

## Powerful Safety Electronic Control Unit – TTC 2390

### General description

The robust and powerful TTC 2390 mid-sized electronic control solution is equipped with Infineon's TriCore™ Aurix™ TC 397 CPU to fulfil the demanding performance requirements of off-highway and automotive safety applications.

Protected by a compact and robust housing, the device is specially developed for vehicles and machines used in a rugged operating environment and at extreme operating temperatures. Due to the ISO 26262 ASIL C automotive safety certification, the device is also used in road vehicles.

### Specifications

| Parameter                                          |                                                              | Unit                                          |
|----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|
| ECU dimensions                                     | 170.6 x 232.0 x 42.0                                         | mm                                            |
| Dimensions for minimum connector release clearance | 70.0 x 182.0 x 50.0                                          | mm                                            |
| Weight                                             | 1220                                                         | g                                             |
| Connector                                          | 2 x 48-pin + 1 x 2-slot HSD                                  |                                               |
| Operating temperature                              | -40 to +85                                                   | °C                                            |
| Operating altitude                                 | 0 to 4000                                                    | m                                             |
| Supply voltage                                     | 8 to 32                                                      | V                                             |
| Maximum supply current at 12 / 24V without load    | 200/130                                                      | mA                                            |
| Maximum standby current                            | <1                                                           | mA                                            |
| Maximum total load current                         | 45                                                           | A                                             |
| <b>Standards</b>                                   |                                                              |                                               |
| Functional safety                                  | IEC 61508 SIL2<br>EN ISO 13849 PL d<br>ISO 25119 AgPL d SRL2 | ISO 26262 ASIL C<br>ISO 19014 MPL d           |
| CE                                                 | 2014/30/EU<br>2011/65/EU                                     | 2006/42/EC                                    |
| E-Mark                                             | ECE-R10 Rev.6                                                |                                               |
| FCC                                                | 47 CFR Part 15B, Class A                                     |                                               |
| EMC                                                | EN 13766<br>ISO 14982<br>CISPR 25                            | IEC 61000-4-2/-3/-4/-5/-6/-8<br>IEC 61000-6-4 |
| ESD                                                | ISO 10605                                                    |                                               |
| Electrical                                         | ISO 16750-2<br>ISO 7637-2,-3                                 |                                               |
| Ingress protection                                 | EN 60529 IP65 and IP67<br>ISO 20653 IP6k9k                   |                                               |
| Climatic                                           | ISO 16750-4                                                  |                                               |
| Mechanical                                         | ISO 16750-3                                                  |                                               |
| ISOBUS                                             | ISO 11783                                                    |                                               |

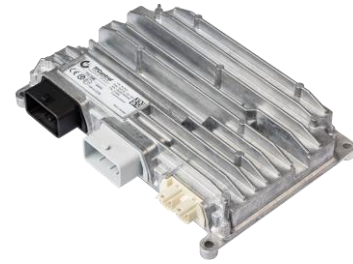
### Software

- Available with the software platform MATCH® by HYDAC Software
- C Programming Environment with real-time operating system
- CODESYS® \* Safety SIL 2 including support for CANopen® Safety Master

Board temperature, sensor supply, and supply voltage are monitored by software. Two independent safety shut-off groups for output stages. For details on the standards, see the system manual.

\* upcoming feature

\*\* can be used as PWM low side only in combination with PWM high side



### Features

#### CPU core

- 32-Bit Infineon TriCore™ Aurix™ TC 397
- 6 cores (4 lockstep cores) running at 300 MHz and memory protection for safety-relevant applications
- Floating-Point Unit and Hardware Security Module
- 6.47 MB int. SRAM, 16 MB int. Flash
- 32 MB ext. Flash, 1 MB int. EEPROM emulation

#### Interfaces

- 4 x CAN FD 50 kbit/s up to 2 Mbit/s (1 x CAN with wake-up capability and 1 x CAN ISOBUS)
- 1 x CAN bus termination configurable via connector pins
- 2 x 100BASE-TX (internal configurable Ethernet switch) \*
- 4 x SENT (with SPC support\*), 1 x LIN

#### Outputs

- 18 x PWM OUT up to 1 kHz or digital OUT, up to 4 A (2 x up to 8 A), high side, with current measurement alternative use as digital timer IN\* (0.1 Hz - 20 kHz), or analog IN 12 bit, 0 - 32 V or LED control OUT\*
- 10 x digital OUT up to 4 A, high side, current sense alternative use as PVG OUT, 10 - 90% of BAT+ or 4 x as voltage OUT 0 - 10 V or LED control OUT\* or analog IN 12 bit, 0 - 32 V
- 4 x PWM OUT up to 4 kHz, up to 4 A, low side, with current measurement (featuring timer feedback) alternative use as analog IN 12 bit, 0 - 5 V, 0 - 32 V or as digital timer IN (0.1 Hz - 20 kHz)
- 4 x PWM OUT\*\* up to 4 kHz, up to 4 A, low side, with current measurement alternative use as analog IN 12 bit, 0 - 5 V, 0 - 32 V
- 4 x digital OUT up to 4 A, low side, with current measurement alternative use as analog IN 12 bit, 0 - 5 V, 0 - 32 V
- 1 x emergency stop OUT\*, alternative use as analog IN 12 bit, 0 - 32 V
- Option to configure up to 4 x H-bridges for motor control\*
- 3 x Status LED

#### Inputs

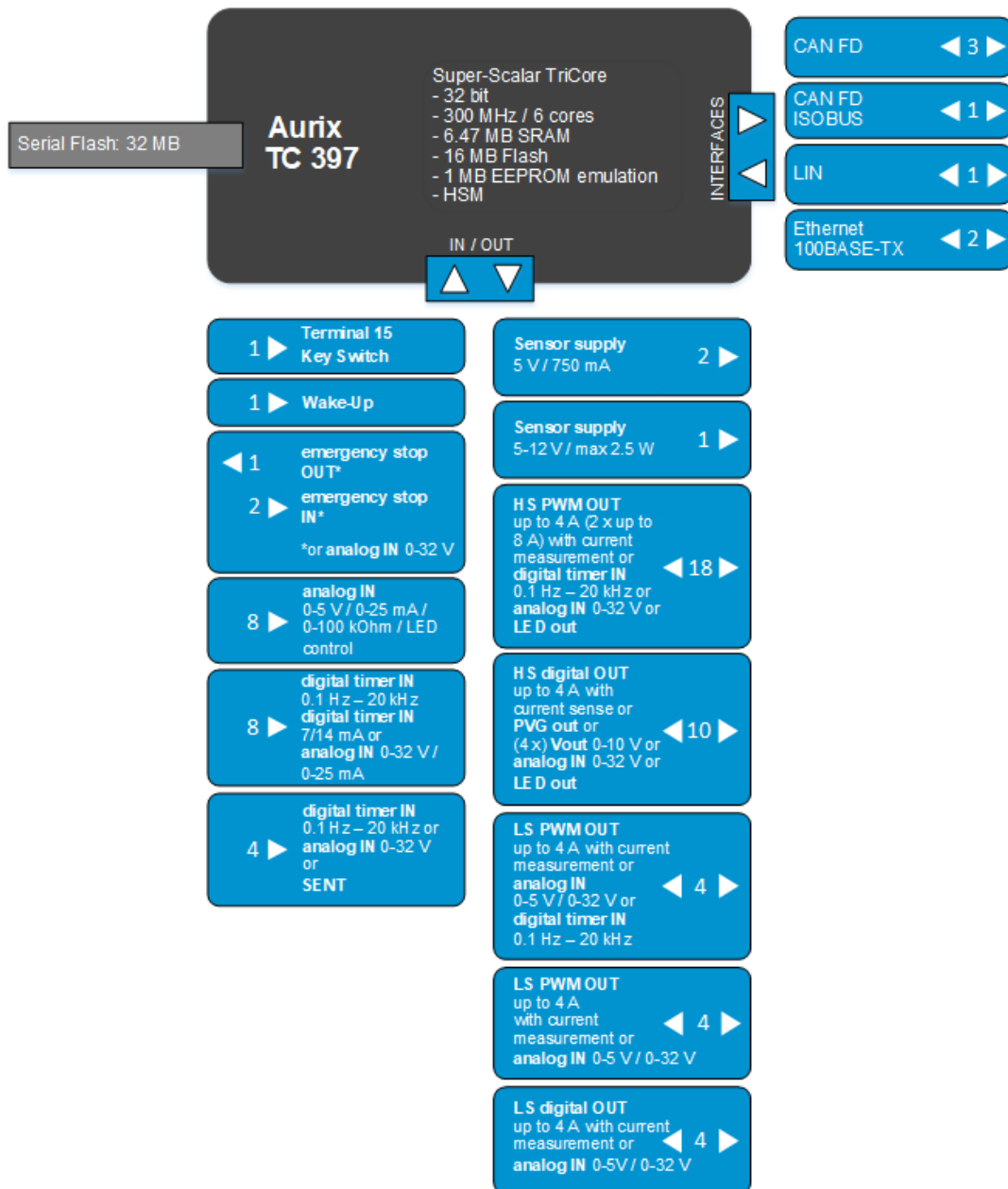
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm, LED control\*
- 8 x digital timer IN (0.1 Hz - 20 kHz), encoder support, configurable pull-up/down, support for 7/14 mA current loop speed sensors alternative use as analog IN 12 bit, 0 - 32 V, 0 - 25 mA
- 4 x digital timer IN (0.1 Hz - 20 kHz), encoder support, configurable pull-up alternative use as analog IN 12 bit, 0 - 32 V or SENT interface
- 2 x emergency stop IN\*, alternative use as analog IN 12 bit, 0 - 32 V
- Terminal 15 and Wake-Up pin

#### Sensor supply

- 2 x sensor supply, 5 V, max. 750 mA
- 1 x sensor supply, 5 - 12 V, max. 2.5 W, max. 750 mA, configurable by SW in 0.5 V steps

All inputs and outputs supporting analog IN can also be used as digital Input. All I/Os and interfaces are protected against short circuit to GND and BAT+ and can be configured by software.

## Block diagram

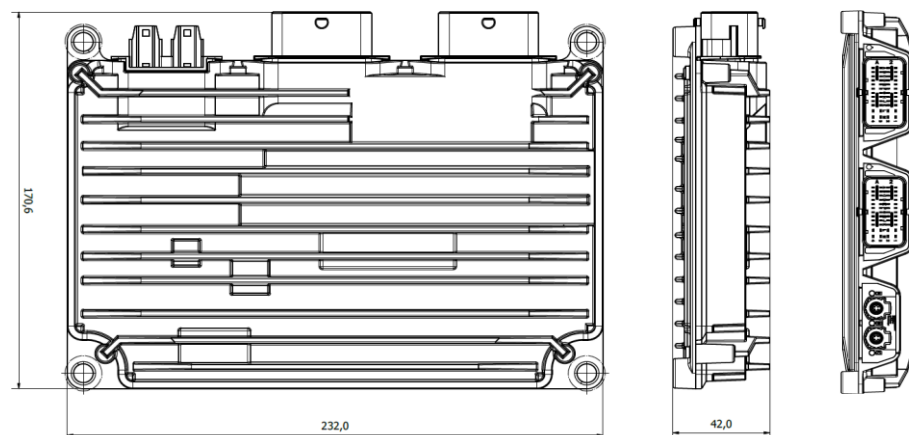


## Housing and connector

Aluminium die-cast housing

2 x 48-pin connectors

1 x 2-slot HSD connector



For further information, including price and availability, please contact [products@ttcontrol.com](mailto:products@ttcontrol.com)

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