High Performance Safety Controller – HY-TTC 580

General Description
HY-TTC 580 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 580 fulfills safety requirements up to SIL 2 (IEC 61508) / PL d (ISO 13849).

The HY-TTC 580 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>mm</td>
</tr>
<tr>
<td>Dimensions for minimum connector release clearance</td>
<td>mm</td>
</tr>
<tr>
<td>Weight</td>
<td>g</td>
</tr>
<tr>
<td>Connector</td>
<td>pins</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>°C</td>
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<tr>
<td>Operating Altitude</td>
<td>m</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>V</td>
</tr>
<tr>
<td>Peak Supply Voltage</td>
<td>V&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Supply Current at 12/24V without load</td>
<td>mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Standby Current</td>
<td>mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Total Load Current</td>
<td>A&lt;sub&gt;max&lt;/sub&gt;</td>
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</tbody>
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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: ISO 16750-2 ISO 7637-2/-3
- Ingress Protection: EN 60529 IP67 ISO 20653 IP66K9K
- Climatic: ISO 16750-4
- Mechanical: 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
- 8 MB ext. Flash, 2 MB ext. RAM, 64 kB ext. EEPROM
- Safety Companion CPU

Interfaces
- 7 x CAN 50 kbit/s up to 1 Mbit/s
- 4 x CAN bus termination configurable via connector pins
- 1 x Ethernet (10 / 100 Mbit/s)
- 1 x LIN, 1 x RS232
- 1 x Real Time Clock

Outputs
- 36 x PWM OUT or digital OUT, up to 4 A, high side, with high side current-measurement
- 8 of these outputs can be alternatively used as digital timer IN (0.1 Hz - 10 kHz)
- 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 12 bit, 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 12 bit, 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
- 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 12 bit, 0 – 32 V

Inputs
- 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
- 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.

Three 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

IN / OUT

1. K15 Key Switch
2. Sensor supply
   5 V / 500 mA

1. Wake-Up
2. Sensor supply
   5-10 V

8. analog IN
   0–5 V / 0–25 mA / 0–100 kΩ

8. analog IN
   0–5 V / 0–10 V / 0–25 mA

8. analog IN
   0–5 V / 0–32 V / 0–25 mA

6. digital timer IN
   0.1 Hz – 20 kHz or analog IN

6. digital timer IN
   0.1 Hz – 20 kHz or analog IN

28. HS PWM OUT
   up to 4 A with current measurement

8. HS PWM OUT
   up to 4 A with current measurement or digital timer IN
   (0.1 Hz – 10 kHz)

8. HS digital OUT
   up to 4 A with current sense or LED OUT or analog IN

8. LS digital OUT
   up to 4 A with current sense or analog IN

8. PVG OUT or Voltage OUT or HS digital OUT or LED OUT
   or analog IN

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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