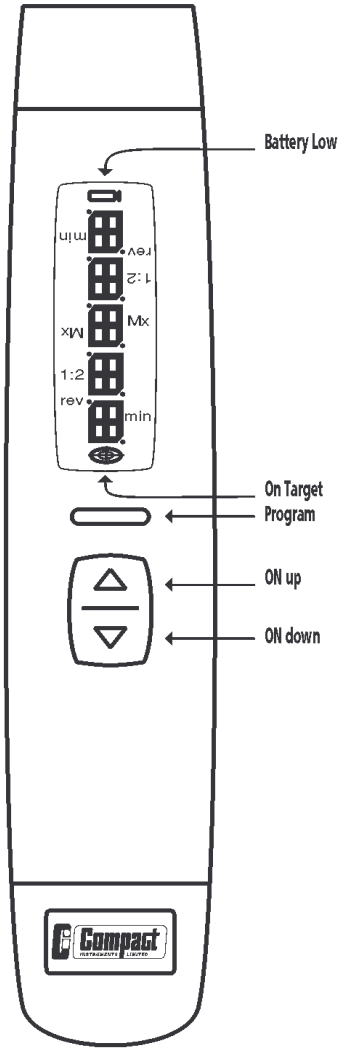

Operating Instructions

A2107

Combined Engine Tachometer
(Diesel, Ignition & Optical)

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A2107 features and operation

General description

The A2107 measures rotational speed via an optical laser system, via an antenna (for ignition engineers), or via a diesel input transducer. It can also measure linear speed using the contact adapter.
Featuring a patented **"Inverting" vertical LCD display** which gives extremely good flexibility in operation in almost any application, the instrument can be used in the normal mode or with the display inverted for applications where access is difficult within confined areas.
Auto power down - once the instrument is turned on it will automatically remain powered up as long as it is receiving input pulses, it will auto power down after about 30 seconds of not receiving any input.

Common Display features & Specification

Display	- Inverting LCD Vertical 5 digit display
Display functions	- 180 deg. Inverting
Function icons	- On target indicator, Low Battery indicator, 1:1, 1:2, Mx
Hands Free	- As Standard

Controls - 3 push-buttons

On normal mode	- Dual action rocker type push-button (UP ARROW)
On inverted mode	- As above but for inverted operation (DOWN ARROW)
Program control	- Selects 1 pulse/rev or 1 pulse/2revs mode (1:2 symbol)

Optical system

Optical range	- 50mm - 2000mm
Angle of operation	- +/- 80 Deg.
Light source	- Red Spot Laser Class II
Measurement ranges	- rpm (1:1 default) , rpm ×2 (1:2) , maximum speed capture (in both ranges)

Measurement range

Speed range -

Optical mode	- 10 - 99,999 rpm
Contact mode	- Max. 50,000 rpm for 10 sec

Note contact adapter is available separately.

Resolution range features	- +/- 1 digit
Accuracy	- 0.02% +/- 1 digit
Timebase standard	- 0.8 seconds or time between pulses, whichever is longest
Timebase, Fast modes	- 0.1 seconds auto-selection in Maximum capture mode
Power Hold	- Auto Switch Off in approx. 30 seconds
Power requirements	- 4 x AAA alkaline cells

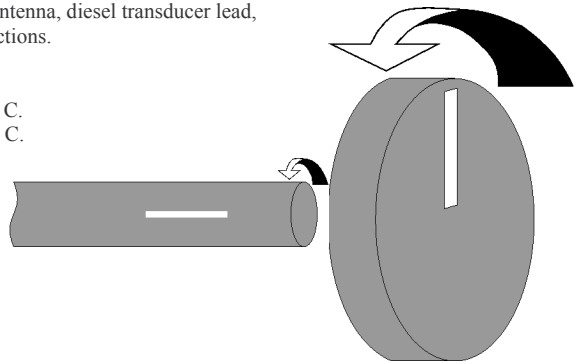
Standard package

Set of batteries, pack of reflective tape, stub antenna, diesel transducer lead, certificate of conformity , carry case & instructions.

Temperature specification

Operating temperature = 0 to + 50 degrees C.
Storage temperature = –10 to + 80 degrees C.

Tape Orientation for use on shafts or disks



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Optional Accessories

Accessory	Order Code
Contact adapter	LSAB-2
Reflective tape	RT/PACK

Diesel Transducers

4.5mm pipe	DES/09
6mm pipe	DES/10
6.35mm (1/4") pipe	DES/11
7mm pipe	DES/14
8mm pipe	DES/12
10mm pipe	DES/15

Ignition remote input lead

Ignition Tachometer

Hands free operation - once the instrument is turned on it will automatically remain powered up as long as it is receiving input pulses.

Program control - Selects 1 pulse/rev or 1 pulse/2revs mode (1:2 symbol)

Measurement range - both models

Measurement ranges	- rpm , rpm ×2 (default), maximum capture (in both ranges)
Speed range rpm	- 100 - 18,000 rpm
Resolution maximum	- ± 10 rpm
Accuracy	- ±0.05% ±10 rpm (± 0.5% maximum hold)
Memory features	- Last reading held for 5 seconds, automatic power down 4.5 minutes after last input pulse received or last button pressed.

Ignition Operation

rpm measurement

1. Attach the stub antenna to the rear of the unit. Start the engine and either point the antenna at one of the spark plug leads from a distance of up to 75mm or connect the optional remote input lead in place of the antenna and attach the clip to one of the HT leads. If the engine is a multi-cylinder one then ensure the instrument is close to one lead but at least 100mm away from any others or a false reading may occur.

2. Momentarily press one of the **ON** buttons to turn the instrument on. The **on-target** icon will glow or flash steadily. If not re-position the Instrument/lead relative to the ignition HT Lead.

3. In ignition mode the range is automatically set to **1:2**. This is suitable if the engine ignition system fires only once every other rev (e.g. 4-strokes) . Should it become necessary to change this mode press both the **Program** button and one of the **ON** buttons at the same time and release, the current range icons will flash, pressing either of the **ON** buttons will toggle the range icons. To confirm the selection press the **Program** button once.

4. To use in an inverted orientation simply press the **Down** button **once** and the display will automatically invert.

5. Maximum Speed Capture- To enable maximum capture mode press the **Program** button once, the instrument will now switch to fast timebase mode, the **Mx** icon will be visible and from now on the display will only change if the current speed is the highest since the **Program** button was pressed. To reset the maximum value ready to capture another reading, press the **ON** button once.

6. To exit the maximum capture mode press the **Program** button once, the **Mx** icon will then turn off and the timebase will revert to 0.8Secs and will continuously display the current speed.

Optical Operation

1. Optical revolutions speed measurement - rpm

1. Attach small reflective target to machine shaft (typically 5mm x 25mm).
2. Start engine/machine and point the tachometer towards the target.
3. Press either of the **On** buttons to switch the unit on then let go.
4. Aim light beam onto target, ensure "on-target" sign is glowing or flashing steadily.
5. Read off rpm, the last rpm reading will be held in display for a few seconds.
6. Press the **On** button to zero reading or take another measurement.

2. Display orientation - Inverting function - All modes

1. The instrument can be used through 180 deg. rotation (e.g. with the light beam pointing downward into a machine), the display inverts so that normal reading can take place.
2. The UP Button selects normal mode for optical and contact measurements.
3. The Down button selects the display inversion mode and the whole display including relevant icons will reverse through 180 degrees allowing access to difficult applications.

3. Maximum speed capture

1. To enable maximum speed capture mode press the **Program** button once, the instrument will now switch to fast timebase mode, the **Mx** icon will be visible and from now on the display will only change if the current speed is the highest since the **Program** button was pressed. To reset the maximum value ready to capture another reading, press the **ON** button once.
2. To exit the maximum speed capture mode press the **Program** button once, the **Mx** icon will then turn off and the Timebase will revert to 0.8Secs and will continuously display the current speed.

4. Measurement Range

1. The Optical mode measurement range is automatically set to **1:1**. Should it become necessary to change this mode press both the **Program** button and one of the **ON** buttons at the same time and release, the current range icons will flash, pressing either of the **ON** buttons will toggle the range icons. To confirm the selection press the **Program** button once.

Use Without Reflective Tape.

Under controlled conditions reflective tape may not be required. If there is an existing difference in reflectivity on part of the object to be monitored then this may be used e.g. keyways and slots in bright shafts, spokes of a wheel, fan blades etc.

If there is more than one target per revolution of the shaft then the resulting reading must be divided by the number of targets to obtain the correct reading. In the case of multiple targets these must be equally spaced around the shaft or disc or jitter will occur in the measured value, this effect is most apparent at slow speeds. On bright shafts it is possible to paint a black non-reflective segment and conversely on non-reflective shafts a white mark can be painted.

Warning

The unit detects contrasts in reflectivity not differences in colour.

As conditions can vary greatly from application to application some experimentation may be required to determine the best method.

Diesel Tachometer

Hands free operation - once the instrument is turned on it will automatically remain powered up as long as it is receiving input pulses.

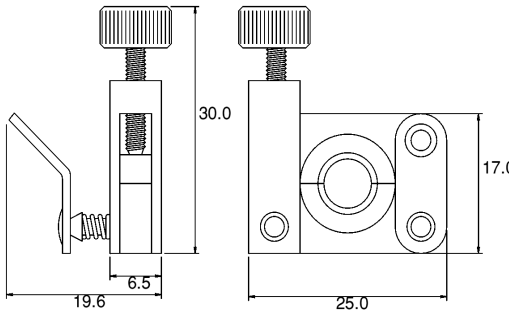
Program control

- Selects 1 pulse/rev or 1 pulse/2revs mode (1:2 symbol)

Measurement range

Measurement ranges	- rpm , rpm ×2 (default), maximum speed capture (in both ranges)
Speed range rpm	- 100 - 18,000 rpm
Resolution maximum	- ± 10 rpm
Accuracy	- ±0.05% ±10 rpm (± 0.5% maximum speed capture)
Memory features	- Last reading held for 5 seconds, automatic power down 4.5 minutes after last input pulse received or last button pressed.

Typical transducer



Available transducers
(ordered separately)

DES/09	4.5mm pipes
DES/10	6mm pipes
DES/11	6.35mm pipes
DES/12	8mm pipes
DES/14	7mm pipes

Diesel Operation

rpm measurement

1. Check that the transducer is the correct size for the injector pipe. Select any convenient injector pipe and choose a position which is straight for at least 20mm. Clean all paint and corrosion from the pipe using an abrasive, wipe clean and fit the transducer. Do not use excessive force when tightening transducer. Do not rotate or slide the transducer when clamped as damage can occur. Connect transducer cable to the 5-pin socket at the rear of the tachometer. Push the ¼" (6.35mm) cable receptacle onto the transducer blade terminal and connect the earth clip to a convenient earth point. Ensure all cables are clear of hot manifolds, fans or other rotating components, before starting the engine.

2. Start the engine. **Momentarily** press one of the **ON** buttons to turn the instrument on. The **on target** icon will glow or flash steadily. If not re-position the transducer.

3. In diesel mode the range is automatically set to **1:2**. This is suitable for all types of diesel engine except 2 stroke. Should it become necessary to change this mode press both the **Program** button and one of the **ON** buttons at the same time and release, the current range icons will flash, pressing either of the **ON** buttons will toggle the range icons. To confirm the selection press the **Program** button once.

4. To use in an inverted orientation simply press the **Down** button **once** and the display will automatically invert.

5. **Maximum speed capture**- To enable maximum speed capture mode press the **Program** button once, the instrument will now switch to fast timebase mode, the **Mx** icon will be visible and from now on the display will only change if the current speed is the highest since the **Program** button was pressed. To reset the maximum value ready to capture another reading, press the **ON** button once.

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