OPERATING INSTRUCTIONS

ELTRIP-65n
ELTRIP-65nc
ELTRIP-65nce

05/2012

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1. TECHNICAL INFORMATION

KEYBOARD: 16 snap-action push buttons

FEATURES:

- 6 counters, of which 1 to 5 can be active at any time
- Display resolution 1 metre *(65n, 65nc)* or 0.1m *(65nce)*
- Time for each counter (hours:minutes)
- Total-km calculator for each counter
- Speed with 0.1km/h resolution
- Computer connectivity *(65nc, 65nce)*
- Language selection

DISPLAY: Graphical display, 10mm number height, can be turned off

DIMENSIONS: 145x47x25mm (W x H x D)

WEIGHT: n. 150 g

OPERATING VOLTAGE: 10-30V

CURRENT CONSUMPTON:

- display enabled n. 100mA, display off n. 50mA

OPERATING TEMPERATURE RANGE: -30º - +60º C

FUSE: max 400 mA

SENSOR: various choices available

2. INTRODUCTION

We congratulate you for selecting reliable and dependable ELTRIP-meter.

This operating instruction booklet is there to instruct you on installation and operation of your ELTRIP meter. Please read this instruction manual carefully for instructions on meter installation, calibration and usage. This allows you to get most out of your meter.

If you have problems with the meter, see chapter 6 of this manual. If this does not help, contact us for further information. Do not try to repair the meter yourself, as servicing the meter requires special skills and tools, and inproper handling of the meter electronics may damage it. Warranty does not cover damage caused by inproper use or servicing of the meter.

When your meter reaches end of its life, please return it to Trippi oy for proper recycling. The return is free for you. If needed, contact Trippi Oy for details.

3. INSTALLATION OF ELTRIP-65N

3.1. INSTALLATION

Install the meter so that you can easily reach it and it does not interfere with operating of the vehicle. Avoid location where meter is exposed to direct sunlight or hot air from heating system.

3.2. INSTALLATION OF SENSOR AND WIRING

Install sensor as described in external instructions.
It is recommended that meter is installed in continuous voltage.

NOTE: DANGER OF FIRE
If vehicle's main power switch is connected to negative (-) wire of battery and you wish to connect meter to continuous power, contact the manufacturer for detailed instructions. The negative supply (-) of the meter and meter housing are connected within the meter. This may cause bypass of main power switch if negative wire is connected past the main power switch.

Black wire: Connect to vehicle chassis (negative supply).

Red: Positive operating voltage 10 .. 30v, fused with max 400mA fast fuse. Can be taked from fuse box of vehicle or other suitable location where it does not interfere with normal operation of vehicle. Supply wire must be protected with small enough fuse.

White and purple wire connection depends on used measurement mode (sensor) as follows:

1. When using vehicle's internal distance pulse. Connect like this if unsure.
   - White: Positive (+) lead of sensor is connected to white wire, negative wire of sensor to vehicle ground. If using vehicle's internal sensor only white wire is connected. Some electronic systems require external adapter.
   - Purple: +/- counting. If meter should reduce measured distance when vehicle is in reverse, connect this to positive side of auxiliary reverse light. If reverse operation is not necessary, connect to vehicle ground and meter will always count up.

2. When using encoder-type sensor (only 65nce-model):
   - Eltrip-65nce can be connected via two-pole switch to use either vehicles internal distance sensor or an encode. Note that switching the signal source during measurement may cause errors in measurement.
     Connect encoder-sensor's pulse wires to meter's white and purple wire. If

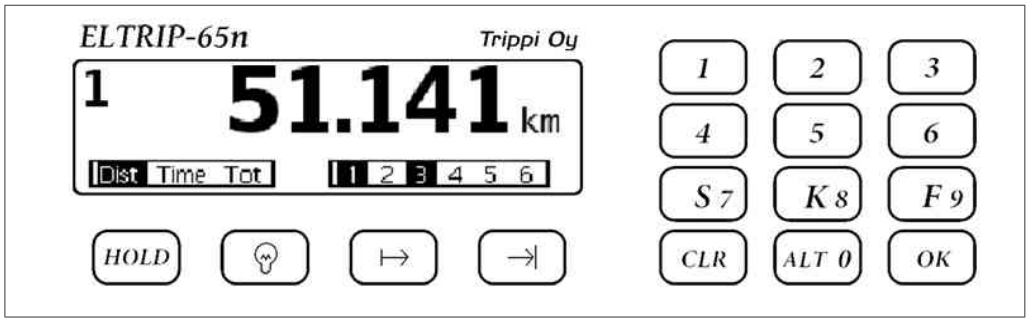
meter measures distance to wrong direction, switch the wires. Note that encoder may require external voltage source.

3.3. CAUTION!

Disconnect the meter during welding operations. Although meter is protected against interference, welding may cause high voltages that breaks sensitive electrics.
Blown fuse may only be replaces with fuse of another type (max 400mA). Warranty does not cover inproper installation of meter.

4. USING ELTRIP-65

Eltrip-65n has been designed to be easy to use in vehicle. All of the most frequent operations can be used with only one key. Settings and other less ofter needed features are activated with simultaneous press of two buttons. Following chapter describes meter functions starting from post-installation calibrations.



Front panel and keyboard of Eltrip-65n

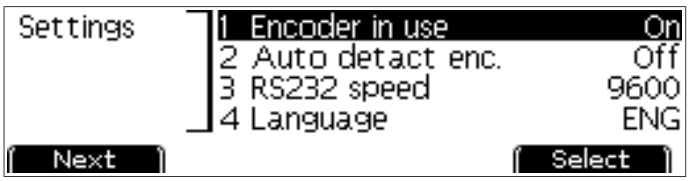
During normal operation a distance reading is shown on meter display, as above. This is called *main screen* of meter, and most of the operations are initiated from this mode. At upper left part of the screen the currently active counter is shown (here 1; can be 1-6 or letter for special measurement modes) and on right is the currnet reading. If a small downwards arrow is shown below counter number, the down-counting of counter 1 is active.

On lower left screen a sub-function of a counter is indicated (”Dist” for distance, ”Time” for time or ”Tot” for total-km counter).

At lower right the status of distance counters is shown; is counter has bright background (here 1 and 3) the counter is active, and if background is dark the counter is disabled (not currently counting).

4.1. SETTINGS

Settings can be opened by pressing *OK* and *3* at the same time at main screen. Settings vary based on the exact model of the meter.



Meter settings (OK + 3)

A specific setting can be selected with *Next* and *Previous* selections below the screen. Setting is changed by pressing *Select* or *OK* keys. Settings menu is closed and active settings stored by pressing *CLR* button. You can also change a specifig setting by pressing indicated number key, for example Language can be changed by pressing *4* button.

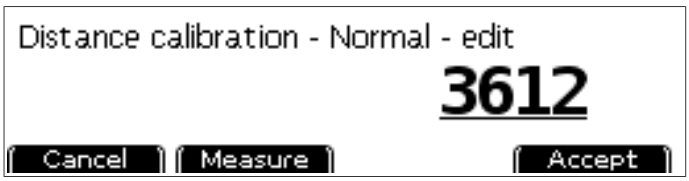
The settings are:

- *Encoder in use* (only in 65nce-model). If this is active, meter uses distance based on encoder sensor input. If this not in use, meter uses distance pulse/reverse signals for distance calculation.
- *Auto detect enc.* (only in 65nce-model). If this is enabled, meter will automatically detect signal source changing between encoder and pulse/reverse signals (for example when source is toggled with external switch). Detection requires driving at constant speed for a few seconds, and during this time there may be errors in distance measurement. Becase of this use of automatic detection is not recommended, and signal type should be set manually with *Encoder in use* setting if changed.
- *RS232 speed* (only 65nc and 65nce models). Set bit rate of computer connectivity. Available settings are 1200, 9500 and 19200 bps. Other line parameters are always 8 data bits, no parity and 1 stop bit.
- *Language*. This changes the language used in menus and setting screens. Available selections are finnish, english and swedish.

4.2. CALIBRATION

Meter must be calibrated for distance measurement to be accurate. Calibration is done on a straight road with where distance from a specific point to another is known accurately.

Calibration is opened by pressing *OK* and *1* on meter main screen. If you know how many impulses per kilometre meter produces, you can enter it directly with number buttons.



Calibration screen for normal (pulse/reverse) sensor in Eltrip-65nce

You can also select *Measure* -selection with keys below screen. Drive vehicle to start point of a track of known length and select *Measure*. During the measurement reading can be cleared with *Reset* selection. At the end of the track you can accept the measured reading by pressing *Accept*. If the track is not exactly one kilometre in length the reading must be corrected arithmetically.

For example: On a track of 500 metres 1742 pulses is measured. In this case reading of pulses per kilometre is 1742x2 = 3484 pulses, which is then entered as calibration factor.

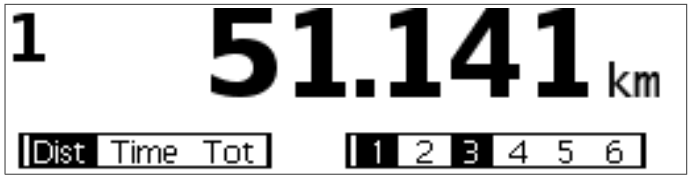
After calibration verify measurement by driving the known track for a few times and measuring its length by using meter counters.

65nce-model: There are separate calibrations for for normal (pulse/reverse) and encoder sensor. If you know that you will only use one of them, the other does not need to be calibrated. The calibration for both modes is started by pressing *OK* and *1* at same time at meter main screen. The meter determines requested calibration based on currently active measurement mode: normal, or encoder; see the *Encoder in use* setting.

4.3. SELECTING COUNTERS

Meter has six indenpendent counters, and each also has three sub-functions. Either counter 1 or 2 is always enabled, and other of these two is always disabled. When either of these is selected, meter automatically starts selected counter and stops the other at same time.

Counter is selected by pressing number key 1-6. Counter selection always selects first sub-counter (distance trip). Sub-counters (time and total-km) are selected by pressing *ALT* button after selecting the counter.



Main screen with distance of counter 1 shown

By holding number button 1-6 or *HOLD*-button down the currently shown reading of counter is held until the button is released. During this time the counter still counts normally, only the reading on the screen is not updated. After button is released the normal running reading is restored. In 65nce-model when the button is pressed, on left part of the screen also the currently active pulse input type is shown: *ENC* for

encoder, and *P/R* for pulse/reverse.

4.4. USE OF COUNTERS

Counters 1 and 2 are exclusive: When either of these is selected to the screen, the selected counter is automatically started and the other is stopped.

Counters 3-6 are started by pressing ⟼-button below the screen and stopped by pressing ⟼|-button.

A counter is cleared (zeroed) by pressing *CLR*-button for approximately one second. The counter is cleared so that if the vehicle is moving, the reading starts from the exact position where vehicle was at the moment when *CLR* was pressed down.

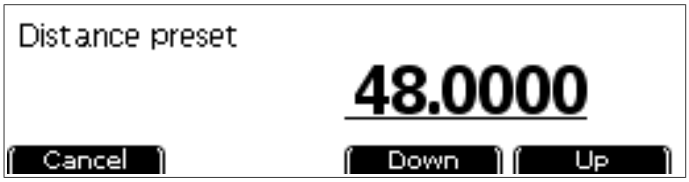
If current sub-counter is distance or time, both of these are cleared. If total-km counter is shown, only the total kilometres are cleared. Clearing counter 1 also disables the down-counting if it were enabled.

4.5. SPEED

Speed reading is selected by pressing *S/7* button. Currently active counters resume operation normally on the background.

4.6. DISTANCE PRE-SET

Counter 1 can be set to count up or down from given reading. Preset is done by pressing *HOLD* and *1* buttons at same time.



Matkan esiasetus

Enter the desired start reading and select *Down* to start downcounting or *Up* to normal up-counting. *Cancel* will abort setting and return to previous mode without changing the previous counter 1 reading.

The down-counting will only affect counter 1. Other counters will still count normally up even is down-counting is enabled. On the meter main screen the downcounting indicator is a small downwards arrow that is shown below the counter number at the left part of the screen.

When down-counting is enabled, counter 1 will count downwards when driving forward and upwards when reversing.

4.7. BRIGHTNESS AND TURNING OFF DISPLAY

If vehicle does not move for approx. 5 minutes the meter will automatically turn off the display. When automatically turned off, the meter will automatically restore the display when vehicle starts moving again. The display can also be restored by pressing any button.

Display brightness can be changed by pressing ”lamp” ( ) -button below the screen. By holding this button down for a second the meter display is turned off after this button is released. When the button is being held the type and version information of the meter is shown. When turned off manually the meter does not automatically turn display back on and the screen must be restored by pressing any key.

All of the meter counters always continue to operate even when meter display is off.

5. COMPUTER CONNECTIVITY

Eltrip-65nc and Eltrip-65nce models are equipped with computer connectivity option which allows to send measurement results to computer manually or allows the computer to control all the measurement functions of the meter.
Communications is done with RS-232 -compatible link. Link uses following parameters:

Connector	RS232 D9 female
Bit rate:	1200, 9600 or 19200 bps (configurable on meter)
Parameters:	8 data bits, no parity, 1 stop bit
Flow control:	None

5.1. DATA SENDING FROM METER

Meter can be put to data link mode where user can manually send counter 1 reading to computer at any time. Data link mode is entered by pressing *OK* and *6* at same time at meter main screen.

Manual data link mode

Data link mode uses meter counter 1 only. Other counters remain their operaton normally on background, but only counter 1 reading is shown on screen and can be sent to computer.

Data link mode is closed by pressing *Exit* button for one second.

Meter buttons 0-6 function as code numbers that is attached to sent reading in format <*code*>,<*kkk.mmm*><*cr*>. For example by pressing number 2 following message is sent:

```
2,003.524<cr>
```

Note that even in 65nce-model the distance is sent with 1 metre resolution. Higher resolution access is available with computer controlled mode, see below

By pressing OK-key for two seconds a continuous sending is enabled. Display shows ”Continuous transmit” and reading of counter 1 is sent continuously in format <*kkk.mmm*><*cr*> to computer. Continuous transmit can be stopped by pressing OK-button again for two seconds, by sending a specific code with buttons 0-6 or by exiting data link mode.

5.2. COMPUTER-CONTROLLED COMMUNICATION

Computer can control all the measurement functions of the meter by using simple text-based protocol that is backwards compatible with protocol used by Eltrip-45nc. Computer can always control the meter regardless of the current meter mode. Command is sent from computer and meter responds. Commands always terminate on <cr> (carriage return) character. Note that when using this protocol, meter counters 1-6 are referred with indices 0-5.

All meter functions can also be used from meter keyboard when it is controlled by computer.

Responses. Meter responds to commands with requested data or following replies:

`+<cr>`	Command accepted
`I<cr>`	Invalid counter index
`C<cr>`	Unrecognized command

Read commands (n is counter index 0-5). These commands can be appended with character *c*, for example `A0c<cr>`, in which case meter will continuously send requested reading until next command is received.

`An<cr>`	Read distance counter n (e.g. *A2<cr>*). Reply is *kkk.mmm<cr>*.
`Bn<cr>`	Read time counter n. Reply is *hhh.mm<cr>*
`Dn<cr>`	Read counter n total-km reading. Reply is *nnnnn<cr>*
`Gn<cr>`	Read distance counter n with 0.1 metre resolution. Reply is *kkk.mmmm<cr>*
`S0<cr>`	Read speed. Reply is *nnn.n<cr>*
`I0<cr>`	Read calibration factor for pulse/reverse operation. Reply is *nnnnn<cr>*
`I1<cr>`	Read calibration factor for encoder operation (only on 65nce). Reply is *nnnnnn<cr>*.

Counter control (n is counter index 0-5).

`Cn<cr>`	Clear distance and time of counter n
`En<cr>`	Clear total-km of counter n
`On<cr>`	(letter O) Start counter n. Note that with indices 0 or 1 (counter 1 or 2) the other of these is stopped.
`Fn<cr>`	Stop counter n.

Calibration

`K0nnnn<cr>`	Set calibration factor for normal (pulse/reverse) operation.
`K1nnnn<cr>`	Set calibration factor for encoder operation (only 65nce-model)

Example:

Computer:	`K03612<cr>`	(set calibration 3612)
Eltrip:	`+<cr>`	
Computer:	`A8n<cr>`	(invalid counter)
Eltrip:	`I<cr>`	
Computer:	`A2c<cr>`	(send continuously)
Eltrip:	`492.525<cr>`	
Eltrip:	`492.527<cr>`	
Eltrip:	`492.528<cr>`	
Eltrip:	`492.530<cr>`	
Computer:	`B0<cr>`	(stops continuous sending)
Eltrip:	`001.51<cr>`	
Computer:	`C0<cr>`	
Eltrip:	`+<cr>`	
Computer:	`B0<cr>`	
Eltrip:	`000.00<cr>`	

6. PROBLEMS?

Here is a short list of possible problems for troubleshooting. If these instructions do not help, please contact your Eltrip dealer or the manufacturer for further instructions.

Do not open the meter, as inproper handling may cause damage to the meter that is not covered by the warranty. Warranty does not cover inproper installation of usage of the meter.

Display of dark
Press a key to enable display or try ”lamp” button below the screen to adjust brightness. If this does not help, check fuse and meter power connections.

Meter does not measure distance
Sensor may be faulty. Check the connections. If you are using sensor on the wheel or axle, verify sensor detection distance; the voltage at distance pulse wire should vary between 2 to 4 volts or even larger when sensor detects magnet or metal (depending on sensor type). If voltage is all the time 5v, cable or sensor may be broken. If voltage is below 1v, sensor or wire may be shorted.
On Eltrip-65nce invalid signal source selection may cause failure to measure, or invalid measurements. Verify that correct measurement source is selected.

Meter only measures backwards, or does not detect reverse
There may be problem in reverse (purple) wire connection. Verify that the connection is properly made to vehicle reverse light's positive side. Verify also that counter 1 down-counting is not enabled.

Other problems
If you have any other problems with installation of usage of the meter, contact your Eltrip dealer or manufacturer for further instructions.

7. DECLARATION OF CONFORMITY

Trippi oy under its sole responsibility declares that following products:

Type: Trip meter
Models: Eltrip-65n, Eltrip-65nc, Eltrip-65nce

Manufactured by:
Trippi Oy
Pilvitie 6
90620 Oulu
Finland

Meet the relevant criteria of following directivs:
2004/104/EU (EMC), appended 2006/28/EU ja 2009/19/EU
2002/95/EU (RoHS), appended 2011/65/EU

Following standards have been used:
ISO 7637-2
IEC 61000-4-2
IEC 61000-4-3

Signed

Toni Räsänen, CEO
16.5.2012

8. QUICK INSTRUCTIONS

Key	Function
1 or 2	Select and start counter 1 or 2; stop the other (page 8)
3 .. 6	Select counter 3 .. 6 (page 8)
S/7	Select speed (page 9)
CLR	Clear counter (press for 1 second) (page 9)
0/ALT	Next sub counter (trip → time → tot.km → trip ..) (page 8)
HOLD	Hold display reading (page 9)
	Alter display brightness; turning off display (2 sec)(page 10)
	Start counter 3 .. 6 (page 8)
	Stop counter 3 .. 6 (page 8)
HOLD+1	Pre-sent/downcounting of counter 1 (page 9)
OK+1	Distance calibrtion (page 7)
OK+3	Settings (page 7)
OK+6	Datalink mode (65nc, 65nce) (page 11)

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