Diamant 2000

MOTORIZED VALVES

USE

Diamant 2000 motorized valve is specifically used for the interception and regulation of fluids in:

- **heating/cooling systems (HVAC)**
- **drinking water systems**
- **systems using alternative energy**
- **household automation systems in general**

All **Diamant 2000** *motorised valves are equipped with an "**ALL IN ONE**" system, which allows to set the **2-POINT or 3-POINT** electrical control with a **jumper-type** selector, **according to the user's needs.***

Actuator

The **Diamant 2000** actuator is available in the following versions:

TECHNICAL FEATURES	Diamant 2000	
Electric control	**ALL IN ONE**	
	3-point	2-point
Connection with valve body	COMPARATO connection	
Operation	modulating / ON/OFF	ON/OFF
Rotation	90° clockwise and counterclockwise	
	180° clockwise and counterclockwise	
Compatible valve bodies (see diameters in the "Valve bodies" section)	2-way	
	3-way with switch	
	3-way with mixer	-
	by-pass	
Position indicator	arrow indicating the ball position	
Motor	bidirectional - synchronous	
Power supply	230 V; 50 Hz *	
	110 V; 50 Hz *	
	24 V; 50 Hz *	
Electrical connection	by means of a terminal block inside the actuator	
Operating time (∠ 90°) and rated torque (for a 180° operation, double the provided times)	4 seconds; 5 Nm	
	12 seconds; 11 Nm	
	35 seconds; 11 Nm (standard version)	
	106 seconds; 11 Nm	
	320 seconds; 11 Nm	

* *for 60 Hz versions, please contact our Technical Office*

to be continued (next page)

patented "ALL IN ONE" system

Diamant 2000

MOTORIZED VALVES

Actuator

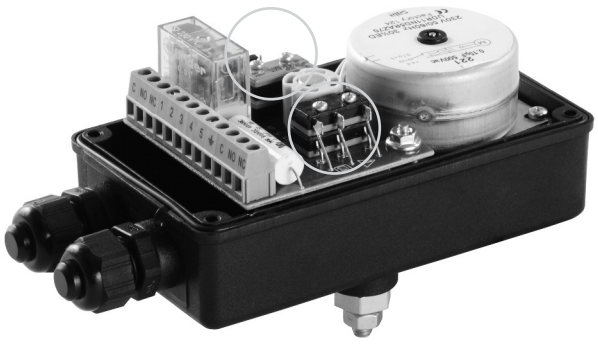
TECHNICAL FEATURES	Diamant 2000
Input power (35, 106, 320-second version)	6 VA (230 V; 50 Hz version)
	6 VA (110 V; 50 Hz version)
	7,5 VA (24 V; 50 Hz version)
Potenza assorbita (versioni 4 e 12 secondi)	13 VA (230 V; 50 Hz version)
	11 VA (110 V; 50 Hz version)
	12 VA (24 V; 50 Hz version)
imum current on the outlet phase to terminals 4 and 5	1 A resistive
Maximum noise (at a 1 meter distance)	35 dB(A) standard version
Maximum current tolerated by extra microswitches	1 A resistive
Operational room temperature	- 10° C ÷ 50° C
Fluid temperature	see page 13
Protection degree	IP65
Maintenance	none
Certification	EC

ACCESSORIES ON REQUEST

- Actuator override, to activate the valve in case of emergency or black-out (not available for 4 and 12-second version).
- One additional opening feedback microswitch (free contact) which is electrically closed when the valve is open.
  Example of use: notification of opening, pump relay actuation, boiler control, notification to PLC, etc.
- One additional closing feedback microswitch (free contact) which is electrically closed when the valve is closed.
  Example of use: notification of closing, relay actuation, notification to PLC, etc.;
- Insulation spacers with and without manual override (see "Valve bodies" section).

Microswitches

EXTRA



Manual override top

Diamant 2000

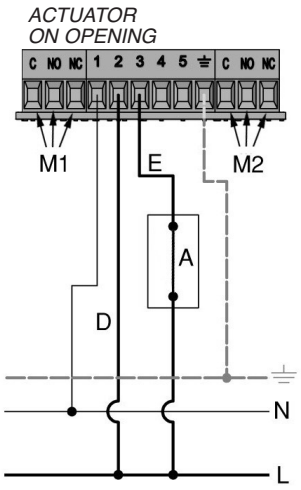
MOTORIZED VALVES

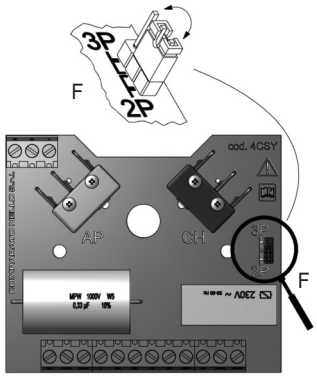
ELECTRICAL CONNECTIONS

2-POINT CONTROL – ON/OFF (SWITCH)

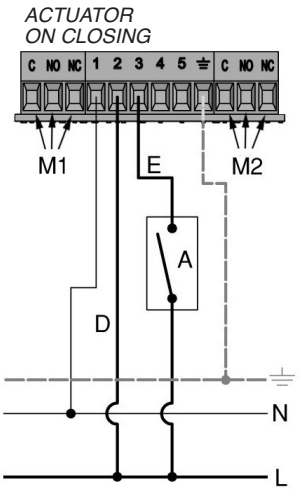
- terminal 1: neutral;
- terminal 2: **fixed** closing phase;
- terminal 3: opening phase.

The phase to terminal 3 can be supplied by means of a switch.
One electric control can activate several actuators.





Get the Jumper in position of the image for the desired electrical connection



KEY:
1 - Neutral
2 - Closing phase
3 - Opening phase
4 - Outlet opening phase
5 - Outlet closing phase

A - Switch-type control
D - Closing
E - Opening
F - Jumper
⏚ - Earth

C - Common
NO - Normally open
NC - Normally closed
M1 - Opening extra microswitch
M2 - Closing extra microswitch

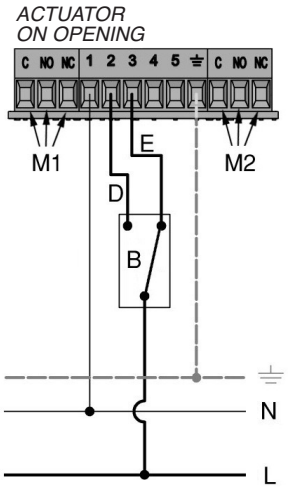
The figures show the wiring diagram of the actuator with **2-POINT ON/OFF** control device.

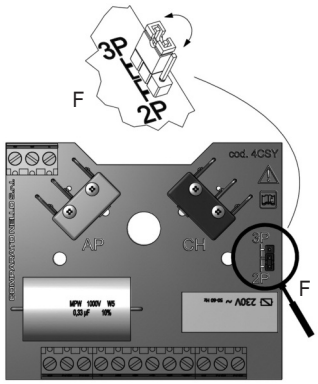
The wiring diagram is shown open and closed, respectively. Supplying power by means of a phase across terminal 2 causes the valve to close (electrical automatic closing); supplying power across terminal 3, too, causes the valve to open.

3-POINT CONTROL – ON/OFF (DIVERTER)

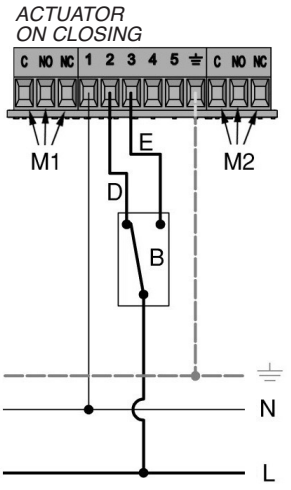
- terminal 1: neutral;
- terminal 2: closing phase;
- terminal 3: opening phase.

Phase shall be diverted to terminal 2 or terminal 3.
Each actuator must be operated by a single electric control.





Get the Jumper in position of the image for the desired electrical connection



KEY:
1 - Neutral
2 - Closing phase
3 - Opening phase
4 - Outlet opening phase
5 - Outlet closing phase

B - Switch-type control
D - Closing
E - Opening
F - Jumper
⏚ - Earth

C - Common
NO - Normally open
NC - Normally closed
M1 - Opening extra microswitch
M2 - Closing extra microswitch

The figures show the wiring diagram of the actuator with **3-POINT ON/OFF** control device.

The wiring diagram is shown open and closed, respectively. When the phase flows across terminal 3, the valve opens; on the contrary, when the phase flows across terminal 2, the valve closes.

Diamant 2000

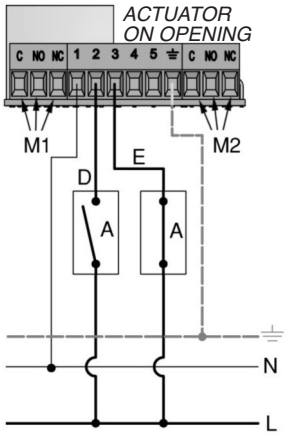
MOTORIZED VALVES

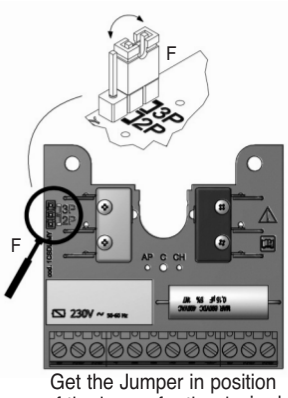
ELECTRICAL CONNECTIONS

3-POINT CONTROL – MODULATING (2 SWITCHES)

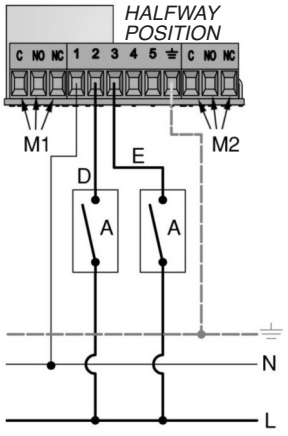
• terminal 1: neutral; • terminal 2: closing phase; • terminal 3: opening phase.

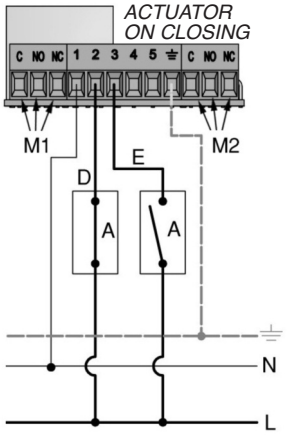
The phase can be diverted to terminal 2, terminal 3 or to none of them, in order to obtain partial openings of the valve. This is necessary for modulating the flow when a regulation is needed. **Each actuator must be operated by a single electric control.**





Get the Jumper in position of the image for the desired electrical connection





KEY:

1 - Neutral
2 - Closing phase
3 - Opening phase
4 - Outlet opening phase
5 - Outlet closing phase

A - Switch-type control
D - Closing
E - Opening
F - Jumper
⏚ - Earth

OPTIONAL

C - Common
NO - Normally open
NC - Normally closed
M1 - Opening additional microswitch
M2 - Closing additional microswitch

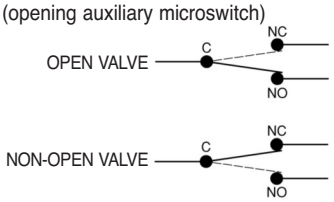
The figures show the wiring diagram of the actuator with **3-POINT MODULATING** control device.

The wiring diagram is shown in an open, closed and intermediate position, respectively. When the phase flows across terminal 3, the valve opens; on the contrary, when the phase flows across terminal 2, the valve closes. When there is no phase on the above mentioned terminals, the actuator can take intermediate positions between the points of complete closure and complete opening, allowing a modulating operation.

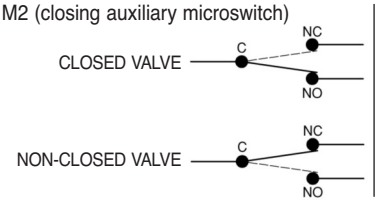
Should power fail, the actuator remains in the position it was when the power outage occurred.

The layout of the extra (optional) microswitch contacts is shown in the following figures.

M1 (opening auxiliary microswitch)



M2 (closing auxiliary microswitch)

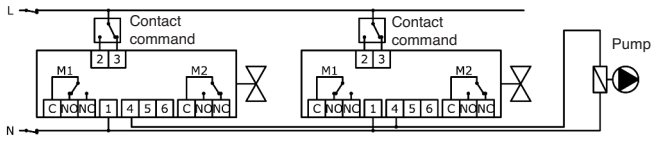


Diamant 2000 actuators have the following features:

• outlet phase to terminal 4 with open valve, to be used as a remote control (notification of opening, pump relay actuation, etc.);

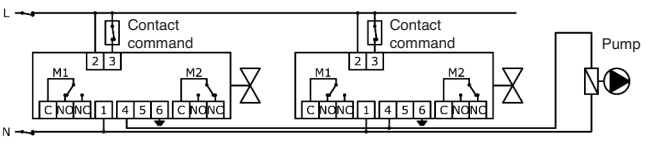
• outlet phase to terminal 5 with closed valve, to be used as a remote control (notification of closing);

EXAMPLES OF ELECTRICAL CONNECTIONS



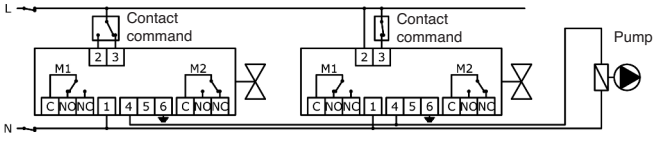
M1 EXTRA MICRO SWITCH FREE IN OPENING POSITION (UPON REQUEST)
M2 EXTRA MICRO SWITCH FREE IN CLOSING POSITION (UPON REQUEST)

Connection of the pump stop with two 3-point actuators



M1 EXTRA MICRO SWITCH FREE IN OPENING POSITION (UPON REQUEST)
M2 EXTRA MICRO SWITCH FREE IN CLOSING POSITION (UPON REQUEST)

Connection of the pump stop with two 2-point actuators



M1 EXTRA MICRO SWITCH FREE IN OPENING POSITION (UPON REQUEST)
M2 EXTRA MICRO SWITCH FREE IN CLOSING POSITION (UPON REQUEST)

Connection of the pump stop with a 3-point and 2-point actuator

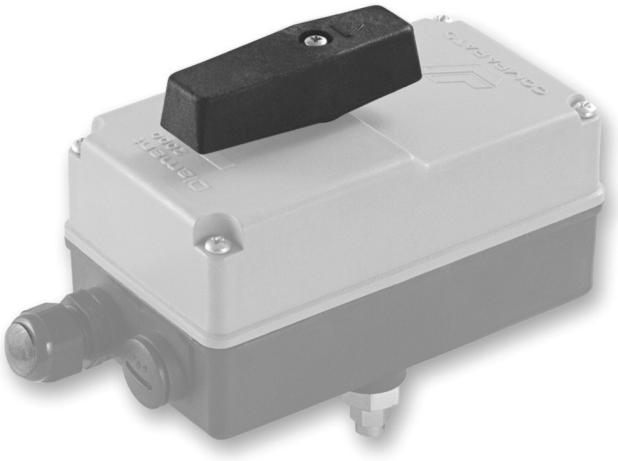
Diamant 2000

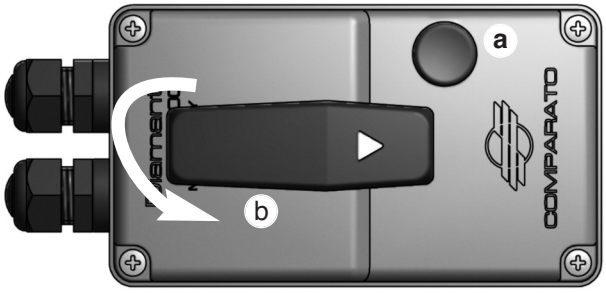
MOTORIZED VALVES

MANUAL OPENING

The **Diamant 2000** actuators can be equipped with an emergency manual override (with the exception of the versions with an operating time of 4 and 12 seconds).

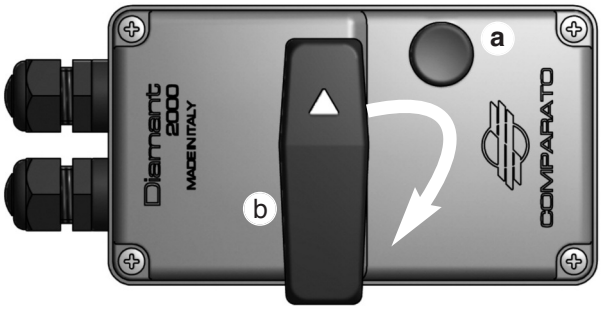
The manual override allows to activate the valve in case of emergency or black-out.





Actuator in **OPEN** position.

Press the unlock button (a) and, at the same time, rotate the lever (b) of 90° **COUNTERCLOCKWISE,** in order to bring the actuator in the **CLOSING** position.



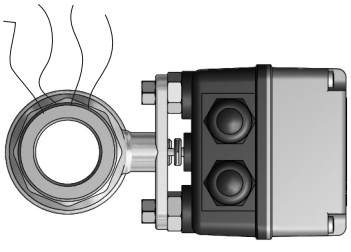
Actuator in **CLOSED** position.

Press the unlock button (a) and, at the same time, rotate the lever (b) of 90° **COUNTERCLOCKWISE,** in order to bring the actuator in the **OPENING** position.

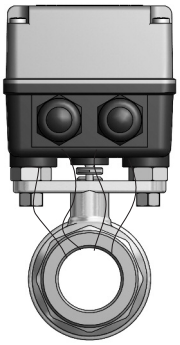
INSTALLATION

The valve should be installed in such a way that the actuator connection is not facing down.

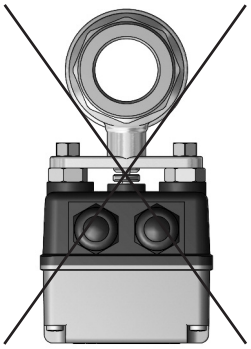
When the valve works with low-temperature fluids (possible frost formation on the valve stem) or with high-temperature fluids (danger of actuator overheating), it is advisable to install it in the recommended position, as shown in the picture.



RECOMMENDED POSITION



ALLOWED POSITION



FORBIDDEN POSITION

Diamant 2000

MOTORIZED VALVES

Valve bodies WITH TANGS

BRASS Valve bodies

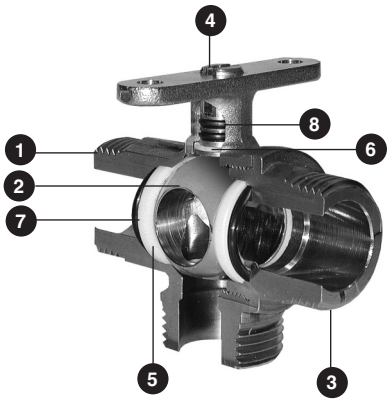
2-WAY · FULL FLOW
Ø 1/2" • 3/4" • 1"

3-WAY · DIVERTER / MIXER
FULL FLOW
Ø 3/4" • 1"

BY-PASS
Ø 3/4" • 1"

Male connections are all provided with tang, which is extremely convenient during the installation and allows to position the valve body and then the actuator properly; moreover, it helps performing any maintenance work.

The ball cut-off ensures the best hydraulic tightness and reduced pressure loss.



MATERIAL USED IN THE VALVE BODY

1	BODY	BRASS CW617N UNI 5705
2	BALL	BRASS CW617N UNI 5705 CHROMED NIKEL
3	COUPLING	BRASS CW617N UNI 5705
4	CONTROL ROD	BRASS CW617N UNI 5705
5	BALL SEAL	P.T.F.E.
6	ROD SEAL	P.T.F.E.
7	BALANCING O-RING	EPDM
8	CONTROL ROD O-RING	EPDM

BRASS Valve Bodies WITH INSULATION SPACER AND MANUAL OVERRIDE

The valve bodies which are suitable for **Diamant 2000** can be equipped with spacers to protect the valve and insulate the actuator from the thermal conduction coming from the valve body. Moreover, the above mentioned spacers can be provided with a lever which enables manual opening and closing operations.

2-WAY · FULL FLOW
Ø 1/2" • 3/4" • 1"
with spacer for insulation

2-WAY · FULL FLOW
Ø 1/2" • 3/4" • 1"
with spacer for insulation
and manual override

3-WAY · DIVERTER / MIXER · FULL FLOW
Ø 3/4" • 1"
with spacer for insulation

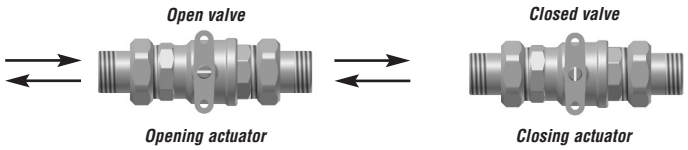
3-WAY DIVERTER / MIXER · FULL FLOW
Ø 3/4" • 1"
with spacer for insulation
and manual override

Diamant 2000

MOTORIZED VALVES

2-WAY valve bodies

The valve body can be mounted in both flow directions, without distinction.



3-WAY diverter/mixer valve bodies

The 3-way version of **Diamant 2000** is available with two different balls. In both cases one of the holes is positioned on the common way, which is therefore always open.

MIXER VALVE BODY (3-HOLE BALL)

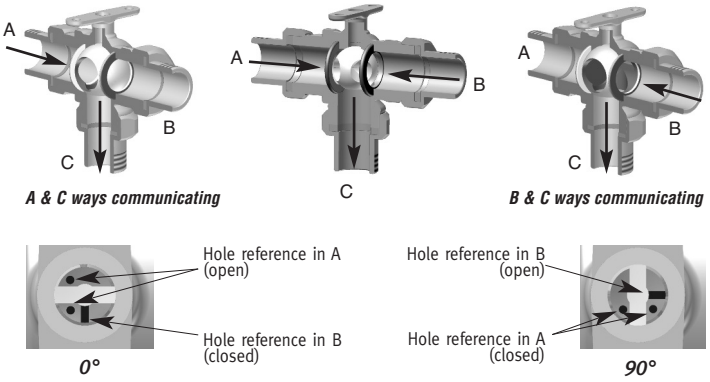
It has a 3-hole ball with one hole pointed towards the common way (always open) and two more holes which are orthogonal to the first one and to each other. When one of these two holes is pointed towards one of the two inlets, the second inlet is closed.

By means of a rotation of 90° of the ball, the second hole points towards the second inlet and closes the first one.

One of the special features of the 3-hole ball valve is the fact that the 3 ways can communicate simultaneously, during the ball rotation from one deviation position to another. At the end of the operation, the valve is a diverter again, for all practical purposes; therefore, the use of the 3-way 3-hole diverter valve is advisable when the diverted ways can communicate.

This is generally the case of heating systems. Moreover, the above mentioned condition allows this valve to be used for mixing. On the control rod there are two symbols **(two dots and a dash)** which indicate which way is **communicating to the common one.**

MIXER - 3 HOLES
C = COMMON WAY



DIVERTER VALVE BODY (2-HOLE BALL)

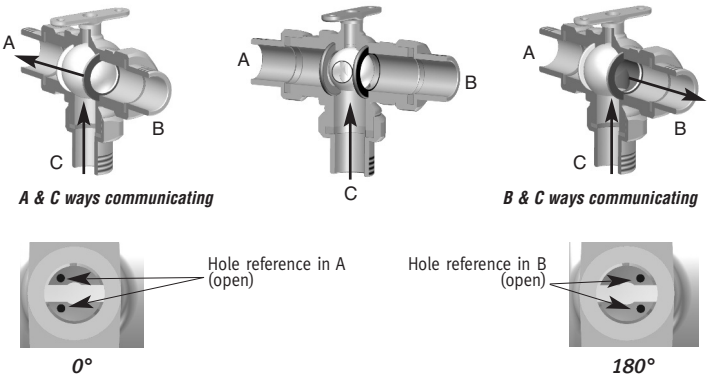
In a **2-hole** ball, the first hole is positioned on one of the two inlets: a 180° rotation is necessary in order to point it to the other inlet.

One of its features is the fact that one of the two inlets closes before the the one opens, so that the two ways never communicate.

The 3-way, **2-hole** iverter valve is necessary when the two diverted ways must never communicate.

On the control rod there is a symbol **(two dots)** ch indicates which way **is communicating to the common one.**

DIVERTER - 2 HOLES
C = FLUID INLET



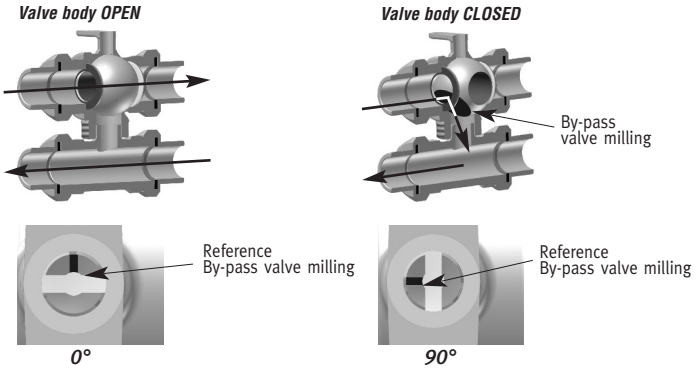
BY-PASS valve bodies

In by-pass valves, the cut-off consists of a ball with a through hole, as in 2-way ones.

One of the features that distinguishes the by-pass ball from the 2-way ball is a milling which allows the recirculation of part of the outlet flow towards the return line when the valve is closed.

Therefore, in by-pass valves it is important to recognize the flow direction.

On the control rod there is a symbol (a dash) which indicates the position of the milling on the ball; when the valve is closed, it must always be oriented towards the direction of the incoming flow.



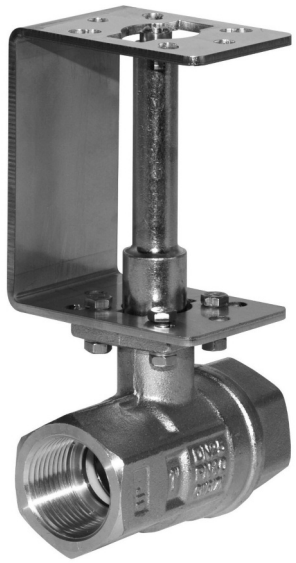
The actuator rotates **90° COUNTERCLOCKWISE**
in order to move from the open position to the closed position

Diamant 2000

MOTORIZED VALVES

FEMMINA valve bodies

BRASS valve bodies WITH INSULATION SPACER AND MANUAL OVERRIDE



2-WAY · FULL FLOW
Ø 1/4" • 3/8" • 1/2"
• 3/4" • 1" • 1"1/4
with spacer for insulation

2-WAY · FULL FLOW
Ø 1/4" • 3/8" • 1/2"
• 3/4" • 1" • 1"1/4
with spacer for insulation
and manual override

3-WAY · DIVERTER / MIXER
FULL FLOW
Ø 1/2" • 3/4" • 1"
with spacer for insulation

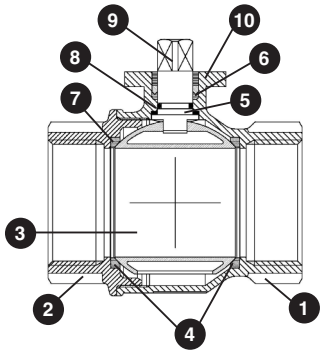
3-WAY · DEVIATORE / MISCELATORE
FULL FLOW
Ø 1/2" • 3/4" • 1"
with spacer for insulation
and manual override

3-WAY · REDUCED PORT
Ø 1/2" • 3/4" • 1"
with spacer for insulation

3-WAY · REDUCED PORT
Ø 1/2" • 3/4" • 1"
with spacer for insulation
and manual override

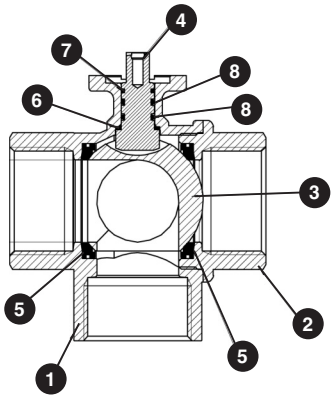
Diamant 2000

MOTORIZED VALVES



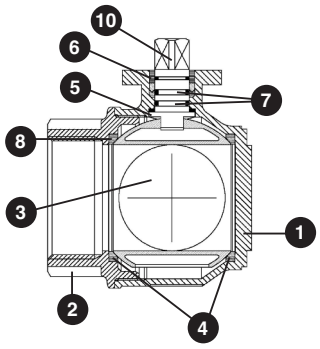
MATERIAL USED IN THE 2-WAY F/F ISO 5211 BRASS VALVE BODY

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	BALL	BRASS CW617N UNI EN 12165
4	BALL SEAL	P.T.F.E.
5	ANTI-FRICTION SEAL	P.T.F.E.
6	ROD SEAL	P.T.F.E.
7	O-RING	FKM
8	O-RING	FKM
9	CONTROL ROD	BRASS CW617N UNI EN 12165
10	ISO 5211 FLANGE	BRASS CW617N UNI EN 12165



MATERIAL USED IN THE 3-WAY F/F/F ISO 5211 DEVIATING/MIXING BRASS VALVE BODY

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	BALL	BRASS CW617N UNI EN 12165
4	CONTROL ROD	P.T.F.E.
5	BALL SEAL	P.T.F.E.
6	ANTI-FRICTION SEAL	P.T.F.E.
7	O-RING	FKM
8	O-RING	FKM



MATERIAL USED IN THE 3-WAY F/F/F ISO 5211 BRASS VALVE BODY

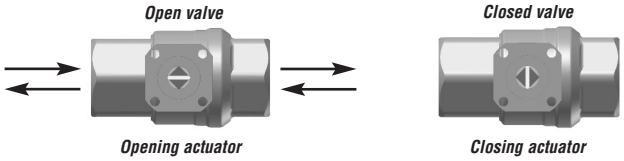
1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	BALL	BRASS CW617N UNI EN 12165
4	BALL SEAL	P.T.F.E.
5	ANTI-FRICTION SEAL	P.T.F.E.
6	ROD SEAL	P.T.F.E.
7	O-RING	FKM
8	O-RING	FKM
10	CONTROL ROD	BRASS CW617N UNI EN 12165

Diamant 2000

MOTORIZED VALVES

2-WAY valve bodies

The valve body can be mounted in both flow directions, without distinction.



3-WAY diverter/mixer valve bodies

The 3-way version of COMPACT PRO valves with **ISO 5211** connection is available with two different balls. In both cases, one of the holes is positioned on the common way, which is therefore always open.

MIXER VALVE BODY (3-HOLE BALL)

The mixing valve body is used to mix two fluids (e.g. in order to control the temperature and/or the flow). In a 3-hole ball valve, the second hole is positioned on one of the two inlets and the third hole is orthogonal to the second one: a 90° rotation is necessary in order to point it to the other inlet.

One of the features of ball valves with 3-hole ball is the possibility to close one of the inlets when the other one begins to open. For a short while, during the operating phase, all the three ways are communicating.

At the end of the operation, the valve is a diverter again, for all practical purposes; therefore, the use of the 3-way 3-hole diverter valve is advisable when the diverted ways can communicate.

This is generally the case of heating systems.

On the control rod there are two orthogonal **millings,** which indicate which way **is communicating with the common one.**

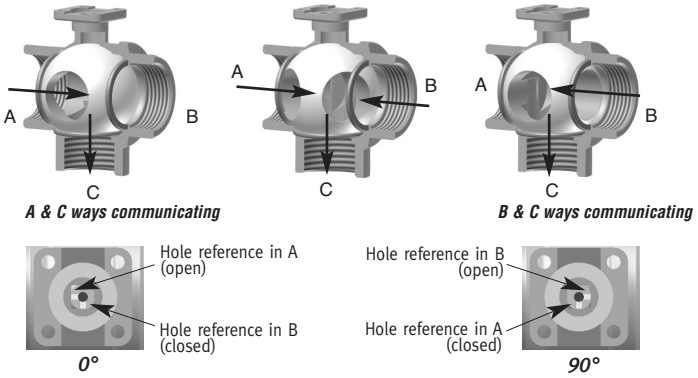
DIVERTER VALVE BODY (2-HOLE BALL)

In a **2-hole** ball, the first hole is positioned on one of the two inlets: a 180° rotation is necessary in order to point it to the other inlet.

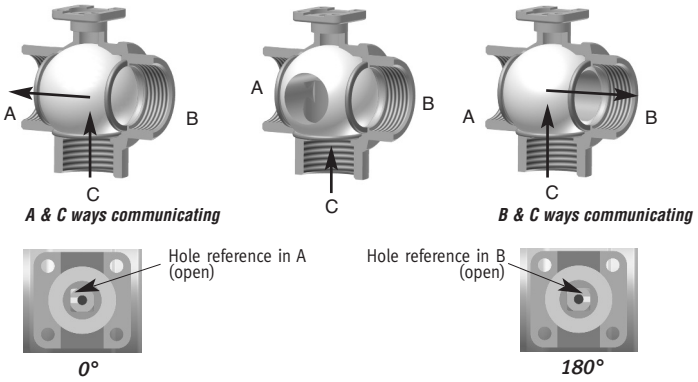
One of the features of the ball valve with **2 holes** is the fact that one of the two inlets closes before the the one opens, so that the two ways never communicate.

The 3-way, **2-hole** diverter valve is necessary when the two diverted ways must never communicate. On the control rod there is an orthogonal **milling,** which indicates which way **is communicating with the common one.**

MIXER - 3-HOLE
C = COMMON WAY

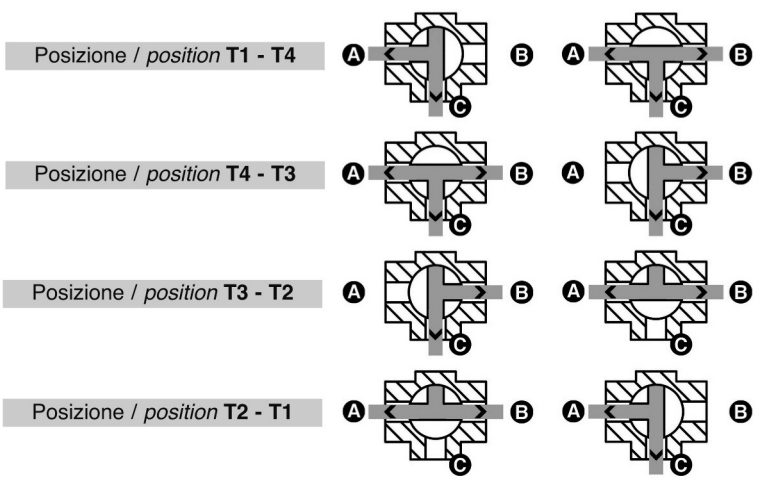


DIVERTER - 2-HOLE
C = FLUID INLET

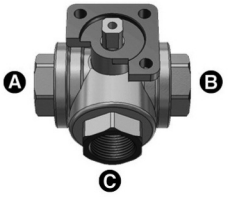


3-WAY valve bodies

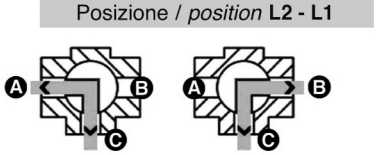
"T" BALL



POSIZIONAMENTO SFERA
BALL POSITIONING



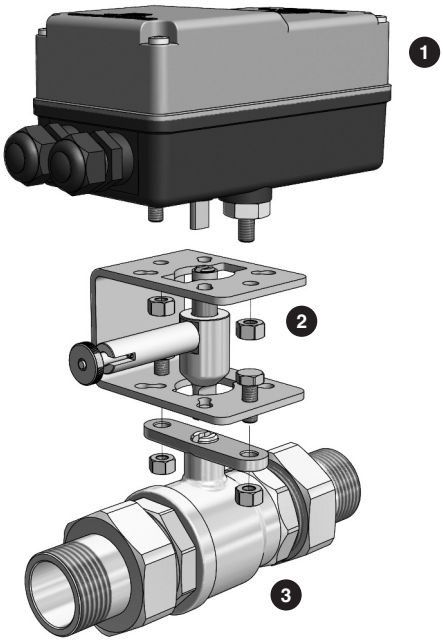
"L" BALL



Diamant 2000

MOTORIZED VALVES

Exploded view FOR THE ASSEMBLY OF SPACER-FITTED MOTORIZED VALVES



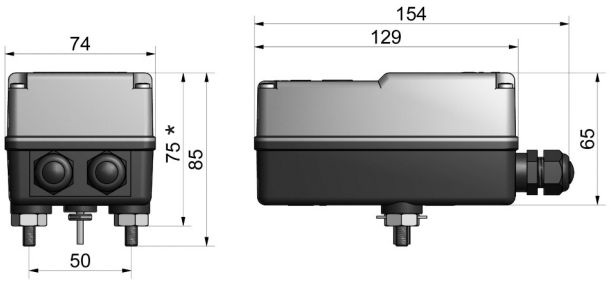
For the evaluation of the overall size of motorized valves, take into account the assembling diagram (next) and the dimensions of each single component, as shown in the following two pages.

When the installation does not require a spacer, directly couple the actuator to the valve.

1 : Diamant 2000 actuator
2 : Spacer/manual opening
3 : Ball valve

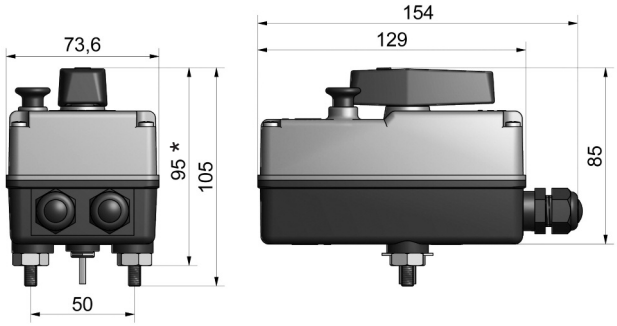
OVERALL SIZE [mm]

STANDARD MODEL

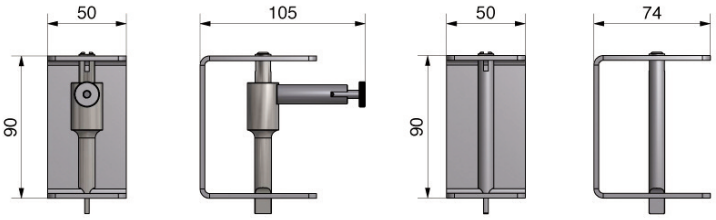


* *the size is to be taken into account when coupling the actuator to the valve body or the spacer.*

MODEL WITHOUT MANUAL OVERRIDE



OPTIONAL SPACERS FOR INSULATION AND/OR MANUAL OVERRIDE



Also available without control lever for manual override.

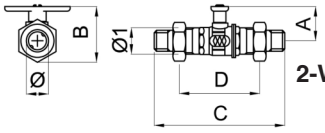
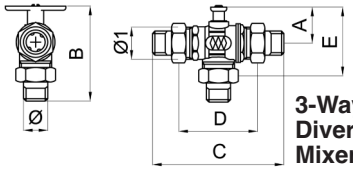
Diamant 2000

MOTORIZED VALVES

VALVE BODIES

VALVE BODIES WITH TANGS

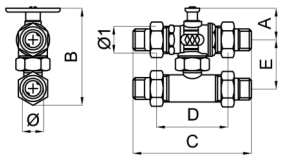
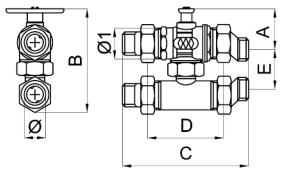
BRASS

MODEL	DN	Ø TANGS	Ø VALVE BODIES	A	B	C	D	E
 **2-Way**	15	1/2"	3/4"	34	48	133	78	
	20	3/4"	1"	38	58	145	84	
	25	1"	1"1/4	42	66	164	94	
 **3-Way Diverter/ Mixer**	20	3/4"	1"	38	105	145	84	74
	25	1"	1"1/4	42	117	164	94	82

D - E: *quote riferite al corpo valvola senza codoli e calotte.*

VALVE BODIES WITH TANGS

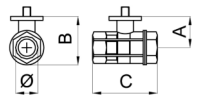
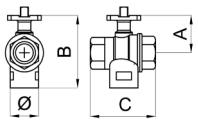
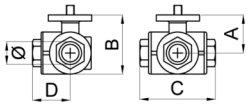
BRASS

MODEL	DN	Ø TANGS	Ø VALVE BODIES	A	B	C	D	E
 **By-Pass**	20	3/4"	1"	38	119	145	84	70
	25	1"	1"1/4	42	119	164	94	81
 **By-Pass** and eccentric tangs	20	3/4"	1"	from 15 to 27	119	145	84	from 58 a 82
	25	1"	1"1/4	from 20 to 32	119	164	94	from 49 a 73

D: *dimension refers to the valve body without tangs and caps.*

FEMALE VALVE BODIES

BRASS

MODEL	DN	Ø	A	B	C	D		
 **2-Way**	8	1/4"	33	50	67			
	10	3/8"	33	50	67			
	15	1/2"	33	50	67			
	20	3/4"	35	55	76			
	25	1"	46	71	90			
	32	1"1/4	49	78	102			
 **3-Way Diverter/ Mixer**	15	1/2"	31	65	64			
	20	3/4"	42	82	74			
	25	1"	45	92	89			
 **3-Way**	15	1/2"	33	52	77	39		
	20	3/4"	42	66	89	44		
	25	1"	47	77	105	53		

Diamant 2000

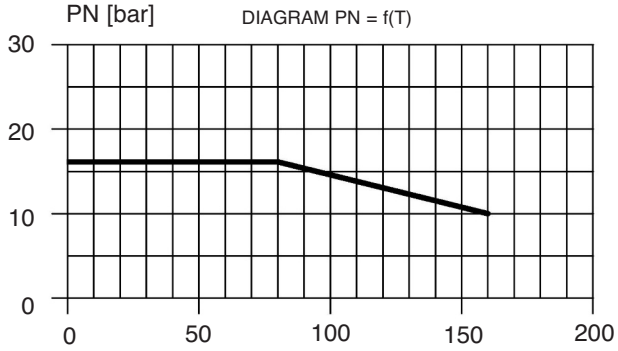
MOTORIZED VALVES

VALVE BODIES **BRASS with tangs**

FLUID-DYNAMIC FEATURES

Kv_S [m^3/h] (with Δp = 100kPa = 1bar)

MODEL	Ø	Kv_S
2-Way	1/2"	16,3
	3/4"	29,5
	1"	43
3-Way Diverter/Mixer	3/4"	11,5
	1"	18,3
By-pass	3/4"	29,5
	1"	43



When the value of the flow is known, the general expression for the calculation of pressure losses is the following:

$$\Delta p\,[\text{bar}] = \left[\frac{Q\,[\text{m}^3/\text{h}]}{k_{v_s}}\right]^2$$

The simplified expression provided applies to water or technically similar fluids.

PRESSURES

- ***Nominal*** ***16 bar***
- ***Max. differential operating*** ***16 bar***

FLUIDS ***Water and EPDM & PTFE- compatible fluids • Other fluids on request***

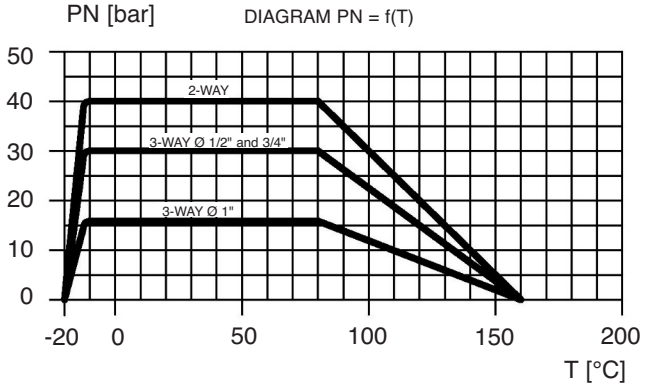
TEMPERATURES

	Normal valve	*Valves with spacer*
• *Minimum*	*+5°C*	*0 °C*
• *Maximum*	*+100 °C*	*+100°C*

VALVE BODIES **BRASS female**

Kv_S [m^3/h] (with Δp = 100kPa = 1bar)

MODEL	Ø	Kv_S
2-Way	1/4"	5,4
	3/8"	6
	1/2"	16,3
	3/4"	29,5
	1"	43
	1"1/4	89
3-Way Diverter/Mixer	1/2"	6
	3/4"	11,5
	1"	18,3
3-Way	1/2"	3,9
	3/4"	7,9
	1"	13



PRESSURES

	2-WAY	3-WAY DIV/MIX	3-WAY
• *Nominal*	*40 bar*	*16 bar**	*30 bar*
• *Max. differential operating*	*40 bar**	*16 bar***	*30 bar**

** 1" 1/4 25 bar* ** 1/2" 25 bar* ***1" 10 bar* ** 3/4" 16 bar*

FLUIDS ***Water and EPDM & PTFE- compatible fluids • Other fluids on request***

TEMPERATURES

	Normal valve	*Valves with spacer*
• *Minimum*	*+5°C*	*0°C*
• *Maximum*	*+100°C*	*+100°C*

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MOTORIZED VALVES

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MOTORIZED VALVES

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MOTORIZED VALVES

GLOSSARY

- Operating torque: Torque which can be occasionally provided by the actuator, with no risk of breaks nor permanent deformation of the actuator components.
- Kv_S: Flow coefficient when the valve is completely open (2-way valve) or when the flow is completely deviated on a perpendicular (3-way valve).
- PN: Nominal operating pressure.
- Δp max: Maximum differential operating pressure.

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