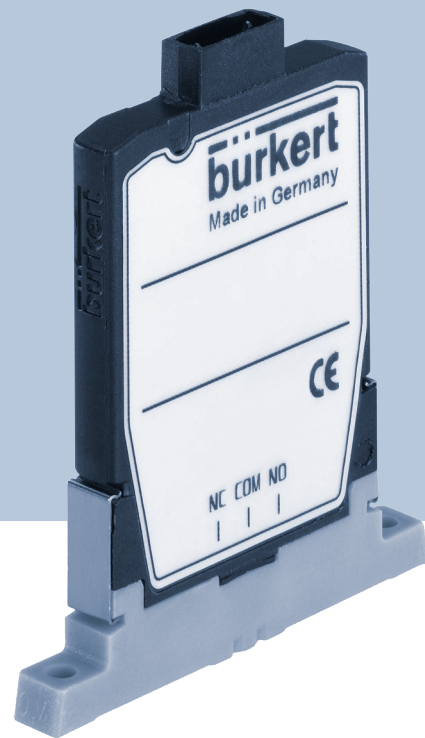


# Type 6650

2/2-way and 3/2-way flipper solenoid valve



## Operating Instructions

We reserve the right to make technical changes without notice.

© Bürkert Werke GmbH & Co. KG, 2015 - 2024

Operating Instructions 2412/10\_GBen\_00805879 / Original DE

# Table of contents

<b>1</b>	<b>About this document</b>	<b>4</b>
1.1	Symbols	4
1.2	Terms and abbreviations	5
1.3	Manufacturer	5
<b>2</b>	<b>Safety</b>	<b>6</b>
2.1	Intended use	6
2.2	Basic safety instructions	6
<b>3</b>	<b>Technical data</b>	<b>8</b>
3.1	Operating conditions	8
3.2	Mechanical data	9
3.3	Fluidic data	9
3.4	Type label	10
3.5	Electrical data	11
3.5.1	Continuous operation with power reduction	11
<b>4</b>	<b>Installation</b>	<b>16</b>
4.1	Safety instructions	16
4.2	Fluidic installation	16
4.3	Electrical installation	17
<b>5</b>	<b>Maintenance, troubleshooting</b>	<b>19</b>
5.1	Safety instructions	19
5.2	Maintenance work	19
5.3	Faults	19
<b>6</b>	<b>Logistics</b>	<b>20</b>
6.1	Transport and storage	20
6.2	Return	20
6.3	Disposal	20

# 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 [Products](#).

- ▶ Enter the article number from the type label in the search bar.

## 1.1 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 on 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.

**Menü** Indicates a software user-interface text.

## 1.2 Terms and abbreviations

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

---

Product	Flipper solenoid valve type 6650
---------	----------------------------------

---

## 1.3 Manufacturer

Bürkert Fluid Control Systems

Christian-Bürkert-Str. 13-17

D-74653 Ingelfingen

The contact addresses are available at [Contact](#).



Need more information or additional products?

▶ Explore the full range of products on our [eShop](#).

---

## 2 Safety

### 2.1 Intended use

Unauthorised use of the flipper solenoid valve type 6650 may be dangerous to people, nearby equipment and the environment.

- ▶ The device is a media-separated solenoid valve and is designed for use with gases and liquids.
- ▶ When using the device, observe the authorised data, and the operating and usage conditions specified in the contract documents and in the operating instructions.
- ▶ Do not use the device without the appropriate safeguards outdoors.
- ▶ Operate the device only with suitable power reduction.
- ▶ Do not exceed the duty cycle.
- ▶ Use only in conjunction with third-party devices and components recommended or approved by Bürkert.
- ▶ Use the device when it is in perfect condition only, and always ensure proper storage, transportation, installation and operation.
- ▶ Use only as intended.

### 2.2 Basic safety instructions

These safety instructions do not take into consideration any contingencies and events that may arise during installation, operation and maintenance.

#### Danger – high pressure

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

#### Risk of burns/fire due to hot device surface if device operated continuously

- ▶ Keep the device away from highly flammable substances and media and do not touch with bare hands.
- ▶ Do not exceed the permitted duty cycle.
- ▶ Do not obstruct heat dissipation required for operation.

#### Medium may leak out if the diaphragm is worn

- ▶ Check regularly for any medium leakages.
- ▶ If the medium is hazardous, secure the environment against risks.

#### General dangerous situations

- ▶ Do not use type 6650 in potentially explosive atmospheres.
- ▶ Do not remove the connecting clips between the coil and the fluid body under any circumstances.
- ▶ Do not make any internal or external changes to the device.
- ▶ Do not subject the body and the coil to mechanical stress.
- ▶ Make sure only trained technicians carry out installation and maintenance work.
- ▶ Ensure that the system cannot be activated unintentionally.

- ▶ After an interruption in the power or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ Operate the device only when it is in perfect condition and in accordance with the operating instructions.
- ▶ The general rules of technical equipment apply to application planning and operation of the device.

### **Electrostatically sensitive components/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, they will be destroyed immediately or will fail after start-up.

- ▶ Observe the requirements for minimizing or avoiding the possibility of damage caused by sudden electrostatic discharge in accordance with EN 61340-5-1!
- ▶ Do not touch electronic components when the supply voltage is connected!

## 3 Technical data

### 3.1 Operating conditions



#### WARNING!

Risk of injury from malfunction if used outdoors.

- ▶ Do not use the device outdoors and keep it away from heat sources that could cause the permissible temperature range to be exceeded.

Ambient temperature	+10 °C...+50 °C
Storage temperature	-10 °C...+65 °C
Medium temperature	+15 °C...+50 °C
Media	aggressive, neutral gaseous and liquid media according to the resistance table (see <a href="http://country.burkert.com">country.burkert.com</a> )
Max. duty cycle	50 s for block structure 60 s for single installation Longer duty cycle is permitted only with power reduction (see <a href="#">Electrical data</a> [▶ 11])
Degree of protection	IP65 acc. to EN 60529
Protection class	3 according to VDE 0580

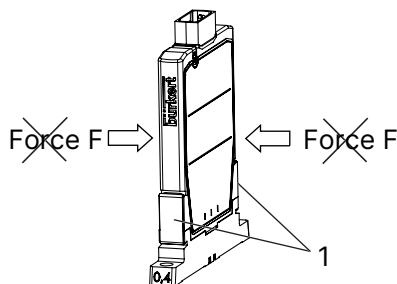


#### WARNING!

Risk of injury due to escaping medium.

Lateral, compressive or tensile force can cause the connection clamps to loosen.

- ▶ Do not mechanically load the device.
- ▶ Do not exert any lateral, compressive or tensile force on the device.



1 Connection clamps



### 3.2 Mechanical data

(without electrical plug)	
Width per station	4.5 mm
Weight	12.5 g
Dimensions	4.5 × 38.5 × 41.2 mm
Body material	PEEK
Seal material	FFKM

### 3.3 Fluidic data

2/2-way variant

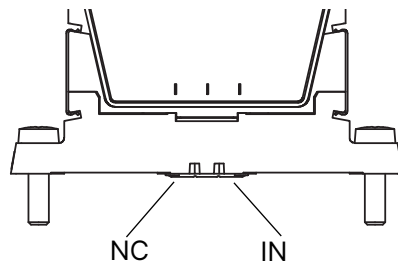


Fig. 1: Fluidic connections

2/2-way NC circuit function A	DN*)	NC	IN	$\Delta P$ max.***)
	0.4	Vac. – 7 bar	Vac. – 7 bar	7 bar
	0.8	-**)	Vac. – 3 bar	3 bar

\*) DN = nominal diameter

\*\*\*) Note the flow direction. The output pressure must not be higher than the input pressure.

\*\*\*) Observe the permissible differential pressure for vacuum operation.

3/2-way variant

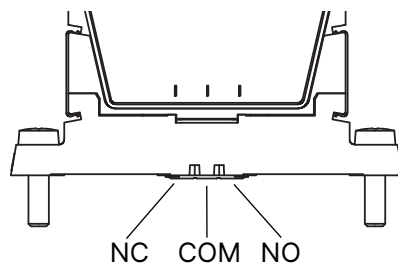
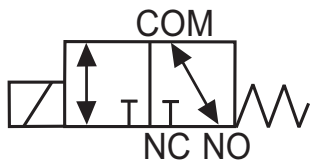


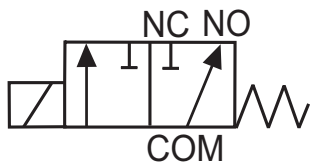
Fig. 2: Fluidic connections

3/2-way universal circuit function T	DN*)	NC	COM	NO	$\Delta P$ max.***)
--------------------------------------	------	----	-----	----	---------------------



0.8	Vac. – 1 bar	Vac. – 1 bar	Vac. – 1 bar	1 bar
-----	--------------	--------------	--------------	-------

3/2-way distributor circuit function F	DN*)	NC	COM	NO	$\Delta P$ max.***)
--	------	----	-----	----	---------------------



0.8	-**)	Vac. – 3 bar	-**)	3 bar
-----	------	--------------	------	-------

\*) DN = nominal diameter

\*\*\*) Note the flow direction. The output pressure must not be higher than the input pressure.

\*\*\*) Observe the permissible differential pressure for vacuum operation.

### 3.4 Type label

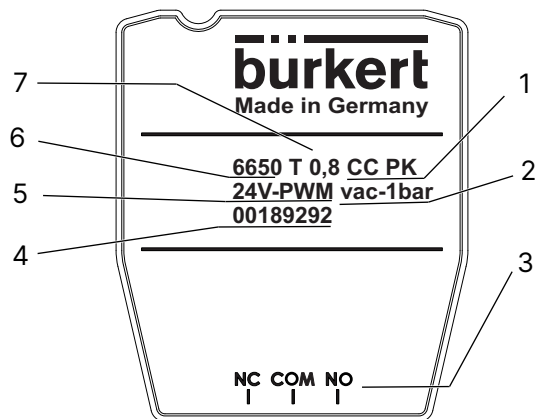


Fig. 3: Example

1 Seal material (CC=FFKM FF = FKM) body material (PK=PEEK)	2 Pressure range
3 Labelling of the fluidic connections	4 Identification number
5 Voltage	6 Type, circuit function
7 Nominal diameter [DN]	

## 3.5 Electrical data

Connections	Type-specific push-in connector, see data sheet
Power supply	12 V, 24 V
Voltage tolerance	± 10%
Power consumption	Actuation/switch-on pulse: 5.7 W Holding power: 0.7 W



The specified values (power consumption) describe the heat output. When designing the power supply, ensure that there are adequate reserves.

### 3.5.1 Continuous operation with power reduction

A power reduction is required for continuous operation of the valve type 6650. It is recommended to use the electronics available as an accessory (see data sheet).

#### **NOTICE!**

##### Function failure due to overheating.

- ▶ Do not exceed the coil temperature of 110 °C.
- ▶ If necessary, use a suitable power reduction.
- ▶ For a switch-on time > 50 s (> 60 s for single installation), a power reduction must always be used!
- ▶ The electronic unit 670178 is available as an accessory and is only suitable for rated voltage 24 V.

The following diagrams provide a guideline for estimating the necessity of a power reduction. If the distance between the individual devices is < 10 mm, the diagram for the block structure must be used as a basis. No power reduction is necessary if the intersection of switch-on and switch-off time is in the upper area of the corresponding diagram.

Single device

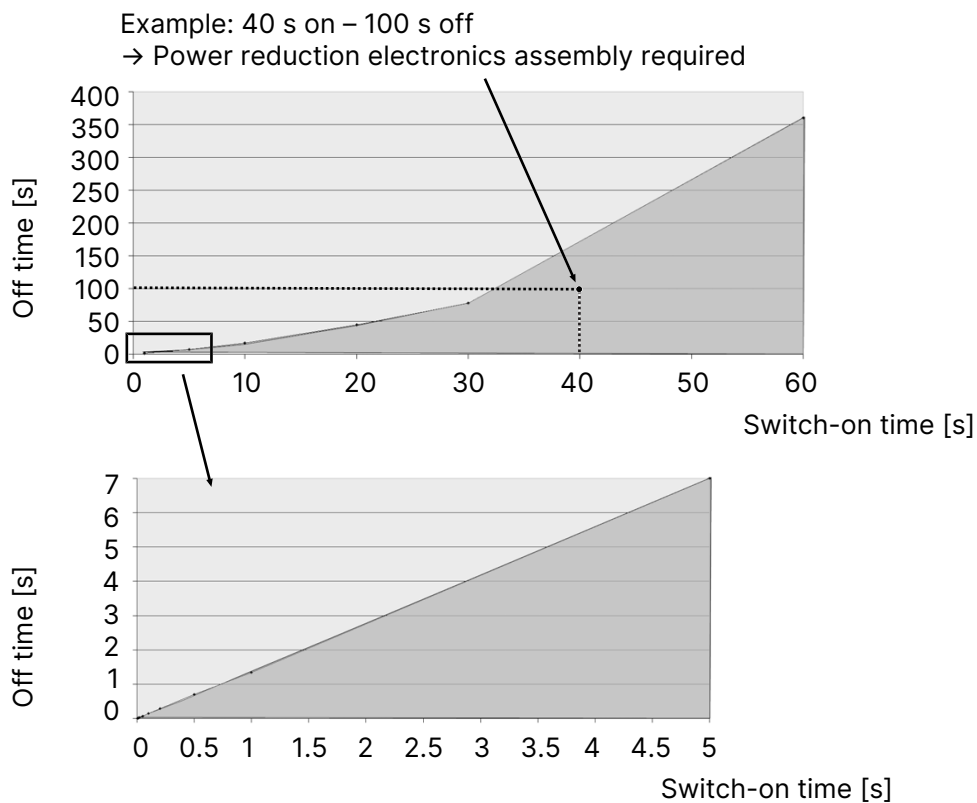


Fig. 4: Pulse/pause ratio at 22 °C ambient temperature

If the intersection point is on or below the marked line or if the switch-on time is longer than 60 seconds, a power reduction is mandatory.

Block structure

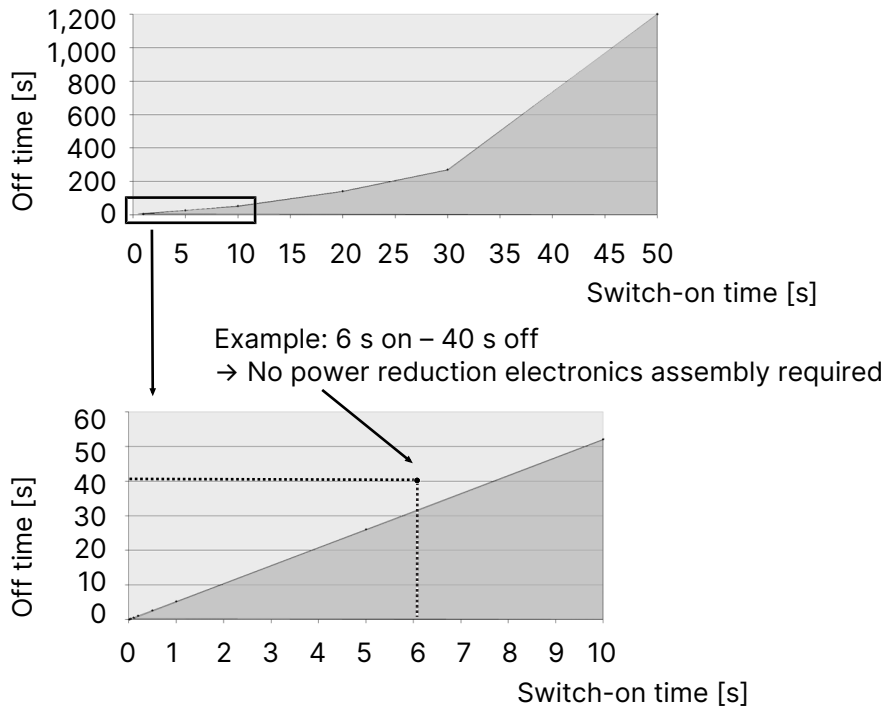
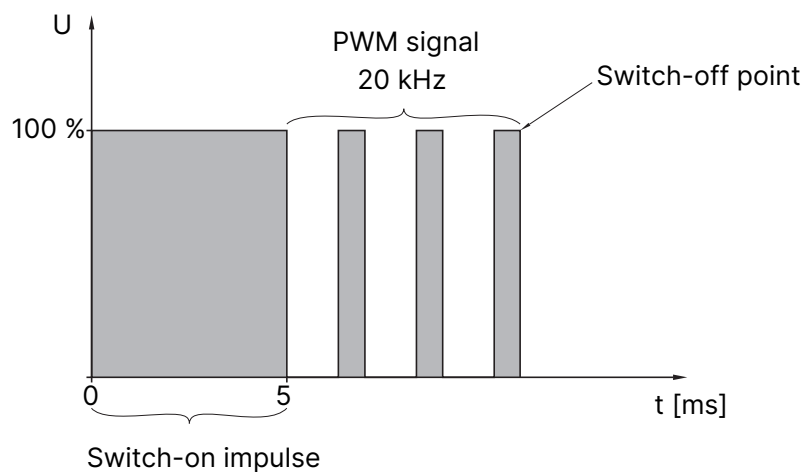


Fig. 5: Pulse/pause ratio at 22 °C ambient temperature

If the intersection point is on or below the marked line or if the switch-on time is longer than 50 seconds, a power reduction is mandatory.

If the Bürkert electronics are not used, but a power reduction is nevertheless used, the following parameters must be used:

- with PWM voltage reduction, duty cycle 33%,  $f = 20 \text{ kHz}$ .



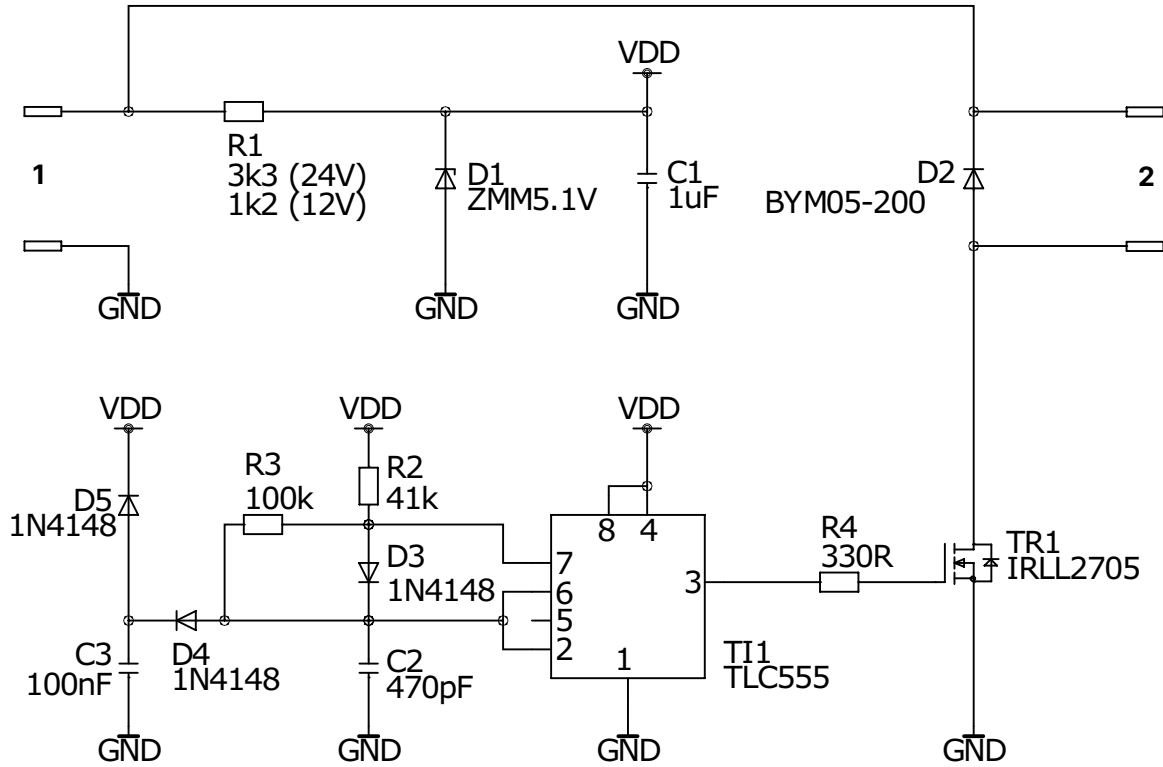
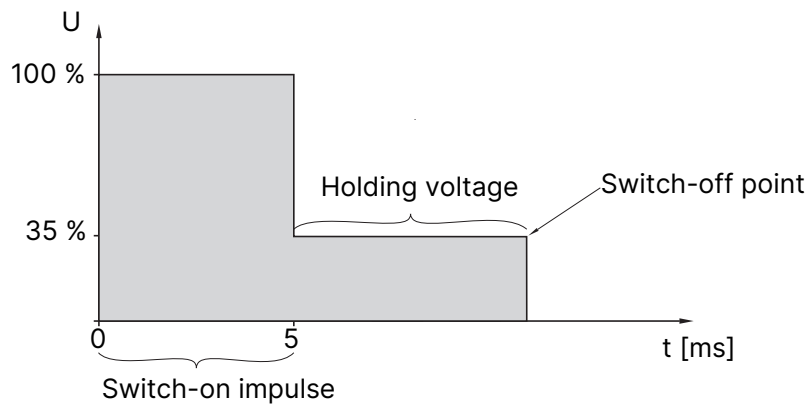


Fig. 6: Circuit diagram recommended for OEM electronics (PWM): Circuit diagram for 24 V

1 Supply voltage

2 Valve

- with resistance reduction, switch-on pulse 100% nominal voltage for 5 ms, then holding voltage 35% nominal voltage.



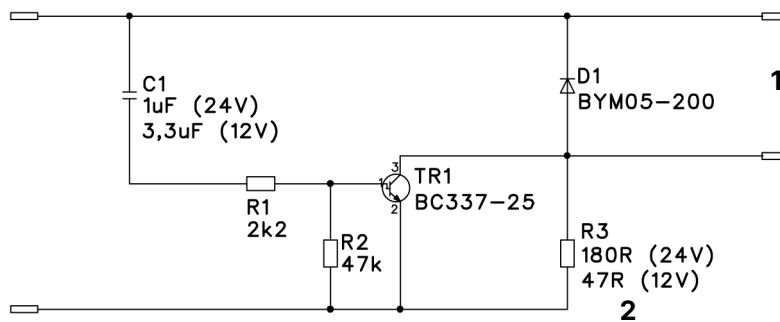


Fig. 7: Circuit diagram recommended for OEM electronics (resistance reduction): Circuit diagram for 24 V design

1 Connection coil

2 Attention: power consumption approx. 1.6 W  
Alternative series or parallel connection of  
several resistors

## 4 Installation

### 4.1 Safety instructions

#### **DANGER!**

Risk of injury from high pressure in the system.

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

#### **WARNING!**

Risk of injury from improper installation.

- ▶ Installation may be carried out by authorised technicians only and with the appropriate tools.

#### **WARNING!**

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.

### 4.2 Fluidic installation

#### **DANGER!**

Risk of injury from high pressure in the system.

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

Installation position: any, preferably actuator facing up.

- ▶ Clean dirt from the pipes and flange connections before installation.
- ▶ Install a dirt trap to protect against disruptions (mesh width: 5 µm).

#### **WARNING!**

Danger due to escaping medium.

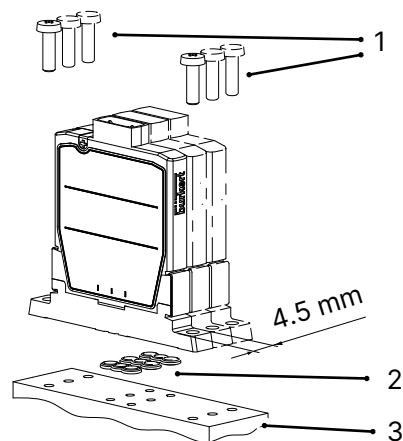
Leaking connections with incorrectly positioned seal.

- ▶ Ensure that the supplied sealing gasket is seated correctly.



The width per station must not be less than 4.5 mm.





1 Flange screws

2 Sealing gasket

3 Manifold

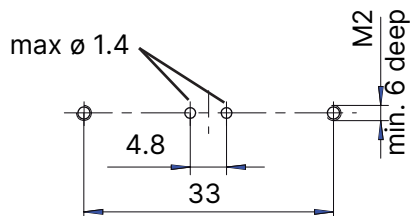


#### Flange screws

Recommended tightening torque:  $0.35 \text{ Nm} \pm 0.1 \text{ Nm}$

- ▶ Place sealing gasket in the valve.
- ▶ Correctly assign fluid pin assignment 1, 2 and 3 on the valve and manifold.
- ▶ Screw the valve onto the manifold.

#### 2-way variant



#### 3-way variant

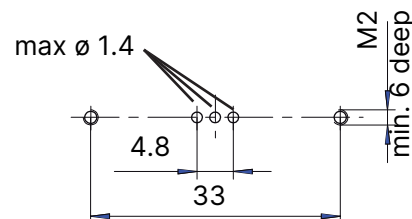


Fig. 8: Dimensioned drawing for manifold

- ▶ Check the valve for tightness.

## 4.3 Electrical installation

### NOTICE!

The valve type 6650 is not suitable for continuous operation without an intended power reduction.  
See [Electrical data](#) [▶ 11]



All valves in the block assembly must have the same polarity. The marking (+) on the valve and the numbers 1 and 2 on the push-in connector serve as orientation. Example: on all devices, the push-in connector with the number 2 points to the marking (+).

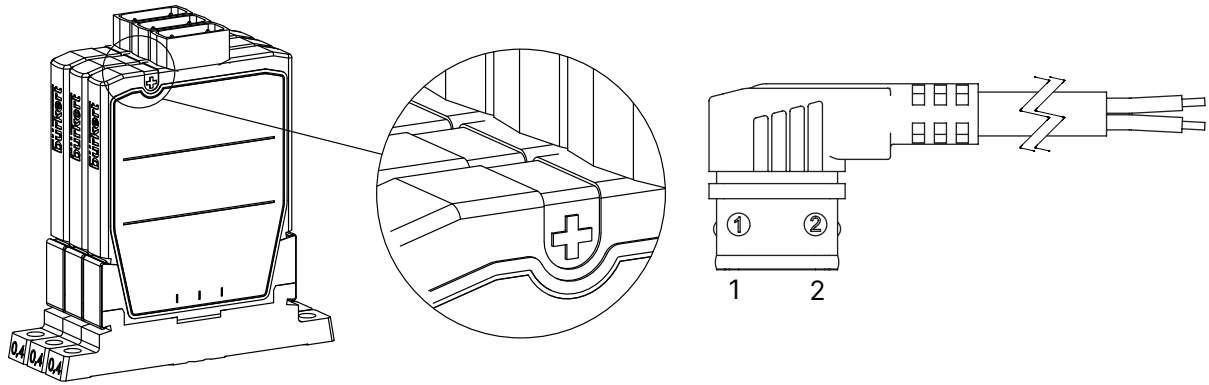


Fig. 9: Push-in connector

---

1 brown

2 white

---



The following polarity must be observed when using the power reduction electronics: brown +/white -.

A type-specific push-in connector is available as an accessory (see data sheet) both with and without integrated power reduction electronics.

## 5 Maintenance, troubleshooting

- ▶ Check regularly for any medium leakages

### 5.1 Safety instructions



#### **DANGER!**

Risk of injury from high pressure in the system.

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



#### **WARNING!**

Risk of injury due to improper maintenance work.

- ▶ Only technicians may perform maintenance work.
- ▶ Secure the system against unintentional activation.
- ▶ Ensure a controlled restart after maintenance is completed.

### 5.2 Maintenance work

The valve operates maintenance-free under normal conditions.

Cleaning with suitable cleaning agents is recommended for heavy external soiling. The suitability of the cleaning agent should be determined by testing if necessary.



#### **WARNING!**

Escaping medium and malfunction when removing the connection clamps.

- ▶ Do not remove the connecting clips between the coil and the fluid body.

### 5.3 Faults



When operating with power reduction electronics, ensure that the edge of the supply voltage is sufficiently fast.

If faults occur, check

- the port connections,
- the operating pressure,
- the power supply and valve control unit.

If the valve still does not actuate, contact your local Bürkert Service representative.

## 6 Logistics

### 6.1 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.

### 6.2 Return



---

No work or tests will be carried out on the device until a valid Contamination Declaration has been received.

---

- ▶ To return a used device to Bürkert, contact the Bürkert sales office. A return number is required.

### 6.3 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](https://country.burkert.com)