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**Manual,
*HAPS-Hydraulic Auxiliary Power Supply***

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Important Precautions and Useful Information

This preface contains information that will help you understand and safely maintain MCE equipment. We strongly recommend you review this preface and read this manual before installing, adjusting, or maintaining Motion Control Engineering equipment. This preface discusses:

- Safety and Other Symbol Meanings
- Environmental Considerations
- In This Guide

Safety and Other Symbol Meanings



Danger

This manual symbol is used to alert you to procedures, instructions, or situations which, if not done properly, might result in personal injury or substantial equipment damage.



Caution

This manual symbol is used to alert you to procedures, instructions, or situations which, if not done properly, might result in equipment damage.



This manual symbol is used to alert you to instructions or other immediately helpful information.

Environmental Considerations

- Keep ambient temperature between 32 and 104 degrees F (0 to 40 degrees C).
- Prevent condensation on the equipment.
- Make certain that power line fluctuations are within plus or minus 5% of proper value.

In This Guide:

This guide is the installation, adjustment, and troubleshooting guide for the HAPS-Hydraulic Auxiliary Power Supply. When viewed online as a pdf file, hyperlinks link to related topics and informational websites. The manual includes:

- [Contents](#): Table of Contents. When viewed online as a pdf file, hyperlinks in the Contents link to the associated topic in the body of the manual.
- [HAPS](#): Product Description, installation, and troubleshooting instructions.

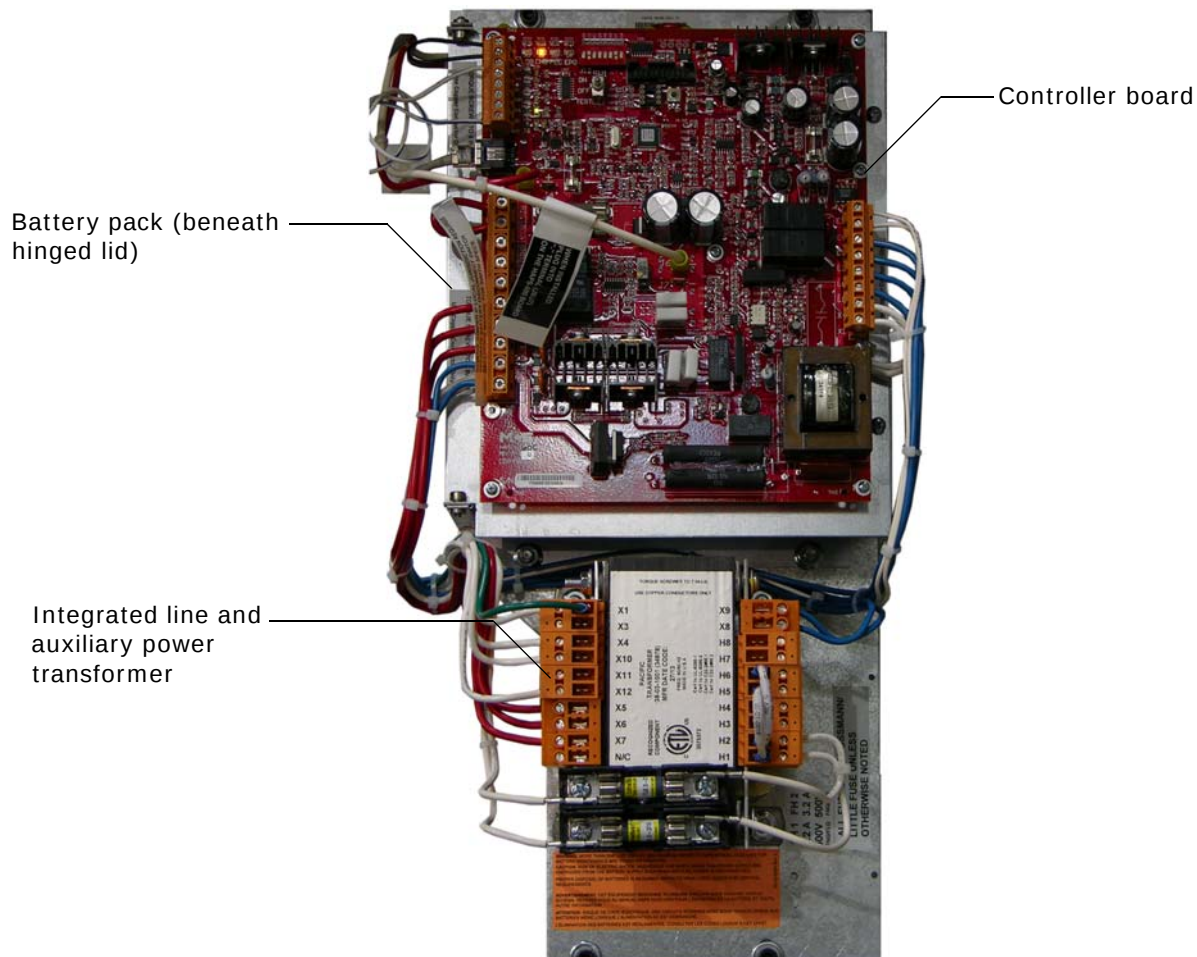
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Hydraulic Auxiliary Power Supply

The Hydraulic Auxiliary Power Supply (HAPS) is a backup power supply for hydraulic elevators. HAPS monitors commercial power provided to a hydraulic elevator controller. If commercial power fails, the auxiliary power supply provides single phase backup power, directs the controller to lower the car safely to a landing, and provides power to open the elevator doors. The HAPS unit will then disconnect power to the elevator controller after a customer defined time period. When commercial power is restored, HAPS will direct commercial power to the elevator controller and automatically recharge the batteries for future use. Periodic maintenance and/or replacement of batteries is required depending upon frequency of use, typically in the range of three to five years.

Figure 1. Hydraulic Auxiliary Power Supply



- **HAPS Main Control Board:** The HAPS main control board monitors commercial power, enables the battery backup power supply, and directs the elevator controller to lower the car to the bottom floor. It also charges the batteries.
- **Batteries:** A compact battery pack is located beneath the hinged lid on which the main controller board is mounted.
- **Transformer:** The heavy duty, multi-tap TH transformer may replace the standard line transformer in some applications, taking over that function in addition to conditioning inverter power during back up operation.

The diagram illustrates the HAPS Logic Board's electrical connections. At the top, three input options are shown: 208 VAC (terminals H1-H6), 220 VAC (H1-H7), and 240 VAC (H1-H8). A 3-phase line input (L1, L2, L3) passes through a Main Disconnect and a transformer (XFMR) to the board. The board includes a Voltage Sensing section, a Main Processor with a 40A+ Battery Pack connection (J4/J5, J6/J7), and a Control I/O section (GND, P1, +24V, CANH, CANL). Power is distributed to various outputs: Lowering Relay (EO, EI), Door Operator (LA, LB), and a transformer (TH) providing 120 VAC, 16 or 19 VAC, and 19 VAC outputs. A dashed box labeled 'Dashed Line = LOAD' indicates the power path to the Door Operator. A note states: 'A dashed box surrounding an output indicates that it is a HAPS load.'

Note 4: HAPS backup operation LOAD.

Specifications

Table 1. HAPS Unit Specifications

Size	8.5W x 16.5H in., 216 x 419 mm
Output Power, Normal	600VA continuous
Output Power, Backup	666VA (5 minutes of every three hours)
Input Voltage	Single phase 208-240Vac
Input Frequency	60Hz
Battery voltage	24 VDC
Battery type	2 or 4, 12VDC, 5.0 AH rechargeable, sealed lead acid.
Output voltage, Normal	X1/X4: 120VAC / 1 phase / 60Hz X10/X11/X12: 16 or 19VAC / 1 phase / 60Hz X8/X9: 19VAC / 1 phase / 60Hz LA/LB: Same as commercial power / 1 phase / 60Hz
Output voltage, Backup	X1/X4: 120VAC / 1 phase / 60Hz X10/X11/X12: 16 or 19VAC / 1 phase / 60Hz X8/X9: 19VAC / 1 phase / 60Hz LA/LB: Adjustable (208 - 240VAC) / 1 phase / 60Hz
Output waveform, Normal	The same as commercial power
Output waveform, Backup	Step quasi sine wave

Table 2. J1 Terminals

Terminal	Description	
EI	Backup operation output For MCE controls: Connect EI to 2 Bus. For MCE controls: Connect EO to EXMLT input. Open during Normal operation Closed during Backup operation Max 120VAC, 120mA	
EO		
L1	AC input	208 - 240 VAC, single phase, 60 Hz
L2		
LA	AC output	208 - 240 VAC (adjustable), single phase, 60 Hz
LB		
X4	Normal operation: Output	208 - 240 VAC, single phase, 60 Hz
X1	Backup operation: Input	

Table 3. J2 Terminals

Terminal	Description
BD1	Battery disconnect terminals
BD2	
GND	(not used)
LS1	(not used)
LS2	(not used)
H2	AC input voltage for battery charger in normal operation.
H1	
H3	H1 - H2, 18VAC, H2 - H3 18VAC
H4	19VAC for inverter
H5	

Hydraulic Auxiliary Power Supply



Figure 3. HAPS Main Control Board

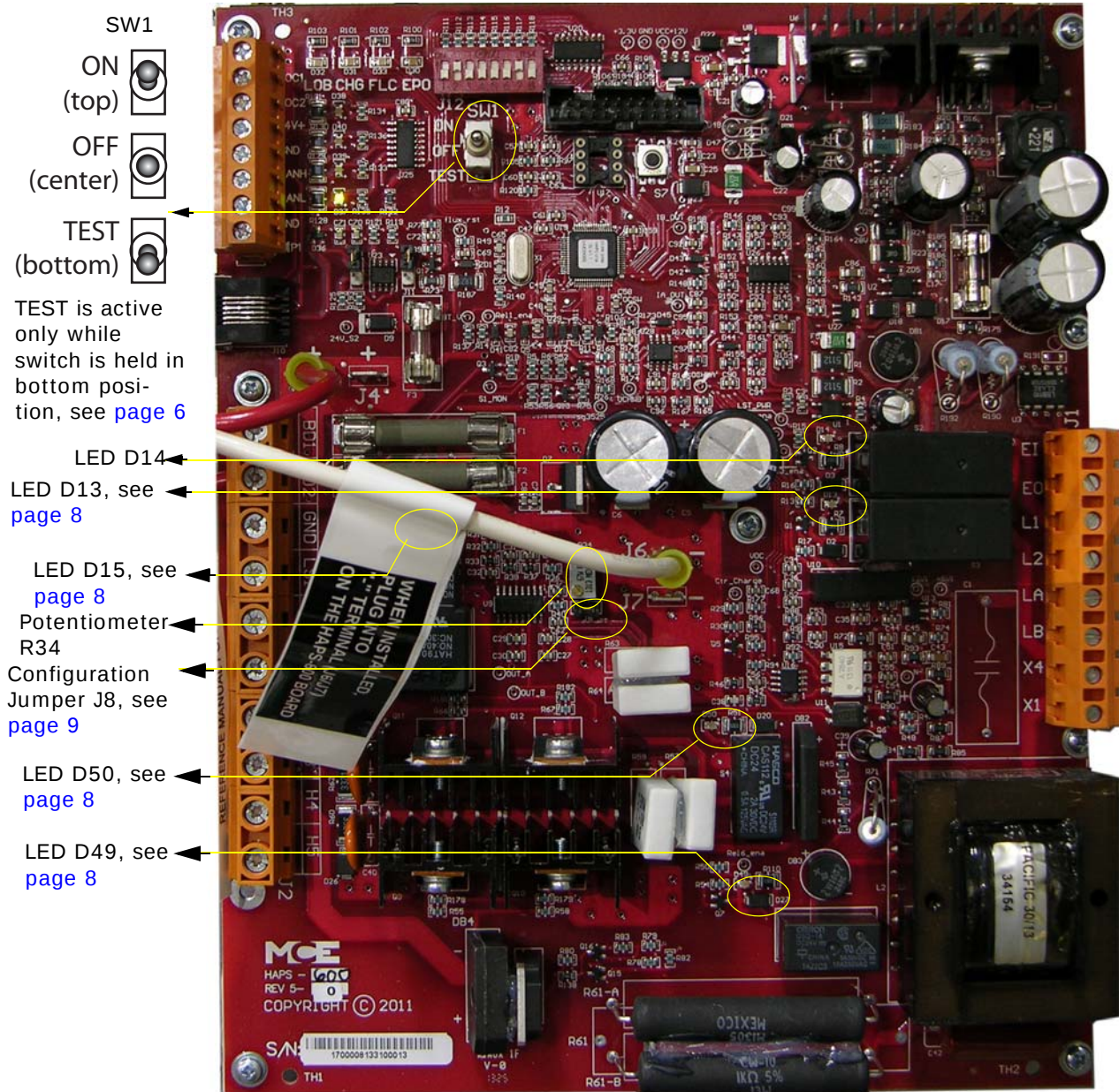


Table 4. J3 Terminals

Terminal	Description
DOC1	Safety circuit terminals (4th pole of main disconnect, DOB)
DOC2	
24V+	24 VDC power supply
GND	Ground line
CANH	CAN bus high
CANL	CAN bus low
GND	Ground line
P1	Restart input, if unused, leave disconnected, see "P1 Input" on page 11.

Table 5. J4, J5 Terminals

Terminal	Label	Description
J4	+	24VDC positive terminal for battery pack(s)
J5		

Table 6. J6, J7 Terminals

Terminal	Label	Description
J6	-	24VDC negative terminal for battery pack(s)
J7		

Main Board Operation

The HAPS main control board provides:

- Microprocessor control
- Over current and over voltage protection
- DC to AC inverter
- Battery charging and control power supply
- CAN communication interface
- P1 control input

Terminals DOC1 and DOC2 are safety terminals. When DOC1 and DOC2 are connected together, the board can go into battery back-up operation if commercial power is lost. When they are open, HAPS is disabled. The 4th pole of the main disconnect must be connected to these terminals in order to detect when the main disconnect is OFF.

Terminals BD1 and BD2 are the battery disconnect terminals. Depending upon the controlling jurisdiction, an external disconnect switch must be connected between these terminals so that the batteries can be disconnected from the HAPS board for safe battery replacement, or a minimum 12 AWG jumper must be connected between them. The rated current for this disconnect switch must be greater than 40A DC.

ON/OFF/TEST Switch SW1

ON (UP): HAPS is in normal operation. In this mode, when commercial power is ON, the output of HAPS is the same as the commercial power input at L1/L2. In this mode, when commercial power is lost, the HAPS unit will go into battery back-up operation as long as the following conditions are satisfied (otherwise the output is 0V):

- No fault during system software detection
- Terminals DOC1 and DOC2 are shorted
- HAPS operation time is valid (as defined by DIP switch J12)
- Terminals BD1 and BD2 are shorted

OFF (CENTER): HAPS is disabled (the system cannot go into battery back-up operation). The output is the same as the commercial power input at L1/L2. Use to bypass the HAPS unit.

TEST (DOWN): HAPS is in test operation (switch is spring-loaded and must be held in Test operation). The output is from the battery supply regardless of commercial power status as long as the following conditions are satisfied (otherwise the output is 0V):

- No fault during system software detection
- Terminals DOC1 and DOC2 are shorted
- Terminals BD1 and BD2 are shorted

Bypass Operation

To bypass HAPS operation, set switch SW1 to the OFF position. In this position, the HAPS output is the same as the commercial power input at L1/L2.

Hard Bypass

If the HAPS unit is badly damaged and SW1 in the OFF position does not seem to provide unit bypass, verify and bypass as follows:

1. Verify main disconnect is closed and that normal line voltage is present at the line input terminals to the controller.
2. Check that HAPS SW1 is in the OFF position.
3. Measure AC voltage at HAPS terminals L1 and L2. It should match the line voltage.
4. Measure AC voltage at HAPS terminals LA and LB. If normal voltage is present, check any fuses fed by these two terminals. (See your job prints.)
5. Measure AC voltage at HAPS terminals X1 and X4. If normal voltage is present, check any fuses fed by these two terminals. (See your job prints.)
6. If you have normal voltage at LA/LB and X1/X4, HAPS is bypassing normally and the problem is not with the HAPS unit.
7. If either output voltage (LA/LB, X1/X4) is missing but line voltage is present at L1/L2, HAPS is not bypassing properly and manual bypass wiring must be accomplished as in the following steps.

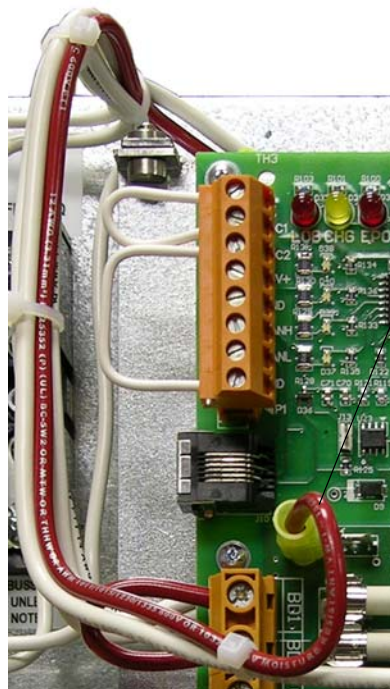
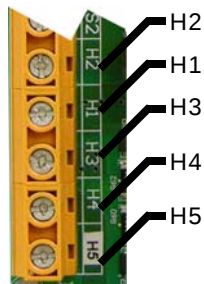
Manual Bypass You will need seven wire nuts for the following procedure. Twisting and taping wire ends will not be good enough to pass the required current.

1. Open the main disconnect to the controller. Follow proper lockout/tagout procedures.
2. Verify no line voltage at HAPS terminals L1 and L2.

3. Disconnect battery positive wire(s) at the battery and the HAPS PC board. (Store for use after HAPS unit has been repaired or replaced.)

4. Attach a tag to each of the following wires, marking it with its HAPS terminal number:

- H2
- H1
- H3
- H4
- H5

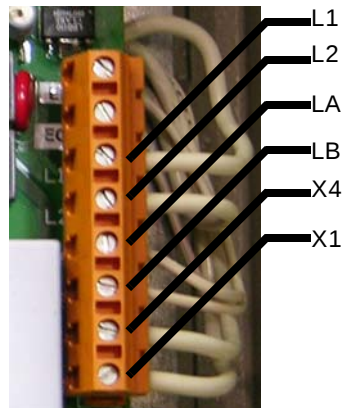


Remove and store the battery + (positive) wire. This is a red wire running from the + symbol on the circuit board to the + battery terminal at the back of the HAPS unit.

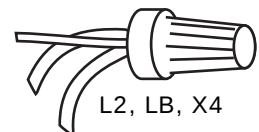
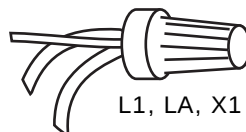
HAPS models with 4 batteries will have a second positive wire connected to the other (+) terminal on the board. In this case, both wires must be disconnected.

5. Disconnect H1 through H5 from the HAPS board. Use a wire nut to insulate each wire.
6. Attach a tag to each of the following wires, marking it with its HAPS terminal number:

- L1
- L2
- LA
- LB
- X4
- X1



7. Disconnect wires L1, LA, and X1 from the HAPS unit and connect them together with a wire nut.



8. Disconnect wires L2, LB, and X4 from the HAPS unit and connect them together with a wire nut.
9. Close the line disconnect. The car should power up and run normally.

J12 DIP switch

HAPS will provide rescue lowering power for 1, 2, 3, 4, or 5 minutes as set (in binary fashion) on DIP switch rockers 1 through 4. If a duration longer than 5 minutes is set, HAPS software will still enforce the 5 minute limitation. DIP switch J12 is used to set the number of minutes HAPS will provide rescue lowering power:



To determine an appropriate timer DIP switch (J12) setting, move the car to the top floor and determine how long it takes for the car to travel to the bottom landing, including door cycling time. Add an additional 30 seconds to cover the correction run. (Correction run time is used to correct the car to the nearest floor when backup operation starts between floors.) Add an additional minute to ensure that anyone who may have inadvertently remained in the car after the rescue is complete will be able to open the door from the inside. Round the result **UP** to the nearest minute (maximum of 5 minutes). Allowing HAPS to run longer than required will deplete battery power.

Indicators

- EPO (Emergency Power On) indicator (red)
 - When the EPO indicator is ON, it means that HAPS is operating on battery power.
- CHG (Charging Battery) indicator (yellow)
 - With commercial power ON, when the CHG indicator is blinking, it means that the battery is charging.
 - If commercial power is lost and the battery is not fully charged, the HAPS unit will operate in backup mode only if battery voltage is above 19.5V.
- LOB (Low Battery Voltage) indicator (red)
 - LOB indicator ON means battery voltage is equal to or less than 19.5V (not yet fully charged). During backup operation, if battery voltage drops below 19.5V, HAPS will stop backup operation. This indicates that the batteries are weak or damaged. During backup operation, the LOB indicator should not be ON. If battery voltage drops below 19.5V during backup operation, the LOB indicator will remain latched until the battery is fully charged or until SW1 is moved to OFF. A healthy battery should be able to fully recharge within 12 hours and the LOB indicator will turn OFF. Very weak or damaged batteries will not be able to fully recharge.
- FLC (Fully Charged Battery) indicator (green)
 - FLC indicator ON means the battery is fully charged. (The battery has reached a minimum voltage, the battery charging circuit has maintained this voltage level for 12 hours and during this time commercial power has been normal and no battery backup has occurred.) FLC blinking: AC power off, HAPS is not inverting.
- D13 indicator
 - Indicator ON means relay S3 is picked. OFF means relay is dropped.
- D14 indicator
 - Indicator ON means relay S2 is picked. OFF means relay is dropped.

- D15 Indicator
 - Indicator ON means relay S1 is picked. OFF means relay is dropped.
- D37 indicator
 - Indicator ON means DOC1 is shorted to DOC2. Since DOC1/DOC2 connect to the 4th pole of the disconnect, this means that the main disconnect is closed (ON).
- D38 indicator
 - Indicator ON means SW1 switch is in the TEST position.
- D39 indicator
 - Indicator ON means SW1 switch is in ON position.
- D40 indicator
 - Indicator ON means the P1 input is high (24VDC).
- D49 Indicator
 - Indicator ON means relay S6 is picked. OFF means relay is dropped.
- D50 Indicator
 - Indicator ON means relay S4 is picked. OFF means relay is dropped.

Jumpers



Caution

J8 jumper must be correctly set.

- J8 jumper
 - For 208-240VAC input at L1/L2, J8 must be closed (jumper present).
- J11 jumper
 - CAN communication baud rate selection. When the jumper is shorted, the baud rate is 250K; when the jumper is open, the baud rate is 500K.
- J13 Jumper
 - CAN bus termination (CAN communication not currently operational).

Fuses and Potentiometers

Table 7. Fuses

Fuse	Description	Value	Function
F4	Battery charging	1.5A, 250V, slow blow, type 2AG	Protects the battery charging circuit
F3	DOC1	1A, 250V, type 2AG	Overcurrent protection
F1, F2	Battery inverting	20A, 250V, type 314	Battery voltage-rising circuit protection
F5	semiconductor	n/a	Protects the battery charging circuit
F6	semiconductor	n/a	Protects the auxiliary power circuit regulators

Table 8. Potentiometers

Potentiometer	Function	Operation
R34	Adjust inverting output voltage	1. Hold toggle switch in TEST position so that HAPS is in backup operation. 2. Measure AC voltage between LA and LB with multi-meter. Adjust potentiometer until a suitable value is achieved. This is set at the factory.

Installation

The HAPS assembly is fully tested and adjusted for the input/output voltage ordered. To complete installation of the HAPS unit, the 4th pole of the mains disconnect must be connected to terminals DOC1 and DOC2 and a battery disconnect switch must be connected between BD1 and BD2 as instructed below (when required).

1. Connect the 4th pole of the mains disconnect between DOC1 and DOC2 on connector J3. This is a low power signal and may be wired with 18AWG wire.
2. Depending upon the controlling jurisdiction, either:
 - Connect a battery disconnect switch between BD1 and BD2 on connector J2. Switch must be rated above 40A DC and be connected using 12 AWG/105 degrees C wire.
 - or,
 - Install a 12 AWG/105 degrees C wire jumper between BD1 and BD2.
3. On the HAPS main board, place ON/OFF/TEST switch SW1 in the OFF (center) position. Set the J12 DIP switch to choose the desired HAPS battery operation time (0 to 5 minutes - [see “J12 DIP switch” on page 8.](#)).
4. Place ON/OFF/TEST switch SW1 in the ON (top) position. HAPS is in normal operation. Commercial power will be present at terminals LA and LB. When commercial power is lost, HAPS will turn on as long as safety terminals DOC1 and DOC2 are shorted, BD1 and BD2 are shorted, battery voltage is high enough, and operation time is not set to '0'. [Please refer to “Main Board Operation” on page 5](#) and [see “Operation Status” on page 11.](#)

P1 Input

Connect as shown in the job prints. The P1 input is used to restart the HAPS inverting cycle but only after the initial rescue cycle is completed and the car is stopped and powered down at the exit floor. P1 and connector J3, DOC1 are intended to be connected through a normally open, independent set of contacts on the Door Open button in the car. In the event a passenger inadvertently remains in the car after the doors have closed and the initial rescue cycle has powered down, pressing the Door Open button will restart HAPS, open the doors, and allow the passenger to exit. P1 is only sampled after an inverting cycle. At all other times the P1 input is ignored.



Caution

Inputs P1 and DOC1 are 24Vdc only. Ensure that they are used as a separate pole of the door open button. If either P1 or DOC1 are connected to 120Vac, damage to the HAPS-600 board will occur.

Operation Status

This section describes status indicators for Normal and Backup operation.

With Commercial Power ON (Normal Mode)

With commercial supply on, HAPS acts as a pass through for line inputs L1 and L2.

- CHG indicator is blinking unless batteries are fully charged (FLC indicator on).
- Twelve hours after batteries reach an acceptable charging voltage, indicator FLC turns on, indicating batteries are fully charged.

Test Mode

- If conditions are as described on page 6 and toggle switch SW1 is held in the TEST (down) position, EPO indicator turns ON, CHG indicator turns OFF, and D15, D14, D13, D49, D50 turn ON, which indicates that relays S1, S2, S3, S4, and S6 are picked and HAPS is on battery operation. When TEST is released, HAPS returns to normal operation.
- Test operation can be used to test the rescue (lowering) operation of the controller.

Test mode will activate 1 second after placing the switch in test mode. This reduces the possibility of entering test mode due to a momentary condition.

With Commercial Power Lost (Battery Backup Mode)

Assuming that conditions on page 6 are met:

- HAPS will start inverting after 1 second
- HAPS output is continuous quasi sine wave.
- Indicator CHG is OFF and indicators D14, D13 are ON which means that relays S2 and S3 are picked. Indicators EPO, D15, and D49 are ON which means that the HAPS is in battery backup operation.

When one of the following occurs, HAPS will stop operating and indicators EPO, D15, and D49 are turned OFF.

- When battery operation time expires, indicator EPO turns OFF and HAPS stops operating. There is no output voltage.
- If DOC1, DOC2 are disconnected, HAPS stops operating.
- If toggle switch SW1 is placed in the OFF (center) position, HAPS stops operating.

- If an external controller sends a Stop command through the CAN bus, HAPS stops operating. (CAN communication is not currently available.)
- If BD1 and BD2 are opened, HAPS stops operating.
- If there is an error in the system, HAPS stops operating. If battery voltage drops to less than 19.5V, indicator LOB turns ON. Even if the under-voltage error is removed and battery voltage increases to greater than 19.5V, indicator LOB remains ON. The error will clear after the batteries are fully charged or if SW1 is moved to OFF.
- When other errors occur, HAPS stops operating but will reset automatically after the error is removed. However, if the error occurs 5 times within 60 seconds, the system will not automatically reset after the 5th fault. The system is placed in error lock mode. Indicators EPO, D13, D14, and D15 are turned OFF. HAPS can return to normal operation only if switch SW1 is toggled to OFF then back to ON.

Commercial Power is Restored

- If HAPS is on when commercial power is restored, indicators EPO, D13, D14, D15 and D49 will still be ON. HAPS will still be operating.
- When HAPS operation time expires, indicator EPO turns OFF and HAPS stops operating. Indicators D13, D14, D15, and D49 turn OFF. HAPS again acts as a pass through for commercial power.
- When indicator EPO is ON, the CHG indicator must be off.

Immediate Commercial Power Restoration If commercial power is restored while HAPS is operating, the unit may be set to complete its lowering operation and wait until the DIP switch set operating timer expires before restoring commercial power or it may be set to restore commercial power promptly when it becomes available. This is determined by DIP switch #7:

- Switch #7 ON: Wait three seconds only before switching from HAPS to commercial power. THIS IS THE DEFAULT SETTING.
- Switch #7 OFF: Wait until the DIP switch set timer expires before switching from HAPS to commercial power.

Battery Maintenance

1. Check the batteries every 4 to 6 months. If a battery is not in good condition, have a qualified technician replace the batteries as soon as possible.
2. The batteries should be charged and discharged every 4 to 6 months during normal use. Before charging, discharge the batteries to under-voltage. (Discharge can be accomplished using Test Mode as needed ([page 11](#)). The charging time must be at least 24 hours.
3. If a battery needs to be replaced, replace all of the batteries in the unit according to the instructions on [page 14](#).



Danger

Working with batteries exposes you to possible electrical shock and burns. Take proper precaution whenever handling batteries. When replacing batteries, use the same type (MCE part number 30-05-0026). Proper Disposal of batteries is required. Refer to your local codes for disposal instructions.

Battery Voltage No Load Test

1. Set switch SW1 to the OFF (middle) position.
2. Open the main disconnect.
3. Measure the DC voltage between terminals J4 (+) and J6 (-) on the HAPS main board using a DC multimeter.
4. Measured voltage should be 26VDC or greater for fully charged batteries. If batteries are not fully charged, this voltage will be less than 26VDC.

Battery Voltage Load Test

1. Make sure batteries are fully charged (indicator FLC is ON).
2. Connect multimeter across terminals J4 (+) and J6 (-) on HAPS main board.
3. Move the elevator to the top landing.
4. Hold switch SW1 in the TEST (bottom) position. HAPS will start backup operation.
5. Check the battery voltage reading on the multimeter while the elevator is running in backup operation.
6. If battery voltage is dropping quickly and goes below 19.5VDC, the batteries need to be replaced.

Battery Charger Circuit Test

If batteries are not fully charged after HAPS has been in normal operation for longer than 12 hours, verify the battery charging circuit is functioning properly.

1. Set switch SW1 to the OFF (middle) position.
2. Open the main disconnect.
3. Ensure that all battery wires are properly connected.
4. Check fuse F4 on the HAPS main board.
5. Measure DC voltage between terminals J4 (+) and J6 (-) using a DC multimeter. Record the measured voltage.
6. Turn ON power by closing the main disconnect.
7. Make sure the CHG indicator is blinking.
8. Measure DC voltage between terminals J4 (+) and J6 (-) using a DC multimeter. The value should be larger than the previously recorded voltage.
9. If the battery charging circuit is operating correctly, replace the batteries. See Battery Replacement Procedure below.

Battery Replacement

1. On the HAPS main board, set switch SW1 in the OFF (center) position.
2. Open the main disconnect.
3. Remove the white wire from negative (-) terminal(s) J6 (and J7). Insulate the wire end to prevent contact/shorting to other components.
4. Unscrew the 2 screws to the right of the HAPS main control board and swing open the cover to expose the batteries. Note that no wires need to be disconnected in order to access the batteries under the HAPS main control board.
5. Carefully disconnect the old batteries from the slip connectors. Remove the batteries taking care to protect the poles from shorting.
6. Replace the batteries ensuring that cables are connected to the correct poles.
7. Close the cover and re-install the screws.
8. Reconnect white wire(s) to negative (-) terminal(s) J6 (and J7).



Caution

When connecting, a spark will occur. This is normal.

9. Restore commercial power.
10. Return HAPS switch SW1 to the ON (top) position. The HAPS unit is now able to enter battery back-up operation if commercial power is lost.

Fault Messages

HAPS continually monitors the condition of the battery and sends the following messages on the CAN bus. Motion and Element controllers can receive these messages and display them.

HAPS BATTERY BAD CONDITION FAULT

This fault message is generated if the battery voltage is not more than 24 volts after the battery has been charging for more than 24 hours. Motion and Element controllers receiving this message via the CAN bus will cause the elevator to stop at the next floor and open the doors. The fault reset button will clear the fault.

- Action: Replace the battery

HAPS CHARGER FAULT

This message is generated if the battery voltage is lower than 26 volts after the batteries have been charging for more than 24 hours. Motion and Element controllers will display this message but car operation will not be affected.

- Action
 1. Check the F4 fuse on HAPS and replace if fuse is blown.
 2. Reset HAPS using the push-button on the HAPS board and measure the battery voltage. It should be 26 volts or more. If not, replace the HAPS board.

Troubleshooting

The following table lists trouble indicators and correctional steps.

Table 9. HAPS Troubleshooting

Problem	Possible Cause	Troubleshooting
Output is 0VAC in backup operation	DOC1/DOC2 open	1) Main disconnect opened 2) Main disconnect 4 th pole not wired 3) Defective main disconnect
	BD1/BD2 open	Switch opened or jumper missing
	SW1 not set to ON	Refer to page 6
	DIP (J12) switches all OFF	see "J12 DIP switch" on page 8.
	F1 and F2 fuses open	Replace fuses with correct type and rating (page 10)
	Defective battery	Replace batteries
	Circuit board damaged	Replace HAPS-600 (main) board
Battery under-voltage (LOB indicator solid ON)	Low charge at start of backup operation, battery damaged, or battery not being charged in normal operation	Please refer to battery tests in this section
Output voltage too high or too low	Mis-adjustment of R34 trim pot	Follow procedure on page 10
	J8 jumper configured incorrectly	See page 9
	Circuit board damaged	Replace HAPS-600 (main) board
Output Over Current Fault Output Over Voltage Fault (LOB indicator blinking)	Output load is higher than HAPS rating or output shorted	1) Set SW1 to OFF. 2) Open Main Disconnect. 3) Disconnect HAPS from load (see page 2). 4) Hold SW1 in TEST (down) position and see if fault occurs again. 5) If no fault occurs, one of the loads is causing the over current fault.
	Defective TH transformer	Replace TH transformer
	Circuit board damaged	Replace HAPS-600 (main) board
Door Open Button (P1 input) does not restart HAPS	F3 fuse is open	1) Confirm Door Open Button pole is isolated on both ends from any other pole. 2) Replace fuse with correct type and rating (Please refer to "Fuses" on page 10).

GAL MOVFR-II Door Operator

When operating on HAPS power, some GAL MOVFR-II operators may experience a fault on start up. This can be corrected by adjusting GAL MOVFR-II parameters:

- Parameter 110: Set to 1 momentarily, then back to 0 to access/change the following parameters:
 - Increase Parameter 112 [Number of Fault Retries] - MCE Lab unit worked at 9
 - Increase Parameter 113 [Retry Waiting Timer]: MCE Lab unit worked at 6

Software Update

EEPROM

HAPS software may be updated in the field if required:

1. Place the elevator car on inspection.
2. Set toggle switch SW1 to the OFF (center position). Open the disconnect to remove power from the HAPS unit.
3. Remove battery power by disconnecting the battery pack wire at board connector J6 (J7 also if the unit uses four batteries).
4. Insert the EEPROM chip at U17 in the correct orientation.
5. Set dip switch #8 to ON.
6. Insert a jumper between DOC1 and DOC2.
7. Reconnect battery power to J6 (and J7 if four batteries). A spark is normal when this is done.



Caution

When batteries are connected and DOC1/DOC2 are jumpered together, it is critical that SW1 is OFF. Otherwise, HAPS will start a rescue operation.

8. Indicators LOB, CHG, FLC, and EPO will scroll during the upgrade (~10 seconds). If the indicators do not scroll, press the RESET button next to the microprocessor.
9. When all indicators turn ON, the software is finished loading. The EEPROM chip can be left in the socket at U17.
10. Set dip switch #8 back to OFF. This causes the new software to run. FLC indicator should be blinking and D37 indicator should be solidly ON.
11. Disconnect Main and Auxiliary (if used) positive (+) battery connections from circuit board.
12. Remove previously installed jumper between DOC1 and DOC2.
13. Reconnect Main and Auxiliary (if used) positive (+) battery connections to circuit board (spark may occur).
14. Close disconnect to restore HAPS power.
15. Set toggle switch SW1 to the ON (top) position. HAPS is ready for backup operation.

CAN

If HAPS has CAN communication connected, HAPS software can be updated just like any other circuit board in the controller. Refer to controller manual for update procedure.