USER'S MANUAL

TACHOGRAPH PROGRAMMER AND CALIBRATOR

SIEMENS VDO

BTC-BR

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Contents:

1 – General Description of Product

The new Tachograph Programmer and Calibrator *Siemens VDO Automotive* main goal is to offer one more tool in tests and measurements of current tachographs, specifically for KTCO 1308, KTCO 1310, KTCO 1318 and MTCO 1390 models.

With the new equipment is possible to measure, generate test chart, simulate speed and, in cases of MTCO 1390, even to program the equipment. Its main feature is to bring together in one unit, two other essential to care of modern tachographs with which you will encounter in your daily life.

Besides practical to operate, it is also easy to be handled and can apply it both on the bench as the vehicle itself in test, thus eliminating the need to remove the tachograph for tests.

It replaces with advantages the current calibrators in use, including the **HTC 1602.19**.
The equipment can be powered using the battery of the vehicle or an external source that is within the standards specified voltage.

The connection with the tachograph is direct, by a single cable and without the need of any additional component. A standard *RS232* serial port is available for general purposes, such as communicating with a bar-code reader, a printer or a microcomputer.

One of the innovations in this new equipment is the possibility of making automatic measurements, i.e. without the need of the operator to define the beginning and end of the measurement.

One of the options is using it attached to an optical sensor and it will be responsible for determinating the beginning and the end of the measurement of twenty meters automatically.

Also new in this equipment relates to the fact that it can be attached to the **Portable Roll Test (1602.26.160.267F)** and thus simulate tracks calibration with 20, 50, 100 and 1000 meters. With this additional facility your measurements will gain speed, accuracy and quality.
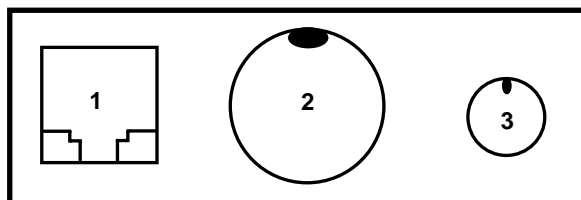

1. RJ – 6 Connector (exit *RS 232*)
2. Self-Lock Connector (tachographs)
3. Mini DIN 6 Connector (Portable Roll Test / Optical Sensor)

Fig. 01: External Connections (basic lower)

1.1 - Accessories

The *Tachograph Programmer and Calibrator Siemens VDO Automotive* comes in carrying pouch (handbag) with two compartments, one for packing the tachograph programmer and manual of operation and other for packing the cables and optical sensors (optional).

The cables consist of 06 parts, as follow:

1. Cables for testing the KTCO 1318 / KTCO 1310
2. Cables for testing and programming the MTCO 1390
3. Cables with claws type alligator for feeding through external source to the vehicle or any other point than that of cigarette lighter.
4. Cables for feeding through the cigarette lighter of the vehicle.
5. Adapter box for benchmarking of mechanical tachograph (use with sensor of 08 or 10 impulses/lap)
6. Adapter box for Portable Roll Test.

Note: *cables* **4** *and* **5** *must be connected to the cables* **1** *or* **2***, as needed.*
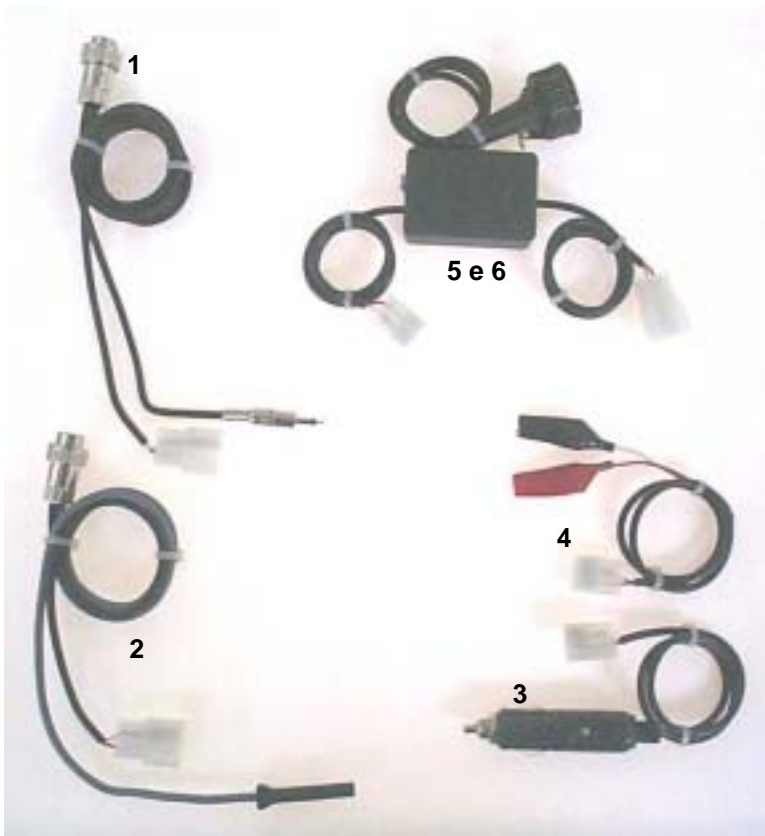

Fig. 02: Cables (accessories)

1.2 – Applications

- Measurement of electronic tachograph MTCO 1390
- Measurement of electronic tachograph KTCO 1318 / KTCO 1310
- Measurement of mechanical tachograph KTCO 1308
- Test Chart
- Variable speed test and odometer
- Programming date/time on electronic tachograph MTCO 1390 with an error of more than 24hs
- Programming the number of chassis, constant "K", odometer, among others, for electronic tachograph MTCO 1390

2 – Functions Available

In this chapter will be detailed all the functions available in portable tachograph programmer, some common to both lines of tachograph, KTCO e MTCO. All functions are accessed through the alpha-numerical keyboard and then will be seen as using it.

⚠️ **All data entry is highlighted with underscore characters indicating that the "edition" mode will be active.**

2.1 – Using the Keyboard

▲ ▼ ⇒ direction of the cursor (Menu)

◀ ▶ ⇒ direction of the cursor (Edition)

E ⇒ confirms operation

C ⇒ cancel operation or return to the previous menu

L ⇒ clean a field of data, letters and numbers (edition mode)

F1 ⇒ use only in some cases, being specified when this occurs

F2 ⇒ return the keyboard to the numerical mode, i.e., numbers *0-9*, "*.*" and "*+/-*" (edition mode)

F3 ⇒ use characters from *A* to *M* of the keyboard, located at the top left of the numerical keyboard. The yellow led, corresponding to this selection, will be lit, showing that this function is enabled (edition mode)

F4 ⇒ use characters from *N* to *Z* of the keyboard, located at the top right of the numerical keyboard. The green led, corresponding to this selection, will be lit, showing that this function is enabled (edition mode)

2.2 – Functions available for KTCO and MTCO

Measurement of the W Automatic: it allows measure the tachograph in an automatic way, using as start and end of measurement a system with optical barrier (optional) and two points of reference 20 meters away from each other. It is more accurate than the conventional method because it does not require the operator's participation at the beginning and end steps of the operation by increasing the accuracy of measurement.

Measurement of the W Manual: it allows measure the tachograph using two points of reference to a pre-determined distance from each other. It is necessary the operator's intervention for the beginning and end of the operation. It is the conventional method of measurement.

Roller Set: it also allows measure the tachograph in an automatic way, using as start and end of measurement a pulses counting system emitted by the wheel of measurement of distance. It is more accurate than the optical barrier method because they may have greater distances (50, 100 and 1000 meters) and the loss of pulses in these cases does not influence as much as the standard distance (20 meters). It also does not require the operator's participation at the beginning and end steps of the operation by increasing the accuracy of measurement.

Reading of Adjusted K: it reads the value of the constant "K" adjusted in the tachograph. For KTCO you can adjust it and make a rereading of the new value. For the MTCO the adjustment is made by programming.

Device Testing:
    Distance Counter Test: it allows measure the indication of the odometer and to know whether the indication of the distance travelled is the actual distance that the vehicle went.
    Test Chart: it allows generate a test chart and to note the conditions of operation of tachographs. It is executed in 22 steps, has estimated duration of 1h50' and can be interrupted at any time.
    Variable Speed: it allows programming a constant speed and changing it at any time unless unprogram the previous speed.

Change Language: it allows switch the language operation between Portuguese, English and Spanish.

2.3 – Exclusive functions for MTCO

Programming:
    Installation:
        Read parameters of MTCO: it allows storing all the parameters described below
        Write parameters in MTCO: it allows recording all the parameters described below
        K Adjustment: programming of the constant of adjustment of the MTCO
        N Adjustment: programming of the constant of the RPM (optional)
        Wheel Circumference: it records the dynamic radius of the wheel with the tire (only information)
        Total Odometer: it programmes the total value of the distance in kilometers travelled by the vehicle
        Vehicle Identification: it records the vehicle number of chassis where it will be installed the MTCO
        Configuration: Keep the original programming
        CAN Configuration: Keep the original programming
        Product Code: Keep the original programming
        Drive Axis: Keep the original programming
        Initial Installation: it programmes the date on which the MTCO was installed
        Calibrate Date: it programmes the dates of measurement of constant "K"
        Seal Number: Record the name/number of representative that mesure/seal the MTCO
        Over Speed: it programmes the removal of alarm (**D4**) and trigger device noise or light for maximun speed reached

    Date-Time:
        MTCO Time: it allows to correct the date and time that it is programmed in the MTCO
        MTCO Time Zone: it allows programming a value of time zone to be considered on European time. Keep the original programming.
        MTCO Over Time: It programme dates of automatic exchange of daylight saving. Disable for national MTCOs. Keep the original programming.

  Setup Kitas: it allows programming the operation of the sensor according to the installed tachograph (only for MTCO 1390).

  Manufacturing Data: it shows the date of manufacture of the board of MTCO.

  Erase Memory: it deletes system errors in the memory of the extended menu. See "Manual of Operation of MTCO".

  Software Version: it indicates the software version's operating in the calibrator. Only for control of lot of the manufacturer of the equipment.

2.4 – Description of functions

Then each function will be detailed in sequential order, for the two lines of tachograph, because the operations are the same. The content of the display, for each case, will also be presented along the sequence that must be carried out by the keypad.

2.4.1 – Automatic Measurement of "W" factor for MTCO

Steps	Contents of the display	Keys	Procedures
1	1. AUTO MEAS W ← 2. MANUAL MEAS W 3. ROLLER SET (▼) – Scroll (E) Enter	**E**	*Select Auto Measurement W.* This function is the automatic measurement of W factor, using two optical sensors (optional). In this case they must be positioned at 20 meters of each other and the issuer must be fixed to the vehicle.

2	AUTO MEASURING
	       MTCO ←
	       KTCO
	(▲/▼) - Scroll (E) Enter
		E	*Select MTCO*
			This function prepares the Calibrator to capture the speed signal from the sensor, including differentiating it in amplitude and format.

3	AUTO. MEAS. - MTCO PULSES: [0000] WAITING START ... (C) Exit		At this moment drive the vehicle toward the first optical sensor and continue toward the second that <u>must be</u> distant 20m from the first one.
4	AUTO MEAS - MTCO PULSES: [0015] WAITING END... (C) Exit		By going to the first sensor, will start up automatically the counting of pulses, ending up only with the passage through the second sensor.
5	AUTO MEAS - MTCO W MEAS: [17586] P/Km (C) Exit	**C**	After the passage through the second sensor the counting ends up automatically and the value to be adjusted to the constant "K" is shown on display.

2.4.2 - Automatic Measurement of "W" factor for KTCO

For the measurement of automatic "W" factor in a vehicle equipped with KTCO, just run the same previous procedure from the step **1**, by changing the cable for tests and the option in step **2** from MTCO to KTCO.

For the measurement of the mechanical tachograph KTCO 1308 is necessary to attach the Adapter Box (page 05/item 05) and use the sensor of 08 or 10 impulses/lap in the gearbox. In this case, the number of laps/km will be equal to the number of measured pulses divided by the number of emitted pulses by the sensor, i.e.:

Nº. laps/km = $\frac{\text{Nº. measured pulses}}{\text{08 or 10 pulses/lap}}$

2.4.3 - Manual Measurement of "W" factor for MTCO

Steps	Contents of the display	Keys	Procedures

1

```
1. AUTO MEAS W
2. MANUAL MEAS W.    ←
3. ROLLER SET

(▲/▼) – Scroll        (E) Enter
```
(E)

Select Manual Meas. W .
This function is the manual measurement of W factor, using two points of reference distant, at least, 20 meters between them. It is essential the operator's in this method of measurement.

2

```
   MANUAL MEASURING
        MTCO       ←
        KTCO

(▲/▼) - Scroll        (E) Enter
```
(E)

Select MTCO
This function prepares the Calibrator to capture the speed signal from the sensor, including differentiating it in amplitude and format.

3

```
MANUAL  MEAS -  MTCO
PULSES:   [0000]


(F1) - START          (C) Exit
```
(F1)

At this moment drive the vehicle toward the first point of reference and, passing through it, press the **F1** key to start the measurement.

4

```
MANUAL MEAS -  MTCO
PULSES:   [0015]


(F2) - END            (C) Exit
```
(F2)

By reaching the second point of reference, the operator must press the **F2** key to finish the counting of pulses.

5

```
MANUAL MEAS  -  MTCO
LENGTH:   [00.00] m


(E) – CALC. W         (C) Exit
```

Enter the distance traveled between the two points of reference.
In case of 20 meters, type 2 0 0 0, without adding point or comma. The calibrator will understand that this is 20 and not 2000 meters.

6

```
MANUAL  MEAS -  MTCO
W MEAS:  [17586]    P/Km



                 (C) Exit
```
(C)

After entering the value of the distance traveled and pressing the **E** key, the value of the constant "K" being adjusted is shown on the display.

2.4.4 - Manual Measurement of "W" factor for KTCO

For the measurement of automatic "W" factor in a vehicle equipped with KTCO, just run the same previous procedure from the step **1**, by changing the cable for tests and the option in step **2** from MTCO to KTCO.

For the measurement of the mechanical macrograph KTCO 1308 is necessary to attach the Adapter Box (page 05/item 05) and use the sensor of 08 or 10 impulses/lap in the gearbox. In this case, the number of laps/km will be equal to the number of measured pulses divided by the number of emitted pulses by the sensor, i.e.:

Nº. laps/km = $\dfrac{\text{Nº. measured pulses}}{\text{08 or 10 pulses/lap}}$

2.4.5 – Roller Set for KTCO and MTCO

Steps	Contents of the display	Keys	Procedures

1

```
1. AUTO MEAS W
2. MANUAL MEAS W
3. ROLLER SET        ←

(▲/▼) – Scroll        (E) Enter
```

E

Select Roller Set
This function prepares the equipment for taking measurements of the "W" factor using the Portable Roll Test (*1602.26.160.267F*).

2

```
ROLLER    SET
      MTCO        ←
      KTCO

(▲/▼) - Scroll        (E) Enter
```

E

From this screen the instructions must be followed from the manual of operation of the Portable Roll Test.

Note: To use other banks of test is necessary to calculate the "W" of equipment through the formula:

$$[(2 \times \pi \times r) \times 8] \times 1000 \qquad \text{where: } \pi \text{ (pi)} = 3,1416$$

$$r = \text{radius of the roll of traction}$$

2.4.6 - Measurement of the Constant "K" for MTCO

Steps	Contents of the display	Keys	Procedures

1

```
2. MANUAL MEAS W
3. ROLLER SET
4. CHECK  K MEASUR ←

(▲/▼) – Sel.        (E) Exec.
```

E

Select Check K Measuring
This function reads the value of the constant "K" pre-adjusted in the tachograph.

2

```
CHECK K MEASURING
      MTCO        ←
      KTCO

(▲/▼) - Scroll        (E) Enter
```

E

Select MTCO
This function prepares the Calibrator to inject a signal of speed and measure its return, by calculating the value of "K".

3

```
CHECK K MEASURING
   K = 08000   P/Km



                (C) Exit
```

C

The value presented is the pre-programmed into the tachograph. In case of MTCO, the value of "K" can only be adjusted by the "PROGRAMMING".

2.4.7 – Measurement and adjustment of the constant "K" for KTCO

For the measurement of the constant "K" in a vehicle equipped with KTCO, just run the same previous procedure from step **1**, changing up the option in step **2** from MTCO to KTCO. In this case the readed value can be adjusted through the programming keys and must be checked by repeating the previous procedure.

⚠ **ATTENTION: This function is not applicable to the mechanical tacrograph KTCO 1308.**

2.4.8 – Test of Electronic Tachographs (KTCO 1318 and MTCO 1390)

This item allows that the models of electronic tachographs have tested some of their functions automatically, such as: Distance Counter Test, Test Chart and Variable Speed Test.

2.4.8.1 – Distance Counter Test (Odometer)

Steps	Contents of the display	Keys	Procedures
1	4. CHECK K MEASUR. 5. DEVICE TESTING ← 6. PROGRAMMING (▲/▼) – Scroll (E) Enter	E	*Select Device Testing* This function will access a sub-menu in which will be possible to measure the indication of the odometer, to generate a test chart and inject a signal of speed previously known.
2	1. DIST COUNT TEST← 2. TEST CHART 3. VARIABLE SPEED (▼) – Scroll (E) Enter	E	*Select Distance Counter Test* In this function will be possible to test whether the indication of the odometer of the tachograph is in accord with the actual distance traveled.
3	DIST COUNTER TEST MTCO ← KTCO (▲/▼) - Scroll (E) Enter	E	*Select MTCO or KTCO* This function prepares the Calibrator to generate a signal of speed compatible with the selected tachograph.
4	DIST COUNTER TEST K = [08000] P/Km (E) – Reference Adjust	E	Enter the value of constant "K" readed in the previous step. (Check "*K" Measuring*).
5	DIST COUNTER TEST S= 20 Km/h K= 08000 D= 0000 meters (E) – Start Measuring	E	In this moment the calibrator is generating a low signal of speed and awaiting the command to increase to 100 Km/h and starts the count in meters. Before giving the command, choose a reference number on the right of the numerator of the odometer and memorize it.
6	DIST COUNTER TEST S= 100 Km/h K= 08000 D= 0095 meters (E) – Decrement Speed	E	By pressing **E** the counter triggers the count and the speed goes to 100 km/h. When it is 950 meters, press **E** to reduce the speed. Doing this will be easier to synchronize the counter with the odometer.
7	DIST COUNTER TEST S= 20 Km/h K= 08000 D= 0987 meters (E) – Stop	E	When the numerator of reference, in the tachograph, arise again, press **E** and check if the counter closed the count near 1000 ± 20 metros.
8	DIST COUNTER TEST S= 0 Km/h K= 08000 D= 1002 meters (C) – Exit	C	The distance traveled by the odometer should be close to the distance indicated by the programmer, i.e., 1000 meters. Being within the limits tolerated, simply close the test, otherwise do it again and in case of repeat the discrepancy, proceed with the repair.

2.4.8.2 – Test Chart (Proof of operation)

Steps	Contents of the display	Keys	Procedures

1

```
4. CHECK K MEASUR
5. DEVICE TESTING    ←
6. PROGRAMMING

(▲/▼) – Scroll        (E) Enter
```

(**E**)

Select Device Testing
This function will access a sub-menu in which will be possible to measure the indication of the odometer, to generate a test chart and inject a signal of speed previously known.

2

```
1. TESTE DE DIST.
2. TEST CHART        ←
3. VARIABLE SPEED

(▲/▼) – Scroll        (E) Enter
```

(**E**)

Select Test Chart
In this function will be possible to generate a disk of proof of good operation of tachograph or if there is an anomaly in the recording.

3

```
       TEST CHART
         MTCO        ←
         KTCO

(▲/▼) - Scroll        (E) Enter
```

(**E**)

Select MTCO or KTCO
This function prepares the Calibrator to generate a signal of speed compatible with the selected tachograph.

4

```
       TEST CHART

   K  =  [08000] P/Km

(E) – Start          (C) Exit
```

(**E**)

Enter the value of constant "K" readed in the previous step. (Check *"K" Measuring*).

5

```
       TEST CHART

  MEAS RANGE =[125] Km/h

(▲/▼) - Scroll        (E) Cont.
```

(**E**)

Enter the value corresponding to the larger scale of the speed in the display of speedometer/tachograph. The most usual is 125 km/h. See Table 01.

6

```
       TEST CHART
S= 000     t= 075     P= 01
MR=125km/h      K=08000

(C) – Exit
```

The automatic test starts in the step **01**. They are **22** steps with duration and speed variables (see Table 01). The total time of the test is **1h50'**, and may be interrupted at any time.

7

```
       TEST CHART
S= 000     t= 001     P= 22
∗ ∗ ∗ END OF TEST ∗ ∗ ∗

(C) – Exit
```

(**C**)

At the end of the test will be issued information on the screen of the programmer and the red led will be lit until pressed the **C** button.

Table 01:

Step	Duration (seconds)	Scale range							
		60	*80*	*90*	*100*	*105*	*120*	*125(*)*	*140*
		Speed (Km/h)							
P1	75	0							
P2	300	70	90	100	110	115	130	135	150
P3	600	0							
P4	75	20	30	30	30	30	40	40	40
P5	75	50	60	60	60	60	80	80	80
P6	75	70	90	90	90	90	120	120	120
P7	10	70	90	100	110	115	130	135	150
P8	75	70	90	90	90	90	120	120	120
P9	75	50	60	60	60	60	80	80	80
P10	75	20	30	30	30	30	40	40	40
P11	600	0							
P12	10	20	30	30	30	30	40	40	40
P13	600	0							
P14	10	50	60	60	60	60	80	80	80
P15	600	0							
P16	10	70	90	90	90	90	120	120	120
P17	600	0							
P18	10	70	90	100	110	115	130	135	150
P19	600	70	90	90	90	90	120	120	120
P20	600	50	60	60	60	60	80	80	80
P21	600	20	30	30	30	30	40	40	40
P22	600	0							

(*) Value of scale ranges more common for tachograph Siemens VDO Automotive.

2.4.8.3 – Variable Speed Test

Steps	Contents of the display	Keys	Procedures

1

```
4. CHECK K MEASUR
5. DEVICE TESTING  ←
6. PROGRAMMING

(▲/▼) – Scroll        (E) Enter
```
(E)

Select Device Testing
This function will access a sub-menu in which will be possible to measure the indication of the odometer, to generate a test chart and inject a signal of speed previously known.

2

```
1. DIST COUNT TEST
2. TEST CHART
3. VARIABLE SPEED  ←

(▲) – Scroll          (E) Enter
```
(E)

Select Variable Speed
In this function will be possible to generate a signal of speed and change it gradually from more to less, observing the behavior of the indicator (speedometer).

3

```
     VARIABLE SPEED
         MTCO       ←
         KTCO

(▲/▼) - Scroll        (E) Enter
```
(E)

Select MTCO or KTCO
This function prepares the Calibrator to generate a signal of speed compatible with the selected tachograph.

4

```
     VARIABLE SPEED
     K = [08000] P/Km


(E) – Speed Adjust
```
(E)

Enter the value of the constant "K" readed in the step **2.4.5** (Check "*K" Measuring*).

5

```
     VARIABLE SPEED
     K = [08000] P/Km
     S = [100] Km/h

(E) – Start           (C) Exit
```
(E)

Enter the value of speed that you want the tachograph indicate, observing the value of the scale range. Press **E** to the test operates.

6

```
     VARIABLE SPEED
     K = [08000] P/Km
     S = [100] Km/h

(E) – Speed Adj       (C) Exit
```
(E)

By activated the test, the value of speed can not be edited more, only by pressing **E** again. By pressing the button **E** it will be possible to adjust the value of speed. In this moment is released the editing mode to the desired value.

7

```
     VARIABLE SPEED
     K = [08000] P/Km
     S = [060] Km/h

(E) – Start           (C) Exit
```
(C)

2.4.9 – Programming

This item is divided into 05 (five) sub-items: *Installation, Date-Time, Manufacturing Data, Erase Memory and Software Version.* For each sub-items there are others sub-items that will allow programming of specific functions of MTCO.

2.4.9.1 – Installation

Steps	Contents of the display	Keys	Procedures
1	4. CHECK K MEASUR 5. DEVICE TESTING 6. PROGRAMMING ← (▲/▼) – Scroll (E) Enter		*Select Programming* This function will access a sub-menu in which will be possible to make all necessary adjustments to the operation of MTCO.
2	1. INSTALLATION ← 2. DATE - TIME 3. MANUFACT DATA (▼) – Scroll (E) Enter	E	*Select Installation* This function will access a sub-menu in which will be possible to read and record all the programmable parameters of MTCO, and to program one by one, if necessary.
3	1. READ PARAMETERS← 2. WRITE PARAMETERS 3. PROGRAMMING K (▲/▼) – Scroll (E) Enter	E	*Select Read Parameters* In this function will be possible to read the parameters necessary for programming a new MTCO identical to the defective.
4	READ PARAMETERS READ OK! (C) Exit	C	After completion of reading, the data remain stored in the memory of the programmer and can be recorded in other unprogrammed MTCO.
5	1. READ PARAMETERS 2. WRITE PARAMETERS← 3. PROGRAMMING K (▲/▼) – Scroll (E) Enter	E	*Select Write Parameters* This function is a complement of the previous. In this case the parameters are recorded in the MTCO to be installed.
6	WRITE PARAMETERS WRITE OK! (C) Exit	C	After completion of writing, the new MTCO is able to be installed on the vehicle from which the defective equipment was removed.
7	1. READ PARAMETERS 2. WRITE PARAMETERS 3. PROGRAMMING K ← (▲/▼) – Scroll (E) Enter	E	This function allows changing the constant of correction "K" of the tachograph MTCO. This is one of the parameters that the function "Read or Save Parameters" keep in memory. This adjustment is necessary for the MTCO understand the sign of speed from the sensor as being the real.
8	∗∗∗ W ADJUST ∗∗∗ [25054] P/Km (E) – Ajustar (C) Sair		In case of wanting to correct the constant "K", press **L** to clear the fields of editing, enter the desired value and press **E**. This adjustment is similar to the installing a reducer in the mechanical tachograph or adjustment of the keys in the electronic tachograph.

Steps	Contents of the display	Keys	Procedures
9	4. N - ADJUSTMENT ← 5. WHEEL CIRCUMFER 6. DIST COUNTER (▲/▼) – Scroll (E) Enter		This function is not enabling to tachograph currently in use. It allows adjusting the constant of adaptation to indication/recording of engine speeds (RPM). *Select next function.*
10	4. N - ADJUSTMENT 5. WHEEL CIRCUMFER← 6. DIST COUNTER (▲/▼) – Scroll (E) Enter	E	*Select Wheel Circumference* In this function must be registered the perimeter or radius of the wheel, with tire, from the vehicle where the MTCO is installed. Auxiliary function in the mathematical calculation of the constant"K".
11	WHEEL CIRCUMFER [5100] mm (E) – Adjust (C) Exit		In case of wanting to correct the value of the perimeter/radius, press **L** to clean the fields of editing, enter the desired and press **E**. This programme is only informative, does not affect the operation of the tachograph.
12	4. N - ADJUSTMENT 5. WHEEL CIRCUMFER 6. DIST COUNTER ← (▲/▼) – Scroll (E) Enter	E	*Select Distance Counter* This function allows programming the total distance traveled in the equipments of exchange and keeping them as the original vehicle mileage.
13	DISTANCE COUNTER [0013586] Km (E) – Adjust (C) Exit		In case of wanting to correct the kilometers traveled, press **L** to clean the field of editing, enter the desired value and press **E**.
14	7. VEHICLE IDENT. ← 8. CONFIGURATION 9. CAN CONFIG. (▲/▼) – Scroll (E) Enter	E	This function allows logging the vehicle identification where the MTCO will be installed. This function is an item of security and will help in cases of traceability of equipment.
15	VEHICLE IDENTIF. [9BWV2VD23YRY03520] F1-SUB (E) – Adjust (C) Exit	E	In case of wanting to correct the vehicle identification, press **L** to clean the field of editing, enter the desired value and press **E**. In case of wanting to replace only one character, press **F1**, select the desired character and enter the new value for it.

*Note: In this function can be used the **F1** key to help in the edition of the vehicle identification. This key alternate the editing mode between overwrite or insert character. While on the screen of the programmer the description **F1-SUB** the editing mode will allow to insert new characters erasing the first from left to right. When it is in the function **F1-INS**, will be available the mode of replacement only from the selected character. To enter the characters in yellow press **F3** (from A to M), for the green characters press **F4** (from N to Z), and for numbers press **F2** (from 0 to 9). At this moment the corresponding led to the mode selected will remain on (for letters) or off (for numbers).*

Steps	Contents of the display	Keys	Procedures

16

```
7. VEHICLE IDENT.
8. CONFIGURATION    ←
9. CAN CONFIG.←

(▲/▼) – Scroll        (E) Enter
```

These functions are not enabling to tachograph currently in use. They are included in the configuration of the product and **_must not_** be changed in any hypothesis.

Select next function.

17

```
10. PRODUCT CODE   ←
11. DRIVE SHAFT
12. INITIAL INSTAL.

(▲/▼) – Scroll        (E) Enter
```

This function is not enabling to tachograph currently in use. Modify since the configuration of the display until the exhibition modes and **_must   not_** be changed under any circumstances.

Select next function.

18

```
10. PRODUCT CODE
11. DRIVE SHAFT       ←
12. INITIAL INSTAL.

(▲/▼) – Scroll        (E) Enter
```

(E)

Select Drive Shaft
This function records the relation of reduction of the rear axle of the vehicle. Auxiliary function in the mathematical calculation of the constant"K".

19

```
DRIVE SHAFT
[00,01] I/U


(E) – Adjust        (C) Exit
```

(E)

In case of wanting to correct the relation of reduction, press **L** to clean the field of editing, enter the desired value and press **E**. This programme is only informative, does not affect the operation of the tachograph.

20

```
10. PRODUCT CODE
11. DRIVE SHAFT
12. INITIAL INSTAL.   ←

(▲/▼) – Scroll        (E) Enter
```

(E)

Select Initial Installation
Function of control. It records the date on which the MTCO was installed. This function is optional, however important in tracking the product.

21

```
INITIAL INSTALLATION
[05 / 01 / 01]


F1 – Adjust        (C) Exit
```

(E)

To register the *Initial Installation*, must be pressed **E** to change the field, i.e., enter the day and press **E**, enter the month and press **E**, and finally enter the year and press **E**. At the end press **F1** and the date will be effective.

22

```
12. INITIAL INSTAL.
13. CALIBRATE DATE ←
14. SEAL NUMBER

(▲/▼) – Scroll        (E) Enter
```

(E)

Select Calibrate Date
Function of control. It records the date on which the measurement of MTCO was made. It is an optional function, however important in the tracking of the measurements by which the MTCO passed.

23

```
CALIBRATE DATE
[05 / 01 / 01]


F1 – Adjust        (C) Exit
```

(E)

To register the *Calibrate Date*, must be pressed **E** to change the field, i.e., enter the day and press **E**, enter the month and press **E**, and finally enter the year and press **E**. At the end press **F1** and the date will be effective.

Steps	Contents of the display	Keys	Procedures
24	12. INITIAL INSTAL. 13. CALIBRATE DATE 14. SEAL NUMBER ← (▲/▼) – Scroll (E) Enter	E	*Select Seal Number* Function of control. It records the number or name of the person responsible for last measurement of MTCO. Important function in the control of those responsible for measurements made.
25	SEAL NUMBER [SIEMENS VDO] F1-SUB (E) – Adjust (C) Exit		To record the desired information, press **L** to clean the field of editing, enter the desired name/number and press **E**. In case of wanting replace only one character, press **F1**, select the desired character and enter the new value for it.

*Note: In this function can be used the **F1** key to help in the edition of the vehicle identification. This key alternate the editing mode between overwrite or insert character. While on the screen of the programmer the description **F1-SUB** the editing mode will allow to insert new characters erasing the first from left to right. When is the function **F1-INS**, will be available the mode of replacement only from the selected character. To enter the characters in yellow press **F3** (from A to M), for the green characters press **F4** (from N to Z), and for numbers press **F2** (from 0 to 9). At this moment the corresponding led to the mode selected will remain on (for letters) or off (for numbers).*

Steps	Contents of the display	Keys	Procedures
26	13. CALIBRATE DATE 14. SEAL NUMBER 15. OVER SPEED ← (▲) – Scroll (E) Enter	E	*Select Over Speed* This function allows adjusting the speed from which a light or sound device could be triggered, activated by the *D4* output of MTCO.
27	OVER SPEED [- - - -] km/h READING MTCO (E) – Adjust (C) Exit		At this moment the calibrator will check what is the value pre-adjusted to the MTCO. This will be possible only if the tachograph have that function.
28	OVER SPEED [080] Km/h (E) – Adjust (C) Exit		After reading the pre-adjusted value will be possible reprogram it. In case of wanting to correct the trigger point of the external device, press **L** to clean the field of editing, enter the desired value and press **E**.

Note: the function "Over Speed" will be valid only for MTCO models that have, in their "Product Code", the numbers 007 and 008 in position hhh (see Information Service T033/02).

2.4.9.2 – Date - Time

Steps	Contents of the display	Keys	Procedures

1

```
1. INSTALLATION
2. DATE - TIME←
3. MANUFACT DATA

(▲/▼) – Scroll        (E) Enter
```

(**E**)

Select Date - Time
This function will access a sub-menu in which will be possible to adjust date/time, time zone and over time.

2

```
1. MTCO TIME ←
2. MTCO TIME ZONE
3. MTCO OVER TIME

(▼) – Scroll          (E) Enter
```

(**E**)

Select MTCO Time
This function will allow correcting the current date (day, month and year) and hour/minutes. This function is necessary only if the MTCO present an error greater than 01 day (or 24 hs).

3

```
     SYSTEM TIME UTC
DATE:        05 / 01 / 2001
TIME:        10:38:25

F1 – Adjust          (C) Exit
```

(**E**)

To change the values of interest, press **E** for change of field to each value entered and, at the end, press **F1** and the modification will be effective.

Note: in this function should be adjust the value of hours always with 01 (one) hour more than the desired. This is necessary because the Tachograph Programmer / Calibrator leaves the factory with a pre-adjusted time zone in less one hour (–01:00hs) than the desired time to adjust. This difference is compensated at the time of adjustment of hours. For instance: in case of wanting to adjust the hours to 12:10 pm, you must enter 13:10hs and the calibrator itself will correct the difference.

⚠ **ATTENTION: Every time when there is change of hours in MTCO, you must open the disk compartment and correct the time of recording in the disk diagram. See "Manual of Operation of MTCO".**

4

```
1. MTCO TIME
2. MTCO TIME ZONE   ←
3. MTCO OVER TIME

(▲/▼) – Scroll       (E) Enter
```

(**E**)

Select Time Zone
This function adjusts the value of the time zone to be compared with the world standard time (UTC). It is pre-adjusted in less one hour (-01:00).

5

```
      TIME ZONE
       -01:00 h

F1 – Adjust          (C) Exit
```

(**E**)

If you do not want to run the process of the previous observation, simply reset the time zone. For this, enter the value zero twice, press **E**, and then **F1**. We recommend not changing the original settings of Tachograph Programmer / Calibrator.

6

```
1. MTCO TIME
2. MTCO TIME ZONE
3. MTCO OVER TIME   ←

(▲) – Scroll         (E) Enter
```

(**C**)

This function is not enabling to tachograph currently in use. Program dates and times in which the MTCO changes automatically to over time and ***must not*** be changed under any circumstances.

Select next function.

2.4.9.3 – Activate Kitas

Steps	Contents of the display	Keys	Procedures
1	1. INSTALLATION 2. DATE - TIME 3. SETUP KITAS ← (▲/▼) – Scroll (**E**) Enter	**E**	*Setup sensor model Kitas* [*] This function allows that the sensor Kitas, installed on the vehicle, is recognized by tachograph MTCO 1390. This transaction affects the operation of the tachograph and should be used whenever there is exchange of the sensor or the tachograph MTCO 1390.
2	SETUP KITAS (**E**) Setup (**C**) Exit	**E**	(*) the sensor Kitas is a differential model. It has the normal functions of the sensor Hall (positive, negative and signal of speed) and also a communication with the MTCO 1390.
3	SETUP KITAS SETTING... (**E**) Setup (**C**) Exit	**E**	If the sensor is not "enabled" it will not recognize the tachograph and vice versa. As a result the MTCO will record the speed normally, when in motion, and will acknowledge the failure of the sensor when stopped. This can be seen through the continuous recording from 0 to 30 km/h on the scale of speed of the disk diagram.
4	SETUP KITAS SENSOR ACTIVATED (**E**) Setup (**C**) Exit	**C**	The sensor Kitas is identificated by code **2170/2171** printed in its body. The other numbers identify the features of each sensor Kitas, for example, the length of the rod.

2.4.9.4 – Manufacturing data

Steps	Contents of the display	Keys	Procedures
1	2. DATE - TIME 3. SETUP KITAS 4. MANUFACT DATA ← (▲/▼) – Scroll (**E**) Enter	**E**	*Select Manufacturing Data* This function informs the date on which the MTCO's board was manufactured. This programme is only informative, does not affect the operation of the tachograph and can not be changed.
2	MANUFACTURING DATA DATE: 31 / 08 / 99 (**C**) Exit	**C**	

2.4.9.5 – Erase memory

Steps	Contents of the display	Keys	Procedures

1

```
1. MANUFACT DATA
2. ERASE ERROR MEM←
3. SW VERSION

(▲/▼) – Scroll        (E) Enter
```
(E)

Select Erase Memory
This function allows erase all the errors of system recorded in the memory of MTCO. See "*Manual of Operation of MTCO"*.

2

```
ERASE ERROR MEMORY


      ERASING OK!
(E) Erase           (C) Exit
```
(E)

2.4.9.6 –Software Version's

Step	Contents of the display	Keys	Procedures

1

```
1. MANUFACT DATA
2. ERASE ERROR MEM
3. SW VERSION      ←

(▲) – Scroll        (E) Enter
```
(E)

Select Software Version's
This function informs the software version's in use in the Tachograph Programmer / Calibrator. This programme is only informative, does not affect the operation of the tachograph and can not be changed.

2

```
    SOFTWARE VERSION
    BTC – BR   V   1.2


           (C) Exit
```
(C)

2.4.10 – Change of Language

This item allows all screens of operation of the calibrator will be shown in the chosen language. The standard option is Portuguese, but could be replaced by Spanish or English.

Step	Contents of the display	Keys	Procedures

1

```
5. DEVICE TESTING
6. PROGRAMMING
7.CHANGE LANGUAGE  ←

(▲) – Scroll        (E) Enter
```
(E)

Select Change Language
This function will show the current language of the operation of calibrator.

2

```
   CHANGE LANGUAGE

      PORTUGUESE

(▲/▼) – Scroll        (E) Enter
```
(E)

By selecting, the text changes between Portuguese, English, and Spanish.
The <E> key assumes the chosen language.

3 – Technical Details:

Display:.. LCD (Liquid Crystal Display) illuminated
4 rows x 20 characteres / row
Character of 5 mm high

Keyboard: .... Keyboard alpha numeric / special characters

System:.. 80C320 Processor (8051 Family)
64 KB of EPROM
32 KB of RAM
Without buffer

Interfaces: .... Serial RS 232, RJ6 connector

Supply Voltage: .... 9,0 V – 30,0 V / direct current
(protection against reversal of polarity)

Rated Voltage: .... 12,0 Vdc

Power Consumption:....................................... 170 mA (12 V)

Operating Temperature:................................... 0°C to + 40°C

Size:... 236 x 125 x 41 mm
(C x L x A)

Cables:.. 1,0 m (length)

Weight:... 0,495 kg

Accessories: .... See chapter 1.1

Material: .... Box in ABS