

## Op-Torq

POWER MONITORING SYSTEM



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Original instructions

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For information on all aspects of the OpDAQ Systems ship-board instrumentation systems and associated services, visit our World Wide Web site: <http://www.opdaq.com>

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## LIMITED WARRANTY

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Please record the date of purchase and serial numbers of the purchased [OpDAQ Systems Inc.](#) Products:

Name and address of purchaser:	_____
Date of Purchase:	_____
Model of product:	_____
Serial number of product:	_____

### ONE YEAR LIMITED WARRANTY

[OpDAQ Systems Inc.](#) warrants solely to the original purchaser of the Products for a period of (1) one year after the date of delivery, the Products to be free from defect in material and workmanship under normal use, and will conform to [OpDAQ Systems Inc.](#) published specifications of the Products. Notwithstanding the foregoing, [OpDAQ Systems Inc.](#) retains its right to deviate from published specifications due to latest improvements in function and design of the Product. The foregoing warranty is subject to proper storage, transportation and use of the Products, and does not include defects due to normal wear and tear or deterioration. Upon delivery, Customer shall immediately inspect the Products for conformity and visible defects. Customer shall give [OpDAQ Systems Inc.](#) immediate written notice of any conformities or visible defects regarding the Products and contact [OpDAQ Systems Inc.](#) in writing concerning return or repair, as the case may be.

[OpDAQ Systems Inc.](#)'s sole obligation under this warranty is, upon evaluation by [OpDAQ Systems Inc.](#), and at [OpDAQ Systems Inc.](#)'s option, to repair or correct any defect or to replace or exchange the Product with a copy of the original invoice to [OpDAQ Systems Inc.](#) at its own cost. Any repaired, corrected, replaced or exchanged Products shall be subject to the warranty and limitations set forth. If [OpDAQ Systems Inc.](#) has received notification from Customer, and no defects of the Product could be found, Customer shall bear the costs that [OpDAQ Systems Inc.](#) incurred as a result of notice.

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This warranty set forth is exclusive and in lieu of all other warranties (whether expressed or implied), rights or conditions and Customer acknowledges that except for such limited warranty the Products are provided "as is". [OpDAQ Systems Inc.](#) specifically disclaims, without limitation, all other warranties of any kind including any implied warranties of merchantability and fitness for a particular purpose or use. Handling of this Product is to be as stated in the Installation and Operating Instructions of this manual. In no event shall [OpDAQ Systems Inc.](#) be liable for any special, indirect, incidental or consequential damages or loss, whether in contract, tort, or otherwise, even if advised of the possibility of such damages. Some states and provinces do not allow limitation of implied warranties or the exclusion of incidental or consequential damages so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state to state or province to province.

## SUPPORT SERVICES

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For technical support, installation services or request for repair please see the contact information below.

OpDAQ Systems Inc.  
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[www.opdaq.com](http://www.opdaq.com)

If any defects not covered under the warranty are found, OpDAQ Systems Inc. will repair the defect after providing the Customer with an estimate.

# 1. ABOUT THIS MANUEL

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The **Op-Torq** system is a versatile system that can be configured for a variety of user’s specifications. Consequently, the information displayed and the menus are specific to each Customer configuration request and can vary considerably.

**Op-Torq** is designed to display, log and analyse power, RPM, torque from and Binsfeld Engineering TorqueTrak torquemeters. **Op-Torq** is generally designed to perform the following functions:

- 1. Propulsion shafting torsional measurement
- 2. Performance measurement
- 3. Remote monitoring and reporting

To ensure clarity and coherence most figures presented in the manual will feature the same system configuration: twin engines. This should be considered only as an example as it does not reflect the full extent for the system’s potential.

Target group	Tasks
Operator-owner	Keep these instructions available at the installation site for future reference.  Ensure that employees read and observe these instructions and the associated documents.  Observe additional system specific directives and regulations.
Specialist personnel, fitters	Read and observe these instructions and the associated documents.



The information contained in this manual are based on our experience and is current and complete to the best of our knowledge and ability at the time of printing. **OpDAQ** Systems Inc. does not accept responsibility for errors, omissions or incorrect interpretations of the contents or any information herein.

# 2. MECHANIC & ELECTRIC ASSEMBLY

## 2.1 SYSTEM COMPONENTS

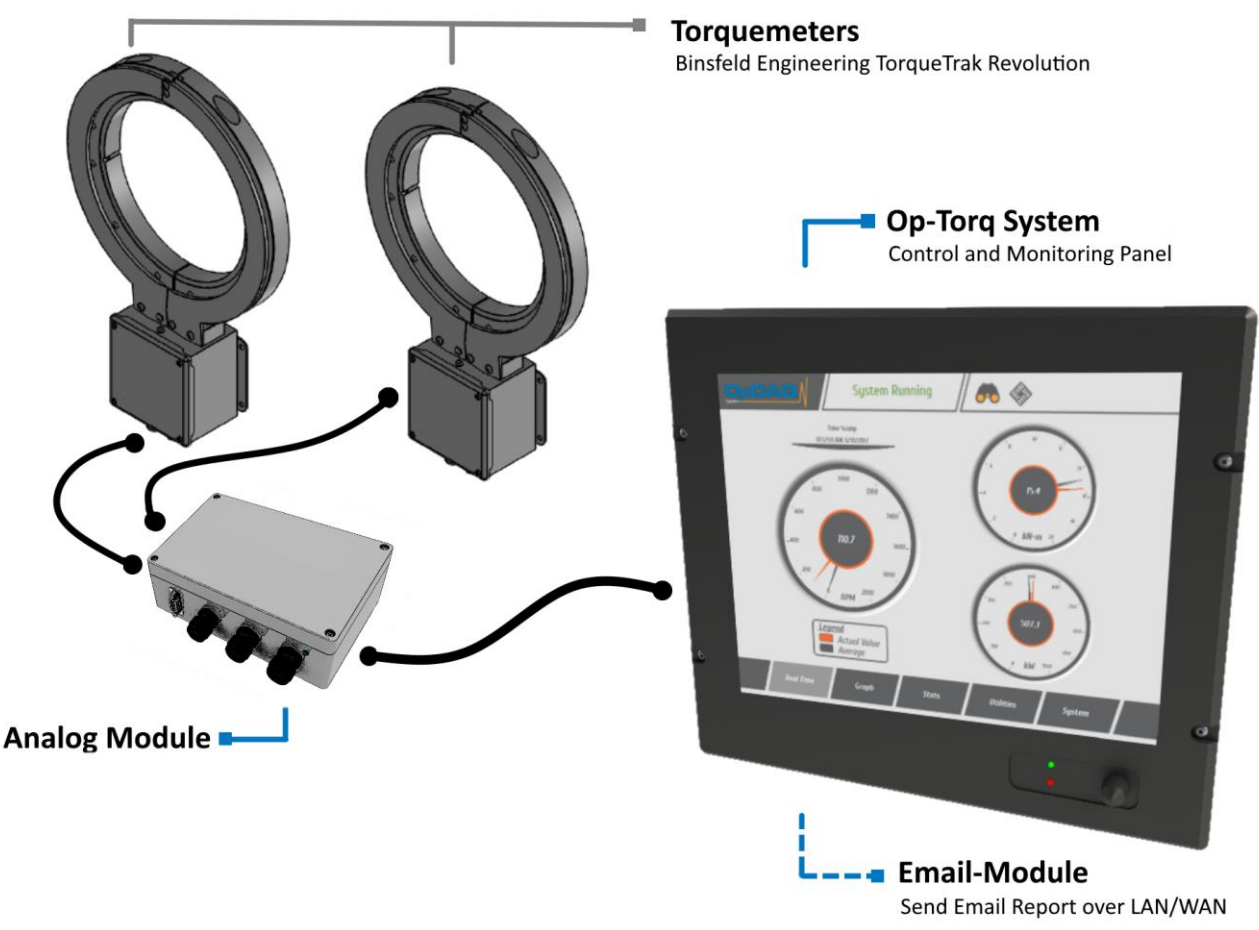


Figure 1 - System components overview



## Op- Torq Main Terminal

**Op-Torq** is built around a Main Terminal, which is a 12.1" touch panel marine computer. The Main Terminal is made of a Marine Grade Panel PC equipped with a high quality 12.1" touch screen monitor. It receives the digitally converted signals from the TorqueTrak TT-Revolution torquemeter(s). The converted signals are logged into a database and displayed in real-time on the Terminal screen.

The computer can log up to one year of data. The data can easily be downloaded on a USB drive. As an option, it can also be sent by email. The user can use the touch screen to navigate the various displays, moving between windows and applications.



Figure 2 – Main Terminal

## Binsfeld TorqueTrak torquemeter (sold separately)

The Binsfeld TorqueTrak torquemeter is a torque and power monitoring and control system that features inductive (non-contact) power and data transfer for continuous operation. It is designed for applications that require ongoing measurement of torque and/or horsepower. These parts are sold separately from the **Op-Torq** system.

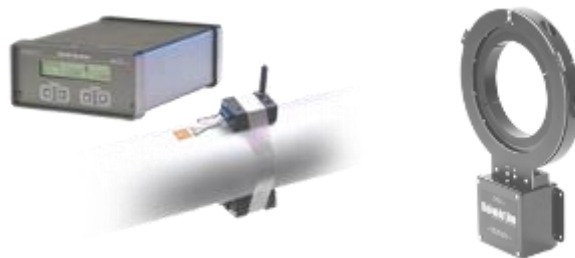


Figure 3 - Binsfeld TorqueTrak torquemeter : (left) TorqueTrak 10K, (right) TorqueTrak Revolution

## Remote USB Port

A remote USB port is supplied with the system to provide an easy way to export the data and update the system without having to access the Main Terminal. It should be installed close to the Main Terminal.



Figure 4 – Remote USB Port

## Analog module (Included)

The analog module receives the 4-20 mA signals from the shaft torquemeter(s) and converts it for serial communication with the processor unit. This item is sold separately from the [Op-Torq](#) system.



Figure 5 - Analog module

## 2.2 DATAVIEW SOFTWARE

Collected data can be analysed by our software called [DataVIEW](#). [DataVIEW](#) is a powerful tool designed to process and analyse data provided by a wide range of instruments and sensors. [DataVIEW](#) runs on a regular PC and gives the users a tool to produce ship performance reports over long periods of time (several months, year, between drydocks). The report format can be customized according to the client standards. The data can also be exported to Microsoft Excel in a tab separated format.



Please refer to the [DataVIEW](#) installation and operation manual for installation and operation instruction of [DataVIEW](#).

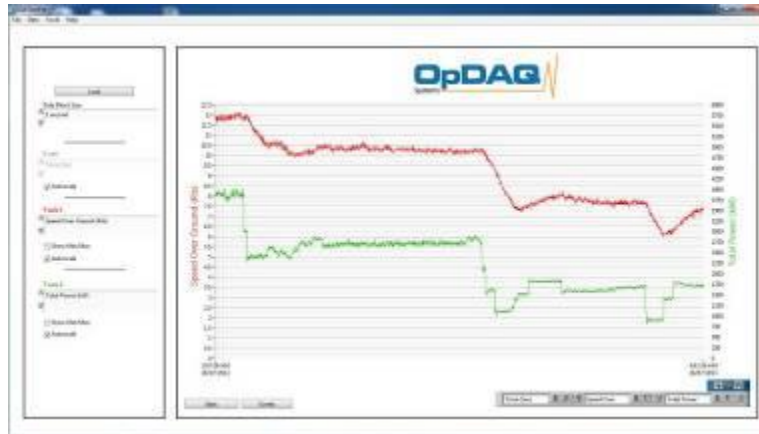


Figure 6 – OpDAQ DataView screenshot

## 2.3 PRODUCT OPTIONS

Op-Torq can be purchased with different optional features including the following:

- Control panel assembly
- Repeater (for wheelhouse)
- Email report
- Electrical power meter

For more information regarding these upgrades please contact OpDAQ Systems at: [info@opdaq.com](mailto:info@opdaq.com)

### Control Panel Assembly

To facilitate the installation of the Op-Torq monitoring system, OpDAQ can provide a custom-designed industrial cabinet to fit the user's needs. The control panel facilitates the display and monitoring of numerous instrumentation assemblies. The Panel PC, the Analog module and the USB port can be assembled in a single control panel as shown in the figure below.



Figure 7 – Main Terminal control panel for Panel PC, analog module and USB port

### Repeater

The **Op-Torq** Main Terminal is typically installed in the engine control room. A Repeater is used to display the acquired data in the wheelhouse or in any other convenient place. The Repeater is a multi-functional display specifically designed to meet the engine monitoring needs of the marine industry. It offers an easy to use interface with the ability to switch between Day and Night mode operations.



The Setup mode is not available on the repeater.



Figure 8 –Repeater

### E-mail report module

The Email report module is designed to send periodic reports via email to allow a third party (for example: the ship owner) to have access to information on a daily basis. The report features a compressed version of the saved data along with the list of events and error codes. The data is compiled into .xml format file. Each file has a size of approximately 100 kB.



Access to an internet connection is necessary to use the Email report module.

## Electrical power meter

The electrical power meter can be integrated to the [Op-Torq](#) system to monitor the electrical power on genset engines and generators.



Figure 9 – Electrical power meter

### 3. DIMENSIONS

#### Dimensions of the 12.1" panel computer

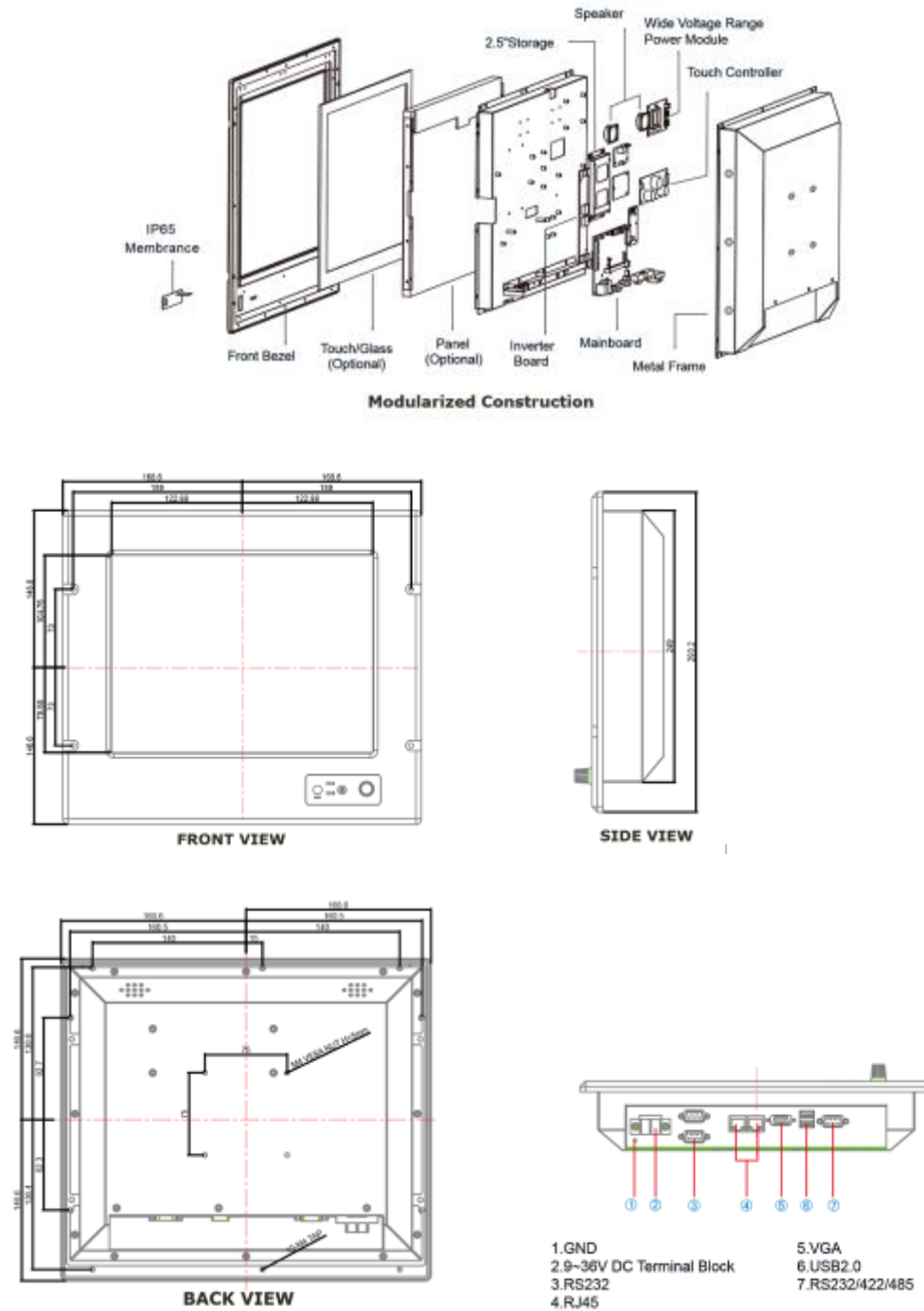


Figure 10 - Dimensions [mm] of the 12.1" panel computer

Dimensions of Analog module

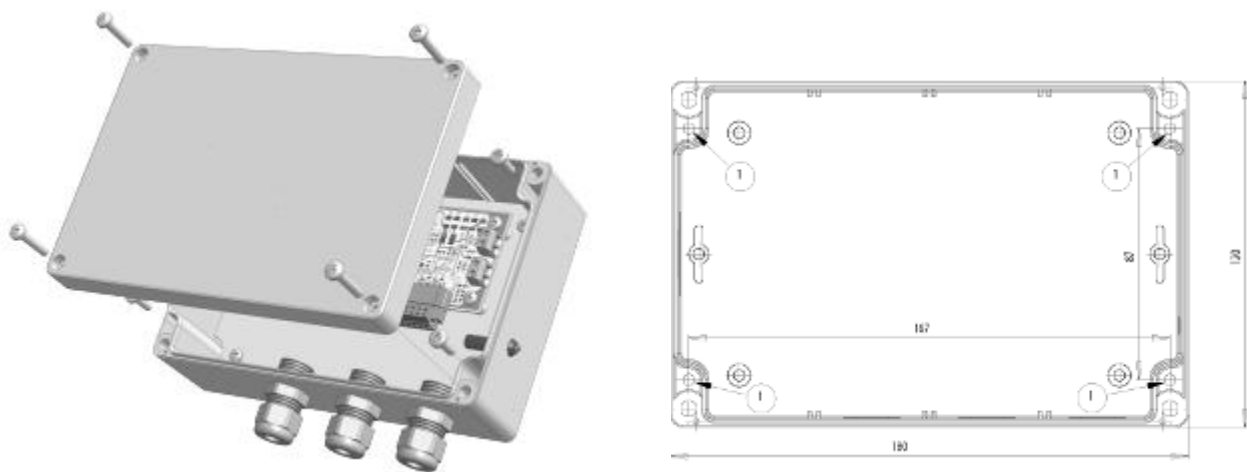


Figure 11 - Dimensions [mm] of the Analog module

Dimensions of the Repeater

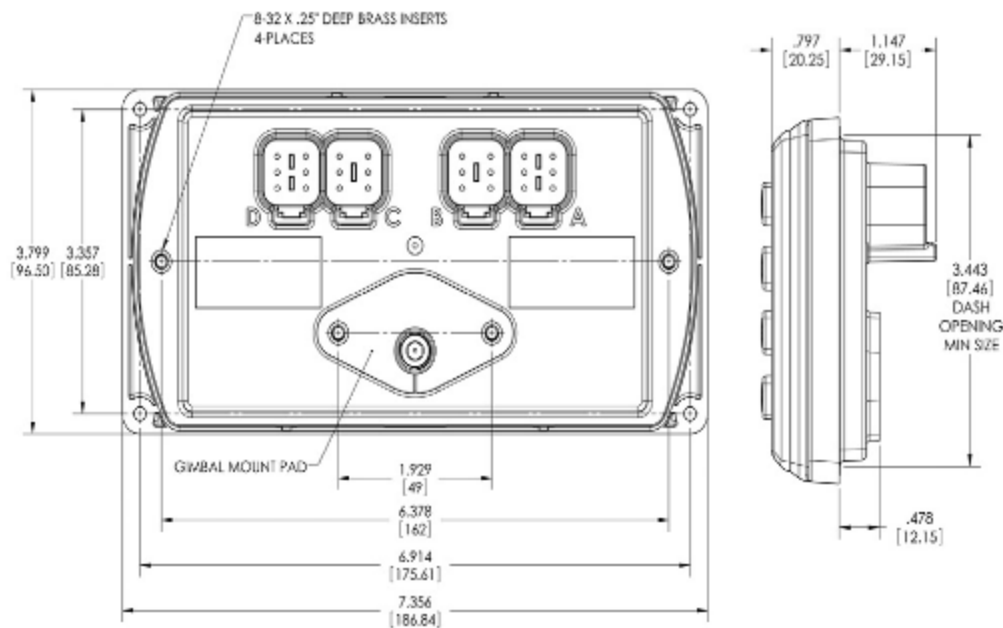


Figure 12 - Dimensions of the repeater

### Dimensions of the Remote USB port

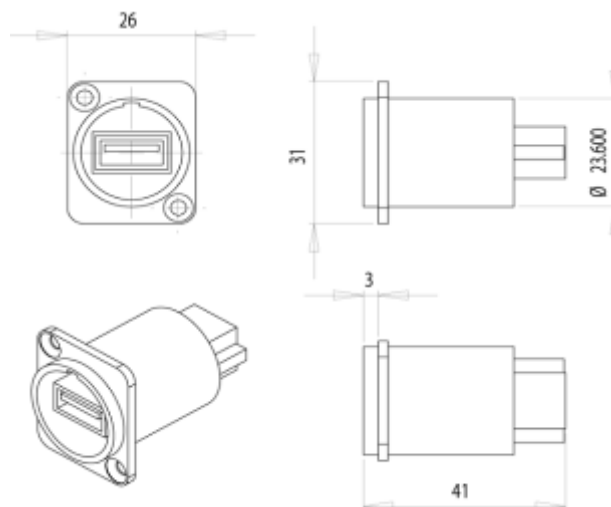


Figure 13 - Dimensions [mm] of the remote USB port

### Dimensions of the Remote USB port cut-out

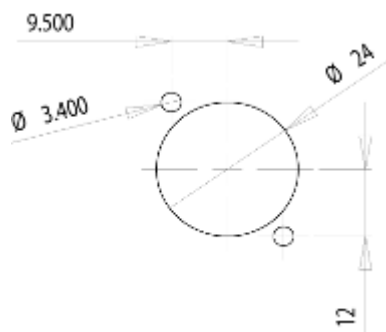


Figure 14 - Dimensions [mm] of the remote USB port cut-out for wheelhouse console



## 4. INSTALLATION

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This section is intended as a summary of the steps needed for the installation of the components of the [Op-Torq](#) system. Always follow the instructions supplied with the components.

Begin by identifying the final location of all components.

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Do not connect power to the instruments during installation

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The following safety instructions must be observed at all time

- ☐ Installation work may only be carried out by qualified personnel.
  - Read the operating instructions supplied with the components.
- ☐ The [Op-Torq](#) components are part of a precision measuring system
  - Ensure cleanliness and take care during installation and removal
- ☐ Do not take apart any of the [Op-Torq](#) components

### Installing the Main Terminal

- ☐ Install the Main Terminal in the Engine control room.
- ☐ Ensure sufficient room is provided for bottom-exit connections.
- ☐ Access to the Main Terminal should be sufficient for daily operation.
- ☐ Use vibration absorbing devices if needed.
- ☐ The Main Terminal should be housed in an enclosure or console protected from humidity, dust or other contaminants. [OpDAQ](#) can provide a custom designed industrial enclosure.

### Installing the Torquemeters

- ☐ Install the TorqueTrak torquemeters as instructed in the manual supplied with the components.

### Installing the Analog Module

- ☐ Install the Analog module in the engine control room. It should be housed in an enclosure or console protected from humidity, dust or other contaminants.
- ☐ Use the mounting holes located under the top of the cover.
- ☐ Use vibration absorbing devices if needed.
- ☐ Ensure sufficient room is provided for connections.

### Installing the Remote USB Port

- ☐ The remote USB port should be installed in a convenient location close to the Main Terminal.
- ☐ Prepare the required cut-out in the console.
- ☐ Insert the Remote USB Port into the cut-out and screw the USB port position.

### RJ-45 Ethernet connectors and cable for E-mail Module and Remote access

- ☐ Measure and cut the amount of cable needed to connect the main Terminal to the ship network. The total length of wire should not exceed 100 m (328 ft) for 100BASE-TX or 300 m (976 ft) for 10BASE-T.

**Notice:** It is much easier to attach the RJ-45 connectors on the cable ends after the cable has been run, especially through holes.

- ☐ Carefully strip the outer sheath insulation back 1" to 2" using a stripper or a knife. Be careful not to nick the wires. Roll back the foil shield insulation and wrap the drain wire around the foil. Do not remove any insulation from the conductors.
- ☐ Spread and untwist the pairs to within 1/8" of the jacket. Cut off the core and discard.
- ☐ Straighten the twisted pairs. Arrange the untwisted wires in a row, placing them into the position, running from right to left, in which they will go into the RJ-45 connector. See figure below.
- ☐ Trim the untwisted wires in a straight line leaving no more than 1/2" of wire exposed otherwise it will be susceptible to crosstalk.
- ☐ Insert the wires into the RJ-45 connector, making sure that they stay aligned and each color goes into its appropriate channel. Make sure that each wire goes all the way to the top of the RJ-45 connector.
- ☐ Insert the plug into a crimp tool. Carefully holding the wires in position. Crimp and recrimp the cable once more to ensure proper connection.
- ☐ Test the cable using a cable tester to check for shorts, opens or miswires.

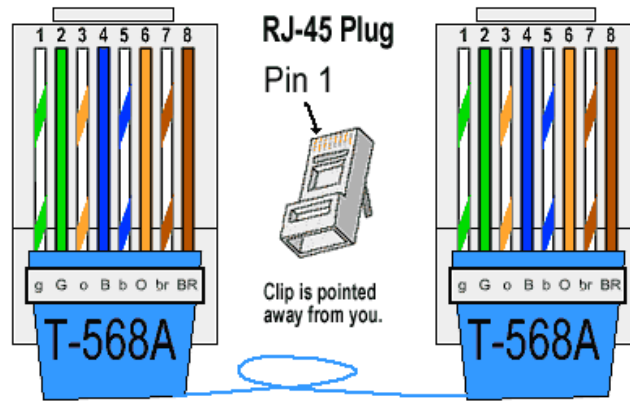


Figure 15 - Ethernet connector assembly



Do not deform, do not bend, do not stretch, do not staple, do not run parallel with power cables, and do not run Ethernet cables near noise inducing components.

## 5. WIRING AND CONNECTIONS

This section is intended as a summary of the steps needed for the installation and connections of the components of the [Op-Torq](#) system. Always follow the instructions supplied with the components.



Do not connect power to the instrument when running cables

### 5.1 RECOMMENDED WIRING

From	To	Signal	Cable	Length
Torquemeter	Main Terminal	Analog	4 Twisted pairs	Up to 100 m
Analog module	Main Terminal	RS232	3 wire serial cable (supplied with system)	5 m



Avoid running the cables close to high voltage power cable.

Analog and pulsed signal between the Torquemeter (s) and the Analog module (twin shaft configuration)

#### PORT (1)

Terminal	Description
PIN AI1+	Torque +
PIN AI1-	Torque -
PIN AI2+	Power +
PIN AI2-	Power -
PIN DI1+	Speed +
PIN DI1-	Speed -

#### STARBOARD (2)

PIN AI5 +	Torque +
PIN AI5 -	Torque -
PIN AI6 +	Power +
PIN AI6 -	Power -
PIN D12 +	Speed +
PIN D12 -	Speed -

### Serial cable between the Analog module and the Main terminal

It is recommended to use shielded serial cable to ensure quality signal transmission. The maximum cable length between the Panel PC and the Analog module is 5 meters. For longer cable run, RS422 converters may be used to increase the cable length to 1200 meters.

Main Terminal Serial Port COM 3	Analog module COM Port
Pin 3: Tx	Rx
Pin 2: Rx	Tx
Pin 5: GND.	GND

### Cables runs summary

- ☐ Output signal cables between the Binsfeld TorqueTrak torquemeters and the Analogue module.
- ☐ Serial cables between the Main terminal and the Analog module (not necessary with the control panel assembly).

## 5.2 CONNECTING THE SYSTEM

This section is intended as a summary of the steps needed for the installation and connections of the components of the [Op-Torq](#) system. Always follow the instructions supplied with the components.

The following safety instructions must be observed:

- ☐ The following qualifications are required for the electrical connection:
  - Practical electrotechnical knowledge
  - Knowledge of the safety guidelines at the workplace
  - Knowledge of the electrotechnical safety guidelines
- ☐ Use shielded communication cable for RS232 connections.
- ☐ Ensure that the DC supply voltage is correct (24 V DC).
- ☐ Ensure that the AC supply voltage is correct (100-250 V AC).

### 5.3 CONNECTION PANELS

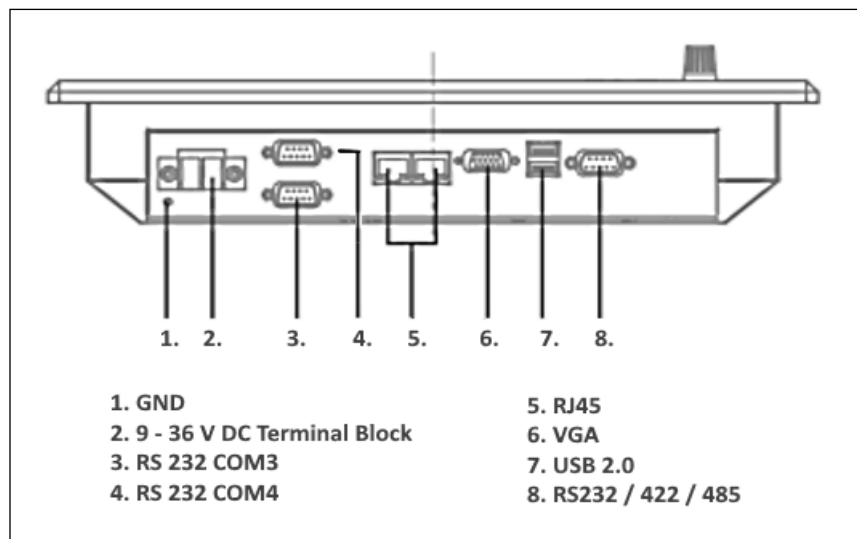


Figure 16 - Connection panel of the Main Terminal

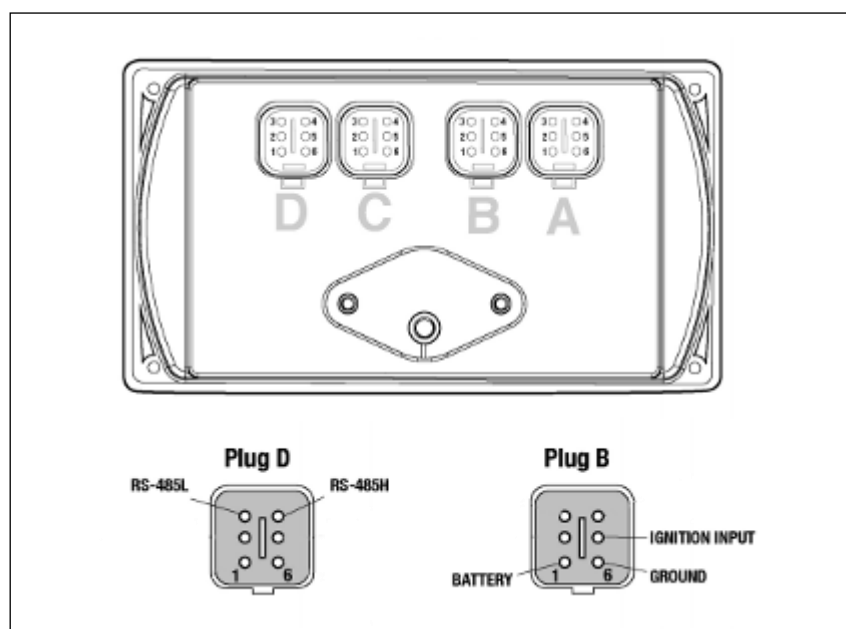


Figure 4 - Connection panel of the repeater

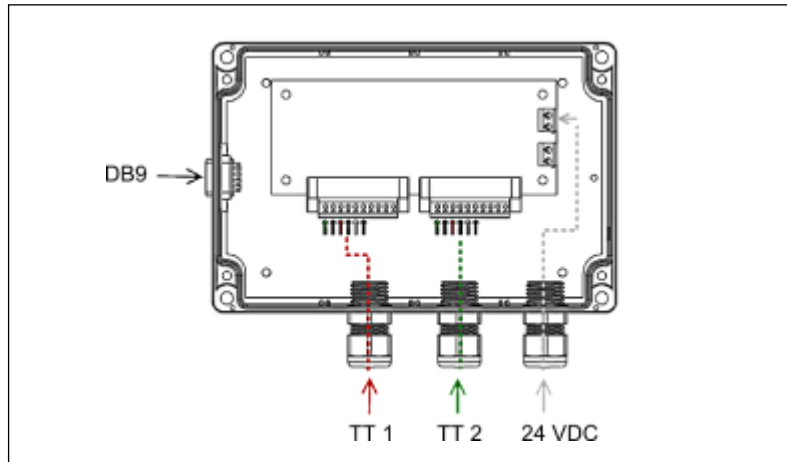


Figure 18– Connection panel of the Analog Module

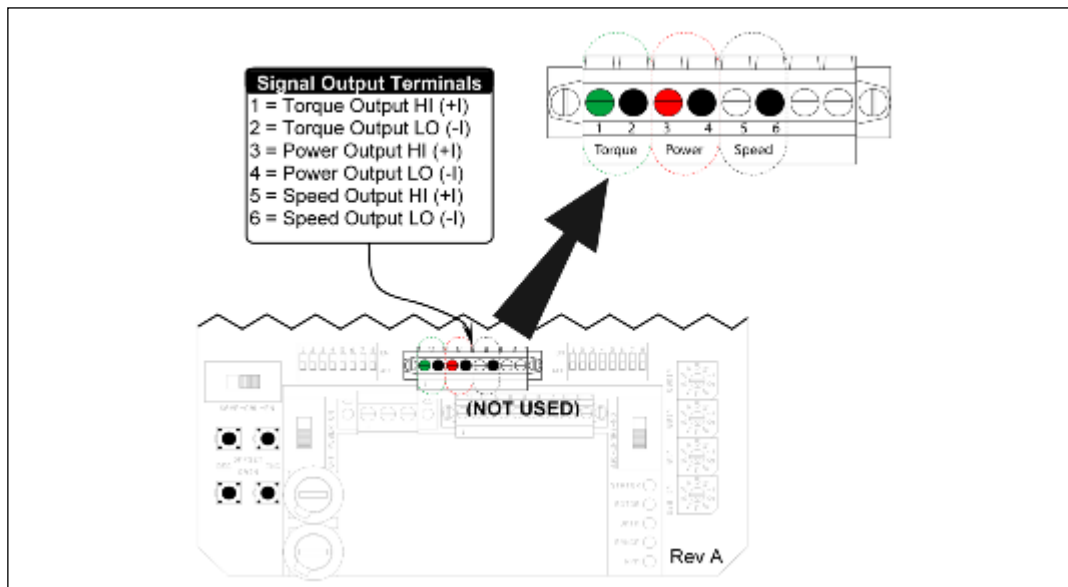


Figure 5 - Connection panel of the *TorqueTrak Revolution* torquemeter(s) (output signal cable end)

## 5.4 CONNECTION SUMMARY

PORT	Cable type	Destination
COM3	Serial cable	Analog module
USB	USB cable	Remote USB Port
12-24 VDC	Power cable	Power Supply

- ☐ Connect the Torquemeter(s) output signal cable to the Analog Module output signal cable

**NOTE : Refer to figure 20 - entitled Connection panel of the Analog module figures.**

- ☐ Connect the Analog module output to the Main terminal serial COM port #3.
- ☐ Connect the USB Port to the Main terminal.

## 5.5 CONNECTION TO POWER SUPPLIES

### Analog module power supply

Criterion	Range
Operating voltage	24 V DC Uninterrupted

### Main terminal power supply

Criterion	Range
Operating voltage	12V or 24 V DC Uninterrupted

### Repeater power supply

Criterion	Range
Operating voltage	6 - 32 V DC, Protected against reverse polarity and load-dump

All power supply need to be of good quality to protect the instruments. It is recommended to supply power through a dedicated circuit protected by a fast acting fuse. The use of an uninterrupted power supply will help avoid data logging gaps.

- ☐ Connect the Torquemeter(s) to a power supply. Refer to the Binsfeld TorqueTrak Revolution manual.
- ☐ Connect the Analog module to a 12 or 24 V DC power supply.
- ☐ Connect the Main terminal to a 12 or 24 V DC power supply.
- ☐ Connect the Repeater monitor to a 12 or 24 V DC power supply.



## 6. COMMISSIONING

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The following safety instructions must be observed at all time

- ☐ The following qualifications are required
  - Practical electrotechnical knowledge
  - Knowledge of the safety guidelines at the workplace
  - Knowledge of the electrotechnical safety guidelines

### Checking the monitoring system

Installation

- ☐ Check that the Main Terminal is installed correctly

Electrical installation

- ☐ Check the connection between the Analog module RS232 output and the Main Terminal COM port #3.

Power supply

- ☐ Check that the power supply on the Main Terminal is connected firmly
- ☐ Check the connection to the local power supply

Function test

- ☐ Switch on the power supply.
  - The system screen will appear on the touch screen monitor.

# 7. SYSTEM SOFTWARE

Press the Power button to power up the Main terminal. The default Home screen may take up to 30 seconds to appear.

There are three (3) ways to navigate the system: accessing the Notification area, using the top contextual menu and using the bottom Main menu.

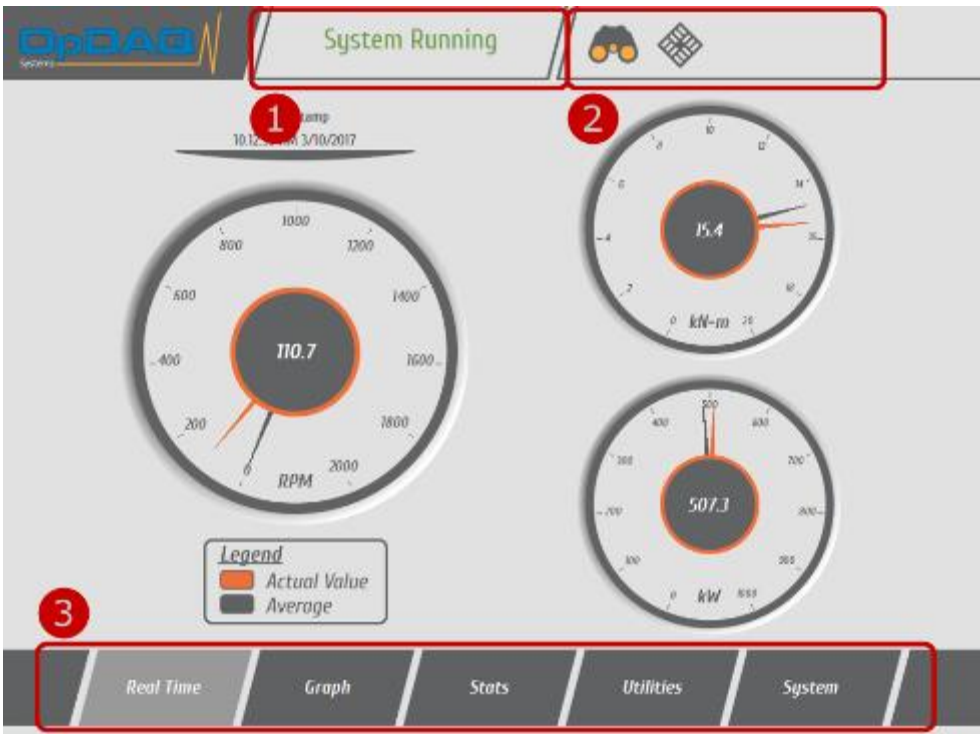


Figure 20 – System Overview

	Navigation tool	Description
1	<b>Notification Area</b>	System alarm notification is always displayed at the top. This area indicates if the system is working properly or if errors occurred. The user may click on the notification area to display errors detail.
2	<b>Contextual Menu</b>	The contextual menu enables a more complex display. The contextual menu is found in the top right corner of the screen. Repeatedly pressing a Main menu button will also cycle between the different contextual screens of that screen.
3	<b>Main Menu</b>	The <b>Op-Torq</b> monitoring system is arranged into five main screens accessible through 5 buttons in the lower part of the screen. This menu does not change unlike the contextual menu.

### 7.1 REAL TIME SCREEN

The REAL TIME screen is used for the real-time display of the measured data from the system instrumentation (torquemeter, flowmeter, GPS, electrical power). The REAL TIME screen displays all measured data including the following:

- Distance travelled
- GPS speed
- Shaft torque “Power and Revolution”

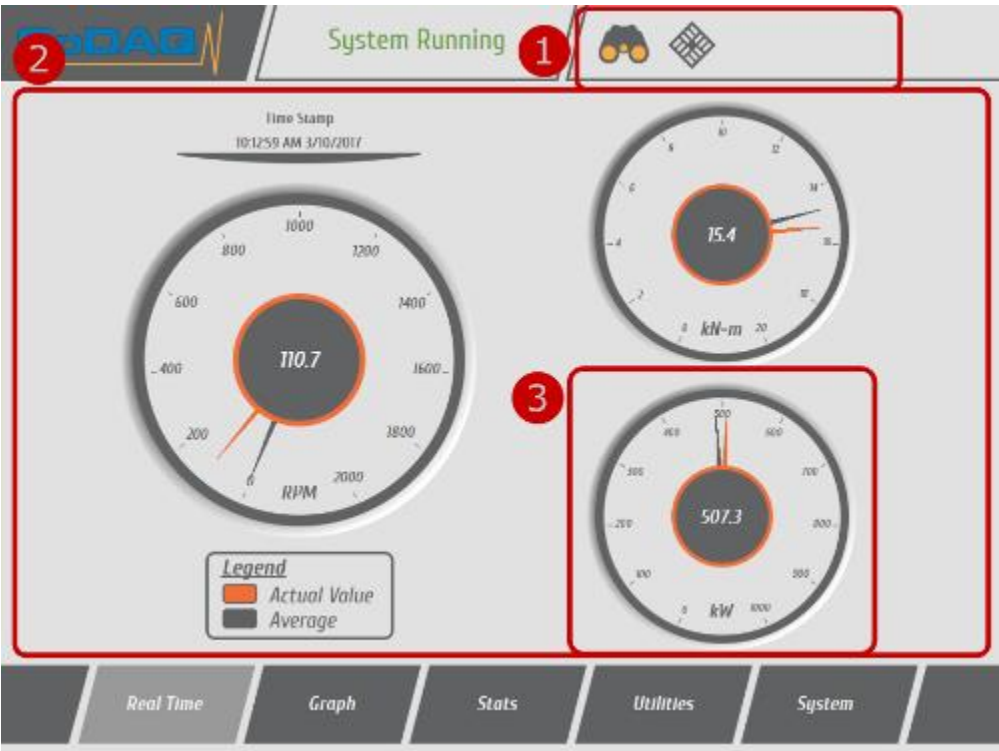


Figure 21 – Real Time screen example

	Navigation tool	Description
1	<b>Real Time Contextual Menu</b>	The <i>Real Time</i> contextual menu is automatically built to include the ship overview followed by the installed instrument displays.
2	<b>Real Time Instrument Values</b>	The <i>Real Time</i> screens display the actual values read from the sensors. Different gauges, bars and images may be used to display the data.
3	<b>Real Time Gauges &amp; Graphical Element</b>	On all graphical elements, orange colored information show the actual value and gray colored information the voyage average.

7.1.1 RESETTING AVERAGE & MAXIMUM

Press “Reset Report” in Report Module. See Section 9.2 for more details on Report Utility.

7.2 GRAPH SCREEN


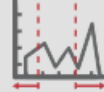


The GRAPH screen is used for displaying last-minute or last hour data on a graph. The displayed data is user selected from a list of options and a set of graphical tools is provided for further analysis.



Figure 22 - Graph screen

Navigation tool		Description
1	<b>Graph Mode</b>	The top part of the GRAPH screen features a contextual menu for a quick access between Full Screen mode and Graph Editing mode.
2	<b>Graph Parameters</b>	The data displayed on the GRAPH screen can be selected using the Parameter dropdown menus. Two sets of data can be displayed simultaneously on the x-axis (time interval) for comparison purposes. The graphs are color coded. Their respective scales (on the y-axis) are displayed on the left and right of the graph.
3	<b>Zoom tools</b>	A set of four (4) graphical tools is provided for zooming in on specific parts of the graph.

### Graph tools

Axis	Description	Choice list
	Zoom to box	With this option, click a point on the display you want to be the corner of the zoom area and drag the tool until the rectangle covers the zoom area.
	X-zoom	Use this option to zoom in on an area of the graph along the x-axis.
	Y-zoom	Use this option to zoom in on an area of the graph along the y-axis.
	Zoom to fit	Use this option to autoscale all x-and y- scales on the graph or chart. Press the ZOOM TO FIT button to return to the original display (autoscale mode).

**Notice:** When using the graphical tools on a touch screen computer, it is required to maintain sufficient pressure on the touch screen to ensure proper selection of graph zone.

### 7.3 STATS SCREEN

The STATS screen gives access to calculated statistics and voyage specific data. The system presents the Average, Total and Peak values for the current day. The STATS screen displays the following:

- Maximum shaft torque, power and revolution
- Average shaft torque, power and revolution

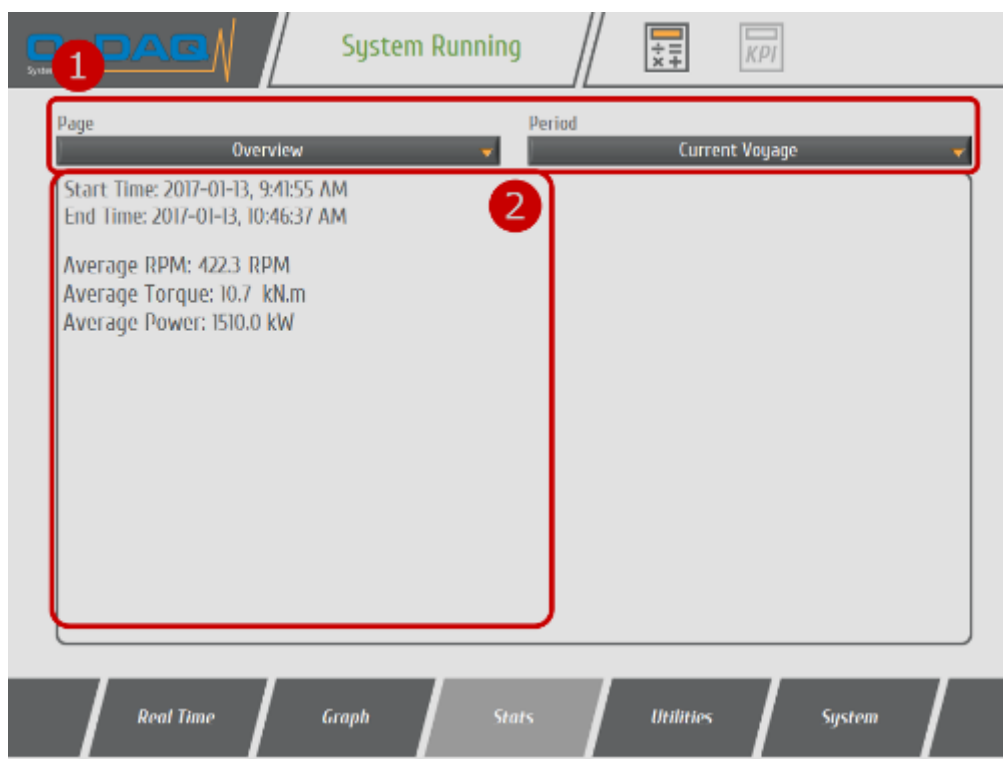


Figure 23 – Stat screen

	Navigation tool	Description
1	<b>Statistics parameters</b>	For any configuration of two or more engines, each shaft data may be displayed at the same time (Overview) or separately.
2	<b>Statistics</b>	Statistics are computed using the template from the stats.txt file. Typically, statistics are shown for specific engine as well as for the overall configuration.

### 7.3.1 RESETTING STATISTICS

Press “Reset Report” in Report Module. See Section 9.2 for more details on Report Utility.

### 7.4 UTILITIES SCREEN

The Utilities screen is designed to meet the user’s specific needs. Add-ons, User Specific modules and Utilities are found on this screen. Any custom user requested utilities will be found on this screen.

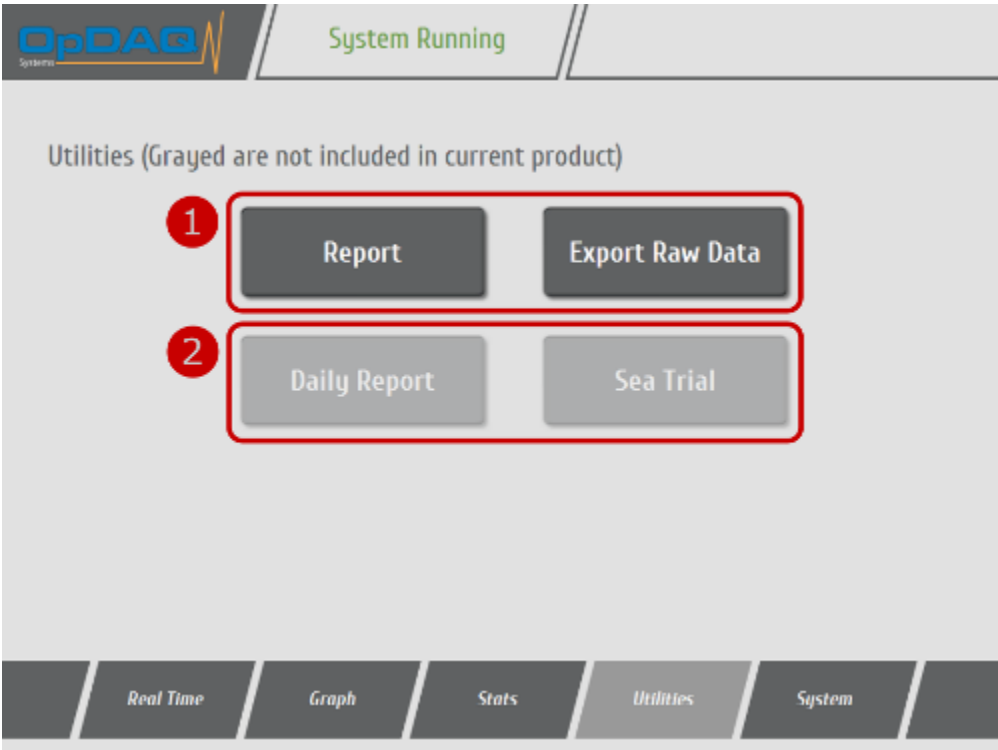


Figure 24 – Utilities screen

Navigation tool	Description
1 <b>Included utilities</b>	Utilities enabled and included in current user version of <a href="#">Op-Torq</a> system.
2 <b>Available upon purchase</b>	Utilities not included in current user version.

Please contact our customer service to know more about the packages available and to share your specific needs for the application.

## 7.5 SYSTEM SCREEN

The SYSTEM contextual menu holds HOME, SETTINGS, EVENT, ABOUT subscreen buttons. It also holds the button to Switch between night and day mode.

### 7.5.1 HOME SUBSCREEN

The Home subscreen is the default screen at system start up.

It holds the System Status to quickly identify erroneous connections and error signals from the connected instruments. This screen is helpful for troubleshooting during installation and use.

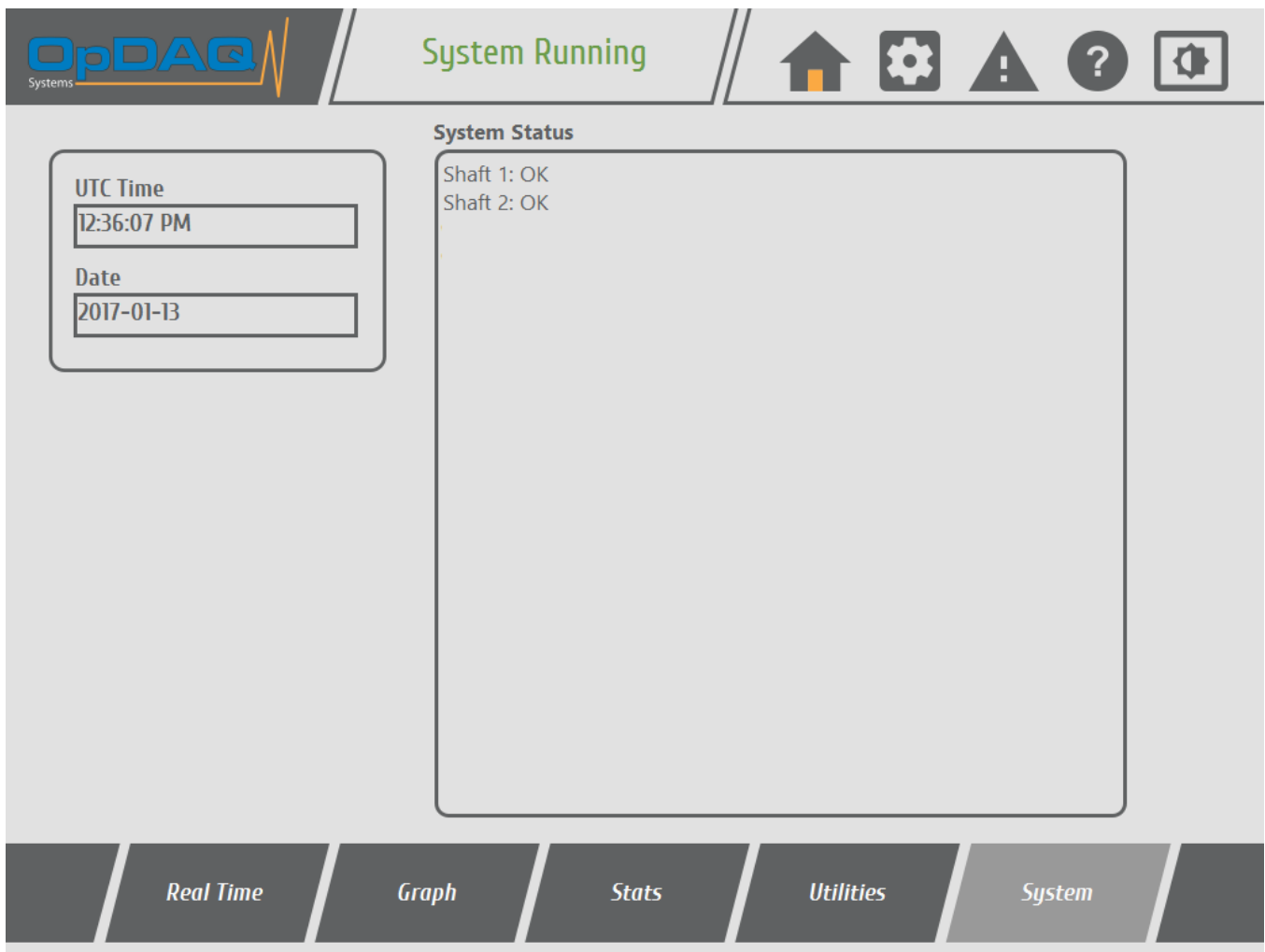


Figure 25 – System screen



7.5.2 CONFIG SUBSCREEN

This screen is locked to the normal everyday user. To unlock it and configure the system, refer to chapter 8.

7.5.3 EVENTS SUBSCREEN

The EVENTS button will show the information recorded at a specific date/time. These events can be System start-ups and shutdowns, user inputs and instrument errors. This screen is helpful for troubleshooting.

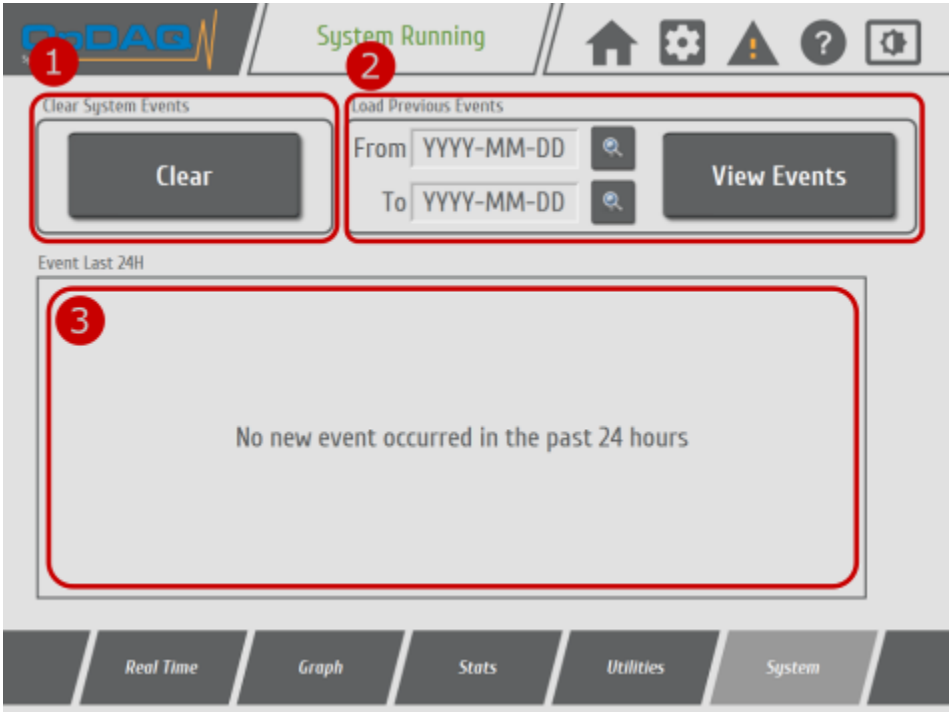


Figure 26 – Events subscreen

Navigation tool	Description
1 <b>Clear System Events</b>	This button clears all system type events from the Last 24H list. This will attest the user has seen the warning and clear the blinking system warning even if no change has been made to fix the error.
2 <b>Load Previous Events</b>	This area allows the user to view all past errors, warnings and events. To view a single day, enter the same date in the “From” and “To” selectors.
3 <b>Event Last 24H</b>	This box shows a list of all the events that occurred last 24 hours. Pressing the Clear System Events will only remove system event and leave other event type unchanged.

#### 7.5.4 ABOUT SUBSCREEN

This subscreen shows the system version and the contact information.

#### 7.5.5 SWITCH DAY/NIGHT MODE

To switch between day and night mode, press the day/night mode button in System.



Figure 27 – Night screen

## 8. OPERATING SYSTEM SETUP

### 8.1 SYSTEM INITIALIZATION

On first system launch, the initialization screen presented will appear. All paths are automatically populated if found on system. The system can still be re-initialized by technician request later on. To do so, go to system configuration and press reset.

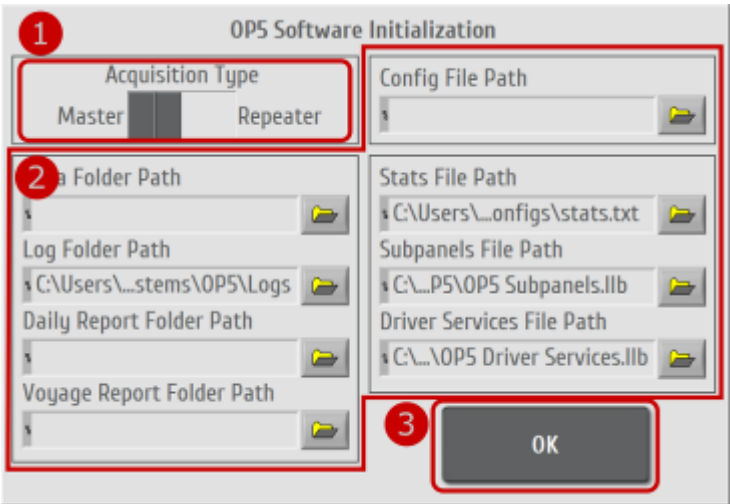



Figure 28 – Initialization screen

Initialization procedure		
1	<b>Acquisition type</b>	Select “Acquisition Type”. (Master is main terminal and Repeater is a UDP terminal)
2	<b>File path</b>	Ensure all paths are found.
3	<b>OK Button</b>	Press OK to apply initialization and start system.

Parameter	Description	File Type
Config Path	General system config file. This file describes the vessel configuration.	.ini
Data Folder Path	Folder to store acquisition data files.	---
Log Folder Path	Folder to store system logs files.	---
Daily Report Folder Path	Folder to store daily report files.	---
Voyage Report Folder Path	Folder to store voyage report files.	---
Stats File Path	Template file for stats display.	.txt
Subpanels File Path	Subpanels library for specific Real-Time displays.	.llb
Driver Services File Path	Service library to read instruments status and values.	.llb

## 8.2 SYSTEM SETTINGS

To enter setup mode, press the  button on the system page. When prompted enter the password « 1487 » using the numerical pad and press OK.

The Setup menu will be displayed.

Once the password is entered, the setup screen is divided in 2 parts: “*Instrument Setup*” and “*System Setup*”. The Instruments Setup reflects the user’s acquisition instrument package. This configuration screen will go back to locked state after 15 minutes without changes or at technician request.

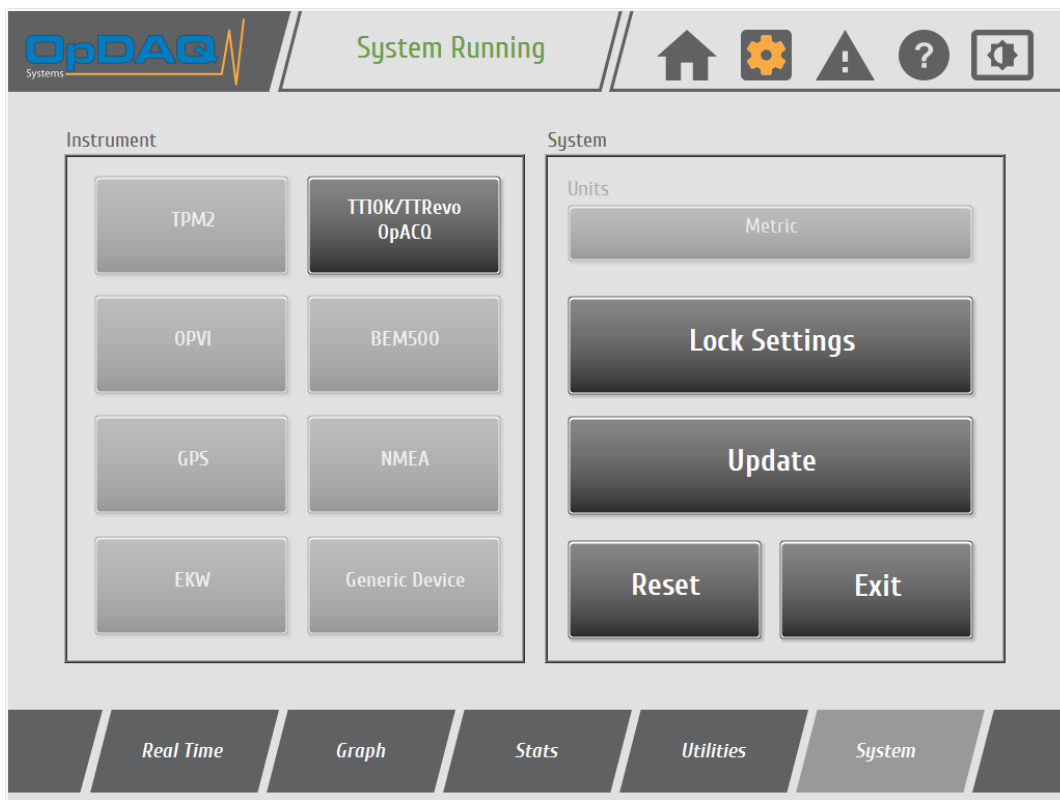


Figure 29 – System Settings Display

8.2.1 UPDATING THE SYSTEM

The Op-Torq system is continuously being improved. Clients may be offered updates free of charge for a two year period following purchase. Updates are sent on a USB memory stick containing update data. The following procedure has to be followed to update the Op-Torq system.

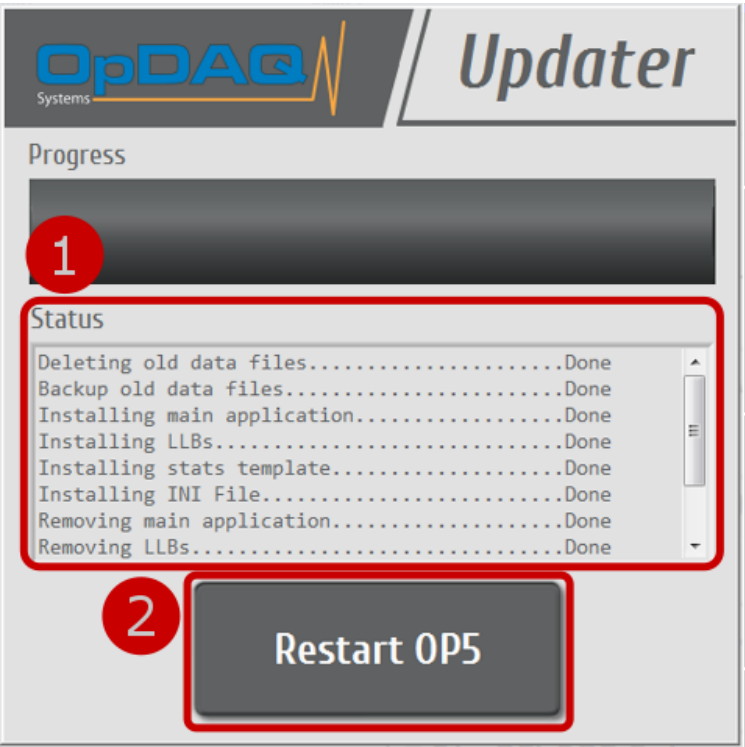


Figure 30 – Updater screen

Update procedure	
<i>Obtain the update</i>	An update can be downloaded online or shipped on a USB flish drive. When downloaded, the updater must be unzipped on the root of any USB flash drive. Connect the USB memory stick into the USB connection on the Main Terminal.
1 <i>Lauch the updater</i>	In System Settings, press the Update button to launch the updater. A dialog box will appear to confirm the user want to perform a software update. The program will shut down and the updater will launch
2 <i>Restart OP5</i>	Once the update is completed, make sure no error occurred before restarting the system. Remove the USB drive.

8.2.2 UNIT FORMAT

To change the unit format, select the preferred unit type from the dropdown menu in the System Settings.

TorqueMeter	English	Metric (default)
Torque	ft.lb	kN.m
Power	hp	kW

8.2.3 RESTARTING THE SYSTEM

To restart the system, press the Power button on the Main Terminal.

8.3 INSTRUMENT SET UP MODE

8.3.2 SETTING THE TORQUEMETER

This menu displays the Torquemeter Configuration for each torquemeter. For more details about the specific TorqueTrak TTRevo Configuration, refer to the Torquemeter Manual.

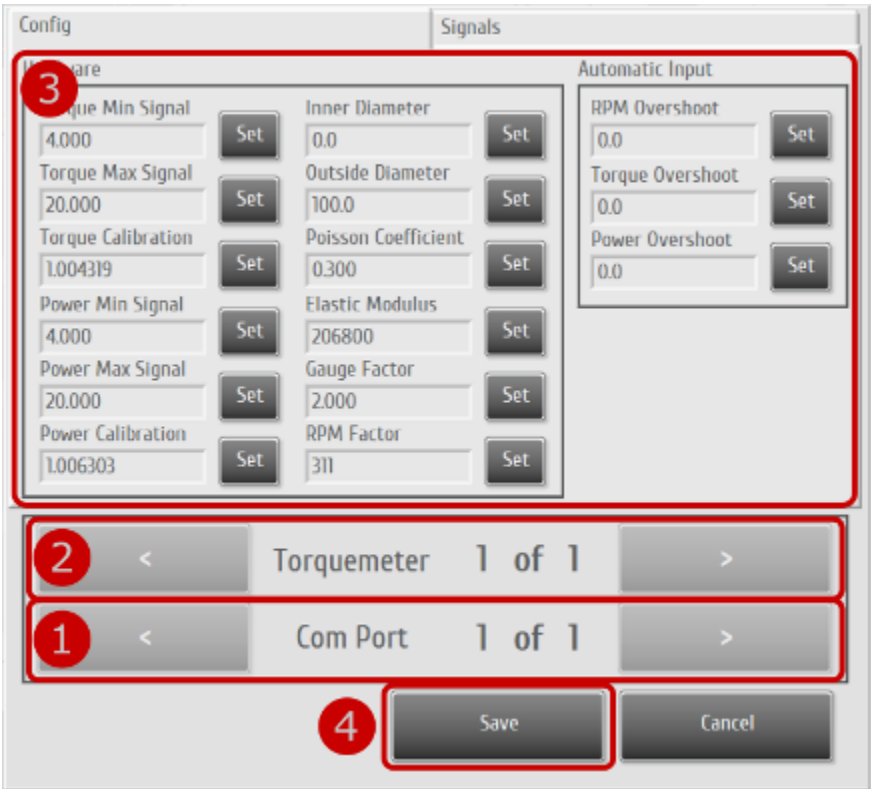


Figure 31 - Typical torquementer setup screen

### General procedure

Press the torquemeter TT10K/TTRevo button in main system setup screen.

- 1 Select a communication port.
- 2 Select a torquemeter on the selected communication port.
- 3 Enter the torquemeter calibration values.
- 4 Press the save button (the save button will appear once a parameter is changed).

Parameter	Description
<b>Torque Min Signal</b>	Zero Torque signal (in mA)
<b>Torque Max Signal</b>	Positive Full Scale Torque signal (in mA)
<b>Torque Calibration</b>	Op-ACQ torque gain calibration (specified with Op-ACQ module)
<b>Power Min Signal</b>	Zero Power signal (in mA)
<b>Power Max Signal</b>	Positive Full Scale Power signal (in mA)
<b>Power Calibration</b>	Op-ACQ power gain calibration (specified with Op-ACQ module)
<b>Inner Diameter</b>	Shaft Inside Diameter (in mm) (0 = Solid Shaft)
<b>Outside Diameter</b>	Shaft Outside Diameter (in mm)
<b>Poisson Coefficient</b>	Poisson Coefficient value (0.3 for steel)
<b>Elastic Modulus</b>	Elastic Modulus value (in N/mm <sup>2</sup> ) (206800 for steel)
<b>Gauge Factor</b>	The gauge factor is the specific gauge calibration factor
<b>RPM Factor</b>	TTRevo Power Scaling (RPM Factor) switches value

<b>RPM Overshoot</b>	Trigger a warning when RPM is higher than Overshoot value. (0 to disable)
<b>Torque Overshoot</b>	Trigger a warning when Torque is higher than Overshoot value. (0 to disable)
<b>Power Overshoot</b>	Trigger a warning when Power is higher than Overshoot value. (0 to disable)

## 9. UTILITIES

### 9.1 USB EXPORT

Op-Torq acquired data may be exported on a USB memory stick. Two data types are available: Raw for further analysis with the DataVIEW software and Excel for any Microsoft Excel version.

When exporting to Excel, some data may be periodically discarded to speed up compute time and reduce file size. The following rule is applied to reduce file size: if data element is larger than 8640, the program will periodically discard data so that the remaining data fit in 8640.

*Example:* A system acquires data every 1 second for an entire day, the exporter will keep 1 sample and discard 9 every 10 seconds of acquisition. The excel file will then displays the entire day of data with a period of 10 seconds between each sample.

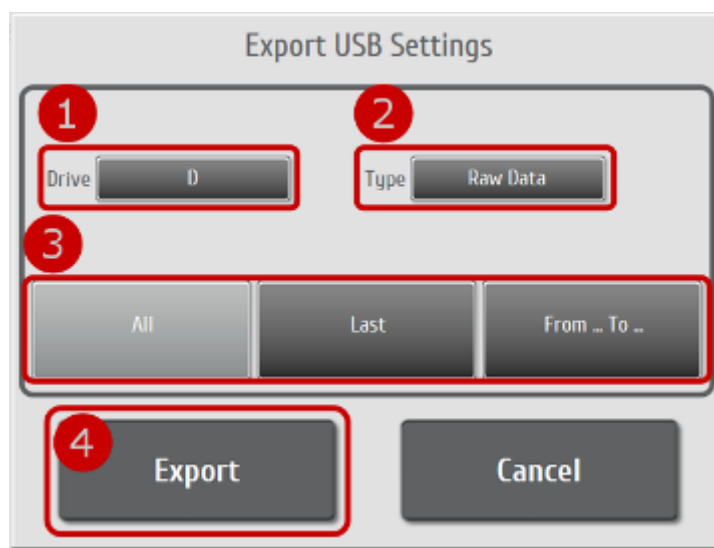


Figure 32 – Export status screen

#### Exportation procedure

Connect the USB memory stick to the remote USB port.

Open the USB Export utilities located in "Utilities".

- 1 Select USB Drive to export data to.
- 2 Choose file type (Data or Excel).
- 3 Choose the days to be exported (EXPORT ALL; EXPORT LAST or EXPORT From... To...).
- 4 Click "Export" to start exportation process.

Remove the USB memory stick from the USB connection.

Use [DataVIEW](#) or Excel 2007 (or newer) to analyse the exported files exported on the USB drive.



## 9.2 REPORT

The OP-Torq Report module is enabled by default. This module helps the user to create report and monitor data over time.

### 9.2.1 REPORT MODULE OVERVIEW

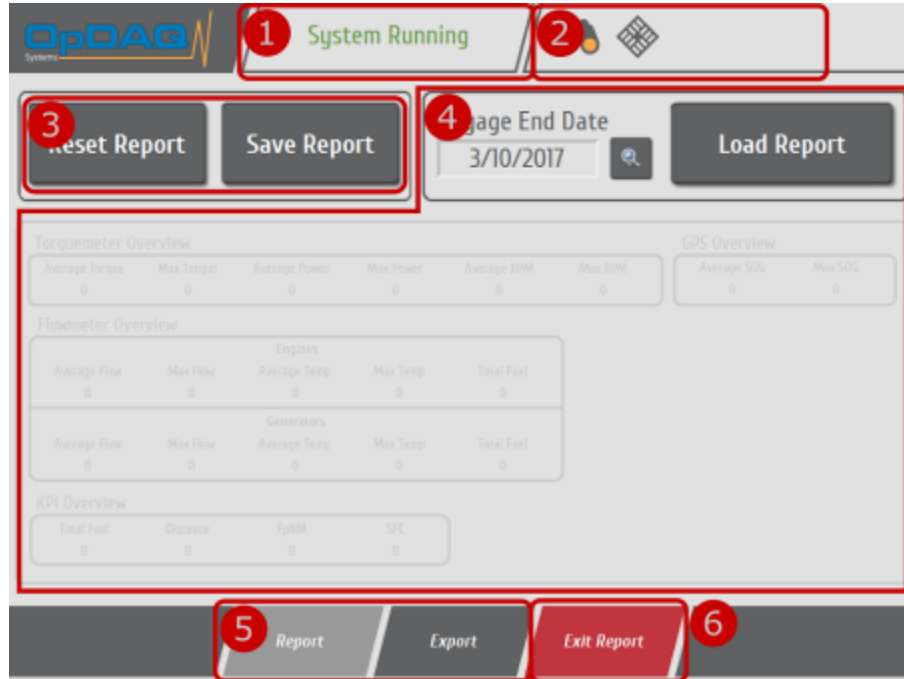


Figure 33 – Report main screen

#### 1. Notification Area

System alarm notification is always displayed at the top. This area indicates if the system is working properly during sea trials. The user must leave Sea Trial mode to display errors detail.

#### 2. Contextual Menu

The *Report* screen holds a contextual menu to display each sensor detailed information. Repeatedly press a main button will also cycle between the different contextual screens.

#### 3. Report Control

Those buttons are used to reset statistics and save current statistics into a report.

#### 4. Report Display

This area is used to display saved report data.

#### 5. Main Menu

The *Report* module is arranged into two main screens. This menu does not change unlike the contextual menu.

#### 6. Exit

To exit Sea Trial Mode and return to *Op-Torq* monitoring system screens, press exit button.

### 9.2.1 RESETTING STATISTICS & CREATING NEW REPORT

Use the following procedure to create reports:

#### Report procedure

- ☐ Select the Report screen.
- ☐ Reset statistics to start computing new report data. (Warning: This will clear all statistics. Make sure to save any unsaved statistics using the “Save Report” button first.)
- ☐ Wait for data to be recorded for as long as you would like.
- ☐ Press “Save Report” to save statistics into a report. (Warning: Only 1 report per day can be generated. Any report generated after that will erase previous report generated the same day.)
- ☐ Select report date and press “Load Report” to display report data.

### 9.2.1 EXPORT SAVED REPORT

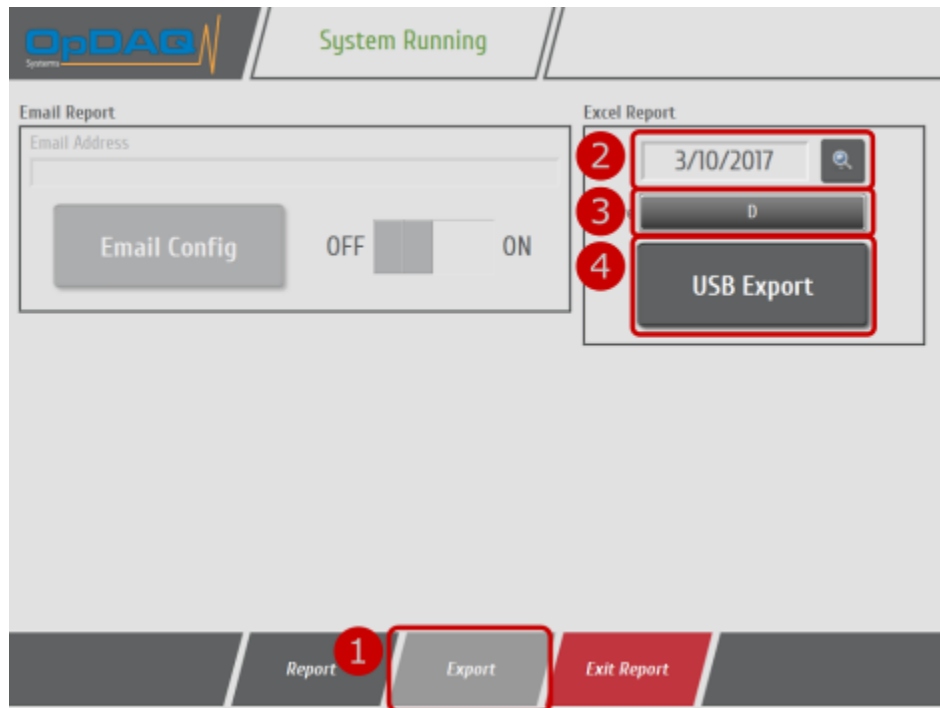


Figure 34 – Report export screen


#### Export Report procedure

0. Plug the USB flash drive to the terminal.
1. Select the export screen.
2. Select date to fetch report. (default is current day)(make sure to save report first)
3. Select USB drive to export data.
4. Press “Export Report” to copy report on USB memory stick.

## 10. TROUBLESHOOTING

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### 10.1 SYSTEM STATUS

The System Home window indicates the status of all measurement instruments and repeaters. When no faults are present, all instrument names are followed by “OK”. In the case of a fault, a short description of the error appears and a notification will appear in the notification area. To get detailed system errors, click on the blinking notification or go to  system status.

#### 10.1.1 PREVIOUS SYSTEM ERROR AND NOTIFICATION

All system errors, events and notifications are saved to a log file. Previous log may be displayed by selecting dates to display and pressing “View Events”. The event can then be filtered by event type to facilitate browsing.

See 7.5.4 Events Subscreen for more details.

### 10.2 SYSTEM ERROR CODE

Error Code	Description	Possible Causes
6600	TTRevo/TT10K: Generic Error	See error description in Op-Torq software
6620	OpACQ Hardware: Generic Error	See error description in Op-Torq software
6621	OpACQ Hardware: Invalid SOF/EOF	<ul style="list-style-type: none"><li>▪ Interference on data line</li><li>▪ Lose connection</li><li>▪ Wrong device connected to serial port</li></ul>
6622	OpACQ Hardware: Communication timed out	<ul style="list-style-type: none"><li>▪ Cable not connected</li><li>▪ Check serial cable pinout and continuity</li><li>▪ No power on OpACQ (Check power LED)</li><li>▪ Wrong serial port</li></ul>

### 10.3 SYSTEM CRITICAL SOFTWARE ERROR

System critical error will be displayed in a pop-up screen as soon as the system encounters a major error. This should never occur during the system setup and normal usage. This type of error often means a software package is missing or low-level configuration is erroneous.

## This image shows a full page of blank graph paper. The grid consists of thin, light gray horizontal and vertical lines that intersect to form a uniform pattern of small squares across the entire surface. There are no margins, text, or other markings present.

