LUBExpert
USER MANUAL

Version 06 - 2021

Contents

1. Before You Begin

1.1. Good to Know

- Due to typical self-discharging characteristics of NiMH batteries, it is recommended to charge the LUBExpert battery at least every 3 months, even if the equipment is not used.

- This manual contains instructions specific to LUBExpert App Firmware and its interface to Ultranalysis Suite Software (UAS3). References to UAS3 usage in the manual are intentionally "LITE". For instructions using UAS3, refer to the UAS3 user manual.

- LUBExpert App runs on an SDT270SU or SDT270DU. If you are using the LUBExpert App on one of these devices and need device specific instructions, refer to your SDT270 User Manual.

1.2. Recommended Calibration Intervals

SDT recommends annual recalibration of SDT instruments and annual verification of sensors. The one-year interval is consistent with the observed long-term stability of SDT electronic equipment's. Annual calibration of your ultrasound equipment is a mandatory condition of SDT's Lifetime Warranty Program. See https://sdtultrasound.com/lifetime-warranty/ for details.

Each instrument leaves SDT's factory with an electronic time stamp indicating the due date of the next calibration. The initial period is 15 months which accounts for the lapse of time from delivery from factory floor to end users.

SDT recognizes that each customer may have their own Quality Assurance Standards and internal requirements. If a customer has established a Quality Assurance Program that includes a documented procedure for measurement deviations, and if an instrument and the relevant sensor show acceptable deviations and do not show signs of physical damage, then calibration intervals could be extended to two years. Just remember that to participate in SDT's Lifetime Warranty Program, annual calibration is mandatory.

1.3. CE compliance

SDT LUBExpert kit has been designed and tested to meet the following directives and standards. The declaration of CE conformity is available on SDT website at https://sdtultrasound.com/support/downloads/certificates/
This product meets the following essential requirements of the applicable European Directives:

- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

- 2014/35/EU; Low voltage directive (LVD), applied on the battery charger

- 2006/66/EU; Batteries and accumulators and waste batteries and accumulators

The equipment hence displays the "CE" logo demonstrating its compliance to the current EC regulations.

To be able to operate by state-of-the-art rules, as stipulated in the directive, it has been designed by the following rules:

- The LUBExpert and the SDT270 do not radiate electromagnetic waves (EMC)
- The LUBExpert and the SDT270 are protected against external electromagnetic radiation (EMI)
- The LUBExpert and the SDT270 are protected against electrostatic discharges (ESD).

1.4. Warranty

Most SDT products are covered by our Limited Lifetime Warranty Program. There are two major conditions for your LUBExpert to be covered by this program.

1. Registration of the product in our Lifetime Warranty database
2. Annually calibrate the instrument at an SDT approved calibration and repair facility

SDT reserves the right to accept or deny warranty claims based on final inspection in our workshop.

In the event of a defect, contact your local SDT representative or SDT International.

For additional information about SDT's Lifetime Warranty, please visit
https://sdtultrasound.com/lifetime-warranty/

1.5. Responsibility limits

Neither the company SDT International, nor any related company, will in any circumstances be liable for any damages, including, without limitation, damages for loss of business, business interruption, loss of information, defect of the LUBExpert or SDT270 unit or its accessories, bodily harm, loss of time, financial or material loss or any other indirect or consequential loss arising out of the use, or inability to use this product, even when it has been warned of possible damages.

1.6. Destruction and recycling of waste equipment

In conformance with European Union (EU) Directives and in particular with Directive 2006/66/EU «Batteries» and Directive 2012/19/EU «WEEE – Waste Electrical and Electronic Equipment», SDT International is organizing the management of waste equipment. However local legal regulations have precedence.

Thus, SDT Customers may:

- Either transfer a waste apparatus to a local company that will recycle it in accordance with applicable local laws.
- Or return the waste apparatus to SDT International or to a SDT Dealer.

For an apparatus that contains a battery, SDT International will transfer the battery to a local company that will recycle it in accordance with EU «Batteries» Directive and Belgian laws.

SDT International will transfer the rest of the apparatus to a local company that will recycle it in accordance with EU «WEEE» Directive and Belgian laws.

1.7. Copyright

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The information herein is believed to be accurate to the best of our knowledge.

Due to continued research and development, specifications of this product can change without prior notice. The most recent version of this manual is available at www.sdtultrasound.com in the downloads section.

1.8. Use of IP

The consumption and/or use of all SDT learning material, images, and other resources is voluntary and we request no payment in exchange. Our intellectual material (IP) is crafted to provide general guidance however its suitability is not guaranteed for any particular use. Using the information contained herein is done solely at the responsibility of the user.

You are free to use, duplicate, share, display, and perform our IP under the following conditions:

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Non-Commercial: You may not use this work as part of a commercial product or service from which you or any other user derives profits.

No Derivative Works: You may not change, transform, dismantle, or expand upon this material.

Reuse or Distribution: The license terms of the IP must be made clear to all who receive forward copies from you.

Waiver of Conditions: Any of these conditions may be waived if you receive permission, in writing, from the copyright holder.

Living Document: Our IP is reviewed from time to time and may be altered, amended, or cancelled as deemed necessary by the owner. Your comments, criticisms, and suggestions for improvement are welcomed by sending an email to hearmore@sdtultrasound.com.

2. Welcome Message

Congratulations and thank you for your purchase of LUBExpert. Get ready to explore the world of ultrasound assisted machinery lubrication. Whether you grease bearings on a time-based or calendar-based schedule, LUBExpert's onboard lubrication and greasing assistant is ready to guide you to a perfect and precise result every time.

Major bearing manufacturers claim that as much as 40% of all bearing related failures result from poor lubrication practices. "Poor Lubrication Practices" include, but are not limited to, bearings receiving too much grease, not enough grease, or even the wrong type of grease.

LUBExpert helps you **Grease Bearings Right**. That means delivering grease to the right location, using the right grease type, dispensing the right quantity, at the right intervals, while receiving the right indication about the condition of the lubrication.

If you are ready to optimize your machinery lubrication practices, then let's get started. The following detailed and illustrated instructions will help you get the most from your LUBExpert/UAS3 investment.

3. Introduction

3.1. What is LUBExpert?

LUBExpert is an ultrasound solution dedicated to acoustic bearing lubrication and specifically, to guide lubricators during the bearing grease replenishment task.

LUBExpert combines SDT's strong measurement capabilities and clever user interface to create an onboard lubrication & greasing assistant. Intelligent algorithms guide lube-techs before, during, and after re-greasing resulting in optimal lubrication parameters on all assets.

Given only a few machine parameters, LUBExpert monitors each stroke of grease and its effect on bearing friction and temperature. Before and after bearing conditions are reported with a "Lubrication success", "Lubrication failure", "Overlubrication", "Shorten interval" or "Suspected bearing failure" status report.

4. Description

4.1. LUBExpert is available in three forms

1. **LUBExpert Kit** – A complete standalone ultrasound instrument with dedicated firmware and software for precision guided lubrication of bearings.

2. **LUBExpert Dynamic Kit** – A standard LUBExpert Kit with ability of collecting and storing Dynamic data. Note that any LUBExpert kit can be upgraded to LUBExpert Dynamic Kit with an Upgrade Key.

3. **LUBExpert Upgrade** – An upgrade kit that adds LUBExpert functionality to any SDT270SU and SDT270DU ultrasound instrument. Please note that LUBExpert upgrade is only for SDT270 (MK2) instruments with serial number beginning with "280". If your serial number begins with "270", please contact your local SDT representative.

4.2. LUBExpert Kit

4.2.1. LUBExpert Base Kit Hardware

LUBExpert Ultrasound Data Collector equipped with the following features and functions:

- Static measurements with four condition indicators (4CI)
- Ultrasound – structure borne (LUBEsense1 Innovative Sensor Technology)
- Temperature – non-contact spot radiometer (°F/C)
- Integration to UAS3 for user-defined planned survey mode
- Non-contact laser guided temperature measurement
- New and innovative LUBEsense1 ultrasound sensor
- Lube consumption report
- Before and After report
- Onboard Assistant provides real-time stroke-by-stroke guidance and status by each step
- Live, in-the-field task completion report
- Lube status alarm and overall alarm live, in-the-field
- Embedded algorithm constantly calculates signal development continuously
- Four condition indicators
- Support for 6 languages plus icon commands
- 2 stage backlit LCD
- IP addressable USB interface to PC (upload/download)
- 12 button keypad and one-handed operation
- Aluminum extruded housing with rubber protective bumpers

4.2.2. LUBExpert Data Management Software

- Ultranalysis Suite™ UAS3 Master license, or single license in case Master already acquired
- Tree structured database with dedicated "LUBExpert Mode", multiple survey creation, trend graphs, asset image mapping, customizable alarming, grease gun management, lube consumption reports, automatic settings, sensor and data collector serial number recording for accountability.

4.2.3. Sensors & Accessories

- LUBEsense1 contact sensor, flat & curved magnetic bases, acoustic lube adaptor, sensor cable
- Custom swivel cradle mounts LUBExpert to any standard grease gun
- Headphones with 25dB noise reduction rating (neckband style)
- Universal voltage battery charger (110-240V AC 50/60Hz)
- Manuals and applicable software on memory flash drive or downloadable
- Belt attachment and shoulder Strap

4.3. LUBExpert Base Kit Contents

Article Code	Description
FS.LBX.001 (.002 or .003)	**LUBExpert Base Kit**
FASFTWUASS01	Ultranalysis Suite UAS3 Master (or single if Master already acquired)
FU.LBX.001	LUBExpert Standard Device w/Battery
FAUPGRKEY270T	Key Activation, Temperature
FUBATTR270-01	Battery, SDT270/200/LUBExpert
FUHDPH-1	Headphone, Neckband
FUPWSPUN-01	SDT Universal Battery Charger w/o Cord
LUBExpert Accessory Pack Includes:	
FAHOLSAC-01	Shoulder Strap
FAHOLSAC-02	Leather Belt Holder w/ Clip
SICABUSBAUSBBM	USB Cable
FUCABLPWRC7EU-01	EU Power Cord for Universal Battery Charger (.002)
FUCABLPWRC7US-01	US Power Cord for Universal Battery Charger (.001)
DMSDTNAUSB	SDT USB Memory Drive
Case:	
FUSUITEPC-T6-01	LUBExpert Custom Carrying Case
Additional Components Include:	
FU.SEN.LUBE.001	LUBEsense1 Contact Sensor, Threaded, w/o Cable
FUCABLSPLE7LE7-3	Cable for Contact Sensor, LEMO to LEMO, Coiled
FUSEACMAG-01	Magnetic Base, Flat Surface
FUSEACMAG-02	Magnetic Base, Multi Surface
FUSEACLUBE-03	Acoustic Lube Adaptor
FU.LBX.DVC.001	Grease Gun Mounting Cradle

4.4. LUBExpert Dynamic Kit contains same items and functionalities as LUBExpert Kit, but upgraded to Dynamic functionality with LUBExpert Dynamic key

Article Code	Description
FAUPGRKEYLBXD	Upgraded key code LBX D – Option Dynamic

Any LUBExpert can be upgraded to Dynamic by using key, there are no specific criteria.

4.5. LUBExpert Upgrade for SDT270SU or SDT270DU (MK2 Only)

4.5.1. LUBExpert Firmware Features

- Static measurements with four condition indicators (4CI)

- Ultrasound – structure borne (LUBEsense1 Innovative Sensor Technology)

- Onboard Assistant provides real-time stroke-by-stroke guidance

- Integration to UAS3 for user-defined planned survey mode

- New and innovative LUBEsense1 ultrasound sensor

- Lube consumption report

- Onboard Assistant provides real-time stroke-by-stroke guidance and status by each step

- Live, in-the-field task completion report

- Lube status alarm and overall alarm live, in-the-field

- Embedded algorithm constantly calculates bearing friction

4.5.2. LUBExpert Upgrade Criteria for SDT270

- Different scenarios exist to add the LUBExpert Key to your SDT270. Some things to consider prior to purchasing the LUBExpert Upgrade:

- Only SDT270 device serial numbers beginning with "280 xxx xxx" are eligible for upgrade. If the SDT270 device serial number begins with "270 xxx xxx" the device must be exchanged. Contact your local SDT Representative for details.

- Do you have a license of UAS3? LUBExpert requires it.

- What is the platform of your SDT270 device?

- LUBExpert only functions on an SDT270SU or SDT270DU

- All other devices must be upgraded first

4.5.3. Sensors & Accessories Included in LUBExpert Upgrade Kit

- LUBEsense1 threaded contact ultrasound sensor

- Flat and curved magnetic bases

- Acoustic lube adaptor

- Sensor cable

- Custom swivel cradle mounts LUBExpert to any standard grease gun

4.6. Upgrade Kit Contents

Article Code	Description
FA.UKIT.R270.LBX	**LUBExpert Upgrade Kit for SDT270SU/DU**
FAUPGRKEY270L	Key Activation, LUBExpert
DMSDTNAUSB	SDT USB Memory Drive (manuals, drivers, software)
FU.SEN.LUBE.001	LUBEsense1 Contact Sensor, Threaded, w/o Cable
FUCABLSPLE7LE7-3	Cable for Contact Sensor, LEMO to LEMO, Coiled
FUSEACMAG-01	Magnetic Base, Flat Surface
FUSEACMAG-02	Magnetic Base, Multi Surface
FUSEACLUBE-03	Acoustic Lube Adaptor
FU.LBX.DVC.001	Grease Gun Mounting Cradle

4.7. Charging the Battery

The LUBExpert uses an internal NiMH battery. The battery charger connects to a socket on the bottom side of the Instrument, near the headphone jack.

Battery Loader Connector

The charging time is typically 6 hours. When the LED of the charger is continuously green, the LUBExpert battery is completely charged.

Like most batteries, leaving the LUBExpert charging after the charger says it is charged does not hurt the battery – in fact, it very slowly tops the charge up a little more.

Expect up to 8 hours of continuous use from your LUBExpert when the battery is fully charged. This will vary depending on your need to use the backlight and the TEMP1 internal temperature sensor. Use the function settings in the main menu to adjust the auto power down and the delay to automatically switch off the backlight.

Charger type:	Specific for SDT170, SDT200 and SDT270 NiMH battery pack
Use:	Indoor use only; ambient temperature: min 0°C, max 45°C. Mode of operation: continuous. Environment pollution: max degree 2. Altitude during operation: max 2000 m.
Power supply:	230 VAC or 110 VAC +6 % / -10 %, 50/60 Hz, 25 VA, max branch fuse 20 A
Status indicator:	• Green LED is continuously lit: battery is fully charged • Green LED flashes evenly: normal charge • One red flash every 5 seconds: Battery Voltage error • Two red flashes every 5 seconds: Over temperature error • Three red flashes every 5 seconds: Timeout full charge • Four red flashes every 5 seconds: Timeout Rapid charging • Five red flashes every 5 seconds: Timeout Activate charging • Six red flashes every 5 seconds: Communication error
Input fuse:	T1.6 A (intern, not user replaceable)
Protection:	Temperature protected, limit set at 60°C / 140°F
Output voltage:	Between +4.0 and 14.5 V DC (depending on the operating mode)
Output Current:	Max 1 A
Output Power:	Max 7 W
Isolation:	Class II double isolation
Main supply transformer:	Class II, switching mode regulation
Overvoltage Category:	II
EMC:	EN 61000-4, EN 61000-3, EN 61010-1
Electrical safety (LVD):	EN 60950-1:2007 UL 60950-1, ed2(2005)
Weight:	300 grams / 10.6 ounces
Housing:	PPE
Protection Class:	IP40

4.8. Turning the LUBExpert "ON" and "OFF"

To turn the LUBExpert device ON, Press the Power Button ① on the bottom right of the keypad. The status LED ② will shine dark blue. Then, a few seconds later the SDT logo and a "loading" message appears on the screen. If you do not see this message your battery may be flat (see above for battery charging instructions).

To turn LUBExpert OFF, Push the Power Button ① on the bottom right of the keypad. The following confirmation displays, asking to confirm that you indeed want to switch off the unit, and to avoid accidently powering down LUBExpert. Confirm the device shut down by pressing the Enter Button ③.
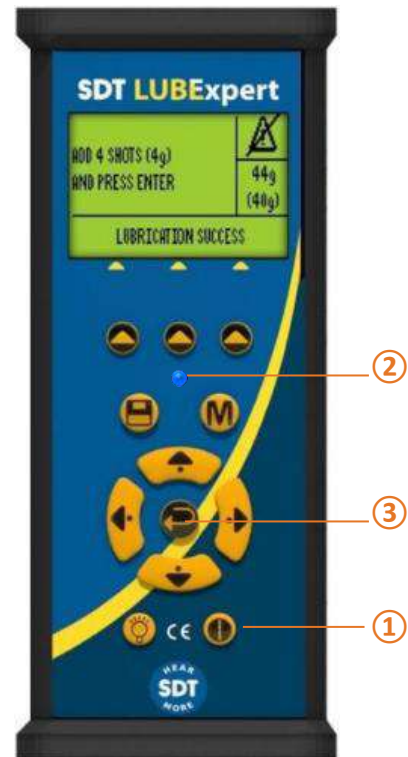
5. Getting Started

5.1. Have you Installed UAS3?

On-condition machinery lubrication starts with creating logical and manageable asset databases from which routine greasing surveys evolve. Your LUBExpert kit includes Ultranalysis Suite (UAS3) software. If you have not already installed UAS3 and the SDT device driver on your PC, you will need to do that first. Everything you need resides on the USB drive delivered with your LUBExpert kit. The installation process is simple enough however should you require installation assistance contact your SDT authorized representative (or support@sdtultrasound.com).

5.2. Are UAS3 and LUBExpert up to date?

Before we get started, let's make sure you're working with the latest tools. SDT takes customer feedback seriously and we continuously improve UAS3 and LUBExpert to ensure the best experience possible. It is therefore a good idea, from time to time, to check for firmware and software updates. While connected to the Internet, you can confirm that both your software and your hardware are at the current update by clicking the "?" Tab in UAS3.

1. Launch UAS3 from the desktop icon or your program start menu.

2. UAS3 checks your software version and advises you if new updates are available.

3. Now let's check the firmware on your LUBExpert. Power up LUBExpert first, then connect it to your PC with the supplied USB cable. UAS3 queries the device version and advises you if updates are available.

4. Follow the simple and intuitive prompts and don't hesitate to contact us if you experience difficulties
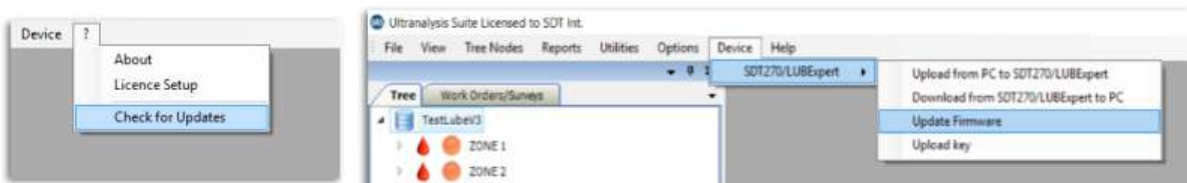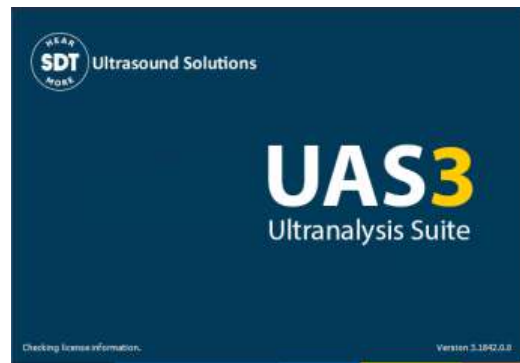
6. System Settings Edits

UAS3 is a multi-functional software platform designed for all sorts of ultrasound condition monitoring tasks. Before we create your first lubrication database and survey, there are a few setup tasks to attend to. The onboard assistant needs some basic information about your lubrication processes.

6.1. Grease Gun Management

If you haven't already launched UAS3 software, do so now. Then select "Options" from the main menu and then "System Settings".
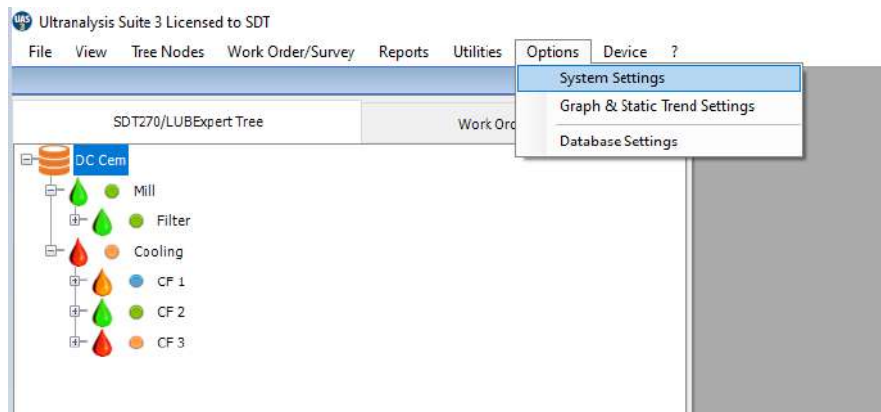
The System Settings dialogue box appears with several selector tabs oriented horizontally across the top. The active window is bold, and the rest appear lighter grey. Click on the "Grease Gun" tab located at the right of the window.
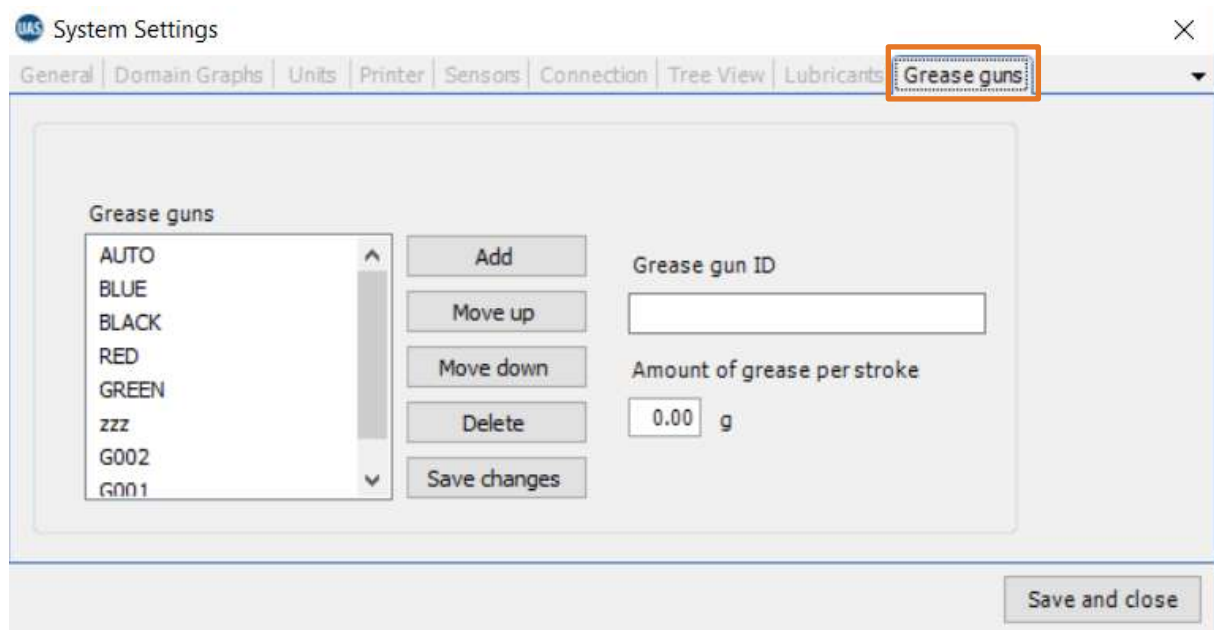
UAS3 and LUBExpert want to ensure you always use the right grease and the right amount. To accomplish this, you need a tool to manage your grease guns. To manage multiple grease guns in

UAS3 choose OPTIONS in the main menu and then select SYSTEM SETTINGS. Look for the Grease Guns management tab all the way to the right and select it with a single left mouse click. Here you will see all the grease guns currently identified in the database. To add more grease guns, enter the gun ID in the Grease gun ID window. You have a maximum of 5 characters to name your grease gun so be brief but obvious. Don't forget to include the calibrated amount of grease per single stroke as you will not be able to add selected grease gun without that information inserted.

In case you use automatic grease guns with digital input, select the default grease gun named AUTO. In the field, during the grease replenishment process, instructions will be displayed in weight. Thus, there is no need to insert any "Amount of grease per stroke" when setting up AUTO grease guns.

Note: This field (amount of grease per stroke) was moved from the LUBRICANTS tab to the GREASE GUNS tab.
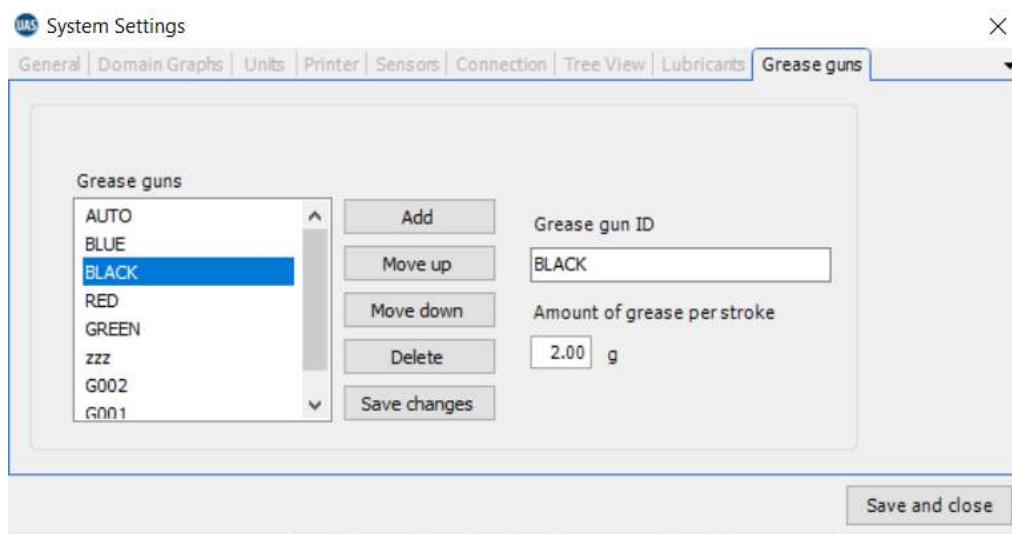
When done, left click on ADD. You can sort your list by selecting any grease gun and moving it UP or DOWN with the move up/move down buttons. You can also Edit grease gun IDs or delete them altogether. Left click Save to save your changes or the "X" in the top right to exit without saving.

6.2. Lubricant Management

UAS3 lets you manage the different grease types used to grease bearings. Select the Lubricants tab and enter your grease types in the 12-character field. Choose Add to add the grease type to the list and edit the list using the Move Up, Move Down, Delete, and Edit buttons. Note that once a grease type is assigned to a measurement asset, it cannot be removed/deleted from the list.

If you need to edit a Lubricant Name, highlight it in the list (step 1) and the name appears in the field to the right of the Edit button (step 2). Place your cursor and edit the text in this field and click Edit (step 3). Once you're finished here, click Save to exit the System Settings dialogue window.
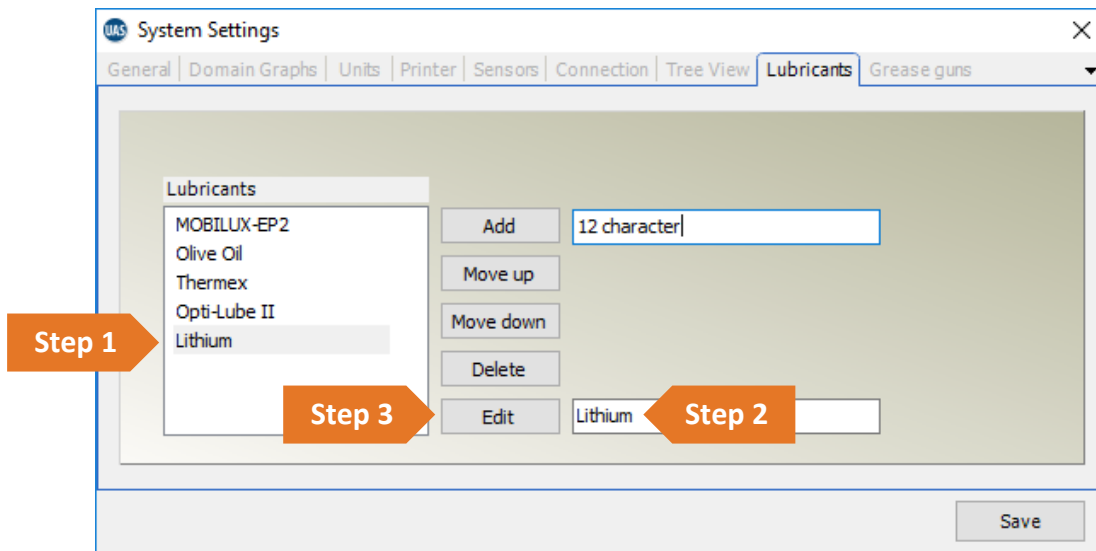
6.3. Sensor Options – LUBExpert Mode

SDT offers versatile solutions for so many applications; so, there are lots of sensors available. But for LUBExpert, there are only two (LUBEsense1 and TEMP2). To help eliminate confusion we created "LUBExpert Mode" in UAS3 to hide all the sensors that do not apply to LUBExpert. To enter LUBExpert Mode, select "Options" from the main menu and then "System Settings". The System Settings dialogue box appears with several selector tabs oriented horizontally across the top. The active window is bold, and the rest appear lighter grey. Click on the Sensors tab and then click the LUBExpert Mode check box and then click LUBEsense1 and TEMP2 check boxes. All other sensor options will now be hidden from view during LUBExpert operation.

Once you're finished, click Save to keep your selections and exit the System Settings dialogue window.

Ultrasound Solutions
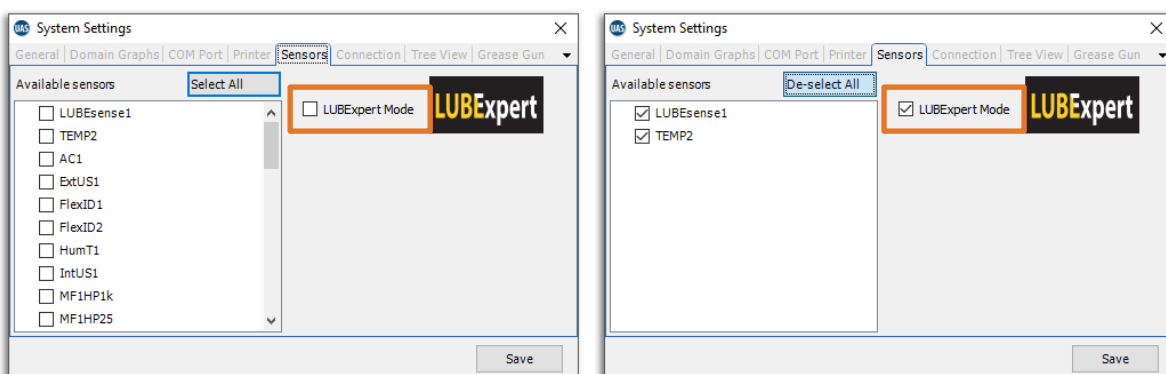
7. LUBExpert databases in UAS3

7.1. Managing Databases

To create new Data Folder, click on **Create New** ①, in Data Folder area
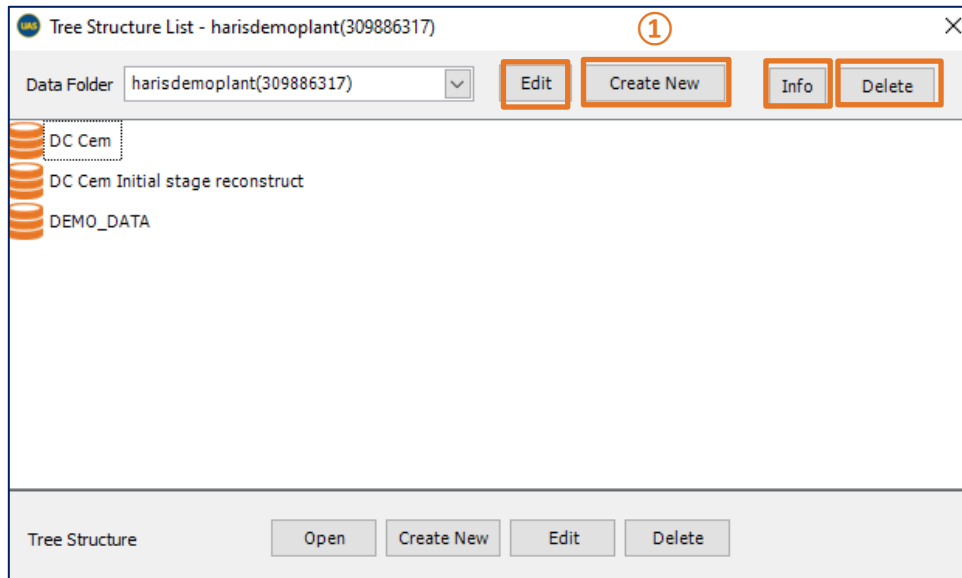
In new window:

Choose SDT2xx (as folders for SDT270 and LUBExpert are separate from folders for SDT340), add folder name and Tree Structure name and click on **Save**.

To view details of selected folder, click on Info ②.
To Delete selected Data Folder, click on Delete ③.

You may easily observe difference between SDT270 & LUBExpert Data Folders and SDT340 Data Folder based on Tree Structure Icon:

SDT270 & LUBExpert

SDT340

To create a new *Tree Structure*:
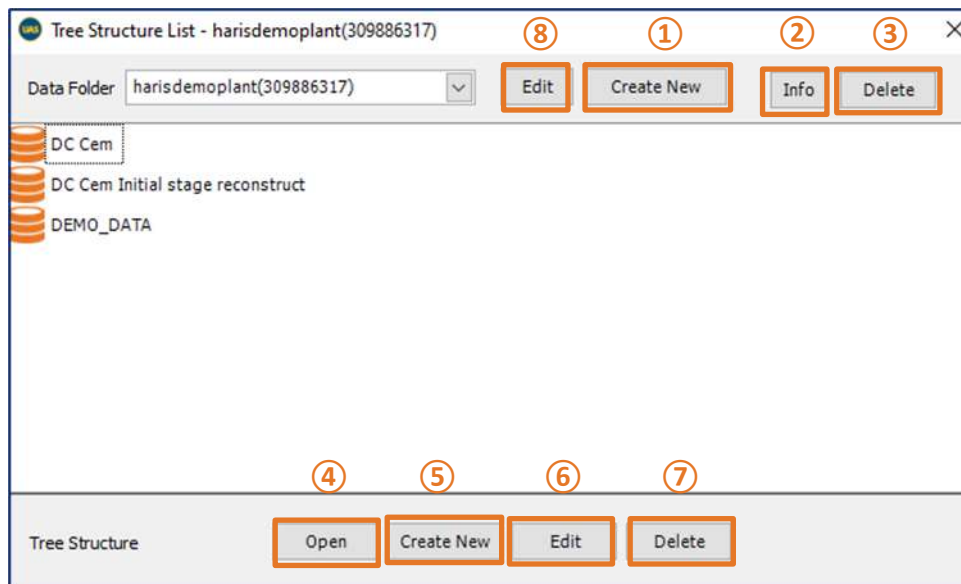
Choose a *Data Folder* (click on arrow next to Data Folder name to open a drop-down menu) and click on *Create New* ⑤, enter *Tree Structure Name* and click on *Save,* as shown below:

- To open an existing Tree Structure, select it from the list and click on Open ④;

- To rename an existing Tree Structure, select it from the list and click on Edit ⑥;

- To rename an existing Data Folder, click on the Edit button ② and then from the new window, type its new name and click on Save;

- To delete a Tree Structure, select it from the list and click on Delete ⑦. This action will delete the database. This operation is not reversible and cannot be undone. A warning message asks first for a confirmation.
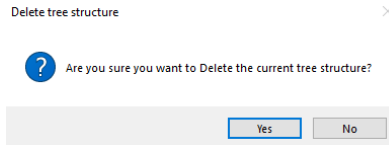
7.2. Modifying a Database

7.2.1. Add Descriptive Tree Nodes

You may choose to add a descriptive node or a measurement node. Descriptive nodes serve to describe the location of the physical asset.

Right click your mouse on any node in the open database tree and select "Add New > Tree Node" from the short-cut menu. This action opens the "Create New Tree Node" dialogue box. Type the name of the new Node and then click save. The new node is added as a lower-level sub-Node of the database or Node level you selected.
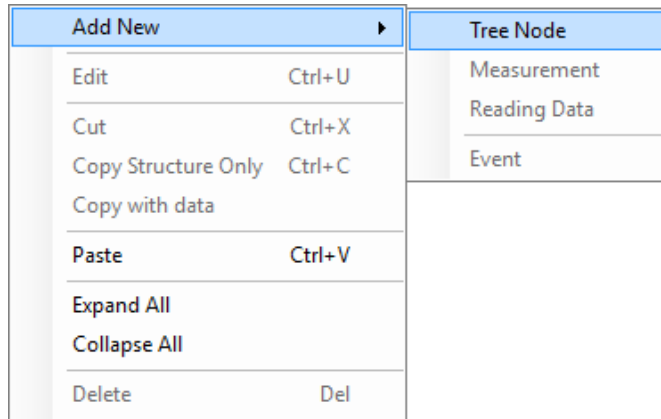
7.2.2. Add Measurement Tree Nodes

The last node in the tree (up to seven) is always used as the measurement node. Measurement nodes describe the type of measurement data collected from the asset. UAS3 will only allow you to assign Measurement Nodes in the correct place on the tree structure. If the "Measurement" option is inactive then you have chosen, the wrong section of the tree to add a measurement.

Adding LUBExpert measurements to your data tree is no different than adding other measurements. The only difference is that for a LUBExpert measurement, you only have two sensor choices (LUBEsense1 and TEMP2).
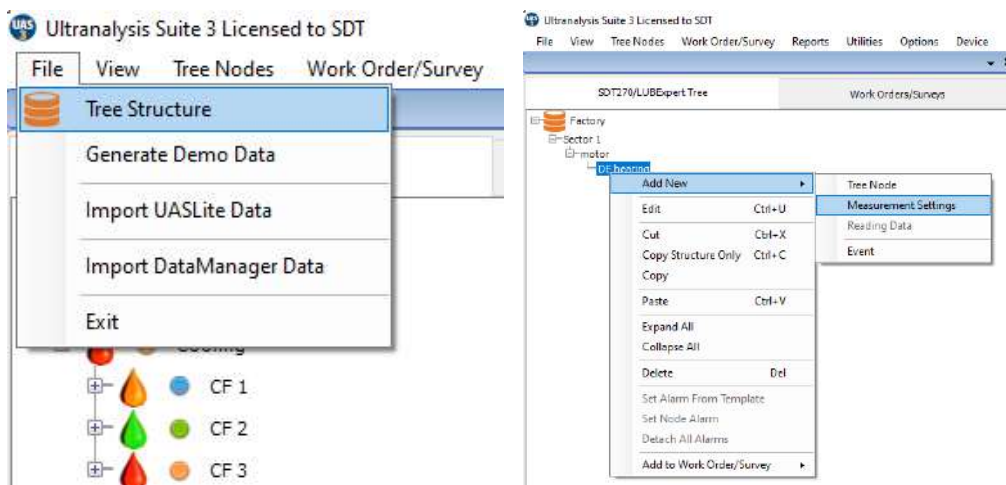
7.2.3. Assigning LUBExpert Sensors

If you followed the instructions to go into LUBExpert Mode, the list of available sensors should only be two (LUBEsense1 and TEMP2). The other sensors are still visible but inactive. Choose **LUBEsense1** to create an ultrasound measurement node and **TEMP2** to create a temperature measurement node as required.
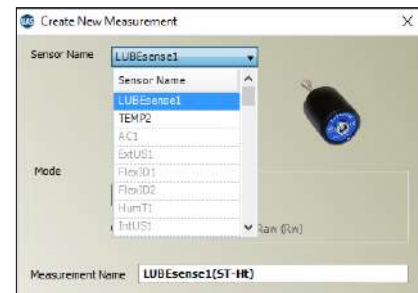
For ultrasound measurements, UAS3 gives you the option to choose either Static or Dynamic and for temperature measurements you can set the measurement interval and the emissivity.

If your instrument has only Static capabilities (LUBExpert, SDT270 SU), you should choose Static. If Dynamic is selected, your instrument will not recognize the measurement.
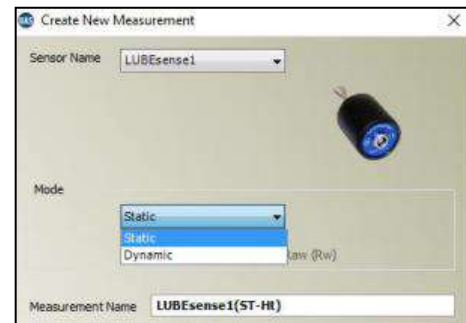
However, if you are using an SDT270DU with the LUBExpert App installed or LUBExpert Dynamic, choosing Dynamic here will instruct your instrument to collect both Dynamic and Static data simultaneously.

7.2.4. Setting Data Collection Interval, Acquisition Time, and Temperature Emissivity

Setting the interval of data collection
For both LUBEsense1 and TEMP2 measurements, the choice to set your preferred data collection interval time ① in months, weeks, days, or hours ② is made here.

Note that this field is not intended to be the re-greasing interval. This field is your data collection interval.

Condition assessment based on measured ultrasound data will be the trigger to perform grease replenishment (or not) as well as the quantity of grease required to restore an optimal lubrication mechanism to the bearing.

For TEMP2 measurements the additional choice to set emissivity exists here. The default emissivity is 1.0.

Setting Grease Type
Earlier we described how to set up a list of all the lubricant types used in your plant under "Lubricant Management". With the "Create New Measurement" dialogue box open, here you select the grease type for this bearing using the drop-down box beside the field Grease Name ③.

Setting Grease Gun

Earlier we described how to manage your inventory of grease guns under "Grease Gun Management". In that section, you named your grease gun and entered its grease injection quantity per stroke. Now, as you create measurement collection points in UAS3, it is important to assign the correct grease gun to the correct asset. Click on the drop-down box and scroll to the grease gun name to be used. Hover and release your mouse to select ④.

Assigning bearing data to Lube point

UAS3 manages a bearing database. This put bearing dimensions conveniently at your fingertips.

In the field Bearing ⑤, you must assign bearing data to the lube point, so all the necessary and automatic settings are then filled by UAS3. In field ⑤, choose the drop-down menu where you will see all the bearing types currently available within the UAS3 bearing database. Alternatively, you can click "EDIT" and add new bearing types.

Assigning bearing types already in the database

Select the drop-down menu in field ⑤, browse the database and select the desired bearing.

Adding new or editing existing bearings to the database

Select "EDIT" in field ⑤ and create new bearing, edit or delete existing bearing types. In case you do not know the type of the bearing installed, create a new one with a temporary name and approximate size and input accurate data at the first possible opportunity.

Manual input of grease quantity
If you want to manually add calculated grease quantity, chose "Edit" in field ⑦ and enter the quantity. In this case, all pre-calculations will be done based on your input. Manually edited quantity will be shown in *Italic.* If you want to go back to automatically calculated qty, simply press the "go back" arrow in field ⑦.

Note that the bearing must be selected, at least temporary one, with an approximate size. Editing quantity by more than 30% might cause guidance malfunction.

Side or Annular replenishment
In field ⑥, you need to choose if grease replenishment is side or annular. Select "side" or "annular" from the drop-down menu.

Note! If you chose to edit calculated grease quantity manually, this field will be blocked.

Once you have selected a bearing that is actually installed in the asset as well as its replenishment position, OD, ID and Width are defined, and grease quantity is calculated and adjusted according to selected grease pump output. This quantity is used as a safety point only in case of "Suspected Bearing Failure" status and to provide automatic recommendation to "Shorten Interval" that you have selected. Based on asset data selected at this point, UAS3 is also able to calculate steps in your guided lubrication process. In this example, step one will be 5 shots injection, step two 3 shots, step 3 and all following steps 2 shots.

Setting rotational speed
In order to complete the setup, UAS3 also needs information about the rotating speed of the selected asset. Enter the rotational speed in RPM in field ⑧. In case you are not sure about the rotating speed, or it is variable, set the lowest expected rotating speed to be on the safe side.

Acquisition time
Based on rotating speed, UAS3 will automatically calculate minimum and recommended acquisition time ⑨.

Recommended time is the result of positive experiences, but if desired, you can choose minimum time or any other acquisition time, but not less than minimum time and not greater than 80 seconds.

Stabilization time
Based on previously inserted data, UAS3 now automatically calculates the stabilization time and displays it in field ⑩.

Press "SAVE" and all settings for the selected asset are ready. These settings are assigned to the selected asset and go with it when workorders are transferred to the LUBExpert instrument. No further settings need to be done (nor can be done) in LUBExpert once in the field. This enables your grease technician to have comfortable, fast, and safe work in the field, as well as tight work control and dependable data for the Lubrication Manager.

8. Working with Work Orders/Surveys

Working with work orders/surveys in UAS3 for LUBExpert should be familiar to UAS3 users. For more detailed explanations, reference your UAS3 user manual. A general description is provided below.

8.1. Create a New Work Order/Survey

NOTE: LUBExpert functionality is activated only when working in WORK ORDER/SURVEY mode.

To create a new lubrication work order/survey, right click on any asset in the data tree to access the shortcut menu. From the shortcut menu select "Add to Work Order/Survey" and then "To SDT270/LUBExpert" and then "New Work Order/Survey". A dialogue box appears asking for the name of the new Work Order/survey. Type it and click Save. The asset is added to the New Work Order/Survey.

Operators may choose to add assets one at a time, or a bulk addition is possible. It is also possible to perform this action from the "Tree Nodes" menu. This is explained in greater detail in the UAS3 User Manual.
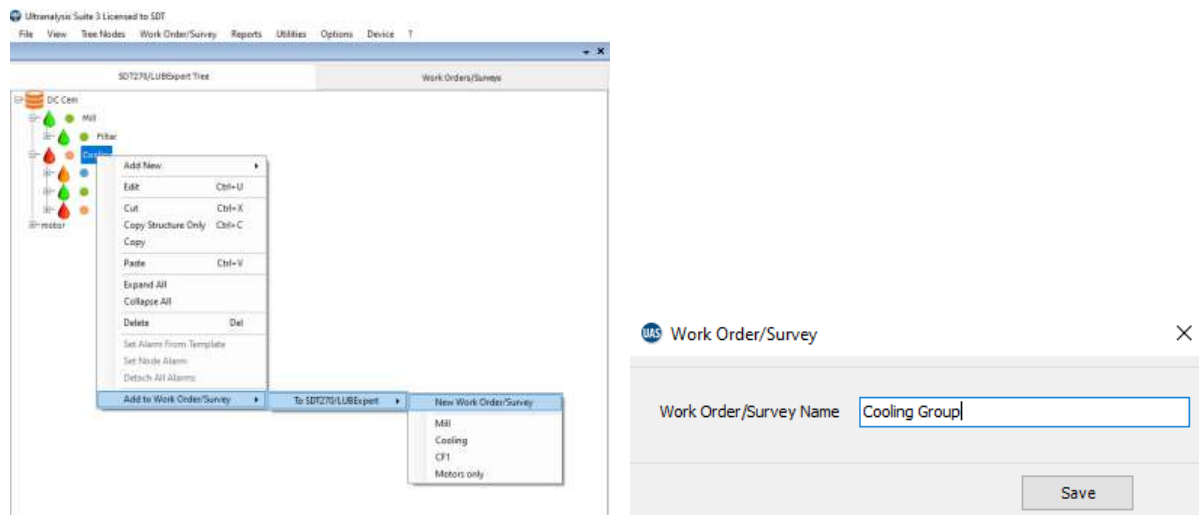
8.2. Transfer Survey to LUBExpert

To transfer lube work orders/surveys from UAS3 to LUBExpert or SDT270SU/DU:

- Connect LUBExpert or SDT270 instrument to PC using the USB transfer cable supplied.
  - o The device driver is found on the supplied USB Flash Drive.
- From the "Device" menu in UAS3 select "SDT270/LUBExpert" and then "Upload from PC to SDT270/LUBExpert
- Wait for message "SDT2xx device is ready" and select "Transfer"
  - o If the message doesn't appear, there is no connection between PC and device
    - ▪ Is the device switched on?
    - ▪ Is the correct driver installed?
- Wait for transfer progress to complete
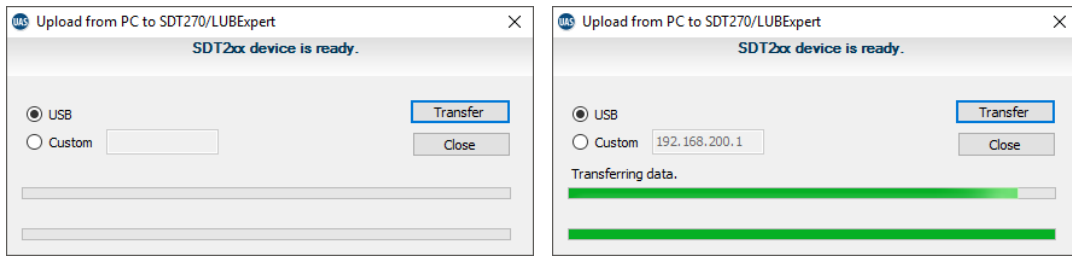
- After a successful transfer, a status report provides relevant transfer statistics
- Click OK. You're ready to go!
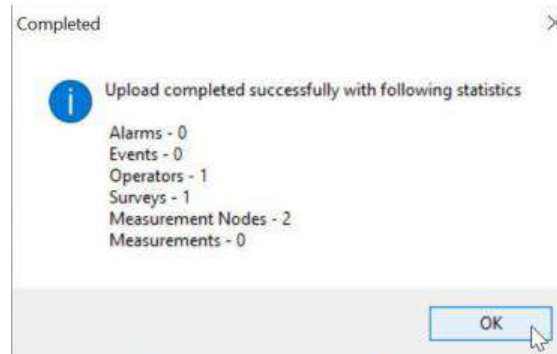
8.3. Before going to the field

You might want to be sure that you have all needed tools and Lubricants with you, in the right quantities. For that purpose, UAS3 offers you a "THINGS YOU NEED" report, containing a SHOPPING LIST. This report provides a summary of grease guns and grease types and quantities of grease you need for certain work order(s). This report can be saved as **PDF**, printed or emailed (usually to LUBE room to prepare it). Right-click on selected Work Order/Survey and select Things You Need Report.
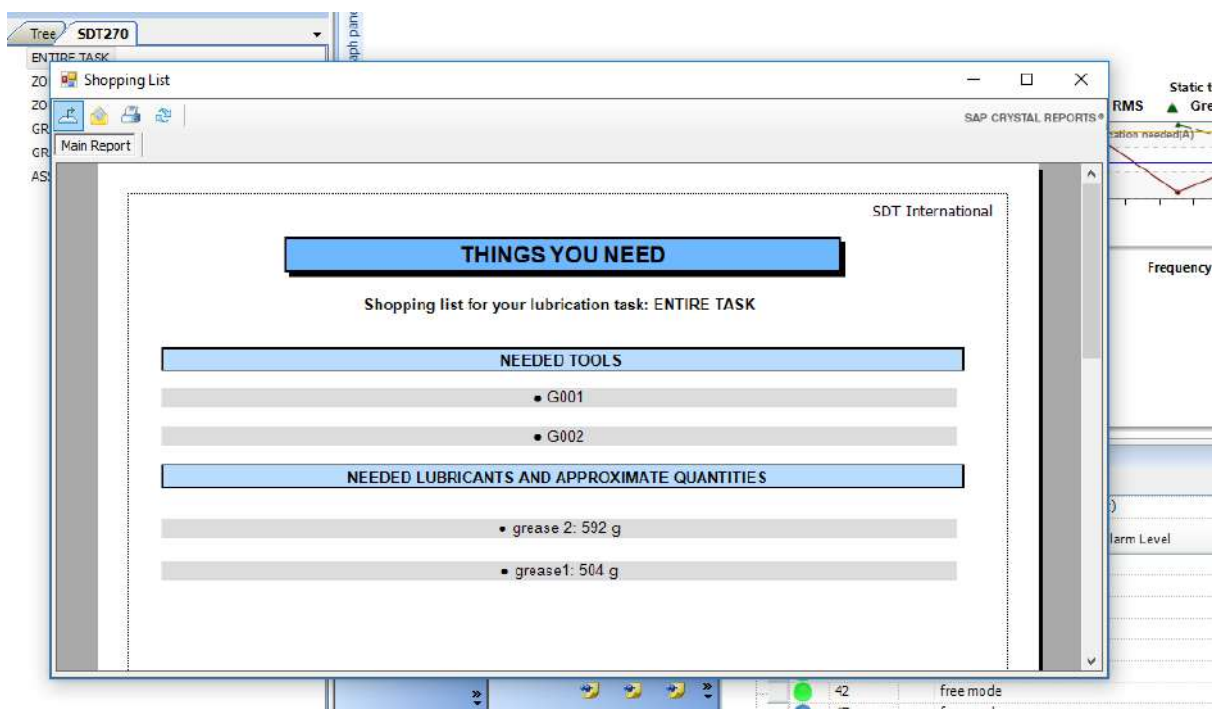
9. In the Field

9.1. Connecting LUBEsense1

LUBEsense1 is the only ultrasound sensor that works with LUBExpert or LUBExpert App on an SDT270SU/DU. Connect the sensor to the instrument with the coiled LEMO to LEMO cable (Article Code: FUCABLSPLE7LE7-3) supplied by SDT.

Carefully line up the red dots on the cable connector with the Black input on the instrument. It is important to line up the red dots to avoid damaging the cable's connector pins. Gently push the connector into the input. The LUBEsense1 probe is identified as "LUBEsense1" on the LUBExpert display.

LUBEsense1 is delivered with both a Magnetic Mount (Article Code FUSEACMAG-01 and FUSEACMAG-02) and the SDT Acoustic Grease Gun Adaptor (Article Code: FUSEACLUBE-03 or FU.SEAC.LUB.006-01). Choose the interface you want and screw it to the base of the LUBEsense1.
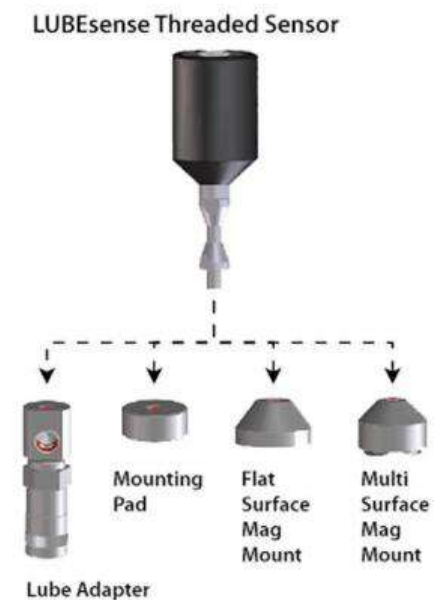
9.2. Starting to work – LUBExpert

Once you connect your sensor and transfer the data from UAS3 to your LUBExpert, you are ready to start. If you are working with LUBExpert you will see following screen:
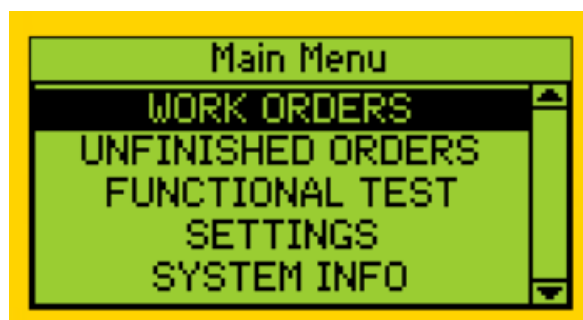
Note: If you are working with the LUBExpert App on SDT270SU or SDT270DU, the welcome screen is slightly different than this. An explanation appears later in this manual.

Let us start from the bottom:

- **SYSTEM INFO** will lead you to the menu where you can find all necessary information about your instrument

- **SETTINGS** will lead you to the menu where you can set up your instrument the way you need (time and date, backlight, automatic turn off when idle, language, text/icon...)

- **FUNCTIONAL TEST** enables you to make a test of sensor, cables and instrument, testing if it all works (it may have been damaged and not reported during previous use).

- **UNFINISHED WORK ORDERS** contain all your current work orders that are not entirely finished. By selecting UNFINISHED WORK ORDERS, all your WORK ORDERS will appear and when selecting any of them, only points with no attached measurements will appear. As an example, if you have a relatively big WORK ORDER to finish today, but for any reason, you were not able to complete it (shortage of time, asset was not in operation, no available tools and/or materials...), you will download today's data to UAS3 at the end of your shift, containing all the work you have done. Do not upload new Work Orders/Surveys on your LUBExpert (new upload deletes existing data in LUBExpert). When you return for next shift, open exactly the same WORK ORDER through UNFINISHED WORK ORDERS, and all missed points will be displayed. That is so much more convenient than navigating through the entire WORK ORDER list and looking for missed points.

- Finally, let us open **WORK ORDERS** and start working:

**You will see the list of your WORK ORDERS**

In case you did not print or send the "Things You Need" report (Shopping List) from UAS3 directly, you can still find it in your LUBExpert. Now visit the LUBE room to get all the items needed for the task(s). Selecting any of them and pressing the right arrow opens a SHOPPING LIST report for that particular WORK ORDER.
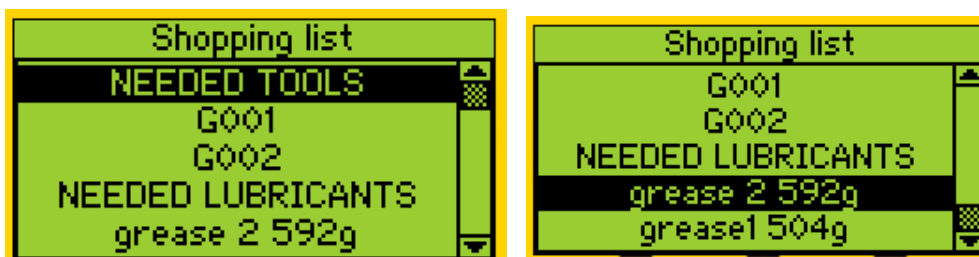
Pressing the left arrow takes you back to the screen where your WORK ORDERS are listed.
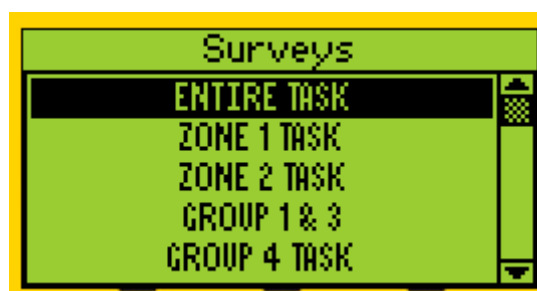
If you already have all you need, select a task and press ENTER. Your WORK ORDER will open at the first Lubrication point, as shown in the screen.
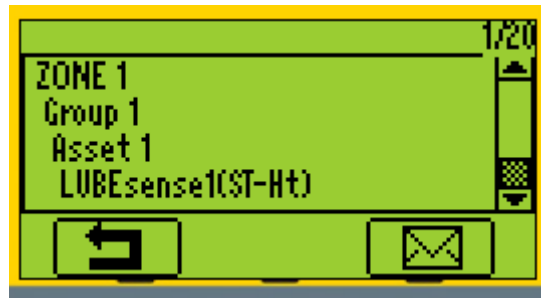

At this point, a message icon is offered in the lower right corner of the display. If the asset is not in operation, or safety is compromised, you have an option to assign a message that explains these conditions and your decision to abort the planned work.


By pressing ENTER, you acknowledge that you are at the RIGHT POSITION at the RIGHT INTERVAL, using the RIGHT LUBRICANT and the RIGHT GREASE GUN. You are also informed if there is an alarm assigned to this position (or not) and if yes, what is the threshold. In case you have multiple alarms, LUBExpert will display lowest (tightest) one that will trigger your decision to apply grease.
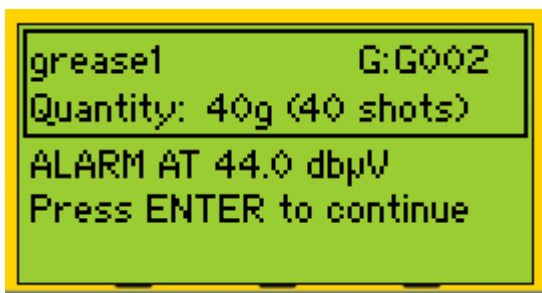
    or
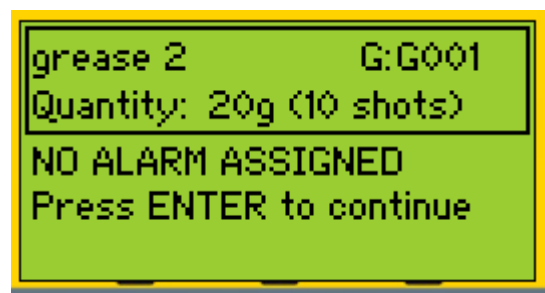
After pressing ENTER, you are instructed to take an initial reading. Pay attention to the (Up/Down) arrow on the LUBExpert display. It indicates if the instrument's amplification needs adjusting. Follow the adjustment instructions by pressing UP or DOWN buttons on the instrument until arrows on the screen disappear. In all following readings during the process, amplification is set automatically. Once arrows on the screen disappear and your sensor is attached to the asset in a safe and stable way, you are ready to measure. Note that LUBExpert prevents you from collecting incorrect data. You MAY NOT proceed until instrument amplification is set correctly. Press ENTER to take a reading.
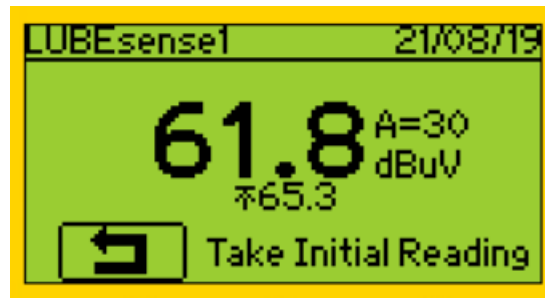
Once the reading has been taken, LUBExpert provides a screen with measurement results, representing RMS, maxRMS, PEAK and Crest Factor:


By pressing either F3 or ENTER, the reading is saved and processed. Depending on the result and triggered alarm (if there was an alarm assigned), one of the following screens will display:

In case there is **no alarm assigned** to Lube position, initial reading will be followed by a screen that offers you all choices.
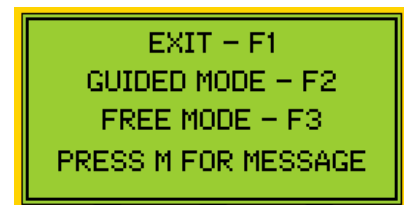

In case there is an **alarm assigned, but not triggered**, you are informed that Lubrication is not needed. You have an option to accept the recommendation done by alarm settings and press F1 to exit. In case you want to ignore this recommendation and continue, you need to press M, assign the message and then continue.
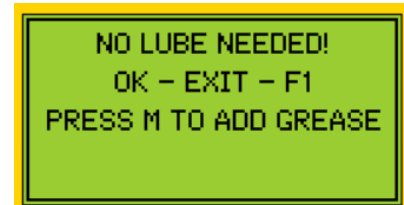
In case there is an **alarm assigned, and triggered,** you are informed that Lubrication Replenishment is needed. You have an option to continue in GUIDED MODE or FREE MODE. In case you want to ignore this recommendation and abort lubrication, you need to press M, assign the message and then exit.
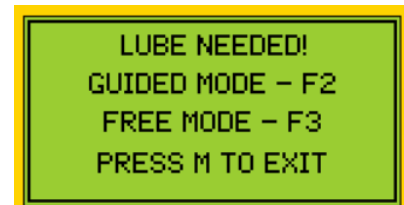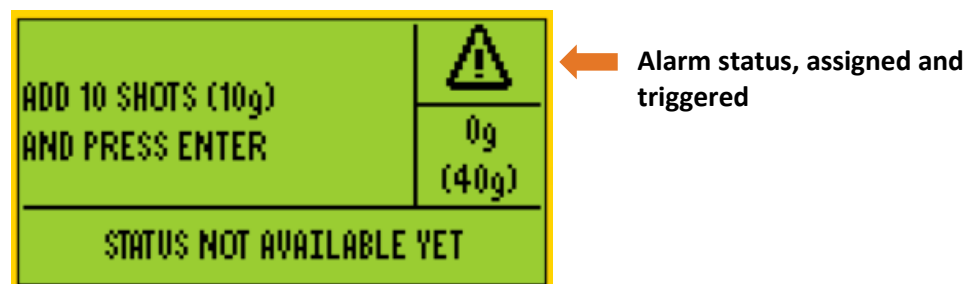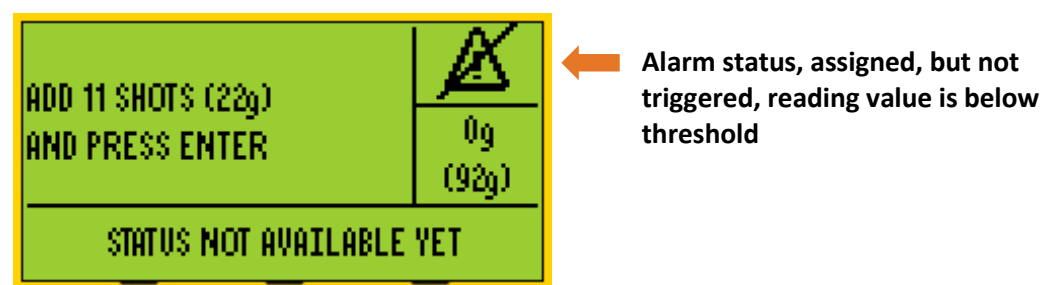
① ALARM NOT ASSIGNED
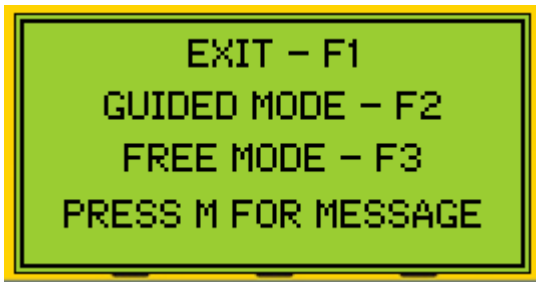
In case there is no alarm assigned to Lube position, initial reading will be followed by a screen that offers you all choices.

- In case you decide not to take any action, press F1 (EXIT) and you will be directed to the next asset in your **WORK ORDER**

- In case you decide to continue lubrication in **GUIDED MODE**, you will receive all instructions status at each step, based on analysis of signal development. Once started, **GUIDED MODE** leads you through with very precise instruction and you must follow the process through to the end.

- Once you choose **GUIDED MODE**, you will see an initial screen that will be different depending on Lube point

Alarm status, in this case, Not Available

Already applied quantity and planned quantity (in brackets)

Alarm status, assigned, but not triggered, reading value is below threshold

Alarm status, assigned and triggered

Note that alarm status is being refreshed after each step.

Now, slowly add grease as instructed on the screen and press enter (press enter after you add grease)

Note! In case you feel backpressure (possible grease fitting or line blockage), abort the process at any time by pressing F1 and add "Defective Fitting/Line" message (or other appropriate message)

Press F1
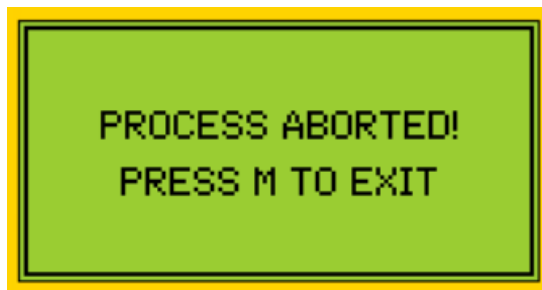
Press M and select the message

Press Enter

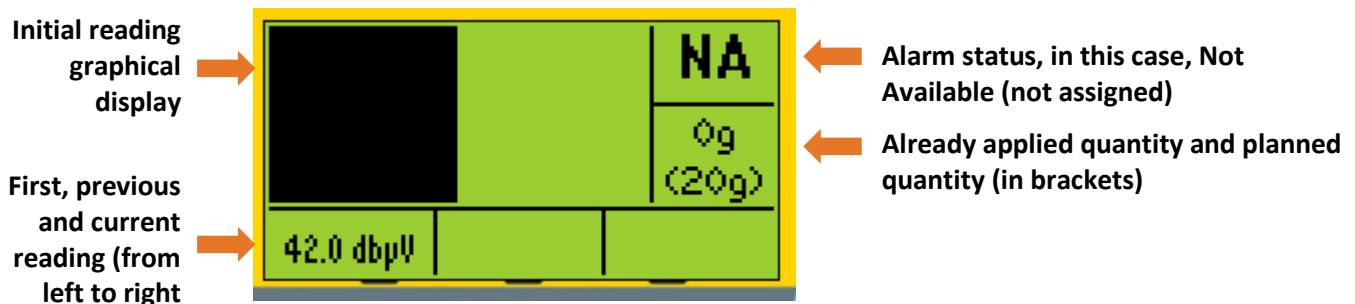After adding grease and pressing enter, the following screen appears (example of some of the possibilities)

Instructions

Alarm status

Already applied quantity and planned quantity (in brackets)

Status

or

Instructions will not be the same at first, second and all following steps, so please follow them carefully.

Status on the screen is a temporary status and may (and probably will) change during the process, but instructions should be followed.

Simply follow instructions for each following step until final screen:
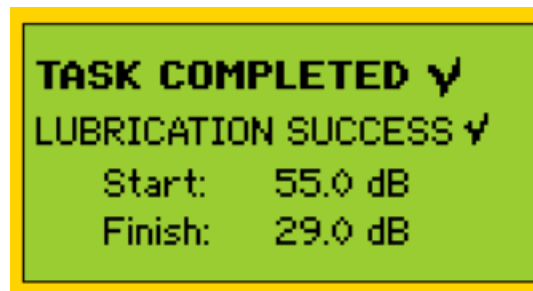
- At this point, you need to press ENTER and continue to the next asset in your task

- In case you decide to perform Lubrication in **FREE MODE**, press F3 and following screen will appear.

Initial reading graphical display

First, previous and current reading (from left to right

Alarm status, in this case, Not Available (not assigned)

Already applied quantity and planned quantity (in brackets)

(In cases when alarm is assigned and triggered, alarm level will be displayed on screen)

Alarm level
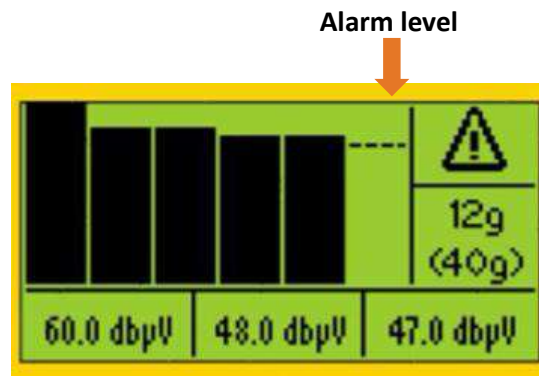
- **FREE MODE** lets you decide on each step you want to take and provides on screen details about the signal development. NOTE that FREE MODE will not guide you with recommendation for the next step and status and will not stop you with conclusion that the task is finished. However, FREE MODE will deliver a final conclusion about the lubrication process to UAS3
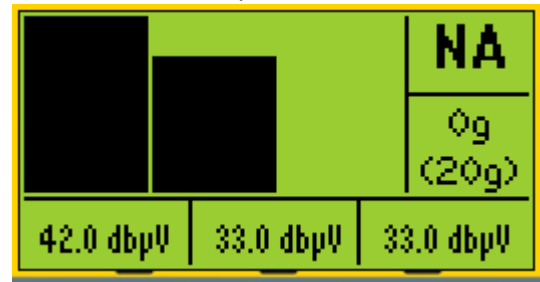

- Inject grease and press **ENTER**, the following screen appears;

- At this point, you need to tell LUBExpert the number of shots you injected into the bearing. Do this by using the **ARROW UP** on the instrument. If you mistakenly add too many shots simply delete them with the DOWN arrow. Note that you CAN NOT continue the grease replenishment tasks until you have inserted the grease quantity to LUBExpert.
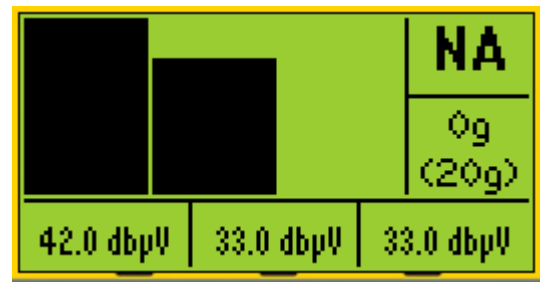
- Continue the process carefully watching signal development. Once you decide to STOP, press the SAVE button (button with **SAVE icon)** and proceed to the next asset in your WORK TASK
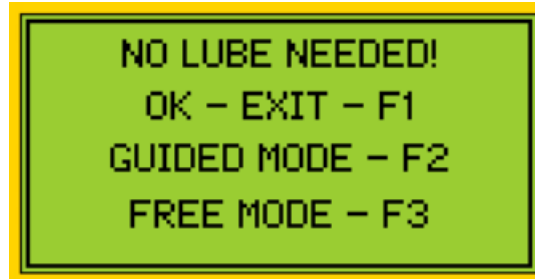
② ALARM ASSIGNED AND NOT TRIGGERED

In case there is an alarm assigned, but not triggered, you will be informed that Lubrication is not needed. You have an option to accept recommendation done by alarm settings and press F1 to exit. In case you want to ignore recommendation and still continue, you need to press M, assign the message and then continue.
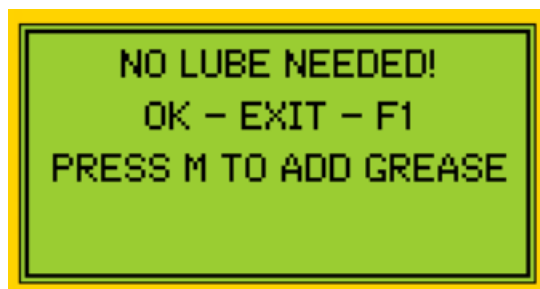

- LUBRICATION NOT NEEDED message is assigned automatically and marked as an automatic status/action message

Ultrasound Solutions

- In case you accept recommendations based on alarm settings, press **F1 (EXIT)** and you will proceed to the next asset in your work order

- In case you decide to ignore alarm recommendations, you must then assign a message in order to see the menu that lets you continue to **ADD GREASE**. In that case, press M, select a message and press ENTER. Your message is now added to the asset and marked as a manually added message. The following screen appears:


- You are once more reminded that lubrication is not needed, and you can still select to exit.

- If you want to add grease, you can choose **GUIDED MODE** or **FREE MODE** by pressing F2 or F3

- Follow either process as explained in previous case.

- Difference on the screen will be alarm status:

- Alarm ICON means that an alarm is assigned. When the Alarm ICON has a cross through it, this indicates that no alarm was triggered. An uncrossed Alarm ICON means that an alarm was triggered
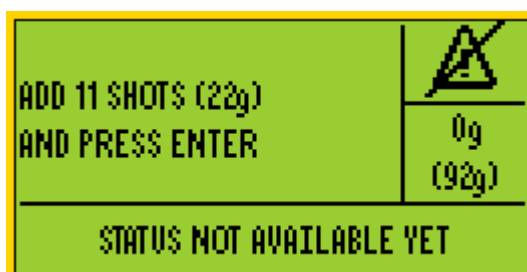

③ ALARM ASSIGNED AND TRIGGERED

In case there is an alarm assigned, and triggered, you are informed that Lubrication is needed. You have an option to continue in GUIDED MODE or FREE MODE. In case you want to ignore this recommendation and abort lubrication, you need to press M, assign the message and then exit.
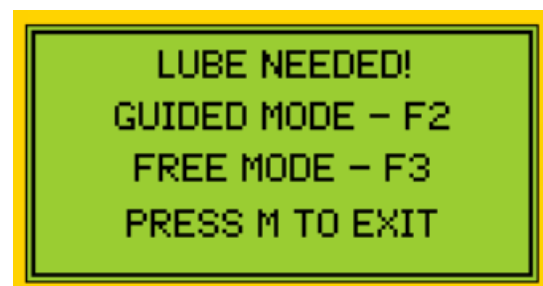
- **LUBRICATION NEEDED** message will be assigned automatically and will be marked as an automatic status/action message

- In case you decide to follow the alarm recommendations you can choose **GUIDED MODE** or **FREE MODE** and follow the process as described in case 1 above.

- In case for some reason, you decide to ignore the alarm recommendation (maybe some safety risk was observed, and you decided to abort the process) and do not add grease, press **M** to **assign a message**, select message and press ENTER. Your message is now added to the asset and marked as a manually added message. The following screen appears:
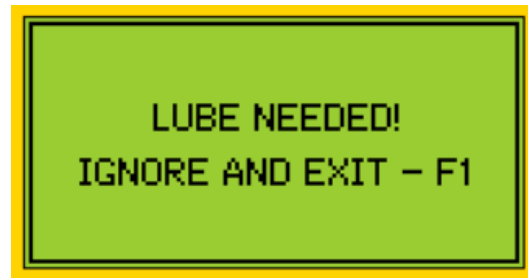

- Only after assigning a message and from this screen, you can press **F1** and **EXIT**

9.3. Collecting dynamic data with LUBExpert app (SDT270DU & LUBExpert Dynamic only)

If you are using LUBExpert Dynamic or SDT270DU with LUBExpert App, there is an additional opportunity to collect Dynamic data (TWF, FFT) while performing your lubrication task through LUBExpert procedures.

You can create your measurement node in two ways:

1. **You can create both Dynamic and Static settings in your measurement node.** Pay attention that settings must be the same. To make it accurate, fast and easy, use copy/paste settings functionality.
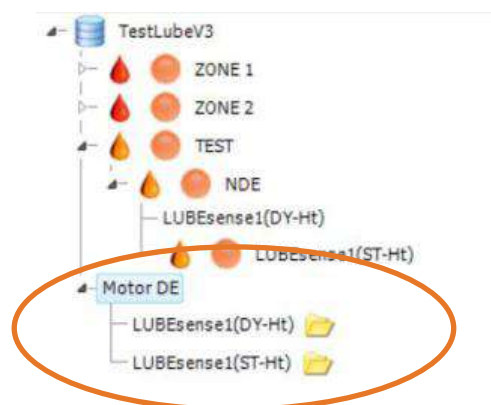
You can add both measurement settings to your Work Order/Survey, or just one of them.

In case you add only Dynamic settings to your Work Order/Survey, you will be able to perform your task through Dynamic only, of course. Still, all static data will be populated to your Static point.

In case you add only Static settings to your Work Order/Survey, you will be able to perform your task through Static only, of course. In this case, your Dynamic data will not be collected, and Dynamic point will not be populated with data.

In case both Dynamic and Static settings are added to Work Order/Survey, you can choose one of them to for grease replenishment process. Same as mentioned before, working through Dynamic data will populate Static data as well, but Static data will not populate Dynamic data.

Reason to have them both in your Work Order/Survey is to offer you a choice not to collect dynamic data (if you decide so).

When transferred to your instrument and selected, you are ready to start.
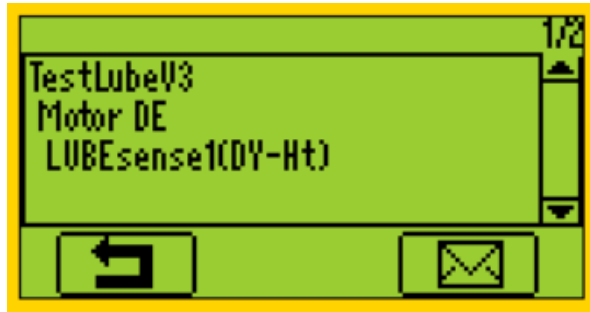
If Dynamic measurement is chosen, your SDT270DU LUBExpert will automatically collect Dynamic data from your initial and final reading. The process is entirely the same as described before with difference that you will be providing additional highly valuable data for bearing Condition Monitoring.

Confirm that you are using the right grease and grease gun:
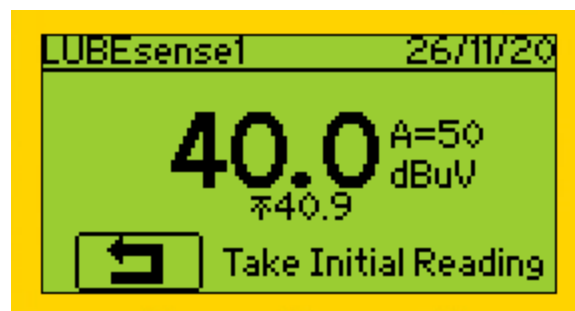
Take initial reading and press Enter when data is collected
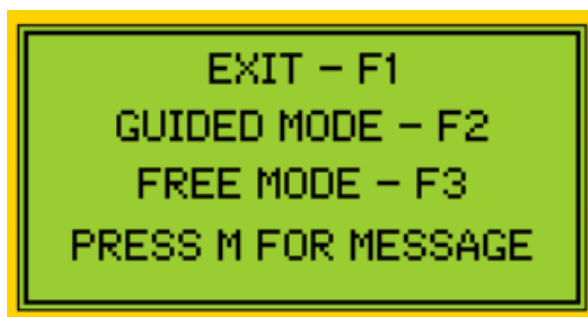
Depending on assigned alarm and reading values, you will be instructed on screen

Depending on your choice, follow instructions (GUIDED MODE) or perform lubrication in FREE MODE. Once you finish this your lubrication task, summary screen will inform you about the details. To confirm, press Enter.

Next position in your work order/survey is Static data measurement of the same asset. Since data has been collected and lubrication task performed, this position is clearly marked as "Done" and you can proceed to your next asset.

In case you chose Static point instead of Dynamic (at the beginning), you will not collect Dynamic data, only perform a lubrication task, as mentioned before.

2. **You can create only Dynamic settings in your measurement node**
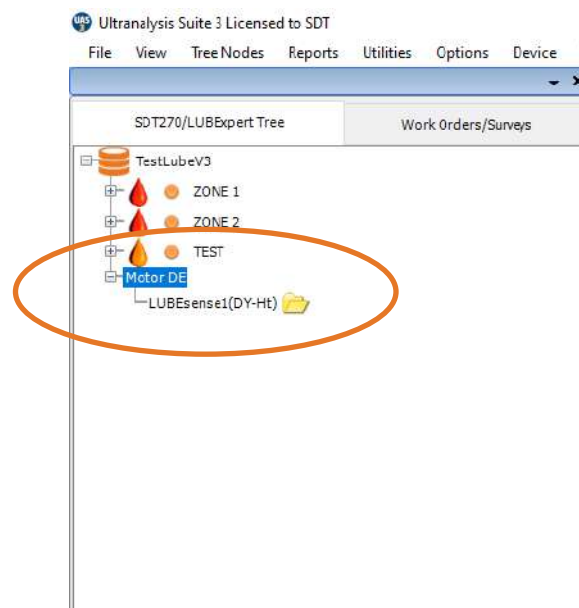
Of course, once you add it to your Work Order/Survey, there will be Dynamic point only to perform grease replenishment through

You will choose Dynamic settings, work through your task as explained before and, once finished, you will download data to your UAS3.

At that point, Static settings in your node will be automatically created in UAS3, all settings properly copied, and point will be populated with data.
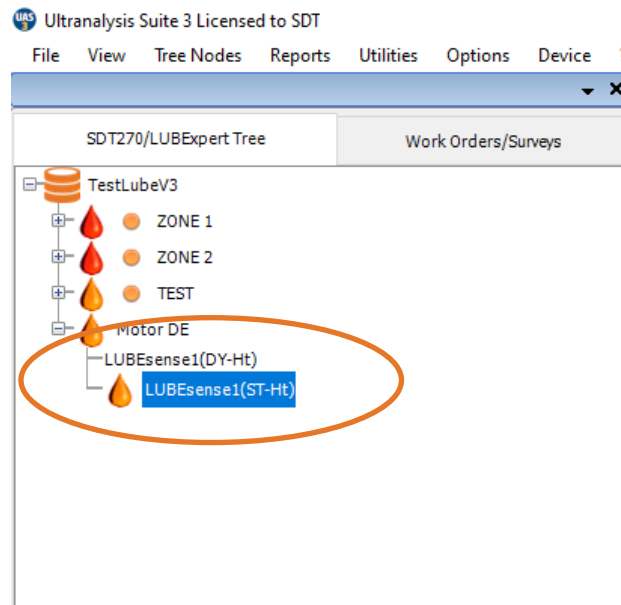
This is very practical way, and it will most probably be your choice.

NOTE!
Alarms can be assigned to Static settings only, but even if Static settings are not transferred to Work Order/Survey, Dynamic settings will be affected by defined thresholds and alarms will be fully functional during field work.

During your lubrication process, all messages will be precisely time stamped and marked as ones automatically added or ones manually added. That way, full control and traceability of work is obtained.

If in **GUIDED MODE**, you will be provided precise instructions and Lubrication status at every step.

In **FREE MODE**, you can perform lubrication at your own assessment, with all necessary information on your display. Lubrication status and outcome of you work will be added in UAS3

Quantities of added grease will be recorded in all cases.

Alarm status (if assigned) will be refreshed with every step in the process.

Note: Checkmarks in the bottom left corner indicate already collected and saved (in SDT270 instrument) data in the measurement point.

No checkmark indicates that there is no reading collected and saved.

One checkmark indicates that there is one reading collected and saved.

Two checkmarks indicate that there are two or more readings collected and saved.

Checkmark indication applies to all measurement settings/sensors.

9.4. Transfer Results to PC

Upon completion of the lubrication survey connect your LUBExpert or SDT270SU/DU to your PC's USB port to download the results. Follow these steps:

- Connect device to PC with the supplied USB cable (article code SICABUSBAUSBBM).

- From the Device menu choose "SDT270/LUBExpert" and the "Download from SDT270/LUBExpert to PC"
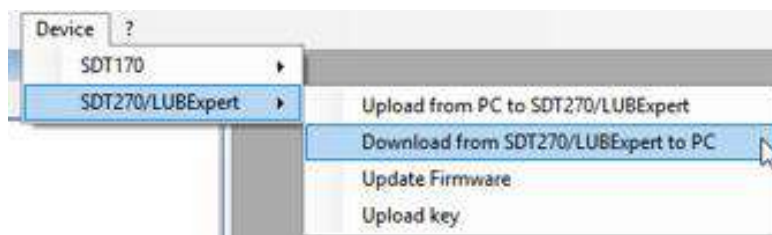
- Verify the SDT270/LUBExpert is connected and ready, then select "Transfer"
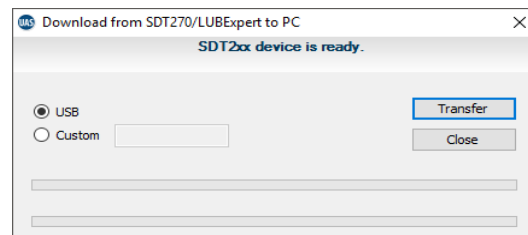
- A message displaying the results of the transfer confirms a successful download.

10. Viewing Results in UAS3

If you already use Ultranalysis Suite (UAS3), the LUBExpert interface will seem familiar. For LUBExpert, new features include Added Grease Trend Curves, Grease Consumption Reports, Lube Status Indication, Messages marked by origin (auto/manual), Trend of all initial readings, Trend of all final readings (baseline), Summary graph of all Lubrication activities for each asset. This manual is not meant to cover every aspect of UAS3. For UAS3 specific features and instructions you are encouraged to read the UAS3 User Manual. For your convenience, we include it with the USB stick in your LUBExpert kit. The manual is also available in the download section of www.sdtultrasound.com.

There are two different dashboards within UAS3, one for LUBEsense1 sensor only and another one for all other sensors.

Dashboard for LUBESense1 (Lubrication dashboard) contains:

- The Measurement Matrix

- The Static Trend

- The Summary analytic graph of Lubrication activities

- The Base/Initial line graph

Dashboard for other sensors (Standard dashboard) contains:

- The Measurement Matrix

- The Static Trend

- TWF

- Spectrum

When you select measurement (sensor level), dashboard is automatically adjusted to sensor type. When you select a parent node, asset, and asset position contains several different sensors including LUBESense1, you can choose what dashboard you prefer to be displayed for your fast overview. To choose dashboard type, in toolbar select Options/Default settings/Tree View, as shown in screenshot below:
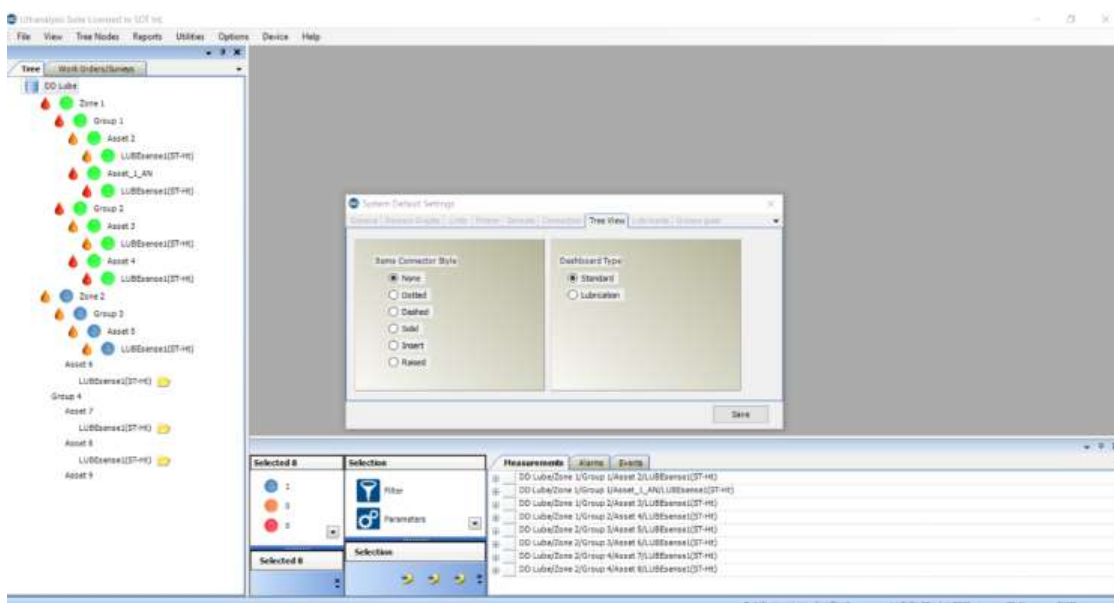
10.1. Selecting, Viewing Trends, Analytics, and Measurement Details

Viewing your lubrication data has never been more important and easier. The standard Dashboard view brings essential information into focus. UAS3 uses four powerful widgets that report, in a single view, operational and condition changes to your assets. The 4 Widgets include, moving clockwise from top left:

- The Measurement Matrix

- The Static Trend

- The Summary analytic graph of Lubrication activities

- The Base/Initial line graph

When using LUBEsense1 sensor, dashboard is customized as shown, showing all relevant data that concerns Lubrication activity.

11. Reports

11.1. Tree View

Tree view provides information on alarm status and Lube status of each asset/Lubrication point. General alarm status is indicated with colored dot: red for danger, orange for warning and blue for alert level. Lube status is additional information is indicated next to each asset that contains LUBEsense1 data. Lube status alarms also uses color code:

- **RED oil drop icon** represents **SUSPECTED BEARING FAILURE** and **PROCESS ABORTED** status and as an indicator that there was a message **SAFETY RISK** or **DEFECTIVE LINE/FITTING** assigned to that asset during last visit

- **ORANGE oil drop icon** represents **LUBRICATION FAILURE, OVERLUBRICATION and SHORTEN INTERVAL**

- **GREEN oil drop icon** represents **LUBRICATION SUCCESS**

Lube status of the asset is indicated by an oil drop icon in one of the mentioned colors.

Regarding priority (RED, ORANGE, GREEN), status of the asset will be transferred to parent nodes.

As an example:

Within ZONE 1, we have GROUP 1 and GROUP 2, and within those two groups we have 4 assets in 1 and 5 assets in 2.

ZONE 1 is marked with RED oil drop icon because one or more nodes within it are marked with RED oil drop icon (in this case both GROUPS).

Group 2 is marked with RED oil drop icon because within this group we have asset 5 marked with RED oil drop icon.

This information is placed within the tree view for user´s convenience. This addition gives a fast view on any irregularities in the lubrication process.

Additional details about Lube status alarms for each asset is available in the bottom pane.
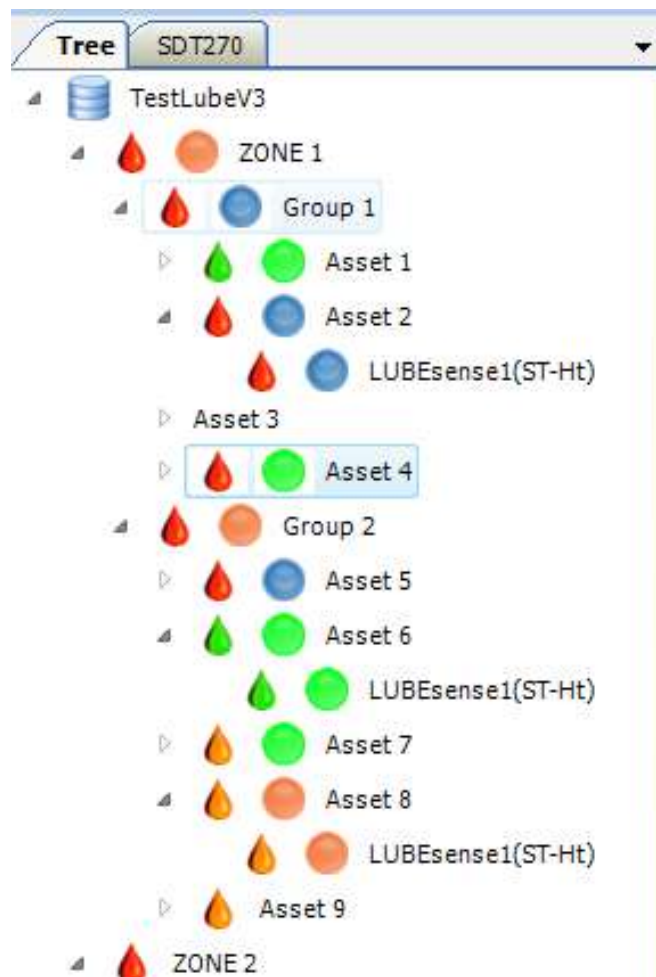
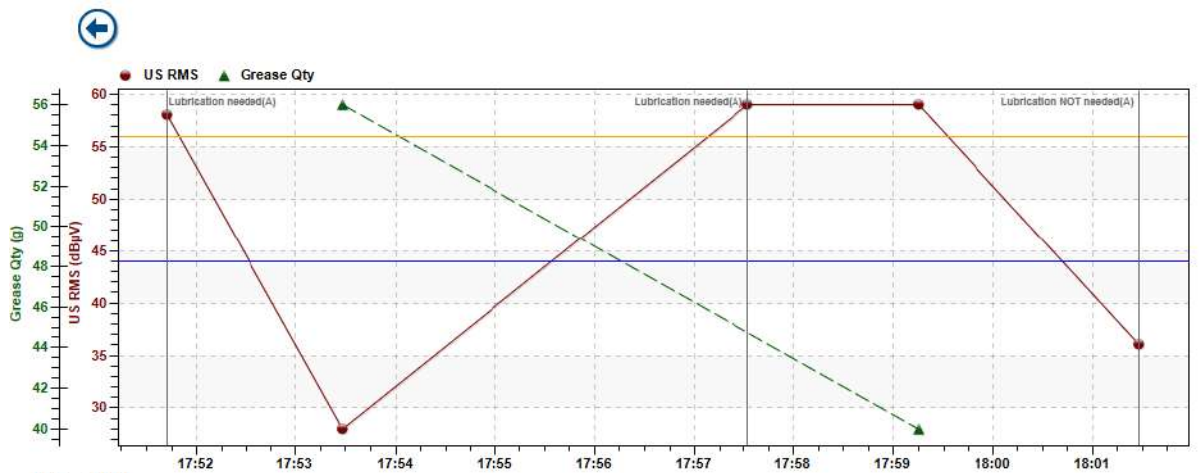## 11.2. Dashboard View (Lubesense1 only)

- The Measurement Matrix

Measurement matrix shows last 4 sets of measurements and includes RMS, maxRMS, Peak, Crest factor and added grease quantity.


- The Static Trend

Static trend is a strong source of information and great tool. In this view, we left only RMS and grease quantity displayed. You can see readings (RMS in red), in this case all done in GUIDED MODE, initial and final. As asset had an alarm assigned, you can see automatically added message in initial readings. In first two cases that message tells me that lubrication was needed. In first case, lubrication was performed and successful. In second case, lubrication was performed but obviously as lubrication failure status. In third case automatically assigned message in that lubrication is not needed and it was not performed. Green line shows added grease quantity. In first case greater quantity that led to success. In second case, very small quantity as process was stopped due to lubrication failure status (inspected afterwards).

- The Summary analytic graph of Lubrication activities
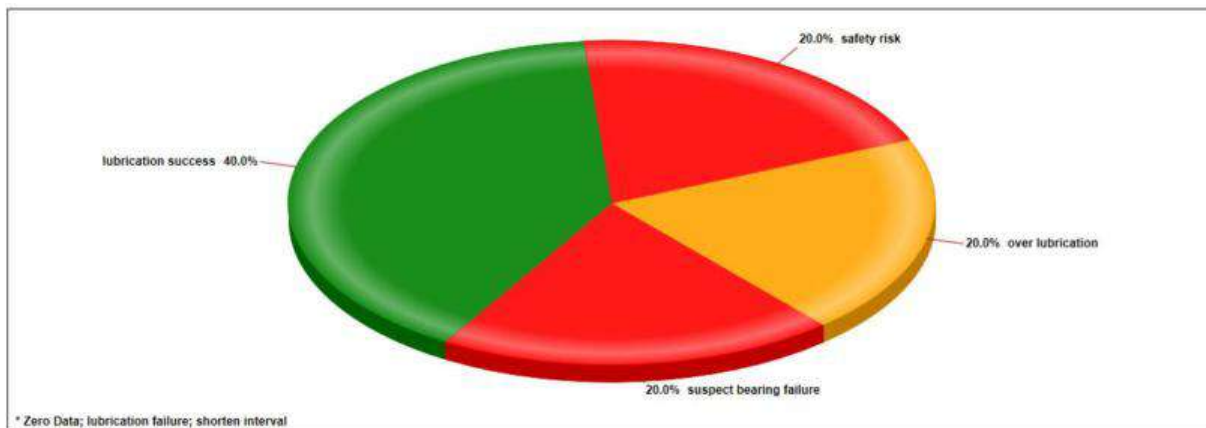
This chart gives you an overview of results of all lubrication activities in this particular asset. Call it a history overview. It helps understanding the success of your strategy.

- The Initial line/Base line graph
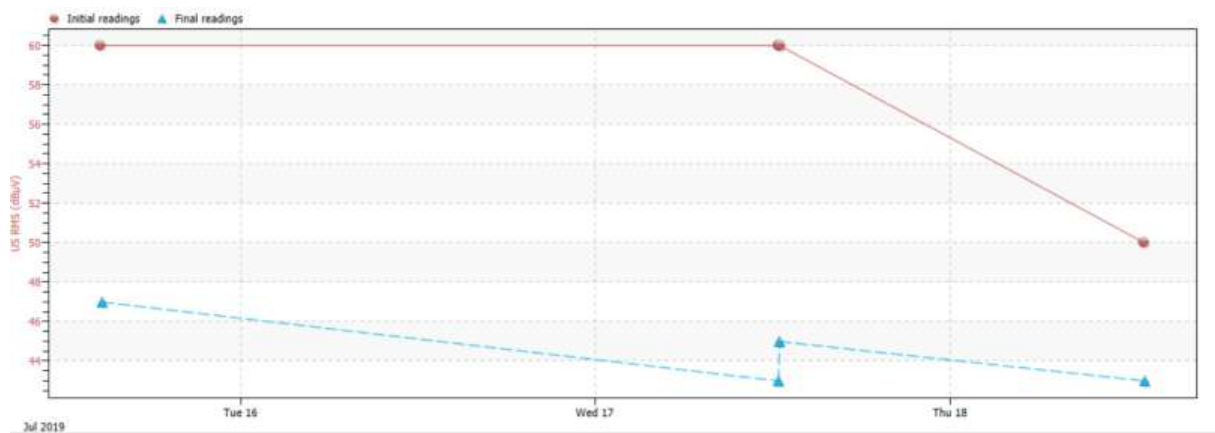
This graph shows you two different trend lines.

It trends all your initial readings. This graphic provides a better understanding of the condition you find your bearing in each time you perform a measurement. This trend helps you understand if your interval is right and give you better insight in general bearing condition.

It also trends all your final readings. Contrary to common opinion disseminated in Ultrasound world, "baseline" is not a flat line. You will not have the same reading as final one in each and every of your lubrication processes. That line is live… as live as your asset. From the behavior of your trend line, you can conclude the right alarm level and also have a great input about the health of your asset.

Pay attention to gaps between those two lines, it is very useful information, and it is on your screen.

11.3. Bottom Pane Views

The bottom pane of UAS3 features informative views specific to lubrication tasks. Clicking on the plus sign expands the measurement data for a specific machine. In this example, for simplicity, we show four different results on one machine.

If you select the one level higher than measurement level (in this case ASSET 5) and select EVENT tab in bottom pane, you will have a review of all events, in this case all messages assigned to this particular point during lubrication process.

Messages assigned during Lubrication process are very important information and a valuable tool for Lubrication management. They can be automatically assigned by LUBExpert, or manually added by

operator. Automatically added messages are result of the alarm status/recommendation after initial reading. Manually added messages represent operator´s actions opposite to alarms/recommendations or field observations. Messages are clearly marked as automatically added (A) or manually added (M). All messages displayed here are also displayed in static trend graph.

By selecting measurement level (sensor) in tree view and selecting Measurements tab in bottom pane, you will have detailed information about each lubrication process performed in this Lube point.
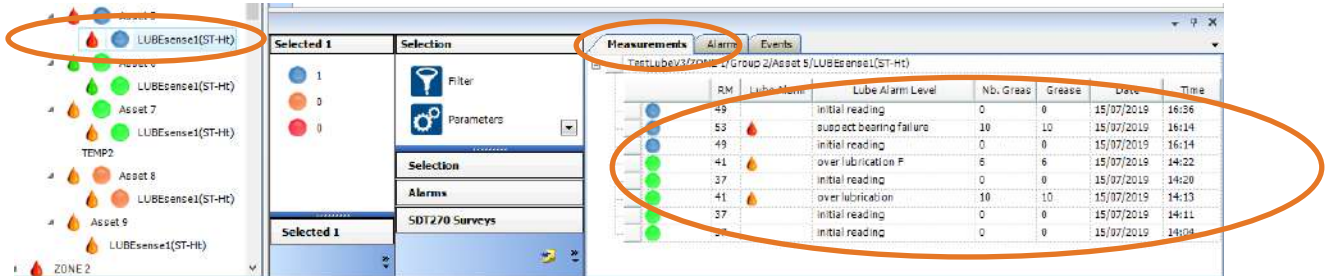
This view gives many different information sets. You can customize your view in the Parameters Menu. In the view displayed in the above screenshot, we see Alarm Level, RMS value for each measurement, Lube Alarm Status, Lube Alarm Level Specified, Number of Shots Added, Quantity of Added Grease in Grams (oz), Date and Time.

In case the lubrication process was performed through FREE MODE, each reading will be displayed: first reading as INITIAL READING, all following readings as FREE MODE and final reading as Lube Alarm Level (as an example LUBRICATION SUCCESS) Each step will be added grease quantity displayed (added in that step), while final step will display total added quantity during the process. Lube Alarm Level will have the letter "F" added, as an indication the process was performed in FREE MODE

In case the Lubrication process was performed in GUIDED MODE only, first and final readings are displayed. First reading is displayed as INITIAL READING and final reading is displayed with Lube Alarm Level, and total quantity of added grease.

Here are some examples:

Initial reading of 59 dBμV RMS triggered alarm status "ALERT" (blue alarm sign) and indicated need for lubrication. Final reading of 45 dBμV is below alarm level, so alarm icon is a green oil drop. Lube alarm is displayed as green oil drop icon indicating a positive outcome of the lubrication task. Lube Alarm Level says "Lubrication success" indicating that the process of lubrication improved friction level (decreased it). 45 shots of grease were added, with 90 grams grease in total.

In the lubrication process performed on 03.07.2019., no alarm was assigned to this particular asset. The initial reading was 10 dBµV RMS and after 10 shots of grease or 20 grams final, a reading of the same 10 dBµV RMS automatically stopped the process and declared Lube Alarm Level "Lubrication failure". This condition requires additional attention, as applying grease did not make any difference in the bearing friction levels.

	RMS	Lube	Lube Alarm Level	Nb. Grease Sh	Grease	Date	Time
🟢	28	🔶	lubrication success - shorten interval	56	56	11/07/...	17:53
🔴	58		initial reading	0	0	11/07/...	17:51

Measurements | Alarms | Events
TestLubeV3/ZONE 1/Group 2/Asset 7/LUBEsense1(ST-Ht)

In this lubrication process, initial reading of 58 dBµV RMS triggered "WARNING" alarm and lubrication was performed. Final reading of 28 dBµV is below the prescribed alarm level, so alarm sign is a green oil drop. Lube Alarm Level indicates that the lubrication process was successful, but with an additional remark to shorten the lubrication process interval. This means that the added grease quantity was significantly greater than the one automatically calculated based on bearing size. Since the friction level was lowering, LUBExpert did not stop the process until minimum friction level was achieved, but high grease quantity suggests shortening the interval when operator visits this asset and takes readings.

	RMS	Lube	Lube Alarm Level	Nb. Grease Sh	Grease	Date	Time
🟢	40	🔴	suspect bearing failure	49	98	11/07/...	16:47
🔴	59		initial reading	0	0	11/07/...	16:45

Measurements | Alarms | Events
TestLubeV3/ZONE 1/Group 1/Asset 4/LUBEsense1(ST-Ht)

In this lubrication process, an initial reading of 59 dBµV RMS triggered "WARNING" alarm and lubrication was performed. Final reading of 40 dBµV is below alarm level, so alarm sign is a green oil drop. Lubrication process showed us a bearing behavior that is suspected to be a failure. As friction level showed overall constant decrease, lubrication process was allowed to continue until calculated quantity was reached (this is a unique case/status where LUBExpert stops the process at that quantity). This is one of two "red" Lube alarm levels as it requires additional attention of the Condition Monitoring team and should be shared as a lead.

	RMS	Lube Alarm	Lube Alarm Level	Nb. Grease	Grease Qty	Date	Time
🟢	40	🔶	over lubrication F	7	7	11/07/2019	15:07
🟢	37		initial reading	0	0	11/07/2019	15:06

Measurements | Alarms | Events
TestLubeV3/ZONE 1/Group 2/Asset 5/LUBEsense1(ST-Ht)

This lubrication process nicely explains the use of alarms and messages assigned. An initial reading of 37 dBµV did not trigger an alarm and message "Lubrication not needed" was automatically assigned. As operator decided to ignore alarm and add grease anyway, he could continue the process only by adding a message to confirm he was ignoring LUBExpert's suggestion. Additional message was "Lubrication needed", marked as manually added. Once process was initiated, 7 grams of added grease increased the friction level and process was stopped with Lube alarm level "Over lubrication".

Here is an example of lubrication preformed in FREE MODE. Initial reading triggered "WARNING" alarm and process was started as FREE MODE by decision of the operator. All following readings are marked as "free mode" and the final one with Lube alarm status (in this case "Lubrication success"). You can see how friction levels were decreasing with each step (also overall alarm status changing). Grease quantity displayed next to each free mode reading indicates the quantity added in that particular step. Final reading shows total added quantity. Lube alarm status and achieved condition in FREE MODE is no different than one achieved through GUIDED MODE, still, mark "F" is added so it can be differentiated how the process was done. It helps in understanding cases by case if needed.

Here is an example of an emergency exit from the process (Process aborted), as there was a reason not to continue lubrication. One of the most common reason is blocked grease line or grease fitting. Status of the bearing is Process Aborted, added quantity and reading value is one that was last recorded prior to emergency exit. In order to exit the menu after this kind of event, operator is obliged to assign a message explaining the reason, and that would most probably be "Defective line/fitting".

As an SDT270DU LUBExpert App or LUBExpert Dynamic user, additional data will be displayed in your UAS3 software:
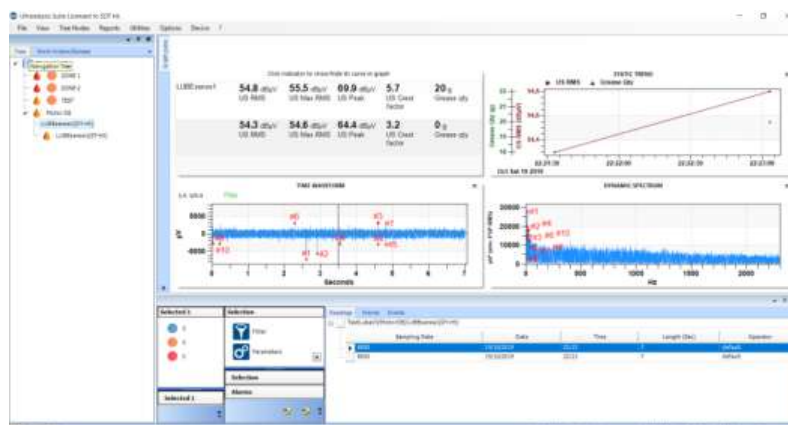
Two Dynamic measurements are collected during initial and final reading of your lubrication process, thus describing condition of your bearing before and after the grease replenishment process. This is great data the lubrication technician provides directly to the condition monitoring team.

Static point offers all data as described before.

11.4. Consumption Reports

The LUBExpert integration in UAS3 includes two new reports dedicated to lubrication features. The first concerns the cumulative lubricant consumption sorted by grease name. The second is the comparison of lubricant consumption sorted by user selected greasing locations.

To generate a lubrication report, select the Menu Reports and then the sub–Menu Lube.
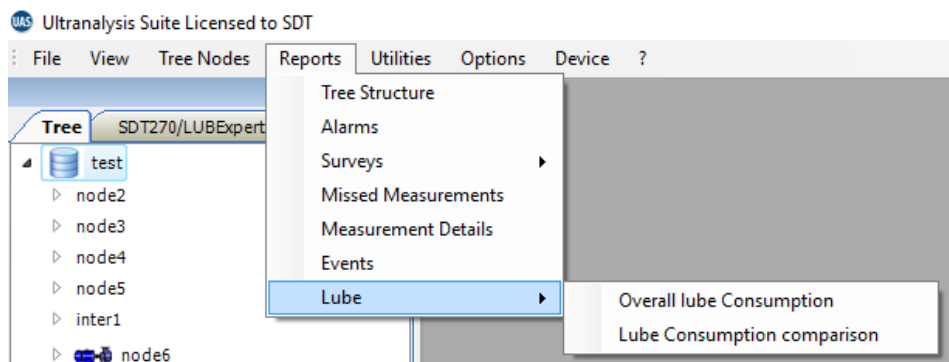
11.4.1. Overall lubricant consumption

After having selected the overall lubricant consumption report, from the new window:
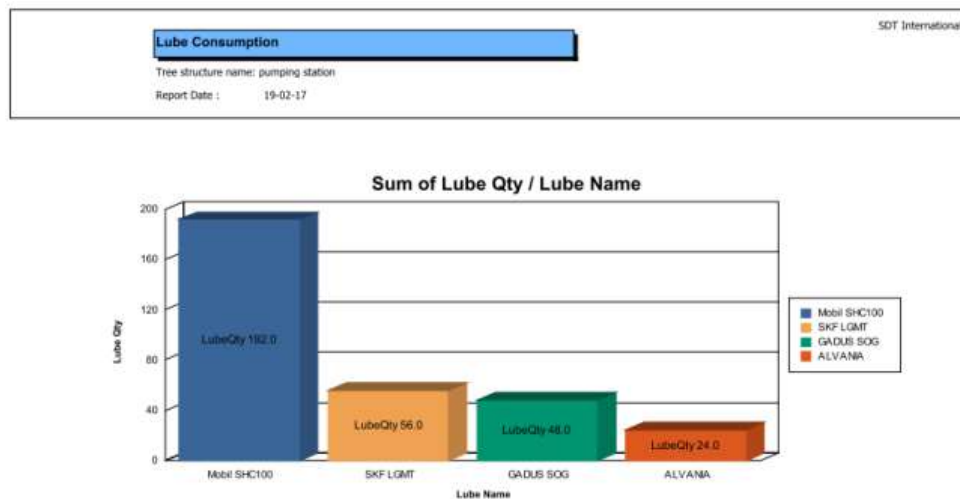
- Select the Tree structures ① to include in the report by ticking their check box ②. The tree structures coming from a common Data Folder could be individually chosen. Two shortcut buttons enable to select ④ and unselect ③ all Tree structures.

If desired, the report may cover a specific date range by ticking the "Selected Date Range" check box ⑤ and then choosing the period using the two drop-down buttons ⑥.
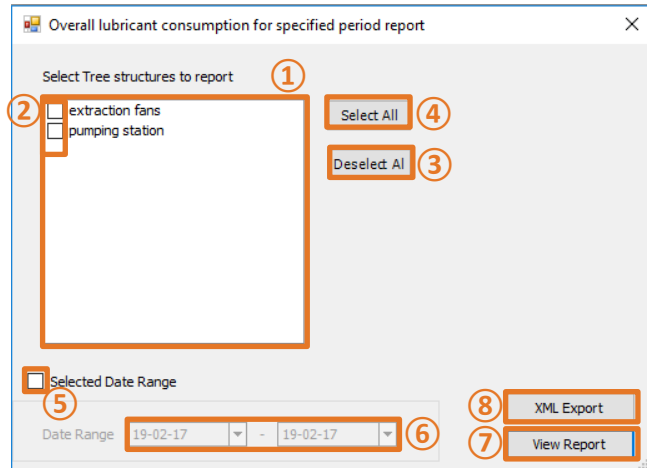
- Finally, the last choice is to generate the report by clicking the "View Report" button ⑦ or to export the data in XML format using the XML Export button ⑧. For this option, an intermediate window asks the name and the location of the generated file.

The generated report details the lubricant consumption per grease name for the chosen period.


11.4.2. Lube Consumption Comparison

Select the Lube Consumption Comparison report, from the new window:

- Select the Tree structures ① to include in the report by ticking their check box ②. The tree structures coming from a common Data Folder could be individually chosen. Two shortcut buttons enable to select ④ and unselect ③ all Tree structures.
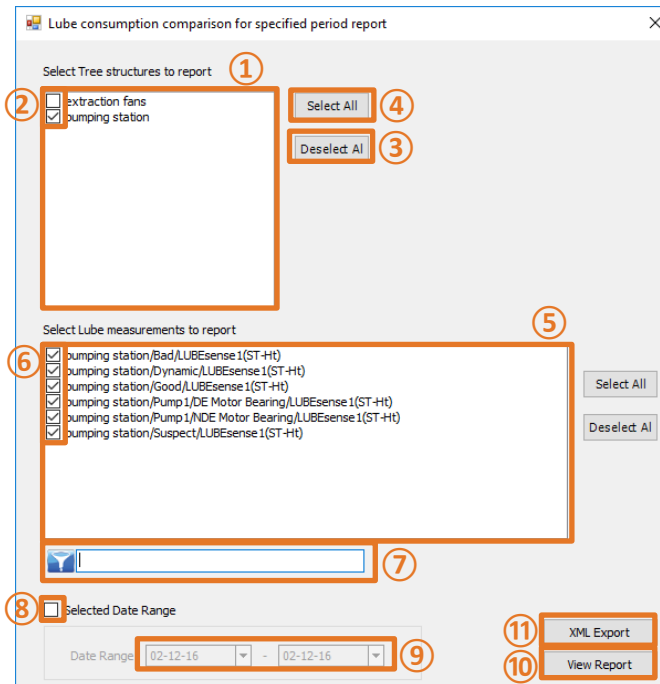
- Select the Lubrication locations ⑤ to report by ticking their respective check box ⑥. The filter ⑦ may be used to quickly sort the measurement points. Note that the filter is case sensitive. As for the Tree structures, two shortcut buttons enable to select and unselect ③ all.

- If desired, the report may cover a specific date range by ticking the "Selected Date Range" check box ⑧ and then choosing the period using the two drop-down buttons ⑨.

- Finally, the last choice is to generate the report by clicking the "View Report" button ⑩ or to export the data in XML format using the XML Export button ⑪. For this option, an intermediate window asks the name and the location for the purpose of the file creation.
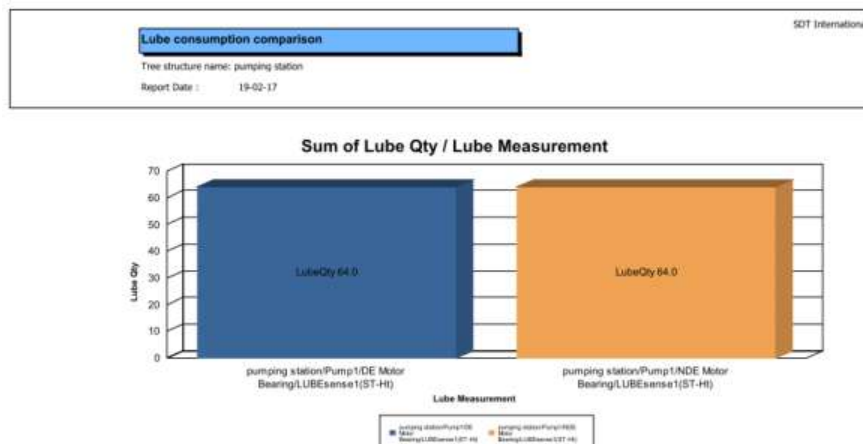
The generated report details the lubricant consumption per lubrication point for the chosen period.

Notes

Ultrasound Solutions

Revision	Writer	Nature of modification	Approved
06	CMA 22/07/2021	EU directive & Standards + LUBE adaptor reference + note on the battery charger	CGI
05	HTR 10/06/2021	Checkmarks	CGR
04	CGI 2/12/2020	UAS3 + LUBExpert Dynamic	CMA
03	CGI 09/03/2020	Original version	CMA

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