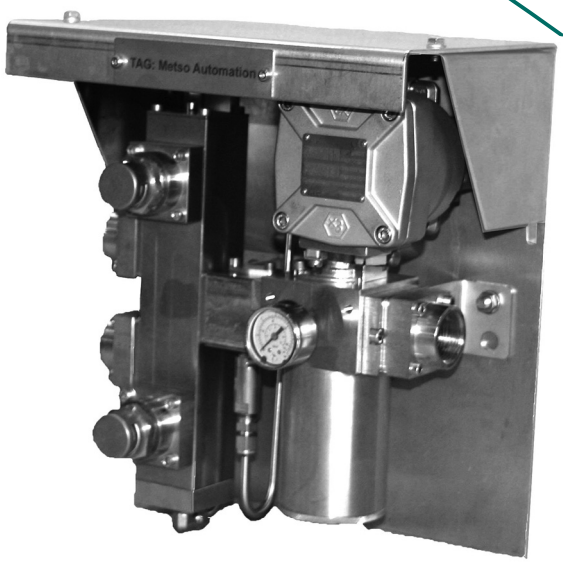
# METSO INSTRUMENTATION FUNCTION PANEL – SERIES SP

Metso SP series instrumentation function panels introduces a range of most common process valve control functionalities. Typically these functionalities are related to valve operation times and failure modes. SP series is designed to meet the most stringent customer needs and stand the most challenging plant environments. Function panels are engineered to be used with Metso pneumatic cylinder and diaphragm actuators to provide excellent performance and high reliability.




## KEY FEATURES & BENEFITS

- Reliable and robust design
- Standardized and fully tested by Metso
- Single source responsibility
- Ease of selection
- Quick and easy installation
- Modular and compact size
- High flow capasity
- Corrosion resistant construction
- Predetermined actuator stroke times

## TECHNICAL SPECIFICATION

### Technical description

Metso SP1 instrumentation panels are ready made assemblies of pneumatic and electro-pneumatic components. These assemblies are designed to execute remote controlled on/off function. SP1 instrumentation panels can be used for both cycling on-off and ESD service. Applicable for all Metso cylinder and diaphragm actuators and also with linear type actuators. When using rack and pinion type actuators (e.g. VPVL) please consult Metso.

### Pneumatics

| | |
|---|---|
| Supply media: | Instrument air |
| Maximum supply pressure: | 10 bar(g) |
| Operating pressure: | 2.5 - 10 bar(g) |
| Filtration: | element 5 microns / manual drain |

Connections and stroke times, see Table 1. Piping and stroke times on page 3.

### Protection class

- All panels are SIL capable. SIL level of panel or whole final assembly is allways case (content) specific. Please consult Metso for further details.
- Ingress protection class IP67 (Electrical).

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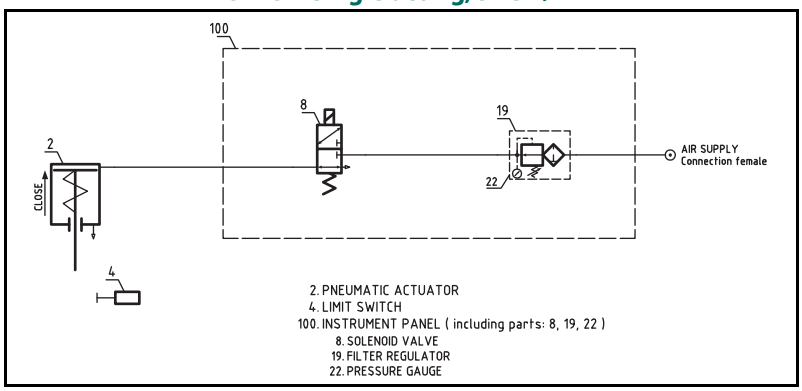
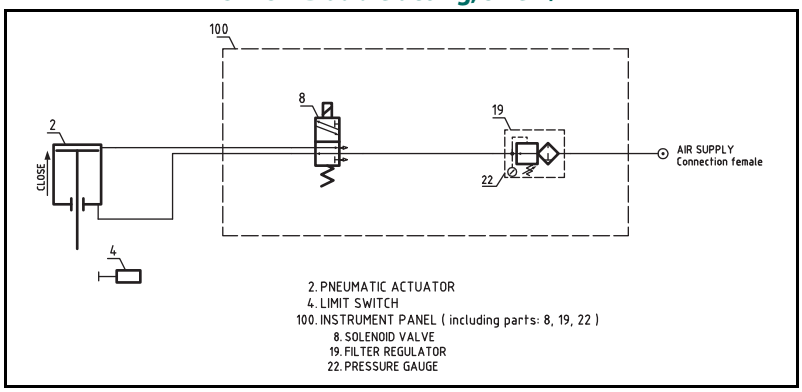
Expect results

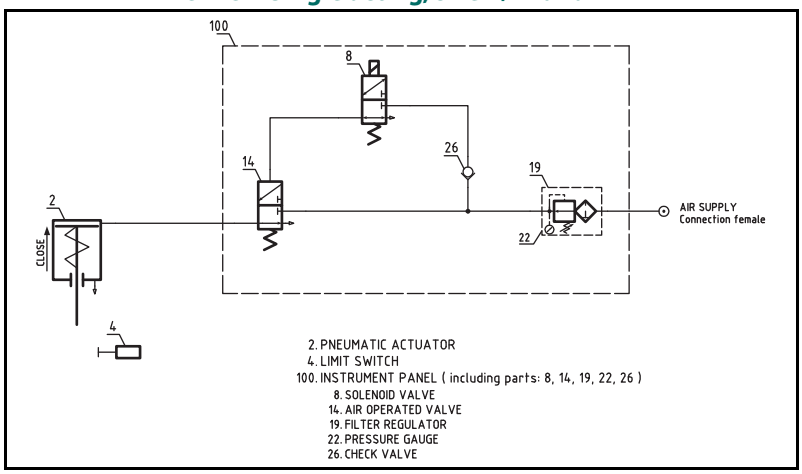
## On-Off Single acting, size 1/4”




## On-Off Double acting, size 1/4”




## On-Off Single acting, size 1/2” and 1”

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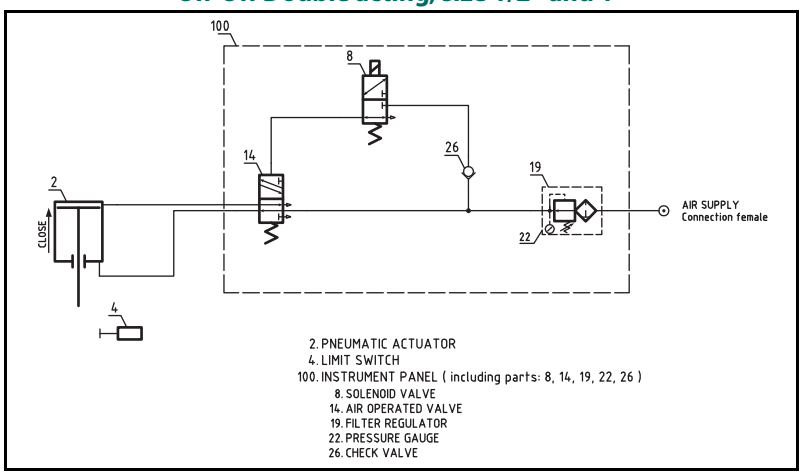


## PNEUMATIC HOOK-UP DIAGRAMS

Operation sequence example:
On-off Single acting panel - De-energized to close function:

FUNCTION: Opening / Closing operation by solenoid valve

Application example: Remote control for on/off valves

Basic stage: The pneumatic diagram shows the system when the solenoid valve (8) is de-energized and the system is without air pressure.

Initial stage: Air pressure becomes available. As the solenoid valve (8) coil is de-energized the actuator stays in closed position.

Operating stage: Solenoid valve only system: When the solenoid valve (8) coil is energized, the actuator drives to open position.

Note: Below hook-up drawings shows de-energized to close type function examples. Same panels can be used in de-energized to open type systems as well just by selecting for single acting cases spring to open type actuator and for double acting cases by assembling the piping from panel to actuator crosswise.

## PNEUMATIC HOOK-UP DIAGRAMS

Operation sequence example:
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Application example: Remote control for on/off valves

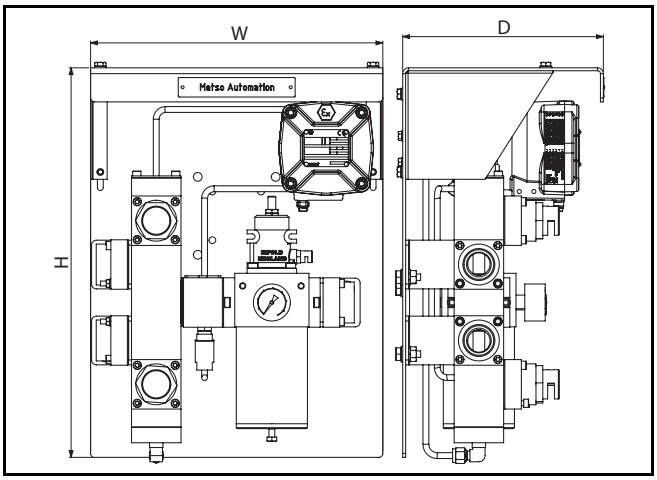
Basic stage: The pneumatic diagram shows the system when the solenoid valve (8) is de-energized and the system is without air pressure.

Initial stage: Air pressure becomes available. As the solenoid valve (8) coil is de-energized / the air operated valve (14) is not piloted, the actuator stays in closed position.

Solenoid + Air Operated valve system: When the solenoid valve (8) coil is energized, the air operated valve (14) is piloted and the actuator opens. Check valve (26) guarantees signal line pilot pressure level in all circumstances. When the solenoid valve is de-energized, the pilot pressure of the air operated valve (14) exhausts through the solenoid valve (8) to atmosphere. The air operated valve (14) is not piloted anymore and the actuator closes.

Note: Below hook-up drawings shows de-energized to close type function examples. Same panels can be used in de-energized to open type systems as well just by selecting for single acting cases spring to open type actuator and for double acting cases by assembling the piping from panel to actuator crosswise.

## DIMENSIONAL DRAWINGS




| Panel Type | | Max Dimensions, mm | | | NPT | Max. Weight, kg |
|---|---|---|---|---|---|---|
| | | W | H | D | | Alu / SS316 |
| S-A 1/4" | SP11F1N2... | 200 | 260 | 210 | 1/4" | 9 |
| S-A 1/2" | SP11F1N4... | 300 | 400 | 210 | 1/2" | 11 |
| S-A 1" | SP11F1N8... | 400 | 450 | 210 | 1" | 13 |
| D-A 1/4" | SP12F1N2... | 200 | 260 | 210 | 1/4" | 10 |
| D-A 1/2" | SP12F1N4... | 300 | 400 | 210 | 1/2" | 12 |
| D-A 1" | SP12F1N8... | 400 | 450 | 210 | 1" | 14 |

Note: S-A = Single acting panel; D-A = Double acting panel
Note: Std mounting on to actuator. 2" post mounting kits available on request.

## Table 1. Piping and stroke times

| Actuator | | | | Panel size 1/4" | | | Panel size 1/2" | | | Panel size 1" | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1J B1JA | Stroke vol. $dm^3$ / $in^3$ | | NPT | Piping | Air (s) | Spring (s) | Piping | Air (s) | Spring (s) | Piping | Air (s) | Spring (s) |
| 8 | 0.9 | 55 | 3/8 | 10 mm or 3/8" | 1 | 1.5 | 12 mm or 1/2" | 0.5 | 1 | - | - | - |
| 10 | 1.8 | 110 | 3/8 | 10 mm or 3/8" | 2 | 3 | 12 mm or 1/2" | 1 | 1 | - | - | - |
| 12 | 3.6 | 220 | 1/2 | 10 mm or 3/8" | 3 | 5 | 12 mm or 1/2" | 1.5 | 2 | 25 mm or 1" | 1 | 1 |
| 16 | 6.7 | 409 | 1/2 | 10 mm or 3/8" | 6 | 9 | 12 mm or 1/2" | 2 | 3 | 25 mm or 1" | 1.5 | 1.5 |
| 20 | 13 | 793 | 3/4 | 10 mm or 3/8" | 11 | 18 | 12 mm or 1/2" | 4 | 6 | 25 mm or 1" | 2 | 3 |
| 25 | 27 | 2048 | 3/4 | 10 mm or 3/8" | 18 | 36 | 12 mm or 1/2" | 6 | 11 | 25 mm or 1" | 3 | 4 |
| 32 | 53 | 3234 | 1 | - | - | - | 12 mm or 1/2" | 12 | 21 | 25 mm or 1" | 5 | 8 |
| 322 | 106 | 6468 | 1 | - | - | - | 12 mm or 1/2" | 24 | 42 | 25 mm or 1" | 9 | 16 |
| B1C | Stroke vol. $dm^3$ / $in^3$ | | NPT | Piping | Open (s) | Close (s) | Piping | Open (s) | Close (s) | Piping | Open (s) | Close (s) |
| 6 | 0.33 | 20 | 1/4 | 6 mm or 1/4" | 0.5 | 0.5 | - | - | - | - | - | - |
| 9 | 0.6 | 37 | 1/4 | 6 mm or 1/4" | 1 | 1 | - | - | - | - | - | - |
| 11 | 1.1 | 67 | 3/8 | 10 mm or 3/8" | 1.5 | 1.5 | 12 mm or 1/2" | 0.5 | 0.5 | - | - | - |
| 13 | 2.3 | 140 | 3/8 | 10 mm or 3/8" | 2.5 | 2.5 | 12 mm or 1/2" | 1 | 1 | - | - | - |
| 17 | 4.3 | 262 | 1/2 | 10 mm or 3/8" | 4.5 | 4.5 | 12 mm or 1/2" | 1.5 | 1.5 | 25 mm or 1" | 1 | 1 |
| 20 | 5.4 | 329 | 1/2 | 10 mm or 3/8" | 9 | 9 | 12 mm or 1/2" | 3 | 3 | 25 mm or 1" | 2 | 2 |
| 25 | 10.5 | 640 | 1/2 | 10 mm or 3/8" | 11 | 11 | 12 mm or 1/2" | 5 | 5 | 25 mm or 1" | 3 | 3 |
| 32 | 21 | 1280 | 3/4 | 10 mm or 3/8" | 20 | 20 | 12 mm or 1/2" | 7 | 7 | 25 mm or 1" | 4 | 4 |
| 40 | 43 | 2624 | 3/4 | - | - | - | 12 mm or 1/2" | 14 | 14 | 25 mm or 1" | 7 | 7 |
| 50 | 84 | 5126 | 1 | - | - | - | 12 mm or 1/2" | 27 | 27 | 25 mm or 1" | 13 | 13 |
| 60 | 121 | 7380 | 1 | - | - | - | 12 mm or 1/2" | 39 | 39 | 25 mm or 1" | 19 | 19 |
| 75 | 189 | 11500 | 1 | - | - | - | 12 mm or 1/2" | 60 | 60 | 25 mm or 1" | 30 | 30 |
| 502 | 195 | 11900 | 1 | - | - | - | 12 mm or 1/2" | 62 | 62 | 25 mm or 1" | 32 | 32 |
| 602 | 282 | 17200 | 1 | - | - | - | 12 mm or 1/2" | 90 | 90 | 25 mm or 1" | 44 | 44 |
| 752 | 441 | 26900 | 1 | - | - | - | 12 mm or 1/2" | 140 | 140 | 25 mm or 1" | 70 | 70 |

Note: "-" means not applicable
If panel nominal size is bigger than actuator std pneumatic connections then improved stroke times possible by specifying actuator with over sized pneumatic connections.

| Actuator | | | | Panel size 1/4" | | | Panel size 1/2" | | | Panel size 1" | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QPX | Stroke vol. $dm^3$ / $in^3$ | | NPT | Piping | Open (s) | Close (s) | Piping | Open (s) | Close (s) | Piping | Open (s) | Close (s) |
| 1 | 0.62 | 38 | 3/8 | 10 mm or 3/8" | 0.8 | 1 | 10 mm or 3/8" | 0.5 | 0.5 | - | - | - |
| 2 | 1.08 | 66 | 3/8 | 10 mm or 3/8" | 1.5 | 2 | 10 mm or 3/8" | 0.8 | 1 | - | - | - |
| 3 | 2.18 | 133 | 3/8 | 10 mm or 3/8" | 2.5 | 4 | 10 mm or 3/8" | 1.5 | 2 | - | - | - |
| 4 | 4.34 | 265 | 3/8 | 10 mm or 3/8" | 5 | 8 | 10 mm or 3/8" | 2 | 3 | - | - | - |
| 5 | 8.7 | 531 | 3/8 | 10 mm or 3/8" | 9 | 15 | 10 mm or 3/8" | 4 | 6 | - | - | - |

Note: "-" means not applicable
No over sized pneumatic connections available for QPX-series.

Note: The stroke times mentioned in table 1 are measured with 4.0 bar(g) supply air pressure and with reference ball valve. Actual stroke times may vary from these values due to different factors such as, but not limited to, pressure difference of the valve, stiction of the actuator, supply air pressure, capacity and the line size of the supply air system.

## HOW TO ORDER – TYPE CODE

## SP1 SERIES INSTRUMENTATION FUNCTION PANEL

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | *) | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| SP | 1 | 1 | F | 1N | 4 | 0 | S | 1 | / | S01 |

*) Slash shall allways be marked before solenoid valve coding (10. sign).

| 1. | PRODUCT GROUP |
|---|---|
| **SP** | Neles Standard Instrumentation Function Panel |

| 2. | SERVICE / DUTY CATEGORY |
|---|---|
| **1** | On-off (ESD with SOV) |

| 3. | ACTUATOR TYPE |
|---|---|
| **1** | Single acting (spring return) |
| **2** | Double acting |

| 4. | FAIL OPERATION |
|---|---|
| **F** | Fail safe = Actuator fail operation when SOV de-energized or air supply lost. |

| 5. | SOLENOID VALVE QTY & CONFIGURATION |
|---|---|
| **1N** | 1 piece, normally de-energized to trip (1oo1). |

| 6. | CAPACITY SIZE |
|---|---|
| **2** | 1/4" size panel components |
| **4** | 1/2" size panel components |
| **8** | 1" size panel components |

| 7. | VOLUME BOOSTER |
|---|---|
| **0** | On-Off category panels (volume booster not applicable) |

| 8. | FLOW MODULE MATERIAL (See more detail from table 2 below) |
|---|---|
| **S** | SS316 (Air Filter Regulator, Air Operated Valve, Check Valve and Pressure Gauge). |
| **A** | Aluminium (Air Filter Regulator, Air Operated Valve, Check Valve and Pressure Gauge). |

| 9. | CONSTRUCTION |
|---|---|
| **1** | Panel with sun shade |

| 10. | SOLENOID VALVE TYPE |
|---|---|
| | See below table 3 for solenoid valve options. |

Table 2.

| Digit 8. | FLOW MODULE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Usability with | Material | | Ambient temp | Supply voltage | Electric power | Electric connection | Electric Ex - classification | Note |
| | | Body | Coil | | | | | | |
| S | All panel versions | SS316 | - | -50..+85 | - | - | - | - | - |
| A | | Aluminium | - | -40..+80 | - | - | - | - | - |

Table 3.

| Digit 10. | SOLENOID VALVE TYPE, TECHNICAL SELECTION TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Usability with | Material | | Ambient temp | Supply voltage | Electric power | Electric connection | Electric Ex - classification | Model |
| | | Body | Coil | | | | | | |
| S01 | Single acting 1/4"-1" and double acting 1/2"-1" | SS | SS | -50...+60C | 24 VDC | 3.7 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO WSNF327B112 |
| S02 | | SS | Alu | -50...+60C | 24 VDC | 3.7 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO NF8327B112 |
| S03 | | SS | Alu | -40...+55C | 24 VDC | 3.9 W | 1/2"NPT | II 2GD Ex mbd IIC T6 | HERION 2401168.4662 |
| A01 | | Alu | Alu | -50...+60C | 24 VDC | 3.7 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO NF8327B111 |
| A02 | | Alu | Alu | -40...+55C | 24 VDC | 3.9 W | 1/2"NPT | II 2GD Ex mbd IIC T6 | HERION 2401106.4662 |
| A03 | | Alu | Alu | -40...+55C | 24 VDC | 8.9 W | 1/2"NPT | II 2GD Ex mbe IIC T5 | HERION 2401106.4270 |
| D01 | Double acting 1/4" | SS | SS | -40...+75C | 24 VDC | 1.9 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO WSNF8551A321 |
| D02 | | SS | Alu | -40...+75C | 24 VDC | 1.9 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO NF8551A321 |
| D03 | | SS | Alu | -40...+65C | 24 VDC | 1.9 W | 1/2"NPT | II 2GD Ex mbd IIC T6 | HERION 9710745.4602 |
| C01 | | Brass | Alu | -40...+75C | 24 VDC | 1.9 W | 1/2"NPT | II 2GD Ex d IIC T6 | ASCO NF8551A319 |
| C02 | | Alu | Alu | -40...+65C | 24 VDC | 0.8 W | 1/2"NPT | II 2GD Ex mbd IIC T6 | HERION 9710545.4602 |
| C03 | | Alu | Alu | -40...+65C | 24 VDC | 0.8 W | 1/2"NPT | II 2GD Ex mbe IIC T6 | HERION 9710545.4200 |

Subject to change without prior notice.

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