INSTALLATION OVERVIEW

Protect the interior of valve from dirt and moisture during storage and installation. Valve should be installed so that the arrow on the valve body is in direction of normal refrigerant flow. System should be free from dirt, weld slag and rust particles. A 60 mesh, close-coupled strainer is available for installation at inlet of valve for 3/4˝, 1˝ and 1-1/4˝. *Do not close-couple strainers to 1-1/2˝ through 2˝ Motorized Control Valves.*

Please note: Valve will not backflow if in closed position. *Do not install check valves upstream of the Motorized Control Valve without hydrostatic pressure relief.* Do not close the hand valve on inlet or outlet without making sure valve is in the open position.

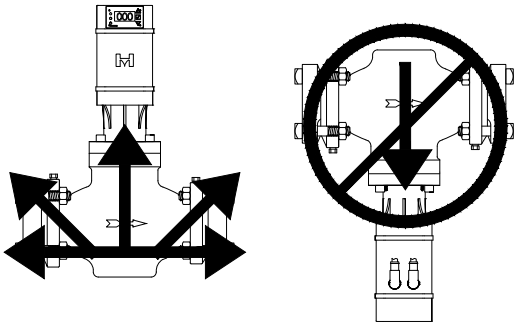
1/4˝ NPT Gauge/Purge port connections are provided on the inlet and outlet of the 3/4˝ thru 2˝ valves standard.

Pipe sizing, valve placement, rating, anchoring, and similar prudent precautions should be taken to ensure "liquid hammer" will not occur when valves open or close.

For proper flange gasket sealing, care must be taken when threading or welding to assure flanges are parallel to each other and perpendicular to pipe. Also, gaskets should be lightly oiled and all bolts should be lubricated with an anti-seize and must be tightened evenly.

Protect cables during installation.

Do **not** mount the valve with the motor in the down position. The valve will **only** operate properly if the motor is mounted in a horizontal or upright position. Refer to diagrams below. Horizontal mounting of motor is satisfactory if oil and dirt are controlled.



MANUAL CONTROL TOOL (MCT)

The V-port can be manually actuated by using the Manual Control Tool (MCT), see Figure 14. To utilize the MCT, the actuator would need to be removed from the valve. This can be done by first removing the cables plugged into the actuator, power (red) cable followed by the signal (green) cable. The valve v-port will remain in the same position it was at when cable was unplugged. Remove the actuator by loosening the three set screws at the base. DO NOT REMOVE THE BONNET. Place the MCT over the cartridge and turn the MCT clockwise to open or counterclockwise to close. Before re-installing rotate the MCT counterclockwise until the V-port is closed. Refer to TABLE 25 for the number of turns to fully actuate the valve. MCT is required to install V-port fully onto cartridge or remove V-port from cartridge (this includes during converting from SMV to MCV).

To reinstall the actuator, follow the instructions on page 21.

FIGURE 14

TABLE 25

NUMBER OF TURNS TO ACTUATE VALVE	
VALVE PORT SIZE INCH (MM)	**NUMBER OF TURNS**
1/16" THRU 9/32" (2 THRU 7)	6
3/4" THRU 1-1/4" (20 THRU 32)	7
1-1/2" THRU 2" (40 THRU 50)	12
3" (80)	18
4" (100)	20

INSTALLATION INSTRUCTIONS NEW COMPLETE VALVE

NOTE: Do not power on actuator until it is mounted to the valve and the set screws are properly torqued.

1. Remove valve, actuator, and remaining contents from box.
2. For flanged valves, align valve with arrow pointing in direction of flow and mount per install protocol. For weld in line valves, it is recommended to remove the cartridge/V-port assembly during welding by loosening bolts and removing bonnet. Replace cartridge/V-port assembly after valve body is installed and ensure o-ring in installed onto cartridge.
3. Install bonnet onto cartridge assembly and tighten four bonnet bolts.
4. Place Manual Control Tool (MCT) onto the top of magnetic cartridge assembly. Continue to rotate the tool counterclockwise until the valve is closed and the V-port will no longer move.
5. Grease exterior of cartridge above the O-ring with supplied low temp, high load, low RPM grease such as Lubriplate Aero or similar.
6. Check the base of the actuator to ensure that the set screws are not protruding past the ID of the threaded ring. If necessary back the set screws out to prevent interference during installation.
7. Install actuator onto cartridge. Press firmly down on the top of the actuator to ensure it fully seats. The gap between the base of the actuator and bonnet should be less than 1/16".
8. Rotate actuator to orient in desired position and torque the 3 set screws at base to 4 in-lb using 3/32" hex key.
9. Wire the flying lead ends of the cable to power and the desired input signal and feedback loop per wiring diagram.
10. Connect the red and green cables to the actuator
11. Upon power-up, the valve will automatically calibrate.
12. Actuator is programmed for 4-20mA input signal. See page 40 to change if other signal is used.

CONVERSION FROM SMV TO MCV

NOTE: Do not power on actuator until it is mounted to the valve and the set screws are torqued.

1. Isolate and pump down existing valve per PSMs.
2. Disconnect existing powerhead connections.
3. Unscrew the powerhead screws and remove the powerhead.
4. Unscrew bonnet bolts and remove the bonnet.
5. Remove existing can and cartridge assembly. Ensure old gasket is removed from counter bore on top face of valve.
6. Remove new actuator and remaining contents from box.
7. Install new cartridge gasket to counter bore on top face of valve.
8. Install V-port into cartridge while fully supporting the V-port and cartridge and carefully aligning the threaded shaft of cartridge with the low friction nut of V-port. Carefully thread together 6-8 turns and align the anti-rotation slot on the V-port with the anti-rotation pin of the cartridge. Using the MCT, fully thread the V-port into the cartridge, screwing the V-port fully into the cartridge by turning the rotor clockwise.
9. Install new rotor cartridge/V-port assembly into valve.
10. Install new bonnet over cartridge assembly and tighten bonnet bolts.
11. Ensure O-ring is installed onto cartridge assembly.
12. Place Manual Control Tool (MCT) onto the top of magnetic cartridge assembly. Continue to rotate the tool counterclockwise until the valve is closed and the V-port will no longer move.
13. Grease exterior of cartridge above the O-ring with supplied low temp, high load, low RPM grease such as Lubriplate Aero or similar.
14. Check the base of the actuator to ensure that the set screws are not protruding past the ID of the threaded ring. If necessary back the set screws out to prevent interference during installation.
15. Install new actuator onto cartridge. Press firmly down on the top of the actuator to ensure it fully seats. The gap between the base of the actuator and bonnet/ cartridge should be less than 1/16".
16. Rotate actuator to orient in desired position and torque the 3 set screws at base to 4 in-lb using 3/32" hex key.
17. For HMMR/HMMV conversion, connect the black 7 pin dongle connector to the existing connection already wired in place. The VPIF can be left in place if desired.

NOTE: For HMSV conversion cut off black 7 pin dongle connector to power and input/output, per wiring diagram. It is important to remove the 24VAC to the pink and yellow relay signal wires. Voltage to this line will cause damage as the input should only be a closed contact switched to ground.

18. Connect the red and green cables to the actuator.
19. Upon power-up, the valve will automatically calibrate.
20. Confirm actuator is programmed for valve size and input signal through the keypad display. See page 40.

NOTE: Gaskets and O-rings should be replaced with new if they are removed from valve. Recommend to lubricate new gaskets/O-rings with oil prior to installing. Bolts should have anti-seize applied.

CUSTOMER SUPPLIED POWER SUPPLY AND CONTROLLER
(Current Input Modulating Control with Position Feedback)

The valve is supplied with 6.5 feet of cable with 22 and 24 gauge wires. For greater distance between valve and controller use wire size as shown in Table 1: 24VAC/DC Power Wiring. Do not run Motorized Control Valve wiring with or near high voltage power wiring or VFD Controls (Variable Frequency Drives). Do not earth or ground 24 VAC wiring.

FIGURE 15

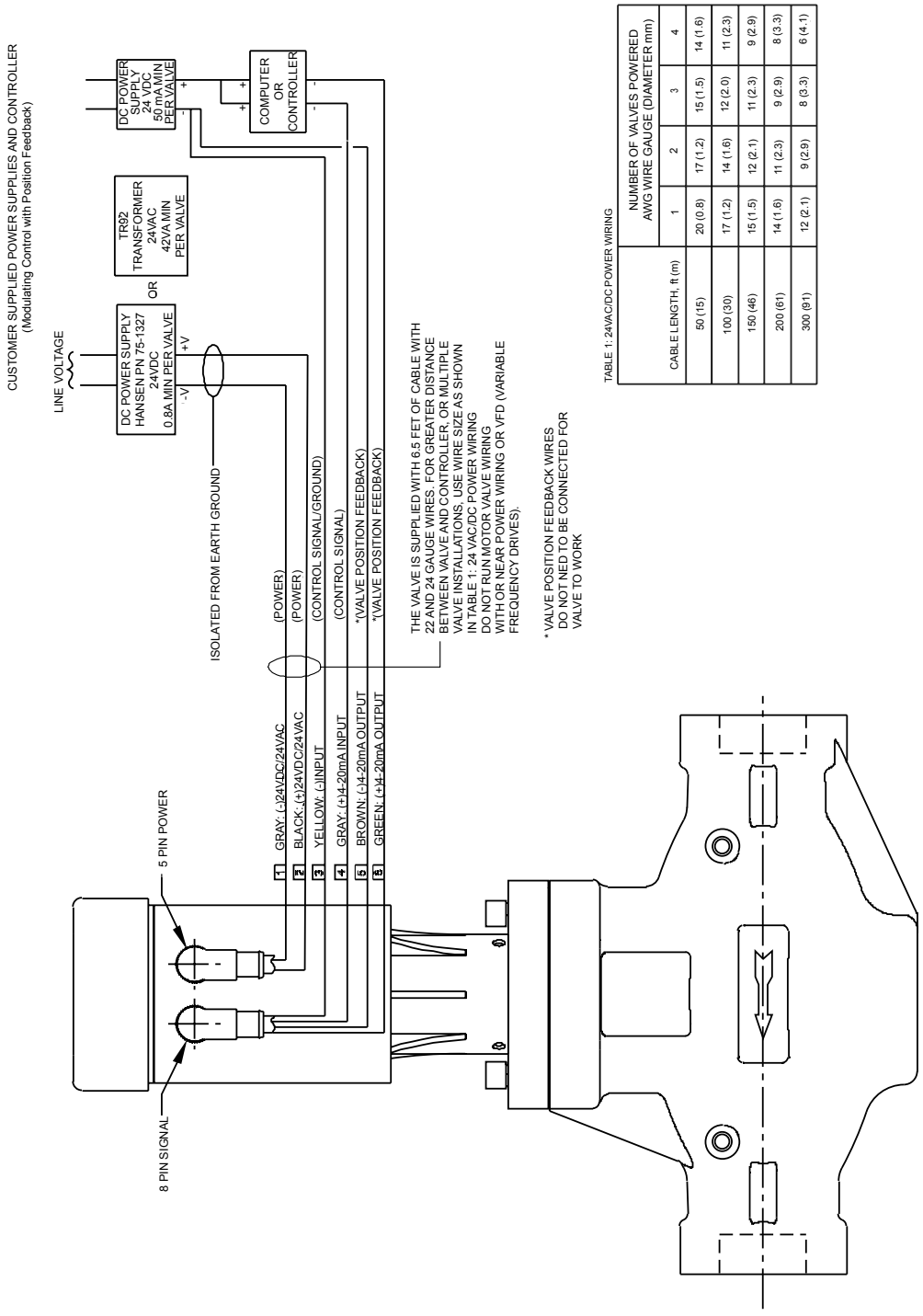


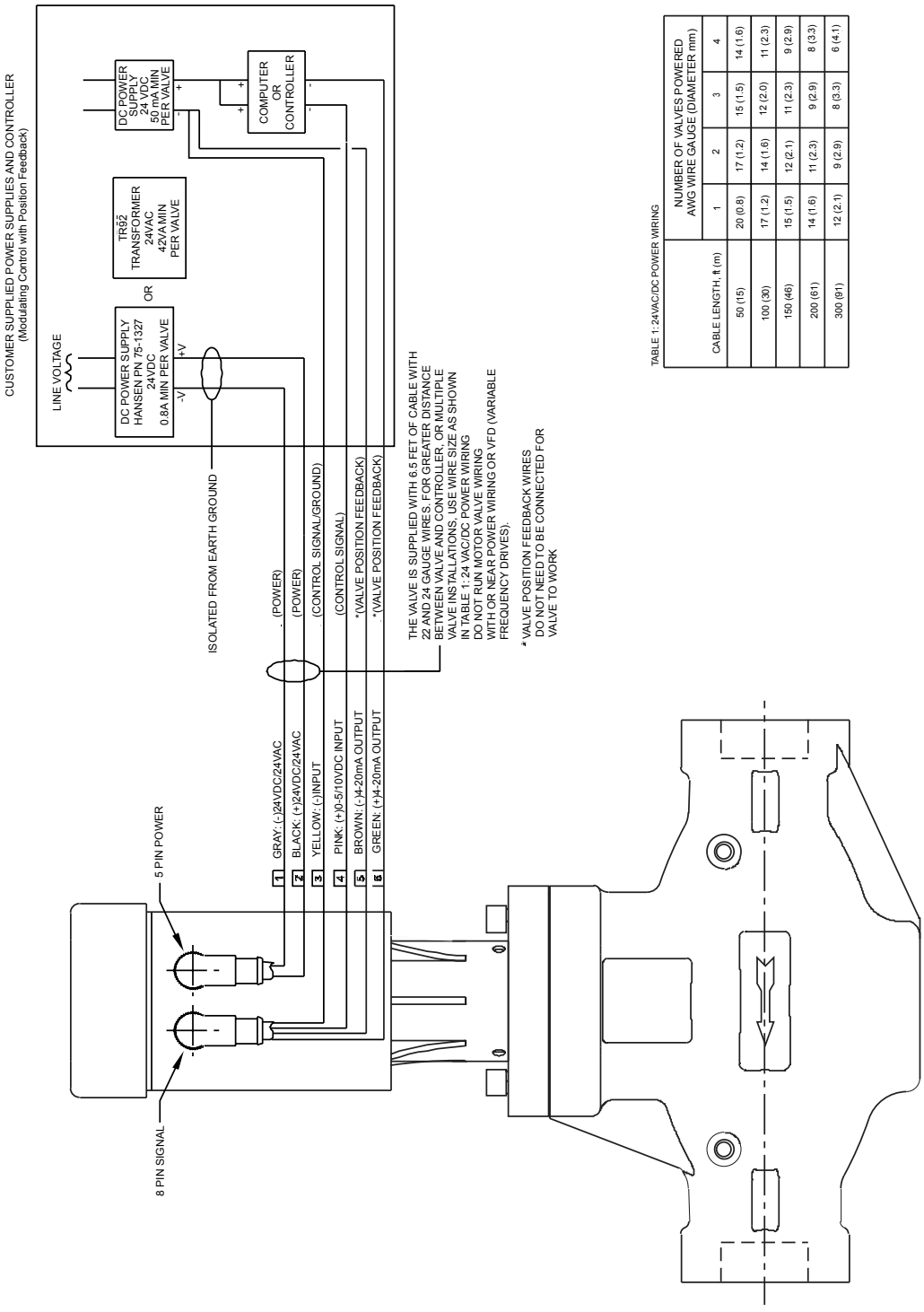
TABLE 1: 24VAC/DC POWER WIRING

CABLE LENGTH, ft (m)	NUMBER OF VALVES POWERED AWG WIRE GAUGE (DIAMETER mm)			
	1	2	3	4
50 (15)	20 (0.8)	17 (1.2)	15 (1.5)	14 (1.6)
100 (30)	17 (1.2)	14 (1.6)	12 (2.0)	11 (2.3)
150 (46)	15 (1.5)	12 (2.1)	11 (2.3)	9 (2.9)
200 (61)	14 (1.6)	11 (2.3)	9 (2.9)	8 (3.3)
300 (91)	12 (2.1)	9 (2.9)	8 (3.3)	6 (4.1)

CUSTOMER SUPPLIED POWER SUPPLY AND CONTROLLER
(Voltage Input Modulating Control with Position Feedback)

The valve is supplied with 6.5 feet of cable with 22 and 24 gauge wires. For greater distance between valve and controller use wire size as shown in Table 1: 24VAC/DC Power Wiring. Do not run Motorized Control Valve wiring with or near high voltage power wiring or VFD Controls (Variable Frequency Drives). Do not earth or ground 24 VAC wiring.

FIGURE 16



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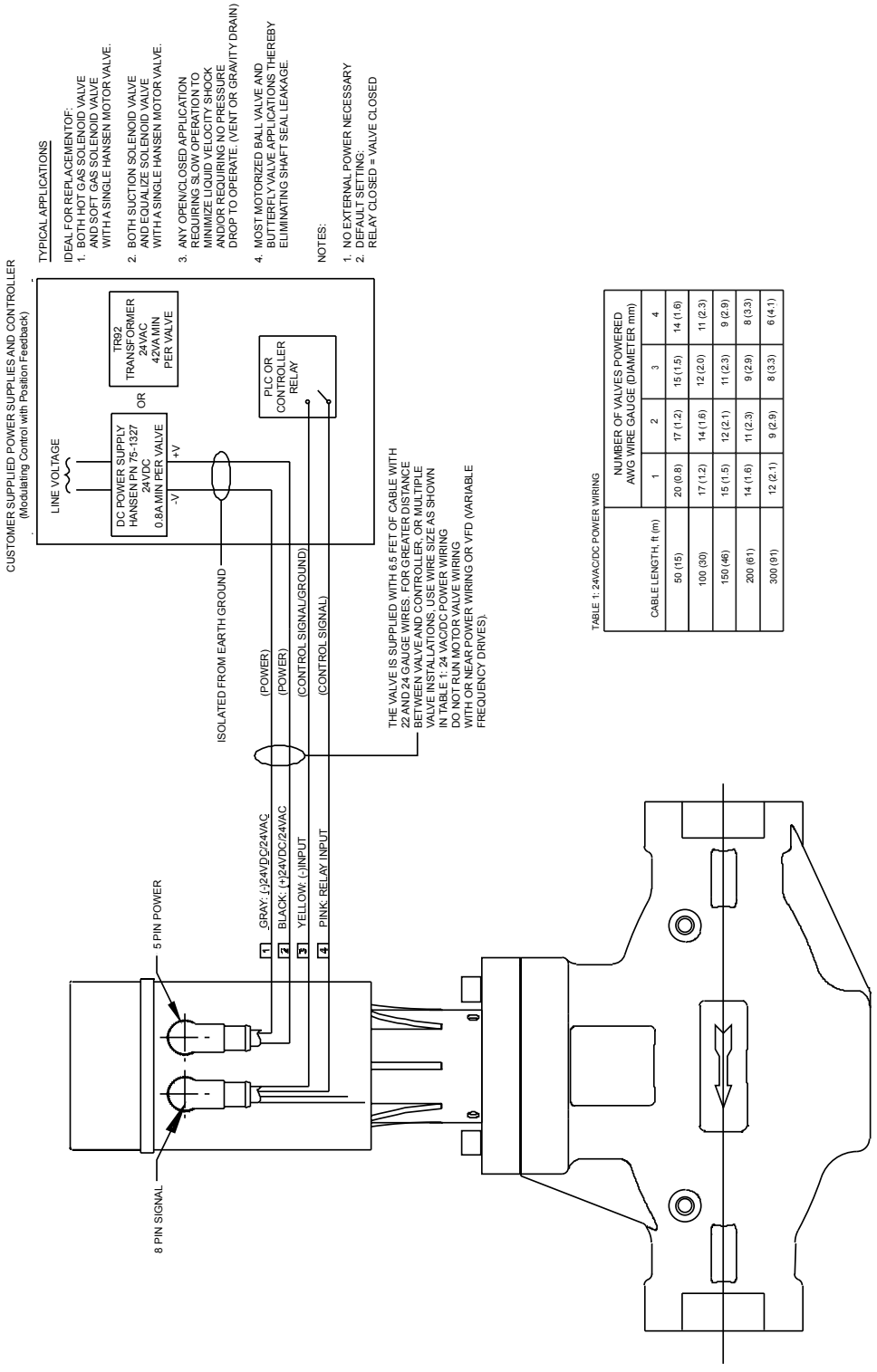
300 (91)	12 (2.1)	9 (2.9)	8 (3.3)	6 (4.1)

CUSTOMER SUPPLIED POWER SUPPLY AND CONTROLLER
(Relay Input Slow Open/Close Solenoid Control)

The valve is supplied with 6.5 feet of cable with 22 and 24 gauge wires. For greater distance between valve and controller use wire size as shown in Table 1: 24VAC/DC Power Wiring. Do not run Motorized Control Valve wiring with or near high voltage power wiring or VFD Controls (Variable Frequency Drives). Do not earth or ground 24 VAC wiring.

NOTE: Do not connect voltage to pink or yellow wires as it will damage the actuator board.

FIGURE 17



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