

INSTALLATION

When Installing this Product:

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check ratings given in instructions and on the product to ensure the product is suitable for your application.
3. Observe and follow all national, state/provincial, local plumbing, fire and electrical codes.
4. Installers must be licensed pipe fitters, electricians and/or service technicians. This publication requires all installers to be trained and experienced in their trades.
5. After installation is complete, check out product operation as provided in these instructions.
6. Full close-off ratings for automated valves apply only when valve is mounted between two flanges. Valve close-off is de-rated when installed on one flange in end-of-line service due to lack of compression on seat seal. Close-off rating of 2 to 12 inch full cut valves mounted to a single flange is 75 psi. Close-off rating of 14 to 20 inch full cut valves mounted to a single flange is 50 psi.

Preparation

Safety

Honeywell assumes no responsibility for damages or injuries resulting from non-compliance with installation instructions or standard good practice when mounting, operating, or maintaining the valves, even if not explicitly mentioned in the installation instructions.



CAUTION

Equipment Damage Hazard:

- Foreign particles like dirt and metal chips can damage valve seals. For trouble-free operation of the product, good installation practice must include initial system flushing, and chemical water treatment. The presence of excessive rust (Fe_2O_3) in the system may void Warranty.
- Clean the lines upstream of particles larger than 1/16 inch (1 mm) diameter (welding slag, pipe scale, sand and other suspended particulate). Use of a 50 micron (or finer) system side-stream filter is suggested. Remove all filters before flushing. Use of 20 mesh strainers in the system is recommended.
- Follow boiler or chiller manufacturer's recommendations for water treatment such as rust inhibitors, acidity, etc.
- Rapid increases in pH levels can create excessive quantities of magnetite (Fe_3O_4) in systems with iron piping and other components.
- Do not use boiler additives, solder flux and wetted materials which are petroleum-based or contain mineral oil, hydrocarbons, or ethylene glycol acetate. These may cause the seat to swell, impairing operation. If treating system with azole-based compounds, system must be thoroughly flushed before filling, or resilient seat may be damaged. Compounds which can be used, with minimum 50% water dilution, are diethylene glycol, ethylene glycol, and propylene glycol (antifreeze solutions).
- If installing these valves in an addition to, or retrofitting and existing building, do not assume that the fluid in the existing piping meets these criteria for water quality or treatment.

Valve Installation

Location

Select a location where the valve and actuator will be accessible, once installed. Allow sufficient space for servicing the valve and actuator. Clearance for valve installation is dependent on actuator size and the valve pipe size. Refer to Figures 1 to 6 for valve body and actuator dimensions.

1. Clean the lines upstream of the valve to remove particles larger than 1/16 inch (1 mm) diameter (welding slag, pipe scale, metal filings, and other contaminants) to prevent damaging or obstructing disk operation.
2. Air should be eliminated from the system so that valves remain full of fluid during operation.
3. To prevent interference with disk operation, a butterfly valve should be installed at least 6 pipe diameters away from other pipe line elements. Where this is impractical, care must be taken to ensure free operation of the disk to prevent damage to moving parts and actuators.
4. Proceed with installation once the system specifics (expansion/contraction of the system and its medium as well as operating pressures) are within tolerances.
5. Valve may be installed with actuator(s) mounted, if preferred.

Mounting 2-way Valves

1. Before installing the valve, rotate the valve stem manually to make sure that the valve stem operates freely. Impaired stem operation can indicate that the stem was bent by rough handling. This condition **may** require replacing the valve.
2. Protect the stem from damage due to bending or scratching.
3. For horizontal piping, install the valve so the actuator is in any position between vertical and horizontal, but preferably above the valve. Do not install the valve with the stem below horizontal or upside down unless splash-proof or waterproof actuators are used. For vertical piping, the actuator can be mounted in any orientation. See Fig. 15.

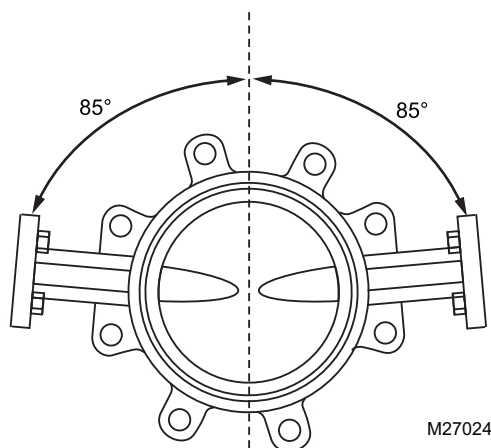


Fig. 15. Butterfly valve orientations for Honeywell direct coupled actuators (DCA's)

4. Hoist valve by its body or neck only, using a nylon sling. Do not lift by actuator, manual operator, or flange holes. (See Fig. 16 for proper hoisting method.)



Fig. 16. Butterfly valve hoisting techniques

5. Mount the valve between aligned pipes. Mounting the valve on pipes that are not aligned causes leakage at the valve-to-pipe connection and add excess strain to flange bolt lugs.. See Fig. 17.

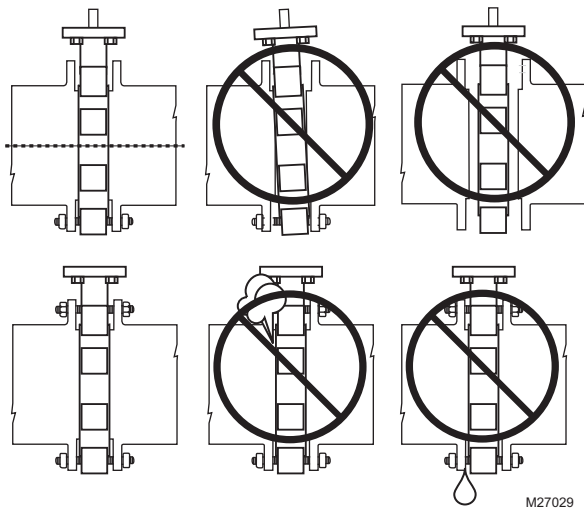


Fig. 17. Proper flange alignment

6. If installing into an existing system, release system pressure and drain the valve pipe section so the medium (water or glycol solution) does not leak out of the valve body during installation.
7. Iron valves are mechanically compatible with standard ANSI Class 150-flat faced or raised-face steel flanges, or with ANSI Class 125 cast iron flanges. Either neck-weld or slip-on flanges may be used; however, *Type C stub-end flanges are not recommended*. See Fig. 18.

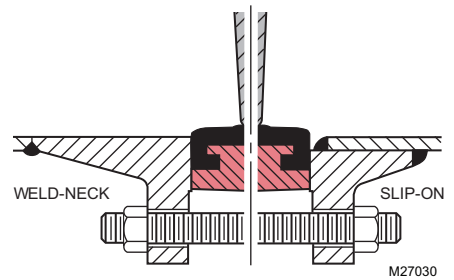


Fig. 18. Flange welding techniques

8. When using welded flanges, loosely assemble valve and flanges using flange bolts with disk open about 10°. Tack weld flanges to pipes. Remove valve from flanges to prevent heat damage and complete flange welding.
9. When flanges have cooled from welding, position the disk in the partially open position, about 10°, keeping the disk at least 3/8 in. (7 mm) inside the body faces. See Fig. 19.

NOTE: The flats of the Double-D valve stem are parallel to the faces of the disk. Valves are shipped with the disks open slightly to avoid compression set of the resilient seat.

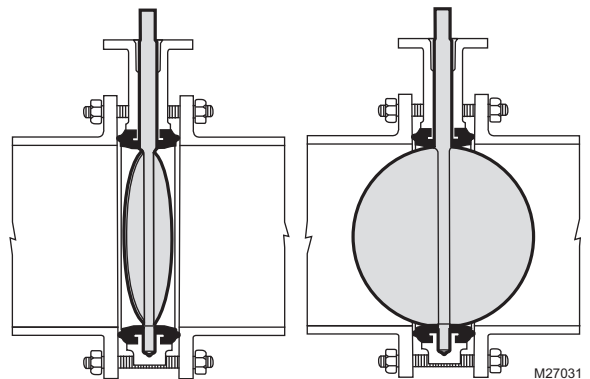


Fig. 19. Valve installation disk positions

10. Spread the pipe flanges. Taking care not to damage the resilient seat gasket, place the body between the flanges, and install all flange bolts. **Do NOT use flange gaskets;** the resilient seat serves this purpose.
11. The disk will project into the attached piping. *Before tightening flange bolts*, carefully open the disk to the full position to ensure proper alignment and clearance of the disk O.D. with the adjacent pipe I.D. Leave disk in full open position. Snug bolts "hand tight" and then use wrench to tighten bolts an additional quarter to half-turn using a staggered pattern, as with wheel rims of a car. Take care not to over-tighten flange bolts -- compression of rubber increases disk friction.

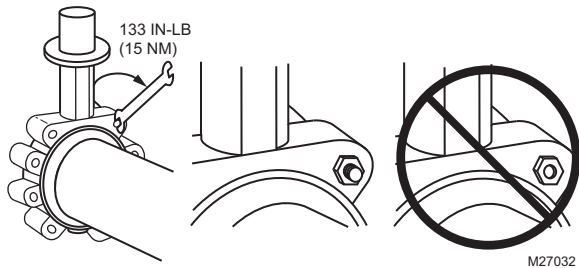


Fig. 20. Flange bolt installation guidelines

12. Once bolts are tightened, carefully rotate disk to closed position to ensure disk O.D. clearance.
13. Proceed to check out operation of actuator.

Mounting 3-way Valve Assemblies

1. Prepare piping as described in steps 1 to 8, in section "Mounting 2-way Valves", above.
2. Mount three-way valves as shown in Fig. 23, according to whether they are to be used for mixing or diverting control. **Note that valve ports are NOT identified on the assembly.** VFF3 valve assembly is factory configured to figure 7a with A port normally closed, but linkage may be adjusted to any position. Note that the B port in Fig. 23 is always the side port of a VFF3 assembly. VFF6 valve assembly is factory configured to figure 7b, but linkage may be adjusted to any position. Note also that the AB (common) port is always the side port of a VFF6 assembly. *Adjust the linkage as needed prior to installation.*
3. Position the disk of the first flange to be attached in the partially open position, keeping the disk within the body faces. See Fig. 23.
4. Attach the first flange and install flange bolts. See Table 1 for bolt specifications. **Do NOT use flange gaskets;** the resilient seat serves this purpose.
5. Before tightening flange bolts, carefully open the disc to the full open position to ensure proper alignment and clearance of the disk O.D. with the adjacent pipe I.D. Leave disk in full open position and tighten flange bolts per required specification.
6. Once bolts are tightened, carefully rotate disc to closed position to ensure disk O.D. clearance.
7. Repeat steps 3 to 6 above to attach the second flange.
8. Proceed to check out operation of actuator.

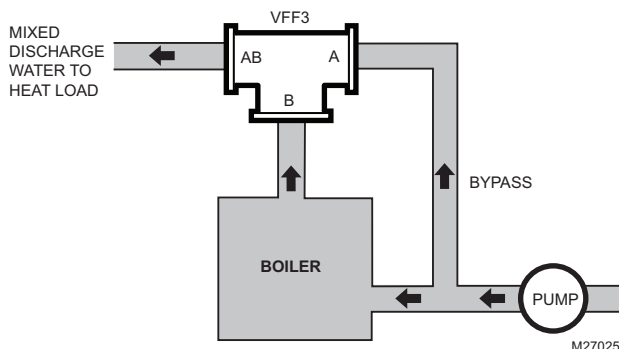


Fig. 21. Boiler bypass for reset control

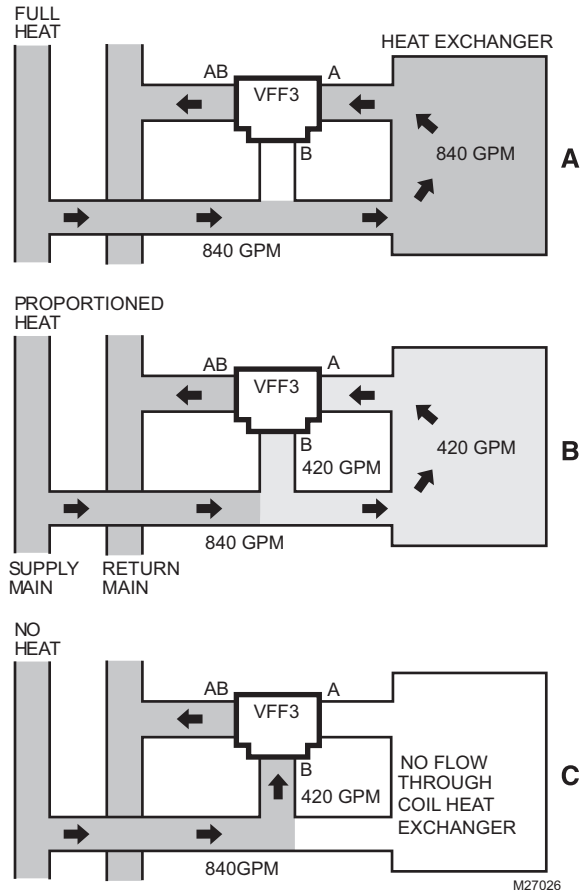


Fig. 22. 3-Way mixing valve operation with coil bypass

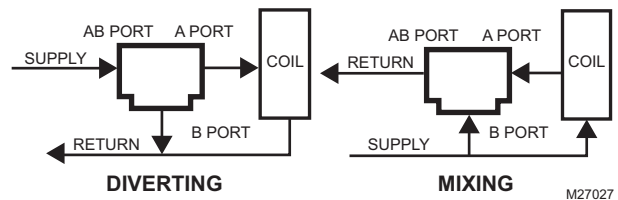


Fig. 23. 3-Way VFF3 butterfly valve flow orientation

Mounting Actuator

For information on actuator (removal and mounting), refer to the operating and maintenance data sheet included with the specific actuator coupled to the valve. It is important to have selected the correct actuator available for the application.

NOTE: Honeywell Environmental and Combustion Control does not recommend its products for use in high precision, process control applications. ECC products are designed for typical Heating, Ventilating and Air-Conditioning applications.

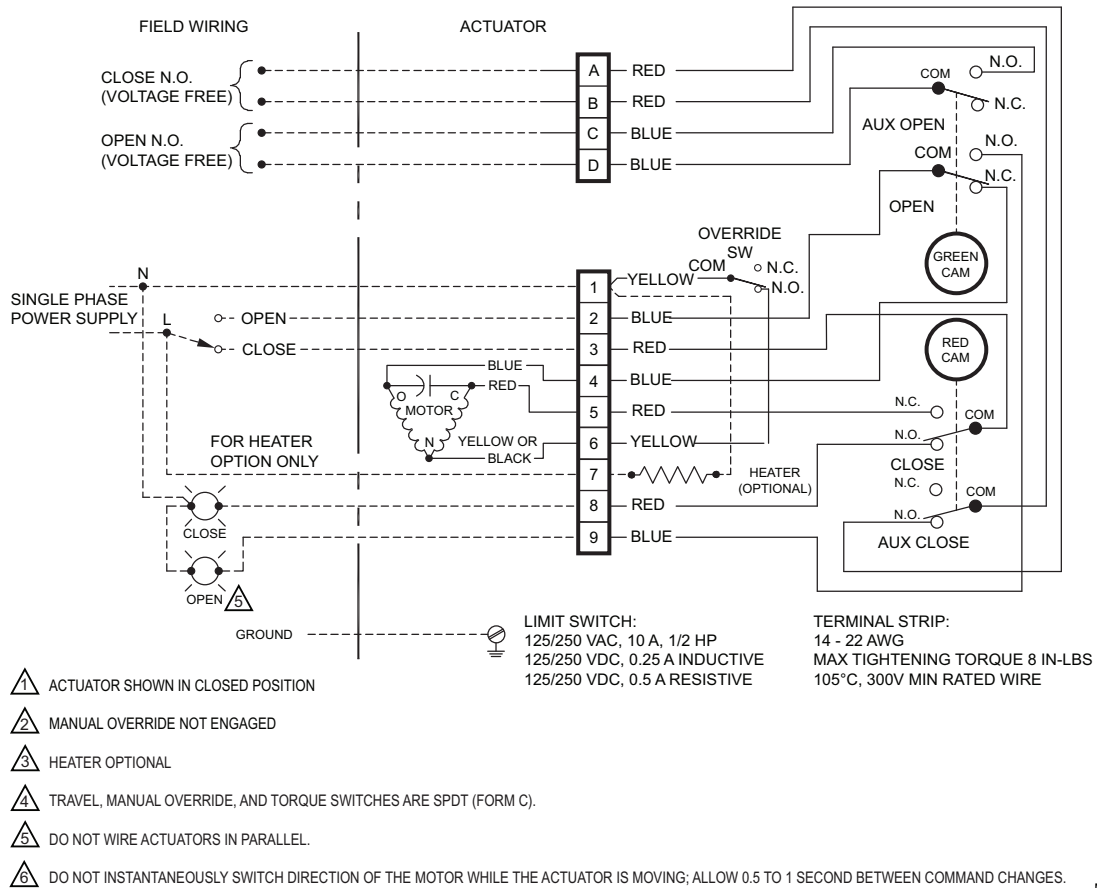
Electrical Installation

1. If necessary, remove actuator wiring cover.
2. Wire actuator using specific wiring instructions that come with each actuator.
3. Replace cover.

Notes:

- With the exception of MS4120A, Honeywell DCAs are 24Vac Class II electrical products.

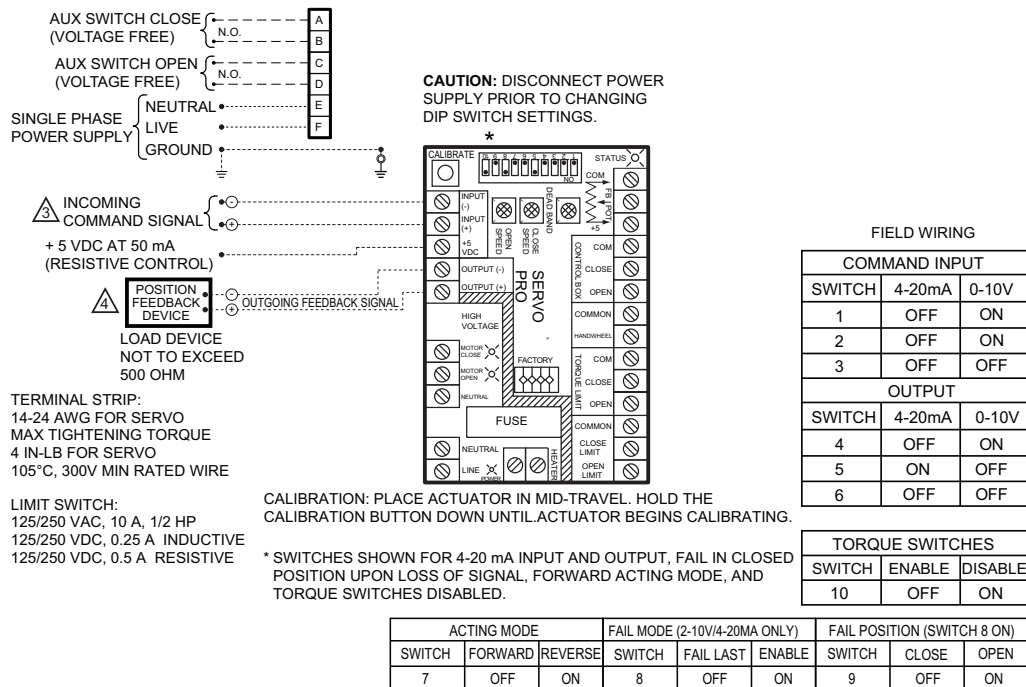
- All industrial-grade (NEMA 4/4X) actuators are Class I devices, wired using 120Vac, 50/60Hz power.
- Pneumatic actuators are available with several electro-pneumatic interface options, including line and low voltage solenoids for two-position control, and 4-20 mA server for modulating control..
- For convenience, typical wiring diagrams are reproduced in Figures 24-28.



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Fig. 24. NEMA 4X floating/2-position industrial-grade actuator for valves up to 18" (VFF...XA)

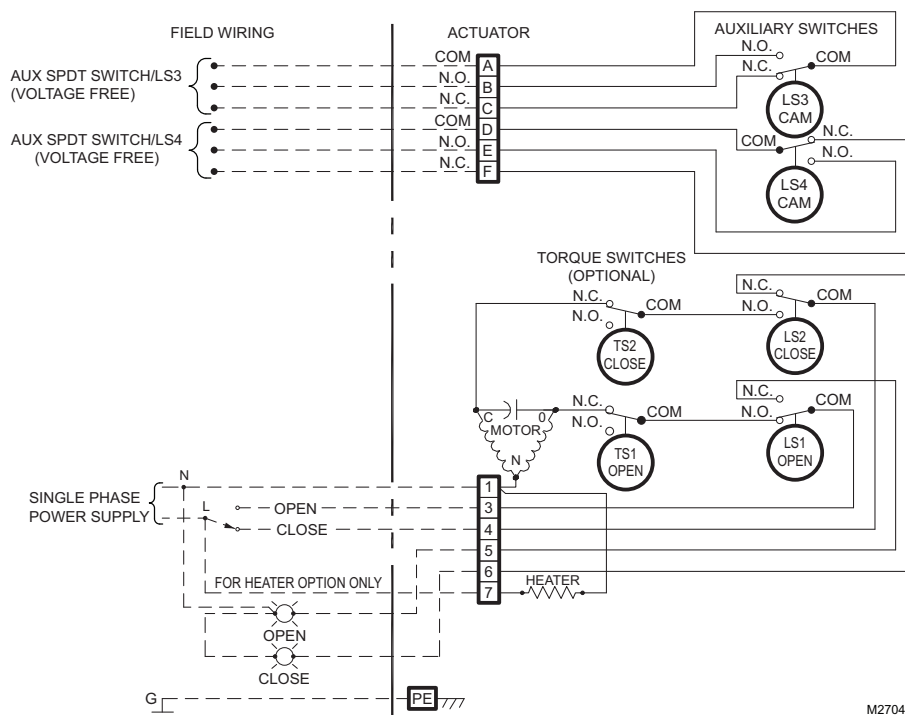
VFF1, VFF2, VFF3, VFF6 RESILIENT SEAT BUTTERFLY VALVES WITH FLANGED CONNECTIONS



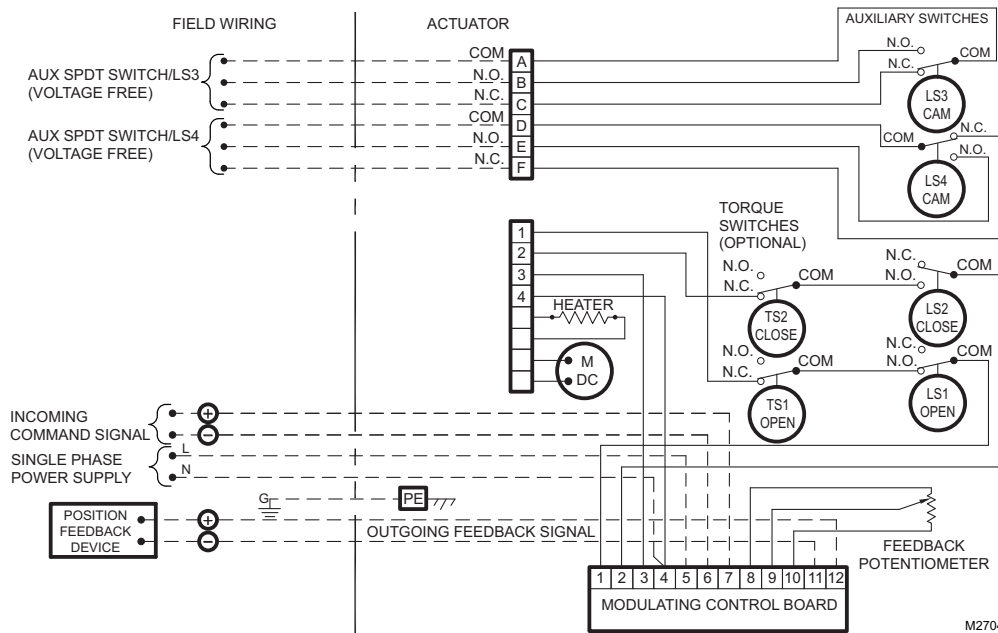
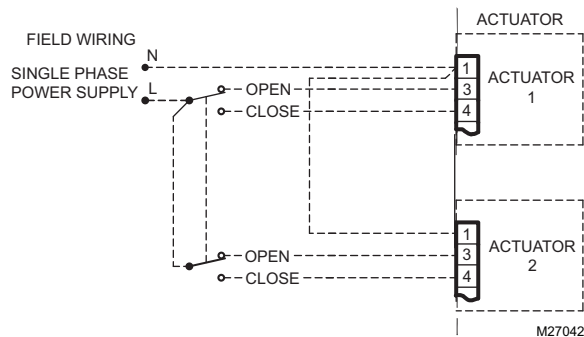
- ⚠ ACTUATOR SHOWN IN CLOSED POSITION.
- ⚠ MANUAL OVERRIDE NOT ENGAGED.
- ⚠ COMMAND SIGNAL AND FEEDBACK SIGNAL MUST BE ISOLATED FROM EACH OTHER AND ANY OTHER CIRCUIT.
- ⚠ FEEDBACK LOOP IS POWERED BY THE SERVO, DO NOT SUPPLY EXTERNAL POWER.
- ⚠ SEE MANUAL FOR DETAILS.
- ⚠ HEATER OPTIONAL.
- ⚠ TRAVEL LIMIT AND MANUAL OVERRIDE SWITCHES ARE SPDT (FORM C).
- ⚠ SEE NAME TAG FOR POWER RATING.

M27039

Fig. 25. NEMA 4X modulating industrial-grade actuator for valves up to 18" (VFF...XB)



M27040

Fig. 26. NEMA 4 floating/2-position industrial-grade actuator for valves 14" to 20" (VFF...4A)**Fig. 27. NEMA 4 modulating industrial-grade actuator for valves 14" to 20" (VFF...4B)****Fig. 28. Unison operation of floating/2-position industrial-grade line voltage actuators using interface relay**

OPERATION AND CHECKOUT

NOTE: Proper valve close-off depends on the disk closing fully to compress the resilient rubber seats. Valves are shipped in the slightly open position, used for initial placement, and so that the seat does not 'set' and leave a groove in the disk. It is not recommended to leave the disk in the seat for extended periods of time when the valve is not installed. When installed, it is recommended to open the valve periodically. Disk position when actuators are removed from installed valve bodies can be determined by noting the flats of the Double-D valve stem are parallel to the faces of the disk.

Checkout

For instructions for operating the valve actuator, see the specific actuator's Product Data Sheet. Wiring terminal connections for industrial-grade electric actuators are included in this publication for reference operate the control system and check valve operation to determine that the valve stem positions the disk smoothly through its full stroke without binding.

Ensure that the actuator selected provides the force to position the valve disk. For electric spring-return actuators, the actuator provides normally closed or normally open operation on electric power or pressure failure, depending on the valve/ actuator combination selected.

General

Spring return actuators return the valve to its normal position (open or closed, depending on the actuator and valve selected) in the event of a power failure. Non-spring return actuators hold the last commanded position.

Pneumatic spring return actuators are factory configured as normally open (VFF1) or normally closed (VFF2). VFF3 and VFF6 3-way valve assemblies are factory configured with the A port normally closed, but the valve linkage may be field-adjusted to one of several other orientations.

Pneumatic actuator torque will vary proportionally to supply air pressure. Depending on torque in excess of valve operating requirements, close-off pressure may vary from published ratings. With air pressure below 80 psi, high pressure bi-directional actuators will lose both seating and unseating torque. Normally open spring return actuators will lose close off torque. Normally closed spring return actuators will lose opening torque. Contact Honeywell for advice on specific, non-standard applications.

Valves with Honeywell spring return direct coupled actuators (DCAs) are shipped with the A port normally closed. This may be converted to normally open by removing the actuator(s),