

# SINTESI SMART

## MOTORIZED VALVES

### USE

**SINTESI SMART** motorised ball valve can be used in the regulation of:

- heating and cooling systems ( HVAC)
- sanitary water systems
- systems using alternative energies
- solar thermal plants, with suitable ball valve
- general civil plants

Main features of the actuator:

- Voltage or current proportional control
- Power supply 24V AC/DC\*
- Positioning feedback 2...10V
- Fast push connection on ball valves

### Actuators

**SINTESI SMART** actuator is available in the following versions:



### TECHNICAL FEATURES

### SINTESI SMART

Power supply	24V DC / AC $\pm$ 20% 50/60 Hz
Power consumption in operation	3.5 W
Power consumption in rest	0.3 W
Power supply signal cable	Length 80 cm
Nominal torque	6 Nm
Max torque	8 Nm
Positioning signal	0-10V DC / 2-10V DC / 0-20 mA / 4-20 mA
Impedence of positioning signal	100 k $\Omega$ voltage signal / 500 $\Omega$ current signal
Positioning signal range	-0.5V ... 12V
Dead band on positioning signal	2%
Positioning feedback signal	DC 2-10V
Positioning feedback's max voltage	1 mA
Operation angle	95°
Operating times	30 s / 60 s / 120 s
Position accuracy	$\pm$ 3%
Sound power level motor (1-meter distance)	40 dB (A)
Position indicator	rotating arrow
Installation	closed environment protected from frost
Ambient temperature	+5°C ... +50°C
Ambient humidity	max 95% u.r, no condensation
Fluid temperature	please check the technical features of ball valves
Class protection	IP54
Insulation class	II - double insulation <input type="checkbox"/>
Required Maintenance	none
Certification	CE

### WARNINGS

The device is designed for being used in heating, cooling, ventilation systems and generally in civil plants with features compliant with the above mentioned specification. A different use beyond the forecasted fields of application is not allowed.

(\*) 85...240V 50 Hz version available on request



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# SINTESI SMART

## MOTORIZED VALVES

### FUNCTIONS

#### • Proportional positioning

**SINTESI SMART** motorised valve receives a positioning analogical control input, which is translated from the actuator into a proportional angular rotation of the valve. Therefore, for instance with an analogical signal between 0V and 10V, the 5V control input positions the actuator on a 45° angle, corresponding to the 50% of nominal operation of the valve.

#### • Auto-calibration

The actuator is designed for realising a calibration cycle every 2000 reverse controls of the rotation sense.

The process implies the reaching of the calibration point, which is positioned at the complete closing of the actuator.

When the process is finished, the actuator re-starts its working and the count is zeroed.

Warning: the process is not realised if the actuator reaches the closing position before 2000 reverse controls

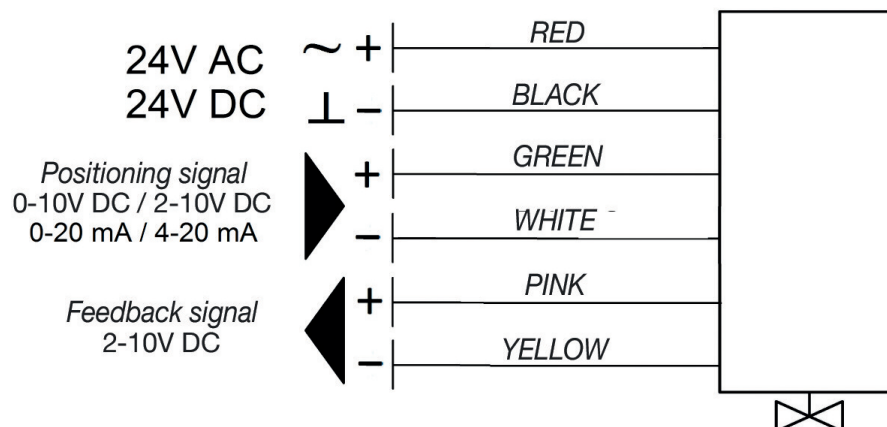
#### • Positioning feedback

Positioning feedback is a voltage analogical signal, which is electronically generated, between 2...10 V, proportional to the angular positioning reached by the actuator.

This signal can be used together with monitoring systems or for controlling another motorised valve.

Warning: The system does not guarantee the correspondence of the feedback value and of the real position of the ball valve.

### ELECTRICAL CONNECTION



### NOTES

Versions with positioning voltage signal may be connected in parallel.

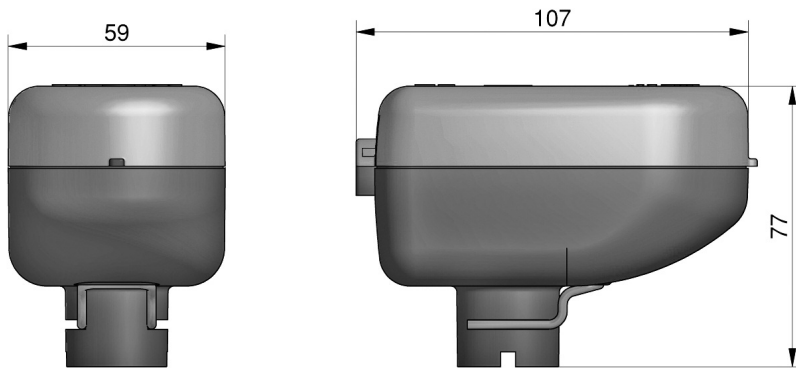
The wire connections must be realised into an electric box granting a IP 54 or higher class protection.



# SINTESI SMART

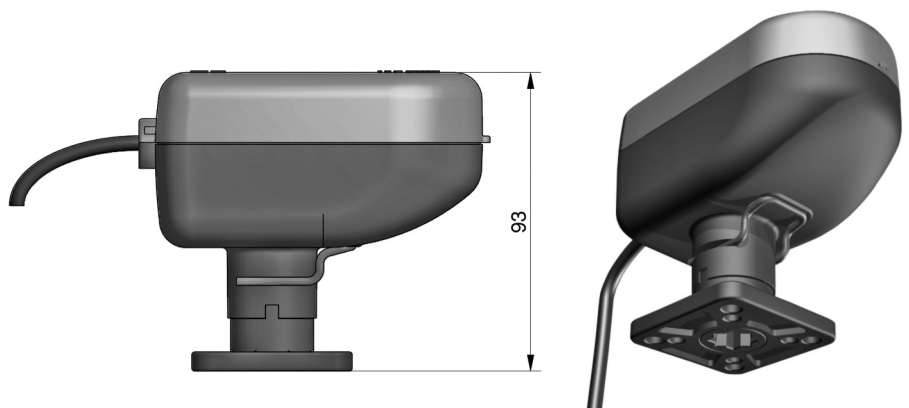
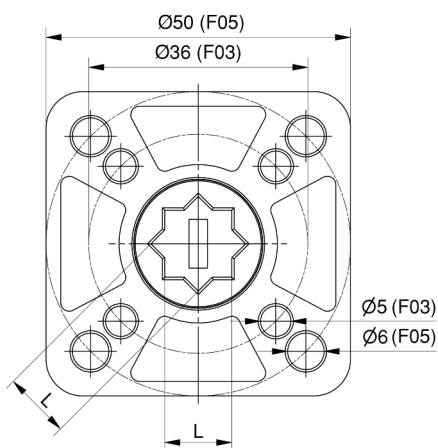
## MOTORIZED VALVES

### ACTUATOR'S DIMENSIONS



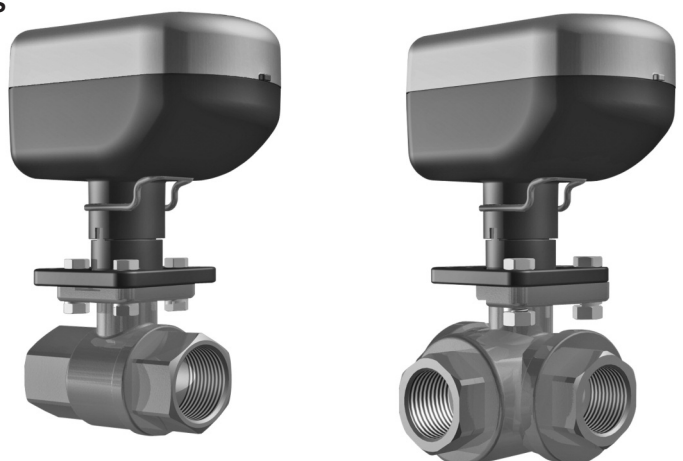
### ISO 5211 CONNECTION KIT

This is an insulation kit allowing the coupling of a **SINTESI SMART** actuator with ISO 5211 F03 and F05 ball valves



ISO connection	L
F03	9
F05	11

### EXAMPLES



AVAILABLE ON REQUEST



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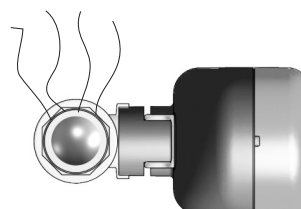
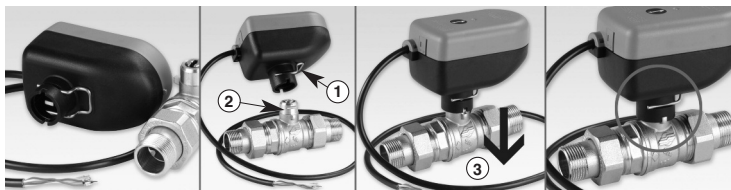
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# SINTESI SMART

## MOTORIZED VALVES

### CONNECTION SEQUENCE OF SINTESI TO A BALL VALVE WITH QUICK CONNECTION

1. Coupler spring;
2. Coupler spring's site;
3. Once the output rod of the actuator is inserted in the female part of the body valve, rotate the first so that both the fixed joints are aligned. After that, press the actuator on the ball valve until the optimal connection is reached by the spring's seal.



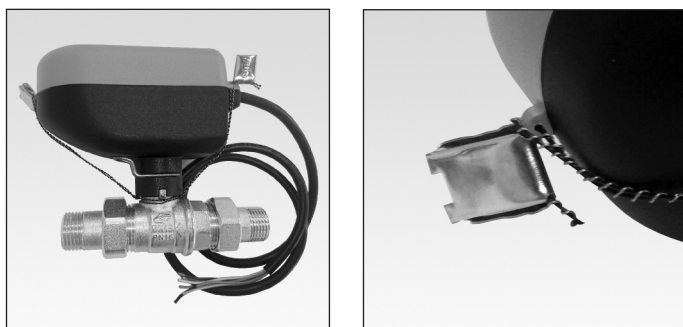
RECOMMENDED POSITION

### INSTALLATION POSITION SUGGESTED IN CASE OF HOT OR COLD FLUID CIRCULATION.

For additional information, please see the user manual.

### SEAL OF THE MOTORISED VALVE

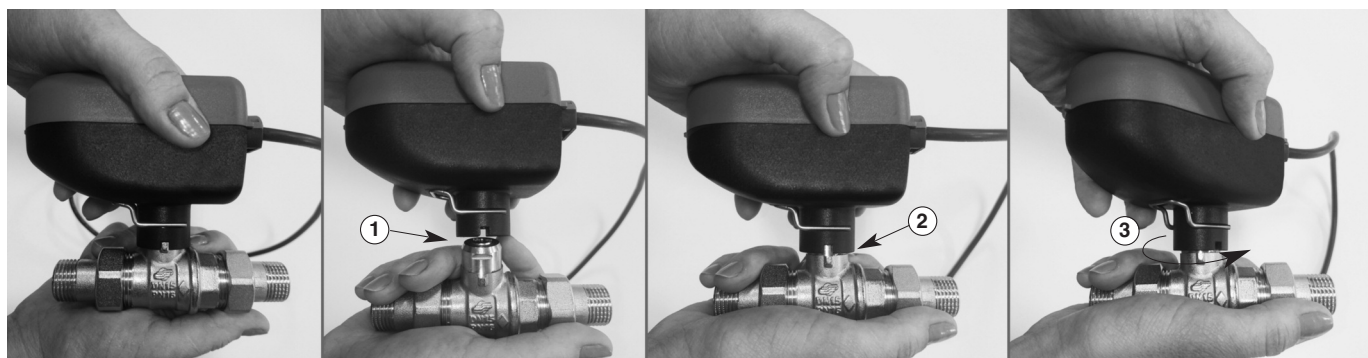
It is possible to seal the motorised valve by appropriate seals ( not included), in order to avoid the dismantling of the actuator from the ball valve.



### MANUAL OVERRIDE

Should it be necessary, it is possible to manually open/close the ball valve as it follows:

1. Free the actuator from the ball valve;
2. Put the actuator on the ball valve without pushing;
3. Proceed with the requested manual operation by using the actuator as a handle.



# SINTESI SMART

## MOTORIZED VALVES

### FAST CONNECTION **Body valve**



2-WAY • FULL FLOW  
MALE-MALE CONNECTION  
Ø 1/2" • 3/4" • 1"



2-WAY • FULL FLOW  
MALE-FEMALE CONNECTION  
Ø 1/2" • 3/4" • 1"



3-WAY DIVERTER / MIXER  
FULL FLOW  
Ø 1/2" • 3/4" • 1"



BY-PASS  
Ø 1/2" • 3/4" • 1"



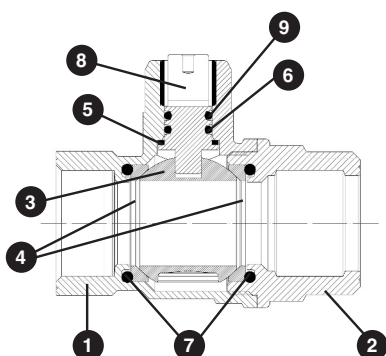
2-WAY • FULL FLOW  
MALE-FEMALE CONNECTION  
Ø 3/4"



$Kv_S = 2,5 \text{ m}^3/\text{h}$      $Kv_S = 4 \text{ m}^3/\text{h}$   
2-WAY • FULL FLOW  
MALE-MALE CONNECTION  
WITH REGULATION DISK  
Ø 1/2"

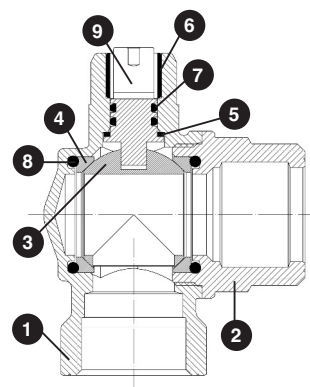
All male connections are provided with threaded union tangs, an extremely important advantage during the installation phase, allowing the user to orientate the body valve and therefore the actuator and making the maintenance operations easier, if necessary.

Sphere shutter assures the best hydraulic seal and limited charge loss.



#### MATERIALS USED FOT 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.
5 ANTI-FRICTION ROD	P.T.F.E.
6 O-RING ROD	EPDM PEROX
7 BALANCE O-RING	EPDM PEROX
8 CONTROL	BRASS CW617N UNI EN 12165
9 ANTI-FRICTION GASKET	P.T.F.E.



#### MATERIALS USED 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.
5 ANTI-FRICTION GASKET	P.T.F.E.
6 ANTI-FRICTION ROD	P.T.F.E.
7 O-RING	EPDM PEROX
8 O-RING	EPDM PEROX
9 CONTROL	BRASS CW617N UNI EN 12165



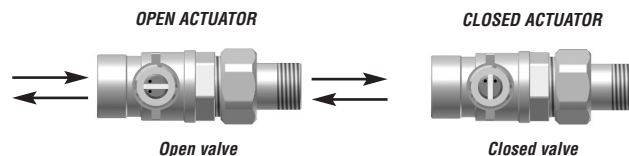


# SINTESI SMART

## MOTORIZED VALVES

### 2-WAY Valve body

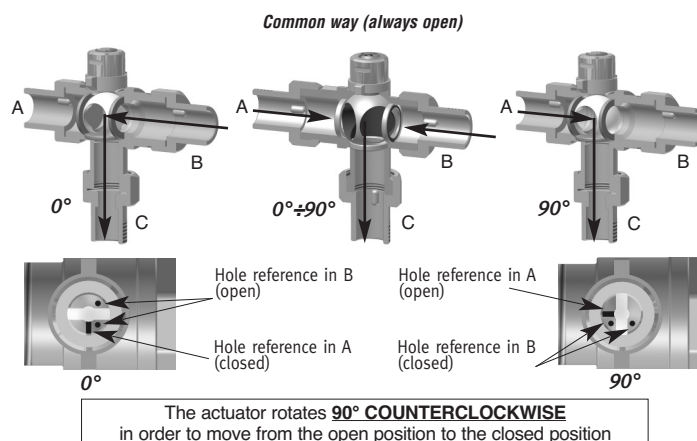
Body valve can be installed independently on the flow direction.  
M/M and M/F versions are also available.



### 3-WAY DIVERTER/MIXER Valve body

It is characterized by a 3-hole-sphere presenting a hole orientated to the common way (always open) and to other two orthogonal holes on the first and among them. When one of the latter two holes is positioned on one or two input ways, the second input way results closed. Thanks to a 90° sphere rotation, the second hole is orientated on the second input way, closing the first. The 3-hole body valve is characterized by a condition where the 3 ways are all communicating during the rotation of the sphere from one deviating condition to the other. When the operation is realized, the valve becomes again a deviator, therefore the use of 3-way-3-hole-deviating valve is suggested when the deviated ways can communicate among each others.

This is generally the case of heating systems. The condition previously described allows the valve to realize the mixing. On the control pin two symbols appear, **a couple of points** and **a dash** indicating which way is communicating with the common way.



### BY-PASS Valve body

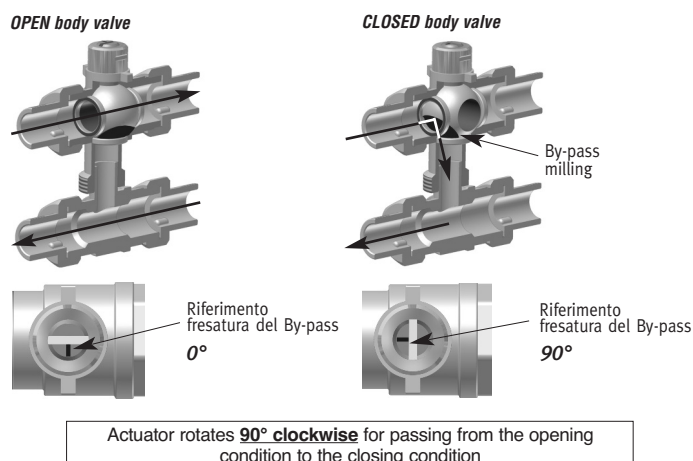
In the 3-way valves with TEE OF BY-PASS, the shutter is constituted of a sphere with a passing hole and a facing.

A peculiar feature distinguishing the 3-way body valve with TEE OF BY PASS from the 2-way sphere is the presence of a facing allowing the re-circulation of a capacity quote to the return line, with closed valve.

In the 3 way body valve with TEE BY PASS it is thus important to recognize the flow direction.

**On the control pin there is a symbol (dash) indicating the position of the facing of the sphere that must always be orientated to the direction of the arriving flow, with closed valve.**

Distance between centres and between the delivery way and return way can be regulated from 50 to 60 mm for 1/2" and 3/4" body valve and from 55 to 60 mm for 1" body valve.



### 2-WAY Valve body with ADJUSTMENT DISK

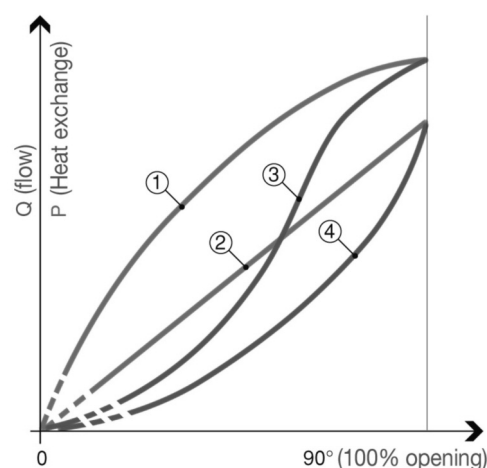
This body valve permits to have a motorised 2-way sphere valve with an equi-prportional circulation curve; its functioning is described below:

Generally, the thermal exchange of the capacity is described by a typically not linear relationship, whose tendency is to saturate when the capacity increases.

During the initial phase, run is partially attenuated from the natural opening characteristic of the sphere valve, while during the end phase of the opening an inversion can be noticed, an inversion that does not allow to complete the compensation action.

**COMPARATO REGULATION DISK** brings to an assembly characteristic valve of equi-proportional valve type. Thanks to the new feature, the compensation action gets nearly linear run between the entity of the thermal exchange and the opening degree of the valve.

It is quite clear that by acting on a constant gain actuator, stability is increased. The presence of the regulation disk reduces rate coefficient to values that are typical of traditional regulation valves, with same dimensions.



1. Thermal exchange with standard valve;
2. Thermal exchange with an equi-proportional valve;
3. Standard characteristic curve of capacity;
4. Equi-proportional characteristic curve of capacity.



# SINTESI SMART

## MOTORIZED VALVES

We notice that the presence of the regulation disk leads to a reduction of the capacity coefficient to values belonging to the traditional regulation valves on equal dimensions.

Thanks to the regulation disk, **SINTESI SMART** valve is included among the regulation valve sector, with all related advantages:

- High stability of the control ring;
- Capacity coefficient similar to usual regulation valve capacity;
- Equipercentage-type standard feature;
- Minor activation operations carried out by the actuator.

Key:

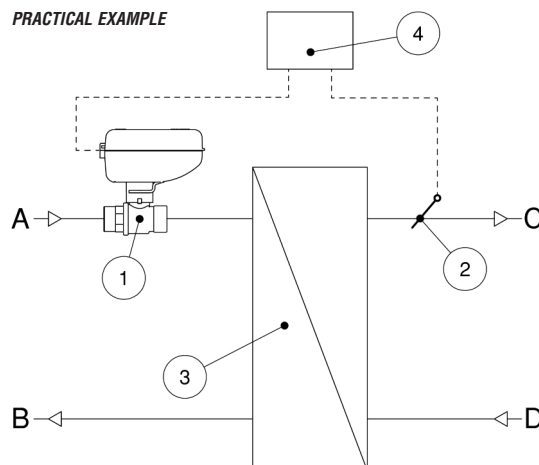
1. **SINTESI SMART** 3-point-motorised valve with regulation disk;
2. Temperature probe;
3. Heat exchanger;
4. Electronical regulator.

- A. Primary fluid delivery;  
B. Primary fluid return;  
C. Secondary fluid delivery;  
D. Secondary fluid return.

**WARNING:** the 2-way-motorised valve with regulation disk cannot be installed not considering the flow direction:

once the position of the disk inside the body valve (please see the pictures), **please install the disk upstream of the valve sphere, with respect to the flow direction.**

PRACTICAL EXAMPLE



$K_v_s = 2,5 \text{ m}^3/\text{h}$



$K_v_s = 4 \text{ m}^3/\text{h}$



- **3-WAY M/M/M** with tangs
- **BRASS** body valve
- full bore

- **3-WAY BY-PASS** with tangs
- **BRASS** body valve
- full bore

- **2-WAY M/F** with tang
- **BRASS** body valve
- full bore

- **2-WAY M/M** with tangs
- **BRASS** body valve
- full bore

- **2-WAY M/F** with tang
- **BRASS SQUARE** body valve
- full bore



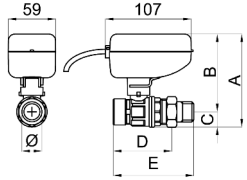
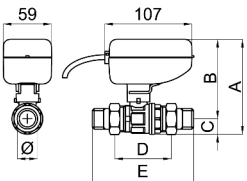
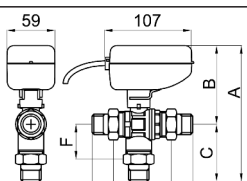
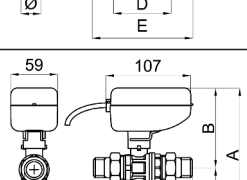
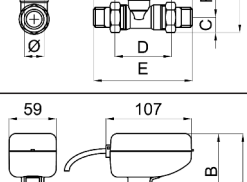
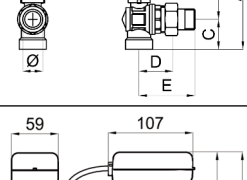
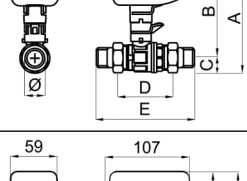
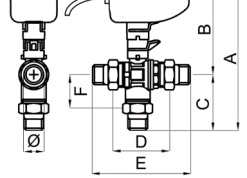
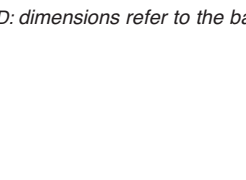

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# SINTESI SMART

## MOTORIZED VALVES

### OVERALL DIMENSIONS

MODEL	DN	Ø TANGS	Ø BALL VALVES	A	B	C	D	E	F
 <b>2 Way male female</b>	15	1/2"	3/4"	111	94	17	66	93	
	20	3/4"	1"	120	100	20	70	100	
	25	1"	1"1/4	126	103	23	79	114	
 <b>2 Way male/male</b>	15	1/2"	3/4"	111	94	17	63	118	
	20	3/4"	1"	120	100	20	67	128	
	25	1"	1"1/4	126	103	23	77	147	
 <b>2 Way male/male with REGULATING DISC</b>	15	1/2"	3/4"	111	94	17	63	118	
	20	3/4"	1"	120	100	20	67	128	
	25	1"	1"1/4	126	103	23	77	147	
 <b>3 Way Diverter/ Mixer 3-hole ball</b>	<i>F: dimensions refer to the ball valve without tangs and caps.</i>								
	15	1/2"	3/4"	159	94	65	63	118	37
	20	3/4"	1"	170	100	70	67	128	40
 <b>3 Way Diverter/ Mixer 3-hole ball</b>	25	1"	1"1/4	181	103	78	77	147	43
 <b>By-pass</b>	15	1/2"	3/4"	161 171	94	17	63	118	50 60
	20	3/4"	1"	170 180	100	20	67	128	50 60
	25	1"	1"1/4	181 186	103	23	77	147	55 60
 <b>2 Way SQUARE body valve</b>	20	3/4"	1"	138	100	38	40	70	
 <b>2 Way male/male</b>	<b>FOR SOLAR THERMAL PLANTS</b>								
	15	1/2"	3/4"	135	118	17	63	118	
	20	3/4"	1"	144	124	20	67	128	
 <b>2 Way male/male</b>	25	1"	1"1/4	150	127	23	77	147	
 <b>3 Way Diverter/ Mixer</b>	<b>FOR SOLAR THERMAL PLANTS</b>								
	15	1/2"	3/4"	183	118	65	63	118	37
	20	3/4"	1"	194	124	70	67	128	40
	25	1"	1"1/4	205	127	78	77	147	43

D: dimensions refer to the ball valve without tangs and caps.

BALL VALVE CONNECTION (with caps and tangs)



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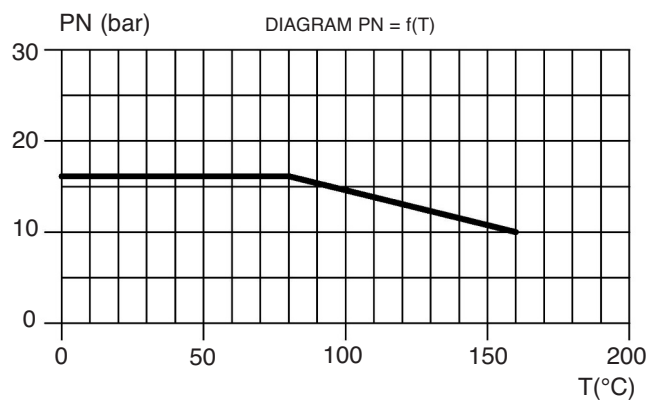
# SINTESI SMART

## MOTORIZED VALVES

### FLUID MECHANICAL CHARACTERISTICS

$Kv_S$  (m<sup>3</sup>/h with  $\Delta p = 100\text{kPa} = 1\text{bar}$ )

MODEL	Ø	$Kv_S$
2 Way	1/2"	16,3
	3/4"	29,5
	1"	43
2 Way with REGULATING DISC	1/2"	2,5
	1/2"	4
SQUARE body valve	3/4"	11,5
	1/2"	6
Diverter/ Mixer	3/4"	11,5
	1"	18,3
By-pass	1/2"	16,3 / 0,8
	3/4"	29,5 / 1,9
	1"	43 / 2,9



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

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

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

### PRESSURE

• Nominal operating	16 bar
• Max. differential operating	16 bar

### FLUIDS      Usable fluids

Water and fluids compatible with EPDM and P.T.F.E. • Other fluids on request

### TEMPERATURES

• Min.	+5 °C
• Max.	+100 °C

SOLAR THERMAL PLANTS body valve \*

+5 °C
+160 °C

\* see page 10



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# SINTESI SMART

## MOTORIZED VALVES

### SOLAR THERMAL PLANTS

**SINTESI SMART** motorised valve offer a wide range of body valve provided with special gaskets suitable for the fluid circulation at high temperatures (max 160°). When it is paired with a spacer a complete thermal cutting between the body valve and the actuator is realized, allowing the installation of the **SINTESI SMART** motorised valve into thermal solar plants, where a water circulation at high temperature is usually detected.

- a** **SINTESI SMART** motorised valve with spacer and a 2 way body valve, suitable for high temperatures (max 160°).
- b** **SINTESI SMART** motorised valve with spacer and MIXING/DEVIATING body valve, suitable for high temperatures (max 160°).



# SINTESI SMART

MOTORIZED VALVES



# SINTESI SMART

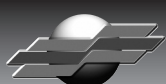
MOTORIZED VALVES



## GLOSSARY

- Pickup torque: Torque which can be occasionally provided by the actuator, with no risk of breaks nor permanent deformation of the actuator components.
- $K_v_S$ : Fluid coefficient when the valve is completely open (2-way valve) or when the flow is completely diverted to a perpendicular (3-way valve).
- PN: Nominal operating pressure.
- $\Delta p_{max}$ : Maximum differential operating pressure.

UPDATED DATA SHEETS AVAILABLE ON THE WEBSITE [www.comparato.com](http://www.comparato.com)



**HYDROTHERMAL SYSTEMS  
COMPARATO NELLO SRL**

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