

FnIO G-Series:

GL-9981

G-Series Embedded Type Programmable I/O

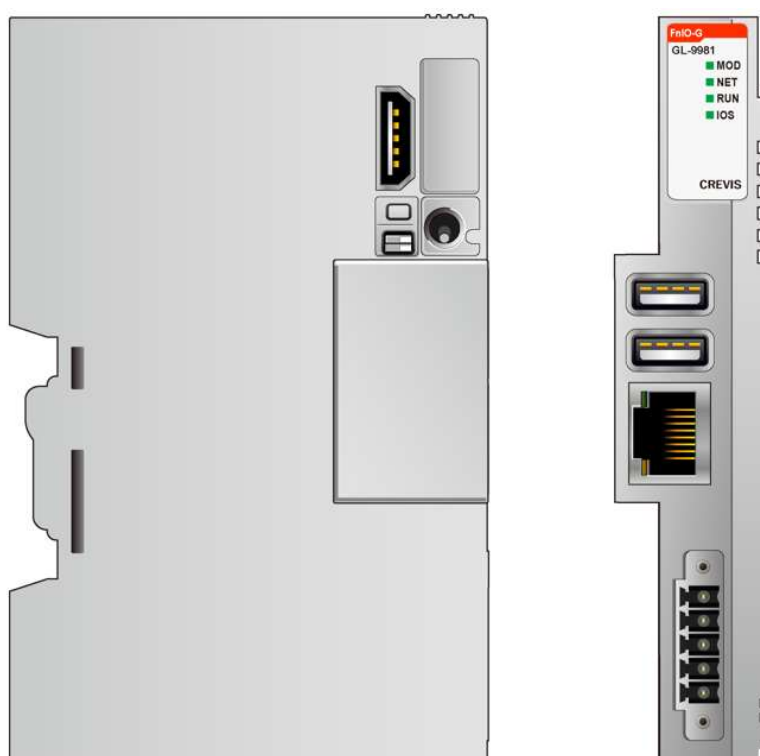


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History

Rev	Pages	Remarks	Date	Editor
1.00			Sep 29, 2025	Jwayoung, Lim

1. Environment Specification

Environmental Specification	
Operation Temperature *	-25°C~40°C
Storage Temperature	-40°C ~85°C
Relative Humidity	5%~90% Non-condensing
Mounting	DIN rail
General Specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6, 4g
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN 61000-6-2 : 2019
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE

* Please install it in a well-ventilated area, avoiding enclosed spaces and use a circulation fan to create airflow if possible.

2. GL-9981 (Embedded Type Programmable I/O)

2.1. GL-9981 Specification

Items	Specification
Communication Interface Specification	
PIO Type	G-Series Embedded Type Programmable I/O
CPU	ARM Cortex-A72 @ 1.5GHz
OS	Linux
Flash Memory / RAM	16GB / 2GB
Interface Connector	RJ-45 Socket * 1pcs USB 2.0 Port * 2pcs Monitor Port * 1pcs
Max. I/O Expansion Module	16 Slots
Max. I/O Expansion Data Size	256 Byte
Ethernet Baudrate	100Mbps, Auto-negotiation, Full Duplex
Indicator	4 LEDs 1 Green, Module Status (MOD) 1 Green, Network Status, Link (NET) 1 Green/Red, Custom (RUN) 1 Green/Red, Expansion I/O Module Status (IOS) 2 LEDs (each RJ45 Connector) 1 Green, System Power Status 1 Yellow, Network Status, Active
RTC	Retain Time : < 30 day (fully recharged supercapacitor at room temperature) RTC Warning : If the supercapacitor is discharged, RTC data will not be saved and will be initialized.
GL-9981-L : Normal (L type)	
Programming Environment	C/C++ (on Linux)
GL-9981-C : CODESYS Control (C type)*	
Programming Environment	IEC 61131-3 (CODESYS V3.5)
Fieldbus support	Modbus TCP
Ethernet based Field buses	EtherCAT Master, Ethernet/IP, PROFINET
Communication	OPC UA Server support
Visualization	Web Visualization support
Max. Task	10
Application Program Size	512KB ~ 18MB
Available I/O Channel	64 ~ 16,384

* The specifications of Codesys are in accordance with the Application-based Licenses policy.

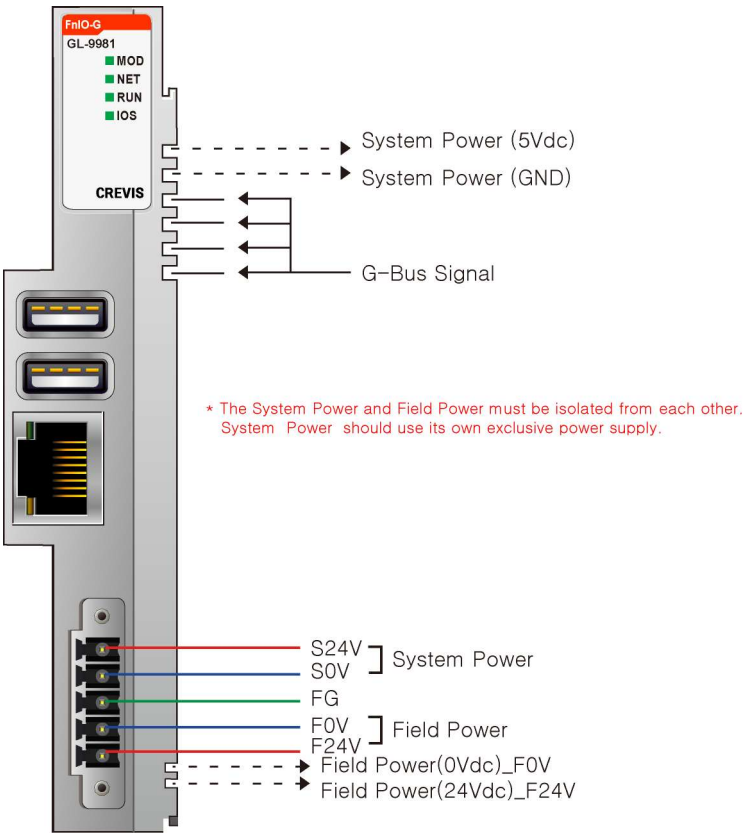
Items	Specification
General specification	
System Power *	Supply voltage : 24Vdc nominal Supply voltage range : 15~28.8Vdc Reverse polarity protection
Power Dissipation**	150mA typical @ 24Vdc
Current for I/O Module ***	0.5A @ 5Vdc
Isolation	System power to internal logic : Non-isolation System power I/O driver : Isolation
Field Power	Supply voltage : 24Vdc typical (Max. 28.8Vdc) * Field Power Range is different depending on IO Module series. Refer to IO Module's Specification.
Max. Current Field Power Contact	DC 8A Max
Wiring	0.05mm ² - 1.31mm ² (30-16 AWG)
Weight	87g
Module size	22.5mm x 109mm x 70mm
Environment Condition	Refer to '1. Environment Specification'

* Since the product does not include UPS, removing the power before Soft Shutdown can cause data damage. Make sure it has been shut down normally and then disconnect the power.

** Current consumption excluding USB.

*** If the load used exceeds the specifications, a throttling mode may occur due to heat, resulting in degraded performance or abnormal operation. (The internal temperature must be less than 85°C)

2.2. GL-9981 Wiring Diagram



2.2.1. Power Connector

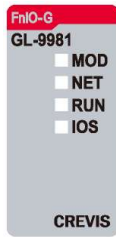


Pin No.	Signal Description
1	System Power, 24V
2	System Power, Ground
3	F.G
4	Field Power, Ground
5	Field Power, 24V

* **Warning:** The system power must not be connected with field power. Use seperate voltage supplies.

2.3. GL-9981 LED Indicator

2.3.1. LED Indicator



LED No.	LED Description	LED Color
MOD	Module Status	Green
NET	Network Status	Green
RUN	Custom	Green/Red
IOS	Expansion IO Status	Green/Red

2.3.2. MOD (Module Status LED)

Status	LED is	To indicate			
Not Powered	Off	Power is not supplied to the unit.			
Idle		Powered on but not accessing eMMC.			
Normal, Operational (eMMC access)	Flashing Green	The unit is operating in normal condition.			
Error during booting	Blinking Green (See 'To indicate'.)	Error patterns			
		Long flashes	Short flashes	Status	
		0	3	Generic failure to boot	
		0	4	start*.elf not found	
		0	7	Kernel image not found	
		0	8	SDRAM failure	
		0	9	Insufficient SDRAM	
		0	10	In HALT state	
		2	1	Partition not FAT	
		2	2	Failed to read from partition	
		2	3	Extended partition not FAT	
		2	4	File signature/hash mismatch	
		3	1	SPI EEPROM error	
		3	2	SPI EEPROM is write protected	
		3	3	I2C error	
		4	4	Unsupported board type	
		4	5	Fatal firmware error	
		4	6	Power failure type A	
		4	7	Power failure type B	

2.3.3. NET (Network Status LED)

Status	LED is	To indicate
Not Powered	Off	Power is not supplied to the unit.
Ethernet off		LAN cable is not connected, or Ethernet is inactive.
Ethernet Activity	Flashing Green	LAN cable is physically connected to the Ethernet port and is active.

2.3.4. RUN (Custom LED)

Status	LED is	To indicate
Codesys Stop	Off	The PLC program is in a stopped state.
Codesys Run	Green	PLC program is in the running state.

* This is a C-type explanation, and only works if there is a PLC program.

If the PLC program is deleted during PLC operation, it will stop in the last state.

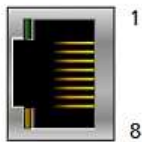
* In the case of L-type, it can be controlled with the library provided.

2.3.5. IOS (Expansion Module Status LED)

Status	LED is	To indicate
No Expansion I/O	Off	Device has no expansion modules or not powered. IO related memory initialization failure
Internal Bus Connection, Run Exchanging I/O	Green	The device and expansion module are operating normally.
Configuration Fault	Red	Replace expansion modules or fail to initialize. - Detect invalid expansion module ID. - Mismatch vendor code between adapter and expansion module. - Changed expansion module configuration. - Communication failure. - Too many expansion modules. - Overflowed I/O size.

2.4. GL-9981 Electrical Interface

2.4.1. RJ-45 Socket



RJ-45	Signal Name	Description
1	TD+	Transmit +
2	TD-	Transmit -
3	RD+	Receive +
4	-	
5	-	
6	RD-	Receive -
7	-	
8	-	
Case	Shield	

2.4.2. USB 2.0 Port



USB 2.0 (Type-A)	Signal Name	Description
1	VCC	+5Vdc
2	D-	Data-
3	D+	Data+
4	GND	Ground

* Current limit of 250 mA per port.

2.4.3. Monitor Port



Monitor	Signal Name	Description
1	TMDS Data2+	TMDS Lanes
2	TMDS Data2 Shield	
3	TMDS Data2-	
4	TMDS Data1+	
5	TMDS Data1 Shield	
6	TMDS Data1-	
7	TMDS Data0+	
8	TMDS Data0 Shield	
9	TMDS Data0-	
10	TMDS Clock+	
11	TMDS Clock Shield	
12	TMDS Clock-	
13	CEC	CEC Remote Control
14	Reserved	
15	SCL	DDC Clock
16	SDA	DDC Data
17	GND	CEC/DDC/HEAC Ground
18	+5V	Power EDID/DDC
19	HPD	Hot Plug Detect

2.4.4. Switch and Button



Push Button	Signal Name	Description
Push and detach	User-defined (L type only.)	It operates according to the user's program.
	PLC Reset (C type only.)	PLC Cold Reset



Toggle Switch	Signal Name	Description
Up/Down	User-defined (L type only.)	It operates according to the user's program.
	RUN / STOP (C type only.)	Up: PLC Run Down: PLC Stop



Dip Switch	Signal Name	Description
Turn on switch 1	force USB boot mode	After connecting to PC and booting in USB Device mode, OS installation is possible.
Turn on switch 2	EEPROM write protect.	Write-protect to the onboard EEPROM that stores the boot code.

* Warning: Turn off the switch when not in use.

3. Codesys Code Size Example (C type only)

- This is an example of the UserCode size according to the Codesys project configuration.
- Maximum configuration for each Application Based License)
- These figures are tested data based on theoretical assumptions and may differ from actual results.

3.1. Default

Name	Instances	IO Channels	Size of User Code	Connected Devices
-	-	-	-	
Default	0	0	20,592 Byte	Empty Project

3.2. Basic L

Name	Instances	IO Channels	Size of User Code	Connected Devices
Basic L	Max. 2x Modbus	256	3MB	
Modbus TCP Master	1	256	27,272 Byte	
Modbus TCP Slave	1	256	22,208 Byte	GT4428 * 16

3.3. Standard L

Name	Instances	IO Channels	Size of User Code	Connected Devices
Standard L	Max. 10x Modbus 2x EIP/ECAT/PN	4096	6MB	
Modbus TCP Master	7	4096	163,136 Byte	
Modbus TCP Slave	1	258	22,240 Byte	GT4428 * 16
EtherCAT	1	4096	86,162 Byte	GN9386 * 17, GT22BA * 1024
Ethernet/IP Master	1	4096	86,162 Byte	
Ethernet/IP Slave	1	258	22,240 Byte	GT4428 * 16
Profinet Master	1	4096	282,840 Byte	GN9587 * 128, GT22BA * 4096
Profinet Slave	1	273	22,264 Byte	GT4428 * 16

3.4. Performance M

Name	Instances	IO Channels	Size of User Code	Connected Devices
Performance M	Max. 12x Modbus 4x EIP/ECAT/PN	8192	12MB	
Modbus TCP Master	12	7680	287,224 Byte	
Modbus TCP Slave	1	258	22,240 Byte	GT4428 * 16
EtherCAT	1	8192	151,720 Byte	GN9386 * 33, GT22BA * 2048
Ethernet/IP Master	1	8192	151,720 Byte	
Ethernet/IP Slave	1	258	22,240 Byte	GT4428 * 16
Profinet Master	1	4096	282,840 Byte	GN9587 * 128, GT22BA * 4096
Profinet Slave	1	273	22,264 Byte	GT4428 * 16

3.5. Performance L

Name	Instances	IO Channels	Size of User Code	Connected Devices
Performance L	Max. 16x Modbus 8x EIP/ECAT/PN	8192	12MB	
Modbus TCP Master	16	10240	376,976 Byte	
Modbus TCP Slave	1	258	22,240 Byte	GT4428 * 16
EtherCAT	1	16384	282,840 Byte	GN9386 * 66, GT22BA * 4096
Ethernet/IP Master	1	16384	282,840 Byte	
Ethernet/IP Slave	1	258	22,240 Byte	GT4428 * 16
Profinet Master	1	4096	282,840 Byte	GN9587 * 128, GT22BA * 4096
Profinet Slave	1	273	22,264 Byte	GT4428 * 16