

Disconnect the 20 pin ribbon cables from the HC-PI/O and MC-RS boards.

Remove the circuit boards from the Swing Panel. Put the nuts back on the bolts for safekeeping.

Unsnap the boards from each other and replace/repair the boards as necessary.

FIGURE A.1 Computer Swing Panel Boards, Unsnapped

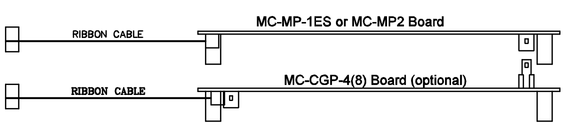


FIGURE A.2 Computer Swing Panel Boards, Snapped Together

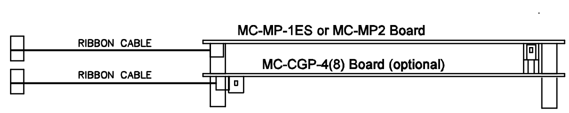
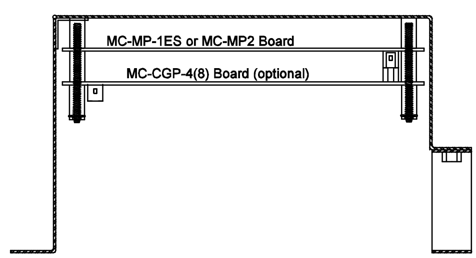


FIGURE A.3 Computer Swing Panel Without Boards (Top View)

FIGURE A.4 Computer Swing Panel With Boards (Top View)



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APPENDIX B
CHANGING PC BOARDS OR EPROMS

With directions from MCE Technical Support, a PC board, EPROMs or Microcontroller may need to be reinstalled in the field. Great care should be taken when changing any of these items. The EPROM stores the computer program, the microcontroller both stores and executes the program and all three are subject to damage by ESD (see CAUTION). These instructions should be followed step-by-step.

CAUTION: Components on the PC boards can be damaged by ESD. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

B.1 REPLACING THE MAIN PROCESSOR BOARD OR EPROMS

Normally the microprocessor on the Main Processor board (MC-MP2-2K) is not replaced in the field. Sometimes the EPROM is replaced to upgrade the program and occasionally the complete board must be replaced due to a component failure.

Replacing the EPROM - The EPROM for the MC-MP2-2K board is labeled S-MP2-xx-1. The “xx” represents the controller type. If the new EPROM has the same job number as the old EPROM, the user settings for timers and adjustable control variables, etc., are retained. Any new timers or variables added to the new EPROM will be set to their default values.

If the job number on the new EPROM is different from the job number on the old EPROM, all of the timers and variables will be set to their default values. The user settings should be documented before the old EPROM is removed so that they can be re-entered when the new EPROM is installed.

Replacing the Main Processor board - The user settings for timer and adjustable control variables are stored in battery backed RAM on the Main Processor board. If the new board was previously installed in another car controller, the user settings from that car will be retained. If the new board is a replacement from MCE, all of the user programmable values will be set to their default values. Therefore, the current user settings should be documented before the old board is removed so that they can be re-entered when the new board is installed. The following is a list of the user settings:

- Elevator Timers (see Section 5.2.3)
- Real Time Clock Flags (see Section 5.2.4)
- Communications Port Settings (see Section 5.3.1)
- Security Codes (see Section 5.3.2)
- Master Software Key (MSK) (see Section 5.3.3)
- Software Options - Adjustable Control Variables (see Section 5.3.4)

Replacement Procedure

1. Document the current settings for the items listed above.

2. Turn power OFF at the main disconnect and verify that no lights are operating on the microprocessor panel. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

3. Remove the Main Processor board (MC-MP2) from the Swing Panel. Refer to Appendix A for instructions on unloading the boards from the Swing Panel. If you are replacing the PC board, proceed to step 6 below (refer to Figure 6.22 MC-MP2 Board Quick Reference) for proper jumper settings.

4. Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket, *not* between the socket and the board (see Figure 6.22). Gently pry the existing EPROM out from the socket. Do this very slowly, taking care not to bend the leads. If they become bent, straighten them carefully with needlenose pliers.

5. Place the new EPROM lightly (do not plug it in yet) into the socket and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the orientation of the notch should also correspond to the notches on all of the other chips on the board). Now push the EPROM firmly into the socket and make sure that *none* of the pins are bent during the insertion. Inspect the EPROM to make sure that no pins are bent outward or under the EPROM.

6. Reassemble the Swing Panel assembly and close the Swing Panel. Refer to the instructions in Appendix A.

7. Turn power ON at the main disconnect. Verify the proper operation of all boards by inspecting the diagnostic indicators and Computer ON LEDs on the individual processor boards.

   - If the Computer ON LEDs are not illuminated on all boards, the EPROMs may not have been installed properly. Repeat the above steps 2 through 7.

8. Re-enter the user settings documented in step 1 above.

B.2 REPLACING THE MC-CGP-4 (8) BOARD OR EPROMS

Sometimes the EPROMs are replaced to upgrade the program to a new software version and occasionally the complete board must be replaced for a software upgrade or a component failure.

Replacing the EPROMs - The EPROMs for the MC-CGP-4 (8) board are labeled S-CGP-C-1 and S-CGP-C-2.

i) EPROMs with the same software version number will not cause the loss of user data. Follow steps **2 thru 7** in the Replacement Procedure below.

ii) EPROMs with a new software version number will result in loss of user data. Follow the **entire** Replacement Procedure below.

Replacing the MC-CGP-4 (8) board - The user settings for the items listed below are stored in battery backed RAM on the MC-CGP-4 (8) board. If the new board was previously installed in another car controller, the user settings from that car will be retained. Follow the **entire**

Replacement Procedure below when using a board from another car controller which has different settings from those of the car being replaced or when installing a board from MCE.

NOTE: The Fault Log and Performance Reports will all be lost and can not be recovered.

Replacement Procedure

1. Document the current settings for the items listed below.

   - M3 Group Parameters or Car ID parameter CNID on F1 -1 screen for local cars only
   - Security - timer tables, security configurations, passenger names and access codes (simplex car and group only)
   - Special Events Calendar Menu options Configure by Type, Configure by Controller, and CMS Com Port Setup (if available)
   - Job Configuration data used for display - job name, car label and landing labels

2. Turn power OFF at the main disconnect and verify that no lights are operating on the microprocessor panel. Install a grounding strap on your wrist and connect it to ground before handling the PC boards.

3. Remove the MC-CGP-4 (8) board from the Swing Panel. Refer to Appendix A for instructions on unloading the boards from the Swing Panel. If you are replacing the PC board, proceed to step 6 below (refer to Figure 6.23 MC-CGP-4 Board Quick Reference for proper jumper settings).

4. The two EPROMs on the MC-CGP-4 (8) board are labeled ROM1-U17 and ROM2-U18 (see Figure 6.23) Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket, *not* between the socket and the board. Gently pry the existing EPROMs out from the socket. Do this very slowly, taking care not to bend the leads. If they become bent, straighten them carefully with a needlenose pliers.

5. Place the new EPROMs lightly (do not plug it in yet) into the sockets and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the orientation of the notch should also correspond to the notches on all of the other chips on the board). Now push the EPROMs firmly into the socket and make sure that *none* of the pins are bent during the insertion. Inspect the EPROMs to make sure that no pins are bent outward or under the EPROM.

6. Reassemble the Swing Panel assembly and close the Swing Panel. Refer to the instructions in Appendix A.

7. Turn power ON at the main disconnect. Verify the proper operation of all boards by inspecting the diagnostic indicators and Computer ON LEDs on the individual processor boards.

   - If the Computer ON LEDs are not illuminated on all boards, the EPROMs may not have been installed properly. Repeat the above steps 2 through 7.
   - Verify that the group controller is communicating with the cars by looking at the LEDs in the front of the group swing panel.

8. Set ODPC=ON, on the General F1-1 screen, and save the parameter, or reset the MC-CGP parameters as described in Section 5.2.6.

9. Re-enter the user settings documented in step 1 above.

B.3 REPLACING THE EPROM ON THE SMARTLINK MC-NC / MC-NIO BOARD

With directions from MCE Technical Support, an EPROM may need to be reinstalled in the field. Great care should be taken as printed circuit (PC) boards and integrated circuits (ICs), such as an EPROM, are subject to damage by ESD (see CAUTION). These instructions should be followed step-by-step.

CAUTION:	Components on the PC boards can be damaged by ESD. Wear an ESD grounding strap on your wrist and connect it to ground before handling the PC boards.

Identification of the EPROMs - The EPROM for the MC-NC board is labeled S-NC-C (see Figure G.9, MC-NC Board Quick Reference). The EPROM for the MC-NIO board is labeled S-NIO-C (see Figure G.10, MC-NIO Board Quick Reference).

Replacement Procedure

1. Turn controller power OFF and verify that no lights are operating on the processor boards. Wear an ESD grounding strap on your wrist and connect it to ground before handling the PC boards.

2. Using a small, thin-bladed screwdriver, place the tip between the EPROM chip and its socket (***not*** between the socket and the board). Gently pry the existing EPROM out from the socket. Do this very slowly, taking care not to bend the leads.

3. Position the new EPROM into the socket (do not plug it in yet) and check to see that all pins are aligned with their corresponding holes in the socket. Also make sure that the notch on the end of the EPROM is correctly aligned with the notch on the socket (the notch orientation of all the ICs on the board are the same). Once these checks have been made, push the EPROM slowly, evenly and firmly into the socket and make sure that the pins are not bent during the insertion. Inspect the EPROM for pins bent outward or under the EPROM and correct any bent pins found.

4. Disconnect Network cable NETA and NETB. Turn power ON. Verify the proper operation of the board by inspecting the diagnostic indicators (COMPUTER ON and SERVICE LEDs) on the respective processor boards:

   MC-NC Board - If installed properly, the COMPUTER ON LED will be ON continuously and the SERVICE LED will be OFF, plus both will blink together approximately once every 10 seconds. This pattern repeats continuously. If the EPROM has been installed incorrectly, both the Computer ON and the SERVICE LEDs will blink simultaneously once per second. A similar pattern is observed if no EPROM is installed. Repeat the above steps 1 through 3. Check for notch orientation and look for bent pins.

   MC-NIO Board - If properly installed, the SERVICE LED should not illuminate and the COMPUTER ON LED should stay ON continuously. If the SERVICE LED stays illuminated, the EPROM may not be installed properly. Repeat the above steps 1 through 3. Check for notch orientation and look for bent pins.

APPENDIX C
QUICK REFERENCE FOR DSD 412 SCR DRIVE PARAMETERS (SERIES M DC PRODUCT ONLY)

Note: Some parameters listed in this table are not listed in the drive manual.

Field adjustable parameters are shown in shaded rows. All other parameters should be set to the values shown in the "Field/MCE" column.

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

WARNING: Parameters with an asterisk (✳) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

P# Drive display	Description	Explanation	Unit	Range	Default	Field/ MCE
1	Current Limit	Sets the drive current limit as a percentage of the rated armature amps (parameter 3).	%	0 - 300	250	250
2	User Self-Tune **(Note 1)**	Selects the measured values of the self tune variables.	-	ON, OFF	OFF	OFF
3	Rated Arm Amp	Motor rated current.	Amp	10 - 1250	50	✳ ______
4	Armature Ohms **(Note 1)**	Total armature circuit resistance, not including the brush drop. Self tune test 997 measures armature resistance and parameter 613 displays the measured value. Enter and save the measured value in Parameter 4. The drive uses this parameter to calculate the regulator integral and feed forward gains and calculate the CEMF for the field weakening.	Ohm	0.001 - 5.0	0.1	✳ 0.235 ______
6	Armature Inductance **(Note 1)**	This is the value of the motor armature circuit inductance. The drive self tune test 997 measures the inductance and parameter 614 displays the measured value. Enter and save the measured value in Parameter 6. This value includes the motor inductance and the inductance of the ripple filter in the armature circuit. This value of inductance is used in the calculation of the current regulator's integral and the proportional gains.	MHNY	0.001 - 1.0	0.01	✳ .0052 ______
7	Rated Arm V	Rated motor name plate armature voltage.	Volts	150 - 550	240	✳ ______
8	I Reg Crossover	This value sets the band width of the current regulator. The drive response will increase as this number is increased. With a large value the motor current will fluctuate and with a lower value motor will become sluggish.	RAD	100 - 1000	500	500
9	Nominal AC Voltage	This is the nominal AC input voltage applied to the SCR drive, measured at drive terminals L1, L2 & L3.	V	150 - 525	230	✳ ______
10	Encoder Pulses/Rev.	Encoder pulses per revolution from the encoder nameplate.	PPR	600 - 19,999	2500	✳✳✳ 4096
11	Motor RPM	Motor name plate RPM. In general this is the motor name plate value but it might require a higher or lower value to run the car at the correct speed. For a direct coupled encoder on a geared application this entry also sets the encoder shaft RPM.	RPM	50 - 2000	1150	✳ ______

P# Drive display	Description	Explanation	Unit	Range	Default	Field/ MCE
12	Overspeed %	This value sets the UP/DN overspeed trip point. The drive will trip on a fault if the motor speed exceeds this value. This is a percentage of the Motor Speed (RPM) entered in parameter 11.	%	0 - 150	110	110
14	V Sense %	This parameter sets the minimum armature voltage above which the tach loss and the reverse tach loss become operative. This is a percentage of the rated armature voltage (parameter 7)	%	0 - 100	25	25
15	Tach Sense %	This parameter sets the percentage of the per unit tach feedback below which a tach loss will be declared.	%	0 -100	5	5
16	Gearless Ratio	This is the ratio of the encoder wheel to the motor sheave for gearless applications. For geared applications this parameter must be set to 1 because the encoder is mounted on the motor shaft.	-	1 - 19	1	1
17	Rated Ft/Min	Rated car speed in feet per minute.	FPM	5 - 2000	400	✳ ______
22	Error List Reset	On = resets the previous drive faults	-	ON, OFF	OFF	OFF
32	Field Sense	Sets the percentage of full motor field required to permit the SCR drive to release the speed regulator and pick the LPR relay which picks the loop contactor.	%	30 - 90	60	50
40	Response	Sets the tracking delay between the drive commanded speed and the actual motor speed. This parameter sets the bandwidth of the seed regulator. Tracking delay (sec) = 1/Response. Higher values result in less delay and tighter control.	RAD	1 - 15	6.0	✳ 8.2 ______
41	System Inertia	This entry sets the system inertia in terms of the time it takes at rated torque to accelerate to the contract motor speed. In general this parameter acts as a gain multiplier internal to the drive software.	SEC	0.1 - 9.9	2.0	✳ 1.15 ______
42	Stability	Stability determines the amount of damping in the regulator for smoother transitions. This is used to modify the response of the speed regulator to correct for mismatch of the system inertia. This parameter should only be adjusted after the INERTIA and RESPONSE are set correctly. If the quality of the ride is reduced by increasing the STABILTY from its default value, the system inertia should be checked again.	-	0.1 - 9.9	1	1 - 2 1
49	Weak Field AMP **(Note 2)**	Sets the motor filed current value in the weaken condition (sets the motor weaken field).	AMP	0.2 - 40	5.0	✳ ______
50	Full Field AMP **(Note 2)**	Hoist motor name plate field current (sets the motor full field).	AMP	0.2 - 40	6	✳ ______
51	Field L/R **(Note 1)**	Motor field time constant. The drive self tune test 997 measures this value and parameter 615 displays the measured value of the inductance. Enter and save the measured value in parameter 51.	SEC	0.1 - 10	0.80	✳ 0.375 ______
52	Rated Field VDC	Rated motor field voltage.	V	50 - 525	240	✳ ______
53	Standing Field AMP	Sets the standing motor field current (motor field current when the car is not running).	I	0.2 - 40	2	✳ ______
54	Field Response	Sets the motor field regulator response.	RAD	1 - 10	5	5

P# Drive display	Description	Explanation	Unit	Range	Default	Field/ MCE
55	Motor Field VAC	Motor field input AC voltage at terminals AC1 and AC2 (TB4). This parameter must be set to a measured value if external boosted voltage is applied to terminals AC1 and AC2. If this parameter is set to 0 the drive will select the value of parameter 9 (which is the input voltage at L1, L2, L3).	V	50 - 525	0	✳ 0 _____
56	Field Strength Speed **(Note 2)**	Sets the speed (as a percentage of parameter 11 - Motor Speed) at which the speed regulator begins to strengthen the motor field during deceleration.	%	10 - 200	130	90
57	Field Weaken Speed **(Note 2)**	Sets the speed (as a percentage of parameter 11 - Motor Speed) at which the speed regulator begins to weaken the motor field during acceleration.	%	10 - 200	130	90
58	Field Strengthen Rate **(Note 2)**	Sets the rate at which the motor field reaches the rated field.	SEC	.01 - 10	2	2
59	Field Weaken Rate **(Note 2)**	Sets the rate at which the motor field reaches the weaken value.	SEC	.01 - 10	2	2
63	UP/DN Bit Pick	Sets the threshold at which the drive will turn on a bit for detection of the motor rotation.	%	.01 - 10	.01	.01
80	Overspeed Test	This is used to activate an overspeed multiplier (parameter 81).	-	ON - OFF	OFF	OFF
81	Overspeed Multiplier	The speed reference is multiplied by this value when parameter 80 (Overspeed Test) is activated.	-	1 - 1.5	1.0	1.0
83	Motor O.L. Time Out	This value shapes the motor overload time out curve.	Sec	0 - 500	90	90
84	Motor Overload Level	This sets the motor over load trip level.	-	0 - 2	1	1
85	Current Decay Ramp	This sets the decay time of the armature current at a predictable rate upon clamping the regulator.	Sec	.001 - 2.5	0.2	0.2
86	LPR Decay time	This parameter allows relay LPR to remain picked until the armature current decays.	Sec	.001 - 2.5	0.3	0.3
95	Analog output 0 (TB1-45)	Set to 0 to assign the Speed Reference to Analog output 0 (0 to +/- 10V between TB1-45 and TB1-80).	V	0 = Spd Ref 1 = Trace Bf	0	0
96	Analog output 1 (TB1-46)	Set to 0 to assign the Speed Feedback to Analog output 1 (0 to +/- 10V between TB1-46 and TB1-80).	v	0 = Spd Fbk 1 = Trace Bf	0	0
97	Test Point 0 Mult	Sets the multiplier for Analog output 0 (TB1-45).	V	0 - 10	1	1
98	Test point 1 Mult	Sets the multiplier for Analog output 1 (TB1-46).	V	0 - 10	1	1
101	Auto Fault ON	Set to ON to automatically reset the drive faults.	-	ON, OFF	OFF	ON
102	3S Loop Fault	3S Loop Fault	-	ON, OFF	OFF	OFF
105	Gain Switch Speed (**Note 3)**	This parameter determine the point on the speed reference curve at which the gain is switched to value adjusted by parameter 108. 0 = Zero speed, 1.0 = 100% of contract speed.	-	0.1 - 1.0	1.0	1.0
107	Tach Rate Gain	This parameter fixes the rope response problem in a gearless elevator. This parameter should not be adjusted from its default (0.0) but, if required, should be adjusted in the increments of 0.1. Higher values will cause jittery ride quality.	%	0 - 30.0	0.0	0.0
108	Gain Reduce (**Note 3)**	This parameter is a multiplier applied to parameter 40 - Response when in a “low gain” mode.	-	0.1 - 1.0	.1	1.0
120	Spd Dev Low Time	Time to detect the speed difference.	Sec	0 - 9.99	0.5	2.0
121	Spd Dev Low Level	The % of the contract speed at which the speed deviation fault is detected.	%	0 - 10	5.0	6

P# Drive display	Description	Explanation	Unit	Range	Default	Field/ MCE
122	Spd Error Time Out	Time for which the speed error remains ON if it is detected	sec	0 - 5.0	5.0	3
123	Speed Error Limit	Error between the Ref & speed output	%	0 - 100	100	30
153	Preset speed #4	Preset Speed #4 (Leveling speed)	FPM	0 - (16%)**	0	✳ 2 - 5 ______
155	Preset Speed # 6	Preset speed #6 (Intermediate speed)	FPM	0 - (91%)**	0	✳ ______
156	Preset Speed #7	Preset Speed #7(High speed)	FPM	0 - (100%)**	0	✳ ______
157	Preset Speed #8	Preset Speed #8 (Correction / Inspection speed)	FPM	0 - (66%)**	0	✳ 20 - 40 ______
170	ACC Rate #1	Acceleration rate #1. (Not used - Must be set equal to parameter 171)	SEC	0.0 - 25.0	5.0	Must be equal to parameter 171
171	ACC Rate #2	Acceleration rate #2. The total time in acceleration on multi-floor run and single floor runs.	SEC	0.0 - 25.0	5.0	✳ 2.12 ______
172	DEC Rate #1	Deceleration rate #1. The total time in deceleration on multi-floor runs.	SEC	0.0 - 25.0	5.0	✳ 2.25 ______
173	DEC Rate #2	Deceleration rate #2. The total time in deceleration on single floor runs.	SEC	0.0 - 25.0	5.0	✳ 2.25 ______
174	ACC J% #1	Jerk at the start and end of acceleration. (Not used - Must be set equal to parameter 175)	%	0 - 100	25	Must be equal to parameter 175
175	ACC J% #2	Jerk at the start and end of acceleration on both multi-floor and one floor runs (percentage of parameter 171 - ACC Rate #2). Higher values result in smoother transitions.	%	0 - 100	25	✳ 0 - 25 20 ______
176	DEC J% #1	Jerk at the start and end of deceleration on multi-floor runs (percentage of parameter 172 - DEC Rate #1).	%	0 - 100	25	✳ 0 - 25 20 ______
177	DEC J% #2	Jerk at the start and end of deceleration on one floor runs (percentage of parameter 173 - DEC Rate #2).	%	0 - 100	25	✳ 0 - 25 20 ______

P# Drive display	**Description**	**Explanation**	**Unit**	**Range**	**Default**	**Field/ MCE**
		Display Parameters (Read only)				
600	Car Speed	The relative velocity of the elevator.	FPM			
601	Motor RPM	The speed of the elevator motor.	RPM			
602	Speed Ref	The reference which dictates how fast the elevator will travel.	FPM			
609	CEFM VDC	The calculated CEMF of the motor.	VDC			
610	Motor ARM V	The actual voltage applied to the motor armature.	VDC			
611	Motor ARM I	The actual armature current delivered to the motor.	ADC			
612	Motor Field I	The actual field current delivered to the motor.	ADC			
613	Measured R	The calculated motor armature resistance which was measured during self tune.	OHM			
614	Measured L	The calculated motor circuit inductance which was measured during self tune.	HNY			
615	Measured Field L/R	The calculated motor field time constant which was measured during self tune.	SEC			
616	Speed Error	The difference between the speed feedback and the speed reference.	FPM			
617	Line Freq	The actual frequency of the 3 phase AC line.	HZ			
619	AC Line Volts	The actual 3 phase AC line voltage, ± 5%.	VAC			
800	Error List		-			
997	Self Tune	Used to access the Self Tune (PCU) parameter measurement.	-			

✳ **Verify and adjust parameters as they are motor / machine / job dependent.**

✳✳ **The actual speed value is entered in FPM. However, the speed range maximum value is described as a percentage of contract speed. Speeds in excess of the defined maximum will cause the drive to generate fault #450.**

✳✳✳ **Encoder PPR (P10) must be set correctly. Incorrect value of this parameter will cause under or over speed condition.**

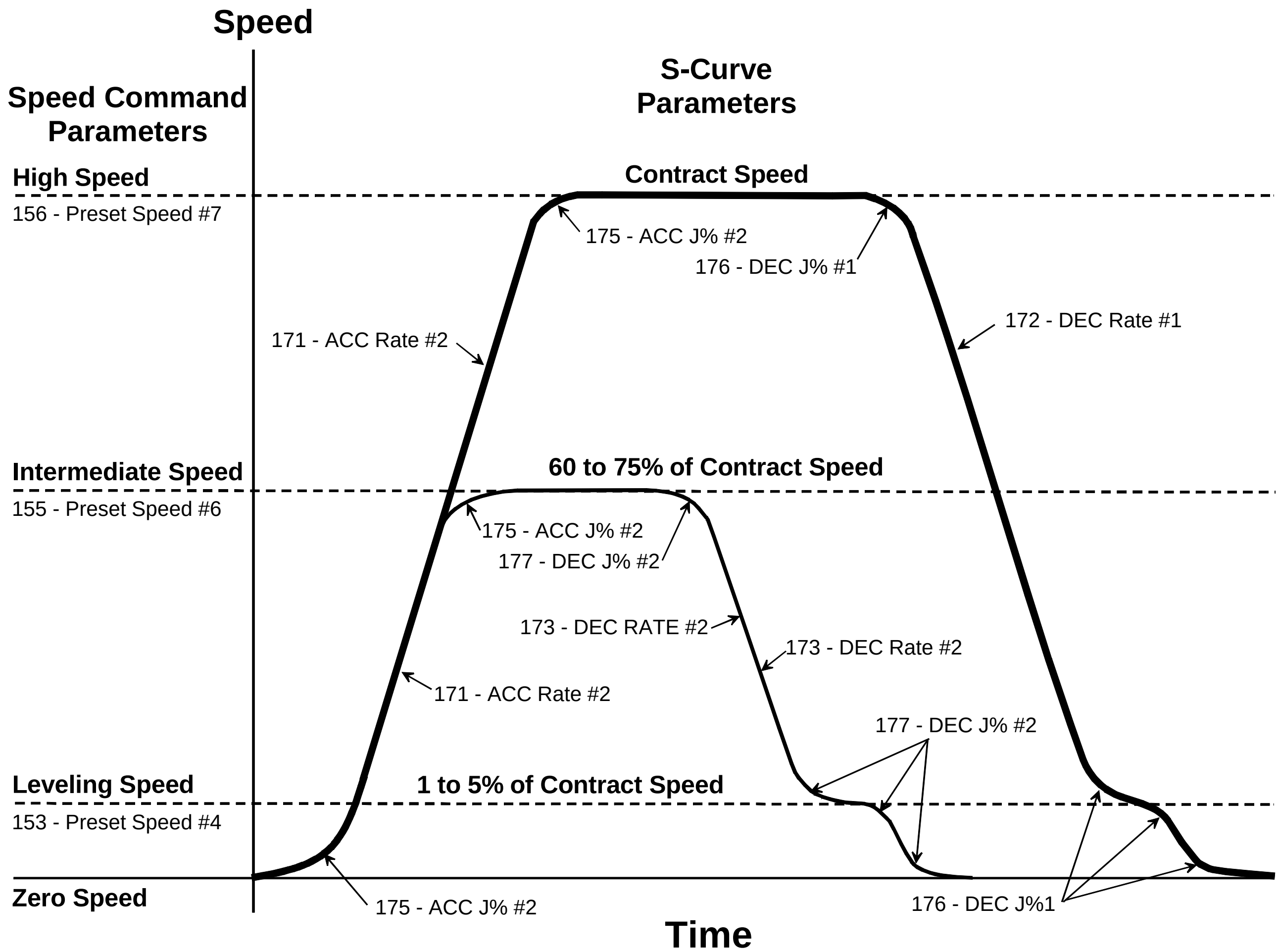
Note 1: Verify and then save this parameter after self tune is completed. (How to save the parameters - refer to Section 3.3.6**)**

Note 2: If contract speed is achieved **without** increasing Motor speed (parameter 11), then set the motor field weaken current (parameter 49) equal to the motor full field current (parameter 50).

If the Motor speed (parameter 11) **must be increased** in order to achieve contract speed, then adjust the motor field weaken current (parameter 49) lower than the motor full field current (parameter 50) to achieve the rated armature voltage at contract speed. The Field Weaken Speed (parameter 57) should be set to the motor rated RPM and the Field Strength SPD (parameter 56) should be set to 80%-90% of the contract speed.

Note 3: If required, adjust this parameter to reduce the gains at high speed for a smoother ride quality.

FIGURE C.1 *Velocity and S Curve Parameters (DSD 412)*



Software Version				
Drive Param. 692 (Day)	Drive Param. 693 (Month)	Drive Param. 695 (Year)	Drive Param. 698 (Software Rev.)	Drive Param. 699 (Controller No.)

Job #:
Prod. Order #:
Drive Manufacturer:
Drive Model #:
Drive Serial #
Tested By:
Approved:

DSD 412 DRIVE PARAMETER SETTINGS

P# Drive display	**Description**	**Unit**	**Range**	**Default**	**Field/ MCE**	**Setting 1**	**Setting 2**	**Final Setting**
1	Current Limit	%	0 - 300	250	250			
2	User Self-Tune	-	ON, OFF	OFF	OFF			
3	Rated Arm Amp	Amp	10 - 1250	50	✳			
4	Armature Ohms	Ohm	0.001 - 5.0	0.1	✳ 0.235			
6	Armature Inductance	MHNY	0.001 - 1.0	0.01	✳ .0052			
7	Rated Arm V	Volts	150 - 550	240	✳			
8	I Reg Crossover	RAD	100 - 1000	500	500			
9	Nominal AC Voltage	V	150 - 525	230	✳			
10	Encoder Pulses/Rev.	PPR	600 - 19,999	4096	4096			
11	Motor RPM	RPM	50 - 2000	1150	✳			
12	Overspeed %	%	0 - 150	110	110			
14	V Sense %	%	0 - 100	25	25			
15	Tach Sense %	%	0 -100	5	5			
16	Gearless Ratio	-	1 - 19	1	1			
17	Rated Ft/Min	FPM	5 - 2000	400	✳			
22	Error List Reset	-	ON, OFF	OFF	OFF			
32	Field Sense	%	30 - 90	45	50			
40	Response	RAD	1 - 15	5.0	✳ 8.2			
41	System Inertia	SEC	0.1 - 9.9	2.0	✳ 1.15			
42	Stability	-	0.1 - 9.9	1	1			
49	Weak Field AMP	AMP	0.2 - 40	2	✳			
50	Full Field AMP	AMP	0.2 - 40	6	✳			
51	Field L/R	SEC	0.1 - 10	0.5	✳ 0.375			
52	Rated Field VDC	V	50 - 525	240	✳			
53	Standing Field AMP	I	0.2 - 40	2	✳			
54	Field Response	RAD	1 - 10	5	5			
55	Motor Field VAC	V	50 - 525	0	0			
56	Field Strength Speed	%	10 - 200	130	90			
57	Field Weaken Speed	%	10 - 200	130	90			
58	Field Strengthen Rate	SEC	.01 - 10	2	2			
59	Field Weaken Rate	SEC	.01 - 10	2	2			
63	UP/DN Bit Pick	%	.01 - 10	.01	.01			
80	Overspeed Test	-	ON - OFF	OFF	OFF			
81	Overspeed Multiplier	-	1 - 1.5	1.5	1.0			
83	Motor O.L. Time Out	Sec	0 - 500	90	90			
84	Motor Overload Level	-	0 - 2	1	1			
85	Current Decay Ramp	Sec	.001 - 2.5	0.2	0.2			
86	LPR Decay time	Sec	.001 - 2.5	0.3	0.3			
95	Analog output 0 (TB1-45)	V	0 = Spd Ref 1 = Trace Bf	0	0			
96	Analog output 1 (TB1-46)	v	0 = Spd Fbk 1 = Trace Bf	0	0			
97	Test Point 0 Mult	V	0 - 10	1	1			

P# Drive display	**Description**	**Unit**	**Range**	**Default**	**Field/ MCE**	**Setting 1**	**Setting 2**	**Final Setting**
98	Test point 1 Mult	V	0 - 10	1	1			
101	Auto Fault ON	-	ON, OFF	OFF	ON			
102	3S Loop Fault	-	ON, OFF	OFF	OFF			
105	Gain Switch Speed	-	0.1 - 1.0	1.0	1.0			
107	Tach Rate Gain	%	0 - 30.0	0.0	0.0			
108	Gain Reduce	-	0.1 - 1.0	.1	1.0			
120	Spd Dev Low Time	Sec	0 - xx	0.5	2.0			
121	Spd Dev Low Level	%	0 - xx	50	6			
122	Spd Error Time	sec	x	50	3			
123	Speed Error Limit	%	0 - 100	100	33			
153	Preset speed #4	FPM	0 - 16%	0	✳ 3 - 5			
155	Preset Speed #6	FPM	0 - 91%	0	✳			
156	Preset Speed #7	FPM	0 - 100%	0	✳			
157	Preset Speed #8	FPM	0 - 66%	0	✳			
170	ACC Rate #1	SEC	0.0 - 25.0	5.0	Must be equal to parameter 171			
171	ACC Rate #2	SEC	0.0 - 25.0	5.0	2.0 - 3.0			
172	DEC Rate #1	SEC	0.0 - 25.0	5.0	2.0 - 3.0			
173	DED Rate #2	SEC	0.0 - 25.0	5.0	2.0 - 3.0			
174	ACC J% #1	%	0 - 100	25	Must be equal to parameter 175			
175	ACC J% #2	%	0 - 100	25	0 - 25			
176	DEC J% #1	%	0 - 100	25	0 - 25			
177	DEC J% #2	%	0 - 100	25	0 - 25			

✳ **Verify and adjust parameters as they are job dependent.**

APPENDIX D

Motion Control Engineering, Inc.	NOMENCLATURE
	Effective Date: 03/06/02 3 Pages

#	PC BOARD	DESCRIPTION
1	HC-RB4	Traction Controller Main Relay Board
1	HC-RBH	Hydraulic Controller Main Relay Board
2	HC-CI/O	Non Programmable Controller Call I/O Board
2	HC-CI/O-E	Programmable Controller Call I/O Expander Board
3	HC-PI/O	Non Programmable Controller Power I/O Board (Car A) ①
3	HC-PCI/O	Programmable Controller Power And Call I/O Board
4	HC-PI/O	Non Programmable Controller Power I/O Board (Car B) ①
6	HC-TAB	Traction Adapter Board
7	HC-RDRB	Rear Door Relay Board
8	HC-RD	Rear Door Logic Board (Car A) ①
9	HC-RD	Rear Door Logic Board (Car B)
10	HC-DB-MOD	Front G.A.L. MOD Door Interface Board
11	HC-DB-MOD-R	Rear G.A.L. MOD Door Interface Board
12	HC-DPS	Door Power Supply Board
13	HC-PIX	Position Indicator Expander Board (Car A) ①
14	HC-PIX	Position Indicator Expander Board (Car B)
15	HC-SRT	Suicide Relay Timing Board
16	HC-SCR	SCR Interface Board
17	HC-EQ	Earthquake Board
18	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car A) ①
19	HC-IOX	I/O(8 Input / 8 Output) Expander Board (Car B)
20	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car A) ①
21	HC-IOX	Additional I/O(8 Input / 8 Output) Expander Board (Car B)
26	HC-DYNA	Dynalift Interface Board
27	MC-ACFR	AC Feedback Relay Board
28	IMC-GIO	General Turbo DF I/O Board
29	IMC-RB	Turbo DF Relay Board
30	HC-DB-MOM/H	Front G.A.L. MOM/MOH Door Interface Board
31	HC-DB-MOM/H-R	Rear G.A.L. MOM/MOH Door Interface Board
32	HC-OA	Output Adapter Board
33	IMC-RI	M/G Relay Interface Board
34	IMC-PRI	M/G Power Relay Interface Board
35	IMC-DIO	Digital I/O Board
36	IMC-DAS	Data Acquisition Board
37	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car A) ①
38	HC-I4O	I/O(16 Input /4 Output) Expander Board (Car B)
39	HC-I4O	Additional I/O(16 Input / 4 Output) Expander Board (Car A) ①
40	HC-I4O	Additional I/O(16 Input /4 Output) Expander Board (Car B)
41	SCR-RI	SCR/AC Relay Interface Board
42	SCR-PRI	SCR/AC Power Relay Interface Board

MCE Motion Control Engineering, Inc.	NOMENCLATURE
	Effective Date: 03/06/02 3 Pages

#	PC BOARD	DESCRIPTION
43	HC-LB	Lock Bypass Board
44	HC-GB	Gong Board
45	HC-GB	Additional Gong Board
46	HC-SIB	Selectable Input Buffer Board (Car A) ①
47	HC-SIB	Selectable Input Buffer Board (Car B)
48	HC-RT	Relay Tester Board
49	IMC-ACIB	AC Baldor Interface Board
50	HC-DPS-MOM/H	Front G.A.L. MOM/MOH Door Interface and Power Supply Board
51	HC-ACI	AC Drive Interface Board
52	HC-ACIF	AC Flux Vector Interface Board
53	HC-DPS-MOM/H-R	Rear G.A.L. MOM/MOH Interface and Power Supply Board
54	IMC-MBX	IMC Enhanced Motherboard
55	SCR-RIX	SCR Relay Interface Extension Board
56	HC-HBF	A.S.M.E. Front Door Lock Bypass Board
57	HC-HBFR	A.S.M.E Front and Rear Door Lock Bypass Board
58	IMC-ACIM	AC MagneTek Interface Board
59	HC-TACH-MG	Tach Adjust Board for VVMC-MG Controller
60	HC-TACH-SCR	Tach Adjust Board for VVMC-SCR Controller
61	SC-SB2K	Main A17.1 - 2000 Compliant Relay Board
62	SC-HDIO	High Density I/O board for A17.1 - 2000
63	SC-BASE-D	Lock Bypass, Access, Overspeed and Emergency Brake Board used with DF controlers
64	SC-BASE	Lock Bypass, Access, Overspeed and Emergency Brake Board used with non-DF controllers
65	SC-BASER-D	Rear version of SC-BASE used with DF controllers
66	SC-BASER	Rear version of SC-BASE used with non-DF controllers
67	SC-SB2K-H	Hydro version of SC-SB2K
68	SC-BAH	Hydro version of SC-BASE
69	SC-BAHR	Hydro version of SC-BASE with rear doors

① Individual group cars use board numbers for car A only

SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
X / X	BUS LOCATED ON PC BOARD
X / X	BUS LOCATED OFF PC BOARD
	MICROCOMPUTER OUTPUT OR CALL CIRCUIT
	MICROCOMPUTER INPUT
MP	MICROCOMPUTER OUTPUT OR CALL CIRCUIT FOR ASME 17.1–2000 SERIES CONTROLLER
MP	MICROCOMPUTER INPUT FOR ASME 17.1–2000 SERIES CONTROLLER
P	PATTERN GENERATOR OUTPUT
P	PATTERN GENERATOR INPUT
S	PATTERN GENERATOR SAFETY INPUT
	POWER TERMINAL
	PANEL MOUNT TERMINAL
XI	EYELET ON PC BOARD
XI	SCREW TERMINAL ON PC BOARD
XI	IDC CONNECTOR ON PC BOARD
CX–X XI CX–X IX	RIBBON CABLE CONNECTOR
TPX	TEST POINT

SYMBOL	DESCRIPTION
OFF BOARD SIDE IX BOARD NUMBER	BOARD DESIGNATOR
	SOLDER CONNECTION ON REAR OF PC BOARD
	WIRING INSIDE CONTROL CABINET
	TRACE ON PC BOARD
	CUSTOMER WIRING INTO CONTROL CABINET
	ALL UNMARKED DIODES ARE 2.5 AMP 1000 VOLT
	VOLTAGE SPIKE SUPPRESSOR
	DOT BY RESISTOR INDICATES TOP OR LEFT SIDE AS MOUNTED
	BOX INDICATES UNUSED ITEM
	RELAY COIL
	FORCE GUIDED RELAY COIL
POLE NUMBER X SWING SIDE	NORMALLY OPEN (N.O.) RELAY CONTACT
POLE NUMBER X SWING SIDE	NORMALLY CLOSED (N.C.) RELAY CONTACT
N/C	NO CONNECTION

WIRE SYMBOLS

SYMBOL	DESCRIPTION
X	#X AWG THHN WIRE 90° C
X	#X AWG PVC WIRE 105° C
X	#X AWG PTL WIRE 125° C
X	#X AWG TEFLON WIRE 200° C

UNLESS NOTED, ALL WIRES ARE #18 AWG PVC, WITH EXCEPTION TO THE PC BOARD WIRING, WHICH IS DETERMINED BY ENGINEERING.

WIRE GAUGES

SYMBOL	SIZE
03	3/0 AWG
02	2/0 AWG
0	0 AWG
1	1 AWG
2	2 AWG
4	4 AWG
6	6 AWG
8	8 AWG
10	10 AWG
12	12 AWG
14	14 AWG
16	16 AWG
18	18 AWG

MCE Motion Control Engineering, Inc.	NOMENCLATURE
F:\ENG\DOCS\NMCLR2.DWG	Effective Date: 3–14–03

APPENDIX E
FLEX-TALK OPTION

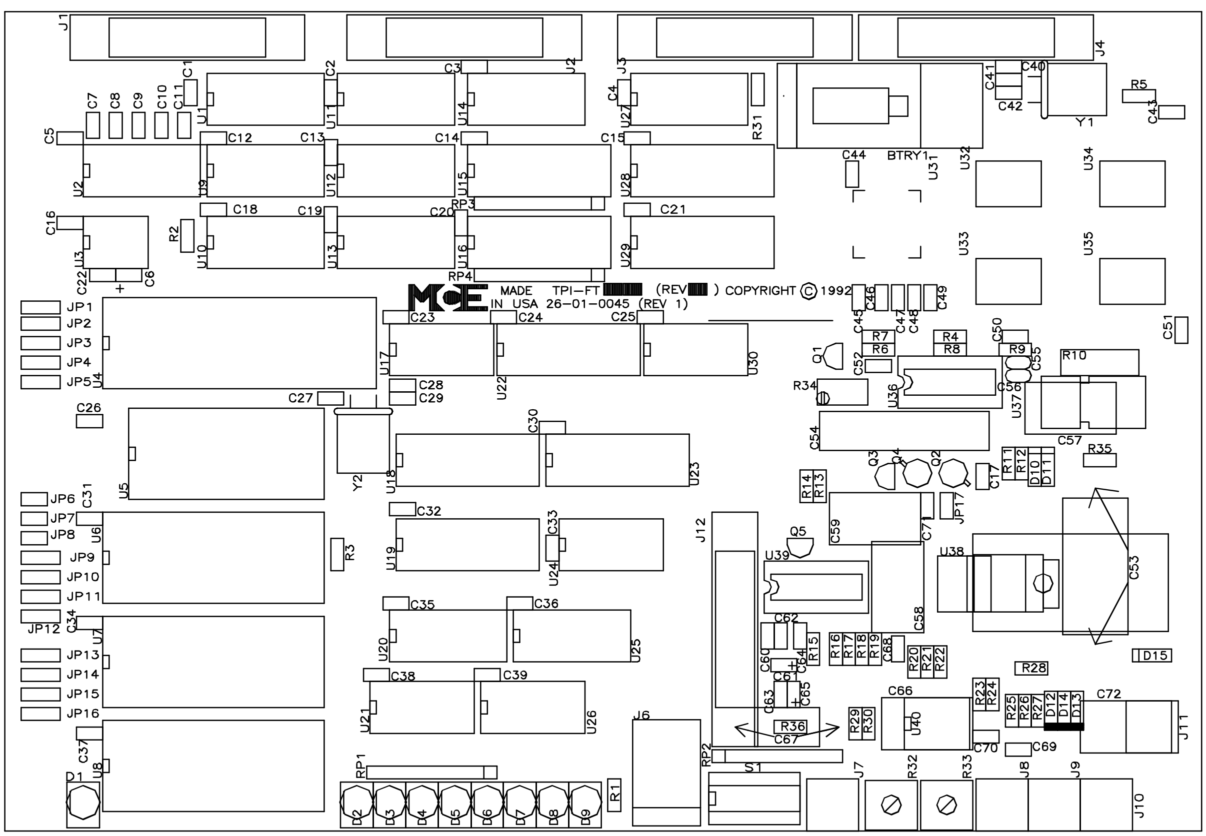
> **NOTE:** The following is a listing of diagnostic tools available on a controller if the Flex-Talk option is provided.

Use this addendum in conjunction with the manual. The addendum provides information regarding the diagnostics and volume adjustments for the TPI-FT, and the TPI-FTR options on the Flex-Talk unit.

E.1 INTRODUCTION AND THEORY OF OPERATION

The Flex-Talk board is designed for use on any MCE controller to provide flexibility in audio announcement. The TPI-FT board is installed inside the controller and hooked up to the last board of the daisy chain. The TPI-FT receives such needed information as door status, nudging, PI, etc. from the MCE bus. A 5V power supply runs the digital circuitry, and a -/+15V supply operates the analog circuitry of the speaker. There are eight LED's used for diagnostic purposes in conjunction with the dip switches. The input and output connectors (J1 and J2) are used for the MCE bus; however, it is unlikely that the output will be used, as the Flex-Talk board is typically the last in the daisy chain, the exception being a duplex where there are two Flex-Talk boards.

FIGURE E.1 TPI-FT Flex-Talk Board



E.2 DIAGNOSTICS

The six switches on the dip switch package are used for diagnostics purposes. There are also eight LEDs (D2 through D9), for displaying diagnostic information. These LED's are used in conjunction with the dip switch package (see below). For self-test, turn ON switch S2 of the dip switch set. The unit will announce each of the floor messages, the direction, nudging and the fire service messages. The special messages are not included in the self test. This test does not require the connection of the MCE bus.

FIGURE E.2 Diagnostic Table

DIP SWITCHES					DIAGNOSTIC LEDS								MNEM.
S2	S3	S4	S5	S6	D2	D3	D4	D5	D6	D7	D8	D9	
1	0	0	0	0	SELF TEST								
0	0	0	0	0	UP	DOWN	NUDG	DOOR	MAIN FIRE	SAF	ALT FIRE	HOSP	MODSW
0	1	0	0	0	PIs DISPLAYED IN BINARY (00 = BOTTOM)								PIN
0	0	1	0	0	X	EM3A	EM2A	EM1A	DORA	GDA	GUA	PIA	MAW
0	1	1	0	0	PIs DISPLAYED IN BINARY (00 = BOTTOM)								IPR_3
0	0	0	1	0	SEC. FLR	HLW	EMP	X	X	X	X	X	SMAW1
0	1	0	1	0	STOP SW	OVS	LOBM	X	X	X	X	X	SMAW2
0	0	1	1	0	X	X	EMP	X	X	X	X	X	EMPWIN
0	1	1	1	0	UP	DOWN	NUDG	DLK	FRS	SAF	FRA	HOSP	ITR-1
0	0	0	0	1	PI0	PI1	PI2	PI3	PI4	CSE	HLW	EPR	ITR-2
0	1	0	0	1	PI5	X	DOPLFR	X	X	H OR (NOT) STC	ATALT	ATMN	ITR-3

Dip switches:
- switches S2, S3, S4, S5, and S6 are used to select which flags on the TPI are to be displayed.
- switch S2 is used for the self test.
- switch S1 is current not used.
- 0 = switch is "Off", 1 = switch is "On"

D2 thru D9: diagnostic LEDs located on the processor board. Lit LEDs indicate that one of the flags listed below D2 thru D9 on the above chart are read as active.

Example: if all switches are off, D4 & D6 are turned on, then nudging and main fire service flags are on.

E.3 VOLUME CONTROL

Trimpots R32 and R33 adjust the main and alternate volume. The main volume adjustment (R32) controls the floor announcements, such as “First Floor”. The alternate volume (R33) controls all other announcements, such as “going up”. Turning either trimpot fully counterclockwise gives maximum volume. The adjustments are easily made with diagnostic switch S2 ON. This will activate the messages and allow the time necessary to adjust the volume. These two trimpots do not affect any music volume that may be connected on J8. Music volume is set external to this unit.

E.4 TROUBLESHOOTING

If there are no audio messages, then:

- The speaker may not be connected on J9.
- The +/-15V supply on connector J7 may not be present.
- Relay U39 may be defective.
- U38 (audio power op-amp) may be defective.
- U5 (program EPROM), U7 or U8 (digitized voice EPROM) may be defective.
- A volume control trimpot may be defective or turned fully clockwise.

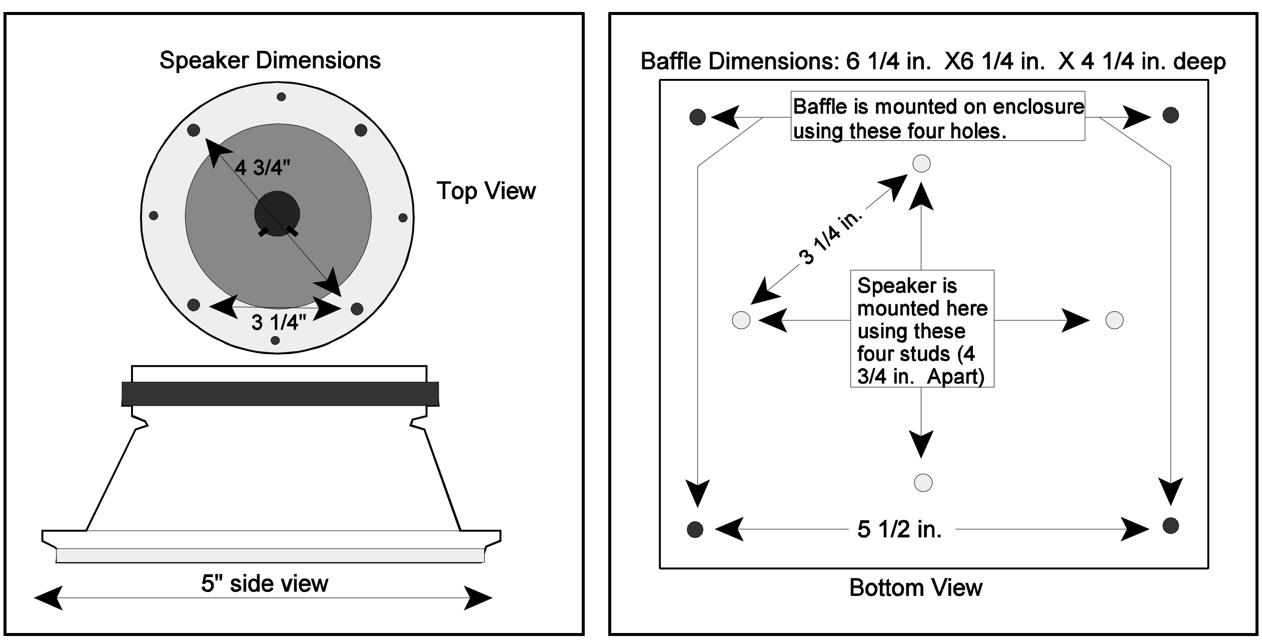
If the message, “Please allow the doors to close” is heard when nudging:

- The photo eye used to detect objects in the door path may be blocked.
- The photo eye may be dirty, or defective.

E.5 PERIPHERAL EQUIPMENT

Square recessed mount 6 1/4" by 6 1/4" by 4 1/4" deep (manufacturer Model # 198-4).
Square surface mount 7" by 7" by 4 1/4" deep (manufacturer Model # SE 198-4).
Circular recessed mount 6 1/8" by 4 1/4" deep without lip (manufacturer Model # 94-4).
7" round by 4 1/4" deep (including lip).
7 3/8" in diameter with circular grill.

FIGURE E.3 Speaker Dimensions



APPENDIX F
LS-QUTE LANDING SYSTEM ASSEMBLY DRAWINGS

NOTE: If a sensor or the HC-IPLS board is replaced, make sure that the **orientation of the HC-IPLS** board is correct. Use the chassis ground and the LEDs shown in the figure below for an orientation reference.

FIGURE F.1 LS QUTE Enclosure Assembly

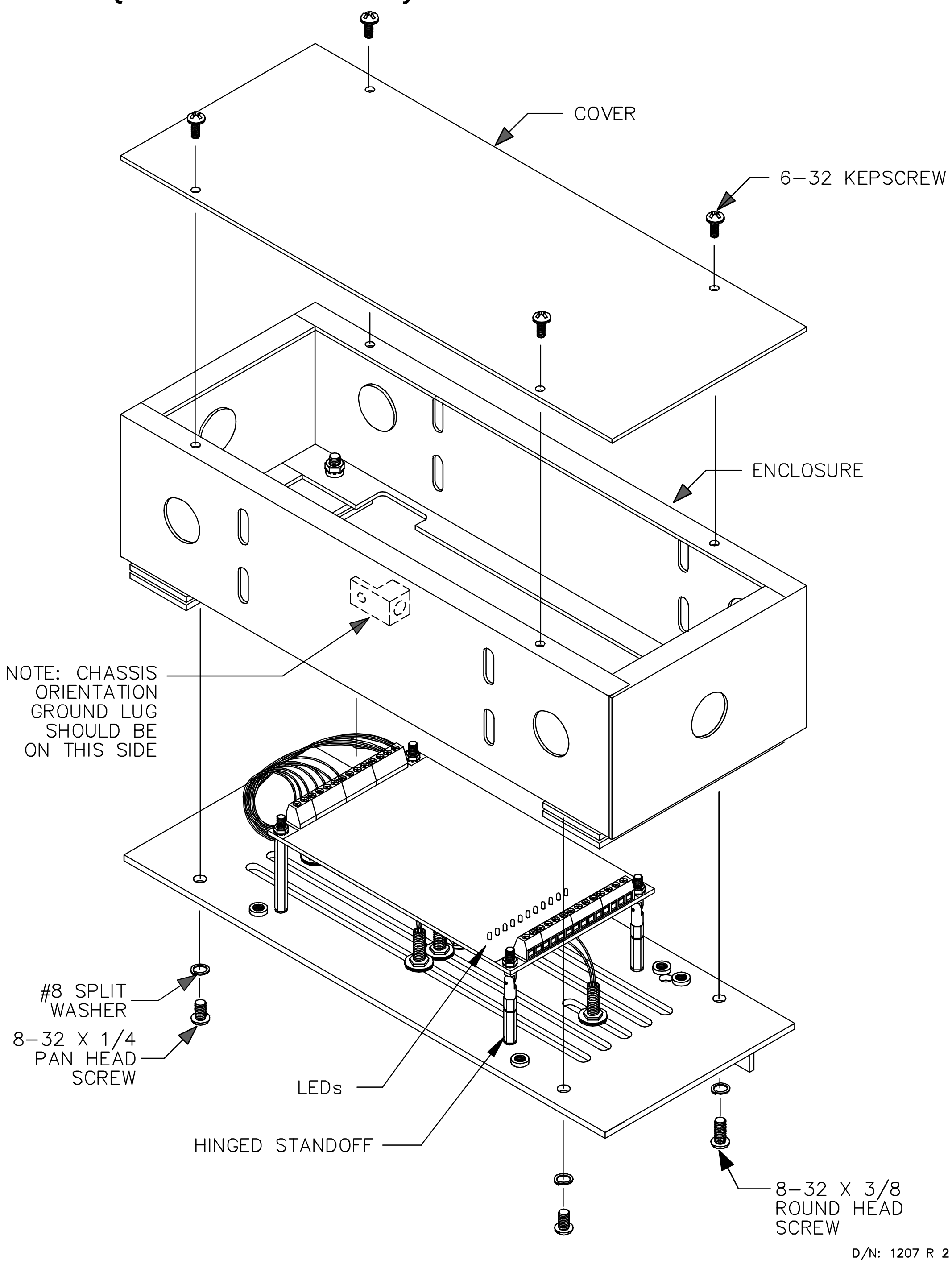
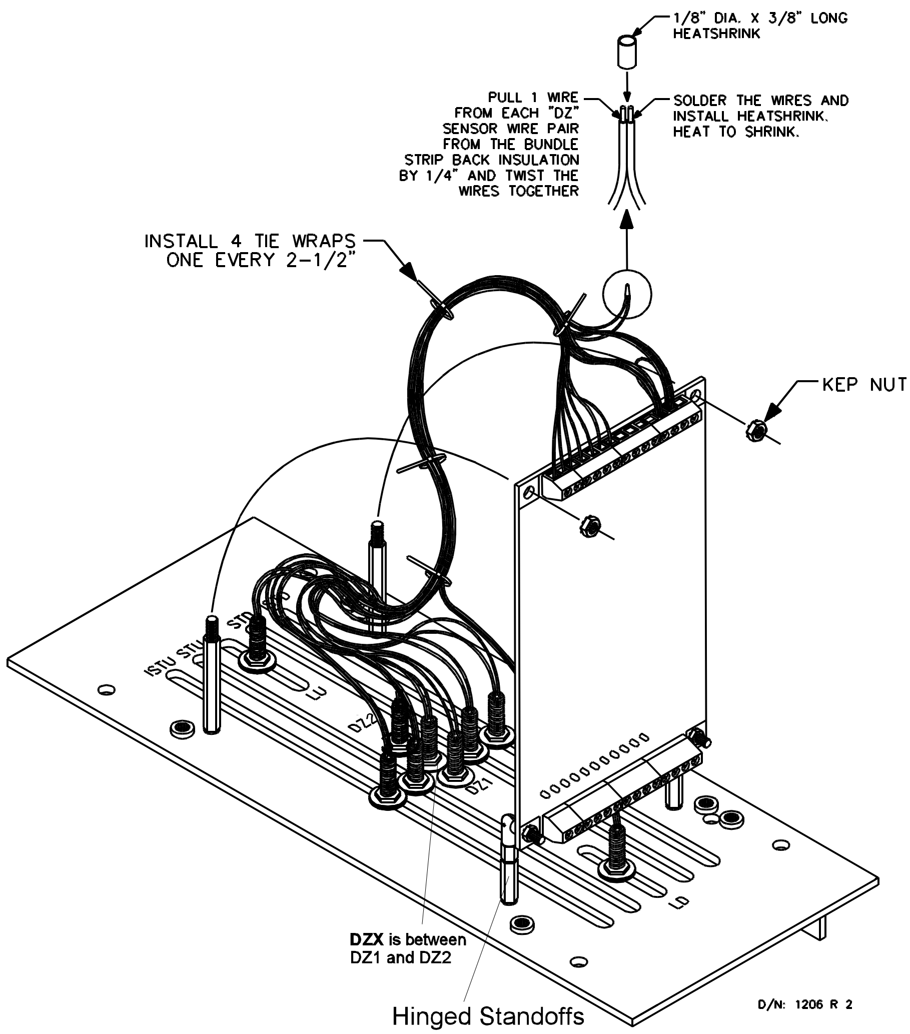


FIGURE F.2 LS QUTE Wiring Diagram



SENSOR	HC-IPLS BOARD TERMINALS	
DZ1	DZ2 SENSOR	S18
DZX	SDZX	S18
DZ2	DZ1 SENSOR	S27
DZF	SDZF	S18
DZR	SDZR	S18
LD	SLD	S18
LU	SLU	S18
STD	STD	S2
STU	STU	S2
ISTD	ISTD	S2
ISTU	ISTU	S2
One 2 inch jumper	S18	S2

APPENDIX G
OPTION SMARTLINK FOR CAR OPERATING PANEL

G.0 GENERAL INFORMATION

This Appendix applies to MCE Controllers with the following boards and software versions: MC-NC Software Version 2.00, and MC-NIO Software Version 2.00. SmartLINK Serial Communication for Car Call Signals **is an option** for MCE controllers. It links the Car Operating Panel (COP) signals to the car controller in the machine room using serial communication techniques. This option reduces the wiring from the COP to the car controller; thus, reducing the installation time and labor cost. The serial link is based on state-of-the-art LonWorks® networking technology. A four-wire link carries the signals and power from the COP to the car controller. If the SmartLINK for COP option is on this controller, reference this Appendix Figure G.1 for controller and board layout. Otherwise, use the controller manual information only.

TABLE G.1 Principal Characteristics

PRINCIPAL CHARACTERISTICS	
Number of Wires	4 (2 for data and 2 for power)
Power on serial link	24 VDC
Number of I/Os on one COP board	24 inputs, 24 outputs
Communication protocol	LonTalk® (based on OSI 7-layer networking protocol)
Controller characteristics	Available for M3 Group System car controllers

G.1 PRODUCT DESCRIPTION

SmartLINK Serial Communication for Car Call Signals provides a serial communication link between the car controller and the Car Operating Panel (COP). Other than the input/output interface between the controller and the COP, there are no changes to the existing controller. The functionality of the controller is not affected.

G.1.1 CAR CONTROLLER NODE

The car controller node (MC-NC board) is the main node of the network. It provides the input/output interface between the car controller computer (MC-MP2 board) and the COP. It contains the Neuron® processor which implements the seven layers of the LonTalk® communication protocol for receiving and sending signals, as network data packets, to and from the COP. It also implements the application level routines to serially transfer these signal values to the car controller computer.

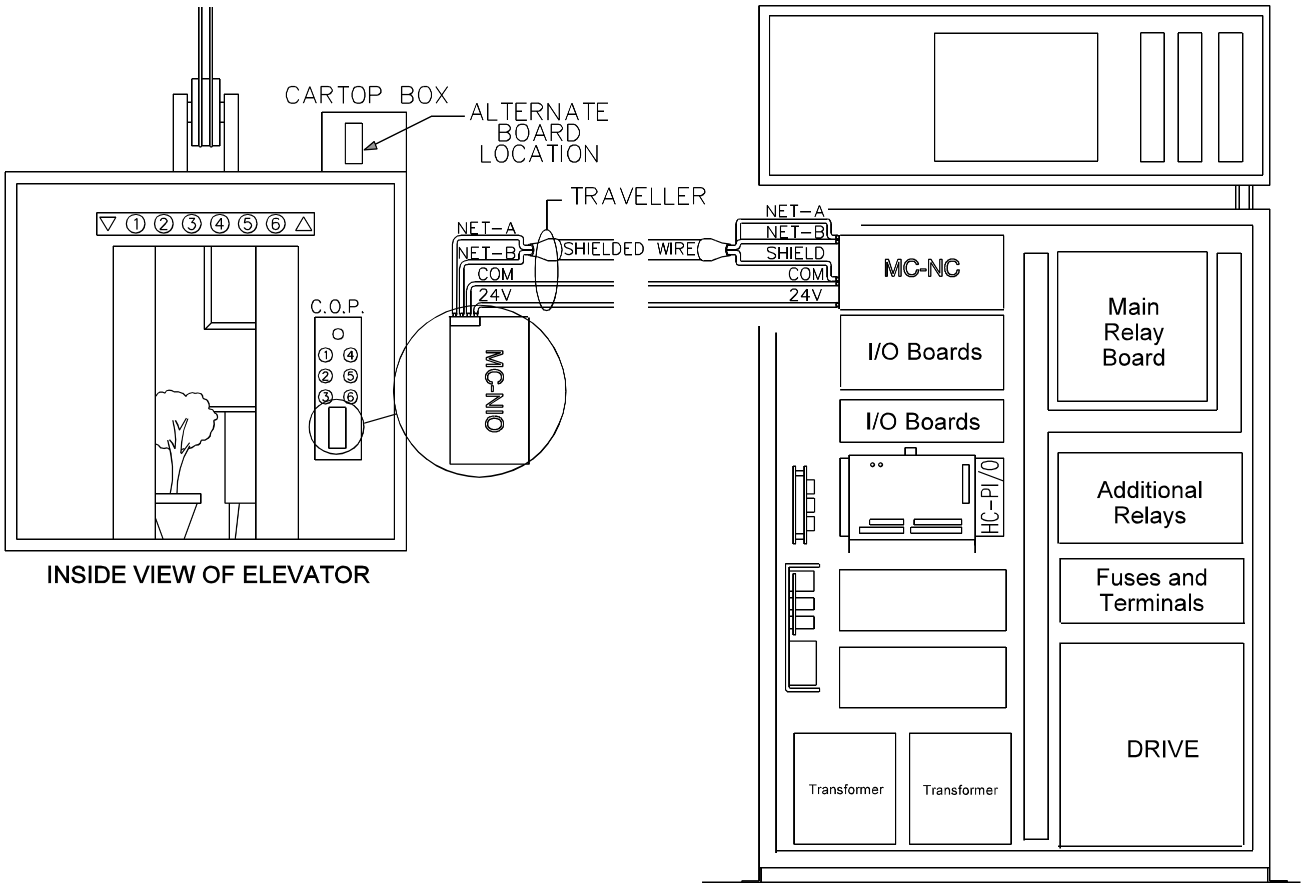
G.1.2 CAR OPERATING PANEL (COP) NODE

The function of the COP node (MC-NIO board) is to transfer COP signal values to and from the car controller node as network packets. The COP signals, such as call buttons, door close button, call lockouts, etc., are sent serially to the car controller node via the LonWorks® network. Similarly, signals such as call button lights, indicators, etc., are received from the car controller node.

G.2 PHYSICAL LAYOUT AND FUNCTIONAL DESCRIPTION

Figure G.1 shows the typical connection between the controller node and the COP node. The physical layout and hardware are described below.

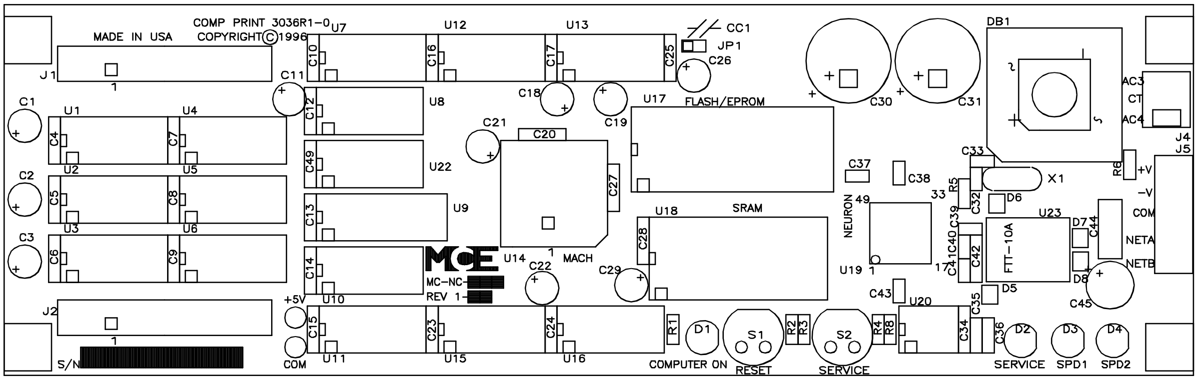
FIGURE G.1 SmartLINK for Car Operating Panel - Typical System



G.2.1 CAR CONTROLLER NODE

The car controller node consists of the MC-NC Neuron Controller board (see Figure G.2) which, for most controllers, replaces the HC-CI/O Call Input/Output board and is physically located where the HC-CI/O board would otherwise be. The MC-NC board provides the interface between the car controller's Main Processor (MC-MP2 board) and the MC-NIO board in the COP. The car call push-button inputs and other input signals from the COP are received serially via the LonWorks® network and are processed by the MC-NC board and then sent serially to the car controller's Main Processor board via a 20-conductor ribbon cable. Information from the car controller's Main Processor board is received serially by the MC-NC board, formatted into data packets, and sent to the COP via the LonWorks® network.

FIGURE G.2 MC-NC Neuron Controller Board



D/N: 3131 R1

G.2.2 CAR OPERATING PANEL (COP) NODE

The COP node consists of the MC-NIO Neuron Input/Output board (see Figure G.3) and, if required, one or more MC-NIO-X Neuron Input/Output Extender board(s) (see Figure G.4). The COP board(s) are physically located either in the COP itself or on the car top. The MC-NIO board has two major functional blocks, the input/output interface and the LonWorks® network interface.

The MC-NIO board monitors the state of the car call push-buttons (ON/OFF) and activates call acknowledgment outputs. It also acquires other inputs from the COP switches and buttons and activates other COP outputs. The MC-NIO board can handle 24 inputs and 24 outputs. The MC-NIO-X board is used for additional inputs and outputs and is responsible for the input/output interface only. It does not contain the network interface electronics.

FIGURE G.3 MC-NIO Neuron Input/Output Board

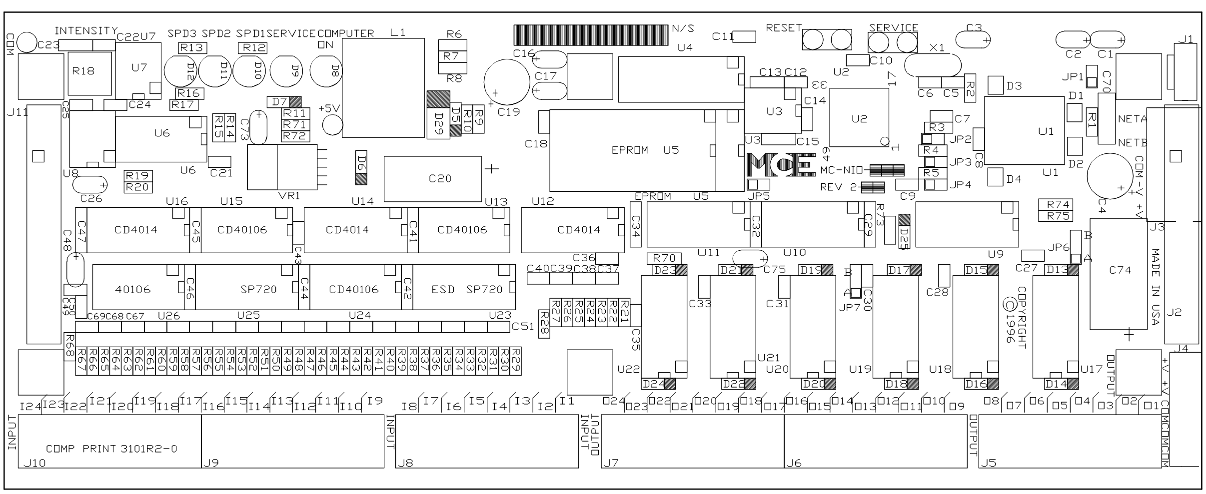


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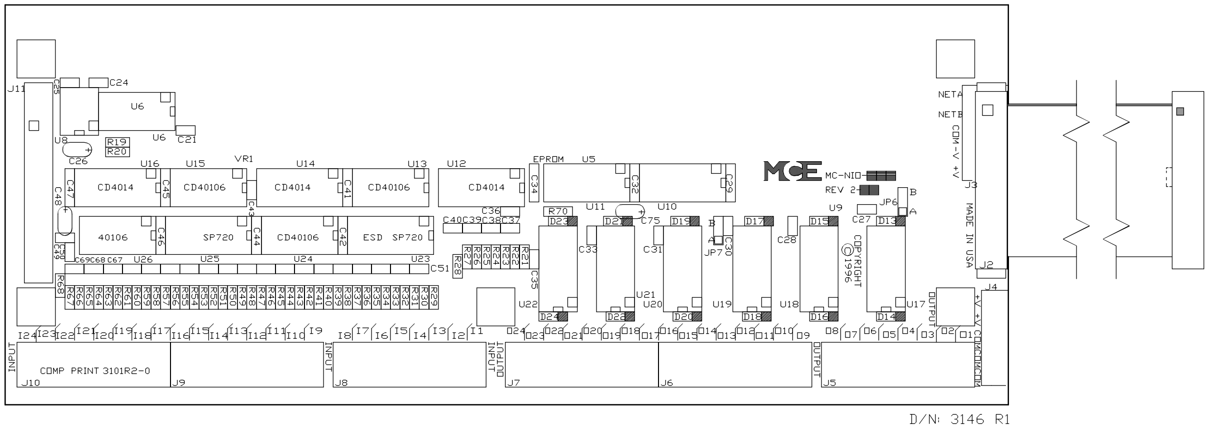
FIGURE G.4 MC-NIO-X Neuron Input/Output Extender Board



G.3 INSTALLATION OF THE MC-NIO & MC-NIO-X BOARDS

MCE's SmartLINK Serial Communication for Car Call Signals option is simple and easy to install. A communication cable is required to connect the MC-NC board (located in the elevator controller) to the MC-NIO board, mounted in the Elevator's Car Operating Panel (COP). As an alternative, the COP board(s) may be located in a metal box on the car top and wired to the COP.

The **MC-NIO** board is the 'NEURON INPUT/OUTPUT' board. All car call buttons as well as all car call acknowledge lights are connected to this board. The **MC-NIO-X** board is the 'NEURON INPUT/OUTPUT EXPANDER' board. It is also located in the COP and used in conjunction with the MC-NIO board for providing additional I/O. The MC-NIO-X board is used when more inputs or outputs are required than the MC-NIO board can provide. The MC-NIO-X board is the same as the MC-NIO board except that fewer components are loaded. The MC-NIO-X board is connected to the MC-NIO board through a 26-conductor ribbon cable. The MC-NIO board connector J11 connects to the MC-NIO-X board at connector J2. Additional MC-NIO-X boards, if needed, can be connected in a cascade fashion to connector J11 of the MC-NIO-X board.

G.3.1 MOUNTING THE BOARDS IN THE COP

MOUNTING ONE BOARD - If the job requires only one board, the MC-NIO can be mounted anywhere in the COP such that the connectors are easily accessible and the board does not obstruct any fixture in the COP. The MC-NIO board is supplied with a mounting plate. The dimensions are shown in Figure G.5.

MOUNTING MORE THAN ONE BOARD - If the job requires the expander MC-NIO-X board(s), they can be mounted in the following three ways. The MC-NIO-X board is also supplied with a mounting plate.

Option 1 - The boards can be stacked one on top of another (see Figure G.6). Make sure that the total height of the boards stacked together does not exceed the available height for mounting the boards in the COP.

Option 2 - The boards can be placed end to end with connector J11 of one board facing connector J2 of the other board (see Figure G.7). In this case, the height requirement will be that of a single board and the I/O connectors on all the boards will be on the same side. Since the boards are mounted lengthwise in this option, make sure that the COP has enough free space lengthwise.

Option 3 - The boards can be placed side by side, with the I/O connectors facing the opposite sides and the non-I/O connector side of the two boards facing each other (see Figure G.8). This option can be used if the COP is wide enough to place two boards side by side.

Any combination of the above three options can be used to best suit the COP length, width, height and the wiring requirements.

NOTE:	The MCE part number for the Mounting Plate is **40-02-0074**

FIGURE G.5 Mounting Plate Dimensions for Mounting the MC-NIO and MC-NIO-X boards

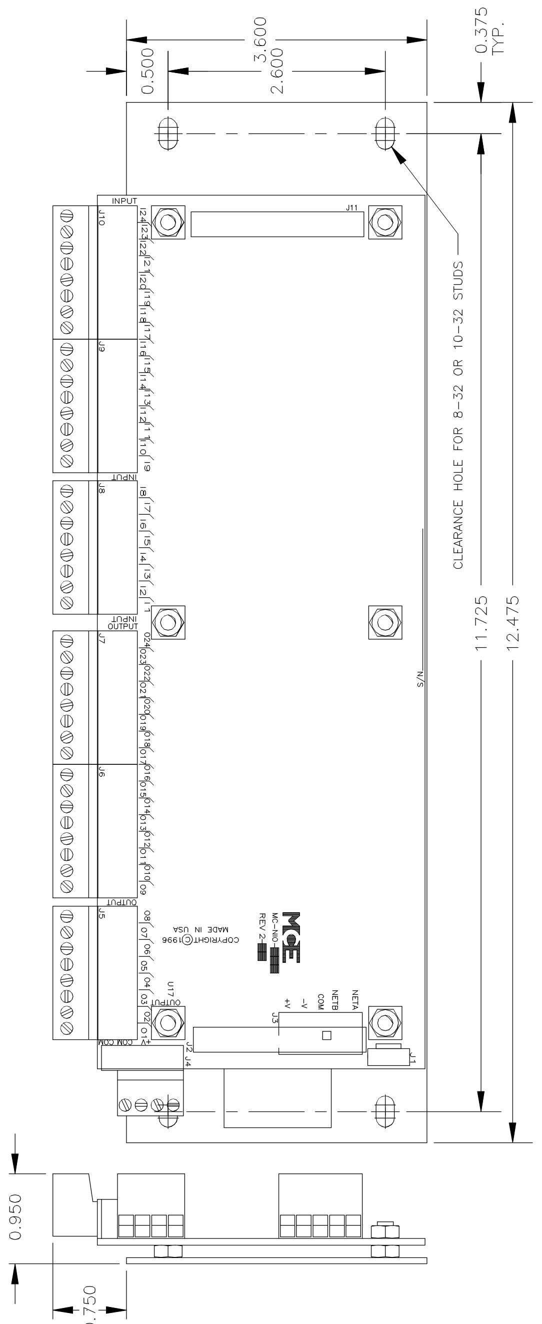


FIGURE G.6 Mounting Option 1: Boards Stacked

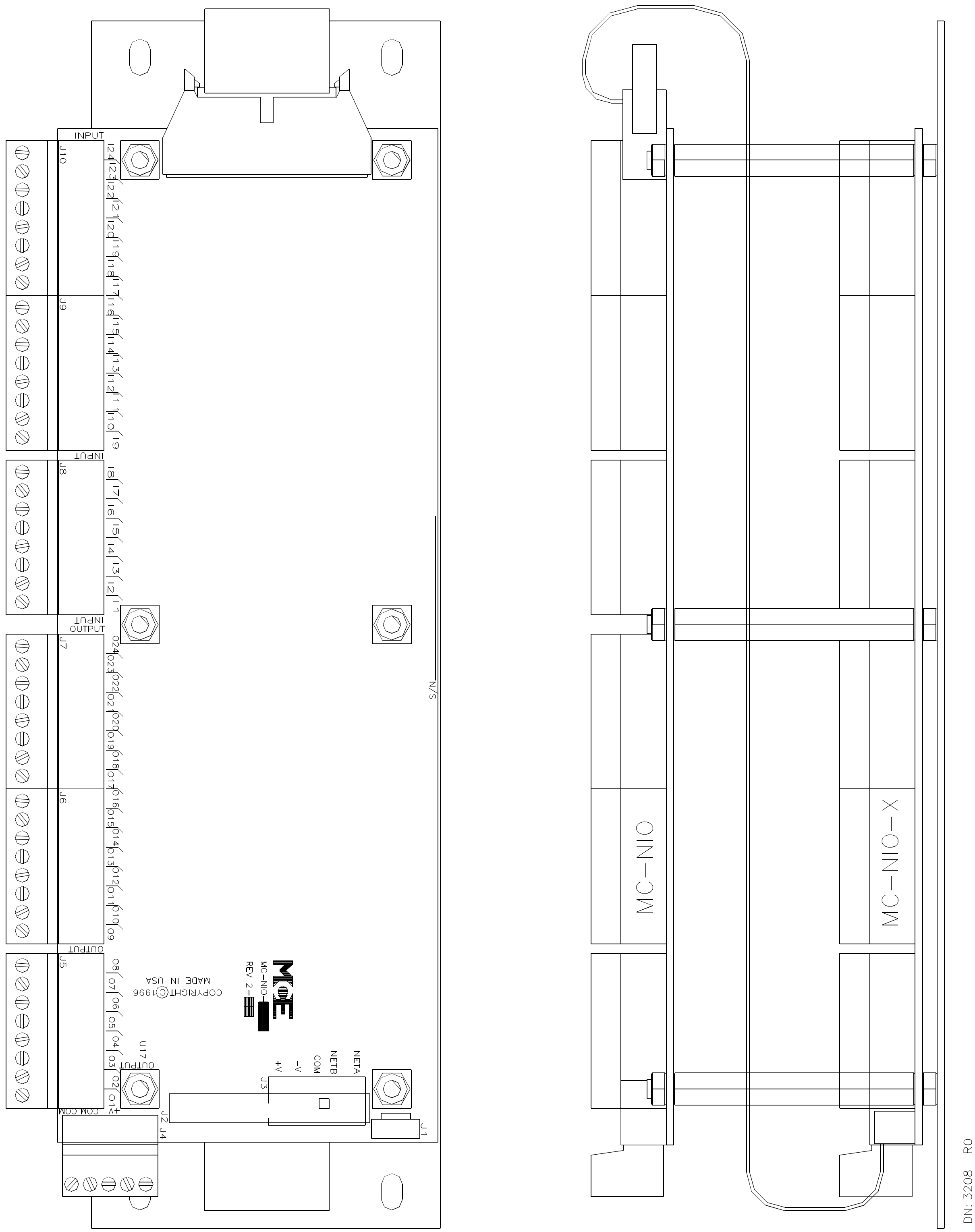


FIGURE G.7   Mounting Option 2: Boards Placed End to End

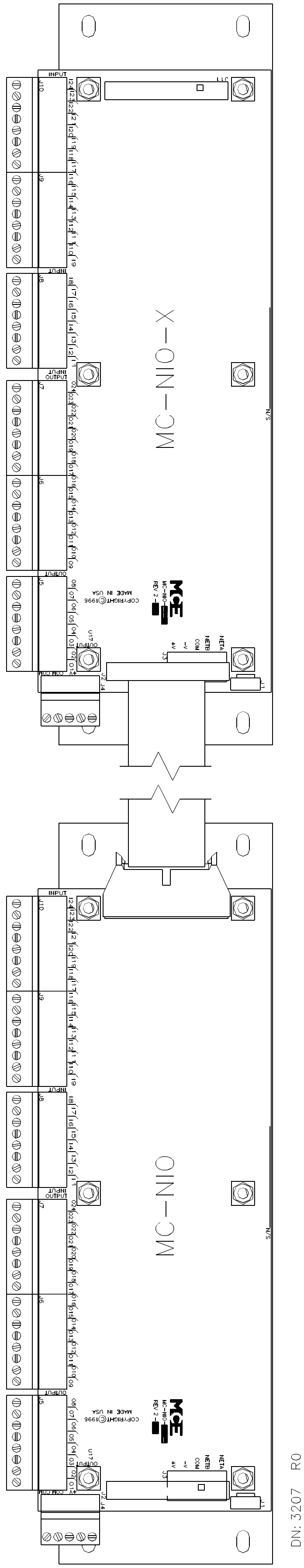
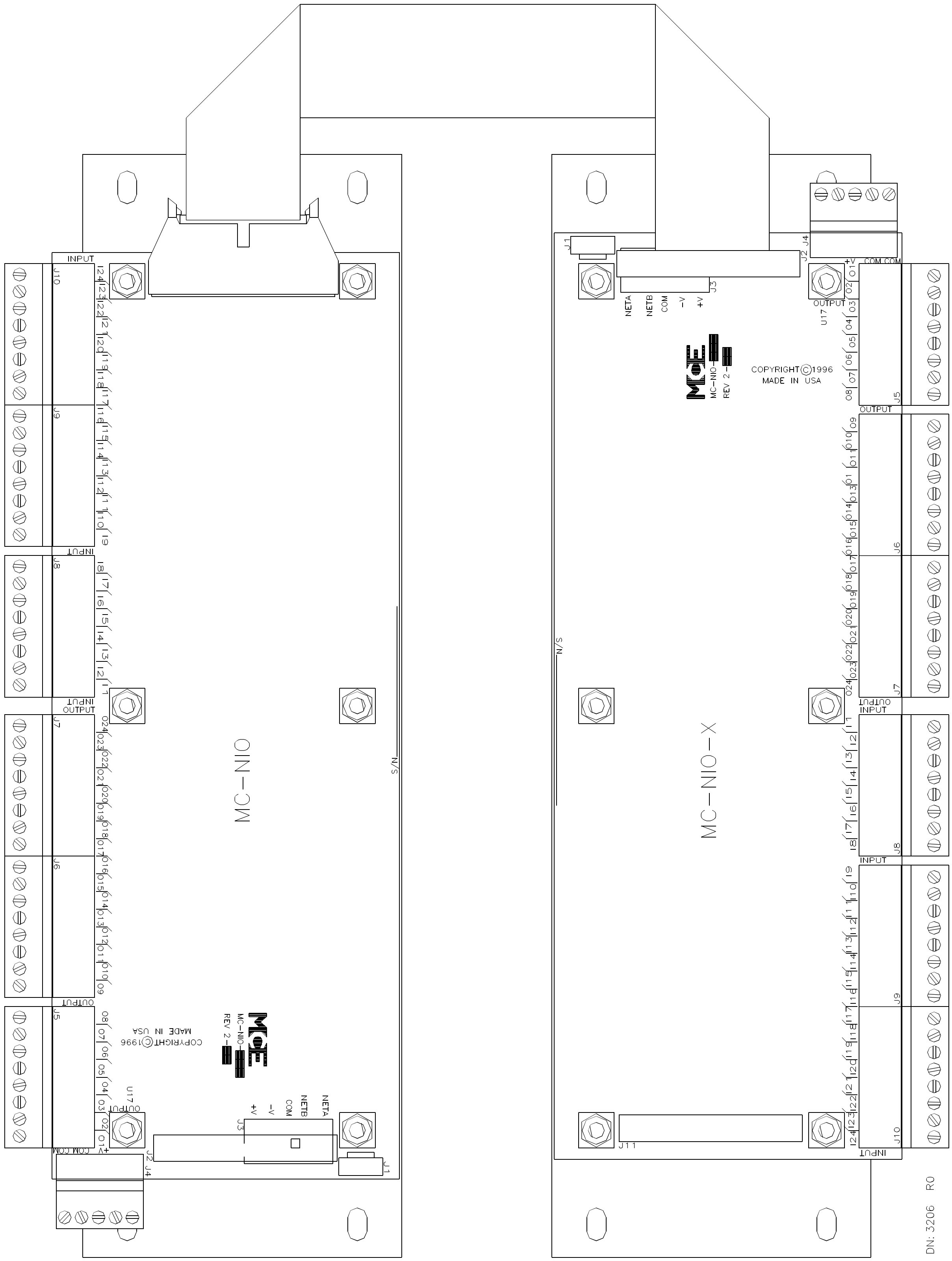


FIGURE G.8 Mounting Option 3: Boards Placed Side By Side



G.3.2 COP INPUT/OUTPUT WIRING

The outputs of the MC-NIO, MC-NIO-X boards are of the “open-collector” type. The bulbs are turned ON when the output terminal is grounded, therefore, the common side of bulbs is connected to the +V terminal (J4) on the MC-NIO and MC-NIO-X boards.

The inputs are internally pulled up to the +V voltage and become activated when grounded, therefore, the common of all the switches is connected to the COM terminal (J4) on the MC-NIO and MC-NIO-X board.

The MC-NIO board is provided with an additional ‘COM’ terminal (J4) which is to be connected to the car or cartop. This will provide a common to the Car. Refer to the job prints for details of the connections.

G.3.2.1 TESTING THE CONNECTIONS

To locally test the connections to the buttons and indicators, power must be supplied with the Network disconnected. To test inputs and outputs after the connections are made, put the MC-NIO board into test mode. To do this, disconnect NETA or NETB and then momentarily short the reset pins. This will cause the inputs of the MC-NIO and MC-NIO-X (if available) boards to turn on its corresponding outputs (i.e., I1 turns on O1 ..... I24 turns on O24). Inputs are activated by grounding them. Test all the outputs by grounding the corresponding inputs. Confirm the wire connections with this test.

G.3.2.2 ACCEPTABLE BULBS FOR USE WITH MC-NIO AND MC-NIO-X BOARDS

In the following tables, the shaded row indicates the preferred lamp for this application.

TABLE G.2 Indicator Specification

INDICATOR SPECIFICATION			
INDICATOR TYPE	**VOLTAGE**	**MAXIMUM CURRENT EACH OUTPUT**	**WATTAGE EACH OUTPUT**
Incandescent Lamp	28V	0.3 Amps	6 Watts
Solid State LED	28V (lamp must have built-in resistor)	0.3 Amps	6 Watts
Neon Lamp	Not applicable		
Electronic Buzzer/Chime	28V	0.3 Amps	6 Watts
Mechanical Buzzer/Chime	Not Applicable		

TABLE G.3 Miniature Bayonet Bulbs

MINIATURE BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
1495	28V	0.30A (MORE BRIGHT)
1873	28V	0.20A
1864, 313, 456, 356	28V	0.17A
1820	28V	0.10A
757, 265	28V	0.08A
1829	28V	0.07A
1819, 28MB	28V	0.04A
1843	28V	0.022A (LESS BRIGHT)

TABLE G.4 Single Contact Bayonet Bulbs

SINGLE CONTACT BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
303	28V	0.30A (MORE BRIGHT)
1251	28V	0.23A
456	28V	0.17A
757	28V	0.08A (LESS BRIGHT)

TABLE G.5 Double Contact Bayonet Bulbs

DOUBLE CONTACT BAYONET BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
304	28V	0.3A (MORE BRIGHT)
6S6DC/30V	30V	0.23A
1252	28V	0.23A (LESS BRIGHT)

TABLE G.6 Screw Base Bulbs

CANDELABRA, SCREW BASE		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
6S6/30V	30V	6 WATTS (MORE BRIGHT)
28RC	28V	1.1 WATTS (LESS BRIGHT)

TABLE G.7 PSB5 Bulbs

SLIDE BASE - TYPE 5 (PSB5)		
LAMP REFERENCE # *	**VOLTAGE**	**CURRENT**
28PSB	28V	0.04A

*** Note:** Bulb shapes vary within a given base style and some may not fit within your fixture.

G.3.3 TRAVELER CABLE

For proper operation the specification of this cable must be, at a minimum, the following:

TABLE G.8 Existing Traveler-Communication Cable Specification

EXISTING TRAVELER-COMMUNICATION CABLE SPECIFICATION	
For NETA and NETB connections	**For +V and Com**
Shielded Twisted Pair (16-22 AWG) (Shield grounded in controller)	See Job Prints - page 1

When the opportunity exists for a new traveler cable, the following specifications are recommended.

TABLE G.9 New Traveler-Communication Cable Specification

NEW TRAVELER-COMMUNICATION CABLE SPECIFICATION	
For NETA and NETB connections	**For +V and Com**
Single twisted pair (one of the following) Belden # 85102 (or equivalent) Belden # 8471 (or equivalent) Belden # 9841 (or equivalent)	See Job Prints - page 1

G.3.3 NODE IDENTIFICATION JUMPERS

A future option will allow multiple MC-NIO boards to be connected to the LonWorks® network where multiple COPs exist. Each MC-NIO board has several jumpers located on it. Three of the jumpers are for identifying the board when more than one is used. These identifying jumper positions are listed in Figure G.10 MC-NIO Board Quick Reference.

G.3.4 BULB INTENSITY

The COP node (MC-NIO board) has an intensity control for incandescent bulbs and solid state LEDs. The intensity adjustment trimpot is located at the edge of the board near the 26-pin ribbon cable connector. It is a single turn trimpot which, when turned fully counterclockwise, reduces the intensity by approximately 50%. When turned fully clockwise the intensity is 100% (full voltage applied at output terminals). In addition, two jumpers control which lamps are affected by the intensity trimpot. Jumper position and affected outputs are listed in Figure G.10 MC-NIO Board Quick Reference. Acceptable bulb types are listed in Tables 0.2 thru 0.7. If two COPs are connected in parallel, bulbs cannot exceed three watts each.

G.3.5 PERIPHERAL DEVICES

Output devices connected to the MC-NIO board must be "Positive Common Bus" type devices. The voltage rating must be 24VDC. Devices can include digital PI's, electronic arrival chimes, lanterns, and electronic buzzers.

G.3.6 COMMUNICATION TERMINATION

The shield of the twisted pair SmartLINK communication cable must be connected to the "COM" terminal (J5) only on the MC-NC board in the car controller (located in the machine room). Do NOT connect the shield on the MC-NIO board.

The serial link is a 78 Kbit per second data link which should be terminated at both ends of the communication cable, both in the machine room and in the COP or car top box. Termination at the car controller end, on the MC-NC board, is integrated into the design. Termination at the COP end, on the MC-NIO board, is accomplished by placing a shunt on jumper JP1 (factory installed).

G.4 NETWORK SELF-INSTALLATION AND CONFIGURATION

NOTE: Previous software versions required that the installer perform a "network installation process" before the serial communication link would function. MC-NC software version 2.00 includes an enhancement which eliminates the need for such a process.

After all electrical connections have been made, network communication should be established approximately 10 seconds after system power-up.

G.4.1 NETWORK COMMUNICATION

The diagnostic LED SPD2 on the MC-NC board indicates network activity/status.

If the SPD2 LED on the MC-NC board blinks at an approximate rate of twice per second, network communication has been established.

If the LED is solidly ON or OFF, the network communication is not established. Check the network wire connections to NETA and NETB.

Diagnostic address 3017H contains a communication error counter. Normally all diagnostic LEDs displayed at this address should be OFF on the computer swing panel. If the counters are increasing rapidly (once every 10 seconds), the communication is not stable, check for proper wiring and shielding.

G.5 TROUBLESHOOTING GENERAL

The Diagnostic Indicators on the MC-NC and MC-NIO boards and on the Computer Swing Panel assist in troubleshooting the SmartLINK Serial Communication for Car Call Signals. The SmartLINK for Car Calls option requires two additional boards, the MC-NC Neuron Controller board (in the car controller) and MC-NIO, Neuron Input/Output board (in the COP or on top of the car). Both of these boards have a processor on them and run independent software programs.

G.5.1 TROUBLESHOOTING THE MC-NC BOARD

Begin by examining the indicators and jumpers on the MC-NC board (see Figure G.9, MC-NC Quick Reference).

G.5.1.1 COMPUTER ON LED

Upon power-up the “Computer On” LED on the MC-NC board should be solidly ON. If this LED is OFF or blinking, verify that the EPROM is installed properly and that all the ribbon cable connections are secure. Verify that the voltage at the +5V test point (located near ribbon cable connector J2) is between 4.75V and 5.1V.

G.5.1.2 COMMUNICATION WITH THE MAIN COMPUTER

The diagnostic LED SPD1 on the MC-NC board indicates communication activity with the Main computer (MC-MP2). If this LED is solidly ON, it means that the MC-NC and the Main Computer are not communicating. Verify that the ribbon cable is connected properly to J2. Proper communication is indicated by the SPD1 LED blinking at a rate of approximately 20 times/second.

G.5.1.3 NETWORK COMMUNICATION

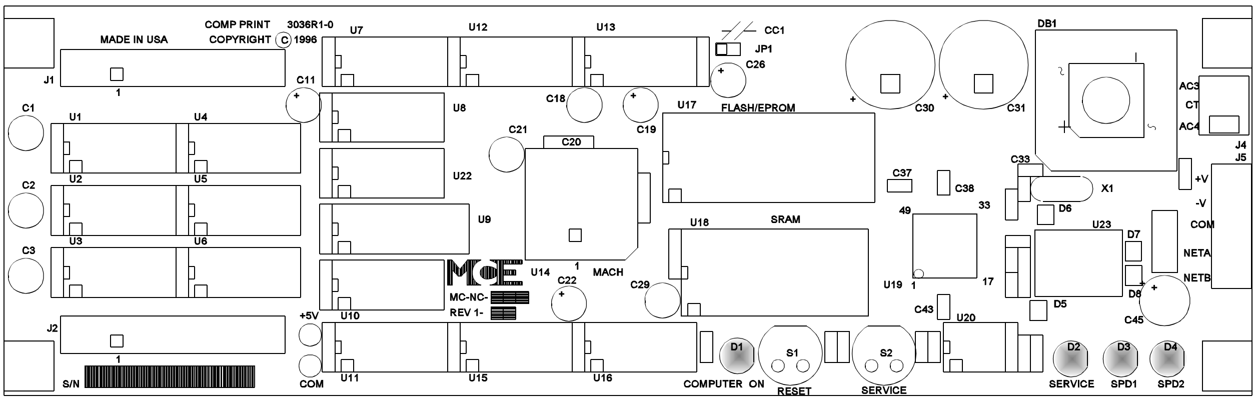
The network communication status is indicated by diagnostic LED SPD2 on the MC-NC board. If this LED is solidly ON, it means that the network communication is not established. Verify that the network wires are connected properly to NETA and NETB on the connector.

To confirm that the network communication is established properly, check the SPD2 LED on the MC-NC board. It should be blinking at a rate of twice a second. If the SPD2 LED on the

MC-NC board is either ON or OFF, network communication is not established. Check the network communication counters in the diagnostic buffer (address 3017H). If these counters are increasing rapidly (once every 10 seconds), the communication is not stable. Verify proper wiring and shielding of the network cable as shown in the Job prints.

FIGURE G.9 MC-NC Board Quick Reference

MC-NC QUICK REFERENCE Software Ver. 2.00 or higher



Note status of LEDs (Computer ON, Service, SPD1 & SPD2)

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RESET AND SERVICE TEST PINS

"Reset" test pins reset the board and the board program when shorted together.
"Service" test pins send the node information on the network when shorted together.

MC-NC Diagnostic Indicators

LED	Computer On	Service	SPD1	SPD2
OFF	Board not functioning. Check +5V. If no +5V, check ribbon cable connection at J2.	**Normal.** The normal state of this LED is OFF.	Possible faulty ribbon cable at J2, connector J2, or MC-NC board.	If normal blinking does not occur (as described below), check NETA and NETB connections.
ON	**Normal.** Computer functioning properly.	Verify proper installation of EPROM. If installed properly, replace board.	MC-NC unsuccessful in communicating with MC-MP2. Possible software configuration error (MP2).	MC-NC unsuccessful in communicating with MC-NIO. Check NETA and NETB connections.
Blinking	If Computer On LED blinks continuously (approx. once per second), verify proper installation of EPROM.	Verify EPROM version. If V2.00 or higher, replace board.	**Normal.** When accompanied by SPD2 blinking, there is communication. SPD1 blinks very rapidly under normal conditions.	**Normal.** Indicates communication between the MC-NC and the MC-NIO (blinks approx. twice per second).

G.5.2 TROUBLESHOOTING THE MC-NIO BOARD

Begin by examining the indicators and jumpers on the MC-NIO board (see Figure G.10, MC-NIO Quick Reference).

G.5.2.1 COMPUTER ON LED

Upon power-up the “Computer ON” LED on the MC-NIO board should be solidly ON. If the LED is OFF or is flashing, verify that the EPROM is installed properly and the voltage on the +V pin of connector J3 is between 12V and 28V and that the voltage at the +5V test point is between 4.75 and 5.15V.

G.5.2.2 NETWORK COMMUNICATION

The network communication status is indicated by diagnostic LED SPD2 on both the MC-NC and the MC-NIO boards. If this LED is solidly ON, it means that the network communication is not established (see the diagnostic indicator table on the MC-NIO QR card).

G.5.2.3 BULB INTENSITY CONTROL

If the bulbs do not come on or if varying the intensity trimpot has no effect on the bulb intensity check jumpers JP6 and JP7 (see Figure G.10, MC-NIO Quick Reference). If the jumpers are installed correctly and the bulb intensity still does not work, replace the MC-NIO board.

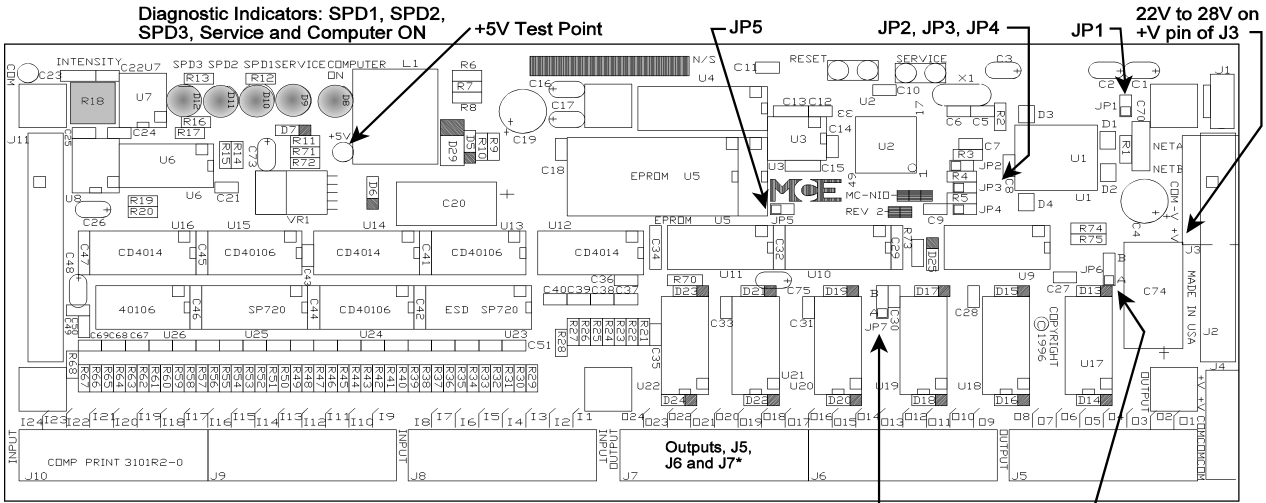
G.5.2.4 MC-NIO & MC-NIO-X OUTPUTS

Testing During Installation - To test inputs and outputs during installation, put the MC-NIO board into test mode. To do this, ensure that the board has power at the +V to COM terminals at connector J3, then disconnect the NETA wire and momentarily short the reset pins. This will cause the inputs of the MC-NIO and MC-NIO-X (if available) boards to turn ON its corresponding outputs (i.e., I1 turns on O1 ..... I24 turns on O24). Inputs are activated by grounding them. Test all the outputs.

Output Fails During Operation - If a previously working output fails, check the output device and wiring. If the device is functional, and the wiring correct, swap the corresponding driver chip with another driver chip (U17 to U22) to check for a failed driver. If problem remains, replace the board.

FIGURE G.10 MC-NIO Board Quick Reference

MC-NIO QUICK REFERENCE Software Ver. 2.00 or higher



* Outputs are open collector type, i.e. bulbs are turned ON when the output terminal is grounded.

Jumper Settings (* Denotes factory setting)

NODE IDENTIFICATION JUMPERS

	JP2	JP3	JP4
1st Board*	ON	ON	ON
2nd Board	OFF	ON	ON
3rd Board	ON	OFF	ON
4th Board	OFF	OFF	ON
5th Board	ON	ON	OFF
7th Board	OFF	ON	OFF
6th Board	ON	OFF	OFF
8th Board	OFF	OFF	OFF

OUTPUT INTENSITY CONTROL JUMPERS
R18 adjusts intensity when Enabled

JUMPER	POSITION	DESCRIPTION
JP6	A	Intensity Enabled Outputs 01 to 08
	B*	Intensity Disabled Outputs 01 to 08
JP7	A*	Intensity Enabled Outputs 09 to 024
	B	Intensity Disabled Outputs 09 to 024

TERMINATION JUMPER

JP1	ON*	ON = terminated, OFF = not terminated

EPROM SIZE JUMPER

JP5	ON*	ON = 27C256, 27C512, 27C010. OFF = 27C020

MC-NIO Diagnostic Indicators

LED	Computer On	Service	SPD1	SPD2	SPD3
OFF	Board not functioning. Check +5V and +24V	**Normal.** The normal state of this LED is OFF.	SPD1 lights whenever any input is activated. If SPD1 does not light when a button is pushed, check the button/switch "common."	This LED should flash whenever a button/switch is activated or deactivated.	SPD3 lights whenever the input/output circuits are being read/written. This LED should blink very quickly (this is the normal state of SPD3). Check EPROM and +5V if SPD3 is off continuously.
ON	**Normal.** Computer functioning properly.	Verify proper installation of EPROM. If installed properly, replace board.			
Blinking	Computer not functioning. Verify proper installation of EPROM.	Verify EPROM version. If V2.00 or higher, replace board.			

G.5.3 SYSTEM TROUBLESHOOTING

GENERAL The serial link is a method of transferring input status (buttons and switches) and output status (indicators) between the car operating panel and the elevator controller. A non-operational serial link would generally result in the complete failure in the transfer of this information. When troubleshooting a problem that you believe might be attributed to a failure of the serial link, bear in mind that the serial link is simply an I/O system. For example, the inability to register a car call from the car operating panel may be due to reasons other than the serial link. Whenever possible, separate the issues (divide and conquer) through creative means (e.g., try to register car calls via the group or local CRT to determine if car calls can be registered at all).

A few examples are given below, with commentaries that serve to illustrate the concepts discussed above.

Problem: Car call buttons do not illuminate when pressed, and the calls do not latch.

Pushing a car call button should always result in the illumination of the indicator for that button. If the car call indicators do not light when the respective buttons are pushed, a failure of the serial link should be investigated. Special attention should be paid to the serial bus wiring (the wires that make up the serial link), especially when this behavior applies to all of the car call buttons (not just a select few). Follow the instructions in the “General Troubleshooting Steps” section below.

Problem: Car calls do latch, and a number of car calls can be registered, but after awhile all the calls cancel simultaneously. The car stops at the next landing and does not open its doors.

Because the car calls can, in fact, be registered through the car operating panel, and because the car call indicators do function properly, the problem described may not be related to the serial link. Cancellation of the car calls may be a result of something unrelated to the serial link (e.g., anti-nuisance logic), so it is important to keep an open mind (don’t assume that the serial link is the cause for canceling the car calls). Check the job prints for inputs that are being transferred through the serial link. There may be an input transferred through the serial link that may cause car cancellation should an intermittent problem with the input signal exist. For example, “flickering” of the independent service input will generally result in car call cancellation (it is typical to initially cancel all car calls whenever an off-to-on transition of independent service is detected).

Problem: When pressed, the call buttons illuminate, but then extinguish. The call does not latch.

Discussion: This may or may not be a problem with the serial link. During conditions in which car calls are not allowed to latch by the controller main processor, this behavior is expected. Follow the “General Troubleshooting Steps” outlined below.

GENERAL TROUBLESHOOTING STEPS

Step 1 Determine if car calls can, in fact, be registered. On many products this can be accomplished via a system CRT Terminal (connected to either the elevator controller or a Group Supervisor). If a CRT is not available, car calls can be latched via the elevator controller’s swing panel. Section 5 of the controller’s installation manual provides details regarding this process. If car calls cannot be registered, the problem may not be with the serial link at all.

Step 2 Determine if the serial link is communicating reliably. This is done by activating the independent service switch in the COP (if one exists; if one does not exist, go to Step 2A). Make sure that the independent service status is not being established through any other means (i.e., the Test switch, or some other independent service switch not wired through the serial link). Verify the car is on independent service. If a helper is available (with communications) verify that the independent service indicator on the swing panel's vertical LEDs toggles on and off corresponding to the activation and deactivation of the switch in the COP. Check to see that the indicator does not "flicker" when the independent service switch is left in the ON position.

Step 2A If an independent service switch does not exist in the COP, activate the door close button. If the doors appear to respond to the button, it is very likely that the serial link is performing properly. It may be worthwhile to verify that the communication link is solid by referencing the swing panel diagnostics (address 20H). As an example, an assistant can observe the DBC flag in the diagnostics while the door close button is being pressed continuously in the COP. The DBC flag should illuminate solidly while constant pressure is placed on the door close button. Refer to the Controller Manual for additional swing panel diagnostic information.

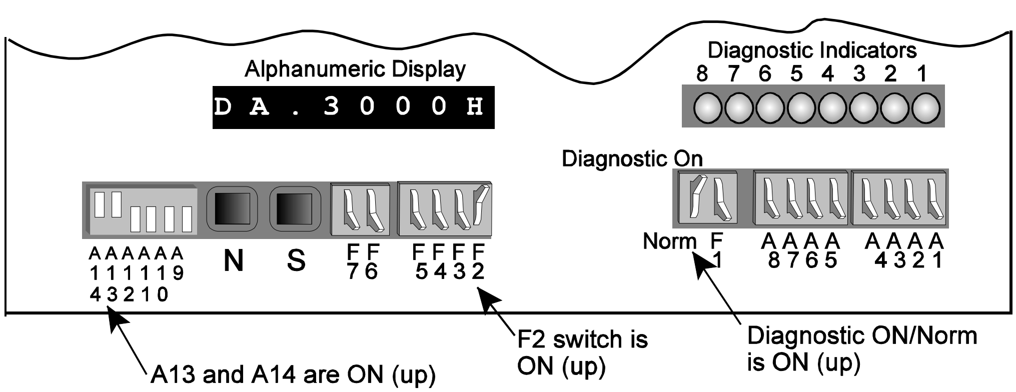
Step 3 If Step 2 indicates that the serial communication is not established, all network wiring should be double-checked. "Network wiring" refers to the wires that connect the MC-NC board (in the controller) to the MC-NIO board (in the COP). These wires should be checked for continuity and for connection to the proper respective terminals on each board. [Note: A subsequent step in the troubleshooting process will call for the inspection of diagnostic indicators on the MC-NIO board. Accordingly, it is suggested that access to the MC-NIO board be maintained at this time.]

Step 4 Once all wiring has been verified (both in the controller and in the COP) observe the diagnostic LEDs on both the MC-NC board and the MC-NIO board. Figures 0.9 "MC-NC Quick Reference" and 0.10 "MC-NIO Quick Reference" provide information regarding the interpretation of these LEDs.

G.5.4 COMPUTER SWING PANEL DIAGNOSTICS

The contents of serial link related computer memory flags can be viewed on the Computer Swing Panel's Diagnostic Indicators. MCE Technical Support personnel may request that you access this information while troubleshooting. The memory flags for serial link data begin at address 3000 hex. Set the switches as shown in Figure G.11 to access address 3000 hex.

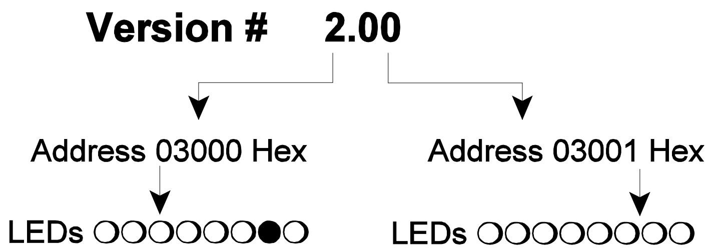
FIGURE G.11 Diagnostic Switch Settings for Address 3000 HEX



Switches A13 and A14 select the first two digits of the address (30) with A9 thru A12 OFF (down) and A13 and A14 ON (up). Switches A1 thru A8 select the last two digits of the address (00) with A1 thru A8 OFF (down). The Alphanumeric Display indicates that address 3000 hex is selected (DA.3000H). The Diagnostic Indicators show the status of the computer memory flags at this location (LED ON = 1, LED OFF = 0).

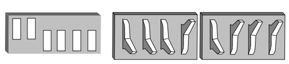
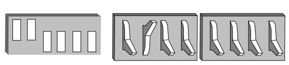
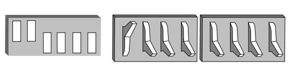
Software Version Verification for the MC-NC: Address 03000H displays the major version number on the diagnostic indicators. Address 03001H displays the minor version number. See example below.

Example:



Car call inputs from the MC-NC board to the MC-MP2 board, and car call latched outputs from the MC-MP2 board may be viewed in the following addresses and are useful troubleshooting tools.

TABLE G.10 Key Diagnostic Memory Addresses

Alpha-numeric Display	**Switch Setting** **A14 - A9 A8 - A1**	**Diagnostic Indicators**	**LED Designation**
3017H		Displays the count of failed attempts for MC-NC communication.	LEDs should be *OFF*.
3040H		Displays the car call inputs from the MC-NIO board.	LEDs correspond to the first eight floors. Subsequent floor calls are viewed at address 3041, 3042 etc.
3080H		Displays the car call registration outputs from the Main controller.	LEDs correspond to the first eight floors. Subsequent floor calls are viewed at address 3081, 3082 etc.

APPENDIX H
ELEVATOR SECURITY INFORMATION AND OPERATION

Building name: ___________________________________

Building location: ___________________________________

Security activation:	Key switch	Mon:	from ________	to ____
	or	Tue:	from ________	to ____
	Time clock	Wed:	from ________	to ____
		Thu:	from ________	to ____
		Fri:	from ________	to ____
		Sat:	from ________	to ____
		Sun:	from ________	to ____

Instructions: To gain access to secured floors, follow the steps below while in the elevator car. The steps may be taken while the car is moving or standing still. Requests for a car from a hallway or corridor are answered without restriction.

1. While in the car, press the button for the desired floor. If the destination floor is secured, the button for that floor will flash ON and OFF.

   If the button for that floor stays solidly lit, that floor is unsecured.

2. While the destination floor button is flashing, enter the security code for that floor within 10 seconds. Enter the security code by pressing the corresponding buttons on the panel.

   If the code was entered correctly and within the required time limit, the car will immediately go to that floor. If the code was not entered within the 10-second time limit or was entered incorrectly, the destination floor button light will turn off after 10 seconds and the entire sequence must be repeated.

   If a mistake is made while entering the security code, simply wait until the destination floor button light stops flashing and start the entire sequence again.

SECURITY CODES

Maintain a record of the security codes by noting the floor name as found in the elevator cab and each floor's code. Any floor with a security code is a secured floor.

1.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
2.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
3.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
4.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
5.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
6.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
7.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
8.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
9.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
10.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
11.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
12.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
13.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
14.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
15.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
16.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
17.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
18.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
19.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
20.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
21.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
22.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
23.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
24.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
25.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
26.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
27.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
28.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
29.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
30.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
31.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___
32.	**Floor**	______	**security code**	**=**	___ ___ ___ ___ ___ ___ ___ ___

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