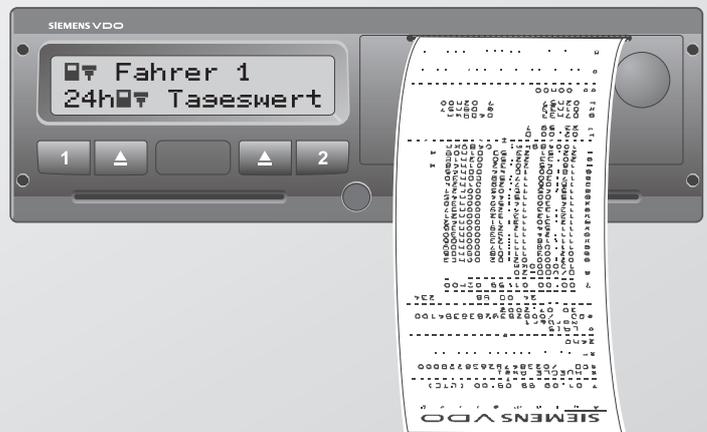
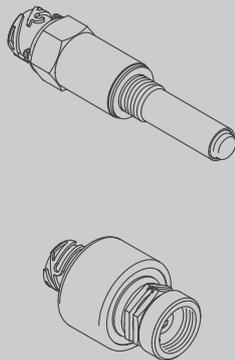


# Digital Tachograph

## Technical Description

DTCO 1381  
(Rel. 1.2a)



[www.siemensvdo.com](http://www.siemensvdo.com)



Dear user,

The information, descriptions, data and illustrations in this technical description may be changed without prior notice and do not represent any liability on the part of the Siemens VDO Automotive AG. The description is based on the most recent operating system and program versions at the time of printing.

No part of this documentation may be reproduced by photocopying or other means without the prior written permission of Siemens VDO Automotive AG.

**The purpose of this documentation**

This documentation is intended exclusively for internal use as an aid when performing service tasks; any other use is prohibited. This documentation may not be given to third parties without the prior written consent of Siemens VDO Automotive AG.

In most cases, the names mentioned in this documentation are registered trademarks and will be used in the following without specific reference to the holder.

**Responsible for the contents**

Siemens VDO Automotive AG  
Commercial Vehicles  
P.O. Box 16 40  
D-78006 Villingen-Schwenningen

© by Siemens VDO Automotive AG. All rights reserved.

**Customer support**

Siemens VDO Automotive AG  
Commercial Vehicles  
SV CV Div TCO OEM PLM  
Heinrich-Hertz-Straße 45  
D-78052 Villingen-Schwenningen

Telephone: +49 (0) 77 21 - 67 31 96

Fax: +49 (0) 77 21 - 67 27 29





TD00.1381.00 132 102

---

**Table of Contents**


---

Overview of changes .....	III
Conventions in this manual .....	VII
Pictographs and their meaning .....	VIII
General instructions .....	IX
List of abbreviations .....	XIV
<b>Chapter 1 Product and system overview</b>	
1.1 System overview .....	1-3
1.2 Digital Tachograph DTCO 1381 .....	1-7
1.3 KITAS 2171 .....	1-11
1.4 Tachograph cards .....	1-14
<b>Chapter 2 Technical data</b>	
2.1 DTCO 1381 .....	2-3
2.2 KITAS 2171 .....	2-14
2.3 Connection diagram DTCO 1381 .....	2-20
<b>Chapter 3 Operating the DTCO 1381</b>	
3.1 General instructions .....	3-3
3.2 Display variations .....	3-5
3.3 Menu functions .....	3-11
3.4 Calibration mode .....	3-16
3.5 Preparing for data download .....	3-21
<b>Chapter 4 Data handling</b>	
4.1 Data handling .....	4-3
4.2 The flow of data and memory behaviour .....	4-4
4.3 Tachograph cards .....	4-14
4.4 Data download .....	4-29
4.5 Rights to access saved data .....	4-30
<b>Chapter 5 Installation</b>	
5.1 General instructions .....	5-3
5.2 Instructions on installing the DTCO 1381 .....	5-7
5.3 Criteria for the installation site .....	5-12
5.4 Tools and installation accessories .....	5-15
5.5 Performing the installation .....	5-17
<b>Chapter 6 Installation of the ADR variant</b>	
6.1 DTCO 1381 in vehicles used for the carriage of hazardous goods .....	6-3
6.2 Performing the installation .....	6-8
6.3 DTCO 1381 (ADR variant) EC type-examination certificate .....	6-11
6.4 KITAS 2171 EC type-examination certificate .....	6-15
<b>Chapter 7 Preprogramming</b>	
7.1 General instructions .....	7-3
7.2 Testing equipment .....	7-4
7.3 Performing the preprogramming .....	7-5

**Chapter 8 Installation and functional test**

8.1 General instructions .....8-3  
 8.2 Permissible error limits .....8-5

**Chapter 9 Activation**

9.1 General instructions .....9-3  
 9.2 Checking the buffer battery .....9-7  
 9.3 Performing the activation .....9-8

**Chapter 10 First calibration**

10.1 General instructions .....10-3  
 10.2 Calibration instructions .....10-6  
 10.3 Testing equipment .....10-10  
 10.4 Checking the buffer battery .....10-11  
 10.5 Performing the first calibration .....10-12

**Chapter 11 Regularly inspection**

11.1 General instructions .....11-3  
 11.2 Calibration instructions .....11-5  
 11.3 Instructions for the regularly inspection .....11-9  
 11.4 Testing equipment .....11-10  
 11.5 Checking the buffer battery .....11-11  
 11.6 Performing the regularly inspection .....11-12

**Chapter 12 Maintenance and cleaning**

12.1 System maintenance .....12-3  
 12.2 Buffer battery .....12-4  
 12.3 Cleaning .....12-9  
 12.4 Disposal .....12-10

**Chapter 13 Events and faults**

13.1 General information about messages .....13-3  
 13.2 Displaying the event and fault memory .....13-6  
 13.3 Printing the event and fault memory .....13-8  
 13.4 Messages and troubleshooting measures .....13-10

**Chapter 14 Appendix**

14.1 Operating conditions of the DTCO 1381 .....14-3  
 14.2 Pictograms and pictogram combinations .....14-8  
 14.3 Printout examples .....14-12  
 14.4 Explanation of printout examples .....14-22  
 14.5 Memory behaviour during events or faults .....14-31

TD00.1381.00 132 102

---

## 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

### Enumeration

---

#### Example:

*Fig. 1-2:*

**3-6**

#### Meaning:

= Figure number:

The number is composed of the current chapter (in this case 1) and a consecutive number representing the figure (in this case 2).

= Page numbering in the footer:

The page number is composed of the current chapter (in this case 3) and a consecutive page number (in this case 6)

## 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 CR (EEC) 3821/85, last amended by the CR (EC) no.1360/2002 and CR (EC) no. 432/2004, in the following referred to as CR (EEC) 3821/85, annex I B.

---

## 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. Part of the first calibration is, to enter the vehicle registration number.

## 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 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.

## 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 Siemens VDO Automotive 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.

<b>Proper use</b>	The <b>DTCO 1381</b> 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.
<b>Power supply</b>	The DTCO 1381 may only be connected to voltages for which it is designed and which can be seen in the wiring diagram (label).
<b>Accessories</b>	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.
<b>Cables</b>	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 a workshop must guarantee the security of the DTCO 1381.

### **Maintenance**

---

<b>Cleaning</b>	Do not use any volatile solvents, such as alcohol, diluting agents, naphtha, or abrasive cleaning solutions when cleaning the devices.  When dirty, clean the housing, the display and the function keys using a slightly moistened cloth.
<b>Operational notes</b>	Avoid excessive impacts and vibrations. Do not use sharp or pointed objects (such as pens) to operate the keys.  Keep the printer drawer closed at all times in order to avoid damages and contamination.

## List of abbreviations

### A

---

<b>ADR</b>	European agreement concerning the international carriage of dangerous goods by road
<b>ATC</b>	Wheel rotation test computer

### B

---

<b>BTC</b>	Operating test computer
------------	-------------------------

### C

---

<b>CAN</b>	Controller area network (vehicle data bus)
------------	--

### D

---

<b>DIN</b>	Deutsche-Industrie-Norm (German industry standard)
<b>DTCO</b>	Digital Tachograph

### E

---

<b>EMC</b>	Electromagnetic compatibility
------------	-------------------------------

### F

---

<b>FM LED</b>	Function monitoring LED
---------------	-------------------------

### I

---

<b>IEC</b>	International electrotechnical commission
<b>IP</b>	International protection (protection classification)
<b>ISO</b>	International organization for standardization

### K

---

<b>k</b>	Constant for the speed and rotational speed adjustment between vehicle and tachograph
<b>KITAS</b>	Kienzle Tachograph Sensor
<b>K-Line</b>	Serial asynchronous diagnosis interface
<b>km</b>	Kilometer
<b>km/h</b>	Kilometers per hour

**L**


---

**LCD**      Liquid crystal display

**M**


---

**MTC**      Mobile test computer

**N**


---

**n**          Engine speed [rpm]

**Nm**        Newton meter (unit of torque)

**P**


---

**p/m**        Pulses per metre

**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

**STC**        Stationary test computer

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

**SW**         Wrench size

**T**


---

**TCO**        Tachograph

**TD**         Technical documentation

**TxD**        Transmit data (asynchronous transmitted data)

**U**


---

**UTC**        Universal time coordinated

**V**

---

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

**W**

---

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

# *Chapter 1*

---

## *Product and system overview*

---

**Table of Contents**

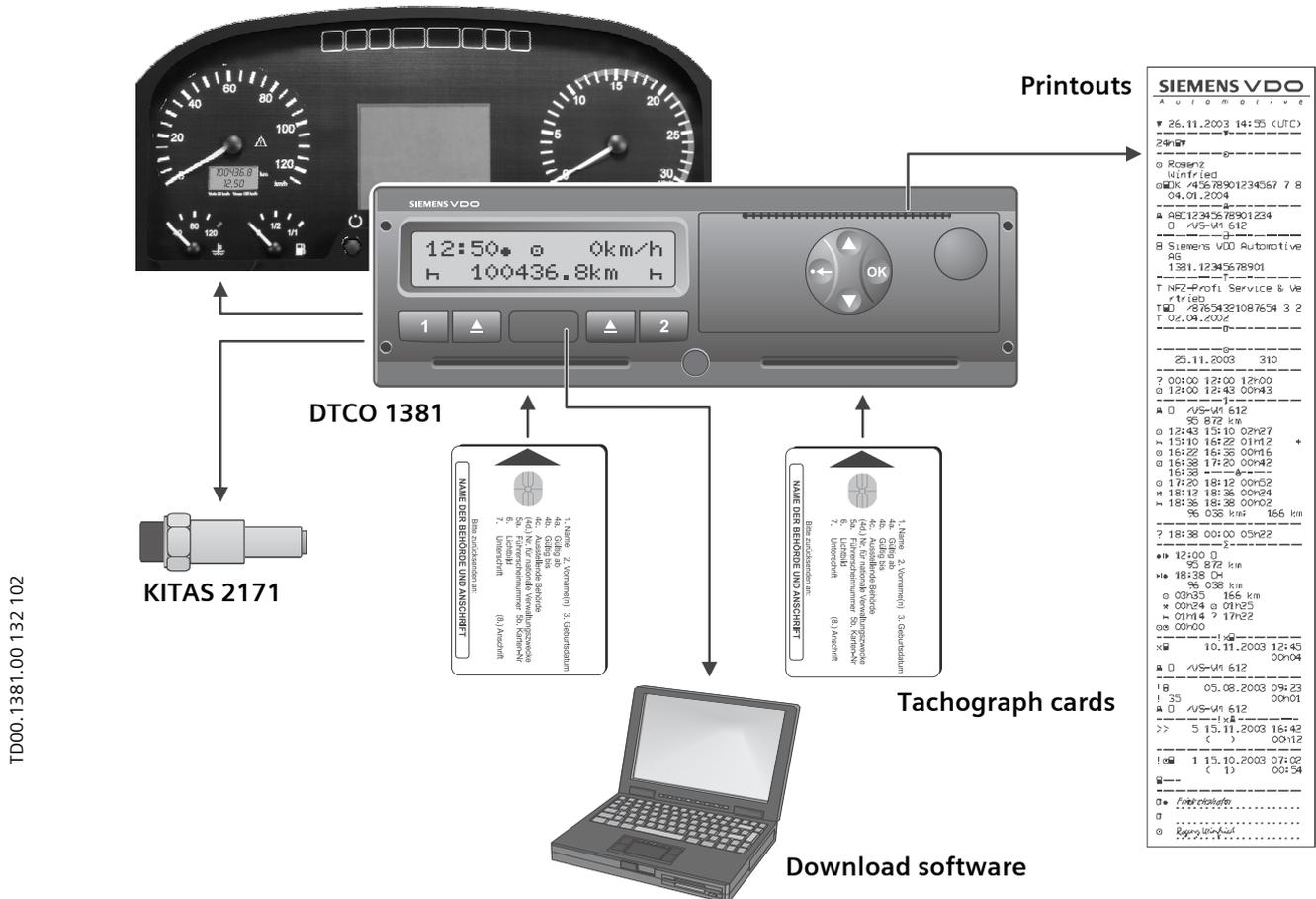
---

**Chapter 1 Product and system overview**

<b>1.1</b>	<b>System overview .....</b>	<b>1-3</b>
1.1.1	Brief description .....	1-4
1.1.2	Characteristics of the DTCO 1381 .....	1-6
<b>1.2</b>	<b>Digital Tachograph DTCO 1381 .....</b>	<b>1-7</b>
1.2.1	DTCO 1381 Device description .....	1-7
1.2.2	DTCO 1381 Rear side .....	1-9
1.2.3	DTCO 1381 Product versions .....	1-10
<b>1.3</b>	<b>KITAS 2171 .....</b>	<b>1-11</b>
1.3.1	KITAS 2171 Product variations .....	1-11
	KITAS 2171 Standard version .....	1-11
	KITAS 2171 Integrated version .....	1-12
	KITAS 2171 Customer-specific version .....	1-12
1.3.2	Characteristics of the KITAS 2171 .....	1-13
1.3.3	KITAS Sensor cable .....	1-13
<b>1.4</b>	<b>Tachograph cards .....</b>	<b>1-14</b>
1.4.1	Valid combinations of tachograph cards .....	1-16

# 1.1 System overview

## Display instrument



TD00.1381.00.132.102

Fig. 1 - 1: DTCO 1381 System overview

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

- Digital Tachograph DTCO 1381
- Motion sensor KITAS 2171

### 1.1.1 Brief description

<b>DTCO 1381</b>	<p>The DTCO 1381 digital tachograph 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", page 3-5.</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>
<b>KITAS 2171</b>	<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>
<b>Printouts</b>	<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>
<b>Printer paper</b>	<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>
<b>Display instrument</b>	<p>A display instrument is located directly in the driver's field of vision. The operational check "T" (shown in the color amber or orange) brings attention to messages from the DTCO 1381.</p>

TD00.1381.00 132 10Z



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.

## Download software

Using a company card, control card, or workshop card it is possible to download, analyze, and archive data about the vehicle and driver. The download is executed through the download interface, for example the PC or laptop with the required software.

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.

---

### 1.1.2 Characteristics of the DTCO 1381

#### General features

- Recording unit in the DIN ISO 7736 radio format
- Manipulation-secure unit in conjunction with the KITAS 2171
- Microcontroller-monitored signal inputs and outputs
- Automatic registration and saving of all legally stipulated data, such as
  - Driver activities
  - Driving status
  - Detailed speed over 24 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)
- Data bus-capable CAN interface SAE J1939, CAN 2.0B for attachment to the vehicle power supply or a display unit
- CAN with diagnosis functionality
- Info interface (SV protocol)

#### Special equipment / options / variations

- K-Line diagnosis interface
- Two supplemental recorder inputs for recording various supplemental information, like for recording blue light, sirens, fuel consumption, secondary drive, etc.
- Rotational speed input, recording of the motor's speed
- Speed impulse output (D6)
- Customer-specific variations with respect to the front cover, display, etc.
- ADR variant

## 1.2 Digital Tachograph DTCO 1381

### 1.2.1 DTCO 1381 Device description

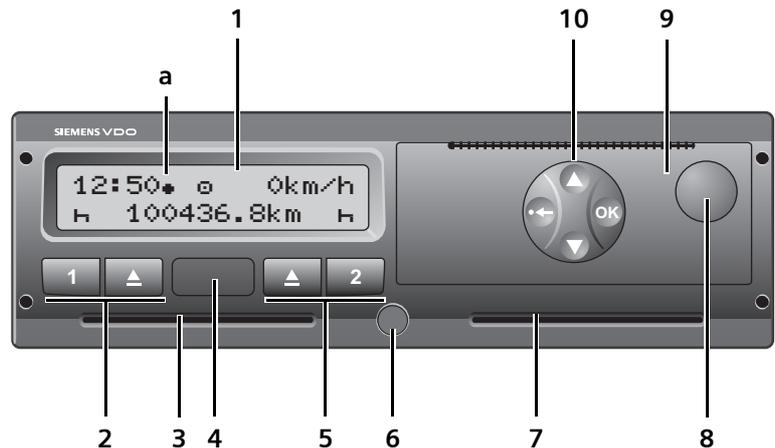


Fig. 1 - 2: DTCO 1381 Front side

#### (1) Display

Depending on the vehicle's operational condition, different displays will appear, see chapter 3.2 "Display variations", page 3-5.

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

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**

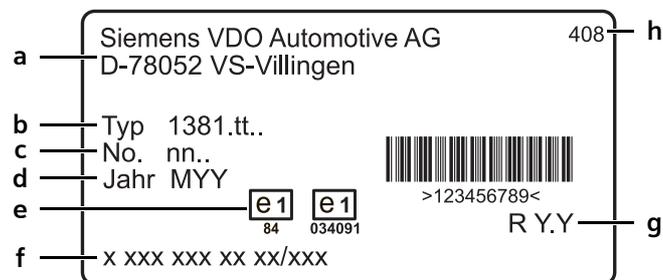
Button to unlock the printer drawer, like when inserting a new roll of paper.

**(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

(c) Serial number

(d) Year or date of manufacture

(e) Test/approval mark

e1-84 (EC recording equipment), e1-034091 (EMC)

(f) External item number

(g) Release version

(h) Part of the drawing reference number

**(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

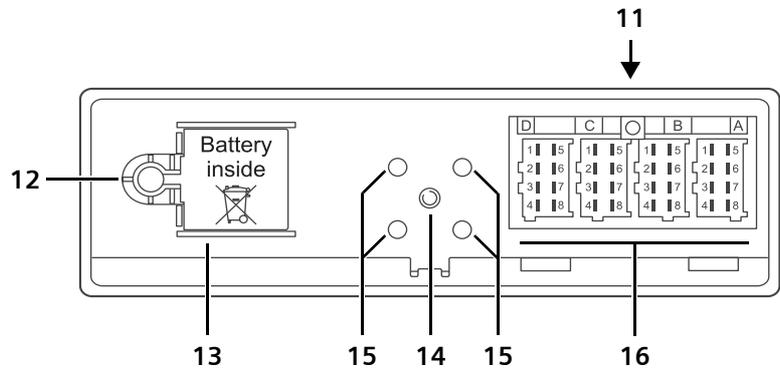
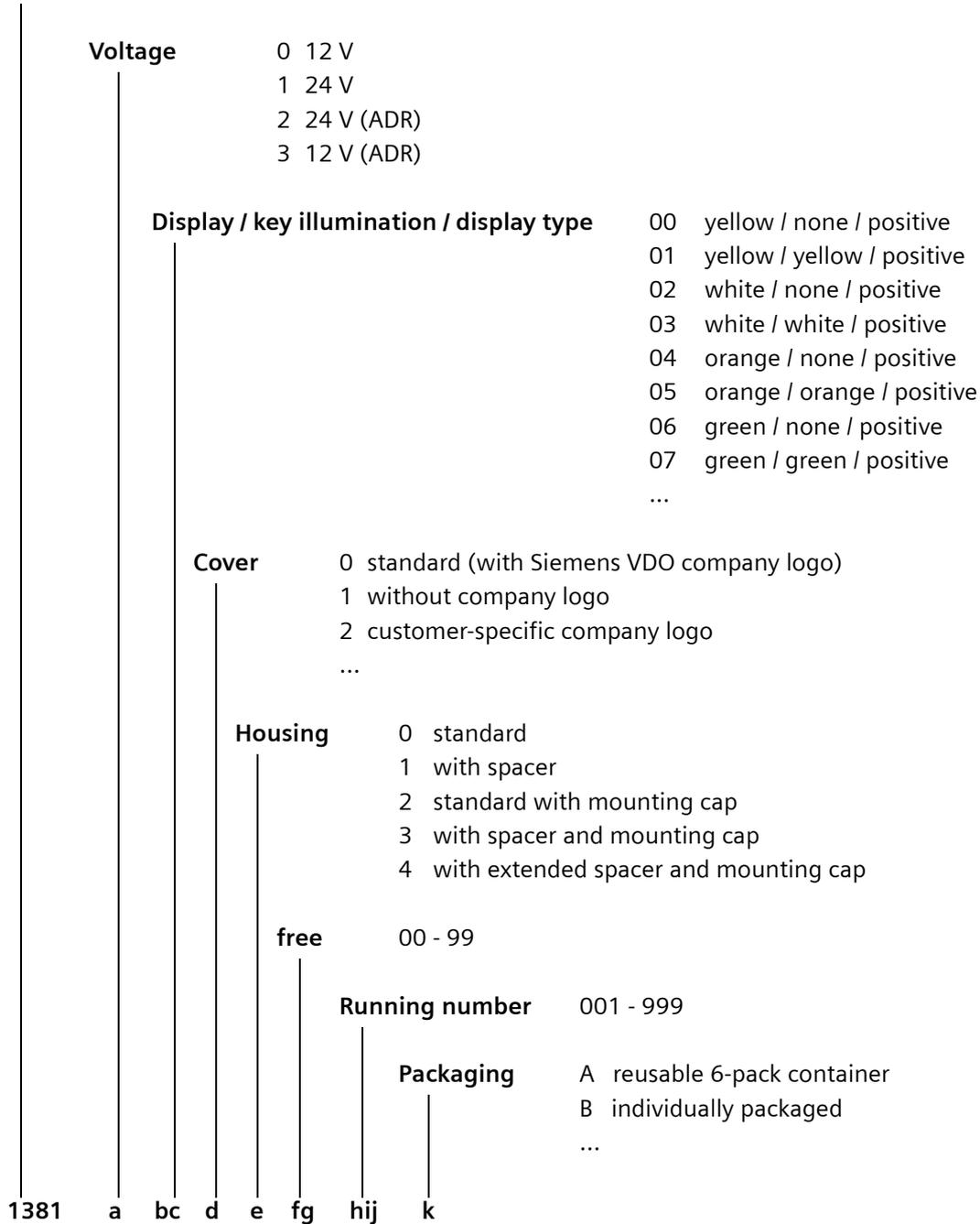


Fig. 1 - 3: DTCO 1381 Rear side

- (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**

1.2.3 DTCO 1381 Product versions

Device type: DTCO 1381 (Digital Tachograph)



TD00.1381.00 132 102

## 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.

### 1.3.1 KITAS 2171 Product variations

The following product variations are available for attachment to the DTCO 1381.

#### KITAS 2171 Standard version

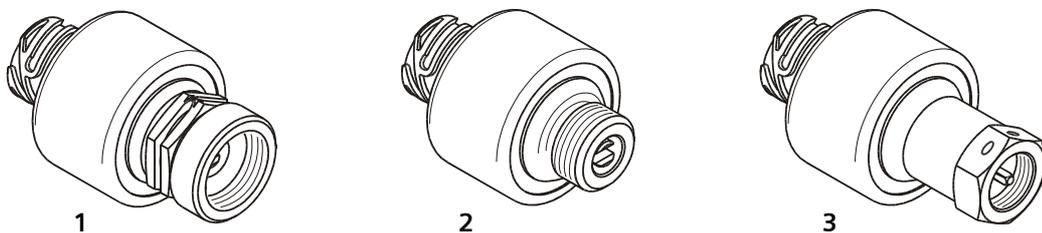


Fig. 1 - 4: KITAS 2171 Standard version (example)

	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**

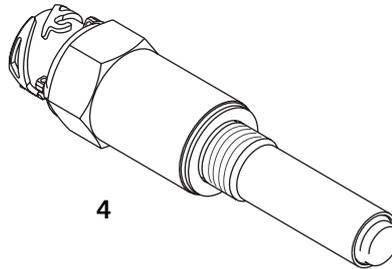


Fig. 1 - 5: KITAS 2171 Integrated version (example)

	Version	KITAS 2171
(4)	Integrated version (static)	2171.20
n.ill.	Integrated version (dynamic)	2171.50



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

**KITAS 2171 Customer-specific version**

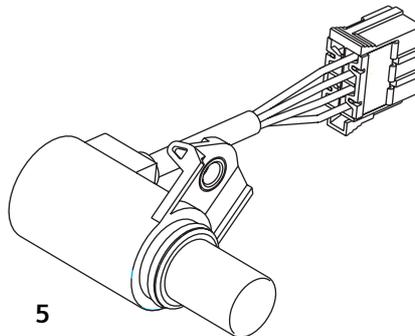


Fig. 1 - 6: KITAS 2171 Customer-specific version (example)

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

TD00.1381.00 132 10Z

### 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 2.2.6 "KITAS Sensor cable", page 2-19.

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

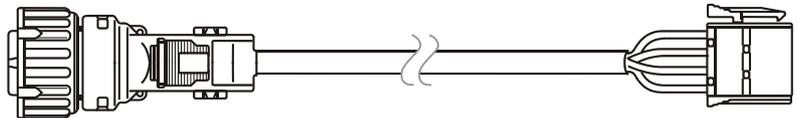


Fig. 1 - 7: KITAS Sensor cable

## 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:



Fig. 1 - 8: 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.

---

<b>Driver card</b> (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.
<b>Company card</b> (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.
<b>Control card</b> (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.
<b>Mechanical locking of the tachograph cards</b>	<p>If the DTCO 1381 accepts an inserted tachograph card, withdrawal of the card will be mechanically blocked.</p> <p>It is possible to remove the tachograph card only when:</p> <ul style="list-style-type: none"><li>• the vehicle is stationary,</li><li>• the ignition is switched on (required only for ADR variant),</li><li>• the user requests withdrawal and</li><li>• after the data defined by the ordinance has been saved on the tachograph card.</li></ul>

### 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)

TD00.1381.00 132 102

## *Chapter 2*

---

# *Technical data*

---

**Table of Contents**


---

**Chapter 2 Technical data**

<b>2.1</b>	<b>DTCO 1381</b> .....	<b>2-3</b>
2.1.1	Installation dimensions and angle .....	2-3
2.1.2	Pin assignment .....	2-4
2.1.3	Connection specifications .....	2-5
	Connection plug A (power supply, CAN bus) .....	2-5
	Connection plug B (KITAS 2171, data signals) .....	2-7
	Connection plug C (n-system, CAN bus) .....	2-8
	Connection plug D (additional stylus, additional functions) .....	2-9
2.1.4	Pin assignment of calibration and download interface .....	2-10
2.1.5	Technical data .....	2-11
2.1.6	Production date .....	2-12
2.1.7	Printer paper .....	2-13
	Rear side of printer paper .....	2-13
<b>2.2</b>	<b>KITAS 2171</b> .....	<b>2-14</b>
2.2.1	KITAS 2171.20 Integrated version .....	2-14
2.2.2	KITAS 2171.50 Integrated version .....	2-15
2.2.3	KITAS 2171.0x Standard version .....	2-16
2.2.4	KITAS 2171 Technical data .....	2-17
2.2.5	Production date .....	2-18
2.2.6	KITAS Sensor cable .....	2-19
<b>2.3</b>	<b>Connection diagram DTCO 1381</b> .....	<b>2-20</b>

## 2.1 DTCO 1381

### 2.1.1 Installation dimensions and angle

#### Installation dimensions

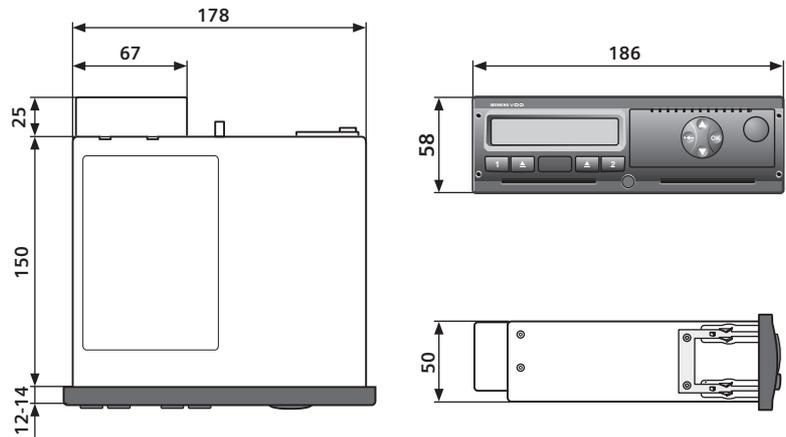


Fig. 2 - 1: Installation dimensions of DTCO 1381

#### Permissible installation angle

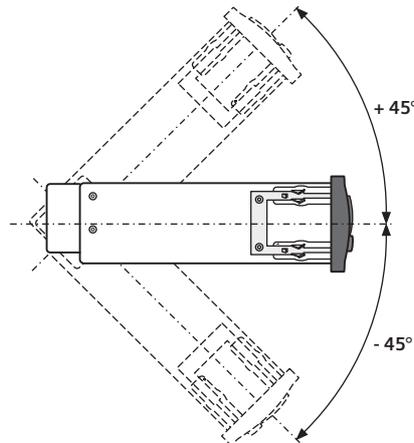


Fig. 2 - 2: Permissible installation angle of DTCO 1381

#### Installation angle of display

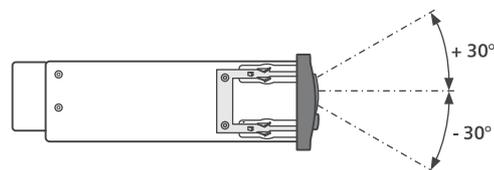


Fig. 2 - 3: Viewing angle of display DTCO 1381



Always comply with chapter 5.3 "Criteria for the installation site", page 5-12.

TD00.1381.00 132 102

### 2.1.2 Pin assignment

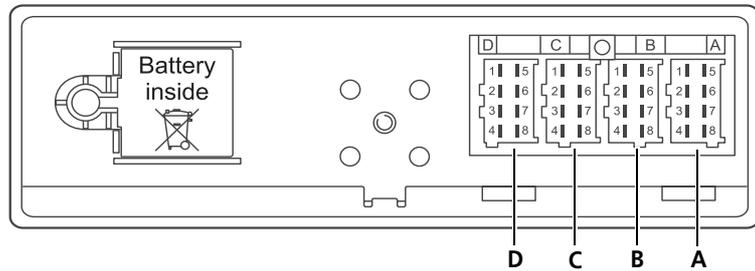


Fig. 2 - 4: Pin assignment DTCO 1381

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

\* Option

### 2.1.3 Connection specifications

#### Connection plug A (power supply, CAN bus)

Pin	Function	Parameter	12 V version <sup>1)</sup>			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
A1	Term. 30 Permanent voltage								Reference potential A5
		Voltage [V]	10,5	12	15	20	24	30	
					16			32	Short-time (max. 1 h)
		Current [A]		0,03			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
				3,5	5		1,6	3	Display illumination 100 %, printer running
				0,2			0,12		ADR variant <sup>1)</sup> , display illumination 100 %, printer running <sup>3)</sup>
	Fuse current [A]	5		5	3		5		
			1			1		ADR variant <sup>1)</sup>	
A2	Term. 58d Illumination <sup>1)</sup> (control input)								Reference potential A6
		Voltage [V]	0		15	0		30	
		Dimming day/ night U <sub>off</sub> [V]	1,49	1,6	1,71	1,46	1,6	1,74	
		Dimming day/ night U <sub>on</sub> [V]	2,16	2,3	2,44	2,12	2,3	2,48	
		PWM freq. [Hz]	50			50			Alternative: Analog signal (0 V - U <sub>battery</sub> ), digital signal (on/off)
		Current [mA]			1,2			1,2	
A3	Term. 15 Ignition								Reference potential A6
		Voltage [V]	10,8	12	15	20	24	30	
					16			32	Short-time (max. 1 h)
		Recognition voltage [V]	6,4	6,8	7,2	13,9	14,4	14,9	Recognition of ignition
		Current [A]		0,012			0,014		
				3			3		ADR variant <sup>1)</sup> , printer running <sup>3)</sup>
		Fuse current [A]	0,5		5	0,5		5	
		5		5	3		5	ADR variant <sup>1)</sup>	
A4	CAN_H <sup>2)</sup>								

<sup>1)</sup> Option

<sup>2)</sup> Specification according to ISO 16844-6 (5) and ISO 11898 (6)

<sup>3)</sup> ADR variant: printer supply via pin A3

TD00.1381.00 132 102

Pin	Function	Parameter	12 V version <sup>1)</sup>			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
A5	Term. 31a Minus (battery)								Reference potential A1
A6	Term. 31 Ground								Reference potential A3
A7	CAN_GND								Galvanic connection to pin A6 (optional capacitive con- nection)
A8	CAN_L <sup>2)</sup>								Reference potential A7

<sup>1)</sup> Option

<sup>2)</sup> Specification according to ISO 16844-6 (5) and ISO 11898 (6)

<sup>3)</sup> ADR variant: printer supply via pin A3

Connection plug B (KITAS 2171, data signals)

Pin	Function	Parameter	12 V version <sup>1)</sup>			24 V version			Comments	
			min.	typ.	max.	min.	typ.	max.		
B1	v-sensor supply (+) <sup>2)</sup>	Voltage [V]	6,5			6,5			at I = 15 mA	
					9			9	at I = 0 mA	
B2	v-sensor supply (-)								connected to A5	
B3	v-signal (real time) <sup>2)</sup>	U <sub>Low</sub> [V]			1			1	at I = -250 µA	
		U <sub>High</sub> [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 <sup>2)</sup>	Input U <sub>Low</sub> [V]			1,2			1,2	at I = -1 mA	
		Input U <sub>High</sub> [V]	5,2			5,2			at I = 0,5 mA	
		Output U <sub>Low</sub> [V]			1			1	at I = 1 mA	
		Output U <sub>High</sub> [V]	5,4			5,4			at I = -20µA	
		Baud rate [Bd]	1164	1200	1236	1164	1200	1236		
B6	v-pulse output <sup>1)3)</sup>	U <sub>Low</sub> [V]			1,5			1,5	at I = 1 mA / 1,5 mA <sup>1)</sup>	
		U <sub>High</sub> [V]	5,5			5,5			at I = -1 mA	
		Frequency [kHz]			1,6			1,6	Square wave signal	
		Pulse duration [ms]	0,64	2	4	0,64	2	4		
B7	v-pulse output <sup>3)4)</sup>								Reference potential A6	
		U <sub>Low</sub> [V]			1,5			1,5	at I = 1 mA	
		U <sub>High</sub> [V]	5,5			5,5			at I = -1 mA	
		Frequency [kHz]			1,6			1,6	Square wave signal	
		Pulse duration [ms]	0,64	2	4	0,64	2	4		
B8	4 pulses/m signal output								Reference potential A6	
		U <sub>Low</sub> [V]			1,5			1,5	at I = 1 mA	
		U <sub>High</sub> [V]	5,5			5,5			at I = -1 mA	
		Frequency [Hz]			244			244	at v = 220 km/h	
		Pulse duration [ms]	1,6			1,6				

<sup>1)</sup> Option

<sup>2)</sup> Specification according to ISO 16844-3 (4)

<sup>3)</sup> Specification according to ISO 16844-2 (3)

<sup>4)</sup> Signal monitoring (configurable)



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 <sup>1)</sup>			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
C2	n-sensor supply (-)								connected to A6
C3	Term. W <sup>1)</sup> n-sensor signal input *								Reference potential C2
		U <sub>Low to High</sub> [V]	2,8		4	2,8		4	Voltage value at which the Schmitt trigger input detects a "low to high" transition
		U <sub>High to Low</sub> [V]	2,3		3,4	2,3		3,4	Voltage value at which the Schmitt trigger input detects a "high to low" transition
		U <sub>Hysteresis</sub> [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	CAN_H <sup>1) 2)</sup>								connected to A4
C6	CAN_GND <sup>1)</sup>								connected to A7
C7	CAN_L <sup>1) 2)</sup>								connected to A8
C8	CAH_H <sup>1)</sup>								via R = 120Ω connected to A4, C5

<sup>1)</sup> Option

<sup>2)</sup> Specification according to ISO 16844-6 (5) and ISO 11898 (6)

TD00.1381.00 132 102



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 <sup>1)</sup>			24 V version			Comments
			min.	typ.	max.	min.	typ.	max.	
D1	Additional stylus <sup>1)</sup> input 1							Pulse width min. 100 ms	
		U <sub>Low</sub> [V]			1,2			1,2	at I = 0 mA
		U <sub>High</sub> [V]	9		15	9		30	at I = 1,7 mA
D2	Additional stylus <sup>1)</sup> input 2							Pulse width min. 100 ms	
		U <sub>Low</sub> [V]			1,2			1,2	at I = 0 mA
		U <sub>High</sub> [V]	9		15	9		30	at I = 1,7 mA
D4	TCO warning output <sup>2)</sup>								
		U <sub>Low</sub> [V]		1,5			1,5		at I = 5 mA
D6	v-pulse output <sup>1) 3)</sup>							Reference potential A6	
		U <sub>Low</sub> [V]			1,5			1,5	at I = 1 mA
		U <sub>High</sub> [V]	5,5			5,5			at I = -1 mA
		Frequency [kHz]			1,6			1,6	Square wave signal
		Pulse duration [ms]	0,64	2	4	0,64	2	4	
D7	K-Line diagnosis interface <sup>1)</sup>							Reference potential A6	
								Specification according to ISO 14230, part 1 (7)	
D8	Info interface								
		U <sub>Low</sub> [V]			1,5			1,5	at I = 1 mA
		U <sub>High</sub> [V]	5,5			5,5			at I = -1 mA

<sup>1)</sup> Option

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

<sup>3)</sup> Specification according to ISO 16844-2 (3)



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

TD00.1381.00 132 102

### 2.1.4 Pin assignment of calibration and download interface



Fig. 2 - 5: DTCO 1381 pin assignment of calibration and download interface

#### Calibration interface

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

#### Download interface

- (3) 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	± 30°		
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 max.	30 mA 5 A	20 mA 3 A
External fuse protection (typical)		5 A	5 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, n-sensor*, additional inputs*		
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 8-5.		
EMC	RL 2006/28/EC		
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 <sup>2</sup> /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	~ 1300 g		
Permissible installation position	± 45° off of horizontal		
Possible special equipment	rpm registration, additional stylus, K-Line diagnosis interface, customer-specific cover, customer-specific display and keypad illumination, customer-specific output circuit, customer-specific interfaces, v-pulse output (D6), without CAN		

\* Option

TD00.1381.00.132.102

## 2.1.6 Production date



Fig. 2 - 6: 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":

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

<i>YY= Year of production</i>			
<b>04</b>	2004	<b>07</b>	2007
<b>05</b>	2005	<b>08</b>	2008
<b>06</b>	2006	⋮	⋮

TD00.1381.00 132 102

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.

TD00.1381.00 132 102

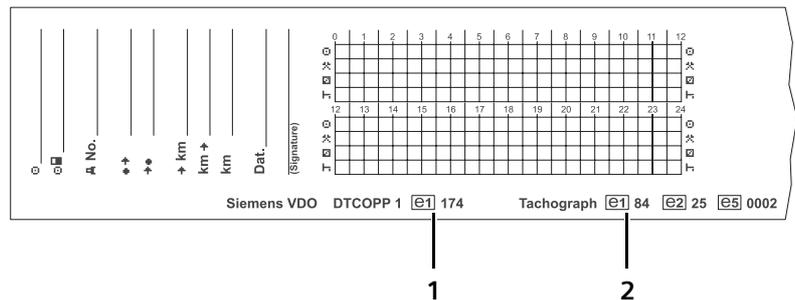


Fig. 2 - 7: Printer paper, rear side

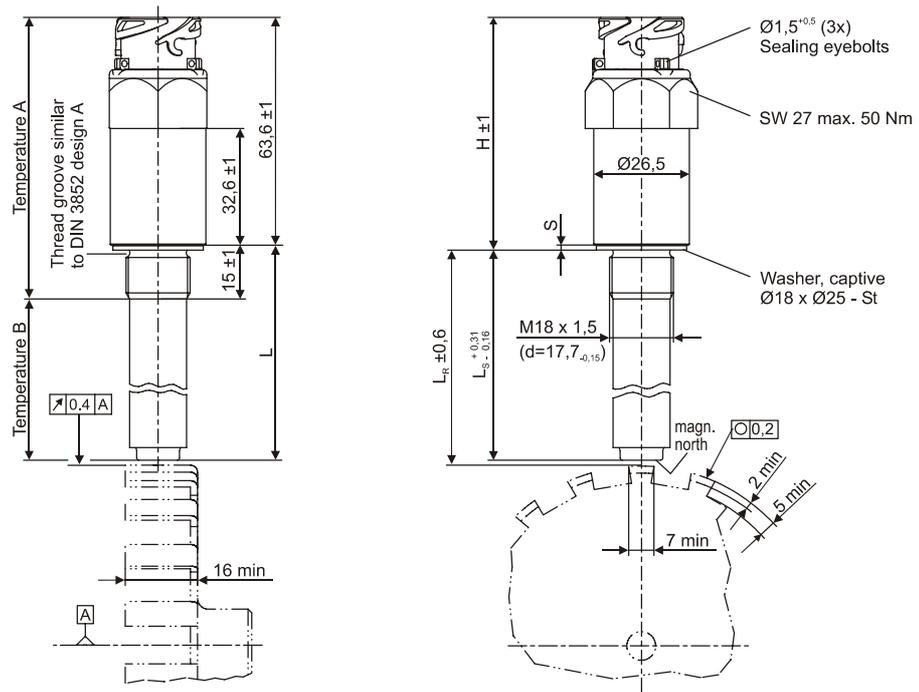


Use (order) only paper rolls on which is visible the recording equipment model DTCO 1381 with approval mark "e1-84" (2) and the printer paper's valid approval mark "e1-174" (1) or "e1-189".

## 2.2 KITAS 2171

### 2.2.1 KITAS 2171.20 Integrated version

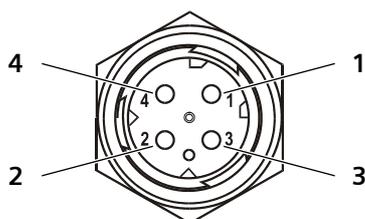
#### Installation dimensions



	KITAS 2171.20								
L	19,8	19,8	25	25	35	63,2	63,2	90	136,8
L <sub>R</sub>	19,4	20,0	25,2	26,4	35,2	63,4	64,6	90,2	137
L <sub>S</sub>	18	18,6	23,8	25	33,8	62,0	63,2	88,8	135,6
S	1,8	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

Fig. 2 - 8: Installation dimensions KITAS 2171.20 Integrated version

#### Pin assignment



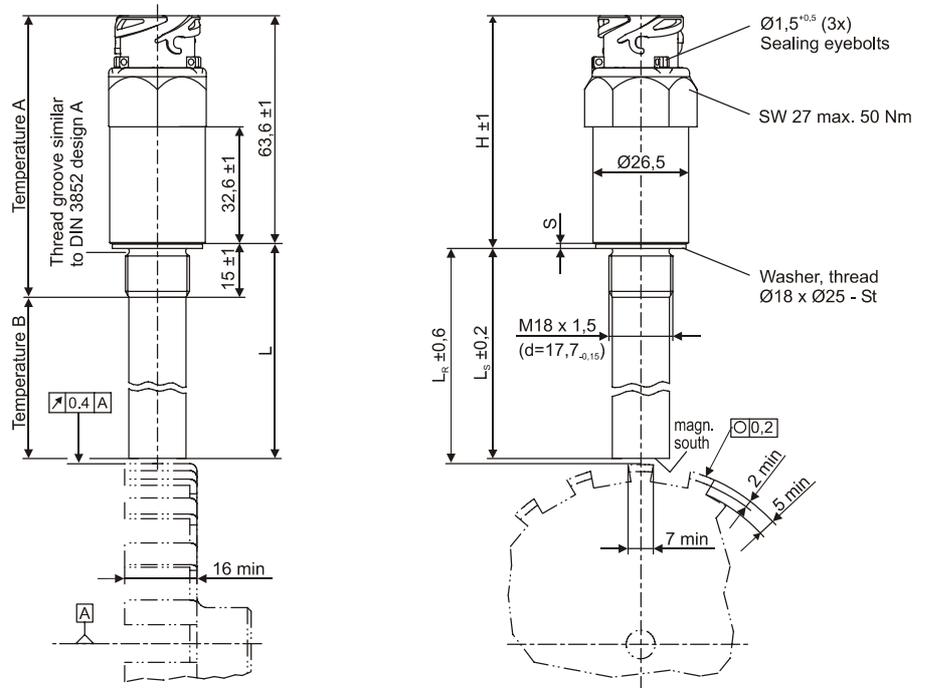
- (1) U<sub>E</sub> Sensor supply (+)
- (2) U<sub>0</sub> Sensor supply (-)
- (3)  $\square$  Real time signal, v-sensor
- (4) I/O I/O data signal

Fig. 2 - 9: Pin assignment KITAS 2171.20 Integrated version

TD00.1381.00 132 102

2.2.2 KITAS 2171.50 Integrated version

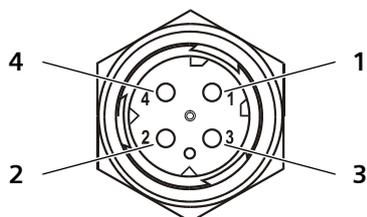
Installation dimensions



	KITAS 2171.50		
L	35	90	115
L <sub>R</sub>	35,2	90,2	115,2
L <sub>S</sub>	33,8	88,8	113,8
S	1,2	1,2	1,2
H	64,8	64,8	64,8

Fig. 2 - 10: Installation dimensions KITAS 2171.50 Integrated version

Pin assignment



- (1) U<sub>E</sub> Sensor supply (+)
- (2) U<sub>0</sub> Sensor supply (-)
- (3)  $\square$  Real time signal, v-sensor
- (4) I/O I/O data signal

Fig. 2 - 11: Pin assignment KITAS 2171.50 Integrated version

TD00.1381.00 132 102

2.2.3 KITAS 2171.0x Standard version

Installation dimensions

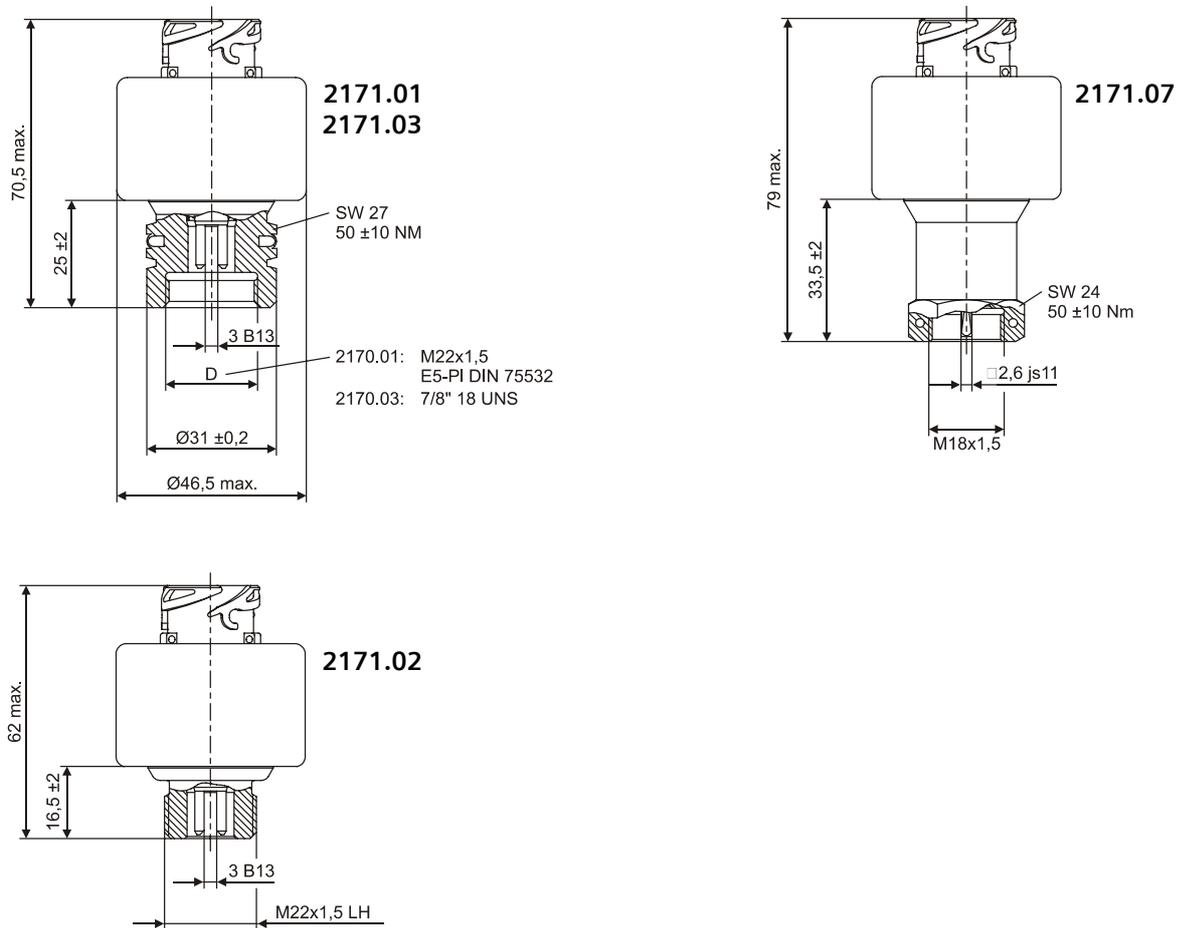


Fig. 2 - 12: Installation dimensions 2171.0x Standard version

Pin assignment

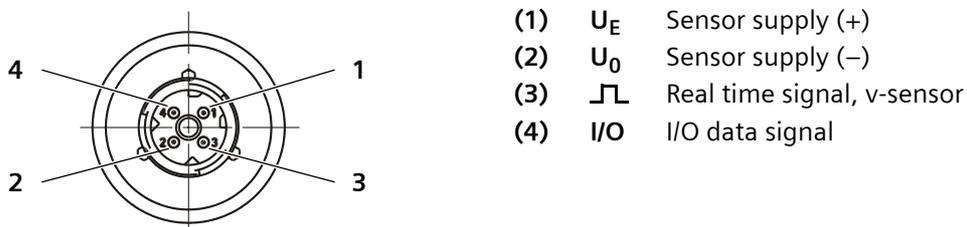


Fig. 2 - 13: Pin assignment KITAS 2171.0x Standard version

TD00.1381.00 132 102

2.2.4 KITAS 2171 Technical data

	Integrated version		Standard version
	2171.20 xx	2171.50 xx	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	800 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	DIN 40 839 T1 + T3 over DTCO		DIN 40 839 T1 + T3 over DTCO
Irradiation immunity	DIN 40 839 T4 (100 V/m)		DIN 40 839 T4 (100 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	1,5 ... 2 x tooth width	---
Cannot be used with external magnetic field	> 2 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. 120 ... 165 g, depending on "L"	approx. 135 ... 150 g

TD00.1381.00 132 102

2.2.5 Production date

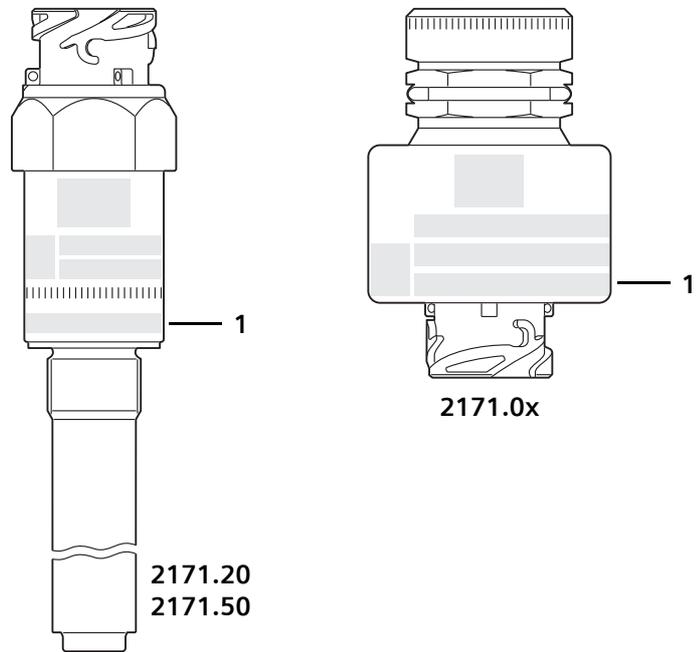


Fig. 2 - 14: Production date KITAS 2171

The production date of the DTCO 1381 is shown on the housing (1), coded in the form of "YYM"

<i>YY= Year of production</i>			
<b>48</b>	2004	<b>51</b>	2007
<b>49</b>	2005	<b>52</b>	2008
<b>50</b>	2006	∴	∴

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

TD00.1381.00 132 102

2.2.6 KITAS Sensor cable

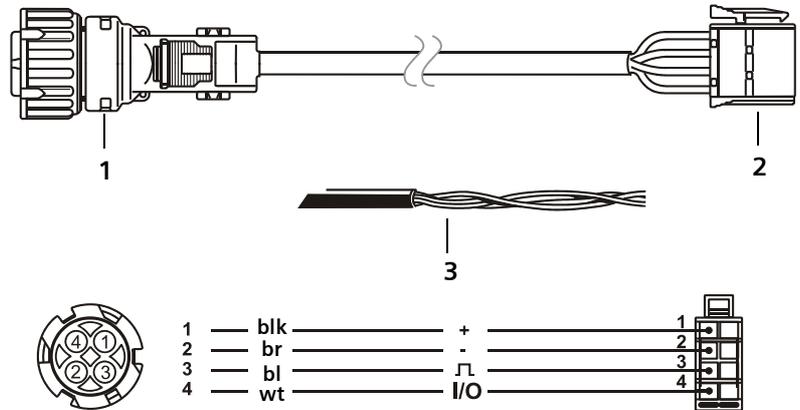
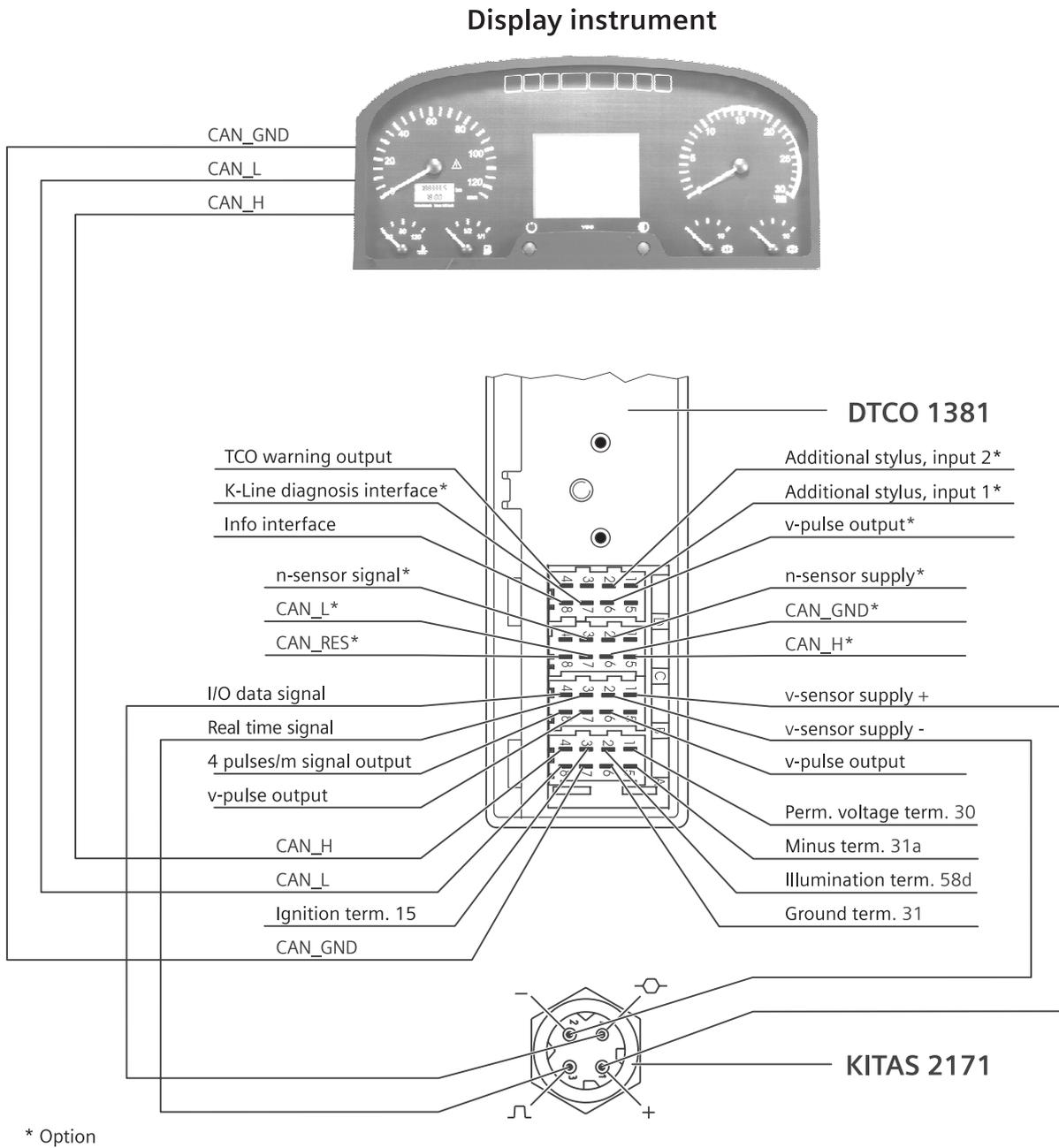


Fig. 2 - 15: KITAS Sensor cable

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

TD00.1381.00.132.102

## 2.3 Connection diagram DTCO 1381



TD00.1381.00 132 10Z

Fig. 2 - 16: Connection diagram DTCO 1381 with KITAS 2171 and display instrument

## *Chapter 3*

---

# *Operating the DTCO 1381*

---

**Table of Contents**


---

**Chapter 3 Operating the DTCO 1381**

<b>3.1</b>	<b>General instructions</b> .....	<b>3-3</b>
3.1.1	Handling the tachograph cards .....	3-3
3.1.2	Operating the ADR variant .....	3-4
3.1.3	Printing or display of data .....	3-4
3.1.4	Handling the printouts .....	3-4
<b>3.2</b>	<b>Display variations</b> .....	<b>3-5</b>
3.2.1	Selecting the text language .....	3-5
3.2.2	Display in standby mode .....	3-6
3.2.3	Display after ignition on .....	3-6
3.2.4	Standard display .....	3-7
3.2.5	Selection menu .....	3-8
3.2.6	Messages .....	3-8
3.2.7	Special displays .....	3-9
3.2.8	Operational notes as information .....	3-10
<b>3.3</b>	<b>Menu functions</b> .....	<b>3-11</b>
3.3.1	Setting the language .....	3-11
3.3.2	Retrieving menu functions .....	3-12
3.3.3	Overview of the menu structure .....	3-13
3.3.4	Menu function "Service" .....	3-14
3.3.5	Leaving menu functions .....	3-15
<b>3.4</b>	<b>Calibration mode</b> .....	<b>3-16</b>
3.4.1	Inserting workshop card .....	3-16
	Menu navigation after inserting workshop card .....	3-17
3.4.2	Removing workshop card .....	3-20
	Menu navigation after removing workshop card .....	3-20
<b>3.5</b>	<b>Preparing for data download</b> .....	<b>3-21</b>

---

## 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).



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

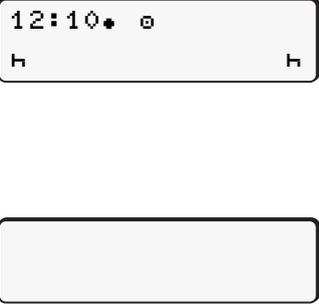
The language will be determined by the tachograph card that is currently inserted in card slot 1, the tachograph card that was most recently inserted, or the tachograph card with the higher value, such as the company card.

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

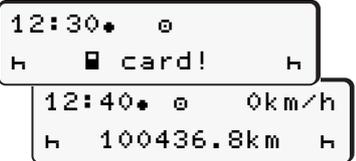
<i>Issuing member state</i>		<i>Language</i>
A	Austria	German
B	Belgium	English
CH	Switzerland	German
CY	Cyprus	Greek
CZ	The Czech Republic	Czech
D	Germany	German
DK	Denmark	Danish
E	Spain	Spanish
EST	Estonia	Estonian
F	France	French
FIN	Finland	Finnish
GR	Greece	Greek
H	Hungary	Hungarian
I	Italy	Italian
IRL	Ireland	English
IS	Iceland	Icelandic
L	Luxembourg	French
LT	Lithuania	Lithuanian
LV	Latvia	Latvian
M	Malta	English
N	Norway	Norwegian
NL	The Netherlands	Dutch
P	Portugal	Portuguese
PL	Poland	Polish
S	Sweden	Swedish
SK	Slovakia	Slovak
SLO	Slovenia	Slovene
UK	United Kingdom	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 3-11.

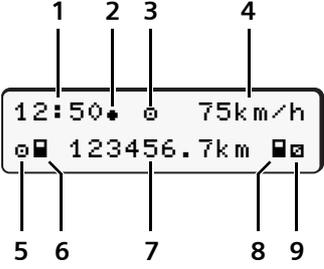
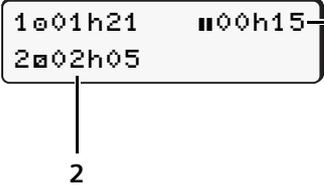
### 3.2.2 Display in standby mode

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"> <li>• the vehicle's ignition is off and</li> <li>• no events or faults are pending.</li> </ul> <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"> <li>• you switch on the ignition,</li> <li>• you press any key or</li> <li>• when the DTCO 1381 announces an event or a fault.</li> </ul> <p>➔ Detailed information, see chapter 14.1.1 "Standby (Power Safe Mode)", page 14-3.</p>

### 3.2.3 Display after ignition on

Menu display	Explanation / meaning
	<p><b>Operational notes</b></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 Standard display

Menu display	Explanation / meaning
	<p>As soon as the vehicle starts moving, the standard display appears automatically.</p> <p>(1) Time; the example shows local time</p> <p>(2) Symbol of the displayed time with symbol (♣) = set local time without symbol (♣) = UTC time</p> <p>(3) Mode; example shows "operational mode", symbol "⊕"</p> <p>(4) Speed</p> <p>(5) Activity, driver 1</p> <p>(6) Card symbol, driver 1 (card slot 1) The card symbol indicates that the DTCO 1381 has correctly read-in the tachograph card</p> <p>(7) Total odometer</p> <p>(8) Card symbol, driver 2 (card slot 2) The card symbol indicates that the DTCO 1381 has correctly read-in the tachograph card</p> <p>(9) Activity, driver 2</p> <p><b>Remark</b></p> <p>The DTCO 1381 can be equipped with the option "Automatic setting of the activities after ignition on/off".</p> <p>This means: When the vehicle is not moving and the ignition is switched on or off, the DTCO 1381 switches automatically to a defined activity, for example "H". The activity (5) and/or (9) which changes automatically on the basis of ignition on or off, flashes for ca. 5 seconds.</p> <p>Which activity is triggered automatically by the DTCO 1381 on switching the ignition on or off can be programmed according to the customer's wishes by an authorised workshop.</p>
	<p><b>Data displayed while driving</b></p> <p>Press any menu key while driving and the times driven by both drivers will appear.</p> <p>The standard display will appear again after any key is pressed again or after 10 seconds.</p> <p>(1) Times of driver 1: Driving time "⊕" since a break of 45 minutes and valid break "H" (cumulative pause time in partial breaks of at least 15 minutes).</p> <p>(2) Times of driver 2: Current activity availability time "⊕" and duration of activity.</p>

TD00.1381.00 132 102

Menu display	Explanation / meaning
	<p><b>Data displayed when vehicle is standing still</b></p> <p>When the vehicle is not moving and driver card 1 is inserted, you can display the current times of driver 1 by pressing the button :</p> <ol style="list-style-type: none"> <li>(1) Driving time since a break of 45 minutes</li> <li>(2) Sum of the valid breaks in partial breaks of at least 15 minutes</li> <li>(3) Driving time of the double week</li> <li>(4) Duration of the set activity</li> </ol> <p>If you press button  once again while driver card 2 is inserted, the times of driver 2 will appear.</p> <p><b>Remark</b></p> <p>If the driver card is missing, data which is assigned to the respective card slot will appear.</p>

### 3.2.5 Selection menu

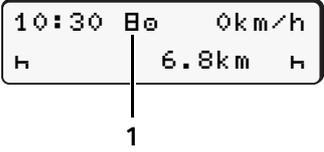
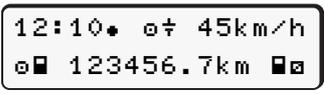
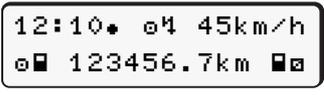
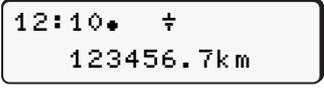
Menu display	Explanation / meaning
	<p>Possible functions or variations which can be selected by you will be shown by blinking in the 2nd line of the menu display.</p> <ul style="list-style-type: none"> <li>• Use the buttons  or  to select the desired function or variation step by step and acknowledge with the  button.</li> </ul>

### 3.2.6 Messages

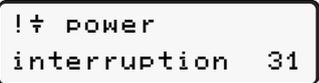
Menu display	Explanation / meaning
	<p>Regardless of which display currently appears or whether the vehicle is moving or stationary, messages will be displayed with priority.</p> <ol style="list-style-type: none"> <li>(1) Pictogram of the cause</li> <li>(2) Text</li> <li>(3) Memory code (position in error memory)</li> </ol> <p>➔ Detailed information, see chapter 13 "Events and faults".</p>

TD00.1381.00 132 10Z

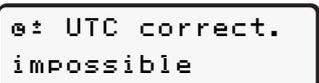
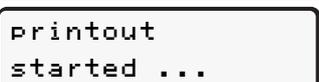
3.2.7 Special displays

Menu display	Explanation / meaning
	<p><b>Production status</b></p> <p>If the DTCO 1381 has not yet been activated to be an EC recording equipment, then the production status, symbol "E" (1), will appear. The DTCO 1381 will not accept any tachograph cards except the workshop card.</p>
	<p><b>Pairing with the KITAS 2171</b></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><b>Out of scope</b></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><b>Ferry transfer or train transfer</b></p> <p>The vehicle is located on a ferry or on a train. (You can set this special condition through the menu).</p>
	<p><b>Undervoltage</b></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 14-4.</p>
	<p><b>Overvoltage</b></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 14.1.3 "Overvoltage", page 14-5.</p>
	<p><b>Power interruption or emergency run</b></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 "Power interruption (Safe Mode)", page 14-6 or chapter 14.1.5 "Emergency run after self-test", page 14-7.</p>

TD00.1381.00 132 102

Menu display	Explanation / meaning
 	<p><b>Restart</b></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 appears (xx.xx.xx) 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", page 9-8, chapter 14.1.4 "Power interruption (Safe Mode)", page 14-6 or chapter 14.1.5 "Emergency run after self-test", page 14-7.</p>

### 3.2.8 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.

TD00.1381.00 132 10Z



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

### 3.3 Menu functions



Please refer to the DTCO 1381 operating instructions for detailed information on the menu functions.

#### 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 	– Starting from the standard display, press repetitively the button  until the display "select language?" appears and – acknowledge with the button .
2 	– 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.

TD00.1381.00 132 102



#### 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.

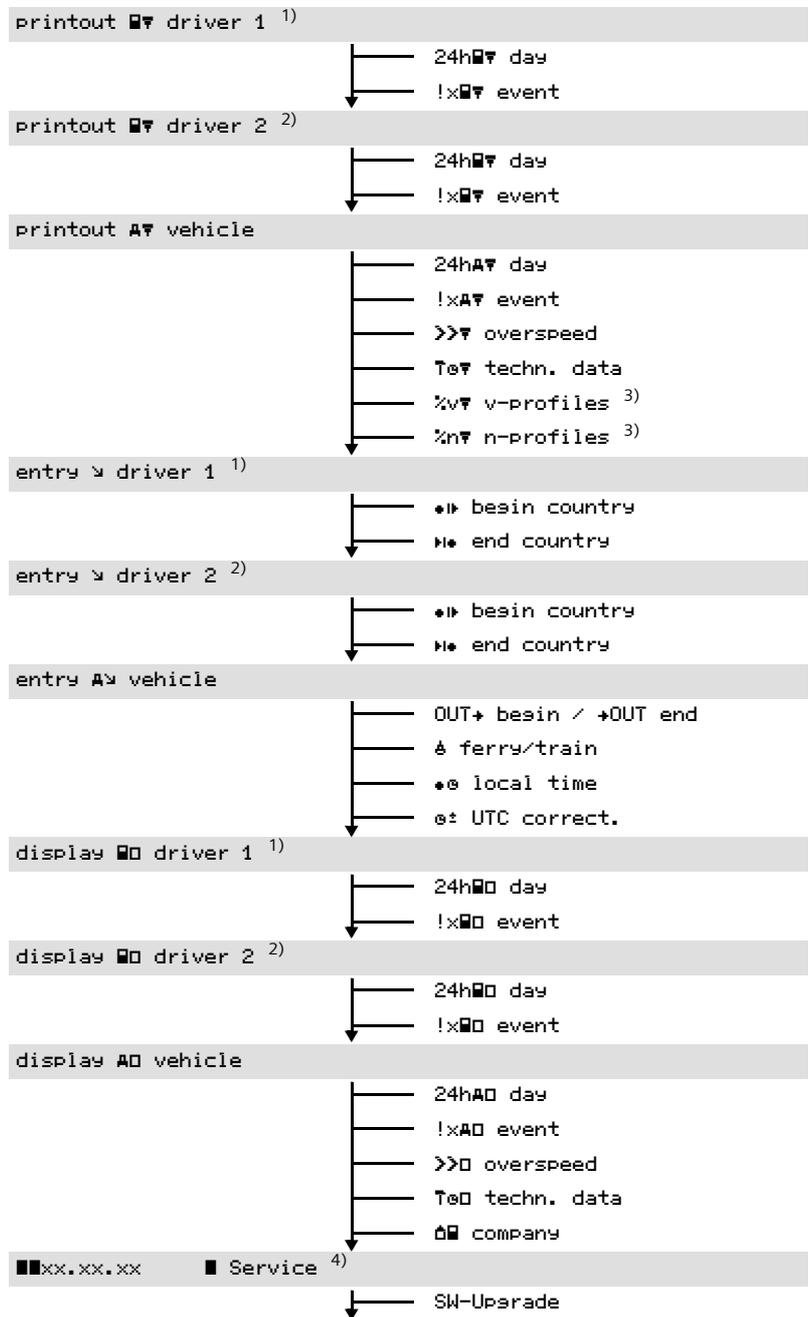
### 3.3.2 Retrieving menu functions



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

Step / menu display	Explanation / meaning
1 	<ul style="list-style-type: none"> <li>- Starting from the standard display, press repetitively the button  until the display "call main menu" appears and</li> <li>- acknowledge with the button .</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>- Press the key .</li> </ul>
2 	<p>Always follow the same procedure when making menu selections:</p> <ul style="list-style-type: none"> <li>- Select the desired menu function, such as printout driver 1, with the button  or  and</li> <li>- acknowledge with the button .</li> </ul>

3.3.3 Overview of the menu structure



1) Functions card slot 1  
 2) Functions card slot 2  
 3) Option  
 4) only available in the production status or in calibration mode

TD00.1381.00 132 102

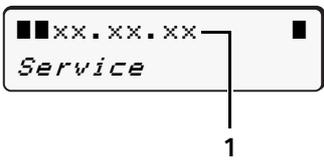
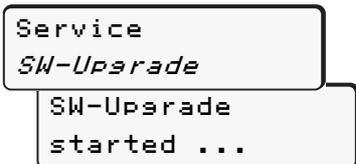
### 3.3.4 Menu function "Service"

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

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



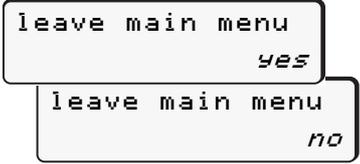
You can only upgrade the user software of the DTCO 1381 if you fulfil further requirements.

Step / menu display	Explanation / meaning
1 	<ul style="list-style-type: none"> <li>– Select the menu function "Service" with the button  or .</li> <li>The current software version is shown in the first line.</li> <li>– Acknowledge with the button .</li> </ul>
2 	<ul style="list-style-type: none"> <li>– Start the software upgrade with the  button.</li> <li>The DTCO 1381 starts the software upgrade function.</li> </ul>
3 	<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><b>Cancel the software upgrade</b></p> <ul style="list-style-type: none"> <li>– Cancel the software upgrade with the button .</li> </ul> <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".

3.3.5 Leaving menu functions

Step / menu display	Explanation / meaning
<p>1</p> 	<ul style="list-style-type: none"> <li>- Press repetitively the button  until the display "leave main menu" appears,</li> <li>- select "yes" with the button  or  and</li> <li>- acknowledge with the button .</li> <li>- Or use the button  to skip the query.</li> </ul> <p>The standard display will appear.</p>



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.

TD00.1381.00 132 102

## 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

Comment 

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

### 3.4.1 Inserting workshop card

Comment 

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", page 9-8.

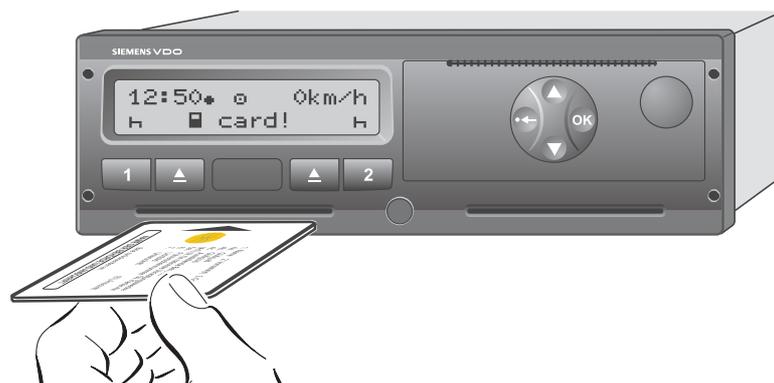


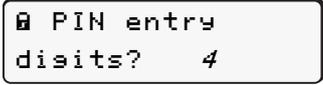
Fig. 3 - 1: Inserting workshop card

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**

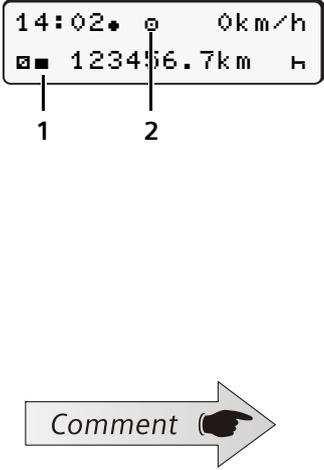
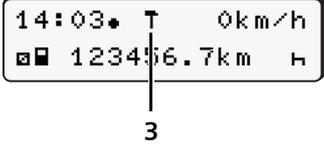


If the workshop card does not contain a preferred language or if the language is not available in the DTCO 1381, the text will appear in the language of the issuing member state, see chapter 3.2.1 "Selecting the text language", page 3-5.

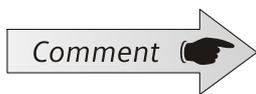
Step / menu display	Explanation / meaning
<p>1</p> 	<p>Greeting text; the set local time (14:00) and the UTC time (12:00) will appear for approximately 3 seconds.</p>
<p>2</p> 	<p>The DTCO 1381 is reading the workshop card. The symbol for the current mode, operational mode, appears and a progress bar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

TD00.1381.00 132 102

Step / menu display	Explanation / meaning
<p>6</p> <div data-bbox="188 320 512 405" style="border: 1px solid black; padding: 5px; width: fit-content;">       18 wrong entry!     </div>  <div data-bbox="264 685 392 797" style="text-align: center;">  </div>	<p><b>If incorrect PIN entered</b></p> <ul style="list-style-type: none"> <li>– Acknowledge message with the button  and re-enter the number.</li> </ul> <p><b>Cancel PIN entry</b></p> <ul style="list-style-type: none"> <li>– Press the ejection button  of the card slot in which the workshop card is located.</li> <li>– After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.</li> </ul> <p><b>Attention!</b></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> <div data-bbox="188 842 512 927" style="border: 1px solid black; padding: 5px; width: fit-content;">       last withdrawal        25.10.02 23:30     </div>	<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> <div data-bbox="188 958 512 1043" style="border: 1px solid black; padding: 5px; width: fit-content;">       M entry        addition?     no     </div>  <div data-bbox="264 1144 400 1245" style="text-align: center;">  </div>	<p><b>Manual entry</b></p> <ul style="list-style-type: none"> <li>– To add activities manually, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul> <p><b>Comment</b></p> <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries.</p>
<p>9</p> <div data-bbox="188 1283 512 1368" style="border: 1px solid black; padding: 5px; width: fit-content;">       •&gt; begin country        26.10 14:00 E     </div>  <div data-bbox="188 1574 512 1659" style="border: 1px solid black; padding: 5px; width: fit-content;">       •&gt; begin region        14:00 E     AM     </div>  <div data-bbox="212 1731 464 1816" style="border: 1px solid black; padding: 5px; width: fit-content;">       Comment  </div>	<p><b>Enter the country for the beginning or continuation of the workday</b></p> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>Cancel entry of country:</p> <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <p><b>Select region if required</b></p> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>This entry is required only in some countries, but the entry will be requested automatically.</p> <p>The beginning or end of the workday can be entered even without an inserted workshop card or at times other than during insertion or withdrawal of the card.</p>

Step / menu display	Explanation / meaning
<p>10</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"> <li>• Calling up menu functions.</li> </ul> <p>Requesting a tachograph card.</p>
<p>11</p> 	<p>After the card has been read, the DTCO 1381 switches to the calibration mode (3).</p>

TD00.1381.00 132 102



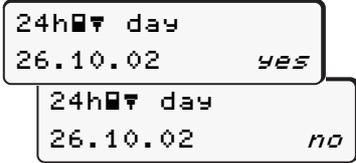
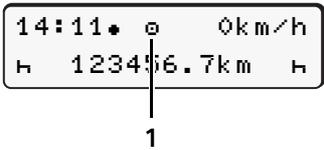
Behaviour of the DTCO 1381 with start of driving while reading a workshop card:

- During PIN entry this is continued and the workshop card then read in completely.
- After completed PIN entry, the workshop card will be completely read and any entries that have already been acknowledged with the  key will be saved.

### 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   	<p><b>Enter country at the end of the workday</b></p> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>Cancel entry of country</p> <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <p><b>Select region if required</b></p> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
3 	Continuation of data transfer to workshop card.
4 	<p><b>Print day value</b></p> <ul style="list-style-type: none"> <li>– To print the day value, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul>
5 	Continuation of data transfer to workshop card.
6 	The workshop card is released, the standard display and the operational mode (1) appear.

### 3.5 Preparing for data download

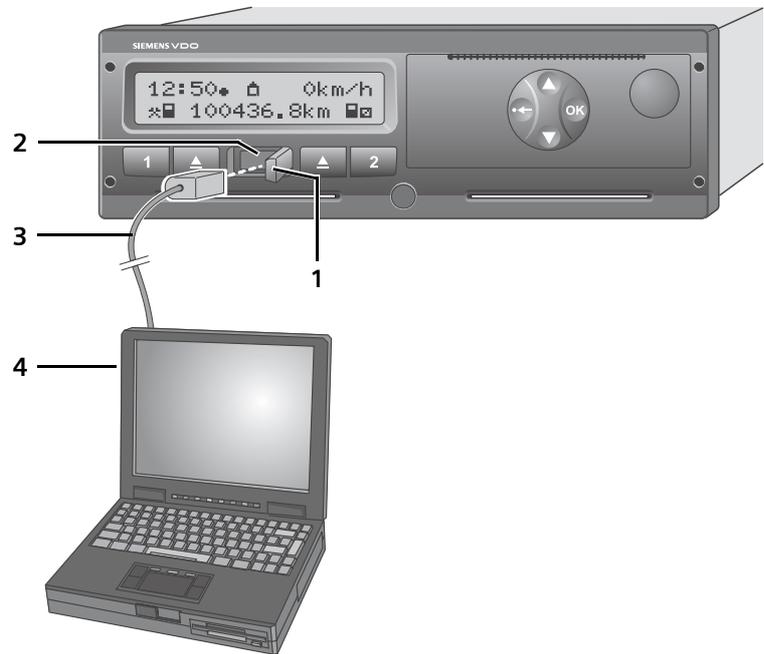


Fig. 3 - 2: Connection to the download interface

1. Insert workshop card, see chapter 3.4.1 "Inserting workshop card", page 3-16.
2. Open the covering cap (1) to the right.
3. Insert data cable (3) into the download interface (2) and the laptop (4).
4. Start the reading software.



For detailed information about the reading software, please refer to the appropriate documentation.

For detailed information about a appropriate reading software, please refer to a Siemens VDO sales office or the traffic Ministry.

5. After downloading the data, make sure you always close the covering cap (1).



TD00.1381.00 132 102

# ***Chapter 4***

---

## ***Data handling***

---

**Table of Contents**

---

**Chapter 4 Data handling**

<b>4.1</b>	<b>Data handling .....</b>	<b>4-3</b>
<b>4.2</b>	<b>The flow of data and memory behaviour .....</b>	<b>4-4</b>
4.2.1	Working memory .....	4-4
4.2.2	Buffer for v-recording .....	4-5
4.2.3	Contents of the data memory .....	4-6
4.2.4	Data saved in the data memory .....	4-7
<b>4.3</b>	<b>Tachograph cards .....</b>	<b>4-14</b>
4.3.1	Driver card .....	4-14
	Fixed data .....	4-14
	Variable data .....	4-15
4.3.2	Workshop card .....	4-19
	Fixed data .....	4-19
	Variable data .....	4-20
4.3.3	Control card .....	4-25
	Fixed data .....	4-25
	Variable data .....	4-26
4.3.4	Company card .....	4-27
	Fixed data .....	4-27
	Variable data .....	4-28
<b>4.4</b>	<b>Data download .....</b>	<b>4-29</b>
<b>4.5</b>	<b>Rights to access saved data .....</b>	<b>4-30</b>

---

## 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
- Identification data of the attached 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 (the last 24 hours of driving time)
- Events
- Faults
- Calibrations
- Control activities
- Lock-in / lock-out from the company
- Download activities
- Specific conditions
- Movement data of the vehicle

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.



### **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".

---

## 4.2 The flow of data and memory behaviour

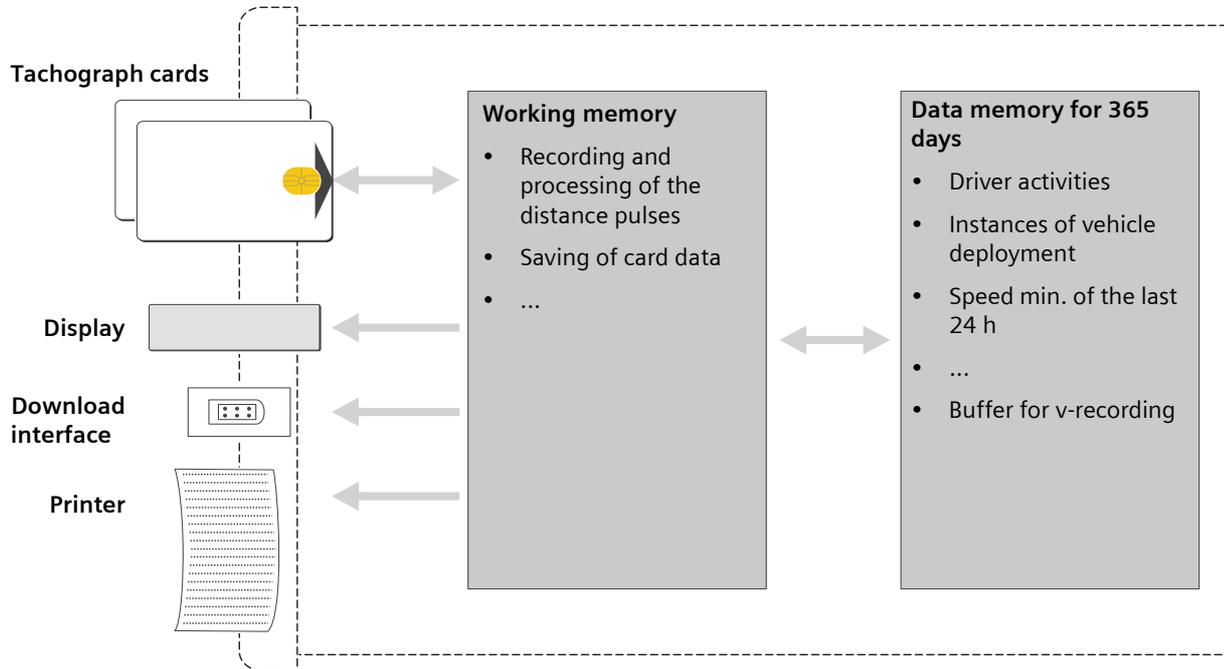


Fig. 4 - 1: The flow of data and memory behaviour, schematic diagram

### 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.

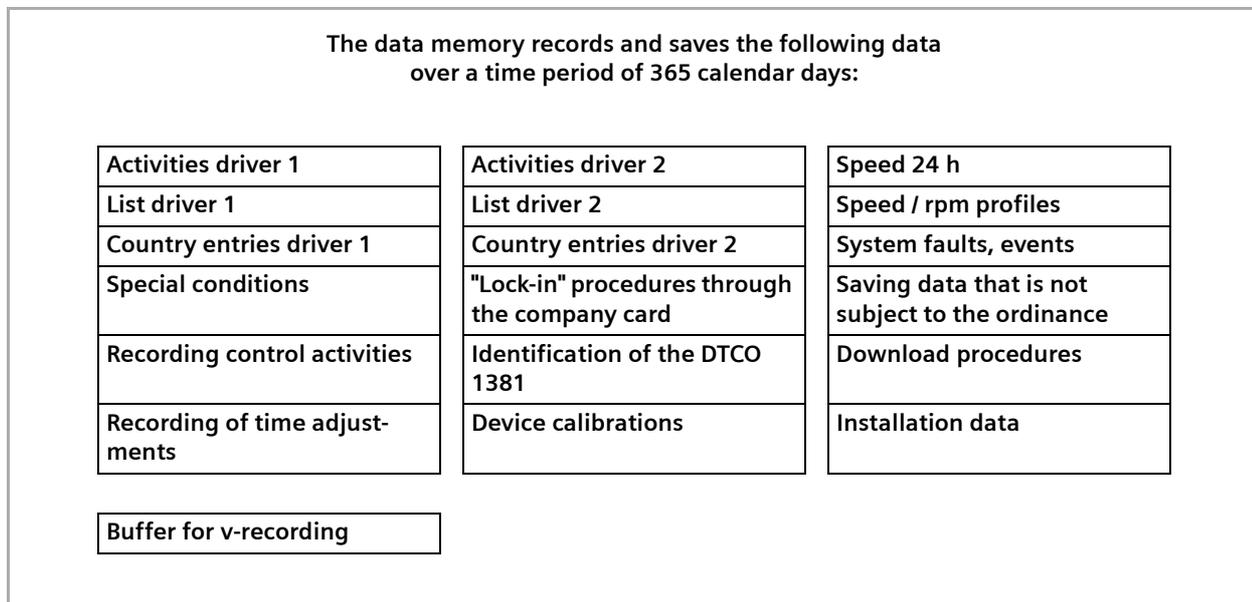
4.2.3 Contents of the data memory

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.



TD00.1381.00 132 10Z

Fig. 4 - 2: Data in data memory, schematic diagram

#### 4.2.4 Data saved in the data memory

---

##### Identification data of the DTCO 1381

The DTCO 1381 registers and saves the following legally stipulated data:

- 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

- Serial number
- Approval number
- Date of initial pairing

##### Security data

- Cryptographical key

##### Insertion and withdrawal of driver cards / workshop cards

The following data will be registered and saved each time a driver card or workshop card is inserted/withdrawn:

- 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
  - Registration number
  - Country of registration
  - Date and time when card withdrawn
- Recognition of whether manual entries were made when card was inserted

**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 24 hours of driving time:

- Momentary speed in km/h
- Date and time

**Speed / rpm profiles**

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.



Assuming an average of six drivers per day, these data will be stored for 365 days.

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

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

TD00.1381.00 132 102

**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"> <li>The 10 most recent driver card faults</li> </ul>	<ul style="list-style-type: none"> <li>Begin – date and time</li> <li>End – date and time</li> <li>A card's type, number, and issuing member state.</li> </ul>
Recording equipment fault	<ul style="list-style-type: none"> <li>The 10 most recent faults of each fault type</li> <li>The first fault after the most recent calibration</li> </ul>	<ul style="list-style-type: none"> <li>Type of fault</li> <li>Begin – date and time</li> <li>End – date and time</li> <li>The type, number, and issuing member state of an inserted card at the beginning and/or end of the fault.</li> </ul>

**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



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)
- 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-value)
  - Recording equipment constant (k-value)
  - Effective wheel circumference
  - 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

---

Comment 

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 20 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

---

<b>Card identification</b>	<ul style="list-style-type: none"> <li>• Detailed information about the card, such as serial number, type, manufacturer, etc.</li> <li>• Card number</li> <li>• Issuing member state, name of the issuing authority / institution, date of issuance</li> <li>• Validity</li> </ul>
<b>Security elements</b>	<ul style="list-style-type: none"> <li>• Public European security key</li> <li>• Certificate of the issuing member state</li> <li>• Card certificate</li> <li>• Private security key of the card</li> </ul>
<b>Driver information (cardholder identification)</b>	<ul style="list-style-type: none"> <li>• Last name, first name</li> <li>• Date of birth</li> <li>• Preferred language</li> <li>• Driver's license number</li> <li>• Issuing member state, name of the issuing authority / institution, date of issuance</li> </ul>

---

**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.

---

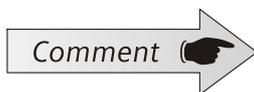
**Driver activities over at least 28 days**

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

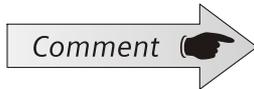
The following events are saved on the driver card:

- Power interruption
- Error in communication with the KITAS 2171
- 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 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



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 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

##### Card identification

- Detailed information about the card, such as serial number, type, manufacturer, etc.
- Card number
- Issuing member state, name of the issuing authority / institution, date of issuance
- Validity

##### Workshop information (cardholder identification)

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

---

**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



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



At least 2 entries will be saved.

---

**Events**

The following events are saved on the workshop card:

- Power interruption
- Error in communication with the KITAS 2171
- 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 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



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 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 (recording equipment identification)
  - Item number
  - Serial number
  - KITAS 2171 serial number
- Date and purpose of the calibration
  - Activation (1)
  - Initial installation (2)
  - Installation (3)
  - Regularly inspection (4)



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.

**Calibration parameters**

The following updated and/or confirmed calibration parameters are saved on the workshop card:

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

---

### 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

- Detailed information about the card, such as serial number, type, manufacturer, etc.
- Card number
- Issuing member state, name of the issuing authority / institution, date of issuance
- 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

---

Comment 

---

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

- Detailed information about the card, such as serial number, type, manufacturer, etc.
- Card number
- Issuing member state, name of the issuing authority / institution, date of issuance
- Validity

##### Company information (cardholder identification)

- Company name
- Company address

---

**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



At least 230 entries will be saved.

---

---

## 4.4 Data download

---

Driver, vehicle, and calibration data can be downloaded (copied) over the download interface from the DTCO 1381 data memory and from an inserted driver card.

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

# *Chapter 5*

---

# *Installation*

---

**Table of Contents**


---

**Chapter 5 Installation**

<b>5.1</b>	<b>General instructions .....</b>	<b>5-3</b>
5.1.1	Terminology definitions .....	5-3
5.1.2	Personnel prerequisites .....	5-4
5.1.3	Technical prerequisites .....	5-4
5.1.4	Other instructions .....	5-5
5.1.5	Handling the tachograph cards .....	5-6
<b>5.2</b>	<b>Instructions on installing the DTCO 1381 .....</b>	<b>5-7</b>
5.2.1	General installation instructions .....	5-8
5.2.2	Working on the electrical onboard power supply .	5-9
5.2.3	Laying and establishing connecting cables .....	5-9
5.2.4	Lead sealing the DTCO 1381 components .....	5-10
	Preparing sealing tools .....	5-11
<b>5.3</b>	<b>Criteria for the installation site .....</b>	<b>5-12</b>
5.3.1	Legal requirements .....	5-12
5.3.2	Manufacturer's specifications .....	5-12
5.3.3	Manufacturer's recommendations .....	5-14
<b>5.4</b>	<b>Tools and installation accessories .....</b>	<b>5-15</b>
5.4.1	Tools .....	5-15
5.4.2	Installation accessories .....	5-16
<b>5.5</b>	<b>Performing the installation .....</b>	<b>5-17</b>
5.5.1	Schematic diagram .....	5-17
5.5.2	Checking the condition of the DTCO 1381 upon delivery .....	5-18
	Checking the identification and sealing .....	5-18
	Checking the buffer battery .....	5-19
5.5.3	Checking the place of installation and the cable connections .....	5-20
5.5.4	Installing the KITAS 2171 .....	5-22
5.5.5	Sealing the KITAS 2171 to the transmission .....	5-23
	With sealing wire .....	5-23
	With KITAS hexagonal seal .....	5-24
5.5.6	Preparing the radio compartment .....	5-25
	Assembling installation frame in the radio compartment .....	5-25
	Checking the radio compartment with the installation frame .....	5-26
	Preparing the DTCO 1381 for mounting into the radio compartment .....	5-26
5.5.7	Connecting the DTCO 1381 to the vehicle's onboard power supply .....	5-27
	Connection plug B .....	5-28
	Connection plugs C and D .....	5-29
	Connection plug A .....	5-30
5.5.8	Mounting the DTCO 1381 .....	5-31
	Removing the DTCO 1381 .....	5-32

## 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. Part of the first calibration is, to enter the vehicle registration number.

---

### 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 Other instructions

---

<b>Proper use</b>	The <b>DTCO 1381</b> 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.
<b>Power supply</b>	The DTCO 1381 may only be connected to voltages for which it is designed and which can be seen in the wiring diagram (label).
<b>Accessories</b>	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.
<b>Cables</b>	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!

---

---

### 5.1.5 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 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".

---

---

### 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 Siemens VDO Automotive 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.

---

## 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!
-

### 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-documentable 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)

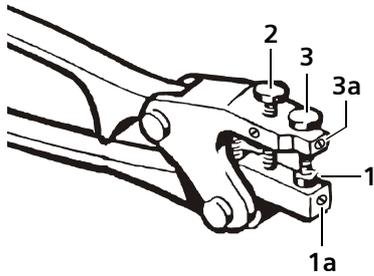
#### Notes

Observe the following notes when sealing the DTCO 1381 components:

- When sealing, use only original tools from Siemens VDO Automotive 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

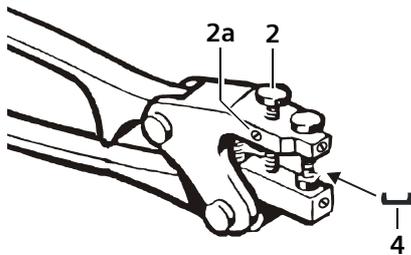
### Assembling the sealing tool



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

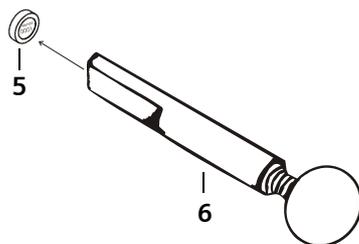
1. Insert an original Kienzle sealing insert (1) into the pliers and engage it using the locking screw (1a).
2. Close the pliers and screw in the knurled screw (2) to the limit stop.
3. Screw the knurled screw (3) into the sealing insert up to the limit stop and engage using the locking screw (3a).

### Embossing the sealing cap



4. Perform an embossing test. Place the neutral sealing cap (4) over the knurled screw (2) 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 and be shown in the color "amber" or "orange".

### 5.3.2 Manufacturer's specifications

Installation dimensions of  
DTCO 1381

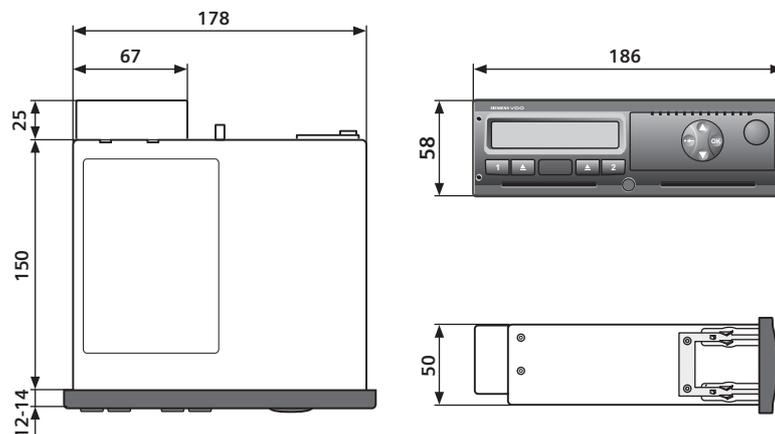


Fig. 5 - 1: Installation dimensions of DTCO 1381

Installation angle of the DTCO 1381

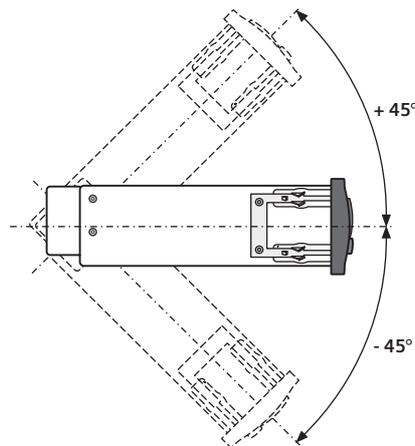


Fig. 5 - 2: Installation angle of the DTCO 1381

Clearance for the installation and operation of the DTCO 1381

TD00.1381.00.132.102

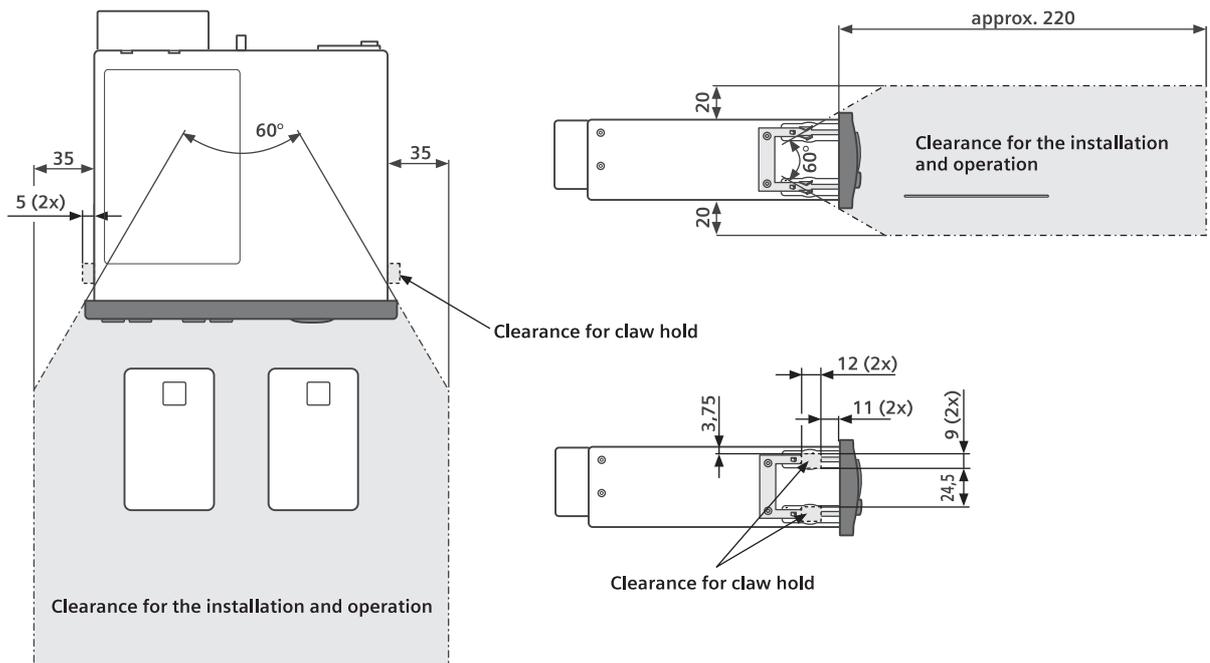


Fig. 5 - 3: Clearance for the installation and operation of the DTCO 1381

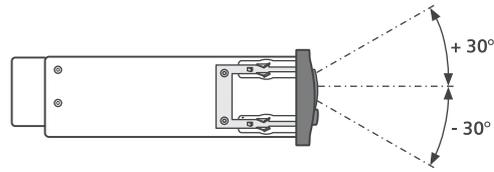
**Permissible installation angle of the display**

Fig. 5 - 4: Permissible viewing angle of display DTCO 1381

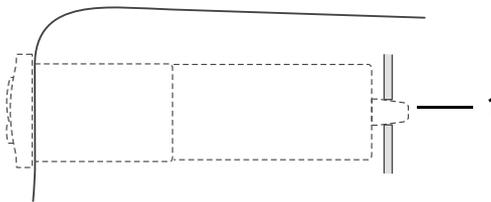
**5.3.3 Manufacturer's recommendations****Support in the radio compartment**

Fig. 5 - 5: Support at the rear of the radio compartment

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

## 5.4 Tools and installation accessories

### 5.4.1 Tools

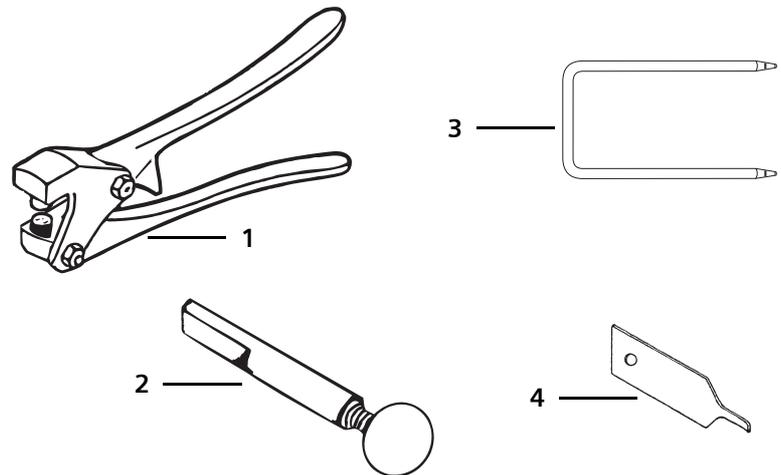


Fig. 5 - 6: Tools

#### Special tools

- (1) **Seal crimpers**
- (2) **Mounting tool** for lead seals
- (3) **Removing aids** (bracket) for removing of the DTCO 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 DTCO 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)



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

5.4.2 Installation accessories

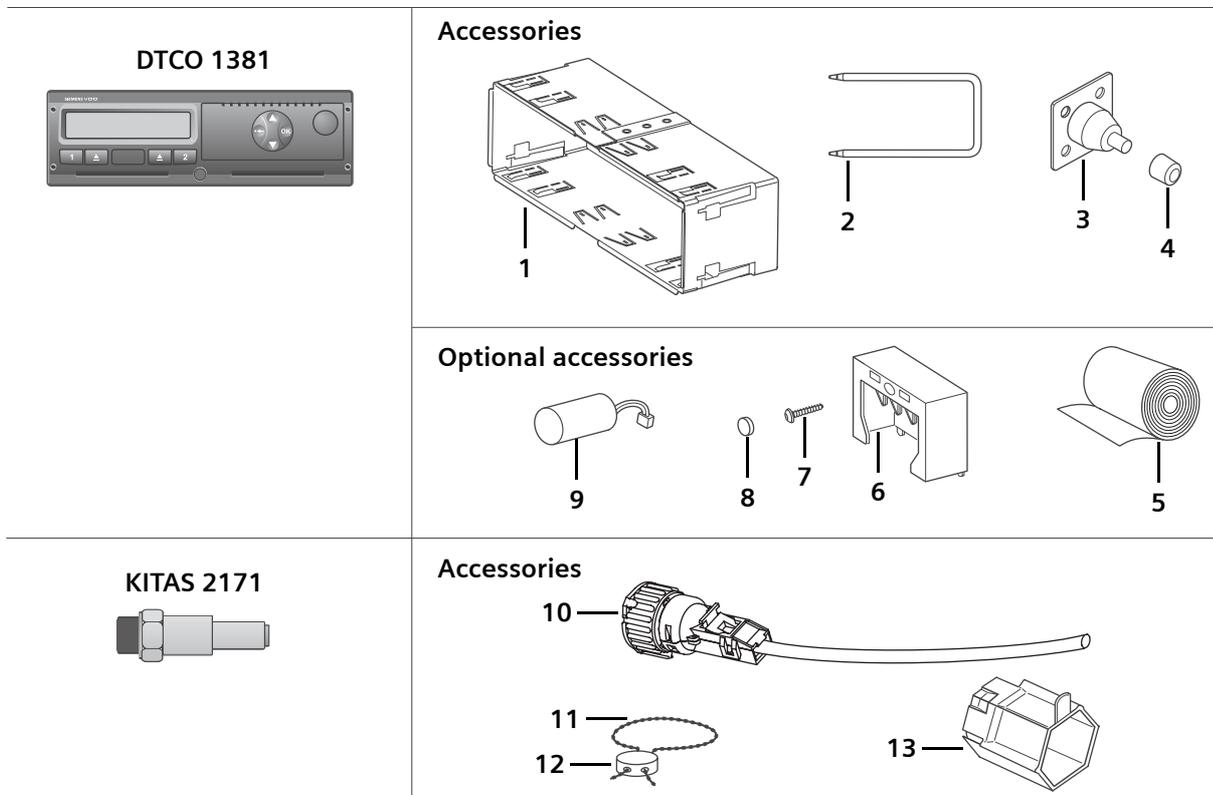


Fig. 5 - 7: Installation accessories

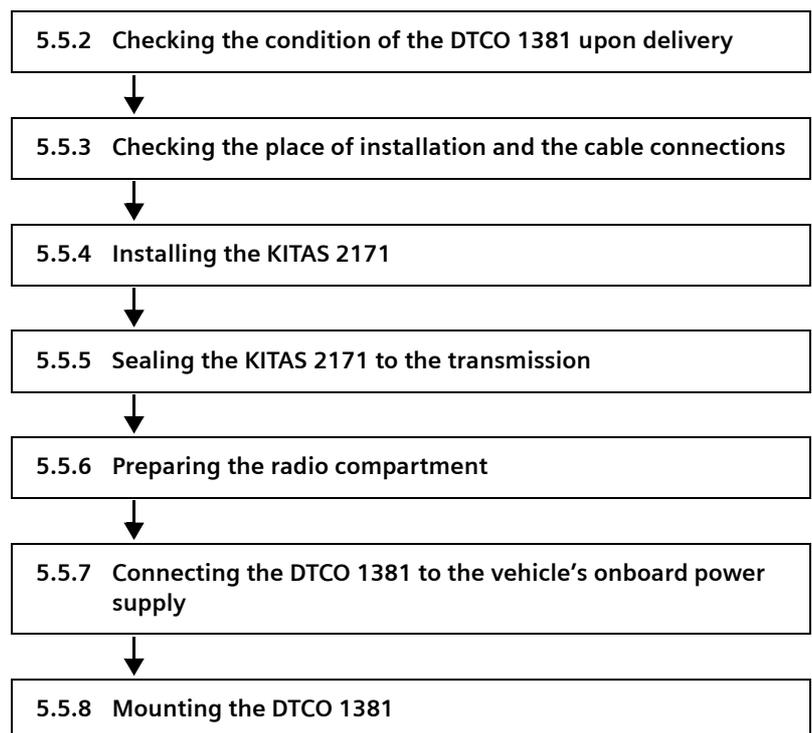
TD00.1381.00 132 10Z

	Item	Order number	Accessories
<b>DTCO 1381 accessories</b>	1	1324.90 01 00 05	Installation frame
	2	1381.90 04 00 00	Removal aid (bracket)
	3		Spacer (set including 4 screws)
			Extended spacer (set including 4 screws)
4	1381.90 05 02 00	Mounting cap	
<b>DTCO 1381 optional accessories</b>	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)
	9	HS53.1600.057	Buffer battery
<b>KITAS 2171 accessories</b>	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

<b>Definition</b>	Mechanical and electrical installation of the DTCO 1381 components into the vehicle.
<b>Requirements</b>	<p>The description of installation assumes the following:</p> <ul style="list-style-type: none"><li>• The place where the DTCO 1381 is installed meets all legal stipulations.</li><li>• The technical specifications (environmental conditions, voltage ranges, etc.) of the DTCO 1381 and the KITAS 2171 are maintained.</li><li>• The required cable connections are available in the vehicle and meet the technical specifications.</li></ul>

### 5.5.1 Schematic diagram



TD00.1381.00.132.102

## 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).
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 "MYY":

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

<i>YY= Year of production</i>			
<b>04</b>	2004	<b>07</b>	2007
<b>05</b>	2005	<b>08</b>	2008
<b>06</b>	2006	:	:

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 12-4.

### 5.5.3 Checking the place of installation and the cable connections

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

#### Legal criteria for the place of installation

- 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 and be shown in the color "amber" or "orange".
- The characters depicted in the display must be easily visible.

#### Manufacturer's specifications for the place of installation

- 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

- 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

- 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

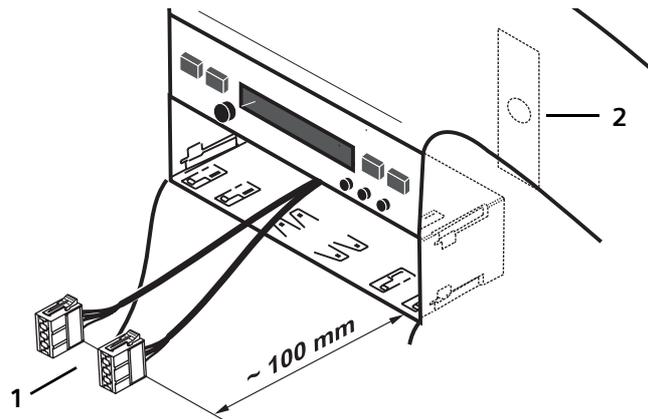


Fig. 5 - 8: Manufacturer recommendations

- 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.

### 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.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!

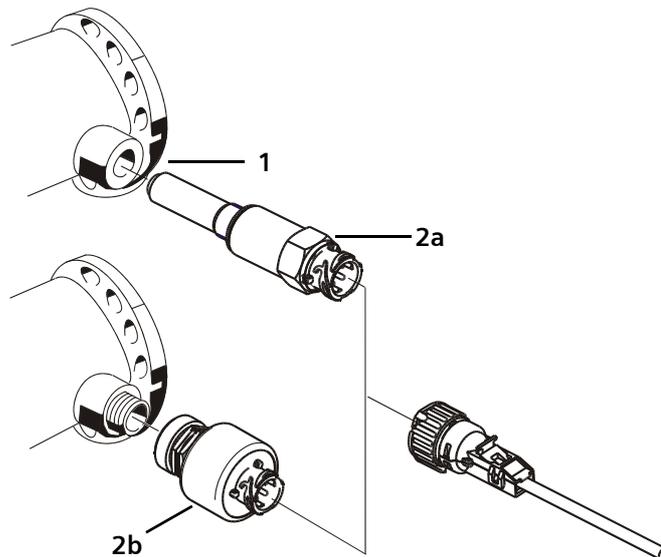


Fig. 5 - 9: Installing the KITAS 2171 motion sensor

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**).

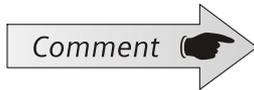


#### Attention!

Observe the maximum tightening torque (50 Nm).

### 5.5.5 Sealing the KITAS 2171 to the transmission

#### With sealing wire



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.

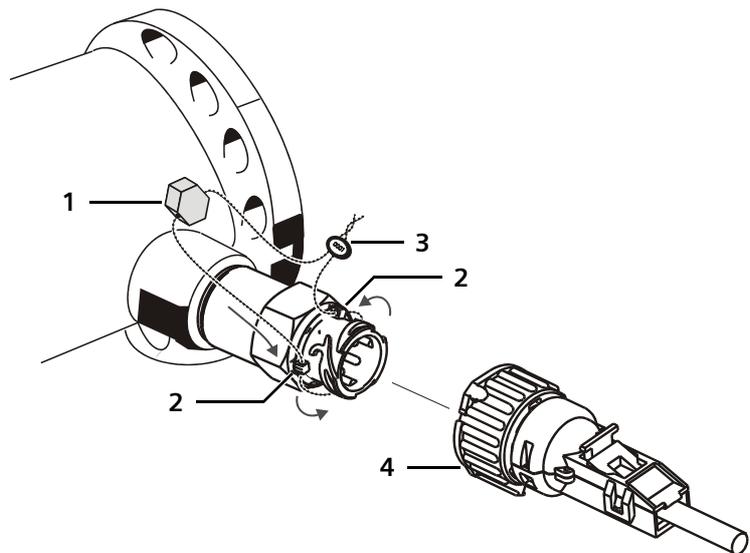


Fig. 5 - 10: Sealing the KITAS 2171 at the transmission (with sealing wire)

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 all three of the sealing eye-bolts (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.



Observe the instructions on sealing, see chapter 5.2.4 "Lead sealing the DTCO 1381 components", page 5-10.

---

**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.

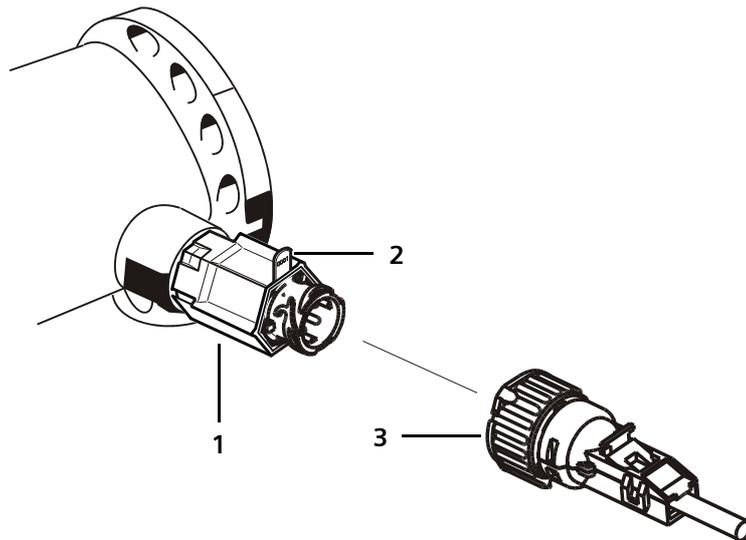


Fig. 5 - 11: Sealing the KITAS 2171 at the transmission (with KITAS hexagonal seal)

1. If required, remove the KITAS sensor cable (3) from the KITAS 2171.
2. Slide the KITAS seal (1) onto the KITAS 2171 until it locks into place.
3. Then clamp the bracket at the KITAS seal (2) using seal crimpers, thereby signing the seal.
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 5-10.

### 5.5.6 Preparing the radio compartment

#### Assembling installation frame in the radio compartment

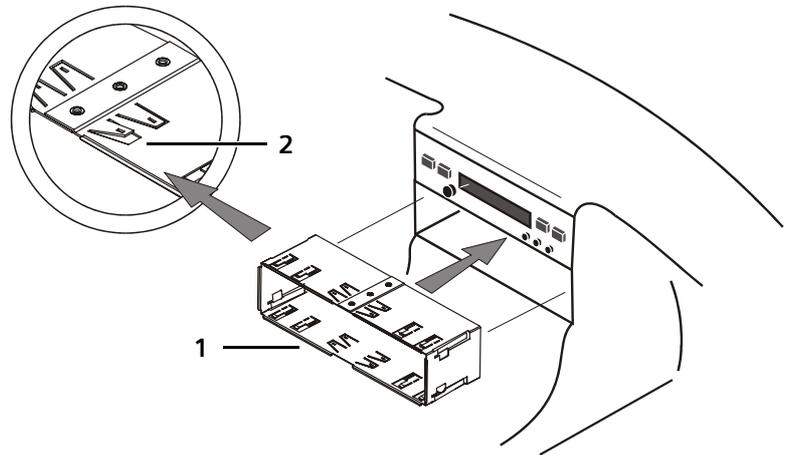


Fig. 5 - 12: Assembling installation frame in the radio compartment

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

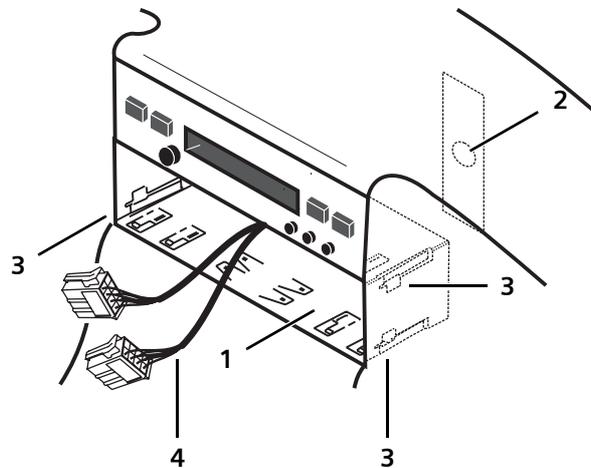


Fig. 5 - 13: Checking the radio compartment with the installation frame

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 DTCCO 1381.
  - All connection cables (4) are laid through the installation frame.

TD00.1381.00 132 102

### Preparing the DTCCO 1381 for mounting into the radio compartment

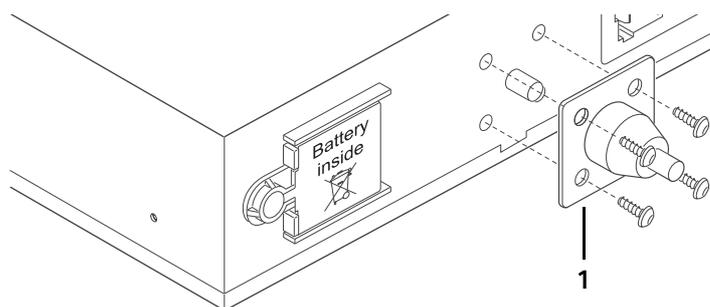


Fig. 5 - 14: Preparing the DTCCO 1381 for mounting into the radio compartment

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 DTCCO 1381.

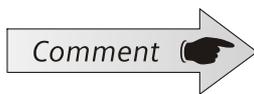
---

### 5.5.7 Connecting the DTCO 1381 to the vehicle's onboard power supply

---

Follow the following procedure in the proper order to connect the DTCO 1381 to the vehicle's onboard power supply:

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

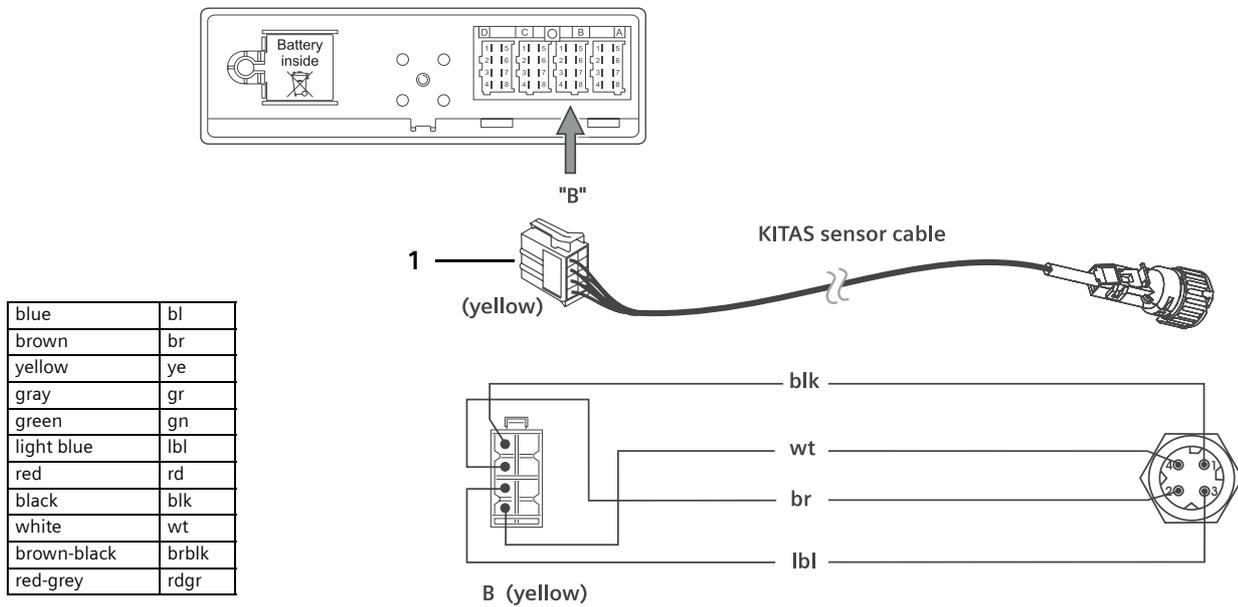


Fig. 5 - 15: Connect DTCO 1381 with KITAS 2171

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



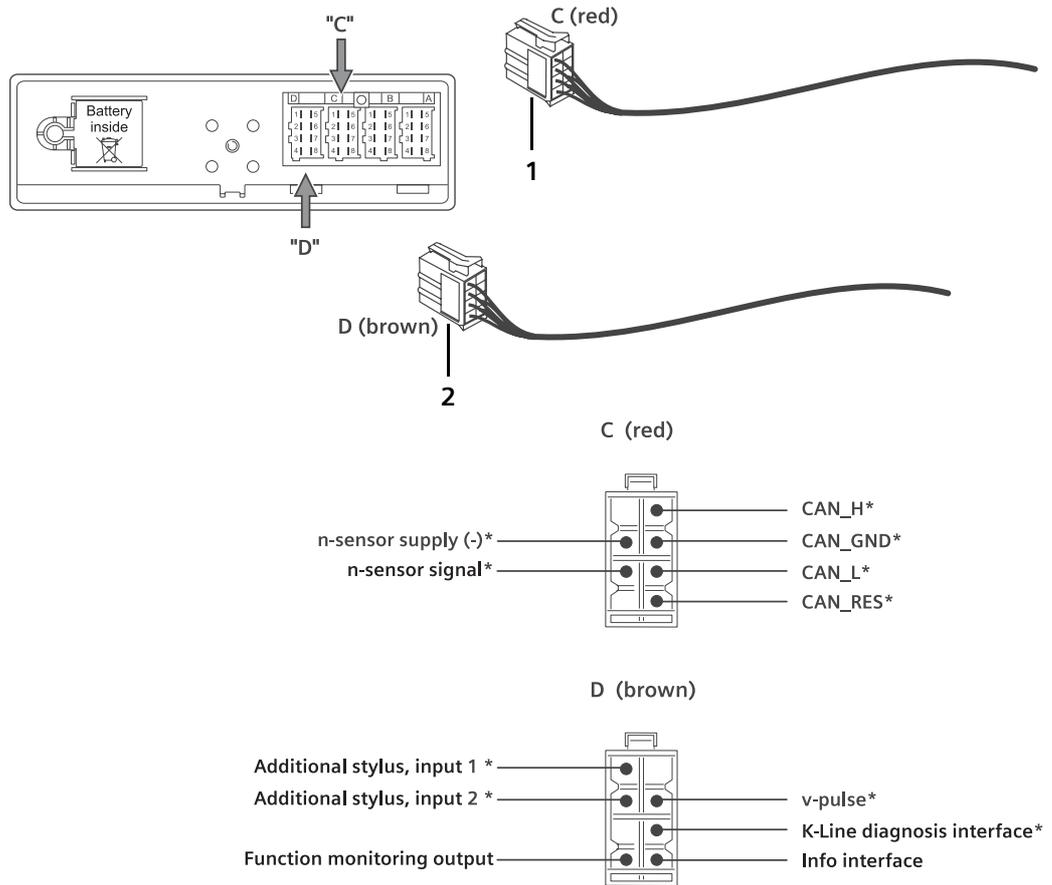
The KITAS sensor cable must meet special requirements, see chapter 2.2.6 "KITAS Sensor cable", page 2-19.

TD00.1381.00 132 102

Connection plugs C and D



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



\* Option

Fig. 5 - 16: 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.

TD00.1381.00.132.102

## Connection plug A



### Caution! Danger of short circuits

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

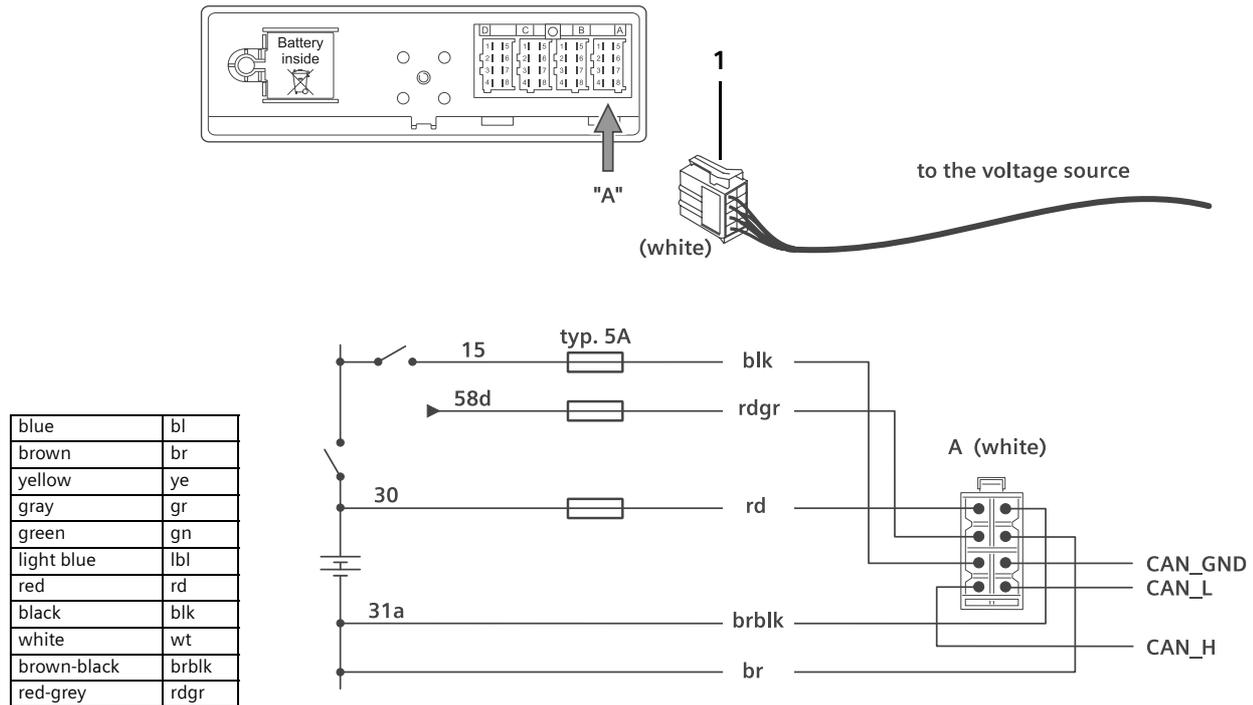


Fig. 5 - 17: Connect the DTCO 1381 connection plug A

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.

TD00.1381.00 132 102

### 5.5.8 Mounting the DTCO 1381

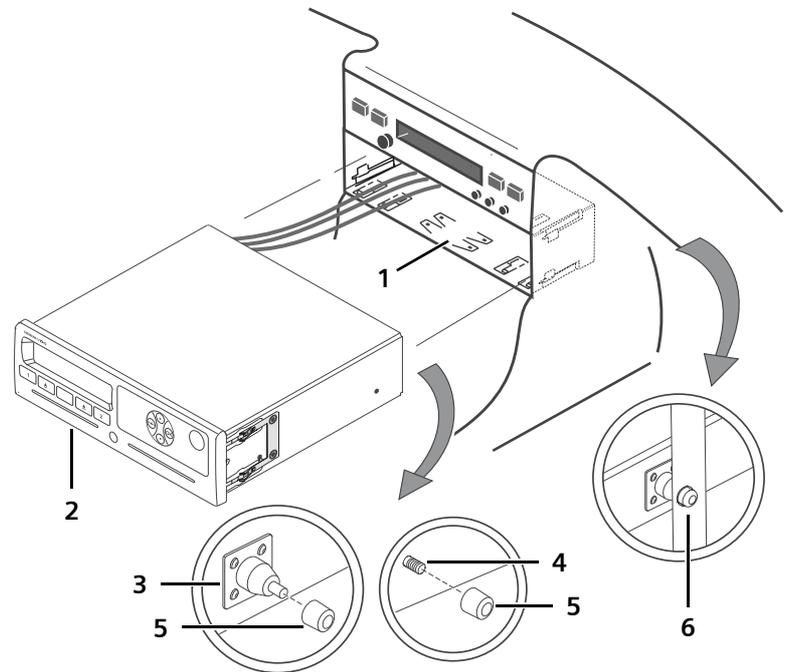


Fig. 5 - 18: Mounting the DTCO 1381 in the radio compartment

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**

---

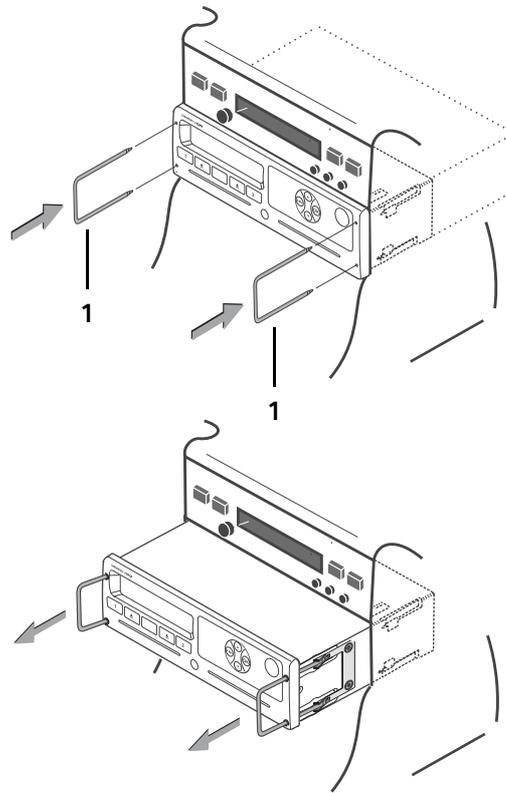


Fig. 5 - 19: Removing the DTCO 1381 from the radio compartment

- 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.

## ***Chapter 6***

---

# ***Installation of the ADR variant***

---

**Table of Contents**

---

**Chapter 6 Installation of the ADR variant**

<b>6.1</b>	<b>DTCO 1381 in vehicles used for the carriage of hazardous goods</b> .....	<b>6-3</b>
6.1.1	Legal requirements .....	6-3
6.1.2	Tachograph system requirements .....	6-4
6.1.3	Requirements for the connection of external devices .....	6-5
6.1.4	Identification of the tachograph system .....	6-6
	Digital Tachograph DTCO 1381 .....	6-6
	KITAS 2171 pulse generator .....	6-7
<b>6.2</b>	<b>Performing the installation</b> .....	<b>6-8</b>
6.2.1	Installation instructions .....	6-8
6.2.2	Power supply DTCO 1381 (ADR variant) .....	6-9
6.2.3	KITAS 2171 intrinsically safe circuitry .....	6-10
<b>6.3</b>	<b>DTCO 1381 (ADR variant)</b>	
	<b>EC type-examination certificate</b> .....	<b>6-11</b>
<b>6.4</b>	<b>KITAS 2171 EC type-examination certificate</b> .....	<b>6-15</b>

## 6.1 DTCO 1381 in vehicles used for the carriage of hazardous goods

---

This chapter describes – supplementary to Chapter 5 "Installation" – 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

---

	Special laws, regulations, and standards apply to vehicles used for the carriage of dangerous goods:
<b>EC-specific</b>	<ul style="list-style-type: none"><li>• ADR part 9</li><li>• EN 50014 requirements</li><li>• EN 50020 requirements</li><li>• EN 50021 requirements</li><li>• EC directives 94/9/EC; 94/55/EC; 98/91/EC</li><li>• CR (EEC) No. 3821/85</li></ul>
<b>Germany</b>	<ul style="list-style-type: none"><li>• ADR (International Carriage of Dangerous Goods by Road)</li><li>• VDE requirements (especially VDE 0170 and 0171)</li></ul>
<b>ADR 2001/2003</b>	<p>The following applies in accordance with the provisions of ADR 2001/2003: All components and wires in the electrical system that must remain under voltage when the battery disconnect switch is open must:</p> <ul style="list-style-type: none"><li>• be suitable for usage within a danger zone and</li><li>• 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.</li></ul>
<b>IEC standard 60079, part 14</b>	<p>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:</p> <ul style="list-style-type: none"><li>• Zone 1, electrical equipment in general or zone 2, electrical equipment in the driver's compartment.</li><li>• Explosion group IIC, temperature class T6.</li></ul>

TD00.1381.00.132.102

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 hazardous 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 (download-, remote- or info interface pin D8) 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 (operational case ADR).
- The data lines must be installed inside the driver's compartment.

#### 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:

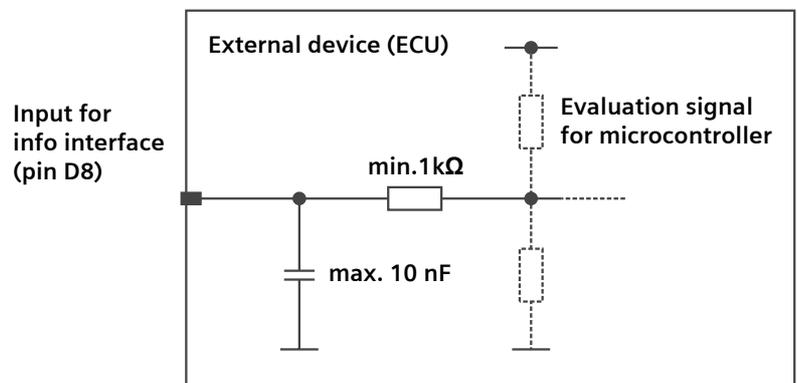


Fig. 6 - 1: Application default info interface (pin D8)



#### 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)



Fig. 6 - 2: DTCO 1381 Front side (ADR variant)

(1) Labeling of the device front side

Model plate DTCO 1381  
(ADR variant)



Fig. 6 - 3: Model plate DTCO 1381 (ADR variant)

- (1) Model designation: DTCO 1381.xxx  
 (2) Approval mark: TÜV 03 ATEX 2324X  
 II 3(2)G EEx nA [Ib] IIC T6 CE0032

TD00.1381.00 132 102

## KITAS 2171 pulse generator

KITAS 2171.20  
KITAS 2171.50  
KITAS 2171.0x

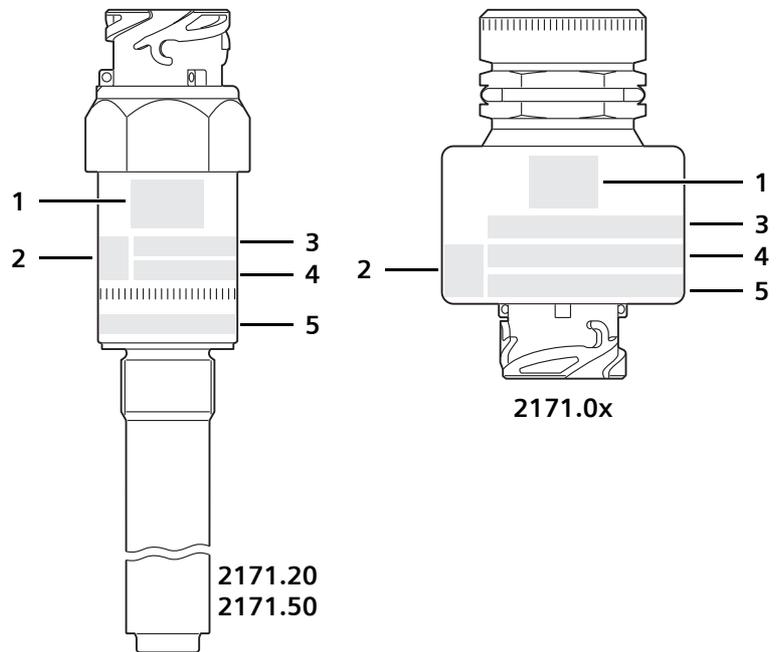


Fig. 6 - 4: KITAS 2171 pulse generator

- (1) EMC type approval  
e1-033434
- (2) EEC design approval  
e1-175
- (3) Manufacturer:  
Siemens VDO Automotive AG Villingen
- (4) Approval mark:  
ⓈII2G EEx ib IIC T4 Ⓒ0032 TÜV 02 ATEX 1842X
- (5) KITAS model designation, production date:  
2171.xx xxxx YYM / 2171.xx xxxx YYM

## 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 "Requirements for the connection of external devices" on page 5 are to be considered.

TD00.1381.00 132.102



#### 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 Power supply DTCO 1381 (ADR variant)

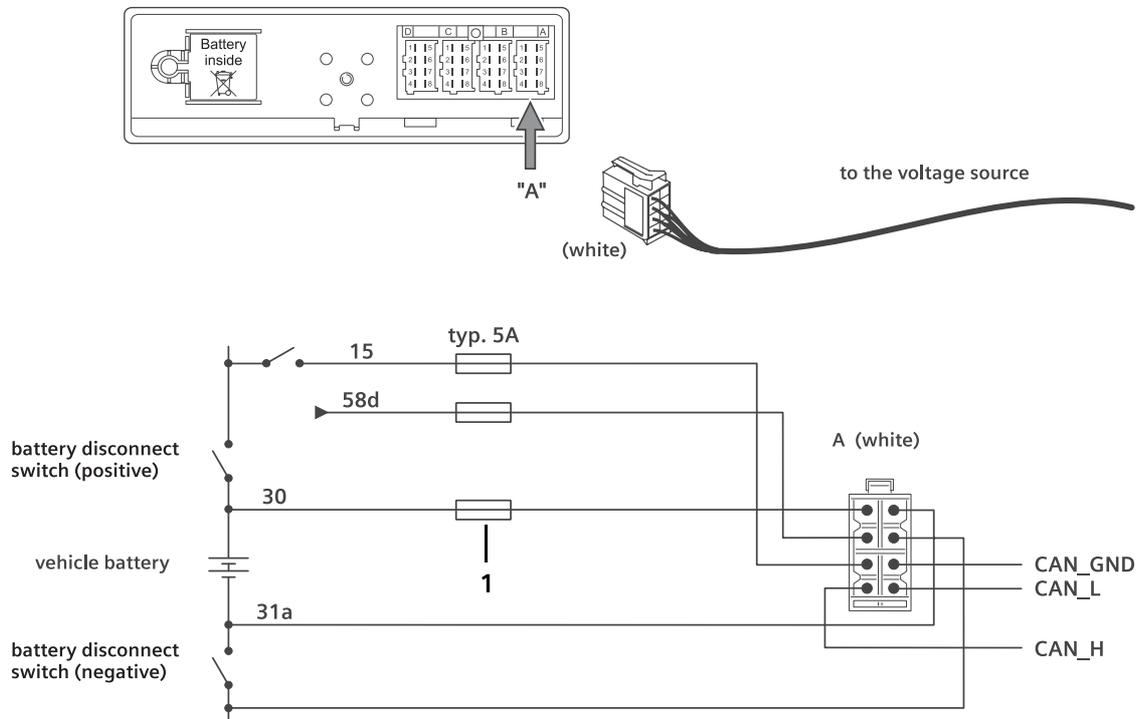


Fig. 6 - 5: Power supply attachment diagram DTCO 1381 (ADR variant)

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.



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 2-5.

6.2.3 KITAS 2171 intrinsically safe circuitry

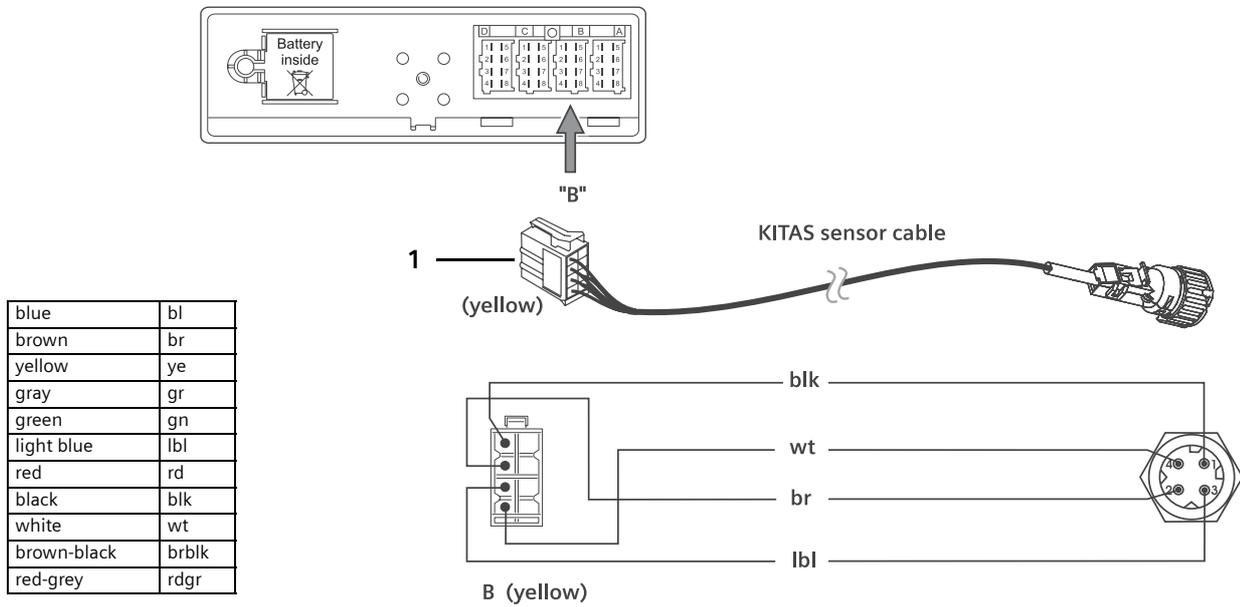


Fig. 6 - 6: KITAS 2171 intrinsically safe circuitry

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

TD00.1381.00 132 102

## 6.3 DTCO 1381 (ADR variant) EC type-examination certificate



**Translation**

(1) **EC-TYPE EXAMINATION CERTIFICATE**

(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

(3) EC-Type Examination Certificate Number



**TÜV 03 ATEX 2324 X**

(4) Equipment: Digital Tachograph type DTCO 1381.x

(5) Manufacturer: Siemens VDO Automotive AG

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

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 04YEX551131.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 50 014: 1997+A1+A2    EN 50 020: 2002    EN 50 021: 1999**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:



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

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

  
Head of the  
Certification Body

Hanover, 2004-11-02



**TÜV NORD CERT**

This certificate may only be reproduced without any change, schedule included.  
Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH & Co. KG

page 1/3

TD00.1381.00.132.102

Fig. 6 - 7: DTCO 1381 (ADR variant) EC type-examination certificate, page 1



(13)

**SCHEDULE**(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 03 ATEX 2324 X**

(15) Description of equipment

Together with the motion sensor type KITAS 2171.xx the Digital Tachograph type DTCO 1381.x is used for the supervision of vehicles transporting combustible liquids or gases.

The Digital Tachograph type DTCO 1381.x is installed according to the intended use in the driving cab of a motor vehicle. The driving cab may be considered an explosion hazardous areas that requires apparatus of the category 3.

The Digital Tachograph type DTCO 1381.x is also an associated electrical apparatus with intrinsically safe circuits.

The explosion protection of the Digital Tachograph type DTCO 1381.x is ensured when the vehicle comes to standstill and the battery master switch is opened.

The permissible ambient temperature range is  $-25^{\circ}\text{C} \dots 70^{\circ}\text{C}$ .

Electrical data

Supply circuit ..... permanent supply from the vehicle battery  
(Connections A1[30] and A5[31a] at the plug connector)  $U_n = 24 \text{ V}$

Ignition system ..... supply via the battery master switch and  
(Connections A2[58d], A3[15], and A6[31] at the plug connector)  $U_n = 24 \text{ V}$

Remainders data and signal circuits ..... electrical data according to the manufacturers specifications

Supply and signal circuits ..... in type of protection Intrinsic Safety EEx ib IIC  
(Connections B1, B2, B3 and B4 at the plug connector) maximum values:  
 $U_o = 9,7 \text{ V}$   
 $I_o = 36 \text{ mA}$   
 $P_o = 320 \text{ mW}$   
characteristic line: trapezoidal

only for connection to the motion sensor type KITAS 2171.xx according to EC-Type Examination Certificate TÜV 02 ATEX 1842 X  
For the interconnection a cable length of 20 m is permissible.

The intrinsically safe circuits are galvanically connected with the non intrinsically safe circuits.

DA-2011-23

page 2/3

TD00.1381.00 132 102

Fig. 6 - 8: DTCO 1381 (ADR variant) EC type-examination certificate, page 2



Schedule EC-Type Examination Certificate N° TÜV 03 ATEX 2324 X

---

(16) Test documents are listed in the test report no. 04 YEX 551131.

(17) Special conditions for safe use

1. The permissible ambient temperature range has to be taken from this EC-Type Examination Certificate resp. the manual of the manufacturer.
2. The Digital Tachograph type DTCO 1381.x is only allowed to be installed into the designated radio panel at any place in the driving cab of a vehicle
3. The connecting and disconnecting as well as the switching of circuits under voltage, is only permitted during installation, for maintenance or for repair purposes.
4. The operation of the Digital Tachograph type DTCO 1381.x with closed battery master switch is not allowed if explosion hazardous atmosphere exists.

(18) Essential Health and Safety Requirements

no additional ones

page 3/3

TD00.1381.00 132 102

Fig. 6 - 9: DTCO 1381 (ADR variant) EC type-examination certificate, page 3



**Translation**  
**1. SUPPLEMENT to**

**EC-TYPE EXAMINATION CERTIFICATE No. TÜV 03 ATEX 2324 X**

Manufacturer: Siemens VDO Automotive AG  
Address: Heinrich-Hertz-Straße 45  
D-78052 Villingen-Schwenningen

In the future, the Digital Tachograph type DTCO 1381.1x may also be manufactured according to the test documents listed in the test report.

The changes refer to the power supply of the printer module via connection 15 as well as the component assembly of the printed circuit board.

The new type designation of the Digital Tachograph reads DTCO 1381.2x.

The electrical data as well as all other details and the "Special conditions for safe use" remain unchanged for the Digital Tachograph type DTCO 1381.2x according to this 1. supplement.

(16) The test documents are listed in the test report N° 05 YEX 551881.

(17) Special conditions for safe use  
no changes

(18) Essential Health and Safety Requirements  
no additional ones

TÜV NORD CERT GmbH & Co. KG  
Am TÜV 1  
D-30519 Hannover  
Tel.: +49 511 986-1470  
Fax: +49 511 986-1590

Hannover, 2005-03-17

Head of the  
Certification Body

BA 02 01 05 1.000.000

page 1/1

TD00.1381.00 132 102

Fig. 6 - 10: DTCO 1381 (ADR variant) EC type-examination certificate, page 4

## 6.4 KITAS 2171 EC type-examination certificate



### Translation

#### 2. SUPPLEMENT to

#### EC TYPE-EXAMINATION CERTIFICATE No. TÜV 02 ATEX 1842 X

of the company Siemens VDO Automotive AG  
Heinrich-Hertz-Straße 45  
D-78052 Villingen-Schwenningen

In the future, the EC-Type Examination Certificate TÜV 02 ATEX 1842 X is also valid for the motion sensor type KITAS 2171.xx .

The modifications refer to the parameters of the integrated microcontroller.  
No modifications were carried out regarding the construction of the device.

The motion sensor type KITAS 2171.xx may also be connected to the intrinsically safe circuits of the EC-recording equipment

- type MTCO 1324 or
- type DTCO 1381 .

The motion sensors according to EC-Type Examination Certificate TÜV 02 ATEX 1842 X incl. of the supplements also meet the requirements of  
EN 50 020:2002 .

All other details remain unchanged for this 2. supplement.

The test documents are listed in the test report no. 04YEX551242.

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

Hanover, 2004-05-03

  
Head of the  
Certification Body

Fig. 6 - 11: KITAS 2171 EC type-examination certificate



TD00.1381.00 132 102

TD00.1381.00 132 102

## ***Chapter 7***

---

# ***Preprogramming***

---

**Table of contents**

---

**Chapter 7 Preprogramming**

<b>7.1</b>	<b>General instructions .....</b>	<b>7-3</b>
7.1.1	Delivery condition of the DTCO 1381 .....	7-3
<b>7.2</b>	<b>Testing equipment .....</b>	<b>7-4</b>
<b>7.3</b>	<b>Performing the preprogramming .....</b>	<b>7-5</b>
7.3.1	Legally stipulated parameters .....	7-5
7.3.2	Device-specific parameters .....	7-6
7.3.3	Other parameters .....	7-6
7.3.4	Entering parameters .....	7-7

## 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. Part of the first calibration is, to enter the vehicle registration number.

### 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	????????????????
Vehicle registration number	????????????
Characteristic coefficient (w-value) [p/km]	8000
Recording equipment constant (k-value) <sup>1)</sup> [p/km]	8000
Effective wheel circumference [mm]	0000
Tire size	????????????
Legally permitted maximum speed [km/h]	0
UTC time <sup>2)</sup>	hh:mm
Odometer reading [km]	0000000
Calibration date <sup>1)</sup>	00.00.00

<sup>1)</sup> The DTCO 1381 sets this data automatically.

<sup>2)</sup> 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 appropriate test equipment; for example, the Siemens VDO SDS test devices MTC 1602.04 or ATC 1601.26.

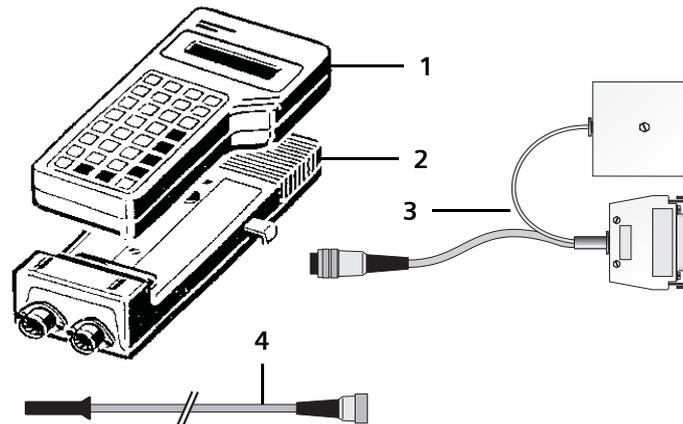


Fig. 7 - 1: Siemens VDO SDS test devices MTC 1602.04 / ATC 1601.26

For the preprogramming with the Siemens VDO SDS test devices the following testing equipment must be available:

- (1) **BTC test software, version DTCO 1381 or higher**
- (2) **Mount (MTC/ATC) with firmware version DTCO 1381**
- (3) **Programming cable**
- (4) **Diagnosis cable DTCO 1381**

**DTCO 1381 testing and programming software**  
(without figure)

---

## 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 number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* 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)
- etc.



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



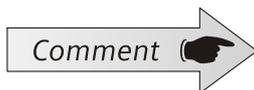
Please refer to the test device instructions for information on how to enter the calibration parameters.

#### Legally stipulated parameters

The following parameters are legally stipulated and must be programmed:

- Vehicle identification number
- Vehicle registration number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* 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
- 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***

**Table of contents**

---

**Chapter 8 Installation and functional test**

<b>8.1</b>	<b>General instructions .....</b>	<b>8-3</b>
8.1.1	Installation and functional test .....	8-4
<b>8.2</b>	<b>Permissible error limits .....</b>	<b>8-5</b>
8.2.1	Creating and sealing installation plate .....	8-6

TD00.1381.00 132 102

---

## 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. Part of the first calibration is, to enter the vehicle registration number.

---

### 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.

---

---

## 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  $\pm 6$  km/h, the following influences must be considered:

- Error limit of  $\pm 2$  km/h for input deviations (such as tire deviations)
- Error limit of  $\pm 1$  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):

- $\pm 1$  km/h



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

---

Accuracy of the speed measurement:

- at least 1 km/h

<b>Time</b>	<p>Permissible time-measurement error limit:</p> <ul style="list-style-type: none"> <li>• <math>\pm 2</math> seconds/day</li> </ul> <p>Accuracy of the time measurement:</p> <ul style="list-style-type: none"> <li>• at least 1 second</li> </ul> <p>The time measurement is accurate to at least 1 second.</p>
-------------	--



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 attached on, in, or directly next to the recording equipment where it will be easily visible.

1. The following information must be transferred to the installation plate:
  - Calibration date
  - Effective wheel circumference (l-value, max. of four digits)
  - Characteristic coefficient (w-value, max. of five digits)
  - Recording equipment constant (k-value, 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. Attach the installation plate on, in, or directly next to the recording equipment where it will be easily visible.
3. Secure the installation plate with sealing foil.



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.

The installation plate must be replaced after every intervention into the system.

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

TD00.1381.00 132 102

# *Chapter 9*

---

## *Activation*

---

**Table of contents**

---

**Chapter 9 Activation**

<b>9.1</b>	<b>General instructions .....</b>	<b>9-3</b>
9.1.1	Terminology definitions .....	9-3
9.1.2	Personnel prerequisites .....	9-4
9.1.3	Legal requirements .....	9-4
9.1.4	Pairing with the KITAS 2171 .....	9-5
9.1.5	Handling the tachograph cards .....	9-6
<b>9.2</b>	<b>Checking the buffer battery .....</b>	<b>9-7</b>
<b>9.3</b>	<b>Performing the activation .....</b>	<b>9-8</b>
9.3.1	Inserting workshop card .....	9-8
	Menu navigation after inserting workshop card .....	9-9
9.3.2	Removing workshop card .....	9-11
	Menu navigation after removing workshop card .....	9-11

---

## 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. Part of the first calibration is, to enter the vehicle registration number.

### 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.
- The device must be activated before the vehicle leaves the location of installation!
- To perform the activation, a workshop card must be inserted, the PIN must be entered, and the workshop card must be positively authenticated.

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!

---



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 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.

## 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>			
<b>A</b>	January	<b>G</b>	July
<b>B</b>	February	<b>H</b>	August
<b>C</b>	March	<b>J</b>	September
<b>D</b>	April	<b>K</b>	October
<b>E</b>	May	<b>L</b>	November
<b>F</b>	June	<b>M</b>	December

<i>YY= Year of production</i>			
<b>04</b>	2004	<b>07</b>	2007
<b>05</b>	2005	<b>08</b>	2008
<b>06</b>	2006	:	:

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 12-4.

TD00.1381.00 132 102

## 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 "B" (1); i.e., the DTCO 1381 has not yet been activated to be EC recording equipment.

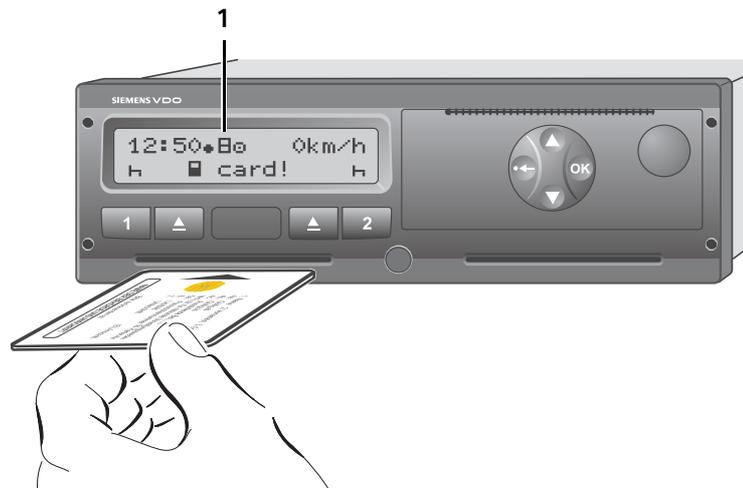


Fig. 9 - 1: Inserting workshop card

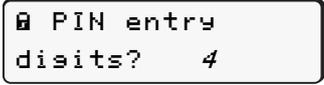
1. Switch ignition on (required only for ADR variant).
2. Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
  - The subsequent procedure is menu-guided.

TD00.1381.00 132 102

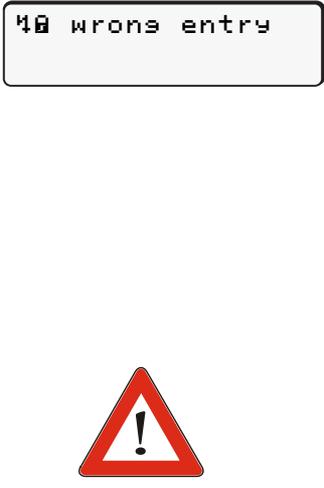
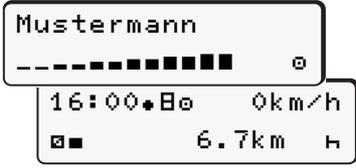
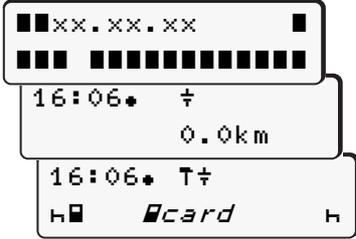
Menu navigation after inserting workshop card



If the workshop card does not contain a preferred language or if the language is not available in the DTCO 1381, the text will appear in the language of the issuing member state, see chapter 3.2.1 "Selecting the text language", page 3-5.

Step / menu display	Explanation / meaning
<p>1</p> 	<p>Greeting text; the set local time (16:00) and the UTC time (14:00) will appear for approximately 3 seconds.</p>
<p>2</p> 	<p>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.</p>
<p>3</p> 	<p>The name of the cardholder appears.</p>
<p>4</p> 	<p><b>Select the number of characters (at least 4, max. 8)</b></p> <ul style="list-style-type: none"> <li>- Select the number of characters with the button ▲ or ▼ and</li> <li>- acknowledge with the button OK.</li> </ul>
<p>5</p>  	<p><b>PIN entry</b></p> <p>"0" 1. character to be entered will blink:</p> <ul style="list-style-type: none"> <li>- Select the first character with the button ▲ or ▼ and</li> <li>- acknowledge with the button OK.</li> </ul> <p>"0" 2. character to be entered will blink:</p> <ul style="list-style-type: none"> <li>- Select the second character with the button ▲ or ▼ and</li> <li>- acknowledge with the button OK.</li> <li>- Follow the same procedure to enter the other characters of the PIN.</li> </ul> <p><b>Correcting an incorrectly entered character or an incorrectly entered number of characters</b></p> <ul style="list-style-type: none"> <li>- Press the button ← to move back to the previous character or to the query for the number of characters,</li> <li>- use the button ▲ or ▼ to select the desired character or number of characters and</li> <li>- acknowledge with the button OK.</li> </ul>

TD00.1381.00 132 102

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

TD00.1381.00 132 102

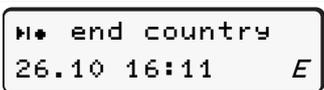
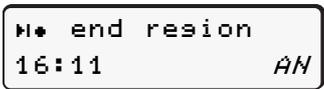
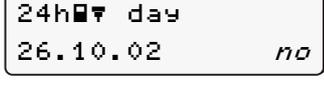
### 9.3.2 Removing workshop card

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".

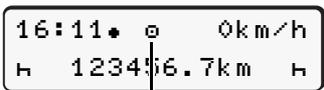


The DTCO 1381 automatically sets the calibration date and the purpose of the calibration (1) when the workshop card is removed. Via the menu functions you can print (printout vehicle "technical data") or display (display vehicle "technical data") the calibration date and the purpose for the calibration.

#### 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   	<b>Enter country at the end of the workday</b> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> Cancel entry of country <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <b>Select region if required</b> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
3 	Continuation of data transfer to workshop card.
4  	<b>Print day value</b> <ul style="list-style-type: none"> <li>– To print the day value, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul>
5 	Continuation of data transfer to workshop card.

TD00.1381.00 132 102

Step / menu display	Explanation / meaning
<p data-bbox="129 315 177 349">6</p>  <p data-bbox="331 443 347 477">1</p>	<p data-bbox="560 315 1375 376">The workshop card is released, the standard display and the operational mode (1) appear.</p>

## ***Chapter 10***

---

### ***First calibration***

---

**Table of contents**


---

**Chapter 10 First calibration**

<b>10.1</b>	<b>General instructions .....</b>	<b>10-3</b>
10.1.1	Terminology definitions .....	10-3
10.1.2	Personnel prerequisites .....	10-4
10.1.3	Technical prerequisites .....	10-4
10.1.4	Handling the tachograph cards .....	10-5
<b>10.2</b>	<b>Calibration instructions .....</b>	<b>10-6</b>
10.2.1	Legal requirements for when to perform a calibration .....	10-6
10.2.2	Access to the calibration functions .....	10-6
10.2.3	Programming the UTC time .....	10-7
10.2.4	Parameter measurements .....	10-7
10.2.5	Checking the KITAS 2171 and the KITAS sensor cable .....	10-8
10.2.6	Pairing with the KITAS 2171 .....	10-9
<b>10.3</b>	<b>Testing equipment .....</b>	<b>10-10</b>
<b>10.4</b>	<b>Checking the buffer battery .....</b>	<b>10-11</b>
<b>10.5</b>	<b>Performing the first calibration .....</b>	<b>10-12</b>
10.5.1	Inserting workshop card .....	10-13
	Menu navigation after inserting workshop card .....	10-14
10.5.2	Legally stipulated parameters .....	10-17
10.5.3	Device-specific parameters .....	10-17
10.5.4	Other parameters .....	10-18
10.5.5	Entering parameters .....	10-18
10.5.6	Removing workshop card .....	10-20
	Menu navigation after removing workshop card .....	10-20
10.5.7	Creating and sealing installation plate .....	10-21

---

## 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. Part of the first calibration is, to enter the vehicle registration number.

---

### 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 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.

---

## 10.2 Calibration instructions

---

The CR (EEC) 3821/85, annex I B, defines the criteria for the calibration of EC recording equipment. Part of the first calibration is, to enter the vehicle registration number.



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 for when to perform a calibration

---

The recording equipment must be calibrated:

- after every installation
- during every regularly inspection



The first calibration must be performed:

- within 14 days after installation (activation) or
- after issuance of the vehicle registration number

whichever occurs first!

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.



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.

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

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



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. Compare the identification data of the KITAS 2171 (serial number) on both printouts.
  - The identification data of the KITAS 2171 (serial number) must be identical on both printouts.



#### 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!

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 appropriate test equipment; for example, the Siemens VDO SDS test devices MTC 1602.04 or ATC 1601.26.

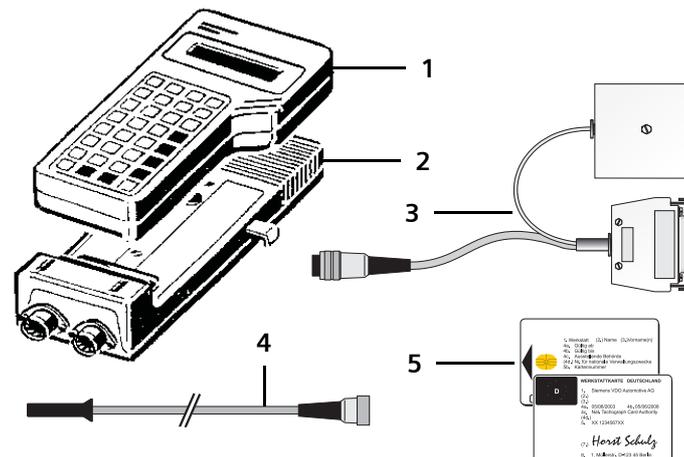


Fig. 10 - 1: Siemens VDO SDS test devices MTC 1602.04 / ATC 1601.26

For the calibration with the Siemens VDO SDS test devices the following testing equipment must be available:

- (1) **BTC test software**, version DTCO 1381 or higher
- (2) **Mount (MTC/ATC)** with firmware version DTCO 1381
- (3) **Programming cable**
- (4) **Diagnosis cable DTCO 1381**

**DTCO 1381 testing and programming software**  
(without figure)

### Authentication

- (5) **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>			
<b>A</b>	January	<b>G</b>	July
<b>B</b>	February	<b>H</b>	August
<b>C</b>	March	<b>J</b>	September
<b>D</b>	April	<b>K</b>	October
<b>E</b>	May	<b>L</b>	November
<b>F</b>	June	<b>M</b>	December

<i>YY= Year of production</i>			
<b>04</b>	2004	<b>07</b>	2007
<b>05</b>	2005	<b>08</b>	2008
<b>06</b>	2006	:	:

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 12-4.

## 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:

- Update or acknowledge all known or operationally necessary and legally required parameters
- Enter vehicle registration number
- Enter registering member state
- Pair DTCO 1381 and KITAS 2171 "manually"
- Check and demonstrate the proper functioning of the EC recording equipment
- Measure display errors
- 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 approval mark of the DTCO 1381
- Check sealing
- Check tire size and effective wheel circumference
- 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", page 9-8.

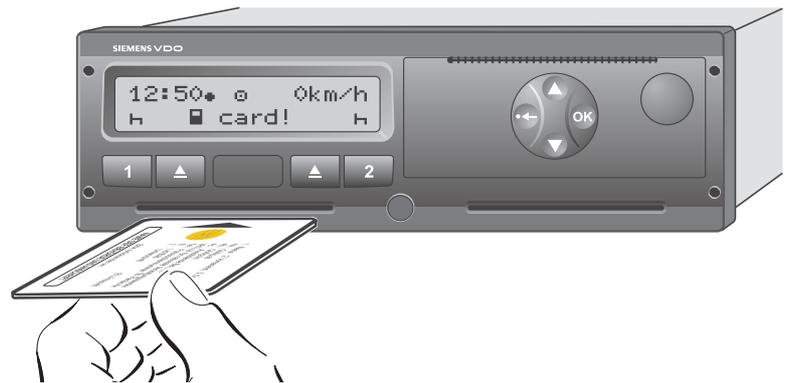


Fig. 10 - 2: Inserting workshop card

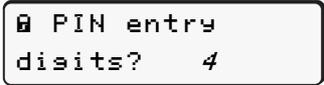
1. Switch ignition on (required only for ADR variant).
2. Eject any tachograph cards that may be already inserted.
3. Insert workshop card into card slot 1 with the chip facing up (after insertion, the card will be automatically locked mechanically).
  - The subsequent procedure is menu-guided.

### Menu navigation after inserting workshop card

Comment



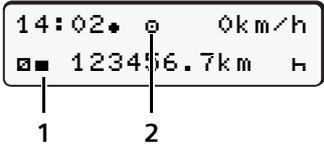
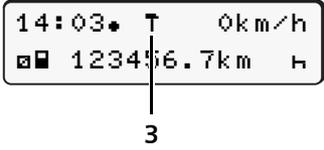
If the workshop card does not contain a preferred language or if the language is not available in the DTCO 1381, the text will appear in the language of the issuing member state, see chapter 3.2.1 "Selecting the text language", page 3-5.

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

TD00.1381.00 132.102

TD00.1381.00.132.102

Step / menu display	Explanation / meaning
<p>6</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">             48 wrong entry!         </div> <div style="text-align: center; margin-top: 20px;">  </div>	<p><b>If incorrect PIN entered</b></p> <ul style="list-style-type: none"> <li>– Acknowledge message with the button  and re-enter the number.</li> </ul> <p><b>Cancel PIN entry</b></p> <ul style="list-style-type: none"> <li>– Press the ejection button  of the card slot in which the workshop card is located.</li> <li>– After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.</li> </ul> <p><b>Attention!</b></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> <div style="border: 1px solid black; padding: 5px; width: fit-content;">             last withdrawal              25.10.02 23:30         </div>	<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> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">             M entry              addition?    no         </div> <div style="text-align: center; margin-top: 20px;">  </div>	<p><b>Manual entry</b></p> <ul style="list-style-type: none"> <li>– To add activities manually, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul> <p><b>Comment</b></p> <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries.</p>
<p>9</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">             •▶ basin country              26.10 14:00 E         </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">             •▶ basin region              14:00 E    AM         </div> <div style="margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;">                 Comment  </div> </div>	<p><b>Enter the country for the beginning or continuation of the workday</b></p> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>Cancel entry of country:</p> <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <p><b>Select region if required</b></p> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>This entry is required only in some countries, but the entry will be requested automatically.</p> <p>The beginning or end of the workday can be entered even without an inserted workshop card or at times other than during insertion or withdrawal of the card.</p>

Step / menu display	Explanation / meaning
<p>10</p>  <p>1 2</p> <p>Comment →</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"> <li>• Calling up menu functions.</li> <li>• Requesting a tachograph card.</li> </ul>
<p>11</p>  <p>3</p>	<p>After the card has been read, the DTCO 1381 switches to the calibration mode (3).</p>

TD00.1381.00 132 102

---

### 10.5.2 Legally stipulated parameters

---

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

- Vehicle identification number
- Vehicle registration number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* *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)
- etc.



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 number
- Vehicle registration number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* 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
- 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.

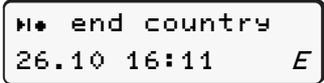
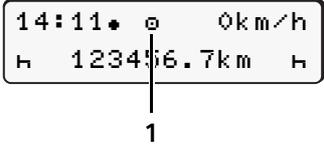
---

---

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   	<b>Enter country at the end of the workday</b> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <b>Cancel entry of country</b> <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <b>Select region if required</b> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
3 	Continuation of data transfer to workshop card.
4  	<b>Print day value</b> <ul style="list-style-type: none"> <li>– To print the day value, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul>
5 	Continuation of data transfer to workshop card.
6 	The workshop card is released, the standard display and the operational mode (1) appear.

TD00.1381.00 132 102

---

### 10.5.7 Creating and sealing installation plate

---

After the first calibration, the installation plate must be attached on, in, or directly next to the recording equipment where it will be easily visible.

1. The following information must be transferred to the installation plate:
  - Calibration date
  - Effective wheel circumference (l-value, max. of four digits)
  - Characteristic coefficient (w-value, max. of five digits)
  - Recording equipment constant (k-value, 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. Attach the installation plate on, in, or directly next to the recording equipment where it will be easily visible.
3. Secure the installation plate with sealing foil.



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.

The installation plate must be replaced after every intervention into the system.

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

---



TD00.1381.00 132 102

## ***Chapter 11***

---

# ***Regularly inspection***

---

**Table of contents**


---

**Chapter 11 Regularly inspection**

<b>11.1</b>	<b>General instructions .....</b>	<b>11-3</b>
11.1.1	Personnel prerequisites .....	11-3
11.1.2	Technical prerequisites .....	11-3
11.1.3	Handling the tachograph cards .....	11-4
11.1.4	Calibration instructions .....	11-5
11.1.5	Legal requirements for when to perform a calibration .....	11-5
11.1.6	Access to the calibration functions .....	11-5
11.1.7	Parameter measurements .....	11-6
11.1.8	Checking the KITAS 2171 and the KITAS sensor cable .....	11-7
11.1.9	Pairing with the KITAS 2171 .....	11-8
<b>11.2</b>	<b>Instructions for the regularly inspection .....</b>	<b>11-9</b>
11.2.1	Legal requirements for when to perform a regularly inspection .....	11-9
<b>11.3</b>	<b>Testing equipment .....</b>	<b>11-10</b>
<b>11.4</b>	<b>Checking the buffer battery .....</b>	<b>11-11</b>
<b>11.5</b>	<b>Performing the regularly inspection .....</b>	<b>11-12</b>
11.5.1	Inserting workshop card .....	11-13
	Menu navigation after inserting workshop card .....	11-14
11.5.2	Legally stipulated parameters .....	11-17
11.5.3	Device-specific parameters .....	11-17
11.5.4	Other parameters .....	11-18
11.5.5	Entering parameters .....	11-18
11.5.6	Removing workshop card .....	11-20
	Menu navigation after removing workshop card .....	11-20
11.5.7	Creating and sealing installation plate .....	11-21

---

## 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 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.

---

## 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 for when to perform a calibration

---

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.

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

3. Check whether the DTCO 1381 displayed or saved any sensor faults.
4. 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.

---

---

### 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. Compare the identification data of the KITAS 2171 (serial number) on both printouts.
  - The identification data of the KITAS 2171 (serial number) must be identical on both printouts.



---

#### 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!

---

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!

## 11.3 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.

### 11.3.1 Legal requirements for when to perform a regularly inspection

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 appropriate test equipment; for example, the Siemens VDO SDS test devices MTC 1602.04 or ATC 1601.26.

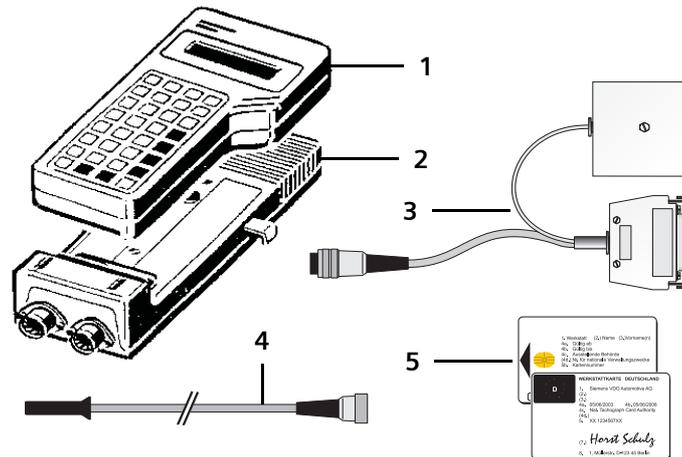


Fig. 11 - 1: Siemens VDO SDS test devices MTC 1602.04 / ATC 1601.26

For the calibration with the Siemens VDO SDS test devices the following testing equipment must be available:

- (1) **BTC test software**, version DTCO 1381 or higher
- (2) **Mount (MTC/ATC)** with firmware version DTCO 1381
- (3) **Programming cable**
- (4) **Diagnosis cable DTCO 1381**

**DTCO 1381 testing and programming software**  
(without figure)

### Authentication

- (5) **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 12-4.

## 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 approval mark of the DTCO 1381
- Check sealing
- Check tire size and effective wheel circumference
- 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.

TD00.1381.00 132 102

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!

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.

### 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", page 9-8.

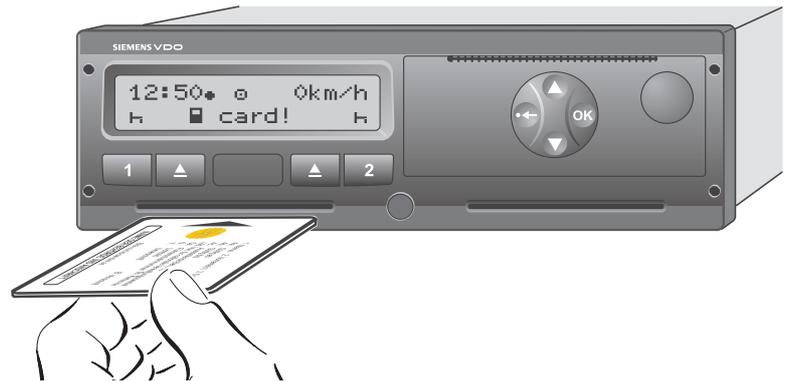


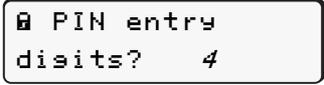
Fig. 11 - 2: Inserting workshop card

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

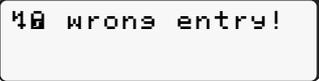
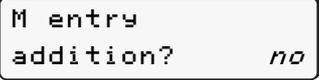
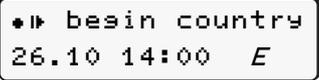


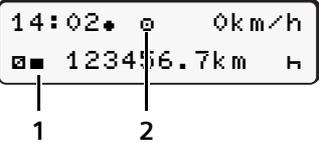
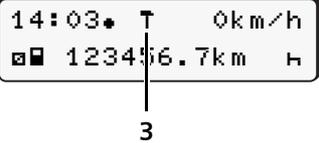
If the workshop card does not contain a preferred language or if the language is not available in the DTCO 1381, the text will appear in the language of the issuing member state, see chapter 3.2.1 "Selecting the text language", page 3-5.

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

TD00.1381.00 132 102

TD00.1381.00.132.102

Step / menu display	Explanation / meaning
<p>6</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">  </div> <div style="text-align: center; margin-bottom: 10px;">  </div>	<p><b>If incorrect PIN entered</b></p> <ul style="list-style-type: none"> <li>– Acknowledge message with the button  and re-enter the number.</li> </ul> <p><b>Cancel PIN entry</b></p> <ul style="list-style-type: none"> <li>– Press the ejection button  of the card slot in which the workshop card is located.</li> <li>– After the card has been released (mechanical unlocking of the card), remove the workshop card from the card slot.</li> </ul> <p><b>Attention!</b></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> <div style="border: 1px solid black; padding: 5px; width: fit-content;">  </div>	<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> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">  </div> <div style="text-align: center; margin-bottom: 10px;">  </div>	<p><b>Manual entry</b></p> <ul style="list-style-type: none"> <li>– To add activities manually, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul> <p><b>Comment</b></p> <p>Please refer to the DTCO 1381 operating instructions for detailed information on making manual entries.</p>
<p>9</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">  </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">  </div> <div style="margin-bottom: 10px;">  </div>	<p><b>Enter the country for the beginning or continuation of the workday</b></p> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>Cancel entry of country:</p> <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <p><b>Select region if required</b></p> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> <p>This entry is required only in some countries, but the entry will be requested automatically.</p> <p>The beginning or end of the workday can be entered even without an inserted workshop card or at times other than during insertion or withdrawal of the card.</p>

Step / menu display	Explanation / meaning
<p>10</p>  <p>1 2</p> <p>Comment </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"> <li>• Calling up menu functions.</li> <li>• Requesting a tachograph card.</li> </ul>
<p>11</p>  <p>3</p>	<p>After the card has been read, the DTCO 1381 switches to the calibration mode (3).</p>

TD00.1381.00 132 102

---

### 11.6.2 Legally stipulated parameters

---

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

- Vehicle identification number
- Vehicle registration number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* *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)
- etc.



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 number
- Country of registration
- Characteristic coefficient (w-value)
- Recording equipment constant (k-value)\*
- Effective wheel circumference
- Tire size
- Legally permitted maximum speed
- Odometer reading
- UTC time
- Calibration date\*

\* 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
- 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.

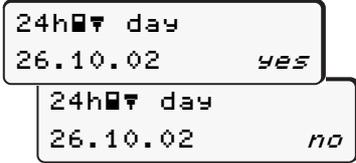
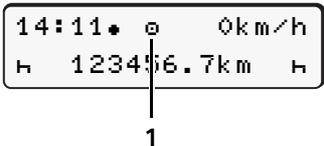
---

---

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 	<b>Enter country at the end of the workday</b> <ul style="list-style-type: none"> <li>– Select the country with the button  or  and</li> <li>– acknowledge with the button .</li> </ul> Cancel entry of country <ul style="list-style-type: none"> <li>– Press the button  to cancel the entry of the country.</li> </ul> <b>Select region if required</b> <ul style="list-style-type: none"> <li>– Select the region with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
3 	Continuation of data transfer to workshop card.
4 	<b>Print day value:</b> <ul style="list-style-type: none"> <li>– To print the day value, select "yes" with the button  or , or select "no" and</li> <li>– acknowledge with the button .</li> </ul>
5 	Continuation of data transfer to workshop card.
6 	The workshop card is released, the standard display and the operational mode (1) appear.

TD00.1381.00 132 102

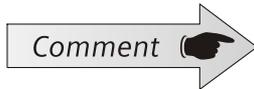
---

### 11.6.7 Creating and sealing installation plate

---

After the first calibration, the installation plate must be attached on, in, or directly next to the recording equipment where it will be easily visible.

1. The following information must be transferred to the installation plate:
  - Calibration date
  - Effective wheel circumference (l-value, max. of four digits)
  - Characteristic coefficient (w-value, max. of five digits)
  - Recording equipment constant (k-value, 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. Attach the installation plate on, in, or directly next to the recording equipment where it will be easily visible.
3. Secure the installation plate with sealing foil.



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.

The installation plate must be replaced after every intervention into the system.

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

---



TD00.1381.00 132 102

## ***Chapter 12***

---

# ***Maintenance and cleaning***

---

**Table of contents**

---

**Chapter 12 Maintenance and cleaning**

<b>12.1 System maintenance .....</b>	<b>12-3</b>
<b>12.2 Buffer battery .....</b>	<b>12-4</b>
12.2.1 Instructions on buffer battery replacement .....	12-4
12.2.2 Disposal instructions .....	12-5
12.2.3 Removing the DTCO 1381 .....	12-6
12.2.4 Replacing the buffer battery .....	12-7
12.2.5 Mounting the DTCO 1381 .....	12-8
<b>12.3 Cleaning .....</b>	<b>12-9</b>
<b>12.4 Disposal .....</b>	<b>12-10</b>

---

## 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 "MYY":

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

<i>YY= Year of production</i>			
<b>04</b>	2004	<b>07</b>	2007
<b>05</b>	2005	<b>08</b>	2008
<b>06</b>	2006	⋮	⋮

TD00.1381.00 132 10Z

**Production date battery**

Only use batteries with a production date which is not more than 8 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>
Vitzrocell Tekcell	YY/MM
XENO Energy	MM/YY



The buffer battery may only be replaced in an authorised workshop by suitably trained personnel.

**12.2.2 Disposal instructions****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

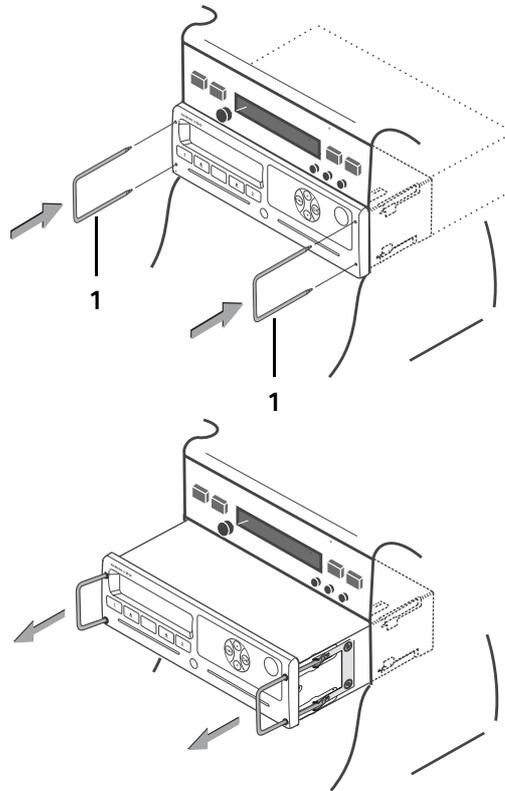


Fig. 12 - 1: Removing the DTCO 1381 from the radio compartment

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.

TD00.1381.00 132 102

### 12.2.4 Replacing the buffer battery



#### Important instructions!

When replacing the battery, only use the approved Siemens VDO Automotive battery (type SB-AA02P, order number HS53.1600.057).

If the DTCO 1381 is not connected to the vehicle's voltage supply when changing the buffer battery, **the device is no longer functional starting from the time of the separation from the battery!**

**When replacing the buffer battery, be absolutely certain that the voltage supply to the DTCO 1381 is not interrupted!**

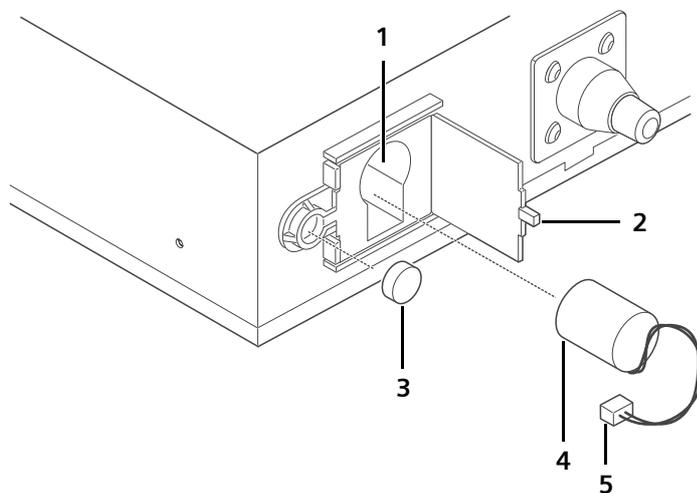


Fig. 12 - 2: Replacing the buffer battery

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

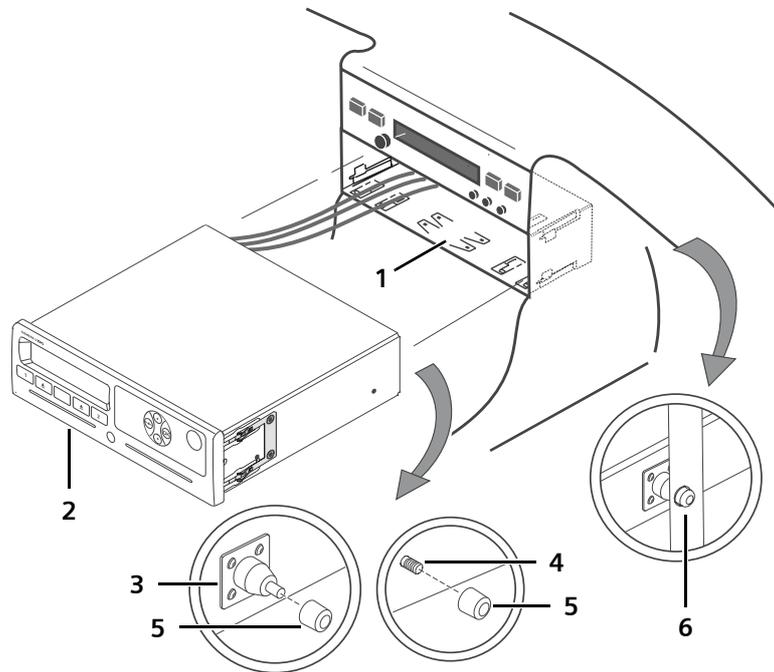


Fig. 12 - 3: Mounting the DTCO 1381 in the radio compartment

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!

---

## 12.3 Cleaning

---

When dirty, use a slightly moistened cloth to clean the housing, the display, and the function keys on the DTCO 1381.



**Please note!**

Do not use solvents such as thinner or naphtha or abrasive cleaning agents because these substances will damage the device.

---

---

---

## 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.**

## ***Chapter 13***

---

### ***Events and faults***

---

**Table of Contents**

---

**Chapter 13 Events and faults**

<b>13.1</b>	<b>General information about messages .....</b>	<b>13-3</b>
13.1.1	Messages shown in the display .....	13-4
	Additional pictograms in the calibration mode ...	13-4
13.1.2	Output of warning messages on the CAN bus ....	13-5
13.1.3	Output of warning messages to info interface ...	13-5
<b>13.2</b>	<b>Displaying the event and fault memory .....</b>	<b>13-6</b>
13.2.1	Driver 1 or driver 2 (inserted tachograph card) ..	13-6
13.2.2	Vehicle (data memory) .....	13-7
<b>13.3</b>	<b>Printing the event and fault memory .....</b>	<b>13-8</b>
13.3.1	Driver 1 or driver 2 (inserted tachograph card) ..	13-8
13.3.2	Vehicle (data memory) .....	13-9
<b>13.4</b>	<b>Messages and troubleshooting measures .....</b>	<b>13-10</b>
13.4.1	Overview of the messages .....	13-11
13.4.2	Operational messages .....	13-14
13.4.3	Work-time warning messages .....	13-19
13.4.4	Fault warning messages .....	13-20
13.4.5	Event warning messages .....	13-27
13.4.6	Security breach warning messages .....	13-32
13.4.7	Other events and faults .....	13-35

---

## 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



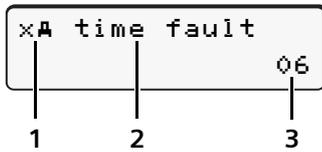
Operational messages and messages about work-time violations are not saved in the DTCO 1381 data memory.

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)



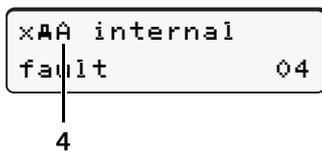
During a warning message, the backlighting of the display is additionally flashing for about 30 seconds or until the warning message will be acknowledged.

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 displayed to the user until the cause has been remedied or is no longer active.

In the calibration mode, some warning messages are displayed with greater detail afforded by additional pictograms.

#### 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.



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.

---

### 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.

---

## 13.2 Displaying the event and fault memory



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 3-4.

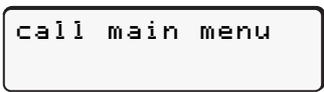
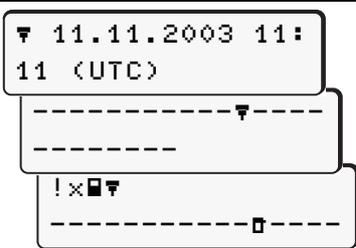
### 13.2.1 Driver 1 or driver 2 (inserted tachograph card)

**Purpose**

In this menu you can display the saved events and faults of an inserted tachograph card.



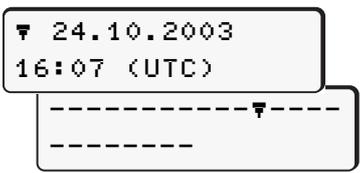
The procedure for driver 2 (tachograph card inserted in card slot 2) is identical to that for driver 1 (tachograph card inserted in card slot 1) and will not be described separately below.

Step / menu display	Explanation / meaning
1 	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 driver 1" with the button  or  and – acknowledge with the button  .
3 	– Select "driver 1 event" with the button  or  and – acknowledge with the button  .
4 	Similar to an event printout, all events and faults saved on the tachograph card will appear. <b>Note</b> 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.

TD00.1381.00 132 10Z

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
<p>1</p> 	<p>Starting from the standard display ...</p> <ul style="list-style-type: none"> <li>- press repetitively the button  until the display "call main menu" appears and</li> <li>- acknowledge with the button .</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>- Press the button .</li> </ul>
<p>2</p> 	<ul style="list-style-type: none"> <li>- Select "display vehicle" with the button  or  and</li> <li>- acknowledge with the button .</li> </ul>
<p>3</p> 	<ul style="list-style-type: none"> <li>- Select "vehicle event" with the button  or  and</li> <li>- acknowledge with the button .</li> </ul>
<p>4</p> 	<p>Similar to an event printout, the saved events and faults will appear.</p>

TD00.1381.00 132 102

## 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 3-4.

### 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 	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 driver 1" with the button  or  and – acknowledge with the button  .
3 	– Select "driver 1 event" with the button  or  and – acknowledge with the button  .
4 	The DTCO 1381 starts the selected printout and displays this for approximately three seconds.

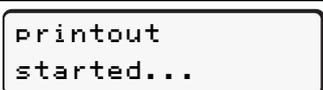
Comment



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 ... <ul style="list-style-type: none"> <li>– press repetitively the button  until the display "call main menu" appears and</li> <li>– acknowledge with the button .</li> </ul> or <ul style="list-style-type: none"> <li>– Press the button .</li> </ul>
2 	<ul style="list-style-type: none"> <li>– Select "printout vehicle" with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
3 	<ul style="list-style-type: none"> <li>– Select "vehicle event" with the button  or  and</li> <li>– acknowledge with the button .</li> </ul>
4 	The DTCO 1381 starts the selected printout and displays this for approximately three 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:

Siemens VDO Automotive AG  
Commercial Vehicles  
OEM-Support  
D-78052 Villingen-Schwenningen

Jürgen Daucher

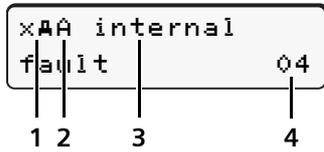
Tel.: +49 (0) 7721 - 67 31 96

Fax: +49 (0) 7721 - 67 27 29

E-Mail: [juergen.daucher@siemens.com](mailto:juergen.daucher@siemens.com)

### 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 diagnosis interfaces (CAN or K-Line) with a test device.

#### Operational messages

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP <sup>1)</sup>	Error text	MC <sup>2)</sup>		
⚠	---	printout not possible	36	0000005B3	➔ page 13-14
⚠	---	printout delayed	37	0000005B3	➔ page 13-15
⚠	---	drawer open	38	0000005B3	➔ page 13-15
⚠	---	no paper	39	800000660	➔ page 13-15
⚠	---	ejection not possible	34	0000005B3	➔ page 13-16
⚠?	---	recording inconsistent	49 67	0000005B3	➔ page 13-16
⚠	---	card error	50 68	0000005B3	➔ page 13-16
⚠	---	wrong card type	51 69	0000005B3	➔ page 13-17
⚠x1	---	card locked	52 70	0000005B3	➔ page 13-17
⚠	---	v-impulses w/o ignition	33	400000900	➔ page 13-17
⚠	---	internal fault	53 71	0000005B3	➔ page 13-18
⚠	---	wrong entry	---	---	➔ page 13-18
⚠	---	please enter	---	---	➔ page 13-18

#### Work-time warning messages

⚠	---	break! 1e04h15	57 75	0000005B3	➔ page 13-19
⚠	---	break! 1e04h30	56 74	0000005B3	➔ page 13-19

<sup>1)</sup> AP = Additional pictogram in calibration mode

<sup>2)</sup> MC = Memory code (position in error memory)

## Fault warning messages

DTCO 1381 display					
Picto.	AP <sup>1)</sup>	Error text	MC <sup>2)</sup>	Error code	Meaning, cause and measures
xA	A	internal fault	01 02 03 05	4000000139	➔ page 13-20
xA	A	internal fault	04	4000000C31	➔ page 13-20
xA	B	internal fault	08	4000000F00	➔ page 13-20
xA	A	internal fault	10	4000003000	➔ page 13-21
xA	E	internal fault	13	4000000A70	➔ page 13-21
xA	E	internal fault	14	4000000B78	➔ page 13-22
xA	D	internal fault	15	8000001177	➔ page 13-23
xA1 xA2	C	internal fault	40 58	4000000400 4000000500	➔ page 13-23
xA	---	time fault	06	8000000800	➔ page 13-24
xA	---	calibration fault	09	8000000D33	➔ page 13-24
x7	---	printer fault	11	4000000700	➔ page 13-25
x0	---	display fault	07	4000001030	➔ page 13-25
x7	---	download fault	12	00000005B2	➔ page 13-25
xL	---	sensor fault	16	8000002508	➔ page 13-25
xM1 xM2	---	card fault	41 59	4000000400 4000000500	➔ page 13-26

## Event warning messages

!7	A	power interruption	31	8000000004	➔ page 13-27
!7	B	power interruption	19	8000002004	➔ page 13-28
!L	A	sensor fault	21	8000002180	➔ page 13-28
!L	B	sensor fault	22	8000002280	➔ page 13-28
!L	C	sensor fault	20	8000002380	➔ page 13-29
!eM	---	drivins without card	28	8000001260	➔ page 13-29
!Me1 !Me2	---	insertion while drivins	46 64	4000000200 4000000300	➔ page 13-29
!ee1 !ee2	---	time overlap	45 63	4000000200 4000000300	➔ page 13-30
!M1 !M2	---	card not valid	48 66	4000000200 4000000300	➔ page 13-30
!MM	---	cards conflict	29	00000005B1	➔ page 13-30
!MA1 !MA2	---	card not closed	44 62	4000000200 4000000300	➔ page 13-31
>>	---	overspeed	30	00000005B1	➔ page 13-31

<sup>1)</sup> AP = Additional pictogram in calibration mode

<sup>2)</sup> MC = Memory code (position in error memory)

Security breach warning messages

DTCO 1381 display					
Picto.	AP <sup>1)</sup>	Error text	MC <sup>2)</sup>	Error code	Meaning, cause and measures
!Ⓜ	Á	security breach	17	8000002452	➔ page 13-32
!Ⓜ	B	security breach	18	8000002452	➔ page 13-32
!Ⓜ	C	security breach	23	8000002452	➔ page 13-33
!Ⓜ	D	security breach	24	8000002452	➔ page 13-33
!Ⓜ	E	security breach	25	00000005B1	➔ page 13-33
!Ⓜ	F	security breach	26	00000005B1	➔ page 13-33
!Ⓜ	G	security breach	27	00000005B1	➔ page 13-34
!Ⓜ !Ⓜ2	H	security breach	43 61	4000000200 4000000300	➔ page 13-34
!Ⓜ !Ⓜ2	I	security breach	42 60	4000000200 4000000300	➔ page 13-34
!Ⓜ !Ⓜ2	---	security breach	47 65	4000000200 4000000300	➔ page 13-34

Other event and fault messages

---	---	---	76	00000001C0	➔ page 13-35
---	---	upgrade module not present	77	00000005B3	➔ page 13-35
---	---	upgrade failed Error #00000003	78	00000005B3	➔ page 13-36
---	---	upgrade failed Error #FFFFFFE	78	00000005B3	➔ page 13-36
---	---	upgrade failed Error #00000001	79	00000005B3	➔ page 13-36
---	---	upgrade failed Error #00000002	79	00000005B3	➔ page 13-36
---	---	upgrade failed Error #00000004	79	00000005B3	➔ page 13-37
---	---	upgrade failed Error #FFFFFFF	79	00000005B3	➔ page 13-37

<sup>1)</sup> AP = Additional pictogram in calibration mode

<sup>2)</sup> MC = Memory code (position in error memory)



Displayed or printed warnings regarding security breaches are broken down with an additional code, see chapter 14.5 "Memory behaviour during events or faults", page 14-30.

TD00.1381.00 132 102

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				
Picto.	Error text	MC	Error code	Meaning, cause and measures
47	Printout not possible	36	0000005B3	<p>Printout (display) of the requested data is currently not possible or an printout in progress is cancelled.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Vehicle is moving</li> <li>• Ignition is switched off (only ADR variant)</li> <li>• Printing head has overheated</li> <li>• Undervoltage or overvoltage</li> <li>• Internal printer interface is occupied by another active process, e.g. communication on k-line diagnosis interface</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>- Repeat process.</li> <li>- 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.</li> <li>- After a long printout, the print head temperature is too high; wait to cool.</li> <li>- Check the voltage supply of the DTCO 1381; correct the following if necessary:                             <ul style="list-style-type: none"> <li>a) Connection plug and cable (pin assignment, poor connection, loose contact).</li> <li>b) Voltage on terminals 30 and 15; within the specified range?</li> <li>c) Voltage behavior on terminals 30 and 15 during starting; within the specified range?</li> </ul> </li> <li>- Wait until the other active process has been completed and the internal printer interface is free once more.</li> </ul> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>

TD00.1381.00 132 102

<i>DTCO 1381 display</i>				
<i>Picto.</i>	<i>Error text</i>	<i>MC</i>	<i>Error code</i>	<i>Meaning, cause and measures</i>
47	Printout delayed	37	00000005B3	<p>A printout will be delayed or cancelled.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Printing head has overheated</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– After a long printout, the print head temperature is too high; wait to cool.</li> </ul> <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>
47	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"> <li>• withdrawing a tachograph card</li> <li>• requesting a printout</li> <li>• during a printout</li> </ul> <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><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Printer drawer is open</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check whether the printer drawer is open and closed if necessary.</li> </ul> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>
47	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><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• No printer paper has been inserted</li> <li>• All printer paper has been used</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check whether there is paper in the printer and insert a new roll if necessary.</li> </ul> <p>After a new roll of printer paper is inserted, it will be automatically marked and the interrupted printout will be continued</p> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>

TD00.1381.00 132 102

DTCO 1381 display				
Picto.	Error text	MC	Error code	Meaning, cause and measures
4E	ejection not possible	34	0000005B3	<p>A tachograph card cannot be ejected; the request is rejected.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Vehicle is moving</li> <li>• Download of data from the requested tachograph card is in progress</li> <li>• Ignition is off (only ADR variant)</li> <li>• The tachograph card is being read or written on</li> <li>• 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).</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check whether the DTCO 1381 detects "drive"; if so, stop the vehicle and repeat the process.</li> <li>– Check whether data is currently being downloaded; if so, repeat the process after the download is finished.</li> <li>– Check whether the ignition is on, turn ignition on if necessary (only ADR variant).</li> <li>– Repeat process.</li> </ul> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p>
4E?1 4E?2	recording inconsistent	49 67	0000005B3	<p>While reading-in a tachograph card, an inconsistency is found in the links within the date data.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check tachograph card.</li> <li>– Analyze data structure.</li> </ul>
4E1 4E2	card error	50 68	0000005B3	<p>The inserted card cannot be read or written to.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Card inserted incorrectly</li> <li>• Card is defective</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check to make sure the tachograph card is valid.</li> <li>– Make sure the tachograph card is correctly inserted and insert properly if needed.</li> <li>– Check tachograph card.</li> <li>– Check if another tachograph card is read correctly.</li> </ul>

TD00.1381.00 132 102

DTCO 1381 display				
Picto.	Error text	MC	Error code	Meaning, cause and measures
	wrong card type	51 69	00000005B3	<p>The inserted card is not a tachograph card.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• The card is not a valid tachograph card</li> <li>• Card is defective</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check to make sure the tachograph card is valid.</li> <li>– Make sure the tachograph card is correctly inserted and insert properly if needed.</li> <li>– Check tachograph card.</li> </ul>
	card locked	52 70	00000005B3	<p>The inserted workshop card is locked.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• The workshop card has been locked after five unsuccessful PIN entries.</li> <li>• Workshop card is defective</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check the workshop card.</li> <li>– Insert a valid (not locked) workshop card.</li> </ul>
	v-impulses w/o ignition	33	4000000900	<p>v-impulses when ignition is switched off.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check whether the DTCO 1381 detects "drive" and stop the vehicle if necessary.</li> <li>– Check KITAS 2171 sensor cable and replace if necessary.</li> <li>– Check the voltage supply of the DTCO 1381; correct the following if necessary: <ul style="list-style-type: none"> <li>a) Connection plug and cable (pin assignment, poor connection, loose contact).</li> <li>b) Voltage on terminal 15; within the specified range?</li> <li>c) Voltage behavior on terminal 15 during starting; within the specified range?</li> </ul> </li> </ul> <p><b>Remark</b></p> <p>This message consists of:</p> <ul style="list-style-type: none"> <li>• Warning message on the display of the DTCO 1381</li> <li>• TCO status output (System Event = SE) on the CAN bus and on the info interface</li> <li>• Signal to output D4 (TCO warning output)</li> </ul>

TD00.1381.00.132.102

DTCO 1381 display				
Picto.	Error text	MC	Error code	Meaning, cause and measures
⚠	internal fault	53 71	00000005B3	<p>Process not possible, tachograph card is not accepted and is ejected.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• The time in the DTCO 1381 is not correct when the tachograph card is inserted.</li> <li>• The DTCO 1381 has detected a generally serious fault in the device.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check UTC time on the DTCO 1381 and use a test device to correct if needed.</li> </ul> <p>If the error message appears repetitively, replace the DTCO 1381.</p>
⚠	wrons entry		---	<p>A wrong PIN for the workshop card has been entered.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Repeat or cancel PIN entry.</li> </ul>
⚠	please enter		---	<p>This request will appear if no entry is made during an entry procedure.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Continue the entry.</li> </ul>

### 13.4.3 Work-time warning messages

The DTCO 1381 warns the driver about excessive driving times.



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
- Signal to output D4 (TCO warning output)

DTCO 1381 display			Error code	Meaning, cause and measures
Picto.	Error text	MC		
401	break! 1004h15 000h15	57	0000005B3	After an uninterrupted driving time of 4 hours 15 minutes, the DTCO 1381 warns of the need for a required break.  <b>Measures</b> – Find a place to stop and pause for the required time.
		75		
401	break! 1004h30 000h15	56	0000005B3	After an uninterrupted driving time of 4 hours 30 minutes, the DTCO 1381 warns of the need for a required break.  <b>Measures</b> – Find a place to stop and pause for the required time.
		74		

TD00.1381.00 132 102

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
- 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 03 05	4000000139	A generally serious fault has appeared in the device.  <b>Measures</b> If the error message appears despite repetitive acknowledgement, replace the DTCO 1381.
xA	A	internal fault	04	4000000C31	A generally serious fault has appeared in the device.  <b>Measures</b> Replace the DTCO 1381.
xA	B	internal fault	08	4000000F00	Fault on the keyboard.  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• One or several keys are stuck or have been pressed for longer than six minutes</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Check keys, release any that are blocked.</li> </ul> If the error cannot be removed and the error message continues to appear, replace the DTCO 1381.

1)  
2)  
1)  
2)  
1)  
2)

TD00.1381.00 132 102

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.  
<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
✖A	Ā	internal fault	10	4000003000	<p>Fault at v-pulse output (B7).</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• The connection cable between the DTCO 1381 and the attached control device is defective.</li> <li>• Attached control device at output "B7" is defective.</li> <li>• Output "B7" on DTCO 1381 is defective.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check whether the attached control device actively monitors the line and deactivate if necessary.</li> <li>– Check output "B7" on DTCO 1381, if necessary deactivate B7 monitoring.</li> <li>– Check the connection cable between the DTCO 1381 and the attached control device: <ul style="list-style-type: none"> <li>a) Short circuit after ground?</li> <li>b) Short circuit after + U<sub>B</sub>?</li> </ul> </li> <li>– Check the connected control device (input).</li> </ul> <p>Replace any defective components.</p>
✖A	E	internal fault	13	4000000A70	<p>Other CAN fault, message of the CAN controller, such as no participant, no acknowledgement, etc.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check the function / configuration of the DTCO 1381, correct if necessary.</li> <li>– Check the power supply (term. 30, 15, and 31) of the CAN participants.</li> <li>– Check the timing behavior of the CAN participants at terminal 15 "on" or "off".</li> <li>– Check bus medium, use a CAN analysis tool if needed.</li> </ul> <p><b>Comment</b></p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> <li>• Monitoring of this fault can be activated or deactivated (CANEVCFg).</li> <li>• The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit).</li> </ul> <p>The DTCO 1381 may not be the cause of the error.</p>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
⚠	E	internal fault	14	4000000B78	<p>CAN fault, message of the CAN controller status "Bus off".</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Faults in the bus medium</li> <li>• Fault in the physical layer</li> <li>• Protocol error</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check the function / configuration of the DTCO 1381, correct if necessary.</li> <li>– Check bus medium, use a CAN analysis tool if needed.</li> <li>– Check the power supply (term. 30, 15, and 31) of the CAN participants.</li> <li>– Check the timing behavior of the CAN participants at terminal 15 "on" or "off".</li> <li>– Check cabling and pin assignment.</li> <li>– Check whether a terminator is missing.</li> <li>– Check whether any CAN participants on the bus have a different baud rate.</li> <li>– Check bit structure.</li> </ul> <p><b>Comment</b></p> <p>Monitoring of this fault depends on the configuration of the DTCO 1381:</p> <ul style="list-style-type: none"> <li>• Monitoring of this fault can be activated or deactivated (CANEVCfg).</li> <li>• The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit).</li> </ul> <p>The DTCO 1381 may not be the cause of the error.</p>

1)  
2)

TD00.1381.00 132 102

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
xA	D	internal fault	15	8000001177	Fault or interruption in the communication with an external display instrument (reset monitoring).  <b>Measures</b> <ul style="list-style-type: none"> <li>– Check the function / configuration of the DTCO 1381, correct if necessary.</li> <li>– Check the connection cable between the DTCO 1381 and the display instrument:               <ul style="list-style-type: none"> <li>a) Pin assignment</li> <li>b) Connection</li> <li>c) Specifications</li> </ul> </li> <li>– Check functionality of the display unit, e.g. send reset-message</li> <li>– Check functionality of the DTCO 1381.</li> <li>– Check calibration data of the DTCO 1381 (variant / configuration).</li> </ul> Replace any defective components if necessary.  <b>Comment</b> Monitoring of this fault depends on the configuration of the DTCO 1381: <ul style="list-style-type: none"> <li>• Monitoring of this fault can be activated or deactivated (CANVCFg).</li> <li>• The fault can be suppressed for a certain period after ignition "on" (ErrorManagementInitialisationInhibit).</li> </ul> The DTCO 1381 may not be the cause of the error.
xA1 xA2	C	internal fault	40 58	4000000400 4000000500	Fault in the card mechanics.  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• Card lock not closed</li> <li>• General error in the card mechanics</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Re-insert tachograph card.</li> <li>– Request the tachograph card again.</li> <li>– Interrupt continuous voltage (perform restart).</li> </ul> If the error message continues to appear despite these measures, replace the DTCO 1381.  <b>Comment</b> Any inserted tachograph card is ejected. This error is reset when a tachograph card has been inserted correctly.

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
⌘A		time fault	06	800000800	<p>The time in the DTCO 1381 is not correct.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>The clock has stopped or is advancing incorrectly.</li> <li>An internal cyclical test has determined that the time is not plausible.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>Check UTC time on the DTCO 1381 and use a test device to correct if needed.</li> <li>Check the "Time" function of the DTCO 1381.</li> </ul> <p>If the error message continues to appear despite these measures, replace the DTCO 1381.</p> <p><b>Comment</b></p> <p>No driver or company cards will be accepted in order to prevent inconsistent data.</p>
⌘A		calibration fault	09	800000D33	<p>Fault in the calibration memory.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>An internal cyclical test of significant calibration parameters has found a check sum error.</li> </ul> <p>Overview of the significant calibration parameters:</p> <ul style="list-style-type: none"> <li>Vehicle identification number</li> <li>Vehicle registration number</li> <li>Characteristic coefficient (w-value)</li> <li>Recording equipment constant (k-value)</li> <li>Effective wheel circumference</li> <li>Tire size</li> <li>Maximum speed</li> <li>UTC time</li> <li>Odometer reading</li> <li>Calibration date</li> </ul> <p><b>Measures</b></p> <p>If the error message appears despite repetitive acknowledgement, replace the DTCO 1381.</p>

1)  
2)1)  
2)

TD00.1381.00 132 102

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
x7		printer fault	11	400000700	Printer fault.  <b>Possible causes</b> <ul style="list-style-type: none"> <li>The printer's supply voltage lies outside of the specified range or has failed.</li> <li>The temperature of the print head is outside the specified range or monitoring supplies values which are not plausible.</li> <li>Fault on the temperature sensor of the print head.</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>Interrupt continuous voltage (perform restart).</li> <li>After a long printout, the print head temperature is too high; wait to cool.</li> </ul> If the error message continues to appear despite these measures and multiple acknowledgements, replace the DTCO 1381.
x0		display fault	07	400001030	Display fault (sometimes no display).  <b>Possible causes</b> <ul style="list-style-type: none"> <li>Data transfer to display controller faulty.</li> <li>Display defective.</li> </ul> <b>Measures</b> If the error message appears repetitively, replace the DTCO 1381.
x3		download fault	12	---	A communication fault has appeared while downloading card or memory data.  <b>Measures</b> <ul style="list-style-type: none"> <li>Repeat download process.</li> <li>Check connection cable to download station and plug (poor connection, loose contact, pin assignment).</li> <li>Check download interface on the DTCO 1381.</li> <li>Check download station.</li> </ul> Replace any defective components.
x1		sensor fault	16	800002508	Internal sensor fault; the KITAS 2171 motion sensor announces an internal fault after a self-test.  <b>Measures</b> <ul style="list-style-type: none"> <li>Check KITAS 2171.</li> </ul> Replace KITAS 2171 if necessary.

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
✖1 ✖2		card fault	41 59	4000000400 4000000500	<p>Communication fault with inserted tachograph cards. A communication fault has appeared during reading or writing of card data.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check the tachograph card's contact points.</li> <li>– Check tachograph card.</li> <li>– Check DTCO 1381.</li> </ul> <p>Replace any defective components.</p> <p><b>Comment</b></p> <p>The inserted tachograph card will be ejected.</p>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

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
- 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.

TD00.1381.00 132 102

DTCO 1381 display				Error code	Meaning, cause and measures
Picto.	AP	Error text	MC		
!†	A	POWER interruption	31	8000000004	The operational voltage of the DTCO 1381 was outside of the specification. <span style="float: right;">2)</span>  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• Overvoltage</li> <li>• Undervoltage</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Check the voltage supply of the DTCO 1381; correct the following if necessary:                             <ol style="list-style-type: none"> <li>a) Connection plug and cable (pin assignment, poor connection, loose contact).</li> <li>b) Voltage on terminals 30 and 15; within the specified range?</li> <li>c) Voltage behavior on terminals 30 and 15 during starting; within the specified range?</li> </ol> </li> <li>– Check functionality of the DTCO 1381.</li> </ul> Replace any defective components.

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!†	B	power interruption	19	800002004	<p>The motion sensor's voltage supply was interrupted. <span style="float: right;">2)</span></p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check KITAS 2171 sensor cable and correct the following if necessary:               <ol style="list-style-type: none"> <li>a) Pin assignment</li> <li>b) Connection (imperfect contact)</li> <li>c) Specifications</li> </ol> </li> <li>– Check voltage behavior on terminals 30 and 15 during starting; within the specified range?</li> <li>– Check KITAS 2171.</li> <li>– Check DTCO 1381 (input B3).</li> </ul> <p>Replace any defective components.</p>
!n	A	sensor fault	21	800002180	<p>Error during sensor communication. <span style="float: right;">1)</span></p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• No real-time signal</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check KITAS 2171 sensor cable and correct the following if necessary:               <ol style="list-style-type: none"> <li>a) Pin assignment</li> <li>b) Connection (imperfect contact)</li> <li>c) Specifications</li> </ol> </li> <li>– Check KITAS 2171.</li> <li>– Check DTCO 1381 (input B3).</li> </ul> <p>Replace any defective components.</p>
!n	B	sensor fault	22	800002280	<p>Error during sensor communication. <span style="float: right;">1)</span></p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Difference of the motion sensor impulses</li> <li>• Transmission error</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check KITAS 2171 sensor cable and correct the following if necessary:               <ol style="list-style-type: none"> <li>a) Pin assignment</li> <li>b) Connection (imperfect contact)</li> <li>c) Specifications</li> </ol> </li> <li>– Check KITAS 2171.</li> <li>– Check DTCO 1381.</li> </ul> <p>Replace any defective components.</p>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!II	C	sensor fault	20	8000002380	Error during sensor communication.  <b>Possible causes</b> <ul style="list-style-type: none"> <li>No data signal (B4)</li> <li>KITAS 2171 not paired with the DTCO 1381</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>Check KITAS 2171 sensor cable and correct the following if necessary:               <ol style="list-style-type: none"> <li>Pin assignment</li> <li>Connection (imperfect contact)</li> <li>Specifications</li> </ol> </li> <li>Check KITAS 2171.</li> <li>Check DTCO 1381 (input B4).</li> <li>Use a test device to pair the KITAS 2171 with the DTCO 1381.</li> </ul> Replace any defective components.
!oI		drivins without card	28	8000001260	Driving without or without valid driver or workshop card in card slot 1 or driving with an invalid card combination in card slot 1 and 2.  <b>Measures</b> <ul style="list-style-type: none"> <li>Check whether a valid driver or workshop card is in card slot 1 and insert a valid card if necessary.</li> <li>Check whether a company card or control card is inserted in the card slot and eject the card if necessary.</li> </ul>
!o1 !o2		insertion while drivins	46 64	4000000200 4000000300	A tachograph card was inserted after driving had commenced.  <b>Possible causes</b> <ul style="list-style-type: none"> <li>Motion sensor impulses detected before correct reading-in of a tachograph card</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>In general, insert tachograph cards only when the vehicle is motionless.</li> </ul> No steps must be taken.

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!001 !002		time overlap	45 63	4000000200 4000000300	<p>Negative time difference relative to last vehicle (EC recording equipment).</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>The removal time saved on the card is later than the current system time (time when 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.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>Check UTC time on the DTCO 1381 and use a test device to correct if needed.</li> <li>Check UTC time on the previous EC recording equipment and use a test device to correct if needed.</li> </ul>
!01 !02		card not valid	48 66	4000000200 4000000300	<p>The inserted tachograph card has expired or is invalid.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>An invalid or expired tachograph card <b>(a)</b> is inserted.</li> <li>During a day change-over <b>(b)</b> it was determined that an inserted tachograph card is no longer valid.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>Check tachograph card.</li> </ul> <p><b>Comment</b></p> <p><b>a)</b> 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>b)</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>
!00		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><b>Measures</b></p> <ul style="list-style-type: none"> <li>Check the combination of the inserted tachograph cards.</li> <li>Invalid card combination, see chapter 1.4.1 "Valid combinations of tachograph cards", page 1-16.</li> </ul>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!A1 !A2		card not closed	44 62	400000200 400000300	<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><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check tachograph card.</li> <li>– Check previous EC recording equipment.</li> </ul> <p><b>Comment</b></p> <p>The source of the error is not located in the current DTCO 1381.</p>
>>		overspeed	30	0000005B1	<p>The programmed maximum speed was exceeded for longer than 60 seconds.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Reduce speed.</li> </ul>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

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
- 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 14.5 "Memory behaviour during events or faults", page 14-30.

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. <span style="float: right;">2)</span>  <b>Measures</b> – 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. <span style="float: right;">2)</span>  <b>Measures</b> – Check KITAS 2171. – Use a test device to pair the KITAS 2171 with the DTCO 1381. Replace KITAS 2171 if necessary.

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

TD00.1381.00 132.102

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!A	C	security breach	23	8000002452	<p>Error during authentication of the motion sensor during operation or error during the pairing procedure.</p> <p><b>Possible causes</b></p> <ul style="list-style-type: none"> <li>• Error during authentication of the motion sensor during operation</li> <li>• 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.</li> </ul> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– As necessary, eject the workshop card and re-insert; repeat coupling.</li> <li>– Check KITAS 2171 sensor cable.</li> <li>– Check KITAS 2171.</li> <li>– Check DTCO 1381 (input B4).</li> <li>– Use a test device to pair the KITAS 2171 with the DTCO 1381.</li> </ul> <p>Replace any defective components.</p>
!A	D	security breach	24	8000002452	<p>Unknown serial number; Error during comparison of the serial numbers of the motion sensor.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check sealing of the KITAS 2171 to the transmission.</li> <li>– Check KITAS 2171.</li> <li>– Check DTCO 1381.</li> <li>– Use a test device to pair the KITAS 2171 with the DTCO 1381.</li> </ul> <p>Replace any defective components.</p>
!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><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check DTCO 1381.</li> </ul> <p>If the error message appears repetitively, replace the DTCO 1381.</p>
!A	F	security breach	26	00000005B1	<p>The DTCO 1381 housing was or is opened.</p> <p><b>Measures</b></p> <ul style="list-style-type: none"> <li>– Check sealing (housing) of the DTCO 1381.</li> <li>– Check DTCO 1381.</li> </ul> <p>If the error message appears repetitively, replace the DTCO 1381.</p>

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
!G	G	security breach	27	00000005B1	Invalid signals on the calibration interface. The interface is blocked and additional signals will be ignored until the entry of a PIN number is requested (workshop card is inserted).  <b>Measures</b> – Check the communication routines. – Check test and programming cables. – Check test device. – Eject workshop card and re-insert. – Repeat process. Replace any defective components.
!G1 !G2	H	security breach	43 61	4000000200 4000000300	Card missing; the DTCO 1381 no longer detects an inserted card.  <b>Possible causes</b> • 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.  <b>Measures</b> – 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.
!G1 !G2	I	security breach	42 60	4000000200 4000000300	Authenticity of the data is not ensured.  <b>Possible causes</b> • Error during inspection of the data's authenticity  <b>Measures</b> – Check tachograph card.  <b>Comment</b> – Tachograph card is ejected.
!G1 !G2	I	security breach	47 65	4000000200 4000000300	Security breach during authentication of a tachograph card.  <b>Possible causes</b> • Error during inspection of a tachograph card's identity.  <b>Measures</b> – Check tachograph card. – Check workshop card, enter correct PIN.

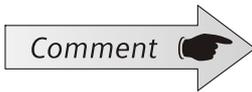
TD00:1381.00 132 102

<sup>1)</sup> These warning messages will be displayed repetitively every hour until the cause is withdrawn.

<sup>2)</sup> These warning messages are not saved in the date memory during calibration mode.

13.4.7 Other events and faults

The DTCO 1381 can also monitor other system functions in addition to the legally required functionality.



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.

The messages in connection with the upgrade of the user software of the DTCO 1381 (Software Upgrade) generally appear in English.



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".

TD00.1381.00.132.102

DTCO 1381 display					
Picto.	AP	Error text	MC	Error code	Meaning, cause and measures
---	---	---	76	00000001C0	Pre-warning on the event "overspeed".  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• Overspeeding.</li> <li>• Faulty configuration.</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Reduce speed.</li> <li>– Check the function / configuration of the DTCO 1381, correct if necessary.</li> </ul> <b>Note</b> <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>
---	---	upgrade module not present	77	00000005B3	The DTCO 1381 is not equipped with a software upgrade module.  <b>Measures</b> <ul style="list-style-type: none"> <li>– No measures necessary.</li> </ul> <b>Note</b> <p>The DTCO 1381 cannot be upgraded.</p>

<sup>1)</sup> 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 #00000003	78	00000005B3	The upgrade file is faulty or damaged; the software upgrade was aborted.  <b>Measures</b> – Check the upgrade file. – Repeat software upgrade with an intact upgrade file.  <b>Note</b> The DTCO 1381 is not the cause of this message.
---	---	upgrade failed Error #FFFFFFE	78	00000005B3	The integrity of the software upgrade module or a security key is not ensured; the software upgrade was aborted.  <b>Measures</b> – Check the DTCO 1381. – Repeat software upgrade.  If the error message continues to appear despite these measures, replace the DTCO 1381.
---	---	upgrade failed Error #00000001	79	00000005B3	The voltage supply of the DTCO 1381 was outside of the specified range during the software upgrade; the software upgrade was aborted.  <b>Measures</b> – Check the voltage supply of the DTCO 1381; correct the following if necessary: 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.  If the error message continues to appear despite these measures, replace the DTCO 1381.  <b>Note</b> The DTCO 1381 may not be the cause of the error.
---	---	upgrade failed Error #00000002	79	00000005B3	The authentication of the management device has failed; the software upgrade was aborted.  <b>Measures</b> – Check the function of the management device. – Repeat software upgrade.  <b>Note</b> The DTCO 1381 is not the cause of the error.

<sup>1)</sup> 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
---	---	uparade failed Error #00000004	79	00000005B3	Communication error; the software upgrade was aborted. <sup>1)</sup>  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• Software upgrade aborted by user.</li> <li>• Download interface of the DTCO 1381 defective.</li> <li>• Data connection interrupted or data cable defective.</li> <li>• Management device interface disturbed or blocked</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Check download interface of the DTCO 1381.</li> <li>– Check data connection and data cable.</li> <li>– Check the interface and the function of the management device.</li> <li>– Repeat software upgrade.</li> </ul> <b>Note</b> The DTCO 1381 may not be the cause of the error.
---	---	uparade failed Error #FFFFFFFF	79	00000005B3	The software upgrade module could not be started; the software upgrade was aborted. <sup>1)</sup>  <b>Possible causes</b> <ul style="list-style-type: none"> <li>• Internal fault of the DTCO 1381.</li> </ul> <b>Measures</b> <ul style="list-style-type: none"> <li>– Check the DTCO 1381.</li> <li>– Repeat software upgrade.</li> </ul> If the error message continues to appear despite these measures, replace the DTCO 1381.

<sup>1)</sup> For these messages the memory code (MC) is not shown in the display of the DTCO 1381.



TD00.1381.00 132 102

# *Chapter 14*

---

## *Appendix*

---

**Table of Contents**

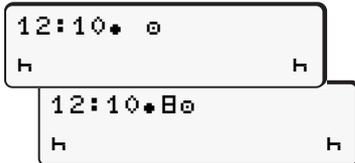

---

**Chapter 14 Appendix**

<b>14.1</b>	<b>Operating conditions of the DTCO 1381 .....</b>	<b>14-3</b>
14.1.1	Standby (Power Safe Mode) .....	14-3
14.1.2	Undervoltage (Safe Prepare Mode) .....	14-4
14.1.3	Overvoltage .....	14-5
14.1.4	Power interruption (Safe Mode) .....	14-6
14.1.5	Emergency run after self-test .....	14-7
<b>14.2</b>	<b>Pictograms and pictogram combinations .....</b>	<b>14-8</b>
14.2.1	Individual pictograms .....	14-8
14.2.2	Pictogram combinations .....	14-9
14.2.3	Country symbols .....	14-11
<b>14.3</b>	<b>Printout examples .....</b>	<b>14-12</b>
14.3.1	Daily printout, driver card activities .....	14-12
14.3.2	Saved driver card events / faults .....	14-14
14.3.3	Daily printout, driver activities from DTCO 1381 .....	14-15
14.3.4	Saved DTCO 1381 events / faults .....	14-17
14.3.5	Overspeeding instances .....	14-18
14.3.6	Technical data of DTCO 1381 / vehicle .....	14-19
14.3.7	Speed profiles .....	14-20
14.3.8	Rpm profiles .....	14-21
<b>14.4</b>	<b>Explanation of printout examples .....</b>	<b>14-22</b>
14.4.1	Specification of the data blocks .....	14-22
	Explanation .....	14-22
<b>14.5</b>	<b>Memory behaviour during events or faults .....</b>	<b>14-31</b>

## 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:

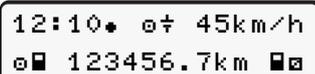
- The DTCO 1381 is in the "Operational" mode, i.e. no workshop, control or company card is inserted.  
or  
The DTCO 1381 is in the production status, i.e. it has not yet been activated.
- The ignition of the vehicle (terminal 15) is switched off.
- A printout has been completed.
- A download procedure has been completed.
- Data communication via the information interface has been completed.
- Data recording 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.

### 14.1.2 Undervoltage (Safe Prepare Mode)



12:10 • 45km/h  
123456.7km

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. 10,0 V (min. 9,4 V; max. 10,2 V)
- 24 V version: typ. 14,0 V (min. 13,4 V; max. 14,6 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. 10,6 V  $\pm$  1 %
- 24 V version: typ. 16,0 V  $\pm$  1 %

If the supply voltage of the DTCO 1381 drops further, the DTCO 1381 switches to the "power interruption" mode.

### 14.1.3 Overvoltage



12:10\* 04 45km/h  
04 123456.7km 04

If the voltage supply of the DTCO 1381 rises above the following maximum value of the specified range, the DTCO 1381 switches to the "overvoltage" mode:

- 12 V version: 17,5 V (min. 16,4 V; max. 18,6 V)
- 24 V version: 35,0 V (min. 33,0 V; max. 37,0 V)

To prevent damage, the internal power supply for the printer 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 (min. 15,9 V; max. 18,1 V)
- 24 V version: 34,0 V (min. 32,1 V; max. 35,9 V)

Afterwards the DTCO 1381 indicates "power interruption".

### 14.1.4 Power interruption (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 "power interruption" mode:

- 12 V version: typ. 6,6 V (min. 6,0 V; max. 7,2 V)
- 24 V version: typ. 7,5 V (min. 6,9 V; max. 8,1 V)



Comment

In the "power interruption" 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.



! power  
interruption 31

If the supply voltage of the DTCO 1381 rises once more above the critical value for the operating mode "power interruption", the DTCO 1381 signals "power interruption".



12:10 45km/h  
123456.7km

As soon as the supply voltage of the DTCO 1381 increases to above the following limit value, the DTCO 1381 switches to the "under-voltage" mode:

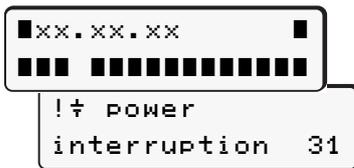
- 12 V version: typ. 7,2 V (min. 6,6 V; max. 7,8 V)
- 24 V version: typ. 8,1 V (min. 7,5 V; max. 8,7 V)



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. 10,6 V  $\pm$  1 %
- 24 V version: typ. 16,0 V  $\pm$  1 %



If the supply voltage of the DTCO 1381 drops further below the reset threshold (5,3 - 5,5 V), the DTCO 1381 switches off.

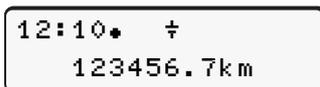
As soon as the supply voltage of the DTCO 1381 rises once more above the limit value (6,0 - 7,2 V), the DTCO 1381 runs a restart procedure. The version of the user software appears for approximately 5 seconds and then the DTCO 1381 indicates "power interruption".

### 14.1.5 Emergency run 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.



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, it switches to the operating mode "emergency run".



In the "emergency run" 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 or removal of the tachograph cards is not possible.

## 14.2 Pictograms and pictogram combinations

### 14.2.1 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	📏	Sensor
🕒	Clock	🚗	Vehicle / Vehicle unit / DTCO 1381
🖨️	Printer / printout	🛞	Tire size
🔌	Entry	⚡	Power supply

Miscellaneous			
!	Event	🔒	Security
✖️	Fault	🚦	Speed
🗨️	Operational note / Work 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	⏳	two weeks
➔	from or until		

## 14.2.2 Pictogram combinations

Miscellaneous			
☐*	Control location	☐☐	Printout driver card
☐+	Start time	☐☐	Printout vehicle / DTCO 1381
+☐	End time	☐☐	Entry vehicle / DTCO 1381
OUT+	Begin out of scope: Recording equipment not required	☐☐	Display driver card
+OUT	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 for two weeks
Printouts			
24h☐☐	Daily driver activities from the driver card	24h☐☐	Daily driver activities from DTCO 1381
!x☐☐	Events and faults from the driver card	!x☐☐	Events and faults from DTCO 1381
>>☐	Overspeeding	%v☐	Speed profiles
T☐☐	Technical data	%n☐	rpm profiles
Display			
24h☐☐	Daily driver activities (day) from the driver card	24h☐☐	Daily driver activities (day) from DTCO 1381
!x☐☐	Events and faults from the driver card	!x☐☐	Events and faults from DTCO 1381
>>☐	Overspeeding	T☐☐	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
!☐	Time adjustment (by workshop)	>☐	Overspeeding control
Faults			
X☐1	Card fault (card slot 1)	X☐	Internal fault DTCO 1381
X☐	Display fault	X☐	Fault during downloading
X☐	Printer fault	X☐	Sensor fault

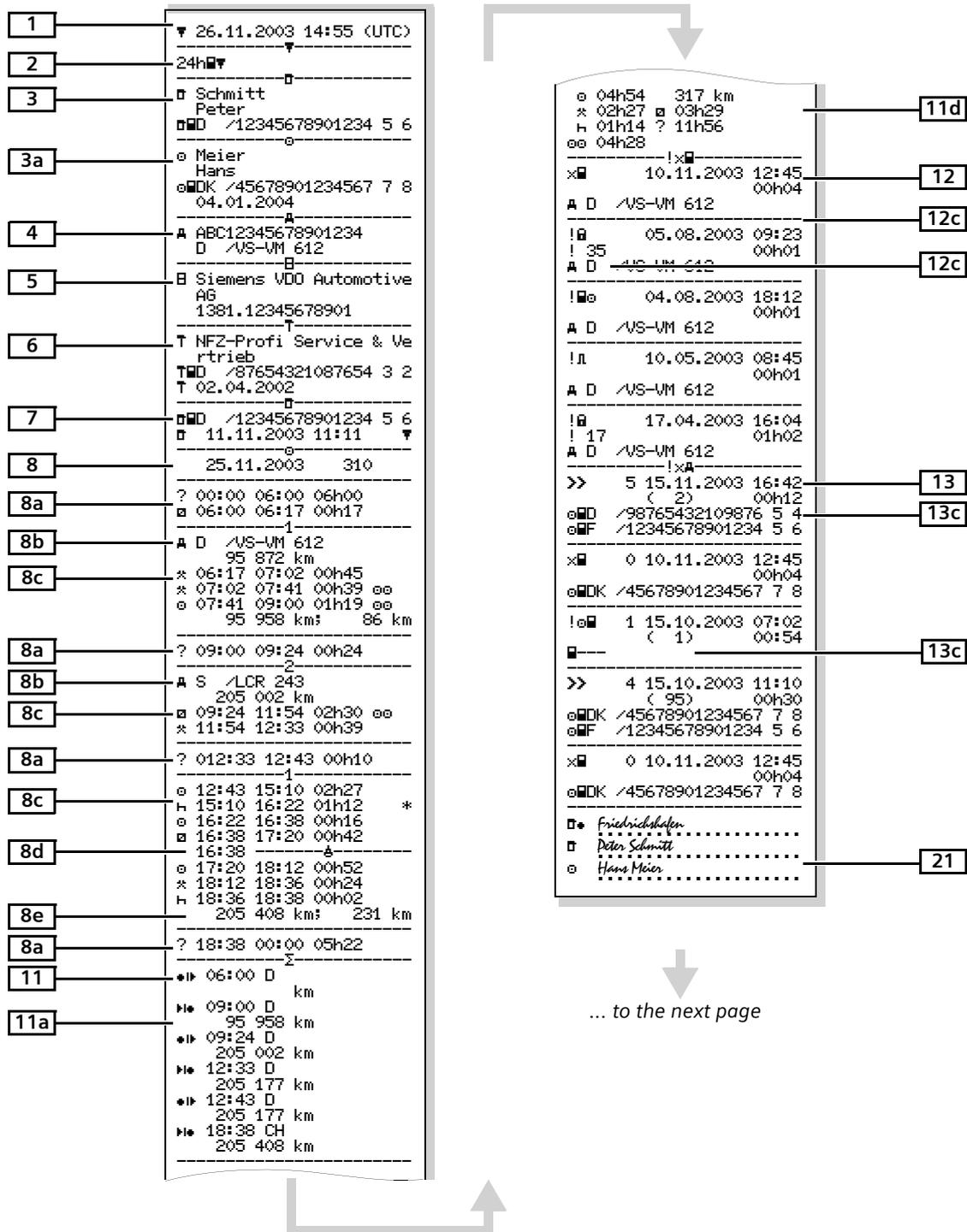
Work time warnings			
	Break ! 04h15		Break ! 04h30
Operational notes			
	Wrong entry		Card defective
	Menu access not possible		Incorrect card
	Please enter		Ejection not possible
	Printout not possible		Process delayed
	Drawer open		Recording inconsistent
	No paper		Internal fault
	Printout delayed		v-impulses without ignition
Manual entry process			
	Begin of work day?		End of work day?
	Entry of location at beginning of work day		Entry of location at end of work day

### 14.2.3 Country symbols

<i>Value assignment</i>			
À	Austria	IS	Iceland
AL	Albania	KZ	Kazachstan
AND	Andorra	L	Luxembourg
ARM	Armenia	LT	Lithuania
AZ	Azerbaijan	LV	Latvia
B	Belgium	M	Malta
BG	Bulgaria	MC	Monaco
BIH	Bosnia and Herzegovina	MD	Republic of Moldavia
BY	Belarus	MK	Macedonia
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	TM	Turkmenistan
FL	Liechtenstein	TR	Turkey
FR	Faroes	UA	Ukraine
GE	Georgia	UK	United Kingdom, Alderney, Guernsey, Jersey, Isle of Man, Gibraltar
GR	Greece		
H	Hungary	UNK	Unknown
HR	Croatia	V	Vatican City
I	Italy	WLD	Rest of the world
IRL	Ireland	YU	Yugoslavia

### 14.3 Printout examples

#### 14.3.1 Daily printout, driver card activities



TD00.1381.00 132.102

Fig. 14 - 1: Printout example: Daily printout, driver card activities, part 1

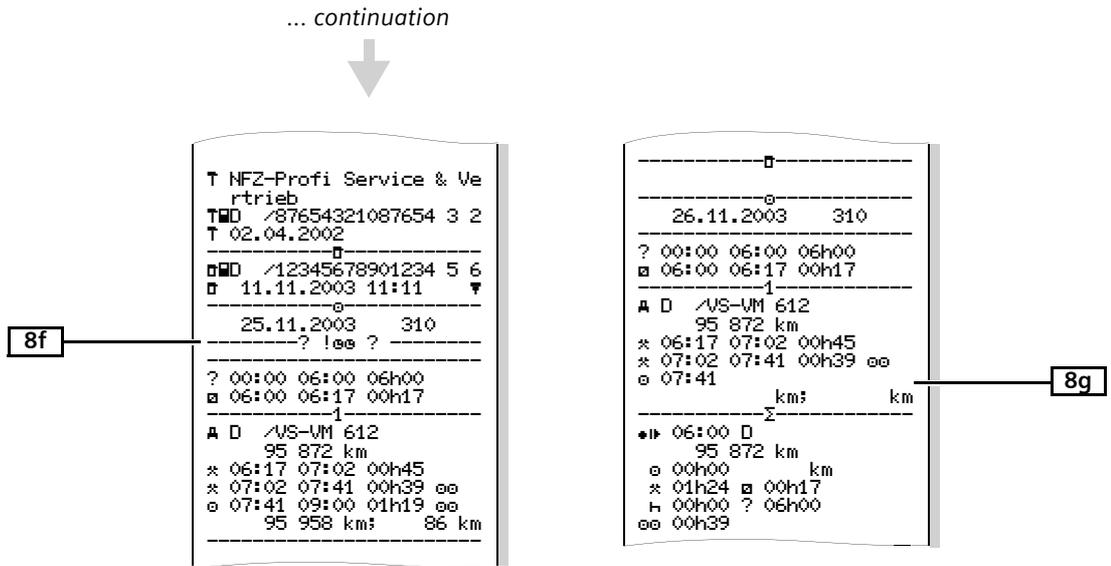


Fig. 14 - 2: Printout example: Daily printout, driver card activities, part 2

TD00.1381.00 132 102

14.3.2 Saved driver card events / faults

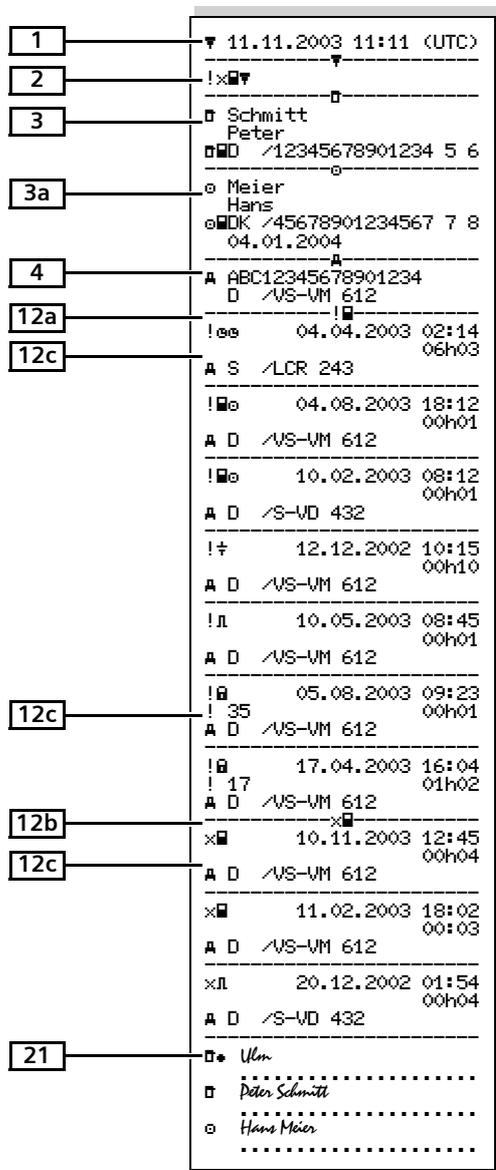


Fig. 14 - 3: Printout example: Saved driver card events / faults

TD00.1381.00 132 102

14.3.3 Daily printout, driver activities from DTCO 1381

TD00.1381.00.132.102

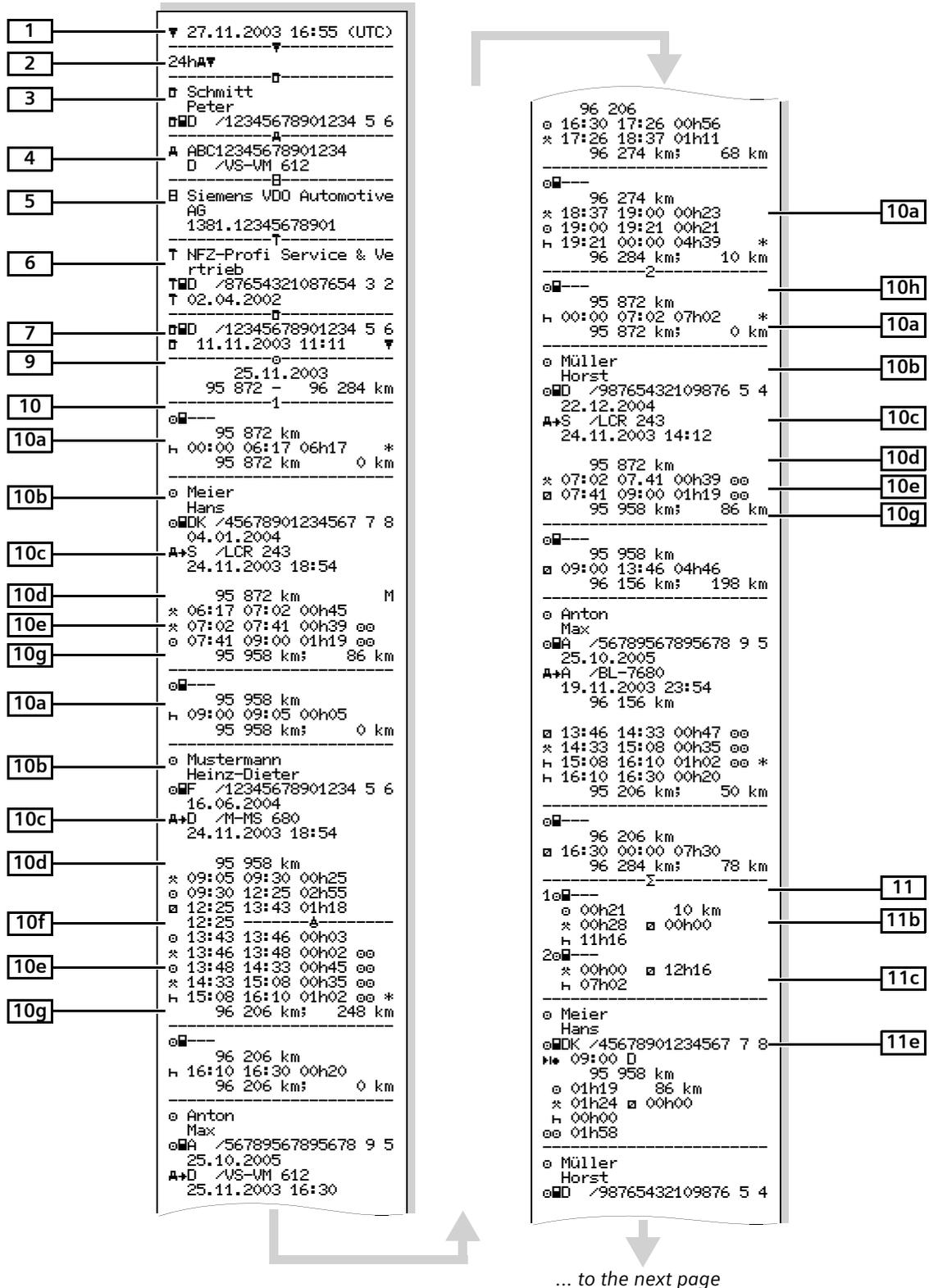
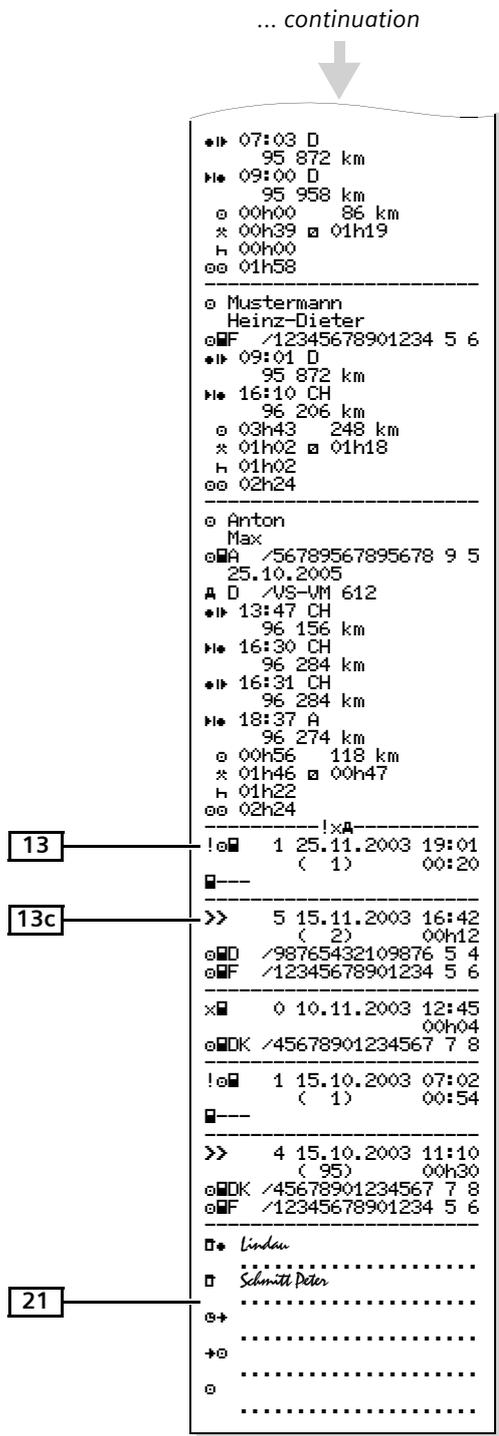


Fig. 14 - 4: Printout example: Daily printout, driver activities from DTCO 1381, part 1



TD00.1381.00 132 102

Fig. 14 - 5: Printout example: Daily printout, driver activities from DTCO 1381, part 2

14.3.4 Saved DTCO 1381 events / faults

TD00.1381.00.132.102

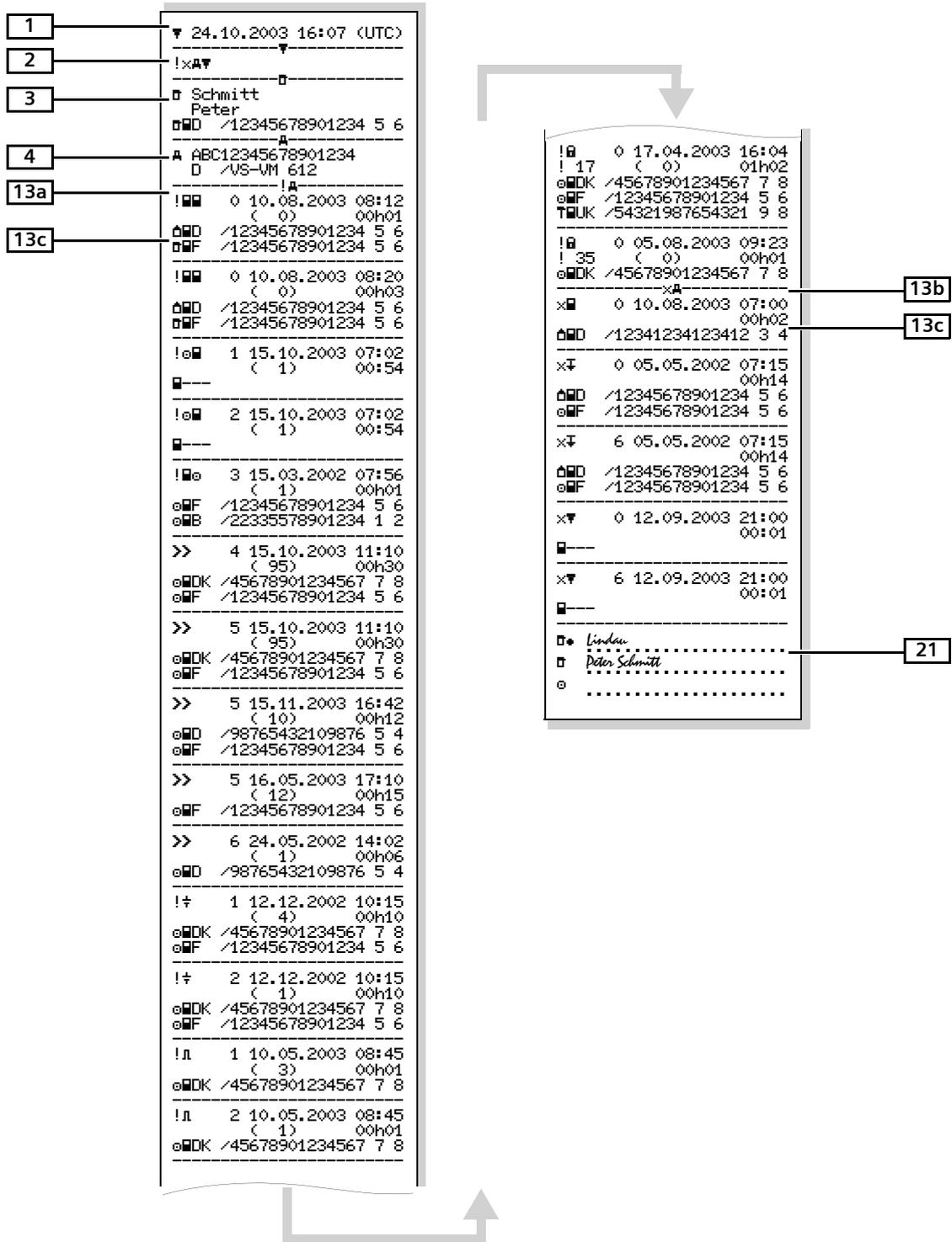


Fig. 14 - 6: Printout example: DTCO 1381 events / faults

14.3.5 Overspeeding instances

1	▼ 24.10.2003 14:50 (UTC)
2	>>▼ 90 km/h
3	▣ Schmitt Peter ▣ID /34563456345634 5 6
3a	○ Mustermann Heinz-Dieter ▣F /12345678901234 5 6 16.06.2004
4	A ABC12345678901234 D /VS-VM 612
19	>>13.03.2003 14:15 >>17.04.2003 17:44 ( 7)
20	>>>T
20c	>>24.05.2002 14:02 00h06 98 km/h 92 km/h ( 1)
20a	○ Müller Horst ▣D /98765432109876 5 4 >>(365)
	>>15.10.2003 11:10 00h30 98 km/h 95 km/h ( 95)
	○ Meier Hans ▣DK /45678901234567 7 8
	>>15.11.2002 16:42 00h12 97 km/h 93 km/h ( 10)
	○ Müller Horst ▣D /98765432109876 5 4
	>>16.05.2003 17:10 00h15 94 km/h 92 km/h ( 12)
20b	○ Mustermann Heinz-Dieter ▣F /12345678901234 5 6 >>(10)
20c	>>15.10.2003 11:10 00h30 98 km/h 95 km/h ( 95)
	○ Meier Hans ▣DK /45678901234567 7 8
	>>15.11.2002 16:42 00h12 97 km/h 93 km/h ( 10)
	○ Müller Horst ▣D /98765432109876 5 4
	>>16.05.2003 17:10 00h15 94 km/h 92 km/h ( 12)
	○ Mustermann Heinz-Dieter ▣F /12345678901234 5 6
21	▣* Hausen im Tal ▣ Dieter Schmitt ○ Heinz Mustermann

Fig. 14 - 7: Printout example: Overspeeding instances

TD00.1381.00 132 102

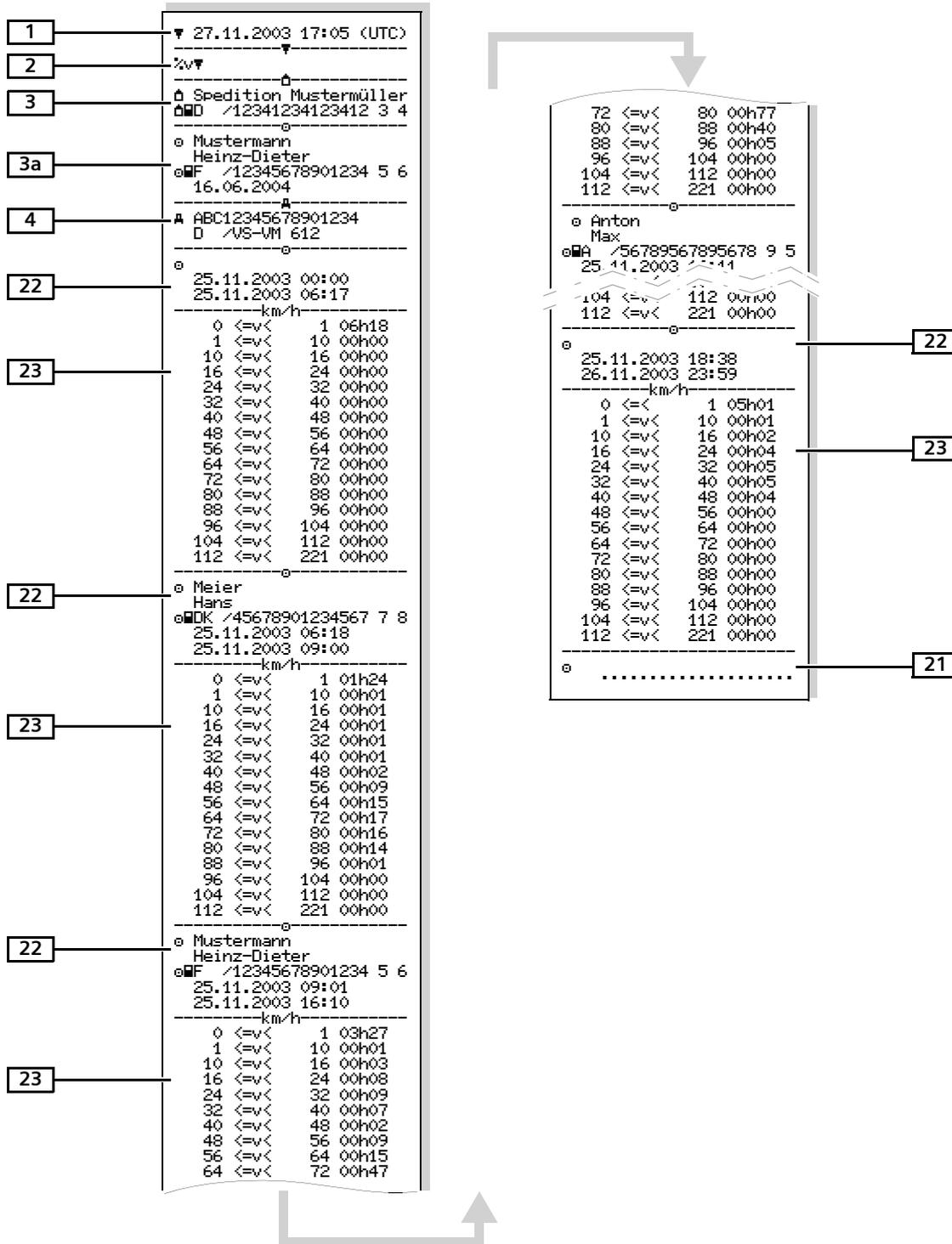
## 14.3.6 Technical data of DTCO 1381 / vehicle

TD00.1381.00.132.102

1	▼ 25.10.2002 14:50 (UTC)
2	Te▼
3	◊ Spedition Mustermüller ◊D /12341234123412 3 4
3a	◊ Mustermann Heinz-Dieter ◊F /12345678901234 5 6 16.06.2004
4	A ABC12345678901234 D /VS-VM 612
14	B Siemens VDO Automotive AG Heinrich-Hertzstr. 45 Villinsen 1381.12345678901234567 E1 84 12345678 2002 V xx.xx.xx 11.02.2002
15	ll 87654321 E1 175 08.03.2002
16	T Fa. Mustermann & NFZ- Hersteller
16a	Schillerstr. 10 Muster kirchen TMD /45678901234567 8 9 21.01.2003
16b	T 08.03.2002 (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
16a	T NFZ-Profi Service & Ve rtrieb Hauptstr. 24-26 Muster stadt TMD /87654321087654 3 2 12.03.2003
16b	T 02.04.2002 (2) A ABC12345678901234 D /VS-VM 612 w 8 000 Imp/km k 8 000 Imp/km l 3 050 mm ● 315/70/R22.5 > 90 km/h 1 015 km
17	!e 08.03.2002 14:00 e 08.03.2002 15:00
17a	T Fa. Mustermann & NFZ- Hersteller Schillerstr. 10 Muster kirchen TMD /45678901234567 8 9 21.01.2003
17b	!e 28.08.2002 13:00 e 28.08.2002 13:26 T Kienzle ARGO GMBH Bismarckstr. 19 Berlin -Stealitz TMD /89012345678901 5 6 19.10.2003
18	! 18/10/2002 06:34 x 30/09/2002 18:15

Fig. 14 - 8: Printout example: Technical data of the DTCO 1381

14.3.7 Speed profiles



TD00.1381.00 132 102

Fig. 14 - 9: Printout example: Speed profiles

14.3.8 Rpm profiles

TD00.1381.00.132.102

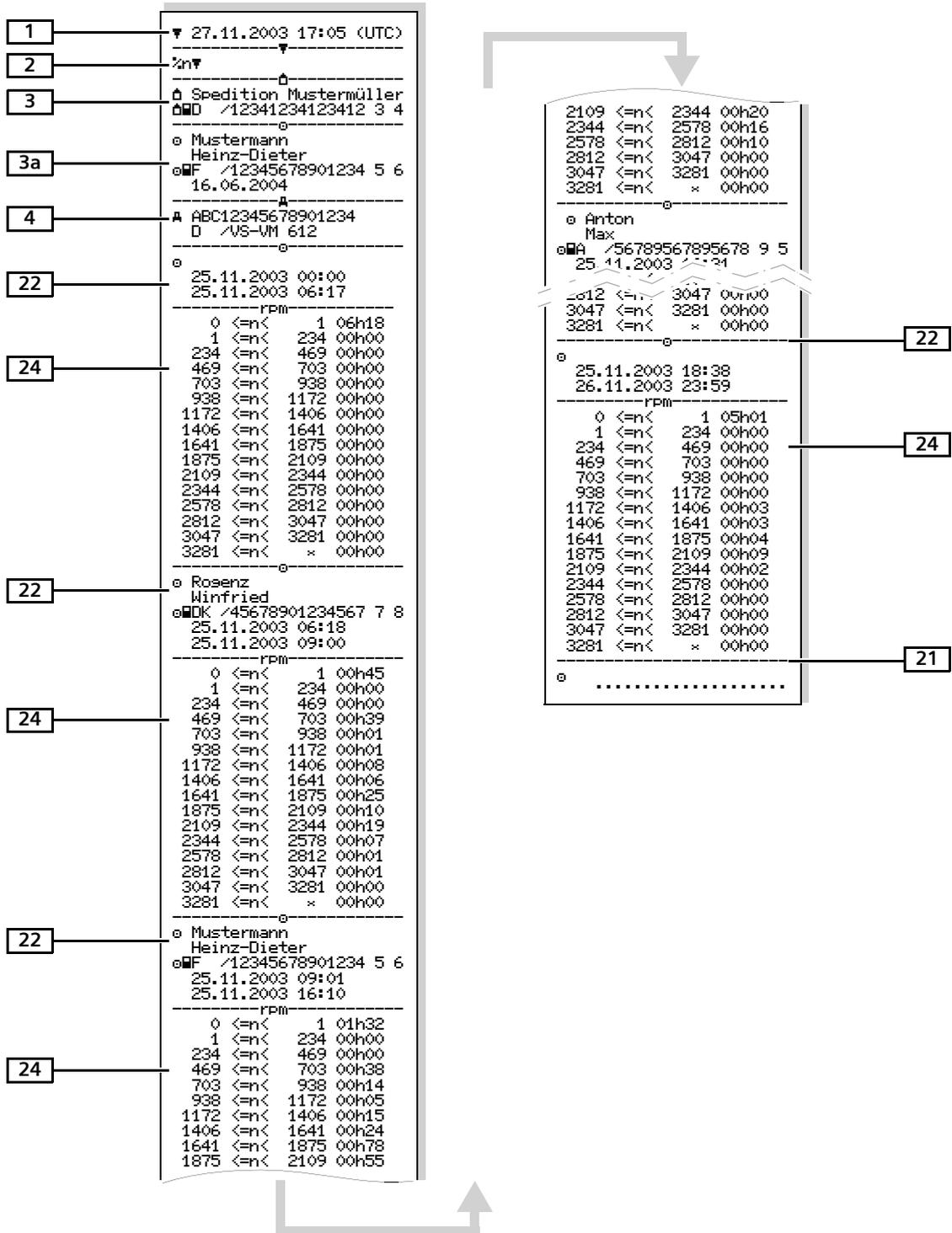


Fig. 14 - 10: Printout example: rpm profiles



Pos. / block	Data block specification / explanation
<b>3a</b>	<b>Information about the Driver (cardholder to which this printout refers)</b> <ul style="list-style-type: none"> <li>Last name</li> <li>First name</li> <li>Card identification</li> <li>Card valid until ...</li> </ul>
<b>4</b>	<b>Vehicle identification</b> <ul style="list-style-type: none"> <li>Vehicle identification number</li> <li>Authorizing member state and vehicle registration number</li> </ul>
<b>5</b>	<b>Identification of the DTCO 1381</b> <ul style="list-style-type: none"> <li>Tachograph manufacturer</li> <li>Part number of the DTCO 1381</li> </ul>
<b>6</b>	<b>Most recent calibration of the DTCO 1381</b> <ul style="list-style-type: none"> <li>Name of workshop</li> <li>Workshop identification</li> <li>Date of calibration</li> </ul>
<b>7</b>	<b>Most recent control</b> <ul style="list-style-type: none"> <li>Control card identification</li> <li>Date, time, and type of control <ul style="list-style-type: none"> <li>■ = Downloading from the driver card</li> <li>⚡ = Downloading from the DTCO 1381</li> <li>▼ = Printing</li> <li>□ = Display</li> </ul> </li> </ul>
<b>8</b>	<b>List of driver activities in the order they appear</b> <ul style="list-style-type: none"> <li>Calendar day of the printout and the usage meter (number of days that the card was used)</li> </ul>
<b>8a</b>	<b>? = Time period that the card was not inserted</b> <ul style="list-style-type: none"> <li>With beginning, end, and duration</li> <li>For example: manually entered activity after insertion of the driver card, with pictogram, beginning, end, and duration</li> </ul>
<b>8b</b>	<b>Insertion of driver card into slot (card slot 1 or 2)</b> <ul style="list-style-type: none"> <li>Authorizing member state and vehicle registration number</li> <li>Odometer reading when card inserted</li> </ul>
<b>8c</b>	<b>Activities while driver card inserted</b> <ul style="list-style-type: none"> <li>With beginning, end, duration, and driving status <ul style="list-style-type: none"> <li>☺ = Crew operation</li> <li>* = Rest periods of at least one hour</li> </ul> </li> </ul>
<b>8d</b>	<b>Specific conditions</b> <ul style="list-style-type: none"> <li>With time of entry and pictogram, for example: ferry or train</li> </ul>

TD00.1381.00 132 102

Pos. / block	Data block specification / explanation
<b>8e</b>	<b>Withdrawal of driver card</b> <ul style="list-style-type: none"> <li>With odometer reading and distance travelled since most recent insertion.</li> </ul>
<b>8f</b>	<b>Attention</b> Possible inconsistency in the data recording since this day was saved twice on the tachograph card.
<b>8g</b>	<b>Activity not completed:</b> <ul style="list-style-type: none"> <li>Duration of activity and daily summaries might be given incompletely when printouts are made while the driver card is inserted.</li> </ul>
<b>9</b>	<b>Beginning of list of all driver activities in the DTCO 1381</b> <ul style="list-style-type: none"> <li>Calendar day of printout (date of inquiry)</li> <li>Odometer readings at the times 00:00 and 23:59</li> </ul>
<b>10</b>	<b>Chronology of all activities from card slot 1</b>
<b>10a</b>	<b>Time period in which no driver card was inserted in card slot 1</b> <ul style="list-style-type: none"> <li>Odometer reading at the beginning of the time period</li> <li>Set activity or activities in this time period</li> <li>Odometer reading at the end of the time period and distance travelled</li> </ul>
<b>10b</b>	<b>Insertion of the driver card</b> <ul style="list-style-type: none"> <li>Last name of driver</li> <li>First name of driver</li> <li>Card identification</li> <li>Card valid until ...</li> </ul>
<b>10c</b>	<ul style="list-style-type: none"> <li>Authorizing member state and registration number of the previous vehicle</li> <li>Date and time card was withdrawn from the previous vehicle</li> </ul>
<b>10d</b>	<ul style="list-style-type: none"> <li>Odometer reading when driver card inserted M = the entry was done manually</li> </ul>
<b>10e</b>	<b>List of activities</b> <ul style="list-style-type: none"> <li>Pictogram of the activity, beginning and end times, duration, and driving status  <ul style="list-style-type: none"> <li>☐☐ = Crew operation</li> <li>* = Rest periods greater than 1 h</li> </ul> </li> </ul>
<b>10f</b>	<b>Entry of specific conditions</b> <ul style="list-style-type: none"> <li>Starting and ending times and pictogram of the condition  <ul style="list-style-type: none"> <li>⚓ = Ferry transfer or train transfer</li> <li>OUT = Recording equipment not required</li> </ul> </li> </ul>
<b>10g</b>	<b>Withdrawal of driver card</b> <ul style="list-style-type: none"> <li>Odometer reading and distance travelled</li> </ul>
<b>10h</b>	<b>Chronology of all activities from card slot 2</b>

TD00.1381.00 132 10Z

Pos. / block	Data block specification / explanation
<b>11</b>	<b>Daily summary</b>
<b>11a</b>	<b>Entered locations</b> <ul style="list-style-type: none"> <li>• <b>••</b> = Beginning time with country and possibly region</li> <li>• <b>••</b> = Ending time with country and possibly region</li> <li>• Vehicle odometer reading</li> </ul>
<b>11b</b>	<b>Summary of times with no driver card in card slot 1</b> <ul style="list-style-type: none"> <li>• Entered locations in chronological order (no entry in example)</li> <li>• Total activities from card slot 1</li> </ul>
<b>11c</b>	<b>Summary of times with no driver card in card slot 2</b> <ul style="list-style-type: none"> <li>• Entered locations in chronological order (no entry in example)</li> <li>• Total activities from card slot 2</li> </ul>
<b>11d</b>	<b>Daily summary "total values of activities" from the driver card</b> <ul style="list-style-type: none"> <li>• Total driving time and distance travelled</li> <li>• Total work and availability time</li> <li>• Total rest time and unknown time</li> <li>• Total time in crew activities</li> </ul>
<b>11e</b>	<b>Summary of the activities, chronological arranged by driver (cumulative for each driver for both card slots)</b> <ul style="list-style-type: none"> <li>• Last name, first name, card identification of the driver</li> <li>• <b>••</b> = Beginning time with country and possibly region</li> <li>• <b>••</b> = Ending time with country and possibly region</li> <li>• Activities from this driver with ... <ul style="list-style-type: none"> <li>total driving time and distance travelled</li> <li>total work and total availability time</li> <li>total rest time</li> <li>total time in crew activities</li> </ul> </li> </ul> <p><b>Note</b></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>
<b>12</b>	<b>List of the five most recent saved events or faults on the driver card</b>
<b>12a</b>	<b>List of all saved events on the driver card, arranged according to type of fault and date</b>
<b>12b</b>	<b>List of all saved faults on the driver card, arranged according to type of fault and date</b>

TD00.1381.00 132 102

Pos. / block	Data block specification / explanation
<b>12c</b>	<p><b>Data record of the event or fault</b></p> <p>Line 1:</p> <ul style="list-style-type: none"> <li>• Pictogram of the event or fault.</li> <li>• Date and beginning.</li> </ul> <p>Line 2:</p> <ul style="list-style-type: none"> <li>• Events subject to security breach are broken down with an additional code, see chapter 14.5 "Memory behaviour during events or faults", page 14-30.</li> <li>• Duration of the event or fault.</li> </ul> <p>Line 3:</p> <ul style="list-style-type: none"> <li>• Authorizing member state and registration number of the vehicle in which the events or faults appeared.</li> </ul>
<b>13</b>	<b>List of the five most recent saved or still active events/disturbances in the DTCO 1381</b>
<b>13a</b>	<b>List of all recorded or continuing events of the DTCO 1381</b>
<b>13b</b>	<b>List of all recorded or continuing faults of the DTCO 1381</b>
<b>13c</b>	<p><b>Data record of the event or fault</b></p> <p>Line 1:</p> <ul style="list-style-type: none"> <li>• Pictogram of the event or fault.</li> <li>• Coding data record purpose, see chapter 14.5 "Memory behaviour during events or faults", page 14-30.</li> <li>• Date and beginning.</li> </ul> <p>Line 2:</p> <ul style="list-style-type: none"> <li>• Events subject to security breach are broken down with an additional code, see chapter 14.5 "Memory behaviour during events or faults", page 14-30.</li> <li>• Number of similar events on this day, see chapter 14.5 "Memory behaviour during events or faults", page 14-30.</li> <li>• Duration of the event or fault.</li> </ul> <p>Line 3:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• "■---" appears when no driver card is inserted.</li> </ul>

TD00.1381.00 132 102

Pos. / block	Data block specification / explanation
<b>14</b>	<b>Identification of the DTCO 1381</b> <ul style="list-style-type: none"> <li>• Tachograph manufacturer</li> <li>• Address of the tachograph manufacturer</li> <li>• Part number</li> <li>• Type approval number</li> <li>• Serial number</li> <li>• Year of manufacture</li> <li>• Version and date of installation of the user software</li> </ul>
<b>15</b>	<b>Identification of the KITAS 2171</b> <ul style="list-style-type: none"> <li>• Serial number</li> <li>• Type approval number</li> <li>• Date of initial installation</li> </ul>
<b>16</b>	<b>Calibration data</b>
<b>16a</b>	<b>Listing of the calibration data (in data sets)</b> <ul style="list-style-type: none"> <li>• Name and address of the workshop</li> <li>• Workshop identification</li> <li>• Workshop card valid until ...</li> </ul>
<b>16b</b>	<ul style="list-style-type: none"> <li>• Date and purpose of the calibration <ul style="list-style-type: none"> <li>1 = Activation (Recording of known calibration data at the time of activation)</li> <li>2 = Initial installation (first calibration data after activation of the DTCO 1381)</li> <li>3 = Installation (first calibration data in current vehicle, identified by the VIN)</li> <li>4 = Regularly inspection (calibration data of a periodic inspection)</li> </ul> </li> <li>• Vehicle identification number</li> <li>• Authorizing member state and registration number</li> <li>• <math>\mu</math> = Characteristic coefficient of the vehicle</li> <li>• <math>k</math> = DTCO 1381 constant</li> <li>• <math>I</math> = Actual circumference of tires</li> <li>• <math>\phi</math> = Tire size</li> <li>• <math>\gg</math> = Speed limiter setting</li> <li>• Old and new odometer reading</li> </ul> <p><b>Remark</b> In the example, this data is available only in the next data set.</p>

TD00.1381.00 132 102

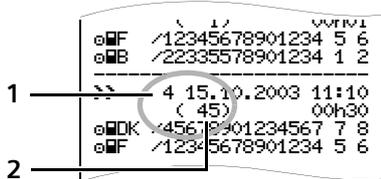
Pos. / block	Data block specification / explanation
<b>17</b>	<b>Time settings</b>
<b>17a</b>	<b>Listing of all available data about time setting (in data sets)</b> <ul style="list-style-type: none"> <li>• Date and time, old</li> <li>• Date and time, changed</li> <li>• Name of workshop that set the time</li> <li>• Address of workshop</li> <li>• Workshop identification</li> <li>• Workshop card valid until ...</li> </ul>
<b>17b</b>	<b>Remark</b> In the second data set it can be seen that the UTC time was corrected by an authorized workshop.
<b>18</b>	<b>The most recently recorded event and the current fault</b> <ul style="list-style-type: none"> <li>• ! = Most recent event, date, and time.</li> <li>• × = Most recent fault, date, and time.</li> </ul>
<b>19</b>	<b>Information on overspeeding control</b> <ul style="list-style-type: none"> <li>• Date and time of the most recent control.</li> <li>• Date and time of the first instance of overspeeding since the most recent control and the number of subsequent overspeeding instances.</li> </ul>
<b>20</b>	<b>First instance of overspeeding since the most recent calibration</b>
<b>20a</b>	<b>The five most severe instances of overspeeding of the last 365 days</b>
<b>20b</b>	<b>The most severe instances of overspeeding on the 10 most recent days of appearance</b>
<b>20c</b>	<b>Entries during instances of overspeeding (chronologically arranged by highest average speed)</b> <ul style="list-style-type: none"> <li>• Date, time, and duration of overspeeding</li> <li>• Highest and average speed of the overspeeding instance, number of similar events on this day</li> <li>• Last name of driver</li> <li>• First name of driver</li> <li>• Card identification of the driver</li> </ul> <b>Remark</b> If no data set for an instance of overspeeding appears in a block, then the following appears: "→→----".

Pos. / block	Data block specification / explanation
21	<p><b>Handwritten information</b></p> <ul style="list-style-type: none"> <li>•  = Location of control</li> <li>•  = Signature of the controller</li> <li>•  = Start time</li> <li>•  = End time</li> <li>•  = Signature of the driver</li> </ul>
22	<p><b>Information about the cardholder of the recorded profile</b></p> <ul style="list-style-type: none"> <li>• Last name of driver</li> <li>• First name of driver</li> <li>• Card identification</li> </ul> <p><b>Remark</b> Missing information about the cardholder means: no driver card inserted in card slot 1.</p> <ul style="list-style-type: none"> <li>• Beginning of the profile recording with date and time</li> <li>• End of the profile recording with date and time</li> </ul> <p><b>Remark</b> New profiles are created:</p> <ul style="list-style-type: none"> <li>– by inserting / withdrawing a tachograph card into / from card slot 1</li> <li>– by a day change</li> <li>– by a correction of the UTC time</li> <li>– by a voltage interruption</li> </ul>
23	<p><b>Recording of speed profile</b></p> <ul style="list-style-type: none"> <li>• List of the defined speed ranges and period in this range</li> <li>• Range: <math>0 \leq v &lt; 1</math> = Vehicle motionless</li> </ul> <p>The speed profile is divided into 16 zones. During installation, the individual ranges can be adjusted individually.</p>
24	<p><b>Recording of rpm profile</b></p> <ul style="list-style-type: none"> <li>• List of the defined motor rpm ranges and period in this range</li> <li>• Range: <math>0 \leq n &lt; 1</math> = Motor off</li> <li>• Range: <math>3281 \leq n &lt; x</math> = unlimited</li> </ul> <p>The rpm profile is divided into 16 zones. During installation, the individual ranges can be adjusted individually.</p>

TD00.1381.00 132 102

## 14.5 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 conflict	0
	!⊠	Driving without valid card	1, 2, 7
	!⊠	Insertion while driving	3
	!⊠	Card not closed	0
	>>	Overspeeding	4, 5, 6
	!⊠	Power interruption	1, 2, 7
	!⊠	Sensor fault	1, 2, 7
	!⊠	Security breach	0
	!⊠	Time overlap <sup>1)</sup>	–
Faults	!⊠	Card invalid <sup>2)</sup>	–
	×⊠	Card fault	0
	×⊠	Internal fault	0, 6
	×⊠	Internal fault	0, 6
	×⊠	Display fault	0, 6
	×⊠	Faults during downloading	0, 6
	×⊠	Sensor fault	0, 6

<sup>1)</sup> This event will be saved only on the driver card

<sup>2)</sup> The DTCO 1381 will not save this event

TD00.1381.00 132 10Z

### 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

!	35	05.08.2003 09:23	00h01
A	D	/VS-VM 612	
!	22	17.04.2003 16:04	01h02
A	D	/VS-VM 612	

Events subject to security breach "!" are broken down with an additional coding (3):

#### Attempts that breach security on the DTCO 1381

- 16 = No additional information
- 17 = Failed authentication of the sensor
- 18 = Authentication errors of the driver card
- 19 = Unauthorized changes to the sensor
- 20 = Integrity error; the authenticity of the data on the driver card is not assured
- 21 = Integrity error, the authenticity of the saved user data is not assured
- 22 = Internal data transmission error
- 23 = Unauthorized opening of the housing
- 24 = Manipulation of the hardware

#### Security breaching attempts on the KITAS 2171 impulse sensor

- 32 = No additional information
- 33 = Failed authentication
- 34 = Integrity error, the authenticity of the memory data is not assured
- 35 = Internal data transmission error
- 36 = Unauthorized opening of the housing
- 37 = Manipulation of the hardware



TD00.1381.00 132 102