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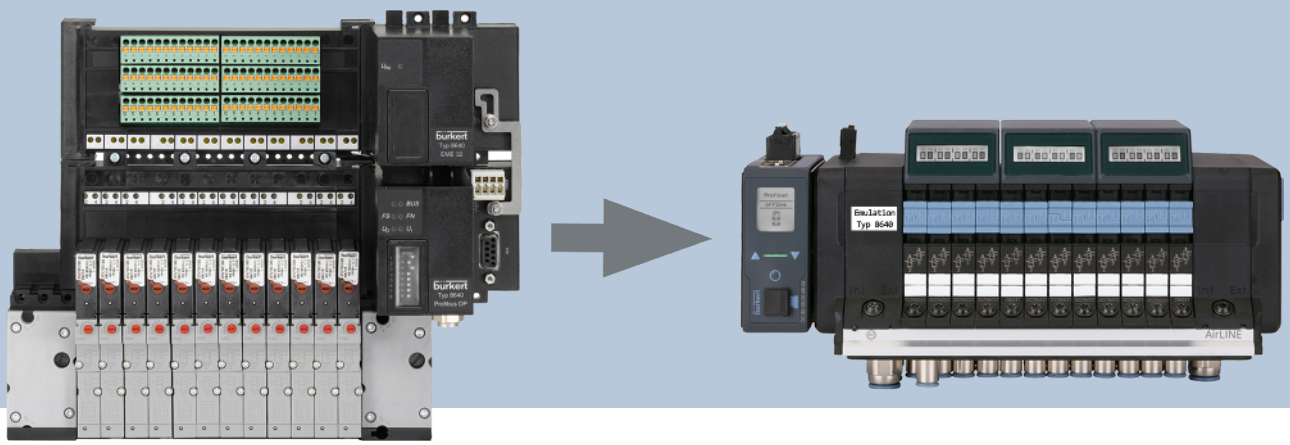
Type 8652

EMULATION FOR TYPE 8640



Replacement Instructions

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Technical documentation 2511/03_GBen_00815458_738066315_45035997014159755 / Original DE

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1 About these instructions

These instructions are supplemental to the operating instructions. The operating instructions for the device must be followed to ensure safe use of the device for its intended purpose.

1.1 New generations of devices

These instructions explain the replacement process for devices that are replaced with new, compact and technically up-to-date devices.
We are providing these instructions as a means to help integrate the new device into your existing system and enable a smooth and complication-free replacement process.

The new generations of devices from Bürkert can be parameterised and configured to the Bürkert Communicator software via the integrated büS interface.

The Bürkert Communicator software can be downloaded free of charge from country.burkert.com.

The USB-büS-Interface set is required to connect to the Bürkert Communicator.

Accessories	Order number
USB-büS interface set 1 (including power supply unit, büS stick with terminating resistor, Y-distributor, 0.7 m cable with M12 plug)	772426
USB-büS interface set 2 (including büS stick with terminating resistor, Y-distributor, 0.7 m cable with M12 plug)	772551

Tab. 1: Accessories

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2 Insert type 8652 as emulation for type 8640

The valve island type 8652 as emulation for type 8640 can be used anywhere where the fieldbus variant of the valve island type 8640 is already in use.

A software extension for type 8652 enables type 8652 to behave exactly like a valve island type 8640 regarding the control. This means that in existing systems with type 8640, a simple emulation can be carried out by the valve island type 8652.

2.1 Emulation island marking

In order to clearly identify the valve island Type 8652 as an emulation for type 8640, it is provided with an additional type label.

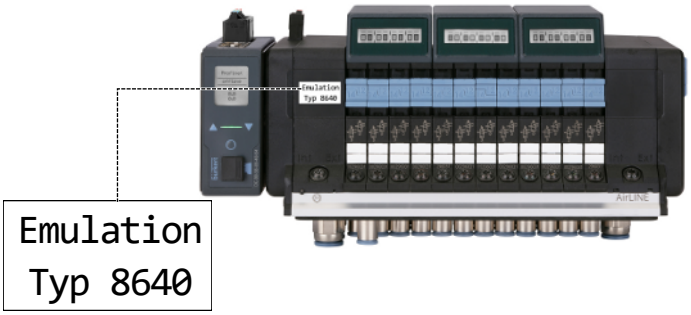

Fig. 1: Labelling type 8652 as emulation for Type 8640

In addition, the display of the communication module shows during start-up/boot-up that the device is an emulation for Type 8640.

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3 Mechanical differences between type 8652 and type 8640

Type 8652 is based on a different valve island architecture than type 8640.

3.1 Basic structure and dimensions

In the case of Type 8640, the basic structure consists of modularly arranged basic modules made of plastic, which contain pneumatic connections.

With Type 8652, the basic structure consists of an aluminium supply manifold into which screw-in connectors are screwed.

Both valve islands have the width per station of 11 mm on the valve side.

Due to the different valve island architecture, the dimensions of Type 8652 and Type 8640 are different.
The fieldbus connection (communication module) is located on the left-hand side of Type 8652, the fieldbus supply is located on the right-hand side of Type 8640.
Due to the arrangement of the communication module and the digital inputs, Type 8652 requires a somewhat larger space in terms of overall length, but the overall height is significantly more compact than Type 8640.

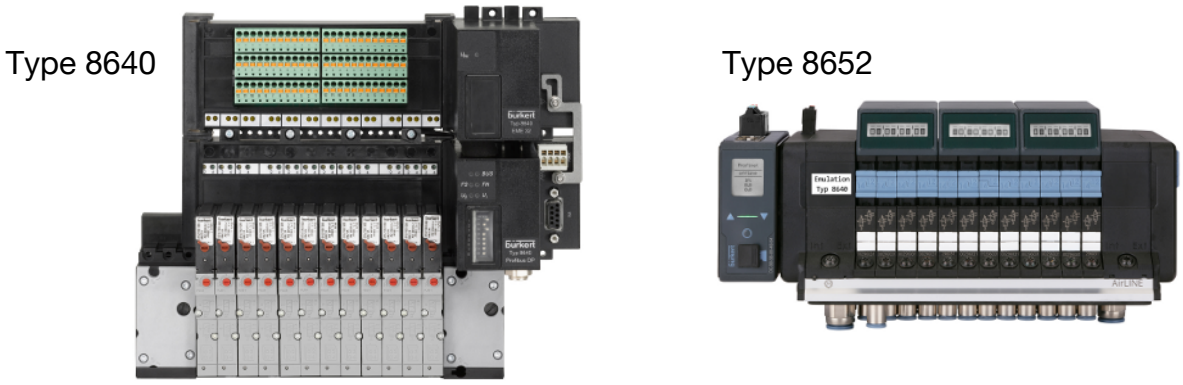

Fig. 2: Example size ratio of Type 8640 to Type 8652 based on a 12-way valve island

Exact dimensions of Type 8652 can be found in the data sheet (item 4 “dimensions”) at:
country.burkert.com

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3.1.1 AirLINE Quick adapter

Due to the different valve island architecture, the flange patterns and the required cut-outs in the control cabinet floor/wall differ.

The emulation variant of type 8652 therefore has a stainless steel AirLINE Quick adapter pre-assembled at the factory. With this adapter, the type 8652 valve island can be mounted onto the existing cutout in the control cabinet floor/wall.

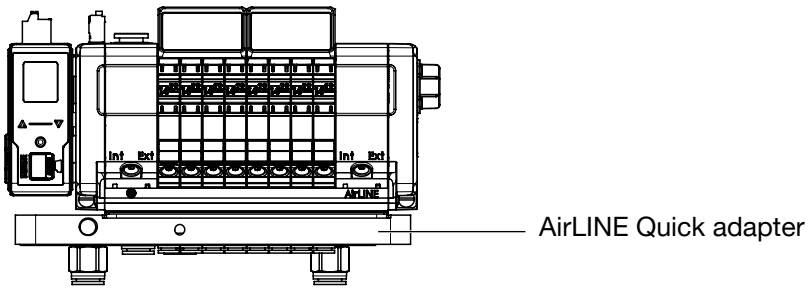
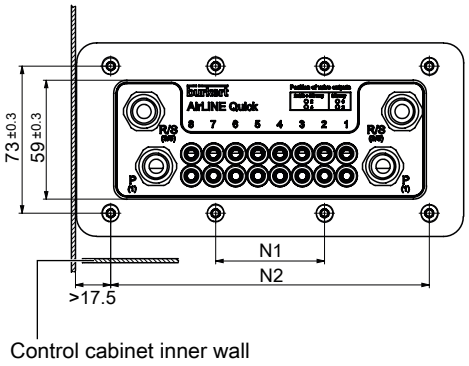


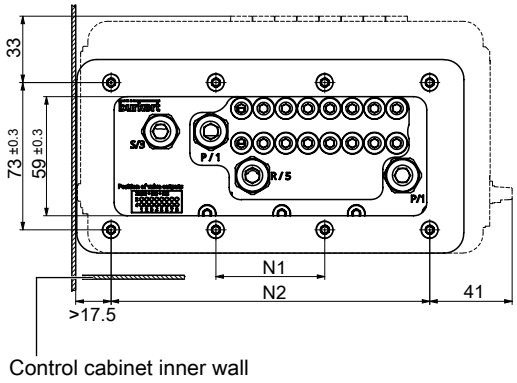
Fig. 3: Valve island 8652 with AirLINE Quick adapter

Flange pattern dimensions Type 8640 and Type 8652

Type 8640



Type 8652



Number of valves	M [mm]	N1 [mm]	N2 [mm]	Number of holes
8	155 ±0.4	54 ±0.3	158 ±0.4	8
12	199 ±0.4	68 ±0.3	202 ±0.4	8

Pneumatic connection

Labelling	Connection type	
	Type 8640	Type 8652
P (1)	G1/4	Push-in connector D10
R (5) / S (3)	G1/4	Push-in connector D10
2 / 4	Push-in connector D6	Push-in connector D6

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3.2 Valves type 6534

Valve island type 8640 uses pneumatic valves type 6524 and type 6525.
Valve island type 8652 uses pneumatic slide valves type 6534.

	Types 6524/6525 (Valve island type 8640)	Type 6534 (Valve island type 8652)
Medium pressure	0...10 bar	0...10 bar
Pilot pressure	2.5...10 bar	3...10 bar

Tab. 2: Comparison of pressure range type 6524/6525 and type 6534

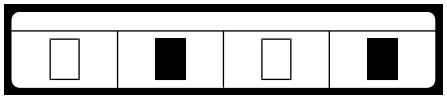
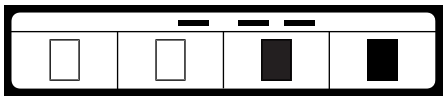
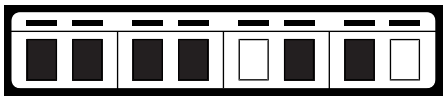
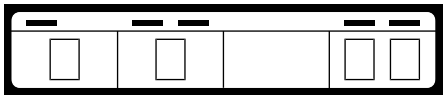
For more information see the operating instructions for type 8652 at: country.burkert.com

- Pneumatic slide valve type 6534
- Commissioning via manual override
- Replacing a pneumatic valve

3.3 Displays

Valve island type 8652 has LC displays for status indication in contrast to valve island type 8640. The switch position and possible error states of the outputs are shown graphically on the display.

Description of the display indicators, emulation island type 8652

	4 single valves, valve 1 and valve 3 actuated, digital inputs inactive
	4 single valves, valve 1 and valve 2 actuated, digital inputs 3, 4 and 5 active
	4 double valves, Valves 2, 3, 5-8 actuated, all digital inputs active
	From right to left: 1 double valve, 1 blind valve, 2 single valves digital inputs 1+2, 5+6, 8 active

Tab. 3: Description of displays

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4 Assignment of working ports to electrical control

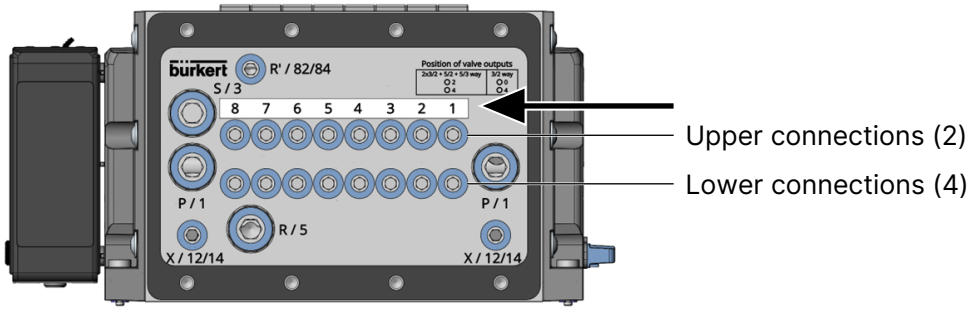
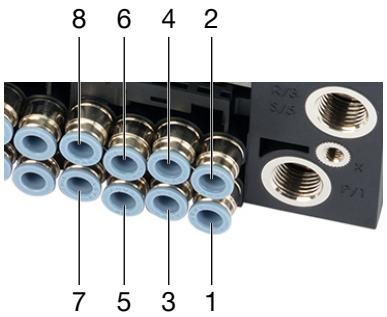


Fig. 4: Valve position markings on the supply manifold of type 8652 as emulation for type 8640

4.1 Pin assignment single valve 5/2-way

Valve island type 8640

Single valve type 6525 5/2-way (CFH)

Bit no.	Bit ...	Bit 3	Bit 2	Bit 1	Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	8	6	4	2
		7	5	3	1
		Unswitched state: Upper port pressurised Lower port vented			

Tab. 4: Valve island type 8640 pin assignment

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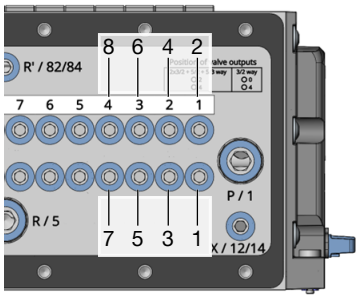
Valve island type 8652 as emulation for type 8640

Single valve type 6534 5/2-way (CFH)

Bit no.	Bit ...	Bit 3	Bit 2	Bit 1	Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	8	6	4	2
		7	5	3	1



Unswitched state:
Upper port pressurised
Lower port vented

Tab. 5: Emulation island type 8652 pin assignment

Supplement to circuit function H (CFH)

Optionally, the valve type 6534 CFH can be used to implement the 3/2-way NC (CFC) or NO (CFD) valve function by sealing a working output 2 or 4, regardless of the electrical control/contacting.

CFH and output 2 closed with sealing plug → CFC (3/2-way NC)

CFH and output 4 closed with sealing plug → CFC (3/2-way NO)

For sealing plugs, see chapter “Accessories” in the operating instructions for type 8652 at country.burkert.com

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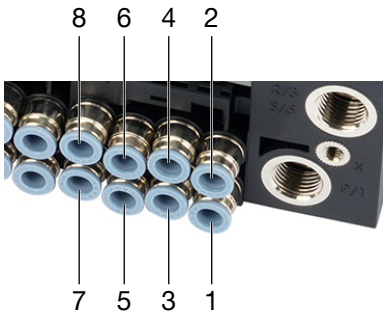
4.2 Pin assignment single valve 3/2-way

Valve island type 8640

Single valve type 6524 3/2-way (CFC and CFD)

Bit no.	Bit ...	Bit 3	Bit 2	Bit 1	Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	7	5	3	1



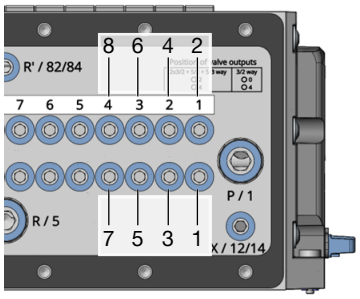
Unswitched state:
Upper port not assigned
Lower port vented (CFC) or pressurised (CFD) depending on the circuit function of the valve

Tab. 6: Valve island type 8640 pin assignment

Valve island type 8652 as emulation for type 8640

Single valve type 6534 3/2-way NC (CFC)

Bit no.	Bit ...	Bit 3	Bit 2	Bit 1	Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	7	5	3	1



Unswitched state:
Upper port not assigned
Lower port vented (CFC)

Tab. 7: Emulation island type 8652 pin assignment

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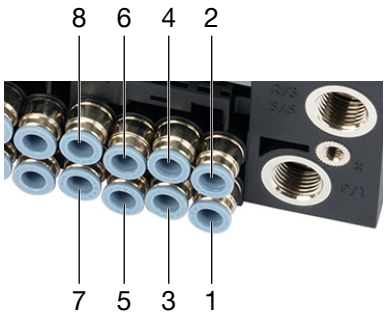
4.3 Pin assignment double valve 2x3/2-way

Valve island type 8640

Double valve type 6524 2 x 3/2-way (CFC)

Bit no.	Bit ...	Bit 7 Bit 6	Bit 5 Bit 4	Bit 3 Bit 2	Bit 1 Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	8	6	4	2
		7	5	3	1



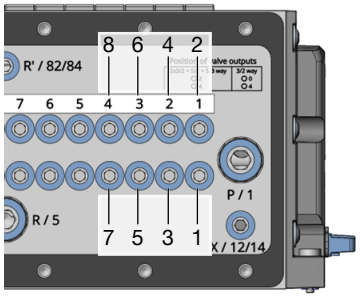
Unswitched state:
Upper and lower port vented (CFC)

Tab. 8: Pin assignment valve island type 8640

Valve island type 8652 as emulation for type 8640

Double valve type 6534 2 x 3/2-way (CFC and CFD)

Bit no.	Bit ...	Bit 7 Bit 6	Bit 5 Bit 4	Bit 3 Bit 2	Bit 1 Bit 0
Valve position (VP)	VP ...	VP 4	VP 3	VP 2	VP 1
Working port	...	8	6	4	2
		7	5	3	1



Unswitched state:
Upper and lower port vented (CFC) or pressurised (CFD) depending on the circuit function of the valve

Tab. 9: Emulation island type 8652 pin assignment

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4.4 Pin assignment example

The following example describes the pin assignment of a valve island type 8652 with 8 valve positions (single valves 3/2-way and 5/2-way as well as double valves).

Single valve						Double valve			
3/2 NC	3/2 NC	3/2 NC	3/2 NC	5/2	5/2	2 x 3/2		2 x 3/2	
Bit 9	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
VP 8	VP 7	VP 6	VP 5	VP 4	VP 3	VP 2		VP 1	
15 (4)	13 (4)	11 (4)	9 (4)	8 (2) 7 (4)	6 (2) 5 (4)	4 (2)	3 (4)	2 (2)	1 (4)

Tab. 10: Pin assignment example

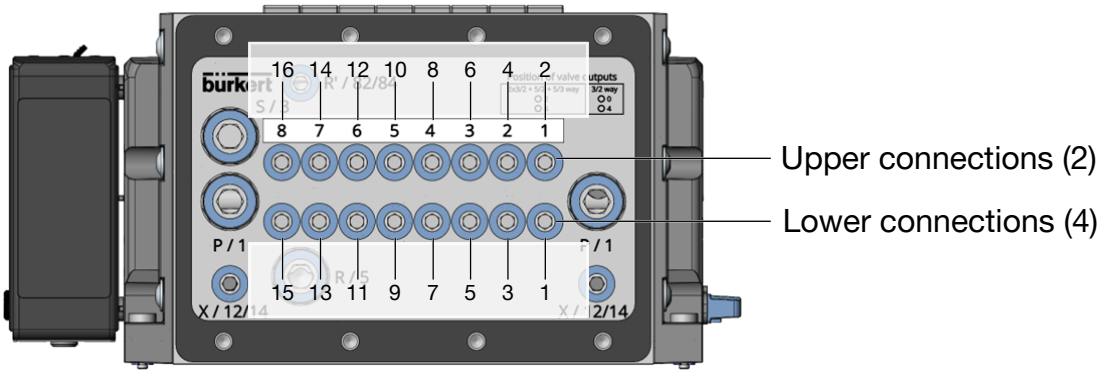

Fig. 5: Pin assignment example

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5 Assignment of digital inputs

With the emulation island, the digital inputs are assigned from right to left, contrary to the labelling on the electronic module.

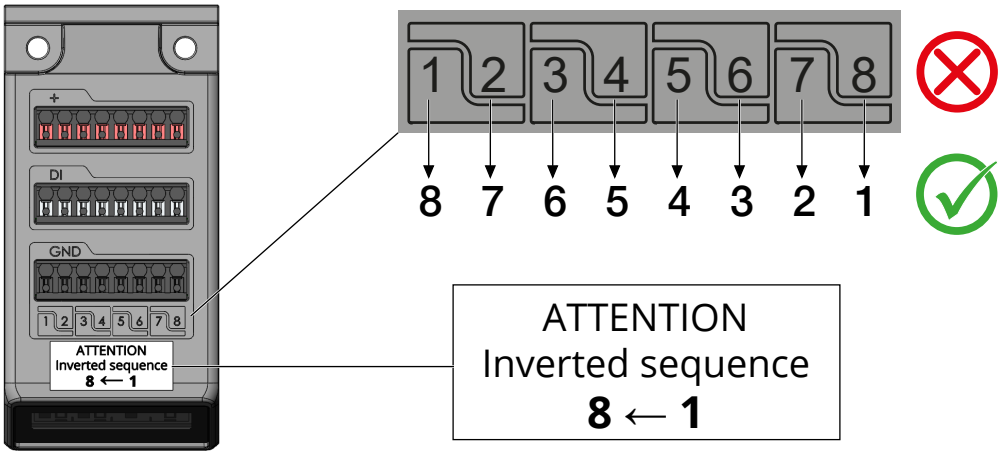

Fig. 6: The digital inputs are assigned from right to left

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6 Installation on control cabinet floor/wall

Due to the different valve island architecture, the flange patterns and the required cut-outs in the control cabinet floor/wall differ.

The emulation variant of type 8652 therefore has a stainless steel AirLINE Quick adapter pre-assembled at the factory. With this adapter, the type 8652 valve island can be mounted onto the existing cutout in the control cabinet floor/wall.

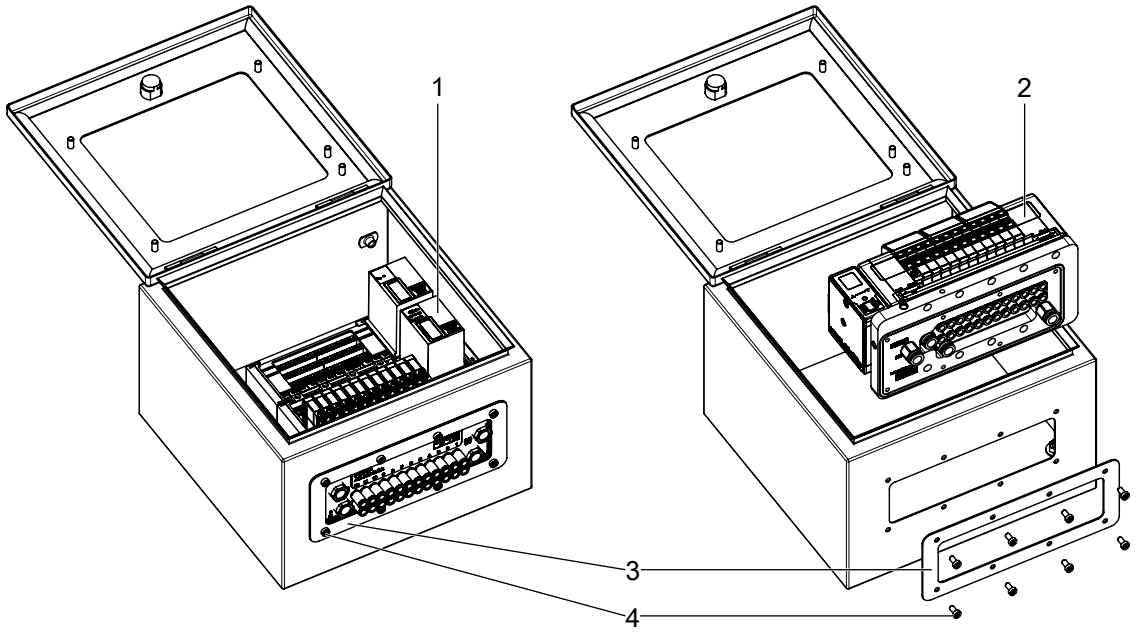

Fig. 7: Replacing type 8640 with type 8652, installation on control cabinet floor/wall

1	Valve island type 8640	2	Valve island type 8652 with AirLINE Quick adapter
3	Stabilising plate	4	M5 x 10 screws

- Loosen the M5 x 10 screws on the valve island type 8640 to be replaced and remove the stabilising plate.
- Remove the valve island type 8640 from the control cabinet and clean the sealing surface along the cutout in the control cabinet if necessary.
- Place the valve island type 8652 with adapter on the cutout in the control cabinet.
- Reinstall the stabilising plate from the outside and secure it with new M5 x 10 screws from the supplied attachment set (tightening torque 2.5 Nm).

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7 Device description file

The device description file must be taken over from the valve island 8640.

Download device description file

- Open country.burkert.com.
- Enter the 4-digit type number in the search mask and press the enter key.
- Select “downloads” filter.
- Filter by document type “software”.
- Download device description files.

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8 Protocol settings

8.1 Selecting the protocol

This step is only necessary if the protocol has not been preset at the factory.

When using RIO extension islands, the setting only needs to be done on the main island (master).

There are several ways to select the protocol:

8.1.1 Select protocol on the communication module

- Press menu key ◉ twice.
- Select **Parameter** > **Ind. Comm.** > **Protocol**.
- Select and confirm desired protocol.
- Navigate **Exit** until message **A restart is required to apply changes** appears.
- Select **OK**.
- **Restart device?** > **Yes**.

8.1.2 Select protocol with web server (not available for PROFIBUS)

- Establish connection to web server (for procedure see operating instructions Type 8652).
  User name: admin, password: admin
- Navigate to **Industrial communication** > **Configuration** > **Protocol**.
- Select protocol.
- For the changes to take effect: restart the device.

8.1.3 Select the protocol with Bürkert Communicator

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to **Industrial communication** > **Parameter** > **Protocol**.
- Select protocol.
- For the changes to take effect: restart the device.

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8.2 Enter protocol-specific address

There are several ways to enter the protocol-specific address:

8.2.1 Enter address on the display of the communication module

- Press menu key twice.
- Navigate from Parameter > Ind. Comm. > IP set to address.
  Or (with PROFIBUS):
  Parameter > Ind. Comm. > IP set > PROFIBUS address.
- Use menu key to enable processing.
- Set address with arrow keys, confirm with menu key and save.
- Navigate Exit until message A restart is required to apply changes appears.
- Select OK.
- Restart device? > Yes.

8.2.2 Select address with web server (not available for PROFIBUS)

- Establish connection to web server (for procedure see operating instructions Type 8652).
  User name: admin, password: admin
- Navigate to Industrial communication > Configuration.
- Enter address.
- For the changes to take effect: restart the device.

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8.2.3 Bürkert Communicator: PROFINET, EtherNet/IP and Modbus TCP

	PROFINET	EtherNet/IP	Modbus TCP
DNS compatible name	X	–	–
Fixed IP address	X	X	X
Network mask	X	X	X
Standard gateway	X	X	X
Temporary IP address	X	X	–

Tab. 11: Possible protocol settings

Read current IP address (such as EtherNet/IP)

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to EtherNet/IP > Parameter > EtherNet/IP settings > IP parameter settings.

  ✓ IP address is displayed.

Protocol settings (EtherNet/IP example)

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to EtherNet/IP > Parameter > EtherNet/IP settings.
- If necessary, change settings.
- For the changes to take effect: restart the device.

8.2.4 Bürkert Communicator: enter PROFIBUS address

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to PROFIBUS DPV1 > Parameter > Profibus settings.
- Set address.
- For the changes to take effect: restart the device.

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9 Configuration of IOs

9.1 Valve settings

The valve types used on the valve island are already preset.

If valves of one type are replaced by valves of another type, the settings can be adjusted via the display of the communication module or with the Bürkert Communicator.

9.1.1 Setting on the display of the communication module

- Press menu key ⚫ twice.
- Select Parameter > AirLINE > Valve cnf > Unit > Slot.
- Select changed valve function.
- If necessary, perform further valve settings.
- Navigate Exit until message A restart is required to apply changes appears.
- Select OK.
- Restart device? > Yes.

9.1.2 Settings with Bürkert Communicator

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to IOs > Parameter > Valve settings.
- Make the settings for each valve unit. This can be set across the globally for the valve unit or separately for each valve.
- For the changes to take effect: restart the device.

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9.2 Fault state settings

The **Fault state settings** menu is for display purposes only. The error state cannot be set either via the Communicator or the display, but is defined exclusively via the programmable logic controller.

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9.3 Input module settings

The settings of the input module can only be changed on extension islands. The main island is configured via the PLC.

Exception: PROFIBUS

For PROFIBUS DPV0, the main island is **not** set via the PLC.

In PROFIBUS DPV1, on the other hand, the PLC takes over the configuration.

Since it is not possible to detect on the device whether there is a DPV0 or DPV1 connection, the setting option is always displayed in the display or in the Bürkert Communicator. If a setting to the input module is made for a DPV1 connection, the PLC overwrites it the next time it is restarted.

9.3.1 Setting on the display of the communication module

- Press menu key twice.
- Navigate to **Parameter** > **AirLINE** > **Input cnf**
- Set mode (see Type 8640 operating instructions for description of modes).
- Navigate **Exit** until message **A restart is required to apply changes** appears.
- Select **OK**.
- **Restart device?** > **Yes**.

9.3.2 Settings with Bürkert Communicator

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to **IOs** > **Parameter** > **Input module settings**.
- Change settings for the valve units according to the device configuration.
- Set **Input operation mode** (see Type 8640 operating instructions for description of modes).
- For the changes to take effect: restart the device.

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10 RIO mapping

RIO assignment is required for valve islands with RIO extension only. Up to 8 extension islands (RIO slaves) are possible.

There are several ways to create the RIO mapping:

10.1 RIO assignment on the display of the communication module

First set RIO slave ID on each extension island.

The assignment of the RIO slave IDs must be continuous. Gaps are not allowed.

- Press menu key twice.
- **Parameter** > **RIO** > Select RIO slave ID.
- Navigate **Exit** until message **A restart is required to apply changes** appears.
- Select **OK**.
- **Restart device?** > **Yes**.

Then search for the slave IDs on the display of the main island (master):

- Press menu key twice.
- Select **Parameter** > **RIO** > **Search**.
  ✓ Main island is looking for slave IDs. After a successful search, the message **RIO found** appears.
- **Save** confirm.
- **Restart now to apply changes** confirm.
  ✓ Main island and all connected extension islands are restarted.
  The displays of the extension islands show the connection state to the main island (master).

Possible error messages

Message	Description
Internal error	Access to own objects failed
Duplicate RIO slaveID found	Multiple devices with the same RIO slave ID found
Invalid RIO slaveID sequence	RIO slave ID numbering not consecutive
RIO device with old firmware	At least 1 extension island uses an outdated firmware that does not yet support the automatic search function
Unconf. RIO device	No RIO slave ID has been assigned to at least one extension island

Tab. 12: RIO assignment, possible error messages on the display of the communication module

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10.2 RIO assignment with Bürkert Communicator

- In Bürkert Communicator, click the “+” in front of the main island (master) in the left-hand screen to open the device menus.
- Select **RIO**.
- Create the **RIO mapping** (a wizard assists with setup).

Notes:

- The 8 maximum possible RIOs are displayed in the window **RIO mapping**.
- The assignment of the RIO slave IDs must be continuous. Gaps are not allowed.
- Assigned devices disappear from the drop-down list.

If a mapping needs to be changed:

- Select **Unused** from the drop-down list.
- Reassign devices.

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11 Assigning device names

Assigning a device name facilitates the assignment of devices. The device name can be changed without affecting communication in Bürkert Communicator.

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to General settings > Parameter > büS > Displayed name.
- Enter a unique device name.

The device name should be assigned to each device individually.

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12 Supply voltage monitoring

The supply voltage monitoring is enabled on the device by the factory. If the supply voltage for the valve block is interrupted, an error message is sent to the PLC.

The monitoring of the supply voltage can be disabled in the Bürkert Communicator if required.

- Click the “+” in front of the desired device in the left-hand screen area to open the device menus.
- Navigate to General settings > Parameter > Supply voltage monitoring.
- Deactivate or activate monitoring (EVS active).
- For the changes to take effect: restart the device.

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13 Error codes

Additional information on certain error codes

19/57, 19/58, 31/29: In this case “EVS” means the supply voltage of the valves

31/60: At least 1 RIO device has a fault in the supply voltage

45/1793: RIO device was lost

Error code	Description
1/3	Overload detected.
2/1	Overvoltage detected.
2/2	Undervoltage detected.
2/3	Voltage is above the warning limit.
2/4	Voltage is below the warning limit.
2/5	Battery voltage is below the warning limit.
2/6	Voltage drop detected.
3/1	Excess temperature detected.
3/2	Low temperature detected.
3/3	Temperature warning limit exceeded.
3/4	Temperature is below the warning limit.
19/13 ... 19/18	Unit 1 ... Unit 6: short circuit on the upper position feedback unit.
19/19 ... 19/24	Unit 1 ... Unit 6: short circuit on the lower position feedback unit.
19/25 ... 19/30	Unit 1 ... Unit 6: wire break on the upper position feedback unit.
19/31 ... 19/36	Unit 1 ... Unit 6: wire break on the lower position feedback unit.
19/57	EVS (external valve shutdown) is active on one unit.
19/58	EVS (external valve shutdown) is active on a unit or the device has no power supply (24 V) for pneumatic valves.
19/59...19/64	Unit 1 ... Unit 6: short circuit on an input of the position feedback unit.
19/65...19/7	Unit 1 ... Unit 6: wire break on an input of the position feedback unit.
31/1 ... 31/6	Unit 1 ... Unit 6: overload detected.
31/10 ... 31/15	Unit 1 ... Unit 6: internal connection to the digital inputs of the electronic module interrupted.
31/16 ... 31/21	Unit 1 ... Unit 6: internal connection to the display of the electronic module interrupted.
31/28	Internal connection to the display of the fieldbus gateway interrupted.
31/29	EVS status cannot be read.
31/50	EVS (external valve shutdown) is active on all units, the device may not have power supply (24V) for pneumatic valves.

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Error code	Description
31/60	RIO power supply error [1].
31/7 ... 31/8	Electronic module defective.
31/9	Valve control defective.
32/1	Capacity of the internal message storage exceeded.
32/130	Initialisation of the device.
33/1	Switch to “operation” state.
33/2	Switch to “diagnostics active” state.
33/3	Switch to “maintenance” state.
33/4	Switch to “out of specification” state.
33/5	Switch to “check function” state.
33/6	Switch to “error” state.
33/7	Switch to AUTO operating state.
33/8	Switch to MANUAL operating state.
33/9	Switch to special mode: LED flashing.
33/11	Switch to “off” state.
33/12	Input value simulation active for at least 1 value.
33/13	Output value simulation active for at least 1 value.
33/14	Demo operation mode enabled.
33/15	User-triggered maintenance signal.
33/32768	1 status message present.
40/996	Error on 1 or more partner device(s).
45/256	büS event: büS is NOT operational.
45/257	büS event: initialisation of communication.
45/512	büS event: localisation.
45/768	büS event: a device is using the same address.
45/1024	büS event: bus connection lost/not available.
45/1792	büS event: partner search active.
45/1793	büS event: producer(s) not found.
45/1794	büS event: manually configured device without address. The search can take up to 1 minute.
45/1795	büS event: producer assignment faulty.
45/1796	büS event: removal of the producer failed.

[1] At least 1 RIO device has a power supply error

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Error code	Description
45/1797	büS event: incorrectly configured CANopen device.
45/1798	büS event: GCV is configured on both büS interfaces.
45/1799	büS event: cyclical communication of the producer is not active.
45/2048	büS event: saving of persistent büS data (do not switch off device).
45/2049	büS event: deletion of persistent büS data (do not switch off device).
45/2304	büS event: router for acyclic data active.
45/2560	büS event: incorrect serial number.
45/2561	büS event: incorrect configuration of cyclical inputs (not enough filters).
45/2562	büS event: incorrect configuration of cyclical values.
45/2816	büS event: manager is active.
45/3072	büS event: monitored device failed.
45/3584	Wait for addressing.
45/4096	Error when initialising the device parameters.
45/4097	Configured address is already being used.
51/1	No correct connection to the process control system.
51/10	Initialisation of industrial communication.
51/101	Error in the NetX configuration, e.g. when downloading the firmware.
51/102	Industrial communication is switched off.
51/103	No or incorrect mapping file present.
51/104	No protocol firmware available.
51/105	Please select a protocol and restart the device.
51/2	The cyclical data traffic was slower than the set timeout parameters.
51/201	Protocol stack initialisation error.
51/202	Protocol stack configuration error.
51/203	Error sending the MAC address.
51/204	Error registering the object data.
51/205	Error registering the connections, more than 5 specified.
51/206	Incorrect PROFIBUS address, only addresses 1–126 possible.
51/207	Incorrect CC-Link address, only addresses 1–64 possible.
51/208	Incorrect CC-Link baud rate.
51/300	The fieldbus master is in stop mode.
51/303	Error during cyclical data exchange.
51/400	The master attempted to connect a faulty module/sub-module.

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Error code	Description
63/50	Too many inputs for one valve island (bitwise composition). (Profibus error in parameterisation telegram)
63/51	Too many outputs for one valve island (bitwise composition). (Profibus error in parameterisation telegram)
63/52	Parameterisation telegram too large. (Profibus error in parameterisation telegram)
63/53	Parameterisation telegram too small. (Profibus error in parameterisation telegram)
63/54	Too many inputs for one valve island. (Profibus error in configuration telegram)
63/55	Too many outputs for one valve island. (Profibus error in configuration telegram)
63/56	Too few inputs for a valve island (default from parameterisation telegram). (Profibus error in configuration telegram)
63/57	Too few outputs for a valve island (default from parameterisation telegram). (Profibus error in configuration telegram)
63/58	An identifier has the incorrect code. (Profibus error in configuration telegram)

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