Generation 3 Controller
Advanced Programming Guide
(For External Release)

May 12, 2021

v1.0.8

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Table of Contents

INMOTION

A Caldwell Company

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 6 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   **Page 7 of 161**

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Document Revisions

Revision	Release Date	Description
1.0.0	Sep 22, 2020	Initial release
1.0.1	Oct 2, 2020	Fixed typos in "Soft Touch" Tuning
1.0.2	Nov 19, 2020	Added info on "hard current limit" vs "Soft Touch"
1.0.3	Mar 15, 2021	TLE update with firmware v0.7.2
1.0.4	Mar 22, 2021	Updated TLE Tech Brief
1.0.5	Mar 24, 2021	Fixed some typos & added a recommended command to the TLE docs
1.0.6	Apr 6, 2021	Adjusted command order in TLE Mitigation tech brief
1.0.7	Apr 8, 2021	Fixed typos in the IOS BLE section
1.0.8	May 12, 2021	Fixed page order in Pulley Diameter Tech Brief

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

G3 Firmware Revisions

Revision	Release Date	Description
0.7.2 (latest)	Mar 11,2021	Maintenance release to address "TLE" over-current/temp issue. • "hfi" help command added for "TLE" issues • Help commands "avi", "maxc" and "acdc" added • Config command "spl" added • "c all reset" updated to preserve "spl" and "hfi" settings • "TLE" over-current/temps counts tracked in flash • G3 LED color code updated • Panel 1 mass increased to 50,000/100,00lbs (Oneway/Bipart)
0.7.1	Aug 28, 2020	Functionally identical to the v0.7.0 release. Updated 4 parameters to use new defaults. **Command** **v0.7.1 New Defaults** **v0.7.0 Defaults** osp 4.0000 IPS 4.5000 IPS csp 4.0000 IPS 4.5000 IPS fpce 470mA 430mA fpthr 10 counts 5 counts
0.7.0	Aug 21, 2020	"Special Features" release for G3 K12. G3 K02 is not supported. • Entertainment, Close Behind, Simplicity & Motion Assist modes • UL325 closing force reduced by 35% over v0.6.7 • Improved security, delayed mag brake, manual span adjust, etc • Integrated cycle testing • Profile bin resolution increased by 300%. • Cleaner CLI interface optimized for smart phone access
0.6.7 (K12) 0.5.91(K02)	Dec 3, 2019	Initial production release for G3 supporting basic door functions only using wired & wireless accessories. Processors K02 & K12 supported.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

If you READ nothing else, read this…

- Prior to installing an INMOTION G3 system verify the mechanical installation is 100% operational.
    - All panels move smoothly, without excessive force required at all points across the span
    - The frame is square & plumb, and the lead panel meets the jam evenly top to bottom.
    - All required weather stripping is installed properly and not binding during panel movement.
    - Panels are NOT warped, and panel pickups release and operate smoothly without issues.
    - Interlocks engage and disengage properly without dragging extra panels etc.
    - In a nutshell the door should be at its mechanical "best" before automation is installed
- NEVER leave a door running on a Cycle Test unattended…even for a minute, unless it is in a controlled environment completely void of people and pets.
- DO NOT experiment with commands you find in this guide unless you know what you are doing or have been directed to do so by a trained factory representative.
- Remember the G3 has been certified by UL to be safe, but that only applies if it has been installed safely by the installer.
- If you have any question or concerns, please consult the factory.
- Remember INMOTION offers free training, year-round, all you have to do is ask.

About this Guide…

This guide documents the more advanced options and features of the G3 Controller by INMOTION. It covers the G3 Controller with v0.7.0 or later firmware. This release added 4 "special feature" modes besides the "normal" mode present in the previous release. In addition, there is a cycle test option available to integrators and installers that can exercise the G3 while running any of the 5 supported modes for testing, option enabling or tuning.

When the G3 first boots, it is operating at the "user" level, and no password is required. In this mode, all commands to operate the door must come from wired or wireless accessories such as wall switches and remotes or from a home automation system wired into the wall switch circuit.

To access any of the advanced mode options, called modifiers, a password is required. The password entered will set the user level. The current user / password level can be checked at any time by entering the command "**pwd**" or "**p**" on the CLI. The current level will be displayed on the CLI.

Supported User Levels	
☑	User
☑	Installer
☑	Developer
☑	Factory

In this guide each page will indicate what user level is required for the given command or function by the graphic shown. A checkmark next to the various levels indicate which user levels can call or modify the command or function documented.

Installers have access to the User, Installer and Developer levels by entering the appropriate password. The difference between the Installer and Developer levels is that some commands change such that the Installer level will not accidentally erase critical door programming information causing more work than necessary. If an installer needs to access one these protected commands, they only need to change to the Developer level to perform the task. For general and advanced programming, the Installer password will work for 99% of the tasks required.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Terms Used in this Document

List of terms, definitions and equivalent terminology that will be used interchangeably throughout this document

Terms	Definition & Equivalent Terms
90 Degree	Installation where panels meet in a corner and open 90 from each other
Bi-Part	Installation where panels part in the middle and go left and right
CLI	Command Line Interface. Configuration method use by the G3
Clutch	Connects or disconnects motor from the G3 belt drive system
Config Commands	CLI persistent settings that affect the function, options, or behavior of a G3
cT	Short for the Cycle Test function
Developer	Same as Installer but with access to more technical CLI commands
Egress Mode	"Close Behind Mode"
Encoder	Digital count used by the G3 to determine panel position in the span
Factory	INMOTION support personnel for the G3 & G3 Accessories
Flashing	Act of installing the "code" that runs inside a G3 or G3 accessory.
Friction Fault	Same as "Soft Touch" or over-current
Friction Profile	Recorded motor power measurements across a door span
G1	INMOTION's first Generation (544/545) Single & Dual Motor Controllers
G2	INMOTION's previous Generation 2 (561) Single Motor Controller
G3	INMOTION's Generation 3 Controller or *this* controller
Help Commands	CLI informative commands that do not persist system changes after a reboot
High Friction Install	HFI refers to an installation that has a high friction load (very heavy pull required)
Installer	Trained or Untrained technician servicing a G3 automation system
Jam	Position where panel 1 is closed with fully engaged weatherstrip
Mag Brake	Magnetic brake that holds panel positions using an electro-magnet
Move Assist	Eq: "Motion Assist Mode" Powered move upon a slight manual panel movement
Normal Mode	Normal runtime mode when no special features such as Egress are enabled
One Button Operation	"Simplicity Mode", "ADA Mode". Single button for Open, Close & Stop
One-Way	Installation where panels open left to right or right to left only
Operator	Homeowner/End User or Installer when operating or testing a G3 system
Partial Move	A mid-span panel move. Moves that do not start at the programmed open or close
Party Mode	Open on motion. "Entertainment Mode"
Persistent	Refers to parameters that are saved and restored after a power loss or reboot
Programming	Act of configuring a G3 Controller for a particular door frame or installation
Reboot	Restarting or power cycling a G3 or component. A form of "reset"
Soft Touch	Stopping the door when movement is impeded by object or person for safety
Span Adjust	Option to change the full or programmed open position of a door
Special Features	"Lifestyle Modes" or modes other than Normal runtime mode.
Tech Briefs	Short, topic specific, sections published from this document
Terminal	Wired or wireless display used to display the G3 configuration data & options
TLE	Indicates a motor controller fault either Over-temperature or Over-current
UL325	UL Safety Standard for automatic doors & windows

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

CLI Password Access

Supported User Levels	
☑	User
☑	Installer
☑	Developer
☑	Factory

Starting with the "Special Features" v0.7.0 firmware release, the G3 controller requires unique passwords for each controller. This is due a California law, as of Jan 1, 2020, requiring minimum security for IoT devices. To address this change, the G3 utilizes its unique serial number as part of the password. Once programmed at the factory, this new password scheme is activated. The previous release supported 2 password levels for access to the CLI. Those being "Installer" and "Developer" and they were the same for all G3's running v0.6.7 firmware. If you memorized those passwords, then the new password mechanism will not take too much effort.

The previous passwords for firmware v0.6.7 were:

User:	"**0**"	// Rarely used as it's the default at boot
Installer:	"**pwd1**"	
Developer:	"**IM1635**"	

The new passwords use the same characters as before but with different numbers at the end.

User:	"**0**"	// Did not change from v0.6.7
Installer:	"**pwdXXXX**"	// Replace the "XXXX" with the **last 4 digits** of the serial number
Developer:	"**IMXXXX**"	// Replace the "XXXX" with the **last 4 digits** of the serial number

Note: Entering an incorrect password, immediately puts the controller into "user" mode or minimum access.

As shown above adding the last 4 digits of the G3's serial number will allow the installer to determine the password and access the G3's CLI at the required user level. The serial number can be found on a sticker affixed to the back of the controller itself.

G3 LABEL

If for some reason the label is unreadable or missing, then the serial number must be obtained from the CLI using the "**ver**" or "**info**" commands. Both the password (**pwd**) and version (**ver**) commands are supported at boot (user level).

G3 VERSION COMMAND

After obtaining the serial number, the password can be entered in the CLI using the password command "**pwd**" or "**p**" for short.

Installer:	pwd **pwd0167**	// Installers should use this one
Developer:	pwd **IM0167**	// Only use if needed or when directed to do so by the factory

* Passwords will auto-expire after 30 minutes regardless of CLI activity. This timeout can be extended by issuing the "**pwd**" or its abbreviation "**p**" (just the command, no password needs to follow)

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Help Commands

The G3 controller supports a "command line interface" or "CLI" where various commands and instructions can be used to control or configure all the various modes and settings the G3 has to offer.

Help commands are informative in nature and for the most part will not affect the operational readiness of the door. Help commands that are not informative and will affect door operations are "**ecfg**" (Erase Config), "**epro**" (Erase/Swap Friction Profile) and "**rst**" (Reset). With the release of firmware version 0.7.2, two addition help commands have been added to this list, "**acdc**" and "**hfi**". The "**acdc**" command allows the installer to set all 4 acceleration & deceleration, "acco", "accc", "deco" & "decc", parameters at once. The "**hfi**" or High Friction Installation command allows the installer to set the 4 acceleration, deceleration plus open "**osp**" and close "**csp**" speeds to factory tested values to address "TLE over-current & over-temperature errors when dealing with very heavy door installations.

Erase Config and **Reset** are particularly intrusive as they can completely erase the configuration requiring the installer to reprogram the controller. Erase Config, "ecfg", has no prompt and immediately resets the critical parameters "learned" during programming.

Erase/Swap Friction Profile operations should be avoided unless **directed by a factory representative**. This command allows the installer, while the "Developer" password is active, to swap the runtime friction profiles with other versions stored in flash, as well as wiping out the runtime profile completely. Wiping the runtime profile leaves the door without a friction profile that will not be restored until the door is exercised for 3 full cycles. If a controller is allowed to run for the required 3 cycles, it will NOT stop for objects blocking the path and will try to push though with significant force in excess of 80lbs. It is essentially re-learning the friction profile of the door so "**soft touch**" is <u>disabled</u> until the profile is restored.

Entrapment at the jam can cause serious injury or death! If "eprof 0"(Erase Current Profile) has been executed, play it safe and just reprogram the door.

These 5 commands are the only "help" commands that after execution, result in a flash write. This means the affect is not going to be reversed by a reboot, with the only recovery option being reprograming the door.

The Help menu displayed is dependent on the current user level which is set by the password command, "pwd". A breakdown of which help commands are available at each user level, while the following pages describe each command in more detail.

At the "User" level, the only CLI help commands available, are "**help**", "**info**", "**ver**", "**pwd**" and "**temp**". Since a password must be entered after boot, the "**pwd**" command is available to all user levels. Determining the unit password requires the unit serial number and that is displayed in the "**info**" report as well as the "**ver**" output. Refer to the password documentation for more information about passwords and serial numbers.

The final command, "**temp**", displays the controller's internal temperature and the battery temperature if attached. A backup battery option will be available as part of a future update.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 13 of 161

INMOTION
A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels **help (CLI Help)**

☑ **User**	
☑ **Installer**	
☑ **Developer**	
☑ **Factory**	

Syntax: help [command] **(Updated for firmware v0.7.2 and later)**
Abbreviation: h or ?
Range/Units: n/a
Default: n/a

Command Description

When executed, the CLI will display a list of supported commands based on the current user level. Help is supported for all user levels, with more commands becoming available as the user level is increased.

If help is executed with an [optional] command as a parameter, help for that command will be displayed.

At the user level the only commands available on the help screen are **help**, **info**, **ver**, **pwd** and **temp**.

User Level Commands

```
Commands:
help    [cmdname]        Command help
info                    Show system information
ver                     Show version & serial number
pwd     [password]      Enter password
temp                    Read temperatures inputs
```

Installer Help Commands

```
Commands:
help    [cmdname]          Command help
info                      Show system information
ver                       Show version & serial number
pwd     [password]        Enter password
config (I|a|c) [V|r]      Show/Set config values
brake  [1|0]              Brake On/Off
clutch [1|0]              Clutch On/Off
button [o|c|s|u|m|a]      Button press simulation
pos                       Show position [In]
ap      [position]        Show/Set actual pos [En]
er                        Show position error [En]
temp                      Read temperatures inputs
maxc                      Show max profile current
ecfg                      Reset configuration
dprof                     Read friction profiles
rst     [0|1|2|3|4]       Reboot/Reset system options(m)
acdc    [.5,30][.5,30]    Set acceleration/deceleration
hfi     [0-5]             Show/Set high friction install
cyct    [0-1000000]       Cycle test
```

Developer Help Commands

```
Commands:
help    [cmdname]          Command help
info                      Show system information
ver                       Show version & serial number
pwd     [password]        Enter password
log     [level]           Show/Set log level
config (I|a|c) [V|r]      Show/Set config values
brake  [1|0]              Brake On/Off
clutch [1|0]              Clutch On/Off
button [o|c|s|u|m|a]      Button press simulation
pos                       Show position [In]
ap      [position]        Show/Set actual pos [En]
av                        Show actual velocity [En/s]
er                        Show position error [En]
temp                      Read temperatures inputs
maxc                      Show max profile current
ecfg                      Reset configuration
epro    [0|1|2|3]         Erase/Swap frict profiles(m)
dprof                     Read friction profiles
rst     [0|1|2|3|4]       Reboot/Reset system options(m)
acdc    [.5,30][.5,30]    Set acceleration/deceleration
hfi     [0-5]             Show/Set high friction install
cyct    [0-1000000]       Cycle test
```

Highlighted commands are new for firmware v0.7.2 and later

References

pwd   Help output is dependent on the active user level / password
info   Display a list of customization parameters & commands to customize special features

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

☑ **User**
☑ **Installer**
☑ **Developer**
☑ **Factory**

info (Controller Information)

Syntax:	info **(Updated for firmware v0.7.2 and later)**
Abbreviation:	i
Range/Units:	n/a
Default:	n/a

Command Description

The info command displays all the pertinent settings for the G3 controller including programmed settings, features, and options for those features.

The "Features" section shows the currently active mode as Normal, Party Mode, Egress, One Button Operation or Move Assist. If a feature has been changed via the CLI, the active mode will not reflect that change until the panel is commanded to close.

The table output profiles the current settings as well as the "config" command required to change those settings. As with the feature settings, most setting will not become *active* until the next command door close operation. E.g. "button close". Commands marked with an '*' require at least an "Installer" level password.

Terminal Output

```
cmd>info                                    Egress:          fege*  -------
                                              Span:          fegd*  40.00in
Gen3 Controller          Patio Door          Auto Close Time: fegw*  DELAY[10s]
---------------                              Brake On Close:  fegb*  DISABLED[0]
Part Number:        28C0016               One Button Op:     fobe*  -------
Serial Number:      28C0016 D2 1903281335   Span:          fobd*  40.00in
Firmware:           0.7.2                    Auto Close Time: fobw*  DISABLED[0]
  Build Hash:       5de70b1                  Brake On Close:  fobb*  DISABLED[0]
  Build Type:       REL_K12
  Config Version:   2a813ec               Move Assist:       fmae*  -------
Max Current:        879mA                    Span:          fmad*  40.00in
Programmed:         Yes                      Auto Close Time: fmaw*  DISABLED[0]
Error Log:          None                     Span Adj Time:   fmat*  5s

Settings                                  Cycle Test:                DISABLED
--------                                      Fault Limit:   ctfl*  5
Panel Mass:         p1ms*  400.00lbs
Pulley Diameter:    pdia*  1.7988in       Modifiers
Door Type:          drtp*  oneway         ---------
Jam Entry:          pje*   0.54in         Hard Close En(G):  mhdc*  ENABLED
Span:               pop*   96.13in        Hard Open En(G):   mhdo*  -------
  Sub-Span:         pops*  0.00in         Brake Disable(G):  mbd*   -------
Motor Direction:    mdir*  normal         Brake On Close(N): mboc*  ENABLED[1]
Encoder Polarity:   epol*  invert         Brake At Open(G):  mbpop* DISABLED[0]

Features - 'Normal Operation' ACTIVE      (G)=Normal & Features, (N)=Normal only
-----------------------------------
Span Adj Time:      fsat*  5s             *Password protected commands 'pwd xxx'
  Actual Adj Time:         5s             ** Password protected help commands
Party Mode:         fpme*  -------           Syntax: 'c command value'
  Span:             fpmd*  40.00in           e.g.    'c fege 1' - Enable Egress
  Auto Close Time:  fpmw*  DELAY[10s]         e.g.    'hfi 5'    - Sets HFI to 5
  Brake On Close:   fpmb*  DISABLED[0]
```

Highlighted commands are new for firmware v0.7.2 and later

References

pwd	G3 passwords require the last 4 digits of the G3 serial number provided by the *info* command
ver	Besides this command, "ver" can also be used to retrieve the unit serial number
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.
Appendix B	Inch position to Encoder count conversion table.
Tech Brief	Info Report in depth

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels
☑ **User**
☑ **Installer**
☑ **Developer**
☑ **Factory**

ver (Version & Serial Number)

Syntax:	ver **(Updated for firmware v0.7.2 and later)**
Abbreviation:	v
Range/Units:	n/a
Default:	n/a

Command Description

The version command displays the G3's current firmware version and controller serial number. The *ver* command is typically the first command sent to the controller to initialize the command line interface (CLI).

It is also used to obtain the G3 serial number, which is required to gain access to the higher-level programming commands using the 'pwd' (password) command.

Terminal Output

```
cmd>ver                              // Version command issued to get the serial number

Caldwell Generation 3 Controller
Fw:  v0.7.0 [REL_K12]
Sn:  28C0016 D2 1903281335           // Serial number displayed
HFI: 0 (High Friction Install)       // HFI setting 0 – 5 or '?' for custom HFI setting
Bn:  5de70b1
```

Highlighted line item is new for firmware v0.7.2 and later

```
Using the ver command to retrieve the last 4 digits of the serial number:

cmd>pwd pwd1335                      // Use the serial number for the "installer" password

Level = 1 (Installer)                // Pwd reports the new user level

cmd>pwd IM1335                       // Use the serial number for the "developer" password

Level = 2 (Developer)                // Pwd reports the new user level
```

References

pwd	Use the "ver" command to determine the unit serial number required by the "pwd" command
info	The "info" command also displays the G3 serial number in its header

INMOTION

A Caldwell Company

Supported User Levels	
☑	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

pwd (Password)

Syntax:	pwd [*PASSWORD*]
Abbreviation:	p
Range/Units:	n/a
Default:	n/a

Command Description

The "**pwd**" command sets or reports the current password which in turn sets the user level. Changing the user level alters the available commands in the *help* and *config* tables. On power up, the user level is set to *User*. At this level, only informational commands are available via the CLI and the door can only be controlled with the standard wall-switch interface to program the G3. To change options or control the door from the CLI requires at least an *installer* level password.

Passwords expire after 30 minutes and revert to *user* level. To renew the password without re-entering the full password, enter the command "**pwd**" *or the abbreviated version "p"* before the 30-minute expiration. If an incorrect password is entered, the user level is immediately revoked to the default *user* level.

The passwords for all G3 controllers are semi-unique and require the last 4 digits of the serial number for the command to unlock the G3's CLI. The serial number can be obtained from the physical sticker on the back of the G3, or on the CLI using "**ver**" *or* "**info**" commands. If the G3 serial number is not programmed or is less than 4 digits long, the default passwords listed below become active.

The installer should enter the *installer* password for 99% of all installs as it provides protection from overwriting a few critical settings that should not be changed without consulting the factory first.

User Level	SN Available e.g SN = "28C0016 D2 1903281234"		Default Password when SN Not Available
User Level	0 (always)	**0** (always)	0 (always)
Installer Level	"pwd" + "1234"	**pwd1234**	pwd1
Developer Level	"IM" + "1234"	**IM1234**	IM1635

Terminal Output

```
cmd>pwd 0                              // Enter the user level "user's" password of "0"

Level = 0 (User)

cmd>pwd pwd1234                        // Enter the "installer" password

Level = 1 (Installer)

cmd>pwd IM1234                         // Enter the "developer" password

Level = 2 (Developer)
```

References

ver	Version command used to obtain serial number from the *ver* command
info	Info command used to obtain the serial number from the info report
rst	Reset command menu changes based on the current user level
dprof	Dump friction profile report changes base on the current user level
epro	Erase profile menu is only available with the *developer* level and above
log	*Developer* mode enables additional CLI output useful when field debugging issues

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels	
☒	User
☒	Installer
☑	Developer
☑	Factory

log (Log Level)

Syntax:	log [*VALUE*]
Abbreviation:	l (lower case 'L')
Range/Units:	0 - 3
Default:	2

Command Description

The text displayed on the CLI is controlled by the *log* level. It has been carefully crafted to only display the correct amount of information to complete basic and advanced programming tasks required by an installer. If an installer is working with a factory representative on a particular issue, the log level can be changed to display additional information to help diagnose a problem.

Log Values	Description
0	No CLI output except for the confirmation "OK"
1	No CLI output except for the confirmation "OK"
2	Installer CLI messages displayed (default)
3	Installer CLI + Internal operational messages displayed

Terminal Output

```
cmd>log                                 // Report the current log level
Log output level = 2                    // The default level of 2 is reported
```

```
cmd>log 3                               // Change the log level to 3
Log output level = 3                    // The new log level is now 3
```

References

pwd   The *log* command is only available at the *developer* level and above

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

config (Configuration Command)

Syntax:	config *COMMAND* [*VALUE or Sub-Cmd*] **(Updated in FW v0.7.2 and later)**
Abbreviation:	c
Range/Units:	command dependent
Default:	n/a

Command Description

The *config* command sets or reports all the configurable settings of the G3 controller. This includes door movement commands, programming values, modifiers, and special features.

To report a configuration value, the config command should be entered without a *VALUE.* When the command is used with a *COMMAND* and a *VALUE,* that value is set and saved to flash memory. All values set in this way will be restored to the controller on power failures and will remain in effect until reprogrammed or changed.

The *config* command can be used to reset a single parameter to its default OR nearly all settings to their defaults. The *config* command can also show only <u>changed</u> values or values that are no longer set to their default values.

Using the *config* command to <u>set</u> then <u>reset</u> the pulley diameter back to default

```
cmd>config pdia 4                       // Set a new pulley diameter to 4.0000 inches
OK: 4.0000                              // New diameter is set

cmd>config pdia reset                   // Reset pulley diameter to factory default
1.7988                                  // Factory default of 1.7988 inches is set
```

Using the "*config all reset*" command to <u>reset</u> nearly all settings to defaults. The parameters excluded from the "reset all" function are those required to keep the door fully programmed in "Normal" mode and 100% functional. This function will reset all special feature parameters to disabled and feature modifiers to their default values. The excluded parameters are displayed after executing "config all reset"

```
cmd>config all reset
909.552: Parameter 'drtp' preserved      // Door type oneway or bipart manually set via CLI
909.556: Parameter 'p1ms' preserved      // Panel 1 mass manually set via the CLI
909.560: Parameter 'pdia' preserved      // Pulley Diameter manually set via the CLI
909.561: Parameter 'acco' preserved      // Open acceleration time in seconds set via the CLI
909.562: Parameter 'accc' preserved      // Close acceleration time in seconds set via the CLI
909.563: Parameter 'deco' preserved      // Open deceleration time in seconds set via the CLI
909.564: Parameter 'decc' preserved      // Close deceleration time in seconds set via the CLI
909.565: Parameter 'csp' preserved       // Close speed in inches/sec set via the CLI
909.566: Parameter 'osp' preserved       // Open speed in inches/sec set via the CLI
909.567: Parameter 'spl' preserved       // Open/Close speed limit in inches/sec set via the CLI
909.568: Parameter 'pcl' preserved       // Panel closed position set during programming
909.572: Parameter 'pje' preserved       // Panel door jam depth set during programming
909.576: Parameter 'pop' preserved       // Panel full open position set during programming
909.580: Parameter 'pops' preserved      // Panel sub-span manually set after programming
909.584: Parameter 'epol' preserved      // Encoder Polarity set during programming
909.588: Parameter 'mdir' preserved      // Motor Polarity set during programming
```
<div align="right">Highlighted line items are new for firmware v0.7.2 and later</div>

Using *config* command to report "changed" settings. This version of the command will report any parameters not currently set to their default value. This includes active features and their modifier parameters.

```
cmd>config changed                        // "c changed" works too
pje   Pos Jamb      0.5in:[0.0-100.0]:[0.5]
                 * current:[range]:[default]
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 19 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

To list all the available *config* commands, enter "**config all**" or "**c all**". The CLI will display the entire command list with the current value, units, range and the default in this form:

Terminal Output (Display all *config* commands)

```
Syntax:
cmd    Description    CurrValue&Units:[ValueRange]:[DefaultValue]

drtp   Door Type      oneway:[oneway|bipart]:[oneway]
p1ms   Panel 1 Mass   172.0000lbs:[50.0-50000.0]:[172.0]
pdia   Pulley Diam    1.7988in:[0.5-4.5]:[1.7988]
fpme   Party Mode En  0:[0|1]:[0]
fpmd    PM OpenSpan    40.0000in:[6.0-1200.0]:[40.0]
fpmw    PM CloseTime   10s:[0-86400]:[10]
fpmb    PM CloseBrk    0:[0-86400]:[0]
fege   Egress En      0:[0|1]:[0]
fegd    Eg OpenSpan    40.0000in:[6.0-1200.0]:[40.0]
fegw    Eg CloseTime   10s:[0-86400]:[10]
fegb    Eg CloseBrk    0:[0-86400]:[0]
fmae   Move Assist En 0:[0|1]:[0]
fmad    MA OpenSpan    40.0000in:[6.0-1200.0]:[40.0]
fmaw    MA CloseTime   0s:[0-86400]:[0]
fmat    MA AdjTime     5s:[0-98]:[5]
fsat   Span Adj Time  5s:[0-99]:[5]
fobe   One Button En  0:[0|1]:[0]
fobd    OB OpenSpan    40.0000in:[6.0-1200.0]:[40.0]
fobw    OB CloseTime   0s:[0-86400]:[0]
fobb    OB CloseBrk    0:[0-86400]:[0]
mhdc   Hrd CloseEn(G) 1:[0|1]:[1]
mhdo   Hrd OpenEn(G)  0:[0|1]:[0]
mbd    Brk Disable(G) 0:[0|1]:[0]
mboc   Brk OnClose(N) 1:[0-86400]:[1]
mbpop  Brk OnOpen(G)  0:[0|1]:[0]
acco   Accel Open     2.5000s:[0.5-30.0]:[2.5]
accc   Accel Close    2.5000s:[0.5-30.0]:[2.5]
deco   Decel Open     3.0000s:[0.5-30.0]:[3.0]
decc   Decel Close    3.0000s:[0.5-30.0]:[3.0]
csp    Close Speed    4.0000in/s:[0.5-10.0]:[4.0]
osp    Open Speed     4.0000in/s:[0.5-10.0]:[4.0]
spl    O/C Speed Lim  0.0000in/s:[0.5-10.0]:[0.0]
crsp   Crawl Speed    2.0000in/s:[0.0-5.0]:[2.0]
crdc   Crawl Decel    1.0000s:[0.5-5.0]:[1.0]
apmf   Acc PM Factor  5.0000:[1.0-20.0]:[5.0]
vpmf   Vel PM Factor  0.7000:[0.0-1.0]:[0.7]
epmf   Env PM Factor  1.0000:[1.0-100.0]:[1.0]
fpce   FP Env Lim     470mA:[0-2000]:[470]
fpthr  FP Fault Cnt   10:[1-2147483647]:[10]
fpcl   FP Hard Lim    0mA:[0-8000]:[0]
fpwar  FP WA Ratio    10:[0-20]:[10]
hdctf  Hard O/C Trq   1:[0-100]:[1]
hdclf  Hard O/C Lim   2.0000:[1.2-5.0]:[2.0]
pcl    Pos Closed     0.0000in:[0.0-5.0]:[0.0]
pje    Pos Jamb       0.5000in:[0.0-100.0]:[0.5]
pop    Pos Open       0.0000in:[24.0-1200.0]:[0.0]
pops   SubSpan Open   0.0000in:[6.0-1200.0]:[0.0]
epol   Encoder Pol    normal:[normal|invert]:[normal]
mdir   Motor Dir      normal:[normal|invert]:[normal]
ctfl   Ct Fault Limit 5:[1-1000]:[5]
kp     P term PID     3000.0000:[0.0-10000.0]:[3000.0]
ki     I term PID     2.0000:[0.0-25.0]:[2.0000]
             * current:[range]:[default]
```

Highlighted line items are new for firmware v0.7.2 and later

References

pwd   The *config* command is only available at the *installer* level and above

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 20 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

brake (Brake Engage/Disengage)

Syntax:	brake [VALUE]
Abbreviation:	br
Range/Units:	0 – 1
Default:	n/a

Command Description

Brake is a command that can be used by the installer to test the controllers brake circuit, brake wiring or the brake itself. The brake command should not be used while the panel is moving as it will immediately activate the magnetic brake, possibly stopping the door abruptly.

If the brake is not engaging as the installer believes it should, the installer can execute this command to verify the entire circuit from the controller to the physical brake itself. When the brake is engaged or disengaged it should make an audible "clap" sound. The brake should respond to this command regardless of the state of the global modifier "**mbd**" (Modifier Brake Disable). This modifier disables the brake for all functions and wall switch / remote commands *except* for the "**brake**" help command. This command cannot be disabled.

When the brake is engaged, and operational a "red" LED should be visible on the motor BOB. When disengaged the LED should be OFF. This command should also command the state of the LED.

When the motor is enabled, a "white" LED will illuminate, and the brake and its LED should be OFF.

Disabling the brake will affect the "motor click" sound used by the controller to communicate programming steps or when enabling/disabling special features from the wall switch. When disabled, the "click" sound will be noticeably quieter because the clutch alone is used to make the sound instead.

Terminal Output

```
cmd>brake 1              // Engages the magnetic brake
OK

cmd>brake 0              // Disengages the magnetic brake
OK
```

```
CLI Message displayed if the Motor Harness Cable is NOT connected to the motor BOB

ERROR: Clutch fault. Check clutch wires and/or motor cable.
001.002:*ERROR: Clutch fault. Check clutch wires and/or motor cable.
```

References

pwd	Requires a minimum user level of "Installer"
mbd	Modifier Brake Disable does NOT disable this help command
mboc	Modifier for normal mode Brake on Close
fpmb	Feature Party Mode Brake on Close
fegb	Feature Egress Brake on Close
fobb	Feature One Button Operation Brake on Close
mbpop	Modifier Brake on Open

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

clutch (Clutch Engage/Disengage)

Syntax: clutch [VALUE]
Abbreviation: cl
Range/Units: 0 – 1
Default: n/a

Command Description

Like the brake command, the "**clutch**" command is a diagnostic tool used to verify the clutch circuit in the controller, though the wires all the way to the device itself. If the clutch is suspect, issuing the command "**clutch 1**" or "**clutch 0**" should result in an audible "click" from the motor. If a "click" is not heard, verify the motor to BOB 10 pin cable is connected and fully inserted into the controller and the motor BOB.

When the clutch is engaged, and operational a "blue" LED should be visible on the motor BOB. When disengaged the LED should be OFF. This command should also command the state of the LED.

When the motor is enabled a "white" LED & the "blue" LED for the clutch should be illuminated, while the brake's "red" LED should be off.

Terminal Output

```
cmd>clutch 0              // Disengages the clutch
OK

cmd>clutch 1              // Engages the clutch
```

CLI Message displayed if the Motor Harness Cable is NOT connected to the motor BOB

```
ERROR: Clutch fault. Check clutch wires and/or motor cable.
001.002:*ERROR: Clutch fault. Check clutch wires and/or motor cable.
```

References

pwd   Requires a minimum user level of "Installer"
brake   Similar command. If neither the brake nor the clutch work, check the cables

INMOTION
A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

button (Button)

Syntax:	button [open close stop release unlock motion autosetup]
Abbreviation:	b [o c s r u m a]
Range/Units:	n/a
Default:	X seconds

Command Description

The "**button**" or '**b**" command simulates a wall switch/remote button press. For example, "**b o**" will cause the door to open.

The button command can simulate a motion signal from a wired/wireless motion detector or IR beam sensor. While the door is closing, issuing a "**b m**" command will stop the door for a motion fault. It can be used even if a motion detector is not attached to the system.

The button command can initiate the G3 programming sequence. It works the same as the "*15s Stop*" press from the wall switch except there is no delay. To program the door, make sure the lead panel is closed AND in the jam, then send the command "button autosetup" or "b a". The controller will not enter "autosetup" while the panel is mid span and out of the jam <u>unless</u> it was powered up while not fully closed. If this occurs, do not move the door and wait for about 30s. The command will timeout leaving the controller's program unchanged.

Full Command	Abbreviation	Description
button open	b o	Opens the door
button close	b c	Closes the door
button stop	b s	Stops the door
button release	b r	Releases the magnetic brake
button unlock	b u	Releases the magnetic brake
button autosetup	b a	Initiates the G3 programming sequence

Terminal Output

```
cmd>b o                                  // Command the door to open
OK
cmd>b r                                  // Command brake release when globally disabled with
OK                                       //   "c mbd 0"
154.446: FEATURE: Brake DISABLED.
  Use 'c mbd 0' to ENABLE brake functionality.
```

```
cmd>b a                                  // Initiate G3 Programming
OK
050.800:
 <<<<<< INSTALLATION >>>>>> 1/5          // Programming has begun…
 Manually open panel until it just clears
 the jam. Then wait for the motor 'click'.
```

References

pwd	Requires a minimum user level of "Installer"
mbd	If "**Modifier Brake Disabled**" is enabled, "button r & u" commands have no affect and a CLI message "*FEATURE: Brake DISABLED" is displayed.*"

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

pos (Position Open in Inches)

Syntax:	pos
Abbreviation:	po
Range/Units:	0 – Max Span in Inches
Default:	n/a

Command Description

The position command is an information command reporting the lead panel's, leading edge position in inches. If the door is closed, then "**pos**" should report a value close to zero. If fully open, the command should report a value very close to the full open parameter "**pop**". The distance reported by "pop" should be within ½" of its actual position in the span *if the belt is tight and the pulley diameter setting is correct.*

The "**pop**" command can be used as a diagnostic tool. When an installation has a belt that is too loose, the encoder cannot accurately locate the door's true location and the reported position will be wrong. The position reported can also be significantly off if the motor pulley has been changed to different diameter and the controller was not updated with this information via the "**c pdia**" command.

The command will function while the door is moving, returning back the door position at the time of the commands reception. This has little value other than being fun to play with.

Terminal Output

```
cmd>pos
Position:  10.51            // Position is reported back in inches
```

Converting Encoder Counts to Position (ap to pos)

Three formulas are presented here based on the size of the pulley on the motor used. The "Silver" pulley is the current OEM pulley, while the "Black" short pulley is our older motor stack that preceded the new tall silver version. The last formula can be used for custom pulley sizes, so the pulley diameter value becomes part of the calculation. All values are in inches and encoder counts.

For example, if you have a "silver" pulley and the actual position, "ap", is 1248 encoder counts, the "pos" value reported should be very close to 29.39" because 29.39 = *1248 / 42.4696.* If the value is way off, it's a sign that the belt is too loose, or you have a custom pulley installed.

$$pos_{CurrentSilver} = \frac{ap_{CountSilver}}{42.4696}$$

$$pos_{CurrentBlack} = \frac{ap_{CountBlack}}{42.5975}$$

$$pos = \frac{ap \; x \; pdia}{76.3944}$$

References

pwd	Requires a minimum user level of "Installer"
ap	Similar to "pop" except the position is reported back in "encoder counts"
pdia	Pop will be way off if the "pulley diameter" is incorrect.
Appendix B	Inch position to Encoder count conversion table.
Tech Brief	Pulley Diameter Calculation

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

ap (Actual Position in Encoder Counts)

Syntax:	ap [VALUE]
Abbreviation:	ap
Range/Units:	0 – Maximum encoder counts of the physical span
Default:	n/a

Command Description

This command is very similar to the "**pos**" (Position) command except it can also <u>set</u> the position of the leading edge of the lead panel in encoder counts. While this may seem exciting or very handy, it is in fact very dangerous.

If for example, the lead panel is stopped somewhere mid span, and an "**ap 0**" is executed, the controller now thinks the door is fully closed. Commanding the door to open will result in the door ramming the frame at full span because the fully closed position was moved via this command. DON'T DO THIS.

The only valid scenario where the installer may need to reset the "**ap**" is when the jam is truly "in the jam", and the "**ap**" command is not exactly 0. In this scenario setting "**ap 0**" is ok. A safer and easier method of accomplishing the same thing is make sure the panel is in the jam, fully closed, and power cycle or reboot the controller with "**r 0**".

Terminal Output

```
cmd>ap                     // Report the current position in encoder counts
ap: 0                      // Actual Position is 0 encoder counts

cmd>ap 10                  // Set the actual position to 10 encoder counts
ap: 0                      // Reports back the previous setting of 0 encoder counts
Control set ap: 10         // Then sets the value to 10 encoder counts
cmd>ap                     // Re-issue the command and
ap: 10                     //  ap reports the new value as 10 as expected
```

Converting Position to Encoder Counts (pos to ap)

Three formulas are presented here based on the size of the pulley on the motor used. The "*silver*" pulley is the current OEM pulley, while the "*black*" short pulley is our older motor stack that preceded the new taller silver version. The last formula can be used for custom pulley sizes, so the pulley diameter value becomes part of the calculation. All values are in inches and encoder counts.

For example, if you have a "*silver*" pulley and the door position is 29.39", the "ap" value reported should be very close to 1248 encoder counts because *1248 = 29.39" x 42.4696.* If the value is way off, it's a sign that the belt is too loose, or you have a custom pulley installed.

$$ap_{CountSilver} = pos_{CurrentSilver} \; x \; 42.4696$$

$$ap_{CountBlack} = pos_{CurrentBlack} \; x \; 42.5975$$

$$ap = \frac{pos}{pdia} \; x \; 76.3944$$

References

pwd	Requires a minimum user level of "Installer"
pos	Changing the encode count position directly affects the position reported in inches too
pdia	Encoder count position is directly related to motor shaft rotations, not the pulley diameter
Appendix B	Inch position to Encoder count conversion table.
Tech Brief	Pulley Diameter Calculation

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☒	Installer
☑	Developer
☑	Factory

av (Actual Velocity in Encoder Counts / sec)

Syntax:	av
Abbreviation:	av
Range/Units:	0 - ~ 800 Encoder Counts / sec
Default:	n/a

Command Description

The "av" command is an informative command reporting back the current velocity of the lead panel in encoder counts / second. As it deals in velocity it is a command for use while a panel is moving while under power or while being manually moved. The resulting data should not be considered overly accurate as there is no buffering or averaging of the data being reported. Internally the velocity is used in an algorithm to smooth the data point values increasing accuracy, while this command is just outputting raw data points.

Terminal Output

```
cmd>av                      // "av" issued while the door is stopped
av:  0

cmd>av                      // "av" report while the door is moving
av:  533
```

Converting Velocity in Encoder Counts / sec to Inches / Second

Three formulas are presented here based on the size of the pulley on the motor used. The "Silver" pulley is the current OEM pulley, while the "*black*" short pulley is our older motor stack that preceded the new taller silver version. The last formula can be used for custom pulley sizes, so the pulley diameter value becomes part of the calculation. All values are in inches and encoder counts.

For example, if you have a "*silver*" pulley and panel is moving at 383 encoder counts/s, "**av**", the velocity in IPS should be very close to 29.39" because 29.39 = *1248 / 42.4696.* If the value is way off, it's a sign that the belt is too loose, or you have a custom pulley installed.

G3 firmware v0.7.2 and later support the "avi" command, which reports the panel velocity in inches / sec directly.

$$VelocityIPS_{CurrentSilver} = \frac{av_{CountsPerSecSilver}}{42.4696}$$

$$VelocityIPS_{CurrentBlack} = \frac{av_{CountsPerSecBlack}}{42.5975}$$

References

pwd	Requires a minimum user level of "Installer"
pdia	Velocity of the physical panel will be increased with a larger pulley while torque is decreased
avi	Report the current panel velocity in inches / sec (firmware v0.7.2 and later)
Appendix B	Inch position to Encoder count conversion table
Tech Brief	Pulley Diameter Calculation

INMOTION

A Caldwell Company

avi (Actual Velocity in Inches / sec)

Syntax:	avi **(Firmware v0.7.2 and later)**
Abbreviation:	avi
Range/Units:	0 - ~ 10 inches / sec
Default:	n/a

Command Description

The "avi" command is an informative command reporting back the current velocity of the lead panel in inches / second. As it deals in velocity, it is a command for use while a panel is moving while under power or while being manually moved. The resulting data should not be considered overly accurate as there is no buffering or averaging of the data being reported. Internally the velocity is used in an algorithm to smooth the data point values increasing accuracy, while this command is just outputting raw data points.

Terminal Output

```
cmd>avi                    // "avi" issued while the door is stopped
avi:  0

cmd>avi                    // "avi" report while the door is opening (positive velocity)
av:i  4.91

cmd>avi                    // "avi" report while the door is closing (negative velocity)
av:i  -2.39
```

References

pwd	Requires a minimum user level of "Installer"
pdia	Velocity of the physical panel will be increased with a larger pulley while torque is decreased
av	Report panel velocity in Encoder Counts / second
Appendix B	Inch position to Encoder count conversion table
Tech Brief	Pulley Diameter Calculation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 27 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

er (Error Position in Encoder Counts)

Syntax:	er
Abbreviation:	er
Range/Units:	Encoder Counts
Default:	n/a

Command Description

The "**er**" command is an informational command reporting the error, in encoder counts, between the current position and the actual command position of the door. The reported data can be for either a moving or stationary panel. Each movement is in fact a series of very small movements executed in rapid succession. For each of those movements there is an "actual position" and a "commanded position" and the difference between the two is the "**er**". The value can be negative or positive.

If for example the door is in the jam, the "commanded position" will be something very close to 0. If the door is then manually opened, the "actual position" will be some positive encoder count value. The "**er**" value is calculated as $(Commanded_{Position} - Actual_{Position})$ making a net negative "**er**".

On the other hand, if a panel is stopped mid span and then manually moved back to the jam, the "**er**" value will be positive.

Terminal Output

```
cmd>er
error: 264
```

References

pwd	Requires a minimum user level of "Installer"
ap	Shows where the controller thinks the actual panel position is in encoder counts
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

Supported User Levels	
☑	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

temp (Temperature)

Syntax:	temp
Abbreviation:	te
Range/Units:	Degrees Celsius
Default:	n/a

Command Description

The "**temp**" instruction is an informational command and reports back the temperature, in ºC, of the main board and backup battery pack. For this release, the backup battery is not supported and thus not attached, so it reports back with a value of "-273.0 ºC."

Terminal Output

```
cmd>temp
Mainboard = 35.9 C
Battery   = -273.0 C
```

References

pwd   Requires a minimum user level of "Installer"

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

ecfg (Erase Configuration)

Syntax:	ecfg
Abbreviation:	ec
Range/Units:	n/a
Default:	n/a

Command Description

The erase configuration, "**ecfg**" command, at one time was a required option to return all configuration data to factory defaults in preparation for a reprogram. It still performs that function, except other commands do it better such as "**rst 2**" or "**rst 4**".

The erase configuration, "**ecfg**" command is an unforgiving command, that once executed, will wipe out the G3 controllers programming requiring a full reprogram. "**ecfg**" does not erase friction profiles and will preserve the pulley diameter "setting" exclusively. The pulley diameter is preserved, because the value is calculated and requires a bit of effort to retrieve. Accidentally deleting a custom pulley diameter will create subtle issues that will be difficult to diagnose.

Terminal Output

```
cmd>ecfg                                             // The command
cmd>                                                 //   and the result nondescript…
                                                     //   however all settings have been cleared!

cmd>c changed                                        // The "c changed" command shows the actual result
               * current:[range]:[default]           // The list is empty, so reprogramming is required

cmd>info                                             // The "info" report indicates the same thing…

Gen3 Controller         Development, R45x3 Beta Test
---------------
Part Number:       28C0016
Serial Number:     28C0016D2 K12 20041600167
Firmware:          0.7.2
  Build Hash:      f659d4e
  Build Type:      REL_K12
  Config Version:  2a8142cd
Max Current:       858mA
Programmed:        No                                // NOT PROGRAMMED so we must reprogram controller
Error Log:         None

Settings
--------
Panel Mass:        p1ms*  172.00lbs
Pulley Diameter:   pdia*  1.7988in
Door Type:         drtp*  oneway
Jam Entry:         pje*   0.50in
Span:              pop*   0.00in                     // NO SPAN, must reprogram
  Sub-Span:        pops*  0.00in
Motor Direction:   mdir*  normal
Encoder Polarity:  epol*  normal
O/C Speed Limit:   spl*   DISABLED[0]
High Frict Inst:   hfi**  0
```

Highlighted line items are new for firmware v0.7.2 and later

References

pwd	Requires a minimum user level of "Installer"
rst	Various "**rst**" commands do this command's job better with fewer keystrokes required.
pdia	Pulley diameter is not reset with the "**ecfg**" command intentionally

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☒	Installer
☑	Developer
☑	Factory

epro (Erase/Swap Friction Profiles [menu])

Syntax:	epro [VALUEl]
Abbreviation:	ep
Range/Units:	0 – 3
Default:	n/a

IMPORTANT:

- **This is an advanced debugging tool. Consult the factory prior to use.**
- **If profiles have been "swapped" the controller MUST be reprogrammed prior to job completion.**

Command Description

The "**epro**" command is an advanced command that should not be required by most installers. It should only be used after consulting the factory representative and after all other debug options are exhausted.

In the previous release, this command was used to clear out the friction profile so that it could be "relearned". With this release, and the addition of 4 full profiles saved in flash memory, its functionality has been expanded. Besides clearing the runtime profile, the runtime profile itself can now be overwritten with a copy of the Current Full Span Backup Profile, Last Profile Programmed or the First Profile Programmed.

The ability to change current runtime profile with one that was created months or years ago can be a helpful debugging tool. After all the repair work is done and the door is operating at its best, swapping in the First Profile Programmed may show that yes indeed the door is as good as new, or it could go the other way.

Remember: This is a debug tool, so if profiles have been swapped, the installer, with the Developer password entered MUST perform a "**rst 2**" on the door and then a final reprogram to complete the job.

Table	Description
Installer	No access
Developer	Erase Current Profile, Restore Backup, Restore Last Program, Restore First Program

Terminal Output

```
cmd>epro
Erase/Restore Profile
---------------------
 0. Erase Current Profile(CP)
 1. Restore Backup(CPF)
 2. Restore Last Program(LPP)
 3. Restore First Program(FPP)
```

References

pwd	Requires a minimum user level of "Installer"
dprof	Dumps 1 or all profiles to the terminal for diagnostic & debugging
rst	The factory reset command, "**r 4**" will clear all profiles from the profile table

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 31 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

maxc (Maximum Current)

Syntax:	maxc **(Firmware v0.7.2 and later)**
Abbreviation:	ma
Range/Units:	0 – 8000mA
Default:	n/a

Command Description

The max current command, "maxc" reports the maximum current between the open and close operations recorded by the "current profile" saved in flash. It is the same value reported at the end of the "dpro" (dump profile) report.

Calculating the max current takes a bit of time, so a 2s delay before the output is displayed is normal. The max current is also reported in the "info" report.

When the max current value is above 5,000 – 6,000mA, it indicates the a "high friction" condition where the motor controller is nearing an over-load condition. It can also indicate the panel installation may need maintenance or an inspection to determine if there is a mechanical issue affecting the smooth operation of the door.

Terminal Output

```
cmd>maxc                                                        // The command
Max Current: 842mA
```

Highlighted line items are new for firmware v0.7.2 and later

References

pwd	Requires a minimum user level of "Installer"
hfi	Sets various parameters to help address "high friction installations"
info	Reports various settings including the "max current" (new for v0.7.2 G3 firmware)
pdia	Pulley diameter is not reset with the "**ecfg**" command intentionally

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

dprof (Dump Friction Profiles)

Syntax:	dprof
Abbreviation:	d
Range/Units:	mA (milliAmps)
Default:	n/a

Command Description

The "**dprof**" command is an informational command that dumps the "learned" friction profiles to the terminal for data analysis. Friction profiles are the key to the "Soft Touch" function of the controller.

The span of the door is divided up into 42 "bins" equally spaced across the programmed span. For each bin the starting and ending location in inches is reported. In flash, each profile bin stores min & max current for open and min & max for close. At the end of the report a single maximum current value is displayed indicating the max current for both open or close which is useful if the optional secondary Friction Profile Hard Limit "**fpcl**" is active.

There are 5 friction profiles in total, 4 of which are saved to flash memory. The 5th profile is in memory and loaded from flash at boot. The in-memory profile is the called the runtime profile and is used to detect friction faults.

All profiles store their current measurements as "mA" in a comma delimited format (csv). Minimum and maximum current values for both open and close are stored for each profile. This format is ideal for importing into Excel for analysis.

User Level	Profiles Reported
Installer	Runtime Only
Developer	All, Runtime, Runtime Flash, Backup Full, Last Program, First Program
Factory	All, Runtime, Runtime Flash, Backup Full, Last Program, First Program

Friction fault determination uses an algorithm to determine if the motor current has exceeded the "learned" profile current *plus* a margin current set by the default or by the installer. If the margin has been exceeded, the door will stop with a friction fault. Only the maximum current per bin, for either open or close is used in making this determination.

Terminal Output (User Level: Installer – Runtime Profile Only)

```
cmd>dprof
Bin,BinStartIN,BinEndIN,OpenMin,OpenMax,CloseMin,CloseMax    // Header for each column
0,0.000,0.518,-5,-725,581,2580                              // Bin0,StartPos,EndPos,OpenMin,OpenMax,CloseMin,CloseMax
1,0.542,1.648,-720,-741,566,595
2,1.672,2.778,-725,-715,565,590                             // Bin 2's position is between 1.672" and 2.778"
3,2.802,3.909,-738,-718,578,622
4,3.932,5.039,-738,-735,572,623                             // Bin 4's max current for Open is -735mA.

. . . (bins 5 – 37 removed for clarity)

38,42.313,43.419,-610,-606,724,739
39,43.443,44.549,-620,-619,728,744                         // Bin 39's max current for Close is 744mA.
40,44.573,45.656,-606,-598,695,725
41,45.680,46.174,-300,-567,-10,683                         // Bin41,StartPos,EndPos,OpenMin,OpenMax,CloseMin,CloseMax

Max Current: 744mA (Bins 1 - 40)                           // Runtime Max Open/Close current in milliAmps
```

Negative current measurements are dependent on motor polarity and will be inverted between open and close. Polarity will vary between open & close based on the learned motor polarity during programming.

INMOTION

A Caldwell Company

Terminal Output (User Level: Developer – All Profiles)

```
cmd>d
Bin,BinSt,BinEn,OMin_M,OMax_M,CMin_M,CMax_M,CpOMin_F,CpOMax_F,CpCMin_F,CpCMax_F,CpfOMin_F,CpfOMax_F,CpfCMin_F,CpfCMax_F,LppO
Min_F,LppOMax_F,LppCMin_F,LppCMax_F,FppOMin_F,FppOMax_F,FppCMin_F,FppCMax_F
 0,0.000,0.612, -5,-729,550,3913, -5,-729,550,3913, -5,-729,550,3913, -5,-729,564,3971, -4,-723,566,2572
 1,0.636,1.742, -709,-756,546,602, -709,-756,546,602, -709,-756,546,602, -709,-756,558,605, -690,-737,553,594
 2,1.766,2.873, -703,-744,566,619, -703,-744,566,619, -703,-744,566,619, -703,-744,577,620, -680,-709,549,589
 3,2.896,4.003, -682,-713,556,587, -682,-713,556,587, -682,-713,556,587, -682,-713,561,592, -679,-713,567,622
 4,4.026,5.133, -695,-720,566,605, -695,-720,566,605, -695,-720,566,605, -695,-720,570,608, -698,-731,564,623
 5,5.157,6.240, -672,-719,552,629, -672,-719,552,629, -672,-719,552,629, -672,-719,560,625, -622,-700,538,582
 6,6.263,7.370, -599,-683,508,561, -599,-683,508,561, -599,-683,508,561, -599,-683,518,563, -605,-630,538,570
 7,7.394,8.500, -595,-619,509,534, -595,-619,509,534, -595,-619,509,534, -595,-619,519,540, -613,-638,540,565
 8,8.524,9.630, -607,-653,518,631, -607,-653,518,631, -607,-653,518,631, -607,-653,532,635, -606,-631,535,608
 9,9.654,10.761, -633,-666,608,642, -633,-666,608,642, -633,-666,608,642, -633,-666,622,647, -607,-637,607,655
10,10.784,11.867, -621,-656,604,642, -621,-656,604,642, -621,-656,604,642, -621,-656,616,649, -619,-658,648,679
11,11.891,12.998, -617,-645,599,646, -617,-645,599,646, -617,-645,599,646, -617,-645,613,652, -621,-656,621,657
12,13.021,14.128, -621,-649,599,634, -621,-649,599,634, -621,-649,599,634, -621,-649,612,639, -606,-640,609,647
13,14.151,15.258, -619,-646,596,634, -619,-646,596,634, -619,-646,596,634, -619,-646,608,640, -613,-642,612,643
14,15.282,16.388, -623,-660,607,647, -623,-660,607,647, -623,-660,607,647, -623,-660,617,652, -620,-662,637,660
15,16.412,17.495, -632,-661,616,654, -632,-661,616,654, -632,-661,616,654, -632,-661,633,661, -633,-663,635,669
16,17.518,18.625, -622,-653,611,654, -622,-653,611,654, -622,-653,611,654, -622,-653,617,659, -619,-656,610,656
17,18.649,19.755, -597,-649,599,633, -597,-649,599,633, -597,-649,599,633, -597,-649,611,638, -603,-640,622,651
18,19.779,20.886, -603,-633,586,631, -603,-633,586,631, -603,-633,586,631, -603,-633,602,637, -608,-637,615,644
19,20.909,22.016, -604,-646,610,665, -604,-646,610,665, -604,-646,610,665, -604,-646,625,667, -608,-645,620,667
20,22.039,23.122, -623,-650,603,663, -623,-650,603,663, -623,-650,603,663, -623,-650,614,665, -628,-655,642,668
21,23.146,24.253, -602,-639,589,635, -602,-639,589,635, -602,-639,589,635, -602,-639,606,642, -612,-646,630,665
22,24.276,25.383, -600,-628,612,662, -600,-628,612,662, -600,-628,612,662, -600,-628,629,666, -599,-631,613,649
23,25.406,26.513, -607,-637,610,653, -607,-637,610,653, -607,-637,610,653, -607,-637,619,655, -597,-628,605,641
24,26.537,27.643, -602,-623,616,656, -602,-623,616,656, -602,-623,616,656, -602,-623,630,663, -608,-638,635,672
25,27.667,28.750, -602,-626,626,666, -602,-626,626,666, -602,-626,626,666, -602,-626,643,672, -621,-644,646,682
26,28.774,29.880, -590,-621,614,657, -590,-621,614,657, -590,-621,614,657, -590,-621,626,662, -606,-640,624,656
27,29.904,31.010, -587,-618,604,645, -587,-618,604,645, -587,-618,604,645, -587,-618,619,651, -587,-615,629,657
28,31.034,32.141, -592,-618,605,655, -592,-618,605,655, -592,-618,605,655, -592,-618,623,663, -595,-622,633,679
29,32.164,33.271, -605,-629,627,661, -605,-629,627,661, -605,-629,627,661, -605,-629,641,666, -603,-624,656,679
30,33.294,34.378, -601,-627,618,663, -601,-627,618,663, -601,-627,618,663, -601,-627,633,666, -598,-616,619,682
31,34.401,35.508, -598,-625,597,639, -598,-625,597,639, -598,-625,597,639, -598,-625,617,647, -594,-615,620,659
32,35.531,36.638, -586,-612,590,630, -586,-612,590,630, -586,-612,590,630, -586,-612,607,639, -591,-623,621,654
33,36.661,37.768, -550,-595,604,644, -550,-595,604,644, -550,-595,604,644, -550,-595,623,648, -528,-603,607,637
34,37.792,38.898, -539,-570,605,648, -539,-570,605,648, -539,-570,605,648, -539,-570,623,652, -515,-538,615,635
35,38.922,40.005, -505,-553,579,628, -505,-553,579,628, -505,-553,579,628, -505,-553,604,637, -514,-540,620,657
36,40.029,41.135, -503,-549,590,704, -503,-549,590,704, -503,-549,590,704, -503,-549,619,709, -510,-550,637,702
37,41.159,42.265, -536,-650,681,742, -536,-650,681,742, -536,-650,681,742, -536,-650,696,743, -536,-598,691,722
38,42.289,43.396, -573,-647,663,717, -573,-647,663,717, -573,-647,663,717, -573,-647,689,723, -564,-601,708,738
39,43.419,44.526, -565,-599,661,710, -565,-599,661,710, -565,-599,661,710, -565,-599,692,724, -578,-615,719,743
40,44.549,45.633, -578,-629,675,728, -578,-629,675,728, -578,-629,675,728, -578,-629,700,737, -562,-594,659,724
41,45.656,46.245, -305,-619,-11,715, -305,-619,-11,715, -305,-619,-11,715, -305,-619,-11,716, -275,-563,-10,681
[B][Bin Position] [ RunTime Profile] [ RunTime Profile ][ RunTime Backup  ][ Last Programmed ][ First Programmed]
          [   "In Memory"  ] [   "In Flash"   ][   "In Flash"   ][   "In Flash"   ][   "In Flash"   ]

Max Current: 756mA (Bins 1 - 40)              // Max current is always reported as a positive value.
```

References

pwd	Requires a minimum user level of "Installer"
epro	Allows erasing and swapping profiles. Requires "Developer" user level.
maxc	Command displays the maximum current without using the "dpro" command.
c fpcl	Optional, secondary friction profile hard limit for instantaneous faults. Default is disabled.
c fpce	Sets the "Friction Profile Envelope Limit" in mA used in the friction fault algo for "Soft Touch"
c fpthr	Sets the "Friction Profile Fault Count Limit" used in the friction fault algo for "Soft Touch"

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 34 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

rst (Reset [menu])

Syntax:	rst [VALUE]
Abbreviation:	'r'
Range/Units:	0 - 4
Default:	n/a

IMPORTANT:

- **When moving a <u>programmed</u> G3 controller to a <u>different door or job</u> it MUST be factory reset to remove the "First Programmed Friction Profile" properly. See Factory Reset Option 4 below…**
- **All G3's, prior shipment are "factory reset" to remove all traces of the testing performed during the manufacturing process.**

Command Description

The "**rst**" or Reset command is used for several reset functions from simple reboots to a complete wipe of the controller for a "Factory Reset". The "**rst**" or "**r**" command requires a numeric parameter and when that is not provided, it displays a menu for reference. Options will vary depending on the user level.

User Level	Description
Installer	Menu Opts: 0: Reboot, 1: Reset Features, 2: Wipe for Reprogram
Developer	Adds options 3: Profile Wipe, and 4: Factory RESET to the Installer's

Reset Options:

Various reset option. All options reboot the controller.

RST Options	Description
rst 0	Performs a reboot of the controller only. Functionally equivalent to a wall switch reboot.
rst 1	Special Features are disabled, and feature options are all reset to defaults. After the controller reboots, it will still be 100% functional and will NOT require reprogramming. Any changes to special feature defaults will need to be reprogrammed.
rst 2	If an installer needs to reset to reprogram this is the preferred selection. Resets all features, AND parameters **except** for the Pulley Diameter, "**pdia**". Runtime profiles are also cleared. After this reset the door must be reprogrammed. Highest level allowed for an "**Installer**" user level.
rst 3	Erases the current runtime and runtime backup friction profiles. Use of this option has been <u>deprecated</u> with this version of the firmware. If executed, the door must be cycled, full open + close for at least 3 times. Only available with "**Developer**" or "**Factory**" user levels.
rst 4	Erases all profiles, configuration and feature options including the Pulley Diameter "**pdia**". Only available with "**Developer**" or "**Factory**" user levels. This must be done if programmed for 1 door and later the controller is moved to a different door / job.

Factory Reset Option 4:

When a door is programmed for the very first time, the 1st friction profile is saved and never updated again. Normally this profile is used as reference to help determine mechanical age, wear and tear, etc over time. However, the G3 command, Erase/Swap Friction Profiles command "epro" allows the installer to overwrite the runtime profile with the First Programmed Profile(FPP). If the FPP contains the profile for a different door and is swapped with the Current Profile(CP), the current door is not going to work properly.

Option 2 is the preferred method for installers to perform a clean reprogram of the G3 unless they are moving the controller to a different physical door. Then Option 4, "**rst 4**" should be used.

INMOTION

A Caldwell Company

Option 2 is also preferred because it does not change the pulley diameter, "pdia" parameter back to factory defaults like Option 4 does. The use of 3rd party motor pulleys is supported by the G3 and provides dealers with options for more torque by trading speed, etc. However, if the "pdia" setting is incorrect for the physical pulley on the motor, subtle issues with full closure, torque and "Soft Touch" can occur. These issues may go unnoticed or present weird behavior's that will be difficult to diagnose for the installer.

To avoid all this, follow these simple rules:

- Prior to doing any reset, issue an "**info**" command to report all critical setting to the terminal "just in case". If you need a setting that was just cleared, they should be available if you scroll the terminal window up a bit.
- Use "**rst 2**" exclusively when you just want to wipe clean a G3 and give it a fresh reprogram.
- If a controller is moved from 1 door to another door, ALWAYS perform a factory reset with "**rst 4**".
- When an installation is in bad shape, requires 40+lbs of pull to open, rails are worn out, jamb is not square / plumb AND you fix it then it is best to do a factory reset. After all the fixes, this is basically a different door. None of the stored profiles are going to work with its newfound functionality, so treat it like a <u>new door</u> and run the "**rst 4**" command.

Terminal Output

```
cmd>rst
Reset Controller
----------------
 0. Reboot
 1. Reset Features+Reboot
 2. Wipe for Reprogram+Reboot
 3. Profile+Reboot
 4. Factory RESET+Reboot
```

References

pwd	Requires a minimum user level of "Installer"
dprof	Dump Profiles command reports out the actual friction profile tables used for "Soft Touch"
info	Reports out all critical programming parameters + all special feature parameters
c pdia	Pulley diameter setting used when a non-OEM motor pulley is installed on the 500 motor.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

acdc (Set Acceleration & Deceleration)

Syntax:	acdc [VALUE] [VALUE] **(Firmware v0.7.2 and later)**	
Abbreviation:	ac	
Range/Units:	0.5 – 30.0s	
Default:	n/a	

Command Description

The set acceleration/deceleration command, "acdc" is a shortcut allowing the installer to set the 4 accleration/deceleration parameters using a single command.

When passed a single parameter, it sets "acco, "accc", "deco" and "decc" to that value. When passed 2 parameters its sets "acco" and "accc" to first value passed while setting "deco" and "decc" to the second value passed.

As with all "help" parameters, "acdc" is not saved in flash, however the acceleration/deceleration parameters it affects are saved.

The reset option, available for most "config" commands is not supported by the "acdc" help command. To revert any or all the accel/decel parameters back to their factory defaults, each must be reset individually.

Terminal Output

```
cmd>acdc 5.0                                        // Set all accel/decel params to 5.0000s
acco: Set to 5.0000s
accc: Set to 5.0000s
deco: Set to 5.0000s
decc: Set to 5.0000s

cmd>acdc 5.0 4.6                                     // Set accel params to 5.0000s, decels to 4.6000
acco: Set to 5.0000s
accc: Set to 5.0000s
deco: Set to 4.6000s
decc: Set to 4.6000s

cmd>c acco reset                                     // Resetting params to factory default
2.5000
cmd>c accc reset
2.5000
cmd>c deco reset
3.0000
cmd>c decc reset
3.0000
```

Highlighted line items are new for firmware v0.7.2 and later

References

pwd	Requires a minimum user level of "Installer"
acco	Open acceleration in seconds
accc	Close acceleration in seconds
deco	Open deceleration in seconds
decc	Close deceleration in seconds
spl	Limits both open & close speeds. (Firmware v0.7.2 and later)
hfi	Sets various params to help address "high friction installations" (Firmware v0.7.2 and later)
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

hfi (Set High Friction Installation Parameters)

Syntax:	hfi [VALUE] **(Firmware v0.7.2 and later)**
Abbreviation:	hf
Range/Units:	0 – 5
Default:	0

Command Description

The set High Friction Installation "hfi" command is another shortcut command that affect multiple configuration commands. It is used when a door installation has a particularly heavy pull requirement due to poor installation, poor manufacturer quality or excessive weather strip OR any time the CLI indicates "**TLE Over-current**" or "**TLE Over-temperature**" warnings. If a panel requires more than 40 -50lbs of pull to move the panel it can be considered a "hfi" candidate.

WARNING: Prior to using this, or any other command to overcome a high friction door installation, **every attempt should be made to reduce the panels high friction issues**. That includes replacing wheels, weather stripping, panels if warped, head/floor track, etc. *Failure to do so will result in premature mechanical and/or failure the controller due to the overload.*

The "hfi" command takes 1 parameter from 0 to 5. A value of 0, resets all affected parameters back to factory defaults. Values from 1 to 5 set the relative high friction installation level. A level of **1** is a "*somewhat heavy pull*" (around 40lbs) while **5** is a "*very heavy*" pull of 70lbs or more.

The "hfi" command sets known values for "osp", "csp", "acco", "accc", "deco" & "decc" documented by the factory that specifically address "TLE Over-current/temperature" issues. The "hfi" value setting, is reported by the "hfi" command itself, when used without a value, "ver" and "info" commands. If any of the 6 affected parameters are changed from factory defaults, the reported "hfi" value is "?" indicating a *custom* setting.

Each time "hfi" is executed, the 6 parameters are set AND the controller is RESET and will require reprograming. The reset is required so that the controller can re-learn its current limits and remain within its UL 325 safety parameters while using the new "hfi" settings.

HFI and Previous G3 Firmware Releases

Since "hfi" modifies parameters that are present in all previous G3 firmware releases, the notion of "hfi" can be applied to earlier firmware versions as well. The only difference being typing a single "hfi X" command versus entering 8 commands to set the same parameters.

```
HFI     OSP   CSP   ACCO   ACCC   DECO   DECC   Description
------  ---   ---   ----   ----   ----   ----   ------------------------
hfi 0   4.0   4.0    2.5    2.5    3.0    3.0   Sets factory defaults
hfi 1   6.0   6.0   12.0   12.0   12.0   12.0   For heavy panels
hfi 2   6.0   6.0   15.0   15.0   15.0   15.0
hfi 3   5.0   5.0   15.0   15.0   15.0   15.0
hfi 4   4.5   4.5   15.0   15.0   15.0   15.0
hfi 5   4.0   4.0   15.0   15.0   15.0   15.0   For the heaviest panels
```

For example to set "hfi 4"…

```
Firmware v0.7.1 and earlier (without HFI support)
cmd>p IMxxxx        // Developer password req'd
cmd>r 4             // Reset to clear profiles
cmd>osp 4.5         // Set open speed
cmd>csp 4.5         // Set close speed
cmd>acco 15         // Set open acceleration
cmd>accc 15         // Set close acceleration
cmd>deco 15         // Set open deceleration
cmd>decc 15         // Set close decleration
                    //   then re-program
```

```
Firmware v0.7.2 or later (with HFI support)
cmd>p pwdxxxx       // Installer or Developer pw req'd
cmd>hfi 4           // All 6 parameters auto set
                    //   then re-program
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 38 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Terminal Output

```
cmd>hfi 4                                           // Apply hfi 4
 - All Profiles Erased:      Success                // Profiles are cleared automatically
 - Configuration Erased:     Success                // Configuration reset to factory defaults
 - Configuration Init:       Success
 - Pulley Diameter Preserved
osp:  Set to 4.5000in/s                             // Open speed automatically set
csp:  Set to 4.5000in/s                             // Close speed automatically set
acco: Set to 15.0000s                               // Open acceleration automatically set
accc: Set to 15.0000s                               // Close acceleration automatically set
deco: Set to 15.0000s                               // Open deceleration automatically set
decc: Set to 15.0000s                               // Close deceleration automatically set
000.000: TLE9201SG init OK, rev 1

Caldwell Generation 3 Controller                    // Controller automatically reboots
Fw:  v0.7.2 [REL_K12]
Type 'help' for valid commands.
cmd>001.784:

****************************************
001.790: <<<  INSTALLATION REQUIRED  >>>
001.794:
001.794:  Controller must be programmed
001.800:   prior to use by a qualified
001.804:            installer
001.808:
001.808:      Wall Switch Commands:
001.812: ------------------------------
001.816: To Program:   STOP(15s)
001.820: Toggle Brake: RELEASE(1s)
001.824: Reboot:       STOP+RELEASE(10s)
001.830:
001.830:    www.caldwellmfgco.com
****************************************                // Re-programming is required here…
                                                       // After reprogramming…
cmd>hfi
hfi: 4                                                  // HFI value reported with HFI command

cmd>ver
Caldwell Generation 3 Controller
Fw:  v0.7.2 [REL_K12]
Sn:  28C0016D2 K12 20041600167
HFI: 4 (High Friction Install)                         // HFI level is reported
Bn:  0a4dc1c

cmd>info
. . .                                                  // Abbreviated "info" report
Settings
--------
High Frict Inst:  hfi**  4                             // HFI level under "Settings"
```

References

pwd	Requires a minimum user level of "Installer"
osp	Open speed in inches / second
csp	Close speed in inches / second
acco	Open acceleration in seconds
accc	Close acceleration in seconds
deco	Open deceleration in seconds
decc	Close deceleration in seconds
info	The "hfi" setting is shown in the "info" report with firmware v0.7.2 and later
ver	The version command will report the "hfi" setting with firmware v0.7.2 and later
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 39 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

cyct (Cycle Test)

Syntax:	cyct [VALUE]
Abbreviation:	t
Range/Units:	1 - 1000000
Default:	n/a

Command Description

The "**cyct**" or "**t**" command, initiates, updates or reports the status of a cycle test already running. It can be used by installers during their final test, while tuning "Soft Touch", or dealer/customer demonstrations. The test can be commanded to exercise an G3 automation system to open and close a door between 1 and 1,000,000 times.

Starting a Cycle Test (cT)

To execute a test, 2 commands are required:

- "t 3"   Initializes the cT for 3 open + close cycles. Door does not move
- "b c"   Button Close is used to "start" the test. Door begins to move and testing begins.
  - *   If the door was already closing when the "t" setting was issued, the 2nd command "b c" is not required. Testing will begin after the door closes.

Terminal Output

```
Cmd>t 15                      // Cycle test, for 15 cycles is requested


Cycle Test
----------
Status              READY     // Status is "Ready" to start.  Door does NOT move yet...
  Progress:         0.00%
  Oneway Travel:    0.00 ft
  Cycle Time:       TBD       // Time for 1 open + close cycle. Updates after 1st cycle.
  Time Remaining:   TBD       // Estimated time to completion in sec, min, hours, days, months and years
Cycle Info          Opening   // Current operation, either Opening or Closing
  Current Cycle:    0
  Total Cycles:     3         // Total cycles requested.  Can be changed with "t VALUE" while running
On Open                       // Friction & Motion Faults during Open
  Friction Faults: 0
  Motion Signals:  0
On Close                      // Friction & Motion fault counts during Close
  Friction Faults: 0
  Motion Signals:  0
Cycle Faults:       0/5       // Cycle fault count down, Current/Maximum, before the test errors out

cmd>b c                       // Starts the test and the cT status changes to "Running".  Movement starts.
```

TLE Warning:

Prior to running a cycle test verify the controller does not indicate "TLE" events in the CLI. Running a cycle test on a controller that is experiencing TLE Over-temperature faults will damage the controller's motor driver chip after approximately 100 events. Refer to the TLE Mitigation Tech Brief for information on preventing TLE faults if you wish to cycle test a system on a high friction installation.

References

pwd	Requires a minimum user level of "Installer"
c ctfl	Cycle Count Fault Limit sets the maximum friction faults per open/close cycle before failure
c fsat	Disabling "Span Adjust" will decrease the cycle time by ~5s / cycle.
Tech Brief	Cycle Testing
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Config Commands

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

Configuration commands differ from help commands in 2 important ways. The first is that all configuration commands are password protected and are not available at the user level. At least an "Installer" level password is required for access to most commands.

The second difference is that all config commands affect door operation in one way or another and the effect is persistent. Once a configuration change is acknowledged, that change is written to flash memory and will persist through a reboot. This includes features and feature modifiers.

Some configuration commands that should not be executed because they are "learned" during programming are "**pje**" (Jam Position), "**pop**" (Position Open), "**epol**" (Encoder Polarity), "**mdir**" (Motor Polarity).

It may be tempting to just tweak the full open position "pop" when the open position is off by an inch. DON'T DO IT. The learned friction profile is linked to physical length of the span. If that length is changed, the friction profile will be out of sync possibly causing an entrapment hazard for the operator. If the span needs to be changed **REPROGRAM THE CONTROLLER. Don't be lazy…be SAFE.**

Activated On Close Commands

Although CLI commands can be called at any time, some commands do not take effect until the "*next"* Close command. Modifier commands that change the span, normal or special feature mode attributes will not be recognized by the controller until the next time the door <u>enters the jam</u>. Even if the door is in the jam, changed modifiers of this type require and additional "close" command before the door's behavior changes to the new functionality. This is done for safety so that all mode changes occur at a known execution point in the code.

Activated On Close

Non-activated on close commands take effect immediately or at the start of the next panel movement, either opening or closing.0

Commands that have this behavior are documented with the above symbol in the upper right page corner.

Description	Command	Description	Command
Normal Mode Open Span	pop	Party Mode Span	fpmd
Normal Mode Sub Span	pops	Party Mode Close Wait Time	fpmw
Brake On Close	mboc	Party Mode Brake On Close	fpmb
Brake On Open	mbpop	Egress Mode Span	fegd
Brake Disable (Global)	mbd	Egress Close Wait Time	fegw
Span Adjust Time	fsat	Egress Brake On Close	fegb
Party Mode Enable	fpme	One Button Span	fobd
Egress Mode Enable	fege	One Button Close Wait Time	fobw
One Button Op Enable	fobe	One Button Brake On Close	fobb
Move Assist Enable	fmae	Move Assist Span	fmad
		Move Assist Close Wait Time	fmaw
		Move Assist Span Adjust Time	fmat

If the panel is in the process of closing, changing an "Activated On Close Command" will be activated at *this* jam entry. In this case an additional manual "close" command will not be required.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 41 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

drtp (Door Type)

Syntax:	config drtp [VALUE]
Abbreviation:	c drtp
Range/Units:	oneway, bipart
Default:	oneway

Command Description

This is an optional parameter that tells the controller what type of door it is attached to either one-way or bi-part. For this release, the value of this parameter has no functional effect on the operation of the door however it does affect some functions that report panel travel distances. Specifically, the "**cyct**" (Cycle Test) command will double its reported "panel travel distance" when set to "**bipart**", however internally the data is always stored as the "**oneway**" distance.

Beginning with firmware release v0.7.2, the value for "p1ms" is doubled for internal calculations when the door type is set to "bipart. This allows the controller to better estimate the panel mass to maintain UL325 safety limits. When this is in effect, the "info" report will list show the "p1ms" as "2x" and display the internal calculated mass.

Parameter Protection

Although not a critical parameter it has some built in protection from accidental changes while performing some operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c drtp bipart
OK: bipart

cmd>c drtp oneway
OK: oneway
```

References

pwd	Requires a minimum user level of "Installer"
cyct	Cycle test doubles panel travel distance if door is a "bipart"
c p1ms	Sets the mass in pounds of a single panel
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

p1ms (Panel 1 Mass)

Syntax:	config p1ms [VALUE]
Abbreviation:	c p1ms
Range/Units:	0 – 50000 lbs
Default:	172 lbs

Command Description

The "**p1ms**" (Panel 1 Mass) parameter tells the G3 controller the weight the lead panel. The UL325 velocity algorithm uses this information to limit the velocity of the lead panel to value low enough to pass the kinetic energy maximums dictated by the specification.

The G3's open and close velocities are low enough already to easily pass the requirement. However, if these velocities are higher than 6" per second and a heavy panel mass is entered, the overall speed of the door will be lowered by the algorithm to maintain safety and compliance with UL325.

Beginning with firmware release v0.7.2, the value for "p1ms" is doubled for internal calculations when the door type is set to "bipart. This allows the controller to better estimate the panel mass to maintain UL325 safety limits. When this is in effect, the "info" report will list show the "p1ms" as "2x" and display the internal calculated mass.

Parameter Protection

Due to the critical nature of this parameter, it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>config p1ms 50                                  // Set panel 1's mass to 50 lbs
OK:  50.0000

Cmd>config p1ms reset                               // Reset p1ms to factory default
172.0000
```

References

pwd	Requires a minimum user level of "Installer"
c kp	PID parameter for the motor control algorithm
c ki	PID parameter for the motor control algorithm
c drtp	Set the door type to either "oneway" or "bipart"

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 43 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

pdia (Pulley Diameter)

Syntax:	config pdia [VALUE]
Abbreviation:	c pdia
Range/Units:	0.5 – 4.5 inches
Default:	1.7998 inches (for current OEM tall silver pulley)

Command Description

This command allows the G3 controller to adapt to a different pulley size, in the rare circumstance where the pulley installed is not the original OEM pulley from INMOTION. The G3 controller uses the pulley diameter for several internal algorithms to calculate panel velocity and distances. UL 325 and "Soft Touch" depend on it and its very important that the value is correct.

Parameter Protection

Due to the critical nature of this parameter, it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.
- rst 2:   Will not change this parameter's value. (Wipe for Reprogram)

Terminal Output

```
cmd>c pdia
1.7988                     // This is the diameter of the current OEM pulley

cmd>c pdia 4               // Set the pulley diameter to 4.0000"
OK: 4.0000

cmd>c pdia reset           // Reset the pulley diameter to factory default
1.7988
```

References

pwd	Requires a minimum user level of "Installer"
rst	Reset command
Appendix B	Inch position to Encoder count conversion table.
Tech Brief	Pulley Diameter Calculation

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpme (Feature Party Mode Enable)

Activated On Close

Syntax:	config fpme [VALUE]
Abbreviation:	c fpme
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

CLI command to enable "Party Mode". Enabling this mode disables any currently active mode including Normal mode. All functions of an attached wall switch, remote or home automation connection remain functional in this mode.

When the door is closed and a motion signal is received by the controller, the controller will open the door to the programmed span(default 40"), wait for a designated period(default 10s) and then close. On closure the door does not engage the magnetic brake by default but can be enabled with the modifier "**fpmb**".

If while closing motion is detected, the door will stop and return to its programmed span and restart the auto close timer if enabled.

Party Mode requires a "motion" trigger from a wired or wireless motion detector, IR Beam sensor or a motion signal from a 3rd party device wired into the motion circuit (requires a RS485 GPIO adaptor). When the system is wireless only, a wireless motion detector is the only supported signaling option. For wired & wireless systems, the "**button motion**" or "**b m**" command will simulate an actual motion signal.

Command Options

Party modes supports the following options. Note the span adjust time (**fsat**) is shared between Normal & Party Mode, Egress, and One Button Operation.

Modifier	Description
fpmd	Span adjustable from 6" to full physical span. Default 40".
fpmw	Auto close disable(0), immediate(1) or delayed(1s to 1day)
fpmb	Brake On Close disable(0), immediate(1) or delayed(1s to 1day)
fsat	Span adjust time disable(0), time limit(1 – 98s), forever(99)
mbpop	Brake On Open disable(0), enabled(1)

Terminal Output

```
cmd>c fpme 1
036.654: FEATURE: Party Mode ENABLED
cmd> c fpme 0
070.932: FEATURE: Party Mode DISABLED
cmd>c fpme                // Check feature status; Status is Disabled
0
cmd>c fpme                // Check feature status; Status is Enabled
1
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fpmd	Party Mode full open span (sub-span)
c fpmw	Party Mode auto close wait time
c fpmb	Party Mode brake on close enable, disable or delay
c mbpop	Brake on Open

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 45 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpmd (Feature Party Mode Distance)

Activated On Close

Syntax:	config fpmd [VALUE]
Abbreviation:	c fpmd
Range/Units:	6"– full span inches
Default:	40 inches

Command Description

CLI command to set the open distance or sub-span for "Party Mode". This is the distance the door will open when this mode is active. If the user adjusted the sub-span manually, the new span will be stored in this parameter.

The sub-span can be set from a minimum of 6" to the physical full span of the door. If the sub-span is set to a value greater than the physical span of the door, the full span is set without error.

Terminal Output

```
cmd>c fpmd                   // Check the modifiers current value
40.0000

cmd>c fpmd 75.5              // Set new sub-span to 75.5 inches
OK: 75.5000

cmd>c fpmd 99999             // Entered sub-span is too large so automatically set to full span
OK: 122.5061

cmd>c fpmd 6                 // Sub-span set to 6" minimum
OK: 6.0000

cmd>c fpmd reset             // Reset sub-span modifier to factory default
40.0000
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fpme	Party Mode enable
c fpmw	Party Mode auto close wait time
c fpmb	Party Mode brake on close enable, disable or delay
c mbpop	Brake on Open
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpmw (Feature Party Mode Wait Time)

Activated On Close

Syntax:	config fpmw [VALUE]
Abbreviation:	c fpmw
Range/Units:	0 – 86400 seconds
Default:	10 seconds

Command Description

This modifier adjusts the wait before auto-closing while in Party Mode. The default is 10s, and it can be disabled(0), set to close immediately(1) or delay the closure (2s to 1day).

The time limit set here takes precedence over the span adjust time set by the "**fsat**" command. For more information refer to "Tech Brief – Info Report, Actual Adjustment Time".

Terminal Output

```
cmd>c fpmw                // Check the modifier's current value
0

cmd>c fpmw 1              // Set auto close to immediately
OK: 1

cmd>c fpmw 60            // Set auto close delay to 60s
OK: 60

cmd>c fpmw 3600         // Set auto close delay to 1 hour
OK: 3600

cmd>c fpmw 86400       // Set auto close delay to 1 day
OK: 86400

cmd>c fpmw reset        // Set auto close to factory default
10
```

References

pwd	Requires a minimum user level of "Installer"
c fpme	CLI enable for the special feature "Party Mode"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fpme	Party Mode enable
c fpmd	Party Mode full open span (sub-span)
c fpmb	Party Mode brake on close enable, disable or delay
c mbpop	Brake on Open
Tech Brief	Info Report, Actual Adjustment time
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpmb (Party Mode Brake on Close)

Activated On Close

Syntax:	config fpmb [VALUE]
Abbreviation:	c fpmb
Range/Units:	0 – 86400 seconds
Default:	0 seconds (Disabled)

Command Description

This modifier adjusts the wait before engaging the magnetic brake when in Party Mode and the door has just closed. The default is disabled(0), but it can be set to brake immediately(1) or to delay the brake from (2s to 1day).

A setting of 1 does not mean, delay by 1 second. When set to 1, the brake is enabled immediately to help lock the panel in place for installs that have a warped jam which can cause the panel to "bounce" out as the clutch disengages. Previous controllers had a separate "brake timer" that would control this functionality.

When set to 1, the G3 on close will engage the brake *before* releasing the clutch to lock the panel in place and prevent panel "bounce out".

"fpmb" Value	Description
0	Brake on close is DISABLED
1	Brake is engaged IMMEDIATELY on close before releasing the clutch
2 – 86400	Brake is engaged after a delay of this many seconds. 2s – 1day

Terminal Output

```
cmd>c fpmb              // Check the modifier's current value
0

cmd>c fpmb 1            // Set brake on close to immediately
OK: 1

cmd>c fpmb 60           // Set brake on close delay to 60s
OK: 60

cmd>c fpmb 3600         // Set brake on close delay to 1 hour
OK: 3600

cmd>c fpmb 86400        // Set brake on close delay to 1 day
OK: 86400

cmd>c fpmb reset        // Set brake on close to factory default
0
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fpme	Party Mode enable
c fpmd	Party Mode full open span (sub-span)
c fpmw	Party Mode auto close wait time
c mbpop	Brake on Open
c mboc	Normal mode brake on close
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 48 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fege (Feature Egress Enable)

Syntax:	config fege [VALUE]
Abbreviation:	c fege
Range/Units:	0 – 1
Default:	0 (Disabled)

Activated On Close

Command Description

CLI command to enable "Egress Mode". Enabling this mode disables any currently active mode including Normal mode. All functions of an attached wall switch, remote or home automation connection remain functional in this mode.

When an "Open" command is received from a wired or wireless wall switch, the controller will open the door to the programmed span(default 40"), wait for a designated period(default 10s) and then close. On closure the door does not engage the magnetic brake by default but can be enabled with the modifier "**fegb**".

Command Options

Egress mode supports the following options. Note the span adjust time "**fsat**" is shared between Normal & Party Mode, Egress, and One Button Operation.

Table	Description
fegd	Span adjustable from 6" to full physical span. Default 40".
fegw	Auto close disable(0), immediate(1) or delayed(1s to 1day)
fegb	Brake On Close disable(0), immediate(1) or delayed(1s to 1day)
fsat	Span adjust time disable(0), time limit(1 – 98s), forever(99)
mbpop	Brake On Open disable(0), enabled(1)

Terminal Output

```
cmd>c fege 1
119.458: FEATURE: Egress ENABLED

cmd>c fege 0
142.274: FEATURE: Egress DISABLED

cmd>c fege              // Check feature status; Status is Disabled
0

cmd>c fege              // Check feature status; Status is Enabled
1
```

```
cmd>cmd OTHER_VERSIONS
output here
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fegd	Egress Mode full open span (sub-span)
c fegw	Egress Mode auto close wait time
c fegb	Egress Mode brake on close enable, disable or delay
c mbpop	Brake on Open

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 49 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fegd (Feature Egress Distance)

Syntax:	config fegd [VALUE]
Abbreviation:	c fegd
Range/Units:	6" – full span inches
Default:	40 inches

Activated On Close

Command Description

CLI command to set the open distance or sub-span for "Egress Mode". This is the distance the door will open when this mode is active. If the user adjusted the sub-span manually, the new span will be stored in this parameter.

The sub-span can be set from a minimum of 6" to the physical full span of the door. If the sub-span is set to a value greater than the physical span of the door, the full span is set without error.

Terminal Output

```
cmd>c fegd                 // Check the modifiers current value
40.0000

cmd>c fegd 75.5            // Set new sub-span to 75.5 inches
OK: 75.5000

cmd>c fegd 99999           // Entered sub-span is too large so automatically set to full span
OK: 122.5061

cmd>c fegd 6               // Sub-span set to 6" minimum
OK: 6.0000

cmd>c fegd reset           // Reset sub-span modifier to factory default
40.0000
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fege	Egress Mode enable
c fegw	Egress Mode auto close wait time
c fegb	Egress Mode brake on close enable, disable or delay
c mbpop	Brake on Open
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fegw (Feature Egress Wait Time)

Activated On Close

Syntax:	config fegw [VALUE]
Abbreviation:	c fegw
Range/Units:	0 – 86400 seconds
Default:	10 seconds

Command Description

This modifier adjusts the wait before auto-closing while in Egress Mode. The default is 10s, and it can be disabled(0), set to close immediately(1) or delay the closure (2s to 1day).

The time limit set here takes precedence over the span adjust time set by the "**fsat**" command. For more information refer to "Tech Brief – Info Report, Actual Adjustment Time".

Terminal Output

```
cmd>c fegw              // Check the modifier's current value
0

cmd>c fegw 1            // Set auto close to immediately
OK: 1

cmd>c fegw 60           // Set auto close delay to 60s
OK: 60

cmd>c fegw 3600         // Set auto close delay to 1 hour
OK: 3600

cmd>c fegw 86400        // Set auto close delay to 1 day
OK: 86400

cmd>c fegw reset        // Set auto close to factory default
10
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fege	Egress Mode enable
c fegd	Egress Mode full open span (sub-span)
c fegb	Egress Mode brake on close enable, disable or delay
c mbpop	Brake on Open
Tech Brief	Info Report, Actual Adjustment time
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fegb (Feature Egress Brake on Close)

Activated On Close

Syntax:	config fegb [VALUE]
Abbreviation:	c fegb
Range/Units:	0 – 86400 seconds
Default:	0 seconds (Disabled)

Command Description

This modifier adjusts the wait before engaging the magnetic brake when in Egress Mode and the door has just closed. The default is disabled(0), but it can be set to brake immediately(1) or to delay the brake from (2s to 1day).

A setting of 1 does not mean, delay by 1 second. When set to 1, the brake is enabled immediately to help lock the panel in place for installs that have a warped jam which can cause the panel to "bounce" out as the clutch disengages. Previous controllers had a separate "brake timer" that would control this functionality.

When set to 1, the G3 on close will engage the brake *before* releasing the clutch to lock the panel in place and prevent panel "bounce out".

"fegb" Value	Description
0	Brake on close is DISABLED
1	Brake is engaged IMMEDIATELY on close before releasing the clutch
2 – 86400	Brake is engaged after a delay of this many seconds. 2s – 1day

Terminal Output

```
cmd>c fegb                 // Check the modifier's current value
0

cmd>c fegb 1               // Set brake on close to immediately
OK: 1

cmd>c fegb 60              // Set brake on close delay to 60s
OK: 60

cmd>c fegb 3600            // Set brake on close delay to 1 hour
OK: 3600

cmd>c fegb 86400           // Set brake on close delay to 1 day
OK: 86400

cmd>c fegb reset           // Set brake on close to factory default
0
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fege	Egress Mode enable
c fegd	Egress Mode full open span (sub-span)
c fegw	Egress Mode auto close wait time
c mboc	Normal mode brake on close parameter
c mbpop	Brake on Open
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fmae (Feature Move Assist Enable)

Activated On Close

Syntax:	config fmae [VALUE]
Abbreviation:	c fmae
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

Use this CLI command to enable "Move/Motion Assist Mode". Enabling this mode disables any currently active mode including Normal mode. All functions of an attached wall switch, remote or home automation connection remain functional in this mode including "**release**" to activate the magnetic brake.

Move assist automatically moves the door in the direction of a manual movement of the panel by the operator. The panel only needs to be moved a fraction of an inch to initiate an automatic motor assisted movement. By default, the panel does not auto close but that can be changed with the modifier "**fmaw**". Brake on Close & Open are not supported with move assist however the magnetic brake can be enabled with the wall switch "release" button if desired.

The Span Adjust Time Limit for Move Assist can be disabled(0) or timed for 1s to 98s. Move assist span adjust cannot be set to "forever(99)".

Command Options

Move Assist supports the following options. Note the span adjust time (fmat) is an independent setting for move assist only, and does NOT support adjust forever(99).

Table	Description
fmad	Span adjustable from 6" to full physical span. Default 40".
fmaw	Auto close disable(0), immediate(1) or delayed(1s to 1day)
fmab	Brake On Close disable(0), immediate(1) or delayed(1s to 1day)
fmat	Span adjust time disable(0), time limit(1 – 98s).
mbpop	Brake On Open is not supported & ignored with Move Assist enabled

Terminal Output

```
cmd>c fmae 1
203.584: FEATURE: Move Assist ENABLED

cmd>c fmae 0
232.574: FEATURE: Move Assist DISABLED

cmd>c fmae                    // Check feature status; Status is Disabled
0

cmd>c fmae                    // Check feature status; Status is Enabled
1
```

References

pwd	Requires a minimum user level of "Installer"
c fmat	Span adjust time for Move Assist only
c fmad	Move Assist full open span (sub-span)
c fmaw	Move Assist auto close wait time
c mbpop	Brake On Open is IGNORED when this feature is enabled

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 53 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fmad (Feature Move Assist Distance)

Activated On Close

Syntax:	config fmad [VALUE]
Abbreviation:	c fmad
Range/Units:	6" – full span inches
Default:	40 inches

Command Description

This CLI command sets the open position or sub-span for "Move Assist". This is the distance the door will open when this mode is active. If the user adjusted the sub-span manually, the new span will be stored in this parameter.

The sub-span can be set from a minimum of 6" to the physical full span of the door. If the sub-span is set to a value greater than the physical span of the door, the full span is set without error.

Terminal Output

```
cmd>c fmad                  // Check the modifiers current value
40.0000

cmd>c fmad 75.5             // Set new sub-span to 75.5 inches
OK: 75.5000

cmd>c fmad 99999            // Entered sub-span is too large so automatically set to full span
OK: 122.5061

cmd>c fmad 6                // Sub-span set to 6" minimum
OK: 6.0000

cmd>c fmad reset            // Reset sub-span modifier to factory default
40.0000
```

References

pwd	Requires a minimum user level of "Installer"
c fmae	Move Assist enable
c fmat	Span adjust time for Move Assist only
c fmad	Move Assist full open span (sub-span)
c fmaw	Move Assist auto close wait time
c mbpop	Brake-On-Open is IGNORED when this feature is enabled
Appendix B	Inch position to Encoder count conversion table.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 54 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

fmaw (Feature Move Assist Wait Time)

Activated On Close

Syntax:	config fmaw [VALUE]
Abbreviation:	c fmaw
Range/Units:	0 – 86400 seconds
Default:	0 seconds (Disabled)

Command Description

This modifier adjusts the wait before auto-closing while in Move Assist. The default is disabled(0), but it can be set to close immediately(1) or to delay closure from (2s to 1day).

The time limit set here takes precedence over the span adjust time set by the "**fmat**" command. For more information refer to "Tech Brief – Info Report, Actual Adjustment Time".

Terminal Output

```
cmd>c fmaw              // Check the modifier's current value
0

cmd>c fmaw 1            // Set auto close to immediately
OK: 1

cmd>c fmaw 60           // Set auto close delay to 60s
OK: 60

cmd>c fmaw 3600         // Set auto close delay to 1 hour
OK: 3600

cmd>c fmaw 86400        // Set auto close delay to 1 day
OK: 86400

cmd>c fmaw reset        // Set auto close to factory default
0
```

References

pwd	Requires a minimum user level of "Installer"
c fmae	Move Assist enable
c fmat	Span adjust time for Move Assist only
c fmad	Move Assist full open span (sub-span)
c fmaw	Move Assist auto close wait time
c mbpop	Brake On Open is IGNORED when this feature is enabled
Tech Brief	Info Report, Actual Adjustment time
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 55 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fmat (Feature Move Assist Span Adjust Time)

Syntax:	config fmat [VALUE]
Abbreviation:	c fmat
Range/Units:	0 – 98 seconds
Default:	5 seconds

Activated On Close

Command Description

This parameter sets the span adjust time limit an operator has to adjust the sub-span of the door just after the door has reached its programmed open position. It is **Move Assist** is specific. Upon stopping, a timer is started, set to "**fmat**" seconds allowing the operator to manually move the panels to a new open position. If panel movement begins before the "**fmat**" timer runs out AND does not stop during the adjustment for longer than "**fmat**" seconds, the new span will be registered for this feature.

For modes that support auto-close, the time limit for auto close can shorten or eliminate the span adjust time. Refer to the "Tech Brief – Info Report, Actual Adjustment Time" for more information.

If additional changes to the span are required after an adjustment is attempted, pressing Open again, even while at full open, will give the operator an additional "**fmat**" timer run to retry the span adjustment for Move Assist.

Panel 1 Manually Moved To…	Description
Between 6" from closed TO 2" from full open	Sub-span is SET for the active feature
Between 2" & 4" from closed	Sub-span is SET to the minimum span of 6"
Less than 2" from closed	Sub-span is NOT set
Between 2" from full open & full open	Sub-span is set to the full open value

Terminal Output

```
cmd>c fmat                   // Report the current span adjust time for Move Assist
5
cmd>c fmat 1                 // Set span adjust time to 1 second which is too short to be useful.
OK: 1

cmd>c fmat 30                // Set span adjust time to 30 seconds
OK: 30

cmd>c fmat 98                // Set span adjust time to its maximum timed period of 98 seconds
OK: 98

cmd>c fmat reset             // Reset span adjust time period to factory default of 5 seconds
5
```

References

pwd	Requires a minimum user level of "Installer"
c fmae	Move Assist Enable
c fmat	Span adjust time for Move Assist only
c fmad	Move Assist full open span (sub-span)
c fmaw	Move Assist auto close wait time
c mbpop	Brake On Open is IGNORED when this feature is enabled
Tech Brief	Info Report, Actual Adjustment Time
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fsat (Shared Feature Span Adjust Time)

Activated On Close

Syntax:	config fsat [VALUE]
Abbreviation:	c fmat
Range/Units:	0 – 98 seconds or 99(forever)
Default:	5 seconds

Command Description

This parameter sets the time limit for an operator to adjust the span of the door just after the door has reached its programmed open position and stopped while **Normal, Party Mode, Egress,** or **One Button Operation** are enabled. Upon stopping a timer is started, set to "**fsat**" seconds allowing the operator to manually move the panels to a new open position. If panel movement begins before the "**fmat**" timer runs out AND does not stop during the adjustment for longer than "**fsat**" seconds, the new span will be registered for this feature.

If additional changes to the span are required after an adjustment is attempted, pressing Open again, even while at full open, will give the operator an additional "**fsat**" timer run to retry the span adjustment for the currently active mode.

Span adjust for all these features can be disabled(0) or enabled with a timer value from 1 to 98s. Setting the parameter to 99 sets the span adjust time to unlimited or "forever". *For modes that support auto-close, the time limit for auto close can shorten or eliminate the span adjust time. Refer to the "Tech Brief – Info Report, Actual Adjustment Time" for more information.*

Panel 1 Manually Moved To…	Description
Between 6" from closed TO 2" from full open	Sub-span is SET for the active feature
Between 2" & 4" from closed	Sub-span is SET to the minimum span of 6"
Less than 2" from closed	Sub-span is NOT set
Between 2" from full open & full open	Sub-span is set to the full open value

Commands Sharing this Parameter

The shared parameter "**fsat**" controls the span adjust time for **Normal** as well as **Party Mode**, **Egress Mode** and **One Button Operation** as these are the only features that support an unlimited adjustment period(99).

Terminal Output

```
cmd>c fsat                  // Report the current span adjust time for Normal, Party Mode Egress & OBO
5
cmd>c fsat 1                // Set span adjust time to 1 second which is too short to be useful.
OK: 1
cmd>c fsat 98               // Set span adjust time to its maximum timed period of 98 seconds
OK: 98
cmd>c fsat 99               // Set span adjust time period to "forever" with (99)
OK: 99
cmd>c fsat reset            // Reset span adjust time period to factory default of 5 seconds
5
```

References

pwd	Requires a minimum user level of "Installer"
c fpme	Party Mode enable
c fege	Egress Mode enable
c fobe	One Button Operation enable
Tech Brief	Info Report "Actual Adjustment Time"
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fobe (Feature One Button Operation Enable)

Activated On Close

Syntax:	config fobe [VALUE]
Abbreviation:	c fobe
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

CLI command to enable "One Button Operation/Simplicity Mode". Enabling this mode disables any currently active mode including Normal mode. One Button Operation makes the door operate like an automated garage door opener.

One Button Operation uses a single wall switch button/command to open, close and stop the door. It operates in the same manner as a garage door opener. The "Stop" button/command is used to initiate all door movements. If the door is opening and "Stop" is pressed, the door stops. Pressing "Stop" again will close the door. Once the door reaches programmed open or close, pressing "Stop" will move the door to the opposite jam.

All functions of an attached wall switch or remote remain functional, except for the "Stop" function, where it will perform as previously described.

Command Options

One Button Operation supports the following options. Note the span adjust time (fsat) is shared between Normal & Party Mode, Egress, and One Button Operation.

Table	Description
fobd	Span adjustable from 6" to full physical span. Default 40".
fobw	Auto close disable(0), immediate(1) or delayed(1s to 1day)
fobb	Brake On Close disable(0), immediate(1) or delayed(1s to 1day)
fsat	Span adjust time disable(0), time limit(1 – 98s), forever(99)
mbpop	Brake On Open disable(0), enabled(1)

Terminal Output

```
cmd>c fobe 1
277.772: FEATURE: One Button Operation ENABLED

cmd>c fobe 0
332.330: FEATURE: One Button Operation DISABLED

cmd>c fobe                // Check feature status; Status is Disabled
0

cmd>c fobe                // Check feature status; Status is Enabled
1
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fobd	One Button Operation full open span (sub-span)
c fobw	One Button Operation auto close wait time
c fobb	One Button Operation brake on close enable, disable or delay
c mbpop	Brake on Open

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 58 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fobd (Feature One Button Op Distance)

Activated On Close

Syntax:	config fobd [VALUE]
Abbreviation:	c fobd
Range/Units:	6" – full span in inches
Default:	40 inches

Command Description

CLI command to set the open distance or sub-span for "One Button Operation". This is the distance the door will open when this mode is active. If the user adjusted the sub-span manually, the new span will be stored in this parameter.

The sub-span can be set from a minimum of 6" to the physical full span of the door. If the sub-span is set to a value greater than the physical span of the door, the full span is set without error.

Terminal Output

```
cmd>c fobd                 // Check the modifiers current value
40.0000

cmd>c fobd 75.5            // Set new sub-span to 75.5 inches
OK: 75.5000

cmd>c fobd 99999           // Entered sub-span is too large so automatically set to full span
OK: 122.5061

cmd>c fobd 6               // Sub-span set to 6" minimum
OK: 6.0000

cmd>c fobd reset           // Reset sub-span modifier to factory default
40.0000
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fobe	One Button Operation enable
c fobw	One Button Operation auto close wait time
c fobb	One Button Operation brake on close enable, disable or delay
c mbpop	Brake on Open
Appendix B	Inch position to Encoder count conversion table.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 59 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

fobw (Feature One Button Op Wait)

Activated On Close

Syntax:	config fobw [VALUE]
Abbreviation:	c fobw
Range/Units:	0 – 86400 seconds
Default:	0 seconds (Disabled)

Command Description

This modifier adjusts the wait before auto-closing while in One Button Operation mode. The default is disabled(0), but it can be set to close immediately(1) or to delay closure from (2s to 1day).

The time limit set here takes precedence over the span adjust time set by the "**fsat**" command. For more information refer to "Tech Brief – Info Report, Actual Adjustment Time".

Terminal Output

```
cmd>c fobw              // Check the modifier's current value
0

cmd>c fobw 1            // Set auto close to immediately
OK: 1

cmd>c fobw 60           // Set auto close delay to 60s
OK: 60

cmd>c fobw 3600         // Set auto close delay to 1 hour
OK: 3600

cmd>c fobw 86400        // Set auto close delay to 1 day
OK: 86400

cmd>c fobw reset        // Set auto close to factory default
0
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fobe	One Button Operation enable
c fobd	One Button Operation full open span (sub-span)
c fobb	One Button Operation brake on close enable, disable or delay
c mbpop	Brake on Open
Tech Brief	Info Report, Actual Adjustment time
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 60 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fobb (Feature One Button Op Brake on Close)

Syntax:	config fobb [optional]
Abbreviation:	c fobb
Range/Units:	0 – 86400 seconds
Default:	0 seconds (Disabled)

**Activated
On Close**

Command Description

This modifier adjusts the wait period before engaging the magnetic brake when in One Button Operation and the door has just closed. The default is disabled(0), but it can be set to brake immediately(1) or to delay the brake from (2s to 1day).

A setting of 1 does not mean, delay by 1 second. When set to 1, the brake is enabled immediately to help lock the panel in place for installs that have a warped jam which can cause the panel to "bounce" out as the clutch disengages. Previous controllers had a separate "brake timer" that would control this functionality.

When set to 1, the G3 on close will engage the brake *before* releasing the clutch to lock the panel in place and prevent panel "bounce out".

"fobb" Value	Description
0	Brake on close is DISABLED
1	Brake is engaged IMMEDIATELY on close before releasing the clutch
2 – 86400	Brake is engaged after a delay of this many seconds. 2s – 1day

Terminal Output

```
cmd>c fobb              // Check the modifier's current value
0

cmd>c fobb 1            // Set brake on close to immediately
OK: 1

cmd>c fobb 60           // Set brake on close delay to 60s
OK: 60

cmd>c fobb 3600         // Set brake on close delay to 1 hour
OK: 3600

cmd>c fobb 86400        // Set brake on close delay to 1 day
OK: 86400

cmd>c fobb reset        // Set brake on close to factory default
0
```

References

pwd	Requires a minimum user level of "Installer"
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fobe	One Button Operation enable
c fobd	One Button Operation full open span (sub-span)
c fobw	One Button Operation auto close wait time
c mbpop	Brake on Open
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

INMOTION

A Caldwell Company

mhdc (Modifier Hard Close Enable [Global])

Syntax:	config mhdc [VALUE]
Abbreviation:	c mhdc
Range/Units:	0 – 1
Default:	1 (Enabled)

Command Description

While closing with this parameter enabled, the amount of motor current is slightly increased to overcome the friction demands of door entering the jam with heavy weather-strip or a deep channel jam.

The default for Hard Close is enabled as it really helps at making sure that one-way panels are pushed deep enough into the jam so that the mechanical lock can be engaged after every cycle. When used on a bi-part it ensures both panels meet in the center tightly.

The force applied is controlled by the modifier "**hdctf**" which multiplies the applied torque when the lead panel is near the closed or open position. The term "near" means at or less than the jam depth set during programming using the parameter "**pje**". The jam depth is typically around a half an inch but will vary depending on how deep the jam was set during programming.

The second modifier which controls both Hard Close & Open is "**hdclf**". The "**hdclf**" adds to the defined current limit at the either end of the span. If for example the panel is over currenting while pushing the panel into the jam, the "**hdclf**" can be increased in small increments until over current issues are resolved.

Terminal Output

```
cmd>c mhdc                  // Report the current value of this parameter
1

cmd>c mhdc 0                // Disable Hard Close
OK: 0

cmd>c mhdc reset            // Reset Hard Close to factory default
1

cmd>c mhdc 1                // Enable Hard Close
OK: 1
```

References

pwd	Requires a minimum user level of "Installer"
c mhdo	Hard Open enable modifier
c hdctf	Hard Open & Close torque factor
c hdclf	Hard Open & Close limit factor

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 62 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

mhdo (Modifier Hard Open Enable [Global])

Syntax:	config mhdo [VALUE]
Abbreviation:	c mhdo
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

This parameter is the opposite of Hard Close where additional motor current is applied during the close cycle from full open. If for some reason the panel, at full open, requires more torque to pull out of a pocket for this parameter will apply addition power without an over overcurrent.

The force applied is controlled by the modifier "**hdctf**" which multiplies the applied torque when the lead panel is either near the closed or open position. The term "near" means at or less than the jam depth set during programming using the parameter "**pje**". The jam depth is typically around a half an inch but will vary depending on how deep the jam was set during programming.

The second modify which controller both Hard Close & Open is "**hdclf**". The "**hdclf**" adds to the defined current limit at the either end of the span. If for example the panel is over currenting while pushing into the jam, the "**hdclf**" can be increased in small increments until over current issues are resolved.

Terminal Output

```
cmd>c mhdo                 // Report the current value of this parameter
1

cmd>c mhdo 0               // Disable Hard Open
OK: 0

cmd>c mhdo reset           // Reset Hard Open to factory default
1

cmd>c mhdo 1               // Enable Open Close
OK: 1
```

References

pwd	Requires a minimum user level of "Installer"
c mhdc	Hard Close enable modifier
c hdctf	Hard Open & Close torque factor
c hdclf	Hard Open & Close limit factor

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

mbd (Modifier Brake Disable [Global])

Activated On Close

Syntax:	config mbd [VALUE]
Abbreviation:	c mbd
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

This parameter will disable the magnetic brake for nearly all controller functions. Some installs utilize a 3rd party locking mechanism to secure the door and the magnetic brake can interfere with this. In the past installers would disconnect the brake at the motor BOB. With the G3, the brake can be disabled with this parameter.

Wall switch "release/unlock" commands will be ignored as well as the CLI "button release/unlock" commands. Brake on close & open are also disabled. The only brake functionality that does work is the help command "**brake**".

Note that when this feature is enabled, the "motor" click sound used during programming and selecting features from a wall switch will be noticeably quieter since the brake is disabled and only the clutch is used to make the "click" sound.

Terminal Output

```
cmd>c mbd                  // Report the status of this parameter
0

cmd>c mbd 1                // Enable Brake Disable global modifier
OK: 1

cmd>b unlock               // If enabled & unlock is attempted the brake does not toggle with CLI message
OK
128.758: FEATURE: Brake DISABLED.
  Use 'c mbd 0' to ENABLE brake functionality.

cmd>c mbd 0                // Disable Brake Disable meaning the brake is now free to operate
OK: 0

cmd>c mbd reset            // Reset Brake Disable to factory default or disabled
0
```

References

pwd	Requires a minimum user level of "Installer"
brake	When "mbd" is enabled, the help "brake" command remains functional.
b unlock	When "mbd" is enabled, the button command will NOT toggle the brake.
c fpmb	When "mbd" is enabled, Party Mode brake on close will be disabled
c fegb	When "mbd" is enabled, Egress Mode brake on close will be disabled
c fobe	When "mbd" is enabled, One Button Operation brake on close will be disabled

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 64 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

mboc (Modifier Brake On Close [Normal])

Activated On Close

Syntax:	config mboc [VALUE]
Abbreviation:	c mboc
Range/Units:	0 – 86400
Default:	1 (Enable)

Command Description

In normal mode, the "**mboc**" parameter enables, disables, or delays the brake on close.

A setting of 1 does not mean, delay by 1 second. When set to 1, the brake is enabled immediately to help lock the panel in place for installs that have a warped jam which can cause the panel to "bounce" out as the clutch disengages. Previous controllers had a separate "brake timer" that would control this functionality.

When set to 1, the G3 on close will engage the brake *before* releasing the clutch to lock the panel in place and prevent panel "bounce out".

"mboc" Value	Description
0	Brake on close is DISABLED
1	Brake is engaged IMMEDIATELY on close before releasing the clutch
2 – 86400	Brake is engaged after a delay of this many seconds. 2s – 1day

Terminal Output

```
cmd>c mboc               // Report the status of this parameter
1

cmd>c mboc 0             // Disable Brake On Close
OK: 0

cmd>c mboc reset         // Reset Brake On Close to factory default
1

cmd>c mboc 1             // Enable Brake On Close
OK: 1
```

References

pwd	Requires a minimum user level of "Installer"
c mbd	When "mbd" global brake disable is enabled, brake on close will not enable the brake.
Appendix A	Minutes/Hours to seconds conversion for brake on close & auto close time parameters.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 65 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

mbpop (Modifier Brake On Open [Global])

Activated On Close

Syntax:	config mbpop [VALUE]
Abbreviation:	c mbpop
Range/Units:	0 – 1
Default:	0 (Disabled)

Command Description

Enabling "**mbpop**" enables the magnetic brake after the door reaches its programmed open position. The open position can be its full programmed open position or a sub-span open position.

Unlike the brake on close functionality, it does not support delayed enabling and activates the brake immediately at the open position.

This is a global feature meaning when enabled, it affects nearly all modes including Normal & Special Feature modes. The exception is Move Assist which does not allow any magnetic brake enabling unless commanded from a wall switch, remote or home automation controller by the operator.

Terminal Output

```
cmd>c mbpop              // Report the status of this parameter
0

cmd>c mbpop 1            // Enable Brake On Open
OK: 1

cmd>c mbpop 0            // Disable Brake On Open
OK: 0

cmd>c mbpop reset        // Set Disable Brake On Open to factory default or disabled.
0
```

References

pwd	Requires a minimum user level of "Installer"
c mboc	Brake on Close parameter
c mbd	The global brake disable parameter will prevent this modifier from enabling the brake

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

acco (Acceleration for Open)

Syntax:	config acco [VALUE]
Abbreviation:	c acco
Range/Units:	0.5 – 30 seconds
Default:	2.5 seconds

Command Description

The Acceleration for Open "**acco**", sets the number of seconds the motor will take to ramp its velocity from stopped to full speed as set by the Open Speed "**osp**" setting.

The default of 2.5s is a good balance for most installations. If a door is on the heavy side, increasing "**acco**" can help if the motor struggles to ramp the panel to full speed while opening. This is exactly the way the "hfi" command helps with "TLE" over-current/over-temp issues.

Decreasing the "**acco**" to speed up the door should be done with a bit of caution. If the "**acco**" is set to a very short duration such as 0.5 seconds and cannot ramp the panel fast enough the controller may fail with a friction fault or noticeable jerky motions.

Unless there is a real need, its best to keep this parameter at the factory setting or at least greater than 1.5 seconds to be safe.

When a partial move is enabled, that is when a panel is commanded to move from a position other than full open or full close, the Acceleration Partial Move Factor "**apmf**" is multiplied by "**acco**" to create an increased acceleration time, i.e. it will take longer to get up to speed. This acceleration increase is needed to pick up out-of-place panels or during sub span moves when partial moves are active.

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c acco
2.5000

cmd>c acco 5
OK: 5.0000

cmd>c acco reset
2.5000
```

References

pwd	Requires a minimum user level of "Installer"
c apmf	Acceleration "partial move" factor. "apmf" multiplies this parameter for partial moves.
c accc	Acceleration for Close and Acceleration `for Open should be set to the same value
c osp	Open speed setting
c csp	Close speed setting
c hfi	This parameter can be changed by the "hfi" command to help address "TLE" issues
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 67 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

accc (Acceleration for Close)

Syntax: config accc [VALUE]
Abbreviation: c accc
Range/Units: 0.5 – 30 seconds
Default: 2.5 seconds

Command Description

The Acceleration for Close "**accc**", sets the number of seconds the motor will take to ramp its velocity from stopped to full speed as set by the Close Speed "**csp**" setting.

The default of 2.5s is a good balance for most installations. If a door is on heavy side increasing "**accc**" can help if the motor struggles to ramp the panel to full speed while closing. This is exactly the way the "hfi" command helps with "TLE" over-current/over-temp issues.

Decreasing the "**accc**" to speed up the door should be done with a bit of caution. If the "**accc**" is set to a very short duration such as 0.5 seconds and cannot ramp the panel fast enough the controller may fail with a friction fault or noticeable jerky motions.

Unless there is are real need its best to keep this parameter at the factory setting or at least greater than 1.5 seconds to be safe.

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c accc
2.5000

cmd>c acco 5
OK: 5.0000

cmd>c accc reset
2.5000
```

References

pwd	Requires a minimum user level of "Installer"
c acco	Acceleration for Open & Acceleration for Close should be set to the same value
c apmf	Acceleration "partial move" factor. "apmf" multiplies this parameter for partial moves.
c osp	Open speed setting
c csp	Close speed setting
c hfi	This parameter can be changed by the "hfi" command to help address "TLE" issues
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 68 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

deco (Deceleration for Open)

Syntax:	config deco [VALUE]
Abbreviation:	c deco
Range/Units:	0.5 – 30 seconds
Default:	3.0 seconds

Acceleration	Open Or Close Speed	Deceleration	Crawl Speed	Crawl Deceleration
Start	Motor Speed / Torque Curve			Stop
	Span (Jam to Jam)			

| OPEN: | "acco" | "osp" | "deco" | "crsp" | "crdc" |
| CLOSE: | "accc" | "csp" | "decc" | "crsp" | "crdc" |

Command Description

The "**deco**" command tells motor how many seconds to decelerate from full speed to crawl speed before finally coming to a halt while opening. Testing has shown that 3 seconds is good average deceleration time for most doors.

Extremely fast deceleration times of 1s or less should be avoided as it can cause the door "jerk" while slowing down. The excessive momentum causes an overshoot of the short period deceleration time and motor attempts to correct this and fails.

The same door momentum issue can also cause problem in the learned friction profile. In this case the door's momentum causes an artificially low motor current value to be stored in the profile table. This low point tends to cause friction faults when passing through that bin location in the span. The only fix is to increase the deceleration for open/close and reprogram.

For heavy doors such as large glass panels, with lots of mass AND extremely smooth movement, momentum may cause the door to overrun its programmed deceleration value because 3.0 seconds is not long enough. If the motor cannot correct its position while decelerating, the correction attempts may cause the panel to jerk or vibrate, sometimes violently. Increasing the deceleration to 5, 6 or more seconds will allow the door to slow down naturally, not back drive the motor and avoid motor over correction attempts.

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c deco
3.0000                      // Report the status of the parameter

cmd>c deco 1                // Set Deceleration for Open to 1 second
OK: 1.0000

cmd>c deco reset            // Reset the Deceleration for Open parameter to the factory default
3.0000
```

References

pwd	Requires a minimum user level of "Installer"
c decc	Deceleration for Close
c osp	Sets the Open speed in inches / second
c csp	Sets the Close speed in inches / second
c hfi	This parameter can be changed by the "hfi" command to help address "TLE" issues
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

decc (Deceleration for Close)

Syntax: config decc [VALUE]
Abbreviation: c decc
Range/Units: 0 – 30.0 seconds
Default: 3.0 seconds

	Acceleration	Open Or Close Speed	Deceleration	Crawl Speed	Crawl Deceleration
	Start	Motor Speed / Torque Curve			Stop
		Span (Jam to Jam)			
OPEN:	"acco"	"osp"	"deco"	"crsp"	"crdc"
CLOSE:	"accc"	"csp"	"decc"	"crsp"	"crdc"

Command Description

The "**decc**" command tells motor how many seconds to decelerate from full speed to crawl speed before finally coming to a halt while closing. Testing has shown that 3 seconds is good average deceleration time for most doors.

Extremely fast deceleration times of 1s or less should be avoided as it can cause the door "jerk" while slowing down. The excessive momentum causes an overshoot of the short period deceleration time and motor attempts to correct this and fails.

The same door momentum issue can also cause problem in the learned friction profile. In this case the door's momentum causes an artificially low motor current value to be stored in the profile table. This low point tends to cause friction faults when passing through that bin location in the span. The only fix is to increase the deceleration for open/close and reprogram.

For heavy doors such as large glass panels, with lots of mass AND extremely smooth movement, momentum may cause the door to overrun its programmed deceleration value because 3.0 seconds is not long enough. If the motor cannot correct its position while decelerating, the correction attempts may cause the panel to jerk or vibrate, sometimes violently. Increasing the deceleration to 5, 6 or more seconds will allow the door to slow down naturally, not back drive the motor and avoid motor over correction attempts.

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c decc
3.0000                      // Report the status of the parameter

cmd>c decc 1                // Set Deceleration for Close to 1 second
OK: 1.0000

cmd>c decc reset            // Reset the Deceleration for Close parameter to the factory default
3.0000
```

References

pwd   Requires a minimum user level of "Installer"
c deco   Deceleration for Open
c osp   Sets the Open speed in inches / second
c csp   Sets the Close speed in inches / second
c hfi   This parameter can be changed by the "hfi" command to help address "TLE" issues
Tech Brief   TLE Mitigation

INMOTION

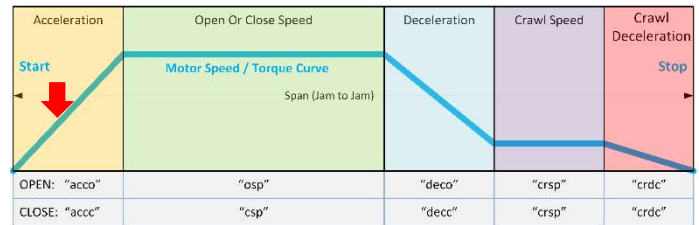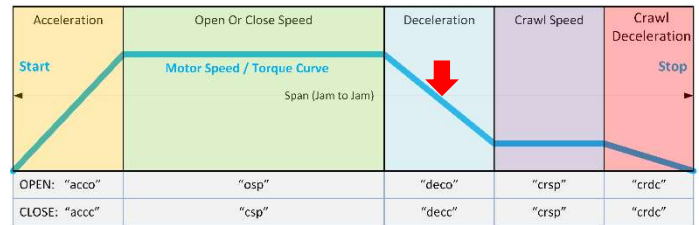A Caldwell Company

csp (Close Speed)

Syntax:	config csp [VALUE]
Abbreviation:	c csp
Range/Units:	0 – 10.0 in / sec
Default:	4.0 IPS

Command Description

The "**csp**" setting sets the close speed in inches / second. The speed setting as well as the "av" (Actual Velocity) help command, which reports the current speed, are approximations only. Setting the speed to 10 does not guarantee the door will move that fast. The motor will attempt to run at the commanded speed but, due to the door's mass, track friction and a dozen other factors, it may not be possible. When this happens, the controller may cause erratic door movements as it tries to correct for velocity and positional errors.

Open and close speeds have been carefully selected to provide smooth operation during panel pickups and helps avoid panels slamming into their collector plates and interlocks. Running panels too fast can result in bent collector plates or damaged collectors. It is best to select a speed that results in smooth panel pickups and controlled acceleration & deceleration ramps.

If the speed of the panel is increased to 6 IPS or higher, the default acceleration & deceleration parameters should also be increased to avoid erratic door movements. Setting any speed above 6.0 IPS is not recommended.

"csp"	Acceleration, Deceleration & Crawl Speed Recomenations
4.0 IPS	At 4.0 IPS acceleration & deceleration values should be adequate
5.0 IPS	Set accel/decel open & close to 3.5 - 4.5 seconds
6.0+ IPS	Set accel/decel open & close to 4.0 - 6.0 seconds

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c csp               // Report the status of the parameter
4.0000

cmd>c csp 7             // Set the Close Speed to 7 inches / second
OK: 7.0000

cmd>c csp reset         // Reset Close Speed to factory default
4.0000
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c acco	Acceleration for Open. Should be the same or close to the accel value for close.
c accc	Acceleration for Close. Should be the same or close to the accel value for open.
c deco	Deceleration for Open. Should be the same or close to the decel value for close.
c decc	Deceleration for Close. Should be the same or close to the decel value for open.
c hfi	This parameter can be changed by the "hfi" command to help address "TLE" issues.
c spl	The speed limit, if set may limit the close speed
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 71 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels
☒ User
☑ Installer
☑ Developer
☑ Factory

osp (Open Speed)

Syntax:	config osp [VALUE]
Abbreviation:	c osp
Range/Units:	0 – 10.0 in / sec
Default:	4.0 IPS

Command Description

The "**osp**" setting sets the open speed in inches / second. The speed setting as well as the "av" (Actual Velocity) help command, which reports the current speed, are approximations only. Setting the speed to 10 does not guarantee the door will move that fast. The motor will attempt to run at the commanded speed but, due to the door's mass, track friction and a dozen other factors it may not be possible. When this happens, the controller may cause erratic door movements as it tries to correct for velocity and positional errors.

Open and close speeds have been carefully selected to provide smooth operation during panel pickups and helps avoid panels slamming into their collector plates and interlocks. Running panels too fast can result in bent collector plates or damaged collectors. It is best to select a speed that results in smooth panel pickups and controlled acceleration & deceleration ramps.

If the speed of the panel is increased to 6 IPS or higher, the default acceleration & deceleration parameters should also be increased to avoid erratic door movements. Setting any speed above 6.0 IPS is not recommended.

"csp"	Acceleration, Deceleration & Crawl Speed Recomenations
4.0 IPS	At 4.0 IPS acceleration & deceleration values should be adequate
5.0 IPS	Set accel/decel open & close to 3.5 - 4.5 seconds
6.0+ IPS	Set accel/decel open & close to 4.0 - 6.0 seconds

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c osp                // Report the status of the parameter
4.0000

cmd>c osp 7              // Set the Open Speed to 7 inches / second
OK: 7.0000

cmd>c osp reset          // Reset Close Speed to factory default
4.0000
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c acco	Acceleration for Open. Should be the same or close to the accel value for close.
c accc	Acceleration for Close. Should be the same or close to the accel value for open.
c deco	Deceleration for Open. Should be the same or close to the decel value for close.
c decc	Deceleration for Close. Should be the same or close to the decel value for open.
c hfi	This parameter can be changed by the "hfi" command to help address "TLE" issues.
c spl	The speed limit, if set may limit the open speed.
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

spl (Speed Limit)

Syntax:	config spl [VALUE] **(Firmware v0.7.2 and later)**
Abbreviation:	c osp
Range/Units:	0 – 10.0 in / sec
Default:	0 IPS (Disabled)

Command Description

The "**spl**" setting limits both the open (osp) and close (csp) speeds. It is useful when "tuning" a door because it allows the installer to effectively set both speeds using a single command. When set to a value less than either the open speed or close speed, the door's velocity will not exceed the speed limit during travel. When set to "0", the speed limit is disabled and the open and close speeds will be in effect. When experimenting with a speed limit make sure the open (osp) and close (csp) speeds are higher than the desired speed limit otherwise a speed limit will have no effect.

Parameter Protection

Due to this parameter's relationship with the "hfi" command it has some built in protection from accidental changes while performing other operations.

- config all reset: Will not change this parameter's value.

Terminal Output

```
cmd>c spl                 // Report the status of the parameter
3.0000

cmd>c spl 3               // Limits the open(osp) & close(csp) speeds to 3 inches/sec
OK: 7.0000

cmd>c spl reset           // Reset Close Speed to factory default
0.0000
```

References

pwd	Requires a minimum user level of "Installer"
avi	Help command that reports the panel's velocity in inches / sec. (Firmware v0.7.2 and later)
acdc	Sets both acceleration & deceleration. (Firmware v0.7.2 and later)
c osp	Open speed setting. Open and close speeds are typically the same.
c csp	Close speed setting. Open and close speeds are typically the same.
c hfi	Useful while experimenting with custom "hfi" settings. (Firmware v0.7.2 and later)
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

☒	User
☑	Installer
☑	Developer
☑	Factory

crsp (Crawl Speed)

Syntax:	config crsp [VALUE]
Abbreviation:	c crdc
Range/Units:	0 – 5.0 seconds
Default:	2.0 seconds

Command Description

The "**crsp**" setting adjusts the number of seconds the run the motor at crawl speed after decelerating from the full run speed set by "**osp**" or "**csp**" before decelerating again to stop. This parameter has not been shown to require any modification in the field. It is however available when and if it is ever needed.

Terminal Output

```
cmd>c crdc              // Report parameter value
1.0000
cmd>c crsp              // Set crawl speed to 2.0 IPS
2.0000
cmd>c crsp 4            // Set crawl speed to 2.0 IPS
OK: 4.0000
cmd>c crsp reset        // Reset crawl speed to factory default
2.0000
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c csp	Close speed setting. Open and close speeds are typically the same.
c acco	Acceleration for Open. Should be the same or close to the accel value for close.
c accc	Acceleration for Close. Should be the same or close to the accel value for open.
c deco	Deceleration for Open. Should be the same or close to the decel value for close.
c decc	Deceleration for Close. Should be the same or close to the decel value for open.
c crdc	Crawl deceleration. May need to increase for high speed, high momentum panels.

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

crdc (Crawl Deceleration)

Syntax: config crdc [VALUE]
Abbreviation: c crdc
Range/Units: 0.5 – 5.0 seconds
Default: 1.0 second

Command Description

After the door completes its timed crawl speed portion of a movement, it ramps down one more time before stopping the panel. This final ramp time is the "**crdc**" setting. The "**crdc**" value tends to be quite small because the panel speed at this point is already very low.

Terminal Output

```
cmd>c crdc                  // Report parameter value
1.0000

cmd>c crdc 5                // Set Crawl Deceleration to 5 seconds
OK: 5.0000

cmd>c crdc reset            // Reset Crawl Deceleration to factory default
1.0000utput here
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c csp	Close speed setting. Open and close speeds are typically the same.
c acco	Acceleration for Open. Should be the same or close to the accel value for close.
c accc	Acceleration for Close. Should be the same or close to the accel value for open.
c deco	Deceleration for Open. Should be the same or close to the decel value for close.
c decc	Deceleration for Close. Should be the same or close to the decel value for open.
c crsp	Crawl speed. May need to adjust for high speed, high momentum panels.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

apmf (Acceleration Partial Move Factor)

Syntax:	config apmf [VALUE]
Abbreviation:	c apmf
Range/Units:	0.0000 – 20.0000
Default:	5.0

Command Description

The "**apmf**" parameter sets the partial move acceleration factor. This setting is multiplied by the Acceleration for Open or Closed, to extend the acceleration ramp during a partial move. Partial moves are any movement that does not begin at full open or full closed, in other words movements that begin "mid-span".

Special note for HFI and TLE Faults: If the installation is utilizing the "High Friction Installation" command "**hfi**", the recommendation is to set this parameter to 1.0. This will prevent the acceleration values from being increased 5x from their already high value set by "**hfi**" setting. If "**apmf**" is NOT reset, the result will be the accel time will be increased to 45s (15s x 5) on partial moves causing the door to move slowly for too long a period.

If the door is stopped mid span due to a command, over current or fault or a sub span setting a movement from this point is considered a "partial move". The door will also move utilize this parameter when operating under a "sub-span".

Partial moves are special because the door has been stopped and the location of the panels can be indeterminant. This parameter extends the acceleration time to help smoothly pick up panels when they are out of position without causing additional friction faults.

Terminal Output

```
cmd>c apmf                 // Report parameter value
5.0000

cmd>c apmf 10              // Set Acceleration Partial Move Factor to 10.0
OK: 10.0000

cmd>c apmf reset           // Reset "apmf" to factory default
5.0000
```

References

pwd	Requires a minimum user level of "Installer"
c acco	Acceleration for Open. Should be the same or close to the accel value for close.
c accc	Acceleration for Close. Should be the same or close to the accel value for open.
c vpmf	Velocity partial move factor.
c epmf	Envelope partial move factor.
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

vpmf (Velocity Partial Move Factor)

Syntax:	config vpmf [VALUE]
Abbreviation:	c vpmf
Range/Units:	0.0 – 1.0
Default:	0.70

Command Description

The maximum speed of a partial move is set by this parameter. By default, this speed is set to 70% of either the open speed, "**osp**" or the close speed "**csp**". The speed of a partial move is reduced to help eliminate over currents when panels are out of place due to a mid-span stoppage or friction fault.

Special note for HFI and TLE Faults: If the installation is utilizing the "High Friction Installation" command "**hfi**", this command will reduce the programmed Open & Close by 30% on partial moves. If this causes "TLE" faults on the CLI to reappear, set "vpmf" to 1.0 to allow full speed on partial moves.

Warning: Setting the "**vpmf**" to 0 should only be used for factory debugging. When "**vpmf**" is set to 0, any stoppage will result in a panel that will not be able to move because the speed is set to 0 for mid-span moves.

Terminal Output

```
cmd>c vpmf                  // Report parameter value
0.7000

cmd>c vpmf 0.5              // Set "vpmf" to 50% speed of open or close full speed for partial moves
OK: 0.5000

cmd>c vpmf 1               // Set "vpmf" to 100% speed of open/close effectively disabling "vpmf"
OK: 1.0000

cmd>c vpmf 0               // Sets "vpmf" to 0. DON'T DO THIS.  Panels stopped mid span will not move.
0.0000

cmd>c vpmf reset           // Resets "vmpf" to the factory default
0.7000
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c csp	Close speed setting. Open and close speeds are typically the same.
c apmf	Acceleration partial move factor
c epmf	Envelope partial move factor
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 77 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

epmf (Envelope Partial Move Factor)

Syntax:	config epmf [VALUE]
Abbreviation:	c epmf
Range/Units:	1.0 – 100.0
Default:	1.0 (Disable)

IMPORTANT:

- **This is an advanced command. Consult the factory prior to use.**

Command Description

The "epmf" parameter is used to modify the Friction Profile Envelop Limit during partial moves. Its intended use is to increase the current limit during partial moves when picking up heavy out-of-place panels. The default is 1.0, which when multiplied by the "fpce" parameter has no affect by design.

Misuse of this parameter can cause the controller to ignore genuine friction fault conditions and drive the panel with so much current that it exceeds the UL325's force limit.

Terminal Output

```
cmd>c epmf                 // Report parameter value
1.0000

cmd>c epmf 5               // Multiply friction profile envelope limit by 5x during partial moves
OK: 5.0000

cmd>c epmf reset           // Reset "epmf" to factory default (Disabled)
1.0000
```

References

pwd	Requires a minimum user level of "Installer"
c osp	Open speed setting. Open and close speeds are typically the same.
c csp	Close speed setting. Open and close speeds are typically the same.
c apmf	Acceleration partial move factor
c vpmf	Velocity partial move factor

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 78 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpce (Friction Profile Current Envelope Limit)

Syntax:	config fpce [VALUE]
Abbreviation:	c fpce
Range/Units:	0 – 2000mA (0 Disables Soft Touch)
Default:	470mA

Command Description

The "fpce" is an adjustable current limit the controller uses to determine when something maybe impeding the doors motion and thus representing a safety hazard.

Lowering "fpce" will increase current faults count, friction faults will be triggered more often, and the force required to stop the door is **reduced**. A lower current limit may cause false faults to **increase**.

Increasing "fpce" will reduce the current faults count, friction faults will be triggered less often, and the force required to stop the door is **increased**. A higher current limit may cause false faults to **decrease**.

Increasing "**fpce**" in 50mA steps is recommended for doors that friction fault during normal unimpeded operation. If the "**fpce**" setting is above 600 – 700mA and the door still faults check the door for mechanical issues and repair if necessary.

For more information about "Soft Touch" review the "**fpce**" command and "**Tech Brief – Soft Touch Tuning**" section. Below are parameters used and tested on our factory standard door.

Terminal Output

```
cmd>c fpce               // Report the parameter value
470

cmd>c fpce 125           // Set "fpce" to 125mA
OK: 125

cmd>c fpce reset         // Reset "fpce" to the factory default
470

cmd>c fpce 0             // Disables Soft Touch
OK: 0                    // IF SOFT TOUCH IS DISABLED, the alternate current limit MUST be activated
                         //  using the command 'c fpcl' to immediately stop the door on the first
                         //  overcurrent.  Refer to the Tech Brief:  "Soft Touch" Tuning for more info.
```

References

pwd	Requires a minimum user level of "Installer"
c fpthr	Friction profile fault count
c fpcl	Friction profile hard limit
Tech Brief	"Soft Touch" Tuning

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 79 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpthr (Friction Profile Fault Count Limit)

Syntax:	config fpthr [VALUE]
Abbreviation:	c fpthr
Range/Units:	1 – 2147483647 counts
Default:	10 counts

Command Description

The "**fpthr**" parameter sets the friction profile fault count. When this count is exceeded, the G3 recognizes this as a friction fault and stops the door for safety.

When adjusting "**fpthr**" make larger incremental changes of 100 to 150. If you find yourself with a count of 300, this maybe an indication that the door has mechanical issues that needs to be corrected.

For more information about "Soft Touch" review the "**fpce**" command and "**Tech Brief – Soft Touch Tuning**" section.

Terminal Output

```
cmd>c fpthr            // Report the parameter value
10

cmd>c fpthr 25         // Set "fpthr" to 25 counts
OK: 25

cmd>c fpthr reset      // Reset "fpthr" to the factory default
10
```

References

pwd	Requires a minimum user level of "Installer"
c fpce	Friction profile current envelope limit
c fpcl	Friction profile hard limit
Tech Brief	"Soft Touch" Tuning

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

fpcl (Friction Profile Current Hard Limit)

Syntax:	config fpcl [VALUE]
Abbreviation:	c fpcl
Range/Units:	0 – 8000mA
Default:	0 (Disabled)

IMPORTANT:

- **This is an advanced command. Consult the factory prior to use.**

Command Description

The Friction Profile Hard Limit provides a secondary "peak" current limit. By default this feature is disabled. It does not provide a "soft touch" but instead works on the peak current draw of the motor alone and stops the motor immediately when the limit is exceeded.

Terminal Output

```
cmd>c fpcl                 // Report the parameter value
0

cmd>c fpcl 1500            // Sets "fpcl" to fault when exceeding 1500mA or 1.5A
OK: 1500

cmd>c fpcl reset           // Reset the parameter to factory default which is disabled
0
```

References

pwd	Requires a minimum user level of "Installer"
c fpce	Friction profile current envelope limit
c fpthr	Friction profile fault count
Tech Brief	"Soft Touch" Tuning

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

fpwar (Friction Profile Weighted Average Ratio)

Syntax:	config fpwar [VALUE]
Abbreviation:	c fpwar
Range/Units:	0 – 20
Default:	10

IMPORTANT:

- **This is an advanced command. Consult the factory prior to use.**

Command Description

This parameter controls the motor current averaging ratio used by an internal algorithm. The algorithm averages the real time current values at run time for all modes. Do not modify this parameter without consulting the factory.

Terminal Output

```
cmd>c fpwar               // Report the parameter value
10

cmd>c fpwar 0             // Set "fpwar" to 0 effectively disabling the algorithm
OK: 0

cmd>c fpwar 18            // Set the weighted average ration to 18:1
OK: 18

cmd>c fpwar reset         // Reset the parameter value to factory default
10
```

References

pwd	Requires a minimum user level of "Installer"
dpro	Reports the friction profile table

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

hdctf (CLI Hard Close/Open Torque Factor)

Syntax:	config hdctf [VALUE]
Abbreviation:	c hdctf
Range/Units:	1 – 100
Default:	1 (Minimum torque)

Command Description

The "hdctf" controls the motor torque increase applied when the Hard Close/Open feature is enabled. The values passed to this parameter are very sensitive. The torque increase applied is adjustable from a minimum of 1.0001% @ 1 to a maximum of 1.01% @ 100.

This parameter affects both hard close "mhdc", and hard open "mhdo" modifiers.

Only make small changes to this parameter if needed and use very small incremental changes such as an increase of 1 or 2.

Terminal Output

```
cmd>c hdctf              // Report the current value which is @ 1.0001%
1

cmd>c hdctf 50           // Set the hard close torque to 1.005%
OK: 50

cmd>c hdctf 100          // Set the maximum torque increase @ 1.01%
OK: 100

cmd>c hdctf reset        // Reset the parameter to factory defaults
1
```

References

pwd	Requires a minimum user level of "Installer"
c hdctf	Hard Close/Open Torque Factor
c mhdc	Modifier "Hard Close" enable
c mhdo	Modifier "Hard Open enable

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 83 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

hdclf (Hard Close Open/Close Limit)

Syntax:	config hdclf [VALUE]
Abbreviation:	c hdclf
Range/Units:	1.25 – 5.0
Default:	2.0

Command Description

When hard close/open is enabled, this parameter increases the Friction Profile Current Envelope, "**fpce**" by a factor of 2.0 (default) while the door is within the jam. The jam depth controlled by "**pje**" which was set during programming.

In simpler terms, once the panel has passed the edge of the jam entry, the over current limit is increased by a factor of "**hdclf**" to prevent overcurrent faults during hard close or open.

This parameter does not increase the force applied to the door at the jam, but instead prevents over current faults when pushing into the jam on close or while closing as the door is moved from the full open position.

If while entering the jam, the door stops and backs up this is an indication of a current fault in the jam. There should be a CLI message indicating this. Increasing the "**hdclf**" will raise the current limit threshold to help prevent jam entry faults when hard close/open is enabled.

Terminal Output

```
cmd>c hdclf              // Report parameter value
2.0000

cmd>c hdclf 5            // Set the current envelop to 5 x "fpce" during hard close & open
OK: 5.0000

cmd>c hdclf reset        // Reset "hdclf" to factory default
2.0000
```

References

pwd	Requires a minimum user level of "Installer"
c fpce	Friction profile current envelope limit
c fpcl	Friction profile hard limit
c hdctf	Hard Close/Open Torque Factor
c mhdc	Modifier "Hard Close" enable
c mhdo	Modifier "Hard Open enable
Tech Brief	"Soft Touch" Tuning

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12

Page 84 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

pcl (Position Closed)

Syntax:	config pcl [VALUE]
Abbreviation:	c pcl
Range/Units:	0 – 5.0000 inches
Default:	0 inches

IMPORTANT:

- **This is an advanced command automatically set during programming. Changing this parameter is not recommended.**

Command Description

The command is for factory testing only and must remain at offset 0.0" for production controllers.

This command sets an offset at close in inches. For example, if set to 2.5", then the door will consider the door closed at 2.5" from the actual closed position. The means there will be a 2.5" gap when the door closes.

Parameter Protection

Due to the critical nature of this parameter it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

Terminal Output

```
cmd>c pcl                  // Return the parameter value
0.0000

cmd>c pcl 3.5              // Set the close position offset to 3.5" open
OK: 3.5000

cmd>c pcl 5               // Set the close position offset to 5.0" open
OK: 5.0000

cmd>c pcl reset           // Reset the parameter to factory default
0.0000
```

References

pwd	Requires a minimum user level of "Installer"
pos	Position help command reports true door position in inches regardless of the "pcl" offset.
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

pje (Position Jam Entry)

Syntax:	config pje [VALUE]
Abbreviation:	c pje
Range/Units:	0 – 100.0000 inches
Default:	0.5000 inches

IMPORTANT:

- **This is an advanced command automatically set during programming. Changing this parameter is not recommended.**

Command Description

This parameter stores the jam depth determined during the first panel movement initiated during programming. When panel 1 is moved the requested ¼ - ½", the jam depth is determined and stored in "pje". The stored jam depth is used by the Hard Close feature to enable the extra torque and an increased current limit required to fully seat panel 1 on close.

Setting "pje" to a jam depth which is greater than the actual depth, increases the risk of entrapment and represents a "pinch" hazard for the operator.

For example, if "pje" is set to 5", Hard Close will activate 5.0" from the jam allowing for the possibility of a finger or hand being caught between the closing panel and the jam. With the increased power of Hard Close the door will not stop per the "Soft Touch" parameters and could cause significant injury.

<p style="text-align:center; color:red;">DON'T CHANGE THIS PARAMETER MANUALLY.</p>

In the field there is little reason to change this parameter unless directed to do so by a factory representative.

Terminal Output

```
cmd>c pje                    // Report the parameter value (Determined during programming)
0.5180

cmd>c pje reset              // Set "pje" to the factory default
0.5000

cmd>c pje 0.518              // Set "pje" back to the original programmed value
OK: 0.5180
```

Parameter Protection

Due to the critical nature of this parameter it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

References

pwd	Requires a minimum user level of "Installer"
hdctf	Hard Close & Open Torque Factor
hdctl	Hard Close & Open Current Limit
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

Activated On Close

pop (Position Full Open)

Syntax:	config cmd [VALUE]
Abbreviation:	c pop
Range/Units:	0 – 1200.0000 inches
Default:	0.0000 inches

IMPORTANT:

- **This is an advanced command automatically set during programming. Changing this parameter is not recommended.**

Command Description

The "**pop**" parameter stores the fully open position determined during programming. The last manual panel movement during programming, when the installer moves panel 1 to "full open", sets this parameter.

During programming, it is important that the installer move panel 1 to its full physical or desired "full open" position to maintain alignment to the learned friction profile bins. Changing the "**pop**" value after programming will break this alignment and cause false friction faults near the open position.

Tip: The "**pop**" value is checked at boot to determine if the controller is programmed. If "**pop**" is 0 at boot, the CLI prompts the installer to program the door. If the "**pop**" value is restored, and the controller is rebooted again with "**rst 0**", the controller will boot normally and not require reprogramming (assuming the door was previously programmed before "**pop**" was zeroed)

There is no reason to manually change this value after programming unless directed to do so by a factory representative.

Terminal Output

```
cmd>c pop                   // Report the parameter value
46.1742

cmd>c pop reset             // Resets the parameter to factory default
0.0000

cmd>c pop 46.1742           // Sets the "pop" to the original span of 46.1742"
OK: 46.1742
```

Parameter Protection

Due to the critical nature of this parameter it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

References

pwd	Requires a minimum user level of "Installer"
pops	Full open sub-span parameter
Appendix B	Inch position to Encoder count conversion table.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 87 of 161

INMOTION
A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

pops (Position Sub Span Open)

Activated On Close

Syntax:	config pops [VALUE]
Abbreviation:	c pops
Range/Units:	6 – 1200.0000 inches
Default:	0.0000 inches (Disabled)

Command Description

The "**pops**" parameter stores the sub-span distance for Normal Mode when none of the Special Features are enabled. When an operator performs a manual sub-span adjustment, the sub-span detected is stored in "pops". If "**pops**" is set while a Special Feature is active, the new sub-span will be activated when the user returns the door to Normal mode.

To set a Normal Mode sub-span, first set the new span with "c pops VALUE", then command the door to close. Failure to immediately close the door after setting "pops" will cause the controller to ignore the change.

```
cmd>c pops 25.5            // Sets the Normal Mode subspan to 25.5000"
cmd>b c                    // Command the door to close.  Upon entering the jam the new sub-span is set
```

Setting "pops" to a value greater than the programed full span will result in "pops" being set to the value of full open or "pop" meaning that a sub-span is not really set at all.

Setting "pops" to 0 disables the sub-span function.

Parameter Protection

Due to the critical nature of this parameter, it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

Terminal Output

```
cmd>c pops                 // Sub-span currently disabled.  Door will open to full span
0.0000
cmd>c pops 25              // CLI used to set new sub-span "pops"
OK: 25.0000
cmd>b c                    // Command door to close saves the new "pops" value of 25"
OK
cmd>c pops                 // The sub-span is set and saved. Door will open to 25" now
25.0000

cmd>c pops                 // Sub-span currently disabled.  Door will open to full span
0.0000
cmd>c pops 25              // CLI used to set new sub-span "pops"
OK: 25.0000
cmd>b o                    // Door commanded to open instead of close; "pops" will not be saved. . .
OK
cmd>030.770: FULL sub-span position DISABLED        // Displayed at full open after the span adjust
        25.00 => 46.17 inches                       //   timer expires.  46.17" is full span or "pop"
036.102: 5s Span Adjust timer expired.
cmd>c pops                                          // Verified:  Sub-span setting failed.
0.0000                                              // Door will open to full span width
```

References

pwd	Requires a minimum user level of "Installer"
c pop	Full programmed span as recorded during the controller programming procedure
Appendix B	Inch position to Encoder count conversion table.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

epol (Encoder Polarity)

Syntax:	config epol [VALUE]
Abbreviation:	c epol
Range/Units:	normal or invert
Default:	normal

IMPORTANT:

- **This is an advanced command automatically set during programming. Changing this parameter is not recommended.**

Command Description

The encoder polarity, "epol" is determined during programming and should not need adjustment via the CLI unless instructed to do so by a factory representative.

Parameter Protection

Due to the critical nature of this parameter, it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

Terminal Output

```
cmd>c epol                // Report the parameter value
invert

cmd>c epol normal         // Sets the encoder polarity to "normal"
OK: normal

cmd>c epol invert         // Sets the encoder polarity to "inverted"
OK: invert

cmd>c epol reset          // Resets encoder polarity to "normal"
normal

cmd>c epol invert         // Set the original setting to restore functionality
OK: invert
```

References

pwd	Requires a minimum user level of "Installer"
mdir	Motor polarity determined during programing
pop	Full span determined during programming

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 89 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

mdir (Motor Polarity)

Syntax:	config mdir [VALUE]
Abbreviation:	c mdir
Range/Units:	normal or invert
Default:	normal

IMPORTANT:

- **This is an advanced command automatically set during programming. Changing this parameter is not recommended.**

Command Description

The motor polarity, "mdir" is determined during programming and should not need adjustment via the CLI unless instructed to do so by a factory representative.

Parameter Protection

Due to the critical nature of this parameter, it has some built in protection from accidental changes while performing other operations.

- config all reset: Will NOT change this parameter's value.

Terminal Output

```
cmd>c mdir              // Report the parameter value
invert

cmd>c mdir normal       // Sets the motor polarity to "normal"
OK: normal

cmd>c mdir invert       // Sets the motor polarity to "inverted"
OK: invert

cmd>c mdir reset        // Resets motor polarity to "normal"
normal

cmd>c mdir invert       // Set the original setting to restore functionality
OK: invert
```

References

pwd	Requires a minimum user level of "Installer"
epol	Encoder polarity determined during programing
pop	Full span determined during programming

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

ctfl (Cycle Test Fault Limit)

Syntax:	config ctfl [VALUE]
Abbreviation:	c ctfl
Range/Units:	1 – 1000 cycles
Default:	5 faults

Command Description

The "**ctfl**" parameter is used to set the maximum number of friction faults allowed during a cycle test before failing the test. The number of faults is counted during each cycle starting with an "open" cycle and then the "close" cycle. If the max number of faults does not exceed the "**ctfl**" limit during the open + close cycles, any faults recorded are discarded and the cycle test will proceed.

If for example "**ctfl**" equals 5, and during the open cycle 2 faults occur then during close 3 more occur, the test will stop with an error after the 3rd friction fault. When the test is stopped due to an error, testing is stopped and cannot be continued without requesting a new cycle test run.

The "**ctfl**" parameter and the entire Cycle Test feature is thoroughly discussed in the "Tech Brief – Cycle Testing"

Terminal Output

```
cmd>c ctfl                 // Report the parameter value
5

cmd>c ctfl 100             // Set the cycle test fault limit to 100 friction faults per cycle
OK: 100

cmd>c ctfl reset           // Reset "ctfl" to factory default
5
```

TLE Warning:

Prior to running a cycle test verify the controller does not indicate "TLE" events in the CLI. Running a cycle test on a controller that is experiencing TLE Over-temperature faults will damage the controller's motor driver chip after approximately 100 events. Refer to the TLE Mitigation Tech Brief for information on preventing TLE faults if you wish to cycle test a system on a high friction installation.

References

pwd	Requires a minimum user level of "Installer"
cyct	Request cycle test status or initiate a new cycle test run
Tech Brief	Cycle Testing
Tech Brief	TLE Mitigation

INMOTION

A Caldwell Company

Supported User Levels	
☒	**User**
☑	**Installer**
☑	**Developer**
☑	**Factory**

kp (PID Proportional Constant)

Syntax:	config kp [VALUE]
Abbreviation:	c kp
Range/Units:	0.0 – 10000
Default:	3000.0000

IMPORTANT:

- **This is an advanced command. Consult the factory prior to use.**

Command Description

This "kp" command sets the *proportional* constant used by the PID motor control algorithm.

Terminal Output

```
cmd>c kp                  // Report parameter value
3000.0000

cmd>c kp 1500             // Set "kp" to 1500
OK: 1500.0000

cmd>c kp reset            // Reset "kp" back to factory default
3000.0000
```

References

pwd	Requires a minimum user level of "Installer"
ki	PID algorithm Integral Constant

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

ki (PID Integral Constant)

Syntax:	config ki [VALUE]
Abbreviation:	c ki
Range/Units:	0.0 – 25.0
Default:	2.0000

IMPORTANT:

- **This is an advanced command. Consult the factory prior to use.**

Command Description

This "ki" command sets the *integral* constant used by the PID motor control algorithm.

Terminal Output

```
cmd>c ki                  // Report parameter value
2.0000

cmd>c k 15                // Set "ki" to 15.0000
OK: 15.0000

cmd>c ki reset            // Reset "ki" back to factory default
2.0000
```

References

pwd	Requires a minimum user level of "Installer"
kp	PID algorithm Proportional Constant

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – G3 Controller Programming

Programming the G3 is required when first installed or when troubleshooting indicates that reprogramming the controller may resolve an issue. The reprogramming procedure can be initiated in 2 ways, via a wall switch or remote and from the CLI. The wall switch method is available to all user levels including the "User" level. The CLI method is available to the Installer level or above.

For installers or homeowners that do not have access to the CLI, any wall switch, remote or home automation system(when programmed with this functionality) can reprogram the door. The "Wall Switch" method use the brake and or clutch to make a double "**click**" sound which is an acknowledgment of a programming step. When the double "**click**" is heard, the operator should proceed with the next step of the procedure.

Note if the magnetic brake is disabled with the "**mbd**" modifier, the "click" sound will be noticeably quieter.

Wall Switch Programming Procedure

For each of the following steps, the operator has about 30s to complete a particular step before the controller will time-out and cancel the programming.

For each motor double "click" step, once the operator starts to manually move the panels, the *next* step begins and the controller monitors that movement. When the movement stops, a 5s timer starts to count down to zero. When 0 is reached, that step is completed and the controller stores that position. If the timer has not reached 0, and the panel moves again, the timer is reset. This means the operator can make positional adjustments while the panel is moved *before* the 5 second timer expires.

While setting the full open position the timer is extended to 10 seconds. This means that an operator, while moving the lead panel to full open, can pause for 5 or 6 seconds to take a break and then continue. The full open position will be NOT be recorded as long as the door movement resumes before the 10s timer expires.

Make sure the door is full closed and in the jam before initiating this procedure. The controller will NOT allow programming if it detects the door position is not closed.
If the door is <u>actually closed</u> and refuses to enter programming mode, power cycle the controller OR press "**Stop + Release**" until the controller reboots. Then proceed.

1. Using a wall switch or remote, press and hold the "**Stop**" button for at least **15s** or until you hear the motor "double clicks".
2. Then within 30 seconds, manually open the lead panel until it just clears the jam.
   a. For a **One-Way** door: The door should just clear the metal edge of the jam so that a finger **cannot** be inserted into the gap or approximately 1/8" – 1/4".
   b. For a **Bi-Part** door: Both lead panels should be opened approximately to a 1/4" - 1/2" gap.
3. Wait for the motor "click"…
4. For a **One-Way** door manually open the lead panel approximately **1 foot**.
   For a **Bi-Part** door, manually open the lead panels until they are approximately **2 feet** apart.
5. After about 5s the motor should automatically move the door approximately 4", open or closed.
6. After the door stops, manually move the lead panel to the full open position. Once in position, the controller will wait about 10 seconds, then start the final step of "auto learning" the span.
7. While "auto learning" the controller will open and close the door several times. On the last cycle the door will do a final close and stop and engage the magnetic brake.
8. Programming is complete.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 94 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

CLI Programming Procedure

The CLI procedure is identical to the wall switch method except for initiating the programming does not require a wall switch. G3 programming is initiated with the command "**button autosetup**" or "**b a**" command. Once initiated, the programming steps are the same.

While programming, the CLI provides step-by-step instructions as shown below. The installer will also receive on screen confirmation that each manual move was detected in addition to the motor "double click" sound.

```
000.000: TLE9201SG init OK, rev 1

Caldwell Generation 3 Controller
Fw:  v0.7.1 [REL_K12]
Type 'help' for valid commands.
cmd>001.784:

*****************************************          // This banner appears when the controller
001.790: <<<  INSTALLATION REQUIRED  >>>          //  is NOT programmed and requires it.
001.794:
001.796:  Controller must be programmed
001.800:   prior to use by a qualified
001.804:            installer
001.808:
001.808:      Wall Switch Commands:
001.812: ----------------------------
001.816: To Program:   STOP(15s)
001.820: Toggle Brake: RELEASE(1s)
001.824: Reboot:       STOP+RELEASE(10s)
001.830:
001.830:   www.caldwellmfgco.com
*****************************************


p pwdXXXX                                         // Installer enters the "installer" password

Level = 1 (Installer)                             // Installer password accepted
cmd>b a                                           // Initiate "programming" with "b a" which is
OK                                                //   the only command the installer needs to type
034.490:
 <<<<<< INSTALLATION >>>>>> 1/5                   // Step 1 of 5 instructions
 Manually open panel until it just clears
 the jam. Then wait for the motor 'click'.

cmd>043.426: Enc: Motion start                    // Controller "sees" installer has started
043.924: Enc: Motion stop                         //   manually moving the lead panel
049.246: Enc pol set: invert
049.250: Captured jamb position = 0.42in          // Controller set the jam depth to 0.42" and
050.402:                                           //   motor "double clicks"
 <<<<<< INSTALLATION >>>>>> 2/5                   // Step 2 of 5 instructions
 Manually open panel about 12in and
 wait for panel to move ~4in and stop.

051.264: Enc: Motion start                        // Installer opens lead panel 12" and the
052.916: Enc: Motion stop                         //   controller sees the manual movement
059.934: Enc: Motion start                        // Controller moves the panel ~4"
063.806:                                           // Motor "double clicks"
 <<<<<< INSTALLATION >>>>>> 3/5                   // Step 3 of 5 instructions
 Manually open the panels fully
 then wait ~10s.

064.130: Motor polarity set: invert
064.426: Enc: Motion stop
068.262: Enc: Motion start                        // Installer moves lead panel to full open
073.822: Enc: Motion stop
084.274: Captured open position = 46.22in         // After 10s, controller saves full open @ 46.22"
```

INMOTION

A Caldwell Company

```
 084.278: Position self-learn successful
 084.290:
 <<<<<< INSTALLATION >>>>>> 4/5                      // Controller takes over and begins auto learn
 Automated 'learning' cycle has begun.

 085.032: Enc: Motion start                          // Panel is open, so it closes
 099.792: Enc: Motion stop
 101.672: Enc: Motion start                          // 1st Open of the "learn" cycle
 116.212: Enc: Motion stop
 118.740: Enc: Motion start
 133.580: Enc: Motion stop
 135.396: Enc: Motion start                          // 2nd Open of the "learn" cycle
 150.032: Enc: Motion stop
 152.514: Enc: Motion start
 167.312: Enc: Motion stop
 169.212: Enc: Motion start                          // 3rd and final Open of the "learn" cycle
 183.756: Enc: Motion stop
 185.602:
 <<<<<< INSTALLATION >>>>>> 5/5                      // Installation steps 5 of 5 complete
 SUCCESS: Programming complete.                      // Door is actually fully programmed when at the
 Panel will now close...                             // last "open" position.  The final close is for
                                                     // convenience only.
 186.296: Enc: Motion start
 200.462: Soft Touch Margin (fpthr,fpce)
         [0 counts of 10 @ 470mA]
 200.816: Enc: Motion stop                           // Lead panel reaches the jam and is ready to use
```

What can go wrong during programming using either method?

- Programming is initiated and you really did not want to reprogram the controller.
  Solution: Do not touch/move the door for at least 30s and the controller will cancel the programming procedure without changing the any of the previous settings.

- The door is open and the CLI command "button autosetup" is attempted.
  The controller will display an error message indicating the "*Panel must be stopped and in the jam before programming*". If the door was rebooted while physically open, the controller <u>will</u> allow programming because it thinks the door is closed at power up. Do not program the door while it is in this condition. Reboot the controller after the lead panel is closed and in the jam and try again.

- The installer does not move the door the required 12" (one-way) or 24"(bi-part).
  If the movement was too short, the controller will quickly cycle through all the steps, lock the panel in place and indicate the programming failed to complete. If this was the 1st programming attempt, the door will have to be closed, **rebooted** then reprogrammed. If the controller was programmed before and not factory reset, the original program will be left unchanged.

- If programming fails for any reason, the general rule is to move the door back to the fully closed position, reboot then try again.
  If the controller still refused to program, contact INMOTION technical support.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 96 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

G3 Programming Step-By-Step

1	Turn the controller <u>OFF.</u> Connect 10 Pin/Molex cable. Connect the AC power cord.	
2	Use a wireless OR wired wall switch. Wireless components purchased with G3 controller, will be pre-paired at the factory.	
3	Manually close the door. Power on the G3 Controller. Wait for the motor/brake " double click"…	**Fully CLOSE the door(s) Power on the G3** **Wait for the "double click"…**
4	Using a wall switch/remote, press and hold the "Stop" button until *after* motor "clicks" twice (about 15s). OR if using the CLI use the command "**button autosetup**"	Hold "Stop" until the motor "Clicks" twice (about 15s) **OR** Use the CLI to send the command "**b autosetup**"
5	One-way: Open the panel 1/8" – 1/4". Bi-Part: Open panel 1/4" – 1/2" (Just enough to clear the Jam) Wait for the motor to "double click" **(~5s).**	**"CLICK" (~5s)** Too Small to "Pinch" One-Way: 1/8" – 1/4" Bi-Part: 1/4" – 1/2"
6	Manually open the door about 1 foot. After about 5 seconds, the door will move about 4 inches then... Wait for the motor to "double click" **(~5s)**	**"CLICK" (~5s)**
7	Manually open the door to its "full" open position. After **10 seconds** the doors will begin to close automatically…	**Fully OPEN the door(s)** Note: Movement of the door to full open does not have to be one continous movement. The installer can pause (less than 10s), then continue the push. **Full Open**
8	**Self-Learn Process:** The door will open and close several times. When complete, the door will be closed with the magnetic brake engaged. Programming is complete.	**Door(s) will Cycle** **Door(s) will close & Lock**

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – Special Features

Special features refers to one of four optional modes supported by the G3 Controller. When none of the special features are active the controller operates in Normal mode.

Special Feature modes, including Normal mode, are unique and cannot be combined such as Party Mode + Egress mode. It's one or the other and this includes Normal mode. If one Special Feature is active and another one enabled, it automatically cancels the previous mode and switches to the new one.

Special features alter the operation of a door and differ from "Normal" mode in the way door operations are commanded to open or close. Special features may enable functions that are not available in "Normal" mode. Some special features require optional accessories.

Special features include "Party Mode" (aka Entertainment Mode), "Egress Mode" (aka Close Behind Mode), "One Button Operation" (aka Convenience or ADA Mode) and "Move Assist Mode" (aka Motion Assist Mode).

- o **Party Mode**: Automatically opens a door when the door is closed and motion has been detected. After a period of time, the door automatically closes. Party Mode requires at least 1 motion detector or IR beam sensor positioned near the panel 1's opening. For operation from either side of the opening, a motion detection device is required on both sides.
- o **Egress Mode**: When an Open command is received from a wall switch or wall switch circuit, the door will open, wait for a period of time, then automatically close.
- o **One Button Operation Mode**: When a Stop command is received from a wall switch or wall switch circuit the door will open. When the door is open, the Stop command/button will cause the door to close. If the door is moving, the Stop command/button will stop the door. Operation is similar to automatic garage door systems. A single button "ADA" wall switch can be wired in place of an INMOTION wall switch to provide door control from a single physical button.
- o **Move Assist Mode**: Allows operation of a door by manually pushing the lead panel in the desired open or close direction. After a slight movement of approximately ¼", the controller will engage the motor and move the door to programmed open or close position automatically.

Special Feature Options for Operators at the Wall Switch

These are options that are available from any wired or wireless wall switch or remote. Wall switch enabling and disabling of Special Feature require the door be <u>fully closed and in the jam</u>. When the feature is enabled, all saved parameters for that feature are restored and the feature is enabled immediately. This differs when Special Feature activation is done from the CLI.

- o Enable/Disable any special feature when the door is closed and, in the jam from a wall switch.
- o Independent manual adjustment of the opening span for each feature including Normal mode.
- o Special Features enabling is persistent and are re-enabled after a power cycle or reboot.
- o Wall switch functions are fully operational while special features are enabled.
- o Motion detections during close will stop the door for safety.
- o "Soft Touch" is enabled for all operations.
- o Defaults for Special Features:
    - o Opening span: 40 inches
    - o Magnetic Brake On Close: Disabled
    - o Auto Close Timer: 10 seconds (when enabled)

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Special Feature Installer Options

These are options can be set by the installer using a CLI terminal over a wired serial connection to the G3 controller, or via Bluetooth BLE if a G3 GPIO RS485 Adapter is attached to the controller. Multiple options are available for each special feature allowing the installer to customize each feature for each installation and customer.

- o Magnetic "**brake at close**" can be enabled or delayed from 1s to 24 hours for all features except "**Move Assist**". Move Assist does not support <u>any</u> automatic magnetic brake operations, however the wall switch "release/unlock" is supported from a wall switch or remote.
    - o Magnetic "**brake at open**" can be enabled for all features except "**Move Assist.**"
- o "**Auto Close**" can be enabled for all features and can be delayed from 1s to 24 hours.
- o Independent feature spans can be set from 6.0" to the mechanical full span limit.
- o Party Mode which uses a motion device to open a door will use the same device(s) to safely stop the door while closing and return to the programmed open position. All other features, including Normal mode will also use the motion detector to stop the door while closing for safety.
- o Span adjust time can be extended or disabled from the 5s default up to "forever" (no time limit).
    - o Normal, Party/Egress & One Button Op share a single span adjust parameter, "**fsat**"
    - o Move Assist has an independent span adjust time parameter, "**fmat**" and only supports a fixed range of options from Disabled(0) or 1s to 98s. "Forever" (no time limit) is not supported.

Note: Unlike the Special Feature wall switch options, CLI option changes are delayed. Although options can be changed at any time with the panel in any position, CLI changes are NOT set immediately. This includes when the panel is stopped and in the jam. Instead, CLI special feature options are only set, after the door is <u>commanded</u> to close and the door then enters the jam and stops. Manual door closures will not cause CLI to update, only a commanded close from a wall switch or the CLI will work.

*For example, if the door is closing and the CLI command to enable Party Mode is sent, the door remains in its previous mode until the door closes and stops at the jam. At that point the controller enables Party Mode for the next door operation. If the door is already closed and a special feature or option is changed, those changes will not be active until the next "button close" operation completes. Enabling the changes only requires a wall switch close command or the CLI command "**button close**" or "**b a**" for short. This behavior can be checked with the "**info**" command, as it shows what features enabled and "active" right now. In the case above, info would show "Party Mode" as enabled but not active until the "button close" operation completes at the closed position in the jam.*

Reprogramming the Door while a Special Feature is Enabled (Active)

If a special feature is enabled and the door needs to be reprogrammed, the G3 supports reprogramming requests from the wall switch or the CLI. When reprogramming is requested, the G3 simply enters the reprogramming mode, and when complete, re-activates the previous active Special Feature.

A request to reprogram from a wall switch is supported by all modes except "One Button Operation". The reason is the wall switch request to reprogram uses a 10s "**Stop**" button press and that cannot be shared with the OBO's use of the "**Stop**" button to initiate open, close and stop. If "One Button Operation" is active, it can be disabled to reprogram and then reenabled manually. Another option is to request reprogramming using the CLI command "**button autosetup**" or "**b a**". All Special Features support reprogramming from the CLI.

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Final Configurations

Since many of the options supported by the G3 are only available to the installer when using the CLI, those options should be set prior to completing the job. Customizing specific functions <u>prior</u> to a customer complaint saves unnecessary service calls and makes for happy customers.

The installer or dealer representative should familiarize themselves with the G3 Controller and its feature set. Knowing what the G3 can do is the first step in configuring the system for the customer's needs. Here are some things that a customer may want changed.

Does the customer need or want the magnetic brake enabled, disabled, or delayed? This applies to Normal mode and Special Features.

```
c mboc XXX     // Normal Mode Brake On Close,      Disable(0), Enable(1), Delay(2-86400s)
c fpmb XXX     // Party Mode Brake On Close,       Disable(0), Enable(1), Delay(2-86400s)
c fegb XXX     // Egress Mode Brake On Close       Disable(0), Enable(1), Delay(2-86400s)
c fobb XXX     // One Button Op Brake On Close,    Disable(0), Enable(1), Delay(2-86400s)
                                                   864,000 seconds = 24hours
```

Does the customer want manual Span Adjust enabled, Disabled or on all the time? Do they need more or less adjustment time?

```
c fsat XXX  // Normal,Party Mode,Egress, One Button Operation
            //   Span Adj Time,                  Disable(0), Time Limit(2-98s), No Limit(99)
c fmat XXX  // Move Assist Span Adj Time,         Disable(0), Time Limit(2-98s)
```

Are there any special needs residents that may benefit from the One Button Operation feature? Do they need an ADA compatible wall switch button?

A compatible third-party ADA switch needs to 24VDC compatible and provide a 0.5s – 1.0s pulse to the wall switch circuit. With "One Button Operation" mode enabled, the ADA switch is wired to the Stop signal. Contact the customer support for more information.

Does the door move too fast or too slow?

```
c osp XXX  // Open Speed in inches per second      Minimum(1), Maximum(10) Inches/Second
c csp XXX  // Move Assist Span Adj Time,           Minimum(1), Maximum(10) Inches/Second
```

Is the homeowner aware of the G3 Safety Features such as smart touch and motion detection devices?

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 100 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Tech Brief - "Soft Touch" Tuning

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

Overview

The "Soft Touch" feature uses 2 parameters and the learned friction profile created during programming to control when to "over current" and stop the panels. After the initial programming, the friction profile will be set and should be able to move all the panels from open to close and close to open. If this is not the case, the overall pull force of the door is not correct and there may be a mechanical issue with the door that needs to be corrected before proceeding.

How "Soft Touch" Works

The G3 controller uses the saved friction profile, created during programming, as "signature" of motor power required at all points across the span. The graph below shows a typical profile with 1 panel pickup. The "hump" is the power increase required at the panel pickup point. Only the close profile is shown. The profile

is used as a baseline to tell the G3 how much power should be required at every point along the span.

While the door is moving the G3 is measuring motor power and comparing that power against the profile to determine when a friction fault has occurred.

Determining if a friction fault is severe enough to friction fault and stop, is the job of the "**fpce**" and "**fpthr**" parameters.

The Friction Profile Envelope Limit or "**fpce**" is the amount of current in mA's, that can exceed the profile level before we start to count a friction fault. When the measured motor current exceeds the profile *plus* "**fpce**" the G3 begins counting. The count is the second parameter called the "Friction Profile Fault Count" or "**fpthr**". When the G3's count exceeds the "**fpthr**" limit parameter, a friction fault has occurred and the G3 friction faults and stops the door.

In the example on the right, 2 friction faults are depicted. The overlaid "blue" boxes represent the current limit "**fpce**" vertically at **470mA**, while the horizontal is the measurement span distance. Within each box is the over-current count.

The 1st box shows that the counter received 2 counts, so the controller did not recognize this as a friction fault. However, during the 2nd period, the count exceeded "**fpthr @ 5**" with a count of 6. This time the controller does friction fault and stops the door.

This of course is a simplified explanation of the friction fault mechanism used by the G3 controller. There are other parameters at work too, but from a tuning standpoint this is all you need to know.

INMOTION

A Caldwell Company

"Soft Touch" Tuning

As mentioned before, after programming the controller you should be able to move all the panels from full closed to full open and back again without over currenting. This is because the profile and the measured current should be about the same because the door is the same, with the same pickup points from a few moments ago when it was programmed.

Over-current conditions will happen when something *changes*. Those changes could be a person hit by a moving panel, a small pebble on the track or a panel was moved from its normal pickup point causing a current spike not recorded in the saved friction profile.

It is the latter condition we need to address for "Soft Touch" tuning. Out of position pickups occur most often when the span of the door has been adjusted from the fully open position to a new position. This should be tested for during final programming and tuning. This can also occur when the panel is commanded to stop mid span, then commanded to move again towards one of the jams.

Out-of-Position Panel Pickup Test

To test out of position panel pickups, start the door opening from any wall switch. After panel 1 has moved about half of its width, manually slide panel 2 towards open so that its new pickup point is near the middle of panel 3. If the "Soft Touch" is set properly panel 2 should pickup without an over-current.

Repeat this test for the other panels then check the same for close.

Span Adjust Test

When the system is configured properly the operator should be able to select any sub-span width while having the controller pickup all required panels without an over-current. The default for normal mode is a span adjustment period of 5s after the door has reached its programmed open position. This span adjust timer parameter is called "**fsat**" and it can be checked on the CLI with "c **fsat**". If it equals 0, change the value to at least 5s with "c **fsat** 5".

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 106 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Note: "**fsat**" only enables or disables the timer to enable manual span adjust (where the operator manually moves the panels). It does not disable the span adjust feature so the CLI can still be used to adjust the span with the command "**pops**" discussed later.

```
cmd>c fsat 5              // Set Normal, Party Mode, Egress & One Button Operation span adjust to 5s
OK: 5
cmd>b c                   // If fsat is set on the CLI, perform a button close to "set" the parameter
```

When testing span adjust:

- Choose several locations when adjusting the span manually. At least 1 position for every panel beyond panel 1.
- Span adjusts at panel position 0 (see red 'X') are typically not checked because panel 1 is the only panel moving.

Span Adjust Test Procedure

MANUAL SPAN ADJUSTMENT

1. Command the door to "Open" using a wall switch or the CLI.
2. *Within 5s, start a manual move panel 1 only allowing its interlocker to grab additional panels to the desired position.*
   NOTE: Panel movement must start within 5s of the programmed open position, but as long as the panel remains moving and does not stop for more than 5s the timer resets.
3. After stopping at the desired position, wait 5s for the timer to run out.
4. Command the door to perform at least 1 close then open cycle verifying there no over currents on panel pickups.
5. Repeat for at addition span locations until satisfied with the performance.

CLI SPAN ADJUSTMENT

1. Make sure the door is in *Normal* mode by checking the "**Info**" report, as the "**fsat**" command affects 3 other modes but when it works in one it will work in the rest.
2. On the cli execute the command "c **pops** XXX" where "XXX" is an inch value between **6** and the full door span. Full span can be checked with the command "c **pop**"
3. Using a wall switch command, the door to close or use the CLI command "**b c**". Upon reaching the closed position the new span will be set.
4. Perform at least 1 full open and close cycle to verify the door does not overcurrent with the selected span setting.
5. Repeat for at addition span locations until satisfied with the performance.
6. When complete, disable the sub-span with the command "c **pops** 0", then "**b c**".

```
800-426-7113
Technical Document Number:  n/a
Rev. 1.0.8
2021-05-12                          Page 107 of 161
```

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

CLI SPAN ADJUSTMENT TERMINAL OUTPUT

```
cmd>info                                          // Request the "info" report
                                                  // Report shortened here for clarity.
Gen3 Controller                                   // Start of the Info report
---------------
Part Number:            28C0016
Serial Number:          28C0016D2 K12 20041600167


. . .

Features - 'Normal Operation' ACTIVE             // NORMAL mode is active and running
------------------------------------
Span Adj Time:      fsat*  5s                     // "fsat" is set to 5s.  DEFAULT
  Actual Adj Time:        5s


. . .

cmd>c fsat 5                                      // If you need to set "fsat" to 5s
Ok: 5
cmd>b c                                           // CLI command door to close to set "fsat"
cmd>c pop                                         // Report the full span width
158.5667                                          // Full span width is 158.5667" wide

cmd>c pops 125                                    // Set the sub-span to 125"
Ok: 125.0000                                      //   New sub-span active next close

cmd>b c                                           // Command the door to close to set the value
Ok

cmd>b o                                           // Verify no friction faults on open

Ok
cmd>b c                                           // Command the door to open to set the value
                                                  //  Verify no friction faults on close
// Select a new sub-span, test & repeat

OPTIONAL:  The "cycle test" makes this procedure easier.
cmd>t 1000                                        // Cycle test set to "Ready"
cmd>c fsat 5                                      // OPTIONAL if you want to manually adjust span
cmd>c pops 125                                    // Set your first sub-span @ 125 inches
cmd>b c                                           // Start the cycle test
                                                  // Verify during open & close visually
While the door is closing quickly enter a new "pops" value
Before panel 1 reaches close where the new "pops" value will
be set OR manually change the span when panel 1 reaches the open
position within 5 seconds.  Check multiple positions.

When complete, cancel the cycle test:
cmd>t 0
cmd>t 0                                           // DONE
```

Adjusting "fpce" and "fpthr"

If during the previously described tests friction faults were discovered, adjusting either "fpce" or "fpthr" can help in correcting the issue.

Adjustments to "**fpce**" and "**fpthr**" allow the door to be fully operational and be safely stopped by an opposing force as low as 20lbs to a dangerously high force at 70lbs. *The goal here is safety, so lower is better.*

The defaults chosen for both "**fpce**" and "**fpthr**" were determined on a select number of factory doors and determined to be a good starting point for an "average" door in the field. Using the default values for "**fpce**" and "**fpthr**" on our factory door, the stopping force is about 26lbs.

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Note: Using the same values on a door that has significant mechanical issues can result in a much higher stopping force. When a door requires significant effort to manually operate, the required stopping force also increases. A manual operating force of less than 25lbs is the goal, with forces of 15lbs or less being ideal.

Example: A Real Door with Real Data

The table on the right shows real data from one of the doors we used to develop the G3 controller. It shows the required force in pounds to stop a 3 panel OXX configured door with various "fpce" and "fpthr" settings. <u>This is for reference only</u>. Setting the table values shown will NOT guarantee your particular door will behave the same as our test door! It just shows a starting point for adjustments.

Goal: Stopping force in the **Green** regions of the table. **Blue** is secondary. **Red** should be avoided due to the excessive stopping force required.

G3 v0.7.1	Low	UL325	UL325 High	High	0.6.7	Unsafe	Legend
Western T1 Config OXX	<23	23.00 27.99	28.00 30.00	30.01 34.99	35.00 45.00	>45	

| *Default | | fpthr: Friction Profile Fault Count | | | | | |
fpce (mA) Friction Profile Envelope Limit		10*	100	250	1000	2000	3500	5000
	1000	45.90	46.90	47.45	52.85	54.05	57.90	61.30
	900	41.30	43.95	44.55	48.20	50.65	54.85	56.95
	800	37.75	39.75	40.45	43.80	49.30	51.00	54.50
	700	34.80	36.45	37.95	41.35	44.60	47.70	49.75
	600	31.05	33.05	35.25	37.15	40.85	43.75	45.80
	550	29.30	30.25	32.00	36.15	38.50	41.30	44.90
	470*	26.30	28.55	30.45	33.00	36.05	40.45	43.50
	400	23.90	25.35	26.15	30.30	33.80	37.25	39.85

Start with Friction Profile Envelope Limit Adjustments "fpce"

The default "**fpce**" value is 470mA. If needed, begin by increasing "**fpce**" in 100mA steps, retesting as you go. If you reach 700 – 900mA without a solution, try setting "**fpce**" back to the default at 470mA and try "fpthr" instead.

Friction Profile Fault Count Adjustment

The default "**fpthr**" value is 10 counts. This adjustment is not linear, so adjustments start out small, such as 20 counts, but then change to 100, 150 or higher count increases. Start at 20, retest, then 100, then 250, 1000 retesting after each change.

Testing the Stopping Force

When and if the friction fault issue is resolved, the goal here is safety. That means installations meet the UL 325 stopping force of 30lbs or less mid span. Unfortunately measuring this accurately requires a very expensive meter that has limited uses outside of UL force testing.

During factory training installers will be provided with an inexpensive luggage scale that can help in measuring the stopping force. It's not perfect, but with training and experience any installer can get the force setting relatively close to the limit. They will also experience what 26.3lbs feels like by stopping a door that has been properly tuned.

Using Max Current Limit Instead of Soft Touch

<u>Contact the factory BEFORE disabling Soft Touch using this procedure</u>. A secondary over current mechanism is available on the G3. In this mode the door will stop immediately if the current draw from the motor exceeds the "fpcl" limit set.

```
cmd>dpro              // Current profile dump.  Find the max at the bottom
                      //  i.e "Max Current: 500mA (Bins 1 - 40)"
cmd>c fpce 0          // Turns off "Soft Touch".  Re-enable with "c fpce reset"
cmd>c fpcl 1500       // Enables hard current limit mode.  Set to 2-3x the Max Current from above.
                      //  i.e. 1500 = 3 x 500mA.  Disable with "c fpcl 0".
                      // Test the door for safety, full span movement etc.
```

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

CLI Example of Force Parameter Testing & the Cycle Test

Assumptions:

- The door is faulting during panel pickup or span adjust and its fault location is known
- Manual span adjust is enabled, "**fsat = 5**"
- After programming the panel moved through a full Open & Close cycle <u>without</u> faulting at all
  - If faults occur after programming with a simple open & close, the door likely has a mechanical issue that needs to be resolved first!
- If faults were observed in multiple span locations, address the location where panel 1 was pulling the greatest number of panels or the position farthest from full closed. Fixing this position will likely clear positions where panel 1 had a lighter load.
- Defaults for "**fpce**" and "**fpthr**" are set, **470mA** and **10 counts** respectively.
- Defaults for **Open** and **Close** speeds are both set to **4.0** inches per second (default).

```
cmd>p pwdXXXX           // Enter the installer password.  Developer password works too.
cmd>t 1000              // Set the cycle test to a 1000 cycle run
cmd>b c                 // Start the cycle test; The door starts moving

On the first close cycle, manually impede panel 1 to get a "feel" of the current stopping force required

After panel 1 has reached its open position, manually change the span to the location showing the fault
OR set the position on the CLI using the command "c pops XXXX" (then allow the door to close to the jam)

Allow the door to fault to verify the issue.  Then increase the "fpce" in 50-100mA steps
cmd>c fpce 550          // Increase "fpce" from 470 to 550

Allow the door to cycle at least 1 full open & close cycle.  If the it still faults continue increasing
"fpce" until its cleared or you've reached 900-1000mA.  If its still not fixed, set "fpce" to 550mA and
start adjusting "fpthr"

cmd>c fpce 550          // Reset "fpce" to 550mA to try "fpthr"

Change "fpthr" from 10 to 100 and allow the panel to cycle full open and close at least 1 time.  If the
Issue is still not fixed, increase "fpthr" to 250, 500, 1000 and 2000 testing for 1 full cycle each time.

cmd>c fpthr 250         // Allow to cycle open and close and observe result.  Not fixed
cmd>c fpthr 500         // Same, but this time it did not fault.  Try other spans and verify a complete
                        // fix.

If "fpthr" is at 2000 and the door still faults, try "fpce" AND "fpthr" at a mid-high values instead

cmd>c fpce 600          // Try these and adjust each upward in value until no faults are observed
cmd>c fpthr 250

While the door is cycle testing and completely fixed, manually impede panel 1 again and compare the force
you originally applied to the new force you just set.  The force increased, but does it "feel" excessive?
If so, try changing "fpthr" and "fpce" to lower values until the issue comes back, then dial them up a bit
to fix the fault issue while keeping a minimum stopping force.

If none of the above fixes the door's force issue, contact the factory for further instructions.
```

References

pwd	Requires a minimum user level of "Installer"
c fpce	Friction profile current envelope limit
c fpthr	Friction profile fault count
c fpcl	Friction profile hard limit
c fsat	Span adjust time for Normal, Party Mode, Egress and One Button Operation
c fmat	Span adjust time for Move Assist
c osp	Sets the open speed in inches per second
c csp	Set the close speed in inches per second

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – Cycle Testing

TLE Warning:

Prior to running a cycle test verify the controller does not indicate "TLE" events in the CLI. Running a cycle test on a controller that is experiencing TLE Over-temperature faults will damage the controller's motor driver chip after approximately 100 events. Refer to the TLE Mitigation Tech Brief for information on preventing TLE faults if you wish to cycle test a system on a high friction installation.

Overview

The "**cyct**" or "**t**" command, initiates, updates, or reports the status of a cycle test already running. It can be used by installers during their final test, while tuning "Soft Touch", or dealer/customer demonstrations. The test can be commanded to exercise an G3 automation system to open and close a door between 1 and 1,000,000 times.

The command is not a customer feature and has been designed as a pure debug/evaluation tool. While testing, special features can be enabled or disabled via the CLI and evaluated without stopping the test. All special feature modifiers and options are executed as they are during runtime. Safety devices are fully operational including "Soft Touch" for evaluation and tuning but do operate slightly differently in order to keep the cycle test running. Wall switches, remotes and even home automation accessories continue to function as they normally would except in a few specific instances.

Unattended cycle tests, in a controlled environment which is void of people and pets, are further protected by a Cycle Count Fault Limit "**ctfl**" parameter. This parameter limits the number of "friction faults" per single Open and Close cycle to 5 events. If this limit is reached, the test stops with an error message. The parameter can be set from 1 to 1000 events per cycle.

Cycle tests must be initiated from the CLI. While running though, the test can be paused or canceled from any wired/wireless wall switch or remote in addition to the CLI.

Door Behaviors While Testing

During testing, friction/motion faults, CLI and wall switch/remote commands behave differently than while the controller is in normal runtime mode. All commands and faults are acknowledged and counted during the test, then the test continues. This means the door does NOT stop while testing unless it's part of the test, paused, the test is completed or errored out due to excessive friction faults.

- Friction Fault Acknowledgement: Panel stops, backs up 4", pauses and continues.
- Motion Fault Acknowledgement: Panel stops, pauses and continues.
- Open, Close, Stop (wall switch or CLI): Panel stops, executes the command and then continues.
- Unlock/Release: 1st Unlock/Release the test **pauses**, 2nd Unlock/Release the test **resumes**.
  - *Pause & Resume works best when the panel is moving and not stopped at the jams.*
- All modifiers are used and can be tested. By default, span adjust is enabled for 5s. This means that for every cycle, at open, the door will wait for a span adjustment. After that time expires the door will begin to close.

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Pausing & Canceling the Test

Testing can be paused indefinitely, then resumed or canceled via the CLI or any wall switch/remote.

- While the door is moving mid span, press or send the "**Release/Unlock"** command.
    - The door stops, status changes to "**Paused**" and a report is displayed.
- To resume testing, press or send" **Release**/**Unlock**" again and the test resumes.
- To cancel testing:
    - While paused, pressing, or sending a "**Stop**" command cancels the test with a report.
    - Sending the command "t 0" will also cancel the test.
- While the test is in a "**Cancelled**" state all test data is available with a CLI "**t**" command.
    - If while in the "**Cancelled**" state and a second CLI "**t**" command is received OR a new test is requested with "t value", all previous test data is cleared.
- Test data from a previous test is available until another test is requested, or the controller is rebooted.
- Test data is note stored in flash memory.
- A test cannot be paused while stopped at either jam.
    - Wait until the door is moving before trying to pause the test.

Starting a Cycle Test (cT)

To execute a test, 2 commands are required:

- "t 3"   Initializes the cT for 3 open + close cycles. Door does not move
- "b c"   Button Close is used to "start" the test. Door begins to move and testing begins.
    - *   If the door was already closing when the "t" setting was issued, the 2nd command "b c" is not required. Testing will begin after the door closes.

Example: Program Controller then Test for 3 cycles

A cycle test can be requested to execute before a door is even programmed. This allows the installer to program a controller and seamlessly enter a cycle test after the door completes its programming cycle. Here is how that is done.

```
*****************************************          // Controller is NOT programmed so this
001.790: <<<  INSTALLATION REQUIRED  >>>          //  banner is displayed at boot
001.794:
001.796:  Controller must be programmed
001.800:   prior to use by a qualified
001.804:            installer
001.808:
001.808:      Wall Switch Commands:
001.812: -----------------------------
001.818: To Program:   STOP(15s)
001.820: Toggle Brake: RELEASE(1s)
001.824: Reboot:       STOP+RELEASE(10s)
001.830:
001.830:   www.caldwellmfgco.com
*****************************************
cmd>p IM1234             // Installer or Developer password is entered
cmd>t 3                  // Request a 3 cycle test.
                         //   cT Ready status reports display (NOT SHOWN)
cmd>b autosetup          // Button command to program the door
                         //   Installer moves panels as they normally would during the install process
                         //   Programming instructions & messages scroll by (NOT SHOWN)
cmd>                     //   Programming "learn" cycle completes and door does its final close…
cmd>                     // cT test starts up for a 3 cycle test automatically
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 112 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Example: Test for 15 cycles

```
Cmd>t 15                    // Cycle test requested

Cycle Test
----------
Status              READY   // Status is "Ready" to start.  Door does NOT move yet...
  Progress:         0.00%
  Oneway Travel:    0.00 ft
  Cycle Time:       TBD     // Time for 1 open + close cycle. Updates after 1st cycle.
  Time Remaining:   TBD     // Estimated time to completion in sec, min, hours, days, months and years
Cycle Info          Opening // Current operation, either Opening or Closing
  Current Cycle:    0
  Total Cycles:     3       // Total cycles requested.  Can be changed with "t VALUE" while running
On Open                     // Friction & Motion Faults during Open
  Friction Faults: 0
  Motion Signals:  0
On Close                    // Friction & Motion fault counts during Close
  Friction Faults: 0
  Motion Signals:  0
Cycle Faults:       0/5     // Cycle fault count down, Current/Maximum, before the test errors out

cmd>b C                     // Starts the test and the cT status changes to "Running".  Movement starts.
```

15 Cycle Test Result

```
Cycle Test
----------
Status              COMPLETE // Test successfully completed without excessive friction faults
  Progress:         100.00%
  Oneway Travel:    118.83 ft// Total distance panel traveled.  Bi-part report double this distance
  Cycle Period:     44s      // Time required for 1 Open + Close cycle
  Time Remaining:   0s
Cycle Info
  Current Cycle:    15
  Total Cycles:     15
On Open                     // Fault Count totals for Opens
  Friction Faults: 1
  Motion Signals:  2
On Close                    // Fault Count totals for Closes
  Friction Faults: 2
  Motion Signals:  4
Cycle Faults:       0/5
```

Other Usage Models

Cycle tests can be updated at any time, even before they start. This means that if a test is about to run, in the "Ready" state, and you decide to change the number of cycles or cancel the test, its only 1 command.

- Test is set for 100 cycles in the "Ready" state (Not Running).
  - Change to 1000 cycles:
  - Cancel the test:

```
cmd>t 1000      // Cycles changed to 1000 cycles
cmd>t 0         // Test is canceled
```

- Test is "running" a 50 cycle test at the 25th cycle and I want to…
  - Change to 1000 cycles:
  - Cancel the test:

```
cmd>t 1000      // Cycles changed to 1000 cycles
cmd>t 0         // Test stops in "Canceled" state, Test data
                //  is available with the "t" command
cmd>t 0         // Test "Disabled" and test data is cleared
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 113 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Other Usage Models (cont)

- I want to run a cT for a set period such as 12 hours, 10 days or a <u>Month</u>…
  - Set a high cycle count:

```
cmd>t 10000    // This is to get the test ready…
```
    - Start the test:
```
cmd>b c        // Button close starts the test
```

```
Cycle Test
----------
Status             READY
  Progress:        0.00%
  Oneway Travel:   0.00 ft
  Cycle Time:      TBD    // TBD during 1st cycle
  Time Remaining:  TBD    // TBD during 1st cycle
```

These update immediately after the 1st cycle

    - After the <u>1st cycle</u>
```
cmd>t          // Request test results after 2nd cycle starts
```

```
  Cycle Period:    44s
  Time Remaining:  5d 2h 12m 36s
```

    - With the "Cycle Period" known, set different cycles until your desired period is correct
      Waiting for a cycle is not required anymore so set, check, set, check rapidly is ok…

```
cmd>t 60000
cmd>t          // Time Remaining:  1M 0w 2d 13h 18m 32s
cmd>t 57500
cmd>t          // Time Remaining:  1M 0w 1d 6h 45m 12s
cmd>t 55000
cmd>t          // Time Remaining:  1M 0w 0d 0h 7m 28s
```

55000 is close enough for a 1 Month run

Done

- I want to complete a test now with a "Complete" status report, but it still has X number of cycles to go.
  - Check the report:
```
cmd>t          // Display report to get the current cycle
```

```
  Cycle Info       Opening
  Current Cycle:   3491 cmd>t          // Display report to
get the current cycle cmd>t           // Display report to
```

  - Check the report:
```
cmd>t 3492     // Add 1 or 2 cycles to "Total Cycles"
```
  - The test will "complete" in 1 or 2 closures and the "Complete" report will display

Test completes as if you intended to run 3492 cycles

```
Cycle Test
----------
Status           COMPLETE
  Progress:      100.00%
```

- I want to cycle test the G3 as <u>fast as possible, as quickly as possible</u>
  Make sure options such as delayed "brake on close", "brake on open" etc. are disabled. These options will delay at the open & close for the period they are set for. If its an hour, then 1 cycle will take about an hour.
  - Disable Span Adjust:
```
cmd>c fsat 0  // Default is 5s.  Turn this off.
```
  - Run the test:
```
cmd>t 1000     // Each cycle will be ~5s shorter than normal
```

References

pwd	Requires a minimum user level of "Installer"
c ctfl	Cycle Count Fault Limit sets the maximum friction faults per open/close cycle before failure
c fsat	Disabling "Span Adjust" will decrease the cycle time by ~5s / cycle.
Tech Brief	TLE Mitigation

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 114 of 161

INMOTION
A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief - Android BLE & USB UART

The Android platform provides the best terminal experience when compared to IOS, so if given a choice use Android. The factory has found 3 Apps by the same developer that support Wireless BLE, Wired USB UART and UART over Wi-Fi communication that are compatible with the G3's CLI. Each App presents a simple terminal screen and a field to enter commands for the G3 to respond to. The user also has the option to create on-screen buttons to send preselected commands to the G3 and this is what we are going to describe here.

Wireless Serial Terminal Connection (Bluetooth)

When a G3 is paired with the wired RS485 GPIO Adaptor wireless Bluetooth BLE communication is possible. This allows an Android tablet or smart phone with Bluetooth BLE 4.0 or later to wirelessly access the G3's CLI. A free terminal App is also required.

Wired Serial Terminal Connection

The G3's CLI can be accessed using "USB Debug" cable plugged into the "J17" connector. This is the same port the "RS485 GPIO Adapter" uses to enable wired accessories and Bluetooth BLE CLI access.

The USB debug cable has a special keyed RJ45 connector compatible with the G3's J17 port. A standard RJ45 will not work. The debug cable can be obtained from the factory as well as the required "OTG" adaptor. OTG is a USB term which stands for "On-The-Go" and allows Android devices to support USB accessories like our debug cable, USB flash drives, keyboards, mice etc. For this solution to work your Android device must also support OTG. Most Samsung & Motorola phones have OTG.

Note: A laptop running a terminal program such as TeraTerm or Putty is the preferred CLI access method when a debug cable is available (OTG adaptor is not required for PC access).

UART over Wi-Fi (Experimental)

The factory has had some success using various Wi-Fi modules and Raspberry Pi's to enable CLI access over Wi-Fi. All that is required is the module and the factory USB debug cable. Commercial solutions have also been identified but not tested. For more information contact service support.

Install the Apps

The first step is to install the required Apps. We recommend you install at least the Bluetooth and the Wired USB Terminal versions so you can use wired and wireless CLI terminals.

Serial USB Terminal: https://play.google.com/store/apps/details?id=de.kai_morich.serial_usb_terminal
Serial Bluetooth Terminal: https://play.google.com/store/apps/details?id=de.kai_morich.serial_bluetooth_terminal
Serial Wi-Fi Terminal: https://play.google.com/store/apps/details?id=de.kai_morich.serial_Wi-Fi_terminal
TeraTerm (Open Source Windows PC Only): https://ttssh2.osdn.jp/index.html.en
Putty (Windows & Unix): https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 115 of 161

INMOTION
A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

App Communication Configurations

For Serial USB Terminal, TeraTerm & Putty Serial Parameters: **115200,8N1**

This step is only required for the Android "Serial USB Terminal" and PC terminal programs like TeraTerm or Putty. Apps that support a "wired" connection require the serial connection to be configured for the correct speed, number of bits, etc. The "Serial Bluetooth Terminal App does this automatically.

Access the settings menu in the "Serial USB Terminal" by selecting the "hamburger" icon in the top left corner.

Choose "Settings" from the popout menu

On the first tab, "Serial", set the parameters as shown.

> Baud Rate: **115200**
>
> Data Bits: **8**
>
> Parity: **None**
>
> Stop Bits: **1**

App User Interface Settings

For Android Serial Bluetooth, USB & Wi-Fi Terminals

All the Android Apps have nearly identical user interface settings. For the apps you have installed set the following values under the settings option and listed tabs for <u>each app</u>.

Terminal Tab	Receive Tab	Send Tab
Font size: 10	Newline: CR+LF	Newline: Auto (same as Receive)
Font style: Monospace		Edit mode: Text
Charset: UTF-8		Line delay: 0 ms
Display mode: Terminal		Character delay: 0 ms
Auto scroll to end of buffer: on		Local echo / Show send data in terminal: off
Show connection messages: on		Clear input on send: on
Show timestamps: off		
Timestamp format: HH:mm:ss		
Buffer size: Unlimited		

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Connecting to a G3 Over Bluetooth BLE
Android Serial Bluetooth App, (Requires the Wired RS485 Adaptor)

Bluetooth BLE does not require device pairing. The BLE device is found from within the App by scanning for it. Before we scan for the G3 we need to make sure the BLE radio is powered on. The G3 Controller will automatically power off the BLE radio 3 minutes after first boot if nothing connects to it so there is a good chance that it is powered off right now.

To power up the G3's BLE Radio: (Make sure the doors are closed)
- From a wall switch, press and hold "**Stop**" and "**Release**" for about 10s. The system should reboot.
- Use the G3 power switch to power cycle the entire system.

Scanning for a G3's BLE Radio:
Open the "hamburger" menu and select "Devices".
Make sure that you are on the App's "Bluetooth LE" tab.
Press "SCAN" and in a few moments you should see 1 or more devices named IM_XXXX. Tip: The label on the back of "RS485 GPIO Adaptor" should have a label matching the "XXXX" numbers in the device names listed after scanning.

Select a device and you should be wirelessly connected to the G3. Test the connection with 1 or more "ver" commands or use the "Ver" button.

Connecting to a G3 Over Wired USB
Android Serial USB Terminal App

Start by connecting the Factory USB UART Debug cable to an appropriate OTG cable for your phone. Then plug the free end of the OTG cable into the phone's USB port. Most phones pause while a driver is loaded and then prompt you to choose the App to use. If the App selection shows the "Serial USB Terminal" selected it now making sure it's NOT the Bluetooth version as they look similar.

1. Select the Serial USB Terminal		
2. Press the "Connect" Button	3. Connected	4. Test with "ver" command

INMOTION

A Caldwell Company

App User Interface Button Settings
OPTIONAL for Android Serial Bluetooth, USB & Wi-Fi Terminals

This step is completely optional, but highly recommended unless you enjoy memorizing all the G3 CLI commands and typing commands on the "small screen". The number of buttons displayed is dependent on your phone's screen resolution and the font size choose in the app. All screen captures here were done on a Samsung Note 8 with the App's font size set to 10, Monospaced.

All 3 Android apps support user defined command buttons that will appear on screen. The user has the option to display up to 5 button rows or less. Once enabled, the buttons will appear on the main interface and the user can customize them or download a set of buttons already configured for the G3 from our support site. We have button configuration for the original 0.6.7 release and this 0.7.x release. First we have to enable the button display.

In the "Settings" menu, under the "Misc" tab…

- For now enable all 5 Rows as shown
- Setting "Keep screen on when connected" is optional

Then close the "Settings" menus and return to the main screen. You should see 5 rows of buttons. The buttons manually assigned or a template can be downloaded from the G3 support site.

Fewer buttons are displayed in portrait	Additional button display in landscape

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Importing & Exporting Factory Defined Buttons

The terminal app provides a way of importing and exporting user created buttons. We have created a set of buttons that cover most of the required G3 commands for the setup process. All 3 apps support import and export so having one set created means the other 2 Apps can simply import them instead of creating a set from scratch. The screen captures below were taken from the wired USB to UART version of the App.

Downloading the Factory Button Configurations

There are 2 configuration files available on the support site for the original G3 Firmware v0.6.7 and one for the latest v0.7.x. We recommend you download both so that you have the correct command set depending on what G3 firmware version you encounter in the field.

Latest Firmware v0.7.x

https://inmotionsupport.freshdesk.com/support/solutions/articles/17000108662-g3-installation-with-500-series-motor-special-features-v0-7-x

Original Firmware v0.6.7

https://inmotionsupport.freshdesk.com/support/solutions/articles/17000094962-g3-installation-with-500-series-motor-v0-6-7-original-release-

From a browser on your Android device, navigate to the G3 Support site above. Scroll to the bottom of the page and a number of files should be listed. The button files to download will be named "IM_G3_v7.cfg.txt" or "IM_G3_v6.cfg.txt". On the link tap and hold on the link then choose "Download Link". Download both button configuration files to the default folder on your device, probably "Downloads".

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

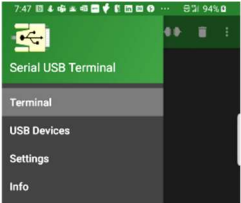## Importing the Factory Button Configuration to the Apps

Open one of the Terminal Apps and press the ⋮ options button in the upper right.

Select "Import"

The next steps depend on the make and model of your phone.

Select an app or function listed to locate the downloaded file you need to import.

Use the app or function to locate your "Downloads" directory and find the desired configuration file, either "**IM_G3_v7.cfg.txt**" or "**IM_G3_v6.cfg.txt**".

After selecting the file, the main screen should return with the defined buttons displayed. If the screen returns, but without any buttons, open the hamburger menu again. Select the "Misc." tab, "Macro buttons", and make sure at least 1 row is selected.

The import process should be repeated for each of the Android Serial Apps installed.

INMOTION

A Caldwell Company

When the phone is in the landscape orientation all 50 buttons (5 x 10) are displayed, however it is difficult to see the terminal screen with all 5 rows shown.

All 50 button displayed. "~~~" button have no commands assigned

Most of the buttons defined simply send a command however that does not work for some commands such as the password commands which require the last 4 digits of the serial number. For those buttons, the App provides a method of defining part of the command and the rest can be entered by the user. We chose to show buttons that may require additional input with a '?' at the end. Buttons like this are the password buttons, "fpce", "fpthr" and the Cycle Test buttons. When those buttons are pressed the command is printed out for you and you optionally fill in the rest. I say optionally because if you want the value of "fpce" for example, you can press the [fpce?] button then press send. The value of "**fpce**" is shown on the terminal. If you want to change "**fpce**", press the [fpce?] button again, but this time enter a new value using the keyboard, then press send. [➤]

All the button commands shown can be changed by the end user by pressing and holding a button for about 2 seconds. An edit screen should appear.

For a static, no user input command fill in the fields	Command plus user input command fill in the fields
| ```
Name:        Button name on screen
Value:       G3 CLI command
Edit mode:   Text
Action:      Send
``` | ```
Name:        Button name on screen
Value:       G3 CLI command
Edit mode:   Text
Action:      Insert
``` |
| With this command, pressing the button just sends the command. | With this definition, the command is printed, then the user can add to it before sending. e.g. "**c fpce**" prints, then you add the 1 "**c fpce 1**" |

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 121 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

The final button trick is sending multiple G3 commands with 1 button. For the most part the G3 controller does not respond well to multiple commands because there is not enough time to execute the first command, display the result and then run the second command.

I did find one set of commands that is very useful for G3 programing. When programming a door for the first time in the factory, we program first, then run a cycle test to verify Soft Touch. Fortunately, the G3 will accept a Cycle test command before its even programmed. Then when programming is complete the Cycle Test starts automatically. Here is how start a 10 cycle "Cycle Test" and program a G3 with single button.

Multiple Commands with One Button		
Name:	Button name on screen	
Value:	Multiple G3 CLI commands	
Edit mode:	**Multiline Text**	
Action:	Send	

This works because the G3 supports starting a Cycle Test even before its programmed. The CycleTest will not run until the programming completes.

The "t 10" command must come first because once the "button autosetup" command is received all other commands will be rejected until setup completes.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 122 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief - IOS BLE

Wireless Serial Terminal Connection (Bluetooth)

The IOS platform has limited support for BLE due to the constraints that Apple puts on its hardware and software. We have identified an App on the their Store that will communicate with the G3 controller. It supports customizable buttons arranged in 4 rows, but unlike the Android App, there is no support for button import/export so end users must create their buttons from scratch.

The App to download is called "BLE Terminal HM-10" by Gopi Godhiya. Download and install the App from the store.

App Store Preview: https://apps.apple.com/in/app/ble-terminal-hm-10/id1398703795#?platform=ipad

TCP Telnet Terminal (Experimental)

The same developer has another IOS App called "TCP Telnet Terminal" that may allow serial communication over IP. This has not been tested by the factory yet.

App Store Preview: https://apps.apple.com/in/app/tcp-telnet-terminal/id1387816355

Connecting to a G3 Over Bluetooth BLE

IOS BLE Terminal App, (Requires the Wired RS485 Adaptor)

Bluetooth BLE does not require device pairing. The BLE device is found from within the App by scanning for it. Before we scan for the G3 we need to make sure the BLE radio is powered on. The G3 Controller will automatically power off the BLE radio 3 minutes after first boot if nothing connects to it so there is a good chance that it is powered off right now.

To power up the G3's BLE Radio: (Make sure the doors are closed)
- From a wall switch, press and hold "**Stop**" and "**Release**" for about 10s. The system should reboot.
- Use the G3 power switch to power cycle the entire system.

Scanning for a G3's BLE Radio:
When starting the BLE Terminal app, it should default to the device scanning page and begin scanning for BLE devices. If it does not press the Scan button in the upper right corner.

In a few moments you should see 1 or more devices named IM_XXXX. Tip: The label on the back of "RS485 GPIO Adaptor" should have a label matching the "XXXX" numbers in the device names listed after scanning.

Select the device that matches the RS485 lable and you should wirelessly connect to the G3.

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

App BLE Configuration Setup

IOS BLE Terminal App, (Requires the Wired RS485 Adaptor)

The IOS app requires a few additional to properly communicate with the G3 Controller.

Press the "Selected XXXXX" button just below the terminal window.

When the next window opens, scroll the list of "characteristics" down until you see the line that reads:
"Service: 49535343-FE7D-4A…". That entry should also have line below it ending in "**BA61**".

Note: This must be done each time the App is run

Select this service and press Ok if prompted.

You should be returned back to the terminal screen

To complete the configuration there are some hidden options that must be enabled otherwise the G3 Controller will not respond properly to commands.

Press and hold the "**Send ASCII**" button for 1-2 seconds. A "**Send Setting**" windows should appear.

In the "**Send Setting**" windows make sure:
- ASCII is selected
- \r – CR (Carriage Return) is checked
- \n – LF (Line Feed) is also checked

Press the **Save** button

INMOTION

A Caldwell Company

Initial Communication Test

IOS BLE Terminal App, (Requires the Wired RS485 Adaptor)

Send a "version" command to the G3 Controller as a test. In the entry box enter the command "ver" or 'v'.

Then press the "**Send**" or "**Send ASCII**" button. The terminal windows should update with a response from the G3 Controller.

If the controller version text is not clearly visible, send the "v" command again.

The G3 Version command output should be visible in the terminal window.

Version Command	Result after 2nd Version Command	Version Command Output
		Caldwell Generation 3 Controller Fw: v0.7.1 [REL_K12] Sn: 28C0016D2 K12 20041600167 Bn: f659d4e

Optional App Settings and Command Buttons

IOS BLE Terminal App, (Requires the Wired RS485 Adaptor)

In the App's settings menu there are options to select font size and in particular enabling command buttons. To enable "command buttons" press 🔢 button, then select "Settings". Up to 20 commands can be defined depending on how many button rows are enabled. Each button must be defined manually.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 125 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Defining Command Buttons

Before defining "command buttons", make sure that at least 1 row of buttons are enabled in "Settings"

With buttons displayed on the main screen, <u>press</u> and <u>hold</u> a button to edit it.

Defining "Version" Button	Save the Button Definition	Two Button Rows Defined Example
Set the "Button Name" "**Ver**" Set "ASCII" Enter the Command "**v**" Set "\r CR (Carriage Return) Set "\n LF (Line Feed) **Then Press Done**	Press the Save button	Eight buttons defined: Open, Close, Stop, Release, Motion, Version, Reset 0, Reset 4, Autosetup and CycleTest 3x.

Up to 20 buttons can be manually defined. Any single G3 command should be supported except for commands that change from unit to unit such as the password command. The password command needs to be entered without the help of a button on IOS.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – Pulley Diameter Calculation

Alternate Pulley Diameters

If a G3 System is purchased new from the factory there should be no reason to change the pulley diameter. If however, a G3 controller is matched up with an older INMOTION motor stack with the short "black" pulley, reported distances from several commands can be improved by using a corrected value of **1.7934** inches.

Current Silver OEM Pulley (Default: 1.7988")

Previous Black OEM Pulley (Change to 1.7934")

Other Pulleys

Some dealers use our motors and change the OEM pulley to either gain speed or torque. If this is done, the "**pdia**" parameter for G3 must be updated to reflect the change for the embedded algorithms to function properly. We have found the G3 controller operates best if the pulley diameter is calculated instead of relying on the manufacturer's mechanical specifications.

Pulley Diameter Calculation (ONLY NEEDED IF PULLEY IS NOT OEM)

Prerequisites: G3 Controller is programmed with at least the encoder polarity correct.
                   G3 belt must be properly tensioned.
Tools: Tape measure, pencil and/or tape.
                   G3 debug cable or Bluetooth access to the CLI.

1. Make sure the door is in jam. Then power cycle or reset the controller with "rst 0"

```
cmd>rst 0                        // Reboot the controller
cmd>p pwd####                    // After booting, enter the password
```

2. Using a piece of tape or a pencil, mark the rear edge of the lead panel on the frame or floor. The mark should line up with edge of the panel exactly.

3. Open the door manually or electrically to the widest position that will still allow you to measure from the tape to the rear edge of panel 1. If the door is pocketing, its ok to leave it out of the pocket.

4. With the door open, measure the distance from the tape to the rear edge of panel 1. *Record the number of inches Panel 1 moved including any fractions.*

INMOTION

A Caldwell Company

- *To make the measurement to an even "inch" mark, lay a tape measure out first, aligned with the correct edge of the tape, all the way back to the full open position. Then manually push Panel 1 until the rear edge lines up to an inch mark on the tape measure and record the distance.*

5. DO NOT MOVE THE DOOR.
6. Get doors encoder position from the CLI using the command "ap" (Actual Position)

```
cmd>ap                            // Get position in encoder counts
5378                              // Record the Encoder Count
```

7. Use the distance recorded earlier and the encoder count from above to calculate the pulley diameter:

$$pdia = \frac{Distance}{EncoderCounts} \, x \, 76.3944$$

Example:

Distance: 172.25"

Encoder: 5378

$$pdia = \frac{172.25}{5378} \, x \, 76.3944$$

$$\boldsymbol{pdia = 2.4468}$$

8. Set your new pulley diameter with the "pdia" command

```
cmd>c pdia 2.4468                 // Set the pulley diameter (use your value)
OK: 2.4468                        // New pulley diameter has been set
```

9. Reprogram the door with the corrected pulley diameter. The CLI "pos" should now report panel 1's distance from the jam to within ½" of the actual measured distance across the span.

```
cmd>pos                           // Reports the panel position in inches
OK: 75.46                         // This should match the measured opening
* If this is a bipart, the opening is from center span.
```

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – Info Report

The Info report shows the installer nearly every configuration setting available on the CLI. Included are the core settings that were set during programming, G3 manufacturing information such as the Serial Number and Firmware version. All special features, feature options and modifiers are displayed near the bottom of the report. For every adjustable parameter displayed, the command to change that parameter is also shown.

Finally, the report indicates what feature is currently "active" and the mode that will be enabled on the next commanded close. Parameters that may be set to a long delay such as "brake on close" after 4500 seconds are decoded into a more readable forms like this "1h 15m 0s".

The report is broken down into 4 sections: Gen 3 Controller, Settings, Features, and Modifiers.

"Gen 3 Controller" Section

Most of the information provided here is set by the factory and is useful when technical support needs to know what version of the firmware the installer has, etc. The installer will find the G3 Serial number here which is required for password access to the CLI. The last line item shown is the "Programmed" field and indicates if the G3 has been programmed or not.

Factory Programmed "Door Name"

G3 Serial Number

```
Gen3 Controller           NW Patio Door
---------------
Part Number:              28C0016
Serial Number:            28C0016D2 K12 20041600167
Firmware:                 0.7.1
    Build Hash:           f659d4e
    Build Type:           REL_K12
    Config Version:       2a8142cd
Max Current:              841mA
Programmed:               Yes
Error Log:                None
                          New in firmware v0.7.2
```

2s Pause during calculation

On the top line of the report, to the right of the section header there is an optional "Door Name". This can only be configured by the factory in this release, but a future release will enable naming of doors/controller with an App.

Two new fields for v0.7.2, "Max Current" from the profile dump and "Error Log" reports "TLE Overcurrent/Overtemperature counts.

"Settings" Section

The Settings section shows all the parameters set during programming, including the span, jam entry or depth, and motor and encoder polarities. The "program" settings should not be changed unless directed to do so by a factory representative.

A handful of settings should be changed if known though. Those include the panel mass, pulley diameter (if not OEM), and the door type. Changing

```
Settings
--------
Panel Mass:        p1ms*   172.00lbs
Pulley Diameter:   pdia*   1.7988in
Door Type:         drtp*   oneway
Jam Entry:         pje*    0.85in
Span:              pop*    46.06in
  Sub-Span:        pops*   0.00in
Motor Direction:   mdir*   invert
Encoder Polarity:  epol*   invert
O/C Speed Limit:   spl*    DISABLED[0]
High Frict Inst:   hfi**   0
                          New in firmware v0.7.2
```

Normal Mode Sub-Span (Disabled)

the panel mass, if known, will allow to the controller to adjust the velocity of the door to maintain UL325 safety compliance standards. Setting the door type has no effect on door operation but for some reports such as the Cycle Test report, will double the reported panel travel distance. The Sub-Span parameter, "pops" controls and indicates the shortened span for Normal Mode. Changing this to a non-zero value changes Normal Mode's open position. Setting it to 0, disables the sub-span and the door will open to its programmed limit.

INMOTION

A Caldwell Company

"Features" Section

This is by far the most useful section as it indicates all the Special Features options and their status. The last parameter, "Cycle Test Fault Limit", displays the number of faults required in 1 open/close cycle to cause a CycleTest to error out and stop.

The header line of the Features section indicates what mode is active "right now". In this case Normal Mode is active and no other features are enabled. Disabled features show "-------".

Activated On Close Commands:

All the commands that control Special Features are "Activated On Close" commands. That means that their affect is "delayed" until the panel is commanded to close, the panel enters the jam and stops. This functionality guarantees that feature and feature

```
                                            Activated
                                            On Close
Features - 'Normal Operation' ACTIVE
------------------------------------
Span Adj Time:      fsat*  5s
  Actual Adj Time:         5s          Decoded "delay" for
Party Mode:         fpme*  -------      4500 seconds
  Span:             fpmd*  40.00in
  Auto Close Time:  fpmw*  DELAY[10s]
  Brake On Close:   fpmb*  DELAY[1h 15m 0s]
Egress:             fege*  -------
  Span:             fegd*  40.00in
  Auto Close Time:  fegw*  DELAY[10s]
  Brake On Close:   fegb*  DISABLED[0]
One Button Op:      fobe*  -------      Disabled
  Span:             fobd*  40.00in      Features
  Auto Close Time:  fobw*  DISABLED[0]
  Brake On Close:   fobb*  DISABLED[0]

Move Assist:        fmae*  -------
  Span:             fmad*  40.00in
  Auto Close Time:  fmaw*  DISABLED[0]
  Span Adj Time:    fmat*  5s

Cycle Test:                DISABLED    Command used to
   Fault Limit:     ctfl*  5           adjust parameter
```

options always change synchronously when the door is at a known position. Without the sync, the controller could confuse a change to Party Mode for example which is really meant for Egress.

The Info table can help the installer know what mode or feature modifiers are active right now, versus what is about to be active on the next commanded close command. Let us see how this works:

In the first report, the controller is in Normal Mode, the door is in jam and all feature are disabled. Lets use the CLI to enable **Egress Mode**, change its span to **6 inches** and enable **brake-on-close** immediately.

```
cmd>c fege 1                    // Enable Egress Mode
132.916: FEATURE: Egress ENABLED
OK: 1
cmd>c fegd 6                    // Set Egress Mode's sub-span to 6 inches
OK: 6.0000
cmd>c fegb 1                    // and then enable brake-on-close
OK: 1
Cmd>info                        // Rerun the Info report
```

Re-running the Info command "**info**" now shows that Egress is Enabled, but we are still in Normal Mode. This is because we have not commanded the door to close to actually "set" the new features. It also means the Egress parameters are not affecting the door at all because we are still in Normal mode.

```
Features - 'Normal Operation' ACTIVE    Normal Mode
------------------------------------    Still Active
. . .
                                        Our "new" Settings
Egress:             fege*  ENABLED      but inactive...Not in
  Span:             fegd*  6.00in       Egress Mode yet
  Auto Close Time:  fegw*  DELAY[10s]
  Brake On Close:   fegb*  ENABLED[1]
```

To make Egress Mode <u>active</u> and activate the new settings we command the door to close with a wall switch or the CLI command "**button close**" or "**b c**".

```
cmd>button close    // Close Commanded
OK
cmd>i               // Report Info again
```

Now we can see Egress is "**Active**", so the controller is now running in Egress Mode.

```
Features - 'Egress' ACTIVE              Egress Mode
------------------------------------    Now Active
. . .
                                        So our "new"
Egress:             fege*  ENABLED      Settings are active
  Span:             fegd*  6.00in       too
  Auto Close Time:  fegw*  DELAY[10s]
  Brake On Close:   fegb*  ENABLED[1]
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 130 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Actual Adjustment Time:

The Info report shows 2 values for span-adjustments for both the shared time (Normal Mode, Party Mode, Egress and One Button Operation) and the Move Assist time. Below each is another field, "Actual Adj Time". Why? Its because the modifier "Auto Close Time" takes precedence over the Span Adjust Time.

If the "Auto Close Time" happened to be a shorter than the "Span Adjust" time, the "Span Adjust Time" is automatically set to 1s less than the "Auto Close Time". This makes sense because, if the door has started to auto close, then adjusting the span is not possible. Let's see how this works when the "Span Adjust Time" is 15s while "Auto Close" remains at 10s.

```
cmd>c fsat 15        // Span Adjust to 15s
OK
cmd>i                // Report Info again
```

Note that the Span Adjust Time changed to **15s** but the "Actual Adj Time" stayed at 5s.
We need to command the door the close to set it.

```
md>b c               // Use close to set again
OK
cmd>i                // Report Info again
```

Now when we run the Info report, the "Actual Adj Time" changes to 1 second less than the active "Auto Close Time".

```
Features - 'Egress' ACTIVE
----------------------------------
Span Adj Time:      fsat*  5s        ┌─ Span Adj = Actual
   Actual Adj Time:        5s
Party Mode:         fpme*  -------
   Span:            fpmd*  40.00in
   Auto Close Time: fpmw*  DELAY[10s]
   Brake On Close:  fpmb*  DELAY[1h 15m 0s]
Egress:             fege*  -------
   Span:            fegd*  6.00in
   Auto Close Time: fegw*  DELAY[10s]
   Brake On Close:  fegb*  ENABLED[1]
One Button Op:      fobe*  -------
   Span:            fobd*  40.00in
   Auto Close Time: fobw*  DISABLED[0]
   Brake On Close:  fobb*  DISABLED[0]

Move Assist:        fmae*  -------
   Span:            fmad*  40.00in
   Auto Close Time: fmaw*  DISABLED[0]
   Span Adj Time:   fmat*  5s        ┌─ Span Adj = Actual

Cycle Test:                DISABLED
```

```
Features - 'Egress' ACTIVE
----------------------------------              ┌─ Setting is
Span Adj Time:      fsat*  15s                  │  set, but not
   Actual Adj Time:        5s                   └─ in effect.
```

```
Features - 'Egress' ACTIVE
----------------------------------              ┌─ Setting is
Span Adj Time:      fsat*  15s                  │  now in in
   Actual Adj Time:        9s                   └─ effect
```

```
Features - 'Egress' ACTIVE
----------------------------------
Span Adj Time:      fsat*  15s        ┌─ Actual Adj Time
   Actual Adj Time:        9s         └─ 10s – 1s = 9s
. . .
Egress:             fege*  -------
   Span:            fegd*  6.00in
   Auto Close Time: fegw*  DELAY[10s]
   Brake On Close:  fegb*  ENABLED[1]
```

Since "Move Assist" has its own span adjust parameter, "**fmat**", it also has its own "**Actual Adjust Time**" field which only appears when "Move Assist" is active. At the same time, the "fsat" "Actual Adjust Time" is removed since it not relevant anymore.

As before, if the "**Span Adjust Time**" is longer than the "**Auto Close Time**", the "Actual Span Adjust" time is set to **1s** less than the "Auto Close time".

```
Features - 'Move Assist' ACTIVE
----------------------------------
Span Adj Time:      fsat*  5s         ┌─ Actual Adj Time
Party Mode:         fpme*  -------    └─ removed
   Span:            fpmd*  40.00in
. . .
Move Assist:        fmae*  ENABLED
   Span:            fmad*  40.00in
   Auto Close Time: fmaw*  DELAY[3]
   Span Adj Time:   fmat*  5s
   Actual Adj Time:        2s         ┌─ Actual Adj Time
                                      └─ 3s – 1s = 2s
Cycle Test:                DISABLED
   Fault Limit:     ctfl*  5
```

INMOTION

A Caldwell Company

"Modifiers" Section

The last section is the Modifiers section and for the most part is self-documenting on the CLI.

There are 5 modifiers listed and they affect Normal Mode & Special Features or just Normal Mode. When a modifier affects Normal Mode & Special Features it is considered a "global" modifier and will be listed with a "(G)" suffix. When a modifier only affects Normal mode it will have "(N)" suffix.

From the report we can see that only "Brake On Close" is a Normal mode only modifier and rest are all global.

Modifiers that are enabled will show a value while disabled modifiers will either show "-------" or DISABLED[0] on the right.

The "Brake On Close" modifier for Normal will be displayed 3 ways depending on it value.

```
cmd>c fsat 15          // Span Adjust to 15s
```

```
Brake On Close(N): mboc*  ENABLED[1]
Brake On Close(N): mboc*  DISABLED[0]
Brake On Close(N): mboc*  DELAYED[2h 10m 0s]
```

```
Gen3 Controller    NW Patio Door
---------------
Part Number:       28C0016
Serial Number:     28C0016D2 K12 20041600167
Firmware:          0.7.2
  Build Hash:      f659d4e
  Build Type:      REL_K12
  Config Version:  2a8142cd
Max Current:       841mA
Programmed:        Yes
Error Log:         None

Settings
--------
Panel Mass:        p1ms*  172.00lbs
Pulley Diameter:   pdia*  1.7988in
Door Type:         drtp*  oneway
Jam Entry:         pje*   0.85in
Span:              pop*   46.06in
  Sub-Span:        pops*  0.00in
Motor Direction:   mdir*  invert
Encoder Polarity:  epol*  invert
O/C Speed Limit:   spl*   DISABLED[0]
High Frict Inst:   hfi**  0

Features - 'Move Assist' ACTIVE
------------------------------
Span Adj Time:     fsat*  15s
Party Mode:        fpme*  -------
  Span:            fpmd*  40.00in
  Auto Close Time: fpmw*  DELAY[10s]
  Brake On Close:  fpmb*  DELAY[1h 15m 0s]
Egress:            fege*  -------
  Span:            fegd*  6.00in
  Auto Close Time: fegw*  DELAY[10s]
  Brake On Close:  fegb*  ENABLED[1]
One Button Op:     fobe*  -------
  Span:            fobd*  40.00in
  Auto Close Time: fobw*  DISABLED[0]
  Brake On Close:  fobb*  DISABLED[0]

Move Assist:       fmae*  ENABLED
  Span:            fmad*  40.00in
  Auto Close Time: fmaw*  DELAY[3s]
  Span Adj Time:   fmat*  5s
  Actual Adj Time:        2s

Cycle Test:               DISABLED
    Fault Limit:   ctfl*  5

Modifiers
---------
Hard Close En(G):  mhdc*  ENABLED
Hard Open En(G):   mhdo*  -------
Brake Disable(G):  mbd*   -------
Brake On Close(N): mboc*  ENABLED[1]
Brake At Open(G):  mbpop* DISABLED[0]

(G)=Normal & Features, (N)=Normal only

*Password protected commands 'pwd xxx'
** Password protected help commands
  Syntax: 'c command value'
  e.g.   'c fege 1' - Enables Egress
  e.g.   'hfi 5'    - Sets HFI to 5
```

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 132 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – Installation Scenarios

G3's support for special features and their related parameters can have applications that were previously impossible or simply did not apply to a typical automated door system. This brief provides solutions to some standard and non-standard installation scenarios when using the G3 controller.

An automated patio door is installed without an external wall switch

Problem: The operator can get locked out when the magnetic brake engages in Normal mode or during special features when the brake-on-close option is enabled.

Solutions:

1. Enable the G3's "**brake-on-close**" delay for Normal mode and all affected features. Setting the brake to delay to 30 minutes up to 1 full day can prevent most lock out situations.
2. Install an exterior wall switch, security wall switch or wireless remote on the system.

The door needs to auto open when externally triggered during an emergency

It is the responsibility of the installer/dealer to check with local building and/or fire authorities prior to using any INMOTION system for installations of this type.

Proper system operation should be verified monthly or on the schedule designated by a governing body.

Problem: An automated door, that is not normally used for exit or entrance, needs to auto open when triggered by a "gas detection" system to provide ventilation. After 2 hours the door needs to auto close and engage its magnetic brake. A wall switch is not accessible at the door.

Solution:

1. Use a G3 with the GPIO RS485 Wired Adaptor with "Party Mode" enabled.
   - Enable "Party Mode".
   - Enable "Party Mode" brake-on-close; Set to 1s.
   - Enable "Party Mode" auto close delay for 2 hours (7200s)
   - Using a relay board compatible with the "gas detection" system, wire the activation signal to the either of the G3's RS485 "motion" ports. The relay should provide a constant 24VDC signal until the door needs to open. To open the door, the relay needs to open, cutting the 24VDC signal for 1s, then close restoring 24VDC to the motion input.
2. Test the full system by sending a "gas" signal from the detection system verifying the door opens, waits for 2 hours, closes, and enables the magnetic brake. This check should be done on a monthly schedule.
3. For a system like this a UPS protecting the G3 is highly recommended for reliable operation during and after AC power outages.

An installation needs to have the magnetic brake disabled permanently

Problem: The magnetic brake interferes with a 3rd party locking mechanism or the operator wants the magnetic brake disabled all the time.

Solution:

1. Disable the magnetic brake using the global CLI command "c mbd 0" command.
2. Disconnecting the brake at the motor BOB is not recommended as the G3 detects this an error and reports the issue on the CLI.
3. When the command "c mbd 0" is active, all brake signals from wired and wireless devices are ignored. The only remaining brake functionality is the help command "brake 0|1" which can only be access from the CLI.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

A door needs to be automated without "Soft Touch"

Problem: A service door needs to be automated without using "Soft Touch" but still provide over-current protection for the controller and associated hardware.

Solution: This solution should NOT be used for pedestrian traffic because "Soft Touch" is disabled but does have applications where reliable open and close functionality is high and entrapment risks for people and pets is low.

1. Disable "Soft Touch" with the command "c fpce 0"
2. Determine the maximum motor current using the command "dpro". Its at the bottom of the report.
3. Enable the "Friction Profile Hard Limit" with the command "c fpcl XXX" where XXX equals at least 150% the maximum motor current reported in step 2 above.
4. Test the door for reliability with the Cycle Test command. During the cycle test, the door should be manually blocked to verify the door will stop on a over current. Increase the "fpcl" if false over-currents happen or decrease "fpcl" if the door does not stop when the door is mechanically halted.

Entrapment protection for very small and large pets simultaneously

Problem: A homeowner wants to make sure a small and a large dog can be reliably detected by a G3's safety devices during close.

Solution: With some additional safety devices most, pets should be protected from becoming entrapped by a closing door controlled by a G3 Controller. Wired motion accessories are recommended to cover both the inside and outside of the doorway. The G3's RS485 GPIO adapter is required along with at least 1 wired IR beam controller with dual sensor kits and 2 wired motion detectors. The RS485 adaptor supports 2 independent wired motion sensors and an independent IR beam sensor controller.

1. A G3 should be installed and then tuned for "Soft Touch". The system should be tuned so that the lightest possible touch will trigger a friction fault, stop and reverse.
2. Wire and install both motion detectors to the RS485 GPIO adapter's Motion Inside & Outside RJ45 ports.
3. The IR beam controller comes standard with 1 set of sensors but supports for a second set for special installations like this.
   a. Mount 1 emitter / receiver pair on the inside of the door and the 2nd pair set on the outside. The mounting height of both sensors is dependent on the height of the smaller dog.
   b. OPTION: Both sensor pairs from the single IR beam controller could be mounted on 1 side of the door with each pair at the different heights to protect the different sized pets. A second IR beam controller with dual sensors would then be required for the outside. Using 2 IR Beam controllers for a total of 4 IR sensor kits does require a bit of custom wiring but it is not difficult. Contact the factory for more information.

Homeowner wants Egress mode to Brake-On-Close just like the G2 Controller

Problem: The homeowner wants to exit the home using Egress mode, and have the magnet brake engage just like the previous G2 controller did.

Solution: Install and program the G3 controller as usual.

1. Enable Egress mode via the wall switch or CLI using the command "c fege 1"
2. Enable Egress brake on close using the CLI command "c fegb 1"
3. Adjust the Egress close delay as desired with the CLI command "c fegw X" where 'X' is the number of seconds to wait before closing.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 134 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Operator wants doors to open to a specific distance in every mode

Problem: The homeowner needs to have the door open to an exact position every time to maintain a "view" of the outside and to prevent fallen leaves and debris from blowing into the house because of nearby tree and strong local winds.

Solution: Install and program the G3 controller as usual.

1. Make sure the G3 is programmed to the full physical span of the frame.
2. With the door in the desired "open" position, execute the CLI command "pos" which reports the current door position in inches.
3. Using the CLI again, execute the following commands to set the sub-span for all modes to the value obtained in step 2 above. If for example the value from step 2 was 85.7845 inches…
   a. Normal Mode: "c pops 85.7845"
   b. Party Mode: "c fpmd 85.7845"
   c. Egress Mode: "c fegd 85.7845"
   d. One Button Op: "c fobd 85.7845"
   e. Move Assist: "c fmae 85.7845"
4. Option: If the homeowner wants to make sure the span cannot be set by manually moving the door within 5s of reaching open, these commands will disable all span adjust timers.
   a. All modes except Move Assist: "c fsat 0"
   b. Disable for Move Assist: "c fmat 0"

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 135 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Tech Brief – TLE Mitigation

"TLE" errors are caused by an overload condition placed on the controller due to a high friction condition with the door. The issue has been investigated by the factory and in nearly every case the pull load placed on the G3 system has exceeded 60lbs and in some cases 90lbs.

v0.7.2 On Power Up ➡ v0.7.2 After 3s   v0.7.1 & Earlier

Quick Adjustment

1	Assumptions: • G3 is programmed • Panel pull >40lbs • CLI indicates "TLE issues" • Panel is fully **CLOSED**	```cmd>060.730: Enc: Motion start 061.436:*TLE Current Limit 068.440:*TLE Overtemp 068.726: Enc: Motion stop``` ➡ > 40lbs

2	Increase the Acceleration & Deceleration Parameter Values	*G3 Firmware v0.7.2* *G3 Firmware v0.7.1 & earlier*
		
		```cmd>p IMxxxx [password] cmd>p IMxx [developer pw]```
		```cmd>hfi 4 cmd>r 4 [wipe G3]```
		```cmd>p IMxxxx [password] cmd>p IMxx [developer pw]```
		```cmd>c vpmf 1 [optional]```
		```cmd>c apmf 1 [recommended] cmd>c acco 15```
		```cmd>b a [reprogram] cmd>c accc 15```
		``` cmd>c deco 15```
		``` cmd>c decc 15```
		``` cmd>c vpmf 1 [optional]```
		``` cmd>c apmf 1 [recommended]```
		``` cmd>b a [reprogram]```
		
		*Optional "**vpmf = 1**" will increase the panel speed for mid-span pickups*
		*Recommended "**apmf = 1**" prevents Accel/Decel increases by 5x for mid span pickups*

3	Test the door by running the panel full OPEN to full CLOSE at least 3 times… Watch for "TLE" messages on the CLI and STOP if they appear	```cmd>b open cmd>b close [repeat 3 times] cmd>b open cmd>b close cmd>b open cmd>b close```

4	Verify no "TLE" issues appear in the CLI during any of the previous test cycles	*G3 Firmware (v0.7.2 or later)* *G3 Firmware (any version)*
		
		```cmd>info [check the info report]```
		
		⬇ ⬇
		
		```Error Log: Prog:0[TLE: T000 C0000]```
		``` Unit:3[TLE: T003 C0009]``` ```765.062: Enc: Motion start
		779.506: Enc: Motion stop
		. . .
		782.062: Enc: Motion start
		791.506: Enc: Motion stop
		. . .
		800.062: Enc: Motion start
		806.506: Enc: Motion stop```

5	**If "TLE" issues continue to appear, consult the remainder of this document OR contact the automation support for additional information.**	

INMOTION

A Caldwell Company

TLE Mitigation Overview

The root cause of TLE over-current & over-temperature errors is a <u>friction overload in the mechanics of the door</u> while the door is programmed to ramp up to speed too quickly.

- If a G3 system is experiencing TLE errors, immediately <mark>STOP</mark> running the controller. Continued use of the controller in an overloaded configuration will damage the motor drive circuit.
- The motor controller chip has a fixed number of "*TLE over-temperature*" faults that it can handle before the chip is damaged and must be replaced. The limit is **100,** so if you suspect the door has had close to or more than 100 TLE over-temperature failures, it is likely the controller requires factory repair. This does not apply to <u>TLE over-currents</u>, only <u>TLE over-temperature</u> events.
- The new G3 firmware v0.7.2 counts both types of TLE errors so that damage can be assessed in the field. Firmware releases prior to v0.7.2 did not support TLE counts.
- Identify the source of the heavy load and correct if possible. The source of the friction load can be in the head/floor track, wheels, or weather strip. Also check the motor stack and return pulley for smooth operation. If the home was insulated with spray-in-foam, make sure the motor and return pulley have not been sprayed. <u>The door MUST work well as mechanically *before* it is automated.</u>
- If the door is mechanically sound and still exhibiting TLE errors, a change to the default move parameters may mitigate the issue. The change involves slowing the ramp times for both open and close to give the controller a chance to build up momentum and prevent the overload. This can be done using the CLI commands "**hfi**", "**acdc**", "**spl**", "**acco**", "**accc**", "**deco**", and "**decc**" depending on the firmware installed on the G3 controller. The latest version of firmware, v0.7.2 added the commands "**hfi**", "**spl**", and "**acdc**" specifically to help with TLE, but older firmware versions can also apply the same mitigation.

TLE Event Counts (Firmware v0.7.2 & later)

TLE error counts are tracked in two ways since the controller was last programmed and since it was manufactured. The manufactured or unit count will indicate the total number TLE over-temperature and TLE over-current faults. The "unit over-temperature" count is the one we need to stay below 100 before a repair is required. The other count, since last programmed, helps the installer determine if a particular adjustment was successful in preventing the accumulation of TLE errors.

TLE error counts are reported using the "info" command and will appear in the header under the title "**Error Log**".

The number of events "*since last programmed*" is labeled "**Prog**"
The number of events "*since manufactured*" is labeled "**Unit**"

On the right, over-temperature faults are prefixed with a "T", while over-current events have the prefix "C".


```
cmd>info

Gen3 Controller
---------------
Part Number:      28C0016
Serial Number:    28C0016D2 K12 1906170064
Firmware:         0.7.2
  Build Hash:     0a4dc1c          TLE Counts
  Build Type:     REL_K12
  Config Version: 2a8143cd
Max Current:      856mA
Programmed:       Yes
Error Log:        Prog:3[TLE: T002 C0006]
                  Unit:3[TLE: T003 C0008]
```

In the example shown, the controller has only had 3 over-temperature events since the unit was <u>manufactured</u> and 2 over-temperature events since it was <u>programmed</u>.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Do not Ignore "Over-Current" Events

Over-current events always precede over-temperature events, so it is only a matter of time before the controller will start accumulating temperature events too, putting the controller at risk.

The goal is to identify TLE events, attempt to mitigate the issue then retest the door. If after several door cycles no CLI TLE messages appear, we can then wipe the controller, apply the fix and reprogram.

The configuration is wiped to restore everything back to factory defaults and make sure the friction profile is relearned to comply with the UL325 safety standard. Then we apply the fix, and finally reprogram. After the controller is reprogrammed, the TLE "Prog" count displayed in the "info" report is zeroed out allowing us to determine if the issue has been truly fixed or not. The "unit" count will remain unchanged.

```
Error Log:          Prog:0[TLE: T000 C0000]
                    Unit:3[TLE: T003 C0009]
```

The Mitigation Parameters

Firmware v0.7.2 and later:

The table below shows the settings to needed to mitigate various "high friction installations". The "hfi" command listed, which is only supported with G3 firmware **v0.7.2 or later**, will enable all the settings to the right. i.e. "c hfi 4" sets the open and close speed and all 4 acceleration/deceleration speeds listed in "hfi" row 4. The row "hfi 0" restores all 6 settings back to factory defaults.

The "hfi X" command performs the following operations in one step:

1. Performs a "factory reset" (**rst 4**) – Developer password required "p IMxxxx"
2. Sets Open/Close Speeds, Acceleration Open/Close Times, and Deceleration Open/Close Times (c **osp** X, c **csp** X, c **acco** Y, c **accc** Y, c **deco** Y, c **decc** Y) per the values in the table below.
3. After the controller reboots it must be reprogrammed.

Firmware v0.7.1 and earlier:

The fix can be enabled with firmware versions v0.7.1 and earlier with a bit more typing. For these firmware releases, each command must be sent individually. To apply the same mitigation using an older firmware:

1. Performs a "factory reset" (rst 4) – Developer password required "p IMxxxx"
2. Set the OPEN speed: "c **osp** X"
3. Set the CLOSE speed: "c **csp** X"
4. Set the OPEN acceleration time: "c **acco** Y"
5. Set the CLOSE acceleration time: "c **accc** Y"
6. Set the OPEN deceleration time: "c **deco** Y"
7. Set the CLOSE deceleration time: "c **decc** Y"

Supported by Firmware ➡	v0.7.2+	Supported by all firmware releases					
Relative Door "Pull"	HFI (c hfi X)	OSP (c osp X)	CSP (c csp X)	ACCO (c acco Y)	ACCC (c accc Y)	DECO (c deco Y)	DECC (c decc Y)
Normal < **40lbs**	0	4	4	2.5	2.5	3	3
Heavy > **40lbs**	1	6	6	12	12	12	12
	2	6	6	15	15	15	15
	3	5	5	15	15	15	15
	4	4.5	4.5	15	15	15	15
Very Heavy > **85lbs**	5	4	4	15	15	15	15

INMOTION

A Caldwell Company

Mitigation Example

The first step is to test the mitigation. For this, only a few commands are required regardless of the firmware version. Since the default door speed is usually between 4 and 6 inches / sec, firmware version dependent, those settings can be skipped for testing, and we only need to adjust the acceleration & deceleration parameters.

v0.7.2 Firmware and Later		v0.7.1 Firmware and Earlier
`cmd>p IMxxxx`	**Initial Test Using "HFI 4" Params** Enter "developer" Password	`cmd>p IMxxxx`

`cmd>c acdc 15`	Set Acceleration
	& Deceleration
		`cmd>c acco 15` (HFI 4)
		`cmd>c accc 15`
		`cmd>c deco 15`
		`cmd>c decc 15`

(test the door for TLE's)	And <u>check</u> the current OPEN &
	CLOSE speeds for reference:
	`cmd>c osp`
	`cmd>4.0000`
	`cmd>c csp`
	`cmd>4.0000`
		(test the door for TLE's)

`cmd>hfi 4`		`cmd>r 4` (factory RESET) `cmd>p IMxxxx`

`cmd>p IMxxxx`	**Test the Door Operation…**
	If no TLE errors are observed
	
	Set the HFI level.
	(Factory RESET + Param changes)
		`cmd>c osp 4.5` (vals for HFI 4)
		`cmd>c csp 4.5`
		`cmd>c acco 15`
		`cmd>c accc 15`
		`cmd>c deco 15`
		`cmd>c decc 15`

`cmd>c apmf 1` `cmd>c vpmf 1`	Enter "developer" Password **RECOMMENDED:** Allows increased speed during mid-span "partial moves" with HFI	`cmd>c apmf 1` `cmd>c vpmf 1`
`cmd>button auto (reprogram)`	Reprogram the Controller	`cmd>button auto (reprogram)`
Operate the door for a few cycles & verify no TLE errors. **Done!**	**Final Test** Done	Operate the door for a few cycles & verify no TLE errors. **Done!**

`cmd>info`
`. . .`
 	
`Error Log: Prog:0[TLE: T000 C0000]`
`           Unit:3[TLE: T003 C0009]`
	While testing verify no "TLE" messages are displayed in "**Prog:**"
	OR
	Check the "info" report "Error Log"
		`cmd>b open`
		
		`384.760:*TLE Current Limit`
		`392.364:*TLE Overtemp`

	If TLE error are still observed during testing or Final Test… Try a higher "hfi" level by changing the open & close speed to 4 or 4.5 inches / second (HFI 5)	

INMOTION

A Caldwell Company

Tech Brief – G3 Troubleshooting

CLI shows "TLE Over-current/over-temp" on the CLI

If the CLI displays any "TLE" messages immediately STOP operating the door. These messages indicate the controller is overloaded and continued use will damage the motor drive circuit. Refer to the "Tech Brief TLE Mitigation" for a procedure that may eliminate overload conditions caused by a high friction installation.

```
cmd>060.730: Enc: Motion start
061.436:*TLE Current Limit
068.440:*TLE Overtemp
068.726: Enc: Motion stop
```

During movement the door "stutters" (stops, starts, stops, etc)

This issue can be caused by setting the panel speed too high but can also indicate a "TLE over-temperature" issue. "TLE" issues will be indicated on the CLI with a text message. If a "TLE" message has been displayed, STOP operating the door and refer to the "Tech Brief – TLE Mitigation" for a programming procedure that may eliminate the overload condition. Ignoring "TLE" errors will eventually damage the controller.

If "TLE" messages are not displayed, then open and/or close speeds may be set too high. If the door cannot reach the programmed speed, it will eventually fault and stop the panel with an error shown on the CLI. Reducing the open and/or the close speed to 3 -4 inches / sec may help, especially with very heavy panels that cannot be ramped up to high speed due to their mass. Refer to the Speed Limit (spl) command for a quick method of limiting panel speeds.

While programming the door stops & locks after the 2ⁿᵈ move

This was most likely caused by a short move. While programming make sure the lead panel is moved at least ¼"- ½" for first move and 1 to 2 feet for the second. For each manual movement of the door during programming or runtime, the CLI will indicate "Motion start" and "Motion stop". If these message are not displayed for each step during programming, the move was not registered by the controller. This means that either the movement was too small or there is something wrong with the encoder or encoder wiring.

If this is occurring, first try an exaggerated movement and verify the CLI displays the "Motion start/stop" messages. If nothing is shown on the CLI, with the power OFF, verify the encoder cable is plugged into the BOB board in the correct port. Also check to make sure the 10-pin cable for damage, full insertion on both ends etc.

If the encoder is suspect, basic encoder functionality can be verified using the BOB board's encoder LED's.

On the motor, there is an attached circuit board with Green & Yellow LED's near the bottom edge. With the power on and observing the LED's at the motor, have someone slowing move the door. If the door is moved slow enough, the Green & Yellow LED's should toggle On and Off. If either LED does not flash, stays on or off, the encoder is probably defective.

Encoder LED's

While programming the full open position the installation aborts

The minimum full span of the door must be at least 2 feet. It is possible to program the door to a few inches shorter but it can be tricky. Reboot the controller and make sure you set a full span of at least 2 feet or more and it should program up without issue.

INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Wireless G3 Randomly Moves as if Command by another Wireless Remote

The G3 controller may be programmed to multiple accessories at one time. When this occurs, every controller paired with a particular accessory will move as commanded. To remedy the situation, you need to clear the controllers wireless receiver. The receiver is inside the case but can be cleared without opening the G3.

Clearing the G3 900MHz Radio Accessory Table

1. Locate the radio pairing hole. A small button should be visible inside.
2. Power on the controller (it does not need to be programmed or attached to a door…just powered on)
3. Use a small screwdriver (a 7/64" Alen Wrench is ideal) to access the button. You will be pressing the button 5 times, 1s on, release, 1s on, release, etc.
4. Press the button 5 times for about 1s for the first **4 button** presses. For the **5th press**, hold the button down for about 2-5s or until you see the blue pairing LED blink 2 times, then a pause then it repeats.
5. When that LED blink sequence is observed, the receiver is cleared.
6. Re-pair any required accessories to the controller as all of those have been erased now.

Wireless Accessory Will not Pair with a G3 Controller

This situation can happen if an accessory has been used for dozens of different controllers. Eventually the accessory's pairing table fills up and it will refuse to pair to another controller. The pairing table is cleared in the same way as the receiver.

Clearing the G3 900MHz Radio Accessory Table

1. Locate the accessory's 900Mhz pairing button.
2. Press the button 5 times for about 1s for the first **4 button** presses. For the **5th press**, hold the button down for about 2-5s or until you see the blue pairing LED blink 2 times, then a pause then it repeats.
3. When that LED blink sequence appears, the accessory is cleared.
4. Try and pair the device to a controller again.

Open & Close Position Drifts on a New Installation

This issue is usually related to belt tension. When the belt is too loose, the encoder will not accurately track the door's position. Tighten the belt by turning the turnbuckle a few more turns and make sure the jam nut is tight when you are done.

Wired Wall Switches will not active Special Features using Open + Close

The wired/wireless key combination Open + Close is used to activate "Special Features" on G3 controllers with firmware versions 0.7.0 or later. If the controller has an earlier version of firmware then it does not support those features and will not respond to an Open + Close command. This is normal. If however, the controller has the correct firmware and the unit still does not respond to Open + Close then the RS485 GPIO module becomes suspect. The RS485 module is required for all wired accessories and it too must support the "Special Features" Open + Close command. RS485 GPIO modules shipped prior to the G3's v0.7.0 release did not support this key combination. If an older RS485 GPIO module is attached to a G3 with v0.7.0 or later, "Special Features" cannot be activated by a wall switch without a firmware update. Contact the factory for instructions on returning a RS485 GPIO module for a firmware update.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 141 of 161

INMOTION

A Caldwell Company

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

Open & Close Position Drifts after upgrading to a G3 Controller from a G1 or G2

The G1 and G2 controllers use the same encoder as the G3 except the voltage used is 24V where the G3 now uses 3V. We have found that even though encoders exposed to the higher G1 or G2 controller voltage usually work, sometimes they do not and they start dropping counts. This can cause the the open and close points to "drift". This is a known issue with hall effect sensors in the industry, so the best practice is to avoid the situation by replacing the encoder if upgrading from a G1 or G2 controller to the new G3.

If the encode already installed on the motor happens to work with the G3, the replacement encoder can be returned to the factory for a full refund.

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 142 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Appendix A: Conversions

Hours & Minutes to Seconds Conversion Table

The following table can be useful when configuring long delays for parameters that only accept parameters in seconds. For example, what is a 10-hour delay in seconds? **36000**

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
0	0	3600	7200	10800	14400	18000	21600	25200	28800	32400	36000	39600	43200	46800	50400	54000	57600	61200	64800	68400	72000	75600	79200	82800	0
1	60	3660	7260	10860	14460	18060	21660	25260	28860	32460	36060	39660	43260	46860	50460	54060	57660	61260	64860	68460	72060	75660	79260	82860	1
2	120	3720	7320	10920	14520	18120	21720	25320	28920	32520	36120	39720	43320	46920	50520	54120	57720	61320	64920	68520	72120	75720	79320	82920	2
3	180	3780	7380	10980	14580	18180	21780	25380	28980	32580	36180	39780	43380	46980	50580	54180	57780	61380	64980	68580	72180	75780	79380	82980	3
4	240	3840	7440	11040	14640	18240	21840	25440	29040	32640	36240	39840	43440	47040	50640	54240	57840	61440	65040	68640	72240	75840	79440	83040	4
5	300	3900	7500	11100	14700	18300	21900	25500	29100	32700	36300	39900	43500	47100	50700	54300	57900	61500	65100	68700	72300	75900	79500	83100	5
6	360	3960	7560	11160	14760	18360	21960	25560	29160	32760	36360	39960	43560	47160	50760	54360	57960	61560	65160	68760	72360	75960	79560	83160	6
7	420	4020	7620	11220	14820	18420	22020	25620	29220	32820	36420	40020	43620	47220	50820	54420	58020	61620	65220	68820	72420	76020	79620	83220	7
8	480	4080	7680	11280	14880	18480	22080	25680	29280	32880	36480	40080	43680	47280	50880	54480	58080	61680	65280	68880	72480	76080	79680	83280	8
9	540	4140	7740	11340	14940	18540	22140	25740	29340	32940	36540	40140	43740	47340	50940	54540	58140	61740	65340	68940	72540	76140	79740	83340	9
10	600	4200	7800	11400	15000	18600	22200	25800	29400	33000	36600	40200	43800	47400	51000	54600	58200	61800	65400	69000	72600	76200	79800	83400	10
11	660	4260	7860	11460	15060	18660	22260	25860	29460	33060	36660	40260	43860	47460	51060	54660	58260	61860	65460	69060	72660	76260	79860	83460	11
12	720	4320	7920	11520	15120	18720	22320	25920	29520	33120	36720	40320	43920	47520	51120	54720	58320	61920	65520	69120	72720	76320	79920	83520	12
13	780	4380	7980	11580	15180	18780	22380	25980	29580	33180	36780	40380	43980	47580	51180	54780	58380	61980	65580	69180	72780	76380	79980	83580	13
14	840	4440	8040	11640	15240	18840	22440	26040	29640	33240	36840	40440	44040	47640	51240	54840	58440	62040	65640	69240	72840	76440	80040	83640	14
15	900	4500	8100	11700	15300	18900	22500	26100	29700	33300	36900	40500	44100	47700	51300	54900	58500	62100	65700	69300	72900	76500	80100	83700	15
16	960	4560	8160	11760	15360	18960	22560	26160	29760	33360	36960	40560	44160	47760	51360	54960	58560	62160	65760	69360	72960	76560	80160	83760	16
17	1020	4620	8220	11820	15420	19020	22620	26220	29820	33420	37020	40620	44220	47820	51420	55020	58620	62220	65820	69420	73020	76620	80220	83820	17
18	1080	4680	8280	11880	15480	19080	22680	26280	29880	33480	37080	40680	44280	47880	51480	55080	58680	62280	65880	69480	73080	76680	80280	83880	18
19	1140	4740	8340	11940	15540	19140	22740	26340	29940	33540	37140	40740	44340	47940	51540	55140	58740	62340	65940	69540	73140	76740	80340	83940	19
20	1200	4800	8400	12000	15600	19200	22800	26400	30000	33600	37200	40800	44400	48000	51600	55200	58800	62400	66000	69600	73200	76800	80400	84000	20
21	1260	4860	8460	12060	15660	19260	22860	26460	30060	33660	37260	40860	44460	48060	51660	55260	58860	62460	66060	69660	73260	76860	80460	84060	21
22	1320	4920	8520	12120	15720	19320	22920	26520	30120	33720	37320	40920	44520	48120	51720	55320	58920	62520	66120	69720	73320	76920	80520	84120	22
23	1380	4980	8580	12180	15780	19380	22980	26580	30180	33780	37380	40980	44580	48180	51780	55380	58980	62580	66180	69780	73380	76980	80580	84180	23
24	1440	5040	8640	12240	15840	19440	23040	26640	30240	33840	37440	41040	44640	48240	51840	55440	59040	62640	66240	69840	73440	77040	80640	84240	24
25	1500	5100	8700	12300	15900	19500	23100	26700	30300	33900	37500	41100	44700	48300	51900	55500	59100	62700	66300	69900	73500	77100	80700	84300	25
26	1560	5160	8760	12360	15960	19560	23160	26760	30360	33960	37560	41160	44760	48360	51960	55560	59160	62760	66360	69960	73560	77160	80760	84360	26
27	1620	5220	8820	12420	16020	19620	23220	26820	30420	34020	37620	41220	44820	48420	52020	55620	59220	62820	66420	70020	73620	77220	80820	84420	27
28	1680	5280	8880	12480	16080	19680	23280	26880	30480	34080	37680	41280	44880	48480	52080	55680	59280	62880	66480	70080	73680	77280	80880	84480	28
29	1740	5340	8940	12540	16140	19740	23340	26940	30540	34140	37740	41340	44940	48540	52140	55740	59340	62940	66540	70140	73740	77340	80940	84540	29
30	1800	5400	9000	12600	16200	19800	23400	27000	30600	34200	37800	41400	45000	48600	52200	55800	59400	63000	66600	70200	73800	77400	81000	84600	30
31	1860	5460	9060	12660	16260	19860	23460	27060	30660	34260	37860	41460	45060	48660	52260	55860	59460	63060	66660	70260	73860	77460	81060	84660	31
32	1920	5520	9120	12720	16320	19920	23520	27120	30720	34320	37920	41520	45120	48720	52320	55920	59520	63120	66720	70320	73920	77520	81120	84720	32
33	1980	5580	9180	12780	16380	19980	23580	27180	30780	34380	37980	41580	45180	48780	52380	55980	59580	63180	66780	70380	73980	77580	81180	84780	33
34	2040	5640	9240	12840	16440	20040	23640	27240	30840	34440	38040	41640	45240	48840	52440	56040	59640	63240	66840	70440	74040	77640	81240	84840	34
35	2100	5700	9300	12900	16500	20100	23700	27300	30900	34500	38100	41700	45300	48900	52500	56100	59700	63300	66900	70500	74100	77700	81300	84900	35
36	2160	5760	9360	12960	16560	20160	23760	27360	30960	34560	38160	41760	45360	48960	52560	56160	59760	63360	66960	70560	74160	77760	81360	84960	36
37	2220	5820	9420	13020	16620	20220	23820	27420	31020	34620	38220	41820	45420	49020	52620	56220	59820	63420	67020	70620	74220	77820	81420	85020	37
38	2280	5880	9480	13080	16680	20280	23880	27480	31080	34680	38280	41880	45480	49080	52680	56280	59880	63480	67080	70680	74280	77880	81480	85080	38
39	2340	5940	9540	13140	16740	20340	23940	27540	31140	34740	38340	41940	45540	49140	52740	56340	59940	63540	67140	70740	74340	77940	81540	85140	39
40	2400	6000	9600	13200	16800	20400	24000	27600	31200	34800	38400	42000	45600	49200	52800	56400	60000	63600	67200	70800	74400	78000	81600	85200	40
41	2460	6060	9660	13260	16860	20460	24060	27660	31260	34860	38460	42060	45660	49260	52860	56460	60060	63660	67260	70860	74460	78060	81660	85260	41
42	2520	6120	9720	13320	16920	20520	24120	27720	31320	34920	38520	42120	45720	49320	52920	56520	60120	63720	67320	70920	74520	78120	81720	85320	42
43	2580	6180	9780	13380	16980	20580	24180	27780	31380	34980	38580	42180	45780	49380	52980	56580	60180	63780	67380	70980	74580	78180	81780	85380	43
44	2640	6240	9840	13440	17040	20640	24240	27840	31440	35040	38640	42240	45840	49440	53040	56640	60240	63840	67440	71040	74640	78240	81840	85440	44
45	2700	6300	9900	13500	17100	20700	24300	27900	31500	35100	38700	42300	45900	49500	53100	56700	60300	63900	67500	71100	74700	78300	81900	85500	45
46	2760	6360	9960	13560	17160	20760	24360	27960	31560	35160	38760	42360	45960	49560	53160	56760	60360	63960	67560	71160	74760	78360	81960	85560	46
47	2820	6420	10020	13620	17220	20820	24420	28020	31620	35220	38820	42420	46020	49620	53220	56820	60420	64020	67620	71220	74820	78420	82020	85620	47
48	2880	6480	10080	13680	17280	20880	24480	28080	31680	35280	38880	42480	46080	49680	53280	56880	60480	64080	67680	71280	74880	78480	82080	85680	48
49	2940	6540	10140	13740	17340	20940	24540	28140	31740	35340	38940	42540	46140	49740	53340	56940	60540	64140	67740	71340	74940	78540	82140	85740	49
50	3000	6600	10200	13800	17400	21000	24600	28200	31800	35400	39000	42600	46200	49800	53400	57000	60600	64200	67800	71400	75000	78600	82200	85800	50
51	3060	6660	10260	13860	17460	21060	24660	28260	31860	35460	39060	42660	46260	49860	53460	57060	60660	64260	67860	71460	75060	78660	82260	85860	51
52	3120	6720	10320	13920	17520	21120	24720	28320	31920	35520	39120	42720	46320	49920	53520	57120	60720	64320	67920	71520	75120	78720	82320	85920	52
53	3180	6780	10380	13980	17580	21180	24780	28380	31980	35580	39180	42780	46380	49980	53580	57180	60780	64380	67980	71580	75180	78780	82380	85980	53
54	3240	6840	10440	14040	17640	21240	24840	28440	32040	35640	39240	42840	46440	50040	53640	57240	60840	64440	68040	71640	75240	78840	82440	86040	54
55	3300	6900	10500	14100	17700	21300	24900	28500	32100	35700	39300	42900	46500	50100	53700	57300	60900	64500	68100	71700	75300	78900	82500	86100	55
56	3360	6960	10560	14160	17760	21360	24960	28560	32160	35760	39360	42960	46560	50160	53760	57360	60960	64560	68160	71760	75360	78960	82560	86160	56
57	3420	7020	10620	14220	17820	21420	25020	28620	32220	35820	39420	43020	46620	50220	53820	57420	61020	64620	68220	71820	75420	79020	82620	86220	57
58	3480	7080	10680	14280	17880	21480	25080	28680	32280	35880	39480	43080	46680	50280	53880	57480	61080	64680	68280	71880	75480	79080	82680	86280	58
59	3540	7140	10740	14340	17940	21540	25140	28740	32340	35940	39540	43140	46740	50340	53940	57540	61140	64740	68340	71940	75540	79140	82740	86340	59
60	3600	7200	10800	14400	18000	21600	25200	28800	32400	36000	39600	43200	46800	50400	54000	57600	61200	64800	68400	72000	75600	79200	82800	86400	60
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12
Page 143 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx

INMOTION

A Caldwell Company

Appendix B: Span To Encoder Count

Supported User Levels	
☒	User
☑	Installer
☑	Developer
☑	Factory

Silver Motor Pulley

Verify span, encoder count and belt tension. Compare, "**pos**" to encoder count, "**ap**" using the tables below. Requires the door type, "c drtp" to be set to "oneway" or "bipart". For spans up to 33'.

PDIA 1.7988 SILVER ONEWAY F E E T *Pulley diameter from G3 INMOTION Tall Silver pulley*

INCHES	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0	0	510	1019	1529	2038	2548	3058	3567	4077	4587	5096	5606	6115	6625	7135	7644	8154	0
1	42	552	1062	1571	2081	2591	3100	3610	4119	4629	5139	5648	6158	6668	7177	7687	8196	1
2	85	595	1104	1614	2123	2633	3143	3652	4162	4672	5181	5691	6200	6710	7220	7729	8239	2
3	127	637	1147	1656	2166	2676	3185	3695	4204	4714	5224	5733	6243	6753	7262	7772	8281	3
4	170	679	1189	1699	2208	2718	3228	3737	4247	4756	5266	5776	6285	6795	7305	7814	8324	4
5	212	722	1232	1741	2251	2760	3270	3780	4289	4799	5309	5818	6328	6837	7347	7857	8366	5
6	255	764	1274	1784	2293	2803	3313	3822	4332	4841	5351	5861	6370	6880	7390	7899	8409	6
7	297	807	1317	1826	2336	2845	3355	3865	4374	4884	5394	5903	6413	6922	7432	7942	8451	7
8	340	849	1359	1869	2378	2888	3397	3907	4417	4926	5436	5946	6455	6965	7474	7984	8494	8
9	382	892	1401	1911	2421	2930	3440	3950	4459	4969	5478	5988	6498	7007	7517	8027	8536	9
10	425	934	1444	1954	2463	2973	3482	3992	4502	5011	5521	6031	6540	7050	7559	8069	8579	10
11	467	977	1486	1996	2506	3015	3525	4035	4544	5054	5563	6073	6583	7092	7602	8112	8621	11

INCHES	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
0	8664	9173	9683	10192	10702	11212	11721	12231	12741	13250	13760	14269	14779	15289	15798	16308	16818	0
1	8706	9216	9725	10235	10745	11254	11764	12273	12783	13293	13802	14312	14822	15331	15841	16350	16860	1
2	8749	9258	9768	10277	10787	11297	11806	12316	12826	13335	13845	14354	14864	15374	15883	16393	16903	2
3	8791	9301	9810	10320	10830	11339	11849	12358	12868	13378	13887	14397	14906	15416	15926	16435	16945	3
4	8833	9343	9853	10362	10872	11382	11891	12401	12910	13420	13930	14439	14949	15459	15968	16478	16987	4
5	8876	9386	9895	10405	10914	11424	11934	12443	12953	13463	13972	14482	14991	15501	16011	16520	17030	5
6	8918	9428	9938	10447	10957	11467	11976	12486	12995	13505	14015	14524	15034	15544	16053	16563	17072	6
7	8961	9471	9980	10490	10999	11509	12019	12528	13038	13547	14057	14567	15076	15586	16096	16605	17115	7
8	9003	9513	10023	10532	11042	11551	12061	12571	13080	13590	14100	14609	15119	15628	16138	16648	17157	8
9	9046	9555	10065	10575	11084	11594	12104	12613	13123	13632	14142	14652	15161	15671	16181	16690	17200	9
10	9088	9598	10108	10617	11127	11636	12146	12656	13165	13675	14185	14694	15204	15713	16223	16733	17242	10
11	9131	9640	10150	10660	11169	11679	12188	12698	13208	13717	14227	14737	15246	15756	16265	16775	17285	11

PDIA 1.7988 SILVER BIPART F E E T *Pulley diameter from G3 INMOTION Tall Silver pulley*

INCHES	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0	0	255	510	764	1019	1274	1529	1784	2038	2293	2548	2803	3058	3313	3567	3822	4077	0
1	21	276	531	786	1040	1295	1550	1805	2060	2315	2569	2824	3079	3334	3589	3843	4098	1
2	42	297	552	807	1062	1317	1571	1826	2081	2336	2591	2845	3100	3355	3610	3865	4119	2
3	64	319	573	828	1083	1338	1593	1847	2102	2357	2612	2867	3121	3376	3631	3886	4141	3
4	85	340	595	849	1104	1359	1614	1869	2123	2378	2633	2888	3143	3397	3652	3907	4162	4
5	106	361	616	871	1125	1380	1635	1890	2145	2399	2654	2909	3164	3419	3674	3928	4183	5
6	127	382	637	892	1147	1401	1656	1911	2166	2421	2676	2930	3185	3440	3695	3950	4204	6
7	149	403	658	913	1168	1423	1678	1932	2187	2442	2697	2952	3206	3461	3716	3971	4226	7
8	170	425	679	934	1189	1444	1699	1954	2208	2463	2718	2973	3228	3482	3737	3992	4247	8
9	191	446	701	956	1210	1465	1720	1975	2230	2484	2739	2994	3249	3504	3758	4013	4268	9
10	212	467	722	977	1232	1486	1741	1996	2251	2506	2760	3015	3270	3525	3780	4035	4289	10
11	234	488	743	998	1253	1508	1762	2017	2272	2527	2782	3037	3291	3546	3801	4056	4311	11

INCHES	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
0	4332	4587	4841	5096	5351	5606	5861	6115	6370	6625	6880	7135	7390	7644	7899	8154	8409	0
1	4353	4608	4863	5117	5372	5627	5882	6137	6392	6646	6901	7156	7411	7666	7920	8175	8430	1
2	4374	4629	4884	5139	5394	5648	5903	6158	6413	6668	6922	7177	7432	7687	7942	8196	8451	2
3	4396	4650	4905	5160	5415	5670	5924	6179	6434	6689	6944	7198	7453	7708	7963	8218	8472	3
4	4417	4672	4926	5181	5436	5691	5946	6200	6455	6710	6965	7220	7474	7729	7984	8239	8494	4
5	4438	4693	4948	5202	5457	5712	5967	6222	6476	6731	6986	7241	7496	7751	8005	8260	8515	5
6	4459	4714	4969	5224	5478	5733	5988	6243	6498	6753	7007	7262	7517	7772	8027	8281	8536	6
7	4480	4735	4990	5245	5500	5754	6009	6264	6519	6774	7029	7283	7538	7793	8048	8303	8557	7
8	4502	4756	5011	5266	5521	5776	6031	6285	6540	6795	7050	7305	7559	7814	8069	8324	8579	8
9	4523	4778	5033	5287	5542	5797	6052	6307	6561	6816	7071	7326	7581	7835	8090	8345	8600	9
10	4544	4799	5054	5309	5563	5818	6073	6328	6583	6837	7092	7347	7602	7857	8112	8366	8621	10
11	4565	4820	5075	5330	5585	5839	6094	6349	6604	6859	7113	7368	7623	7878	8133	8388	8642	11

800-426-7113
Technical Document Number: n/a
Rev. 1.0.8
2021-05-12   Page 144 of 161

Y:\Automation Service\Docs\Series 500 Motor with G3 Controller\G3 Advanced Programming Guide.docx
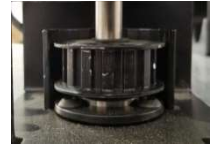
INMOTION

A Caldwell Company

G3 Advanced Programming Guide

Part Number(s): 28C0030(G3), 28C0061(RCM), 29C0052(RS485)

Black Motor Pulley

Verify span, encoder count and belt tension. Compare, "pos" to encoder count, "ap" using the tables below. Requires the door type, "c drtp" to be set to "oneway" or "bipart". For spans up to 33'.

PDIA 1.7934 BLACK BIPART — FEET
Pulley diameter from G3 INMOTION Short Black pulley

INCHES	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	0	256	511	767	1022	1278	1534	1789	2045	2300	2556	2811	3067	3323	3578	3834	4089
1	21	277	532	788	1044	1299	1555	1810	2066	2322	2577	2833	3088	3344	3600	3855	4111
2	43	298	554	809	1065	1321	1576	1832	2087	2343	2598	2854	3110	3365	3621	3876	4132
3	64	319	575	831	1086	1342	1597	1853	2109	2364	2620	2875	3131	3387	3642	3898	4153
4	85	341	596	852	1108	1363	1619	1874	2130	2385	2641	2897	3152	3408	3663	3919	4175
5	106	362	618	873	1129	1384	1640	1896	2151	2407	2662	2918	3174	3429	3685	3940	4196
6	128	383	639	895	1150	1406	1661	1917	2172	2428	2684	2939	3195	3450	3706	3962	4217
7	149	405	660	916	1171	1427	1683	1938	2194	2449	2705	2961	3216	3472	3727	3983	4239
8	170	426	682	937	1193	1448	1704	1960	2215	2471	2726	2982	3237	3493	3749	4004	4260
9	192	447	703	958	1214	1470	1725	1981	2236	2492	2748	3003	3259	3514	3770	4026	4281
10	213	469	724	980	1235	1491	1747	2002	2258	2513	2769	3024	3280	3536	3791	4047	4302
11	234	490	745	1001	1257	1512	1768	2023	2279	2535	2790	3046	3301	3557	3813	4068	4324

INCHES	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
0	4345	4601	4856	5112	5367	5623	5879	6134	6390	6645	6901	7156	7412	7668	7923	8179	8434
1	4366	4622	4877	5133	5389	5644	5900	6155	6411	6667	6922	7178	7433	7689	7945	8200	8456
2	4388	4643	4899	5154	5410	5666	5921	6177	6432	6688	6943	7199	7455	7710	7966	8221	8477
3	4409	4664	4920	5176	5431	5687	5942	6198	6454	6709	6965	7220	7476	7732	7987	8243	8498
4	4430	4686	4941	5197	5453	5708	5964	6219	6475	6730	6986	7242	7497	7753	8008	8264	8520
5	4451	4707	4963	5218	5474	5729	5985	6241	6496	6752	7007	7263	7519	7774	8030	8285	8541
6	4473	4728	4984	5240	5495	5751	6006	6262	6517	6773	7029	7284	7540	7795	8051	8307	8562
7	4494	4750	5005	5261	5516	5772	6028	6283	6539	6794	7050	7306	7561	7817	8072	8328	8583
8	4515	4771	5027	5282	5538	5793	6049	6305	6560	6816	7071	7327	7582	7838	8094	8349	8605
9	4537	4792	5048	5303	5559	5815	6070	6326	6581	6837	7093	7348	7604	7859	8115	8371	8626
10	4558	4814	5069	5325	5580	5836	6092	6347	6603	6858	7114	7369	7625	7881	8136	8392	8647
11	4579	4835	5090	5346	5602	5857	6113	6368	6624	6880	7135	7391	7646	7902	8158	8413	8669

PDIA 1.7934 BLACK ONEWAY — FEET
Pulley diameter from G3 INMOTION Short Black pulley

INCHES	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	0	511	1022	1534	2045	2556	3067	3578	4089	4601	5112	5623	6134	6645	7156	7668	8179
1	43	554	1065	1576	2087	2598	3110	3621	4132	4643	5154	5666	6177	6688	7199	7710	8221
2	85	596	1108	1619	2130	2641	3152	3663	4175	4686	5197	5708	6219	6730	7242	7753	8264
3	128	639	1150	1661	2172	2684	3195	3706	4217	4728	5240	5751	6262	6773	7284	7795	8307
4	170	682	1193	1704	2215	2726	3237	3749	4260	4771	5282	5793	6305	6816	7327	7838	8349
5	213	724	1235	1747	2258	2769	3280	3791	4302	4814	5325	5836	6347	6858	7369	7881	8392
6	256	767	1278	1789	2300	2811	3323	3834	4345	4856	5367	5879	6390	6901	7412	7923	8434
7	298	809	1321	1832	2343	2854	3365	3876	4388	4899	5410	5921	6432	6943	7455	7966	8477
8	341	852	1363	1874	2385	2897	3408	3919	4430	4941	5453	5964	6475	6986	7497	8008	8520
9	383	895	1406	1917	2428	2939	3450	3962	4473	4984	5495	6006	6517	7029	7540	8051	8562
10	426	937	1448	1960	2471	2982	3493	4004	4515	5027	5538	6049	6560	7071	7582	8094	8605
11	469	980	1491	2002	2513	3024	3536	4047	4558	5069	5580	6092	6603	7114	7625	8136	8647

INCHES	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
0	8690	9201	9712	10224	10735	11246	11757	12268	12779	13291	13802	14313	14824	15335	15846	16358	16869
1	8733	9244	9755	10266	10777	11288	11800	12311	12822	13333	13844	14356	14867	15378	15889	16400	16911
2	8775	9286	9798	10309	10820	11331	11842	12353	12865	13376	13887	14398	14909	15420	15932	16443	16954
3	8818	9329	9840	10351	10862	11374	11885	12396	12907	13418	13930	14441	14952	15463	15974	16485	16997
4	8860	9372	9883	10394	10905	11416	11927	12439	12950	13461	13972	14483	14994	15506	16017	16528	17039
5	8903	9414	9925	10437	10948	11459	11970	12481	12992	13504	14015	14526	15037	15548	16059	16571	17082
6	8946	9457	9968	10479	10990	11501	12013	12524	13035	13546	14057	14569	15080	15591	16102	16613	17124
7	8988	9499	10011	10522	11033	11544	12055	12566	13078	13589	14100	14611	15122	15633	16145	16656	17167
8	9031	9542	10053	10564	11075	11587	12098	12609	13120	13631	14143	14654	15165	15676	16187	16698	17210
9	9073	9585	10096	10607	11118	11629	12140	12652	13163	13674	14185	14696	15207	15719	16230	16741	17252
10	9116	9627	10138	10649	11161	11672	12183	12694	13205	13717	14228	14739	15250	15761	16272	16784	17295
11	9159	9670	10181	10692	11203	11714	12226	12737	13248	13759	14270	14782	15293	15804	16315	16826	17337

INMOTION

A Caldwell Company