CS1171
User's Manual

Hand-Held Programmer

Document Number: 000434A
Revision: B

CONTROL SOLUTIONS LLC
INNOVATIVE SOLUTIONS FOR A WORLD IN MOTION
WWW.CONTROLS.COM
2520 DIEHL ROAD • AURORA, ILLINOIS 60502 • PHONE: (630) 806-7062 • FAX: (630) 806-7065

Warranty

For warranty information please refer to the following website: http://www.controls.com/index.php/support/warranty

Disclaimer

Control Solutions LLC reserves the right to update this manual at any time without notice. This manual supersedes all previous issues, which must no longer be used. Control Solutions LLC reserves the right to change this product without any notification.

Control Solutions LLC and the Control Solutions logo are trademarks of Control Solutions LLC.

All other brand and product names, company names, and logos are trademarks or registered trademarks of their respective companies.

All materials contained within this manual, in printed or electronic format, are protected by copyright laws and other intellectual property laws.

Control Solutions LLC
2520 Diehl Road
Aurora, Illinois 60502
Tel: (630) 806-7062
Fax: (630) 806-7065
Web: www.controls.com

Table of Contents	Page

List of Tables	Page

List of Figures	Page

This page intentionally left blank

Introduction

Before using the Hand-Held Programmer (HHP) please read this entire manual carefully to become familiar with the features, benefits and operation.

Purpose

This manual is intended to provide the information you will need to connect and use the CS1171 HHP.

Scope

This manual explains how to connect the CS1171 to various motor controllers. In addition it describes the CS1171 layout, buttons, menu items and usage. It also provides general care and maintenance as well as basic troubleshooting tips.

Revision History

Revision	Update
B	The format and information in this document has been enhanced and updated to provide a more user friendly experience.

Precautions

This document contains hazard statements for your safety. Hazard statements are provided where safety consequences to personnel, equipment, and operation may exist. Failure to follow these statements may result in serious consequences.

A standard set of icons are used to draw your attention to the appropriate type of statement. Refer to Figure 1 for sample icons and statements.

Warning

A warning statement indicates the presence of a hazard that can cause severe injury or death.

Caution

A caution statement indicates the presence of a hazard that can or will cause minor injury or property damage.

This symbol is used whenever there is relevant supplemental information.

Figure 1 - *Precaution Blocks*

Terms

Table 1 defines the abbreviations and acronyms used in this document.

Abbreviation – Acronym	Definition
CSLLC	Control Solutions Limited Liability Company
EM	Electromagnetic or Electromechanical
HHP	Hand-Held Programmer
LCD	Liquid Crystal Display
LED	Light Emitting Diode
PCB	Printed Circuit Board
POD	Power on Demand
PWM	Pulse Width Modulation
RJ	Registered Jack

Table 1 - *Abbreviations and Acronyms*

Definitions

None

References

Number	Description
DOC0000466A	CS1108 PWM Motor Controller User's Manual
DOC0001877A	CS1125 PWM Motor Controller User's Manual
--	HHP Error code url: www.controls.com/index.php/support/troubleshoot/hhp

Audience

This document was prepared for individuals that use the CS1171 HHP to program motor controllers or technicians performing maintenance on a motor controller.

Product Description

This section of the document provides an overview of the CS1171 HHP, supported features, specifications and kit content.

Overview

Control Solutions' CS1171 Hand-Held Programmer was designed to offer field programmability to the end user, dealer, and distributor of CSLLC Programmable Motor Controllers, or products containing them. See Figure 2.

Figure 2 - *CS1171 Hand-Held Programmer*

Features

The HHP serves as a valuable tool providing the following features:

- Flexibility of use
- Custom tailored driving characteristics
- Debugging features
- Special features to better match product performance with the customer

Additional Features

The CS1171 supports auto shut-off to conserve battery power and prevent inadvertent operation. This feature works by automatically powering down the HHP whenever the controller powers down.

Specifications

Table 2 lists select specifications for the CS1171 HHP.

Specification	Value	Unit
LCD Interface	16 x 2	Characters/Lines
Input Voltage	16 - 60	Volts (DC)
Unit Size	3.6 x 5.75 x 1.125	Inches
Unit Weight	4.8 (139)	Ounces (Grams)

Table 2 - *CS1171 Product Specifications*

Kit Content

Table 3 provides a list of the items that may be included when purchased as a kit.

Quantity	Item
1	CS1171 Hand-Held Programmer
1	User's Manual
1	Plastic hard shell foam-lined carrying case
1	8-pin to 8-pin 48" HHP Interface Cable
1	8-pin to 8-pin 5" HHP to Y-Adapter Cable
1	8-pin to 4-pin HHP Interface Cable*
1	CS1303 Y-Adapter
***** Included with dealer kit	

Table 3 - *Package Contents*

Please note the actual kit contents vary and are dependent upon the kit you purchase.

CS1171 Hand-Held Programmer

This section of the document describes the HHP layout, navigation and interface.

Unit Layout

The programmer contains a Liquid Crystal Display (LCD) and five button keypad on the front of the unit, and one RJ45 port on the back. See Figure 3 and Figure 4.

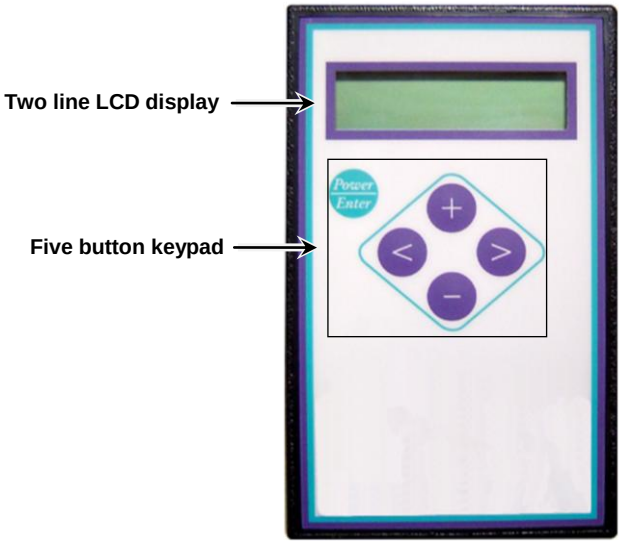


Figure 3 - *HHP Front*

Display

Information is output to the user through the 16 character x 2 line LCD display located on the front of the unit.

Input and Navigation

The user can review and configure controllers by navigating through a series of menus and options. Navigation is performed using the keypad buttons located on the front of the unit. Table 4 describes the function of each HHP keypad button.

Button	Meaning
Power Enter	This button only serves to power up or power down the unit. With most applications, the HHP will power up with the system.
<	This button is used to navigate to the Main Menu or set a parameter.
–	This button is used to scroll down through the menu list or decrement the current parameter.
+	This button is used to scroll up through the menu list or increment the current parameter.
>	This button is used to access a lower level menu or select a parameter to modify.

Table 4 - *HHP Navigation*

Cable Interface

The RJ45 port is located on the top middle back of the HHP unit. See Figure 4.

Figure 4 - *HHP Back*

Wiring Configurations

When using a non-display (refer to Figure 5 - Figure 9), the HHP must be directly connected to the controller. If the programming connector style is an 8-pin (RJ45 Telco type connector) and the display is connected to the same 8-pin connector, the display must be disconnected to use the HHP.

An intelligent display e.g. CS1151A or CS1161 must be used in conjunction with the HHP when using the CS1303 Y-Adapter or the HHP will not function. The CS1155 is not an intelligent display.

Table 5 lists the wiring configurations for Control Solutions motor controllers.

Controller Type	Configuration	Programming Connector	Programming Connector PCB Label	Motor Controller Type
CS1103	See Figure 5	8-pin Telco	JP2	Single
CS1106	See Figure 6	4-pin	JP1	Single
CS1107	See Figure 7	4-pin	J16	Single
CS1108	See Figure 5	8-pin Telco	JP1	Single
CS1109	See Figure 5	8-pin Telco	JP1	Single
CS1112	See Figure 6	4-pin	JP1	Single
CS1115	See Figure 8	4-pin	J2	Single
CS1117	See Figure 9	4-pin	J16	Quad
CS1125	See Figure 5	8-pin Telco	JP2	Single
CS1126	See Figure 5	8-pin Telco	JP2	Dual

Table 5 - *CSLLC Motor Controllers*

Figure 5 shows a Controller attached to the display unit through an 8-pin to 8-pin connection, the HHP through an 8-pin to 8-pin connector and the CS1303 Y-adapter connected to the HHP, intelligent display unit and the controller.

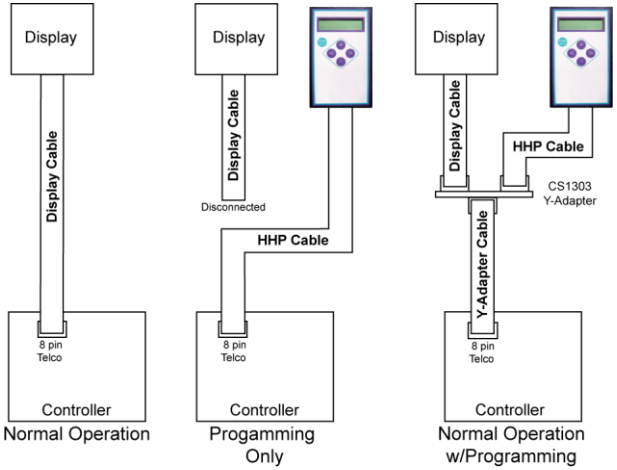


Figure 5 - *8-pin to 8-pin Connection*

Figure 6 shows a Controller attached to the display unit through an 8-pin to 8-pin connection and the display unit through the 8-pin to 8-pin connector with the HHP connected through an 8-pin to 4-pin cable.

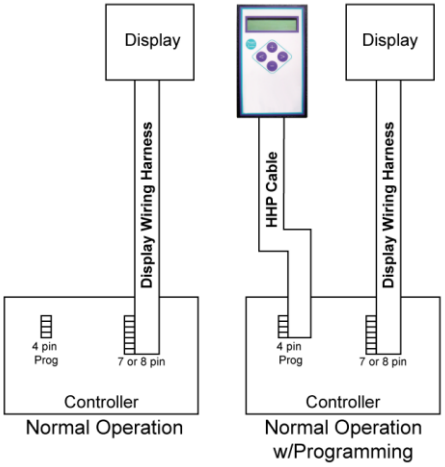


Figure 6 - *8-pin to 4-pin Connection*

Figure 7 shows a Display/Controller attached to an HHP through an 8-pin to 4-pin cable.

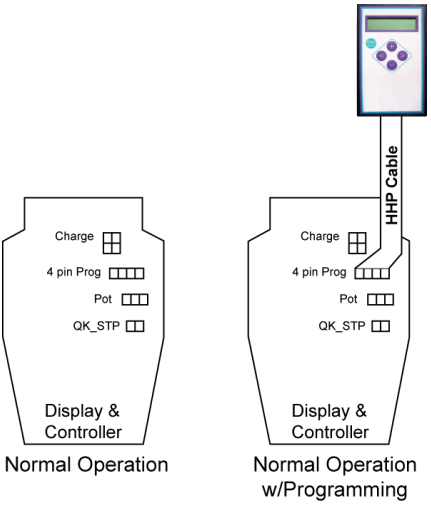


Figure 7 - *8-pin to 4-pin Connection to Display and Controller*

Figure 8 shows the CS1115 Motor Controller attached to an HHP through an 8-pin to 4-pin cable. The controller is also connected to a separate display unit.

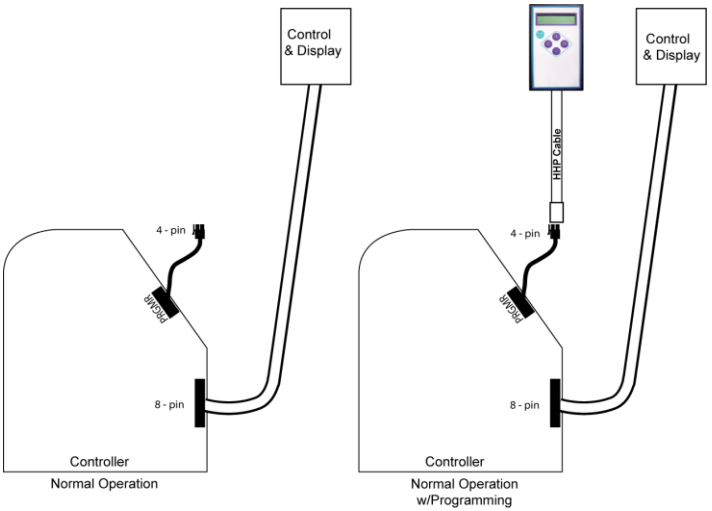


Figure 8 - *CS1115 Connection to Controller with Independent Display*

Figure 9 shows the CS1117 Motor Controller attached to an HHP through an 8-pin to 4-pin cable along with the switch panel.

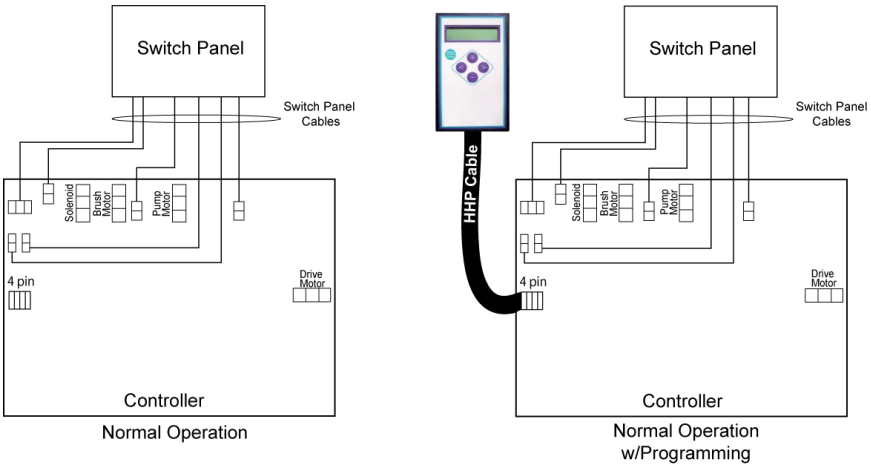


Figure 9 - *CS1117 Connection to Controller with Switch Panel*

Figure 10 shows an example of the CS1171 Hand-Held Programmer connected to the CS1108 PWM Motor Controller using the 8-pin to 8-pin Telco type interface.

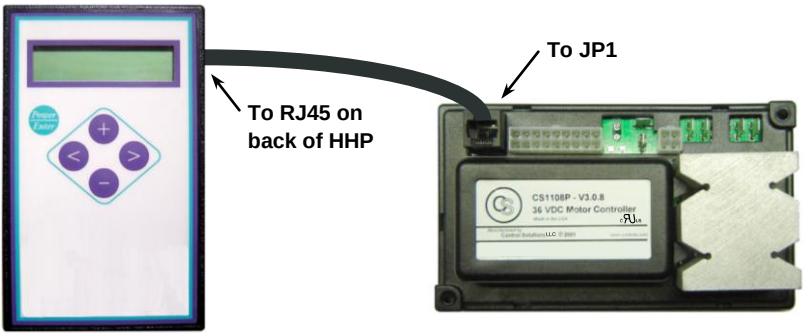


Figure 10 - *HHP Connection to CS1108*

Using the Hand-Held Programmer

Follow the directions below to prepare and use the CS1171 HHP.

1. Insert one end of the interface cable into HHP's 8-pin jack (RJ45).
2. With the controller turned **off**, connect the other end of the cable to the controller's **programming** port – refer to the **Wiring Configurations** section for details on your specific controller.
3. Turn on the Hand-Held Programmer by pressing the **Power/Enter** button, or by turning on the Controller using the key switch.

You must have an 8-pin connector on your controller to be able to use the HHP Power/Enter button for power-up.

4. If the HHP is compatible with the controller version, upon powering up the HHP, a splash screen **CS Programmer CS1171C OEM Vxxx** (for the OEM version) or **CS Programmer CS1171R DLR Vxxx** (for the Dealer version) is displayed for five seconds, followed by the **Main menu**. If the controller generates a fault code, the first menu item will be the controller's fault code followed by **FWD speed**. If no fault code is present, the first menu item is **FWD speed**. Powering up the controller with a fault code will not inhibit HHP functionality.

If the controller version is incompatible with the HHP version, the HHP will display **BAD REV! See user manual** for three seconds, and then the controller firmware version will be displayed **FW rev h xxx FW l xxx**, and HHP functions will be disabled. (See www.controls.com/index.php/support/troubleshoot/hhp for error code explanations.)

5. To modify a parameter:

Step	Action
1	Scroll through the Main menu using **+** to scroll up, and **–** to scroll down, until the parameter you wish to change is reached ☞ The parameter will blink when selected
2	Press **>** to select the parameter value
3	Press the **+** to increment/toggle the parameter or **–** to decrement/toggle the parameter value
4	Press **<** to save the value to the controller

Table 6 - *Modifying a Parameter*

As a parameter's value is modified, it is continuously updated to the controller so that its effect can be verified immediately. If power is lost to the controller or the HHP

Power/Enter button is pressed before the parameter is saved, the parameter may revert back to its previous value. (Refer to **Menus and Parameters** and **Parameter Information** for details on specific parameters).

You can rapidly scroll through menu parameters or increment/decrement parameter values by pressing and holding the **+** or **–** buttons.

6. To enter a menu other than the **Main menu**:

Step	Action
1	Scroll through the Main menu using **+** to scroll up, and **–** to scroll down, to the sub-menu you wish to enter ☞ Sub-menus are easy to recognize by the **>** after the menu name; when selected, the sub-menu name will blink
2	Press **>** to enter the sub-menu ☞ The first entry in all sub-menus is a return to the **< Main menu** item
3	Repeat the steps listed in the Table 6 to change a parameter within the sub-menu
4	Press **+** to scroll up to the **< Main menu** item
5	Press **<** to return to the Main menu

Table 7 - *Accessing a Sub-menu*

Refer to **Menus and Parameters** and **Parameter Information** for details on the specific menus.

7. When finished using your HHP, it can be turned off by:
   - Pressing the Power/Enter button on the HHP,
   - Disconnecting it from the controller or Y-Adapter, or
   - Turning off the controller power.

Menus and Parameters

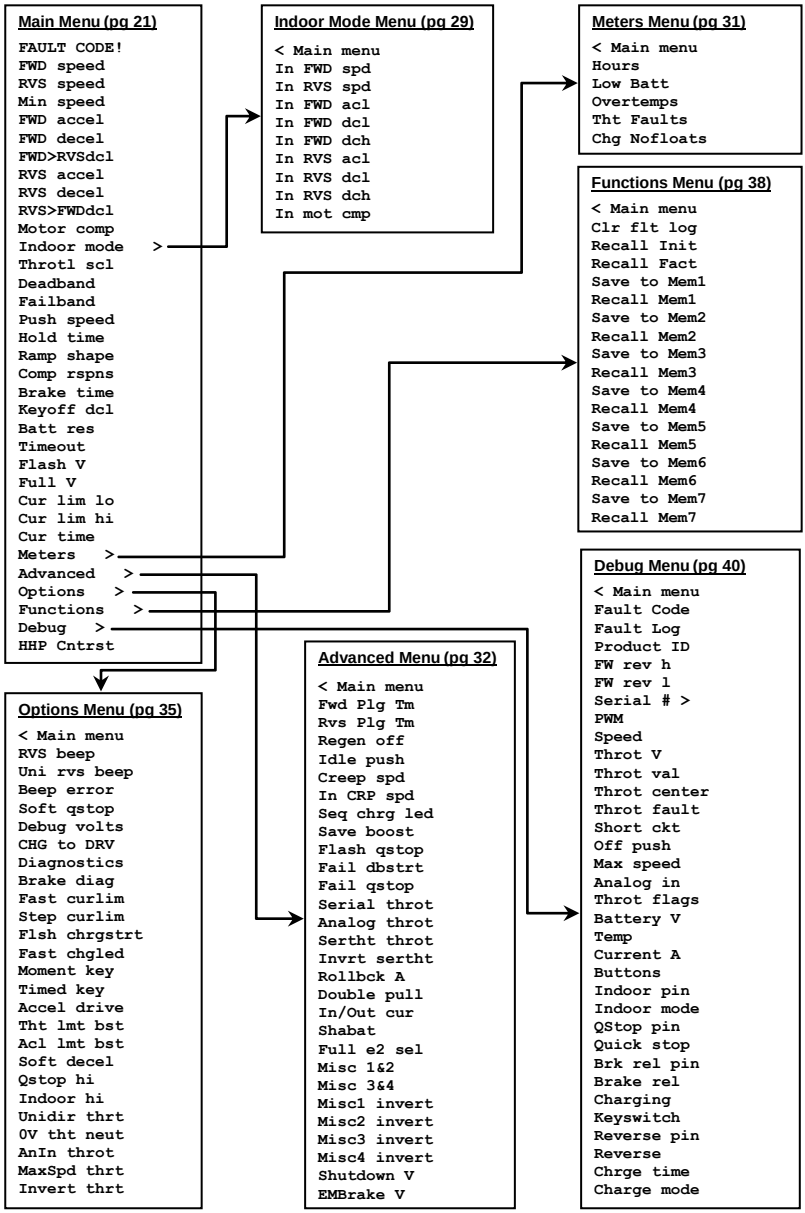


Figure 11 - *Menus and Parameters*

The above menu is from an "OEM" HHP. The descriptive information on the following pages can be used for both a Dealer and OEM HHP. See **Parameter Information** for additional parameter information.

This page intentionally left blank

Main Menu

Parameter	Description
FAULT CODE!	If the Hand-Held Programmer is powered up and the controller generates a fault code, the first menu item is the controller's fault code. When a fault code is displayed e.g. **12h**, the **>** button can be pushed to momentarily display the text associated with the error code e.g. **Em-brake Open**. When no fault code is present, the first menu item will be **FWD speed**. Powering up the controller with a fault code will not inhibit Hand-Held Programmer functionality.
FWD speed	Sets the percentage of the maximum forward speed allowed to the motor when the throttle has reached the full forward position and speed control is set to full speed.
RVS speed	Sets the percentage of the maximum reverse speed allowed to the motor when the throttle has reached the full reverse position and speed control is set to full speed.
Min speed	Sets the minimum percentage of speed for forward/reverse throttle when the Enhanced Deluxe Display Pot or ANIN input is at its lowest setting. If set to 0, and Enhanced Deluxe Display Pot is turned all of the way down, the forward/reverse speed is 0.
FWD accel	Sets the amount of forward acceleration. The higher the percent value, the faster the forward acceleration.
FWD decel	Sets the amount of forward deceleration. The higher the percent value, the faster the forward deceleration.
FWD>RVSdcl	Sets the amount of forward deceleration during a forward-to-reverse direction change of throttle. The higher the percent value, the faster the forward deceleration during a forward-to-reverse direction change of the throttle.
RVS accel	Sets the amount of reverse acceleration. The higher the percent value, the faster the reverse acceleration.
RVS decel	Sets the amount of reverse deceleration. The higher the percent value, the faster the reverse deceleration.
RVS>FWDdcl	Sets the amount of reverse deceleration during a reverse-to-forward direction change of throttle. The higher the percent value, the faster the reverse deceleration during a reverse-to-forward direction change of the throttle.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Motor comp</td><td>Sets the motor compensation which is the calibration value used to compensate speed control for varying terrain, also known as Power On Demand (POD). Set to 0 for no speed control compensation.

 
Warning
Setting this parameter too high can result in an over compensated drive motor that may behave erratically. Please seek advice from your manufacturer or dealer before attempting to calibrate this parameter. This feature should typically only be used by the manufacturer.

To calibrate:
<table><tr><th>Step</th><th>Action</th></tr><tr><td>1</td><td>Set Motor comp to 0</td></tr><tr><td>2</td><td>Set FWD speed to 50%</td></tr><tr><td>3</td><td>Drive at full throttle on flat terrain and measure vehicle speed</td></tr><tr><td>4</td><td>Drive at full throttle on a moderate incline and increase the Motor comp until the vehicle's speed matches the speed measurement in step 3</td></tr><tr><td>5</td><td>Verify that PWM is not 100% (monitor PWM in the Debug menu)</td></tr><tr><td>6</td><td>Is PWM is 100%?
• If yes, reduce FWD speed and continue with step 3
• If no, continue with the next step</td></tr><tr><td>7</td><td>Reduce the Motor comp value by 20% to allow for temperature tolerance of the motor and controller</td></tr></table></td></tr>
<tr><td>Indoor mode ></td><td>See Indoor Mode Sub-Menu on page 29.

Indoor Mode is also referred to as Drive Mode 2.</td></tr>
</table>

Parameter	Description
Throtl scl	Sets the throttle scale which determines the throttle pot voltage needed for full speed, and sets the amount of throttle movement necessary to obtain full throttle. See Figure 12.

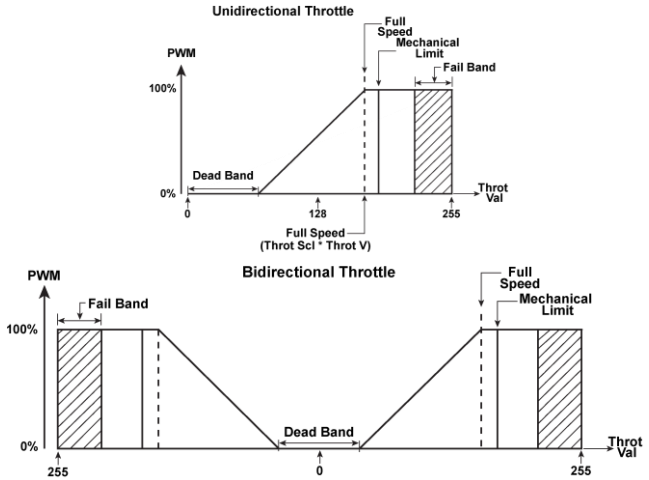


Figure 12 - *Throttle Scale*

Deadband	Sets the throttle pot range that the controller determines as neutral (See Figure 13).

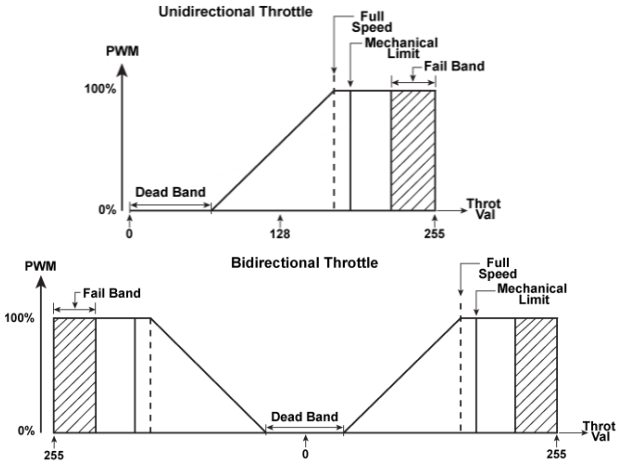
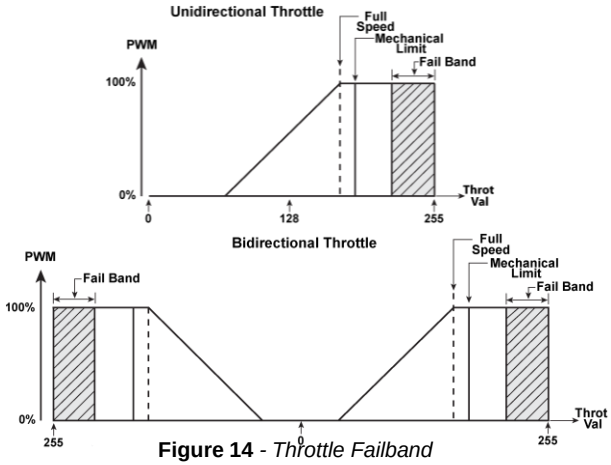


Figure 13 - *Throttle Deadband*

Parameter	Description
Failband	This is an area above the Throttle Scale value that disables the motor (See Figure 14). Throttle Failband provides a safety feature to protect against throttle shorts to ground or 5V, which could lead to dangerous runaways.  **Figure 14** - *Throttle Failband*
Push speed	Sets a percentage of the maximum allowable speed (**PWM**) to manually move the unit by releasing the electromagnetic brake. Increasing the percentage makes the unit easier to push. To work properly, the following conditions must be met: • The key switch must be off • The EM brake must be manually released • **Idle push** set to **off** **OR** • The key switch on • The EM brake is manually released • The throttle is idle • **Idle push** is set to **on**
Hold time	Sets the spasticity control which is used to filter unwanted fast changes in throttle input, or to smooth out the throttle feel. Higher hold time results in a more relaxed and filtered throttle response range.

Parameter	Description
Ramp shape	Sets the shape of throttle curves. This value is used to determine the ratio of linear to logarithmic shape on the throttle curve. A higher ramp shape value results in a more progressive throttle response when changing throttle inputs. A setting higher than **3** will usually roll off low end throttle response too far and is not recommended. Figure 15 shows the ramp shape curve with the ramp shape settings of 0, 1, 2, and 3.

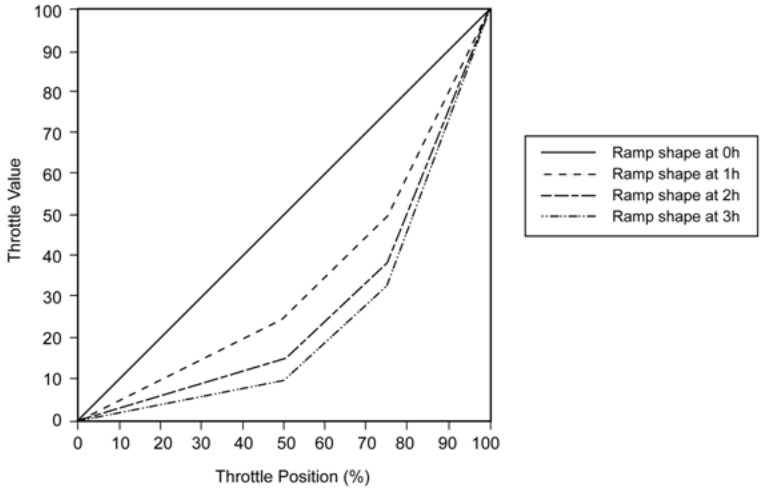


Figure 15 - *Ramp Shape Curve*

Comp rspns	Sets the Compensation Response in percent. A boost is progressively applied when surmounting obstacles such as inclines, doorway thresholds, bumps, etc. This boost is set by the parameter **Motor comp**. A higher value of **Comp rspns** results in a faster boost response time.
Brake time	Sets the nominal amount of time from when the motor **PWM=0** until the EM Brake is de-energized. This prevents EM braking before a complete stop.
Keyoff dcl	Sets a filter constant for key switch off or active quickstop condition. The higher the percentage, the faster the deceleration when the key switch is turned off while driving, or quickstop is asserted.

Parameter	Description
Batt res	Sets the resistance of the power wires. It's used to compensate the battery display for wiring drop at high current. It is typically calculated in milliohms: **Batt res value/3485.1485 = Resistance in ohms**
Timeout	The length of time before the controller powers down after inactivity. When set to **0**, the controller will not timeout.
Flash V	Sets the point when the battery voltage reaches the desired low voltage threshold. When the battery voltage reaches the value set by **Flash V**, an LED is flashed. The **Flash V** value is in volts.
Full V	Sets the desired point when the battery voltage level is considered to be fully charged. When using a multi-segmented LED, this voltage value indicates a full battery on the display. **Full V** is displayed in Volts.
Cur lim lo	Sets the Current Limit Lower Bound, maximum current allowable (in Amps). After the Current Limit Upper Bound threshold time is exceeded (Cur time) the motor controller will limit the maximum current to this value which protects the motor and supporting components. Due to tolerances in the drive system, it is recommended to verify the current limit. See Figure 16.

Warning Setting the current limit value too high can result in damage to the motor controller, as well as other components in the vehicle. Do not set this value higher than the maximum rated current for the motors, cables, batteries, and controller.

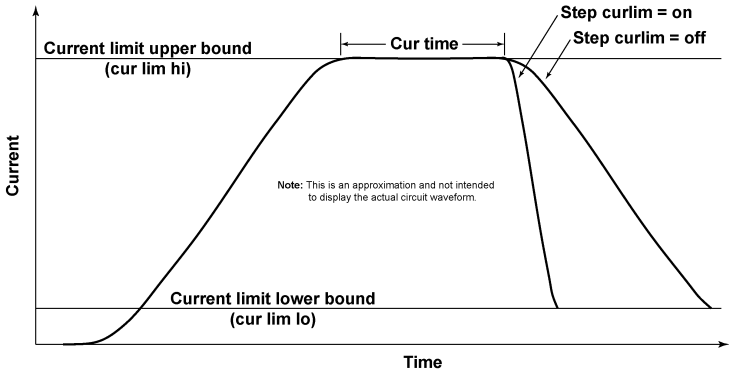


Figure 16 - *Current Parameter Relationships*

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Cur lim hi</td><td>Sets the Current Limit Upper Bound, maximum current allowable (in Amps). When initially current limiting, current will not exceed the upper bound. Due to tolerances in the drive system, it is recommended to verify the maximum current limit. See Figure 16.
To verify the maximum current limit:
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Stall the drive motor</td></tr>
<tr><td>2</td><td>Apply full throttle to the controller and measure the motor current with a calibrated DC clamp meter</td></tr>
<tr><td>3</td><td>If the current is:
Too high, decrement the Cur lim hi parameter by one
Too low, increment the Cur lim hi parameter by one
Acceptable, continue with step 6</td></tr>
<tr><td>4</td><td>Allow the controller to cool off for a minute or two</td></tr>
<tr><td>5</td><td>Go to step 1</td></tr>
<tr><td>6</td><td>Stop you have completed this procedure</td></tr>
</table>
Warning Setting the current limit value too high can result in damage to the motor controller, as well as other components in the vehicle. Do not set this value higher than the maximum rated current for the motors, cables, batteries, and controller. Refer to Table 8 for range values.</td></tr>
<tr><td>Cur time</td><td>Sets the delay time before a controller abruptly drops from the programmed maximum allowable current limit (Cur lim hi) to the lower current limit (Cur lim lo), when Step curlim is enabled. See Figure 16.</td></tr>
<tr><td>Meters ></td><td>See Meters Sub-Menu on page 31.</td></tr>
<tr><td>Advanced ></td><td>See Advanced Sub-Menu on page 32.</td></tr>
<tr><td>Options ></td><td>See Options Sub-Menu on page 35.</td></tr>
<tr><td>Functions ></td><td>See Functions Sub-Menu on page 38.</td></tr>
<tr><td>Debug ></td><td>See Debug Sub-Menu on page 40.</td></tr>
<tr><td>HHP Cntrst</td><td>Adjusts the Hand-Held Programmer’s LCD contrast.
0 = lightest; 50 = default; 100 = darkest</td></tr>
</table>

This page intentionally left blank

Indoor Mode Sub-Menu (Drive Mode 2)

The following Indoor Mode (Drive Mode 2) parameters will only be active if the controller's IN/OUT input is asserted (5V). If a controller does not have an IN/OUT input, these parameters are **not** used.

Parameter	Description
In FWD spd	Sets the percentage of the maximum indoor forward speed allowed to the motor when the throttle has reached the full forward position and speed control is set to full speed.
In RVS spd	Sets the percentage of the maximum indoor reverse speed allowed to the motor when the throttle has reached the full reverse position and speed control is set to full speed.
In FWD acl	Sets the amount of indoor forward acceleration. The higher the percent value, the faster the indoor forward acceleration.
In FWD dcl	Sets the amount of indoor forward deceleration. The higher the percent value, the faster the indoor forward deceleration.
In FWD dch	Sets the amount of indoor forward deceleration during a forward-to-reverse direction change of throttle. The higher the percent value, the faster the indoor forward deceleration during a forward-to-reverse direction change of the throttle.
In RVS acl	Sets the amount of indoor reverse acceleration. The higher the percent value, the faster the indoor reverse acceleration.
In RVS dcl	Sets the amount of indoor reverse deceleration. The higher the percent value, the faster the indoor reverse deceleration.
In RVS dch	Sets the amount of indoor reverse deceleration during a reverse-to-forward direction change of throttle. The higher the percent value, the faster the indoor reverse deceleration during a reverse-to-forward direction change of the throttle.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>In mot cmp</td><td>Sets the indoor motor compensation which is the calibration value used to compensate speed control for varying terrain, also known as Power On Demand (POD). Set to 0 for no speed control compensation.

To calibrate:

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>Set In mot cmp to 0</td></tr>
<tr><td>2</td><td>Set In FWD spd to 50%</td></tr>
<tr><td>3</td><td>Drive at full throttle on flat terrain and measure vehicle speed</td></tr>
<tr><td>4</td><td>Drive at full throttle on a moderate incline and increase the In mot cmp until the vehicle's speed matches the speed measurement in step 3</td></tr>
<tr><td>5</td><td>Verify that PWM is not 100% (monitor PWM in the Debug menu)</td></tr>
<tr><td>6</td><td>Is PWM is 100%?
• If yes, reduce FWD speed and continue with step 3
• If no, continue with the next step</td></tr>
<tr><td>7</td><td>Reduce the In mot cmp value by 20% to allow for temperature tolerance of the motor and controller</td></tr>
</table>

 
Setting this parameter too high can result in an over compensated drive motor that may behave erratically. Please seek advice from your manufacturer or dealer before attempting to calibrate this parameter. This feature should typically only be used by the manufacturer.</td></tr>
</table>

Meters Sub-Menu

The Meters Sub-Menu provides several useful entries that display various statistics.

Parameter	Description
Hours	Displays the number of hours the controller has operated.
Low Batt	Displays the number of hours the unit has operated with the battery voltage level below the low battery threshold.
Overtemps	Displays the number of over temperature conditions that have occurred.
Tht Faults	Displays the number of times a throttle failband failure occurred.
Chg Nofloats	Displays the number of times the charge cycle was ended early.

The above counts and timers do not roll over and cannot be cleared.

Advanced Sub-Menu

Parameter	Description
Fwd Plg Tm	The duration of time the motor is reversed after the quickstop input is activated while driving forward.
Rvs Plg Tm	The duration of time the motor is reversed after the quickstop input is activated while driving in reverse.
Regen off	Regenerative braking utilizes the fact that an electric motor can also act as a generator. The vehicle's motor is used as a generator during braking, conserving battery power. Setting this menu option to: • **On**, turns off regenerative braking • **Off**, turns on regenerative braking
Idle push	Idle push allows the unit to be manually pushed and limits the speed to a percentage defined by **Push speed**. To work properly, the following conditions must be met: • The key switch is on • The EM brake is manually released • The throttle is idle • **Idle push** is set to **on**
Creep spd	Sets drive mode 1 creep speed. It is the minimum PWM percentage applied to the motor output after the throttle exceeds Deadband. This setting helps prevent rollback on inclines when the brake releases with minimal throttle applied.  This setting should not be set too high to achieve proper low speed control on flat ground.
In CRP spd	Sets drive mode 2 creep speed. It is the minimum PWM percentage applied to the motor output after the throttle exceeds Deadband. This setting helps prevent rollback on inclines when the brake releases with minimal throttle applied and is active when IN/OUT input is asserted.  This setting should not be set too high to achieve proper low speed control on flat ground.

Parameter	Description
Seq chrg led	When set to **On**, cycles the battery status LEDs from the bottom segment to the top segment, with **charge complete** status indicated by flashing the top segment. Setting **Seq chrg led** to **Off** disables this feature. The display type used, determines how this option indicates a charge complete status.  An intelligent display with the ability to visually represent real time data is required to use **Seq chrg led**.
Save boost	When set to **On**, saves real-time motor compensation (boost) values and automatically reapplies them when stopping and restarting on an incline to prevent rollback. Boost values are not saved through a key switch power cycle.
Flash qstop	When set to **On**, while asserting a Quickstop, flashes the status LED on the controller at a constant 2Hz rate. If equipped with a display unit, also flashes the battery LEDs.
Fail dbstrt	When set to **On** or **Off**, it allows the status LED to display the appropriate error code.
Fail qstop	When set to **On**, with Quickstop asserted, allows the status LED to display the appropriate error code.
Serial throt	When set to **On**, configures the controller to respond to throttle from an Enhanced Deluxe Display.
Analog throt	When set to **On**, configures the controller to respond to an analog throttle directly connected to **TPOTC** input.
Sertht throt	When set to **On**, configures the controller to respond to the speed control pot from an Enhanced Deluxe Display as a throttle.
Invrt sertht	When set to **On** while **Sertht throt** is enabled, inverts the operation of the response to the speed control.
Rollbck A	Speeds up the activation of the EM brake when stopping on an incline. It should be set low enough for acceptable stopping performance on a nominal incline, but should not be set so low that the brake prematurely engages when stopping on flat ground or grass.
Double pull	When set to **On**, makes it necessary to activate the throttle mechanism twice to make the vehicle drive.

Parameter	Description
In/Out cur	When turned **On**, uses the upper bound current limit setting when in Outdoor mode, and the lower bound current limit setting when in Indoor mode.
Shabat	When turned **On**, and properly configured, the motor controller enters indoor mode and uses defined creep speed parameters.
Full e2 sel	When turned **On**, allows a section of memory to be accessed that stores creep speed information used by Shabat.
Misc 1&2	To configure these pins contact CSLLC, refer to page 53.
Misc 3&4	To configure these pins contact CSLLC, refer to page 53.
Misc1 invert	Inverts the operation state of the Misc 1 input.
Misc2 invert	Inverts the operation state of the Misc 2 input.
Misc3 invert	Inverts the operation state of the Misc 3 input.
Misc4 invert	Inverts the operation state of the Misc 4 input.
Shutdown V	Voltage level of the battery, that when reached, shuts down the controller.
EMBrake V	Sets the desired EM brake voltage. The EM brake output is pulse width modulated to achieve values lower than the actual battery voltage. Output is independent of the battery voltage, but can never be higher than the absolute battery voltage.

Options Sub-Menu

Parameter	Description
RVS beep	When set to **On**, enables a horn beep (if equipped) when the controller is in reverse.
Uni rvs beep	When set to **On**, enables a horn beep (if equipped) when the controller is in reverse – for unidirectional throttle only.
Beep error	When set to **On**, **Beep** enables a horn beep (if equipped) when a controller error code is present. The horn will pulse out the error code, similar to the LED modulation for an error code.
Soft qstop	When set to **On**, asserting the quick stop input triggers a programmable softer stop. When set to **Off**, asserting quick stop triggers an abrupt stop.
Debug volts	When set to **On**, a sample battery voltage is displayed. This is used for battery related testing and problem diagnosis. Turn **off** when finished with diagnostics.
CHG to DRV	When set to **On**, the controller jumps to drive mode when charging completes. If enabled, the key must be on to jump to drive mode. When set to **Off**, the controller turns off when charging completes.
Diagnostics	When set to **On**, the controller performs general power-up self-diagnostics. Diagnostics are not performed when powering up in charge mode.
Brake diag	When set to **On**, electromagnetic (EM) brake diagnostics are enabled at power-up and also during operation. When set to **Off**, diagnostics are not performed on the EM brake output. Most applications with an EM brake require this option to be enabled as part of compliance standards.
Fast curlim	When set to **On**, the current limit characteristic of the controller will recover quickly in response to motor current, versus a slower cutback and recover.
Step curlim	When set to **On**, the current limit decay function changes to an abrupt step function, such that after a time defined by **Cur time**; the current limit will drop from **Cur lim hi** to **Cur lim lo**. When set to **Off**, current limit will follow a normal linear decay function. See Figure 16.
Flsh chgstrt	When set to **On**, the status LED will flash when charging starts.

Parameter	Description
Fast chgled	A typical charging cycle will go through the following charging modes in order: 1. Pre-charge, 2. Charge Qualification, 3. Bulk Charge, 4. Top-off Charge, and 5. Float. The **Fast chgled** on/off setting determines when to flash the LED. When set to **On**, flash will occur at the end of Bulk Charge mode. When set to **Off**, flash will occur at the end of Top-off charge mode.
Moment key	When set to **On**, the system turns **On** and **Off** with a pushbutton or momentary contact of the key switch. When set to **Off**, the unit remains powered up only while the key switch remains closed, and powers down when the key switch contact is opened.
Timed key	When set to **On**, the unit will not power down immediately when key switch state indicates power down, but remains on for the duration defined by **Timeout**. When set to **Off**, the unit powers down as normal with no delays.
Accel drive	Used to configure throttle for acceleration control, instead of speed control. When set to **Off**, the controller interprets throttle as a conventional speed adjustment, where the direction and speed of the unit is determined by the displacement from center and the magnitude of the displacement. When set to **On**, a throttle displacement indicates acceleration to the controller. The unit accelerates proportional to this displacement, as long as it is present. Deceleration requires an equal and opposite displacement. **FWD/REV** input controls direction while **Accel drive** is **On**, which results in a hard stop when toggling direction.
Tht lmt bst	When set to **On**, motor compensation (boost) is limited by the absolute throttle position.
Acl lmt bst	When set to **On**, motor compensation (boost) is limited by the acceleration of the throttle position (change in throttle over time).
Soft decel	When set to **On**, negative (decelerating) boost is not applied, resulting in a soft deceleration.
Qstop hi	Depending on the module configuration quickstop can be wired as active (+5 V) or passive (GND). In a passive configuration: • When the parameter is **On**, quickstop is asserted when active. • When the parameter is **Off**, quickstop is asserted when the circuit is closed.

Parameter	Description
Indoor hi	When set to **On**, indoor input will be asserted on a high input instead of a low input.
Unidir thrt	When set to **On**, the full throttle displacement controls speed only, i.e. 0V to 5V (default forward), and direction is controlled by the FWD/RVS input. When set to **Off**, throttle displacement overrides the FWD/RVS input and controls speed and direction, i.e. 2.5V to 0V (default reverse) and 2.5V to 5V (default forward).
0V tht neut	When set to **On**, throttle neutral voltage will be 0V (typical 2-wire throttle, foot pedal control). When set to **Off**, throttle neutral voltage will be 2.5V (typical 3-wire throttle, wig-wag control).
AnIn throt	When set to **On**, the controller will respond to an analog max-speed control directly connected to the AnIn input. AnIn must be enabled.
MaxSpd thrt	When set to **On**, the controller will respond to a max-speed control on a Deluxe display.
Invert thrt	When set to **On**, throttle actuation is inverted such that a default forward actuation of the throttle results in reverse movement.

Functions Sub-Menu

Parameter	Description
Clr flt log	Clears all faults from the controller's Fault log.
Recall Init	Every time the HHP is powered up successfully, it stores the controller's current configuration. After changing various parameters, but before powering down the Hand-Held Programmer, this option can restore the controller's original configuration of all parameters. If the HHP power is turned off or lost, memory of the controller's configuration at the time of the last power-up is lost as well.
Recall Fact	Restores the factory default configuration of all parameters, if available (See **Troubleshooting and Diagnostics** on page 51 for details).
Save to Mem1	Stores the current configuration of all parameters to the Hand-Held Programmer's non-volatile memory. Overwrites any configuration currently stored. Values are not destroyed after recalling from memory to allow program-cloning of controllers. Values are only overwritten when **Save to Mem1** is used again.  Use this feature cautiously when program-cloning, so as not to inadvertently program many controllers with undesired values.
Recall Mem1	Restores the Hand-Held Programmer's stored configuration of all parameters from Memory 1.
Save to Mem2	Functions the same as **Save to Mem1** but stores to **Mem2**.
Recall Mem2	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem2**.
Save to Mem3	Functions the same as **Save to Mem1** but stores to **Mem3**.
Recall Mem3	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem3**.
Save to Mem4	Functions the same as **Save to Mem1** but stores to **Mem4**.
Recall Mem4	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem4**.
Save to Mem5	Functions the same as **Save to Mem1** but stores to **Mem5**.

Parameter	Description
Recall Mem5	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem5**.
Save to Mem6	Functions the same as **Save to Mem1** but stores to **Mem6**.
Recall Mem6	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem6**.
Save to Mem7	Functions the same as **Save to Mem1** but stores to **Mem7**.
Recall Mem7	Restores the Hand-Held Programmer's stored configuration of all parameters from **Mem7**.

Debug Sub-Menu

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Fault Code</td><td>Displays the controller's current fault code, if present. Will display 00 if no fault present.</td></tr>
<tr><td>Fault Log</td><td>Displays the controller's most recent fault log. To access the log:
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>On the HHP from the Main menu, scroll down to the Debug > menu parameter</td></tr>
<tr><td>2</td><td>Press > to enter the Debug menu</td></tr>
<tr><td>3</td><td>Scroll down to the Fault Log parameter</td></tr>
<tr><td>4</td><td>Press > to select the parameter</td></tr>
<tr><td>5</td><td>Press + to access the next fault, or – to access the previous fault</td></tr>
</table>

When a fault code is displayed, the > can be pushed to momentarily display the text associated with the error code.
Up to 16 faults can be stored. FF or 00 represent a blank fault log location. (See www.controls.com/index.php/support/troubleshoot/hhp for error code explanations on all controllers)</td></tr>
<tr><td>Product ID</td><td>Displays the controller's 4-digit CS product identification (e.g. CS1108 would display 1108).</td></tr>
<tr><td>FW rev h</td><td>Displays the firmware revision of the controller.</td></tr>
<tr><td>FW rev l</td><td>Displays the firmware revision of the controller.</td></tr>
<tr><td>Serial # ></td><td>Displays the controller's serial number. To access the serial number:
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1</td><td>On the HHP from the Main menu, scroll down to the Debug > menu parameter</td></tr>
<tr><td>2</td><td>Press > to enter the Debug menu</td></tr>
<tr><td>3</td><td>Scroll down to the Serial # > parameter</td></tr>
<tr><td>4</td><td>Press > to select the parameter</td></tr>
<tr><td>5</td><td>Press < to return to the Debug menu</td></tr>
</table></td></tr>
<tr><td>PWM</td><td>Displays in real time, the set PWM duty cycle percent of the drive system output (M1+/M1- motor terminals).</td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Speed</td><td>Displays in real time the speed percentage that the controller attempts to maintain.</td></tr>
<tr><td>Throt V</td><td>Displays in real time the throttle input voltage in volts. There is a two place decimal point that is not displayed on the programmer, so a displayed value of 0100 would equal 1.00V, and a displayed value of 0250 would equal 2.50V.</td></tr>
<tr><td>Throt val</td><td>Displays in real time the absolute throttle percentage from neutral with respect to the throttle input range.</td></tr>
<tr><td>Throt center</td><td>Displays in real time when the throttle is in the center position.</td></tr>
<tr><td>Throt fault</td><td>Displays in real time when there is a throttle fault.</td></tr>
<tr><td>Short ckt</td><td>Displays in real time if there is a short circuit in the motor circuit.</td></tr>
<tr><td>Off push</td><td>Displays in real time, On if the vehicle is being pushed while the key is off and charging mode is off.</td></tr>
<tr><td>Max speed</td><td>Displays in real time the set maximum speed percentage, which can be set by an intelligent display (CS1151A, CS1161). Check Throt flags to see which input is used to set Maximum Speed.</td></tr>
<tr><td>Analog in</td><td>Displays in real time the Analog input voltage relative to the controller’s +5V power supply, in terms of percentage.</td></tr>
<tr><td>Throt flags</td><td>Displays different throttle and max speed option configurations. Enabled = 1, Disabled = 0. They are defined as follows:
<table>
<tr><th>No.</th><th>Option(s)</th><th>Hex Code</th><th>Description</th></tr>
<tr><td>1</td><td>Inverted Throttle</td><td>01</td><td>Changes the driving throttle actuation so that a normal forward actuation of the throttle results in reverse operation from the controller</td></tr>
<tr><td>2</td><td>Max Speed = Analog Input</td><td>04</td><td>Enables analog input to be used for max speed control</td></tr>
<tr><td>3</td><td>Max Speed = Max Speed</td><td>10</td><td>Enables max speed input to be used for max speed control</td></tr>
<tr><td>4</td><td>Max Speed = Serial throt</td><td>40</td><td>Enables Serial throt input to be used for max speed control</td></tr>
<tr><td>5</td><td>1 & 2</td><td>05</td><td>(See 1 & 2 above)</td></tr>
<tr><td>6</td><td>1 & 3</td><td>11</td><td>(See 1 & 3 above)</td></tr>
<tr><td>7</td><td>1 & 4</td><td>41</td><td>(See 1 & 4 above)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Battery V</td><td>If Debug volts is enabled, Battery V displays in real time the battery voltage. Otherwise, it displays the battery capacity. There is a two place decimal point that is not displayed on the programmer, so a displayed value of 0100 would equal 1.00V, and a displayed value of 0250 would equal 2.50V.</td></tr>
<tr><td>Temp</td><td>Displays in real time the temperature of the drive FET transistors.</td></tr>
<tr><td>Current A</td><td>Displays in real time the motor current in Amps.</td></tr>
<tr><td>Buttons</td><td>Each one of the eight bits that make up the hexadecimal value represents one button on a deluxe display. A button pressed = 0, not pressed = 1. They are defined as follows:
<table>
<tr><th>Bit 8</th><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th></tr>
<tr><td>Break Release</td><td>Seat Up</td><td>Head light</td><td>Seat Down</td><td>Right Turn Signal</td><td>Speed Up</td><td>Left Turn Signal</td><td>Speed Down</td></tr>
</table>
If only one button is pressed at a time, the hexadecimal codes displayed will be as follows:
<table>
<tr><th>Break Release</th><th>Seat Up</th><th>Head light</th><th>Seat Down</th><th>Right Turn Signal</th><th>Speed Up</th><th>Left Turn Signal</th><th>Speed Down</th></tr>
<tr><td>7F</td><td>BF</td><td>DF</td><td>EF</td><td>7F</td><td>FB</td><td>FD</td><td>FE</td></tr>
</table>
If more than one button is pressed at a time, a combination of bits will be 0 at the same time. There are 255 possible combinations. This feature can be helpful to determine which button(s) may be stuck down on a deluxe display e.g. FF = no buttons pressed, FE = Speed Down, FC = Speed Down and Left Turn Signal, 00 = All Buttons presses.</td></tr>
<tr><td>Indoor pin</td><td>Displays in real time whether the Indoor mode (drive mode 2) is on or off.</td></tr>
<tr><td>Indoor mode</td><td>Displays in real time, On when in Indoor mode (drive mode 2).</td></tr>
<tr><td>QStop pin</td><td>Displays in real time, if the controller is seeing a quick stop input.</td></tr>
<tr><td>Quick stop</td><td>Shows On when Quick Stop is active.</td></tr>
<tr><td>Brk rel pin</td><td>Displays in real time, On when the controller sees a high external brake release input.</td></tr>
<tr><td>Brake rel</td><td>Displays in real time, On when Brake Release is active.</td></tr>
<tr><td>Charging</td><td>Displays in real time, On when Charge Mode is active.</td></tr>
</table>

Parameter	Description
Keyswitch	Displays in real time whether the controller detects a key switch.
Reverse pin	Displays **On** when the controller detects an active reverse input.
Reverse	Displays **On** when the Reverse input is active.
Chrge time	Displays elapsed time for the current Charging Mode. Time resets for every Charging Mode change. For Charging Time in hours and minutes, convert from hexadecimal using Figure 17.
Charge mode	Indicates current mode of operation while charging. Codes are as follows: **00** = Pre-charge, **02** = Charge qualification/Bulk charge, **04** = Top-Off charge, and **08** = Float charge.

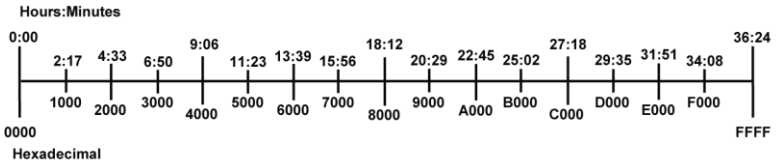


Figure 17 - *Charging Time Conversion*

This page intentionally left blank

Parameter Information

Table 8 - Table 14 provide a listing of the HHP parameters and their read/write (R/W) capability, range, unit of measure and whether the parameter is dynamic. The last column of each table indicates whether the parameter can be modified by the OEM HHP, Dealer HHP, or both. The column key for HHP is:

O = OEM only
B = OEM and Dealer

Main Menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
FAULT CODE!	Read only	00-FF	Hex	Y	B
FWD speed	Y	0-100	%	N	B
RVS speed	Y	0-100	%	N	B
Min speed	Y	0-100	%	N	O
FWD accel	Y	0-100	%	N	B
FWD decel	Y	0-100	%	N	B
FWD>RVSdcl	Y	0-100	%	N	B
RVS accel	Y	0-100	%	N	B
RVS decel	Y	0-100	%	N	B
RVS>FWDdcl	Y	0-100	%	N	B
Motor comp	Y	0-240	Decimal	N	B
Indoor mode >	–	–	–	–	B
Throtl scl	Y	0-255	Decimal	N	O
Deadband	Y	0-255	Decimal	N	O
Failband	Y	0-255	Decimal	N	O
Push speed	Y	0-100	%	N	O
Hold time	Y	0-100	%	N	O
Ramp shape	Y	0-15	Decimal	N	O
Comp rspns	Y	0-100	%	N	O
Brake time	Y	0.00-2.55	–	N	B
Keyoff dcl	Y	0-100	%	N	O
Batt res	Y	0-255	†Coefficient	N	O
Timeout	Y	0-240	Minutes	N	B
Flash V	Y	18-23	Volts	N	B
Full V	Y	23.1-26	Volts	N	B
†**Note:** Refer to the parameter description on page 26					

Main Menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Cur lim lo	Y	1.2-292.5	Amps	N	O
Cur lim hi	Y	1.2-292.5	Amps	N	O
Cur time	Y	1-253	–	N	O
Meters >	–	–	–	–	B
Advanced >	–	–	–	–	O
Options >	–	–	–	–	B
Functions >	–	–	–	–	B
Debug >	–	–	–	–	B
HHP Cntrst	Y	0-100	%	N	B

Table 8 - *HHP Main Menu Parameter Reference*

Indoor Mode Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
In FWD spd	Y	0-100	%	N	B
In RVS spd	Y	0-100	%	N	B
In FWD acl	Y	0-100	%	N	B
In FWD dcl	Y	0-100	%	N	B
In FWD dch	Y	0-100	%	N	B
In RVS acl	Y	0-100	%	N	B
In RVS dcl	Y	0-100	%	N	B
In RVS dch	Y	0-100	%	N	B
In mot cmp	Y	0-240	Decimal	N	B

Table 9 - *HHP Indoor Mode Sub-menu Parameter Reference*

Meters Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Hours	Read only	0-65535.9	Hours	Y	B
Low Batt	Read only	0-255:59	Hours:Minutes	Y	B
Overtemps	Read only	0-255	Decimal	Y	B
Tht Faults	Read only	0-255	Decimal	Y	B
Chg Nofloats	Read only	0-255	Decimal	Y	B
Note: Counters and timers do not roll over or reset.					

Table 10 - *HHP Meters Sub-menu Parameter Reference*

Advanced Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Fwd Plg Tm	Y	0.00-10.20	Seconds	N	O
Rvs Plg Tm	Y	0.00-10.20	Seconds	N	O
Regen off	Y	On/off	–	N	O
Idle push	Y	On/off	–	N	O
Creep spd	Y	0-100	%	N	O
In CRP spd	Y	0-100	%	N	O
Seq chrg led	Y	On/off	–	N	O
Save boost	Y	On/off	–	N	O
Flash qstop	Y	On/off	–	N	O
Fail dbstrt	Y	On/off	–	N	O
Fail qstop	Y	On/off	–	N	O
Serial throt	Y	On/off	–	N	O
Analog throt	Y	On/off	–	N	O
Sertht throt	Y	On/off	–	N	O
Invrt sertht	Y	On/off	–	N	O
Rollbck A	Y	0.0-621.7	Amps	N	O
Double pull	Y	On/off	–	N	O
In/Out cur	Y	On/off	–	N	O
Shabat	Y	On/off	–	N	O
Full e2 sel	Y	On/off	–	N	O
Misc 1&2	Y	00-FF	Hex	N	O
Misc 3&4	Y	00-FF	Hex	N	O
Misc1 invert	Y	On/off	–	N	O
Misc2 invert	Y	On/off	–	N	O
Misc3 invert	Y	On/off	–	N	O
Misc4 invert	Y	On/off	–	N	O
Shutdown V	Y	3.58-29.94	Volts	N	O
EMBrake V	Y	0-45.72	Volts	N	O

Table 11 - *HHP Advanced Sub-menu Parameter Reference*

Options Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
RVS beep	Y	On/off	–	N	B
Uni rvs beep	Y	On/off	–	N	O
Beep error	Y	On/off	–	N	O
Soft qstop	Y	On/off	–	N	O
Debug volts	Y	On/off	–	N	B
CHG to DRV	Y	On/off	–	N	O
Diagnostics	Y	On/off	–	N	O
Brake diag	Y	On/off	–	N	O
Fast curlim	Y	On/off	–	N	O
Step curlim	Y	On/off	–	N	O
Flsh chgstrt	Y	On/off	–	N	O
Fast chgled	Y	On/off	–	N	O
Moment key	Y	On/off	–	N	O
Timed key	Y	On/off	–	N	O
Accel drive	Y	On/off	–	N	O
Tht lmt bst	Y	On/off	–	N	O
Acl lmt bst	Y	On/off	–	N	O
Soft decel	Y	On/off	–	N	O
Qstop hi	Y	On/off	–	N	O
Indoor hi	Y	On/off	–	N	O
Unidir thrt	Y	On/off	–	N	O
0V tht neut	Y	On/off	–	N	O
AnIn throt	Y	On/off	–	N	O
MaxSpd thrt	Y	On/off	–	N	O
Invert thrt	Y	On/off	–	N	O

Table 12 - *HHP Options Sub-menu Parameter Reference*

Functions Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Clr flt log	Y	Y/N	–	N	B
Recall Init	Y	Y/N	–	N	B
Recall Fact	Y	Y/N	–	N	B
Save to Mem1	Y	Y/N	–	N	B
Recall Mem1	Y	Y/N	–	N	B
Save to Mem2	Y	Y/N	–	N	B
Recall Mem2	Y	Y/N	–	N	B
Save to Mem3	Y	Y/N	–	N	B
Recall Mem3	Y	Y/N	–	N	B
Save to Mem4	Y	Y/N	–	N	B
Recall Mem4	Y	Y/N	–	N	B
Save to Mem5	Y	Y/N	–	N	B
Recall Mem5	Y	Y/N	–	N	B
Save to Mem6	Y	Y/N	–	N	B
Recall Mem6	Y	Y/N	–	N	B
Save to Mem7	Y	Y/N	–	N	B
Recall Mem7	Y	Y/N	–	N	B

Table 13 - *HHP Functions Sub-menu Parameter Reference*

Debug Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Fault Code	Read only	00-FF	Hex	N	B
Fault Log	Read only	00-FF	Hex	N	B
Product ID	Read only	–	–	N	B
FW rev h	Read only	00-FF	Hex	N	B
FW rev l	Read only	00-FF	Hex	N	B
Serial # >	Read only	–	–	N	B
PWM	Read only	0-100	%	Y	***B**
Speed	Read only	0-100	%	Y	O
Throt V	Read only	0-5	Volts	Y	B
Throt val	Read only	0-100	%	Y	B
Throt center	Read only	On/off	–	Y	B
Throt fault	Read only	On/off	–	Y	B
***Note**: Different order to menu items					

Debug Sub-menu					
Parameter	**R/W**	**Range**	**Measure**	**Dynamic**	**HHP**
Short ckt	Read only	On/off	–	Y	O
Off push	Read only	On/off	–	Y	O
Max speed	Y	0-100	%	Y	B
Analog in	Read only	0-100	%	Y	B
Throt flags	Read only	✲00-FF	Hex	Y	B
Battery V	Read only	0-99	Volts	Y	B
Temp	Read only	-20 to +147	°C	Y	B
Current A	Read only	-999.9 to +999.9	Amps	Y	B
Buttons	Read only	00-FF	Hex	Y	B
Indoor pin	Read only	On/off	–	Y	B
Indoor mode	Read only	On/off	–	Y	B
QStop pin	Read only	On/off	–	Y	O
Quick stop	Read only	On/off	–	Y	B
Brk rel pin	Read only	On/off	–	Y	O
Brake rel	Read only	On/off	–	Y	B
Charging	Read only	On/off	–	Y	B
Keyswitch	Read only	On/off	–	Y	O
Reverse pin	Read only	On/off	–	Y	O
Reverse	Read only	On/off	–	Y	B
Chrge time	Read only	0000-FFFF	Hex	Y	B
Charge mode	Read only	00-08	Hex	Y	B
✲**Note**: Bit mapped					

Table 14 - *HHP Debug Sub-menu Parameter Reference*

Troubleshooting and Diagnostics

The most current information is always available from the Control Solutions website. Table 15 provides direct links to the web page for CS1171 Error Displays and related troubleshooting information.

Product	Website URL
Hand-Held Programmer	http://www.controls.com/index.php/support/troubleshoot/hhp

Table 15 - *Troubleshooting URL*

This page intentionally left blank

Contacting Customer Service

Customer Service is a top priority at Control Solutions. We are committed to being a leader in our industries, while providing our customers with superior quality, value, and service. We are here to help you find answers to your Control Solutions LLC related questions.

If you have any questions, experience technical problems, need any parts or service, contact Control Solutions LLC Customer Service during normal business hours (Mon-Fri, 8am-5pm Central Time) at (630) 806-7062.

This page intentionally left blank

Parameter Setting Worksheet

Use the following worksheet to document your parameter values.

Parameter	Value	Parameter	Value	Parameter	Value
Main Menu	--	In FWD acl		Misc2 invert	
FWD speed		In FWD dcl		Misc3 invert	
RVS speed		In FWD dch		Misc4 invert	
Min speed		In RVS acl		Shutdown V	
FWD accel		In RVS dcl		EMBrake V	
FWD decel		In RVS dch		**Options Menu**	--
FWD>RVSdcl		In mot cmp		RVS beep	
RVS accel		**Advanced Menu**	--	Uni rvs beep	
RVS decel		Fwd Plg Tm		Beep error	
RVS>FWDdcl		Rvs Plg Tm		Soft qstop	
Motor comp		Regen off		Debug volts	
Throtl scl		Idle push		CHG to DRV	
Deadband		Creep spd		Diagnostics	
Failband		In CRP spd		Brake diag	
Push speed		Seq chrg led		Fast curlim	
Hold time		Save boost		Step curlim	
Ramp shape		Flash qstop		Flsh chrgstrt	
Comp rspns		Fail dbstrt		Fast chgled	
Brake time		Fail qstop		Moment key	
Keyoff dcl		Serial throt		Timed key	
Batt res		Analog throt		Accel drive	
Timeout		Sertht throt		Tht lmt bst	
Flash V		Invrt sertht		Acl lmt bst	
Full V		Rollbck A		Soft decel	
Cur lim lo		Double pull		Qstop hi	
Cur lim hi		In/Out cur		Indoor hi	
Cur time		Shabat		Unidir thrt	
HHP Cntrst		Full e2 sel		0V tht neut	
Indoor Menu	--	Misc 1&2		AnIn throt	
In FWD spd		Misc 3&4		MaxSpd thrt	
In RVS spd		Misc1 invert		Invert thrt	

Registered to
ISO 9001

CONTROL SOLUTIONS LLC®
INNOVATIVE SOLUTIONS FOR A WORLD IN MOTION
WWW.CONTROLS.COM
2520 DIEHL ROAD • AURORA, ILLINOIS 60502 • PHONE: (630) 806-7062 • FAX: (630) 806-7065