# TITAN S8

Titan S8-CAN Portable Data Acquisition Logger

# PRODUCT USER GUIDE

To view the full MadgeTech product line, visit our website at **madgetech.com**.

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# PRODUCT OVERVIEW

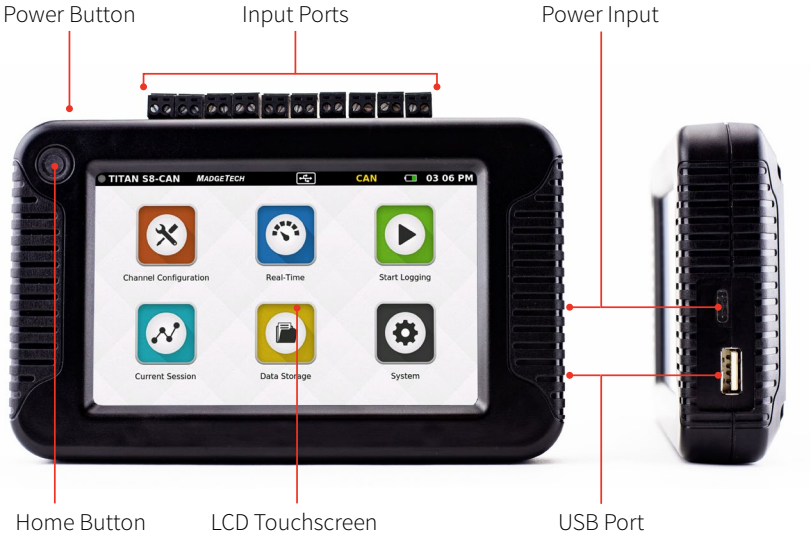
## Device Overview

The Titan S8-CAN is compatible with diesel engines that use SAE J1939 CAN communication protocol. The Titan-CAN connects to the vehicle via the J1939 diagnostic port and has the ability to monitor/record up to 23 active SPNs (suspect parameter numbers). In addition to CAN measurements, this versatile logger measures and records temperature, current, voltage and pulse simultaneously and displays data in real-time. The Titan S8-CAN is compatible for use with many thermocouple, RTD or thermistor probes as well as a number of voltage output sensors, current switches, transmitters and transducers.

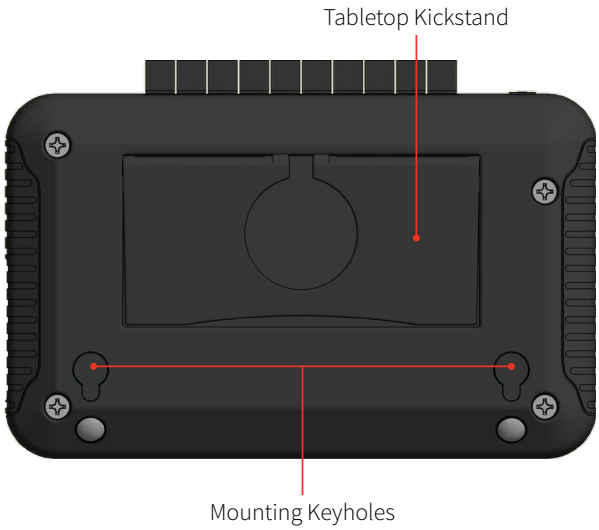
The Titan S8-CAN is helpful for allowing diesel technicians and fleet owners with preventative and predictive maintenance with their fleet of vehicles. It's touchscreen user interface allows for easy set up and configuration.

The Titan S8-CAN is a powerful, independent tool. Unlike other data loggers, the Titan S8-CAN delivers an all-in-one data collection and monitoring solution that does not require a PC or any downloaded software for operation.

## External Features




- **Power Button:** To power on and power off the device, hold down the Power button for 3 seconds.
  **If device doesn't power on after 3 seconds and the battery is charged, hold down the power button for 20 seconds to reset the system.*
- **Home Button:** The Home button will return the user to the home screen (details on page 5).
- **Input Ports:** The Titan S8-CAN features 8 sensor channel inputs plus one alarm port and a ground (details on pages 3-4).
- **LCD Touchscreen:** 5 inch LCD capacitive touchscreen.
- **USB Port:** The Titan S8-CAN has a built-in USB port for connecting the CAN converter (details on page 4) and downloading data to a flash drive.
- **Power Input:** Charging port.



# PRODUCT OVERVIEW

## Device Orientation

The Titan S8-CAN display can rotate 180 degrees depending on the desired orientation of the device. This option is available from the Settings menu under the Display section. ***Please note:*** *Power restart required in order to apply screen rotation.*

### Desktop Orientation

For handheld and tabletop use, the inputs will be on the top. Note port number as it relates to device orientation.

### Wall Mount Orientation

For wall mount use the unit will be rotated so that the inputs will be on the bottom.

### Tabletop Orientation

The Titan S8-CAN features a built in kickstand on the back of the device for use on flat surfaces.

## Device Ports

The Titan S8-CAN features 10 ports. Please refer to the images above for the port number as it relates to device orientation.

**Channels and Functions**

- Ports 1 thru 8 are sensor input channels (Temperature, Current or Voltage)
- Port 9 serves as an alarm output
- Port 10 serves as a ground for the device

**Frequency or Pulse Counter**

Can only be used on port 1

**3-Wire and 4-Wire PT100 RTD Sensors**

Use ports 1-2, 3-4, 5-6, or 7-8

**2-Wire PT100 RTD Sensors**

Can be used on ports 1-8

# PRODUCT OVERVIEW

## Powering, Charging and Downloading Data

Power Button
(On/Off)

USB-C Charging Port
(Cable Included)

USB Port
For Offloading data files, updating device software, screen captures, and remote keyboard.

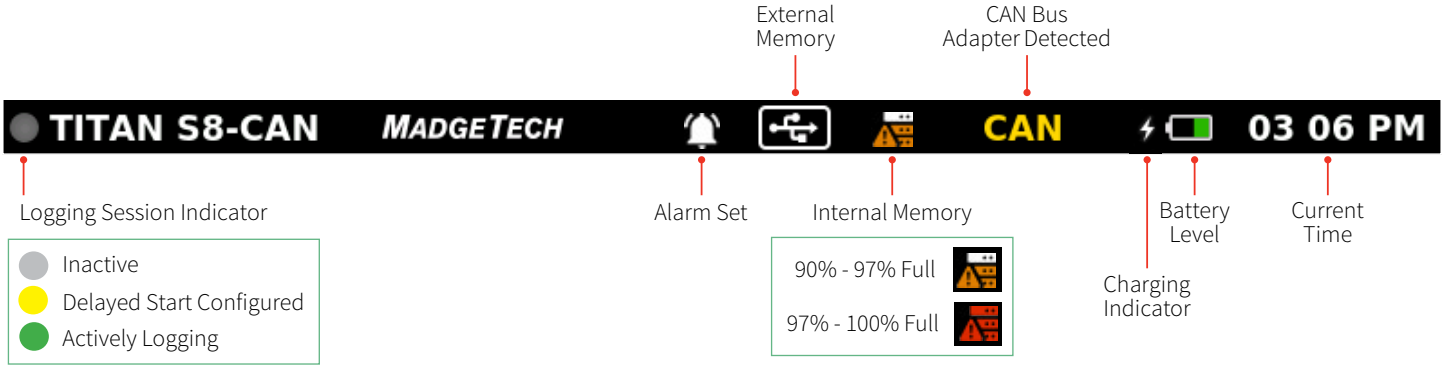
## CAN to Vehicle Connection

**CAN Connections** are made by connecting CAN converter to USB port. Diagnostic cable is then plugged into the 9-pin DIN connector and plugged into the vehicle.

# USER INTERFACE

## Top Menu Bar

The top bar of the Titan S8-CAN Interface features status icons and useful information to refer to while using the device.




## Home Screen

The Home screen will display the following options when the Home button is selected.

- **Channel Configuration:** Configure parameters and options for each channel.
- **Real-Time:** Quickly view Real-Time data for all active channels.
- **Start Logging:** Start logging using current settings. (Stop logging if device is actively logging.)
- **Current Session:** View data from the current logging session as graph, tabular or real-time.
- **Data Storage:** View, Copy, Delete and Add notes to logged sessions.
- **System:** Access device preferences and options.

**External Memory**

The External Memory icon is also a button for screen capture. Press the icon to save screen images to the attached USB drive. Images are saved in the pictures folder.

**CAN Bus Adapter Detected**

**CAN Bus driver is opened and ready to receive**
Will turn from yellow to green once the Update button in the Channel Configuration Screen has been pressed.

**CAN Bus adapter has been removed**
If the USB CAN Bus adapter is removed while data logging is active then data logging is automatically terminated and a popup alert message is displayed. In this case, the red CAN icon will flash for a couple of seconds before going blank.

**Stop Logging**
The Start Logging icon will change to "Stop Logging" when device is recording.

# USER INTERFACE

## First Time Use

Follow these steps when the device is powered on for the first time.

### 1

**POWER BUTTON**

Press and hold the Power Button for 3 seconds to power up the device.

### 2

**SCREEN READY**

Wait for the device to initiate, you will see the MadgeTech logo when complete.

### 3

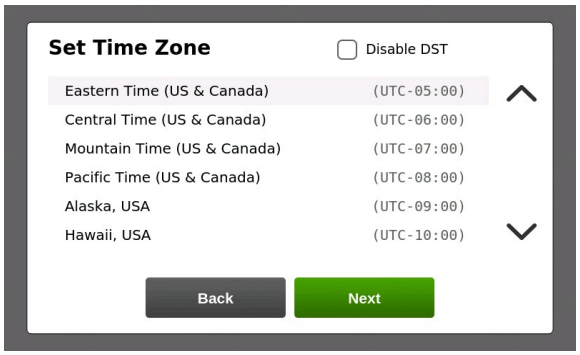
**SELECT SCREEN ORIENTATION**

For desktop use, inputs are facing upward.
For wall mounted use, inputs are facing downward.

### 4

**SET INITIAL TIME ZONE**

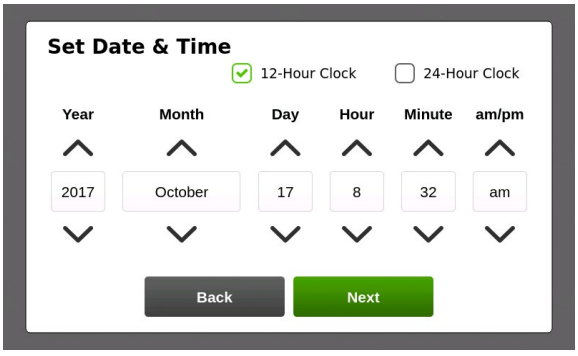
Enter the local time zone to be used by the device and select **Next**. Available in version v4.7 or later.




### 4

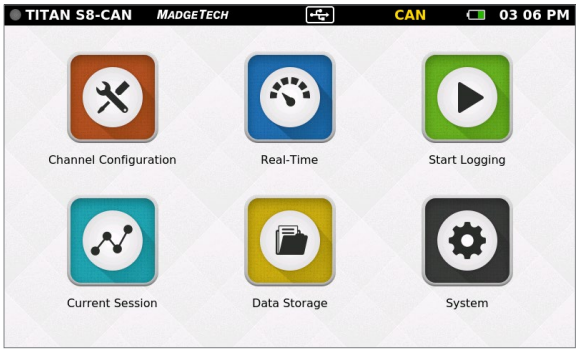
**SET INITIAL DATE AND TIME**

Enter the local date and time and select **Next**.




### 5

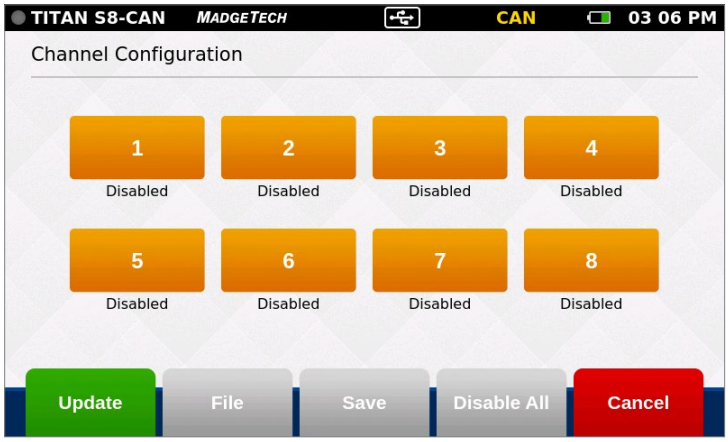
When the device presents the Home screen it is ready to use.



# USER INTERFACE

## Channel Configuration

When the Channel Configuration icon is selected, the device will display the screen shown below:

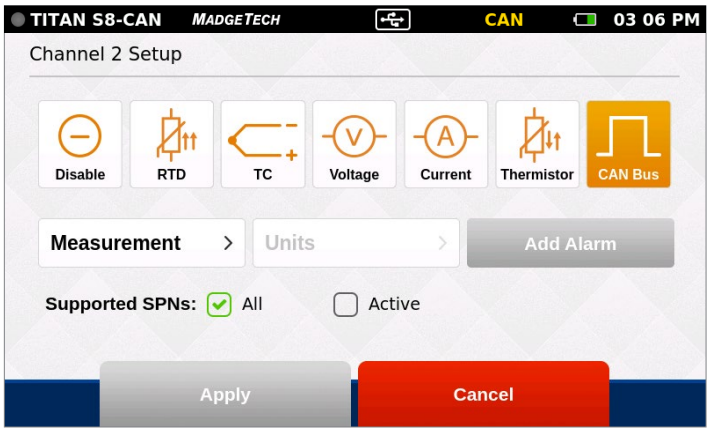


Select Channel Configuration

- **Channel 1-8:** Configures the type of channel input, units, engineering units (if applicable), alarms and user calibration adjustments. ***Channel 1 cannot be used for CAN.***
- **Channel 9-24:** Channels 9-24 are for CAN measurements. Channels 2-24 can be programmed for Active or All SPNs.
- **Update:** Applies the current channel configuration to make the device ready to start logging or display real-time data.
- **File:** Loads previously saved channel configurations.
- **Save:** Saves the current channel configuration so it may be loaded and used later.
- **Disable All:** Clears the configuration of all channels, returning them to the default disabled status.
- **Cancel:** Cancels changes and then goes back to the Home screen.

## Channel Setup

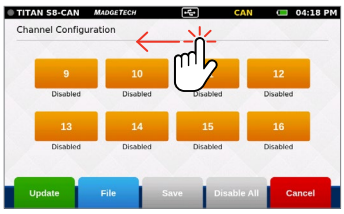
When the user selects a Channel, the device will display the Channel Setup screen with several options:




- **Disable** (Channel is not being used)
- **RTD** (RTD probe)
- **TC** (Thermocouple probe)
- **Voltage**
- **Current**
- **Thermistor** (Thermistor probe)
- **Can Bus**
- **Pulse** (Only available on channel 1)

Select Channel Configuration

Select Channel




Swipe Left for Channels 9-24

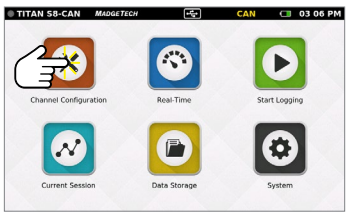
# USER INTERFACE

## Measurement Setup

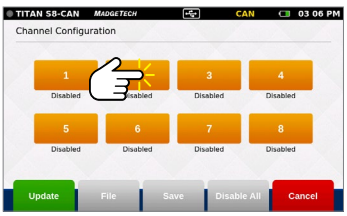
When the user selects a Measurement Parameter, the device will display the relevant options for that selection. The example below shows the SAE J1939 CAN Bus options:

Select the **Measurement** button to display a pop-up screen of relevant measurement types to choose from.

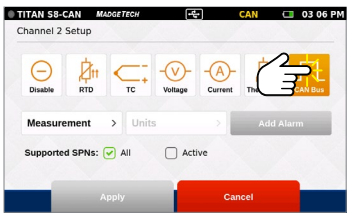
For CAN, selecting the **Measurement** button will bring up a list of all or active SPNs.



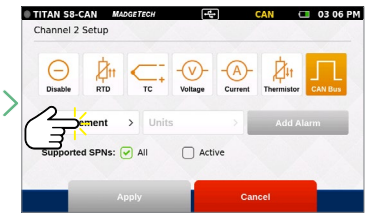

Select Channel Configuration




Select Channel



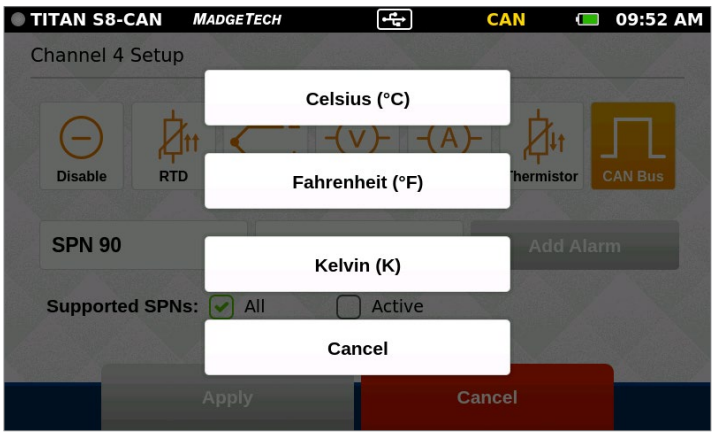

Select Measurement Parameter




Select Measurement Type

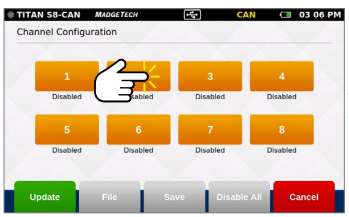
## Measurement Units

When the user selects the Units button, the device will display a pop-up menu of the corresponding options for that selection. The example below shows the Temperature options:

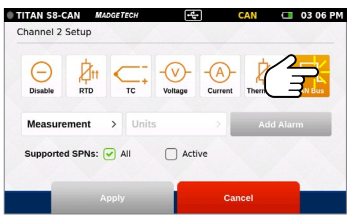



**Units:** These are the associated units for the specific SPN selected. For instance for engine temp = °F or °C. For fuel level = 0-100%, etc.

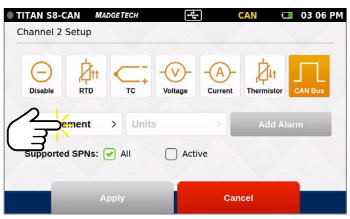
If the user selects **Engineering Units** for Voltage, Current or Pulse sensor, see set-up instructions on page 11-12.



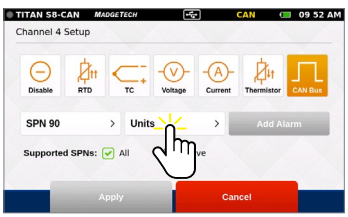

Select Channel




Select Measurement Parameter




Select Measurement Type

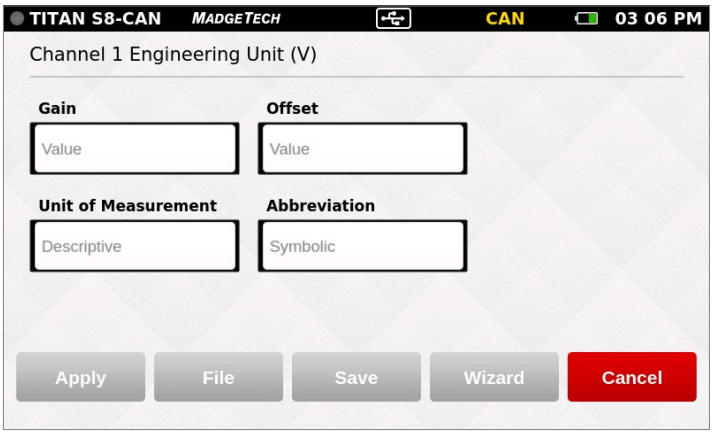



Select Measurement Units

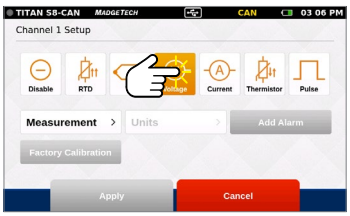
# USER INTERFACE

## Engineering Units

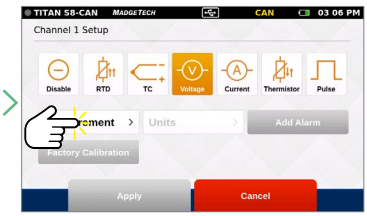
Engineering Units can be applied to any channel measuring Voltage, Frequency or Pulse to display readings in a user selected custom unit of measure.



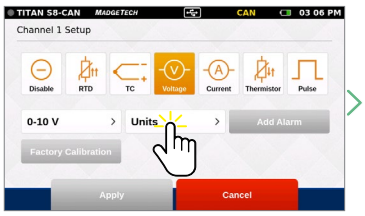

- **Gain:** User selected gain value.
- **Offset:** User selected offset value.
- **Unit of Measurement:** Desired unit to be measured.
- **Abbreviation:** User defined abbreviation.
- **Apply:** Saves the settings.
- **File:** Retrieves a previously saved Engineering Unit setting.
- **Save:** Saves the Engineering Unit setting for future use.
- **Wizard:** Allows the user to set up units by entering the input and output values for low and high scale points. The unit will automatically calculate the gain and offset the from these values.
- **Cancel:** Cancels Engineering Unit configuration and returns the user to the Channel Configuration screen.



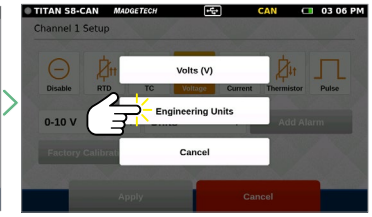

Select Measurement Parameter




Select Measurement Type



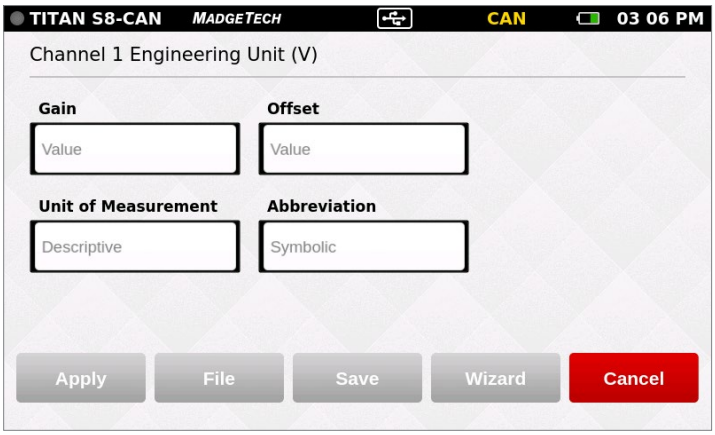

Select Measurement Units



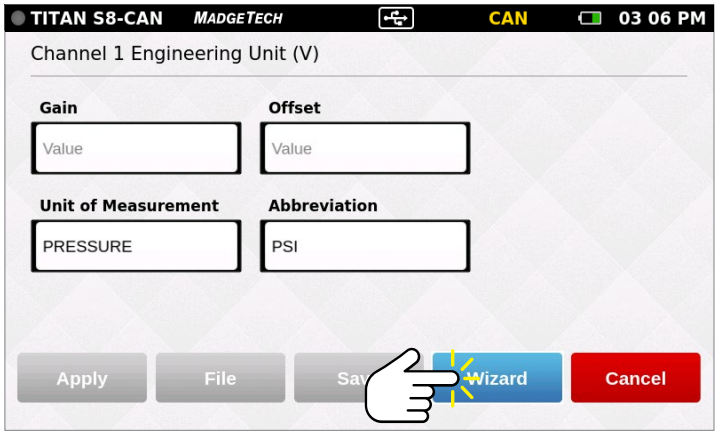

Select Engineering Units

# USER INTERFACE

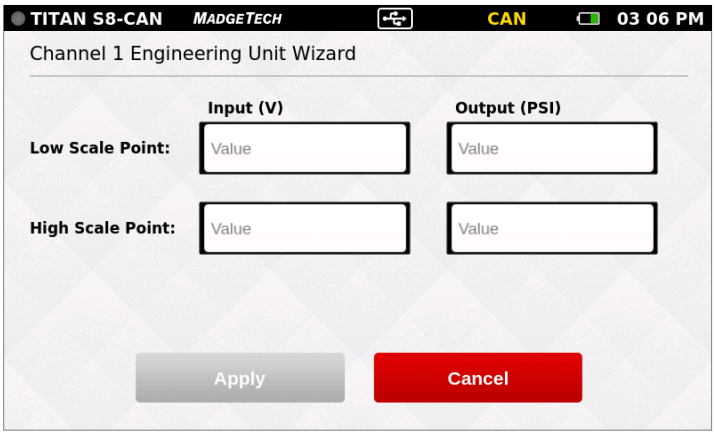
## Setting Up Engineering Units



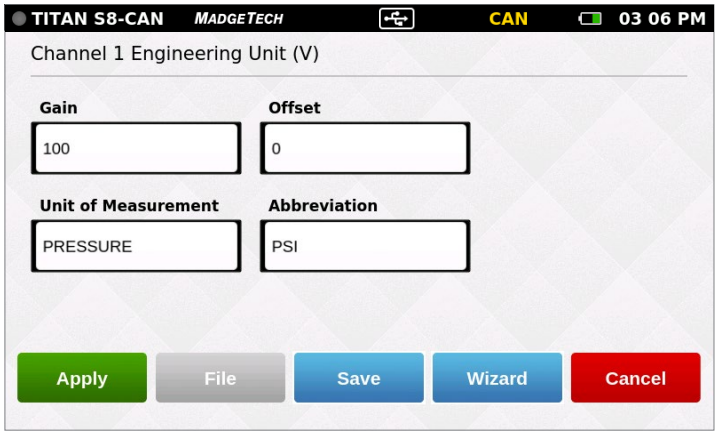

Enter the unit of measurement and abbreviation.




Click the **Wizard** button to launch the Engineering Unit Wizard.




Enter the low and high scale point inputs and outputs and click **Apply**.



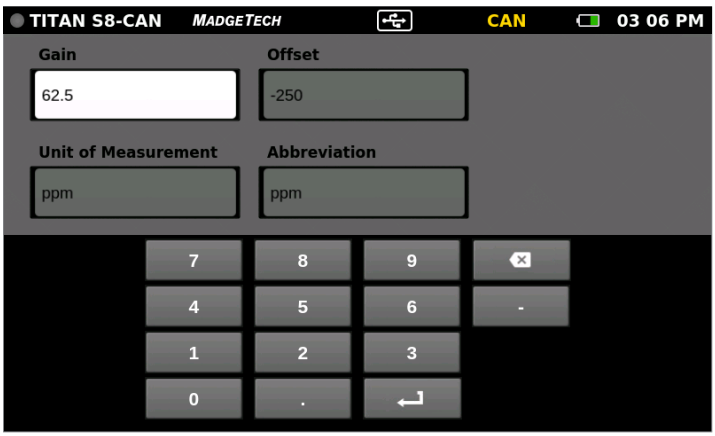

The gain and offset are automatically set. Click **Save** to save the engineering units to the channel and click **Apply** to apply the changes to current logging session.

# USER INTERFACE

## Keyboard Function

When the user taps in any text field within the interface, the keyboard will appear. The numeric keypad appears when the **Gain** and **Offset** fields are selected. The keyboard appears when **Unit of Measurement** and **Abbreviation** fields are selected.

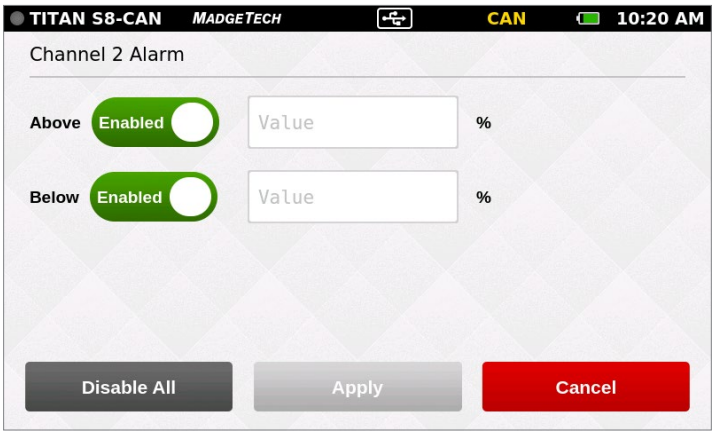
To prevent the keyboard from obscuring content, the screen will always focus on the selected field and bring it into view. Once the text field is complete, the user can tap anywhere on the screen and the keyboard will disappear from view.




An external keyboard can also be used by plugging it into the USB port on the device.

## Alarms

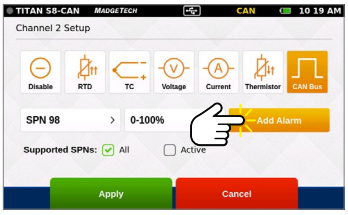
Users can create one alarm configuration per channel with up to two alarm values per channel (above and below threshold):




- **Above:** Indicates the high reading threshold at which above the alarm becomes active.
- **Below:** Indicates the low reading threshold at which below the alarm becomes active.
- **Enabled/Disabled:** Tap the button to either enable or disable the text field to enter desired alarm value.
- **Disable All:** Clears the alarm settings.
- **Apply:** Applies the setting to the current channel.
- **Cancel:** Cancels changes and then returns the user to the Channel Configuration screen.

Select Channel Configuration

Select Channel

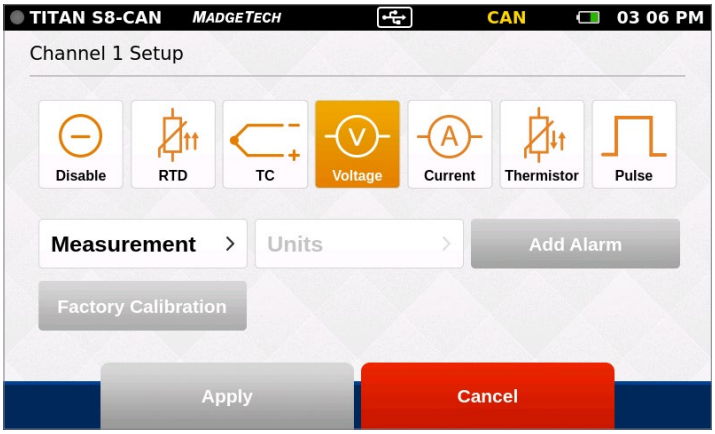



Select Add Alarm

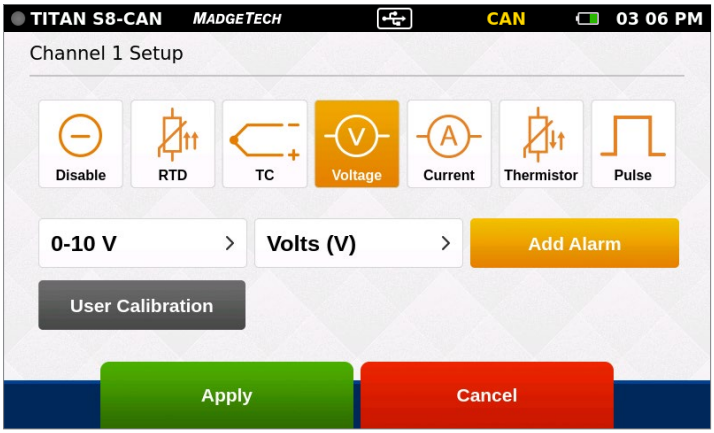
# USER INTERFACE

## Factory Calibration

The Titan S8-CAN includes a complete Factory Calibration feature that provides users with the ability to adjust the calibration settings per channel and revert back to the factory settings at any time. ***Note:*** *For best performance and accuracy, Factory Calibration should be performed by MadgeTech at least once every 12 months.*



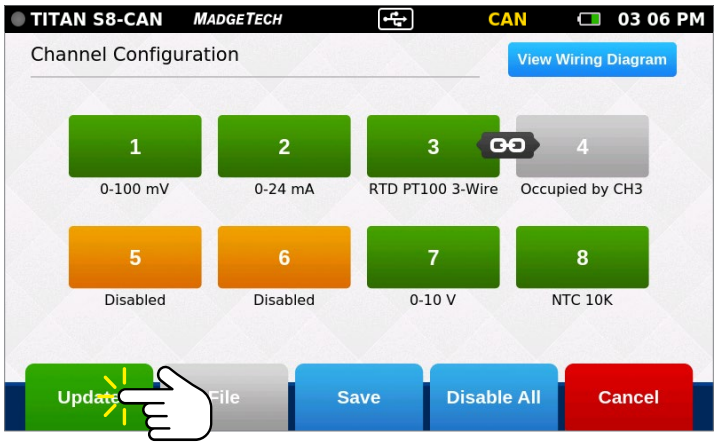

**Factory Calibration:** Indicates the device is currently in the factory calibrated state.




**User Calibration:** Indicates the calibration settings have been modified by the user.

## Channel Configuration Overview

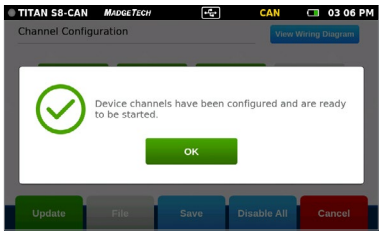
An example of a completed channel configuration screen is shown below.:




### Apply Channel Configuration

Once channels are configured as desired, the user must then select **Update** to use those settings.

A pop-up as shown to the right will confirm that settings have been applied.

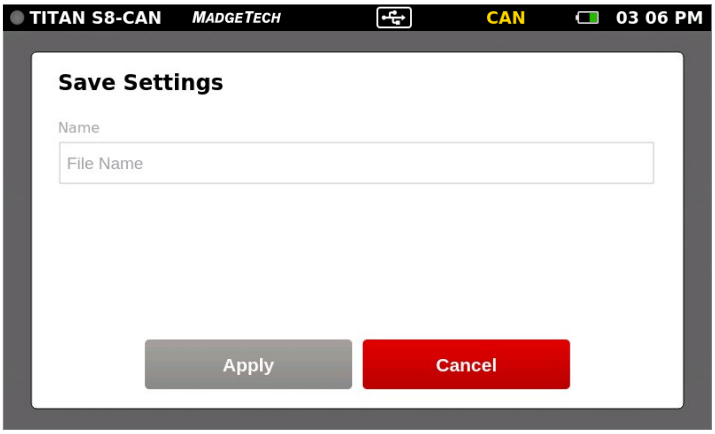


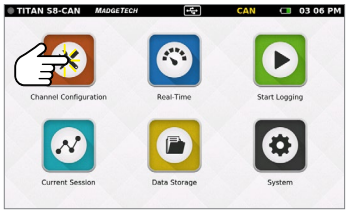

- **View Wiring Diagram:** Shows how to properly wire the device.
- **Green Channel:** Enabled channel.
- **Orange Channel:** Disabled channel.
- **Linked Channels / Gray Channels:** 3 or 4 wire RTD sensor types can be selected for Channels 1, 3, 5 and 7. This sensor type will also occupy the next sequential channel and will be visually represented with a Link icon as seen between Channels 3 and 4 on the screen to the left.
- **Update:** Once the user has configured the channel settings, this button will apply the current settings to all channels.
- **File:** Loads previously saved configurations.
- **Save:** Saves the current Channel Configuration so it may be loaded and used in the future.
- **Disable All:** Clears the programmed channels to disable all.
- **Cancel:** Cancels user changes and then goes back to the Home screen.

# USER INTERFACE

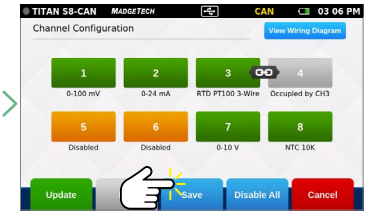
## Save Configuration Settings

Completed channel configurations can be saved for repeated use. The user can select **Save** from the channel configuration screen to select a name for the saved settings file and apply them.



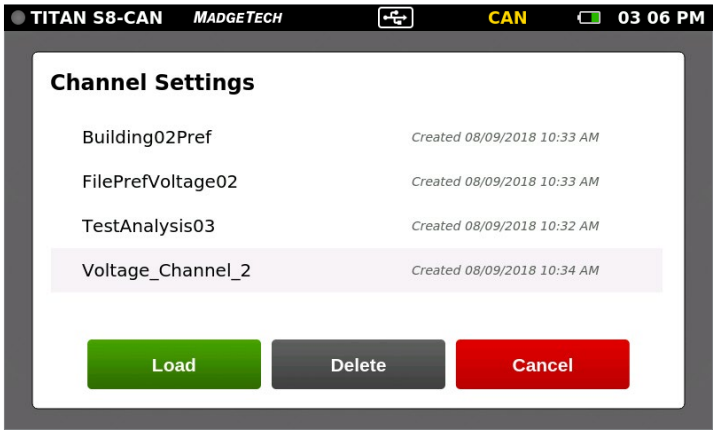

Select Channel Configuration



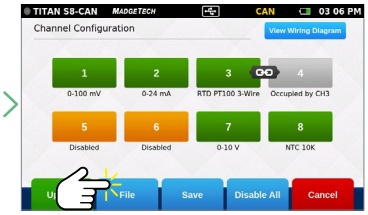

Select Save

## Load Configuration Settings

Saved channel configurations can be easily loaded for repeated use. The user can select File from the channel configuration screen to choose from the list of previously saved settings files. ***Note:*** *Loading a saved settings file will replace the existing configuration.*



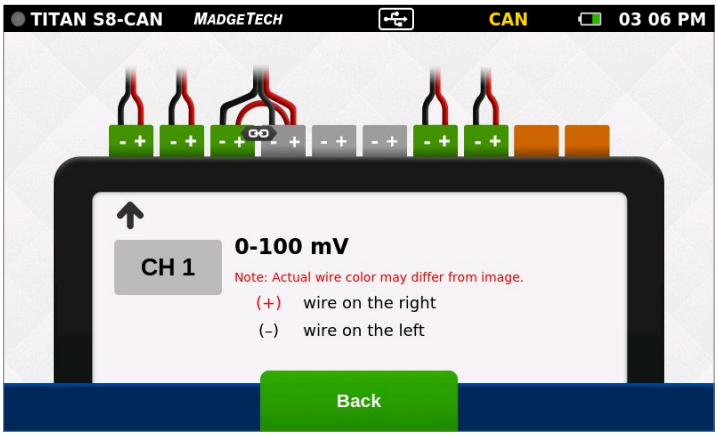
Select Channel Configuration

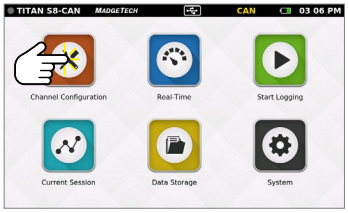



Select File

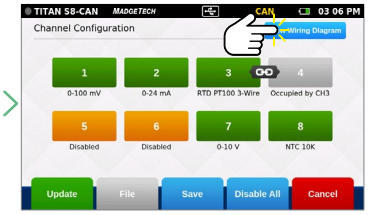
## Wiring Diagram

From the channel configuration screen, the user can select the Wiring Diagram button to display the proper wiring of the unit based on the currently applied configuration. *Please note the position of channel 1 in regards to screen orientation.*




Select Channel Configuration

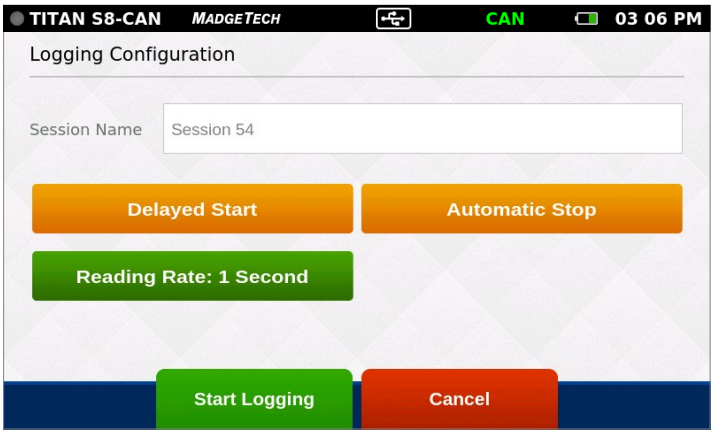


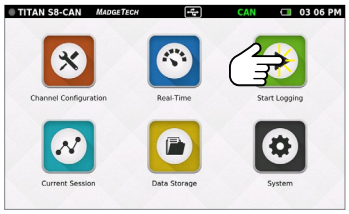

Select View Wiring Diagram

# LOGGING DATA

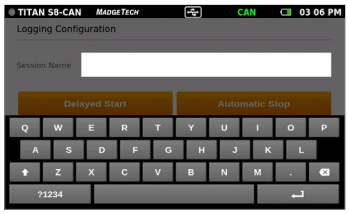
## Start Logging

When **Start Logging** is selected from the **Home** screen, the **Logging Configuration** screen will appear and the user will be prompted to name the data logging session. If the user has not already configured the channels, they will be prompted to configure prior to starting a logging session. The user will be able to configure start time, stop time, and reading rate in addition to naming the logging session.




Select Start Logging



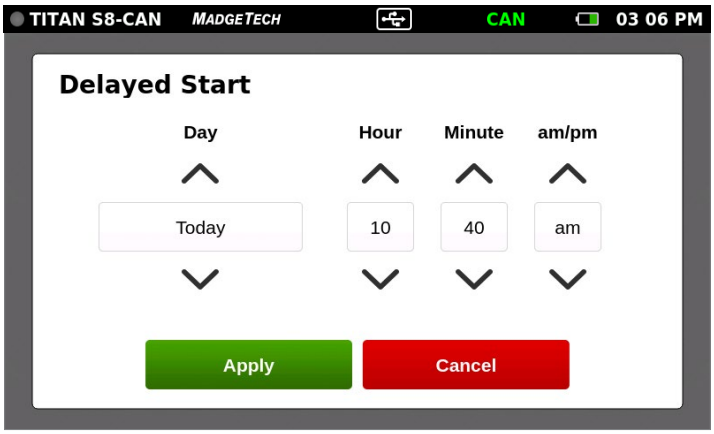

Keyboard will appear when user taps in the session text field.

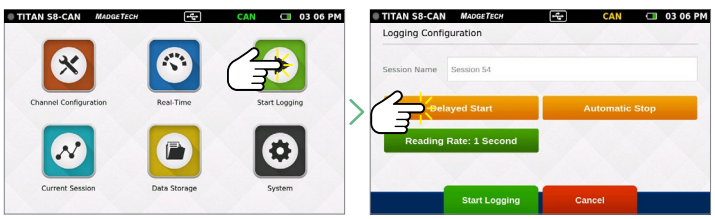
- **Session Name:** Enter the desired name for the logging session. If no name is given, a unique default name will be assigned (i.e. Session 1).
- **Delayed Start:** To set a logging start time in the future, select delayed start. To start logging immediately, select the Start Logging button at the bottom of this screen.
- **Automatic Stop:** The user has the option of selecting an Automatic Stop time. If no time is selected, the user will use the Stop Logging button on the Home screen to manually stop the device.
- **Reading Rate:** The reading rate will default to 10 seconds or use the setting of the last session configuration.
- **Start Logging Data:** Begins logging data session. If delay start has been set, the logging session will begin on the selected date and time.
- **Cancel:** Cancels user configuration and returns back to the Home screen.

**NOTE:** Maximum number of readings per session is 1,000,000 or 5,000,000 (user selectable in System/File Format).

## Delayed Start

Selecting **Delayed Start** will bring up the following configuration screen:




Select Start Logging

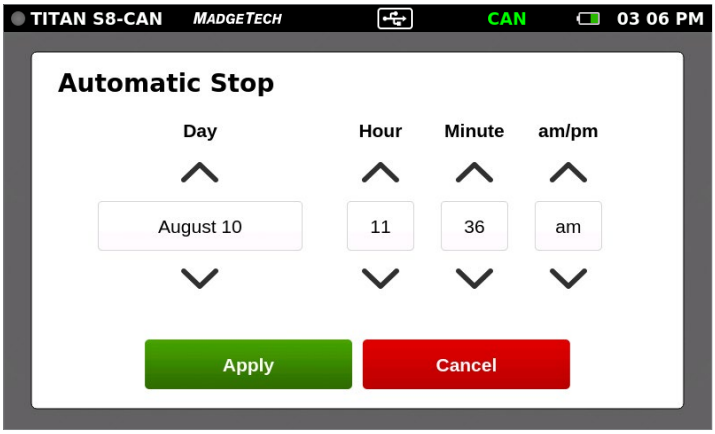
Select Delayed Start

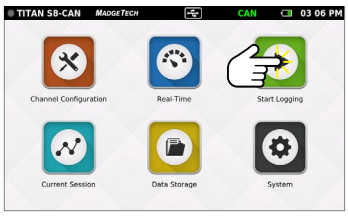
- **Day:** Using the up and down arrows, the user is able to adjust the day.
- **Hour:** Using the up and down arrows, the user is able to adjust the hour.
- **Minute:** Using the up and down arrows, the user is able to adjust the minute.
- **am/pm:** Using the up and down arrows, the user is able to select am or pm (12-hour clock only).
- **Apply:** Applies the start or stop time settings and returns the user back to the Logging Configuration screen.
- **Cancel:** Cancels the start time settings and returns the user to the Logging Configuration screen.

# LOGGING DATA

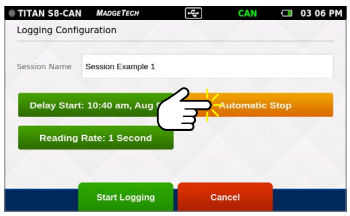
## Automatic Stop

Selecting **Automatic Stop** will bring up the following configuration screen:




Select Start Logging

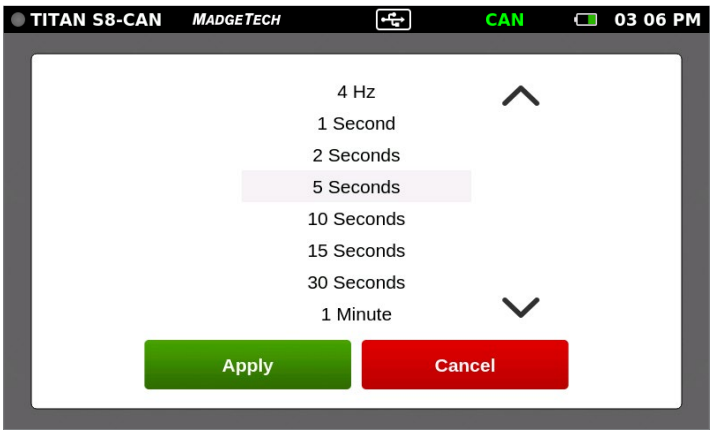


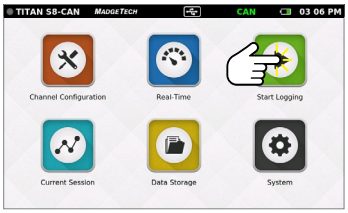

Select Automatic Stop

- **Day:** Use the up and down arrows to adjust the day.
- **Hour:** Use the up and down arrows to adjust the hour.
- **Minute:** Use the up and down arrows to adjust the minute.
- **am/pm:** Use the up and down arrows to select am or pm (12 -hour clock only).
- **Apply:** Applies the start or stop time settings and returns the user back to the Logging Configuration screen.
- **Cancel:** Cancels the stop time settings and returns the user to the Logging Configuration screen.

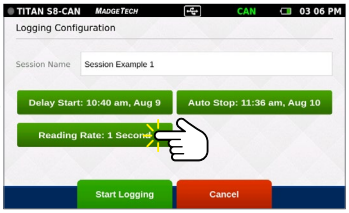
## Reading Rate

When the user selects **Reading Rate**, the following configuration screen will appear. Once the desired reading rate is selected, the user must select **Apply** to use that option, or **Cancel** to return to the previous screen. See page 31 for available reading rates.




Select Start Logging

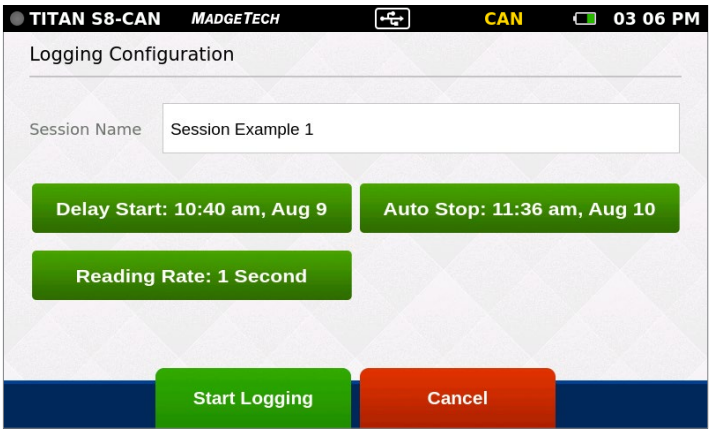



Select Reading Rate

# LOGGING DATA

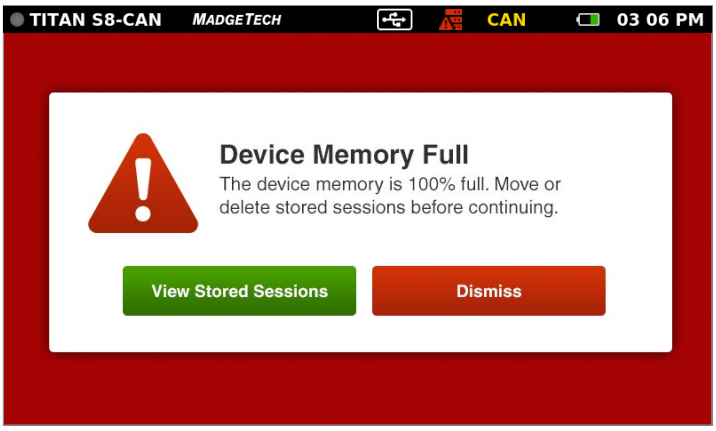
## Review Session Details and Start Logging

Once the user selects a Session Name, Start Time, Stop Time and Reading Rate, the screen will look similar as it does below. Once the settings are complete, the user will select **Start Logging** to begin **Logging Mode**. After selecting **Start Logging**, the user will be brought to the **Home** screen.




## Device Memory Warning

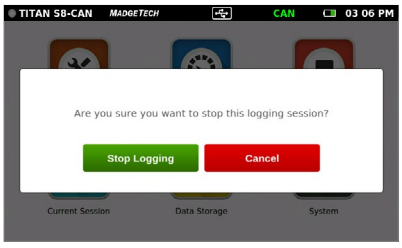
After selecting **Start Logging**, if the internal memory of the device is 100% full, the user will be notified with a pop-up warning message and two options to choose from. This warning will also appear if the internal memory of the device reaches 100% capacity while actively logging.




- **View Stored Sessions:** Takes the user to the Data Storage screen to delete or remove stored data from the device.
- **Dismiss:** Returns the user back to the Home screen and logging will not start.

## Stop Logging

To manually stop a logging session, the user will select the **Stop Logging** button from the **Home** screen. ***Note:*** *Access the Home screen at any time by pressing the Home button.*




**Stop Logging Confirmation**

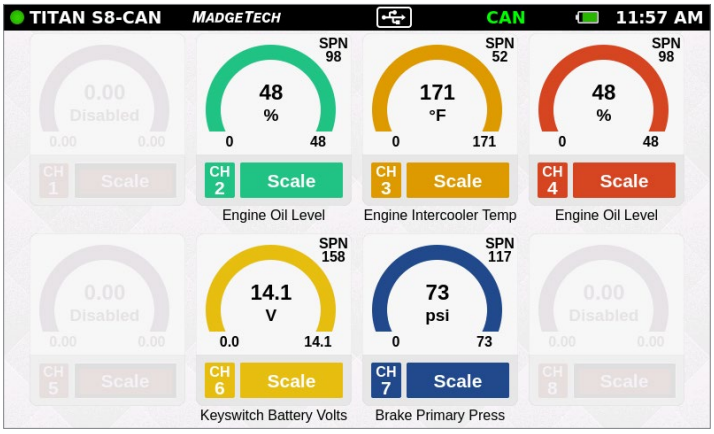
When the user selects Stop Logging, a pop-up screen will emerge prompting the user to confirm the action.

- **Stop Logging:** Ends the current logging session.
- **Cancel:** Continues logging and returns the user to the Home screen.

# VIEWING DATA

## Real-Time Data

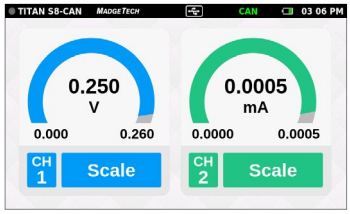
When **Real-Time** is selected from the **Home** screen, the device will display data from all enabled channels and update at the user selected reading rates. The **Real-time** view is also available from the **Current Session** menu when the device is actively logging.

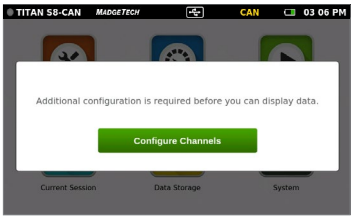



- **Current Reading:** Displayed in the center of the gauge.
- **Minimum:** Displayed on the bottom left of each gauge.
- **Maximum:** Displayed on the bottom right of each gauge.
- **Zero:** (Pulse Only) Resets the displayed reading to zero.
- **Scale:** Scales the readings on the screen. Maximum value will be reset to the current value.

If an SPN is not active, it will not allow you to log data or see real time data. You will need to disable that channel with the inactive SPN or change to an active SPN.

Select Real-Time

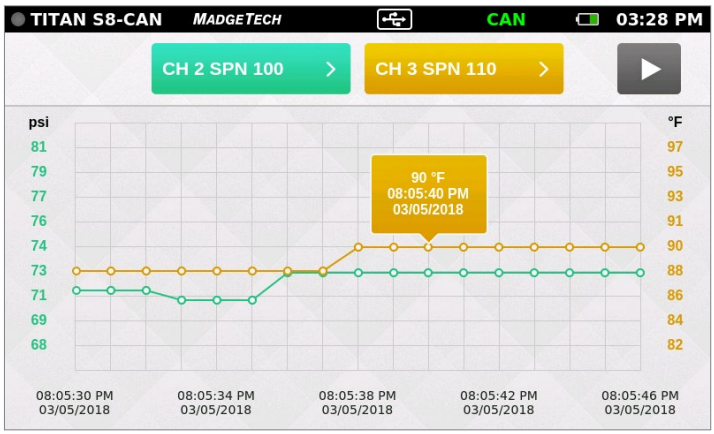



**Configuration Warning**
Real-Time data is only available if the device channels are configured.

## Current Session — Graph View

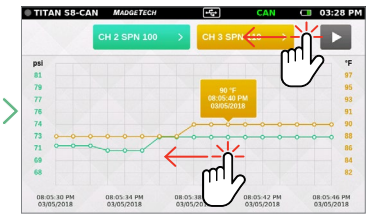
Select the **Current Session** button from the **Home** screen to view the recorded data in various formats, swipe the screen to the left or right to navigate. This view can only be used or seen while actively logging.




### Graph View

- Use the drop down menus at the top to select which channels to view.
- Touch any point on the graph line to display more detailed information.
- Triggered alarm events will be visible within the graph.
- **Start/Stop Button:** Stop the current screen display to analyze the data. Restarts the screen to go back to real time display on the graph.

Select Current Session




Swipe to Navigate

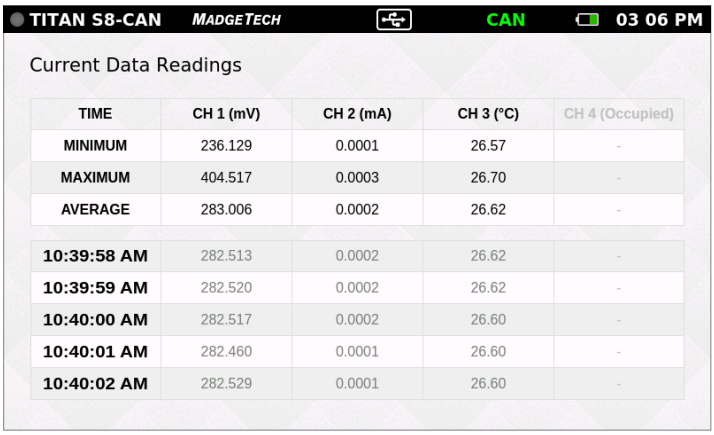
### Swipe Options

- Swipe left at the top of the screen to go to the tabular data view.
- Swipe within the graph to scroll through the graph timeline.

# VIEWING DATA

## Current Session — Tabular View

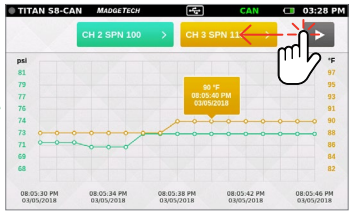
Select the **Current Session** button from the **Home** screen to view the recorded data in various formats, swipe the screen to the left or right to navigate. This view can only be used or seen while actively logging.



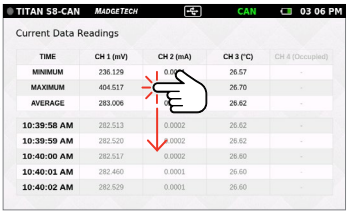

| TIME | CH 1 (mV) | CH 2 (mA) | CH 3 (°C) | CH 4 (Occupied) |
|---|---|---|---|---|
| MINIMUM | 236.129 | 0.0001 | 26.57 | - |
| MAXIMUM | 404.517 | 0.0003 | 26.70 | - |
| AVERAGE | 283.006 | 0.0002 | 26.62 | - |
| 10:39:58 AM | 282.513 | 0.0002 | 26.62 | - |
| 10:39:59 AM | 282.520 | 0.0002 | 26.62 | - |
| 10:40:00 AM | 282.517 | 0.0002 | 26.60 | - |
| 10:40:01 AM | 282.460 | 0.0001 | 26.60 | - |
| 10:40:02 AM | 282.529 | 0.0001 | 26.60 | - |

- Displays the Minimum, Maximum and Average values for the current session.
- Readings that exceeded user selected thresholds/ alarms are displayed as red.
- Scroll vertically to see data timeline in tabular format.
- View four channels at a time.
- Swipe left at the top of the screen to see additional active channels.
- Pressing on the Time heading will change it from Time to Number.

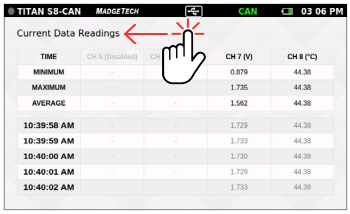
Select Current Session




Swipe Left to View Tabular Data




Swipe Vertically to Scroll Timeline




Swipe Left for Additional Active Channels

### Additional Views

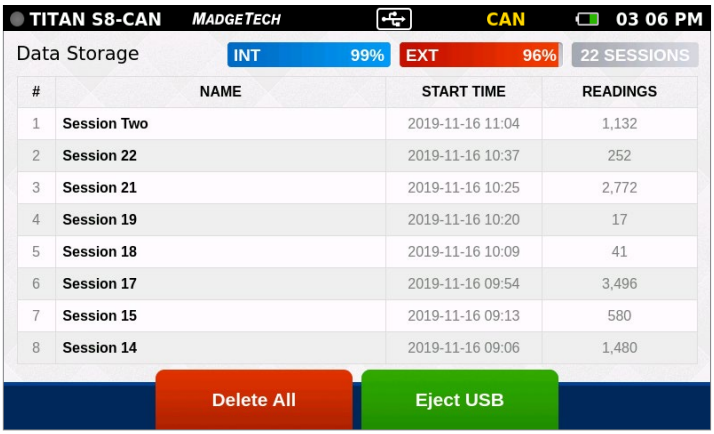
Swipe left and right to rotate through the various screens.
Graph View > Tabular Views > Real-Time View > Current Session Overview

***Note:*** *Use the swipe navigation of data views for both current and stored sessions.*

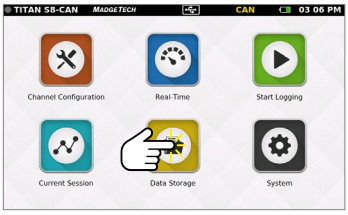
# MANAGING DATA

## Data Storage

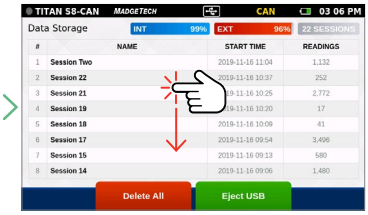
Selecting the **Data Storage** icon will bring up the screen pictured below. Stored sessions are displayed in a scrollable list. Swipe vertically to browse the list. Session Information includes the name of the session, the start time and date of the session, and the number of readings. The options available on this screen include the following:




- **INT:** Available percentage of internal memory remaining on the device.
- **EXT:** Available percentage of memory remaining on the external USB drive.
- **Number of Sessions:** The total number of stored sessions on the device.
- **Session Information:** Tap on any row to view session specific options.
- **Delete All:** Erases all stored sessions from the internal memory.
- **Eject USB:** Select this button prior to removing the external USB drive.




Select Data Storage



Swipe Vertically Through Sessions

## Storage Space

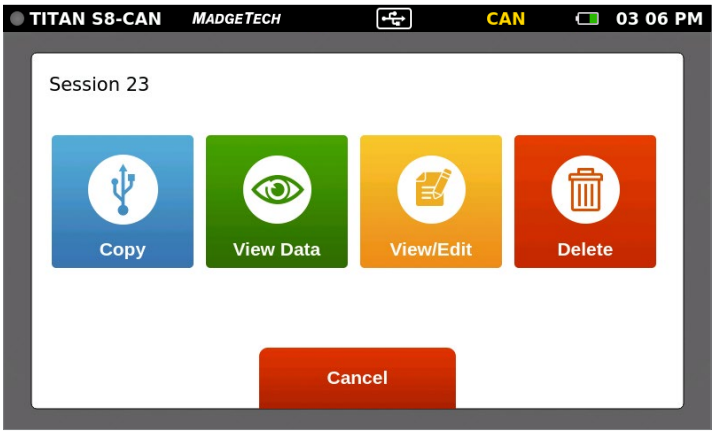
*Every channel configured is considered a separate reading, so the number of readings divided by the number of channels gives you the readings per channel. Maximum number of readings per session is 1,000,000 or 5,000,000 user selectable in Device Settings.*

| Thermocouple Channels: | Millivolt, Volt, RTD, Thermistor (NTC), Milliamp channels: | Frequency/Counter (Single Channel): |
|---|---|---|
| • **1 Hz or slower** — 62,000,000 to 150,000,000 readings (depends on number of configured channels) in 1,000,000 or 5,000,000 reading increments.<br>• **4 Hz or faster** — 80,000,000 to 150,000,000 readings (depends on number of configured channels) in 1,000,000 or 5,000,000 reading increments. | • **1 Hz or slower** — 93,000,000 to 164,000,000 readings (depends on number of configured channels) in 1,000,000 or 5,000,000 reading increments.<br>• **4 Hz or faster** — 150,000,000 to 173,000,000 readings (depends on number of configured channels) in 1,000,000 or 5,000,000 reading increments. | • **1 Hz or slower** — 93,000,000 readings in 1,000,000 or 5,000,000 reading increments. |

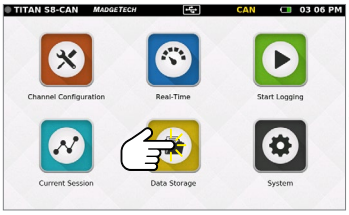
# MANAGING DATA

## Saved Session Options

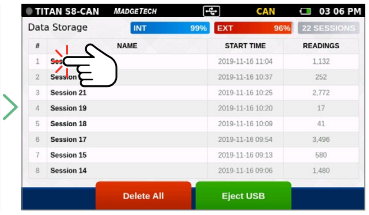
From the **Data Storage** screen, tap on any row in the list to select a specific session to view options. The **Session Options** screen features four actions the user can take on any stored session:




- **Copy:** Copies the stored session to an external USB drive. If no USB drive is plugged into the device, the Copy button will not display.
- **View Data:** Views the data of this session in tabular or graph view.
- **View/Edit Note:** Add notes or comments to the session. Also allows the user to change the Session name (v4.7 or later).
- **Delete:** Removes the stored session from the device.



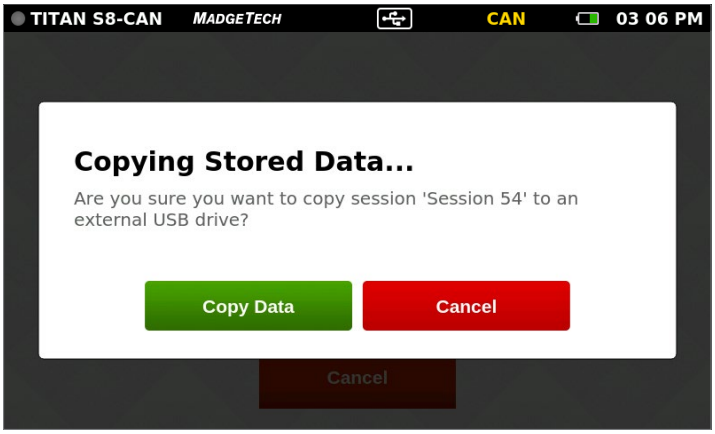

Select Data Storage




Select a Session

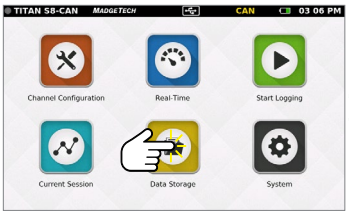
## Copy Stored Sessions

Sessions can be copied from the internal device memory to an external USB drive. When the **Copy** option is selected, the **Copy Stored Session** pop-up will appear to confirm the user's request.

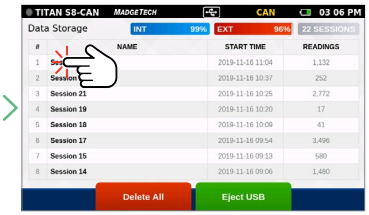



***Note:*** *Data can be saved to external memory as .csv and/or .mtb file format (user selectable in System/File Format).*

- **Copy Data:** The session is copied to the external USB drive.
- **Cancel:** Cancels the copy and takes the user back to the Options screen.




Select Data Storage



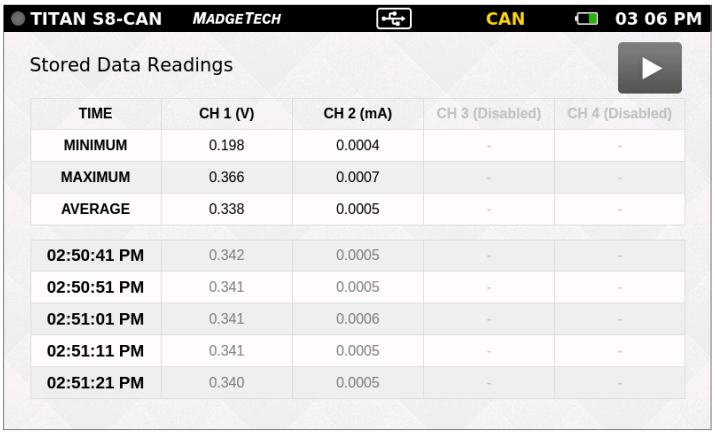

Select a Session

Select Copy

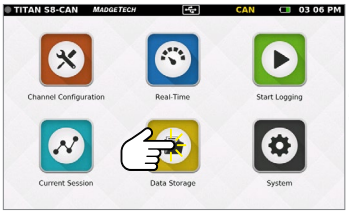
# MANAGING DATA

## View Data Sessions

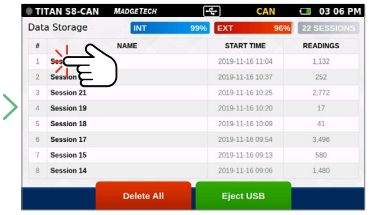
When the **View Data** option is selected, the user is presented with the **Tabular Data** view of that session. From this screen the user can swipe left and right to navigate other views of the recorded data from that session (see swipe navigation options on page 18).



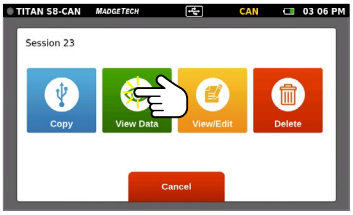

Playback mode is available in tabular Data form or in the graphing mode.




Select Data Storage



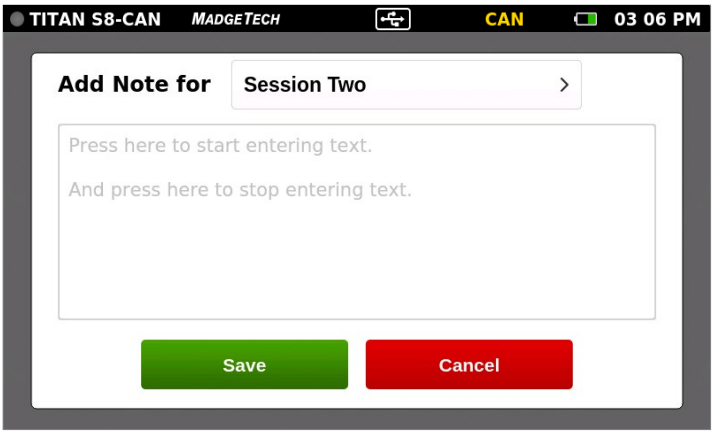

Select a Session

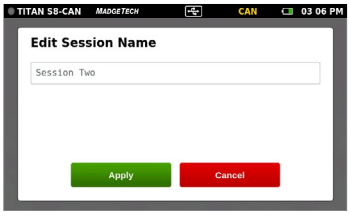



Select View Data

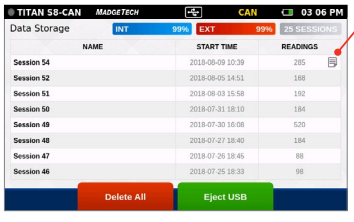
## View/Edit Note and Session Name

When the **View/Edit Note** option is selected, the user is presented with a text entry screen. Text entered here is stored as a note associated with a particular session. This can be accessed and edited by users as desired.




User also has the ability to change the Session name in this section (v4.7 or later).

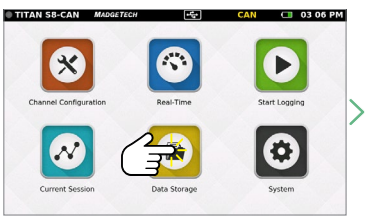



### Note Flag

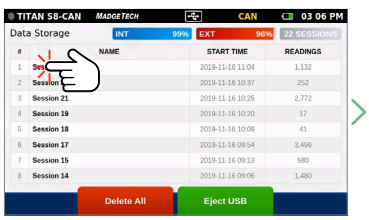
When a note has been added to a logging session, a notes icon appears in the list of sessions.

### Delete a Note

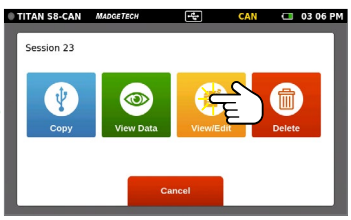
To delete a note, edit to remove all text and click **Save**.




Select Data Storage




Select a Session

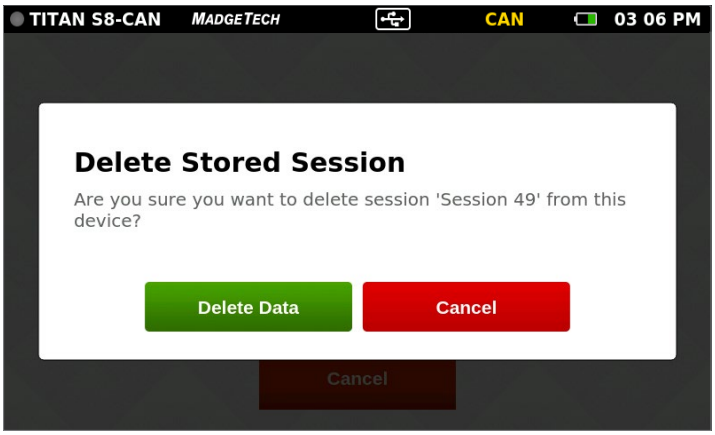


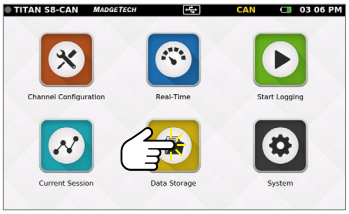

Select View/Edit Note

# MANAGING DATA

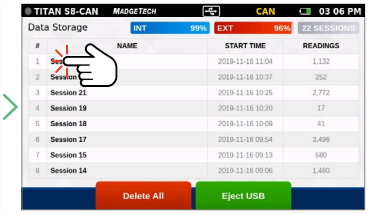
## Delete Stored Session

When the **Delete** session option is selected, the user is presented with a pop-up screen confirming the request:




Select Data Storage

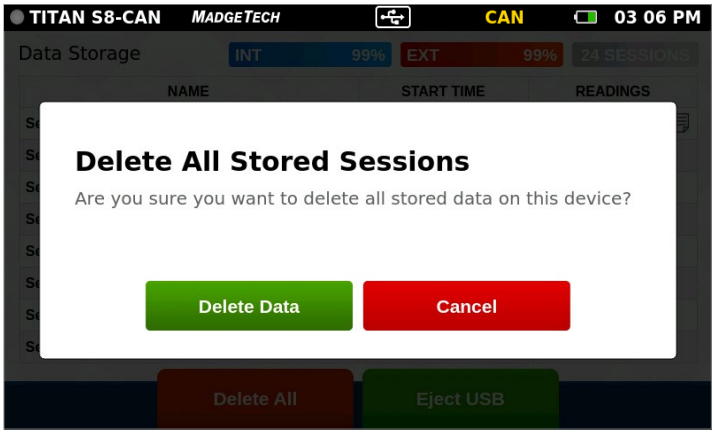


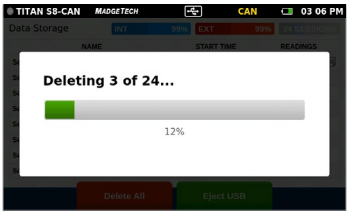

Select a Session

Select Delete

## Delete All

If a user selects the **Delete All** option, they will be presented with a confirmation screen. Selecting **Cancel** will return the user to the **Data Storage** screen and the stored data will not be deleted.



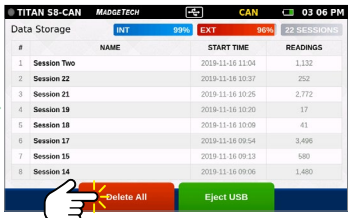




### Deleting Stored Data Confirmation

When Delete Data is selected a pop-up screen will display a progress bar and confirm when action is complete. After data is successfully removed the user will be returned to the Data Storage screen.

**Warning:** Deleting a session is a permanent action.

Select Data Storage

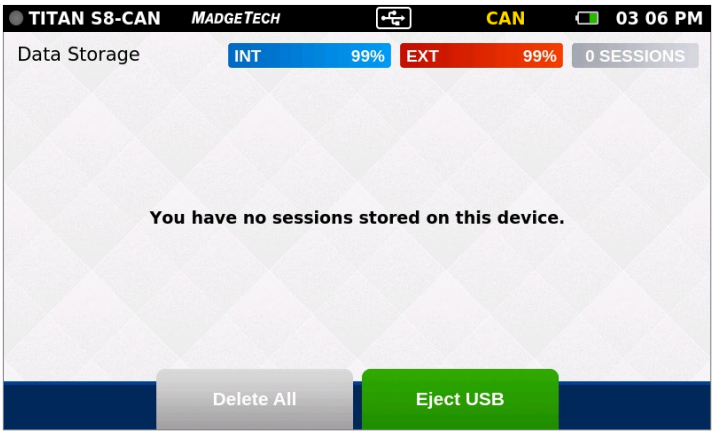


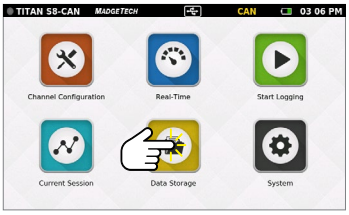

Select Delete All

# MANAGING DATA

## No Stored Sessions

Before first use or after all data has been deleted, the **Data Storage** screen on the device will resemble the screen shown below:



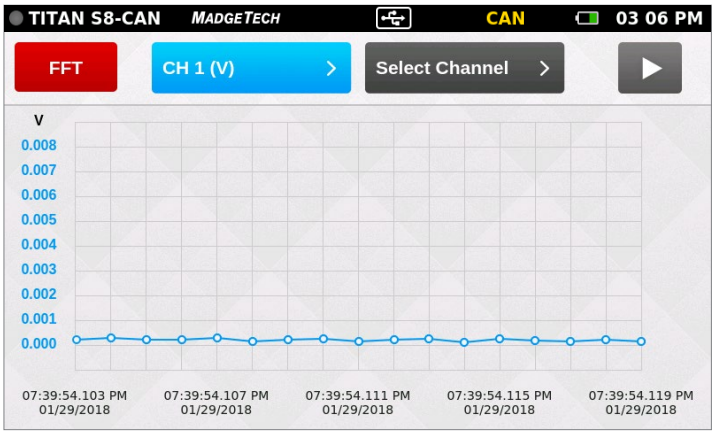

Select Data Storage

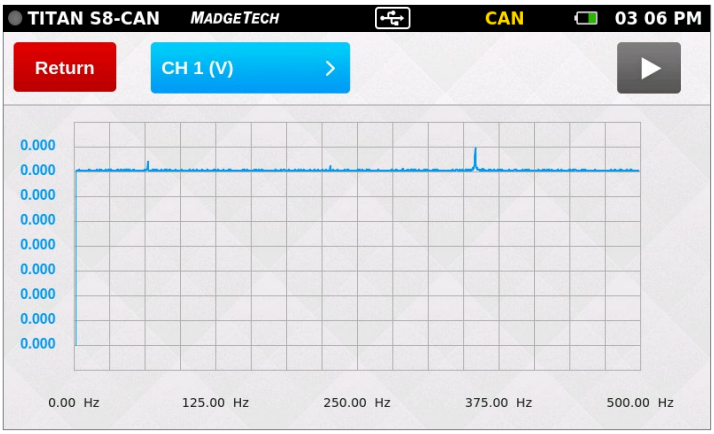
## FFT User Capabilities

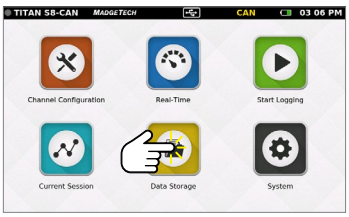
The Titan S8-CAN will automatically calculate FFT for users in real time providing exact frequencies to make post analysis data easily available for both vibrational and electrical applications.

To enable FFT go to **System** (Device Settings/Display). FFT is available to view in both current sessions and stored sessions. To view FFT in a current session, select the **Current Session** icon and select the desired channel to be viewed. From the upper left-hand corner, select the red FFT button to view the real-time FFT monitoring.

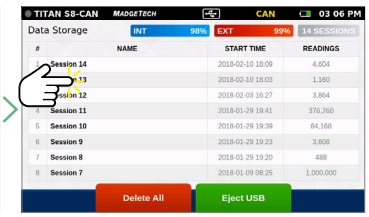
To view FFT in a stored session, select the **Data Storage** button from the home screen. From the **Data Storage** tab, select the desired stored session to be viewed. Select **View Data** from the options panel. Once the graph is visible, select the red FFT button to view FFT monitoring from a stored session. 2,048 data readings have to be recorded before FFT will plot.




Select Data Storage

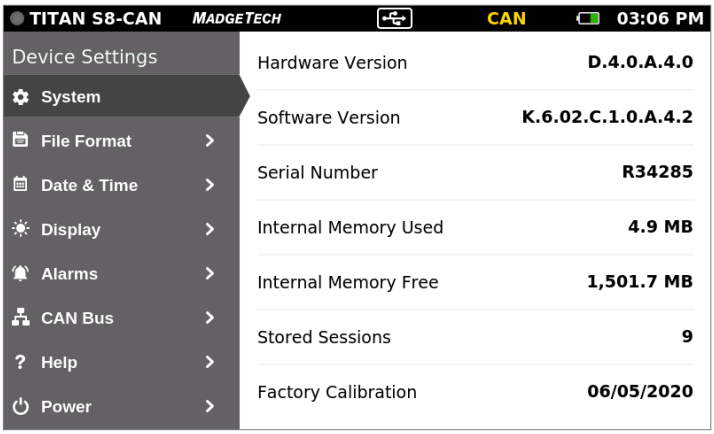



Select Stored Session to View

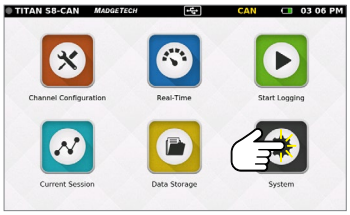
# DEVICE SETTINGS

## Device Settings

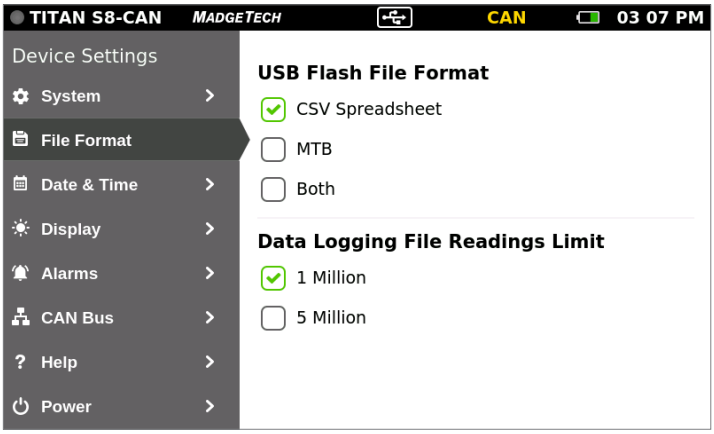
When the **System** button is selected from the **Home** screen, the user is presented with options, preferences and information as shown below. The **System** panel displays an overview of information specific to the device. Network settings appear in v5.0 or later.




- **Hardware Version**
- **Software Version**
- **Serial Number**
- **Internal Memory Used and Available**
- **Number of Stored Sessions**
- **Factory Calibration Date**



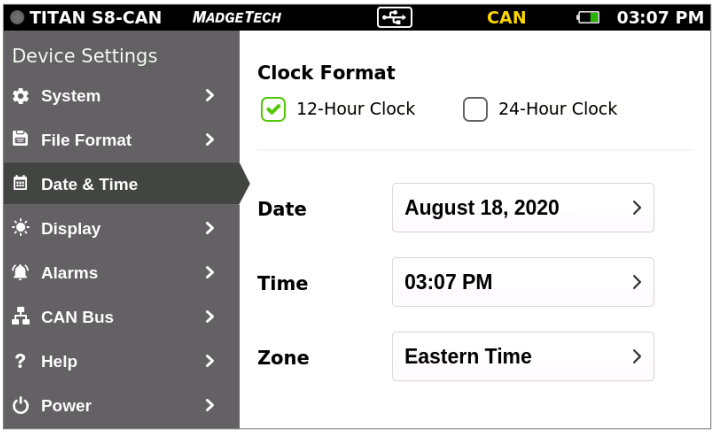

Select System

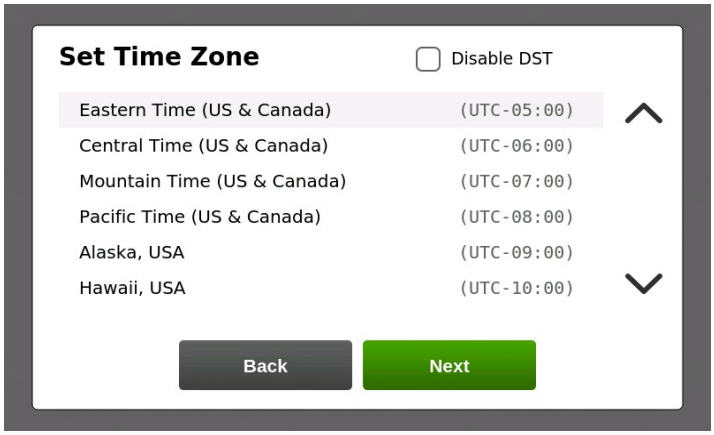



### File Format

Data from the Titan S8-CAN can be saved to external memory in one of two formats.

- **USB Flash File Format:** .csv spreadsheet, .mtb file or both.
- **Data Logging File Readings Limit:** Choose between 1 million or 5 million file readings limit.

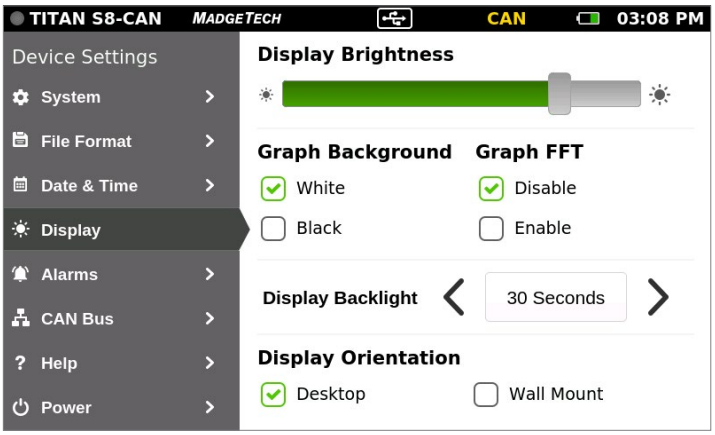



### Date & Time

The **Date & Time** screen will display the current date and time as well as provide the user with 12-Hour or 24-Hour clock options and time zone settings. Except for time zone UTC and “International Date Line West”, a selected time zone may automatically support Daylight Saving Time. Arizona does not support DST so “Disable DST” has to be checked and “Mountain Time (US & Canada)” selected when in Arizona.

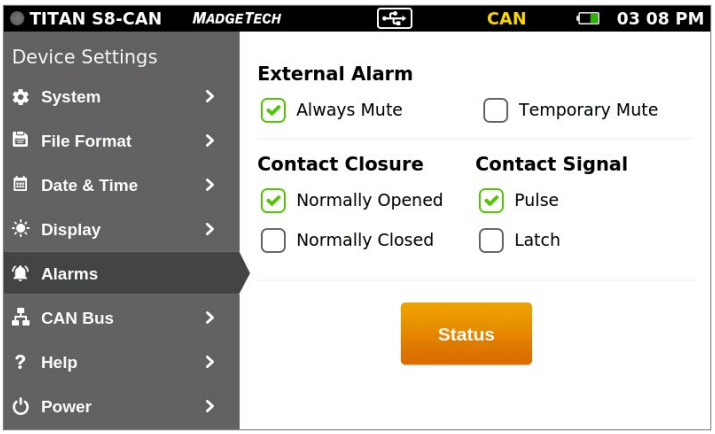
# DEVICE SETTINGS




## Display

The **Display** screen allows the user to adjust options for the touch-screen display including:

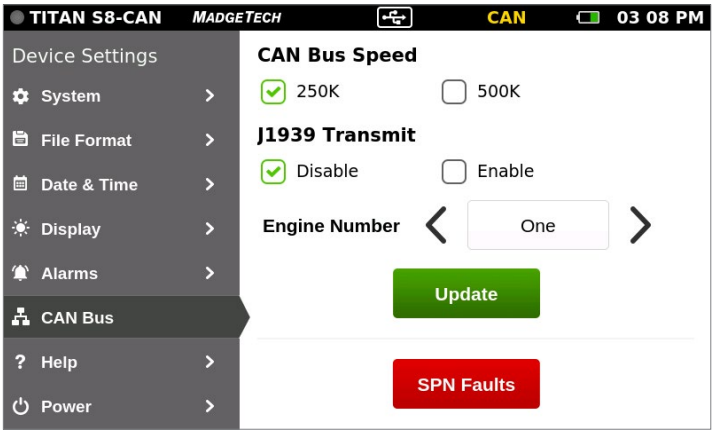
- **Display Brightness:** User adjustable screen brightness level.
- **Graph background:** Select white or black.
- **Graph FFT:** Select enable or disable.
- **Display Backlight:** User selectable timeout period.
- **Display Orientation:** Changing the display orientation requires a reboot of the device.




## Alarms

The **Alarms** screen provides the user with two **Contact Closure** options for when an alarm is triggered.

- **Always/Temporary Mute**
- **Contact Closure:** Normally Open / Closed
- **Contact Signal:** Pulse / Latch
- **Status:** Shows if there are any alarms triggered.




## CAN Bus

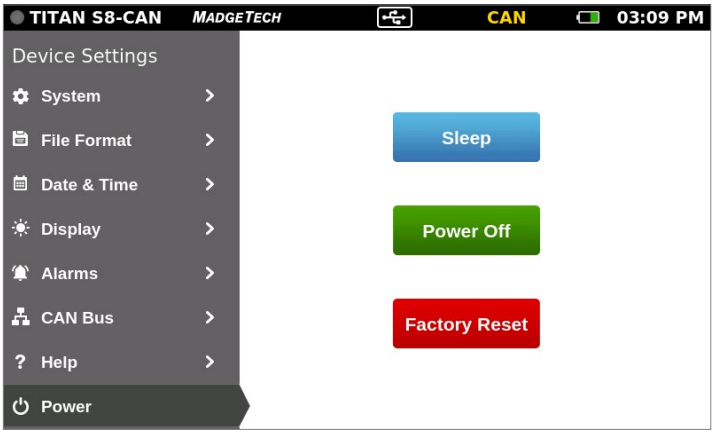
The **CAN Bus** screen allows the user to set up CAN Bus options.

- **CAN Bus Speed:** 250K / 500K
- **J1939 Transmit:** Disable / Enable
- **Engine Number:** One or Two
- **SPN Faults List**

# DEVICE SETTINGS

### Help

Provides MadgeTech's contact information to the user.




### Power

Provides sleep mode, power off via screen and factory reset.

**Warning:** Factory reset will restore the unit to Factory Settings. This will delete all saved sessions and configurations.

# SAE PARAMETERS

## SAE J1939 Parameters

The Titan S8-CAN supports 55 suspect parameter numbers (SPN).

| SPN | PARAMETER NAME | PGN Parameter Group No. | DESCRIPTION Per SAE J1939 Documentation | TITAN PARAMETER Displayed Name in Configuration | UNIT OF MEASURE Displayed in Titan S8-CAN |
|---|---|---|---|---|---|
| 38 | Fuel Level 2 | 65276 | When Fuel Level 2 (SPN 38) is not used, Fuel Level 1 represents the total fuel in all fuel storage containers. When Fuel Level 2 is used, Fuel Level 1 represents the fuel level in the primary or left-side fuel storage container | Fuel Level 2 | 0-100%, Engineering Units |
| 51 | Engine Throttle Valve 1 Position | 65266 | The position of the valve used to regulate the supply of a fluid, usually air or fuel/air mixture, to an engine. 0% represents no supply and 100% is full supply. | Engine Throttle Position | 0-100%, Engineering Units |
| 52 | Engine Intercooler Temperature | 65262 | Temperature of liquid found in the intercooler located after the turbocharger. | Engine Intercooler Temp | °C, °F, K |
| 80 | Washer Fluid Level | 65276 | Ratio of volume of liquid to total container volume of fluid reservoir in windshield wash system. | Washer Fluid Level | 0-100%, Engineering Units |
| 84 | Wheel-Based Vehicle Speed | 65265 | Speed of the vehicle as calculated from wheel or tailshaft speed | Wheel-Based Speed | Kilometers per hour, miles per hour, knots |
| 90 | Power Takeoff Oil Temperature | 65264 | Temperature of lubricant in device used to transmit engine power to auxiliary equipment. | Power Takeoff Oil Temp | °C, °F, K |
| 91 | Accelerator Pedal Position 1 | 61443 | Accelerator Pedal Position 1 | Accelerator Position | 0-100%, Engineering Units |
| 92 | Engine Percent Load At Current Speed | 61443 | Engine Percent Load At Current Speed | Engine Percent Load | 0-100%, Engineering Units |
| 94 | Engine Fuel Delivery Pressure | 65263 | Gage pressure of fuel in system as delivered from supply pump to the injection pump. See also SPN 5578 for Fuel | Engine Fuel Pressure | PSI, megapascal, kilopascal, bar |
| 96 | Fuel Level 1 | 65276 | Ratio of volume of fuel to the total volume of fuel storage container. When Fuel Level 2 (SPN 38) is not used, Fuel Level 1 represents the total fuel in all fuel storage containers. | Fuel Level 1 | 0-100%, Engineering Units |
| 97 | Water In Fuel Indicator | 65279 | Signal which indicates the presence of water in the fuel | Water in Fuel Indicator | Numberic code |
| 98 | Engine Oil Level | 65263 | Ratio of current volume of engine sump oil to maximum required volume. | Engine Oil Level | 0-100%, Engineering Units |
| 100 | Engine Oil Pressure | 65263 | Gage pressure of oil in engine lubrication system as provided by oil pump. | Engine Oil Press | PSI, megapascal, kilopascal, bar |
| 101 | Engine Crankcase Pressure | 65263 | Gage pressure inside engine crankcase. | Engine Crankcase Press | PSI, megapascal, kilopascal, bar |
| 102 | Engine Intake Manifold #1 Pressure | 65270 | The gage pressure measurement of the air intake manifold. If there are multiple air pressure sensors in the intake stream, this is the last one in flow direction before entering the combustion chamber. This should be the pressure used to drive gauges and displays. | Intake Manifold Press | PSI, megapascal, kilopascal, bar |
| 103 | Engine Turbocharger 1 Speed | 65245 | Rotational velocity of rotor in the turbocharger. | Turbocharger Speed | PSI, megapascal, kilopascal, bar |
| 104 | Engine Turbocharger Lube Oil Pressure 1 | 65245 | Gage pressure of oil in turbocharger lubrication system. | Turbocharger Oil Press | PSI, megapascal, kilopascal, bar |
| 105 | Engine Intake Manifold 1 Temperature | 65270 | Temperature of pre-combustion air found in intake manifold of engine air supply system. | Intake Manifold Temp | °C, °F, K |
| 109 | Engine Coolant Pressure | 65263 | Gage pressure of liquid found in engine cooling system. | Engine Coolant Press | PSI, megapascal, kilopascal, bar |
| 110 | Engine Coolant Temperature | 65262 | Temperature of liquid found in engine cooling system. | Engine Coolant Temp | °C, °F, K |
| 111 | Engine Coolant Level | 65263 | Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank. | Engine Coolant Level | 0-100%, Engineering Units |
| 114 | Net Battery Current | 65271 | Net flow of electrical current into/out of the battery or batteries. | Net Battery Current | Amps |
| 115 | Alternator Current | 65271 | Measure of electrical current flow from the alternator. Alternator Current (High Range/Resolution) parameter SPN 1795 has a higher range and resolution of the same parameter. | Alternator Current | Amps |
| 116 | Brake Application Pressure | 65274 | Gage pressure of compressed air or fluid in vehicle braking system measured at the brake chamber when brake shoe (or pad) is placed against brake drum (or disc). | Brake Application Press | PSI, megapascal, kilopascal, bar |
| 117 | Brake Primary Pressure | 65274 | Gage pressure of air in the primary, or supply side, of the air brake system | Brake Primary Press | PSI, megapascal, kilopascal, bar |
| 118 | Brake Secondary Pressure | 65274 | Gage pressure of air in the secondary, or service side, of the air brake system | Brake Secondary Press | PSI, megapascal, kilopascal, bar |
| 124 | Transmission Oil Level 1 | 65272 | First instance of a transmission oil level indicator. Conveys the ratio of volume of transmission sump oil to recommended volume | Transmission Oil Level | 0-100%, Engineering Units |
| 127 | Transmission Oil Pressure | 65272 | Gage pressure of lubrication fluid in transmission, measured after pump | Transmission Oil Press | PSI, megapascal, kilopascal, bar |
| 157 | Engine Injector Metering Rail 1 Pressure | 65243 | The gage pressure of fuel in the primary, or first, metering rail as delivered from the supply pump to the injector metering intake. | Engine Injector 1 Press | PSI, megapascal, kilopascal, bar |

# SAE PARAMETERS

## SAE J1939 Parameters (cont'd)

The Titan S8-CAN supports 55 suspect parameter numbers (SPN).

| SPN | PARAMETER NAME | PGN Parameter Group No. | DESCRIPTION Per SAE J1939 Documentation | TITAN PARAMETER Displayed Name in Configuration | UNIT OF MEASURE Displayed in Titan S8-CAN |
|---|---|---|---|---|---|
| 158 | Keyswitch Battery Potential | 65271 | Battery potential measured at the input of the electronic control unit supplied through a keyswitch or similar switching device. | Battery Voltage (Combined with SPN 168) | Volts |
| 167 | Charging System Potential (Voltage) | 65271 | Electrical potential measured at the charging system output. The charging system may be any device charging the batteries. This includes alternators, generators, solid state charger and other charging devices. | Charging System | Volts |
| 168 | Battery Potential / Power Input 1 | 65271 | This parameter measures the first source of battery potential as measured at the input of the ECM/actuator etc. coming from one or more batteries, irrespective of the distance between the component and the battery. This SPN is also used when ECM's are interconnected in a series configuration, where the source of power is coming directly or indirectly from the same battery/batteries | Battery Voltage (Combined with SPN 158) | Volts |
| 173 | Engine Exhaust Gas Temperature | 65270 | Temperature of combustion byproducts leaving the engine. See SPNs 2433 and 2434 for engines with more than one exhaust gas temperature measurement | Exhaust Gas Temp | °C, °F, K |
| 174 | Engine Fuel Temperature 1 | 65262 | Temperature of fuel (or gas) passing through the first fuel control system. See SPN 3468 for the second control system | Engine Fuel Temp | °C, °F, K |
| 175 | Engine Oil Temperature 1 | 65262 | Temperature of the engine lubricant | Engine Oil Temp | °C, °F, K |
| 176 | Engine Turbocharger Oil Temperature | 65262 | Temperature of the turbocharger lubricant | Turbocharger Oil Temp | °C, °F, K |
| 177 | Transmission Oil Temperature 1 | 65272 | First instance of transmission lubricant temperature | Transmission Oil Temp | °C, °F, K |
| 183 | Engine Fuel Rate | 65266 | Amount of fuel consumed by engine per unit of time | Engine Fuel Rate | liters per hour, ounces per hour, quarts per hour, gallons per hour |
| 184 | Engine Instantaneous Fuel Economy | 65266 | Current fuel economy at current vehicle velocity | Instant Fuel Economy | kilometers per liter, miles per gallon |
| 185 | Engine Average Fuel Economy | 65266 | Average of instantaneous fuel economy for that segment of vehicle operation of interest | Average Fuel Economy | kilometers per liter, miles per gallon |
| 186 | Power Takeoff Speed | 65264 | Rotational velocity of device used to transmit engine power to auxiliary equipment. | Power Takeoff Speed | RPM |
| 190 | Engine Speed | 61444 | Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders. | Engine Speed | RPM |
| 245 | Total Vehicle Distance | 65248 | Accumulated distance traveled by vehicle during its operation. | Total Vehicle Distance | kilometers, miles, nautical miles |
| 246 | Total Vehicle Hours | 65255 | Accumulated time of operation of vehicle. | Total Vehicle Hours | Hours |
| 247 | Engine Total Hours of Operation | 65253 | Accumulated time of operation of engine. | Total Engine Hours | Hours |
| 248 | Total Power Takeoff Hours | 65255 | Accumulated time of operation of power takeoff device. | Total Power Takeoff Hrs | Hours |
| 917 | High Resolution Total Vehicle Distance | 65217 | Accumulated distance traveled by the vehicle during its operation | Hi-Res Total Distance | kilometers, miles, nautical miles |
| 1349 | Engine Injector Metering Rail 2 Pressure | 65243 | The gage pressure of fuel in the metering rail #2 as delivered from the supply pump to the injector metering intake. See Figure SPN16_A for fuel system related parameters. Although the figure does not show rail #2 it does show the relationship of rail pressure to other signals. | Engine Injector 2 Press | PSI, megapascal, kilopascal, bar |
| 1638 | Hydraulic Temperature | 65128 | Temperature of hydraulic fluid. | Hydraulic Temperature | °C, °F, K |
| 1761 | Aftertreatment 1 Diesel Exhaust Fluid Tank Level | 65110 | Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container | DEF Tank Level | 0-100%, Engineering Units |
| 2602 | Hydraulic Oil Level | 65128 | This parameter indicates the level of the hydraulic fluid in tank as a ratio of current volume to total tank volume. This parameter is intended for reporting the hydraulic fluid level in the system tank or reservoir. This hydraulic fluid is for the entire hydraulics system of a piece of equipment. | Hydraulic Oil Level | 0-100%, Engineering Units |
| 3031 | Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature | 65110 | Temperature of the diesel exhaust fluid in the storage tank | DEF Tank Temperature | °C, °F, K |
| 3515 | Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 | 64923 | Temperature of the diesel exhaust fluid at the device measuring diesel exhaust fluid quality | DEF Temperature 2 | °C, °F, K |
| 3516 | Aftertreatment 1 Diesel Exhaust Fluid Concentration | 64923 | A measure of the concentration of urea in water. Zero percent means that the tank contains no urea. A 32.5% value indicates that the diesel exhaust fluid is of the proper concentration. The 32.5% value indicates that the concentration is highest quality. | DEF Concentration | 0-100%, Engineering Units |
| 3517 | Aftertreatment 1 Diesel Exhaust Fluid Tank Level 2 | 65110 | The measure of the diesel exhaust fluid level in the diesel exhaust fluid tank | DEF Tank Level 2 | millimeter, centimeter, meter, inch, feet, yard |
| 3521 | Aftertreatment 1 Diesel Exhaust Fluid Property | 64923 | This parameter indicates the property of the fluid compound in the tank. A value of 0011 indicates uncontaminated Diesel Exhaust Fluid. | DEF Propery | numberic code |

# SPECIFICATIONS

Specifications subject to change. See MadgeTech's Terms and Conditions at **madgetech.com**.

| GENERAL | |
|---|---|
| **Dimensions** | 6.65 in x 4.40 in x 1.41 in<br>(168.9 mm x 111.8 mm x 35.8 mm)<br>*Data logger only* |
| **Touch Screen Dimensions** | 5 inches |
| **Number of Channels** | 24: 23 can be configured for CAN data. Channel 1 cannot be CAN, and channels 2-8 can be used for direct measurements. If 1-8 are configured for direct measurements, 9-24 can still be CAN channels. |
| **Weight** | 1.3 lbs (20.8 oz) |
| **IP Rating** | IP20 |
| **Start Modes** | Immediate Start & Delay Start |
| **Memory** | 1.8 GB, with session size of 1,000,000 or 5,000,000 readings |
| **Battery Type** | Rechargeable 3.7 V Lithium Ion Battery Pack |
| **Battery Life** | • Continuous on-screen sampling: 7–9 hours depending on display setting and reading rate<br>• Stand-by mode: 100 hours |
| **Data Format** | Exported .csv file format, .mtb or both |
| **Time Accuracy** | ±1 minute/month |
| **Operating Environment** | 0 °C to +50 °C (32 °F to +122 °F)<br>0 %RH to 95 %RH non-condensing |
| **Enclosure Material** | Polycarbonate, TPE Protective Boot |
| **Calibration** | Factory calibration is recommended annually |
| **Alarm Output** | 50 mA @ 100V, Solid State Relay Output |
| **SAE** | J1939 (55 available SPN's) |
| **Range** | SPN Dependent |
| **Resolution** | SPN Dependent |
| **Message Priority** | SPN Dependent |

| 0 - 24 mA | |
|---|---|
| Range | -5 mA to 50 mA |
| Resolution | 0.0001 mA |
| Accuracy | ±0.024 mA (0 to 24 mA) |
| Input Impedance | 30 Ω |

| 0 - 100 mV | |
|---|---|
| Range | -100 mV to 2450 mV |
| Resolution | 0.001 mV |
| Accuracy | ±0.1 mV (0 to 100 mV) |
| Input Impedance | 1 GΩ |
| Maximum Voltage | 3.0 V |

| 0 - 10 V | |
|---|---|
| Range | -0.5 V to 12.0 V |
| Resolution | 0.001 V |
| Accuracy | ± 0.01 V (-0.5 V to 12.0 V) |
| Input Impedance | 1 GΩ |
| Maximum Voltage | 25 V |

| FREQUENCY / PULSE | |
|---|---|
| Maximum Count | 4,000,000,000 |
| Maximum Frequency | 25 KHz |
| Input Signal | 0 V to 12 V |
| Input Impedance | 58 KΩ |

| TEMPERATURE PT-100 (2, 3, 4-WIRE RTD) (0.00385 CURVE) | |
|---|---|
| Range | -200 °C to +850 °C (Probe Dependent)<br>(18.5 Ω to 390.5 Ω) |
| Resolution | 0.01 °C |
| Accuracy | ±0.1 °C (-200 °C to +400 °C) (Probe Dependent)<br>±0.034 Ω (18.5 Ω to 247.1 Ω) |

| TEMPERATURE NTC-1 (2252) | |
|---|---|
| Range | -25 °C to +150 °C (Probe Dependent)<br>(29,380 Ω to 41.9 Ω) |
| Resolution | 0.01 °C |
| Accuracy | ±0.50% FSR (Probe Dependent) |

| TEMPERATURE NTC-2 (10K) | |
|---|---|
| Range | -25 °C to +150 °C (Probe Dependent)<br>(102,900 Ω to 238 Ω) |
| Resolution | 0.01 °C |
| Accuracy | ±0.50% FSR (Probe Dependent) |

**RTD Note (All RTD Configurations)**
Temperature Specifications based on ideal 100 Ω PT RTD Complaint with IEC 751(1983) and ITS-90. Accuracy based on 4-wire configuration.

BATTERY WARNING: Battery may explode or catch fire if mistreated. Do not disassemble or dispose of in fire. Do not charge except specified with charging condition. Do not heat above 212 °F, or short circuit. Do not crush or modify.

# SPECIFICATIONS

## Sensor Types & Measurement Ranges

Each of the 8 input channels can be individually configured for the following types and sensor ranges.

| PARAMETER | INPUT TYPE | RANGE |
|---|---|---|
| Current | Current input | -5 mA to 50 mA |
| Frequency (port 1 only) | Frequency input | 0 to 25,000 Hz |
| Pulse / Counter (port 1 only) | Pulse input | 0 to 4,000,000,000 Pulses |
| Voltage | Volt input | -0.5 V to 12.0 V |
| Voltage | Millivolt input | -100 mV to 2450 mV |
| Temperature | Thermistor NTC-1 (2252) | -25 °C to +150 °C |
| Temperature | Thermistor NTC-2 (10K) | -25 °C to +150 °C |
| Temperature | PT100 RTD 2-Wire | -200 °C to +850 °C |
| Temperature | PT100 RTD 3-Wire | -200 °C to +850 °C |
| Temperature | PT100 RTD 4-Wire | -200 °C to +850 °C |
| Temperature | Thermocouple J | -210 °C to +760 °C |
| Temperature | Thermocouple K | -270 °C to +1370 °C |
| Temperature | Thermocouple T | -270 °C to +400 °C |
| Temperature | Thermocouple E | -270 °C to +980 °C |
| Temperature | Thermocouple R | -50 °C to +1760 °C |
| Temperature | Thermocouple S | -50 °C to +1760 °C |
| Temperature | Thermocouple N | -270 °C to +1300 °C |
| Temperature | Thermocouple B | +50 °C to +1820 °C |

## Measurement Accuracy

- At room temperature (25 °C ±10 °C) after 60 minute warm-up period.
- Temperature calibrated accuracy is thermocouple dependent.
- Accuracy does not include Cold Junction Compensation (CJC). CJC error: ±1.5 °C

| THERMOCOUPLE TYPE | RANGE | RESOLUTION | ACCURACY |
|---|---|---|---|
| J | -200 °C to +760 °C | 0.1 °C | ±0.5 °C |
| K | -270 °C to +1370 °C | 0.1 °C | ±0.5 °C |
| T | -270 °C to +400 °C | 0.1 °C | ±0.5 °C |
| E | -270 °C to +980 °C | 0.1 °C | ±0.5 °C |
| R | -50 °C to +1760 °C | 0.5 °C | ±2.0 °C |
| S | -50 °C to +1760 °C | 0.5 °C | ±2.0 °C |
| N | -270 °C to +1300 °C | 0.1 °C | ±0.5 °C |
| B | 50 °C to 1820 °C | 0.5 °C | ±2.0 °C |

# SPECIFICATIONS

## Reading Rate Information

All channels will use the same reading rate.
Reading rates will be capped at 4 Hz when a temperature channel is selected.

- 4 KHz (Supports single channel of voltage or current measurement only)
- 2 KHz (Supports single channel of voltage or current measurement only)
- 1 KHz (Supports single channel of voltage or current measurement only)
- 500 Hz (Supports single channel of voltage or current measurement only)
- 250 Hz (Supports single channel of voltage or current measurement only)
- 100 Hz (Supports single channel of voltage or current measurement only)
- 50 Hz (Supports single channel of voltage or current measurement only)
- 25 Hz (Supports single channel of voltage or current measurement only)
- 10 Hz (Supports multiple channels of voltage or current measurement only)
- 4 Hz
- 1 Second
- 2 Seconds
- 5 Seconds
- 10 Seconds
- 15 Seconds
- 30 Seconds
- 1 Minute
- 2 Minutes
- 5 Minutes
- 10 Minutes
- 15 Minutes
- 30 Minutes
- 1 Hour
- 2 Hours
- 5 Hours
- 10 Hours
- 12 Hours
- 24 Hours

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# NEED HELP?

## Device Maintenance:

- To provide optimum performance and accuracy, MadgeTech recommends an annual factory calibration for the Titan S8-CAN.
- To send a device back to MadgeTech for calibration or repair, please visit the MadgeTech website at **madgetech.com**.

## Product Support & Troubleshooting:

- Visit our Knowledge Base online at **madgetech.com**.
- Contact our friendly Customer Support Team at (603) 456-2011 or **support@madgetech.com**.

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