

VN SERIES ZONE VALVES

INSTALLATION INSTRUCTIONS



APPLICATION

The VN Series Zone Valves and Actuators are space-saving, compact, two or three-way ball valves, factory assembled, and tested with electronic rotary fail-in-place or electronic-fail-safe actuators.

Actuators provide 2-position or modulating control (with position feedback) of hot or cold water with up to 50% glycol in residential and commercial HVAC equipment. Optimized for cooling and heating in Fan Coil Units (FCU), Variable Air Volume (VAV), Unit heaters, Reheat coils, Radiators and Chilled beam.

Application Notes

Valve sizing is essential for correct system operation. Undersized valves do not have sufficient capacity at maximum load. Oversized valves do not have sufficient authority over the load. These can cause excessive cycling, lead to premature actuator failure, and damage the seat and ball because of the restricted opening.

Proper Use

The VN valves are intended for use only in hot and cold water closed loop applications, with a temperature range of 32 to 200 °F (0 to 93 °C) and a nominal pressures of up to 290 psi.

Water should be properly filtered, treated, and conditioned for good operating performance, and according to recommendations of the boiler or chiller manufacturers. The installation of strainers and filters is recommended.



IMPORTANT:

The presence of excessive iron oxide (red rust) in the system, voids the valve warranty.

PREPARATION



CAUTION

Foreign particles like dirt and metal chips can damage the ball seals.

For trouble-free operation of the product, good installation practice must include initial system flushing and chemical water treatment. Clean the lines upstream of particles larger than 1/16 inch in 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.

Do not use boiler additives, solder flux, and wetted materials which are petroleum based or contain mineral oil, hydrocarbons, or ethylene glycol acetate. Compounds that can be used with a minimum of 50% water dilution are diethylene glycol, ethylene glycol and propylene glycol (antifreeze solutions).

If installing these valves in addition to or retrofitting an existing building, do not assume that the fluid in the existing piping meets these criteria.



**CALIFORNIA PROPOSITION 65
WARNING**

This product can expose you to chemicals including lead, which is known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

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 the ratings in the instructions and the product to ensure the product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After the installation is completed, check out the product operation as provided in these instructions.

MECHANICAL INSTALLATION

IMPORTANT:
Hold the valve with a pipe wrench by hexagonal fitting **ONLY**.
Operate pipe wrenches on the same side of the valve body to avoid unscrewing the end pieces.
Do **NOT** handle the valve body with the pipe wrench; product damage may result.

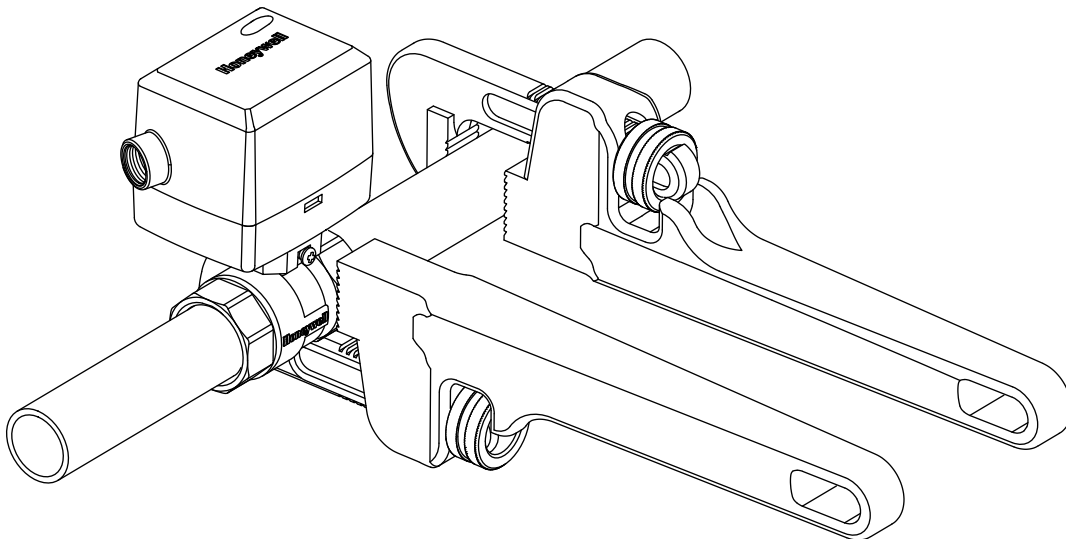


Fig. 1 Proper Installation

The valves are tapped in NPT and should be sealed with an approved pipe sealant.

1. Clean the lines upstream of particles larger than 1/16 inch in diameter (welding slag, pipe scale and other contaminants).
2. Proceed with installation once the system specifics (expansion/contraction of the system and its medium as well as operating pressures) are within tolerances.

3. Eliminate air from the system.
4. Two-way valves are marked to show the flow direction, and the flow arrow must point in the flow direction of the medium for proper operation.

**NOTE:**

Port B is common port on three-way valves. For three-way valve mounting, see Fig. 3 and 4.

5. Stem rotation:
 - **For two-way valves:** Clockwise to close and Counterclockwise to open.
 - **For three-way valves:** Clockwise to increase AB to B (common) flow and counterclockwise to increase A to B (common) flow.
6. The valve must be mounted with the actuator/bracket above the valve body. Do not install the valve with the stem below horizontally or upside down.

FLOW CAPACITY ADJUSTMENT

Maximum flow capacity can be set by reducing the maximum control signal sent from the controller. Use the values in Table 1 to set the maximum control signal if a reduced flow capacity is needed.

Table 1 Modulating Valve Cv Scaling

Control Signal		Voltage									
		1.11	2.22	3.33	4.44	5.56	6.67	7.78	8.89	10.00	
Valve Size		Cv									
in.	DN	10°	20°	30°	40°	50°	60°	70°	80°	90°	
2-Way	1/2"	15	0.11	0.16	0.24	0.35	0.51	0.74	1.08	1.58	2.30
	3/4"	20	0.18	0.26	0.38	0.56	0.82	1.19	1.74	2.54	3.70
	1"	25	0.32	0.47	0.68	1.00	1.46	2.12	3.10	4.52	6.60
3-Way	1/2"	15	0.18	0.26	0.38	0.56	0.82	1.19	1.74	2.54	3.70
	3/4"	20	0.26	0.38	0.55	0.80	1.17	1.71	2.49	3.63	5.30
	1"	25	0.37	0.55	0.80	1.16	1.70	2.48	3.62	5.28	7.70

**NOTE:**

For 3-way valves Cv from A to B ports.

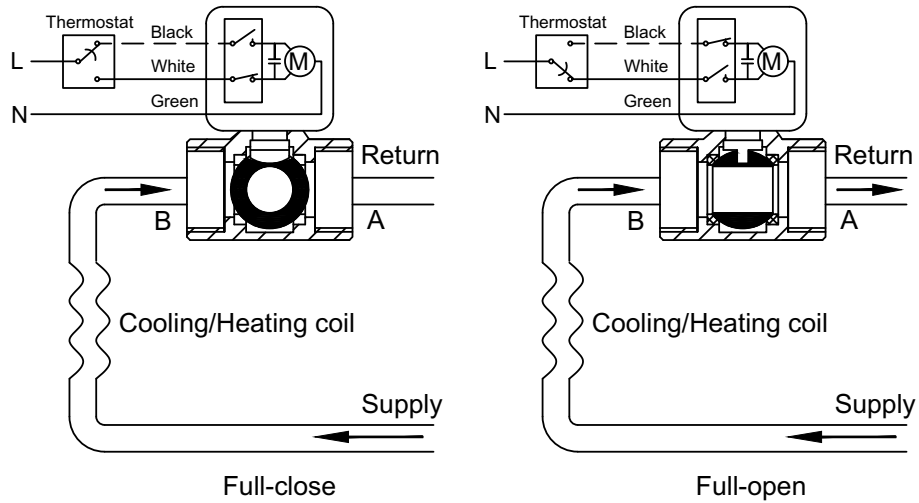


Fig. 2 2-Way Valve Flow Orientation

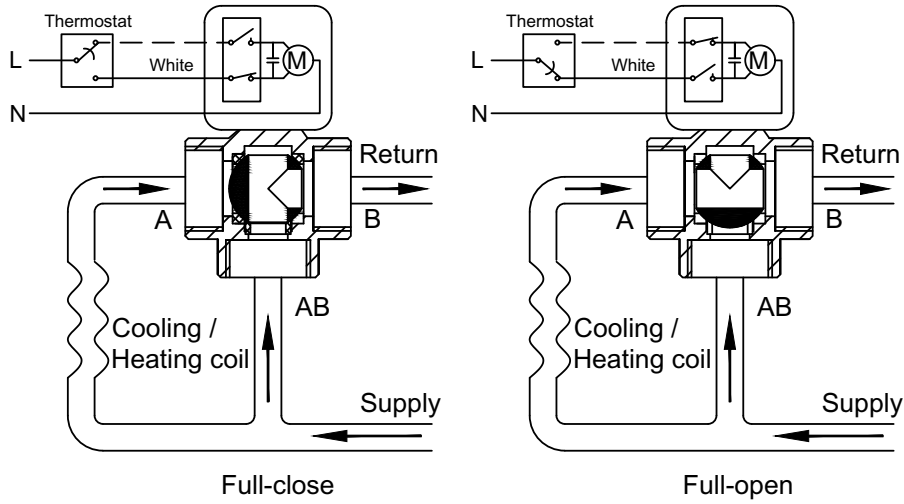


Fig. 3 3-Way Mixing Flow Orientation

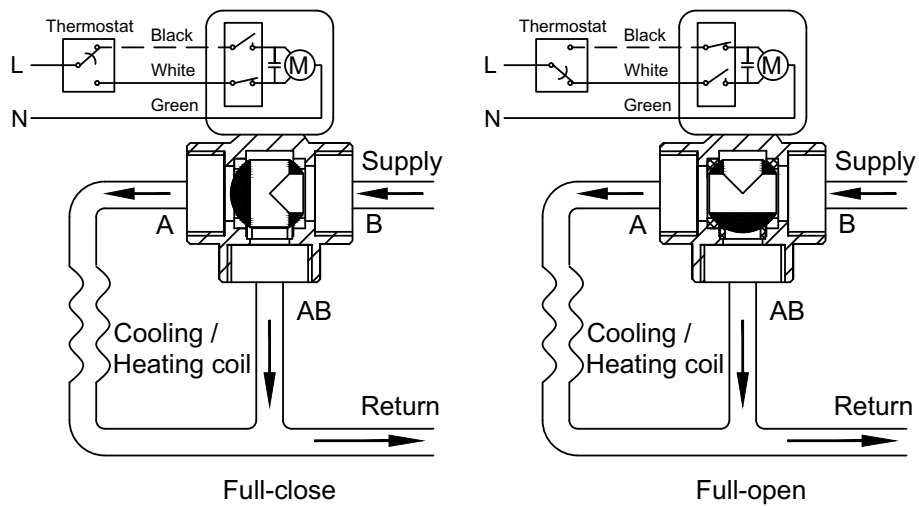


Fig. 4 3-Way Diverting Flow Orientation

MANUAL OPERATION

The valve actuator can be manually operated with a supplied 4 mm hex wrench. Remove power from the actuator before operation. The electronic fail safe function must be disconnected on electronic fail-safe actuator by changing the dip switch position.

NOTE:
For dip switch positions see Fig. 5 and 6.

To manually operate the valve, push down on the 4 mm hex bolt to engage with the gear-train. While pushing down, turn CW to open or CCW to close.

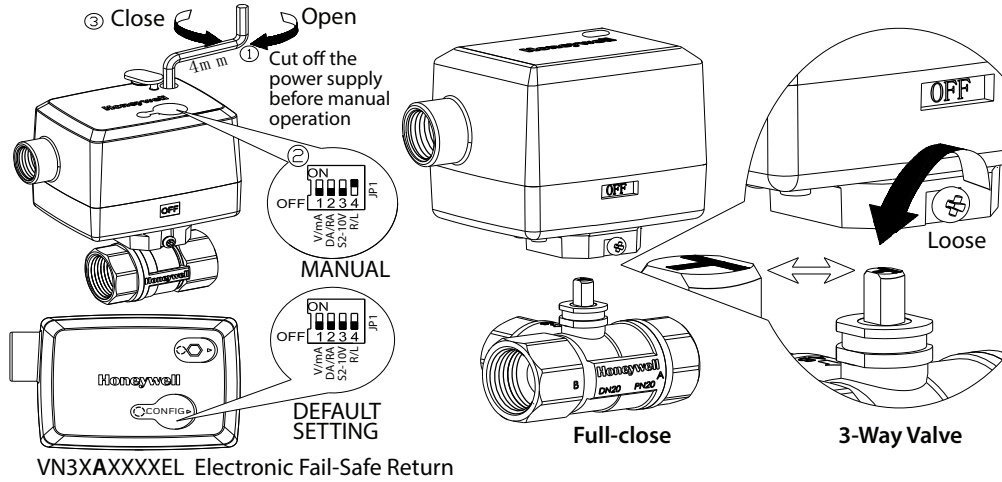


Fig. 5 Manual Operation and Stem Position of VN3 Assemblies

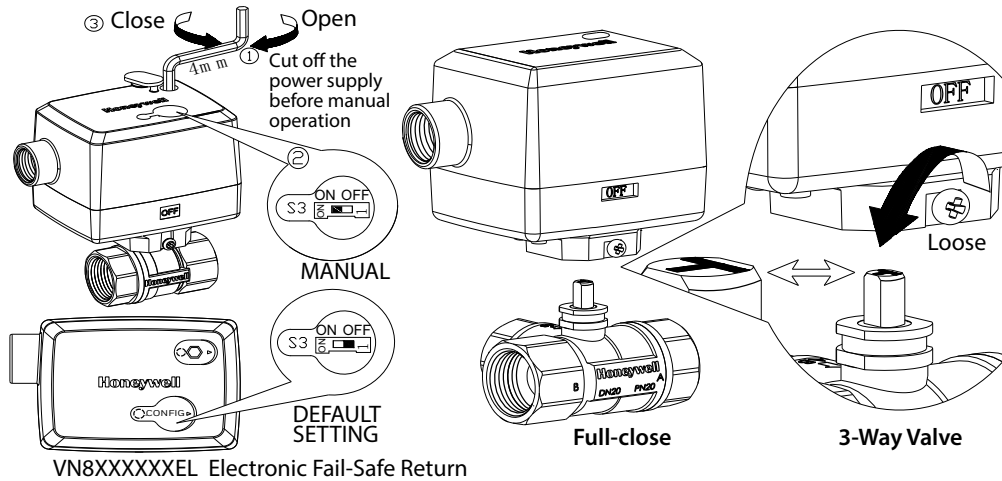


Fig. 6 Manual Operation and Stem Position of VN8 Assemblies

WIRING

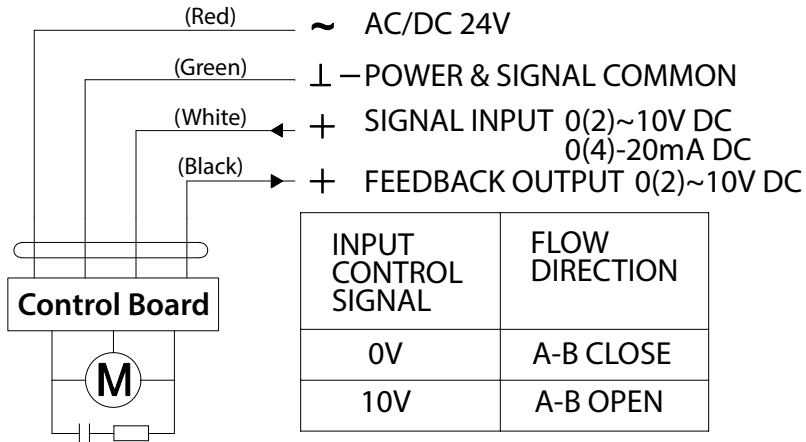


Fig. 7 Modulating Fail-in-Place and Electronic Fail-safe Wiring

MODE \ CTRL SIGNAL	DA	RA
	0% = A-B CLOSE 100% = A-B OPEN	0% = A-B OPEN 100% = A-B CLOSE
0~10V DC	 ON OFF 1 2 3 4 DEFAULT SETTING	 ON OFF 1 2 3 4
2~10V DC	 ON OFF 1 2 3 4	 ON OFF 1 2 3 4
0~20mA DC	 ON OFF 1 2 3 4	 ON OFF 1 2 3 4
4~20mA DC	 ON OFF 1 2 3 4	 ON OFF 1 2 3 4

Turning switch 4 to ON position will disable electronic fail-safe function. Electronic fail-safe must be disabled before manual operation.

Fig. 8 Modulating Actuator Dip Switch Positions

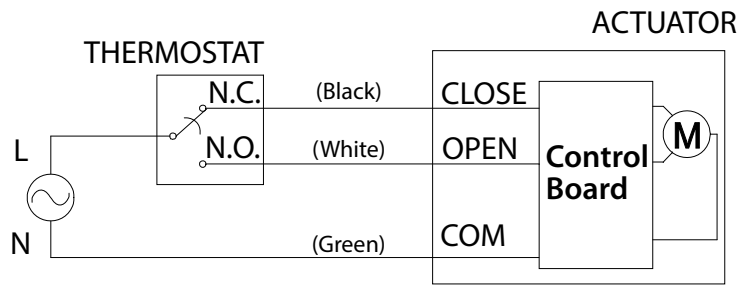


Fig. 9 Two-position Fail-in-place Wiring

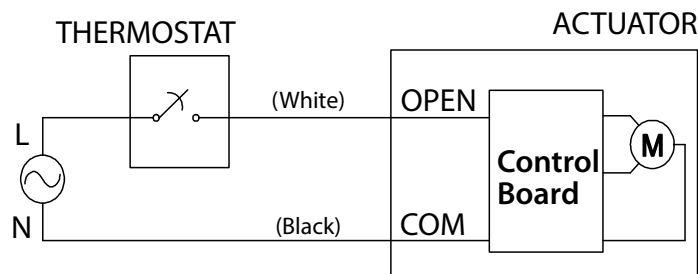


Fig. 10 Two-position Electronic Fail-safe Closed Wiring

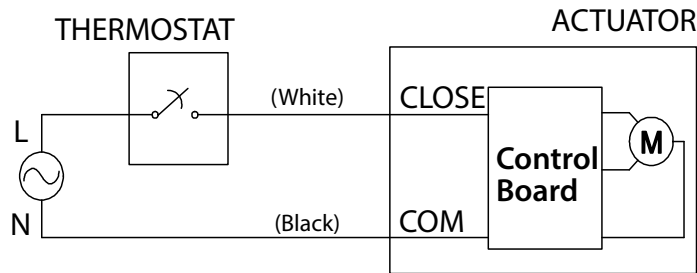


Fig. 11 Two-position Electronic Fail-safe Open Wiring

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