Instruction Manual

Installation
Operation
Maintenance

Paralleling Module
508-00470-60
508-00470-61

Nidec
KATO ENGINEERING™

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PARALLELING MODULE
508-00470-60
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PURPOSE:

The paralleling module provides a paralleling signal at the optimum time to parallel a motor-generator set with a power bus. It does this by continuously monitoring the phase relationship between the two sources, and calculating the rate of change in phase. Paralleling is accomplished without speed matching.

PHYSICAL DESCRIPTION:

The board is a card cage style conforming to the Euro-card 3U dimensions (100mm X 160mm). On the front plate are four led's. The board is interfaced to the card rack by a 32 pin male Din connector.

EXTERNAL CONNECTIONS:

One phase of the load bus, and the corresponding phase of the oncoming power source are connected to terminals A22 & A2, and C18 & C2 respectively. Each phase must be transformed to 24 vac nominal. 24 vdc power is connected to terminals A4(+), and A32(-). 5 vdc power is connected to terminals C28(+), and C32(-). A 24vdc enable signal is connected to terminal A28. Outputs are normally open relay contacts. The sync output is connected to terminals A8, and C8. The sync error output is connected to terminals A16, and C16.

OPERATION

The operator brings the oncoming unit up to full speed. When the operator pushes a button to commence automatic paralleling, a positive 24vdc is connected to the enable pin A28. The parallel module then monitors the phase relationship between the bus voltage, and the on-coming MG voltage. At the correct time, the paralleling module will energize the sync output, which causes the on-coming power source to be connected to the load bus. Once the on-coming unit is connected, external circuitry removes the enable input.

In the event the parallel module doesn't detect either the bus voltage, or the oncoming MG voltage, the sync-error output is energized, and external circuitry aborts the paralleling sequence.

INDICATING LIGHTS

Four indicating lights are provided as an aid to trouble-shooting. Figure #1 is an enlarged view of the four lights. A brief explanation of the function of the lights follows:

- CPU In normal operation, this light blinks at approximately a 1 second repetition rate. This indicates that the on board microprocessor is executing the program normally. If this light stops blinking, there is something wrong with the board.

- SYNC This light is illuminated when the bus voltage, and the on-coming MG voltage are in phase. This provides the output to connect the on-coming MG.

- -120° This light indicates that the on-coming voltage is approximately 120° lagging the on bus voltage. This light will only indicate when the enable signal is present.

- +120° This light indicates that the on-coming voltage is approximately 120° leading the on bus voltage. This light will only indicate when the enable signal is present.

- Error This light indicates that an error has occurred, and the paralleling module is unable to perform the paralleling sequence. The most likely cause for this light to illuminate is when one of the sensing voltages is not present.

ADJUSTMENTS:

On the pc board, there are two 8 position dip switches labeled SW1, and SW2. These switches are used to determine the optimum time for closure of the sync signal. A description of each switch follows:

SW1: This dip switch is used to determine the delay time needed between the time the sync signal is given, and the time that the output contactor actually closes. This information is factored in to the closing time to provide the lowest possible transient. Table #1 shows the settings allowed. Consult the factory for the correct setting for your application. Note: switch #8 is used to select the operating frequency. If SW1 #8 is open, the 60 hz table is selected. If SW1 #8 is closed, the 400 hz table is selected.

SW2: This dip switch is used to set the size of the sync-window. This is the phase displacement limits for an in phase condition. The settings are in degrees and are centered by 0 degrees. Table #2 shows the settings allowed. Consult the factory for the correct setting for your application.

Table #1
Contactor Delay Adjustment
SW1

Switch Positions 8	7	6	5	4	3	2	1	60 hz Delay
0	0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	1	0.03
0	0	0	0	0	0	1	0	0.06
0	0	0	0	0	0	1	1	0.10
0	0	0	0	0	1	0	0	0.13
0	0	0	0	0	1	0	1	0.16
0	0	0	0	0	1	1	0	0.20
0	0	0	0	0	1	1	1	0.23
0	0	0	0	1	0	0	0	0.26
0	0	0	0	1	0	0	1	0.30

Switch Positions 8	7	6	5	4	3	2	1	400 Hz Delay
1	0	0	0	0	0	0	0	0.00
1	0	0	0	0	0	0	1	0.01
1	0	0	0	0	0	1	0	0.02
1	0	0	0	0	0	1	1	0.03
1	0	0	0	0	1	0	0	0.04
1	0	0	0	0	1	0	1	0.05
1	0	0	0	0	1	1	0	0.06
1	0	0	0	0	1	1	1	0.07
1	0	0	0	1	0	0	0	0.08
1	0	0	0	1	0	0	1	0.09
1	0	0	0	1	0	1	0	0.10
1	0	0	0	1	0	1	1	0.11
1	0	0	0	1	1	0	0	0.12
1	0	0	0	1	1	0	1	0.13
1	0	0	0	1	1	1	0	0.14
1	0	0	0	1	1	1	1	0.15
1	0	0	1	0	0	0	0	0.16
1	0	0	1	0	0	0	1	0.17
1	0	0	1	0	0	1	0	0.18
1	0	0	1	0	0	1	1	0.19
1	0	0	1	0	1	0	0	0.20
1	0	0	1	0	1	0	1	0.22
1	0	0	1	0	1	1	0	0.23
1	0	0	1	0	1	1	1	0.24
1	0	0	1	1	0	0	0	0.25
1	0	0	1	1	0	0	1	0.26
1	0	0	1	1	0	1	0	0.27
1	0	0	1	1	0	1	1	0.28
1	0	0	1	1	1	0	0	0.29
1	0	0	1	1	1	0	1	0.30

Table #2
SYNC WINDOW ADJUSTMENT
SW2

Switch Position 8	7	6	5	4	3	2	1	Phase Angle
0	0	0	0	0	0	1	0	2.5
0	0	0	0	0	1	0	0	05
0	0	0	0	0	1	0	1	7.5
0	0	0	0	0	1	1	1	10
0	0	0	0	1	0	0	1	12.5
0	0	0	0	1	0	1	1	15
0	0	0	0	1	1	0	0	17.5
0	0	0	0	1	1	1	0	20
0	0	0	1	0	0	0	0	22.5
0	0	0	1	0	0	1	0	25
0	0	0	1	0	0	1	1	27.5
0	0	0	1	0	1	0	1	30

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