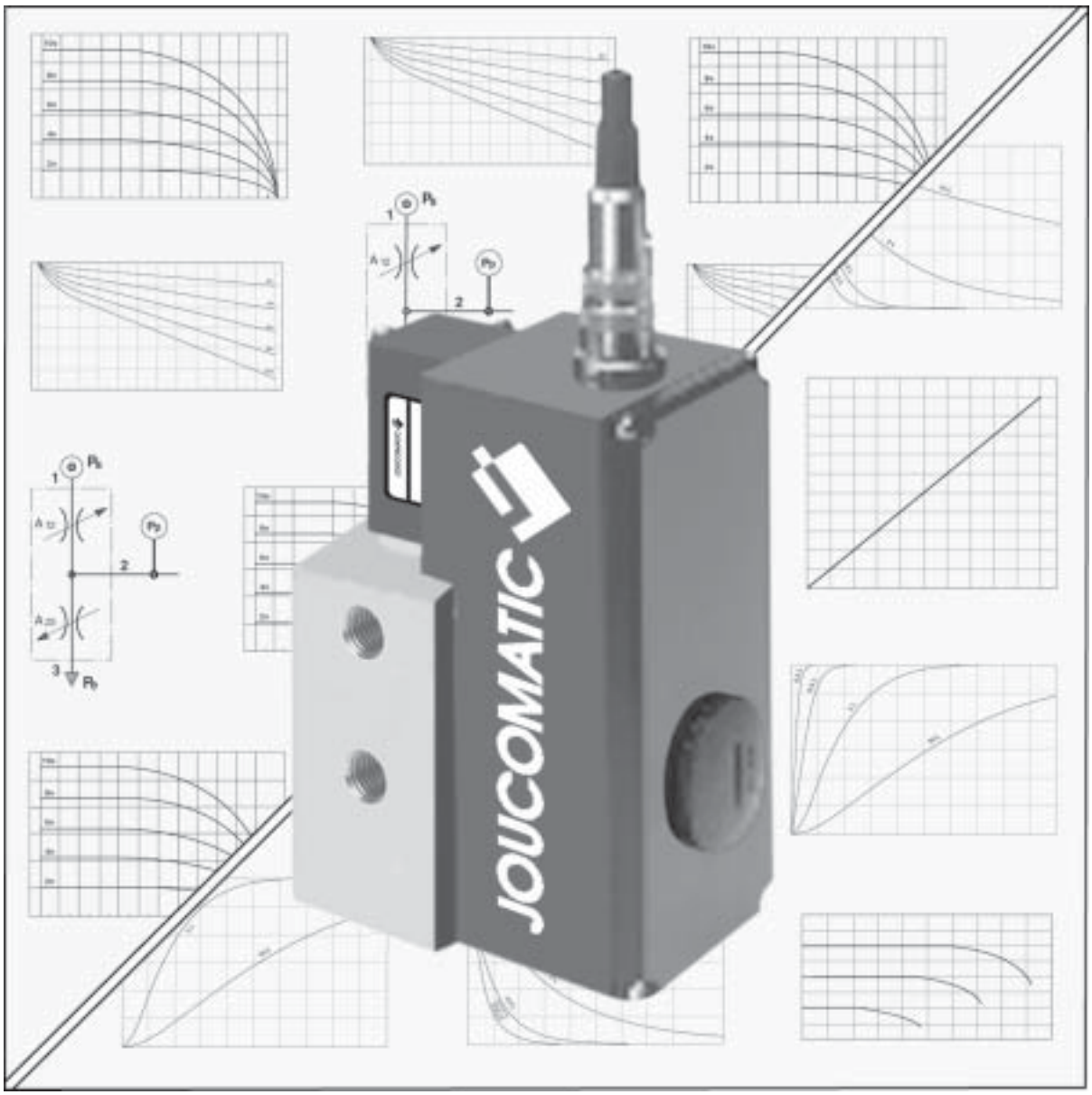
# PROPORTIONAL VALVE
# FOR FLOW CONTROL
# OR PRESSURE CONTROL
# ON PNEUMATIC SYSTEM
# *SERVOTRONIC*






P 330-GB-R0a

ASCO®
JOUCOMATIC

# THE PROPORTIONAL PNEUMATIC SERVOTRONIC

**The flexibility of pneumatics**
**combined with smart electronics**
**for greater utilization versatility**
**of electropneumatic components**

## INTRODUCTION

The evolution in the automation process is moving towards a need of obtaining greater versatility and increased precision in compressed air driven equipment. This means obtaining proportional operation of the power element as a function of an electric control signal. Combining pneumatic technology and high precision mechanicals is a speedy way of accurately controlling FLOW or PRESSURE values of a pneumatic power system according to a signal obtained from the control electronics.

SERVOTRONIC G 1/4 operates in the following scales of values:
For **flow** control : 0 - 1400 l/min (ANR) with a ± 10V set-point signal.
For **pressure** control : choice of 7 control ranges, 0 - 0.1 to 0 - 16 bar.
with a 0 - 10V, 0 - 20mA or 4 - 20mA set-point signal.
These modern design products offer high levels of performance.

## THE ADVANTAGES OF THE SERVOTRONIC RANGE

- Very short response times
- Very low hysteresis
- Excellent flow-rate performance
- 2 versions proposed: for flow or pressure control
- Compact monoblock assembly with built-in electronics and sensor
- Electrical connection by plug-in connector
- High reliability and long life duration thanks to:
  - A high precision mechanism combined with simple kinematics
  - Very light mobile equipment with small displacements
  - High quality components
- Various possibilities of input set-points (voltage and current) for the pressure control version

## APPLICATION AREAS

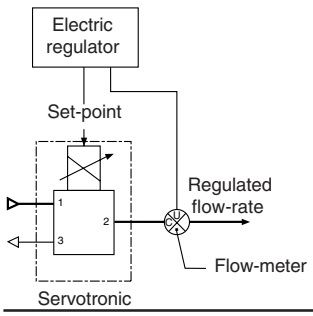
The performance and the two-fold capability of the SERVOTRONIC range directly responds to pressure or flow control requirements and, indirectly, to many other physical quantities such as : positions, speeds, accelerations, forces, quantities of material, etc.
The industrial applications of these systems address many activity areas : packaging and preservation, handling, processing of wood, paint, agro-food, etc.

*Application examples :*
- spray guns with controlled air pressure or flow,
- precise and fast pressure adjustment,
- pneumatic actuator force control,
- pneumatic turbine speed control,
- pneumatic screwdriver speed control,
- neutral gas flow and proportioning control,
- mechanical entrainment speed regulation,
- dosing and transport of powders,
- active load damping (mother roll receiver in the paper-making industry for instance),
- active load stabilization when affected by spurious movements,
- pneumatic positioning.

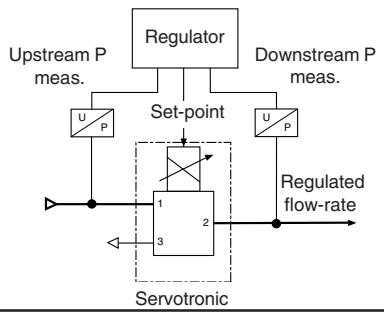
## EXAMPLE - APPLICATION DIAGRAM TYPES

**for flow control**

**Direct** control with flow-meter

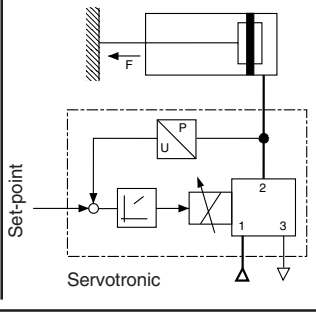



**Indirect** control with upstream/downstream pressure sensors

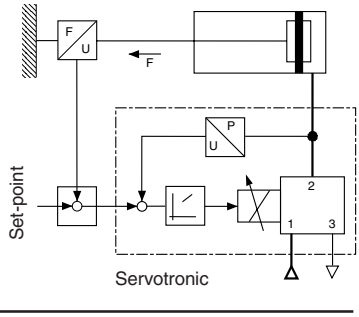



**for pressure control**

**Direct** pressure control




**Indirect** pressure control




*All leaflets are available on*: **www.ascojoucomatic.com**

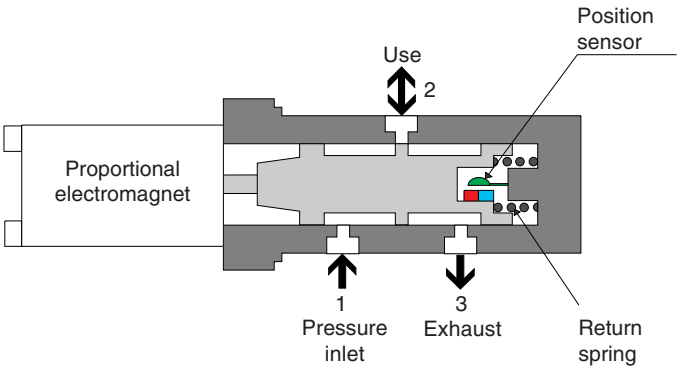
# THE PROPORTIONAL PNEUMATIC SERVOTRONIC

## SERVOTRONIC ON **FLOW** CONTROL

The SERVOTRONIC series 607 flow control version is a 3 port/3 position slide servovalve with an electronic control supplying a flow-rate proportional to a given set-point.

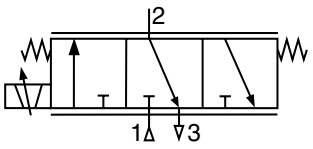
The product includes :

- a pneumatic distributor consisting of matching **spool-sleeve assembly.**
- a **proportional electromagnet** directly controlling the movement of the spool.
- a **position sensor** supplying a signal proportional to the position of the spool and indicating the flow-rate.

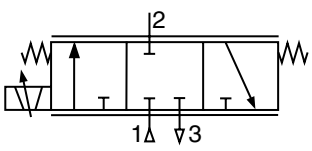



The position of the spool can be modified in continuous manner from a ± 10V set-point signal between the end positions.
Two versions of the SERVOTRONIC are available depending on the desired state of the **current cut-off** component ("Failsafe" position) :

▪ Pressure released (open center).




▪ Flow held (closed center).

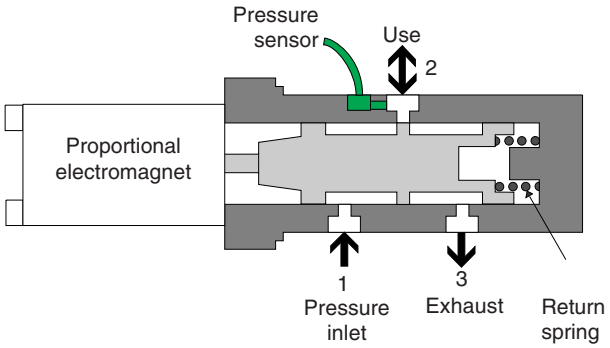



## SERVOTRONIC ON **PRESSURE** CONTROL

The SERVOTRONIC series 607 in the pressure control version is a 3 port/3 position pressure control with electronic control supplying a pressure proportional to a given set-point.

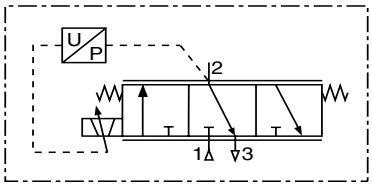
The product includes :

- a pneumatic distributor consisting of matching **spool-sleeve assembly**.
- a **proportional electromagnet** directly controlling the movement of the spool.
- a **pressure sensor** located near the load port (2) supplying a signal proportional to the pressure obtained in the load volume.

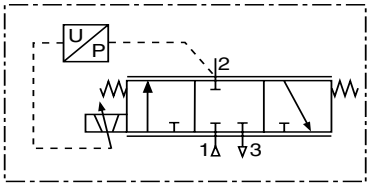



The position of the spool changes continuously to maintain a constant outlet pressure as function of a 0-10V set-point signal for a given pressure.
Two versions of the SERVOTRONIC are available depending on the desired state of the **current cut-off** component ("Failsafe" position) :

▪ Pressure released (open center).




▪ Pressure held (closed center).




*NOTE - Note that SERVOTRONIC is not a pneumatic isolating system and that its absolute tightness is not a necessary criterion for operation (maximum leakage flow-rate at 6 bar : 50 l/min - ANR).*

# SERVOTRONIC 3 PORT ELECTROPNEUMATIC PROPORTIONAL VALVE
## for **FLOW-RATE** control

### SPECIFICATIONS

CONTROLLED FLUIDS : Air or neutral gas, filtered to 5µm, without condensates, lubricated or not
CONNECTION : G1/4
MAX ADMITTED PRESSURE (MAP) : 10 bar
FLOW COEFFICIENT (as per ISO6358) when fully open:
**C** : 3.29x10$^{-8}$ m$^3$/s.Pa (sonic conductance)
**b** : 0.44 (critical pressure ratio)
FLOW-RATE (Qv at 6 bar) : 1400l/min (ANR), when fully open
MAX LEAKAGE (at 6 bar) : 50l/min (ANR) (set-point at 0V)
FLUID TEMPERATURE : +5°C to +40°C
AMBIENT TEMPERATURE : +5°C to +40°C
SET-POINT-ANALOG : + or - 10 Volts (Impedance 100 kΩ)
MECHANICAL RESPONSE TIME : 5 ms (at 50% amplitude)
BANDWIDTH : 150 Hz (at -3 dB, and at 50% amplitude)


### CONSTRUCTION

Direct acting spool valve
Housing : treated light alloy
Internal parts : treated light alloy

### INSTALLATION

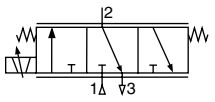
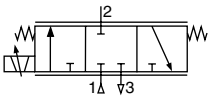
Assembly position: any
Comply with required air quality
Comply with electrical supply specifications

### ELECTRICAL CHARACTERISTICS

| Connection diameter | DC voltage* | Max power (W) | Max current (mA) | Insulation class | Protection rating | Electrical connection |
|---|---|---|---|---|---|---|
| G 1/4 | 24V = +/-10% | 30 | 1250 | F | IP65 | 7-pin connector DIN43651 |

*Max ripple : 10%
Electromagnetic compatibility : electrostatic discharge IEC 801-2 level 3
fast electrical transience (coupling clip) IEC 801-4 level 3

### EQUIPMENT SELECTION

| Connection diameter | "Failsafe" current function | | Load pressure (bar) | Max flow at 6 bar/ΔP1 bar (l/min-ANR) | CODES |
|---|---|---|---|---|---|
| G 1/4 |  | Pressure released (open center) | 0 - 10 | 1400 | **607 00 005** |
| |  | Flow held (closed center) | 0 - 10 | 1400 | **607 00 006** |

### OPTION

Floating input (1) _____ code : **010643**
(1) Common mode voltage accepted : ± 24V to ground

### ACCESSORIES

1 turn or 10 turn potentiometer
Pressure sensor
} (See page 7)

# SERVOTRONIC 3 PORT ELECTROPNEUMATIC PROPORTIONAL VALVE
## for **PRESSURE** control


3

### SPECIFICATIONS

CONTROLLED FLUIDS : Air or neutral gas, filtered to 5µm, without condensates, lubricated or not
CONNECTION : G1/4
CONTROL RANGE : 0-0.1 to 0-16 bar (see table below)
MAX ADMITTED PRESSURE (PMA) : (see table below)
FLOW COEFFICIENT (as per ISO6358) when fully open:
**C** : $3.29 \times 10^{-8}$ m³/s.Pa (sonic conductance)
**b** : 0.44 (critical pressure ratio)
FLOW-RATE (Qv at 6 bar) : 1400l/min (ANR), when fully open
MAX LEAKAGE (at 6 bar) : 50l/min (ANR) (set-point at 0V)
FLUID TEMPERATURE : +5°C to +40°C
AMBIENT TEMPERATURE : +5°C to +40°C
SET-POINT - ANALOG : 0 -10 Volts (Impedance 100 kΩ)
- DIGITAL (optional) : 8 bits + memory function
8 bits + pressure reset
HYSTERESIS : < 0,5 % of the PMR
INDEPENDENT LINEARITY : < 0,1 % of the PMR

### CONSTRUCTION

Direct acting spool valve
Housing : treated light alloy
Internal parts : treated light alloy

### INSTALLATION

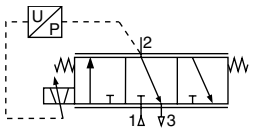
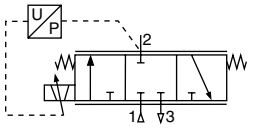
Assembly position: any
Comply with required air quality
Comply with electrical supply specifications

### ELECTRICAL CHARACTERISTICS

| Connection diameter | DC voltage* | Max power (W) | Max current (mA) | Insulation class | Protection rating | Electrical connection |
|---|---|---|---|---|---|---|
| G 1/4 | 24V = +/-10% | 30 | 1250 | F | IP65 | 7-pin connector DIN43651 |

*Max ripple: 10%
Electromagnetic compatibility : electrostatic discharge IEC 801-2 level 3
fast electrical transience (coupling clip) IEC 801-4 level 3

### EQUIPMENT SELECTION

| Connection diameter | Failsafe current function | Max flow at 6 bar/ΔP1 bar (l/min-ANR) | PMR control range (bar) | PMA (bar) | CODES |
|---|---|---|---|---|---|
| G 1/4 |  Pressure released (open center) | 1400 | 0 - 0.1 | 2 | **607 00 007** |
| | | | 0 - 0.5 | 2 | **607 00 008** |
| | | | 0 - 1 | 2 | **607 00 009** |
| | | | 0 - 3 | 8 | **607 00 010** |
| | | | 0 - 6 | 12 | **607 00 011** |
| | | | 0 - 10 | 12 | **607 00 012** |
| | | | 0 - 16 | 18 | **607 00 013** |
| |  Pressure held (closed center) | 1400 | 0 - 0.1 | 2 | **607 00 014** |
| | | | 0 - 0.5 | 2 | **607 00 015** |
| | | | 0 - 1 | 2 | **607 00 016** |
| | | | 0 - 3 | 8 | **607 00 017** |
| | | | 0 - 6 | 12 | **607 00 018** |
| | | | 0 - 10 | 12 | **607 00 019** |
| | | | 0 - 16 | 18 | **607 00 020** |

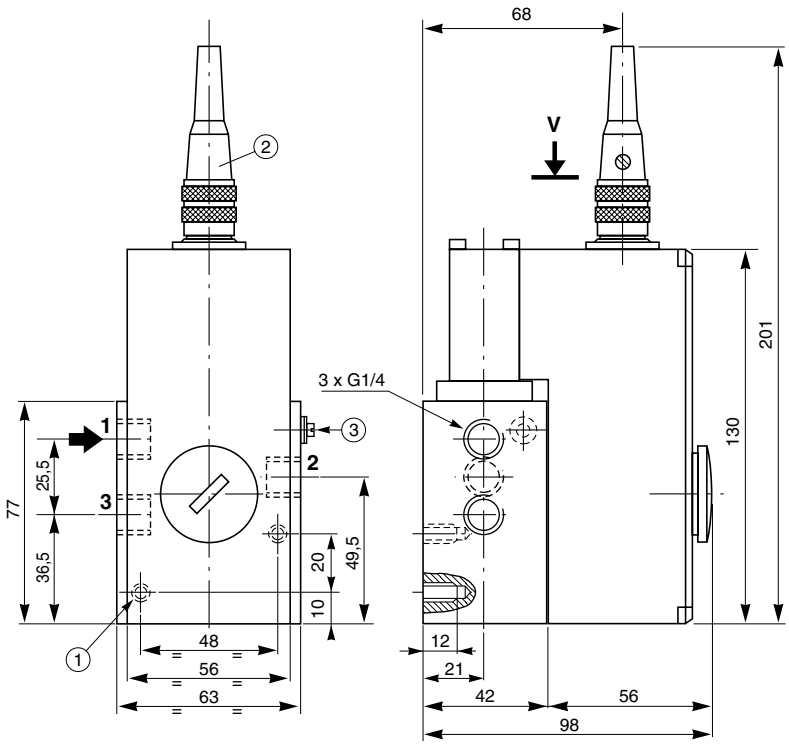
### OPTIONS

Analog set-point 0 - 20mA (Input impedance 500Ω) — code : **010644**
Analog set-point 4 - 20mA (Input impedance 500Ω) — code : **010645**
Floating input of set-point 0 - 20mA (1) — code : **010819**
Floating input of set-point 4 - 20mA (1) — code : **010820**
Pressure information output 0 - 20mA (max load 500Ω) — code : **010646**
Pressure information output 4 - 20mA (max load 500Ω) — code : **010647**
PNP pressure switch if set-point reached — code : **010648**
NPN pressure switch if set-point reached — code : **010649**
PNP pressure switch if set-point not reached — code : **010817**
NPN pressure switch if set-point not reached — code : **010818**
Digital set-point (8 bits + memory function) — code : **010650**
Digital set-point (8 bits + pressure reset) — code : **010651**
Additional spool control loop (2) — code : **010652**
(1) Common mode voltage accepted: ± 24V to ground
(2) Optional loop for pressure release version (open center)
The loop is included in the pressure held standard version (closed center)

**ACCESSORIES** : See page 7

## DIMENSIONS AND WEIGHT

Weight : 1.100 kg




(1) - Lower attachment : 2 ØM5 holes
Tapped depth: 12 mm

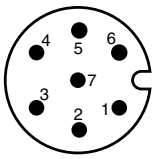
(2) - Electric connection by plug-in connector

(3) - External ground terminal

## CONNECTION CONNECTORS

Version : **analog** set-point

view along "V"
(solder side of female connector)




**Flow** control

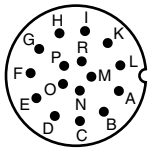
1 - +24V power supply
2 - Ground (power supply)
3 - + set-point input
4 - Ground (set-point)
5 - Not connected
6 - Not connected
7 - Not connected

**Pressure** control

1 - +24V power supply
2 - Ground (power supply)
3 - + set-point input
4 - Ground (set-point)
5 - 12V stabilized voltage output
(30 mA max)
6 - Pressure signal (pressure sensor output 0-10V for the pressure range in question)
7 - Not connected (standard)
On option : pressure switch output connection NPN or PNP
(500 mA max)

Version : **digital** set-point

view along "V"
(solder side of female connector)




**Pressure** control

A - +24V power supply
B - Ground (power supply)
C - Bit 1 (LSB)
D - Bit 2
E - Bit 3
F - Bit 4
G - Bit 5
H - Bit 6
I - Bit 7
K - Bit 8 (MSB)
L - Memory function (option 010650)
Pressure reset function (option 010651)
M - Not connected (standard)
On option: pressure switch output connection NPN or PNP (500 mA max)
N - Not connected
O - Not connected
P - Pressure signal (pressure sensor output 0-10V for the pressure range in question)
R - Not connected

*The digital set-point version is not proposed in the flow control mode.*

# ACCESSORIES FOR SERVOTRONIC CONTROL

To meet the complementary requirements of control installations, JOUCOMATIC proposes the following accessories:

## RELATIVE PRESSURE SENSORS

Associated with the SERVOTRONIC, for FLOW control, these sensors transmit upstream and downstream relative pressure information in order to calculate the real flow-rate after taking the atmospheric pressure value into consideration.



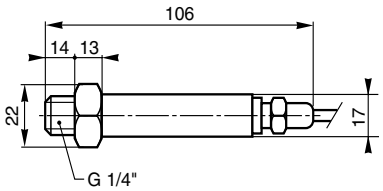
### EQUIPMENT SELECTION

| Pressure range (bar) | CODES | |
|---|---|---|
| | Voltage output 0 - 10V | Current output 0 - 20 mA |
| 0 - 20 | **603 00 022** | **603 00 027** |
| 0 - 10 | **603 00 023** | **603 00 028** |
| 0 - 5 | **603 00 024** | **603 00 029** |
| 0 - 3 | **603 00 025** | **603 00 030** |
| 0 - 2 | **603 00 026** | **603 00 031** |
| 0 - 1 | **603 00 104** | **603 00 105** |

### ELECTRICAL CHARACTERISTICS

- Power supply voltage : 24V DC= ±10%
- Protection level : IP 65
- Precision class : 0.5
- 3 conductor cable output, length 2m
  Brown = +24V
  White = output
  Green= ground

### DIMENSIONS




## SET-POINT POTENTIOMETER

Combined with the SERVOTRONIC unit, for PRESSURE control, the potentiometer provides manual control of the set-point.

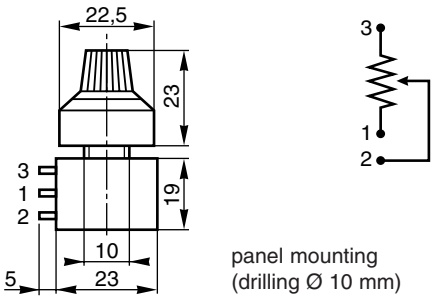
Photo : model / fine adjustment, 10 turns

### EQUIPMENT SELECTION

| Designation | CODE |
|---|---|
| 1 turn adjustment | **603 00 042** |
| Fine 10 turn adjustment | **603 00 043** |

Ohmic value: 10 kΩ (linear)

### DIMENSIONS




panel mounting
(drilling Ø 10 mm)