Main Features

▸ 10 digital wide range I/O channels; 8 inputs and 2 outputs

▸ 4 analog inputs for current, voltage or resistive measurements

▸ Support for most common real-time Ethernet protocols including TRDP, IPTCom and EtherNet/IP – CIP

▸ Extension port for I^2C, SPI and 1-Wire communication

▸ Coding pins for optional geographical addressing (7 bit)

▸ duagon web server for remote firmware updates

▸ -40 to 70°C operating temperature

Overview

The DIO021E is a remote I/O with 8 digital inputs, 2 digital outputs and 4 analog inputs, that is controlled via an Ethernet interface. All digital inputs can be used as PWM or event counter. The two digital outputs are isolated and allow bidirectional current flow. The analog inputs can be used for voltage (±10 V), current (±20 mA) or resistive measurements (10Ω...5kΩ). All I/O channels, digital and analog, are galvanically isolated from the internal logic and the Ethernet interface.

Additionally, the I/O module offers a serial interface (RS232/422/485), a maintenance port to access the command-line interface, an extension port for I^2C, SPI and 1-Wire communication and 7 CODE inputs. The CODE inputs can be used to generate an index, which enables geographical addressing by the application.

The integrated Ethernet controller, designed by duagon, features hardware prioritization and very low jitter. The Ethernet interface supports various real-time communication stacks, e.g. EtherNet/IP – CIP, IPTCom or TRDP. The real-time protocols are built upon duagon's proprietary UDP stack, enabling process data prioritization to decrease the message latency.

Furthermore, the Ethernet interface is compliant to IEEE 802.3 and supports autonegotiation, auto MDI-X as well as half and full duplex.

The DIO021E offers a secure web front-end (HTTPS), that can be used for diagnostic purposes and to upload and execute firmware updates.

The applications running on the DIO021E are generally developed by the customer. duagon provides a build environment including the development library, which is required to implement any customer-specific application. The development library is accompanied by a simple demo application. On request, duagon offers the application development as an engineering service. Please contact duagon for more information about the possibilities.

The DIO021E can be powered directly from battery, supporting voltage ranges of 24 Vdc to 110 Vdc. It is designed for harsh rolling stock environment and complies with the EN 50155 standard by:

- -40 to +70°C operating temperature
- coating against humidity
- enhanced EMI and vibration robustness

Technical Specification

PHYSICAL DATA

Fast Ethernet connectors	M12, female, D-coded
I/O connector	2x Phoenix Contact MCV 1,5/20-GF connectors (20-pole)

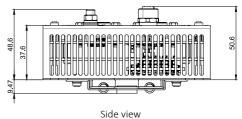|	
Serial connector	SUB-D, 9-pin, male
CODE input connector	SUB-D, 9-pin, female
Maintenance port connector	Socket, 12-pin

Extension port connector	Socket, 12-pin
Power supply voltage range	24 Vdc to 110 Vdc
Power consumption	<5.5 W
Overall dimensions	136 × 116 × 60.1 mm
Weight	614 g
Operating temperature	-40 to +70°C, according to EN 50155; Class OT4
Storage temperature	-40 °C to +85 °C
Relative humidity	yearly average ≤75%, 95% for 30 consecutive days max. (EN 50155)
Useful life	20 years, according to EN 50155 Class L4

COMPLIANCE

EN 50155	Railway Applications (Electronic equipment used on rolling stock)
EN 50121-3-2	Electromagnetic compatibility rolling stock apparatus
EN 61373	Shock & Vibration
EN 45545-2	Fire protection, HL3
IEC 61375-3-4	Ethernet Consist Network (ECN)
RoHS	Restriction of the Use of Certain Hazardous Substances
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals

IEEE STANDARDS

IEEE 802.3u	Fast Ethernet (FE)

IEEE 802.1X	Port-based network access control
IEEE 802.3ad	Link Aggregation Control Protocol (LACP)

Dimensions

Dimensions only for reference

Top view

Side view

Ordering Information

Product: **DIO021E** - **I** - **LV** - **G**

Example:
DIO021E-I-LV-G[1]

Ethernet Protocols	
TCP/IP, UDP Sockets	I
IPTCom*	B
EtherNet/IP–CIP*	C
PROFINET*	R
TRDP*	TR

Power Supply	
Nominal Battery Voltage 24V, 36V	LV
Nominal Battery Voltage 48V, 72V, 96V, 110V	HV

Grounding Bolt	
With grounding bolt	G
Without grounding bolt*	N

[1] Default ordering options
* Please contact duagon for lead times and availability