

Instruction Manual

Pulse Valve for Dust Collector

Series JSXF(E,F,H)



The intended use of this product is to provide a pulse of air in dust collector and similar systems.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC⁽¹⁾), and other safety regulations.

⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Caution

- The product is provided for use in manufacturing industries only. Do not use in residential premises.

2 Specifications

2.1 Valve specifications

Valve construction	Diaphragm Type Pilot Operated	
Valve type	Normally closed (N.C.)	
Piping	JSXFE	Compression fitting ^{Note 1)}
	JSXFF	Direct piping
	JSXFH	Tank mounting (immersion) ^{Note 2)}
Fluid	Air	
Proof pressure [MPa]	1.5	
Minimum operating pressure differential [MPa]	0.1	
Minimum operating pressure differential [MPa]	0.9	
Maximum system pressure [MPa]		
Fluid temperature [°C] ^{Note 3)}	-40 to 60 (no freezing)	
Ambient temperature [°C]		
Flow characteristics	Contact SMC	
Response time [ms]		
Duty cycle		

2 Specification - continued

Minimum operating frequency	1 cycle / 30 days			
Maximum operating frequency	Contact SMC			
Lubrication	Not required			
Impact/vibration resistance [m/s ²] ^{Note 4)}	150/30			
Mounting orientation	Unrestricted			
Enclosure ^{Note 5)} (based on IEC60529)	IP67 (IP65 with DIN connector)			
Port size [inch]	3/4	1	1 1/2	2 ^{Note 6)}
Orifice, Ø [mm]	32	40	JSXFE/F:50 JSXFH:45	55 ^{Note 6)}
Tank size ANSI [inch] ^{Note 6)}	4, 5	5, 6	6, 8	8, 10
Weight	Refer to catalogue			

Table 1.

Note 1) Seals and washers included.

Note 2) Valve and piping packed together, not assembled.

Note 3) No condensation.

Note 4) Impact resistance: No malfunction occurred when it was tested with a drop tester in the axial direction and at right angles to the main valve and armature; in both energized and de-energized states and for every time in each condition. (Values quoted are for a new valve)

Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Tests are performed at both energized and de-energized states in the axial direction and at right angles to the main valve and armature. (Values quoted are for a new valve)

Note 5) If water enters the coil, it may cause malfunction and failure. Take waterproofing measures, if using this product outdoor or in an environment where water is always around and likely to adhere to the product.

Note 6) Only available for JSXFH

2.2 Solenoid specification

Rated voltage [V]	AC	100, 120 (110), 200, 220, 230, 240
	DC	24
Electrical entry	Grommet, grommet with PCB, conduit, DIN terminal, M12	
Coil insulation type	Class B	
Allowable voltage fluctuation	±10% of rated voltage (See 3.6)	
Allowable leakage voltage	AC	≤5% of rated voltage
	DC	≤2% of rated voltage
Apparent power [VA] ^{Note 1), 2)}	18	
Power consumption [W] ^{Note 2)}	12	
Surge voltage suppressor	Varistor	

Indicator light	DC	LED
	AC	Neon

Table 2.

Note 1) There is no difference in the frequency and the inrush and energised apparent power, since a rectifying circuit is used in the AC.

Note 2) Power consumption and apparent power values are based on an ambient temperature of 20°C and when rated voltage applied. (Variation: ±10%).

2.3 Special products

Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Products compliant with IP65 and IP67 enclosures are protected against dust and water, however, these products cannot be used in water.
- Products compliant with IP65 and IP67 enclosures satisfy the specifications by mounting each product properly. Be sure to read the Specific Product Precautions for each product.

3 Installation - continued

3.3 Piping

Warning

- The compression fitting is used to seal the connection between the valve and the pipework. Do not rely on the compression fitting to support the piping as it could become detached. Ensure that inlet and outlet piping is secured with separate fixings.
- During use, deterioration of the tubes or damage to the fittings could cause the tubes to come loose from their fittings and thrash about. To prevent uncontrolled tube movement, install protective covers or fasten tubes securely in place.

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Avoid connecting ground lines to piping, as this may cause electric corrosion of the system.
- Use steel tubing for the inlet and outlet piping
- Tighten fittings to the specified tightening torque.

Connection thread	Tightening torque [N·m]
1/4	12 to 14
3/8	22 to 24
1/2	28 to 30
3/4	
1	36 to 38
1 1/2	40 to 42

Table 3.

3.4 Fluid supply

Warning

- Use clean air. If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas, etc., it can lead to damage or malfunction.
- If there is a possibility of back pressure being applied to the valve, take countermeasures such as mounting a check valve on the downstream side of the valve.

Caution

- Compressed air that includes excessive drainage may cause

malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after cooler, etc.

- The use of a fluid that contains foreign objects can cause problems such as malfunction and seal failure by promoting wear of the valve seat and armature and by sticking to the sliding parts of the armature etc. Install a suitable filter (5 µm or less) immediately upstream from the valve.
- If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause a malfunction. Install mist separators upstream of the valves to eliminate it.

3.5 Mounting

Warning

- Ensure sufficient space for maintenance activities.
- Avoid sources of vibration or adjust the distance from the body to a minimum length so that resonance will not occur.
- Do not apply external force to the coil section: When tightening fittings, apply a wrench or other tool to the outside of the piping connection parts.
- Do not warm the coil assembly with a heat insulator, etc. They can cause the coil to burn out. Use tape, heaters, etc, for freeze prevention on the piping and body only.
- Valve becomes hot during and after energization. Do not touch it with bare hands as it may cause burns.

Caution

- If a regulator, or a restrictor, is installed immediately before or after the IN port of the valve, the main valve may oscillate (chatter). Install them away from the valve or change the restriction.
- The header tank capacity should be sufficient. (Install a sufficient air volume immediately upstream from the IN side) This is a valve for large flow rate, so if the capacity is small, the main valve may not open or may oscillate due to pressure drop or insufficient air supply.

3.5.1 JSXFE

- Mount the valve to secured metal piping.
- Insert the piping into the valve body until it stops to prevent misalignment of the piping in relation to the valve body.
- Tighten the compression nut.

3 Installation - continued

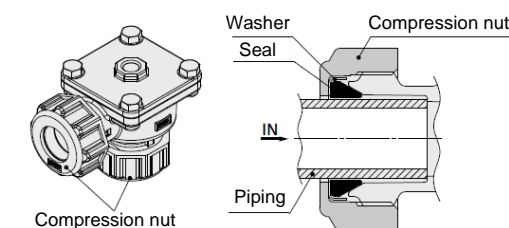


Figure 1.

- Tighten the compression nut sufficiently to prevent the nut becoming loose and causing leakage, looseness, and rattling. Hand tighten, then secure with a wrench.

Wrench tightening angle after hand tightening	
Size	Wrench tightening angle
3/4 (20A)	90° to 270°
1 (25A)	135° to 315°
1 1/2 (40A)	150° to 330°

Table 4.

3.5.2 JSXFH

Caution

- Mount the valve to the tank as shown below.

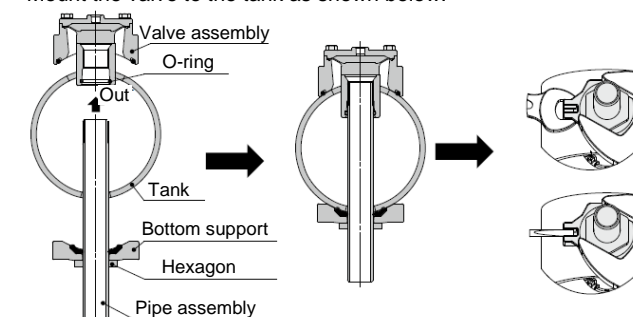


Figure 2.

- Refer to catalogue for additional information
- Pipe assembly tightening guide.

Size	Tightening torque [N·m]
3/4 (20A)	30
1 (25A)	50
1 1/2 (40A)	
2 (50A)	120

Table 5.

Note 1) Excessive tightening may damage the valve or deform or damage the tank.

Note 2) The pipe assembly may become loose due to vibration when discharging air.

Note 3) The recommended tank is the ANSI shc40. If making your own tank, ensure that it has sufficient strength to prevent it from becoming deformed when the valve is being screwed in.

3.6 Electrical connection

Warning

- The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use according to local regulations. When using a number of solenoid valves, installing one fuse on the primary side is not enough. To protect the device more safely, select and install a fuse for each circuit.
- Take measures to prevent static electricity since some fluids can cause static electricity.

Caution

- Use electrical wire with cross sectional area 0.5 mm² to 1.25 mm².
- Do not apply more than 10 N of force to the lead wires or damage may occur.
- Use electrical circuits that do not generate chattering in their contacts.
- Use voltage that is within ±10% of the rated voltage. In case of direct current, if the response time is important, ensure that voltage is within ±5% of the rated value. (The voltage drop is the value in the lead wire section connecting the coil.)
- Do not bend or pull lead wires and cables repeatedly.
- Do not bend the lead wires beyond 90° with a radius of less than 20mm or damage may occur. See figure below.

3 Installation - continued

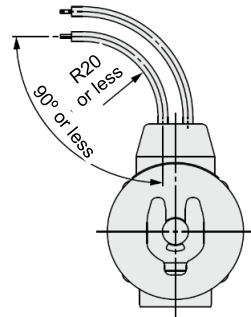


Figure 3.

3.6.1 Grommet

Lead wire AWG20, outer diameter 2.6mm.

Rated voltage	Lead wire colour	
	1	2
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other VAC	Grey	Grey

Table 6.

Note: There is no polarity.

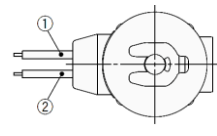


Figure 4.

3.6.2 Conduit

Lead wire AWG18, outer diameter 2.8mm.

Rated voltage	Lead wire colour		
	1	2	3
DC	Black	Red	
100 VAC	Black	Red	Green/ Yellow
200 VAC	Blue	Blue	
Other VAC	Grey	Grey	

Table 7.

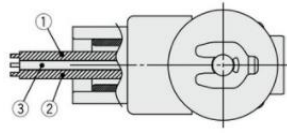


Figure 5.

3.6.3 DIN terminal

- Use a cord with an outside cable diameter of Ø6 mm to Ø12 mm.
- Tighten screws and fittings according to Figure 7.
- If an outside cable diameter of Ø9 mm to Ø12 mm is used, remove the internal parts of the rubber seal before using.

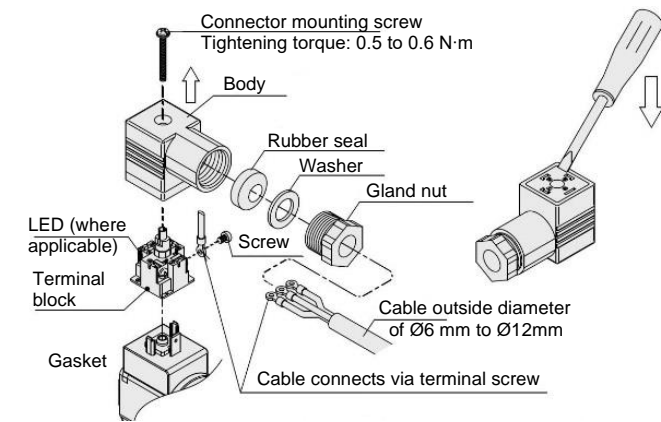


Figure 6.

- Conforms to DIN EN 175301-803, 18 mm, Form A.

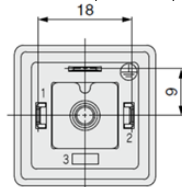


Figure 7. DIN terminal - Form A

- Internal connections are shown below. Make connections to the power supply accordingly.

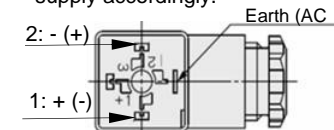


Figure 8.

Note: There is no polarity.

Contact	1	2
DIN Terminal	+ (-)	- (+)

Table 8.

3 Installation - continued

3.6.4 M12 connector

Coding and pin arrangement of the M12 connector on the valve side	
DC: A-coded, 4-pin (non-polar)	AC: B-coded, 4-pin
Coding and pin arrangement of the M12 connector on the cable side	

Table 9.

M12 connector wire colour			
1	2	3	4
Brown	White	Blue	Black

Table 10.

Caution

- The valve achieves IP67 rating when used with IP67 rated female connector (with cable). Note that the valve shouldn't be used in water.
- Tighten the connector by hand (at 0.39 to 0.49 N·m), not with a tool which may damage the connector.
- Do not apply repeated bending force, tensile force or heavy load to the cable.
- Do not pull the connector or cable unnecessarily.
- When installing the valve, do not bend the cable at the root from the connector body.

3.7 Electrical circuits

Caution

- Surge suppression should be specified by using the appropriate part

number. If a valve type without suppression is used, suppression must be provided by the host controller as close as possible to the valve.

3.7.1 DC circuit

Grommet	Grommet, Conduit, DIN terminal
Without light/surge voltage suppressor	With light/surge voltage suppressor
DIN terminal	M12 Connector
With light/surge voltage suppressor	With surge voltage suppressor

Table 11.

3.7.2 AC circuit

The standard product is equipped with a surge voltage suppressor.

Grommet, Conduit, DIN terminal, M12 connector	DIN terminal
Without light	With light

Table 12.

3 Installation - continued

3.8 Residual voltage

- If a varistor or diode surge voltage suppressor is used, the suppressor arrests the back EMF voltage from the coil to approximately 1 V (AC type) or 60 V (DC type).
- Ensure the transient voltage is within the specification of the host controller.
- Valve response time is dependent on surge suppression method selected.

3.9 Countermeasure for external surge voltage

Caution

- At times of sudden interruption of the power supply, the energy stored in a large inductive device may cause non-polar type valves in a de-energised state to switch.
- When installing a breaker circuit to isolate the power, install a surge absorption diode across the output of the breaker.

3.10 Extended period of continuous energization

Warning

This product is a pulse operating valve. Do not energise for a prolonged period. It consumes a large flow, which causes a lack of supply on the inlet of the valve, resulting in chattering of the diaphragm and failure.

4 How to Order

Refer to catalogue for 'How to Order'.

5 Outline Dimensions

Refer to catalogue for outline dimensions.

6 Maintenance

6.1 General maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to

atmosphere.

- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Periodic maintenance of filter and strainer:
 - Replace filter element every 1 year or when the pressure drop becomes 0.1 MPa, whichever comes first.
 - Wash strainer when the pressure drop becomes 0.1 MPa.
- Exhaust the drainage from the air filters periodically. If the drainage overflows and enters the air line, this may cause malfunction of pneumatic equipment.
- If a silencer is used for a long period of time, clogging may occur and the response characteristics may change. Depending on the quality of the fluid and the energizing time, replace the silencer after 500,000 cycles.

6.2 Storage

Caution

In the case of long-term storage after use, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

6.3 Replacement parts

Refer to catalogue.

6.4 Disassembly procedure

Caution

- Before starting the disassembly work, be sure to shut off the power supply and pressure supply, and then release the residual pressure.
- Make sure that the temperature of the solenoid coil has dropped sufficiently before removing it.
- Remove the clip and take out the solenoid coil.
- Loosen the hexagon bolts and remove the bonnet, O-ring, and main valve (sub-valve). See below.

6 Maintenance - continued

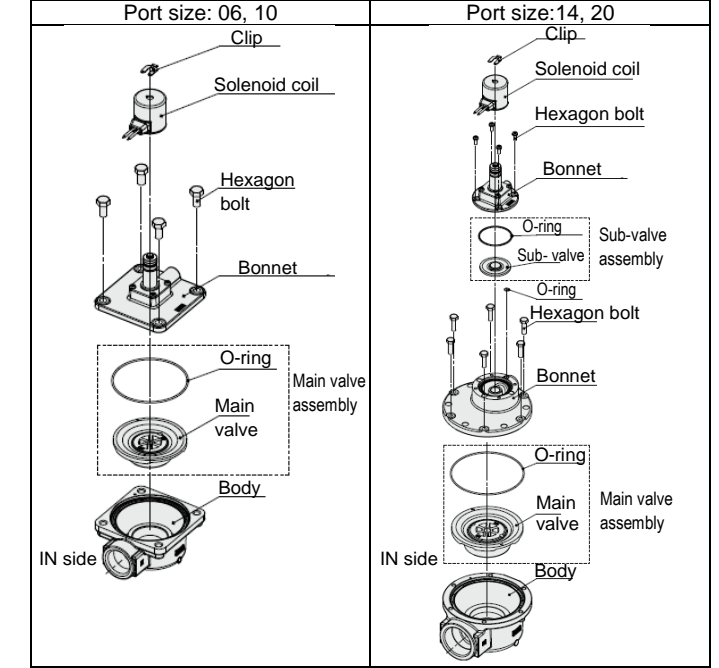


Figure 9.

6.5 Assembly procedure

Caution

- Assemble the main valve (sub-valve) to the body, with reference to mounting orientation shown in Figure 10. Incorrect assembly can lead to product malfunction.
- After installation, make sure that the O-ring is fully seated in the groove (see Figure 11). If the O-ring has fallen out of the groove, it may cause external leakage or malfunction.

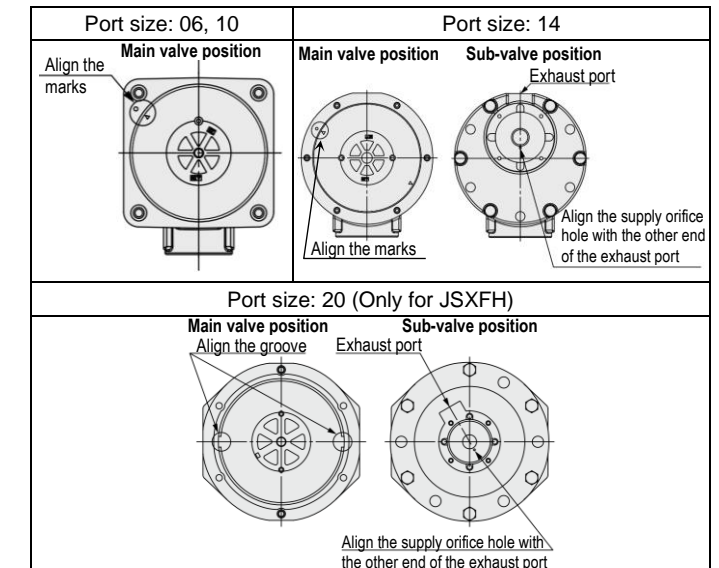


Figure 10.

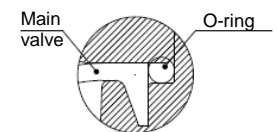


Figure 11. O-ring position

6.6 How to replace the solenoid coil

Warning

- When replacing the solenoid coil, turn off the power supply.
- Be careful of possible high temperature of the solenoid coil due to the fluid temperature and operating conditions.

6 Maintenance - continued

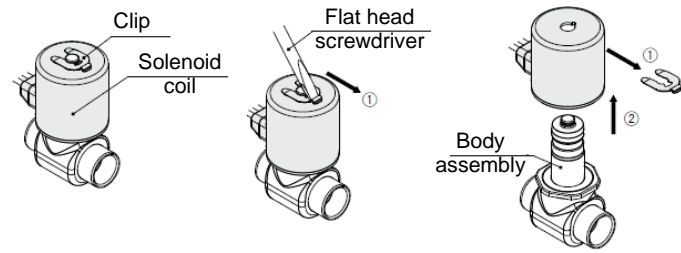


Figure 12.

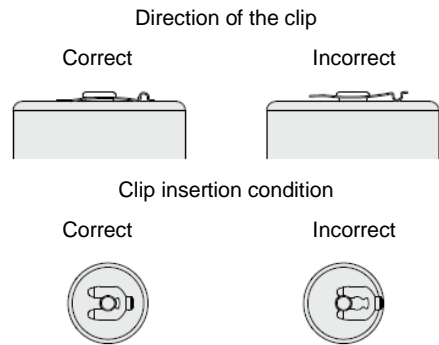


Figure 13.

7 Limitations of Use

7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

⚠ Caution

7.2 Low temperature operation

⚠ Warning

- The valve can be used in an ambient temperature of -40°C . However, take measures to prevent freezing or solidification of impurities, etc.
- A high dew point in low ambient temperature or a high flow rate may cause freezing. In such cases, take measures to prevent freezing by, for example, installing an air dryer or keeping the body warm.

7.3 Holding of pressure

⚠ Warning

Since valves are subject to air leakage, they cannot be used for applications such as holding pressure (including vacuum) in a system.

7.4 Cannot be used as an emergency shut-off valve

⚠ Warning

This product is not designed for safety applications such as an emergency shut-off valve. If the valves are used in this type of system, other reliable safety assurance measures should be adopted.

7.5 Normally closed valves

⚠ Warning

Although the valves are normally closed (IN and OUT port blocked), and flow is blocked from Port 1 to Port 2, the fluid will not be blocked if Port 2 pressure is greater than Port 1 pressure, and fluid will flow from Port 2 to Port 1.

7.6 Leakage voltage

⚠ Caution

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes $\leq 2\%$ of the rated voltage across the valve for DC coil and $\leq 5\%$ for AC coils.

8 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

9 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
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 Template DKP50047-F-085M