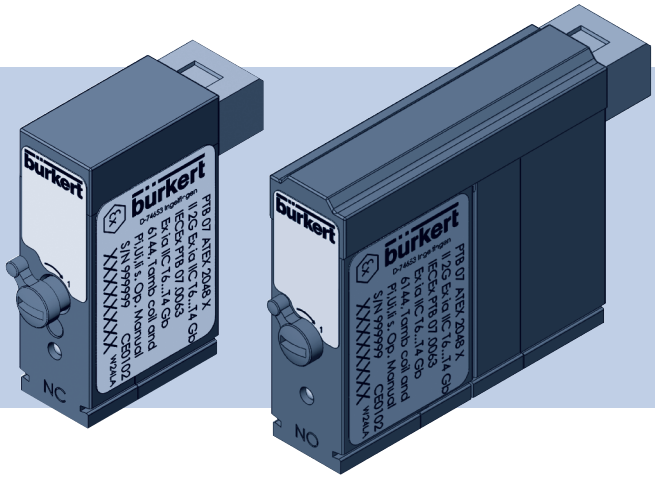
bürkert
FLUID CONTROL SYSTEMS

PTB 07 ATEX 2048 X

Geräte mit IIC 2G EX ia Zulassung
Device with IIC 2G EX ia approval
Appareils avec mode de protection IIC 2G EX ia

Example/Beispiel/Exemple

Flipperventil 6144
Flipper valve 6144
Vanne à languette 6144



Additional manual

Zusatzanleitung
Manuel supplémentaire

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Flipper valve 6144, device with II 2G EX ia certification

Contents:

1. ADDITIONAL INSTRUCTIONS

The additional instructions describe the special requirements and measures for using the device in potentially explosive atmospheres. Keep these instructions in a location which is easily accessible to every user and make them available to every new owner of the device.

Important safety information!

Carefully read through these additional instructions. Pay particular attention to the following:

- the “intended use”,
- all safety instructions,
- the “special conditions of use”.

▸ The additional instructions must be read and understood.

These additional instructions contain the safety instructions as well as special information for use in potentially explosive atmospheres. All other notes and descriptions about the device can be found in the respective operating instructions, which must also be observed along with the additional instructions.

The operating instructions can be found on the Internet at: www.burkert.com

1.1. Definition of the term ‘device’

The term “device” used in these instructions always stands for the Type 6144 flipper valve.

The abbreviation “Ex” used in these instructions always stands for “potentially explosive”.

1.2. Symbols

The following symbols are used in these instructions to identify important information:

DANGER!

Warns of an immediate danger.

▸ Failure to observe these instructions will result in death or serious injuries.

WARNING!

Warns of a potentially hazardous situation.

▸ Failure to observe these instructions may result in serious injuries or death.

CAUTION!

Warns of a potential danger.

▸ Failure to observe these instructions may result in moderate or minor injuries.

NOTE!

Warns of damage.

Important tips and recommendations.

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

▸ Highlights instructions to avoid a danger.

→ Designates a procedure which you must carry out.

2. INTENDED USE

Non-intended use of the Type 6144 flipper valve may be dangerous to people, nearby equipment and the environment.

- The flipper valve serves exclusively to control the gaseous or liquid media permitted according to the “Technical data”. For use in a potentially explosive atmosphere, install the flipper valve in a housing that meets the requirements of IP20 or higher in accordance with IEC 60529.
- The flipper valve was designed for use in explosion group IIC, category 2G and temperature class T4, T5 or T6. Observe the adhesive label for the potentially explosive atmosphere as well as the technical data in these additional instructions.
- Do not use the flipper valve outdoors and protect it from UV radiation.
- When using the device, observe the permitted data, operating conditions and deployment conditions specified in the contract documents and
  – in the operating instructions for the flipper valve 6144
  – on the type label of the device
  – in the operating instructions for the valve island in which the valve is to be used.
- The flipper valve may be used only in conjunction with third-party devices and components recommended or approved by Bürkert.
- Prerequisites for safe and trouble-free operation are correct transportation, correct storage and installation as well as careful operation and maintenance.
- Only use the device for its intended purpose.

Temperature classes and electrical data are specified on the type label and in the “technical data“ of these instructions.

2.2.1. Explosion protection approval

The EX approval is only valid if you use the modules and components authorised by Bürkets in such a way as described in this operating manual.

The flipper valve may only be used in combination with additional components that have been approved by Bürkert. Otherwise, the Ex approval will expire.

If you make any unauthorised changes to the device, the modules or the components, the Ex approval will also expire.

The EU type approval certificate PTB 07 ATEX 2048 X was issued by the PTB (Physikalisch Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany), which also audits production (CE0102).

3. BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- contingencies and events which may arise during the installation, operation and maintenance of the devices.
- local safety regulations, whereby the operator is responsible for their compliance, by the installation personnel too.

Danger of explosion.

- The flipper valve is part of a closed system. During operation, it must not be dismantled.

Danger – high pressure.

There is a serious risk of injury when reaching into the system.

- Before loosening the lines and valves, turn off the pressure and vent the lines.
- During the installation, make certain the direction of flow is correct.
- Observe applicable accident prevention and safety regulations for pressurised devices.
- After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.

Risk of burn due to hot device surface.

- Do not touch the device with bare hands.

General hazardous situations.

To prevent injuries, ensure that:

- the system cannot be activated unintentionally
- Do not place the housing under mechanical stress (e.g. by placing objects on it or standing on it).
- Do not make any internal or external alterations to the device housings. Do not paint housing parts or screws.
- Unauthorised modifications to the system are not permitted.
- Work on the system may only be carried out by qualified and trained personnel using suitable tools.
- The flipper valve may be operated only when in perfect condition and in consideration of the operating instructions.
- The general rules of technology apply to application planning and operation of the flipper valve.

4. GENERAL INFORMATION

4.1. Contact address

Germany

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

International

Contact addresses can be found on the final pages of these 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 authorized in accordance with the specified application conditions.

4.3. Information on the internet

Operating instructions and data sheets for the flipper valve type 6144 can be found on the internet at: www.burkert.com

5. USAGE CONDITIONS

For use in a potentially explosive atmosphere, install the flipper valve in a housing that meets the requirements of IP20 or higher in accordance with IEC 60529.

Do not use the flipper valve outdoors and protect it from UV radiation.

5.1. Operating conditions

When operating the single valve type 6144, the following requirements have to be observed.

5.1.1. Application temperature range:

For the application temperature range, the permissible values for the flipper valve apply, which are listed in the chapter "Technical data".

5.1.2. Max. permissible ambient temperature

The maximum permissible ambient temperature is dependent on the energy fed in, the temperature class and the installation. The corresponding values are listed in the chapter "Technical data".

5.2. Installation conditions

The suitability of the valve for single or block installation is dependent on the energy fed in, the temperature class and the ambient temperature (see "Technical data").

Also follow the instructions in the chapter “9. Assembly / installation” and “10. Start-up”.

6. GENERAL TECHNICAL DATA

DANGER!

Danger of explosion.

Non-compliance or non-observance of the safety-relevant data and values specified on the rating plate could cause dangerous situations.

- When using the device, the protection class and the temperature class must be observed.

Exceeding the voltage stated on the rating plate can cause overheating of the device.

- Do not connect the device with a voltage that is higher than stated on the rating plate.

6.1. Identification of the device

Example (version with rectangular connector):

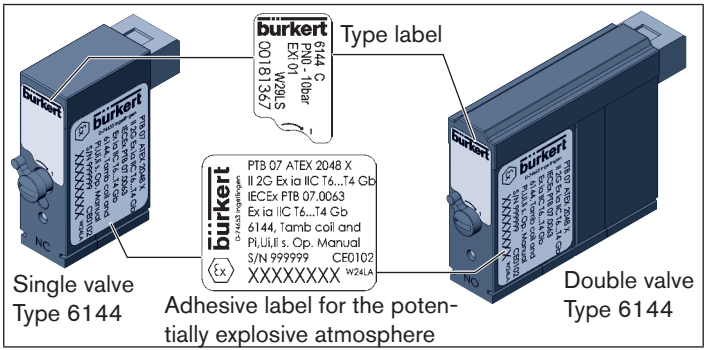


Image 1: Type label and adhesive label for potentially explosive atmosphere

6.1.1. Example – adhesive label for potentially explosive atmosphere and type label

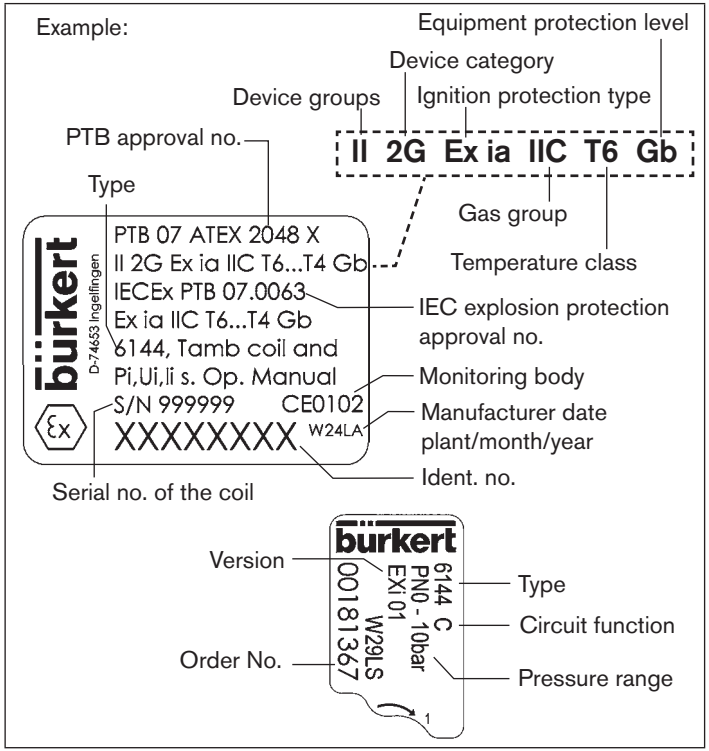


Image 2: Description: Adhesive label for potentially explosive atmosphere and type label

6.2. Conformity

The Type 6144 conforms to the EU Directives as per the EU Declaration of Conformity.

6.3. Standards

- EN 60079-0:2018 and EN 60079-11:2012

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

6.4. Labelling for type variants

Example: 6144-C00,6FFPSFB05-0-EXI/02-AW
* JB18+JF80+PF02

6144	PF02*	JF80*
Type designation	Encryption of the approval	Electrical connection

* all flipper valve variants are listed in the following tables "Encryption of the approval" and "Electrical connections".

Encryption of the approval:

PF01	Ex ia IIC T6...T4	Set up as an individual device
PF02	Ex ia IIC T6...T4	Set up as a block installation

Electrical connections:

JD68	2 press-fit PVC stranded wires 0.14 mm^2(AWG 26)
JF80	Rectangular connector connection 2-pole
JF81	Rectangular connector connection 3-pole
JF82	Rectangular connector connection 2-pole without shroud

6.5. Functional data

The solenoid valve 6144 is available in a single and double valve design with 3 versions each.

Version		Resistance R20 [Ω]	Minimum terminal voltage [V]	Minimum current [mA]
01	Version for the use with 300 Ω supply module	320	9,3	29
02	High-impedance version	510	11,7	23
03	Version for theuse at the valve terminal 8650	125	Single valve 6.1	49
			Double valve 5.28	42

The maximum voltage and current values are determined by the admissible electrical equipment.

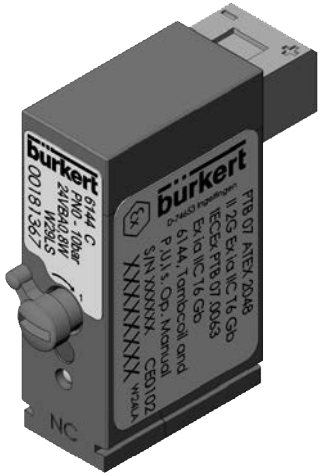
Please refer to the chapters titled "7. Technical data Single valve" and "8. Technical data Double valve".

6.6. Permissible ambient temperature

The maximum permissible ambient temperature is dependent on the energy fed in, the temperature class and the installation (single or block installation).

Please refer to the chapters titled "7. Technical data Single valve" and "8. Technical data Double valve".

7. TECHNICAL DATA SINGLE VALVE



7.1. Temperature-class-specific data

The maximum permissible output is dependent on the maximum ambient temperature, the temperature class and the installation (single or block installation).

The permissible values are listed in the following separate tables (one for each temperature class).

7.1.1. Temperature class T6

Max. permissible surface temperature for T6: 85 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Max. permitted power Pi [W]	Ignition protection type	Explosion group
T6	-40 ... +40	Block installation	0,4	Ex ia	IIC
	-40 ... +30		0,5		
	-40 ... +55	Single valve	0,4		
	-40 ... +50		0,5		
	-40 ... +45		0,6		
	-40 ... +40		0,7		
	-40 ... +35		0,8		

7.1.2. Temperature class T5:

max. permissible surface temperature for T5: 100 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Max. permitted power Pi [W]	Ignition protection type	Explosion group
T5	-40 ... +55	Block installation	0,4	Ex ia	IIC
	-40 ... +45		0,5		
	-40 ... +40		0,6		
	-40 ... +35		0,7		
	-40 ... +25		0,8		
	-40 ... +70	Single valve	0,4		
	-40 ... +65		0,5		
	-40 ... +60		0,6		
	-40 ... +55		0,7		
	-40 ... +50		0,8		
	-40 ... +45		0,9		
	-40 ... +40		1,0		
	-40 ... +35		1,1		

7.1.3. Temperature class T4:

max. permissible surface temperature for T4: 135 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Max. permitted power Pi [W]	Ignition protection type	Explosion group
T4	-40 ... +90	Block installation	0,4	Ex ia	IIC
	-40 ... +80		0,5		
	-40 ... +75		0,6		
	-40 ... +70		0,7		
	-40 ... +60		0,8		
	-40 ... +105	Single valve	0,4		
	-40 ... +100		0,5		
	-40 ... +95		0,6		
	-40 ... +90		0,7		
	-40 ... +85		0,8		
	-40 ... +80		0,9		
	-40 ... +75		1,0		
	-40 ... +70		1,1		

7.2. Electrical data

The flipper valve type 6144 with ignition protection type intrinsic safety Ex ia IIC must only be connected to certified, intrinsically safe electric circuits with the following maximum values.

Explosion group	IIC
Category	ia
Temperature class	T6 / T5 / T4
Max. permissible input voltage (Ui)	35 V
Max. permissible input current (Ii)	0.9 A
Max. permissible input power (Pi)	see tables in chapter "7.1. Temperature-class-specific data"

Power supply voltage:

For the maximum permissible voltages and the corresponding maximum permissible short-circuit currents for the respective explosion groups, please see standard EN 60079-11.

Some value pairs for the explosion group IIC are listed as an example for every ignition protection type.

Valve with ignition protection type intrinsic safety Ex ia IIC.

Voltage value [V] = Ui	15	18	20	22	25	28	30	35
Current value [A] = Ii	0,9	0,44	0,309	0,224	0,158	0,120	0,101	0,073

7.2.1. Protection class

At least IP20 as per IEC 60529, DIN EN60529, (DIN VDE 0470 part1),

7.3. Dimensions and weight

Length	Width	Height	Ground
18 mm	10 mm	31.5 mm	10 g

8. TECHNICAL DATA DOUBLE VALVE

8.1. Temperature-class-specific data

The maximum permissible output is dependent on the maximum ambient temperature, the temperature class and the installation (single or block installation).

The permissible values are listed in the following separate tables (one for each temperature class).

The control units for both coils (double solenoid valve) must be implemented based on an intrinsically safe power circuit using the specified limit values.

8.1.1. Temperature class T6

max. permissible surface temperature for T6: 85 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Per coil Max. permitted power Pi [W]	Ignition protection type	Explosion group
T6	-40 ... +35	Block installation	0,4	Ex ia	IIC
	-40 ... +25		0,5		
	-40 ... +50	Single valve	0,4		
	-40 ... +45		0,5		
	-40 ... +40		0,6		
	-40 ... +30		0,7		
	-40 ... +25		0,8		

8.1.2. Temperature class T5:

Max. permissible surface temperature for T5: 100 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Per coil Max. permitted power Pi [W]	Ignition protection type	Explosion group
T5	-40 ... +50	Block installation	0,4	Ex ia	IIC
	-40 ... +40		0,5		
	-40 ... +30		0,6		
	-40 ... +65	Single valve	0,4		
	-40 ... +60		0,5		
	-40 ... +55		0,6		
	-40 ... +45		0,7		
	-40 ... +40		0,8		
	-40 ... +35		0,9		
	-40 ... +30		1,0		

8.1.3. Temperature class T4:

Max. permissible surface temperature for T4: 135 °C

Temp. class	Max. permissible ambient temperature [°C]	Installation	Per coil Max. permitted power Pi [W]	Ignition protection type	Explosion group
T4	-40 ... +85	Block installation	0,4	Ex ia	IIC
	-40 ... +75		0,5		
	-40 ... +65		0,6		
	-40 ... +55		0,7		
	-40 ... +50		0,8		
	-40 ... +40		0,9		
	-40 ... +35		1,0		
	-40 ... +100	Single valve	0,4		
	-40 ... +95		0,5		
	-40 ... +90		0,6		
	-40 ... +85		0,7		
	-40 ... +75		0,8		
	-40 ... +70		0,9		
	-40 ... +65		1,0		

8.2. Electrical data

The flipper valve type 6144 with ignition protection type intrinsic safety Ex ia IIC must only be connected to certified, intrinsically safe electric circuits with the following maximum values.

Explosion group	IIC
Category	ia
Temperature class	T6 / T5 / T4
Max. permissible input voltage (Ui)	35 V
Max. permissible input current (Ii)	0.9 A
Max. permissible input power (Pi)	see tables in chapter "8.1. Temperature-class-specific data"

The indicated power values for Pi apply to the individual coils and not to the entire device.

The control units for both coils (double solenoid valve) must be implemented based on an intrinsically safe power circuit using the specified limit values.

Power supply voltage:

For the maximum permissible voltages and the corresponding maximum permissible short-circuit currents for the respective explosion groups, please see standard EN 60079-11.

Some value pairs for the explosion group IIC are listed as an example for every ignition protection type.

Valve with ignition protection type intrinsic safety Ex ia IIC.

Voltage value [V] = Ui	15	18	20	22	25	28	30	35
Current value [A] = Ii	0,9	0,44	0,309	0,224	0,158	0,120	0,101	0,073

8.2.1. Protection class

At least IP20 as per IEC 60529, DIN EN60529, (DIN VDE 0470 part1),

8.3. Dimensions and weight

Length	Width	Height	Ground
36 mm	10.5 mm	31.5 mm	20 g

9. ASSEMBLY / INSTALLATION

9.1. Safety instructions

DANGER!

Danger of explosion.

- The flipper valve is part of a closed system. During operation, it must not be dismantled.

Danger – high pressure.

There is a serious risk of injury when reaching into the system.

- Before loosening the lines and valves, turn off the pressure and vent the lines.
- During the installation, make certain the direction of flow is correct.
- Installation work on the system may be carried out exclusively by expert and instructed personnel and with appropriate tools.
- Observe applicable accident prevention and safety regulations for pressurised devices.
- After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.

Danger of short circuit.

Damaged connection lines may result in a short circuit.

- The connection lines of the valve must be firmly laid and protected against damage.

9.2. Fluid installation

WARNUNG!

Risk of injury due to malfunction/escape of medium.

If the exhaust air from other processes is used to generate compressed air for the device, the seals may be destroyed by the media contained in the air.

- Use only fresh air to generate compressed air for the device.

The installation position of the flipper valve is arbitrary. Preferably, the drive should be at the top.

Important operating condition for the prevention of malfunctions:
The valve must have a minimum distance of 5 mm from other ferromagnetic materials.

Prior to the installation:

WARNING!

Risk of injury from high pressure.

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

→ Clean any possible dirt off the pipelines and flange connections.

→ Install a filter (5 µm) in front of the valve to protect it from malfunctions.

Installation of type 6144 with Bürkert flange:

(see "Image 3: Installation drawing for Bürkert flange")

WARNING!

Risk of injury through spillage of medium.

Medium that is spilled by leaking connections can result in injuries (e.g. burns or acid burns).

- Make sure that the sealing gasket included with delivery sits properly.

→ Insert the sealing gasket into the valve.

→ Correctly allocate the fluid connection configuration 1, 2 and 3 to the valve and the connection plate.

→ Drill holes according to the drill hole-pattern.

→ Screw valve onto the connection plate

→ Check valve for leakage.

Installation of type 6144 with angle flange:

(see "Image 4: Installation drawing for angle flange (FS09)")

→ Correctly allocate the fluid connection configuration 1, 2 and 3 to the valve and the connection plate.

→ Drill holes according to the drill hole-pattern.

→ Screw valve onto the connection plate

→ Check valve for leakage.

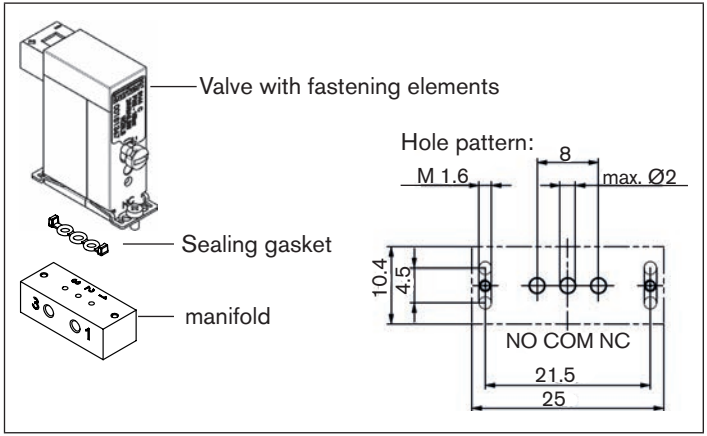


Image 3: Installation drawing for Bürkert flange

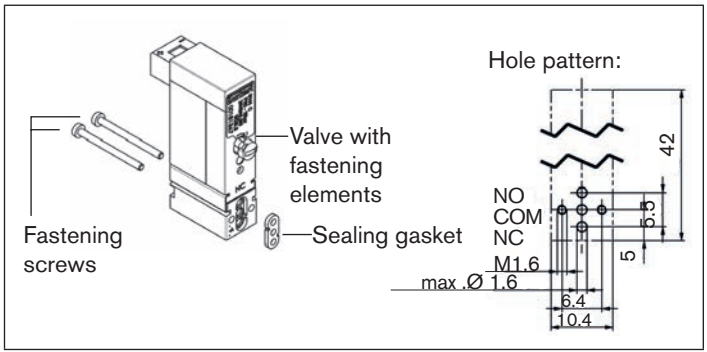


Image 4: Installation drawing for angle flange (FS09)

Installation of type 6144 double valve:

The proper installation of the double valve type 6144 is only possible if it is used with the double amplifier V524/V525.

Fig. 1: Double valve type 6144 with double amplifier V524/V525

9.3. Electrical installation

WARNING!

Risk of explosion.

The correct polarity is the prerequisite for the safe function of the device. If the polarity is reversed, the explosion protection no longer applies.

- To avoid reversing the polarity, observe the label on the top of the valve.

Only operate the device with direct voltage.
Maximum permissible residual ripple: ±0.1 %, absolute (at 24 V) 0.2 % or 50 mVss

10. START-UP

WARNING!

Danger of burns during long-term operation.

The surface of the device may become hot during long-term operation.

- A device that has already been in operation for an extended period of time must not be handled with bare hands.

Danger due to 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.
- In particular observe the safety instructions and intended use.
- The device/the system may be started by adequately trained personnel only.

Risk of injury due to malfunction/escape of medium.

If the exhaust air from other processes is used to generate compressed air for the device, the seals may be destroyed by the media contained in the air.

- Use only fresh air to generate compressed air for the device.

Make sure before the start-up that

→ the device has been installed according to the specifications,

→ the connection has been established properly,

→ the device is not damaged.

11. MAINTENANCE, TROUBLESHOOTING

11.1. Maintenance

DANGER!

Risk of injury due to malfunction/escape of medium.

If the exhaust air from other processes is used to generate compressed air for the device, the seals may be destroyed by the media contained in the air.

▸ Use only fresh air to generate compressed air for the device.

The flipper valve type 6144 is maintenance-free if the operating conditions described in this manual are observed.

11.2. Troubleshooting

In the event of malfunctions, make sure that

→ the device has been installed according to the specifications,

→ the connection has been established properly,no technical direct voltage has been used (see chapter “9.3. Electrical installation”)

→ and that the device is not damaged.

Check

→ the line connections

→ the operating pressure

→ the power supply and valve control unit

→ the free flow through the pipelines.

12. PACKAGING, TRANSPORT, STORAGE

NOTE!

Transport damages.

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against wet and dirt in shock-resistant packaging.
- Avoid exceeding or dropping below the allowable storage temperature.

Incorrect storage may damage the device.

- Store the device in a dry and dust-free location!
- Storage temperature -20 ... +65 °C.

13. DISPOSAL

NOTE!

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

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

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