FiGS 2.0 Sensor and Power bottle

User / Service Manual / Quick Guide

Sensor for measurement of electric field gradients in seawater

This manual exists in electronic (PDF) and printed format.

Contact information

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Abbreviations

FTN: FORCE Technology Norway AS

EU EMF Statement

FiGS 2.0 is compliant with the requirement for EMF in EU with no separation distance between the user and/or bystander of the device.

EU Radio equipment intentionally emitting radio waves

Tx Frequency band stated: 2400 MHz to 2483.5 MHz
Technologies stated: Proprietary
Maximum Tx power stated: 0.5μW

USA Statement

Note:

FiGS 2.0 is only compliant if no changes or modifications are made to the device.

FiGS 2.0 is compliant with the requirement for RF exposure in US with <5 mm separation distance between the user and/or bystander of the device.

FiGS 2.0 has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canada Statement

Note:

FiGS 2.0 complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage; et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Important Safety and Handling Information

Caution: Changes/modifications not approved by FORCE Technology could void the user's authority to operate the equipment.

Disposal and Recycling Information

Please ask FORCE Technology concerning disposal of FiGS 2.0 in your country.

Disclaimer

The information contained in this document is subject to change without notice.

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Visit our web-site: http://figs.no

Contents

Intended use of the equipment

Note: Use the unit only in the way described in this manual. Failure to follow the guidelines and instructions in this manual may be dangerous and result in damage to the equipment and erroneous measurements.

FiGS 2.0 usage

FiGS 2.0 is a sensor for measurement of cathodic protection activity and corrosion for assets in seawater, such as pipelines, subsea structures and fixed installations.

The sensor is mounted on an underwater vehicle, such as a ROV, AUV or ROTV. The sensor is connected through the vehicle control systems and sensor data is either transmitted topside to a control computer with logging software or stored locally on the vehicle.

What does FiGS 2.0 measure

FiGS 2.0 measures the electric field gradient in a conductive medium such as seawater. The sensor reports the electric field gradient vector as two components, FGx and FGy, with the unit µV/cm.

## Overview of the sensor

The sensor system consists of:

1. FiGS 2.0 sensor with mounting bracket
2. FiGS 2.0 Power bottle
3. Connecting cable
4. Open-ended connector with pigtail
5. 1 pcs USB memory stick with PC control software and user manual

The sensor consists of 3 main parts:

- o Rotor
- o Motor housing
- o Electronics housing

The sensor is built up with 3 sensing electrodes mounted on a rotating shaft. The rotating part, from now on called the rotor, will rotate at a speed of 250 or 500RPM when the sensor is in operation. The motor and part of the rotor is enclosed in the motor housing, which is oil filled and pressure compensated.
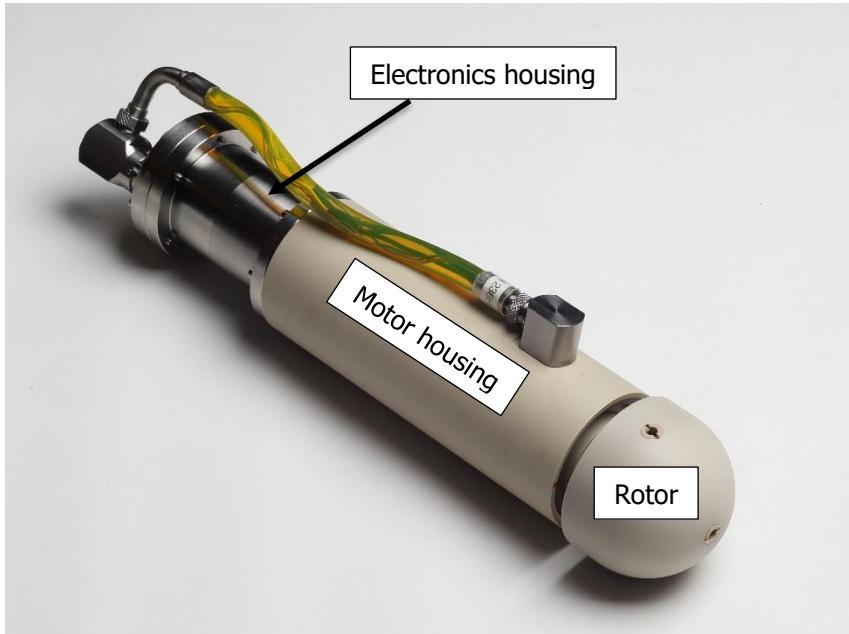
Sensor dimensions

All dimensions are in [mm]
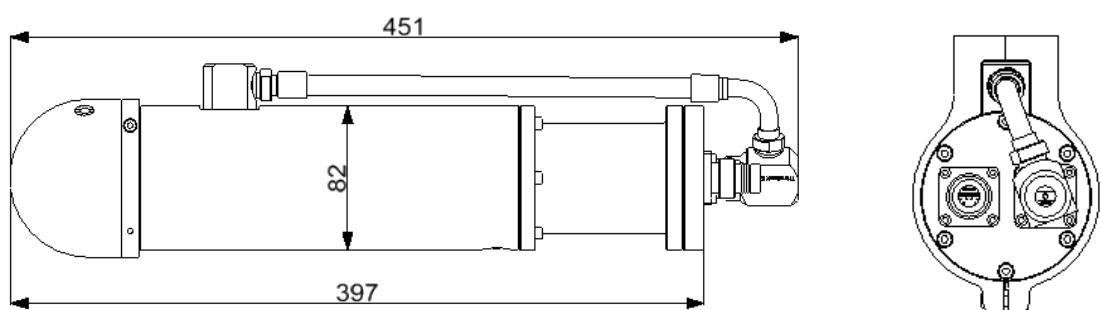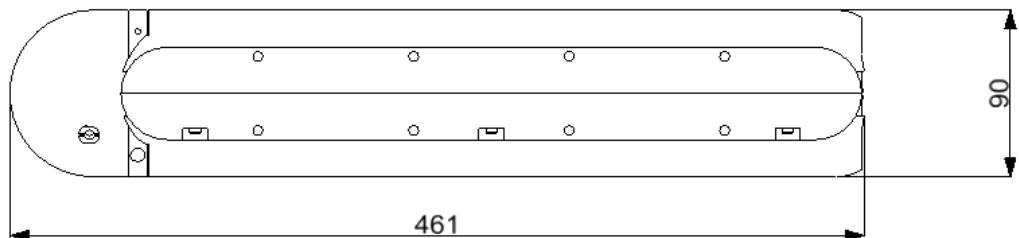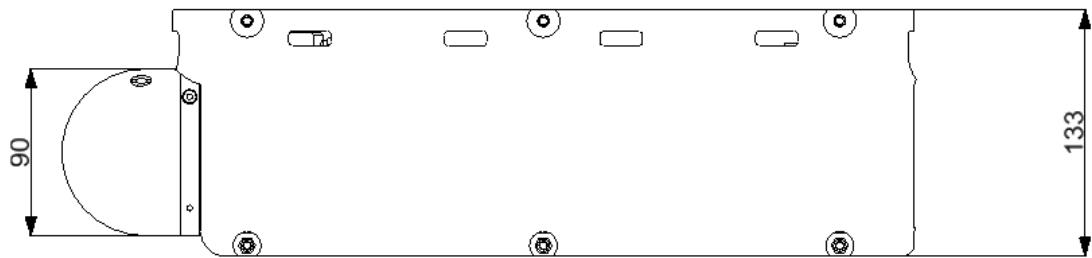
Power bottle dimension
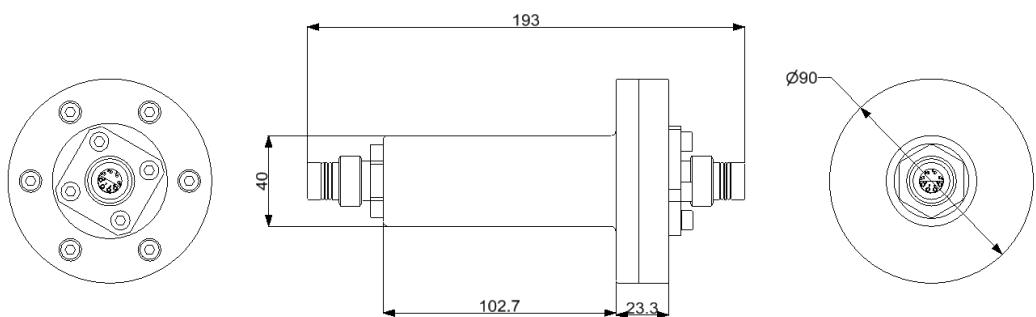
Equipment ratings

FiGS 2.0 sensor:

Supply voltage:	24VDC
Supply current:	3A
Maximum power consumption:	72W
Typical power consumption:	20W
Over Voltage Category	I
Data connection:	RS 485 full duplex
Connector spec:	Transmark TS-FCR-08P-MING-3S
Temperature:	-15 / +50C
Pressure	3000MSW / 300barg
Matings	+500
Isolation	1000V
Rated voltage	600VDC
Rated current	3.5A
Indoor and outdoor use	
Altitude	4000m
Depth	3000m seawater / 300barg
Temperature	In air: -15 / 40C
	In water: 0 / 40C
Relative humidity:	100%
Contains oil:	Panolin HLP SYNTH 15
	https://www.panolin.com/
Pollution Degree	2
Dimensions incl. bracket	Ø90 x 461mm
Weight in air	5kg
Weight in seawater	2.5kg

FiGS 2.0 Power bottle:

Supply voltage:	21-27VDC
Supply current, full load:	3.4A
Output Voltage	24VDC
Output current:	3A
Over Voltage Category	I
Volts, transient, 100 mSec	0-50VDC
Maximum power consumption:	72W
Data connection sensor side:	RS 485 full duplex
Data connection computer side:	RS 232
Connector spec:	Transmark TS-FCR-08P-MING-3S
Temperature:	-15 / +50C
Pressure	3000MSW / 300barg
Matings	+500
Isolation	1000V
Rated voltage	600VDC
Rated current	3.5A
Indoor and outdoor use	
Altitude	4000m
Depth	3000m seawater / 300barg
Temperature	In air: -15 / 40C
	In water: 0 / 40C
Relative humidity:	100%
Pollution Degree	2
Dimensions	Ø90mm x 193mm
Weight in air	1.05kg

Equipment installation

Connect FiGS 2.0 sensor to the FiGS 2.0 power bottle with the supplied cable. Check that the power bottle is mounted the correct way. The power bottle is marked with "FiGS side" and "ROV side" on the bottle. If the power bottle is mounted the wrong way, the sensor will fail to power up. Make sure the receptible is clean and that the O-rings are clean and un-damaged. The O-rings shall be coated with a thin film of silicone-based O-ring lube. Insert the connector plug into the receptible and tighten the lock ring firmly. For more permanent installations, a set screw can be used to secure the lock ring.

Receptable O-rings

Part No.: 213118
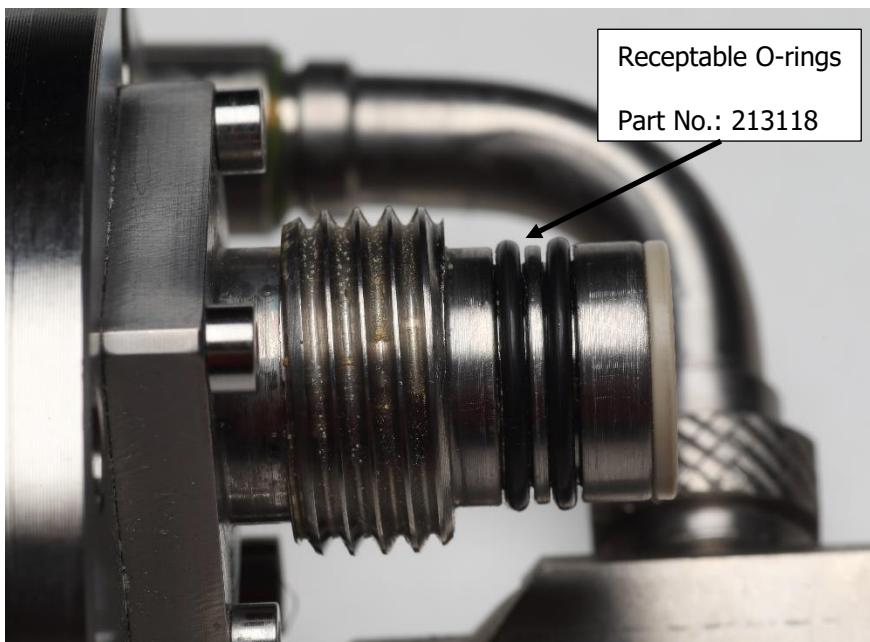
- Always control the receptible and O-rings for any damage before use. Any failure on the receptable can damage the sensor. If a receptable has visual damage, the sensor must be repaired. Contact FTN for service and advice.
- The receptible and connectors shall be clean and free from lint before assembly
- Any damaged O-rings shall be replaced before assembly. Spares can be obtained by contacting FTN.
- Always check that the cable is free form any visual damage. Any damage to the supplied cable can lead to failure of the sensor. A damaged cable shall be replaced before use. Spare cables can be obtained by contacting FTN.

Connect the power bottle to the preferred interface, e.g. ROV or AUV. The receptable on the power bottle has 8 pins. The pinout is:

- o Pin1: NC
- o Pin2: NC
- o Pin3: NC
- o Pin4: RS232 RX
- o Pin5: RS232 TX
- o Pin6: RS232 GND
- o Pin7: 0V power
- o Pin8: +24V power

Either use the supplied pigtail to make the appropriate connection to the ROV / AUV connector panel or contact FTN for supply of a custom cable.
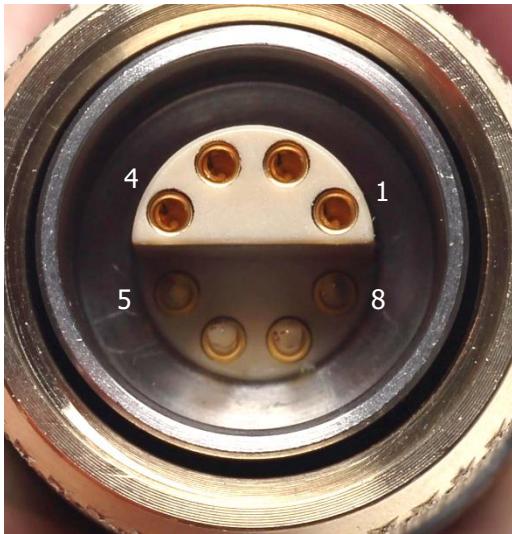
Figure 1 Pinout on connector

Before use, soak the electrode cotton plugs with 3.5wt% salt water (Clean tap water mixed with 3.5wt% NaCl)

Equipment operation

Connecting the sensor to a computer

Connect the sensor to the computer via the RS232 interface. The sensor can be controlled by a terminal software, such as Putty, or by a specific logging and control software.

Protocol FiGS 2.0

FiGS can communicate over RS-232 at 19200, 115800 and 1000000 baud. The communication is ASCI based, i.e. all messages sent or received are in the ASCI format. There are two message types from FiGS: formatted messages and non-formatted messages.

Formatted messages

Formated messages starts with {XXXXXX} and ends with [YYY]. These messages are meant to be parsed by a computer. XXXXXX are always 6 characters long and describes the content of the message. An example is {SYSTEM} which contains system settings. A formatted message always ends with [YYY] where YYY is the length of the formatted message, excluding the {XXXXXX} and [YYY].

An example of a formatted message is:

{VECTOR}   x: 0.470132   y: -0.755581   E: -6623.961971   xa: -0.020   ya: -0.963   za:-0.086 len: 921[82]

This message is of the type "vector" and is 82 characters long. Values in the message are described with a name followed by ":" followed by "space" and then the value. Different values are separated by tab (\t) or newline (\n). NB! A formatted message may contain the newline character (\n). This is to make the

messages easier to read in a terminal window. NB! (\n) cannot be used as a terminal character when reading from the serial port.

Non-formatted messages

In addition to the formatted messages, FiGS also prints loose text. This is intended to be read by humans and should not be parsed by a computer.

Protocol details

The following messages are defined:

{SYSTEM}	system settings
{R STAT}	rotor electronics status
{M STAT}	motor electronics status
{VECTOR}	measurement values
{CMDACK}	command acknowledge
{RAWDMP}	raw signals from rotor
{HALDMP}	Hall sensor values from motor

{SYSTEM}

System contains the following parameters, separated by tab (\t) or newline (\n)

id: 1835060	A unique number identifying the master processor
digital filter: 1	System settings for digital filter (50Hz Cut-off). 0 is off, 1 is on
digital AC: 1	System settings for digital AC filter. 0 is off, 1 is on
mute vectors: 0	0 sends all vector data, 1 mutes the vector data
menu active: 1	1 activates the menu and allows you to send short commands for start, stop and help menu. 0 deactivates the menu
50hz filter: 1	50Hz analogue filter. 0 deactivates and 1 activates
220nf cap: 0	Filter for active pipe-tracker, e.g. TSS440. 0 deactivates, 1 activates
100x gain: 1	Gain setting on FiGS 0 is 10x gain and 1 is 100x gain
rotor state: 1	1 is measure, 2 is impedance
motor state: 0	Motor state, 0 is off, 1 is on
no rotation mode: 0	0 no-rotation mode deactivated, 1 no-rotation mode active
electrode distance: 7.00	Distance between electrodes in [cm]
use dir cal: 1	Direction calibration: 0 deactivated, 1 active
dir cal: -72.13	active direction calibration angle
use level calibration: 1	Level calibration, 0 is deactivated, 1 is active
level calibration: 147.79	Level calibration angle
use mounted angle: 1	use mounted angle, 0 is deactivated, 1 is active
mounted angle: 147.71	mounted angle
target RPM: 500	system target RPM
use relative cal: 1	use relative cal, 0 is deactivated, 1 is active
relative cal deg: 41.135	relative cal. angle
relative cal amp: 1.053	relative cal. amplitude
use absolute cal: 1	use absolute calibration, 0 is deactivated, 1 is active
absolute cal factor: 1.010	absolute calibration factor
use geometry factor: 1	use geometry factor, 0 is deactivated, 1 is active
geometry factor: 0.714	geometry factor value

auto gain lower: 6	auto gain lower limit
auto gain upper: 85	auto gain upper limit
auto gain enabled: 1	auto gain, 0 is deactivated, 1 is active
master version: 0.9.2	Master software version

{R STAT}
{R STAT} contains the following parameters, separated by tab (\t) or newline (\n)

id: 4653098	A unique number identifying the rotor processor
hum: 31.12	Relative humidity
temp: 28.16	Rotor temperature in °C
5.5 volt: 5.4	5.5 volt value
supply volt: 24.32	supply voltage
rotor state: 1	rotor state, 1 is measure, 2 is impedance
50hz filter: 1	50Hz filter. 1 is enabled, 0 is 500Hz enabled
220nf cap: 0	Pipetracker filter. 1 is enabled, 0 is disabled
100x gain: 1	Gain settings. 0 is 10x, 1 is 100x
version: 0.9.0	Rotor software version

{M STAT}
{M STAT} contains the following parameters, separated by tab (\t) or newline (\n)

id: 2883615	A unique number identifying the motor processor
hum: 43.56	Relative humidity
temp: 28.54	Motor temperature in °C
accel x: 1.03	Inclinometer x-value
accel y: 0.01	Inclinometer y-value
accel z: -0.01	Inclinometer z-value
motor current: 11	motor current
coil current: 0.17	coil current
coil voltage: 27.94	coil voltage
5 volt: 4.33	5.5 volt value

24 volt: 23.68	24 volt value
target rpm: 0	target motor speed
actual rpm: 0.00	actual motor speed
average rpm: 0.00	average motor speed
std rpm: 0.00	standard deviation motor speed
min rpm: 0.00	minimum motor speed
max rpm: 0.00	maximum motor speed
throttle: 0	throttle
comm angle: 0.000000	commutation angle
use stored CA: 0	use stored commutation angle, 1 is enabled, 0 is disabled
version: 0.9.0	motor software version
motor phase current: 0.03	motor phase current

{VECTOR}

{VECTOR} contains the following parameters, separated by tab (\t)

x: 0.470132	Measurement value x-component
y: -0.755581	Measurement value Y-component
E: -6.961971	Electrode polarization
xa: -0.020	Inclinometer x-value
ya: -0.963	Inclinometer y-value
za:-0.086	Inclinometer z-value
len: 922	Received bytes from rotor

{RAWDMP}

{RAWDMP} contains raw measurements from the rotor. {RAWDMP} is followed by 10 values separated by newline (\n)

-336.621908

-336.621651

-336.621422

-336.621190

-336.620852

-336.620497

-336.620268

-336.620156

-336.619807

-336.619441

{HALDMP}

{HALDMP} contains hall sensor samples. {HALDMP} contains the following parameters separated by tab (\t)

H1raw: 1305	Sample from hall sensor 1
H2raw: 2029	Sample from hall sensor 2

Commands

The following commands are available. A command always starts with '#'

Arguments are called with commas in between as in the example below:

#set motor speed,250<ENTER>

set motor speed	- 1 argument: 250/500 RPM
use stored comm angle	- 1 arg: 1 use comm angle stored in motor memory, 0 to calculate in ramp
store comm angle	- Store the current communation angle in memoery
norot	- 1 arg: 1 to start no rotation mode, 0 to stop
direction calibration	- Perform direction calibration (requires the sensor to run)
level calibration	- Perform level calibration when the sensor is perfectly leveled
mounted calibration	- Perform level correction when the sensor is mounted
use dircal	- 1 arg: 1 to enable direction calibration, 0 to disable
use levelcal	- 1 arg: 1 to enable level calibration, 0 to disable
use mounted angle	- 1 arg: 1 to use the mounted andgle correction, 0 to disable it
set rotor mode	- 1 or 2 args: arg 1: measure/counting/impedance
	if 1st arg is impedance a 2nd arg is expected for frequency (float)
use digital filter	- 1 arg: 1 to enable digital 50hz fitler coupling, 0 to disable it
use digital ac	- 1 arg: 1 to enable digital AC coupling, 0 to disable it

| Command	Description
set pt filter	- 1 arg: 1 220nf cap in pipetracker filter, 0 for 10nf
set filter	- 1 arg: 1 for cutoff at 50hz, 0 for cutoff at 500hz
set gain	- 1 arg: 1 for high gain (100), 0 for low gain (10)
mute vectors	- 1 arg: 1 mutes vectors, 0 unmutes them
mute status	- 1 arg: 1 mutes status messages, 0 unmutes them
electrode distance	- 1 arg: X (float), set the electrode distance to X
raw dump	- 1 arg: Dump the last X raw data
hall dump	- Dump the last 900 hall samples
menu	- 1 arg: 1 enables the menu, 0 disables it
motor run	- 1 arg: "start" starts the motor, "stop" stops it
rotor power	- 1 arg: 1 turns on the rotor, 0 turns it off
set control	- 2 args, arg 1: k/p/i, arg 2: value
set baud	- 1 arg,: "low": 19200 "medium": 115200 "high": 1000000
save	- 1 arg, X: Save current settings to slot X (0-4)
load	- 1 arg, X: load settings from slot X (0-4)
erase	- 1 arg, X: erase settings at slot X (0-4)
rotor relative cal	- 2 args, arg1: Deg, arg2: Amplitude, stores calibration with current settings
use rotor relative cal	- 1 arg: 1 to use rotor relative calibration (if available), 0 to ignore rotor relative calibration
rotor absolute cal	- 2 args, arg 1: measured voltage (micro volts), arg 2: rms/amp/pp
use rotor absolute cal	- 1 arg: 1 to use rotor absolute calibration (if available), 0 to ignore rotor absolute calibration
use geometry factor	- 1 arg: 1 to enable geometry factor correction, 0 to disable it
set geometry factor	- 1 arg: geometry factor
set figs type	- 1 arg: fat/slim

How to send commands

Commands can be sent by typing the commands in the terminal window. The other option is to use a computer program to send the command. To send a command, one must send one and one character, not a

complete string. This is because the sensor at the same time writes the characters back to the console. It is recommended to use a 1ms delay between each character written.
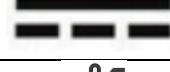
Instructions for interconnection to accessories and other equipment, including indication of suitable accessories, detachable parts and any special materials

The nonmetallic bracket which is delivered with the sensor can be replaced with a custom bracket if needed. Contact FTN for options.
A sliding rail with quick connection is available for the bracket.
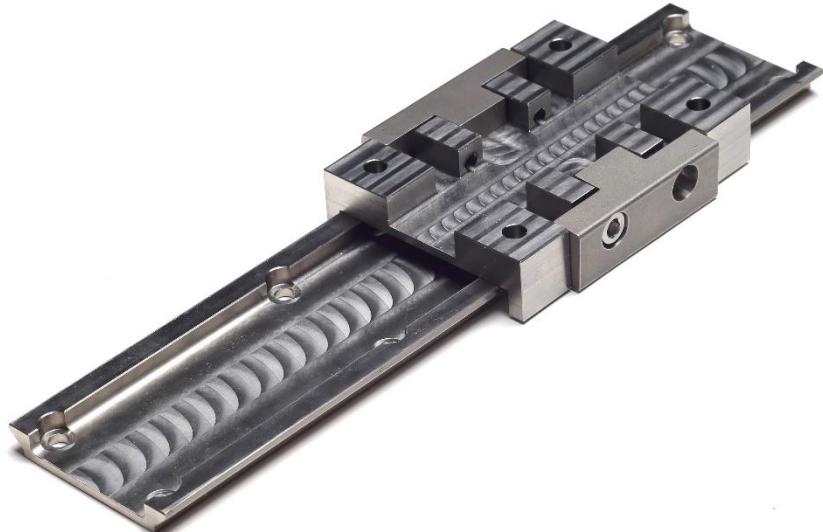
o   Check mounting bracket for damages before use. Replacement brackets can be provided by FTN

Explanations of symbols related to safety which are used on the equipment

SN	Serial number	
CE	CE mark – indicates conformance with the essential requirements of the directive ##NAME OF DIRECTIVE	
	Dispose of the instrument in compliance with local regulations for the disposal of electronic equipment. Do not put in domestic waste.	
	Consult Instructions for use	
⚠	Attention, see the instructions for use	
	Manufacturer	
	Direct current	
	Temperature limitation	

Spare Parts

O-rings:	See part numbers in drawings	
Connecting cable:	Cable assy. TS-CCP-08P-xx-3S-01 both ends of 4 m PUR Signal cable	
Pigtail cable:	Cable assy. TS-CCP-08P-xx-3S-01 on 1 m PUR Signal cable	
Bolts:	See part numbers in drawings	
Brackets:	Quick Mount Bracket, Part No.:	101478
Bracket:	General Mounting Bracket, Part No.:	101260
Oil:	Panolin HLP SYNTH 15	
Filling tool:	MK2 TSAS, Part No.:	212124

D-D (2 : 1)

A-A (1 : 2)

C (2 : 1)

B (2 : 1)

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1		Sensor housing (Customer supply)
2	1		ATM chamber(Customer supply)
3	1		Front lid (Customer supply)
4	1	104838	Penetrator housing for Force Sensor housing MK3 hose interface
5	1	104839	Washer for tube penetrator
6	1	104841	Penetrator flange 9-p
7	1		Insert 9 pin assy
7.1	1	104598	Insert, for soldering pin, PEEK, 9 way
7.2	9	104595	
7.3	1	210588	O-ring 10,00 x 1,50 NBR 70
7.4	18	211552	O-ring 0,74 x 1,00 NBR 70
8	1	104842	Housing for penetrator - Oilfilled RA
9	1	100527	Plug for MK2 fill port
10	2	100600	O-ring 6,20 x 1,00 NBR 70
11	1	104852	Transmark Connector TS-FCR-08P-MING-3S-XX
11.1	2	213118	O-ring 14 x 1,5 NBR70
11.2	1	213117	O-ring 10,7 x 1,1 NBR 70
11.3	1	104851	Housing FCR, - MING interface, TSAS Size 3 connector
11.4	1	211857	O-ring 14 x 1,78 NBR70
11.5	1	211838	O-ring 18,77 x 1,78 NBR70
11.6	1	104607	
11.7	1	213460	
11.8	8	100611	Wire 22AWG 600V
12	1	104840	Nut for Penetrator M12 - Force
13	4	104869	Screw DIN 912 M4x10 Ti Gr.2
14	0,3	211996	Tygon hose F-4040-A ID 3/8" OD 1/2" AAG00027
15	4	210888	Hexagon Socket Set Screw DIN 916 - M3 x 5 Ti Gr.2
16	4	104870	Screw DIN 912 - M3x10 Ti Gr.2
17	2	210712	O-ring 15,00 x 1,50 NBR70
18	1	100464	O-ring 12,42 x 1,78 NBR70
19	1	104844	O-ring 20,00 x 2,0 NBR70
20	1	104025	O-ring 13,50 x 1,50 NBR70
21	4	212468	O-ring 12,00 x 1,00 NBR 70
22	1	104836	Bend RA Murene MK3 fittings 8mm
23	2	211888	Nut M16x1,5 for fittings Murene MK2 8 mm
24	2	104740	Crimp sleeve for Tygon hose ID8mm
25	1	211887	Insert Murene MK3 fittings 8 mm
26	1	105122	Distance piece for insert

Ø82

54,1   320,9

62,55

65

8	29	Nuts, Titanium Gr.5	ISO 4161 - M5
8	28	Socket head bolts, Titanium Gr.5	ISO 4762 - M5 x 20
1	24	Quick Mount Bracket	101478
QTY	ITEM	TITLE	PART NUMBER
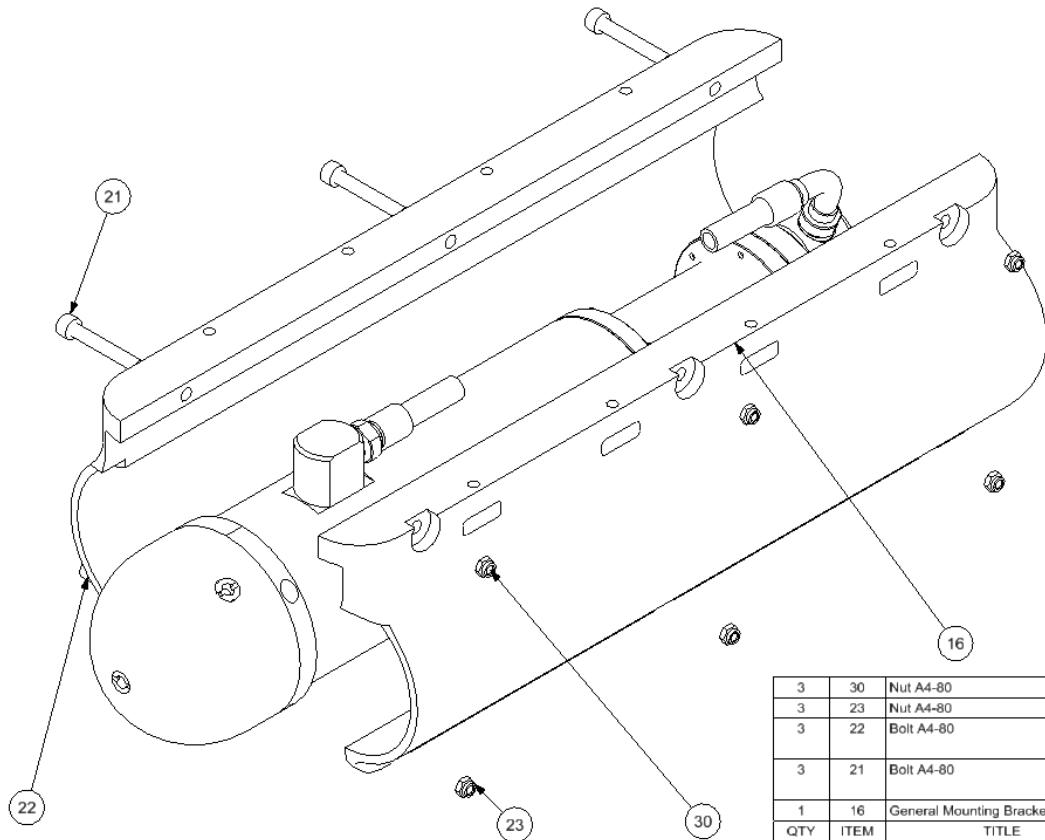
3	30	Nut A4-80	DIN 985 - M5
3	23	Nut A4-80	ISO 7042 - M5
3	22	Bolt A4-80	ISO 4762 - M5 x 16
3	21	Bolt A4-80	ISO 4762 - M6 x 40
1	16	General Mounting Bracket	101260
QTY	ITEM	TITLE	PART NUMBER

2	31	O-ring 6,20 x 1,00 NBR 70	100600
1	7	Plug for MK2 Fill Port	100527
QTY	ITEM	TITLE	PART NUMBER
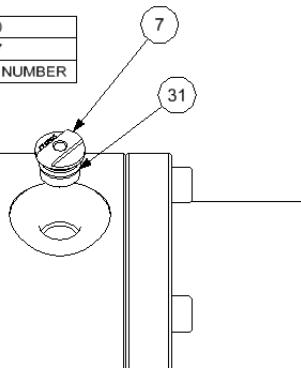
6	18	Bolt Titanium Gr.5	ISO 4762 - M4 x 16
6	15.7	Bolt Titanium Gr.5	ISO 4762 - M4 x 16
2	15.2	O-ring NBR70	BS 4518 - 0586-24
QTY	ITEM	TITLE	PART NUMBER
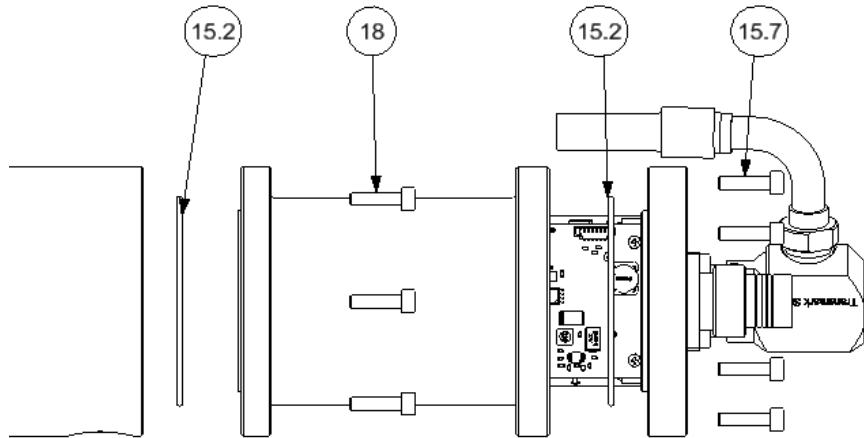
| 3 | 20 | Electrode cap | 314-20653.202 |
| QTY | ITEM | TITLE | PART NUMBER |

| 1 | 32 | O-ring, NBR90 | Parker 3-905 |
| QTY | ITEM | TITLE | PART NUMBER |
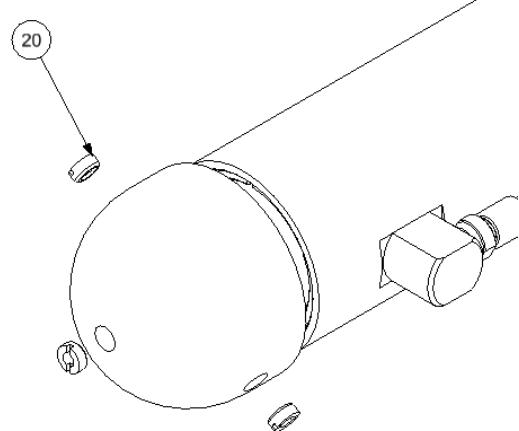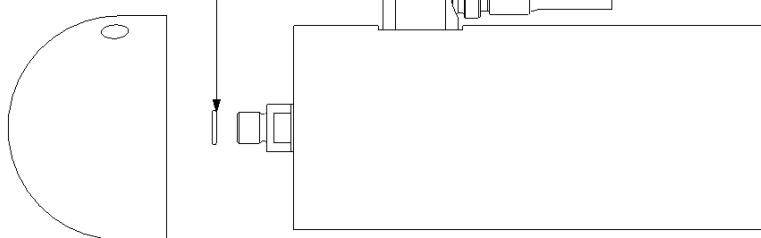
QTY	ITEM	TITLE	PART NUMBER
4	14.7	Bolt, Titanium Gr.5	ISO 4762 - M3 x 8
1	14.6	Seal cap	101326
1	14.5	Oil Seal	TXMF000389_A
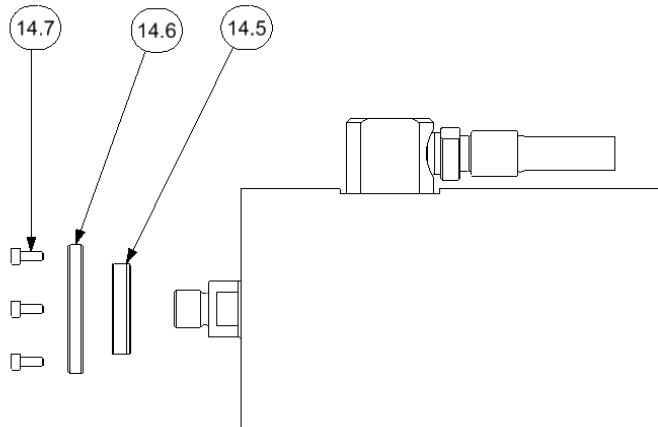
QTY	ITEM	TITLE	PART NUMBER
1	14.2	O-ring, NBR70	BS-230, 63,09 x 3,53 N2705
1	14.1	Bearing holder	101206
1	8	Lock ring	101208
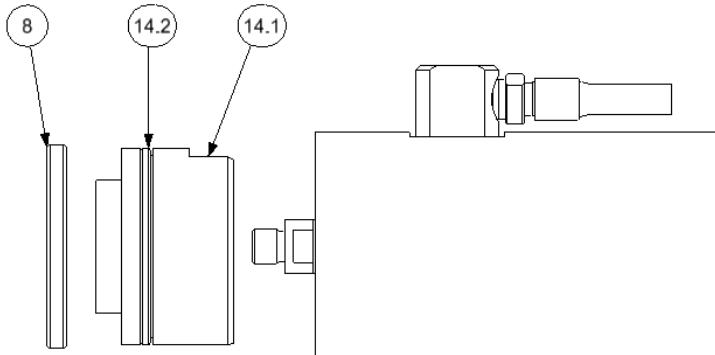
QTY	ITEM	TITLE	PART NUMBER
4	1	O-ring 14 x 1.5 NBR70	213118
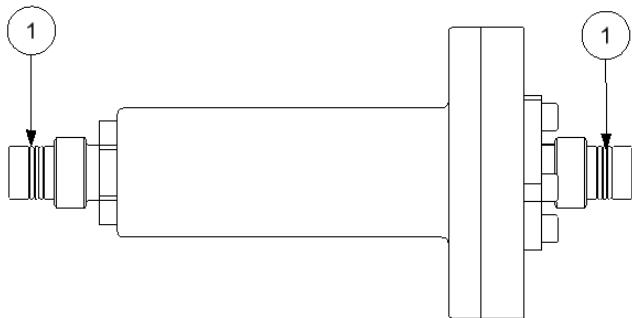
MAINTENANCE

Cleaning

After every use.

To clean the sensor, perform the following steps:

1. Keep the cables connected to the receptables or us a dummy-connector to keep the receptable pins dry. Clean the sensor in cold freshwater. Use a hose to hose off any seawater and salt remnants. Dry off with paper towels or leave to dry.

2. Remove electrode caps and carefully remove the cotton plugs. Rinse with clean fresh water.
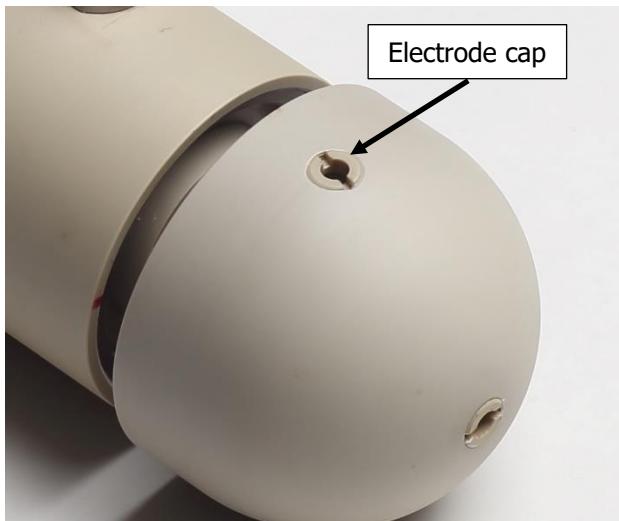
3. Use a clean Q-tip soaked in isopropyl alcohol to carefully wipe of the surface of the electrodes. Leave to dry and mount new cotton plugs and remount the electrode caps.

Sensor head
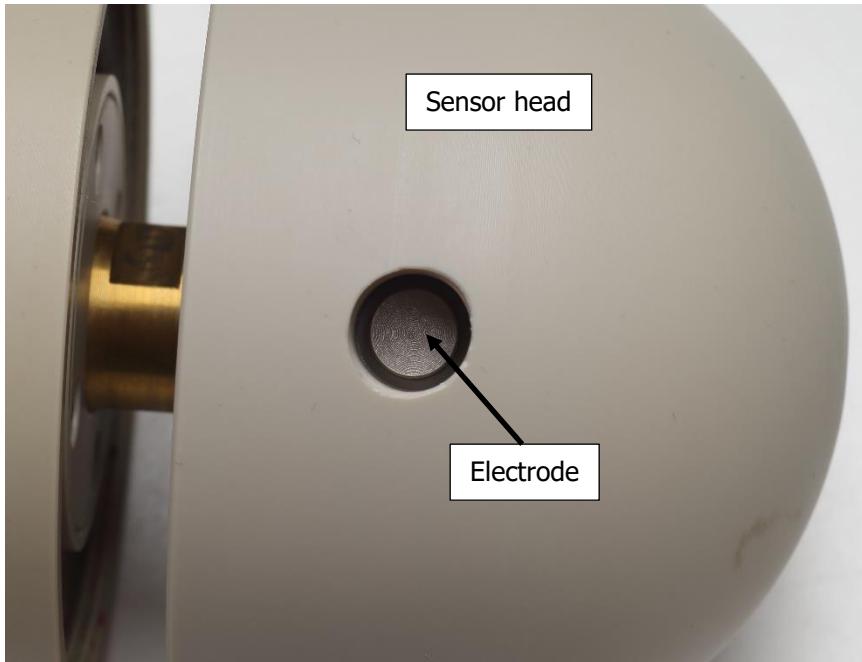
Electrode

4. For special cleaning, skip part 3 and place the sensor head in an ultrasonic bath with isopropyl alcohol for 2 minutes. Leave to dry and mount new cotton plugs and remount the electrode caps.

5. Cleaning of receptables: remove connector and O-rings and clean the receptable with a soft cloth soaked in isopropyl alcohol.

6. Wipe off O-rings, check for damage, replace if necessary, add O-ring grease and mount O-rings on receptable.

Regular Maintenance

After every survey or after every 150 hours use, whichever comes first:

1. Check for oil leakage around
   o Shaft seal

Shaft seal
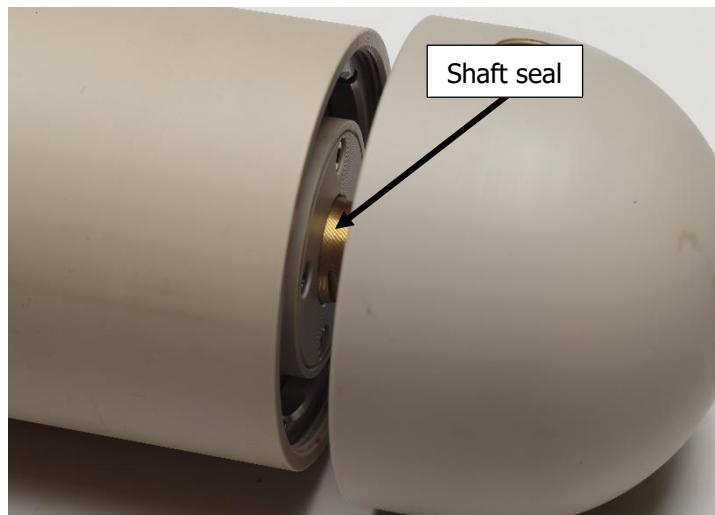
o Oil-fill plug on motor housing

o Oil-fill plug on penetrator
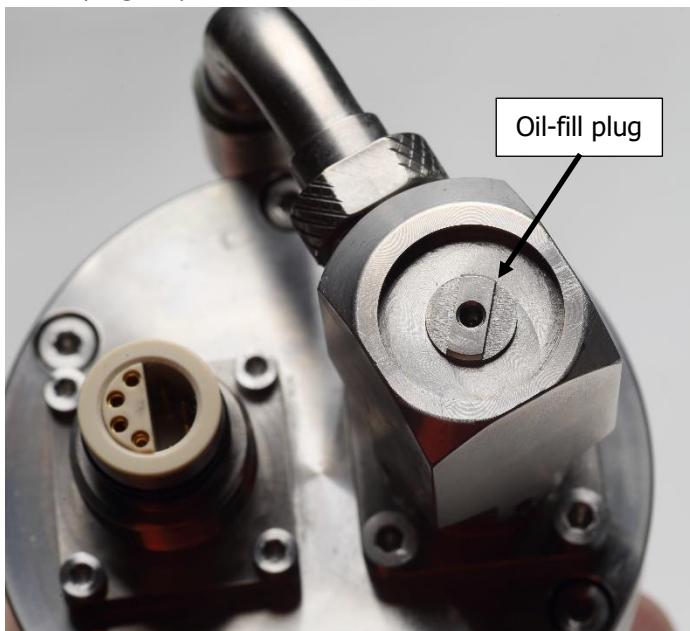
o Around oil-filled hose

Oil filled hose
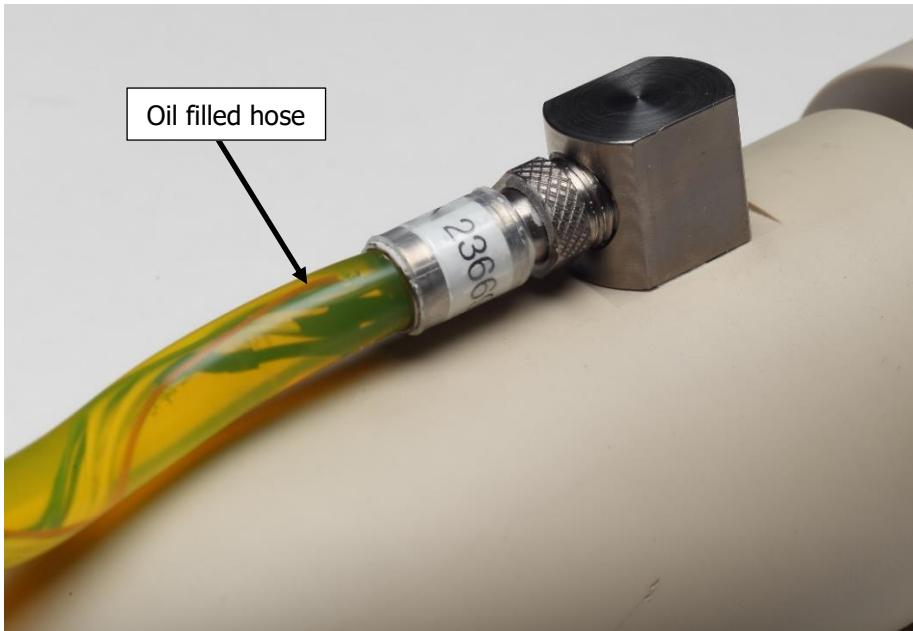
o   Between motor housing and electronics housing
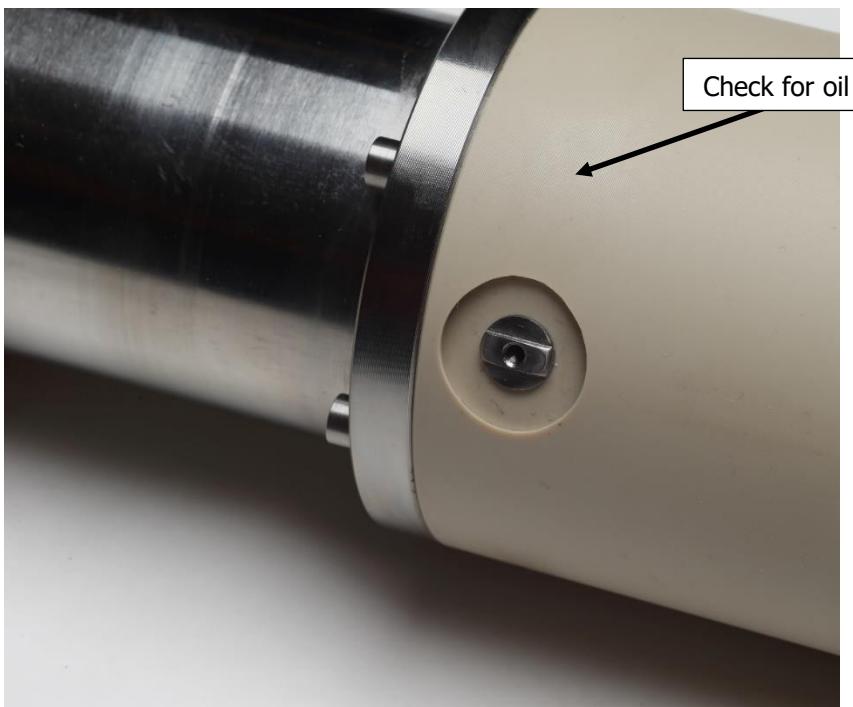
Check for oil

2. Check for damage to cables and connectors. Any damaged cable must be replaced. Failure to replace damaged cables can result in damage to the sensor and loss of function of the sensor. Contact FTN for replacement cables.
3. Check that no bolts are loose. M3 bolts shall be tightened to 1.8Nm and M4 bolts shall be tightened to 4.3Nm in the lid and 3.5Nm to the motor housing.

Warning! Do not replace bolts! The bolts are made specifically for this sensor. Replacement of bolts made from other materials and /or other specifications may lead to water ingress and erroneous measurements. Replacement bolts can be obtained from FTN.

Note: If any leakage is found, **contact FTN for service**. Unrepaired leakages will result in loss of oil and possibly loss of function of the sensor.

Note: Do not attempt to refill hydraulic oil without proper tools. Filling tool MK2 TSAS, Part No.: 212124 shall be used for filling and re-filling of hydraulic oil. Follow the user-manual for the filling tool. Follow the safety data sheet on the oil for protective measures.

Note: Do not attempt to replace O-rings other than on the connectors. After replacement of O-rings on the pressure bearing components, the sensor shall be pressure tested in 3.5wt% salt water for 30min at 300bar following a complete function test in a test test-rig. These tests must be done at FTN.

Integration into systems

For mounting and use of the sensor on ROV's and AUV's, please refer to the FiGS Generic Method Statement provided by FTN

Label / Marking for model identification

The sensor and power bottle are marked with the following tags and symbols.

On Sensor

On Power bottle