SINTESI

MOTORIZED BALL VALVES

USE

SINTESI motorized valve has its peculiar use in interception and regulation of:

- **zone heating systems**
- **systems that make use of alternative energy**
- **automated systems in general**

The SINTESI servo-control has a truly innovative "press-down"connection systems, which permits easy and rational connection to the body valve. This all goes to make for easier installation and maintenance.

Actuator

The SINTESI actuator is available in the following versions:

≫ **UNI/BIDIRECTIONAL** type the actuator rotates at 90°, alternatively in clockwise or anti-clockwise direction, in order to open and close the valve. It can be combined with 2-way, 3-way and by-pass valves.

≫ **BIDIRECTIONAL** type the actuator rotates at 90°, alternatively in clockwise or anti-clockwise direction, in order to open and close the valve. If it is connected to a proper actuator it can be used as "modulating". It can be combined with 2-way, 3-way and by-pass valves.

Both models can be:

≫ **3-POINT** **without relay (deviator)**
neutral blue wire, phase on green wire opens, deviated to brown wire closes (see wiring diagram)
each servo-control must be engaged using a single control.

≫ **2-POINT** **with relay - (switch)**
neutral blue wire, brown wire fixed phase, green wire control phase for opening (see wiring diagram)
several servo-controls may be engaged from a single control.

Both versions have an ON - OFF function (fully open or fully closed)
The 3-point bidirectional version without relay, if it received a proper command signal, may be set to intermediate positions.

For modulating regulations refer to page 8.

The SINTESI actuator features:

- grey wire power with fully open valve to be used as a remote control (to signal that any opening or pump relay activation actions have been undertaken).
- an auxiliary opening micro (clean contact) which is electrically closed when the valve is open (pink and white wire). Optional use (indicates opening action has been undertaken, pump relay command, boiler command, PLC, indicator etc).

ACTUATOR TECHNICAL FEATURES

- Electrical motor: uni/bidirectional and bidirectional
- Electrical power supply: 230/24V 50/60 Hz
- Cable length: 80 cm
- Manoeuvre time (90°) : 45 sec. Torque on the control rod: 8 Nm
  Manoeuvre time (90°) : 10 sec. Torque on the control rod: 5 Nm
- Absorbed power: 3,8 VA (version 230V 50 Hz)
  5,2 VA (version 24V 50 Hz)
- Appliance class: 2 - double insulated electrical appliance ⧈
- Degree of electrical protection: IP 54
- Electrical capacity of the auxiliary micro: 1A resistive
- Working environment temperature: minimum -10°C maximum 50°C, for lower temperatures please contact our technical office.

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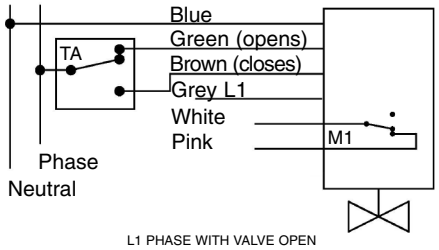
MOTORIZED BALL VALVES

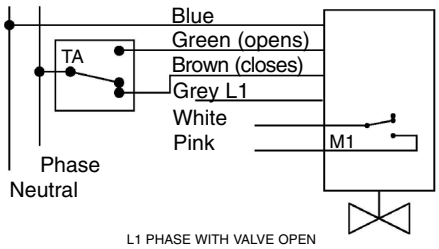
ELECTRICAL CONNECTIONS

Actuator WITHOUT RELAY 3-POINT CONTROL

OPENED



L1 PHASE WITH VALVE OPEN
TA ROOM THERMOSTAT
M1 FREE AUXILIARY MICRO-SWITCH ON OPENING (ON REQUEST)



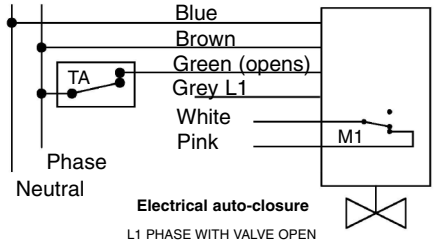
CLOSED

L1 PHASE WITH VALVE OPEN
TA ROOM THERMOSTAT
M1 FREE AUXILIARY MICRO-SWITCH ON OPENING (ON REQUEST)

Diagrams illustrate the electric scheme of the 3-POINT actuator (serial auxiliary micro-switch). The actuator is shown in opening and closure position respectively. Phase presence on the green wire causes the opening of the valve connected to the servo-control, vice versa the presence live power on the brown wire causes its closure.

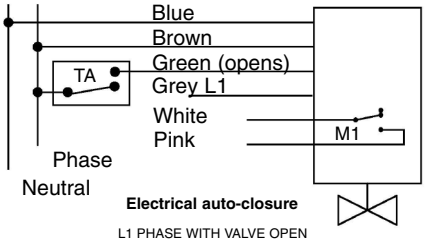
Actuator WITH RELAY 2-POINT CONTROL

OPENED



Electrical auto-closure

L1 PHASE WITH VALVE OPEN
TA ROOM THERMOSTAT
M1 FREE AUXILIARY MICRO-SWITCH ON OPENING (ON REQUEST)



CLOSED

Electrical auto-closure

L1 PHASE WITH VALVE OPEN
TA ROOM THERMOSTAT
M1 FREE AUXILIARY MICRO-SWITCH ON OPENING (ON REQUEST)

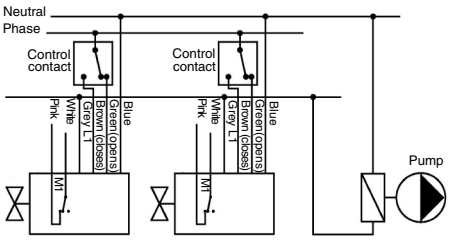
Diagrams illustrate the electric scheme of the 2-POINT with relay actuator (serial auxiliary micro-switch). The actuator is shown in opening and closure position respectively. The phase on green wire determines the valve opening, as where removing the phase on the same wire determines the closure (electrical auto-closure).

NOTE:

After opening, in both cases, an input phase on grey cable is available and micro auxiliary contacts place themselves as shown in the picture (actuator in opening).

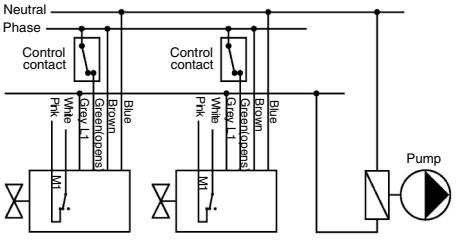
Both the 3-POINT and 2-POINT actuators with relay remain in their original position, in the absence of electrical power supply.

ELECTRICAL CONNECTION EXAMPLES



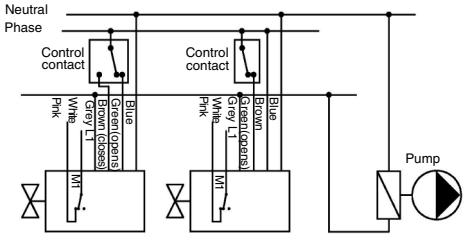
M1 FREE AUXILIARY MICRO-SWITCH ON OPENING

Pump stop connection with two standard actuators



M1 FREE AUXILIARY MICRO-SWITCH ON OPENING

Pump stop connection with two special with relay actuators



M1 FREE AUXILIARY MICRO-SWITCH ON OPENING

Connection of the pump stop with one standard and one special with relay actuators

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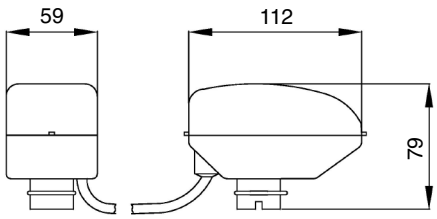
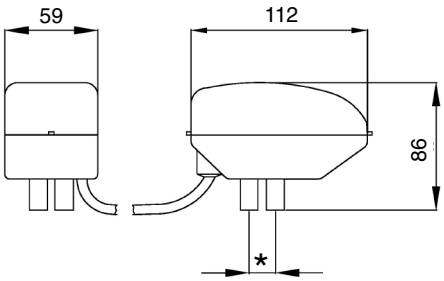
MOTORIZED BALL VALVES

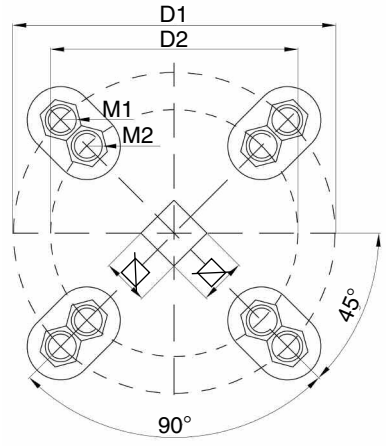
OVERALL DIMENSIONS ACTUATOR

BASIC MODEL



MODEL WITH ISO 5211 CONNECTION





ISO flange	D1/D2	M1/M2	⊠
F03	36	M5	9
F05	50	M6	11

* IN THE ORDER PLEASE SPECIFY THE KIND OF ISO 5211 CONNECTION OF THE BODY VALVE ON WHICH ACTUATOR MUST BE FIXED (F03 - F05)

FAST CONNECTION Body valve

2 WAY MALE-MALE ATTACHMENT
TOTAL PASSAGE
Ø 1/2" • 3/4" • 1"

2 WAY MALE-MALE ATTACHMENT
TOTAL PASSAGE WITH REGULATING DISC
Ø 1/2"

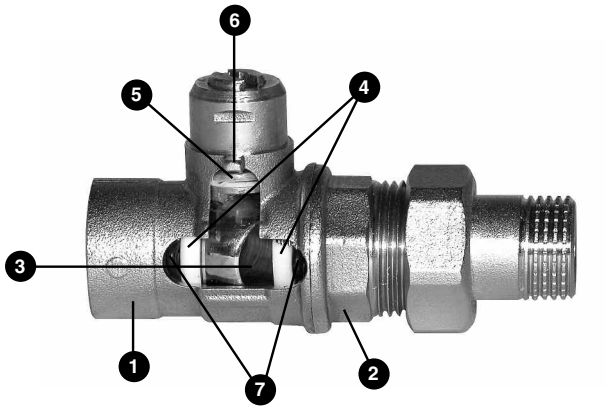
2 WAY MALE-FEMALE ATTACHMENT
TOTAL PASSAGE
Ø 1/2" • 3/4" • 1"

3 WAY VERTICAL
TOTAL PASSAGE
Ø 1/2" • 3/4" • 1"

BY-PASS
Ø 1/2" • 3/4" • 1"

The male attachments are all complete with spigot, which is very convenient for installation purposes as it permits the easy positioning of the body valve and the relative actuator and also greatly facilitates any maintenance operations that may be necessary.

Ball shutter assures a better hydraulic seal and reduced charge loss.



USED MATERIAL FOR BODY VALVE

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	SPHERE	BRASS CW617N UNI EN 12165
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	ROD GASKET	P.T.F.E. (TEFLON®)
6	ROD O-RING	FKM VITON®
7	BALANCE O-RING	FKM VITON®

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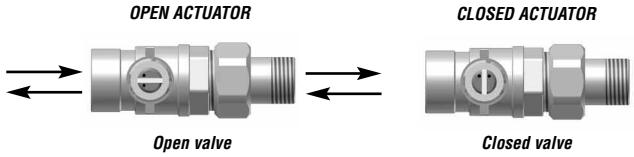
2 WAY Body valve

The body valve can be fitted without any differences as to the fluid sense. It is available in male-male and male-female version.



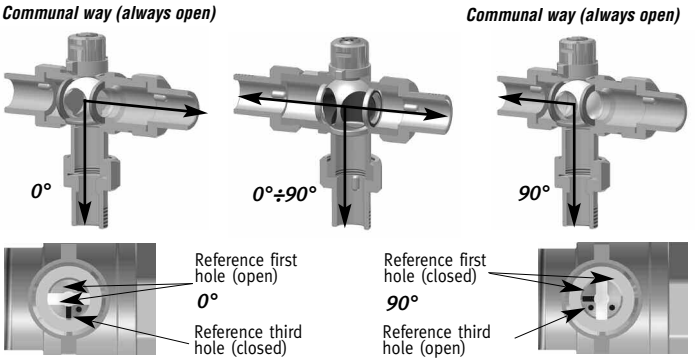
3 WAY VERTICAL Body valve

In the 3 - hole ball the second hole is located on one of the entrance ways while the third hole is positioned at right angles to the second hole: positioning towards the other entrance way requires 90° rotation.

A feature of the 3 hole shutter is that it is able to close one entrance way whilst beginning the opening of the next at the same time.

For a short period, during the manouvre stage all the three ways intercommunicate. Once the operation is complete the valve returns to being a deviation valve to all intents and purpose, so the used of the 3 - way - 3 hole deviation valve is recommended when the three deviated ways can communicate between themselves, which is usually the case of heating systems.

The control pin has two symbols, **a pair of dots** and **a dash**, indicating whichway **is in communication with the communal way**.



The actuator rotates by **90° CLOCKWISE** sense to shift from opening to closing position

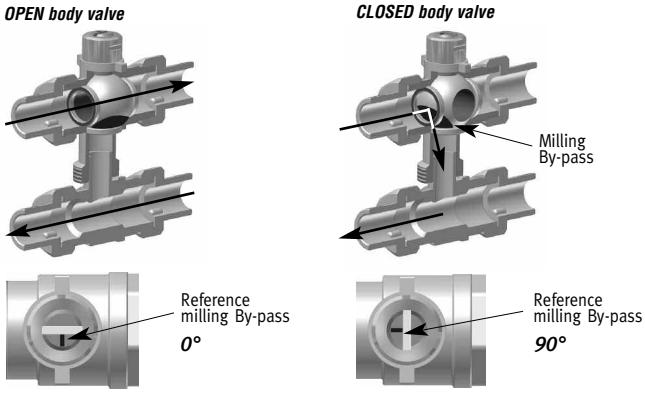
BY-PASS Body valve

The sphere of a by-pass valve differs from the one of 2 way valve because of the presence of a “facing” that allows the blow-by of a rate portion towards the return line, with closed valve.

For this reason in by-pass valve, it is important to recognise the fluid direction.

On command pin, you can find an hyphen that indicates the position of the ball facing. With closed valve, it must be always turned towards the coming fluid direction.

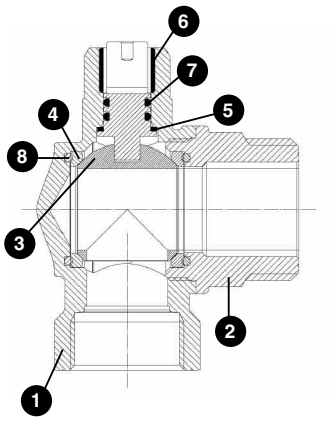
The inter-axis between the delivery and return ways is adjustable to between 50 and 60 mm for the valve bodies with diam of 1/2 and 3/4 and between 55 and 60 mm for valve bodies of 1” in diamete



The actuator rotates by **90° CLOCKWISE** sense to shift from opening to closing position

SQUARE body valve

2 WAY BRASS • TOTAL PASSAGE
Ø 3/4”



USED MATERIALS FOR SQUARE BODY VALVE

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	SPHERE	BRASS CW617N UNI EN 12165
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	ANTI-FRICTION GASKET	P.T.F.E. (TEFLON®)
6	ROD GASKET	P.T.F.E. (TEFLON®)
7	O-RING	FKM VITON®
8	O-RING	FKM VITON®

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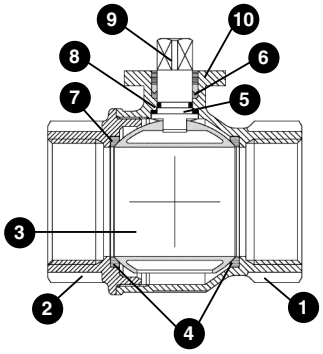
ISO 5211 CONNECTION Body valve

Ball shutter assures a better hydraulic seal and reduces charge loss.

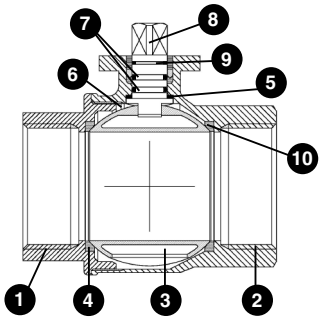
2 WAY BRASS • TOTAL PASSAGE
Ø 1/4" • 3/8" • 1/2" • 3/4"



USED MATERIAL FOR 2 WAY - ISO 5211 BODY VALVE

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	SPHERE	BRASS CW617N UNI EN 12165
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	ANTI-FRICTION GASKET	P.T.F.E. (TEFLON®)
6	ROD GASKET	P.T.F.E. (TEFLON®)
7	O-RING	FKM VITON®
8	O-RING	FKM VITON®
9	ROD	BRASS CW617N UNI EN 12165
10	ISO 5211 ADAPTOR	BRASS CW617N UNI EN 12165

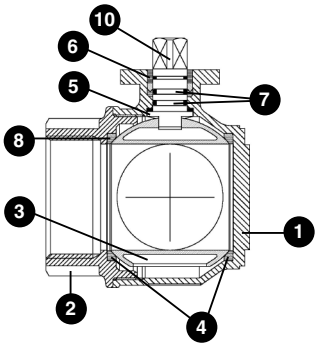
2 WAY AISI 316 • TOTAL PASSAGE
Ø 1/2" • 3/4"



USED MATERIAL FOR 2 WAY - AISI 316 BODY VALVE

1	BODY	CF8M
2	COUPLING	CF8M
3	SPHERE	INOX AISI 316
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	GASKET	P.T.F.E. (TEFLON®)
6	ROD WASHER	P.T.F.E. (TEFLON®)
7	O-RING	FKM VITON®
8	ROD	INOX AISI 316
9	ROD GASKET	P.T.F.E. (TEFLON®)
10	O-RING	FKM VITON®

3 WAY BRASS • TOTAL PASSAGE
Ø 1/4" • 3/8" • 1/2"

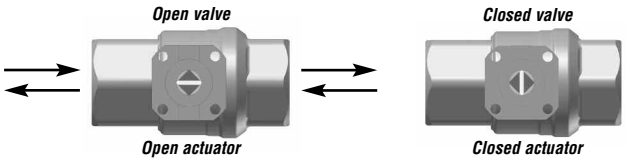


USED MATERIAL FOR 3 WAY HORIZONTAL ISO 5211 BODY VALVE

1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	SPHERE	BRASS CW617N UNI EN 12165
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	ANTI-FRICTION GASKET	P.T.F.E. (TEFLON®)
6	ROD GASKET	P.T.F.E. (TEFLON®)
7	O-RING	FKM VITON®
8	O-RING	FKM VITON®
10	ROD	BRASS CW617N UNI EN 12165

2 WAY Body valve

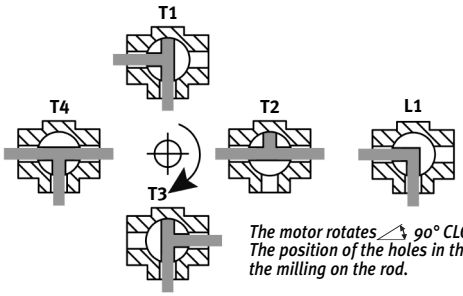
The body valve can be fitted without any differences as to the fluid sense.



3 WAY HORIZONTAL Body valve

3 way SINTESI with ISO 5211 connection is available with 2 different spheres and totally 5 holes positions.

Positions and movement spheres holes scheme



The motor rotates 90° CLOCKWISE.
The position of the holes in the sphere is indicated by the milling on the rod.

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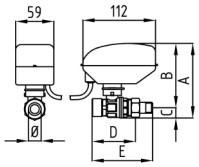
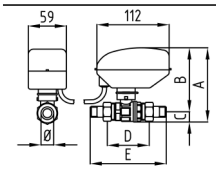
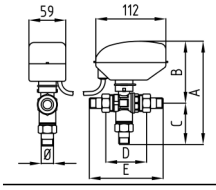
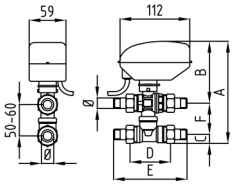
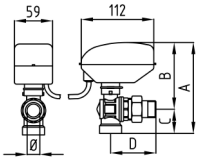
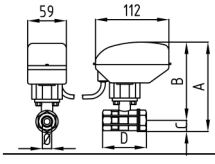
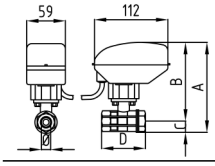
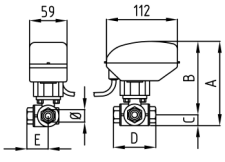
MOTORIZED BALL VALVES

OVERALL DIMENSIONS

BODY VALVES **BRASS (with tangs)**

MODEL	DN	Ø	A	B	C	D	E	F
 **2 Way** male female	15	1/2"	115	99	17	67	93	
	20	3/4"	122	103	19	70	100	
	25	1"	130	106	24	78	112	
 **2 Way** male/male								
2 Way male/male with REGULATING DISC	15	1/2"	115	99	17	64	118	
	20	3/4"	122	103	19	67	128	
	25	1"	130	106	24	77	147	
 **3 Way Vertical** 3 hole ball	15	1/2"	164	99	66	64	118	
	20	3/4"	173	103	71	67	128	
	25	1"	207	106	78	77	147	
 **By-pass**	15	1/2"	165	99	17	64	118	50
			175					60
	20	3/4"	172	103	67	67	128	50
			182					60
	25	1"	185	106	77	77	147	55
			190					60
 **2 Way** SQUARE body valve	20	3/4"	141	103	38	70		

BODY VALVES **ISO 5211** CONNECTION

MODEL	DN	Ø	A	B	C	D	E	
 **2 Way BRASS ISO 5211**	8	1/4"	136	119	17	67		
	10	3/8"	136	119	17	67		
	15	1/2"	136	119	17	67		
	20	3/4"	141	121	20	76		
 **2 Way AISI 316 ISO 5211**	15	1/2"	132	115	17	75		
	20	3/4"	144	122	22	80		
 **3 Way Horizontal ISO 5211**	8	1/4"	137	116	17	67	34	
	10	3/8"	137	116	17	67	34	
	15	1/2"	137	119	20	77	39	
	20	3/4"	151	128	24	87	44	

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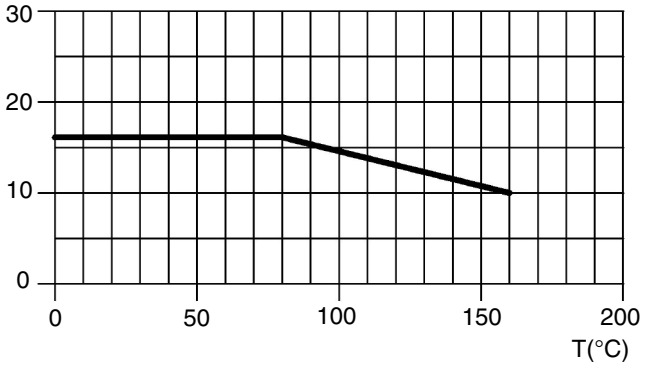
MOTORIZED BALL VALVES

FLUID MECHANICAL CHARACTERISTICS

Kv_S (m^3/h with Δp = 100kPa = 1bar)

MODEL	Ø	Kv_S
2 Way	1/2"	13
	3/4"	17
	1"	32
2 Way with REGULATING DISC	1/2"	2
	1/2"	4
SQUARE body valve	3/4"	7,9
3 Way	1/2"	4,9
	3/4"	7,3
	1"	16
By-pass	1/2"	0,8
	3/4"	1,9
	1"	2,9

PN (bar) DIAGRAM PN = f(T)



The pressure drop general expression, knowing the nominal pressure value of the fluid, is the following one:

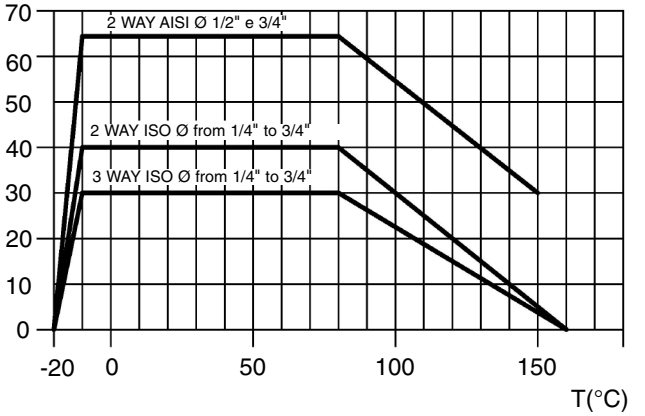
$$\Delta p\,[bar] = \left[\frac{Q\,[m^3/h]}{k_{v_S}}\right]^2$$

The above mentioned expression is valid for water and similar fluids.

Kv_S (m^3/h with Δp = 100kPa = 1bar)

MODEL	Ø	Kv_S
2 Way BRASS ISO 5211	1/4"	5,4
	3/8"	6
	1/2"	16,3
	3/4"	29,5
2 Way AISI 316 ISO 5211	1/2"	16,3
	3/4"	29,5
3 Way BRASS ISO 5211	1/4"	2,8
	3/8"	3
	1/2"	3,9
	3/4"	7,9

PN (bar) DIAGRAM PN = f(T)



PRESSURE

	2/3 WAY, By-pass	2 WAY ISO 5211	2 WAY AISI 316	3 WAY ISO 5211	SQUARED body valve
• Nominal working pressure	16 bar	40 bar	64 bar	30 bar	16 bar
• Working max differential	16 bar	16 bar	16 bar	16 bar	16 bar

FLUIDS *Usable fluids* — *Water and fluids compatible with EPDM® and TEFLON® • Other fluids on request*

TEMPERATURES

• Minimum	+7 °C
• Maximum	+100 °C

SINTESI
MOTORIZED BALL VALVES

USE IN ZONE HEATING SYSTEMS

Zone regulation is prescrived, in provided cases, by paraghraph no. 12 of art. n. 5 of D.P.R. 412/93 and regulated by art. 7 paraghraphs no. 3,4,5,7 and 8.
SINTESI motorized valve can be used either in a "**ON - OFF**" regulation or a modulating one.

"**ON -OFF**" **REGULATION:**

You execute it with a traditional thermostat, that can be a two-wire one, to be coupled to a actuator 2-POINT type, or with three-wire thermostat to be coupled with a actuator 3-POINT type.

MODULATING REGULATION:

To obtain high returns, new plant engineering requests a modulating regulation.
Modulation action can be accomplished through two different kinds of actuator.

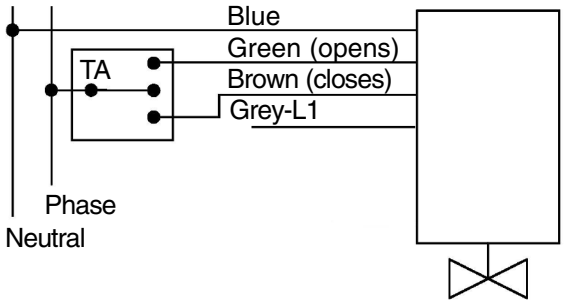
≫ MODULATING THERMOSTAT WITH 2-WIRE CONTROL (to be coupled to 2-POINT actuator with relay) and MODULATING THERMOSTAT WITH 3-WIRE CONTROL (to be coupled to 3-POINT actuator) which alternates opening and closing periods, which can be longer or shorter according to the difference between environmental temperature and set one.

≫ MODULATING THERMOSTAT WITH 3-WIRE CONTROL WITH STILL IN POSITION OF THE VALVE (to be coupled to 3-POINT actuator) which determines a valve opening angle proportional to the difference between environmental temperature and set one.

EXAMPLE:

With an environmental temperature of 15°C and a set one of 20°C, opening angle would be of 90° correspondent to 100% of the fluid passage, when the environmental temperature will increase to 19°C, opening angle decreases to 45°C correspondent to 50% of the fluid passage.
The more the difference between environmental temperature and set one decreases the more the opening angle will decrease, until a difference of 0°C correspondent to closed valve.

ELECTRIC SCHEME OF STANDARD TYPE ACTUATOR WITH MODULATING USE FOR STILL IN POSITION



UNI10348 norm provides different efficienty for different ways for zone regulation. In particular, the following scheme, shows how to a modulating zone regulation correspond higher values of efficiency.

ZONE REGULATION WITHOUT CLIMATIC PRE-REGULATION	Radiators and convectors	Radiant panels isolated from structure	Radiant panels flooded in the structure
"ON - OFF" regulator	0,93	0,91	0,87
Modulating regulator (proportional band 1°C)	0,97	0,96	0,92
Modulating regulator (proportional band 2 °C)	0,95	0,93	0,89

ZONE REGULATION WITHOUT CLIMATIC PRE-REGULATION	Radiators and convectors	Radiant panels isolated from structure	Radiant panels flooded in the structure
"ON - OFF" regulator	0,96	0,94	0,92
Modulating regulator (proportional band 1°C)	0,98	0,97	0,95
Modulating regulator (proportional band 2 °C)	0,97	0,96	0,94

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