CONTENTS

IN GENERAL

Edition 2011

Coralba trip is used for gathering accurate road data measurements such as temperatures, numbers and distance between road sites or specific road sections. It is an indispensable instrument for highway engineers, surveyors, technical staff who work with highway maintenance, inventory collection, planning and counting. The instrument has been carefully developed and tested over the last few years following a considerable amount of study and evaluation into the needs of the highway engineers and their every day use he or she may require from such a system. **Coralba**'s quality design allows C-trip to carry out most types of longitudinal measuring presently undertaken **quickly**, with greater **safety**, and in the **comfort** of a vehicle.

Mounted in the vehicle and connected onto the speedometer C-trip is basically a precision distance- and speedo- meter for the vehicle. Additional C-trip features include a unit counter and an automatic function which makes it possible to easily measure to and from the centre of road junctions. The precision of the instrument is reached by a simple but effective calibrating procedure. After calibration C-trip shows correct values to a tolerance typically better than 0.003 %.

Available options which may be ordered for C-trip include a precision temperature measuring function, RS232C, and a printer port/computer interface.

A complete **Coralba trip** set consists of:

- Instrument
- Cables
- Fastening device (universal joint), velcro
- Pulse generator
- Fitting- and using instruction

NOTE! Check that you have got the correct parts for your vehicle before installing the C-trip...

INTRODUCTION

1 Before you start installing the instrument make sure that you have the correct parts for your vehicle (see "**IN GENERAL**". p. 2).
2 Install the pulse interface according to the separate instruction. The pulse interface is suited for your vehicle with consideration to car model and year model.
3 Connect the electrical connections according to "**Electrical connections**", p. 4.
4 Install temperature sensor (option).
5 Mount the instrument in a safe place in the vehicle, i.e. on the dash board with a foot hold or velcro fastening.
6 Calibrate your instrument, see "**CALIBRATION**", p. 6.
7 Your **Coralba trip** instrument is now ready to for precise measurements.

Pulse interfaces

The pulse generator may be of different types:

- Interface for a vehicle with electronic speedometer (PGE-..) / Can Bus adapter.
- Proximity switch pulse generator (PGI).

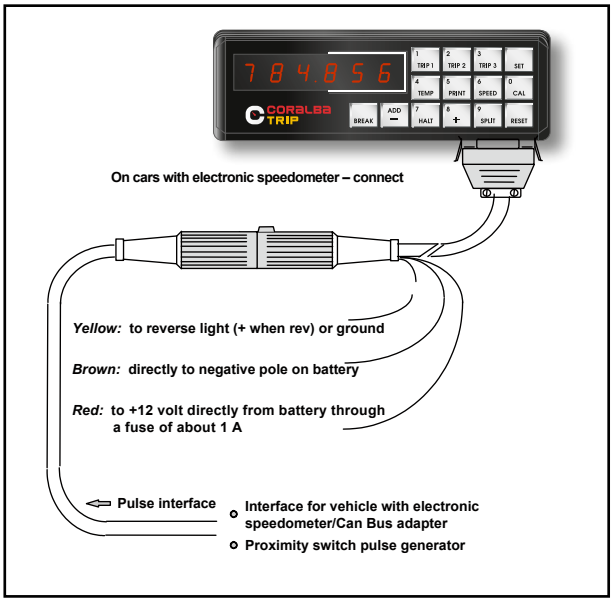
Depending which type is required for your vehicle the pulse generator is fitted in different ways.

NOTE! We have shipped a pulse interface according to your information about the vehicle. If the included pulse interface will not suit your vehicle – contact your Coralba salesman.

Electrical connections

Ensure that all connections are done in a correct way when connecting **Coralba trip** as damage may occur to the unit if it is connected incorrectly. The system is designed for a negative ground system.

- **Red** cable (power) is connected to +12 volt directly from the battery through a fuse of about 1 A.
- **Brown** cable is connected to the negative pole directly on the battery.
- **Yellow** cable is not used if the pulse generator is a rotating type. If the pulse generator is a non rotating type the yellow cable is connected to the reverse light so that the trip will be supplied with +12 volt when the vehicle is driven in reverse. If this is not possible the yellow cable must be connected to ground.



Make sure all connections are done professionaly. The cables should be fixed to avoid damage. Most electrical interferences that occur are caused by poor connections to the power supply.

Vehicles with 24 V

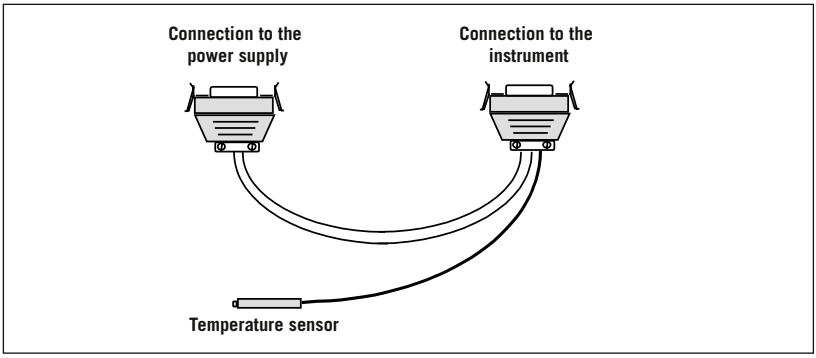
For vehicles with 24 V you need to install a 24 V cable set from **Coralba**. You can also connect to a 24 V to 12 V converter. The instrument is only intended for 12 V.

Power ON/OFF

There is no on/off key on the **Coralba trip** instrument. When the instrument is not in use it will automatically switch itself into an idling mode after 7 minutes where the display and the keyboard are totally unlit. When the **Coralba trip** is operated or the vehicle is moved it is automatically turned on again.

Fitting temperature sensor (option)

The temperature sensor is fitted to the C-trip by disconnecting the cable at the back and then inserting the sensor as an extension cable in between. When disconnecting the cable, unlock the connector by holding over both locking springs and pressing them by hand against each other at the same time as you press the connector towards the meter. Then the springs will unlock and it is easy to pull out the connector. When connecting the cables, assure that the springs both go into locking position. Once the sensor is connected it must be calibrated. See page 8.



The sensor itself is fitted in a safe place from mud and water from the wheels. A commonly used position is inside the front bumper.

CALIBRATION

Calibrate Coralba trip, DISTANCE

To enable the **Coralba** trip to measure accurately it must be calibrated. The dimensions of tyres and transmission ratios influence the performance and therefore it is important to calibrate **Coralba** trip if these are altered.

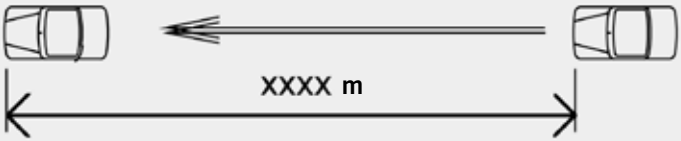
If this is the first time you calibrate the unit ensure that you have selected the desirable display of mode (meters, feet, miles...). If not see page 20 for set up.

Then check tyre pressure and inflate, as necessary, to manufacturers specifications. Then you need to know the exact distance of your calibrating distance (this may be any value but for the best results it should be in excess of 0.999 km 999 feet or 0.999 miles). If you do not have access to an exact distance the local police force is usually prepared to advise you of a number of sites.

You are now ready to calibrate the instrument. Follow the calibration steps on the following page.

NOTE! Your instrument is not more accurate than the accuracy of your calibration.

Procedure	**C-trip shows**
Select any [1 TRIP 1] or [6 SPEED]	Selected register
Press [0 CAL]	Current calibrating constant
Press [0 CAL]	Display flashes. Flash text (.drILE.)
Drive the calibrating distance	".drILE." and the calibrating constant flash alternatively



Press [SET] (start input)	.LEnGHt
Enter the calibrating distance length	xxx.xxx
Press [SET] (store value)	New calibrating constant

If the calibrating sequence has been carried out correctly, and the distance used for this calibration was correct, you will usually be able to measure to an accuracy better than 0.03 % (30 cm/km).

Check the accuracy by travelling over your calibrating distance whilst measuring its length. If all factors are correct the length should correlate exactly.

You have now calibrated your **Coralba** trip for distance and speed. Even if C-trip is disconnected from the power supply it will keep its calibrating constant in memory. The calibration should be checked at least once a month and when tyres are changed. The value may of course be changed by using the standard SET procedure as described on page 18.

Calibrate Coralba trip, TEMPERATURE

First check that you have selected the desirable display mode. °C or °F is shown when you press 

. If not, see page 20 for setup.

To calibrate the temperature you need some water with a known temperature. The easiest way is to get some ice water. Place the temperature sensor into the water.

Follow the calibration steps in the list below:

Procedure	***Coralba Trip shows***
Press 4 TEMP	Current temperature (temp. in °C or °F)
Press 0 CAL	*.CALib.* then current temperature
Press SET (start input)	Temperature flashes
Enter correct temperature. INCLUD one figure for fractional part	xx.x
Press SET (store with SET-key)	Calibrated temperature

Now **Coralba** trip is calibrated for temperature measurements. Even if **Coralba** trip is disconnected from the power supply it will keep its calibrating constant in memory.

FUNCTIONS

Now that **Coralba trip** is calibrated it is ready to be used. The following chapter will make you familiar with the functions of the instrument.

The display has four different kinds of keys:

- Option keys: 

these choose different registers and show on the display.

- Function keys: 

these control the value of the chosen register.

- Display key: 

this freezes the values in all registers.

- Numerical keys: 

these will change to numerical function when registration of a value has been started with 

Furthermore a 

key will always bring you back to a default setting of the mode of operation.

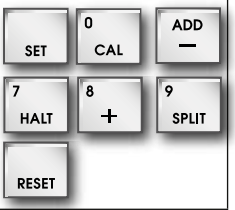
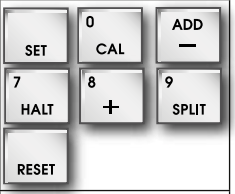
The basic philosophy for **Coralba trip** is that when you press any of the keys you do not influence any other register in the instrument other than the one that you see in the display. The register in the display is called the current register. While pressing a key to select a new register the display shows a flash text telling you which current register will be shown next. Some keys have more than one register. They are selected by repeatedly pressing the key.

Explanation to keys

The following chapter aims to explain the four different groups of keys:

- Option keys
- Function keys
- Display keys
- Numerical keys

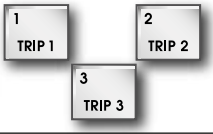
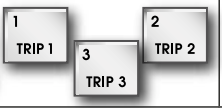
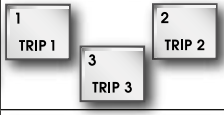
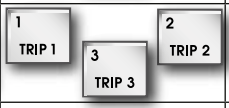
Option keys

Key	*Flash text*	*Function*	*Appropriate keys*
First press 	trip.1	Trip meter with a resolution of 1 m (see "**Set units in Coralba trip**", p. 20). Each trip register is independent from the others.	
Second press 	memory	Memory register allows you to save a numeric number. When you reset with the RESET key the display window will not be on. This is the only possibility to turn off the display window while driving.	
First press 	trip.2	Trip meter with a resolution of 1 m (see "**Set units in Coralba trip**", p. 20). Each trip register is independent from the others.	
Second press 	.55Hour	Used for time measurement. Period of time since TRIP 2 started to count from zero.	
Third press 	.ASPEEd	Average speed since TRIP 2 started to count from zero.	

Key	*Flash text*	*Function*	*Appropriate keys*
Fourth press 2 TRIP 2	.toP.SPd	Maximum speed since TRIP 2 started from zero or top speed was reset.	RESET, 9 SPLIT
Any of: 1 TRIP 1 2 TRIP 2 3 TRIP 3 + 0 CAL	.CAL.diS	Calibrate distance if TRIP or SPEED is selected. Second touch will show "CALib" in display and then ".drivE" telling to drive reference length. Press "SET" at end of reference length and set the length of the calibrating distance. "RESET" will give access to a set up mode for different units.	SET, 9 SPLIT, RESET
First press 3 TRIP 3	tri P. 3	Trip meter with a resolution of 1 m (see "**Set up units in Coralba trip**", p. 20).	SET, 0 CAL, ADD −, 7 HALT, 8 +, 9 SPLIT, RESET
First press 4 TEMP	. . .°C. .	Shows temperature if a sensor is installed. ...°C. eller ...°F. can be shown, (see "**Set up units in Coralba trip**", p. 20).	0 CAL, 9 SPLIT
Second press 4 TEMP	. Uni t.	Unit counter. Its value is increased by one when '+' is pressed and reduced by one when '-' is pressed. Reset by pressing 'RESET' key.	SET, ADD −, 8 +, 9 SPLIT, RESET
4 TEMP + 0 CAL	.CALib.	Calibrate temperature if TEMP is selected.	SET, 9 SPLIT, RESET

Key	*Flash text*	*Function*	*Appropriate keys*
First press 	. .nodE.	Combined with a TRIP register this function can be used for measurements to/from centre of junctions, or if this instrument has a RS232 connection (optional) you activate a print from this key.	
First press 	.SPEEd.	A precision speedometer.	
Second press 	.SPd.Ehr	Speed threshold to set warning against speeding (option).	
First press  if TRIP or SPEED is chosen	.CAL.di 5	Prepares the instrument for calibration of distance and speed. (See "**Set up units in Coralba trip**", p. 20).	
Second press  and then .drivE.	.CAL i b.	The instrument is waiting for you to drive the calibration distance and register the length of the calibration distance.	
First press  if TEMP is chosen	.CAL i b.	Prepares the instrument for calibration of temperature (option). The keys TEMP and CAL are lit.	

Function keys

Key	Use with	Function
SET		SET is used to start the input of a value to the register that is shown in the display. SET is also used for adding/subtracting a value in a register. Push SET and the display windows start blinking. Register a new value. Push SET to approve the registration.
SET		SET in combination with TEMP is only used when calibrating the temperature sensor (see p. 8). If you press TEMP a second time, and then SET, you can register a value in the unit counter.
ADD —		Makes the counting direction NEGATIVE ('-') for the register which is currently chosen.
ADD —		This function may be used together with TRIP1, 2 and 3. Used as first entry in the SET mode it is interpreted as a minus sign. When used after the input of figures it is interpreted as ADD.
ADD —		When you push the '-' key after pushing the TEMP key twice you will decrease the counter value with each press on the ADD/- key.
7 HALT		HALT will stop the current register from counting. To start counting again, choose if you want to start counting in positive counting direction (push +) or negative direction (push -).
8 +		Makes the counting direction POSITIVE ('+') for the register which is currently chosen.
8 +		When you push the '+' key after pushing the TEMP key twice '–' you will increase counter value with each press on the '+' key.
RESET		RESET will set current register to zero. Every register has to be reset separately.
RESET		When you push the RESET key after pushing the TEMP key twice you can RESET the counter value.
RESET		If you use RESET when you register a value, you will interrupt the registration and restore the previous value (see "**Set up units in Coralba trip**", p. 20).

Display keys

There is only one key which controls the display window. SPLIT freezes the values of all registers in the instrument. This function is convenient when a value needs to be registered at a certain point during a traffic situation when you can not stop the vehicle.

Numerical keys

Coralba trip has ten numeric keys 

– 

. When registrating a numeric value these keys will automatically change to numeric function.

OPERATION

Distance measurement (Trip 1, Trip 2 and Trip 3)

When measuring DISTANCES **Coralba trip** has got three registers for this purpose – TRIP 1, TRIP 2 and TRIP 3. They may be used individually with separate counting directions plus ('+'), minus ('-') or 'HALT' that stops the current register. 'SPLIT' freezes the values of all registers in the instrument. If the measurement is to be done in the negative direction you just press the '-' key. The Trip meters will automatically switch counting direction when the vehicle is going in reverse.

Example: You want to register both total length and the length of a new pavement on a certain road. Drive to the starting point of the road and reset all trip registers. (In the example we will use Trip 1 for total length and Trip 2 for road which needs new pavements). Since Trip 1 will be used for total length, it will be counting all the time. We reset Trip 1 and control it is counting in positive mode ('+'). We want the Trip 2 to count the sections which need new pavement. We will stop the counting with 'HALT' when we drive through good sections of the road and press ('+') when we drive through bad sections of the road. At the end of the road Trip 1 will show the total length of the road and Trip 2 will show the length of the road that needs new pavement.

Preset

If you want to start measuring from a given point it is easy to set that value into a trip register. Select the trip to be used (TRIP 1, TRIP 2 or TRIP 3), press the 'SET' key and feed the value into the register with the numeric keys 'O'–'9'. The input is confirmed with the 'SET' key. Now your measuring starts from the set distance. If you require the measurement to start from a negative value the figures must be preceeded by a minus sign ('-'). If you change your mind it is possible to get the original value back by pressing 'RESET' instead of 'SET' as the confirmation.

Example: Yesterday you measured up to 5 500 m up to a certain point. Today you want to continue from this point. Choose a trip memory, press 'SET' (the actual trip value is blinking), use the numeric keys and press the value 5 500, and confirm with 'SET'.

Adding a number to a trip value

The registers may also be adjusted with an arbitrary value. If a junction is passed at distance 43.670 according to a master measurement but the trip shows a different value then it is easy to adjust the trip very accurately without stopping the vehicle. 'RESET' the trip at the junction. Carry on driving and press 'SET' and input the desired value (43670) with the numeric keys. Finish the input with 'ADD/-'. When you terminate the input with the 'ADD/-' key that means that the current value is to be adjusted with the input value. The result is that the measurement takes place from the junction with the correct value.

The register may also be adjusted by reducing and increasing the trip value. To increase or reduce from the trip value press 'SET' and use the numeric keys for input of value. If the value is negative and you want to reduce the value use '-' before input of value. Finish by pressing the 'ADD/'-key.

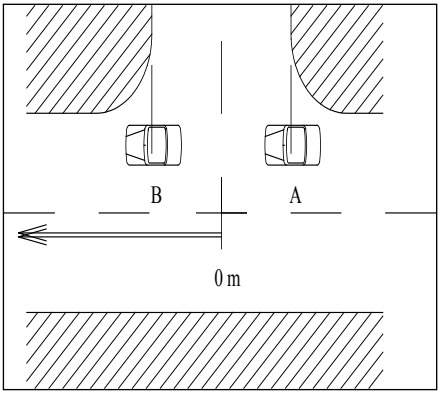
Centre point measurement (PRINT key)

Coralba trip has a function to enable automatic measurements from and to the centre of a junction. This function is selected with the 'PRINT' key.

This function is necessary since roads often have a start and stop in the centre of a junction. This function facilitates the need to stop at the centre of a junction.

The function is toggled on at the beginning of the junction and toggled off at the end. In the mean time the display is switching between the flash text and the measured value. The distance travelled in the mean time is divided by two. The function only has an influence on the register(s) where the function is toggled on (TRIP 1, TRIP 2 and TRIP 3 may be toggled on).

Starting centre measuring from a junction is carried out in the following way:



Toggle on the centre measuring before the junction by pressing 'PRINT'. At the start of junction (A) you reset the trip meter to zero by pressing 'RESET'. The display changes between the flash text (..nodE.) and '0'. Drive to the end of junction (B) and you will see the value increasing to half of the travelled distance. At the end of the junction you press 'PRINT' again to disable the function. This will give you the distance from the centre of the junction.

Finishing a measurement in the centre of a junction is done in a similar way:

For finishing a measurement in the centre of a junction (A) you press 'PRINT'. The flash text (..nodE.) is shown flashing in the display. When you pass the end of the junction (B) you press 'STOP' to finish the measurement at the centre of the junction. Centre measuring is toggled off by pressing 'PRINT' again.

Memory register/display window on/off

As mentioned before the instrument has no on/off key. You can turn off the display window choosing memory register by pressing 'TRIP 1' twice and then 'RESET'.

Automatic journey measurements

This option is a way to monitor travelled distance, time, average speed and maximum achieved speed for a journey. By resetting TRIP 2 the automatic measurement of the length, time, top speed and average speed is initiated. The measurement will start automatically when the vehicle is driven the first meter. When TRIP 2 shows its first meter

a timer is started and from elapsed time and travelled distance the average speed is calculated continuously. Any time you can then read the different values by pressing 'TRIP 2' repeatedly.

The following list gives more information:

Action		*Flash text*	*Coralba trip shows*	*Shown format*
Shown format				
First press		tri P. 2	Value of Trip 2	xxx.xxx
Second press		SSHour	Time of journey	xx.xx.xx
Third press		ASPEEd	Average speed	xxx.x
Fourth press		toPSPd	Maximum acheieved speed	xxx
Fifth press		tri P. 2	Back to Trip 2	

Except for maximum speed it is not possible to control these functions in any other way than through TRIP 2. The maximum speed may be reset to zero separately.

SET

As mentioned previously SET is used to set or change **any** register to a desired value. The register to be set is selected by pressing the appropriate key and thus making it visible in the display. To set the value simply press 'SET' and you will see the figures in the display flashing. This indicates that by using the numeric keys you may enter a new value. A negative value may be entered by preceding the value with '-'. The input is finished by pressing 'SET' again. The value is then visible in the display.

NOTE! If, for any reason, you wish to retrieve the original value – say if you made a mistake – simply press 'RESET' instead of 'SET'.

Unit counting (press TEMP twice)

Coralba trip is equipped with a register to count numbers of any kind of items. The register is selected by pressing 'TEMP' twice (flash text ..Unit). Its value is increased by pressing '+', decreased by pressing '-', and reset to zero with 'RESET'. The value may be preset or adjusted with 'SET', like any other register.

Example: your mission is to count how many poles are needed to be replaced along a road length. Choose unit counting register by pressing the 'TEMP' key twice and clear with the'RESET' key. For each pole you pass that needs replacement you press '+'. This will add one in the number count register. If you add one too many, then press '-' to exclude one from the unit counting register. At the end of the road length the total number of poles in need of replacement is shown.

Set up units in Coralba trip

Procedure	*Coralba trip shows*
Select any  or 	Selected register
Press 	Current calibrating constant
Press  for 2 seconds Enter setup mode	.SEtUP. Red light in key flashes
Press any of the selection keys as listed below	Flash text shows current setting
Press the same key once more to change	Flash text shows new setting and
	.SEtUP. setting starts to flash, indicating that something has been changed.
Repeat selection key until desired set up is ready	
Press  (store with SET-key)	If something is changed the program brings you back to the start position.
Otherwise to	Calibrating constant

You may select different units for distance, speed and temperature in a special set up mode. Also the communication for a printer (option) may be set. From the factory the unit is set up to the standard setting for your location. If you want to change units it is important to have your desired units set up before the calibration takes place. After the calibration has been carried out, the set up may be changed without recalibrating the unit.

You may exit any time from the set up mode without changing anything by pressing  .

You have now set up your **Coralba trip** to show your desired units. Even if the instrument is disconnected from the power supply it keeps the set up in its memory.

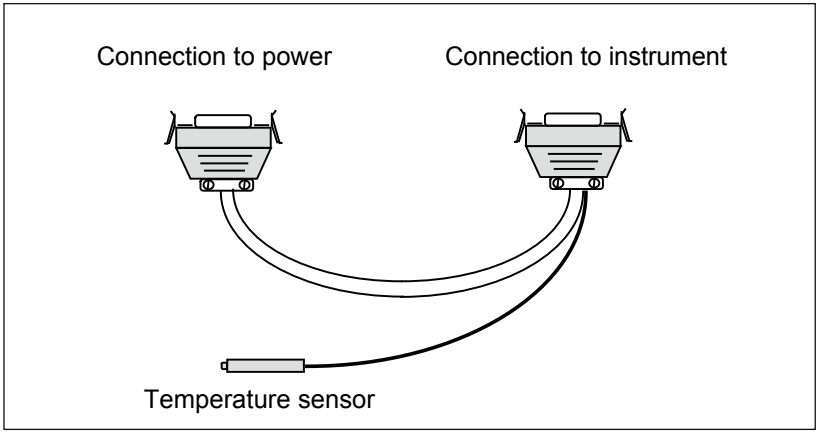
The following selection keys and choices are available:

Function	*Choose key*	*Unit*	*Text*
Change display of measurement unit	First press 	Meters	METER
For DISTANCE	Second press 	Miles	MILES
	Third press 	Miles + yards	MI YARd
	Fourth press 	Feet	FEEt
	Fifth press 	Nautical mile	nAutMI
	Sixth press 	Miles + feet	MI FEEt
	Seventh press 	(Back to) meters	METER
Change display of measurement unit	First press 	Kilometers per hour	KILOMrH
For SPEED	Second press 	Miles per hour	MPH
(Speed warning)	Third press 	Meters per minute	MrMin
	Fourth press 	Feet per minute	FtrMin
	Fifth press 	Knots	FtrMin
	Sixth press 	Meters per second	MrSEc
	Seventh press 	(Back to) km/h	KILOMrH
Change display of measurement unit	First press 	Degrees Celsius	°C
for	Second press 	Degrees Fahrenheit	°F
TEMPERATURE	Third press 	(Back to) °C	°C

OPTIONS

Temperature measurement (option)

As an option **Coralba trip** has a temperature sensor. Temperature is selected by pressing 'TEMP'. The temperature is shown in format xx.x. You can choose display mode °C or °F. See "**Set up units in Coralba trip**", p. 20. Before using for the first time the temperature sensor needs to be calibrated in order to show the correct value. See "**Calibrate Coralba trip, TEMPERATURE**", p. 8.



Printers and computers RS232C (option)

The following function keys and alternative settings are available for printers and computers:

Function	*Choose key*	*Choose (baud)*	*For text/ comment*
Change BAUDRATE	First press 	9600	Default setting
Communication speed	Second press 	110	br. 110
	Third press 	300	br. 300
	Fourth press 	600	br. 600
	Fifth press 	1200	br. 1200
	Sixth press 	2400	br. 2400
	Seventh press 	4800	br. 4800
Change	First press 	Negative polarity	CtS.nEG Default setting
CTS POLARITY	Second press 	Positive polarity	CtS.PoS
	Third press 	Back to Neg. Polarity	CtS.nEG

Printer connector (option)

As an option the 'PRINT' key may be used together with a printer to get a hard copy of the values when measuring. See below. If the printer is connected pressing 'PRINT' will turn on the indicator and enable the print out of all the registers every time any key is pressed. A heading is printed each time after a 'BREAK'. See "**Printers and computers (option)**", p. 23 for questions regarding **BAUDRATE**.

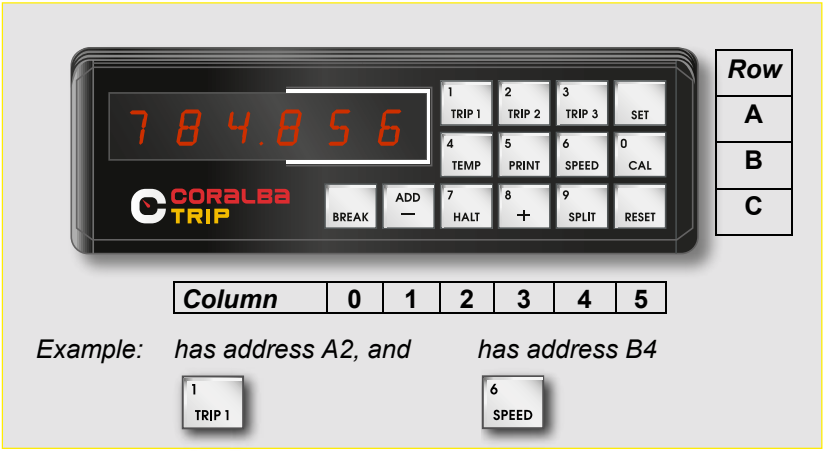
Coralba trip Version rEL3.08 by Coralba Sweden

\- + Halt Cal: 49975

Trip 1	Memory	Trip 2	SS.time	Av.Speed	Topspeed	Trip 3	Temp.	Unit	Speed	SpeedThr	Key
.	0	.	0	00.00.00	---	0	. 0	35.6xC	0	0	0	B3
.-28		. 27	00.00.05	16.6	24	. 0	37.6xC	0	23	0	C5
.-28		. 55	00.00.09	20.4	30	. 0	36.3xC	0	30	0	A4
.-46		. 73	00.00.11	22.3	32	. 0	36.6xC	0	32	0	C3
.-94		.122	00.00.16	25.9	38	. 47	34.6xC	0	38	0	C5
-.141		.168	00.00.20	28.6	41	. 45	37.0xC	0	41	0	C5
-.187		.214	00.00.24	30.9	42	. 43	38.0xC	0	42	0	C5

Exemple of a print

As you can see from the example above all values in all registers are printed when a key is pushed. The right column shows which key initiated the print. Keys are addressed as follows:



TROUBLE-SHOOTING

This chapter explains error codes and presents practical trouble-shooting.

Error codes

On some occasions an error code may appear in the display. The following codes are available:

Code	*Reason*	*Action to be taken*
PG-Err	Driving direction or polarity of yellow cable changed at a speed of at least 10 MPH. Polarity to yellow cable has been changed (connected to reverse light signal).	Check connection of yellow cable or pulse generator. Make sure the instrument is correctly calibrated and that correct units are used for distance and speed. See "**Calibrate Coralba trip, DISTANCE**", p. 6, and "**Set up units in Coralba trip**", p. 20.
S.U.-Err	Probably caused by problems with power supply.	Contact **Coralba** for service.
CAL.Err	Probably caused by problems with power supply.	Calibrate Distance. See "**Calibrate Coralba trip, DISTANCE**", p. 6.

Trouble-shooting

The table below describes some simple problems and presents suggestions to solve them:

Problem	*Reason*	*Action to be taken*
No light in the instrument even if you push a key	Faulty power supply	– Check all connections including '+' and '-' to power supply – Check the fuse
The instrument is lit up only after you push a key	No pulse from pulse interface to the instrument	– Check all connections between the instrument and the pulse interface – Install a new pulse interface
The instrument counts wrong	Wrong calibration number	– Check the calibration value – Perform a new calibration
The instrument counts wrong only on distance and speed	Wrong «setup» for distance or speed	– Check «setup» for distance and speed (see "**Set up units in Coralba trip**", p. 20).

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