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 (EN ISO 13849), AgPL d (ISO 25119 *) and ASIL C (ISO 26262 *).

The HY-TTC 510 is part of a complete and compatible product family and is protected by a compact, automotive-style housing suited for 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 connector 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

- IEC 61508 SIL2
- EN ISO 13849 PL d
- ISO 25119 AgPL d *
- ISO 26262 ASIL C *
- ECE R10 Rev. 4
- EN 13309
- EN 1508
- CISPR 25
- ISO 14982
- ISO 10605
- ISO 7637-2-3
- ISO 5609
- EN 60529 IP67
- EN 60730-2-3
- ISO 16750-4
- EN 50581
- ISO 16750-3

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 12bit, 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.

* available for C-Programming environment only.
Block Diagram

**TMS 570**

ARM Cortex

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

**IN / OUT**

- HS PWM OUT up to 4 A with current measurement
- CAN
- LIN

**INTERFACES**

- K15 Key Switch
- Sensor supply 5 V / 500 mA
- Wake-Up
- Sensor supply 5-10 V
- analog IN 0-5 V / 0-25 mA / 0-100 kOhm
- HS PWM OUT up to 4 A with current measurement
- analog IN 0-5 V / 0-10 V / 0-25 mA
- HS digital OUT up to 4 A with current sense or LED ctrl OUT or analog IN
- analog IN 0-5 V / 0-32 V / 0-25 mA
- LS digital OUT up to 4 A or analog IN
- digital timer IN 0.1 Hz – 20 kHz or analog IN
- digital timer IN 0.1 Hz – 20 kHz or analog IN
- digital timer IN 0.1 Hz – 10 kHz

**Housing and Connector**

- Aluminum die-cast housing
- 154-pin connector

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

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