



- up to 36 digital ON/OFF inputs configurable for high/low-side operation (18 of them can be alternatively used as input or output resource)

OPTIONAL

- Real Time Clock with rechargeable battery
- 32KByte EEPROM

OPERATING CONDITIONS

- Supply voltage: 10 .. 30 Vdc
- Operating temperature range: -40 .. +70 °C
- Storage temperature range: -40 .. +85 °C
- Max. humidity level: 95% (without condensation)
- Protection grade: IP68 certified (with connector plugged)
- Weight: 720 g

REMARKS

This product uses the following Open Source softwares:

- Kernel Realtime FreeRTOS (www.freertos.org)
- CANopenNode CANOpen Stack (sourceforge.net/projects/canopennode)

OVERVIEW

The **SIOC** control unit (**Secure IO Controller**) is a programmable controller designed to operate as slave unit in "automotive" environment with a high degree of reliability and safety.

It offers the possibility to realize, together with a master unit, a master/slave control system with PL-d (ISO EN 13849, this matches to SIL-3 of IEC ISO 61508) safety level without the need of certifying the application software on the master unit.

This goal is reached because the SIOC units handle all the security critical parts of the system by themselves: the logic that defines the safety-relevant part of the system is programmed using a very simple (and easy to analyze) Instruction List (IL) language (simplified IEC1131 IL) and the communication over the CAN-bus is based on the CANOpen EN50325-5:2010 security protocol.

SPECIFICATIONS

- CPU n.1: Microchip PIC24HJ128GP506 (40Mips, 16 bit Core, Internal memory: 8 kByte RAM, 128 kByte Flash)
- CPU n.2: Microchip PIC18F4580 (10Mips, 8 bit Core, Internal memory: 1.5 kByte RAM, 32 kByte Flash, 256 byte EEPROM)
- CAN-bus full 2.0B (11 bit or 29 bit ID), programmable baud-rate from 125Kbit/s to 1Mbit/s, redundant CANOpen protocol
- Serial interface: RS485, with baud-rate programmable from 1.2 to 115.2 kbit/s

CERTIFICATIONS

- PL-d ISO EN 13849, or SIL-3 IEC ISO 61508 (TUV-CY-19-MD-020529)
- UNECE n. 10 rev. 5 (E3 10R 05-1266)
- IP6K8 according to ISO 20653:2013

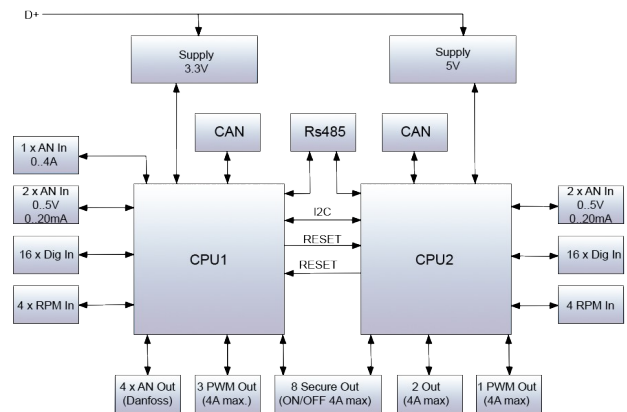
OUTPUTS

- 8 digital safety outputs (dual control, activation by both CPUs) with diagnostic and feedback, 4 outputs can be used as PWM (4A max.) or as analog outputs (0..Vbatt)
- 2 digital outputs with diagnostic and feedback (4A max.)
- 2 PWM outputs (4A max.) with integrated current feedback and diagnostic
- 2 PWM outputs (voltage or current PWM, 4A max.) with diagnostic
- 4 analog outputs with 0..Vbatt range (Danfoss) with diagnostic
- 1 current source output, programmable from 0.2mA to 20mA
- 5 V d.c. (100mA max.) regulated power supply output for external sensors

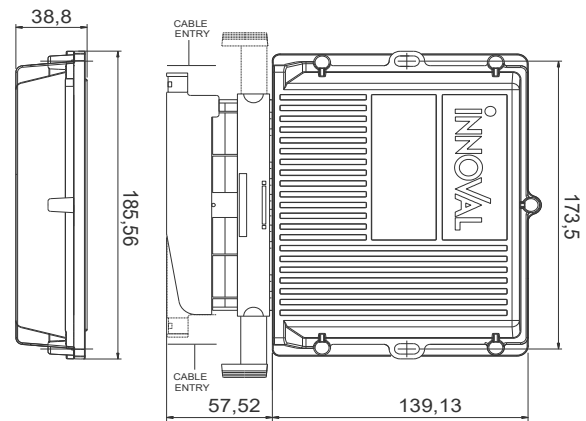
INPUTS

- 2 programmable analog inputs (0.5V, 0.25mA) with 12 bit resolution
- 2 programmable analog inputs (0.5V, 0.25mA) with 10 bit resolution
- 1 analog input with 12 bit resolution, range 0..4A (can be used for the 6 PWM outputs that do not have integrated current measurement)
- 8 RPM inputs (2kHz) configurable for high/low-side operation; they can be used as digital ON/OFF inputs, too

BLOCK DIAGRAM



MECHANICAL DRAWING



Remark: cable exit is possible on both sides.



Test Description	Reference Document
UENECE 10R05	E3-10R05-1266
IP6K8	ISO 20653:2013
Temperature Cycling Test	ISO 16750-4:2010 §5.3
Measurement of radiated emissions	EN 61000-6-4:2007/A1:2011 EN 55011:2009/A1:2010
Electrostatic discharge immunity test	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-2:2009
Immunity test to radiated radio - frequency electromagnetic fields	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-3:2006/A2:2010
Electrical fast transient/burst immunity test	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-4:2012
Electrical fast transient/burst immunity test	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-4:2012
Immunity to conducted disturbances, induced by radio-frequency fields	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-6:2014
Power frequency magnetic field immunity test	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-8:2010
Immunity to conducted common mode disturbances	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-16:2014
Voltage dips, short interruptions and voltage variations immunity tests	EN 61326-3-1:2017 EN 61000-6-2:2017 EN 61000-4-29:2000
Random Vibration Test - Test IV	ISO 16750-3 Par. 4.1.2.4 CEI EN 60068-2-64:2012
Random Vibration Test - Test VII	ISO 16750-3 Par. 4.1.2.7 CEI EN 60068-2-64:2012
Random Vibration Test - Test VIII	ISO 16750-3 Par. 4.1.2.8 CEI EN 60068-2-64:2012
Annex I Machinery Directive 2006/42/EC	EN13849-1:2015 EN13849-2:2021 EN12100:2010 EN60204-1:2006/AC:2010 EN50325-5:2012



EC Type – Examination



The CE marking can be used if the product also complies with the other applicable EC Directives



Registered no.

TÜV CY 19 MD 020529

Customer's name and address	INNOVAL S.r.l. Via R. Bianchi, 38 16152 – Genova (GE) Italia
Tested in accordance with	Annex I Machinery Directive 2006/42/EC EN 13849-1:2015 Safety-related parts of control systems - Part 1: General principles for design EN 13849-2:2012 Safety-related parts of control systems - Part 2: Validation EN 12100:2010 General principles for design - Risk assessment and risk reduction EN 60204-1:2006/AC:2010 Electrical equipment of machines - Part 1: General requirements EN 50325-5:2012 Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces - part 5: functional safety communication based on EN 50325-4
Description of product	Programmable control unit ensuring safety functions
Type Description	SIOC (Secure IO Controller) (for HW/SW release Sec 1)
Serial-no.	N/A
Order number	020529
Validity	From 2019.02.28 to 2024.02.28
Remark	See 7 for safety functions assessed and for achieved PL The EC Type – Examination certificate is used according to Article 12(3) b or 12(4) a of Council Directive 2006/42/EC relating to machinery. It confirms that the listed Annex-IV equipment complies with the principal protection requirements of the directive.

TÜV CYPRUS Ltd (TUV NORD Group),
The head of the notified body,

D. Demosthenous

The inspector
Mario Ragani
A. Ragani

This document is invalid when presented without the full attached schedule composed of 7 sections and 5 pages. This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.

TÜV CYPRUS (TUV NORD) Ltd,
2 Papaflessa Str., 2235 Latsia, Nicosia - P.O.Box: 20732, 1663 Nicosia, Cyprus
Tel: +357 22 44 28 40 Fax: +357 22 44 28 50 email: info@tuvcyprus.com.cy
www.tuv-nord.com/cy

This certificate may only be reproduced without any change, schedule included.
Excerpts or changes shall be allowed by the TÜV CYPRUS Ltd

EC Type – examination n. TÜV CY 19 MD 020529
CY-QF(IND-MD-01)-10-Rev01_15_03_2017

Page 1 of 5