

CONTROL BALL VALVES
WITH EQUAL PERCENTAGE CHARACTERISTIC

2010

NEW

TECHNICAL BULLETIN



ENOLGAS



Series of Ball Valves and Actuator Assemblies Selection

Description

This Technical Bulletin aids in the selection of a ball valve and actuator assembly.

- Tables 1 and 2 list ball valve product numbers, close-off torque, and flow rates respectively for two-way and three-way ball valves
- Tables 3 and 4 identify product numbers for all possible combinations of ball valves and compatible actuators that can be ordered as complete valve assemblies from the factory

NOTE: It is recommended that two-position applications use a full-port ball valve without a flow optimizer. For modulating applications, it is recommended that the ball valve include a flow optimizer.

NOTE: Actuators for two-way valves have the same connection from 1/2" size valve up to 2". One actuator is suitable for all these 2-way valves. Therefore in Table 3 all the actuators will be suitable to all the valves.

Meanwhile for the 3-way valves, check Table 4, to find out the right actuators that match the right valve and size.

Selecting a Ball Valve and Actuator for a 2-Position Control

1. Obtain the supply line size from job specifications.
2. See Table 1 or 2 and select a full-port valve with a line size that matches the supply line size. In Tables 1 and 2, full-port valves are denoted *without an asterisk (*)*.
3. In the Table 3 or 4, locate the actuator column corresponding to the required application. Also, locate the row corresponding to the valve product number. Read down the actuator and valve product number.

Selecting a Ball Valve and Actuator for Modulating Control

1. Obtain the supply line size, flow rate, and differential pressure from job specifications.
2. See Table 1 or 2 and locate the column corresponding to the required differential pressure. Read down this column to locate the flow rate equal to or greater than the required value. Read to the left to determine the line size and products number of the valve. Make certain that the valve has a flow optimizer and is not a full-port valve. In Table 1 and 2, valve with *optimizer disc are denoted by an asterisk (*)*.
3. In Table 3 or 4, locate the actuator column corresponding to the required application. Also, locate the row corresponding to the valve products number. Read down the actuator and valve product number.

Example of Selecting a 2-Way Ball Valve and Actuator for 2-Position Control

1. Job specification requires a two-position, ball valve in a supply line size of 1" 1/4 inch (32 mm) and a flow rate of 16 Kvs (16 m³/h).
2. See Table 1 to locate a full-port valve with a 1" 1/4 inch (32 mm) supply line size. Select valve product number S3041N07.
3. In Table 3, locate the column for a two-position actuator. Also, locate the row corresponding to the S3041N07 valve. Read down the actuator product number.

Example of Selecting a 2-Way Ball Valve and Actuator for Modulating Control

1. Job Specification requires 24V, modulating 0 to 10 Vdc, BALL VALVE in a supply line size of 1" 1/4 inch (32 mm) and a flow rate of 16 Kvs (16 m³/h).
2. See Table 1 and locate the column corresponding to the flow rate equal to or greater than the required 16 Kvs (16 m³/h) value. For example, 16 Kvs (16 m³/h) read left for the S3041N42 + S1661L07 + S1669P07 valve product number. This valve has a flow optimizer disc so it is suitable for modulating applications.
3. In the Table 3, locate the actuator column for a 24V, 0 to 10 Vdc, actuator. Also, locate the row corresponding to the S3041N42 valve product number. Read down the actuator product numbers (S2912P00).



2-WAY

TABLE 1

VALVE PRODUCT NUMBER	FLOW OPTIMIZER DISC	SIZE	DN (mm)	TORQUE (Nm)	Kvs (m ³ /h)
S3041N35 + S1661L04 + S1665P04	*	1/2"	15	2,7	3
S3041N04					17
S3041N37 + S1661L05 + S1667P05	*	3/4"	20	3,7	6,7
S3041N05					41
S3041N40 + S1661L06 + S1668P06	*	1"	25	5,6	9
S3041N06					70
S3041N42 + S1661L07 + S1669P07	*	1" 1/4	32	6,6	16
S3041N07					121
S3041N44 + S1661L08 + S1671P08	*	1" 1/2	40	8	20,4
S3041N08					121
S3041N46 + S1661L09 + S1672P09	*	2"	50	9,5	31
S3041N09					200

3-WAY

TABLE 2

VALVE PRODUCT NUMBER	FLOW OPTIMIZER DISC	SIZE	DN (mm)	TORQUE (Nm)	Kvs (m ³ /h)
S1070N34 + S1661L04 + S1665P04	*	1/2"	15	5	3
S1070N34					17
S1070N35 + S1661L05 + S1667P05	*	3/4"	20	6,5	6,7
S1070N35					41
S1070N36 + S1661L06 + S1668P06	*	1"	25	9,5	9
S1070N36					70
S1070N37 + S1661L07 + S1669P07	*	1" 1/4	32	15	16
S1070N37					121
S1070N38 + S1661L08 + S1671P08	*	1" 1/2	40	25	27
S1070N38					200
S1070N39 + S1661L09 + S1672P099	*	2"	50	30	40
S1070N39					292

Note: Valve marked with an asterisk (*) have a flow optimizer disc for modulating applications.

Note: For coated valves specify the last letter with P instead of N or L on the valve product number.

Example: S1070P36.



2-WAY ACTUATOR

TABLE 3

VALVE PRODUCT NUMBER	230V 3 POINT CONNECTION NO MICRO RED COLOUR	230V 3 POINT CONNECTION ON-OFF	24V 3 POINT CONNECTION ON-OFF	230V 2 POINT CONNECTION ON-OFF	24V 2 POINT CONNECTION ON-OFF	24 V 0-10 VDC MODULATING	230 V 0-10 VDC MODULATING
S3041N35 + S1661L04 + S1665P04	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N04	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N37 + S1661L05 + S1667P05	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N05	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N40 + S1661L06 + S1668P06	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N06	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N42 + S1661L07 + S1669P07	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N07	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N44 + S1661L08 + S1671P08	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N08	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N46 + S1661L09 + S1672P09	R2813P00	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST
S3041N09	S3041N07	S2815P00	S2816P00	S2817P00	S2818P00	S2912P00	AV. ON RQST

3-WAY ACTUATOR

TABLE 4

VALVE PRODUCT NUMBER	230V 3 POINT CONNECTION ON-OFF	24V 3 POINT CONNECTION ON-OFF	230V 2 POINT CONNECTION ON-OFF	24V 2 POINT CONNECTION ON-OFF	24 V 0-10 VDC MODULATING	230 V 0-10 VDC MODULATING
S1070N34 + S1661L04 + S1665P04	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N34	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N35 + S1661L05 + S1667P05	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N35	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N36 + S1661L06 + S1668P06	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N36	S2935P00	S2936P00	S2937P00	S2938P00	S2940P00	AV. ON RQST
S1070N37 + S1661L07 + S1669P07	AV. ON RQST	AV. ON RQST	S2860P10	S2862P10	AV. ON RQST	AV. ON RQST
S1070N37	AV. ON RQST	AV. ON RQST	S2860P10	S2862P10	AV. ON RQST	AV. ON RQST
S1070N38 + S1661L08 + S1671P08	AV. ON RQST0	AV. ON RQST	S2863P40	S2865P40	AV. ON RQST	AV. ON RQST
S1070N38	AV. ON RQST	AV. ON RQST	S2863P40	S2865P40	AV. ON RQST	AV. ON RQST
S1070N39 + S1661L09 + S1672P09	AV. ON RQST	AV. ON RQST	S2863P40	S2865P40	AV. ON RQST	AV. ON RQST
S1070N39	AV. ON RQST	AV. ON RQST	S2863P40	S2865P40	AV. ON RQST	AV. ON RQST



VALVES OVERVIEW

PRODUCT NUMBER	DN		Kvs (m ³ /h)	2-WAY 3-WAY	TORQUE (Nm)	QM OR ISO-TOP CONNECTION VALVE/ACTUATOR
	mm	Inch				
S3041N35 + S1661L04 + S1665P04	15	1/2"	3	2-Way	2,7	QM
S3041N04			17			
S1070N34 + S1661L04 + S1665P04			3	3-Way	5	ISO-TOP F03
S1070N34			17			
S3041N37 + S1661L05 + S1667P05	20	3/4"	6,7	2-Way	3,7	QM
S3041N05			41			
S1070N35 + S1661L05 + S1667P05			6,7	3-Way	6,5	ISO-TOP F03
S1070N35			41			
S3041N40 + S1661L06 + S1668P06	25	1"	9	2-Way	5,6	QM
S3041N06			70			
S1070N36 + S1661L06 + S1668P06			9	3-Way	9,5	ISO-TOP F03-F04
S1070N36			70			
S3041N42 + S1661L07 + S1669P07	32	1" 1/4	16	2-Way	6,6	QM
S3041N07			121			
S1070N37 + S1661L07 + S1669P07			16	3-Way	15	ISO-TOP F04-F05
S1070N37			121			
S3041N44 + S1661L08 + S1671P08	40	1" 1/2	20,4	2-Way	8	QM
S3041N08			121			
S1070N38 + S1661L08 + S1671P08			27	3-Way	25	ISO-TOP F04-F05
S1070N38			200			
S3041N46 + S1661L09 + S1672P09	50	2"	31	2-Way	9,5	QM
S3041N09			200			
S1070N39 + S1661L09 + S1672P09			40	3-Way	30	ISO-TOP F05
S1070N39			292			

ACTUATORS OVERVIEW

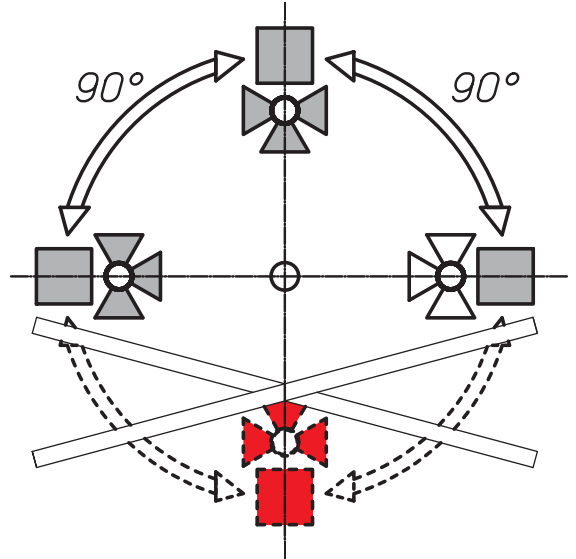
PRODUCT NUMBER	OPERATING VOLTAGE	TYPE OF CONTROL (CONTROL SIGNAL)	TORQUE (Nm)	RUN-TIME (SECOND) 90°	AUXILIARY SWITCHES	QM OR ISO-TOP CONNECTION VALVE ACTUATOR						
R2813P00	AC 230 V	2 position control signal	10Nm; 88,50Lbin max.	60	No	QM						
S2815P00		3 position control signal				ISO-TOP						
S2935P00						QM						
S2936P00	AC 24 V	2 position control signal			10Nm; 88,50Lbin max.	60	Yes	ISO-TOP				
S2816P00								QM				
S2817P00	AC 230 V	2 position control signal					10Nm; 88,50Lbin max.	60	Yes	ISO-TOP		
S2937P00										QM		
S2938P00										ISO-TOP		
S2818P00	AC 24 V	2 position control signal							10Nm; 88,50Lbin max.	60	Yes	QM
S2940P00			ISO-TOP									
S2912P00	AC/DC 24 V	AC 0...10 VDC	10Nm; 88,50Lbin max.	60							Yes	QM



NOTE ON INSTALLATION, DIRECTION OF FLOW AND COMMISSIONING

Installation Notes

- 1) Recommended Mounting Positions
The valve may be mounted either vertically or horizontally.
It is not permissible, mounting the valve with stem pointing downwards.
- 2) Water quality requirements
Valves are suitable for cooling water, chilled water, and water with anti-freeze.
Optimizer control valve discs are relatively sensitive control devices. In order to ensure a long service life, it is advisable to fit strainers.
- 3) Wiring connection
Please carefully install and connect the actuator wires in the proper manner. This is clearly explained in our brochures and on the actuator sticker. The actuator models with an auxiliary switch, can be wired to a pump relay, alarm or indicate the valve positional status.
- 4) Regulation
There are three types of valve actuators available. 2 point controlled (on/off), 3 point controlled (floating) or modulating 0 to 10VDC.
- 5) Installation
Importantly pay attention to the correct flow direction, particularly on the modulating control valves with proportional actuator. Then turn off the pump and the operating voltage, close the shut-off valves, depressurize the pipes and allow them to cool down. Disconnect the electrical connection, where required, from the terminals.



The valve and actuator have to be carefully installed together. Concerning the 2 way valves, please check the valve position: **must be open at the first installation**. Then assemble the actuator on the valve stem and put on the security spindle to guarantee the connection between valve and actuator. Meanwhile for the 3 way valve, check the stem position and the actuator position and then (with the 4 nuts and screws that are supplied in each box) assemble the valve and actuator.

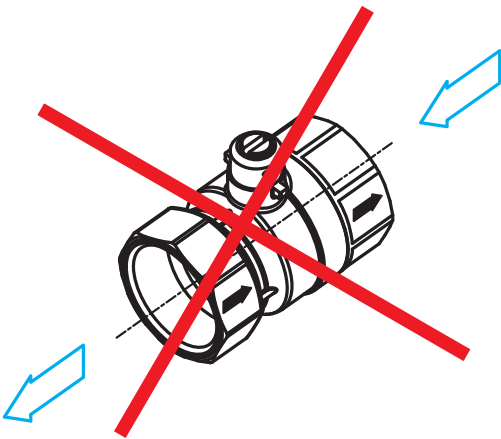
In both cases before assembling any valve to an actuator its recommended and very important to **operate the valve manually at least one time**, before any installation. This enables the correct junction of the valve and actuator and ensures a better and longer life performance.

- 6) Maintenance
The modulating and on-off valves are maintenance free. Before any kind of service work is carried out on actuators, it's essential to isolate the rotary actuator from the power supply; by unplugging the power lead. Any related pumps in the relevant piping system must also be switched off and the appropriate isolating fitting closed, allowing everything to cool down and if necessary reduce the pressure in the system to atmospheric. The system must not be returned to service until the ball valve and rotary actuator have been properly re-assembled in accordance with the instructions and the pipe-work has been refilled in the proper manner.

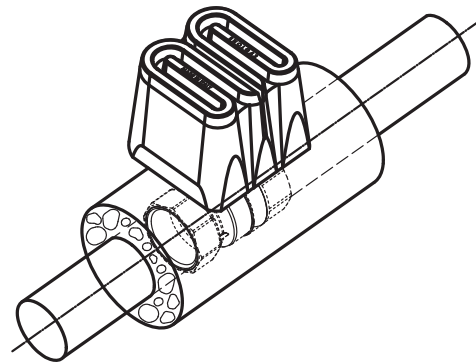
Safety Notes

- 1)The valve has been designed for use in stationary heating, ventilating and air conditioning systems and is not allowed to be used outside the specific field of application, especially in aircraft or in any other airborne means of transport.
- 2)It may only be installed by suitably trained personnel. All applicable legal or institutional installation regulations must be compliant with.
- 3)The valve does not contain any parts that can be replaced or repaired by the user.
- 4)The valve must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- 5)The recognized rules should be applied when determining the flow characteristic of final controlling elements.

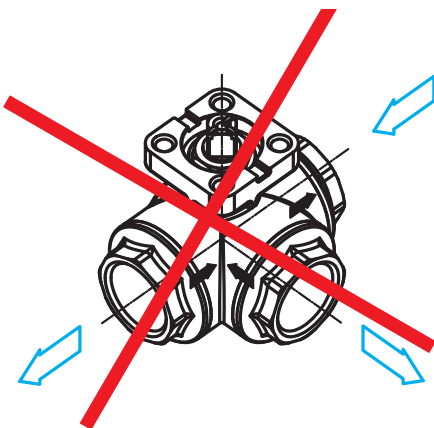
INCORRECTLY INSTALLED



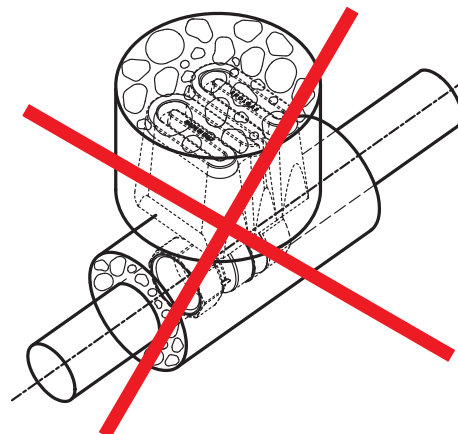
CORRECTLY INSULATED



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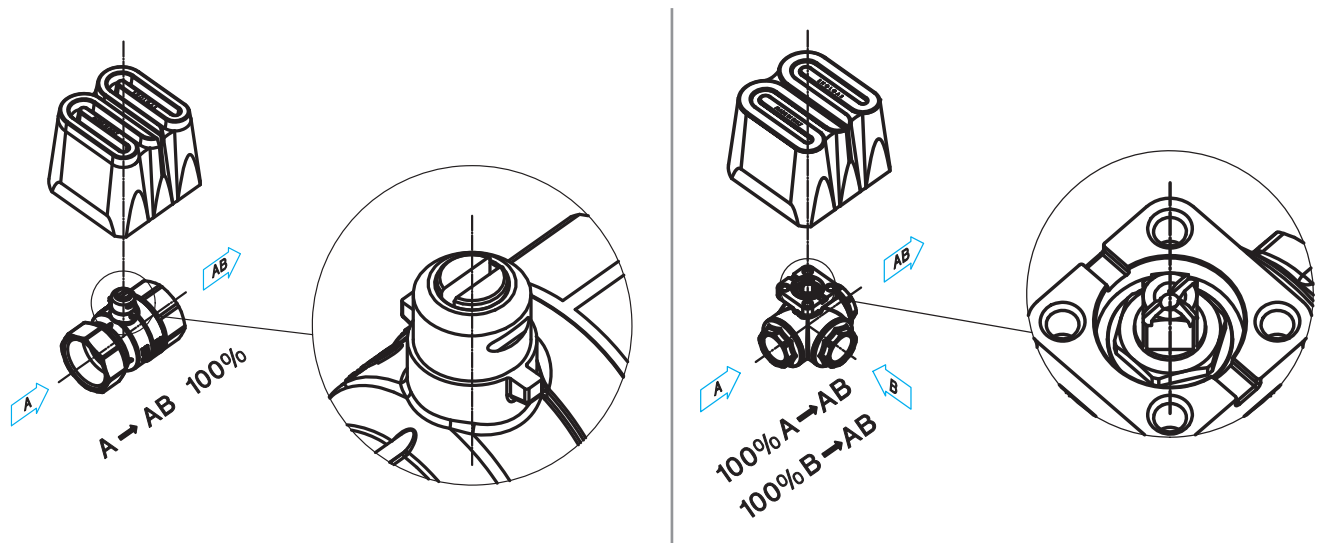
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SWIFT•O•MATIC®

Technical bulletin



<p>Kv ↑</p> <p>WITH DISC</p> <p>Y</p> <p>characterized control valves</p>	<p>A - AB open</p>	<p>A - AB closed</p>	2-way
	<p>A - AB open</p>	<p>A - AB closed</p>	3-way
<p>Kv ↑</p> <p>NO DISC</p> <p>Y</p> <p>open-closed ball valve</p>	<p>A - AB open</p>	<p>A - AB closed</p>	2-way
	<p>A - AB open</p>	<p>A - AB closed</p>	3-way

NOTE: when assembling the actuator to the valve, carefully double-check the stem is in the correct position. This is very important to guarantee correct use of the product.

MANUAL OPERATION

In case of emergency, the 2-Way valve, can be easily operated with a screw driver, from the stem above. For the 3 way valves a spanner is required. To operate the valve with a screw driver or spanner, kindly remove the spindle (nuts and screw for 3-Way valve) on the actuator and remove it from the valve. At this point you can easily operate the valve with the screw driver or spanner, but remember to re-stroke the valve and actuator, prior to installation.



BALL VALVES

- Size from DN 15.....up to DN 50 mm (1/2".....2")
- Kvs 3.....to 292 m³/h
- Can be easily equipped with R2813.....S2815....S2818.....S2940..... actuators
- Manual assembly between valve and actuator quick mounting
- Suitable for small or medium size-sized heating, ventilating and air conditioning plants as a control or safety shut off valve
- Cooling water
- Chilled water
- Low temperature hot water
- Water with anti-freeze
- -20 to + 130°C

ELECTRIC ACTUATORS

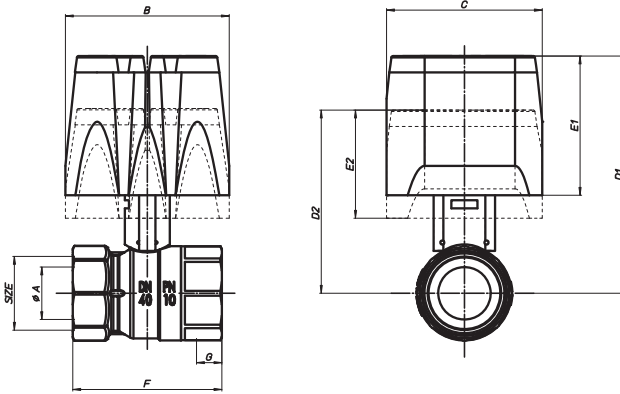
- R2813P00 AC 230V operating voltage, 2-position control signal, red colour, without auxiliary switch
- S2815,17 QM for 2-way ball valves - S2935,37 ISO•TOP for 3-way ball valves..... AC 230V operating voltage
- S2816,18 QM for 2-way ball valves - S2936,38 ISO•TOP for 3-way ball valves.....AC 24V operating voltage
- S2912P00 and S2940P09 AC 24V operating voltage and 0 to 10 Vdc, for 2-way modulating ball valves
- All actuators are from IP 54 to IP 65
- All actuators include an auxiliary switch for additional functions
- Directly mounting on the valve, without adjustment or brackets

APPLICATIONS

- Suitable to operate the valves S3041.....S1070....
- Ambient temperatures: -20°C to +80°C; -4°F to +176°F
- Cooling water
- Chilled water
- Low temperature hot water
- Water with anti-freeze
- -20 to + 130°C

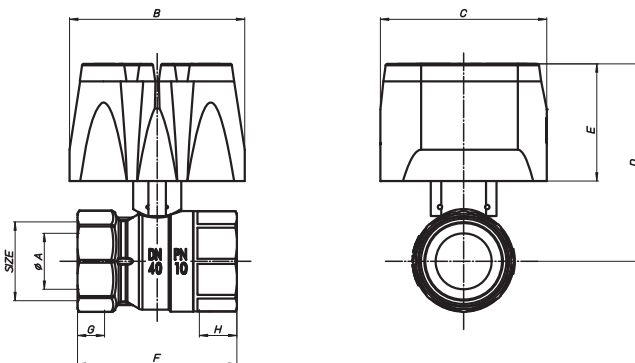


2-WAY ON-OFF



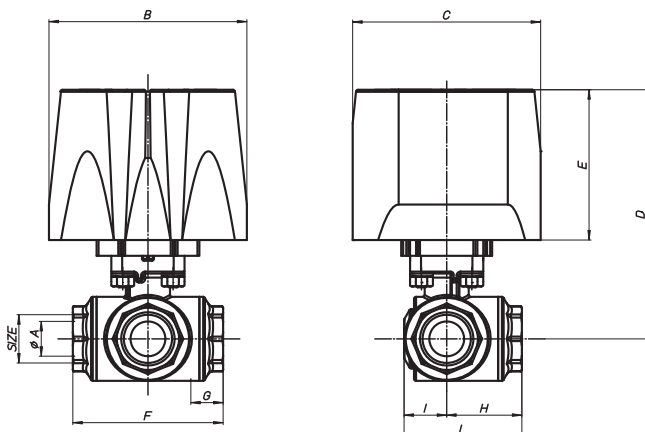
Size		½"	¾"	1"	1¼"	1½"	2"
øA bore		15	20	25	32	32	40
B mm		100	100	100	100	100	100
C mm		73	73	73	73	73	73
D1 mm		122	126	130	135	135	142
E1 mm		76	76	76	76	76	76
D2 mm		110	114	118	123	123	130
E2 mm		66	66	66	66	66	66
F mm		50	58,5	71	82	90	105
G mm		7,2	11	12,5	13,5	15,5	17,5

2-WAY MODULATING



Size		½"	¾"	1"	1¼"	1½"	2"
øA bore		15	20	25	32	32	40
B mm		100	100	100	100	100	100
C mm		73	73	73	73	73	73
D mm		110	114	118	123	123	130
E mm		66	66	66	66	66	66
F mm		57	64,5	77	90,5	95	112,5
G mm		7,2	11	12,5	13,5	15,5	17,5
H mm		15	16,3	19,1	21,4	21,4	25,7

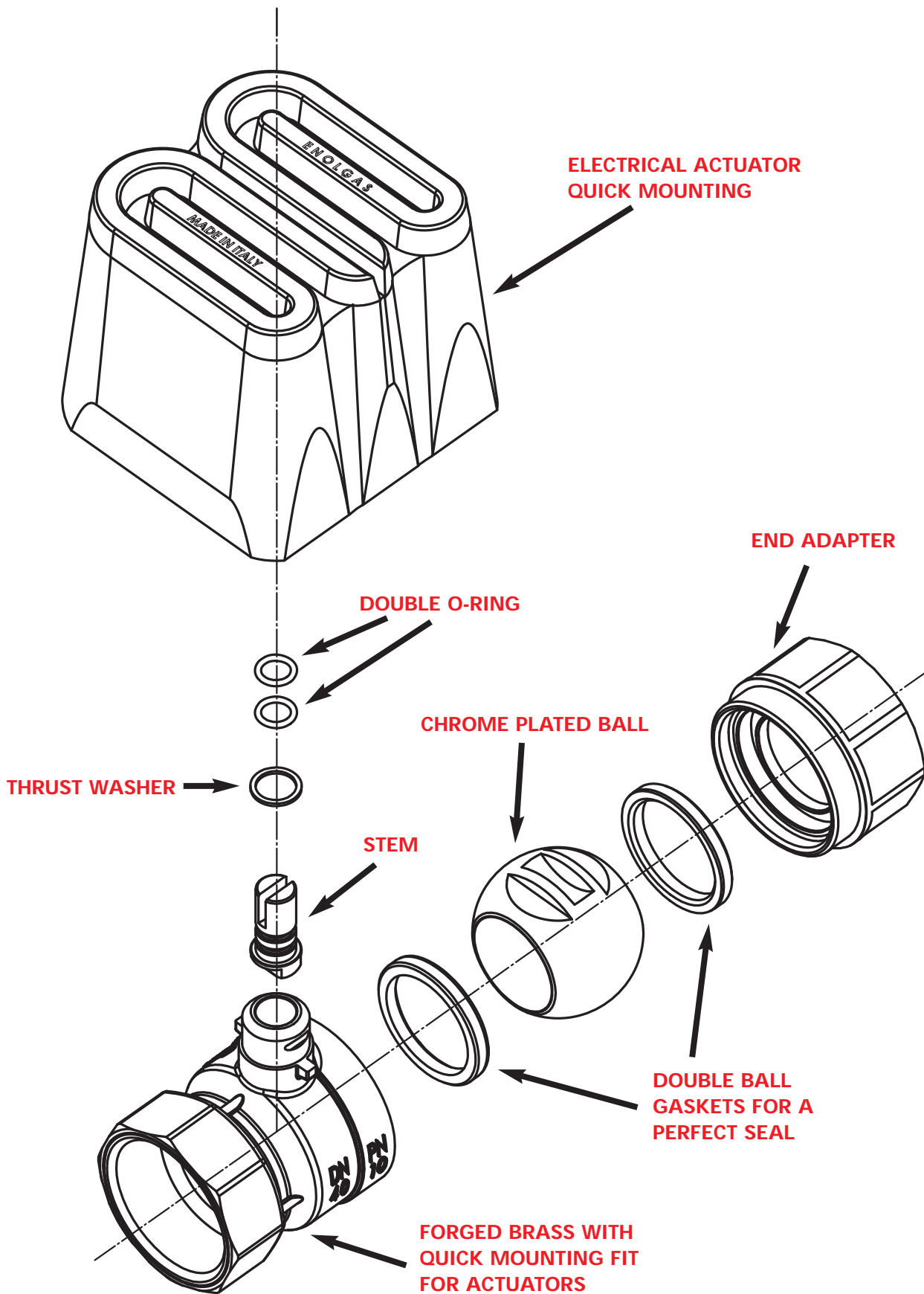
3-WAY ON-OFF and MODULATING



Size	¼"	¾"	½"	¾"	1"	1½"	1¾"	2"
øA bore	8	10	14,1	17,6	25	-	-	-
B mm	100	100	100	100	100	-	-	-
C mm	73	73	73	73	73	-	-	-
D mm	122	122	122	126	130	-	-	-
E mm	66	66	66	66	66	-	-	-
F mm	64,5	64,5	64,5	76	97	-	-	-
G mm	15	15	15	16,3	19,1	-	-	-
H mm	32,5	32,5	32,5	38	48,5	-	-	-
I mm	17	17	17	21,5	26	-	-	-
L mm	49,5	49,5	49,5	59,5	74,5	-	-	-

SWIFT•O•MATIC® QM

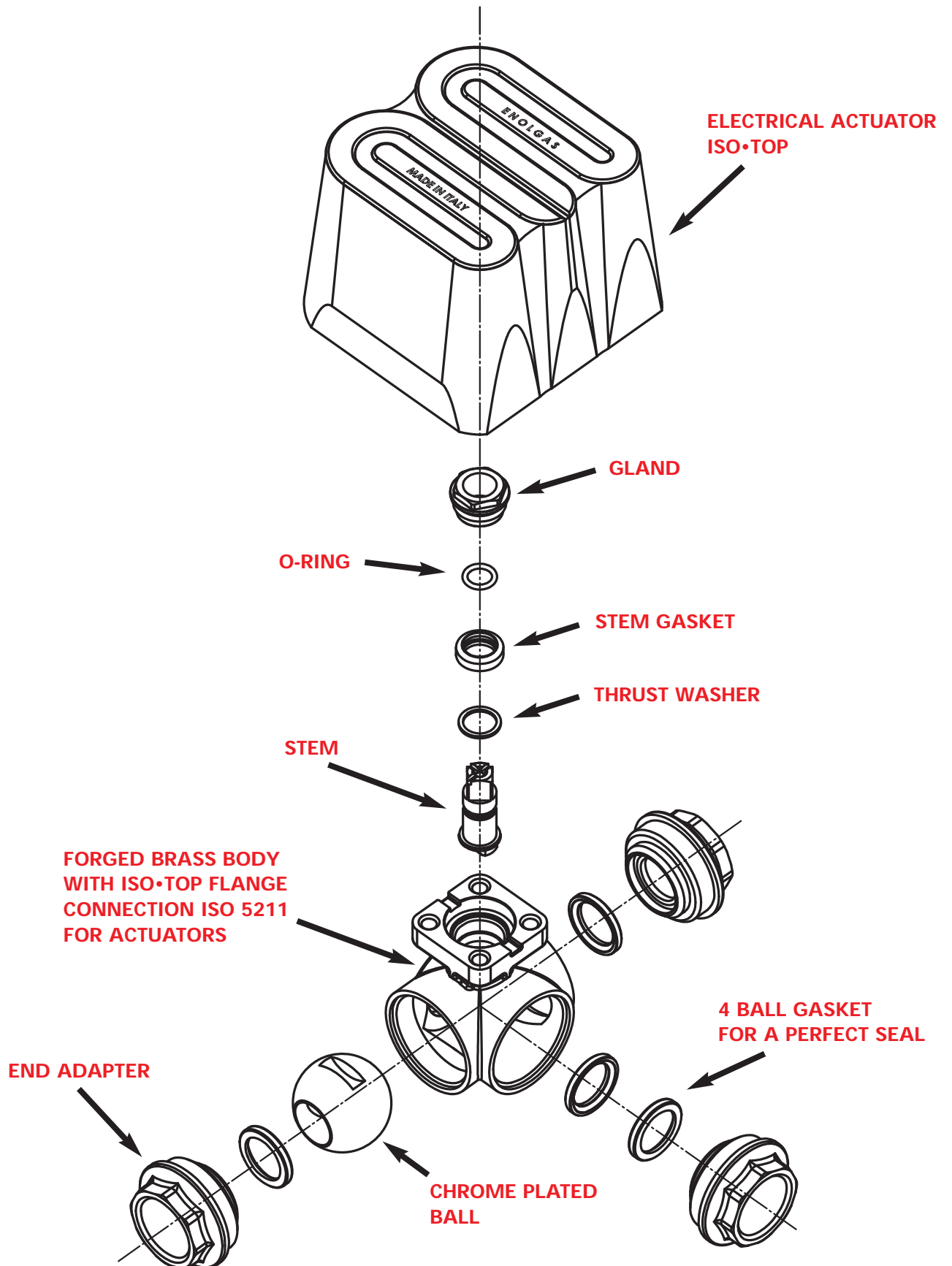
Assembly 2-way





SWIFT•O•MATIC® ISO•TOP

Assembly 3-way

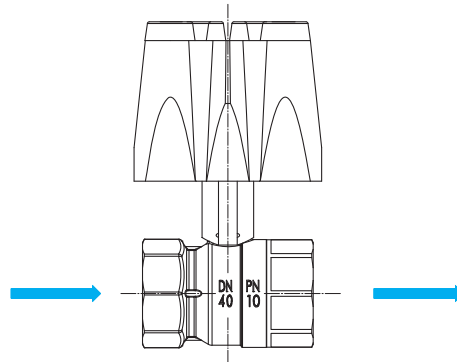


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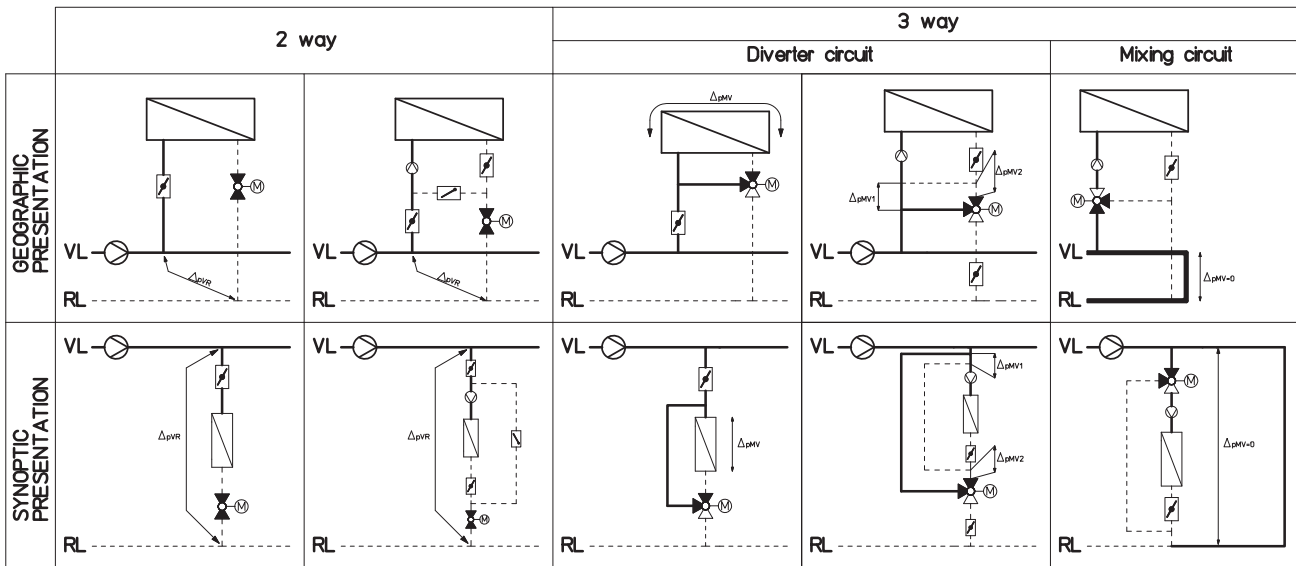
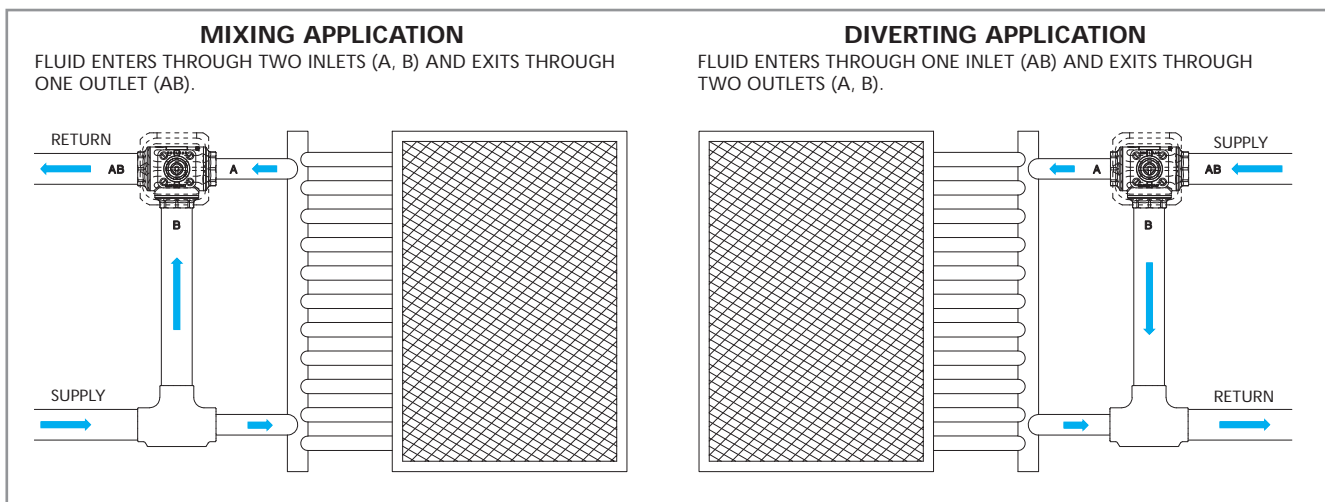
Typical applications



2-WAY



3-WAY

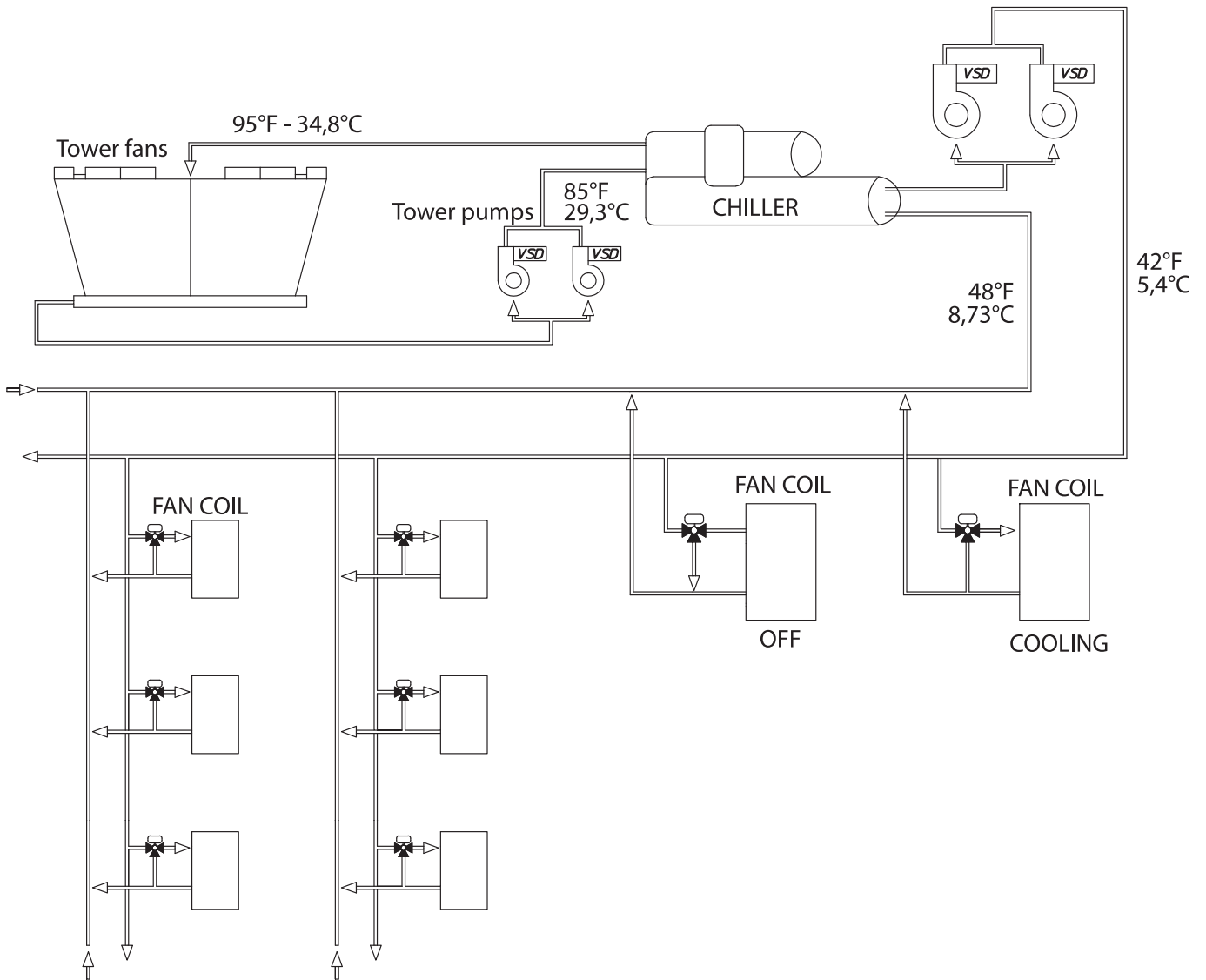


	Characterized control valve, 2-way, with rotary actuator	VL ———	Supply	Δp_{VR} Differential pressure across specified section at rated load Δp_{MV} Differential pressure across variable-flow section at rated load (e.g. head exchanger)
	Characterized control valve, 3-way, with rotary actuator	RL - - - - -	Return	
	Pump			
	Non-return valve			
	Balancing valve			



SWIFT•O•MATIC® QM

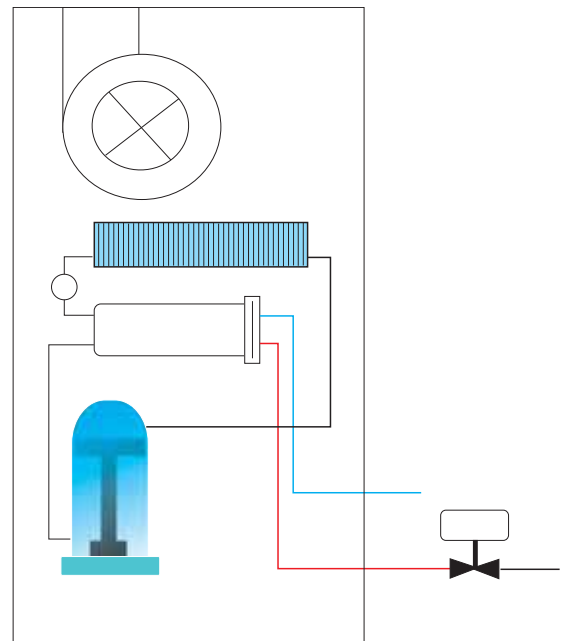
Typical applications

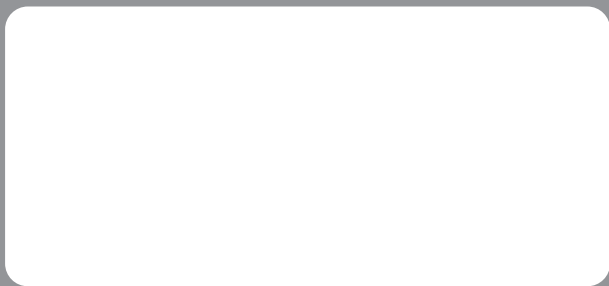


Many states have adopted ASHRAE Standard 90.1, "Energy Standard for Buildings".

The standard has specific requirements for HVAC pumping systems. These requirements (see Standard 90.1, section 6.5.4, "Hydronic System Design & Control") include a mandatory, two-position, automatic shutoff valve on all water-source heat pumps (see diagram), along with a variable flow pumping system.

Enolgas has added specific design features to its Swift o Matic series of valves, making them particularly suited to this application.





ENOLGAS BONOMI S.p.A. • via Europa 227 • 25062 Concesio (Bs) • Italy
tel. 030 2184311 • fax 030 2184333 • www.enolgas.it • enolgas@enolgas.it