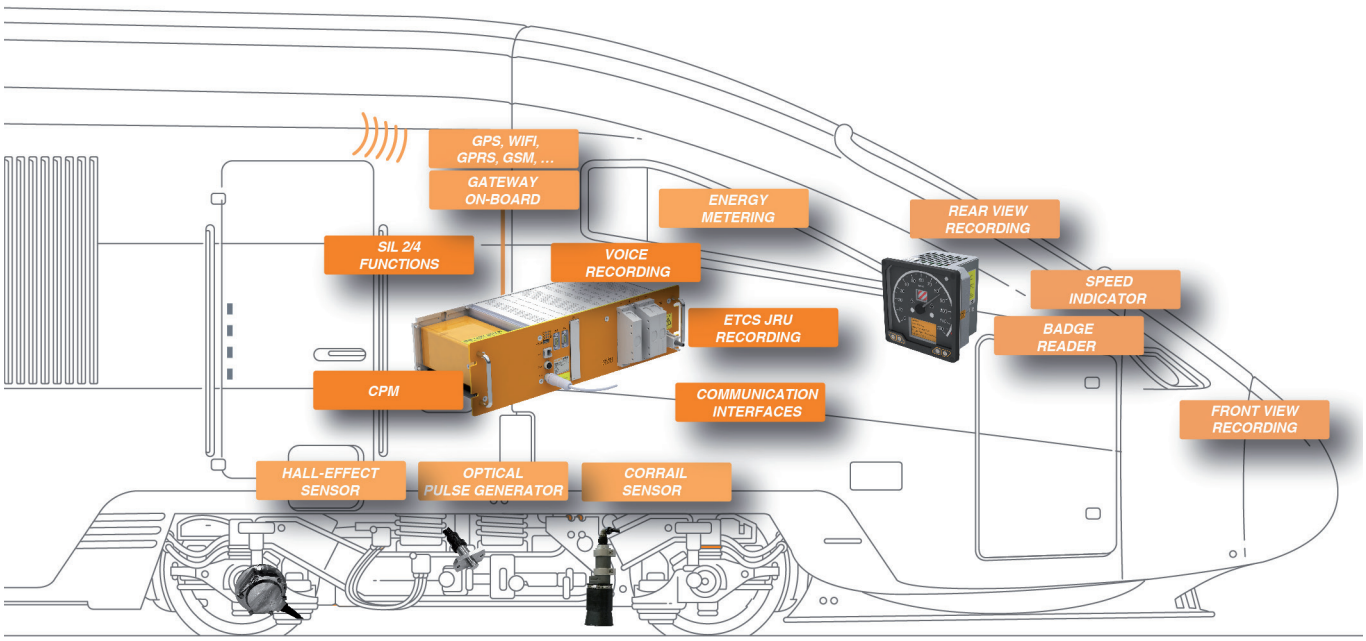
TELOC 3000

TELOC 3000 is part of a brand new smart-tech equipment generation that satisfies the most demanding requirements. Due to the open architecture of the system, new functions can be integrated at hardware and software level.The housing can be customised to customer's requirements and is based on a 19 inch technology. The TELOC 3000 generation has been developed for use on all railway vehicles such as electric and diesel locomotives, high speed trains, electric and diesel multiple units and mountain railways. It is also suitable for mass transit, i.e. on light rail vehicles, trams and metro trains.
TELOC 3000 is certified to be used as JRU (Juridical Recording Unit) for ETCS on board installations in combination with national data recording. It is possible to integrate Safety functions up to SIL4 (EN 50126). Realised functions include vigilance control, dead man function, SIFA, rollback-protection, roll-protection, speed monitoring, brake curve supervision, etc.
HaslerRail also offers a wide range of peripheral products, such as speed indicator, pulse generators, etc. Furthermore, HaslerRail has the possibility to transfer data from the data recorder to a ground server via different wireless solutions, e.g. GPRS, WiFi, etc. Together with HaslerRail's new software Hasler® EVA+ it is possible that data can be automatically scanned according customer predefined events and requirements. Depending on the connectivity to the train a live view of the train's location is available.

System Overview



Main technical data

Memory size	2 GB (more available on request)
Power supply	wide range power supply board 24 ... 110 VDC
Power consumption	Maximum 50 W, typical 25 W
Degree of protection	IP20 (according EN 60529), other degrees of protection possible
Interfaces	MVB, Profibus, CANOpen, RS232, RS485, Ethernet (others on demand)
SIL Functions	Vigilance, speed thresholds, etc. (up to SIL4)
Weight	5 to 12 kg, project specific

TELOC 3000

User interfaces	
Ethernet	1 x Service interface Ethernet IEEE 802.3 (RJ45 or M12 as an option)
USB 2.0	1 x USB stick data download, type A

Optional interfaces	
Field bus interfaces	MVB, Profibus, CanOpen
Serial interfaces	Insulated, up to 6 RS422 / RS485, bit rates configurable
GPS	On demand
Ethernet	2 x Ethernet IEEE 802.3 (2 x M12, D-Code)

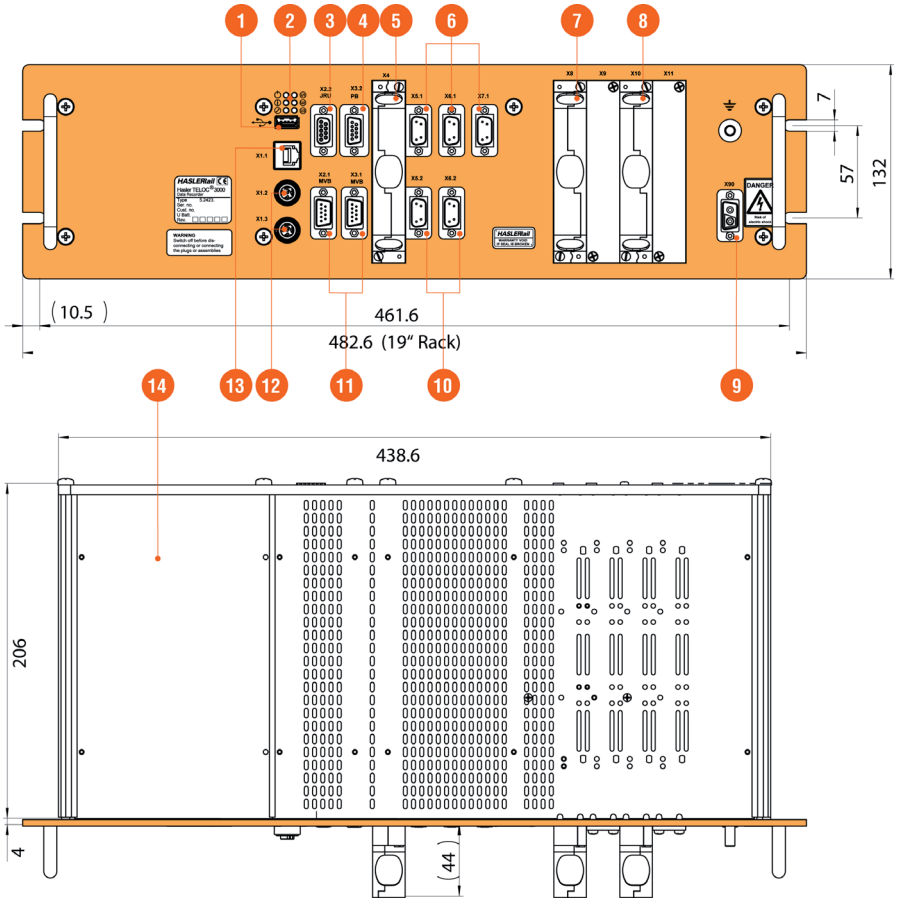
Input / Output Board TACH (including options)	
2 x 2 frequency inputs	insulated, up to 25 kHz, voltage or current signal configurable
4 digital inputs	insulated, up to 150 V, polarity and overvoltage protected
2 PWM inputs	insulated, frequency 100 – 500 Hz, duty cycle 1 – 99 %, voltage 5 – 60 V
1 or 2 analogue inputs	insulated, 0(4) – 20 mA, 0 – 10 V, -10 – +10 V, accuracy 1%
1 or 2 analogue outputs	insulated, 0(4) – 20 mA, 0 – 10 V, accuracy 0.5 %
4 relay outputs	insulated, max. 140 VDC, max. switch current 0.43 A @ 140 V, 1 A @ 60 V
2 PWM or pulse outputs	insulated, max. 140 VDC, max. switch current 800 mA
2 frequency outputs	insulated, up to 10 kHz, duty cycle 50 %, voltage 0-12 V or 0-24 V

Input / Output Board DAIO	
Digital inputs (16/board)	insulated, up to 150 V, polarity and overvoltage protected
Analogue inputs (4/board)	insulated, 0(4) – 20 mA, 0 – 10 V, -10 – +10 V, accuracy 1%
Analogue outputs (2/board)	insulated, 0(4) – 20 mA, 0 – 10 V, accuracy 1%

Relais Board REBO	
Relay outputs (8/board)	insulated, max. 140 VDC, max. switch current 0.2 A @ 140 V, 0.7A @ 60 V



Outline drawings sample device (19-inch housing, other dimensions on demand)



1	USB
2	Status indicator
3	JRU
4	Profibus
5	4 frequency inputs, 4 digital inputs, 2 PWM inputs, 4 relay outputs, 2 pulse outputs
6	3 x RS485 / RS 422
7	16 digital inputs, 4 analogue inputs, 2 analogue outputs
8	8 relay outputs
9	Power supply connector
10	Analog I/O
11	MVB
12	2 x Ethernet M12
13	Ethernet RJ45
14	Internal CPM (T3-I)

Crash Protected Memory (CPM)

Memory size	2 GB (more available on request)
Standards	GM/RT2472, Issue 1 and 2, weight 2.9 kg IEEE 1482.1: 1999, weight 2.9 kg IEC 62625-1, parameter values A and B, weight 2.9 kg FRA (49 CFR Part 229) final rule, IEEE1482.1: 2013, weight ~6.5 kg
Remark: *CPM according to FRA standard must be mounted outside the TELOC housing.*	



T3-I



T3-E



Standards

EN 50155:2007 **IEC 60571:2012**	Railway applications - Electronic equipment used on rolling stock	Temperature class Tx (without safety functions) Interruptions of voltage supply class S2 Supply change over class C1
IEC 62625-1:2013	Electronic Railway Equipment – On-board driving data recording system	
EN 50121-3-2:2016 **IEC 62236-3-2:2008**	Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus	
EN 55011:2009+A1 **CISPR 11:2009mod+A1**	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	**Conducted emission:** 0.15 – 0.5 MHz: 99 dBµV quasi-peak 0.5 – 30 MHz: 93 dBµV quasi-peak **Radiated emission:** 30 – 230 MHz: 40 dBµV/m 230 MHz – 1 GHz: 47 dBµV/m quasi-peak measured at 3m
EN 61000-4-2:2009 **IEC 61000-4-2:2008**	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test	Contact discharge: ± 6 kV Performance criteria B
EN 61000-4-3:2006+A1+A2 **IEC 61000-4-3:2006+A1+A2**	Electromagnetic compatibility (EMC) – Part 4-3: Radiated, radio-frequency, electromagnetic field immunity test	80 MHz – 1000 MHz: 20 V/m 1000 MHz – 2500 MHz: 10 V/m Performance criteria A
EN 61000-4-4:2012 **IEC 61000-4-4:2012**	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test	Battery referenced ports: ± 2 kV Signal & communication ports: ± 2 kV Burst frequency: 5 kHz Performance criteria A
EN 61000-4-5:2014 **IEC 61000-4-5:2014**	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test	Battery referenced ports Line to ground: ± 2 kV, 42 Ω, 0.5 µF Line to line: ± 1 kV, 42 Ω, 0.5 µF Performance criteria B
EN 61000-4-6:2014 **IEC 61000-4-6:2013**	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields	0.15 MHz – 80 MHz 10 Vr.m.s., 80 % AM, 1kHz Performance criteria A
EN 61373:1999 **IEC 61373:1999**	Railway applications – Rolling stock equipment – Shock and vibration tests	Category 1 Body mounted, Class B
EN 60068-2-1:2007 **IEC 60068-2-1:2007**	Environmental testing – Part 2-1: Test A: Cold	Test Ad @ temperature class Tx (-40 °C) 2 hours in operation
EN 60068-2-2:2007 **IEC 60068-2-2:2007**	Environmental testing – Part 2-2: Test B: Dry heat	Test Bd @ temperature class Tx (70 °C) 6 hours @ 70 °C, then 10 minutes @ 85 °C
EN 60068-2-30:2005 **IEC 60068-2-30:2005**	Environmental testing – Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	Temperatures: +25 °C / +55 °C @ 93 % rH 2 cycles each 24 h, total duration 48 h
EN 60529:1991+A1+A2 **IEC 60529:1989+A1+A2**	Degrees of protection provided by enclosures (IP Code)	IP20 or higher
DIN 5510-2:2009	Preventive fire protection in railway vehicles - Part 2: Fire behaviour and fire side effects of materials and parts - Classification, requirements and test methods	
EN 45545-2:2013+A1	Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components	
EN 50126:2015 **IEC 62278:2002**	Railway applications - Specification and demonstration of reliability, availability, maintainability and safety (RAMS)	
Juridical Recording Unit (JRU)	for interoperability of the rail system within the European Community (EC), ETCS	

Country-specific standards

GM/RT, IEEE, FRA (others to be verified)

Additional designs on request. Technical changes reserved. - (02.23)