



## Universal Input/Output FB7304E3

- 4-channel
- Inputs with plug-in Ex e terminals
- Installation in suitable enclosures in Zone 1
- Module can be exchanged under voltage (hot swap)
- Analog input, digital input, analog output, digital output
- Supply circuit 21.5 V (4 mA)
- HART communication via field bus or service bus
- Simulation mode for service operations (forcing)
- Line fault detection (LFD): one LED per channel
- Permanently self-monitoring
- Output with bus-independent safety shutdown

Universal input/output with HART communication and switch-off input



### Function

The device is a configurable universal module. Each channel can operate in the following modes:

- As an analog input (AI) it feeds 2-wire transmitters.
- As an analog output (AO) it can drive proportional valves, I/P converters, or local indicators.
- As a digital input (DI) it reads dry contacts.
- As a digital output (DO) it can drive solenoids, sounders, or LED.

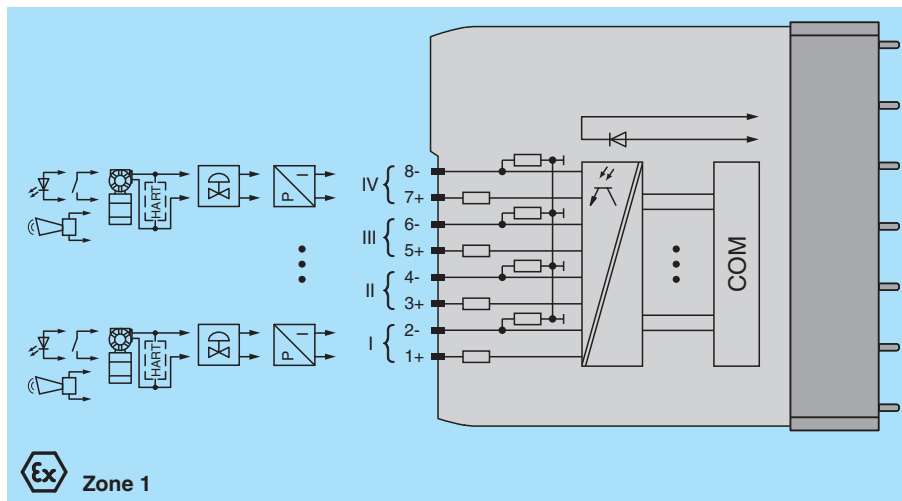
A combination of analog and digital I/O is possible.

Channel LEDs indicate the status of each channel. White LEDs indicate whether AI, AO, DI, DO are selected.

The outputs can be switched off via a contact. This can be used for bus independent safety applications.

The intrinsically safe signals are galvanically isolated from the bus and the power supply.

### Wiring Diagram



### Technical Data

|                                             |                |                                                             |  |
|---------------------------------------------|----------------|-------------------------------------------------------------|--|
| <b>Slots</b>                                |                |                                                             |  |
| Occupied slots                              |                | 1                                                           |  |
| <b>Functional safety related parameters</b> |                |                                                             |  |
| Safety Integrity Level (SIL)                |                | SIL 2                                                       |  |
| <b>Supply</b>                               |                |                                                             |  |
| Connection                                  |                | backplane bus                                               |  |
| Rated voltage                               | U <sub>r</sub> | 12 V DC , only in connection with the power supplies FB92** |  |

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Technical Data

|                            |                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------|
| Power dissipation          | 2 W                                                                                                  |
| Power consumption          | 3 W                                                                                                  |
| <b>Internal bus</b>        |                                                                                                      |
| Connection                 | backplane bus                                                                                        |
| Interface                  | manufacturer-specific bus to standard com unit                                                       |
| <b>Analog input</b>        |                                                                                                      |
| Number of channels         | 4                                                                                                    |
| Suitable field devices     |                                                                                                      |
| Field device               | pressure converter                                                                                   |
| Field device [2]           | flow converter                                                                                       |
| Field device [3]           | level converter                                                                                      |
| Field device [4]           | Temperature Converter                                                                                |
| Field device interface     |                                                                                                      |
| Connection                 | 2-wire transmitter                                                                                   |
| Connection                 | terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-                                                             |
| Transmitter supply voltage | min. 15 V at 20 mA ; 21.5 V at 4 mA                                                                  |
| Input resistance           | 15 $\Omega$                                                                                          |
| Line fault detection       | can be switched on/off for each channel via configuration tool , configurable via configuration tool |
| Short-circuit              | factory setting: > 21 mA Can be parameterized in the range 0 ... 22 mA                               |
| Open-circuit               | factory setting: < 3.6 mA Can be parameterized in the range 0 ... 22 mA                              |
| HART communication         | yes                                                                                                  |
| HART secondary variable    | yes                                                                                                  |
| <b>Analog output</b>       |                                                                                                      |
| Number of channels         | 4                                                                                                    |
| Suitable field devices     |                                                                                                      |
| Field device               | Proportional Valve                                                                                   |
| Field device [2]           | I/P converters                                                                                       |
| Field device [3]           | on-site display                                                                                      |
| Connection                 | terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-                                                             |
| Current                    | 0 ... 20 mA short-circuit protected                                                                  |
| Line fault detection       | can be switched on/off for each channel via configuration tool , configurable via configuration tool |
| Short-circuit              | factory setting: < 50 $\Omega$ configurable between 0 ... 26 mA                                      |
| Open-circuit               | deviation of preset output value > 0.5 mA                                                            |
| Load                       | max. 750 $\Omega$ at 20 mA                                                                           |
| HART communication         | yes                                                                                                  |
| HART secondary variable    | yes                                                                                                  |
| Watchdog                   | output off 0.5 s after serious fault                                                                 |
| <b>Digital input</b>       |                                                                                                      |
| Number of channels         | 4                                                                                                    |
| Sensor interface           |                                                                                                      |
| Connection [2]             | volt-free contact                                                                                    |
| Connection                 | terminals 1+, 2-; 3+, 4-; 5+, 6-; 7+, 8-                                                             |
| Line fault detection       | can be switched on/off for each channel via configuration tool                                       |
| Connection                 | mechanical switch with additional resistors (see connection diagram)                                 |
| Short-circuit              | > 7 mA                                                                                               |
| Open-circuit               | < 0.1 mA                                                                                             |
| Digital signals (active)   |                                                                                                      |
| Switching point: ON        | > 2.1 mA                                                                                             |
| Switching point: OFF       | < 1.2 mA                                                                                             |
| <b>Digital output</b>      |                                                                                                      |
| Number of channels         | 4                                                                                                    |
| Suitable field devices     |                                                                                                      |

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|                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Field device                     |           | Solenoid Valve                                                                                                                                                                                                                                                                                                                                                                                               |
| Field device [2]                 |           | audible alarm                                                                                                                                                                                                                                                                                                                                                                                                |
| Field device [3]                 |           | visual alarm                                                                                                                                                                                                                                                                                                                                                                                                 |
| Connection                       |           | terminals 1+, 2-, 3+, 4-, 5+, 6-, 7+, 8-                                                                                                                                                                                                                                                                                                                                                                     |
| Drive capability                 |           | 12 V / 22 mA                                                                                                                                                                                                                                                                                                                                                                                                 |
| Internal resistor                | $R_i$     | 385 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                 |
| Current limit                    | $I_{max}$ | 22 mA                                                                                                                                                                                                                                                                                                                                                                                                        |
| Open loop voltage                | $U_s$     | min. 22.7 V                                                                                                                                                                                                                                                                                                                                                                                                  |
| Line fault detection             |           | can be switched on/off for each channel via configuration tool                                                                                                                                                                                                                                                                                                                                               |
| Test current                     |           | 0.4 mA                                                                                                                                                                                                                                                                                                                                                                                                       |
| Short-circuit                    |           | < 50 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                |
| Open-circuit                     |           | < 0.2 mA                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Transfer characteristics</b>  |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Deviation                        |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| After calibration                |           | 0.1 % of the signal range at 20 °C (68 °F)                                                                                                                                                                                                                                                                                                                                                                   |
| Influence of ambient temperature |           | 0.1 %/10 K of the signal range                                                                                                                                                                                                                                                                                                                                                                               |
| Resolution                       |           | 12 Bit (0 ... 26 mA)                                                                                                                                                                                                                                                                                                                                                                                         |
| Refresh time                     |           | approx. 100 ms (4 channels)                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Indicators/settings</b>       |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| LED indication                   |           | Power LED (P) green: supply<br>Diagnostic LED (I) red: module fault , red flashing: communication error , white: fixed parameter set (parameters from com unit are ignored) , white flashing: requests parameters from com unit<br>Status LED (1-4) red: line fault (lead breakage or short circuit) , yellow: state of digital I/O (0/1)<br>Configuration LED (AI, AO, DI, DO) white: selected channel mode |
| Coding                           |           | optional mechanical coding via front socket                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Directive conformity</b>      |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Electromagnetic compatibility    |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Directive 2014/30/EU             |           | EN 61326-1:2013                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Conformity</b>                |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Electromagnetic compatibility    |           | NE 21:2007                                                                                                                                                                                                                                                                                                                                                                                                   |
| Degree of protection             |           | IEC 60529                                                                                                                                                                                                                                                                                                                                                                                                    |
| Environmental test               |           | EN 60068-2-14                                                                                                                                                                                                                                                                                                                                                                                                |
| Shock resistance                 |           | EN 60068-2-27                                                                                                                                                                                                                                                                                                                                                                                                |
| Vibration resistance             |           | EN 60068-2-6                                                                                                                                                                                                                                                                                                                                                                                                 |
| Damaging gas                     |           | EN 60068-2-42                                                                                                                                                                                                                                                                                                                                                                                                |
| Relative humidity                |           | EN 60068-2-78                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Ambient conditions</b>        |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ambient temperature              |           | -20 ... 60 °C (-4 ... 140 °F)                                                                                                                                                                                                                                                                                                                                                                                |
| Storage temperature              |           | -25 ... 85 °C (-13 ... 185 °F)                                                                                                                                                                                                                                                                                                                                                                               |
| Relative humidity                |           | 95 % non-condensing                                                                                                                                                                                                                                                                                                                                                                                          |
| Shock resistance                 |           | shock type I, shock duration 11 ms, shock amplitude 15 g, number of shocks 18                                                                                                                                                                                                                                                                                                                                |
| Vibration resistance             |           | frequency range 10 ... 150 Hz; transition frequency: 57.56 Hz, amplitude/acceleration $\pm 0.075$ mm/1 g; 10 cycles<br>frequency range 5 ... 100 Hz; transition frequency: 13.2 Hz amplitude/acceleration $\pm 1$ mm/0.7 g; 90 minutes at each resonance                                                                                                                                                     |
| Damaging gas                     |           | designed for operation in environmental conditions acc. to ISA-S71.04-1985, severity level G3                                                                                                                                                                                                                                                                                                                |
| <b>Mechanical specifications</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Degree of protection             |           | IP20 (module) , a separate housing is required acc. to the system description                                                                                                                                                                                                                                                                                                                                |
| Connection                       |           | removable front connector with screw flange (accessory)<br>wiring connection via spring terminals (0.14 ... 1.5 mm <sup>2</sup> ) or screw terminals (0.08 ... 1.5 mm <sup>2</sup> )                                                                                                                                                                                                                         |
| Mass                             |           | approx. 425 g                                                                                                                                                                                                                                                                                                                                                                                                |
| Dimensions                       |           |                                                                                                                                                                                                                                                                                                                                                                                                              |
| Height                           |           | 107 mm                                                                                                                                                                                                                                                                                                                                                                                                       |

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|                                                                |                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Width                                                          | 28 mm                                                                                                                                                                                                                                                        |
| Depth                                                          | 132 mm                                                                                                                                                                                                                                                       |
| <b>Data for application in connection with hazardous areas</b> |                                                                                                                                                                                                                                                              |
| EU-type examination certificate                                | FIDI 21 ATEX 0013 U                                                                                                                                                                                                                                          |
| Marking                                                        | II 2G Ex db eb q IIC Gb                                                                                                                                                                                                                                      |
| Galvanic isolation                                             |                                                                                                                                                                                                                                                              |
| Input/power supply, internal bus                               | safe electrical isolation acc. to EN 60079-11, voltage peak value 375 V                                                                                                                                                                                      |
| Directive conformity                                           |                                                                                                                                                                                                                                                              |
| Directive 2014/34/EU                                           | EN 60079-0:2018<br>EN 60079-1:2014<br>EN 60079-5:2015<br>EN 60079-7:2015+A1:2018                                                                                                                                                                             |
| <b>International approvals</b>                                 |                                                                                                                                                                                                                                                              |
| ATEX approval                                                  | FIDI 21 ATEX 0013 U                                                                                                                                                                                                                                          |
| IECEx approval                                                 |                                                                                                                                                                                                                                                              |
| IECEx certificate                                              | IECEx FIDI 21.0003U                                                                                                                                                                                                                                          |
| IECEx marking                                                  | Ex db eb q IIC Gb                                                                                                                                                                                                                                            |
| <b>General information</b>                                     |                                                                                                                                                                                                                                                              |
| System information                                             | The module has to be mounted in appropriate backplanes and housings (FB92**) in Zone 1, 2, 21, 22 or outside hazardous areas (gas or dust). Here, observe the corresponding EC-type examination certificate.                                                 |
| Supplementary information                                      | EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> . |

## Assembly

### Front view

