PTS – XXX
Intrinsically Safe
Hook Load Sensor
User Manual

hohner

OPTICAL ENCODERS

Hohner Corporation
5536 Regional Road 81
Beamsville,
Ontario
Canada
L0R 1B3
Canada
Tel: 1 - (905) - 563 - 4924
hohner@hohner.com

Hohner Automation Ltd
Units 14 - 16
Whitegate Industrial Estate
Wrexham,
LL13 8UG
Wales
United Kingdom
Tel: (44) - 1978 - 363 - 888
uksales@hohner.com

Hohner Eletronica Ltda
Rua João Bombo 754
Parque Itamaraty
Artur Nogueira,
São Paulo
Brasil
CEP - 13-160-000
Tel: (55) - 1938 - 77 - 5214
vendas@hohner.com.br

Hohner Automazione
Piazzale cocchi 10
Vedano olona (VA)
Italia
Tel: (39) 0332 866109
hohner.info@hohner.it

Hohner Elektrotechnik GmbH
Gewerbehof 1
D- 59368 Werne
Deutschland
Tel: + 49 (0) 2389 / 98780
info@hohner-electrotechnik.de

V1.0

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Section 1 - Equipment Overview

Any reference to ’Equipment’ or ‘Hook Load Sensor’ or ‘Pit Bull Sensor’ refers to: Intrinsically Safe Hook Load Sensor PTS-XXX.

This manual covers both the certification and functional aspects of the equipment. Any suitably certified Load Cell can be fitted to the housing. Any conditions of safe use / X conditions are included in this manual. Please use this manual in conjunction with the product datasheets for Part Number specific technical details.

The PTS-XXX is a sensing device comprised of an Intrinsically Safe Load Cell (certified as equipment in its own right) fitted inside a mechanical housing that is used to measure the amount of weight that is present on a length of metal cable (Drill Line). The Load Cell is fixed into the housing via several screws and a protective cover. A central bolt (with adjustable ratchet) is threaded through the loadcell and is in direct contact with the drill line via various sized cable inserts.

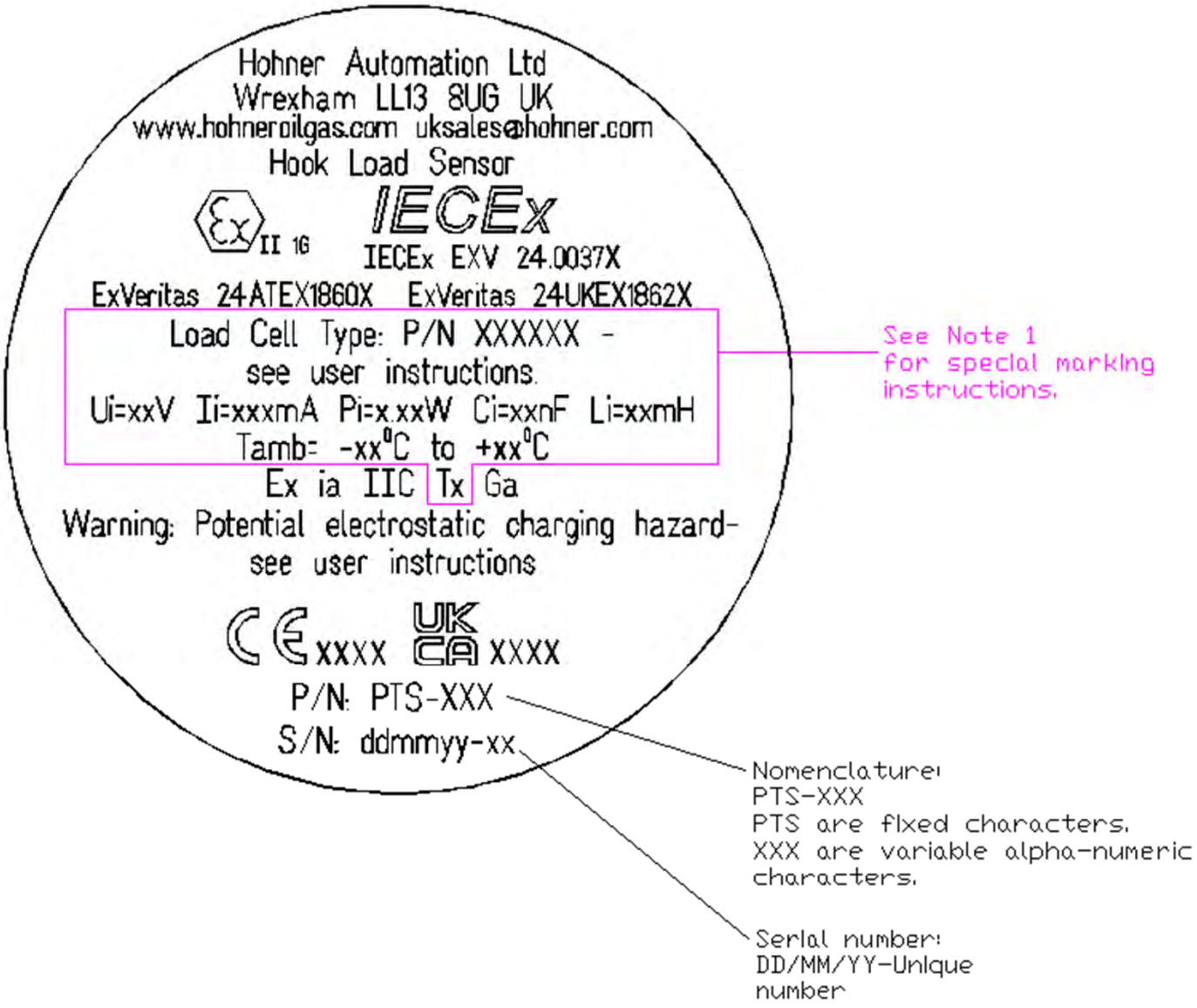
The device produces an electrical signal directly proportional to the measured weight of the drill line by detecting the amount of deflection present on the cable itself. As the weight increases, the amount of deflection in the cable increases and the electrical output also increases and vice-versa, less weight will give a lower electrical output.

Calibration of the sensor is carried out by tightening the ratchet down relative to known weights on the drill line (or similar methods) which can be used to set the electrical ‘low and high’ values of the signal output. The output is an intrinsically safe 2-wire 4-20mA signal. The low end (4mA) would represent the minimum amount of weight on the drill line and the high end (20mA) represents the maximum weight that could be measured. All points in-between are proportionally linear.

The output termination accommodates either a connector or terminal box for connection for external cables. See General Assembly section.

Section 2 - Safety Markings, Warnings and Special Conditions for Safe Use

The following instructions specific to hazardous area installations are covered by certificate numbers ExVeritas 24ATEX1860X & IECEx EXV 24.0037X & ExVeritas 24ATEX1862X. The ‘full’ ATEX, IECEx & UKCA certification marking, together with any warnings or special conditions for safe use are as follows:



Note 1: The equipment can be fitted with any suitably certified (Ex ia IIC Tx Ga) Load Cell. The entity parameters, temperature range and T rating shall be marked accordingly specific to the actual load cell ‘Type’ fitted. All 'X's' will be replaced with the recapitulated values stated on the specific Load Cell ATEX / IECEx / UKCA Certificates. See ‘Section 10’ for further details.

It is the users responsibility to ensure that the equipment certification is complied with and that it is supplied from an intrinsically safe source in accordance with the variable entity parameters stated in section 10.

The equipment is to be installed by suitably trained personnel in accordance with the applicable code of practice (typically IEC EN60079-14).

The Hook Load is certified for use in Equipment group II (Surface) and may be used in zones 0, 1, and 2 with flammable gases and vapours IIC,IIB,IIA.

If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected thus ensuring that the type of protection is not compromised.

With regard to safety, it is necessary to check for correct operation and that there is a measured electrical output signal relative to the ratchet being tightened and removed after commissioning / installation is complete. Functionally, the equipment does require some user assembly and there is permitted user adjustment – see sections 2-9 for further details.

Repair of the equipment can be carried out by the end-user, or their approved agents, in accordance with the applicable code of practice. Only Hohner provided parts shall be used together with controlled instructions – see section 11 for further details.

Earthing of the equipment is not a requirement of certification, however it is recommended from an EMC perspective and particularly for any version that is fitted with Load Cells that do not conform with the 500V Dielectric strength test requirement – see section 10 or contact Hohner for further details.

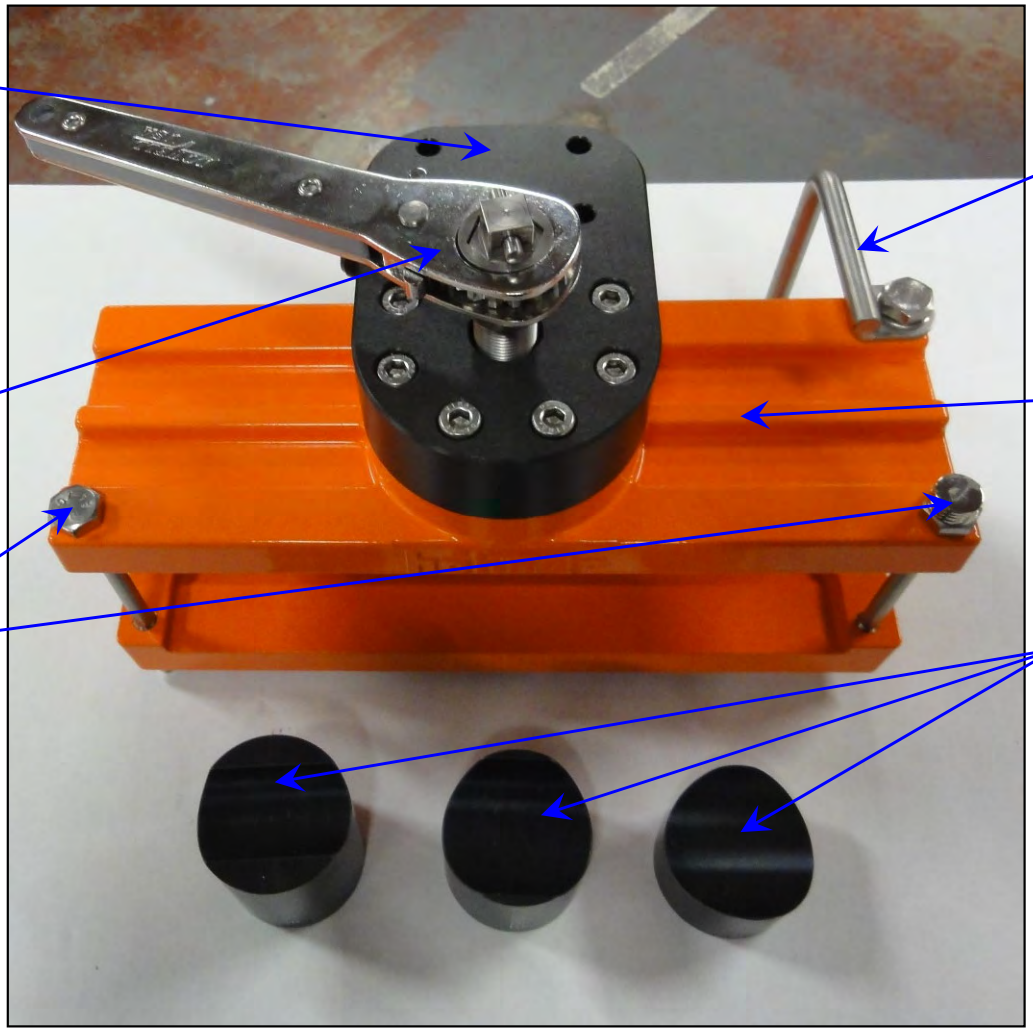
The certificate numbers have an ‘X’ suffix which indicates that special conditions of installation and use apply. Those installing or inspecting this equipment must have access to the contents of the certificate or these instructions. The conditions listed in the certificate are reproduced below:

- The equipment is constructed from Aluminium and in rare cases ignition sources due to impact and friction sparks could occur. This should be considered in the final installation
- When commissioning, the equipment must be sufficiently tensioned onto the ‘drill line’ ensuring that the equipment is secured.
- Tensioning Ratchet to be used only during calibration / commissioning / maintenance and must be removed before use.
- Some versions of the equipment (load cells) may not be capable of passing a 500V dielectric strength test. This shall be taken into account when installing the equipment. See section 10 for further details.
- Potential electrostatic risk: The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
- User repair – only Hohner supplied parts are to be used, contact manufacturer for spares. See section 11 for further details.

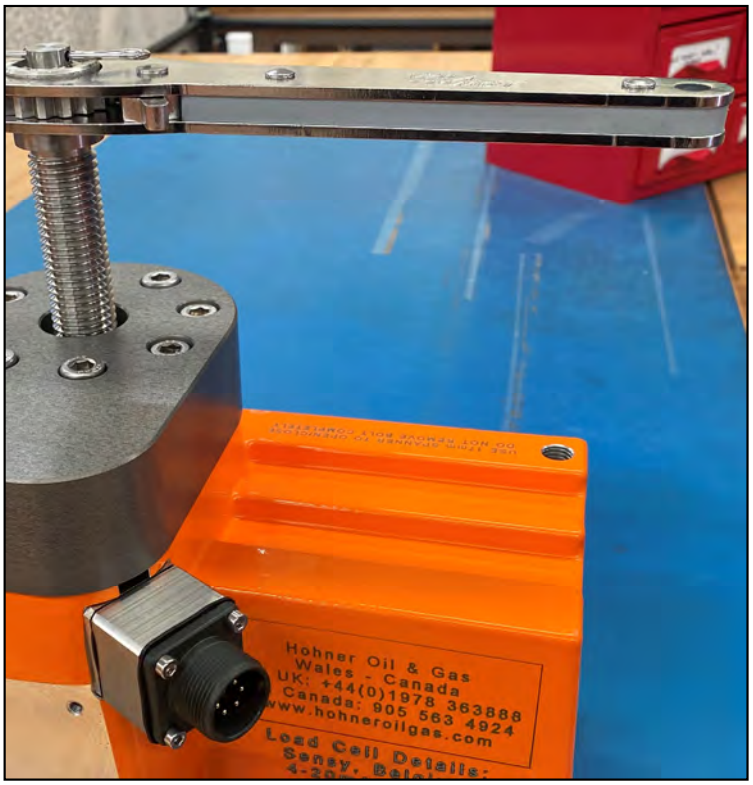
Section 3 - Equipment Contents

1 x Hook Load Sensor
1 x Squex / Ratchet Assembly
1 x 1.5” Cable Insert
1 x 2” Cable Insert
1 x 2.5” Cable Insert
1 x Tube of Anti Seize Paste

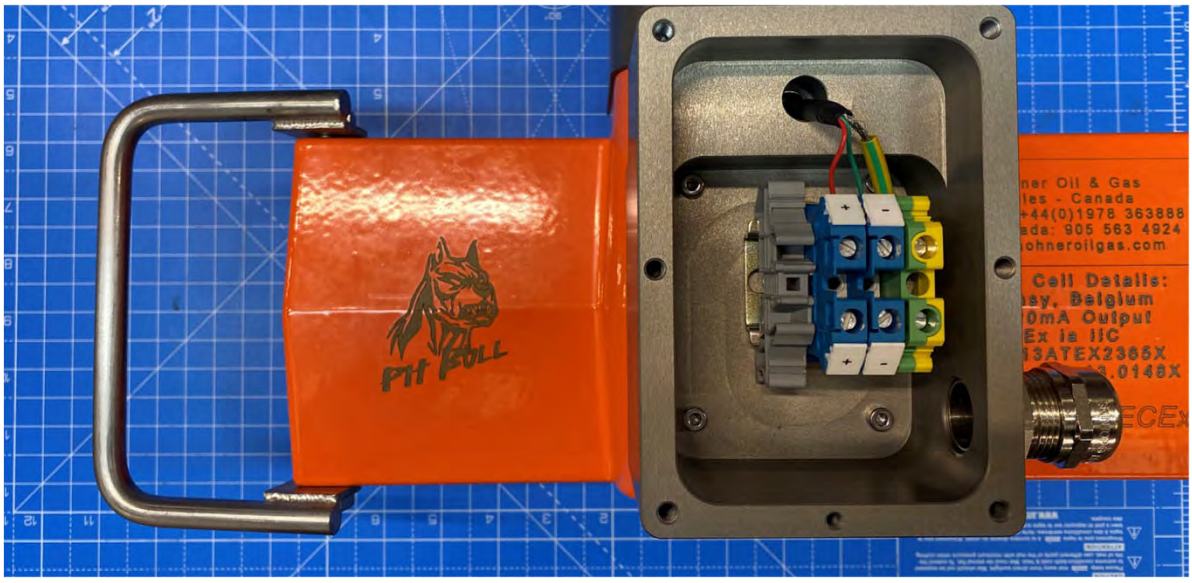
Section 4 – General Assembly



Connector Version (Various Types)

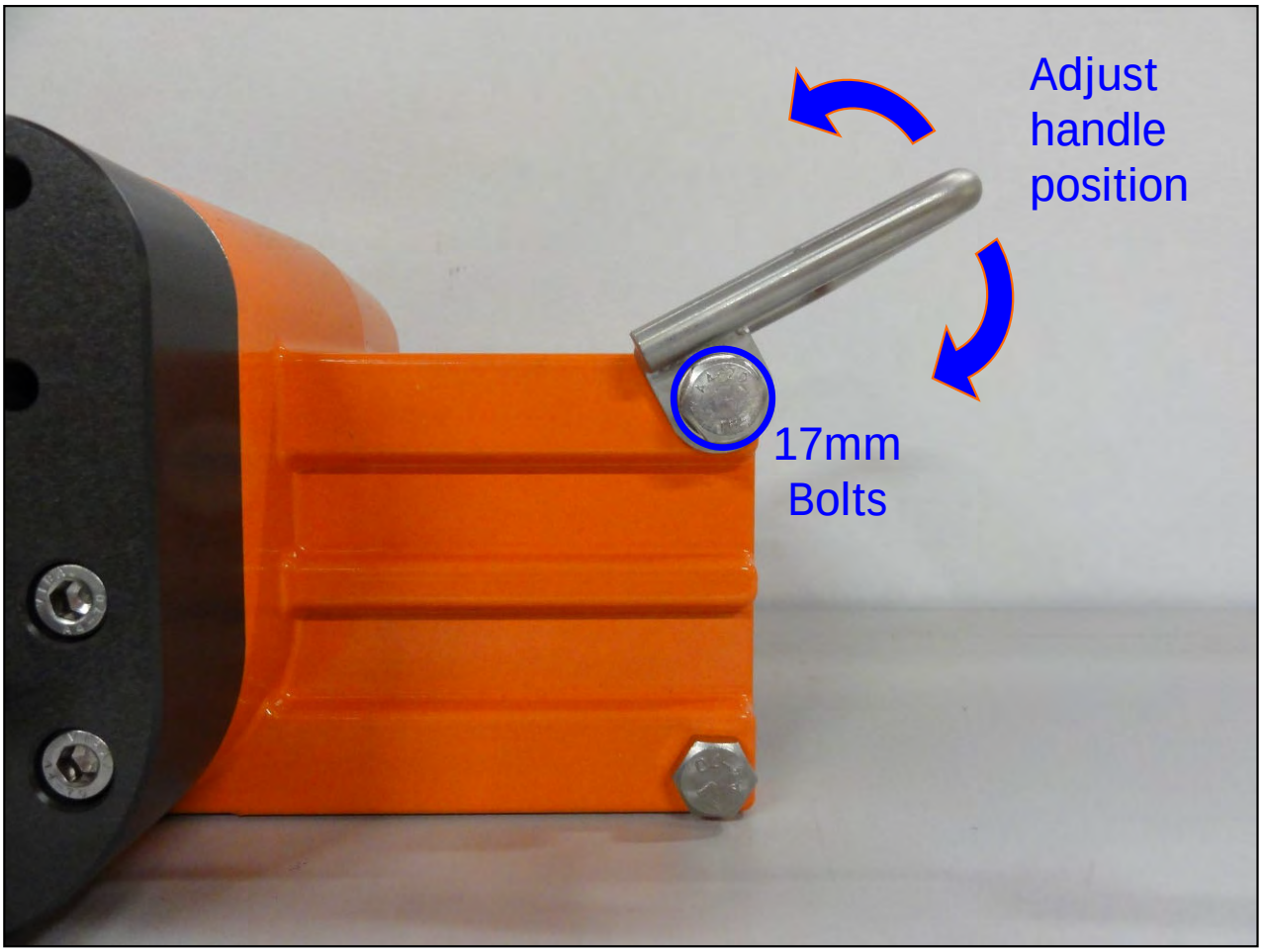


Terminals Version (2 x Signal Wires + Earth)



Cable gland range includes M16-M25 (M20 is standard).
Refer to specific Part Number / Product datasheets for details.

Section 5 – Fixing Handle into Position

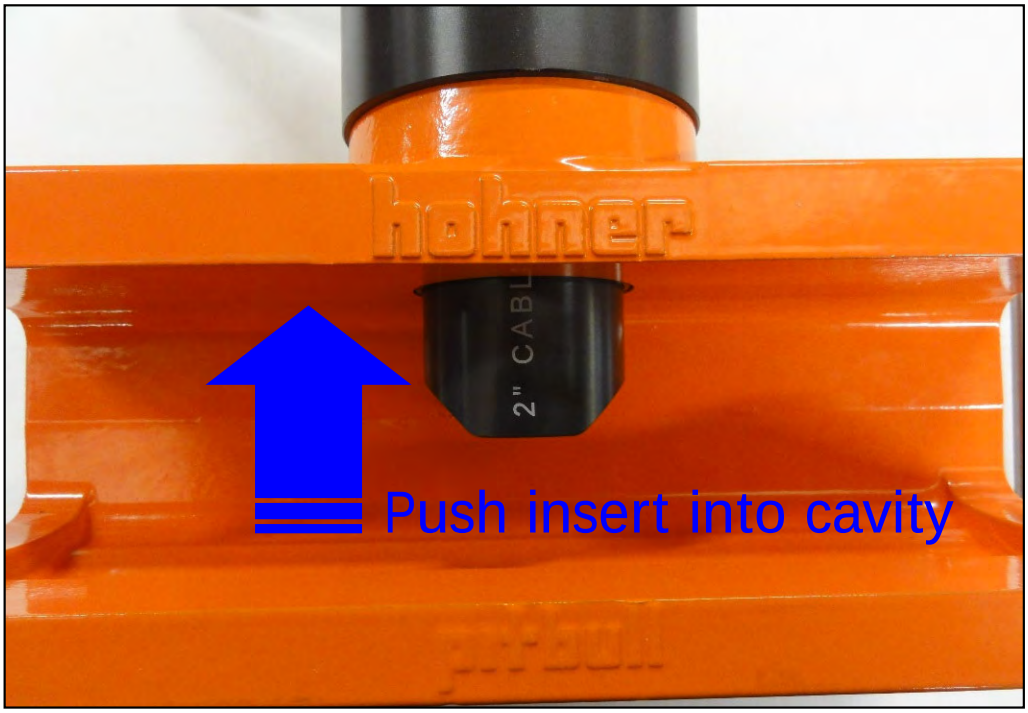


Before installing the Hook Load sensor it is important to lock the handle into position.
Choose an angle for the handle that will be comfortable to hold during installation of the sensor
Once a suitable angle has been found
tighten the two bolts using a 17mm spanner

Section 6 - Insert Selection and Fitting

Select one of the three supplied inserts for desired diameter of drill line

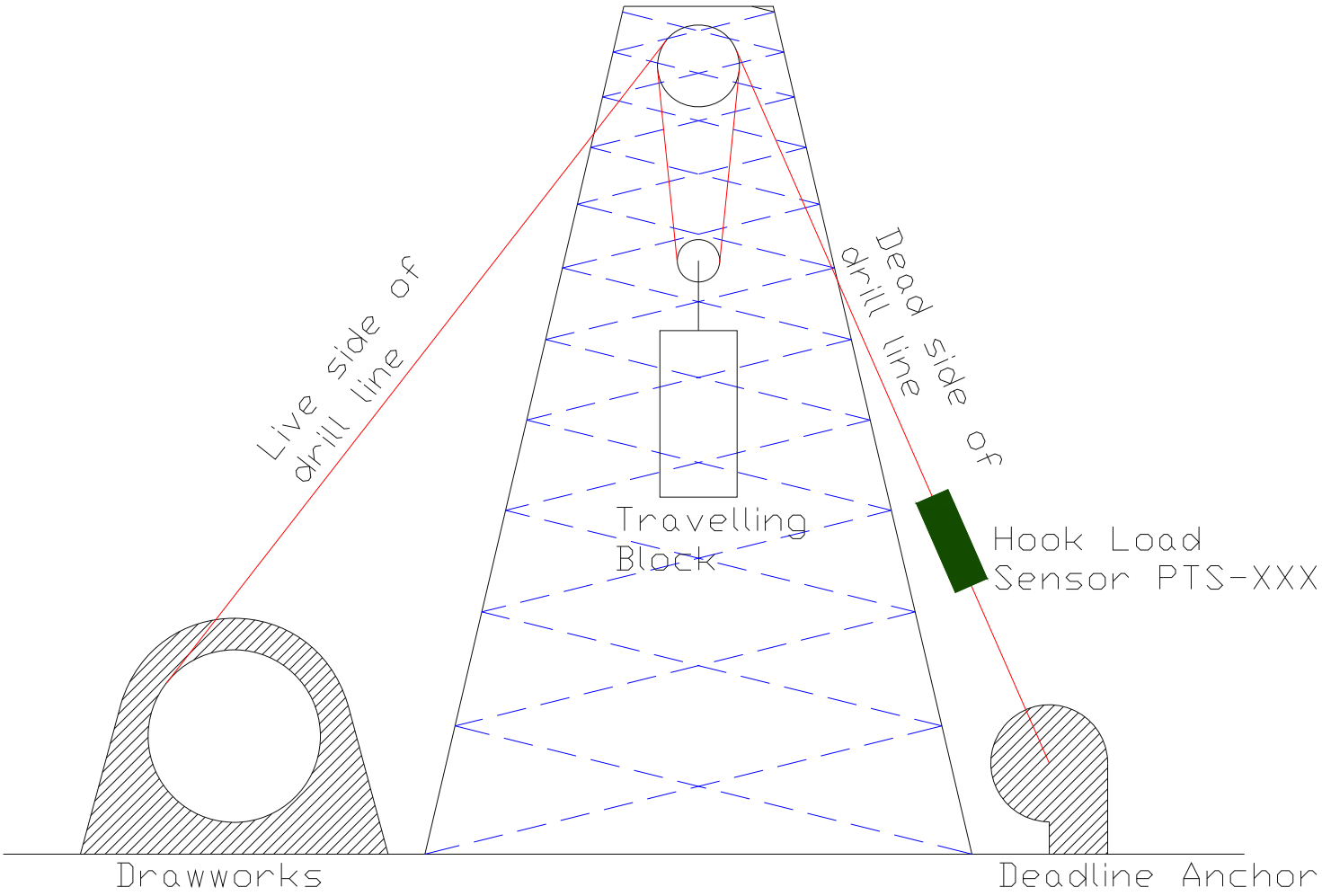
- Max diameter of 1.5”
- Max diameter of 2”
- Max diameter of 2.5”



Push the selected insert into the cavity in the centre of the upper wall of the channel
The tip of the ‘squex’ and each insert contain magnets to help hold one to the other
Rotate the ‘squex’ until it mates with the insert; the insert should now be held in place

NOTE PLEASE APPLY FRESH ANTI SEIZE PASTE TO THREAD OF SQUEX WITH EACH NEW DEPLOYMENT

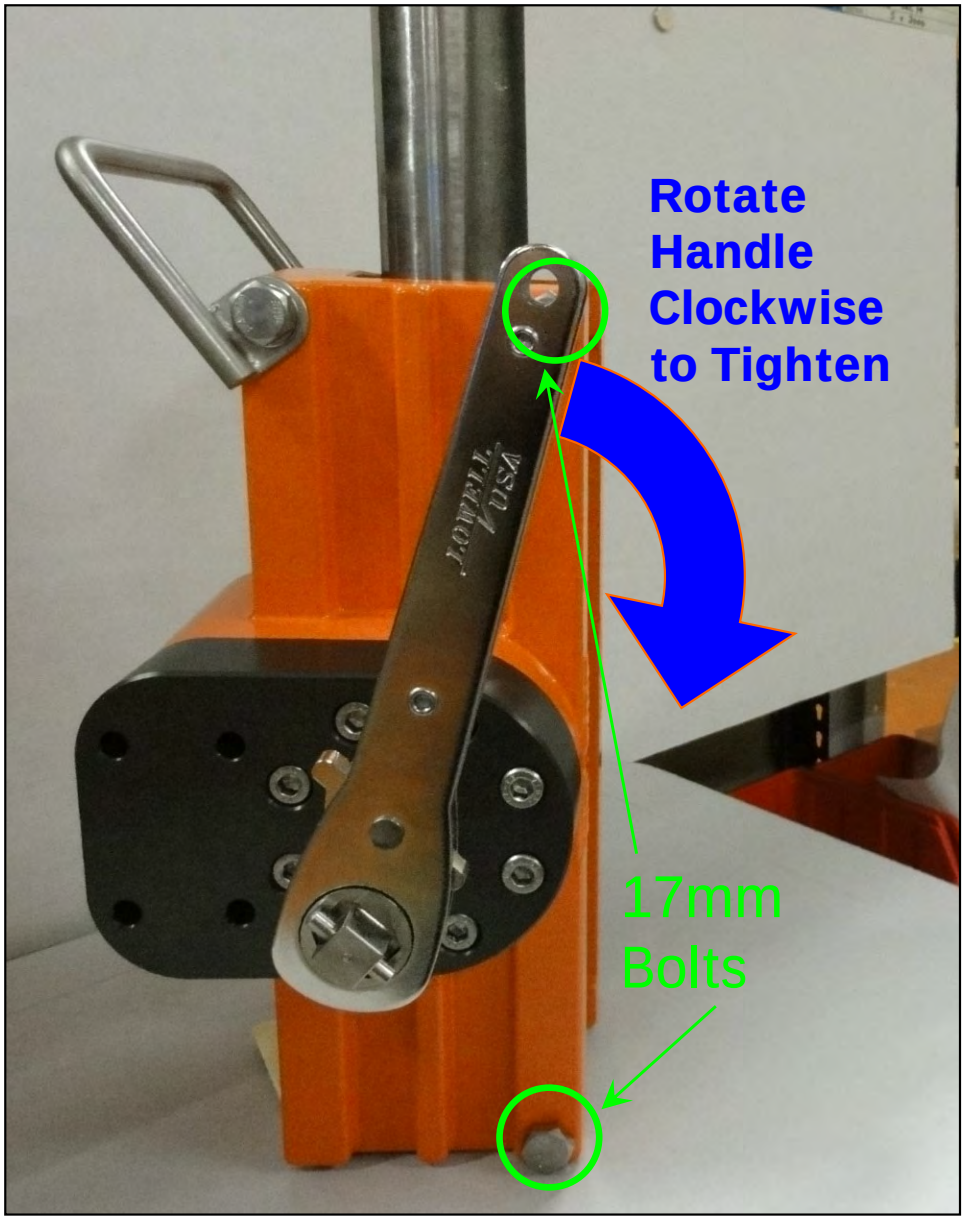
Section 7 - Fitting Sensor to Line



The above diagram is an overview of the positioning of the sensor

IMPORTANT

THE SENSOR MUST ALWAYS BE INSTALLED ON THE DEAD SIDE OF THE DRILL LINE



- Position the sensor on the line (Ensuring that the line is in the channels of both the sensor and the insert)
- Tighten the two 17mm security bolts into position.
- Rotate the ‘squex’ ratchet in a clockwise direction to secure the sensor to the line until the line is slightly deformed (bent); the sensor should now be supporting its own weight

***NOTE* do not over tighten at this point as the sensor is not yet calibrated**

Section 8 - Calibrating the Sensor

Overview

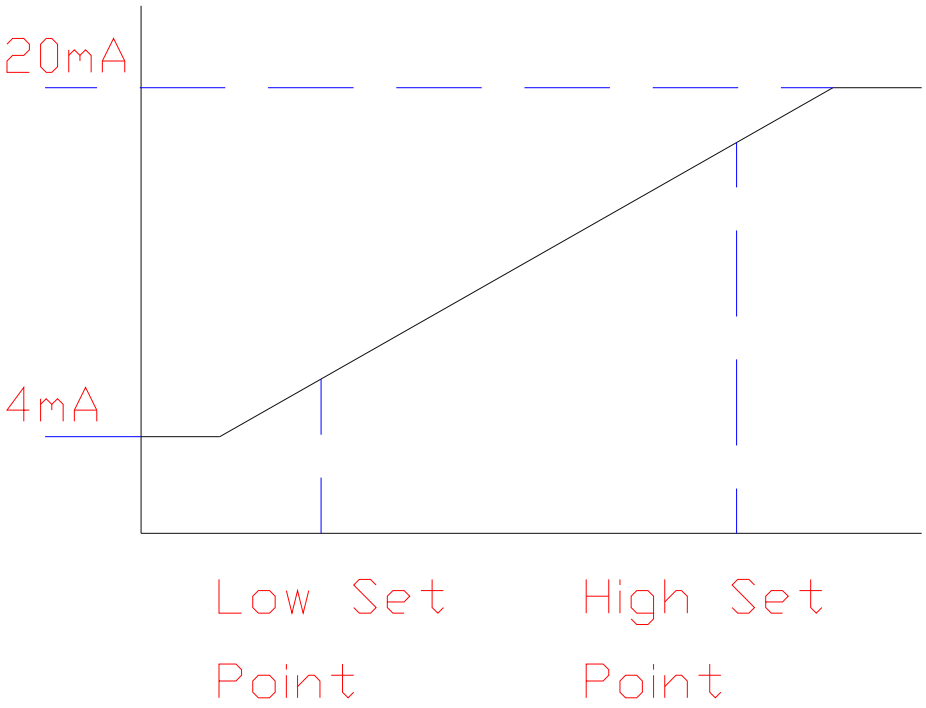
The output of the sensor is a 4..20mA linear scale which is dependent on the calibration points set by the end user.

Two points are required to set a linear scale for ideal operation of the sensor.

The measured output depends on how tight the sensor is attached to the drilling line and thus can be infinitely adjusted for the different spans required.

Once the calibration points have been set; it is ideal to re-calibrate at two-day intervals; this is due to the strain in the drill line and temperature variances.

The re-calibration will simply raise / lower the linear line.



There are three methods of calibrating the sensor; these are described below

Method 1 - Calibration using two known weights

• Ensure that only the travelling block is attached to the drill line; nothing else is to be attached at this point in time.

• attach the sensor to the dead line and tighten onto the line until it is secure and supporting its own weight (as previously explained on page 8).

• Setting the zero-weight point -The mA reading shown at this point is now the reading for the zero-weight point (travelling block only)

• Setting the second point - lift a known weight on the travelling block; The mA reading shown at this point is now the value for the known weight.

The two points are now set; all other values are now linearly derived from these two values.

Method 2 - Calibration using dead line anchor values

• Attach the sensor to the dead line and tighten onto the line until it is secure and supporting its own weight (as previously explained on page 8).

• Compare the mA value to the actual value from the built in deadline anchor value and set this point into your system

• To set another value; add / remove weight from the travelling block and again compare the mA value to the actual value from the built in deadline anchor and set this point into your system

The two points are now set; all other values are now linearly derived from these two values.

Method 3 - Calibration of a Specific Span

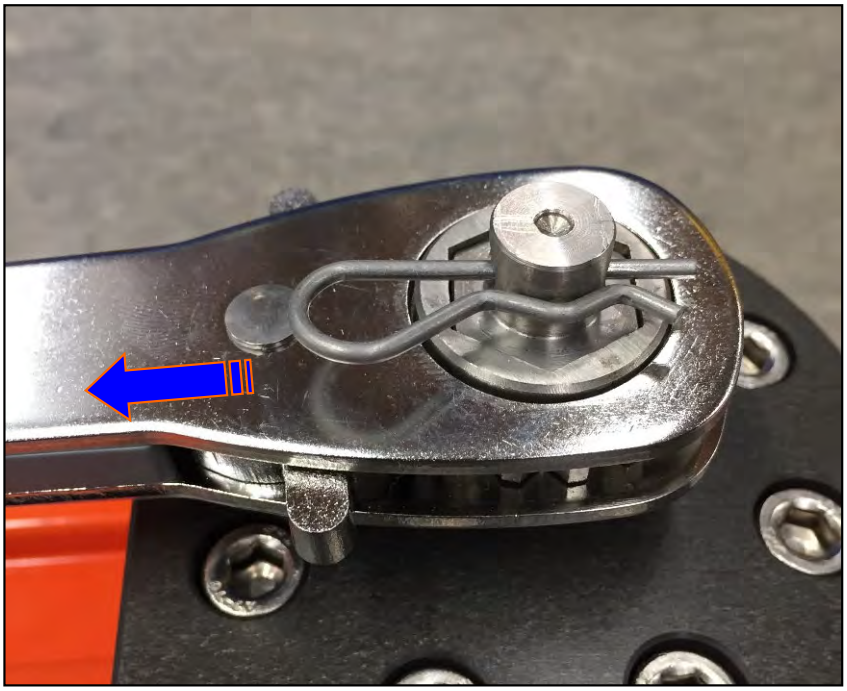
• Ensure that only the travelling block is attached to the drill line; nothing else is to be attached at this point in time.

• Attach the sensor to the dead line and tighten onto the line until it is secure and supporting its own weight (as previously explained on page 8).

• Lift the amount of weight required for the 20mA reading; once the weight is lifted adjust the ratchet on the sensor until the mA output reaches 19 / 20mA. The maximum weight and 20mA high point are now set.

• Release the weight and observe the mA value with the travelling block only. The zero-weight point is now set

Section 9 - Removal of Ratchet from Squex



If the ratchet becomes damaged it can be removed by removing the retaining clip

Once the retaining clip and ratchet have been removed the squex can still be operated by using a ¾” spanner

Section 10 - Load Cell Specific Certification Details

The following instructions apply to the electrical aspects of the Hook Load Sensor which incorporates any suitably certified intrinsically safe Load Cell (certified as equipment). The following information has been taken directly from the ATEX / IECEX and UKCA Load Cell certificates that are currently used. Please cross reference the 'Type' fitted on the product to the relevant information below for all electrical certification and safety requirements.

Certification Note: Some Load Cells are certified for Gas and Dust, however the Hook Load is only certified against Gas, therefore any reference to 'Dust' on the actual product or certificates can be ignored.

Load Cell Manufacturer:	Elite Transducers, UK
Type P/N:	LPMW-50KN
Certifications:	ATEX, IECEx.
Type of Protection:	Intrinsically Safe. Ex ia IIC T6 Ga Ta = -40°C to +60°C
Entity Parameters:	Ui =28V Pi =1.3W Ii =300mA Ci =0.04pF Li = 284 pH
Special Conditions:	None

Section 10 - Continued

Load Cell Manufacturer:	Sensy, Belgium
Type P/N:	2960-50KN
Certifications:	ATEX, IECEx.
Type of Protection:	Intrinsically Safe. Ex ia IIC T6 Ga Ta = -55°C to +60°C
Entity Parameters:	Ui =28V Pi =0.7W Ii =160mA Ci =0nF Li = 15.92pH

Special Conditions:

The equipment is not capable of withstanding the 500V dielectric strength requirement in accordance with clause 6.3.13 of EN 60079-11:2012. This shall be taken into account when installing the equipment.

The enclosure of the C6 CARRE amplifier box is manufactured from aluminium. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation.

Section 11 - Maintenance, Repair & Replacement Parts

Hook Load Maintenance

The Hook Load sensor is ruggedly designed for use in harsh environments. Once installed, very little maintenance is required, as the equipment is predominantly mechanical with no moving low frictional parts due to the nature of the application (measuring the tension on a metal cable). The rated life of the Sensor is typically 10 years.

For each deployment it is recommended to apply a dose of anti seize paste onto the main threaded part squex as detailed in section 6. Periodically a check and clean of the squex is recommended to ensure no damage to the threads exists. A new Squex must be purchased if any damage is found.

Repair & Replacement Parts

Any work carried out by end users (or their agents) must be done using Hohner supplied parts to Hohner supplied instructions. Users carrying out the work must be suitably qualified in relation to the applicable codes of practice and Ex protection concepts / methods.

All individual parts are available as replacement parts together with assembly instructions. Hohner have created several dedicated ‘repair kits’ that cover the main parts used in the construction of the equipment including the Load Cell. Please contact Hohner with your part number and serial number of the equipment for further advice.