

CAN.I/O.100

Electronic Control Unit (ECU)

Programmable module



CHARACTERISTICS

High protection class IP67
Programmable IOs (7 inputs and 8 outputs)
Functional safety level: SIL2 (EN62061) / PLd (EN13849)
Compact design



ADVANTAGES

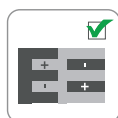
Free contact WDO Relay
Optional CANbus termination resistor
Separate power supply (Power and logic)
High configuration flexibility
Upgradeable via can bus bootloader



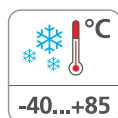
High protection level



Shock/vibration resistant



Reverse polarity protection



Wide range temperature
-40...+85



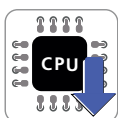
Functional safety



CANopen Safety



CANopen output



Firmware Upgradable



Directive 2011/65/EU



EU conformity

CAN.I/O.100

Electronic Control Unit (ECU)

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PRODUCT DESCRIPTION

The CAN.I/O.100 is an electronic control unit operating as an input/output expansion with CAN Bus communication interface.

The ECU collects the status of the inputs and transmits it to a master unit which in turn can activate or deactivate one or more outputs. The device performs many internal checks and an in-depth diagnosis which allows to improve the diagnostic coverage when use for safety functions.

Optionally, the unit can be used as a master device capable of autonomously performing actions on the outputs, known the inputs status and by mean user-defined algorithms. These logics can be easily implemented by mean of a simple IDE, coding the software in C language.

In case of master version, the communication interface is CAN: the integration of CANOpen and CANOpen Safety stacks is in charge of the customer.



Agricultural machinery



Construction



Earth moving



Handling and lifting

L.4 - DS0029 R02 CAN IO CANopen 27/02/25

CAN.I/O.100

Electronic Control Unit (ECU)

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PRODUCT CODE

ORDER CODE ⁽¹⁾	▶	CAN.I/O.100.	a	b	c
			__	__	__

a

Version

- 01** ◀ = Master standard
- 02** ◀ = Master safety
- 03** ◀ = Slave standard
- 04** ◀ = Slave safety

b

Customization

- X** ◀ = None
- ?** ◀ = Customization code

c

Approvals

- 1** ◀ = Standard components⁽²⁾
- 2** ◀ = SIL2/PLd



ACCESSORY

PROGRAMMING: "C" language, STM32CubeIDE, "gcc" compiler for ARM.
On request: IDE & low level driver Safety library.

(1) Not all combinations can be ordered. Please contact TSM for confirmation before placing an order.

(2) MTTFd > 100 years (EN ISO 13849-1) a) b)

a) Standard component. It does not constitute a safety component as defined in the Machinery Directive 2006/42/CE.

b) Every second failure of an electronic component is regarded as a dangerous failure.



TECHNICAL SPECIFICATION

Type of connection	Aptiv (formerly Delphi) 24 WAY PIN HEADER
Protection class	IP67 acc. to IEC60529
Operating temperature range	- 40°C to + 85°C
Enviromental resistance	acc. to: IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-38 IEC 60068-2-78
Weight approx.	150 g
Shock resistance	acc. to EN 60068-2-27 50 G, 11 ms
Vibration resistance	acc. to EN 60068-2-6 10 ... 500 Hz



ELECTRICAL CHARACTERISTICS

Power supply range	8-32 VDC
Reverse polarity protection	Yes
Over/Under voltage protection	Yes
Consumption typ. (logic)	< 150 mA
EMC compatibility (Industrial electromagnetic environment)	acc. to EN 61326-1, EN 61326-3-1
EU conformity	EMC directive 2014/30/EU RoHS directive 2011/65/EU + 2015/863/EU



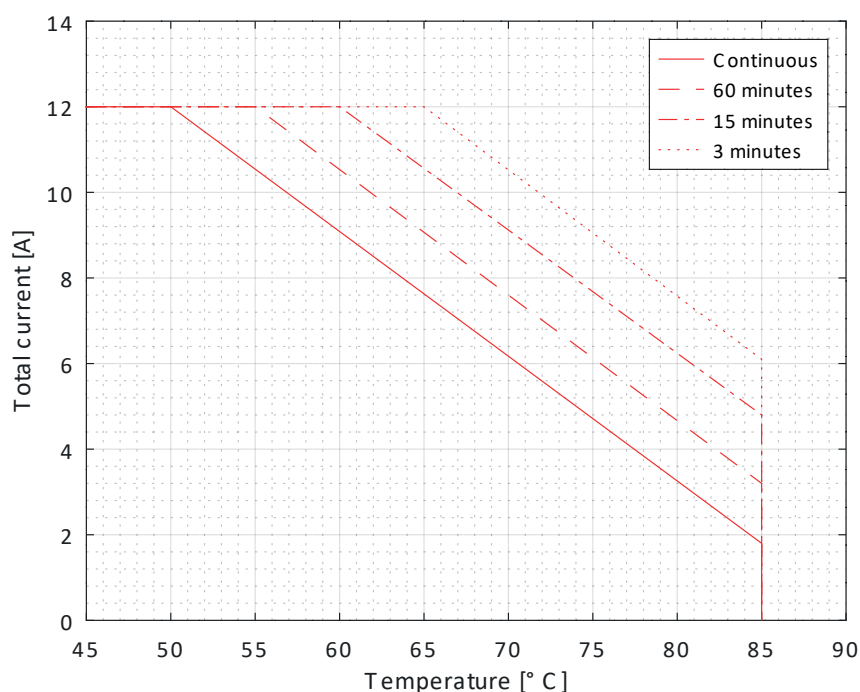
HARDWARE CHARACTERISTICS

1 x CPU 32 bit STM32F103RCT6	Working frequency: 72 MHz Internal flash memory: 256 kB Internal RAM: 48 kB Communication: 1 x CANBUS
1 x CPU 32 bit STM32F030C8T6	Working frequency: 48 MHz Internal flash memory: 64 kB Internal RAM: 8 kB
SPI interface	according to internal connection between the two microcontroller
RS232 interface	according to internal connection between the two microcontroller
IOs (*)	- 6 of Inputs: digital high side or analogue 0-25 mA, 0-32 Vdc, 0-5,5 Vdc - 1 of Inputs: digital high side or analogue 0-32 Vdc, 0-5,5 Vdc - 8 of Digital/PWM high side outputs 2A, open loop with ON-OFF/ratio status feedback input, whit overall over current measurement for protection purpose (max current 12A **); - WDO circuit with free relay contacts (12A) and status feedback inputs

The block diagram illustrates the control system for the 100W LED driver. It features two microcontrollers, uC1 (STM32F103) and uC2 (STM32F030), which manage the system's operation. The power input (8-32V) is monitored by a DC/DC Overvoltage / Undervoltage Supervisor, which provides a 5V supply to another DC/DC converter. This converter outputs 3V3_1 and 3V3_2, which are connected to both microcontrollers. uC1 also receives an Output Current Monitor signal. Both microcontrollers are connected via SPI and RS232. uC1 controls an Output Buffer and an Output Current Monitor. uC2 controls a High-Side Driver and an Output Feedback block. The High-Side Driver outputs OUT-4 and OUT-5-8. The Output Feedback block outputs OUT-4 and OUT-5-8. The system also includes a CAN Driver, a Relay WDO, and an AND gate for WDO Enable.



Output current derating (SOA)

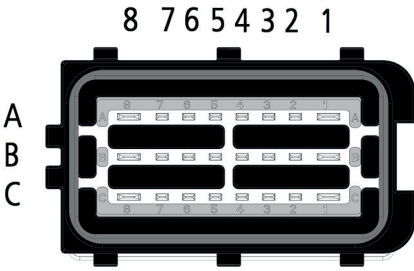


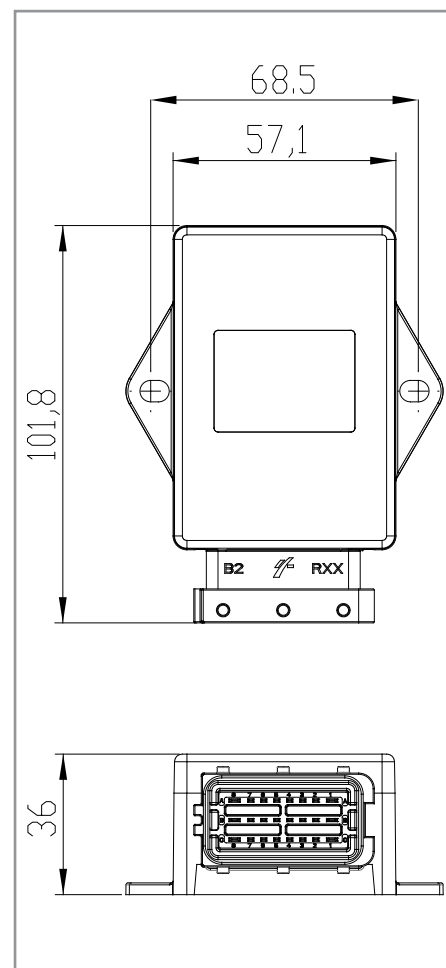
4 - DS0029 R02 CAN IO CANopen 27/02/25

ELECTRICAL CONNECTION 24 PIN



DIMENSIONS [mm]

			
	Pinout		Description
	COMPATIBILITY MODE	STANDARD MODE	
1A	OUT 7	OUT 1	On-Off/PWM open loop High Side Output (max 2A)
2A	OUT 5	OUT 3	On-Off/PWM open loop High Side Output (max 2A)
3A	OUT 4	OUT 4	On-Off/PWM open loop High Side Output (max 2A)
4A	OUT 3	OUT 5	On-Off/PWM open loop High Side Output (max 2A)
5A	OUT 2	OUT 6	On-Off/PWM open loop High Side Output (max 2A)
6A	OUT 1	OUT 7	On-Off/PWM open loop High Side Output (max 2A)
7A	OUT 0	OUT 8	On-Off/PWM open loop High Side Output (max 2A)
8A	+VP	+VP	Power Supply for OUTPUTS stage (max 12A **)
1B	-VB	-VB	GND supply from vehicle battery to CAN-IO logic
2B	OUT 6	OUT 2	On-Off/PWM open loop High Side Output (max 2A)
3B	INP 0	INP 1	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
4B	INP 2	INP 2	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
5B	CA 0	INP 3	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
6B	CAN R2	CAN R2	Pin 2 for CAN BUS termination resistor
7B	CANL	CAN L	CAN Low Line
8B	WDO-IN	WDO-IN	Pin 1 of WDO Relay (max 12A **)
1C	+VB	+VB	Power supply from vehicle battery to CAN-IO logic
2C	INP 7	INP 7	Analogue IN range: 0-5,5 V or 0-30 V OR On/Off IN High Active (*)
3C	INP 1	INP 5	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
4C	INP 3	INP 6	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
5C	CA 1	INP 4	Analogue IN range: 0-5,5 V or 0-25 mA or 0-30 V OR On/Off IN High Active (*)
6C	CANH	CANH	CAN High Line
7C	CAN R1	CAN R1	Pin 1 for CAN BUS termination resistor
8C	WDO-OUT	WDO-OUT	Pin 2 of WDO Relay (max 12A **)



L.4 - DS0029 R02 CAN IO CANopen 27/02/25

* The selection of the input range sets the channel resolution but the maximum analog input voltage is always limited by the power supply voltage (VB).
 Example: if VB is 24 Vdc and the selected input range is 0-30 V, the analog input voltage is clamped at 24 Vdc anyway.

** The maximum output current is limited versus temperature according to the SOA curve.