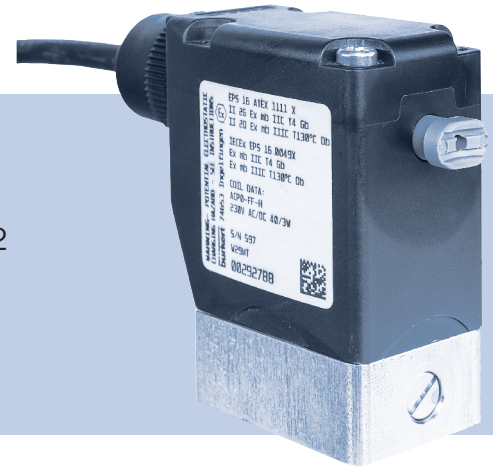


Solenoid coil Type ACP016 Bobine magnétique Type ACP016

Device with Hazardous Locations Zone 1/21
and Class I, II, III Div 2 Listing
Appareil approuvé pour les emplacements
dangereux de zone 1/21 et de classe I, II, III, division 2



Operating Instructions

Manuel d'utilisation

We reserve the right to make technical changes without notice.
Sous réserve de modifications techniques.

© Bürkert Werke GmbH & Co. KG, 2019-2020

Operating Instructions 2012/01_EU-ML_00815314 / Original EN

1	OPERATING INSTRUCTION	4	7	TECHNICAL DATA	12
1.1	Definitions of terms	4	7.1	Identification of the solenoid coil with cable outlet ...	12
1.2	Symbols.....	4	7.2	Identification of the solenoid coil with terminal box ..	13
2	INTENDED USE	5	7.3	Types of protection.....	14
2.1	Explosion protection approval.....	5	7.4	Electrical data.....	15
2.2	Applied standards	6	8	ACCESSORIES	16
3	BASIC SAFETY INSTRUCTIONS	7	8.1	Cable gland for terminal box	16
4	GENERAL INFORMATION	8	8.2	External grounding connection for terminal box	16
4.1	Contact address.....	8	9	INSTALLATION AND REMOVAL	16
4.2	Warranty	8	9.1	Installation	17
4.3	Information on the Internet.....	8	9.2	Electrical connection	17
5	PRODUCT DESCRIPTION	9	9.3	Removal	19
5.1	Structure.....	9	10	START-UP	19
5.2	Solenoid coil with cable outlet	10	11	MAINTENANCE, REPAIR, TROUBLESHOOTING	20
5.3	Solenoid coil with terminal box	10	11.1	Troubleshooting.....	20
6	SPECIFIC CONDITIONS OF USE	10	12	TRANSPORT, STORAGE, DISPOSAL	20
6.1	Avoiding build-up of electrostatic charge.....	10			
6.2	Block assembly	10			
6.3	Operating conditions	11			
6.4	Operating temperature range	11			
6.5	Mechanical danger	11			
6.6	Supply connection for solenoid coil with terminal box.....	11			

1 OPERATING INSTRUCTION

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the device.

Operating instruction contain important information.

- ▶ Read the operating instructions carefully and follow the safety instructions in particular.
- ▶ Operating instructions must be available to each user.
- ▶ The liability and warranty for the device are void if the operating instructions are not followed.

1.1 Definitions of terms

The term “device” used in these instructions applies to the solenoid coil Type ACP016.

1.2 Symbols



DANGER

Warns of an immediate danger.

- ▶ Failure to observe the warning may result in a fatal or serious injury.



WARNING

Warns of a potentially dangerous situation.

- ▶ Failure to observe the warning may result in serious injuries or death.



CAUTION

Warns of a possible danger.

- ▶ Failure to observe this warning may result in a moderate or minor injury.

NOTE

Warns of damage to property.



Important tips and recommendations.



Refers to information in these operating instructions or in other documentation.

- ▶ designates an instruction to prevent risks.

→ designates a procedure which you must carry out.

2 INTENDED USE

Non-authorized use of the solenoid coil Type ACP016 may be a hazard to people, nearby equipment and the environment.

The solenoid coil Type ACP016 is used to actuate valves which control gaseous or liquid media.

- ▶ Use according to the authorized data, operating conditions, and conditions of use specified in the contract documents and operating instructions.
- ▶ Use solenoid coil ACP016 only as specified on type label.
- ▶ Use the solenoid coil only for the application cases designated in chapter „6 Specific conditions of use“ and in conjunction with third-party devices and third-party components recommended or approved by Bürkert.
- ▶ The type of protection is encapsulation Ex “m” for coils with cable connection.
- ▶ The type of protection for the optionally mounted terminal box is “e” for gas and “t” for dust.
- ▶ Correct transportation, correct storage as well as correct assembly, installation, start-up, operation and maintenance are essential for reliable and problem-free operation.
- ▶ Use the device only for its intended purpose.

2.1 Explosion protection approval

The explosion protection approval is only valid if you use the modules and components authorized by Bürkert, as described in these operating instructions.

The solenoid coil Type ACP016 may be used only in combination with the valve types released by Bürkert, otherwise the explosion protection approval will be terminated. If you make unauthorized changes to the system, the modules or components, the explosion protection approval will also be void.

The following UL Listing for Solenoid coil ACP016

were issued by the: UL LLC
333 Pfingsten Road
Northbrook
IL 60062-2096 USA

2.2 Applied standards

USL - U.S. Listed investigation to UL 429

and

UL 60079-0	EXPLOSIVE ATMOSPHERES - PART 0: EQUIPMENT - GENERAL REQUIREMENTS	Edition 6 - Revision Date 2017/10/20
UL 60079-7	STANDARD FOR EXPLOSIVE ATMOSPHERES - PART 7: EQUIPMENT PROTECTION BY INCREASED SAFETY "E"	Edition 5 - Revision Date 2017/04/21
UL 60079-18	STANDARD FOR EXPLOSIVE ATMOSPHERES - PART 18: EQUIPMENT PROTECTION BY ENCAPSULATION 'M'	Edition 4 - Revision Date 2018/05/25
UL 60079-31	EXPLOSIVE ATMOSPHERES - PART 31: EQUIPMENT DUST IGNITION PROTECTION BY ENCLOSURE "T"	Edition 2 - Issue Date 2015/06/12

Tab. 1: Applied standards USL

CNL - Canada Listed investigation to CSA C22.2 NO. 139

and

CSA C22.2 NO. 60079-0	EXPLOSIVE ATMOSPHERES -- PART 0: EQUIPMENT -- GENERAL REQUIREMENTS	Edition 3 - Issue Date 2015/10/01
CSA C22.2 NO. 60079-7:16	EXPLOSIVE ATMOSPHERES - PART 7: EQUIPMENT PRO- TECTION BY INCREASED SAFETY "E"	Edition 2 - Issue Date 2016/10/01
CSA C22.2 NO. 60079-18:16	EXPLOSIVE ATMOSPHERES - PART 18: EQUIPMENT PROTECTION BY ENCAPSU- LATION "M"	Edition 2 - Issue Date 2016/08/01
CSA C22.2 NO. 60079-31:15	EXPLOSIVE ATMOSPHERES - PART 31: EQUIPMENT DUST IGNITION PROTECTION BY ENCLOSURE 'T'	Edition 2 - Issue Date 2015/10/01

Tab. 2: Applied standards CNL

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not consider any contingencies or incidents which occur during installation, operation and maintenance.

The operator is responsible for observing the location-specific safety regulations, also with reference to the personnel.



Risk of injury from high pressure.

- ▶ Before working on the system or device, switch off the pressure and vent or drain lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of burns and risk of fire if used during long-term operation through hot device surface.

The solenoid coil can get very hot during long-term operation.

- ▶ Keep the device away from highly flammable substances and media.
- ▶ Do not touch the device with bare hands.

Risk of explosion.

The solenoid coil form a closed system after installation. When used in explosion-risk areas, there is a risk of explosion if the system is opened in the operating state.

- ▶ Do not remove or open the system during operation.



Risk of explosion due to electrostatic discharge.

In the event of a sudden discharge from electrostatically charged devices or individuals, there is a risk of an explosion in the explosion-risk area.

- ▶ Take suitable measures to ensure that no electrostatic discharges can build up in the explosion-risk area.
- ▶ Do not use the device in areas where there are powerful chargegenerating processes, mechanical reaming and cutting processes, the spraying of electrons (e.g. in the vicinity of electrostatic coating equipment) as well as pneumatically conveyed dust.
- ▶ Clean the device surface by gently wiping it with a damp or antistatic cloth only.

To avoid the risk of explosion, the following must be observed for operation in potentially explosive atmosphere:

- ▶ Information on the temperature class, degree of protection and voltage on the type label for potentially explosive atmosphere.
- ▶ Repairs may only be performed by the manufacturer.
- ▶ The device must not be exposed to any mechanical and/or thermal loads which exceed the limits specified in the operating instructions.
- ▶ Before opening the terminal box, disconnect the power supply.
- ▶ The applicable safety regulations (including national regulations) as well as general technical standards must be observed during setup and operation.



General hazardous situations.

To prevent injury, ensure:

- ▶ Secure system/equipment against unintentional activation.
- ▶ Observe the direction of flow during installation.
- ▶ After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ Do not make any internal or external changes on the device and do not subject it to mechanical stress.
- ▶ Installation, operation and maintenance may only be performed by qualified specialists.
- ▶ The device must be installed in accordance with the regulations applicable in the country.
- ▶ Observe the general rules of technology.

4 GENERAL INFORMATION

4.1 Contact address

Germany

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10-91 111
Fax + 49 (0) 7940 - 10-91 448
Email: info@burkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

And also on the Internet at:

www.burkert.com

4.2 Warranty

The warranty is only valid if the device is used as intended in accordance with the specified application conditions.

4.3 Information on the Internet

Operating instructions and data sheets for Type ACP016 can be found on the Internet at: www.burkert.com

5 PRODUCT DESCRIPTION

5.1 Structure

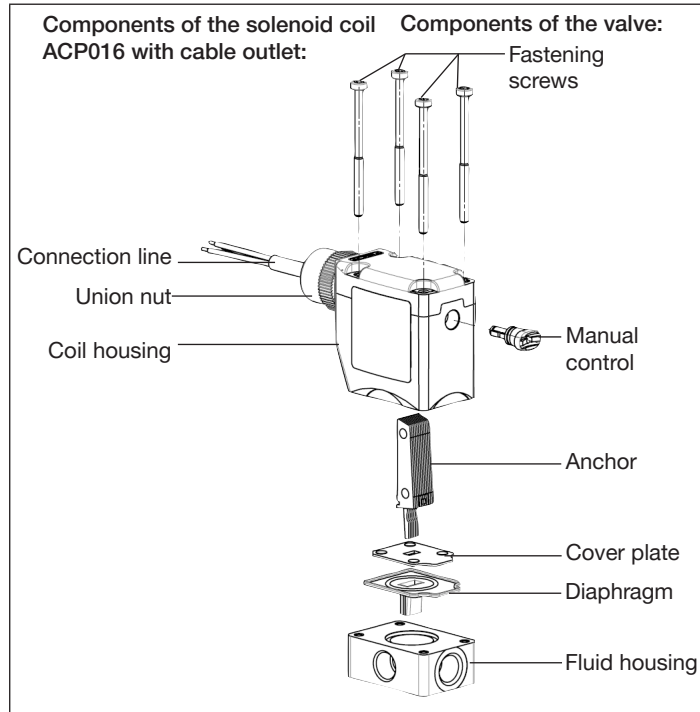


Fig. 1: Valve with solenoid coil Type ACP016 with cable outlet

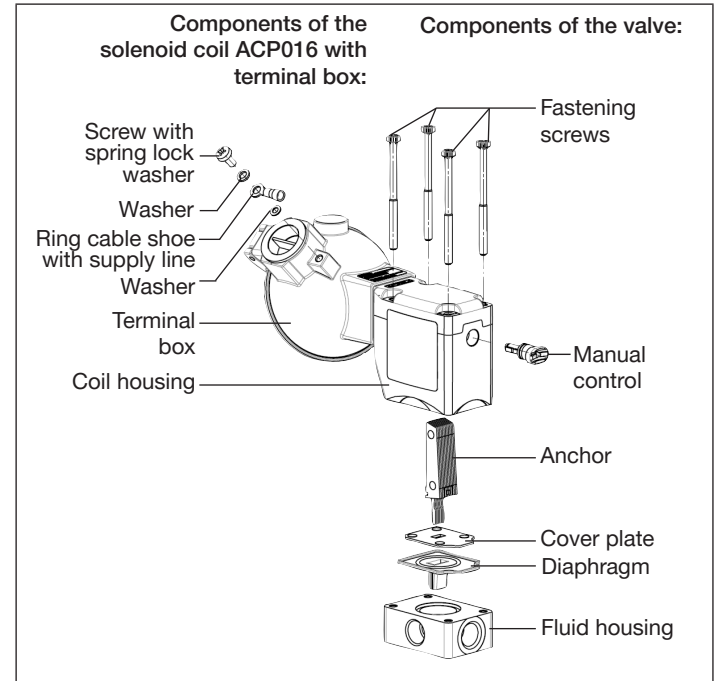


Fig. 2: Valve with solenoid coil Type ACP016 with terminal box

5.2 Solenoid coil with cable outlet

The solenoid coil ACP016 is an electromagnetic actuator for various Bürkert valves. The valve function is based on the connection of the solenoid coil with a fluid housing. Solenoid coil and fluid housing are connected with fastening screws; this is why the solenoid coil ACP016 is included in the solenoid coils which are screwed together as a block.

The fastening screws ensure electrical contact between the fluid housing and solenoid coil.

The solenoid coil housing is composed of epoxy resin.

The power supply is connected via a cable. The cable is permanently integrated in the solenoid coil, the union nut is not intended to be removed. All metallic components are grounded via the protective conductor in the cable.

Actuation is possible with alternating voltage or direct voltage. 120 V and 240 V only for alternating voltage (see „[Tab. 7](#)“). Do not pay attention to polarity on account of the integrated bridge rectifier.

The solenoid coil also includes electronic power switching for reducing the power consumption during operation.

5.3 Solenoid coil with terminal box

The structure of the solenoid coil is identical to the description under „[5.2 Solenoid coil with cable outlet](#)“, however a terminal box is also installed here (see „[Fig. 2](#)“).

A connection kit for additional potential equalization is enclosed with the terminal box, observe the information in chapter „[8.2](#)“.

6 SPECIFIC CONDITIONS OF USE

6.1 Avoiding build-up of electrostatic charge



DANGER

Risk of explosion due to electrostatic discharge.

In the event of a sudden discharge from electrostatically charged devices or individuals, there is a risk of an explosion in the potentially explosive atmosphere.

- ▶ Take suitable measures to ensure that no electrostatic discharges can build up in the potentially explosive atmosphere.
- ▶ Do not use the device in areas where there are powerful charge generating processes, mechanical reaming and cutting processes, the spraying of electrons (e.g. in the vicinity of electrostatic coating equipment) as well as pneumatically conveyed dust.
- ▶ Clean the device surface by gently wiping it with a damp or antistatic cloth only.
- ▶ Fluid housings made of brass must not be used in atmospheres containing acetylene.

6.2 Block assembly

The solenoid coil with cable outlet can be a block assembly. The grid dimension must be at least 37 mm. Preferably use blocks from the manufacturer.

The solenoid coil with terminal box cannot be a block assembly.

6.3 Operating conditions



WARNING

Warns of a potentially dangerous situation.

- ▶ Failure to observe the warning may result in serious injuries or death.

The fluid housing performs a cooling function for the solenoid coil.

Operate the solenoid coil with fluid housing only. The fluid housing must comply with the following requirements:

Material	Dimensions (L x W x H)
Brass, SS	32 mm x 46 mm x 18 mm
PP, PVDF, PEEK	32 mm x 46 mm x 19 mm
PVC	35 mm x 65 mm x 38 mm
PTFE	35 mm x 76 mm x 38 mm

Tab. 3: Fluid housing

Fluid housings made of the same material with larger dimensions or with the same dimensions made of a material with better thermal conductivity can be used at any time.

6.4 Operating temperature range

For each valve type observe the operating temperature range specified in the electrical data.

6.5 Mechanical danger

The solenoid coil with terminal box shall be operated only in areas which have a low risk of mechanical danger. They are evaluated by the operator. The solenoid coil with cable outlet may also be used in areas with a high risk of mechanical danger.

6.6 Supply connection for solenoid coil with terminal box

For connections, use wires suitable for at least 90 °C (194 °F).

7 TECHNICAL DATA



DANGER

Risk of explosion.

If the safety data and values specified on the type label are not observed or maintained, hazardous situations may be the consequence.

- ▶ Observe the degree of protection and temperature class when using the device.

It is a safety risk to exceed the voltage indicated on the type label, as this may cause the device to overheat.

- ▶ Do not connect the device to a voltage which is higher than the one stated on the type label.

It is a safety risk to exceed the max. permitted switching frequency, as this may cause the device to overheat.

- ▶ Do not operate the device at a higher than the maximum permitted switching frequency.

7.1 Identification of the solenoid coil with cable outlet

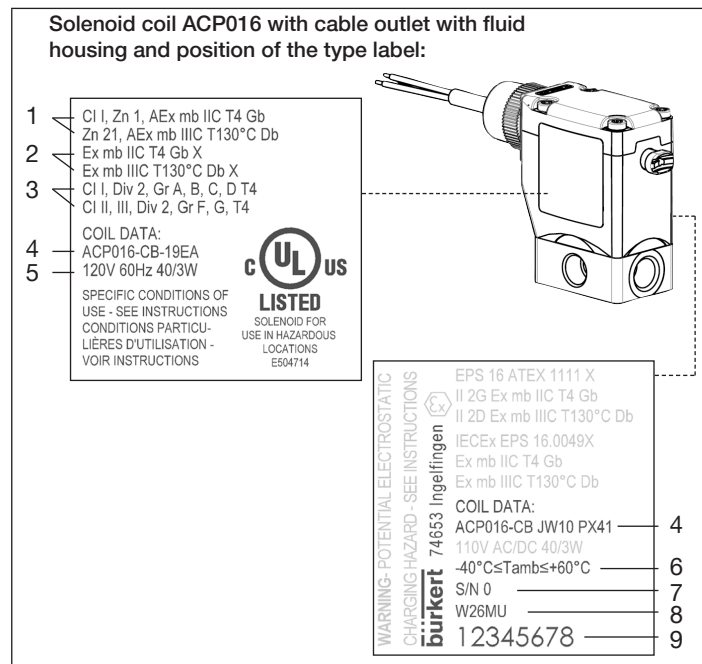


Fig. 3: Location and description of the Ex type label

Key:

Position	Description
1	Zone identification US
2	Zone identification CA
3	Division identification
4	Type identification
5	Nominal voltage, frequency and power
6	Ambient temperature
7	Serial number
8	Manufacturing location, date
9	ID number

Tab. 4: Identification of the solenoid coil with cable outlet

7.2 Identification of the solenoid coil with terminal box

NOTE

Attachment of the terminal box changes the type of protection.

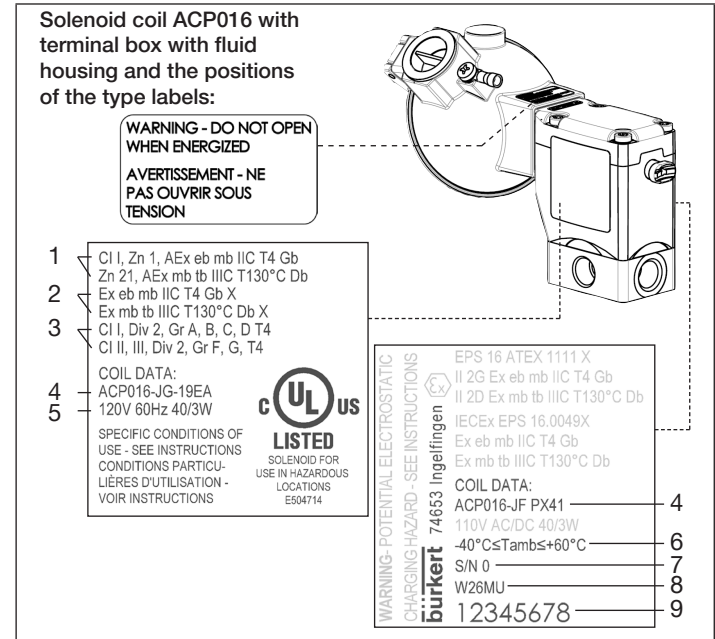


Fig. 4: Location and description of the Ex type labels

Key:

Position	Description
1	Zone identification US
2	Zone identification CA
3	Division identification
4	Type identification
5	Nominal voltage, frequency and power
6	Ambient temperature
7	Serial number
8	Manufacturing location, date
9	ID number

Tab. 5: Identification of the solenoid coil with terminal box

7.3 Types of protection

The Ex identification complies with the types of protection of the particular components used.

Model	Internal code	Ex marking	
Cable outlet	CB + JWxx ¹⁾	CI I, Zn 1, AEx mb IIC T4 Gb Zn 21, AEx mb IIIC T130°C Db	US zone marking
		Ex mb IIC T4 Gb X Ex mb IIIC T130°C Db X	CA zone marking
		CI I, Div 2, Gr A,B,C,D T4 CI II,III, Div 2, Gr F, G T4	US & CA division marking
Terminal box	Jx ²⁾	CI I, Zn 1, AEx eb mb IIC T4 Gb Zn 21, AEx mb tb IIIC T130°C Db	US zone marking
		Ex eb mb IIC T4 Gb X Ex mb tb IIIC T130°C Db X	CA zone marking
		CI I, Div 2, Gr A,B,C,D T4 CI II,III, Div 2, Gr F,G T4	US & CA division marking

Tab. 6: Ex identification

1) Different cable lengths

2) Terminal box, comp. „Tab. 9“

7.4 Electrical data

Nominal voltage / Frequency	24 V / DC, 60 Hz 120 V / 60 Hz 240 V / 60 Hz
Voltage tolerance	±10%
Nominal power	40 W
Reduced nominal power	3 W
Rated current	0.18...1.6 A
Reduced rated current	0.014...0.11 A
Ambient temperature range	-40...+60 °C (-40...+140 °F)
Operating mode	Long-term operation Intermittent operation

Tab. 7: Electrical data



Observe the maximum permitted ambient temperature range indicated for each valve type under operating conditions of the valve.

Maximum switching frequency	30 1/min
Minimum currentless interval	0.5 s

Tab. 8: Permitted parameters for intermittent operation



DANGER

Risk of explosion due to overheating.

- ▶ Do not connect the device to a voltage which is higher than the one stated on the type label.
- ▶ Do not operate the device at a higher than the maximum permitted switching frequency.

7.4.1 Electrical connection

Material ³⁾ :	Polyolefin
Temperature operating range ³⁾ :	-55...+145 °C (-67...+293 °F) for fixed installation
Minimum bending radius ³⁾ :	4 x external diameter for fixed installation
External diameter ³⁾ :	6.2 mm
Structure and function:	3 x stranded copper wire 0.5 mm ² / LNPE
Halogen-free according to:	IEC 60754-1

Variants	Code	Enclosure type
Permanently installed cable	CB + JWxx ⁴⁾	This equipment must be mounted in an UL/cUL AEx eb/Ex eb resp. AEx tb/Ex tb enclosure certified for use in Class I, Zone 1 resp. Zone 21.
Terminal box with internal thread M20 x 1.5	JF	Type 1
Terminal box with internal thread NPT1/2	JG	Type 1

Tab. 9: Electrical connection

3) Information according to the manufacturer

4) Different cable lengths

8 ACCESSORIES

8.1 Cable gland for terminal box



Device must be installed in accordance with Article 505 and 506 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada. Note that the operating temperature of the cable gland must be at least 15 K above the maximum ambient temperature.

8.2 External grounding connection for terminal box

If solenoid coils feature a terminal box, connection terminals are enclosed for the external grounding connection.

If the potential equalization is not to be connected by a pipeline or by the use of a plastic fitting, the connection can be made via the external grounding connection. Its use is therefore optional and must be assessed by the operator.

The connection capacity of the ring cable lug is 4...6 mm² and the tightening torque is 1.2 Nm. The connection is made as shown in „Fig. 6“.

9 INSTALLATION AND REMOVAL



DANGER

Risk of injury from high pressure.

- ▶ Before working on the system or device, switch off the pressure and vent or drain lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of burns and risk of fire if used during long-term operation through hot device surface.

- ▶ Keep the device away from highly flammable substances and media.
- ▶ Do not touch the device with bare hands.

Risk of short circuit due to damaged connection cable.

- ▶ The coil connection cable have to be fixed and protected against damage.

Risk of explosion.

The solenoid coil form a closed system after installation. When used in potentially explosive atmosphere, there is a risk of explosion if the system is opened in the operating state.

- ▶ The system must not be disassembled during operation.

**DANGER****Risk of explosion due to electrostatic discharge.**

In the event of a sudden discharge from electrostatically charged devices or individuals, there is a risk of an explosion in the potentially explosive atmosphere.

- ▶ Take suitable measures to ensure that no electrostatic discharges can build up in the potentially explosive atmosphere.
- ▶ Do not use the device in areas where there are powerful charge generating processes, mechanical reaming and cutting processes, the spraying of electrons (e.g. in the vicinity of electrostatic coating equipment) as well as pneumatically conveyed dust.
- ▶ Clean the device surface by gently wiping it with a damp or antistatic cloth only.

**WARNING****Risk of injury from improper installation.**

- ▶ Installation may be carried out by authorized technicians only and with the appropriate tools.
- ▶ Secure system from unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

9.1 Installation

Device must be installed in accordance with Article 505 and 506 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.



Detailed installation instructions can be found in the operating instructions of the respective valve and/or online at: www.burkert.com

9.2 Electrical connection**DANGER****Risk of electric shock.**

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

There is a risk of electric shock if there is no electrical contact between the metal parts of the valve and the protective conductor of the coil.

- ▶ Always connect the protective conductor.
- ▶ Test for continuity between the protective conductor of the coil and the core guide tube of the valve.

If solenoid coils feature a terminal box, also observe the following:

- ▶ Insert permanently installed cables and lines only.
- ▶ Use a suitable cable and line entry (see chapter „8“). Observe specifications in the enclosed operating instructions.
- ▶ In the terminal box connect only wires which have a rated connection between 0.5 mm² and 2.5 mm².
- ▶ Tighten terminal screws to 0.25 Nm.
- ▶ Lock housing cover properly. Tighten lock screw to 2 Nm.
- ▶ Check continuity of the protective conductor connection.
- ▶ Before opening the housing cover, disconnect the power supply.
- ▶ Connect maximum two conductors to each terminal.

External grounding connection for terminal box:

- ▶ The connection terminals for the external earth connection, which are packed for delivery in a bag and bonded to the housing cover, must be removed during installation of the device.

9.2.1 Solenoid coils with cable outlet



The connection cable is encapsulated with the solenoid coil Type ACP016 and cannot be removed. Observe the indicated voltage according to the type label.

Wire color	Assignment
green / yellow	Protective conductor
black	Phase / positive pole (+)
black	Neutral conductor / negative pole (-)

Tab. 10: Wire assignment

9.2.2 Solenoid coils with terminal box

Position	Terminal assignment
	Protective conductor
	Neutral conductor / negative pole (-)
	Phase / positive pole (+)

Fig. 5: Terminal box

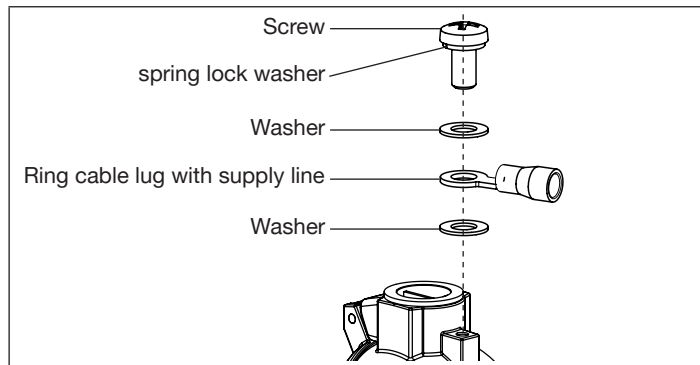


Fig. 6: Connection of external potential equalization

9.3 Removal



DANGER

Risk of injury from high pressure.

- ▶ Before loosening the lines and valves, turn off the pressure and vent the lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING

Risk of injury from improper removal.

- ▶ Removal may be carried out by authorized technicians only and with the appropriate tools.

Risk of injury due to media escaping from leaky connections.

- ▶ Seal the connection lines carefully.

- Separate the electrical connections.
- Separate the valve body from the pipeline.

NOTE

Malfunctions due to dirt.

- ▶ Remove the old PTFE tape from the connections during re-installs. Tape residue must not get into the pipeline.

10 START-UP



WARNING

Risk of injury from improper operation.

Improper operation may result in injuries as well as damage to the device and the area around it.

- ▶ Before start-up, ensure that the operating personnel are familiar with and completely understand the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may start up the equipment or the device.

Before start-up, ensure that

- the device has been installed according to the instructions,
- the connection has been made properly,
- the device is not damaged,
- all screws have been tightened.

11 MAINTENANCE, REPAIR, TROUBLESHOOTING



DANGER

Danger due to improper maintenance and repair work.

Improper maintenance and repair work may result in injuries as well as damage to the device and its environment.

- ▶ Only trained technicians may perform maintenance work.
- ▶ Perform maintenance work with suitable tools only.
- ▶ Have repair work on the device performed by the manufacturer only.
- ▶ When maintaining or repairing the system, do not open the valve and do not disconnect the protective conductor connection.

11.1 Troubleshooting

In the event of malfunctions, make sure that

- the device has been installed according to the instructions,
- the connection has been made properly,
- the device is not damaged,
- the voltage and pressure have been switched on,
- the pipelines are free,
- all screws have been tightened.

12 TRANSPORT, STORAGE, DISPOSAL

NOTE

Transport damage.

Inadequately protected devices may be damaged during transportation.

- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Prevent the temperature from exceeding or dropping below the permitted storage temperature.

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location.
- ▶ Storage temperature $-40...+80$ °C ($-40...+176$ °F).

Damage to the environment caused by device components contaminated with media.

- ▶ Dispose of the device and packaging in an environmentally friendly manner.
- ▶ Observe applicable disposal and environmental regulations.

www.burkert.com