EExpand your communications
Serial Interface – Fieldbus System
Quick overview
Serial Interface – Fieldbus System
EXpand your communications

Fieldbus brought you savings
The use of Fieldbus in manufacturing processes has substantially improved the way we handle communications, providing us with substantial savings in terms of wiring, connectors, installation and set-up time, electronic diagrams or documentation.

SMC’s Serial Interface Solutions will EXpand your communications
For the development of our Serial Interface range, we have gone a step further and enlarged the number of possibilities in industrial communication, bearing in mind the flexibility and versatility that markets currently demand.

SMC’s EX range of solutions:
- Communicate & connect – Our solutions communicate in your language: EtherNet-based Fieldbus system and other common industrial communication protocols available. Furthermore, the range’s versatility allows connecting any EX unit to any of our valve manifolds: all-to-all connectivity with no surprises.

- Enter the Industry 4.0 era – Taken by the hand of its remote control capabilities. Our solutions offer a high degree of access to and feedback from automation components via control systems. Also by the hand of EX range’s adaptability. Our solutions provide the possibility of managing different pneumatic components such as valves, cylinders or instrumentation equipment in any common network. Besides, you will be able to easily update, enlarge or integrate your machine with our solution in a simple way.

- Build a complete solution with us – Range of 12,000 basic models with over 700,000 variations to accommodate many of your automation requirements.

“Our solutions communicate in your language.

Our solutions offer a high degree of access to and feedback from automation components via control systems.”
Main features

- **Fieldbus system**
  Serial interface uses Fieldbus for communicating, instead of point-to-point connections, thus allowing savings in:
  - Material costs – cables, connectors, gutters
  - Connection and set-up times
  - Generation of electrical diagrams
  - Labelling and documentation
  - Electric panels, cleaner and more compact – it is even possible to remove cabinets.

- **Highlighted EX serial interface solutions**
  EX260 Series – centralised and compact solution for solenoid valves, with up to 32 outputs.
  EX600 Series – centralised and great capacity solution for both solenoid valves and I/O, with up to 512 inputs & 512 outputs.
  EX500 Series – decentralised solution for both solenoid valves and I/O, with up to 128 inputs & 128 outputs.

- **Compatible with EtherNet-based and other common industrial protocols**

- **Short/open circuit detection**
  Easy to identify short circuits or open circuits.

- **Web server function**
  This function allows remote access via a general-purpose web browser, such as Internet Explorer, and enables status checks, parameter settings and forced output, among others, so start-up of the system and maintenance can be performed efficiently.

- **High environmental resistance**
  Up to IP67 enclosure protection.

For dimensions and other details refer to the general catalogue of each series in www.smc.eu
**Independent power supply control areas**

Ease which, in the same machine, allows removing the power supply of one zone and maintaining the power supply of the rest. This is useful for collaborative robotics, where operators and robots work together.

In the example, just by using a Y branch connector, power from a different system can be supplied to the serial interface unit (valve manifold).

**QuickConnect™ function**

Enables the EtherNet/IP™ devices to quickly power up and join an EtherNet/IP™ network, thus considerably reducing the communication connection times.

**General specifications**

Serial Interface – Fieldbus System
Fieldbus system portfolio

<table>
<thead>
<tr>
<th>Series</th>
<th>Centralised system</th>
<th>Decentralised system</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX250 Series</td>
<td>Integrated type (for input/output)</td>
<td>Gateway type EX500 Series</td>
</tr>
<tr>
<td>EX260 Series</td>
<td>Integrated type (for output)</td>
<td></td>
</tr>
<tr>
<td>EX600 Series</td>
<td>Integrated type (for input/output)</td>
<td></td>
</tr>
<tr>
<td>EX510 Series</td>
<td>Gateway type</td>
<td></td>
</tr>
</tbody>
</table>

Compatible protocol

- DeviceNet™
- PROFIBUS DP
- CC-Link
- EtherNet/IP™
- EtherCAT®
- PROFINET

Other Fieldbus system solutions

- **Centralised system, integrated type for input/output**
  EX250 Series
  - Solenoid valve solution + I/O
  - 32 inputs / 32 outputs module
  - Output units available for external use, EX9
  - Applicable protocols: DeviceNet™, PROFIBUS DP, CC-Link, EtherNet/IP™, CANopen®, AS-Interface
  - Applicable valve series: SY, VQC, S0700, SV
  - Enclosure: up to IP67.

- **Decentralised system, gateway type**
  EX510 Series
  - Solenoid valve solution + digital I/O
  - 64 inputs / 64 outputs in 8 branches
  - Possibility of terminal outputs for external use
  - Applicable protocols: DeviceNet™, PROFIBUS DP, CC-Link
  - Applicable valve series: SY, VQC, S0700, SV
  - Enclosure: IP20.
## Applicable valve series

<table>
<thead>
<tr>
<th>Series</th>
<th>Flow rate characteristics (4/2→5/3)</th>
<th>Maximum number of solenoids</th>
<th>Power consumption [W]</th>
<th>Enclosure</th>
<th>International standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>SY3000</td>
<td>C [dm³/(s·bar)] b Q [l/min] (ANR)</td>
<td>32</td>
<td>0.35 (Standard) 0.1 (With power saving circuit) [Inrush 0.4, Holding 0.1]</td>
<td>IP67</td>
<td></td>
</tr>
<tr>
<td>SY5000</td>
<td>1.6 0.19 381</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SY7000</td>
<td>3.6 0.17 848</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VQC1000</td>
<td>1.0 0.30 254</td>
<td>24</td>
<td>0.4 (Standard)</td>
<td>IP67</td>
<td></td>
</tr>
<tr>
<td>VQC2000</td>
<td>3.2 0.30 814</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VQC4000</td>
<td>7.3 0.38 1958</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VQC5000</td>
<td>17.0 0.31 4350</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S0700</td>
<td>0.37 0.39 100</td>
<td>32</td>
<td>0.35</td>
<td>IP40</td>
<td></td>
</tr>
<tr>
<td>SV1000</td>
<td>1.1 0.35 289</td>
<td></td>
<td></td>
<td>IP67</td>
<td></td>
</tr>
<tr>
<td>SV2000</td>
<td>2.4 0.18 568</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV3000</td>
<td>4.3 0.21 1036</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Values for 2-position single, rubber seal type.
2) These valves have been calculated according to ISO 6358 and indicate the flow rate under standard conditions with an inlet pressure of 0.6 MPa (relative pressure) and a pressure drop of 0.1 MPa.
**Main features**

- **Centralised & compact Fieldbus system**
- **Valve output system for driving 5 port solenoid valves**
  Up to 32 solenoids, up to 24 stations.
- **Compatible communication protocols:**
  - EtherNet/IP™
  - PROFINET
  - EtherCAT®
  - PROFIBUS DP
  - DeviceNet™
  - CC-Link
- **IP67 enclosure protection**
  For units with D-sub connector, and when connected to S0700 manifolds, it is IP40.
- **SPEEDCON connectors compatible**
  Just insert and rotate 1/2 turn.
- **Wiring and piping possible from the same direction**
- **Daisy-chain communication**
  External branch connector is not necessary.
- **Internal terminal resistor**
  ON/OFF switching is possible with an internal terminating resistor, an external terminating resistor is not necessary. Only available for M12 PROFIBUS DP, CC-Link communication connectors.

**Selected part numbers**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Protocol</th>
<th>Number of outputs</th>
<th>Si unit output polarity</th>
<th>Communication connector</th>
<th>Enclosure protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX260-SEN1</td>
<td>EtherNet/IP™</td>
<td>32</td>
<td>Source/PNP</td>
<td>M12</td>
<td>IP67</td>
</tr>
<tr>
<td>EX260-SEN3</td>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SPN1</td>
<td>PROFINET</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SPN3</td>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SEC1</td>
<td>EtherCAT®</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SEC3</td>
<td></td>
<td>16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SDN1</td>
<td>DeviceNet™</td>
<td>32</td>
<td></td>
<td></td>
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<tr>
<td>EX260-SDN3</td>
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<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SPR1</td>
<td>PROFIBUS DP</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SPR3</td>
<td></td>
<td>16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EX260-SPR5</td>
<td></td>
<td>32</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>EX260-SPR7</td>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Stocked items*
Centralised & compact Fieldbus system

Valve output system for driving 5 port solenoid valves

Up to 9 input/output units either digital or analogue, can be connected in any order:
- 144 digital inputs – 8/16 inputs/module
- 72 digital outputs – 8 outputs/module
- 18 analogue inputs – 2 inputs/module
- 18 analogue outputs – 2 outputs/module.

It is possible to connect various input and output devices to the digital/analogue I/O units.

Compatible communication protocols:
- EtherNet/IP™
- PROFINET
- EtherCAT®
- PROFIBUS DP
- DeviceNet™
- CC-Link

IP67 enclosure protection
- IP40 for the input/output units with D-sub connector or spring type terminal block.
- IP20 for the handheld terminal.

SPEEDCON connectors compatible
- Just insert and rotate 1/2 turn.

Dual port SI unit for EtherNet/IP™ that allows for DLR topology
- No loss of EtherNet/IP™ communication occurs, despite having a disconnected location, thanks to DLR (Device Level Ring) topology.

QuickConnect™ function
- In the case of a tool changer, communication can be established in approximately 0.5 seconds.

Web server function
- Status checks and settings can be performed on a general purpose web browser.

Self diagnosis function
- In combination with the handheld terminal, the following functions are available:
  - Short/Open circuit detection
  - Counter function.

Handheld terminal
- Can be used for the adjustment of internal parameters and the monitoring of input and output signal status.
  - Forced input and output function
  - Password setting function
  - Simple operation.

### Accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX500-AP010-S</td>
<td>Power cable for EtherNet/IP™, PROFINET, EtherCAT®, PROFIBUS DP, DeviceNet™</td>
</tr>
<tr>
<td>EX500-AP050-S</td>
<td>Straight connector, 5 m</td>
</tr>
<tr>
<td>EX500-AP010-A</td>
<td>Angled connector, 1 m</td>
</tr>
<tr>
<td>EX500-AP050-A</td>
<td>Angled connector, 5 m</td>
</tr>
<tr>
<td>EX50-AC030-1</td>
<td>Power cable for CC-Link</td>
</tr>
<tr>
<td>EX9-AC050-1</td>
<td>Straight connector, 5 m</td>
</tr>
<tr>
<td>PCA-1445556</td>
<td>Communication cable for EtherNet/IP™, PROFINET, EtherCAT®, M12 SPEEDCON connector, 5 m</td>
</tr>
<tr>
<td>EX9-AC020EN-PSRJ</td>
<td>Communication cable for EtherNet/IP™, PROFINET, EtherCAT®, PROFIBUS DP, DeviceNet™, CC-Link, M12 – RJ-45 connector, 2 m</td>
</tr>
<tr>
<td>EX9-AC050EN-PSRJ</td>
<td>CC-Link, M12 – RJ-45 connector, 5 m</td>
</tr>
</tbody>
</table>
### EX600 Series configuration

#### Analogue Unit
- Pressure sensor
- Flow sensor
- Electro-pneumatic regulator etc.

#### Output device

#### SI Unit
- Handheld Terminal
  - Parameter setting and I/O monitor tool

- Input unit
- Output unit
- Input/Output Unit

#### Selected part numbers

<table>
<thead>
<tr>
<th>Part number</th>
<th>Type of unit / Description</th>
<th>No. of inputs/outputs</th>
<th>Polarity</th>
<th>Communication connector</th>
<th>Enclosure protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX600-SEN1</td>
<td>SI unit, EtherNet/IP™ (1 port)</td>
<td>− / 32</td>
<td>PNP</td>
<td>M12 connector (5 pins)</td>
<td>IP67</td>
</tr>
<tr>
<td>EX600-SEN3</td>
<td>SI unit, EtherNet/IP™ (2 ports)</td>
<td></td>
<td></td>
<td>M12 connector (5 pins)</td>
<td></td>
</tr>
<tr>
<td>EX600-SPN1</td>
<td>SI unit, PROFINET</td>
<td></td>
<td></td>
<td>M12 connector (5 pins)</td>
<td></td>
</tr>
<tr>
<td>EX600-SEC1</td>
<td>SI unit, EtherCAT®</td>
<td></td>
<td></td>
<td>M12 connector (5 pins)</td>
<td></td>
</tr>
<tr>
<td>EX600-SDN1A</td>
<td>SI unit, DeviceNet™</td>
<td></td>
<td></td>
<td>M12 connector (5 pins)</td>
<td></td>
</tr>
<tr>
<td>EX600-SPR1A</td>
<td>SI unit PROFIBUS DP</td>
<td></td>
<td></td>
<td>M12 connector (5 pins)</td>
<td></td>
</tr>
</tbody>
</table>

#### Digital Unit
- Input device
- Output device

#### Analogue Unit
- SI Unit
- EtherNet/IP™ (1 port)
- EtherNet/IP™ (2 ports)
- PROFINET
- EtherCAT®
- DeviceNet™
- DeviceNet™
- PROFIBUS DP
- Digital input/output unit
- Analogue input/output unit

#### End plate
- − / −

#### Others
- Proximity sensor
- Photoelectric switch
- Limit switch
- Solenoid valve
- Indicator light
- Relay
- Buzzer

#### Pressure switch
- Flow switch
- Auto switch

1) This element cannot communicate with the handheld terminal.

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For dimensions and other details refer to the general catalogue of each series in www.smc.eu
## Accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX600-HT1A</td>
<td>Handheld terminal, no cable</td>
</tr>
<tr>
<td>EX600-ZMA2</td>
<td>End plate bracket</td>
</tr>
<tr>
<td>EX600-ZMA3</td>
<td>Valve plate</td>
</tr>
<tr>
<td>EX600-ZMVM1</td>
<td>Reinforcing brace</td>
</tr>
<tr>
<td>EX500-AWES</td>
<td>Seal cap</td>
</tr>
<tr>
<td>EX600-M0010-1</td>
<td>Handheld terminal cable</td>
</tr>
<tr>
<td>EX600-M0030-1</td>
<td>Handheld terminal cable</td>
</tr>
<tr>
<td>PCA-1564927</td>
<td>Power cable with M12 connector</td>
</tr>
<tr>
<td>PCA-1564930</td>
<td>Power cable with M12 connector</td>
</tr>
<tr>
<td>PCA-1564969</td>
<td>Power cable with M12 connector</td>
</tr>
<tr>
<td>PCA-1558810</td>
<td>Power cable with 7/8 inch connector</td>
</tr>
<tr>
<td>PCA-1558823</td>
<td>Power cable with 7/8 inch connector</td>
</tr>
<tr>
<td>PCA-1558836</td>
<td>Power cable with 7/8 inch connector</td>
</tr>
<tr>
<td>PCA-1558849</td>
<td>Power cable with 7/8 inch connector</td>
</tr>
<tr>
<td>PCA-1446566</td>
<td>Communication cable for SI unit compatible with EtherNet/IP™, PROFINET, EtherCAT®</td>
</tr>
<tr>
<td>EX9-AC020EN-PSRJ</td>
<td>Communication cable for SI unit compatible with EtherNet/IP™, PROFINET, EtherCAT®</td>
</tr>
<tr>
<td>EX9-AC050EN-PSRJ</td>
<td>Communication cable for SI unit compatible with PROFIBUS DP</td>
</tr>
<tr>
<td>PCA-1557688</td>
<td>Communication cable for SI unit compatible with DeviceNet™</td>
</tr>
<tr>
<td>PCA-1557691</td>
<td>Communication cable for SI unit compatible with CC-Link</td>
</tr>
<tr>
<td>PCA-1557633</td>
<td>Communication cable for SI unit compatible with CC-Link</td>
</tr>
<tr>
<td>PCA-1557646</td>
<td>Communication cable for SI unit compatible with CC-Link</td>
</tr>
<tr>
<td>PCA-1567720</td>
<td>Communication cable for SI unit compatible with CC-Link</td>
</tr>
<tr>
<td>PCA-1567717</td>
<td>Communication cable for SI unit compatible with CC-Link</td>
</tr>
</tbody>
</table>

### Examples of connections

#### D-sub connector

There are three EX600 units capable of connection using a D-sub connector: digital input, digital output, and digital input/output.

- The digital output unit can be connected with an SMC manifold solenoid valve, K-kit (D-sub connector).

#### Digital input unit

This unit is for inputting a digital signal (ON/OFF signal).

- The signal of a 2-wire/3-wire auto switch attached to the actuator can be acquired to feedback a signal to the PLC. The control signal of an entire system can be managed by the Fieldbus system.

#### Spring type terminal block

There are three EX600 units compatible with individual wiring configurations: digital input, digital output, and digital input/output.

- The wiring connection can be carried out easily using only a flat head screwdriver.

#### Analogue input/output unit

This unit is for inputting or outputting an analogue signal (voltage/current).

- A single unit performs both input and output, allowing feedback control where analogue signals are received from a pressure sensor and sent to a pressure controller. With this, installation space is also minimised.
Main features

- Decentralised Fieldbus system
- Valve output system for driving 5 port solenoid valves
- Up to 128 digital inputs/outputs, up to 16 valve manifolds and input unit connections
  - Up to 32 input/output points per branch
  - Up to 8 valve manifold connections, 2 per branch
  - Up to 8 input unit connections, 2 per branch
  - 4 branches or subnetworks possible, each up to 20 metres long.
- Output units available for external use (EX9)
  Applicable to output devices other than valve manifolds – it is possible to operate elements such as lights and buzzers by using output blocks.
- IP65/IP67 enclosure protection
  IP67 for the input units (128 points system) and the SI units.
  IP65 for the input units (64 points system) and the gateways.
- Web server function
  Status checks and settings can be performed on a general purpose web browser.
  Valve operation test (ON/OFF).
  Connection diagnostic between valve manifold and input unit.
  Short-circuit diagnostic of input device.
- Fixed I/O mapping
  I/O data for the valve manifolds (SI unit) and input units is automatically set by the gateway unit.
- Management of different power supplies
  By using a Y branch connector, it is possible to supply power from a different system to the SI unit (valve manifold).
- Compatible communication protocols:
  EtherNet/IP™
  PROFINET
  PROFIBUS DP
  DeviceNet™

For dimensions and other details refer to the general catalogue of each series in www.smc.eu
Selected part numbers

128 points gateway decentralised system

<table>
<thead>
<tr>
<th>Part number</th>
<th>Type of unit / Description</th>
<th>No. of inputs/outputs</th>
<th>Polarity</th>
<th>Communication connector</th>
<th>Enclosure protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX500-GEN2</td>
<td>Gateway unit, EtherNet/IP™</td>
<td>128 / 128</td>
<td>—</td>
<td>M12 connector (5 pins)</td>
<td>IP65</td>
</tr>
<tr>
<td>EX500-GPN2</td>
<td>Gateway unit, PROFINET</td>
<td>128 / 128</td>
<td>—</td>
<td>M12 connector (8 pins)</td>
<td>IP67</td>
</tr>
</tbody>
</table>

1) Number of outputs can be 16 or 32, switched by a built-in setting switch.

64 points gateway decentralised system

<table>
<thead>
<tr>
<th>Part number</th>
<th>Type of unit / Description</th>
<th>No. of inputs/outputs</th>
<th>Polarity</th>
<th>Communication connector</th>
<th>Enclosure protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX500-GEN1</td>
<td>Gateway unit, DeviceNet™</td>
<td>64 / 64</td>
<td>—</td>
<td>M12 connector (5 pins)</td>
<td>IP65</td>
</tr>
<tr>
<td>EX500-GPR1A</td>
<td>Gateway unit, PROFIBUS DP</td>
<td>64 / 64</td>
<td>NPN</td>
<td>M12 connector (8 pins)</td>
<td>IP67</td>
</tr>
</tbody>
</table>

64 points gateway decentralised system

<table>
<thead>
<tr>
<th>Part number</th>
<th>Type of unit / Description</th>
<th>No. of inputs/outputs</th>
<th>Polarity</th>
<th>Communication connector</th>
<th>Enclosure protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX500-S001</td>
<td>SI unit for SV valve series</td>
<td>64 / 32</td>
<td>PNP</td>
<td>M8 connector (3 pins)</td>
<td>IP65</td>
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<tr>
<td>EX500-S010</td>
<td>SI unit for SY/S0700/VQC valve series</td>
<td>64 / 16</td>
<td>PNP</td>
<td>M8 connector (4 pins)</td>
<td>IP65</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX500-AWES</td>
<td>Seal caps (10 units), male plug</td>
<td>For M8 connector</td>
</tr>
<tr>
<td>EX500-AWTS</td>
<td>Seal cap, female plug</td>
<td>For M12 connector</td>
</tr>
</tbody>
</table>

Part numbers:** L50098 **

Stocked items:
**Other information**

**Related products**

- **Electro-pneumatic regulator**  
  ITV1000/2000/3000 Series

**Valve Configurator online**

With the help of our Valve Configurator online, defining your valve manifold assembly has never been easier!

Our SY/VQC/SV Configurator software has been specifically developed for defining valve manifold configurations using either our versatile and flexible SY solenoid valve range or other powerful valves, VQC and SV. It facilitates the definition of most usual SY/VQC/SV manifolds in very few steps.

Besides, it will provide you with information about the dimensions and weight of the manifold, a comprehensive parts list, the possibility of downloading the CAD file of the manifold in multiple formats and a quotation document to speed up your communication with our experts.

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**What to do now:**

1. **Enter SMC’s Valve Configurator online at** [www.smc.eu](http://www.smc.eu)
2. **Select your valve series**
3. **Select your manifold type**
4. **Complete your configuration**
5. **Contact SMC for further details**

In the event you want to configure your serial transmission solution with S0700 series, visit [www.smc.eu](http://www.smc.eu)

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For dimensions and other details refer to the general catalogue of each series in [www.smc.eu](http://www.smc.eu)