Table of Content

General Information

The purpose of this tool is to help end users adjust their Multi Gauges to their preference. The adjustment includes changing the attributes saved in the gauge along with the color of the gauge.

Requirements

What	Why
iOS version >= 15	**Apple is no longer supporting iOS versions lower than 15.**
Android version >= 28	**Although the target version is 35, the lowest version (28) should be able to run the app fine (have not tested it).**
Bluetooth and Location enabled	**Bluetooth is required since it's the only way for the app to communicate with the gauge. Location is needed so that the app can have more precision in locating the BT device. And additionally, Android requires location to utilize BT.**

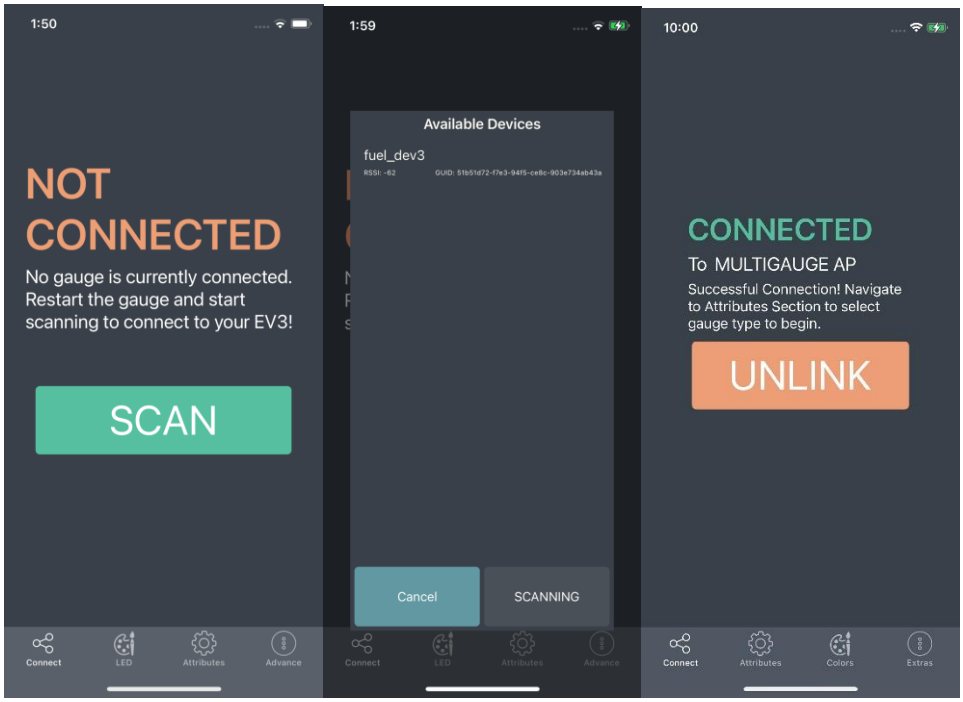
Connecting to the device

First time running

After downloading and installing the app for the first time, the app will prompt a request to access your phone's current location and permission to use your phone's BT. Make sure that you accept both requests so that it's able to locate the gauge(s). Once you have accepted the request, you will see the following landing page.

Connecting

To connect, power on the harness either by turning on the vehicle or turning on to battery mode. The gauge will do a quick spin and open for connection. From there, tap on the SCAN button and wait until you see the "MULTIGAUGE AP" name.



(Fig. 1) **(Fig. 2)** **(Fig. 3)**

Once your BT Harness is visible, tap on it and let it connect. If successfully connected, it will prompt a message notifying you it is connected.

Modifying Attributes

On the Attribute page (3rd tab of the navigation bar, Fig. 5), users are able to adjust their multi-gauge to match their vehicle requirements or needs. All manual input fields are numeric-only entry boxes, and those entry boxes have value validation to reduce and prevent user-made errors.

Shared Attributes	Meanings
Dimmer Voltage High/Low	The voltage bounds for the brightness of the dimmer, where if the voltage ≥ high then the brightness is 100% and if it's ≤ low then the lights will be off.
Dimmer Input Source	Option to use either Analog or J1939 Input signal for dimmer
Warning Light Flash Enabled/Disabled	When the gauge enters a warning state (warning light is on) this feature will cause the corresponding backlight quadrant to flash dimmer and brighter than its current color brightness. As soon as the warning light is turned off the backlight flashing will end.

Pointer/LCD Max Brightness	**Change intensity of the Pointer/LCD display max backlight through a 0-100 percent value.**
Pointer/LCD Daytime Brightness	**Change intensity of the Pointer/LCD display daytime backlight through a 0-100 percent value.**

Quadrant Attributes	**Meanings**
Warning Threshold and Zone	**Bound value for when the warning will be toggled** **Indication Zone: to indicate whether the values are represented as "Low" or "High".**
Pointer Weight	**Sensitivity of the needle for values where FASTEST is most sensitive**
Hysteresis	**Deals with sensor reading to filter out unwanted noise in the data from the ADC count. Think of it as a "dead zone" where if the data is within the set range the data is ignored.** **Range for values is 0-3.**
Sensor Input Source	**Option to use either Analog or J1939 Input signal for sensor**
Fuel Sensor Curve	**Selects which Fuel Sensor Curve to use for the given Quadrant (Fuel Level Gauges Only)**

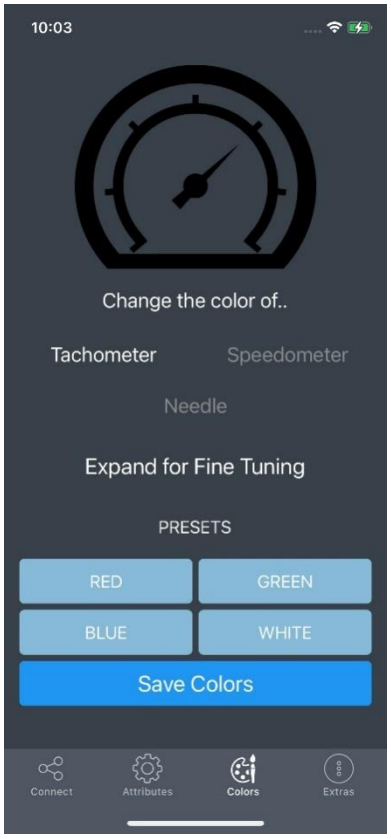
Output Attributes	**Meanings**
Output Driver threshold and zone	**Bound value for when the output driver will be toggled** **Indication Zone: to indicate whether the values are represented as "Low" or "High".** **Only the selected quadrant can control the output driver.**

Advanced Attributes (Non-Speedo/Tach Gauges)	**Meanings**
Curve Memory Slot	**Select which slot to save curve coefficients (0 or 1)**
Sensor Coeff 0	**Curve Coefficient value 0**
Sensor Coeff 1	**Curve Coefficient value 1**

Speedo/Tach Attributes	Meanings
Total Accumulation	Enable or Disable Tracking Total Accumulation
Distance Units	Use either miles or kilometers on speedometer
Speedometer PPM	Set Speedometer's Pulse Per Mile Setting
Tachometer PPR	Set Tachometer's Pulse Per Revolution Setting
Tachometer Hall Effect	Enable or Disable using Hall Effect for Tachometer
Speedometer Hall Effect	Enable or Disable using Hall Effect for Speedometer

Once users are done adjusting their attributes, they can save the profile at the very bottom of the page. Once saved, the gauge will reset with new attributes and default colors (colors can be changed on colors page once gauge is chosen on attributes page).

Changing the colors



To change the color of the gauge, head over to the Color page (second item in the navigation bar). In this page, you can change both the backlight and pointer's colors using a variety of different ways.

NOTICE: The color of the LEDs will not be the same color as shown on the app due to the color calibration of the LED and the phone screen.

How to change the backlight or pointer color

To set focus on a quadrant backlight or the pointer for your color selections, you can set it by tapping on either the name of the quadrant's gauge or "Needle" that is below the speedometer image. You can also change it by tapping on either the needle or backlight of the image. (Make sure the quadrant's gauge is selected before clicking on the backlight of the image.)

Using the color wheel

To enable the color wheel to help you decide, tap on either the Backlight or the pointer of the image and a color wheel dialog will appear. (If backlight is chosen, the currently

selected quadrant's color will be changed). On this dialog, users can place a cursor (selected color) anywhere on the wheel either by tapping a spot on the wheel or tap and drag around inside the wheel.

The background of the dialog will change to the selection made on the wheel to show you the color the gauge will change to. If satisfied with the selection, the user can tap on the OK button to change the gauge's color. Or, tap CANCEL to close out of the dialog.

Using HEX values

For more advance usage, if a user has a specific color they have in mind, they can enter the 6 character hex code (with or without the '#') into the *Hex Value* box.

Using sliders to adjust the color.

If the user wants to fine tune their color selection, they can do it via the RGB sliders. When changing the sliders level, the preview (speedometer image) and gauge (if connected) will change in real time (with a bit of a latency delay). Additionally, users can enter a specific RGB value by tapping on the number. The value range is [0,255].

Preset styles.

This app also provides the options to quicky cycle between red, blue, green, or white colors. Simply tap on the style button (you may have to scroll down) of the model the user wishes to see.

Saving attributes on the color page

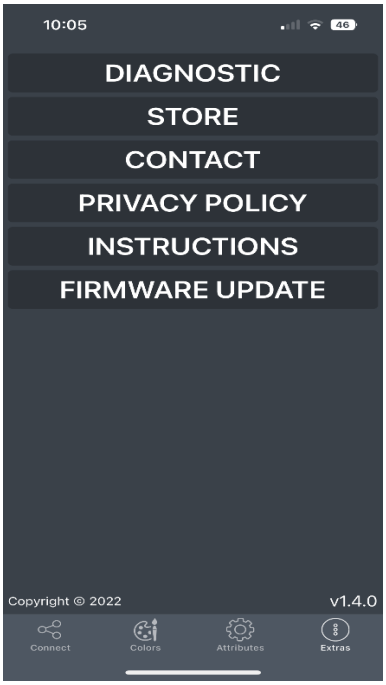
Once the user is satisfied with their color choices, they can scroll all the way to the bottom and tap the save button. This will flash all attributes onto the gauge. If successful, the Multi Gauge will do a soft reset with the new colors present.

(Make sure to have selected a Gauge Type on the Attributes Page before saving any colors.)

Extras

Users can go to the Advance page (4th item on the navigation bar) if they wish to reach out to ISSPRO, troubleshoot their gauge, or view instructions.

(Fig. 5)



(Fig. 6)

Troubleshooting

If there was a problem with the app trying to communicate with the gauge, the users can head over to the Diagnostic page (Fig. 7) via the Advance page. This reporting page tries to capture all the interaction the user made with the app and the communication that was made from the app to the gauge (and vice-versa). They can copy the report log and email it to ISSPRO to help us troubleshoot the root cause of the problem

Understanding Diagnostic Logs

The Diagnostic logs have a fixed template that it uses to display it's messages. The template are as follows:

<Time> <Message type>[:] <Message>

The time displays the time of the message recorded in 24 hour times, the Message Type indicates where the reporting is error or informational, and Message lets us know what the actual report is in detail. There are three message types, and they are

I:	**Informational, usually to let us know the interaction that was made with the application.**
E*:	**Anything starting with an E represents an error that has occurred. The letters after E helps the developer know exactly where the error has occurred.**
>>	**The data that was sent to the gauge from the app.**
<<	**The response data sent to the app from the gauge.**

Firmware Update

There are two ways to update the firmware. You can use ISSPRO's firmware update tab built within the Attribute Programmer or use Nordic's DFU Application

A. Using ISSPRO's Application

To update the firmware on the harness (delivered as a zip file supplied by ISSPRO), click on the Firmware Update button on the Extras tab of the EV3 Application.

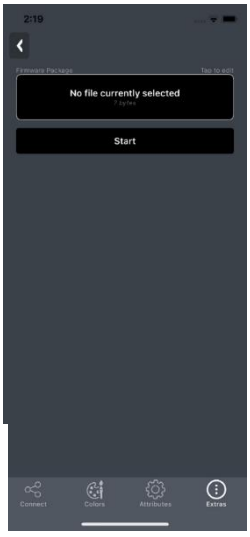
Step 1. Connect to the gauge normally on the connect page

Step 2. Click "No file selected" and use the document explore to navigate and select the .zip file (Note: Some phones block you from selecting .zip files with the factor file explorer, if this is the case, go the App store and download a free file explorer App and use it to select the .zip file)

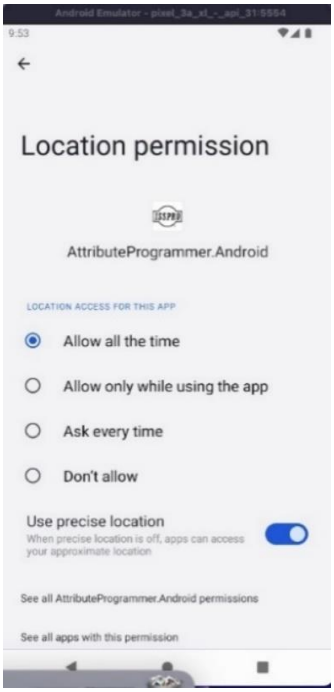
Step 3. Click Start. The gauge will disconnect when done.

Step 4. Connect to the updated device on the main page, and make sure all changes in firmware and working as intended.

ALERT: If you are using an Android device with an Android API >= 30, you must allow location to always be used in the background. This setting will be presented as in Fig 8 if not enabled.



(Fig. 7)



(Fig. 8)

B. Using Nordic's DFU Application

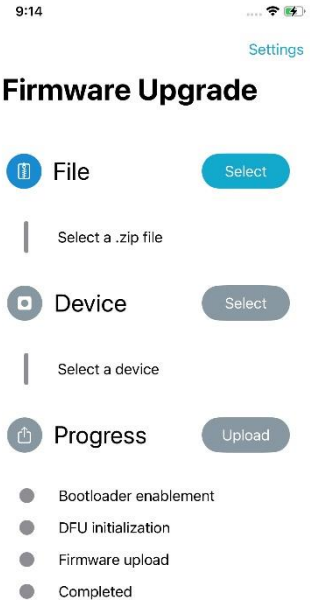
Step 1. Select Firmware File

Step 2. Select EV3 Device

Step 3. (iOS Only) Tap Settings and Disable Alternative Advertising Name

Step 4. Upload.

Step 5. Connect to the updated EV3 device on the main page, and make sure all changes in firmware and working as intended



(Fig. 9)