



## Mobile Controller HY-TTC 540

Functional safety  
PL d  
SIL 2

### Description

The controller HY-TTC 540 is based on a modern 32-bit microcontroller platform.

Practically all the system diagnostics is handled by an optimised safety component, so the entire computing capacity is available to the main processor for the actual application.

The HY-TTC 540 has an impressive number of highly flexible inputs and outputs. The outputs in particular provide high individual and total currents or can alternatively be used as inputs.

To achieve differentiated safety levels, two separate PWM shutdown groups are available.

The HY-TTC 540 was developed in accordance with the international standards IEC 61508 and ISO/EN 13849 and is certified by TÜV Nord. It meets the requirements of Functional Safety according to **SIL 2** and **PL d**.

The module is protected in a proven, robust and compact housing, specially designed for the off-highway automotive industry.

### Special features

- **SIL 2 / PL d certified**
- Safety Companion CPU
- CODESYS Safety SIL 2 with CANopen Safety Master
- CODESYS 3.X
- Two alternative PWM shutdown groups
- 28 PWM power outputs with current measurement
- Highly flexible I/O groups thanks to 96 configurable inputs and outputs
- Excellent computing performance
- 4 CAN bus interfaces

### Technical data

Environmental conditions	
Operating temperature	-40 .. +85 °C (full load)
Operating altitude	0 .. 4,000 m
Supply voltage	8 .. 32 V (BAT+) (5.5 .. 32 V CPU operative)
Peak voltage	45 V max. (1 ms)
Idle current	400/200 mA at 12/24 V
Standby current	≤ 1 mA max.
Current consumption	60 A max. (complete voltage and temperature range)
Fulfils the following standards	
CE mark	Compliant with 2014/30/EU, 2006/42/EC
E-mark	ECE-R10 Rev.4
Functional safety	EN ISO 13849 – PL d - IEC 61508 – SIL 2 -
EMC	EN 13309; ISO 14982; CISPR 25
ESD	ISO 10605
Protection class	EN 60529 IP 67; ISO 20653 IP 6k9k
Electrical	ISO 16750-2; ISO 7637-2,-3
Temperature	ISO 16750-4
Vibration, shock, bump	ISO 16750-3
Dimensions and weight	
Housing dimensions	231.3 x 204.9 x 38.8 mm
Minimum clearance for connection	316 x 205 x 40 mm
Weight	1,200 g
Features <sup>1)2)3)</sup>	
32-bit TI TMS 570 Dual-core lockstep CPU, 180 MHz, 298 DMIPS, FPU; 3 MB int. Flash, 256 kB int. RAM, 2 MB ext. RAM	
64 kB EEPROM	
Safety Companion CPU	
4 x CAN, 50 kbit/s up to 1 Mbit/s	
4 x CAN node terminations configurable via pin	
IN	
8 x Analogue IN 0 .. 5 V, 0 .. 25 mA or 0 .. 100 kΩ, range configurable via software	
8 x Analogue IN 0 .. 5 V, 0 .. 10 V or 0 .. 25 mA, range configurable via software	
8 x Analogue IN 0 .. 5 V, 0 .. 32 V or 0 .. 25 mA, range configurable via software	
6 x Timer IN (Timer inputs 0.1 Hz .. 20 kHz)/Timer IN (7/14 mA (DSM)/Analogue IN (0 .. 32 V) configurable pull-up/down, encoder	
6 x Timer IN (Timer inputs 0.1 Hz .. 20 kHz)/Analogue IN (0 .. 32 V) configurable pull-up/down, encoder	
8 x Timer IN (0.1 Hz .. 10 kHz)	
8 x Analogue IN, 0 .. 32 V	
K 15 and wake up	
OUT	
28 x PWM OUT 4 A high-side, current measurement, configurable as Digital OUT	
8 x Digital OUT 4 A high-side, with current monitoring, overload and load detection, configurable as 8 x Analogue IN (0 .. 32 V) with configurable pull-up/down or LED controller	
8 x Digital OUT 4 A low-side, with current monitoring, overload and load detection, configurable as 8 x Analogue IN (0 .. 32 V)	
Wiring up to 8 Digital OUT high-side and 8 Digital OUT low-side as full bridge control for the control of DC motors	
Internal monitoring of board temperature, sensor supply and battery voltage	
Connector types: 154 pole male	
1 x sensor supply 5 .. 10 V/max. 2.5 W configurable with 1 V increments	
2 x sensor supply 5 V (500 mA)	
Programming in C or CODESYS Safety SIL 2 with CANopen Safety Master	

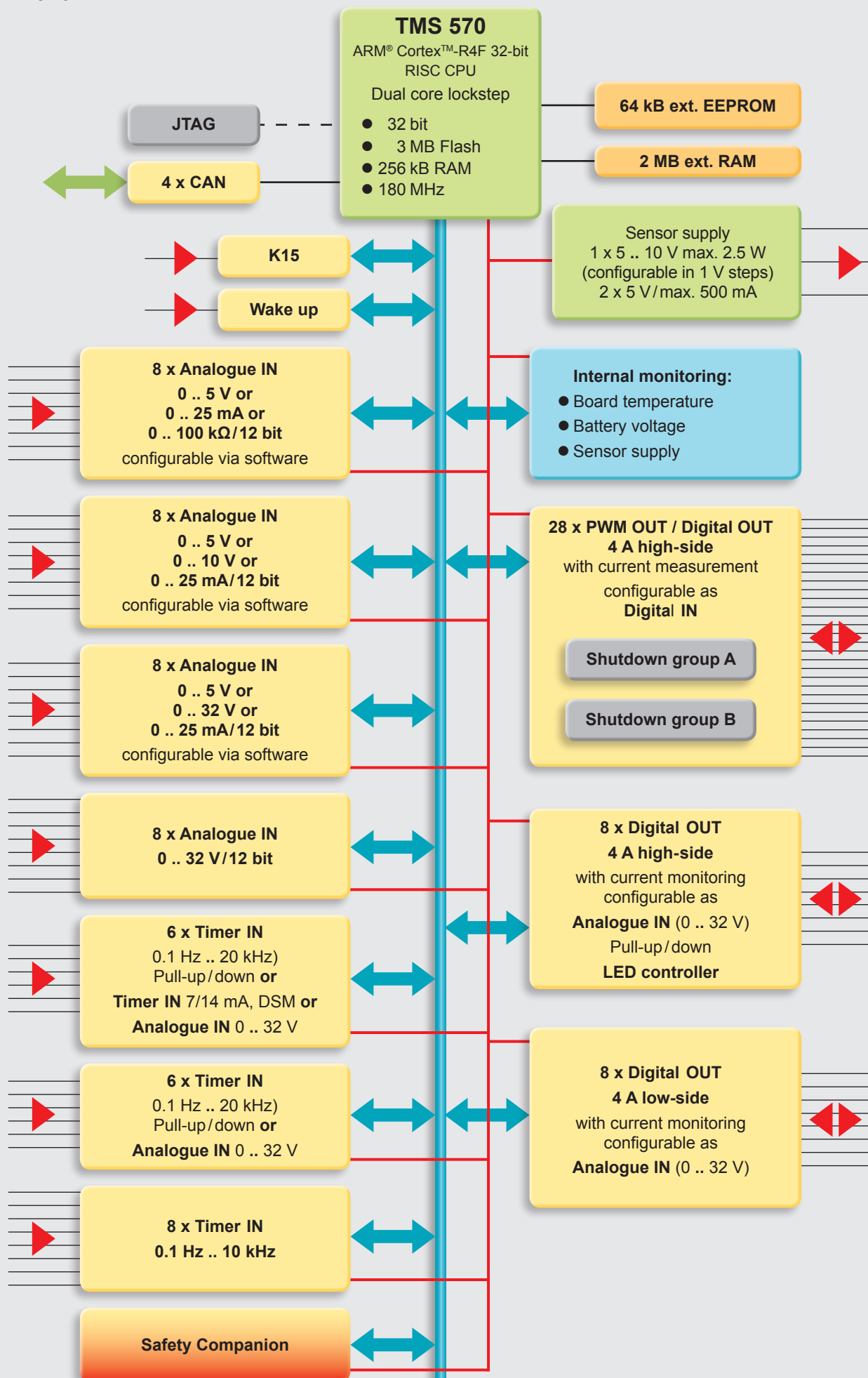
**Note:** <sup>1)</sup> All I/Os and interfaces are protected against short circuit to GND and BAT+.

<sup>2)</sup> All I/Os are configurable as Digital IN.

<sup>3)</sup> All I/Os have a 12-bit resolution.

## Block circuit diagram

### HY-TTC 540



## Model code

HY-TTC 540 – XX – 2.3M – 003M – 00 – S2Pd – 000

### Programming environment

CP = C programming  
CD = CODESYS or CODESYS 3.X

### RAM

2.3M = 2 MB ext. RAM, 256 kB int. RAM

### Flash

003M = 3 MB Flash (3 MB int. Flash)

### Equipment options

00 = standard  
10 = open housing/developer version

### Functional safety

S2Pd = SIL 2 and Performance Level d

### Modification number

000 = standard

### Note

On devices with a different modification number, please read the name plate or the technical amendment details supplied with the device.

### Accessories

Appropriate accessories, such as cable harnesses, cabling and connection technology, service tools and software can be found in the Accessories section.

## Note

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications and corrections.

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## Dimensions

