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

The HY-TTC 580 is part of a complete and compatible product family and is protected by a compact, automotive-style housing suited for mobile applications.

**Specifications**

**Parameter** | **Unit**
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ECU Dimensions | 231.3 x 204.9 x 38.8 mm
Dimensions for minimum connector release clearance | 315.3 x 204.9 x 38.8 mm
Weight | 1200 g
Connector | 154 pins
Operating Temperature | -40 to +85 °C
Operating Altitude | 0 to 4000 m
Supply Voltage | 8 to 32 V
Peak Supply Voltage | 45 \( V_{\text{max}} \)
Supply Current at 12/24V without load | 400/200 mA\(_{\text{max}}\)
Standby Current | <1 mA\(_{\text{max}}\)
Total Load Current | 60 mA\(_{\text{max}}\)

**Standards**

- **Functional safety**
  - IEC 61508 SIL2
  - EN ISO 13849 PL d
  - ISO 25119 AgPL d *
  - ISO 26262 ASIL C *
- **CE-Mark**
  - 2014/30/EU
  - 2006/42/EC
- **E-Classement**
  - 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 IP65k9
- **Climatic**
  - ISO 16750-4
  - EN 50581
- **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
- **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 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, 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.

* available for C-Programming environment only.

**Software**

- C-Programming environment
- SAFERTOS® integration, as extension of C-Programming environment
- CODESYS® Safety SIL 2 including support for CANopen® Safety Master
- CODESYS® V3 including support for CANopen® Master

**Contact Information**

TTControl S.r.l. – Brixen, Italy
Tel. +39 0472 26 80-11, office@ttcontrol.com, www.ttcontrol.com

TTControl GmbH – Vienna, Austria
Tel.: +43 1 585 34 34-0
Block Diagram

TMS 570
ARM Cortex

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

IN / OUT

1 K15 Key Switch
1 Wake-Up
8 analog IN
0-5 V / 0-25 mA / 0-100 kOhm
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
5.1 Hz – 20 kHz or analog IN
6 digital timer IN
5.1 Hz – 20 kHz or analog IN

Sensor supply
5 V / 500 mA
Sensor supply
5-10 V
HS PWM OUT
up to 4 A with current measurement
HS PWM OUT
up to 4 A with current measurement or digital timer IN (0.1 Hz – 10 kHz)
HS digital OUT
up to 4 A with current sense or LED OUT or analog IN

PVC OUT or Voltage OUT or HS digital OUT or LED OUT or analog IN

10/100 BASE-TX Ethernet
CAN
LIN
RS232

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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