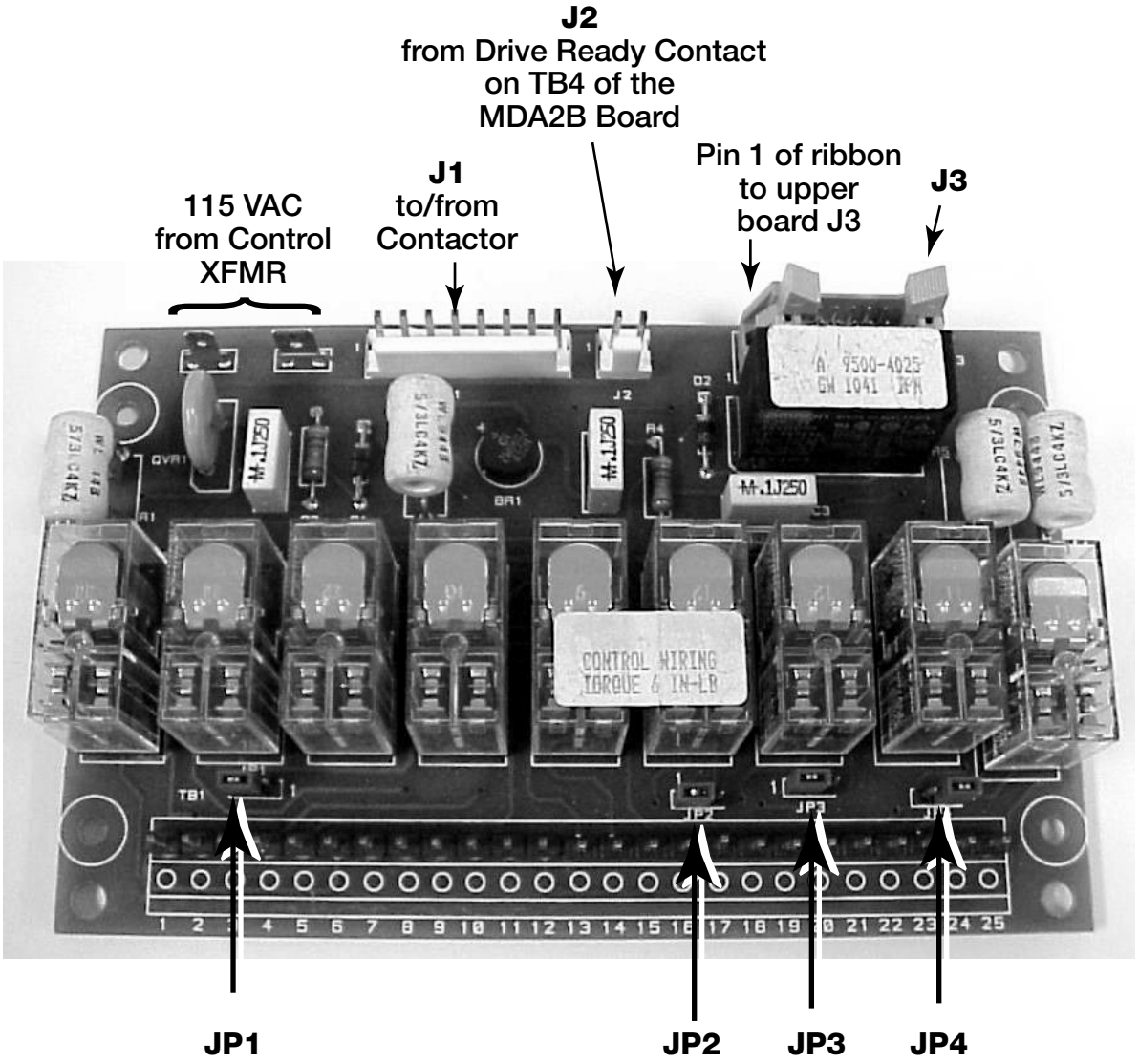
115 VAC Interface Board 9500-4025



Jumper Number	Position 1-2	Alternate Position 2-3	Notes
JP1	2-Wire On/Off	**3-Wire Start/Stop**	For Run/Stop Logic
JP2	**NO No Fault Relay Output**	NC No Fault Relay Output	Drive has No Fault
JP3	**NO Fault Relay Output**	NC Fault Relay Output	External Trip In Effect
JP4	**NO PGM #2 Relay**	NC PGM #2 Relay	From Input #2

NO = Normally open
NC = Normally closed.
Items in **bold** are factory settings.

9 Logic Interface Circuitry

The AC Logic Board, (9500-4025) and the Logic Interface Board (9500-4030) interface the 115VAC Start/Stop/Jog operators and the motor contactor to the control.

The AC Interface Board (9500-4025) has the following relays with their associated functions (refer to Figure 9-1):

9.1 NF— NO FAULT

This relay provides a relay contact for external use. It is programmable via JP2 to provide either a normally open or closed contact. This relay is turned on when power is applied to the drive and no faults are present.

9.2 FR— FAULT RELAY

This relay provides a fault contact for external use. It is programmable via JP3 to provide either a normally open or closed contact. From Figure 9-1 it can be seen that the coil of this relay is in series with the E-Stop, the motor thermal and the additional system interlocks. All these interlocks are normally closed connections which open under a fault condition. A second contact off this relay is used to trigger an external trip fault in the control. Note that this contact changes state for only the time period in which the fault contact is open.

9.3 PGM#1— PROGRAMMABLE RELAY #1

This relay is free for customer use. Its default is the forward/reverse function applicable to regenerative drives only. Programmable logic input F4 inverts the polarity of the speed reference when PGM#1 is turned on via one of its contacts. A second contact (form C) is available at the terminal strip. The function of this relay may be changed to provide other functions, such as auto/manual, by changing the default function of the programmable logic input F4.

9.4 PGM#2— PROGRAMMABLE RELAY #2

This relay is also free for customer use. Its default function is drive reset. A relay contact is also available at the customer terminal strip which is selectable as either a normally open or closed contact. The function of this relay may be changed by moving jumper JP1 (on the 9500-4030 PC board) from position 2-3 to 1-2 and changing the programmable input F5 to the desired function.

9.5 RUN/STOP CONTACTOR LOGIC

The run/stop contactor control function is performed by relays R, RA, MCA, MCB, and ZS/PB. To describe the function and purpose of these relays, the basic sequence of operation will be given. To better understand this relay logic, a brief description of the required logic inputs to the control and their functions will be described. Note that the standard default parameters for run forward, run reverse, inch forward and inch reverse have been changed for use with the AC logic board. These parameter changes can be found in Section 10.

Terminal #31—Enable

When this input is pulled “low,” the SCRs are enabled. When this input is released, the SCRs will be disabled 30 milliseconds later.

Terminal #21—Input F1/Run Permit

Terminal #22—Input F2/Reference ON

These two inputs are tied together. When these inputs are pulled “low,” the Speed reference input to the accel/decel circuit is unclamped. If the Enable has been pulled low, the SCRs will be phased forward and the motor will accelerate to set speed.

When these inputs are released, the speed reference will be clamped. The motor will either decelerate to zero speed if the Enable input is held “low” (Ramp Stop Mode; JP3 on the 9500-4030 programmed for position 2-3) or the motor will go into a coast/dynamic braking mode if the Enable input is also released (Coast Stop Mode; JP3 programmed for position 1-2).

Terminal #23—Input F3/Jog (Inch)

When this input is pulled “low,” the speed reference will be switched to the Jog reference (parameter 1.05).

Terminal #24—Input F4/Reverse

When this input is pulled “low,” the polarity of either the speed reference or the jog reference (which ever is active) will be inverted.

Terminal #19—Status Output ST5/Electrical Phaseback

This is an open collector status output which turns on when the SCRs are phased forward (i.e. the control is actively supplying power to the motor). This output controls the relay ZS/PB (zero speed/phaseback) which holds in the motor contactor when a stop command is given until the SCRs are fully phased back. This guarantees that the armature current has

reached zero before allowing the motor contactor to open. If ramp stop has been selected, this will occur once the motor reaches zero speed.

9.6 RUN LOGIC

The Run/Stop sequence is as follows. The standard three wire configuration will be used. The two wire is exactly the same except the “seal in” circuit is not used and thus the drive will stop once the run input is opened. When the run button is depressed, the run relay will pick up. One of its contacts will then supply power to the motor contactor while a second contact will close between pins #3 and #4 of J3. Once the contactor picks up, an auxiliary contact off the contactor will close and turn on MCA and MCB. A contact of MCA then closes and connects pins #1 to #2. This now applies +24VDC to pins #2, #3, and #4 of J3. From Figure 9-1 one can see that Q1 and Q2 will turn on and pull “low” the Enable, the Run Permit, and the Reference On. This enables the SCRs and the speed reference. The drive is now active and will supply power to the motor. While all this is occurring, the run circuit is sealed-in through a run contact and a contact of MCA. This prevents the run circuit from sealing-in if the contactor did not stay picked-up. At this point, since the SCRs are now phased forward, the status output ST5 will pull low and pick up the ZS/PB relay. A contact off this relay, which is connected in series with a contact of MCB, closes around the run (or jog) relay contact which picked up the motor contactor. This arrangement allows the contactor to be held in when the run relay is dropped out for ramp stopping and for preventing the contactor from opening while it is conducting armature current. A second normally closed contact of MCB, connected around the diode in series with the motor contactor coil, opens to reduce the voltage supplied to this coil. This allows the coil to operate at reduced voltage providing cooler operation and a longer life. The MCB contact in series with the ZS/PB contact prevents the ZS/PB from sealing in the run (or jog) contact until the motor contactor has been turned on. The remaining contact of MCB is available at the terminal strip. This contact will close in run or jog and will open whenever the motor contactor opens.

When a stop command is given, the run relay will drop out and cause the run permit and the reference on to disable (when JP3 on the 9500-4030 board is programmed for ramp stop), or it will disable the run permit, reference on and the enable when programmed for coast stop. In the ramp stop mode, the motor will decelerate to zero speed and the SCRs will phaseback. At this point, the ZS/PB contact will open and the motor contactor will drop out. Since relay MCA (which is controlled by the auxiliary contact of the motor contactor) drops out, the contactor will then be locked out until another run command is given. In the coast stop mode, the same sequence occurs except the SCRs immediately phaseback, the contactor opens, and the motor either coasts to a stop or the dynamic braking is applied.

9.7 JOG LOGIC

The Jog logic is the same as the Run/Stop logic except that, with the two wire operation, the jog drops out when the jog contact is opened. In addition, Q3 will also be turned on, thus enabling programmable input F3, the Jog reference select.

9.8 ADDITIONAL CIRCUITRY ON THE 9500-4030 BOARD

There are three other circuits located on the 9500-4030 PC board. They are AC/DC tachometer select, HP (horsepower) shunt select, and an optional motor thermal input.

9.8.1 AC/DC Tachometer Select

This allows selection of either an AC or a DC tachometer for speed feedback. There are two jumpers on the 9500-4030 board, JP4 and JP5. To program for DC tachometer, both jumpers should be set for position #1. The tachometer should be connected to terminals #1 and #3 as shown in Figure 9-1. If an AC tachometer is used, JP4 and JP5 should be set for position #2 and the tachometer should be connected to terminals #1 and #2 (shield to #3) as shown in Figure 9-1. In both cases, the control should be programmed for tachometer feedback (parameters 3.12 and 3.13 both set to 0). Also, located on the MDA-2 board, SW1 (dip switch #1 positions F, G, and H) and potentiometer RV1 must be adjusted for proper feedback levels. Refer to section 8 of this manual.

9.8.2 HP Shunt Circuit

This circuit brings out to the terminal strip (#1 and #3 of TBS) the internal connections for the current scaling resistors in the control. The drive is defaulted to a current rating of 10.2 amps when no external resistor is connected to the terminal strip. Figure A-1 gives a table of resistor values for programming the drive for the various motor current/horsepower settings. The resistor values applicable to each drive model are provided with the unit. Note that this HP shunt connection is used only with drive models up to and including 100HP (9500-8303 through -8306 and 9500-8603 through -8606).

9.8.3 Optional Motor Thermal Connection

Provided on TBS pins #4 and #5 of the 9500-4030 board are connections for a motor thermal. The motor thermal may be connected to these two terminals or as shown in Figure 9-1 (in the 120VAC ladder circuit). The difference between these two selections is the way the fault is annunciated. If the motor thermal is connected in the 120VAC logic, a fault will cause the display to read “Et” which is also the case with E-stop and an opening of the system interlocks. If the motor thermal is connected to terminals #4 and #5, the display will show “th” (thermal trip) under a fault condition. To use this optional input, it must be enabled by setting parameter 10.32 to 0 and pressing reset. This parameter change should be stored when used.

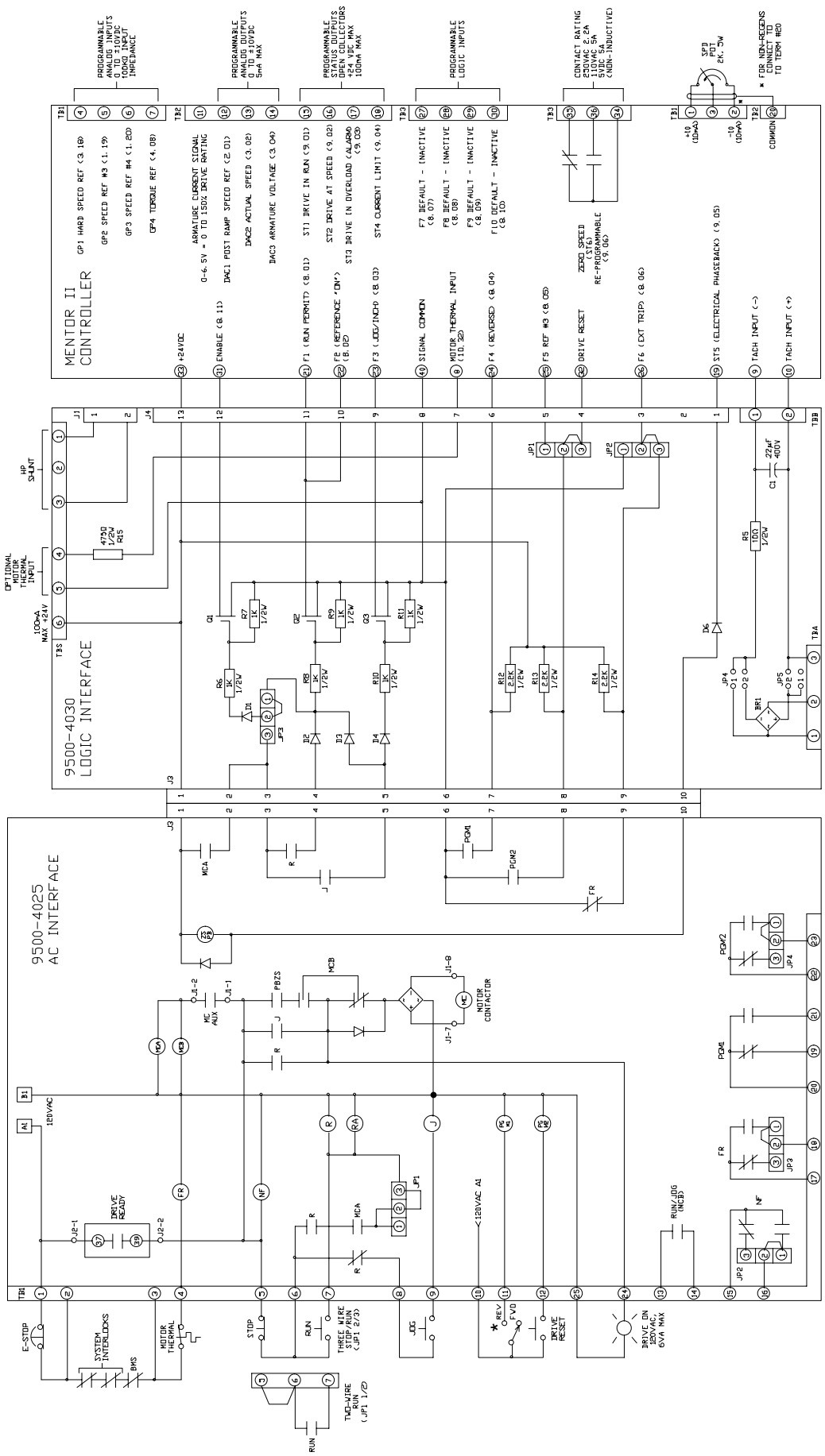


Figure 9-1.
Quantum III Interconnect Diagram
9500-1300-I, sheet 4

* Forward/Reverse selection not available on Non-Regen models