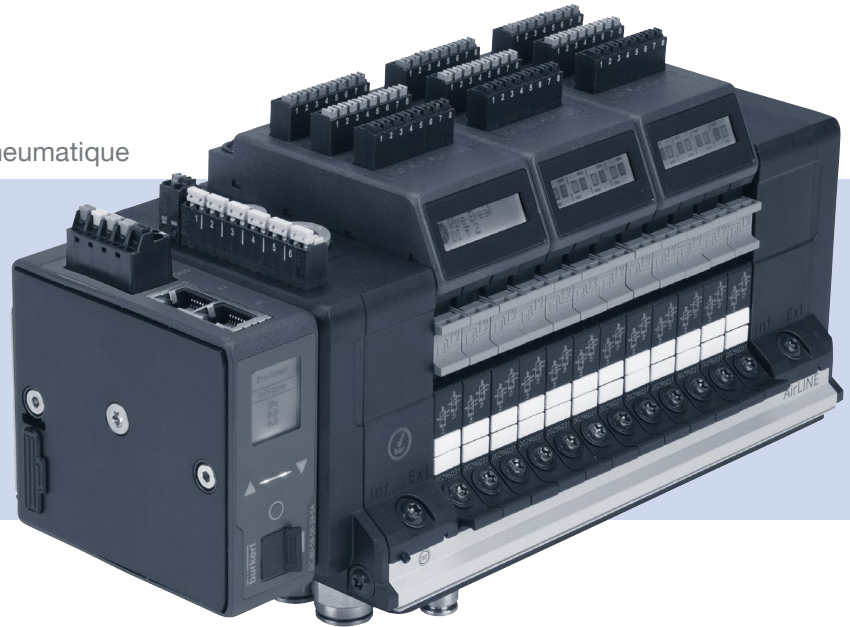


Type 8652 AirLINE

Modular valve island for pneumatics
Modulare Ventilinsel für Pneumatik
Îlot de vannes modulaire pour système pneumatique



Quickstart

English Deutsch Français

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

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Operating Instructions 2211/15_EUml_00810542 / Original DE

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1	THE QUICKSTART	4	8.3	Electrical connection electronics module with digital inputs (option)	20
1.1	Symbols.....	4	8.4	Electrical connection Type 6534 valves for safety-related shut-off, SIA variant (option).....	20
2	INTENDED USE	5	8.5	Electrical connection module-based safety shutdown (option).....	23
3	DEFINITIONS OF TERMS	5	9	PNEUMATIC CONNECTION	25
4	BASIC SAFETY INSTRUCTIONS.....	6	10	START-UP.....	26
5	GENERAL INFORMATION	7	10.1	Start-up files.....	26
5.1	Contact address.....	7	10.2	Selecting protocol at fieldbus gateway ME43.....	27
5.2	Warranty	7	10.3	Starting up via manual override.....	27
5.3	Information on the Internet.....	7	10.4	Marking the valve slots.....	28
6	TECHNICAL DATA.....	7	11	OPERATION	29
6.1	Standards and directives.....	7	11.1	Operating via manual override	29
6.2	Operating conditions.....	7	11.2	Operating via the fieldbus gateway ME43.....	29
6.3	Electrical data.....	8	11.3	Operating via Bürkert Communicator.....	29
6.4	Type label standard (example).....	10	11.4	Display elements fieldbus gateway ME43.....	29
6.5	Type label UL (example)	10	11.5	Display elements electronics module.....	30
6.6	Specifications Industrial Ethernet.....	10	12	MAINTENANCE, TROUBLESHOOTING	31
6.8	Specifications PROFIBUS DPV1	12	12.1	Replacing the valve	31
6.9	Specifications CC-Link.....	12	12.2	Replacing the filter.....	34
7	ASSEMBLY	13	12.3	Troubleshooting.....	34
7.1	Assembly on standard rail in a control cabinet	13	12.4	LC display of electronics module	36
7.2	Assembly on the base of the control cabinet or the wall of the control cabinet with AirLINE Quick	14	13	DISASSEMBLY	37
8	INSTALLATION	16	14	TRANSPORTATION, STORAGE, DISPOSAL	37
8.1	Electrical connection gateway.....	17			
8.2	Electrical connection 24 V supply voltage for the pneumatic valves.....	19			

1 THE QUICKSTART

The Quickstart contains the most important information and notes regarding the use of the device. A detailed description can be found in the operating instructions for Type 8652.

Keep the Quickstart in an easily accessible location for each user. The Quickstart must be available to each new owner of the device.

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.



The operating instructions and data sheets for Bürkert devices can be found on the Internet at:
country.burkert.com

1.1 Symbols



DANGER

Warns of an immediate danger.

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



WARNING

Warns of a potentially dangerous situation.

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



CAUTION

Warns of a possible danger.

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

NOTE

Warns of damage to property.



Important tips and recommendations.



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

- ▶ Designates an instruction which you must follow to prevent a hazard.

→ Designates a procedure which you must carry out.

2 INTENDED USE

The valve island AirLINE Type 8652 is designed for controlling and recording the switching statuses of pneumatically operated process valves.

- ▶ Use the device for its intended purpose only. Non-intended use of the device may be dangerous to people, nearby equipment and the environment.
- ▶ In areas at risk of explosion, only use devices approved for use in those areas. These devices are labeled with a separate Ex type label. For use in areas at risk of explosion, observe the information provided on the separate Ex type label and the additional explosion-related information included in the scope of supply.
- ▶ Correct transportation, correct storage as well as correct assembly, installation, start-up, operation and maintenance are essential for reliable and problem-free operation.
- ▶ When using the device, observe the permitted data, operating conditions and application conditions. This information can be found in the contractual documents, the operating instructions and on the type label.
- ▶ Use the device only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- ▶ In outdoor areas, make sure the device is installed in a control cabinet with a minimum degree of protection of IP 65.
- ▶ In indoor areas, make sure the device is installed in a control cabinet with a minimum degree of protection of IP 20.
- ▶ Do not operate the device unless it is in perfect working order.



The valve island is only intended for use in industrial environments.

The valve island is only permitted in applications where there is a danger to life and limb if the SIA and EVS functions provided for this purpose are used with appropriate, approved equipment (safety relays, etc.).

3 DEFINITIONS OF TERMS

Term	Is used in these instructions in substitution for
Actuator, process valve	Pneumatic consumer activated by the valve island
büS	Bürkert system bus, a communication bus developed by Bürkert based on the CANopen protocol
Device, valve island	Valve island AirLINE Type 8652
EVS	External valve voltage shutdown Valves can be de-energised irrespective of the control signals from the bus master. This safety shutdown can be applied to individual valves, valve units or the complete valve block.
SIA variant	Variant for safety-related shutdown (see „EVS“)
Pneumatic valve, pilot valve	Pneumatic slide valve that can be integrated in the valve block

4 BASIC SAFETY INSTRUCTIONS

These safety instructions do not consider any contingencies or incidents which occur during assembly, operation and maintenance. The operator is responsible for observing the location-specific safety regulations, also with reference to the personnel.



Risk of injury from high pressure and uncontrolled movement of the actuators.

- ▶ Before working on the device or system, secure the actuators against moving.
- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.

Risk of injury due to electric shock.

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

Risk of injury due to hot device components.

- ▶ Keep the device away from highly flammable substances and media.

Risk of injury due to improper installation and maintenance.

- ▶ Only trained technicians may perform installation and maintenance work.
- ▶ Perform installation and maintenance with suitable tools only.

Risk of injury due to unintentional activation and uncontrolled start-up of the device and system.

- ▶ Secure the device and system to prevent unintentional activation.
- ▶ Ensure that the system does not start up in an uncontrolled manner.

Risk of injury from heavy device.

During transportation or installation work, a heavy device may fall down and cause injuries.

- ▶ Transport, install and remove heavy device with the aid of a second person only.
- ▶ Use suitable tools.

General hazardous situations.

To prevent injury, ensure the following:

- ▶ Install the device according to the regulations applicable in the country.
- ▶ Do not supply the medium connectors of the device with aggressive or flammable media.
- ▶ Do not supply the medium connectors of the device with liquids.
- ▶ After an interruption, ensure that the process is restarted in a controlled manner. Observe sequence:
 1. Connect power supply.
 2. Connect the pneumatic supply (with an external pressure supply, connect the external auxiliary pilot air [X / 12/14] first and then the medium pressure [P / 1]).
- ▶ Do not make any changes to the device
- ▶ Do not subject the device to mechanical loading.
- ▶ Observe the general rules of technology.

NOTE

Electrostatic sensitive components and modules.

The device contains electronic components which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects are hazardous to these components. In the worst case scenario, these components will be destroyed immediately or will fail after starting up.

To minimize or eliminate the risk of damage resulting from sudden electrostatic discharges, ensure compliance with the requirements of EN 61340-5-1. Do not touch electronic components while the supply voltage is switched on!

5 GENERAL INFORMATION

5.1 Contact address

Germany

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

International

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

And also on the Internet at: country.burkert.com

5.2 Warranty

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

5.3 Information on the Internet

The operating instructions and data sheets for Bürkert products can be found on the Internet at:

country.burkert.com

6 TECHNICAL DATA

6.1 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.

6.2 Operating conditions

Ambient temperature	-10...+55 °C
Storage temperature	-10...+60 °C
Altitude	Restricted to max. 2000 m above sea level for UL approved versions
Compressed air quality	ISO 8573-1:2010, Class 7.4.4
Degree of protection	IP20

6.3 Electrical data

6.3.1 General

NOTE

- Use protective low voltage according to protection class III EN 61140, VDE 0140.

Nominal operating mode	Continuous operation (100% duty cycle)
Operating voltage	24 V \pm 10%, residual ripple for fieldbus interface max. 1 V _{ss} ¹

- 1) *UL approved Versions must be supplied by one of the following:*
a) *Limited Energy Circuit (LEC) according to UL/ IEC 61010-1*
b) *Limited Power Source (LPS) according to UL/ IEC 60950*
c) *SELV/ PELV with UL Recognized Overcurrent Protection dimensioned according to UL/ IEC 61010-1 Table 18*
d) *NEC Class 2 power source*

Power consumption

Power consumption is dependent on the configuration of the valve island. For the fieldbus interface, the total current is calculated using the formula:

$$I_{\text{total}} = I_{\text{background}} + (n \times I_{\text{valve}}) + (m \times I_{\text{feedb.}}) + (k \times I_{\text{electr. mod.}})$$

I_{total} :	Total current
$I_{\text{background}}$:	Background current depending on the fieldbus system
	PROFINET IO: 135 mA
	EtherNet/IP: 135 mA
	Modbus TCP: 135 mA
	EtherCat: 135 mA
	CC-Link IE Field Basic: 135 mA
	PROFIBUS DPV1: 120 mA
	büS/CANopen: 70 mA
	CC-Link: 120 mA
n:	No. of valves (max. 48 when using 24 double valves 2x3/2-way)
I_{valve} :	Nominal current of the valve (30 mA)
m:	Number of position feedbacks (max. 48)
$I_{\text{feedb.}}$:	Power consumption position feedback (max. 30 mA)
k:	Number of electronics modules (max. 6)
$I_{\text{electr. mod.}}$:	Power consumption electronics modules (21 mA)

6.3.2 Electronic module with digital inputs

Module properties	
Diagnostics	Wire break detection for 2-wire sensors Short circuit detection for 3-wire sensors
Safety	Protection against overvoltage
Electrical data	
Electrical connection (position feedback)	2-wire sensors 3-wire sensors Mechanical limit switches
Input type	Type 1 and type 3 according to IEC 61132-2
Conductor cross-section	$\leq 1.5 \text{ mm}^2$
Max. Cable length	< 30 m
Sensor supply (position feedback)	
Current consumption	8 x max. 30 mA
Voltage	24 V \pm 10 %
Input current for V_{ON} = type 24 V DC \pm	Type 5.8 mA
Input impedance	> 3 k Ω
Switching threshold	$V_{OFF} = 0...5\text{V}$ $V_{ON} = 10...30\text{V}$
Electrical isolation	No

6.3.3 Pneumatic slide valve Type 6534

Circuit function (CF)	2 x CFC* NC (norm. closed) 2 x 3/2-way 2 x CFD NO (norm. open) 2 x 3/2-way	CFH* 5/2-way monostable CFZ 5/2-way bistable	CFL* 5/3-way blocked CFM 5/3-way pressurized CFN 5/3-way vented
Flow rate Q_{Nn}	up to 310 l_N/min (for exact flow values for the various circuit functions, see the data sheet)		
Medium pressure**	0...10 bar		
Pilot pressure***	3...10 bar		
Electr. power before/after power reduction	2 x 0.7 W / 2 x 0.175 W	0.7 W / 0.175 W	0.7 W / 0.175 W
Current before/after power reduction	2 x 29 mA / 2 x $\leq 10 \text{ mA}$	29 mA / $\leq 10 \text{ mA}$	

*) Also available as SIA variant (see chapter "8.4", page 20).

**) At levels of vacuum up to 3 bar, observe the pilot pressure diagram and set the feed of auxiliary pilot air to "external" (see chapter "9.5.1").

***) With the external auxiliary pilot air variant, select the pilot pressure according to the pilot pressure diagram.

Pilot pressure diagram

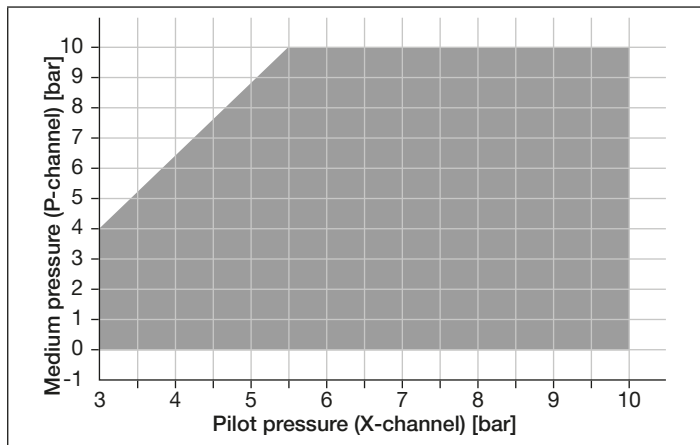


Fig. 1: Pilot pressure diagram pneumatic slide valve Type 6534

6.4 Type label standard (example)

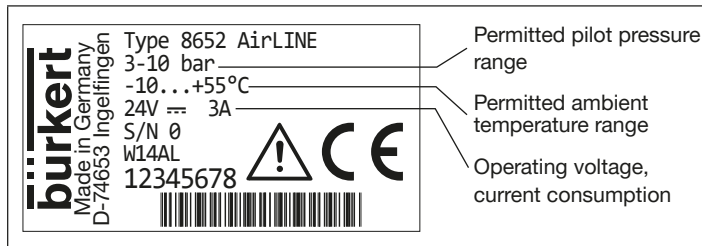


Fig. 2: Type label standard for valve island Type 8652

6.5 Type label UL (example)

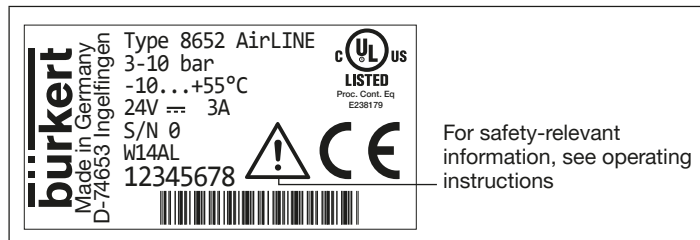


Fig. 3: Type label UL for valve island Type 8652

6.6 Specifications Industrial Ethernet PROFINET IO

Topology recognition	LLDP, SNMP V1, MIB2, physical device
Minimum cycle time	10 ms
IRT	not supported
MRP (Media Redundancy)	MRP Client is supported
Additional supported features	DCP, VLAN priority tagging, Shared Device
Transmission speed	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
PROFINET IO specification	V2.3
AR (Application Relations)	The device can simultaneously process up to 2 IO-ARs, 1 Supervisor AR and 1 Supervisor DA AR.

EtherNet/IP

Predefined standard objects	Identity Object (0x01) Message Router Object (0x02) Assembly Object (0x04) Connection Manager (0x06) DLR Object (0x47) QoS Object (0x48) TCP/IP Interface Object (0xF5) Ethernet Link Object (0xF6)
DHCP	supported
BOOTP	supported
Transmission speed	10 and 100 MBit/s
Duplex transmission	Half Duplex, full Duplex, autonegotiation
MDI modes	MDI, MDI-X, Auto-MDIX
Data transport layer	Ethernet II, IEEE 802.3
Address Conflict Detection (ACD)	supported
DLR (ring topology)	supported
Integrated switch	supported
CIP Reset services	Identity Object Reset Service of Type 0 and Type 1

Modbus TCP

Modbus Function Codes	1, 2, 3, 4, 6, 15, 16, 23
Mode	Message Mode: Server

Transmission speed	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3

EtherCAT

EtherCAT 

Industrial Ethernet interface X1, X2	X1: EtherCAT IN X2: EtherCAT OUT
Maximum number of cyclic input and output data	512 bytes in sum
Maximum number of cyclic input data	1024 bytes
Maximum number of cyclic output data	1024 bytes
Acyclic communication (CoE)	SDO SDO master-Slave SDO slave-slave (depending on master capability)
Type	Complex slave
FMMUs	8
Sync managers	4
Distributed clocks	supported with 32-bit timestamps
Transmission speed	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

CC-Link IE field basic

Number of occupied stations	1 to 16
Acyclic communication	SLMP Server
Data transport layer	Ethernet II, IEEE 802.3, 100 Mbit/s
CC-Link interface	Cyclic data 61450 (UDP) Discovery and SLMP Server 61451 (UDP) SLMP Communication 20000 (UDP)

6.8 Specifications PROFIBUS DPV1

Acyclic communication	DP V1 Class 1 Read/Write DP V1 Class 1 Alarm DP V1 Class 2 Read/Write/Data Transport
Transmission speed	Fixed values from 9.6 kBit/s to 12 MBit/s Autodetect mode is supported
Maximum size of the transmitted data	Input data: 244 bytes Output data: 244 bytes

6.9 Specifications CC-Link

Remote I/O Station	only I/O points
Remote Device Station	I/O points and Words
Configurable number of occupied stations	1...4

Configurable number of extension cycles	1, 2, 4, or 8
Supported protocols	CC-Link version 2.0 CC-Link version 1.1
CC-Link version 2.0	
Number of stations	up to 4 occupied stations
Maximum number of input data	368 bytes
Maximum number of output data	368 bytes
Input data	112 bytes (RY) and 256 bytes (RWw)
Output data	112 bytes (RX) and 256 bytes (RWr)
Extension cycles	1, 2, 4, 8
Transmission speed	156 kbit/s, 625 kbit/s, 2500 kbit/s, 5 Mbit/s, 10 Mbit/s
CC-Link version 1.1	
Number of stations	up to 4 occupied stations
Maximum number of input data	48 bytes
Maximum number of output data	48 bytes
Input data	4 bytes (RY) and 8 bytes (RWw) per occupied station
Output data	4 bytes (RX) and 8 bytes (RWr) per occupied station
Transmission speed	156 kbit/s, 625 kbit/s, 2500 kbit/s, 5 Mbit/s, 10 Mbit/s

7 ASSEMBLY



WARNING

Risk of injury from improper assembly.

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



Valve island AirLINE Type 8652 is supplied as a fully assembled device. Any modifications should only be carried out by Bürkert.

The valves are an exception to this rule and may be replaced with identical valves by the user.

7.1 Assembly on standard rail in a control cabinet



WARNING

Danger due to electromagnetic disruptions.

If the functional earth (FE) is not connected, then the requirements of the EMC protection are not met and malfunctions may occur on the unit.

- ▶ Connect the standard rail to the functional ground (FE) using a **short** cable with a **large** cross-section or via a copper strip.
- ▶ Only use shielded cables.



The valve island must be freely accessible from above. Ensure good heat dissipation!

- Fasten the standard rail firmly in the control cabinet.
- Establish a short, wide PE connection between the standard rail and the control cabinet.
- Hook the valve island onto the upper guide of the standard rail.
- Secure with fastening screws (tightening torque 1.5 Nm).

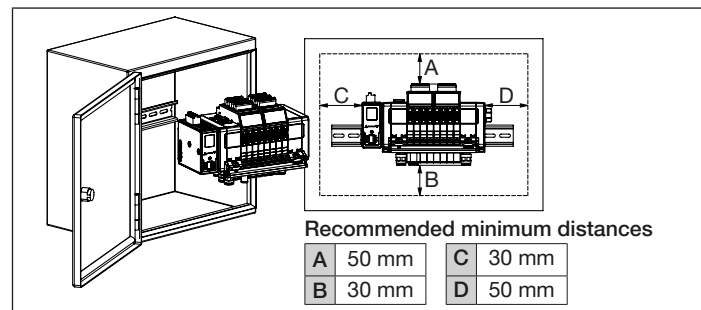


Fig. 4: Recommended minimum distances for assembly on standard rail in the control cabinet

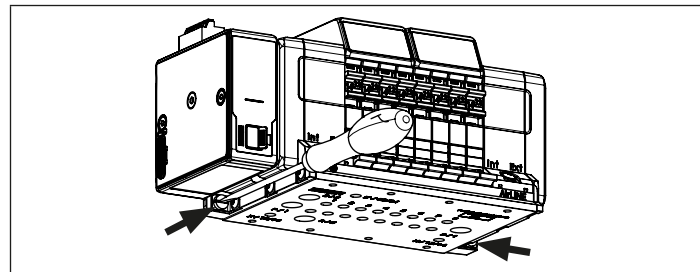


Fig. 5: Use the two fastening screws to fasten the valve island to the standard rail

7.2 Assembly on the base of the control cabinet or the wall of the control cabinet with AirLINE Quick



WARNING

Danger due to electromagnetic disruptions.

If the functional earth (FE) is not connected, then the requirements of the EMC protection are not met and malfunctions may occur on the unit.

- ▶ Connect the control cabinet housing to the functional ground (FE) using a **short** cable with a **large** cross-section or via a copper strip.
- ▶ Only use shielded cables.

For assembly, initially prepare a cut-out on the base or the wall of the control cabinet and drill the holes for the fastening screws. The cut-out can be created, e.g., through laser-cutting or punching (see “Tab. 2”, page 15).

When the valve island is installed correctly in the control cabinet base or control cabinet wall as specified in this chapter, degree of protection IP65 is achieved at the interface between adapter plate AirLINE Quick and the control cabinet.

NOTE

The cut-out at the control cabinet must be free from burr to ensure the seal between AirLINE Quick and the control cabinet is not damaged.

Note when measuring the cut-out:

To be able to utilize the Hot Swap function (easy valve replacement during operation), always observe a minimum distance to the front edge of the control cabinet when installing the valve island in the control cabinet (see “Fig. 6”). The valves can only be extracted from the front of the valve island when the minimum distance has been observed.

The minimum distances [mm] to the left, right, front, and top depend on the position of the valve island in the control cabinet:

Position in the control cabinet	front	left	right	top	bottom
base of the control cabinet	60.5	30	50	50	–
right-hand wall	60.5	50	–	50	30
left-hand wall	60.5	–	50	30	50

Tab. 1: Minimum distances by assembling with AirLINE Quick

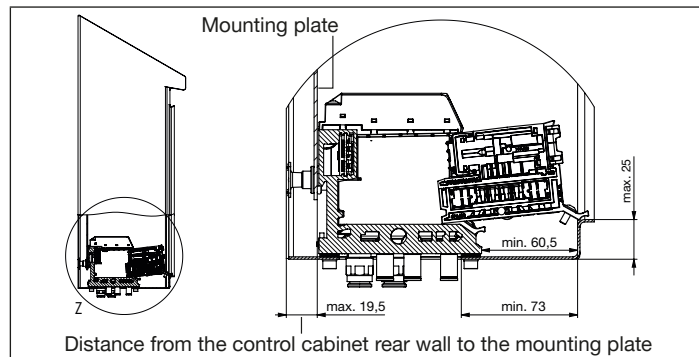


Fig. 6: Assembly in the control cabinet with AirLINE Quick

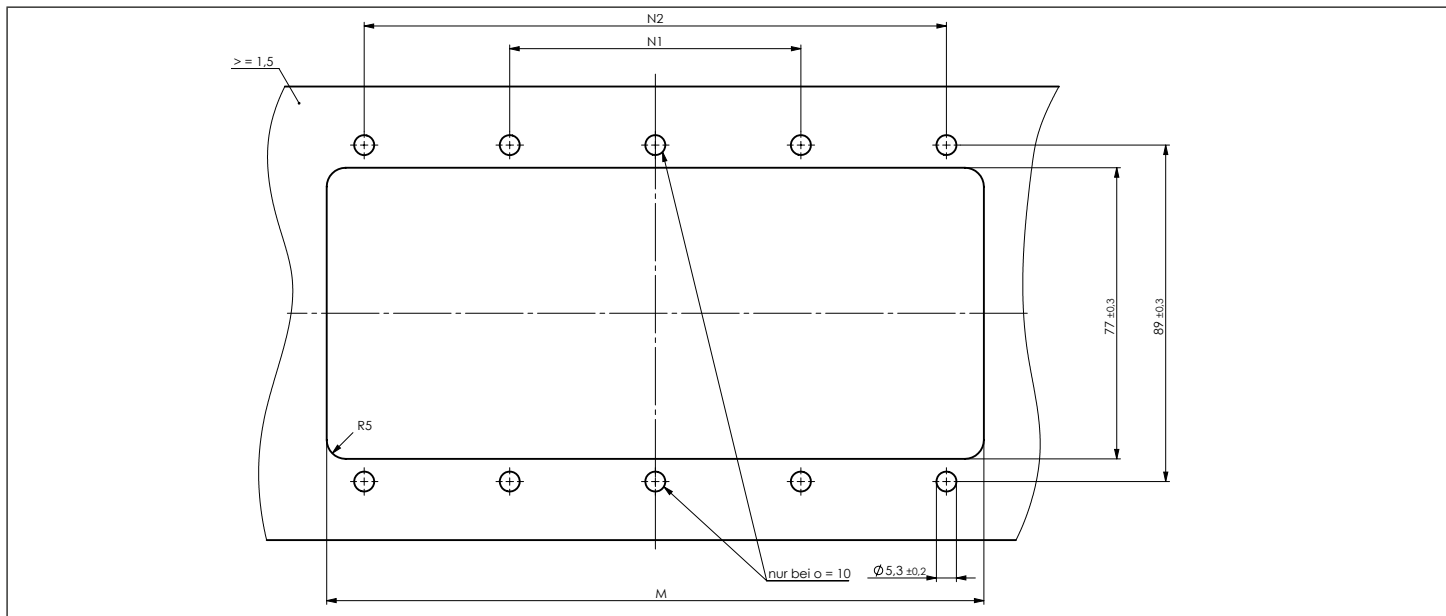


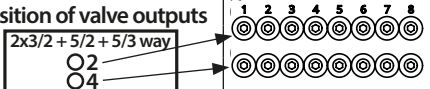
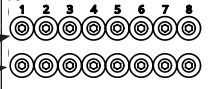
Fig. 7: Flange interface AirLINE Quick

Number of valves	M [mm]	N1 [mm]	N2 [mm]	Number of boreholes
4	85.8 ±0,3	66 ±0,3	-	4
8	129.8 ±0,4	37 ±0,3	111 ±0,4	8
12	173.8 ±0,4	77 ±0,3	154 ±0,4	10

Number of valves	M [mm]	N1 [mm]	N2 [mm]	Number of boreholes
16	244 ±0.4	112 ±0.3	224 ±0,4	10
20	288 ±0.4	134 ±0.3	268 ±0,4	10
24	332.1 ±0.4	156 ±0.3	312 ±0,4	10

Tab. 2: Dimensions flange interface AirLINE Quick

- Make sure the seal between AirLINE Quick and the control cabinet is undamaged.
- Place the valve island in the control cabinet on the prepared cut-out.
- Fix from the outside using M5x10 screws (tightening torque 2.5 Nm).

Valve type	Pneumatic connection	
	Valve output	AirLINE Quick
2x3/2-way	Position of valve outputs 	
5/2-way		
5/3-way		

Tab. 3: Assignment of the pneumatic connections for AirLINE Quick

8 INSTALLATION



DANGER

Risk of injury from high pressure.

Actuators may change their position when the pressure changes.

- ▶ Before working on the device or system, secure the actuators against moving.

Suddenly escaping pressure medium can quickly accelerate device components (hoses, small parts, ...) resulting in injuries and/or damage.

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



WARNING

Risk of injury due to electric shock.

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

Risk of injury from improper installation.

- ▶ Only trained technicians may perform installation work.
- ▶ Perform installation work with suitable tools only.

Risk of injury due to unintentional activation and uncontrolled start-up of the device and system.

- ▶ Secure the device and system to prevent unintentional activation.
- ▶ Ensure that the system does not start up in an uncontrolled manner.



CAUTION

Risk of injury due to discharge of medium and malfunctioning.

Medium may escape if the seals are not seated correctly. The function of the device may be restricted by pressure losses.

- ▶ Ensure that all the seals are seated correctly.

Risk of injury from damaged contacts.

Damaged contacts may result in a short circuit and malfunctioning.

- ▶ Do not bend contacts.
- ▶ If contacts are damaged or bent, replace the affected components.
- ▶ Do not switch on the device unless the components are in perfect condition.

8.1 Electrical connection gateway



Further information on the cabling of bÜS networks can be found in the „Cabling guide for bÜS/EDIP“ at country.burkert.com.

NOTE

To ensure electromagnetic compatibility:

- ▶ Only use shielded cables.
- ▶ Ground the standard rail with low impedance to guarantee the best possible EMC protection.
- ▶ With AirLINE Quick, connect the control cabinet housing to the functional earth (FE) to connect the cable shielding to ground.

Possible cable cross-section: $\leq 1.5 \text{ mm}^2$

- Connect the spring-loaded terminal according to the configuration (see “Tab. 4”)
- Establish Ethernet or PROFIBUS DPV1 connection according to the assignment (see “Tab. 5” and “Tab. 6”).
- Apply supply voltage.

Configuration of 5-pin spring-loaded terminal		
Connector view	Terminal	Description
	Red	Supply voltage 24 V ===
	White	CAN H (bÜS connection) ²
	Green	Shielding
	Blue	CAN L (bÜS connection) ²
	Black	GND

Tab. 4: Configuration of 5-pin spring-loaded terminal

²⁾ In the case of Industrial Ethernet, Profibus DPV1 and CC-Link the terminals are assigned only when using several Bürkert devices (EDIP) or in combination with the Communicator.

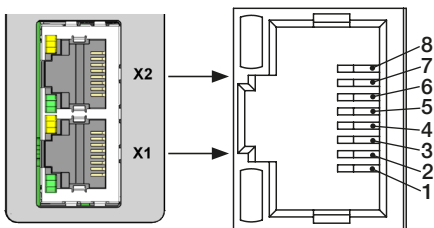
8.1.1 Industrial Ethernet

The following protocols are supported:

- EtherCAT
- EtherNet/IP
- Modbus TCP
- PROFINET

The X1 and X2 interfaces for RJ45 plug-in connectors are equivalent.

Configuration Plug-in connector RJ45

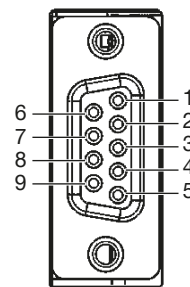


Pin	1	2	3	4	5	6	7	8
Plug configuration	TX+	TX-	RX+	Not assigned	RX-	Not assigned	Not assigned	Not assigned

Tab. 5: Plug-in connector RJ45, interfaces X1 (EtherCAT IN) and X2 (EtherCAT OUT)

8.1.2 PROFIBUS DPV1

Configuration Plug-in connector D-Sub, 9-pin

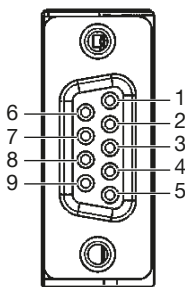


Pin	Signal	Function	Connection
1	Not assigned		
2	Not assigned		
3	RxD/TxD-P	Data line P (B-conductor)	Mandatory
4	CNTR-P	Repeater direction check	Optional
5	DGND	Ground	Optional
6	VP	+5 V	Optional
7	Not assigned		
8	RxD/TxD-N	Data line N (A-conductor)	Mandatory
9	Not assigned		

Tab. 6: PROFIBUS DPV1, assignment of push-in connector D-Sub, 9-pole

8.1.3 CC-Link

Configuration Plug-in connector D-Sub, 9-pin



Pin	Signal	Function	Connection
1	Not assigned		
2	Not assigned		
3	DA	Data line A	Mandatory
4	DG	Data ground	Mandatory
5	Not assigned		
6	Not assigned		
7	Not assigned		
8	DB	Data line B	Mandatory
9	Not assigned		

Tab. 7: CC-Link, assignment of push-in connector D-Sub, 9-pole

8.2 Electrical connection 24 V supply voltage for the pneumatic valves

The interface board has a 2-pole spring-loaded terminal to which the supply voltage for the pneumatic valves is connected. This allows the voltage for all pneumatic valves of the valve island to be shut down irrespective of the communication to the superordinate controller (PLC).

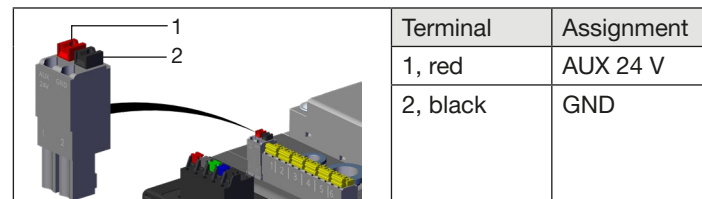


Fig. 8: Assignment of the 2-pole spring-loaded terminal

8.3 Electrical connection electronics module with digital inputs (option)

- Connect position feedbacks according to the assignment on the electronics module.

Possible cable cross-section: $\leq 1.5 \text{ mm}^2$

Maximum cable length: $< 30 \text{ m}$

The electrical supply to the position feedbacks (24 V) is provided by the electronic module.

- Limit the current consumption of position feedback units to 30 mA!

Assignment of the digital inputs electronics module

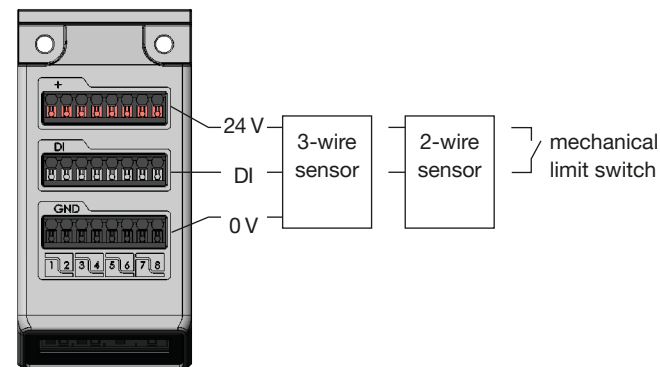


Fig. 9: Assignment of the digital inputs electronics module

Standard position feedbacks (3-wire sensors and 2-wire sensors as well as mechanical limit switches) can be used.

Depending on the position feedback used, the following data can be displayed:

Possible data	3-wire sensors	2-wire sensors	Mechan. limit switches
Position feedback actuated	X	X	X
Position feedback not actuated	X	X	X
Short circuit	X	–	–
Broken wire	–	X	–

8.4 Electrical connection Type 6534 valves for safety-related shut-off, SIA variant (option)



DANGER

Risk of injury due to unintentional movement of the actuators.

If the shut-off function is required to control safety-critical processes, hazardous movements of the actuators may be triggered when the switch-off function is faulty.

- Make sure the shut-off function is working properly before start-up.

**WARNING****Risk of injury and property damage due to electrical faults.**

If the connections for the safety-related shut-off are not connected correctly, there is a risk of injury due to uncontrolled behaviour of the plant.

- ▶ When using several SIA variant valves, connect each connection to an individual potential-free contact (mechanical switch or relay). Never connect several contacts together under any circumstances!
- ▶ Do not apply voltage to the connections (risk of damage to the valves).

Risk of injury due to sharp edges.

Sharp edges on the connection or on the contacts of the screw-type terminal can cause cuts.

- ▶ Wear suitable protective gloves.

Type 6534 valves for safety-related shut-off (SIA variant) are equipped with additional connection terminals. The circuit of a valve can therefore be interrupted by an external switch. Manual override is not required for these valve variants.

The technical data of the Type 6534 SIA variant valves corresponds to the data of the standard device.

To use the shut-off function, connect the connection to a potential-free contact (mechanical switch or relay).

The yellow connection terminals are pluggable and can be removed to facilitate connection of a cable. Except for CFH, there are always 2 connection terminals. To avoid mixing up the connections, the connection terminals are coded.

On delivery, the connection terminals are provided with a bridge to ensure the valve can be put into operation immediately. Remove the bridge before connecting a cable.

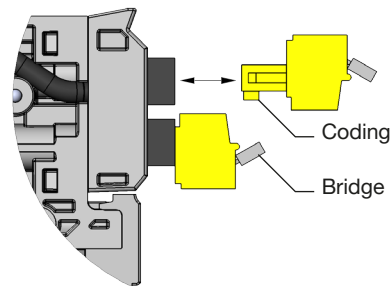


Fig. 10: Connection terminals SIA variant

Connection terminals:	Pluggable screw-type terminal, 2-pole, coded wire cross-section (rigid or flexible) 0.14 mm ² ...1.5 mm ² (AWG 28...16)
Labelling connection terminals:	21 → connection terminal 2, pole 1 22 → connection terminal 2, pole 2 41 → connection terminal 4, pole 1 42 → connection terminal 4, pole 2
Required switching capacity of the contact:	0.5 A / 24 V \equiv

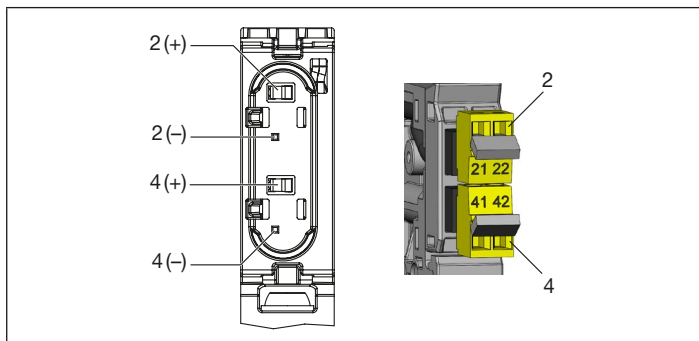


Fig. 11: Connection designation diagram of all circuit functions available as SIA variant, except circuit function H

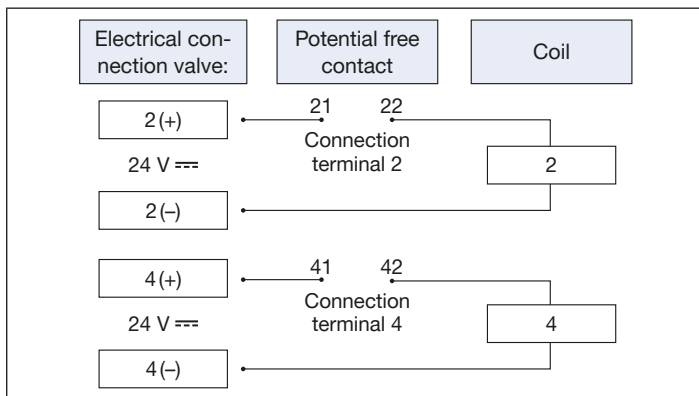


Fig. 12: Circuit diagram diagram of all circuit functions available as SIA variant, except circuit function H

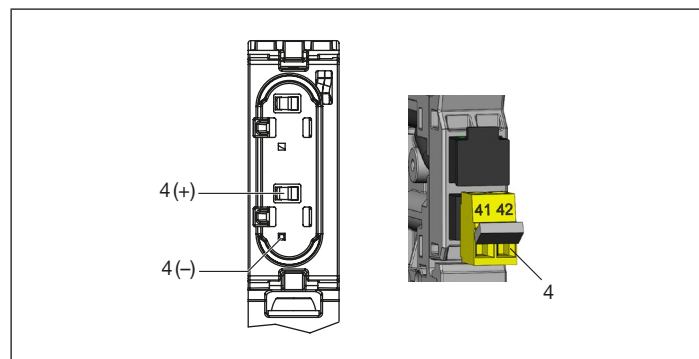


Fig. 13: Connection designation SIA variant, circuit function H (CFH)

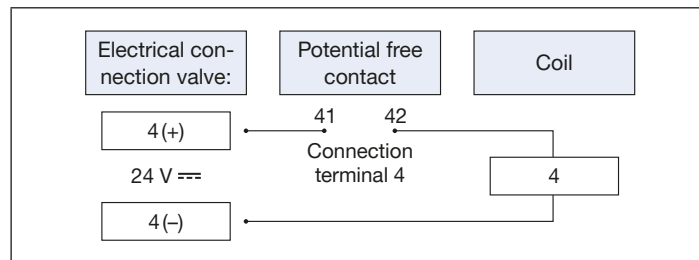


Fig. 14: Circuit diagram SIA variant, circuit function H (CFH)



The labels 2 and 4 refer to the assignment to the respective working port.

8.5 Electrical connection module-based safety shutdown (option)



DANGER

Risk of injury due to unintentional movement of the actuators.

If the shutdown function “Module-based safety shutdown” is required to control safety-critical procedures, hazardous movements of the actuators may be triggered if the shutdown function is faulty.

- ▶ Make sure the shutdown function is working properly before start-up.

In spite of the activated shutdown function “Module-based safety shutdown”, actuators can be moved through manual overrides of the valves. If the shutdown function is used to control safety-critical procedures:

- ▶ Take suitable measures against unintentional actuation of the valves, e.g., by means of a lockable control cabinet or by blocking the manual overrides with the additional element “Lock Manual Override” (see chapter “10.3.1”, page 28)

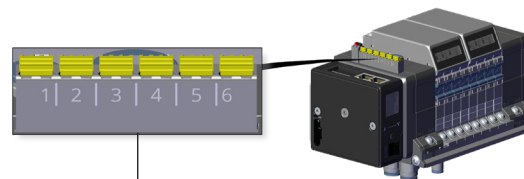


WARNING

Risk of injury and property damage due to electrical faults.

If the connections for module-based safety shutdown are not connected correctly, there is a risk of injury due to uncontrolled behaviour of the plant.

- ▶ If several valve units are to be shut down in a safe manner, connect each connection to an individual potential-free contact (mechanical switch or relay). **Never interconnect several contacts!**
- ▶ Do not supply voltage to the connections for module-based safety shutdown (risk of damaging the valves).



Option: Connections for module-based safety shutdown
Terminal 1 = valve unit 1, Terminal 2 = valve unit 2, ...

Fig. 15: Connections for module-based safety shutdown

The interface boards for module-based safety shutdown are additionally equipped with a 12-pole spring-loaded terminal. As a result, the electric circuit of a valve unit (4 pneumatic valves) can be interrupted by an external switch, e.g. to implement functions such as “Central system off” or to deactivate actuators group by group.

The interruption will immediately cause a single-pole interruption of the common supply to all valves of the valve unit (see “Fig. 16”).

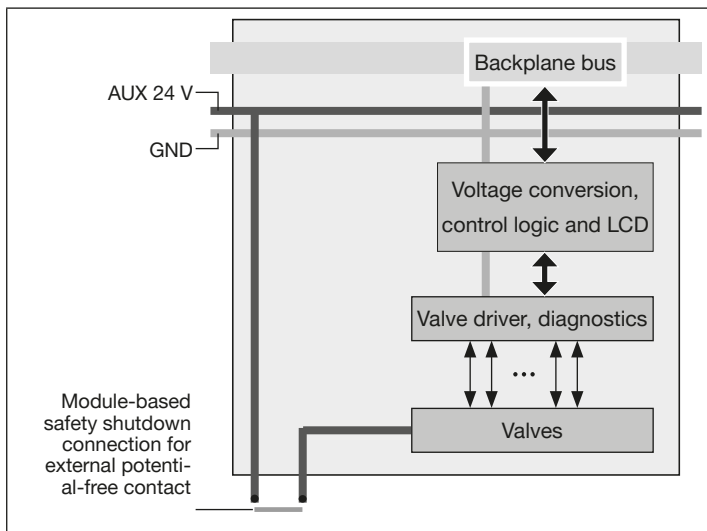


Fig. 16: Schematic representation of a valve unit with shutdown function
"Module-based safety shutdown"

For use, the "Module-based safety shutdown" connection must be connected to a potential-free contact (mechanical switch or relay).

The contact must be in the same control cabinet as the valve island; restrict the maximum cable length to 2 m.

Connection	Pluggable screw-type terminal*, 12-pole cable cross-section (rigid or flexible) 0.14 mm ² ...1.5 mm ² (AWG 26...16)
Required switching capacity of the contact	1.5 A / 24 V DC

*) Upon delivery, the spring-loaded terminal is fitted with a bridge that enables immediate operation of the valve island. Remove the bridge before connecting a cable.

9 PNEUMATIC CONNECTION

! DANGER

Risk of injury from high pressure.

- ▶ Before working on the device or system, secure the actuators against moving.
- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.

! CAUTION

Danger due to loud noises.

- ▶ Seal unused connections with sealing plugs (e.g. for 5/2-way valves).

! We recommend the use of original Bürkert accessories only.

Plastic hoses for pneumatic system

When using hoses from other manufacturers, make sure the hose diameter remains within the tolerance of ± 0.1 mm.

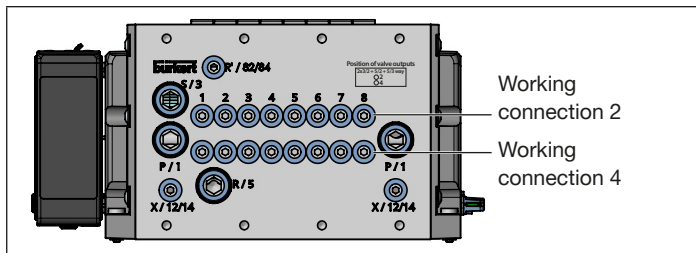


Fig. 17: Pneumatic connections valve island

Connection	Assignment
1...8	Valve slots
P / 1	Supply connection
X / 12/14	Supply connection for auxiliary pilot air
R / 5	Air discharge connections
S / 3	
R' / 82/84	Air discharge connection for auxiliary pilot air

Tab. 8: Pin assignment valve island

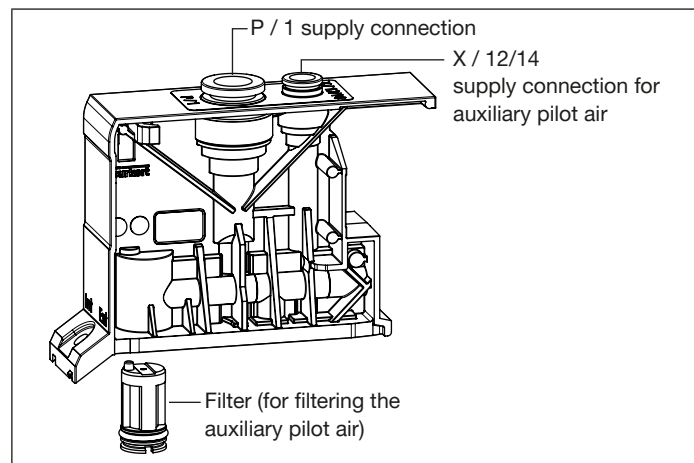


Fig. 18: Pneumatic connections connection module

9.5.1 External and internal auxiliary pilot air

NOTE

Internal short circuit between auxiliary pilot air and pilot pressure.

To avoid an internal short circuit, the seals of the connection modules must be positioned equally (external or internal auxiliary pilot air supply).

► Never mix the external or the internal supply.

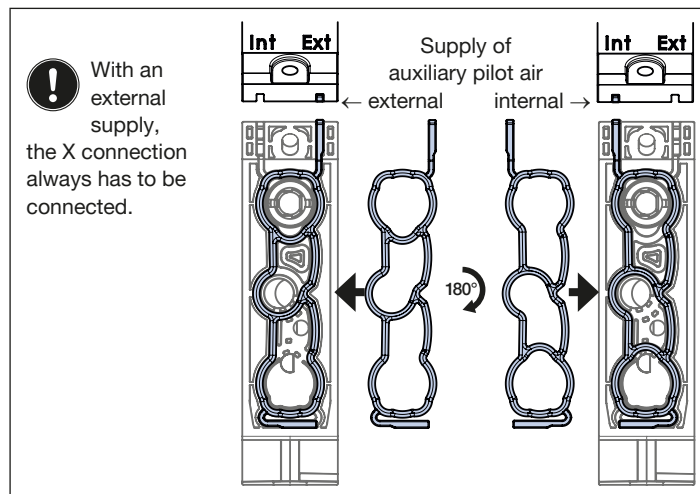


Fig. 19: By rotating the seal 180°, it is set whether the auxiliary pilot air supply occurs internally or externally.

10 START-UP



WARNING

Risk of injury from improper operation.

- Before start-up, it must be ensured that the operating personnel are aware of and fully understand the contents of the operating instructions.
- Observe safety instructions and intended use.
- Only trained and qualified personnel may start up the device or system.

NOTE

Internal short circuit between auxiliary pilot air and pilot pressure.

To avoid an internal short circuit, the seals of the connection modules must be positioned equally (external or internal auxiliary pilot air supply). Mixing the external or the internal supply is not permissible.

- Prior to start-up, make sure all the seals of the connection modules are positioned equally (external or internal, see "Fig. 19").

10.1 Start-up files


The start-up files required by the respective design software and their descriptions are available online.



Download the start-up files and their descriptions from:
country.burkert.com → Type 8652 →
Downloads „Software“ → Initiation Files

Instructions on installing the start-up files can be found in the documentation of the project planning software which you are using.

10.2 Selecting protocol at fieldbus gateway ME43

 For PROFIBUS DPV1 and CC-Link devices, the protocol has been preset at the factory.

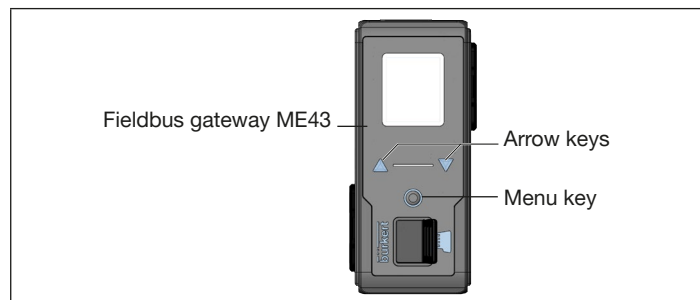










Fig. 20: Fieldbus gateway ME43

-  Press the menu key twice.
- Confirm **Parameter** with .
- Use   to navigate to the **Protocol** menu, confirm with .
- Use   to navigate to the required protocol, confirm with .

10.3 Starting up via manual override

Manual override lends itself to start-up the device and system. Manual override functions without a voltage supply to the valve island and enables manual switching of the valves.

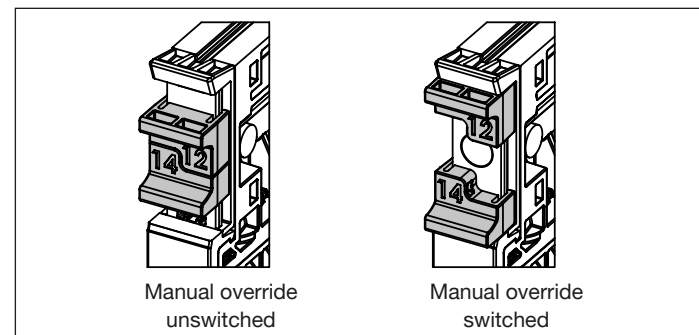


Fig. 21: Manual override of the valves

Manual override comes with spring return and latching as standard.

Spring return:

If the slide mechanism is pushed to an initial resistor, the manual override returns to the unswitched status after being released.

Latching:

If the resistor is exceeded, the manual override remains switched after being released. To return to the unswitched status, the manual override needs to be pushed back manually over the latching point.

10.3.1 Additional element “Lock Manual Override”

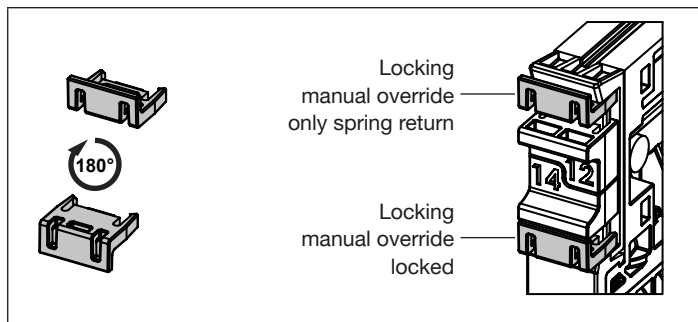


Fig. 22: Additional element “Lock Manual Override”

The additional element “Lock Manual Override” enables restriction of the manual override.

The manual override offers only spring return or locked depending on the rotational position (0° or rotated 180°) of the clipped-on additional element.

The additional element is available as an accessory (see chapter “Other accessories” in the operating instructions for Type 8652).



The operating instructions can be found on the Internet at: country.burkert.com → 8652 → Downloads: User Manuals

10.4 Marking the valve slots

The valve island is supplied with MultiCard format device markers:

Device marker ESG 5/10 MC NE WS

The individual device markers are fixed to a sprue and can be printed in this form using standardized industrial printers (e.g. from Weidmüller). After printing, remove the device markers from the sprue and clip them onto the valve.

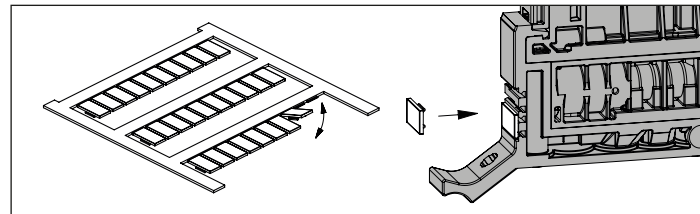


Fig. 23: Marking the valve slots using MultiCard format device markers: After printing, remove the device markers from the sprue and clip them onto the valve.

11 OPERATION

WARNING




Danger due to improper operation.




- ▶ The operating personnel must be aware of and have understood the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may operate the system or device.

11.1 Operating via manual override

See chapter “10.3 Starting up via manual override”.

11.2 Operating via the fieldbus gateway ME43

Operation at the fieldbus gateway occurs via the arrow keys   and the round menu key .

Element	Functions
	Open the main menu (double click) Confirm selection/input
 	Page down / up through menu Change the numerical values. Hold down the arrow key to run through quickly.

11.3 Operating via Bürkert Communicator



The Bürkert Communicator software can be downloaded free of charge from the Bürkert website. In addition to the software, the USB bÜS interface set, available as an accessory, is required.



Operation of the valve island AirLINE Type 8652 using the Bürkert Communicator software is described in the operating instructions: country.burkert.com

11.4 Display elements fieldbus gateway ME43

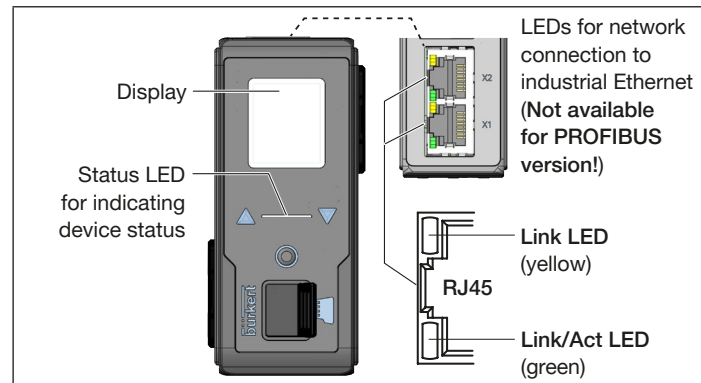


Fig. 24: Overview of the display elements

LED status	Description
Link LED (yellow) lights up	Connection to the network has been established.
Link/Act LED (green) flashes quickly	Connection to the higher-level protocol layer (Ethernet/IP, PROFINET, Modbus-TCP or EtherCAT) established. Data is being transmitted.
Link/Act LED (green) flashes slowly	Approx. 20 seconds after restart: No connection to the protocol layer.






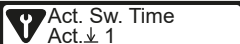
Tab. 9: Description of LEDs for network connection

11.5 Display elements electronics module

The electronics modules are equipped with an LC display for displaying the status. The switching position of the valve and actuator and possible fault states of the outputs are graphically presented on the display.

	Display view with 4 valve slots (e.g. 5/2-way valves)
	Display view with 4 valve slots (double valve, e.g. 2x3/2-way valves)
	Mixed display view (double and single valves)
	Valve 1 activated
	Valve 1 activated, feedback: "Upper position reached"

	Valve 1 activated, feedback: "Lower position reached"	
	Valve 1 + 2 each have 1 valve slot Valve 3 + 4 each have 1 empty slot (blind valve)	
Message 1 / Message 2 alternating: 	Short circuit at input 2 of the upper position feedback unit	Example of other possible messages: Short circuit at inputs 2-4 of the lower position feedback unit
Message 1 	Wire break at input 2 of the upper position feedback unit	Example of other possible messages: Wire break at inputs 2-4 of the lower position feedback unit
Message 1 / Message 2 alternating: 	Maintenance limit for pilot valve 1 reached	Example of other possible messages: Act. SCC Limit Ch. 1 Maintenance limit for actuator 1 reached

<p>Message 1 / Message 2 alternating:</p>  <p>Message 1</p>  <p>Message 2</p>	<p><i>EVS has been implemented for this valve unit.</i></p> <p><i>Logic, display and diagnostics continue to operate unaffected and remain available.</i></p>
<p>Message 1 / Message 2 alternating:</p>  <p>Message 1</p>  <p>Message 2</p>	<p><i>If connection modules are equipped with an integrated pressure sensor, the current medium pressure can be shown on the display (can be activated via the web server or Bürkert Communicator software).</i></p>
<p>Message 1 / Message 2 alternating:</p>  <p>Message 1</p>  <p>Message 2</p>	<p><i>The switching time of actuator 1, lower end position, has been exceeded.</i></p> <p><i>For further information see operating instructions at:</i></p> <p>country.burkert.com → Type 8652</p>

12 MAINTENANCE, TROUBLESHOOTING



WARNING

Risk of injury from improper maintenance work.

- ▶ Maintenance may be carried out only by trained technicians and with the appropriate tools.
- ▶ Secure system against unintentional activation.
- ▶ Following maintenance, ensure a controlled restart.

12.1 Replacing the valve



DANGER

Risk of injury from high pressure and discharge of medium at valves without HotSwap function.

- ▶ Before working on the device or system, secure the actuators against moving at valves without HotSwap function.
- ▶ Before working on the device or system, switch off the pressure at valves without HotSwap function. Vent or drain lines.

Risk of injury from high pressure and discharge of medium at valves with HotSwap function.

When disassembling a valve, lines and actuators may still be pressurized and can lead to uncontrolled movement of the actuator.

- ▶ Before working on the device or system, secure the actuators against moving at valves with HotSwap function.

Valves at valve islands with Hot Swap function can be replaced when pressurized. To ensure safe disassembly of the valve from the valve island, there must be sufficient space available to extract the valve from the front. Therefore, always observe the minimum distance from the valve island to the front edge of the control cabinet (see chapter “7.2”).



If the device is used for a longer period of time, the valve seal may be stuck to the supply strip. Additional force may therefore be required to release the valve from the valve island.

12.1.1 Replacing a valve with the correct minimum distance

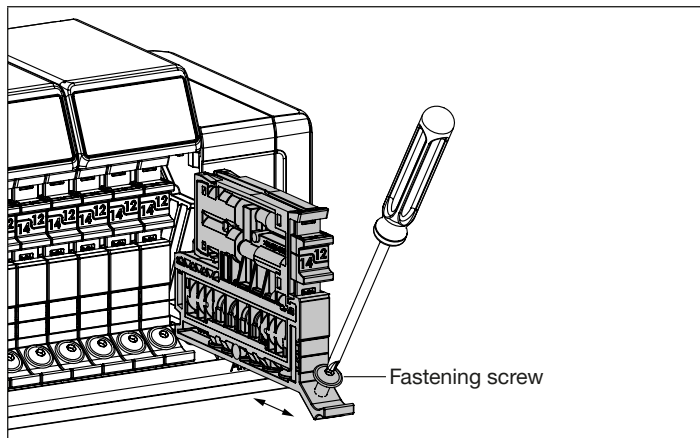


Fig. 25: Replacing the valve

- Observe safety instructions.
- Using a screwdriver, loosen the fastening screws of the valve.
- Remove valve from the valve island.
- Insert new valve into the valve slot.
- Tighten the fastening screw (tightening torque 2 Nm).

12.1.2 Replacing a valve without minimum distance



WARNING

Risk of injury due to uncontrolled movement of the actuators.

- ▶ Before working on the device or system, secure the actuators against moving.
- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.
- ▶ Before working on the device or system, switch off the power supply. Secure against reactivation.

NOTE

Irreparable damage to the fieldbus gateway.

If an electronic module is detached from an energised valve island, the electronics of the fieldbus gateway may be destroyed.

- ▶ Therefore, always switch off the voltage before unscrewing the electronic module from the valve island. Secure against reactivation.

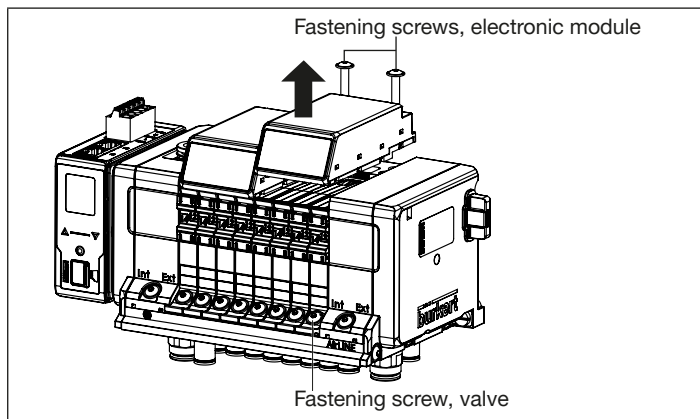


Fig. 26: Replacing a valve without minimum distance to the front edge of the control cabinet

- **!** Pay attention to the safety instructions.
- Use a screwdriver to undo the fastening screws of the electronic module and the valve.
- Remove the electronic module from the top.
- Remove the valve upward from the valve island.
- Insert a new valve into the valve slot.
- Place the electronic module back on the valve island.
- Tighten the fastening screws of the electronic module and the valve (tightening torque 2 Nm).

12.1.3 Replacing valves CFZ or CFZ*



WARNING

Risk of injury due to uncontrolled movement of the actuators.

- ▶ Before working on the device or system, secure the actuators against moving at valves with HotSwap function.

For valves with circuit function Z and circuit function Z*, depending on the switch position either
port 2 vented and port 4 exhausted
or
port 2 exhausted and port 4 vented.

For valves with circuit function Z*, the software of the valve island ensures that the newly inserted valve assumes the switching position of the original valve in the event of a valve replacement (HotSwap).

For valves with circuit function Z*, manual operation is disabled after the first electrical switching.

Valves with circuit function Z assume an undefined switching position.

12.2 Replacing the filter

DANGER

Risk of injury from high pressure and discharge of medium.

- ▶ Before working on the device or system, secure the actuators against moving.
- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.

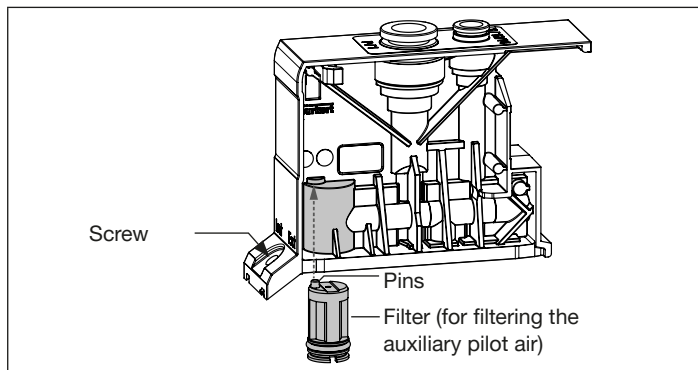


Fig. 27: Replacing the filter

- Observe safety instructions.
- Loosen the screw, extract the connection module from the front.
- Use a flat-blade screwdriver to extract the filter.
- Insert a new filter. Make sure to insert the pins of the filter into the intended holes.
- Slide in the connection module and screw tight (tightening torque 2 Nm).

12.3 Troubleshooting

Malfunction	Possible cause	Corrective action
Valves do not switch	No or insufficient load voltage	Check the electrical connection Ensure correct load voltage
	Manual override of the valves not in neutral position	Bring manual override into neutral position
	Inadequate or no pressure supply	Design the pressure supply with the largest possible volume (even for upstream devices such as pressure controllers, maintenance units, shut-off valves, etc.) For valves without auxiliary pilot air, ensure a minimum operating pressure of 3.0 bar
	Incorrect configuration	Configure the system according to the hardware set-up
	Channel not released for use	Change adjustment of the parameters (Communicator)

Type 8652

Maintenance, troubleshooting

Malfunction	Possible cause	Corrective action
Valves do not switch	24 V supply not connected or incorrectly contacted	Make sure the 24 V supply is connected correctly
	for SIA variant: Connection terminal with bridge or connected cable not connected	Connect connection terminal with bridge or connected cable
Valves switch with a delay or blow off at the deaeration connections	Inadequate or no pressure supply	Design the pressure supply with the largest possible volume (even for upstream devices such as pressure controllers, maintenance units, shut-off valves, etc.)
		For valves without auxiliary pilot air: Ensure minimum operating pressure of 3.0 bar
	Insufficient pilot pressure build-up	With 5/2-way valves (CFH) and 2x3/2-way valves (CFD, normally open), operate the valve island with an external pilot pressure supply

Malfunction	Possible cause	Corrective action
Valves switch with a delay or blow off at the deaeration connections	Valves are not in home position (de-energized) during pressure build-up	Before switching the valves, pressurize the valve block
	Deaeration of the exhaust air ducts inadequate due to too small or dirty silencers (back pressures)	Use appropriately sized silencers or expansion tanks Clean dirty silencers
	Impurities or foreign objects in the pilot valve	Replace valve
	Impurities or foreign objects in the filter	Clean the filter with compressed air or replace the filter

12.4 LC display of electronics module

An overview of the possible display contents is provided in chapter “[11.5 Display elements electronics module](#)”, page 30.

Message	Possible cause	Corrective action
No message, LC display off	No or insufficient load voltage	Check the electrical connection or Ensure correct load voltage
	Voltage interruption during firmware update	Execute firmware update again
Pilot SCC Limit Ch. x or Act. SCC Limit Ch. x	Maintenance limit for pilot valve / actuator channel X reached	Replace pilot valve or maintain actuator and reset switching cycle counter or deactivate switching cycle counter or increase warning limit switching cycle counter
Short Circuit Ch. x	Short circuit at input x of the position feedback unit (position feedback or plug-in connection defective)	Check position feedback/ plug-in connection or replace position feedback

Message	Possible cause	Corrective action
Wire Break Ch. x	Wire break at input x of the position feedback unit (position feedback or plug-in con- nection defective)	Check position feedback/plug-in connection or replace position feedback
EVS Active	24 V supply not connected or incor- rectly contacted	Check correct connection
	Electric circuit of a valve unit inter- rupted due to the shutdown function “Module-based safety shutdown”	
Act. Sw. Time	The tolerance value of the actuator switching time has been exceeded	Maintain actuator (For further information see operating instructions at: country.burkert.com → Type 8652)

13 DISASSEMBLY



DANGER

Risk of injury from high pressure and discharge of medium.

- ▶ Before working on the device or system, secure the actuators against moving.
- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.



WARNING

Risk of injury due to electric shock.

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

Risk of injury due to improper disassembly!

- ▶ Disassembly may be carried out only by trained technicians and with the appropriate tools!

→ Loosen the pneumatic connection.

→ Loosen the electrical connection.

14 TRANSPORTATION, STORAGE, DISPOSAL

NOTE

Transport damage due to inadequately protected devices.

- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Observe permitted storage temperature.

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location.
- ▶ Storage temperature -10...+60 °C.

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 country.burkert.com.

country.burkert.com