EVO - Evolution Modules

Fabry-Perot

HIGH-ACCURACY SIGNAL CONDITIONER
STATIC OR DYNAMIC MEASUREMENTS
MODULAR, PLUG & PLAY,

Reliable and high performance Fabry-Perot fiber optic acquisition modules for laboratory, civil engineering & Industrial applications.

Description

SMARTEC Fabry-Perot fiber-optic gauges are designed around a Fabry-Perot interferometer (FPI). An FPI consists of two mirrors facing each other, the space separating the mirrors being called the cavity length. Light reflected in the FPI is wavelength-modulated in exact accordance with the cavity length. FPI gauges convert strain, temperature, pressure and displacement into cavity length variations. FISO's patented white-light cross-correlator offers a unique and powerful way to make absolute Fabry-Perot cavity length measurements with astonishing accuracy and linearity, providing consistency time after time.

Evolution chassis footprint, communication capabilities and speed make it the ideal tool for laboratory and in site test environments. The evolution chassis can house different module types with different channel capabilities to combine results from a single acquisition source. Module capacities, communication ports, and overall width specifications differ from one model to the other.

USB communication interface is available on all chassis. **Evolution software** enables manual configuration and data acquisition up to 5 k samples/sec.

External data acquisition system is required for **higher acquisition rate > 5k samples/sec** (full bandwidth via analog output connectors).
Evolution modules are compatible with **SCAI intelligent connectors**; these connectors contain an EEPROM with sensor calibration parameters for automatic configuration.

Evolution platform is a **modular concept (DIN-rail), upgradeable and expandable**

Key Features

- Static or dynamic measurements up to 15 kHz
- Strain, temperature, pressure , displacement
- Plug and Play technology with SCAI connector
- Polynomial gauge factor
- Evolution software for configuration and data acquisition up to 5 k samples /sec. total
- Analog outputs 0-5V / 16 bits resolution
- TS35 DIN RAIL snap-on

Applications

- Laboratories
- Research & Development
- Geotechnical
- Dams, Dikes and Reservoirs
- Civil Engineering
- Railways
- Aerospace
- Cryogenics
- Industrial Process Control

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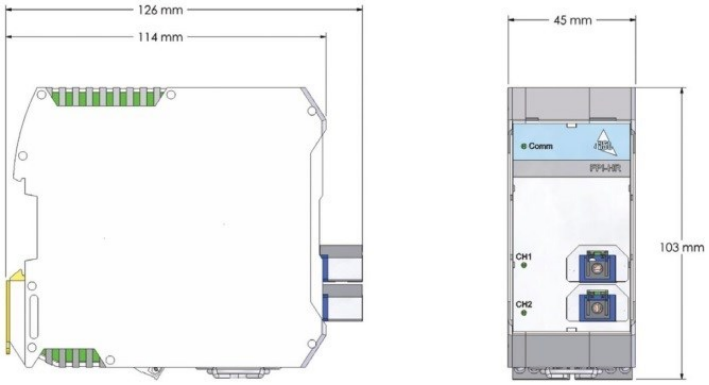
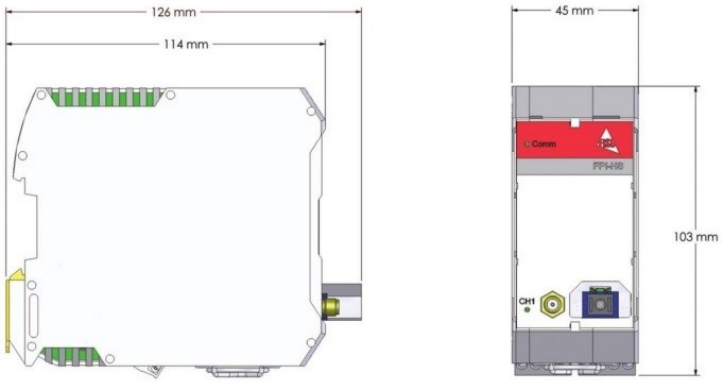
EVOLUTION MODULES AND CHASSIS

Versatile: FPI-HR and FPI-HS modules compatible on the same chassis

Dimensions : FPI-HR Module



Dimensions : FPI-HS Module

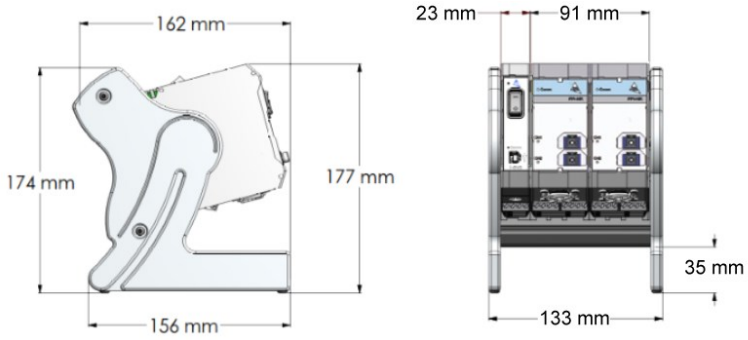


Chassis and Rack-Mount

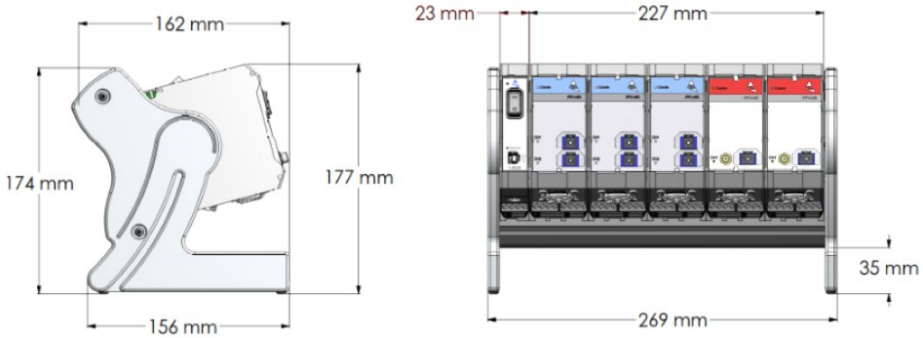
Technical features	EVO-SD-2 Chassis	EVO-SD-5 Chassis	EVO-RM-8 Rack-Mount
Communication:	USB	USB	USB
Data logging:	Via computer	Via computer	Via computer
Number of modules:	Up to 2	Up to 5	Up to 8
Power supply:	24 VDC 70 W	24 VDC 70 W	24 VDC 150 W
Evolution software:	Included	Included	Included
Maximum rate of acquisition[1]:	5k samples / sec. total	5k samples / sec. total	5k samples / sec. total
Dimensions:	W: 133 x H: 177 x D: 156mm	W: 269 x H: 177 x D: 156mm	W: 483 x H: 132 x D: 175mm

[1] To divide by the quantity of FPI modules connected on the chassis. Analog output is available directly on the reading modules, offering full acquisition rate; for example FPI-HS plugged on analog is at 15k samples / sec.

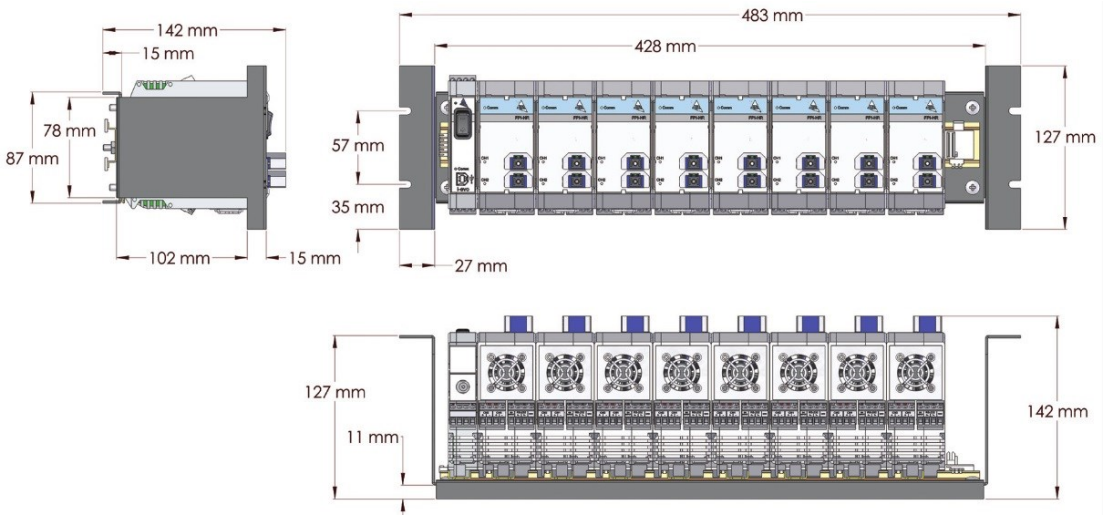
Dimensions : EVO SD-2 Chassis



Dimensions : EVO SD-5 Chassis



Dimensions : EVO RM Rack-mount Chassis



EVO - Evolution Software

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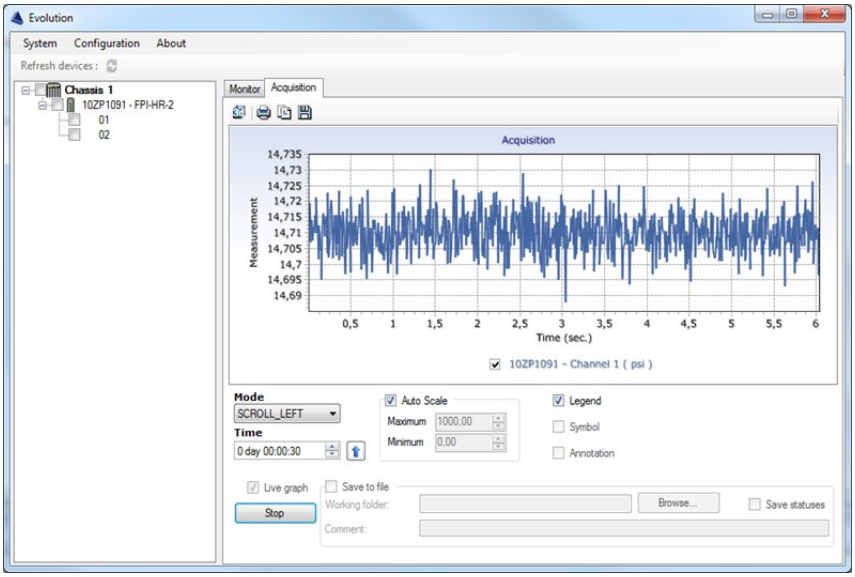
EVOLUTION SOFTWARE (COMES WITH THE CHASSIS)

Simple monitoring and real-time graphing

Users may choose reading the actual measurement, or plot in real-time with user specified screen refresh rates.



Configure and control the reading instrument

The most common set-up users will be configure the 0-5V analog output level to the measurement of interest, but end user will also enjoy the visually confirm proper communication between sensors and instrument.

Export data

While users may generally prefer to use 250Hz/125Hz analog output on the FPI-HR, data may also be recorded and saved in multiple files formats

Fabry-Perot Sensors

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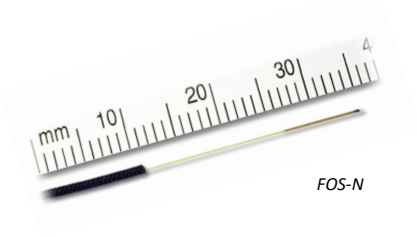
EVOLUTION PLATFORM IS COMPATIBLE WITH FOLLOWING SENSORS:

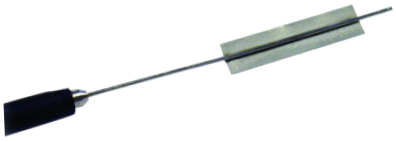
FOS Fiber Optic Strain Gauge



FOS-N

SPECIFICATIONS	
Range	Up to ±5000με
Accuracy	Range dependent
Resolution	0.01% of full scale
Operating temperature	−40°C to +250°C
Capillary length	8.5 to 10 mm

SFO-W Fiber Optic Weldable Strain Gauge

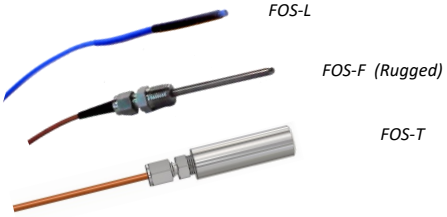


SPECIFICATIONS	
Range	Up to, ±2000με
Accuracy	Range dependent
Resolution	0.01% of full scale
Operating temperature	−40°C to +85°C
Dimensions	50.8 x 1.1x 4.7 mm (LxTXH)

EFO Embedded Fiber Optic Strain Gauge

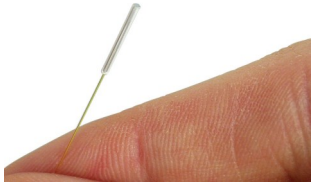
SPECIFICATIONS	
Range	Up to ±3000με
Accuracy	Range dependent
Resolution	0.01% of full scale
Operating temperature	−40°C to +85°C
Dimensions	O.D.: 12.5mm (dia.) / Length 70mm

FOT Fiber Optic Temperature Sensors



SPECIFICATIONS	
Range	−40°C to +85°C (Max, 300°C)
Accuracy	0.25% of full scale
Resolution	0.025% of full scale
Housing	Stainless Steel or PVC
Dimension (Model dependant)	O.D.: 19 to 33.4 mm / Length 100 mm to 210 mm

FOP-MA Fiber Optic Compact Pressure Sensors



SPECIFICATIONS	
Range	−40°C to +85°C (cable dependent)
Accuracy	0.0075 psi
Resolution	±1% of full scale
Frequency response	Up to 30 kHz
Operating T°	−20ºC to 150ºC (−4°F to 302°F

[1] *Higher ranges available as a custom product*

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Fabry-Perot Sensors

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EVOLUTION PLATFORM IS COMPATIBLE WITH FOLLOWING SENSORS:

FOP Fiber Optic Piezometer

SPECIFICATIONS	
Range	200 to 7000 kPa
Accuracy	± 0.25 % F.S.
Resolution	0.025% of full scale
Dimension	O.D.: 19 to 33.4 mm Length: 100 mm to 210 mm

FOP MicroPZ Fiber Optic Piezometer

FOP Micro PZ (metal)

FOP Micro PZ (plastic)

SPECIFICATIONS	
Range	100, 200, 300 kPa
Accuracy	± 1 % F.S.
Resolution	0.025% of full scale
Thermal Drift	< 0.1 % FS / °C
Dimensions	O.D. 4.8 mm / Length 54 mm (metal housing) O.D. 16 mm / Length 116 mm (plastic housing)

TPC Fiber Optic Total Pressure Cell

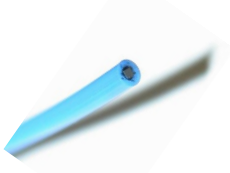
SPECIFICATIONS	
Pressure range[1]	200 to 10,000 kPa
Accuracy[1]	±0.1% to ±0.5% of full scale
Resolution[1] **with MB-3TL**	0.025% of full scale

[1] *Higher ranges available*

FOD Fiber Optic Displacement Sensor

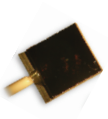
SPECIFICATIONS	
Range	20 or 40 mm (spring-loaded shaft)
Accuracy	±0.1% of full scale.
Resolution	0.002 mm
Outside Diameter	19 mm
Dimensions	144 mm (ngth

Other FOP Fiber Optic Compact Pressure Sensors



FOP M-PK

FOP-MS Side Looking



FOP-MS Side Looking Square

FOP-M260 & FOP-MIV

FOP-M-HP High Pressure
FOP-M-MH High Temperature

Detailed fiber optic sensor specifications available at www.smartec.ch or www.fiso.com

NOVA METRIX

EVO - Evolution Platform

Fabry-Perot

EVO—Evolution Platform—Accessories and ordering information

- Evolution FPI-HR single channel high resolution fiber optic signal conditioner; up to 250 Hz
- Evolution FPI-HR dual channel high resolution fiber optic signal conditioner; up to 125 Hz
- Evolution FPI-HS single channel high speed fiber optic signal conditioner; up to 15 kHz
- 15.2060.cc Evolution SD-2*chassis for up to 2 FPI modules
- 15.2060.cc Evolution SD-5* chassis for up to 5 FPI modules
- 15.2060.cc Evolution RM-8* rackmount chassis for up to 8 FPI modules
- I-EVO EVOLUTION USB communication BUS module for TS 35 DIN RAIL (no chassis)
- AC Adapter - Input:100-240V 1.5A - Output: 24V 70W 2.5mm R/A
- Power Cord 220V European Type 92-2525-250BKH
- Terminal Blocks (Din rail) ME - 2 (two) Blocks for an FPI module
- USB Cable type A to type B (2 meters)
- Pin contact interface for TS 35 DIN RAIL (no chassis)
- Extension cables - Laboratory cables and rugged cables (contact Smartec)
- EasyThrough and Patchcords (contact Smartec)
- EVOLUTION Software

* including AC Adapter, Power Cord, I-EVO USB communication module, Terminal Blocks, USB cable and EVOLUTION Software

SMARTEC SA, Switzerland, was founded in 1996. SMARTEC is part of the Roctest Group, a Nova Metrix company. Smartec's Solution & Services Team has considerable field experience to support you in the management and execution of your monitoring projects.

In particular, we offer the following services: System Design, Installation, Operation, Maintenance, Data Management and Data Analysis.

The quality of our products and the experience of our engineers at Smartec are reflected by the completion of more than 1200 successful monitoring projects, located in 30 countries on all continents.

Some notable projects include the Burj Kalifa tower (world's tallest building), the Duxton Complex in Singapore, the New I35W bridge in Minneapolis, MN, the Manhattan Bridge in New York, NY, the Alp Transit tunnel in Switzerland (world's longest tunnel), the CERN-LHC particle accelerator (world's largest particle accelerator) and the ITER fusion reactor.

FISO Technologies Inc., a leading developer and manufacturer of fiber optic sensors and signal conditioners, is worldly recognized for its unparalleled range of fiber optic solutions. Besides being extremely small, thus minimally invasive, the advantages of fiber optic sensors are that they are highly precise, intrinsically safe and immune to radio frequencies, electromagnetic interferences and microwave radiations.

Founded in 1994, FISO is part of the Roctest Group, a Nova Metrix company. Its products are sold in more than 75 countries through a network of representatives and distributors.

FISO Technologies meets the requirements of the ISO 9001:2008 and ISO 13485:2003 certifications. The company is assessed and certified by the BSI Group and strictly applies its quality policy day after day.

SMARTEC

EVO - Evolution Platform

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EVOLUTION MODULES

Technical features	FPI-HR (2X) Module	FPI-HS Module
Number of channels:	1 or 2 (parallel)	1
Sampling rate:	250 Hz (1 channel) 125 Hz (2 channels)	15 kHz
Analog output:	0-5V (optional 4-20 mA) / 16 bits resolution	0-5V (optional 4-20 mA) / 16 bits resolution
Analog output delay response:	8ms (1 channel) 16ms (2 channels)	130µs
Connector:	SCA or SCAI Plug and Play intelligent connector	SCA or SCAI Plug and Play intelligent connector
Fiber typology:	MMF 62.5/125 µm	MMF 62.5/125 µm
Strain range	± 1000µℰ to ± 5000µℰ sensor depending	± 1000µℰ to ± 2500µℰ sensor depending
Strain resolution:	± 0.01%	0.03% to 0.05%
Temperature range:	R1: -40°C to 300°C ± 1°C R4: 25°C to 45°C ± 0.25°C R5: -10°C to 120°C ± 0.40°C	n/a
Temperature resolution:	0.01°C	n/a
Pressure range:	0 to 2 psig ± 0.5% (FOP-MA) 0 to 1000 psig ± 0.05% (Compact pressure) 0 to 3000 psig ± 2% (FOP-MHP) 0 to 7000 kPa ± 0.25% (FOP Piezometers)	0 to 2 psig ± 0.5% (FOP-MA) 0 to 1000 psig ± 0.05% (Compact pressure) n/a 0 to 7000 kPa ± 0.25% (FOP Piezometers)
Pressure resolution:	±0.05% of full scale	±0.05% of full scale
Displacement range:	0 to ~ 15 mm ± 0.02 mm	n/a
Displacement resolution:	0.002 mm	n/a
Working distance from sensor:	1 km	

Accuracy includes reproductibility (sensor/module exchange), repeatability and hysteresis, non-linearity, scale error, offset error, conditioner temperature compensation error. Pressure: Accuracy at room temperature.

Technical specifications		
Operating temperature:	10°C to +50°C	10°C to +50°C
Storage temperature:	-30°C to +80°C	-30°C to +80°C
DC Power:	24V	24V
Power consumption	5 Watts	12 Watts
Dimension (HxWxD):	114.5 x 303.5 x 365.7 mm	114.5 x 303.5 x 365.7 mm
Weight:	7 kg	7 kg
Communication / via EVO chassis	USB 2.0	USB 2.0 for acquisition rate up to 5 kHz
Communication / TS 35 DIN RAIL	RS-232 & RS-485 + Analog output	RS-232 & RS-485 + Analog output (SMA) for acquisition rate > 5 kHz
LED	Sensor signal and communication diagnostic	

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NOVA METRIX

Smartec SA reserves the right to make any changes in the specifications without prior notice