

Semel Oy taximeter system C30

Issued to

Semel Oy

Valimotie 21, 00380 HELSINKI, FINLAND

Semel Oy taximeter system C30 is fulfilling module B (Annex II) of directive 2014/32/EU on measuring instruments (MID), implemented in Swedish law by SWEDAC (The Swedish Board for Accreditation and Conformity Assessment) through STAFS 2016:1 The Measuring Instruments Regulations and STAFS 2016:8 The Regulations and Guidelines concerning Taximeters. Rise Certification Rule SPCR 302 has been applied.

Applicable essential requirements of directive 2014/32/EU

- Annex I, Essential requirements
- Annex IX (MI-007), Taximeters

Harmonised standards and normative documents used

OIML R21

Further applied documents

WELMEC 7.2, Software Guide (Issue 5)

Rated operating conditions

Measurand:	Time and or distance	Mechanic environment class:	M3
Measurement range:	Maximum 6 digits on the display (corresponding to the fare to be paid)	Electromagnetic environment class:	E3
Accuracy:	- Time elapsed: $\pm 0,1 \%$ - Distance travelled: $\pm 0,2 \%$ - Calculation of the fare: $\pm 0,1 \%$ - Measuring range: 500-75 000 pulses/km	Climatic environment:	-25 to +55 °C Condensing Closed (installed in a car)

Originally issued: 27 June 2019

Expiry date: 27 June 2029

This certificate replaces earlier issues with the same number. Earlier issues were issued according to directive 2004/22/EC, and were issued under the name SP Technical Research Institute of Sweden. The principal characteristics, approval conditions are set out in the appendix hereto, which forms part of the approval documents and consists of 13 pages. All the plans, schematic diagrams and documentations are recorded under reference files ELe P702286, P901535, P90153, P906438, PX04579, PX07823, PX10562, PX23898, 4P04492 and 8P07148.

Issued by Notified body 0402.

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8P07148



The instruments / measuring systems must correspond with the following specifications:

1. Design of the instrument

1.1 Construction

Product names

C30 consists of:

TM206e or TM206eC (Central processor unit)

TD321 (Display with numeric key pad)

RX80e or RX90hn (Printers) can be connected to the system but is not a requirement according to directive 2014/32/EU.

TM6000 consists of:

TM206e or TM206eC (Central processor unit)

TD321 (Display with numeric key pad)

RX80e or RX90hn (Printers) can be connected to the system but is not a requirement according to directive 2014/32/EU.

FR3000 consists of:

TM206e or TM206eC (Central processor unit)

TD330 (Display without numeric key pad)

RX80e or RX90hn (Printers) can be connected to the system but is not a requirement according to directive 2014/32/EU.

Measuring system description

The taximeter is designed to measure time and receive information to calculate distance. Time is measured by its internal real time clock and distance is calculated by the number of pulses received from the pulse generator of the car in relation to the given pulse constant. The supply voltage is taken from the battery of the vehicle. For connections see the schematic picture below.

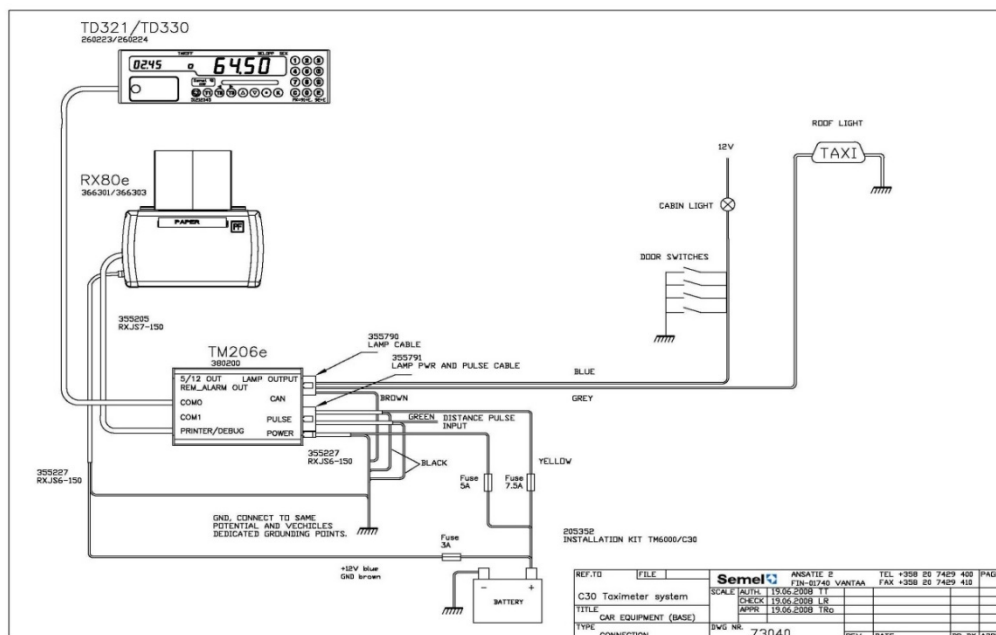


Figure 1: taximeter connections



Figure 2: Central Processor Unit (CPU) TM206e Figure 3: Display with numeric key pad TD321



Figure 4: Display without numeric key pad TD330

Supply voltage

Taximeter (CPU): 8-32V

Printer 8-16V (the printer is not a part of the certified taximeter)

Connection to pulse generator of the vehicle

The pulse from the pulse generator of the car is to fulfil the following the requirements according to the manufacturer:

Pulse reference can be referenced either to car chassis ground or to PULSE_GND. which can be up to 10V from car ground.

Distance pulse input electrical characteristics:

- maximum high level 32V
- minimum high level 5V
- low to high threshold 3,0V
- high to low threshold 1,2V
- minimum low level 0V
- input impedance 3,3 kohm
- measuring range 0...5kHz

Driving pulse specification:

- pulse type square wave
- duty cycle 40...60%
- output impedance 600 ohm max
- output amplitude 5V min referenced to ground
- output amplitude 32V max referenced to ground

Device constant k: 500 pulses/km min
 75000 pulses/km max

The taximeter will only accept analogue pulses

1.2 Software

The validation of software was based on the essential requirements given in MID and WELMEC Guide 7.2. A report with number P702286-03, dated November 6, 2008 was issued and is held by SP.

Software version

For a CPU connected to display alternative TD321 the following versions are approved:

Program version	Checksum
C30.BXX.XX479X.XXXXXXX	1280579479
C30.BXX.XX062X.XXXXXXX	730886062
C30.BXX.XX187X.XXXXXXX	1350068187
C30.BXX.XX287X.XXXXXXX	793593287
C30.BXX.XX958X.XXXXXXX	640439958
C30.CXX.XX958X.XXXXXXX	
C30.BXX.XX472X.XXXXXXX	62928472
C30.CXX.XX472X.XXXXXXX	
C30.BXX.XX790X.XXXXXXX	3075236790
C30.CXX.XX790X.XXXXXXX	
C30.BXX.XX203X.XXXXXXX	309973203
C30.CXX.XX203X.XXXXXXX	

For a CPU connected to display alternative TD330 the following versions are approved:

Program version	Checksum
C30.bXX.XX479X.XXXXXXX	1280579479
C30.bXX.XX062X.XXXXXXX	730886062
C30.bXX.XX187X.XXXXXXX	1350068187
C30.bXX.XX287X.XXXXXXX	793593287
C30.bXX.XX958X.XXXXXXX	640439958
C30.cXX.XX958X.XXXXXXX	
C30.bXX.XX472X.XXXXXXX	62928472
C30.cXX.XX472X.XXXXXXX	
C30.bXX.XX790X.XXXXXXX	3075236790
C30.cXX.XX790X.XXXXXXX	
C30.bXX.XX203X.XXXXXXX	309973203
C30.cXX.XX203X.XXXXXXX	

X states information not required by the directive 2004/22/EC.

The software identification numbers are to be interpreted in the following way:

Example:

Complete program version: C30.BSE.01999A.105010

C30 is the taximeter type

B is the hardware version (capital letter indicates a system with display TD321)

SE is stating which country the program is intended for (e.g. language, SE means Sweden).

01 is the version number for country specific functions

999 is the three last digits of the checksum

A is the version of customers' function in the country

1 is the version of bigger changes

05 is the version of smaller changes

01 is the revision number

0 not in use

The software checksum can be seen in the following way: use code* 96 in OFF or "For hire" mode.

* When the numeric key pad of TD321 can be used to enter a code the number of the code has been written. To do the same thing when using TD331 arrow up or down until the same number has been found is to be used. The chosen function is confirmed with button E on TD321 and button P on TD330.

Alternatively if a printer is connected the number and the checksum can be read by making a "Taxameterkontroll"* (code 91).

* The mode "Taxameterkontroll" is a print-out intended for the police or other authority in order to check e.g. the totalisers, the date of securing and the tariff values.

Flags

Even if the software identification number and checksum is the same the functionality can be different depending on the settings of flags. In order to fulfil the requirements of directive 2014/32/EU the flags (flags can be seen by using code 600) are to be set in the following ways (for checksums previous to 62928472):

Parameter	Taximeter display	Press / Scroll	Setting necessary to fulfil the requirements of directive 2014/32/EU
F-KORT	Shift start with driver card	0 = No driver card 1 = With driver card(DEFAULT)	
LT.INTE	Lamp test intervall	0 = No test (DEFAULT) 1-X = Lamps diagnostics run interval in seconds 5=5s test interval (DEFAULT)	

Parameter	Taximeter display	Press / Scroll	Setting necessary to fulfil the requirements of directive 2014/32/EU
LAMP.TP	Set roof light type	0=None 1=Starplast 5 2=Gamma 6 3=Gamma 5 4= 5=Norway (DEFAULT)	
LOG.WAR	Free space percentage of the MID log. Notification when memory full	1-100 5 = DEFAULT	
TAR.NAM	Show tariff name/number on display.	0=Show number(DEFAULT) 1=Show name	
LOG.CLE	MID log overwrite allow/deny.	0 = log overwrite allowed, 1 = log overwrite denied, need command 902 to clear log.(DEFAULT)	1
EXT.MID	Extra included/not included in price	0 = Included 1 = Not included (DEFAULT) 2= Included with additional extra on left	1
SW.PERM	Software update approval setting.	0 = software update approval with code 999 1= No approval (DEFAULT)	
KLO.INT**	Clock adjustment interface	0 = Numeric keys are NOT needed (TD330) 1 = Numeric keys are needed (DEFAULT)	
SKR.TYP*	Printer type	0 = No printer 1 = RX80 2 = RX80e (DEFAULT) 4 = RX90hn	
LDG.MID	Show OFF and FREE status	0 = Not shown on display 1= OFF mode (shift off) and FREE mode is indicated on display.(DEFAULT)	1
RASTUT	Pause during TARIFF mode	0= Not allowed 1= Allowed (DEFAULT)	
PRIVAT	Private trips allowed	0= Not allowed 1= Allowed (DEFAULT)	

Parameter	Taximeter display	Press / Scroll	Setting necessary to fulfil the requirements of directive 2014/32/EU
SKR.OBL	Printer mandatory	0= Not mandatory (DEFAULT) 1= Mandatory	
FÖRARN	Driver number minimum length	0= No driver number needed (DEFAULT) 1-X = Driver number min. length	
EFT930	Payment terminal mandatory	0= Not mandatory (DEFAULT) 1= Mandatory	

* The parameter SKR.TYP was not available in the program versions with checksum 793593287 to checksum 6292847, since only printer RX80e were used. The parameter SKR.TYP is available in program version with checksum 3075236790 and later versions, since different printers can be used.

**The parameter KLO.INT is not available in the program version 640439958 for display TD330.

For program versions with checksums 62928472, 3075236790 and 3109973203 the flag menu have been separated in to two flag menus, flags code 600 and flags code 601, where the parameter settings in the flag menu with code 601 is regulated by the directive 2014/32/EU or national requirements.

The parameters in flag menu with code 601 are to be set in the following ways to fulfil the requirements of the directive 2014/32/EU:

Parameter	Taximeter display	Press / Scroll	Setting necessary to fulfil the requirements of directive 2014/32/EU
LOG.WAR	Free space percentage of the MID log. Notification when memory full	1-100 5 = DEFAULT	5
TAR.NAM	Show tariff name/number on display.	0=Show number(DEFAULT) 1=Show name	
INF.MID	MID log overwrite allow/deny.	0 = log overwrite allowed, 1 = log overwrite denied, need command 902 to clear log.(DEFAULT)	1
MID.MIN	Handling minimum price.	0 = minimum price is shown only after cashier. 1 = minimum price is shown instantly. (DEFAULT)	1
MID.EXT	Extra included/not included in price	0 = Included 1 = Not included (DEFAULT) 2 = Included with additional extra on left	1
SW.PERM	Software update approval setting.	0 = software update approval with code 999 1= No approval (DEFAULT)	

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Parameter	Taximeter display	Press / Scroll	Setting necessary to fulfil the requirements of directive 2014/32/EU
MID.OP	Show OFF and FOR HIRE status	0 = Not shown on display 1= OFF mode (shift off) and FOR HIRE mode is indicated on display.(DEFAULT)	1
DIS.OFF	Can display be shut down	0= Display is always on (DEFAULT) 1= Display can be shut down, so it does not show anything.	0
PRI.OBL	Printer mandatory	0= Not mandatory (DEFAULT) 1= Mandatory	
DRI.NO	Driver number minimum length	0= No driver number needed (DEFAULT) 1-X = Driver number min. length	

1.3 Components included for electronic function

CPU according to Drawing index 10194

*Display board TD321 according to Drawing index 10198

*Display board TD330 according to Drawing index 10197

Cable set

* Alternative exists, but is dependent on the software of the instrument

1.4 Optional equipment and functions subject to MID requirements

None identified

1.5 Technical documentation

For market surveillance the construction, software and included components are described in 1.1, 1.2 and 1.3.

1.6 Integrated equipment and functions not subject to MID

Software to fulfil national requirements or to communicate with booking central etc. must not influence the accuracy of measurements such that the maximum permissible error is exceeded or the required functions are changed.

2. Technical data

2.1 Rated operating conditions

Measurand

Time and distance.

Measurement range

Total Memory:

Distance: 184 467 440 737 095 km (based on; max = 264- 1 cm)

Time: 18 446 744 073 709 551 s (based on; 264-1 ms)

Money: 18 446 744 073 709 551 615 cents (based on 264-1 cents)

Per Tariff limitations during one trip:

Distance: 57266 km (based on tk = 75000 pulses / km; max = (232- 1)/ 75000 km)

Time: 4294967 s (based on 232 – 1 ms)
Money: 4 294 967 296 cents (based on 232-1 cents)

The limitation is the maximum fare that can be displayed. The amount is limited to six digits e.g. SEK 999 999.

Accuracy

- Time elapsed: $\pm 0,1 \%$
- Distance travelled: $\pm 0,2 \%$
- Calculation of the fare: $\pm 0,1 \%$
- Pulse range: 500-75000 pulses/km

Environments classes / influence quantities

Mechanic: class M3
Electromagnetic: class E3
Ambient temperature limits: -25°C to $+55^{\circ}\text{C}$
Humidity: condensing
Location: closed (inside a car)

2.2 Other operating conditions

Not applicable.

3. Interfaces and compatibility conditions

See clause 1.1

4. Requirements on production, putting into use and utilisation

The requirements of the installation manual are to be followed when installed

4.1 Requirements on production

No special requirements identified.

4.2 Requirements on putting into use

The taximeter must be adapted to the vehicle.

4.3 Requirements for consistent utilisations

No special requirements identified.

5. Control of the measuring tasks of the instrument in use

5.1 Documentation of the procedure

The procedure to control the accuracy after installation in a car is described in the user's manual.

5.2 Special equipment or software, if applicable







A stop watch or other time measure equipment is needed.

5.3 Calibration-/adjustment procedure

To check the accuracy of distance measurement the following procedure is to be followed:

Taximeter constant test [94] TK TEST

With this function the constant (Tk) can be manually checked. The check will not change the original value





Note/ Explanation	Taximeter display	
Taximeter in OFF mode		Code [94]
Taximeter goes into test mode. Additional display shows START. The test may start.		E
As soon as ENTER is pressed the meter starts to count pulses. Drive the test distance 1000m, and press enter at destination.		E
The taximeter shows first the present stored value, added during calibration		E
The meter shows the actual value from this test. It should be the same as the earlier.		E
The meter shows the distance driven, it should be 1000m		E

To change the taximeter constant the sealing must be broken and code 202 is to be used.

To check the accuracy of the time measurement the following procedure is to be followed:

TIME CONTROL [93] TD.TST

TD.TST : With this command 30 min time control test can be carried out.

Note/ Explanation	Taximeter display	
Taximeter in OFF mode. NOTE: This operation can be done with the seal open or seal closed.		Code [93]
Taximeter goes into test mode. Additional display shows START. The test may start as soon as You press E		
Have Your own timer ready and press Enter on the display simultaneously with Your own timer.		
Display will show TID and the calculation will begin. Display shows in this phase an accuracy of 10 sec. Continue this test for 10 minutes.		E

Note/ Explanation	Taximeter display	
When time on the display is 10 minutes, stop the calculation by pressing E and at the same time stop Your own timer. Accurate time is shown in seconds (10min = 600sec.)	 	E
Press E and add the manually received time from Your own timer in seconds, press E. The offset is now recalculated for a 30 min. period and is printed out on the printer. This should be attached to the control report.	 	E
Taximeter will return to OFF mode		

6. Security measures

6.1 Sealing

The taximeter is sealed according to page 7 and 8.

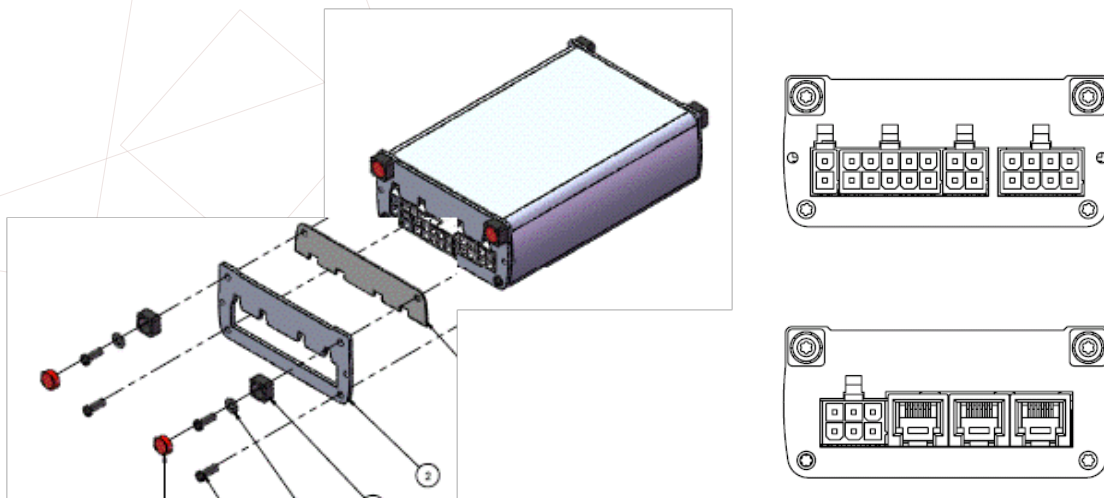


Figure 5: Sealing of TM206e and TM206eC

TM206e and TM206eC is sealed with four (4) seal screws and a seal buttons in both ends of the device. (red buttons in picture)

The connectors for power, pulses and lamp output are additionally locked with a locking plate that is fixed between the end plate and the device. This makes it sure that connectors cannot be removed without opening the end plate and its seal screws.

Electronic identification

The CPU also has a unique electronic registration number. The registration number is a factory-lasered. 64-bit ROM that includes a unique 48-bit serial number. an 8-bit CRC and ab 8-bit family code.

The device can be fastened to the body of the car from the hole of the end plate with the seal thread.

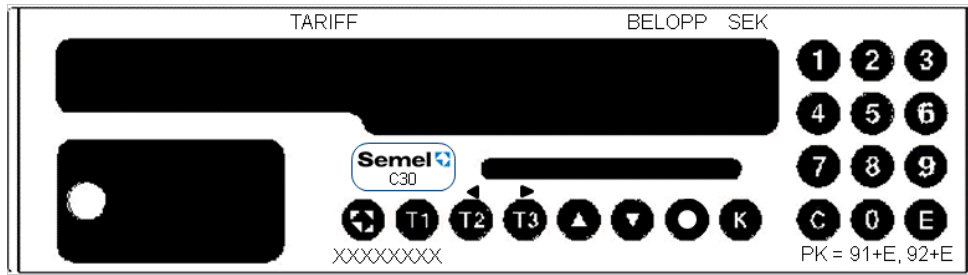


Figure 6: Sealing of displays TD321 i.e. sealing button to allow change of software and flag settings.



Figure 7: Sealing of displays TD330 i.e. sealing button to allow change of software and flag settings.

Semel C30 taximeter display has a black cover on the front side which is fixed with a screw. The screw has a red seal button to display if the lid has been opened. The electronic seal button is placed under the seal cover and if the button is pressed the text “Seal open” is displayed. Seal open and seal closed is stored in an event log.

If the seal has not been closed again, the red diodes under the display will be twinkling.

6.2 Data logger

The totalisers are stored in FRAM (non-volatile) memory.

Opening and closing of electronic seal, change of program version, low supply voltage and print-out will be stored in the event log, which can be reach by using code 97.

7. Labelling and inscriptions

7.1 Information to be borne by the instrument

The marking on the instrument shall contain the following information:

- the name of the manufacturer
- the serial number
- the designation or type name (according to “Product names” on page 2)
- the EC-type examination certificate number, 0402-MID-502302
- the accuracy class
- markings regarding other approvals
- marking regarding additional devices not being covered by MID

7.2 Conformity marking in accordance to MID article 21

The instrument shall be marked in accordance to MID article 21 which e.g. describes the CE-marking together with M, year of marking and the notified body number.

7.3 Further inscriptions, if necessary

Further inscriptions e.g. e- or E-marking and national markings are necessary, but are not connected to this directive.

8. Manuals

The following manuals are to accompany the different systems in the official language of the country of use (the manufacturer is responsible for the translation of approved documents).

<i>Program version</i>	<i>Title of manual</i>	<i>Docu- ment No.</i>	<i>Date</i>	<i>Language of examined version</i>
C30.BXX.XX479X.XXXXXX	C30 User Manual with TD321	73540	07.10.2008	English
C30.BXX.XX062X.XXXXXX	C30 User Manual with TD321	73540B	30.3.2009	English
C30.BXX.XX187X.XXXXXX	C30 User Manual with TD321	73540C	21.01.2010	English
C30.BXX.XX287X.XXXXXX and C30.BXX.XX958X.XXXXXX	C30 User Manual with TD321	73540D	05.07.2010	English
C30.CXX.XX958X.XXXXXX	C30 User Manual with TD321	73540E	11.01.2011	English
C30.BXX.XX472X.XXXXXX C30.CXX.XX472X.XXXXXX	C30 User Manual with TD321	73540F	12.09.2012	English
C30.BXX.XX790X.XXXXXX C30.CXX.XX790X.XXXXXX C30.BXX.XX203X.XXXXXX C30.CXX.XX203X.XXXXXX	C30 User Manual with TD321	73540G	15.12.2012	English
C30.bXX.XX479X.XXXXXX	C30 User Manual with TD330	73541	07.10.2008	English
C30.bXX.XX062X.XXXXXX	C30 User Manual with TD330	73541B	30.3.2009	English
C30.bXX.XX187X.XXXXXX	C30 User Manual with TD330	73541C	21.01.2010	English
C30.bXX.XX287X.XXXXXX	C30 User Manual with TD330	73541D	05.07.2010	English
C30.bXX.XX958X.XXXXXX C30.cXX.XX958X.XXXXXX	C30 User Manual with TD330	73541E	11.01.2011	English
C30.bXX.XX472X.XXXXXX C30.cXX.XX472X.XXXXXX	C30 User Manual with TD330	73541F	12.09.2012	English
C30.bXX.XX790X.XXXXXX C30.cXX.XX790X.XXXXXX C30.bXX.XX203X.XXXXXX C30.cXX.XX203X.XXXXXX	C30 User Manual with TD330	73541G	15.12.2014	English

For installation purposes the installation manual “C30 Installation manual” with document number 73542, dated 07.10.2008 (examined in English version) is to be followed.

9. Testing and examination

Testing and examination have been carried out in accordance with reports in chapter 10 . The principal characteristics, approval conditions are set out in this certificate. All the plans, schematic diagrams and documentations are recorded under reference files ELe P702286, P901535, P90153, P906438, PX04579, PX07823, PX10562, PX23898, 4P04492 and 8P07148.

Vibration

OIML R21, A.5.4.4.1 with testing according to IEC 68-2-64:

10-20 Hz: $1\text{m}^2\text{s}^{-3}$

20-150Hz: -3 dB/octave

Testing was carried out in three mutually perpendicular axes for 0.5 hours in each direction and the taximeter was connected to power during testing.

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Dry Heat

OIML R21, A.5.4.1 with testing according to IEC 60068-2-2, but with the duration 16h and the highest temperature +55°C.

The test object was connected to power during the test.

Cold

OIML R21, A.5.4.1 with testing according to IEC 60068-2-2, but with the duration 16h and the lowest temperature -25°C.

The taximeter was not connected to power during testing.

Cyclic damp heat

OIML R21, A.5.4.2 with testing according to IEC 60068-2-30, with the following climate sequence:

- (a) The first 3 hours - temperature rise from the specified low (25°C and 65%Rh);
- (b) Temperature maintained at the specified high (+55°C and at least 93%Rh) until 12 hours from start of the cycle;
- (c) Temperature lowered from the specified high to the specified low (+25°C and at least 95%Rh) within the next 3-6 hours;
- (d) Temperature maintained at the specified low until the 24-hour cycle is completed.

two cycles were performed.

Emission

EN 55022, Class B

Immunity

OIML R21 A.5.4.5.1 Radiated immunity, according to IEC 61000-4-3, 24V/m

OIML R21 A.5.4.5.2 Injected RF immunity, according to IEC 61000-4-6, 24V

OIML R21 A.5.4.6 Electrostatic discharge, according to IEC 61000-4-2, 6kV CD/ 8kV AD

OIML R21 A.5.4.7.1 Automotive transient immunity on supply lines, according to ISO 7637-2, Pulse 1, 2a, 2b, 3a, 3b, 4, 5 level 4

OIML R21 A.5.4.7.2 Automotive transient immunity on signal lines, according to ISO 7637-3, Pulse 3a, 3b, level 4

10. Traceability of reports concerning the EU type examination

EU type examination reports

Report	Title	Date
P702286	EC Type examination of taximeter (module B)	2008-10-20
P702286-02a	EMC test on taximeter C30	2008-04-10
P702286-02b	EMC test on Display C30 French version	2008-04-10
P702286-03	Evaluation of TM206e Taximeter Software	2008-11-06

Supplementary EU type examination reports concerning changes

<i>Report</i>	<i>Description of change</i>	<i>Date</i>
P901536	Software changes	2009-04-02
P901535	The changes consisted of adding and changing some of the components in order to be able to check the functionality of the roof lights and change one 6-pole connection into an 8-pole connection.	2009-06-24
P901535-01a	EMC test regarding changes of P901535	2009-06-18
P906438:MID	Software changes	2010-01-29
PX04579:MID	Software changes	2010-07-16
PX07823	Software changes	2011-01-12
PX10562	Software changes	2011-03-01
PX23898	Software changes	2012-10-01
4P04492-MID	Software changes	2014-12-15
8P07148-MID	EMC testing regarding new EMC requirements and evaluation of risk assessment	2019-06-27