General features

Compact Instruments A2109 tachometers feature a large vertical LCD display that gives excellent visibility in most applications. Both have an "Inverting display feature" which maintains the display in the correct plane for the user, for example when pointing the unit down into machinery.

This inverting display feature offers greater operational flexibility in almost any application where access is difficult.

Laser optics provide enhanced optical performance compared to standard non-contact tachometers. Both models are supplied with a contact adaptor for rpm and linear speed contact applications.

Other features include Maximum and Minimum speed Capture and Average speed modes.

SAFETY RECOMMENDATIONS

Always read and follow the operating instructions for use.
The units use a laser diode with an output power below 1 mW.
Never stare directly into the laser source.
Never aim the laser beam into anyone else's eyes.
Never open the instrument and attempt to adjust the output of the laser.
All repair work should be taken care of by Compact Instruments repair shop.

EU-DECLARATION OF CONFORMITY

We, Compact Instruments Ltd,
Unit 1, Mikar Business Park, Northolt Drive, Bolton, BL3 6RE
declare that the

A2109 Tachometer Series

has been designed and and manufactured in accordance with:
EMC Directive 89/336/EEC as outlined in harmonised norm for
Emission EN 50081-1, EN55011 (B)
Immunity EN 50082-2, EN61000-4-2, -3, level 3
A2109 complies with the harmonized European Standards:
Directive 94/9/EC
ISO9001:2000
Pr EN 13980: 2002 E
CENELEC EN 50014: 1997 +A1, A2
CENELEC EN 50020: 2002
Ex Classification: EEx ia IIC T4
Atex code: II 2 G
Ex Certificate Number: BAS01ATEX2301X
The laser is classified in accordance to the
Swedish Standard SS-EN-60825-1-1994
British Standard BS 4803 Parts 1 to 3
Deutshe Industrie Norm DIN SEC 76 (CO) 6
USA FDA Standard 21 CFR, Ch 1, Part 1040.10 and 1040.11
and is provided with the European CE approval.
UK, March 2005

Nick Bennett
Product Development Manager

A2109 features and operation

Refer to the illustration on the page 7.

Common Display features & Specification

Display	Inverting LCD Vertical 5 digit display
Display functions	180° Inverting
On target indicator	Yes
Low Battery indicator	Yes
Function icons	Comprehensive selection of ranges shown in display
Controls - 3 push-buttons	
On/off normal mode	Dual action switch (UP ARROW)
On/off inverted mode	Dual action switch (DOWN ARROW)
Program control	Selects program mode in conjunction with Up/Down switches

Optical system	**Laser**	**LED**
Optical range	50mm - 2000mm	50mm—1000mm
Angle of operation	+/- 80°	+/- 45°
Light source	Red Spot Laser Class II	Red LED

Measurement range

Measurement modes	- Optical rpm and rps (also Count and Time interval) - Via contact adaptor rpm & rps, metres, yards, feet, per min & per sec - Count total revs, metres, feet, yards - Measure Time interval in seconds between pulses (reciprocal rate) - Speed Capture feature - Maximum, Minimum or Average rate
Speed range	
Optical mode	3 - 99,999 rpm
Contact mode	Max. 50,000 rpm for 10 sec
Linear speeds	0.30 - 1500.0 Metres (1 - 4,500ft/min)
Resolution range features	Fully Autoranging up to 0.001digit or +/- 1 digit fixed, User selectable
Count mode resolution	+/- 0.1 Metres (or equivalent in all ranges)
Accuracy speed modes only	0.02% of reading +/- 1 digit
Time interval mode	0 - 99999 seconds Autoranging only (max 0.01 resolution)
Timebase standard	0.8 seconds or time between pulses, whichever is longest
Timebase, Fast modes	0.1 seconds auto-selection in Maximum or Minimum capture mode
Memory features	Last reading held for 1 minute, Auto Switch Off Program settings retained in memory after power down off
Contact adaptor	Included complete with rpm cone & metric wheel assembly (removable)
Pulse Output	Models /002, active pull down via 22K Ohm series resistor
Battery type	**ONLY** use 4 x Duracell "Procell" AAA cells
Operating temperature	0 to + 40°C (32 to 104°F)
Storage temperature	–10 to + 50°C (14 to 122°F)
Unit dimensions	213 x 40 x 39 mm (8.3 x 1.5 x 1.5 in)
Unit weight (incl. batteries)	170 g (5.9 oz)
Carrying case dimensions	238 x 49 x 102 mm (9.3 x 1.9 x 4.0 in)
Total weight (incl. case)	355 g (12.5 oz)
Warranty	12 months

Standard package

Set of batteries, contact adaptor, pack of reflective tape, certificate of calibration, custom carrycase and instructions for use.

Operation of all models

Default setting - rpm mode, non autoranging

1.Programming - measurement mode selection

a) All measurement modes are chosen by this method and once confirmed, selected mode remains in permanent memory until re-programmed by the user.
b) 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.
c) 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.
d) For non-speed modes the unit is now programmed and ready for use.
e) To select mx, mn, av. modes continue to scroll 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.
Note. Selected parameters will be retained until reprogrammed.

2. Optical revolutions speed measurement - rpm or rps.

a) Attach small reflective target to machine shaft (typically 6mm x 25mm)
b) Start machine and point the tachometer towards the target.
c) Press and hold either of the ON up/down buttons to suit application and hold continuously.
d) Aim light beam onto target, ensure "on-target" sign is lit or flashing steadily
e) Read off rpm, releasing button will hold last reading.
f) Last rpm reading will be held in display for 1 minute.
g) Press the On button to zero reading or take another measurement.
h) Releasing the ON switch will hold the reading automatically for 1 minute, automatic switch off.

3.Contact revolution speed measurement - rpm or rps.

> Warning for A2109:
> Ensure the contact adapter rotates freely before use.
> Continuous contact time must not exceed 10 seconds.

a) Fit contact adapter into the tachometer and ensure a good click fit connection.
b) Start machine and make clean contact with the recess in shaft end (wheel can be removed).
c) Contact the shaft end via the rubber cone, ensure a steady firm pressure is applied and that the instrument is in line accurately with the machine shaft.
d) Press and hold either up or down measure button as required & read speed.
e) Releasing the ON switch will hold the reading automatically for 1 minute, automatic switch off.

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

> Warning for A2109:
> Ensure the contact adapter rotates freely before use.
> Continuous contact time must not exceed 10 seconds.

a) Fit contact adaptor as above.
b) Keeping the on button pressed, now place the contact wheel on the moving surface and read the linear rate, ensure wheel is vertical to the moving surface.
c) Releasing the on button will then hold the last reading in the display for 1 min.
d) The instrument retains selected measurement mode for further linear measurements after switch off until programmed to a different mode.

5. Autorange selection - speed modes only

a) 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.

a) Average speed mode - this mode provides a rolling average of the last 8 measured values.
b) Press and hold the On/off button at the forward arrow position and hold continuously
c) Aim light beam onto target, ensure "on-target" sign is on at bottom of display screen.
d) Take rpm reading.

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

a) Having selected the required mode, i.e. Maximum or Minimum, (mx,mn).
b) You are now ready to Capture a reading "On Demand" but continuing to operate normally.
c) 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 Timebase 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 c) should be repeated.

8. Count measurement mode - cnt

a) Select the count mode (cnt).
b) For counting revolution optically, point the light beam at the target and the instrument will measure all revolutions (revs) until button is released, the display will hold Count for 1 minute.
c) By contact method, fit contact adaptor, press speed cone onto the end of the shaft, the Instrument will count revolutions.

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

> Warning for A2109:
> Ensure the contact adapter rotates freely before use.
> Continuous contact time must not exceed 10 seconds.

a) 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.
b) 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

a) Select int mode.
b) This mode allows measurement of Time between pulses from optical system (or contactor).
c) Optically the instrument will measure the time in seconds between pulses, useful for cycle timing of reciprocating machinery.
d) (Time in seconds per revolution), which equals reciprocal speed.
e) Very slow speeds can be measured in this mode below 3 rpm.

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a) 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.

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a) Average speed mode - this mode provides a rolling average of the last 8 measured values.
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d) Take rpm reading.

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

Warning for A2109:
Ensure the contact adapter rotates freely before use.
Continuous contact time must not exceed 10 seconds.

a) 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.
b) 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.

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a) Select int mode.
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d) (Time in seconds per revolution), which equals reciprocal speed.
e) Very slow speeds can be measured in this mode below 3 rpm.

14. Maintenance

Important: Repair or servicing should only be carried out by Compact Instruments.

Warning for A2109
1. The A2109 is not intended to be exposed to dusty conditions.
2. If excessive wear/corrosion has taken place to the plating on the housing and another colour begins to show through, the unit must be returned to Compact Instruments for attention.
3. The A2109 should not be subjected to mechanical or thermal stress, nor should it be subjected to any aggressive substances.
Note
This instrument has been designed such that it will not give rise to injury or other harm due to contact, nor will it produce excessive heat, infrared, electromagnetic or ionising radiation, nor does it have any non-electrical dangers.

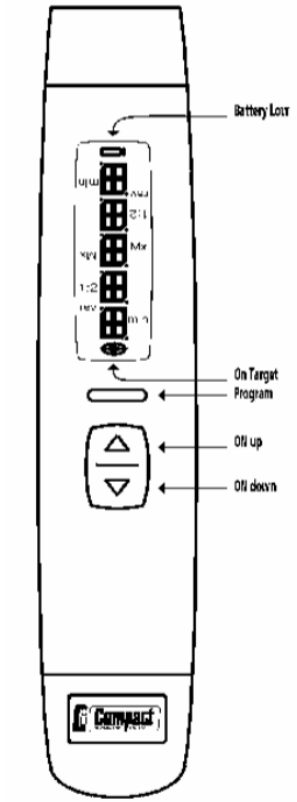
15. Spare parts and accessories

Designation	Description
A2100/01	Contact adapter
RT/PACK	Reflective tape

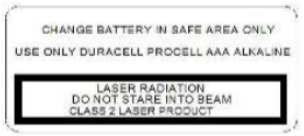
16. Model coding

A2109/LSR	Standard laser tachometer.
A2109/LSR/002	Laser tachometer with pulse output.
A2109/LED	Standard LED tachometer.
A2109/LED/002	LED tachometer with pulse output.

A2109 Controls layout



Safety label



Explanatory label

Warning: Do not look directly into the light source.

In line with our policy of continual development of our products we reserve the right to alter any part of the above specification without prior notice.
Although care has been taken to ensure the accuracy of this publication, Compact Instruments does not assume any liability for errors or omissions.

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