High Performance Safety Controller – HY-TTC 510

General Description

HY-TTC 510 is a high-end electronic control solution for the off-highway industry satisfying all upcoming needs: The core of the controller is the very powerful TMS570 CPU designed for use in demanding safety-critical automotive and transportation applications. The HY-TTC 510 fulfills safety requirements up to SIL 2 (IEC 61508) / PL d (ISO 13849).

The HY-TTC 510 is part of a complete and compatible product family and is protected by a compact, automotive-style housing suited to mobile applications.

Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECU Dimensions</td>
<td>231.3 x 204.9 x 38.8 mm</td>
</tr>
<tr>
<td>Dimensions for minimum connection release clearance</td>
<td>315.3 x 204.9 x 38.8 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1200 g</td>
</tr>
<tr>
<td>Connector</td>
<td>154 pins</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>Peak Supply Voltage</td>
<td>45 V&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Supply Current at 12/24V without load</td>
<td>400/200 mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Standby Current</td>
<td>&lt;1 mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Total Load Current</td>
<td>40 A&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Standards

- Functional safety: IEC 61508 SIL2, EN ISO 13849 PL d
- CE-Mark: 2014/30/EU, 2006/42/EC
- E-Mark: ECE-R10 Rev.4
- EMC: EN 13309, ISO 14982, CISPR 25, EN 61000-6-2/-4
- ESD: ISO 10605
- Electrical: EN 60529 IP67, ISO 7632 IP6klk
- Ingress Protection: EN 61750-1, ISO 7637-2,-3
- Climatic: ISO 61750-4
- Mechanical: ISO 61750-3

Software

- C Programming Environment (extended with SAFERTOS® integration)
- CODESYS® Safety SIL 2 including support for CANopen® Safety Master
- CODESYS® V3 including support for CANopen® Master

Features

- CPU Core: 32-Bit TI TMS570, ARM cortex-R4F based
- Dual-core lockstep CPU and memory protection for safety-relevant applications
- 180 MHz, 298 DMIPS, Floating-Point Unit
- 3 MB int. Flash, 256 kB int. RAM
- 2 MB ext. RAM, 64 kB ext. EEPROM
- Safety Companion CPU

Interfaces

- 3 x CAN 50 kbit/s up to 1 Mbit/s
- 3 x CAN bus termination configurable via connector pins
- 1 x LIN

Outputs

- 16 x PWM OUT or digital OUT, up to 4 A, high side, with high side current-measurement
- 8 x digital OUT up to 4 A, high side, overload and open load detection, current sense, alternative use as LED control OUT or analog IN 0 – 32 V, with configurable pull-up/down
- 8 x digital OUT up to 4 A, low side, current sense, overload and open load detection, alternative use as analog IN, 0 – 32 V
- Wiring option to use up to 8 of the digital OUT, high side and 8 digital OUT, low side, as full H-bridge for motor control

Multi-purpose I/O’s

- 8 x configurable as
  - PVG OUT, 10 - 90% of BAT+ or voltage OUT, 0 - 100% of BAT+ or digital OUT up to 4 A high side or
  - LED control OUT or analog IN 12 bit, 0 - 32 V

Inputs

- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 10 V, 0 - 25 mA
- 8 x analog IN 12 bit, 0 - 5 V, 0 - 32 V, 0 - 25 mA
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, digital (7/14 mA) current loop speed-sensor alternative use as analog IN 12bit, 0 – 32 V
- 6 x digital timer IN (0.1 Hz - 20 kHz), encoder supporting digital voltage sensors with configurable pull-up/down, alternative use as analog IN 12 bit, 0 – 32 V
- 8 x digital timer IN (0.1 Hz - 10 kHz) with pull-up
- K15 and wake up

Sensor supply

- 2 x sensor supply, 5 V, max. 500 mA
- 1 x sensor supply, 5 – 10 V, max. 2.5 W, configurable by SW in 1 V steps

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.

Inputs and Outputs can also be used as digital Input.

Two independent shut-off groups for PWM output stages.

Details to the standards can be found in the System-Manual.
Block Diagram

**TMS 570 ARM Cortex**

- Dual-core lockstep
- 32 bit / 180 MHz
- 256 kB RAM
- 3 MB Flash
- Safety Companion

**INTERFACES**

- CAN
- LIN

**IN / OUT**

- RAM: 2 MB
- EEPROM: 64 kB

**Housing and Connector**

- Aluminum die-cast housing
- 154-pin connector

For further information, including price and availability, please contact products@ttcontrol.com

Subject to changes and corrections. HY-TTC 510 is a product name of TTControl GmbH. CODESYS is a trademark of 3S Smart Software Solutions GmbH. CANopen is a trademark of CAN in Automation (CiA). All other trademarks are the property of their respective holders. To the extent possible under applicable law TTControl hereby disclaims any and all liability for the content and use of this product flyer.

Copyright ©, TTControl GmbH. All rights reserved. D-TTC5F-E-20-003