

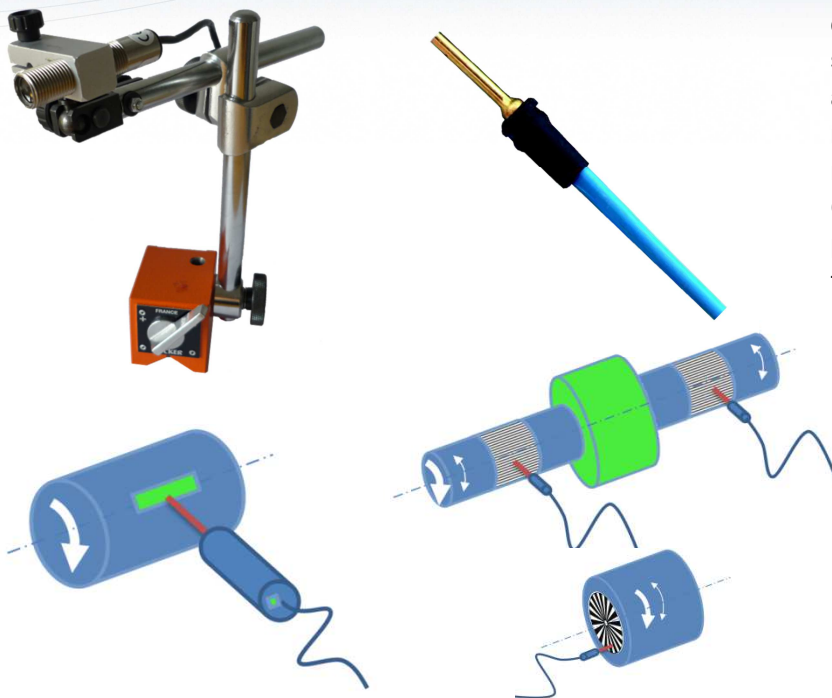
Tachometer Solutions

Field sensors and accessories for rotating speed sensing

Introduction

OROS Tachometer Solutions are a range of sensors and accessories for applications such as RPM or phase measurement. They are designed for field measurements and may be easily adapted to various types of rotating machinery. They fit well with OROS analyzers allowing them to be powered from the instrument. Two main types of sensors are provided:

- > The **TAC-O01** is particularly suited for **1 pulse/rev** signals. It is recommended for applications such as Order Analysis, Keyphasor[®] applications, phase reference, balancing and RPM measurements.
- > The **TAC-O02** is suited for multiple pulse/rev signals. It is often used for rotating speed fluctuations and cover torsional and twist applications based on **multiple pulses/rev**.



Industries

- > Energy & Process
 - Power generation
 - Oil & Gas
- > Manufacturing
- > Marine
- > Aerospace
- > Ground Transportation



Machines

- > Turbines & Compressors
- > Engines, Recip compressor
- > Motors & Generators
- > Gearboxes, Transmissions
- > Alternators
- > Fans
- > Machine Tools



Applications

- > Rotating speed determination (RPM)
- > 1 pulse/rev, Phase (Keyphasor[®]) reference for
 - Synchronous order
 - balancing
 - Order extraction
- > Multiple pulse/rev: Torsional vibration analysis, Twist analysis.

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TAC-O01: The RPM and Phase sensor

- > Optical sensor
- > Conditioning, cables and accessories included
- > Powered by the analyzer
- > Designed for the field
- > Easy to mount
- > 1 Top/rev sensor

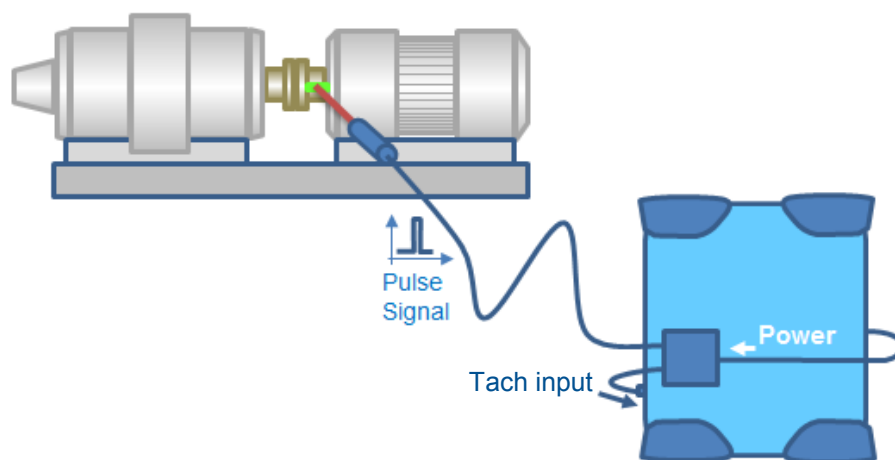


Description

ORAC-TAC-O01 is a versatile optical tachometer probe. The probe detects rotation pulses using a reflective tape placed on the shaft under test. OROS 3 Series analyzers, or 100-240V mains, can power it. Based on the captured pulse signal, the OROS analyzer achieves the RPM computation or any other type of analysis such as Order tracking or Synchronous time domain averaging (FFT).

Flexible power management

The Tach may be flexibly powered using the OROS instrument. All cables and conditioning units are provided with the TAC-O01 pack.



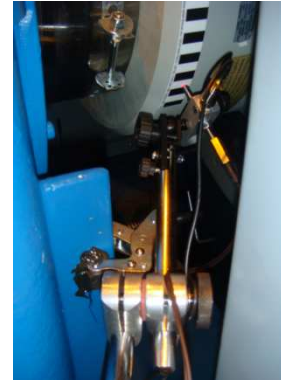
Practical mounting in the field

The TAC-O01 is easily mounted in any situation as it can detect pulses from distances far as 0.9 m and an angle of 45° away from the reflective tape. The green LED On-Target Indicator will blink at the input frequency rate when the sensor is properly aimed. Using one of the clamps provided the probe is rigidly mounted avoiding vibrations of the probe itself resulting in accurate results.



TAC-O02: The Torsion & Twist sensor

- > Fiber-optics sensor
- > Accurate
- > Conditioning, cables and accessories included
- > Powered by the analyzer
- > Designed for the field
- > Accurately mounted with the provided frame



Description

On reciprocating machinery (diesel engine, pump) or any cyclic rotating devices (generator, compressor, transmission), the cause of vibrations often comes from the fluctuations of the angular speed. The analysis of the instantaneous angular speed inside each shaft revolution provides essential information. Such information is helpful for vibration reduction during prototyping or even for source identification while doing service diagnostics. The common way to measure such instantaneous velocity is to install a black & white stripe or disk on the shaft as well as an accurate tachometer.

The ORAC-TAC-O02, an interference-free and noncontact high speed optical fiber sensor providing up to 50000 imp/sec from an optical fiber probe is the perfect tool for such as measurement.

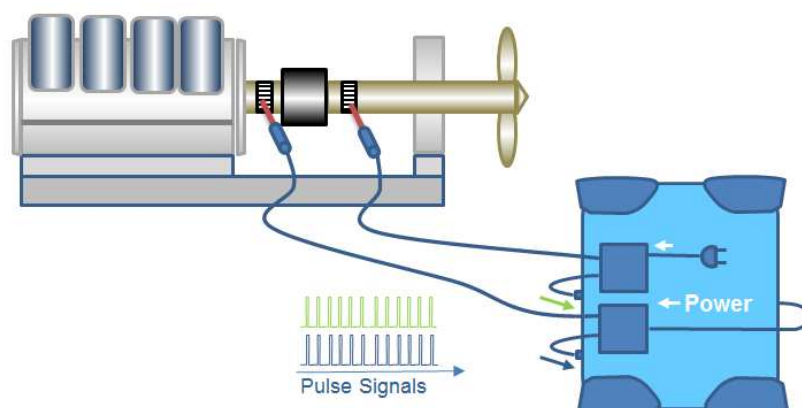
Note that for safety, the sensor does not contain any laser.

Torsion and Twist

The package is made to allow the use of one or two sensors to realize torsion and twist measurement. For example, the twist measurement consists of computing the angle between the 2 side of transmission shaft (or belt/chain). The measured angle is directly proportional to the stress and the applied torque.

Flexible power management

The tachometer may be flexibly powered using the OROS instrument. All cables and conditioning units are provided with the TAC-O02 pack.



Accessories

The ORAC-TAC-O01 and ORAC-TAC-O02 are offered with a set of accessories and options as described below.

Mounting frames

OROS provides Lockable mounting bases adapted for tachometers. Rugged, stiff and adjustable, these supports are the perfect accessories for accurate rotating speed measurement in industrial environments. Articulations are equipped with needle graduations which allow tightening without moving and then a better accuracy for positioning.

The bases are adapted to the 2 described tachometers in this datasheet: ORAC-TAC-O01 ORAC-TAC-O02.

2 types of base available:

Magnetic base:

With a high-pull magnetic base and 2 magnetic surfaces, this type, thanks to its great rigidity, is able to work in difficult environments. Being the most common type of support, it can be used in the majority of cases.

Clamp base:

When surfaces are not conducive to magnetic frames due to oil, paint ... The clamp type is a good alternative. Easily installed, it provides a rigid and accurate support whatever the surface of the machine.



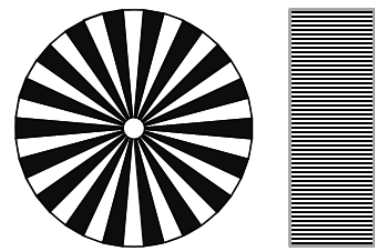
The magnetic base



The clamp base

Optical targets for Torsion&Twist probes

The product range for rotating speed measurements includes black & white adhesive back encoders. The manufacturing method of these encoders combines a very high black & white contrast with very high line quality even with 240 pulses per revolution. The adhesive backed encoder is very strong, washable and can be cut in order to suit various environments, especially hard condition. These encoders are available under two different shapes: striped or disked with several different dimensions.



Optical targets

A packaged system for the field

When going to the field or to the workshop it is key to be able to quickly grab the box with all its items included. Thus, there is no risk to forget a cable or piece of reflecting tape.



Packaged sensor system

Specifications

The following specifications concern ORAC-TAC-O01, ORAC-TAC-O02 and their accessories.

TAC-O01

The TAC-O01 main sensor is designed and manufactured by Monarch Instrument.

Specifications

Speed range	1 to 250 000 RPM (15 mHz to 4 kHz)
Operating angle	±45° from reflective tape
Operating distance	< 0.9 m (36") from reflective tape
Operating temperature	-40 °C o 120 °C (-40 °F to 250 °F)
Power supply	Direct from OR3-Series analyzer. AC 100 V to 240 V Any serial port providing +5V / 30mA on DB9 pin 1 connector
LED	A Green LED located on the probe indicates pulses detection.
Dimensions	Threaded tube M16 x 1.5 x 74 mm. (0.62 " x 2.90 ") 303 stainless steel.

EMC

EN 55011	1991: Class B
EN 50082	1992
IEC 801-2	1991
IEC 801-3	1994
IEC 801-4	1998

Accessories

ORAC-TAC-O01 comes with the following accessories.

Reflector tape	1.5 m (5 feet) roll
Cabling	Probe to power supply: 2.5 m (8 feet) cable Power supply to analyzer: 20 cm BNC-BNC cable AC mains to power supply: 1.5 m (5 feet)
Support	90° Angle slotted aluminum mounting bracket 50 mm x 50 mm x 20 mm (2 " x 2" x 0.8 ")
Nut	2 x M16 jam nuts
Carrying Bag	1 plastic case

TAC-O02

The TAC-O02 main sensor is designed and manufactured by Optel Thevon SA.

Specifications

Diffuse reflection $D=f(\text{encoding})=f(\text{Albedo})$	1 mm < D < 5 mm (black and white)
Through-beam	20 mm/ 30 mm+ micro-optic/ 60 mm+ objectives
Supply voltage	12 Vdc / 24 Vdc / limit from 9 to 30 Vdc
Current Consumption	30 mA with 30 V / 85 mA with 9V
Output control	Yellow LED
Weight	150 g
Shape and setting	14X48 mm, Hole diameter 3mm
Temperature Range	From -50°C to +120 °C

Accessories

Black and white encoder stripe	Length: 1.40 m / Width: 20 mm / Step: 2 mm, 5 mm, 10 mm, 20 mm
Black and white encoder disk	diameter 200 mm / 15 pulses, 36 pulses, 60 pulses, 120 pulses, 240 pulses

Keyphasor® is a registered trademark from GE Energy/Bently Nevada

Ordering Information

The table below are examples of the possibilities. Please contact your local sales agent for other configurations according to your needs.

TAC-O01

<i>Reference</i>	<i>Description</i>
ORAC-TACM-O01	OROS Optical tachometer kit powered by 3-Series analyzer or 100-240V mains + 3 meter cable + Magnetique base
ORAC-TACC-O01	OROS Optical tachometer kit powered by 3-Series analyzer or 100-240V mains + 3 meter cable + Clamp base

Extension cables are available on demand.

TAC-O02

<i>Reference</i>	<i>Description</i>
ORAC-TACM-O02	OROS Optical Fiber tachometer kit powered by 3-Series analyzer or 100-240V mains + 2 meter cable + Magnetic base
ORAC-TACC-O02	OROS Optical Fiber tachometer kit powered by 3-Series analyzer or 100-240V mains + 2 meter cable + Clamp base
ORAC-STP-O02	Black and white encoder stripe - Length: 1.40 m / Width: 20 mm / Step: 2 mm
ORAC-DSK-O60	Black and white encoder disk - diameter 200 mm / 60 pulses

For more dimensions options, please contact OROS.

Common Accessories

<i>Reference</i>	<i>Description</i>
ORAC-BASE-L01	Magnetic base with 2 articulations and a dedicated tightening yoke for TAC-O01 or TAC-O02
ORAC-BASE-L03	Clamp base opening 0-50 mm with 2 articulations and a dedicated tightening yoke for TAC-O01 or TAC-O02

OROS, Leadership through Innovation

About Us

Now approaching 30-years in business, OROS' designs and manufacturing have been renowned for providing the best in noise and vibration analyzers as well as in specific application solutions.

Our Philosophy

Reliability and efficiency are our ambition everyday. We know you require the same for your measurement instruments: comprehensive solutions providing performance and assurance, designed to fit the challenges of your demanding world.

Our Emphasis

Continuously paying attention to your needs, OROS collaborates with a network of proven scientific affiliates to offer the latest of the technology, always based on innovation.

Worldwide Presence

OROS products are marketed in more than 35 countries, through our authorized network of representatives, offices and accredited maintenance centers.

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