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# **FnIO G-Series:**

## ***GN-9231***

***GN-9231 (CC-Link Network Adapter)***

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# Specification Preliminary

## 1. ENVIRONMENT SPECIFICATION

Environment specification	
Operating Temperature	60°C ~ 70°C : Power dissipation is limited to 0.8A. -40°C ~ 60°C : 1.5A full load is allowed.
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5% ~ 90% non-condensing
Operating Altitude	2000m
Mounting	DIN rail
General specification	
Shock Operating	10g
Shock Non-Operating	30g
Vibration/shock resistance	Displacement : 0.012Inch p-p from 10~57Hz Acceleration : 2G's from 57~500Hz Sweep Rate : 1 octave Per Minute Axes to test : x, y, z Frequency Sweeps Per Axis : 10
EMC resistance burst/ESD	EMC Directive
Installation Pos. / Protect. Class	Variable/IP20
Product Certifications	CE, UL

## 2. GN-9231 (CC-Link NETWORK ADAPTER)

### 2.1. GN-9231 Specification

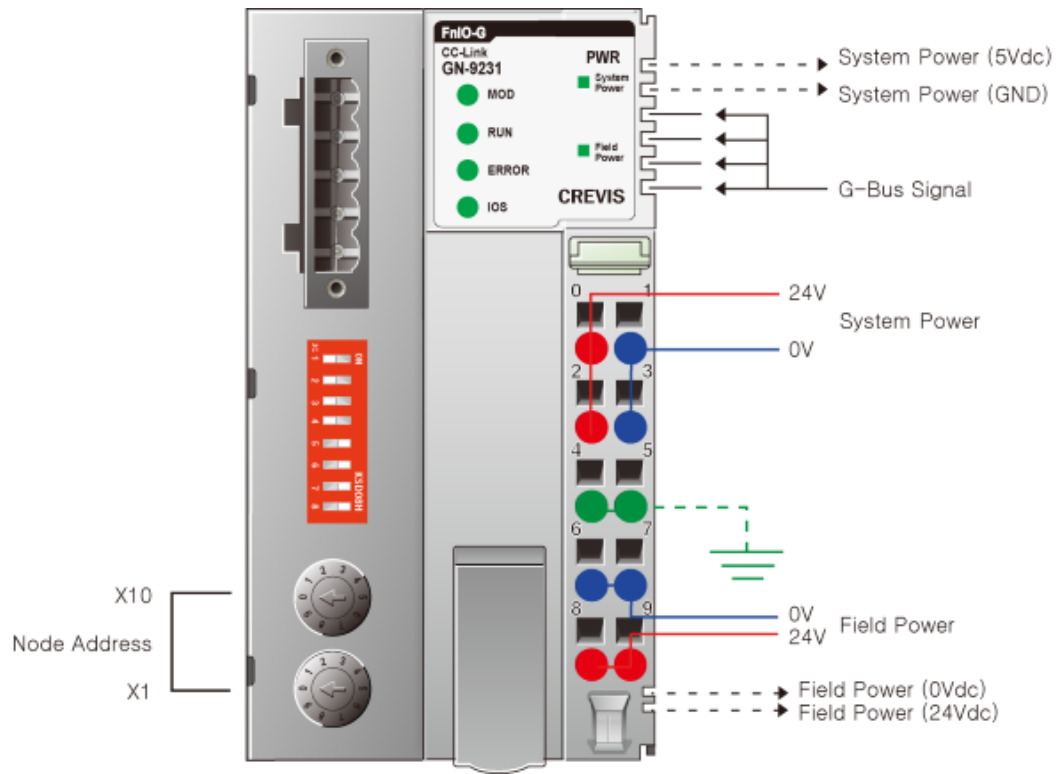
Items	Specification
<b>Input Specification</b>	
Adapter Type	Slave node (CC-Link Version 1)
Max. Expansion Module	63slots
I/O Data size	System area : 16 points RX/RX : 112 points(4station occupied) RWr/RWw : 16 points(4station occupied)
Max. Nodes number	42 Node/Max
Baud Rate	156/625/2500/5000/10000Kbps
Interface Connector	5 Pin open connector
Other Serial Port	RS232 for MODBUS/RTU, Touch Panel or IOGuide
Serial Configuration (RS232)	Node : 1 (Fixed) Baud Rate : 115200 (Fixed) Data bit : 8 (Fixed) Parity bit : No parity (Fixed) Stop bit : 1 (Fixed)
Indicator	5 LEDs 1 Green/Red, Module Status (MOD) 1 Green, Current Running Status (NET) 1 Green, Error Status (ERROR) 1 Green/Red Expansion I/O Module Status (IOS) 1 Green, Field Power Status 2 LEDs (each RJ45 Connector) 1 Green, Active 1 Yellow, Link
Module Location	Starter module left side of G-bus system
Field Power Detection	About 14Vdc
Station class	Remote Device station
<b>General specification</b>	
System Power	Supply voltage : 24Vdc nominal Supply voltage range : 15~32Vdc Protection : Output current limit (Min. 1.5A) Reverse polarity protection
Power Dissipation	70mA typical @ 24Vdc
Current for I/O Module	1.5A @ 5Vdc(When using in '60°C ~ 70 °C' temperature environment, the power dissipation is limited to 0.8A.)
Isolation	System power to internal logic : Non-isolation System power I/O driver : Isolation
Field Power	Supply voltage : 24Vdc nominal(Max. 32Vdc) * Field Power Range is different depending on IO Module series. Refer to IO Module's Specification.

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Max. Current Field Power Contact	DC 10A Max
Weight	<165g
Module Size	54mm x 99mm x 70mm
<b>Environment Condition</b>	<b>Refer to '1. Environment Specification'</b>

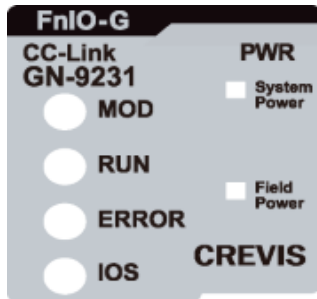
## 2.2. GN-9231 Wire Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	System Power, 24V	System Power, Ground	1
2	System Power, 24V	System Power, Ground	3
4	F.G	F.G	5
6	Field Power, Ground	Field Power, Ground	7
8	Field Power, 24V	Field Power, 24V	9

## 2.3. GN-9231 LED Indicator

### 2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
MOD	Module Status	Green/Red
RUN	Current Communication status	Green/Red
ERROR	Error Status	Green
IOS	Fn-Bus Status	Green/Red
Field Power	Field Power Enable	Green

### 2.3.2. MOD (Module Status LED)

Status	LED is	To indicate
Not Powered	OFF	Not power is supplied to the unit.
Normal, Operational	Green	The unit is operating in normal condition.
Device in Standby	RED	The EEPROM parameter is not initialized yet. Serial Number is zero value (0x00000000)

### 2.3.3. RUN (Network State LED)

Status	LED is	To indicate
Init / No Communication	Red	No Communication / Communication Disconnection
Communication	Green	Normal Communication
Communication Error	OFF	Communication Error / Token passing

### 2.3.4. ERROR (Error State LED)

Status	LED is	To indicate
No Error	OFF	
Invalid Configuration	Flashing Red	TBD

### 2.3.5. IOS LED (G-Bus Status LED)

Status	LED is	To indicate
Not Powered No Expansion Module	OFF	Device has no expansion module or 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"> <li>- Detected invalid expansion module ID.</li> <li>- Too many expansion module</li> <li>- Initialization failure</li> </ul>



# Specification Preliminary

- Communication failure.
- Changed expansion module configuration.
- Mismatch vendor code between adapter and expansion module.

## 2.3.6. Field Power LED (Field Power, LED)

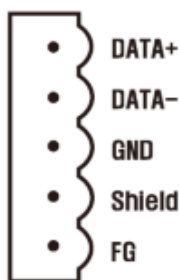
Status	LED is	To indicate
Not supplied field power	OFF	Not supplied 24Vdc field power, 5Vdc system power.
Supplied field power	Green	Supplied 24Vdc field power, 5Vdc system power.

## 2.3.7. Indicator states and flash rates

LED ON	Constantly ON
LED OFF	Constantly OFF.
LED flickering	Equal ON and OFF times with a frequency of approximately 10 Hz: ON for approximately 50ms and OFF for approximately 50ms.
LED blinking	Equal ON and OFF times with a frequency of approximately 2, 5Hz: ON for approximately 200ms followed by OFF for approximately 200ms.
LED single flash	One short flash (approximately 200ms) followed by a long OFF phase (approximately 1000ms)
LED double flash	A sequence of two short flashes (approximately 200ms), separated by an OFF phase (approximately 200ms). The sequence is finished by a long OFF phase (approximately 1000ms)
LED triple flash	A sequence of three short flashes (approximately 200ms), separated by an OFF phase (approximately 200ms). The sequence is finished by a long OFF phase (approximately 1000ms)

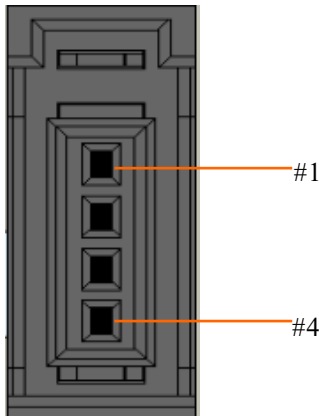
## 2.4. GN-9231 Electrical Interface

### 2.4.1. 5 Pin open connector



RJ-45	Signal Name	Description
1	DATA+	Transceiver Data High
2	DATA-	Transceiver Data Low
3	GND	Signal Common
4	Shield	Shield
5	FG	Frame Ground Internally shorted with shield

**2.4.2. RS232 Port for MODBUS/RTU, Touch Panel or IOGuide(Only Monitoring)**



RS232 (37204-62A3-004PL/3M)		
Pin#	Signal Name	Description
1	Reserved	----
2	TXD	RS232 TXD
3	RXD	RS232 RXD
4	GND	RS232 GND

**2.4.3. Rotary Switch**



Node address set-up is rotary switch. Default Node Address is 1. Max node Addrss is 42.

**2.4.4. Dip Switch**



DIP Pole#	Description	
1	Station No. #0	0 : 1 Station Occupied 1 : 2 Station Occupied
2	Station No. #1	2 : 3 Station Occupied 3 : 4 Station Occupied
3	Fixed Station	0 : Setting Station No. #0, #1 1 : 4station Occupied
4	Baudrate #1	0 : 156Kbps 1 : 625Kbps
5	Baudrate #2	2 : 2.5Mbps 3 : 5Mbps
6	Baudrate #3	4 : 10Mbps Default Baudrate 156Kbps
7	Mode	Mode switch is ON, the IO size will be increased 2bytes more respectively
8	Terminator Resistor	0 : Terminator Resistor Non-set 1: Terminator Resistor Non-set

### 3. Process image

#### 3.1. Remote input area

No. of occupied station	Size	Signal name
1 station : 16points	2 bytes	Discrete input
2 station : 48points	6 bytes	
3 station : 80points	10 bytes	
4 station : 112points	14 bytes	
System area	2 bytes	System

\* When Mode switch is ON, the IO size will be increased 2bytes more respectively

#### 3.2. Remote output area

No. of occupied station	Size	Signal name
1 station : 16points	2 bytes	Discrete Output
2 station : 48points	6 bytes	
3 station : 80points	10 bytes	
4 station : 112points	14 bytes	
System area	2 bytes	System

\* When Mode switch is ON, the IO size will be increased 2bytes more respectively

#### 3.3. RW<sub>r</sub>/RW<sub>w</sub> area

Address	Configuartion	size	Signal	Address	Configuartion	size	Signal
Rwr0 ~ Rwr3	1 Staion	4Word	Analog in / Special module	Rww0 ~ Rww3	1 Staion	4Word	Analog out / Special module
Rwr4 ~ Rwr7	2 Staion	8Word		Rww4 ~ Rww7	2 Staion	8Word	
Rwr8 ~ Rwr11	3 Staion	12Word		Rww8 ~ Rww11	3 Staion	12Word	
Rwr12 ~ Rwr27	4 Staion	16Word		Rww12 ~ Rww27	4 Staion	16Word	

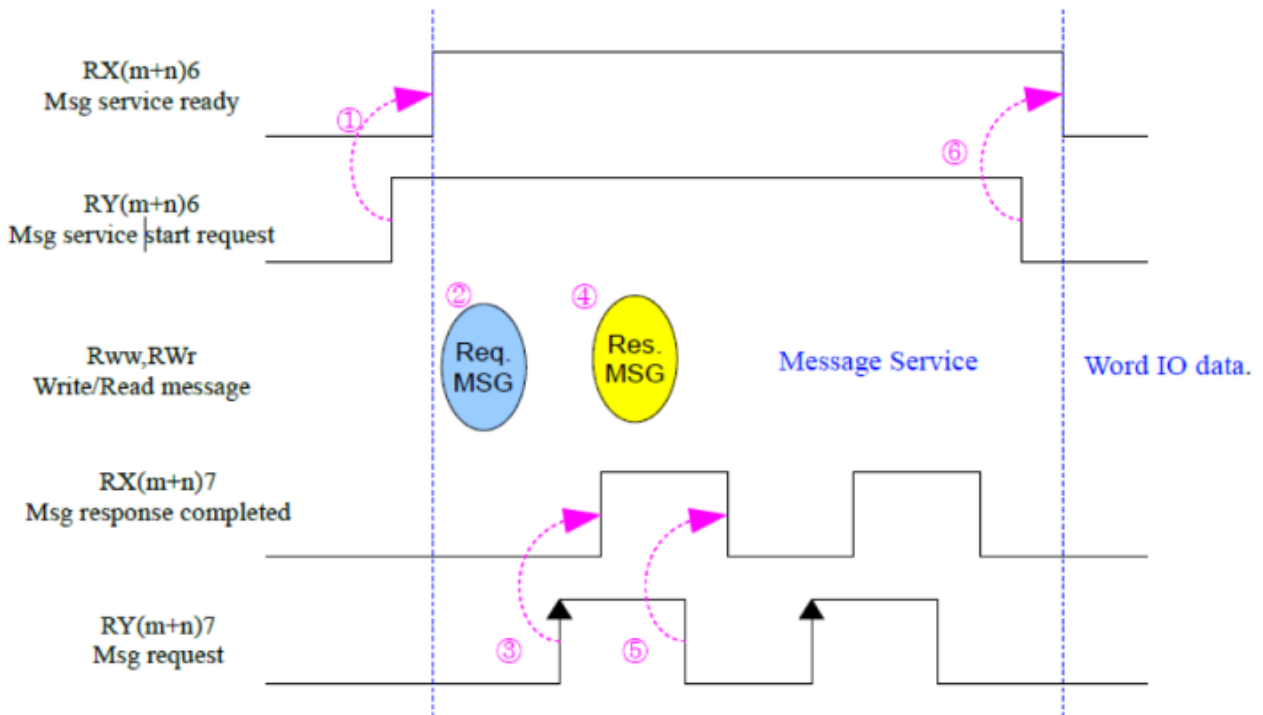
### 3.4. System area

Input	Description	Output	Description
RX0	Reaction on network error	RY0	Reaction on network error
RX1	Reaction on network error	RY1	Reaction on network error
RX2	Reserved	RY2	Reserved
RX3	Reserved	RY3	Reserved
RX4	Reserved	RY4	Reserved
RX5	Reserved	RY5	Reserved
RX6	Msg service ready	RY6	Msg service start request
RX7	Msg response completed	RY7	Msg request
RX8	Reserved	RY8	Reserved
RX9	Reserved	RY9	Reserved
RXA	Error status flag	RYA	Reserved
RXB	Remote station ready	RYB	Reserved
RXC	Reserved	RYC	Reserved
RXD	Reserved	RYD	Reserved
RXE	Reserved	RYE	Reserved
RXF	Reserved	RYF	Reserved

#### 3.4.1. Reaction on network error

RY1	RY0	Description
0	0	Hold Last value
0	1	Clear output to zero
1	0	Stop Bus
1	1	Not used(internally switched to 10)

3.4.2. Service Message



3.4.3. Service Message request

Address	High byte	Low byte	station
RWw[0]	Slot number	Service code - Read Parameter : 2 - Write Parameter : 3	1
RWw[1]	offset		
RWw[2]	User data length		
RWw[3]	User data 1	User data 0	2
RWw[4]	User data 3	User data 2	
RWw[5]	User data 5	User data 4	
RWw[6]	User data 7	User data 6	
RWw[7]	User data 9	User data 8	3
RWw[8]	User data 11	User data 10	
RWw[9]	User data 13	User data 12	
RWw[10]	User data 15	User data 14	4
RWw[11]	User data 17	User data 16	
RWw[12]	User data 19	User data 18	
RWw[13]	User data 21	User data 20	
RWw[14]	User data 23	User data 22	
RWw[15]	User data 25	User data 24	

### 3.4.4. Service Message response

Address	High byte	Low byte	station
RWr[0]	Slot number	Service code - Read Parameter : 2 - Write Parameter : 3	1
RWr[1]	offset		
RWr[2]	User data length		
RWr[3]	User data 1	User data 0	2
RWr[4]	User data 3	User data 2	
RWr[5]	User data 5	User data 4	
RWr[6]	User data 7	User data 6	
RWr[7]	User data 9	User data 8	3
RWr[8]	User data 11	User data 10	
RWr[9]	User data 13	User data 12	
RWr[10]	User data 15	User data 14	
RWr[11]	User data 17	User data 16	4
RWr[12]	User data 19	User data 18	
RWr[13]	User data 21	User data 20	
RWr[14]	User data 23	User data 22	
RWr[15]	User data 25	User data 24	

## 4. MODBUS Interface

### 4.1. MODBUS Interface Register/Bit Map

- Register Map

Start Address	Read/Write	Description	Func. Code
0x0000 ~	Read	Process input image register(Rwr)	3,4,23
0x0800 ~	Read	Process output image register(Rww)	3,4,23
0x8000 ~	Read	Process input image bit (Rx)	1,2,3,4,23
0x8800 ~	Read	Process output image bit (Ry)	1,2,3,4,23
0x1000 *	Read	Adapter Identification special registers.	3,4,23
0x1020 *	Read/Write	Adapter Watchdog, other time special register.	3,4,6,16,23
0x1100 *	Read/Write	Adapter Information special registers.	3,4,6,16,23
0x2000 *	Read/Write	Expansion Slot Information special registers.	3,4,6,16,23

\* The special register map must be accessed by read/write of every each address (one address).

- Register Map

Start Address	Read/Write	Description	Func. Code
0x0000~	Read	Process input image bits All input registers area are addressable by bit address. Size of input image bit is size of input image register * 16.	2
0x1000~	Read/Write	Process output image bits All output registers area are addressable by bit address. Size of output image bit is size of output image register * 16.	1,5,15

### 4.2. Supported MODBUS Function Codes

Function Code	Function	Description
1(0x01)	Read Coils (Read output bit)	This function code is used to read from 1 to 2000 contiguous status of coils in a remote device. The Request PDU specifies the starting address, i.e. the address of the first coil specified, and the number of coils. In the PDU Coils are addressed starting at zero. Therefore coils numbered 1-16 are addressed as 0-15. The coils in the response message are packed as one coil per bit of the data field. Status is indicated as 1= ON and 0= OFF.

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2(0x02)	Read Discrete Inputs (Read input bit)	This function code is used to read from 1 to 2000 contiguous status of discrete inputs in a remote device. The Request PDU specifies the starting address, i.e. the address of the first input specified, and the number of inputs. In the PDU Discrete Inputs are addressed starting at zero. Therefore Discrete inputs numbered 1-16 are addressed as 0-15. The discrete inputs in the response message are packed as one input per bit of the data field. Status is indicated as 1= ON; 0= OFF.
3(0x03)	Read Holding Registers (Read output word)	This function code is used to read the contents of a contiguous block of holding registers in a remote device. The Request PDU specifies the starting register address and the number of registers. The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.
4(0x04)	Read Input Registers (Read input word)	This function code is used to read from 1 to approx. 125 contiguous input registers in a remote device. The Request PDU specifies the starting register address and the number of registers. The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.
5(0x05)	Write Single Coil (Write one bit output)	This function code is used to write a single output to either ON or OFF in a remote device. The requested ON/OFF state is specified by a constant in the request data field. A value of FF 00 hex requests the output to be ON. A value of 00 00 requests it to be OFF. All other values are illegal and will not affect the output.
6(0x06)	Write Single Register (Write one word output)	This function code is used to write a single holding register in a remote device. Therefore register numbered 1 is addressed as 0. The normal response is an echo of the request, returned after the register contents have been written.
8(0x08)	Diagnostics (Read diagnostic register)  *Refer to the 4.2.1	MODBUS function code 08 provides a series of tests for checking the communication system between a client ( Master) device and a server ( Slave), or for checking various internal error conditions within a server. The function uses a two-byte sub-function code field in the query to define the type of test to be performed. The server echoes both the function code and sub-function code in a normal response. Some of the diagnostics cause data to be returned from the remote device in the data field of a normal response.
15(0x0F)	Write Multiple Coils (Write a number of output bits)	This function code is used to force each coil in a sequence of coils to either ON or OFF in a remote device. The Request PDU specifies the coil references to be forced. Coils are addressed starting at zero. A logical '1' in a bit position of the field requests the corresponding output to be ON. A logical '0' requests it to be OFF. The normal response returns the function code, starting address, and quantity of coils forced.
16(0x10)	Write Multiple registers (Write a number of output words)	This function code is used to write a block of contiguous registers (1 to approx. 120 registers) in a remote device. The requested written values are specified in the request data field. Data is packed as two bytes per register. The normal response returns the function code, starting address, and quantity of registers written.



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23(0x17)	Read/Write Multiple registers (Read a number of input words /Write a number of output words)	Read a number of input words /Write a number of output words This function code performs a combination of one read operation and one write operation in a single MODBUS transaction. The write operation is performed before the read. The request specifies the starting address and number of holding registers to be read as well as the starting address, number of holding registers, and the data to be written. The byte count specifies the number of bytes to follow in the write data field. The normal response contains the data from the group of registers that were read. The byte count field specifies the quantity of bytes to follow in the read data field.
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- Refer to MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1a

## 4.2.1. 8 (0x08) Diagnostics

### Sub-function 0x0000(0) Return Query Data

The data passed in the request data field is to be returned (looped back) in the response.

The entire response message should be identical to the request.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x0000(0)	Any	Echo Request Data	

### Sub-function 0x0001(1) Restart Communications Option

The remote device could be initialized and restarted, and all of its communications event counters are cleared.

Especially, data field 0x55AA make the remote device to restart with factory default setup of EEPROM.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x0001(1)	0x0000, 0xFF00	Echo Request Data	Reset Only

### Sub-function 0x000B(11) Return Bus Message Count

The response data field returns the quantity of messages that the remote device has detected on the communications system since its last restart, clear counters operation, or power-up.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x000B(11)	0x0000	Total Message Count	

### Sub-function 0x000C(12) Return Bus Communication Error Count

The response data field returns the quantity of CRC errors encountered by the remote device since its last restart, clear

counters operation, or power-up.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x000C(12)	0x0000	CRC Error Count	

#### Sub-function 0x000D(13) Return Bus Exception Error Count

The response data field returns the quantity of MODBUS exception responses returned by the remote device since its last restart, clear counters operation, or power-up.

Exception responses are described and listed in section 3.2.11.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x000D(13)	0x0000	Exception Error Count	

#### Sub-function 0x000E(14) Return Slave Message Count

The response data field returns the quantity of messages addressed to the remote device, or broadcast, that the remote device has processed since its last restart, clear counters operation, or power-up.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x000E(14)	0x0000	Slave Message Count	

#### Sub-function 0x000F(15) Return Slave No Response Count

The response data field returns the quantity of messages addressed to the remote device for which it has returned no response (neither a normal response nor an exception response), since its last restart, clear counters operation, or power-up.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x000F(15)	0x0000	Slave No Response Count	

#### Sub-function 0x0064(100) Return Slave ModBus, Internal Status

The response data field returns the status of ModBus and Internal addressed to the remote device.

This status values are identical with status 1word of input process image.

Sub-function	Data Field (Request)	Data Field (Response)	Description
0x0064(100)	0x0000	ModBus, Internal Status	Same as status 1word

## 4.2.2. Error Response

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In an exception response, the server sets the MSB of the function code to 1. This makes the function code value in an exception response exactly 80 hexadecimal higher than the value would be for a normal response.

- **Exception Codes**

Exception Code	Name	Description
01	Illegal Function	The function code received in the query is not an allowable action for the server (or slave).
02	Illegal Data Address	The data address received in the query is not an allowable address for the server (or slave).
03	Illegal Data Value	A value contained in the query data field is not an allowable value for server (or slave).
04	Slave Device Failure	An unrecoverable error occurred while the server (or slave) was attempting to perform the requested action.
05	Acknowledge	The server (or slave) has accepted the request and is processing it, but a long duration of time will be required to do so.
06	Slave Device Busy	Specialized use in conjunction with programming commands. The server (or slave) is engaged in processing a long-duration program command. The client (or master) should retransmit the message later when the server (or slave) is free.
08	Memory Parity Error	The server (or slave) attempted to read record file, but detected a parity error in the memory. The client (or master) can retry the request, but service may be required on the server (or slave) device.
0A	Gateway Path Unavailable	Specialized use in conjunction with gateways, indicates that the gateway was unable to allocate an internal communication path from the input port to the output port for processing the request.

### 4.3. MODBUS Special Register Map

The special register map can be accessed by function code 3, 4, 6 and 16. Also the special register map must be accessed by read/write of every each address (one address).

#### 4.3.1. Adapter Identification Special Register (0x1000, 4096)

Address	Access	Type, Size	Description
0x1000(4096)	Read	1 word	Vendor ID = 0x02E5(741), Crevis. Co., Ltd.
0x1001(4097)	Read	1 word	Device type = 0x000C, Network Adapter
0x1002(4098)	Read	1 word	Product code = 0x90A0(GN-9231)
0x1003(4099)	Read	1 word	Firmware revision, if 0x0100, revision 1.00
0x1004(4100)	Read	2 word	Product unique serial number
0x1005(4101)	Read	String upto 34byte	Product name string (ASCII) "GN9231_CC-Link_Adapter"
0x1010(4112)	Read	2 word	Firmware release date
0x1013(4115)	Read	1 word	Firmware Code = 0x9231
0x101E(4126)	Read	7word - 1 word - 1 word - 1 word - 1 word - 1 word - 2 word	Composite Id of following address 0x1100(4352), Modbus RS232 Node. (Fixed 0x0001) 0x1000(4096), Vendor ID 0x1001(4097), Device type 0x1002(4098), Product code 0x1003(4099), Firmware revision 0x1004(4100), Product serial number

- String Type consist of valid string length (first 1 word) and array of characters

### 4.3.2. Adapter Information Special Register (0x1100, 4352)

Address	Access	Type, Size	Description
0x1102(4354)	Read	1 word	Start address of input image word register. =0x0000
0x1103(4355)	Read	1 word	Start address of output image word register. =0x0800
0x1104(4356)	Read	1 word	Size of input image word register. = 0x0078
0x1105(4357)	Read	1 word	Size of output image word register. = 0x0078
0x1106(4358)	Read	1 word	Start address of input image bit. = 0x8000
0x1107(4359)	Read	1 word	Start address of output image bit. =0x8800
0x1108(4360)	Read	1 word	Size of input image bit.= 0x780
0x1109(4361)	Read	1 word	Size of output image bit. = 0x780
0x110A(4362)	Read	1 word	Update time for cyclic data change (same as 0x1028)
0x110D(4365)	Read	1 word	Current Dip Switch State and Field Power Status (MSB) ex) Dip SW(0x01), Field Power On = 0x8001
0x110E(4366)	Read	upto 33word	Expansion slot's ST-number including NA First 1word is adapter's number, if GN-9289, then 0x9289
0x1110(4368)	Read	1 word	Number of expansion slot
0x1113(4371)	Read	upto 33word	Expansion slot Module Id. Refer to Appendix A.1 Product List. First 1word is adapter's module id.
0x1119(4377)	Read	1 word	Hi byte is ModBus status, low byte is internal status. Zero value means 'no error'.

\*After the system is reset, the new "Set Value" action is applied.

\*\* If the slot location is changed, set default value automatically (all expansion slot are live).

# Specification Preliminary

### 4.3.3. Expansion Slot Information Special Register (0x2000, 8192)

Each expansion slot has 0x20(32) address offset and same information structure.

- |         |                             |         |                           |
|---------|-----------------------------|---------|---------------------------|
| Slot#1  | 0x2000(8192)~0x201F(8223)   | Slot#2  | 0x2020(8224)~0x203F(8255) |
| Slot#3  | 0x2040(8256)~0x205F(8287)   | Slot#4  | 0x2060(8288)~0x207F(8319) |
| Slot#5  | 0x2080(8320)~0x209F(8351)   | Slot#6  | 0x20A0(8352)~0x20BF(8383) |
| Slot#7  | 0x20C0(8384)~0x20DF(8415)   | Slot#8  | 0x20E0(8416)~0x20FF(8447) |
| Slot#9  | 0x2100(8448)~0x211F(8479)   | Slot#10 | 0x2120(8480)~0x213F(8511) |
| Slot#11 | 0x2140(8512)~0x215F(8543)   | Slot#12 | 0x2160(8544)~0x217F(8575) |
| Slot#13 | 0x2180(8576)~0x219F(8607)   | Slot#14 | 0x21A0(8608)~0x21BF(8639) |
| Slot#15 | 0x21C0(8640)~0x21DF(8671)   | Slot#16 | 0x21E0(8672)~0x21FF(8703) |
| Slot#17 | 0x2200(8704)~0x221F(8735)   | Slot#18 | 0x2220(8736)~0x223F(8767) |
| Slot#19 | 0x2240(8768)~0x225F(8799)   | Slot#20 | 0x2260(8800)~0x227F(8831) |
| Slot#21 | 0x2280(8832)~0x229F(8863)   | Slot#22 | 0x22A0(8864)~0x22BF(8895) |
| Slot#23 | 0x22C0(8896)~0x22DF(8927)   | Slot#24 | 0x22E0(8928)~0x22FF(8959) |
| Slot#25 | 0x2300(8960)~0x231F(8991)   | Slot#26 | 0x2320(8992)~0x233F(9023) |
| Slot#27 | 0x2340(9024)~0x235F(9055)   | Slot#28 | 0x2360(9056)~0x237F(9087) |
| Slot#29 | 0x2380(9088)~0x239F(9119)   | Slot#30 | 0x23A0(9120)~0x23BF(9151) |
| Slot#31 | 0x23C0(9152)~0x23DF(9183)   | Slot#32 | 0x23E0(9184)~0x23FF(9215) |
| Slot#33 | 0x2400(9216)~0x241F(9247)   | Slot#34 | 0x2420(9248)~0x243F(9279) |
| .....   |                             |         |                           |
| Slot#63 | 0x27C0(10176)~0x27DF(10207) |         |                           |

Address Offset	Expansion Slot#1	Expansion Slot#2	Expansion Slot#3	Expansion Slot#4	.....	Expansion Slot#63
+ 0x00(+0)	0x2000(8192)	0x2020(8224)	0x2040(8256)	0x2060(8288)	.....	0x27C0(10176)
+ 0x01(+1)	0x2001(8193)	0x2021(8225)	0x2041(8257)	0x2061(8289)	.....	0x27C1(10177)
+ 0x02(+2)	0x2002(8194)	0x2022(8226)	0x2042(8258)	0x2062(8290)	.....	0x27C2(10178)
+ 0x03(+3)	0x2003(8195)	0x2023(8227)	0x2043(8259)	0x2063(8291)	.....	0x27C3(10179)
+ 0x04(+4)	0x2004(8196)	0x2024(8228)	0x2044(8260)	0x2064(8292)	.....	0x27C4(10180)
+ 0x05(+5)	0x2005(8197)	0x2025(8229)	0x2045(8261)	0x2065(8293)	.....	0x27C5(10181)
+ 0x06(+6)	0x2006(8198)	0x2026(8230)	0x2046(8262)	0x2066(8294)	.....	0x27C6(10182)
+ 0x07(+7)	0x2007(8199)	0x2027(8231)	0x2047(8263)	0x2067(8295)	.....	0x27C7(10183)
+ 0x08(+8)	0x2008(8200)	0x2028(8232)	0x2048(8264)	0x2068(8296)	.....	0x27C8(10184)
+ 0x09(+9)	0x2009(8201)	0x2029(8233)	0x2049(8265)	0x2069(8297)	.....	0x27C9(10185)
+ 0x0A(+10)	0x200A(8202)	0x202A(8234)	0x204A(8266)	0x206A(8298)	.....	0x27CA(10186)
+ 0x0B(+11)	0x200B(8203)	0x202B(8235)	0x204B(8267)	0x206B(8299)	.....	0x27CB(10187)
+ 0x0C(+12)	0x200C(8204)	0x202C(8236)	0x204C(8268)	0x206C(8300)	.....	0x27CC(10188)
+ 0x0D(+13)	0x200D(8205)	0x202D(8237)	0x204D(8269)	0x206D(8301)	.....	0x27CD(10189)
+ 0x0E(+14)	0x200E(8206)	0x202E(8238)	0x204E(8270)	0x206E(8302)	.....	0x27CE(10190)
+ 0x0F(+15)	0x200F(8207)	0x202F(8239)	0x204F(8271)	0x206F(8303)	.....	0x27CF(10191)
+ 0x10(+16)	0x2010(8208)	0x2030(8240)	0x2050(8272)	0x2070(8304)	.....	0x27D0(10192)
+ 0x11(+17)	0x2011(8209)	0x2031(8241)	0x2051(8273)	0x2071(8305)	.....	0x27D1(10193)
+ 0x12(+18)	0x2012(8210)	0x2032(8242)	0x2052(8274)	0x2072(8306)	.....	0x27D2(10194)
+ 0x13(+19)	0x2013(8211)	0x2033(8243)	0x2053(8275)	0x2073(8307)	.....	0x27D3(10195)
+ 0x14(+20)	0x2014(8212)	0x2034(8244)	0x2054(8276)	0x2074(8308)	.....	0x27D4(10196)
+ 0x15(+21)	0x2015(8213)	0x2035(8245)	0x2055(8277)	0x2075(8309)	.....	0x27D5(10197)
+ 0x16(+22)	0x2016(8214)	0x2036(8246)	0x2056(8278)	0x2076(8310)	.....	0x27D6(10198)
+ 0x17(+23)	0x2017(8215)	0x2037(8247)	0x2057(8279)	0x2077(8311)	.....	0x27D7(10199)
+ 0x18(+24)	0x2018(8216)	0x2038(8248)	0x2058(8280)	0x2078(8312)	.....	0x27D8(10200)
+ 0x19(+25)	0x2018(8217)	0x2038(8249)	0x2058(8281)	0x2078(8313)	.....	0x27D9(10201)
+ 0x1A(+26)	0x201A(8218)	0x203A(8250)	0x205A(8282)	0x207A(8314)	.....	0x27DA(10202)
+ 0x1B(+27)	0x201B(8219)	0x203B(8251)	0x205B(8283)	0x207B(8315)	.....	0x27DB(10203)
+ 0x1C(+28)	0x201C(8220)	0x203C(8252)	0x205C(8284)	0x207C(8316)	.....	0x27DC(10204)
+ 0x1D(+29)	0x201D(8221)	0x203D(8253)	0x205D(8285)	0x207D(8317)	.....	0x27DD(10205)
+ 0x1E(+30)	0x201E(8222)	0x203E(8254)	0x205E(8286)	0x207E(8318)	.....	0x27DE(10206)

# Specification Preliminary

+ 0x1F(+31)	0x201F(8223)	0x203F(8255)	0x205F(8287)	0x207F(8319)	.....	0x27DF(10207)
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Address Offset	Access	Type, Size	Description
+ 0x02(+2) **	Read	1 word	Input start register address of input image word this slot.
+ 0x03(+3) **	Read	1 word	Input word's bit offset of input image word this slot.
+ 0x04(+4) **	Read	1 word	Output start register address of output image word this slot.
+ 0x05(+5) **	Read	1 word	Output word's bit offset of output image word this slot.
+ 0x06(+6) **	Read	1 word	Input bit start address of input image bit this slot.
+ 0x07(+7) **	Read	1 word	Output bit start address of output image bit this slot.
+ 0x08(+8) **	Read	1 word	Size of input bit this slot
+ 0x09(+9) **	Read	1 word	Size of output bit this slot
+ 0x0A(+10)**	Read	n word	Read input data this slot
+ 0x0B(+11)**	Read	n word	Read output data this slot
+ 0x0E(+14)	Read	1 word	ST-number, if ST-1218, returns 0x1218
+ 0x0F(+15)	Read	String upto 72byte	First 1word is length of valid character string. If ST-1218, returns "00 20 53 54 2D 31 32 31 38 2C 20 46 6E 49 4F 20 38 20 53 69 6E 6B 69 6E 67 20 49 6E 20 32 34 56 64 63" Valid character size = 0x001E =30 characters, "GT-1218, FnIO 8 Sinking In 24Vdc"
+ 0x10(+16)	Read	1 word	Size of configuration parameter byte
+ 0x11(+17)**	Read/Write	n word	Read/write Configuration parameter data, up to 8byte. Refer to A.2 ***
+ 0x17(+23)	Read	2word	Firmware Revision ex) 0x00010010 (Major revision 1 /Minor revision 1, Rev 1.001)

\* After the system is reset, the new "Set Value" action is applied.

\*\* Nothing of output, input, memory or configuration parameter corresponding slot returns Exception 02.