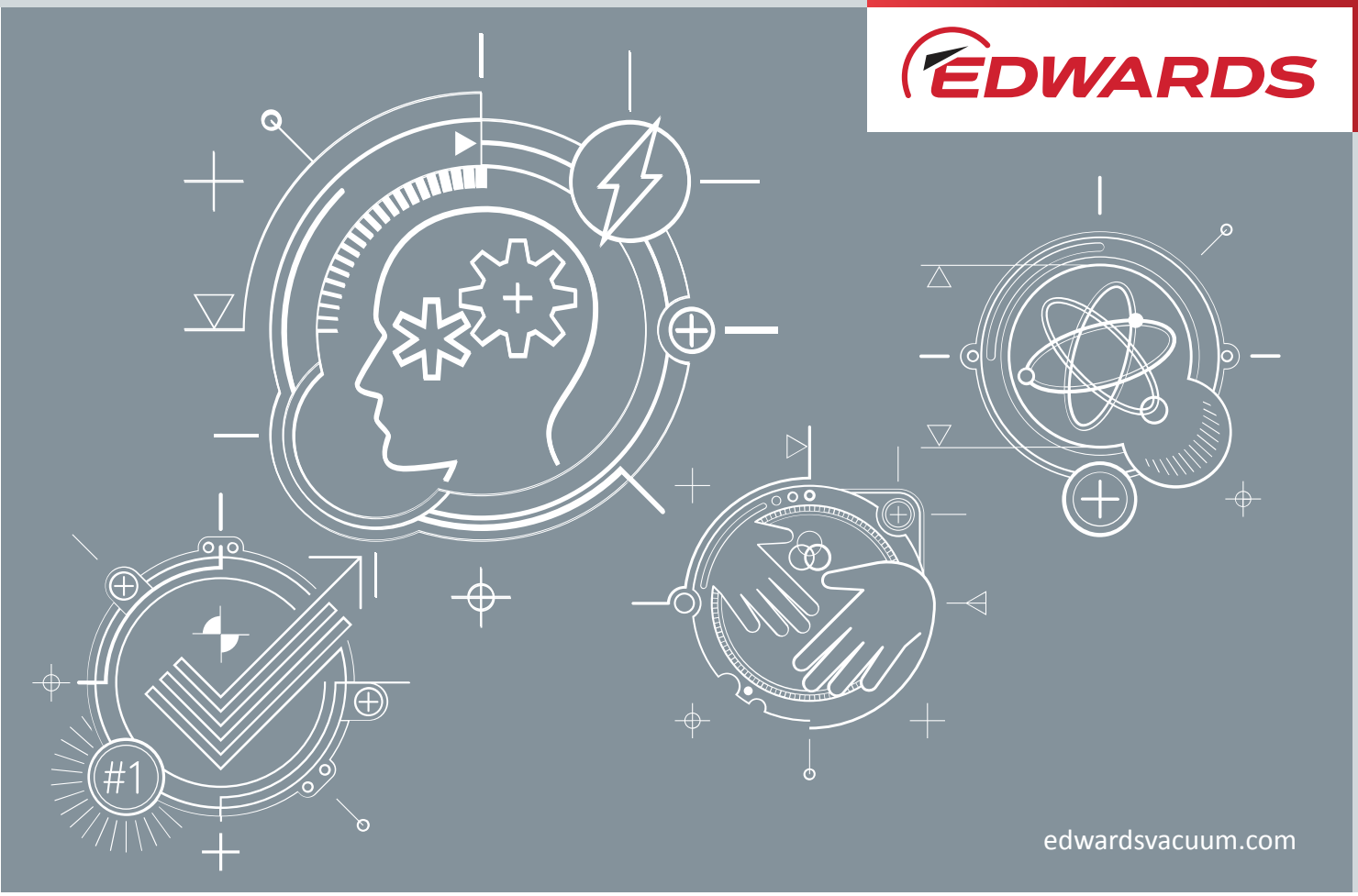

Vacuum Isolation Valve (VIV)

INSTRUCTION MANUAL

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Trademark credit

Disclaimer

The content of this manual may change from time to time without notice. We accept no liability for any errors that may appear in this manual nor do we make any expressed or implied warranties regarding the content. As far as practical we have ensured that the products have been designed and constructed to be safe and without risks when properly installed and used in accordance with their operating instructions.

We accept no liability for loss of profit, loss of market or any other indirect or consequential loss whatsoever.

Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate and maintain the product.

CE Declaration of Incorporation

P20010246A

Edwards Ltd
Innovation Drive
Burgess Hill
West Sussex
RH15 9TW
UK

The following product

Product	Description
A50637500	VIV25EKA 24V dc
A50637501	VIV25EKA 100 – 115V ac 50/60Hz
A50637502	VIV25EKA 208 – 230V ac 50/60Hz
A50637510	VIV40EKA 24V dc
A50637511	VIV40EKA 100 – 115V ac 50/60Hz
A50637512	VIV40EKA 208 – 230V ac 50/60Hz
A50637520	VIV50EKA 24V dc

is intended to be incorporated into other machinery and is not for independent use.

It must not be put into service until the final machinery into which it is incorporated has been declared to be in conformity with the applicable provisions of Directive 2006/42/EC on Machinery. So far as practicable, this complies with the essential safety requirements of Annex I as specified below:

1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.4, 1.5.1, 1.5.3, 1.5.4, 1.6.1, 1.6.2, 1.6.4, 1.6.5, 1.7.1, 1.7.2, 1.7.3, 1.7.4

The relevant technical documentation has been compiled in accordance with Machinery directive 2006/42/EC Annex VII Part B. In response to a reasoned request by the national authorities, we undertake to provide relevant information on the partly completed machinery (via email).

So far as practicable this product also complies with the essential requirements of:

2011/65/EU	Restriction of certain hazardous substances (RoHS) directive as amended by Delegated Directive (EU) 2015/863
Documentation Officer:	Jelena Havelkova, Spielberk Office Centre, Holandska 10, Brno, 63900 Czech Republic, ✆: +42(0) 734 418 896, ✉: documentation@edwardsvacuum.com

This declaration, based on the requirements of the listed Directives and EN ISO/IEC 17050-1, covers all product serial numbers from this date on: *29th October 2019*

Nick Barratt - Engineering Manager
Research and Development
Eastbourne, UK

Andy Marsh – General Manager
Eastbourne, UK

Additional Legislation and Compliance Information

EU RoHS Directive: Material Exemption Information

This product is compliant with the following Annex III Exemptions:

- 6(a) **Lead** as an alloying element in steel for machining purposes and in galvanised steel containing up to 0.35 % lead by weight
- 6(b) **Lead** as an alloying element in aluminium containing up to 0.4% by weight
- 6(c) Copper alloy containing up to 4% **lead** by weight

EU REACH Regulation Compliance

This product is a complex article which is not designed for intentional substance release. To the best of our knowledge the materials used comply with the requirements of REACH. The product manual provides information and instruction to ensure the safe storage, use, maintenance and disposal of the product including any substance based requirements.

Article 33.1 Declaration

This product does contain Candidate List Substances of Very High Concern above 0.1%ww by article as clarified under the 2015 European Court of Justice ruling in case C-106/14.

- Lead (Pb) added to the Candidate List June 2018

As indicated by the applied RoHS exemption(s) above this substance is present in certain aluminium, brass, steel, electrical or electronic components.

ADDITIONAL INFORMATION

The products listed are also in scope for and comply with the requirements of the following:

2012/19/EU Directive on waste electrical and electronic equipment (WEEE)

材料成分声明

China Material Content Declaration

	有害物质 Hazardous Substances					
部件名称 Part name	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr VI)	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
阀体 Valve body	X	O	O	O	O	O
阀盖 Valve bonnet	X	O	O	O	O	O
内部部件 Internal components	X	O	O	O	O	O
电枢总成 Armature assembly	X	O	O	O	O	O
线圈 Coil	X	O	O	O	O	O

O: 表示该有害物质在该部件的所有均质材料中的含量低于 GB/T 26572 标准规定的限量要求。
O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: 表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 标准规定的限量要求。
X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.

Contents

List of Figures

1. Safety and compliance

1.1 Definition of Warnings and Cautions

Important safety information is highlighted as WARNING and CAUTION instructions. These instructions must be obeyed.

The use of WARNINGs and CAUTIONs is defined below.

WARNING:

Warnings are given where failure to observe the instruction could result in minor injury or death to people. The actual symbol shown varies according to the hazard.

CAUTION:

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment or process.

1.2 Safety symbols

The safety symbols on the products denote areas where care and attention is required.

The following safety symbols may be used on the product or throughout the product documentation.

	Warning/Caution An appropriate safety instruction must be followed or caution to a potential hazard exists.
	Warning - Hot Surfaces Indicates that the marked item may be hot and should not be touched without taking precautions.

2. General description

2.1 Overview

The Vacuum Isolation Valve (VIV) is a fast closing high vacuum isolation valve that is designed to prevent the movement of vapour or particulates from the backing pump to the process chamber. When the VIV is closed, the backing pump will be safely vented.

The VIV gives the additional benefit of protecting the process chamber from being vented in the event of a power supply failure.

When the backing pump is restarted, the valve will slowly open when the pressure within the VIV has dropped, reducing the effects of pressure burst.

Backing pumps can be connected to the VIV through a range of optional accessory cables with no additional wiring:

1. The 24 V d.c. VIV variant can be connected through an optional accessory cable to our backing pumps fitted with an M8 valve connector.
2. The 24 V d.c. VIV can be connected to our backing pump fitted with an IEC 60320 C14 or C20 appliance inlet and 15-way D-Type logic interface connector through an optional VIV Link. The VIV Link simultaneously monitors the status of the pump from the 15-way D-Type logic interface connector.
3. The 24 V d.c. VIV can be connected to all the backing pumps supplied with an IEC 60320 C14 or C20 appliance inlet through an optional VIV Link with a pre-installed logic interface plug.

Implementations 1 and 2 gives additional levels of protection, including protection from pump error, drive failure or protection during power cycling.

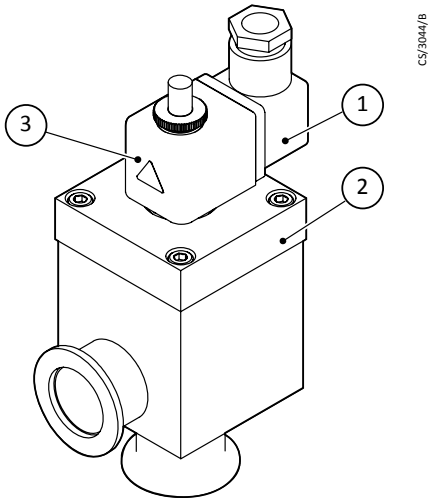
Implementation 3 gives protection from power supply failure only.

The valve is designed for indoor use and clean dry vacuum applications only. The valve is not intended to pump liquids or gases which are not compatible with the materials of construction listed in the *Manufacturing materials* on page 39.

Note:

Some components in this product contain Lead (Pb) which is in the REACH SVHC Candidate List.

Figure 1 General view of the VIV



1. Electrical connector
2. Housing
3. Pilot valve

3. Installation

3.1 Installation safety

WARNING: INSTALLATION SAFETY

Risk of injury. Follow the safety instructions and take note of all appropriate precautions. Only suitably trained and supervised technicians should install the valve.

3.2 Unpack and inspect

1. If the valve is damaged, notify the supplier and carrier in writing within three days. Write the item number of the valve together with the order number and the supplier's invoice number. Retail all packaging materials for inspection. Do not use the valve if it is damaged.
2. Check that the package contains the items listed in *Table: Checklist of items* on page 9. If any of these items are missing, notify the supplier in writing within three days.
3. Remove the protective covers from the valve flanges only at the moment when the valve is being installed on the vacuum system. Make sure that the unprotected sealing surfaces are clean and not damaged.
4. Store the original packaging material. It may be useful if products need to be returned.

Table 1 Item checklist

Description	Quantity	Check
Vacuum Isolation Valve (VIV)	1	
Protective flange covers	2	
Instruction manual (A50637880)	1	

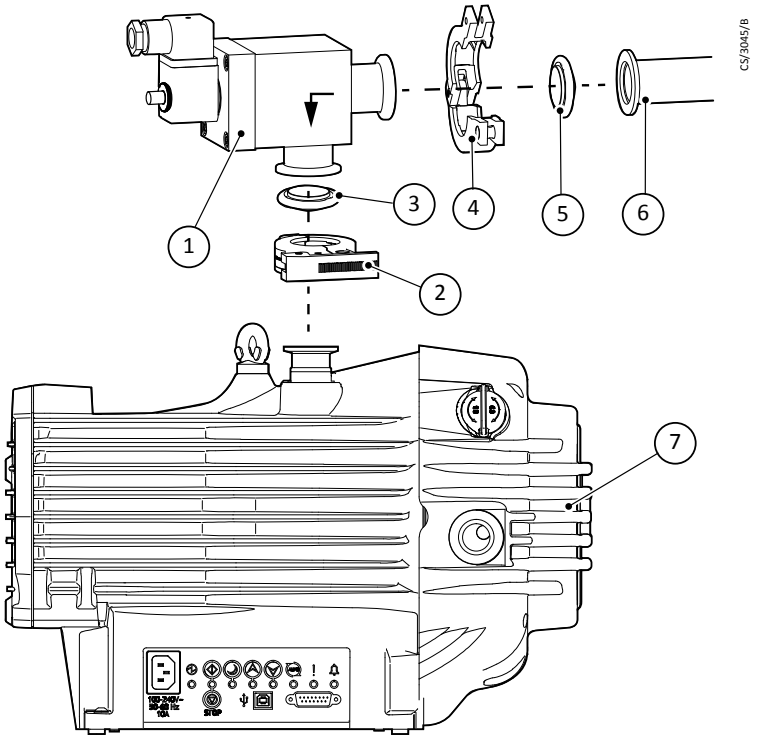
3.3 Vacuum connection

WARNING: COMPRESSED GAS

Risk of compressed gas. Do not install the valve on systems where the pressure may exceed the atmospheric pressure. This valve is not applicable for positive pressure applications.

1. Remove the protective covers from the valve flanges and connect the VIV to the backing pump and vacuum system as shown in *Figure: Mounting the VIV on a vacuum system* on page 10. Make sure that the direction of flow is correctly suited to the vacuum system.
2. Check that the vacuum connections are leak proof.

Figure 2 Mounting the Vacuum Isolation Valve on a vacuum system



1. Vacuum Isolation Valve
2. Pump clamp
3. Pump O-ring
4. Vacuum chamber clamp
5. Vacuum chamber O-ring
6. Vacuum chamber ISO-KF connection flange
7. Backing pump

3.4 Electrical connection

WARNING: ELECTRICAL CONNECTIONS

Risk of electric shock. Make sure that the electrical supply is switched off before making electrical connections to the product.

Risk of electric shock. Do not apply power to the electrical connector when the connector is disconnected from the valve.

CAUTION: INCORRECT VOLTAGE

Risk of damage to equipment. Incorrect voltages can destroy the product. The rating of the supply voltage must correspond to the nominal voltage of the pilot valve.

Make sure that the electrical installation of the valve conforms to all local and national safety requirements. It must be connected to a suitably fused electrical supply with a protective earth connection.

Do not use the electrical connector to interrupt the electrical supply to the valve. The valve is considered a permanently connected piece of the equipment.

- Fit the electrical connector to the valve and secure with the locking screw provided before applying power to the valve.
- Isolate the electrical supply to the valve before removing the electrical connector from the valve.

For our backing pumps fitted with the M8 valve connector or the 15-way D-Type logic interface connector, we recommend the use of an optional accessory cable or VIV Link for increased levels of protection.

If the above options are not suitable, it is possible to connect the VIV directly to the backing pump electrical supply. Check that the voltage rating of the VIV is compatible with the electrical supply of the pump. Connect the coil of the pilot valve in parallel with the electrical supply to the backing pump. The VIV should be fitted with applicable fuse according to the values in *Table: Fuse requirements* on page 11.

Note:

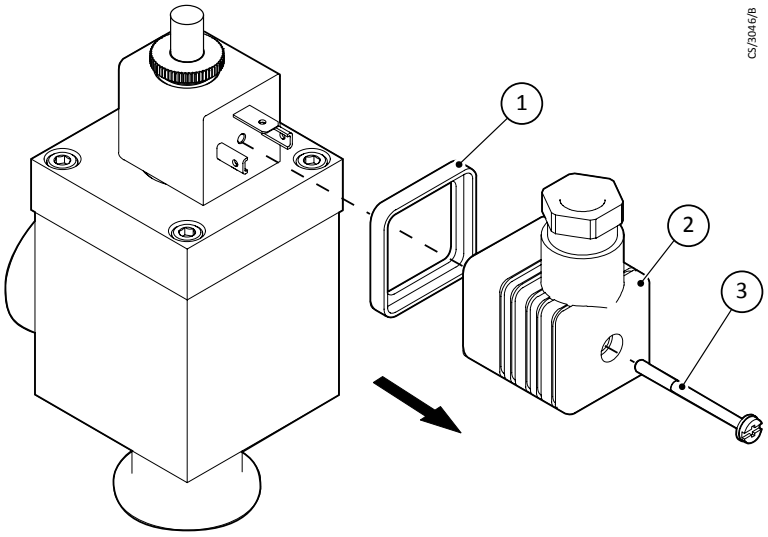
A fuse is not required if the VIV is connected using the M8 valve connector or the VIV Link interface.

Table 2 Fuse requirements

Rated voltage of pilot valve	Fuse	Example
24 V d.c.	125 mA type T	Littelfuse Series 218 Time-Lag (Slo-Blo) Fuse Littelfuse P/N: 0218.125MXP
100 – 115 V 50 / 60 Hz	80 mA type T	Littelfuse Series 218 Time-Lag (Slo-Blo) Fuse Littelfuse P/N: 0218.080MXP
208 – 230 V 50 / 60 Hz	32 mA type T	Littelfuse Series 218 Time-Lag (Slo-Blo) Fuse Littelfuse P/N: 0218.032MXP

3.4.1 Disassemble the connector socket

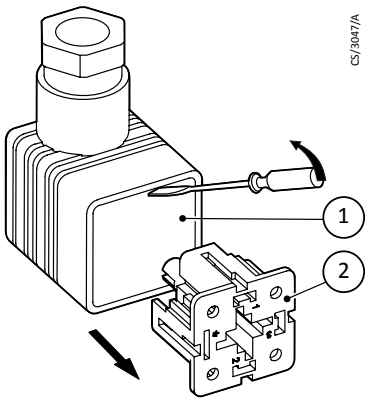
Figure 3 Unfasten the locking screw and remove the electrical connector socket



1. Gasket
2. Electrical connector socket
3. Locking screw

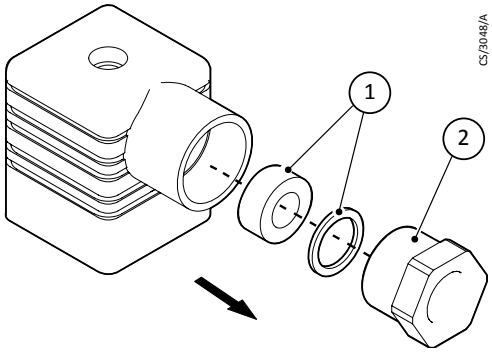
3.4.2 Prepare the electrical connector socket

Figure 4 Remove the insert



1. Electrical connector socket
2. Insert

Figure 5 Remove the cable gland



1. Cable gland
2. Strain relief nut

3.4.3 Prepare and connect the cable

WARNING: INCORRECT EARTHING

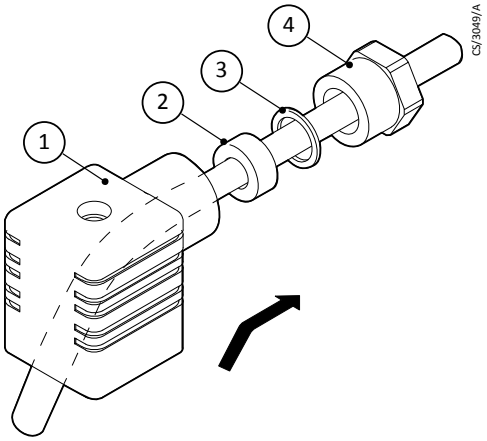
Risk of electric shock. Incorrectly grounded products can be extremely hazardous if a fault occurs.
Use only three conductor power cable with a protective conductor. The cable must only be plugged into a socket with a protective conductor. The impedance between the protective earth connection and the coil should be tested and verified to be less than 0.1 Ω (ohm) before power is applied to the product.

The cable should be suitably rated for the environment in which it will be used. Make sure that the maximum surface temperature of the pump is considered when you select the cable.

We recommend cable specification:

- type : SJT, VW-1
- size : 3x18 AWG
- voltage rating : 300 V
- temperature rating : 105 °C

Figure 6 Slide the strain relief nut, washer, seal and housing on the cable



1. Electrical connector socket housing
2. Seal
3. Washer
4. Strain relief nut

Prepare the cable

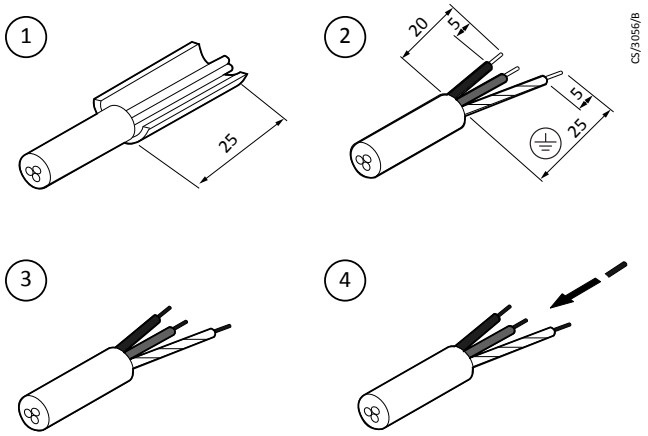
Refer to *Figure: Prepare the cable* on page 13,

1. Strip back the outer insulation for 25 mm carefully to prevent damage to the insulation of the conductors.
2. Cut the protective conductor to 25 mm and the L and N conductors to 20 mm. Strip back the L, N and the protective conductor insulation back by 5 mm.
3. Make sure that the protective conductor is the longest conductor.
4. Fit a ferrule to the end of each conductor.

Note:

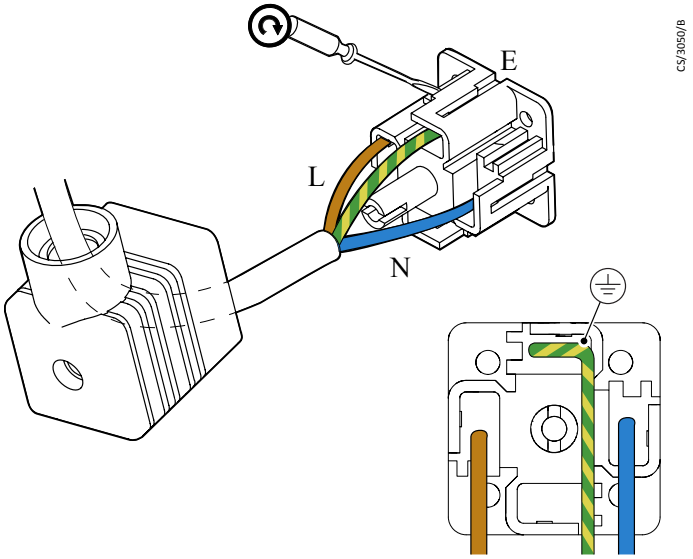
The protective conductor should be fitted on all the variants of the valve including the 24 V d.c. variant.

Figure 7 Prepare the cable



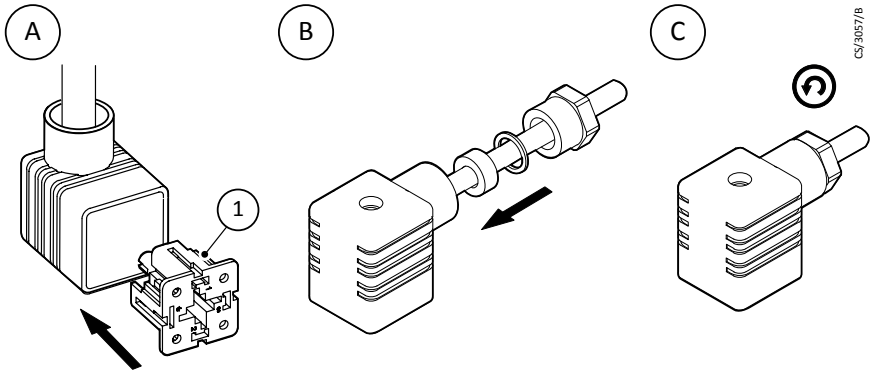
Connect the cable

Figure 8 Connect the cable



3.4.4 Assemble the cable socket

Figure 9 Cable socket assembly



1. Insert

A. Clip the insert into the housing.
B. Push the strain relief nut into the housing.
C. Rotate and tighten the strain relief nut.

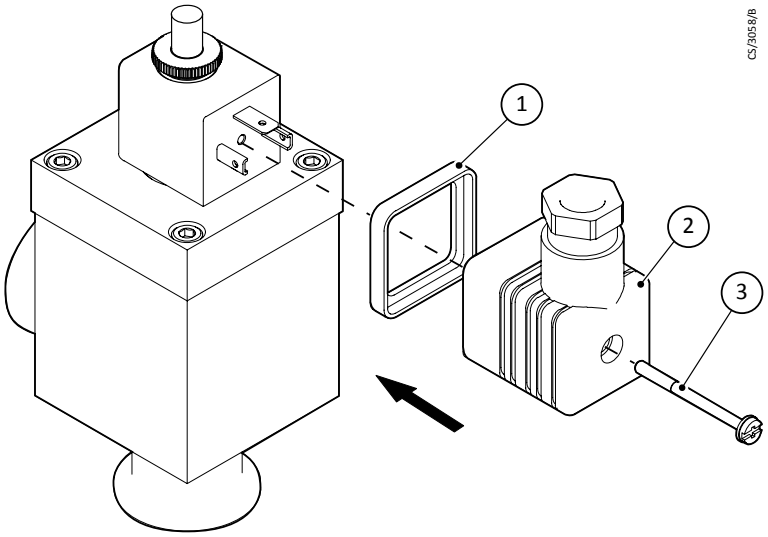
Note:

The insert can be rotated in steps of 90 degrees.

3.4.5 Connect the cable socket

Fit the gasket to the face of the electrical connector socket and plug the electrical connector socket and gasket into the pilot valve. Secure with the locking screw provided. Make sure that the impedance between the protective conductor and the coil is tested and verified to be less than 0.1 Ω (ohm) before the power supply is activated.

Figure 10 Connect the pilot valve to the electrical supply



1. Gasket
2. Electrical connector socket
3. Locking screw

4. Operation

WARNING: HIGH TEMPERATURE

Risk of damage to equipment. Do not use the valve if it has been exposed to temperatures more than 250 °C. Fluoroelastomer are used in the valve and can decompose into dangerous breakdown products when heated.

WARNING: HOT SURFACE

Risk of burn. Do not touch the pilot valve, the coil may be hot.

WARNING: SAFETY CRITICAL OPERATION

Risk of damage to equipment. Do not use the valve in safety critical applications. The valve is not intended to be fail safe.

The product is ready for operation as soon as it is installed.

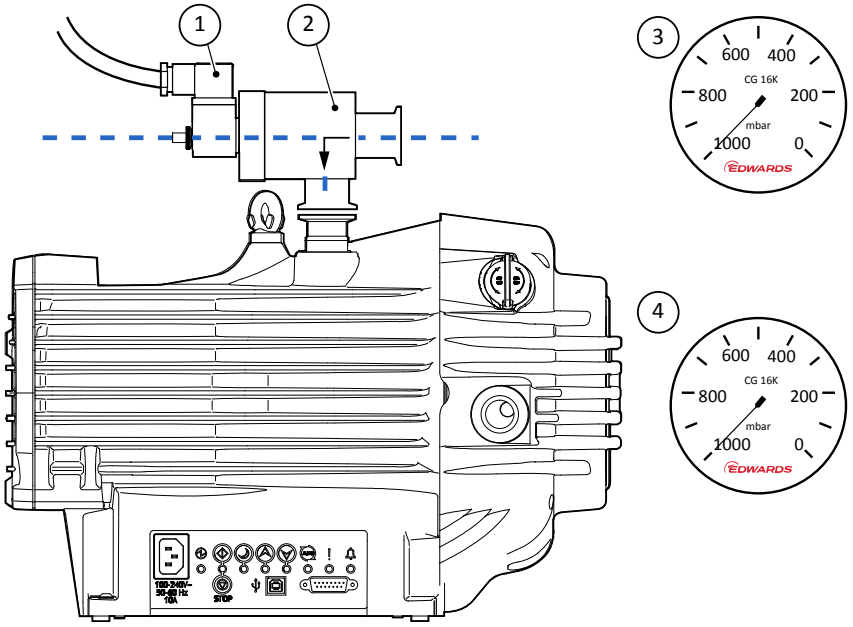
Table 3 Operation of the valve on a typical process

Subsection	Summary
Initial state on page 16	Initially, the VIV is at atmospheric pressure and in the open state.
Initial pump-down from atmospheric pressure on page 17	After applying power to the VIV and the backing pump, the vacuum system can be evacuated through the VIV.
Power supply failure – Vacuum isolation – Vent backing pump on page 18	If the power supply fails, the VIV seals off the vacuum chamber and safely vents the backing pump.
Pump-down after vacuum isolation – Atmosphere to rough vacuum on page 18	When the power is restored, the vacuum chamber remains sealed off until the pressure differential across the VIV is less than 200 mbar.
Pump-down after vacuum isolation – Rough vacuum to ultimate pressure on page 19	When the pressure differential is low enough, the VIV opens and the chamber can be pumped down to the ultimate pressure of the backing pump.

4.1 Initial state

Immediately after installation, the backing pump and VIV are at atmospheric pressure, both the VIV and the pilot valve are in the open position.

Figure 11 Initial state – Atmospheric pressure

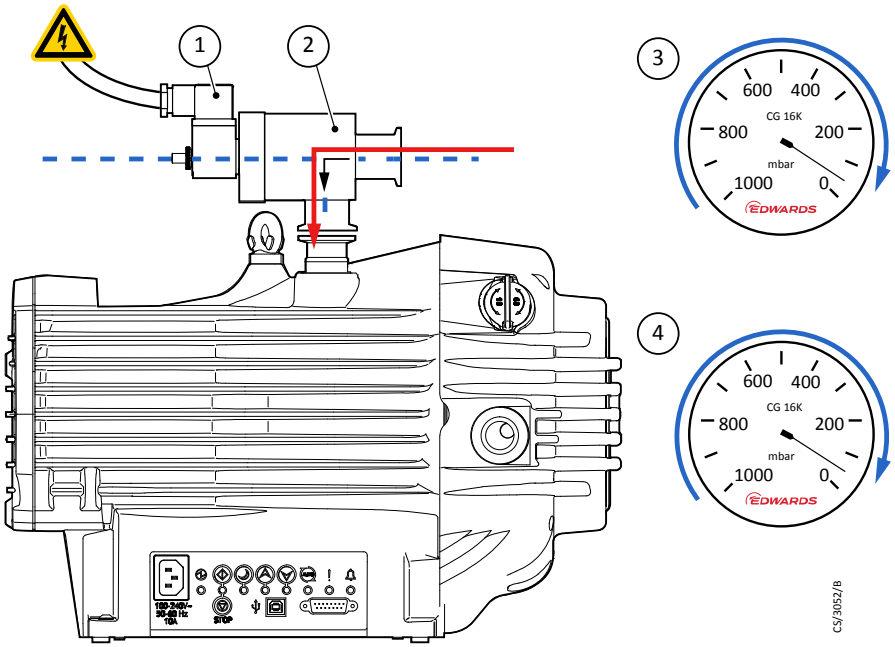


1. Pilot valve open
2. Vacuum Isolation Valve open
3. Vacuum chamber pressure indicator
4. Backing pump pressure indicator

4.2 Initial pump-down from atmospheric pressure

When the backing pump is switched on, the pilot valve is energised and closes. As the backing pump evacuates the vacuum chamber, the pressure at the pump inlet and the pressure in the vacuum chamber decreases.

Figure 12 Pump-down from atmospheric pressure



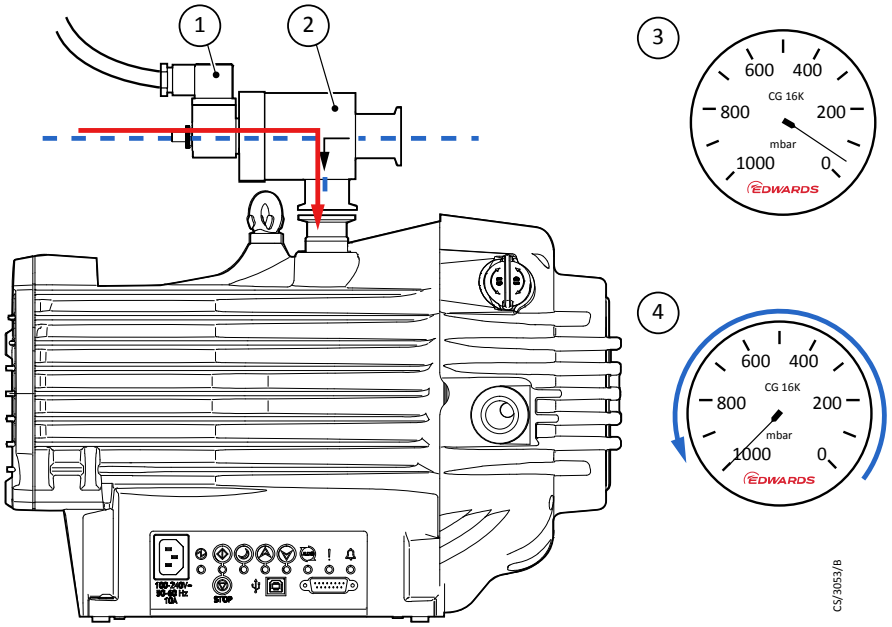
1. Pilot valve closed
2. Vacuum Isolation Valve open
3. Vacuum chamber pressure indicator
4. Backing pump pressure indicator

4.3 Power supply failure – Vacuum isolation – Vent backing pump

If the power supply fails, the VIV closes rapidly resulting in the vacuum chamber being isolated from the backing pump. The vacuum chamber will remain under vacuum indefinitely while the backing pump is safely vented.

As the backing pump switches off, the pilot valve is de-energised and opens. There is a sudden flow of air through the pilot valve and the resulting pressure differential between the incoming air and the vacuum chamber forces the VIV to close rapidly. The level of vacuum in the vacuum chamber is maintained as the backing pump is safely vented to atmospheric pressure.

Figure 13 Power supply failure – Vacuum isolation – Vent backing pump



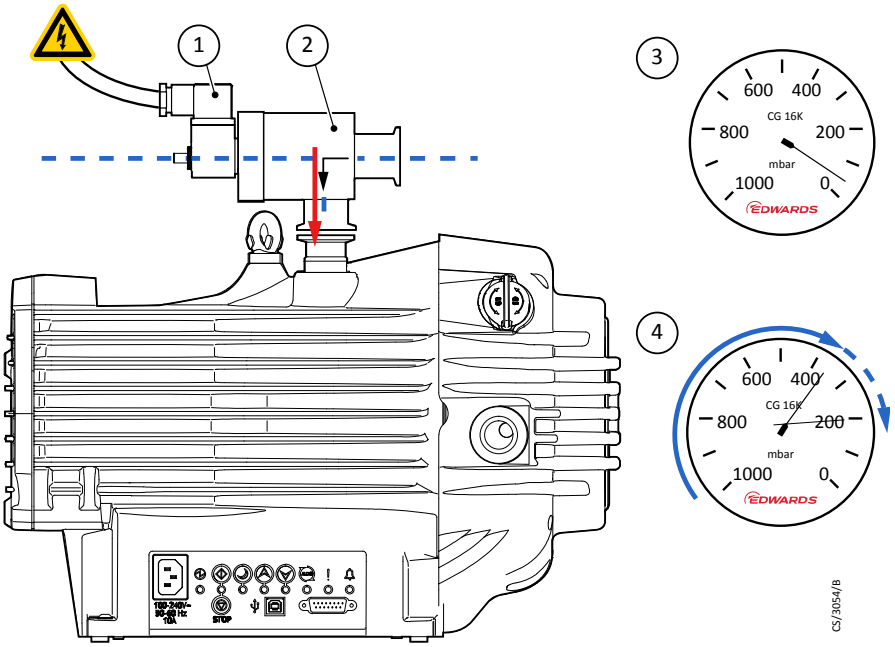
1. Pilot valve open
2. Vacuum Isolation Valve closed
3. Vacuum chamber pressure indicator
4. Backing pump pressure indicator

4.4 Pump-down after vacuum isolation – Atmosphere to rough vacuum

When the power is restored to the pump and the VIV, the pilot valve is energised and closes. Initially, the pressure differential between the backing pump inlet and the vacuum chamber maintains the VIV in the closed state.

With time, the pressure within the VIV decreases and as a result, the pressure differential between the backing pump inlet and the vacuum chamber also decreases.

Figure 14 Pump-down after isolation – Atmosphere to rough vacuum

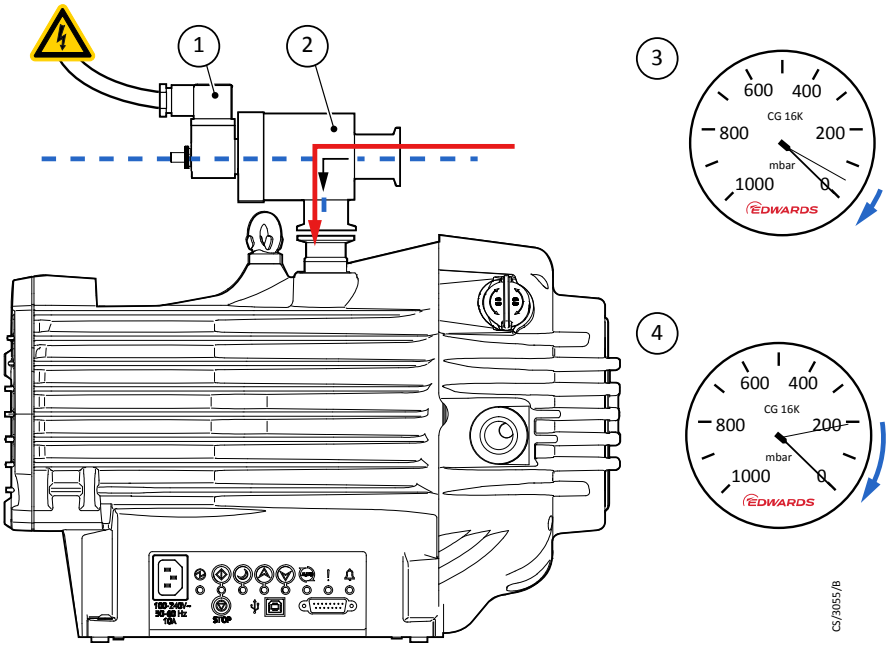


1. Pilot valve closed
2. Vacuum Isolation Valve closed
3. Vacuum chamber pressure indicator
4. Backing pump pressure indicator

4.5 Pump-down after vacuum isolation – Rough vacuum to ultimate pressure

When the pressure differential between the backing pump inlet and the vacuum chamber is approximately 200 mbar, the VIV starts to open. As the backing pump continues to pump to its ultimate pressure, the vacuum chamber pressure decreases accordingly.

Figure 15 Pump-down after vacuum isolation – Rough vacuum to ultimate pressure



1. Pilot valve closed
2. Vacuum Isolation Valve open
3. Vacuum chamber pressure indicator
4. Backing pump pressure indicator

5. Maintenance

WARNING: ELECTRICAL CONNECTIONS

Risk of electric shock. Make sure that the electrical supply is switched off before you do any maintenance on the product.

WARNING: HOT SURFACE

Risk of burn. Make sure that the valve has cooled down before you do any maintenance on the product.

WARNING: CONTAMINATED PARTS

Risk of toxic exposure.Use the product as specified to prevent contamination. Observe best vacuum practices when you do the maintenance. Wear appropriate PPE and lint free gloves during maintenance.

CAUTION: CONTAMINATED PARTS

Risk of contamination. Make sure that all parts are kept clean during maintenance. Contaminated parts can be hazardous to health and must be disposed according to all local environmental practices.

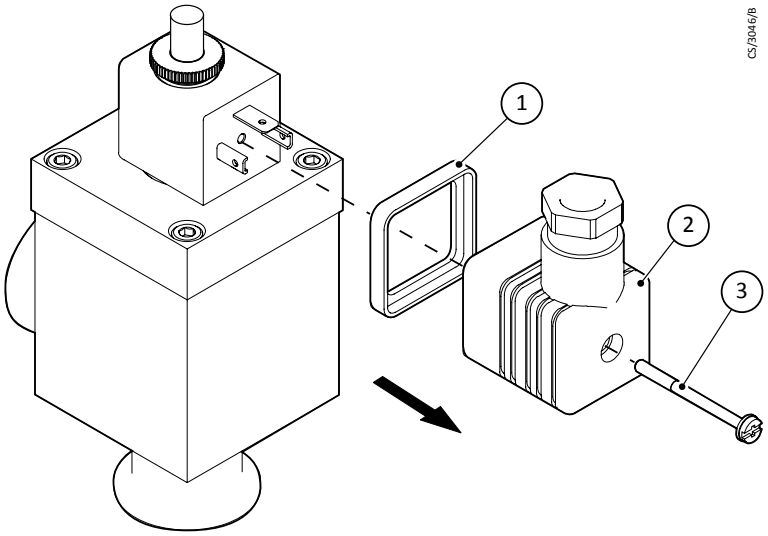
WARNING: O-RING SAFETY

Risk of damage to equipment. Use only our branded spares to service the valve. The O-rings may not be used in other applications.

5.1 Isolate the valve

1. Open the valve and make sure that the valve has cooled down to less than 55 °C.
2. Unfasten the locking screw and remove the electrical connector socket and gasket.
3. Disconnect the VIV from the vacuum system and replace the protective flange caps.

Figure 16 Unfasten the locking screw and remove the electrical connector socket



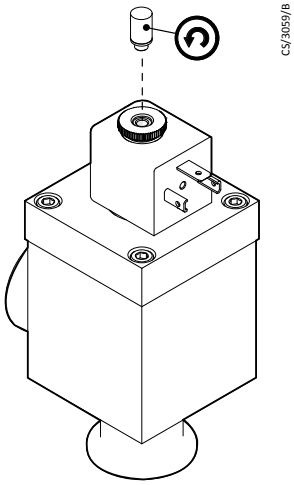
1. Gasket
2. Electrical connector socket
3. Locking screw

5.2 Replace the filter

Make sure that the valve is isolated before you replace the filter. Refer to *Isolate the valve* on page 20. Remove the filter and replace it with a new filter if necessary.

Refer to *Table: Spares and maintenance kits* on page 33 for details of spares.

Figure 17 Replace the filter



5.3 Replace the coil

Before you replace the coil, the filter must be removed. Refer to *Replace the filter* on page 21 for details on the removal of the filter.

Referring to *Figure: Replace the coil* on page 22,

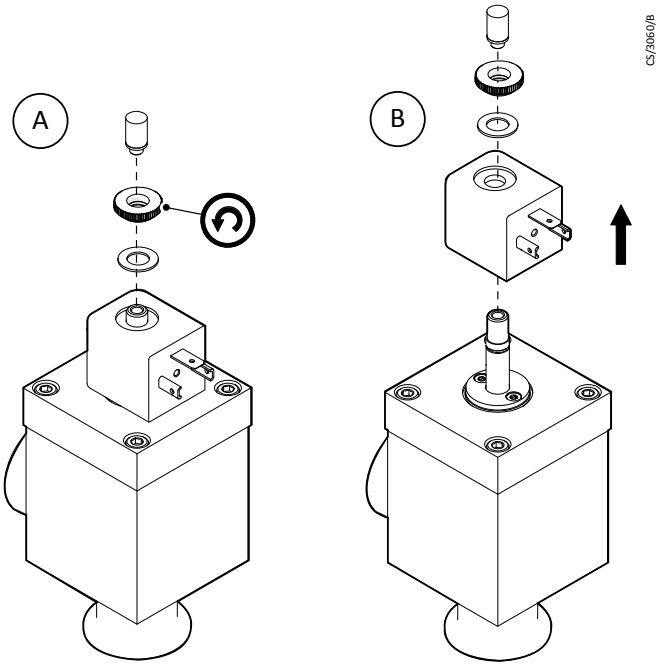
A. Remove the knurled nut and washer.

B. Pull the coil up off the armature assembly.

Replace the coil and follow the steps in reverse order to reassemble the VIV.

Refer to *Table: Spares and maintenance kits* on page 33 for details of spares.

Figure 18 Replace the coil



5.4 Replace the armature assembly

Before you replace the armature, the coil must be removed. Refer to *Replace the coil* on page 21 for details on the removal of the coil.

Referring to *Figure: Replace the armature assembly* on page 23,

A. Remove the two screws that holds the mounting plate.

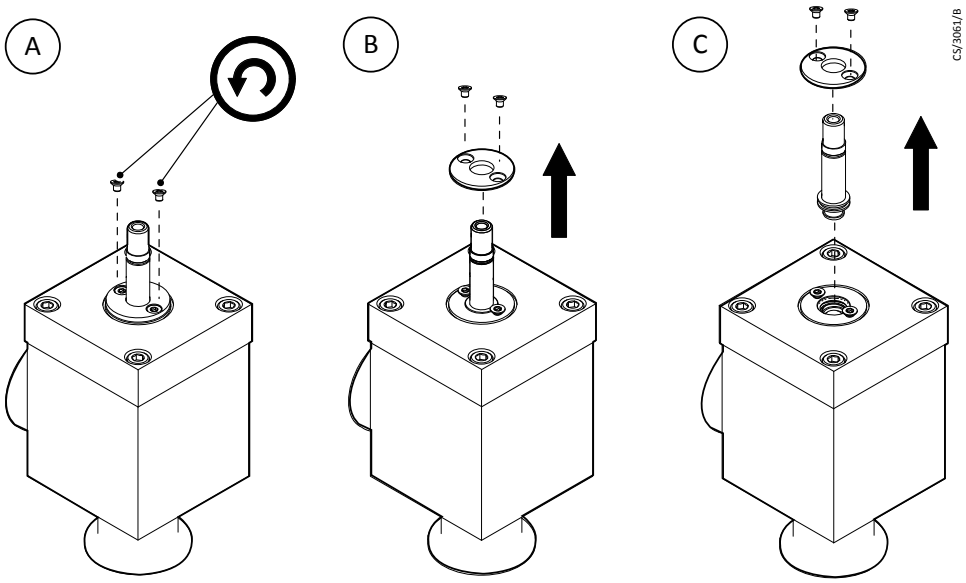
B. Remove the mounting plate from the valve.

C. Pull the armature assembly from the bonnet of the valve.

Replace the armature assembly and follow the steps in reverse order to reassemble the VIV.

Refer to *Table: Spares and maintenance kits* on page 33 for details of spares.

Figure 19 Replace the armature assembly



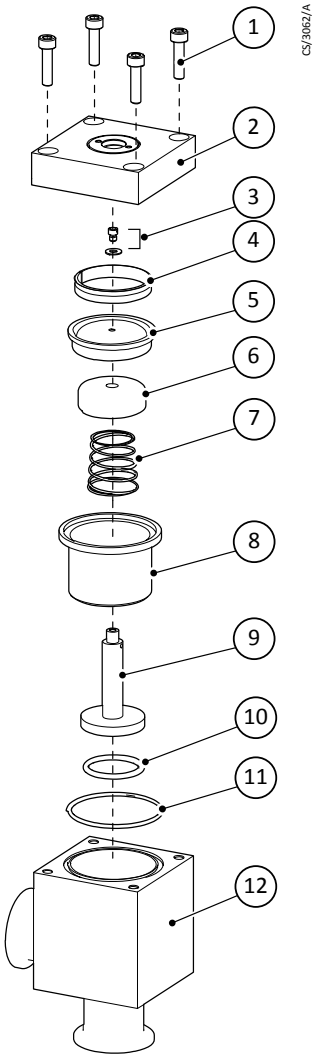
5.5 Disassemble the valve

Before the valve is disassembled, isolate the valve, and remove the coil and armature assembly. Refer to *Isolate the valve* on page 20, *Replace the coil* on page 21 and *Replace the armature assembly* on page 22.

Refer to *Figure: Disassemble the VIV25EKA* on page 24, *Figure: Disassemble the VIV40EKA and VIV50EKA* on page 25 as applicable.

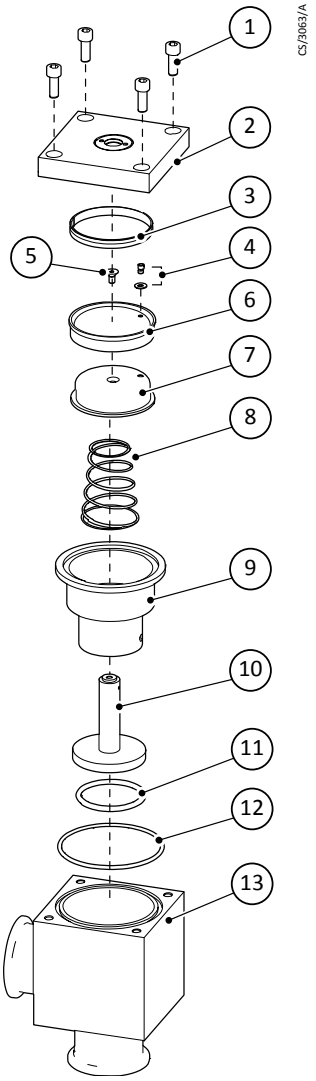
- Remove the four bonnet screws and lift the bonnet away from the valve body.
- Hold the bearing housing and lift gently to separate the valve body from the internal components.

Figure 20 Disassemble the VIV25EKA



1. Bonnet screw (4 off)
2. Bonnet
3. Orifice and washer
4. Retaining ring
5. Diaphragm
6. Piston
7. Spring
8. Bearing housing
9. Pad
10. Pad O-ring
11. Valve body O-ring
12. Valve body

Figure 21 Disassemble the VIV40EKA and VIV50EKA



1. Bonnet screw (4 off)
2. Bonnet
3. Retaining ring
4. Orifice and washer
5. Piston screw
6. Diaphragm
7. Piston
8. Spring
9. Bearing housing
10. Pad
11. Pad o-ring
12. Valve body O-ring
13. Valve body

5.6 Replace the seals

With the internal mechanism removed, the valve body O-ring and pad O-ring can be removed and replaced. Make sure that the O-rings or the O-ring grooves are not damaged.

To remove the diaphragm:

1. Remove the piston screw if fitted. Remove the orifice and washer with a 0.6 mm x 4.0 mm flat bladed screwdriver.
2. Apply a gentle force on the pad in the direction of the bearing housing to push out the retaining ring, diaphragm and piston out of the bearing housing.
3. Release the diaphragm from the piston and retaining ring.

5.7 Clean the valve

1. Clean the metallic components (apart from the armature assembly which is a replaceable part) in a suitable detergent in an ultrasonic bath.
2. Wash the parts again in de-mineralized water in an ultrasonic bath.
3. Dry the parts with hot air.
4. Clean the seals which are not damaged with a lint free cloth soaked in alcohol.

5.8 Assemble the valve

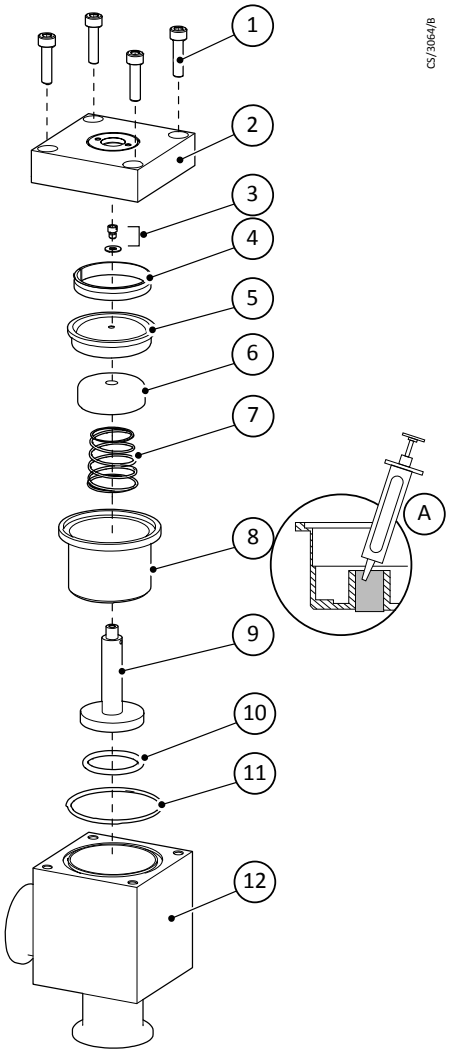
Refer to *Figure: Assemble the VIV25EKA* on page 27, *Figure: Assemble the VIV40EKA and VIV50EKA* on page 28 as applicable.

Note:

Make sure that the O-rings are level within the grooves and not twisted when the valve is assembled.

1. Apply a thin film of VIV grease to the body O-ring and pad O-ring before you replace them in the appropriate O-ring grooves.
2. Apply a thin film of VIV grease to the inner surface of the bearing housing as shown in the figure.
3. Assemble the components as shown in the figure.
4. Do the steps in reverse order to assemble the armature assembly, the coil and the filter. Refer to *Replace the armature assembly* on page 22, *Replace the coil* on page 21, and *Replace the filter* on page 21.

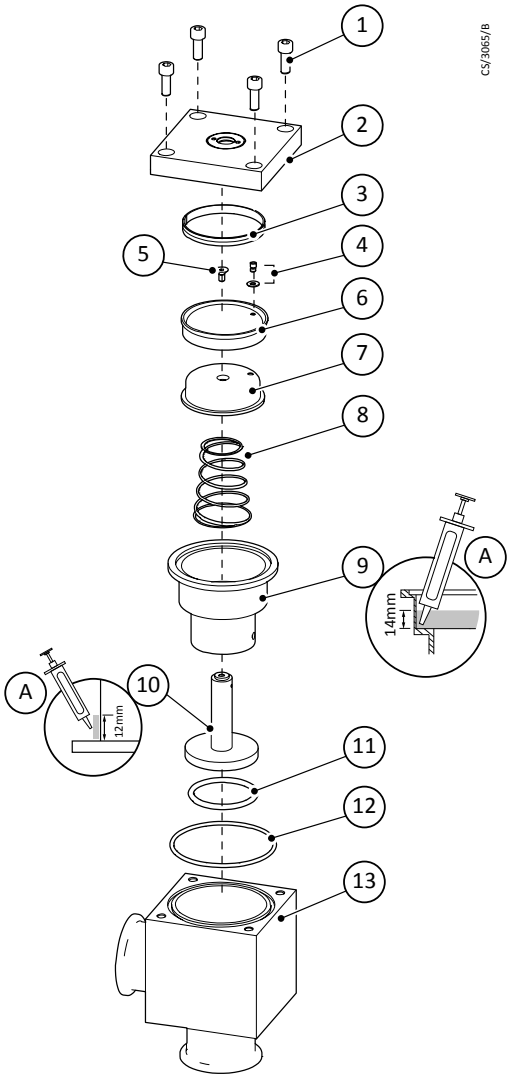
Figure 22 Assemble the VIV25EKA



A. <0.5mm thick

1. Bonnet screw (4 off)
2. Bonnet
3. Orifice and washer
4. Retaining ring
5. Diaphragm
6. Piston
7. Spring
8. Bearing housing
9. Pad
10. Pad O-ring
11. Valve body O-ring
12. Valve body

Figure 23 Assemble the VIV40EKA and VIV50EKA



A. <0.5mm thick

1. Bonnet screw (4 off)
2. Bonnet
3. Retaining ring
4. Orifice and washer
5. Piston screw
6. Diaphragm
7. Piston
8. Spring
9. Bearing housing
10. Pad
11. Pad O-ring
12. Valve body O-ring
13. Valve body

6. Fault finding

Fault	The valve fails to operate
Cause	**The flow direction is incorrect.**
Remedy	Make sure that the valve orientation is correct. The flow direction through the valve should be as indicated by the arrow on the valve body.
Cause	**There is an issue with the electrical supply.**
Remedy	Check that the electrical supply is appropriate for the coil rating. Check that the electrical supply is correct. Repair/replace if necessary.
Cause	**The coil is damaged.**
Remedy	Check that the coil is not an open circuit. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement coils and *Replace the coil* on page 21.
Cause	**The armature is damaged.**
Remedy	It is possible to faintly hear the solenoid valve actuating as power is supplied to the armature. If the electrical supply is correctly functioning and the coil is not open circuit, consider replacing the armature tube. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement armatures and *Replace the armature assembly* on page 22.

Fault	The valve leaks
Cause	**The valve orientation is not correct.**
Remedy	Make sure that the valve orientation is correct. The flow direction through the valve should be as indicated by the arrow on the valve body.
Cause	**There is an issue with the electrical supply.**
Remedy	Check that the electrical supply is appropriate for the coil rating. Check the electrical supply is correct. Repair/replace if necessary.
Cause	**The coil is damaged.**
Remedy	Check the coil is not open circuit. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement coils and *Replace the coil* on page 21.
Cause	**The armature is damaged.**
Remedy	It is possible to faintly hear the solenoid valve actuating as power is supplied to the armature. If the electrical supply is correctly functioning and the coil is not open circuit, consider replacing the armature tube. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement armatures and *Replace the armature assembly* on page 22.
Cause	**The seals are dirty or damaged.**
Remedy	Disassemble the valve as shown in *Disassemble the valve* on page 23. Clean the valve and replace the seals if necessary. Refer to *Table: Spares and maintenance kits* on page 33 for details of seal kits.

Fault	The valve opens too slowly
Cause	**The nozzle is clogged.**

Remedy	Disassemble the valve as shown in *Disassemble the valve* on page 23 and clean the orifice.

Fault	**The valve closes too slowly**
Cause	**The filter is clogged.**
Remedy	Replace the filter. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement filters and *Replace the filter* on page 21.
Cause	**The armature tube assembly is clogged.**
Remedy	Disassemble and clean the valve. Replace the armature assembly if necessary. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement armatures and *Replace the armature assembly* on page 22.

Fault	**The valve is noisy**
Cause	**The armature assembly is dirty.**
Remedy	Disassemble and clean the valve. Replace the armature assembly if necessary. Refer to *Table: Spares and maintenance kits* on page 33 for details of replacement armatures and *Replace the armature assembly* on page 22.

7. Storage

To store the Vacuum Isolation Valve:

- Make sure that the protective flange covers are attached to the flanges and keep the valve in its original packaging.
- Store the valve in cool dry conditions until required to use.
- When required, prepare and install the valve as described in *Installation* on page 9.

Refer to *Table: Operating and storage conditions* on page 37 for details of suitable storage conditions.

8. Disposal

Dispose of the Vacuum Isolation Valve and any components or accessories safely and in accordance with all local and national safety and environmental requirements.

Take particular care with:

- Components that may have been contaminated with dangerous process substances.
- Fluoroelastomer seals which can decompose to very dangerous substances when heated to high temperatures. Do not burn the VIV.

9. Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must send us a completed Declaration of Contamination of Vacuum Equipment and Components – Form HS2. The HS2 form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

We provide instructions for completing the form in the Declaration of Contamination of Vacuum equipment and Components – Procedure HS1.

If you are returning a vacuum pump, note the following:

- If a pump is configured to suit the application, make a record of the configuration before returning the pump. All replacement pumps will be supplied with default factory settings.
- Do not return a pump with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from *www.edwardsvacuum.com/HSForms/*, follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to us.

NOTICE:

If we do not receive a completed HS2 form, your equipment cannot be serviced.

10. Spares

CAUTION: REDUCED RELIABILITY

Use of spares, not supplied by us, may result in reduced reliability and performance and will invalidate product warranty.

WARNING: O-RING SAFETY

Risk of damage to equipment. Use only our branded spares to service the valve. The O-ring may not be used in other applications.

Table 4 Spares and maintenance kits

Spare	Item number
VIV25EKA seal kit*	A50637760
VIV40EKA seal kit*	A50637761
VIV50EKA seal kit*	A50637762
VIV coil 24 V d.c. 2.5 W	A50637770
VIV coil 110 V a. c. 4.5 W	A50637771
VIV coil 230 V a.c. 3.1 W	A50637772
Filter spare, pack of 5	A50637780
Armature spare	A50637781

** Seal kits contain the applicable body O-ring, pad O-ring, diaphragm and VIV grease necessary to service the valve.*

11. Accessories

We offer a range of accessories to connect the VIV to our specified pumps without additional wiring.

Table 5 Accessories

Accessory	Item number
VIV power cable M8 - valve	A50637392
VIV Link C14	A50637580
VIV Link C20	A50637590

11.1 VIV power cable M8 – valve

The VIV power cable is designed to interface between any of our pump fitted with the M8 valve connector and a 24 V d.c. VIV. This includes pumps such as nRVi rotary vane pumps and nXLi dry pumps.

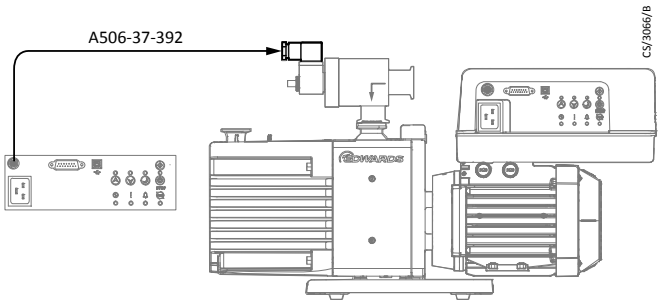
The VIV power cable protects the pump from:

- Power failure
- Drive failure
- Pump error
- Manual or remote start/stop command

Table 6 Power cable M8- valve accessories

Accessory	Compatible VIV	Item number
VIV power cable M8 - valve		A50637392
	VIV25EKA 24 V d.c.	A50637500
	VIV40EKA 24 V d.c	A50637510
	VIV50EKA 24 V d.c	A50637520

Figure 24 VIV power cable M8 - valve



11.2 VIV Link C14/C20

The VIV Link C14 is designed to interface between any of our pumps fitted with an IEC 60320 C14 appliance inlet and 15-way D-Type logic interface connector. This includes pumps such as the nXDS scroll pump.

The VIV Link C20 is designed to interface between any of our pumps fitted with an IEC 60320 C20 appliance inlet and 15-way D-Type logic interface connector. This includes pumps such as the XDS35i scroll pump.

The VIV Link protects the pump from:

- Power failure
- Drive failure
- Pump error
- Manual or remote start/stop command

An example of the VIV Link C14 being used with an nXDS scroll pump is shown in *Figure: VIV Link C14* on page 35.

It is also possible to use a VIV Link with any pump fitted with an IEC 60320 C14 or IEC 60320 C20 appliance inlet if the logic interface plug is installed. The VIV Link with logic interface plug fitted protects the pump from power failure. An example of the VIV Link C14 being used with an XDS scroll pump is shown in *Figure: VIV Link C14 with logic interface plug fitted* on page 36.

Table 7 VIV Link C14 compatibility

Accessory	Compatible VIV	Item number
VIV Link C14	-	A50637580
	VIV25EKA 24 V d.c.	A50637500
	VIV40EKA 24 V d.c.	A50637510
	VIV50EKA 24 V d.c.	A50637520

Table 8 VIV Link C20 compatibility

Accessory	Compatible VIV	Item number
VIV Link C20	-	A50637590
	VIV25EKA 24 V d.c.	A50637500
	VIV40EKA 24 V d.c.	A50637510
	VIV50EKA 24 V d.c.	A50637520

Figure 25 VIV Link C14

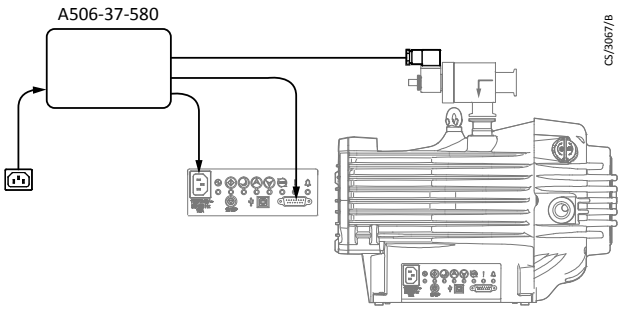
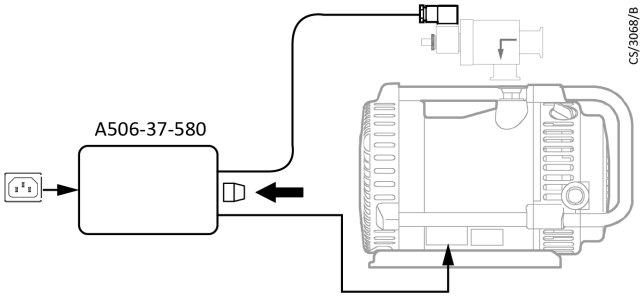


Figure 26 VIV Link C14 with logic interface plug fitted



12. Technical reference

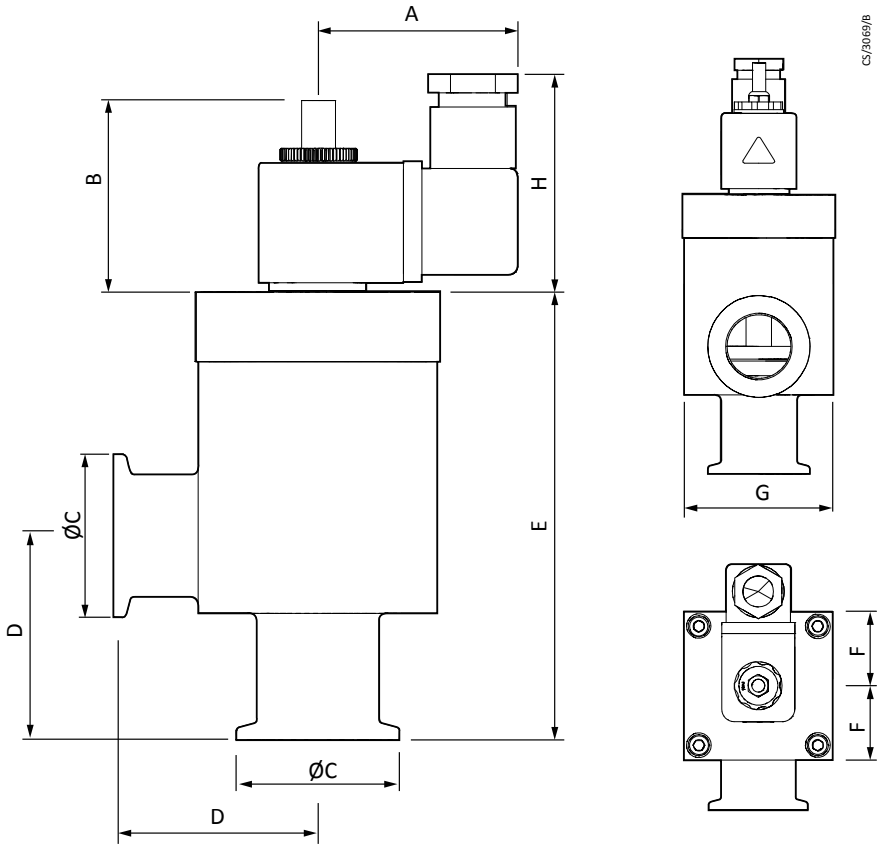
12.1 Operating and storage conditions

Table 9 Operating and storage conditions

Parameter	Value	Unit
Intended use	Indoor use only	-
Pressure range of operation	1E-8 to 1000	mbar(a)
Ambient operating temperature range	+5 to +50	°C
Maximum operating humidity	Maximum 80% relative humidity for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C.	-
Ambient storage temperature range	+10 to +50	°C
Ambient storage humidity range	10% to 70% relative humidity (non-condensing)	-
Maximum operating altitude	2000	m
Pollution degree (EN61010)	2	-
Mounting orientation	Any	-
Pressure differential across flanges: VIV closing	200	mbar
Pressure differential across flanges: VIV opening	200	mbar
Maximum bakeout temperature: VIV housing	<60	°C
Maximum bakeout temperature: pilot valve	<50	°C

12.2 Mechanical data

Figure 27 Dimensions



VIV flange variant	A mm (inches)	B mm (inches)	C mm (inches)	D mm (inches)	E mm (inches)	F mm (inches)	G mm (inches)	H mm (inches)	Weight (kg)
NW25	57 (2.24)	48 (1.88)	40 (1.57)	50 (1.97)	110 (4.31)	30 (1.18)	60 (2.36)	55 (2.15)	0.5
NW40	57 (2.24)	48 (1.88)	55 (2.17)	65 (2.56)	126 (4.96)	40 (1.56)	79 (3.11)	55 (2.15)	0.9
NW50	57 (2.24)	48 (1.88)	75 (2.95)	70 (2.76)	136 (5.36)	45 (1.75)	89 (3.50)	55 (2.15)	1.5

12.3 Performance data

Table 10 Performance data

Parameter	VIV flange variant			Unit
	NW25	NW40	NW50	
Time to open*	<15			s
Time to close	<0.1			s
Response time	<0.05			s
Molecular conductance	11	30.5	126	l/s
Leak tightness – housing	<1E-9			mbar.l/s
Leak tightness – valve pad	<1E-5			mbar.l/s

Parameter	VIV flange variant			Unit
	NW25	NW40	NW50	
Leak tightness – pilot valve	<1E-7			mbar.l/s
Pilot valve temperature (20 °C ambient)	<55			°C
Pilot valve temperature (50 °C ambient)	<85			°C

**Time to open is related to when the pressure differential across the flanges is <200 mbar. It depends on the pumping speed and size of the vacuum system.*

12.4 Manufacturing materials

Table 11 Materials in contact with pumped gas

Material	Usage
Aluminium	Valve housing
Aluminium	Flange
Fluoroelastomer	Seals
Stainless steel (430F)	Armature assembly
Brass	Armature assembly
Copper (shading ring)	Armature assembly

12.5 Electrical data

Table 12 Electrical supply data

Parameter	VIV Electrical supply rating		
	24 V d.c.	100 - 115 V 50/60 Hz	208 - 230 V 50/60 Hz
Rated voltage	24 V d.c.	100 – 115 V a.c.	208 – 230 V a.c.
Rated frequency	-	50/60 Hz	50/60 Hz
Power	2.5 W	4.5 W	3.1 W
Duty cycle	continuous		
Installation category	II		

Table 13 Pilot valve electrical connector

Parameter	Value	Unit
Connector style	EN 175301-803 style A	-
Gasket	Yes	-
Degree of protection provided by enclosure	IP 65 to EN 60529	-
Cable gland cable diameter	6 - 9	mm
Electrical conductor cross sectional area	0.5 – 1.5	mm^2

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