EKE

Digital Input/Output Module (DIO)

SIL-2	EN 50126
	EN 50128
	EN 50129
	EN 50155
	EN 45545

SIL-2

MODULE FUNCTIONS

The Trainnet® Digital Input/ Output Module (DIO) provides a standard interface for digital input and output signals. The Trainnet® DIO receives the digital signals via its input channels and makes them available to the train computer's CPU Module. The Trainnet® DIO receives instructions from the train computer's CPU Module and sends digital signals to the sub-systems accordingly via its output channels. Separate channels are provided for frequency measurements (can be used for tachometer inputs).

The Trainnet® Digital Input/Output Module can be used as a part of a Trainnet® TCMS, VCU or Event Recorder. Alternatively, the Trainnet® DIO can be fitted in the Trainnet® Remote I/O Module (RIOM).

KEY FEATURES

The Trainnet® DIO has 24 input channels and 8 channels which can be used either as input channels or output channels. 2 frequency input channels are also available. Up to four outputs can be connected in parallel to increase output current.

One special feature of the DIO module is to supports the UIC-556 sleep mode. The DIO can remain active with WTB modules, and provide local inauguration and battery voltage monitoring.

The module also provides emergency output short circuit protection: if the output current exceeds its maximum value, the short circuit protection shuts down the output. The status of the short circuit protection is available to the train computer's CPU module. If the communication between the train computer's CPU and the module fails, the module's output channel goes to a state defined in the application software (emergency output), which can be individually set for each single channel.

The module's own 32-bit embedded processor implements diagnostics functions and reports to the train computer's CPU module if it suspects that the input values cannot be trusted. Each input channel has a common test circuit, which is used for real-time diagnostics of the channel. This test is carried out during power-on and repeated during normal operation. The input and output states, and their configuration parameters (wetting current, threshold levels) are accessible by the train computer's CPU module.

Two separate group voltages with common ground allow split behind two circuit breakers, or having a mixed voltage system. Input and Input/Output channels are split evenly between group voltage 1 and 2. Please note that the groups are not isolated from each other.

SIL-2 CERTIFIED

The module development is based on the railway standards EN 50126, EN 50128 and EN 50129 that are in accordance with safety integrity level SIL 2. A non-SIL certified version of the module is also available.
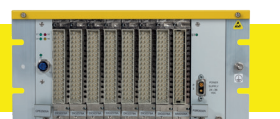
TECHNICAL SPECIFICATIONS

Dimensions (W x H x D)
4 TE x 3 U x 160 mm

Weight: 179 g

Input Power
5 V DC ± 5 % (500 mA max., 200 mA typ.)

Temperature Range (operational)
-40 ºC...+70 ºC

MTBF (40 ºC ambient temperature)
2 160 000 h (DIO2378A)
1 200 000 h (DIO2908B) (SIL-2)

I/O Connector
DIN41612-F48 (at front)

Host Interface: RS 485

Number of Input-only Channels: 24

Number of Input/Ouput Channels: 8

Number of Frequency Input Channels: 2

Frequency Input Range: 0...32 kHz, resolution 1 Hz

Battery Voltage Monitor
Yes, one or two (UIC-556)

Temperature Measurement
Yes, local CPU

Input type: Current sink

Output Type
High side (FET) from battery voltage

Voltage Drop: Max. 2 V

Input/Output Voltage Range
16.8...137.5 V DC (1 sec 14...154 V DC)

Threshold levels
Software selectable (both, positive and negative) (either V or % V_{in})

Software Selectable Wetting Current
0 ... 25 mA

Output Current
1.0 A Continuous