

Electro-Magnetic Compatibility (EMC)

This product complies with Directive 2004/108/EC
when installed and used in accordance with the relevant
instructions.



Service and Technical Support

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User Guide

"Speed-Distance 200"

Speed-Distance Meter

Calibration and Operation

Software Reference WZ802-002 rev.2

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Overview

The RDS *Speed-Distance 200 Meter* is a versatile simple to use, two channel instrument.

It displays forward Speed (km/hr or miles/hr) and Total Distance covered (miles or km) to the vehicle operator. [Although not normally enabled, it is also possible to reset the distance total as required.](#)

NOTE: [The availability of the reset function is determined on initial installation. It cannot normally be enabled by the operator.](#)

The displayed information can be converted from Metric to Imperial units at any time.

It also includes a programmable forward speed alarm - an internal audible alarm in tandem with an external alarm output.

A second external alarm output is triggered if the programmed maximum speed is exceeded for more than a pre-programmed period.

Depending on the installation, the alarm output can trigger an audible/visible alarm, or retard the vehicle (e.g. operating a fuel restricting solenoid valve).

While the forward speed is greater than the alarm speed, the instrument also logs the distance travelled over 4 Overspeed Ranges:-

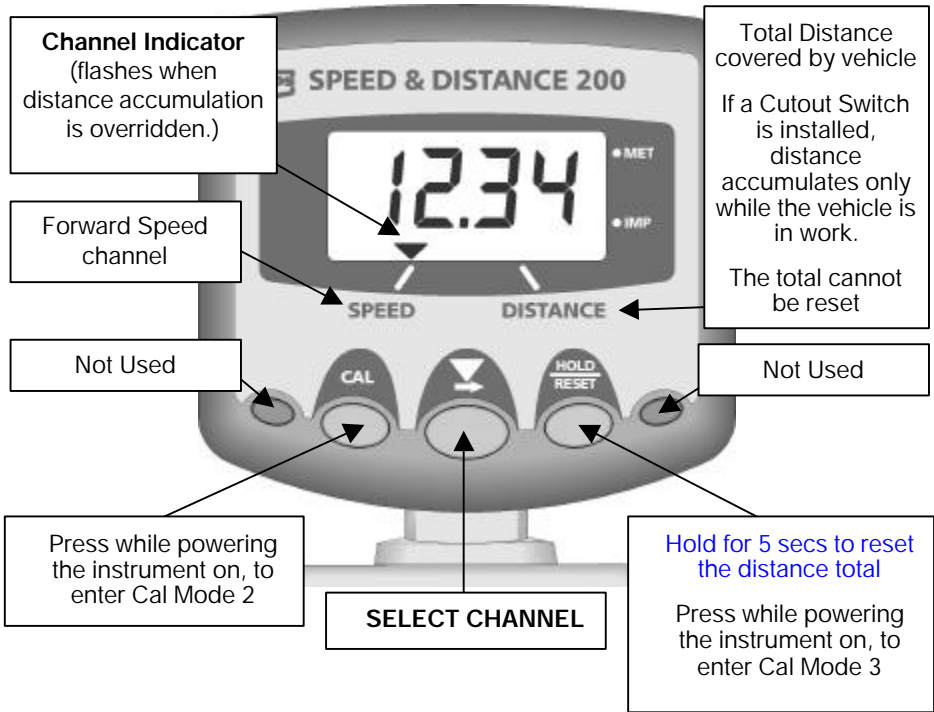
up to 5% over max. speed
5% to 20% over max. speed
20% to 50% over max. speed
50% or more over max. speed

The system comprises :

- The Head Unit.
- A Forward Speed Sensor kit.
- An automatic Cutout Switch to prevent distance accumulation, e.g. when the vehicle is out of work
- A power supply kit.
- A Radar Speed Sensor is an option to the standard (magnetic) Forward Speed Sensor

The Control Switches

The front panel has five buttons. Only the middle three are used.



The instrument will normally be powered through the vehicle ignition system and will be on whenever the vehicle ignition is on. The display is permanently illuminated.


Channel Selection



Simply press the ▼ button to switch between Forward Speed and Distance displays.

Distance Override

If an automatic override switch is installed, the distance will automatically stop accumulating when the vehicle is put out of work. The channel indicator will flash when distance accumulation is overridden and will be on permanently when distance is being recorded.

NOTE: *You cannot manually override distance accumulation nor clear the distance total with the  button, in normal operating mode. This button is used only in CAL mode 3, to clear the "Overspeed Distance" total and the "Total Travelled Distance" total.*

Alarm Conditions

Stage 1

If you exceed the programmed maximum speed, the display will revert to the Forward Speed channel and begin flashing along with an audible beep. If an external alarm device is fitted, this will be activated as well.

Stage 2

If you continue to overspeed for more than a programmed time period (default = 10 sec), then,

- (i) the internal audible alarm / external alarm (O/P 2) will then sound a more continuous tone.
- (ii) the external Overspeed Alarm output (O/P 1) will be activated. The effect of the Overspeed Alarm will depend on your particular installation. For example, the alarm output could trigger a high intensity audible or visible warning, or it is possible to switch a fuel valve solenoid or similar device which will automatically retard the vehicle, until the speed drops back to a given (programmable) speed below the maximum speed limit.

Overspeed Logging

While the maximum speed limit is exceeded, the instrument will log the distance travelled, in any of four Overspeed ranges depending on how much you are exceeding the speed limit.

Distance Log	Overspeed Range
1	Maximum Speed + 5%
2	5% - 20% over maximum speed
3	20% - 50% over maximum speed
4	More than 50% over maximum speed

CAL Mode 2

The instrument has a calibration mode 2 and a calibration mode 3 (There is no Cal mode 1 on this instrument). Both require a PIN to access them.

NOTE: *The default PIN is 1234. This cannot be changed by the operator.*

In calibration mode 2 you can view and change the:-

- Forward Speed Alarm Limit
- Speed Sensor Factor
- Metric / Imperial Display
- Over speed Alarm Time Delay

Entry to CAL Mode 2

1. Press and hold the CAL button as you switch on the instrument. The display shows "CAL2" for 2 seconds (figure 3), followed by "PIN" for 2 seconds. The screen will then show "0000" with the leading zero flashing.
2. Press and hold the ▼ button to change the digit.
3. Release the ▼ button and the next digit will flash.
4. Repeat step 2 for the other digits (or if you need to correct a mistake).
5. Press **HOLD
RESET** to accept the PIN. If the PIN has been entered correctly, the calibration data for channel 1 (Forward Speed Alarm Limit) is displayed.
If the PIN was incorrect, the first digit starts flashing again.
6. Press the **CAL** button to cycle between channels 1, 2, 3, 4 and 5.



Figure 3: Enter Cal. Mode 2

Select Metric/Imperial Unit

NOTE: You should check that the desired unit of measurement is selected before programming any values in the calibration mode. (for example, a Forward Speed Alarm threshold).

1. Press the **CAL** button and select **channel 3**. The instrument displays 4 bars, either across the top of the display to indicate Metric units (km) or across the bottom of the display to indicate Imperial units (miles).

The default setting is Metric units.

2. Press **▼** to change between Metric and Imperial units (Figure 4).

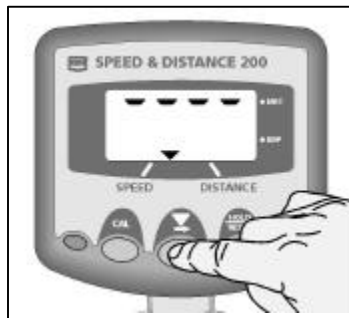


Figure 4: Select Units

Set Forward Speed Alarm Limit

This is the maximum forward speed which when exceeded, the Forward Speed display will flash, the internal audible alarm beeps, and the external alarm output is activated.

1. Press the **CAL** button to select **channel 1**. The first digit will flash.

The default setting is 10 km/h.

2. Press and release the **▼** button to select the digit you want to change.

or: Press and hold the **▼** button to change the digit.

3. Release the **▼** button and the next digit will flash.
4. Repeat step 2 for other digits (or if you need to correct a mistake).

In addition to manual programming of this factor, while this channel is selected, the speed limit alarm can be set to a current forward speed as follows,

- (i) While stationary, press and hold the 'RESET' key for 3 seconds until the display alternates between the forward speed readout and 'SET'.
- (ii) Drive at the desired speed and then press the **▼** key. The display will then show 'SET' for 3 seconds to confirm the alarm speed limit has been set, before returning to the manual entry alarm speed display as in step 1 above.



Figure 5: Set Alarm Speed

Speed Sensor Factor

The forward speed is displayed either in miles/hr or km/hr according to the units selected in the CAL Mode. In order to display the correct speed and accumulate distance correctly, the instrument must be programmed with the correct Speed Sensor Factor (SSF). This is the distance travelled between pulses received from the sensor.

The factory default setting is 1.000 m (39.39").

Calculating the Forward Speed factor

The smaller the speed sensor factor the better the speed update will be. Aim for a factor less than 2.000 m (78.78").

NOTE: *Perform the following calculations in inches or metres depending on whether the instrument is set for Imperial or Metric units. If you calculate the factor using any other unit of measurement e.g. feet or centimetres, the forward speed display will be incorrect.*

- (i) ***If a single magnet is installed (as with a standard RDS Propshaft Sensor kit)***, the distance travelled for each turn of the prop shaft must be determined. To determine this distance, drive the vehicle forwards for exactly **10** revolutions of the prop shaft. Measure this distance (in inches or metres) and divide by **10**, to find the Speed Sensor Factor.
- (ii) ***If 2 magnets are installed (as with a standard RDS Wheel Sensor kit)***, the distance is 1/2 the effective rolling circumference of the wheel. To determine this circumference, drive the vehicle forward in field conditions (with the implement attached if applicable), for exactly **10** revolutions of the sensed wheel. Measure this distance (in inches or metres) and divide by **20** to find the Speed Sensor Factor.
- (iii) ***If 4 wheel magnets are installed***, the distance is 1/4 the effective rolling circumference of the wheel. To determine this circumference, drive the vehicle forward in field conditions (with the implement attached if applicable), for exactly **10** revolutions of the sensed wheel. Measure this distance (metres) and divide by **40** to find the Speed Sensor Factor.

Carry out this test whenever soil conditions or wheel sizes change.

- (iv) ***If a Radar sensor is installed***, the Speed Sensor Factor is **0.008 m** (or **0.312 inches**).

If the calibration factor works out at over 2.000 m (78.78 inches), consider fitting additional magnets. Extra magnets are recommended if the vehicle has large diameter wheels or is slow-moving. In extreme circumstances you can find that the speed keeps going to zero as it times out before the next pulse arrives.

The table overleaf gives some guidelines.

Number of Sensor magnets

The table gives the number of magnets required to enable a speed update of approximately once per second or faster on the display.

Tyre diameter	Typical speed in normal operation:		
	up to 5mph (8km/hr)	6 to 9 mph (9 to 15 km/hr)	10mph (16 km/hr) or over
12" (0.3m)	1	1	1
24" (0.6m)	1	1	1
36" (0.9m)	2	2	1
48" (1.2m)	4	2	2
60" (1.5m)	4	4	2
72" (1.8m)	4	4	2

Example Calculation 1

A truck is fitted with a single magnet mounted in the tyre sidewall. The measured distance for 10 rotations of the sensed wheel is 47'-6".

1. Convert the distance to inches :- $(47' \times 12") + 6" = 570"$
2. Divide by 10 (magnet pulses) to give the calibration factor:- $570" / 10 = \underline{57.0}"$
3. Programme the factor '057.0' as described overleaf.

Example Calculation 2

A vehicle with row crop wheels is fitted with 4 magnets. It is found to move 144 feet for 10 rotations of the sensed wheel.

Converting the distance to inches and dividing by 40 gives a calibration factor of $(144' \times 12") / 40 = \underline{43.2}"$.

Setting the Speed Sensor Factor

Having established the Speed Sensor Factor, programme this figure in as follows.




1. Press the **CAL** button to select **channel 2**. The first digit will flash.
The default setting is 1.000 (m)
2. Press and release the  button to select the digit you want to change.
- or: Press and hold the  button to change the digit.
3. Release the  button and the next digit will flash.
4. Repeat step 2 for other digits (or if you need to correct a mistake).



Figure 6: Edit Speed Sensor Factor

Set Overspeed Alarm - Time Delay

This sets the time delay after the forward speed limit is exceeded, before the External Overspeed Alarm is activated.

Default = 10 seconds. It is programmable between 0 and 99 seconds.



1. Press the **CAL** button to select **channel 4**. The first digit will flash.
2. Press and release the  button to select the digit you want to change.
Press and hold the  button to change the digit.



Figure 7: Edit Alarm time Delay

Set Alarm Reset Threshold

Cal Mode 2 - Channel 5 : Default setting = 80%

To prevent the vehicle being driven on the speed limit and using the fuel solenoid as a governor, the 'Reset Threshold' can be set to a percentage of the Alarm speed threshold.

The 'Alarm Reset Threshold' is the speed at which the overspeed alarm output (O/P 1) deactivates, e.g. if this output operates a fuel solenoid to retard the engine, full engine power will be restored at a forward speed determined by this setting.

For example, if the programmed speed limit is 10 km/hr and the 'Reset threshold' is 80%, you would have to reduce your speed to 8km/hr to resume full engine power.

Exit Cal Mode 2

Simply switch the instrument off then back on to resume the normal operating mode.

CAL Mode 3

In calibration mode 3 you can:-

- View "Overspeed Distance" totals for Overspeed Ranges 1, 2, 3 and 4
- Reset "Overspeed Distance" totals (all together)
- Zero "Distance Travelled" total

Entry to CAL Mode 3

1. Press and hold the **HOLD RESET** button as you switch on the instrument. The display shows "CAL3" for 2 seconds (figure 8), followed by "PIN" for 2 seconds. The screen will then show "0000" with the leading zero flashing.
2. Enter the PIN number as for Cal Mode 2. The display defaults to channel 1 (Overspeed Distance Total for Overspeed Range 1)

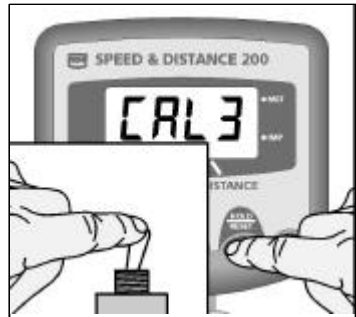


Figure 8: Enter CAL Mode 3

View / Reset Overspeed Distances

Channel 1 displays the total distance travelled at a forward speed between the maximum speed limit and the maximum speed limit + 5%.

Similarly, channels 2, 3 and 4 display the totals for the other speed ranges:-

2 - 5% to 20% over max. speed.

3 - 20% to 50% over max. speed.

4 - more than 50% over max. speed.

To reset all bands to zero, select **channel 5**. The screen displays "**orSt**" (figure 9).

Press and hold **HOLD
RESET** for 5 seconds to reset.

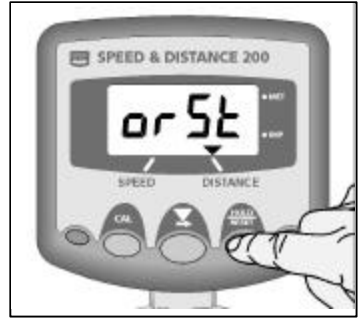


Figure 9: Reset Overspeed Totals

Reset Total Travelled Distance

Select **channel 6**. The screen displays "**drSt**" (figure 10).

Press and hold **HOLD
RESET** for 5 seconds to reset.

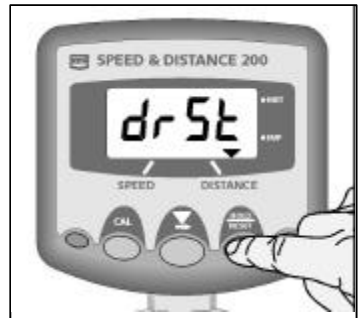


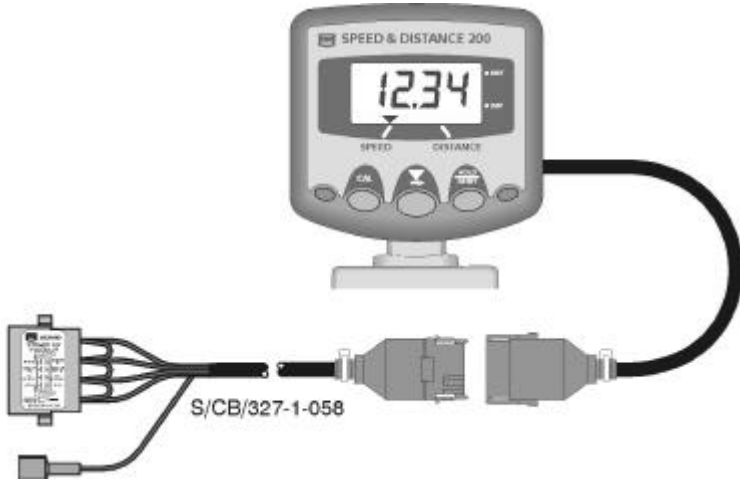
Figure 10: Reset Total Distance

Exit Cal Mode 3

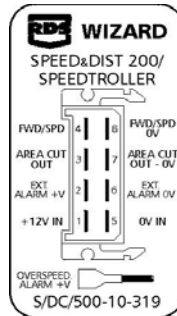
Simply switch the instrument off then back on to resume the normal operating mode.

Wiring Connections: – S-D 200 (8-way AMP FIFO)

The Speed-Distance 200 Meter has a 12-way Framatome “Qikmate” connector on the head unit lead. A 12-way Qikmate to 8-way interconnection cable Pt No. S/CB/327-1-058 (fig.2) is supplied to connect to the sensors, power supply etc.



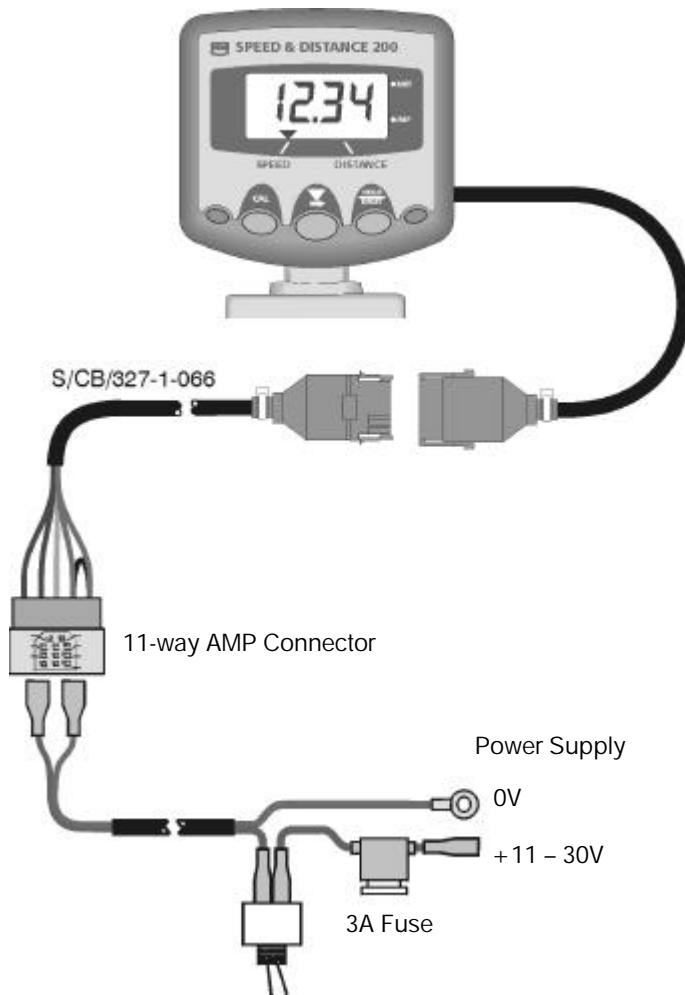
Connections:



Refer to the “Work measurement Installation” manual S/DC/500-10-261 for details on power supply, fitting sensors / cutout switches etc.

Wiring Connections: – S-D 200 (11-way AMP FIFO)

Instruments with software version WZ802-002 rev.2 onwards are supplied with cable Pt No. S/CB/327-1-066.

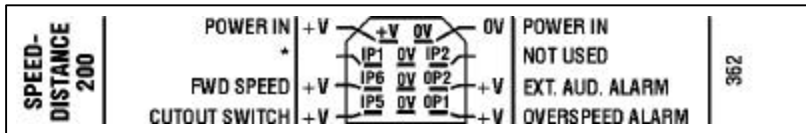


Refer to the "Work measurement Installation" manual S/DC/500-10-261 for details on power supply, fitting sensors / cutout switches etc.

The Total Distance Reset function is enabled by via a security link on the 11-way connector.

11-WAY AMP CONNECTOR			
TERMINAL	KEY	COLOUR	FUNCTION
11	+V	RED	+V IN
10	0V	BLACK	0V IN
3,5,8	0V		(+ 3 x COMMON 0V FOR SENSORS)
9	IP1	GREEN	SECURITY LINK (TO 0V)
7	IP2	YELLOW	NOT USED
3	IP5	BLUE	CUTOUT SWITCH +V
6	IP6	WHITE	FORWARD SPEED +V
4	OP2	VIOLET	EXT. AUDIBLE ALARM +VD
1	OP1	BROWN	OVERSPEED ALARM +V

The AMP connector, wiring label is Pt No. S/DC/500-10-362



SPEED-DISTANCE 200 METER

Issue 1 :	21/6/01	Original Issue
Issue 2 :	19/7/01	p.8 - S.S.F. = 0.008 for TGSS
Issue 3 :	17/6/02	Deleted Figure 1
Issue 4:	25/7/02	Corrections:- Press "CAL" to change channels in Cal modes; SSF calculation – divide by 20 :Added new AMP wiring regime.
Issue 5:	21/4/04	p.3 - Added note p.5 - Revised para. 'Alarm conditions p.6 - Ref.to channel 5 in Step 6 p.9 - Add para. 'Set Alarm Threshold' p.12,13 - Revised wiring instructions for 8-way AMP cable
Issue 6:	4/5/04	removed reference to Speedtroller p.7 - ref. option to set alarm limit to current speed. p.8,9 - Clarified SSF calculation
Issue 7:	4/4/05	Distance total reset function - ref. p. 3, 4 Changed to cable S/CB/327-1-066 - ref. p.14, 15