

Toucan Touchscreen Gauge Unit
User Guide V1.86A (Emtron)

Firmware Versions 1.86 and above

Disclaimer

Although every care is taken with the design of this product, JT Innovations Ltd. can in no way be held responsible for any consequential damage resulting from the use of Toucan in your vehicle.

Always operate your vehicle safely and do not allow yourself to be distracted by your Toucan display while driving. Minimise the amount of time you spend viewing the screen. Do not access any function requiring prolonged use of the menus whilst driving.

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Introduction

Thank you for purchasing a Toucan display. We hope it will be easy to install and configure, and we recommend you read this guide before you start.

Installation

Before You Start

Please check the box contents to ensure nothing is missing. You should have:

toucan Unit



Cable Harness

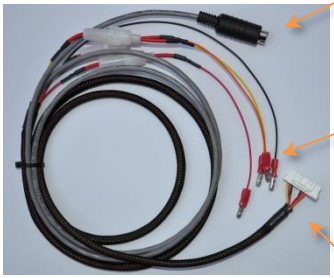


Mount



Installation

Connectors



Bare wires, CAN connection	
Black	CAN HI
White	CAN LO

BLACK	Power Ground
YELLOW	Permanent +12V
RED	Switched +12V
ORANGE	Lighting circuit

Multiway	Connects to Toucan unit

ENSURE THE CAR BATTERY IS DISCONNECTED BEFORE ATTEMPTING TO INSTALL YOUR TOUCAN DISPLAY UNIT

IF IN DOUBT, PLEASE CONSULT A QUALIFIED AUTOMOTIVE ELECTRICIAN

Power

Each power feed has an inline fuse holder pre-fitted with a 1 amp 20mm glass fuse. Ensure a good ground connection is provided to the BLACK wire.

To allow Toucan to power up quickly, it is recommended that a connection to both a permanent and switched (i.e. only live when the ignition is on) vehicle battery feed are made. When the ignition is off, Toucan will consume about 40 milliamps from the permanent connection – a typical, healthy, 40 amp-hour vehicle battery will last over a month before being run completely flat by Toucan: but it's your choice.

If you decide not to connect the YELLOW permanent +12 Volt, please make sure it is wired along with the RED connection to the switched ignition feed; otherwise Toucan may not start up when you turn on the ignition.

Toucan will take about 6 seconds to start if the permanent +12 Volt feed is not connected compared to less than a second when the permanent connection is made.

A connection to the vehicle lighting circuit may be made using the ORANGE connector – this will allow the Toucan unit to automatically dim when the vehicle lights are turned on. If not required, please insulate the unused wire to prevent damage to the unit or vehicle.

Multiway Connector

This connects to the rear of the Toucan unit. Note that it has a latching tab that must be depressed before the connector and cable can be detached.

The connector is intended to allow occasional removal of the unit from the car to allow, for example, firmware updates to be applied.



When detaching the unit, take care not to put unnecessary strain on the wires otherwise they may be damaged.

In-vehicle Mounting

Toucan is fitted with a mounting plate using the AMPS mounting hole pattern (common to many phone and satnav mounting systems) to suit the Arkon dual-T mounting system and a vent mount is included. Alternatives are available online (search for "Arkon Mount" and then look for "dual-T" compatible mounts.

Data Connection

The black and white wires at the end of the cable are the CANbus connection:

- Black CAN HI
- White CAN LO

CANbus Termination

Note that the Emtron ECU does **NOT** have a built in CAN termination. A CAN network must have terminations at either end of the bus and the ends are most often the EWCU and Toucan.

It may be necessary to enable the bus termination if Toucan is the last device on the CANbus network. By default the termination is switched off, but it may be enabled by sliding the small switch on the rear of the unit towards the 4-prong mounting plate. You may need to use a small screwdriver to access the switch through the rear cover.

You can confirm the status of the termination switch via the “more” menus.

It is most likely a termination will also need to be added to the supplied cable at the ECU end. A 120R resistor is included for this.

Emtron Configuration

Having checked the installation of your Toucan, ensuring all connectors are fully home and especially that the power wiring is correct, reconnect the vehicle battery and turn on the ignition. After a few seconds, Toucan should power up and display the main gauge screen. Before it can display any gauges, the ECU must be configured correctly.

Toucan is capable of receiving runtime parameters and status information from Emtron ECUs and is also capable of sending messages to the ECU to control:

- CAL switching
- Launch on/off
- ALS on/off
- Either ALS or Traction Control CAL switching (as preferred)

Configuring the Gauge Datastream

Files will need to be downloaded from the JTinnovations website – there are 2 files in a file called "Toucan Emtron Frames.zip" from the relevant page of the 'site.

Use the Emtune PC program to configure the CAN datastreams.

1. Set CANbus 1 to 1Mbps
2. Set CAN1 – Channel 1 to
    - Enable ON
    - Pre-defined Tx Data Set 1
    - CAN Base Address = **1250**
    - Addressing – **Sequential (11 bit)**
    - Direction – Transmit
    - Transmit Rate 10Hz, max 20Hz.



3. Configure Custom Tx Data Set 1 – read in "Toucan Emtron Additional TX Frames.edf" and set

4. Set Can 1 – Channel 2 as follows
    - Enable ON
    - Transmit “Custom Tx Data Set 1”.
    - CAN Base address **1260**
    - Addressing – **Sequential (11 bit)**
    - Direction – Transmit
    - Transmit Rate 10Hz (or 20Hz) – makes no big deal, but no point being faster
5. Configure Custom Rx Data Set 1 – read in “Toucan Emtron RX Frames.ecx”
6. Set CAN 1 – Channel 3 as follows
    - Enable ON
    - Transmit “Custom Rx Data Set 1”.
    - CAN Base address **1270**
    - Addressing – **Single (11 bit)**
    - Direction – Receive

Toucan will auto detect the stream as usual. TX functions from Toucan are:

- CAL switching – sent as CAN AN Volt 1, with each step as 650mV, 8 steps
- Launch on/off – sent as CAN AN Volt 2, switching between 0/5V
- ALS on/off – sent as CAN AN Volt 3, switching between 0/5V
- ALS or TC CAL or whatever (use as wanted) - sent as CAN AN Volt 4, with each step as 650mV, 8 steps

Menus and Operation

Gauge Screens

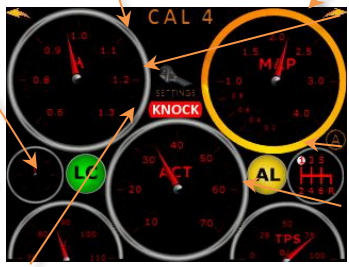
Touch here to go to previous gauge page

Touch here to change current calibration. Label shown is the first 5 characters of the text entered.

Touch here to go to next gauge page

Touch here to enter SETTINGS menus

Touch to turn launch control on or off
- Red - off
- Green – on



Shows which gauge screen is showing: A, B, C or D.

Touch the centre of any gauge to display the full screen version and then cycle through all gauges or reset the peak marker.

Press and hold any gauge to display the most recently shown large gauge.

Return to the main gauge screen by touching the centre of the large gauge.

Knock warning. Also shows sensor alarms or Check Engine light using different icons. Touch the icon to bring up a display of current sensor

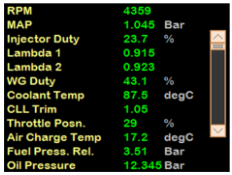
Touch to cycle through both available antilag maps.
- Red – off
- Yellow – ALS1
- Green – ALS2

Four gauge screens are available with complete flexibility of which gauge is displayed where. This can be configured via the Gauge Select pages, accessible via the “Gauge Setup” button.

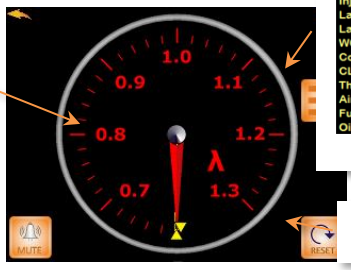
Only data from sensors that are actually connected to the ecu and are configured correctly can actually be displayed.

Large Gauges

Goes to parameter list view.



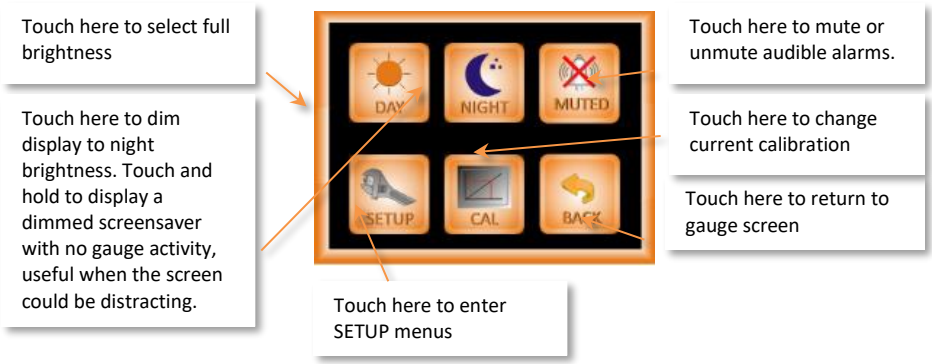
Touch here to return to main gauge screen.



Touch here to mute an active alarm. Will be automatically unmuted when this alarm clears

Resets the peak marker.

Settings Menu



If the “illumination” wire has been wired to the vehicle’s lighting circuit, the manual day and night buttons will temporarily override the brightness as controlled from the vehicle lighting stalk.

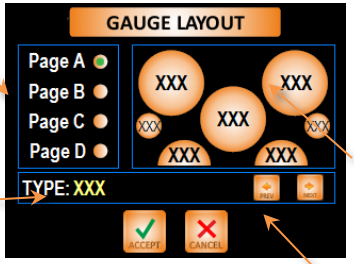
Setup Menu



Gauge Layout

This is accessed via the Gauge Setup button, and then “Gauge Select”.





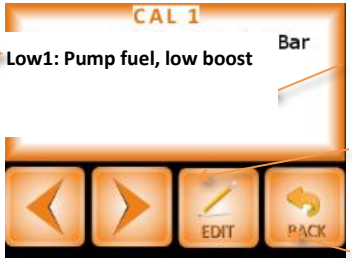
Touch here to select which of the 4 pages to setup

Gauge name is shown

Touch the gauge that you wish to change. A 3 letter mnemonic describes the current gauge selected for each position

Touch here cycle between the next and previous gauges in the list

CAL Selection Menu



First 5 characters of this text used on main gauge screen as label.

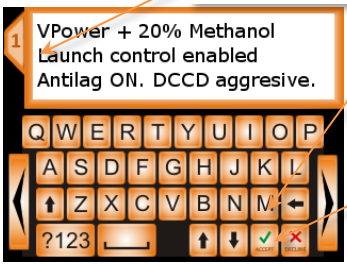
User Text describing this calibration function

Next and previous buttons to select a different setting

Touch here to edit the User Text

Touch here to return to previous menu

Editing CAL Text



First 5 characters used as label on main screen

The text being edited.

Backspace (delete character to left)

Shift key to access lower case characters, symbols, etc.

Move the cursor up or down the 3 lines of text

Next and previous buttons to select a different CAL

Touch here to return accept or

CAL PIN Protection.

If enabled via the "more" menus, Toucan can be set to prevent the current CAL being changed unless you enter a 4-digit PIN. This can be useful if you have a "valet" mode (with reduced rpm limit for example) and/or an anti-theft CAL. You can also set PIN protection to *only* apply to the last CAL (i.e. CAL 8), *only* to the first CAL or to *both* the first and last CAL.

There are a few things to be aware of if you choose to use this option:

- The default PIN is 0000 and it is recommended that you change this to something else.
- Once PIN protection is enabled, the (correct) PIN will need to be entered before you can change the PIN, or to disable PIN protection again.
- If the PIN is entered incorrectly 3 times, PIN entry will be prevented for the next 10 minutes. Note that this 10-minute timeout will be reset if power is removed from the unit.
- In the event that Toucan is disconnected from the Syvecs ecu, the ecu will, in most cases default to CAL 8 (although this can be CAL 1 if a Syvecs input with no pull-up resistor is used). It is generally recommended that the valet or anti-theft CAL is in position 8, or the PIN protect first CAL function (or first *and* last) is used.
- In the event that you forget the PIN it can be reset using a PC programme, connecting to Toucan via USB. This programme is available from the JT Innovations website, or contact technical support for assistance.



Alarm Configuration

The Alarms configuration menu allows you to determine which parameters will cause alarm events. A setting allows the audible alarm to be muted if the engine is not running.

An alarm event will:

- Cause an audible warning, unless Toucan is muted
- Cause the bezel of the relevant gauge to change to a flashing orange
- If enabled, cause the relevant gauge to be displayed full screen.

In addition, there is a low oil temperature warning that can be enabled. This will not sound the audible alarm, but will display a non-flashing orange bezel until the oil temperature exceeds the configured temperature. Obviously this function only works if an oil temperature sensor is connected to your ECU.

When an alarm is activated, the relevant large gauge has a mute button. This may be used to temporarily mute that specific alarm. It will remain muted until either that alarm condition clears or Toucan is repowered. Alarms for other fault conditions will not be supressed or muted

Available Alarms

- ACT. Any value in range, in 1°C steps. Alarm triggered if alarm value is exceeded. Default 50C.
- Battery voltage. Any value in range in 0.25V steps. Alarm triggered if current value is below alarm threshold. Default 11.5V
- Boost. Any value from 0 to max, in 0.05 bar increments. Alarm triggered if alarm value is exceeded. Default 1.5bar.
- Coolant temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 95C.
- Exhaust Temperature (EGT1 and EGT2). Any value in range in 10°C steps. Alarm triggered if current value is above alarm threshold. Default 850C.
- Fuel Level Low. 0-100% in 1% increments. Alarm is triggered if current level is below the alarm value, default 10%.
- Fuel Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Fuel Temperature. Any value in range in 1°C steps. Alarm triggered if current value is above alarm threshold. Default 70C.
- Injector Duty Cycle. Any value up to 100% in 1% steps, default 85%. Alarm triggered if injector duty cycle exceeds the alarm threshold.
- Knock detected.
- Lambda 1 and Lambda 2. Any value in range, in 0.01 steps. Alarm triggered if alarm value is exceeded. Default 1.05.
- “Lean Lambda”. Alarm is triggered if lambda exceeds set value AND RPM is above set value AND Boost exceeds set value.
- Boost. Any value in 0.05 bar increments. Alarm is triggered if alarm value is exceeded. Default 2.5bar
- Oil Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Oil Temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 120C.
- Oil Temperature Low. Any value in range in 1°C steps. Alarm triggered if current value is below alarm threshold. Default 70C.
- RPM. Any value in range 0-10,000 rpm in 100rpm steps. Alarm triggered if alarm value is exceeded. Default 7500.
- Sensor Alarms. Any sensor in a fault state will cause an alarm.
- TPS. Any value 0-100%, 5% steps. Alarm triggered if alarm value is exceeded. Default 50%.
- Wheel speed. Any value in range in 1mph or 1kph steps. Alarm triggered if alarm value is exceeded. Default 70mph/120km/

"More" Menus

The more menus allow you to select

- Units used – Metric, Imperial or "USA" (which uses Imperial measurements for everything except Boost and MAP which are in kPa)
- Speed display – mph or kph
- Gear display – H pattern or digits
- Whether the large full screen gauge should be automatically displayed should the gauge start showing an alarm
- Whether changing the CAL should be PIN protected – either all of them, or just the last CAL.
- Change the CAL PIN
- Select Absolute or Relative Fuel Pressure (Relative only available if CAN bus or custom serial data selected).
- Enable/Disable the display of peak markers on gauges. Peaks are remembered until manually reset on the large gauge display.
- Enable/disable dynamic peak markers. Dynamic peak markers maintain the current peak for just a few seconds and then drop back to the current reading. The hold period can be adjusted.
- Choose the ECU interface (STACK, CAN or Syvecs customer serial data)
- Choose the CAN data rate (1Mbit or 500kbit)
- Edit Digital Inputs (DIs) sent for CALs 1 to 8, launch control, and antilag control
- Choose between Link G4 and G4+ models.
- Mute alarms if the engine is not running - useful if the vehicle is not being driven, but the ignition is switched on.
- Turn the audible touchscreen feedback beep on/off
- Determine which large gauges will be displayed when you cycle through them. This is useful to hide gauges when the appropriate gauge sensor hasn't been fitted.
- Display CAN termination on/off, software version and current/actual CAL voltage

Firmware Updates

Occasional firmware updates will be made available to add new features. These may be downloaded from the Downloads section of the JT Innovations website.

Updates are applied using a PC program (also available from the website) and a standard "mini" USB cable. Updates should be applied with the Toucan disconnected from the vehicle. It will be powered from the PC USB port, although the LCD will be shut down.



The USB connector on later units – those fitted with the Arkon mount system – is obscured by the black plastic mounting plate on the rear of the unit. This plate will need to be unscrewed before a USB cable can be attached.

Technical

Data Interface	CAN 2.0B at 1Mbit/s or 500kbit/s with selectable termination, or RS232 at 9600 baud or 115.2kbaud
Expansion Connector	RS232, CAN, Power Out and Ground. Allows connection of toucan expansion accessories, available in 2012.
Power	8-20V <200mA typ. <40mA in standby mode Connections to permanent, switched and illumination power, via 1A fused connections.
Memory	Non-volatile storage of all parameters
Firmware Updates	Via rear-panel USB connector, using PC programme.
Compliance	Directives: 2002/96/EC, 72/245/EC, EN50498:2010
Warranty	1 year
Dimensions	100x83x16mm
Weight	200g
Display	3.5" QVGA TFT, 320x240 pixels, 24 bit colour, with touchscreen
Processing system.	190MHz 32 bit ARM9, 8Mbytes Flash memory, 8Mbytes SDRAM.
Package contents	Toucan unit, power/data cable harness, mount, installation guide.
Available Gauges/Alarms	Air intake temperature; Battery Volts; Boost (2.5 bar and 3.5 bar); Exhaust Gas Temperature (2 channels); Fuel level; Fuel Pressure; Fuel Temperature; Current Gear; Injector Duty warning; Knock; Lambda (2xwideband channels, 1x narrowband); Lean Lambda warning; Engine limp/Cut mode; MAP; Oil Pressure; Oil Temperature; RPM; Sensor Error; Throttle Position; Coolant Temperature; Wheel Speed.

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