

# SINTESI

## MOTORISED BALL VALVE

**USE**

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

- zoned heating/cooling systems
- water plants, with suitable ball valve
- alternative energy plants
- solar thermal plants
- general automation plants

**SINTESI** actuator has an absolute innovative “pressure” “push fast” connection system with the ball valve allowing an extremely fast and reliable connection.

These features make the installation and possible maintenance operations easy and fast to do.

The Bi-directional type may be provided with the new “ALL IN ONE” system, which allows to directly choose the 2 or 3 point electric command during the installation steps, thanks to a selector on the actuator.

INSTRUCTION MANUAL



### Actuators

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



TECHNICAL FEATURES	Uni/Bi-directional <i>patented</i>	Bi-directional	
			<b>ALL IN ONE, <i>patented</i></b> with selector on the border of the actuator
Electric command	2 points	3 points	3 points / 2 points
Price list root	SR...	SS...	SY...
Connection with ball valve	push fast connection, <i>patented</i>		
Functioning (please see also dedicated sections)	ON/OFF	modulating working ON/OFF	
Rotation	90°, clockwise and anticlockwise		
Suitable ball valve (as far as diameters are concerned, please see the “Ball Valve” section)	2 ways		
	-	2 ways with regulation disk	
	-	3 ways – deviator	
	-	3 ways – mixing	
	3 ways with TEE by-pass		
Position indicator	rotating arrow, indicating the sphere position		
Engine	unidirectional	bi-directional	
Power supply	230 V ; 50/60 Hz 24 V ; 50/60 Hz		
Power supply wire – length	80 cm		
Operating times ( $\triangle 90^\circ$ ) and static torque	45 seconds; 8 Nm	35 seconds; 8 Nm	
		15 seconds; 5 Nm	
Power consumption	3,9 VA		
Electrical capacity of the output phase to the grey wire	1 A resistive		
Electrical capacity of the additional micro switch	1 A resistive ; 250 V		
Environment temperature	+5°C ÷ +50°C *		
Fluid temperature	please see page 10		
Class protection	IP 54		
Insulation class	II - double insulation □		
External shell material	polyamide PA 6, 30% fibre glass		
Required maintenance	none		
Certification	CE		

\* for lower temperatures please contact our Technical



# SINTESI

## MOTORISED BALL VALVE

### ELECTRICAL CONNECTION

#### 2 POINT CONTROL – ON/OFF (SWITCH) Uni/Bi-directional and Bi-directional actuators

- blue wire: neutral;
- brown wire: **fixed** closing phase;
- green wire: opening phase.

The green wire phase can be supplied by a switch.

**More than one actuators can be controlled by a single electrical control.**



Figures represent the electrical scheme of the **2 POINT** actuator.

Electrical scheme is shown in the opening and closing conditions respectively.

The power supply with brown wire phase brings to the closing of the valve (electrical auto closing), while the green wire supply allows the opening.

#### 3 POINT CONTROL - ON/OFF (DEVIATOR) Bidirectional Actuator

- blue wire : neutral;
- brown wire; closing phase;
- green wire: opening phase.

Phase must be deviated to the brown or to the green wire.

**Each actuator must be operated by a single electrical control.**



Figures represent the electrical scheme of the **3 POINT - ON/OFF** control actuator.

Electrical scheme is shown in the opening and closing conditions respectively.

The power supply with brown wire phase brings to the closing of the valve (electrical automatic closing), while the green wire supply allows the opening.



# SINTESI

## MOTORIZED BALL VALVE

### 3 POINT CONTROL - MODULATING WORKING (2 SWITCHES) Bidirectional actuator

- blue wire : neutral;
- brown wire: closing phase;
- green wire: opening phase.

The phase can be deviated to the brown wire or to the green wire or to none of them, allowing the valve to realize the partial opening necessary for the modulating working. This solution has to be applied to all uses characterized by regulation.

**Each actuator must be operated by a single electrical control.**



Figures represent the electrical scheme of the **3 POINT-Modulating** working actuator. Electrical scheme is shown in the opening and closing conditions respectively.

The power supply with brown wire phase bring to the closing of the valve (electrical automatic closing), while the green wire supply allows the opening. The lack of the phase on both mentioned wires allows the actuator to position itself in middle positions between the complete closing and the complete opening, realizing a modulating working functioning.

#### GENERAL NOTES

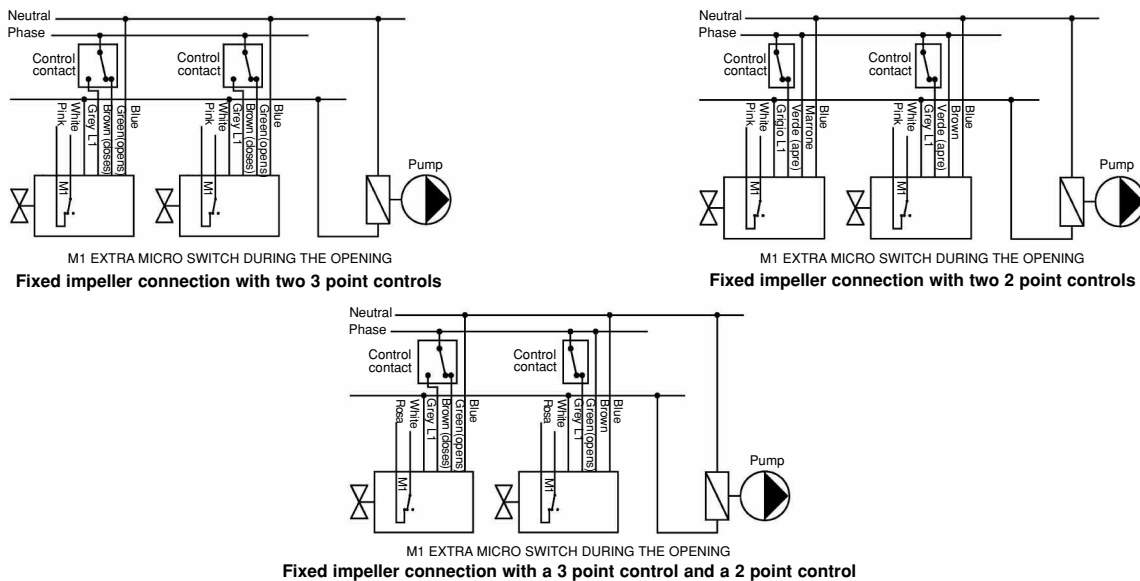
**When there is a power supply fault, controls introduced until that moment keep the actuator in the position it was when the fault occurred.**

**SINTESI** actuators are characterized by:

- outing phase in the grey wire with completely open valve to use as remote control (the voltage is the same of the actuator's). Its use is optional (for instance; realized opening signal, drive of the impeller relay, etc.).
- an extra micro switch during the opening (white and rose wires, **clean contact**) resulting completely closed when the valve is open. Its use is optional (for instance; realized opening signal, drive of the impeller relay, boiler control, signalling to PLC, etc.)

**NOTE:** The power supply wire connection has to be realized inside the shunt box which guarantees an IP 54 or higher class protection.

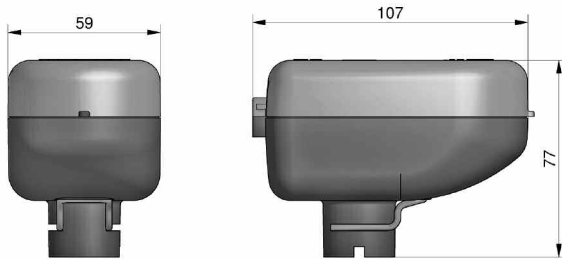
#### ELECTRICAL CONNECTIONS - EXAMPLES



# SINTESI

## MOTORIZED BALL VALVE

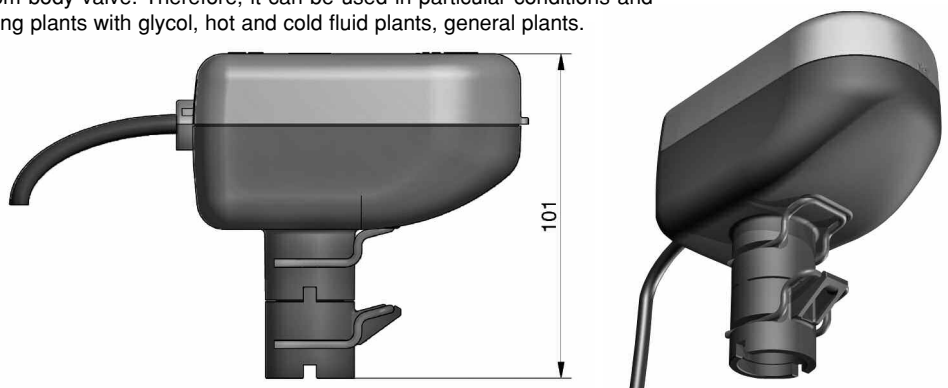
### ACTUATOR OVERALL DIMENSIONS



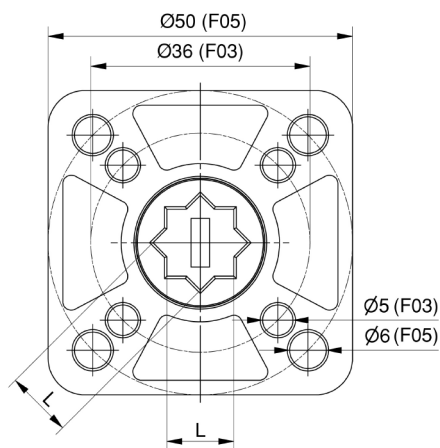
### SPACERS

**SINTESI** actuator may be provided with spacers for allowing valve insulation and the insulation of the actuator from thermal conduction deriving from body valve. Therefore, it can be used in particular conditions and temperature, such as, for instance, refrigerating plants with glycol, hot and cold fluid plants, general plants.

This spacer is also needed in bodies with **RAPID CONNECTION** for **SOLAR PLANTS** (with **max. temperature 160°** - price list root SC..).



We have now available also another type of spacer, that, in addition to its isolation and insulation characteristics, makes the **SINTESI** actuator suitable for valve bodies characterized by ISO 5211 F03 and F05.



Connection ISO	L
F03	9
F05	11



In thermal solar plants, **SINTESI** motorised valve with ISO connection 5211, with ISO spacer, may be used.

This product allows the water circulation at very high temperatures (max 160°), which are often reached in hydraulic solar plants.

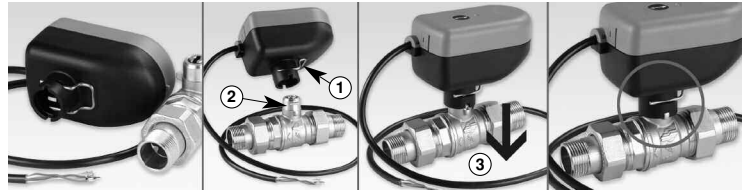


# SINTESI

## MOTORIZED BALL VALVE

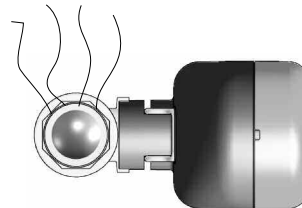
### CONNECTION SEQUENCE OF SINTESI TO A BALL VALVE WITH QUICK CONNECTION

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.



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

For additional information, please see the user manual.



POSIZIONE CONSIGLIATA

### FAST CONNECTION Body valve



2 WAY M/M  
FULL BORE  
Ø 1/2" • 3/4" • 1"



2 WAY M/F  
FULL BORE  
Ø 1/2" • 3/4" • 1"



3 WAY VERTICAL  
FULL BORE  
Ø 1/2" • 3/4" • 1"



3 WAY BY TEE BY PASS  
Ø 1/2" • 3/4" • 1"



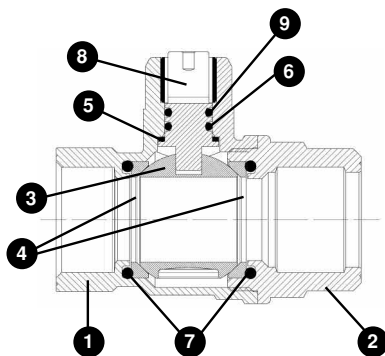
2 WAY M/F  
FULL BORE  
Ø 3/4"



$Kv_S = 2,5 \text{ m}^3/\text{h}$      $Kv_S = 4 \text{ m}^3/\text{h}$   
2 WAY M/M  
FULL BORE  
WITH REGULATION DISK  
Ø 1/2"

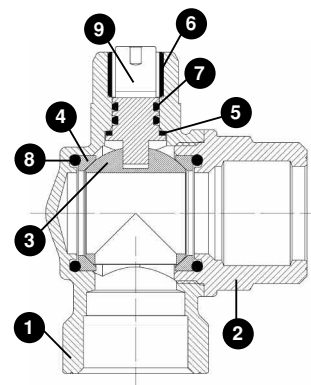
All male connections are provided with threaded union tangs, an extremely important advantage during the installation phase, allowing the user to orientate the body valve and therefore the actuator and making the maintenance operations easier, if necessary.

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

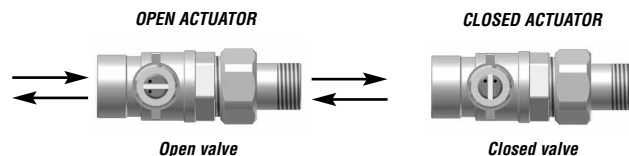


# SINTESI

## MOTORISED BALL VALVE

### 2 WAY Body valve

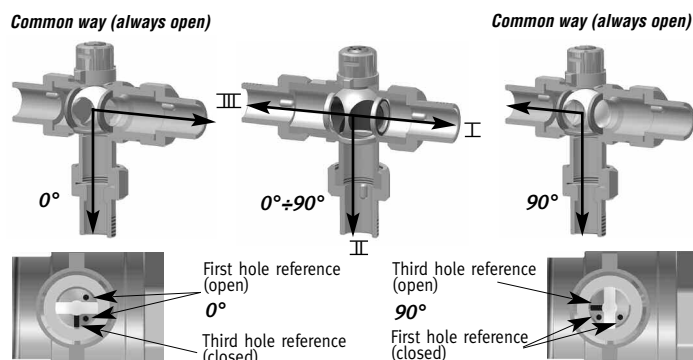
Body valve can be installed independently on the flow direction.  
M/M and M/F versions are also available.



### deviating / mixing Body valve

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.



### 3 WAY Body valve with TEE OF BY-PASS

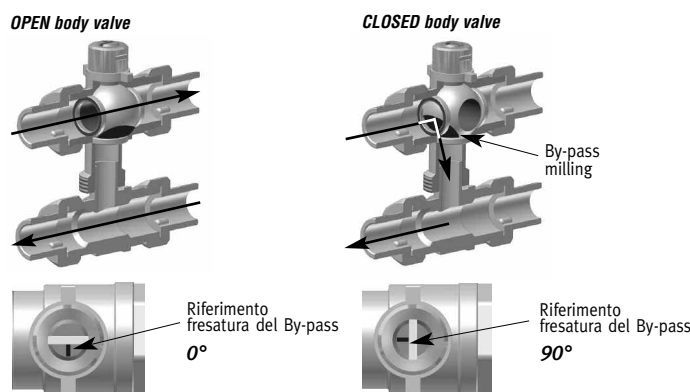
In the 3-way valves with TEE OF BY-PASS, the shutter is constituted of a sphere with a passing hole and a facing.

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.



Actuator rotates **90° clockwise** for passing from the opening condition to the closing condition

### 2 WAY Body valve with REGULATION DISK

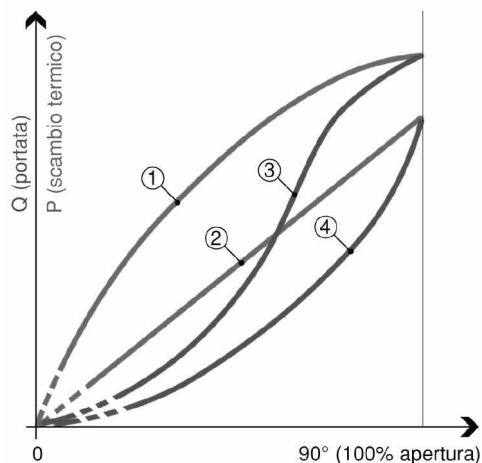
This body valve permits to have a motorised 2-way sphere valve with an equi-prortional circulation curve; its functioning is described below:

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

## MOTORIZED BALL VALVE

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** 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:

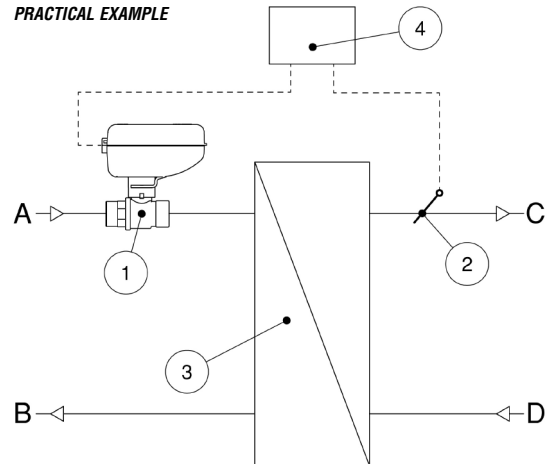
1. **SINTESI** 3-point-motorised valve with regulation disk;
2. Temperature probe;
3. Heat exchanger;
4. Electronical regulator.

- 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



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



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



# SINTESI

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



- **3-WAY M/M/M** 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 vie M/F** con codolo
- **BRASS SQUARE** body valve
- full bore



COMPARATO NELLO SRL

QUALITY SYSTEMS CERTIFIED UNI EN ISO 9001: 2008

# SINTESI

## MOTORIZED BALL VALVE

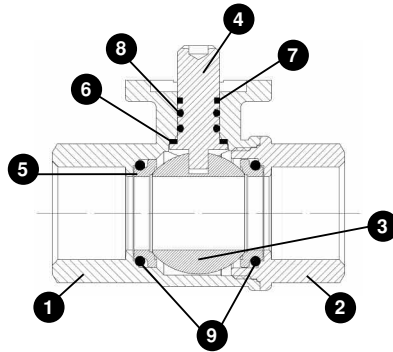
### ISO 5211 CONNECTION **Body valve**

#### 2 WAY **Body valve**

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



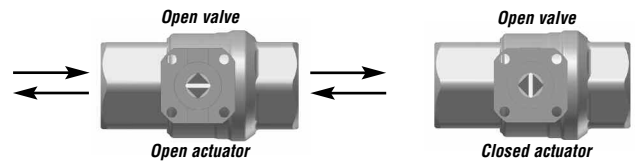
2 WAY BRASS - TOTAL PASSAGE  
Ø 1/4" • 3/8" • 1/2" • 3/4"



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

#### USED MATERIAL FOR 2 WAY - ISO 5211 BODY VALVE

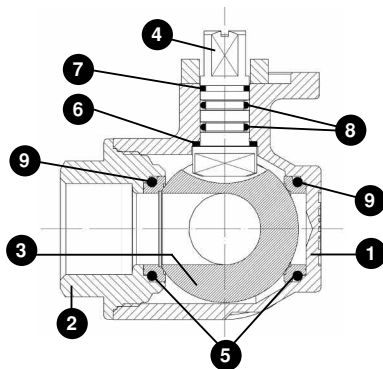
1	BODY	BRASS	CW617N UNI EN 12165
2	COUPLING	BRASS	CW617N UNI EN 12165
3	SPHERE	BRASS	CW617N UNI EN 12165
4	CONTROL ROD	BRASS	CW617N UNI EN 12165
5	BALL SEAL	P.T.F.E.	
6	ANTIFRICTION SEAL	P.T.F.E.	
7	ANTIFRICTION SEAL	P.T.F.E.	
8	O-RING	FKM	
9	O-RING	FKM	



#### 3 WAY **Body valve**



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

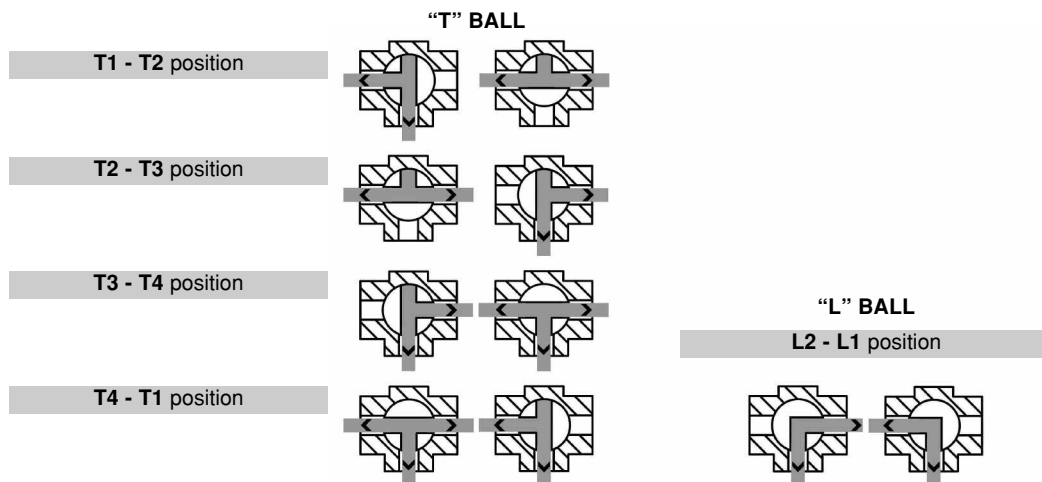


#### USED MATERIAL FOR 3 WAY HORIZONTAL ISO 5211 BODY VALVE

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

SINTESI actuator with ISO 5211 spacer can be paired to 3 way body valves with two different sphere and 5 hole positions.

#### Positions layout and ball holes movement:

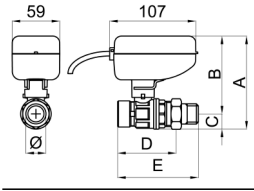
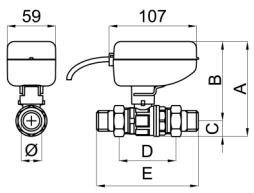
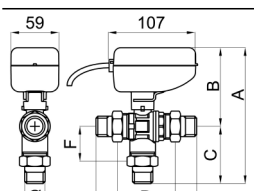
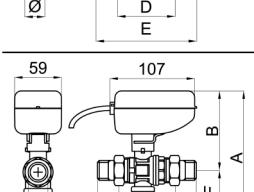
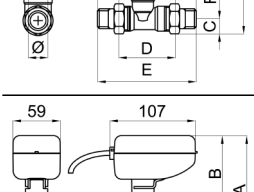




# SINTESI

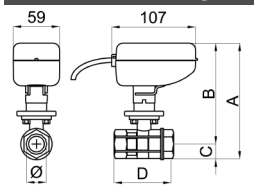
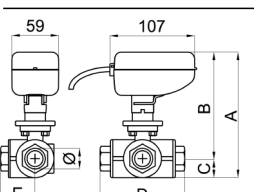
## MOTORIZED BALL VALVE

### 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> <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>Diverter/ mixer</b>		15	1/2"	3/4"	159	94	65	63	118	37
		20	3/4"	1"	170	100	70	67	128	40
		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	

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

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

MODEL		DN	Ø	A	B	C	D	E		
 <b>2 Way ISO 5211</b>		8	1/4"	143	126	17	67			
		10	3/8"	143	126	17	67			
		15	1/2"	143	126	17	67			
		20	3/4"	148	128	20	76			
 <b>3 Way ISO 5211</b>		8	1/4"	141	124	17	67	34		
		10	3/8"	141	124	17	67	34		
		15	1/2"	152	132	20	77	39		
		20	3/4"	161	137	24	87	44		



# SINTESI

## MOTORISED BALL VALVE

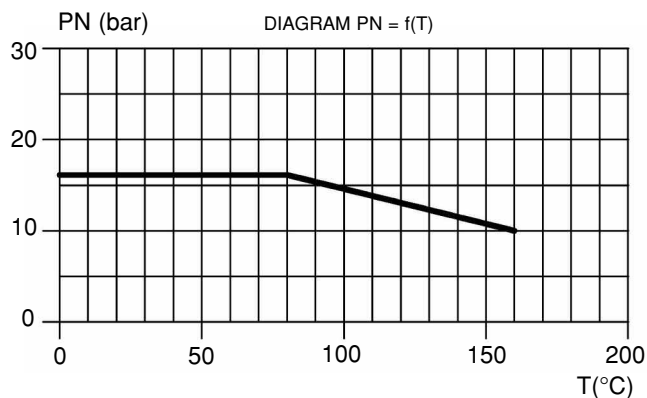
### FLUID MECHANICAL CHARACTERISTICS

$Kv_S$  (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
	1/2"	16,3 / 0,8
By-pass	3/4"	29,5 / 1,9
	1"	43 / 2,9

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

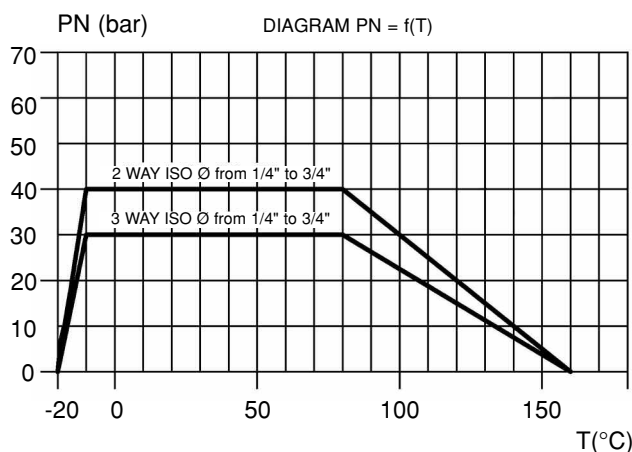
MODEL	Ø	$Kv_S$
2 Way BRASS ISO 5211	1/4"	5,4
	3/8"	6
	1/2"	16,3
	3/4"	29,5
3 Way BRASS ISO 5211	1/4"	2,8
	3/8"	3
	1/2"	3,9
	3/4"	7,9



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

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

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



### PRESSURE

	Valvola 2/3 VIE/3 VIE con TEE di by-pass	Valve 2 WAY ISO 5211	Valve 3 WAY ISO 5211	SQUARE Body valve
• Nominal operating	16 bar	40 bar	30 bar	16 bar
• Max. differential operating	16 bar	16 bar	16 bar	16 bar

FLUIDS      *Fluido utilizzabile*      Water and fluids compatible with EPDM and TEFLON • Other fluids on request

### TEMPERATURES

	Spacer	Spacer + ISO 5211 body valve / SOLAR THERMAL PLANTS body valve *
• Min.	-10°C	-20°C
• Max.	+100°C	+110°C

\* see page 11



# SINTESI

## MOTORISED BALL VALVE

### SOLAR THERMAL PLANTS

**SINTESI** 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** motorised valve into thermal solar plants, where a water circulation at high temperature is usually detected.

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



# SINTESI

## MOTORISED BALL VALVE



### GLOSSARY

- Pickup torque: Torque which can be occasionally provided by the actuator, with no risk of breaks nor permanent deformation of the actuator components.
- $Kv_S$ : 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.

DATA SHEET



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



**HYDROTHERMAL SYSTEMS**  
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