

The Application Note is pertinent to the Quantum III DC Drive Family

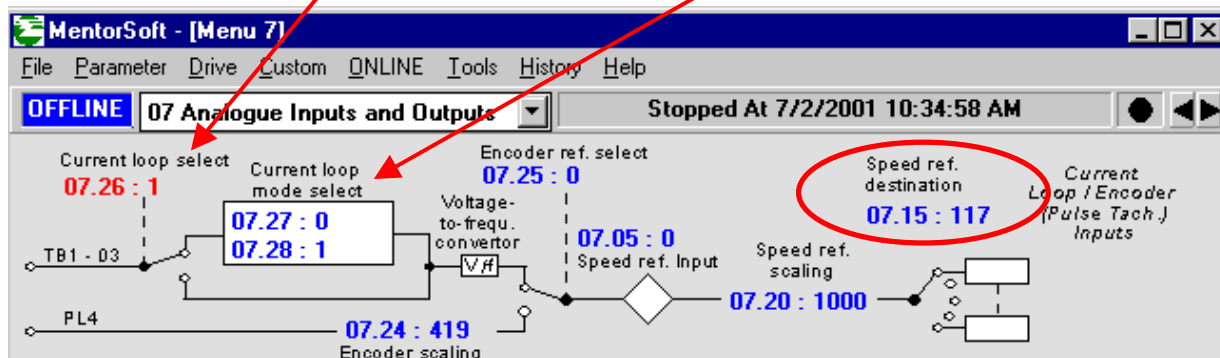
Auto (4-20mA) / Manual Speed Control

Every now and then a Drive system requires an Auto Mode whereby the reference is derived from an external process loop controller providing 4-20mA and also requires a Manual mode where the reference is provided by a speed pot.

This application note goes through an example of how one could obtain this functionality with the Quantum III DC Drive. One should refer to the Quantum III Manual March 2002 page 37 or 212 Interconnect Diagram for additional info. The Mentor II could be configured in a similar manner to achieve the same functionality.

Auto Mode

As far as bring in the 4-20mA signal, that's easy. Pin 3 on the MDA2B interface board can accept the mA signal by setting #7.26=1. The default settings for 7.27 & 7.28 are already set for 4-20mA.



07.28 R/W 20mA Current Loop Mode Selector 2—Offset Selector

In conjunction with 07.27, configures 20mA current loop input. Refer to table. When a 4mA offset is used, the drive trips if it senses that the current is <3.5mA—indicating “loop open”.

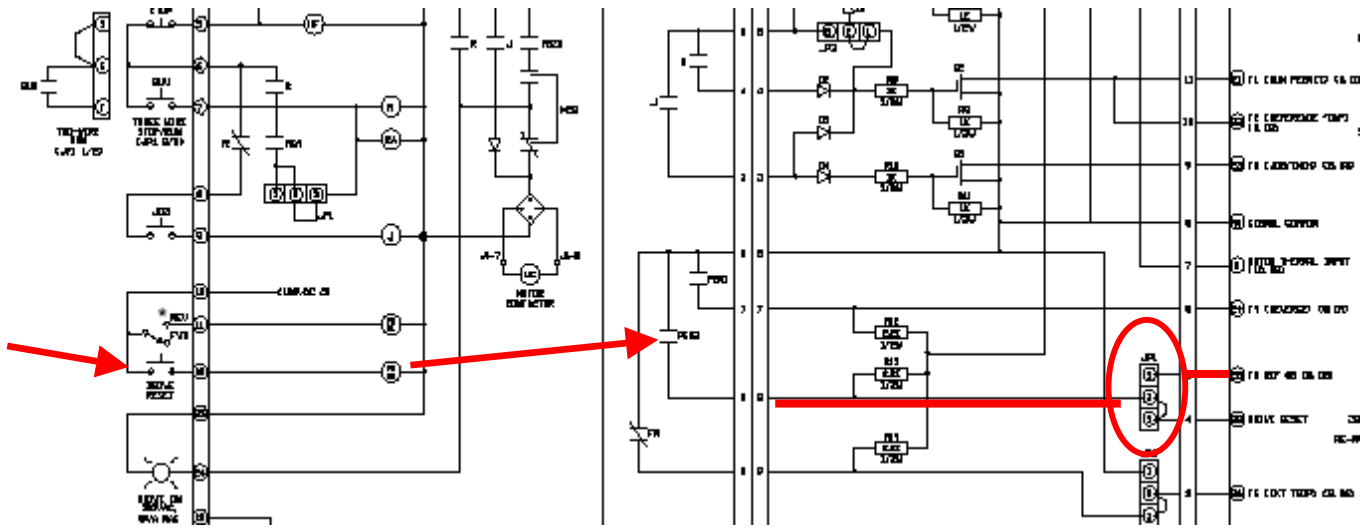
Default 1

CURRENT LOOP INPUT SELECTION		
INPUT	07.28	07.27
0-20mA	0	0
20-0mA	0	1
4-20mA	1	0
20-4mA	1	1

Manual Mode

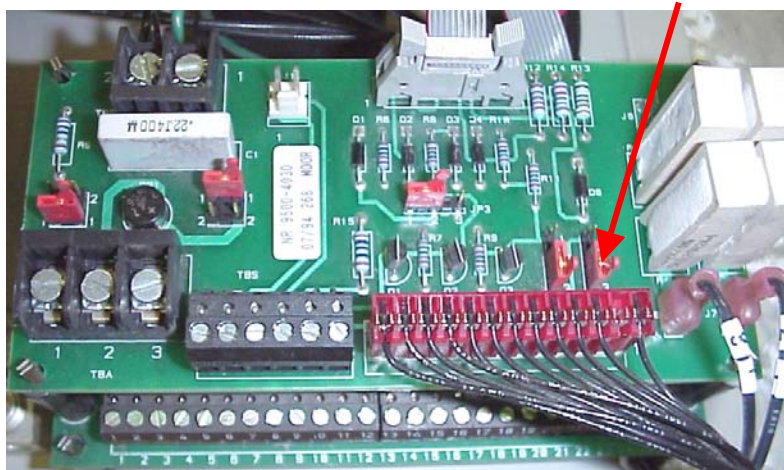
Manual mode implies that the drive is to follow a simple speed pot analog voltage. Normally pin 3 was used for this so now we must figure out how to get that speed pot in and where to send it and how to make the drive obey it when Manual is selected vs. Auto.

This solution uses one of the 2 programmable inputs to command an internal digital speed preset that would command this other speed when desired. One of the 115v inputs that could be used for this purpose is already setup for an alternate reference selection and is available on TB1 pin 12 of the 9500-4025 AC Interface Board. This input is shipped from the factory as an External Fault Reset function. If this were not needed, this input would be ideal for this purpose.



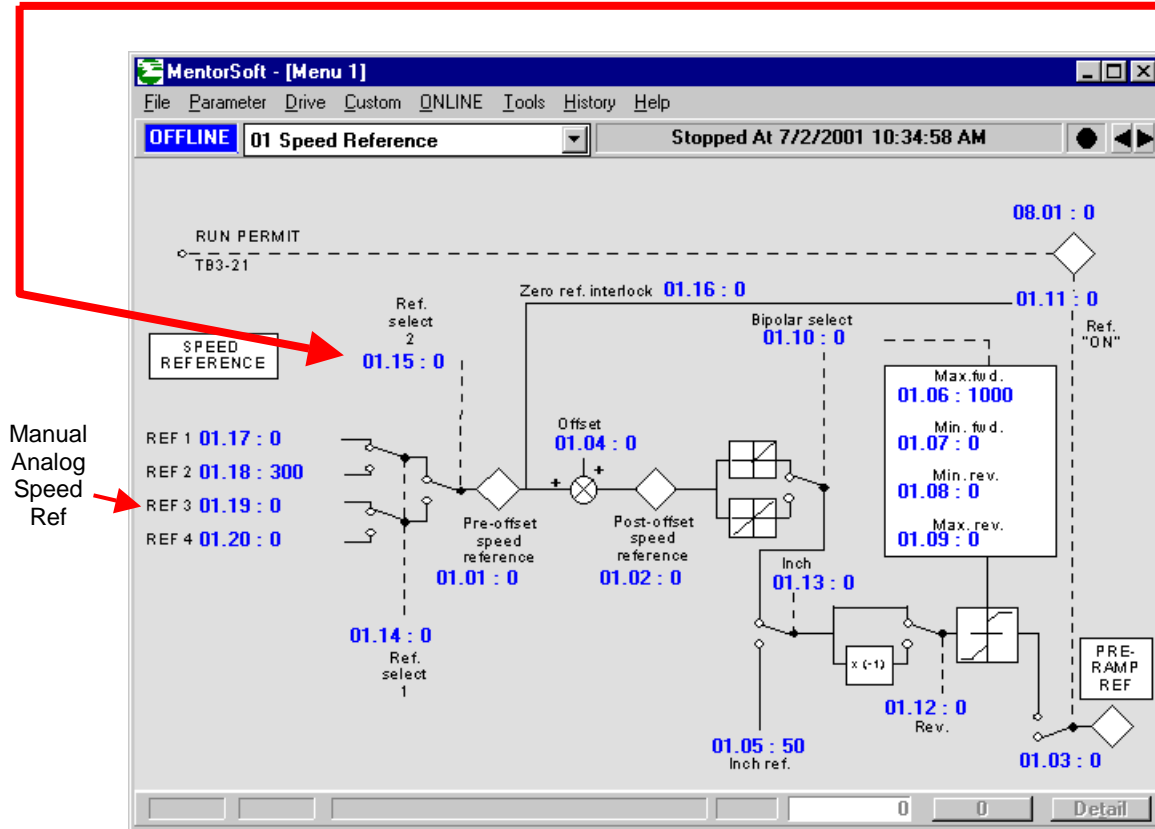
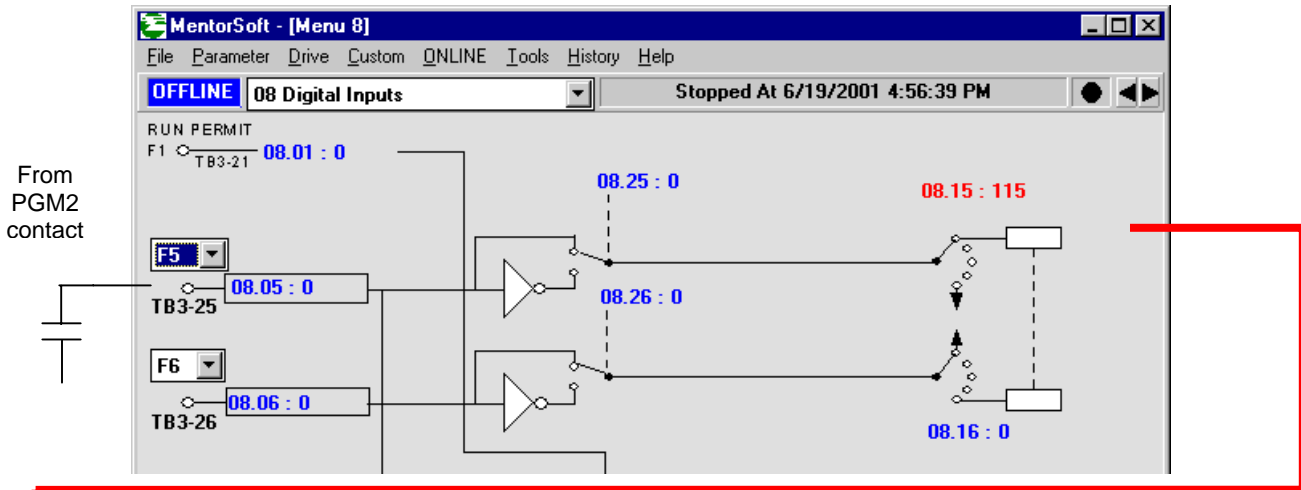
Quantum III Manual March 2002 page 37 or 212 Interconnect Diagram segment

An Auto/Manual Speed selector switch could be tied between TB1 pins 10 and 12 of the 9500-4025 AC Interface Board. This will cause the relay PGM2 to operate based on this selector switch. Now all one would have to do is change the setting of the JP1 jumper on the 9500-4030 Interface Board to position 1-2.



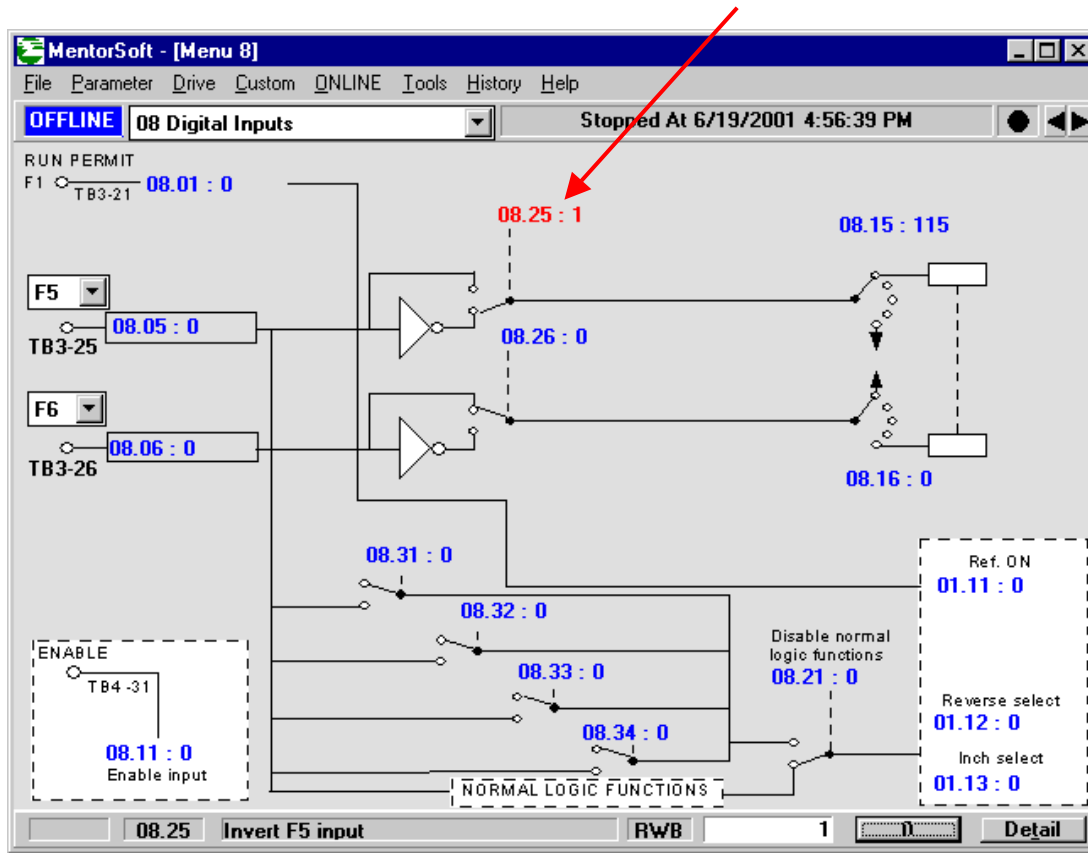
This will change the assignment of this function from the DRIVE RESET to the F5 input (pin 25 of the Drive itself).

This input was pre-configured in the factory to switch bit parameter #1.15, which selects between Ref # 1 and Ref # 3 (if # 1.14=0).



Setting parameter #8.15 =115 will direct the Auto/Manual selector switch to change the state of #1.15 from a 0 to a 1. This can be wired and tested before the drive is actually placed into RUN by observing parameter #1.01. In the above setup, Ref #1 (parameter #1.17) normally comes from the analog Speed Reference input on pin 3 of TB1 under the Drive cover, and for this example would be active without closing a contact to pin 12 of TB1 (the Auto or 4-20mA speed input we configured). The Manual speed would be selected when a contact closes to pin 12 of the 9500-4025 Relay Interface Board.

If it were desired that Manual speed is normally selected and the Auto Mode reference selected if the contact to pin 12 is made, one would only need to invert the function of the F5 input. This can be accomplished by setting #8.25=1 as shown below.



Alternatives

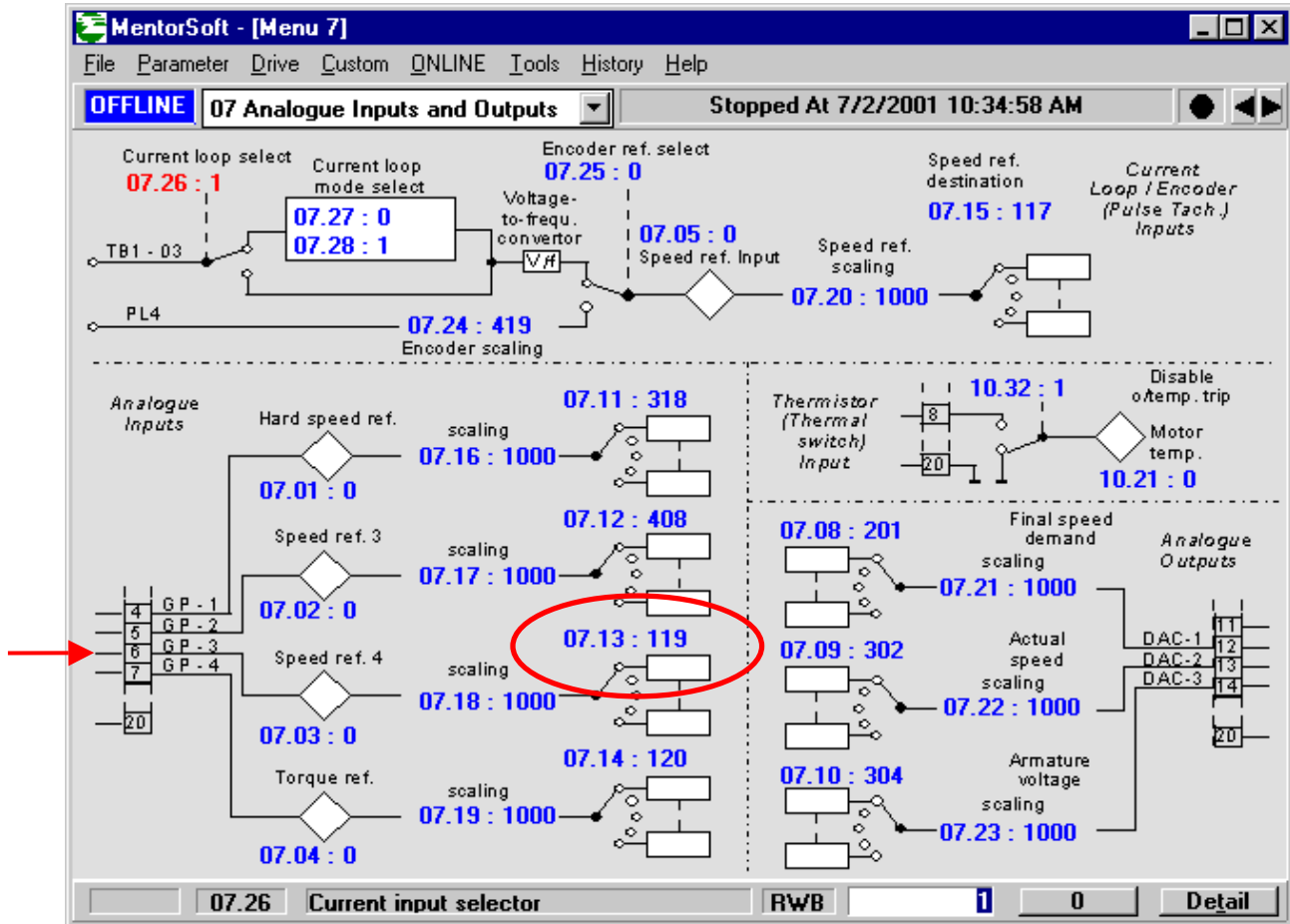
If you do not use the Fwd/Rev input on the drive and wish to use this input for Auto/Manual instead, simply connect your Auto/Manual Speed selector switch between TB1 pins 10 and 11 of the 9500-4025 AC Interface Board. This will cause the relay PGM1 to operate based on this selector switch. Disregard moving the jumper on the 9500-4025 Relay board.

You must re-program the F4 input (#8.14) from Reverse (112) to become 115. So set #8.14= 115.

If it were desired that Manual speed is normally selected and the Auto Mode reference selected if the contact to pin 11 is made, one would only need to invert the function of the F4 input. So set #8.24= 1.

Manual Speed Reference Signal

Now to get the Manual Speed pot signal to Reference #1.19 one would wire up the wiper to pin 6 (CCW of the pot to common and CW to +10v) of the MDA2 Interface Board. We can see that this analog input is being directed to #1.19 as a default already.



Questions ?? Ask the Author:

Author: Ray McGranor
(716)-774-0093

e-mail : ray.mcgranor@emersonct.com