# Diamant 2000 MOTORIZED BALL VALVES ISO 5211 CU US LISTED IND. CONT. EQ IND.

#### USE

**Diamant 2000** motorized valve has its peculiar use in interception and regulation of:

- zone heating systems
- systems that make use of alternative energy
- industrial systems in general using hot and cold fluids
- automated systems in general



#### <u>Servocontrol</u>

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

≫ 3-POINT without relay (deviator)

terminal 1 neutral, phase on terminal 2 open, deviated to terminal 3 close (see wiring diagram).

Each servocontrol must be engaged using a single control

>> 2-POINT with relay (switch)

terminal 1 neutral, terminal 2 fixed phase, terminal 3 control phase for opening (see wiring diagram).

Several servocontrols may be engaged from a single control

Both versions have an ON - OFF function (fully open or fully closed)
The 3-POINT version without relay may be set to intermediate positions using a suitable command.

For modulating regulations refer to page 12.

The **Diamant 2000** servocontrol features:

- power to terminal 4 with fully open valve to be used as a remote control (with indication of opening, pump relay engagement etc)
- power to terminal 5 with valve fully closed to be used as a remote control (closure indication)

#### **OPTIONAL**

- manual opening on the servocontrol to engage the valve in the event of an electrical power failure or emergency.
- an auxiliary opening micro-switch (clean contact) which is electrically closed when the valve is open.
   optional use (opening complete indication, pump relay command, boiler command, PLC signal etc).
- an auxiliary closure micro-switch (clean contact) which is electrically closed when the valve is closed.
   optional use (closure completed indication, relay command, PLC signal etc).
- two micro-relays one for opening and one for closing.
- external components made of AISI 303 GVR and in OT 58 brass for the use of the servo-control in particularly difficult conditions (PROTECTED TYPE)

Thanks to the high quality of this servo-control it is widely used in a variety of industrial fields for the regulation of fluids in the preservation field, as well as in the food sector and in glycol passage.

**NOTE** For possible outdoor installations, if directly exposed at **SUN RAYS / BAD WEATHER**, a **SIMPLE PREVIOUS FURTHER PROTECTION** is recommended **(COVER D)**.

#### SERVOCONTROL TECHNICAL FEATURES

- Electrical motor: dual-direction
- Electrical power supply: 230/110/24V 50/60 Hz (on request: 24V DC)
- Manoeuvre time ( \$\alpha\$ 90°): 35 sec. Torque on the control rod: 11 Nm

Manoeuvre time ( 180°): 70 sec. Torque on the control rod: 11 Nm

Quotation on request ( △ 90°): 4 sec. 5 Nm • ( → 90°): 12 sec. 12 Nm. • ( → 90°): from 110 to 330 sec. 16 Nm max

Absorbed power: 4,8 VA (version 230V 50 Hz)

5,1 VA (version 110V 50 Hz)

5,2 VA (version 24V 50 Hz)

- Degree of electrical protection: IP 65
- 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.

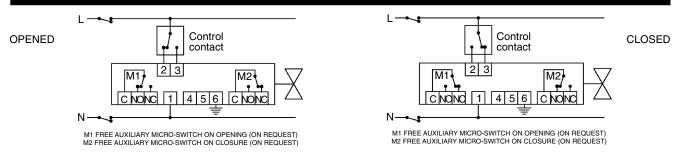


#### **MOTORIZED BALL VALVES**



#### **ELECTRICAL CONNECTIONS**

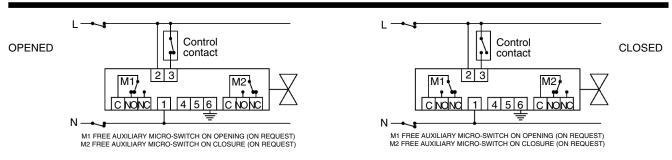
#### Servocontrol WITHOUT RELAY 3-POINT CONTROL



The illustrations show the terminals of the 3-POINT servocontrol, in the complete version which also features two auxiliary micros: the servocontrol is shown in the opening and closure conditions respectively.

Phase presence on terminal 2 opens the valve connected to the servocontrol, vice versa the presence of phase on terminal 3 undertakes the closure action.

#### Servocontrol WITH RELAY 2-POINT CONTROL



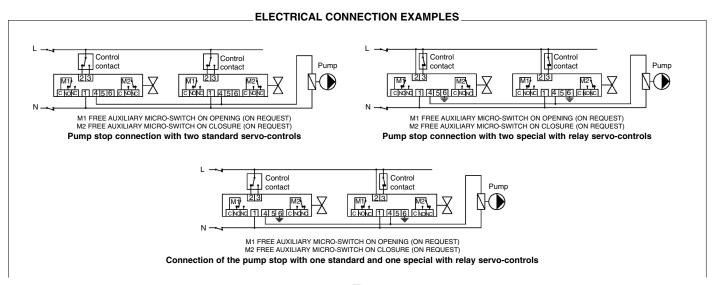
The illustrations show the terminals of the 2-POINT servocontrol with relay in the complete version which also features two auxiliary micros: the servocontrol is shown in the opening and closure conditions respectively.

The presence of phase on terminal 3 permits the opening of the valve connected to the servocontrol, while the absence of phase on the same terminal determines its closure. (electrical auto-closure)

#### NOTE:

In both cases, once opening has been undertaken, a power phase reaches terminal 4 and the contacts of the auxiliary micros, if present, arrange themselves as indicated in the diagram (opening servocontrol), vice versa, once closure occurs, a power phase reaches terminal 5 and the auxiliary micro contacts arrange themselves as shown in the relative diagram (closure servocontrol).

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



## Diamant 2000 \_

**MOTORIZED BALL VALVES** 

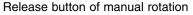


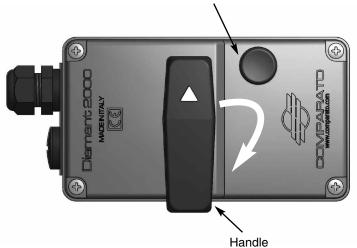
#### **MANUAL OPENING**

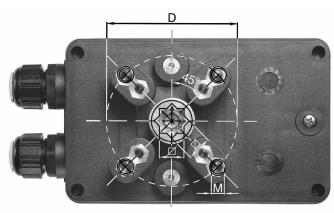
**Diamant 2000** servocontrol may be fitted, with the exception of those with a rotation time of 4 and 12 sec, with an upper manual opening feature.

The manual opening feature makes it possible to operate the valve in emergency conditions.



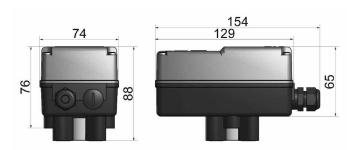






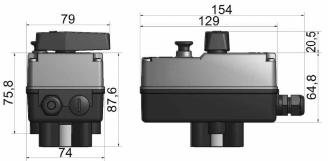
Servocomando		D	Q	М
DIAMANT	F03	36 mm	9 mm	5 mm
DIAMANT	F04	42 mm	11 mm	5 mm
DIAMANT	F05	50 mm	11 mm	6 mm
DIAMANT	F07	70 mm	11 mm	8 mm

### OVERALL DIMENSIONS (mm) BASIC MODEL



ISO 5211 model: to be directly coupled to body valve with ISO 5211 attachment F03 - F04 - F05 - F07 ( to be specifield in the order)

### OVERALL DIMENSIONS (mm) MODEL WITH TOP MANUAL OPENING FEATURE



ISO 5211 model with manual override from above: to be directly coupled to body valve with ISO 5211 attachment F03 - F04 - F05 - F07 (to be specified in the order)



**MOTORIZED BALL VALVES** 



#### **BRASS Body valve**

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



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



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



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

#### AISI 316 Body valve

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



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



3 WAY HORIZONTAL REDUCED PASSAGE Ø 1/4" • 3/8" • 1/2"

### **Spacer FOR INSULATION**

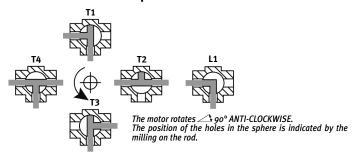


Low thermal conductivity plastic. Length: 70 mm.

### 3 WAY HORIZONTAL Body valve

3 way Diamant 2000 with ISO 5211 connection is available with 2 different spheres and totally 5 holes positions.

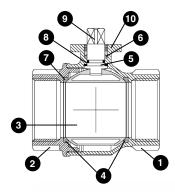
#### Positions and movement spheres holes scheme





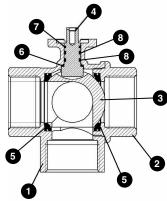
#### **MOTORIZED BALL VALVES**





#### 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 CONTROL ROD	BRASS CW617N UNI EN 12165
10 ISO 5211 ADAPTOR	BRASS CW617N UNI EN 12165

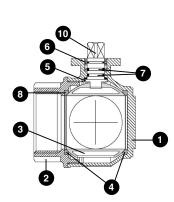


#### USED MATERIAL FOR 3 WAY VERTICAL - ISO 5211 BODY VALVE

	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®

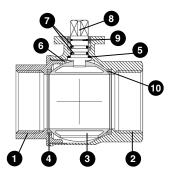


1	BODY	BRASS CW617N UNI EN 12165
2	COUPLING	BRASS CW617N UNI EN 12165
3	SPHERE	BRASS CW617N UNI EN 12165
4	SPHERE GASKET	P.T.F.E. (TEFLON®)
5	ANTI-FRICTION GASKET	P.T.F.E. (TEFLON®)
6	ROD GASKET	P.T.F.E. (TEFLON®)
7	O-RING	FKM VITON®
8	O-RING	FKM VITON®
10	CONTROL ROD	BRASS CW617N UNI EN 12165



#### USED MATERIAL FOR 3 WAY HORIZONTAL - AISI 316 BODY VALVE

1	BODY	CF8M
2	COUPLING	CF8M
3	SPHERE	INOX AISI 316
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	CONTROL ROD	INOX AISI 316



#### **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	CONTROL ROD	INOX AISI 316
9	ROD GASKET	P.T.F.E. (TEFLON®)
10	O-RING	FKM VITON®

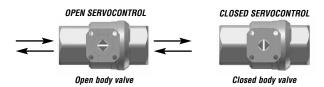


**MOTORIZED BALL VALVES** 



### 2 WAY Body valve

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



#### 3 WAY VERTICAL Body valve

In **Diamant ISO** valves, the 3 - way version available with two different spheres. In both cases, one hole is set axially to the common way,that is always opened.

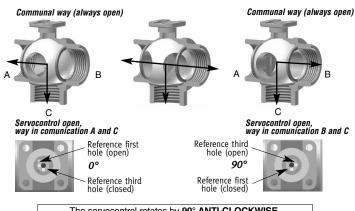
#### 3 - WAY - 3 HOLE BODY VALVE.

In the case of 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 manoeuvre stage all the three ways inter-communicate.

Once the operation is complete the valve returns to being a deviation valve to all intents and purpose, so the use of the 3 way - 3 hole deviation valve is recommended when the three deviated ways can communicate between themselves, which is usually the case in heating systems.

On the control rod there are two orthogonal millings that indicate which way communicates with the common way.



The servocontrol rotates by 90° ANTI-CLOCKWISE

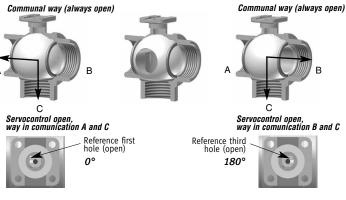
#### 3 - WAY - 2 HOLE BODY VALVE

In the case of 2 hole ball, the second hole is positioned on one of the two entrance ways; positioning to the other entrance way requires 180° rotation.

A feature of the 2 hole shutter is that it is able to close one of the 2 entrance ways beforee preparing the other for opening.

The use of the 3 - way - 2 hole deviation valve is necessary when the 2 deviated ways must never be in communication with each

On the control rod there is an orthogonal milling that indicates which way communicates with the common way.



The servocontrol rotates by 90° ANTI-CLOCKWISE

### MOTORIZED BALL VALVES

#### **OVERALL DIMENSIONS**



	MODI	EL	DN	Ø	Α	В	С	D	E
	74 155	1		4 / 4 11	105	440	10.7	07	
	134	_	<u>8</u> 10	1/4" 3/8"	135 135	118 118	16,7 16,7	67 67	
		o was	15	1/2"	133	116	16,7	67	
		2 Way ISO 5211	20	3/4"	145	123	20	76	
		1130 3211	25	1"	154	127	24,5	90	
			32	1"1/4	175,5	143	29	102	
	80	Ī	8	1/4"	158	141	16,7	67	
		2 Way	10	3/8"	158	141	16,7	67	
			15	1/2"	156	139	16,7	67	
		with manual override from above	20	3/4"	168	146	20	76	
		-	25	1"	177	150	24,5	90	
	74		32	1"1/4	186	159	29	102	
	, , , , , , , , , , , , , , , , , , ,	1	8	1/4"	205	188	16.7	67	
		2 Way	10	3/8"	205	188	16,7 16,7	67	
		ISO 5211	15	1/2"	202	184,5	16,7	67	
		with spacer for insulation	20	3/4"	207,5	186,5	20	76	
			25	1"	222,5	196,5	24,5	90	
			32	1"1/4	253	221	29	102	
	80								
		2 Way	8	1/4"	228	211	16,7	67	
		ISO 5211	10	3/8"	228	211	16,7	67	
		with spacer for insulation and	15	1/2"	225	205,5	16,7	67	
		manual override from above	20	3/4"	231,5	207,5	20	76	
		iioiii above	25	1"	243,5	217,5	24,5	90	
			32	1"1/4	253	221	29	102	
	74 155 134		8	1/4"	134	117	17	67	33,5
		3 Way	10	3/8"	134	117	17	67	33,5
ā		Horizontal	15	1/2"	138,7	119,2	19,5	77	38,5
		JISO 5211	20	3/4"	155	131	24	87	43,5
			25	1"	166,5	136,5	30	105	52,5
	80	3 Way	0	4 / 4 11	455	100	47	07	00.5
M		Horizontal	8 10	1/4" 3/8"	155 155	138 138	17 17	67 67	33,5 33,5
9		ISO 5211	15	1/2"	159,7	140,2	19,5	77	38,5
		with manual - override from above	20	3/4"	176	152	24	87	43,5
			25	1"	187,5	157,5	30	105	52,5
	74								
Ō		3 Way		4 / 4 !!	004	107	17	67	00.5
		Horizontal	<u>8</u> 10	1/4" 3/8"	204 204	187 187	17 17	67 67	33,5 33,5
		ISO 5211 with spacer for	15	1/2"	208,7	189,2	19,5	77	38,5
		insulation -	20	3/4"	225	201	24	87	43,5
	'  _E_    D  1		25	1"	236,5	206,5	30	105	52,5
U	80								
0		3 Way							
	TO THE PER SECOND SECON	Horizontal	8	1/4"	225	208	17	67	33,5
		ISO 5211 with spacer for	10	3/8"	225	208	17	67	33,5
		insulation and manual override	15	1/2"	229,7	210,2	19,5	77	38,5
		from above	20	3/4"	246	222	24	87	43,5
			25	1"	257,5	227,5	30	105	52,5

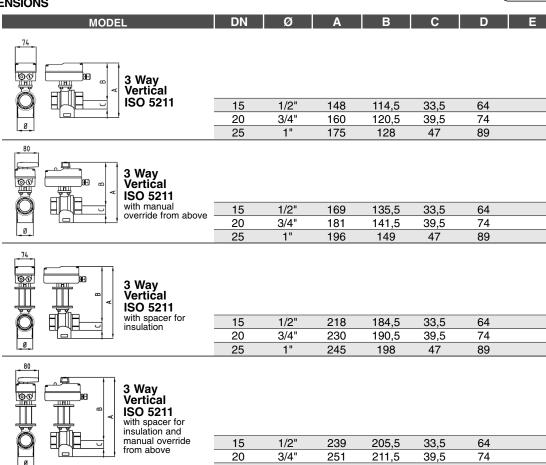
## **ISO 5211**

**MOTORIZED BALL VALVES** 

## US LISTED IND. CONT. EQ. 2TD8

#### **OVERALL DIMENSIONS**

211 connection



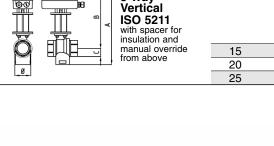
1"

266

47

89

219







#### **MOTORIZED BALL VALVES**

#### **OVERALL DIMENSIONS**



	MOD	EL	DN	Ø	Α	В	С	D	Е
74	155								
[-/4-]	134								
60		1	15	1/0"	100	1115	17	67	
			15 20	1/2" 3/4"	132 137,5	114,5 116,5	17 22	67 78	
Ø	D	AISI 316	25	1"	152,5	126,5	24	90	
	1 <del>-0-</del> 1		32	1"1/4	167	135	32	100	
80				, .					
	. =	1							
60		2 Way AISI 316	15	1/2"	155	135,5	17	67	
		with manual	20	3/4"	161,5	137,5	22	78	
Ø		override from above	25	1"	173,5	147,5	24	90	
- 0	[_ <del></del> ]		32	1"1/4	188	156	32	100	
74									
60	98	2 Way							
	P   B	AISI 316 with spacer for	15	1/2"	202	184,5	17	67	
		insulation	20	3/4"	207,5	186,5	22	78	
Ø			25	1"	222,5	196,5	24	90	
	1 <del></del> 1		32	1"1/4	237	205	32	100	
80									
		2 Way							
60		AISI 316							
		with spacer for insulation and	15	1/2"	225	205,5	17	67	
		manual override	20	3/4"	231,5	207,5	22	78	
<b>©</b>		from above	25	1"	243,5	217,5	24	90	
[0]	<u> </u>		32	1"1/4	258	226	32	100	
74	155								
-	134	∃ 3 Way							
60		l llautaratal	8	1/4"	141,5	123	18,5	79	39
		AISI 316	10	3/8"	141,5	123	22,5	86	43
E	D		15	1/2"	141,5	123	26	108	54
80					, .				
		3 Way							
60		Horizontal							
		AISI 316 with manual	8	1/4"	162,5	144	18,5	79	39
E	D	override from above	10	3/8"	162,5	144	22,5	86	43
			15	1/2"	162,5	144	26	108	54
74									
<b>60</b>		3 Way							
777		Horizontal AISI 316							
. ##	₩	with spacer for	8	1/4"	211,5	193	18,5	79	39
~ TO		insulation	10	3/8"	211,5	193	22,5	86	43
<u> </u>			15	1/2"	211,5	193	26	108	54
80									
		3 Way							
60	98	Horizontal							
TTT		AISI 316 with spacer for							
		insulation and	8	1/4"	232,5	214	18,5	79	39
ø		manual override from above	10	3/8"	232,5	214	22,5	86	43
<u> </u>	<u>D</u> †	-	15	1/2"	232,5	214	26	108	54

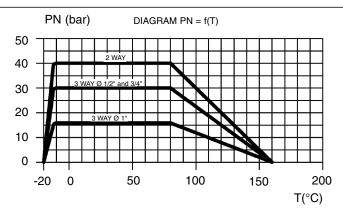
#### **MOTORIZED BALL VALVES**



#### FLUID MECHANICAL CHARACTERISTICS

Kv (m<sup>3</sup>/h with  $\Delta p = 100$ kPa = 1bar)

MODEL	Ø	Kv
	1/4"	5,4
	3/8"	6
2 Way BRASS	1/2"	16,3
ISO 5211	3/4"	29,5
	1"	43
	1"1/4	89
3 Way BRASS	1/2"	3,9
vertical	3/4"	7,9
ISO 5211	1"	13
3 Way BRASS horizontal ISO 5211	1/2"	3,9
	3/4"	7,9
	1"	13



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

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

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

#### PRESSURE

	2 WAY	3 WAY 1/2" and 3/4"	3 WAY 1"
<ul> <li>Nominal working pressure</li> <li>Working max differential</li> </ul>	40 bar 16 bar	30 bar	16 bar

FLUIDS Usable fluids

Water and fluids compatible with EPDM® and TEFLON® ● Other fluids on request

#### \* TEMPERATURES

	Normal valve	Valve with spacer for insulation (for fluid compatible with these temperatures)	
• Minimum	+7°C	-20 °C	
• Maximum	+100°C	+100 °C	

<sup>\*</sup> Higher temperatures on request

## Diamant 2000 \_\_

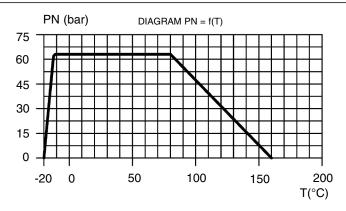
#### **MOTORIZED BALL VALVES**



#### FLUID MECHANICAL CHARACTERISTICS

Kv (m<sup>3</sup>/h with  $\Delta p = 100$ kPa = 1bar)

MODEL	Ø	Kv
2 Way AISI 316	1/2"	16,3
	3/4"	29,5
	1"	43
	1"1/4	89
3 Way AISI 316 Horizontal	1/4"	2,8
	3/8"	3
	1/2"	3,6



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

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

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

#### PRESSURE

• Nominal working pressure 64 bar • Working max differential 16 bar

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

\* TEMPERATURES

	Normal valve	Valve with spacer for insulation
		(for fluid compatible with these temperatures)
• Minimum	+7℃	-20 °C
<ul><li>Maximum</li></ul>	+100 °C	+100 °C

\* Higher temperatures on request

#### **VALVOLE A SFERA MOTORIZZATE**



#### **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.

Diamant 2000 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 servocontrol 2-POINT type, or with three-wire thermostat to be coupled with a servocontrol 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 servocontrol.

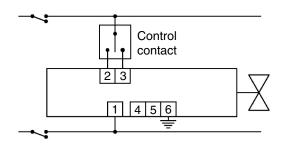
- >> MODULATING THERMOSTAT WITH 2-WIRE CONTROL (to be coupled to 2-POINT servocontrol with relay) and MODULATING THERMOSTAT WITH 3-WIRE CONTROL (to be coupled to 3-POINT servocontrol) which alternates opening and closing periods, which can be longer or shorter according to the difference between environmental temperature and set one.
- >> MODULATING THERMOSTAT WITH 3-WIRE CONTROL WITH STILL IN POSITION OF THE VALVE (to be coupled to 3-POINT servocontrol) 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 SERVOCONTROL 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

ALWAYS UPDATED DATASHEETS ARE AVAILABLE ON OUR WEB-SITE www.comparato.com



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