Generation 3 Controller Advanced Programming Guide

March 24, 2021

Technical Brief

v1.0.5

Info Report





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.
 - o All panels move smoothly, without excessive force required at all points across the span
 - o The frame is square & plumb, and the lead panel meets the jam evenly top to bottom.
 - o All required weather stripping is installed properly and not binding during panel movement.
 - o Panels are NOT warped, and panel pickups release and operate smoothly without issues.
 - o Interlocks engage and disengage properly without dragging extra panels etc.
 - o 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.

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.

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User

Installer

Developer

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CLI Password Access

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.

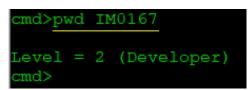
If for some reason the label is unreadable or missing, then the serial number must be obtained from the CLI using the "**ver**" or "**info**" commands. Both the password (**pwd**) and version (**ver**) commands are supported at boot (user level).



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
```

```
cmd>pwd pwd0167
Level = 1 (Installer)
cmd>
```



^{*} 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)



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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 displayed.



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 form 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.



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
                 plms* 172.00lbs
Panel Mass:
Pulley Diameter: pdia* 1.7988in
Door Type: drtp* oneway
Jam Entry:
                   pje*
                          0.85in
                   pop*
                          46.06in
Span:
Sub-Span: pops* 0.00in Motor Direction: mdir* invert
                                       Normal Mode Sub-
Encoder Polarity: epol* invert
                                        Span (Disabled)
                  spl* DISABLED[0]
O/C Speed Limit:
High Frict Inst:
                   hfi**
                          0
                                New in firmware v0.7.2
```

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.

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"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

```
On Close
Features ('Normal Operation' ACTIVE
Span Adj Time: fsat*
                         5s
                                  Decoded "delay" for
 Actual Adj Time:
                        5s
                                    4500 seconds
Party Mode: fpme*
                        -----
                  fpmd* 40.00in
 Span:
 Auto Close Time: fpmw* DELAY[10s]
 Brake On Close: fpmb* DELAY[1h 15m 0s]
Earess:
                  feae*
                  fegd* 40.00in
 Span:
 Auto Close Time: fegw* DELAY[10s]
 Brake On Close: fegb* DISABLED[0]
                                         Disabled
One Button Op:
                  fobe*
                                         Features
                  fobd* 40.00in
 Span:
 Auto Close Time: fobw* DISABLED[0]
 Brake On Close: fobb* DISABLED[0]
Move Assist:
                fmae* -----
                 fmad*
                        40.00in
 Span:
 Auto Close Time: fmaw* DISABLED[0]
 Span Adj Time: fmat* 5s
                                   Command used to
Cycle Test:
                         DISABLED
                                   adjust parameter
   Fault Limit: ctfl*
```

Activated

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.

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

. . . .

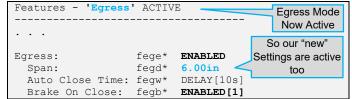
Egress: fege* ENABLED Subtrinactive...Not in Egress Mode yet

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
```

Now we can see Egress is "**Active**", so the controller is now running in Egress Mode.



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// Report Info again



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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.

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.

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*
                 fpmd* 40.00in
 Auto Close Time: fpmw* DELAY[10s]
 Brake On Close: fpmb* DELAY[1h 15m 0s]
Egress: fege* -----
                 fegd*
                         6.00in
 Span:
 Auto Close Time: fegw* (DELAY[10s]
 Brake On Close: fegb* ENABLED[1]
Brake on tone Button Op: fobe* -- 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:
 Span Adj Time: fmat* 5s
                                 Span Adj = Actual
Cvcle Test:
                        DISABLED
Features - 'Egress' ACTIVE
                                       Setting is
                                       set, but not
Span Adj Time: fsat* 15s
                                      in effect.
 Actual Adj Time:
                        5s
```

```
Features - 'Egress' ACTIVE

Span Adj Time: fsat* 15s
Actual Adj Time: 9s

Setting is now in in effect
```

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 removed

Party Mode: fpme* 40.00in

...

Move Assist: fmae* ENABLED

Span: fmad* 40.00in

Auto Close Time: fmaw* DELAY[3]

Span Adj Time: fmat* 5s

Actual Adj Time

Actual Adj Time: 2s

Cycle Test: DISABLED

Fault Limit: ctfl* 5
```

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"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
  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
Jam Entry: pdf oneway pje* 0.85in pop* 46.06in 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
Span: fegd* 6.00in
Auto Close Time: fegw* DELAY[10s]
  Span:
Brake On Close: fegb* ENABLED[1]
One Button Op: fobe* -----
  Span: fobd* 40.00in
Auto Close Time: fobw* DISABLED[0]
  Span:
  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:
                               DISABLED
Cycle Test:
    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
```



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Supported User Levels User Syntax: info (Updated for firmware v0.7.2 and later) Abbreviation: i Developer 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

```
Egress: fege* -----
Span: fegd* 40.00in
Auto Close Time: fegw* DELAY[10s]
Brake On Close: fegb* DISABLED[0]
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
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'
             'c fege 1' - Enable Egress
'hfi 5' - Sets HFI to 5
```

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

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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

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G3 Firmware Revisions

Revision	Release Date	Description
0.7.2	Mar 11,2021	Maintenance release to address "TLE" over-current/temp issue.
(latest)		"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
0.7.1	7 tag 20, 2020	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.
0.1.10	7 (49 2 1, 2020	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 his procedution is proceed by 200%
		Profile bin resolution increased by 300%.
0.07 (1(10)	D 0 0040	Cleaner CLI interface optimized for smart phone access
0.6.7 (K12)	Dec 3, 2019	Initial production release for G3 supporting basic door functions only using
0.5.91(K02)		wired & wireless accessories. Processors K02 & K12 supported.

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