innovation in geotechnical instrumentation

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RST Instruments Ltd.
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ISO 9001

A close-up shows the single cable which connects each sensor along the entire chain of inclinometer sensors forming a “digital bus.”

PRODUCT CATEGORY:
INCLINOMETERS + TILT SENSORS

Digital Bus Vertical In-place MEMS Inclinometer System

Digital Bus Vertical In-place MEMS Inclinometer Systems are designed to measure lateral movement of soil and rock or deflection of man made structures such as piles or retaining walls, when remote and continuous monitoring is required.

These inclinometers consist of one or more MEMS inclinometer sensors housed inside a 31.75 mm (1.25 in.) diameter, water-tight, stainless steel enclosure. Each sensor is separated from the next by stainless steel rods and wheel assemblies; however, the entire system is connected by a digital bus system which consists of one single cable running the length of the entire chain of connected sensors; this eliminates the need of a separate cable for each sensor and reduces the amount of cable to be managed. Rod lengths can be varied to alter the gauge length and sensors can be concentrated in areas of expected movement. An optional analog cable system is also available.

Wheel assemblies are sized to fit 70 mm (2.75 in.) or 85 mm (3.34 in.) O.D. inclinometer casing. As movement occurs and the inclinometer casing deforms, each sensor can be automatically monitored and can be read at a remote readout location. If necessary, an alarm can be triggered when movement reaches a preset critical rate or magnitude.

> WHY IT IS IMPORTANT

Provides constant remote monitoring; early warning of movements is essential for protecting life and equipment.

> APPLICATIONS

Ideal for monitoring of:

Stability adjacent to excavations or underground workings.	Deflection of piles, piers, abutments, or retaining walls.
Dams and embankments.	Landslides.

> FEATURES

Water-tight, stainless steel enclosure.	On board electronics.
High precision, wheeled probe.	Easy adaptability to data logging.
Individual sensor monitoring.	Optional alarm.

> BENEFITS

✓ **Increase Safety**	✓ **Upgradable**
✓ **Increase Productivity**	✓ **Technical Support**
✓ **High Reliability**	✓ **Custom Options**
✓ **High Accuracy**	✓ **Cost effective per sensor point**

MEMS TILT & INCLINATION SERIES

WORKS WITH flexDAQ DATALOGGERS — READY TO RUN: pre-assembled, pre-wired, pre-tested, pre-programmed

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Digital Bus Vertical In-place MEMS Inclinometer System

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INCLINOMETERS + TILT SENSORS

SPECIFICATIONS + ORDERING

SPECIFICATIONS

ELECTRICAL	
ITEM	**SPECIFICATION**
Range	±15° (other ranges upon request)
Resolution (digital)	±2 arc sec. (±0.0006°) (0.01 mm/m)
Resolution (analog)	±5 arc sec. (±0.025 mm/m) (10Hz BW)
Non-linearity (digital)	±0.0125% F.S. (±0.002°) (0.03 mm/m)
Non-linearity (analog)	±0.05% F.S. (±0.0075°) (0.13 mm/m)
Repeatability (digital)	±0.0125% F.S. (±0.002°) (0.03 mm/m)
Repeatability (analog)	±0.025% F.S. (±0.004°) (0.06 mm/m)
Sensor	MEMS (Micro-Electro-Mechanical Systems) Accelerometer Uniaxial or Biaxial
Sensor Offset	+/- 0.002 arc deg./deg. C
Sensor Sensitivity	+/- 0.013 % of reading/deg. C
Excitation (analog)	8 - 15V DC
Operating Temp.	-40 to 85°C (-40 to 185°F)
Ingress Protection	IP68 to 200m H20 (2000 kPa)
MECHANICAL	
Gauge Length	0.5 - 3 meters
Housing Diameter	31.75mm (1.25 in.) (sensor)
Wheel Assembly	70 mm (2.75 in.) 85 mm (3.34 in.)
Extension Rod Diameter	25 mm (1.0 in.)

ORDERING: GENERAL INFO REQUIRED

Part number	Gauge length
Number of boreholes	Wheel assembly size
Number of sensors per borehole	Length of signal cable
Location of sensors in borehole	

OPTIONS

Submersible cable connector for bus options.

ORDERING: COLLAR HANGERS

DIGITAL BUS SYSTEM OR ANALOG	PART #
Collar hanger w/1 bottom wheel assembly for 70 mm casing	IC7070
Collar hanger w/1 bottom wheel assembly for 85 mm casing	IC7085
WIRE ROPE SYSTEM	**PART #**
Collar hanger for 70 mm casing	IC7070R
Collar hanger for 85 mm casing	IC7085R

ORDERING: SENSORS

DIGITAL BUS CABLE SYSTEM	PART #
MEMS IPI bus sensor assembly: Biaxial for 70 mm casing	IC7565
MEMS IPI bus sensor assembly: Biaxial for 85 mm casing	IC7575
MEMS IPI bus sensor assembly: Uniaxial for 70 mm casing	IC7560
MEMS IPI bus sensor assembly: Uniaxial for 85 mm casing	IC7570
DIGITAL WIRE ROPE SYSTEM WITH BOTTOM WHEEL ASSEMBLY	**PART #**
MEMS IPI assembly: Biaxial 70 mm casing	IC7525
MEMS IPI assembly: Biaxial 85 mm casing	IC7555
MEMS IPI assembly: Uniaxial 70 mm casing	IC7520
MEMS IPI assembly: Uniaxial 85 mm casing	IC7550
ANALOG CABLE SYSTEM	**PART #**
MEMS IPI sensor assembly: Biaxial for 70 mm casing	IC7505
MEMS IPI sensor assembly: Biaxial for 85 mm casing	IC7515
MEMS IPI sensor assembly: Uniaxial for 70 mm casing	IC7500
MEMS IPI sensor assembly: Uniaxial for 85 mm casing	IC7510
ANALOG WIRE ROPE SYSTEM WITH BOTTOM WHEEL ASSEMBLY	**PART #**
MEMS IPI assembly: Biaxial 70 mm casing	IC7535
MEMS IPI assembly: Biaxial 85 mm casing	IC7545
MEMS IPI assembly: Uniaxial 70 mm casing	IC7530
MEMS IPI assembly: Uniaxial 85 mm casing	IC7540

ORDERING: EXTENSION RODS

DIGITAL BUS, ANALOG OR WIRE ROPE SYSTEMS	PART #
Extension rod for 0.5 m gauge length	IC7700
Extension rod for 1 m gauge length	IC7701
Extension rod for 1.5 m gauge length	IC7702
Extension rod for 2 m gauge length	IC7703
Extension rod for 2.5 m gauge length	IC7704
Extension rod for 3 m gauge length	IC7705

ORDERING: CABLES

DIGITAL BUS, ANALOG AND WIRE ROPE SYSTEM	PART #
6 conductor, 22 gauge polyurethane jacketed cable (analog)	EL380006
4 conductor, 22 gauge polyurethane jacketed cable (digital bus)	EL380004
SUSPENSION CABLE - FOR WIRE ROPE SYSTEM ONLY	**PART #**
Stainless steel suspension cable 3/32"	IC7300
Extension rod for 2.5 m gauge length	IC7704
Extension rod for 3 m gauge length	IC7705

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