

## Dynafor<sup>™</sup> Industrial

Installation, operating and maintenance manual

English Original manual

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*Industrial series electronic dynamometer*



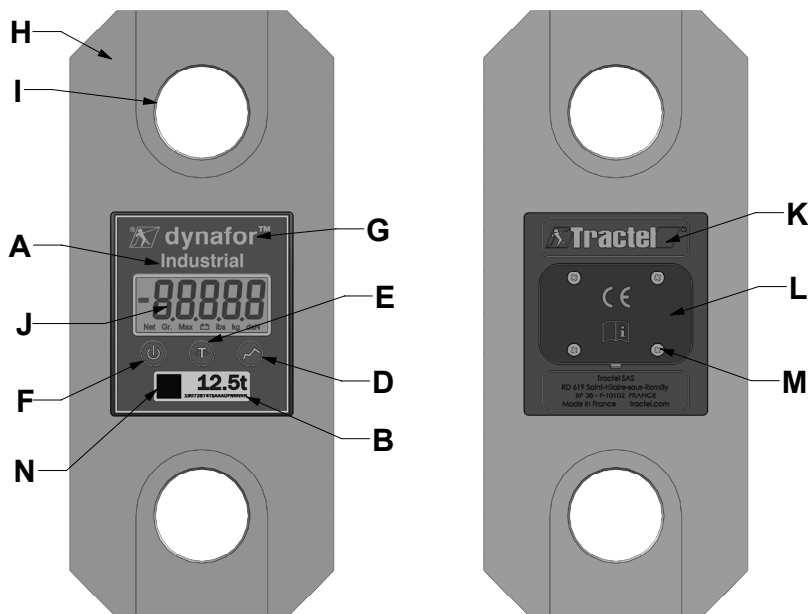


Fig. 1

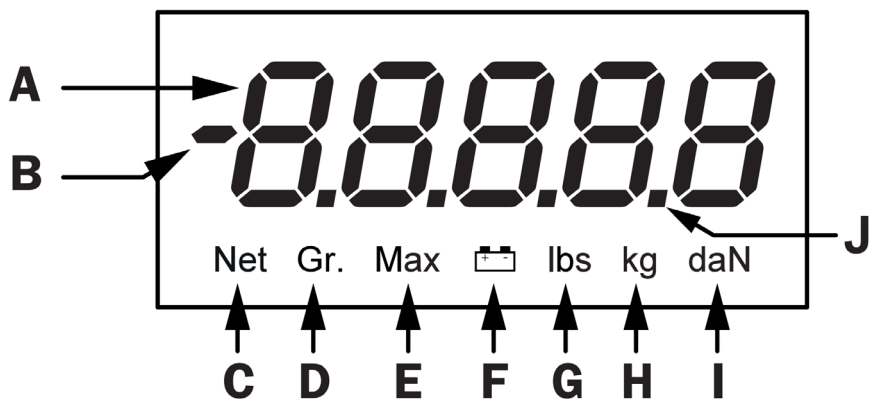
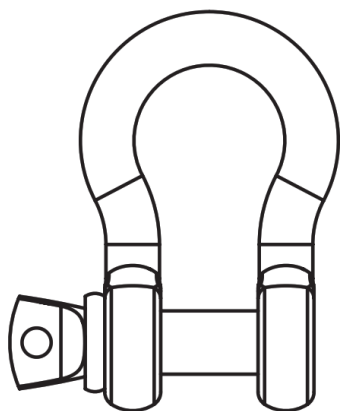
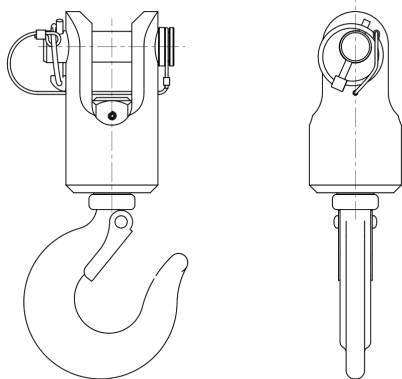


Fig. 2



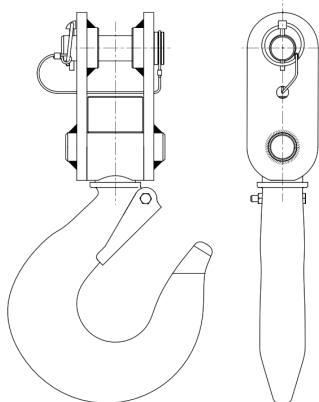


**Fig. 4**



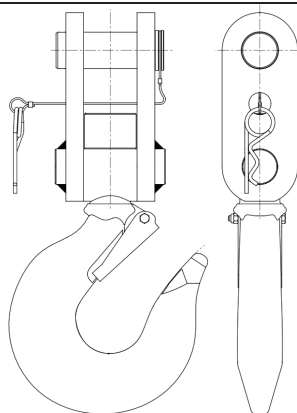
**Fig. 5A**

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**Fig. 5B**

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**Fig. 5C**

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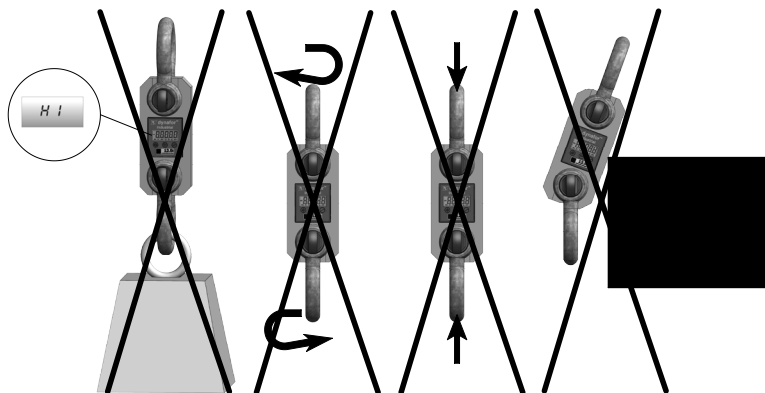


Fig. 6

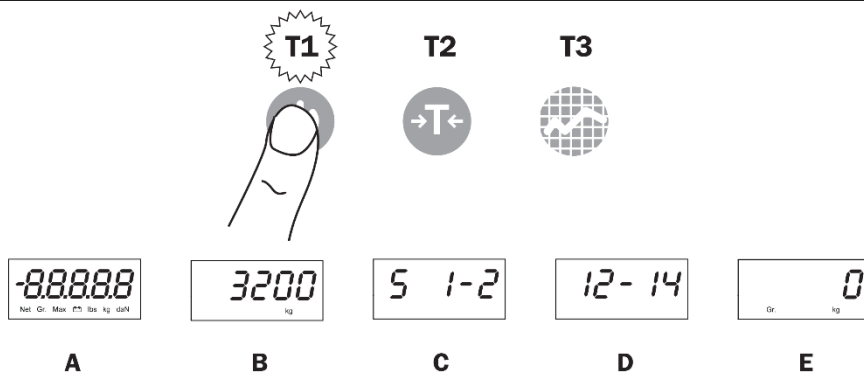


Fig. 7

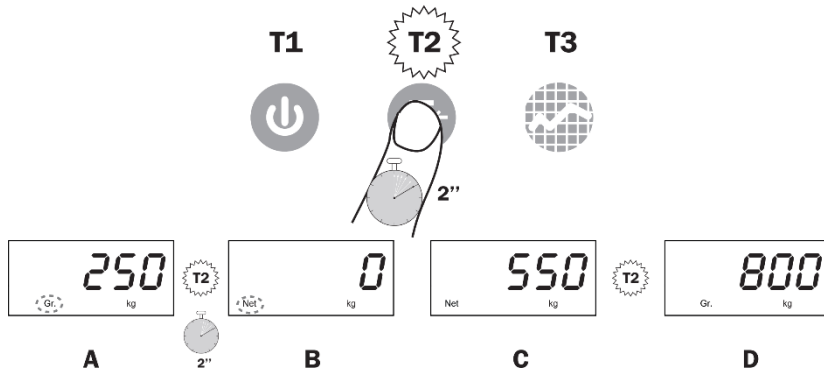
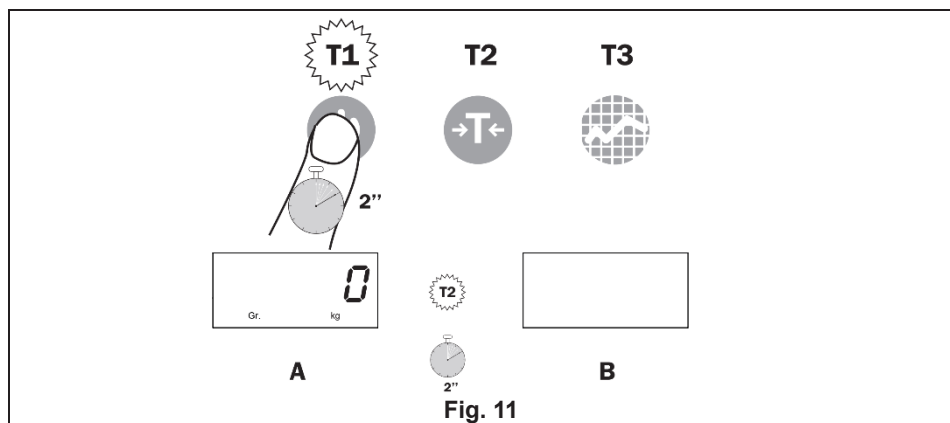
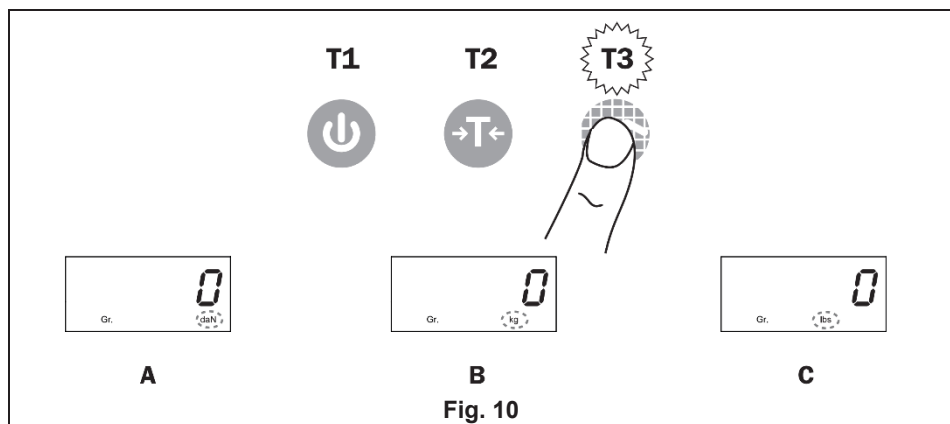
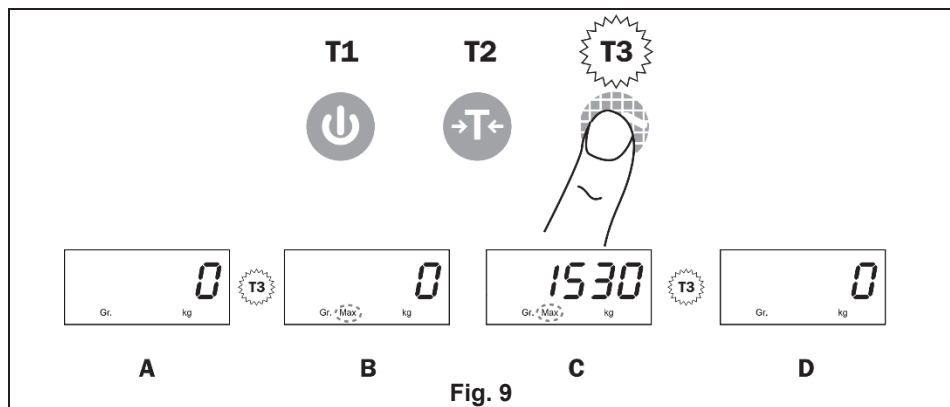


Fig. 8



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## 1. Priority instructions

- Before installing and using this product, it is essential that you read this manual and comply with its instructions for safe and effective use. A copy of this manual must be made available to all operators. Additional copies can be obtained upon request from Tractel®.
- Do not use this product if any of the labels affixed to it or any of its accessories, or any of the markings on it as shown at the end of this manual are no longer present or legible. Identical labels can be obtained upon request from Tractel® and must be affixed before continuing to use this product.
- Make sure that any user of this product is familiar with its operation and capable of applying the safety requirements for the task to be performed. This manual must be provided to all users. Protect your equipment from uncontrolled intervention.
- This product must be installed and put into operation in conditions that ensure the safety of the installer in accordance with applicable local regulations.
- Every time you use the product, first inspect its condition and that of any accessories. Never use a product that does not appear to be in good condition.
- Return the product to the manufacturer for servicing if there are any visible or operating problems unrelated to the battery condition.
- Protect the product from impacts.
- This product may never be used for operations other than those described in this manual. It may never be used for loads above the safe working load indicated on the product. It may never be used in an explosive atmosphere.
- Before this product is used in a man-riding system, the supervisor must first verify the application of the coefficients of use required for the safety of personnel, and generally compliance with the safety regulations applicable to the load line in which it is used.
- Tractel® shall not be liable for the operation of this product in an assembly configuration not described in this manual.
- Any modification of this product without the approval of Tractel® or any removal of any component part shall release Tractel® from any liability.
- Any disassembly of this product not described in this manual or any repair work not approved by Tractel® shall release Tractel® from any liability, especially if original parts are replaced by parts from another source.
- A Dynafor™ dynamometer is a lifting accessory and the safety regulations applicable to that category of equipment must be applied.
- When the product is finally withdrawn from service, it must be scrapped in such a way that it cannot be

used again. Comply with environmental protection regulations.

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15. This product is approved according to European regulations and the standards specified in the section "11. Regulations and standards", and must be verified for compliance with the regulations of any other country in which it may be used, prior to commissioning and use. Comply with such regulations.
16. Any use of this product with additional equipment that relays its signals to an operating system must be preceded by a risk analysis specific to the operating functions used and all appropriate measures must be taken accordingly.
17. The product is not approved for commercial transactions.
18. As part of continual product improvement, Tractel® reserves the right to make changes to the product.

## 2. Definitions and pictograms

### 2.1. Definitions

In this manual, the following terms have the meaning given below:

**"Product"**: Item or equipment described in this manual and delivered complete in the standard version, or in its various existing models.

**"Installation"**: All the operations required to bring the complete product from the state in which it was delivered into a state of commissioning (or connection to other elements for commissioning).

**"Supervisor"**: Individual or party responsible for the management and safe use of the product described in the manual.

**"Technician"**: Qualified person familiar with the product, in charge of the maintenance operations described and permitted in the manual.

**"Operator"**: Individual using the product in accordance with the instructions in this manual.

**"MR"**: Measurement Range (full scale).

**"SWL"**: Safe Working Load.

### 2.2. Pictograms



**DANGER**: When placed at the beginning of a paragraph, it indicates instructions for preventing injuries ranging from minor to fatal and also environmental damage.



**IMPORTANT**: When placed at the beginning of a paragraph, it indicates instructions for preventing product failure or damage which would not directly endanger the life or health of operators or other individuals and/or which may harm the environment.



**NB**: When placed at the beginning of a paragraph, it indicates the necessary precautions to apply for efficient and ergonomic installation, use and maintenance.



When placed on the product itself or a product component, it indicates the need to read the operating and maintenance manual.

## 3. Description and marking

### 3.1. Presentation

Dynafor™ Industrial are precision force sensors (0.3% MR) for measuring forces and indicating loads. The capacity range is from 1 t to 20 t.

### 3.2. Operating principle

The operating principle of Dynafor™ Industrial is based on the measurement using strain gauges of the elongation, within the elastic limit, of a metal body subjected to tensile stress.

The product operates in all directions.

The product is delivered with its batteries in a case containing:

- The Dynafor™ Industrial
- Its installation, operating and maintenance manual.
- Its adjustment certificate.
- Its CE declaration of conformity.

Adjustment certificate

This document is valid for one year and certifies that the sensor has been adjusted using an internal Tractel® procedure on a calibration bench with a standard sensor connected to the international standard.

### 3.3. Markings

See figure 1

A	Model
B	Serial number
C	Capacity
D	T3 Peak Load button



<b>E</b>	T2 Tare Button
<b>F</b>	T1 On/Off button
<b>G</b>	Product brand
<b>H</b>	Sensor body
<b>I</b>	Shackle bore
<b>J</b>	LCD screen
<b>K</b>	Manufacturer's name
<b>L</b>	Battery compartment cover
<b>M</b>	Cover fixing screw M



All indications and labels affixed on the product by the manufacturer must be kept fully legible. If any indications and labels are removed or damaged, they must be replaced before continuing to use the product. Tractel® can supply new marking materials on request.

## 4. Associated equipment

The product is compatible with the following equipment:

Lifting accessories:

- Bow shackle
- Swivel hook under load

Dynafor™	Bow shackle	Swivel hook
Industrial 1t	47916	40977 (type A)
Industrial 3.2t	47916	40977 (type A)
Industrial 6.3t	47926	105567 (type B)
Industrial 12.5t	47936	113227 (type C)
Industrial 20t	47946	105587 (type C)

For details of lifting accessories, please refer to the data sheets and illustration of swivel hooks in figure 5.

## 5. Uses



The supervisor must ensure that a technician is tasked with installing the product. The supervisor must ensure that the operator has reviewed this installation, operation and maintenance manual before they use the product.

### 5.1. Installing the batteries

The two 1.5 V "AAA" batteries are factory installed.

Remove the insulating tab protruding from the battery compartment to activate the batteries. For subsequent battery replacement, please refer to section 7.1

## 5.2. Installation

During installation, it is absolutely necessary to:

1. Make sure that the load line anchor point or points are sufficiently strong for the force that will be applied.
2. Make sure that the lifting accessories at both ends of the product are compatible and comply with applicable local regulations.
3. Correctly lock the shackles by screwing their pin in fully and make sure that the hook safety catch is present and in good working order.
4. Allow the product to line up freely in the line of force.
5. Check the presence and condition of the batteries in the sensor.

Use the product only with tensile force.

Check that the product has a valid calibration certificate.

The product may be used in all directions, including horizontally.

The product works satisfactorily in a temperature range of -20°C to +50°C. For use beyond those temperatures, the product must have thermal protection.

## 5.3. Starting up

To start the product, press the on/off button for 1 second (ref. F, fig. 1). five different screens will then be displayed successively in the following order (see figure 7):

Reference	Description
A	Digit control
B	SWL
C	Program version
D	Date of last calibration (mm - yy)
E	Measurement in progress

## 5.4. Functions

### 5.4.1. Automatic zeroing

When the Dynafor™ Industrial is switched on, the display will show "0" providing the measured force is less than 10% of the SWL of the product.

### 5.4.2. Tare function

The Tare function is used to indicate the net force of the load.

The Tare function resets the value displayed by the product to zero. This function is obtained by pressing the Tare button for 2 seconds (ref. E, fig 1).

It is then possible to apply a force and display its net value.

Pressing the Tare button switches from the net value to the gross value.

Description of Figure 8.

Reference	Description
A	Gross force
B	Net force
C	Application of a force = net force
D	1 press net force <-> gross force

 When the tare function is activated, a reduction in force may cause the display to turn negative.

#### 5.4.3. Peak load function

The peak load function is used to store the maximum value reached when force is applied.


To activate the function, press the button T3 (ref. D, fig 1). The "MAX" symbol appears and remains on the display.

The value displayed is the maximum force applied.

To deactivate, press the button T3 once again.

Description of Figure 9

Reference	Description
A	Measurement in progress
B	Activating the Peak Load function
C	The maximum value of the measurement remains displayed
D	Deactivating the Peak Load Function

 The tare function is accessible in peak load mode.

#### 5.4.4. Change of units


See figure 10

Hold the button T3 (ref. D, fig. 1) pressed down to scroll through the units (kg, daN, lbs), and release the button T3 to select the unit.

#### 5.4.5. Turning the product off

See figure 11

To turn the product off, press and hold the on/off button for 2 seconds.


 If there is no load variation, the product will turn off automatically after 20 minutes.


On request, Tractel® can disable this function.

#### 5.4.6. Overload

When the force applied on the sensor exceeds the maximum capacity of the product by more than 10% (e.g. 1 t loaded at 1.1 t) the integrated display shows the overload status message "- HI -" shown below.



 In case of overload, it is imperative to fully release the force on the sensor and check that the product is again showing zero.

 If the product indicates a force value even when it is not subjected to any force, it has been deformed permanently. In that case, the product must absolutely be checked by the manufacturer before continuing to use it.

#### 5.5. Deinstallation

When deinstalling the product, make sure that all tensile forces have been removed beforehand.

Clean the product and store it according to the sections 7.2.Other verifications and 8.Transport and storage

### 6. Prohibited uses

The following are forbidden:

- Using the product for commercial transactions.
- Using the product in a personnel lifting line without first carrying out a specific risk analysis.
- Modifying the product.
- Using the product beyond its SWL with static or dynamic forces.
- Arc welding with the product in the ground circuit.
- Exposing the product to any electric and/or electromagnetic shock.
- Disassembling or opening the product.
- Using the product for operations other than those described in this manual.

- Using the product if there is a risk that it may be subjected to compressive, bending or torsional loads.
- Preventing the product being aligned in the line of force.
- Using the product in a highly corrosive environment.
- Using the product in an explosive environment.
- Using the product outside the temperature range of -20°C to 50°C.
- Using the product if it has been subjected to a force above 110% of its SWL.
- Before use, failing to observe the stabilisation time (20-30 minutes) of the product after a sudden change in temperature.

## 7. Maintenance and periodic verification

### 7.1. Battery replacement

The battery indicator light flashes when the batteries are low. They need to be replaced.

- Using a Philips screwdriver, remove the battery compartment cover.
- Replace the two "AAA" 1.5 V batteries with new ones, minding the polarities.
- Put back the battery cover and tighten the fixing screws so that the cover is flush with the edge of the battery compartment.

### 7.2. Other verifications

Tractel recommends periodically:

- inspecting the appearance of the product
- cleaning the sensor regularly with a dry cloth
- inspecting the dimensions of the product

Tractel recommendations are specified in the file "Inspection/Checklist Dynafor loadcells (reference 241295)", available upon request.

Tractel® also recommends annual recalibration (for adjustment see section 3.1 Presentation) before the valid certificate expires.

Tractel® can provide these services on request.

## 8. Transport and storage

During storage and/or transport, the product must be:

- Packed in its original packaging with the batteries removed
- Stored in a dry location
- Stored at a temperature between -20°C and 60°C
- Protected from chemical, mechanical or any other type of attack.

## 9. Product disposal and environmental protection

The product must be disposed of in accordance with the regulations applicable in the country of use.

The product complies with the requirements of the REACH regulation and the RoHS directive; it is not covered by the WEEE directive.

The different product components must be recycled on the basis of the table below, after separating metal and synthetic materials. These materials must be recycled by specialist organisations.

At the time of disposal, only trained individuals may dismantle the product to separate its components.

Component	To be treated as a waste of the type
Product body	Aluminium
Electronic housing (plastic)	Ordinary waste
Printed circuit board and display	Electronics
Batteries	Accumulator

Tractel® can recycle the product. Please contact Tractel® for more information.

## 10. Technical specifications

Description of the integrated display on the front panel. See figure 2.

A	Measured value
B	Measurement sign
C	Net indicator (net measurement value)
D	Gross indicator (gross measurement value)
E	Peak load indicator
F	Battery indicator
G	Pounds unit indicator
H	Kg unit indicator
I	daN unit indicator
J	Decimal point

## Features of the Dynafor™ Industrial range

Model	Unit	Industrial 1	Industrial 3.2	Industrial 6.3	Industrial 12.5	Industrial 20
SWL	t	1	3.2	6.3	12.5	20
Safety coefficient		>4				
Accuracy	± %	0.3% MR				
	± kg	3	9.6	18.9	37.5	60
Resolution	kg	1	2	5	10	20
Measurement frequency	Hz	3 Hz - 32 Hz in peak load mode				
Max. display	%	110% of SWL				
Height of digits	mm	18				
Display unit		kg/daN/lbs				
Conversion factor		1 kg = 0.98083 daN = 2.20462 lbs				
Battery life	h	250				
Net weight of sensor	kg	0.75	0.93	1.44	3.22	5.1
IP rating		IP 64				
Operating temperature	°C	-20°C to +50°C				
Body material		Aluminium				
Type of battery		2x AAA				
Dimensions (figure 3)						
A	mm	191	191	236	277	342
B		164	164	184	226	264
C		22	22	28	42	54
D		83.5	99.5	121.5	120.5	147
E		22	22	22	45	45
F		19.8	19.8	19.8	40.5	40.5
G		36.4	36.4	36.4	59.4	59.4
H		37.6	44.8	54.7	60	73.5

In case of difficulties or special uses, please contact Tractel®.

## 11. Regulations and standards

The product described in this manual complies with the following:

### European standards

Machinery Directive 2006/42/EC

Reference of EMC standards: 2004/108/EC

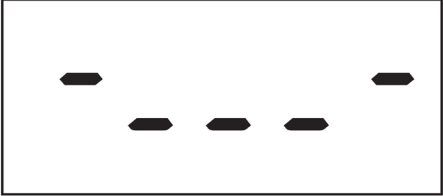
### International Standard

IEC 61326-1 Ed.2: 2012

IEC 61311: 2007

## 12. Troubleshooting

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Problems	Possible causes	Remedies
The sensor does not light up	Batteries empty.	Replace the batteries.
	Fault in circuitry.	Contact Tractel®
No return to initial zero	Tare function enabled.	Disable the Tare function and display the "GROSS" value of the force.
	Sensor permanently deformed due to incorrect handling, excessive overload or compression.	The product must not be used before it is verified by Tractel®.
No change in the display or inconsistent display.	Malfunctioning sensor or circuitry.	Reset: Switch the sensor off and then on. If the malfunction persists, contact Tractel®
Linearity or accuracy problem.	Malfunctioning sensor or circuitry.	Contact Tractel®
	Sensor subject to compressive or torsional stress.	Eliminate compressive or torsional stress on the product. If the malfunction persists, contact Tractel®