



Instruction Manual

Ex-Tacho 10



Contents

1. Application	17
2. Safety references	17
3. Damage and inadmissible operation	17
4. Safety regulations	17
5. Safety information	18
6. Ex-data	18
7. Technical details	18
8. Functional description / operating instructions	20
9. Repairs	25
10. Cleaning and maintenance	25
11. Guarantee and liability	25
12. Declaration of EC-Conformity	26
13. EC-Type Examination Certificate	27

1. Application

The Ex-Tacho 10 is an explosion protected revolution counter for the measurement of rotary frequency and speed in potentially explosive areas (excluding firedamp endangered underground mining) of Zones 1 and 2 in accordance with IEC/CENELEC,

2. Safety references

This operating manual contains information and safety recommendations, which must be complied with in order to guarantee safe functioning of the unit under the conditions described.

Please read these instructions very carefully before using the unit.

In case of doubt (for example due to mistakes in the translation), the German operating instructions are valid.

3. Damage and inadmissible operation

Should one suspect that the safety of the equipment is endangered, it must be taken out of service and immediately removed from the explosion-endangered area. Precautions must be taken to prevent its unintentional reuse. We recommend that the unit be re-turned to the manufacturer for checking.

For example, the safe use could be endangered by :

- visible damage to the outside of the housing.
- the unit being subjected to improper strain.
- the unit being improperly stored.
- the unit being damaged in transit.
- the lettering on the unit being unreadable.
- the occurrence of malfunctioning.
- obviously inaccurate readings being displayed.
- no measurements with the unit being possible.
- the permissible limiting values being exceeded.

4. Safety regulations

In order to exclude false operation of the unit, its use assumes that the user is aware of and complies with the usual safety regulations.

The following safety regulations must be complied with:

- the unit must not be opened within the explosionendangered area.
- the batteries may only be changed outside the explosion-endangered area.

- only batteries Type LR03 Procell AAA Alkaline, manufactured by DURACELL may be used.
- the revolution counter with plugged-in adapter may only be held for a maximum of 10 seconds in contact with a rotating object (such as a shaft).

5. Safety information

- warning: laser beam – take extreme care !
- don't look directly into the laser beam !
- risk of damage to the eyes !

6. Ex-Data



EC-Type Examination Certificate: BAS 02 ATEX 2159 X

EC-Designation:  II 2 G EEx ia IIC T4

Approved for Zone 1, Equipment group II, Gas group C potentially-explosive gases, vapour or fog, Temperature class T4

7. Technical details

Ambient temperature Ta: -20 ... +40°C
 Storage temperature: -20 ... +40°C
 Batteries: 4 x LR03 DURACELL
 Procell AAA Alkaline
 Operating life: average 3 - 6 months
 Dimensions: 215 x 40 x 40 mm
 Weight : approx. 185 g (with batteries)
 CE-Designation: C€ 0102

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

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: Laser Models

Optical range: 50mm - 2000mm

Optical angle: ±80°

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

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)

8. Description of the functions / remarks

Ex works setting - rpm mode, non auto ranging

- 8.1** 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.
- 8.1.1** 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.
- 8.1.2** 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.
- 8.1.3** 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
- 8.2** Optical revolutions speed measurement - rpm or rps
- 8.2.1** Ensure batteries are correctly fitted.
- 8.2.2** Attach small reflective target to machine shaft (typically 6mm x 25mm, less for laser version)
- 8.2.3** Start machine and point the tachometer towards the target.
- 8.2.4** Press and hold either of the on/off buttons to suit application and hold continuously.
- 8.2.5** Aim light beam onto target, ensure "on-target" sign is glowing or flashing steadily
- 8.2.6** Read off rpm, releasing button will hold last reading.
- 8.2.7** Last rpm reading will be held in display for 1 minute.
- 8.2.8** Press the On button to zero reading or take another measurement.
- 8.3** Contact revolution speed measurement - rpm or rps

- 8.3.1** Fit contact adapter into the tachometer and ensure a good click fit connection.
- 8.3.2** Start machine and make clean contact with the recess in shaft end (wheel can be removed).
- 8.3.3** 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. Do not maintain contact for more than 10 seconds.
- 8.3.4** Press and hold either up or down measure button as required & read speed
- 8.3.5** Releasing the On switch will hold the reading automatically for 1 minute, automatic switch off.
- 8.4** Linear contact speeds measurement - metres, yds, feet etc
- 8.4.1** Fit contact adapter as above.
- 8.4.2** 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. Do not maintain contact for more than 10 seconds.
- 8.4.3** Releasing the on button will then hold the last reading in the display for 1 min.
- 8.4.4** The instrument retains selected measurement mode for further linear measurements after switch off until programmed to a different mode.
- 8.5** Auto-range selection - speed modes only
- 8.5.1** 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.
- 8.6** Average speed monitoring mode - av icon
- 8.6.1** Average speed mode - this mode provides a rolling average of the last 8 measured values.
- 8.7** Operation of Maximum & Minimum modes Speed Capture functions - mx, mn
- 8.7.1** Having selected the required mode, i.e. Maximum or Minimum.
- 8.7.2** You are now ready to capture a reading "On Demand" but continuing to operate normally.

- 8.7.3** 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 8.7.3 should be repeated.
- 8.8** Count measurement mode - cnt
- 8.8.1** Select mode as described in Measurement mode selection section
- 8.8.2** 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.
- 8.8.3** By contact method, fit contact adaptor, press speed cone onto the end of the shaft, the Instrument will count revs.
- 8.9** Linear Length Totalisation measurements - mt, ft, yd
- 8.9.1** 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.
- 8.9.2** 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.
- 8.10** Time interval measurement - int
- 8.10.1** Select int mode through Measurement selection mode
- 8.10.2** This mode allows measurement of time between pulses from optical system (or contact adapter).
- 8.10.3** Optically the instrument will measure the time in seconds between pulses, useful for cycle timing of reciprocating machinery.
- 8.10.4** Time in seconds per revolution, which equals reciprocal speed.
- 8.10.5** Very slow speeds can be measured in this mode below 3 rpm.

- 8.11** Display orientation - Inverting function - All modes
- 8.11.1** 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.
- 8.11.2** The UP Button selects normal mode for optical and contact measurements.
- 8.11.3** 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.

Operation Notes

Ensure the contact adapter rotates freely before use, do not maintain contact for longer than 10 seconds at any one time.

Battery Replacement

Batteries must only be replaced with Duracell "Procell" AAA cells.

The battery compartment lid must only be opened in a safe area. To open the lid, first unscrew the security screw with a special tool until it moves freely. The screw is a captive type and should not be removed from the lid. Once the screw moves freely, press the thumb grip on the lid and push/slide the lid backwards and lift off.

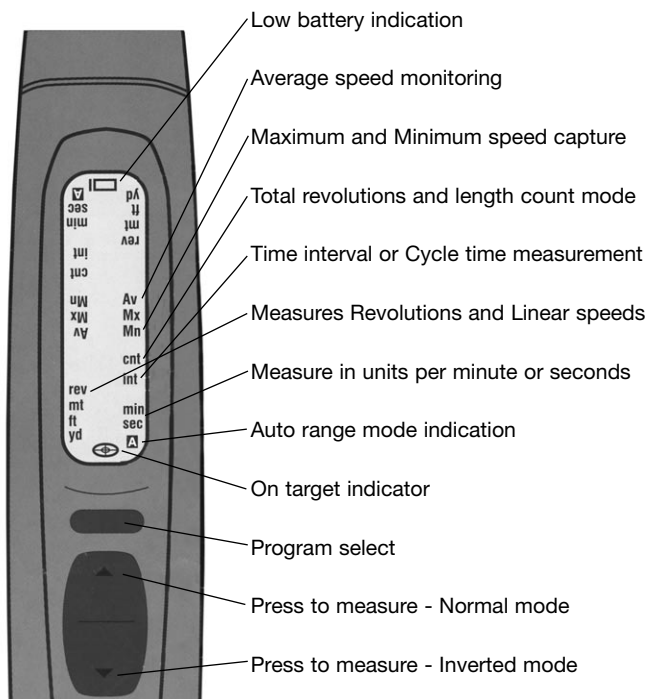
The old batteries can then be replaced ensuring correct orientation. Replaced the lid ensuring the security screw is pulled upwards to avoid catching underneath. The base of the lid is now pushed until a click is heard, tighten the security screw and the unit is ready for use.

Warning

1. The Ex-Tacho 10 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 the manufacturer for attention.
3. The Ex-Tacho 10 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.



9. Repairs

Should repairs be necessary, then the conditions of ELEX V. must be complied with.

We recommend that repairs be carried out in the manufacturer's factory as it is necessary for the unit to be checked for technical safety reasons.

10. Cleaning and maintenance

The unit should only be cleaned with a moist cloth or sponge. Detergents or abrasive materials should not be used.

We recommend that the function and accuracy of the unit be checked every two years by the manufacturer.

11. Guarantee and liability

For this product, the ecom Instruments GmbH guarantees the function and workmanship of the unit under normal operating and maintenance conditions for a period of two years commencing from the date of delivery .

This guarantee does not apply to products which are improperly used, modified, neglected, damaged in accidents or exposed to abnormal operating conditions or improper handling.

Claims under the guarantee can be made by returning the defective unit to the factory. We reserve the right to repair, renew the settings or exchange the device.

The above-mentioned guarantee conditions are the sole and only right of the purchaser to compensation, are exclusively valid and replace all other contract or legal warranty obligations.

The ecom Company accepts no responsibility for special, direct, indirect, accompanying or consequential damage as well as losses including the loss of data which may arise through the use or acquisition of the equipment. ecom will not be responsible for any special or consequential damage which may occur independent of whether it was caused by violation of the warranty obligation, lawful or unlawful action, action in good faith or any other action.

If in certain countries, the limitation of a legal guarantee as well as the exclusion or limitation of accompanying or consequential damage is not permissible, it may be that the above-mentioned limitations and exclusions are not valid for every purchaser. Should such clauses of these guarantee terms be declared to be void or not realisable by a competent court, the effectiveness or enforceability of any one of the other conditions of these guarantee terms will be unaffected by the court decision.

12. Declaration of EC-Conformity

We

ecom instruments GmbH
Industriestraße 2
D-97959 Assamstadt

declare under our sole responsibility that the product

Ex-Tacho 10

to which this declaration relates is in accordance with the provision of the following directives,

94/9/EC Electrical apparatus for potentially explosive atmospheres

and is in conformity with the following standards or other normative documents.

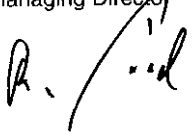
EN 50014:1997 Electrical apparatus for potentially explosive atmospheres;
General requirements

EN 50020:1994 Electrical apparatus for potentially explosive atmospheres;
Intrinsic safety "I"






ecom instruments GmbH

Assamstadt, den 30.07.02

Rolf Nied
Managing Director



13. EC-Type Examination Certificate

 	
EC-TYPE EXAMINATION CERTIFICATE	
Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC	
1	
2	
3	EC-Type Examination Certificate Number : BAS02ATEX2159X
4	Equipment or Protective System: ADVENT HAND TACHOMETER TYPE Ex-Tacho 10
5	This certificate is held by: ECOM ROLF NIED GmbH
6	Address: Industriestrasse 2, D-97959 Assamstadt, Germany
7	This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
8	The Electrical Equipment Certification Service, notified body number 600 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in confidential Report N° 02(C)0355 dated 27 May 2002
9	Compliance with the Essential Health and Safety Requirements has been assured by compliance with: EN 50014: 1997 + Amds 1 & 2 EN 50020: 1994 except in respect of those requirements listed at item 18 of the Schedule.
10	If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
11	This EC-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment or protective system.
12	The marking of the equipment or protective system shall include the following:-  This certificate may only be reproduced in its entirety and without any change, schedule included.
File No: EECS 4206/02/002	
<small>This certificate is granted subject to the general conditions of the Electrical Equipment Certification Service. It does not necessarily indicate that the apparatus may be used in particular industries or circumstances.</small>	
 	
Electrical Equipment Certification Service Health and Safety Executive Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom Tel: +44(0)1298 28000 Fax: +44(0)1298 28244 Internet: www.basefa.com e-mail: basefa.info.eecs@hse.gov.uk	
I M CLEARE DIRECTOR 13 June 2002	

CERTATEX/EQUIP/CAT1-2/P*, Issue 1, Dated September 1998

Page 1/3



Schedule

EC-TYPE EXAMINATION CERTIFICATE N° BAS02ATEX2159X

Description of Equipment or Protective System

The **Advent Hand Tachometer Type Ex-Tacho 10** is a hand held instrument designed to measure the speed of rotating shafts. It produces either an optical beam using photo diodes or a laser beam using laser diodes. The reflection of the beam from a reflective surface on a rotating shaft is detected by a sensor in the Tachometer. Tachometer may be used with a contact adapter fitted to the front which is held against a rotating shaft. The contact adapter has a permanent magnet that rotates to produce a rotating magnetic field which is sensed by the instrument.

The Tachometer contains electronic components and an LCD display mounted on a printed circuit board (pcb). The instrument is internally powered using 4 x Duracell size AAA alkaline cells. The electrical components are enclosed in a chrome plated plastic housing with separate compartments for the pcb and the battery. The instrument has a transparent window for the display and the battery compartment is fitted with a cover which is secured using anti-tamper fixing. The Tachometer has an optional **Rear Plug** to which external diagnostic instruments may be connected.

The Type number may be suffixed with various characters to signify the following variants:-

Ex-Tacho 10/**

- ** = LED for LED version - no output
- = LED/1F for LED version - 5 way rear plug
- = LSR for Laser version - no output
- = LSR/1F for laser version - 5 way rear plug

Input Parameters

At the **Rear Plug Pin 4** w.r.t. Pin 3:

$$U_i = 10.1V$$

Output Parameters

At the **Rear Plug Pin 4** w.r.t. Pin 3:

$$U_o = 6.6V$$

$$I_o = 0.3 mA$$

$$P_o = 0.43 mW$$

$$L_o = 700 mH$$

$$C_o = 22 \mu F$$

$$L_o/R_o = 68 mH/\Omega$$

$$L_i = 0$$

$$C_i = 0$$



Schedule

EC-TYPE EXAMINATION CERTIFICATE N° BAS02ATEX2159X

At the **Rear Plug Pin 1** w.r.t. Pin 2:

$$U_o = 6.6V$$

$$I_o = 463 mA$$

$$P_o = 0.63W$$

$$L_o = 0.17 mH$$

$$C_o = 22 \mu F$$

$$L_o/R_o = 49 \mu H/\Omega$$

$$L_i = 0$$

$$C_i = 2.245 \mu F$$

Report No.

02(C)0355

Special Conditions For Safe Use

Tachometer fitted with a contact adapter presents a potential risk of frictional ignition and must not be used continuously for more than 10 seconds.

Essential Health and Safety Requirements

ESSENTIAL HEALTH & SAFETY REQUIREMENTS not covered by standards listed in Section 9		
Clause	Subject	Compliance
1.1.3	Changes in characteristics of materials and combinations thereof	Report No 99(C)0950 Clause 5.1.1.3
1.2.2	Components for incorporation or replacement	Report No 99(C)0950 Clause 5.1.2.2
1.2.5	Additional means of protection	Report No 99(C)0950 Clause 5.1.2.5
1.2.7	Protection against other hazards	Report No 99(C)0950 Clause 5.1.2.7
1.4.2	Withstanding attack by aggressive substances	Report No 99(C)0950 Clause 5.1.4.2

DOCUMENTS

1. BASEEFA EC-Type Examination Certificate No BAS01ATEX2301X dated 10 September 2001.
2. Label drawing 001304 Issue 1.2 Date 21.5.02
3. Label drawing P0530 Issue 1.1 Date 22.5.02

This certificate may only be reproduced in its entirety and without any change, schedule included.

BASEEFA List Keywords
TACHOMETER



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