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DT2306 Potentiometer Data Logger Manual

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Rev.	Revision History	Date	Prepared By	Approved By
B	Initial release	18-Apr-2019	MP	JW

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1 INTRODUCTION

FIGURE 1-1 DT2306 POTENTIOMETER DATA LOGGER

1	Philips screw	**2**	Cable gland
3	Black cable plug	**4**	USB port
5	RSTAR/DT Link antenna	**6**	Logger lid

A mini-B USB connector cable and RST Resource DVD are included in a standard DT2306 data logger shipment.

Contact RST Instruments if any items are missing from the shipment.

Visit https://www.rstinstruments.com/Geotechnical-Videos.html or https://youtu.be/a5hHQaN1NkI for an instructional installation video.

An optional Cable Gland Nut Wrench may be purchased from RST for effortless cable gland access. Contact RST for more details.

FIGURE 1-2 CABLE GLAND NUT WRENCH

2 SAFETY

Avoid potential electrical faults when wiring the DT2306 data logger.

Do not wire the DT2306 data logger in a lightning storm.

The DT2306 data logger uses a 3.6 V lithium-thionyl chloride battery. Standard batteries (defined as SAFT LSH 20 D-cell, or equivalent) are used for radio-enabled loggers and compact batteries (defined as either one SAFT LSH 14 light C-cell battery, two SAFT LS 14500 AA batteries, or equivalent) are used for stand-alone data loggers. For more information about batteries, please see Section 6.

CAUTION:

DO NOT ATTEMPT TO RECHARGE THE BATTERY.

DO NOT REPLACE THE BATTERY WITH AN ALKALINE OR ZINC-CARBON BATTERY.

REMOVE STANDARD BATTERIES PRIOR TO SHIPPING THE DT2306.

3 INSTALLATION

3.1 INSTALLATION TOOLS AND MATERIALS

- Desktop or laptop computer with USB port.
  - Supported operating systems include Microsoft™ Windows Vista, 7, 8, and 10.
- Phillips #2 screwdriver.
- Flat-head 2.5 mm screwdriver.
- Two 20 mm open wrenches or small crescent wrenches.
  - Optional: Cable Gland Nut Wrench.

3.2 SOFTWARE INSTALLATION

1 Insert the supplied RST Resource DVD into your computer's DVD drive. The disk contains an auto-run feature.

2 Click the install button. Follow the on-screen instructions. The default directory is:

C:\Program Files\RST Instruments\DT Logger Host

The drivers will automatically install. Refer to Section 5 if they do not install.

3.3 POTENTIOMETER CONNECTION

There are five cable glands on the exterior of the DT2306 logger. The following instructions detail the steps necessary to loosen the glands and insert and connect the cable.

CAUTION:

AVOID OPERATIONS WITH THE LOGGER COVER OFF IN RAIN OR SNOW.

DO NOT ALLOW RAIN OR SNOW TO ENTER THE ENCLOSURE.

DO NOT INSTALL IN FLOODABLE LOCATIONS.

THE LOGGER IS RAIN-TIGHT ONLY AND NON-SUBMERSIBLE.

NOTE: THE PICTURES IN THIS SECTION ARE INSTRUCTIONAL AND MAY FEATURE A LOGGER OTHER THAN THE DT2306 TO ILLUSTRATE THE INSTRUCTIONS.

1 Loosen the cable gland using two 20 mm wrenches. Hold the bolt in place with one wrench. Loosen the cap with the other wrench. Refer to Figure 3-1 for proper wrench placement.

Refer to Figure 3-2 for the cable gland nut wrench placement.

CAUTION: ENSURE THE ENTIRE NUT BODY DOES NOT LOOSEN. LOOSEN ONLY THE GLAND.

FIGURE 3-1 LOOSEN THE CABLE GLAND USING TWO 20 MM WRENCHES

FIGURE 3-2 LOOSEN THE CABLE GLAND USING THE CABLE GLAND NUT WRENCH

2 Remove the black cable plugs from the cable glands. Refer to Figure 3-3.

FIGURE 3-3 REMOVE THE CABLE PLUG FROM THE CABLE GLAND

3 Loosen the 4 Phillips screws on the top of the logger. Lift the cover off.

4 Insert the sensor cable with stripped wire ends through the cable glands and into the logger. Ensure the cable sheathes are inside the enclosure.

5 Connect the leads. Refer to Figure 3-4.

CAUTION: ENSURE NO BARE WIRES ARE VISIBLE.

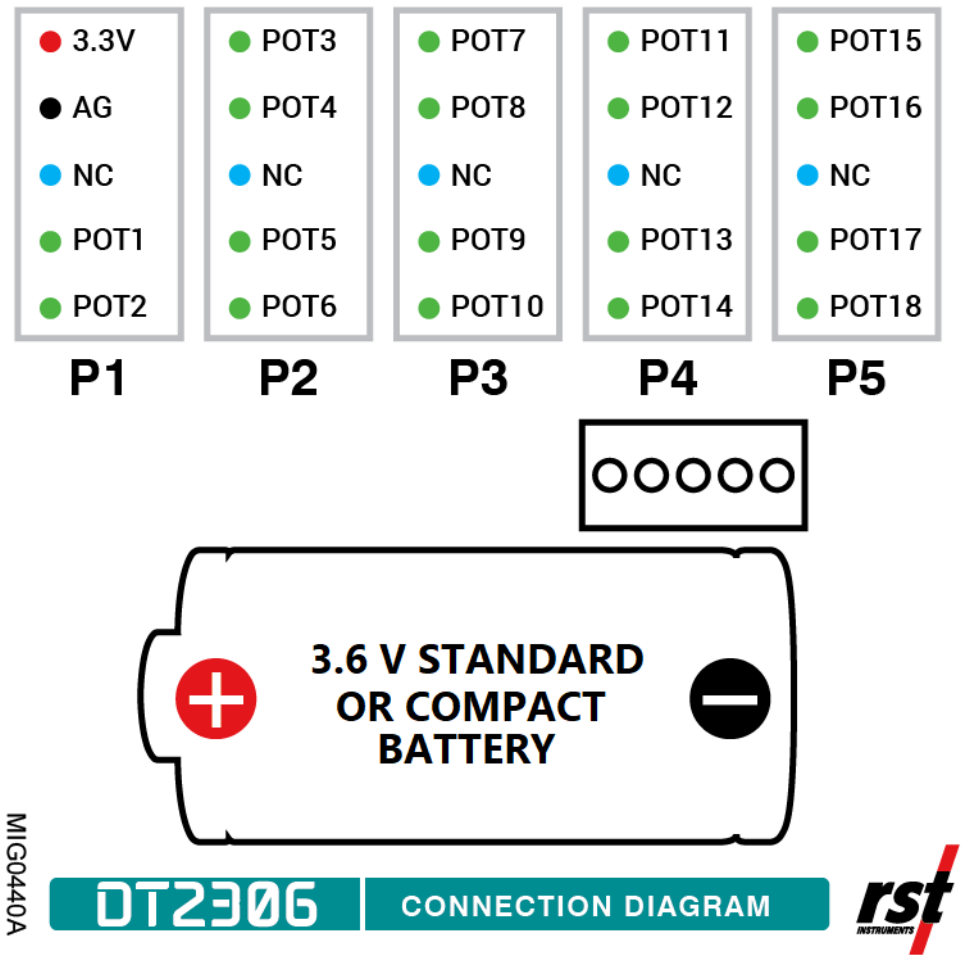

FIGURE 3-4 DT2306 CONNECTION DIAGRAM

6 Secure the wires to the logger circuit by tightening each wire with a 2.5 mm flat-blade screwdriver.

7 Tighten the cable glands using the same wrench positioning as step 1. Refer to Figure 3-5. Tug gently on the cable after each half turn to inspect cable mobility.

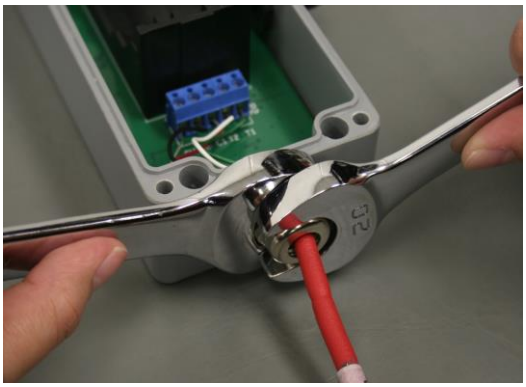

FIGURE 3-5 TIGHTENING THE CABLE GLAND

8 Perform a final half turn once the cable is immobile. Do not overtighten or under tighten cable glands.

CAUTION:

OVERTIGHTENING THE CABLE GLAND COULD DAMAGE THE CABLE.

UNDER TIGHTENING THE CABLE GLAND COULD CAUSE A LEAKAGE AND WATER DAMAGE.

9 For a stand-alone data logger, insert the battery into the battery adapter (see Section 6 for information regarding the types of batteries suitable for this logger). Place the adapter into the battery holder.

For radio-enabled loggers, place the battery into the battery holder. Roll the battery back and forth to clean the contacts.

If the batteries are already installed, hold the battery in place and pull the tab out to activate the logger. Refer to Figure 3-6.

FIGURE 3-6 ACTIVATE THE BATTERY

10 Replace the cover. Loosely tighten each screw in the X pattern as shown in Figure 3-7. Then securely tighten each screw in the X pattern.

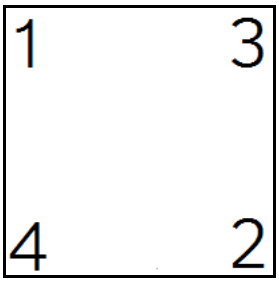

FIGURE 3-7 TIGHTEN SCREWS IN THE FOLLOWING ORDER AND PATTERN

CAUTION: ENSURE THE DT LOGGER HOST SOFTWARE AND USB DRIVERS ARE INSTALLED BEFORE PROCEEDING FURTHER.

11 Unscrew the cover of the mini-B USB port. Refer to Figure 3-8.

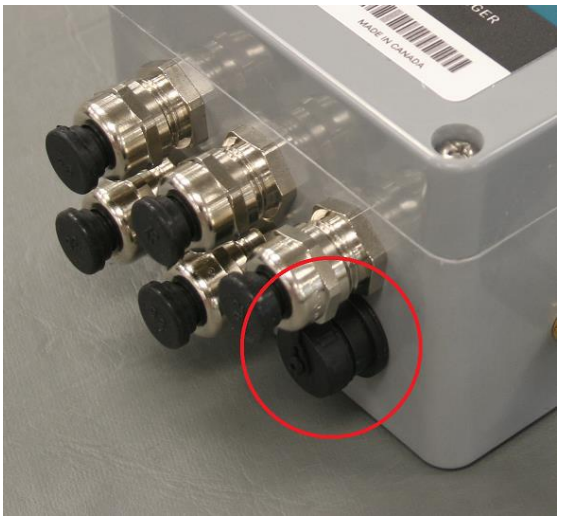

FIGURE 3-8 MINI-B USB PORT

12 Connect the supplied USB connector cable to the DT2306 data logger and computer's USB port.

Launch the DT Logger Host software. Wait for the port and status indicator to turn green. Refer to Figure 3-9. Refer to Section 5 if the indicators do not turn green.

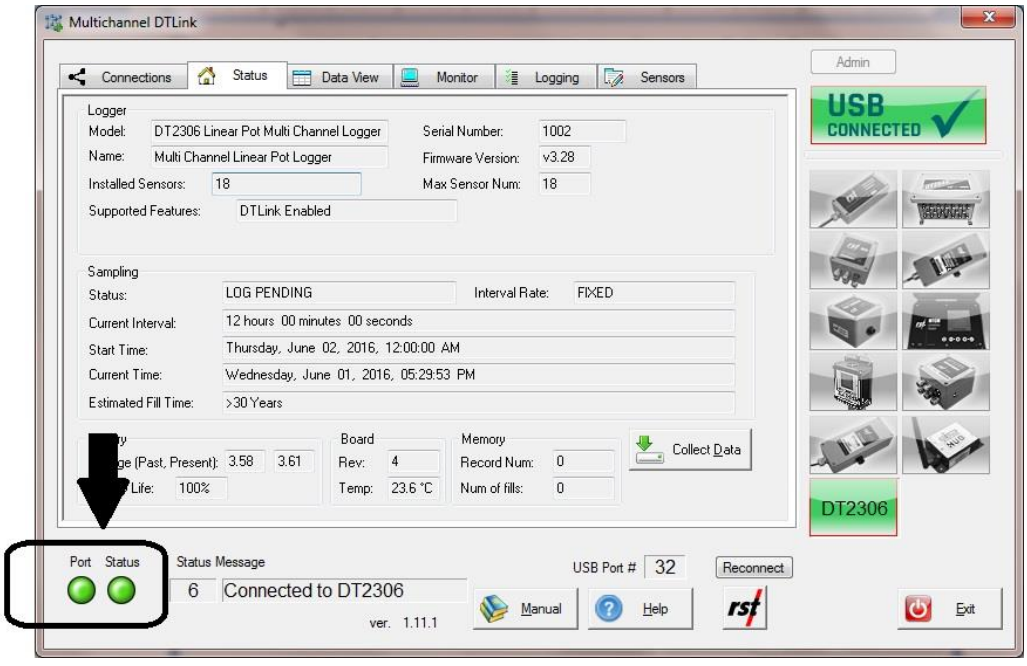

FIGURE 3-9 PORT AND STATUS INDICATORS

The DT2306 data logger is now ready to be configured for data logging.

4 LOGGER CONFIGURATION

The following sections detail how to correctly configure the DT2306 for data logging. It is important o ensure the logger is properly configured before beginning data collection.

4.1 LOGGING TAB

Configure the logger in the Logging Tab (Figure 4-1) prior to data collection.

Refer to Table 4-1 for Logging settings and descriptions.

NOTE: SOME LOGGER CONFIGURATION PARAMETERS WILL BE CONTROLLED BY THE RTU BASE STATION WHEN THE LOGGER IS IN RSTAR ENABLED MODE. ANY SUCH PARAMETERS WILL BE INACCESSIBLE BY THE DT LOGGER HOST SOFTWARE.

CAUTION: DATA LOSS WARNING

ENSURE THE DATA HAS BEEN DOWNLOADED PRIOR TO APPLYING SETTINGS. ALL EXISTING LOGGER DATA WILL BE ERASED DURING LOGGER SETTINGS UPLOAD.

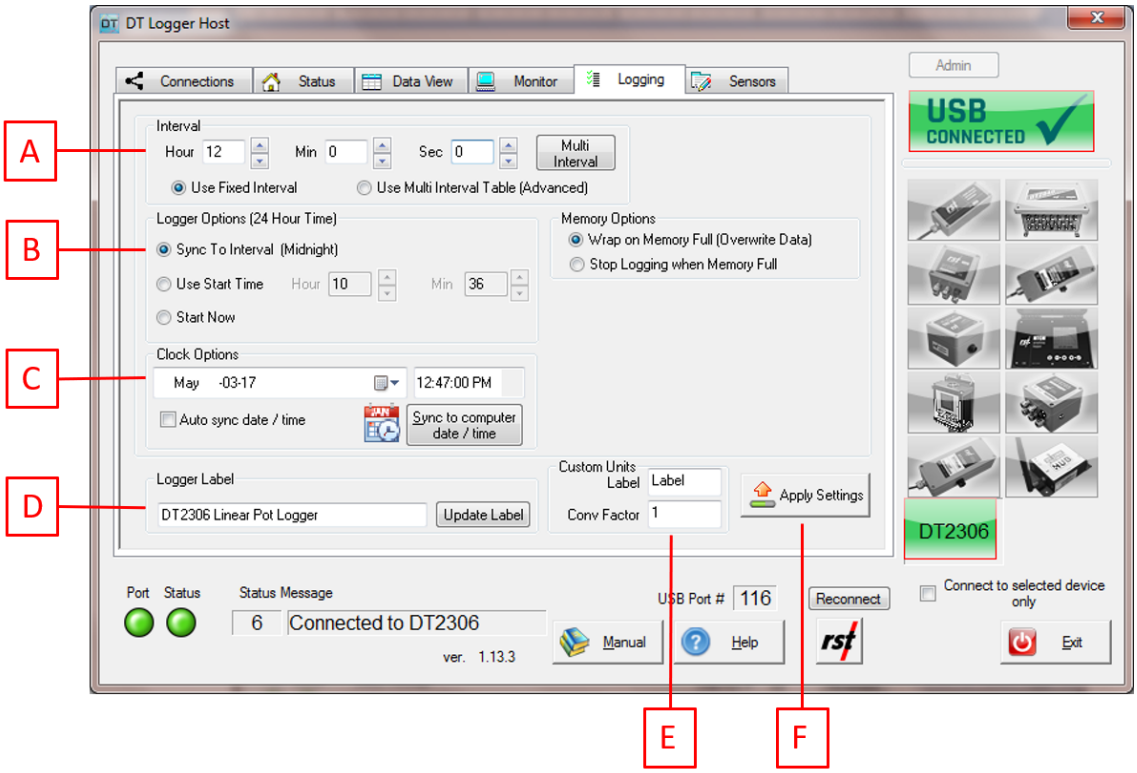

FIGURE 4-1 THE LOGGING TAB

TABLE 4-1 LOGGING TAB OPTIONS AND DESCRIPTION

	SETTING	APPLICATION
A	Interval	Select 'Use Fixed Interval' to adjust the intervals and set the logging frequency. Select 'Use Multi Interval Table' and click on 'Multi Interval' to set up to 12 custom, multiple logging frequencies. **Note**: The hour, minute, second, and number of iterations per interval must be specified. Each interval MUST have an iteration except the last iteration which must be set to zero. This tells the program that the logger will continue at the last iteration rate.
B	Logger Options (24 Hour Time)	Check 'Use Start Time' to select the desired logging start time (24-hour format). **Note**: The logger will not start until it reaches the custom start time even if the time has already passed. E.g., if the current time is 13:01 and the start time is set to 13:00, the logger will not start logging data until 13:00 the **next day**. The status will read *Log Pending* until the custom start time is reached. Select 'Wrap on Memory Full (Overwrite Data)' to overwrite the logger memory when logger memory is full. Select 'Stop Logging when Memory Full' to stop collecting data when logger memory is full. This option is recommended for locations with access issues where data may not be retrieved prior to battery failure.
C	Clock Options	Select a custom date and time or click 'Sync to computer date/time' to sync it to the computer's current date and time. Select 'Auto sync date/time' to always sync to the computer's date/time when connected via USB.
D	Logger Label	Type a custom name for the logger. Click 'Update Label' to apply the label. This name will appear in the data files.
E	Custom Units	Enter desired label and conversion factor to add custom units in the Sensor configuration tab.
F	Apply Settings	Click 'Apply Settings' to save any changes and upload them to logger memory. 'Apply Settings' **must** be clicked to ensure settings are saved. **CAUTION: DATA LOSS WARNING** **ALL EXISTING LOGGER DATA WILL BE ERASED DURING LOGGER SETTINGS UPLOAD. ENSURE THE DATA HAS BEEN DOWNLOADED PRIOR TO APPLYING SETTINGS. SENSOR CONFIGURATION WILL NOT BE AFFECTED.**

Clicking 'Apply Settings' will display a prompt reminding the user to download existing logger data.

Only click 'yes' if the data has already been downloaded. Click 'no' to return to the Logging Tab.

4.2 STATUS TAB

The Status tab provides an overview of general information about the currently connected DT2306 data logger (such as logger information, logger status, battery life, and current memory usage) (Figure 4-2).

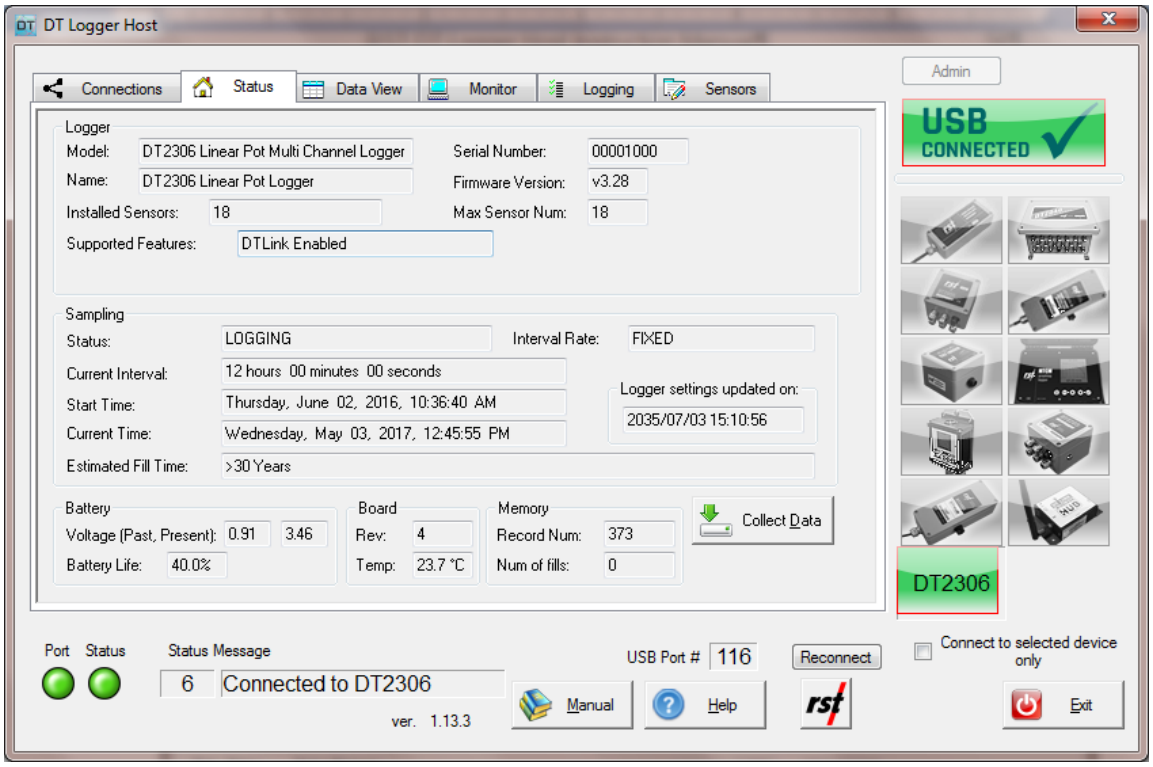

FIGURE 4-2 THE STATUS TAB

Ensure the serial number displayed matches the logger serial number.

Click 'Collect Data' to download the data into a *.csv file. A prompt will appear asking to append or overwrite data. Append will **continue** to add data to existing readings in the memory. Overwrite data will erase all data in the logger and **restart** the logging process.

4.3 DATA VIEW TAB

The Data View tab provides a quick preview of logger data files (Figure 4-3).

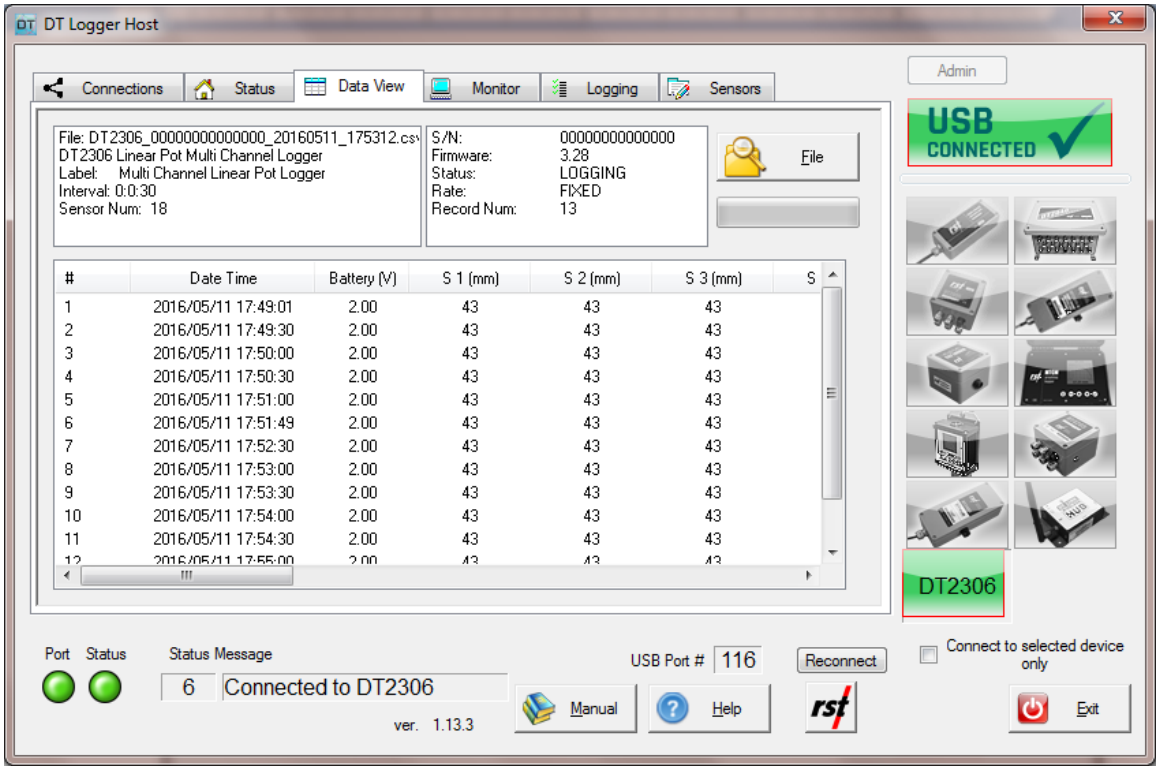

FIGURE 4-3 DATA VIEW TAB

NOTE: DATA VIEW DISPLAYS MAJOR DATA LOGGER SETTINGS AND ALL SAVED DATA RECORDS. USE A TEXT FILE VIEWER OR SPREADSHEET PROGRAM (E.G. MICROSOFT EXCEL™) TO VIEW THE ENTIRE FILE.

4.4 MONITOR TAB

The following section details the features of the Monitor Tab (Figure 4-4).

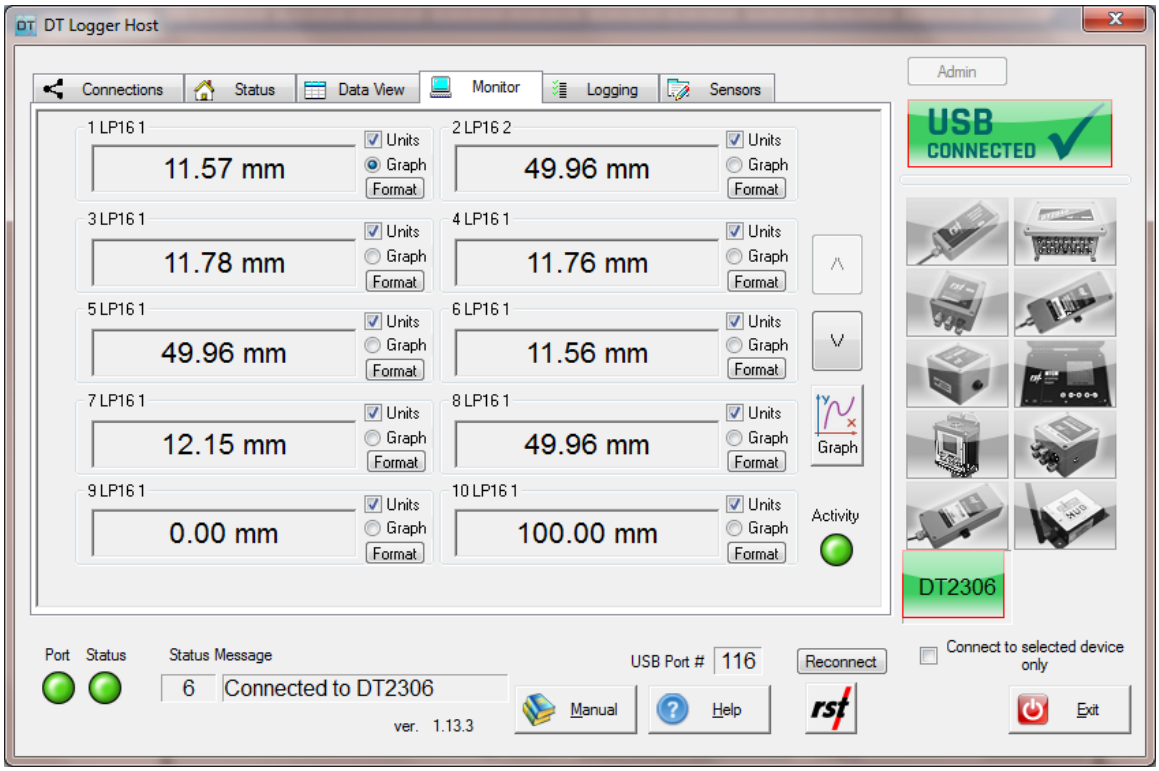

FIGURE 4-4 THE MONITOR TAB

Opening the monitor tab sets the data logger into monitor mode. The screen reports in % of the detected potentiometer ratio by default.

Click the check boxes to change the display to Engineering Units.

NOTE: ENGINEERING UNITS ARE ONLY AVAILABLE WHEN SENSOR CALIBRATION DATA AND CONVERSION METHOD IS SET IN THE SENSORS TAB.

The sensor reading will update approximately every two seconds when successfully connected to the data logger. A green indicator will flash each time a sensor data is updated.

The program will display "----" in each Sensor Reading field until communication is established with the data logger.

The program will display "RANGE_ERR" when the Sensor Reading is outside of valid range.

4.4.1 Graphical Monitor

Click the 'Graph' button to invoke the data logger graphical monitor. The graphical monitor displays the recently monitor readings in a Sensor Reading vs. Time graph.

The graphical monitor will update approximately every two seconds when successfully connected.

The real-time sensor reading is displayed below the graph window. The pre-set default range is applied in Range mode. Uncheck 'Auto' to apply a custom range.

Minimum and maximum sensor reading values are automatically adjusted to display the entire graph. Uncheck 'Auto' to apply custom values. The time range (x-axis) can be adjusted between 1 – 120 minutes.

Click the 'Settings' button to open the Graph Settings dialog and manipulate graph properties such as line style, background color, and grid lines (Figure 4-5).

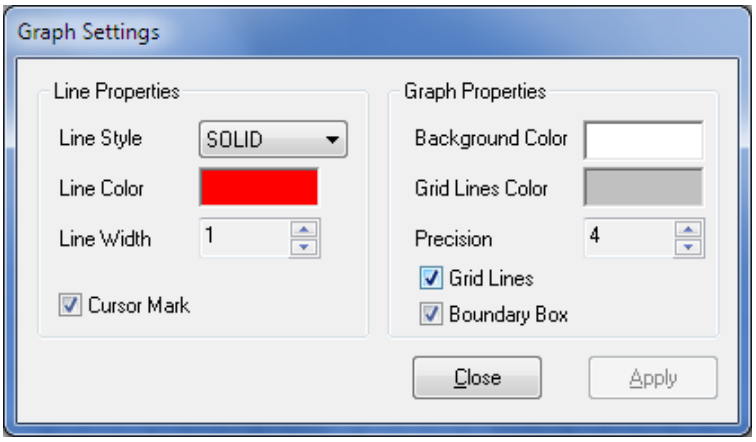

FIGURE 4-5 GRAPHICAL MONITOR OPTIONS

4.5 SENSORS TAB

The sensors tab shows current sensor configurations (Figure 4-6). Readings can be adjusted from % to Engineering Units, if desired. Data required for the conversion to engineering units is found on the calibration sheet provided by RST with each shipment. Contact RST if the calibration sheet is missing from the shipment or you require a replacement.

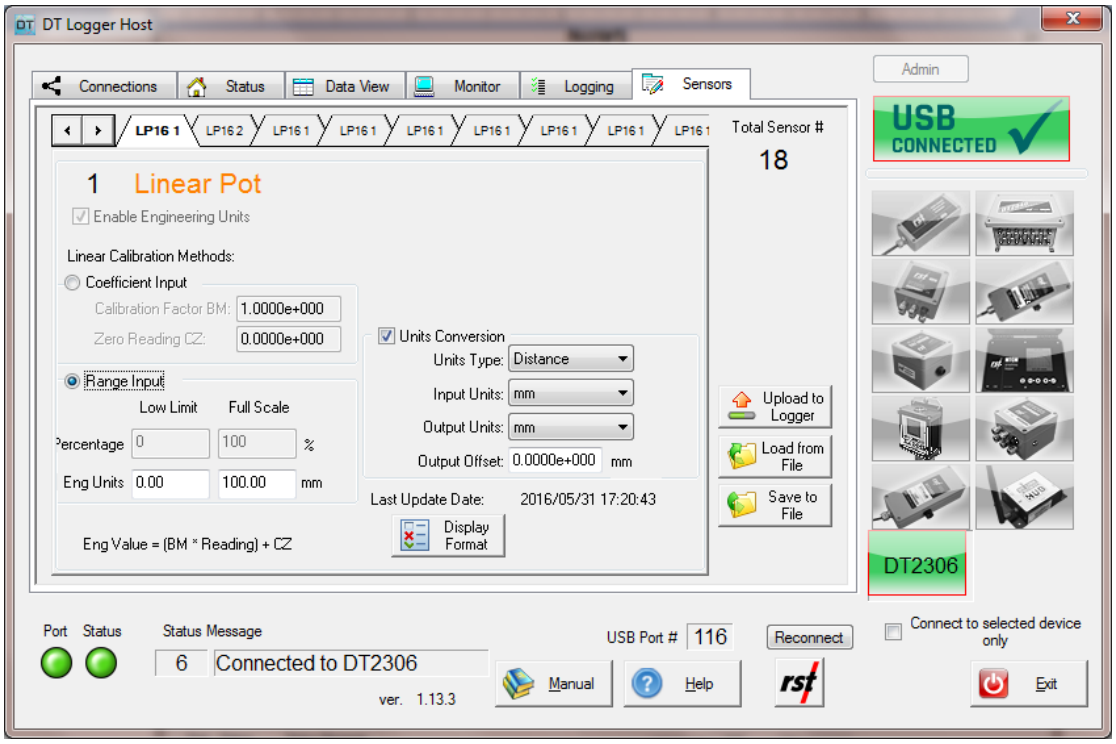

FIGURE 4-6 SENSOR TAB

Refer to Table 4-2 for Sensors settings and descriptions.

TABLE 4-2 SENSORS TAB OPTIONS AND DESCRIPTION

SETTING	APPLICATION
Conversion Method	Select 'Coefficient Input' to calculate engineering values using linear conversion. Select 'Range Input' to automatically calculate coefficient parameters given range values.
Units Conversion	Select 'Units Conversion' to apply a user defined output offset value and output units. The conversion will be done automatically resulting in desired units displayed in the Monitor tab and recorded in the downloaded file data.
Display Format	Click to customize monitor display settings – alter precision or switch to scientific display.
Upload to Logger	Click to update logger with current sensor settings. **Note**: 'Upload to Logger' **must** be clicked to update logger with new settings. **CAUTION: DATA LOSS WARNING** **THE PROGRAM WILL PROMPT THE USER TO RESTART LOGGING OR ERASE DATA CURRENTLY CONTAINED IN THE LOGGER. CURRENT READINGS AND ALL PREVIOUS DATA WITH CURRENT SENSOR CALIBRATION SETTINGS WILL BE DOWNLOADED TO A *.CSV FILE NEXT TIME DATA IS COLLECTED IF THE LOGGER MEMORY IS NOT ERASED.**
Save to File	Click to save current sensor settings to file for later retrieval.
Load from File	Click to load previously saved sensor settings.

CAUTION: DO NOT DISCONNECT THE LOGGER BEFORE EXITING THE SOFTWARE.

4.6 CONNECTIONS TAB

The connections tab allows the user to change logger settings and access advanced features.

Advanced features should be used only with the assistance of RST Instruments technical personnel. Contact RST for more information.

TABLE 4-3 CONNECTIONS TAB OPTIONS AND DESCRIPTION

PROBLEM	SOLUTION
CSV Data File Folder	Click 'Browse' to change the *.csv save folder location.
Open Folder	Click 'Data Folder' to open the *.csv save folder location.
Advanced	Advanced features should be used only with the assistance of RST Instruments technical personnel. Contact RST for more information.
RSTAR Settings	Click 'RSTAR Settings' to enable/disable RSTAR and view advanced RSTAR settings.
Software Settings	Click 'Default Settings' to revert to default logger settings. Click 'Change Admin Password' to change the logger password.
Software Update Check	Click 'Check now' to check for a software update. Click 'Update Options' to adjust the frequency and save folder location of the software updates.

5 TROUBLESHOOTING

Press F1 or click the help button to activate the help system. Answers to common problems and troubleshooting tips may be found by browsing help topics or by searching keywords.

TABLE 5-1 COMMON TROUBLESHOOTING PROBLEMS AND SOLUTIONS

PROBLEM	SOLUTION
Failed Drivers Installation	Manual installation of the USB drivers: **Start Menu > RST Instruments > DT Logger Host software > Tools> Install USB Drivers**
Status Message: Port Not Open	Close other windows applications. Select the correct logger using logger mode buttons.
Status Message: Connecting to the logger	Verify that the communication cable is tightly connected. Replace logger batteries.
Reading Errors	Close and restart DT Logger Host software.
Transmission Error	Check the battery state on the Status tab. Drained battery may cause data transmission errors.
Damaged USB port cover	Contact RST for a replacement cap.
Battery voltage below 3V	Contact RST for replacement batteries. Do **not** replace the battery with an alkaline or zinc-carbon battery.

The software should always be closed when changing loggers or reconnecting the cable.

6 BATTERY INFORMATION

6.1 BATTERY TYPE

The DT2306 data logger uses a 3.6 V lithium-thionyl chloride battery. The type of battery used will depend upon whether or not the logger is radio-enabled. Table 6-1 summarizes the types of batteries and their uses in the DT 2306. Standard batteries (defined as SAFT LSH 20 D-cell, or equivalent) are used for radio-enabled loggers. Stand-alone data loggers use a compact battery. This is defined as either one SAFT LSH 14 light C-cell battery or two SAFT LS 14500 AA batteries, or equivalent. Compact battery options are designed to support the same level of performance in the DT 2306 and are considered equivalent.

TABLE 6-1 BATTERY TYPES

BATTERY NAME	BATTERY TYPE	APPLICATION
Standard Battery	SAFT LSH 20 D-Cell or equivalent	Radio-enabled loggers (RSTAR, DT Link)
Compact Battery	One SAFT LSH 14 Light C-Cell or two SAFT LS 14500 AA (with appropriate adapter)	Stand-alone loggers

CAUTION:

DO NOT ATTEMPT TO RECHARGE THE BATTERY.

DO NOT REPLACE THE BATTERY WITH AN ALKALINE OR ZINC-CARBON BATTERY.

REMOVE STANDARD BATTERIES PRIOR TO SHIPPING THE DT2306.

Recycle the battery according to local laws and regulations.

Contact RST for replacement batteries.

6.2 ESTIMATED BATTERY LIFE

The following table outlines the estimated life of a 3.6V compact or standard lithium-thionyl chloride battery in a DT2306.

TABLE 6-2 ESTIMATED BATTERY LIFE

DATA LOGGER CONFIGURATION	READING INTERVAL	RADIO	COMPACT BATTERY	STANDARD BATTERY
DT2306, 18 potentiometers	1 hour	none	4 years	4 years
		RSTAR	*n/a*	4 years
		DT Link	*n/a*	3.5 years
	10 minutes	none	1 year	3.5 years
		RSTAR	*n/a*	1.5 years
		DT Link	*n/a*	2 years
	1 minute	none	1 month	4.5 months
		RSTAR	*n/a*	2 months
		DT Link	*n/a*	4 months

To determine the remaining battery life, connect the DT2306 to a computer or Field PC and launch DT Logger Host. Battery status information will be displayed on the Status tab (Figure 4-2).

Replace the battery when the estimated battery life is low to ensure uninterrupted operation. The Status tab battery indicator will turn red when the estimated battery life is 20% or less.

6.3 CHANGING THE BATTERY

The following steps outline the procedure to change the battery

CAUTION: CONNECT THE DATA LOGGER TO THE DT LOGGER HOST SOFTWARE AND RE-APPLY LOGGING SETTINGS AFTER BATTERY REPLACEMENT TO ENSURE TIME SETTINGS ARE CORRECT. FAILURE TO RE-APPLY SETTINGS COULD RESULT IN IMPROPER TIME STAMPS AFTER BATTERY REPLACEMENT.

1. Connect the data logger to the DT Logger Host software. Download existing logger data within the Status Tab.

2. Disconnect the logger from the computer. Loosen the 4 Phillips screws on the top of the logger. Lift the cover off.

3. Remove the battery from the carrier by lifting it from the negative terminal.

NOTE: LIFT THE BATTERY FROM THE NEGATIVE TERMINAL.

4. Replace with a new battery provided by RST. Do not replace the battery with an alkaline or zinc-carbon battery.

5. Replace the cover. Loosely tighten each screw in the X pattern as shown in Figure 6-1. Then securely tighten each screw in the X pattern.

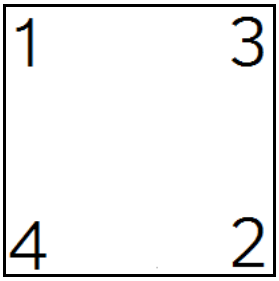

FIGURE 6-1 TIGHTEN SCREWS IN THE FOLLOWING ORDER AND PATTERN

6 Connect the data logger to the DT Logger Host software. Click on the Connections Tab. Click on 'Advanced'. Click on 'Initialize Battery'.

7 Click on the Logging Tab. Verify that the settings are correct. Click on 'Apply Settings' to verify any parameter changes or to ensure current settings are accurate.

NOTE: 'APPLY SETTINGS' MUST BE CLICKED EVEN IF NO CHANGES HAVE BEEN MADE.

7 SERVICE AND REPAIR

The product contains no user-serviceable parts. Contact RST for product service or repair not covered in this manual.