

Toucan Touchscreen Gauge and CAL Selection Unit

User Guide (Syvecs)

Version 1.2

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. It is recommended that you register your product in the JT Innovations website – this way we can keep you advised of any product updates etc.

Installation

Before You Start

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

***toucan* Unit**



Cable Harness

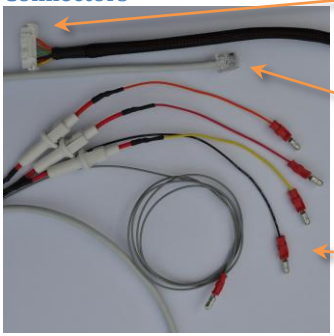


Mount (one of the following)



Installation

Connectors



Multiway	Connects to Toucan unit
RJ25	Data connection to Syvecs
BLACK	Power Ground
YELLOW	Permanent +12V
RED	Switched +12V
ORANGE	Lighting circuit
GREY	CAL Switch

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

IF IN DOUBT, PLEASE CONSULT A QUALIFIED AUTOMOTIVE ELECTRICIAN

Power

The power connectors are provided with “bullet” connectors which may be removed if preferred. 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.

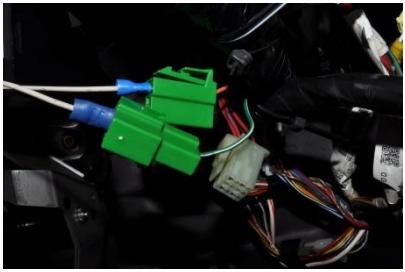
Toucan will take about 6 seconds to start if the permanent +12 Volt feed is not connected compared to less than a second when the permanent connection is made.

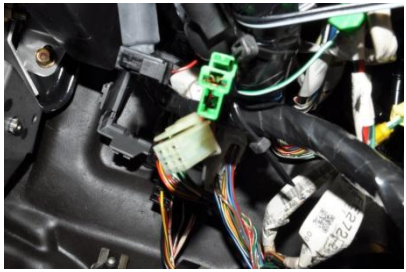
A connection to the vehicle lighting circuit may be made using the ORANGE connector – this will allow the Toucan unit to automatically dim when the vehicle lights are turned on. If not required, please insulate the unused wire to prevent damage to the unit or vehicle.

CAL Switch

The long GREY wire, also equipped with a bullet connector, may be connected to the Syvecs CAL switch input to allow you to use Toucan to select the required calibration.

The CAL switch for Subaru S6PnP ecu's is usually wired to the green “test” connector located above the pedal box, near the steering column as shown below/left. A short adapter cable is available to allow the Toucan CAL wire to be directly plugged in to this connector, otherwise make use of the bullet connector, or remove it as preferred.





One of these two connectors is simply a ground connection: for “newage” vehicles (MY01 onwards) it is the female/receptacle connector that you need to connect to, as shown above/right. For “classic” vehicles, MY00 and earlier, it is usually the male connector – but sometimes it can be the black connectors: it is best to check with your mapper/fitter if you’re not sure.

CAL switches for S6GP and S8 ecu's are usually wired directly to the ecu connector or loom adapter, to ecu pin 65 (AR3/#15) – but check your own Syvecs installation and wiring schedule to be sure.

RJ25 Data Connector

S6PnP ecu's are provided with an RJ25 socket on the front edge of the ecu, adjacent to the Ethernet connector. Plug Toucan's RJ25 connector directly in to this socket.

S6GP and S8 ecu's are not provided with a mating connector, so the RJ25 should be cut off and the cores wired as follows:

RJ11	Cable Core	Syvecs Function	Syvecs Pin
Pin 1	green	RS232 RX	55
Pin 2	green/white	RS232 TX	56
Pin 4	brown	CAN HI	53
Pin 5	brown/white	CAN LO	54



Syvecs S6PnP RJ25

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 uses the Herbert Richter™ 4-prong mount system, which provides a secure mount when in the vehicle, but easy removal should it be required.

The default mount supplied is a permanent mount which is intended to be permanently screwed to the vehicle. Make sure the mount is in the location you require before attaching it!

An alternative mount may have been supplied as an option when you purchased your unit, or they may be purchased separately if required: please contact JT Innovations for availability.

Initial Toucan 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, ***but do not start the engine at this time***. After a few seconds, Toucan should power up and display the main gauge screen.

CAL switch configuration

If Toucan is being used to select calibrations, it is necessary to check that the voltage thresholds configured in the Syvecs ecu match those of your Toucan. The original rotary CAL switches do vary from sample to sample and your mapper may have adjusted the values in the Syvecs to match your specific switch. These are typical Syvecs threshold values, as well as the default Toucan voltages:

CAL	Syvecs threshold	Toucan Voltage
1	<0.36V	0.00V
2	>0.36V, <1.07V	0.70V
3	>1.07V, < 1.68V	1.40V
4	>1.68V, < 2.19V	1.95V
5	>2.19V, <2.79V	2.50V
6	>2.79V, <3.20V	3.00V
7	>3.20V, <3.61V	3.40V
8	>3.61V	4.00V

To ensure Toucan and your Syvecs match, you can either alter the voltages in the Toucan unit, or alter the Syvecs calibration to match Toucan: in either case you will need to examine the Syvecs calibration. If you are not confident to do this, please contact your mapper, or contact technical support at JT Innovations for assistance.

See the basic operation guide for how to adjust the CAL voltage output of Toucan.



Once the CAL voltages have been set, you can start the engine and begin to explore the gauge and other options available in your Toucan unit.

Doesn't work?

- Double check installation, especially the data connection to the Syvecs unit.
- By default, Toucan connects using CANbus data. The Syvecs ecu can only stream RS232 data ***or*** CAN bus data, not both, and it may have been configured to use either the RS232 STACK protocol, or the custom Syvecs serial protocol. Try changing Toucan to use RS232 STACK or the Syvecs custom protocol. This is described in the basic operation guide – the setting is in the "MORE" menus.
- Contact technical support at JT Innovations for assistance.

Menus and Operation

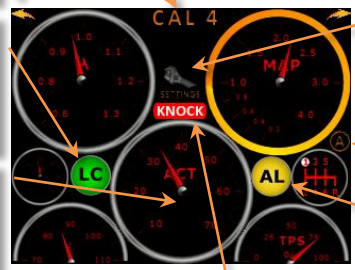
Gauge Screens

Touch here to go to previous gauge page

Touch here to change current calibration

Touch here to go to next gauge page

Launch Control status
- Not present, not active
- Yellow – active, not engaged
- Green – active



Touch here to enter SETTINGS menus

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.

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

AntiLag status
- Not present – not active
- Yellow – start CAL
- Green – active
- Red - shutdown

Shows Knock ignition retard has exceeded set value on any 1 or more cylinders (CANbus only). Also shows sensor alarms.

Four gauge screens are available as follows:

Ⓐ Air Charge Temperature, MAP/Boost, Water Temperature, Battery Volts, RPM, Gear and Throttle Position

Ⓑ Lambda, Oil Temperature, Oil Pressure, Exhaust Gas Temperature, RPM, Speed, Gear

Ⓒ Oil Pressure, Oil Temperature, MAP/Boost, Air Charge Temperature, Lambda, Water Temperature, Battery Volts

Ⓓ Oil Pressure, Oil Temperature, MAP/Boost, Exhaust Gas Temperature, Lambda, Fuel Temperature, Fuel Pressure

Only data from sensors that are actually connected to the Syvecs ecu and configured correcrly will be displayed.

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.

Setup Menu



CAL Selection Menu

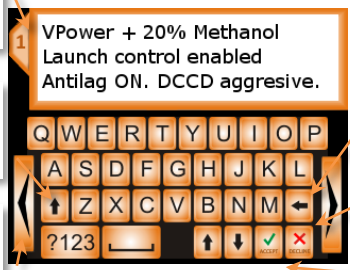


Editing CAL Text

The CAL text being edited.

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

Next and previous buttons to select a different CAL



Backspace (delete character to left)

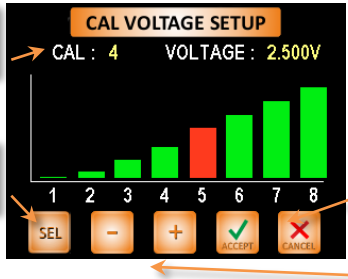
Move the cursor up or down the 3 lines of text

Touch here to return accept or

CAL Voltage Adjustment

The CAL voltage currently being edited and the

Select the next CAL voltage to adjust



Graphic representation of the voltage (red is the current voltage being adjusted)

Touch here to return accept or reject changes

Adjust the voltage up or down.

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” CAL (with reduced rpm limit for example) or an anti-theft CAL. You can also set PIN protection to *only* apply to the last CAL (i.e. CAL 8).

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 default to CAL 8. It is therefore recommended that the valet or anti-theft CAL is in position 8.
- 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.
- Each large gauge has a “mute” button that temporarily mutes the alarm until either it clears and re-occurs; or you unmute it; or Toucan is repowered.

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.

Available Alarms

- MAP. Any value from 1.0 to max, in 0.05 bar increments. Alarm is triggered if alarm value is exceeded. Default 2.5bar
- Boost. Any value from 0 to max, in 0.05 bar increments. Alarm triggered if alarm value is exceeded. Default 1.5bar.
- TPS. Any value 0-100%, 5% steps. Alarm triggered if alarm value is exceeded. Default 50%.
- Lambda. Any value in range, in 0.01 steps. Alarm triggered if alarm value is exceeded. Default 1.05.
- Coolant temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 95C.
- Battery voltage. Any value in range in 0.25V steps. Alarm triggered if current value is below alarm threshold. Default 11.5V
- ACT. Any value in range, in 1°C steps. Alarm triggered if alarm value is exceeded. Default 50C.
- Oil Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Injector Duty Cycle. Any value up to 100% in 1% steps, default 85%. Alarm triggered if injector duty cycle exceeds the alarm threshold.
- Wheel speed. Any value in range in 1mph or 1kph steps. Alarm triggered if alarm value is exceeded. Default 70mph/120km/h
- RPM. Any value in range 0-10,000 rpm in 100rpm steps. Alarm triggered if alarm value is exceeded. Default 7500.
- Oil Temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 120C.
- Fuel Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Exhaust Temperature. Any value in range in 10°C steps. Alarm triggered if current value is above alarm threshold. Default 850C.
- Fuel Temperature. Any value in range in 1°C steps. Alarm triggered if current value is above alarm threshold. Default 70C.
- Oil Temperature Low Warning. Any value in range in 1°C steps. Warning triggered if current value is below threshold. Default 70C.
- Knock. Any value in range 0-20 degrees of ignition retard in 0.5° steps. Default 5° (looks at all engine cylinders).
- Sensor Alarms. If configured in the Syvecs ecu, sensor alarms will notified, displayed as minor, moderate or critical as per the Syvecs calibration.

"More" Menus

The more menus allow you to select

- Whether a Manifold Absolute Pressure (MAP) or Boost gauge is displayed. Boost is calculated by taking a single pressure reading at power up and referencing MAP to this, so it is not as accurate as MAP. It will also not work reliably if Toucan is not provided with a permanent connection to +12V as the initial reading will probably be taken after the engine starts – if this is the case, Toucan will use a default value for atmospheric pressure.
- Whether a narrow or wideband lambda sensor is in use. If narrow band is selected, the rich/lean values received are averaged to give a representation of the current fuelling. A wideband sensor is recommended.
- Gauge units – metric or imperial.
- Speed – mph or kph
- Whether the full screen gauge should automatically be displayed if an alarm condition is detected.
- 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.
- 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.
- Mute alarms if the engine is not running - useful if the vehicle is not being driven, but the ignition is switched on.
- Choose between CAN, RS232 "STACK" or Syvecs RS232 datastreams.
- Display CAN termination on/off, software version and current/actual CAL voltage

CANbus/Custom RS232

Although you can connect to the Syvecs ecu using RS232 serial data using the "STACK" protocol, this means you cannot use the following functions:

- Relative Fuel Pressure
- Knock warning indicator
- Launch control indicator
- Anti-lag indicator
- Sensor alarms
- Injector duty alarm
- Muting alarms when the engine is not running

For this reason it is best to ensure you use either the CANbus or Custom RS232 serial data options – the Custom serial data carries exactly the same information as is configured for CANbus.

CANbus Termination

It will be necessary to enable the bus termination if Toucan is the last device on a 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.

Syvecs CAN bus configuration

To ensure that Toucan is able to receive CAN bus data or custom Serial data, the Syvecs ecu calibration must be changed to configure the necessary CANbus parameter, and for the datastream itself to be either CAN or Custom Serial.

If in doubt, consult your installer/mapper or JT Innovations technical support: but this is the basic procedure.

1. Download the Toucan CANbus calibration file from the JT Innovations website.
2. Ensure you have the latest Syvecs software and firmware by downloading it from the Syvecs forum, accessible through the Syvecs website
3. Run SCal and connect to your Syvecs ecu, to obtain a copy of the current configuration. Make sure you save a copy of this configuration to your computer before making any changes!
4. Now use the Import function in the File menu and select the Toucan CANbus calibration file you downloaded. This file has everything set to "invalid" except the datastream settings – no changes will be made to anything in your existing calibration except the necessary datastream settings.
5. This file selects CAN as the datastream format – if necessary or preferred, change the datastream option to Custom RS232.
6. You should now save this calibration on your computer for future reference.

7. If SCal is still connected to your vehicle's powered ecu, the changes will have been made "live" but you need to **Program** the calibration to the ecu from the **Device** menu. If you have made the changes offline, you will need to reconnect to the ecu and perform a "disk calibration" by opening the newly modified calibration after you have connected SCal to the ecu, and then performing the **Program** operation when prompted.

Finally, change Toucan to use CANbus or Syvecs Custom RS232 using the "more" menus.

Toucan should now be communicating with the Syvecs ecu using CANbus parameters.

CANbus Doesn't Work?



Please note that a small number of Syvecs units do not have a fully functioning CAN bus interface. If you find that Toucan stops displaying information once you switch to using CAN bus data, but does still work if you revert to STACK RS232, change both Toucan and the ecu to use "Custom RS232" – all the data configured on the CAN datastream will then be transmitted on the RS232 interface instead. This option is only available in Syvecs version 1.25 onwards.

Sensor Alarms

Syvecs firmware version 1.25 onwards allows sensor alarms to be configured, and for this information to be transmitted via CAN bus to Toucan. In essence, individual sensors can be configured to be ignored if they fail, or to generate a minor, moderate or critical alarm value. If this is configured in the calibration, Toucan alarms can be enabled to draw your attention to sensor failures. SCal will still be needed to determine which sensor has actually caused the alarm.

Your mapper can advise on the best configuration of sensor alarms for your specific vehicle, or contact JT Innovations technical support for advise.

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.

It is recommended that you register your Toucan with us on the website – that way we can keep you informed when firmware upgrades are available.

Multiple Toucan Units

It is possible to run multiple Toucans, allowing more than one gauge screen to be visible at a time. A simple daisy-chain cable is available from JT Innovations that interconnects data from the master Toucan unit to the slave unit: please contact us for availability.

Technical

Data Interface	CAN 2.0B at 1Mbit/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.
CAL Voltage	Adjustable via menus to match Syvecs configuration. Fail-safe monitoring of CAL voltage.
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.

Glossary

Term	Description
ACT	Air Charge Temperature
CANbus	“Controller Area Network” bus – a serial interconnect common in vehicles.
ECT	Engine Coolant Temperature
EGT	Exhaust Gas Temperature
EOP	Engine Oil Pressure
EOT	Engine Oil Temperature
FP	Fuel Pressure
MAP	Manifold Absolute Pressure – the air pressure in the manifold, atmospheric pressure is 1bar, total vacuum is 0bar.
TPS	Throttle Position Sensor