Special IO Module

GT-5xxx

User Manual

Version 1.0

2018 CREVIS Co.,Ltd

DOCUMENT CHANGE SUMMARY				
REV	PAGE	REMARKS	DATE	EDITOR
1.0	New Document		2017/08/01	HD SHIN

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1. Important Notes

Solid state equipment has operational characteristics differing from those of electromechanical equipment.

Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls describes some important differences between solid state equipment and hard-wired electromechanical devices.

Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will CREVIS be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, CREVIS cannot assume responsibility or liability for actual use based on the examples and diagrams.

Warning!

If you don't follow the directions, it could cause a personal injury, damage to the equipment or explosion

Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.

Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction.

Keep away from the strange metallic materials not related to the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction

Caution!

If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below Instructions.

Check the rated voltage and terminal array before wiring. Avoid the circumstances over 50℃ of temperature. Avoid placing it directly in the sunlight.

Avoid the place under circumstances over 85% of humidity.

Do not place Modules near by the inflammable material. Else it may cause a fire.

Do not permit any vibration approaching it directly.

Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring.

Use Product under pollution degree 2 environment.

1.1. Safety Instruction

1.1.1. Symbols

DANGER 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death property damage, or economic loss
IMPORTANT	Identifies information that is critical for successful application and understanding of the product
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury, property damage, or economic loss. Attentions help you to identity a hazard, avoid a hazard, and recognize the consequences

1.1.2. Safety Notes

DANGER 	The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, RBUS Pin.

1.1.3. Certification

c-UL-us UL Listed Industrial Control Equipment, certified for U.S. and Canada

See UL File E235505

CE Certificate

EN 61000-6-2; Industrial Immunity

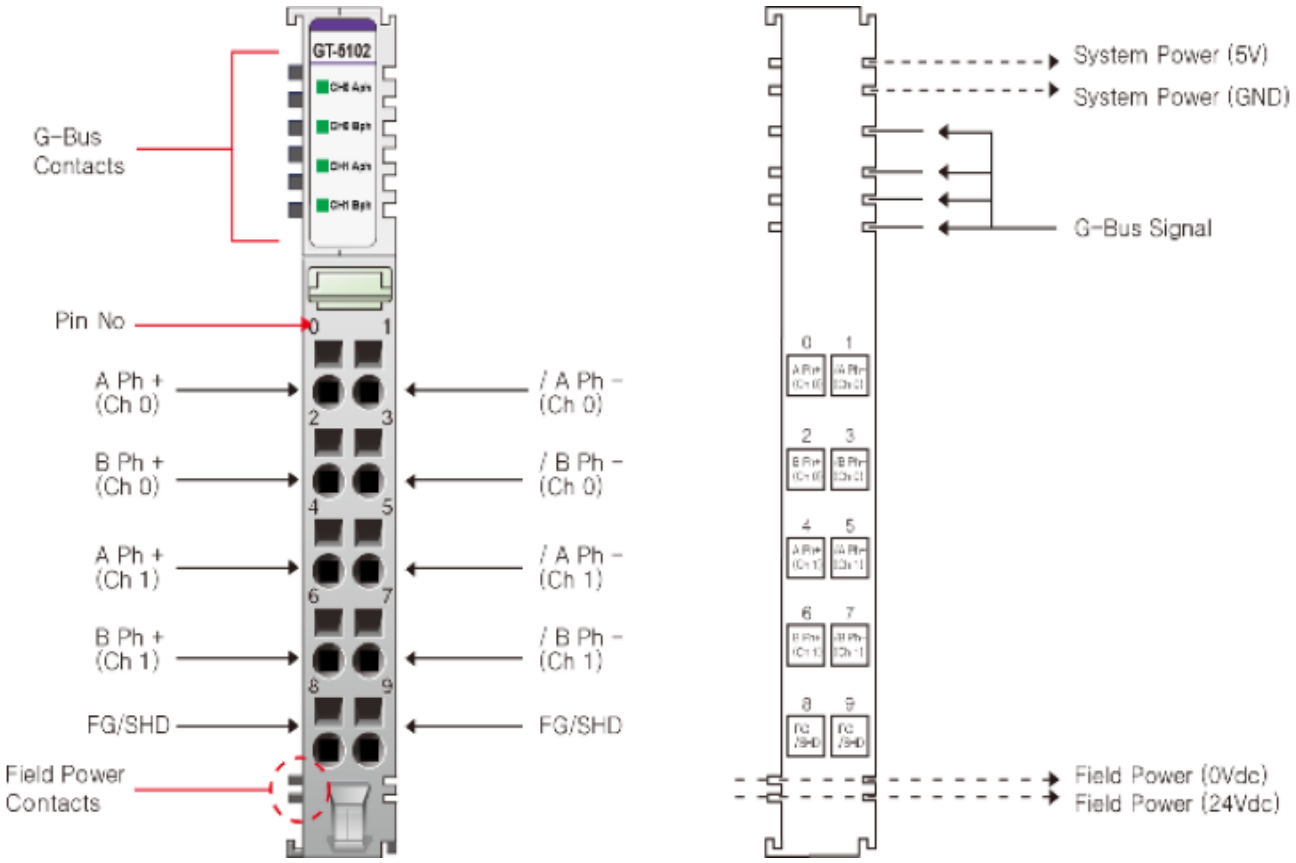
EN 61000-6-4; Industrial Emissions

Reach, RoHS (EU, CHINA)

2. Specification

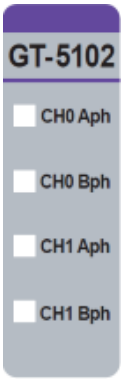
2.1. GT-5102

2.1.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Aph Input+ Ch# 0	/Aph Input - Ch# 0	1
2	Bph Input+ Ch# 0	/Bph Input - Ch# 0	3
4	Aph Input+ Ch# 1	/Aph Input - Ch# 1	5
6	Bph Input+ Ch# 1	/Bph Input - Ch# 1	7
8	Shield	Shield	9

2.1.2. LED Indicator



LED No.	LED Function / Description	LED Color
0	Aph Input Ch# 0	Green
1	Bph Input Ch# 0	Green
2	Aph Input Ch# 1	Green
3	Bph Input Ch# 1	Green

2.1.3. Channel Status LED

Status	LED is	To indicate
No Signal	Off	Normal Operation
On Signal	Green	Normal Operation

2.1.4. Specification

Items	Specification
Input Specification	
Number of Channel	2 Channel - Encoder, High Speed Counter, Frequency measurement Pulse width & Period measurement
Indicators	4 Green Terminal Input LEDs
Input Voltage	5Vdc(Max)
Input Current	13mA@5.2Vdc
Min On-State Volt	≥2.1Vdc
Max Off-State Volt	≤2.0Vdc
Input Frequency	0~600KHz Encoder Mode 0~1MHz Counting Mode
Counting Mode	1-Input Mode : Up,Down 2-Input Mode : Encoder 4x, Up/Inhibit, Up/Reset, Down/Inhibit down/Reset, UP/Down, Clock/Direction, Frequency Measurement, Pulse Width & Period measurement
Counter Size	32bit-wide/Channel
General specification	
Power Dissipation	70mA maximum @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler isolation I/O to Field Power : Non-Isolation
Field Power (Bypass)	Supply voltage : 24Vdc nominal Voltage range : 18~32Vdc
Wiring	I/O Cable Max. 2.0mm^2(AWG 14)
Weight	60g
Module Size	12mm x 90.5mm x 65mm
Environment Condition	**Refer to '1. Environment Specification'**

2.1.5. Mapping data into the image table

Input Image Data – 8Byte

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Counter Value Ch#0 LL							
1	Counter Value Ch#0 LH							
2	Counter Value Ch#0 HL							
3	Counter Value Ch#0 HH							
4	Counter Value Ch#1 LL							
5	Counter Value Ch#1 LH							
6	Counter Value Ch#1 HL							
7	Counter Value Ch#1 HH							

- Each channel has 4-byte Input
- Counter value represents counter, frequency(Hz), pulse width (0.1usec) or pulse period (0.1usec).

Output Image Data – 2Byte

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	CR 0	CS 0	--	--	Count Mode ch#0			
1	CR 1	CS 1	--	--	Count Mode ch#1			

- CR 0,1 : Counter Reset for Ch#0, Ch#1
- CS 0,1 : Counter Stop (Inhibit Input) for Ch#0, Ch#1
- Count Mode Ch#0,1 : Count Mode for Ch#0, Ch#1 respectively

Count Mode Ch#0, Ch#1

Value	Count Mode	Description
B' 0000 (0x0)	Encoder 4x	Encoder 4x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input
B' 0001 (0x1)	Encoder 2x	Encoder 2x

		- Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input
B' 0010 (0x2)	Up	Up Counter - Aph Input acts as Up Clock - Bph Input is not used
B' 0011 (0x3)	Down	Down Counter - Aph Input acts as Down Clock - Bph Input is not used
B' 0100 (0x4)	Up Clock & Inhibit	Up Counter with Inhibit - Aph Input acts as Up Clock Input - Bph Input acts as Inhibit function for Up Clock Input
B' 0101 (0x5)	Up Clock & Reset	Up Counter with Reset - Aph Input acts as Up Clock Input - Bph Input acts as Reset function to Counter
B' 0110 (0x6)	Down Clock & Inhibit	Down Counter with Inhibit - Aph Input acts as Down Clock Input - Bph Input acts as Inhibit function for Down Clock Input
B' 0111 (0x7)	Down Clock & Reset	Down Counter with Reset - Aph Input acts as Down Clock Input - Bph Input acts as Reset function to Counter
B' 1000 (0x8)	Up Clock & Down Clock	Up & Down Counter - Aph Input acts as Up Clock Input - Bph Input acts as Down Clock Input
B' 1001 (0x9)	Clock & Direction	Up & Down with Direction - Aph Input acts as Clock Input - Bph Input acts as Direction Input (Low = Up Count, High = Down Count)
B' 1010 (0xA)	Encoder 4x (*1)	Encoder 4x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input
B' 1011 (0xB)	Encoder 2x (*1)	Encoder 2x - Aph Input acts as Encoder's A phase Input - Bph Input acts as Encoder's B phase Input
B' 1100 (0xC)	Frequency Measurement (*2) 1 sec Update	Simple Frequency Measurement, updated by 1sec, Hz Unit - Aph Input acts as Frequency Input - Bph Input is not used
B' 1101 (0xD)	Frequency Measurement 100 msec (0.1sec) Update	Simple Frequency Measurement, updated by 100msec, Hz Unit - Available in case of Pulse Input >= 10Hz - Aph Input acts as Frequency Input - Bph Input is not used
B' 1110 (0xE)	Pulse Width Measurement	Simple Pulse Width Measurement, 0.1usec Unit - Pulse Width(32bit), if 1234, then Pulse High(On) width is

		123.4usec (*3) - Aph Input acts as Pulse Input - Bph Input is not used
B' 1111 (0xF)	Pulse Width & Period Measurement	Simple Pulse Width & Period Measurement, 0.1usec Unit, - Available in case of Pulse Input >= 200Hz(<= 2.5msec, Pulse On Width) - Pulse Width(16bit, Low Word) + Pulse Period(16bit, High Word) (*4) - Aph Input acts as Pulse Input - Bph Input is not used

- This encoder mode is perfectly same with mode B'0000, B'0001. This is for using Encoder module easily.
- Frequency, B'1100(0xC) and B'1101(0xD) can't be used with other channel's Count Mode = 0x2 ~ 0x9
- Pulse Width, B'1110(0xE) measures Aph Input's High(On) Pulse Width(32bit) in 0.1usec unit.
- Pulse Width & Period, B'1111(0xF) measures Aph's Pulse High(On) Width(16bit) & Period(16bit) in 0.1usec unit.

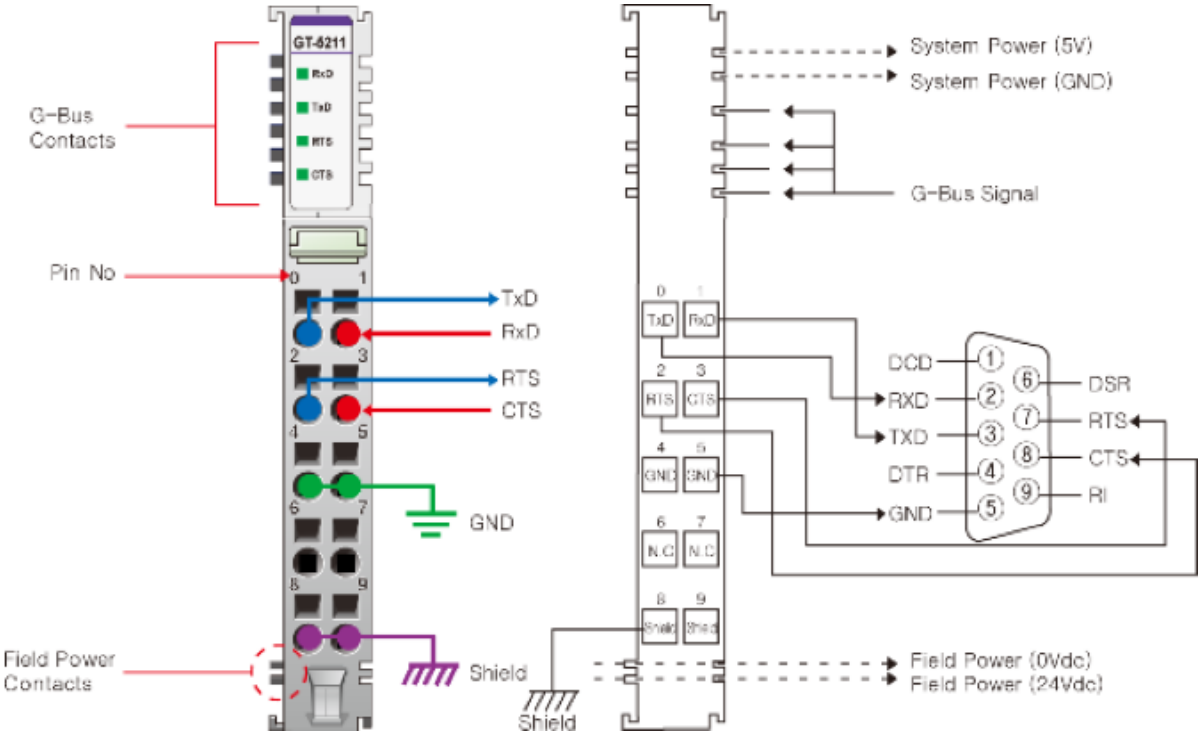
2.1.6. Configuration Parameter Data – 4byte

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved							
1	Reserved							
2	Reserved							
3	Reserved							

2.2. GT-52xx

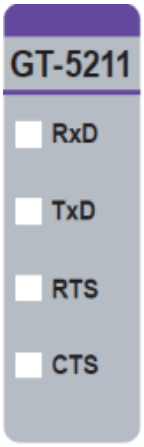
2.2.1. GT-5211

2.2.1.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	TxD	RxD	1
2	RTS	CTS	3
4	Common(GND)	Common(GND)	5
6	N.C	N.C	7
8	Shield	Shield	9

2.2.1.2. LED Indicator



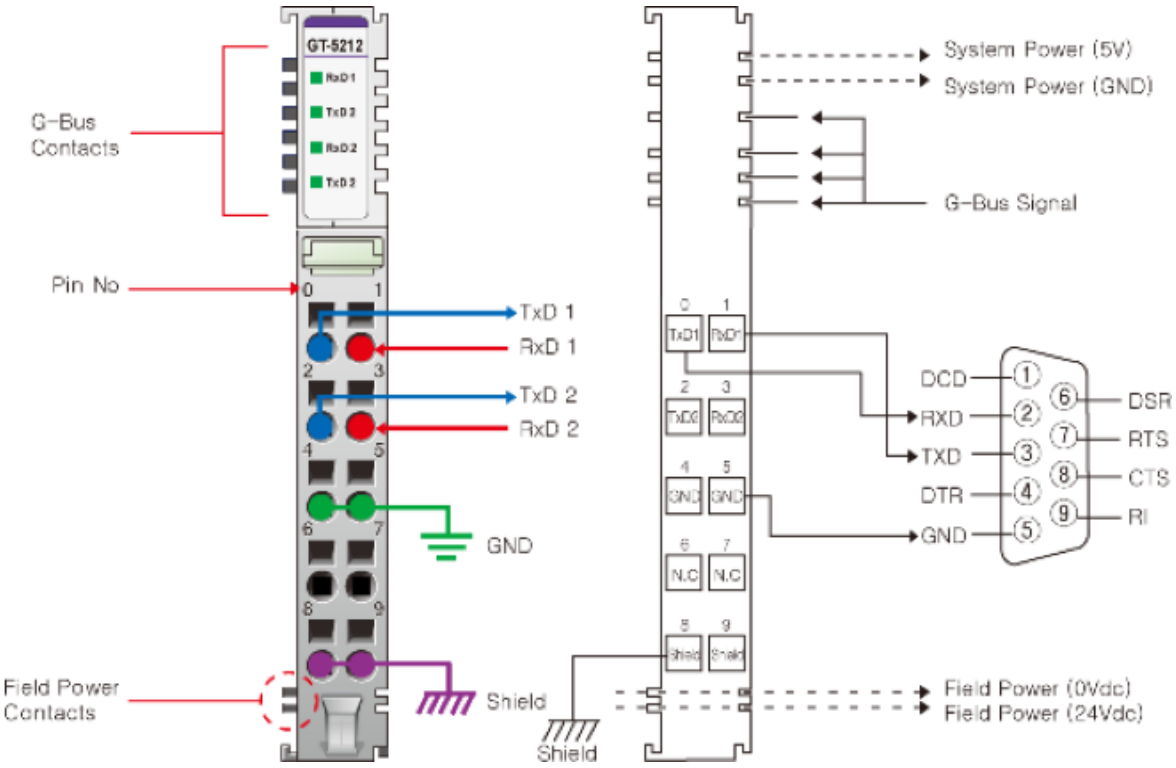
LED No.	LED Function / Description	LED Color
RxD	Received Data	Green
TxD	Transmit Data	Green
RTS	Request-to-send	Green
CTS	Clear-to-send	Green

2.2.1.3. Channel Status LED

LED	Color	Status
RxD	GREEN	Received Data
TxD	GREEN	Transmit Data
RTS	GREEN	Request-to-send
CTS	GREEN	Clear-to-send

2.2.2. GT-5212

2.2.2.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	TxD1	RxD1	1
2	TxD2	RxD2	3
4	Common(GND)	Common(GND)	5
6	N.C	N.C	7
8	Shield	Shield	9

2.2.2.2. LED Indicator

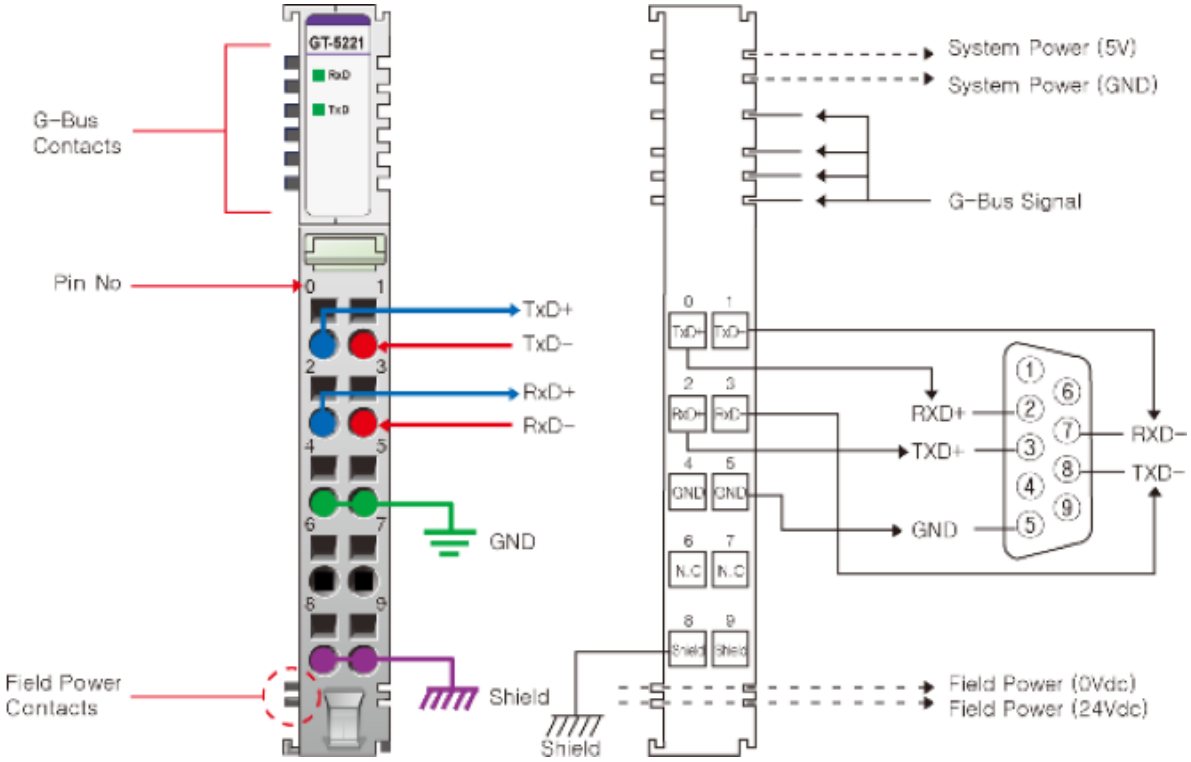
LED No.	LED Function / Description	LED Color
RxD1	Received Data 1	Green
TxD1	Transmit Data 1	Green
RxD2	Received Data 2	Green
TxD2	Transmit Data 2	Green

2.2.2.3. LED Indicator

LED	Color	Status
RxD1	GREEN	Received Data1
TxD1	GREEN	Transmit Data1
RxD2	GREEN	Received Data2
TxD2	GREEN	Transmit Data2

2.2.3. GT-5221

2.2.3.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	TxD+	TxD-	1
2	RxD+	RxD-	3
4	Common(GND)	Common(GND)	5
6	N.C	N.C	7
8	Shield	Shield	9

2.2.3.2. LED Indicator

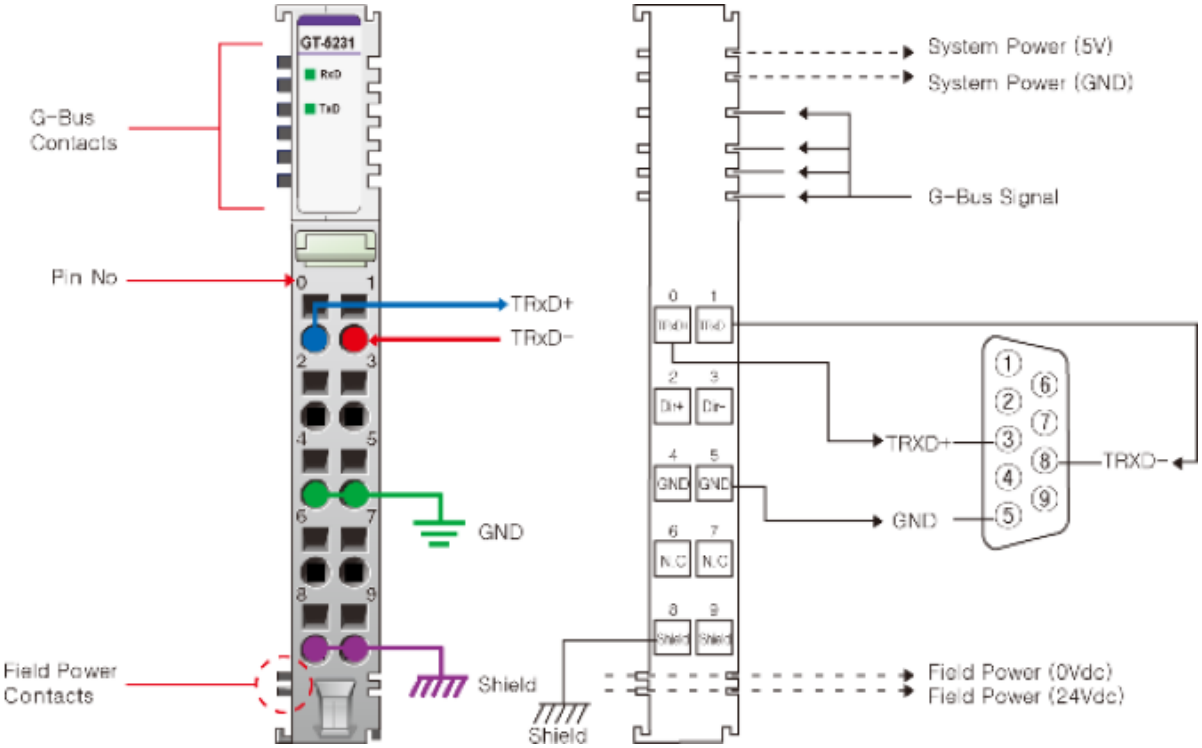
LED No.	LED Function / Description	LED Color
RxD	Received Data	Green
TxD	Transmit Data	Green

2.2.3.3. Channel Status LED

LED	Color	Status
RxD	GREEN	Received Data
TxD	GREEN	Transmit Data

2.2.4. GT-5231

2.2.4.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	RS485+	RS485-	1
2	DIR+	DIR-	3
4	Common(GND)	Common(GND)	5
6	N.C	N.C	7
8	Shield	Shield	9

2.2.4.2. LED Indicator

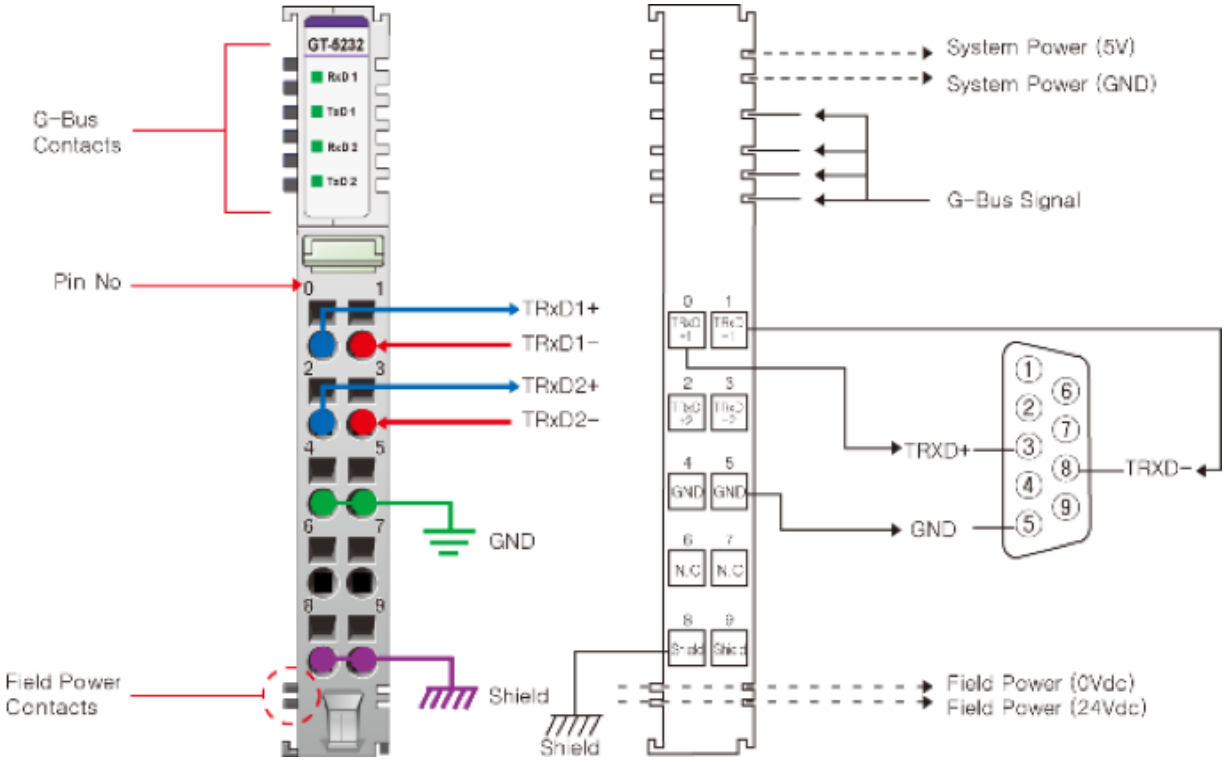
LED No.	LED Function / Description	LED Color
RxD	Received Data	Green
TxD	Transmit Data	Green

2.2.4.3. LED Indicator

LED	Color	Status
RxD	GREEN	Received Data
TxD	GREEN	Transmit Data

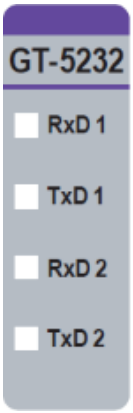
2.2.5. GT-5232

2.2.5.1. Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	RS485+(ch0)	RS485-(ch0)	1
2	RS485+(ch1)	RS485-(ch1)	3
4	Common(GND)	Common(GND)	5
6	N.C	N.C	7
8	Shield	Shield	9

2.2.5.2. LED Indicator



LED No.	LED Function / Description	LED Color
RxD1	Received Data 0	Green
TxD1	Transmit Data 0	Green
RxD2	Received Data 1	Green
TxD2	Transmit Data 1	Green

2.2.5.3. LED Indicator

LED	Color	Status
RxD1	GREEN	Received Data0
TxD1	GREEN	Transmit Data0
RxD2	GREEN	Received Data1
TxD2	GREEN	Transmit Data1

2.2.6. Specification

Items	GT-5211	GT-5212	GT-5221	GT-5231	GT-5232
Specification					
Transfer Channels	TxD, RxD, Full Duplex			TxD, RxD, Half Duplex	
Transfer Rate	1200bps~115200bps				
Data Bit	8bit				
Parity Bit	None, Odd, Even(*Default : None)				
Stop Bit	1bit, 2bit (*Default : 1bit)				
Flow Control	RTS,CTS	-			
Bit Distortion	<1.6%		-		
Connection	10 RTB				
Cable Type	Shield Cable Recommended.				
Cable Length	Max.15m		1km twisted pair		
Low Signal Voltage	-18V ~ -3V		-		
High Signal Voltage	3V ~ 18V		-		
Data Buffer	IO User data 14 bytes	IO User data 12 bytes	IO User data 14 bytes		IO User data 12 bytes
	IO size changed Max. 62 bytes	Control/Status 2 bytes	IO size changed Max. 62 bytes		Control/Status 2 bytes
	Control/Status 1 byte, Rx/Tx Length 1 byte	Rx/Tx Length 2 bytes	Control/Status 1 byte, Rx/Tx Length 1 byte		Rx/Tx Length 2 bytes
RXD Buffer	1024bytes				
TXD Buffer	1024bytes				
Line Impedance	-		120Ω		
Input Image Size	16 bytes (*Default) @ Max. 63 bytes	16 bytes @ Default_2 channels	16 bytes (*Default) @ Max. 63 bytes		16 bytes @ Default_2 channels
Output Image Size	16 bytes (*Default) @ Max. 62 bytes	16 bytes @ Default_2 channels	16 bytes (*Default) @ Max. 62 bytes		16 bytes @ Default_2 channels
General Specification					
Power Dissipation	Max. 85mA @ 5.0Vdc				
Isolation	I/O to Logic : Isolation Logic to Field power : Isolation (Not used) Logic to System Power : Non-isolation				
Relative Humidity	5% ~ 90%				

	Non-condensing
Field Power	Not used (Field Power is bypass)
Wiring	I/O Cable Max. 2.0mm^2(AWG 14)
Weight	57g
Module Size	12mm x 99mm x 70mm
Environment Condition	**Refer to ‘Environment Specification’**

3. Environment Specification

Environmental specification	
Operating Temperature	-40℃~70℃
UL Temperature	-20℃~60℃
Storage Temperature	-40℃~85℃
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 ~ 40 Hz : 0.0125 g^2/Hz - 40 ~ 100 Hz : 0.0125 → 0.002 g^2/Hz - 100 ~ 500 Hz : 0.002 g^2/Hz - 500 ~ 2000 Hz : 0.002 → 1.3 x 10^{-4} g^2/Hz - Test time : 1hrs for each test
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN 61000-6-2 : 2005
Installation Pos. / Protect. Class	Variable/IP20
Product Certifications	CE, UL

4. Configuration and Operation Function

4.1. GT-52xx(Series) Mapping data into the image table

Input image data

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- **IA :** Initialization Acknowledge
- **TA :** Transmit Acknowledge
- **RR :** Receive Request
- **RBO :** RxD Buffer Overrun
- **RE :** RxD Exist (Remained)
- **FRA :** Flush RxD buffer Acknowledge
- **FTA :** Flush TxD buffer Acknowledge
- **TRA :** Transmit Processing Acknowledge

Output image data

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

- **IR :** Initialization Request (rising edge active)
- **TR :** Transmit Request (both edge active)
- **RA :** Receive Acknowledge (both edge active)
- **FR :** Flush RxD buffer Request (rising edge active)
- **FT :** Flush TxD buffer Acknowledge
- **TPR :** Transmit Processing Request (both edge active)

GT-5211,5221,5231_image data (Input, Output Data Size : Default, 16Byte)

IO Input		IO Output	
Byte#0	Status	Byte#0	Control
Byte#1	RxLength	Byte#1	TxLength
Byte#2	RxData#0	Byte#2	TxData#0
Byte#3	RxData#1	Byte#3	TxData#1
Byte#4	RxData#2	Byte#4	TxData#2
Byte#5	RxData#3	Byte#5	TxData#3
Byte#6	RxData#4	Byte#6	TxData#4
Byte#7	RxData#5	Byte#7	TxData#5
Byte#8	RxData#6	Byte#8	TxData#6
Byte#9	RxData#7	Byte#9	TxData#7
Byte#10	RxData#8	Byte#10	TxData#8
Byte#11	RxData#9	Byte#11	TxData#9
Byte#12	RxData#10	Byte#12	TxData#10
Byte#13	RxData#11	Byte#13	TxData#11
Byte#14	RxData#12	Byte#14	TxData#12
Byte#15	RxData#13	Byte#15	TxData#13
-------	-------	-------	-------
-------	-------	-------	-------
-------	-------	-------	-------
-------	-------	-------	-------
Byte#62	RxData#62	Byte#62	TxData#62
Byte#63	RxData#63	Byte#63	TxData#63

- Can be changed, Input output data size (IO data size **MAX 63Byte**)
- **Default** Input, output data size : 16Byte

GT-5212,5232_image data (Input, Output Data Size : Default, 16Byte)

IO Input		IO Output	
Byte#0	Ch#0 Status	Byte#0	Ch#0 Control
Byte#1	Ch#0 RxLength	Byte#1	Ch#0 TxLength
Byte#2	Ch#0 RxData#0	Byte#2	Ch#0 TxData#0
Byte#3	Ch#0 RxData#1	Byte#3	Ch#0 TxData#1
Byte#4	Ch#0 RxData#2	Byte#4	Ch#0 TxData#2
Byte#5	Ch#0 RxData#3	Byte#5	Ch#0 TxData#3
Byte#6	Ch#0 RxData#4	Byte#6	Ch#0 TxData#4
Byte#7	Ch#0 RxData#5	Byte#7	Ch#0 TxData#5
Byte#8	Ch#1 Status	Byte#8	Ch#1 Control
Byte#9	Ch#1 RxLength	Byte#9	Ch#1 TxLength
Byte#10	Ch#1 RxData#0	Byte#10	Ch#1 TxData#0
Byte#11	Ch#1 RxData#1	Byte#11	Ch#1 TxData#1
Byte#12	Ch#1 RxData#2	Byte#12	Ch#1 TxData#2
Byte#13	Ch#1 RxData#3	Byte#13	Ch#1 TxData#3
Byte#14	Ch#1 RxData#4	Byte#14	Ch#1 TxData#4
Byte#15	Ch#1 RxData#5	Byte#15	Ch#1TxData#5

- **1channel** Input, output data size : 8Byte
- **Default** Input, output data All size : 16Byte
- Can be set IO data size Even number
(If set to an odd number IO data size, Automatically changes to an even number)

4.2. Configuration Parameter Data

Precautions for use : if you changed Parameter, you must reset Module

4.2.1. 1 Channel Module Parameter Data(GT-5211)

Byte#0	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	TxD Process	Stop bit	Parity Bit		Baudrate			
	0 : Disable	0 : 1bit	00 : No		0000 : 115200bps			
	1 : Enable	1 : 2bit	01 : Odd		0001 : 1200bps			
			10 : Even		0010 : 2400bps			
					0011 : 4800bps			
					0100 : 9600bps			
					0101 : 19200bps			
					0110 : 38400bps			
					0111 : 57600bps			
					1000 : 115200bps			
					Others : 115200bps			
Byte#1	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Data Bit						Flow Control	
	16~63						00 : RTS/CTS Disable	
							01 : RTS Enable	
							10 : CTS Enable	
							11 : RTS/CTS Enable	
Byte#2	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Not Used							
Byte#3	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Not Used							

4.2.2. 1 Channel Module Parameter Data(GT-5221, 5231)

Byte#0	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	TxD Process	Stop bit	Parity Bit		Baudrate			
	0 : Disable	0 : 1bit	00 : No		0000 : 115200bps			
	1 : Enable	1 : 2bit	01 : Odd		0001 : 1200bps			
			10 : Even		0010 : 2400bps			
					0011 : 4800bps			
					0100 : 9600bps			
					0101 : 19200bps			
					0110 : 38400bps			
					0111 : 57600bps			
					1000 : 115200bps			
					Others : 115200bps			
Byte#1	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
			Data Bit					
			16~63					
Byte#2	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Not Used							
Byte#3	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Not Used							

- byte#0~1 for ch#0, byte#2~3 not used

*** Note 1:**

- Disable : Transmit immediately Output data

- Enable : Store the value of Output Data continually at RxD Buffer of Serial Interface Module, when TPA bit and TPR bit of Control Byte and Status Byte are different, transmit all Data that saved at TxD Buffer

4.2.3. 2 Channel Module Parameter Data(GT-5212, 5232)

Byte#0	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	TxD Process	Stop bit	Parity Bit		Baudrate			
	0 : Disable	0 : 1bit	00 : No		0000 : 115200bps			
	1 : Enable	1 : 2bit	01 : Odd		0001 : 1200bps			
			10 : Even		0010 : 2400bps			
					0011 : 4800bps			
					0100 : 9600bps			
					0101 : 19200bps			
					0110 : 38400bps			
					0111 : 57600bps			
					1000 : 115200bps			
					Others : 115200bps			
Byte#1	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
			Data Bit					
			16~62					
Byte#2	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	TxD Process	Stop bit	Parity Bit		Baudrate			
	0 : Disable	0 : 1bit	00 : No		0000 : 115200bps			
	1 : Enable	1 : 2bit	01 : Odd		0001 : 1200bps			
			10 : Even		0010 : 2400bps			
					0011 : 4800bps			
					0100 : 9600bps			
					0101 : 19200bps			
					0110 : 38400bps			
					0111 : 57600bps			
					1000 : 115200bps			
					Others : 115200bps			
Byte#3	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
	Not Used							

- byte#0~1 for ch#0, byte#2~3 for ch#1

*** Note 1:**

- Disable : Transmit immediately Output data

- Enable : Store the value of Output Data continually at RxD Buffer of Serial Interface Module, when TPA bit and TPR bit of Control Byte and Status Byte are different, transmit all Data that saved at TxD Buffer

4.3. Example

4.3.1. Example of Transmitting data

Transmit data : A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z(26byte)

Input, Output data Size : 16byte

Configuration Parameter

Parameter	Description	Value
Data Bit	8 Data Bit	Not used
Parity Bit	No Parity	Default Value
Baud rate	115200bps	Default Value
Stop Bit	1 Bit	Default Value
RTS/CTS Flow Control	RTS/CTS Disable	Default Value
TxD Process	Disable	Default Value

- Step#0

TR inverting (TR≠TA)

Output Length = 14byte (0x0E)

Output Data = “A, B, C, D, E, F, G, H, I, J, K, L, M, N”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	1	0
Tx Length #1	‘ 0E'(14byte)							
Output Byte #2	‘A' (0x41:ASCII code)							
Output Byte #3	‘B' (0x42)							
Output Byte #4	‘C' (0x43)							
Output Byte #5	‘D' (0x44)							
Output Byte #6	‘E' (0x45)							

Output Byte #7	'F' (0x46)
Output Byte #8	'G' (0x47)
Output Byte #9	'H' (0x48)
Output Byte #10	'I' (0x49)
Output Byte #11	'J' (0x4A)
Output Byte #12	'K' (0x4B)
Output Byte #13	'L' (0x4C)
Output Byte #14	'M' (0x4D)
Output Byte #15	'N' (0x4E)

- Step#1

Check TA bit value in Status Byte.

TR=TA: transmit complete.

	bit#7	**bit#6**	**bit#5**	**bit#4**	**bit#3**	**bit#2**	**bit#1**	**bit#0**
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	1	0

- Step#2

TR inverting (TR≠TA)

Output Length = 12byte (0x0C)

Output Data = “O, P, Q, R, S, T, U, V, W, X, Y, Z”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	0
Tx Length #1	‘ 0C’(12byte)							
Output Byte #2	‘O' (0x4F:ASCII code)							
Output Byte #3	‘P' (0x50)							
Output Byte #4	‘Q' (0x51)							
Output Byte #5	‘R' (0x52)							
Output Byte #6	‘S' (0x53)							
Output Byte #7	‘T' (0x54)							
Output Byte #8	‘U' (0x55)							
Output Byte #9	‘V' (0x56)							
Output Byte #10	‘W' (0x57)							
Output Byte #11	‘X' (0x58)							
Output Byte #12	‘Y' (0x59)							
Output Byte #13	‘Z' (0x5A)							
Output Byte #14	0x00							
Output Byte #15	0x00							

- Step#3

Check TA bit value in Status Byte.

TR=TA: transmit complete.

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0

4.3.2. Example of Receiving data

Receive data : “ Company:CREVIS G-Series“(22byte)

Input, Output data Size : 16byte

Configuration Parameter

Parameter	Description	Value
Data Bit	8 Data Bit	Not used
Parity Bit	No Parity	Default Value
Baud rate	115200bps	Default Value
Stop Bit	1 Bit	Default Value
RTS/CTS Flow Control	RTS/CTS Disable	Default Value
TxD Process	Disable	Default Value

- Step#0

RR=RA

RE : RxD Exist (Remained)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	1	0	0	0	0

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	0

- Step#1

RA inverting (RA≠RR)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	1	0	0

- Step#2

RA inverting (RA=RR)

Input Length = 14byte

Input Data = "Company:CREVIS"

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	1	0	0
RX Length #1	' 0E'(14byte)							
Output Byte #2	'C' (0x43:ASCII code)							
Output Byte #3	'o' (0x6F)							
Output Byte #4	'm' (0x6D)							
Output Byte #5	'p' (0x70)							
Output Byte #6	'a' (0x61)							
Output Byte #7	'n' (0x6E)							
Output Byte #8	'y' (0x79)							
Output Byte #9	':' (0x3A)							
Output Byte #10	'C' (0x43)							
Output Byte #11	'R' (0x52)							
Output Byte #12	'E' (0x45)							
Output Byte #13	'V' (0x56)							
Output Byte #14	'I' (0x49)							
Output Byte #15	'S' (0x53)							

- Step#3

RA inverting (RA≠RR)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	0

- Step#4

RA inverting (RA=RR)

Input Length = 8byte

Input Data = “**R-Series**”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0
RX Length #1	‘ 0E'(14byte)							
Output Byte #2	‘G' (0x43:ASCII code)							
Output Byte #3	‘-' (0x2D)							
Output Byte #4	‘S' (0x53)							
Output Byte #5	‘e' (0x65)							
Output Byte #6	‘r' (0x72)							
Output Byte #7	‘i' (0x69)							
Output Byte #8	‘e' (0x65)							
Output Byte #9	‘s' (0x73)							
Output Byte #10	0x00							
Output Byte #11	0x00							
Output Byte #12	0x00							
Output Byte #13	0x00							
Output Byte #14	0x00							
Output Byte #15	0x00							

4.3.3. Example of Transmitting data and Receiving data

Transmit data: ”CREVIS”(6byte) _Receive data : “CREVIS“(6byte)

Input, Output data Size : 16byte

Configuration Parameter

Parameter	Description	Value
Data Bit	8 Data Bit	Not used
Parity Bit	No Parity	Default Value
Baud rate	115200bps	Default Value
Stop Bit	1 Bit	Default Value
RTS/CTS Flow Control	RTS/CTS Disable	Default Value
TxD Process	Disable	Default Value

- Step#0 (Transmit)

TR inverting (TR≠TA)

Output Length = 6byte

Output Data = “CREVIS”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	1	0
Tx Length #1	‘ 06'(6byte)							
Output Byte #2	‘C' (0x43:ASCII code)							
Output Byte #3	‘R' (0x52)							
Output Byte #4	‘E' (0x45)							
Output Byte #5	‘V' (0x56)							
Output Byte #6	‘I' (0x49)							
Output Byte #7	‘S' (0x53)							
Output Byte #8	0x00							
Output Byte #9	0x00							
Output Byte #10	0x00							
Output Byte #11	0x00							

Output Byte #12	0x00
Output Byte #13	0x00
Output Byte #14	0x00
Output Byte #15	0x00

- Step#1

Check TA bit value in Status Byte.

TR=TA: transmit complete.

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	1	0

- Step#2 (Receive)

RR=RA

RE : RxD Exist (Remained)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	1	0	0	0	0

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	0

- Step#3

RA inverting (RA≠RR)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	1	0	0

- Step#4

RA inverting (RA=RR)

Input Length = 6byte

Input Data = “CREVIS”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	1	0	0
RX Length #1	‘ 06'(6byte)							
Output Byte #2	‘C' (0x43:ASCII code)							
Output Byte #3	‘R' (0x52)							
Output Byte #4	‘E' (0x45)							
Output Byte #5	‘V' (0x56)							
Output Byte #6	‘I' (0x49)							
Output Byte #7	‘S' (0x53)							
Output Byte #8	0x00							
Output Byte #9	0x00							
Output Byte #10	0x00							
Output Byte #11	0x00							
Output Byte #12	0x00							
Output Byte #13	0x00							
Output Byte #14	0x00							
Output Byte #15	0x00							

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	0

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0

4.3.4. TPR and TPA Example

Transmit data: ”CREVIS”(6byte) _Receive data : “CREVIS“(6byte)

Input, Output data Size : 16byte

Configuration Parameter

Parameter	Description	Value
Data Bit	8 Data Bit	Not used
Parity Bit	No Parity	Default Value
Baud rate	115200bps	Default Value
Stop Bit	1 Bit	Default Value
RTS/CTS Flow Control	RTS/CTS Disable	Default Value
TxD Process	**Enable**	Default Value(Disable)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0
	bit#7	**bit#6**	**bit#5**	**bit#4**	**bit#3**	**bit#2**	**bit#1**	**bit#0**
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	1	0
Tx Length #1	‘ 06'(6byte)							
Output Byte #2	‘C' (0x43:ASCII code)							
Output Byte #3	‘R' (0x52)							
Output Byte #4	‘E' (0x45)							
Output Byte #5	0x00							
Output Byte #6	0x00							
Output Byte #7	0x00							
Output Byte #8	0x00							
Output Byte #9	0x00							
Output Byte #10	0x00							
Output Byte #11	0x00							

Output Byte #12	0x00
Output Byte #13	0x00
Output Byte #14	0x00
Output Byte #15	0x00

- Step#2

Check TA bit value in Status Byte.

TR=TA: transmit complete.

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	1	0

TxD Buffer

Offset	TxD Buffer Data
Output Byte #0	'C' (0x43:ASCII code)
Output Byte #1	'R' (0x52)
Output Byte #2	'E' (0x45)
Output Byte #3	0x00
Output Byte #4	0x00
Output Byte #5	0x00
Output Byte #6	0x00
Output Byte #7	0x00
Output Byte #8	0x00
. . . . .	. . . . .
Output Byte #252	0x00
Output Byte #253	0x00
Output Byte	0x00

#254	
Output Byte #255	0x00

- Step#3

RA inverting (RA≠RR)

Output Length = 3

Output Data = “VIS”

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	1	0
Tx Length #1	‘ 03'(3byte)							
Output Byte #2	‘V' (0x56 ASCII code)							
Output Byte #3	‘I' (0x49)							
Output Byte #4	‘S' (0x53)							
Output Byte #5	0x00							
Output Byte #6	0x00							
Output Byte #7	0x00							
Output Byte #8	0x00							
Output Byte #9	0x00							
Output Byte #10	0x00							
Output Byte #11	0x00							
Output Byte #12	0x00							
Output Byte #13	0x00							
Output Byte #14	0x00							
Output Byte #15	0x00							

- Step#4

Check TA bit value in Status Byte.

TR=TA: transmit complete

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	0	0	0	0	0

TxD Buffer

Offset	TxD Buffer Data
Output Byte #0	'C' (0x43:ASCII code)
Output Byte #1	'R' (0x52)
Output Byte #2	'E' (0x45)
Output Byte #3	'V' (0x56 ASCII code)
Output Byte #4	'I' (0x49)
Output Byte #5	'S' (0x53)
Output Byte #6	0x00
Output Byte #7	0x00
Output Byte #8	0x00
. . . . .	. . . . .
Output Byte #252	0x00
Output Byte #253	0x00
Output Byte #254	0x00
Output Byte #255	0x00

- Step#5

TPR inverting (TPR≠TPA)

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	1	0	0	0	0	1	0	0

Transmit all TxD Buffer data (TxD Buffer empty)

Offset	TxD Buffer Data
Output Byte #0	0x00
Output Byte #1	0x00
Output Byte #2	0x00
Output Byte #3	0x00
Output Byte #4	0x00
Output Byte #5	0x00
Output Byte #6	0x00
Output Byte #7	0x00
Output Byte #8	0x00
. . . . .	. . . . .
Output Byte #252	0x00
Output Byte #253	0x00
Output Byte #254	0x00
Output Byte #255	0x00

- Step#6

Check TPA bit value in Status Byte.

TPR=TPA: transmit complete

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	1	0	0	0	0	0	0	0

4.3.5. GT-5211, 5221 (1ch) RxD Buffer data Overrun Check

For example, if other device transmits 1025 bytes of TxD data, RxD buffer of GT-52xx (Serial) will be overwritten 1

bytes.

Other device		**GT-52xx(Serial)**	
Offset	TxD Data	**Offset**	RxD Buffer data
Output Byte #1	0x01	**Input Byte #1**	0x06(Overrun data)
Output Byte #2	0x02	**Input Byte #2**	0x02
Output Byte #3	0x03	**Input Byte #3**	0x03
Output Byte #4	0x04	**Input Byte #4**	0x04
Output Byte #5	0x05	**Input Byte #5**	0x05
Output Byte #6	0x06	**Input Byte #6**	0x06
. . .	. . .	. . .	
Output Byte #1020	0x01	**Input Byte #1019**	0x10
Output Byte #1021	0x02	**Input Byte #1020**	0x01
Output Byte #1022	0x03	**Input Byte #1021**	0x02
Output Byte #1023	0x04	**Input Byte #1022**	0x03
Output Byte #1024 MAX	0x05	**Input Byte #1023**	0x04
Output Byte #1025	0x06(Overrun data)	**Input Byte #1024**	0x05

RE (RxD Exist) bit check

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	1	0	0	0	0

RA (Receive Acknowledge) bit set

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	1	0	0

PLEASE CHECK RBO bit in Status Byte in order to prevent overwrite RX buffer.
When the RBO bit is set, it notifies that the RX buffer is full.

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status Byte #0	TRA	FTA	FRA	RE	RBO	RR	TA	IA
	0	0	0	1	1	1	0	0

If you try to write more than 1024 bytes on RX buffer, 1025rd byte overwrites the first byte on RX buffer.
Thus, it is recommended to write less than 1024 bytes.
IR (Initialization Request) bit set

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control Byte #0	TPR	FT	FR	----	----	RA	TR	IR
	0	0	0	0	0	0	0	1

RxD Buffer data Reset.

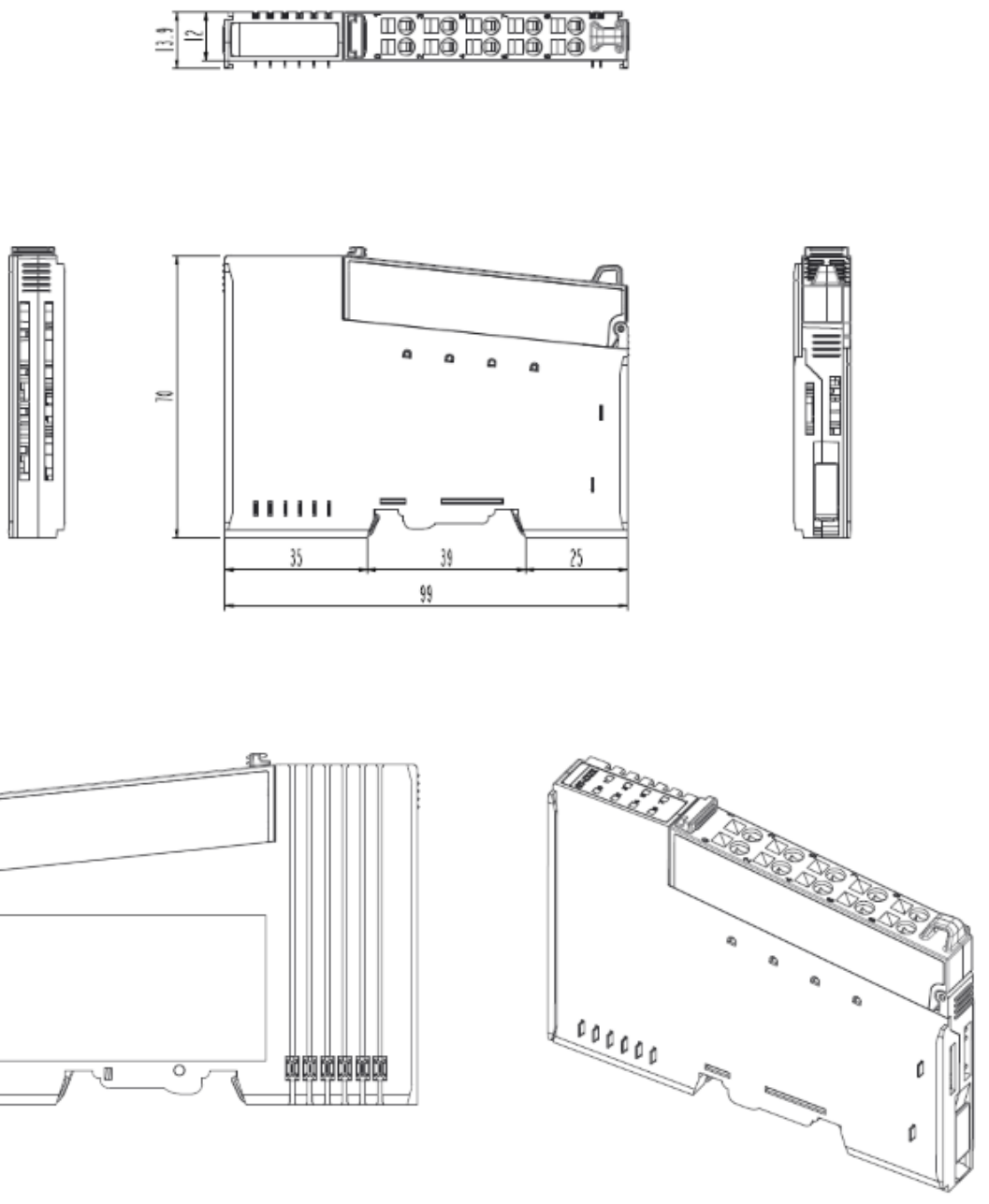
Offset	RxD Buffer Data
Input Byte #1	0x00
Input Byte #2	0x00
Input Byte #3	0x00
Input Byte #4	0x00

Input Byte #5	0x00
Input Byte #6	0x00
. . .	. . .
Input Byte #1021	0x00
Input Byte #1022	0x00
Input Byte #1023	0x00
Input Byte #1024	0x00

5. Dimension

5.1. GT-5xxx

(mm)



6. Mounting

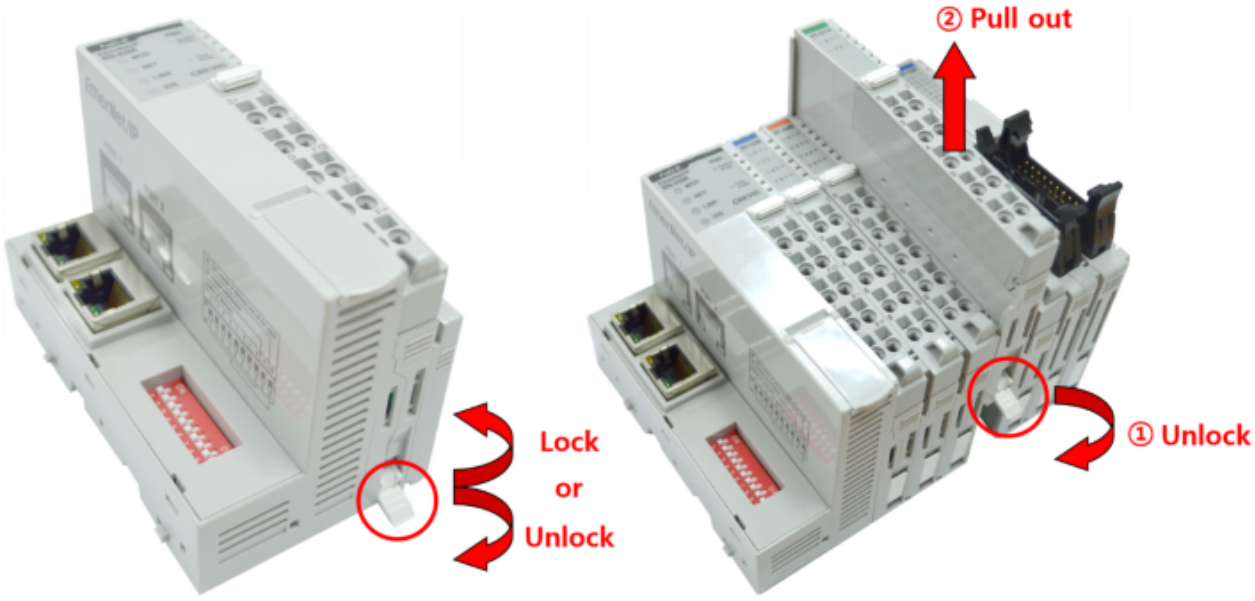
Caution!

Hot surface!
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to cool off before touching it.

Notice!

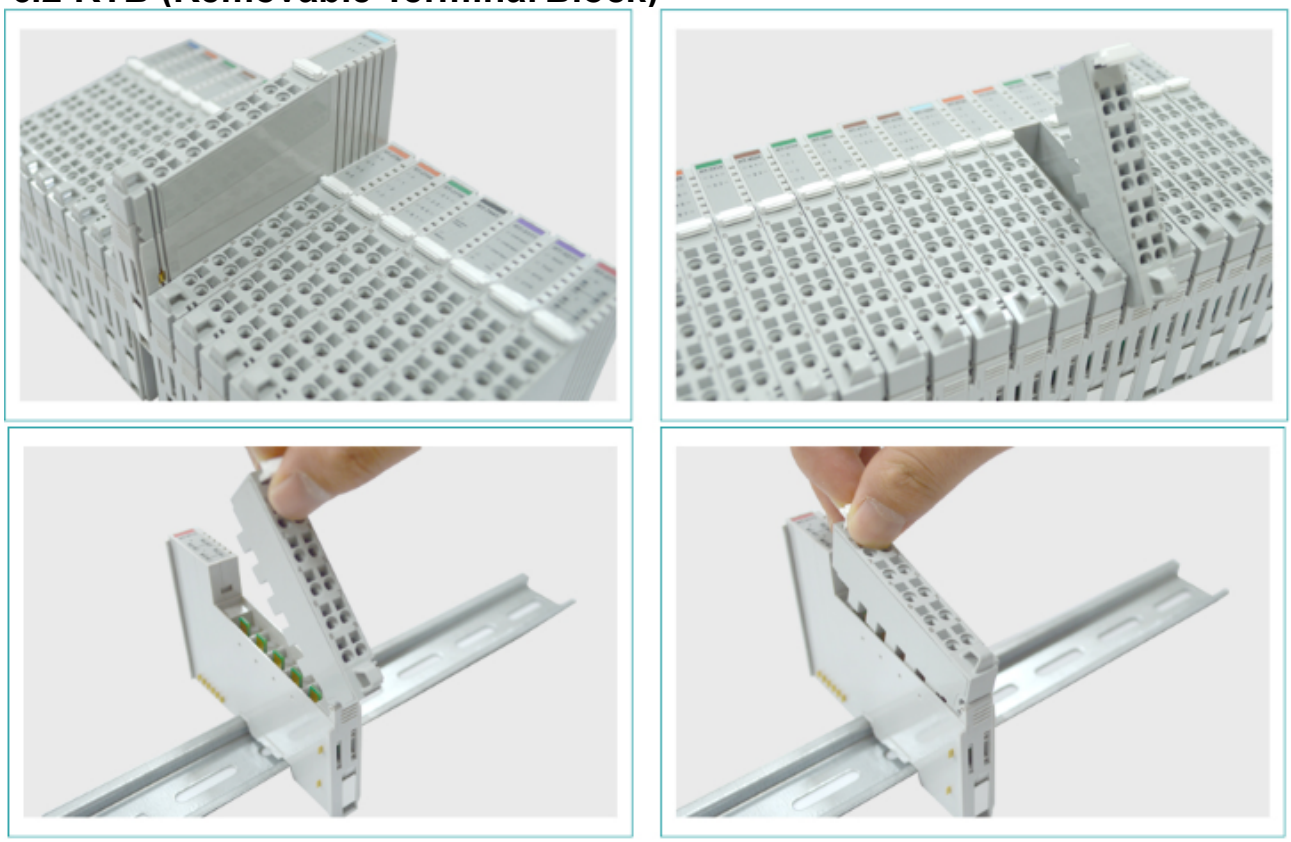
Perform work on devices only if they are de-energized!
Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

6.1 I/O Inserting and Removing Devices



- As above figure in order to safeguard the FnIO module from jamming, it should be fixed onto the DIN rail with locking level. To do so, fold on the upper of the locking lever.
  To pull out the FnIO module, unfold the locking lever as below figure.

6.2 RTB (Removable Terminal Block)



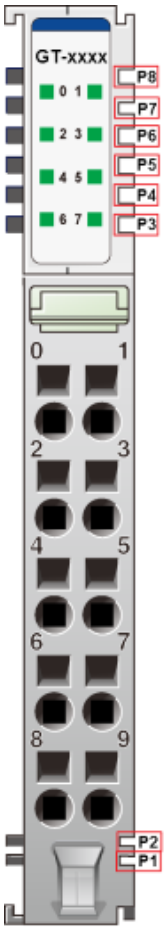
Whole terminal block can be combined and removed for the convenience if its maintenance.

There is a locking switch on the RTB for the easy combination and easy removal.

Easy combination and easy removal for IO modules on the din rail through One Touch Locking Switch.

7. G-Bus Pin Description

Communication between the RN series and the expansion module as well as system / field power supply of the bus modules is carried out via the internal bus. It is comprised of 6 data pin and 2 field power pin.



*Please refer to the table below regarding the pin description from P1 to P8.

No.	Description
P1	Field Power (VCC)
P2	Field Power (GND)
P3	GBUS CLK
P4	GBUS MISO
P5	GBUS MOSI
P6	GBUS Token
P7	System Power (GND)
P8	System Power (VCC)

DANGER 	Do not touch data and field power pins in order to avoid soiling and damage by ESD noise.