Generation 3 Controller
Advanced Programming Guide

Technical Brief

March 24, 2021

v1.0.5

Installation Scenarios

INNOTION

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.

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.

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.

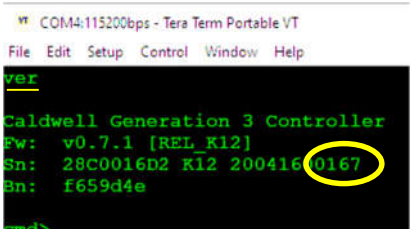
User:	“**0**”	// Did not change from v0.6.7
Installer:	“**pwd**XXXX”	// Replace the “XXXX” with the **last 4 digits** of the serial number
Developer:	“**IM**XXXX”	// Replace the “XXXX” with the **last 4 digits** of the serial number

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

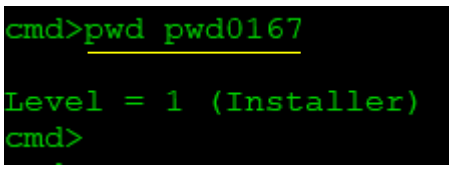
If for some reason the label is unreadable or missing, then the serial number must be obtained from the CLI using the “**ver**” or “**info**” commands. Both the password (**pwd**) and version (**ver**) commands are supported at boot (user level).

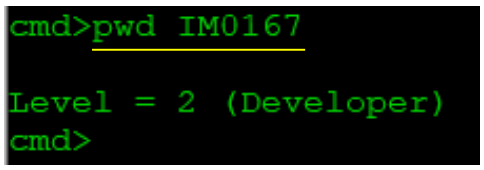


G3 VERSION COMMAND

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)

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.

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.

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"

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

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.