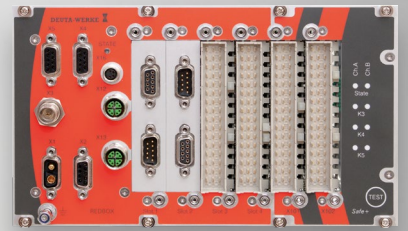
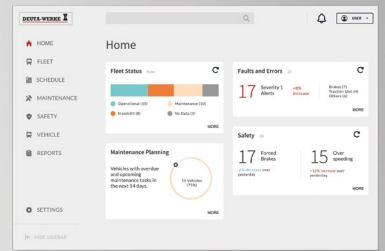


DEUTA

Innovations



IconTrust® - You can Trust.

DEUTA-WERKE 
Technology under Control

Product Overview



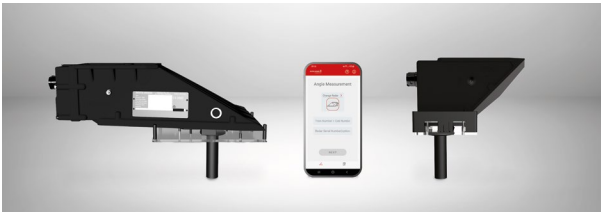


D-EcoView®
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D-PowerView®
► Page 6





DEUTA SmarT App
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DEUTA REDBOX® 2K
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Wide Terminals
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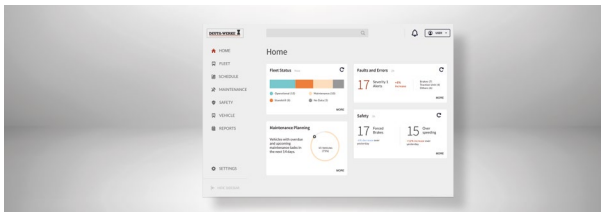


Head-Up-Display
► Page 10



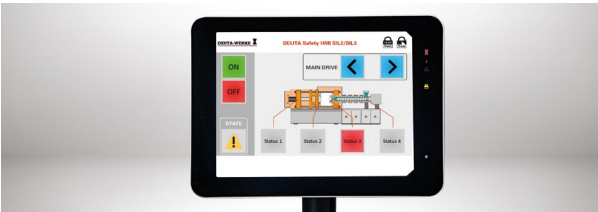


DEUTA PMU
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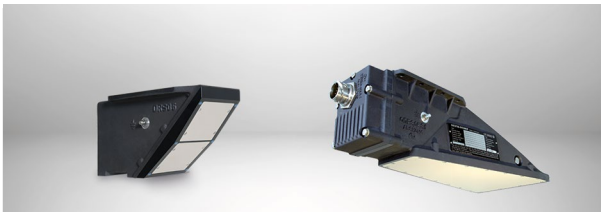


DEUTA RedCloud®
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IconTrust® HMI
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Radar Sensors
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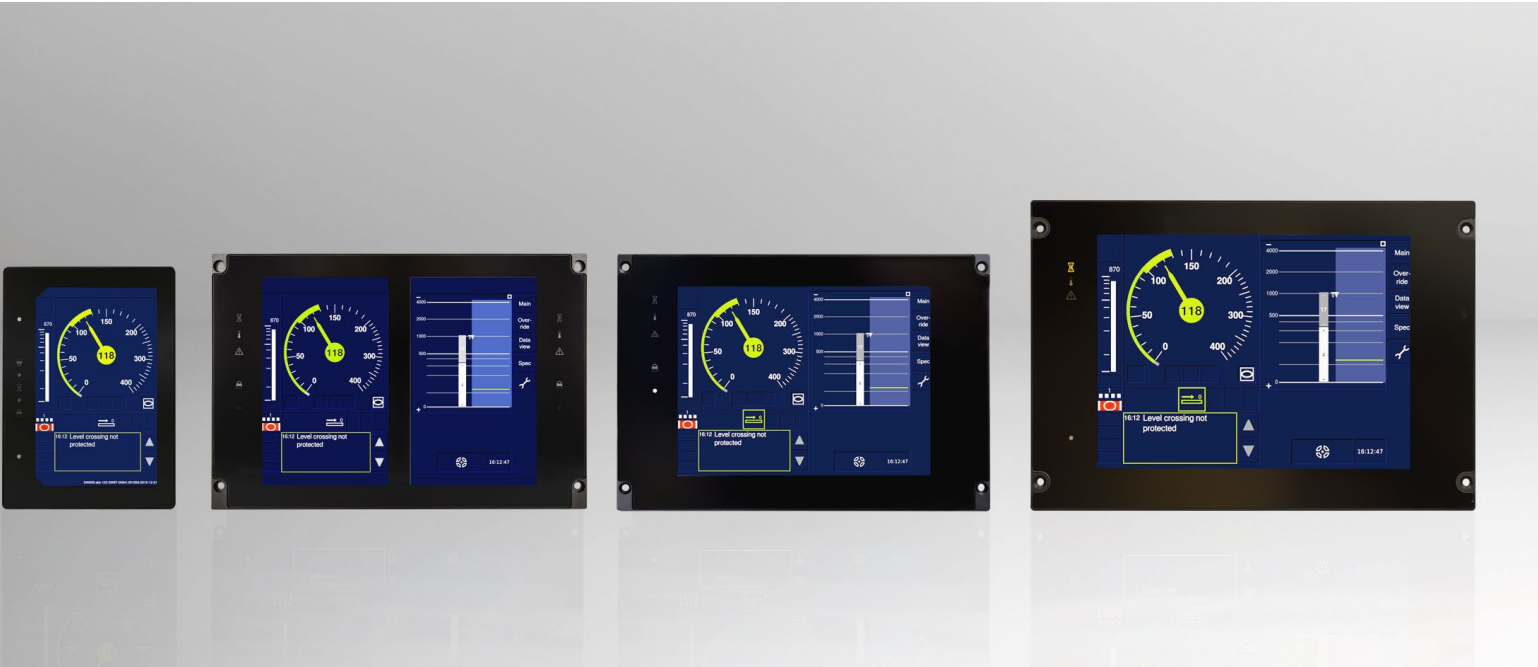


DEUTA DSK10/3
► Page 28





DEUTA DSC17
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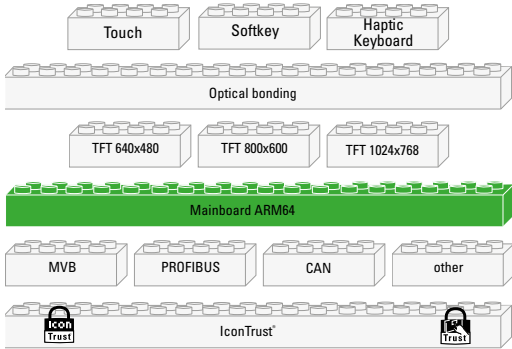
»D-EcoView®/D-EcoView® R Trust - Sustainability in Focus«

D-EcoView®
High performance, low power consumption and long-term availability are the three goals we have combined to make the D-EcoView®.

The IMX8X quad core A35 processor with 64 bit is synonymous with high performance, long-term availability but with a 30% lower power consumption in comparance with Intel ATOM or AMD Fusion and ground-breaking security features.

The D-EcoView® is designed as modular system. Inside the D-EcoView®, the ARM mainboard forms the basis for a wide range of terminal variants. The position of the interfaces remains the same on every terminals size.

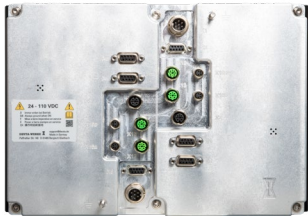
D-EcoView® Trust
The D-EcoView® Trust Terminals are optionally available with the safety functions IconTrust® and SelectTrust®.



D-EcoView®

Display type	Colour TFT 8" / 10.4" / 12.1"
Display resolution	480 x 800 / 1024 x 768/ up to full HD
Display backlight	LED backlight
Dimmable lighting	0 to 1,000 cd/m²
Status LEDs	4 LEDs
Ambient light sensor	front side
Input unit	capacitive touch
CPU/clock frequency	IMX8X Quad Core ARM64 A35, 1.2GHz
RAM memory	3 GB RAM DDR4
Flash memory	64 GB SD card
Extensibility	upon request
Additional controller	Environment Controller
Voltage range	24 VDC to 110 VDC (± 30%)
Ethernet interfaces	2x 10/100 BaseT (M12 d-coded) ¹⁾
USB interfaces	2 x USB2.0 (M8 a-coded) ¹⁾
Vehicle bus I/O	RS 422/485, MVB, CAN, RS232, PROFIBUS
Device coding	4
Audio out	1 x 10 W, 8 Ohm, amplifier
Weight	approx. 3 kg
Protection category front/rear	IP 65 / IP 30
Temperature range operation	-25 °C to +70 °C classification
Temperature range for storage	-40 °C to +85 °C
Safe Supervision Function (optional)	with IconTrust® up to SIL2 with SelectTrust® up to SIL2
Operating system	LINUX
Project software	DEUTA (QDMI) or customer specific
Application software	In accordance with ETCS Baseline 3 and national train protection requirements
EN standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	yes

¹⁾ Available as accessories from DEUTA: Connector for 7-pole power supply, Scha151 redundancy switch, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 to RJ45 adapter cable, cable length 0.5 m, when used as redundant dual display: Vehicle bus connector cable DSUB9 4/40 UNC, ETH/ETC M12/M1



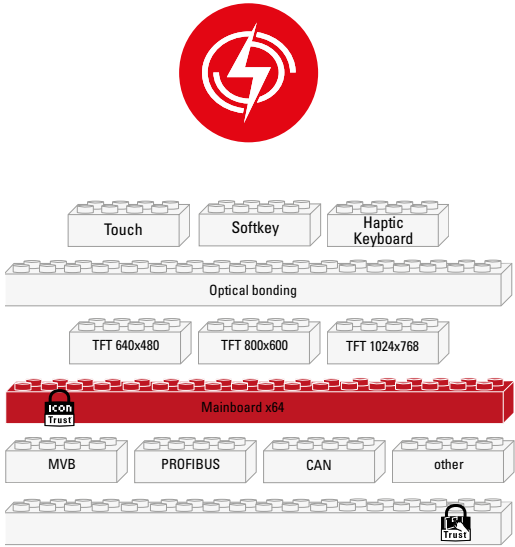


»D-PowerView® - High Performance Displays«

D-PowerView®
In the D-PowerView®, the x64Intel Elkhart Lake delivers the performance required for demanding applications. Its 8 GB RAM memory capacity delivers sufficient future-proofing.

The D-PowerView® is designed as modular system. Inside the D-PowerView®, the x64 mainboard forms the basis for a wide range of terminal variants. The position of the interfaces remains the same on every terminals size.

D-PowerView® Trust
The D-PowerView® Trust Terminals are optionally available with the security functions IconTrust® and SelectTrust®.



D-PowerView®

Display type	Colour TFT 10.4" / 12.1" / 15"
Display resolution	480 x 800 / 1024 x 768/ up to full HD
Display backlight	LED backlight
Dimmable lighting	0 to 1,000 cd/m²
Status LEDs	4 LEDs
Ambient light sensor	front side
Input unit	capacitive touch
CPU/clock frequency	Intel Atom x6413E series 1.5 GHz Quad Core
RAM memory	8 GB RAM DDR4
Flash memory	64 GB SD card
Extensibility	upon request
Additional controller	Environment Controller
Buzzer	70 dB measured at 50 cm
Voltage range	24 VDC to 110 VDC (± 30%)
Power consumption	< 20 W
Ethernet interfaces	2x 10/100 BaseT (M12 d-coded) ¹⁾
USB interfaces	2 x USB2.0 (M8 a-coded) ¹⁾
Vehicle bus I/O	RS 422/485, MVB, CAN, RS232, PROFIBUS
Device coding	4
Audio out	1 x 10 W, 8 Ohm, amplifier
Weight	approx. 3 kg
Protection category front/rear	IP 65 / IP 30
Temperature range operation	-25 °C to +70 °C classification
Temperature range storage	-40 °C to + 85 °C
Safe Supervision Function (optional)	with IconTrust® up to SIL2 with SelectTrust® up to SIL2
Operating system	LINUX
Project software	DEUTA (QDMI) or customer specific
Application software	In accordance with ETCS Baseline 3 and national train protection requirements
EN standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	yes

¹⁾ Available as accessories from DEUTA: Connector for 7-pole power supply, Scha151 redundancy switch, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 to RJ45 adapter cable, cable length 0.5 m, when used as redundant dual display: Vehicle bus connector cable DSUB9 4/40 UNC, ETH/ETC M12/M1



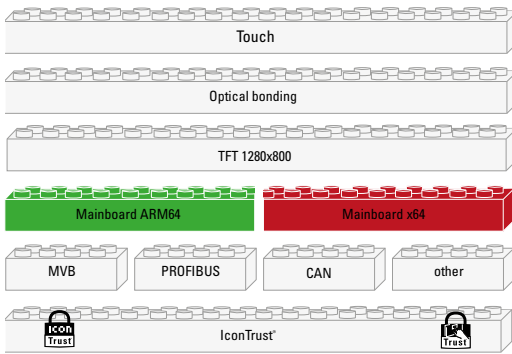


»DEUTA Wide Terminals - Everything at a glance!«

More Space for your Information

DEUTA Wide Terminals feature the compact installation dimensions of a 10" housing combined with a 12.1" display. The optically bonded surface offers space to display travel and vehicle data in parallel. The Wide Terminals are optionally available with the IconTrust® and SelectTrust® safety functions to ensure secure display and input.

Depending on your requirements, the high-performance Intel Quad Core Elkhart Lake x64 or the sustainable IMX8X Quad Core A35 64-bit processors are available.



DEUTA Wide Terminals - 12.1"

Display type	Colour TFT 12.1" Wide
Display resolution	1280 x 800
Display backlight	LED backlight
Dimmable lighting	0 to 1,000 cd/m²
Status LEDs	4 LEDs
Ambient light sensor	front side
Input unit	capacitive touch
CPU/clock frequency	D-EcoView®: IMX8X Quad Core ARM64 A35, 1.2GHz D-PowerView®: Intel Atom x64 13E 1.5 GHz Quad Core
RAM memory	D-EcoView®: 3 GB RAM DDR4 D-PowerView®: 8 GB RAM DDR4
Flash memory	64 GB SD card
Extensibility	upon request
Additional controller	Environment Controller
Voltage range	24 VDC to 110 VDC (± 30%)
Ethernet interfaces	2x 10/100 BaseT (M12 d-coded) ¹⁾
USB interfaces	2 x USB2.0 (M8 a-coded) ¹⁾
Vehicle bus I/O	RS 422/485, MVB, CAN, PROFIBUS
Device coding	4
Audio out	1 x 10 W, 8 Ohm, amplifier
Cut-out	282 mm x 206 mm
Weight	approx. 3 kg
Protection category front/rear	IP 65 / IP 30
Temperature range operation	-25 °C to +70 °C OT3 classification
Temperature range for storage	-40 °C to +85 °C
Safe Supervision Function (optional)	with IconTrust® up to SIL2 with SelectTrust® up to SIL2
Operating system	LINUX
Project software	DEUTA (QDMI) or customer specific
Application software	In accordance with ETCS Baseline 3 and national train protection requirements
EN standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	yes

¹⁾ Available as accessories from DEUTA: Connector for 7-pole power supply, Scha151 redundancy switch, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 to RJ45 adapter cable, cable length 0.5 m, when used as redundant dual display: Vehicle bus connector cable DSUB9 4/40 UNC, ETH/ETC M12/M1



D-EcoView®



D-PowerView®





»DEUTA Head-Up-Display - With IconTrust® DMI Safety«

Important travel data at a glance

Head-Up-Displays are state-of-the-art-technology in automotive and aviation. DEUTA developed a Head-Up-Display solution for railway vehicles, presenting forward travel information from the driver machine instruments onto a combiner display in front of the vehicle windshield upgraded with IconTrust® safety up to SIL2.

One generic HUD platform for all railway projects

Finding the best Head-Up-Display position - even in narrow installation spaces is a complex challenge in new and refurbishment railway vehicle projects. DEUTA designed a generic HUD platform, combining flexible installation options, advanced safety and more operating and driving comfort in a compact space-saving design. The Head-Up-Display architecture fits even in narrow drivers desks.

Improvement of safety

The most important information are mirrored parallel at the Head-Up-Display combiner surface. The driver keeps continuously the visual axis between the Head-Up-Display and the track. The Multifunctional Terminal communicates via the vehicle computer and generates the information for the Head-Up-Display without changing the vehicle architecture.

HUD & IconTrust® = SIL2

In combination with an IconTrust® Multifunctional Terminal the DEUTA Head-Up-Display can reach a safety level up to SIL2. IconTrust® monitors dedicated areas on the TFT panel and differentiates between safety related and non-safety related information.

Each of the individual areas of the displayed image are analysed and compared to the value of the respective input variable during every image refresh cycle in IconTrust®.

Head-Up-Display & DMI

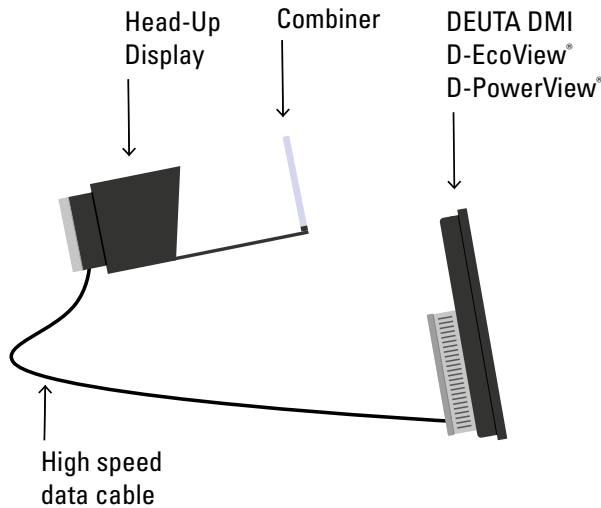
HUD type	Combiner
Brightness	>15,000 cd/m²
Contrast	1700:1
Resolution	800 x 480
Vehicle bus	MVB, Profibus, CAN, Ethernet
Power Supply	Wide range, 24 - 100 VDC
Safe Supervision Function (opt.)	In combination with IconTrust® DMI up to SIL2

DMI type	D-PowerView®
CPU/clock frequency	Intel Atom x64XX series 1.5 GHz Quad Core
Display type	Colour TFT 10.4" / 12.1" / 15"
Safe Supervision Function (opt.)	With IconTrust® up to SIL2

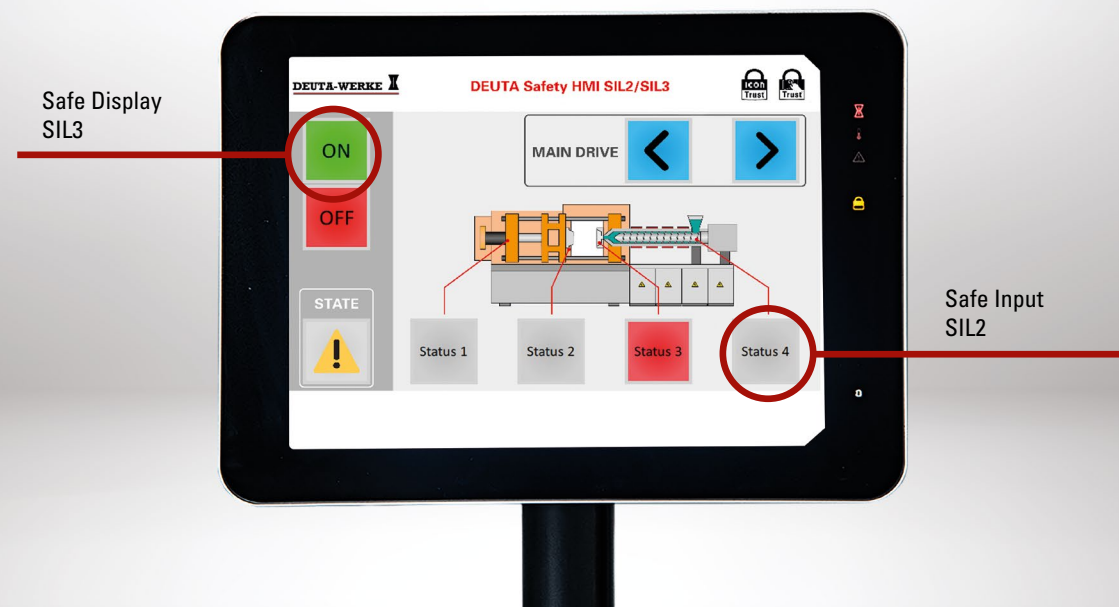
Icon Trust

DMI type	D-EcoView®
CPU/clock frequency	IMX8X Quadcore ARM A35, 1.2GHz
Display type	Colour TFT 8" / 10.4" / 12.1"
Safe Supervision Function (opt.)	With IconTrust® up to SIL2

Icon Trust



- Generic HUD platform
- Projection on a transparent combiner in front of the windshield
- Independent of the angle and geometry of the windshield
- The view angle of the driver keeps unchanged



»3 Steps Towards a Safe HMI«

The safe display and operating elements can be quickly configured in the web browser and customised in a variety of project-specific ways. Time-consuming and cost-intensive work steps for project changes are no longer necessary.

1. Design

The user positions the desired buttons on the interface. Text or graphic symbols as well as colour can be freely selected for each field.

2. Transfer and generate

The data are transferred from the browser to the IconTrust® HMI. An IconTrust® configuration with an associated report is generated, which can be used for verification and documentation.

3. Integrate

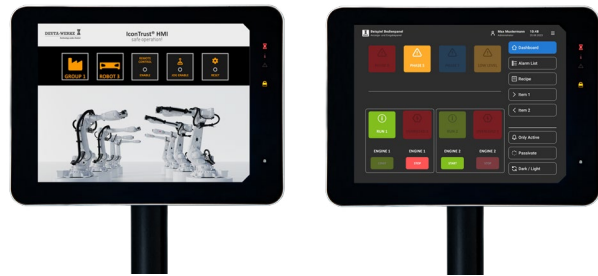
All of the IconTrust® HMI fields are now connected to the safety controller via PROFIsafe. The IconTrust® HMI can be integrated into the safety infrastructure.

»IconTrust® HMI - Digital Functional Safety up to SIL3«

The IconTrust® HMI is based on a brilliant TFT screen. Indicator lights and pushbuttons can be configured via a web browser in a very short time – and adapted to meet the needs of specific projects in a variety of ways.

Time- and cost-intensive work steps for project changes are not necessary. The new operating units are reconfigured remotely on the HMI. A typical IconTrust® HMI application is the design of digital operator panels with SIL requirements. While hard-wired panels are built in many steps and project changes are time consuming and cost-intensive, IconTrust® HMI creates digital panels to safety levels up to SIL3.

- Typical IconTrust® HMI use cases:
- Matrix panel
 - Operating mode selection
 - Recipe selection
 - Batch selection
 - Process value display and input
 - Alarm lists
 - Standard operating procedure
 - Maintenance Override Switch (MOS)
 - Hybrid operation (Non-SIL and SIL)





»D-SmartView® -
As Elegant as a Consumer Tablet with PROFINET & PROFIsafe«

D-SmartView®
In modern rail vehicles, the driver's cab terminal is not only a control instrument in the driver's line of vision, but also a visual component in the overall impression of the vehicle. The D-SmartView® terminal underlines the modernity of the vehicles with its very flat design, narrow rounded display edges and a brilliant optically-bonded surface.

The D-SmartView® terminal will not longer be embedded inside the surface of the driver's desk, as it is designed to be mounted on a Vesa monitor system. Depending on the seating position and size of the drivers, the height of the terminal can be positioned variably.

PROFI
NET

PROFIsafe

PROFINET
The unit is equipped with PROFINET:

- Compact field unit
- CC-B support
- Dual port
- PNIO_version: V2.43
- Status LED for „DCP signal“

PROFIsafe (only MFTS204)

- PROFIsafe Version: V2.4 and V2.6
- Adress Type 2
- Without iPar-Server support



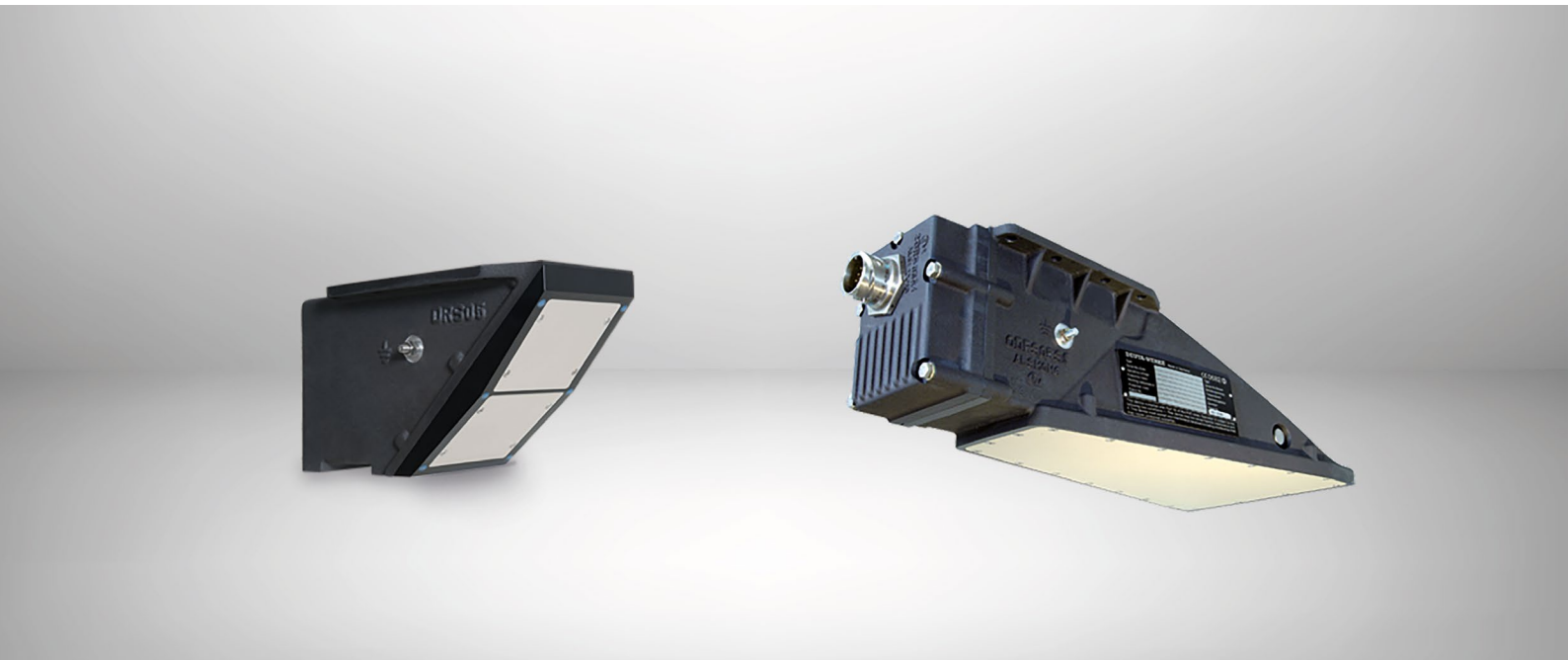
D-SmartView®



Display backlight	LED backlight
Dimmable lighting	0 to 800 cd/m2
Status LEDs	3
CPU/clock frequency	Quadcore INTEL® ATOM processor®, 4x 1.6 GHz
RAM memory	8 GB
Graphics	INTEL® HD Graphics 500
Bulk memory	up to 64 GB
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Voltage	prepared for external 24 VDC power supply unit compliant with railway standard
Power consumption	typ. 25 W
Display type/size	Colour TFT / 12.1"
Display resolution, colour depth	1024 x 768 bit
Read angle	±85° in horiz. (left -, right +) and vert. (lower -, upper +) direction
Ethernet	1x 10/100 Base T as M12 d-coded ¹⁾ 2x PROFINET plug connector
PROFINET	2x CC-B, dual port, M12 D-coded PNIO_version: V2.34, status LED for "DCP signal"
Audio out	Class-D stereo audio amplifier min. 5 W at 8 Ohm
USB interfaces	2 x USB2.0 (M8 a-coded ¹⁾)
Vehicle bus	1x Ethernet, 1x PROFINET, on request: CAN, MVB, RS422, RS485
Device coding	4 codings possible
Touch screen	capacitive, optically bonded
Front dimension (W x H)	318 mm x 234 mm
Weight	approx. 3.6 kg
Protection category front/rear	IP42 (resistant to dusts and water sprays)
Operating temperature	full functionality: -25°C to +55 °C
Safe Supervision Function (optionally)	with IconTrust® up to SIL2 with SelectTrust® up to SIL2
Operating system	LINUX
Applications	variable, depends on area of application
Mounting	prepared for the VESA 75 Standard
Standard	EN 45545, EN 50155, EN 50121-3-2, EN55011, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6

¹⁾Available as accessories from DEUTA: Connector for 5-pole power supply, Scha151 redundancy switch, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 to RJ45 adapter cable, cable length 0.5 m, when used as redundant dual display: Vehicle bus connector cable DSUB9 4/40 UNC, ETH/ETC M12/M1





»DEUTA Radar Sensors - Speed not affected by slip and slide!«

- DRS05/3S1 with integrated protective cover against impact of stones
- suitable for ETCS, CBTC, high-speed trains and metro vehicles
- applicable for traction control

Minimum Life cycle costs (LCC)

The radar sensors operate completely wear-free and provide reliable measured values throughout the entire life cycle because they are not exposed to particular mechanical wear. There is no alternative to the favorable cost-benefit ratio resulting from low requirements of maintenance and repair over the entire life cycle.

Borderless applications

Radar sensors of the type DRS05 can be used world-wide. Declarations of conformity are available for Europe, U.K., Canada, USA, Japan and Australia.

Acceleration sensor

The integrated acceleration sensor supports speed measurement and minimises dynamic deviations. Short unavailability can be bridged. Interference signals at a standstill are suppressed.

Particularly robust under harsh environmental conditions

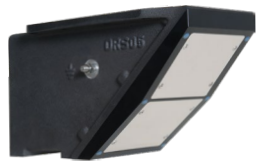
At the DRS05/3S1, an integrated protective prolongs the durability of the radar sensors when they are hit by stone and extends the availability in winter conditions. Such housing is specially recommended for high-speed trains.

Special applications?

Beyond the proven use in the established means of transport the radar sensors can also be adopted to unconventional transport modes like suspension railways or monorail systems. The experienced engineers at DEUTA will be happy to advise you on any issues related to radar sensors, speed detection and connection to your odometry, even at early project stage.

DEUTA Radar Sensors

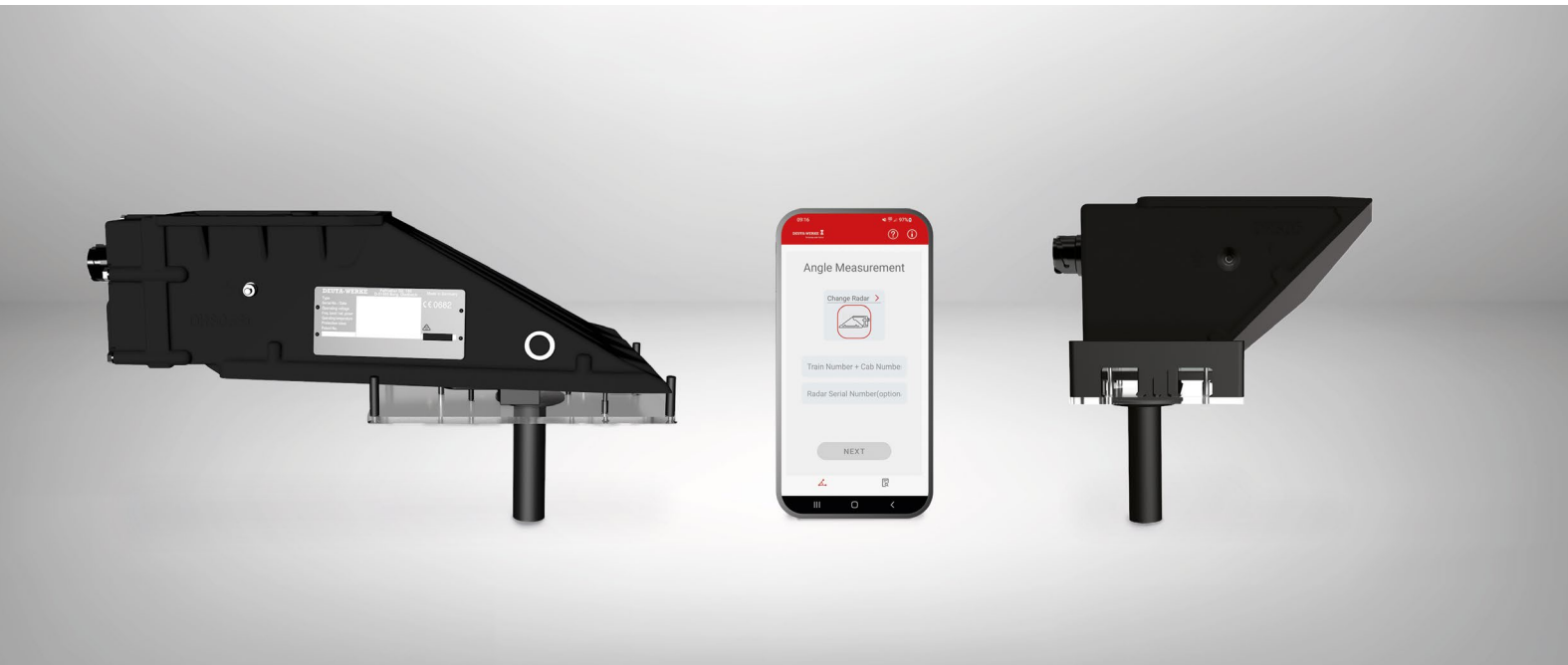
Feature/Specification	DRS05/3	DRS05/3S1
Working principle	two-channel speed sensor	two-channel speed sensor
Determinable speed range	0.2 km/h up to max. 600 km/h	0.2 km/h up to max. 600 km/h
Measurement noise (1σ)	<0.4 km/h (v <100 km/h) <0.4 % (v >100 km/h)	<0.4 km/h (v <100 km/h) <0.4 % (v >100 km/h)
Uncertainty due to variation of the underground	<1 % typical	<1 % typical
Path measurement reproducibility (1σ)	<0.1% typical from 1,000 m distance	<0.1% typical from 1,000 m distance
Power supply	15 to 150 VDC, extended-range power, galvanically isolated, battery potential permitted	15 to 150 VDC, extended-range power, galvanically isolated, battery potential permitted
Power consumption	max. 10 W	max. 10 W
Standard interfaces	1. digital: RS485 2-wire bus, unidirectional, serial 2. analog: pulse output (open collector)	1. digital: RS485 2-wire bus, unidirectional, serial 2. analog: pulse output (open collector)
Forward/Backward recognition	yes	yes
Inverse polarity protection/ short-circuit-proof	yes/yes	yes/yes
Operating temperature	-40° C to +70° C	-40° C to +70° C
Dimensions	approx. 244 mm x 134 mm x 140 mm (lxwxh) (without plug connector and cable)	approx. 481 mm x 214 mm x 140 mm (LxBxH) (lxwxh) (without plug connector and cable)
Distance to the reflection surface	approx. 200 mm to 1,000 mm, depending on the application	approx. 200 mm to 1,000 mm, depending on the application
Housing material	aluminium cast anodised, cover PEEK	aluminium cast anodised, cover PEEK
Protection class	IP66/IP67/P69 (with plug and cable)	IP66/IP67/IP69 (with plug and cable)
Weight	approx. 2.6 kg (without plug and cable)	approx. 4.7 kg (without plug and cable)



DRS05/1, DRS05/2 & DRS05/3



DRS05/1S1 & DRS05/3S1



»DEUTA SmaRT App - The comfortable inclinometer app«

DEUTA Doppler radar sensor DRS05 is the top-selling radar sensor for rail vehicles world-wide. The wide-range power supply 24 V-110 V, the large measuring range up to 600 km/h and the wide variety of output protocols allow an easy integration into the customers' system. Especially, the housing variant DRS05/1S1, a housing with integrated protective hood has proven its reliability in many projects.

Special two-channel algorithms reduce the calibration-shift effect thus providing high accuracy even with changing surfaces. Under winter conditions the integrated protective hood together with a redundancy concept basing on Doppler signal amplitudes and taking into account a spectral evaluation assures the high availability.

SmaRT App - SmaRT Radar Tool

We decide together with our customer on the mounting position which will then be optimized during the integration period.

The horizontal alignment of the mounting position is crucial since the angle to the horizontal in direction of the movement in relation to a reference surface on the radar sensor has a direct impact on the speed detection. For the calibration our customers use the so-called inclinometer.

The completely new inclinometer technology

With the SmaRT App, DEUTA has developed a completely new inclinometer technology. The useful smartphone app accompanies the user through the measurement. The SmaRT App manages the callibration factors, the different vehicles and attachment positions.

- Cost effective
- One tool for measuring inclination, calculating and managing calibration factors
- Guides the user through the measurement process
- Supports to manage the calibration factors of different vehicles and locations
- Easy to integrate into customers' maintenance processes





»DEUTA REDBOX® 2K – The Platform Concept«

Whatever area of operation you are planning for your DEUTA REDBOX® 2K, the basic equipment is identical: A uniform platform for all REDBOX recorder variants. Consistently developed, produced, tested and qualified by DEUTA staff, actively accompanied by our obsolescence management and our in-house board production.

Whether you plan to use your DEUTA REDBOX® 2K as a data logger or as a multifunctional recorder within a complex communication structure: The DEUTA REDBOX® 2K is equipped for all application scenarios. DEUTA configures the right REDBOX for any area of application – quickly and flexibly.

Flexibility through standardisation

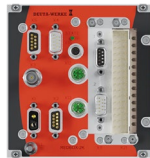
- Compact 19" hardware design
- Future-proof performance through multiple vehicle bus system and I/O expansion
- More flexibility through numerous in- and outputs
- Can be used to record data from various train safety systems, e.g. ETCS
- Can be flexibly used for all application areas in railway traffic – from streetcars to high-speed trains
- GPS
- Optional Safe+ module up to SIL4
- Optional protected memory storage for legal data

DEUTA REDBOX® 2K

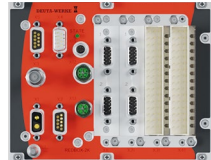
Basic configuration	DEUTA REDBOX® 2K in 19" cassette
Operating voltage	Rated voltage: 24 to 110 V DC
Power consumption	max. 30 W
Protection category	IP20
Temperature range	Operation: -25 °C to +70 °C; Storage: -40 °C to +85 °C
Storage medium	Internal microSD card with 16 GB available storage
Location and time synchronisation	GPS receiver via TNC socket, connection an active or passive GPS antenna can be configured
Real-time clock	RRTC with TCXO: ± 2 minutes/per year across the entire temperature range
Diagnostic interface	Gbit-Ethernet
Service interface	Gbit-Ethernet, USB 2.0
Bus interfaces	MVB (Standard), optional Gbit-Ethernet, CAN, Profibus, RS485, RS422, IBIS, LZB
Analogue outputs voltage or current	0-10 V , 0/4-20 mA
Analogue inputs voltage or current	±10 V, 0/4-20 mA
Digital outputs	with Open Collector transistor output, max. 100 mA
Digital inputs	High level: +12 to +154 V DC
Frequency inputs for digital sources	Rectangle input, fmax = 10 kHz, Imin. 2 mA
Frequency inputs for AC encoder	suitable for 20 V / 80 V encoders
CodePlug	for the continued use of vehicle specific data when exchanging devices
Internal web server	entry of vehicle data, display of process values
Width	14 HP: with no expansion cards 32 HP: with four expansion cards 44 HP: with three expansion cards and Safe+ module
Height	3U
Depth	171 mm without plugs and mating plugs 1 to 3 kg (depends on variant)
Protected memory unit	Protected Memory Unit PMU22/2, PMU23, PMU24 or PMU25/2 Connection via USB 2.0 interface, Standards GM/RT 2472, IEEE 1482 1-1999 FRA Guideline 49, FRA 49 CFR Part 229, Sect. 229.135 Appendix D)
MVB- Master	MVB Master expansion card
Safe+ module	Safety functions up to SIL4 Connection via USB 2.0 interface, Standards GM/RT 2472, IEEE Std. 1482.1-1999 FRA Guideline 49, FRA 49 CFR Part 229, Sect. 229.135 Appendix D)
Removable memory card (optional)	a memory card that can be removed via the front plate without using tools for the purpose of vehicle data archival
Removable SolidStateDisk (optional)	for the storage of video data
Applied standards	EN 50155, EN 50121-3-2, EN 45545-2, EN 50126, EN 50128, EN 50129



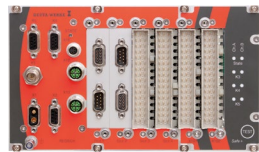
REDBOX S



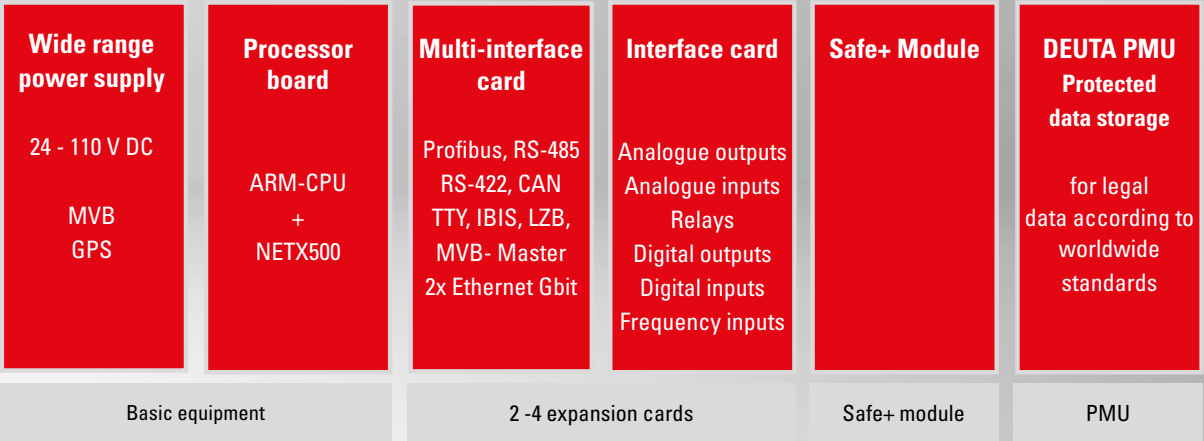
REDBOX M/L



REDBOX XL/L



REDBOX XXL



»DEUTA REDBOX® 2K –
The Platform Concept«

Functional improvements:

- Faster data transfer when reading trip data via USB and Ethernet
- Improved service mode using the web interface
- Separation of legal and machine-technical data
- Able to process multiple video signals
- Multiple data storage areas can be configured, including on different physical storage media
- User configuration tool (optional)

Non-functional improvements:

- Uses high-performance ARM CPU
- Robust data recorder with improved thermal management
- Higher reliability due to improved MTBF values
- Improved mechanical protection of data storage
- Optimised housing components for simplified maintenance
- Reduction of component variations due to configurable hardware modules
- Higher availability due to automated testing and inspection scenarios



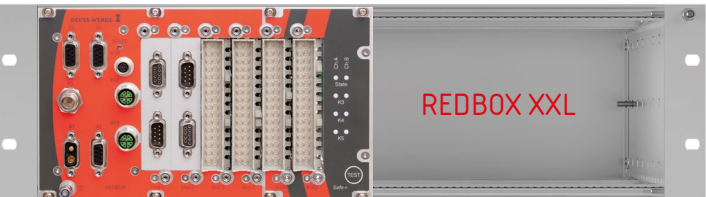
Basic configuration



Up to 2 configurable cards



Up to 4 configurable cards



Up to 3 configurable cards
& Safe+ modul



»DEUTA PMU – Protected Data Memory – optimally protected against stresses in railway traffic!«

DEUTA PMU (Protected Memory Unit) completes the product line of REDBOX Multifunctional Recorders with protected travel data recorder units. The special structure of the housing is optimised to withstand the extreme mechanical and thermal stresses in exceptional situations.

Housing

- Space-efficient and compact
- As a stand-alone unit with fastening bracket set (PMU23)
- Can be mounted alternatively in the 19" module rack (PMU22/2 / PMU25/2)

The interface

- with USB interface

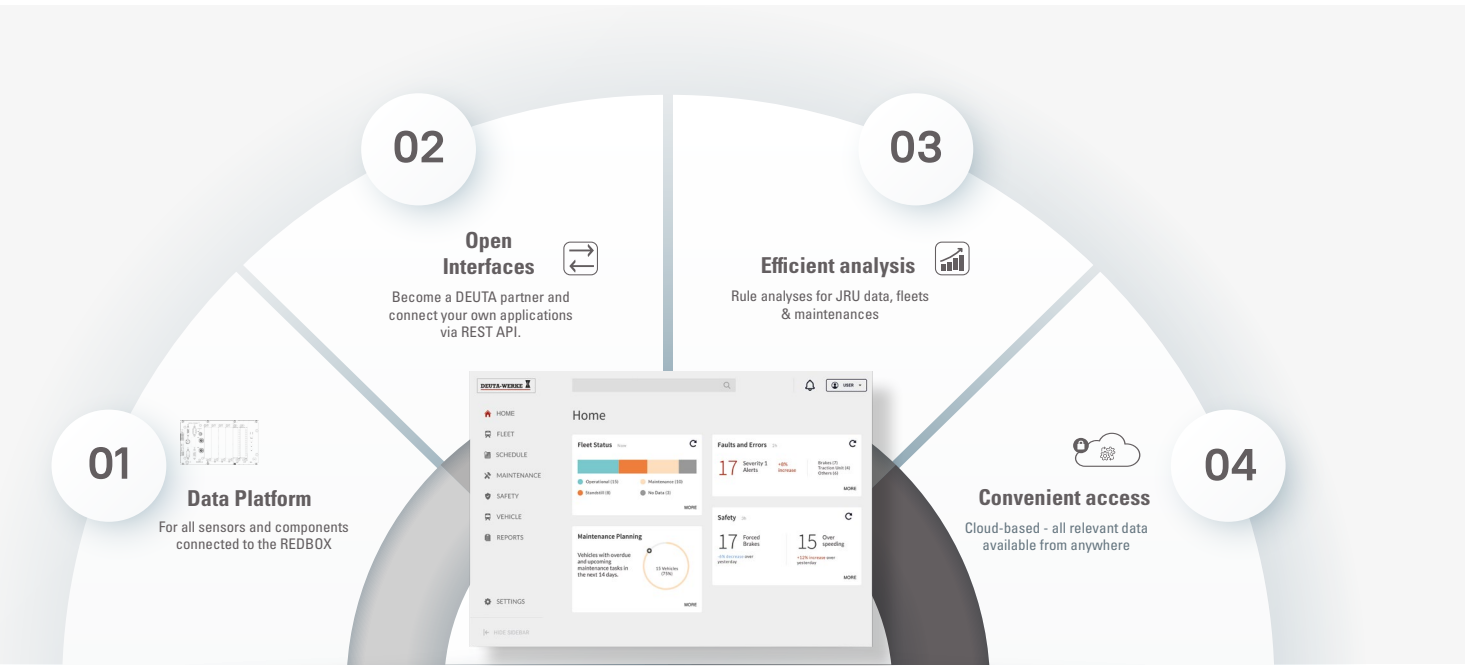
The load capacity

- Shock and vibration as per EN 60068
- Fire protection as per DIN 5510-2 and EN 45554
- Mechanical load capacity as per IEEE Std 1482.1-2013 and 1999
- Mechanical load capacity as per GM/RT 24/72 (PMU22/2 / PMU23 / PMU25/2)

DEUTA PMU

	PMU22/2	PMU23	PMU25/2	PMU26
Standards	GM/RT 2472 IEEE Std 1482.1-1999 EN 62625	GM/RT 2472 IEEE Std 1482 1-1999 EN 62625	GM/RT 2472 IEEE Std 1482.1-1999 EN 62625	IEEE Std 1482.1:2013 and 1999 FRA 49 CFR Part 229 App D
Power consumption	max. 100 mA	max. 130 mA	max. 100 mA	24-110 VDC, 10W
Temperature range	-40°C to +70°C (operation) -40 °C to +85 °C (storage)	-25°C to +70°C (operation) -40 °C to +85 °C (storage)	-40 °C to +70 °C (operation) -40 °C to +85 °C (storage)	-25 °C to +70 °C (operation) -40 °C to +85 °C (storage)
Storage medium	16 GB	1 GB	16 GB, 64 GB	up to 512 GB
Service PC connection	1x M8 USB 2.0	1x USB	1x USB 2.0	M12 10/100 MB Ethernet, Direct Ethernet connection to NVR, 1x USB 2.0, service interface for unit manage- ment and IP camera setup, etc.

Width	122 mm (4.8 inch) 24TE	120 mm (4.72 inch) without fastening bracket 180 mm (7.09 inch) with fastening bracket	152 mm (6 inch) 30TE	160 mm (6.3 inch) without fastening bracket 220 mm (8.7 inch) with fastening bracket
Height	128.4 mm (5.08 inch) 3HE	120 mm (4.72 inch) with-out fastening bracket 125 mm (4.92 inch) with fastening bracket	128,4 mm (5,08 inch) 3HE	160 mm (6.3 inch) without fastening bracket 165 mm (6.5 inch) with fastening bracket
Depth	170 mm (6.7 inch)	233 mm (9.17 inch)	170 mm (6.7 inch)	292 mm (11.5 inch)
Weight	approx. 3.5 kg	approx. 7.5 kg	approx. 3 kg	approx. 13 kg
Protection category	Outside housing IP64 (mechanical protection) Inside housing IP67 (tightness protection)	Outside housing IP20 (mechanical protection) Inside housing IP67 (tightness protection)	Outside housing IP64 (mechanical protection) Inside housing IP67 (tightness protection)	Outside housing IP20 (mechanical protection) Inside housing IP67 (tightness protection)
Static pressure	110 kN (25000 lbf) for 5 min.	110 kN (25000 lbf) for 5 min.	110 kN (25000 lbf) for 5 min.	110 kN (25000 lbf) for 5 min.
Penetration	Steel bolts: 6.4 mm (0.25 inch) diameter and 23 kg (50 lb) weight at a fall height of 1.5 m (5.0 feet)	Steel bolts: 6.4 mm (0.25 inch) diameter and 23 kg (50 lb) weight at a fall height of 1.5 m (5.0 feet)	Steel bolts: 6.4 mm (0.25 inch) diameter and 23 kg (50 lb) weight at a fall height of 1.5 m (5.0 feet)	Steel bolts: 6.4 mm (0.25 inch) diameter and 23 kg (50 lb) weight at a fall height of 1.5 m (5.0 feet)
Shock	55 g Peak (10 ms duration)	55 g Peak (100 ms duration)	55 g Peak (100 ms duration)	55 g Peak (100 ms duration)
Thermal load capacity	650 °C (1200 °F) for approx. 30 min. 300 °C (570 °F) for approx. 60 min. 100 °C (212 °F) for approx. 5 hrs.	650 °C (1200 °F) for approx. 30 min. 300 °C (570 °F) for approx. 60 min. 100 °C (212 °F) for approx. 5 hrs.	650 °C (1200 °F) for approx. 30 min. 300 °C (570 °F) for approx. 60 min. 100 °C (212 °F) for approx. 5 hrs.	750 °C (1382 °F) for approx. 60 min. 260 °C (500 °F) for approx. 10 min.
Tightness	#1 Diesel (ASTM D975), #2 Diesel (ASTM D975), water, salt water, lubricating oil (each liquid for 48 hrs, immersion in fire extinguish- ing agent for 10 min.)	#1 Diesel (ASTM D975), #2 Diesel (ASTM D975), water, salt water, lubricating oil (each liquid for 48 hrs, immersion in fire extinguish- ing agent for 10 min.)	#1 Diesel (ASTM D975), #2 Diesel (ASTM D975), water, salt water, lubricating oil (each liquid for 48 h, im- mersion in fire extinguishing agent for 10 min.)	#1 Diesel (ASTM D975), #2 Diesel (ASTM D975), water, salt water, lubricating oil (each liquid for 48 h, im- mersion in fire extinguishing agent for 10 min.)
Hydrostatic pressure	15 m depth (50 feet) for 48 hours Salt water 15 m depth (48 hrs.)	15 m depth (50 feet) for 48 hours Salt water 15 m depth (48 hrs.)	15 m depth (50 feet) for 48 hours Salt water 15 m depth (48 hrs.)	15 m depth (50 feet) for 48 hours Salt water 15 m depth (48 hrs.)



»DEUTA RedCloud® – Data overview in real time!«

DEUTA RedCloud® is a cloud-based software solution for real time acquisition, processing and analysis of event recorder and sensor data, improving efficiency of railway operations, proving compliance and supporting maintenance activities.

Your evaluation - and fleet data at a glance

The goal of DEUTA RedCloud® is to provide a fleet-level view by aggregating data from multiple trains and subsystems. This would provide insights into train use, operations and maintenance activities, which can improve uptime, reliability, safety and reduce cost.

The innovative user interface of the DEUTA RedCloud® presents all data clearly at a glance: speed, analogue and digital tracks and train control data are displayed at the same time.

Rule evaluations

According to the regulations of the TSI OPE, railway undertakings must regularly read out their journey data. These rule analyses become a simple daily routine with RedCloud®.

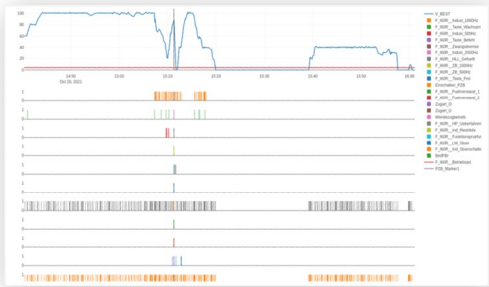
- + Prepared data per recorder without file limits
- + Access to the data within seconds
- + Daily rule evaluations as efficiently as possible
- + Processing of automatically recognised incidents
- + Sensible data preselection for the analysis
- + Interim safed work statuses
- + Freely nameable markers and notes
- + Export e.g. as PDF report

App for rule evaluations

The innovative user interface of the DEUTA RedCloud® presents all data clearly at a glance: speed, analogue and digital tracks and train control data are displayed at the same time.



KPIs, trends, breakdowns by journey, track and vehicle

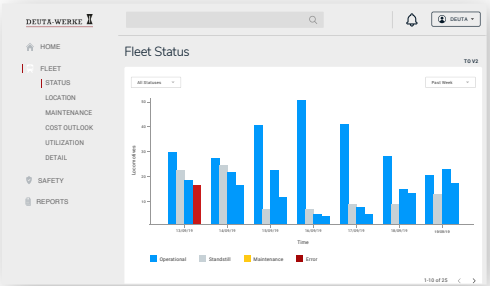


Nameable markers, signal selection, navigation and orientation for the table view.

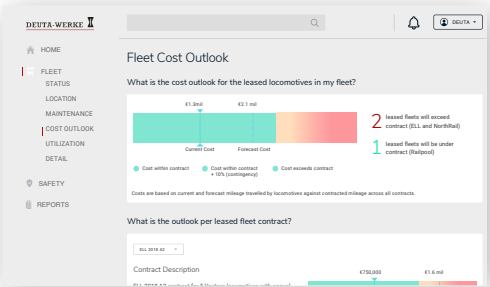
Tabular display: PZB signals, markers and notes with smooth navigation

App for fleet managment and maintenance planning

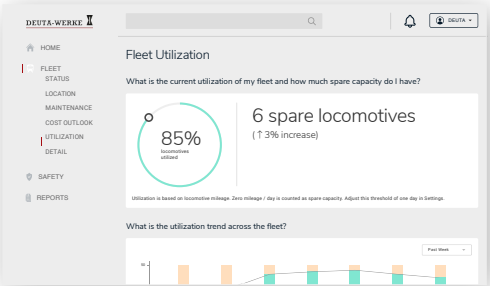
The Fleet Management module provides a view of operational status across the entire fleet. It provides details on fleet location, standstill, upcoming scheduled maintenance based on mileage or operating hours, asnd the ability to drilldown into the details of a single locomotive.



Maintenance planning



Mileage & running times



Capacity utilisation and deadlines



»DEUTA DSK10/3 – The perfect replacement for DSK10/1«

The form-fit-function replacement for DSK10/1

As a specialist for retrofit products, DEUTA developed the DSK10/3 as an adequate replacement for the DSK10/1 which offers a WiFi interface in addition to the proven functionalities. Travel data and status parameters are read out via the Web Interface.

Short-time and long-term memory

The DSK manages and stores the received data in a short memory with maximum resolution and in a long memory with a speed-dependent resolution.

Data storage

- The following data are stored:
- selected operating data (train data, PZB/LZB influences, travel route)
 - Train driver No
 - Train number
 - Vehicle number
 - Time and date
 - Operational actions

DEUTA DSK10/3

Feature/Specification	
Operating voltage	5 VDC +/- 5 %
Power consumption	max. 1 W
Temperature range	-25 °C to +70 °C (operation) -40 °C or up to +85 °C (storage)
Storage medium	1 short-time memory, 1 long-time memory
Memory resolution	Short-time memory: max. resolution, Long-time memory: speed-dependent resolution
Memory capacity	32 Mbyte
Real-time clock (RTC)	+/- 4 min. / year
RTC battery	15 years data retention
Data interface	RS-232, 9600 baud
RS-232 service interface	9600 to 115200 baud
USB interface	Read out travel data via ADS software, Diagnostics via PZB Service software
Ethernet interface	10/100 Mbit/s
WiFi	Read out travel data and status parameters via Web Interface
Status/Operating indicator	Two-colour: Red, yellow
Front panel version	grey

Dimensions

Width	50.5 mm (10 HP) 19"
Height	128.4 mm (3 U) 19"
Depth	166.5 mm
Weight	approx. 0.5 kg
Protection category	IP 20
Connection	1 D-SUB 9-pin 1 D-SUB 25-pin 1 USB type B 1 Ethernet M12



DSK10/3



»DEUTA DSC17 - Digital Signal Converter«

DEUTA Digital Signal Converter DSC17 converts recorded speed signals (frequencies) into digital and analogue output signals, such as distance pulses, switching thresholds, signals for controlling the speed indicators and mileage recorders. A further area of application is the control of the wheel flange lubrication: For this application, distance interval and duration of lubrication pulses are configurable.

With the exception of setting the wheel diameter, the DSC17 is already configured at the factory. It is possible to enter wheel diameters between 300 and 2,000 mm. The operating program is located on the internal memory. It is possible for the manufacturer to update the firmware via the Ethernet interface. The process values are visualised via the Web interface of the DSC17.

Speed signals used can be either DEUTA AC generators (EF sensors) or digital DEUTA generators (DF pulse sensors). The power supply of the two-channel DF pulse generators is provided by the DSC17. These digital sensors can be used for direction of rotation detection. The frequency inputs are galvanically isolated and can be used alternatively for both sensor variants by using different connection terminals.

The operating state of the DSC17 is displayed by three configurable LEDs on the front of the device. The keys on the front of the device can be used to switch the WiFi function on and off and to adjust the wheel diameter.

Digital Signal Converter DSC17

Nominal supply voltage:	DC 24 V
Supply voltage range:	DC 16.8 to 30 V
Current	max. 0.4 A at 24 V supply voltage
Frequency inputs	galvanically isolated 2 inputs
max. frequency inputs	10 kHz
Power supply for sensors	2
Voltage for sensor	DC 15 V
max. output current	65 mA per channel
Outputs	
analogue outputs (alternative):	
Current alternative	2
Voltage alternative	2
PWM	2
digital. Outputs (relays)	4
digital outputs 0-100 Hz	2
Frequency output	2
Status LED (configurable)	green: Speed yellow: Power red: Error
Wheel diameter parameter range	300 - 2,000 mm
MTBF mean value: GM/40°C	141,616 h (according to SN 29500)
Ambient temperature	Operation: -25° C ... +70° C, Storage: -40° C ... +85 °C
Humidity	EN 50125-1
Shock/Vibration	EN 61373 category 1, class B
Fire protection	EN 45545-2
Standard	EN 50155
Weight	approx. 350 g
Protection category	IP20

analogue outputs	
Number	2
Version	galvanically isolated
Voltage output alternat.	0 V - 10 V , max. 10 mA
Current output alternative	0(4) mA - 20 mA, load ≤ 500 R
PWM output	1-99 %, 10 V, max. 10 mA, 1 KHz basic frequency
proportional error	± 0.25 % (-25°C...+70°C)
Offset error	± 0.25 % from the final value (-25°C...+70°C)
Insulation voltage	AC 500 V
max. output frequency	5 Hz

Relay outputs	
Number	4
Version	realized as change-over contact
max. switching voltage	DC 125 V
max. switching current	1 A
max. circuit capacity	60 W (at ohmic load)

Frequency outputs	
Number	2
Version	NPN open collector - galvanically isolated
max. switching voltage	DC 40 V
max. switching current	25 mA
max. circuit capacity	0.25 W
Insulation voltage	AC 500 V
max. switching frequency	5 kHz

digital outputs	
Number	2
Version	NPN open collector - galvanically isolated
max. switching voltage	DC 150 V
max. switching current	100 mA
max. circuit capacity	0.25 W
Insulation voltage	AC 1000 V
max. switching frequency	100 Hz

Communication	
Ethernet	
WiFi	

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