TTC 2390 – Powerful Safety Electronic Control Unit

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

Protected by a compact and robust housing, the device is specially developed for vehicles 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECU dimensions</td>
<td>170.6 x 232.0 x 42.0 mm</td>
</tr>
<tr>
<td>Dimensions for minimum connector release clearance</td>
<td>70.0 x 182.0 x 50.0 mm</td>
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<tr>
<td>Weight</td>
<td>1220 g</td>
</tr>
<tr>
<td>Connector</td>
<td>2 x 48-pin + 1 x 2-slot HSD</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40 to +85 °C</td>
</tr>
<tr>
<td>Operating altitude</td>
<td>0 to 4000 m</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>8 to 32 V</td>
</tr>
<tr>
<td>Maximum supply current at 12 / 24V without load</td>
<td>200/130 mA</td>
</tr>
<tr>
<td>Maximum standby current</td>
<td>&lt;1 mA</td>
</tr>
<tr>
<td>Maximum total load current</td>
<td>45 A</td>
</tr>
</tbody>
</table>

Standards

<table>
<thead>
<tr>
<th>Functional safety</th>
<th>IEC 61508 SIL2</th>
</tr>
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<tbody>
<tr>
<td>CE-Mark</td>
<td>2014/30/EU</td>
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<tr>
<td>E-Mark</td>
<td>ECE-R10 Rev.6</td>
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<tr>
<td>FCC-Mark</td>
<td>47 CFR Part 15B, Class A</td>
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<tr>
<td>EMC</td>
<td>EN 13766</td>
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<tr>
<td>ESD</td>
<td>ISO 10605</td>
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<tr>
<td>Electrical</td>
<td>ISO 16750-2</td>
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<tr>
<td>Ingress protection</td>
<td>EN 60529 IP65 and IP67</td>
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<tr>
<td>Climatic</td>
<td>ISO 16750-4</td>
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<tr>
<td>Mechanical</td>
<td>ISO 16750-3</td>
</tr>
<tr>
<td>ISOBUS</td>
<td>ISO 11783</td>
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</tbody>
</table>

CPU core
- 32-Bit Infineon TriCore™ Aurix™ TC397
- 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), configurable pull-up in groups of 2 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
- 8 x PWM OUT up to 4 kHz, up to 4 A, low side, with current measurement (4 x featuring timer feedback) alternative use as analog IN 12 bit, 0 - 5 V, 0 - 32 V or 4 x as digital timer IN (0.1 Hz - 20 kHz)
- 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. 500 mA
- 1 x sensor supply, 5 - 12 V, max. 2.5 W, 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.
Board temperature, sensor supply, and supply voltage are monitored by software.
Two independent shut-off groups for PWM output stages.
Details to the standards can be found in the system manual.

* upcoming feature
### Aurix TC 397

- **Super-Scalar TriCore**
  - 32-bit
  - 300 MHz / 6 cores
  - 6.47 MB SRAM
  - 16 MB Flash
  - 1 MB EEPROM emulation
  - HSM

**INTERFACES**

- **IN / OUT**
  - Serial Flash: 32 MB
  - Ethernet 100BASE-TX
  - LIN
  - CAN FD
  - CAN FD ISOBUS

**TERMINAL**

- **Key Switch**
- **Wake-Up**
- **emergency stop OUT**
- **emergency stop IN**
  - analog IN 0-32 V
- **digital timer IN**
  - 0.1 Hz–20 kHz
  - 7/14 mA or analog IN 0-25 mA
- **digital timer IN**
  - 0.1 Hz–20 kHz
  - analog IN 0-32 V or SENT
- **HS PWM OUT**
  - up to 4 A (x up to 8) with current measurement or digital timer IN 0.1 Hz–20 kHz or analog IN 0-32 V or LED OUT
- **LS PWM OUT**
  - up to 4 A (x up to 4) with current measurement or analog IN 0-32 V or 0.1 Hz–20 kHz
- **digital OUT**
  - 18 V
  - 4 A with current measurement or LED OUT
  - (4 x) Vout 0-10 V or analog IN 0-32 V

### Housing and connector

- Aluminum die-cast housing
- 2 x 48-pin connectors
- 1 x 2-slot HSD connector

For further information, including price and availability, please contact products@tttech-auto.com.

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