User Manual
42813893
Ref. 8520.8051/06- EN

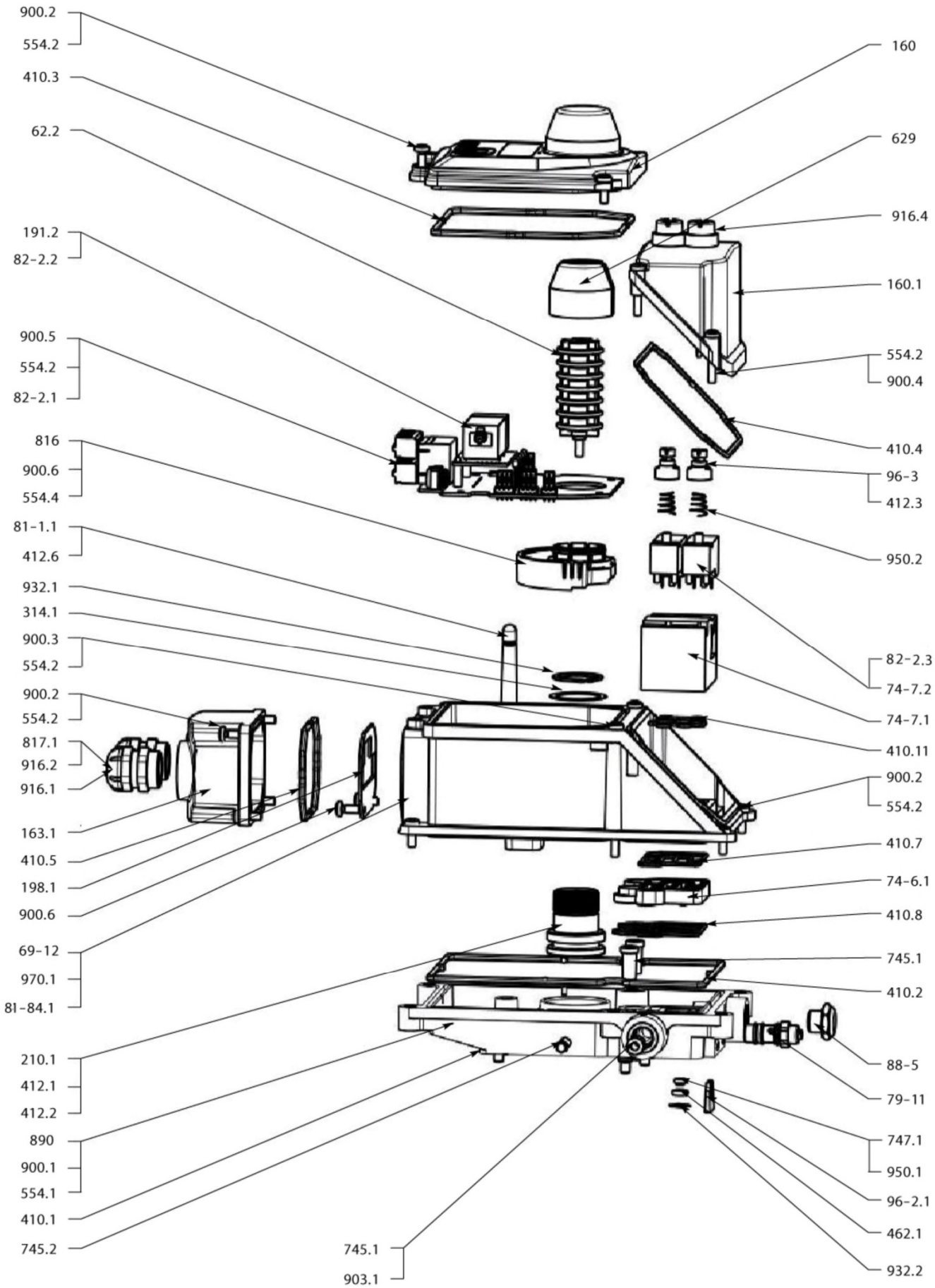
SMARTRONIC PC R1312

Intelligent control box for Profibus DP compatible pneumatic actuators

Different versions of SMARTRONIC PC units ref. R1312

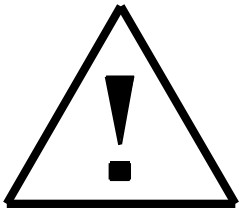
- Programmed **open/close function**
- Intelligent **positioner function**
- External sensor **surveillance function**
- **Regulation** function
- Filter facade **regulation function**
- **RS485** communication
- **Ethernet** communication
- **WiFi** communication

Optional Profibus DP network compatibility for all versions.


900.2
554.2
410.3
62.2
191.2
82-2.2
900.5
554.2
82-2.1
816
900.6
554.4
81-1.1
412.6
932.1
314.1
900.3
554.2
900.2
554.2
817.1
916.2
916.1
163.1
410.5
198.1
900.6
69-12
970.1
81-84.1
210.1
412.1
412.2
890
900.1
554.1
410.1
745.2
745.1
903.1
160
629
916.4
160.1
554.2
900.4
410.4
96-3
412.3
950.2
82-2.3
74-7.2
74-7.1
410.11
900.2
554.2
410.7
74-6.1
410.8
745.1
410.2
88-5
79-11
747.1
950.1
96-2.1
462.1
932.2

Item No.	Description	Material
160	Cover	Polycarbonate SM60/0
160.1	Distributor cover	Polycarbonate SM60/0
163.1	Housing	Polycarbonate SM60/0
191.2	Support	PA 6.6
198.1	Connection plate	
210.1	Drive shaft	Polycarbonate SM60/0
314.1	Friction washer	Stainless steel 304L
410.1	Profiled seal	NBR 70
410.2	Profiled seal	NBR 70
410.3	Profiled seal	NBR 70
410.4	Profiled seal	NBR 70
410.5	Profiled seal	NBR 70
410.7	Profiled seal	NBR 70
410.8	Profiled seal	NBR 70
410.11	Profiled seal	NBR 70
412.1	O-ring	NBR 70
412.2	O-ring	NBR 70
412.3	O-ring	NBR 70
412.6	O-ring	NBR 70
462.1	Countersunk washer	
554.1	Washer	Stainless steel
554.2	Washer	Stainless steel
554.4	Toothed washer	Steel
62.2	Adjustable cam S/A	
629	Visual index S/A	
69- 12	Unit	Polycarbonate SM60/0
74- 6.1	Distribution plate	
74- 7.1	Distributor	
74- 7.2	Pilot	
745.1	Sintered filter	
745.2	Sintered filter	Bronze
747.1	Valve profiled seal	
79- 11	1/8” RP flow rate limiter	
81- 1.1	Antenna connector S/A	
81- 84.1	Coupling diagram	
816	Angular sensor S/A	
817.1	Plug	
82- 2.1	Printed board	
82- 2.2	COM card S/A	
82-2.3	COM card S/A electro valve	
88- 5	BSP 1/4” silencer	Bronze
96- 2.1	Adjuster lock plate	Polycarbonate SM60/0
96- 3	Emergency control	Polycarbonate SM60/0
890	Base	Polycarbonate SM60/0
900.1	Screw	A2 - 70
900.2	Pozidriv screw	A2 - 70
900.3	Pozidriv screw	A2 - 70
900.4	Pozidriv screw	A2 - 70
900.5	Pozidriv screw	A2 - 70
900.6	Self-tapping screw	A2 - 80
903.1	Plug	
916.1	Threaded plug	
916.2	Protective plug	Rubber
916.4	Ball	Stainless steel
932.1	Spring retaining ring	Steel
932.2	Reinforced self-locking retaining ring	Steel
950.1	Valve spring	
950.2	Lockable control spring	Stainless steel
970.1	Label	polyester + adhesive

Warnings



CAUTION!

Installation and commissioning of the electropneumatic actuators must be carried out in accordance with instrumentation professional standards, and in particular:

Piping:
When commissioning a new or modified installation, the piping must be blown through before connecting the actuator in order to clear the circuit of any impurities, which cannot be avoided during construction (iron filings, scale, Teflon, welding flux, etc.).

Electric wiring:
The power supply voltage and the value of the control signal must be checked before final connection.

SMARTRONIC PC unit:
The cover and connection housing must be properly closed to protect the contents from humidity and, generally, from the outer atmosphere ("aggressive" atmosphere, dust, etc.) and any incidents which could damage the internal parts.

Connection by cable gland:
When the electric connection is made through a cable gland, make sure that:
- the cable gland is suitable for the cable diameter
- the cable gland is correctly tightened on the cable
- if just one of the 2 cable glands is used, replace the unused cable gland with a watertight plug or seal the cable gland

The pneumatic connection must be made according to the product specifications.
(see IV - 1 Pneumatic connection)

Never exceed the values indicated in this manual!

This unit is an electrical device which contains pressurized gas components. As such, it may be a source of danger for property or even personnel. Exceeding the values indicated could result in damage.

Never uncouple or dismantle the SMARTRONIC PC unit or its accessories when pressurised or powered up.

Always make sure that the actuator reservoirs are decompressed by operating the push-buttons of the pilot emergency controls before disassembling the distributor, its solenoid valves or the unit itself.
Also, always check that the power supply cables are disconnected from the power source before dismantling.

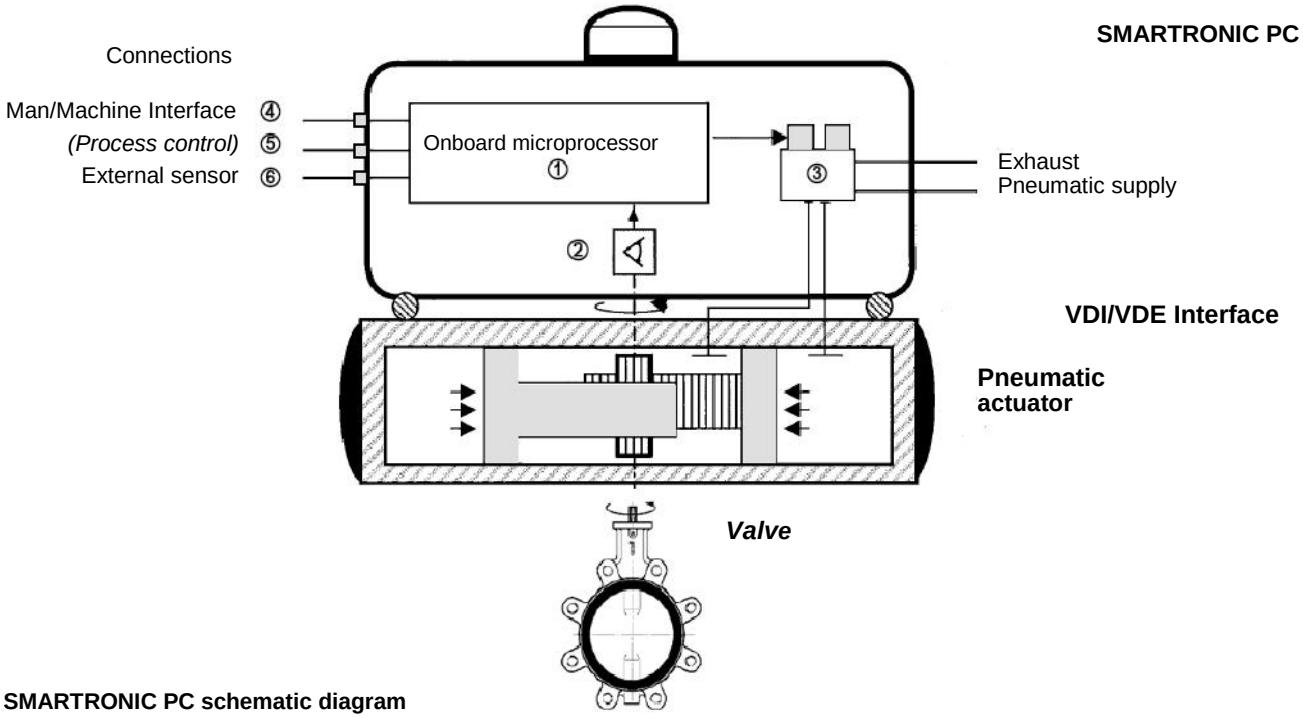
During checks in the workshop or on site, the valve associated with the actuator and its SMARTRONIC PC unit must be operated from fully open to fully closed.
This operation could present a very high risk of injury unless minimum safety measures are taken to prevent access between the disc and the seat.

Contents

I - Introduction

I - 1 General

The SMARTRONIC PC R1312 control unit is designed to control the quarter-turn actuators of the ACTAIR and DYNACTAIR range by direct surface mounting on the standardised VDI/VDE 3845 interface.
It provides both the direct pneumatic and mechanical link with the actuator chambers.
The positioner can also be mounted on any other VDI/VDE 3845 actuator using an adapter kit (see §X - Spare parts kit)
Combining all the functions of pneumatic distribution, detection and position feedback, it enables advanced control, command and surveillance functions over the valve/actuator unit thanks to the inclusion of a programmable microprocessor card.



SMARTRONIC PC schematic diagram

① **Onboard microprocessor:**
Programmed to manage all information, run the control and command algorithms specific to each version of SMARTRONIC PC. Manages communication with the MMI, the process control system or via fieldbus (Profibus DP).

② **Position monitoring:**
The valve position is read using a resistive angular sensor mounted on the actuator rotation axis. This information is transmitted to the microprocessor and the PLC for processing.
The angular sensor is fitted with a declutchable system: adjustment of sensor travel over the stroke of the actuator is automatic.

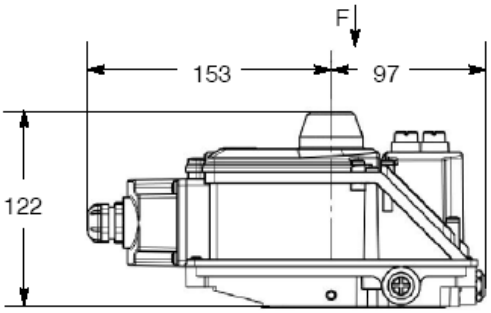
③ **Built-in pneumatic control:**
The pneumatic electrodistributor is integrated into the SMARTRONIC PC unit.
Drive air transmission is via the VDI/VDE interface without external connection (up to ACTAIR 200 and DYNACTAIR 100). The distributor is of the on/off type with 4 holes, 3 positions. It is controlled by 2 N/Closed (normally closed) or N/Open (normally open) solenoid valves.
The no power failsafe position (Open or Closed) is specific to each device and must be specified when the equipment is ordered.

④ **Connection to the Man/Machine interface:**
Configuration of the SMARTRONIC PC unit and real time observation of its behaviour is carried out with a PC via a serial, Ethernet or WiFi connection.

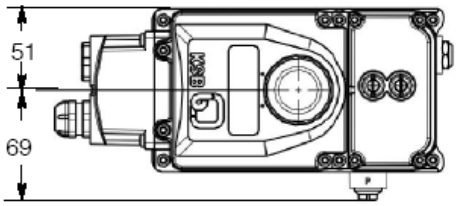
⑤ **Connection to the process control system:**
The SMARTRONIC PC unit control information can be sent by wire or through a fieldbus (Profibus DP) to the PLC, the supervisor.

⑥ **Connection to the external sensor:**
An analogue external sensor on the process can be connected to the SMARTRONIC PC unit which directly processes the reading. This can be used for process regulation or monitoring purposes.

Dimensions (mm)



View along F

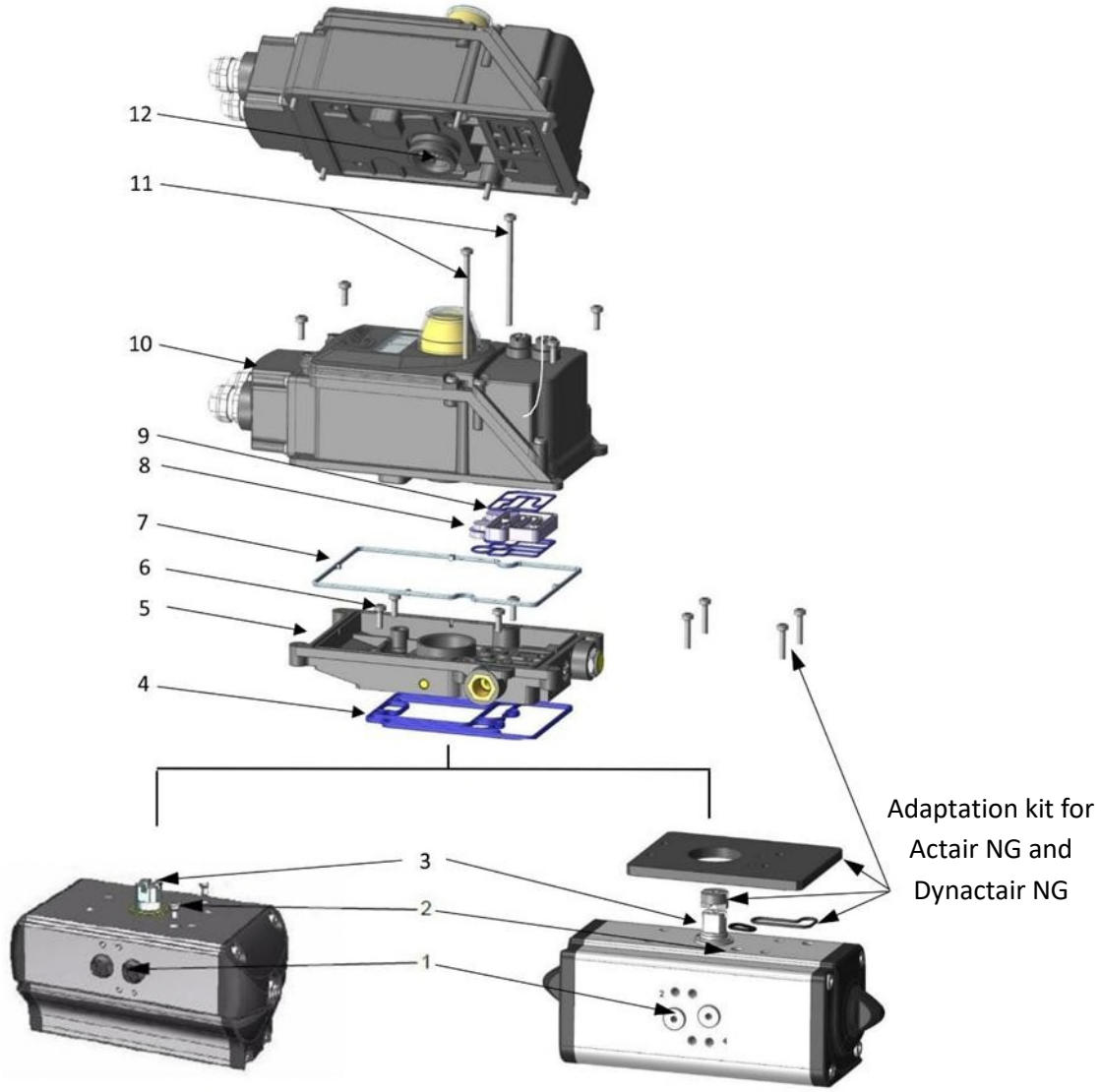


I - 2 Technical characteristics

Environment	
Standard protection class	IP 67 according to EN 60529
Electromagnetic Compatibility	Complies with European directive 2004/108/CE according to standards NF EN 61000-6-2 and NF EN 61000-6-4
WiFi version	Complies with European directive 1999/5/EC (R&TTE)
Climatic class	- Working temperature: - 30°C to + 80°C - Working temperature: - 20°C to + 80°C
Vibrations	- According to IEC 68-2-6 Test Fc
Unit	
Material	PC 20% Fibreglass
Position signalling	By visible pointer on the cover
Pneumatic connection	2 X 1/4"GAS
Electric connection	- To MMI (RS485 and Ethernet versions): 5 pin M12 female connector, - To MMI (WiFi version): WiFi antenna - To PLC and external sensor: 2 cable glands accepting dia. 6 to 12mm cable
Internal connectors	- Spring connection - Length to be stripped: 8mm - Accepts rigid or flexible 0.14sq.mm (26 AWG) to 0.5sq.mm (20 AWG) gauge conductors - Accepts flexible conductors with end connector without insulating entry cone, gauge 0.25sq.mm (23 AWG) to 0.5sq.mm (20 AWG)
Weight	1.70kg
Pneumatic distribution	
Pressure connection	Hole "P" fitted with an internal filter
Exhaust connection	Hole "E" equipped with a silencer or connectable to an exhaust network
Operating pressure	3 to 8 bar (30 to 115psi).
Filtration level	ISO 8573 -1 (2001) class 7 (< 40µm)
Dew point	ISO 8573 -1 (2001) class 5 (<7°C and in all cases <5°C at ambient temperature)
Lubrication	ISO 8573 -1 (1991) class 5 (< 25mg/m3)
Maximum flow rate	400Nl/min
Consumption when idle	none
Electrical distribution	
Max. voltage	30V DC
Min. voltage	20V DC
Consumption	6.3W max

II - Assembly on pneumatic actuator

II - 1 ACTAIR 3 to 200, ACTAIR NG 2 to 160, DYNACTAIR 1.5 to 100 and DYNACTAIR 1 to 80



A- Check that the actuator has both plugs (item 1) on the external supply holes.

B- Remove the two screws with seals (item 2) (TORX T20 screwdriver).

C- Separate the unit (item 10) from the base (item 5) by unscrewing the 6 screws (item 11) (TORX T20 screwdriver).

D- Remove distribution plate A or B (item 8) with both gaskets, item 9.

E- Attach the base (item 5) to the actuator with the 4 screws (item 6) (TORX T20 screwdriver).
Tightening torque = 2.5 Nm

Check the correct position of the seal, item 4.

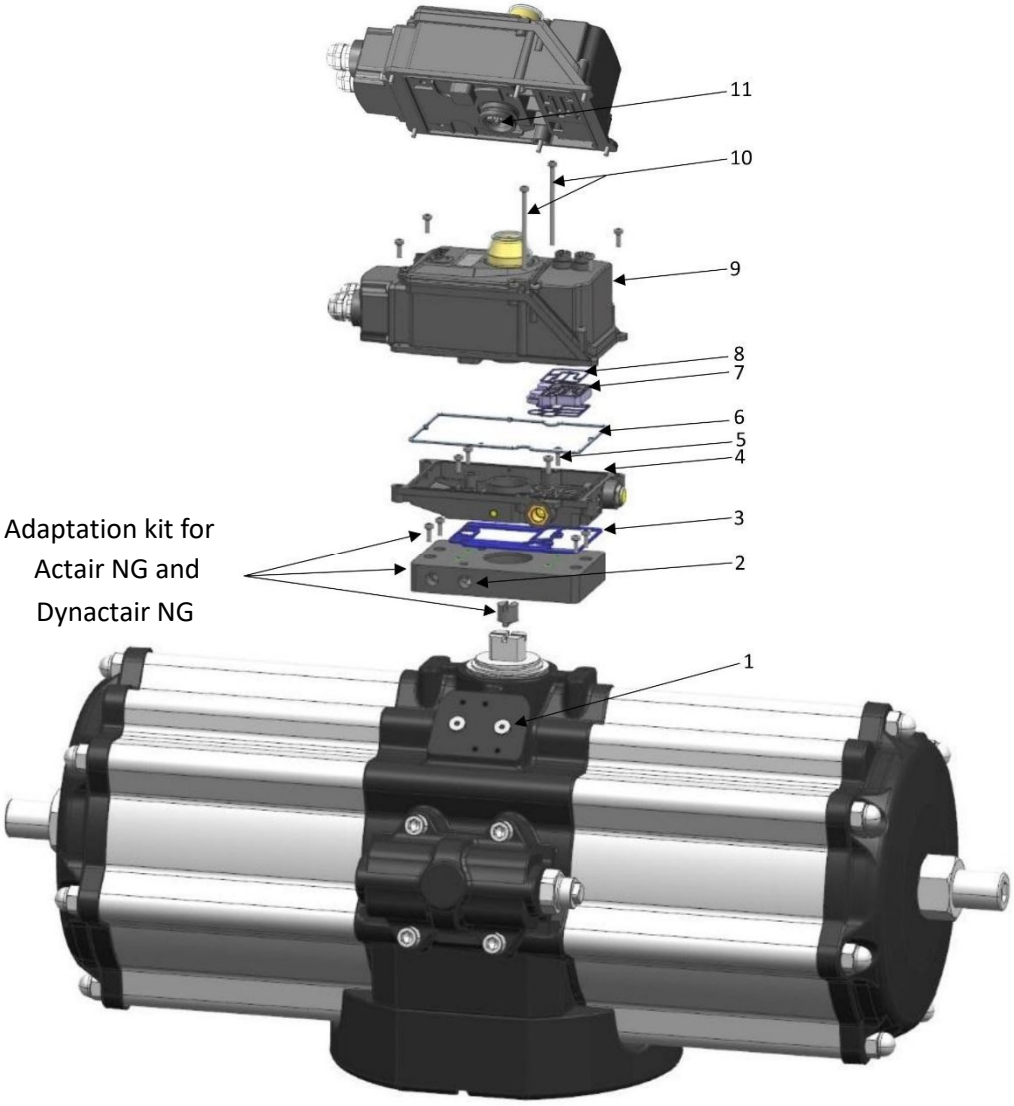
F- Reposition distribution plate A or B (item 8) with its two seals, item 9

Check the correct position of the seal, item 9.

G- Position the unit (item 10) on the base (item 5) taking care to engage the column (item 12) with the actuator shaft (item 3) and tighten the 6 M4 screws (item 11) (TORX T20 screwdriver).

Check the correct position of the seal, item 7.

II – 2 ACTAIR NG 240 to 700 and DYNACTAIR NG 120 to 350



A- Position the adaptations elements for Actair NG and Dynactair NG

B- Fix the adapter kit plate to the actuator interface with 4 M5 screws

C- Separate the unit (item 9) from the base (item 4) by unscrewing the 6 screws (item 10) (TORX T20 screwdriver).

D- Remove distribution plate A or B (item 7) with its two seals (item 5).

E- Fix the base (item 4) to the actuator using 4 M5 screws + seals + washers (item 5) (TORX T20 screwdriver).
Tightening torque = 2.5 Nm

Check the correct position of the seal (item 3).

F- Reposition distribution plate A or B (item 7) with its two seals (item 8).

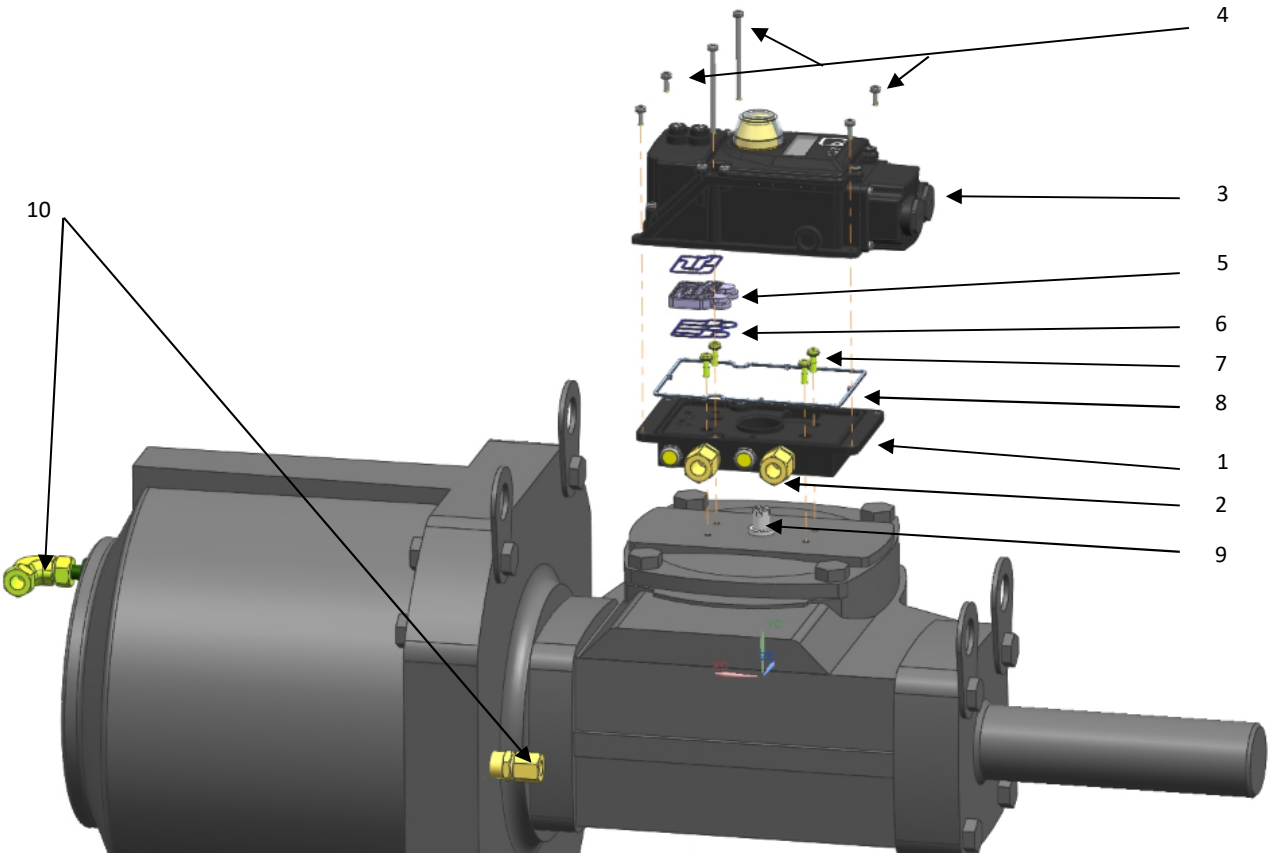
Check the correct position of the seal (item 8).

G- Position the unit (item 9) on the base (item 4) taking care to engage the column (item 11) with the adapter and tighten the 6 M4 screws (item 10) (TORX T20 screwdriver).

Check the correct position of the seal (item 6).

II - 3 ACTAIR 400 to 1600 and DYNACTAIR 200 to 800 and other ¼ turn actuators

These instructions only relate to pneumatic ¼ turn actuators whose flange complies with VDI/VDE 3845 with the following dimensions: A = 80 mm; B = 20 mm (actuator shaft height).
For the other VDI/VDE dimensions, please contact us.



A – Check that the base (item 1) supplied with the unit is intended for this type of actuator.
It must have two ¼" gas pneumatic openings (item 2 - connections not supplied) on the side, to supply the actuator chambers).

B – Separate the unit (item 3) from the base (item 1) by unscrewing the 6 M4 screws (item 4) (TORX T20 screwdriver).

C – Remove distribution plate A or B (item 5) with its two seals (item 6)

D – Fix the base (item 1) to the actuator using 4 M5 screws + seals + washers (item 7) (TORX T20 screwdriver)

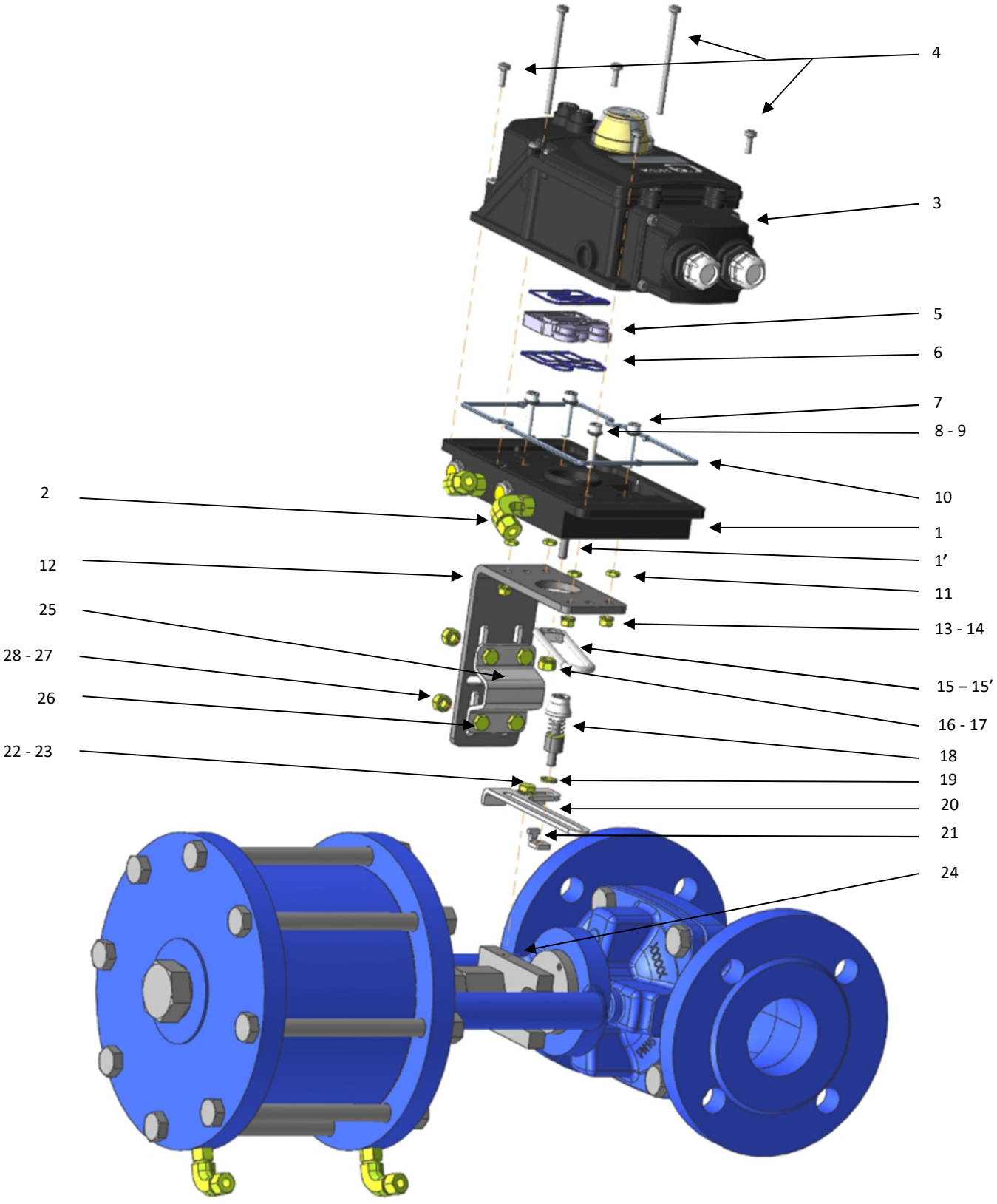
E – Reposition distribution plate A or B (item 5) with its two seals (item 6)

Check that the seal is correctly positioned (item 8)

F – Position the unit (item 3) on the base (item 1) taking care to engage the white shaft of the unit with the shaft (item 9) of the actuator and tighten the 6 M4 screws (item 4) (TORX T20 screwdriver)

G – The openings of the base (2 x ¼'' G) (item 2) must be connected to the pneumatic actuator (item 10) as shown in the actuator instructions.

II - 4 Linear actuators



These instructions only relate to linear pneumatic actuators which comply with VDI/VDE 3847 with rod-shaped pillars:
For the other actuator types, please contact us.

A – Check that the base (item 1) supplied with the unit is intended for this type of actuator.
It must have two ¼" gas pneumatic openings (item 2 - connections not supplied) on the side, to supply the actuator chambers).

B – Separate the unit (item 3) from the base (item 1) by unscrewing the 6 M4 screws (item 4) (TORX T20 screwdriver).

C – Remove distribution plate A or B (item 5) with its two seals (item 6)

D – Fit a washer (item 9) and an O-ring (item 8) on each of the 4 M5 screws (item 7)

E – Tighten these 4 screws onto the base (item 1) with the 4 low-profile nuts (item 11)

F – Fix the base (item 1) to the plate (item 12) by tightening the 4 screws (item 7) and the washers (item 13) and nuts (item 14)

The base can be positioned every 180° according to requirements/ constraints

G – Mount the fluted rivet (item 15') on the driver (item 15). Mount the unit onto the shaft (item 1') and tighten with the nut (item 17) and washer (item 16)

H – Reposition distribution plate A or B (item 5) with its two seals (item 6)

Check that the seal is correctly positioned (item 10)

I – Position the unit (item 3) on the base (item 1) taking care to engage the white shaft of the unit with the shaft (item 1) of the base and tighten the 6 M4 screws (item 4) (TORX T20 screwdriver)

J – Mount the sub-assembly (item 18) fitted with the washer (item19) on the plate (item 20) by tightening it onto the counterplate (item 21)

K – Fix the assembled plate (item 20) onto the valve slider (item 24) with the screws (item 22) and washers (item 23).

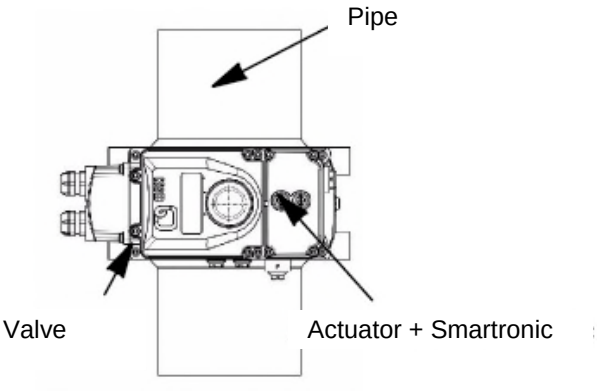
L – Fix the plate (item 12) to one of the actuator pillars using the plate (item 25) by tightening the 4 screws (item 26) and the washers (item 27) and nuts (item 28)

Adjust the position of the plate (item 12) and the sub-assembly (item 18) so that the sub-assembly (item 18) slides in the driver (item 15) (without exiting) over the entire valve stroke.

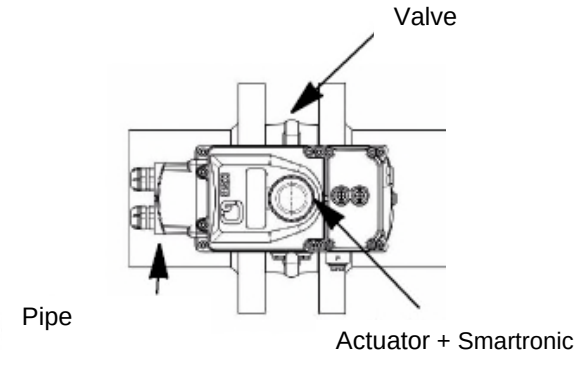
III - Assembling the SMARTRONIC R1312/Actuator assembly on the valve

Use of an angular sensor with no mechanical stops makes it easier to assemble the positioner on the valve.
It is essential to perform a complete opening/closing cycle up to the actuator mechanical stops so that the angular sensor takes up the correct position.

Assembly N



Assembly

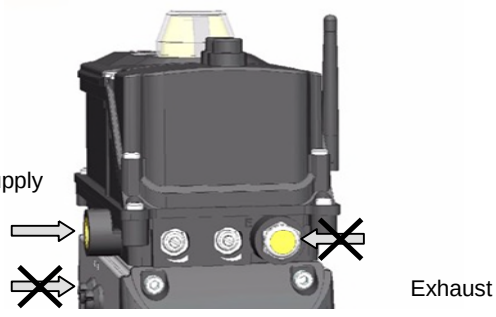


IV - Pneumatic supply

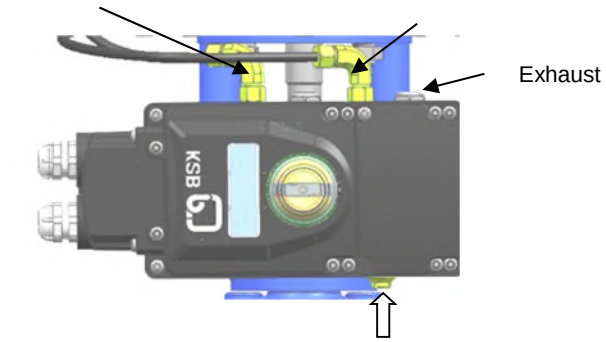
IV - 1 Pneumatic connection

Before making any pneumatic connections, check that there are no impurities in the piping, especially when starting the installation. As a safety measure, a sintered bronze filter is fitted in the unit intake hole to prevent the pneumatic distributor from being blocked or damaged by impurities.
This filter can be cleaned: take it out and clean it with a solvent and/or compressed air.

Direct pneumatic connection



Pneumatic connection by piping



- The connection is made on the SMARTRONIC PC unit.
- Operating pressure: 3 to 8bar (44 to 115psi)
- Pressure connection: hole "P"
- Exhaust connection: hole "E" equipped with a silencer or connectable to an exhaust network.

Caution: When used as a position regulator, use air lubricated between 5 and 25mg/m^3 to prevent premature wear of the actuator mechanical parts.

Attention: If severe vibrations are expected or excessive tensile strain (max. 80 kg) needs to be prevented at the ¼" gas thread connections, the use of flexible tubing is strongly recommended for pneumatic connection.

IV - 2 Mechanical adjustment of the operating time

Mechanical adjustment of the operating time is carried out in the factory to obtain the best accuracy/speed balance for the positioner.
Mechanical modification of the operating times could prevent the positioner from operating correctly.
After making these modifications, it is essential to perform self-calibration.
Opening and closing times of at least 0.5s must be respected for self-calibration to be carried out correctly.

The valve operating time can be adjusted using the adjustment screws located on the side of the base, beside the exhaust hole. Adjustment is carried out directly with a 4mm flat screwdriver.

Procedure:
- Adjust the adjustment screws depending on the type of actuator used.
- Restart self-calibration.

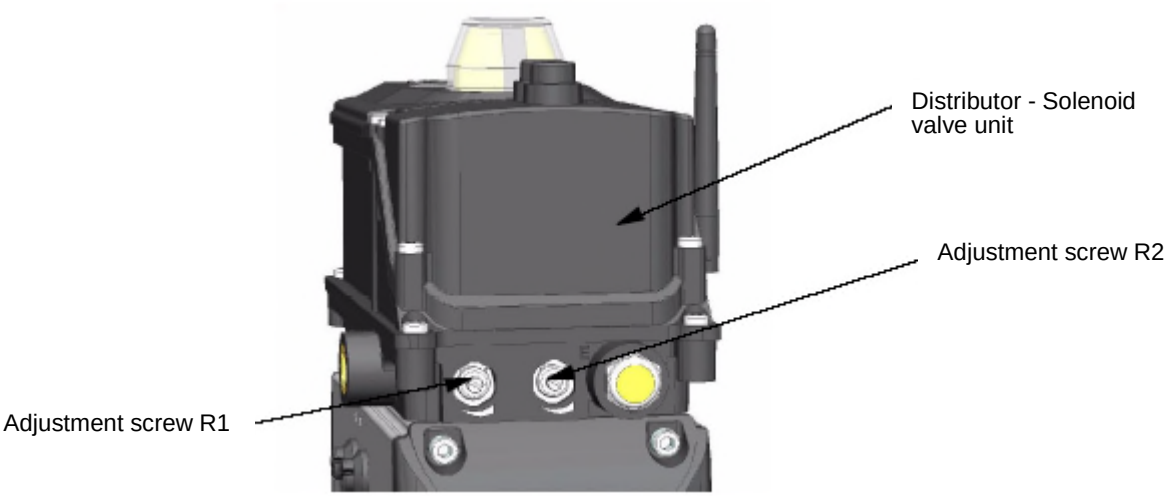
For information, the following minimum operating times can be obtained:
(reducing the operating time may impair positioning accuracy)

Double-acting actuators	
Type	Min. operating time
ACTAIR 3	1 second
ACTAIR 6	1 second
ACTAIR 12	2 seconds
ACTAIR 25	4 seconds
ACTAIR 50	5 seconds
ACTAIR 100	6 seconds
ACTAIR 200	9 seconds
ACTAIR 400	25 seconds
ACTAIR 800	50 seconds
ACTAIR 1600	90 seconds

Single-acting actuators	
Type	Min. operating time
DYNACTAIR 1.5	2 seconds
DYNACTAIR 3	2 seconds
DYNACTAIR 6	2 seconds
DYNACTAIR 12	4 seconds
DYNACTAIR 25	6 seconds
DYNACTAIR 50	10 seconds
DYNACTAIR 100	15 seconds
DYNACTAIR 200	45 seconds
DYNACTAIR 400	90 seconds
DYNACTAIR 800	180 seconds

Single-acting actuators	
Type	Min. operating time
ACTAIR NG 2	1 second
ACTAIR NG 5	1 second
ACTAIR NG 10	1 second
ACTAIR NG 15	2 seconds
ACTAIR NG 20	2 seconds
ACTAIR NG 30	2 seconds
ACTAIR NG 4020	3 seconds
ACTAIR NG 60	3 seconds
ACTAIR NG 80	5 seconds
ACTAIR NG 120	7 seconds
ACTAIR NG 160	9 seconds
ACTAIR NG 240	17 seconds
ACTAIR NG 340	18 seconds
ACTAIR NG 500	30 seconds
ACTAIR NG 700	40 seconds

Single-acting actuators	
Type	Min. operating time
DYNACTAIR NG 1	1 second
DYNACTAIR NG 2	1 second
DYNACTAIR NG 4	1 second
DYNACTAIR NG 6	3 seconds
DYNACTAIR NG 8	3 seconds
DYNACTAIR NG 12	4 seconds
DYNACTAIR NG 16	6 seconds
DYNACTAIR NG 25	8 seconds
DYNACTAIR NG 35	11 seconds
DYNACTAIR NG 50	16 seconds
DYNACTAIR NG 80	23 seconds
DYNACTAIR NG 120	14 seconds
DYNACTAIR NG 160	16 seconds
DYNACTAIR NG 240	27 seconds
DYNACTAIR NG 350	37 seconds



ACTAIR 3 to 200 and ACTAIR NG 2 to 160	R1	R2
Stop on closing (standard version)	Closing time	Opening time
Stop on opening (upon request)	Opening time	Closing time

DYNACTAIR 1.5 to 100 and DYNACTAIR NG 1 to 80	Safety position on loss of pneumatic supply	R1	R2
DYNACTAIR 1.5 to 25	Closing	Closing time	Not active
DYNACTAIR 50 and 100	Opening	Not active	Opening time
DYNACTAIR NG 1 to 80	Opening	Not active	Opening time
DYNACTAIR 1.5 to 25	Opening	Opening time	Not active
DYNACTAIR 50 and 100	Closing	Not active	Closing time
DYNACTAIR NG 1 to 80	Closing	Not active	Closing time

VI - 3 Use of emergency manual controls

Note: the emergency manual controls are only available when the SMARTRONIC PC unit uses 2 Normally closed solenoid valves:

Case N°1:

- ACTAIR 3 to 200, end-stops on closing
- ACTAIR NG 2 to 160, end-stops on closing
- DYNACTAIR 1.5 to 25, closing by air failure, end-stops on closing
- DYNACTAIR 50, opening by air failure, end-stops on opening.
- DYNACTAIR NG 1 to 80, opening by air failure, end-stops on opening

Valve failsafe position on loss of electrical supply	EV1 = 0 EV2 = 0	EV1 = 1 EV2 = 0	EV1 = 0 EV2 = 1
STOP (stays in position)	STOP (stays in position)	Closed	Open
Closed	Emergency manual controls not available		
Open			

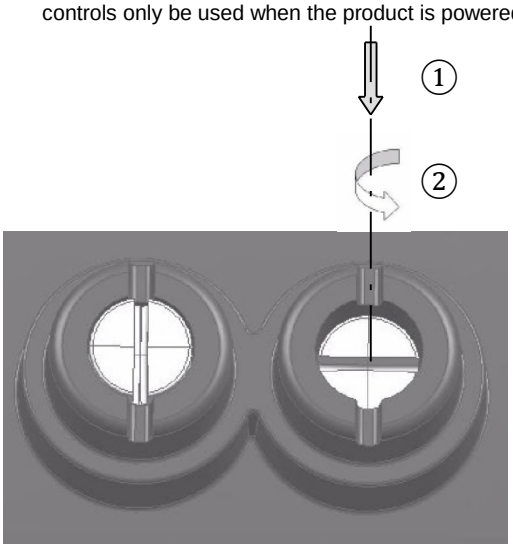
Case N°2:

- ACTAIR 3 to 200, end-stops on opening
- ACTAIR NG 2 to 160, end-stops on opening
- DYNACTAIR 1.5 to 25, opening by air failure, end-stops on opening
- DYNACTAIR 50, closing by air failure, end-stops on closing.
- DYNACTAIR NG 1 to 80, closing by air failure, end-stops on closing

Valve failsafe position on loss of electrical supply	EV1 = 0 EV2 = 0	EV1 = 1 EV2 = 0	EV1 = 0 EV2 = 1
STOP (stays in position)	STOP (stays in position)	Open	Closed
Closed	Emergency manual controls not available		
Open			

External emergency controls can be used to operate the solenoid valves manually.

To avoid any interference with the solenoid valve electrical controls, it is recommended that emergency controls only be used when the product is powered off.



The emergency controls are fitted with a locking mechanism.
To activate an emergency control:

1. Push the emergency control
2. Rotate through 90° to lock into position.

EV2 = 0 EV1 = 1

To understand the action of the EV1 and EV2 controls, please refer to chapter VI, Pneumatic distribution.

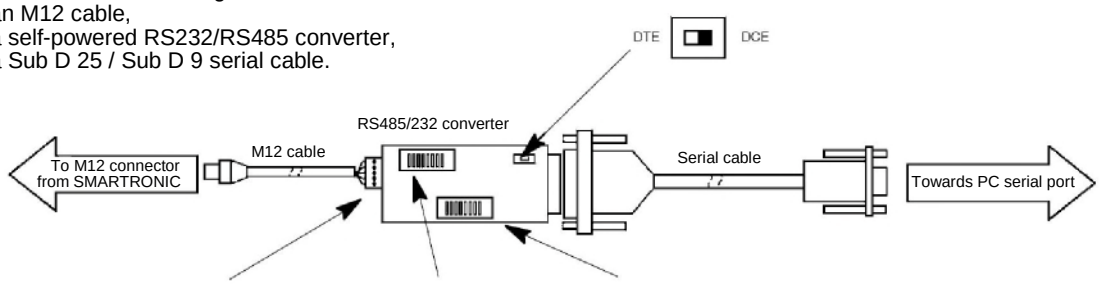
V - Connecting the Man Machine interface

The SMARTRONIC PC unit is configured using a Man Machine Interface when it is commissioned: this is used to set the parameters needed for the valve/actuator assembly to operate with reference to the process characteristics.
This interface can also be used to view valve operation when it is controlled by a process control system (PLC, regulator).
Depending on the type of SMARTRONIC PC unit ordered, a serial, Ethernet or WiFi connection may be used. A specific connection kit is provided for serial or Ethernet connection.

V - 1 Connection using a serial link RS485 (SMARTRONIC PC R001312/00000..R7….061)

V-1-1 Kit de connexion RS232

Connection kit consisting of:
- an M12 cable,
- a self-powered RS232/RS485 converter,
- a Sub D 25 / Sub D 9 serial cable.



Grey	GND
Brown	R+
White	R-
Blue	T+
Black	T-

1	ON
2	ON
3	ON
4	ON
5	OFF
6	OFF
7	ON
8	OFF

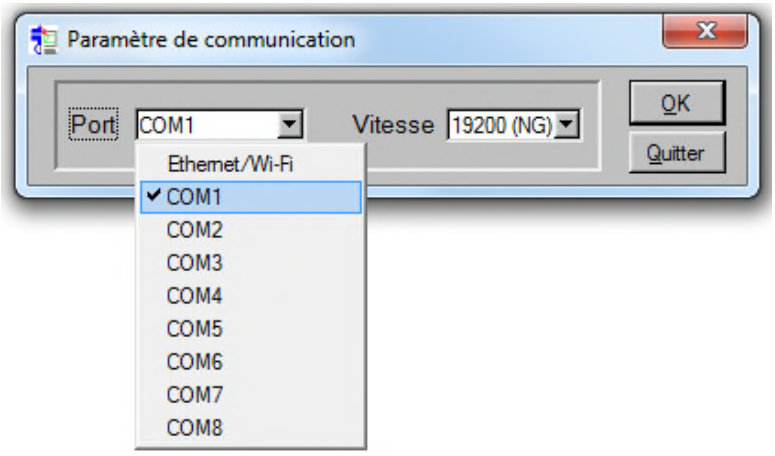
1	ON
2	OFF
3	ON
4	ON
5	OFF
6	ON
7	ON
8	OFF

Make the connections according to the diagram above, checking the configuration of each of the switches on the converter.

Installation of the SMARTRONIC PC software:

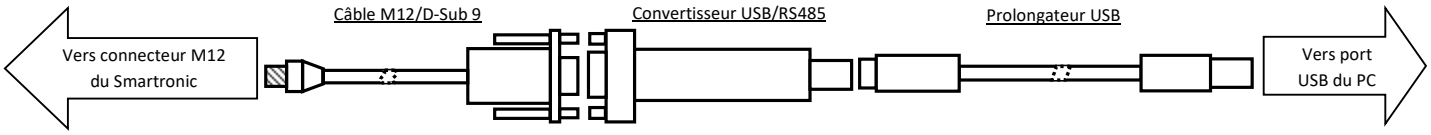
- Install the Smartronic PC software using the KSD CD supplied or by downloading it from www.ksb.com.

- When the software is run, select the COM port to which the connection kit is plugged in

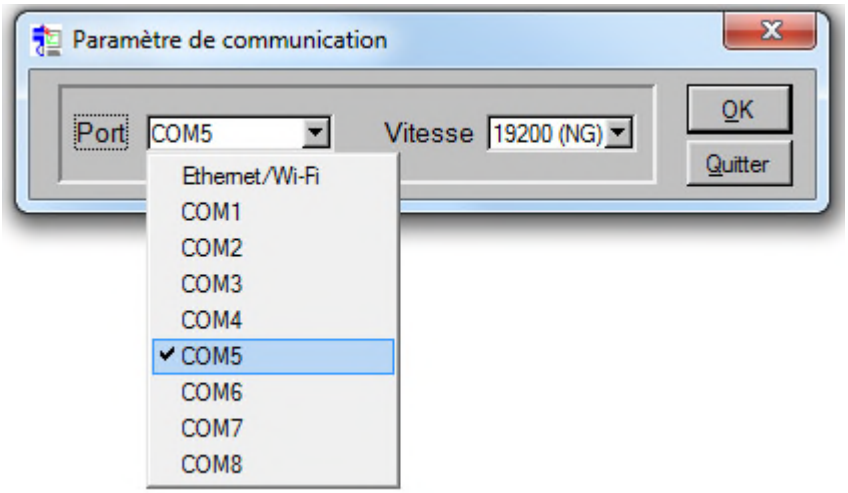


V-1-2 USB connection kit (new version)

The connection kit consists of:
- M12/D-Sub 9 cable
- USB/RS485 converter + installation CD
- USB extension



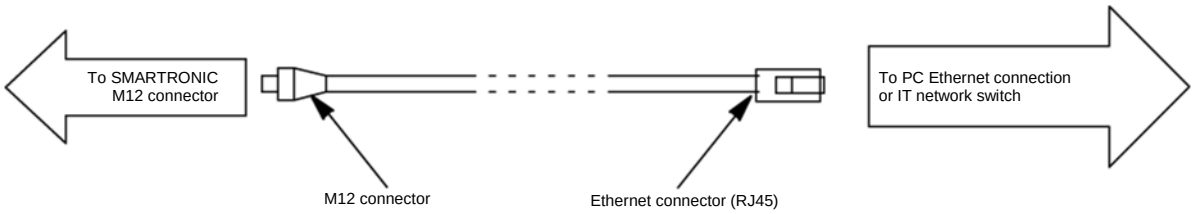
- Install the USB/RS485 converter driver (CD supplied with the kit)
- Install the Smartronic PC software using the KSD CD supplied or by downloading it from www.ksb.com.
- When the software is run, select the COM port to which the USB/RS485 is connected (see Control Panel>Device Manager



For “new generation” SMARTRONIC PC R1312 units, select speed “19200 (NG)”.
For “earlier generation” SMARTRONIC PC R1148 units, select speed “9600”.

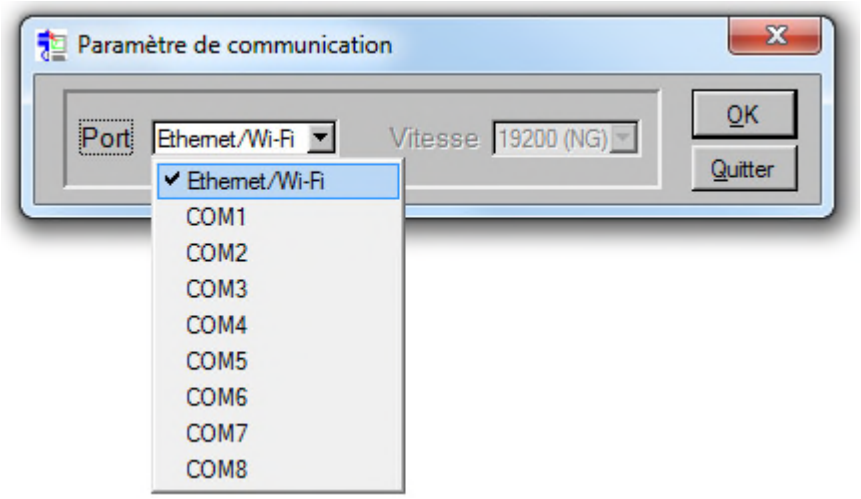
V - 2 Connection using an Ethernet link (SMARTRONIC PC R001312/00000..R7….062.)

Connection kit consisting of an Ethernet/M12 cable:

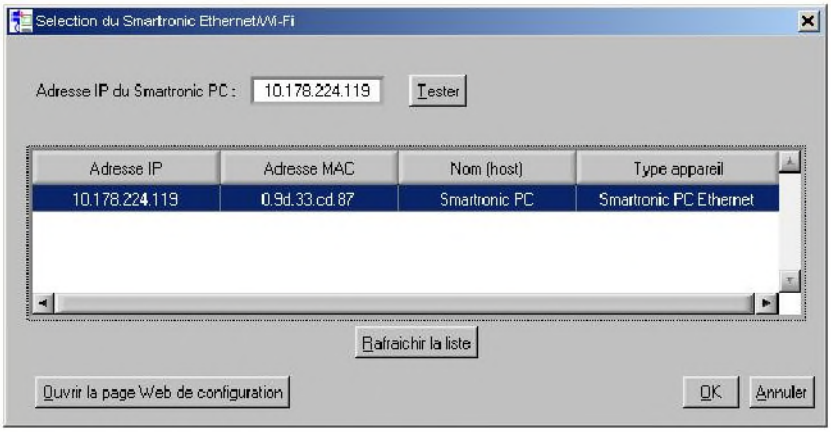


Installation du logiciel SMARTRONIC PC :

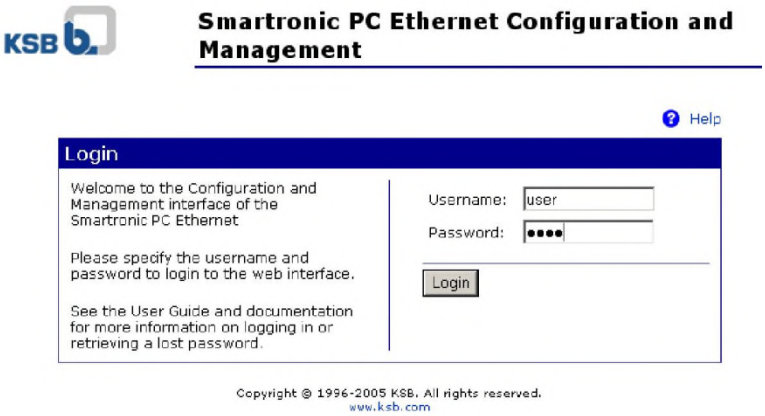
- Install the Smartronic PC software using the KSD CD supplied or by downloading it from www.ksb.com.
- When the software is run, select the Ethernet/Wi-Fi port



The software will then automatically detect the devices connected to the network or directly to the PC.



To modify the SMARTRONIC PC network parameters, in particular the name (host) in order to distinguish each SMARTRONIC PC, click the **Open configuration web page button.**



Enter the following information:
- Username: user
- Password: user

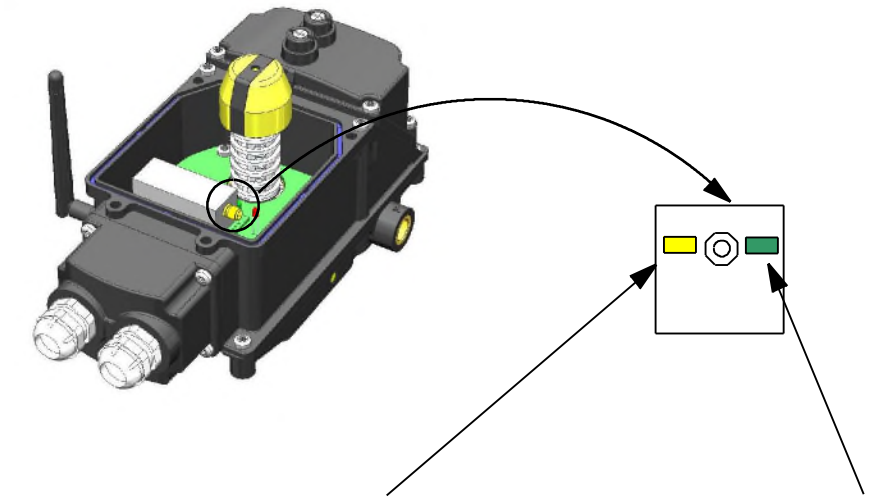
You can then modify the device's network configuration, in particular the name (Host) in the section **Configuration > Network > Advanced Network Setting.**

V - 3 Connection using a WiFi link (SMARTRONIC PC R001312/00000...R7….063)

Characteristics:
Standard: IEEE 802.11b
Security: WEP, WPA/WPA2/802.11i

Two types of connection are possible: <<infrastructure>> (recommended) and <<ad hoc>>.

LEDs on the WiFi module let you see the SMARTRONIC PC WiFi connection status.

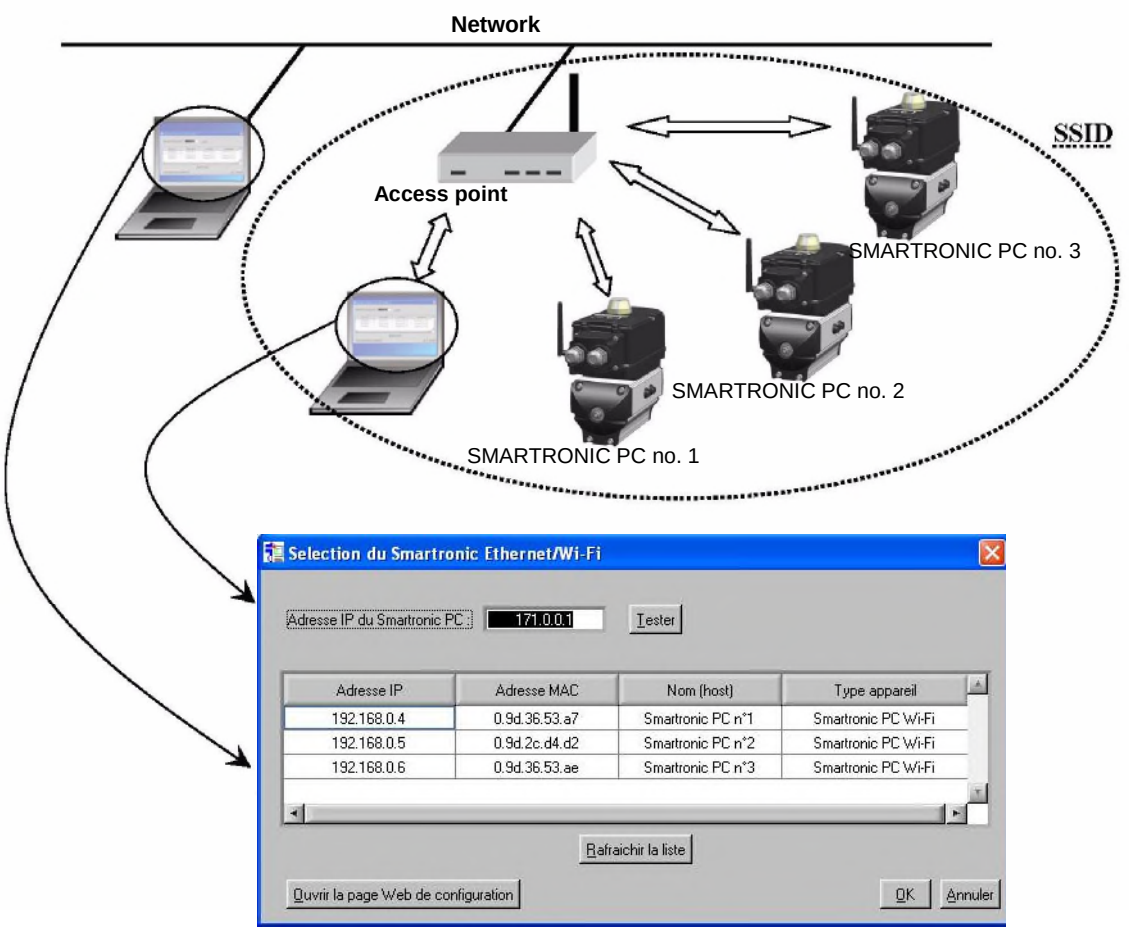


Connection status (yellow LED):
- Flashing quickly: network detection
- Flashing slowly: connected in <<ad hoc>> mode
- LED steadily ON: connected to an access point ("infrastructure" mode)

Network activity (green LED):
- Off: no data transmission
- Flashing: data being exchanged

<<infrastructure>> connection (recommended)

In <<infrastructure>> mode, each WiFi device is connected to an access point using a wireless connection.
In this manner, a PC connected to an access point (Ethernet or WiFi) can communicate with all SMARTRONIC PCs connected to the same access point.

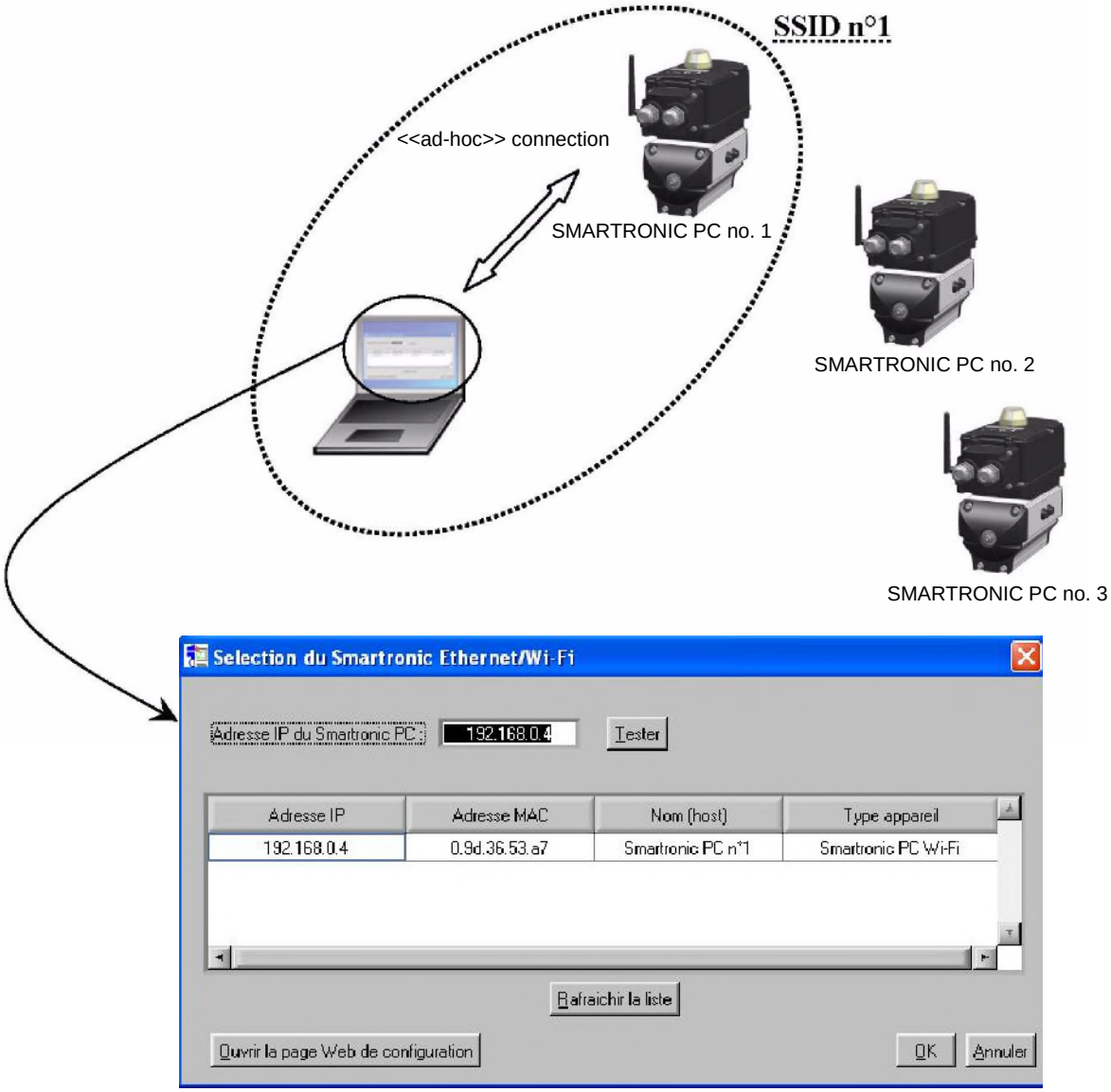


SSID stands for Service Set Identifier. This is a wireless network identifier name as per the IEEE 802.11 (WiFi) standard. This name can consist of up to 32 characters.

In the event of an infrastructure type connection, the SSID is defined by the access point.
All network devices are connected to the same network and therefore to the same SSID.

Connection in <<ad-hoc>> mode

In <<ad-hoc>> mode, you do not need to use an access point.
However, this is a point-to-point connection: the configuration PC can only connect to one SMARTRONIC PC at a time.
To do so, the user must first create an <<ad-hoc>> connection between the computer and a SMARTRONIC PC using the WiFi connection manager on the computer.
The user can then run the SMARTRONIC software on the computer, but it can only detect the SMARTRONIC PC to which an <<ad-hoc>> connection has been made.



SSID stands for Service Set Identifier. This is a wireless network identifier name as per the IEEE 802.11 (WiFi) standard. This name can consist of up to 32 characters.

In the case of an <<ad-hoc>> type connection, an SSID is used to identify a point-to-point connection and should be different for each device.

WiFi SMARTRONIC PC network configuration

WiFi SMARTRONIC PC units are configured by default to connect to the strongest signal received from an access point <<infrastructure mode>>) or a PC (<<ad-hoc mode>>).
In addition, no communication security (WEP, WPA, etc.) is configured on the equipment.

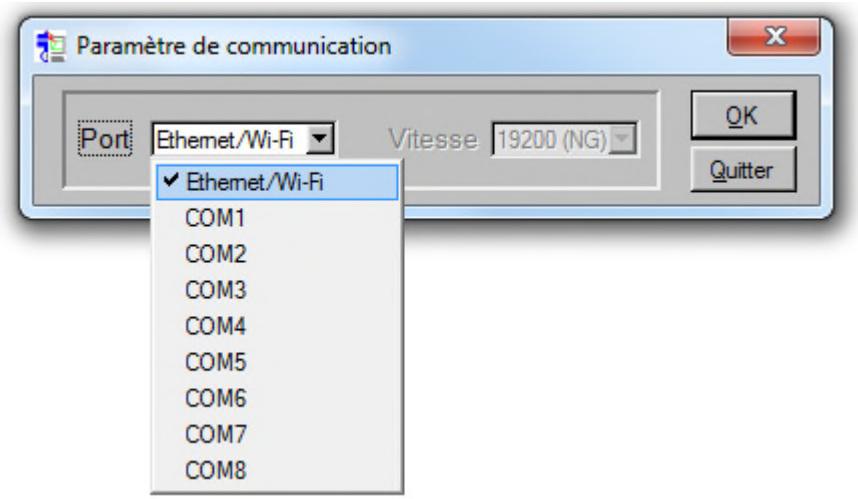
For this reason, in order to define the final connection parameters (<<infrastructure>> or <<ad-hoc>>) as well as security settings, we recommend creating an initial <<ad-hoc>> connection using a laptop in order to define the final device network settings.

- Step 1: Position the PC near the device to be configured (so that the signal received by the device is the strongest)

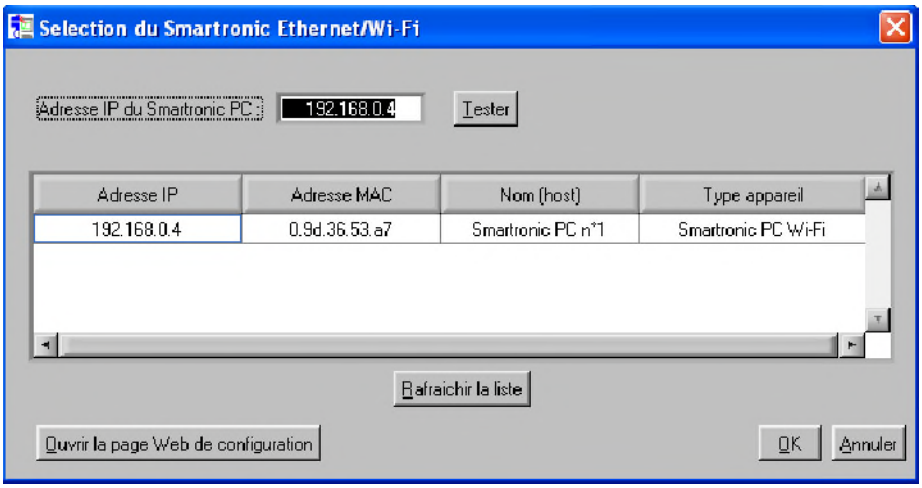
- Step 2: On the PC, create an ad hoc network (or PC-to-PC network) using the following parameters:
  - SSID: digi
  - Security parameters: none

Please refer to your computer's documentation to learn how to create a WiFi <<ad-hoc>> network.

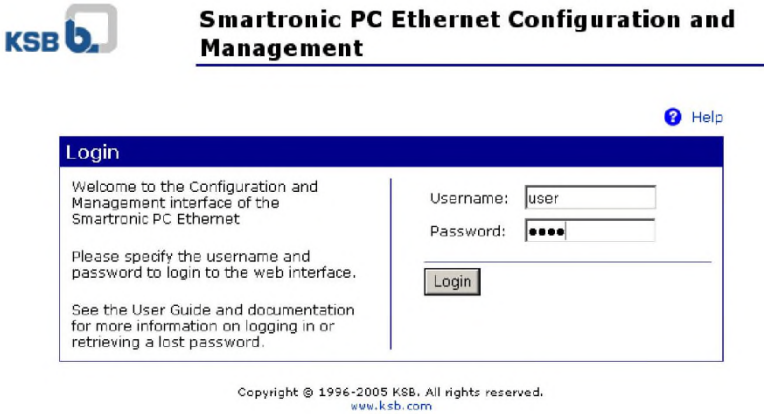
- Step 3: When the PC and the Smartronic PC are connected, run the Smartronic PC software, selecting the **Ethernet** port:



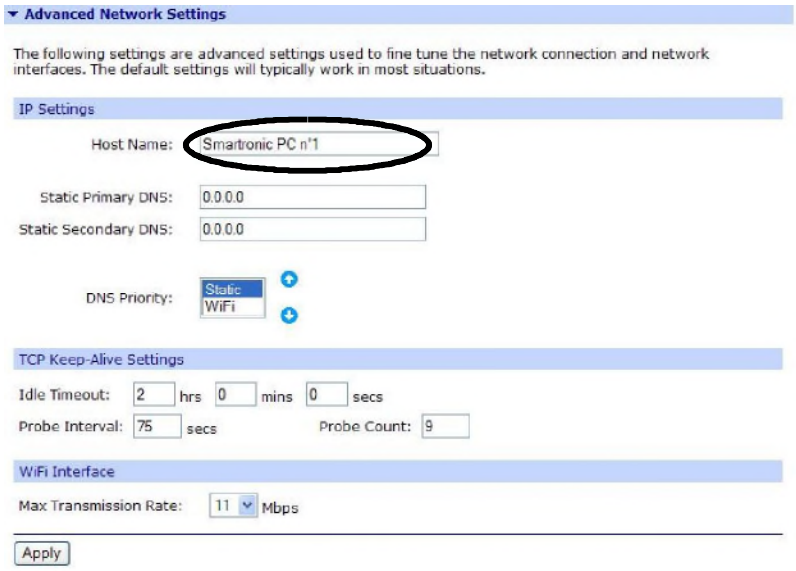
- Step 4: Select the Smartronic PC detected, then click the **Ouvrir la page Web de configuration** (Open configuration web page) button



- Step 5: Enter the following information:
  - Username: user
  - Password: user



- Step 6: In the **Configuration > Network > Advanced Network Setting** section, change the **Host Name** to define a unique identifier to enable you to distinguish this device from others.



- Step 7: In the **Configuration > Network > WiFi LAN setting** network section, enter the **SSID** of the network to which the device must connect.
  - In the case of an access point connection (<<infrastructure mode>>) enter the **SSID** of the access point that will be used.
  - In the case of an <<ad hoc>> connection: enter a different SSID for each device so that you can distinguish them when creating an <<ad hoc>> connection.

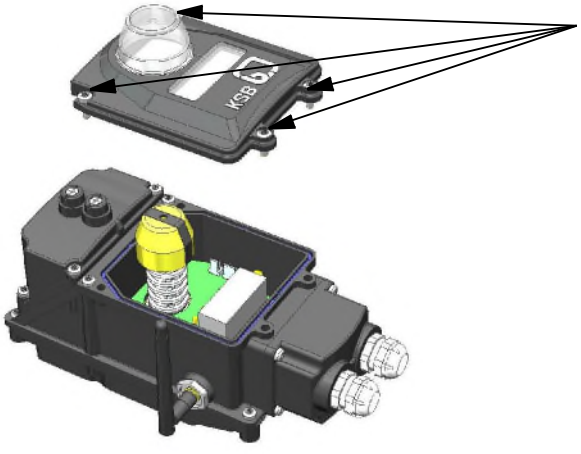
- Step 8: In the WiFi Security Setting section, define the security levels to apply.
  - In the case of an access point connection (<<infrastructure mode>>), enter the security parameters of the access point to which the device will be connected.
  - In the case of an <<ad hoc>> connection: define the security level you wish to use when connecting to devices (minimum recommended: WEP).

V - 4 Resetting Ethernet and WiFi modules

It is possible to restore the Ethernet and WiFi module factory settings.
This can be useful for example if there is a configuration error in the WiFi parameters making it impossible to connect the SMARTRONIC PC.

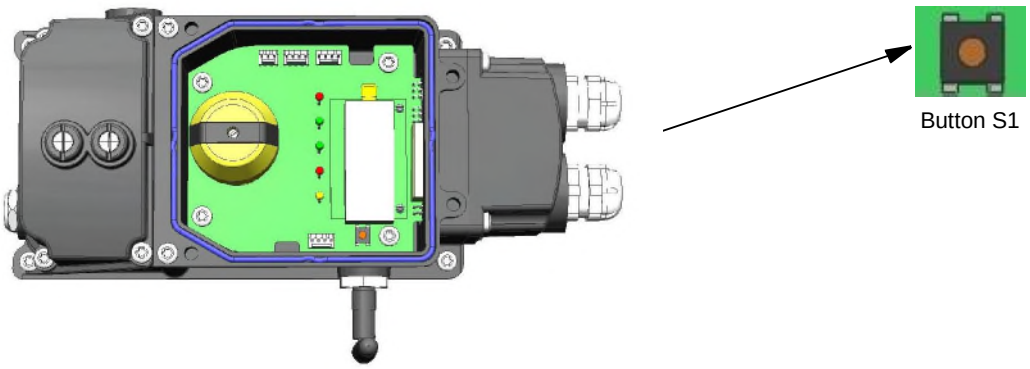
- Step 1: Disconnect the power supply from the SMARTRONIC PC (for example by unplugging it at terminal strip 1- 11, see VI.1 General Presentation).

- Step 2: Open the unit cover.



Unscrew the 4 TORX screws (T 20) in the cover.
Tightening torque: 2Nm

- Step 3: Hold down button S1.



- Step 4: Reconnect the unit power supply and wait 10 seconds while continuing to hold down S1.

- Step 5: Release S1.

Following these operations, the Ethernet/WiFi modules will restart with the factory configuration.
Then carry out the module configuration steps (see V.2 Connection using an Ethernet link and V.3 Connection using a WiFi link according to the type of device).

VI- Commissioning the SMARTRONIC PC unit

VI - 1 General presentation

<u>Please note</u>: To achieve a stable control process and prevent premature wear of the valve/actuator/positioner assembly, we strongly recommend defining a control dead band at the PID regulator in order to limit the setpoint variations transmitted to the positioner.
This control dead band should be as wide as possible to suit the requirements of the control process.

<u>Local interface</u>

LEDs placed on the upper surface of the product let you see the operation of the SMARTRONIC PC.

<u>POWER (yellow):</u>
ON → product receiving correct power supply

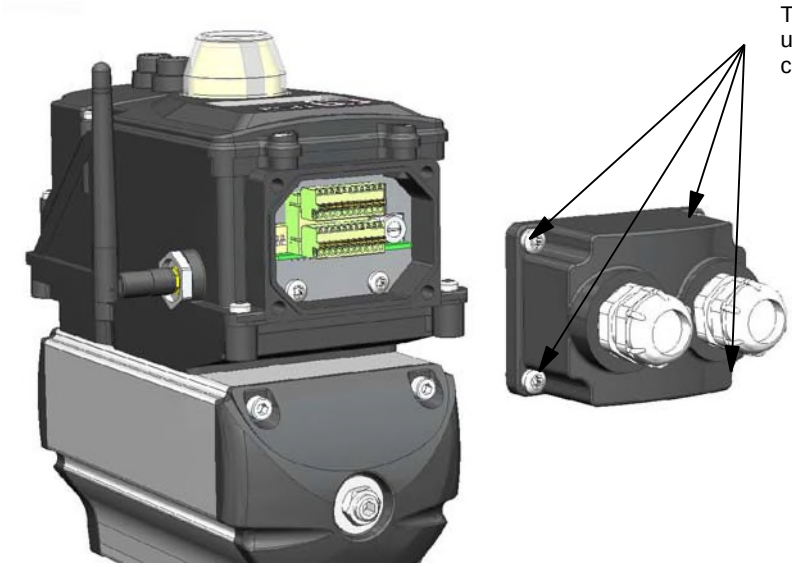
<u>DIAG (red):</u>
OFF → product controlled by the process control system (external)
Flashing → product controlled by the PC

<u>EV1 and EV2 (green):</u>
ON→ solenoid valve controlled by the unit

<u>BF (red, Bus Failure)*:</u>
ON→ no communication on the network
OFF → communication established with a Profibus DP master

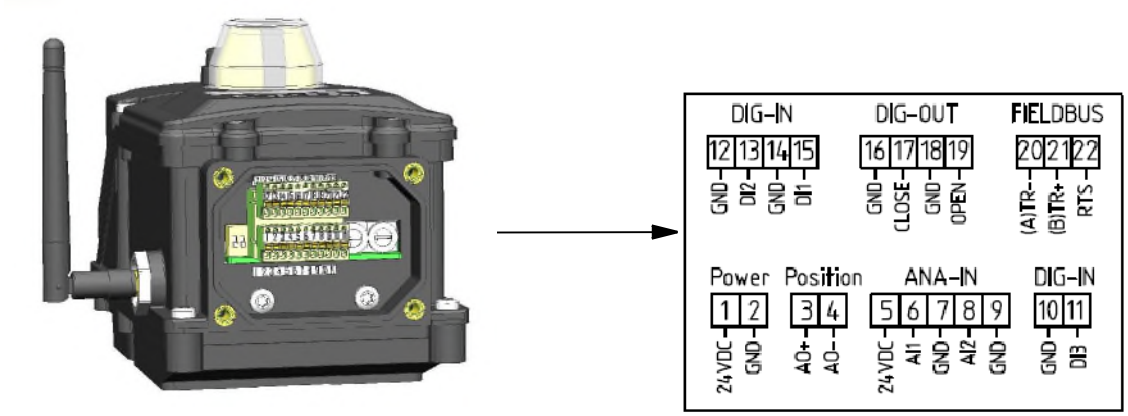
* Profibus DP version only

<u>Wiring</u>



To access the electrical connection terminals unscrew the 4 TORX screws (T20) from the connection housing.

Below is a general presentation of the SMARTRONIC PC connection elements.
For the details of connections to be made, please refer to the installation chapters for each type of SMARTRONIC PC.



Configuration by Man Machine Interface

Configuring and adjusting the SMARTRONIC PC unit is done through a Man Machine Interface (MMI).
Depending on the type of SMARTRONIC PC ordered, a serial, Ethernet or WiFi connection may be used for connecting to the MMI.

The MMI enables different adjustment and display functions to be carried out from drop-down menus:

Identification:
This function is used to view identification information relating to the SMARTRONIC PC - Actuator - Valve assembly. The user can also change this information except for that relating to the SMARTRONIC PC unit that can only be changed by the manufacturer.

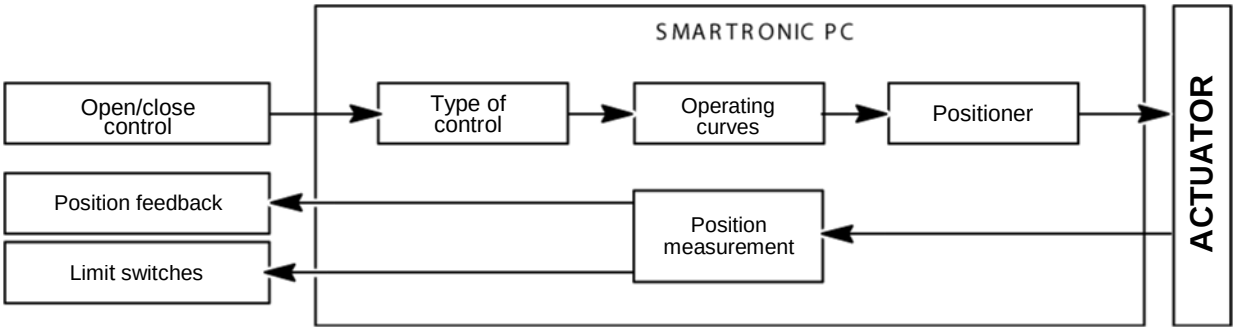
Adjustment:
Depending on the type of SMARTRONIC PC, the user defines the unit operating parameters (for example, the operating curves for the SMARTRONIC PC, programmed Open/Close or the PID for a SMARTRONIC PC Regulator).

Command:
This menu is used to select the unit control mode:
- External control: the unit is controlled by the external PLC,
- Control by the PC: using the MMI, the user simulates the external PLC control information. This enables the user to observe the unit's operation in real time without the need to remotely control the PLC outputs.

Service:
- Self-calibration: this function is used to run self-calibration and to manually adjust the positioner dead band. When the user commands a self-calibration procedure, the SMARTRONIC PC unit automatically determines the optimum positioner parameters. These parameters are calculated so that the valve disc is positioned without oscillation near the setpoint or overrun. When the self-calibration is complete, the SMARTRONIC PC calculates the system dead band. The user can then decrease or increase this dead band. Decreasing the dead band will improve system accuracy to the detriment of stability. Increasing the dead band will increase system stability to the detriment of accuracy.
- Maintenance: this function displays the number of times the valve has been operated since commissioning. An operation corresponds to a movement of the disc through 180 degrees (complete open and close). This value is refreshed every 5 operations.
- External sensor: where a SMARTRONIC PC unit is directly connected to an external sensor (SMARTRONIC PC Surveillance and SMARTRONIC PC Regulator), this function is used to automatically carry out the conversion of this signal into a physical value (for example: °C or m3/h).

VI - 2 Smartronic PC programmed Open/Close

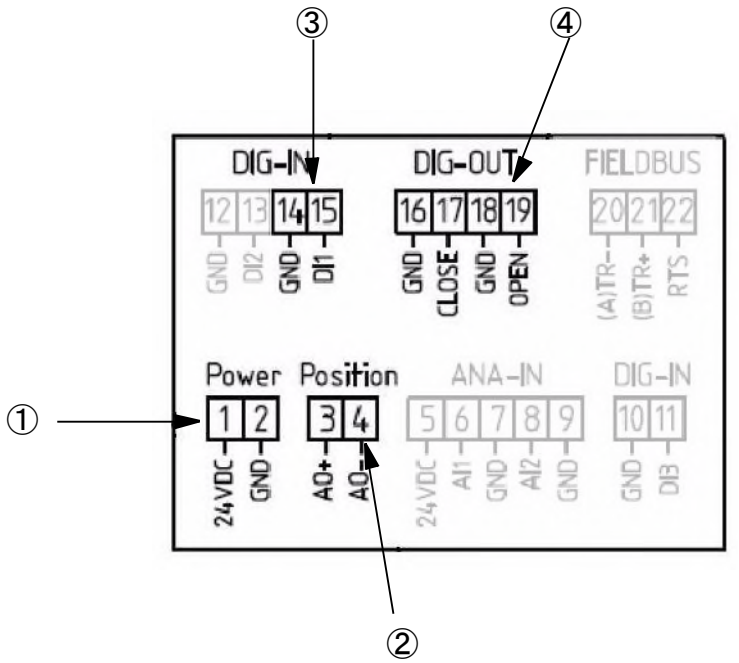
The valve function is of the on/off type (open and closed).
The user can program the duration of the valve movement as well as the open and close curves according to time.
Controlling the opening and closing is carried out by way of a dry contact.
This device is used for example to prevent pressure surges.



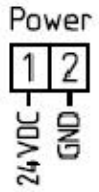
Type of control: normally open (control contact open → valve open) or normally closed (control contact open → valve closed) valve operation.
Operating curves: valve open and close curves according to time.
Positioner: automatically set by the self-calibration procedure.

VI - 2.1 Hardware implementation

For details of the cables and conductors that can be used with the SMARTRONIC PC R1312 unit, please refer to chapter I -2 - Technical Characteristics.

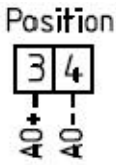


① Electrical power supply



Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

② Valve position feedback

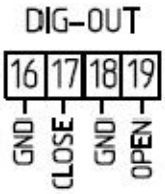


Output type:	active output, power supply from the unit
Output type:	from 4mA (valve closed) to 20mA (valve open)
Measurement accuracy:	< 1%
Max. load:	1Kohms

③ Opening and Closing control

Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)

④ Limit swiches



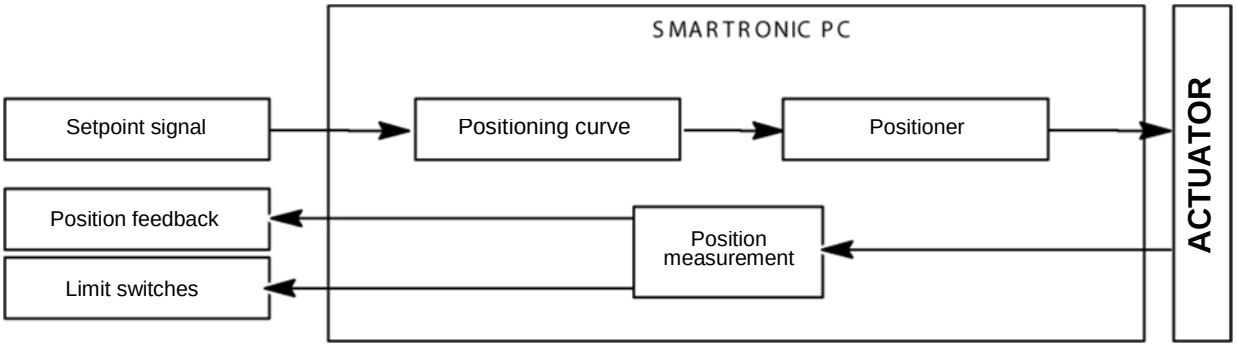
Output type:	isolated outputs equivalent to dry contacts
Max. load current:	1A (AC peak or DC)
Max. load voltage:	60V (AC peak or DC)
Contact resistance:	0.5ohm (typ.)

VI - 2.2 Software implementation

The paragraph below shows the different settings to be carried out for implementation of the software.

VI - 3 SMARTRONIC PC Positioner

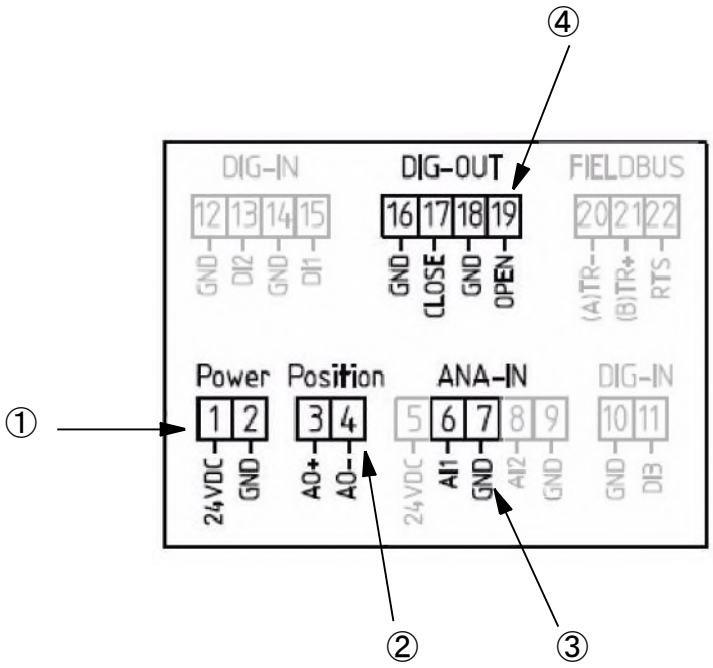
The valve position is controlled by a 4-20mA external setpoint signal.
The user defines the value of this setpoint signal for which full open and full close are obtained:
this capability is used where valves are used in Split range.
The user can also configure the disc position curve according to the external signal.
This enables you to have a positioning either of linear type or according to a law programmed specifically for the application.



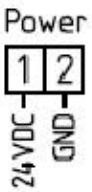
Positioning curve: position setpoint curve according to the external setpoint signal
Positioner: automatically set by the self-calibration procedure.

VI - 3.1 Hardware implementation

For details of the cables and conductors that can be used with the Smartronic PC R1312 unit, please refer to chapter I-2 - Technical Characteristics.

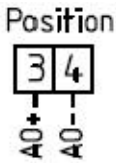


① Electrical power supply



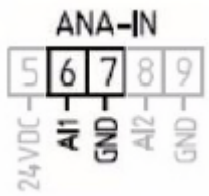
Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

② Valve position feedback



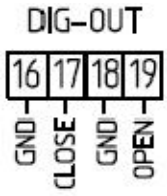
Output type:	active output, power supply from the unit
Output type:	from 4mA (valve closed) to 20mA (valve open)
Measurement accuracy:	< 1%
Max. load:	1Kohms

③ Setpoint signal



Input type:	4-20mA analogue input
Input impedance:	235ohms
Measurement accuracy:	< 1%

④ Limit switches



Output type:	isolated outputs equivalent to dry contacts
Max. load current:	1 A (AC peak or DC)
Max. load voltage:	60V (AC peak or DC)
Contact resistance:	0.5ohm (typ.)

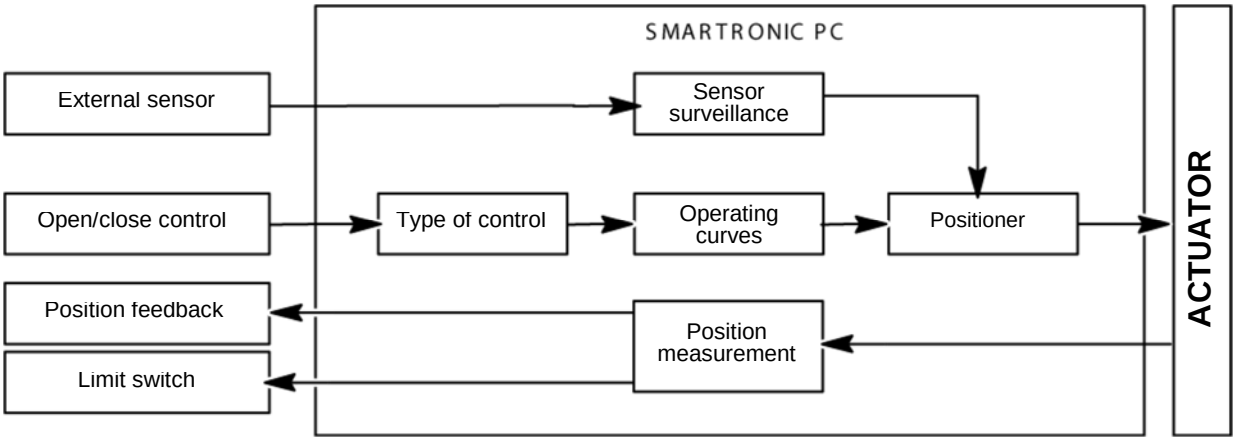
VI - 3.2 Software implementation

The paragraph below shows the different settings to be carried out for implementation of the unit. For the details of each adjustment, please refer to the software online help.

- Connect the configuration tool according to chapter V.
- Launch the SMARTRONIC PC software.
- Carry out a self-calibration of the positioner: in the Service/Self-calibration menu, click on Launch self-calibration (2 to 3 minutes).
- Adjust the disc position curve according to the setpoint signal: in the Adjustment → Positioner menu.
- In the Control menu, select the SMARTRONIC PC unit control mode:
    - external control: the unit is controlled by the setpoint analogue signal,
    - control by the PC: the analogue input is inactive, the unit is only controlled by the PC.

VI - 4 Smartronic PC monitoring process

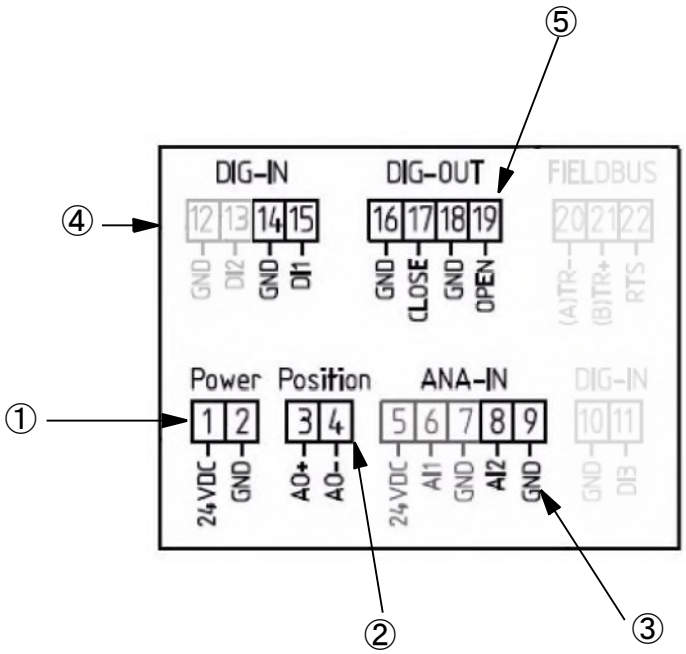
The valve's operation is of the programmed open/close type (see section VI- 2).
In addition, an external sensor, directly connected to and supplied by the SMARTRONIC PC unit, is used to carry out surveillance and safety functions locally.
The user defines a high value and a low value for this external sensor (4-20mA type) and associates a failsafe action with it.



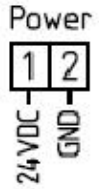
Sensor surveillance: definition of sensor values for which the valve moves to the safety position and an alarm is triggered. When this alarm is active, it takes priority over the open/close command.
Type of control: normally open (control contact open→ valve open) or normally closed (control contact open → valve closed) valve operation.
Operating curves: valve open and close curves according to time.
Positioner: automatically set by the self-calibration procedure.

VI - 4.1 Hardware implementation

For details of the cables and conductors that can be used with the SMARTRONIC PC R1312 unit, please refer to chapter I-2- Technical Characteristics.
A cable gland is reserved for wiring the unit to the process control system (①②④⑤), while the second is used for the unit's connection to the external sensor (③).

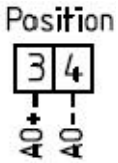


① Electrical power supply



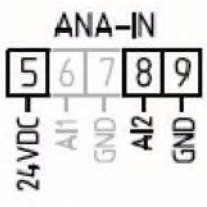
Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

② Valve position feedback



Output type:	active output, power supply from the unit
Output type:	from 4mA (valve closed) to 20mA (valve open)
Measurement accuracy:	< 1%
Max. load:	1Kohms

③ External sensor

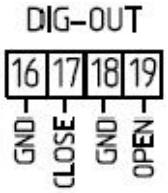


Input type:	4-20mA analogue input Input
impedance:	235ohms
Measurement accuracy:	< 1%
Sensor power supply:	A 24V DC power supply is available for the sensor. The ground on this power supply is isolated from the ground of the analog input. To supply a 2-wire 4-20mA sensor, connect the “+” of the sensor to the 24V DC, the “-” to the AI2 input then do a electrical connection between the terminal n°2 (ground of power supply) and terminal n°9 (ground of the analog input).

④ Opening and Closing control

Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)

⑤Limit switches



Output type:	isolated outputs equivalent to dry contacts
Max. load current :	1A (AC peak or DC)
Max. load voltage :	60V (AC peak or DC)
Contact resistance:	0.5ohm (typ.)

VI - 4.2 Software implementation

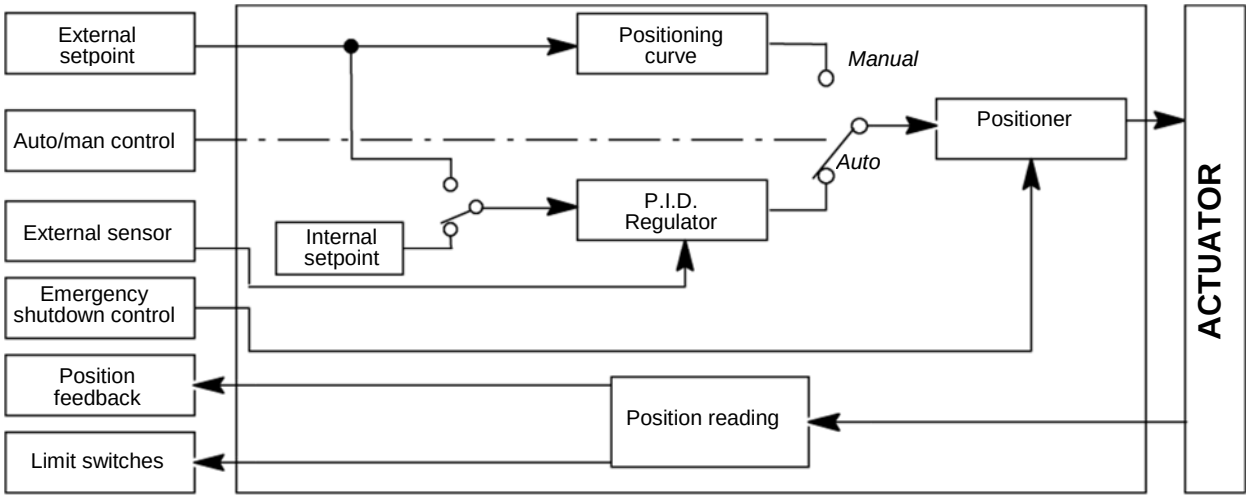
The paragraph below shows the different settings to be carried out for implementation of the unit. For the details of each adjustment, please refer to the software online help.

- Connect the configuration tool according to chapter V.
- Launch the SMARTRONIC PC software.
- Carry out a self-calibration of the positioner: in the Service/Self-calibration menu, click on Launch self-calibration (2 to 3 minutes).
- Configure the type of SMARTRONIC PC control according to the ON/OFF input: in the Adjustment menu → Programmed open/close → Type of control
- Enter the valve open and close curves according to time: in the Adjustment menu → Programmed open/close → Open curve and Close curve.
- Calibrate the sensor: in the Service menu → External sensor, then validate the sensor type and the signal conversion parameters into a physical value.
- Adjust the alarm trigger levels according to the external sensor value: in the Adjustment menu → Sensor surveillance.
- In the Control menu, select the SMARTRONIC PC unit control mode:
    - external control: open and close are controlled by the ON/OFF input and the alarm by the analogue input,
    - control by the PC: the ON/OFF input and the analogue input are inactive, the unit is only controlled by the PC.

VI - 5 SMARTRONIC PC Regulator

A PID type regulation algorithm is used to regulate a physical value measured by a sensor directly connected to the SMARTRONIC PC unit. The external sensor, 4-20mA type, can be powered with 24V by the unit. An on/off command is used to choose the SMARTRONIC PC operating mode: Auto or Manual When the unit is in Auto mode, it adjusts a physical value measured by the sensor. When the unit is in manual mode, it is used as a positioner. In Manual mode, the External setpoint input (4-20mA or Profibus) corresponds to a setpoint position (for example: valve at 45°). In Auto mode, the External setpoint input corresponds to a regulation setpoint (for example: 400m3/h if flow rate is measured by the External sensor input).

The Emergency shutdown control is used to close the valve automatically.



Positioning curve: setpoint position curve according to the external setpoint signal.
P.I.D. Regulator: the PID equation used is based on the “status feedback” theory. This type of correction offers the advantage of not saturating the control signal during sudden setpoint variations:

$U(p) = (K / T_i\, p) (y_c - y) - K (1 + T_d\, p) y$

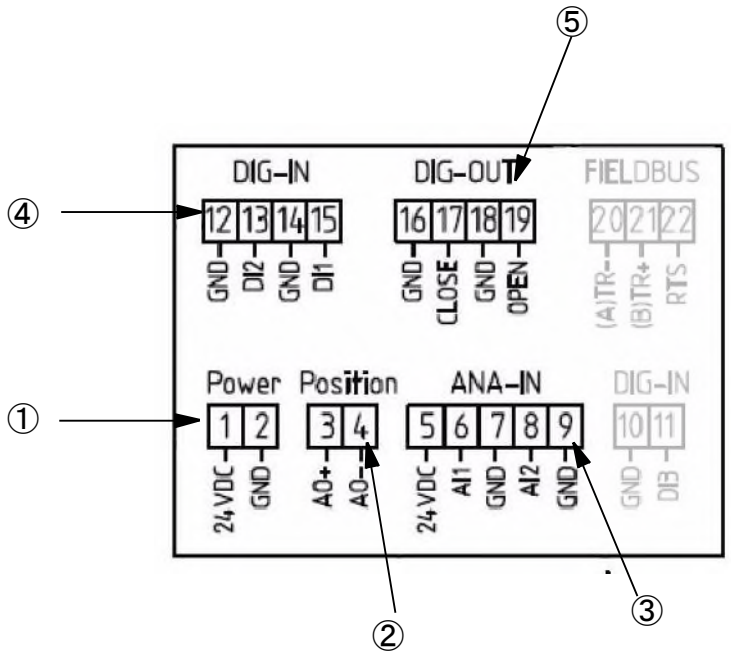
U(p): PID corrector output
y: measured signal
y_c: setpoint value
K: proportional gain
T_i: integration time constant
T_d: derivation time constant

Positioner: automatically set by the self-calibration procedure
Regulation setpoint: there are two types of regulation setpoint:

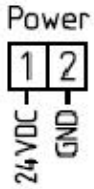
- Internal setpoint: the setpoint is entered directly using the Man Machine Interface, it remains stable during the regulation process.
- External setpoint: given by an external signal (4-20mA or Profibus), the external setpoint can be modified during the regulation process.

VI - 5.1 Hardware implementation

For details of the cables and conductors that can be used with the SMARTRONIC PC R1312 unit, please refer to chapter I-2 - Technical Characteristics.
A cable gland is reserved for wiring the unit to the process control system (①②④⑤) , while the second is used for the unit's connection to the external sensor (③) .

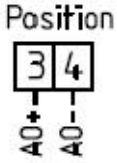


① Electrical power supply



Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

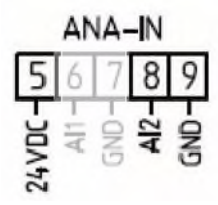
② Valve position feedback



Output type:	active output, power supply from the unit
Output type:	from 4mA (valve closed) to 20mA (valve open)
Measurement accuracy:	< 1%
Max. load:	1Kohms

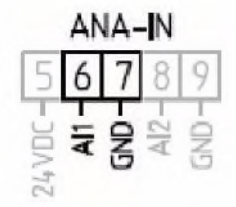
③ Analogue inputs

External sensor



Input type:	4-20mA analogue input Input
impedance:	235ohms
Measurement accuracy:	< 1%
Sensor power supply:	A 24V DC power supply is available for the sensor. The ground on this power supply is isolated from the ground of the analog input. To supply a 2-wire 4-20mA sensor, connect the “+” of the sensor to the 24V DC, the “-” to the AI2 input then do a electrical connection between the terminal n°2 (ground of power supply) and terminal n°9 (ground of the analog input).

Position/regulation setpoint



Input type:	4-20mA analogue input Input
impedance:	235ohms
Measurement accuracy:	< 1%

④ On/off inputs

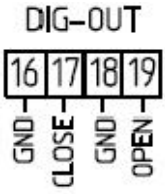
Auto/man command

Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)
Operating mode:	open contact: auto mode (regulator) closed contact: manual mode (positioner)

Emergency shutdown request

Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)
Operating mode:	open contact: inactive closed contact: active

⑤ Limit switches



Output type:	isolated outputs equivalent to dry contacts
Max. load current:	1 A (AC peak or DC)
Max. load voltage:	60V (AC peak or DC)
Contact resistance:	0.5ohm (typ.)

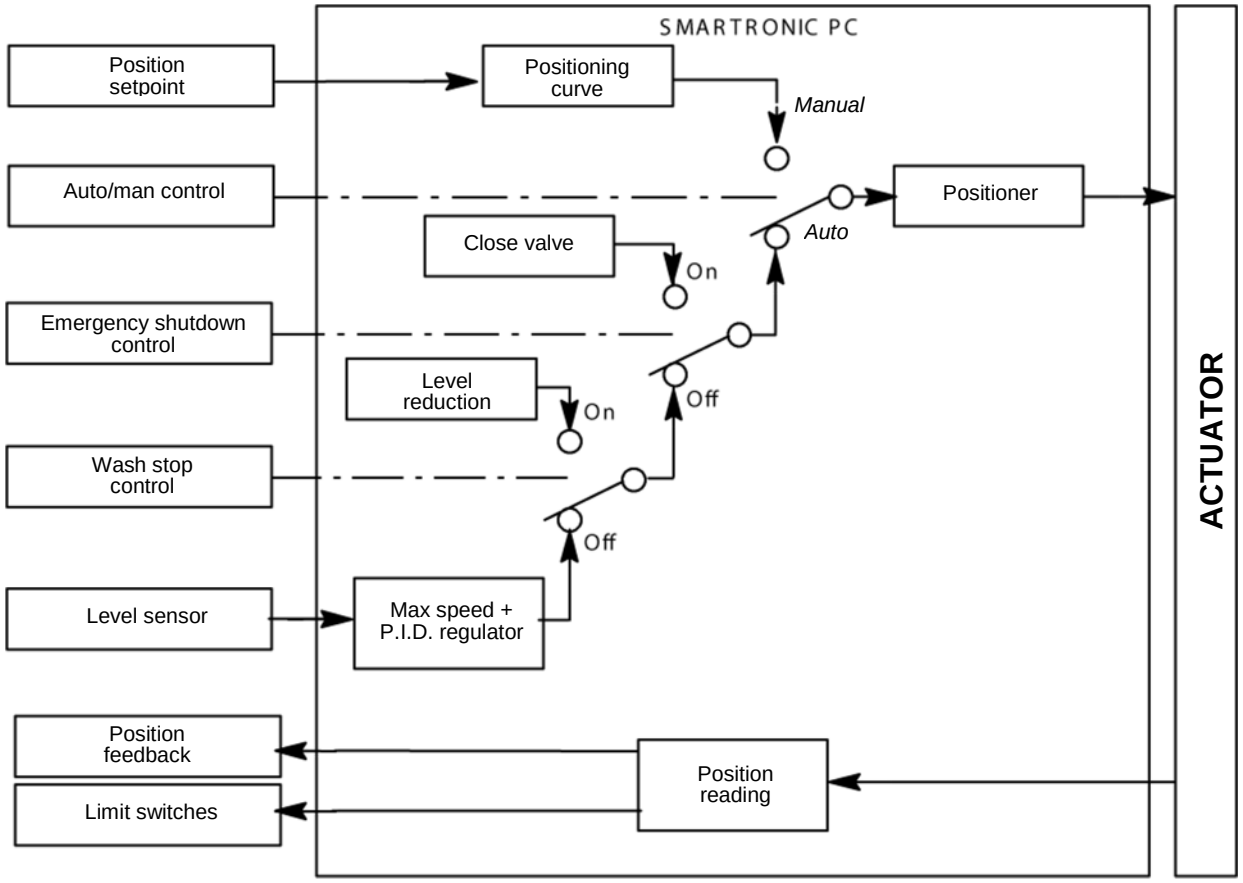
VI - 5.2 Software implementation

The paragraph below shows the different settings to be carried out for implementation of the unit. For the details of each adjustment, please refer to the software online help.

- Connect the configuration tool according to chapter V.
- Launch the SMARTRONIC PC software.
- Carry out a self-calibration of the positioner: in the Service menu → Self-calibration, click on Launch self-calibration (2 to 3 minutes).
- Calibrate the external sensor: in the Service menu → External sensor, validate the sensor type and the signal conversion parameters into a physical value.
- Adjust the valve position parameters (manual mode) according to the setpoint signal: in the Adjustment menu → Positioner.
- Adjust the regulator parameters (Auto mode): click on Adjustment → Regulation → Normal regulation → Process characteristics and on Adjustment → Regulation → Normal regulation → PID
- In the Control menu, select the SMARTRONIC PC unit control mode:
    - external control: the SMARTRONIC PC is controlled by the analogue and ON/OFF inputs,
    - control by the PC: the SMARTRONIC PC is only controlled by the PC.

VI - 6 SMARTRONIC PC Filter facade level regulator

The purpose of filter facade regulation is to maintain a constant level of water within a tank responsible for filtering the water through a sand or charcoal bacterial filter.
The SMARTRONIC PC unit placed at the tank outlet, compensates for the progressive rise in head loss by the filter mass and variations in the tank supply output.
In addition to regulation functions (see section VI- 5), the unit also has control algorithms specific to filter level regulation.



Positioning curve: setpoint position curve according to the external setpoint signal.
Positioner: automatically set by the self-calibration procedure.
Close valve: when the emergency shutdown control is activated, the SMARTRONIC PC unit closes the valve regardless of the level sensor value.

Level reduction: when wash stop is activated, the SMARTRONIC PC unit puts the valve in failsafe position until the level reaches the wash level. When the level has reached this value, the unit closes the valve and keeps it closed even if the level goes above the wash level. The user can then initiate the filter wash procedure.

Max speed + P.I.D. regulator: the PID equation used is based on the “status feedback” theory.
This type of correction offers the advantage of not saturating the control signal during sudden setpoint variations:

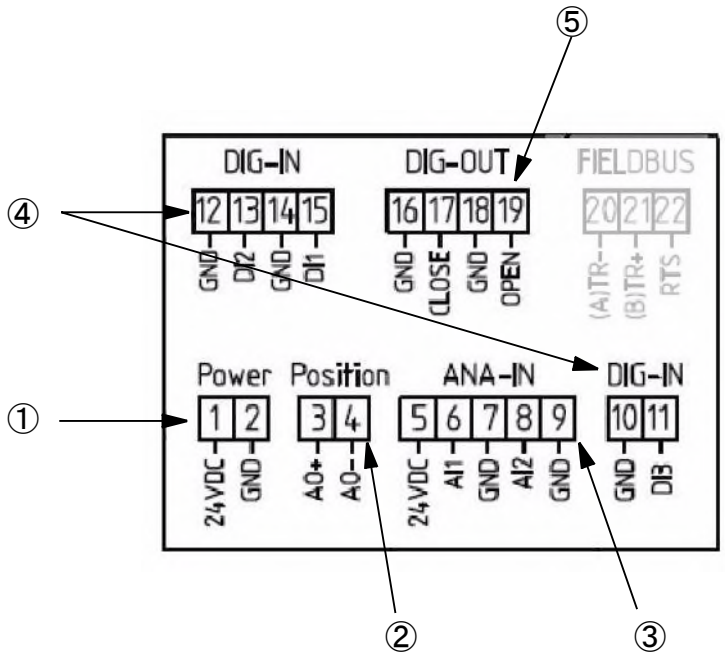
$$U(p) = (K / Ti\ p) (yc - y) - K (1 + Td\ p) y$$

U(p): PID corrector output
y: measured signal
y_c: setpoint value
K: proportional gain
T_i: integration time constant
T_d: derivation time constant

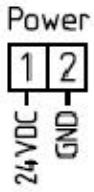
In addition to level regulation by PID, the user can define a maximum level decrease speed within the tank. When this speed is exceeded, the unit adjusts the valve opening while continuing to regulate the level. This function is used to prevent a filtration speed that is too high from destroying the filter, in particular when restarting regulation following washing, when the water in the tank is at its maximum level.

VI - 6.1 Hardware implementation

For details of the cables and conductors that can be used with the SMARTRONIC PC R1312 unit, please refer to chapter I-2 - Technical Characteristics.
A cable gland is reserved for wiring the unit to the process control system (①②④⑤) , while the second is used for the unit's connection to the external sensor (③).

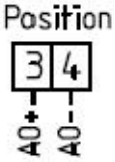


① Electrical power supply



Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

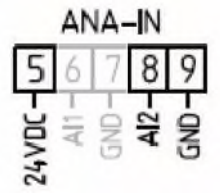
② Valve position feedback



Output type:	active output, power supply from the unit
Output type:	from 4mA (valve closed) to 20mA (valve open)
Measurement accuracy:	< 1%
Max. load:	1Kohms

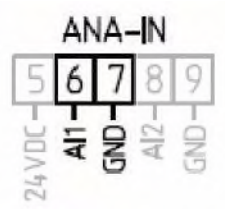
③ Analogue inputs

External sensor



Input type:	4-20mA analogue input
Input impedance:	235ohms
Measurement accuracy:	< 1%
Sensor power supply:	A 24V DC power supply is available for the sensor. The ground on this power supply is isolated from the ground of the analog input. To supply a 2-wire 4-20mA sensor, connect the “+” of the sensor to the 24V DC, the “-” to the AI2 input then do a electrical connection between the terminal n°2 (ground of power supply) and terminal n°9 (ground of the analog input).

Position setpoint



Input type:	4-20mA analogue input Input
Impedance:	235ohms
Measurement accuracy:	< 1%

④ On/off inputs

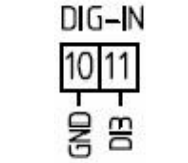
Auto/man control

Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)
Operating mode:	open contact: auto mode (regulator) Closed contact: manual mode (positioner)

Emergency shutdown control

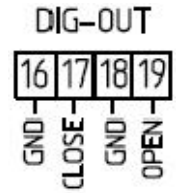
Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)
Operating mode:	open contact: inactive closed contact: active

Wash stop control



Input type:	potential-free contact, power supply from the unit
Input current:	5mA (typ.)
Operating mode:	open contact: inactive closed contact: active

⑤ Limit switches



Output type:	isolated outputs equivalent to dry contacts
Max. load current:	1A (AC peak or DC)
Max. load voltage:	60V (AC peak or DC)
Contact resistance:	0.5ohm (typ.)

VI - 6.2 Software implementation

The paragraph below shows the different settings to be carried out for implementation of the unit. For the details of each adjustment, please refer to the software online help.
- Connect the configuration tool according to chapter V.
- Launch the SMARTRONIC PC software.
- Carry out a self-calibration of the positioner: in the Service menu → Self-calibration, click on Launch self-calibration (2 to 3 minutes).
- Calibrate the external sensor: in the Service menu → External sensor, validate the sensor type and the signal conversion parameters into a physical value.
- Adjust the valve position parameters (manual mode) according to the setpoint signal: in the Adjustment menu → Positioner.
- Adjust the regulator parameters (Auto mode): click on Adjustment → Regulation → Filter facade → Process Characteristics and on Adjustment → Regulation → Filter facade → PID
- In the Control menu, select the SMARTRONIC PC unit control mode:
  - external control: the SMARTRONIC PC is controlled by the analogue and ON/OFF inputs,
  - control by the PC: the SMARTRONIC PC is only controlled by the PC.

VI - 7 Profibus DP

VI - 7.1 Technical characteristics of the SMARTRONIC PC Profibus DP unit

The SMARTRONIC PC Profibus DP unit complies with standard EN 50170 and DIN 19245 (Profibus standards).

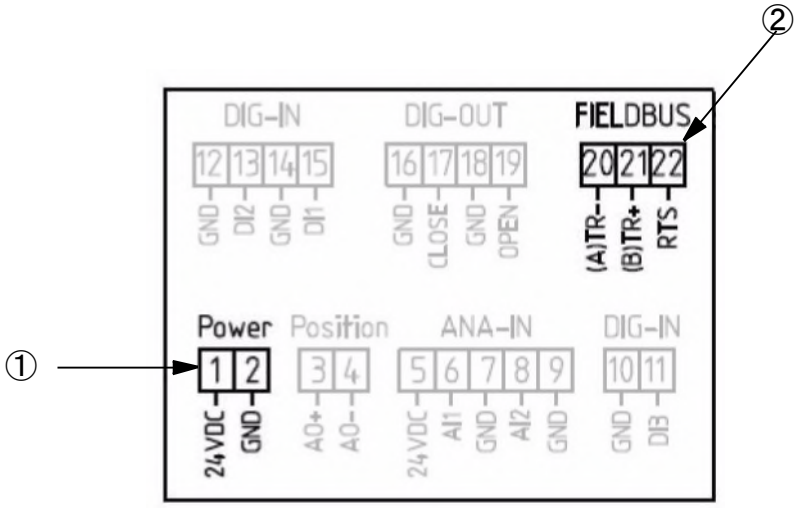
Applications	The SMARTRONIC PC Profibus DP unit fits onto the full ranges of ACTAIR and DYNACTAIR pneumatic actuators.		
Topology	Bus, tree produced using repeaters		
Medium	Twisted pair, RS 485 interface		
Network speed and length	Speed Bauds (kbit/s) 9,6 19,2 45,45 93,75 187,5 500 1500	Length (without repeater) 1,200 m 1,200 m 1,200 m 1,200 m 1,000 m 400 m 200 m	Length (with repeater) 10 km 10 km 10 km 10 km 6 km 1 km 600 m
Max. number of stations	32 and up to 126 with repeater		
Addressing	Using two hexadecimal encoders on the SMARTRONIC PC card		
Bus access	Master to slave polling (single master or multi master architecture)		
Control network variables	- 6 input bytes - 6 output bytes		
Bus termination	A termination resistor is included in each SMARTRONIC PC Profibus DP slave and can be activated by a switch on the card		
Operations supported	Cyclic data exchange, Sync mode, Freeze mode		

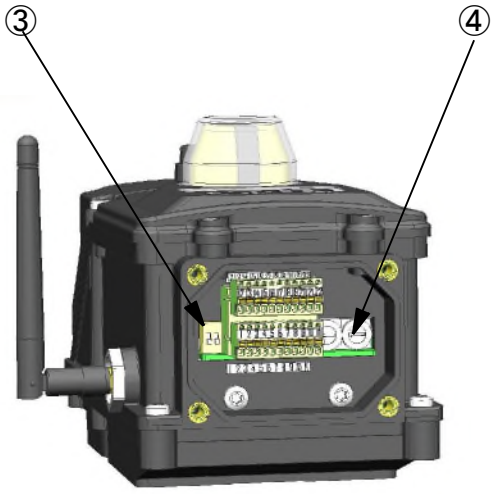
VI - 7.2 Hardware implementation

For details of the cables and conductors that can be used with the SMARTRONIC PC R1312 unit, please refer to chapter I-2 - Technical Characteristics.
Only type A shielded twisted pair cables must be used to connect the units to the Profibus DP network: please refer to standard EN 50170-2.
This cable must be installed at least 20cm away from the other cables, preferably in a separate, earthed cable duct.
Ensure that there is no potential difference between the various stations.
Up to 32 stations can be connected to a segment; in addition, several segments can be connected using repeaters.

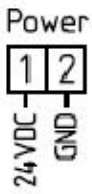
Reminder of type A cable specifications for Profibus DP:

- Impedance:	135 to 165ohms at a frequency of 3 to 20MHz
- Capacity:	< 30pF per metre
- Diameter:	> 0.64mm
- Core section:	> 0.34 sq.mm
- Loop resistance:	< 110ohms per kilometre
- Protection:	braided or foil shield



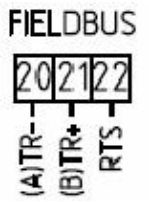


① Electrical power supply



Consumption:	260mA @ 24V DC, or 6.3W max
Max. voltage:	30V DC
Min. voltage:	20V DC
Current protection:	600mA protection via resettable fuse (automatic)

② Profibus DP network



③ Profibus DP termination resistor

Switches 1 and 2 set to OFF: without termination resistor
Switches 1 and 2 set to ON: with termination resistor

The termination resistor must be activated when the SMARTRONIC PC Profibus DP unit is placed at the end of the network to prevent end of line resonance phenomena.

④ Profibus DP address

The SMARTRONIC PC Profibus DP unit is is shipped with address 0.
An address between 1 and 126 must be assigned to it
for installation in the network. The address is set using two x10 and x1
hexadecimal encoders.
Encoder x1 is used to set the units and encoder x10 is used to set the tens.

x 10 (tens) x 1 (units)

For example:
57 (decimal) → 39 (hex) → encoder x10 on 3 and encoder x1 on 9.

VI - 7.3 Software implementation

- SMARTRONIC PC configuration
The unit is adjusted and configured via the Man Machine Interface. The different adjustments to be carried out are the same as on a non-network SMARTRONIC PC:

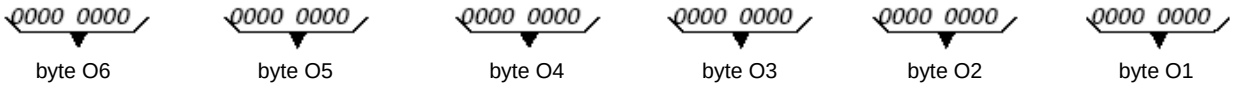
- SMARTRONIC PC programmed Open/Close see section VI- 2- 2
- SMARTRONIC PC Positioner see section VI- 3- 2
- SMARTRONIC PC Process surveillance see section VI- 4- 2
- SMARTRONIC PC Regulator see section VI- 5- 2
- SMARTRONIC PC Facade level regulator see section VI- 6- 2

- Integrating the SMARTRONIC PC unit into the Profibus DP network :
When commissioning the Profibus network, the stations are set and configured by the Profibus network master.
To carry out this operation, the master must know the technical characteristics of each station present on the network.
This information is contained in the GSD file.

- GSD file
The SMARTRONIC PC unit GSD file (see appendix) is called 051D.GSD. The hexadecimal figure 051D corresponds to the SMARTRONIC PC Profibus identification number assigned by the PNO (Profibus Nutzer Organisation).
When configuring the equipment corresponding to the unit, load file 051D.GSD. Then when selecting the data transfer modules, select Base module.

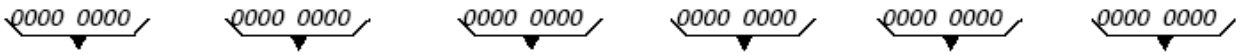
- Control variable read/write
Regardless of the type of SMARTRONIC PC unit, the input and output frames each contain 6 bytes.
These 6 bytes are coded with the unit control variables.
The number and type of these variables depend on the type of unit to install.

Output frame (control)



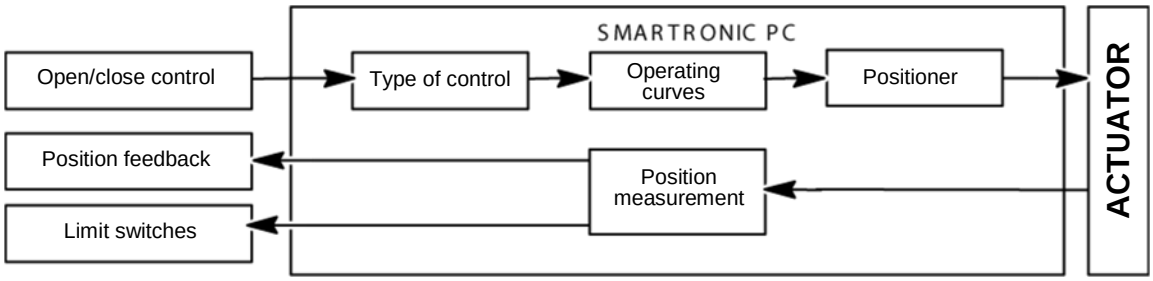
byte O6 byte O5 byte O4 byte O3 byte O2 byte O1

Input frame (monitoring)



byte 16 byte 15 byte 14 byte 13 byte 12 byte 11

Programmed open/close



Output frame (control)

- Open and close ON/OFF control (byte O1)
  - variable type: bit
  - coding: third bit of byte O1

eg: byte O1: 0000 0000 → ON/OFF control on 0
byte O1: 0000 0100 → ON/OFF control on 1

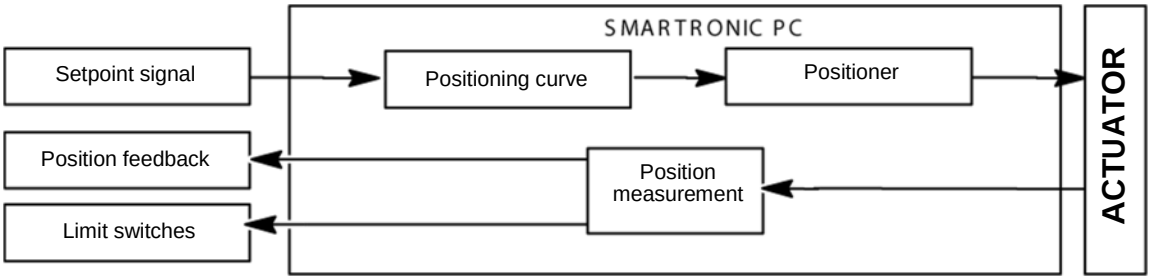
Input frame (monitoring)

- Valve position (bytes I1 and I2)
  - variable type: unsigned short (2 bytes)
    The value sent corresponds to tenths of a degree:
    0 → disc at 0 degrees (valve closed)
    450 → disc at 45.0 degrees
    900 → disc at 90.0 degrees (valve open)
  - coding: byte I1 is the most significant
    byte I2 is the least significant

    eg: byte I1: 0000 0001 (most significant)
    byte I2: 1100 0010 (least significant)
    → position: 0000 0001 1100 0010 (bin) or 450 (dec) which corresponds to a disc position of 45.0 degrees

- Valve limit (byte I5)
  - variable type: 1 bit for each limit position
- coding:
- closing limit: first bit
- opening limit: second bit
  eg: byte I5: 0000 0000 → intermediate position
  byte I5: 0000 0001 → valve closed byte I5: 0000 0010 → valve open

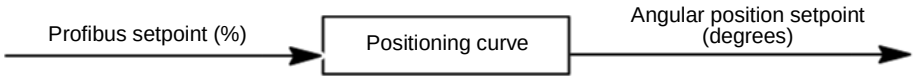
Positioner



Output frame (control)

- Valve position setpoint (bytes O2 and O3)

  - variable type: unsigned short (2 bytes)
  The valve position setpoint is coded in tenths of %: setpoint=555 → 55.5%
  The SMARTRONIC PC generates an angular setpoint according to this setpoint variable following a positioning curve. This curve is adjusted at unit level using the
  SMARTRONIC PC software (see section VI- 3- 2).



  - coding: byte O2 is the most significant
  byte O3 is the least significant

  eg: byte no. 2: 0000 0010 (most significant)
  byte no. 3: 0010 1011 (least significant)
  → position: 0000 0010 0010 1011 (bin) or 555 (dec) which corresponds to a setpoint of 55.5%.

Input frame (monitoring)

- Valve position (bytes I1 and I2)

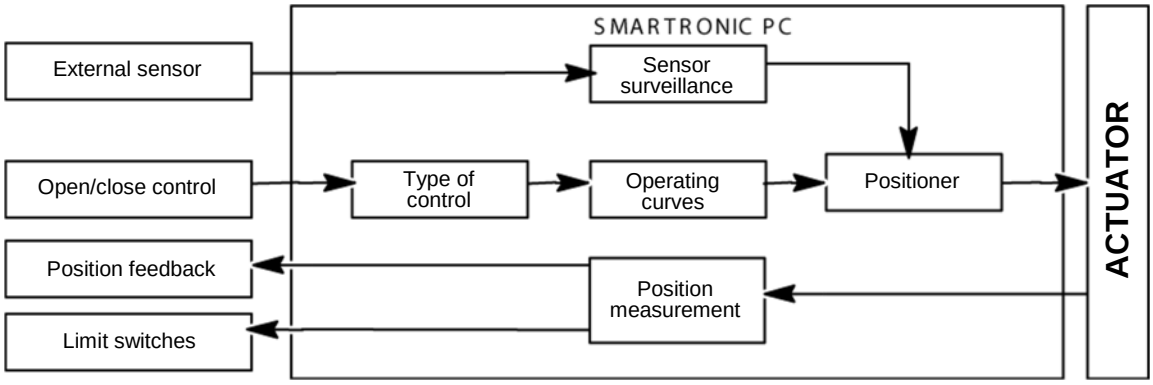
  - variable type: unsigned short (2 bytes)
  The value sent corresponds to tenths of a degree:
  0 → disc at 0 degrees (valve closed)
  450 → disc at 45.0 degrees
  900 → disc at 90.0 degrees (valve open)
  - coding: byte I1 is the most significant
  byte I2 is the least significant

  eg: byte I1: 0000 0001 (most significant)
  byte I2: 1100 0010 (least significant)
  → position: 0000 0001 1100 0010 (bin) or 450 (dec) which corresponds to a disc position of 45.0 degrees

- Valve limit (byte I5)
  - variable type: 1 bit for each limit position
  - coding:
    - closing limit: first bit
    - opening limit: second bit

  eg: byte I5: 0000 0000 → intermediate position
  byte I5: 0000 0001 → valve closed
  byte I5: 0000 0010 → valve open

Process surveillance



Output frame (control)

- Open and close ON/OFF control (byte O1)
  - variable type: bit
  - coding: third bit of byte O1

eg: byte O1: 0000 0000 → ON/OFF control on 0
byte O1: 0000 0100 → ON/OFF control on 1

Input frame (monitoring)

- Valve position (bytes I1 and I2)
  - variable type: unsigned short (2 bytes)
    The value sent corresponds to tenths of a degree:
    0 → disc at 0 degrees (valve closed)
    450 → disc at 45.0 degrees
    900 → disc at 90.0 degrees (valve open)
  - coding: byte I1 is the most significant
    byte I2 is the least significant

eg: byte I1: 0000 0001 (most significant)
byte I2: 1100 0010 (least significant)
→ position: 0000 0001 1100 0010 (bin) or 450 (dec) which corresponds to a disc position of 45.0 degrees

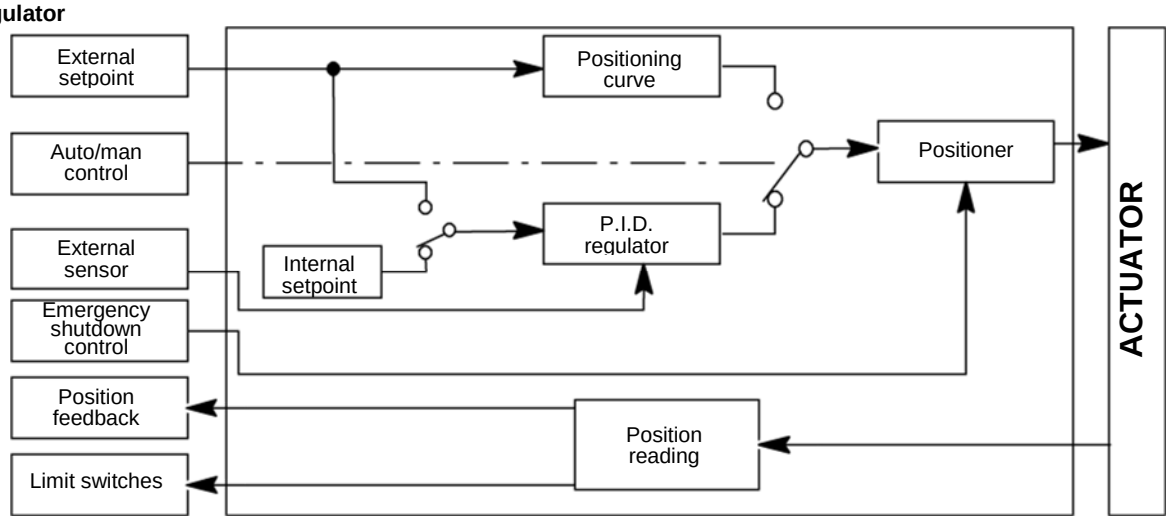
- External sensor value (bytes I3 and I4)
  - variable type: unsigned short (2 bytes)
    The value sent is in hundredths of mA:
    515 → 5.15V or 5.15mA
  - coding: byte I3 is the most significant
    byte I4 is the least significant

eg: byte I3: 0000 0010 (most significant)
byte I4: 1100 0011 (least significant)
→ sensor: 0000 0010 0000 0011 (bin) or 515 (dec) which corresponds to a sensor value of 5.15mA

- Valve limit (byte I5)
  - variable type: 1 bit for each limit position
  - coding:
    - closing limit: first bit
    - opening limit: second bit

eg: byte I5: 0000 0000 → intermediate position
byte I5: 0000 0001 → valve closed
byte I5: 0000 0010 → valve open

Regulator



Output frame (control)

- ON/OFF control: Auto/man and Emergency shutdown (byte O1)

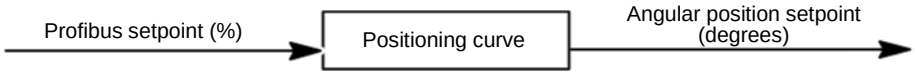
  - variable type: one bit for each control
  - coding:
    Emergency shutdown: first bit of byte O1
    Auto/Man: third bit of byte O1
  eg: Auto/man: byte O1: 0000 0000 → auto mode (regulator)
  byte O1: 0000 0100 → manual mode (positioner)
  Emergency shutdown: byte O1: 0000 0000 → inactive
  byte O1: 0000 0001 → active (valve close)

- External position/regulation setpoint (bytes O2 and O3)

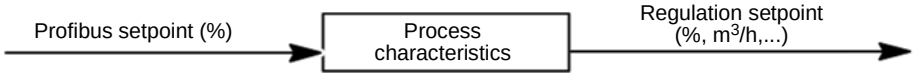
  - variable type: unsigned short (2 bytes)

  In **Manual** mode, the **External setpoint input** corresponds to a setpoint position (for example: valve at 45°). In **Auto** mode, the **External setpoint** input corresponds to a regulation setpoint (for example: 400m3/h if flow rate is measured by the External sensor input).
  The valve position setpoint is coded in tenths of %: setpoint=555 55.5%

  Manual Mode:
  The SMARTRONIC PC generates an angular setpoint according to this setpoint variable following a positioning curve. This positioning curve is adjusted at unit level using the SMARTRONIC PC software (see section VI- 3- 2).



  Auto mode:
  The SMARTRONIC PC generates a regulation setpoint according to this setpoint variable following the Process characteristics. The Process characteristics are adjusted at unit level using the SMARTRONIC PC software (see section VI- 3-2).



  - coding: byte O2 is the most significant
    byte O3 is the least significant
  eg: byte no. 2: 0000 0010 (most significant)
    byte no. 3: 0010 1011 (least significant)
  → position: 0000 0010 0010 1011 (bin) or 555 (dec) which corresponds to a setpoint of 55.5%.

Input frame (monitoring)

- Valve position (bytes I1 and I2)

  - variable type: unsigned short (2 bytes)
    The value sent corresponds to tenths of a degree:
    0 → disc at 0 degrees (valve closed)
    450 → disc at 45.0 degrees
    900 → disc at 90.0 degrees (valve open)
  - coding: byte I1 is the most significant
    byte I2 is the least significant

  eg: byte I1: 0000 0001 (most significant)
  byte I2: 1100 0010 (least significant)
  → position: 0000 0001 1100 0010 (bin) or 450 (dec) which corresponds to a disc position of 45.0 degrees

- External sensor value (bytes I3 and I4)

  - variable type: unsigned short (2 bytes)
    The value sent is in hundredths of mA, depending on sensor type:
    515 → 5.15V or 5.15mA
  - coding: byte I3 is the most significant
    byte I4 is the least significant

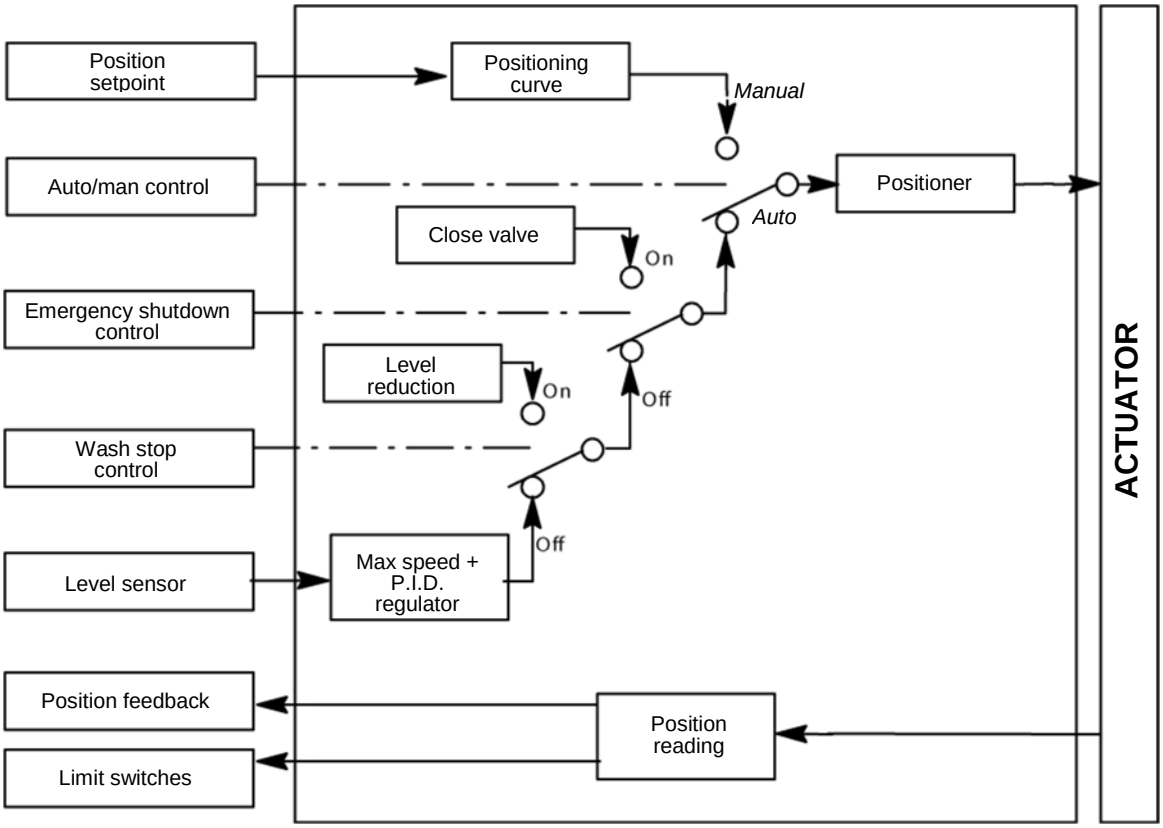
  eg: byte I3: 0000 0010 (most significant)
  byte I4: 1100 0011 (least significant)
  → sensor: 0000 0010 0000 0011 (bin) or 515 (dec) which corresponds to a sensor value of 5.15mA

- Valve limit (byte I5)

  - variable type: 1 bit for each limit position
  - coding:
    - closing limit: first bit
    - opening limit: second bit

  eg: byte I5: 0000 0000 → intermediate position
  byte I5: 0000 0001 → valve closed
  byte I5: 0000 0010 → valve open

Filter facade level regulator



Output frame (control)

- ON/OFF control: Auto/man, Emergency shutdown and Wash stop (byte O1)

  - variable type: one bit for each control
  - coding:
    Emergency shutdown: first bit of byte O1
    Wash stop: second bit of byte O1
    Auto/man: third bit of byte O1

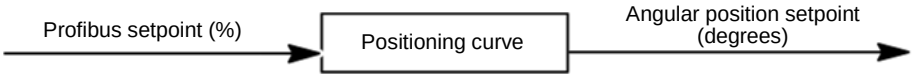
  eg: Auto/man
  byte O1: 0000 0000 → auto mode (regulator)
  byte O1: 0000 0100 → manual mode (positioner)

  Emergency shutdown
  byte O1: 0000 0000 → inactive
  byte O1: 0000 0001 → active (valve close)

  Wash stop
  byte O1: 0000 0000 → inactive
  byte O1: 0000 0010 → active (level reduction)

- Valve position setpoint (bytes O2 and O3)

  - variable type: unsigned short (2 bytes)
  The position setpoint is only active when the SMARTRONIC PC Regulator is in manual mode (positioner). In auto mode (regulation), only the regulation setpoint, entered using the Man Machine Interface, is active.
  The valve position setpoint is coded in tenths of %: setpoint=555 → 55.5%
  The SMARTRONIC PC generates an angular setpoint according to this setpoint variable following a positioning curve. This curve is adjusted at unit level using the SMARTRONIC PC software (see section VI- 3- 2).



  - coding: byte O2 is the most significant
  byte O3 is the least significant
  eg: byte no. 2: 0000 0010 (most significant)
  byte no. 3: 0010 1011 (least significant)
  → position: 0000 0010 0010 1011 (bin) or 555 (dec) which corresponds to a setpoint of 55.5%.

Input frame (monitoring)

- Valve position (bytes I1 and I2)

  - variable type: unsigned short (2 bytes)
  The value sent corresponds to tenths of a degree:
  0 → disc at 0 degrees (valve closed)
  450 → disc at 45.0 degrees
  900 → disc at 90.0 degrees (valve open)
  - coding: byte I1 is the most significant
  byte I2 is the least significant

  eg: byte I1: 0000 0001 (most significant)
  byte I2: 1100 0010 (least significant)
  → position: 0000 0001 1100 0010 (bin) or 450 (dec) which corresponds to a disc position of 45.0 degrees

- External sensor value (bytes I3 and I4)

  - variable type: unsigned short (2 bytes)
  The value sent is in hundredths of mA, depending on sensor type:
  515 → 5.15mA
  - coding: byte I3 is the most significant
  byte I4 is the least significant

  eg: byte I3: 0000 0010 (most significant)
  byte I4: 1100 0011 (least significant)
  → sensor: 0000 0010 0000 0011 (bin) or 515 (dec) which corresponds to the sensor value of 5.15mA

- Valve limit (byte I5)

  - variable type: 1 bit for each limit position
  - coding:
  - closing limit: first bit
  - opening limit: second bit

  eg: byte I5: 0000 0000 → intermediate position
  byte I5: 0000 0001 → valve closed
  byte I5: 0000 0010 → valve open

VII - Operating faults - Causes and solutions

Operating faults	*Causes*	*Corrections*
One or more solenoid valves are energized but the actuator does not move.	- Insufficient drive air pressure. - Drive air pressure too high (P > 8bar). - Drive air pressure too low (P < 3bar). - Valve blocked. - Actuator blocked or destroyed. - Distributor clogged by impurities.	- Check the pneumatic supply. - Check and restore pressure P. - Check and restore pressure P. - Check that the valve can move freely. - Change the actuator. - Change the inlet filter.
Solenoid valves unstable, surging.	- SMARTRONIC PC not calibrated. - Mechanical adjustment (set screws) of the operating time too fast.	- Run self-calibration using the MMI. - Carry out a mechanical adjustment to make the operating time longer, then run self-calibration For optimum operation: closing time = opening time.
The SMARTRONIC PC unit is not responding to any control	- The unit is not being powered correctly (no LED illuminated on the card). - The SMARTRONIC PC is in control by PC mode (see VI.1.1)	- Check the connector wiring and the power supply voltage. - Change the control mode using the MMI.

Man Machine Interface		
The valve position displayed on the screen does not correspond to its actual position.	- The SMARTRONIC PC unit angular sensor is not calibrated. - The angular sensor is faulty.	- Calibrate the sensor automatically using the SMARTRONIC PC software. - Check that the angular sensor resistance value varies linearly between opening and closing.
The MMI is not communicating with the SMARTRONIC PC.	- The PC is not correctly connected to the SMARTRONIC PC unit. - The SMARTRONIC PC unit is not receiving power. - The RS 232/485 converter is incorrectly configured. - A firewall is blocking communication.	- Check the wiring between the PC and the programming connector. - Check the SMARTRONIC PC unit power supply. - Check the configuration of the converter switches (see section V). - Check the configuration of the firewall installed on your computer.

VIII - Codes

Code	Description
	Unit type
R001312 / 0 0 0 0 0 4 . R 7 . . . . 0 6 . .	SMARTRONIC PC
	Detection
R- - - - - - / **0 0 0 0** 0 4 . R 7 . . . . 0 6 . .	Self-calibration
	Detection position
R- - - - - - / 0 0 0 0 **0** 4 . R 7 . . . . 0 6 . .	End stop reconstituted
	Position feedback
R- - - - - - / 0 0 0 0 0 **4** . R 7 . . . . 0 6 . .	With feedback 4-20mA - Active (2-wires)
	Electrical output
R- - - - - - / 0 0 0 0 0 4 **2** R 7 . . . . 0 6 . .	2 M20 metal cable glands, IP67 (dia. 6 to 12)
	Electrodistributor
R- - - - - - / 0 0 0 0 0 **4** . R 7 . . . . 0 6 . .	4/3 closed centre - position (POS)
	Electrodistributor voltage
R- - - - - - / 0 0 0 0 0 **4** . R 7 . . . . 0 6 . .	24V DC
	Actuator
R- - - - - - / 0 0 0 0 0 4 . R 7 **2** . . . 0 6 . .	Actair 3 to 200 with end-stops on Closing (C)
R- - - - - - / 0 0 0 0 0 4 . R 7 **3** . . . 0 6 . .	Actair 3 to 200 with end-stops on Opening (O)
R- - - - - - / 0 0 0 0 0 4 . R 7 **4** . . . 0 6 . .	Actair 400 to 1600
R- - - - - - / 0 0 0 0 0 4 . R 7 **6** . . . 0 6 . .	Dynactair 1.5 to 25 Air fail close (FMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **7** . . . 0 6 . .	Dynactair 1.5 to 25 Air fail open (OMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **8** . . . 0 6 . .	Dynactair 50 and 100 Air fail close (FMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **9** . . . 0 6 . .	Dynactair 50 and 100 Air fail open (OMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **J** . . . 0 6 . .	Dynactair 200 to 800 Air fail close (FMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **K** . . . 0 6 . .	Dynactair 200 to 800 Air fail open (OMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **L** . . . 0 6 . .	Acrair NG 2 to 700
R- - - - - - / 0 0 0 0 0 4 . R 7 **M** . . . 0 6 . .	Dynactair NG 1 to 350 Air fail close (FMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **N** . . . 0 6 . .	Dynactair NG 1to 350 Air fail open (OMA)
R- - - - - - / 0 0 0 0 0 4 . R 7 **W** . . . 0 6 . .	Double acting 1/4-turn pneumatic actuator
R- - - - - - / 0 0 0 0 0 4 . R 7 **X** . . . 0 6 . .	Single acting 1/4-turn pneumatic actuator
R- - - - - - / 0 0 0 0 0 4 . R 7 **Y** . . . 0 6 . .	Double acting linear pneumatic actuator
R- - - - - - / 0 0 0 0 0 4 . R 7 **Z** . . . 0 6 . .	Single acting linear pneumatic actuator
	Failsafe position
R- - - - - - / 0 0 0 0 0 4 . R 7 . **A** . . . 0 6 . .	Closing by lack of power (FMC)
R- - - - - - / 0 0 0 0 0 4 . R 7 . **B** . . . 0 6 . .	Opening by lack of power (OMC)
R- - - - - - / 0 0 0 0 0 4 . R 7 . **C** . . . 0 6 . .	Hold in position by lack of power (MPMC)
	SMARTRONIC function
R- - - - - - / 0 0 0 0 0 4 . R 7 . . **1** . 0 6 . .	Programmed open/close
R- - - - - - / 0 0 0 0 0 4 . R 7 . . **2** . 0 6 . .	Intelligent positioner
R- - - - - - / 0 0 0 0 0 4 . R 7 . . **3** . 0 6 . .	External sensor surveillance
R- - - - - - / 0 0 0 0 0 4 . R 7 . . **4** . 0 6 . .	Regulation
R- - - - - - / 0 0 0 0 0 4 . R 7 . . **5** . 0 6 . .	Filter facade regulation

Code	Description
	Fieldbus
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . **0** 0 6 . .	Without
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . **2** 0 6 . .	Profibus DP
	Heating resistor
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . **0** 6 . .	Without
	Viewing
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 **6** . .	Through 3D sight glass
	Configuration
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 6 **1** .	RS232 (M12x1.5 connector)
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 6 **2** .	Ethernet (M12x1.5 connector)
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 6 **3** .	Wi-Fi 802.11
	Diagnostics
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 6 . **0**	Without
R- - - - - - / 0 0 0 0 0 4 . R 7 . . . . 0 6 . **1**	With

Distribution options

Code	Description
4/3 closed centre distributor	
R- - - - - - / . . . . . **R** 7 2 A	4/3 closed centre (POS) - Actair 3 to 200 “F”- FMC
R- - - - - - / . . . . . **R** 7 2 B	4/3 closed centre (POS) - Actair 3 to 200 “F”- OMC
R- - - - - - / . . . . . **R** 7 2 C	4/3 closed centre (POS) - Actair 3 to 200 “F”- MPMC
R- - - - - - / . . . . . **R** 7 3 A	4/3 closed centre (POS) - Actair 3 to 200 “O”- FMC
R- - - - - - / . . . . . **R** 7 3 B	4/3 closed centre (POS) - Actair 3 to 200 “O”- OMC
R- - - - - - / . . . . . **R** 7 3 C	4/3 closed centre (POS) - Actair 3 to 200 “O”- MPMC
R- - - - - - / . . . . . **R** 7 4 A	4/3 closed centre (POS) - Actair 400 to 1600 - FMC
R- - - - - - / . . . . . **R** 7 4 B	4/3 closed centre (POS) - Actair 400 to 1600 - OMC
R- - - - - - / . . . . . **R** 7 4 C	4/3 closed centre (POS) - Actair 400 to 1600 - MPMC
R- - - - - - / . . . . . **R** 7 6 A	4/3 closed centre (POS) - Dynactair 1.5 to 25 - FMA - FMC
R- - - - - - / . . . . . **R** 7 7 B	4/3 closed centre (POS) - Dynactair 1.5 to 25 - OMA - OMC
R- - - - - - / . . . . . **R** 7 8 A	4/3 closed centre (POS) - Dynactair 50 to 100 - FMA - FMC
R- - - - - - / . . . . . **R** 7 9 B	4/3 closed centre (POS) - Dynactair 50 to 100 - OMA - OMC
R- - - - - - / . . . . . **R** 7 J A	4/3 closed centre (POS) - Dynactair 200 to 800 - FMA - FMC
R- - - - - - / . . . . . **R** 7 K B	4/3 closed centre (POS) - Dynactair 200 to 800 - OMA – OMC
R- - - - - - / . . . . . **R** 7 L A	4/3 cf (POS) - Actair NG 2 à NG 700 - FMC
R- - - - - - / . . . . . **R** 7 L B	4/3 cf (POS) - Actair NG 2 à NG 700 - OMC
R- - - - - - / . . . . . **R** 7 L C	4/3 cf (POS) - Actair NG 2 à NG 700 - MPMC
R- - - - - - / . . . . . **R** 7 M A	4/3 cf (POS) - Dynactair NG 1 à NG 350 FMA - FMC
R- - - - - - / . . . . . **R** 7 N B	4/3 cf (POS) - Dynactair NG 1 à NG 350 - OMA - OMC
R- - - - - - / . . . . . **R** 7 W	4/3 closed centre (POS) - Double acting 1/4-turn actuator
R- - - - - - / . . . . . **R** 7 W C	4/3 closed centre (POS) - Double acting 1/4-turn actuator - MPMC
R- - - - - - / . . . . . **R** 7 X A	4/3 closed centre (POS) - Single acting 1/4-turn actuator - FMC
R- - - - - - / . . . . . **R** 7 X B	4/3 closed centre (POS) - Single acting 1/4-turn actuator - OMC
R- - - - - - / . . . . . **R** 7 Y	4/3 closed centre (POS) - Double acting linear actuator
R- - - - - - / . . . . . **R** 7 Y C	4/3 closed centre (POS) - Double acting linear actuator - MPMC
R- - - - - - / . . . . . **R** 7 Z A	4/3 closed centre (POS) - Single acting linear actuator – FMC
R- - - - - - / . . . . . **R** 7 Z B	4/3 closed centre (POS) - Single acting linear actuator - OMC

IX - Spare parts and kits

Please contact us

Notes:

06.02.2020

8520.8051/6-EN

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