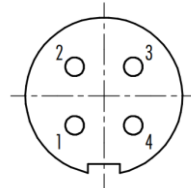
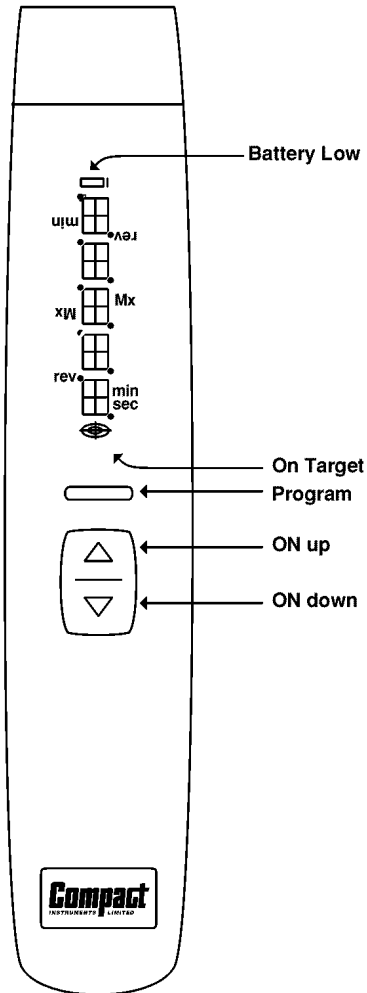


Operating Instructions

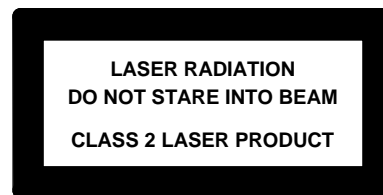
Digital Optical Tachometer Pulse Output

A2103/LSR/001

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Pin Diagram	
Pin 1	+v
Pin 2	Up button
Pin 3	-v
Pin 4	Pulse output



EXPLANATORY

Laser Models – Caution

Note: Avoid looking directly into the Laser light source as temporary dazzling may occur.

Model A2103/LSR/001

Display	- Inverting LCD Vertical 5-digit display
Display functions	- 180 deg. Inverting
On target indicator	- Yes
Low Battery indicator	- Yes
Function icons	- Comprehensive selection of ranges shown in display
Pulse output	- Output pulse train nominally 5V pk, TTL compatible
Remotely powered	- Yes, using Advent remote unit

Controls - 3 push-buttons

On/off normal mode	- Dual action rocker type touch push-button (UP ARROW)
On/off inverted mode	- As above but for inverted operation (DOWN ARROW)
Programme control	- Selects programme mode in conjunction with Up/Down switches

Optical system

Optical range	- 50mm - 2000mm
Optical angle	- +/- 80 Deg.
Light source	- Red Spot Laser, Class II

Measurement Range

Measurement modes	- rpm & rps optically (also Count & Time) - rpm & rps, metres, yards, feet, per min & per sec. via contact adaptor - Count total revs, metres, feet, yards - Measure Time interval in seconds between pulses (reciprocal rate). - Speed Capture feature - Maximum, Minimum or Average rate
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Speed Range

Optical mode	- 3 - 99,999 rpm (or equivalent in rps)
Contact mode	- Max. 50,000 rpm for 10 sec (or equivalent in rps)
Linear speeds -maximum	- 0.3 - 1500.0 Metres or Yds/min. (4,500 ft/min) or equivalent in seconds
Resolution range features	- Fully Auto-ranging, up to 0.001 digit or +/- 1 digit fixed, User selectable
Accuracy speed modes only	- 0.01% ± 1 digit
Count mode resolution	- ± 0.1 Metres (or equivalent in all ranges)
Time interval mode	- 0 - 99999 seconds Auto-ranging only (max. 0.001 resolution)
Time-base standard	- 0.8 seconds or time between pulses, whichever is longest
Time-base, Fast mode	- 0.1 seconds auto-selection in Maximum or Minimum capture mode
Memory features	- Last reading held for 1 minute, Auto Switch Off - Programme settings retained in memory after power down off
Contact adaptor	- Included complete with rpm cone & metric wheel assembly (removable)
Power requirements	- 4 x AAA alkaline cells
Standard package	Contact adaptor, pack of reflective tape, connecting lead, certificate of calibration, custom carrycase & instructions.

Operation of Model A2013/LSR

Ex works setting - rpm mode, non-auto-ranging

1. Programming - measurement mode selection

All measurement modes are chosen by this method and once confirmed, selected mode remains in permanent memory until re-programmed by the user.

1.1. To change mode hold programme button on and press up measure button and then release both buttons, the display will now illuminate all icons, and the current range will flash.

1.2. To select new measurement mode press either up or down button to scan through the modes, when the required mode icons flash release measure button & press programme button once to confirm settings.

For non-speed modes the unit is now programmed and ready for use.

1.3. To select mx, mn, av. modes continue to scan through each one, if the mode is not required, stop scan when all three icons illuminate continuously, then press programme button once.

The instrument is now ready to use. Set parameters will be retained until reprogrammed

2. Optical revolutions speed measurement - rpm or rps

2.1. Ensure batteries are correctly fitted.

2.2. Attach small reflective target to machine shaft (typically 6mm x 25mm, less for laser version)

2.3. Start machine and point the tachometer towards the target.

2.4. Press and hold either of the on/off buttons to suit application and hold continuously.

2.5. Aim light beam onto target, ensure "on-target" sign is glowing or flashing steadily

2.6. Read off rpm, releasing button will hold last reading.

2.7. Last rpm reading will be held in display for 1 minute.

2.8. Press the on button to zero reading or take another measurement.

3. Contact revolution speed measurement - rpm or rps

3.1. Fit contact adapter into the tachometer and ensure a good click fit connection.

3.2. Start machine and make clean contact with the recess in shaft end (wheel can be removed).

3.3. Contact the shaft end via the rubber cone, ensure a steady firm pressure is applied and that the instrument is accurately in line with the machine shaft.

3.4. Press and hold either up or down measure button as required & read speed

3.5. Releasing the on switch will hold the reading automatically for 1 minute, automatic switch off.

4. Linear contact speeds measurement - metres, yds, feet etc

4.1. Fit contact adapter as above.

4.2. Keeping the on button pressed, now place the contact wheel on the moving surface and read the linear rate, ensure wheel is perpendicular to the moving surface.

4.3. Releasing the on button will then hold the last reading in the display for 1 min.

4.4. The instrument retains selected measurement mode for further linear measurements after switch off until programmed to a different mode.

5. Auto-range selection - speed modes only

5.1. While taking a measurement using either up or down measure button, the user can toggle between auto and non-auto mode by pressing the programme button, in the auto mode, the A icon will illuminate.

6. Average speed monitoring mode - av icon

6.1. Average speed mode - this mode provides a rolling average of the last 8 measured values.

7. Operation of Maximum & Minimum modes Speed Capture functions - mx, mn

7.1. Having selected the required mode, i.e. Maximum or Minimum, (mx).

7.2. You are now ready to Capture a reading "On Demand" but continuing to operate normally.

7.3. When a capture test is ready to commence, while the Measure button is held On, press Programme button once, at this point the instrument will switch into high speed Time-base mode, (0.1 Seconds) and will Capture the highest or lowest reading after pressing the Programme button.

Releasing the On button will hold the reading and cancel the Capture mode until another Capture measurement is required, when 7.3. should be repeated.

8. Count measurement mode - cnt

8.1. Select mode as described in Measurement mode selection section

8.2. For rev Counting optically, point the light beam at the target and the instrument will measure all revs. (Pulses) until button is released, the display will hold Count for 1 minute.

8.3. By contact method, fit contact adaptor, press speed cone onto the end of the shaft, the Instrument will count revs.

9. Linear Length Totalisation measurements - mt, ft, yd

9.1. Select any linear unit of measurement, press contact wheel onto moving surface and commence Count by pressing & holding Measure button On, Count will increment until button is released.

9.2. The displayed value can be scanned through the equivalent values of Metres, Feet, Yards, Count by pressing the Programming button, the instrument automatically calculates the appropriate reading.

Note. Measurement Units will be stored in originally programmed parameter e.g. metres.

10. Time interval measurement - int

10.1. Select int mode through Measurement selection mode

10.2. This mode allows measurement of Time between pulses from optical system (or contactor).

10.3. Optically the instrument will measure the time in seconds between pulses, useful for cycle timing of reciprocating machinery.

10.4. (Time in seconds per revolution), which equals reciprocal speed.

10.5. Very slow speeds can be measured in this mode below 3 rpm.

11. Display orientation - Inverting function - All modes

11.1. 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.

11.2. The UP Button selects normal mode for optical and contact measurements.

11.3. 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.

12. Pulse output facility

12.1 The A2103/LSR/001 can be connected to external measurement equipment with a TTL compatible input.

12.2 Connect the lead supplied to the tachometer output socket. The Tachometer will turn on automatically and remain powered as long as the lead is attached.

12.3 The tachometer will give a 5V TTL compatible signal when the laser is on target.