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Digital Tachograph DTCO 1381 – Release 2.0

Technical Description



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Conventions in this manual

Formatting features

The following formatting features will be used in order to help you more easily use this documentation:

Organisation of the manual

Example:

Product / system overview

1.1 System overview

1.1.1 Brief description

Product versions

Meaning:

= Main chapter

= Subchapter of 1st level

= Subchapter of 2nd level

= Section within a chapter

Emphasis in text

Example:

1. Switch on the ignition.

2. Insert tachograph card.

3. Call main menu.

• Activities

– Driving time

Meaning:

= Handling instructions which must be carried out one after the other

= Lists within a paragraph

= Additional lists within a list

Pictographs and their meaning



Caution!

Just as in street traffic, this symbol means "STOP"! Please pay special attention to information and instructions. In doing so, you will protect yourself and others from injury.



Attention!

The text next to this symbol contains important instructions which must be observed to prevent a loss of data or damage to the device.



Comment!

Important supplementary information on the product.



Book symbol

Refers to other documentation, e.g. see operating instructions DTCO 1381.

Marginal column

A short keyword to a topic can be used for finding certain information in the text quickly.

General instructions

The DTCO 1381 digital tachograph with its system components is an EC recording equipment that complies with the requirements of the EC regulation (EEC) no. 3821/85 annex I B (as amended).

Terminology definitions

Installation of the DTCO 1381 is divided into the following steps:

1. Installation

Mechanical and electrical installation of the DTCO 1381 components into the vehicle.

2. Preprogramming

Preprogramming of all known or operationally necessary and legally required parameters.

3. Installation and functional test

Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.

4. Activation

Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).

5. First calibration

First calibration of the EC recording equipment.

Personnel prerequisites

In the following instructions, the manufacturer assumes that the personnel possess extensive professional knowledge, securely master the necessary technical activities, and have been trained in the use of the DTCO 1381 components as appropriate for the area of application.

Installation

The persons who are charged with the installation of the DTCO 1381 components must complete a training program on the installation of the DTCO 1381 components.

Activation and calibration

The persons who are charged with the activation and calibration of the DTCO 1381 components must:

- have a valid workshop card.
- complete a training program on the installation, calibration, and activation of the DTCO 1381 components.
- (in Germany) also fulfil the conditions for executing tasks according to §57b.

Comment



When installing the DTCO 1381 please obey the valid legal regulations in your country!

Technical prerequisites

The following requirements must be fulfilled in order to carry out the assigned tasks:

- The equipment and tools required or recommended by the manufacturer must be available.
- The equipment, testing devices, and furnishings must comply with the respective valid legal requirements for the country in which they are used.

Handling the tachograph cards



Attention!

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following instructions about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

Installing the DTCO 1381



Attention! Danger of injury

Working on a motor vehicle can be dangerous. When working, observe the professional association's safety instructions and the regulations for the prevention of accidents.

Installation of the DTCO 1381 components does not require any interventions in the vehicle's safety equipment. When installed correctly, the vehicle's equipment and driving characteristics will neither be changed nor influenced.

Observe the following general instructions for the installation of the DTCO 1381 components:

- Always observe the manufacturer's instructions, particularly when working on the onboard power supply.
- Make sure that the vehicle's ignition is switched off.
- Make sure that the legal regulations regarding installation room are complied with, that there is sufficient room to operate the DTCO 1381, and that the display is positioned in a way that affords optimal readability.
- When installing the DTCO 1381 components, avoid damaging the existing cables in the vehicle or unintentionally loosening plug-in connections.
- Before removing covers and similar vehicle parts, obtain information on proper dismantling procedures in order to prevent damage to the parts.
- Refer to the connection diagrams for information on the location of fuel, hydraulic, compressed air, and electrical lines.
- When separating plug-in connections, do not pull on the cable, but rather on the plugs or the proper unlocking systems only.
- For mounting tasks, use only original VDO installation parts and accessories. Install undamaged components only.
- During installation, be absolutely certain that the DTCO 1381 components do not influence or restrict the vehicle's functionality in an undesirable way.
- Instruct the driver / company in the use of the DTCO 1381 and transfer to him with the appropriate operating instructions.

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Proper use	The DTCO 1381 is an EC recording equipment that complies with CR (EEC) 3821/85, annex I B for the registration, saving, display, printing, and outputting of driver-based and vehicle-based data. It may be used only for the purpose for which it is designed.
Power supply	The DTCO 1381 may only be connected to voltages for which it is designed and which can be seen in the wiring diagram (label).
Accessories	For reasons of operational safety, no alterations may be made to the accessories. Do not use any accessories other than those recommended or approved by the manufacturer in order to help avoid accidents and operational disruptions.
Cables	Make sure that the cables are undamaged, that other objects or sources of heat cannot cause damages, and that the lines cannot cause any undesired interference or disturbances.



Caution! Danger of fire due to short circuit

Damaged cables can cause short circuits, undesired interferences, or disturbances.

Always replace damaged cables immediately!

General security instructions

While handling a DTCO 1381, which has not yet been activated, the approved recording equipment manufacturer, vehicle manufacturer, installer, or workshop must guarantee the security of the DTCO 1381.

Maintenance

Operational notes	<p>Avoid excessive impacts and vibrations. Do not use sharp or pointed objects (such as pens) to operate the keys.</p> <p>Keep the printer drawer and the covering cap of the download and calibration interface closed at all times in order to avoid damages and contamination.</p>
--------------------------	---

List of abbreviations

A

ABS	Anti-lock braking system
ADR	European agreement concerning the international carriage of dangerous goods by road

C

CAN	Controller area network (vehicle data bus)
CTC	Compact test computer

D

DIN	German Institute for Standardisation (Deutsche-Industrie-Norm)
DTCO	Digital Tachograph

E

EMC	Electromagnetic compatibility
------------	-------------------------------

G

GGVSEB	Gefahr-Gut-Verordnung-Straße, Eisenbahn und Binnenschifffahrt (German Directive on the transport of dangerous goods by road, rail and inland waterways)
GPS	Global Positioning System

I

IEC	International electrotechnical commission
IMS	Independent Motion Signal
IP	International protection (protection classification)
ISO	International organization for standardization

K

k	Constant for the speed and rotational speed adjustment between vehicle and tachograph
KITAS	Kienzle Tachograph Sensor
K-Line	Serial asynchronous diagnosis interface
km	Kilometer

km/h Kilometers per hour

L

LCD Liquid crystal display

M

M1 EU vehicle class M1
(vehicles with not more than 8 seats, excluding the driver's seat)

N

n Engine speed [rpm]

N1 EU vehicle class N1
(goods vehicles with a maximum total permissive mass not exceeding 3.5 t)

Nm Newton meter (unit of torque)

P

PIN Personal identity number

PWM Pulse range modulation

R

RMS Root-mean-square

rpm Revolutions per minute

RxD Received data (asynchronous received data)

S

SDS Service diagnosis system

StVZO Straßenverkehrs-Zulassungs-Ordnung
(German Regulation authorizing the use of vehicles for road traffic)

T

TCO Tachograph

TD Technical documentation

TxD Transmit data (asynchronous transmitted data)

U

UTC	Universal time coordinated
------------	----------------------------

V

v	Speed [km/h]
VIN	Vehicle identification number
VRN	Vehicle registration number

W

w	Characteristic coefficient (w-value) [p/km]
W	Terminal "W" of the electric generator

Chapter 1

Product and system overview

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1.1 System overview

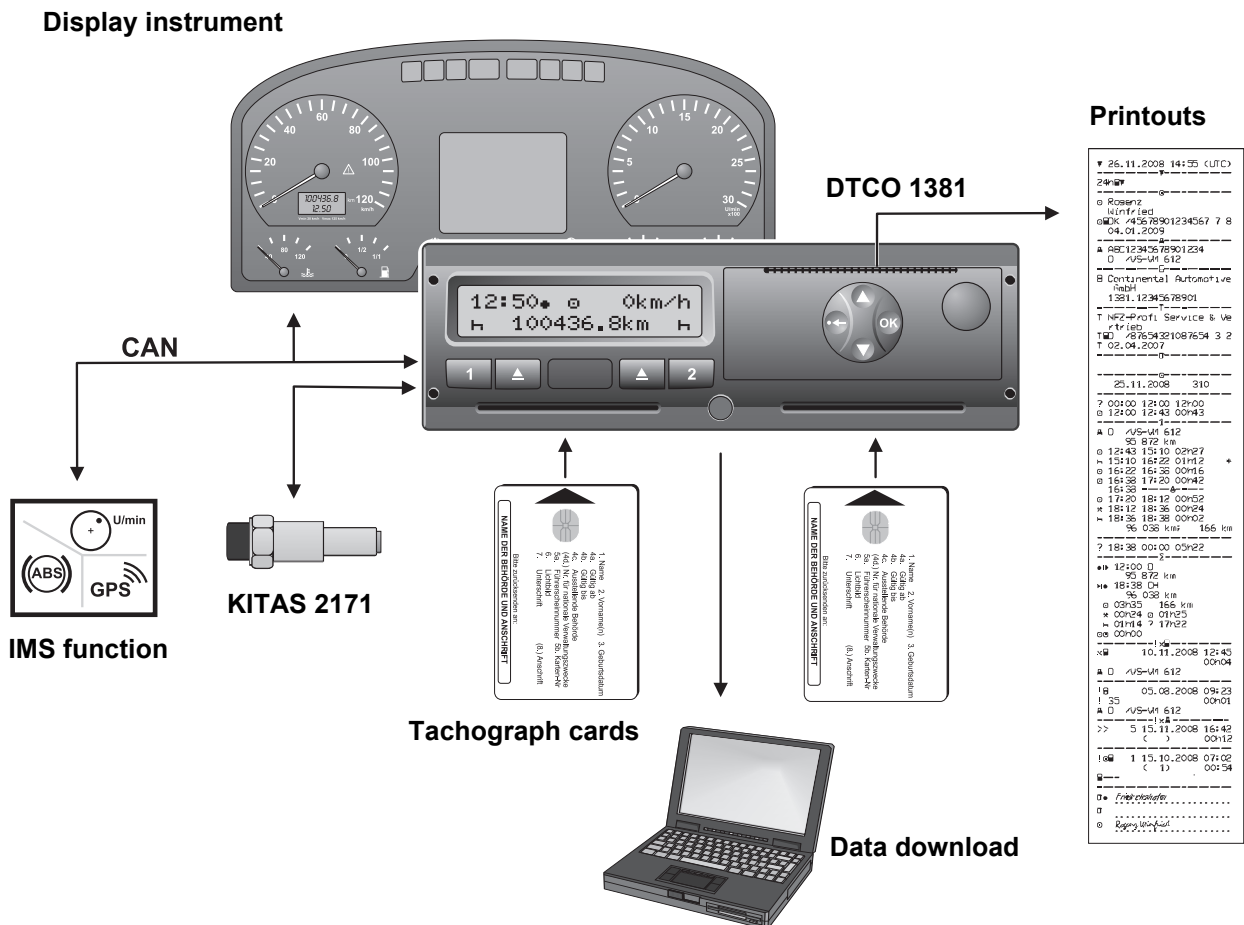


Illustration 1: DTCO 1381 System overview

The **EC recording equipment DTCO 1381** consists of these individual components:

- Digital Tachograph **DTCO 1381**
- Distance and speed sensor KITAS 2171
or other type-approved sensors with an interface according to
ISO 16844-3:2004.

External components for the fulfillment of further requirements of the regulation:

- **IMS** = Independent Motion Signal, second independent motion signal via CAN
- Tachograph cards
- Software selection (data download)

In order to meet the functional requirements in the vehicle:

- Display instrument

1.1.1 Brief description

DTCO 1381	<p>The DTCO 1381 is an EC recording equipment that complies with the requirements of CR (EEC) 3821/85, annex I B.</p> <p>It is used to register, save, display, print, and output driver-based and vehicle-based data. The data is saved in the DTCO 1381 device memory and on inserted tachograph cards.</p> <p>The standard display provides an overview that shows the time, current speed, and distance. It also shows the set activities and symbols of the inserted tachograph cards, see chapter 3.2 "Display variations" from page 61.</p> <p>An internal diagnosis function monitors the system and automatically notifies if events or faults appear. Events, faults, or warning messages are displayed optically.</p>
KITAS 2171	<p>KITAS 2171 is part of the EC recording equipment, it provides real-time signals and cryptologically encoded data. The signals serve for recording the distance and speed.</p> <p>The DTCO 1381 can detect external interferences and influences by monitoring the data communication with the KITAS 2171 and comparing this to the real-time signal.</p>
IMS = Independent Motion Signal	<p>Second independent motion signal. (From October 2012 this function will be mandatory for all newly registered vehicles.)</p> <p>The digital tachograph (DTCO) tests the vehicle motion / standstill in addition to the KITAS signal via the CAN Bus: Data from the ABS, wheel speed sensor or odometer GPS are evaluated.</p>
M1N1 adapter	<p>In vehicles of class M1 or N1, in which the installation of a KITAS is mechanically not possible, the M1N1 adapter supplies the signals for recording the speed and the distance travelled.</p> <p>Note: The M1N1 adapter may exclusively be installed into and/or used in vehicles with initial registration between May 1, 2006 and December 31, 2013. (Determination of the vehicle category, Directive 2007/46/EC pursuant to annex II of the Council.)</p>
Printouts	<p>The integrated printer on the DTCO 1381 can print data from the memory and the tachograph cards. The types of printout, the format, arrangement, and data contents are defined in CR (EEC) 3821/85, annex I B.</p>
Printer paper	<p>The printer paper is approved for use with the DTCO 1381 and exhibits a corresponding mark of approval. The paper is a special thermal printing paper.</p>

Display instrument

A display instrument is located directly in the driver's field of vision. The operational check "T" brings attention to messages from the DTCO 1381.



The display instrument is not part of the EC recording equipment. Display instruments are designed for specific vehicles and will not be covered in this documentation.

Tachograph cards

Authorities and institutions in the individual EU member states will issue the tachograph cards specified by the legislature.

There are color-marked cards, arranged according to access rights and areas of activity, for the following groups of users:

- Driver card (white)
- Company card (yellow)
- Control card (blue)
- Workshop card (red)

The DTCO 1381 can read and process all tachograph cards.

Data download

Using a company card, control, or workshop card it is possible to download, analyze, and archive data about the vehicle and driver via the interfaces of the DTCO 1381 provided for this purpose.

Download software for the controlling bodies:

- This software is used during street or company controls or for generating an expert report.

Download software for fleet management:

- This software enables the company to manage data on the vehicle, logistics, and drivers.



Please refer to the respective software manuals for more information on the software packages.

Remote download

As an option, the DTCO 1381 can be equipped with the "remote download" function. Following the successful authentication of a company card, the data can also be downloaded by remote control via the interfaces provided for this purpose.



For detailed information concerning the remote download function please refer to a VDO sales office.

1.1.2 Characteristics of the DTCO 1381

General features

- Recording unit in the DIN ISO 7736 radio format
- Evaluating a second motion signal (IMS) supports the detection of manipulative interventions in the system such as interruptions or disturbances of the KITAS sensor cable.
- Microcontroller-monitored signal inputs and outputs
- Automatic registration and saving of all legally stipulated data, such as
 - Driver activities
 - Driving status
 - Detailed speed 168 hours
 - Distance
 - Events, faults, and security breaches
 - etc.
- Multifunctional LCD, illuminated
- Digital speedometer in display
- Buttons for
 - Ejecting driver 1 and driver 2 cards
 - Setting the desired time groups for driver 1 and driver 2
 - Menu control
- Two card slots with automatic chip card pull-in and chip card interface for driver 1 and driver 2
- Download and calibration interface
- Integrated printer
- Internal memory for recording all activities
- Internal diagnosis function (self-test)
- Speed impulse outputs (B6, B7)
- Distance impulse output 4 Imp/m (B8)
- Two data bus-capable CAN interfaces (SAE J1939, CAN 2.0B) for attachment to the vehicle's electric system or a display unit
- CAN with diagnosis functionality
- Info interface (D8, VDO protocol)

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Options

- K-Line diagnosis interface (D7)
- Two supplemental recorder inputs for recording various supplemental information, like for recording blue light, sirens, fuel consumption, secondary drive, etc.
- Rotational speed input (C3 or CAN), recording of the motor's speed
- Speed impulse output (B6)
 - increased current carrying capacity ($I_{\max} = 1,5 \text{ mA}$) or
 - looped-through transmitter signal
- Speed impulse output (D6)
- CAN2 with second CAN driver, independent of CAN1
- CAN2 Remote Download Wake-Up (D3)
- Military Blackout Lighting Mode
- ADR variant
- Remote download
- Customer-specific variations
 - Front cover
 - Display and keypad illumination
 - Interfaces
 - DTC (Diagnostic Trouble Codes)
 - Company logo on printout
- VDO Counter
- Replace option **without** IMS function for vehicles registered before October 2012.

1.2 Digital Tachograph DTCO 1381

1.2.1 DTCO 1381 Device description

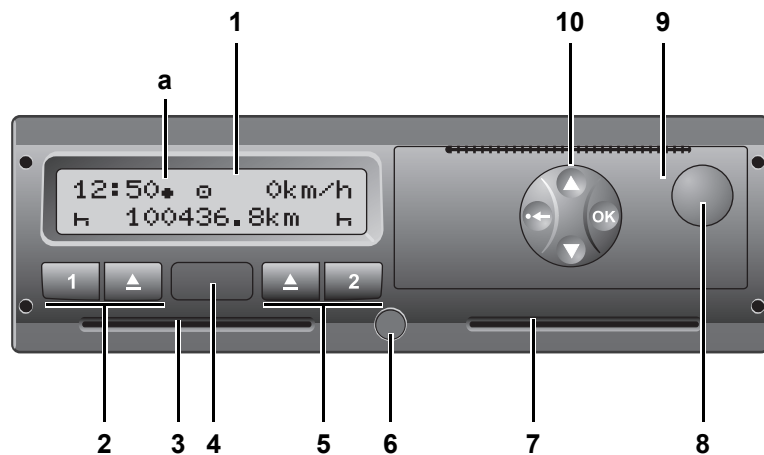


Illustration 2: DTCO 1381 Front side

(1) Display

Depending on the vehicle's operational condition, different displays will appear, see chapter 3.2 "Display variations" from page 61.

Events, faults, or warnings appear automatically, see chapter 13 "Events and faults" from page 251.

When required, data can be displayed that is saved in the memory or on the inserted tachograph card.

Dynamic procedures, such as reading in the driver card, are depicted visually.



Time data is generally expressed in UTC time.

If desired, the standard display can show the local time. This is labeled with the pictogram "⌚" (a).

(2) Driver 1 keypad

1 Activity button for driver 1

▲ Ejection button for card slot 1

(3) Card slot 1 (with mechanical lock)

The driver who will steer the vehicle inserts his driver card into slot 1.



(4) Download and calibration interface

The download and calibration interface is located under the cover.

Download interface: When a company card, control card, or workshop card is inserted, data can be read out from the memory and the inserted tachograph cards.

Calibration interface: The DTCO 1381 is calibrated or tested through the calibration interface.

(5) Driver 2 keypad

-  Activity button for driver 2
-  Ejection button for card slot 2

(6) Device sealing

To secure against unauthorized opening of the housing.

(7) Card slot 2 (with mechanical lock)

The driver who will not steer the vehicle inserts his driver card into slot 2 (crew operation).

(8) Unlock button

Button to unlock the printer drawer, like when inserting a new roll of paper.

(9) Printer

Integrated printer for outputting data from the internal memory or the inserted tachograph cards.

Model plate

The model plate is visible after opening the printer drawer and removing the paper roll:






- (a) Manufacturer
- (b) Device type – product key
- (c) Serial number
- (d) Year or date of manufacture
- (e) Test/approval mark
e1-84 (EC recording equipment), e1-R10-034091 (EMC)
- (f) External item number
- (g) Release version

Comment



The product key (pos. **(b)**) shows whether the marking is with or without **IMS function**, see chapter 1.2.3 "DTCO 1381 Product versions", page 27.

(10) Menu buttons

-  Select desired function,
-  acknowledge function or confirm actions,
-  leave menu one step at a time or cancel the function.

1.2.2 DTCO 1381 Rear side

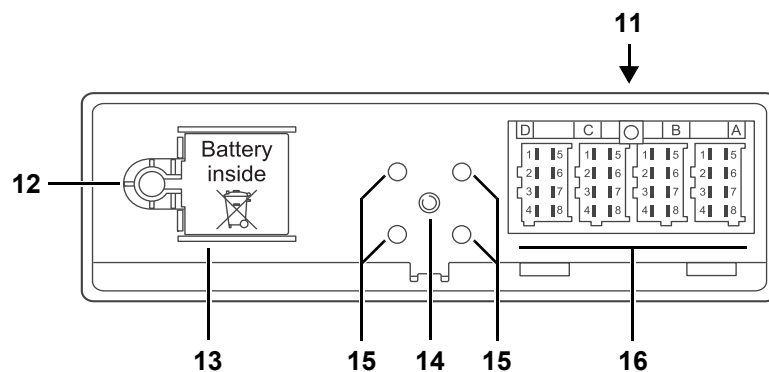


Illustration 3: DTCO 1381 Rear side

- (11) Connection diagram**
Label with pin assignments and connection diagram
- (12) Seal for battery compartment**
Sealing against unauthorized opening of the battery compartment
- (13) Battery compartment**
Buffer battery installed at factory
- (14) Mount for threaded studs and fastening cap**
For support in the radio compartment
- (15) Screw connection points for spacer**
When using the spacer for support in the installation compartment
- (16) Connection plugs A through D**

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1.2.3 DTCO 1381 Product versions

Device type: DTCO 1381 (Digital Tachograph)

1381	a	bc	d	e	f	g	hij	k	Voltage	0 12 V
									1 24 V	
									2 24 V (ADR); CAN1 possible only in zone 2	
									3 12 V (ADR)	
									4 24 V (ADR); CAN1 possible in zone 1	
									Display / key illumination / display type	00 yellow / none / positive
									01 yellow / yellow / positive	
									02 white / none / positive	
									03 white / white / positive	
									04 orange / none / positive	
									05 orange / orange / positive	
									06 green / none / positive	
									07 green / green / positive	
									:	
									Cover	0 standard (with VDO company logo)
									1 without company logo	
									2 customer-specific company logo	
:										
Housing	0 standard									
1 with spacer										
2 standard with mounting cap										
3 with spacer and mounting cap										
4 with extended spacer and mounting cap										
free	00 - 99									
IMS	0 without IMS function									
9 with IMS function										
Running number	001 - 999									
Packaging¹⁾	A reusable 6-pack container									
B individually packaged										
:										

¹⁾ The type of packaging is not indicated on the model plate.

1.3 KITAS 2171

KITAS 2171 is part of the EC recording equipment, it provides real-time signals and cryptologically encoded data. The signals serve for recording the distance and speed.

The DTCO 1381 can detect external interferences and influences by monitoring the data communication with the KITAS 2171 and comparing this to the real-time signal. (Specification according to ISO 16844-3:2004).

Comment

Please note!

From October 2012, the "KITAS 2171 Version 2+" must, in principle, be installed in new vehicles, chapter 2.2.4 "Product identification", page 52.

1.3.1 KITAS 2171 Product versions

The following product versions are available for attachment to the DTCO 1381:

- Standard version
- Integrated version
- Customer-specific version
- KITAS 2171-Version 2+

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KITAS 2171 Standard version

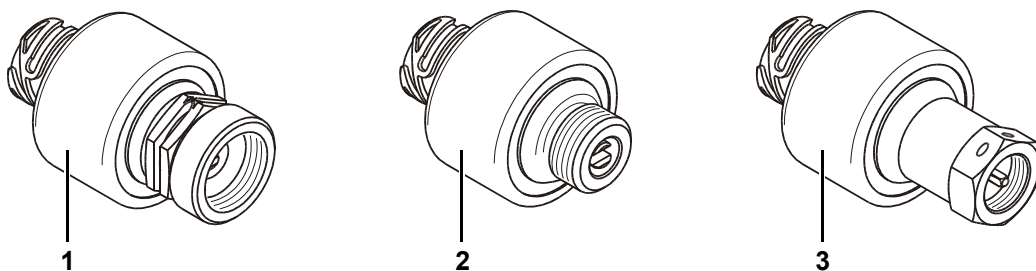


Illustration 4: KITAS 2171 Standard version (example)

	Version with thread type ...	KITAS 2171
(1)	Inside threads M22 x 1,5 right	2171.01
(2)	Outside threads M22 x 1,5 left	2171.02
(3)	Inside threads M18 x 1,5 right	2171.07
n.ill.	Inside threads 7/8"	2171.03

Comment



These KITAS versions are screwed to the gear output. Various types of threads are available for the mounting procedure.

KITAS 2171 Integrated version

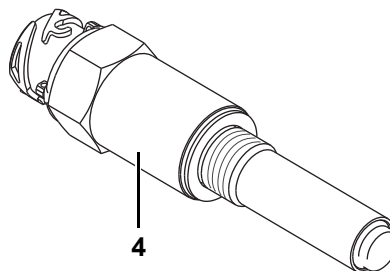


Illustration 5: KITAS 2171 Integrated version (example)

	Version	KITAS 2171
(4)	Integrated version (static)	2171.20
n.ill.	Integrated version for application with Telma brake	2171.2050

Comment



These KITAS versions are screwed into the gear output. A variety of lengths are available for the installation.

KITAS 2171 Customer-specific version

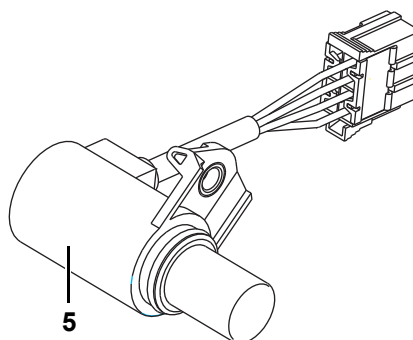


Illustration 6: KITAS 2171 Customer-specific version (example)

	Version	KITAS 2171
(5)	Customer-specific version	2171.xx

1.3.2 Characteristics of the KITAS 2171

Characteristics of all KITAS 2171 versions

- Transmission of the motion sensor's serial number and testing in the DTCO 1381
- Data security through special encoding process
- Comparison of real time signal and encoded data signal in the DTCO 1381

Additional characteristic of the integrated and customer-specific versions:

- Non-contact measurement process

1.3.3 KITAS Sensor cable

The KITAS sensor cable connects the KITAS 2171 to the DTCO 1381. The sensor cable must meet certain requirements, see chapter 2.2.5 "KITAS Sensor cable", page 53.

The VDO standard sensor cables are available in a several different lengths, for example: 2.8 m, 8.5 m, or 15 m.

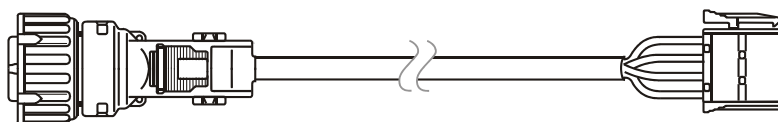


Illustration 7: KITAS Sensor cable

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1.3.4 M1N1 Adapter

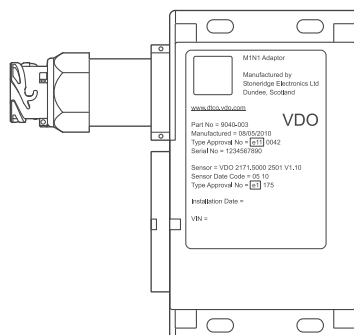


Illustration 8: M1N1 Adapter

In vehicles of class M1 or N1, in which the installation of a KITAS is mechanically not possible, the M1N1 adapter supplies the signals for recording the speed and the distance travelled.

1.4 Tachograph cards

Authorities and institutions in the individual EU member states will issue the tachograph cards specified by the legislature.

There are color-marked cards, arranged according to access rights and areas of activity, for the following groups of users:



Illustration 9: Overview tachograph cards (examples)

Workshop card (red)

Issued to:

- Manufacturers of EC recording equipment
- Vehicle manufacturers and vehicle fitters
- Authorized workshops

Authorized persons who are charged with calibration, activation, testing, etc. will receive a workshop card. In addition to performing workshop functions, the holder can also drive with this card.

If the authentication is positive, the following functions will be activated:

- Calibration
- Test
- Data download

Comment



The DTCO 1381 can be activated only with a valid workshop card.

Driver card
(white)

The driver uses the driver card to identify himself to the DTCO 1381. The card is used for normal driving and permits savings, displaying, or printing of activities under this identity.

Company card
(yellow)

The company card identifies a company, authorises access to the company's data and can assign the DTCO 1381 to a company. This card is intended for the owners and holders of vehicles. With this card it is possible to display, print, and download the data assigned to the company in the internal memory and on an inserted driver card.

If necessary (once per unit), the entry of the authorising member state and the official registration number in the DTCO 1381.

Control card
(blue)

The control card identifies an official of a controlling body (like the police) and permits access to the data in the internal memory. All saved data and the data of an inserted driver card are accessible. This data can be displayed, printed, or downloaded through the download interface.

Mechanical locking of the tachograph cards

If the DTCO 1381 accepts an inserted tachograph card, withdrawal of the card will be mechanically blocked.

It is possible to remove the tachograph card only when:

- the vehicle is stationary,
- the ignition is switched on (required only for ADR variant),
- the user requests withdrawal and
- after the data defined by the ordinance has been saved on the tachograph card.

1.4.1 Valid combinations of tachograph cards

		Card slot 1				
		No card	Driver card	Control card	Workshop card	Company card
Card slot 2	No card	✓	✓	✓	✓	✓
	Driver card	✓	✓	✓	-	✓
	Control card	✓	✓	-	-	-
	Workshop card	✓	-	-	-	-
	Company card	✓	✓	-	-	-

✓ = valid combination

- = invalid combination ("cards conflict" event)

Chapter 2

Technical data

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2.1 DTCO 1381

2.1.1 Installation dimensions and angle

Installation dimensions

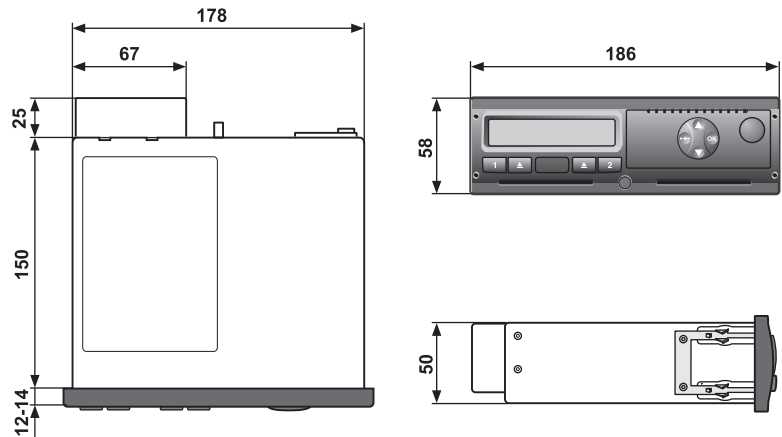


Illustration 10: Installation dimensions of DTCO 1381

Permissible installation angle

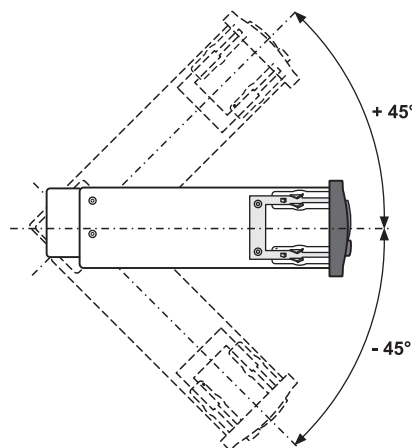


Illustration 11: Permissible installation angle of DTCO 1381

Installation angle of display

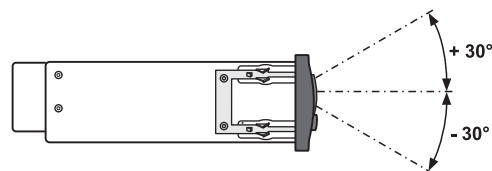


Illustration 12: Viewing angle of display DTCO 1381



Always comply with chapter 5.3 "Criteria for the installation site", page 123.

2.1.2 Pin assignment

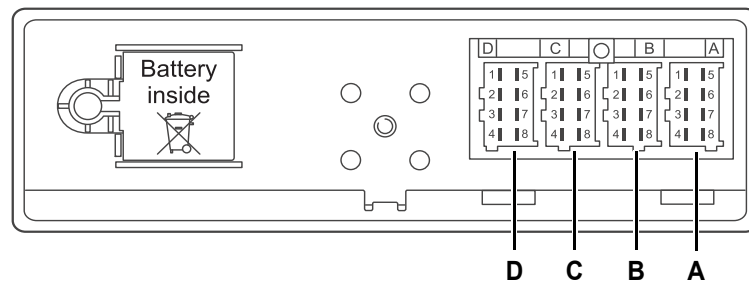


Illustration 13: Pin assignment DTCO 1381

Connection			
Plug A	A1	Term. 30	Permanent voltage
	A2	Term. 58d	Illumination ¹⁾ (control input)
	A3	Term. 15	Ignition
	A4		CAN1_H
	A5	Term. 31a	Minus
	A6	Term. 31	Ground
	A7		CAN1_GND
	A8		CAN1_L
Plug B	B1		v-sensor supply (+)
	B2		v-sensor supply (-)
	B3		v-signal (real time)
	B4		I/O data signal
	B5		---
	B6		v-pulse output ¹⁾
	B7		v-pulse output
	B8		4 pulses/m signal output
Plug C	C1		---
	C2		n-sensor supply (-) ¹⁾
	C3	Term. W	n-sensor signal input ¹⁾
	C4		---
	C5		CAN2_H ²⁾
	C6		CAN2_GND ²⁾
	C7		CAN2_L ²⁾
	C8		CAN_RES ¹⁾
Plug D	D1		Additional stylus, input 1 ¹⁾
	D2		Additional stylus, input 2 ¹⁾
	D3		CAN1 on/off ¹⁾
	D4		TCO warning output
	D5		---
	D6		v-pulse output ¹⁾
	D7		K-Line diagnosis interface ¹⁾
	D8		Info interface

1) Option

2) CAN variations, see page 44

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2.1.3 Connection specifications

Connection plug A (power supply, CAN bus)

Pin	Function	Parameter	12 V version ¹⁾			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
A1	Term. 30 Permanent voltage								Reference potential A5
		Voltage [V]	10,5	12	16	16	24	32	
			9		16	15			Card mechanism and printer deactivated (ADR variant)
					17			36	Short-time (max. 1 h)
		Current [A]			0,02			0,02	Standby (vehicle stationary, 5 min. after ignition off)
				0,2			0,12		Display illumination 100 %
				0,7	0,8		0,35	0,45	Display illumination 100 %, card mechanism running
				3			1		Display illumination 100 %, printer running
					8			8	Maximum starting current
		Fuse current [A]	4	5	6	4	5	6	Slow-blow fuse
			4		6	1	1	5	ADR variant ^{1) 3)}
A2	Term. 58d Illumination ¹⁾ (control input)								Reference potential A6
		Voltage [V]	0		16	0		32	
		Dimming day/night U _{off} [V]	1,49	1,6	1,71	1,46	1,6	1,74	version-dependent
		Dimming day/night U _{on} [V]	2,16	2,3	2,44	2,12	2,3	2,48	version-dependent
		PWM freq. [Hz]	50	1000	10000	50	1000	10000	Alternative: analog signal (0 V - U _B), digital signal (on/off)
		Current [mA]			1,2			1,2	
A3	Term. 15 Ignition								Reference potential A6
		Voltage [V]	9	12	15	16	24	32	
					16			36	Short-time (max. 1 h)
		Recognition voltage [V]	7,1	7,7	8,4	13,3	14,1	14,9	Recognition of the ignition
									Recognition of the ignition (optional)
		Current [A]		0,014	0,25		0,01	0,25	
		Fuse current [A]	0,5		5	0,5		5	
		Current [A]				0,06		2,5	ADR variant ¹⁾
		Fuse current [A]				4		6	ADR variant ^{1) 3)}
A4	CAN1_H ²⁾								

1) Option

2) Specification according to ISO 16844-6 (5) and ISO 11898 (6)

3) Special fuse according to EN 50020

Pin	Function	Parameter	12 V version ¹⁾			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
A5	Term. 31a Minus (battery)								Reference potential A1 optionally connected to A6
A6	Term. 31 Ground								Reference potential A3 optionally connected to A5
A7	CAN1_GND								
									Galvanic connection to pin A6 (optional capacitive connection)
A8	CAN1_L ²⁾								Reference potential A7

1) Option

2) Specification according to ISO 16844-6 (5) and ISO 11898 (6)

3) Special fuse according to EN 50020

Connection plug B (KITAS 2171, data signals)

Pin	Function	Parameter	12 V version ¹⁾			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
B1	v-sensor supply (+) ²⁾								
		Voltage [V]	6,5			6,5			at I = 15 mA
					9			9	at I = 0 mA
		Current [A]			0,015			0,015	
B2	v-sensor supply (–)								connected to A5
B3	v-signal (real time) ²⁾								
		U _{Low} [V]			1			1	at I = –250 µA
		U _{High} [V]	3,8			3,8			at I = –150 µA
		Frequency [kHz]			1,5			1,5	Square wave signal
		Pulse duration [µs]	200			200			
B4	I/O data signal ²⁾								
		Input U _{Low} [V]			1,2			1,2	at I = –1 mA
		Input U _{High} [V]	5,2			5,2			at I = –0,5 mA
		Output U _{Low} [V]			1			1	at I = 1 mA
		Output U _{High} [V]	5,4			5,4			at I = –20µA
		Baud rate [Bd]	1164	1200	1236	1164	1200	1236	
B6	v-pulse output ^{3) 4) 5) 7)}								
		U _{Low} [V]			1,5			1,5	at I = 1 mA / 1,5 mA ¹⁾
		U _{High} [V]	5,5			5,5			at I = –1 mA
		Frequency [kHz]			1,5			1,5	Square wave signal
		Pulse duration [ms]	0,64	2	4	0,64	2	4	
B7	v-pulse output ^{3) 6) 7)}								Reference potential A6
		U _{Low} [V]			1,5			1,5	at I = 1 mA
		U _{High} [V]	5,5			5,5			at I = –1 mA
		Frequency [kHz]			1,5			1,5	Square wave signal
		Pulse duration [ms]	0,64	2	4	0,64	2	4	
B8	4 pulses/m signal output ³⁾								Reference potential A6
		U _{Low} [V]			1,5			1,5	at I = 1 mA
		U _{High} [V]	5,5			5,5			at I = –1 mA
		Frequency [Hz]			244,44			244,44	at v = 220 km/h
		Pulse duration [ms]	1,6			1,6			

1) Option

2) Specification according to 16844-3 :2004

3) Specification according to ISO 16844-2 (3)

4) Option increased current carrying capacity ($I_{max} = 1,5 \text{ mA}$)

5) Option looped-through transmitter signal

6) Signal monitoring (configurable)

7) For components/systems which are critical for safety, only use with independent plausibilization

Comment



The symbol with current data in the "Comments" column indicates the direction of current.

Connection plug C (n-system, CAN bus)

Pin	Function	Parameter	12 V version ¹⁾			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
C2	n-sensor supply (-)								connected to A6
C3	Term. W n-sensor signal input ¹⁾								Reference potential C2
		U _{Low to High} [V]	2,8		4	2,8		4	Voltage value at which the Schmitt trigger input detects a "low to high" transition
		U _{High to Low} [V]	2,3		3,4	2,3		3,4	Voltage value at which the Schmitt trigger input detects a "high to low" transition
		U _{Hysteresis} [V]	0,4		0,6	0,4		0,6	Hysteresis between "low to high" and "high to low" transitions
		Current [mA]			- 1,2			- 1,2	at U = - 2 V
		Current [mA]			2,7				at U = 14 V
		Current [mA]						6,3	at U = 28 V
		Frequency [kHz]			5			5	
C5	CAN2_H ^{2) 3)}								Variant 1: connected to A4
									Variant 2: CAN2_H
C6	CAN2_GND ³⁾								connected to A6
C7	CAN2_L ^{2) 3)}								Variant 1: connected to A8
									Variant 2: CAN2_L
C8	CAN_RES ¹⁾								connected with C5 via R = 120 Ω

1) Option

2) Specification according to ISO 16844-6 (5) and ISO 11898 (6)

3) CAN variations, see page 44

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The symbol with current data in the "Comments" column indicates the direction of current.

Connection plug D (additional stylus, additional functions)

Pin	Function	Parameter	12 V version ¹⁾			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
D1	Additional stylus input 1 ¹⁾								Pulse width min. 100 ms
		U _{Low} [V]			1,2			1,2	at I = 0 mA
		U _{High} [V]	9		16	9		32	at I = 1,7 mA
D2	Additional stylus input 2 ¹⁾								Pulse width min. 100 ms
		U _{Low} [V]			1,2			1,2	at I = 0 mA
		U _{High} [V]	9		16	9		32	at I = 1,7 mA
D3	CAN1 on/off ¹⁾								Reference potential A6
		Voltage [V]				18	24	32	
								36	Short-time (max. 1 h)
		Recognition voltage [V]				6	7,5	8,7	CAN1 on/off
		Current [A]						0,1	
D4	TCO warning output ²⁾								
		U _{Low} [V]		1,5			1,5		at I = 5 mA
		Current [A]		0,015			0,015		Resistor 220 Ω in series
D6	v-pulse output ^{1) 3) 4)}								Reference potential A6
		U _{Low} [V]			1,5			1,5	at I = 1 mA
		U _{High} [V]	5,5			5,5			at I = -1 mA
		Frequency [kHz]			1,5			1,5	Square wave signal
		Pulse duration [ms]	0,64	2	4	0,64	2	4	
D7	K-Line diagnosis interface ¹⁾								Reference potential A6
									Specification according to ISO 14230, part 1 (7) and DiaCalis
D8	Info interface								
		U _{Low} [V]			1,5			1,5	at I = 1 mA
		U _{High} [V]	5,5			5,5			at I = -1 mA

1) Option

2) Specification according to CR (EEC) 3821/85, annex I B

3) Specification according to ISO 16844-2 (3)

4) For components/systems which are critical for safety, only use with independent plausibilization



The symbol with current data in the "Comments" column indicates the direction of current.

CAN variations

The DTCO 1381 is available with the following CAN variations:

Variations with one CAN driver

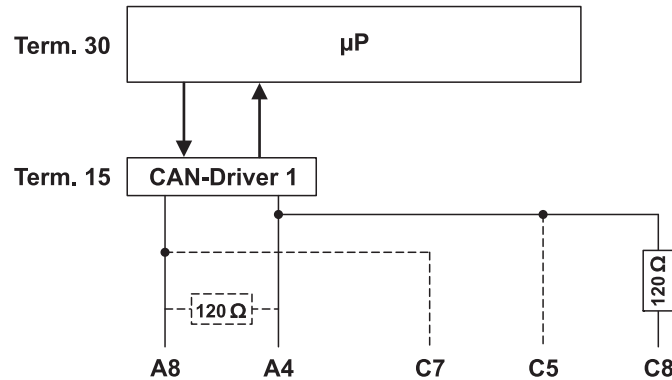


Illustration 14: CAN variations with one CAN driver

- Without terminator between Pin A8 and A4
- Terminator ($R = 120 \Omega$) between Pin A8 and A4
- CAN2 (Pin C7 and C5)

Variations with two CAN drivers

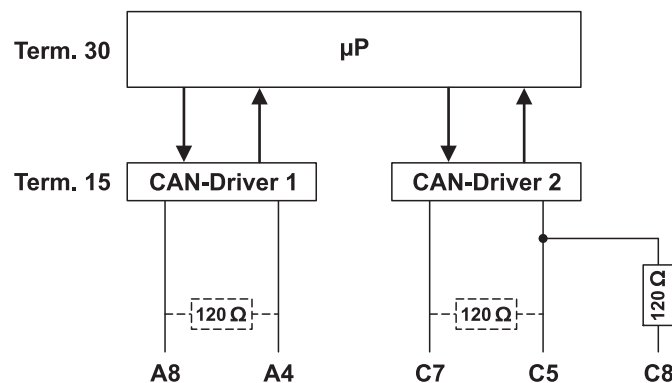


Illustration 15: CAN variations with two CAN drivers

- Terminator ($R = 120 \Omega$) between Pin A4 and A8
- Terminator ($R = 120 \Omega$) between Pin C5 and C7
- Terminator ($R = 120 \Omega$) between Pin A4 and A8 and PIN C5 and C7

Comment

In case of CAN variations with two CAN drivers the terminator at Pin C8 can be connected only to CAN2, connector C.

2.1.4 Pin assignment of calibration and download interface

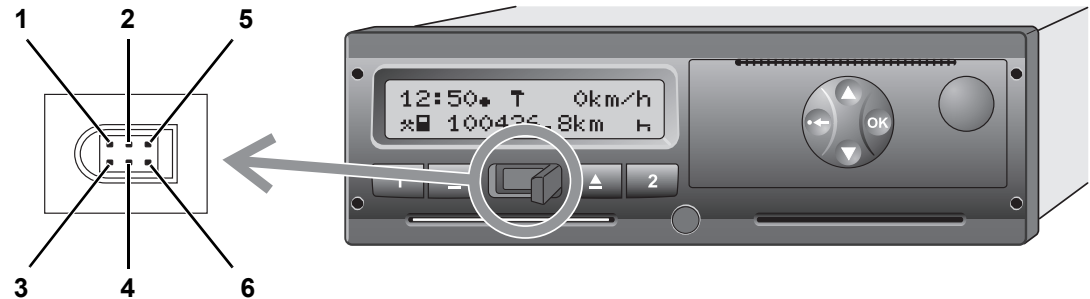


Illustration 16: DTCO 1381 pin assignment of calibration and download interface

Calibration interface

- (1) Battery minus
- (2) Data communication, K-Line
- (3) Input/output signal calibration
- (4) Battery plus ($U_B - 3\text{ V}$)

Download interface

- (5) Received data interface (RxD)
- (6) Transmit data interface (TxD)

2.1.5 Technical data

Measurement range	0 ... 220 km/h		
LCD	2 lines with 16 characters each, illuminated, dimmable*		
Installation angle of display	$\pm 30^\circ$		
Character height	6.3 mm		
Operating voltage	24 V DC or 12 V DC*		
Power consumption		12 V DC*	24 V DC
	Standby typical Operation typical	20 mA 3 A	20 mA 1 A
External fuse protection (typical)	Typical (slow-blow fuse)	5 A	5 A
	ADR variant, typical	3 A	1 A
Operating temperature	-25 °C ... +70 °C		
Storage temperature	-40 °C ... +85 °C		
Pulse range v	4000 to 25000 pulses/km		
Maximum frequency v	1,5 kHz		
Pulse range n	2000 to 64000 pulses/1000 revolutions		
Maximum frequency n	5 kHz		
Inputs	KITAS 2171, rotational speed input*, additional inputs (D1/D2)* CAN1 on/off (D3)*		
Outputs	2 x v-pulses, 1 x 4 pulses/m, TCO warning output (FM LED)		
Interfaces	Calibration interface, download interface, CAN interface, info interface		
Accuracy (under test conditions)	See chapter 8.2 "Permissible error limits", page 181.		
EMC	ECE R10		
Vibrations	ISO 16750-3 sec. 4.1.3.2.4.2, test VIII code VA Sinusoidal oscillations according to IEC 60068-2-6 test Fc: 2-11 Hz, ± 10 mm; 11 - 300 Hz, 5g, 3 x 15 h Oscillations random according to IEC 60068-2-64 test Fh: 5 - 150 Hz, 0,02 g ² /Hz, 3 x 16 h		
Material of the connection pins	Surface OL Cu Ag 6		
Buffer battery	Lithium cell 3,6 V 1/2 AA (type SB-AA02P)		
Housing	Galvanized steel plate		
Weight	~ 1200 g		
Permissible installation position	$\pm 45^\circ$ off of horizontal		
Options	K-Line diagnosis interface, additional inputs (D1/D2), rotational speed input, speed impulse output (B6) with increased current carrying capacity ($I_{\max} = 1,5$ mA) or looped-through transmitter signal, speed impulse output (D6), CAN1 on/off (D3), CAN2 with second CAN driver independent of CAN1, Military Blackout Lighting Mode, ADR variant, remote download Customer-specific variations (front cover, display and keypad illumination, interfaces, DTC (Diagnostic Trouble Codes), company logo on printout)		

* Option

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2.1.6 Production date

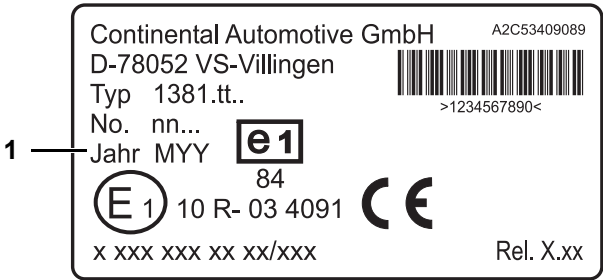


Illustration 17: Production date DTCO 1381

The production date of the DTCO 1381 is shown on the packaging and the model plate (1), coded in the form of "MYY":

M = Month of production			
A	January	G	July
B	February	H	August
C	March	J	September
D	April	K	October
E	May	L	November
F	June	M	December

YY= Year of production			
12	2012	14	2014
13	2013	:	:

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2.1.7 Printer paper

Paper type	Special paper approved for the DTCO 1381
Dimensions	Diameter approx. 27,5 mm Width: approx. 56,5 mm Length: approx. 8 m Thickness:
Ambient conditions	-25 to 70 °C
Order number	1381.90 03 03 00

Rear side of printer paper

The test and approval marks are printed on the rear side of the printer paper. There is also a place to enter activities with pen or pencil.

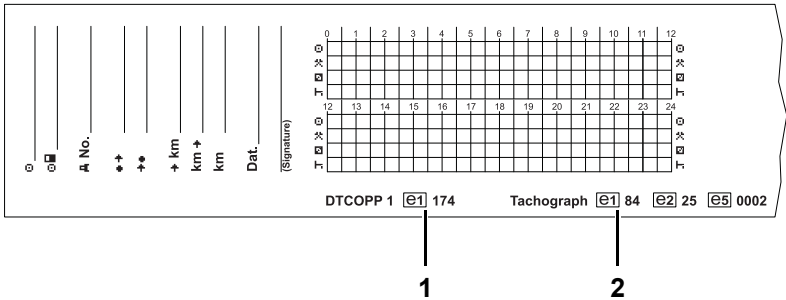


Illustration 18: Printer paper, rear side

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Comment

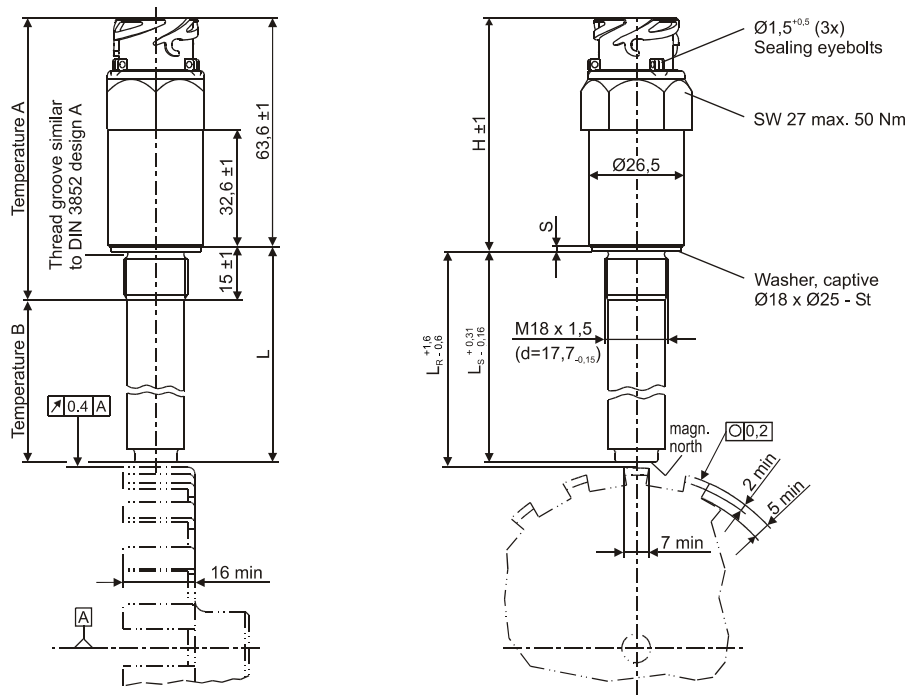


Use (order) only paper rolls on which is visible the recording equipment model DTCO 1381 with approval mark "e1-84" (2) and the printer paper's valid approval mark "e1-174" (1) or "e1-189".

2.2 KITAS 2171

2.2.1 KITAS 2171.20 Integrated version

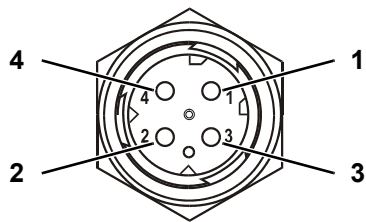
Installation dimensions



KITAS 2171.20										
L	19,8	19,8	25	25	35	63,2	63,2	90	115	136,8
L _R	19,4	20,0	25,2	26,4	35,2	63,4	64,6	90,2	115,2	137
L _S	18	18,6	23,8	25	33,8	62,0	63,2	88,8	113,8	135,6
S	1,8	1,2	1,2	---	1,2	1,2	---	1,2	1,2	1,2
H	65,4	64,8	64,8	63,6	64,8	64,8	63,6	64,8	64,8	64,8

Illustration 19: Installation dimensions KITAS 2171.20 Integrated version

Pin assignment



- (1) U_E Sensor supply (+)
- (2) U₀ Sensor supply (-)
- (3) \neg L Real time signal, v-sensor
- (4) I/O I/O data signal

Illustration 20: Pin assignment KITAS 2171.20 Integrated version

2.2.2 KITAS 2171.0x Standard version

Installation dimensions

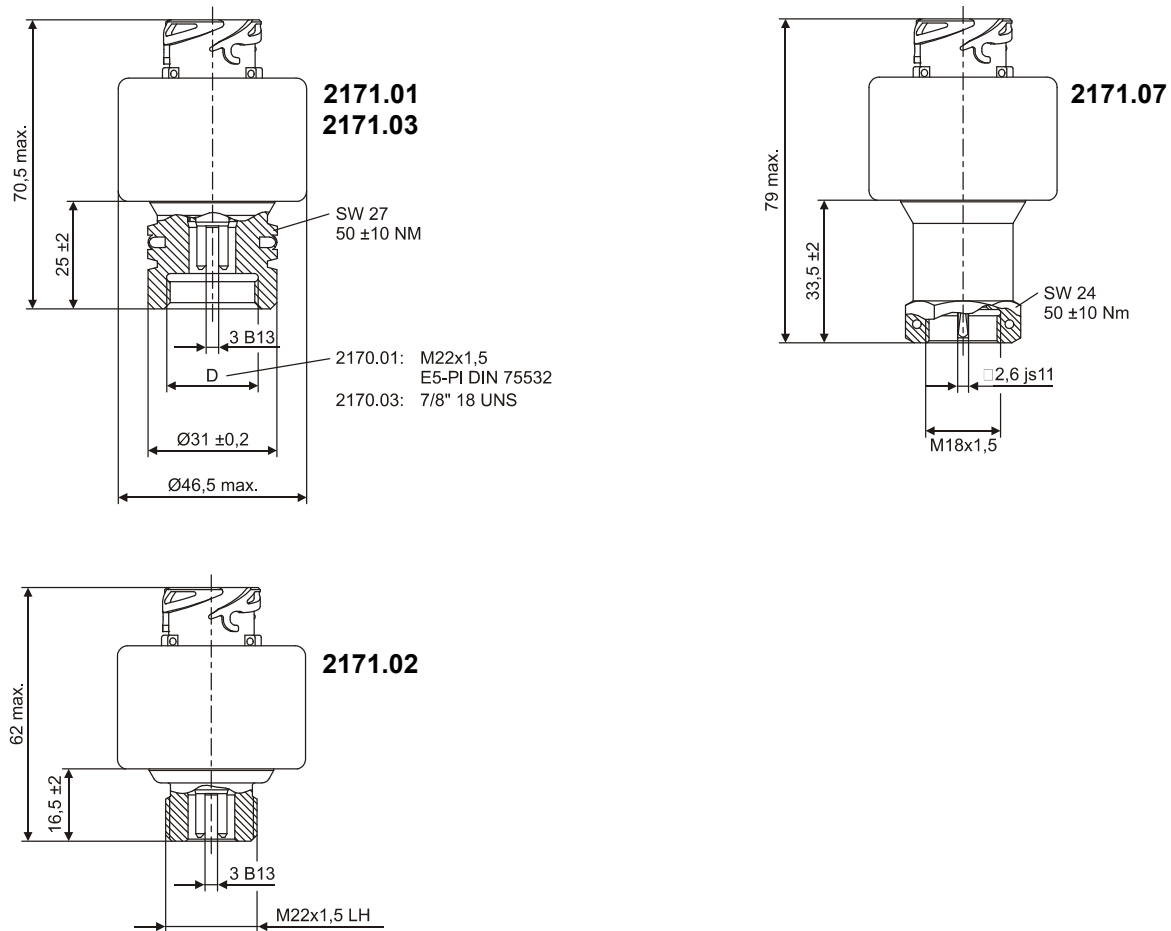


Illustration 21: Installation dimensions 2171.0x Standard version

Pin assignment

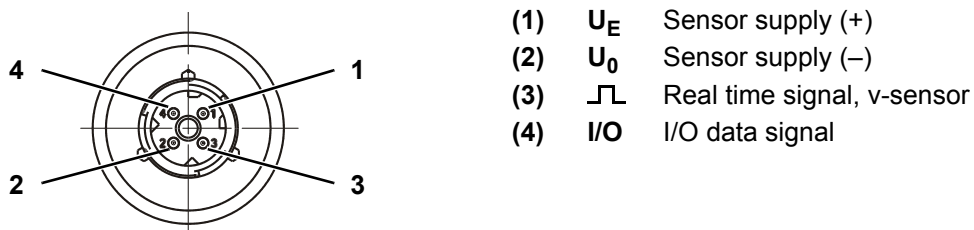


Illustration 22: Pin assignment KITAS 2171.0x Standard version

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2.2.3 Technical data

	Integrated version 2171.20 xx	Standard version 2171.0x
Operational voltage U_E	6,5 ... 9 V DC	6,5 ... 9 V DC
Power consumption	max. 15 mA	max. 15 mA
Operating temperature	Range A: -30 ... +135 °C Range B: -30 ... +145 °C	- 30 ... +125 °C
Storage temperature	Range A: -40 ... +140 °C Range B: -40 ... +150 °C	- 40 ... +140 °C
Pulses / revolution	-----	8
Pulse ratio	-----	30 ... 70 % - 70 ... 30 %
Connection	ungrounded	ungrounded
Signal form (pin 3)	Rectangular	Rectangular
Frequency range	1 Hz ... 2000 Hz	1 Hz ... 1000 Hz
Output signal (pin 3)	Real time signal $U_{Lmax} = 0,8 \text{ V } (@I=250 \mu\text{A})$ $U_{Hmin} = U_E - 1,5 \text{ V } (@I=150 \mu\text{A})$	Real time signal $U_{Lmax} = 0,8 \text{ V } (@I=250 \mu\text{A})$ $U_{Hmin} = U_E - 1,5 \text{ V } (@I=150 \mu\text{A})$
Noise voltage protection	ISO 7637-2, Level 4 via DTCO, ISO 7637-3, Level 4 via coupling tongs	ISO 7637-2, Level 4 via DTCO, ISO 7637-3, Level 4 via coupling tongs
Irradiation immunity	ISO 11452-2 (100 V/m), ISO 11452-5 (200 V/m)	ISO 11452-2 (100 V/m), ISO 11452-5 (200 V/m)
Outputs (short-circuit protected)	28 V, 1 min.	28 V, 1 min.
Output signal (pin 4)	bi-directional	bi-directional
Protection type	EN 60529-IP67 + IP69K	EN 60529-IP67 + IP69K
Vibro stability	30 g	10 g
Shock stability	1000 g	50 g 11 ms
Pulse wheel material	DC04 (= St 4)	---
Pulse wheel thickness	2 mm	---
Tooth width	min. 7 mm	---
Tooth length	16 mm	---
Tooth gap	min. 1,5 x tooth width	---
Cannot be used with external magnetic field	> 5 mT	---
Connection: pulse generator on pulse generator line	Plug connection according to ISO 15170-B1-4.1-Ag/K3	Plug connection according to ISO 15170-B1-4.1-Ag/K3
Connection: pulse generator on vehicle transmission	via M18 x 1,5 thread	via M22 x 1,5 thread or 7/8" 18 UNS 2B
Tightening torque (wrench size)	max. 50 Nm (27)	max. 50 Nm (27)
Weight	approx. 100 ... 180 g, depending on "L"	approx. 135 ... 150 g

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2.2.4 Product identification

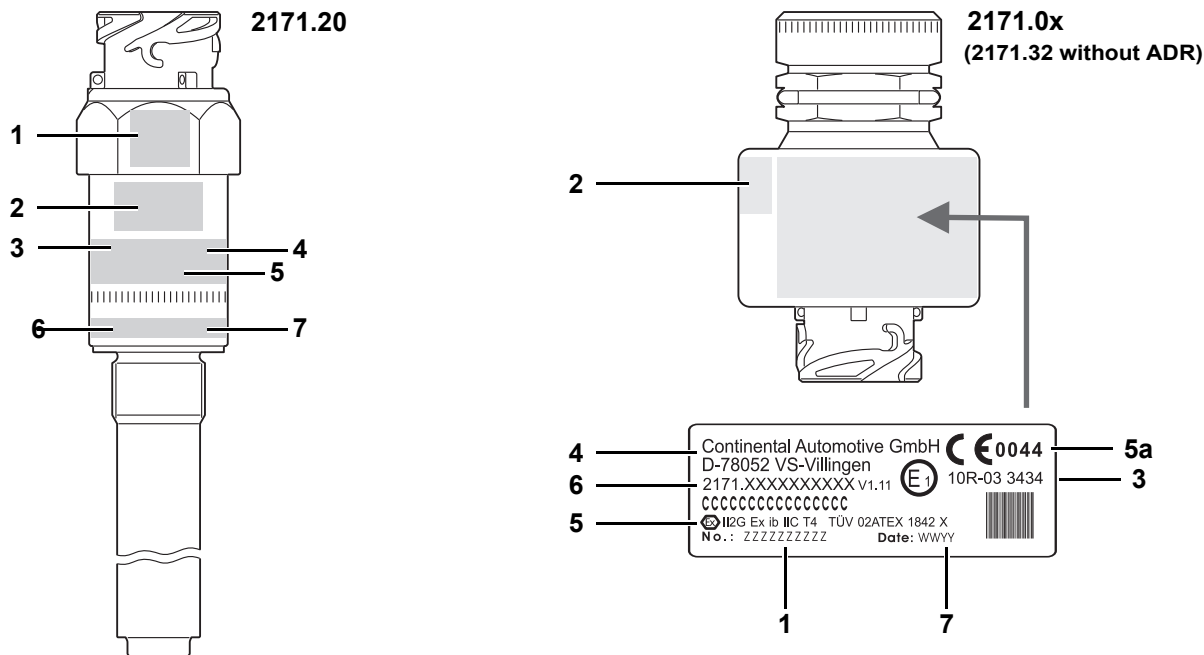


Illustration 23: IKITAS 2171 pulse generator, product marking

- (1) Serial number
(visible from KITAS 2171 Version 2+, no. 10xxxxxx)
- (2) EEC design approval: E1 -175
- (3) EMC type approval: E1 10 R- 03 3434
- (4) Manufacturer: Continental Automotive GmbH VS-Villingen
- (5) Approval mark / conformity label:
 II2G Ex ib IIC T4 $\text{CE 0044 TÜV 02 ATEX 1842 X}$
- (5a) Conformity mark
- (6) Model designation: 2171.xx xxxx V1.11
V1.11 = KITAS 2171 Version 2+
- (7) Production date: WWYY

WWYY (week/year)

WW= Week of production			
01	Calendar week 01	03	Calendar week 03
02	Calendar week 02	⋮	⋮

YY= Year of production			
⋮	⋮	12	2012
10	2010	⋮	⋮
11	2011		

2.2.5 KITAS Sensor cable

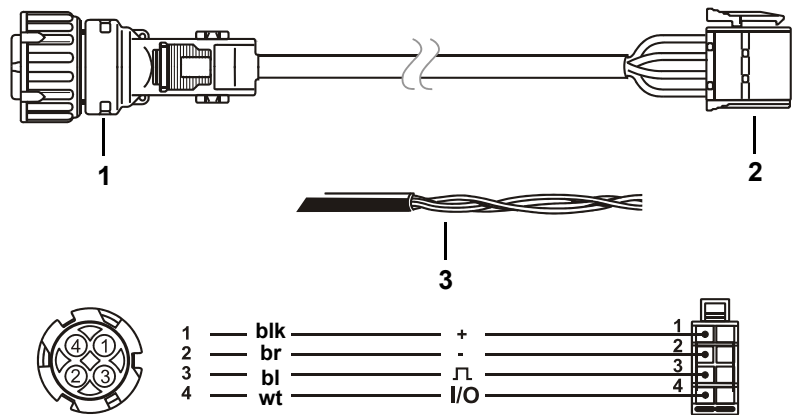


Illustration 24: KITAS Sensor cable

(1)	Bayonet connection: Protection type: (bayonet type connection)	DIN 72585-A1-4.1 <ul style="list-style-type: none"> • straight • 90 ° bend • with sealing eyebolts DIN 40050 T9-IP69K
(2)	Connection plug: (yellow)	AMP plug shell with Junior-Power-Timer
(3)	Line, 4-wire: Cable length: Temperature range:	FLRYYW 4 x 0,75 mm ² <ul style="list-style-type: none"> • max. length of lay 66 mm • min. of 15 lays/m 2,8 m / 8,5 m / 15 m customer-specific lengths are available -40 ... +105 °C
or		
(3)	Cable, individual wires:	Stranded in pairs <ul style="list-style-type: none"> • Pair 1: data line and sensor ground • Pair 2: real time signal and sensor supply • Lay length: max. 40 mm, at least 25 lays/m

2.2.6 M1N1 Adapter

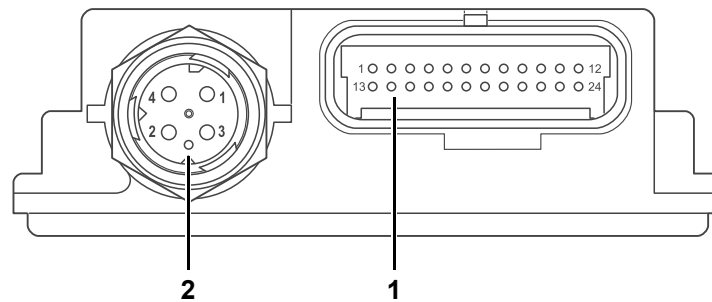


Illustration 25: Pin assignment M1N1 Adapter

- (1) Connection M1N1 Adapter
- (2) Connection KITAS 2171

Pin assignment

Connection M1N1 Adapter		Connection KITAS 2171	Connection DTCO 1381
Pin	Function		
2	I/O data signal	4	
3	I/O data signal		B4
4	v-signal (real time)	3	
5	v-signal (real time)		B3
7	Permanent voltage (term. 30)		
9	Vehicle v-signal		
10	v-sensor supply (+)	1	
11	v-sensor supply (+)		B1
12	v-sensor supply (–)	2	
13	Ground (term. 31)		
24	v-sensor supply (–)		B2

Technical data

Operational voltage	12 V
Power consumption (standby)	10 mA
Operating / storage temperature	–40 ... +125 °C
Voltage input signal	2 ... 24 V (peak-to-peak)
Frequency range input signal	1 ... 10.000 Hz
EMC	72/245/EEC
Protection type	IP 56

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2.3 Connection diagram DTCO 1381

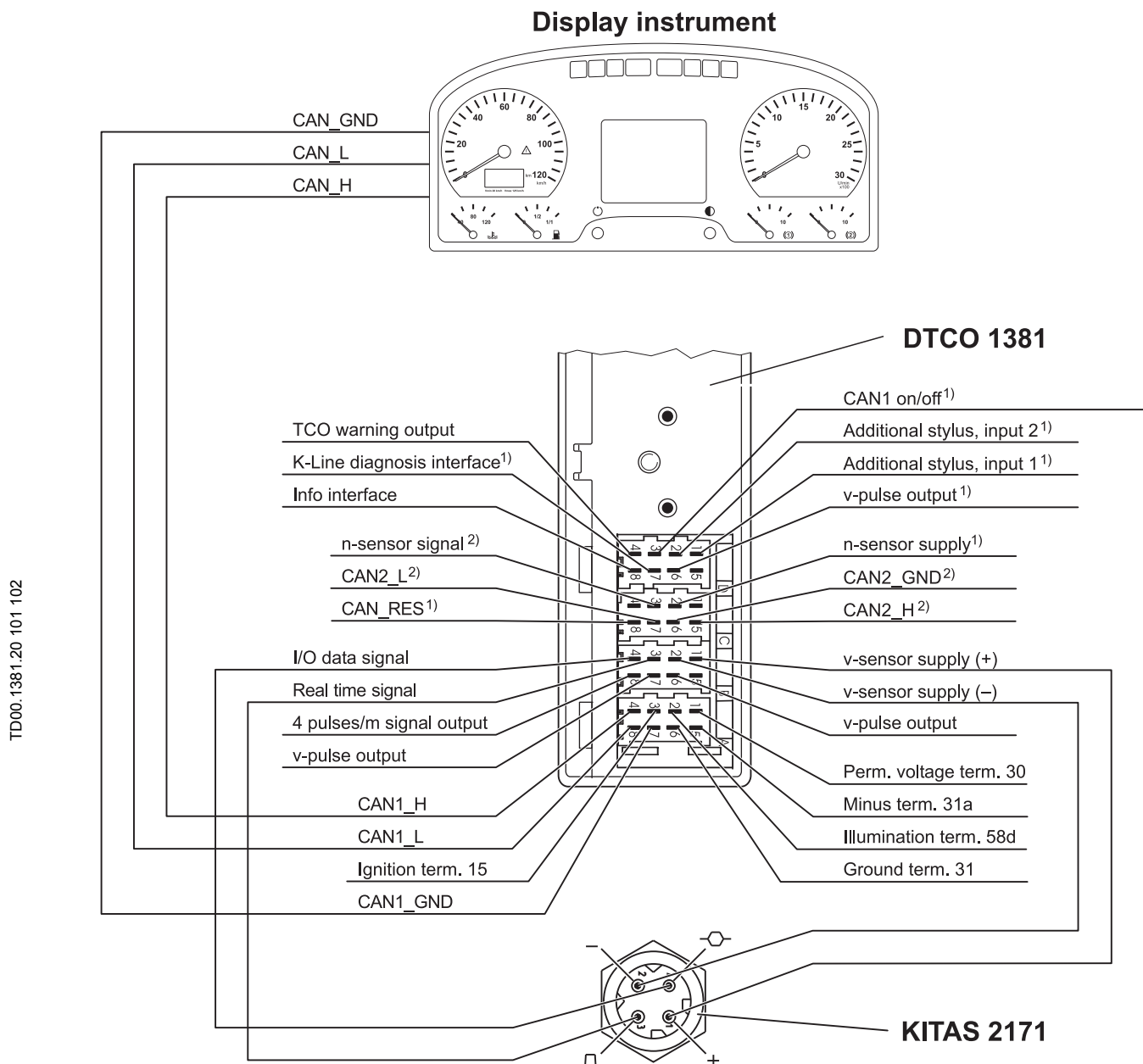


Illustration 26: Connection diagram DTCO 1381 with KITAS 2171 and display instrument

1) Option

2) CAN variations, see page 44

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Chapter 3

Operating the DTCO 1381

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3.1 General instructions

3.1.1 Handling the tachograph cards

**Attention!**

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferrable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following instructions about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

3.1.2 Operating the ADR variant

In the ADR variant, the insertion or withdrawal of a tachograph card and the printing or display of data is possible only when the ignition is turned on.

3.1.3 Printing or display of data

Before activation, no calibration parameters are given when printing or displaying the Technical data (printout vehicle "Technical data" or display vehicle "Technical data").

If, at the time of request, no data for printing or display are available, e.g. the DTCO 1381 has not yet been activated, printing or display will not be started.

3.1.4 Handling the printouts

Retain the printouts where they will not be damaged by strong light, sunlight, moisture, or heat (making them illegible).

Comment



Please obey your country's legal regulations surrounding the printouts, especially the obligation to preserve the printouts!

3.2 Display variations

The display is a mixture of pictograms and text.

3.2.1 Selecting the text language

The language will be determined by the tachograph card that is currently inserted in card slot 1, the tachograph card that was most recently inserted, or the tachograph card with the higher value, such as the company card.



If the tachograph card does not contain a preferred language or if the the DTCO 1381 does not support the preferred language, the text will appear in the language of the of the issuing member state:

Issuing member state		Language
A	Austria	German
AND	Andorra	Spanish
AZ	Azerbaijan	Turkish
B	Belgium	English
BG	Bulgaria	Bulgarian
BIH	Bosnia and Herzegovina	Bosnian
BY	Belarus	Russian
CH	Switzerland	German
CY	Cyprus	Greek
CZ	The Czech Republic	Czech
D	Germany	German
DK	Denmark	Danish
E	Spain	Spanish
EST	Estonia	Estonian
F	France	French
FIN	Finland	Finnish
FL	Liechtenstein	German
GR	Greece	Greek
H	Hungary	Hungarian
HR	Croatia	Croatian
I	Italy	Italian
IRL	Ireland	English
IS	Iceland	Icelandic
KZ	Kazakhstan	Russian

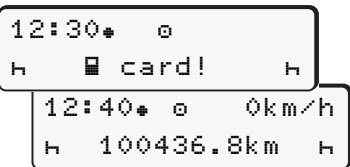
Issuing member state		Language
L	Luxembourg	French
LT	Lithuania	Lithuanian
LV	Latvia	Latvian
M	Malta	English
MC	Monaco	French
MD	Republic of Moldavia	Romanian
MK	Macedonia	English
MNE	Montenegro	Serbian
N	Norway	Norwegian
NL	The Netherlands	Dutch
P	Portugal	Portuguese
PL	Poland	Polish
RO	Romania	Romanian
RSM	San Marino	Italian
RUS	The Russian Federation	Russian
S	Sweden	Swedish
SK	Slovakia	Slovak
SLO	Slovenia	Slovene
SRB	Serbia	Serbian
TM	Turkmenistan	English
TR	Turkey	Turkish
UA	Ukraine	Ukrainian
UK	United Kingdom	English
UZ	Uzbekistan	English

As an alternative to the automatic language setting by the tachograph card, you can individually set a preferred language, see chapter 3.3.1 "Setting the language", page 68.

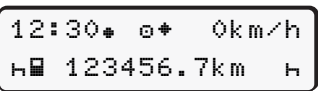
3.2.2 Display in standby mode

Menu display	Explanation / meaning
 	<p>Under the following conditions, the DTCO 1381 will switch into standby mode after about 5 minutes:</p> <ul style="list-style-type: none"> the vehicle's ignition is off and no events or faults are pending. <p>The currently set activities will appear in addition to the time and mode.</p> <p>The DTCO 1381 will switch off the display after another three minutes (configurable between 1 - 10 minutes).</p> <p>Standby mode will be cancelled when:</p> <ul style="list-style-type: none"> you switch on the ignition, you press any key or when the DTCO 1381 announces an event or a fault. <p>➔ Detailed information, see chapter 14.1.1 "Standby (Power Safe Mode)", page 293.</p>

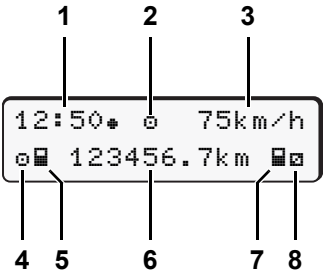
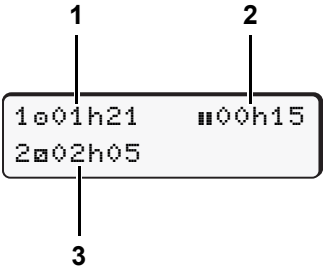
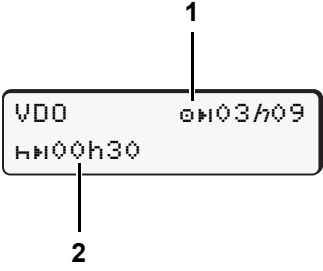

3.2.3 Display after ignition on

Menu display	Explanation / meaning
	<p>Operational notes</p> <p>If there is no tachograph card in card slot 1, this note will appear for approximately 20 seconds and then the standard display will appear.</p>



3.2.4 Display after ignition OFF

Menu display	Explanation / meaning
	<p>Symbol of the product variant: DTCO 1381 with IMS function</p> <p>Symbol "*" means that the IMS function is available for this DTCO 1381. (IMS = Independent Motion Signal)</p>

3.2.5 Standard displays during trip




Menu display	Explanation / meaning
	<p>As soon as the vehicle starts moving and no message is displayed, the previously set standard display appears automatically. By pressing any menu key, you can also switch over to the standard display (a), (b) or (c).</p> <p>Standard display (a):</p> <ul style="list-style-type: none"> (1) Time, with symbol "*" = local time, without symbol = UTC time (2) Mode; example shows operational mode "Ⓢ" (3) Speed (4) Activity, driver 1 (5) Card symbol, driver 1 (card slot 1) (6) Total odometer (7) Card symbol, driver 2 (card slot 2) (8) Activity, driver 2
	<p>Standard display (b)</p> <ul style="list-style-type: none"> (1) Driver 1: Driving time "Ⓢ" since a valid pause time. (2) Valid pause time "Ⓢ" in break periods of at least 15 minutes and next 30 minutes, in accordance with regulation (EU) no. 561/2006. (3) Driver 2: Current activity availability time "Ⓢ" and duration of activity. <p>The standard display will appear again after any key is pressed again or after 10 seconds.</p> <p>Note</p> <p>If the driver card is missing, times which are assigned to the respective card slot will appear.</p>
 	<p>Option: VDO Counter (c)</p> <ul style="list-style-type: none"> (1) Remaining driving time "Ⓢ". The blinking "h" means that this part of the display is currently active. (2) At the latest after the end of the driving time (1), there must be a pause or continuation of the cumulative pause "Hh". <p>For detailed information about the VDO Counter option, please refer to the operating instructions DTCO 1381 (BA00.1381.20.101102).</p>

3.2.6 Data display when the vehicle is stationary

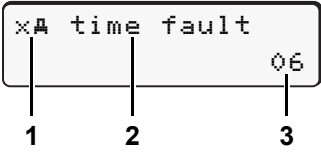
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> 1 (a) <div style="border: 1px solid black; padding: 5px; width: 150px;"> 1e03h46 00h15 1e1125h57 *00h21 </div> 3 </div> <div style="text-align: center;"> 2 4 </div> </div> <div style="margin-top: 20px;"> (b) <div style="border: 1px solid black; padding: 5px; width: 150px;"> 2e01h10 00h36 2e1115h00 *00h21 </div> </div>	<p>Press the button  to display the times of the driver card(s):</p> <p>(a) Times of driver 1 (b) Times of driver 2</p> <p>(1) Driving time "e" since a valid pause time. (2) Valid pause time " " in break periods of at least 15 minutes and next 30 minutes, in accordance with regulation (EU) no. 561/2006. (3) Sum of driving times over two weeks "11" (4) Duration of the set activity</p> <p>Note</p> <p>If the driver card is missing, times (except for pos. 3) which are assigned to the respective card slot will appear.</p>
<div style="text-align: center;"> 2 <div style="border: 1px solid black; padding: 5px; width: 150px;"> VDO eM00h09 H100h29 H01004h30 </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> 1 3 </div> </div> <div style="text-align: center; margin-top: 20px;">  </div>	<p>VDO Counter option: Display for activity "Pause"</p> <p>(1) Remaining pause time. (2) Remaining driving time if the pause time (1) is disregarded. (3) Duration of the next available driving time after the end of the displayed pause time (1).</p> <p>After the end of a valid pause time, the new available driving time is displayed in pos. (2).</p> <p>For detailed information about the VDO Counter option, please refer to the operating instructions DTCO 1381 (BA00.1381.20.101101).</p>

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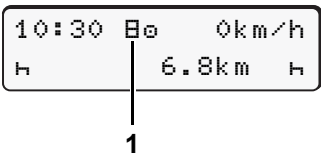

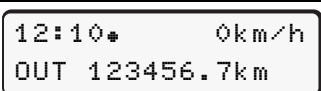
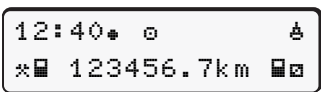
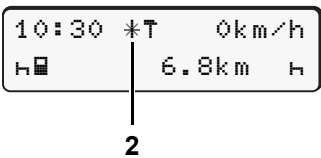
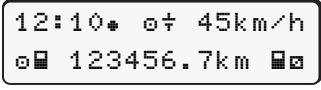
3.2.7 Selection menu

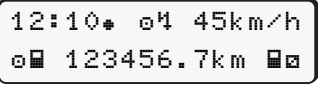

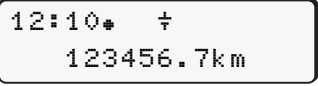
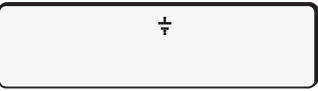
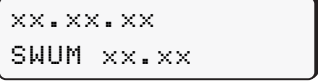
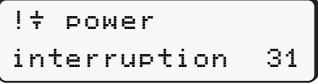
Menu display	Explanation / meaning
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> display ▣ driver 2 </div> <div style="border: 1px solid black; padding: 5px;"> display ▣ vehicle </div>	<p>Possible functions or variations which can be selected by you will be shown by blinking in the 2nd line of the menu display.</p> <p>Use the buttons  or  to select the desired function or variation step by step and acknowledge with the  button.</p>

3.2.8 Messages

Menu display	Explanation / meaning
	<p>Regardless of which display currently appears or whether the vehicle is moving or stationary, messages will be displayed with priority.</p> <p>(1) Pictogram of the cause (2) Text (3) Memory code (position in error memory)</p> <p>➔ Detailed information, see chapter 13 "Events and faults" from page 251.</p>


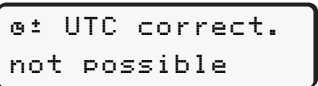
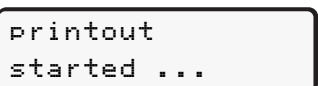

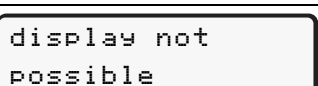
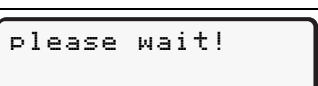
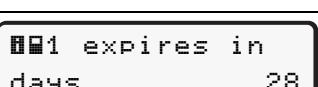

3.2.9 Special displays

Menu display	Explanation / meaning
	<p>Production status</p> <p>If the DTCO 1381 has not yet been activated to be an EC recording equipment, then the production status, symbol "B" (1), will appear. The DTCO 1381 will not accept any tachograph cards except the workshop card.</p>
	<p>Pairing with the KITAS 2171</p> <p>The first time the workshop card is inserted, the DTCO 1381 and the KITAS 2171 will be paired automatically; a progress bar shows this event.</p>
	<p>Out of scope</p> <p>The vehicle is driving outside of the ordinance's valid range; the activity and card symbols are not shown (you can set this special condition through the menu).</p>
	<p>Ferry transfer or train transfer</p> <p>The vehicle is located on a ferry or on a train (you can set this special condition through the menu).</p>
	<p>Data transmission running</p> <p>The symbol (2) shows a data download or data transmission in progress.</p>
	<p>Undervoltage</p> <p>The supply voltage of the DTCO 1381 is currently too low.</p> <p>The DTCO 1381 continues to fulfil its role as a recording equipment. Only the printing or display of data and the insertion or withdrawal of tachograph cards is not possible.</p> <p>➔ Detailed information, see chapter 14.1.2 "Undervoltage (Safe Prepare Mode)", page 294.</p>

Menu display	Explanation / meaning
 <p>or</p> 	<p>Overvoltage</p> <p>The supply voltage of the DTCO 1381 is currently too high.</p> <p>The DTCO 1381 continues to fulfil its role as a recording equipment. Only the printing or display of data and the insertion or withdrawal of tachograph cards is not possible.</p> <p>➡ Detailed information, see chapter 14.1.5 "Overvoltage", page 297.</p>
	<p>Safe Mode or Limp Home Mode</p> <p>The DTCO 1381 cannot fulfil its role as recording equipment! The driver's activities will not be recorded.</p> <p>➡ Detailed information, see chapter 14.1.3 "Safe Mode", page 295 or chapter 14.1.6 "Limp Home Mode after self-test", page 298.</p>
	<p>Halt Mode</p> <p>The DTCO 1381 cannot fulfil its role as recording equipment! The driver's activities will not be recorded.</p> <p>Detailed information, see chapter 14.1.4 "Halt Mode", page 296.</p>
 	<p>Restart</p> <p>After activation, a power interruption or a failed self-test, the DTCO 1381 carries out a restart, the version of the operating software (xx.xx.xx) and the version of the software upgrade module (SWUM xx.xx) will appear for approximately 5 seconds.</p> <p>If the restart occurs as the result of a power interruption, the DTCO 1381 indicates "power interruption".</p> <p>➡ Detailed information, see chapter 9.3 "Performing the activation" from page 192, or chapter 14.1 "Operating conditions of the DTCO 1381" from page 293.</p>

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3.2.10 Operational notes as information

Menu display	Explanation / meaning
	The menu function cannot be called up since, in the card slot, no driver / workshop card is inserted, or a company card / control card is inserted.
	The UTC time was already corrected within the last seven days. or You are trying to correct the UTC time between one minute before and one minute after midnight.
	Feedback that the DTCO 1381 started the printout.
	Feedback that the DTCO 1381 saved the entry.
	No data can be displayed as long as the printing is in progress.
	The tachograph card has not yet been read completely. It is not possible to call up menu functions.
	The released tachograph card will expire, for example in 28 days! Note The day as of which the notice should appear can be programmed by an authorised workshop according to the customer's wishes.
	The next regularly inspection is pending, for example in 28 days. Note The day as of which the notice should appear can be programmed by an authorised workshop according to the customer's wishes.


 Comment

These operational notes disappear automatically after three seconds. No steps must be taken.

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3.3 Menu functions



Please refer to the DTCO 1381 operating instructions for detailed information on the menu functions (BA00.1381.20.101102).

3.3.1 Setting the language

As an alternative to the automatic language setting by the tachograph card, you can individually set a preferred language.

Step / menu display		Explanation / meaning
1		<ul style="list-style-type: none"> Starting from the standard display, press repetitively the button until the display "select language?" appears and acknowledge with the button .
2		<ul style="list-style-type: none"> Select the desired language with the button or and acknowledge with the button .
3		The DTCO 1381 indicates the language setting for about three seconds in the selected language.

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Comment



Storing the language setting

If, at the time of the language setting, a workshop card is inserted, the individual language setting is not saved, and therefore the next time a tachograph card is removed / inserted the language is determined autonomously once more by the tachograph card.

If, at the time of the language setting, only a driver card or company card is in the card slot 1, the DTCO 1381 memorises the preferred language for this card number.

3.3.2 Retrieving menu functions

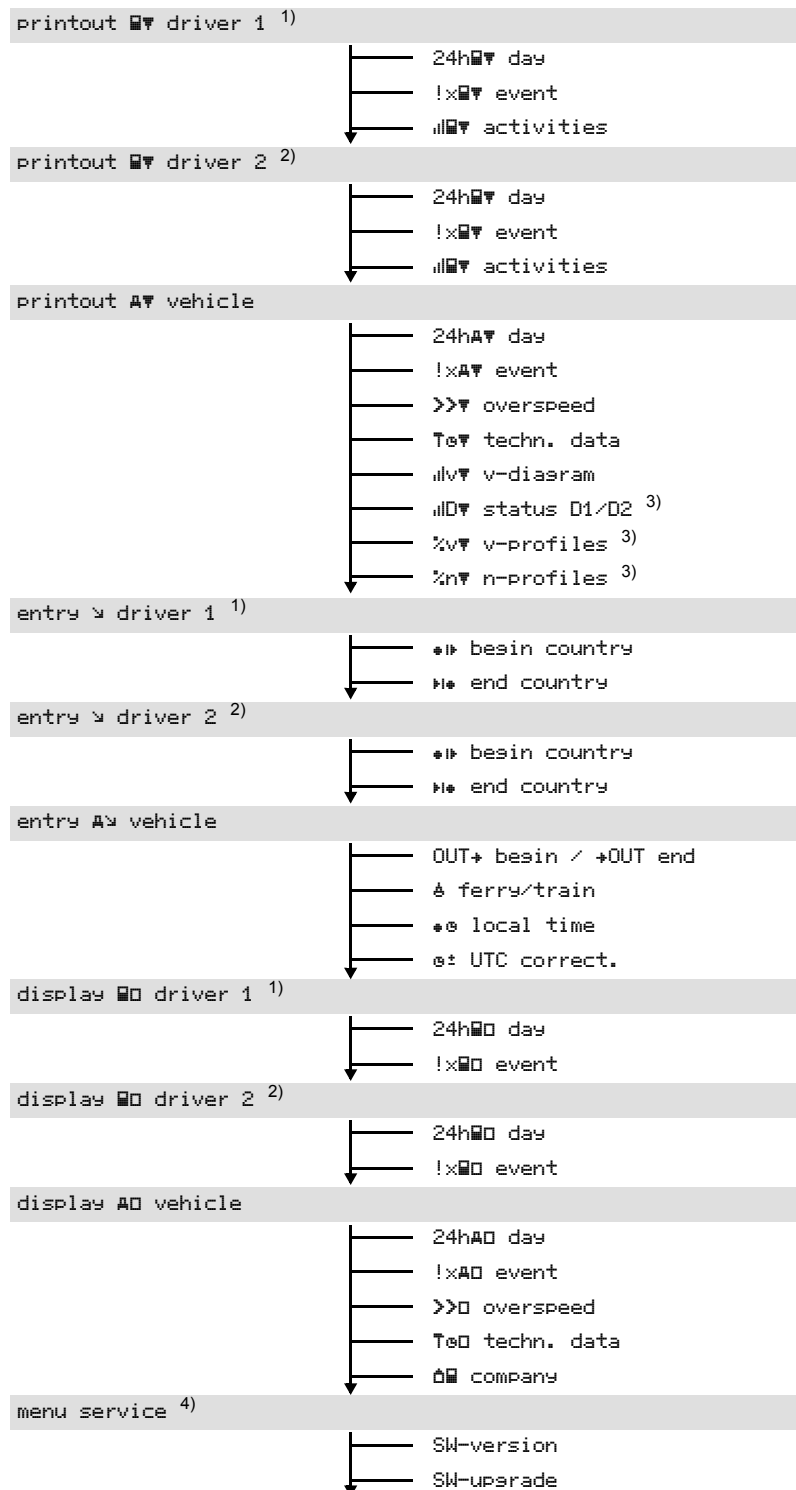


The menu functions may be called only if the vehicle is stationary.

Step / menu display	Explanation / meaning
1 <div>call main menu?</div>	<ul style="list-style-type: none"> Starting from the standard display, press repetitively the button ▼ until the display "call main menu?" appears and acknowledge with the button OK. <p>or</p> <ul style="list-style-type: none"> Press the key OK.
2 <div>printout driver 1</div>	<p>Always follow the same procedure when making menu selections:</p> <ul style="list-style-type: none"> Select the desired menu function, such as printout driver 1, with the button ▲ or ▼ and acknowledge with the button OK.
3 <div>driver 1 24h day</div>	<ul style="list-style-type: none"> Select the desired menu function, such as "Daily value" with the button ▲ or ▼ and acknowledge with the button OK.
4 <div>24h day 23.10.2013</div>	<ul style="list-style-type: none"> Select the desired day with the button ▲ or ▼ and acknowledge with the button OK.
5 <div>printout in UTC time yes</div> <div>printout in UTC time no</div> <div>printout started ...</div>	<ul style="list-style-type: none"> Use the button ▲ or ▼ to select the desired printing time and acknowledge with the button OK. With "No", printing is carried out in local time. <p>The DTCO 1381 starts the selected printout and displays this for approximately 3 seconds.</p>

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3.3.3 Overview of the menu structure



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1) Functions card slot 1

2) Functions card slot 2

3) Option

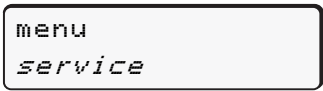

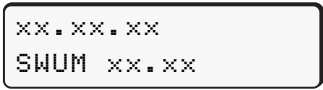
4) Only available in calibration mode

3.3.4 Menu function "Service"

If the DTCO 1381 is in calibration mode, the additional "Service" menu function is available.

Software version

The version of the operating software of the DTCO 1381 can be shown via the menu function "SW-version".

Step / menu display	Explanation / meaning
1 	<ul style="list-style-type: none"> – Select the menu function "Service" with the button ▲ or ▼ and – acknowledge with the button OK.
2 	<ul style="list-style-type: none"> – Select the menu function "SW-version" with the button ▲ or ▼ and – acknowledge with the button OK.
3 	<p>The version of the operating software (xx.xx.xx) and the version of the software upgrade module (SWUM xx.xx) appears.</p> <ul style="list-style-type: none"> – Return to the menu "service" with the button ←.

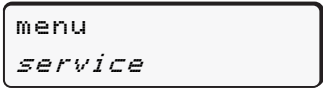
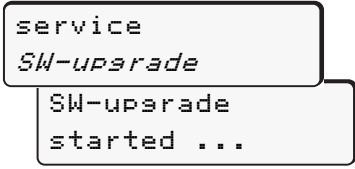
Software upgrade



The software of the DTCO 1381 can be updated with the "SW-upgrade" menu function.



You can only upgrade the user software of the DTCO 1381 if you fulfil further requirements.

For detailed information please refer to a VDO sales office.






Step / menu display	Explanation / meaning
1 	<ul style="list-style-type: none"> – Select the menu function "Service" with the button ▲ or ▼ and – acknowledge with the button OK.
2 	<ul style="list-style-type: none"> – Select the menu function "SW-upgrade" with the button ▲ or ▼ and – acknowledge with the button OK. <p>The DTCO 1381 starts the software upgrade function.</p>

Step / menu display	Explanation / meaning
3 <div>data download done ? no</div> <div>upgrade module not present</div> <div>upgrade aborted</div> <div>menu service</div>	<p>The question "data download done?" appears, i.e. the DTCO 1381 can be upgraded.</p> <p>or</p> <p>The message "upgrade module not present" appears, i.e. the DTCO 1381 cannot be upgraded.</p> <p>Cancel the software upgrade</p> <p>– Cancel the software upgrade with the button .</p> <p>The message "upgrade aborted" appears.</p> <p>After approx. one minute or pressing the button  the DTCO 1381 returns to the menu "Service".</p>



Detailed information on the "Software-Upgrade" is contained in the Technical Description "Software-Upgrade DTCO 1381", TD00.1381.00 6xx 102.

3.3.5 Leaving menu functions

Step / menu display	Explanation / meaning
1 <div>leave main menu yes</div> <div>leave main menu no</div>	<ul style="list-style-type: none"> – Press repetitively the button  until the display "leave main menu" appears, – select "yes" with the button  or  and – acknowledge with the button . – Or use the button  to skip the query. <p>The standard display will appear.</p>

Comment



The DTCO 1381 will automatically exit the menu functions in the following cases:

- at the beginning of a trip.
- when a tachograph card is inserted.
- when a tachograph card is requested.

3.4 Calibration mode

Authorized persons who are charged with calibration, activation, testing, etc. will receive a workshop card. In addition to performing workshop functions, the holder can also drive with this card.

If the authentication is positive, the following functions will be activated:

- Calibration
- Test
- Data download



When the calibration mode is active, the display of the DTCO 1381 will show the pictogram "T".

3.4.1 Inserting workshop card



The following description of "Inserting workshop card" is based on a DTCO 1381 that is already activated.

For detailed information on activating the DTCO 1381, see chapter 9.3 "Performing the activation" from page 192.

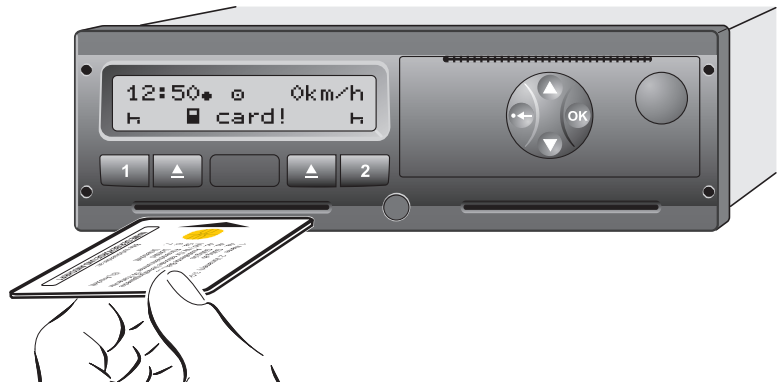


Illustration 27: Inserting workshop card

1. Switch ignition on (required only for ADR variant).
2. Eject any tachograph cards that may be already inserted.
3. Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
 - The subsequent procedure is menu-guided.

Menu navigation after inserting workshop card












Comment




If the tachograph card does not contain a preferred language or if the the DTCO 1381 does not support the preferred language, the text will appear in the language of the of the issuing member state; see chapter 3.2.1 "Selecting the text language", page 61.

Step / menu display		Explanation / meaning
1		Greeting text; the set local time (14:00) and the UTC time (12:00) will appear for approximately 3 seconds.
2		The DTCO 1381 is reading the workshop card. The symbol for the current mode, operational mode, appears and a progress bar shows that the DTCO 1381 is reading the card.
3		The name of the cardholder appears.
4		Select the number of characters (at least 4, max. 8) <ul style="list-style-type: none"> – Select the number of characters with the button ▲ or ▼ and – acknowledge with the button OK.
5		PIN entry "0" 1. character to be entered will blink: <ul style="list-style-type: none"> – Select the first character with the button ▲ or ▼ and – acknowledge with the button OK. "0" 2. character to be entered will blink: <ul style="list-style-type: none"> – Select the second character with the button ▲ or ▼ and – acknowledge with the button OK. Follow the same procedure to enter the other characters of the PIN. Correcting an incorrectly entered character or an incorrectly entered number of characters <ul style="list-style-type: none"> – Press the button ← to move back to the previous character or to the query for the number of characters, – use the button ▲ or ▼ to select the desired character or number of characters and – acknowledge with the button OK.


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Step / menu display	Explanation / meaning
5	Cancel PIN entry <ul style="list-style-type: none"> Press the ejection button  of the card slot in which the workshop card is located. <p>After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.</p>
6 <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> 18 wrong entry </div> <div style="text-align: center;">  </div>	If incorrect PIN entered <ul style="list-style-type: none"> Acknowledge message with the button  and re-enter the number. <p>Attention!</p> <p>If an incorrect PIN is entered five times, the workshop card will be blocked and the process cancelled. The workshop card will be ejected.</p>
7 <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> last withdrawal 25.10.13 23:30* </div>	Display "last withdrawal"; the date and time of the most recent card withdrawal will be displayed in UTC time for approximately 3 - 5 seconds.
8 <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> 1M entry addition? no </div> <div style="text-align: center;">  </div>	Manual entry <ul style="list-style-type: none"> To add activities manually, select "yes" with the button  or , or select "no" and acknowledge with the button . <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries (BA00.1381.20.101102).</p>
9 <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> 14:02* @ 0km/h  123456.7km H </div> <div style="margin: 10px 0;"> <div style="display: inline-block; width: 20px; text-align: center;">1</div> <div style="display: inline-block; width: 20px; text-align: center;">2</div> </div> <div style="margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Comment </div>  </div>	Continuation of reading the workshop card. The standard display appears; the DTCO 1381 still remains in operational mode (2) . The card symbol will be displayed only if the data of the driver card have been read completely. Symbols (1) which are displayed before have the following meaning: "_" The workshop card is in the card slot. "  " You can start a test drive if necessary, relevant data for a test drive are read in. As long as the card symbol is missing in the display, the following functions are not possible at the moment: <ul style="list-style-type: none"> Calling up menu functions. Requesting a tachograph card.
10 <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> 14:03* T 0km/h  123456.7km H </div> <div style="margin: 10px 0;"> <div style="display: inline-block; width: 20px; text-align: center;">3</div> </div>	After the card has been read, the DTCO 1381 switches to the calibration mode (3) .




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Comment










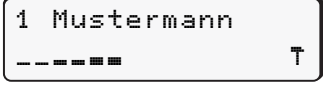




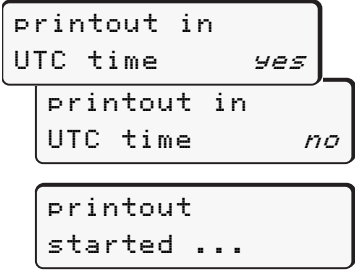
Behaviour of the DTCO 1381 with start of driving while reading a workshop card:

- During the PIN entry:
 - Conclude the PIN entry and the DTCO 1381 then completes reading in the workshop card.
 - After the PIN entry:
 - The DTCO 1381 completes reading in the workshop card and saves entries that have already been acknowledged with button .
-

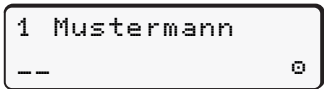
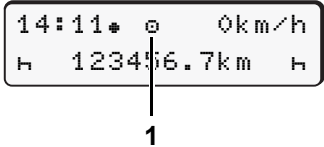
3.4.2 Removing workshop card

1. Press the ejection button  of the card slot in which the workshop card is located.
 - The subsequent procedure is menu-guided.
2. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.
3. Use the button  or  to set the respective activity, such as "H".

Menu navigation after removing workshop card

Step / menu display	Explanation / meaning
1 	The name of the cardholder appears; a progress bar shows that the DTCO 1381 is transferring data to the workshop card.
2 	Enter country at the end of the workday <ul style="list-style-type: none"> – Select the country with the button  or  and – acknowledge with the button . Cancel entry of country <ul style="list-style-type: none"> – Press the button  to cancel the entry of the country. Select region if required <ul style="list-style-type: none"> – Select the region with the button  or  and – acknowledge with the button .
3 	Continuation of data transfer to workshop card.
4 	Print day value <ul style="list-style-type: none"> – To print the day value, select "yes" with the button  or , or select "no" and – acknowledge with the button .
5 	Selection: Printout in UTC time or local time <ul style="list-style-type: none"> – Acknowledge "Yes" if you want the printout in UTC-time (required by law). – If you select "No" and acknowledge, you will receive a printout in "Local time". – After the function has been selected, the DTCO 1381 starts printing, the display shown here will appear for approx. 3 seconds.

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Step / menu display		Explanation / meaning
6		Continuation of data transfer to workshop card.
7		<p>The workshop card is released, the standard display and the operational mode (1) appear.</p> <p>As applicable, a notice may appear that the regularly inspection is pending or the validity of the workshop card is expiring,</p>

3.5 Preparing for data download



Warning! Danger of explosion

In explosion-risk environments, the connection of external devices to the download interface of the DTCO 1381 is not permitted during proper operation - state of operation "Loading and unloading dangerous goods"!

Have the covering cap always closed in the state of operation "Loading and unloading dangerous goods"!

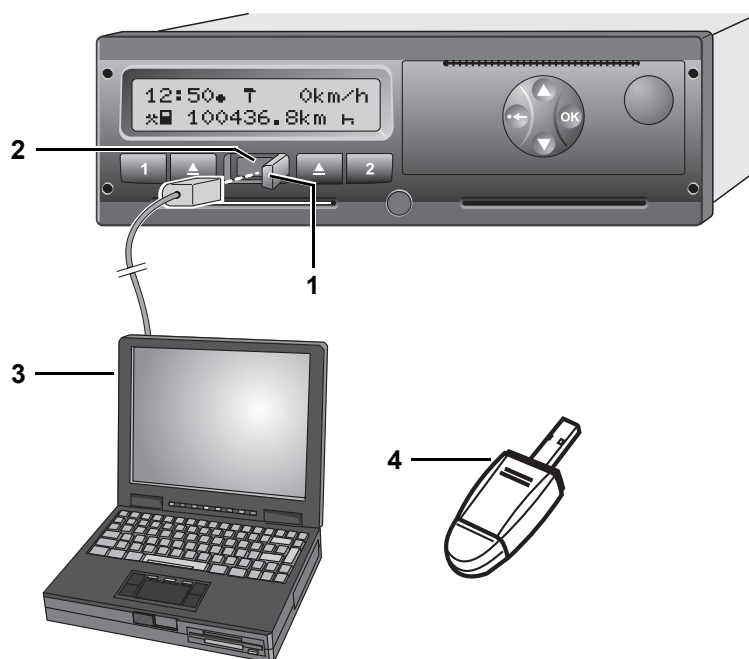


Illustration 28: Connection to the download interface

- 1.** Insert workshop card, see chapter 3.4.1 "Inserting workshop card", page 73.
- 2.** Open the covering cap **(1)** to the right.
- 3.** Connect the laptop **(3)** or the download key **(4)** to the download interface **(2)**.
- 4.** Carrying out download.



For detailed information about the handling of the reading software or the download key, please refer to the appropriate documentation!

- 5.** After the download, remove data cable or download key and close the covering cap.
- 6.** As necessary, eject the workshop card.



For detailed information about a appropriate reading software, download key, etc. please refer to a VDO sales office.

Chapter 4

Data handling

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4.1 Data handling

The DTCO 1381 registers in the internal data memory the activities and data of all drivers and the vehicle itself over a time period of at least 365 calendar days in accordance with CR (EEC) 3821/85, annex I B.

The following data will be registered:

- Device identification data of the DTCO 1381 and KITAS 2171
- Security data (cryptographical key)
- Insertion and withdrawal of the driver cards, for 2190 drivers
- Driver activities
- Location at the beginning and end of the working time
- Distance
- Detailed speed of the last 168 hours of driving time
- Events and faults
- Calibrations
- Control activities
- Lock-in / lock-out from the company
- Download activities
- Specific conditions
- Movement data of the vehicle



In general, the following applies:

- If the memory capacity is exhausted, the oldest data will be continuously overwritten.
 - Data elements with unknown or inapplicable content are filled with FF bytes.
-



For detailed information on data formats, elements and structures, please see EU Directive No. 1360/2002, annex 1 "Data glossary".

Customer-specific data

Additionally to the data according to the EC regulation (EEC) no. 3821/85 annex I B, the DTCO 1381 can record other customer-specific data.



For detailed information concerning recorded customer-specific data please refer to the valid specifications.

Output of the stored data

The saved data can be shown on the display of the DTCO 1381, printed on the integrated printer, or transferred (copied) over the interfaces to external devices.

4.2 The flow of data and memory behaviour

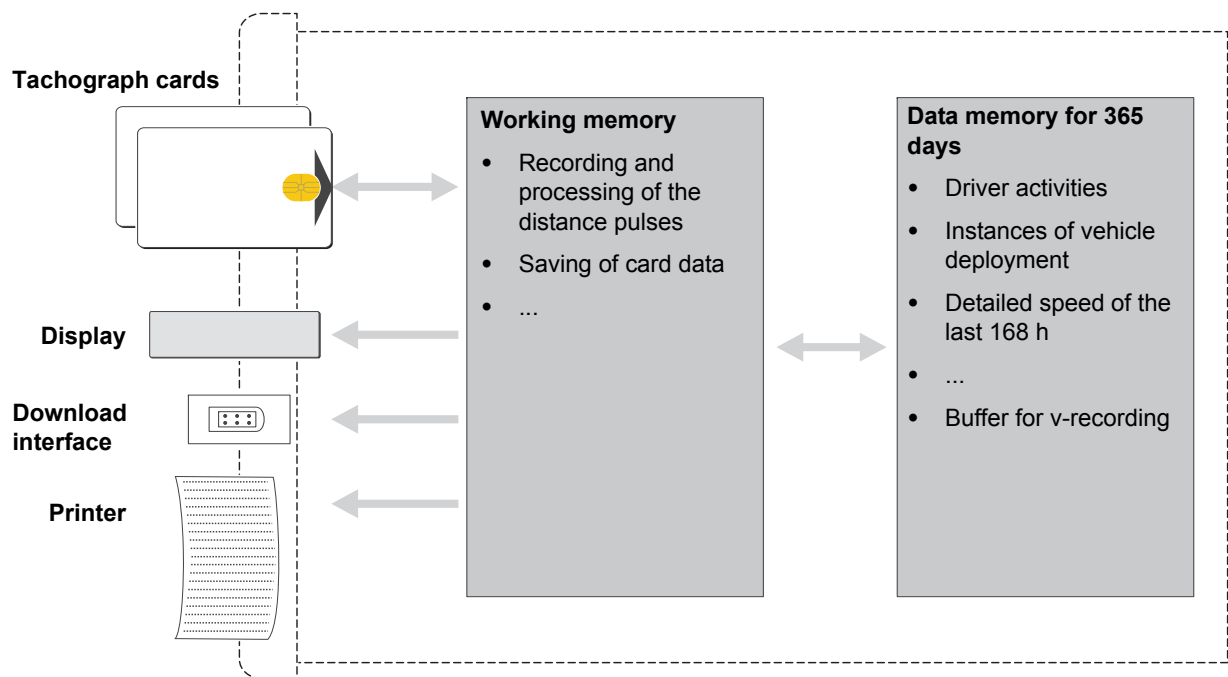


Illustration 29: The flow of data and memory behaviour, schematic diagram

4.2.1 Working memory

The working memory is used for temporary intermediate storage of all recorded and processed data.

The following procedures are processed in the working memory:

- Preparation and transferring of all recorded and legally stipulated data for archiving in the data memory.
- Preparation and outputting of the requested data over the display, download interface, or printer.
- Saving of data that is read in from an inserted tachograph card for the time period of usage.
- Transfer of the updated data to the tachograph card and deletion of the data from the working memory (when requested by a tachograph card).

4.2.2 Buffer for v-recording

In two special cases, the buffer for v-recording will serve to store detailed speed data:

- A large deceleration ($a < -3 \text{ m/s}^2$; such as hard braking, collision with an obstacle)
 - The detected speed values (4 speed values per second) will be recorded and saved each second for the time period of one minute before until one minute after the delay.
- Vehicle motionless
 - The detected speed values (4 speed values per second) will be saved each second for the time period of one minute before until one minute after the vehicle stopped moving.

4.2.3 Contents of the data memory

The DTCO 1381 registers in the internal data memory the activities and data of all drivers and the vehicle itself over a time period of at least 365 calendar days in accordance with CR (EEC) 3821/85, annex I B.



The data will be saved in the data memory of the DTCO 1381 only after activation with a workshop card.

If the memory capacity is exhausted, the oldest data will be overwritten.

The data memory records and saves the following data over a time period of 365 calendar days:

Activities driver 1	Activities driver 2	Detailed speed 168 h
List driver 1	List driver 2	System faults, events
Country entries driver 1	Country entries driver 2	Saving data that is not subject to the ordinance
Special conditions	"Lock-in" procedures through the company card	Data download
Recording control activities	Identification of the DTCO 1381	Installation data
Recording of time adjustments	Device calibrations	v-diagram*, status D1/D2*
Buffer for v-recording		Speed profiles*, rpm profiles*

Illustration 30: Data in data memory, schematic diagram

* Option

4.2.4 Data saved in the data memory

Identification data of the DTCO 1381	<p>The DTCO 1381 registers and saves the following legally stipulated data:</p> <ul style="list-style-type: none"> • Name of manufacturer • Address of manufacturer • Model / part number • Year of manufacture • Serial number • Approval number • Software version • Date of software installation
Identification data of the KITAS 2171	<ul style="list-style-type: none"> • Serial number • Approval number • Date of initial pairing
Security data	<ul style="list-style-type: none"> • Cryptographical key
Insertion and withdrawal of driver cards / workshop cards	<p>The following data will be registered and saved each time a driver card or workshop card is inserted/withdrawn:</p> <ul style="list-style-type: none"> • Last and first names of the cardholder (saved on the card) • Card number, issuing member state, validity • Card in slot 1 (driver) or card in slot 2 (co-driver) • Date and time card inserted • Odometer reading when card inserted • Date and time when card withdrawn • Odometer reading when card withdrawn • Information about the last vehicle <ul style="list-style-type: none"> – Registration number – Country of registration – Date and time when card withdrawn • Recognition of whether manual entries were made when card was inserted

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Driver activities

The following data will be registered and saved each time there is a change of activity based on driver 1 or 2, the driving status (single/team), or when the driver/workshop card is withdrawn:

- Driving status
 - Single (only one driver card is inserted)
 - Team (two driver cards are inserted)
- Card in slot 1 (driver) or card in slot 2 (co-driver)
- Card status (inserted, not inserted) for the affected slot
- Activity setting (time group: drive, availability time, pause, work)
- Date and time of the change



Manual entries about activities are not stored in the data memory.

Location at the beginning and end of the working time

The following data will be registered and saved each time the location at the beginning or end of the working time is entered:

- Date and time of the entry or the manual entry
- Type of entry
 - Begin
 - End
- Card number of driver 1 or 2
 - Issuing authority and country
- Entered country and region
- Odometer reading at time of the entry



Assuming that a driver makes two entries each day (at the beginning and end of each day), this data will be saved over 365 days.

Odometer

At time 00:00 on every calendar day the following data will be registered and saved:

- Odometer reading
- Date

Detailed speed

The following data will be registered and saved every second for the last 168 hours of driving time:

- Momentary speed in km/h
- Date and time

Speed / rpm profiles (option)

After any use of the vehicle (from insertion to removal of the driver card), the DTCO 1381 assesses driven profiles. The DTCO 1381 saves the time intervals, i.e. how long the vehicle was moved in a defined speed or rpm range.



A maximum of 168 entries will be saved.

Events

The DTCO 1381 saves events with a resolution of one second.

The following data will be saved for every event:

<i>Event</i>	<i>Saving regulations</i>	<i>Recorded data</i>
Card conflict	<ul style="list-style-type: none"> • The 10 most recent events 	<ul style="list-style-type: none"> • Begin – date and time • End – date and time • Type, number, and issuing member state of both cards that produce the conflict.
Driving without valid card	<ul style="list-style-type: none"> • The longest event on each of the 10 most recent days of appearance • The 5 longest events of the last 365 days 	<ul style="list-style-type: none"> • Begin – date and time • End – date and time • The type, number, and issuing member state of an inserted card at the beginning and/or end of the event. • Number of the same types of events on this day.
Insertion of the card while driving	<ul style="list-style-type: none"> • The last event of each of the 10 most recent days of appearance 	<ul style="list-style-type: none"> • Date and time • A card's type, number, and issuing member state • Number of the same types of events on this day.
Last procedure not completed correctly	<ul style="list-style-type: none"> • The 10 most recent events 	<ul style="list-style-type: none"> • Insertion of the card – date and time • A card's type, number, and issuing member state • Data read from the card during last procedure: <ul style="list-style-type: none"> – vehicle registration number – registering authority of member state.

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<i>Event</i>	<i>Saving regulations</i>	<i>Recorded data</i>
Data error motion and speed	<ul style="list-style-type: none"> The longest event on each of the 10 most recent days of appearance The 5 longest events of the last 365 days 	<ul style="list-style-type: none"> Begin – date and time End – date and time The type, number, and issuing member state of an inserted card at the beginning and/or end of the event. Number of the same types of events on this day.
Data conflict vehicle movement	<ul style="list-style-type: none"> The longest event on each of the 10 most recent days of appearance The 5 longest events of the last 365 days 	<ul style="list-style-type: none"> Begin - date and time End - date and time Card type, card number, and issuing member state of an inserted card at the beginning and/or end of the event Number of the same types of events on this day
Security breach	<ul style="list-style-type: none"> The 10 most recent events by type of event 	<ul style="list-style-type: none"> Type of event Begin – date and time End – date and time (if relevant) The type, number, and issuing member state of an inserted card at the beginning and/or end of the event.
Overspeeding	<ul style="list-style-type: none"> The most severe instance of the 10 most recent days of appearance (the event with the highest average speed) The 5 most severe events of the last 365 days The first event after the most recent calibration 	<ul style="list-style-type: none"> Begin – date and time End – date and time Measured highest speed Measured arithmetic average speed The driver's card type, number, and issuing member state (if applicable) Number of the same types of events on this day. Overspeeding control – date and time First instance of overspeeding after the most recent control – date and time Number of instances of overspeeding after the most recent control
Interruption of power supply	<ul style="list-style-type: none"> The longest event on each of the 10 most recent days of appearance The 5 longest events of the last 365 days 	<ul style="list-style-type: none"> Begin – date and time End – date and time The type, number, and issuing member state of an inserted card at the beginning and/or end of the event. Number of the same types of events on this day. <p>Note</p> <p>This data can be recorded only after re-establishing the power supply, whereby the accuracy here can be one minute.</p>

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Faults (errors)

The DTCO 1381 saves faults (errors) with a resolution of one second.

The following data will be saved for every fault (error):

<i>Fault</i>	<i>Saving regulations</i>	<i>Recorded data</i>
Card faults	<ul style="list-style-type: none"> The 10 most recent driver card faults 	<ul style="list-style-type: none"> Begin – date and time End – date and time A card's type, number, and issuing member state.
Recording equipment fault	<ul style="list-style-type: none"> The 10 most recent faults of each fault type The first fault after the most recent calibration 	<ul style="list-style-type: none"> Type of fault Begin – date and time End – date and time The type, number, and issuing member state of an inserted card at the beginning and/or end of the fault.
IMS signal missing (IMS = Independent Motion Signal)	<ul style="list-style-type: none"> The longest event on each of the 10 most recent days of appearance The 5 longest events of the last 365 days 	<ul style="list-style-type: none"> Begin - date and time End - date and time Card type, card number, and issuing member state of an inserted card at the beginning and/or end of the event Number of the same types of events on this day.

Calibration data

The DTCO 1381 registers and saves the following calibration data in its data memory:

- Programmed calibration parameters at the time point of the activation
- The first calibration after activation
- The first calibration in the current vehicle (depending on the chassis number)
- The 5 most recent calibrations

Comment



If several calibrations are performed on one calendar day, only the last calibration will be saved.

- Date and purpose of the calibration
 - Activation (1)
 - Initial installation (2)
 - Installation (3)
 - Regularly inspection (4)
 - Entry of the vehicle registration number by the company (5)
- Name and address of the workshop
- Number of the workshop card, issuing member state, validity

Calibration parameters

The DTCO 1381 saves the following updated and/or acknowledged calibration parameters:

- Vehicle identification
 - Chassis number
 - Vehicle registration number
 - Registering authority of member state
- Vehicle characteristics
 - Characteristic coefficient (w)
 - Recording equipment constant (k)
 - Effective wheel circumference (l)
 - Tire size
 - Legally permitted maximum speed
 - Odometer – old value
 - Odometer – new value
 - Date and time – old value
 - Date and time – new value

Time settings

In the calibration mode, the following data will be registered and saved for the most recent time setting and the five time setting with the largest corrections:

- Date and time – old value
- Date and time – new value
- Number of the workshop card, issuing member state, expiration of validity
- Name and address of the workshop

Control activities

The following information is registered and saved from the last 20 control activities:

- Date and time of the control
- Number of the control card, issuing member state
- Type of control
 - Display, printing, or downloading of data from memory
 - Display, printing, or downloading of card data



With a download, the time period (from/to) of the copied data is registered.

Company locking data

The following information is registered and saved from the last 255 company locking actions:

- Lock-in – date and time
- Lock-out – date and time
- Number of the company card, issuing member state
- Name and address of the company

Download activities

The following information is registered and saved about the last time data was downloaded from the data memory:

- Date and time
- Number of the company or workshop card, issuing member state
- Name and address of the company or workshop

Special conditions

In the "special conditions" entries (operation outside the scope of the CR (EEC) 3821/85 or ferry/train transfers), the following information is registered and saved:

- Date and time
- Type of entry



Assuming that a driver makes one entry each day (commencement and cessation of the condition), this data will be saved over 365 days.

4.3 Tachograph cards

4.3.1 Driver card

All of the driver-based data (fixed and variable) defined in CR (EEC) 3821/85, annex I B is saved on the driver card.

The driver uses the card to identify himself to the DTCO 1381, enabling saving of activities under this identity.

Fixed data

Card identification

- Card type
- Card number
- Issuing member state, name of the issuing authority / institution and date of issuance of the card
- Validity

Security elements

- Public European security key
- Certificate of the issuing member state
- Card certificate
- Private security key of the card

Driver information (cardholder identification)

- Last name, first name
- Date of birth
- Preferred language
- Driver's license number
- Issuing member state, name of the issuing authority / institution and date of issuance of the driver's licence

Variable data**Data on vehicles used**

The data about the vehicles used is saved by calendar day and time period of usage:

- Vehicle registration number, registering authority of member state.
- Date, time, and odometer the first time the vehicle is used or the first time the card is inserted, respectively.
- Date, time, and odometer the last time the vehicle is used or the withdrawal of the card, respectively.



At least 84 entries will be saved.

Driver activities over at least 28 days

The following data will be saved for every workday (calendar day on which the card is used or for which a manual entry is executed):

- Date
- Daily usage meter (increased by 1 each workday)
- Distance driven per workday
- Driver status at time 00:00

Each time the driver changes activity, each time the driving status changes, or when the card is inserted or withdrawn, the following data is saved:

- Driving status (single or crew)
- Insertion location of the card (slot 1 or 2)
- Card status (inserted or not inserted)
- Activity (time group)
- Time of the change



Assuming that 93 activity changes will be registered each day, the activity data for at least 28 days must be saved on the driver card.

Location at the beginning and end of the working time

When the location at the beginning and end of the work time is entered (driver enters manually), the following data is saved:

- Date and time
- Type of entry (begin or end)
- Odometer reading
- Country and region



At least 42 entries (beginning and end of each) are saved.

Special conditions

Since the vehicle crew must maintain complete records of working times, it is necessary to record activities that are not directly related to the stipulated activities.

Examples of "special conditions" include:

- Transfer with a ferry
- Transfer on a train
- Operation outside of the applicable area

When special conditions are entered (manual entry by the driver), the following data is also saved:

- Type of entry
- Date and time



At least 56 entries will be saved.

Events

The following events are saved on the driver card:

- Interruption of power supply
- Data error motion and speed
- Attempt to breach security
- Time overlap*
- Card insertion while driving*
- Last card procedure not completely correctly*

** This event will be saved only when the event was caused by the inserted driver card.*

The following data will be saved about events:

- Event code
- Beginning – date and time (if the event is already active at the time of the inserting, the date and time of the inserting is stored; if the event continues while card withdrawn, the date and time will be saved upon withdrawal)
- End – date and time (if the event continues while card withdrawn, the date and time will be saved upon withdrawal)
- Vehicle registration number of the vehicle in which the event appeared
- Place of registration of the vehicle in which the event appeared

Comment



The six most recent events of all types will be saved; in total, up to 72 entries will be saved.

Faults (errors)

The following faults are saved on the driver card:

- Device fault of the DTCO 1381
- Card fault if the driver card is the object of the fault

The following data will be saved about faults:

- Fault code
- Beginning – date and time (if the event is already active at the time of the inserting, the date and time of the inserting is stored; if the event continues while card withdrawn, the date and time will be saved upon withdrawal)
- End – date and time (if the event continues while card withdrawn, the date and time will be saved upon withdrawal)
- Vehicle registration number of the vehicle in which the fault appeared
- Place of registration of the vehicle in which the fault appeared



The twelve most recent faults of all types will be saved; in total, up to 48 errors will be saved.

Control activities

The following data will be saved about control activities:

- Date and time of the control
- Number of the control card, issuing member state
- Type of control
 - Display, printing, or downloading of data from memory
 - Display, printing, or downloading of card data
- Vehicle registration number of the inspected vehicle
- Place of registration of the inspected vehicle
- In the case of download, the time period (from / to) for which the data was copied



The card data download can be saved on the tachograph card only if this happens through the DTCO 1381. In other words, the card must be located in a card slot on the DTCO 1381.

4.3.2 Workshop card

All of the workshop-based data (fixed and variable) defined in CR (EEC) 3821/85, annex I B is saved on the workshop card.

An approved recording equipment manufacturer, vehicle manufacturer, installer, or a workshop uses its card to identify itself to the DTCO 1381, enabling saving of activities under this identity.

After a positive authentication of a valid workshop card, the interfaces for calibration and testing the DTCO 1381, as well as the access to displays, printouts, or downloading of memory data will be enabled.

With the workshop card, transfers and test drives are possible.

Fixed data

Security elements

- Public European security key
- Certificate of the issuing member state
- Card certificate
- Private security key of the card
- PIN (Personal Identification Number)
- Cryptological key for pairing the KITAS 2171

Identification of the card Card identification

- Card type
- Card number
- Issuing member state, name of the issuing authority / institution and date of issuance of the card
- Validity

Workshop information (cardholder identification)

- Workshop name
- Workshop address
- Last name, first name of the cardholder
- Preferred language

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Variable data

Data on vehicles used

The data about the vehicles used is saved by calendar day and time period of usage:

- Vehicle registration number, registering authority of member state
- Date, time, and odometer the first time the vehicle is used or the first time the card is inserted, respectively
- Date, time, and odometer the last time the vehicle is used or the withdrawal of the card, respectively



At least 4 entries will be saved.

Activities (driver activities)

The following data will be saved for every workday (calendar day on which the card is used or for which a manual entry is executed):

- Date
- Daily usage meter (increased by one each workday)
- Distance driven per workday
- Driving status at time 00:00

Each time the activity changes, each time the driving status changes, or when the card is inserted or withdrawn, the following data is saved:

- Driving status (single or crew)
- Insertion location of the card (slot 1 or 2)
- Card status (inserted or not inserted)
- Activity (time group)
- Time of the change

Location at the beginning and end of the working time

When the location at the beginning and end of the work time is entered (manual entry), the following data is saved:

- Date and time
- Type of entry (begin or end)
- Odometer reading
- Country and region

Comment

At least 3 entries (beginning and end of each) are saved.

Special conditions

Since the vehicle crew must maintain complete records of working times, it is necessary to record activities that are not directly related to the stipulated activities.

Examples of "special conditions" include:

- Transfer with a ferry
- Transfer on a train
- Operation outside of the applicable area

When special conditions are entered (manual entry by the driver), the following data is also saved:

- Type of entry
- Date and time

Comment

At least 2 entries will be saved.

Events

The following events are saved on the workshop card:

- Interruption of power supply
- Data error motion and speed
- Security breach
- Time overlap*
- Card insertion while driving*
- Last card procedure not completely correctly*

* *This event will be saved only when the event was caused by the inserted workshop card.*

The following data will be saved about events:

- Event code
- Beginning – date and time
(If the event is already active at the time of the inserting, the date and time of the inserting is stored;
if the event continues while card withdrawn, the date and time will be saved upon withdrawal.)
- End – date and time
(If the event continues while card withdrawn, the date and time will be saved upon withdrawal.)
- Vehicle registration number of the vehicle, in which the event appeared
- Place of registration of the vehicle, in which the event appeared

Comment



The three most recent events of all types will be saved; in total, 18 entries will be saved.

Faults (errors)

The following faults are saved on the workshop card:

- Faults of the DTCO 1381
- Card fault if the workshop card is the object of the fault

The following data will be saved about faults:

- Fault code
- Beginning – date and time
(If the event is already active at the time of the inserting, the date and time of the inserting is stored; if the event continues while card withdrawn, the date and time will be saved upon withdrawal.)
- End – date and time
(If the event continues while card withdrawn, the date and time will be saved upon withdrawal.)
- Vehicle registration number of the vehicle, in which the fault appeared
- Place of registration of the vehicle in which the fault appeared



The six most recent events of all types will be saved; in total, 12 entries will be saved.

Control activities

The following data will be saved about control activities:

- Date and time of the control
- Number of the control card, issuing member state
- Type of control
 - Display, printing, or downloading of data from memory
 - Display, printing, or downloading of card data
- Vehicle registration number of the inspected vehicle
- Place of registration of the inspected vehicle
- In the case of download, the time period (from / to) for which the data was copied.



The card data download can be saved on the tachograph card only if this happens through the DTCO 1381. In other words, the card must be located in a card slot on the DTCO 1381.

Data on calibrations and time settings

The following data will be saved about every calibration or time setting:

- Identification of the DTCO 1381 (inspection device identification)
 - Item number
 - Series number
 - Date of manufacture and manufacturer
- Identification of the KITAS 2171
 - Series number
 - Date of manufacture and manufacturer
- Date and purpose of the calibration*
 - Activation (1)
 - Initial installation (2)
 - Installation (3)
 - Periodic inspection (4)
- Vehicle identification*
 - Chassis number
 - Vehicle registration number
 - Approving member state
- Vehicle characteristics
 - Distance pulse count (w value)
 - Recording equipment constant (k value)
 - Effective wheel circumference (l value)
 - Tyre size
 - Legally permitted maximum speed
 - Odometer – old value*
 - Odometer – new value*
 - Date and time - old value
 - Date and time - new value
 - Date of next calibration
- Date of the next calibration

* Only these data are saved for a time setting.



At least 88 calibrations will be saved.

The workshop card will also save a counter for the total number of calibrations and the number of calibrations since the last download.

4.3.3 Control card

All of the control authority-based data (fixed and variable) defined in CR (EEC) 3821/85, annex I B is saved on the control card.

An employee of an control authority uses the card to identify himself to the DTCO 1381, enabling saving of control activities under this identity.

After positive authentication of a valid control card, the download interface as well as the access to displays, printouts, or downloading of card and memory data, among other things, will be released.

Fixed data

Card identification

- Card type
- Card number
- Issuing member state, name of the issuing authority / institution and date of issuance of the card
- Validity

Control information (cardholder identification)

- Name of the control body
- Address of the control body
- Last name, first name of the cardholder
- Preferred language

Variable data

The following data will be saved about every control activity:

Control activities

- Date and time of the control
- Type of control
 - Display, printing, or downloading of data from memory
 - Display, printing, or downloading of card data
 - In the case of download, the time period (from / to) for which the data was copied.
- Vehicle registration number
- The vehicle's place of registration
- In the case of a driver card control
 - Card number
 - Issuing member state



At least 230 entries will be saved.

4.3.4 Company card

All of the company-based data (fixed and variable data about the owner or holder of the vehicle) defined in CR (EEC) 3821/85, annex I B is saved on the company card.

The company representative uses the card to identify himself to the DTCO 1381, enabling saving of company activities under this identity.

With the functions "lock-in" or "lock-out", the DTCO 1381 can be assigned (locked) to a company or signed off (unlocked) for the company.

After positive authentication of a valid company card, the download interface as well as the access rights to displays, printouts, or downloading of card and memory data, among other things, will be released.

Fixed data

Card identification

- Card type
- Card number
- Issuing member state, name of the issuing authority / institution and date of issuance of the card
- Validity

Company information (cardholder identification)

- Company name
- Company address

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Variable data

- Date and time of the company activity
- Type of activity
 - Lock
 - Unlock
 - Downloading of card data*
 - Downloading of memory data*
- In the case of download, the time period (from / to) for which the data was downloaded.
- In the case of card data downloading, number and issuing member state of the driver card
- Vehicle registration number and registration authority of the vehicle in which a download was executed

* *These data are saved only if the company card is in a DTCO 1381 at the time of activity.*



At least 230 entries will be saved.

4.4 Data download

Driver, vehicle, and calibration data from the DTCO 1381 data memory and from an inserted driver card can be downloaded (copied) over the interfaces of the DTCO 1381 provided for this purpose.

The legislators have planned a data download for the following cases:

- Street and operational controls
- Sale of the vehicle
- Decommissioning of the vehicle
- Replacement of a defective DTCO 1381

A download can be executed after positive authentication of a valid company, workshop, or control card. The respective access rights are regulated in CR (EEC) 3281/85, annex I B, see next page.



The downloading of data will not alter or delete the data in the memory of the DTCO 1381 and on a tachograph card.

Before the data is downloaded, the DTCO 1381 will attach a digital signature (identification) to the data being downloaded. With this signature, the data can be assigned to the EC recording equipment and permit checking of the data's completeness and authenticity.

4.5 Rights to access saved data

Definition

The right to access (release) saved data is specified in CR (EEC) 3821/85, annex I B and depends on the tachograph card that is used.

Access rights do not refer to direct access to the memory cells, but instead only the release of saved data in order to print, display, or download this information.

Rights to access saved data

		without card	Driver card	Company card	Control card	Workshop card
Print	Driver data	x	U	U	U	U
	Vehicle data	T1	T2	T3	U	U
	Parameter data	U	U	U	U	U
Display	Driver data	x	U	U	U	U
	Vehicle data	T1	T2	T3	U	U
	Parameter data	U	U	U	U	U
Download	Driver data	x	x	U	U	U
	Vehicle data	x	x	T3	U	U
	Parameter data	x	x	U	U	U

Driver data = Data on the driver's card

Vehicle data = Data in the data memory

Parameter data = Data for device adaptation

U = Unlimited access rights

T1 = Driver activities of the last eight days without driver identification data

T2 = Driver identification only for the inserted card

T3 = The associated company's driver activities

x = No right to access data

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Chapter 5

Installation

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5.1 General instructions

5.1.1 Terminology definitions

Installation of the DTCO 1381 is divided into the following steps:

1. Installation

Mechanical and electrical installation of the DTCO 1381 components into the vehicle.

2. Preprogramming

Preprogramming of all known or operationally necessary and legally required parameters.

3. Installation and functional test

Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.

4. Activation

Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).

5. First calibration

First calibration of the EC recording equipment.

5.1.2 Personnel prerequisites

In the following instructions, the manufacturer assumes that the personnel possess extensive professional knowledge, securely master the necessary technical activities, and have been trained in the use of the DTCO 1381 components as appropriate for the area of application.

Installation

The persons who are charged with the installation of the DTCO 1381 components must complete a training program on the installation of the DTCO 1381 components.

Activation and calibration

The persons who are charged with the activation and calibration of the DTCO 1381 components must:

- have a valid workshop card.
- complete a training program on the installation, calibration, and activation of the DTCO 1381 components.
- (in Germany) also fulfil the conditions for executing tasks according to §57b.

Comment

When installing the DTCO 1381 please obey the valid legal regulations in your country!

5.1.3 Technical prerequisites

The following requirements must be fulfilled in order to carry out the assigned tasks:

- The equipment and tools required or recommended by the manufacturer must be available.
- The equipment, testing devices, and furnishings must comply with the respective valid legal requirements for the country in which they are used.

5.1.4 Handling the tachograph cards



Attention!

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following information about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

5.2 Instructions on installing the DTCO 1381

This chapter describes the correct installation of the DTCO 1381 components in the vehicle.



Attention! Vehicles used for the carriage of dangerous goods

During installation of the DTCO 1381 (ADR variant) in a vehicle for the carriage of dangerous goods it is essential to observe all additional or different instructions, requirements, and work steps in chapter 6 "Installation of the ADR variant", page 147.

5.2.1 General installation instructions



Attention! Danger of injury

Working on a motor vehicle can be dangerous. When working, observe the professional association's safety instructions and the regulations for the prevention of accidents.

Installation of the DTCO 1381 components does not require any interventions in the vehicle's safety equipment. When installed correctly, the vehicle's equipment and driving characteristics will neither be changed nor influenced.

General instructions

Observe the following general instructions for the installation of the DTCO 1381 components:

- Always observe the manufacturer's instructions, particularly when working on the onboard power supply.
- Make sure that the vehicle's ignition is switched off.
- Make sure that the legal regulations regarding installation room are complied with, that there is sufficient room to operate the DTCO 1381, and that the display is positioned in a way that affords optimal readability.
- When installing the DTCO 1381 components, avoid damaging the existing cables in the vehicle or unintentionally loosening plug-in connections.
- Before removing covers and similar vehicle parts, obtain information on proper dismantling procedures in order to prevent damage to the parts.
- Refer to the connection diagrams for information on the location of fuel, hydraulic, compressed air, and electrical lines.
- When separating plug-in connections, do not pull on the cable, but rather on the plugs or the proper unlocking systems only.

- For mounting tasks, use only original VDO installation parts and accessories. Install undamaged components only.
- During installation, be absolutely certain that the DTCO 1381 components do not influence or restrict the vehicle's functionality in an undesirable way.
- Instruct the driver / company in the use of the DTCO 1381 and transfer to him with the appropriate operating instructions.

Proper use

The DTCO 1381 is an EC recording equipment that complies with CR (EEC) 3821/85, annex I B for the registration, saving, display, printing, and outputting of driver-based and vehicle-based data. It may be used only for the purpose for which it is designed.

Power supply

The DTCO 1381 may only be connected to voltages for which it is designed and which can be seen in the wiring diagram (label).

Accessories

For reasons of operational safety, no alterations may be made to the accessories.

Do not use any accessories other than those recommended or approved by the manufacturer in order to help avoid accidents and operational disruptions.

Cables

When laying the cables, make sure that they are undamaged, that other objects or sources of heat cannot cause damages, and that the lines cannot cause any undesired interference or disturbances.

**Caution! Danger of fire due to short circuit**

Damaged cables can cause short circuits, undesired interferences, or disturbances.

Always replace damaged cables immediately!

5.2.2 Working on the electrical onboard power supply

**Caution! Danger of short circuits**

Before working on the onboard power supply, please observe the relevant manufacturer's instructions!

- Although disconnection of the vehicle's battery will prevent short circuits, this may also result in other secondary effects:
 - The security code of the vehicle's radio may be deleted.
 - If intelligent systems are installed, their data (like the error memory of the motor controller) may be deleted.
 - Before disconnecting the connection terminals from the battery, observe the following points:
 - Switch off all electrical consumers.
 - Separate the minus and plus terminals.
-

5.2.3 Laying and establishing connecting cables

**Caution! Danger of fire due to short circuit**

Damaged cables can cause short circuits, undesired interferences, or disturbances.

Please observe the following:

- Always observe the information provided by the vehicle manufacturer.
 - Lay the lines in such a way that they are not subjected to tensile or shearing force or pressure.
 - Properly fit the cables into place using tape or cable binders.
 - Do not route the cable around moving parts. Use rubber sleeves as protection when feeding a cable through metal or plastic parts.
 - Replace damaged cables immediately!
-

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5.2.4 Lead sealing the DTCO 1381 components

Legal fundamentals

According to CR (EEC) 3821/85, annex I B, the following device parts must be sealed:

- Every connection that, if separated, would lead to non-documented changes or non-detectable loss of data.
- The installation plate, unless it is installed in a way that it cannot be withdrawn without destroying the information it provides.



Note the legal provisions applicable in your country and check whether further lead-sealing of the EC recording equipment is prescribed.

Sealing of the DTCO 1381

The German Federal Vehicle Office has granted the EEC design approval number "e1-84" for the EC recording equipment DTCO 1381.

The following types of sealing are required by law for the DTCO 1381 components:

- Lead sealing to prevent opening of the housing
- Lead sealing to prevent opening of the battery compartment
- Sealing to prevent unscrewing of the KITAS 2171 pulse generator at the transmission
 - With sealing wire and two-hole leading
 - With KITAS hexagonal leading
- Sealing of the installation plate (sealing foil)

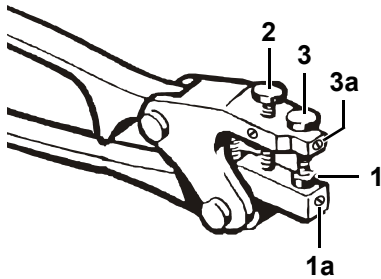
Notes

Observe the following notes when sealing the DTCO 1381 components:

- When sealing, use only original tools from VDO and the sealing parts available as accessories.
- The components can be lead-sealed during the individual operating steps.
- It may not be possible to remove or decommission the elements secured by the seal without destroying the seal or causing recognizable damage.
- When sealing, note especially that:
 - the sealing pliers are properly adjusted and the assigned seal number is used,
 - the seal wire is short so that the connections cannot be unscrewed;
 - the seal wire will not cause short circuits

Preparing sealing tools

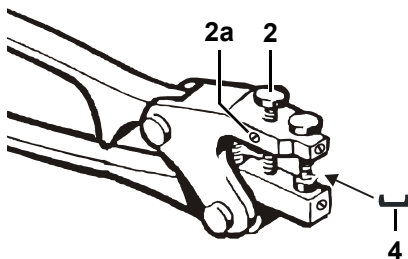
Assembling the sealing tool



To emboss the seal caps properly, equip and adjust the sealing pliers accordingly.

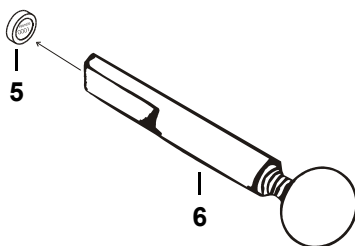
1. Insert an original Kienzle sealing insert (1) into the pliers and engage it using the locking screw (1a).
2. Close the pliers and screw in the knurled screw (2) to the limit stop.
3. Screw the knurled screw (3) into the sealing insert up to the limit stop and engage using the locking screw (3a).

Embossing the sealing cap



4. Perform an embossing test. Place the neutral sealing cap (4) over the knurled screw and press the sealing pliers together to the limit stop.
 - The embossing of the sealing cap must be clearly readable.
5. If necessary fine-adjustment the knurled screw (2) and use the locking screw (2a) to secure the position.

Inserting the sealing cap



6. Insert the sealing cap (5) into the respective sealing cup and use the mounting tool (6) to press it in.

5.3 Criteria for the installation site

5.3.1 Legal requirements

The law CR (EEC) 3821/85, annex I B regulates the criteria for the location of installation of the EC recording equipment. The following excerpts describe the major criteria:

Requirement 248a

The recording equipment must be attached in the vehicle in a way that gives the driver access to all necessary functions while sitting in the driver's seat.

Requirements 143 and 144

Optical warning messages must be clearly recognizable for the user, be located in the driver's field of vision, and be clearly legible in daylight and during night.

Requirement 144

Optical warning messages may be included in the recording equipment or be installed remotely (such as a combi-instrument).

Requirement 145

If installed remotely, the warning message must be labeled with a "T" symbol.

5.3.2 Manufacturer's specifications

Installation dimensions of DTCO 1381

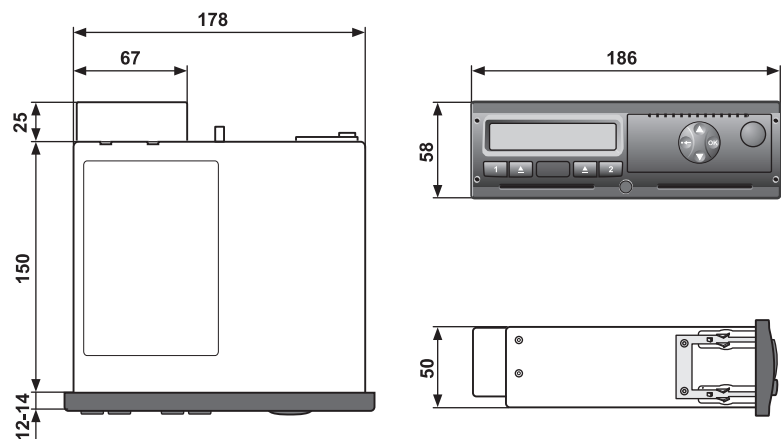


Illustration 31: Installation dimensions of DTCO 1381

Installation angle of the DTCO 1381

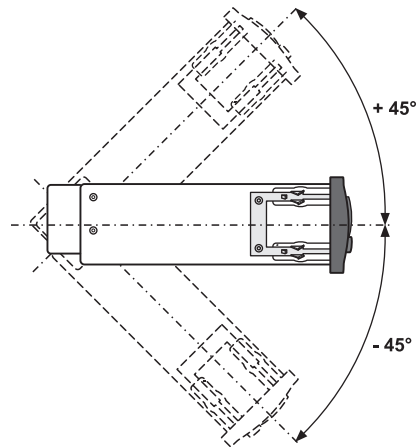


Illustration 32: Installation angle of the DTCO 1381

Clearance for the installation and operation of the DTCO 1381

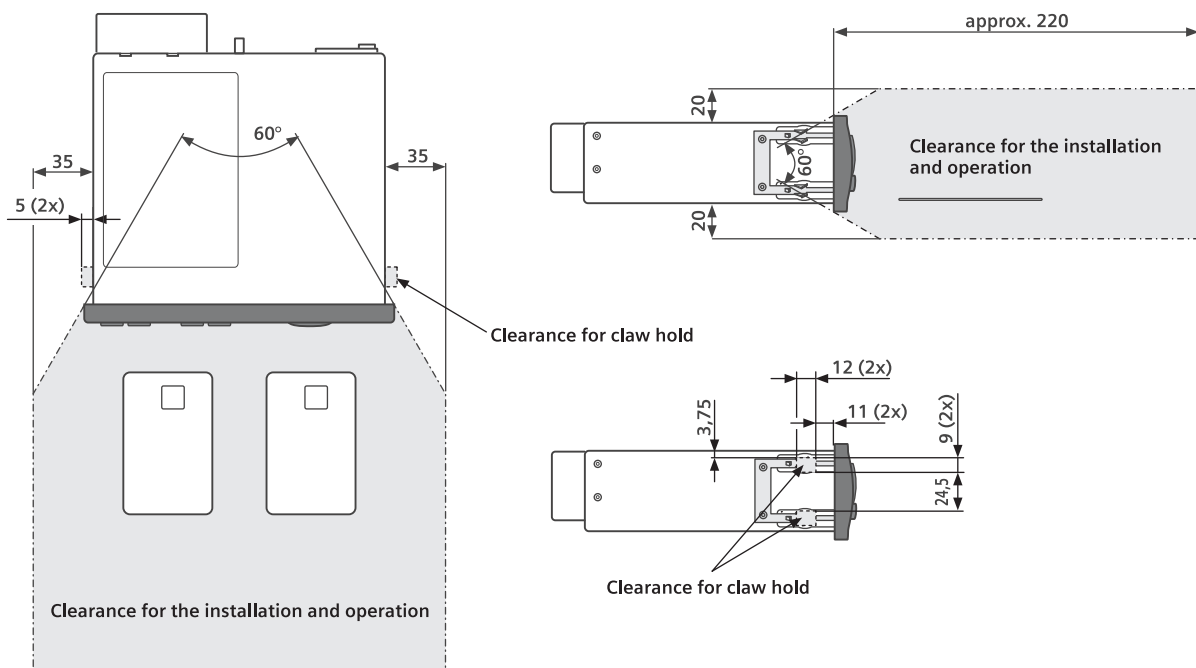


Illustration 33: Clearance for the installation and operation of the DTCO 1381

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Permissible installation angle of the display

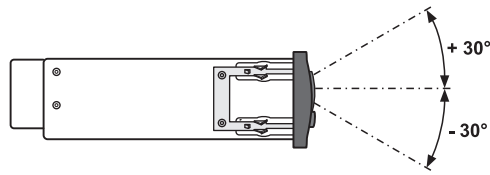


Illustration 34: Permissible viewing angle of display DTDO 1381

5.3.3 Manufacturer's recommendations

Support in the radio compartment

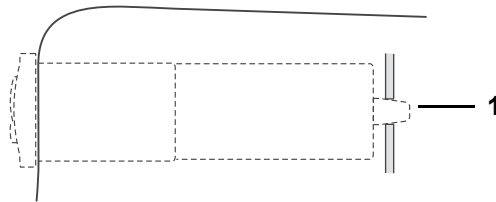


Illustration 35: Support at the rear of the radio compartment

- (1) Support of the housing rear side of the DTDO 1381 at the suitable mounting in the radio compartment.

5.4 Tools and installation accessories

5.4.1 Tools

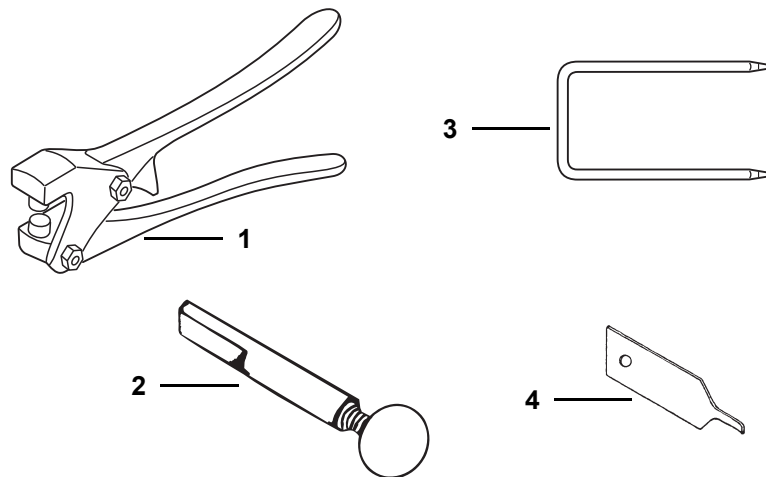


Illustration 36: Tools

Special tools

- (1) **Seal crimpers**
- (2) **Mounting tool** for lead seals
- (3) **Removing aids** (bracket) for removing of the DTDO 1381 from the installation frame (2 pieces)
- (4) **Special tools** for disengaging the Junior-Power-Timer

Standard tools

You may need a standard automotive mechanic's tool set for installing the DTDO 1381 components:

- Screw driver set
- Ring and open-ended wrench set
- Box spanner fittings
- Installation tools for vehicle electrical systems, such as wire strippers, crimping pliers, and side cutting pliers, etc.
- Measuring instruments (multimeters)

Comment



Special vehicle-specific tools may be needed to dismantle the sub-assemblies of the dashboard.

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5.4.2 Installation accessories

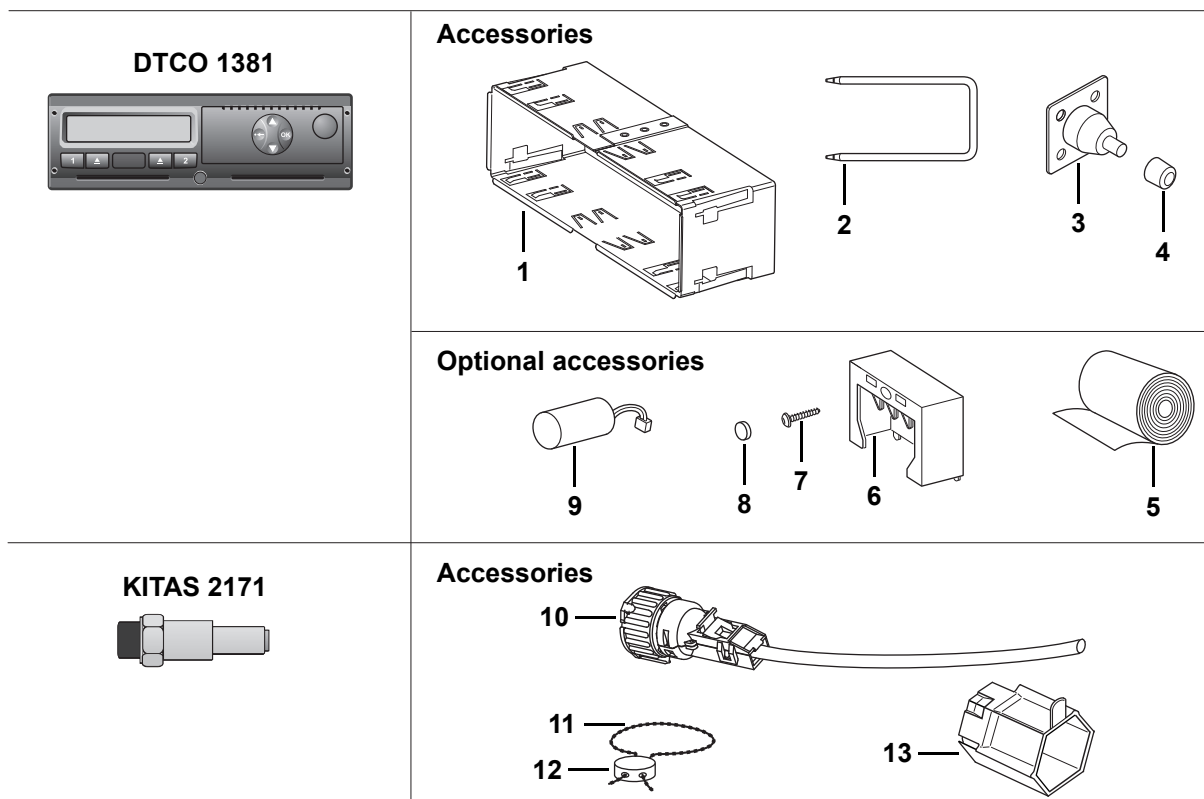


Illustration 37: Installation accessories

	Item	Order number	Accessories
DTCO 1381 accessories	1	1324.90 01 00 05	Installation frame
	2	1381.90 04 00 00	Removal aid (bracket)
	3	1381.90 05 04 00	Spacer
		1381.90 05 05 00	Fastening screw (4 pcs.)
			Extended spacer
DTCO 1381 optional accessories	4	1381.90 05 02 00	Mounting cap
	5	1381.90 03 03 00	Printer paper (3 rolls)
	6	1381.90 02 01 00	Plug cover
	7	1381.90 02 03 00	Screw
	8	1311.92 00 00 09	Seal (neutral)
KITAS 2171 accessories	9	HS53.1600.057	Buffer battery
	10	2170.80 01 08 50	Pulse cable (8,5 m or as appropriate)
	11	1999.92 00 00 12	Seal wire
	12	1999.92 00 00 15	Two-hole seal
	13	2170.92 00 00 03	KITAS hexagonal seal

5.5 Performing the installation

Definition

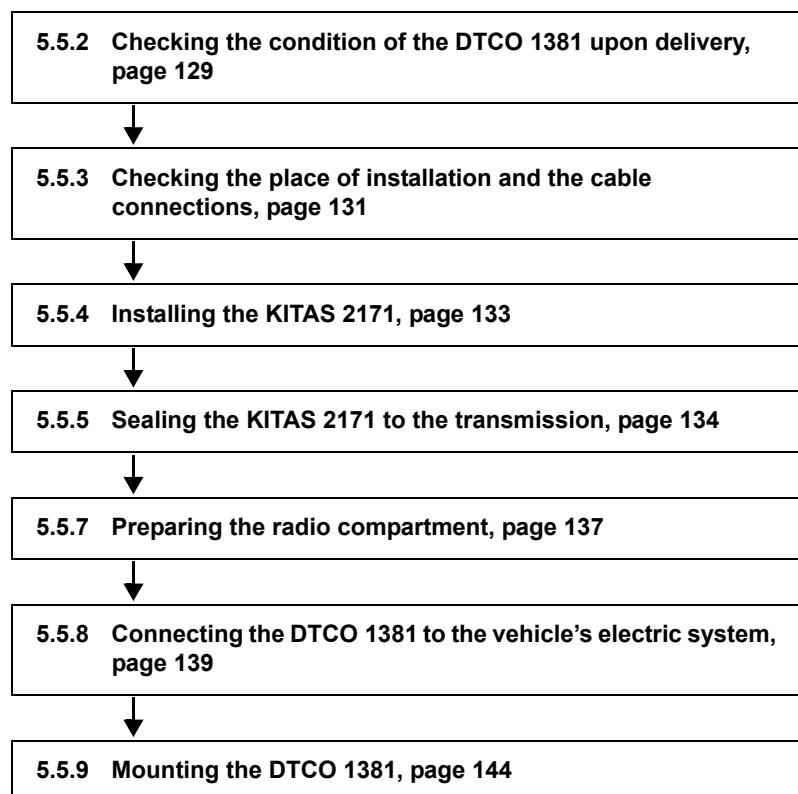
Mechanical and electrical installation of the DTCO 1381 components into the vehicle.

Requirements

The description of installation assumes the following:

- The place where the DTCO 1381 is installed meets all legal stipulations.
- The technical specifications (environmental conditions, voltage ranges, etc.) of the DTCO 1381 and the KITAS 2171 are maintained.
- The required cable connections are available in the vehicle and meet the technical specifications.

5.5.1 Schematic diagram



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5.5.2 Checking the condition of the DTCO 1381 upon delivery

Checking the identification and sealing

The following points must be checked before installing the DTCO 1381:

1. Check to make sure that the DTCO 1381 identification information on the model plate correspond to those on the delivery certificate:
 - Manufacturer
 - Device type (product number), for example with our without IMS functions, see chapter 1.2.3 "DTCO 1381 Product versions", page 27.
2. Check to make sure that the DTCO 1381 identification information on the model plate correspond to the data electronically saved in the DTCO 1381:
 - Manufacturer
 - Device type (product number)
 - Serial number.
3. Check to make sure that the following seals on the DTCO 1381 are undamaged:
 - Device sealing
 - Seal for battery compartment.



You can read out the data stored in the DTCO 1381 via the following interfaces:

- Calibration interface
- K-Line diagnosis interface*
- CAN bus diagnosis*

* *version-dependent*

Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the data stored in the DTCO 1381.



Attention!

If any of the above-mentioned points do not match the specifications, do not install the DTCO 1381!

Checking the buffer battery

The buffer battery must be replaced in the following cases to ensure reliable function of the DTCO 1381:

- During installation, activation or initial calibration if the production date of the DTCO 1381 is more than 12 months ago.
- During every regularly inspection.

Production date DTCO 1381

The production date of the DTCO 1381 is shown on the packaging and the model plate, coded as "MY":

<i>M = Month of production</i>			
A	January	G	July
B	February	H	August
C	March	J	September
D	April	K	October
E	May	L	November
F	June	M	December

<i>YY= Year of production</i>			
12	2012	14	2014
13	2013	⋮	⋮

1. Check the production date of the DTCO 1381.
2. If the production date of the DTCO 1381 is more than 12 months ago, replace the buffer battery of the DTCO 1381, see chapter 12.2 "Buffer battery", page 244.

5.5.3 Checking the place of installation and the cable connections

Legal criteria for the place of installation	<p>The following points must be checked before installing the DTCO 1381:</p> <ul style="list-style-type: none"> • The recording equipment must be attached in the vehicle in a way that gives the driver access to all necessary functions while sitting in the driver's seat. • Optical warning messages must be clearly recognizable for the user, be located in the driver's field of vision, and be clearly legible in daylight and during night. • Optical warning messages may be included in the recording equipment or be installed remotely (such as a combi-instrument). • If installed remotely, the warning message must be labeled with a "T" symbol. • The characters depicted in the display must be easily visible.
Manufacturer's specifications for the place of installation	<ul style="list-style-type: none"> • Installation angle of the DTCO 1381: max. $\pm 45^\circ$ • Installation angle of the display: max. $\pm 30^\circ$ • There must be sufficient clearance for installing and operating the DTCO 1381.
Power supply	<ul style="list-style-type: none"> • The DTCO 1381 may only be connected to voltages for which it is designed and which can be seen in the wiring diagram (label).
Connection cables	<ul style="list-style-type: none"> • When laying the connection cables, make sure that they are undamaged, that other objects or sources of heat cannot cause damages, and that the lines cannot cause any undesired interference or disturbances. • Make sure that the plug contacts of the connecting cables ensure a reliable contact, e.g. by using Junior-Power-Timer.



Caution! Danger of fire due to short circuit

Damaged cables can cause short circuits, undesired interferences, or disturbances.

Please replace damaged cables immediately!

Manufacturer recommendations

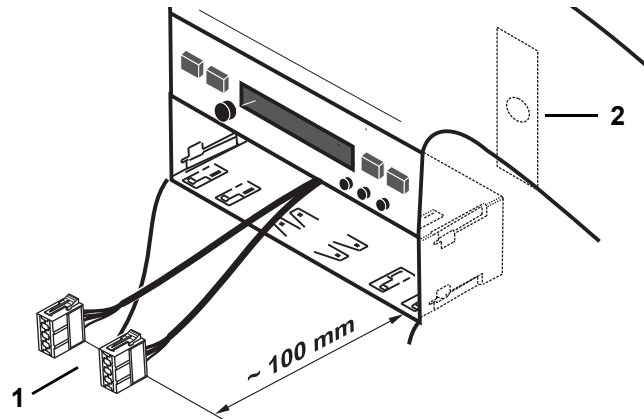


Illustration 38: Manufacturer recommendations

- Make sure that the connection lines **(1)** are sufficiently long that an installed DTCO 1381 can be easily removed from its compartment and additional connections can be realised as necessary.
 - Support **(2)** in the radio compartment.
- 1.** Check to make sure that the installation places for the DTCO 1381 and the KITAS 2171 meet the legal criteria and the manufacturer's specifications.
 - 2.** Check whether the cable connections in the vehicle are all present and fulfil the corresponding requirements.

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5.5.4 Installing the KITAS 2171

For the installation, the following KITAS versions are available:

- Standard version KITAS 2171.0x
This version is screwed onto the transmission output.
- Integrated version KITAS 2171.20 / 2171.50 / 2171.xx
This version is screwed into the transmission output and there is a variety of lengths for the insertion depth.



Attention!

Use only the version of KITAS 2171 that corresponds with the specifications of the transmission.

When using the integrated version of the KITAS 2171, make sure you have the correct insertion depth!

From October 2012, the "KITAS 2171 Version 2+" must, in principle, be installed in new vehicles.

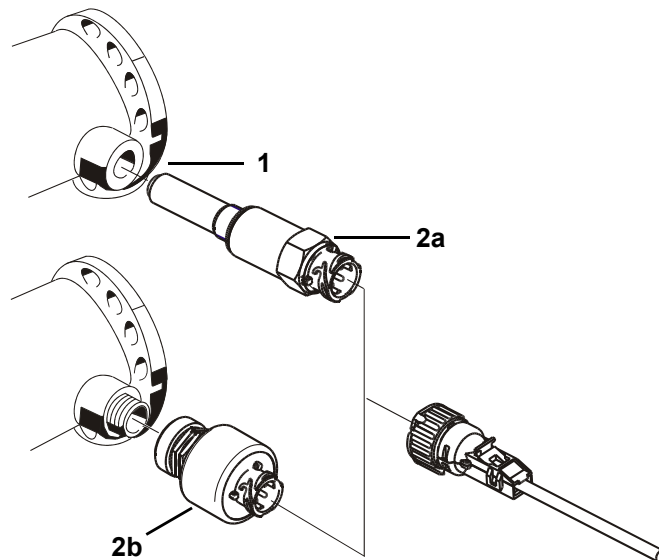


Illustration 39: Installing the KITAS 2171 motion sensor

1. Screw in the KITAS 2171 – integrated version (2a) – into the transmission output (1).
or
Screw the KITAS 2171 – standard version (2b) – onto the transmission output (1).



Attention!

Observe the maximum tightening torque (50 Nm).

5.5.5 Sealing the KITAS 2171 to the transmission

With sealing wire

Comment

The following description describes the procedure for using the KITAS 2171 in the integrated, screw-in version. In the case of the other methods of installation, the procedure is identical.

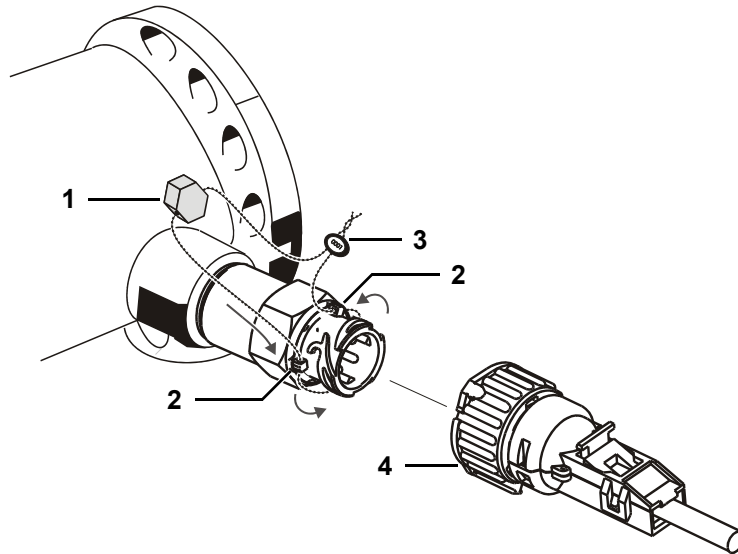


Illustration 40: Sealing the KITAS 2171 at the transmission (with sealing wire)

1. If required, remove the KITAS sensor cable (4) from the KITAS 2171.
2. Feed the sealing wire through the port of the screw (1) (or similar) on the transmission output.
3. Then lead the sealing wire through the sealing eyebolts (2) on the KITAS 2171.
4. Lead the two-hole seal (3) over both ends of the wire and twist the ends of the wire together.
5. Then clamp the two-hole seal with the sealing pliers, thereby signing the seal.
6. Connect the KITAS sensor cable (4) to the KITAS 2171 via a bayonet-type connection.

Comment

The KITAS 2171 secured by the lead sealing may not be removed or taken out of commission without the seal parts being destroyed or suffering recognisable damage.

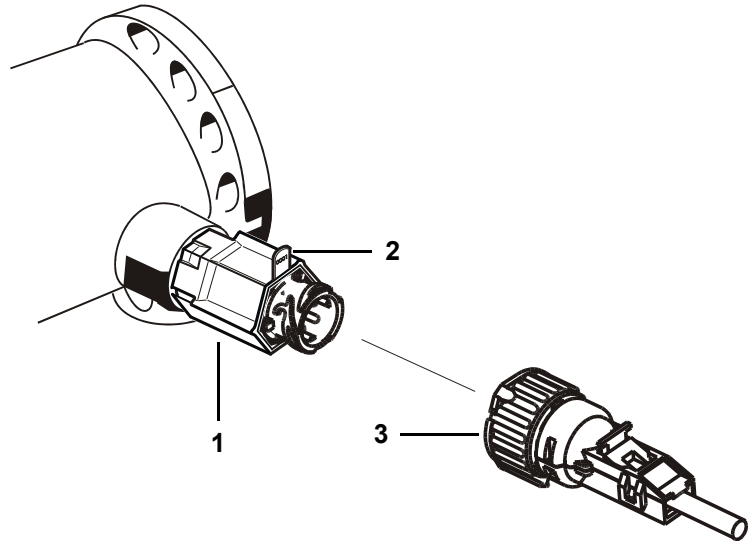
Observe the instructions on sealing, see chapter 5.2.4 "Lead sealing the DTCO 1381 components", page 121.

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With KITAS hexagonal seal

Comment

The following description describes the procedure for using the KITAS 2171 in the integrated, screw-in version. In the case of the other methods of installation, the procedure is identical.



*Illustration 41: Sealing the KITAS 2171 at the transmission
(with KITAS hexagonal seal)*

- 1.** If required, remove the KITAS sensor cable **(3)** from the KITAS 2171.
- 2.** Clamp the bracket at the KITAS seal **(2)** using seal crimpers, thereby signing the seal.
- 3.** Then slide the KITAS seal **(1)** onto the KITAS 2171 until it locks into place.
- 4.** Connect the KITAS sensor cable **(3)** to the KITAS 2171 via the bayonet-type connection.

Comment

Observe the instructions on sealing, see chapter 5.2.4 "Lead sealing the DTCO 1381 components", page 121.

The KITAS 2171 secured by the lead sealing may not be removed or taken out of commission without the seal parts being destroyed or suffering recognisable damage.

5.5.6 Installing the M1N1 adapter

Comment

In vehicles of class M1 or N1, in which the installation of a KITAS is mechanically not possible, the M1N1 adapter supplies the signals for recording the speed and the distance travelled.

The M1N1 adapter may be installed into vehicles of class M1 or N1 with initial registration between May 1, 2006 and December 31, 2013.



Your VDO service partner will give you detailed information concerning the installation of the M1N1 adapter, vehicle-specific installation proposals, and installation accessories.

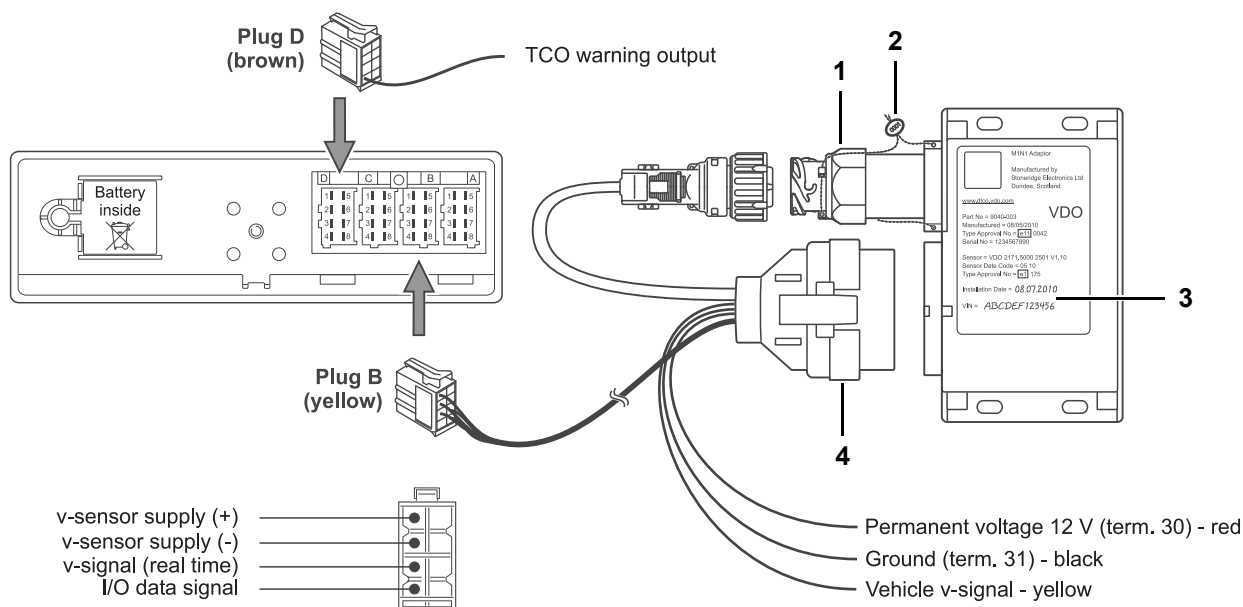


Illustration 42: Installing the M1N1 adapter

1. Use sealing wire (2) to seal the KITAS 2171 (1) to the housing of the M1N1 adapter.
2. Enter the installation date and the vehicle identification number on the model plate (3) and secure the model plate by means of a sealing foil.
3. Mount the function control LED in the vehicle and connect it to the vehicle's on-board power supply (ignition, terminal 15) and the DTCO 1381 (TCO warning output, D4).
4. Connect the connection line (4) to the vehicle's on-board power supply and the DTCO 1381 (yellow plug B).
5. Connect the connection line with the M1N1 adapter and mount the M1N1 adapter in the vehicle.

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5.5.7 Preparing the radio compartment

Assembling installation frame in the radio compartment

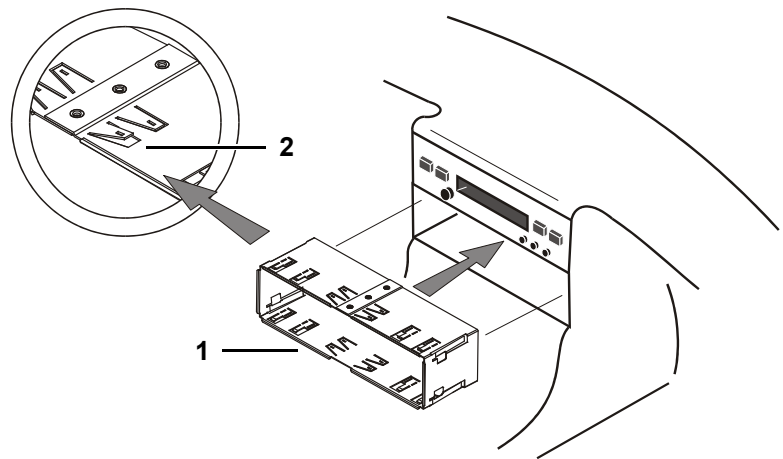


Illustration 43: Assembling installation frame in the radio compartment

- 1.** Insert the installation frame (1).
- 2.** Use a screwdriver to bend up cut-outs (2) with a screwdriver and hook them onto the dashboard so that the installation frame is sitting firmly in the radio compartment.
- 3.** Lay all connection cables to the DTCO 1381 through the installation frame.

Comment



When using a specific vehicle installation frame always observe the specifications of the vehicle manufacturer.

Checking the radio compartment with the installation frame

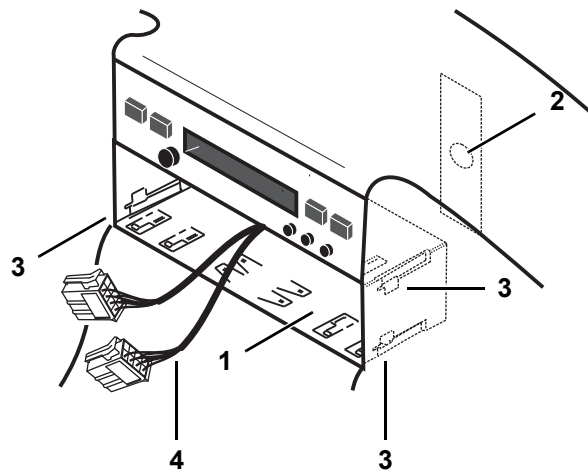


Illustration 44: Checking the radio compartment with the installation frame

1. Checking the radio compartment with the installation frame:
 - The required installation frame (1) installed and fixed in place.
 - Additional support (2) at the rear of the radio compartment.
 - Clearance for claw hold (3) of the DTCO 1381.
 - All connection cables (4) are laid through the installation frame.

Preparing the DTCO 1381 for mounting into the radio compartment

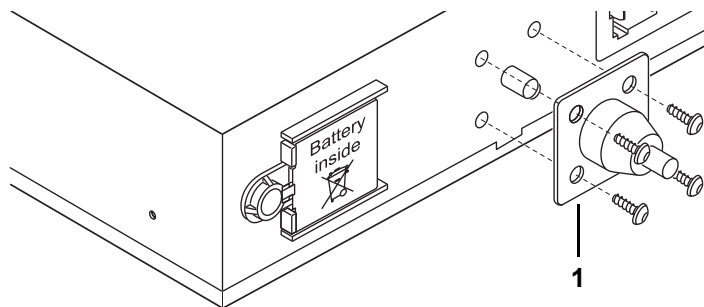


Illustration 45: Preparing the DTCO 1381 for mounting into the radio compartment

1. Check whether the spacer (1) is necessary for support at the rear of the compartment.
2. If necessary, screw the spacer to the rear of the housing of the DTCO 1381.

5.5.8 Connecting the DTCO 1381 to the vehicle's electric system

Follow the following procedure in the proper order to connect the DTCO 1381 to the vehicle's electric system:

- 1.** Connection plug B (motion sensor KITAS 2171, v-outputs).
- 2.** Connection plugs C (CAN bus, n-system*) and D (info interface, additional functions*).
- 3.** Connection plug A (power supply, CAN bus).
- 4.** If necessary, mount and seal the plug cover.



To prevent unauthorised handling you can also mount and seal the plug cover which is available as an accessory.

Installation and sealing of the plug cover is, however, not required by law.

* *Option*

Connection plug B

Comment

The speed signal of the DTCO 1381 (v-impulse output) may be used for components/systems which are critical for safety, only with an independent plausibilization of the signal.

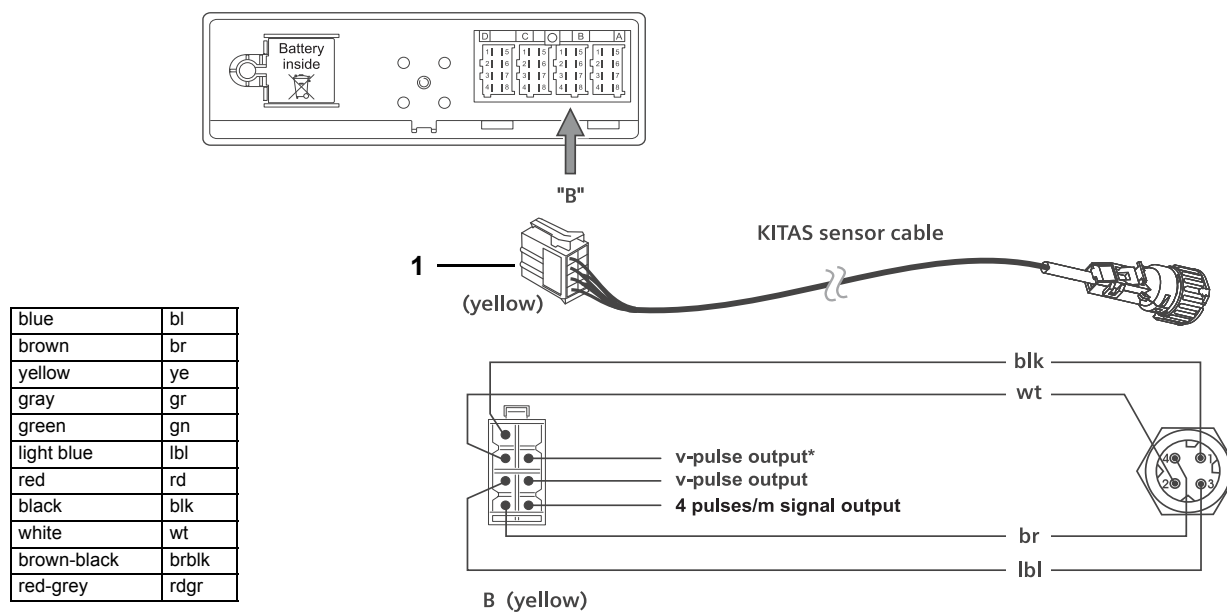


Illustration 46: Connect DTCO 1381 with KITAS 2171

1. Insert the yellow plug (1) of the KITAS sensor cable into the connection plug "B" on the DTCO 1381.

Comment

The KITAS sensor cable must meet special requirements, see chapter 2.2.5 "KITAS Sensor cable", page 53.

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Connection plugs C and D

Comment



The pin assignments and connection diagram may vary depending on the version of the DTCO 1381.

The speed signal of the DTCO 1381 (v-impulse output) may be used for components/systems which are critical for safety, only with an independent plausibilization of the signal.

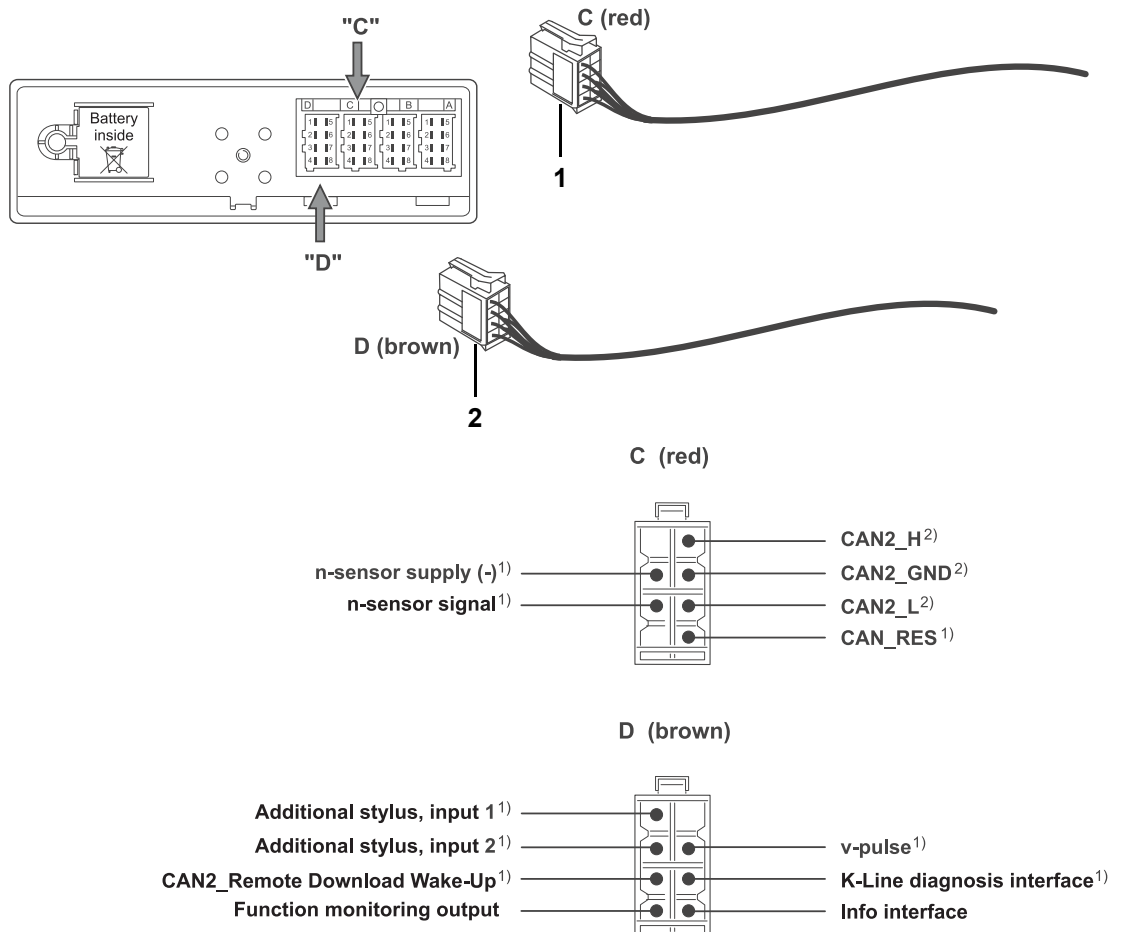


Illustration 47: Connect the DTCO 1381 connection plugs C and D

1. Insert the red plug (1) into connection plug "C" and the brown plug (2) into connection plug "D" on the DTCO 1381.

1) Option

2) Option CAN2 with second CAN driver, independent of CAN1

Connection plug A



Caution! Danger of short circuits

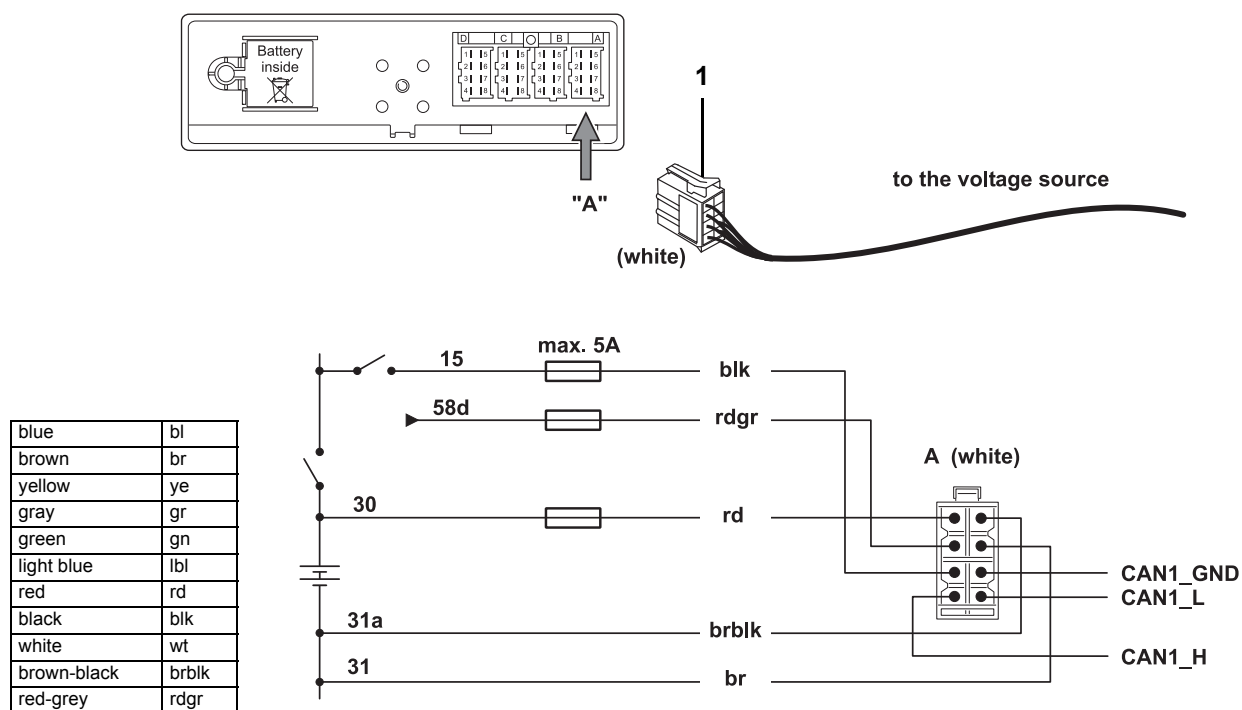
Always observe the vehicle manufacturer's instructions when executing the following work steps!



Attention!

The DTCO 1381 has an electrically conductive casing.

Therefore make sure that no current to other loads will flow over the housing of the DTCO 1381.



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Illustration 48: Connect the DTCO 1381 connection plug A

1. Separate the vehicle's battery from the on-board power supply.
or
Interrupt the respective power circuit by removing the fuse.
2. Then insert the white plug (1) into the connection plug "A" on the DTCO 1381.
3. Reconnect vehicle battery.
or
Re-insert the fuses.

Connect the DTCO 1381 connection plug A "Ground shutdown"



Warning! Danger of short circuits

Always observe the vehicle manufacturer's instructions when executing the following work steps!



Attention!

The DTCO 1381 has an electrically conductive casing.

Therefore make sure that no current to other loads will flow over the housing of the DTCO 1381.

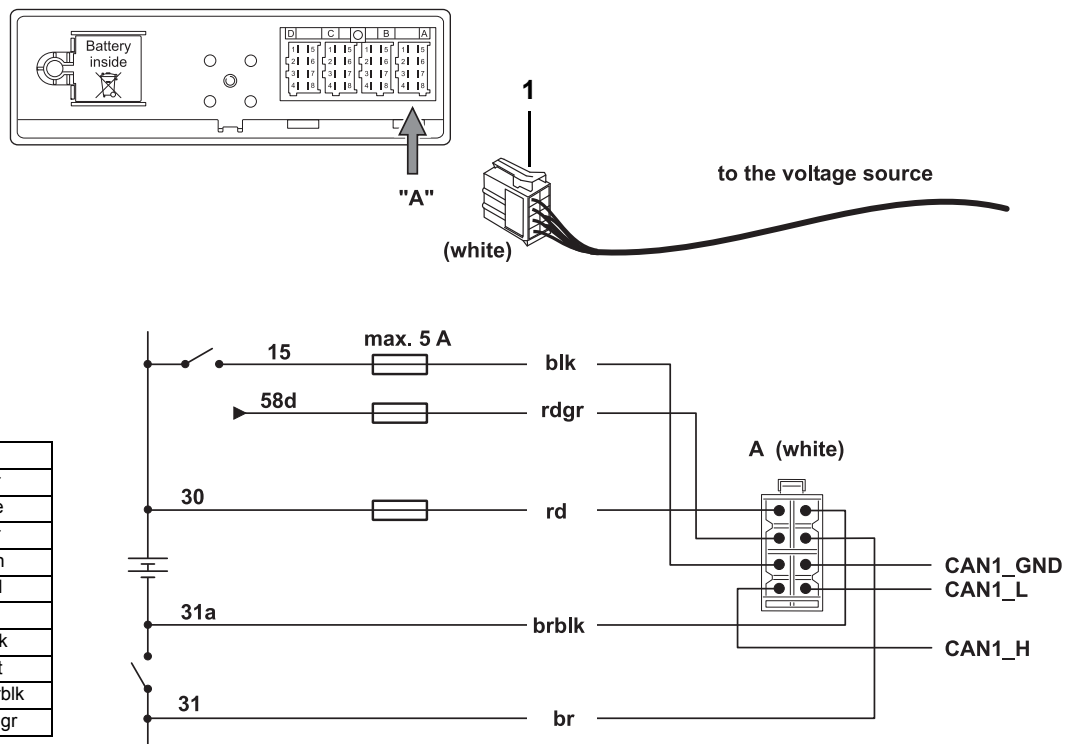


Abb. 49: DConnect the DTCO 1381 connection plug A "Ground shutdown"

1. Separate the vehicle's battery from the on-board power supply
or
Interrupt the respective power circuit by removing the fuse.
2. Then insert the white plug (1) into the connection plug "A" on the DTCO 1381.
3. Reconnect vehicle battery.
or
Re-insert the fuses.

5.5.9 Mounting the DTCO 1381

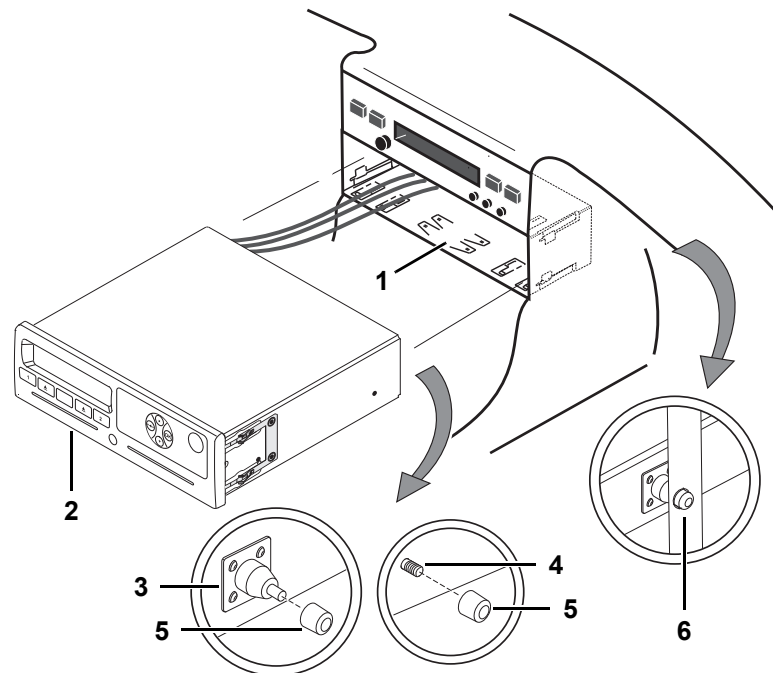



Illustration 50: Mounting the DTCO 1381 in the radio compartment

- 1.** On the rear of the DTCO 1381 (2) press the mounting cap (5) onto the spacer (3) or the threaded bolt (4).
- 2.** Then push the DTCO 1381 into the mounting frame (1) until it engages in the frame and the cover is flush with the console.

Comment 

There is usually a mounting bracket with a hole (6) on the rear wall of the radio compartment. When the DTCO 1381 is pushed in, the fastening cap (5) locks into this hole.



Attention!

When inserting the DTCO 1381 into the installation frame, make sure that none of the cables become pinched and damaged!

Removing the DTCO 1381

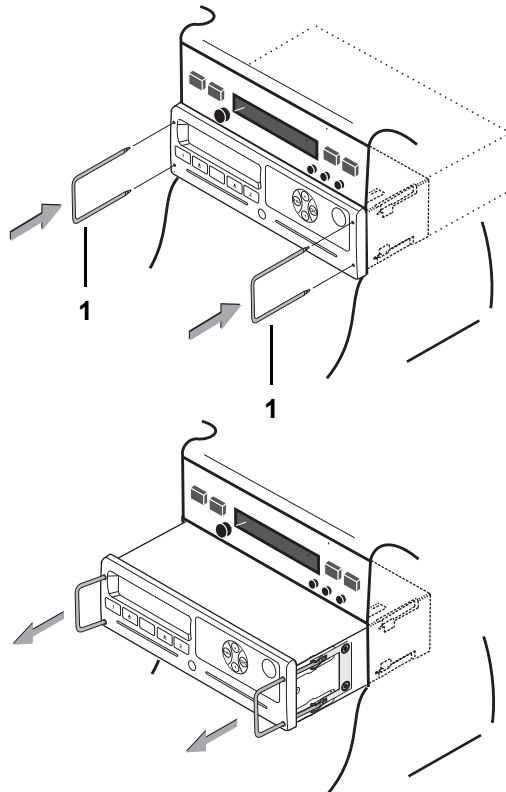


Illustration 51: Removing the DTCO 1381 from the radio compartment

- 1.** Feed the removal aids **(1)** into the openings on both outer sides of the DTCO 1381 until the engagement springs release.
- 2.** Then press the removal aids lightly to the outside and pull the DTCO 1381 from the radio compartment.

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Chapter 6

Installation of the ADR variant

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6.1 DTCO 1381 in vehicles for the carriage of dangerous goods

This chapter describes – supplementary to chapter 5 "Installation" from page 113 – only the additional or different instructions, requirements, and work steps for correct installation of the DTCO 1381 components in a vehicle for the carriage of dangerous goods.

6.1.1 Legal requirements

EC-specific

Special laws, regulations, and standards apply to vehicles used for the carriage of dangerous goods:

- ADR part 9
- EN 50014 requirements
- EN 50020 requirements
- EN 50021 requirements
- EC directives 94/9/EC; 94/55/EC; 98/91/EC
- CR (EEC) No. 3821/85

Germany

- GGVSEB (German Directive on the transport of dangerous goods by road, rail and inland waterways)

ADR 2009

The following applies in accordance with the provisions of ADR 2009:

All components and wires in the electrical system that must remain under voltage when the battery disconnect switch is open must:

- be suitable for usage within a danger zone and
- comply with the general regulations of the IEC standard 60079 parts 0 and 14 as well as the applicable regulations in parts 1, 2, 5, 6, 7, 11, 15, or 18.

IEC standard 60079, part 14

The following classification applies to the application of the IEC standard 60079, part 14:

Components and wires in the electrical system that must remain under voltage when the battery disconnect switch is open must fulfil the following regulations:

- Zone 1, electrical equipment in general or zone 2, electrical equipment in the driver's compartment.
- Explosion group IIC, temperature class T6.

Components and wires of the electrical system whose ambient temperature exceeds, induced to non-electrical equipment, the temperature class T6 must:

- achieve the temperature class T4 or higher.

Alternatively, the general regulations of the standard EN 50014 and the additional regulations of the standards EN 50015 to 50021 or 50028 can be applied.

ADR identification

Vehicles used for the carriage of dangerous goods require special approval and must be marked accordingly.

6.1.2 Tachograph system requirements

The tachograph system consists of the EC recording equipment DTCO 1381 and the motion sensor KITAS 2171.



An attached display instrument is not part of the tachograph system and must be switched to a dead (electrical) condition by opening the battery disconnect switch (ADR operation).

Tachographs systems fitted to vehicles used for the carriage of dangerous goods must be constructed accordingly:

- The EC recording equipment is fitted with the necessary special equipment and is marked accordingly.
- The tachograph system has intrinsically safe circuitry between the EC recording equipment and the sensor.

EC type-approval certificate DTCO 1381

An EC type-approval certificate in accordance with EN 50021 protection type "n" was issued for the DTCO 1381; for the sensor interface an EC type-approval certificate was issued in accordance with EN 50020, intrinsic safety "ib" as an associated intrinsically-safe device.

EC type-approval certificate KITAS 2171

For the KITAS 2171, an EC type-approval certificate was issued according to EN 50020, intrinsic safety "ib", as an intrinsically-safe device.

6.1.3 Requirements for the connection of external devices

The connection of external devices to the interfaces of the DTCO 1381 is permissible only when these devices fulfil the following requirements:

- The devices must be switched to a dead (electrical) condition in the intended operation (loading and unloading dangerous goods).
- The data lines must be installed inside the driver's compartment.



Warning! Danger of explosion

In explosion-risk environments, the connection of external devices to the download interface of the DTCO 1381 is not permitted during proper operation - state of operation "Loading and unloading dangerous goods"!

Application default info interface (pin D8)

Additionally devices for the connection to the info interface (pin D8) must have the following electrical characteristics at their input:

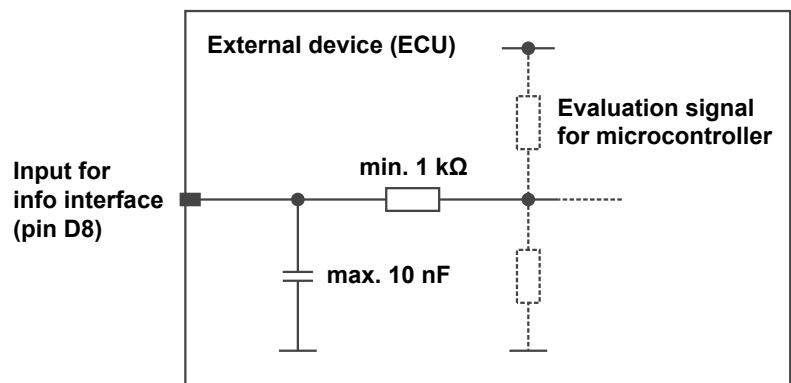


Illustration 52: Application default info interface (pin D8)



Attention!

The mentioned requirements for the connection of external devices to the interfaces of the DTCO 1381 and the application default for the info interface (pin D8) are part of the certificate of conformity and must be absolutely kept with the installation in the vehicle.

6.1.4 Identification of the tachograph system

Digital Tachograph DTCO 1381

Device front side
(ADR variant)



Illustration 53: DTCO 1381 Front side (ADR variant)

(1) Labeling of the device front side

Model plate DTCO 1381
(ADR variant)

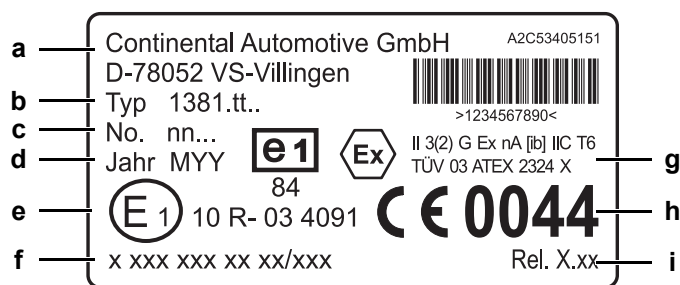


Abb. 54: Model plate DTCO 1381 (ADR variant)

- (a) Manufacturer
- (b) Device type - product key
- (c) Series number
- (d) Year or date of manufacture
- (e) Test/approval mark
e1-84 (EC recording device), E1 10R- 03 4091 (EMC)
- (f) External item number
- (g) ADR approval mark: II 3(2)G Ex nA [Ib] IIC T6
TÜV 03 ATEX 2324X
- (h) Conformity mark
- (i) Release status

Comment



The product key (pos. (b)) shows whether the marking is **with** or **without** IMS function, see chapter 1.2.3 "DTCO 1381 Product versions", page 27.

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6.1.5 KITAS 2171 pulse generator

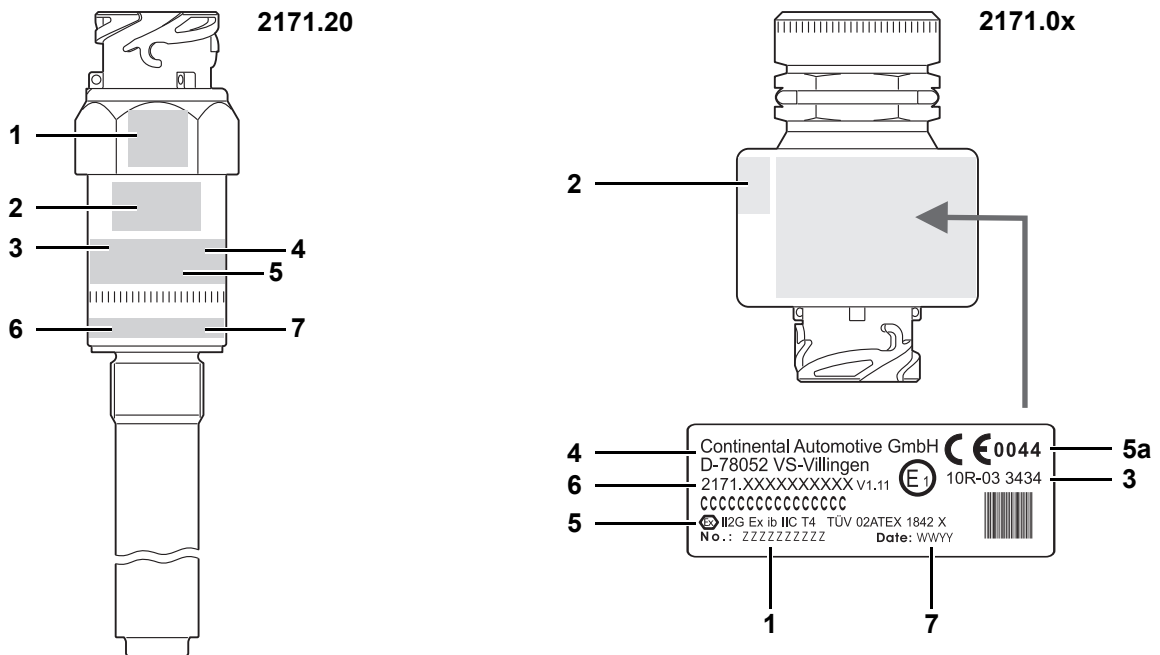


Illustration 55: KITAS 2171 pulse generator, product marking

- (1) Serial number
(visible from KITAS 2171 Version 2+, no. 10 xxx xxx)
- (2) EEC design approval: -175
- (3) EMC type approval: 10 R- 03 3434
- (4) Manufacturer: Continental Automotive GmbH VS-Villingen
- (5) Approval mark / conformity label:
 II2G Ex ib IIC T4 0044 TÜV 02 ATEX 1842 X
- (5a) Conformity mark
- (6) Model designation: 2171.xx xxxx V1.11
V1.11 = KITAS 2171 Version 2+
- (7) Production date: WWYY

WWYY (week/year)

WW= Week of production			
01	Calendar week 01	03	Calendar week 03
02	Calendar week 02	:	:
YY= Year of production			
:	:	12	2012
10	2010	:	:
11	2011		

6.2 Performing the installation

6.2.1 Installation instructions

Notes

When installing the DTCO 1381 (ADR variant) into a vehicle used for the carriage of dangerous goods, the following instructions must be complied with:

- The DTCO 1381 was designed for installation in a radio compartment. In order to preserve the protection afforded by the housing of the ADR variant, installation is permitted in a radio compartment only.
- Circuits that carry current continuously must comply with the regulations of the usual EN standards to the explosion protection and of ADR.
- No additional units or loads may be connected to the intrinsically-safe electrical circuit.
- All electrical wires must be fastened well and placed in a way that protects them from mechanical and thermal stress.
- Electrical wires outside of the driver's compartment must be protected against impact, wear, and abrasions when the vehicle is in operation. This can be achieved by means of:
 - a protective covering or corrugated tubing made of polyamide
 - a protective covering or corrugated tubing made of polyurethane
 - metal wire mesh with inner and outer wrappings.
- Plug connections must be locked in place in order to prevent unintended loosening.
- The zone approval or zone division must be observed for the safety device.
- The length of the sensor cable may not exceed 20 meters.
- When connecting external devices to the download-, remote or info interface (pin D8) of the DTCO 1381 the chapter 6.1.3 "Requirements for the connection of external devices", page 151, are to be considered.



Please note!

Only authorized repair centers may perform repairs to the DTCO 1381 and the KITAS 2171!

Never attempt to open or make changes to the DTCO 1381 and the KITAS 2171.

6.2.2 Voltage supply and CAN1 connection (ADR variant)



Please note!

- The DTCO 1381 has an electrically conductive casing. Therefore make sure that no current to other loads will flow over the housing of the DTCO 1381.
- Until the next gateway (node), the CAN1 connection must not leave zone 2 (cabin)!
- **Exception:** Device type **1381.4xxx**, page 27. In combination with D3 (CAN1 On/Off), a connection into zone 1 is possible!

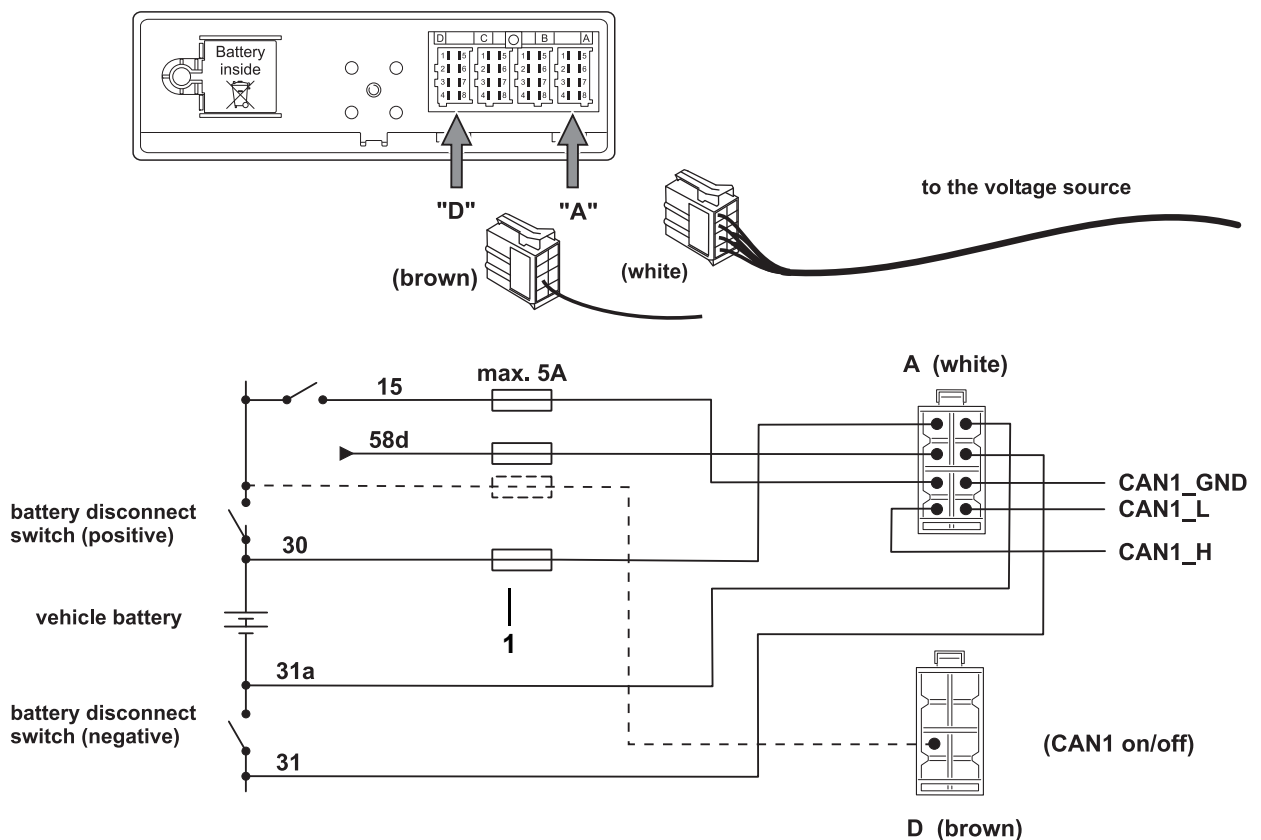


Illustration 56: Voltage supply connection and CAN1 connection (ADR variant)

1. Separate the vehicle's battery from the on-board power supply
or
Interrupt the respective power circuit by removing the fuse.
2. Then insert the wire on the DTCO 1381 into the connection plug "A".
3. Reconnect vehicle battery.
or
Re-insert the fuses.

Comment



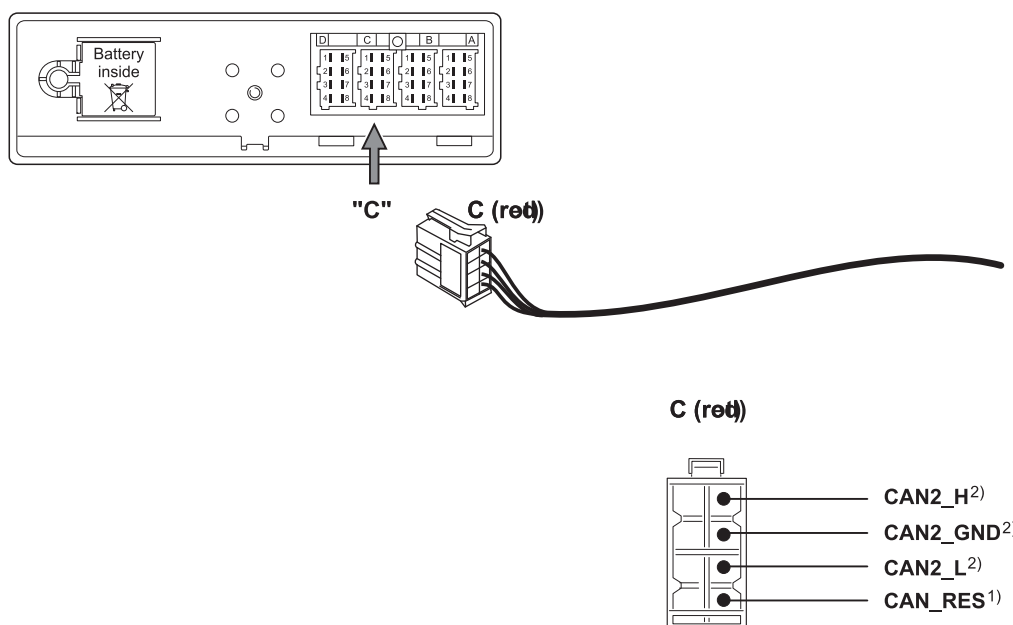
Observe the guidelines in EN 50020 and the connection specifications of the DTCO 1381 for the sizing of the fuse **(1)** and the diameter of the wires, see chapter 2.1.3 "Connection specifications", page 39.

6.2.3 CAN2 connection (ADR variant)



Please note!

CAN2 may only be connected with devices which are within zone 2 (cabin)!



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Abb. 57: CAN2 connection (ADR variant)

1. Separate the vehicle's battery from the on-board power supply
or
Interrupt the respective power circuit by removing the fuse.
2. Then insert the wire on the DTCO 1381 into the connection plug "D".
3. Reconnect vehicle battery.
or
Re-insert the fuses.

1) Option

2) CAN2 option with second CAN driver, independent of CAN1

6.2.4 KITAS 2171 intrinsically safe circuitry

Comment

The speed signal of the DTCO 1381 (v-impulse output) may be used for components/systems which are critical for safety, only with an independent plausibilization of the signal.

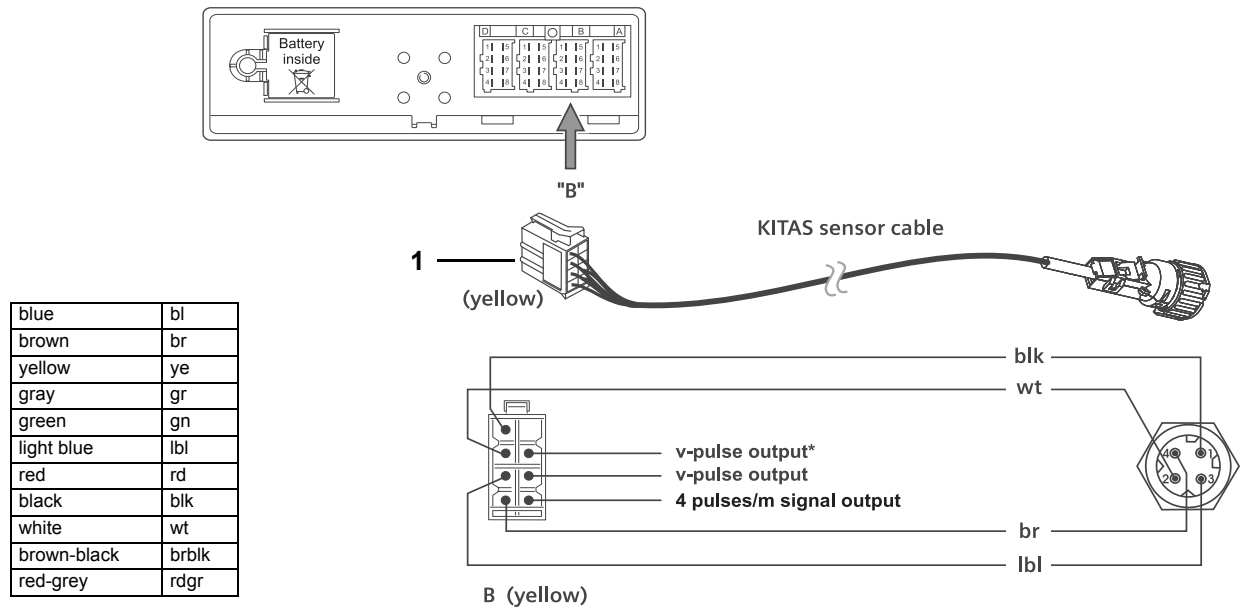


Illustration 58: KITAS 2171 intrinsically safe circuitry

1. Insert the yellow plug (1) of the KITAS sensor cable into the connection plug "B" on the DTCO 1381.

6.3 EU Certificate of Conformity

6.3.1 DTCO 1381



Interior


EG-Konformitätserklärung nach Richtlinie Nr. 94/9/EG (ATEX)

EC Declaration of Conformity under the terms of Directive No. 94/9/EC (ATEX)

Nr. HOM_001

Wir erklären hiermit als Hersteller, dass die nachstehend beschriebene Einrichtung die Anforderungen der Richtlinie Nr. 1994/9/EG vom 23. März 1994 für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen erfüllt.

We as manufacturer hereby declare that the following described equipment complies with the fundamental requirements of the Directive No. 94/9/EC of 23 March 1994 concerning equipment and protective systems intended for use in potentially explosive atmospheres.

Hersteller Manufacturer	Continental Automotive GmbH Heinrich-Hertz-Str. 45, 78052 Villingen-Schwenningen
Gerät Equipment	Digitaler Tachograph Typ DTCO 1381.x Digital tachograph type DTCO 1381.x
EG-Baumusterprüfbescheinigung EC type examination certificate	TÜV 03 ATEX 2324 X
Benannte Stelle Notified body	TÜV NORD CERT GmbH, Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, DE 0044
GeräteKennzeichnung Marking of the equipment	 II3(2)G Ex nA [ib] IIC T6
Verwendete harmonisierte Normen Used harmonized standards	EN 60079-0: 2006 EN 60079-11: 2007 EN 60079-15: 2005
Andere angewandte Richtlinien Other used directives	VO (EWG) Nr. 3821/85, ECE R10, RL 72/245/EWG

VS-Villingen, den / the 2010-06-22

Continental Automotive GmbH

Winfried Rogenz
Head of Homologation

Name / Name
Funktion / function

Unterschrift
signature

Thomas Hausmann
Head TTS Product and Project Quality

Name / Name
Funktion / function

Unterschrift
signature

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the conformity to the specified directives but does not imply any warranty for properties. The safety documentation accompanying the product shall be considered in detail.

Continental Automotive GmbH
Heinrich-Hertz-Str.45
78052 Villingen-Schwenningen

Telefon +49 (7721) 67-0
Telefax +49 (7721) 8747
www.continental-corporation.com

Sitz der Gesellschaft: Hannover
Registergericht: Hannover,
HRB 59424,
USt-Id. Nr. DE814950663

Geschäftsführer:
Heinut Matschi,
Gérard Cordonnier,
Harald Stuhlmann

TD00.1381.20 101 102

Illustration 59: DTCO 1381 (ADR variant) EC Declaration of Conformity

6.3.2 KITAS 2171



Interior

EG-Konformitätserklärung nach Richtlinie Nr. 94/9/EG (ATEX)*EC Declaration of Conformity under the terms of Directive No. 94/9/EC (ATEX)*

Nr. HOM_003

Wir erklären hiermit als Hersteller, dass die nachstehend beschriebene Einrichtung die Anforderungen der Richtlinie Nr. 1994/9/EG vom 23. März 1994 für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen erfüllt.

We as manufacturer hereby declare that the following described equipment complies with the fundamental requirements of the Directive No. 94/9/EC of 23 March 1994 concerning equipment and protective systems intended for use in potentially explosive atmospheres.

Hersteller
Manufacturer

Continental Automotive GmbH

Heinrich-Hertz-Str. 45, 78052 Villingen-Schwenningen

Gerät
Equipment

Weg- und Geschwindigkeitsgeber Typ KITAS 2171.xx
Motion sensor type KITAS2171.xx

EG-Baumusterprüfbescheinigung
EC type examination certificate

TÜV 02 ATEX 1842 X

Benannte Stelle
Notified body

TÜV NORD CERT GmbH, Geschäftsstelle Hannover, Am TÜV 1,
30519 Hannover, CE 0044

Gerätekennzeichnung
Marking of the equipment



II 2 G Ex ib IIC T4

Verwendete harmonisierte Normen
Used harmonized standards

EN 60079-0:2006

EN 60079-11: 2007

Andere angewandte Richtlinien
Other used directives

VO (EWG) Nr. 3821/85, ECE R10, RL 72/245/EWG

VS-Villingen, den / the 2010-06-22

Continental Automotive GmbH

Winfried Rogenz
Head of Homologation

Name / Name
Funktion / function

Unterschrift
signature

Thomas Hausmann
Head TTS Product and Project Quality

Name / Name
Funktion / function

Unterschrift
signature

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the conformity to the specified directives but does not imply any warranty for properties. The safety documentation accompanying the product shall be considered in detail.

Continental Automotive GmbH
Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen

Telefon +49 (7721) 67-0
Telefax +49 (7721) 8747
www.continental-corporation.com

Sitz der Gesellschaft: Hannover
Registergericht: Hannover,
HRB 59424,
USt-Id. Nr. DE814950663

Geschäftsführer:
Helmut Matschi,
Gérard Cordonnier,
Harald Stuhlmann

Illustration 60: KITAS 2171 EC Declaration of Conformity

6.4 EC type-examination certificate

6.4.1 DTCO 1381



EG-Baumusterprüfbescheinigung

- (2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**
- (3) EG Baumusterprüfbescheinigungsnummer
TÜV 03 ATEX 2324 X
- (4) Gerät: Digitaler Tachograph Typ DTCO 1381.x
- (5) Hersteller: Siemens VDO Automotive AG
- (6) Anschrift: Heinrich-Hertz-Straße 45
 D-78052 Villingen-Schwenningen
- (7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.
- (8) Die TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Zertifizierungsstelle, bescheinigt als benannte Stelle Nr. 0032 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.
 Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr. 04YEX551131 festgelegt.
- (9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit
EN 50014+A1+A2:1997 EN 50020:2002 EN 50 021: 1999
- (10) Falls das Zeichen "X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.
- (11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.
- (12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:



II 3 (2) G EEx n A [ib] IIC T6

TÜV NORD CERT GmbH & Co. KG
 TÜV CERT-Zertifizierungsstelle
 Am TÜV 1
 D-30519 Hannover
 Tel.: 0511 986-1470
 Fax: 0511 986-2555

Hannover, 02.11.2004

Der Leiter



Diese EG-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
 Auszüge oder Änderungen bedürfen der Genehmigung der TÜV NORD CERT GmbH & Co. KG

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Illustration 61: DTCO 1381 (ADR variant) EC type-examination certificate, page 1



(13)

ANLAGE(14) **EG-Baumusterprüfbescheinigung Nr. TÜV 03 ATEX 2324 X**

(15) Beschreibung des Gerätes

Der Digitale Tachograph Typ DTCO 1381.x dient zusammen mit einem Weg- und Geschwindigkeitsgeber Typ KITAS 2171.xx zur Überwachung von Fahrzeugen zum Transport brennbarer Flüssigkeiten oder Gasen.

Der Digitale Tachograph Typ DTCO 1381.x wird bestimmungsgemäß in das Führerhaus eines Kraftfahrzeuges eingebaut. Das Führerhaus darf als explosionsgefährdeter Bereich betrachtet werden, in dem Betriebsmittel der Kategorie 3 erforderlich sind.

Der Digitale Tachograph Typ DTCO 1381.x ist auch ein zugehöriges elektrisches Betriebsmittel mit eigensicheren Stromkreisen.

Der Explosionsschutz des Digitalen Tachographen Typ DTCO 1381.x ist bei Stillstand des Fahrzeuges und geöffnetem Batterietrennschalter gegeben.

Der zulässige Umgebungstemperaturbereich ist -25°C ... 70°C.

Elektrische Daten

Versorgungsstromkreis dauernde Versorgung aus der Fahrzeugbatterie
(Anschlüsse A1[30] und A5[31a] am Steckverbinder) $U_n = 24\text{ V}$

Zündungs-System Versorgung über den Batterietrenn- und
(Anschlüsse A2[58d], A3[15], Zündungsschalter aus der Fahrzeugbatterie
und A6[31] am Steckverbinder) $U_n = 24\text{ V}$

übrige Daten- und
Signalstromkreise elektrische Daten gemäß Angaben des Herstellers

Versorgungs- und
Signalstromkreise in Zündschutzart Eigensicherheit EEx ib IIC
(Anschlüsse B1, B2, B3 und B4 am Steckverbinder)
Höchstwerte:
 $U_o = 9,7\text{ V}$
 $I_o = 36\text{ mA}$
 $P_o = 320\text{ mW}$
Kennlinie: trapezförmig
nur zum Anschluss an den
Weg- und Geschwindigkeitsgeber
Typ KITAS 2171.xx gemäß der
EG-Baumusterprüfbescheinigung TÜV 02 ATEX 1842 X
Für die Zusammenschaltung ist eine Leitungslänge von
20 m zulässig.

Die eigensicheren Stromkreise sind galvanisch mit den nichteigensicheren Stromkreisen verbunden.

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Illustration 62: DTCO 1381 (ADR variant) EC type-examination certificate, page 2



Anlage EG-Baumusterprüfbescheinigung Nr. TÜV 03 ATEX 2324 X

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 04YEX551131 aufgelistet.

(17) Besondere Bedingungen

1. Der zulässige Umgebungstemperaturbereich ist dieser EG-Baumusterprüfbescheinigung bzw. der Betriebsanleitung des Herstellers zu entnehmen.
2. Der Digitale Tachograph Typ DTCO 1381.x darf nur in das hierfür vorgesehene Radiofach an beliebiger Stelle im Führerhaus eines Kraftfahrzeuges eingebaut werden.
3. Das Verbinden und Unterbrechen sowie das Schalten von nicht eigensicheren Stromkreisen unter Spannung ist nur bei der Installation, der Wartung oder für Reparaturzwecke zulässig.
4. Der Betrieb des Digitalen Tachographen Typ DTCO 1381.x darf bei geschlossenem Batterie Hauptschalter nicht in explosionsfähiger Atmosphäre erfolgen.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

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Illustration 63: DTCO 1381 (ADR variant) EC type-examination certificate, page 3



4. E R G Ä N Z U N G

zur Bescheinigungsnummer: TÜV 03 ATEX 2324 X

Gerät: Digitaler Tachograph Typ DTCO 1381.x

Hersteller: Continental Automotive GmbH

Anschrift: Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen

Auftragsnummer: 8000555959

Ausstellungsdatum: 11.05.2010

Änderungen:

Die Änderungen dieser vierten Ergänzung umfassen ausschließlich die Bewertung des Gerätes für die Normengenerationänderung (EN 50014+A1+A2:1997 nach EN 60079-0:2006, EN 50020:2002 nach EN 60079-11:2007 und EN 50021:1999 nach EN 60079-15:2005).

Die elektrischen Daten sowie alle weiteren Angaben gelten unverändert für diese Ergänzung.

Die Kennzeichnung lautet zukünftig wie folgt:

 II 3(2) G Ex nA [ib] IIC T6

Das Gerät incl. dieser Ergänzung erfüllt die Anforderungen der folgenden Normen:

EN 60079-0:2006 **EN 60079-11:2007** **EN 60079-15:2005**

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 10 203 555959 aufgelistet.

(17) Besondere Bedingungen

keine zusätzlichen

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, akkreditiert durch die Zentralstelle der Länder für Sicherheitstechnik (ZLS), Ident. Nr. 0044, Rechtsnachfolger der TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

Der Leiter der Zertifizierungsstelle



Schwedt
Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

Illustration 64: DTCO 1381 (ADR variant) EC type-examination certificate, 4. supplement

6.4.2 KITAS 2171

(1) **EG-Baumusterprüfbescheinigung**(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG Baumusterprüfbescheinigungsnummer

TÜV 02 ATEX 1842 X

(4) Gerät: Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx

(5) Hersteller: Siemens VDO Automotive AG

(6) Anschrift: Heinrich-Hertz-Straße 45
D-78052 Villingen-Schwenningen

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Zertifizierungsstelle, bescheinigt als benannte Stelle Nr. 0032 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr. 02YEX169668 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997**EN 50020:1994**

(10) Falls das Zeichen "X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

II 2 G EEx Ib IIC T4

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Der Leiter

Hannover, 05.08.2002

**TÜV NORD CERT**

TUV CERT A4 0701 10 000 L6

Diese EG-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung der TÜV NORD CERT GmbH & Co. KG

Seite 1/2

Illustration 65: KITAS 2171 EC type-examination certificate, page 1

TD00.1381.20 101 102

(13) **ANLAGE**(14) **EG-Baumusterprüfbescheinigung Nr. TÜV 02 ATEX 1842 X**

(15) Beschreibung des Gerätes

Der Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx dient zusammen mit einem EG-Kontrollgerät Typ MTCO 1324 zur Überwachung von Fahrzeugen zum Transport brennbarer Flüssigkeiten.

Der Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx wird an der Getriebeeinheit des Fahrzeuges installiert und versorgt das EG-Kontrollgerät mit Wegimpulsen.

Der Explosionsschutz des Weg- und Geschwindigkeitsgebers Typ KITAS 2170.xx ist bei Stillstand des Fahrzeuges gegeben.

Der zulässige Umgebungtemperaturbereich ist -40°C ... 120°C .

Elektrische Daten

Versorgungs- und

Signalstromkreise in Zündschutzart Eigensicherheit EEx ib IIC

(Anschlüsse

am Steckverbinder)

nur zum Anschluss an die eigensicheren Stromkreise

des Tachografen Typ MTCO 1324

gemäß der

EG-Baumusterprüfbescheinigung TÜV 02 ATEX 1850 X

Für die Zusammenschaltung ist eine Leitungslänge von 20 m zulässig.

Die eigensicheren Stromkreise sind sicher galvanisch von dem Erdpotential getrennt.

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 02YEX169668 aufgelistet.

(17) Besondere Bedingung

Der zulässige Umgebungtemperaturbereich ist dieser EG-

Baumusterprüfbescheinigung bzw. der Betriebsanleitung des Herstellers zu entnehmen.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

TD00.1381.20 101 102

BA 02 03 02

Seite 2/2

Abb. 66: KITAS 2171 EC type-examination certificate, page 2

3. E R G Ä N Z U N G

zur Bescheinigungsnummer: TÜV 02 ATEX 1842 X

Gerät: Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx

Hersteller: Continental Automotive GmbH

Anschrift: Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen

Auftragsnummer: 8000555960

Ausstellungsdatum: 12.05.2010

Änderungen:

Die Änderungen dieser dritten Ergänzung umfassen ausschließlich die Bewertung des Gerätes für die Normengenerationsänderung (EN 50014+A1+A2:1997 nach EN 60079-0:2006 und EN 50020:2002 nach EN 60079-11:2007).

Die elektrischen Daten sowie alle weiteren Angaben gelten unverändert für diese Ergänzung.

Die Kennzeichnung lautet zukünftig wie folgt:

 II 2 G Ex ib IIC T4

Das Gerät incl. dieser Ergänzung erfüllt die Anforderungen der folgenden Normen:

EN 60079-0:2006 **EN 60 079-11:2007**

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 10 203 555960 aufgelistet.

(17) Besondere Bedingungen

keine zusätzlichen

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

TÜV NORD CERT GmbH, Langemarkstraße 20, 45141 Essen, akkreditiert durch die Zentralstelle der Länder für Sicherheitstechnik (ZLS), Ident. Nr. 0044, Rechtsnachfolger der TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

Der Leiter der Zertifizierungsstelle



Schwedt

Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

Abb. 67: KITAS 2171 EC type-examination certificate, 3. supplement



4. E R G Ä N Z U N G

zur Bescheinigungsnummer: TÜV 02 ATEX 1842 X

Gerät: Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx

Hersteller: Continental Automotive GmbH

Anschrift: Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen

Auftragsnummer: 8000556226

Ausstellungsdatum: 11.01.2011

Änderungen:

Die Weg- und Geschwindigkeitsgeber Typ KITAS 2170.xx dürfen künftig auch in der Variante KITAS2+ 2171.nx, KITAS2+ 2171.20 und KITAS2+ 2171.0x entsprechend der im Prüfbericht 11 203 556226 aufgeführten Prüfungsunterlagen gefertigt werden.

Die elektrischen Daten sowie alle weiteren Angaben gelten unverändert für diese Ergänzung.

Die Kennzeichnung lautet wie folgt:

 II 2 G Ex ib IIC T4 (unverändert)

Das Gerät incl. dieser Ergänzung erfüllt die Anforderungen der folgenden Normen:

EN 60079-0:2006 **EN 60 079-11:2007**

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 11 203 556226 aufgelistet.

(17) Besondere Bedingungen

keine zusätzlichen

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, akkreditiert durch die Zentralstelle der Länder für Sicherheitstechnik (ZLS), Ident. Nr. 0044, Rechtsnachfolger der TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

Der Leiter der Zertifizierungsstelle

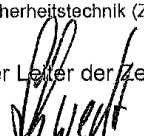

Schwedt
Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

Illustration 68: KITAS 2171 EC type-examination certificate, 3. supplement

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Chapter 7

Preprogramming

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Chapter 7 Preprogramming

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7.1 General instructions

Installation of the DTCO 1381 is divided into the following steps:

- 1. Installation**
Mechanical and electrical installation of the DTCO 1381 components into the vehicle.
- 2. Preprogramming**
Preprogramming of all known or operationally necessary and legally required parameters.
- 3. Installation and functional test**
Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.
- 4. Activation**
Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).
- 5. First calibration**
First calibration of the EC recording equipment.

7.1.1 Delivery condition of the DTCO 1381

The DTCO is delivered in the non-activated condition; the following default parameters are set at the factory:

Vehicle identification number	????????????????
Authorising member state	???
Vehicle registration number	????????????
Characteristic coefficient (w) [p/km]	8000
Recording equipment constant (k) ¹⁾ [p/km]	8000
Effective wheel circumference (l) [mm]	0000
Tire size	????????????
Legally permitted maximum speed [km/h]	0
UTC time ²⁾	hh:mm
Odometer reading [km]	0000000
Calibration date ¹⁾	01.01.85
IMS configuration (CAN, Source, Gain, Factor)	version-dependent

1) The DTCO 1381 sets this data automatically.

2) Actual UTC time; the UTC time is set for the first time at the time of production of the DTCO 1381.

7.2 Testing equipment

The preprogramming is performed with a suitable test equipment, for example, the VDO SDS test device CTC II.

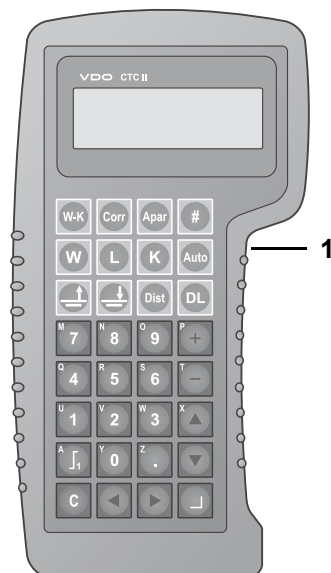


Illustration 69: SDS test device CTC II

(1) CTC II (item number A2C59512169)



For detailed information concerning VDO SDS test devices please refer to a VDO sales office.

7.3 Performing the preprogramming

Definition

Preprogramming of all known or operationally necessary and legally required parameters.

**Attention!**

During preprogramming, be absolutely certain that the DTCO 1381 is operated in the specified voltage range!

7.3.1 Legally stipulated parameters

The following parameters are legally stipulated and must be preprogrammed:

- Vehicle identification number
- Vehicle registration number¹⁾
- Country of registration¹⁾
- Characteristic coefficient (w)
- Recording equipment constant (k)²⁾
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date²⁾

1) If known, entry by the company where required.

2) The DTCO 1381 sets this data automatically.

7.3.2 Device-specific parameters

Additional device-specific parameters must be preprogrammed for operation of the DTCO 1381, e.g.:

- n-constant
- Configuration
- CAN configuration
- Product key
- Drive shaft I/U
- Production data (such as dimming parameters, limit values for n)
- Adaptation of the IMS configuration (independent motion signal)
- etc.

Comment

The settings for the device-specific parameters are dependent on the customer or device type.

7.3.3 Other parameters

Other parameters can be preprogrammed if necessary:

- Installation date
- Date of the next calibration
- etc.

7.3.4 Entering parameters



Please refer to the test device instructions for information on how to enter the calibration parameters.

Legally stipulated parameters

The following parameters are legally stipulated and must be programmed:

- Vehicle identification number
- Vehicle registration number¹⁾
- Country of registration¹⁾
- Characteristic coefficient (w)
- Recording equipment constant (k)²⁾
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date²⁾

1) If known, entry by the company where required.

2) The DTCO 1381 sets this data automatically.



The DTCO 1381 sets the calibration date and the purpose for the calibration automatically.

Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the calibration date and the purpose for the calibration.

Device-specific parameters

Depending on the variation of the DTCO 1381, other parameters that are not legally-stipulated must be programmed:

- n-constant
- Drive shaft I/U
- Adaptation of the IMS configuration (independent motion signal)
 - CAN (CAN1 or CAN2)
 - Signal source (speed = ABS; wheel = wheel speed; odometer GPS = GPS unit)
 - Conversion factor for adapting the unit of measurement
 - Factor for adaptation to the sensor signal
- etc.

Other parameter

Other parameters can be preprogrammed if necessary:

- Installation date
- Date of the next calibration
- etc.

**Attention!**

Check whether the programmed and saved parameters are according to the beforehand measured parameters.

Chapter 8

Installation and functional test

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8.1 General instructions

Installation of the DTCO 1381 is divided into the following steps:

- 1. Installation**
Mechanical and electrical installation of the DTCO 1381 components into the vehicle.
- 2. Preprogramming**
Preprogramming of all known or operationally necessary and legally required parameters.
- 3. Installation and functional test**
Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.
- 4. Activation**
Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).
- 5. First calibration**
First calibration of the EC recording equipment.

8.1.1 Installation and functional test

After preprogramming all data stipulated by the legislators and necessary for operation an installation and functional test must be performed.

This check is defined in the law CR (EEC) 3821/85, annex I B (requirement 255).

The inspection must demonstrate that the entire system, including the DTCO 1381, complies with the regulations and falls within the permissible error limits concerning distance and speed (requirement 255).

During the installation and functional test a measurement of the display errors is performed (requirement 259).

Note the legal provisions applicable in your country and check, how the installation and functional test must be performed and whether further tests of the EC recording equipment are prescribed.

Comment



The installation and functional test must be performed after every installation, i.e. in every vehicle.

If the installation and functional test is performed on a DTCO 1381 that is already activated, the detected and saved data can be evaluated.

On a DTCO 1381 that is not yet activated, the compliance with the specified error limits can be performed only visually.

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8.2 Permissible error limits

Distance

Permissible error limit of the distance measurement (on a distance of at least 1000 m):

- $\pm 1\%$ before installation
- $\pm 2\%$ during installation and during the regularly inspections
- $\pm 4\%$ during operation

Accuracy (resolution) of the distance measurement:

- at least 0,1 km

Speed

In order to achieve a permissible error limit of the displayed speed during operation of ± 6 km/h, the following influences must be considered:

- Error limit of ± 2 km/h for input deviations (such as tire deviations)
- Error limit of ± 1 km/h during installation measurements or regularly inspections

From this results the permissible error limit of the speed measurement (with speed between 20 and 180 km/h, characteristic coefficient of the vehicle between 4000 and 25000 pulses/km):

- ± 1 km/h

Comment



Due to the data storage resolution, there is another permissible error limit of ± 0.5 km/h for the speed saved by the recording equipment.

Time

Accuracy of the speed measurement:

- at least 1 km/h

Permissible time-measurement error limit:

- ± 2 seconds/day

Accuracy of the time measurement:

- at least 1 second

The time measurement is accurate to at least 1 second.

Comment



All provided accuracy data are applicable under test conditions, such as room temperature.

On a DTCO 1381 that is not activated, the compliance with all specified error limits can be performed only visually.

If the installation test is performed on a DTCO 1381 that is already activated, the detected and saved data can be evaluated.

8.2.1 Creating and sealing installation plate

After the installation and functional test, the installation plate must be visibly attached on or near the recording equipment (for example on the B-pillar or door frame).

- 1.** The following information must be transferred to the installation plate:
 - Calibration date
 - Effective wheel circumference (l, max. of four digits)
 - Characteristic coefficient (w, max. of five digits)
 - Recording equipment constant (k, five digits)
 - Vehicle identification number (max. of 17 digits)
 - Device number (max. 10 digits)
 - Tire size (max. 15 digits)
 - Name and address or company logo*.
- 2.** When using an M1N1 adapter, additionally transfer the following data to the installation plate:
 - Installation site of the M1N1 adapter
 - Cable colour vehicle v-signal
 - Series number
- 3.** Attach the installation plate where it will be easily visible.
- 4.** Secure the installation plate with sealing foil.

* The name and address or company logo of the workshop or the manufacturer may be printed on the sealing foil.

Comment



After every intervention, the installation plate must be replaced.

The installation plate must be protected with a sealing foil, unless it is installed in a way that it cannot be withdrawn without destroying the information it provides.

8.3 Check IMS function

Step / menu display	Explanation / meaning
1 <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 12:30* B* 0km/h ┌ 123456.7km ─┐ </div>	<ul style="list-style-type: none"> – Switch off the the ignition or press any button. <p>Symbol "*" means that the installed DTCO 131 is equipped with the IMS function.</p>
2 <div style="border: 1px solid black; padding: 5px; width: fit-content;"> 12:32 B 0km/h ┌ 123456.7km ─┐ </div>	<ul style="list-style-type: none"> – Switch on the ignition. <p>If the symbol "*" disappears, the DTCO 1381 is correctly connected to the ignition.</p>
3 <div style="border: 1px solid black; padding: 5px; width: fit-content;"> xALL IMS fault </div>	<ul style="list-style-type: none"> – Wait for one minute. <p>The message "xALL IMS fault" must not appear.</p> <p>If the message appears:</p> <ul style="list-style-type: none"> – Check the connection lines (CAN connection). – Check the plausability of the IMS configuration. – Check whether "Odometer GPS" is configured as the signal source and may be disturbed (vehicle is not outdoors with an unobstructed view of the sky).

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Chapter 9

Activation

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Chapter 9 Activation

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9.1 General instructions

9.1.1 Terminology definitions

Installation of the DTCO 1381 is divided into the following steps:

- 1. Installation**
Mechanical and electrical installation of the DTCO 1381 components into the vehicle.
- 2. Preprogramming**
Preprogramming of all known or operationally necessary and legally required parameters.
- 3. Installation and functional test**
Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.
- 4. Activation**
Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).
- 5. First calibration**
First calibration of the EC recording equipment.

9.1.2 Personnel prerequisites

In the following instructions, the manufacturer assumes that the personnel possess extensive professional knowledge, securely master the necessary technical activities, and have been trained in the use of the DTCO 1381 components as appropriate for the area of application.

Installation

The persons who are charged with the installation of the DTCO 1381 components must complete a training program on the installation of the DTCO 1381 components.

Activation and calibration

The persons who are charged with the activation and calibration of the DTCO 1381 components must:

- have a valid workshop card.
- complete a training program on the installation, calibration, and activation of the DTCO 1381 components.
- (in Germany) also fulfil the conditions for executing tasks according to §57b.

Comment



When installing the DTCO 1381 please obey the valid legal regulations in your country!

9.1.3 Legal requirements

CR (EEC) 3821/85, annex I B

- New recording units are delivered to installers or vehicle manufacturers in a non-activated condition.
- Before being activated, the DTCO 1381 does not save any data defined in the CR (EEC) 3821/85, annex I B and will obtain the full functionality of EC recording equipment only after being activated.
- To perform the activation, a workshop card must be inserted, the PIN must be entered, and the workshop card must be positively authenticated.
- The device must be activated before operating the vehicle within the scope of the regulation.

Comment



Note the legal provisions applicable in your country and check when and how the DTCO 1381 must be activated.

9.1.4 Pairing with the KITAS 2171

- The DTCO 1381 and the KITAS 2171 are paired together automatically during activation (the first time a workshop card is inserted).
- During the pairing process, the DTCO 1381 and the KITAS 2171 mutually authenticate each other and create a shared work key.
- "Manual" pairing (pairing with the aid of a test device) is possible only by using a workshop card on an activated DTCO 1381.
- After three pairing processes, this function will be blocked for security reasons. The workshop card must then be withdrawn and re-inserted; i.e., the workshop card must be re-authenticated.
- Each time a regularly inspection is performed, the DTCO 1381 and the KITAS 2171 must be manually paired for security reasons.



Attention!

- A power failure during the coupling can cause irreversible damage to the KITAS 2171.
- When coupling with the KITAS 2171 make sure that the DTCO 1381 is operated within the permissible voltage range!

From October 2012, the "KITAS 2171 Version 2+" must, in principle, be installed in new vehicles, chapter 2.2.4 "Product identification", page 52 or page 153.



The KITAS 2171 can be paired either with the TCO type MTCO 1324 or DTCO 1381.

With the first pairing, the KITAS 2171 is specified for one TCO type and can be used only for this TCO type!

9.1.5 Handling the tachograph cards

**Attention!**

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferrable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following instructions about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

9.2 Checking the buffer battery

The buffer battery must be replaced in the following cases to ensure reliable function of the DTCO 1381:

- During installation, activation or initial calibration if the production date of the DTCO 1381 is more than 12 months ago.
- During every regularly inspection.

Production date DTCO 1381

The production date of the DTCO 1381 is shown on the packaging and the model plate, coded as "MYY:

<i>M = Month of production</i>			
A	January	G	July
B	February	H	August
C	March	J	September
D	April	K	October
E	May	L	November
F	June	M	December

<i>YY= Year of production</i>			
:	:	12	2012
10	2010	:	:
11	2011		

1. Check the production date of the DTCO 1381.
2. If the production date of the DTCO 1381 is more than 12 months ago, replace the buffer battery of the DTCO 1381, see chapter 12.2 "Buffer battery", page 244.

9.3 Performing the activation

Definition

Activating the DTCO 1381 to be EC recording equipment (with the first insertion of the workshop card).



Attention!

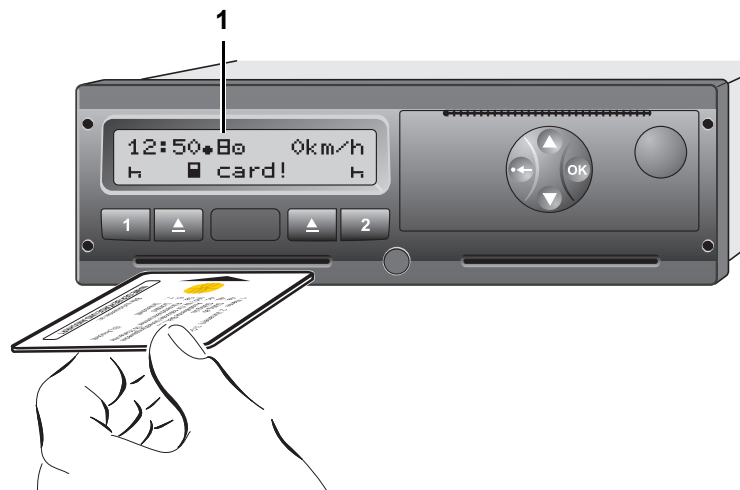
During activation, be absolutely certain that the DTCO 1381 is operated in the specified voltage range!

9.3.1 Inserting workshop card

Comment



The following instructions for "Inserting workshop card" are based on a DTCO 1381 in the production status, symbol "E" (1); i.e., the DTCO 1381 has not yet been activated to be EC recording equipment.



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Illustration 70: Inserting workshop card

1. Switch ignition on (required only for ADR variant).
2. Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
 - The subsequent procedure is menu-guided.

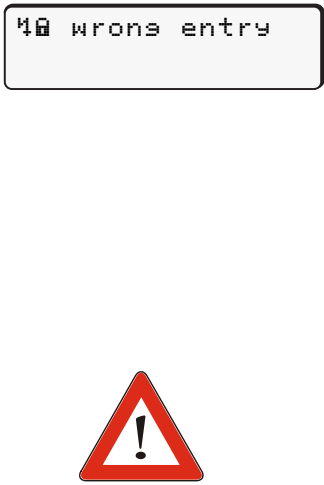


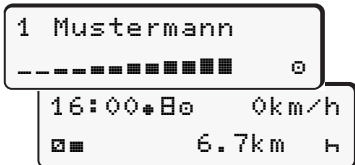
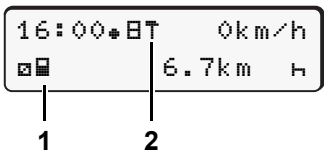

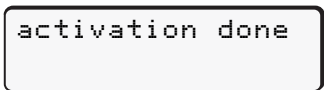
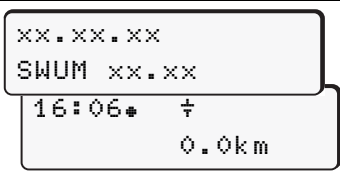
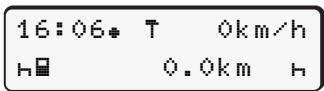
Menu navigation after inserting workshop card



If the tachograph card does not contain a preferred language or if the the DTCO 1381 does not support the preferred language, the text will appear in the language of the of the issuing member state; see chapter 3.2.1 "Selecting the text language", page 61.




Step / menu display		Explanation / meaning
1		Greeting text; the set local time (16:00) and the UTC time (14:00) will appear for approximately 3 seconds.
2		The DTCO 1381 is reading the workshop card. The symbol for the current mode, operational mode, appears and a progress bar shows that the DTCO 1381 is reading the card.
3		The name of the cardholder appears.
4		Select the number of characters (at least 4, max. 8) – Select the number of characters with the button ▲ or ▼ and – acknowledge with the button OK.
5		PIN entry "0" 1. character to be entered will blink: – Select the first character with the button ▲ or ▼ and – acknowledge with the button OK. "0" 2. character to be entered will blink: – Select the second character with the button ▲ or ▼ and – acknowledge with the button OK. – Follow the same procedure to enter the other characters of the PIN. Correcting an incorrectly entered character or an incorrectly entered number of characters – Press the button ← to move back to the previous character or to the query for the number of characters, – use the button ▲ or ▼ to select the desired character or number of characters and – acknowledge with the button OK.

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Step / menu display	Explanation / meaning
6 	If incorrect PIN entered <ul style="list-style-type: none"> Acknowledge message with the button  and re-enter the number. Cancel PIN entry <ul style="list-style-type: none"> Press the ejection button  of the card slot in which the workshop card is located. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot. Attention! If an incorrect PIN is entered five times, the workshop card will be blocked and the process cancelled. The workshop card will be ejected.
7 	Continuation of reading the workshop card. The standard display appears; the DTCO 1381 still remains in operational mode.
8 	After the card has been read, the card symbol (1) appears and the DTCO 1381 switches to the calibration mode (2) .
9 	Pairing with the KITAS 2171 The DTCO 1381 automatically starts pairing with the KITAS 2171. Activating the DTCO 1381 After pairing with the KITAS 2171 has completed, the DTCO 1381 automatically begins the EC recording equipment activation.
10 	After activation completes, the message "activation done" appears.
11 	The DTCO 1381 restarts and reads the workshop card again. Comment During activation, the DTCO 1381 resets the odometer reading to the value "0.0 km" (this function can be deactivated).
12 	After reading the workshop card the standard display appears, the DTCO 1381 is now in calibration mode "T".

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9.3.2 Removing workshop card


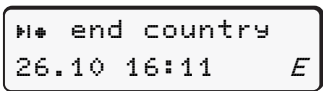
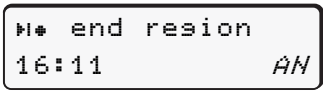







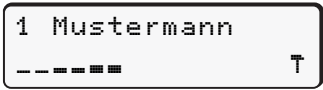
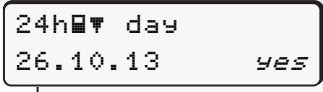
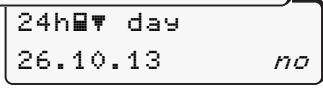



1. Press the ejection button  of the card slot in which the workshop card is located.
 - The subsequent procedure is menu-guided.
2. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.
3. Use the button  or  to set the respective activity, such as "H".



The DTCO 1381 automatically sets the calibration date and the purpose of the calibration (1) when the workshop card is removed.

Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the calibration date and the purpose for the calibration.

Menu navigation after removing workshop card

Step / menu display	Explanation / meaning
1 	The name of the cardholder appears; a progress bar shows that the DTCO 1381 is transferring data to the workshop card.
2  	Enter country at the end of the workday <ul style="list-style-type: none"> – Select the country with the button  or  and – acknowledge with the button . Cancel entry of country <ul style="list-style-type: none"> – Press the button  to cancel the entry of the country. Select region if required <ul style="list-style-type: none"> – Select the region with the button  or  and – acknowledge with the button .
3 	Continuation of data transfer to workshop card.
4  	Print day value <ul style="list-style-type: none"> – To print the day value, select "yes" with the button  or , or select "no" and – acknowledge with the button .

Step / menu display	Explanation / meaning
5 <div> <pre> printout in UTC time yes printout in UTC time no printout started ... </pre> </div>	Selection: Printout in UTC time or local time <ul style="list-style-type: none"> – Acknowledge "Yes" if you want the printout in UTC-time (required by law). – If you select "No" and acknowledge, you will receive a printout in "Local time". – After the function has been selected, the DTCO 1381 starts printing, the display shown here will appear for approx. 3 seconds.
6 <div> <pre> 1 Mustermann -- @ </pre> </div>	Continuation of data transfer to workshop card.
7 <div> <pre> 16:11* @ 0km/h H 123456.7km H </pre> <p style="text-align: center;">1</p> </div>	The workshop card is released, the standard display and the operational mode (1) appear.

Chapter 10

First calibration

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Chapter 10 First calibration

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10.1 General instructions

10.1.1 Terminology definitions

Installation of the DTCO 1381 is divided into the following steps:

- 1. Installation**
Mechanical and electrical installation of the DTCO 1381 components into the vehicle.
- 2. Preprogramming**
Preprogramming of all known or operationally necessary and legally required parameters.
- 3. Installation and functional test**
Test and demonstration that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.
- 4. Activation**
Activation of the DTCO 1381 to be an EC recording equipment (with the first insertion of the workshop card).
- 5. First calibration**
First calibration of the EC recording equipment.

10.1.2 Personnel prerequisites

In the following instructions, the manufacturer assumes that the personnel possess extensive professional knowledge, securely master the necessary technical activities, and have been trained in the use of the DTCO 1381 components as appropriate for the area of application.

Installation

The persons who are charged with the installation of the DTCO 1381 components must complete a training program on the installation of the DTCO 1381 components.

Activation and calibration

The persons who are charged with the activation and calibration of the DTCO 1381 components must:

- have a valid workshop card.
- complete a training program on the installation, calibration, and activation of the DTCO 1381 components.
- (in Germany) also fulfil the conditions for executing tasks according to §57b.

Comment

When installing the DTCO 1381 please obey the valid legal regulations in your country!

10.1.3 Technical prerequisites

The following requirements must be fulfilled in order to carry out the assigned tasks:

- The equipment and tools required or recommended by the manufacturer must be available.
- The equipment, testing devices, and furnishings must comply with the respective valid legal requirements for the country in which they are used.

10.1.4 Handling the tachograph cards



Attention!

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following instructions about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

10.2 Calibration instructions

The CR (EEC) 3821/85, annex I B, defines the criteria for the calibration of EC recording equipment.

Comment



Note the legal provisions applicable in your country and check, how the calibration must be performed and whether further tests of the EC recording equipment are prescribed.

10.2.1 Legal requirements

The recording equipment must be calibrated:

- after every installation
- during every regularly inspection

Comment



Note the legal provisions applicable in your country and check when and how the calibration of the DTCO 1381 must be performed.

10.2.2 Access to the calibration functions

Before activation of the DTCO 1381 to be EC recording equipment, it will be possible to access the calibration functions through the calibration interface, the CAN bus diagnosis, or the K-Line diagnosis without a workshop card.

After activation of the DTCO 1381, it will be possible to access the calibration functions only with a workshop card.

Comment



The accredited workshop must guarantee that the calibration is performed only via one interface selected before and that the calibration functions of the other interfaces are deactivated.

10.2.3 Programming the UTC time

Before activating the DTCO 1381 as the EU control device, unrestricted programming of the UTC time is possible.

After activation of the DTCO 1381 and one-off programming of the UTC time, this function is blocked for security reasons. The workshop card must then be removed and re-inserted; i.e. the workshop card must be re-authenticated.

10.2.4 Parameter measurements



Please refer to the testing device instructions for information on how to prepare for and execute the parameter measurements.

Before the parameter measurements – in particular the characteristic coefficient (w-value) – the following must be checked:

1. Check whether all cables – in particular the KITAS sensor cable – are undamaged.
2. Check whether the KITAS sensor cable is connected directly, i.e. without branchings, at DTCO 1381 and KITAS 2171.
3. Check whether the IMS function is available.
Switch ignition on/off.

After the measurements and the input of the calibration parameters - in particular the vehicle distance pulse count and the IMS configuration - the following must be checked:

4. Check whether the DTCO 1381 did not display or save a sensor fault during calibration.
5. Check whether the programmed and stored parameters match the values which were determined before.
6. Check whether the IMS configuration has been plausibly and correctly programmed.

After the parameter measurements and programming – in particular the characteristic coefficient (w-value) – the following must be checked:

7. Check whether the DTCO 1381 displayed or saved any sensor faults.
8. Check whether the programmed and saved parameters are according to the beforehand measured parameters.

Comment


If one of the above-mentioned points is not fulfilled, locate the cause and repeat the measurement.

10.2.5 Checking the KITAS 2171 and the KITAS sensor cable

Proceed as follows to check the KITAS 2171 and the KITAS sensor cable and to check whether the KITAS sensor cable is connected directly, i.e. without branchings, at DTCO 1381 and KITAS 2171.

1. Insert workshop card.
2. Print the technical data of the DTCO 1381 (printout vehicle "technical data").
3. Disconnect the DTCO 1381 from the supply voltage.
4. Separate the KITAS sensor cable in the vehicle from the DTCO 1381 and the KITAS 2171 and replace it by a test connection.
5. Connect the DTCO 1381 to the supply voltage.
6. Pair the DTCO 1381 and the KITAS 2171 manually and await the pairing process.
7. Print the technical data of the DTCO 1381 (printout vehicle "technical data").
8. Check the data of the sensor identification (serial number and type approval of the KITAS 2171) on both printouts and on the KITAS 2171.
 - The type approval (e1-175) and the serial number on both printouts must be the same as on the KITAS 2171.

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Attention!

If the data of the sensor identification do not correspond, find the cause, check the KITAS 2171 and the KITAS pulse cable and if necessary replace the defective components!

Record all found irregularities in your inspection record. According to the regulation, the inspection report must be ...

- retained for at least two years.
 - on request, handed over to the authorised authorities.
-

9. Disconnect the DTCO 1381 from the supply voltage.
10. Separate the test connection and reconnect the original KITAS sensor cable with DTCO 1381 and KITAS 2171.
11. Connect the DTCO 1381 to the supply voltage.
12. Remove the workshop card.

10.2.6 Pairing with the KITAS 2171

- The DTCO 1381 and the KITAS 2171 are paired together automatically during activation (the first time a workshop card is inserted).
- During the pairing process, the DTCO 1381 and the KITAS 2171 mutually authenticate each other and create a shared work key.
- "Manual" pairing (pairing with the aid of a test device) is possible only by using a workshop card on an activated DTCO 1381.
- After three pairing processes, this function will be blocked for security reasons. The workshop card must then be withdrawn and re-inserted; i.e., the workshop card must be re-authenticated.
- Each time a regularly inspection is performed, the DTCO 1381 and the KITAS 2171 must be manually paired for security reasons.



Attention!

A power failure during the coupling can cause irreversible damage to the KITAS 2171.

When coupling with the KITAS 2171 make sure that the DTCO 1381 is operated within the permissible voltage range!



The KITAS 2171 can be paired either with the TCO type MTCO 1324 or DTCO 1381.

With the first pairing, the KITAS 2171 is specified for one TCO type and can be used only for this TCO type!

10.3 Testing equipment

The calibration is performed with a suitable test equipment, for example, the VDO SDS test device CTC II.

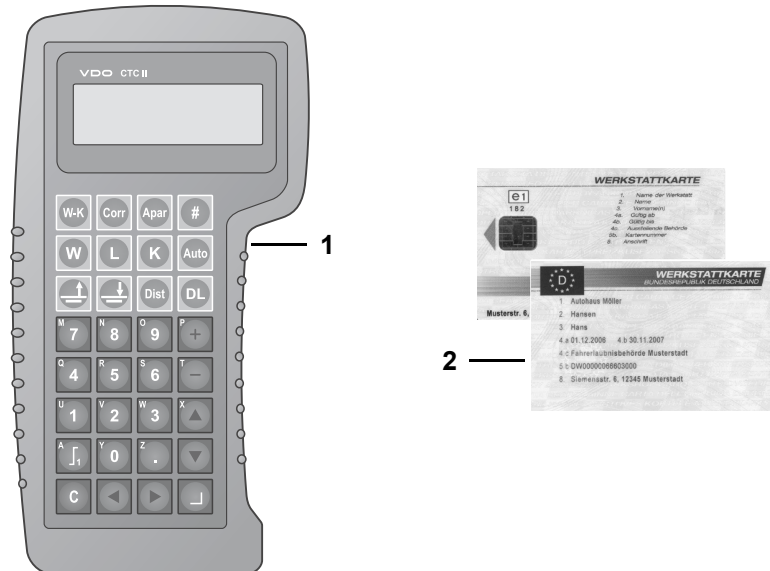


Illustration 71: SDS test device CTC II

(1) **CTC II** (item number A2C59512169)



For detailed information concerning VDO SDS test devices please refer to a VDO sales office.

Authentication

(2) Workshop card

An approved recording equipment manufacturer, vehicle manufacturer, installer, or a workshop uses its card to identify itself to the DTCO 1381, enabling saving of activities under this identity.

After a positive authentication, the workshop card enables activation; pairing with the KITAS 2171; calibration, and testing of the DTCO 1381; the downloading of data; and transfer, test, and test drives.

10.4 Checking the buffer battery

The buffer battery must be replaced in the following cases to ensure reliable function of the DTCO 1381:

- During installation, activation or initial calibration if the production date of the DTCO 1381 is more than 12 months ago.
- During every regularly inspection.

Production date DTCO 1381

The production date of the DTCO 1381 is shown on the packaging and the model plate, coded as "MYY:

<i>M = Month of production</i>			
A	January	G	July
B	February	H	August
C	March	J	September
D	April	K	October
E	May	L	November
F	June	M	December

<i>YY= Year of production</i>			
:	:	12	2012
10	2010	:	:
11	2011		

1. Check the production date of the DTCO 1381.
2. If the production date of the DTCO 1381 is more than 12 months ago, replace the buffer battery of the DTCO 1381, see chapter 12.2 "Buffer battery", page 244.

10.5 Performing the first calibration

Definition

First calibration of the EC recording equipment.

**Attention!**

During the first calibration, be absolutely certain that the DTCO 1381 is operated in the specified voltage range!

During the first calibration the following steps must be taken at least:

- Check approval mark of the DTCO 1381
- Check sealings
- Check tire size and effective wheel circumference
- Check KITAS 2171 and KITAS sensor cable
- Pair DTCO 1381 and KITAS 2171 "manually"
- Measure display errors
- Update or acknowledge all known or operationally necessary and legally required parameters
- Check and demonstrate the proper functioning of the EC recording equipment
- Check and demonstrate IMS function
- Test and demonstrate that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B
- Check existing installation plate; create a new installation plate and seal it if necessary

Comment

Note the legal provisions applicable in your country and check, how the first calibration must be performed and whether further tests of the EC recording equipment are prescribed within the first calibration.

It is possible to access the calibration functions through the calibration interface, the CAN bus diagnosis, or the K-Line diagnosis without a workshop card.

**Attention!**

If the workshop determines with the inspection – according to CR (EEC) 3821/85, annex I B, paragraph IV – that the housing switch was operated or is, the law-conformal functioning of the DTCO 1381 must be proven by appropriate inspections.

The registered data starting from the last inspection must be classified as not trustworthy, until the proof of the law-conformal functioning.

10.5.1 Inserting workshop card

The following description of "Inserting workshop card" is based on a DTCO 1381 that is already activated.

For detailed information on activating the DTCO 1381, see chapter 9.3 "Performing the activation" from page 192.

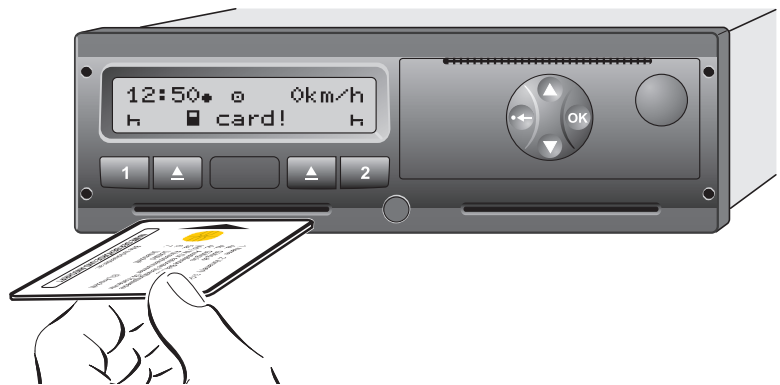


Illustration 72: Inserting workshop card

- 1.** Switch ignition on (required only for ADR variant).
- 2.** Eject any tachograph cards that may be already inserted.
- 3.** Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
 - The subsequent procedure is menu-guided.

Menu navigation after inserting workshop card

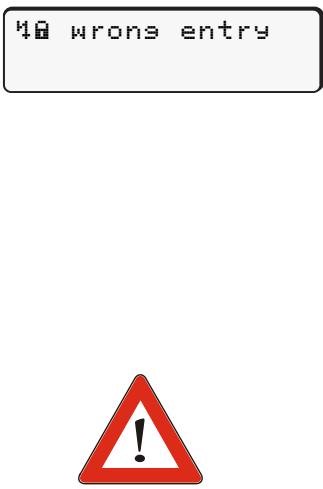

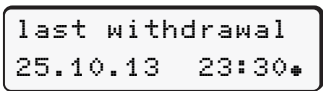
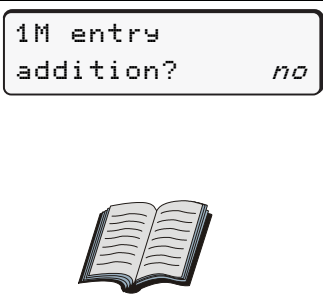
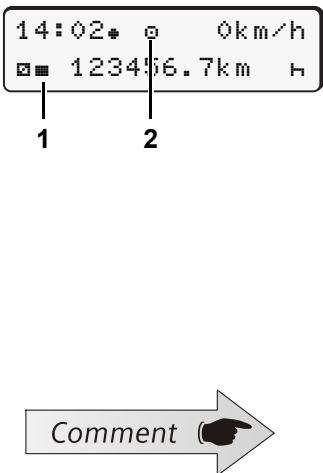
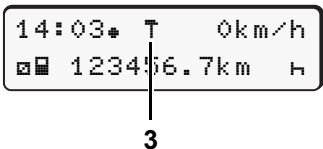
Comment



If the tachograph card does not contain a preferred language or if the the DTCO 1381 does not support the preferred language, the text will appear in the language of the of the issuing member state; see chapter 3.2.1 "Selecting the text language", page 61.

Step / menu display		Explanation / meaning
1		Greeting text; the set local time (14:00) and the UTC time (12:00) will appear for approximately 3 seconds.
2		<p>The DTCO 1381 is reading the workshop card.</p> <p>The symbol for the current mode, operational mode, appears and a progress bar shows that the DTCO 1381 is reading the card.</p>
3		The name of the cardholder appears.
4		<p>Select the number of characters (at least 4, max. 8)</p> <ul style="list-style-type: none"> – Select the number of characters with the button ▲ or ▼ and – acknowledge with the button OK.
5		<p>PIN entry</p> <p>"0" 1. character to be entered will blink:</p> <ul style="list-style-type: none"> – Select the first character with the button ▲ or ▼ and – acknowledge with the button OK. <p>"0" 2. character to be entered will blink:</p> <ul style="list-style-type: none"> – Select the second character with the button ▲ or ▼ and – acknowledge with the button OK. – Follow the same procedure to enter the other characters of the PIN. <p>Correcting an incorrectly entered character or an incorrectly entered number of characters</p> <ul style="list-style-type: none"> – Press the button ← to move back to the previous character or to the query for the number of characters, – use the button ▲ or ▼ to select the desired character or number of characters and – acknowledge with the button OK.

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Step / menu display	Explanation / meaning
<p>6</p> 	<p>If incorrect PIN entered</p> <ul style="list-style-type: none"> Acknowledge message with the button OK and re-enter the number. <p>Cancel PIN entry</p> <ul style="list-style-type: none"> Press the ejection button  of the card slot in which the workshop card is located. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot. <p>Attention!</p> <p>If an incorrect PIN is entered five times, the workshop card will be blocked and the process cancelled. The workshop card will be ejected.</p>
<p>7</p> 	<p>Display "Last withdrawal"; the date and time of the most recent card withdrawal will be displayed in UTC time for approximately 3 - 5 seconds.</p>
<p>8</p> 	<p>Manual entry</p> <ul style="list-style-type: none"> To add activities manually, select "yes" with the button ▲ or ▼, or select "no" and acknowledge with the button OK. <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries (BA00.1381.20.101102).</p>
<p>9</p> 	<p>Continuation of reading the workshop card.</p> <p>The standard display appears; the DTCO 1381 still remains in operational mode (2).</p> <p>The card symbol will be displayed only if the data of the driver card have been read completely. Symbols (1) which are displayed before have the following meaning:</p> <p>"_" The workshop card is in the card slot.</p> <p>"■" You can start a test drive if necessary, relevant data for a test drive are read in.</p> <p>As long as the card symbol is missing in the display, the following functions are not possible at the moment:</p> <ul style="list-style-type: none"> Calling up menu functions. Requesting a tachograph card.
<p>10</p> 	<p>After the card has been read, the DTCO 1381 switches to the calibration mode (3).</p>

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10.5.2 Legally stipulated parameters

The following parameters are legally stipulated and must be updated or acknowledged:

- Vehicle identification number¹⁾
- Vehicle registration number²⁾
- Country of registration
- Characteristic coefficient (w)
- Recording equipment constant (k)²⁾
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date²⁾

1) If known, otherwise entry by the company where required

2) The DTCO 1381 sets this data automatically.

10.5.3 Device-specific parameters

Additional device-specific parameters must be updated or acknowledged for operation of the DTCO 1381, e.g.:

- n-constant
- Configuration
- CAN configuration
- Product key
- Drive shaft I/U
- Production data (such as dimming parameters, limit values for n)
- Adaptation of the IMS configuration (independent motion signal)
- etc.

Comment



The settings for the device-specific parameters are dependent on the customer or device type.

10.5.4 Other parameters

Other parameters can be updated or acknowledged if necessary:

- Installation date
- Date of the next calibration
- etc.

10.5.5 Entering parameters



Please refer to the test device instructions for information on how to enter the calibration parameters.

Legally stipulated parameters

The following parameters are legally stipulated and must be updated or acknowledged:

- Vehicle identification number¹⁾
- Vehicle registration number¹⁾
- Country of registration
- Characteristic coefficient (w)
- Recording equipment constant (k)²⁾
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date²⁾

1) If known, otherwise entry by the company where required

2) The DTCO 1381 sets this data automatically.

Comment



The DTCO 1381 automatically sets the calibration date and the purpose of the calibration (2, 3) when the workshop card is removed.

Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the calibration date and the purpose for the calibration.

Device-specific parameters

Depending on the variation of the DTCO 1381, other parameters that are not legally-stipulated must be updated or acknowledged:

- n-constant
- Drive shaft I/U
- Adaptation of the IMS configuration (independent motion signal)
 - CAN (CAN1 or CAN2)
 - Signal source (speed, wheel or odometer GPS)
 - Conversion factor for adapting the unit of measurement
 - Factor for adaptation to the sensor signal
- etc.

Other parameter




Other parameters can be updated or acknowledged if necessary:

- Installation date
- Date of the next calibration
- etc.


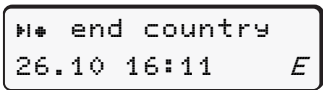
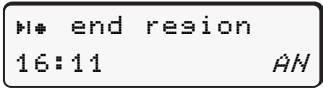







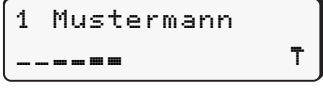
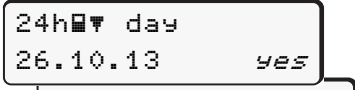
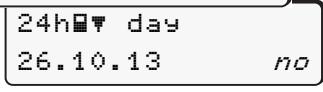



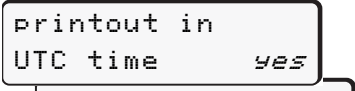
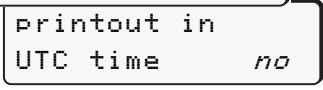
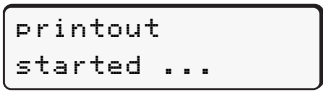
**Attention!**

Check whether the programmed and saved parameters are according to the beforehand measured parameters.

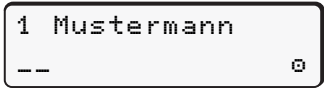
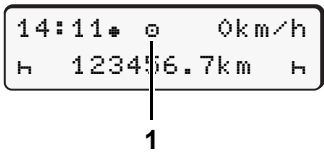
10.5.6 Removing workshop card

1. Press the ejection button  of the card slot in which the workshop card is located.
 - The subsequent procedure is menu-guided.
2. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.
3. Use the button  or  to set the respective activity, such as "H".

Menu navigation after removing workshop card

Step / menu display	Explanation / meaning
1 	The name of the cardholder appears; a progress bar shows that the DTCO 1381 is transferring data to the workshop card.
2  	Enter country at the end of the workday <ul style="list-style-type: none"> – Select the country with the button  or  and – acknowledge with the button . Cancel entry of country <ul style="list-style-type: none"> – Press the button  to cancel the entry of the country. Select region if required <ul style="list-style-type: none"> – Select the region with the button  or  and – acknowledge with the button .
3 	Continuation of data transfer to workshop card.
4  	Print day value <ul style="list-style-type: none"> – To print the day value, select "yes" with the button  or , or select "no" and – acknowledge with the button .
5   	Selection: Printout in UTC time or local time <ul style="list-style-type: none"> – Acknowledge "Yes" if you want the printout in UTC-time (required by law). – If you select "No" and acknowledge, you will receive a printout in "Local time". – After the function has been selected, the DTCO 1381 starts printing, the display shown here will appear for approx. 3 seconds.

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Step / menu display	Explanation / meaning
6 	Continuation of data transfer to workshop card.
7 	The workshop card is released, the standard display and the operational mode (1) appear.

10.5.7 Creating and sealing installation plate

After the first calibration, the installation plate must be visibly attached on or near the recording equipment (for example on the B-pillar or door frame).

- 1.** The following information must be transferred to the installation plate:
 - Calibration date
 - Effective wheel circumference (l, max. of four digits)
 - Characteristic coefficient (w, max. of five digits)
 - Recording equipment constant (k, five digits)
 - Vehicle identification number (max. of 17 digits)
 - Device number (max. 10 digits)
 - Tire size (max. 15 digits)
 - Name and address or company logo*.
- 2.** When using an M1N1 adapter, additionally transfer the following data to the installation plate:
 - Installation site of the M1N1 adapter
 - Cable colour vehicle v-signal
 - Series number
- 3.** Attach the installation plate where it will be easily visible.
- 4.** Secure the installation plate with sealing foil.

* The name and address or company logo of the workshop or the manufacturer may be printed on the sealing foil.

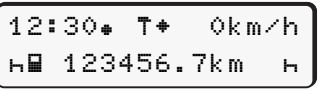
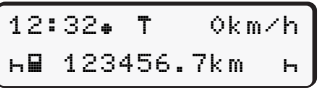
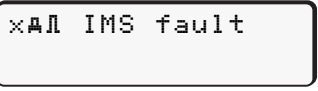
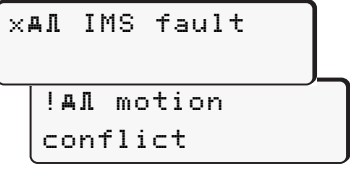
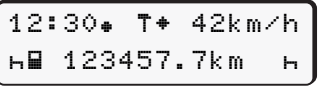
Comment



After every intervention, the installation plate must be replaced.

The installation plate must be protected with a sealing foil, unless it is installed in a way that it cannot be withdrawn without destroying the information it provides.

10.5.8 Check IMS function

Step / menu display		Explanation / meaning
1		<ul style="list-style-type: none"> – Switch off the the ignition or press any button. <p>Symbol "+" means that the installed DTCO 131 is equipped with the IMS function.</p>
2		<ul style="list-style-type: none"> – Switch on the ignition. <p>If the symbol "+" disappears, the DTCO 1381 is correctly connected to the ignition.</p>
3		<ul style="list-style-type: none"> – Wait for one minute. <p>The message "xAL IMS fault" must not appear.</p> <p>If the message appears:</p> <ul style="list-style-type: none"> – Check the connection lines (CAN connection). – Check the plausability of the IMS configuration. – Check whether "Odometer GPS" is configured as the signal source and may be disturbed (vehicle is not outdoors with an unobstructed view of the sky).
4		<ul style="list-style-type: none"> – Acknowledge any messages and make a test drive of more than 2 minutes. – None of these messages may appear. – Otherwise, check the plausability of the IMS configuration.
5		<ul style="list-style-type: none"> – Take a test drive and read out the "IMSSpeed" parameter with a suitable diagnostic device and compare with the speed displayed on the DTCO 1381.

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Chapter 11

Regularly inspection

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11.1 General instructions

11.1.1 Personnel prerequisites

In the following instructions, the manufacturer assumes that the personnel possess extensive professional knowledge, securely master the necessary technical activities, and have been trained in the use of the DTCO 1381 components as appropriate for the area of application.

Installation

The persons who are charged with the installation of the DTCO 1381 components must complete a training program on the installation of the DTCO 1381 components.

Activation and calibration

The persons who are charged with the activation and calibration of the DTCO 1381 components must:

- have a valid workshop card.
- complete a training program on the installation, calibration, and activation of the DTCO 1381 components.
- (in Germany) also fulfil the conditions for executing tasks according to §57b.



When installing the DTCO 1381 please obey the valid legal regulations in your country!

11.1.2 Technical prerequisites

The following requirements must be fulfilled in order to carry out the assigned tasks:

- The equipment and tools required or recommended by the manufacturer must be available.
- The equipment, testing devices, and furnishings must comply with the respective valid legal requirements for the country in which they are used.

11.1.3 Handling the tachograph cards



Attention!

Possession of a tachograph card authorizes the holder to use the digital tachograph. The tachograph cards are person-specific (workshop cards are company-specific) and are therefore not transferrable to others!

An accredited workshop must securely retain, use, and administer its workshop card and PIN; workshop cards and PIN may not be made available to third parties!

An accredited workshop must ensure secure communication between the DTCO 1381 and workshop card!

Loss of the workshop card must be reported immediately to the issuing authority / institution!

Obey the valid legal regulations in your country surrounding workshop cards!

Obey the instructions of the issuing authority / institution and the card manufacturer!

Please observe the following instructions about using the tachograph cards:

- Handle the tachograph cards carefully in order to avoid loss of data.
- Do not bend or fold the tachograph cards and do not use them for anything other than their intended purpose.
- Do not use damaged tachograph cards.
- Keep all contact surfaces clean, dry, and free of grease and oil (always use the protective cover).
- Protect the card from direct sunlight (do not allow it to lie on the instrument panel).
- Do not place it in direct proximity to strong electromagnetic fields.
- Do not use the card beyond its period of validity. Apply for a new card in a timely manner before expiry.

11.2 Calibration instructions

The CR (EEC) 3821/85, annex I B, defines the criteria for the calibration of EC recording equipment.



Note the legal provisions applicable in your country and check, how the calibration must be performed and whether further tests of the EC recording equipment are prescribed.

11.2.1 Legal requirements

The recording equipment must be calibrated:

- after every installation
- during every regularly inspection

11.2.2 Access to the calibration functions

Before activation of the DTCO 1381 to be EC recording equipment, it will be possible to access the calibration functions through the calibration interface, the CAN bus diagnosis, or the K-Line diagnosis without a workshop card.

After activation of the DTCO 1381, it will be possible to access the calibration functions only with a workshop card.



The accredited workshop must guarantee that the calibration is performed only via one interface selected before and that the calibration functions of the other interfaces are deactivated.

11.2.3 Programming the UTC time

Before activating the DTCO 1381 as the EU control device, unrestricted programming of the UTC time is possible.

After activation of the DTCO 1381 and one-off programming of the UTC time, this function is blocked for security reasons. The workshop card must then be removed and re-inserted; i.e. the workshop card must be re-authenticated.

11.2.4 Parameter measurements



Please refer to the testing device instructions for information on how to prepare for and execute the parameter measurements.

Before the parameter measurements – in particular the characteristic coefficient (w-value) – the following must be checked:

1. Check whether all cables – in particular the KITAS sensor cable – are undamaged.
2. Check whether the KITAS sensor cable is connected directly, i.e. without branchings, at DTCO 1381 and KITAS 2171.
3. Check whether there are any interfering components in the direct proximity of the pulse generator, e.g. permanent magnets or electromagnets or whether other manipulation devices can be recognised.
4. Check whether the IMS function is available.
Switch ignition on/off, wait for one minute.

After the measurements and the input of the calibration parameters - in particular the vehicle distance pulse count and the IMS configuration - the following must be checked:

5. Check whether the DTCO 1381 did not display or save a sensor fault during calibration.
6. Check whether the programmed and stored parameters match the values which were determined before.
7. Check whether the IMS configuration has been plausibly and correctly programmed.

Comment



If one of the above-mentioned points is not fulfilled, locate the cause and repeat the measurement.

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11.2.5 Checking the KITAS 2171 and the KITAS sensor cable

Proceed as follows to check the KITAS 2171 and the KITAS sensor cable and to check whether the KITAS sensor cable is connected directly, i.e. without branchings, at DTCO 1381 and KITAS 2171.

1. Insert workshop card.
2. Print the technical data of the DTCO 1381 (printout vehicle "technical data").
3. Disconnect the DTCO 1381 from the supply voltage.
4. Separate the KITAS sensor cable in the vehicle from the DTCO 1381 and the KITAS 2171 and replace it by a test connection.
5. Connect the DTCO 1381 to the supply voltage.
6. Pair the DTCO 1381 and the KITAS 2171 manually and await the pairing process.
7. Print the technical data of the DTCO 1381 (printout vehicle "technical data").
8. Check the data of the sensor identification (serial number and type approval of the KITAS 2171) on both printouts and on the KITAS 2171.
 - The type approval (e1-175) and the serial number on both printouts must be the same as on the KITAS 2171.



Attention!

If the data of the sensor identification do not correspond, find the cause, check the KITAS 2171 and the KITAS pulse cable and if necessary replace the defective components!

Record all found irregularities in your inspection record. According to the regulation, the inspection report must be ...

- retained for at least two years.
 - on request, handed over to the authorised authorities.
-

9. Disconnect the DTCO 1381 from the supply voltage.
10. Separate the test connection and reconnect the original KITAS sensor cable with DTCO 1381 and KITAS 2171.
11. Connect the DTCO 1381 to the supply voltage.
12. Remove the workshop card.

11.2.6 Pairing with the KITAS 2171

- The DTCO 1381 and the KITAS 2171 are paired together automatically during activation (the first time a workshop card is inserted).
- During the pairing process, the DTCO 1381 and the KITAS 2171 mutually authenticate each other and create a shared work key.
- "Manual" pairing (pairing with the aid of a test device) is possible only by using a workshop card on an activated DTCO 1381.
- After three pairing processes, this function will be blocked for security reasons. The workshop card must then be withdrawn and re-inserted; i.e., the workshop card must be re-authenticated.
- Each time a regularly inspection is performed, the DTCO 1381 and the KITAS 2171 must be manually paired for security reasons.

**Attention!**

A power failure during the coupling can cause irreversible damage to the KITAS 2171.

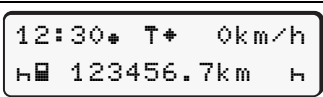
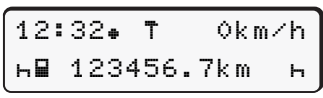
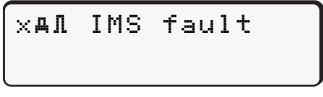
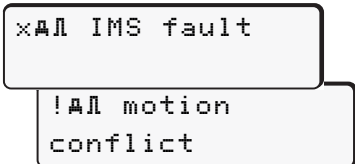
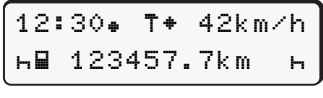
When coupling with the KITAS 2171 make sure that the DTCO 1381 is operated within the permissible voltage range!



The KITAS 2171 can be paired either with the TCO type MTCO 1324 or DTCO 1381.

With the first pairing, the KITAS 2171 is specified for one TCO type and can be used only for this TCO type!

11.2.7 Instructions for checking the IMS function

Step / menu display		Explanation / meaning
1		<ul style="list-style-type: none"> – Switch off the the ignition or press any button. <p>Symbol "*" means that the installed DTCO 131 is equipped with the IMS function.</p>
2		<ul style="list-style-type: none"> – Switch on the ignition. <p>If the symbol "*" disappears, the DTCO 1381 is correctly connected to the ignition.</p>
3		<ul style="list-style-type: none"> – Wait for one minute. <p>The message "xAL IMS fault" must not appear.</p> <p>If the message appears:</p> <ul style="list-style-type: none"> – Check the connection lines (CAN connection). – Check the plausability of the IMS configuration. – Check whether "Odometer GPS" is configured as the signal source and may be disturbed (vehicle is not outdoors with an unobstructed view of the sky).
4		<ul style="list-style-type: none"> – Acknowledge any messages and make a test drive of more than 2 minutes. – None of these messages may appear. – Otherwise, check the plausability of the IMS configuration.
5		<ul style="list-style-type: none"> – Take a test drive and read out the "IMSSpeed" parameter with a suitable diagnostic device and compare with the speed displayed on the DTCO 1381.

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11.3 Instructions for the regularly inspection

The DTCO 1381 with its system components is an approved EC recording equipment in compliance with CR (EEC) 3821/85, annex I B. If the DTCO 1381 is installed in a vehicle that legally requires recording equipment, the vehicle will be subject to compulsory inspections:

- CR (EEC) 3821/85, annex I B, paragraph IV (installation inspections, regularly inspection, and repairs)

For Germany, the compulsory inspections are stipulated in:

- § 57b of StVZO

The device manufacturer or an authorized workshop must perform these inspections; for new vehicles, these inspections must be performed by approved vehicle manufacturers.



Note the legal provisions applicable in your country and check, how the regularly inspection must be performed and whether further tests of the EC recording equipment are prescribed within the regularly inspection.



Attention!

After every intervention into the system, make sure that the required inspections are performed and corresponding sealing points are properly resealed.

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11.3.1 Legal requirements

A regularly inspection must be performed:

- After every repair
- After every change of the characteristic coefficient (w-value)
- After every change of the effective wheel circumference
- If the UTC time deviates from the correct time for more than 20 minutes
- After every change of the vehicle registration number
- At least once within 2 years since the last regularly inspection

11.4 Testing equipment

The calibration is performed with a suitable test equipment, for example, the VDO SDS test device CTC II.

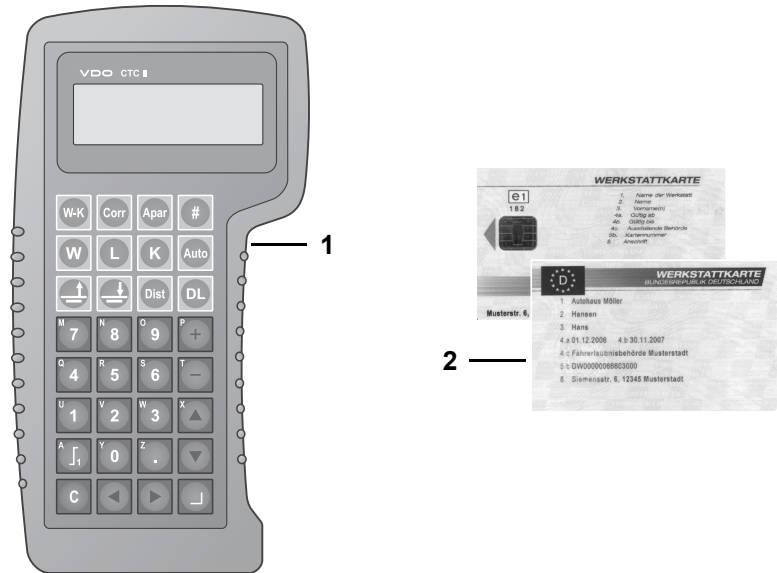


Illustration 73: SDS test device CTC II

(1) **CTC II** (item number A2C59512169)



For detailed information concerning VDO SDS test devices please refer to a VDO sales office.

Authentication

(2) Workshop card

An approved recording equipment manufacturer, vehicle manufacturer, installer, or a workshop uses its card to identify itself to the DTCO 1381, enabling saving of activities under this identity.

After a positive authentication, the workshop card enables activation; pairing with the KITAS 2171; calibration, and testing of the DTCO 1381; the downloading of data; and transfer, test, and test drives.

11.5 Checking the buffer battery

The buffer battery must be replaced in the following cases to ensure reliable function of the DTCO 1381:

- During installation, activation or initial calibration if the production date of the DTCO 1381 is more than 12 months ago.
- During every regularly inspection.

1. Replace the buffer battery of the DTCO 1381, see chapter 12.2 "Buffer battery", page 244.

11.6 Performing the regularly inspection



Attention!

During the regularly inspection, be absolutely certain that the DTCO 1381 is operated in the specified voltage range!

During the regularly inspection the following steps must be taken at least:

- Check the housing of DTCO 1381 and KITAS 2171 visual for indications of manipulation
- Check whether there are manipulation devices available at the DTCO 1381, KITAS 2171 or the KITAS sensor cable.
- Check approval mark of the DTCO 1381
- Check sealing
- Check tire size and effective wheel circumference
- Check whether the DTCO 1381 stored a security breach, a power interruption, an internal fault, or a sensor fault after the last checking. If yes,
 - check whether the data on the present installation date match those on a printout of the technical data of the DTCO 1381.
 - check KITAS 2171 and KITAS sensor cable.
- Check whether the DTCO 1381 stored sensor faults together with the "motion conflict" event after the last checking.
 - If yes, check whether the cause was possibly operator error. (no entry of transport on ferry/train)
 - Check IMS function
- IMS Funktion prüfen
- Pair DTCO 1381 and KITAS 2171 "manually"
- Measure display errors
- Perform a calibration
- Check and demonstrate the proper functioning of the EC recording equipment
- Test and demonstrate that the entire system complies with the permissible error limits concerning distance and speed, defined by CR (EEC) 3821/85, annex I B.
- Check existing installation plate; create a new installation plate and seal it if necessary.

Comment

Note the legal provisions applicable in your country and check, how the regularly inspection must be performed and whether further tests of the EC recording equipment are prescribed within the regularly inspection.

It is possible to access the calibration functions through the calibration interface, the CAN bus diagnosis, or the K-Line diagnosis without a workshop card.

**Attention!**

Record all found irregularities in your inspection record. According to the regulation, the inspection report must be ...

- retained for at least two years.
 - on request, handed over to the authorised authorities.
-

**Attention!**

If the workshop determines with the inspection – according to CR (EEC) 3821/85, annex I B, paragraph IV – that the housing switch was operated or is, the law-conformal functioning of the DTCO 1381 must be proven by appropriate inspections.

The registered data starting from the last inspection must be classified as not trustworthy, until the proof of the law-conformal functioning.

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11.6.1 Inserting workshop card



The following description of "Inserting workshop card" is based on a DTCO 1381 that is already activated.

For detailed information on activating the DTCO 1381, see chapter 9.3 "Performing the activation" from page 192.

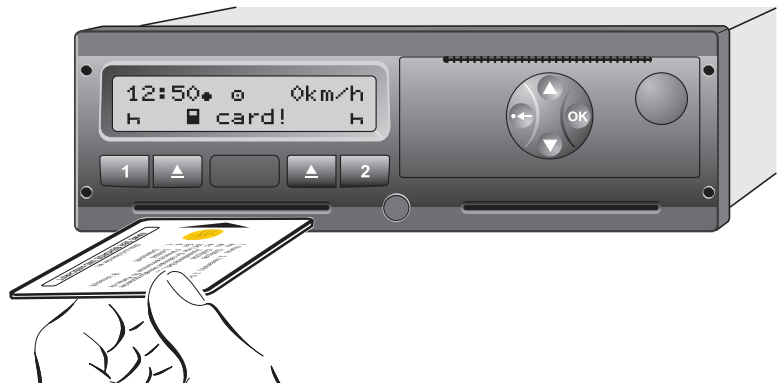


Illustration 74: Inserting workshop card

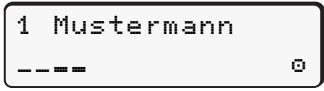
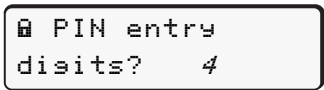

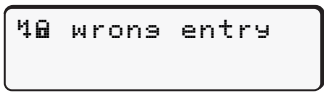

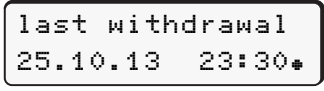
1. Switch ignition on (required only for ADR variant).
2. Eject any tachograph cards that may be already inserted.
3. Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
 - The subsequent procedure is menu-guided.

Menu navigation after inserting workshop card

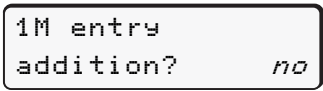

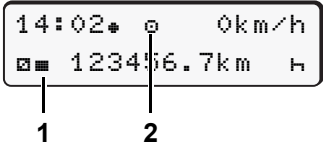

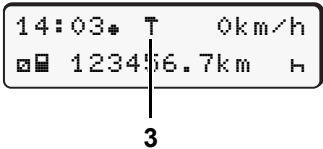


If the tachograph card does not contain a preferred language or if the the DTCO 1381 does not support the preferred language, the text will appear in the language of the of the issuing member state; see chapter 3.2.1 "Selecting the text language", page 61.

Step / menu display	Explanation / meaning
1 	Greeting text; the set local time (14:00) and the UTC time (12:00) will appear for approximately 3 seconds.
2 	<p>The DTCO 1381 is reading the workshop card.</p> <p>The symbol for the current mode, operational mode, appears and a progress bar shows that the DTCO 1381 is reading the card.</p>

Step / menu display	Explanation / meaning
3 	The name of the cardholder appears.
4 	Select the number of characters (at least 4, max. 8) <ul style="list-style-type: none"> – Select the number of characters with the button ▲ or ▼ and – acknowledge with the button OK.
5 	PIN entry <p>"0" 1. character to be entered will blink:</p> <ul style="list-style-type: none"> – Select the first character with the button ▲ or ▼ and – acknowledge with the button OK. <p>"0" 2. character to be entered will blink:</p> <ul style="list-style-type: none"> – Select the second character with the button ▲ or ▼ and – acknowledge with the button OK. – Follow the same procedure to enter the other characters of the PIN. <p>Correcting an incorrectly entered character or an incorrectly entered number of characters</p> <ul style="list-style-type: none"> – Press the button ← to move back to the previous character or to the query for the number of characters, – use the button ▲ or ▼ to select the desired character or number of characters and – acknowledge with the button OK.
6  	If incorrect PIN entered <ul style="list-style-type: none"> – Acknowledge message with the button OK and re-enter the number. <p>Cancel PIN entry</p> <ul style="list-style-type: none"> – Press the ejection button ▲ of the card slot in which the workshop card is located. – After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot. <p>Attention!</p> <p>If an incorrect PIN is entered five times, the workshop card will be blocked and the process cancelled. The workshop card will be ejected.</p>
7 	Display "Last withdrawal"; the date and time of the most recent card withdrawal will be displayed in UTC time for approximately 3 - 5 seconds.

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Step / menu display	Explanation / meaning
<p>8</p>  	<p>Manual entry</p> <ul style="list-style-type: none"> – To add activities manually, select "yes" with the button or , or select "no" and – acknowledge with the button . <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries (BA00.1381.20.101102).</p>
<p>9</p>  	<p>Continuation of reading the workshop card.</p> <p>The standard display appears; the DTCO 1381 still remains in operational mode (2).</p> <p>The card symbol will be displayed only if the data of the driver card have been read completely. Symbols (1) which are displayed before have the following meaning:</p> <p>"_" The workshop card is in the card slot.</p> <p>"■" You can start a test drive if necessary, relevant data for a test drive are read in.</p> <p>As long as the card symbol is missing in the display, the following functions are not possible at the moment:</p> <ul style="list-style-type: none"> • Calling up menu functions. • Requesting a tachograph card.
<p>10</p> 	<p>After the card has been read, the DTCO 1381 switches to the calibration mode (3).</p>

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11.6.2 Legally stipulated parameters

The following parameters are legally stipulated and must be updated or acknowledged:

- Vehicle identification number
- Vehicle registration number¹⁾
- Country of registration¹⁾
- Characteristic coefficient (w)
- Recording equipment constant (k)²⁾
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date²⁾

1) If known, entry by the company where required.

2) The DTCO 1381 sets this data automatically

11.6.3 Device-specific parameters

Additional device-specific parameters must be updated or acknowledged for operation of the DTCO 1381, e.g.:

- n-constant
- Configuration
- CAN configuration
- Product key
- Drive shaft I/U
- Production data (such as dimming parameters, limit values for n)
- Adaptation of the IMS configuration (independent motion signal)
 - CAN (CAN1 or CAN2)
 - Signal source (speed, wheel or odometer GPS)
 - Conversion factor for adapting the unit of measurement
 - Factor for adaptation to the sensor signal
- etc.

Comment



The settings for the device-specific parameters are dependent on the customer or device type.

11.6.4 Other parameters

Other parameters can be updated or acknowledged if necessary:

- Installation date
- Date of the next calibration
- etc.

11.6.5 Entering parameters



Please refer to the test device instructions for information on how to enter the calibration parameters.

Legally stipulated parameters

The following parameters are legally stipulated and must be updated or acknowledged:

- Vehicle identification number
- Vehicle registration number¹⁾
- Country of registration
- Characteristic coefficient (w)
- Recording equipment constant (k)*
- Effective wheel circumference (l)
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date*

1) If known, entry by the company where required.

2) The DTCO 1381 sets this data automatically

Comment



The DTCO 1381 automatically sets the calibration date and the purpose of the calibration (4) when the workshop card is removed.

Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the calibration date and the purpose for the calibration.

Device-specific parameters

Depending on the variation of the DTCO 1381, other parameters that are not legally-stipulated must be updated or acknowledged:

- n-constant
- Drive shaft I/U
- Adaptation of the IMS configuration (independent motion signal)
 - CAN (CAN1 or CAN2)
 - Signal source (speed, wheel or odometer GPS)
 - Conversion factor for adapting the unit of measurement
 - Factor for adaptation to the sensor signal
- etc.

Other parameter




Other parameters can be updated or acknowledged if necessary:

- Installation date
- Date of the next calibration
- etc.


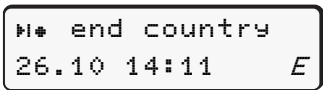
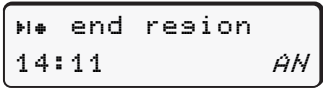







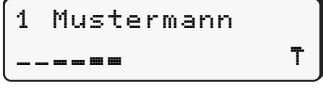
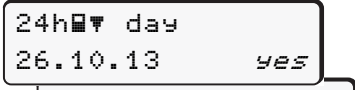
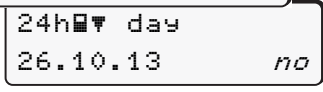



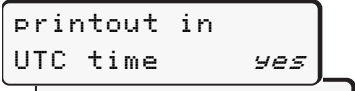
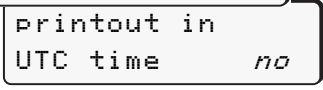
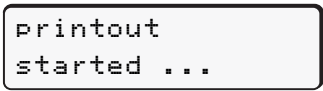
**Attention!**

Check whether the programmed and saved parameters are according to the beforehand measured parameters.

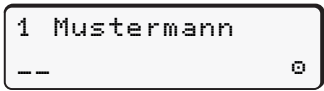
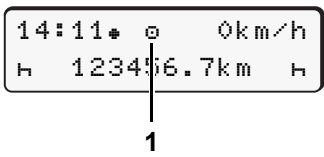
11.6.6 Removing workshop card

1. Press the ejection button  of the card slot in which the workshop card is located.
 - The subsequent procedure is menu-guided.
2. After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.
3. Use the button  or  to set the respective activity, such as "H".

Menu navigation after removing workshop card

Step / menu display	Explanation / meaning
1 	The name of the cardholder appears; a progress bar shows that the DTCO 1381 is transferring data to the workshop card.
2  	Enter country at the end of the workday <ul style="list-style-type: none"> – Select the country with the button  or  and – acknowledge with the button . Cancel entry of country <ul style="list-style-type: none"> – Press the button  to cancel the entry of the country. Select region if required <ul style="list-style-type: none"> – Select the region with the button  or  and – acknowledge with the button .
3 	Continuation of data transfer to workshop card.
4  	Print day value: <ul style="list-style-type: none"> – To print the day value, select "yes" with the button  or , or select "no" and – acknowledge with the button .
5   	Selection: Printout in UTC time or local time <ul style="list-style-type: none"> – Acknowledge "Yes" if you want the printout in UTC-time (required by law). – If you select "No" and acknowledge, you will receive a printout in "Local time". – After the function has been selected, the DTCO 1381 starts printing, the display shown here will appear for approx. 3 seconds.

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Step / menu display		Explanation / meaning
6		Continuation of data transfer to workshop card.
6		The workshop card is released, the standard display and the operational mode (1) appear.

11.6.7 Creating and sealing installation plate

After the calibration, the installation plate must be visibly attached on or near the recording equipment (for example on the B-pillar or door frame).

- The following information must be transferred to the installation plate:
 - Calibration date
 - Effective wheel circumference (l, max. of four digits)
 - Characteristic coefficient (w, max. of five digits)
 - Recording equipment constant (k, five digits)
 - Vehicle identification number (max. of 17 digits)
 - Device number (max. 10 digits)
 - Tire size (max. 15 digits)
 - Name and address or company logo*.
- When using an M1N1 adapter, additionally transfer the following data to the installation plate:
 - Installation site of the M1N1 adapter
 - Cable colour vehicle v-signal
 - Series number
- Attach the installation plate where it will be easily visible.
- Secure the installation plate with sealing foil.

* The name and address or company logo of the workshop or the manufacturer may be printed on the sealing foil.

Comment



After every intervention, the installation plate must be replaced.

The installation plate must be protected with a sealing foil, unless it is installed in a way that it cannot be withdrawn without destroying the information it provides.

Chapter 12

Maintenance and cleaning

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12.1 System maintenance

The DTCO 1381 system components employ modern, maintenance-free technology. For this reason, preventive maintenance work is not required.



Please refer to the appropriate documentation for maintenance instructions applicable to vehicle-specific display instruments (combi-instruments).

12.2 Buffer battery

12.2.1 Instructions on buffer battery replacement

The buffer battery must be replaced in the following cases to ensure reliable function of the DTCO 1381:

- During installation, activation or initial calibration if the production date of the DTCO 1381 is more than 12 months ago.
- During every regularly inspection.

Comment



Replacement of the buffer battery in stored devices

To ensure the reliable function of stored DTCO 1381 units, the buffer battery must be replaced in stored devices if the production date is more than 24 months ago.

Production date DTCO 1381

The production date of the DTCO 1381 is shown on the packaging and the model plate, coded as "MY":

<i>M = Month of production</i>			
A	January	G	July
B	February	H	August
C	March	J	September
D	April	K	October
E	May	L	November
F	June	M	December

<i>YY= Year of production</i>			
12	2012	14	2014
11	2011	:	:

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Production date battery

Only use batteries with a production date which is not more than 6 years ago.

The production date is printed on the battery; please note the different date code:

<i>Manufacturer / battery type</i>	<i>Date code</i>
VDO	YY/MM



The buffer battery may only be replaced in an authorised workshop by suitably trained personnel.

12.2.2 Disposal instructions**Attention!****Replaced batteries must not be reused in a DTCO 1381!**

Please make sure that replaced batteries cannot be used again, for example by cutting off the connection plug.

**Batteries may not be disposed with normal household waste!**

Please dispose of the battery with responsibly and according to your country's valid guidelines for disposing batteries.

12.2.3 Removing the DTCO 1381

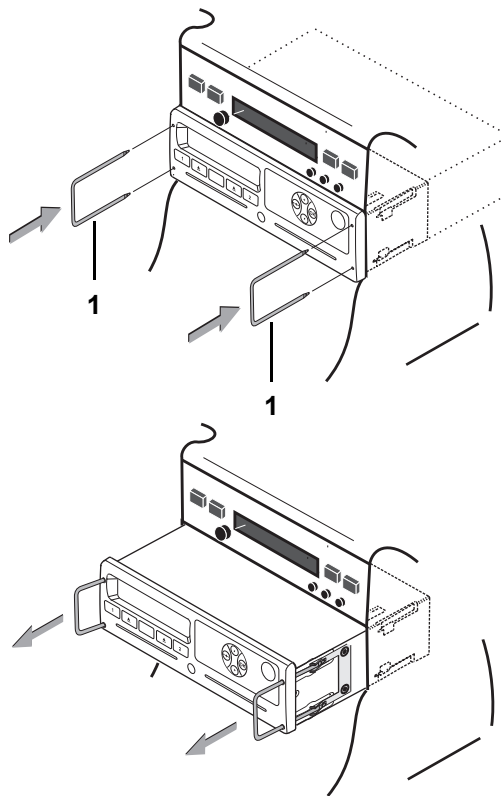


Illustration 75: Removing the DTCO 1381 from the radio compartment

- 1.** Feed the removal aids (**1**) into the openings on both outer sides of the DTCO 1381 until the engagement springs release.
- 2.** Then press the removal aids lightly to the outside and pull the DTCO 1381 from the radio compartment.

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12.2.4 Replacing the buffer battery



Important instructions!

Otherwise the DTCO 1381 is irreparably damaged!

While replacing the buffer battery, the DTCO 1381 must be permanently supplied with voltage (external voltage or vehicle voltage).

When replacing the battery, only use the approved VDO battery (type SB-AA02P, order number HS53.1600.057).

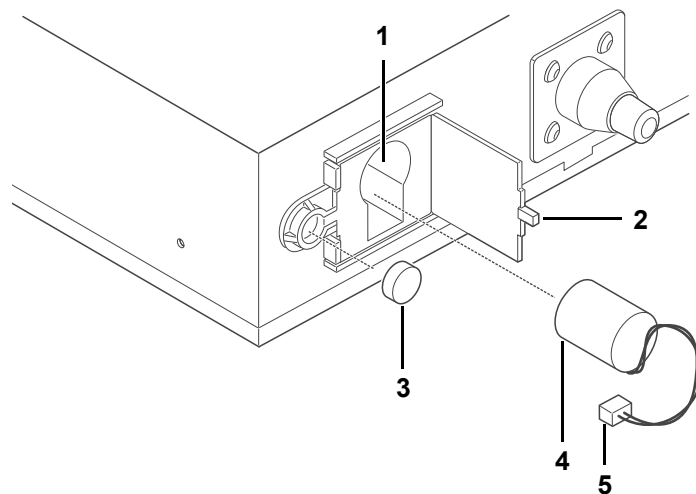


Illustration 76: Replacing the buffer battery

1. Remove the DTCO 1381 from the radio compartment.
2. Remove the battery compartment's sealing cap (3) and open the cover (2) of the battery compartment (1).
3. Remove the existing battery (4) from the battery compartment and carefully pull of the plug (5) from the plug-in connection.
4. Carefully press the new battery's plug into the plug-in connection and insert the battery into the battery compartment.
5. Close the cover of the battery compartment.
Note!
Make sure that the battery cable does not become pinched!
6. Emboss seal cap (3) and use a mounting tool to press it into the seal cup.

12.2.5 Mounting the DTCO 1381

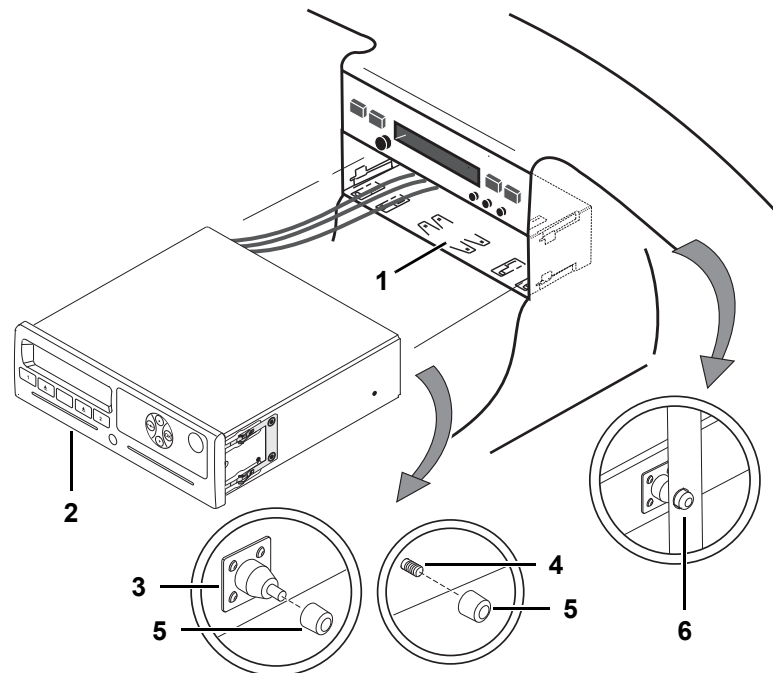



Illustration 77: Mounting the DTCO 1381 in the radio compartment

1. On the rear of the DTCO 1381 (2) press the mounting cap (5) onto the spacer (3) or the threaded bolt (4).
2. Then push the DTCO 1381 (2) into the mounting frame (1) until it engages in the frame and the cover is flush with the console.

Comment 

There is usually a mounting bracket with a hole (6) on the rear wall of the radio compartment. When the DTCO 1381 is pushed in, the fastening cap (5) locks into this hole.



Attention!

When inserting the DTCO 1381 into the installation frame, make sure that none of the cables become pinched and damaged!

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12.3 Cleaning

Cleaning the DTCO 1381

Clean the housing, the display and the function keys of the DTCO 1381 with a slightly moistened cloth or with a microfibre cleaning cloth.

Cleaning tachograph card

Clean the contacts of the tachograph card with a slightly moistened cloth or with a microfibre cleaning cloth.

Cleaning the contacts of the card slot

Clean the contacts of the card slot of the DTCO 1381 with a suitable cleaning card.



Attention!

Do not use solvents such as thinner or naphtha or abrasive cleaning agents because these substances will damage the device or the tachograph card.

Only use cleaning cards recommended or approved by VDO, always comply with all manufacturer's instructions for the correct handling!



Detailed information and suitable cleaning cloths and cleaning cards are available from a VDO sales office.

12.4 Disposal

The DTCO 1381 with its system components is an EC recording equipment in compliance with CR (EEC) 89821/85, annex I B.

EC recording equipment may be disposed only in compliance with the guidelines for disposing EC recording equipment effective in the respective member states.

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Chapter 13

Events and faults

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13.1 General information about messages

The DTCO 1381 monitors the functionality of the system and automatically announces and registers when a legally defined event, a security breach, or a fault appears.

The DTCO 1381 does the following with event, fault, or safety-violation messages:

- saves them in the data memory of the DTCO 1381 for analysis
- saves them on the inserted tachograph cards for analysis
- makes them available on the CAN bus (TCO status) for other CAN stations
- outputs them to the info interface (TCO status).
- shown optically in the DTCO 1381 display and by means of blinking of the display background illumination

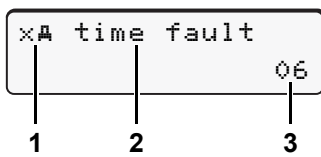


Operational messages and messages about work-time violations are not saved in the DTCO 1381 data memory.

The saved events and faults can be transferred (copied) over the DTCO 1381 interfaces (such as the download interface) to external devices.

During card-based messages, the card slot number will appear in addition to the pictogram.

13.1.1 Messages shown in the display




Messages in the display are comprised of the following elements:

- (1) Pictograms or pictogram combinations (specified by law).
- (2) Error text
- (3) Memory code (MC = position in error memory)

Comment



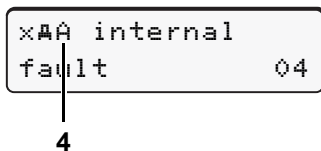
During a warning message, the backlighting of the display is additionally flashing for about 30 seconds or until the warning message will be acknowledged.

The corresponding pictograms or pictogram combinations and informational text in a warning message are displayed (independently of the display's blinking background) until the button  is pressed to acknowledge the message.

Certain warning messages will be cyclically emitted on the display until the cause has been remedied or is no longer active.

If the DTCO 1381 is equipped with the option "Military Blackout Lighting Mode" and this function has been activated, only pictograms or pictogram combinations and error texts will be flashing instead of the background illumination of the display during warning messages.

Additional pictograms in the calibration mode



To permit better differentiation of some warning messages that have the same error text but may have different causes in the device, an additional pictogram (letter) **(4)** will appear in the "Calibration" mode that is not specified in CR (EEC) 3821/85, annex I B.

Comment




This additional pictogram will not be shown when printing or displaying data.

13.1.2 Output of warning messages on the CAN bus

The DTCO 1381 sends the status of the tachograph as part of the TCO1 message (error status, data byte 4).

Warning messages will be sent as "System Event (SE)".



The error status is emitted on the CAN bus until the warning message is acknowledged by pressing the button .

Certain warning messages will be cyclically emitted on the CAN bus until the cause has been remedied or is no longer active.


While the additional condition "Out of scope" is set, the output of warning messages can optionally be suppressed on the CAN bus.

13.1.3 Output of warning messages to info interface

The DTCO 1381 sends the status of the tachograph as part of the data information (error status, data byte 12).

Warning messages will be sent as "System Event (SE)".



The error status is emitted on the info interface until the warning message is acknowledged by pressing the button .

Certain warning messages will be cyclically emitted on the info interface until the cause has been remedied or is no longer active.

While the additional condition "Out of scope" is set, the output of warning messages can optionally be suppressed on the info interface.

13.2 Displaying the event and fault memory

Comment



The event and fault memory can be displayed / printed only when the vehicle is motionless, and in the case of the ADR variant, only when the ignition is turned on, see chapter 3.1.3 "Printing or display of data", page 60.

13.2.1 Driver 1 or driver 2 (inserted tachograph card)

Purpose

In this menu you can display the saved events and faults of an inserted tachograph card.

Comment



The procedure for driver 2 (tachograph card inserted in card slot 2) is identical to that for driver 1 (tachograph card inserted in card slot 1) and will not be described separately below.

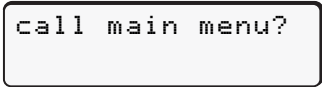



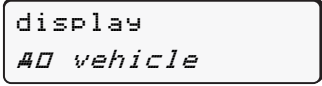



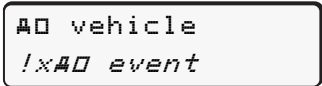



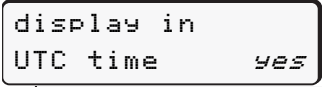
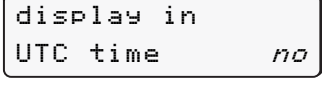



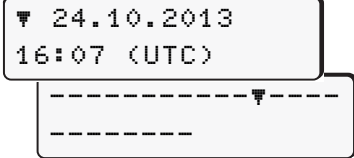
Step / menu display		Explanation / meaning
1	<div>call main menu?</div>	Starting from the standard display ... – press repetitively the button until the display "call main menu?" appears and – acknowledge with the button . or – Press the button .
2	<div>display [driver 1]</div>	– Select "display driver 1" with the button or and – acknowledge with the button .
3	<div>[driver 1] [event]</div>	– Select "driver 1 event" with the button or and – acknowledge with the button .
4	<div>display in UTC time yes</div> <div>display in UTC time no</div>	– Use the button or to select the desired display time – and acknowledge with the button . – With "No", the display shows local time.
5	<div>▼ 11.11.2013 11: 11 (UTC)</div> <div>-----▼----- -----</div> <div>!x[]▼ -----□-----</div>	Similar to an event printout, all events and faults saved on the tachograph card will appear. Note The 24 characters of a printout line are shown on two lines of the display! If you page backward while paging through the information, you will be able to move backward only about 20 printout lines.

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13.2.2 Vehicle (data memory)

Purpose

In this menu you can display the events and faults saved in the data memory.

Step / menu display	Explanation / meaning
1 	Starting from the standard display ... – press repetitively the button  until the display "call main menu?" appears and – acknowledge with the button  or – Press the button  .
2 	– Select "display vehicle" with the button  or  and – acknowledge with the button  .
3 	– Select "vehicle event" with the button  or  and – acknowledge with the button  .
4  	– Use the button  or  to select the desired display time – and acknowledge with the button  – With "No", the display shows local time.
5 	Similar to an event printout, the saved events and faults will appear. Note The 24 characters of a printout line are shown on two lines of the display! If you page backward while paging through the information, you will be able to move backward only about 20 printout lines.

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13.3 Printing the event and fault memory

Comment



The event and fault memory can be displayed / printed only when the vehicle is motionless, and in the case of the ADR variant, only when the ignition is turned on, see chapter 3.1.3 "Printing or display of data", page 60.

13.3.1 Driver 1 or driver 2 (inserted tachograph card)

Purpose

In this menu you can print the saved events and faults of an inserted tachograph card.

Comment



The procedure for driver 2 (tachograph card inserted in card slot 2) is identical to that for driver 1 (tachograph card inserted in card slot 1) and will not be described separately below.

Step / menu display	Explanation / meaning
1 <div>call main menu?</div>	Starting from the standard display ... – press repetitively the button until the display "call main menu?" appears and – acknowledge with the button . or – Press the button .
2 <div>printout driver 1</div>	– Select "printout driver 1" with the button or and – acknowledge with the button .
3 <div> driver 1 event </div>	– Select "driver 1 event" with the button or and – acknowledge with the button .
4 <div> printout in UTC time yes printout in UTC time no printout started ... </div>	– Use the button or to select the desired printing time – and acknowledge with the button . – With "No", printing is carried out in local time. – The DTCO 1381 starts the selected printout and displays this for approximately 3 seconds.

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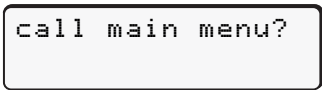



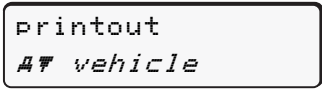



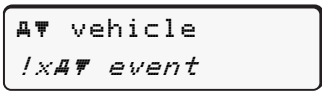



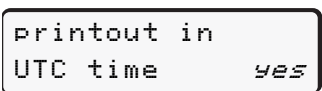
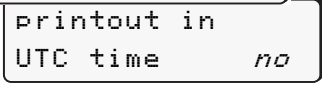
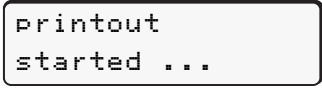





The additional pictograms shown in the calibration mode will not be printed.

13.3.2 Vehicle (data memory)

Purpose

In this menu you can print the events and faults saved in the data memory.

Step / menu display	Explanation / meaning
1 	Starting from the standard display ... – press repetitively the button  until the display "call main menu?" appears and – acknowledge with the button  or – Press the button  .
2 	– Select "printout vehicle" with the button  or  and – acknowledge with the button  .
3 	– Select "vehicle event" with the button  or  and – acknowledge with the button  .
4   	– Use the button  or  to select the desired printing time – and acknowledge with the button  – With "No", printing is carried out in local time. – The DTCO 1381 starts the selected printout and displays this for approximately 3 seconds.



The additional pictograms shown in the calibration mode will not be printed.

13.4 Messages and troubleshooting measures

**Attention**

Please do not attempt to open or modify the device!

A defective DTCO 1381 or the respective system component must be inspected and possibly replaced in its entirety.

The recommended troubleshooting measures are listed in the following tables. If an error persists even after you have performed the recommended measures, please contact our hotline:

Continental Automotive GmbH
P.O. Box 1640
78006 Villingen-Schwenningen
GERMANY

Frank Schmidt

Tel.: +49 (0) 7721 - 67 30 60

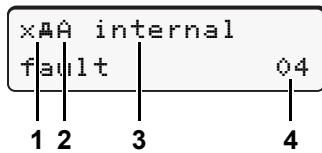
Fax: +49 (0) 7721 - 67 79 30 60

E-Mail: frank.3.schmidt@continental-corporation.com

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13.4.1 Overview of the messages

DTCO 1381 display



Messages in the display are comprised of the following elements:

- (1) Pictograms or pictogram combinations (Picto.)
- (2) Additional pictogram in calibration mode (AP)
- (3) Error text
- (4) Memory code (MC)

Error code

The error code can be read-out over the calibration interface and diagnosis interfaces (CAN or K-Line) with a test device.



Different customer-specific error codes can be sent via the diagnosis interfaces (CAN or K-line).



Refer to the annex for an overview of the messages, arranged according to the memory code (MC), see chapter 14.9 "Overview of the messages according to the memory code (MC)", page 329.







Operational messages

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP ¹⁾	Error text	MC ²⁾		
✕AA	A	internal fault	10	4000003000	➡ page 265
✕B	---	ejection not possible	34	00000005B3	➡ page 266
✕F	---	printout not possible	36	00000005B3	➡ page 267
✕FZ	---	printout delayed	37	00000005B3	➡ page 267
✕F	---	drawer open	38	00000005B3	➡ page 268
✕Fo	---	no paper	39	8000000660	➡ page 268
✕A1 ✕A2	C	internal fault	40 58	4000000400 4000000500	➡ page 269
✕B?1 ✕B?2	---	recordings inconsistent	49 67	00000005B3	➡ page 269
✕B1 ✕B2	---	card error	50 68	00000005B3	➡ page 269
✕B1 ✕B2	---	wrong card type	51 69	00000005B3	➡ page 270



1) AP = Additional pictogram in calibration mode

2) MC = Memory code (position in error memory)












Operational messages

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP ¹⁾	Error text	MC ²⁾		
	---	card locked	52 70	00000005B3	➡ page 270
	---	internal fault	53 71	00000005B3	➡ page 270
	---	wrong entry	---	---	➡ page 270
	---	please enter	---	---	➡ page 271
	---	expires in days 28	---	---	➡ page 271
	---	calibration in days 28	---	---	➡ page 271

Warning messages regarding the driving time

	---	break! 1e04h15 00h15	57 75	00000005B3	➡ page 272
	---	break! 1e04h30 00h15	56 74	0000,0005B3	➡ page 272

Fault warning messages

	A	internal fault	01 02 05	4000000139	➡ page 273
	A	internal fault	04	8000000C31	➡ page 273
	---	time fault	06	8000000800	➡ page 274
	---	calibration fault	09	8000000D33	➡ page 274
	---	download fault	12	00000005B2	➡ page 275
	E	internal fault	13	4000000A70	➡ page 275
	E	internal fault	14	4000000B78	➡ page 276
	D	internal fault	15	8000001177	➡ page 277
	---	sensor fault	16	8000002508	➡ page 277
	---	IMS fault	81	00000005B2	➡ page 227
	---	card fault	41 59	4000000400 4000000500	➡ page 278

1) AP = Additional pictogram in calibration mode

2) MC = Memory code (position in error memory)

Event warning messages

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP ¹⁾	Error text	MC ²⁾		
!⚡	B	power interruption	19	8000002004	➡ page 279
!⚡	C	sensor fault	20	8000002380	➡ page 280
!⚡	A	sensor fault	21	8000002180	➡ page 280
!⚡	B	sensor fault	22	8000002280	➡ page 281
!⚡	---	motion conflict	80	8000002280	➡ page 284
!⚡	---	driving without card	28	8000001260	➡ page 281
!⚡	---	cards conflict	29	00000005B1	➡ page 281
>>	---	overspeed	30	00000005B1	➡ page 281
!⚡	A	power interruption	31	8000000004	➡ page 282
!⚡A1 !⚡A2	---	card not closed	44 62	4000000200 4000000300	➡ page 282
!⚡1 !⚡2	---	time overlap	45 63	4000000200 4000000300	➡ page 283
!⚡1 !⚡2	---	insertion while driving	46 64	4000000200 4000000300	➡ page 283
!⚡1 !⚡2	---	card not valid	48 66	4000000200 4000000300	➡ page 283

Security breach warning messages

!⚡	A	security breach	17	8000002452	➡ page 285
!⚡	B	security breach	18	8000002452	➡ page 285
!⚡	C	security breach	23	8000002452	➡ page 286
!⚡	D	security breach	24	8000002452	➡ page 286
!⚡	E	security breach	25	00000005B1	➡ page 286
!⚡	F	security breach	26	00000005B1	➡ page 286
!⚡1 !⚡2	I	security breach	42 60	4000000200 4000000300	➡ page 287
!⚡1 !⚡2	H	security breach	43 61	4000000200 4000000300	➡ page 287
!⚡1 !⚡2	I	security breach	47 65	4000000200 4000000300	➡ page 287

1) AP = Additional pictogram in calibration mode

2) MC = Memory code (position in error memory)

Other event and fault messages

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP ¹⁾	Error text	MC ²⁾		
---	---	---	76	00000001C0	➡ page 288
---	---	upgrade module not present	77	00000005B3	➡ page 288
---	---	upgrade failed Error #FFFFFFFE	78	00000005B3	➡ page 289
---	---	upgrade failed Error #00000001	79	00000005B3	➡ page 289
---	---	upgrade failed Error #00000002	79	00000005B3	➡ page 289
---	---	upgrade failed Error #00000004	79	00000005B3	➡ page 290
---	---	upgrade failed Error #FFFFFFF	79	00000005B3	➡ page 290

1) AP = Additional pictogram in calibration mode

2) MC = Memory code (position in error memory)

Comment



Displayed or printed warnings regarding security breaches are broken down with an additional code, see chapter 14.7 "Memory behaviour during events or faults", page 326.

13.4.2 Operational messages

The DTCO 1381 recognizes operational errors and outputs the respective message on the display of the DTCO 1381.




Operational messages are not saved in the DTCO 1381 data memory.



The error code can be read-out over the diagnosis interfaces (CAN or K-Line) with a test device, but it will not be shown on the display of the DTCO 1381.



DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	A	internal fault	10	4000003000	<p>Fault at v-pulse output (B7).</p> <p>Possible causes</p> <ul style="list-style-type: none"> • The connection cable between the DTCO 1381 and the attached control device is defective. • Attached control device at output "B7" is defective. • Output "B7" on DTCO 1381 is defective. <p>Measures</p> <ul style="list-style-type: none"> – Check whether the attached control device actively monitors the line and deactivate if necessary. – Check output "B7" on DTCO 1381, if necessary deactivate B7 monitoring. – Check the connection cable between the DTCO 1381 and the attached control device: <ul style="list-style-type: none"> a) Short circuit after ground? b) Short circuit after + U_B? – Check the connected control device (input). – Replace any defective components. <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated (B7recognise).

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DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	---	ejection not possible	34	00000005B3	<p>A tachograph card cannot be ejected; the request is rejected.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Vehicle is moving • Download of data from the requested tachograph card is in progress • Ignition is off (only ADR variant) • The tachograph card is being read or written on • The tachograph card is requested within the same minute during which the tachograph card is correctly read in (after insertion or after restart during activation). • Undervoltage or overvoltage <p>Measures</p> <ul style="list-style-type: none"> – Check whether the DTCO 1381 detects "drive"; if so, stop the vehicle and repeat the process. – Check whether data is currently being downloaded; if so, repeat the process after the download is finished. – Check whether the ignition is on, turn ignition on if necessary (only ADR variant). – Check the voltage supply of the DTCO 1381; correct the following if necessary: <ul style="list-style-type: none"> a) Connection plug and cable (pin assignment, poor connection, loose contact). b) Voltage on terminals 30 and 15; within the specified range? c) Voltage behavior on terminals 30 and 15 during starting; within the specified range? – Repeat process. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>

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



DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	---	Printout not possible	36	00000005B3	<p>Printout (display) of the requested data is currently not possible or a printout in progress is cancelled.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Vehicle is moving • Ignition is switched off (only ADR variant) • Printing head has overheated • Undervoltage or overvoltage • Internal printer interface is not available • Internal printer interface is occupied by another active process, e.g. a printout in progress <p>Measures</p> <ul style="list-style-type: none"> – Repeat process. – Printing or displaying is possible only when the vehicle is motionless and the ignition is switched on (only ADR variant); if necessary, stop the vehicle or turn on the ignition. – After a long printout, the print head temperature is too high; wait to cool. – Check the voltage supply of the DTCO 1381; correct the following if necessary: <ul style="list-style-type: none"> a) Connection plug and cable (pin assignment, poor connection, loose contact). b) Voltage on terminals 30 and 15; within the specified range? c) Voltage behavior on terminals 30 and 15 during starting; within the specified range? – Wait until the other active process has been completed and the internal printer interface is free once more. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>
	---	Printout delayed	37	00000005B3	<p>A printout will be delayed or cancelled.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Printing head has overheated <p>Measures</p> <ul style="list-style-type: none"> – After a long printout, the print head temperature is too high; wait to cool. <p>The printout will automatically continue as soon as these parameters are again within the specified range.</p> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>





DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	---	drawer open	38	00000005B3	<p>In one of the following situations it is determined that the printer drawer is open:</p> <ul style="list-style-type: none"> • withdrawing a tachograph card • requesting a printout • during a printout <p>The ejection of the tachograph card is delayed until the printer drawer is closed. A printout in progress will be interrupted or any print request will be rejected.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Printer drawer is open <p>Measures</p> <ul style="list-style-type: none"> – Check whether the printer drawer is open and closed if necessary. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>
	---	no paper	39	8000000660	<p>It is determined during a printout or during a print request that there is no paper in the printer. The printout in progress is interrupted and the previously printed part automatically marked or the print request is rejected.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • No printer paper has been inserted • All printer paper has been used <p>Measures</p> <ul style="list-style-type: none"> – Check whether there is paper in the printer and insert a new roll if necessary. <p>If a new roll of paper is inserted within one hour, the DTCO 1381 automatically continues the printout. A notice is given in the first two lines of the subsequent printout (line 1: starting time of printout; line 2: counter of the successive prints).</p> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>

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DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
<div> <div> <div></div> <div></div> </div> <div> <div>1A1</div> <div>1A2</div> </div> </div>	C	internal fault	<div> <div>40</div> <div>58</div> </div>	<div> <div>4000000400</div> <div>4000000500</div> </div>	<p>Fault in the card mechanics.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Card lock not closed • General error in the card mechanics <p>Measures</p> <ul style="list-style-type: none"> – Re-insert tachograph card. – Request the tachograph card again. – Interrupt continuous voltage (perform restart). <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p> <p>Comment</p> <p>Any inserted tachograph card is ejected. This error is reset when a tachograph card has been inserted correctly.</p>
<div> <div> <div></div> <div></div> </div> <div> <div>1B?1</div> <div>1B?2</div> </div> </div>	---	recording inconsistent	<div> <div>49</div> <div>67</div> </div>	00000005B3	<p>While reading-in a tachograph card, an inconsistency is found in the links within the date data.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check tachograph card. – Analyze data structure.
<div> <div> <div></div> <div></div> </div> <div> <div>1B1</div> <div>1B2</div> </div> </div>	---	card error	<div> <div>50</div> <div>68</div> </div>	00000005B3	<p>The inserted tachograph card cannot be read or written to.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Tachograph card inserted incorrectly • Contacts of the tachograph card dirty • Tachograph card is defective • Contacts of the card slot dirty <p>Measures</p> <ul style="list-style-type: none"> – Check to make sure the tachograph card is valid. – Make sure the tachograph card is correctly inserted and insert properly if needed. – Check the contacts of the tachograph card, clean them if necessary, see chapter 12.3 "Cleaning", page 249. – Check tachograph card. – Check if another tachograph card is read correctly. – Clean the contacts of the card slot, see chapter 12.3 "Cleaning", page 249.

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DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	---	wrong card type	51 69	00000005B3	<p>The inserted card is not a tachograph card.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • The card is not a valid tachograph card • Contacts of the tachograph card dirty • Tachograph card is defective • Contacts of the card slot dirty <p>Measures</p> <ul style="list-style-type: none"> – Check to make sure the tachograph card is valid. – Make sure the tachograph card is correctly inserted and insert properly if needed. – Check the contacts of the tachograph card, clean them if necessary, see chapter 12.3 "Cleaning", page 249. – Check tachograph card. – Clean the contacts of the card slot, see chapter 12.3 "Cleaning", page 249.
	---	card locked	52 70	00000005B3	<p>The inserted workshop card is locked.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • The workshop card has been locked after five unsuccessful PIN entries. • Workshop card is defective <p>Measures</p> <ul style="list-style-type: none"> – Check the workshop card. – Insert a valid (not locked) workshop card.
	---	internal fault	53 71	00000005B3	<p>Process not possible, tachograph card is not accepted and is ejected.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • The time in the DTCO 1381 is not correct when the tachograph card is inserted. • The DTCO 1381 has detected a generally serious fault in the device. <p>Measures</p> <ul style="list-style-type: none"> – Check UTC time on the DTCO 1381 and use a test device to correct if needed. <p>If the error message appears repetitively, replace the DTCO 1381.</p>
	---	wrong entry	---	---	<p>A wrong PIN for the workshop card has been entered.</p> <p>Measures</p> <ul style="list-style-type: none"> – Repeat or cancel PIN entry.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.		Error text	MC		
	---	please enter	---	---	<p>This request will appear if no entry is made during an entry procedure.</p> <p>Measures</p> <ul style="list-style-type: none"> – Continue the entry.
 	---	expires in days 28	---	---	<p>The released tachograph card will expire, for example in 28 days!</p> <p>Measures</p> <ul style="list-style-type: none"> – Apply for a new tachograph card in a timely manner before the expiry of the period of validity. <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated. • The pre-warning time (0 - 92 days) for this message can be configured (WarnBeforeExpiryDate).
	---	calibration in days 28	---	---	<p>The next regularly inspection is pending, for example in 28 days.</p> <p>Measures</p> <ul style="list-style-type: none"> – Have the regularly inspections prescribed by law done by an authorised workshop in, for example, 28 days at the latest. ➡ Detailed information, see chapter 11 "Regularly inspection" from page 219. <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated. • The pre-warning time (0 - 92 days) for this message can be configured (WarnBeforeExpiryDate).

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13.4.3 Warning messages regarding the driving time

The DTCO 1381 warns the driver about excessive driving times.

Comment



After a driving time of four and a half hours, the driver must interrupt driving for at least 45 continuous minutes unless he has a rest period.

This interruption can be replaced by an interruption of at least 15 minutes, followed by an interruption of at least 30 minutes which have to be included into the driving time in such a way that the legal stipulations will be kept.

The DTCO 1381 calculates on the basis of the actually determined driving times and warns the driver if he will exceed the driving time (before a statutory break). However, these cumulative driving times do not anticipate the legal interpretation of "continuous driving time".

The warning message consists of:

- Warning message on the display of the DTCO 1381
- TCO status output on the CAN bus and on the info interface (can optionally be suppressed during "Out of scope")
- Signal to output D4 (TCO warning output)

DTCO 1381 display			Error code	Meaning, cause and measures
Picto.	Error text	MC		
!e1	break! 1e04h15 1100h15	57 75	00000005B3	After an uninterrupted driving time of 4 hours 15 minutes, the DTCO 1381 warns of the need for a required break. Measures – Find a place to stop and pause for the required time.
!e1	break! 1e04h30 1100h15	56 74	00000005B3	After an uninterrupted driving time of 4 hours 30 minutes, the DTCO 1381 warns of the need for a required break. Measures – Find a place to stop and pause for the required time.

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13.4.4 Fault warning messages

The DTCO 1381 recognizes faults and outputs a corresponding warning message.

The warning message consists of:

- Entry in the DTCO 1381 data memory
- Entry on the inserted tachograph cards
- Warning message on the display of the DTCO 1381
- TCO status output on the CAN bus and on the info interface (can optionally be suppressed during "Out of scope")
- Signal to output D4 (TCO warning output)



If the DTCO 1381 is in the calibration mode, some messages will be accompanied by an additional pictogram (letter) in the display; see column "AP".

The error code can be read-out over the diagnosis interfaces (CAN or K-Line) with a test device, but it will not be shown on the display of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
xA	A	internal fault	01 02 05 07	4000000139	A generally serious fault has appeared in the device. Measures If the error message appears despite repetitive acknowledgement, replace the DTCO 1381.
xA	A	internal fault	04	8000000C31	A generally serious fault has appeared in the device. Measures – Replace the DTCO 1381. Comment This warning message is not saved in the data memory and will never be reset.

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.



DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
XA	---	time fault	06	8000000800	<p>The time in the DTCO 1381 is not correct.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • The clock has stopped or is advancing incorrectly. • An internal cyclical test has determined that the time is not plausible. <p>Measures</p> <ul style="list-style-type: none"> – Check UTC time on the DTCO 1381 and use a test device to correct if needed. – Check the "Time" function of the DTCO 1381. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p> <p>Comment</p> <p>No driver or company cards will be accepted in order to prevent inconsistent data.</p>	1) 2)
XA	---	calibration fault	09	8000000D33	<p>Fault in the calibration memory.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • An internal cyclical test of significant calibration parameters has found a check sum error. <p>Overview of the significant calibration parameters:</p> <ul style="list-style-type: none"> • Vehicle identification number • Vehicle registration number • Characteristic coefficient (w) • Recording equipment constant (k) • Effective wheel circumference (l) • Tire size • Maximum speed • UTC time • Odometer reading • Calibration date <p>Measures</p> <p>If the error message appears despite repetitive acknowledgement, replace the DTCO 1381.</p>	1) 2)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.

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DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
	---	download fault	12	00000005B2	<p>A communication fault has appeared while downloading card or memory data.</p> <p>Measures</p> <ul style="list-style-type: none"> – Repeat download process. – Check connection cable to download station and plug (poor connection, loose contact, pin assignment). – Check download interface on the DTCO 1381. – Check download station. <p>Replace any defective components.</p>	2)
	E	internal fault	13	4000000A70	<p>Other CAN fault, message of the CAN controller, such as no participant, no acknowledgement, etc.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the function / configuration of the DTCO 1381, correct if necessary. – Check the power supply (term. 30, 15, and 31) of the CAN participants. – Check the ground connection of pin A5/A6. – Check the timing behavior of the CAN participants at terminal 15 "on" or "off". – Check bus medium, use a CAN analysis tool if needed. <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated (CAN1EVCfg). • The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit). <p>The DTCO 1381 may not be the cause of the error.</p>	1) 2) 3)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
xA	E	internal fault	14	4000000B78	<p>CAN fault, message of the CAN controller status "Bus off".</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Faults in the bus medium • Fault in the physical layer • Protocol error <p>Measures</p> <ul style="list-style-type: none"> – Check the function / configuration of the DTCO 1381, correct if necessary. – Check bus medium, use a CAN analysis tool if needed. – Check the power supply (term. 30, 15, and 31) of the CAN participants. – Check the ground connection of pin A5/A6. – Check the timing behavior of the CAN participants at terminal 15 "on" or "off". – Check cabling and pin assignment. – Check whether a terminator is missing. – Check whether any CAN participants on the bus have a different baud rate. – Check bit structure. <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated (CAN1EVCfg). • The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit). <p>The DTCO 1381 may not be the cause of the error.</p>

1)
2)
3)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.

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DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
xA	D	internal fault	15	8000001177	<p>Fault or interruption in the communication with an external display instrument (reset monitoring).</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the function / configuration of the DTCO 1381, correct if necessary. – Check the connection cable between the DTCO 1381 and the display instrument: <ul style="list-style-type: none"> a) Pin assignment b) Connection c) Specifications – Check functionality of the display unit, e.g. send reset-message – Check functionality of the DTCO 1381. – Check calibration data of the DTCO 1381 (variant / configuration). <p>Replace any defective components if necessary.</p> <p>Comment</p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> • Monitoring of this fault can be activated or deactivated (CAN1EVCfg). • The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit). <p>The DTCO 1381 may not be the cause of the error.</p>	1) 2) 3)
xl	---	sensor fault	16	8000002508	<p>Internal sensor fault; the KITAS 2171 motion sensor announces an internal fault after a self-test.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check KITAS 2171. <p>Replace KITAS 2171 if necessary.</p>	2)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
x11 x12	---	card fault	41 59	4000000400 4000000500	<p>Communication fault with inserted tachograph cards.</p> <p>A communication fault has appeared during reading or writing of card data.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Contacts of the tachograph card dirty • Tachograph card is defective • Contacts of the card slot dirty <p>Measures</p> <ul style="list-style-type: none"> – Check the contacts of the tachograph card, clean them if necessary, see chapter 12.3 "Cleaning", page 249. – Check tachograph card. – Check DTCO 1381, clean the contacts of the card slot if necessary, see chapter 12.3 "Cleaning", page 249. <p>Replace any defective components.</p> <p>Comment</p> <p>The inserted tachograph card will be ejected.</p>
x11	---	IMS fault	81	00000005B2	<p>The additional independent motion signal is missing or is not available.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Faults in the CAN bus medium • The DTCO 1381 may not be the cause of the error! For example, the vehicle is not outdoors (GPS interference). • Or the control unit sending the IMS message is defective! <p>Measures:</p> <ul style="list-style-type: none"> – Check IMS function. – Check bus medium, use a CAN analysis tool if needed. – Check the connection cable between the DTCO 1381 and the vehicle data bus (CAN). – Check the power supply (term. 30, 15, and 31) of the CAN participants.

1)
2

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These warning messages apply to CAN1 only.

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13.4.5 Event warning messages

The DTCO 1381 detects events and outputs a corresponding warning message.

The warning message consists of:

- Entry in the DTCO 1381 data memory
- Entry on the inserted tachograph cards
- Warning message on the display of the DTCO 1381
- TCO status output on the CAN bus and on the info interface (can optionally be suppressed during "Out of scope")
- Signal to output D4 (TCO warning output)



If the DTCO 1381 is in the calibration mode, some messages will be accompanied by an additional pictogram (letter) in the display; see column "AP".

The error code can be read-out over the diagnosis interfaces (CAN or K-Line) with a test device, but it will not be shown on the display of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!⚡	B	power interruption	19	8000002004	<p>The motion sensor's voltage supply was interrupted.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check KITAS 2171 sensor cable and correct the following if necessary: <ul style="list-style-type: none"> a) Pin assignment b) Connection (imperfect contact) c) Specifications – Check voltage behavior on terminals 30 and 15 during starting; within the specified range? – Check KITAS 2171. – Check DTCO 1381 (input B3). <p>Replace any defective components.</p>

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
!A	C	sensor fault	20	8000002380	<p>Error during sensor communication.</p> <p>Possible causes</p> <ul style="list-style-type: none"> No data signal (B4) KITAS 2171 not paired with the DTCO 1381 <p>Measures</p> <ul style="list-style-type: none"> Check KITAS 2171 sensor cable and correct the following if necessary: <ol style="list-style-type: none"> Pin assignment Connection (imperfect contact) Specifications Check KITAS 2171. Check DTCO 1381 (input B4). Use a test device to pair the KITAS 2171 with the DTCO 1381. <p>Replace any defective components.</p>	1) 3)
!A	A	sensor fault	21	8000002180	<p>Error during sensor communication.</p> <p>Possible causes</p> <ul style="list-style-type: none"> No real-time signal <p>Measures</p> <ul style="list-style-type: none"> Check KITAS 2171 sensor cable and correct the following if necessary: <ol style="list-style-type: none"> Pin assignment Connection (imperfect contact) Specifications Check KITAS 2171. Check DTCO 1381 (input B3). <p>Replace any defective components.</p>	1) 3)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

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DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!II	B	sensor fault	22	8000002280	<p>Error during sensor communication.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Difference of the motion sensor impulses • Transmission error <p>Measures</p> <ul style="list-style-type: none"> – Check KITAS 2171 sensor cable and correct the following if necessary: <ul style="list-style-type: none"> a) Pin assignment b) Connection (imperfect contact) c) Specifications – Check KITAS 2171. – Check DTCO 1381. <p>Replace any defective components.</p>
!e		driving without card	28	8000001260	<p>Driving without or without valid driver or workshop card in card slot 1 or driving with a card combination not authorised for driving in card slot 1 and 2.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check whether a valid driver or workshop card is in card slot 1 and insert a valid card if necessary. – Check whether a company card or control card is inserted in the card slot and eject the card if necessary.
!II		cards conflict	29	00000005B1	<p>Invalid card combination in card slots 1 and 2; these two tachograph cards may not be inserted at the same time.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the combination of the inserted tachograph cards. ➡ Invalid card combination, see chapter 1.4.1 "Valid combinations of tachograph cards", page 33.
>>		overspeed	30	00000005B1	<p>The programmed maximum speed was exceeded for longer than 60 seconds.</p> <p>Measures</p> <ul style="list-style-type: none"> – Reduce speed.

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!⚡	A	power interruption	31	8000000004	<p>The operational voltage of the DTCO 1381 was outside of the specification.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Overvoltage; detailed information, see chapter 14.1.5 "Overvoltage", page 297. • Power interruption <p>Power interruption</p> <p>If the voltage supply of the DTCO 1381 drops below the following critical value of the specified range, the DTCO 1381 detects a "power interruption":</p> <ul style="list-style-type: none"> – 12 V version: typ. 7,5 V (min. 7,4 V; max. 8,0 V) – 24 V version: typ. 8,1 V (min. 8,0 V; max. 8,7 V) <p>If the supply voltage of the DTCO 1381 rises again above the following critical value, the DTCO 1381 signals "power interruption":</p> <ul style="list-style-type: none"> – 12 V version: typ. 8,4 V (min. 8,2 V; max. 9,0 V) – 24 V version: typ. 9,0 V (min. 8,9 V; max. 9,6 V) <p>Measures</p> <ul style="list-style-type: none"> – Check the voltage supply of the DTCO 1381; correct the following if necessary: <ul style="list-style-type: none"> a) Connection plug and cable (pin assignment, poor connection, loose contact). b) Voltage on terminals 30 and 15; within the specified range? c) Voltage behavior on terminals 30 and 15 during starting; within the specified range? – Check functionality of the DTCO 1381. <p>Replace any defective components.</p>
!A1 !A2		card not closed	44 62	4000000200 4000000300	<p>When a driver or workshop card (in card slot 1 or 2) is read it is determined that the card was not properly withdrawn in the last vehicle or the data was not saved properly.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check tachograph card. – Check previous EC recording equipment. <p>Comment</p> <p>The source of the error is not located in the current DTCO 1381.</p>

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!e1 !e2		time overlap	45 63	4000000200 4000000300	<p>Negative time difference relative to last vehicle (EC recording equipment).</p> <p>Possible causes</p> <ul style="list-style-type: none"> The removal time saved on the tachograph card is later than the current system time (time when tachograph card was inserted in the current DTCO 1381); i.e., the time of the current recording equipment comes after the time of the previous recording equipment. <p>Measures</p> <ul style="list-style-type: none"> Check UTC time on the DTCO 1381 and use a test device to correct if needed. Check UTC time on the previous EC recording equipment and use a test device to correct if needed.
!e1 !e2		insertion while driving	46 64	4000000200 4000000300	<p>A tachograph card was inserted after driving had commenced.</p> <p>Possible causes</p> <ul style="list-style-type: none"> Motion sensor impulses detected before correct reading-in of a tachograph card <p>Measures</p> <ul style="list-style-type: none"> In general, insert tachograph cards only when the vehicle is motionless. <p>No steps must be taken.</p>
!e1 !e2		card not valid	48 66	4000000200 4000000300	<p>The inserted tachograph card has expired or is invalid.</p> <p>Possible causes</p> <ul style="list-style-type: none"> An invalid or expired tachograph card (a) is inserted. During a day change-over (b) it was determined that an inserted tachograph card is no longer valid. <p>Measures</p> <ul style="list-style-type: none"> Check tachograph card. <p>Comment</p> <p>a) An expired tachograph card (tachograph card has expired but the certificate is still valid), can be inserted for printing or displaying the saved data; after having acknowledged the warning message, the tachograph card is read in with the "read only" status.</p> <p>b) If a day change takes place while the vehicle is not moving, the respective data will be saved on the tachograph card and the card will be ejected. If a day change takes place while the vehicle is moving, the respective data will be saved on the tachograph card after the end of the trip and the card will be ejected.</p>

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!A	---	motion conflict	80	8000002280	<p>Contradiction in the evaluation of the vehicle movement between sensor and an independent signal source.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • IMS function is missing or IMS configuration (independent motion signal) is incorrectly programmed. • Possible operating error during transport on a ferry/train. • KITAS 2171 defective and/or sensor line interrupted or defective. <p>Measures</p> <ul style="list-style-type: none"> – Check KITAS 2171 sensor line. – Check KITAS 2171. – Check IMS function. – Check IMS configuration (independent motion signal). – Check the connection cable between the DTCO 1381 and the vehicle data bus (CAN). – Replace any defective components..

1)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

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13.4.6 Security breach warning messages

The DTCO 1381 recognizes security breaches and outputs a corresponding warning message.

The warning message consists of:

- Entry in the DTCO 1381 data memory
- Entry on the inserted tachograph cards
- Warning message on the display of the DTCO 1381
- TCO status output on the CAN bus and on the info interface (can optionally be suppressed during "Out of scope")
- Signal to output D4 (TCO warning output)



If the DTCO 1381 is in the calibration mode, some messages will be accompanied by an additional pictogram (letter) in the display; see column "AP".

The error code can be read-out over the diagnosis interfaces (CAN or K-Line) with a test device, but it will not be shown on the display of the DTCO 1381.

Displayed or printed warnings regarding security breaches are broken down with an additional code, see chapter 14.7 "Memory behaviour during events or faults", page 326.

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!A	A	security breach	17	8000002452	Data security fault. Internal sensor error, the motion sensor indicates an error in the data integrity. Measures – Check KITAS 2171. Replace KITAS 2171 if necessary.
!B	B	security breach	18	8000002452	Internal sensor error, authentication error. The motion sensor indicates an error during authentication. Measures – Check KITAS 2171. – Use a test device to pair the KITAS 2171 with the DTCO 1381. Replace KITAS 2171 if necessary.

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
!A	C	security breach	23	8000002452	<p>Error during authentication of the motion sensor during operation or error during the pairing procedure.</p> <p>Possible causes</p> <ul style="list-style-type: none"> Error during authentication of the motion sensor during operation Multiple coupling with the KITAS 2171. After three pairing processes, this function will be blocked for security reasons. The workshop card must then be withdrawn and re-inserted; i.e., the workshop card must be re-authenticated. <p>Measures</p> <ul style="list-style-type: none"> As necessary, eject the workshop card and re-insert; repeat coupling. Check KITAS 2171 sensor cable. Check KITAS 2171. Check DTCO 1381 (input B4). Use a test device to pair the KITAS 2171 with the DTCO 1381. <p>Replace any defective components.</p>	1) 2) 3)
!A	D	security breach	24	8000002452	<p>Unknown serial number; Error during comparison of the serial numbers of the motion sensor.</p> <p>Measures</p> <ul style="list-style-type: none"> Check sealing of the KITAS 2171 to the transmission. Check KITAS 2171. Check DTCO 1381. Use a test device to pair the KITAS 2171 with the DTCO 1381. <p>Replace any defective components.</p>	1) 2) 3)
!A	E	security breach	25	00000005B1	<p>Error in data memory. Due to an error in the data memory of the DTCO 1381, data security is no longer ensured.</p> <p>Measures</p> <ul style="list-style-type: none"> Check DTCO 1381. <p>If the error message appears repetitively, replace the DTCO 1381.</p>	1) 2)
!A	F	security breach	26	00000005B1	<p>The DTCO 1381 housing was or is opened.</p> <p>Measures</p> <ul style="list-style-type: none"> Check sealing (housing) of the DTCO 1381. Check DTCO 1381. <p>If the error message appears repetitively, replace the DTCO 1381.</p>	2)

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

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DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
!01 !02	I	security breach	42	4000000200	Authenticity of the data is not ensured. Possible causes • Error during inspection of the data's authenticity Measures – Check tachograph card. Comment – Tachograph card is ejected.	2)
			60	4000000300		
!01 !02	H	security breach	43	4000000200	Card missing; the DTCO 1381 no longer detects an inserted card. Possible causes • After a voltage interruption, an identity test determines that a previously inserted card is missing or another card is inserted. • When the card is inserted, the lock of the card mechanics is open. Measures – Check whether the tachograph card is properly inserted. – Eject tachograph card and re-insert. – Check functionality of the card lock. If the error message appears repetitively, replace the DTCO 1381.	2)
			61	4000000300		
!01 !02	I	security breach	47	4000000200	Security breach during authentication of a tachograph card. Possible causes • Error during inspection of a tachograph card's identity. Measures – Check tachograph card. – Check workshop card, enter correct PIN.	2)
			65	4000000300		

1) These warning messages will be displayed repetitively every hour until the cause is withdrawn.

2) These warning messages are not saved in the data memory during calibration mode.

3) These events will be monitored only after activation of the DTCO 1381.

13.4.7 Other events and faults

The DTCO 1381 can also monitor other system functions in addition to the legally required functionality.

Comment



Other events and faults are not saved in the date memory.

The error code can be read-out over the diagnosis interfaces (CAN or K-Line) with a test device, but it will not be shown on the display of the DTCO 1381.



Detailed information on the messages in connection with the upgrade of the user software of the DTCO 1381 (Software Upgrade) is contained in the Technical Description "Software-Upgrade DTCO 1381", TD00.1381.20 600 102.

DTCO 1381 display				Error code	Meaning, cause and measures	
Picto.	AP	Error text	MC			
---	---	---	76	00000001C0	Pre-warning on the event "overspeed". Possible causes <ul style="list-style-type: none"> • Overspeeding. • Faulty configuration. Measures <ul style="list-style-type: none"> – Reduce speed. – Check the function / configuration of the DTCO 1381, correct if necessary. Note <p>For this message the TCO status (Handling Information = HI) is sent on the CAN bus and on the info interface (customer-specific, deviating signal output possible).</p> <p>The pre-warning time (0 - 60 s) for this message can be configured.</p>	1)
---	---	upgrade module not present	77	00000005B3	The DTCO 1381 is not equipped with a software upgrade module. Measures <ul style="list-style-type: none"> – No measures necessary. Note <p>The DTCO 1381 cannot be upgraded.</p>	1)

1) For these messages the memory code (MC) is not shown in the display of the DTCO 1381.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
---	---	upgrade failed Error #FFFFFFE	78	00000005B3	<p>The integrity of the software upgrade module or a security key is not ensured; the software upgrade was aborted.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the DTCO 1381. – Repeat software upgrade. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>
---	---	upgrade failed Error #00000001	79	00000005B3	<p>The software upgrade was aborted.</p> <p>The voltage supply of the DTCO 1381 was outside of the specified range during the software upgrade; the software upgrade was aborted.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the voltage supply of the DTCO 1381; correct the following if necessary: <ul style="list-style-type: none"> a) Connection plug and cable (pin assignment, poor connection, loose contact). b) Voltage on terminal 30 and 15; within the specified range? – Make sure that the DTCO 1381 has a reliable voltage supply during the software upgrade, e.g. a lab power supply unit. – Repeat software upgrade. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p> <p>Note</p> <p>The DTCO 1381 may not be the cause of the error.</p>
---	---	upgrade failed Error #00000002	79	00000005B3	<p>The authentication of the management device has failed; the software upgrade was aborted.</p> <p>Measures</p> <ul style="list-style-type: none"> – Check the function of the management device. – Repeat software upgrade. <p>Note</p> <p>The DTCO 1381 is not the cause of the error.</p>

1) For these messages the memory code (MC) is not shown in the display of the DTCO 1381.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
---	---	upgrade failed Error #00000004	79	00000005B3	<p>Communication error; the software upgrade was aborted.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Software upgrade aborted by user. • Download interface of the DTCO 1381 defective. • Data connection interrupted or data cable defective. • Management device interface disturbed or blocked <p>Measures</p> <ul style="list-style-type: none"> – Check download interface of the DTCO 1381. – Check data connection and data cable. – Check the interface and the function of the management device. – Repeat software upgrade. <p>Note</p> <p>The DTCO 1381 may not be the cause of the error.</p>
---	---	upgrade failed Error #FFFFFFFF	79	00000005B3	<p>The software upgrade module could not be started; the software upgrade was aborted.</p> <p>Possible causes</p> <ul style="list-style-type: none"> • Internal fault of the DTCO 1381. <p>Measures</p> <ul style="list-style-type: none"> – Check the DTCO 1381. – Repeat software upgrade. <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>

1)

1)

1) For these messages the memory code (MC) is not shown in the display of the DTCO 1381.

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Chapter 14

Appendix

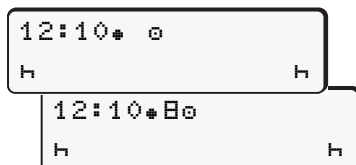
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14.1 Operating conditions of the DTCO 1381

14.1.1 Standby (Power Safe Mode)



In the "Standby" condition, the power consumers of the DTCO 1381 are switched off to minimise battery discharge.

Under the following conditions, the DTCO 1381 will switch into the "Standby" condition after about 5 minutes:

- The DTCO 1381 is in the "Operational" mode, i.e. no workshop, control or company card is inserted.
or
The DTCO 1381 is in the production status, i.e. it has not yet been activated.
- No button is pressed.
- The ignition of the vehicle (terminal 15) is switched off.
- A printout has been completed.
- A download procedure has been completed.
- No remote download wake-up signal (D3) is available.
- Data communication via the information interface has been completed.
- Data recording has been completed.
- Card communication has been completed.
- The voltage supply of the DTCO 1381 is within the specified range.
Exception "Undervoltage", i.e. in the "Undervoltage" mode, too, the DTCO 1381 will switch into "Standby" mode after about five minutes.
- The voltage supply of the motion sensor is within the specified range.
- No motion sensor pulses are applied.
- There is no communication to external diagnosis interfaces.
- The housing switch of the DTCO 1381 is not actuated, i.e. the housing is not opened.

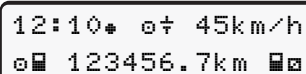


The DTCO 1381 will switch off the display after another three minutes (configurable between 1 - 10 minutes).

Standby mode is cancelled by the following conditions:

- The ignition of the vehicle (terminal 15) is switched on.
- Any button is actuated.
- The DTCO 1381 detects motion sensor pulses.
- Failure of the voltage supply of the DTCO 1381 / motion sensor.
- The housing switch of the DTCO 1381 is actuated, i.e. the housing is opened.
- The DTCO 1381 detects and announces an event or a fault.
- Remote download wake-up signal (D3).
- Communication on external diagnosis interfaces.

14.1.2 Undervoltage (Safe Prepare Mode)



If the voltage supply of the DTCO 1381 drops below the following minimum value of the specified range, the DTCO 1381 switches to the "undervoltage" mode:

- 12 V version: typ. 8,5 V (min. 8,3 V; max. 8,6 V)
- 24 V version: typ. 14,0 V (min. 13,8 V; max. 14,3 V)

Current consumption is limited to ensure that the system can be shut down reliably if the voltage drops further.

The following functions are not available:

- The backlighting of the display is switched off.
- Printing or display of data is not possible.
- Insertion or removal of the tachograph cards is not possible.

As soon as the voltage supply of the DTCO 1381 increases once more to above the following limit value into the specified range, the DTCO 1381 returns to the normal operating mode:

- 12 V version: typ. 8,7 V (min. 8,5 V; max. 8,9 V)
- 24 V version: typ. 15,1 V (min. 14,8 V; max. 15,3 V)

If the supply voltage of the DTCO 1381 drops further, the DTCO 1381 switches to the "safe mode".

14.1.3 Safe Mode

12:10* ÷
123456.7km

If the voltage supply of the DTCO 1381 drops below the following critical value of the specified range, the DTCO 1381 switches to the "safe mode":

- 12 V version: typ. 6,6 V (min. 6,2 V; max. 7,0 V)
- 24 V version: typ. 7,5 V (min. 7,0 V; max. 8,0 V)

Comment



In the "safe mode" the DTCO 1381 cannot fulfil its function as EC recording equipment!

The following functions are not available:

- The driver's activities will not be recorded.
- The speed is not indicated.
- The backlighting of the display is switched off.
- All buttons are deactivated.
- All external interfaces are deactivated (except the v-pulse outputs and the 4 pulses/m signal output).
- Printing or display of data is not possible.
- Insertion or removal of the tachograph cards is not possible.

12:10* 45km/h
123456.7km

As soon as the supply voltage of the DTCO 1381 rises above the following limit value again, the DTCO 1381 switches to the "under-voltage" mode:

- 12 V version: typ. 7,2 V (min. 6,8 V; max. 7,6 V)
- 24 V version: typ. 8,1 V (min. 7,6 V; max. 8,6 V)

! power
interruption 31

If the supply voltage of the DTCO 1381 continues to rise above the following critical value, the DTCO 1381 signals "Power interruption".

- 12 V version: typ. 8,4 V (min. 8,2 V; max. 9,0 V)
- 24 V version: typ. 9,0 V (min. 8,9 V; max. 9,6 V)

12:10* 45km/h
123456.7km

As soon as the voltage supply of the DTCO 1381 increases once more to above the following limit value into the specified range, the DTCO 1381 returns to the normal operating mode:

- 12 V version: typ. 8,7 V (min. 8,6 V; max. 8,9 V)
- 24 V version: typ. 15,1 V (min. 14,8 V; max. 15,3 V)

14.1.4 Halt Mode



If the voltage supply of the DTCO 1381 continues to drop below the limit value (typ. 6,6 V; min. 6,1 V; max. 7,0 V), the DTCO 1381 switches to the "Halt Mode".

If the voltage supply of the DTCO 1381 continues to drop, the DTCO 1381 switches off.

Comment



In the "Halt Mode" the DTCO 1381 cannot fulfil its function as EC recording equipment!

```
xx.xx.xx
SWUM xx.xx
```

```
!⚡ power
interruption 31
```

As soon as the supply voltage of the DTCO 1381 rises once more above the limit value* (typ. 6,6 V; min. 6,1 V; max. 7,0 V), the DTCO 1381 runs a restart procedure. The version of the operating software (xx.xx.xx) and the version of the software upgrade module (SWUM xx.xx) appear for approximately 5 seconds, then the DTCO 1381 switches to the "safe mode".

* Different limit values in production status:

- 12 V version: min. 7,2 V; max. 7,8 V
- 24 V version: min. 7,5 V; max. 8,1 V.

14.1.5 Overvoltage

12:10 45km/h
123456.7km

or



If the voltage supply of the DTCO 1381 rises above the following value of the specified range, the DTCO 1381 switches to the "over-voltage" mode:

- 12 V version: > 17,5 V
- 24 V version: > 35,0 V

To prevent damage, the internal power supply for the printer, the display and the card slots is switched off.

The following functions are not available:

- Printing or display of data is not possible.
- Insertion or removal of the tachograph cards is not possible.

! power
interruption 31


As soon as the voltage supply of the DTCO 1381 falls once more to below the following limit value into the specified range, the DTCO 1381 returns to the normal operating mode:

- 12 V version: < 17,0 V
- 24 V version: < 34,0 V

Afterwards the DTCO 1381 indicates "power interruption".

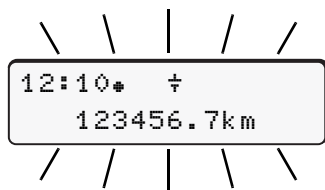
14.1.6 Limp Home Mode after self-test

The DTCO 1381 monitors the correct functioning of the operating software; if a fault occurs, the DTCO 1381 carries out a restart to eliminate the fault.



xx.xx.xx
SWUM xx.xx

The operating software version appears for approximately five seconds. After the fault has been successfully eliminated the DTCO 1381 returns to the normal operating mode.



If, after a number of attempts, the DTCO 1381 is unable to eliminate the fault, the DTCO 1381 switches to the operating mode "limp home mode", the background illumination of the display is permanently flashing.



Comment

In the "limp home mode" mode the DTCO 1381 cannot fulfil its function as EC recording equipment!

The following functions are not available:

- The driver's activities will not be recorded.
- The speed is not indicated.
- The backlighting of the display is switched off.
- All buttons are deactivated.
- All external interfaces are deactivated (except the v-pulse outputs, the 4 pulses/m signal output and conditionally the CAN interface).
- Printing or display of data is not possible.
- Insertion of the tachograph cards is not possible.

14.2 Notes regarding options

14.2.1 Military Blackout Lighting Mode

If the DTCO 1381 is equipped with the option "Military Blackout Lighting Mode" and this function has been activated, only pictograms or pictogram combinations and information texts will be flashing instead of the background illumination of the display during warning messages.

- **Activated:** Pin A2 to ground
- **Deactivated:** Pin A2 open or to +U_B



If the function is deactivated, the function remains active until the ignition is switched off and on for the next time.

14.2.2 Remote Download

If the DTCO 1381 is equipped with the option "remote download", the data can also be downloaded by remote control via the interfaces provided for this purpose following the successful authentication of a company card.



Remote download is possible only in the "Operational" mode.
Remote download can be made only via the interface through which a company card was authenticated first.

14.3 Pictograms and pictogram combinations

14.3.1 Individual pictograms

Operational modes			
	Company		Calibration
	Control mode		Production status
	Operational mode		
Persons			
	Company		Workshop / inspection station
	Controller		Manufacturer
	Driver		
Activities			
	Availability time		Other working time
	Driving time		Valid interruption
	Break and rest time		Unknown
Devices / functions			
1	Card slot 1		Display
2	Card slot 2		Download data (copy)
	Tachograph card (read correctly)		Data transmission running
—	Tachograph card inserted,		Sensor
	relevant data read		Vehicle / Vehicle unit / DTCO 1381
	Clock		Tire size
	Printer / printout		Power supply
	Entry		
Miscellaneous			
	Event		Security(
	Fault		Speed
	Operational note / Driving time warnings		Time
	Start of work day		Total / summary
	End of work day		Manual entry of driver activities
	Location		
Specific conditions			
OUT	Recording equipment not required		Ferry transfer / train transfer
Qualifiers			
24h	daily		w(eekly
	from or until		two weeks

14.3.2 Pictogram combinations

Miscellaneous			
	Control location		Printout driver card
	Start time		Printout vehicle / DTCO 1381
	End time		Entry vehicle / DTCO 1381
	Begin out of scope: Recording equipment not required		Display driver card
	End out of scope		Display vehicle / DTCO 1381
	Location at beginning of work day		Local time
	Location at end of work day		UTC correction
	From vehicle		
Cards			
	Driver card		Workshop card
	Company card		No card
	Control card		
Driving			
	Team		Driving time over two weeks
Printouts			
	Daily driver activities from the driver card		Daily driver activities from DTCO 1381
	Events and faults from the driver card		Events and faults from DTCO 1381
	Overspeeding		Technical data
	Speed profiles		rpm profiles
	Driver's activities		v-diagram
	Status D1/D2		
Display			
	Daily driver activities (day) from the driver card		Daily driver activities (day) from DTCO 1381
	Events and faults from the driver card		Events and faults from DTCO 1381
	Overspeeding		Technical data
Events			
	Insertion of an invalid tachograph card		Card conflict
	Time overlap		Driving without valid driver card
	Insertion of driver card while driving		Last card process not completed correctly
	Overspeeding		Interruption of power supply
	Communication fault with the sensor		Security breach
	Motion data conflict during vehicle movement		Overspeeding control
	Time adjustment (by workshop)		

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Faults			
✖1	Card fault (card slot 1)	✖	Fault during downloading
✖A	Internal fault DTCO 1381	✖L	Sensor fault
✖A	Time fault	✖AL	(IMS = Independent Motion Signal) Independent motion signal missing
✖	Printer fault		

Driving time warnings			
!o	Break ! 04h15	!o	Break ! 04h30

Operational notes			
!o	Wrong entry	!o	Card defective
!	Menu access not possible	!o	Incorrect card
!o	Please enter	!o	Ejection not possible
!o	Printout not possible	!o	Process delayed
!o	Drawer open	!o?	Recording inconsistent
!o	No paper	!o	Internal fault
!o	Printout delayed	!A1	Expires in days ...
!A	Calibration in days ...		

Manual entry process			
h/x/o	Entering "activities"	o/?	Entering "location" at the end of the shift
?	Entering "unknown activity"	h/?	Entering "location" at the beginning of the shift

VDO Counter *			
oH	Remaining driving time	hH	Remaining break time / rest period
oH	Beginning of the next driving time	*h	Remaining time until the beginning of the daily, weekly rest period
hH	Future driving time		

* = Option

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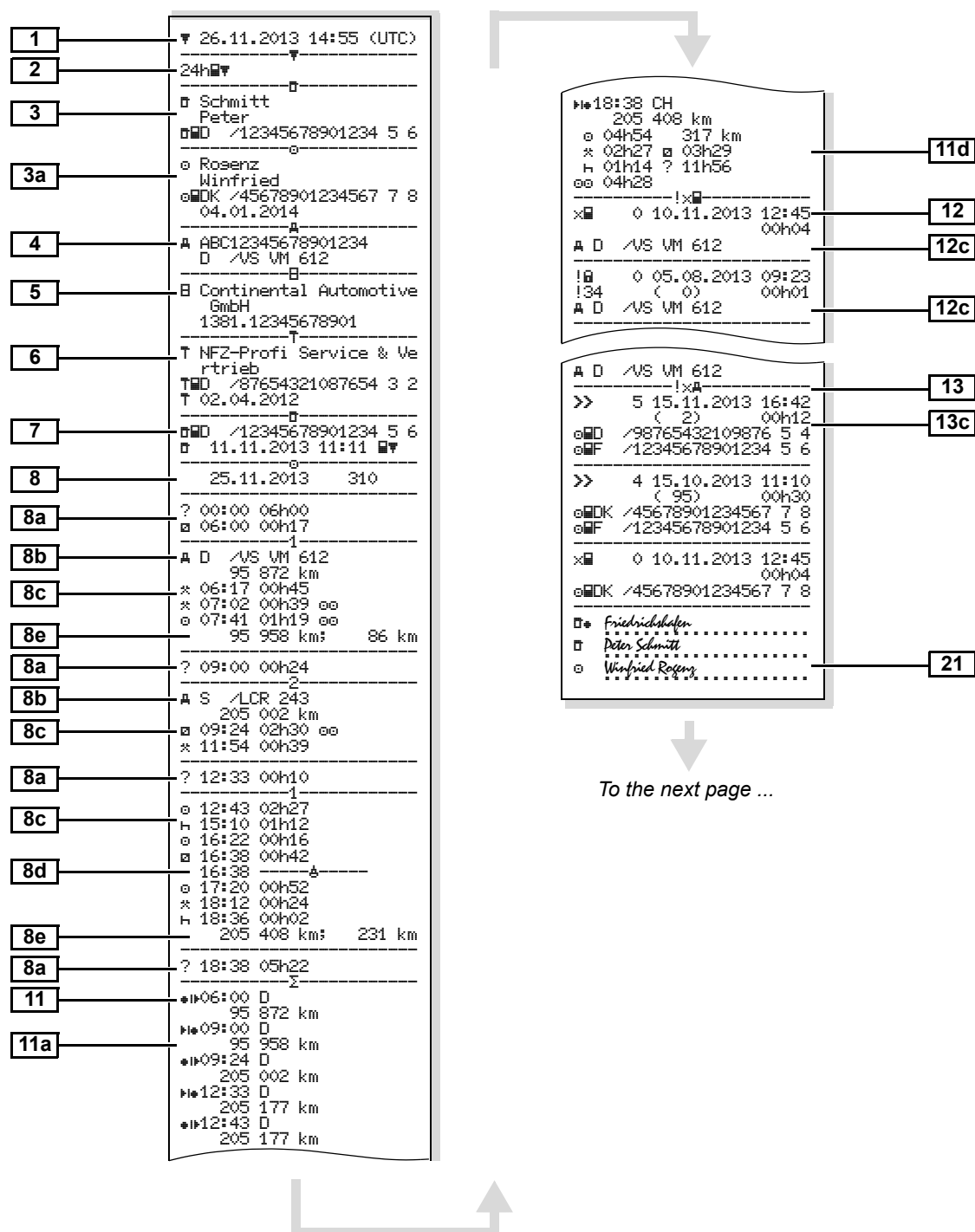
14.3.3 Country symbols

Value assignment			
A	Austria	KZ	Kazachstan
AL	Albania	L	Luxembourg
AND	Andorra	LT	Lithuania
ARM	Armenia	LV	Latvia
AZ	Azerbaijan	M	Malta
B	Belgium	MC	Monaco
BG	Bulgaria	MD	Republic of Moldavia
BIH	Bosnia and Herzegovina	MK	Macedonia
BY	Belarus	MNE	Montenegro
CH	Switzerland	N	Norway
CY	Cyprus	NL	The Netherlands
CZ	The Czech Republic	P	Portugal
D	Germany	PL	Poland
DK	Denmark	RO	Romania
E	Spain	RSM	San Marino
EC	European Community	RUS	The Russian Federation
EST	Estonia	S	Sweden
EUR	Rest of Europe	SK	Slovakia
F	France	SLO	Slovenia
FIN	Finland	SRB	Serbia
FL	Liechtenstein	TM	Turkmenistan
FR	Faroes	TR	Turkey
GE	Georgia	UA	Ukraine
GR	Greece	UK	United Kingdom, Alderney, Guernsey, Jersey, Isle of Man, Gibraltar
H	Hungary		
HR	Croatia	UZ	Uzbekistan
I	Italy	V	Vatican City
IRL	Ireland	WLD	Rest of the world
IS	Iceland		

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14.4 Printout examples – legal printouts

14.4.1 Daily printout, driver card activities



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Illustration 78: Printout example: Daily printout, driver card activities, part 1

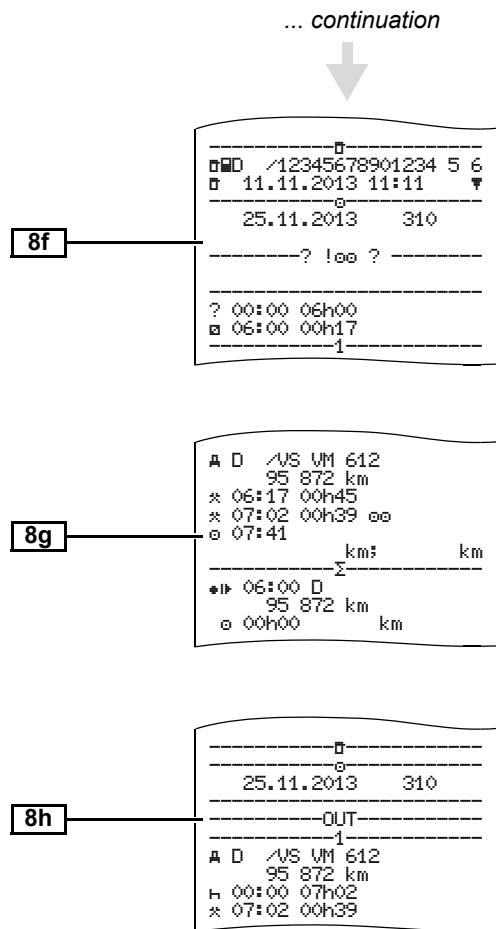


Illustration 79: Printout example: Daily printout, driver card activities, part 2

14.4.2 Driver card events / faults

1	▼ 11.11.2013 11:11 (UTC)
2	!x▼
3	<div> <div>Schmitt</div> <div>Peter</div> <div>12345678901234 5 6</div> </div>
3a	<div> <div>Rosenz</div> <div>Winfried</div> <div>45678901234567 7 8</div> <div>04.01.2014</div> </div>
4	<div> <div>ABC12345678901234</div> <div>D /VS VM 612</div> </div>
12a	!+ 04.04.2013 02:14
12c	06h03
	A S /LCR 243
	! 04.11.2013 18:12
	00h01
	A D /VS VM 612
	! 10.02.2013 08:12
	00h05
	A D /S VD 432
	!+ 12.12.2012 10:15
	00h10
	A D /VS VM 612
	! 10.05.2013 08:45
	00h01
	A D /VS VM 612
12c	! 05.08.2013 09:23
	!22 00h01
	A D /VS VM 612
	! 17.04.2013 16:04
	!11 01h02
	A D /VS VM 612
12b	x 10.11.2013 12:45
12c	00h04
	A D /VS VM 612
	x 11.02.2013 18:02
	00h03
	A D /VS VM 612
	x 20.12.2012 01:54
	00h04
	A D /S VD 432
21	<div> <div>Ulm</div> <div>Peter Schmitt</div> <div>Winfried Rosenz</div> </div>

Illustration 80: Printout example: Driver card events / faults

14.4.3 Daily printout, driver activities from DTCO 1381

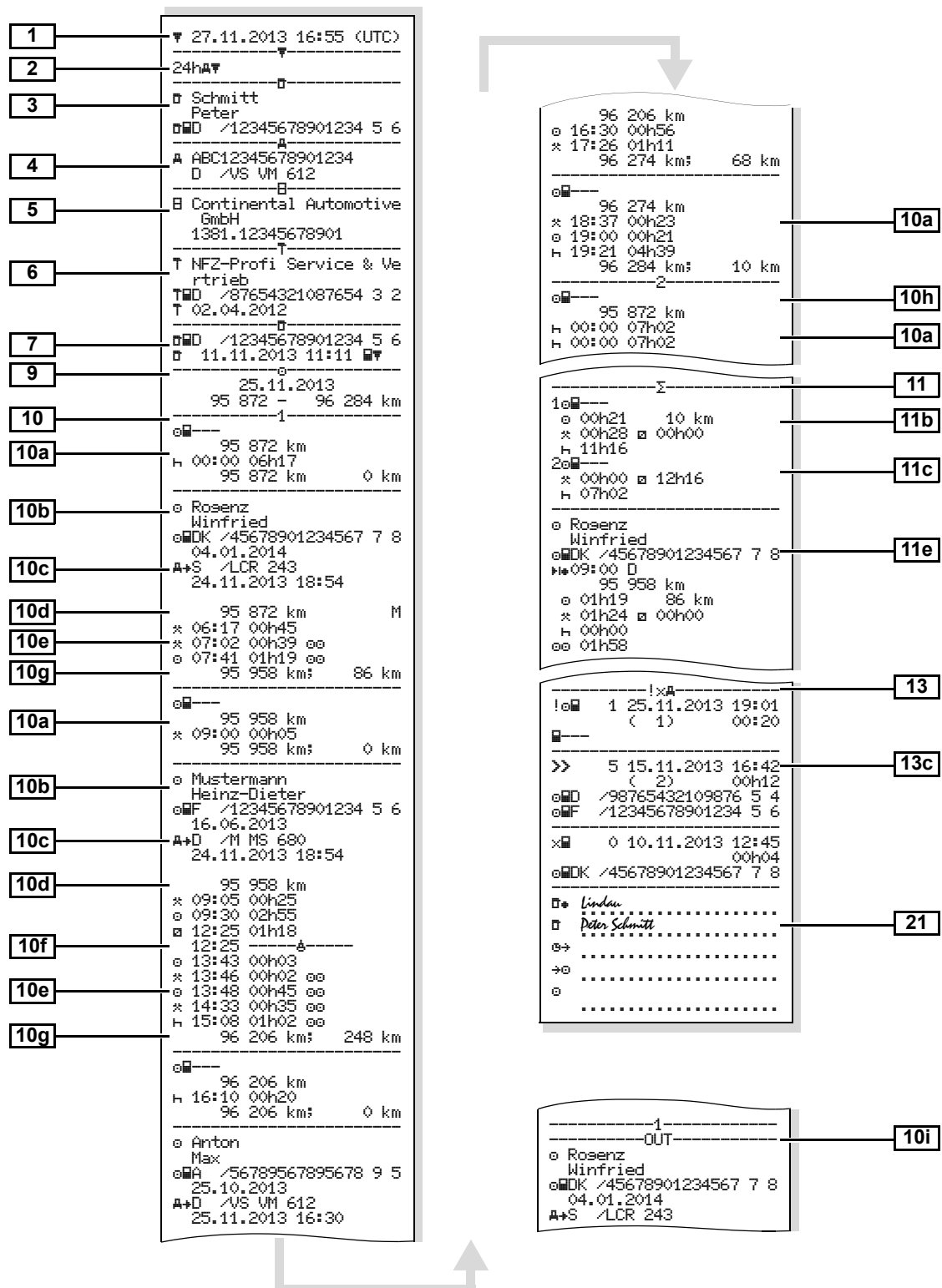


Illustration 81: Printout example: Daily printout, driver activities from DTCO 1381

14.4.4 DTCO 1381 events / faults

1	▼ 24.10.2013 16:07 (UTC)
2	!xA▼
3	Schmitt Peter /12345678901234 5 6
4	ABC12345678901234 D /VS VM 612
13a	! 0 10.08.2013 08:12 (0) 00h01
13c	/12345678901234 5 6 /12345678901234 5 6
	! 0 10.08.2013 08:20 (0) 00h03
	/12345678901234 5 6 /12345678901234 5 6
	!e 1 15.10.2013 07:02 (1) 00h54
	—
	!e 2 15.10.2013 07:02 (1) 00h54
	—
	!e 3 15.03.2012 07:56 (1) 00h01
	/12345678901234 5 6 /22335578901234 1 2
	>> 4 15.10.2013 11:10 (95) 00h30
	/45678901234567 7 8 /12345678901234 5 6
	! 0 17.04.2013 16:04 (0) 01h02
	/45678901234567 7 8 /12345678901234 5 6
	! 0 05.08.2013 09:23 (0) 00h01
	!22 /45678901234567 7 8
13b	x 0 10.08.2013 07:00 00h02
13c	/12341234123412 3 4
	x 0 05.05.2012 07:15 00h14
	/12345678901234 5 6 /12345678901234 5 6
	x 6 05.05.2012 07:15 00h14
	/12345678901234 5 6 /12345678901234 5 6
	x 0 12.09.2013 21:00 00h01
	—
	x 0 02.06.2013 21:00 00h30
	/12341234123412 3 4
21	Lindau Peter Schmitt

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Illustration 82: Printout example: DTCO 1381 events / faults

14.4.5 Overspeeding instances

1	▼ 24.10.2013 14:50 (UTC)
2	>>▼ 90 km/h
3	◦ Mustermann Heinz-Dieter ◦ID /12345678901234 5 6 16.06.2013
4	A ABC12345678901234 D /VS VM 612 >>
19	>>13.03.2013 14:15
20	>>17.04.2013 17:44 (7)
20c	>>T >>24.05.2012 14:02 00h06 98 km/h 92 km/h (1) ◦ Förster Thomas ◦ID /98765432109876 5 4 >>(365)
20a	>>15.10.2013 11:10 00h30 98 km/h 95 km/h (95) ◦ Rosenz Winfried ◦IDK /45678901234567 7 8
20b	◦IDK /45678901234567 7 8 >>(10) >>16.05.2013 17:10 00h15 94 km/h 92 km/h (12) ◦ Mustermann Heinz-Dieter ◦ID /12345678901234 5 6
21	◦* ◦ ◦ Heinz Mustermann

Illustration 83: Printout example: Overspeeding instances

14.4.6 Technical data of the DTCO 1381 / vehicle

1	▼ 25.10.2013 14:50 (UTC)
2	Te▼
3	⚠ Spedition Mustermüller ⚠ID /12341234123412 3 4 ○ ○ Mustermann Heinz-Dieter ○MF /12345678901234 5 6 16.06.2013 -----A-----
3a	
4	A ABC12345678901234 D /VS VM 612 -----B-----
14	B Continental Automotive GmbH H.-Hertz-Str.45 78052 VS-Villinsen 1381.12345678901234567 ei-84 12345678 2013 V xxxx 17.04.2013 -----I-----
15	I 87654321 ei-175 08.03.2012 -----T-----
16	
16a	T Fa. Mustermann & NFZ- Hersteller Schillerstr. 10 Muster kirchen TID /45678901234567 8 9 21.01.2013
16b	T 08.03.2012 (1) A ABC12345678901234 //////////////////// w 8 000 Imp/km k 8 000 Imp/km l 3 050 mm ● 315/70/R22.5 > 90 km/h 0 - km -----T----- T NFZ-Profi Service & Ve trieb Hauptstr. 24-26 Muster stadt TID /87654321087654 3 2 12.03.2013
17	-----e----- !e 08.03.2012 14:00 e 08.03.2012 15:00 T Fa. Mustermann & NFZ- Hersteller Schillerstr. 10 Muster kirchen TID /45678901234567 8 9 21.01.2013 -----
17a	
	!e 28.08.2012 13:00 e 28.08.2012 13:26 T Kienzle ARG0 GMBH Bismarckstr. 19 Berlin Steslitz TID /89012345678901 5 6 19.10.2013 -----!xA-----
18	! 18.10.2013 06:34 x 30.09.2013 18:15 -----B ATTACHMENT-----
25	SWUM V xx.xx -----All-----
26	CAN: 1 Source: speed Gain: 0.00390625 Factor: 0.926

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Illustration 84: Printout example: Technical data of the DTCO 1381 / vehicle

14.4.7 Driver's activities

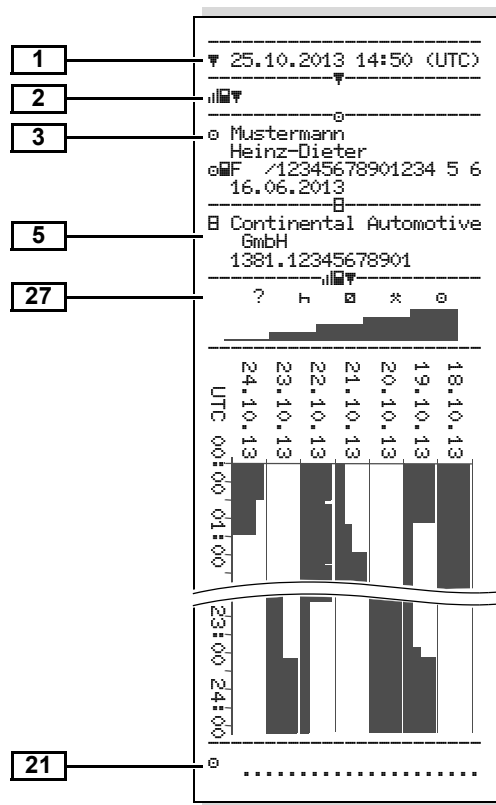


Illustration 85: Printout example: Driver's activities

14.4.8 v-diagram

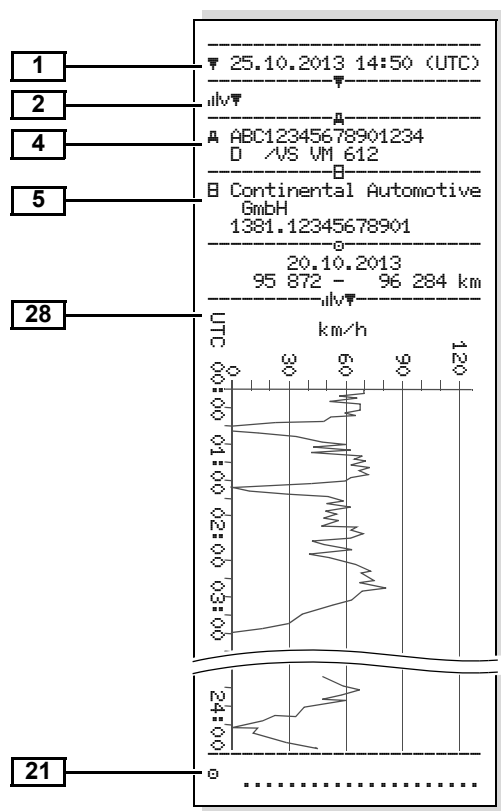


Illustration 86: Printout example: v-diagram

14.5 Printout examples – optional printouts

14.5.1 Status D1/D2 diagram

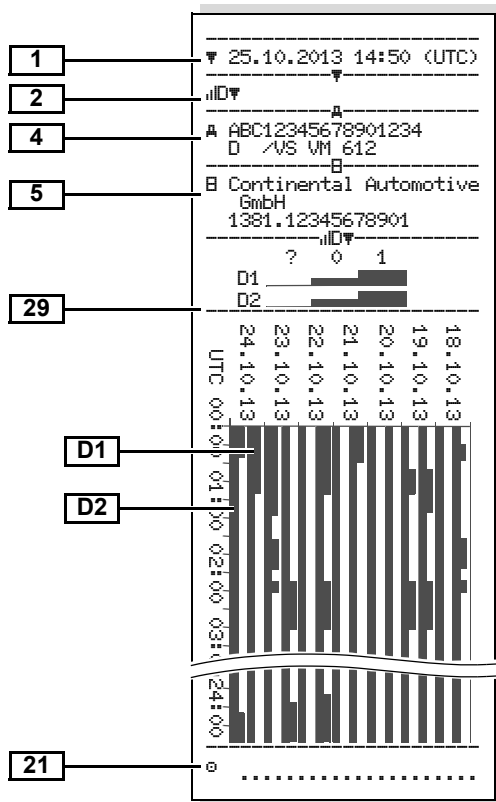


Illustration 87: Printout example: Status D1/D2 diagram

14.5.2 Speed profiles

1	▼ 27.11.2013 17:05 (UTC)
2	▼▼
3	◊ Spedition Mustermüller ◊ /12341234123412 3 4
4	A ABC12345678901234 D /VS VM 612
4	◊ 25.11.2013 00:00 25.11.2013 06:17 --- km/h
22	112 <=v< 221 00h00 ◊ ◊ Mustermann Heinz-Dieter 25.11.2013 18:37 26.11.2013 00:00 --- km/h
23	0 <=v< 1 05h02 1 <=v< 10 00h01 10 <=v< 16 00h02 16 <=v< 24 00h04 24 <=v< 32 00h05 32 <=v< 40 00h05 40 <=v< 48 00h04 48 <=v< 56 00h00 56 <=v< 64 00h00 64 <=v< 72 00h00 72 <=v< 80 00h00 80 <=v< 88 00h00 88 <=v< 96 00h00 96 <=v< 104 00h00 104 <=v< 112 00h00 112 <=v< 221 00h00
21	◊

Illustration 88: Printout example: Speed profiles

14.5.3 Rpm profiles

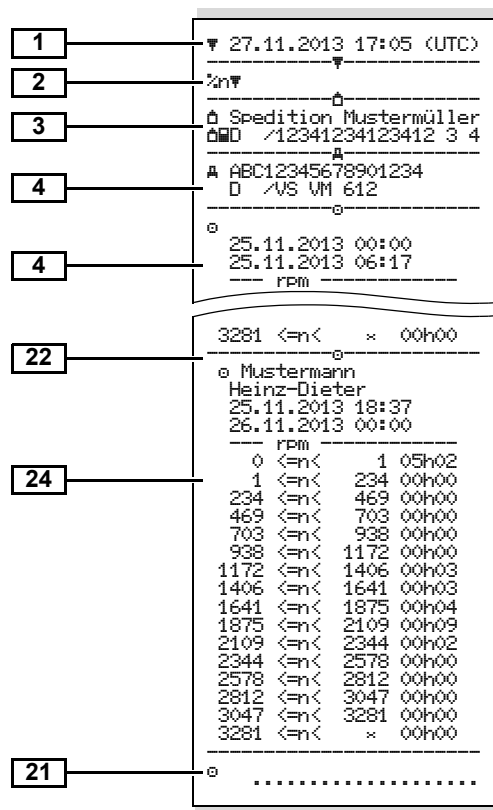


Illustration 89: Printout example: rpm profiles

14.5.4 Printout in local time

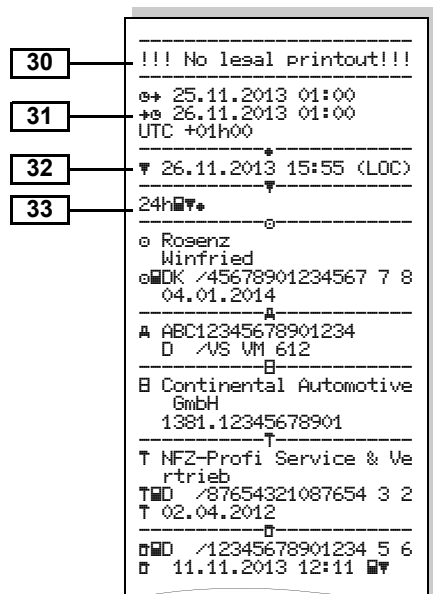


Illustration 90: Printout example: Printout in local time

Comment

Every printout can be made in local time. The option for this desired printing time is displayed before the printout is started.

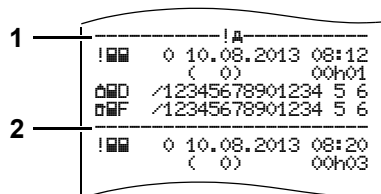
14.6 Explanation of printout examples



On request, a company-specific logo can be applied to the printout.

14.6.1 Specification of the data blocks

General Information







- Every printout consists of a string of different data blocks that are identified by block identifiers **(1)**.
- A data block contains one or several data records that are identified by means of a data set identifier **(2)**.
- A data record will not be printed immediately after a block identifier!

Explanation





Pos. / block	Data block specification / explanation
1	Date and time of the printout in UTC time
2	Type of printout 24h = Daily printout of the driver card !x = Events / faults from the driver card 24hA = Daily printout from DTCO 1381 !xA = Events / faults from DTCO 1381 >> = Overspeeding* T = Technical data al = Driver's activities alv = v-diagram Optional printouts alD = Status D1/D2 diagram %v = Speed profiles %n = Rpm profiles * The value set in the speed limiter will also be printed.

Pos. / block	Data block specification / explanation
3	Information about Cardholder (only when tachograph card is inserted) <ul style="list-style-type: none"> ☐ = Controller ⊗ = Driver ☐ = Company ⊞ = Workshop / inspection station • Last name • First name • Card identification • Card valid until ... Note If a tachograph card is not associated with a person, the name of the control body, the company, or the workshop will be printed instead of the person's name.
3a	Information about the cardholder of the other tachograph card
4	Vehicle identification <ul style="list-style-type: none"> • Vehicle identification number • Authorizing member state and vehicle registration number
5	Identification of the DTCO 1381 <ul style="list-style-type: none"> • Tachograph manufacturer • Part number of the DTCO 1381
6	Most recent calibration of the DTCO 1381 <ul style="list-style-type: none"> • Name of workshop • Workshop identification • Date of calibration
7	Most recent control <ul style="list-style-type: none"> • Control card identification • Date, time, and type of control <ul style="list-style-type: none"> ☐ = Downloading from the driver card ⊞ = Downloading from the DTCO 1381 ☐ = Printing ☐ = Display
8	List of driver activities in the order they appear <ul style="list-style-type: none"> • Calendar day of the printout and the usage meter (number of days that the card was used)
8a	? = Time period that the card was not inserted <ul style="list-style-type: none"> • Manually entered activity after insertion of the driver card, with pictogram, beginning and duration.
8b	Insertion of driver card into slot (card slot 1 or 2) <ul style="list-style-type: none"> • Authorizing member state and vehicle registration number • Odometer reading when card inserted

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Pos. / block	Data block specification / explanation
8c	Activities of the driver card <ul style="list-style-type: none"> Beginning and duration, and driving status  = Crew operation
8d	Specific conditions <ul style="list-style-type: none"> With time of entry and pictogram, for example: ferry or train
8e	Withdrawal of driver card <ul style="list-style-type: none"> With odometer reading and distance travelled since most recent insertion.
8f	Attention Possible inconsistency in the data recording since this day was saved twice on the tachograph card.
8g	Activity not completed: <ul style="list-style-type: none"> Duration of activity and daily summaries might be given incompletely when printouts are made while the driver card is inserted.
8h	The specific condition "OUT of scope" was switched on at start of the day
9	Beginning of list of all driver activities in the DTCO 1381 <ul style="list-style-type: none"> Calendar day of printout (date of inquiry) Odometer readings at the times 00:00 and 23:59
10	Chronology of all activities from card slot 1
10a	Time period in which no driver card was inserted in card slot 1 <ul style="list-style-type: none"> Odometer reading at the beginning of the time period Set activity or activities in this time period Odometer reading at the end of the time period and distance travelled
10b	Insertion of the driver card <ul style="list-style-type: none"> Last name of driver First name of driver Card identification Card valid until ...
10c	<ul style="list-style-type: none"> Authorizing member state and registration number of the previous vehicle Date and time card was withdrawn from the previous vehicle
10d	<ul style="list-style-type: none"> Odometer reading when driver card inserted  = the entry was done manually
10e	List of activities <ul style="list-style-type: none"> Pictogram of the activity, beginning and duration, and driving status  = Crew operation
10f	Entry of specific conditions <ul style="list-style-type: none"> Entry time and pictogram of the condition  = Ferry transfer or train transfer OUT+ = Begin (Recording equipment not required) +OUT = End

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Pos. / block	Data block specification / explanation
10g	Withdrawal of driver card <ul style="list-style-type: none"> • Odometer reading and distance travelled
10h	Chronology of all activities from card slot 2
10i	The specific condition "OUT of scope" was switched on at start of the day
11	Daily summary
11a	Entered locations <ul style="list-style-type: none"> •  = Beginning time with country and possibly region •  = Ending time with country and possibly region • Vehicle odometer reading
11b	Summary of times with no driver card in card slot 1 <ul style="list-style-type: none"> • Entered locations in chronological order (no entry in example) • Total activities from card slot 1
11c	Summary of times with no driver card in card slot 2 <ul style="list-style-type: none"> • Entered locations in chronological order (no entry in example) • Total activities from card slot 2
11d	Daily summary "total values of activities" from the driver card <ul style="list-style-type: none"> • Total driving time and distance travelled • Total work and availability time • Total rest time and unknown time • Total time in crew activities
11e	Summary of the activities, chronological arranged by driver (cumulative for each driver for both card slots) <ul style="list-style-type: none"> • Last name, first name, card identification of the driver •  = Beginning time with country and possibly region •  = Ending time with country and possibly region • Activities from this driver with ... <ul style="list-style-type: none"> – total driving time and distance travelled – total work and total availability time – total rest time – total time in crew activities <p>Note</p> <p>In this sample printout, the driver Anton Max is initially active as driver 2, then as driver 1. The sum of the activities is derived from both card slots.</p>

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<i>Pos. / block</i>	<i>Data block specification / explanation</i>
12	List of the five most recent saved events or faults on the driver card
12a	List of all saved events on the driver card, arranged according to type of fault and date
12b	List of all saved faults on the driver card, arranged according to type of fault and date
12c	Data record of the event or fault Line 1: <ul style="list-style-type: none"> • Pictogram of the event or fault. • Date and beginning. Line 2: <ul style="list-style-type: none"> • Events subject to security breach are broken down with an additional code, see chapter 14.7 "Memory behaviour during events or faults", page 326. • Duration of the event or fault. Line 3: <ul style="list-style-type: none"> • Authorizing member state and registration number of the vehicle in which the events or faults appeared.
13	List of the five most recent saved or still active events/disturbances in the DTCO 1381
13a	List of all recorded or continuing events of the DTCO 1381
13b	List of all recorded or continuing faults of the DTCO 1381
13c	Data record of the event or fault Line 1: <ul style="list-style-type: none"> • Pictogram of the event or fault. • Coding data record purpose, see chapter 14.7 "Memory behaviour during events or faults", page 326. • Date and beginning. Line 2: <ul style="list-style-type: none"> • Events subject to security breach are broken down with an additional code, see chapter 14.7 "Memory behaviour during events or faults", page 326. • Number of similar events on this day, see chapter 14.7 "Memory behaviour during events or faults", page 326. • Duration of the event or fault. Line 3: <ul style="list-style-type: none"> • Identification of the driver card(s) (maximum of four entries) that was inserted at the beginning or at the end of the event or fault. • "■----" appears when no driver card is inserted.

Pos. / block	Data block specification / explanation
14	Identification of the DTCO 1381 <ul style="list-style-type: none"> • Tachograph manufacturer • Address of the tachograph manufacturer • Part number • Type approval number • Serial number • Year of manufacture • Version and date of installation of the user software
15	Identification of the KITAS 2171 <ul style="list-style-type: none"> • Serial number • Type approval number • Date of initial installation
16	Calibration data
16a	Listing of the calibration data (in data sets) <ul style="list-style-type: none"> • Name and address of the workshop • Workshop identification • Workshop card valid until ...
16b	<ul style="list-style-type: none"> • Date and purpose of the calibration <ul style="list-style-type: none"> 1 = Activation (recording of known calibration data at the time of activation) 2 = Initial installation (first calibration data after activation of the DTCO 1381) 3 = Installation (first calibration data in current vehicle, identified by the VIN) 4 = Regularly inspection (calibration data of a periodic inspection) 5 = Entry of the vehicle registration number by the company • Vehicle identification number • Authorizing member state and registration number • μ = Characteristic coefficient of the vehicle • k = DTCO 1381 constant • l = Actual circumference of tires • Φ = Tire size • λ = Speed limiter setting • Old and new odometer reading <p>Remark</p> <p>In the example, this data is available only in the next data set.</p>

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Pos. / block	Data block specification / explanation
17	Time settings
17a	Listing of all available data about time setting (in data sets) <ul style="list-style-type: none"> • Date and time, old • Date and time, changed • Name of workshop that set the time • Address of workshop • Workshop identification • Workshop card valid until ...
17b	Remark In the second data set it can be seen that the UTC time was corrected by an authorized workshop.
18	The most recently recorded event and the current fault <ul style="list-style-type: none"> • ! = Most recent event, date, and time. • x = Most recent fault, date, and time.
19	Information on overspeeding control <ul style="list-style-type: none"> • Date and time of the most recent control. • Date and time of the first instance of overspeeding since the most recent control and the number of subsequent overspeeding instances.
20	First instance of overspeeding since the most recent calibration
20a	The five most severe instances of overspeeding of the last 365 days
20b	The 10 most recently recorded instances of overspeeding. For each day the most severe instance of over-speeding is recorded.
20c	Entries during instances of overspeeding (chronologically arranged by highest average speed) <ul style="list-style-type: none"> • Date, time, and duration of overspeeding • Highest and average speed of the overspeeding instance, number of similar events on this day • Last name of driver • First name of driver • Card identification of the driver Remark If no data set for an instance of overspeeding appears in a block, then the following appears: ">>---".

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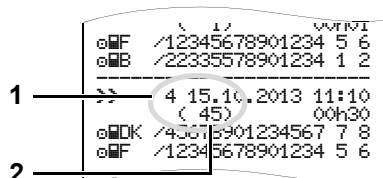
Pos. / block	Data block specification / explanation
21	Handwritten information <ul style="list-style-type: none"> •  = Location of control •  = Signature of the controller •  = Start time •  = End time •  = Signature of the driver
22	Information about the cardholder of the recorded profile <ul style="list-style-type: none"> • Last name of driver • First name of driver • Card identification Remark Missing information about the cardholder means: no driver card inserted in card slot 1. <ul style="list-style-type: none"> • Beginning of the profile recording with date and time • End of the profile recording with date and time Remark New profiles are created: <ul style="list-style-type: none"> – by inserting / withdrawing a tachograph card into / from card slot 1 – by a day change – by a correction of the UTC time – by a voltage interruption
23	Recording of speed profile <ul style="list-style-type: none"> • List of the defined speed ranges and period in this range • Range: $0 \leq v < 1$ = Vehicle motionless The speed profile is divided into 16 zones. During installation, the individual ranges can be adjusted individually.
24	Recording of rpm profile <ul style="list-style-type: none"> • List of the defined motor rpm ranges and period in this range • Range: $0 \leq n < 1$ = Motor off • Range: $3281 \leq n < x$ = unlimited The rpm profile is divided into 16 zones. During installation, the individual ranges can be adjusted individually.
25	Manufacturer-specific data <ul style="list-style-type: none"> • Version number of the software upgrade module (SWUM)

Pos. / block	Data block specification / explanation
26	IMS configuration (independent motion signal) <ul style="list-style-type: none"> CAN: Vehicle data bus 1 or 2 Source: Signal source; speed = ABS / wheel = wheel speed / odometer (GPS) = GPS unit Gain: Conversion factor for adapting the unit of measurement between "independent signal source" and sensor signal. Factor: Factor for adaptation to the sensor signal.
27	Recording of the activities <ul style="list-style-type: none"> Legend of the symbols From the selected day on, there are profiles of the activities of the last 7 calendar days.
28	Recording of the speed data on the selected day
29	Recording of additional statuses, such as the use of blue lights and sirens on emergency vehicles, etc. <ul style="list-style-type: none"> Legend of the symbols From the selected day on, there are profiles of status inputs D1/D2 of the last 7 calendar days.
30	!!! No legal printout!!! Please note: No permitted printout! A printout in local time is invalid in accordance with the regulation (e.g. retention obligation)!
31	Period of the printout in local time: <ul style="list-style-type: none"> ☞ = Start of recording ☛ = End of recording UTC +01h00 = Difference between UTC time and local time.
32	Date and time of the printout in local time (LOC)
33	Type of printout e.g. "24h☛" in local time "☞"

14.7 Memory behaviour during events or faults

For each established event or fault, the DTCO 1381 will register and save the data according to the specified rules.

- (1) Data record purpose
- (2) Number of similar events on this day



The data record purpose **(1)** indicates why the event or fault was recorded. Events of the same type appearing several times on this day are displayed at pos. **(2)**.

Coding of data record purpose

The following overview shows the events and faults arranged according to error type (cause) and the assignment of the data record purpose:

	Picto	Cause	Data record purpose
Events	! [card]	Card conflict ²⁾	0
	! [card]	Driving without valid card ²⁾	1, 2, 7
	! [card]	Insertion while driving	3
	! [card]	Card not closed	0
	>>	Overspeeding ²⁾	4, 5, 6
	! [power]	Power interruption	1, 2, 7
	! [sensor]	Sensor fault	1, 2, 7
	! [motion]	Motion conflict ²⁾	1, 2
	! [security]	Security breach	0
	! [time]	Time overlap ¹⁾	—
Faults	! [card]	Card invalid ³⁾	—
	✗ [card]	Card fault	0
	✗ [internal]	Internal fault	0, 6
	✗ [internal]	Internal fault	0, 6
	✗ [display]	Display fault	0, 6
	✗ [faults]	Faults during downloading	0, 6
	✗ [sensor]	Sensor fault	0, 6
	✗ [motion]	Independent motion signal missing ²⁾ (IMS = Independent Motion Signal)	0, 6

1) This event will be saved only on the driver card.

2) This event / fault will only be saved in the DTCO 1381.

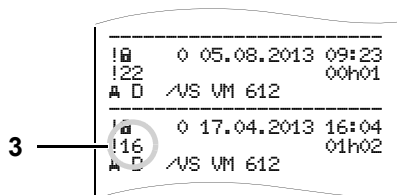
3) The DTCO 1381 will not save this event.

Overview of the data record purpose

- 0 = One of the 10 most recent events or faults
- 1 = The longest event from one of the last 10 days during which an event appeared
- 2 = One of the 5 longest events of the last 365 days
- 3 = The most recent event from one of the last 10 days during which an event appeared
- 4 = The most serious event from one of the last 10 days during which an event appeared
- 5 = The 5 most serious events of the last 365 days
- 6 = The first event or first fault after the most recent calibration
- 7 = An active event or a continuing fault

Number of similar events

- 0 = For this event, it is not necessary to save "number of similar events"
- 1 = One event of this type appeared on this day
- 2 = Two events of this type appeared on this day, but only one was saved
- n = "n" events of this type appeared on this day, but only one was saved

Coding for more detailed description

Events subject to security breach "!" are broken down with an additional coding (3):

Attempts that breach security on the DTCO 1381

- 10 = No additional information
- 11 = Failed authentication of the sensor
- 12 = Authentication errors of the driver card
- 13 = Unauthorized changes to the sensor
- 14 = Integrity error; the authenticity of the data on the driver card is not assured
- 15 = Integrity error, the authenticity of the saved user data is not assured
- 16 = Internal data transmission error
- 17 = Unauthorized opening of the housing
- 18 = Manipulation of the hardware

Security breaching attempts on the KITAS 2171 impulse sensor

- 20 = No additional information
- 21 = Failed authentication
- 22 = Integrity error, the authenticity of the memory data is not assured
- 23 = Internal data transmission error
- 24 = Unauthorized opening of the housing
- 25 = Manipulation of the hardware

14.8 IMS configuration

Comment



The examples presented were carefully checked and serve solely as orientation. They make no claim to completeness!

Vehicle types	Data bus		Signal source			Adjustment factors		Remark: Approximate values for all vehicles for which installation is mandatory
	CAN1	CAN2	speed	wheel	odometer (GPS)	Gain	Factor * (typical)	
- Mercedes: Actros/Axor/Atego - VOLVO: FH/FL - IVECO: Stralis/Eurocargo - Scania: P-/G-/R-series - Renault: Magnum/Midlum/Premium - MAN TGX/TGM/TGL - DAF XF/CF/LF	X	X	X	–	–	0,00390625	0,900 ... 1,100	85 % of all heavy-duty trucks
- Mercedes: Sprinter	X	X	–	X	–	0,50000000	2,100 ... 2,300	8 %
- NISSAN: Cabstar	X	X	–	X	–	0,50000000	2,200 ... 2,500	2 %
- Vehicles with M1N1 adapter - Other imported vehicles	X	X	–	–	X	0,00390625	1,000	2 % ... 4%
- ...	–	–	–	–	–	–	–	1 %

* The factor value is set by the vehicle manufacturer or in the workshop.

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14.9 Overview of the messages according to the memory code (MC)



For detailed information, see chapter 13 "Events and faults" from page 251 and chapter 13.4 "Messages and troubleshooting measures" from page 260.

Memory code (MC)	DTCO 1381 display				Error code	Meaning, cause and measures
	Picto.	AP	Error text	MC		
01	xA	A	internal fault	01	4000000139	➡ page 273
02	xA	A	internal fault	02	4000000139	➡ page 273
04	xA	A	internal fault	04	8000000C31	➡ page 273
05	xA	A	internal fault	05	4000000139	➡ page 273
06	xA	---	time fault	06	8000000800	➡ page 274
07	!A	A	security breach	07	4000000139	➡ page 273
09	xA	---	calibration fault	09	8000000D33	➡ page 274
10	xA	A	internal fault	10	4000003000	➡ page 265
12	xT	---	download fault	12	00000005B2	➡ page 275
13	xA	E	internal fault	13	4000000A70	➡ page 275
14	xA	E	internal fault	14	4000000B78	➡ page 276
15	xA	D	internal fault	15	8000001177	➡ page 277
16	xL	---	sensor fault	16	8000002508	➡ page 277
17	!A	A	security breach	17	8000002452	➡ page 285
18	!A	B	security breach	18	8000002452	➡ page 285
19	!T	B	power interruption	19	8000002004	➡ page 279
20	!L	C	sensor fault	20	8000002380	➡ page 280
21	!L	A	sensor fault	21	8000002180	➡ page 280
22	!L	B	sensor fault	22	8000002280	➡ page 281
23	!A	C	security breach	23	8000002452	➡ page 286
24	!A	D	security breach	24	8000002452	➡ page 286
25	!A	E	security breach	25	00000005B1	➡ page 286
26	!A	F	security breach	26	00000005B1	➡ page 286

Memory code (MC)	DTCO 1381 display				Error code	Meaning, cause and measures
	Picto.	AP	Error text	MC		
28	!e	---	driving without card	28	8000001260	➔ page 281
29	!B	---	cards conflict	29	00000005B1	➔ page 281
30	>>	---	overspeed	30	00000005B1	➔ page 281
31	!+	A	power interruption	31	8000000004	➔ page 282
34	!B	---	ejection not possible	34	00000005B3	➔ page 266
36	!B	---	printout not possible	36	00000005B3	➔ page 267
37	!B	---	printout delayed	37	00000005B3	➔ page 267
38	!B	---	drawer open	38	00000005B3	➔ page 268
39	!B	---	no paper	39	8000000660	➔ page 268
40	!A1	C	internal fault	40	4000000400 4000000500	➔ page 269
41	xB1	---	card fault	41	4000000400 4000000500	➔ page 278
42	!B1	I	security breach	42	4000000200 4000000300	➔ page 287
43	!B1	H	security breach	43	4000000200 4000000300	➔ page 287
44	!BA1	---	card not closed	44	4000000200 4000000300	➔ page 282
45	!e1	---	time overlap	45	4000000200 4000000300	➔ page 283
46	!B1	---	insertion while driving	46	4000000200 4000000300	➔ page 283
47	!B1	I	security breach	47	4000000200 4000000300	➔ page 287
48	!B1	---	card not valid	48	4000000200 4000000300	➔ page 283
49	!B?1	---	recording inconsistent	49	00000005B3	➔ page 269
50	!B1	---	card error	50	00000005B3	➔ page 269
51	!B1	---	wrong card type	51	00000005B3	➔ page 270
52	!Bx1	---	card locked	52	00000005B3	➔ page 270
53	!A	---	internal fault	53	00000005B3	➔ page 270

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Memory code (MC)	DTCO 1381 display				Error code	Meaning, cause and measures
	Picto.	AP	Error text	MC		
56	4e1	---	break! 1e04h30 000h15	56	00000005B3	➡ page 272
57	4e1	---	break! 1e04h15 000h15	57	00000005B3	➡ page 272
58	4A2	C	internal fault	58	4000000400 4000000500	➡ page 269
59	x2	---	card fault	59	4000000400 4000000500	➡ page 278
60	!2	I	security breach	60	4000000200 4000000300	➡ page 287
61	!2	H	security breach	61	4000000200 4000000300	➡ page 287
62	!A2	---	card not closed	62	4000000200 4000000300	➡ page 282
63	!e2	---	time overlap	63	4000000200 4000000300	➡ page 283
64	2	---	insertion while driving	64	4000000200 4000000300	➡ page 283
65	!2	I	security breach	65	4000000200 4000000300	➡ page 287
66	!2	---	card not valid	66	4000000200 4000000300	➡ page 283
67	42	---	recording inconsistent	67	00000005B3	➡ page 269
68	42	---	card error	68	00000005B3	➡ page 269
69	42	---	wrong card type	69	00000005B3	➡ page 270
70	4x2	---	card locked	70	00000005B3	➡ page 270
71	4A	---	internal fault	71	00000005B3	➡ page 270
74	4e2	---	break! 1e04h30 000h15	74	00000005B3	➡ page 272
75	4e2	---	break! 1e04h15 000h15	75	00000005B3	➡ page 272
76	---	---	---	76	00000001C0	➡ page 288
77	---	---	upgrade module not present	77	00000005B3	➡ page 288
78	---	---	upgrade failed Error #FFFFFFE	78	00000005B3	➡ page 289
79	---	---	upgrade failed Error #00000001	79	00000005B3	➡ page 289

Memory code (MC)	DTCO 1381 display				Error code	Meaning, cause and measures
	Picto.	AP	Error text	MC		
79	---	---	upgrade failed Error #00000002	79	00000005B3	➡ page 289
79	---	---	upgrade failed Error #00000004	79	00000005B3	➡ page 290
79	---	---	upgrade failed Error #FFFFFFF	79	00000005B3	➡ page 290
80	!LA	---	motion conflict	80	8000002280	➡ page 284
81	xAL	---	IMS fault	81	00000005B2	➡ page 284
---	4a	---	wrong entry	---	---	➡ page 270
---	4v	---	please enter	---	---	➡ page 271
---	111 112	---	expires in days 28	---	---	➡ page 271
---	1AS	---	calibration in days 28	---	---	➡ page 271