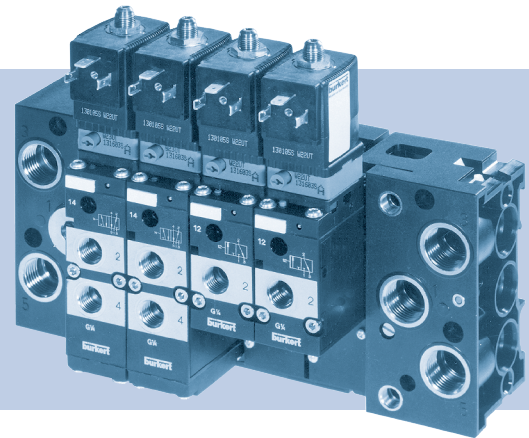


Type 6516-6519

Multiple blocks and modular pneumatic base rail type MP07



Operating Instructions

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

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Operating Instructions 2103/14_EU-en_00803150 / Original DE

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1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions ready to hand at the operation site.

Important safety information!

- ▶ Carefully read these instructions.
- ▶ Observe in particular the safety instructions, intended use and operating conditions.
- ▶ Persons who work on the device must read and understand these instructions.

1.1 Symbols



DANGER!

Warns of an immediate danger.

- ▶ Failure to observe will result in death or serious injuries.



WARNING!

Warns of a potential danger.

- ▶ Failure to observe these warnings may result in serious injuries or death.



CAUTION!

Warns of a potential hazard.

- ▶ Failure to observe may result in moderate or minor injuries.

NOTE!

Warns of damage.



Important tips and recommendations.

▶ Designates instructions to avoid danger.

→ Designates a procedure which you must carry out.

1.2 Definition of terms

Term	Definition for these instructions
Device	Multiple block consisting of solenoid valves of types 6516 – 6519 and a modular pneumatic base rail of the type MP07.

2 INTENDED USE

The multiple block with valves types 6516 – 6519 is designed to control neutral media and compressed air.

- ▶ Use the device only as intended. Non-intended use of the device may be dangerous to people, nearby equipment and the environment.
- ▶ Use the device only in conjunction with third-party devices and components recommended or approved by Bürkert.
- ▶ Prerequisites for safe and trouble-free operation include correct transportation, correct storage, installation, start-up, operation and maintenance.
- ▶ Observe the permissible data, operating conditions and conditions of use of the respective devices or products. These specifications can be found in the contract documents, the operating instructions and on the type label.
- ▶ With a properly connected and mounted cable plug, e.g. Bürkert type 2516 (for type 6516/6517) or type 2518 (for type 6518/6519), the unit fulfils degree of protection IP65 according to DIN EN 60529 / IEC 60529.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not take into account any coincidences or events occurring during installation, operation and maintenance. The operator is responsible for observing the location-specific safety regulations, also with reference to personnel.



Risk of injury due to high pressure and any escaping media.

- ▶ Switch off the pressure before working on the device or system. Vent or empty the lines.

Risk of injury from electric shock.

- ▶ Switch off the power supply before working on the device or system. Secure it against reactivation.
- ▶ Observe any applicable accident prevention and safety regulations for electrical devices.

Risk of injury from quickly accelerating device parts and unconnected compressed air hoses flapping around.

- ▶ Before applying pressure to the valve, check all hose connections and fittings for tight, secure fit.

Risk of burns or fire from hot device surfaces due to longer duty cycles.

- ▶ Only touch the device when wearing protective gloves.
- ▶ Keep the device away from highly flammable substances and media.

Risk of injury due to malfunctioning valves with alternating current (AC).

A seized core causes the coil to overheat, which leads to functional failure.

- ▶ Monitor the working process for proper function.

General hazardous situations.

To prevent injuries, observe the following:

- ▶ Observe the general rules of technology.
- ▶ In the potentially explosive atmosphere, only use devices that are approved for this purpose. These devices are identified by a separate “Ex” type label. Before use, note the information on the separate Ex type label and the Ex additional instructions or the separate Ex operating Instructions.
- ▶ Approvals such as Ex, UL, UR, CSA, DVGW etc. are marked on the type label or by a special sticker.
- ▶ Use the device only when it is in perfect condition and in accordance with the operating instructions.
- ▶ Secure the device or system to prevent unintentional activation.
- ▶ After an interruption in the power supply, ensure that the process is restarted in a controlled manner.
- ▶ Do not modify the device.
- ▶ Do not mechanically load the device.
- ▶ Only trained technicians may perform installation and maintenance work.
- ▶ Install the device according to the regulations applicable in the respective country.

NOTE!

Electrostatically sensitive components and assemblies.

The device contains electronic components that are susceptible to the effects of electrostatic discharging (ESD). Components that come into contact with electrostatically charged persons or objects are at risk. In the worst case scenario, these components will be destroyed immediately or fail after start-up.

- ▶ Meet the requirements specified by EN 61340-5-1 to minimise or avoid the possibility of damage caused by a sudden electrostatic discharge.
- ▶ Do not touch electronic components when the supply voltage is connected.

4 GENERAL NOTES

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
E-mail: info@burkert.com

International

The contact addresses can be found on the back pages of the printed operating instructions.

They are also available online at: www.burkert.com

4.2 Information on the Internet

Operating instructions and data sheets for Bürkert products can be found on the Internet at: www.buerkert.de

5 STRUCTURE AND DESCRIPTION

5.1 Design

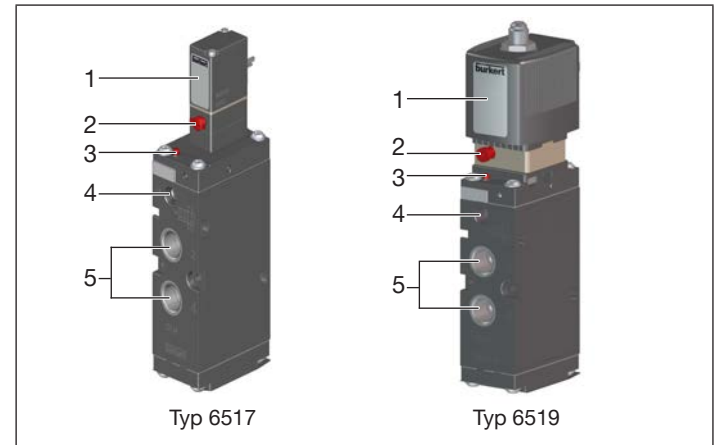


Fig. 1: Valve assembly type 6516/6517 (using type 6517 as an example) and type 6518/6519 (using Type 6519 as an example)

Item	Designation
1	Pilot valve type 6106 (for type 6516/6517) Pilot valve type 6014 (for type 6518/6519)
2	Manual override
3	Indicator pin (see chapter “5.1.2 Indicator pin for pressure test”)
4	Pilot pressure port
5	Working port 2 or 2 and 4

5.1.1 Manual override

- To operate the valve manually, press the manual override and turn it 90° clockwise (until it stops). The manual override is locked and does not reset automatically.
- Only operate the manual override when the power is off.

5.1.2 Indicator pin for pressure test

- Indicator pin can be pushed in: Pressure in the valve < 1 bar
 - Indicator pin cannot be pushed in: Valve is pressurised.
 - Indicator pin springs back: Valve is pressurised.
- For every function check, the indicator pin on the valve and the multi-block must be pressed in again.

5.1.3 Connections

The connections are marked with numbers for better assignment.

Connection number	Designation
1	Pressure port
2 and 4	Working port
3 and 5	Exhaust port
12 and 14	Pilot pressure port

5.2 Description

The valves consist of:

- 3/2-way pilot valve (type 6014) with different electrical connection variants.

For type 6518/6519:

Pilot valve coil can be locked in 4 x 90° steps, in between it can be positioned as desired around the core guide tube.

- Valve body with diaphragm and seat seals (3/2 and 5/2-way valve) or slide (5/3-way valve).
- Working connections 2 (B) / 4 (A)
- Supply and exhaust port 1 (P) / 3 (R) / 5 (S) with G1/4 internal thread or push-in connection (only for working connections 2 (B) and 4 (A)) for hose outer diameter 8 mm.

The valves can be mounted on the modular, pneumatic type MP07 base rails to form valve blocks. Any installation position, preferably with solenoid actuator on top.



The cable plug type 2516 (for type 6516/6517) or type 2518 (for type 6518/6519) is used to control DC and AC coils with power ≤ 5 W without external power supply.

Type 6516 - 6519

Structure and description

5.3 Design of 5/3-way valve, 5/2-way pulse valve

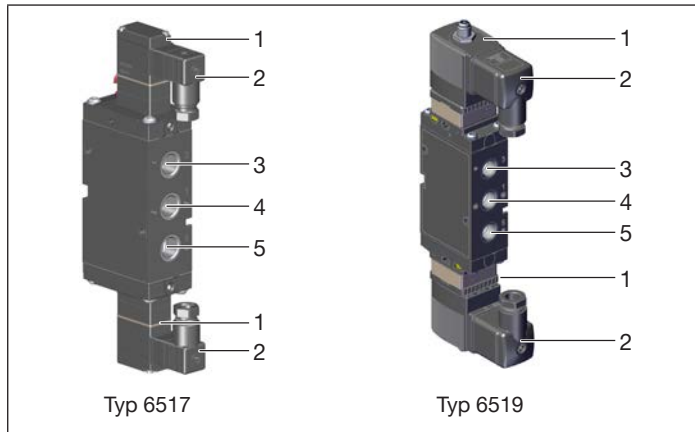
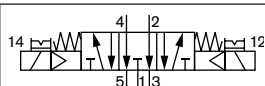


Fig. 2: Design of 5/3-way valve, 5/2-way pulse valve

Item	Designation
1	Pilot valve type 6106 (for type 6516/6517) Pilot valve type 6014 (for type 6518/6519)
2	Cable plug type 2516 (for type 6516/6517) Cable plug type 2518 (for type 6518/6519)
3	Exhaust port 5
4	Pressure port 1
5	Exhaust port 3

5.4 Circuit functions

	C, 3/2-way valve (*for vacuum ¹⁾ , with auxiliary pilot air)
	In idle position, pressure port 1 (P/NC) closed, working port 2 (A/OUT) open after port 3 (R/NO).
<p>*Vacuum, with auxiliary pilot air</p>	D, 3/2-way valve
	In idle position pressure port 1 (P/NO) after working port 2 (B/OUT) open, port 3 (R/NC) closed.
	H, 5/2-way valve
	In idle position pressure port 1 (P) after working port 2 (A) open, working port 4 (B) after port 5 (S) open, port 3 (R) closed.
	H, 5/2-way valve Pulse variant (2 coils)
	H, 5/3-way valve
	In the centre position, all connections are closed. Pressure port at 1. Working ports at 4 and 2. Vent the working connections after 5 or 3.



H, 5/3-way valve

In the middle position, pressure port 1 (P) closed, both working ports 2 (A) and 4 (B) open after outlet 3 (R) or 5 (S).

1) The vacuum generator must be connected to port 1.

6 TECHNICAL DATA

6.1 Conformity

The device conforms to EU directives as per the EU Declaration of Conformity.

6.2 Standards

The applied standards as used to verify compliance with the Directives can be found in the EC type examination certificate and/or the EC Declaration of Conformity.

6.3 Operating conditions

NOTE!

Pilot pressure for pneumatic control unit depends on the pressure of the flow medium; it must be between 2–8 bar (at least 70% of operating pressure).

NOTE!

Pressure difference between port 1 and 3/5 \geq 2 bar

Ambient temperature	–10 ... +55 °C
Medium temperature	–10 ... +50 °C
Medium	<ul style="list-style-type: none"> Filtered compressed air (particle size max. 10 µm), preferably unlubricated (operation with lubricated air is possible) Neutral gases
Operating pressure range	2–8 bar

6.3.1 Materials

Sealing materials depend on the body materials:

Body material	PA	AL anodised	AL ematalised	VA
Seal material	NBR, PUR	NBR	FKM / NBR	PU, NBR, FKM

Type 6516 - 6519

Structure and description

6.4 Electrical data

	6516/6517	6518/6519
Electrical connection	Cable plug type 2516 on the tag connections of the coil (torque for fastening: 0.4 bis 0.5 Nm).	Cable plug type 2518 on the tag connections of the coil (torque for fastening: 0.5 bis 0.6 Nm).
Additional electrical connection options	Type 6106 or 8640	Type 6014 or 8640
Voltage tolerance	±10%	
Degree of protection	IP65 Only in conjunction with cable plug type 2516	IP65 Only in connection with cable plug type 2518
Cable plug	Can be mounted offset by 180° for the cable outlet selected.	can be mounted offset by 4 x 90° for the cable outlet selected.

NOTE!

Damage to the appliance when screwing the cable plug.

► Make sure that the flat seal is seated properly.

6.5 Type label

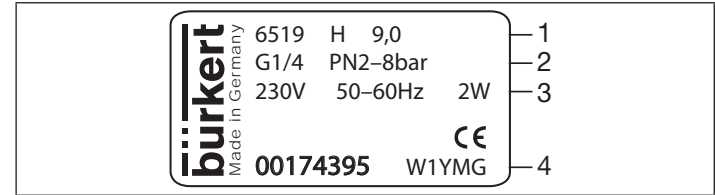


Fig. 3: Example of type plate of pilot-operated solenoid valve type 6519

Item	Text	Designation
1	6519	Type
	H	Circuit function
	9.0	DN
2	G1/4	Connection type
	PN 2-8 bar	Operating pressure range
3	230V	Voltage
	50-60Hz	Frequency
	2W	Capacity
4	00174395	Order number
	W1YMG	Manufacture code (encrypted)

7 ASSEMBLY



WARNING!

Risk of injury due to improper assembly.

- ▶ Only trained technicians may perform assembly work.
- ▶ Perform assembly work using suitable tools only.

Risk of injury from quickly accelerating device parts and unconnected compressed air hoses flapping around.

- ▶ Before applying pressure to the valve, check all hose connections and fittings for tight, secure fit.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- ▶ Secure the system against unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

Prior to assembly

- Clean the pipelines.
- If necessary, attach dirt trap upstream.
- Do not use the coil as a lever when screwing in the connections.

7.1 Assembly of the pilot valve Type 6106 (for Type 6516/6517) or 6014 (for Type 6518/6519)



WARNING!

Risk of injury due to leaking valve.

- ▶ Make sure that the O-rings/seals are correctly seated in the valve.

Overheating, risk of fire.

Without a pre-installed valve, connecting the coil will cause overheating and destroy the coil.

- ▶ Only connect the coil after the valve has been assembled.

Danger of electric shock if the coil is assembled incorrectly.

- ▶ When assembling, make sure that the coil is firmly seated on the housing lid so the protective conductor connection of the coil is connected to the valve body.

NOTE!

Do not use the coil as a lever arm when screwing it in.

Type 6516 - 6519

Assembly

Type 6106 (for type 6516/6517)

- Always assemble in the position shown. If necessary, rotate the coil 180°.
- Screw the housing of the pilot valve onto the housing of the pneumatic valve. Observe the maximum tightening torque of 1.5 Nm.
- Position the solenoid coil and screw it on with M2 screws. Observe a maximum tightening torque of 0.15 Nm.

Type 6014 (for type 6518/6519)

- Screw the housing of the pilot valve onto the pneumatic valve. Observe the maximum tightening torque of 1.5 Nm.
- Place the lid on the housing.
- Fit the O-ring onto the core guide tube.
- Position the coil onto the core guide tube. The coil can be rotated 4 x 90° (with block assembly only 2 x 180°).
- Fasten the coil nut with an open-end wrench. Observe a maximum tightening torque of 5 Nm.

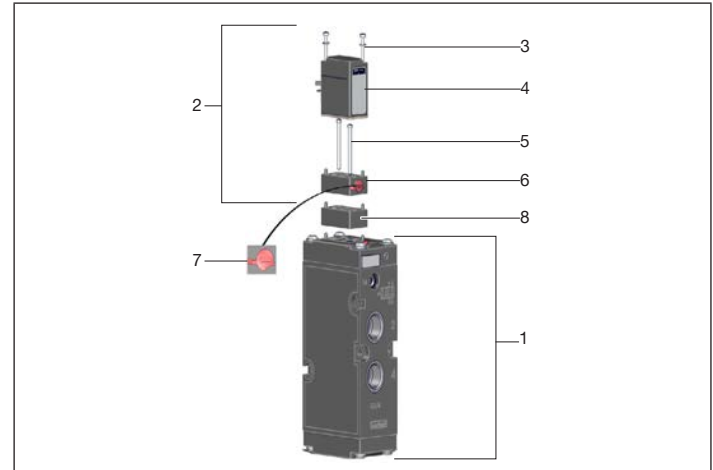


Fig. 4: Assembling pilot valve types 6517

Item	Designation
1	Pneumatic valve
2	Pilot valve
3	M2 screws
4	Solenoid
5	Screws
6	Pilot valve housing
7	Manual override (0=rest position; 1=switch position)
8	Main valve housing

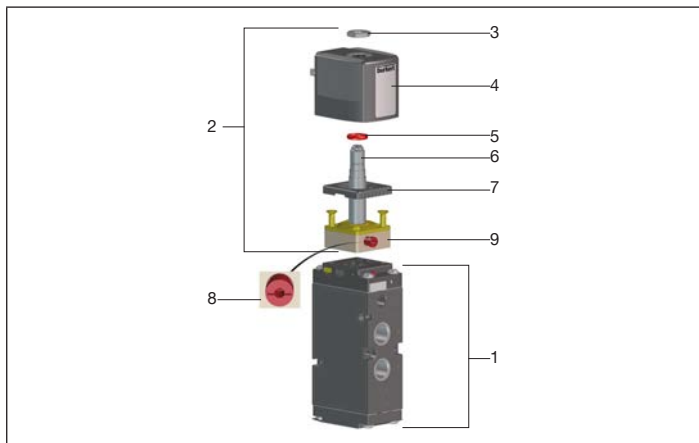


Fig. 5: Assembling pilot valve type 6519

Item	Designation
1	Pneumatic valve
2	Pilot valve
3	Nut
4	Solenoid
5	O-ring
6	Core guide tube
7	Housing lid
8	Manual override
9	Housing

7.2 Assembly of the multiple block

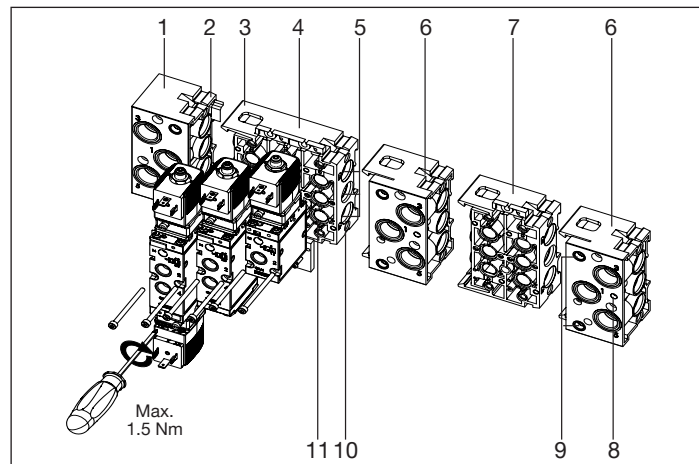


Fig. 6: Example of a multi-block with type 6519 valves

Item	Designation
1	Connection module left
2	Latch tab
3	Latch hook
4	3 base modules
5	Supply channels 1(P), 3(S), 5(R)
6	Connection module right
7	2 base modules

Type 6516 - 6519

Assembly

Item	Designation
8	Pressure indicator pin
9	Venting the pilot control
10	O-ring
11	Profile seal

- Begin assembly with connection module on the left (see “Fig. 6”)
- Check modules for complete installation. 1 O-ring per connection.
- Lightly oil or grease all O-rings before engaging.
- Engage the latch hooks of the module to be attached in the latch grooves of the preceding module. Make sure that the O-rings are properly seated.
- Ensure the profile seals are correctly seated on the base module.

! Crushed O-rings and profile seals lead to leaky blocks.

- Fasten each valve to the base module with 2 M4 screws.
Observe a maximum tightening torque of 1.5 Nm.

7.3 Valve block assembly

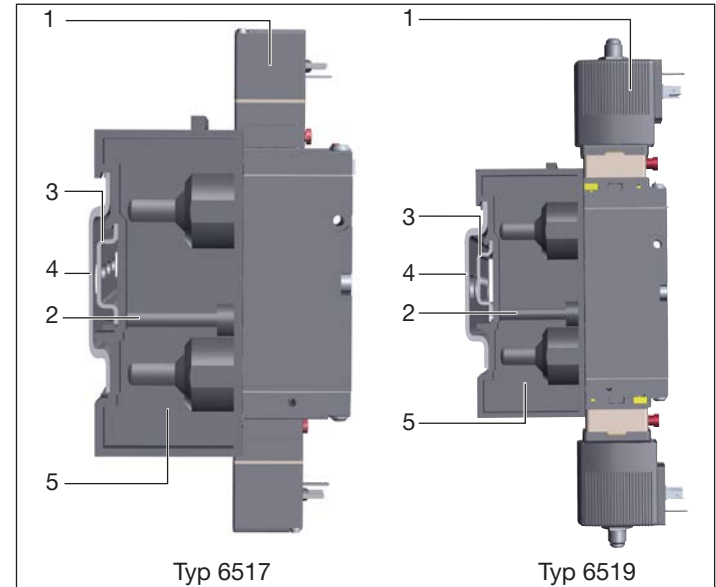


Fig. 7: Mounting the valve block

Item	Designation
1	Electrical connection can be rotated 180°
2	Wall mount
3	Standard rail 35 x 15 DIN 50022
4	Standard rail 75 x 25 DIN 50023
5	Connection module

7.3.1 Standard rail assembly

- Hook the valve block with the upper groove into the standard rail.
- Snap the lower clamping pieces into the standard rail.
- Tighten the screws on the clamping pieces.

Standard rail

- Standard rail 35 x 15 DIN 50022 (standard)
- Standard rail 75 x 25 DIN 50023



When using the standard rail 75 x 25 DIN 50023, reposition the pre-installed screws accordingly with clamping pieces and springs.

7.3.2 Wall mount

- Fasten the valve block directly to the wall with M5 screws.

7.4 Single valve assembly

- Fasten individual valves directly to the wall with M4 screws (see “Fig. 8”).

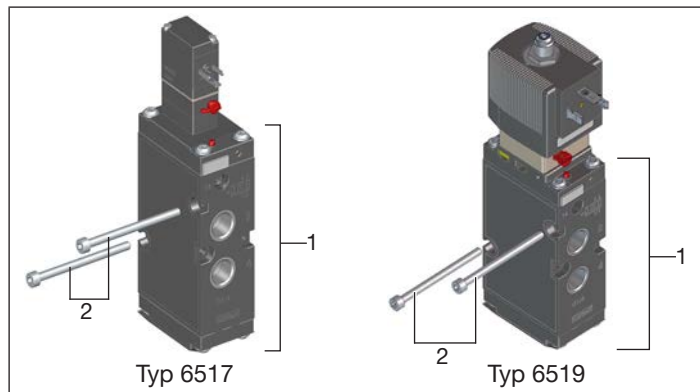


Fig. 8: Fastening single valves

Item	Designation
1	Single valve
2	M4 screw

8 INSTALLATION



WARNING!

Risk of injury due to improper installation

- ▶ Only trained technicians may perform installation work.
- ▶ Only carry out installations with suitable tools.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- ▶ Secure the system against unintentional activation.
- ▶ Following installation, ensure a controlled restart.

8.1 Pneumatic installation



DANGER!

Risk of injury due to high pressure and any escaping media.

- ▶ Switch off the pressure before working on the device or system.
- Vent or empty the lines.



DANGER!

Risk of injury from quickly accelerating device parts and unconnected compressed air hoses flapping around.

- ▶ Before applying pressure to the valve, check all hose connections and fittings for tight, secure fit.

Installation position of the valves:

- any, preferably solenoid actuator on top

Before connection

- Check the hose lines for contamination and clean them.
- If necessary, install dirt traps upstream of the valve inlet ($\leq 500 \mu\text{m}$).

Pneumatic connection:

NOTE!

Note the assignment of the connections (see chapter [“5.1.3 Connections”](#))

- Push the hose lines as far as they will go into the hose push-in connections of the solenoid valves.
- Use PTFE tape or elastomer seal for sealing.
- Align hose lines
- Connect the supply and working lines to the valve block.

Requirements for hose lines

- Minimum hardness 40 Shore D (according to DIN 53505 or ISO 868).
- Outer diameter according to DIN 73378 (maximum permissible deviation $\pm 0.1 \text{ mm}$ from nominal dimension).
- Burr-free, cut off at right angles and undamaged on the outer diameter surface.

8.2 Electrical installation



DANGER!

Risk of injury from electric shock.

- ▶ Switch off the power supply before working on the device or system. Secure it against reactivation.
- ▶ Observe any applicable accident prevention and safety regulations for electrical devices.

If there is no protective conductor contact between the coil and the housing, there is a risk of electric shock!

- ▶ Always connect the protective conductor.
- ▶ Check electrical continuity between coil and housing.

- Make the electrical connections to the pilot valves while observing the data on the type plate.

8.2.1 Electrical installation of cable plugs

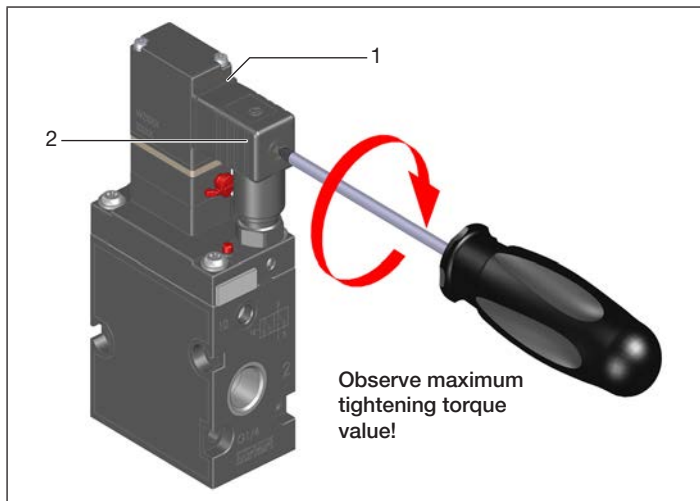


Fig. 9: Installation of cable plug types 2516 (for type 6516/6517)

Item	Designation
1	Seal
2	Approved cable plug e.g. type 2516 or other according to DIN ISO 175301-803 Form C

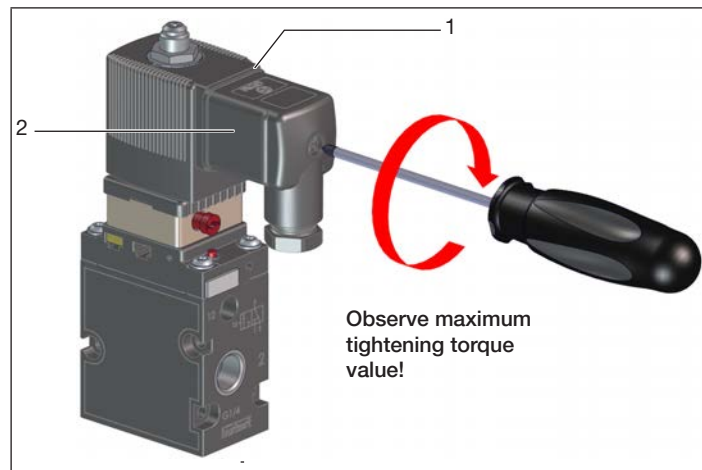


Fig. 10: Installation of cable plug types 2518 (for type 6518/6519)

Item	Designation
1	Seal
2	Approved cable plug e.g. type 2518 or other according to DIN ISO 175301-803 Form A

- Screw on the cable plug (see data sheet for approved types), observing the maximum tightening torque of 0.4 to 0.5 Nm (type 2516) or 0.5 to 0.6 Nm (type 2518).
- Check that the seal is correctly fitted.
- Connect the protective conductor and check electrical continuity between coil and housing (see "Tab. 1").

NOTE!

If the screw is pointing upwards when installed, insert a seal made of a material compatible with the process under the screw head.

Resistor	Test voltage	Test current
Maximum 0.1 Ω	12 V	1 A

Tab. 1: Protective conductor function test values

9 START-UP



WARNING!

Risk of injury due to improper operation.

- ▶ Prior to start-up, it must be ensured that the operating personnel are familiar with and fully understand the contents of the operating instructions.
- ▶ Only authorised technicians may start up the device or system.

- Check connections, voltage and operating pressure.
- Observe data on the type label
- Check the correct assignment of connections 1 and 3 or 5. Do not mix them up under any circumstances.
- For electrical operation, unlock the manual override.

10 MAINTENANCE, TROUBLESHOOTING



WARNING!

Risk of injury if maintenance work is not carried out correctly.

- ▶ Only trained technicians may perform maintenance work.
- ▶ Perform maintenance work using suitable tools only.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- ▶ Secure the system against unintentional activation.
- ▶ Ensure a controlled restart after maintenance is completed.

Fault	Possible cause	Remedy
Valves do not switch	No operating voltage or operating voltage too low	Check electrical connection Ensure operating voltage according to type label
	Manual override not in zero position	Bring manual override to zero position.
	Pressure supply insufficient or not available	Set up large-volume pressure supply (also for upstream devices such as pressure regulators, maintenance units, on/off valves, etc.) Minimum operating pressure ≥ 2 bar

Fault	Possible cause	Remedy
Valves switch with a delay or blow off at the exhaust ports	Pressure supply insufficient or not available	Set up large-volume pressure supply (also for upstream devices such as pressure regulators, maintenance units, on/off valves, etc.) Minimum operating pressure ≥ 2 bar
	Valves are not in home position (de-energized) during pressure build-up	Apply pressure to the valve block before the valves are switched.
	Insufficient ventilation of the exhaust air ducts due to too small or dirty silencers (back pressure)	Use suitably sized silencers or expansion vessels. Clean the dirty silencers.
	Impurities or foreign matter in the pilot or pneumatic valve	Apply pulsed pressure to the exhaust air ducts to blow out the impurities. Install a new pilot or pneumatic valve.

Fault	Possible cause	Remedy
Leaky valve blocks	Missing or crushed O-rings between the modules	Identify leak or missing seals
	Missing or incorrectly positioned flat seals between valve and base plate	Insert missing seals or replace damaged seals

11 DISASSEMBLY



WARNING!

Risk of injury due to high pressure and any escaping media.

- Switch off the pressure before working on the device or system.
Vent or empty the lines.

Risk of injury from electric shock.

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



WARNING!

Risk of injury due to improper disassembly.

- Only trained specialist personnel may carry out the disassembly.
- Perform disassembly work using suitable tools only.

Risk of injury from dangerous fluids.

- Before loosening lines or valves, flush out hazardous media, depressurise and drain the lines.

11.1 Valve block disassembly

- Loosen the clamping screws (approx. 4 turns).
- Remove the block upwards from the standard rail.

11.2 Disassembling multi-blocks

- Use the screwdriver to disengage the upper latch hook from the disassembly groove on the front side.
- Remove the sub-block/module from the side.

11.3 Disassembling hose lines

- To release the lines, push in the pressure ring and pull out the hose line.

12 CONNECTION MODULE RIGHT

Other application options:

- Connection modules on the right can be used in special applications as sub-modules to build up several operating pressure stages in one block.
- Makes additional feed possible for larger valve blocks.

NOTE!

If necessary, pierce the lateral predetermined breaking points of connections 1, 3 and 5, and those of the upper pilot vent.

13 PULSED OPERATION

Pulse-controlled solenoid valves work with two coils that are switched alternately.

NOTE!

Observe pulse data on the type label. Avoid simultaneous pulsing of both coils.



Valves can be reversed with the manual override.

14 TRANSPORTATION, STORAGE, DISPOSAL

NOTE!

Damage in transit due to inadequately protected devices.

- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Observe permitted storage temperature.
- ▶ Protect the electrical interfaces of the coil and the pneumatic connections from damage by placing protective caps on them.

Incorrect storage may damage the device.

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

Damage to the environment caused by device parts that are contaminated with media.

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

www.burkert.com