

# Type 8643 Power I/O-Box

with FOUNDATION™ Fieldbus Connection  
mit FOUNDATION™ Fieldbus-Anschaltung  
avec connexion FOUNDATION™ Fieldbus



## Operating Instructions

Bedienungsanleitung  
Instructions de Service

MAN 1000010108 ML Version: N Status: RL (released | freigegeben) printed: 28.05.2018

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

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Operating Instructions 1805/13\_EU-EN\_00804006 / Original DE

**POWER I/O-BOX Typ 8643**

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## 1 THE MANUAL

This operating manual describes the entire life cycle of the device. Store this manual in such a way that is easily accessible to every user and is available to every new owner of the device.

### WARNING!



**The operating instructions have to be read and understood.**

Read the operating manual carefully. Observe the chapters *Intended Use* and *General Safety Precautions*!

### 1.1 Symbols

#### 1.1.1 Safety Precautions

The following symbols are used throughout this operating manual:

#### DANGER!



**High risk**

Signifies an *immediate impending danger*. If it is not avoided, *death or serious injury* will result.

#### WARNING!



**Medium risk**

Signifies a *potentially dangerous situation*. If it is not avoided, *death or serious injury* may result.

#### CAUTION!



**Low risk**

Signifies a *potentially dangerous situation*. If it is not avoided, *minor injury or equipment damage* may result.

#### 1.1.2 Information, Recommendations

#### NOTE!



Describes important additional information, tips and recommendations that are important for your safety and the proper functioning of the device.

#### NOTE!



Refers to information in this operating manual or in other documents.

#### 1.1.3 Work steps

→ indicates a work step which you must carry out.

## 1.2 Trademarks

FOUNDATION Fieldbus	registered trademark of Fieldbus Foundation
NAMUR	Consortium Automation technology for the process industry

## 2 INTENDED USE

Observe the instructions in this operating manual, as well as the conditions of use and permissible data specified in the EC-Type Examination Certificate (see Annex).

The proper and safe functioning of the Power I/O Box Type 8643 with FOUNDATION Fieldbus activation is dependent on proper transport, storage and installation, and on careful operation and maintenance.

## 2.1 Limitations

Pay attention to any limitations if the system is to be exported.

### EX APPROVAL

Unauthorized modifications to the Power I/O Box Type 8643 with FOUNDATION Fieldbus activation or to the components invalidates the Ex approval.

### 3 SAFETY PRECAUTIONS

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**DANGER!****Hazard due to electrical voltage in the system!**

Working on the unit involves acute risk of injury.

- Before starting work, be sure to switch off the supply voltage and secure it to prevent restarting!
- Observe all applicable accident prevention and safety regulations for electrical equipment!

**Danger from using the Power I/O Box Type 8643 in unauthorized ambient temperature ranges!**

Hazardous situations may arise due to use in unauthorized ambient temperature ranges, especially in potentially explosive environments.

- Remain within the appropriate ambient temperature range, for each type (e. g. 8643-4-AL-KS-F-I/O), according to the table in the EC-Type Examination Certificate.

**Hazard due to unauthorized combination of types of ignition protection!**

Hazardous situations may arise due to unauthorized combination of different types of ignition protection!

- Once the bus supply has been used in an increased ignition protection class (e), the bus supply may no longer be done at the intrinsic standard ignition protection class (i).
- 

**WARNING!****Unintentional operations or unauthorized tampering can lead to generally dangerous situations including personal injury.**

- Take suitable measures to prevent unintentional operation or unauthorized tampering!

**Dangerous situations may occur during installation and maintenance work.**

- This work may only be carried out by authorized service personnel using appropriate tools!
  - After an interruption of the electricity or compressed air supply, ensure that the process is re-started in a dened or controlled manner!
-

**CAUTION!****Electrostatically sensitive components / modules**

The system contains electronic components that react sensitively to electrostatic discharge (ESD).

Contact with electrostatically charged persons or objects can endanger these components. In the worst case they may be immediately destroyed or fail after commissioning.

- Observe the requirements of EN 100 015 - 1 in order to avoid or minimize the risk of damage caused by sudden electrostatic discharges.
- Pay attention not to touch electronic components when the supply voltage is switched on.

**NOTE!**

- Operate the Power I/O Box Type 8643 only when it is in proper working order and only in accordance with the operating manual.
- Do not subject the housing of the Power I/O Box Type 8643 to mechanical loads (e. g. by using it as a support for objects or as a step).
- Failure to observe this operating manual and its operating instructions as well as unauthorized tampering with the device release us from any liability and also invalidate the warranty covering the devices and accessories!
- **The Ex approval** is only valid if the Power I/O Box Type 8643 is used in the manner described. Unauthorized modifications invalidate the Ex approval!

**NOTE!****Information about the FOUNDATION Fieldbus**

Detailed information about the commissioning of a FOUNDATION Fieldbus (FF) line is found in the *FOUNDATION Fieldbus Application Guide*, in the section *Wiring and Installation of the Fieldbus Foundation*.

Internet: [www.fieldbus.org](http://www.fieldbus.org)



## 4 GENERAL INFORMATION

### 4.1 Contact Addresses

#### Germany

Bürkert Fluid Control System  
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.buerkert.com

#### International

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

You can also find information on the Internet under: [www.buerkert.com](http://www.buerkert.com)

### 4.2 Warranty

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

### 4.3 Information in the Internet

The operating instructions and data sheet for the Power I/O Box Type 8643 with FOUNDATION Fieldbus activation are found on the Internet under:  
[www.burkert.com](http://www.burkert.com) → Documentation → Type XXXX

### 4.4 Conformity

Type 8643 conforms with the EC Directives according to the EC Declaration of Conformity.

### 4.5 Standards

The applied standards, which verify conformity with the EC Directives, can be found on the EC-Type Examination Certificate and / or the EC Declaration of Conformity.

## 5 SYSTEM DESCRIPTION

### 5.1 General Description

The Power I/O Box Type 8643 with FOUNDATION Fieldbus activation (hereafter Power I/O Box Type 8643) is used for the activation of binary signals on the FOUNDATION Fieldbus.

It is suitable for use in potentially explosive atmospheres and has been approved according to ATEX for use in Zone 1 and 21.

This device is supplied in either an aluminum or polyester housing in protection class IP65 or as an electronic module in protection class IP20/IP30 for installation in housings with Ex-e approval or control cabinets.

All cable fittings are found on the bottom.

The device is supplied via a separate power supply source for the Ex-i bus due to the fact that the usable energy from the bus wiring is extremely limited.

#### 5.1.1 Advantages and technical features

##### Advantages of the Power I/O Box

- Simple and safe installation.
- Secure galvanic isolation between power supply, bus connection, inputs and outputs.
- Dependable IP protection.
- Freedom in the assignment of the individual signals thanks to the FOUNDATION Fieldbus' DO and DI function blocks.

##### Power I/O Box technical features

- 4-lead device
- Housing: Polyester, powder-coated aluminum
- Protection class: IP65 (as electronic module, IP20 / IP30)
- Temperature range from -20 to +55 °C  
(see table in the EC Type Examination Certificate)
- Interfaces: FOUNDATION Fieldbus H1
- Outputs: 4x Ex-i DO; Inputs: 8x Ex-i DI
- ATEX approval: II 2 (1) G Ex e mb [ia IIC Ga] IIC T4 Gb  
II 2 (1) D Ex tb [ia IIIC Da] IIIC T65 °C Db IP65
- IECEx approval: Ex e mb [ia IIC Ga] IIC T4 Gb  
Ex tb [ia IIIC Da] IIIC T65 °C Db IP65

## 5.1.2 Field of Application

The Power I/O Box Type 8643 is designed for decentralized use in industrial environments, especially the pharmaceutical, petrochemical and specialized chemical industries.

It meets the specifications for the protection classes IP20/IP30 (as an electronic module) and IP65 (in aluminum or polyester housings).

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### DANGER!



#### Hazard due to electrical voltage!

The Power I/O Box Type 8643 is designed with ignition protection type Ex-e (increased safety).

- Switch off the system's operating voltage before working on the Power I/O Box Type 8643!
- 

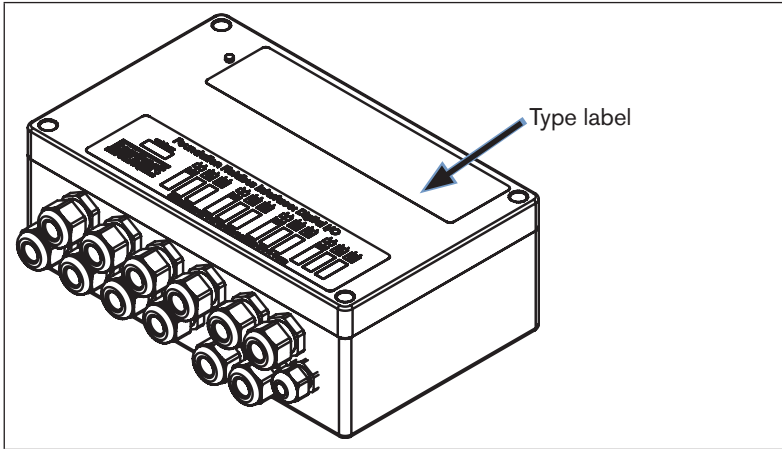
### NOTE!



When using the Power I/O Box Type 8643 in a control cabinet, ensure that:

- the control cabinet is also approved for use in an explosive environment,
  - the control cabinet is dimensioned sufficiently large to exhaust the waste heat out of the cabinet in a suitable manner,
  - the temperature inside the control cabinet does not exceed the permissible operating temperature of the Power I/O Box Type 8643!
-

### 5.1.3 Marking



*Illustration 5-1: Location of the type label*

## 5.1.4 Cable connections on the housing

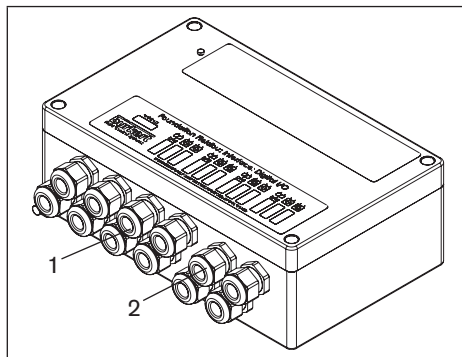


Illustration 5-2: Location of the cable connections on the aluminum housing of the device

### Legend

- 1 Cable fittings for intrinsically safe electrical circuits (8 fittings, blue)
- 2 Cable fittings for bus and voltage supply (4 fittings, black)

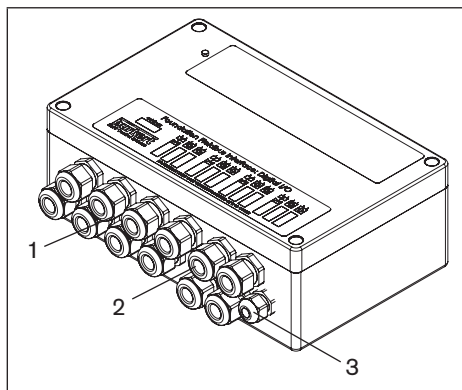


Illustration 5-3: Location of the cable connections on the plastic housing of the device

### Legend

- 1 Cable fittings for intrinsically safe electrical circuits (8 fittings, blue)
- 2 Cable fittings for bus and voltage supply (4 fittings, black)
- 3 Cable fitting for grounding cable PA (potential equalization)

### NOTE!



The cable fittings come supplied with protective caps. The protective caps must remain in place covering the cable fittings until the cables are connected to prevent the ingress of dirt.

### 5.1.5 LED display

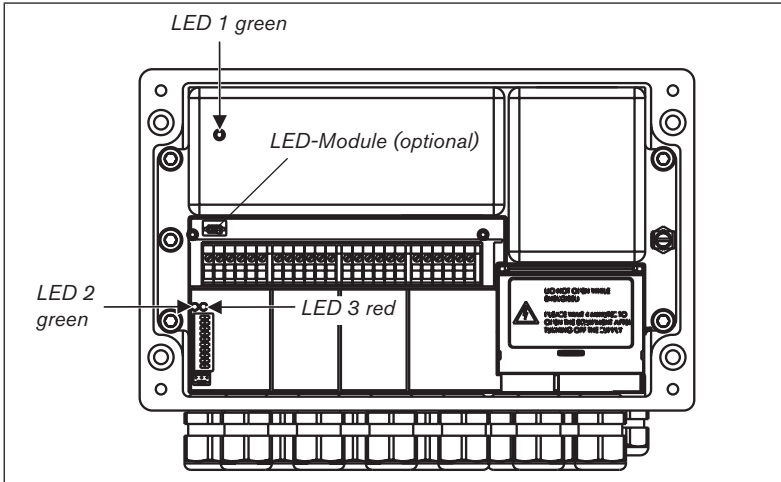


Illustration 5-4: Location of the LED display

LED 1 illuminates when voltage is connected to the bus supply.  
 LED 2 illuminates when the device is registered in the TOKEN circulation.  
 LED 3 illuminates if the device does not receive a TOKEN for more than 5 sec.

**NOTE!**



Check the power supply if neither LED 2 nor LED 3 illuminates!

### 5.1.6 DIP-Switch

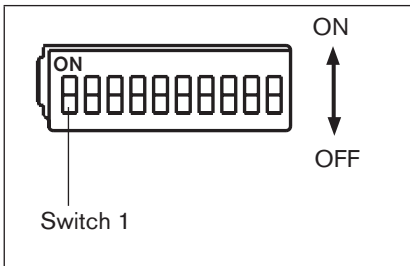


Illustration 5-5: Location of the DIP switch

Switch 1 - ON:

Simulate can be locked so that the *READBACK\_D* is overwritten in the *DO\_valve* function block.

## 5.2 Technical data

Name	Value
Housing material	Polyester, aluminum
Color	black
Ambient temperature	-20 to +60 °C
Cable entry	Polyamide cable fittings
Degree of protection	IP 65 (DIN EN 60529)
Protection class	3 (DIN EN 61140 (VDE 0140-1))
Ignition protection identification (entire device)	ATEX approval: II 2 (1) G Ex e mb [ia IIC Ga] IIC T4 Gb II 2 (1) D Ex tb [ia IIIC Da] IIIC T65 °C Db IP65  IECEX approval: Ex e mb [ia IIC Ga] IIC T4 Gb Ex tb [ia IIIC Da] IIIC T65 °C Db IP65
Power supply voltage	
Auxiliary supply 24 V	17 to 32 V DC
Max. current demand	200 mA (17 V) 140 mA (24 V) 110 mA (32 V)
Bus voltage	9 to 32 V DC
Bus current consumption	12 mA /17 mA FDE
Inputs	8, intrinsically safe, NAMUR (according to EN 60947-5-6)
Outputs	4, intrinsically safe
Outputs for pilot valves	
Min. switching current	30 mA <sup>1)</sup>
Min. holding current	15 mA
Internal resistance	330 Ohm
Open-circuit voltage	24 V
<sup>1)</sup> Power reduction on holding current after min. 50 ms.	
Electrical connections for inputs and outputs	Screw terminals (up to 2.5 mm <sup>2</sup> )

Name	Value
Fieldbus interface	Communication according to IEC 1158-2 According to FISCO
Type of ignition protection	Ex i
Electrical connection	Bus 4 screw terminals (up to 2.5 mm <sup>2</sup> ) Shield 3 screw terminals (1x directly and 2x capacitively grounded)
Auxiliary supply	
Type of ignition protection	Increased safety Ex e
Electrical connection	4 screw terminals (up to 2.5 mm <sup>2</sup> )
Device keys (see type plate)	
4-Lead version Polyester housing	8643-4-PO-XX-X-XXX
4-Lead version Aluminum housing	8643-4-AL-XX-X-XXX

**NOTE!**



- The maximum line resistance to the sensors and actuators is 20 Ω.
- The Power I/O Box Type 8643 may only be supplied with safety low voltage in compliance with VDE 0631.

**NOTE!**



- The Power I/O Box Type 8643 meets the specifications of the EMC laws. EN61000-6-2 interference resistance and EN61000-6-4 emitted interference.
- The safety engineering maximum values for use in the Ex area are found in the Type Examination Certificate.



### 5.3 Dimensions

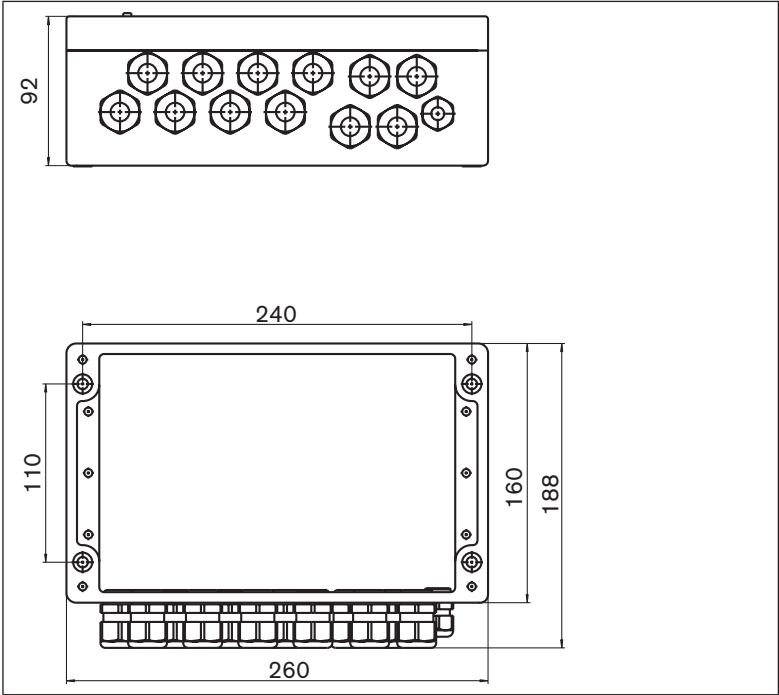


Illustration 5-7: Dimensions Type 8643

## 6 INSTALLATION

### 6.1 Safety Precautions

#### **DANGER!**



#### **Hazard due to electrical voltage in the system!**

Working on the unit involves acute risk of injury.

- Before starting work, be sure to switch off the supply voltage!
- Observe all applicable accident prevention and safety regulations for electrical equipment during installation, operation and maintenance of the device!
- In a potentially explosive atmosphere, only remove the connection terminal cover for Ex-e circuits after the connected Ex-e electrical circuits have been de-energized for more than 4 minutes. After 4 minutes, the internally stored energy is completely gone and the terminals are voltage-free.

#### **Danger from use in unauthorized ambient temperature ranges!**

Hazardous situations may arise due to use in unauthorized ambient temperature ranges, especially in potentially explosive atmospheres.

- Remain within the appropriate ambient temperature range, for each type (e. g. 8643-4-AL-KS-F-I/O), according to the table in the EC-Type Examination Certificate.

#### **Hazard due to unauthorized combination of the types of ignition protection!**

Hazardous situations may arise due to unauthorized combination of types of ignition protection!

- Once the bus supply has been used in an increased ignition protection class (e), the bus supply may no longer be done at the intrinsic standard ignition protection class (i).

## WARNING!



**Unintentional operations or unauthorized tampering can lead to generally dangerous situations including personal injury.**

- Take suitable measures to prevent unintentional operation or unauthorized tampering!

### **Hazardous situations can arise during installation work.**

- This work may only be carried out by authorized and explosive-atmosphere-trained service personnel using suitable tools!
- Adhere to the regulations applicable in the country of use for the set up / operation of electrical equipment in potentially explosive environments!

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## CAUTION!



### **Electrostatically sensitive components / modules**

The Power I/O Box Type 8643 contains electronic components that react sensitively to electrostatic exhaust (ESD).

Contact with electrostatically charged persons or objects can endanger these components. In the worst case they may be immediately destroyed or fail after commissioning.

- Observe the requirements of EN 100 015 - 1 in order to avoid or to minimize the risk of damage caused by sudden electrostatic discharges!
- Do not touch electronic components as long as the supply voltage is switched on!

### **Functional limitations**

Without potential equalization, the function of the device may be limited.

- Connect the potential equalization (PA) to the grounding terminal on the housing.

## 6.2 Installation Instructions

**NOTE!**



- The permissible technical data values may not be exceeded.
- Preferred installation position:  
Cable fittings downwards!
- The cable fittings on the housing have a metric threading.
- Only use shielded leads for bus supply!
- Make sure the bus wiring shields are fitted as close as possible on the designated screw terminals!
- The housing must be carefully re-closed after conclusion of the work!

**NOTE!**



This device complies with the EMC directive of the Council of the European Community No. 2004/108/EC. Observe the installation instructions to fulfill the requirements of this directive.

## 6.3 Cable glands

**WARNING!**



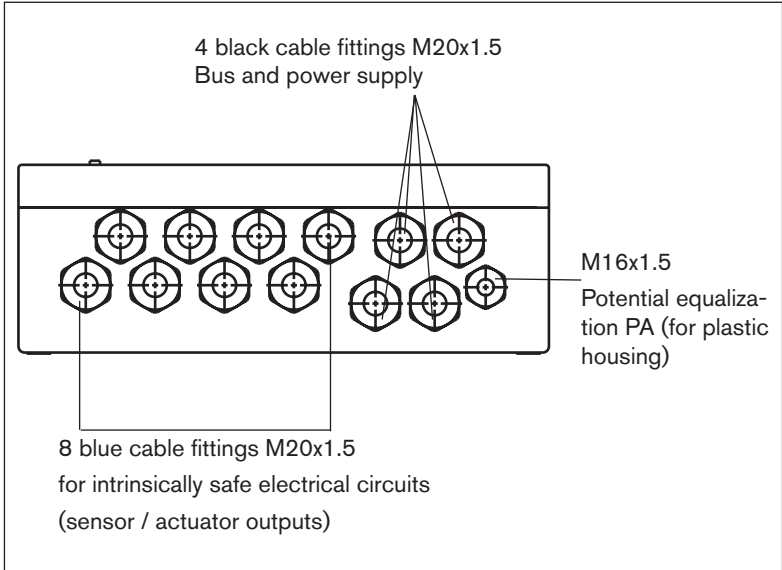
**Risk of explosion!**

- No explosion protection with defective or improper cable fittings
- Replace defective cable fittings only with Ex approved (Ex e II) cable fittings with adequate operational temperature range (see EC-Type Examination Certificate).

**NOTE!**



- All cable fittings are factory-equipped with a sealing plug (protection class IP65).
- Seal all of the remaining open cable fittings with a sealing plug to preserve the IP protection (IP65).



*Illustration 6-1: Cable fittings on the metal housing*

There are eight blue cable fittings on the housing for intrinsically safe electrical circuits and four fittings for the bus and power supply with increased safety.

There are two M20x1.5 fittings each for the bus and power supply in order to loop in the supply lines. Each output (with two sensors) has an M20x1.5 cable fitting for sensors and actuators.

Devices with a plastic housing have an M16x1.5 cable fitting for internal ground connection (PA).

Devices with a metal housing (e. g. aluminum) have an external ground connection on the housing.

## 6.4 Electrical Connections

### 6.4.1 Safety Precautions

**CAUTION!**



**Incorrect polarity!**

No function with incorrect polarity.

- Pay attention to the polarity of the terminals!

### 6.4.2 Overview of terminals and outputs

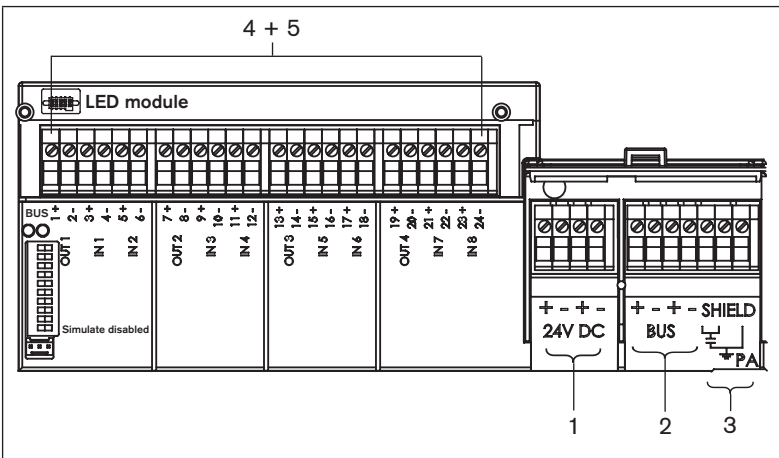


Illustration 6-2: Overview of terminals and outputs

*Legend*

- 1 Power supply 24 V DC
- 2 Bus
- 3 Shield
- 4 Actuators
- 5 Sensors

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## 6.4.4 Supply connection

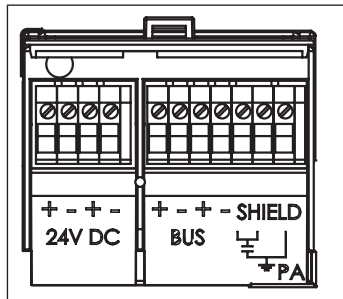


Illustration 6-4:  
Terminal arrangement

### TERMINAL 24 V DC

Connection for power supply in ignition protection type Ex e II.  
See EC-Type Examination Certificate for max. connection values.

### TERMINAL BUS

Connection for bus supply according to IEC 1158-2.

There are two variations available depending on the model of the device:

- **Bus supply with increased safety**  
Explosion protection type: Ex e II
- **Inherently safe bus supply**  
Explosion protection type Ex ia IIC or Explosion protection type Ex ia IIB

### DANGER!



**Risk of explosion due to unauthorized combining of ignition protection types!**

Hazardous situations may arise due to unauthorized combination of ignition protection types!

- Once the bus supply has been used in an increased ignition protection class (e), the bus supply may no longer be done at the intrinsic standard ignition protection class (i).

## 6.4.5 Terminal connection SHIELD

Connection for the bus wiring shield.

There are two possible ways to connect the shield:

- **Direct grounding to housing (PA)**

Connecting the shield:

→ Connect the shield to the right terminal (see illustration 6-2, position 3).

**▪ Capacitive grounding to housing (PA)**

A capacitor with a capacity  $< 10$  nF is built into the device for the dissipation of EMC interference with the ground potential.

If an error occurs when parallel switching several devices with capacitive shield-grounding, the stored energy in the capacitors may not exceed the permissible limits (see IEC/EN 60079-11) for the current gas group.

In order to ascertain the stored energy, the maximum permissible bus voltage must be considered.

Connecting the shield:

- Connect the shield to the left 2 terminals (see illustration 6-2, position 3).
- Connect the shield all the way through.
- Ground the shield on a position in the bus line.

**NOTE!**

The terminals for the bus and power supply have a cover to protect against unintentional contact.

**TERMINALS HOUSING**

Connection for potential compensation (PA).

**Electromagnetic compatibility**

Connect the ground terminal to the potential equalization (PA) with a as short a lead as possible to ensure adequate dissipation of EMC interference. If this is not possible, take appropriate measures to prevent electromagnetic interference from inadmissibly influencing the Power I/O Box Type 8643.

Connection cable:

- minimum of cross-section:  $2.5 \text{ mm}^2$
- maximum length: 0.5 m

**NOTE!**

To warranty the tightness of the housing, the outer diameter of the connecting lead must be at least 4 mm for plastic housings.



## 6.4.6 Terminals *Actuators*

The Power I/O Box Type 8643 has performance-reduced outputs. This means that the current required to switch the actuator is provided at the moment of switching. After a pre-determined time, it is reduced to the holding current.

The actuator outputs are designed with ignition protection type ia.

	Terminal marking	
	+	-
Polarity	+	-
Output 1	1	2
Output 2	7	8
Output 3	13	14
Output 4	19	20

## 6.4.7 Terminals *Sensor*

The Power I/O Box Type 8643 has eight NAMUR sensor inputs, where two sensors are always assigned to one actuator output. The sensors indicate the position of a connected process valve. However, they can also return other process values (e. g. control keys, scraper end positions ...) independently of actuator outputs.

The sensor inputs are designed with ignition protection type ia.

Output	Sensor	Terminal marking	
		Polarity +	Polarity -
1	1.1	3	4
	1.2	5	6
2	2.1	9	10
	2.2	11	12
3	3.1	15	16
	3.2	17	18
4	4.1	21	22
	4.2	23	24

## 7 NETWORK CONFIGURATION

### 7.1 Memory Allocation for User Data Traffic

**NOTE!**



Your control system handbook is the basis for the configuration of the network!

In order to be able to apply the correct settings for the configuration program, you will need the following files from the enclosed CD:

\*.ffo, \*.sym, \*.fhx, \*.cff

### 7.2 System Parameters

**NOTE!**



- All data refers to the ITK Version 5.
- Make sure that voltage is connected when writing the parameters!

#### 7.2.1 Block parameters of the transducer (DO valve)

- suitable for solenoid valve applications
- two proximity switches for each magnetic output
- the input signals give information on the ON/OFF state of the valve

Parameter	Description
VALVE_MAN_1...4	Name of valve manufacturer
ACTUATOR_MAN_1...4	Name of actuator manufacturer
VALVE_SER_NUM_1...4	Serial number of valve belonging to device
ACTUATOR_SER_NUM_1...4	Serial number of actuator belonging to device
VALVE_ID_1...4	Valve identifier (valve type)
ACTUATOR_ID_1...4	Actuator identifier (actuator type)

Parameter	Description
TRAVEL_COUNT_1...4	<p>Number of cycles from OPEN to CLOSED and from CLOSED to OPEN.</p> <p>The numerical range of TRAVEL_COUNT exceeds the memory capacity of the EEPROM.</p> <p>The value is saved in the EEPROM after every 100 write cycles. If the TRAVEL_COUNT_LIM1 to 4 is set to 0, nothing is counted.</p>
TRAVEL_COUNT_LIM_1...4	<p>Limits of the parameter TRAVEL_COUNT.</p> <p>At 0, TRAVEL_COUNT_LIM is not processed.</p> <p>If the LIMIT values are exceeded, the corresponding bit is set in the parameter CHECK_BACK.</p>
TRAVEL_TIME_CLOSE_OPEN_1...4	<p>Set point value for the time in seconds between the change of state from CLOSED to OPEN.</p> <p>At 0, the time is not processed.</p> <p>If the limits are exceeded, the corresponding bit is set in the parameter CHECK_BACK.</p>
TRAVEL_TIME_OPEN_CLOSE_1...4	<p>Set point value for the time in seconds between the change of state from OPEN to CLOSED.</p> <p>At 0, the time is not processed.</p> <p>If the limits are exceeded, the corresponding bit is set in the parameter CHECK_BACK.</p>
TRAVEL_TIME_CLOSE_OPEN_TOL_1...4	<p>Maximum time difference between TRAVEL_TIME_CLOSE_OPEN and the current switching time.</p>
TRAVEL_TIME_OPEN_CLOSE_TOL_1...4	<p>Maximum time difference between TRAVEL_TIME_OPEN_CLOSE and the current switching time.</p>

Parameter	Description																							
CALIB_DO_VALVE_1...4	<p>Introduction of a device-specific calibration.</p> <table border="1"> <tr> <td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>x</td><td>y</td> </tr> </table> <table border="1"> <thead> <tr> <th></th> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>y</td> <td>0</td> <td>undamped active</td> </tr> <tr> <td>y</td> <td>1</td> <td>damped active</td> </tr> <tr> <td>x</td> <td>0</td> <td>Sensor 1 indicates: valve open</td> </tr> <tr> <td>x</td> <td>1</td> <td>Sensor 1 indicates: valve closed</td> </tr> </tbody> </table>	-	-	-	-	-	-	x	y		Value	Description	y	0	undamped active	y	1	damped active	x	0	Sensor 1 indicates: valve open	x	1	Sensor 1 indicates: valve closed
-	-	-	-	-	-	x	y																	
	Value	Description																						
y	0	undamped active																						
y	1	damped active																						
x	0	Sensor 1 indicates: valve open																						
x	1	Sensor 1 indicates: valve closed																						
CHECKBACK_1...4	<p>Feedback from the transducer block</p> <table border="1"> <tr> <td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>c</td><td>b</td><td>a</td> </tr> </table> <table border="1"> <thead> <tr> <th></th> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>1</td> <td>TRAVEL_COUNT_TIME exceeded</td> </tr> <tr> <td>b</td> <td>1</td> <td>TRAVEL_TIME_CLOSE-OPEN exceeded</td> </tr> <tr> <td>c</td> <td>1</td> <td>TRAVEL_TIME_OPEN_CLOSE exceeded</td> </tr> </tbody> </table>	-	-	-	-	-	c	b	a		Value	Description	a	1	TRAVEL_COUNT_TIME exceeded	b	1	TRAVEL_TIME_CLOSE-OPEN exceeded	c	1	TRAVEL_TIME_OPEN_CLOSE exceeded			
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## 7.2.2 Description of some block parameters of the function block (DO)

Parameter	Description																		
READBACK_D	<p>This parameter reports the position of the valve and the sensors.</p> <table style="margin-left: 40px;"> <tr> <td style="text-align: center;">7</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> <td style="text-align: center;">4</td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: right;">Bit</td> </tr> <tr> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></td> <td style="vertical-align: top;"> <p>0 0 not initialized</p> <p>0 1 closed</p> <p>1 0 open</p> <p>1 1 moving state</p> </td> </tr> </table> <p style="margin-left: 40px;"> <span style="margin-left: 100px;">sensor 1</span>  <span style="margin-left: 100px;">short-circuit sensor 1</span>  <span style="margin-left: 100px;">open circuit sensor 1</span>  <span style="margin-left: 100px;">state sensor 2</span>  <span style="margin-left: 100px;">short-circuit sensor 2</span>  <span style="margin-left: 100px;">open circuit sensor 2</span> </p> <hr style="width: 50%; margin-left: 0;"/> <p style="margin-left: 40px;"><i>Legend: 1 = active, 2 = inactive</i></p> <p>A sensor failure changes the status to "BAD"/Sensor-failure.</p>	7	6	5	4	3	2	1	0	Bit									<p>0 0 not initialized</p> <p>0 1 closed</p> <p>1 0 open</p> <p>1 1 moving state</p>
7	6	5	4	3	2	1	0	Bit											
								<p>0 0 not initialized</p> <p>0 1 closed</p> <p>1 0 open</p> <p>1 1 moving state</p>											
SP_D	<p>Setpoint value</p> <p>Bit 0 in the value specifies the valve position. (The status must be „GOOD“ (0x80 hex))</p>																		
RCAS_IN_D	<p>Setpoint in the state RCAS (Remote Cascade).</p> <p>Bit 0 in the value specifies the valve position.</p>																		
CHANNEL	<p>Indicates the transducer block.</p> <p>Channels 1-4 are for the DO_valve_TB (1 output, 2 inputs) and the channels 5-8 are for the DO_TB (1 output).</p> <p>If the channel 100 is entered, the inputs i. e. outputs will not be occupied.</p>																		

**7.2.3 Description of some of the block parameters of the transducer block (DO)**

Parameter	Description
CALIB_DO_OUT_5...8	0x10 line default detection ON 0x80 line default detection OFF (Sets the „fault detection“ for the LED module)
ACTUATOR_MAN_5...8	Name of actuator manufacturer
ACTUATOR_SER_NUM_5...8	Actuator serial number
ACTUATOR_ID_5...8	Actuator identification
VALVE_MAN_5...8	Name of valve manufacturer
VALVE_SER_NUM_5...8	Valve serial number
VALVE_ID_5...8	Valve identifier

If a fault is detected at the output, MANUAL mode commences (MAN).

**7.2.4 Description of a parameter of the function block (DI)**

Parameter	Description
CHANNEL	There are channels 11-18. The input may not be occupied with a DO_valve_TB. If channel 100 is entered, the inputs and /or outputs will not be occupied.

## 7.2.5 Description of some of the parameters of the transducer block (DI)

Parameter	Description
CALIB_DI_11...18	0x10 key input OFF, line fault detection ON <sup>1)</sup> 0x11 key input ON, line fault detection ON <sup>1)</sup> 0x80 key input OFF, line fault detection OFF 0x81 key input ON <sup>2)</sup> , line fault detection OFF 1) sets the „fault detection“ for the LED module 2) for key input ON, the received impulse must be at least 200 ms
SENSOR_MAN_11...18	Name of the sensor manufacturer
SENSOR_SER_NUM_11...18	Serial number of the sensor belonging to the device
SENSOR_ID_11...18	Sensor identification

## 8 COMMISSIONING

Before commissioning the Power I/O Box Type 8643 with FOUNDATION Fieldbus activation, make sure that:

- the unit has been properly connected,
- the Power I/O Box has been installed according to the instructions
- the Power I/O Box is not damaged.

## 9 SERVICE

When used in accordance with the instructions given in this operating manual, the Power I/O Box Type 8643 is maintenance-free.

### WARNING!



#### **Hazardous situations can arise during maintenance work.**

- Work may only be carried out by authorized service personnel who have been trained to work in potentially explosive environments!
- Adhere to the regulations applicable in the country of use for the set up / operation of electrical equipment in potentially environments!

During servicing, check that:

- the lines are seated securely,
- the plastic housing is not cracked,
- the inlet seals are not damaged,
- the unit operates correctly.

## 10 REPAIR

### DANGER!



#### **Risk of explosion if the device is repaired!**

- The explosion protection can no longer be guaranteed if the device is repaired.
- Do not repair the device yourself; return the device to the manufacturer for repair!

## 11 PACKAGING, TRANSPORT

### CAUTION!



#### **Transport damage!**

Inadequately protected devices may be damaged during transport.

- Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- Avoid exposure to excessively high or low temperatures that could lead to the permissible storage temperatures being exceeded.



## 12 STORAGE

### 12.1 Storage Conditions

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#### CAUTION!



#### Damage!

Improper storage can cause damage to the device.

- Store the device in a clean, dry place!
  - Storage temperature: -40 to +55 °C.
- 

### 12.2 Decommissioning

Switch off the Power I/O Box Type 8643 as follows:

- Depressurize the system.
- Switch off the power supply.
- Remove the Power I/O Box Type 8643.
- Store the Power I/O Box Type 8643 in the original packaging.

### 12.3 Restarting

Place the Power I/O Box Type 8643 into operations again as follows:

- Unpack the Power I/O Box Type 8643 and allow it to reach room temperature before switching on again.
- Then proceed as described in the chapter *Installation*.

## 13 DISPOSAL

- Dispose of the device and the packaging in an environmentally safe manner.
- 

#### CAUTION!



**Environmental damage due to device components contaminated with media!**

- Adhere to applicable disposal and environmental protection regulations!
-





