

# User Guide

## **SENSE-3** Kit



Language:	English
Version:	1
Date:	29 November 2024
Publication N <sup>o</sup>	TP_0037_v1_11-24



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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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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.

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## AMENDMENT RECORD SHEET

		-	
Version Number	Amendment(s)	Amended by	Date
1	New document	S Rickards	29 November 2024



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#### **1 SENSE-3 KIT - INTRODUCTION**

#### → 1.1 Product overview

SENSE-3 is a scalable data monitoring & analysis solution giving you access to both live and historic data using Tan Delta's **Cumolicity** application.

The standard kit allows up to three OQSx-G2 sensors to be connected out of the box. However, you can expand the system to include up to 16 Sensors by connecting multiple Gateway Hubs to the SENSE-3 standard kit (additional sensors and hubs are sold separately)

Therefore, you can monitor large multi-asset systems where timing of maintenance intervals is crucial.

SENSE-3 enables data transmission using a variety of methods depending upon location and network availability. These include Cellular, WiFi and Ethernet.

## **1.2** Kit Contents



Check that your kit contains the following items:

What'	s in the box? Product Code: SENSE-3-BS1
Item	Description
1	SENSE-3 Unit - Gateway pre-assembled with Gateway Hub and Mounting Kit
2	OQSx-G2 Sensor
3	Gateway 4 G Antenna
4	Sensor to Hub Cable 5 m (Cable SH)
5	Gateway Hub to Gateway Cable 0.2 m (Cable GH)
6	Gateway Hub Power Cable 10 m (Cable HP)
7	2 x Gateway Hub Continuity Plug (HCP-1)
8	Quick Start Guide
9	USB Stick containing: Gateway Configurator, Software, CADS and Gateway component User Guides

#### 1.3 About this User Guide

This User Guide provides details on how to configure, install, operate, and maintain the components of the SENSE-3 Kit.



#### 2 PRODUCT INFORMATION - TAN DELTA OIL QUALITY GATEWAY (OQTg)

## **2.1** Introduction

The Tan Delta Oil Quality Gateway (OQTg) is a comprehensive networking device.

The OQTg - coupled with Cumulocity or TD Online - provides remote visibility for all connected assets.



## 2.2 Important Safety Information

Pay attention to the following safety notes:

- The Gateway is not IECEx certified.
- Never disassemble, repair or tamper with the Gateway.
- Make sure that the supply voltage is within the specified range.
- Make sure that the load currents do not exceed the rated value.
- Check all the wiring for correct connection before powering the unit.

#### 2.3 Dimensions



Product Height 58 mm Approximate dimensions that may change. Illustrations not to scale.

135 mm





## 2.4.1 SENSE-3 Kit - Standard kit, as supplied



Item	Description
1	OQSxG2 Sensor
2	OQSxG2 Sensor to OQTh Gateway Hub Cable - Cable SH
3	Gateway Hub
4	Gateway Hub Power Cable - Cable HP
5	OQTh Gateway Hub Continuity Plug (1 per unpopulated sensor slot)
6	OQTh Gateway Hub to OQTg Gateway Cable
7	OQTg Gateway

## 2.4.2 Multi-Sensor and Hub System - Typical example



Item	Description
1	OQSxG2 Sensor
2	OQSxG2 Sensor to OQTh Gateway Hub Cable - Cable SH
3	Gateway Hub
4	Gateway Hub Power Cable - Cable HP
5	OQTh Gateway Hub Continuity Plug
6	OQTh Gateway Hub to OQTg Gateway Cable
7	OQTg Gateway
8	OQTh Gateway Hub to OQTg Gateway Hub Cable - Cable HH
9	4G / Wi-Fi / Ethernet
10	Internet
11	Cumulocity Software Application

Gateway Hul	os and Sensors
Nº of Gateway Hubs	N <sup>o</sup> of Sensors Supported
1	3
2	5
3	7
n	2n+1



#### **3 OQSx-G2 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 our website and clicking the link to download: <a href="http://www.tandeltasystems.com/support/">www.tandeltasystems.com/support/</a>

#### () NOTE:

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

CADS does not operate on Mac devices or Chromebook devices.

#### 3.1 Set Up

#### (I) NOTE:

You will Administrator privileges on your computer to Install the CADS application.

Also, when CADS has installed, we recommend that you connect the Configuration cable to the PC whilst Administrator privileges are still granted, so it will recognise the cable and install any drivers that are needed.

#### 3.1.1 Install the CADS application onto a PC / Laptop

- 1) Install CADS by accessing <u>www.tandeltasystems.com/support/</u>
- 2) Follow the link and download.
- 3) When prompted, select **Open folder** to view files.
- 4) Launch the **setup.exe** file and follow the instructions in the setup wizard.
- 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 OQSx-G2.

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

#### 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 OQSx-G2

- Once the home screen has loaded, select
   Configure Oil Quality Sensor from the options on the home screen.
- Connect the OQSx-G2 to your computer using the configuration cable (Cable J) as shown in Fig. 3-1.



(Standard sensor shown)



#### 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 CADS application lists the options for the device to which you are connecting the sensor, as shown in Fig. 3-3. SENSE-3 Gateway Devices are supplied configured for Modbus, and therefore require Custom Communications Settings.

Earlier versions of the Gateway were not configured for Modbus. If you have a query, contact Tan Delta Support <u>www.tandeltasystems.com/support/</u>

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



#### Fig. 3-3 Communication options

#### 3.1.6 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 <a href="mailto:support@tandeltasystems.com">support@tandeltasystems.com</a> for help.

Condition value for end of For accurate readings, plea Selected Oil: Deeron, I	ail Me (TDH): (800 se celect the oil that you'll be s Selo LE 480, 159948	ating this sensor with		Restore O	Serial Number 1900 Firmume Version 4
Masufacturer	Oi Name	Viscosity	Application	Hin. Temp. ('C)	Has. Temp. ('C)
Outlas from		RearDe	Randhastic	-35.857	135.077
Shell	Helm HXS	199/10	Engine	-25.0°C	125.0°C
Chevron	Delo LE 710	2099/40	Engine	-35.0°C	125.0°C
Mobil	DTE 68		Ger	-25#°C	116.0°C
Mobil	Gear SHC XMP	320	Gear	-35.0°C	125.0°C
Mobil	Gear 600 XP	320	Gee	-25.4°C	125.0°C
Fetrosas	ORLLHID-2		Engine	-35.0°C	125.0°C
Raylene	Ashless Hydraulic 46		Hydraelic	-25.0°C	125.0°C
			Ergino		
Patronas	Akcella Unitek CK4	10W/40	Engine	-25.0°C	122.0°C
Castrol	PE-P154		Ergino	-25.8°C	115.0°C
Masterdraw	88306 HV		Machining	-25.0°C	120.0°C
Photod	Gaard PM30		Provine	-35.810	116.017

Fig. 3-5 Oil Selection



#### 4 TAN DELTA OIL QUALITY GATEWAY - CONFIGURATION & INSTALLATION

#### () NOTE:

You MUST configure the OQSxG2 Sensor for use with the Oil Quality Gateway (OQTg) **before** configuring the OQTg.

This is done in CADS. See the Sensor Configuration section of this User Guide for more information.

The Gateway configurator software is provided on the USB stick within the Sense 3 kit.

#### 4.1 Writing your Configuration settings to a USB

Before you can use the OQTg, it must be configured to work on the particular network that you have chosen to use.

This is done by writing the configuration settings to a USB stick and uploading them to the device.

#### 4.1.1 Run the Software

- 1) Run the Gateway Configuration Tool from the product USB
- 2) To start the application, double-click on the file **OQGatewayConfigurator.exe**

■ I ☑ III = I File Home	Share View	Application Tools Manage	MY USB (D:)					
Pin to Quick Copy	Paste Paste shore	ntcut to +	Copy Delete Rename	New ite New folder	tess • Prope	Tties	Select all Select none Invert selection	
$\leftarrow \rightarrow \cdot \uparrow$	> This PC > MY	USB (D:)	Organise	New		Open	Select	v ♂ Search
🖈 Quick access		^ 🗆 N	lame ^		Date modifier	d Type		Size
			OQGatewayConfigura SetupCads_4.1.0.6.exe	tor.exe	07/02/2019 09	15 Applica 10 Applica	ion ion	152 КВ 7,957 КВ
		* *	OQTg User Guide V1.0.	pdf	07/02/2019 09 01/02/2019 00	k35 Adobe / k01 Oil Data	Acrobat Document base File	1,631 KB 463 KB
		~						
		Fig. 4-	1 OQGa	ateway	Con	figura	tor.exe	

#### 4.1.2 Selecting and setting up your interface settings

The Configurator has three interface options.

- LAN (Ethernet)
- WLAN (Wi-Fi)
- GPRS (Mobile Data)

Select the one that applies to your chosen network type.

#### 4.1.3 LAN (Ethernet) configuration

 Select either Dynamic (DHCP) or Static – Consult with your network administrator to make sure that you select the correct option.

Make sure through your IT provider that the device will be granted access to the Internet through any applicable firewalls or other security protocols.

- 2) If **Static** is selected, enter the **IP Address**, **Subnet Mask** and **Gateway**.
- When you have chosen the required settings, click Save Configuration to File.

Refer to Section 4.1.6.

< OQGateway C	onfig			×
Select Interface LAN (Ethernet) WLAN (Wi-Fi) GPRS (Mobile	Data)			
- Configure Interfac	e			
IP Selection	Dynami	c (DHCP)	⊖ Stat	tic
IP Address	000.000	0.000.00	D	
Subnet Mask	255.25	5.255.00	D	
Gateway	192.16	8.001.254	4	
Save (	Configura	ation To	File	
Fig. 4-	-2 LAN	l (Ethe	ernet)	



## 4.1.4 WLAN (Wi-Fi) configuration

1) Select either **Dynamic (DHCP)** or **Static** – consult with your network administrator to make sure that you select the correct option.

Make sure through your IT provider that the device will be granted access to the Internet through any applicable firewalls or other security protocols.

- 2) If **Static** is selected, enter the **IP Address**, **Subnet Mask** and **Gateway**.
- 3) Enter the details following details for the required Wi-Fi network consult with your network administrator.
  - SSID
  - Security Type
  - Password
- 4) When you have chosen the required settings, click **Save Configuration to File**.

Refer to Section 4.1.6.

Configure Interfac	e Dynamic (DHCP) 🔿 Static
IP Address	000.000.000.000
Subnet Mask	255.255.255.000
Gateway	192.168.001.254
Wi-Fi Credential SSID (Wi-Fi Name	s •) TanDelta WiFi
Security Type	WPA/2 - PSK ×
Password	•••••

## 4.1.5 GPRS (Mobile Data) configuration

When you select the **GPRS (Mobile Data)** option, a list of available pre-configured networks is displayed, as shown in Fig. 4-4.

 If your required network IS displayed in the list, delete all of the other configurations leaving only the one you need. click on it and proceed directly to Step 4.

If your network **IS NOT displayed**, complete Steps 2 and 3.

- In the list of displayed networks, click on the 'Bin' icon for each network you will not need.
- 3) Scroll to bottom of list and click + to add a new network.
- Once you have selected (or created) a network, the Create Mobile Access
   Point screen displays a list of required parameters, as shown in Fig. 4-5.

All the information for your specific network will be available online, or from your network provider.

Enter the correct details for your network, then click **Create**.

Refer to Section 4.1.6.

OQGateway Configurator						×
Select Interface CLAN (Ethernet) WLAN (Wi-Fi) GPRS (Mobile Data)						Î
Configure Interface						
APN: everywhere	MCC: 234	MNC: 30	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	)
APN: orange.fr	MCC: 208	MNC: 01	DNS 1: 80.10.246.2	DNS 2: 80.10.246.129	6	)
APN: EEM2M	MCC: 234	MNC: 30	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	)
APN: wlapn.com	MCC: 213	MNC: 01	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	ð
APN: airtelnet.es	MCC: 214	MNC: 01	DNS 1: 212.73.32.3	DNS 2: 212.73.32.67	6	)
APN: movistar.es	MCC: 214	MNC: 07	DNS 1: 194.179.1.100	DNS 2: 194.179.1.101	6	)
APN: public4.m2minternet.com	MCC: 204	MNC: 04	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	)
APN: internet.telekom	MCC: 262	MNC: 01	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	)
APN: web.vodafone.de	MCC: 262	MNC: 02	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	Ð
APN: surfo2	MCC: 262	MNC: 07	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6	ð
					-	× ×

#### Fig. 4-4 List of available GPRS Networks

Create Mobile Acce	ess Po	int	—		×
Mobile Country Code:					
Mobile Network Code					
Access Point Name					
Network Username:					
Network Password:					
Domain Name Server 1	8.8.8	8.8			
Domain Name Server 2	8.8.4	.4			
Create				Cancel	

Fig. 4-5 Create Mobile Access Point settings



## 4.1.6 Save the Configuration Settings

- When you have entered the required configuration details click
   Save Configuration To File.
   This file will be saved automatically to the USB stick.
- 2) Close the OQTG Configurator and remove the USB stick safely from your computer.

🕈 OQGateway Confi	igurator				
APN: web.vodafone.de	MCC: 262	MNC: 02	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: surfo2	MCC: 262	MNC: 07	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: live.vodafone.com	MCC: 505	MNC: 03	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: telstra	MCC: 505	MNC: 01	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: yesinternet	MCC: 505	MNC: 02	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: internet	MCC: 655	MNC: 01	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: internet	MCC: 655	MNC: 10	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
APN: broadband	MCC: 310	MNC: 410	DNS 1: 8.8.8.8	DNS 2: 8.8.4.4	6
		Ð			
Save Configuration To File					

#### Fig. 4-6 List of available GPRS Networks

#### • 4.2 Uploading your settings to the OQTg

- 1) Turn on power to the OQTg Gateway.
- 2) Remove the translucent clip-on cover on the front of the OQTg.

#### (!) NOTE:

The Gateway device will take a few minutes to start up. A green LED will show once device is operational.

- Make sure you are using the memory stick containing the required network configuration, as set up in Section 4.1.
- 4) Refer to Fig. 4-7. Insert the memory stick into the USB port of the OQTg.
- 5) Wait for the Red LED to turn on and off again before removing USB memory stick.

Once your network configuration has been loaded, the OQTg will reboot.

 Wait for Green LED to turn on – this may take several minutes.



Fig. 4-7 OQTg Interface ports and LEDs

The OQTg is now loaded with your network configuration.

#### 4.3 Mounting the OQTg

The OQTg has mounting brackets that allow it to be mounted to any suitable surface.

Refer to the environmental and approvals specifications this User Guide and make sure that the mounting location meets these requirements.



#### 5 OQSx-G2 SENSOR INSTALLATION

## **5.1** Precautions

#### Read these instructions before installing the oil quality sensor.

The sensor is robust, however it can be damaged by mistreatment.

The following must be noted:

- Install the sensor into the equipment **before** making electrical/wiring connections.
- Make sure that the fittings being used correspond with the sensor thread size
- Tighten to no more than 20 Nm with a 32 mm spanner.
  - Do not over tighten.
- Do not attempt to screw or tighten the sensor using the body. Always use the "Hex" head with the correct size spanner (32 mm).
- Refer to Fig. 5-1. To prevent vibration having any adverse effects to the cable/ sensor connectors, the cable must either be mounted on the same plane as the sensor, or have a loop fitted to absorb vibration.
- Do not twist the cable relative to the sensor head.



- Keep away from sharp edges which may cut into the cable.
- Do not bend the cable excessively, minimum bend radius = 50 mm (2 inches).
- Where possible, keep the cable away from sources of heat, (such as an engine block), and electrical interfaces.
- Oil pressure must not exceed 70 bar.

#### **9** 5.2 Choosing the Sensor Mounting Location

The performance of the sensor will be enhanced through careful consideration of the mounting location. Refer to Fig. 5-2.



Fig. 5-2 Choosing a mounting location for the Sensor



The following guidelines must be followed.

- The Sensor must, if possible, be mounted in a horizontal position.
- 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; The oil in the sensor needs to be representative of the whole system.
- The sensor nose must remain immersed in the oil at all times.
- When the oil quality sensor is mounted in a pipeline, make sure that the sensor will not restrict flow.
- For maximum performance when mounting the oil quality sensor in a lubrication system, make sure that the sensor is located prior to the oil filters, oil coolers etc. This ensures that the oil is representative of the whole system.

#### **5.3** 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.



#### 6 OQTg GATEWAY - UNDERSTANDING DATA

#### 6.1 Dynamic Maintenance Optimisation (DMO)

Dynamic Maintenance Optimisation (DMO) is the method by which the data can be used to optimise the maintenance intervals for the lubricating oil in the application.

Changing the oil at an interval determined by Tan Delta software means you are only changing the oil when you need to, not at a predetermined schedule when the oil may still be in a useable condition.

## **6.2** Cumolocity

**Cumolocity** is a cloud-based Internet of Things (IoT) solution that uses a Gateway device connected to the Internet to send data from either one or a multiple sensors to a cloud-based viewing platform. **Cumolocity** allows live reading of oil condition and oil temperature.



The **Cumolocity** platform allows you to simply view the data live, or alternatively set alerts and alarms for oil condition from a remote online portal.

Alerts and alarms can be configured to show in the online dashboard or to email relevant personnel to take action.





Historic data collected from the sensor and presented on **Cumolocity** can also be viewed through the Data Explorer menu, including viewing pre-set date ranges or setting a custom period to review.



#### **6.3** Example good sensor output readings

The graph in Fig. 1-4 shows a classic "sawtooth" representation of an engine in operation, illustrating when oil changes have taken place at checkpoints F, L and R.

The green lettered checkpoints are where oil samples would normally be sent for analysis to ensure oil condition is acceptable.

With the OQSxG2 installed, oil sampling is not required prior to checkpoints F, L and R.



#### 6.4 Implementing DMO in Cumolocity

**Cumulocity** presents oil condition data as the Tan Delta Number (TDN) Legacy versions of the application presented oil condition as percentage loss factor (%LF) values. DMO can be reported as an alert on **Cumulocity** and also via email.

The Cockpit, displayed on logging in, shows the alerts across all assets to which you have access.



## 6.4.1 Adding a Smart Rule

1) Refer to Fig. 6-6. Click on the **Smart rules** tab.





The **Smart rules** screen displays a list of the smart rules that have been set up for your asset.

#### 3) Click on **Add smart rule**.

The Add local smart rule pop-up window is displayed, as shown in Fig. 6-7.

icting co.				
🤹 Add local smart rule				
$\bigcirc \rightarrow \bigcirc$ On alarm send SMS When alarm is received then SMS is sent	On alarm send email When alarm is received then email is sent	On alarm escalate it Escalate alarm		
On alarm duration increase severity Increase alarm severity when active for too long	Con geofence create alarm On geofence create alarm	Con geofence send email On geofence send email		
Ø → 1         Calculate energy consumption         Calculates energy consumption	$\textbf{old} \rightarrow \textbf{O}$ On missing measurements create alarm Creates alarm when measurements are missing	( → CO On alarm execute operation Executes an operation when alarm is received		
Creve alarm when measurement reaches exercit thresholds	On measurement threshold create alarm Creates alarm when measurement reaches thresholds			
	Cancel			
	<b>Eig 6 7</b>	Adding a Smort Pula		
	Fig. 6-7	Adding a Smart Rule		

- 4) Select **On measurement explicit threshold create alarm**.
- 5) Click on the **Select data point to prefill inputs below** drop-down list. See Fig. 6-8.

Select data point to prefill inputs below				
Select data point to prefill inputs below				
Internal Temperature (°C) - InternalTemperatureC				
Oil Condition (TDN) - OilConditionTdn				
Oil Temperature (°C) - OilTemperatureC				
Oil Condition (LF) - OilConditionLf				
Fig. 6-8 Select data point drop-down list				

Select the required data point from Internal Temperature (°C), Oil Condition (TDN), Oil Temperature (°C) or Oil Condition (LF). Continued...



Fig. 6-9 shows the data point alarms settings options for Oil Condition (TDN).

- 6) Enter the values that you want to trigger the alarm.
- 7) Click on **Create.**

2 On threshold:			
Oil Condition (TDN) - OilConditionTdn			
OilReading			
OilConditionTdn			
0			
Default: 90			
300			
Default: 100			
Cancel Create			
Fig. 6-9 Data point alarm threshold settings			

The new smart rule will be displayed in the **Smart rules** tab of the Cumulocity Cockpit, as shown in Fig. 6-10.





#### 6.4.2 Setting up an email alert

1) To set up an email alert, you will need to know the **Type** details of the alarm.

This is shown on the alarm details on the Alarms screen e.g.  $\Xi^{\text{TYPE}}_{\text{c8y_ThresholdAlarm}}$ 

2) Click the **Add smart rule** link in the **Smart rules** screen, and select the **On alarm send email** option.

The **On alarm send email** window is displayed, similar to Fig. 6-11.

- 3) Enter a **Rule name** for your rule.
- In the On alarm matching field, enter the Type of the alarm
   e.g. c8y\_ThresholdAlarm
- 5) In the **Send email** details, enter the email address for each recipient in the **Send to** field. For multiple email addresses, separate each address with a comma.
- 6) If required, enter the **Send CC to** email address for recipients of a copy of the email.
- 7) When you have entered the required details, click on **Create**.

The new smart rule will be displayed in the **Smart rules** tab of the Cumulocity Cockpit, as shown in Fig. 7-12.

On alarm send email Fields marked * are required.						
Senabled						
1 Rule name						
When alarm is received then email is sent						
2 On alarm matching:						
c8y_ThresholdAlarm						
• Add alarm type						
3 Send email:						
Send to you@youremail.com						
Enter one or more valid email addresses, separated with a comma.						
Send CC to cc@youremail.com						
with a comma.						
Cancel Create						
Fig. 6-11 Setting an email alert						
Q₀ Local smart rule :						
On alarm send email						
Children						
✓ All children active						
◆ DETAILS						
Fig. 6-12 Setting an email alert						

Add local smart rule



## e.5 Advanced Fault Detection (AFD) & Event Identification and Validation (EIV)

Advanced Fault Detection (AFD) is the identification of potential issues in a piece of machinery that through analysis of the holistic oil condition.

Similarly, **Event Identification and Validation (EIV)** uses the same methodology to track maintenance and other interactions which affect the oil.

Through our in-house analytics, it is possible to identify different faults and events, including degradation of the oil, water ingress, wear metals, TBN decrease and soot increase.

The below list shows the range of alerts which will be triggered in Cumulocity, and what the implications are for the asset:

#### 7.5.1 Oil Condition Alerts

#### **Sensor in Air**

• This can indicate a loss of oil from the asset, a blockage, or incorrect sensor installation.

#### **Oil Approaching End of Life**

• Warning to monitor the asset as the oil is approaching its end of life.

#### **Oil At End of Life**

• Indicating that the oil is now worn sufficiently to require changing.

#### 7.5.2 Oil Behaviour Alerts

#### Accelerated Oil Wear

• The oil is showing wear at a faster rate than expected, indicating an issue with the oil or the asset itself.

#### Water / Coolant Contamination

• Detection of water ingress or coolant leakage into the oil system.

#### Particulate Contamination

• Detection of particulate contamination (e.g. soot or wear metal) giving early indication of an asset maintenance issue.

#### **Fuel Dilution**

• Leakage of fuel into the oil system, indicating an asset problem requiring immediate attention.

#### 7.5.3 Event Detection Alerts

#### **Oil Change**

• Detection that an oil change has occurred, to confirm with the maintenance team.

#### Top Up / Sweeting

• Detection that an oil top-up has occurred, to confirm with the maintenance team.

#### **Incorrect Oil Filled**

• Flagging that the incorrect oil has been installed in the system, which doesn't fit the configured oil profile.



## 7 OQTg GATEWAY - SUPPORT

Issue	Possible cause	Checks	What to do if the check fails				
	Power Issue?		Make sure that the power supply to hub is 9-30V DC				
		Check the Green LED on the Hub	Make sure that a secure connection is made from cable HP to hub device				
			Replace Hub				
		Check the Green LED on the Gateway	Allow the Gateway to boot up (5-10 minutes)				
			Check the Hub to Gateway Cable				
			If SIM: Is SIM inserted correctly?				
			Is 4G antenna connected?				
			Is there 4G signal in the area on that network?				
			Check SIM configuration				
			Check SIM APN details with network provider				
			If WiFi: Check WiFi configuration				
Cannot see any data in Cumulocity	Internet Issue?	Check the Amber LED on	Check WiFi network with IT provider (Signal, firewall etc)				
, , , , , , , , , , , , , , , , , , ,			If LAN: Check the LAN cable to the Gateway				
			Check LED activity on the Gateway LAN port				
			Check the LAN cable to the switch				
			Check the LED activity on the network switch LAN port				
			Check the LAN with your IT provider (Internet connection, firewall etc)				
	Sensor Communication Issue?	Check "Ring" LED	Make sure that all connections are made correctly				
			Make sure that continuity plugs are installed into all unused hub locations				
		Check "Data" LED for a flash once per sensor connected	Check the sensor configuration using CADS				
If all the above are OK, contact Tan Delta Support							
Cannot see the asset in Cumulocity	Access rights issue	Check tenancy access with system administrator	Contact Tan Delta Support				
Cannot see dashboard in Cumulocity	Dashboard not present	System administrator can add a new dashboard	Contact Tan Delta Support				
Cannot log into Cumulocity	Incorrect password	Enter email into forgotten password link	Contact Tan Delta Support				
	Unauthenticated user	System administrator can add new users	Contact Tan Delta Support				
Not receiving alerts from Cumulocity	Alerts not setup for user	System administrator can edit alerts in cumulocity	Contact Tan Delta Support				



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