SMART PRO Range

MULTIFUNCTIONAL ROTARY ACTUATORS

USE

- **industrial plants with hot and cold fluids**
- **winery**
- **automation systems**
- **Building Management Systems (BMS)**
- **hydraulic plants**
- **HVAC plants**
- **compressed air plants**

Wi Fi™

Modbus

FUNCTIONING

SMART PRO multifunctional actuators use the last generation stepper motors with closed loop control system: the position of the gear shaft is detected by a potentiometer and this grants high precision and reliability in terms of positioning. All **SMART PRO** actuators can be supplied with a Fail Safe system: in case of failure of power supply the actuator automatically moves to the set safety position by using the energy stored in the integrated supercapacitors.

Thanks to the Wi-Fi configuration unit it is possible to easily and remotely access to all actuator's functions (type of control, operating times, rotation angles, etc.), to check its status (reached position, inside temperature, work time, etc.) and to perform a diagnostic control in case of mistakes or default.

Versions with Modbus RTU can be connected to a RS485 2-wire network for the direct communication to a PLC or BMS by using the

Modbus RTU protocol. This allows an easy and safe control and monitoring of the actuators.

VERSIONS AND CODE BUILDER

In order to get the code, replace the letters and digits according to the desired characteristics.

EXAMPLE code

D S P 2 4 F M F A

Range
DSP = Diamant SMART PRO • 11 Nm
CSP = Compact SMART PRO • 22 Nm
USP = Universal SMART PRO • 40 Nm

Rotation angle
2 = 90°
3 = 180°

Power supply
2 = 100...240V 50/60 Hz
4 = 12V / 24V AC/DC

Connection to ball valve
C = COMPARATO connection
F = ISO 5211 connection

Manual Override
A = Present

Fail Safe
F = Present
0 = Not present

Communication
M = Modbus
W = Wi-Fi

Example: **Diamant SMART PRO**, 90° rotation, 12V/24V AC/DC power supply, ISO 5211 connection, Modbus protocol, Fail Safe, emergency manual override.

SMART PRO Range

MULTIFUNCTIONAL ROTARY ACTUATORS

TECHNICAL FEATURES

SMART PRO

		Diamant SMART PRO	Compact SMART PRO	Universal SMART PRO
ELECTRICAL DATA	**Power supply**	12Vdc • 24Vdc • 24V 50/60 Hz • 100...240V 50/60 Hz ± 10%		
	Max working power consumption	10W	25W	25W
	Standby power consumption	2W	3W	3W
	Heating resistance consumption	3W	5W	5W
	Power supply cable	4 x 0,5 mm^2 (AWG 20) - Length 1m		
	Signal cable	12 x 0,2 mm^2 (AWG 24) - Length 1m		
	Microswitch features	max 30Vdc - 0,1 A		
FEATURES	**Nominal torque**	11Nm	22Nm	40Nm
	Control type ON/FF	2 points • 3 points • 3 positions		
	Proportional positioning signal	0-10V • 2-10V • 0-20 mA • 4-20 mA • PWM1 • PWM2		
	Dead band positioning signal	Adjustable 1% - 3% - 5%		
	Impedance of the positioning signal	100kΩ (0-10V / 2-10V) • 500Ω (0-20 mA / 4-20 mA) • 133kΩ (PWM)		
	Positioning feedback	2-10Vdc		
	Max positioning feedback power	40 mA		
	Precision of positioning	± 5%		
	Motor rotation direction	Reversible		
	Emergency manual override	Lever and release button		
	Rotation angle	90° • 180°		
	Correction of angular positioning	by Wi-Fi or Modbus interface		
	Operating time (90°)	15s * • 30s • 60s • 120s	15s * • 30s • 60s • 120s	30s • 60s • 120s
	Max noise	45 dB (A)	60 dB (A)	65 dB (A)
	Class protection	IP67		
	Ball valve connection	Comparato • ISO 5211 F03/F05	ISO 5211 F03/F05	ISO 5211 F05/F07
FAIL SAFE	**Accumulators**	Supercapacitors		
	Emergency position	Adjustable: opening / closing / middle		
	Fail safe operating time (90°)	20s	26s	30s **
	Minimum charging time	15 min (90°) • 60 min (180°)	15 min (90°) • 30 min (180°)	50 min (90°)
	Max power consumption	0,6 W	3 W	3 W
Wi-Fi ***	**Frequency**	2,4 GHz		
	Standard	802.11 b/g/n - 802.11 n (2.4 GHz), up to 150 Mbps		
	Transmission signal	160 meters with device		
	Connection	Access point – Web server		
	Wi-Fi function	Setting of operating parameters, status and diagnostics		
Modbus	**Protocol**	Modbus - RTU		
	Standard	EIA-RS 485 Half duplex mode		
	Speed	9600 Baud/s		
	Bit	8		
	Stop bit	1		
	Parity	none		
SAFETY	**Working room temperature**	-10°C ÷ + 50°C		
	Storing and transport conditions	- 40°C ÷ +80°C, RH max 95% - No condensation		
	Required maintenance	none		
	Certification	CE		

* operating time not available with a 12Vdc power supply

** for the activation of Fail Safe with a 180° rotation please contact our technical department

*** in case of installation in areas with several Wi-Fi networks (such as airports or fairs), the Wi-Fi communication may be more difficult and slower

SMART *PRO* Range

MULTIFUNCTIONAL ROTARY ACTUATORS

ELECTRICAL CONNECTIONS

POWER CORD 1

Cavo Alimentazione *Power Cord*		
Blu / *Blue*	⎓	12V DC
Marrone / *Brown*	∼ ±	24V AC/DC
Nero / *Black*	∼ ±	100...240V AC *
Giallo-Verde / Green-Yellow	⏚	

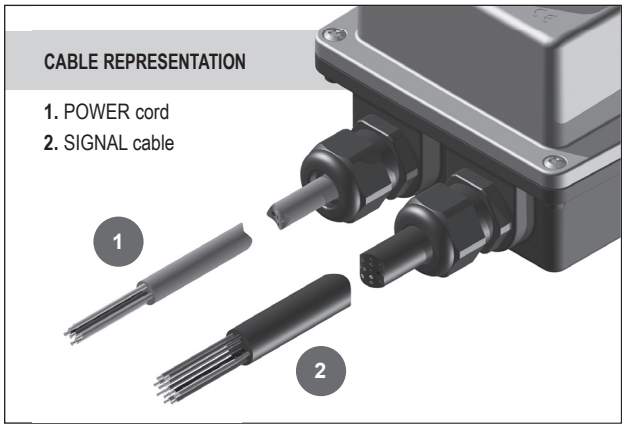
*** POWER SUPPLY ACCORDING TO THE SELECTED VERSION**

SIGNAL CABLE 2

FUSE FAST 100 mA

Cavo Segnali *Signal Cable*		
Bianco / *White*	GND	
Rosa / *Pink*	▶	Feedback 2-10V
Grigio / *Grey*	◀	PWM1 / PWM2
Verde / *Green*	◀	0(2)...10V / 0(4)...20mA
Arancione / *Orange*	RS 485 L+	Modbus-RTU **
Giallo / *Yellow*	RS 485 L-	Modbus-RTU **
Blu / *Blue*	MICRO AUX	
Marrone / *Brown*	MICRO AUX	
Rosso / *Red*	MICRO AUX	
Viola / *Violet*	MICRO AUX	
Nero / *Black*	MICRO AUX	
Azzurro / *Light blue*	MICRO AUX	

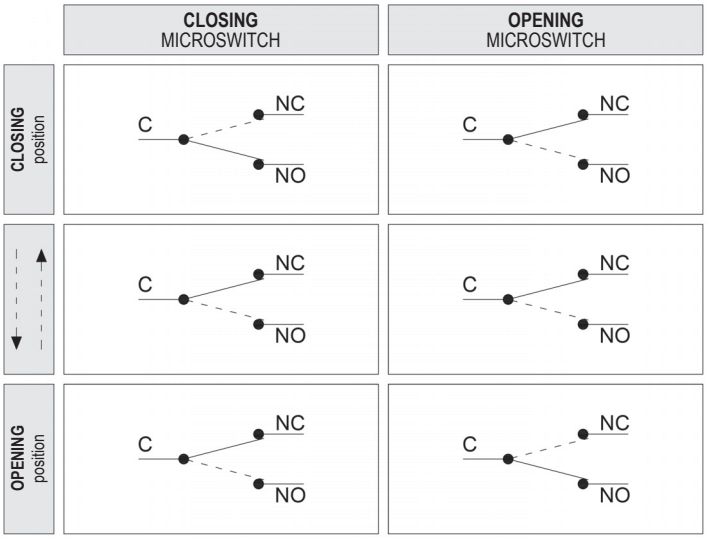
**** only for MODBUS version**

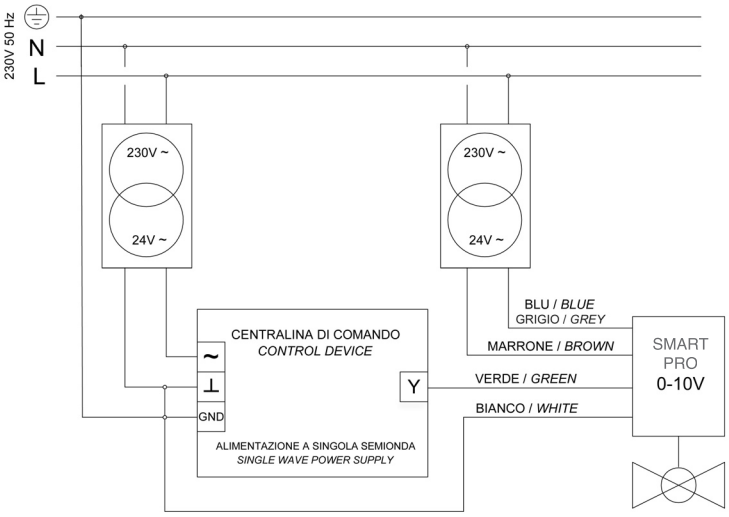


MICRO AUSILIARI / AUXILIARIES

DIAMANT SMART		
APERTURA OPENING	**C**	**MARRONE** / BROWN
	NC	**BLU** / BLUE
	NO	**ROSSO** / RED
CHIUSURA CLOSING	**C**	**NERO** / BLACK
	NC	**VIOLA** / VIOLET
	NO	**AZZURRO** / LIGHT BLUE

COMPACT/UNIVERSAL SMART		
APERTURA OPENING	**C**	**NERO** / BLACK
	NC	**AZZURRO** / LIGHT BLUE
	NO	**VIOLA** / VIOLET
CHIUSURA CLOSING	**C**	**MARRONE** / BROWN
	NC	**ROSSO** / RED
	NO	**BLU** / BLUE





CAUTION

The actuator has a double wave power supply and therefore it shall not be directly used with other devices with half wave power supply sharing the same power supply and the same control signal: it is necessary to check that the ground/neutral signal of the power supply (POWER SUPPLY – BLUE wire) has not the same electrical potential of GND of the feedback's control signal (SIGNAL CABLE – WHITE wire).

In case an actuator with a 24V AC power supply is coupled with systems/control units with proportional output in tension (0-10V / 2-10V) and half wave power supply 24VAC, it is possible to realise the wiring according to the nearby scheme.

SMART *PRO* Range

MULTIFUNCTIONAL ROTARY ACTUATORS

FUNCTIONS

Operating modes

Close-loop positioning control: a potentiometer on the final gear shaft detects the exact position reached by the actuator.

2-POSITION control

ON/OFF 2 or 3 point control

(-) NEUTRAL	(+) PHASE	(+) PHASE	POSITION
I	I	0	Closing
I	0	I	Opening
I	I	I	Opening

3-POSITION control

The actuator can reach the middle position thanks to the ON/OFF control (45° or 90° angle on the basis of the 90° or 180° operating angle)

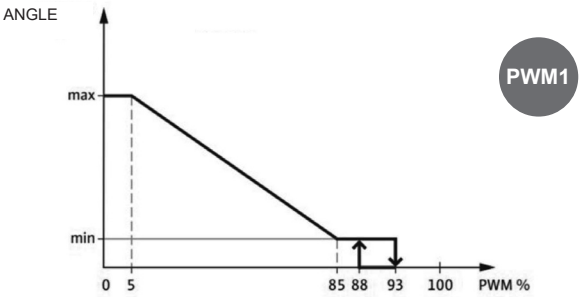
(-) NEUTRAL	(+) PHASE	(+) PHASE	POSITION
I	I	0	Closing
I	0	I	Opening
I	I	I	Middle (45°/90°)

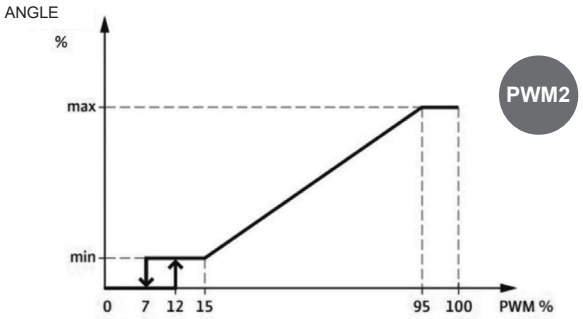
PROPORTIONAL control

Powered-on modulating signal (0…10V /2…10V) or current (0…20mA/4…20mA) determining the proportional positioning of the actuator.

PWM control

Modulating signal and pulse width modulation compliant with DIN IEC 60469-1 regulation.





FEEDBACK signal

Proportional signal in 2…10V tension to the angular position achieved by the actuator. 0V= anomalies in the system.

Positioning timeout

If the set position is not achieved within 250 seconds, the actuator is stopped and the system is in anomaly mode

SMART PRO Range

MULTIFUNCTIONAL ROTARY ACTUATORS

Variation of the operating time

It is possible to select different operating times for the 90° rotation; the supply torque of the actuator is kept constant at the nominal value.

Correction of the angular positioning

This function can increase or decrease the angular value of the closing, opening and middle position:

- closing (0°) interval [-4° ÷ +30°]
- opening (90°/180°) interval [-30° ÷ +4°]
- middle (45°/90°) interval [-10° ÷ +10°]

Dead band

The dead band is defined in percentage according to the proportional control. If the proportional control is lower than the % set value the actuator stays in its position without moving.

Control inversion

If this function is activated, it inverts the relationship between the control signal (2 positions, 3 positions, proportional and PWM) and the closing and opening positions. Example:

0-10V control ⟶ 0V= closing; 10V = opening

0-10V INVERTED control ⟶ 0V= opening; 10V = closing

Heating resistor

This function controls the activation of the integrated heating resistor: when the temperature detected by the internal probe is lower than the set temperature the resistor is activated. Conversely, when the temperature detected by the internal probe is higher than the set temperature the resistor is deactivated.

The temperature can be selected among 5°C and 30°C.

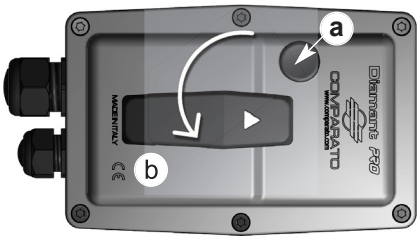
Fail Safe

This system collects energy for moving the actuator to the set safety position in case of power failure. The collection of energy is realised by last generation supercapacitors, granting fast charging times and high reliability over time.

Thanks to the Wi-Fi interface or to a serial connection with a Modbus protocol, it is possible to set the safety position (opening, closing or middle), see the charge level of supercapacitors and know the number of the system's interventions.

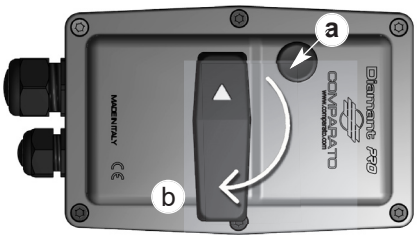
MANUAL OPERATION

SMART PRO actuators are provided with a manual override on the top of the cover. The manual override allows the activation of the valve in case of emergency or power failure.



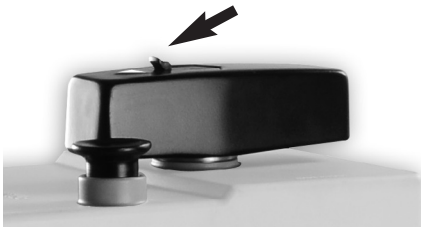
Actuator in **OPENING** position.

Press the release button (a) and, simultaneously, rotate the lever (b) 90° **COUNTERCLOCKWISE**, in order to move the actuator in the **CLOSING** position.



Actuator in **CLOSING** position.

Press the release button (a) and, simultaneously, rotate the lever (b) 90° **CLOCKWISE**, in order to move the actuator in the **OPENING** position.



Universal SMART PRO

If you cannot manually operate the ball valve, you can remove the plastic handle by pressing the lever in the direction shown and operate it manually using a size 17mm wrench. Pay attention not to exceed the 40 Nm torque provided by the actuator, in order to avoid the risk of breaks.

Once the manual opening/closing operation is realised, the actuator stays in its position until the control signal does not change.

SMART *PRO* Range

MULTIFUNCTIONAL ROTARY ACTUATORS

WI-FI COMMUNICATION INTERFACE

The built-in Wi-Fi communication module has an access point - Web server: when the actuator is powered, a password-protected Wi-Fi network accessible from any connectable device (e.g. Smartphone) is created.

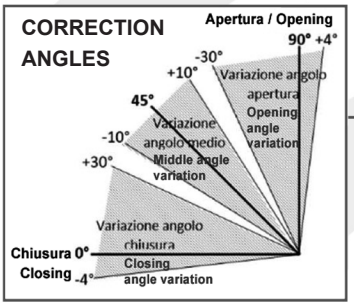
TIPO COMANDO

2 POS
3 POS
0-10V
2-10V
0-20mA
4-20mA
PWM1
PWM2

POWER SUPPLY
depending on the selected power supply

100...240V AC
12V DC
24V AC/DC

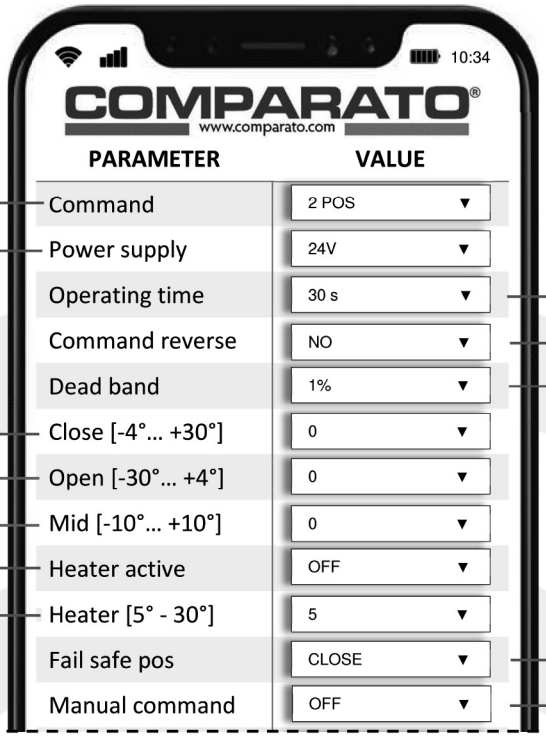
CORRECTION ANGLES



HEATING RESISTANCE

OFF
ON

HEATER TEMPERATURE SETPOINT
[°C]



OPERATING TIME

15 sec
30 sec
60 sec
120 sec

INVERSION OF CONTROL

NO
YES

DEAD BAND VALUE

1%
3%
5%

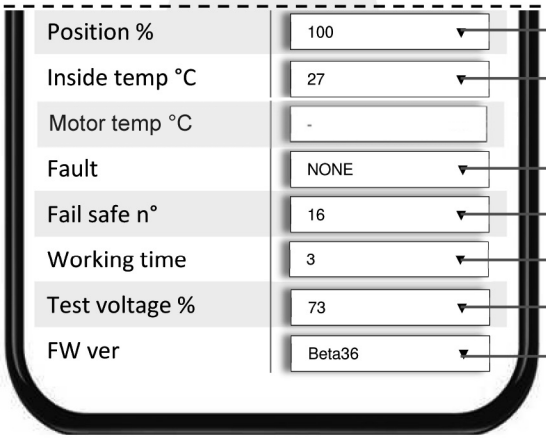
FAIL SAFE POSITION

OPEN
CLOSE
MID

COMMAND MANUAL

OFF
OPEN
CLOSE
MID

MONITORING



- Percentage reached position
- Internal temperature of the actuator
- Anomaly signal
- Number of fail safe interventions
- Functioning times (set of ten minutes)
- Battery charge indicator of supercapacitors
- Software version

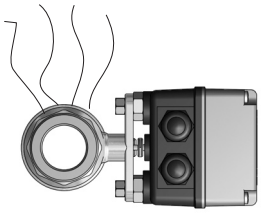
SMART PRO Range

MULTIFUNCTIONAL ROTARY ACTUATORS

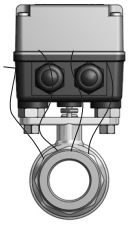
INSTALLATION

The valve shall not be installed upside down. When the valve operates with low temperature fluids (possibility of formation of ice on the shaft) or with high temperature (danger of overheating of the actuator), it is advisable to install it as per the pictures below:

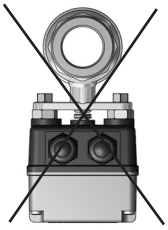
RECOMMENDED POSITION



ALLOWED POSITION



FORBIDDEN POSITION

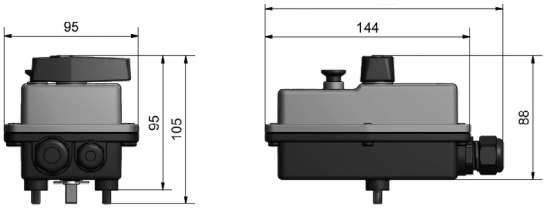


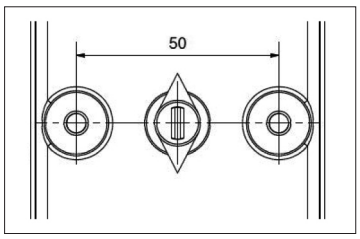
CAUTION! Do not use high-pressure water directly on the actuator (e.g. a pressure washer)

DIMENSIONS AND BALL VALVE CONNECTION

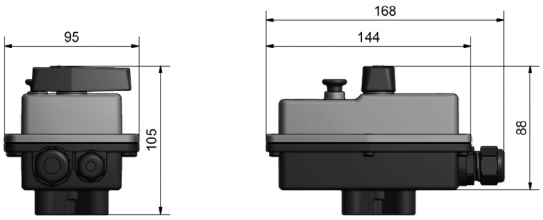
ACTUATORS

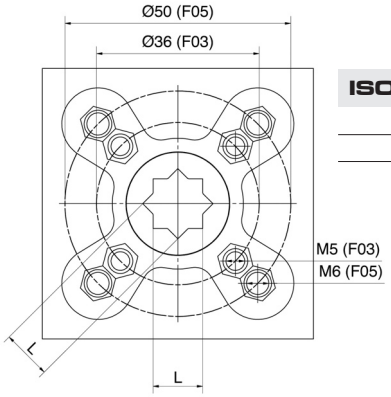
Diamant SMART PRO
COMPARATO connection





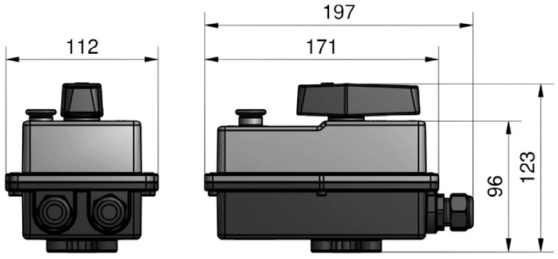
Diamant SMART PRO
ISO 5211 connection

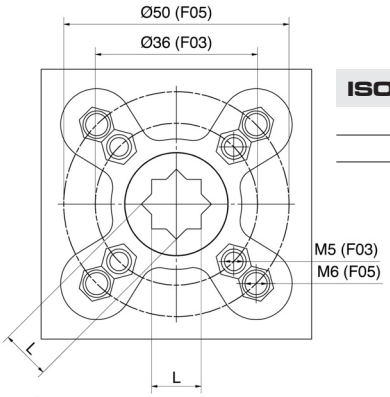




ISO 5211 connection	L
F03	9 mm
F05	11 mm

Compact SMART PRO



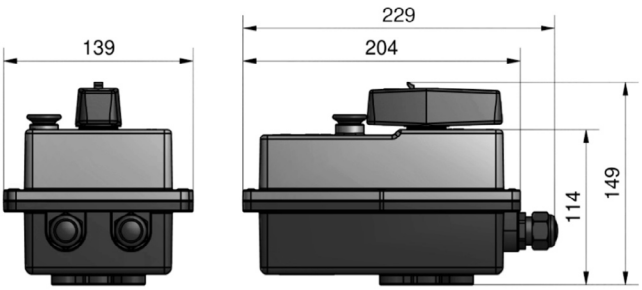


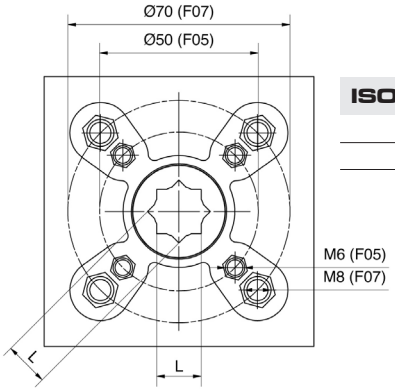
ISO 5211 connection	L
F03	9 mm
F05	11 mm

SMART PRO Range

MULTIFUNCTIONAL ROTARY ACTUATORS

Universal SMART PRO





ISO 5211 connection	L
F05	11 mm
F07	14 mm

EXAMPLE OF SPECIFICATIONS

DIAMANT SMART PRO MULTIFUNCTION ACTUATOR • torque: 11 Nm, rotation angle: 90°, power supply: 12V-24V AC/DC, 2 microswitches free in opening and closing, positioning feedback: 2-10V, communication protocol: Wi-Fi access point - web server programming, manual control, monitoring and diagnostics, programmable Fail Safe in opening / closing / middle position, class protection: IP67, emergency manual override, connection to the ball valve: ISO 5211 connection F03-F05 Q9-11.

Brand: **COMPARATO**

Code: **DSP24FWFA**

BIM BUILDING INFORMATION MODELING

UPDATED DATA SHEETS AVAILABLE AT www.comparato.com

HYDROTHERMAL SYSTEMS
COMPARATO NELLO s.r.l.
17014 CAIRO MONTENOTTE (SV) ITALIA VIALE DELLA LIBERTÀ • LOCALITÀ FERRANIA • Tel. +39 019 510.371 - FAX +39 019 517.102
www.comparato.com e-mail:info@comparato.com UNI EN ISO 9001:2015 CERTIFIED COMPANY