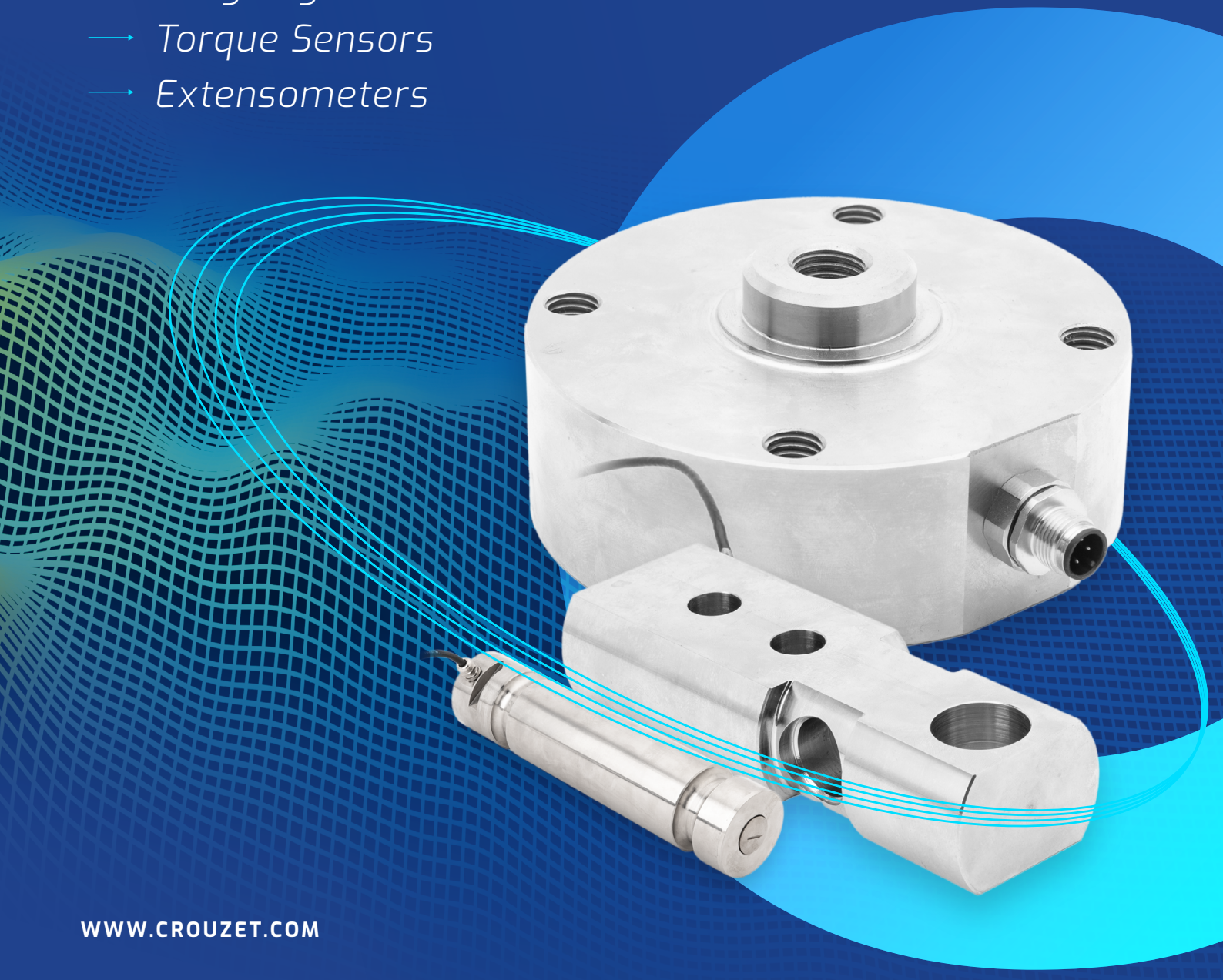
CROUZET

GAROS IS NOW A BRAND OF CROUZET

STRUCTURAL MONITORING SENSORS

Technical Capabilities

- Force Sensors
- Weighing Load Cells
- Torque Sensors
- Extensometers



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ABOUT CROUZET

100 YEARS MANUFACTURING THE FUTURE *Together*

Crouzet is an independent company **manufacturing mechatronic components for demanding applications in Aerospace & Transportation, Energy, Building & Machinery Industry.**

Crouzet provides **Switches & Sensors, Electromechanical Actuators, Electrical Control & Protection Equipment, Flight Control Equipment, Automation Controllers & Relays, and Instrumentation Services.**

Since 1921, Crouzet has a heritage of close collaboration with customers in the development of products, from standard components to fully customized solutions.

Crouzet's customers and partners can rely on our teams worldwide to always meet and often exceed their expectations. Driven by innovation, our experts are focused on designing and delivering the right product for the right application.

Crouzet is your trusted partner of choice to face the industrial challenges of today and tomorrow.

WORLDWIDE PRESENCE

10 Manufacturing Plants
& 6 R&D Labs

HEADQUARTERS *SALES OFFICES*

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NANTES, **FRANCE**

ORLEANS, **FRANCE**

VOUVRY, **SWITZERLAND**

CASABLANCA 1, **MOROCCO**

CASABLANCA 2, **MOROCCO**

HUIZHOU, **CHINA**

BANGALORE, **INDIA**

CONTENT

CROUZET

Compression sensor
(0,5 kN → 20 MN)

The compression sensor only measures an axial force and returns information proportional to the force.

Manufactured in various materials, the sensor is rated up to 20 MN and can be used in any environment, even the most critical.

The compression cell is a strain gauge sensor that can be supplied with either an analogue or digital output.

MARKETS

Aerospace

Marine

Handling

Railway

RANGE OF MEASUREMENTS

› 500 N → 20 MN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Immersible
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,25
Repeatability error	% E.M	± 0,1
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,005
Output temperature effect	%/°C	< ± 0,005
Protection class	-	IP65, IP66, IP67, IP68

CROUZET

Wafer sensors
(500 daN → 1000 daN)

The wafer is a load cell designed for compression applications.
This sensor only measures axial force.

The cylindrical steel load cell (with surface treatment) has a capacity of up to 1,000 daN. This sensor can be used in restricted environments due to its small size.

The sensor can be installed between a nacelle and its rotor.

MARKETS

Lifting

Machinery

Handling

Railway

RANGE OF MEASUREMENTS

› 500 daN → 1000 daN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 30 CrNiMo 8 + QT
› Autres sur demande

CERTIFICATION

› SIL/PL compatibility
› EN280

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	200
Breaking load	% E.M	> 400
Linearity error	% E.M	± 0,5
Hysteresis error	% E.M	± 0,25
Repeatability error	% E.M	± 0,1
Operating temperature	°C	-30 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,02
Output temperature effect	%/°C	< ± 0,04
Protection class	-	IP65

CROUZET

Tension & compression sensor
(1 kN → 1200 kN)

The tension & compression sensor only measures an axial force and returns information proportional to the force.

Manufactured in various materials, the sensor is rated up to 1,200 kN and can be used in even the most critical environments.

The tension & compression sensor is a strain gauge sensor that can be supplied with either an analogue or digital output.

MARKETS

Aerospace

Marine

Handling

Railway

RANGE OF MEASUREMENTS

› 1 kN → 1200 kN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,25
Repeatability error	% E.M	± 0,1
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,005
Output temperature effect	%/°C	< ± 0,005
Protection class	-	IP65, IP66, IP67, IP68

CROUZET

Bending sensor
(0,3 kN → 100 kN)

The bending sensor, also called beam sensor, is designed to measure a force perpendicular to its axis.

Cantilevered, it delivers a signal proportional to the force applied, using strain gauge technology.

The load cell is made of different materials and has a capacity of up to 100 kN. This sensor can be used in even the most critical environments.

The bending sensor can be supplied with an analogue or digital output.

MARKETS

Handling

Machinery

RANGE OF MEASUREMENTS

› 300 N → 100 kN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› Stainless steel
› Aluminium
› Steel + surface treatment

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,1
Repeatability error	% E.M	± 0,05
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,01
Output temperature effect	%/°C	< ± 0,003
Protection class	-	IP65, IP66, IP67

CROUZET

Load pins
(1000 N → 20 MN)

Load pins can be used either to measure loads and forces or as protection against overload. It is mounted in place of an existing axle.

This cylindrical load cell with axial or radial output can measure a load ranging from 1000 N to 20 MN and is made of various materials (mainly stainless steel). This makes the pin ideal for any type of environment, up to and including marine environments.
It can be immersed.

The load pin is a strain gauge load cell that can be supplied with either an analogue or digital output. The measurement signal is proportional to the force acting on the pin.

MARKETS

- Aerospace
- Handling
- Machinery
- Energy

RANGE OF MEASUREMENTS

› 1000 N → 20 MN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Immersible
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant
› • Bi-directional (X, Y)
  → Separate channels
  → Digital: resulting and angle résultante et angle
› Redundant bi-directional

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,5 - 2
Repeatability error	% E.M	± 0,25
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,02
Output temperature effect	%/°C	< ± 0,02
Protection class	-	IP65, IP66, IP67, IP68

CROUZET

Torque shackle
(5 kN → 1200 kN)

The torque shackle measures tensile forces.

The shackle is equipped with a torque pin with a capacity of up to 1,200 kN.

It is suitable for harsh environments (aerial and submarine off-shore, etc).

MARKETS

Lifting

Handling

RANGE OF MEASUREMENTS

› 5 kN → 1200 kN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA
› Wireless (2.4 GHz)

ENVIRONMENT

› Sturdy
› Immersible
› Connectivity (Wet-mate)
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,5 - 2
Repeatability error	% E.M	± 0,25
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,02
Output temperature effect	%/°C	< ± 0,02
Protection class	-	IP65, IP66, IP67, IP68

CROUZET

Wedge box
(5 kN → 200 kN)

The torque wedge box measures the force applied at the end of the cable (fixed point).

The standard wedge box is equipped with a load pin. The wedge box retains its mechanical characteristics. This solution is ideal as a replacement for a standard wedge box.

MARKETS

Lifting

Handling

RANGE OF MEASUREMENTS

› 5 kN → 200 kN
› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA
› Wireless (2.4 GHz)

ENVIRONMENT

› Sturdy
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	200
Breaking load	% E.M	> 400
Linearity error + hysteresis error	% E.M	± 0,5 - 2
Repeatability error	% E.M	± 0,25
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,02
Output temperature effect	%/°C	< ± 0,02
Protection class	-	IP 65, IP 66, IP 67

CROUZET

Multi axis sensors

The multi axis sensors can measure any or all of the three forces and moments of the mechanical torsor.

Manufactured from a variety of materials, the sensor can be used in even the most critical environments.

The multi axis sensors is a strain gauge sensor that can be supplied with either an analogue or digital output. It is supplied with its sensitivity matrix.

MARKETS

- Aerospace
- Marine
- Machinery
- Energy

RANGE OF MEASUREMENTS

› Other on request

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

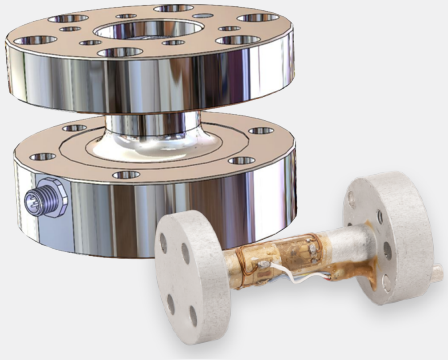
CERTIFICATION

› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis	% E.M	± 0,25
Repeatability error	% E.M	± 0,15
Operating temperature	°C	-30 → +70
Compensated temperature range	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,01
Impact température sur la sortie	%/°C	< ± 0,005

CROUZET

Static torque meters



A static torque transducer is a mechanical element whose function is to measure a torque between two parts. Frequently used for the control and calibration of screwdrivers and torque spanners.

Manufactured from various materials, the sensor has a capacity of up to 20,000 Nm and may be used in any environment.

The sensor is a strain gauge sensor that can be supplied with either an analogue or digital output.

MARKETS

Aerospace

Marine

Handling

Railway

RANGE OF MEASUREMENTS

› 5 N.m → 20 000 N.m

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Immersible
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› 17-4 PH (H1025, H1150-D)
› 15-5 PH (H1025)
› 1.4418 + QT900
› 30 CrNiMo 8 + QT
› Titanium Ta6V
› Inconel 718
› Nitronic 50

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Breaking load	% E.M	> 300
Linearity error + hysteresis error	% E.M	± 0,1
Repeatability error	% E.M	± 0,05
Operating temperature	°C	-30 → +70
Compensated temperature	°C	-10 → +70
Storage temperature	°C	- 40 → +80
Temperature effect on zero	% E.M/°C	< ± 0,005
Output temperature effect	%/°C	< ± 0,005
Protection class	-	IP65, IP66, IP67, IP68

CROUZET

Extensometers

Strain sensors, also known as strain gauges or elongation sensors, are designed to measure the deformation of a part, component or structure. The device is mounted in parallel with the load to be measured and secured to its support with two screws. This sensor incorporates a temperature measurement to account for the difference in the coefficients of expansion of the sensor/support.

The strain sensor is a strain gauge sensor that can be supplied with either an analogue or digital output. The sensor's output signal is proportional to the deformation measured on the structure.

MARKETS

Lifting

Machinery

Handling

RANGE OF MEASUREMENTS

› ± 1000 µm/m

OUTPUT SIGNAL

› mV/V
› CAN Open
› CAN J1939
› RS232 – RS485
› 0-10 V
› 4-20 mA

ENVIRONMENT

› Sturdy
› Connectivity
› Protection class

FUNCTIONS

› Redundant or non-redundant

MATERIALS

› Sensitive element: alloy steel + surface treatment
› Housing: stainless steel
› M12 connectivity: nickel-plated brass

CERTIFICATION

› EXi, ATEX
› SIL/PL compatibility

MAIN CHARACTERISTICS	UNIT	VALUE
Metrological overload	% E.M	150
Operating temperature	°C	-30 → +80
Storage temperature	°C	- 40 → +90
Protection class	-	IP67

Note

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