

Neles instrumentation function panel

Series SP1

Installation, maintenance and
operating instructions

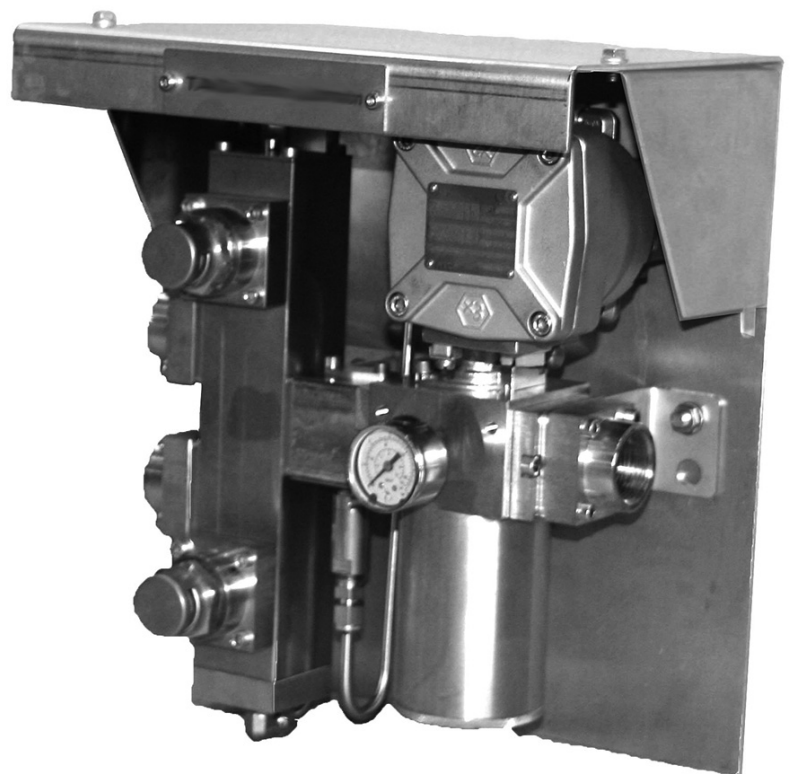


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All trademarks are the property of their respective owners.

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1 NELES INSTRUMENTATION FUNCTION PANEL – SERIES SP1

1.1 General

This manual incorporates Installation, Maintenance and Operating instructions for Neles Instrumentation Function Panel – Series SP1.

NOTE:

The selection and use of the SP panel in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the likely situations that may occur when installing, using and or servicing the SP panel.

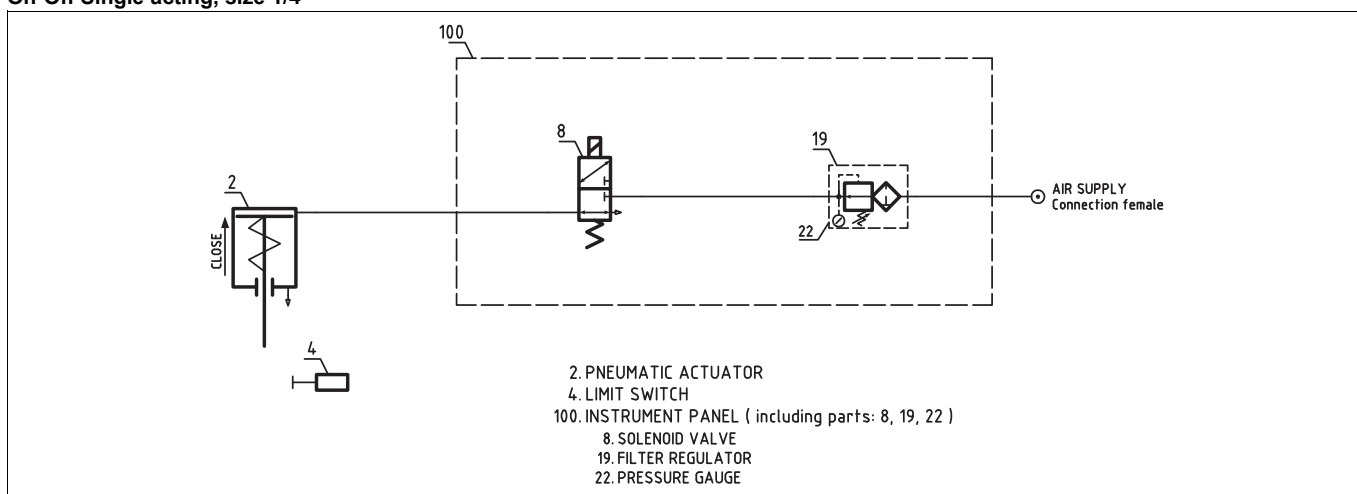
1.2 Technical description

Neles SP1 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 Neles cylinder and diaphragm actuators and also with linear type actuators. When using rack and pinion type actuators (e.g.VPVL) please consult Neles.

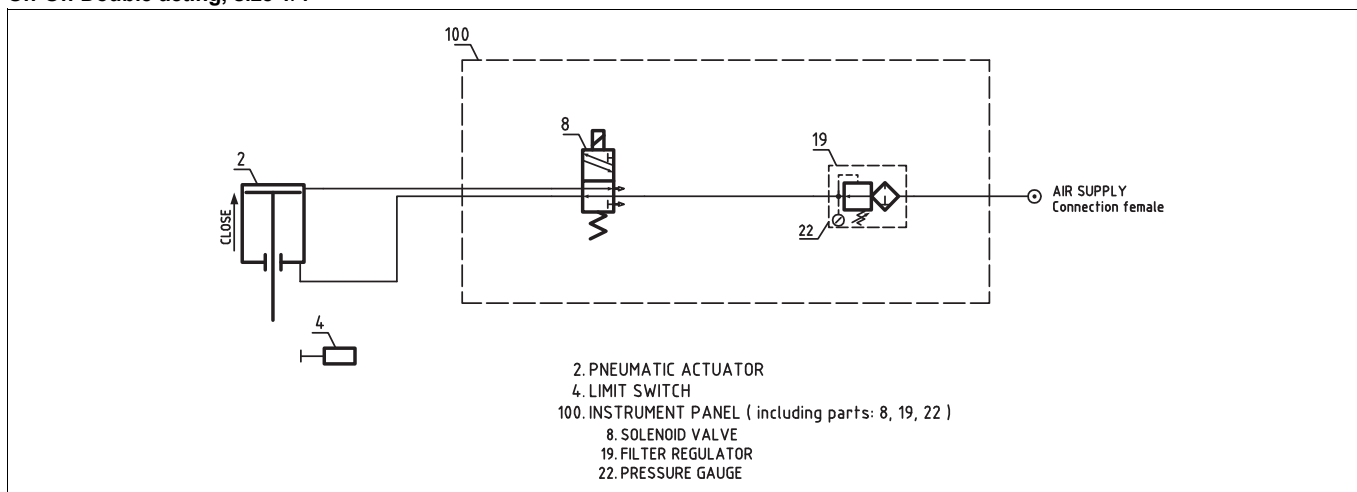
Main components of the SP1 panel are solenoid valve, air filter regulator and possibly also air operated valve and check valve depending on the capacity version. Note: In this manual the combination of air filter regulator + pressure gauge or air filter regulator + pressure + air operated valve + check valve is called as a flow module.

PNEUMATIC HOOK-UP DIAGRAMS

On-Off Single acting, size 1/4"



On-Off Double acting, size 1/4"



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:

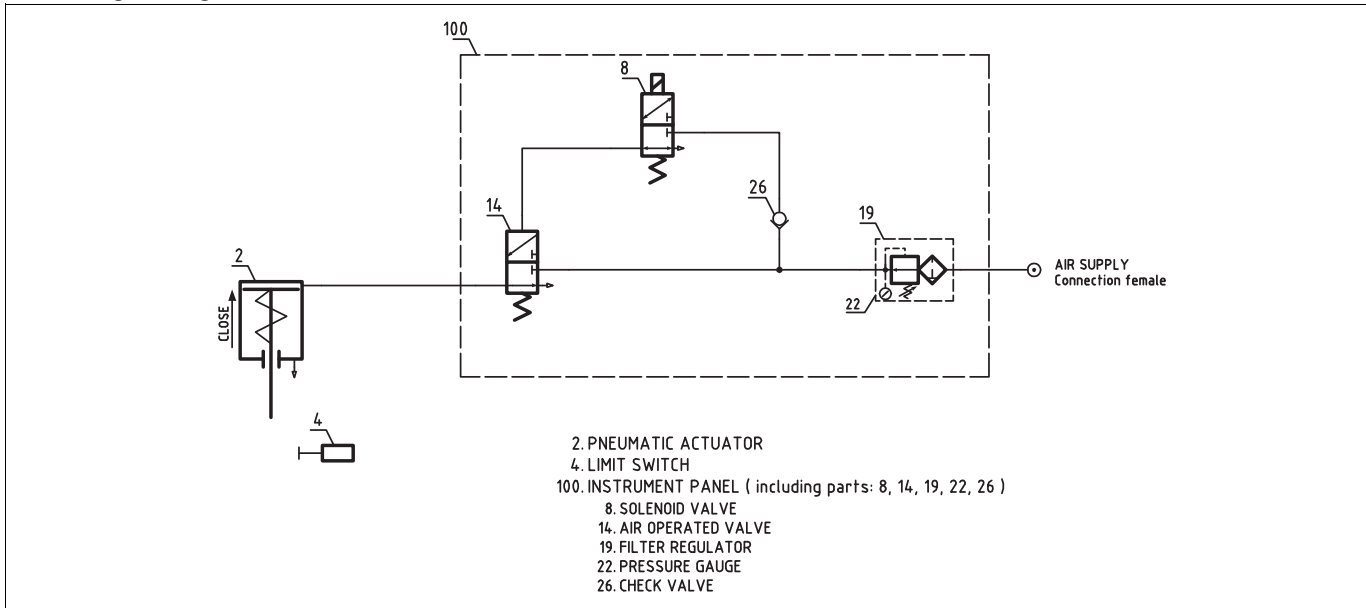
Solenoid valve only system: When the solenoid valve (8) coil is energized, the actuator drives to open position.

NOTE:

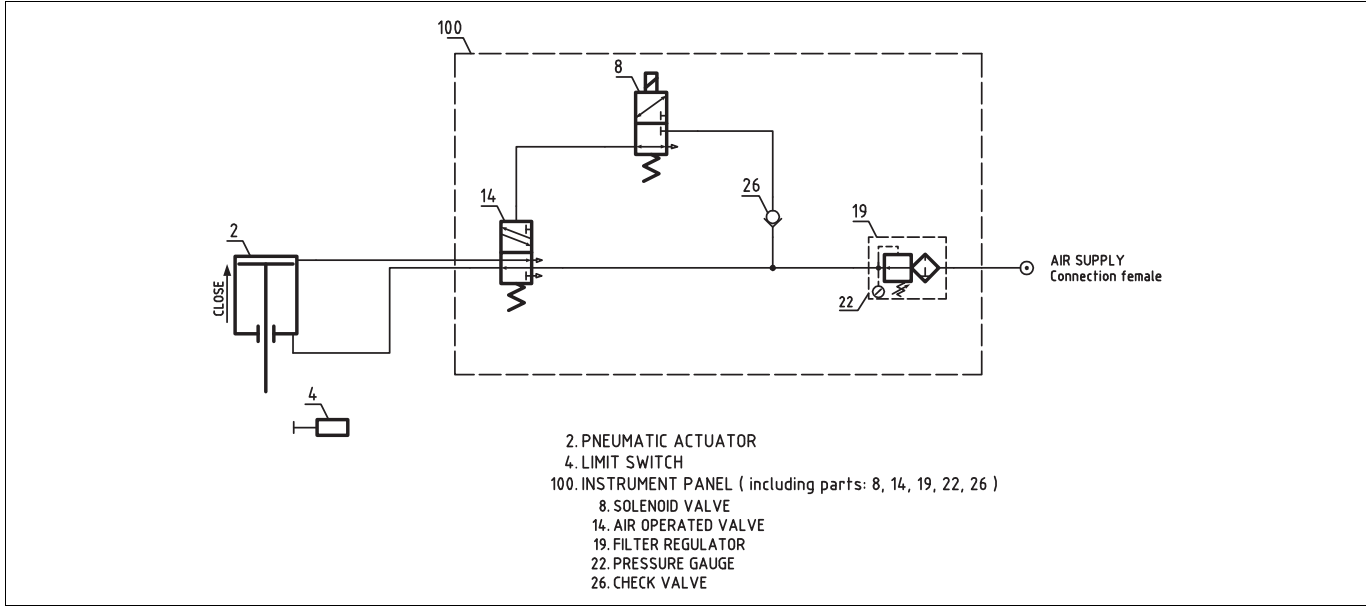
Below hook-up drawings shows de-energized to close type function examples. Same panels can be used in de-energized to open type systems as well just by selecting for single acting cases spring to open type actuator and for double acting cases by assembling the piping from panel to actuator crosswise.

PNEUMATIC HOOK-UP DIAGRAMS

On-Off Single acting, size 1/2" and 1"



On-Off Double acting, size 1/2" and 1"



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 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.

1.3 System architecture

SP1 panel electric connection(s) can be directly connected to DCS or ESD system digital output module. Wiring details available in specified solenoid valve IMO which is delivered together with the SP panel.

1.4 Markings

Series SP panels are equipped with an identification plate (Fig. 1, ID plate)



- Type designation of instrumentation function panel
- Serial number
- Id code

- Manufacturing date
- Inspected by

1.5 Technical specification

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 2.

Electrical

Electric connection: 1/2"NPT cable entry (M20 x1.5 available with adapter)

Table 1 Example of identification plate

SOV code	Material		Ambient temp	Supply voltage	Electric power	Electric connection	Electric Ex -classification
	Body	Coil					
S01	SS	SS	-50...+60 °C	24 VDC	3.7 W	1/2"NPT	II 2GD Ex d IIC T6
S02	SS	Alu	-50...+60 °C	24 VDC	3.7 W	1/2"NPT	II 2GD Ex d IIC T6
S03	SS	Alu	-40...+55 °C	24 VDC	3.9 W	1/2"NPT	II 2GD Ex mbd IIC T6
A01	Alu	Alu	-50...+60 °C	24 VDC	3.7 W	1/2"NPT	II 2GD Ex d IIC T6
A02	Alu	Alu	-40...+55 °C	24 VDC	3.9 W	1/2"NPT	II 2GD Ex mbd IIC T6
A03	Alu	Alu	-40...+55 °C	24 VDC	8.9 W	1/2"NPT	II 2GD Ex mbe IIC T5
D01	SS	SS	-40...+75 °C	24 VDC	1.9 W	1/2"NPT	II 2GD Ex d IIC T6
D02	SS	Alu	-40...+75 °C	24 VDC	1.9 W	1/2"NPT	II 2GD Ex d IIC T6
D03	SS	Alu	-40...+65 °C	24 VDC	1.9 W	1/2"NPT	II 2GD Ex mbd IIC T6
C01	Brass	Alu	-40...+75 °C	24 VDC	1.9 W	1/2"NPT	II 2GD Ex d IIC T6
C02	Alu	Alu	-40...+65 °C	24 VDC	0.8 W	1/2"NPT	II 2GD Ex mbd IIC T6
C03	Alu	Alu	-40...+65 °C	24 VDC	0.8 W	1/2"NPT	II 2GD Ex mbd IIC T6

1.6 Recycling and disposal

Most series SP panel components can be recycled if sorted according to material. More detailed recycling instruction can be found from panel component IMOs.

1.7 Safety precautions

CAUTION:

Solenoid valve cover should be opened only in dry places, not when the device is vulnerable to e.g. salt water.

CAUTION:

Do not exceed the permitted values!

Exceeding the permitted values marked on the panel name plate or component name plates may cause damage to panel components or equipment attached to the panel and can lead to uncontrolled pressure release in the worst case. Damage to the equipment and personal injury may result.

CAUTION:

Do not remove or dismantle a pressurized SP1 panel.

Removing or dismantling a pressurized function panel or component in it leads to uncontrolled pressure release. All ways shut of the supply air and release the pressure from the pipe lines and equipments before removing or dismantling the function panel at any level. Damage to the equipment and personal injury may result.

CAUTION:

Make sure that during the maintenance or commissioning when the solenoid valve cover is open, water does not go inside the coil housing.

WARNING:

During testing and tuning the valve operates open and close positions. Make sure that the operation does not endanger people or process!

WARNING:

Do not operate the device with the solenoid valve cover removed!

Electromagnetic immunity is reduced, valve may stroke.

Ex WARNING

Do not operate the device with the solenoid valve cover removed!

Solenoid valve coil housing cover is essential to be locked in place according to instructions from equipment IMO, otherwise Ex protection level is jeopardized.

Ex WARNING:

Spark hazard!

If solenoid valve has aluminum coil housing and cover it must be protected from impacts.

Ex WARNING:**Electrostatic charge hazard!**

Do not install the SP panel in proximity of high voltage sources.

Ex NOTE:

Only persons familiar with Ex protection are allowed to work with the Ex protected versions of the SP panel. Special attention has to be paid to careful handling and closing of the solenoid valve coil housing cover.

Ex d WARNING:

Do not open the solenoid valve coil housing cover when an explosive atmosphere may be present.

Ex d WARNING:

Use a cable gland with suitable Exd certification.

NOTE:

Avoid earthing a welding machine in close proximity to a SP panel. Damage to the SP panel components may result.

- Remove all the protective plastic plugs from the pneumatic connections.
- Attach the pneumatic tubing & fittings (6 (7)) from the SP panel (3) to actuator pneumatic connection(s).
- Attach the pneumatic supply air tubing (8) from plant instrument air header to the SP panel air supply inlet.

NOTE:

Recommended screws and nuts (1) for SP panel fastening:

- Up to B1J10/B1C13: Screws M6x25 and M6 nuts
- From B1J12/B1C17: Screws M8x25 and M8 nuts

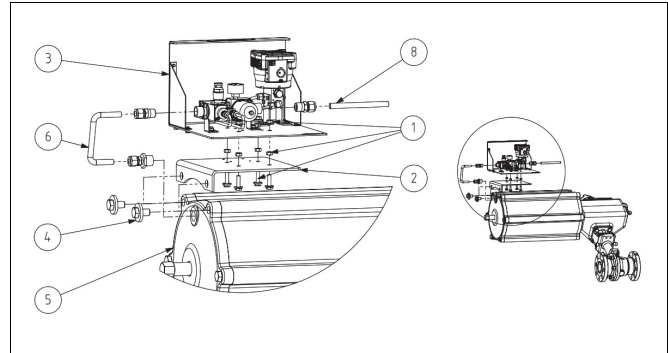


Fig. 1 Mounting on to B1J actuator

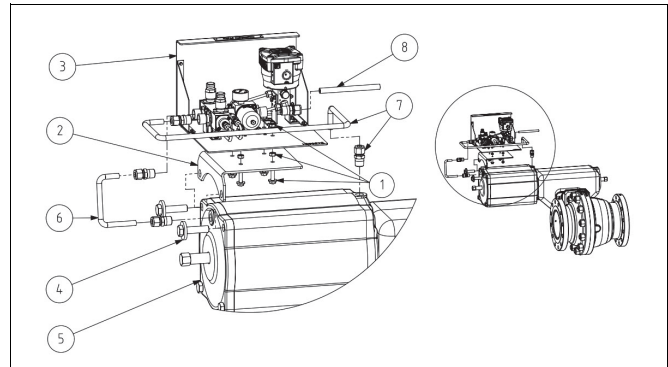


Fig. 2 Mounting on to B1C actuator

2 TRANSPORTATION, RECEIPT AND STORAGE

The instrumentation function panel is robust design but should still be handled with care.

- Check the function panel for any damage that may have occurred during the transportation.
- Store the function panel preferably indoors, keep it away from rain and dust.
- Don not unpack the panel until installing it.
- Do not drop or knock the panel.
- Keep the flow ports and cable glands plugged until installing.
- Follow instructions elsewhere in this manual.

3 MOUNTING

3.1 General

Note:

The solenoid valves coil enclosures meets IP66/IP67 protection class according to EN 60529. Cable entry needs to be plugged or equipped with cable gland according to coil IP rating and hazardous area (ATEX) rating. SP series function panel shall be mounted only to positions where the cable entry is not pointing upwards and filter regulator bowl is pointing downwards.

If the SP series panel is supplied with valve and actuator, the pneumatic tubes from panel to actuator are mounted in accordance with the customer's specification.

3.2 Mounting on to Neles actuators

See example figures 2 and 3.

- Mount the SP panel (3) on to fixing plate (2) by using screws and nuts (1). Fixing plate and function panel has matching mounting hole patterns. Screws 4 pcs shall be assembled from the fixing plate back side, 4 pcs of nuts to fasten screws on to the fixing plate and 4 pcs of nuts to fasten the SP panel (front side) to fixing plate.
- Mount the fixing plate to the actuator (5) by using 2 pcs of screws (4) from actuator cylinder end cap.

3.3 Piping

Caution:

Do not exceed the permitted supply pressure of the SP function panel.

Table 2 provides the recommended tube sizes in accordance with actuator sizes. For supply air it is recommended to choose one size bigger.

Note:

When opening/closing times are defined in the Table 2, the specified function panel size can be used with that actuator size. If there is '-' sign in the table or if smaller actuators than shown in the table are used, please contact Neles.

Connect the air supply tube to SP function panel flow module (air filter regulator) inlet port. Connect tubing from function panel out let(s) to actuator pneumatic connection according to desired function. Liquid sealant such as Loctite 577 is recommended for tube fitting threads.

NOTE:

An excess of sealant may result in faulty operation of the SP panel.

The air supply must be clean, dry and oil-free instrument air.

CAUTION:

The air supply system must be of sufficient size and capacity to ensure that the pressure at the SP panel does not fall below the actuator minimum supply pressure level during the valve movement otherwise the stroke speed will be affected.

CAUTION:

The stroke times mentioned in table 2 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.

Table 2 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.

3.4 Electrical connections

Before connecting the power, make sure that the electrical specifications and the wiring meets the installation conditions. Further details of electrical terminals can be found from the component IMOs delivered together with the SP panel.

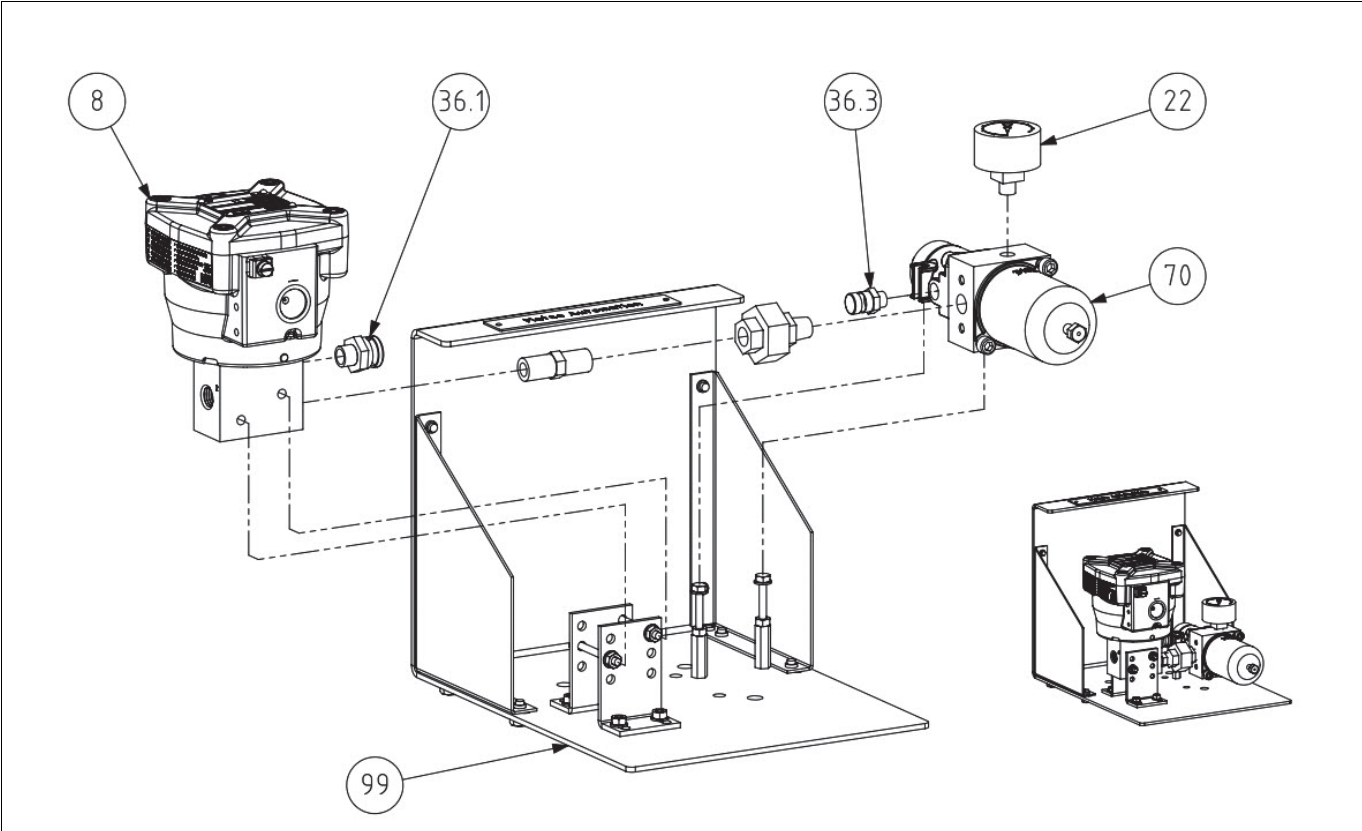
4 MAINTENANCE

4.1 General

Regular maintenance of the function panel is not necessary. However the filter regulator bowl in the flow module should be periodically drained through the manual drain valve. With this action any particles or moisture collected to bowl is purged from the system.

5 DRAWINGS AND PARTS LIST

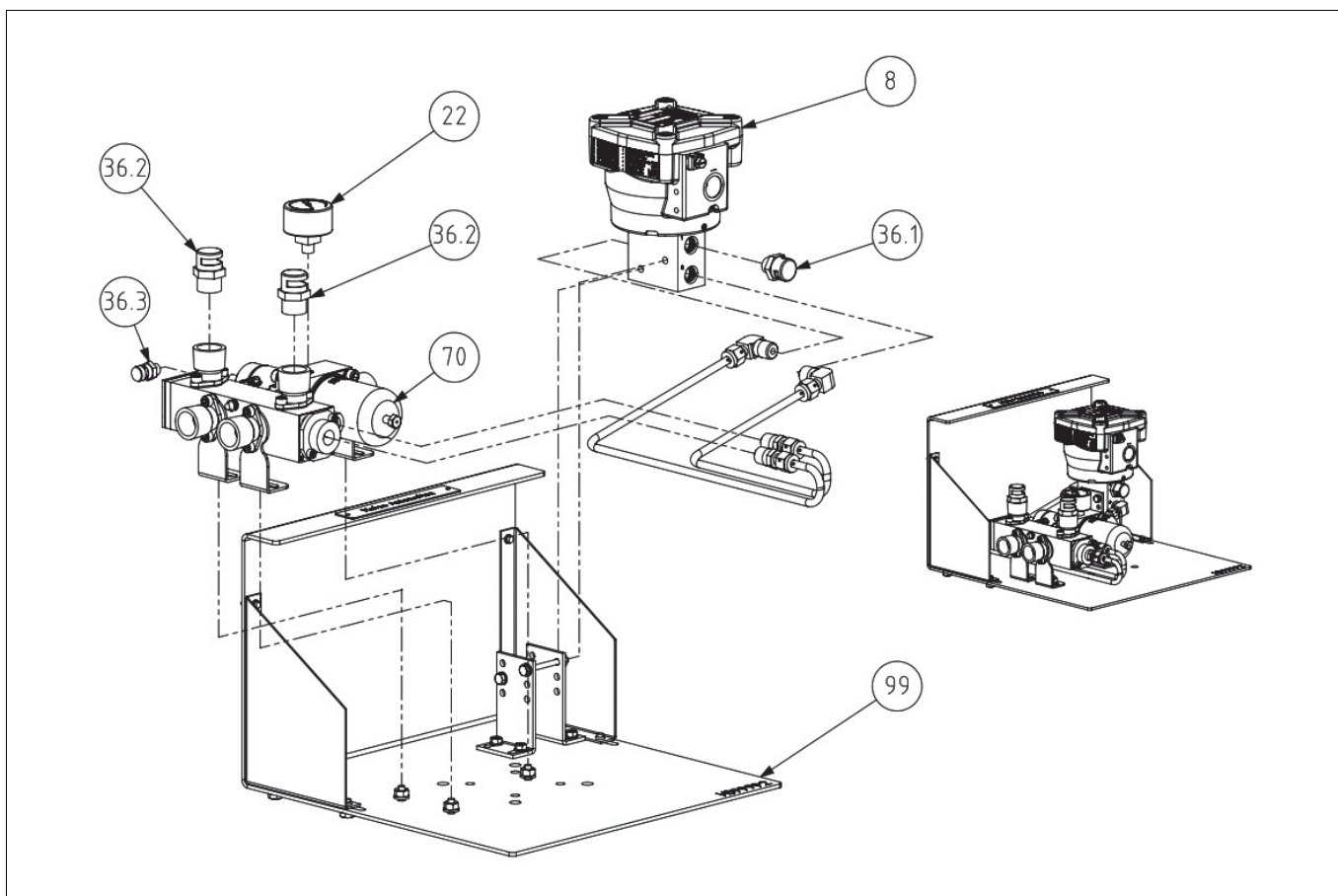
5.1 Exploded view and parts list, single- and double acting panel size 1/4"



Item	Qty	Description	Spare part
8	1	Solenoid valve	*
22	1	Pressure gauge	*
36.1	1	Silencer	
36.3	1	Silencer	
70	1	Flow module	*
99	1	Panel plate	

(*) = Available as spare part

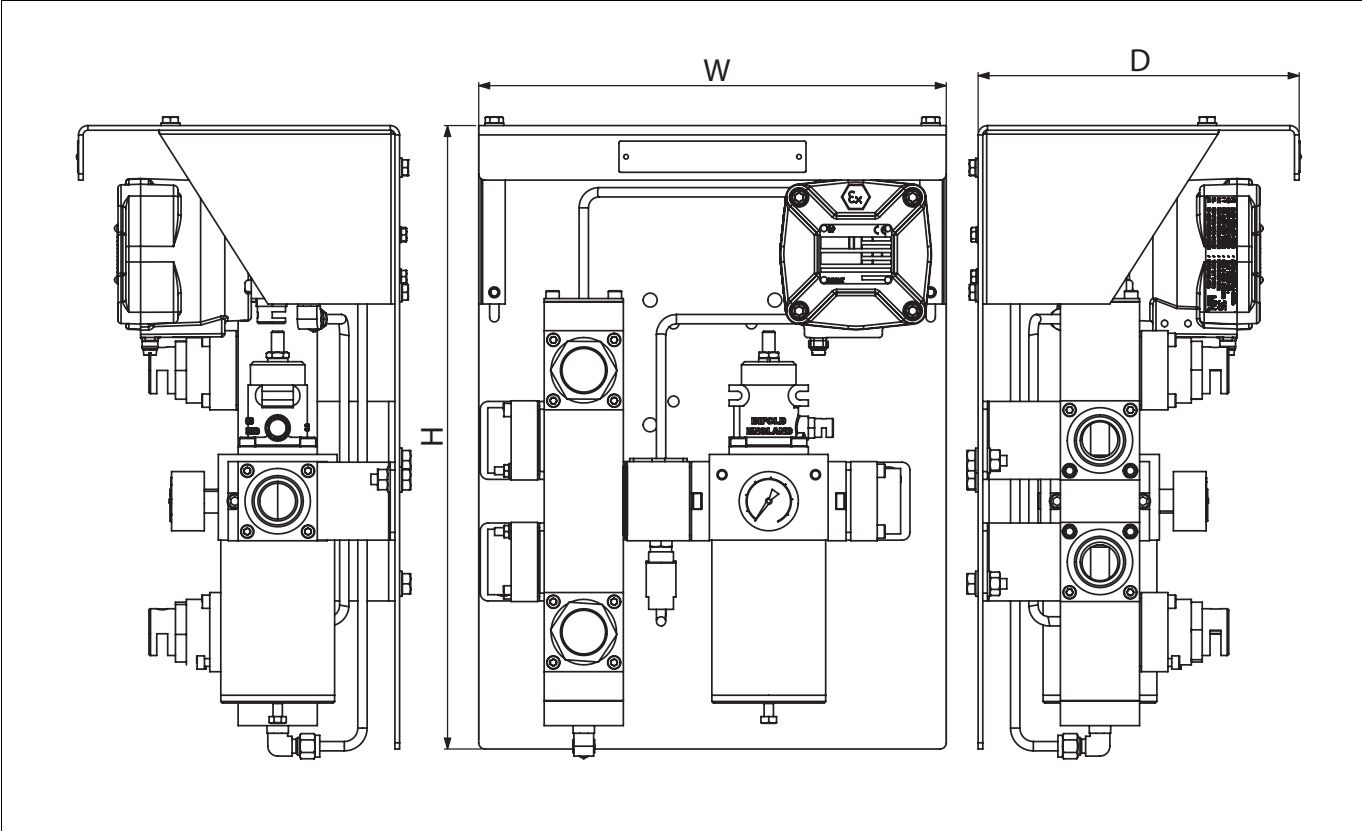
5.2 Exploded view and parts list, single- and double acting panel size 1/2" and 1"



Item	Qty	Description	Spare part
8	1	Solenoid valve	*
22	1	Pressure gauge	*
36.1	1	Silencer	
36.2	2	Silencer	
36.3	1	Silencer	
70	1	Flow module	*
99	1	Panel plate	

(*) = Available as spare part

6 DIMENSIONS



Panel Type		Dimensions, mm			NPT	Weight, kg
		W	H	D		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.

7 TYPE CODING

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
S	SS316, temp: -50...+85°C (Air Filter Regulator, Air Operated Valve, Check Valve and Pressure Gauge).
A	Aluminium, temp: -40...+80°C (Air Filter Regulator, Air Operated Valve, Check Valve and Pressure Gauge).

9.	CONSTRUCTION
1	Panel with sun shade

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

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

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 mbd IIC T6	HERION 9710545.4200

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