
FnIO G - Series

GL-9087

GL-9087(ProfiNet Network Adapter)

Date : 2019.11.21

Table of Contents

History.....

1. ENVIRONMENT SPECIFICATION.....

2. GL-9087 (MODBUS TCP/UDP NETWORK ADAPTER).....

 2.1 GL-9087 Specification.....

 2.2 GL-9087 Wiring Diagram.....

 2.3 GL-9087 LED Indicator.....

 2.3.1 LED Indicator.....

 2.3.2 MOD (Module Status LED).....

 2.3.3 NET (Network Status LED).....

 2.3.4 ERROR (Error Status LED).....

 2.3.5 IOS LED (Extension Module Status LED).....

 2.4. GL-9087 Electrical Interface.....

 2.4.1 RJ-45 Socket.....

 2.4.2 Dip Switch(TBD).....

3. I/O Process Image Map.....

 3.1. Mapping Data into Image Table.....

 3.1.1. Discrete Input Module.....

 3.1.2 Discrete Output Module.....

 3.1.3. Analog Input Module.....

 3.1.4. Analog Output Module.....

 3.2. Example of Input Process Image (Input Register) Map.....

 3.3. Example of Output Process Image (Output Register) Map.....

4. Parameter

 4.1. GL-9087 Parameter.....

4.2. GL-9087 PROFINET IO Characteristics.....

 4.2.1. Device Identity.....

 4.2.2. Device Access Point.....

 4.2.3. Sub-slot of GL-9087.....

History

REV.	PAGES	REMARKS	DATE	Editor
1.00			November 21, 2019	Joonho Park

1. ENVIRONMENT SPECIFICATION

Test Equipment	
Operating Temperature	-20°C ~ 60°C : 1.0A full load is allowed.
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN rail

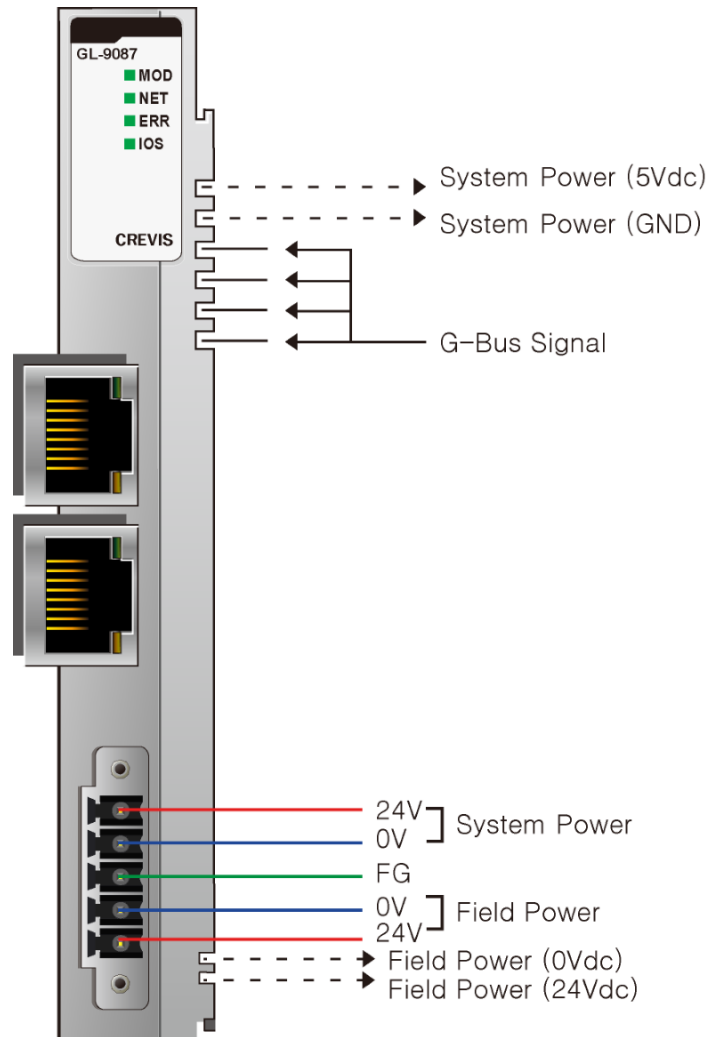
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 Sine Vibration 5 ~ 25Hz : 1.6mm 25 ~ 300Hz : 4g Sweep Rate : 1 Oct/min, 20 cycles Random Vibration 10 ~ 40Hz : 0.0125g ² /Hz 40 ~ 100Hz : 0.0125 → 0.002g ² /Hz 100 ~ 500Hz : 0.002g ² /Hz 500 ~ 2000Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz Test time : 1hrs for each test
EMC Resistance Burst/ESD	EN 61000-6-2 : 2005 EN 61000-6-4/A11 : 2011
Installation Pos. / Protect. Class	Variable/IP20
Product Certifications	CE, UL(TBD)

2. GL-9087 (MODBUS TCP/UDP NETWORK ADAPTER)

2.1 GL-9087 Specification

Items	Specification
Input Specification	
Adapter Type	Slave node (Profinet)
Protocol	Profinet
Max. Expantsion Module	10 slots
Max. Input / Output Data Size	Max. Input 128 bytes / Output 128 bytes
Max Length Bus Line	Up to 100m from Ethernet Hub/Switch with twisted CAT5 UTP/STP
Max. Nodes	Limited by Profinet Specification.
Baud Rate	100Mbps, Auto-negotiation, Full duplex
Interface Connector	RJ-45 socket * 2pcs
IP-Address Setup	Via Master Device Software
IAP Mode	When DIP Switch 1 to 8 setting is 254 or 255 (Using only Internet Explorer / recommended version 11)
Indicator	4 LEDs 1 Green/Red, Module Status(MOD) 1 Green/Red, Network Status(NET) 1 Green/Red, Error Status(ERROR) 1 Green/Red Expansion I/O Module Status(IOS) 2 LEDs (each RJ45 Connector) 1 Yellow, Link/Active 1 Green, Not used
Module Location	Starter module left side of G-Series system
General specification	
System Power	Supply voltage : 24Vdc nominal Supply voltage range : 15~28.8Vdc Protection : Reverse polarity protection
Power Dissipation	55mA typical @ 24Vdc
Current for I/O Module	1.0A @ 5Vdc
Isolation	System power to internal logic : Non-isolation System power I/O driver : Isolation
Field Power	Supply voltage : 24Vdc typical (Max. 32Vdc) * Field Power Range is different depending on IO Module series. Refer to IO Module's Specification.
Max. Current Field Power Contact	DC 8A Max
Weight	76g
Module Size	22mm x 109mm x 70mm
Environment Condition	Refer to '1. Environment Specification'

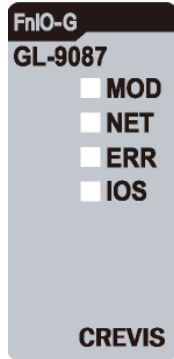
2.2 GL-9087 Wiring Diagram



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

2.3 GL-9087 LED Indicator

2.3.1 LED Indicator



LED	LED Function / Description	LED Color
MOD	Module status	Green/Red
NET	Current communication status	Green/Red
ERROR	Error Status (Profinet)	Red
IOS	Extension Module Status	Green/Red

2.3.2 MOD (Module Status LED)

Status	LED	To indicate
No Powered	OFF	No power is supplied to the unit.
Device Operational	Green	The unit is operating in normal condition.
Unrecoverable Fault	Red	The device has an unrecoverable fault. - Memory error or CPU watchdog error.

2.3.3 NET (Network Status LED)

Status	LED	To indicate
No Powered	OFF	No power is supplied to the unit.
Communication	Green	Normal communication.
Communication Ready	Flashing Green	Communication identification.
Invalid Configuration	Flashing Red	DCP Communication error(Invalid Configuration).

2.3.4 ERROR (Error Status LED)

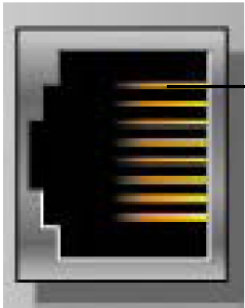
Status	LED	To indicate
No Error	OFF	No Error.
Connection error	Red	Communication connection error.

2.3.5 IOS LED (Extension Module Status LED)

Status	LED	To indicate
Not Powered	OFF	Adapter may not be powered.
No Expansion Module	Flashing Red	Adapter has no expansion module
Internal Bus Connection, Run Exchanging I/O	Green	Exchanging I/O data.
Expansion Configuration Failed	Red	One or more expansion module occurred in fault state. <ul style="list-style-type: none">- Detected invalid expansion module ID.- Overflowed Input/Output Size- Too many expansion module- Initialization failure- Communication failure.- Changed expansion module configuration.- Mismatch vendor code between adapter and expansion module.

2.4. GL-9087 Electrical Interface

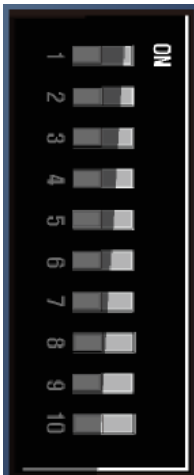
2.4.1 RJ-45 Socket



Shield 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 Dip Switch(TBD)



DIP Pole#	Description	
1	IP_DIP bit#0	Device Name (GL9087-XX) - XX must a value between 1~99.
2	IP_DIP bit#1	
3	IP_DIP bit#2	
4	IP_DIP bit#3	
5	IP_DIP bit#4	
6	IP_DIP bit#5	
7	IP_DIP bit#6	
8	Reserve	
9	Reserve	
10	Node ID : Flash Memory Value	

- **When the dip switch is not set to non-zero (1~99):**

If the decimal value of the dip switch is not zero (0), the name of device will be fixed as “GL9087-xx” (xx: 1~99). You must put the fixed device name.

- **When the dip switch “10 pole” is set to switch ON:**

GL-9087 Devices on a PROFINET subnet must have unique names. The device names must satisfy DNS naming conventions. This means that the following rules must be observed:

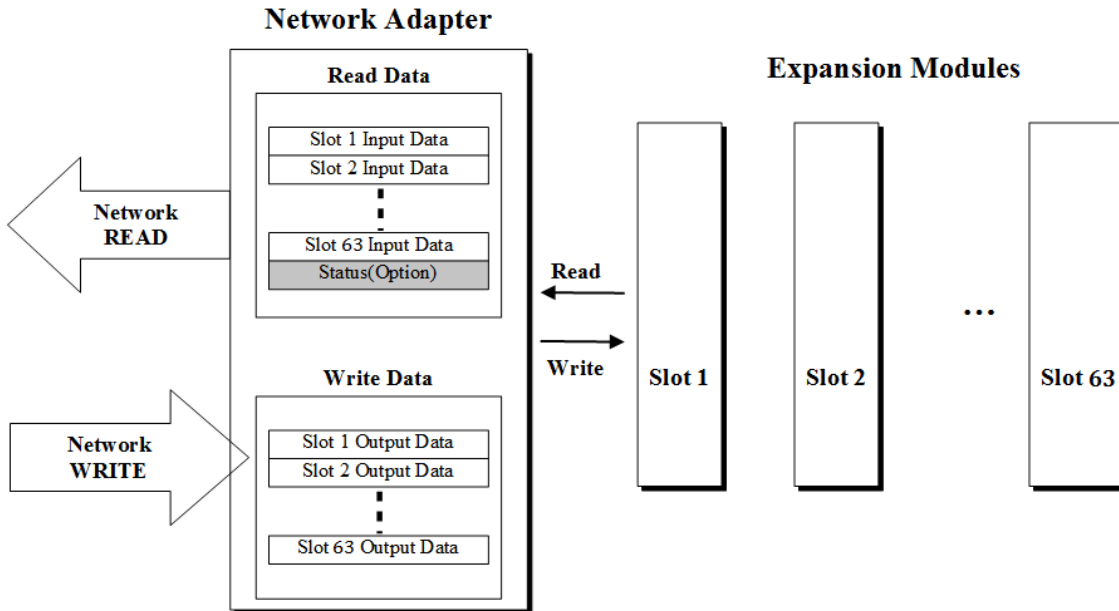
- Names are limited to a total of 127 characters (letters, numbers, dashes or dots)
- Any component part (that is, a character string between two dots) of the device name may only be up to 63 characters long.
- Names cannot contain any special characters such as umlauts, parentheses, underscores, forward or backward slashes, empty spaces, etc. The dash is the only special character allowed.
- Names must not begin or end with the "-" or "." characters.
- Names must not have the format n.n.n.n (where n = 0...999).
- The device name must not start with numbers.

– If you want to change the IP address in non-volatile memory, please refer to Chapter3. (Editing Ethernet Nodes)
Device names are assigned to PROFINET IO device when the device is being set up and placed in operation for the first time ("commissioned").

The default name is “GL9087-address”.

3. I/O Process Image Map

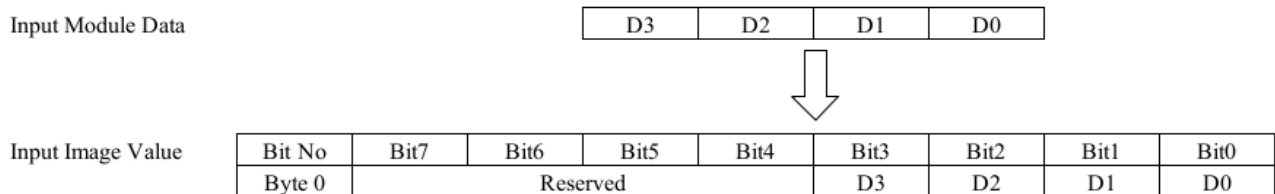
An expansion module may have 3 types of data as I/O data, configuration parameter and memory register. The data exchange between network adapter and expansion modules is done via an I/O process image data by G-Series protocol. The following figure shows the data flow of process image between network adapter and expansion modules.



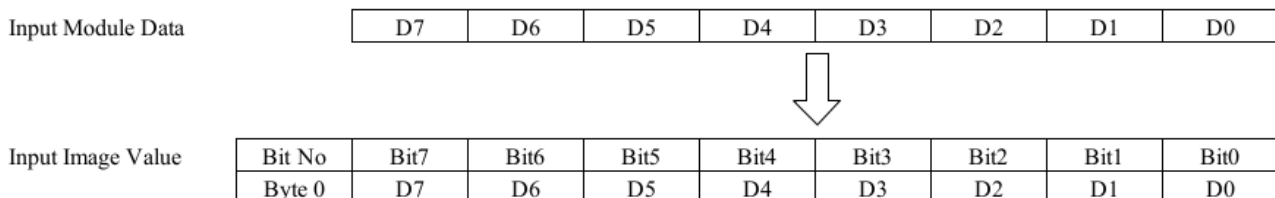
3.1. Mapping Data into Image Table

3.1.1. Discrete Input Module

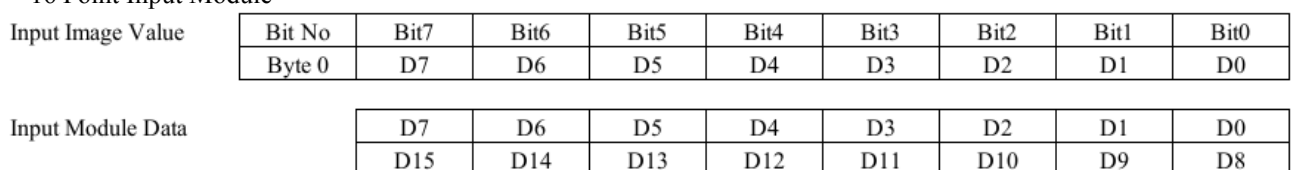
- 4 Point Input Module



- 8 Point Input Module



- 16 Point Input Module



Input Module Data

D7	D6	D5	D4	D3	D2	D1	D0
D15	D14	D13	D12	D11	D10	D9	D8
D23	D22	D21	D20	D19	D18	D17	D16
D31	D30	D29	D28	D27	D26	D25	D24



Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8
Byte 2	D23	D22	D21	D20	D19	D18	D17	D16
Byte 3	D31	D30	D29	D28	D27	D26	D25	D24

3.1.2 Discrete Output Module

- 4 Point Output Module

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved				D3	D2	D1	D0



Output Module Data

D3	D2	D1	D0
----	----	----	----

- 8 Point Output Module

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0



Output Module Data

D7	D6	D5	D4	D3	D2	D1	D0
----	----	----	----	----	----	----	----

- 16 Point Output Module

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8



Output Module Data

D7	D6	D5	D4	D3	D2	D1	D0
D15	D14	D13	D12	D11	D10	D9	D8

- 32 Point Output Module

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8
Byte 2	D23	D22	D21	D20	D19	D18	D17	D16
Byte 3	D31	D30	D29	D28	D27	D26	D25	D24



Output Module Data

D7	D6	D5	D4	D3	D2	D1	D0
D15	D14	D13	D12	D11	D10	D9	D8
D23	D22	D21	D20	D19	D18	D17	D16
D31	D30	D29	D28	D27	D26	D25	D24

3.1.3. Analog Input Module

- 4 Channel Analog Input Module

Input Module Data

Analog Input Ch0
Analog Input Ch1
Analog Input Ch2
Analog Input Ch3



Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Input Ch0 low byte							
Byte 1	Analog Input Ch0 high byte							
Byte 2	Analog Input Ch1 low byte							
Byte 3	Analog Input Ch1 high byte							
Byte 4	Analog Input Ch2 low byte							
Byte 5	Analog Input Ch2 high byte							
Byte 6	Analog Input Ch3 low byte							
Byte 7	Analog Input Ch3 high byte							

- 8 Channel Analog Input Module

Input Module Data

Analog Input Ch0
Analog Input Ch1
Analog Input Ch2
Analog Input Ch3
Analog Input Ch4
Analog Input Ch5
Analog Input Ch6
Analog Input Ch7



Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Input Ch0 low byte							
Byte 1	Analog Input Ch0 high byte							
Byte 2	Analog Input Ch1 low byte							
Byte 3	Analog Input Ch1 high byte							
Byte 4	Analog Input Ch2 low byte							
Byte 5	Analog Input Ch2 high byte							
Byte 6	Analog Input Ch3 low byte							
Byte 7	Analog Input Ch3 high byte							
Byte 8	Analog Input Ch0 low byte							
Byte 9	Analog Input Ch0 high byte							
Byte 10	Analog Input Ch1 low byte							
Byte 11	Analog Input Ch1 high byte							
Byte 12	Analog Input Ch2 low byte							
Byte 13	Analog Input Ch2 high byte							
Byte 14	Analog Input Ch3 low byte							
Byte 15	Analog Input Ch3 high byte							

3.1.4. Analog Output Module

- 4 Channel Analog Input Module

Output Image Value	Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Output Ch0 low byte								
Byte 1	Analog Output Ch0 high byte								
Byte 2	Analog Output Ch1 low byte								
Byte 3	Analog Output Ch1 high byte								
Byte 4	Analog Output Ch2 low byte								
Byte 5	Analog Output Ch2 high byte								
Byte 6	Analog Output Ch3 low byte								
Byte 7	Analog Output Ch3 high byte								



Output Module Data	Analog Output Ch0
	Analog Output Ch1
	Analog Output Ch2
	Analog Output Ch3

- 8 Channel Analog Input Module

Output Image Value	Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Output Ch0 low byte								
Byte 1	Analog Output Ch0 high byte								
Byte 2	Analog Output Ch1 low byte								
Byte 3	Analog Output Ch1 high byte								
Byte 4	Analog Output Ch2 low byte								
Byte 5	Analog Output Ch2 high byte								
Byte 6	Analog Output Ch3 low byte								
Byte 7	Analog Output Ch3 high byte								
Byte 8	Analog Output Ch4 low byte								
Byte 9	Analog Output Ch4 high byte								
Byte 10	Analog Output Ch5 low byte								
Byte 11	Analog Output Ch5 high byte								
Byte 12	Analog Output Ch6 low byte								
Byte 13	Analog Output Ch6 high byte								
Byte 14	Analog Output Ch7 low byte								
Byte 15	Analog Output Ch7 high byte								

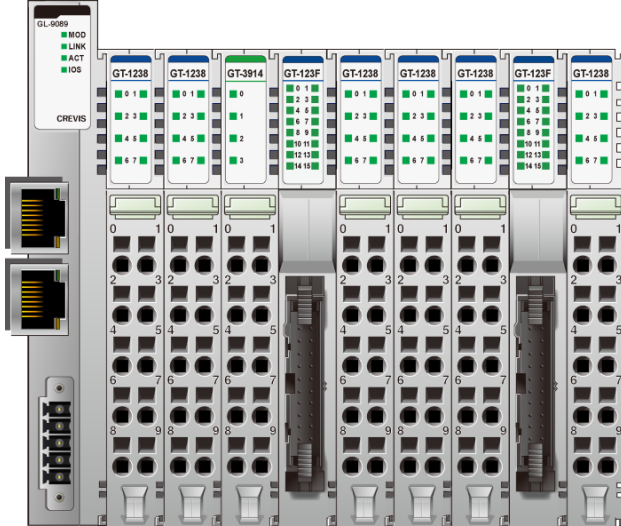


Output Module Data	Analog Output Ch0
	Analog Output Ch1
	Analog Output Ch2
	Analog Output Ch3
	Analog Output Ch4
	Analog Output Ch5
	Analog Output Ch6
	Analog Output Ch7

3.2. Example of Input Process Image (Input Register) Map

Input image data depends on slot position and expansion slot data type. Input process image data is only ordered by expansion slot position .

• For example slot configuration



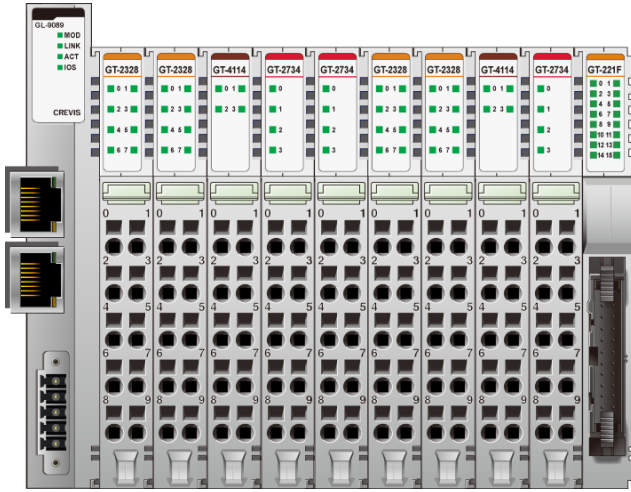
Slot No.	Module Description
#0	MODBUS/TCP Adapter
#1	8-discrete input
#2	8-discrete input
#3	4-analog input
#4	16-discrete input
#5	8-discrete input
#6	8-discrete input
#7	8-discrete input
#8	16-discrete input
#9	8-discrete input

• Input Process Image

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0x0001	Discrete Input 8 pts (Slot#2)								Discrete Input 8 pts (Slot#1)							
0x0002	Analog Input Ch0 high byte (Slot#3)								Analog Input Ch0 low byte (Slot#3)							
0x0003	Analog Input Ch1 high byte (Slot#3)								Analog Input Ch1 low byte (Slot#3)							
0x0004	Analog Input Ch2 high byte (Slot#3)								Analog Input Ch2 low byte (Slot#3)							
0x0005	Analog Input Ch3 high byte (Slot#3)								Analog Input Ch3 low byte (Slot#3)							
0x0006	Discrete Input 8 pts (Slot#4)								Discrete Input 8 pts (Slot#4)							
0x0007	Discrete Input 8 pts (Slot#6)								Discrete Input 8 pts (Slot#5)							
0x0008	Discrete Input 8 pts (Slot#8)								Discrete Input 8 pts (Slot#7)							
0x0009	Discrete Input 8 pts (Slot#9)								Discrete Input 8 pts (Slot#8)							

3.3. Example of Output Process Image (Output Register) Map

- For example slot configuration



Slot No.	Module Description
#0	MODBUS/TCP Adapter
#1	8-discrete output
#2	8-discrete output
#3	4-analog output
#4	4- relay output
#5	4-relay output
#6	8-discrete output
#7	8-discrete output
#8	4-analog output
#9	4-relay output
#10	16-discrete output

- Output Process Image

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0x0800	Discrete Output 8 pts (Slot#2)							Discrete Output 8 pts (Slot#1)								
0x0801	Analog Output Ch0 high byte (Slot#3)							Analog Output Ch0 low byte (Slot#3)								
0x0802	Analog Output Ch1 high byte (Slot#3)							Analog Output Ch1 low byte (Slot#3)								
0x0803	Analog Output Ch2 high byte (Slot#3)							Analog Output Ch2 low byte (Slot#3)								
0x0804	Analog Output Ch3 high byte (Slot#3)							Analog Output Ch3 low byte (Slot#3)								
0x0805	Empty, Don't Care				Discrete Out 4 pts (Slot#5)			Empty, Don't Care				Discrete Out 4 pts (Slot#4)				
0x0806	Discrete Output low 8 pts (Slot#7)							Discrete Output low 8 pts (Slot#6)								
0x0807	Analog Output Ch0 high byte (Slot#8)							Analog Output Ch0 low byte (Slot#8)								
0x0808	Analog Output Ch1 high byte (Slot#8)							Analog Output Ch1 low byte (Slot#8)								
0x0809	Analog Output Ch2 high byte (Slot#8)							Analog Output Ch2 low byte (Slot#8)								
0x080A	Analog Output Ch3 high byte (Slot#8)							Analog Output Ch3 low byte (Slot#8)								
0x080B	Discrete Output low 8 pts (Slot#10)							Empty, Don't Care				Discrete Out 4 pts (Slot#9)				
0x080C	Empty, Don't Care							Discrete Output high 8 pts (Slot#10)								

4. Parameter

4.1. GL-9087 Parameter

Parameter	Setting	Description
Word data type	All type	Little Endian format(LSB-MSB)
Stop action	Clear output image to 0 *	All outputs are set to 0.
	Hold last valid output image	All outputs are remain the last value.
* : Default setting		

4.2. GL-9087 PROFINET IO Characteristics

4.2.1. Device Identity

Item	Value
Vendor	CREVIS
Vendor ID	0x0140
Product family	CREVIS FnIO System
Device ID	0x9087
Details	GL9087 PROFINET IO Device

4.2.2. Device Access Point

Item	Value
Module Ident Number	0x00009087
Details	GL9087 PROFINET IO Device
Vendor Name	CREVIS
Order Number	GL-9087
Category	CREVIS PROFINET I/O
Software Version	V1.0
Hardware Version	V1.0
Maximal Input Length	1440 Bytes
Maximal Output Length	1440 Bytes
Physical Slots	0..32
Minimal Device Interval	4msec
Based on	portStack
DNS Compliant Name	GL9087-xx
Supports Extended Assignment of IP Address	No
Fixed in Slots	0
Instance Field of the Object UUID	1
Supports Multiple Write	Yes
Requires IOPS/IOCS	Yes
Requires Engineering tool which supports at least GSDML Version	V2.32

4.2.3. Sub-slot of GL-9087

Item	Value
Sub-slot Number	Sub-slot Label
32768 (0x8000)	X1
32769 (0x8001)	P1

Sub-module								
Sub-module Ident Number	0x00000001							
GL-9087 Parameters (Index : 1, Length : 2Bytes, Transfer sequence : 0)								
Byte Offset	Data							
0	0x00, 0x00							
Name of Parameter	Data Type	Byte Offset	Bit Offset	Bit Length	Default value	Value Range	Changeable	Visible
Word data format	Bit Area	0	0	1	MOTOROLA	0..1	Yes	Yes
Stop action	Bit Area	1	0	1	Clear output images to 0	0..1	Yes	Yes
Interface : GL-9087								
Sub-module Ident Number	0x0002							
Sub-slot Number	32768 (0x8000)							
Supports Real time Class	Class 1							
Supports Isochronous Mode	No							
Number of Additional Input CRs	0							
Number of Additional Output CRs	0							
Number of Additional Multicast Provider CRs	0							
Number of Multicast Consumer CRs	0							
Supported Send-clock Factors (Base 31.25us)	32 64 128							
Supported Reduction Ratios	1 2 4 8 16 32 64 128 256 512							
Port 1 : Port 1								
Sub-module Ident Number	0x0003							
Sub-slot Number	32769 (0x8001)							
MAU Type	100BASETXFD							