



Installation and Maintenance Manual
3 Port Solenoid Valve, Rubber Seal,
Body ported/Base mounted
Series VZ100/300/500



1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety, ISO4414 and JIS B 8370, Pneumatic Fluid power – General rules relating to systems, must be observed, along with other relevant safety practices.

⚠ DANGER	In extreme conditions, there is a possibility of serious injury or loss of life.
⚠ WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

⚠ WARNING

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**
 Since the products specified here can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.
- Only trained personnel should operate pneumatically operated machinery and equipment.**
 Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.
- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
 3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create backpressure, i.e. incorporate a soft-start valve).
- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**
 1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
 2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
 3) An application that has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

⚠ CAUTION

- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

2.1 Valve Specifications

Item	Type	VZ100	VZ300/500
Fluid		Air	
Operating pressure range (MPa)		N.C. 0 – 0.7 N.O. 0 – 0.5	0.15 - 0.7
Ambient and fluid temperature (°C)		-10 to 50 (No freezing)	
Response time (ms) ⁽¹⁾		15 or less	20 or less
Max. operating frequency (Hz)		15	10
Manual override ⁽²⁾		Non locking push type	Non-locking push type, locking slotted type, locking lever type.
Pilot exhaust method		N/A	Individual pilot exhaust type, Common exhaust (pilot and main valve) type
Lubrication		Not required	
Mounting orientation		Unrestricted	
Shock/Vibration resistance (m/s ²) ⁽³⁾		300/50	
Enclosure		Dustproof	

Table 1.

- Note 1) Based on dynamic performance test, JIS B 8374-1981. (coil temperature: 20°C, at rated voltage, without surge suppressor)
 Note 2) When operating the locking type manually, apply torque of 0.2 N•m or less.
 Note 3) Impact resistance: No malfunction from test using drop impact tester to axis and right angle direction of main valve and armature, each one time when energised and de-energised
 Vibration resistance: No malfunction from test from 45 to 1000 Hz (VZ100) and 45 to 2000 Hz (VZ300 and VZ500). 1 sweep to axis and right angle of main valve and armature, one time each when energised and de-energised (Value in the initial stage).

2.2 Solenoid Specifications

Electrical entry		* Option	
		Grommet (G)/(H), L plug connector (L), M plug connector (M), DIN terminal (D)	
Coil rated voltage	AC 50/60Hz	100, 200, 24*, 48*, 110*, 220*	
	DC	24, 6*, 12*, 48*	
Allowable voltage fluctuation (%)		-15 to +10% of rated voltage	
Power consumption (W) [Current mA]	DC	1.8 (2.1 with LED) [24 VDC: 75 (87.5 with LED)]	
Apparent power (VA)	AC	Inrush	4.5/50 Hz, 4.2/60 Hz
		Holding	3.5/50 Hz, 3/60 Hz
Surge voltage suppressor		DC: Diode, AC: ZNR	
Indicator light		DC: LED (Red), AC: Neon bulb	

Table 2.

2.3 Operating Pressure

Model	Type of actuation	Operating pressure range MPa	Vacuum specifications (MPa)		Port size
			1 (P) port	3 (R) port	
Body ported	VZ110	N.C.	0 to 0.7	-27kPa to 0.6	M5 x 0.8
	VZ120	N.O.	0 to 0.5	-100kPa to 0	

Applicable models	Base mounted VZ300, VZ500	
Operating pressure range (MPa)	Main pressure	-100 KPa to 0.7
	External pilot pressure	0.15 to 0.7

Table 3.

2 Specifications (continued)

2.3 Circuit Symbols

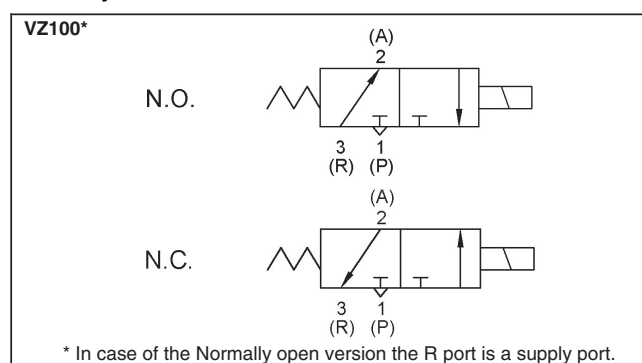


Figure 1.

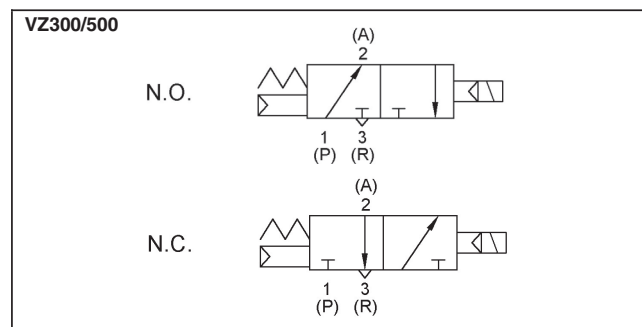


Figure 2.

3 Installation (continued)

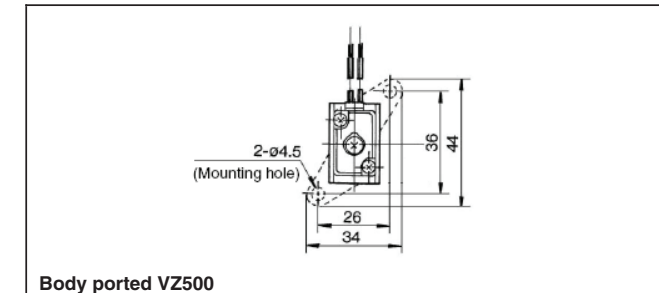


Figure 5.

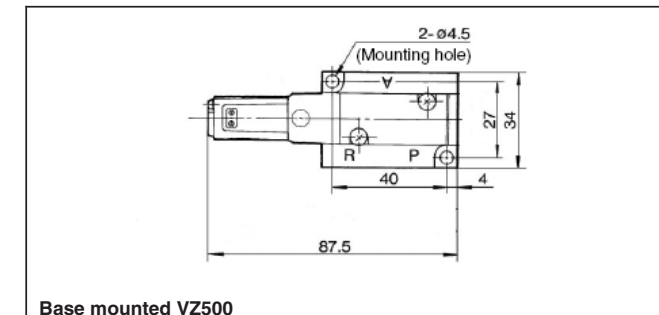


Figure 6.

3.2 Plug connector

Attaching and detaching connectors.

- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.

3 Installation

3.1 Installation

⚠ WARNING

- Do not install the product unless the safety instructions have been read and understood.
- The installation should allow sufficient space for maintenance activities (removal of valve, etc.).

3.2 Outline dimensions (mm)

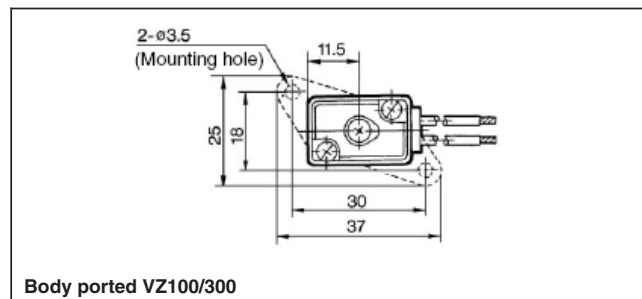


Figure 3.

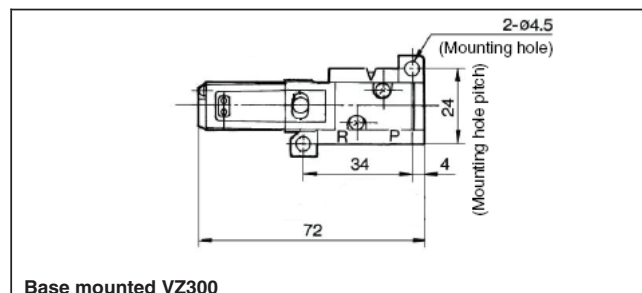


Figure 4.

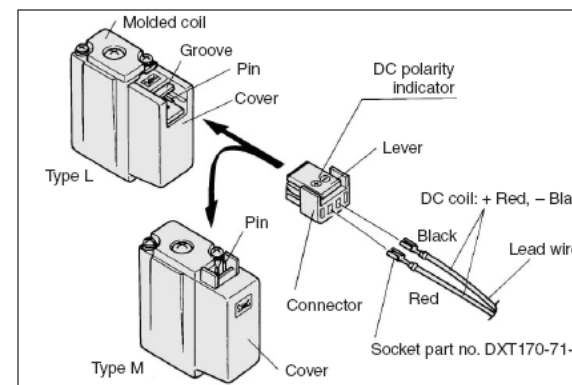


Figure 7.

3.3 DIN Terminal Connection

- Loosen the setscrew and pull out the connector from the terminal block of the solenoid.
- Pull out screw and insert a screwdriver to the slit area near the bottom of the terminal block to separate block and housing.
- Loosen the terminal screws (slotted screws) on the terminal block, insert the core of the lead wire into the terminal in accordance with the prescribed connection method, and attach securely with the terminal screws.
- Tighten the ground nut to secure the wire.

Change of electrical entry (Orientation)

After separating terminal block and housing, the cord entry direction can be changed by attaching the housing in the desired direction (4 directions of 90° increments).

* In the case of w/indicator light, avoid damaging the indicator light with lead wire.

Precautions

Plug a connector in or out vertically, never at an angle.

Applicable cable

O.D.: Ø3.5 to Ø7
 (Reference) 0.5mm² 2 core and 3 core wires equivalent to JIS C 3306.

3 Installation (continued)

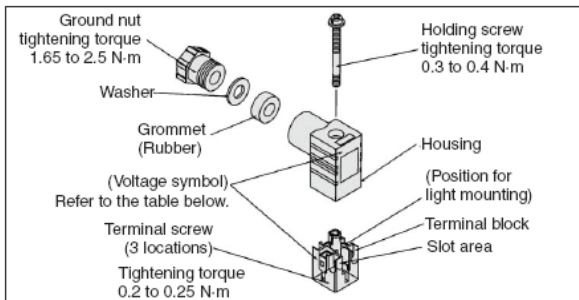


Figure 8.

3.4 Environment

WARNING

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock. Check the product specifications.
- Do not mount the product in a location exposed to radiant heat.

3.5 Piping

CAUTION

- Before 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 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings according to appropriate tightening torque.

Thread	Tightening Torque Kgf/cm (N-m)
M5	By hand + 1/6 turn with a wrench (1/4 turn for miniature fittings)
Rc 1/8	70 to 90 (7 to 9)
Rc 1/4	120 to 140 (12 to 14)

Table 4.

3.6 Lubrication

CAUTION

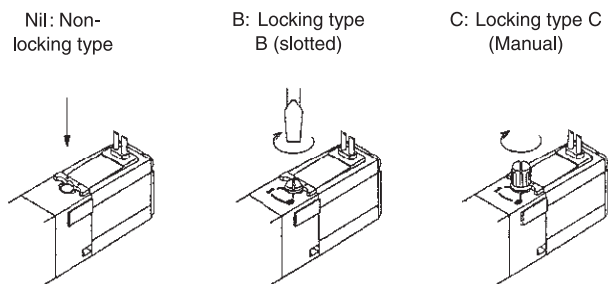
- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, use turbine oil Class 1 (no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

4 Setting

Manual override operation

Exercise **EXTREME CAUTION** when operating a solenoid manual override, as connected equipment will commence operation. Ensure all reasonable safety measures are in place.

* Non-locking push type must be pressed in the direction of the arrow.



When operating the locking type manually, apply a torque of 0.2 N-m or less.

Figure 9.

5 Maintenance

5.1 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 only be performed by qualified personnel.
- Before performing maintenance ensure the supply pressure is shut off and all residual air pressure is released from the system.
- After maintenance apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, verify product set-up parameters.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

5.2 Options

Description	Part no.	Note	
With foot bracket	VZ100	DXT170-34-1A	Mounting screw (M3x6)
	VZ300	DXT170-34-1B	With screw (for VZ3#2)
	VZ500	DXT201-19-1A	With screw (for VZ5#2)
Silencer	M5	AN120-M5 (Ø8x17*)	For valve unit (R port), noise reduction: 12 dB or more, Effective area 5 mm ²

Table 5.

5.3 Construction

VZ100

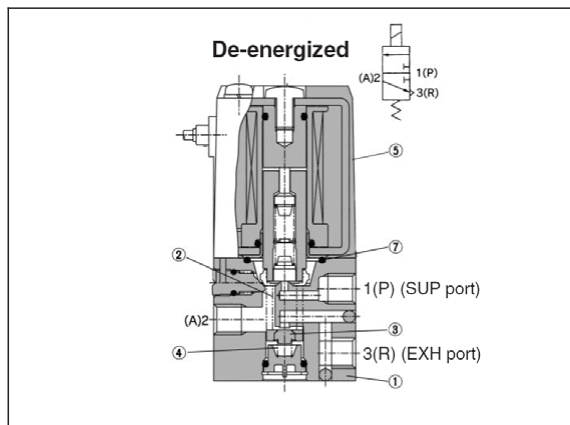


Figure 10.

Component parts

No.	Description	Material	Notes
1	Body	ZDC	Platinum silver
2	Push rod	Resin	-
3	EXH poppet	NBR	-
4	N.C.	Back up spring	Stainless steel
	N.O.	Poppet spring	

Replacement parts

No.	Description	Part no.	Material
5	Solenoid Assembly	VZ110	DXT170-A-###
		VZ120	DXT170-E-###
7	O-ring	13 x 11 x 1	NBR

Table 6.

5 Maintenance (continued)

VZ300/500

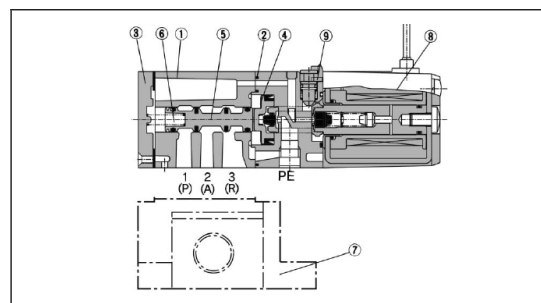


Figure 11.

Component parts

No.	Description	Material	Note
1	Body	Aluminium die-cast	Platinum silver
2	Piston plate	Resin	Black
3	End cover	Aluminium die-cast	Black
4	Piston	Resin	-
5	Spool valve assembly	-	-
6	Spool spring	Stainless steel	-

Replacement parts

No.	Description	Material	Part no.		
7	Sub-plate	Aluminium die-cast	VZ300	DXT200-13-1#P	
			VZ500	1/8	DXT201-2-1#P
				1/4	DXT201-2-2#P
8	Solenoid assembly	Epoxy/stainless steel	VZ300	DXT170-C-###	
			VZ500		
	O-ring	NBR	13x11x1		

Table 7.

5.4 Manifold specifications

CAUTION

When mounting a solenoid valve on the manifold base or sub-plate, etc., the mounting direction is determined. If mounting in the wrong direction, the equipment to be wired might result in malfunction. Refer to dimensions in the catalogue and use caution to the mounting direction.

Mounting screw tightening torques: M2.5: 0.45 N•m

Body ported

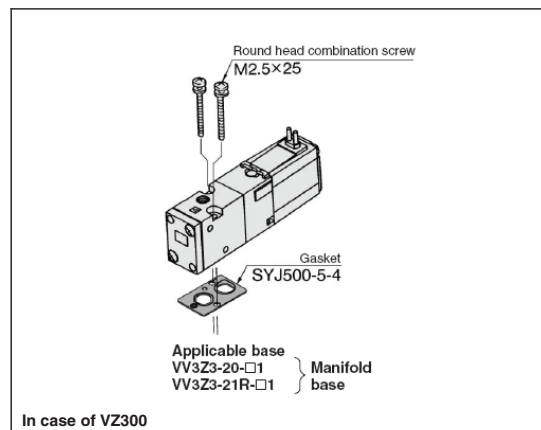
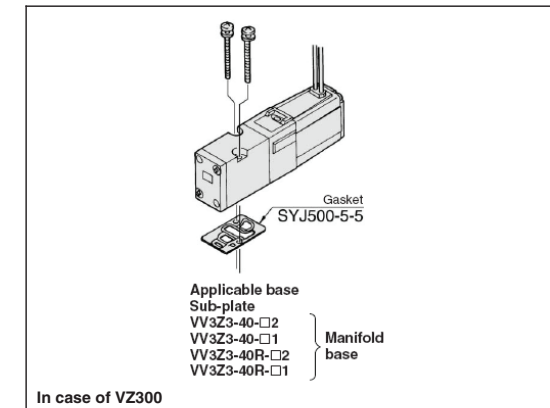


Figure 12.

5 Maintenance (continued)

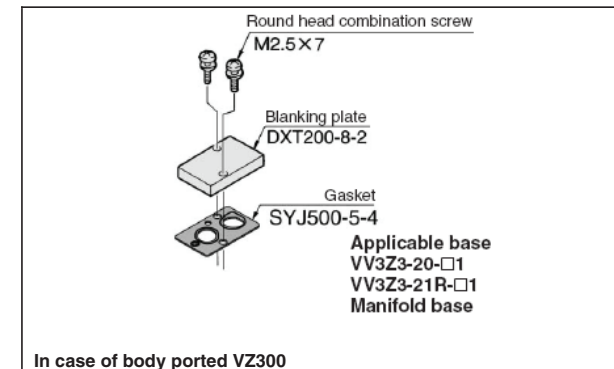
Base mounted



In case of VZ300

Figure 13.

Blanking plate assembly



In case of body ported VZ300

Figure 14.

6 Internal Circuit and Wiring

6.1 Light/surge voltage suppressor

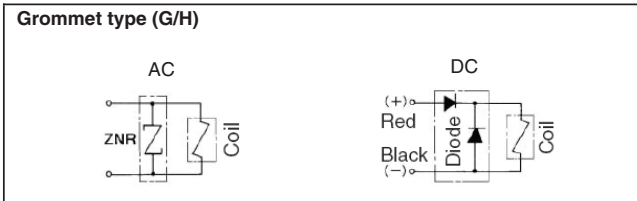


Figure 15.

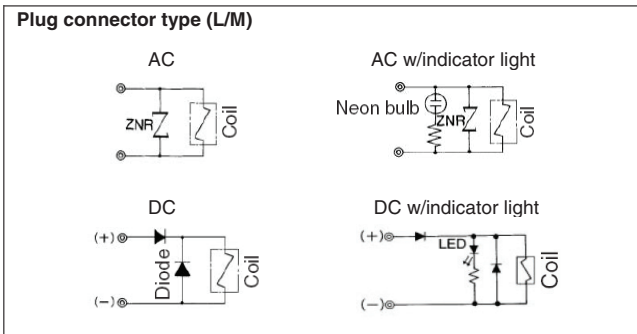


Figure 16.

In case of D.C. wiring for grommet and plug type (G/H/L/M), be sure to connect in line with the polarity indication (positive [+/negative [-]) on the connector. When the lead wire is pre-wired, positive [+] is red and negative [-] is black respectively.

6 Internal Circuit and Wiring (continued)

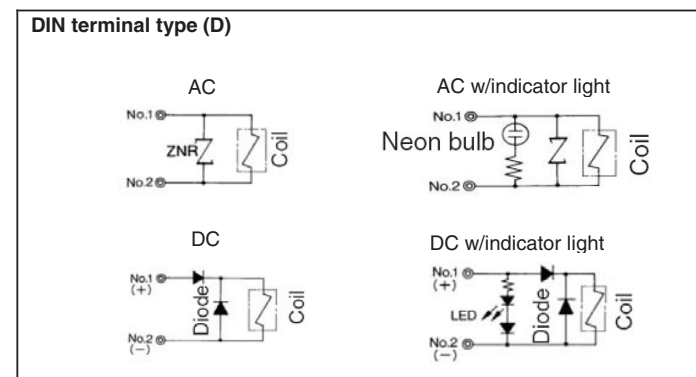


Figure 17.

In case of D.C. wiring for DIN type (D), connect terminal no.1 of the connector to the positive [+] side, and terminal no.2 to the negative [-] side. Refer to the markings on the terminal block)

7 Limitations of Use

CAUTION

- When an actuator, such as a cylinder, is to be driven using a valve, take the appropriate measures to prevent potential danger caused by actuator operation.
 - These valves are not designed for safety applications such as an emergency shutoff valve. If the valves are to be used in this type of system, other reliable safety assurance measures should also be adopted.
 - Since valves are subject to air leakage, they cannot be used for applications such as holding pressure (including vacuum) in a pressure vessel.
 - When valve is used for switching vacuum, take measures to prevent external suction of dust or other contaminants that may lead to valve malfunction.
-
- Valve use is possible to temperature extremes to -10°C . Take appropriate measures to avoid freezing of drainage, moisture etc.

7.1 Limited warranty and disclaimer/compliance requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

Limited warranty and Disclaimer

1) The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*3)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2) For any failure or damage reported within the warranty period, which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3) Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*3) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

7.2 Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law.

8 Contacts

AUSTRIA	(43) 2262 62 280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 5 414 24611	POLAND	(48) 22 211 9600
DENMARK	(45) 70 25 29 00	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 64 76 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 18 4100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 0700
HUNGARY	(36) 1 371 1343	SWITZERLAND	(41) 52 396 3131
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