

G5 flow computers

μ FLO^{G5} (microFLO^{G5})

Upgrade kit

Easily upgrade to the most accurate and reliable single run gas flow computer



Introduction

This guide is designed for typical installations only. Maintenance must be performed by personnel knowledgeable of the ABB Totalflow[®] μ FLO^{G5} flow computer, the integral multivariable transducer (IMV), and the theory of natural gas electronic flow measurement. Maintenance personnel must also be knowledgeable of local and national codes as they apply to hazardous areas, communication wiring, and electrical wiring.



CAUTION – Equipment damage. The μ FLO^{G5} flow computer operating temperature range differs from the μ FLO^{G4}. The μ FLO^{G5} is rated for ambient temperatures between -40 °F and +158 °F (-40 °C and +70 °C).

Do not upgrade to the μ FLO^{G5} if the ambient temperature range falls outside of this range.

Purpose

This guide provides simple instructions and information for upgrading an original μ FLO (referred to as the μ FLO (G3) for clarification purposes) or a μ FLO^{G4} to a μ FLO^{G5} flow computer.

Additional information

Additional free publications for the μ FLO^{G5} flow computer are available for download at www.abb.com/totalflow or by scanning this code:



<i>μFLO^{G5} flow computer user manual</i>	2105614
<i>μFLO^{G5} flow computer startup guide</i>	2105513
<i>μFLO^{G5} component replacement application guide</i>	2105514
<i>μFLO^{G5} flow computer data sheet</i>	2102800
<i>μFLO^{G5} (2104939 BD) wiring guide</i>	2105507
<i>μFLO^{G5} enclosure measurements</i>	2105508
<i>μFLO^{G5} I/O expansion board (2104395 BD) installation and wiring guide</i>	2105506
<i>μFLO^{G5} (2104939 BD) solar panel connection</i>	2105509
NRTL/C (Class 1, Div 2) 60 °C	2015246
NRTL/C (Class 1, Div 2) 70 °C	2104615
ATEX Cert, EX II 3G, Ex nA IIB (Zone 2)	2104152
IECEx Cert, Ex nA IIB (Zone 2)	2100750

Assumptions

For questions that are not answered in this guide or other documentation listed in the previous section, call a local ABB representative, or call the main office number listed on the back page of this guide.

The following apply to this guide:

- Specific instructions about collecting data, shutting in the measurement sensor, disconnecting the high and low input lines, and manifold connections are outside the scope of this document. At the appropriate times, guidelines prompt when these procedures are to be performed.
- A μ FLO flow computer is already installed, with either the original IMV (referred to as the G3 IMV for clarification purposes) or the G4 IMV. The μ FLO computer is being upgraded to a μ FLO^{G5}.
- The host computer is running PCCU32 version 7.58 or newer.
- The optional serial communication board for the μ FLO (G3) will not install on the G5 main electronic board. An optional I/O expansion board, first available for the μ FLO^{G4}, provides additional I/O and a second communication port as a separate accessory. This board is plug and play to the new G5. Instructions for installing and wiring the optional I/O expansion board are detailed in the startup guide included with this kit.

1 Safety warning and note symbols

Read and follow the instructions contained in this guide before and during equipment installation. Failure to do so could result in bodily injury or equipment damage.



IMPORTANT NOTE: Installation and maintenance must only be conducted by personnel authorized to work on electrical installations, and in accordance with relevant national and local codes.

1.1 Safety conventions

The following conventions are used throughout this document to bring attention to important information:



DANGER – Serious damage to health / risk to life. This symbol, in conjunction with the signal word "DANGER", indicates an imminent danger. Failure to observe this safety information will result in death or severe injury. The text may state the hazard, how to avoid the hazard, and what the result would be if not followed.



WARNING – Bodily injury. This symbol, in conjunction with the signal word "WARNING", indicates a potentially dangerous electrical situation. Failure to observe this safety information may result in severe injury. The text may state the hazard, how to avoid the hazard, and what the result would be if not followed.



CAUTION – Minor injuries/equipment damage. This symbol, in conjunction with the signal word "CAUTION", indicates a potentially dangerous situation. Failure to observe this safety information may result in minor or moderate injury. The symbol may also be used for property damage warnings. The text may state the hazard, how to avoid the hazard, and what the result would be if not followed.



IMPORTANT NOTE: This symbol indicates useful information, important information, or information to clarify a concept. The signal words "IMPORTANT NOTE" do not indicate a dangerous or harmful situation.

1.2 Potential safety hazards

Installation, commissioning, and maintenance of this equipment must only be conducted by personnel authorized to work on electrical installations, and in accordance with relevant national and local codes.

The flow computer operates on 9 - 30 Vdc. However, optional equipment may convert power from alternating current to direct current.

There are no hazardous voltages present.

Personal Protective Equipment (PPE) is not required for this equipment.

2 Upgrade kit overview

2.1 Upgrade kit contents

Two different μ FLO^{G5} upgrade kits are available:

- μ FLO^{G4} to μ FLO^{G5} flow computer upgrade kit
- μ FLO (G3) to μ FLO^{G5} flow computer upgrade kit

Both upgrade kits include the following items:

- G5 IMV complete assembly
- μ FLO^{G5} board layout label (Part no. 2104412-002)
- μ FLO^{G5} product identification label (Part no. 2103226-002)
- μ FLO^{G5} Startup guide (Part no. 2105513-001)
- TLF device operator software products DVD (Part no. 2104410-022 or later)

Additionally, the μ FLO (G3) to μ FLO^{G5} upgrade kit includes:

- PCCU cable (Part no. 2104400-001)

The G5 IMV consists of the sensor assembly and comes preprogrammed with the latest version of the standard FLASH software and the standard configuration file. If a different FLASH or configuration file is required, contact the ABB Main office at the number listed on the back of this guide.

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IMPORTANT NOTE: The G5 IMV is available with the high pressure port on the left or right, and in carbon steel and stainless steel configurations.

In this guide, section 3.8, *MMI cable replacement (G3 to G5 conversion only)*, beginning on page 12, is only applicable for the G3 to G5 upgrade. Please skip that section for G4 to G5 upgrades. All remaining sections are applicable to both kits.

2.2 Requisite tools and materials

The following items are necessary to perform the upgrade:

- Phillips screwdriver
- Small slotted screwdriver
- 1/4 inch hex driver
- 1/2 inch socket with ratchet
- 7/8 inch open end wrench
- Clean dry cloth

3 Upgrade procedures

To upgrade the μ FLO to the μ FLO^{G5} use the following procedures:

3.1 μ FLOG5 board layout label installation

When upgrading to the μ FLO^{G5}, the upgrade kit comes with a new board layout label. This label contains information regarding the μ FLO^{G5} motherboard and the various pin-outs contained on the board. Use the following instructions to install the new label.

1. Locate the old tag on the inside of the enclosure door.
2. Wipe the old tag with a clean soft cloth to remove any dust or debris that may keep the new tag from adhering.
3. Remove the coated back from the new display tag.
4. Place the new tag on top of the old tag.

3.2 μ FLOG5 product identification label installation

The μ FLO^{G5} upgrade kit comes with a product identification label. This label contains the new model number of the flow computer for easy identification. Use the following instructions to install the new label.

1. Locate the product identification label. When facing the closed flow computer, the label is on the upper right hand corner of the enclosure.
2. Wipe the old tag with a clean soft cloth to remove any dust or debris that may keep the new tag from adhering.
3. Remove the coated back from the new label.
4. Place the new tag on top of the old tag.

3.3 Disconnect power, cables, and field wiring

To disconnect all cables, wiring, and expansion boards from the IMV:

1. Disconnect the external power / charger connector (Figure 1).

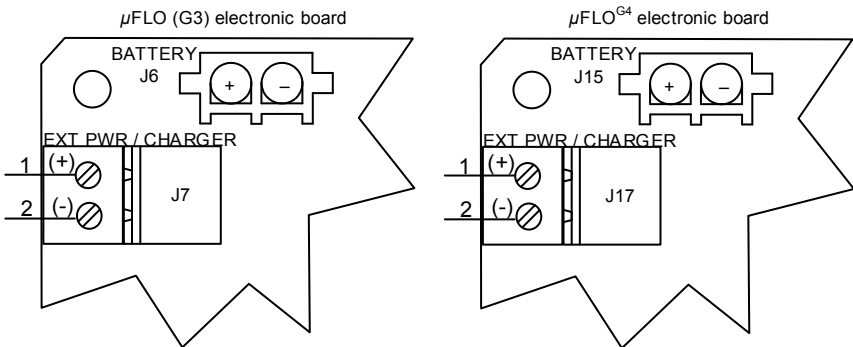


Figure 1: μ FLO^{G5} electronic board power connections

2. Disconnect the battery cable plug.



CAUTION – Equipment damage. The external power/charger and battery connections must be removed before all other cables, boards, and field connections. Connecting or disconnecting cables and wires on the main electronic board while power is applied can damage the electronic components.

3. Disconnect the remaining onboard cable and wiring connections (Table 1).

Table 1: Connections to be disconnected

Onboard connections	G3 IMV	G4 IMV
External power/Charger	J7	J17
Battery cable	J6	J15
MMI cable	J4	J9
USB cable	N/A	J4
Ethernet cable	N/A	J1
LCD cable	J5	J8
RTD connector	J9	J3
Digital input	NA	J12
Digital output	N/A	J13
Communication port 1	N/A	J10
G3 I/O expansion board	J3	N/A
G4/G5 I/O expansion board	N/A	J2

4. Remove the I/O expansion board:

a. To remove a G4/G5 expansion board:

- i. Use a small slotted screwdriver to loosen the four (4) mounting screws that attach the I/O board to the μ FLO^{G5} board. Alternate between the four screws, one to two turns each. As the screws are loosened, the J2 connector is gradually disconnected from the electronic board socket. The mounting screws are held in place with a screw keeper.
- ii. Grasp the expansion board on either side and gently lift up from the μ FLO^{G5} electronic board.

b. To remove a G3 expansion (termination) board:

- i. Use a small slotted screwdriver to loosen the two (2) mounting screws that attach the I/O board to the μ FLO board.
- ii. Grasp the expansion board on either side and gently lift up from the μ FLO electronic board.
- iii. Disconnect all field wiring from the expansion board as it will need to be rewired to a G4/G5 expansion board.

3.4 Prepare the IMV assembly for removal



DANGER – Serious damage to health / risk to life. Preparation for removing the IMV should include shutting in the measurement sensor and disconnecting the high and low input lines or manifold connections. Depending on company policy, other steps may be required but are outside the scope of this document. Complete all requirements before continuing.

The following are general guidelines. Adjust these steps according to the specific site requirements. To remove the IMV assembly:

1. Shut in the measurement sensor:
 - a. Using the manifold high/low control valves, equalize the pressure to the IMV.
 - b. Using the high/low tap valves, close off both lines. These two valves connect the meter run high/low output lines to the μ FLO.
 - c. Vent the manifold to atmosphere using the vent valve.
 - d. Completely disconnect the high/low manifold lines from the IMV.
 2. Rotate the enclosure, if necessary, to allow removal of the IMV:
 - a. Using a 1/2 inch socket with ratchet, loosen the μ FLO enclosure mounting clamp bolts and rotate the enclosure a sufficient distance to allow removal of the IMV, approximately 11 inches (28 cm).
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CAUTION – Equipment damage. When rotating the enclosure, be careful to not stress or damage the wires and cables connected through the enclosure access points.

- b. After rotation, tighten the clamp bolts to hold the μ FLO in place.

3.5 Remove the IMV

1. Using a phillips screwdriver, remove the eight (8) mounting screws, washers and lock washers, located on the bottom of the enclosure, that secure the IMV to the μ FLO cabinet (Figure 2). Be careful not to drop the screws.

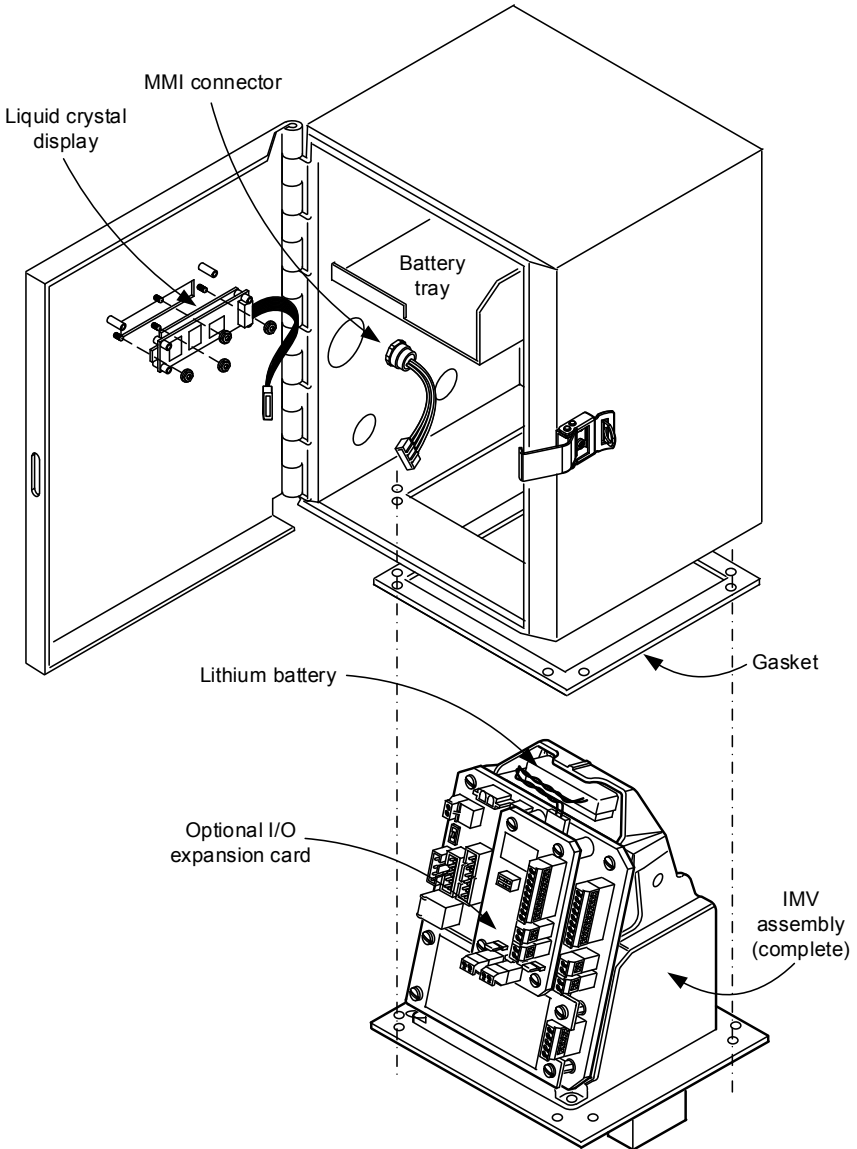


Figure 2: μ FLO IMV replacement (for illustrative purposes only)

2. Loosen the IMV by tilting it slightly forwards and then backwards. Carefully slide the upper body of the assembly down through the bottom access cutout until clear.

3. The weather-sealing gasket is affixed to the top side of the IMV mounting flange and may be stuck to the bottom of the enclosure. Remove any remaining gasket that is adhered to the bottom of the cabinet.



CAUTION – Equipment damage. The gasket area should be clean and free of any materials that may hinder the seal of a new gasket. An improper gasket seal may allow moisture or dirt to enter the enclosure and damage the electronic components.

3.6 Install the new G5 IMV



CAUTION – Equipment damage. The μ FLO^{G5} flow computer operating temperature range differs from previous models of the μ FLO. The μ FLO^{G5} is rated for ambient temperatures between -40 °F and +158 °F (-40 °C and +70 °C).

To install the replacement G5 IMV, perform the following steps:

1. Place the clean weather sealing gasket over the upper body of the IMV assembly and move the gasket down to the mounting plate just below the electronic board (Figure 2, *μ FLO IMV replacement (for illustrative purposes only)*, on page 8).
 2. Carefully move the IMV up into the access cutout.
 3. Place the split washer, then the flat washer on the screw and screw into the mounting plate and up into the corresponding screw hole.
 4. Repeat step 3 for the remaining mounting screws.
 5. Securely tighten all eight mounting screws to keep out external environmental elements.
 6. Reinstall field wiring and cable connections to the new μ FLO^{G5} main electronic board. Use Figure 3 for component and terminal locations and the information in Table 2 to determine if the connector requires rewiring to a new terminal.
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WARNING – Bodily injury and property damage. Wiring peripheral devices to the flow computer electronic board should be performed prior to applying power. Do not apply power until instructed to do so.

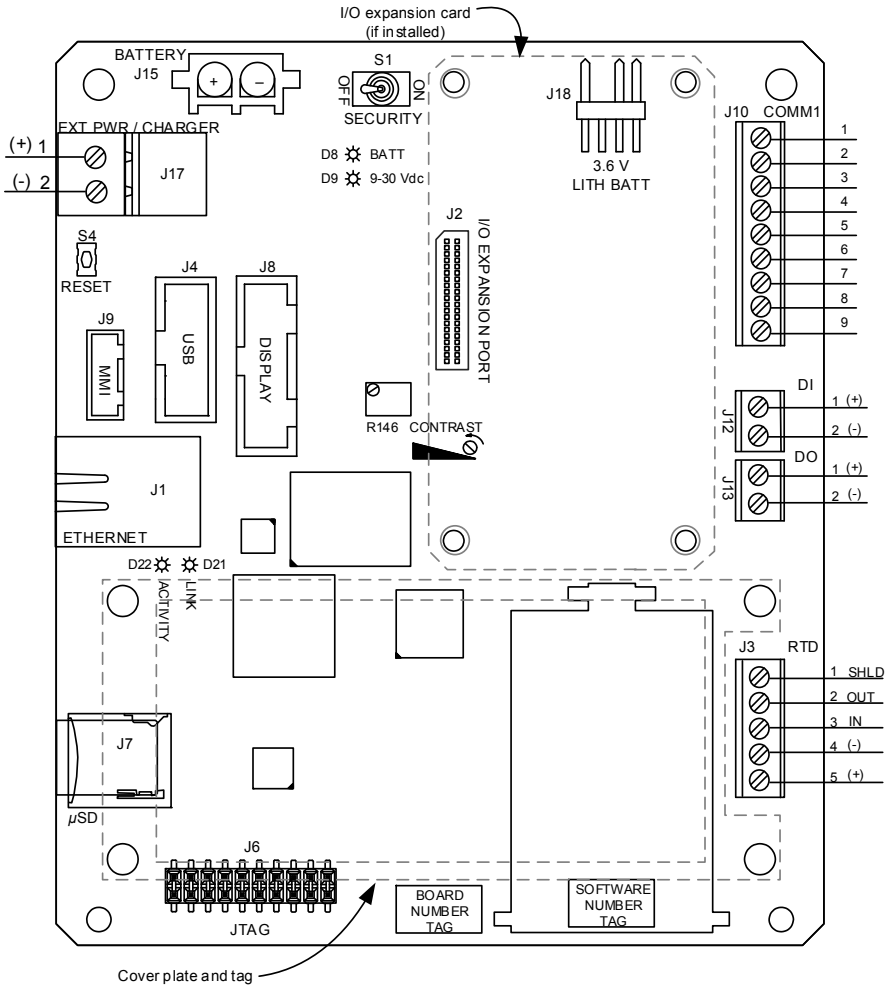


Figure 3: μ FLO^{G5} main electronic board

Table 2: Onboard connections

Onboard connections	G3 IMV	G4 IMV	G5 IMV
USB cable	N/A	J4	J4
Ethernet cable	N/A	J1	J1
LCD cable	J5	J8	J8

Onboard connections	G3 IMV	G4 IMV	G5 IMV
RTD connector	J9	J3 ¹	J3 ¹
Digital input	NA	J12	J12
Digital output	N/A	J13	J12
Communication port 1	N/A	J10	J10 ²

3.7 Reinstall the I/O expansion board

To reinstall the optional I/O expansion board, if in use:

1. For G4 IMV upgrades, reinstall the I/O expansion board. Using a small slotted screwdriver, begin turning each captive screw a few turns each, moving sequentially to each of the 4 (four) corners of the board to slowly seat the board into the onboard connector. Continue until the board is fully seated.
2. For G3 IMV communication board to I/O expansion board upgrades, install the G4/G5 I/O expansion board. Move the G3 IMV communication board wires to the corresponding pins on the G4/G5 I/O expansion board. See Table 3 for communication wiring information and Table 4 for Digital I/O wiring information.

1 **IMPORTANT NOTES:** The G3 legacy terminal connectors are not a direct swap to the G5. G4 connector terminals are a direct swap to the G5 and no rewiring is required.

RS-485 bus terminations are software selectable in the G5 platform. Please follow the instructions in the COMM 2 setup instruction section of the startup guide included in this kit.

Table 3: Expansion board communication pinouts

G5 Pin	RS-232	RS-422	RS-485
J2-1	Volts out	Volts out	Volts out
J2-2	Ground	Ground	Ground
J2-3	Sw. volts out	Sw. volts out	Sw. volts out
J2-4	Operate	Operate	Operate
J2-5	N/A	RRTS	RRTS
J2-6	Request to send	Transmit bus +	Transmit bus +
J2-7	Transmit data	Transmit bus -	Transmit bus -
J2-8	Receive data	Receive bus +	N/A
J2-9	Clear to send	Receive bus -	N/A

¹ RTD wiring points differ from the G3 to G4/G5 μ FLO and may require rewiring.

² RS-485 communication wiring termination is set during communication setup in PCCU32.

Table 4: Expansion board Digital Input/Digital Output pinouts

I/O	Pin	Description
J12	1	DI (+)
	2	DI Ground
J13	1	DO (+)
	2	DO Ground

- If the enclosure was previously rotated, use a 5/16 inch hex socket with ratchet to loosen the enclosure mounting clamp bolts. Rotate the enclosure back to the original position and retighten the bolts.

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IMPORTANT NOTE: Manifold and tubing connections, power application and unit startup will be addressed in the startup guide included in this kit. Complete the remaining procedures in this guide before beginning startup procedures.

3.8 MMI cable replacement (G3 to G5 conversion only)

When upgrading from the G3 IMV to the G5 IMV, the MMI cable must be replaced. The onboard MMI cable socket is different. Use the following instructions to remove and replace the MMI cable.

- Remove the exterior MMI cap on the outside of the enclosure (Figure 4).

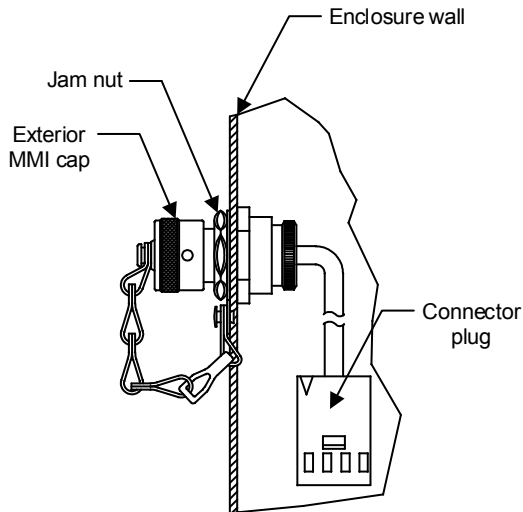


Figure 4: G4/G5 MMI cable installation, enclosure side view

- Using a 7/8 inch open end wrench, loosen and remove the jam nut from the connector body on the outside of the enclosure.
- Pull the connector head through to the inside of the enclosure. Discard the old MMI cable assembly.
- Remove the exterior cap and jam nut from the replacement assembly, being careful to leave the sealing o-ring in place.
- From inside the enclosure, insert the new connector head through the enclosure hole, to the outside.

6. Screw the jam nut onto the connector body outside of the enclosure and tighten. The jam nut holds the MMI connector, o-ring, and cable in place for a tight seal.
7. Connect the MMI cable plug into J9.

4 Considerations outside the scope of this document

4.1 μ FLOG5 startup

Now that the upgrade kit replacement parts are properly installed, the flow computer must be connected to the manifold and meter run. The μ FLOG^{G5} startup guide, included with this kit, addresses startup from installation through setup and operation. For the purposes of this upgrade kit, review the entire guide and then begin with the first applicable section for this installation.



DANGER – Serious damage to health/risk to life. Manifold and tubing connection leaks could create a build-up of explosive gases in the immediate vicinity. Power should not be applied before the tubing and connections are leak-free, the area is ventilated, and explosive gases have dissipated.



IMPORTANT NOTES: RS-485 bus terminations are software selectable in the G5 platform. During communication setup for COMM 1, the termination must be handled through the setup screen.

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