

User Guide

EX GEN II ATEX, IECEX, US/C, UKEX

OQSx-G2 HAZ Sensor



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DEFINITIONS

WARNING: Risk of injury or death.

CAUTION: Risk of damage to objects

IMPORTANT: Important information

TABLE OF ACRONYMS

MOT - Mobile Oil Tester Kit	TBN - Total Base Number	LHS - Left Hand Side
FSH - Full Spectrum Holistics	UKCA - UK Conformity Assessed	PDO - Process Data Object
OQS - Oil Quality Sensor	FAQ's - Frequently Asked Questions	ENC - Electronic Navigational Charts
TDN - Tan Delta Number	BS - British Standard	Ts&Cs - Terms and Conditions
TAN - Total Acid Number	RHS - Right Hand Side	

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DISCLAIMER

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain. Always ensure the correct configuration, installation, and connection of the sensor in accordance with these instructions prior to any use.

The information contained within this manual affects your legal rights, responsibilities, and safety. Failure to read and follow any instructions and warnings contained within this document may result in a serious injury to yourself or others, damage to your Tan Delta Systems product(s), or damage to other objects.

By installing and using your Tan Delta Systems product(s), you are agreeing that you acknowledge and understand this disclaimer and warning.

Tan Delta Systems accepts no liability for damage, injury or any legal responsibilities incurred directly or indirectly from the use of this product. The user shall at all times observe safe and lawful practices including, but not limited to, those set out in this document and any associated reference documents.



AMENDMENT RECORD SHEET

Version Number	Amendment(s)	Amended by	Date
1	New document	S Rickards	02 December 2024



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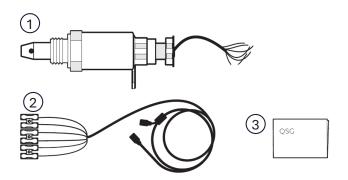


1 PRODUCT INFORMATION



Check that your kit contains the following items:

What's in the box Product Code: SENSE-1-BS1		
Item	Description	
1	Oil Quality Ex-Sensor OQSx-G2 HAZ	
2	Ex-Sensor Configuration Cable - Cable X	
3	1 x Quick Start Guide & Warranty	



1.2 Important Safety Notes

Pay attention to following safety notes:

- Never reassemble, repair or tamper with the Sensor.
- Make sure that the supply voltage is within the specified range.
- Make sure that the load currents do not exceed the rated value.
- Make sure that an explosive atmosphere **is not present** when connecting/disconnecting the Sensor.
- Check all the wiring for correct connection before powering the unit.
- Make sure that the sensor case is earthed and power connected as detailed in 1.3 Additional Ex Notes.
- The unterminated end of the integral cable **must** be terminated in a receptacle meeting an ingress protection rating of IP20.
- The equipment **must** be installed in a manner that any heating from the process connection does not exceed the ambient temperature assigned to the equipment.



1.3 Additional EX Notes

- 1) Working Voltage (peak value) must be less than 28.8 V d.c, or 24 V d.c. + 20%.
- Sensor must be powered using an IEC / EN 60950-1 compliant power supply, or through a suitable EX barrier (e.g. MTL5522) which is earthed to the Equipotential Bonding System and from a power supply with negligible output series inductance.
- 3) Any additional interface circuits monitoring the serial outputs or the 4-20 mA analogue outputs must be similarly IEC / EN 60950-1 compliant or through a similar EX barrier.
- 4) The sensor body must be directly screwed into the earthed body of the machine on which it is used, or earthed pipework and fittings in the lubrication system for such machine.

Insulating bushes or adaptors must not be used.

Ensure the sensor case is earthed using the earthing lug on the sensor connected directly and at a single point to the Equipotential Bonding System.

- 5) The manufacturer confirms that the verifications necessary to ensure that the electrical equipment complies with the documentation will be carried out. All manufacture is to be carried out using a fully ISO 9001 compliant sub-contractor and full documentation retained for both the manufacture and testing process. Compliance is guaranteed by design for all electronic and mechanical components and by process for the overall manufacture.
- 6) The equipment is prefabricated with an unterminated integral cable i.e. flying leads which is nominally supplied in a 2 m length but can be provided up to a maximum length of 10 m.
- 7) The equipment is supplied by an intrinsically safe source and is supplied with the terminal parameters:

Ui = 28 V

- li = 142 mA
- Pi = 1.90 W Ci = 1.08 nF

Li = 7.22 µH

For Class 1, Division 2 applications the equipment should be supplied by a suitably certified Power Source and the non-incendive output parameters do not apply.

The equipment is also intended for use in process temperatures no greater than the stated ambient temperature range of the product.

Any deviation from the above parameters requires input from Tan Delta Systems plc.

Where:

Ui≥Uob.

li≥loc.

Pi≥Pod.

 $Ci \leq Co + C cable$

 $Li \leq Lo + L cable f.$

Ci and Li on the terminal parameters include capacitance and inductance of integral cable up to a maximum length of 10 m.

8) The equipment is also intended for use in process temperatures no greater than the stated ambient temperature range of the product.

Any deviation from the above parameters requires input from Tan Delta Systems plc.



1.4 External Marking on product or in accompanying documentation

1.4.1 In accompanying documentation:

- a. Name and address of manufacturer.
 Tan Delta Systems plc.
 1 Carrera Court, Church Lane,
 Dinnington, South Yorkshire S25 2RG
- Manufacturer's type identification.
 OQSExISG2 EX GEN II OIL QUALITY SENSOR
- c. Serial Number nnnnnn (e.g. 1234567)
- d. Certificate Numbers

SGS22ATEX0059X

IECEx BAS 22.0033X

SGSNA/22/CA/00013X

BAS22UKEX0171X

e. Specific Ex Marking

See Certification Marking Options below:

1.4.2 On Product:

Certification Markings:

There are 5 options for Certification Markings of this product. These are displayed below. Unless requested otherwise by the customer, the default Certification Label will be applied to the product.

It is critical the customer checks which marking refers to their application.



And elsewhere on Product:-S/N 1234567

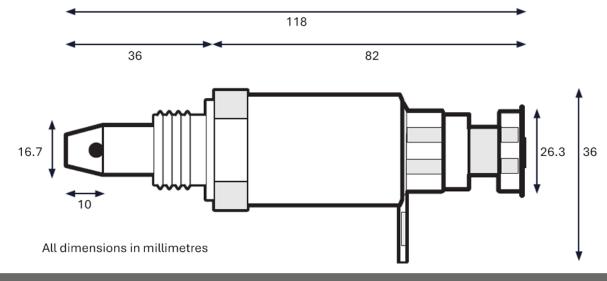
401-022

SGS22ATEX0059X

BAS22UKEX0171X 40 SGSNA/22/CA/00013X



1.5 Physical Dimensions



Approximate dimensions that may change. Illustrations not to scale.

Fig. 1-1 Probe Dimensions

Thread Dimensions			
Product Code	Description	Thread Length	
NP1	Body ¹ / ₂ in NPT	Nose diameter 16.7 mm Insertion Length 36 mm	
BS1	Body 1/2 in BSPP Flat Faced	Nose diameter 16.7 mm Insertion Length 36 mm	
UN1	Body 7_8 UNF	Nose diameter 16.7 mm Insertion Length 36 mm	
M18	Body M18	Nose diameter 16.3 mm Insertion Length 36 mm	
		Nose diameter 16.7 mm Insertion Length 61 mm Long	
Cable X	Overall cable length	2 m (nominal)	
NA	Strip Back Sheath	50 mm	
NA	Strip and Tin	5 mm	

() NOTE:

The M6 lug must be connected by 4 sq. mm minimum earth cable to the equipotential bonding system.



2 TECHNICAL SPECIFICATION

Environmental Specifications			
Protection Rating	IP68		
Operating Temperature	-20°C to +120°C		
Fluid Temperature	-20°C to +120°C		
External Pressure	0 bar to 20 bar		
Fluid Pressure	Up to 70 bar		

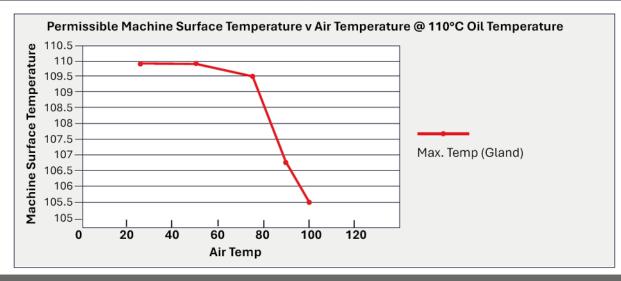


Fig. 2-1 Temperature Graph

Physical Characteristics			
Material	Stainless Steel AISI304		
Dimensions	118 mm x 45 mm (L x W)		
Weight	160 g		
Thread	1/2 in BSPP / 1/2 in NPT / 7/8 in UNF,		
	All use Spanner size 32 mm Hex		
Seal	DOWTY Seal for BSPP, no seal for NPT, O-ring for UNF		
Connectivity			
General	Glanded cable entry to 10.0 m cable for termination inside EX junction box		
Electrical			
Power Supply	10 - 28.8 V DC		
Power Consumption	Average 0.4 W continuous 30 mA		
Data Output/Input			
Analog Output	2 x 4 - 20 mA (current sourcing, active output)		
Digital Output	1 x RS485:9600 baud half duplex		



Range and Accuracy			
Sensor oil quality normal operating range	- 10 % to + 30 % loss factor		
Sensor oil quality accuracy/repeatability	+/- 3 % loss factor		
Sensor temperature normalisation accuracy	Pre V 2.4 +/- 3 % loss factor		
	Post V 2.4 +/- 1.5 % loss factor		
Sensor oil temperature normal operating range	-20 °C to + 120 °C		
Sensor oil temperature accuracy	+/- 3% of full range (+/- 4.2 °C)		
Sensor internal temperature operating range	-20 °C to +120 °C		
Sensor internal temperature accuracy	+/- 3% of full range (+/- 4.2 °C)		
Sensor 4-20 mA accuracy	+/- 1% of full range (+/- 0.2 mA)*		
Standards and Approvals			
	BS EN 60529:1992+A2:2013 IP68 Dust and Water Ingress.		
	BS EN 60068-2-30:2005 Cyclic Humidity.		
	BS EN 60068-2-6:2008 Sine Vibration.		
	BS EN 60068-2-27:2009 Mechanical Shock.		
CE marked:	EN 61000-6-4:2007 Generic Emissions Standard for Industrial Environments.		
	EN 61000-6-2:2005 Generic Immunity Standard for Industrial Environments.		
	EX approval to BS EN 60079-0: 2018 and BS EN 60079-11:2012		



3 SENSOR CONFIGURATION

IMPORTANT: (!)

You must configure the sensor to your specifications using the Tan Delta Configuration and Data Management Software (CADS).

Install CADS by going to: www.tandeltasystems.com/support/ and following the link to download.



The CADS application **must** be installed on a windows PC or laptop.

CADS does not operate on Mac or Chromebook devices.

3.1 Set Up

3.1.1 Install the CADS application onto a PC / Laptop

- 1) Install CADS by accessing www.tandeltasystems.com/support/
- 2) Follow the link and download.
- 3) When prompted, select **Open folder** to view files.
- Launch the **setup.exe** file and follow the instructions in the setup wizard. 4)
- 5) When prompted, click on Install.

When installation is complete, CADS is displayed.

It may take up to a minute for the software to identify the OQSxG2-HAZ.

Allow the PC/laptop to automatically update drivers, if needed. 6)

3.1.2 Start the software

Start the CADS application and wait for the home screen to load.

(!)NOTE:

If sensors are configured to Modbus/CANbus, you must open the software first, and then connect the Sensor.

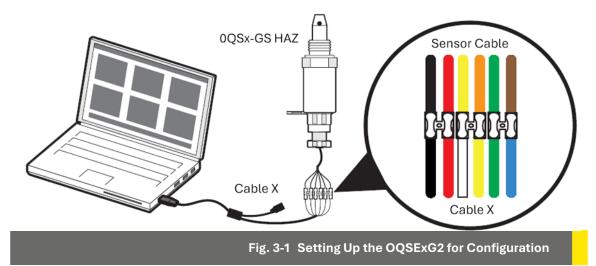


3.1.3 Connect the OQSxG2 HAZ

CAUTION:

This must be done in the Safe Area, not the Hazardous Area, as the Configuration Cable is not EX certified.

1) To connect the OQSxG2 HAZ to the configuration cable, connect the wires as shown in Fig. 3-1.

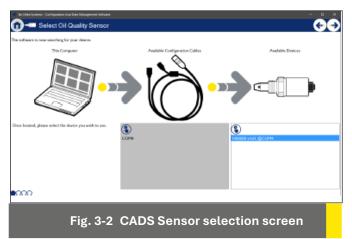


3.1.4 Select your Sensor

CADS will display a list of all connected devices, identified by serial number, as shown in Fig. 3-2.

- 1) Select the required device.
- 2) Click the arrow in the top right corner to proceed





3.1.5 Communication Settings

The next screen lists the options for the device to which you are connecting the sensor, as shown in Fig. 3-3:

- **Oil Quality Display Express** sets the sensor to use our proprietary RS485 communications protocol.
- Oil Quality Telemetry Gateway This sets the sensor to CANbus for use with our legacy range of gateway devices operating on CANbus.

Make sure that the sensors are numbered uniquely from 1-10.

teral Number 1911



I NOTE:

If you are using the sensor with the OQTg, the Node ID must be set uniquely to each sensor, numbered 1 to 16.

This also applies if the sensor is being used on a data bus with more than one sensor.

I NOTE:

The newer versions of the SENSE-3 Gateway Device are supplied configured for Modbus and therefore require Custom Communications Settings.

• **Custom Communications Settings** – Allows you to select custom **Node ID** and **Bit Rate** for RS485, CANbus, J1939, Modbus RTU.

(!) NOTE:

CANbus Self Starting allows the sensor to power up straight into Operational mode and begin sending Process Data Object (PDO) responses without validation from a CANopen master.

This means that the sensor can be used on systems without a full CANopen master.

3.1.6 Advanced Settings

This function uses hysteresis to reduce the noise caused by changes in the oil such, as temperature.

In order for the algorithms to settle, the sensor must go through at least one 'thermal cycle' of the application. This simply means running the machine from standby until it reaches its highest normal operating temperature.

Hide Advanced Settings				
Smoothing of the oil Disabled	condition output	O Medium	O High	
	F	ig. 3-4 Advance	ed Settings	

We recommend that you start with the filter disabled and run the sensor in-situ for a few weeks (definitely over a few thermal cycles of the application). If the data is relatively smooth leave the smoothing disabled, if not, enable the smoothing.

3.1.7 Oil Configuration

This page allows you to select any oil from our database.

The boxes at the top of each column allow you to either search or filter the database with the dropdown menu or type directly into the box.

If the oil you require is not in the database, please contact support@tandeltasystems.com for help.

Condition value for end of For accurate readings, plea Selected Oil: Chewron, I	are relect the oil that you'll be	ating this sensor with.		Restore O	Serial Number 1900 Firmume Vertion 4
Masufacturer	Oi Name	Viscosity	Application	Hin. Temp. ('C)	Has. Temp. ('C)
Ouaker State	1	5008	Synthetic	-35.0%	135.070
Vell	Haller H005	15W40	Engine	-35#°C	125.0°C
Olewoo	Delo LE 710	200040	Engine	-35470	125.070
Mobil	DTE 88	201111	Gear	-35#°C	1160°C
Mobil	Gear SHC XMP	320	Gear	-35.0°C	125.070
Modul	Gener 640 XP	320	Gen	254%	135.0°C
Forroase	CELLH 0-3		Engine	-35.0°C	125.0°C
Reviewe	Ashless Hydraulic 46		Hydraelic	-25 #°C	125.0°C
Chevron	Delo LE 400	1599/40	Ergino	-35.8°C	121.0°C
Patronas	Akcella Unitek CK4	100/40	Engine	-25.#*C	122.0°C
Castrol	PH-P 154		Ergine	-35.0°C	115.0°C
Masterdraw	B8306 HV		Machining	-25.0°C	120.0°C
	Gaard PM30		Preise	-31.810	116.07



4 INSTALLATION

4.1 Precautions

Read these instructions **before** installing the oil quality sensor. The sensor is designed to be robust, however it can be damaged by mistreatment.

The following must be noted:

- The sensor must be powered using an EN6950 compliant power supply, or through a suitable EX barrier which is earthed (1) to the Equipotential Bonding System and from a power supply with negligible output series inductance.
- Any additional interface circuits monitoring the serial outputs or the 4-20 mA analogue outputs must be similarly EN6950 compliant or through a similar EX barrier.
- The sensor body must be directly screwed into the earthed body of the machine on which it is used, or earthed pipework and fittings in the lubrication system for such machine.
- Insulating bushes or adaptors must not be used.
- Ensure the sensor case is earthed lising the earthing lug on the sensor connected directly and at a single point to the Equipotential Bonding System.
- Working Voltage (peak value) must not exceed 28.8V d.c, or 24V d.c. + 20%.
- Install the sensor into the equipment before attempting electrical/wiring connections.
- To avoid thread damage, make sure that you use fittings with the correct thread size.
- Do not attempt to screw or tighten the sensor using the body.
- Always use the "Hex" head with the correct size spanner (32 mm). Do not overtighten.
- Do not twist the cable relative to the sensor head.
- Keep away from sharp edges which may cut into the cable.
- Minimum cable bend radius = 67 mm.
- Where possible, keep the cable away from sources of heat, (such as an engine block), and electrical interfaces.



4.2 Choosing the Sensor Mounting Location

The performance of the sensor will be enhanced through careful consideration of the mounting location.

The following guidelines must be followed:

- Whenever possible, the sensor **should not** be mounted in the bottom of a sump, as the sensor head may become restricted which will prevent correct operation.
- Dynamic oil flow is necessary; do not mount in places where the oil is likely to stagnate or be static, since the oil in the sensor needs to be representative of the whole system.
- When the oil quality sensor is mounted in a pipeline, make sure that the sensor will not restrict flow.
- When mounting the oil quality sensor in a lubrication system, for maximum performance, make sure that the sensor is located prior to the oil filters, oil coolers etc. to ensure oil is representative of the whole system.

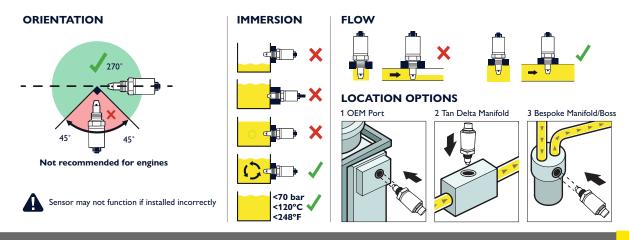


Fig. 4-2 Choosing the Sensor Mounting Location

4.3 Fitting Method

- Use a 32 mm Torque-adjustable spanner for installation.
- Decide on an appropriate location for the sensor head installation.
- Drain the lubricant sufficiently to allow the sensor to be fitted.
- Install the sensor head into the selected location/position. Torque to 20 Nm, being careful not to over-tighten.
- Route the cable, fixing it with cable ties at appropriate intervals.
- Avoid sharp edges and hot surfaces.
- Connect the sensor to the chosen interface.



→ 4.4 Electrical Connection

4.4.1 Power Supply

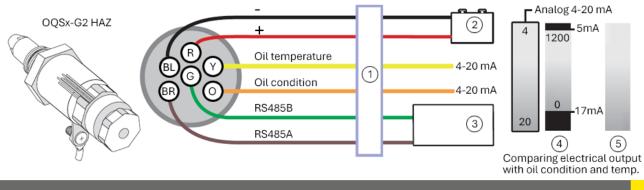


Fig. 4-3 Wiring Diagram for Power Supply & Data Output (Inc 4-20 mA)

Item	Description	Item	Description
1	ATEX Barrier	4	Oil TDN
2	BS1 10 - 28.8V DC	5	Oil Temperature °C
3	Digital RS485 Modbus CANbus		

4.4.2 Connecting to a Tan Delta OQDe

CAUTION:

The OQDe is **not** EX certified, so it must be mounted **outside** the Hazardous Area.

- Connect the OQSxG2 HAZ to the left-hand connector of the OQDe. This requires a Tan Delta OQDe Cable ExSD (various length versions available) and suitable EX Zener barrier, which must be earthed to the Equipotential bonding system.
- 2) Connect the Sensor cable RS485 wires (green, brown and black) via an EX certified Junction Box to a suitable EX isolating or Zener barrier.
- 3) Connect the safe-area Zener barrier pins to the OQDe Cable ExSD.
- Align and slot in the 6-pin connector to the OQDe and then tighten the connector screw-cap. Refer to the OQDe User Guide for further information about OQDe wiring colours, setup and configuration.

4.4.3 Data Output

You can use the output from yellow and orange wires to provide analog indication of the oil temperature and condition on other, third party, data acquisition and control systems.

4.4.4 Using the Oil Condition analog output

Oil condition is output on the orange wire as a Loss Factor Percentage and is linearly scaled from -20% (4 mA) to 60% (20 mA). Loss Factor Percentage can easily be converted to the TDN scale using the table in **Appendix 1**.

A clean oil should provide an output of about 8 mA.

For most applications, we recommend setting a warning alert for a value of 13 mA and an alarm notification for values over 14 mA.

Any value below 4 mA indicates a fault. This output must be connected via a suitable isolating or Zener barrier if the monitoring equipment is mounted in the safe area.



For some common applications, illustrative warning and alarm values are shown in Fig. 4-4. Any value below 4 mA or above 20 mA indicates a fault.

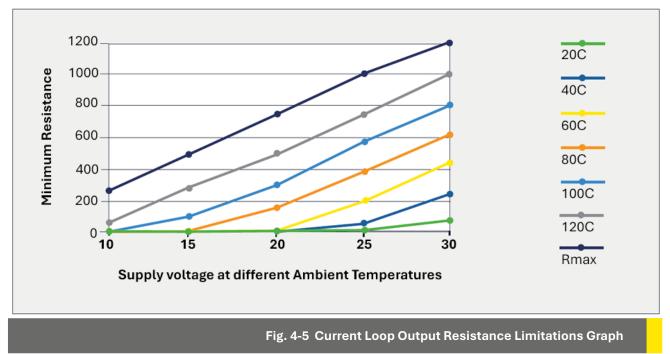
	Engine (e.g. Diesel)	Gas Engine	Hydraulic	Compressor	Transmission
High Alarm	5.6 mA	5.6 mA	6.4 mA	7.7 mA	6 mA
	(1140 TDN)	(1140 TDN)	(1060 TDN)	(1050 TDN)	(1100 TDN)
High Warning	6.4 mA	6.4 mA	7 mA	7 mA	7 mA
	(1160 TDN)	(1160 TDN)	(1000 TDN)	(1000 TDN)	(1000 TDN)
Condition OK					
Low Warning	13 mA	9.4 mA	9.4 mA	10.5 mA	10 mA
	(400 TDN)	(760 TDN)	(760 TDN)	(650 TDN)	(700 TDN)
Low Alarm	14 mA	10.4 mA	10.4 mA	11 mA	12 mA
	(300 TDN)	(660 TDN)	(660 TDN)	(600 TDN)	(500 TDN)
Fig. 4-4 Generic Warnings / Alarms (Inc 4 - 20 mA)				nc 4 - 20 mA)	

4.4.5 Using the Oil Temperature analog output

The analog output on the yellow wire provides a linearly scaled measure of Oil Temperature in °C between -30°C (4 mA) and +130°C (20 mA). See **Appendix 2**.

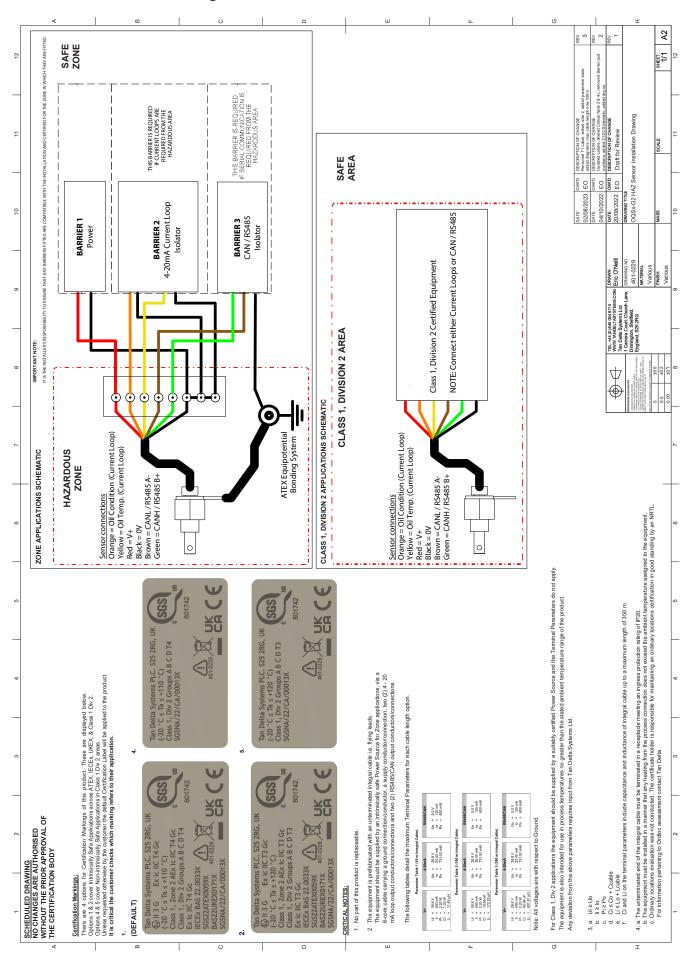
This output must be connected via a suitable isolating or Zener barrier if the monitoring equipment is mounted in the safe area.

For both analog outputs, in order to avoid excessive power dissipation inside the sensor, ensure that the 4-20 mA current sense resistances fitted to the third party monitoring equipment/Zener barrier are greater than the values in the graph as shown in Fig. 4-5.





4.4.6 Ex-Sensor Drawing





5 SENSOR CLEANING & MAINTENANCE

CAUTION:

For accurate results during testing, it is vitally important to do any test using a clean sensor.

Any oil residue from a previous test **MUST** be removed.

To clean the sensor:

- 1) Clean any excess oil from the end of the sensor with absorbent paper.
- 2) Remove the remaining oil by spraying Loctite 7063 cleaner into each of the four holes at the end of the sensor, and all over the outside of the tip.
- 3) Give a general exterior wash on both sides as shown in Fig. 5-1.
- Give a longer blast into the centre hole (2 seconds).
- 5) Give the sensor a sharp shake to dislodge any solvent remaining around the electrode.



Fig. 5-1 Cleaning the Sensor

6) Leave to dry for at least 1 minute.



*Loctite 7063 Solvent Cleaner Recommended Other low residue cleaners may also be suitable, please refer to your distributor for more information. See Section 5.1.

(!) NOTE:

The sensor does not require cleaning once it has been installed, unless the application is relatively high in particulate contamination.

5.1 Cleaning Procedure – Using Odourless Kerosene

- 1) Unplug and remove the sensor then use absorbent paper to wipe off the excess oil from the sensor tip and thread.
- 2) Attach a bottle adaptor to a sample bottle and pour in approximately 15ml of kerosene.
- 3) Screw in the sensor and shake vigorously for 2 minutes to ensure the kerosene washes up around the tip of the sensor.
- 4) Remove the sensor from the adaptor and shake rigorously over the absorbent paper to dislodge any excess kerosene.
- 5) Leave to dry for a few minutes.



6 SUPPORT

🕘 6.1 FAQs

If you have any issues, please read the tips below before contacting us for further support.

1) Where are the Cable X drivers?

The drivers for Cable X should install automatically.

2) How do I update the software?

Software updates will be made available periodically by Tan Delta. You can check for updates in the software settings. If you are provided with an installer by Tan Delta, please uninstall any previous versions of software before installing the new one.

3) Can I use the Software with Tablet devices or Mac devices?

The software is currently written for PCs using a Windows 10 OS or newer only, it can be used on Microsoft Surface devices by enabling third party apps to be installed.

Note: you may need a USB A to USB C adapter depending on the USB ports on your device.

4) Does the sensor require cleaning?

Cleaning is **not required** once the sensor is installed. However, when using the sensor for testing offline samples (i.e. MOT Kit), then cleaning between samples is essential.

5) Can I use other cleaning substances to clean my sensor?

We recommend using either a zero-residue solvent cleaner or odourless kerosene to clean.

The sensor is tested with Loctite SF 7063 and odourless kerosene.

Similar formula cleaners are available, please contact Tan Delta for advice or guidance.

IMPORTANT:

Do not use water or detergent based cleaners as these may react with any oil deposits and may not clean the sensor correctly.

6) Where can I obtain the EU and UK Declaration of Conformity? The Declaration of Conformity (EU and UK) for the product are available on the USB supplied and can also be downloaded online at www.tandeltasystems.com/products/oqsxg2hazsensor.

7) I need help sourcing a suitable ATEX Barrier for my application?

Contact support@tandeltasystems.com and we will be happy to help.

 (\rightarrow)



6.2 Troubleshooting

lssue	Resolution	
Software will not load	Incorrect installation. Install the software again using full administrator privileges.	
Software cannot locate configuration cable	Check cable is not damaged and is plugged into an active USB port on your PC.	
	Check that the USB port is set as an active COM port in your PC settings.	
	Check to ensure the cable drivers are installed on your PC.	
Software cannot locate sensor	Check the sensor is connected to your configuration cable and that the configuration cable has been located by the software.	
The oil I am using is not listed in the oil database	The sensor uses a known oil database to configure the sensor for each test.	
	If you need a new oil adding to the database, we will need to profile the oil.	
	See the Tan Delta website for details of our oil profiling service.	
Test result is different to what I	Clean the sensor thoroughly using the instructions in this manual.	
expected	Take a new sample of oil from a sample port that has live oil and re-test.	
	If the result is the same then the result is accurate.	
There is no oil condition data in my test result (fields are greyed out)	The visual inspection reported that the oil condition is poor / visibly contaminated.	
	This result means that the oil is not in a usable condition and action should be taken straight away.	
There is no value for estimated remaining hours given	Check the expected oil hours and hours used fields are completed in the test setup.	
	Complete these fields and run the test again.	



7 SOFTWARE USER AGREEMENT

IMPORTANT:

Please read carefully before using the Software.

Your use of this computer program is subject to the terms and conditions of the following Software User Agreement. If you do not wish to accept these terms and conditions, do not install or use this Software and please return this Software to the place you obtained it for refund.

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8 APPENDIX 1

Oil Condition Conversion Chart

The table below gives illustrative and guideline figures only.

For further advice on setting your alarms, contact our support team

www.tandeltasystems.com/support/

Number Format

TDN = Always 4 digits Conversion 4 - 20 mA to TDN = (mA -17) * -100

4 - 20 mA	TDN	Alarm Setting
<4		
4 mA	1200	
5 mA	1200	High Alarm
6 mA	1100	High Warning
7 mA	1000	
8 mA	0900	
9 mA	0800	
10 mA	0700	
11 mA	0600	
12 mA	0500	
13 mA	0400	Low Warning
14mA	0200	Low Alarm
15 mA	0200	
16 mA	0100	
17 mA	0000	
18 mA	0000	
19 mA	0000	
20 mA	0000	



9 APPENDIX 2

Oil Temperature Analog Output

The table below shows how the Oil Temperature output (4 - 20 mA) converts to temperature. The conversion from mA to °C and °F are as follows:

Output	Pin	Calculation	Unit	Low	High
O'I Tanan anatana	2	°C = (mA * 10) – 70	°C	4 mA = - 30°C	20 mA = 130°C
Oil Temperature		°F = (mA * 18) – 94	°F	4 mA = -22°F	20 mA = 266°F

OQSxG2 Output	Temperature Conversion		
4-20 mA value	°C	°F	
20	130	266	
19.5	125	257	
19	120	248	
18.5	115	239	
18	110	230	
17.5	105	221	
17	100	212	
16.5	95	203	
16	90	194	
15.5	85	185	
15	80	176	
14.5	75	167	
14	70	158	
13.5	65	149	
13	60	140	
12.5	55	131	
12	50	122	
11.5	45	113	
11	40	104	
10.5	35	95	
10	30	86	
9.5	25	77	
9	20	68	
8.5	15	59	
8	10	50	
7.5	5	41	
7	0	32	
6.5	-5	23	
6	-10	14	
5.5	-15	5	
5	-20	-4	
4.5	-25	-13	
4	-30	-22	
<4	Fault		



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