

Executive summary for the EC (not part of this legislation)

Recording equipment in road transport adapted to technical progress is placed on the market and put into service in the Czech Republic in accordance with Regulation (EU) No 165/2014 of the European Parliament and of the Council on tachographs in road transport.

The purpose of the draft which is the subject of this notification is to establish metrological and technical requirements arising from Regulation (EU) No 165/2014 of the European Parliament and of the Council on tachographs in road transport – digital tachographs in vehicles and methods for their verification within specified time limits. This draft only concerns the verification of digital tachographs in use since type approval of these instruments in the Czech Republic is not relevant.

Some of the parameters referred to in this document are properties of measuring instruments in new condition and are only noted here because the preservation of these properties when in use is only subject to visual or other checks within the scope of verification.

*(End of executive summary.)*

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## **PUBLIC DECREE**

As the authority with substantive and territorial jurisdiction in the matter of laying down metrological and technical requirements for legally controlled measuring instruments and laying down the methods for type approval and verification of legally controlled measuring instruments under § 14(1) of Act No 505/1990 on metrology, as amended (hereinafter the 'Metrology Act'), and in accordance with the provisions of § 172 et seq. of Act No 500/2004, the Administrative Procedure Code (hereinafter the 'APC'), the Czech Metrology Institute (hereinafter the 'CMI') commenced ex officio proceedings on 11.12.2015 pursuant to § 46 of the APC, and, based on the supporting documents, issues the following:

### **I.**

## **DRAFT GENERAL MEASURE**

number: 0111-OOP-C062-15

ref. no.0313/016/15/Pos.,

**laying down metrological and technical requirements for legally controlled measuring instruments, including the testing methods for the verification of legally controlled measuring instruments:**

**‘tachographs recording the work activities of drivers of motor vehicles compulsorily equipped with these tachographs – digital tachographs’**

This General Measure lays down the metrological and technical requirements for tachographs recording the work activities of drivers of motor vehicles compulsorily equipped with these tachographs – digital tachographs, to be applied when verifying these instruments after they have been placed on the market or put into service. These requirements comply with the requirements of:

Annex 1B to Council Regulation (EEC) No 3821/85 of 20 December 1985 on recording equipment in road transport, as amended.

Regulation (EC) No 561/2006 of the European Parliament and of the Council of 15 March 2006 on the harmonisation of certain social legislation relating to road transport (hereinafter ‘Regulation (EC) No 561/2006 of the European Parliament and of the Council’);

Regulation (EU) No 165/2014 of the European Parliament and of the Council of 4 February 2014 on tachographs in road transport (hereinafter ‘Regulation (EU) No 165/2014 of the European Parliament and of the Council’),

Commission Implementing Regulation (EU) 2016/799 of 18 March 2016 implementing Regulation (EU) No 165/2014 of the European Parliament and of the Council laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components.

## **1 Basic definitions**

For the purposes of this General Measure, the terms and definitions according to VIM and VIML<sup>1)</sup>, the relevant EU regulations referred to above and the terms and definitions below shall apply.

### **1.1**

#### **tachograph or recording equipment**

means the equipment intended for installation in road vehicles to display, record, print, store and output automatically or semi-automatically details of the movement, including the speed, of such vehicles, and details of certain periods of activity of their drivers

### **1.2**

#### **vehicle unit**

means the tachograph excluding the motion sensor and the cables connecting the motion sensor. The vehicle unit may be a single unit or several units distributed in the vehicle, provided that it complies with the security requirements of Regulation (EU) No 165/2014 of the European Parliament and of the Council; the vehicle unit includes, among other things, a processing unit, a data memory, a time measurement function, two smart card interface devices for driver and co-driver, a printer, a display, connectors and facilities for entering the user’s inputs

### **1.3**

#### **motion sensor**

means a part of the tachograph providing a signal representative of vehicle speed and/or distance travelled

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<sup>1)</sup> International Vocabulary of Metrology – Basic and General Concepts and Associated Terms (VIM) and International Vocabulary of Terms in Legal Metrology (VIML) are part of the technical harmonisation compendium ‘Terminology in the Area of Metrology’, which is publicly accessible at [www.unmz.cz](http://www.unmz.cz)

**1.4**

**digital tachograph (hereinafter also DT)**

means a tachograph using a tachograph card

**1.5**

**adaptor**

means a part of the recording equipment, which provides a signal permanently representative of vehicle speed and/or distance travelled and which is installed and used only in M1 and N1 vehicles where it is not mechanically possible to install any other type of existing motion sensor. For those vehicles, the recording equipment includes cables, an adaptor, and a vehicle unit

**1.6**

**tachograph card**

means a smart card intended for use with the tachograph, which allows identification by the tachograph of the role of the cardholder and allows data transfer and storage

**1.7**

**driver card**

means a tachograph card, issued by the authorities of a Member State to a particular driver; the driver card identifies the driver and allows for storage of driver activity data

**1.8**

**control card**

means a tachograph card issued by the authorities of a Member State to a national competent control authority which identifies the control body and, optionally, the control officer, and which allows access to the data stored in the data memory or in the driver cards and, optionally, in the workshop cards for reading, printing or downloading

**1.9**

**workshop card**

means a tachograph card issued by the authorities of a Member State to designated staff of a tachograph manufacturer, a fitter, a vehicle manufacturer or a workshop, approved by that Member State, which identifies the cardholder and allows for the testing, calibration and activation of tachographs, or downloading of data from them (hereinafter also referred to as the 'service card')

**1.10**

**company card**

means a tachograph card issued by the authorities of a Member State to a transport undertaking needing to operate vehicles fitted with a tachograph, which identifies the transport undertaking and allows for the displaying, downloading and printing of the data stored in the tachograph, which have been locked by that transport undertaking

**1.11**

**tachograph constant**

the numerical characteristic giving the value of the input signal required to show and record a distance travelled of one kilometre; this constant is expressed in impulses per kilometre ( $k = \dots \text{ imp/km}$ )

**1.12**

**characteristic coefficient of the vehicle  $W$  (hereinafter also referred to as 'vehicle constant')**

means the numerical characteristic giving the value of the output signal emitted by the part of the vehicle linking it with the recording equipment (gearbox output shaft or axle) while the vehicle travels a distance of one kilometre under standard test conditions. The characteristic coefficient is expressed in impulses per kilometre ( $W = \dots \text{ imp/km}$ )

**1.13**

**tyre size**

means the designation of the dimensions of the tyres (external driving wheels) in accordance with Directive 92/23/EEC of 31 March 1992

**1.14**

**effective circumference of the wheel tyres**

means the average of the distances travelled by each of the wheels moving the vehicle (driving wheels) in the course of one complete rotation. These distances are measured under standard test conditions and are expressed in the form:  $l = \dots$  mm

**1.15**

**UTC**

coordinated universal time; this is not affected by switching between summer and winter time

**1.16**

**tachograph activation**

means the phase in which the tachograph becomes fully operational and implements all functions, including security functions. Activating a recording equipment requires the use of a workshop card and the entry of its PIN code

**1.17**

**tachograph calibration**

means updating or confirming vehicle parameters, including vehicle identification and vehicle characteristics, to be held in the data memory through the use of a workshop card

**1.18**

**tachograph verification**

comprises all activities necessary to confirm compliance of the recording equipment installed in a vehicle with the requirements specified in the relevant regulations

**1.19**

**data memory**

means electronic equipment for storing data, which is built in to the tachograph

**1.20**

**printer**

means component of the recording equipment which provides printouts of stored data

**1.21**

**downloading from a digital tachograph**

means the copying, together with the digital signature, of a part, or of a complete set, of data files recorded in the data memory of the vehicle unit or in the memory of a tachograph card, provided that this process does not alter or delete any stored data

**1.22**

**event**

means abnormal operation detected by the recording equipment which may come from a fraud attempt

**1.23**

**fault**

means abnormal operation detected by the recording equipment which may come from an equipment malfunction or failure

**1.24**

**over speeding**

means exceeding the authorised speed of the vehicle, defined as any period of more than 60 sec during which the vehicle's measured speed exceeds the limit for setting the speed limitation device

**1.25**

**speed limitation device**

means a device limiting the maximum speed of a vehicle

**1.26**

**repair**

means any repair of a motion sensor or of a vehicle unit that requires the disconnection of its power supply, or its disconnection from other tachograph components, or the opening of the motion sensor or vehicle unit

**1.27**

**interface**

means a facility between systems which provides the media through which they can connect and interact

**1.28**

**installation**

means the mounting of a tachograph in a vehicle

**1.29**

**self test**

means tests run cyclically and automatically by the recording equipment to detect faults

**2 Metrological requirements**

The metrological requirements are based on the requirements under Annex 1B to Council Regulation (EEC) No 3821/85 and Regulation (EU) No 165/2014 of the European Parliament and of the Council.

**2.1 Rated operating conditions**

The tachograph shall work properly in an ambient temperature range of -20 °C to 70 °C.

The data memory of the tachograph shall be preserved at temperatures down to -40 °C.

The ambient temperature range for the motion sensor shall be -40 °C to 135 °C.

Speedometers shall not be sensitive to relative ambient humidity.

The tachograph shall be fully operational in the humidity range 10 % to 90 %.

The recording equipment shall be protected against over-voltage, inversion of its power supply polarity, and short circuits.

The tachograph shall conform to applicable legislation related to electromagnetic compatibility and shall be protected against electrostatic discharges and transients.

**2.2 Measuring intervals**

**2.2.1 Vehicle speed**

The DT shall measure speed within the interval of 0 km/h to 220 km/h with a resolution of 1 km/h or better.

**2.2.2 Distance travelled**

The distance travelled may be measured either so as to combine both forward and reverse movement, or so as to include only forward movements.

The DT shall be able to record distance within the interval of not less than 0 km to 9 999 999.9 km.

### 2.2.3 Time

The ‘time measurement’ function of the digital tachograph shall measure time permanently and digitally provide UTC date and time with a resolution of 1 km/h or better.

## 2.3 Maximum tolerances in verification

### 2.3.1 Maximum tolerances for tachographs before installation

The maximum tolerances for digital tachographs before installation in a vehicle are listed in Table 1.

**Table 1 – Maximum tolerances for digital tachographs before installation**

Parameter	Maximum tolerances
distance travelled	1 % more or less than the real distance, where that distance is at least one kilometre
speed	±1 km/h
time	±2 s over 24 h

The maximum tolerance of ±1 km/h for speed applies for speeds between 20 km/h and 180 km/h for characteristic coefficients of the vehicle ‘W’ between 4 000 and 25 000 imp/km.

### 2.3.2 Maximum tolerances for tachographs after installation

The maximum tolerances for digital tachographs after installation in a vehicle are listed in Table 2.

**Table 2 – Maximum tolerances for tachographs after installation**

Parameter	Maximum tolerances
distance travelled	2 % more or less than the real distance, where that distance is at least one kilometre;
speed	±2 km/h
time	±2 s over 24 h

Maximum tolerances apply for testing under the following conditions:

- a) vehicle unladen, in normal running order,
- b) tyre pressures in accordance with the manufacturer’s instructions,
- c) tyre wear within the limits allowed by national regulations,
- d) the vehicle shall advance under its own engine power in a straight line on level ground at a speed of 50 ± 5 km/h and the measuring distance shall be at least 1 000 m. Provided that it is of comparable accuracy, suitable test equipment (dynamometer) may also be used for the test.

The maximum tolerances for speed apply for speeds indicated by the speed indicator and for speeds recorded on the record sheet.

## 2.4 Maximum tolerances in use

The maximum tolerances for digital tachographs in use are listed in Table 3.

**Table 3 – Maximum tolerances for tachographs in use**

Parameter	Maximum tolerances
distance travelled	4 % more or less than the real distance, where that distance is at least one kilometre;

speed	$\pm 6$ km/h
time	$\pm 2$ s over 24 h

The maximum tolerances are valid for temperatures between 0 °C and 40 °C taken in close proximity to the equipment.

### 3 Technical requirements

The technical requirements are based on the requirements under Annex 1B to Council Regulation (EEC) No 3821/85 on recording equipment in road transport and Regulation (EU) No 165/2014 of the European Parliament and of the Council.

The digital tachograph shall record and store data in the data memory and the inserted tachograph card.

Tachographs and tachograph cards shall comply with the following requirements:

- record data related to the driver, driver activity and the vehicle which shall be accurate and reliable;
- be secure, in particular guaranteeing the integrity and the origin of the source of data recorded by and retrieved from vehicle units and motion sensors;
- be interoperable as between the various generations of vehicle units and tachograph cards;
- allow for efficient verification of compliance with the above regulations and other applicable legal acts;
- be user-friendly.

Digital tachographs shall record the following data:

- the distance travelled and the speed of the vehicle;
- time measurement;
- the identity of the driver;
- the activity of the driver;
- control, calibration and tachograph repair data, including the identity of the workshop;
- events and faults.

Digital tachographs shall ensure the following functions:

- speed and distance measurement;
- second independent speed signal;
- monitoring of driver activities and driving status;
- monitoring of the insertion and withdrawal of tachograph cards;
- recording of drivers' manual entries;
- calibration;
- monitoring of control activities;
- detection and recording of events and faults;
- reading from data memory and recording and storing in data memory;
- reading from tachograph cards and recording and storing in tachograph cards;
- displaying, warning, printing and downloading of data to external devices;

- time adjustment and measurement;
- company locks management;
- built-in and self tests.

### **3.1 Modes of operation**

Digital tachographs shall possess four modes of operation:

- a) operational mode;
- b) control mode;
- c) calibration mode;
- d) company mode.

Digital tachographs shall switch to the various modes of operation according to the valid tachograph card inserted into the card interface device.

Digital tachographs shall ignore non-valid cards inserted, except displaying, printing or downloading data held on an expired card which shall be possible.

All functions listed under point 3 shall be active in any mode of operation with the following exceptions:

- the calibration function is accessible in the calibration mode only,
- the time adjustment function is limited when not in the calibration mode,
- the driver manual entries functions are accessible in operational or calibration modes only,
- the company locks management function is accessible in the company mode only;
- the monitoring of control activities function is operational in the control mode only;
- the downloading function is not accessible in the operational mode (except when downloading data for a company which provides proof of its access rights for data downloading);

The recording equipment can output any data to display, printer or external interfaces with the following exceptions:

- in the operational mode, any personal identification (surname and first name(s)) not corresponding to a tachograph card inserted shall be blanked and any card number not corresponding to a tachograph card inserted shall be partially blanked (every odd character from left to right shall be blanked);
- in the company mode, driver related data can be output only for periods not locked by another company (as identified by the first 13 digits of the company card number);
- when no card is inserted in the recording equipment, driver related data can be output only for the current and eight previous calendar days.

#### **3.1.1 Display and warning**

Information contained in digital tachographs and tachograph cards relating to vehicle activities and to drivers and co-drivers shall be displayed in a clear, unambiguous and ergonomic way.

The following information shall be displayed:

- a) time;
- b) mode of operation;
- c) driver activity:
  - if the current activity is driving, the driver's current continuous driving time and the current cumulative break time,

- if the current activity is availability/other work/rest or break, the current duration of that activity (since it was selected) and the current cumulative break time;

d) data related to warnings;

e) data related to menu access.

Additional information may be displayed, provided that it is clearly distinguishable from the information required in this paragraph.

Digital tachographs shall warn drivers when detecting any event and/or fault, and before and at the time of exceeding the maximum allowed continuous driving time, in order to facilitate compliance with the relevant legislation.

Warnings shall be visual and may also be audible. Warnings shall have a duration of at least 30 seconds, unless acknowledged by the user by pushing any key of the digital tachograph. The reason for the warning shall be displayed and shall remain visible until acknowledged by the user using a specific key or command of the digital tachograph.

### **3.2 Construction of digital tachographs**

Digital tachographs include a processing unit, a data memory, a real time clock, two smart card interface devices (driver and co-driver), a printer, a display, a visual warning, a calibration/downloading connector, and facilities for entry of user's inputs.

Digital tachographs may be connected to other devices through additional connectors. Any inclusion in or connection to the recording equipment of any function, device, or devices, approved or otherwise, shall not interfere with, or be capable of interfering with, the proper and secure operation of the recording equipment or compliance with the requirements of Regulation (EU) No 165/2014 of the European Parliament and of the Council and Regulation (EC) No 561/2006.

### **3.3 Security measures**

The system security aims at protecting the data in the data memory of the digital tachograph in such a way as to prevent unauthorised access to or manipulation of the data and detecting any such attempts, protecting the integrity and authenticity of data exchanged between the motion sensor and the vehicle unit, protecting the integrity and authenticity of data exchanged between the recording equipment and the tachograph cards, and verifying the integrity and authenticity of data downloaded.

In order to achieve system security, digital tachographs shall meet the security requirements defined in Regulation (EU) No 165/2014 of the European Parliament and of the Council.

### **3.4 Recording and storing of data in the data memory**

For the purposes of this article '365 days' means 365 calendar days of average driver's activity in a vehicle. The average activity per day in a vehicle is defined as at least six drivers or co-drivers, six card insertion withdrawal cycles, and 256 activity changes. 365 days therefore include at least 2 190 (co-)drivers, 2 190 card insertion withdrawal cycles, and 93 440 activity changes.

Times are recorded with a resolution of one minute, unless otherwise specified. Distances travelled are recorded with a resolution of one kilometre. Speeds are recorded with a resolution of 1 km/h.

Data stored into the data memory shall not be affected by an external power supply cut-off of less than 12 months.

The recording equipment shall be able to record and store implicitly or explicitly in its data memory the following data:

### **3.4.1 Equipment identification data**

a) DT identification data

These data are recorded and stored in the data memory once and for all by the DT manufacturer, except the software-related data and type approval number which may be changed in case of software upgrade.

b) Motion sensor identification data

These data are recorded and stored once and for all in the motion sensor data memory by the motion sensor manufacturer.

### **3.4.2 Security elements**

The DT shall be able to store the following security elements:

- European public key;
- Member State certificate;
- equipment certificate;
- equipment private key.

Recording equipment security elements are inserted in the DT by the manufacturer of the DT.

### **3.4.3 Driver card insertion and withdrawal data**

The DT shall record and store these data in its data memory for each insertion and withdrawal cycle of a driver or workshop card.

### **3.4.4 Driver activity data**

The DT shall record and store the relevant data in its data memory whenever there is a change of activity for the driver and/or the co-driver or whenever there is a change of driving status, or whenever there is an insertion or withdrawal of a driver or workshop card.

### **3.4.5 Places where the driver's daily work periods begin or end**

The DT shall record and store the relevant data in its data memory whenever a (co-)driver enters the place where a daily work period begins or ends.

### **3.4.6 Odometer data**

The DT shall record in its data memory the data on distance travelled and the corresponding date at midnight every calendar day.

### **3.4.7 Detailed speed data**

The DT shall record and store in its data memory the data on the instantaneous speed of the vehicle and the corresponding date and time at every second of at least the last 24 hours that the vehicle has been moving.

### **3.4.8 Events data**

For the purposes of this point, time shall be stored with a resolution of one second.

The DT shall record and store in its data memory the following data for each event detected according to the following storage rules:

- card inserted at the beginning or end of an event, the 'card conflict' event (the 10 most recent events);
- driving without an appropriate card (the longest event for each of the 10 last days of occurrence, plus the five longest events over the last 365 days);

- card insertion while driving (the last event for each of the 10 last days of occurrence);
- last card session not correctly closed (the 10 most recent events);
- over speeding (the most serious event for each of the 10 last days of occurrence [i.e. the one with the highest average speed), plus the five most serious events over the last 365 days, plus the first event having occurred after the last calibration];
- power supply interruption (the longest event for each of the 10 last days of occurrence, plus the five longest events over the last 365 days);
- motion data error (the longest event for each of the 10 last days of occurrence, plus the five longest events over the last 365 days);
- vehicle motion conflict (the longest event for each of the 10 last days of occurrence, the 5 longest events over the last 365 days, date and time of beginning of event, date and time of end of event, card type, number and issuing Member State of any card inserted at beginning and/or end of the event, number of similar events that day);
- security breach attempt (the 10 most recent events for each type of event, date and time of beginning of event, date and time of end of event, card type, number and issuing Member State for any event).

The recording equipment shall also record and store in its data memory:

- the date and time of the last over speeding control;
- the date and time of the first over speeding following over speeding control;
- the number of over speeding events since the last over speeding control.

These data may be recorded at power supply reconnection only, times may be indicated with an accuracy to the minute.

### **3.4.9 Faults data**

The DT shall record and store in its data memory the following data for each fault detected according to the following storage rules:

- card fault (the 10 most recent driver card faults);
- DT fault (the 10 most recent faults for each type of fault, the first fault after the last calibration).

Time shall be recorded with a resolution of one second.

### **3.4.10 Calibration data**

The DT shall record and store in its data memory data relevant to:

- known calibration parameters at the moment of activation;
- its very first calibration following its activation;
- its first calibration in the current vehicle (as identified by its vehicle identification number);
- the five most recent calibrations (if several calibrations happen within one calendar day, only the last one of the day shall be stored).

For each calibration, the following data shall be recorded:

- purpose of calibration (activation, first installation, installation, periodic inspection);
- workshop name and address;
- workshop card number, card issuing Member State and card expiry date;
- vehicle identification;

- parameters updated or confirmed – *W, k, l*, tyre size, speed limiting device setting, odometer (old and new values), date and time (old and new values).

#### **3.4.11 Time adjustment data**

The DT shall record and store in its data memory data relevant to:

- the most recent time adjustment;
- the five largest time adjustments, since last calibration, performed in calibration mode outside the frame of a regular calibration.

The following data shall be recorded for each of these time adjustments:

- date and time, old value;
- date and time, new value;
- workshop name and address;
- workshop card number, card issuing Member State and card expiry date.

#### **3.4.12 Control activity data**

The DT shall record and store in its data memory the following data relevant to the 20 most recent control activities:

- date and time of the control;
- control card number and card issuing Member State;
- type of the control (displaying, printing or DT downloading or card downloading).

In case of downloading, the dates of the oldest and of the most recent days downloaded shall also be recorded.

#### **3.4.13 Company locks data**

The DT shall record and store in its data memory the following data relevant to the 255 most recent company locks:

- lock-in date and time;
- lock-out date and time;
- company card number and card issuing Member States;
- company name and address.

Data previously locked by a lock removed from memory due to the limit above, shall be treated as not locked.

#### **3.4.14 Download activity data**

The DT shall record and store in its data memory the following data relevant to the last data memory downloading to external media while in company or in calibration mode:

- date and time of downloading;
- company or workshop card number and card issuing Member State;
- company or workshop name.

#### **3.4.15 Specific conditions data**

The DT shall record in its data memory the following data relevant to specific conditions:

- date and time of the entry;

- type of specific condition.

The data memory shall be able to record and hold specific conditions data for at least 365 days (with the assumption that on average, one specific condition is opened and closed per day). When storage capacity is exhausted, new data shall replace oldest data.

### **3.5 Reading from tachograph cards**

The digital tachograph shall be able to read from tachograph cards the necessary data:

- to identify the card type, the card holder, the previously used vehicle, the date and time of the last card withdrawal and the activity selected at that time;
- to check that last card session was correctly closed;
- to compute the driver's continuous driving time, cumulative break time and cumulated driving times for the previous and the current week;
- to print requested printouts of data recorded on a driver card;
- to download a driver card to external media.

In case of a reading error, the digital tachograph shall try again, three times maximum, the same read command, and then if still unsuccessful, declare the card faulty and non-valid.

### **3.6 Recording and storing on tachograph cards**

The DT shall set the 'card session data' in the driver or workshop card right after the card insertion.

The DT shall update data stored on valid driver, workshop or control cards with all data relevant to the period while the card is inserted and relevant to the card holder.

The DT shall update driver activity and location data stored on valid driver and/or workshop cards with activity and location data manually entered by the card holder.

The scope of data stored on cards is provided in Chapter IV or Annex 1B to Council Regulation (EEC) No 3821/85.

The data stored in tachograph cards shall be updated in a manner and at a time when needed, taking into account card actual storage capacity and replacing oldest data with most recent data.

In the case of a writing error, the DT shall try again, three times maximum, the same write command, and then if still unsuccessful, declare the card faulty and non-valid.

Before releasing a driver card, and after all relevant data have been stored on the card, the DT shall reset the card session data.

### **3.7 Displaying**

The DT shall be able to display:

- a) default data;
- b) data related to warnings;
- c) data related to menu access;
- d) other data requested by a user.

If the recording equipment displays the vehicle odometer and speedometer values, the following details shall also appear on its display:

- near the figure indicating the distance, the unit of measurement of distance, indicated by the abbreviation 'km';
- near the figure showing the speed, the entry 'km/h'.

The recording equipment may also be switched to display the speed in miles per hour, in which case the unit of measurement of speed shall be shown by the abbreviation 'mph'.

Additional information may be displayed by the DT, provided that it is clearly distinguishable from information required above.

Concerning (a) Displaying of default data:

When no other information needs to be displayed, the digital tachograph shall display, by default, the following data:

- the local time (as a result of UTC time + offset as set by the driver);
- the mode of operation;
- the current activity of the driver and the current activity of the co-driver.

Information related to the driver:

- if his current activity is DRIVING, his current continuous driving time and his current cumulative break time,
- if his current activity is not DRIVING, the current duration of this activity (since it was selected) and his current cumulative break time.

Concerning (b) Displaying of data related to warnings:

The DT shall display warning information using primarily the pictograms of Appendix 3 in Annex 1B to Council Regulation (EEC) No 3821/85, completed where needed by an additional numerically coded information.

Concerning (c) Displaying of data related to menu access:

The DT shall provide necessary commands through an appropriate menu structure.

Concerning (d) Other displayed data:

It shall be possible to display selectively on request:

- the UTC date and time, and local time offset;
- the content of any of the six printouts under the same formats as the printouts themselves;
- the continuous driving time and cumulative break time of the driver;
- the continuous driving time and cumulative break time of the co-driver;
- the cumulated driving time of the driver for the previous and the current week;
- the cumulated driving time of the co-driver for the previous and the current week.

Optionally:

- the current duration of co-driver activity (since it was selected);
- the cumulated driving time of the driver for the current week;
- the cumulated driving time of the driver for the current daily work period;
- the cumulated driving time of the co-driver for the current daily work period.

Printout content display shall be sequential, line by line. If the display width is less than 24 characters, the user shall be provided with the complete information through appropriate means (several lines, scrolling, etc.). Printout lines devoted to hand-written information may be omitted for display.

### **3.8 Printing**

The DT shall be able to print information from its data memory or from tachograph cards in accordance with the six following printouts:

- driver activities from card daily printout;
- driver activities from vehicle unit daily printout;
- events and faults from card printout;
- events and faults from vehicle unit printout;
- technical data printout;
- over speeding printout.

Additional data may be provided at the end of these printouts. Additional printouts may also be provided by the DT, if clearly distinguishable from the six aforementioned printouts.

The 'driver activities from card daily printout' and 'events and faults from card printout' shall be available only when a driver card or a workshop card is inserted in the DT. The DT shall update data stored on the relevant card before starting printing. In order to produce the 'driver activities from card daily printout' or the 'events and faults from card printout', the DT shall:

- either automatically select the driver card or the workshop card if one only of these cards is inserted or
- provide a command to select the source card or select the card in the driver slot if two of these cards are inserted in the DT.

Complete and detailed requirements for printers and standard printouts are specified in Annex 1B to Council Regulation (EEC) No 3821/85 and its Appendix 4.

Printers shall be so designed as to produce these printouts with a degree of definition likely to avoid any ambiguity when they are read.

Print-outs must remain legible under normal conditions of storage for at least one year. Printouts shall retain their dimensions and recordings under normal conditions of relative humidity (10 to 90 %) and temperature.

The printout paper used by the recording equipment shall bear the relevant type approval mark and an indication of the type(s) of DT with which it may be used.

Printouts shall remain legible under normal conditions of storage, in terms of light intensity, humidity and temperature, for at least two years.

### **3.9 Data downloading to external media**

The DT shall be able to download on request data from its data memory or from a driver card to external storage media via the calibration or downloading connector. The DT shall update data stored on the relevant card before starting downloading.

In addition and as an optional feature, the recording equipment may, in any mode of operation, download data through another connector to a company authenticated through this channel. In such a case, company mode data access rights shall apply to this download.

Downloading shall not alter or delete any stored data.

The calibration or downloading connector electrical interface is specified in detail in Appendix 6 of Annex 1B to Council Regulation (EEC) No 3821/85.

Downloading protocols are specified in Appendix 7 of Council Regulation (EEC) No 3821/85.

### **3.10 Output data to additional external devices**

When the DT does not include speed or odometer display functions, the DT shall provide output signal(s) to allow for displaying the speed of the vehicle (speedometer) or the total distance travelled by the vehicle (odometer).

The DT shall also be able to output signal corresponding to the following data using an appropriate dedicated serial link independent from an optional CAN bus connection to allow their electronic processing by other electronic units installed in the vehicle:

- current UTC date and time;
- vehicle speed;
- total distance travelled by the vehicle (odometer);
- currently selected driver and co-driver activity;
- information if any tachograph card is currently inserted in the driver slot and in the co-driver slot and the card's identification data (card number and issuing Member State).

In addition, the DT shall provide information on the ON/OFF state of the vehicle's 'ignition'; additional information regarding this state may also be available.

Other metrological and technical requirements for digital tachographs are specified in detail in Annex 1B to Council Regulation (EEC) No 3821/85, Regulation (EU) No 165/2014 of the European Parliament and of the Council and Regulation (EC) No 561/2006.

### **3.11 Calibration**

The calibration function shall allow:

- a) to automatically pair the motion sensor with the VU;
- b) to digitally adapt the constant of the digital tachograph ' $k$ ' to the characteristic coefficient of the vehicle ' $W$ ' (vehicles with two or more axle ratios shall be fitted with a switch device whereby these various ratios will automatically be brought into line with the ratio for which the recording equipment has been adapted to the vehicle);
- c) to adjust (without limitation) the current time;
- d) to adjust the current odometer values;
- e) to update impulse sensor identification data stored in the data memory;
- f) to update or confirm other parameters known to the recording equipment: vehicle identification,  $W$ ,  $l$ , tyre size and speed limiting device setting, if applicable.

Pairing the motion sensor to the vehicle unit shall consist, at least, in:

- updating impulse sensor installation data held by the impulse sensor (as needed);
- copying from the motion sensor to the vehicle unit data memory necessary motion sensor identification data.

The calibration function shall be able to input necessary data through the calibration or downloading connector in accordance with the calibration protocol defined in Appendix 8 of Annex 1B to Council Regulation (EEC) No 3821/85. The calibration function shall also be able to input necessary data through other connectors.

### **3.12 Time adjustment**

The time adjustment function shall allow for adjusting the current time in amounts of one minute maximum at intervals of not less than seven days. It shall allow for adjusting the current time without limitation in calibration mode.

### **3.13 Materials**

All the constituent parts of the recording equipment shall be made of materials of sufficient stability and mechanical strength and with stable electrical and magnetic characteristics.

For normal conditions of use, all the internal parts of the equipment shall be protected against damp and dust.

Digital tachographs shall meet the cover protection grade IP 40 and the motion sensor shall meet the cover protection grade IP 64.

The equipment shall conform to applicable technical specifications related to ergonomic design.

The equipment shall be protected against accidental damage.

### **3.14 Tachograph card**

Digital tachographs shall be so designed that the driver card (with memory) is locked in position on its proper insertion into the card reader and that the relevant driver card data are automatically stored in the data memory of the DT. The release of the driver card may function only when the vehicle is stationary and after the relevant data have been stored on the driver card.

**3.14.1** Tachograph cards shall be subject to type approval consisting of:

- a) safety certification;
- b) functionality certification;
- c) certification of interoperability of the given tachograph card with every approved digital tachograph.

**3.14.2** Tachograph cards shall include, inter alia:

- card type name;
- card issuing Member State;
- distinguishing sign of the Member State issuing the card;
- card holder identification;
- start of validity and expiry date of the card;
- the name of the issuing authority.

**3.14.3** Tachograph cards shall be printed with the following background predominant colours:

- a) driver card – white;
- b) control card – blue;
- c) workshop card – red;
- d) company card – yellow.

**3.14.4** Tachograph cards shall bear features for protection of the card against counterfeiting and tampering.

### **3.14.5 Security measures**

The system security aims at protecting authenticity of data exchanged between the cards and the digital tachograph, protecting the integrity and authenticity of data downloaded from the cards, allowing certain write operations onto the cards to digital tachograph only and protecting the card against damage and detecting any attempt of that kind.

In order to achieve the system security, the tachograph cards shall meet the security requirements defined in Annex 1B to Council Regulation (EEC) No 3821/85.

### **3.15 Motion sensor**

The motion sensor is intended to be installed in road transport vehicles. Its purpose is to provide secured motion data representative of vehicle's speed and distance travelled.

The motion sensor is subject to type approval consisting of safety certification and functionality certification.

Interoperability between every model of motion sensor and every DT is not required, therefore the type approval for a motion sensor can be granted only in combination with the type approval of a DT and vice versa.

The motion sensor is mechanically interfaced to a moving part of the vehicle, which movement can be representative of vehicle's speed or distance travelled. It may be located in the vehicle's gear box or other part of the vehicle.

In its operational mode, the motion sensor is connected to a vehicle unit.

It may also be connected to specific equipment for management purposes (to be defined by manufacturer). The motion sensor shall record and store in its data memory in the vehicle unit the following motion sensor installation data:

- a) first pairing with a DT (date, time, DT type-approval number, DT serial number);
- b) last pairing with a DT (date, time, DT type-approval number, DT serial number).

The motion sensor shall store in its data memory the following identification data:

- a) name of the manufacturer;
- b) part number;
- c) serial number;
- d) type-approval mark;
- e) embedded security component identifier (e.g. internal chip/processor number);
- f) operating system identifier (e.g. software version number).

Motion sensor identification data are recorded and stored once and for all in the motion sensor data memory, by the motion sensor manufacturer.

Other requirements for motion sensors are specified in detail in Annex 1B to Council Regulation (EEC) No 3821/85.

### **3.16 Adaptor for category M1 and N1 vehicles**

Adaptor is a part of the recording equipment installed and used only in M1 and N1 vehicles put into service for the first time between 1.5.2006 and 31.12.2015, where it is not mechanically possible to install any other type of existing motion sensor. Any adaptor may be submitted for its own type approval, or for type approval as a component of a recording equipment.

The adaptor shall include the following functions:

- interfacing and adapting the incoming speed pulses;
- inducing the incoming pulses to the embedded motion sensor;
- all functions of the embedded motion sensor, providing secured motion data to the vehicle unit.

The adaptor shall not be mechanically interfaced to a moving part of the vehicle, but connected to the distance/speed impulses which are generated by integrated sensors or alternative interfaces.

The identification data of the embedded motion sensor shall be used by the tachograph to identify the adaptor.

## **4 Inscriptions and marks**

### **4.1 Descriptive plaque**

A descriptive plaque shall be affixed to each separate component of the digital tachograph and show the following details:

- a) name and address of the manufacturer of the equipment;
- b) manufacturer's part number and year of manufacture of the equipment;
- c) serial number;
- d) type-approval mark of the digital tachograph.

When physical space is not sufficient to show all above-mentioned details, the descriptive plaque shall show at least the manufacturer's name or logo and the part number.

## **5 Type approval**

Tachographs (recording equipment) are not subject to type approval under the Metrology Act.

Tachographs are subject to type-approval in accordance with Article 13 of Regulation (EU) No 165/2014 of the European Parliament and of the Council through which Member States certify that the tachograph, its relevant components or the tachograph card to be introduced to market fulfil the requirements of this Regulation.

Approval of recording equipment consists of a separate approval of the vehicle unit, motion sensor, tachograph card and model printout paper.

### **5.1 Requirements relating to type approval**

The requirements relating to type approval are specified in detail in Annex 1B to Council Regulation (EEC) No 3821/85 and Regulation (EU) No 165/2014 of the European Parliament and of the Council. The competent authorities of each Member State shall indicate on the approval certificate for a model printout paper, the type or types of digital tachographs in which that model paper may be used.

### **5.2 Type approval mark and type approval certificate**

The type approval mark consists of a rectangle within which shall be placed the letter 'e' and a distinguishing number or letter for the country which has approved the type, and a type approval number which corresponds to the type-approval certificate number for the recording equipment (i.e. tachograph and/or motion sensor) or the model record sheet, placed at any point within the immediate proximity of this rectangle.

The type approval mark shall be shown on the descriptive plaque of each set of equipment and each record sheet. It must be indelible and must always remain clearly legible.

The precise appearance of the type approval mark, including dimensions, is provided in Annex II to Regulation (EU) No 165/2014 of the European Parliament and of the Council.

No Member State may refuse to register a vehicle fitted with recording equipment, or prohibit the use of such vehicle for any reason connected with this equipment, if the equipment bears the type approval mark and the installation plaque.

## **6 Installation and verification**

### **6.1 Installation of recording equipment**

New recording equipment shall be delivered non-activated to an entity authorised to carry out installation, with all calibration parameters, as listed in point 3.4.10, set to appropriate valid default

values. Where no particular value is appropriate, literal parameters shall be set to strings of '?' and numeric parameters shall be set to '0'. Before its activation, the recording equipment shall give access to the calibration function even if not in calibration mode. Before its activation, the recording equipment shall neither record nor store data referred to in points 3.4.3 to 3.4.9 and 3.4.12 to 3.4.14 inclusive. During installation, manufacturers shall pre-set all known parameters.

Vehicle manufacturers or approved workshops shall activate the installed recording equipment before the vehicle is used in scope of Regulation (EC) No 561/2006. The activation of the recording equipment shall be triggered automatically by the first insertion of a workshop card in either of its card interface devices. Specific pairing operations required between the motion sensor and the vehicle unit, if any, shall take place automatically before or during activation. After its activation, the recording equipment shall fully enforce functions and data access rights. The recording and storing functions of the recording equipment shall be fully operational after its activation.

Installation shall be followed by a calibration and verification. The first calibration may not necessarily include entry of the vehicle registration number (VRN), when it is not known by the entity having to undertake this calibration. In these circumstances, it shall be possible, for the vehicle owner, and at this time only, to enter the VRN using his company card prior to using the vehicle in scope of Regulation (EC) No 561/2006. Any update or confirmation of this entry shall only be possible using a workshop card.

After calibration, an installation plaque which is clearly visible and easily accessible shall be affixed onto the recording equipment. In cases where this is not possible, the plaque shall be affixed to the vehicle's 'B' pillar so that it is clearly visible. For vehicles that do not have a 'B' pillar, the installation plaque shall be affixed to the doorframe on the driver's side of the vehicle and be clearly visible in all cases.

In cases where it is not technically possible to affix the installation plaque directly onto or in close proximity of the tachograph and the vehicle does not have the 'B' pillar, the workshop shall affix the installation plaque firmly to the doorframe of the vehicle on the driver's side. If the vehicle has no door on the driver's side (e.g. certain buses), the installation plaque shall be affixed firmly on the frame of the vehicle's front door. In cases where this is not possible for certain buses, the installation plaque shall be affixed to the side window on the driver's side.

The installation plaque shall bear at least the following details:

- a) name, address or trade name of the approved fitter or workshop;
- b) characteristic coefficient of the vehicle, in the form ' $w = \dots \text{ imp/km}$ ';
- c) constant of the recording equipment, in the form ' $k = \dots \text{ imp/km}$ ';
- d) effective circumference of the wheel tyres, in the form ' $l = \dots \text{ mm}$ ';
- e) tyre size;
- f) the date on which the characteristic coefficient of the vehicle and the effective circumference of the wheel tyres were measured;
- g) vehicle identification number.

In addition, when installing adaptors for vehicles of categories M1 and N1:

- h) the part of the vehicle where the adaptor, if any, is installed;
- i) the part of the vehicle where the motion sensor is installed, if not connected to the gear-box or an adaptor is not being used;
- j) a description of the colour of the cable between the adaptor and that part of the vehicle providing its incoming impulses;
- k) the serial number of the embedded motion sensor of the adaptor.

Installation plaques for vehicles equipped with adaptors, or for vehicles where the motion sensor is not connected to the gear-box shall be fitted at the time of installation. For all other vehicles, installation plaques bearing the new information shall be fitted at the time of inspection following the installation.

For M1 and N1 vehicles only, and which are fitted with an adaptor in conformity with Appendix 16 of Regulation (EC) No 2016/799 and where it is not possible to include all the information necessary on the installation plaque, a descriptive plaque may be used. In such cases, the descriptive plaque shall contain at least the information referred to in points (h) to (k).

If a descriptive plaque is used, it shall be affixed next to the installation plaque and shall have the same level of protection. Furthermore, the descriptive plaque shall also bear the name and address of the entity that carried out the installation and the date of installation.

In the case of installation of tachographs in vehicles subject to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), only tachographs approved for these vehicles may be installed. Tachographs shall be marked with a symbol with the letters 'Ex' in a hexagon. The same requirements shall apply to motion sensors.

### **6.1.1 Attachment of official marks**

Any connection which, if disconnected, would cause undetectable alterations to be made or undetectable data loss, shall be secured with an official mark.

The installation plaque shall be attached and secured in such a way that it cannot be removed without the markings thereon being destroyed.

The official marks mentioned above may be removed:

- in case of emergency,
- to install, to adjust or to repair a speed limitation device or any other device contributing to road safety, provided that the recording equipment continues to function reliably and correctly and is secured again with the official mark of an authorised metrology centre immediately after fitting the speed limitation device or any other device contributing to road safety or within seven days in other cases.

In the case that the official mark is broken, a written statement giving the reasons for such action shall be prepared and made available to the competent authority.

## **6.2 Initial verification of digital tachographs**

The tachograph shall be delivered for verification activated and installed in the vehicle.

The subject of tachograph verification shall be the inspection of the tachograph and vehicle in which the tachograph is installed, a test of the functions of the tachograph, determination of the metrological parameters of the tachograph and the vehicle, adjustment of the constants '*k*' and '*W*' and, if appropriate, entry or modification of data in the data memory of the digital tachograph.

### **6.2.1 External inspection of tachographs and vehicles and recording of results:**

- external inspection and check of completeness, identification and functionality of the tachograph;
- inspection of the vehicle (check according to the vehicle registration certificate);
- check of suitability, integrity and identification of the impulse sensor.

### **6.2.2 Vehicle tests**

- determination of the effective circumference of the tyres on driving wheels;
- determination of the vehicle constant '*W*'.

### **6.2.3 Sensor functionality check**

### **6.2.4 Check of the adaptor for category M1 and N1 vehicles**

### **6.2.5 Procedure for the verification of digital tachographs**

The procedure for the verification of digital tachographs consists of:

- external inspection and check of functionality of the tachograph;
- external inspection of the vehicle;
- tachograph activation (automatic check after inserting the workshop card), if not already activated;
- determination of the effective circumference of the tyres on driving wheels;
- determination of the characteristic coefficient 'W' of the vehicle;
- DT calibration and programming, i.e. check and entry of standard data in the data memory and programming of specific parameters and functions depending on the vehicle and/or other accessories linked to the tachograph;
- test of indication of speed and distance travelled;
- check and test of functionality of the independent motion signal IMS;
- test of accuracy of the crew activity record;
- tachograph time base test;
- test drive;
- attachment of the installation plaque and official marks onto the tachograph;
- attachment of the installation plaque and official marks onto the M1 and N1 vehicle adaptor;
- keeping of a continuous record of the test specifying the conditions and partial and final results of the above tests;
- continuous making of printouts from the data memory;
- preparation and printing of a tampering check report;
- issue of a 'Tachograph test record' on the basis of the data observed and recorded;
- downloading, viewing and archiving of data from the workshop card and DT memory;
- downloading of data from the DT on the basis of the company lock and issue of a confirmation of data copying. If it is not possible to copy data from the data memory, a 'Confirmation of impossibility of data copying' shall be issued;
- keeping of the 'Tachograph test record' throughout the verification procedure.

### **6.2.6 Official marks and verification documentation**

Based on positive results of all tests and compliance with the requirements of this General Measure, the installation plaque and the official mark of the authorised metrology centre shall be attached to the appropriate part of the tachograph, i.e. onto, into or, if appropriate, outside the tachograph. In order to increase the durability of the installation plaque, it shall be covered with a transparent protective film so that the official mark is always broken when the installation plaque is removed.

## **7 Follow-up verification**

Periodic verification of tachographs installed in vehicles shall take place after any repair of the recording equipment or after any alteration of the characteristic coefficient of the vehicle or the effective circumference of the tyres, or after equipment UTC time is wrong by more than 20 minutes,

or when the vehicle registration number has changed, and at least once within two years (24 months) of the last inspection.

The scope of follow-up verification tests of digital tachographs shall be identical to that of initial verification.

### **8 Examination at the request of a concerned person in accordance with § 11a**

Users of legally controlled measuring instruments shall, at the request of a person who may be affected by inaccurate measurement, request examination of the legally controlled measuring instrument. The tachograph shall meet the metrological requirements specified in chapter 2.3.1 of this General Measure.

Examination shall consist of the following types of tests:

- a) determination of the effective circumference of the tyres on driving wheels;
- b) determination of the characteristic coefficient W of the vehicle;
- c) tests of indication of speed and distance travelled;
- d) tests of accuracy of the crew activity record;
- e) tachograph time base test;
- f) test drive.

In the course of the above tests, at the request of a person who may be affected by inaccurate measurement under § 11a, the authorised metrology centre shall not intervene in the data memory of the digital tachograph.

### **9 Notified standards**

For the purposes of specifying the metrological and technical requirements for measuring instruments and specifying the testing methods for their type approval and verification arising from this General Measure, the CMI shall provide notification of the Czech technical standards, other technical standards or technical documents of international or foreign organisations, or other technical documents containing more detailed technical requirements (hereinafter referred to as “notified standards”). The CMI shall publish a list of these notified standards attached to the relevant measures, together with the general measure, in a manner accessible to the public (on the [www.cmi.cz](http://www.cmi.cz) website).

Compliance with notified standards or parts thereof shall be considered, to the extent and under the conditions laid down in the General Measure, as compliance with those requirements laid down in this measure to which these standards or parts thereof apply.

## **II.**

### **G R O U N D S**

The CMI has issued this General Measure laying down metrological and technical requirements for legally controlled measuring instruments and tests for the type approval and verification of these legally controlled measuring instrument in accordance with § 14(1)(j) of the Metrology Act to implement § 6(1), § 9(1) and § 9(9) of the Metrology Act.

Under item 2.2.2 of the Annex ‘List of the types of legally controlled measuring instruments’ to Implementing Decree No 345/2002 specifying the measuring instruments whose verification is mandatory and measuring instruments subject to type approval, as amended, tachographs recording the work activities of drivers of motor vehicles compulsorily equipped with these tachographs, point (b) digital, are classified as measuring instruments subject to verification.

Therefore, to implement § 24d of the Metrology Act, as amended, for this particular type of measuring instrument ‘tachographs recording the work activities of drivers of motor vehicles compulsorily equipped with these tachographs – digital tachographs’, the CMI has issued this General Measure laying down the metrological and technical requirements for tachographs recording the work activities of drivers of motor vehicles compulsorily equipped with these tachographs – digital tachographs and testing methods for the verification of these legally controlled measuring instruments.

This legislation (General Measure) will be notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

### **III. I N S T R U C T I O N S**

In accordance with § 172(1), in conjunction with § 39(1) of the APC, a time limit for comments of 30 days of posting of the draft has been set by the CMI. Comments submitted after this time limit will not be considered.

The persons concerned are hereby invited to comment on this draft General Measure. With a view to the provisions of § 172(4) of the APC, the comments shall be submitted in writing and meet the requirements for submissions in accordance with § 37 of the APC.

The comments shall include the particulars referred to in § 37(2) of the APC, stating clearly who is making the comments, which general measure they concern, to what extent the comments challenge the measure, how it contradicts legislation or how the general measure or the procedure that preceded it is inaccurate, which matters the comments concern and what is being proposed; the comments shall also contain an identification of the administrative authority to which they are addressed and signature of the person making them.

The supporting documents for the draft General Measure may be consulted at the Czech Metrological Institute, Department of Legal Metrology, Okružní 31, 638 00 Brno, door no. 158, Monday to Wednesday, from 9:00am to 03:30pm or, on other days, on an appointment made by phone.

This General Measure shall be posted for a period of 15 days.

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RNDr. Pavel Klenovský

Director-General

Person responsible for accuracy: Mgr. Tomáš Hendrych

Posted on: 18.11.2016

Signature of the authorised person confirming posting:

Removed on:

Signature of the authorised person confirming removal: