



“EZcal Pro”
“EZcal Green”
“EZcal +”

Advanced hand-held device, configures and diagnoses controllers

General features

- Diagnosis and configuration of PG Trionic controllers
- “Quick HELP” gives instant access to diagnostic help from any menu
- Built-in USB storage for file transfer between controllers and PCs
- SAVE and LOAD functions allow controller settings to be saved for documentation, and loaded to another controller for easy repeating of machine configuration
- “PGFLASH” function for easy controller software updates
- Advanced features include “GETCURVE”, “QUICKLOG” and “CLONE save/restore”





1.1 Description

The EZcal is a hand-held device used to diagnose and configure machine controllers from PG Trionic Inc. The device has a two line x 16 character backlit display, a 7 button keypad, RS232 / power connection, and USB connection.

When connected to a PG Trionic Inc controller, the buttons and display are used to access, view and alter controller diagnostics and adjustments.

When connected to a PC via USB, files can be written to or read from the EZcal; subsequently the EZcal can use the files to enable field diagnosis and update of controllers without needing a PC. It's also possible to update the EZcal itself.

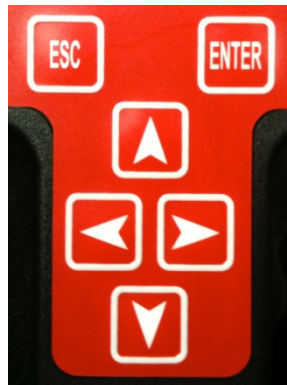
1.2 EZcal functionality

The EZcal can be used instead of an EZcal, for diagnosing and configuring a controller – simply use the supplied four pin connector cable between the EZcal and the controller. When the EZcal is connected, the display lights up and shows the initial controller menu,



typically like:

The LEFT (◀) and RIGHT (▶) arrow keys can be used to select different controller menus, while the ENTER key opens the menu and the ESC key escapes back out of an opened menu:



The UP (▲) and DOWN (▼) arrow keys can adjust some controller values.

All normal controller menu functions are available, including DIAGNOSTICS, ADJUSTMENTS, and SETUPS menus.



1.3 EZcal “?” Quick HELP

The EZcal “?” button instantly shows the controllers current HELP message, while viewing any controller menu (there is no need to exit the current menu and navigate to the HELP menu).

The current HELP message is displayed while the “?” button is pressed; the EZcal immediately reverts to the original menu display, once the button is released:



1.4 Accessing EZcal functions

The EZcal incorporates a number of “computer like” features so that a PC is not needed for many controller configuration tasks, such as updating the controller software or copying settings & adjustments from one controller to another.

The EZcal functions are accessed from a set of menus separate to those of the connected controller; access to the EZcal Pro Menus is possible:

- 1) Press and hold the ESC key while connecting the EZcal to the controller
- 2) OR press and hold the ESC key for about 5 seconds, if the EZcal is already connected to the controller
- 3) OR press the ESC key while pressing the “?” button (avoids the 5 second delay)

In each case, the EZcal Pro Menus will show, with the initial SETUP option:



The LEFT (◀) and RIGHT (▶) arrow keys can be used to select different EZcal Pro Menus, while the ENTER key opens the menu and the ESC key escapes back out of an opened menu. EZcal Pro Menus include:

SETUP, SNAPSHOT, SAVE, LOAD, PGFLASH, QUICKLOG, GETCURVE, ABOUT



2.1 EZcal SNAPSHOT menu (added April 2016)

The EZcal SNAPSHOT menu (if supported) provides fast “snapshot” capture of diagnostic data which can then be SAVED (see next menu).

Initially SNAPSHOT shows “?” to prompt for it to be selected. Pressing ENTER causes the SNAPSHOT to attempt to run – it will show “WORKING” and will then show “READY” when completed.

When SNAPSHOT shows “READY”, the next SAVE will use the “snapshot” data instead of fetching new data from the controller – in this way a temporary condition or operation of the controller can be quickly captured, even though the actual SAVE process takes a long time.

2.2 EZcal SAVE menu

The EZcal SAVE menu enables all data in the connected controller to be saved to USB storage in the EZcal; subsequently the file can be accessed from a PC, or used to load the same data to another controller (ie: copying from one controller to another).

The SAVE function saves all controller information including ADJUSTMENTS, SETUPS, DIAGNOSTICS, etc; an eight character filename can be specified to identify the data, and the file has a “.PGT” extension – example:

```
[DIAGNOSTICS]
"SYSTEM driveENABLE","NO","0",6
"SYSTEM boomENABLE","NO","0",7
"SYSTEM B+SUPPLY","10.9V","13039",8
...
[ADJUSTMENTS]
"DRIVE FWD MIN","36%","36",292
"DRIVE FWD MAX","55%","55",293
...
```

To SAVE all controller data to a USB storage file:

- Access the EZcal Pro Menus and select the SAVE menu
- Enter an appropriate filename; press UP/DOWN to set each character, and LEFT/RIGHT to move between characters; press ENTER when the filename is correct
- The EZcal will prompt for confirmation, displaying “:NO” after the filename; to confirm the filename and begin the SAVE, press UP/DOWN to show “:YES” then press ENTER
- The EZcal will now create the filename in USB storage, read all data from the controller, and write it to file; this will take a long time (30s or longer)
- The display will show the data being written as the EZcal works: DIAGNOSTICS, ADJUSTMENTS, SETUPS, etc (preceded by “SNAPSHOT” if it was used). When complete the display will show “OK”; press ESC to exit the SAVE menu



2.3 EZcal LOAD menu

The EZcal LOAD menu enables ADJUSTMENTS and SETUPS that have been saved from a controller, to be loaded to another controller – once done, both controllers will be identically configured.

To LOAD controller data from a previously saved USB file:

- Access the EZcal Pro Menus and select the LOAD menu
- All available files (created with EZcal SAVE menu) are displayed, one by one, followed by the “:NO” confirmation prompt
- If the filename displayed is not the correct one, press ENTER with “:NO” to reject that filename and display the next
- When the correct filename is displayed, press UP/DOWN to show “:YES” then press ENTER to confirm that filename
- The EZcal will display “WORKING” while the data in the file is compared with that in the controller
- The EZcal will display “LOADCOUNT=”, indicating how much data needs to be changed in the controller, followed by a percent complete while the changes are made
- The EZcal will display “OK” when all data in the controller matches that in the file; press ESC to exit the LOAD menu

IMPORTANT: Ensure that data is only transferred between identical controllers running the same software – loading data for one controller to a different type of controller will have unexpected and possibly dangerous effects on the vehicle!

The EZcal will detect an attempt to load data for the wrong controller type, and will display a warning like “MACHINE CODE CHANGED” or “MODEL CHANGED” – this is a warning to cancel the LOAD operation.

2.4 EZcal PGFLASH menu *(not available for “EZcal Green” or “EZcal+”)*

The EZcal PGFLASH menu allows the software of a connected controller to be updated, perhaps to provide new vehicle functionality. Controller software files have a “.REC” extension, and are provided by PG Trionic Inc according to customer needs. File contents are a meaningless sequence of letters and numbers, and should never be altered!

```
S113F60050475420444953504C41592056312E31CF  
S113F6100032303039205047205472696F6E69636C  
...  
S105FFFEF628DF  
S903F60006
```

A supplied controller software “.REC” file must first be transferred to USB storage in the EZcal, then the EZcal can be connected to the controller to update it.

To PGFLASH new controller software:

- Access the EZcal Pro Menus and select the PGFLASH menu



- All available filenames (update software from PG Trionic, Inc) are displayed, one by one, followed by the “:NO” confirmation prompt
- If the filename displayed is not the correct one, press ENTER with “:NO” to reject that filename and display the next
- When the correct filename is displayed, press UP/DOWN to show “:YES” then press ENTER to confirm that filename
- The EZcal will proceed with updating the controller software, displaying various messages while working:
ACCESSING BOOT
CHECKING BOOT
ERASING
PROGRAMMING
- A percent complete shows progress (the PGFLASH process can take up to a few minutes to complete); when complete an OK/FINISHED message is displayed (the new controller software version is also displayed)
- If there are any errors, be sure to confirm that the correct software file was chosen, matching the connected controller – if necessary the ABOUT menu can provide additional help with problems

NOTE: Normally the PGFLASH routine communicates with the controller at HIGHSPEED (as fast as possible); in rare circumstances this may cause erratic failures. If this is suspected, the EZcal SETUP menu can be used to disable HIGHSPEED – the PGFLASH routine will then proceed more slowly.

2.5 EZcal GETCURVE menu

The EZcal GETCURVE menu saves the platform overload calibration curve data in the connected controller to be saved to USB storage in the EZcal; subsequently the file can be accessed from a PC.

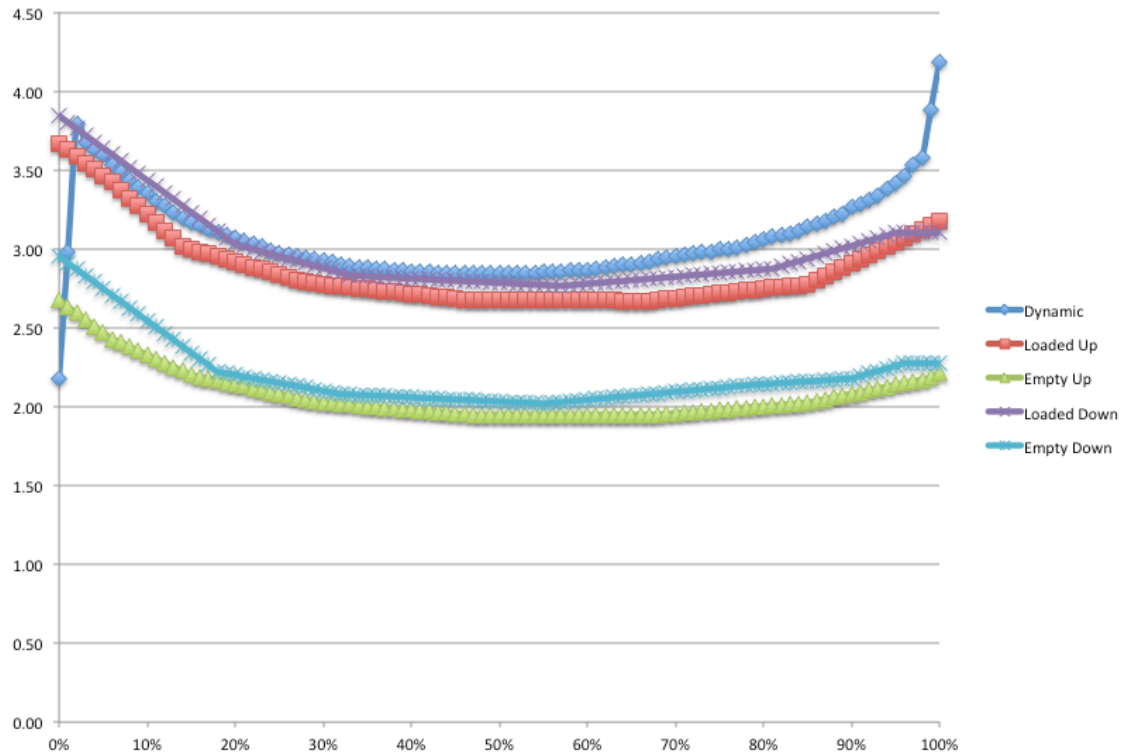
This function is only useful for controllers which implement curve-based platform overload.

To store platform overload curve data to a USB file:

- Access the EZcal Pro Menus and select the GETCURVE menu
- Enter an appropriate filename; press UP/DOWN to set each character, and LEFT/RIGHT to move between characters; press ENTER when the filename is correct
- The EZcal will prompt for confirmation, displaying “:NO” after the filename; to confirm the filename and begin storing the curve data, press UP/DOWN to show “:YES” then press ENTER
- The EZcal will now create the filename in USB storage, read the platform overload data from the controller, and write it to file; this will take a long time (30s or longer)
- The display will show various messages as the EZcal works; when complete FINISHED is displayed



NOTE: The file created by GETCURVE may have a “.CRV” or “.LOG” extension, depending on the controller type; in either case the file can be viewed on a PC with using the PG Trionic Inc GETCURVEW program, or a spreadsheet:



2.6 EZcal QUICKLOG menu (not available for “EZcal Green” or “EZcal+”)

The EZcal QUICKLOG menu can store selected controller values to a file in USB storage, while the machine is being tested (for example to record motor voltage / current). Please see “EZcal Advanced Instructions”.

2.7 EZcal SETUP menu

The EZcal has a number of special setup options, accessible in this menu; generally the setup options are needed only rarely:

- EZCAL MODE (legacy, smart); please see “EZcal Advanced Instructions”
- DEBUG (no, yes); assists with resolving EZcal communications issues
- HIGHSPEED (yes, no); disables highspeed PGFLASH updating if problems occur
- FORMAT (no, yes); formats the USB storage in the EZcal, wiping all data
- QUICKLOG / SLOWLOG; please see “EZcal Advanced Instructions”
- FLASHSAVE (no, yes); please see “EZcal Advanced Instructions”
- TRANSLATION (no files, yes, no); please see “EZcal Advanced Instructions”

To select the EZCAL MODE of the EZcal:



- Access the EZcal Pro Menus and select the SETUP menu
- Access the EZCAL MODE sub-menu; press UP or DOWN to choose LEGACY or SMART, then ENTER to exit the EZcal Pro Menus and return to EZcal mode showing controller menus, using the selected mode
- NOTE: The selected mode is remembered until it is changed again

To use the DEBUG function of the EZcal:

- Access the EZcal Pro Menus and select the SETUP menu
- Access the DEBUG sub-menu; press UP/DOWN to choose “:YES” to enable debug
- Now all RS232 communications with the controller will be logged; proceed to carry out the problem activity
- Once the problem activity has been completed, return to this DEBUG sub-menu in the EZcal SETUP menu, and press UP/DOWN to choose “:NO” to stop debug – this is critical, so that the created debug file is available for access in USB storage
- Finally, connect the EZcal to a PC and copy the file DEBUG.TXT from USB storage – this file can be provided to PG Trionic Inc engineers to assist with resolving the communications problem

To change the HIGHSPEED mode of the EZcal:

- Access the EZcal Pro Menus and select the SETUP menu
- Access the HIGHSPEED sub-menu; press UP/DOWN to choose “:YES” to enable highspeed, or “:NO” to disable
- When HIGHSPEED is enabled, the PGFLASH update of controller software occurs at maximum speed; when disabled, the update occurs at standard speed
- Normally using the HIGHSPEED mode is recommended (so choose “:YES”)
- NOTE: The selected mode is remembered until it is changed again

To FORMAT the USB storage in the EZcal:

- Access the EZcal Pro Menus and select the SETUP menu
- Access the FORMAT sub-menu; press UP or DOWN to choose YES, then ENTER to begin wiping all USB storage in the EZcal
- The message “WORKING” will be displayed, followed by “OK”

The FORMAT sub-menu wipes the USB storage in the EZcal, erasing all files; this should be used in preference to using the format command on a computer, to ensure that the storage is prepared so that the EZcal can access it.

2.8 EZcal CLONE SAVE / RESTORE menus (added August 2014)

The EZcal CLONE SAVE menu can store all controller values including height / overload calibrations, to a file in USB storage, if the controller needs replacing.

The EZcal CLONE RESTORE menu can restore all controller value from the file, to the replacement controller.

Please see “EZcal Advanced Instructions”.



2.9 EZcal ABOUT menu

The EZcal ABOUT menu displays various information about the EZcal, as well as information about the latest PGFLASH (in case there was a problem).

To view the ABOUT menu of the EZcal:

- Access the EZcal Pro Menus and select the ABOUT menu
- Press LEFT or RIGHT to move through the different ABOUT information displays; press ESC to exit
- Information displays in the ABOUT menu include:
 - Copyright information
 - EZcal version build information
 - USB storage information (including file count)
 - MACHINE information (model/version for connected controller)
 - RS232 code/tx/rx information (details last RS232 message to/from controller)
 - BOOT/FLASH/CODE information (details last PGFLASH activity)
 - DCODE information (details any unsupported SMART EZcal menu)
 - DEVID/DEVREV information (internal identification data)
 - V/T information (supply voltage, internal temperature data)

IMPORTANT: When the ABOUT menu is entered, the file EZCAL.TXT is created in USB storage, with all information – there is no need to copy the displayed information, as this file can be accessed instead:

```
©2009 PG Trionic Inc
V3.05 Mar 4 2010
FILE SYSTEM OK (11)
MACHINE=439/V1.6
CODE=$10,TX=$02,RX=$82,ADDR=$076C,LEN=$04,ERR=$20
BOOT=160, FLASH=12, CODE=0
DCODE=0,ADDR=0,MSG=$0000
DEVID=$1009, DEVREV=$0001
V=10.4, T=172
```

2.10 EZcal BACK TO EZCAL menu

This menu provides a return to displaying EZcal controller menus (in LEGACY or SMART mode); simply select the BACK TO EZCAL menu and press ENTER.



3.1 EZcal USB connection

The EZcal provides an industry standard “mini USB” connector which both powers the EZcal and allows for stored files to be accessed by a PC.

Files created on the EZcal (by SAVE, GETCURVE, etc) can be read by the PC; new files can also be stored in the EZcal from the PC (for later access by PGFLASH, LOAD, etc)

IMPORTANT: When changing files on the EZcal, do not disconnect until the change is complete; the EZcal will flash the display illumination when files are being changed by a PC connected via USB.

Be sure to properly “eject” the EZcal before disconnecting it; some computers do not properly finish writing files until the device is ejected.

The EZcal USB file storage can display filenames of more than 8 characters; however, files created on the EZcal (by SAVE, GETCURVE, etc) are limited to no more than 8 characters.

The USB connection also allows the EZcal itself to be updated, using programs available from PG Trionic, Inc; please see “EZcal Advanced Instructions”.

The EZcal can act as a USB serial device, enabling communication with a PG Trionic Inc controller from a PC running certain programs.

To use this feature:

- Connect the EZcal to the controller in the normal way
- Now also connect USB between the EZcal and the USB
- Wait for the EZcal to be fully connected (the USB storage drive window will display)
- Run a supported PG Trionic Inc program, go to the File menu and check the “Connect via EZcal” option

NOTE: Only a limited set of PG Trionic Inc programs can use the EZcal as a USB serial device.

Do not leave the EZcal connected via USB to a PC which goes to sleep (extra current drawn by the EZcal may drain batteries and cause the PC to switch off).