bürkert
FLUID CONTROL SYSTEMS

Type 6440

2/2-way solenoid valve, servo-assisted

Operating Instructions

MAN 1000584756 ML Version: A Status: RL (released | freigegeben) printed: 30.01.2024

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Operating Instructions 2401/01_ENen_ 00815439 / Original DE

CONTENTS

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1 ABOUT THIS DOCUMENT

The document is an important part of the product and guides the user to safe installation and operation. The information and instructions in this document are binding for the use of the product.

- Before using the product for the first time, read and observe the whole safety chapter.
- Before starting any work on the product, read and observe the respective sections of the document.
- Keep the document available for reference and give it to the next user.
- Contact the Bürkert sales office for any questions.

Further information concerning the product at country.burkert.com.

1.1 Manufacturer

Bürkert Fluid Control Systems

Christian-Bürkert-Str. 13–17

D-74653 Ingelfingen

The contact addresses are available at country.burkert.com in the menu Contact.

1.2 Used symbols

DANGER!

Warns of a danger that leads to death or serious injuries.

WARNING!

Warns of a danger that can lead to death or serious injuries.

CAUTION!

Warns of a danger that can lead to minor injuries.

NOTICE!

Warns of property damage that can damage the product or the installation.

Indicates important additional information, tips and recommendations.

Refers to information in this document or in other documents.

➔ Indicates a step to be carried out.

✓ Indicates a result.

Menu Indicates a software user-interface text.

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1.3 Terms and abbreviations

The terms and abbreviations are used in this document to refer to following definitions.

Device	2/2-way solenoid valve; servo-assisted, type 6440
bar	Unit for relative pressure

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2 SAFETY INSTRUCTIONS

2.1 Intended use

The device is designed to control the flow rate of media. The permitted media are listed in Technical data [▶ 11].

Prerequisites for safe and trouble-free operation are correct proper transportation, storage, installation, start-up, operation and maintenance.

The instructions are part of the device. The device is intended exclusively for use within the scope of these instructions. Uses of the device that are not described in these instructions, the contractual documents or the type label can lead to severe personal injury or death, damage to the device or property and dangers for the surrounding area or the environment.

- ➔ Do not mechanically load the device.
- ➔ Only trained and qualified personnel may install, operate and maintain the device. See qualification of persons in Safety [▶ 6]
- ➔ Use the device only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- ➔ Use the device only when it is in perfect condition.

2.2 Safety

Qualification of personnel working with the device

Improper use of the device can lead to serious personal injury or death. To avoid accidents when working with the device, the following minimum requirements must be met:

- ➔ Carry out work on the device within the scope of these instructions in a safety-compliant manner.
- ➔ Detect and avoid dangers when working on the device.
- ➔ Understand the instructions and implement the information contained therein accordingly.

Responsibility of the operator

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

- ➔ Observe the general rules of technology.
- ➔ Install the device according to the regulations applicable in the respective country.
- ➔ The operator must make hazards arising from the location of the device avoidable by providing appropriate operating instructions.

Only use authorised devices in a potentially explosive atmosphere

There are variants for this device type that may be used in Ex areas. These variants are identified by a separate Ex type label. The scope of delivery for these variants includes additional instructions identified with the ATEX logo.

- ➔ Only use devices that are approved for this type of potentially explosive atmosphere.
- ➔ Note the information on the separate Ex type label for usage in an Ex area.
- ➔ Follow the additional instructions identified with the ATEX logo for usage in an Ex area.

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Changes and other modifications, spare parts and accessories

Changes to the device, incorrect installation or use of non-approved devices or components create hazards that can lead to accidents and injuries.

- ➔ Do not make any changes to the device.
- ➔ Do not mechanically load the device.
- ➔ Observe the operating instructions of the device or component used.
- ➔ Only use the devices in conjunction with approved devices or components.

Spare parts and accessories that do not meet Bürkert's requirements may impair the operational safety of the device and cause accidents.

- ➔ To ensure operational safety, only use original parts from Bürkert.

Operation only after proper transport, storage, installation, start-up or maintenance.

Improper transport, storage, installation, start-up or maintenance endanger the operational safety of the device and can cause accidents. This can lead to serious personal injury or death.

- ➔ Only carry out works which are described in these instructions.
- ➔ Only carry out works using suitable tools.
- ➔ Have all other works carried out by Bürkert only.

Technical limit values and media

Non-compliance with technical limit values or unsuitable media can damage the device and lead to leaks. This can cause accidents and seriously injure or kill people.

- ➔ Comply with limit values. See Technical data [▸ 11] and information on the type label.
- ➔ Only feed media into the media ports that are listed in the chapter Technical data [▸ 11].
- ➔ Observe the safety data sheet for the media used.

Medium under pressure

Medium under pressure can seriously injure people. In the event of overpressure or pressure surges, the device or lines can burst. Pneumatic lines that are defective or not securely fastened can come loose and swing around.

- ➔ Before working on the device or system, switch off the pressure. Vent or empty the lines.
- ➔ Adhere to the permitted pressure ranges of the medium.
- ➔ Comply with the permitted temperature ranges of the medium.

Electric shock due to electrical components

Touching live parts can result in severe electric shock. This can lead to serious personal injury or death.

- ➔ Before working on the device or system, switch off the power supply. Secure it against reactivation.
- ➔ Observe any applicable accident prevention and safety regulations for electrical devices.

Hot surfaces and fire hazard

The surface of the device can become hot with fast-switching actuators or with hot media.

- ➔ Wear suitable protective gloves.
- ➔ Keep highly flammable substances and media away from the device.

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Working on the device

Working on the device that has not been powered down, unauthorised switching on or uncontrolled start-up of the system can cause accidents. This can lead to serious personal injury or death.

- ➔ Only work on the device when it is not in use.
- ➔ Ensure that the device or system cannot be switched on unintentionally.
- ➔ Only start the process in a controlled manner following disruptions. Observe sequence:
  1. Apply supply voltage or pneumatic supply.
  2. Charge the device with medium.

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3 PRODUCT DESCRIPTION

Type 6440 is a pilot-operated and compact 2/2-way piston valve with the following properties:

- Safe opening via a force pilot operated piston system.
- Vibration-proof, screwed coil system
- Increased leak proofing through welded core guide tube.
- Optimised for use in hydrogen applications, such as fuel cells or electrolysis.

3.1 Product structure

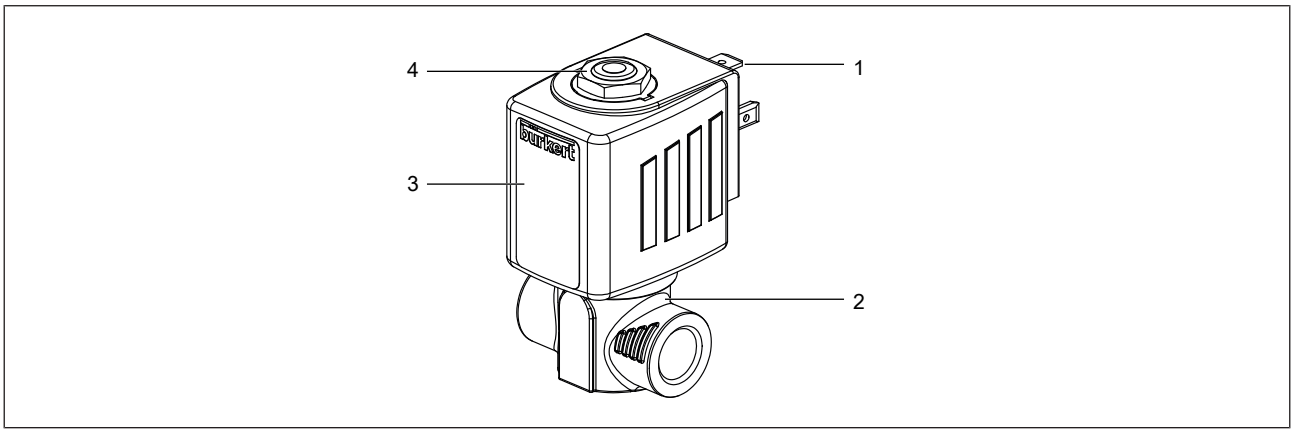

Fig. 1: Type 6440 socket variants

1	Coil	2	Valve body
3	Type label	4	Nut for coil attachment

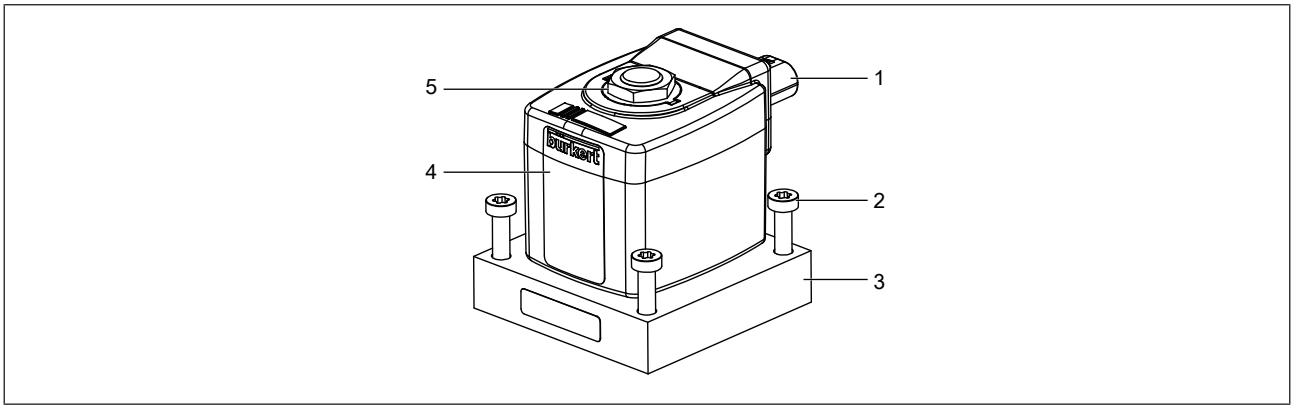

Fig. 2: Typ 6440 flange variant FK14/FK17

1	Coil	2	4 M4 screws (variant FK14) or M5 screws (variant FK17)*
3	Valve body	4	Type label
5	Nut for coil attachment		

*) The screws are not included in the scope of delivery.

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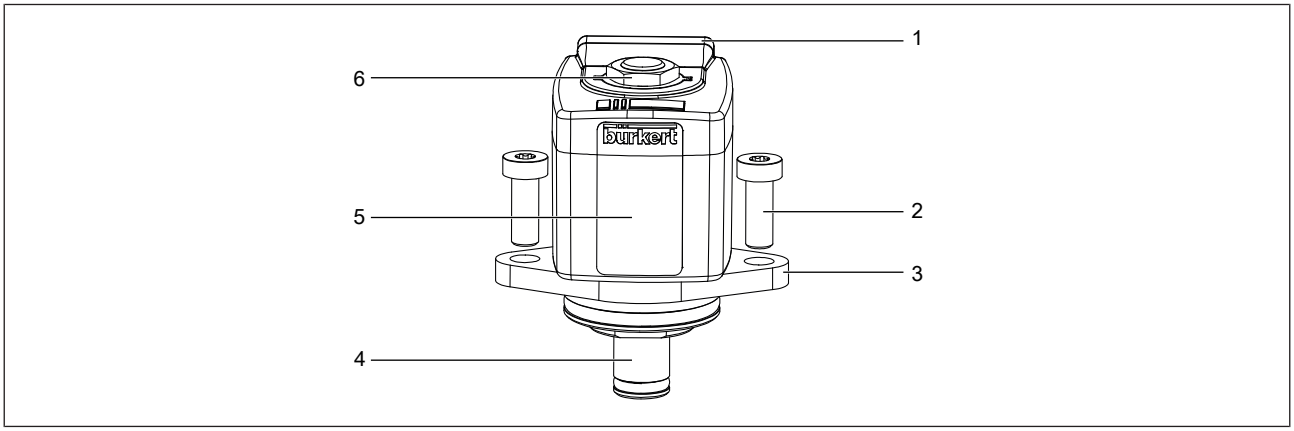

Fig. 3: Type 6440 cartridge variant FC16/FC17

1	Coil	2	2 M6 screws (variant FC16) or 4 M5 screws (variant FC17)*
3	Retaining plate	4	Valve body
5	Type label	6	Nut for coil attachment

*) The screws are not included in the scope of delivery.

3.2 Type label

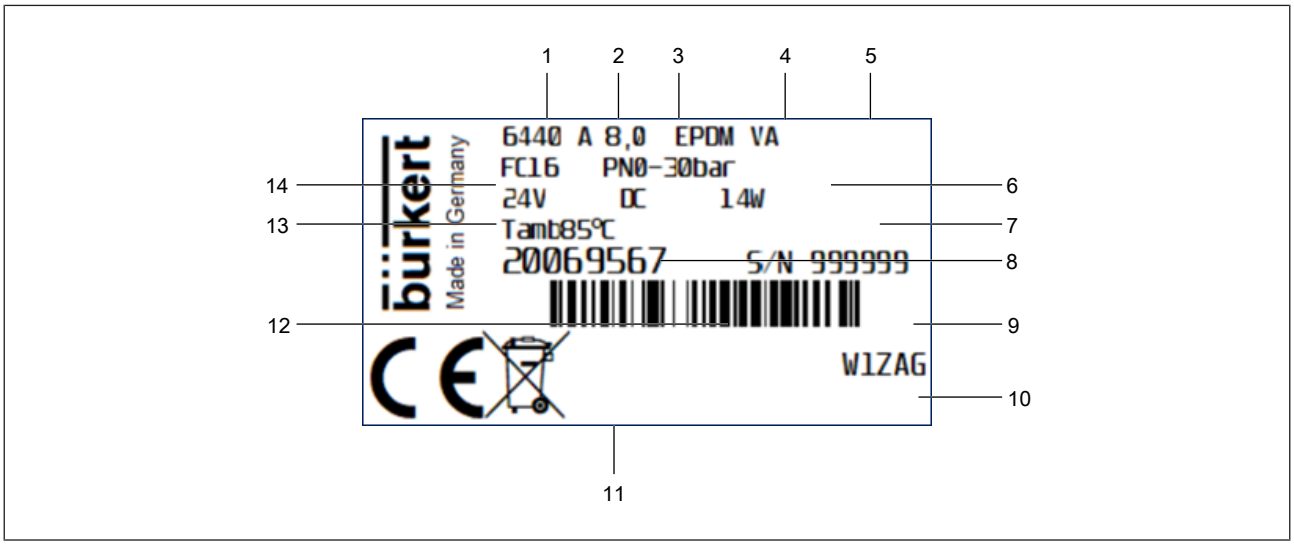

Fig. 4: Type label Type 6440 (example)

1	Type	2	Circuit function
3	Orifice	4	Sealing material
5	Body material	6	Operating pressure
7	Cold power (tolerance ±10%)	8	Ambient temperature
9	CE marking	10	Manufacture code
11	Article number	12	Indication for disposal
13	Operating voltage	14	Port connection

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4 TECHNICAL DATA

4.1 Standards and Directives

The device complies with the relevant EU harmonisation legislation. In addition, the device also complies with the requirements of the laws of the United Kingdom.

The harmonised standards that have been applied for the conformity assessment procedure are listed in the current version of the EU Declaration of Conformity/UK Declaration of Conformity.

4.2 Operating conditions

Medium	neutral gases and liquids, optimised for hydrogen
Medium temperature	–40…+120 °C
Ambient temperature	–40...+55 °C/+75 °C for stationary applications
	–40...+85 °C for mobile applications
Storage temperature	–40…+80 °C
Operating mode	Unless otherwise specified on the type label, the solenoid actuator is suitable for continuous operation.
	Power must be reduced to max. 25 % of the nominal power (holding phase) with the aid of current control or PWM signal after max. 500 ms (switch-on pulse) for mobile applications with increased ambient temperature (max. +85°C).
Installation position	Any, preferably actuator face up
Protection classes (according to VDE 0580)	I (standard coil)
	III (coil with automotive plug)
Degree of protection (EN 60529 / IEC 60529)	IP65*
	**With correctly connected cable plug*.
Degree of protection (ISO 20653)	IP6K, IPX7 (immersion test in accordance with ISO 16750-4), IPX9K*
	**If a coil is used with an automotive plug. Degree of protection can only be guaranteed if the coil is not removed from the valve*.
Materials	see data sheet

Temperatures for valves with UL/UR approval

Medium	Seal material	V code	Medium temperature	Ambient temperature
Air, inert gas, vapour, water, hydrogen	EPDM + EPDM (AA)	-	–40°C...+120°C	–40°C...+75°C

Tab. 1: Temperatures for valves with UL/UR approval

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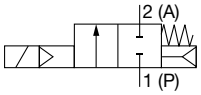
NOTICE!

High pressure surges

Liquids and high differential pressure may cause high pressure surges.

4.3 Circuit function

	**Circuit function A** Solenoid valve, 2/2-way, servo-assisted, normally closed

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5 INSTALLATION

Risk of injury or material damage when working on the device or system.

➔ Read and observe the chapter Safety instructions [▶ 6] before working on the device or system.

5.1 Preparatory work

DANGER!

Risk of injury from high pressure and discharge of medium.

➔ Before working on the device or system, switch off the pressure. Vent or drain lines.

➔ Clear pipes of any dirt.

➔ Fit a dirt trap on a dirty medium before the valve inlet (mesh size 0.2...0.4 mm).

➔ Devices that are suitable for use with food according to the manufacturer should be flushed for 5 minutes prior to start-up.

➔ Seal pipe connections using an elastomer seal or PTFE tape. Ensure that seal material does not get into the device.

5.2 Installation of socket variants

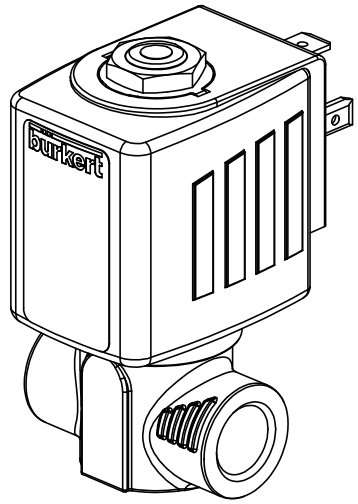

Fig. 5: Installation of socket variants

➔ Note the flow direction: from 1 to 2 (from P to A).

➔ Ensure that the seal surfaces on the body port connections are free of any damage.

➔ Hold the device on the valve body using an open-end wrench and screw into the pipe.

NOTICE!

➔ Be sure not to damage the seal surfaces on the body port connections when screwing into the pipe.

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5.3 Installation of cartridge variants

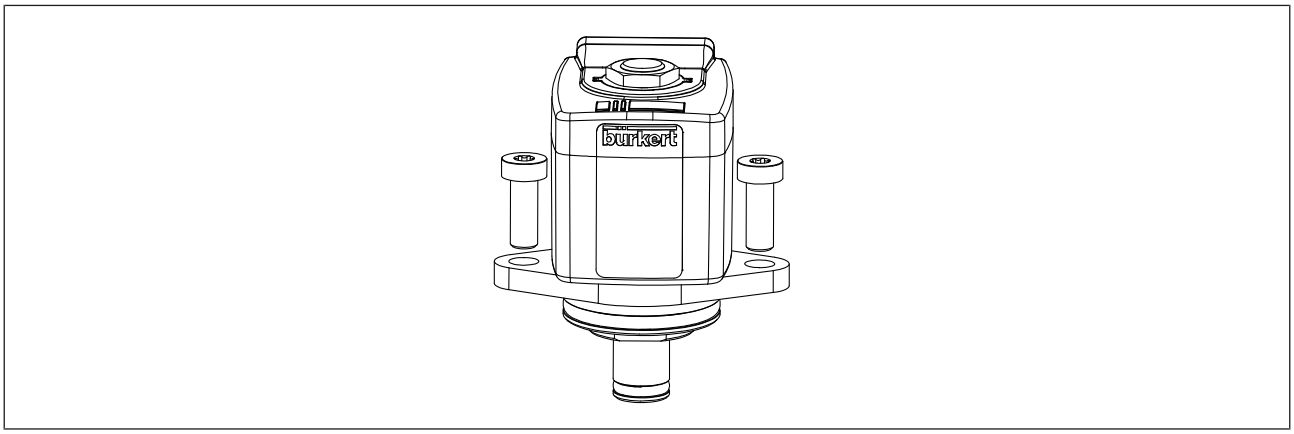

Fig. 6: Installation of cartridge variants, example FC16

- ➔ Ensure that the O-rings on the valve body and the seal surfaces of the connection housing are free of any damage.
- ➔ Coat O-rings on the body in a suitable lubricant to prevent damage.
- ➔ Press the valve into the connection housing.
- ➔ Tightly screw in the retaining plate, observing the tightening torque indicated in the following table.

NOTICE!

- ➔ Ensure that the O-rings on the valve body and the seal surfaces of the connection housing are not damaged during installation.

Variant	Orifice (DN)	Tightening torque [Nm]	Screw
FC16	6	10	M6 x 16 A2 8.8
FC17	12	6	M5 x 16 A2 8.8

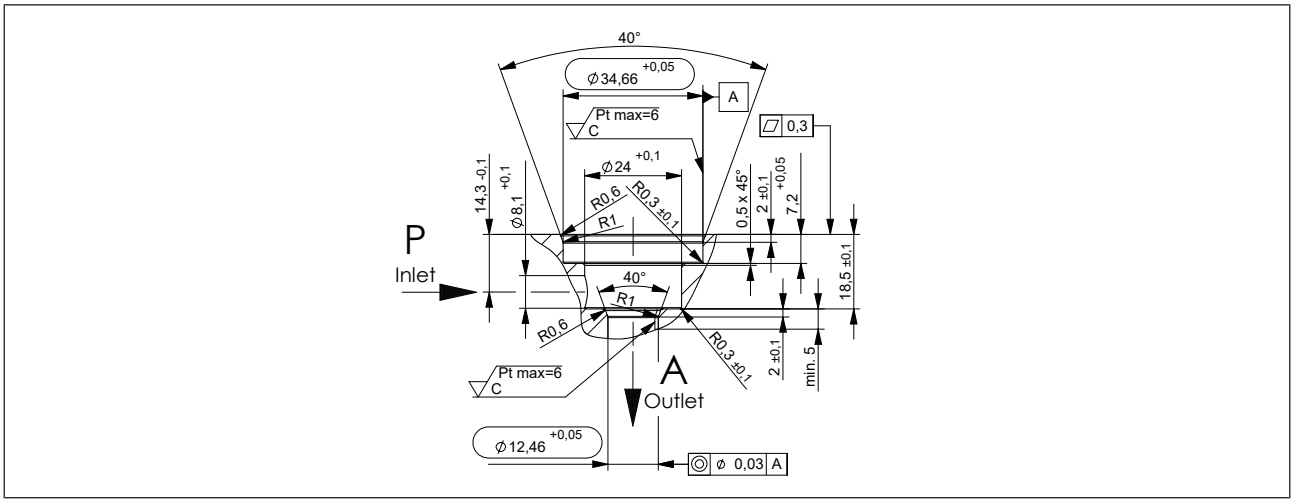

Fig. 7: Connection diagram 1 cartridge variant FC16

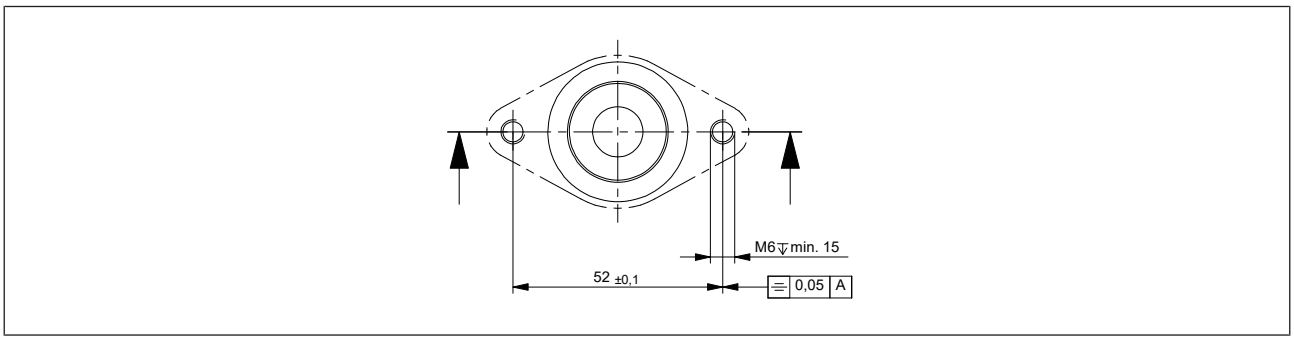

Fig. 8: Connection diagram 2 cartridge variant FC16

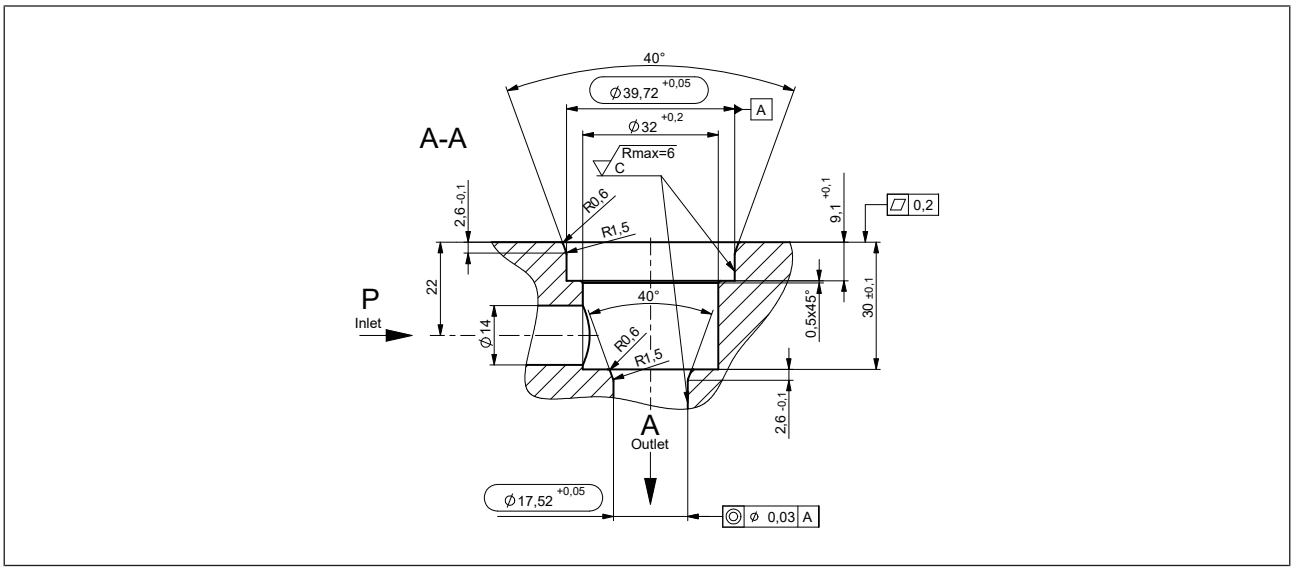

Fig. 9: Connection diagram 1 cartridge variant FC17

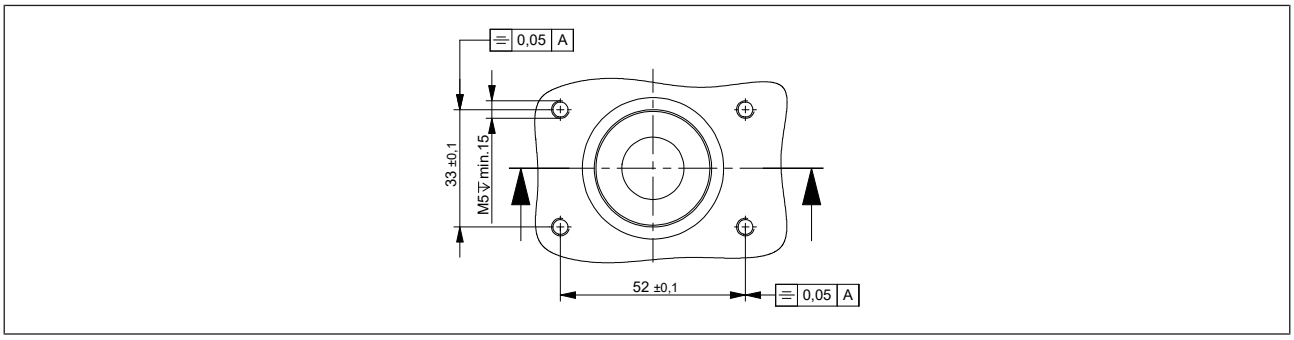

Fig. 10: Connection diagram 2 cartridge variant FC17

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5.4 Flange variant installation

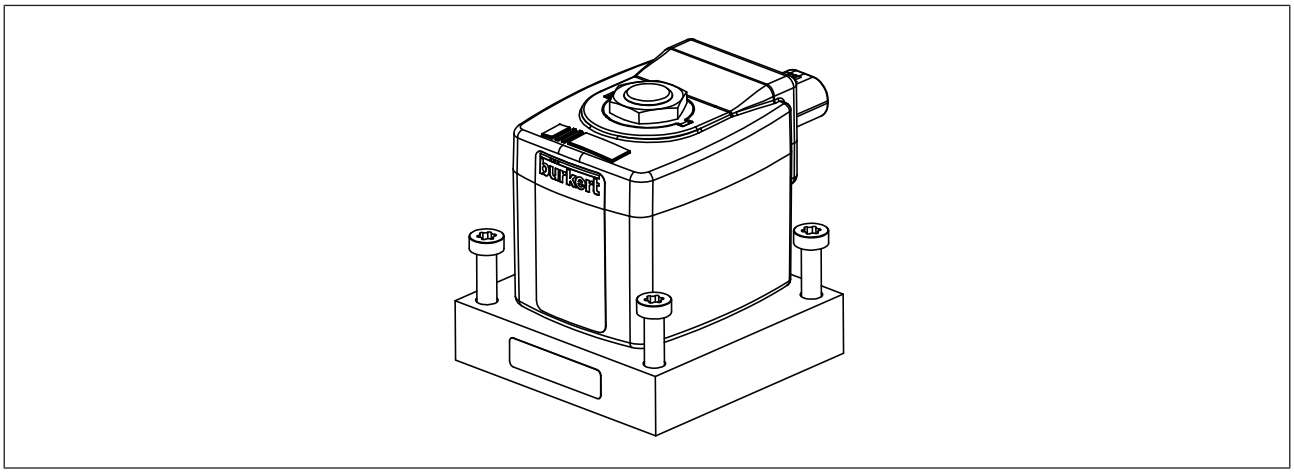

Fig. 11: Flange variant installation

- ➔ Ensure that the O-rings on the valve body and the seal surfaces of the connection housing are free of any damage.
- ➔ Place the valve on the connection housing. To achieve the Kv value stated in the data sheet, the inlet openings of the flange connection and connection block must be arranged directly on top of each other.
- ➔ Tightly screw in the valve body crosswise, observing the tightening torque indicated in the following table.

NOTICE!

- ➔ Ensure that the O-rings on the valve body and the seal surfaces of the connection housing are not damaged during installation.

Variant	Orifice (DN)	Tightening torque [Nm]	Screw
FK14	6/8	3	M4 x 20 A2 8.8
FK17	12	6	M5 x 30 A2 8.8

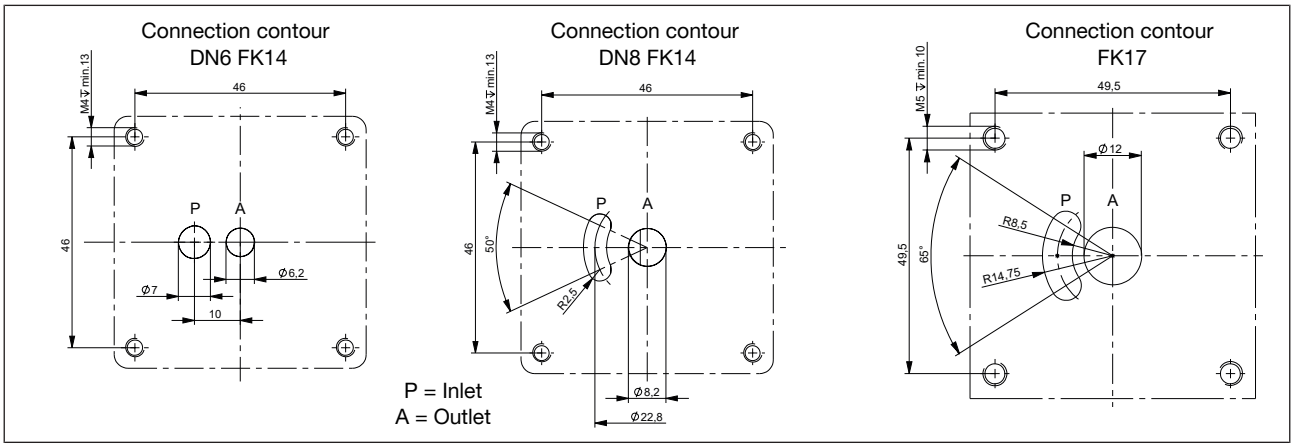

Fig. 12: Connection diagram flange variant FK14 and FK17

5.5 Coil installation

WARNING!

Risk of injury due to medium leak

Medium may leak if a firmly fastened nut is loosened.

➔ Do not continue to rotate firmly fastened nuts.

CAUTION!

Risk of injury from electric shock

If there is no protective conductor function between the coil and the body, there is a risk of electric shock.

➔ The anti-twist device (plastic ring) must be inserted into the body pins during installation. It must not protrude over the octagonal nipple.

➔ Check the protective conductor function after installing the coil.

NOTICE!

Overheating of coil, fire hazard

Connecting the coil without a pre-installed valve will cause overheating and destroy the coil.

➔ Only connect the coil after the valve has been installed.

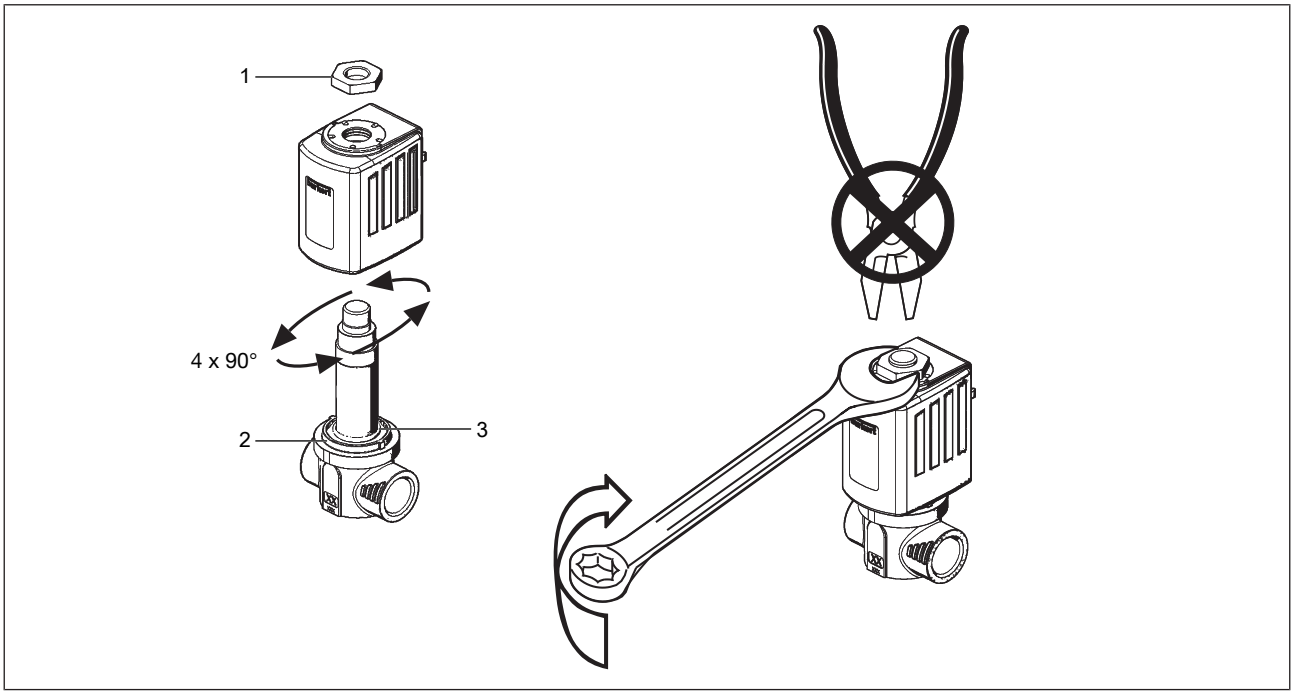

Fig. 13: Coil installation

1	Nut	2	Anti-twist device (only available for socket variants)
3	O-ring		

➔ Check the correct positioning of the O-ring on the valve body.

➔ Slide the coil onto the core guide tube. Make sure that the anti-twist device is fully inserted into the housing spigot. It must not protrude axially over the octagonal nipple.

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➔ Fasten the nut with an open-end wrench. When screwing in, observe the tightening torque indicated in the following table.

➔ Check protective conductor function.

Variant	Nominal diameter (DN)	Tightening torque [Nm]
all variants	6	5
	12	15

Tab. 2: Tightening torque during coil installation

5.6 Cable plug installation

CAUTION!

If there is no protective conductor function, there is a risk of injury from electric shock.

➔ Always connect the protective conductor.

➔ Check electrical continuity between coil and body.

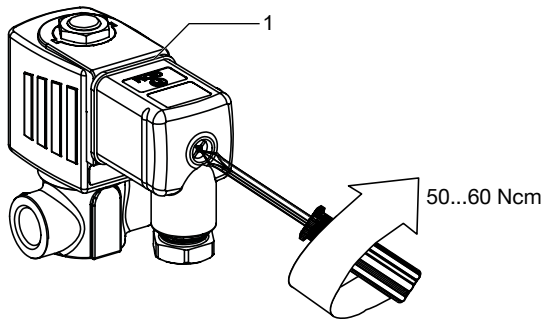

Fig. 14: Install the cable plug

1	Seal

➔ Attach the cable plug (for permitted types, see data sheet) to the contacts on the coil.

➔ Check that the seal is properly fitted.

➔ Tightly screw cable plug, while observing a tightening torque between 50 Ncm and 60 Ncm.

➔ Connect the protective conductor.

➔ Check electrical continuity between coil and body.

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6 ELECTRICAL CONNECTION

WARNING!

Risk of injury from electric shock.

➔ Switch off the power supply before working on the device or system. Secure it against reactivation.

➔ Observe the applicable accident prevention and safety regulations for electrical devices.

6.1 Cable plug Type 2518, plug shape A according to DIN EN 175301-803

Other cable plug variants can be found on the data sheet for Type 2518 at country.burkert.com.

Fig. 15: Cable plug Type 2518, plug shape A according to DIN EN 175301-803

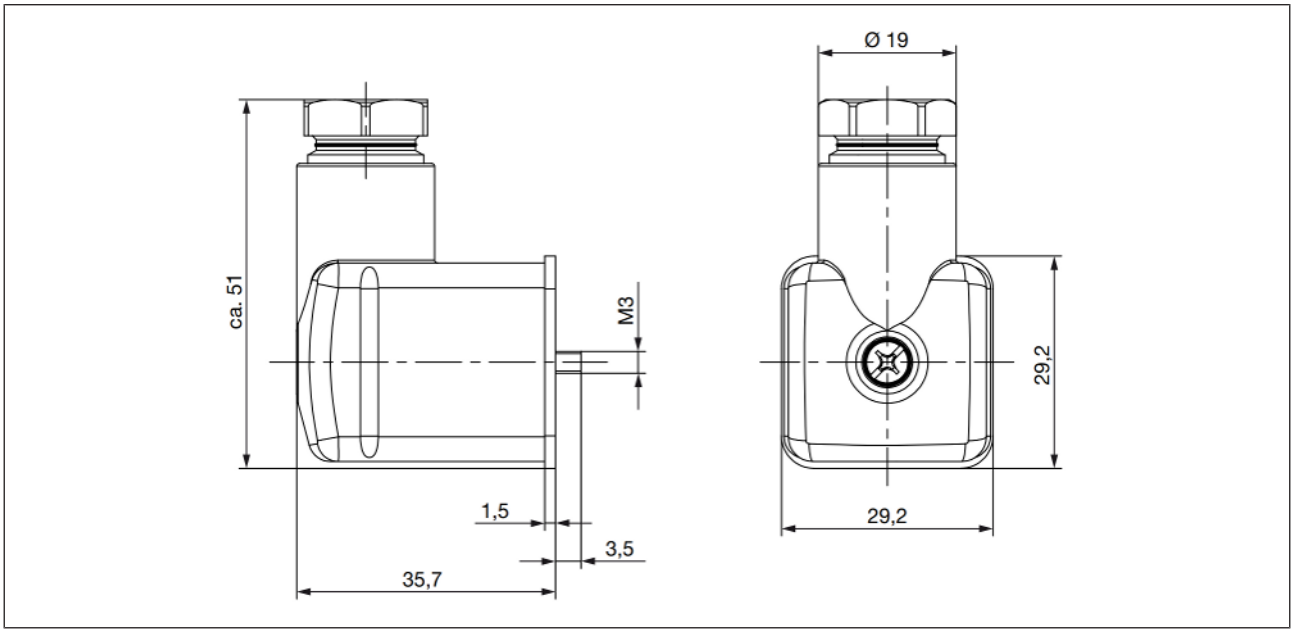

Fig. 16: Cable plug dimensions Type 2518

Further information, such as wiring and electrical values can be found on the data sheet for Type 2518 at country.burkert.com.

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6.2 Automotive plugs for IP6K9K coil variants

For mobile applications, coils are provided with the following automotive plugs:

- KOSTAL MLK1.2 plug, 2-pin, coding A (male)
- TE MCON 1.2 plug, 2-pin, coding A (male)

Fig. 17: Automotive plugs for IP6K9K coil variants AC10

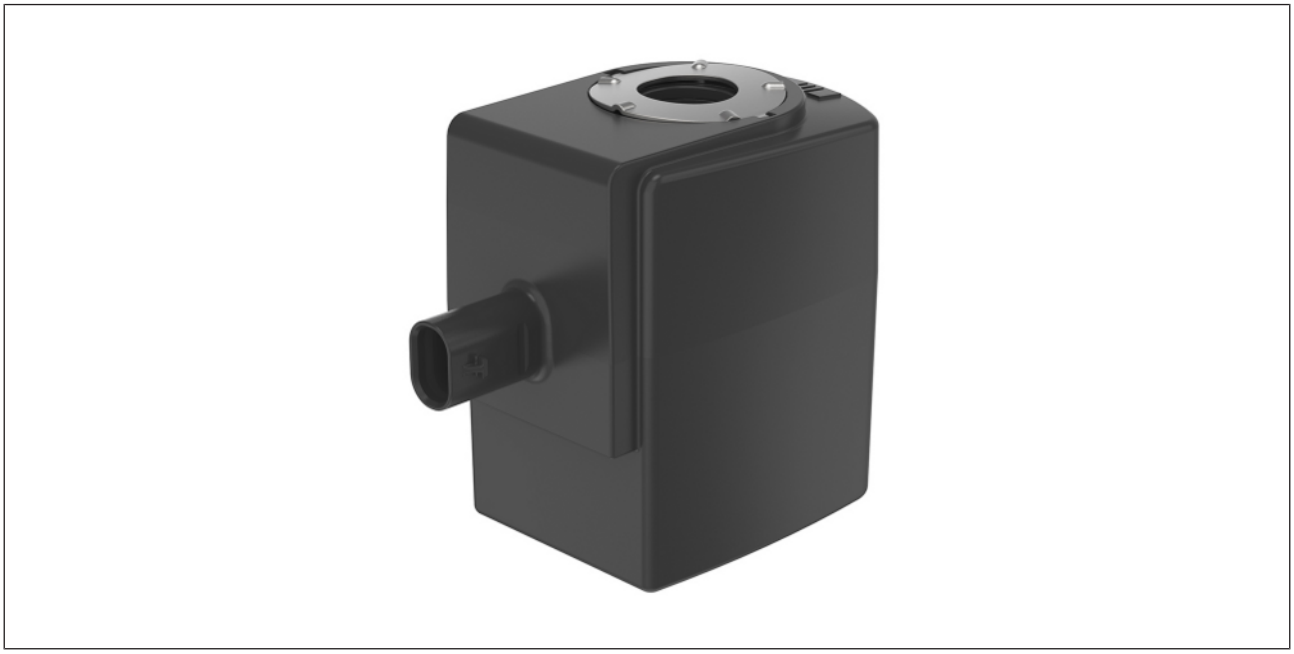

Fig. 18: Automotive plugs for IP6K9K coil variants AC19

Customer-specific plug forms available on request.

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7 FAULTS

DANGER!

Risk of injury from high pressure and discharge of medium.

➔ Before working on the device or system, switch off the pressure. Vent or drain lines.

WARNING!

Risk of injury from electric shock.

➔ Switch off the power supply before working on the device or system. Secure it against reactivation.

➔ Observe the applicable accident prevention and safety regulations for electrical devices.

If faults occur, check whether:

- the device has been installed according to regulations
- the connection has been properly made
- the device has been damaged
- all screws have been tightened
- voltage and pressure have been applied
- the pipes are clean.

If the magnet is not attracting

Possible cause:

- Short circuit or coil interrupted
- Core or core area contaminated

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8 LOGISTICS

8.1 Transport and storage

- ➔ Protect the device against moisture and dirt in the original packaging during transportation and storage.
- ➔ Avoid UV radiation and direct sunlight.
- ➔ Protect connections from damage with protective caps.
- ➔ Observe permitted storage temperature.

8.2 Disposal

Environmentally friendly disposal

- ➔ Follow national regulations regarding disposal and the environment.
- ➔ Collect electrical and electronic devices separately and dispose of them as special waste.

Further information at country.burkert.com

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