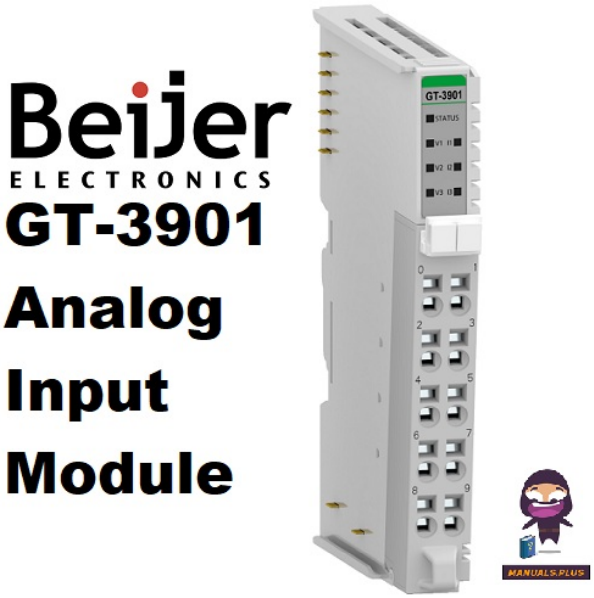


Beijer ELECTRONICS GT-3901 Analog Input Module User Manual

Contents

Beijer ELECTRONICS GT-3901 Analog Input Module

Specifications

- **Model:** GT-3901 Analog Input Module
- **Input:** 1 channel 3-phase AC measurement, Lx-Ly
- **Maximum Voltage:** 500 VAC
- **Maximum Current:** 1 A
- **Resolution:** 12-bit
- **Terminal Type:** Cage Clamp, Not Removable

Product Usage Instructions

Installation

- Ensure the power is off before connecting the module. Follow the wiring diagram provided in the manual for proper installation.

Setup

- Configure the module according to your system requirements.
- Refer to the G-series system overview for understanding the data mapping.

Usage

- Once installed and set up, monitor the LED indicators for channel status. Data mapping into the image table can be done for further analysis.

About This Manual

This manual contains information on the software and hardware features of the Beijer Electronics GT-3901 Analog Input Module. It provides in-depth specifications, guidance on installation, setup, and usage of the product.

Symbols Used in This Manual

This publication includes Warning, Caution, Note and Important icons where appropriate, to point out safety-related, or other important information. The corresponding symbols should be interpreted as follows:

 **WARNING**

The Warning icon indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and major damage to the product.

 **CAUTION**

The Caution icon indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, and moderate damage to the product.

 **NOTE**

The Note icon alerts the reader to relevant facts and conditions.

 **IMPORTANT**

The Important icon highlights important information.

Safety

Before using this product, please read this manual and other relevant manuals carefully. Pay full attention to safety instructions!

In no event will Beijer Electronics be responsible or liable for damages resulting from the use of this product.

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

Product Certifications

The product has the following product certifications.

General Safety Requirements

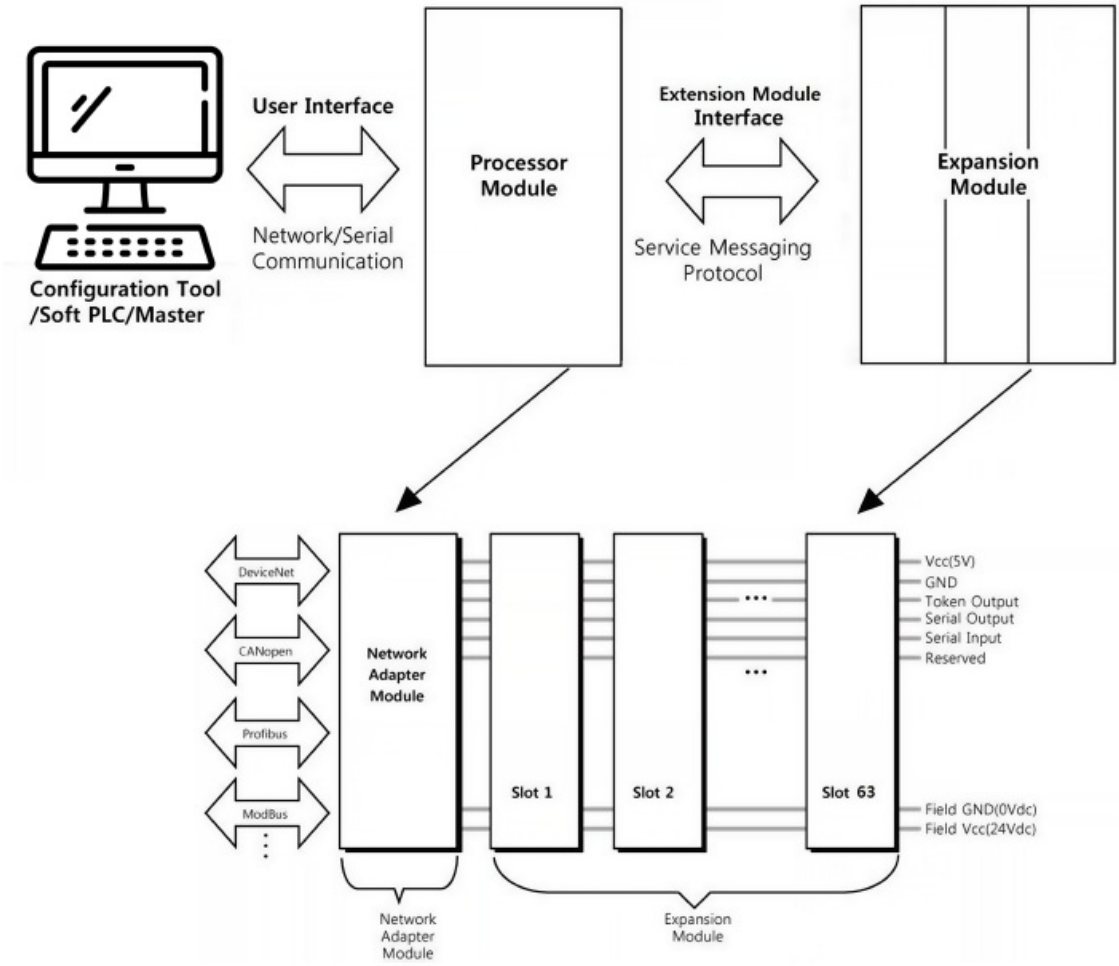
WARNING

- Do not assemble the products and wires with power connected to the system. Doing so cause an “arc flash”, which can result in unexpected dangerous events (burns, fire, flying objects, blast pressure, sound blast, heat).
- Do not touch terminal blocks or IO modules when the system is running. Doing so may cause electric shock, short circuit or malfunction of the device.
- Never let external metallic objects touch the product when the system is running. Doing so may cause electric shock, short circuit or malfunction of the device.
- Do not place the product near inflammable material. Doing so may cause a fire.
- All wiring work should be performed by an electrical engineer.
- When handling the modules, ensure that all persons, the workplace and the packing are well grounded. Avoid touching conductive components, the modules contain electronic components that may be destroyed by electrostatic discharge.

CAUTION

- Never use the product in environments with temperature over 60°C. Avoid placing the product in direct sunlight.
- Never use the product in environments with over 90% humidity.
- Always use the product in environments with pollution degree 1 or 2.
- Use standard cables for wiring.

About the G-series System

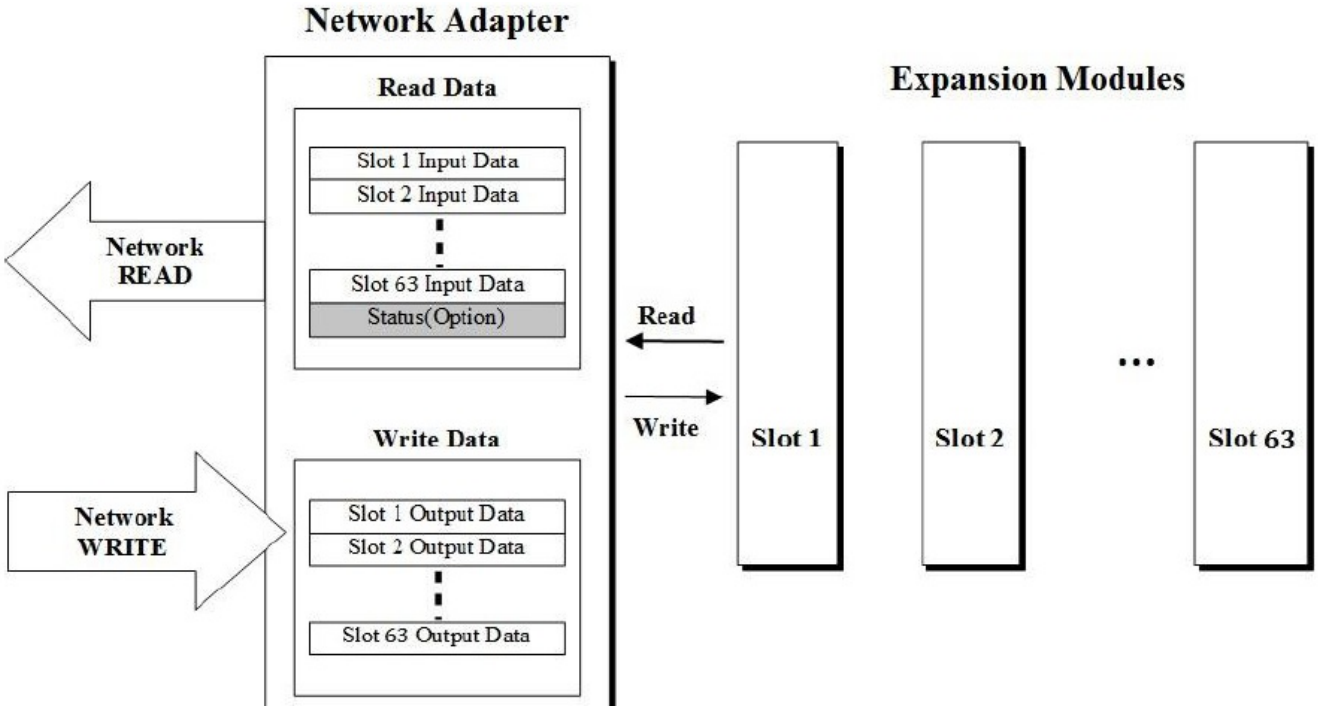


System overview

- **Network Adapter Module:** The network adapter module forms the link between the field bus and the field devices with the expansion modules. The connection to different field bus systems can be established by each of the corresponding network adapter module, e.g., for MODBUS TCP, Ethernet IP, EtherCAT, PROFINET, CC-Link IE Field, PROFIBUS, CANopen, DeviceNet, CC-Link, MODBUS/Serial etc.
- **Expansion Module:** Expansion module types: Digital IO, Analog IO, and Special modules.
- **Messaging:** The system uses two types of messaging: Service messaging and IO messaging.

IO Process Data Mapping

An expansion module has three types of data: IO data, configuration parameter, and memory register. The data exchange between the network adapter and the expansion modules is made via IO process image data by internal protocol.



Data flow between network adapter (63 slots) and expansion modules

The input and output image data depend on the slot position and the data type of the expansion slot. The ordering of input and output process image data is based on the expansion slot position. Calculations for this arrangement are included in the manuals for network adapter and programmable IO modules.

Valid parameter data depends on the modules in use. For example, analog modules have settings of either 0-20 mA or 4-20 mA, and temperature modules have settings such as PT100, PT200, and PT500. The documentation for each module provides a description of the parameter data.

Specifications

Environment Specifications

Operating temperature	-20°C – 60°C
UL temperature	-20°C – 60°C
Storage temperature	-40°C – 85°C
Relative humidity	5% – 90% non-condensing
Mounting	DIN rail
Shock operating	IEC 60068-2-27 (15G)
Vibration resistance	IEC 60068-2-6 (4 g)
Industrial emissions	EN 61000-6-4: 2019
Industrial immunity	EN 61000-6-2: 2019
Installation position	Vertical and horizontal
Product certifications	CE, FCC

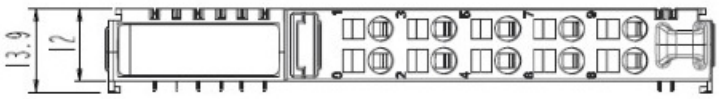
General Specifications

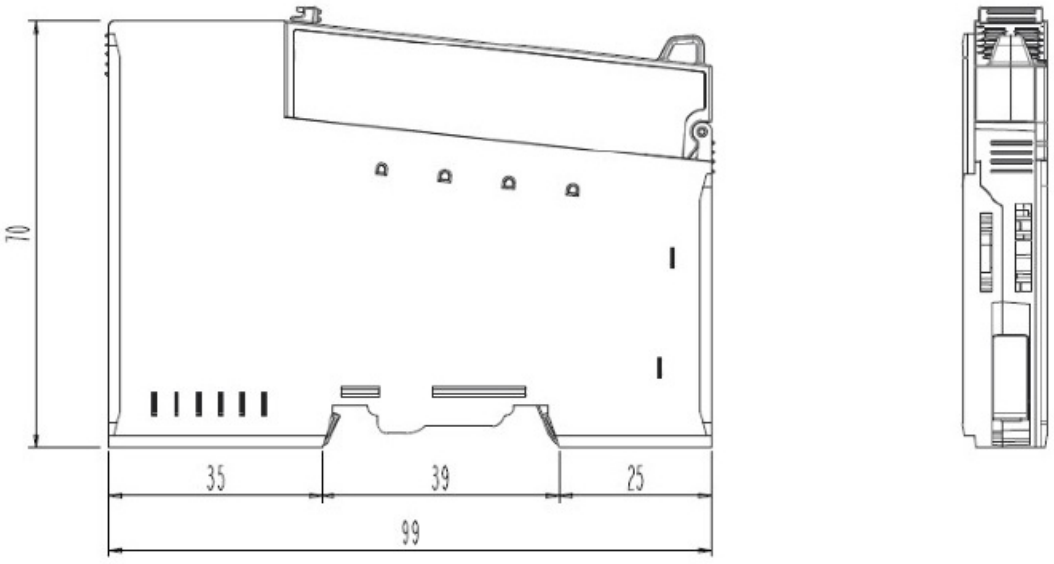
Power dissipation	Max. 125 mA @ 5 VDC
Isolation	I/O to Logic: Photocoupler isolation Field power: Non-isolation
Field power	Supply voltage: 24 VDC nominal Voltage range: 18 – 30 VDC Power dissipation: 0 mA @ 24 VDC
Wiring	I/O cable max. 2.0mm2 (AWG 14)
Weight	63 g
Module size	12 mm x 99 mm x 70 mm

NOTE

- The measuring accuracy is reduced, if the extended temperature range is used (-40 – 70 °C).
- If the input value is small, the error of calculation value can be large (please input 10% or more of the whole range).

Dimensions





Module dimensions (mm)

Input Specifications

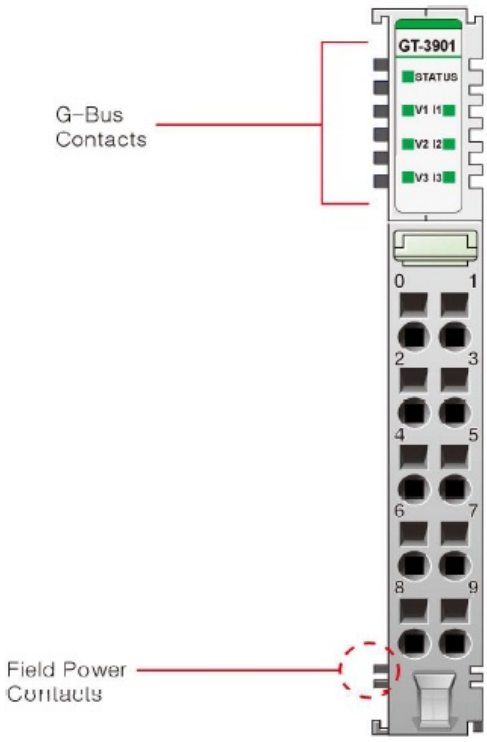
Number of channels	3 Ch voltage input, 3 Ch current input via CT
Indicators	Status, VL1, VL2, VL3, IL1, IL2, IL3
Maximum input voltage range	V_{LN}= 288 VAC V_{LL}= 500 VAC
UL certified voltage range	V_{LN}= 240 VAC
Input resistance voltage path	1200 kΩ
Measuring current	1 A (max.) CT 1: 4000 (max.)
Input resistance current path	30 mΩ
Resolution	24 bits
Input frequency range	45 – 65 Hz
Measured values	Angle, Voltage, Current, Power, Energy, Frequency, Power Factors

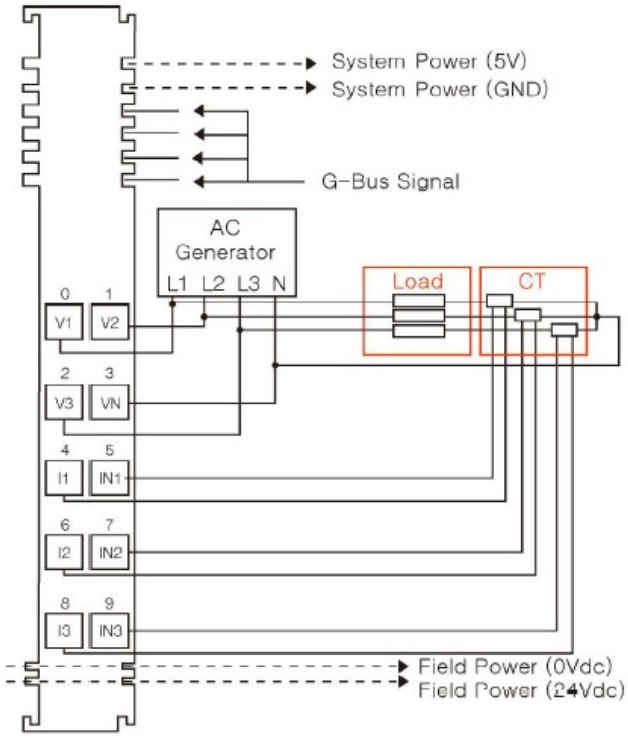
Measuring error	Voltage & current: 0.5 % @ -20 – 50 °C Voltage & current: 1 % @ -20 – 60 °C Voltage & current: 1.5 % @ -40 – 70 °C Frequency: ±0.1 Hz Phase angle: ±0.6 ⁰

Update Cycle of Process Data

Read data	Update time
	Max
RMS voltage	300 us
Max. RMS voltage	300 us
Min. RMS voltage	300 us
RMS current	300 us
Max. RMS current	300 us
Min. RMS current	300 us
Apparent power	250 us
Active power	350 us
Max. active power	350 us
Min active power	350 us
Reactive power	2000 us
Apparent energy	100 ms
Total apparent energy	100 ms
Active energy	100 ms
Total active energy	100 ms
Reactive energy	100 ms
Total reactive energy	100 ms
cos phi	200 us
Supply network frequency	200 us
Max. supply network frequency	200 us
Min. supply network frequency	200 us
Phase angle phi	300 us

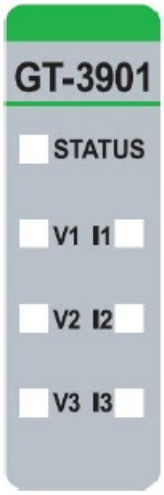
Wiring Diagram





Pin no.	Signal description
0	Voltage input 0 (L1)
1	Voltage input 1 (L2)
2	Voltage input 2 (L3)
3	Voltage input common (neutral)
4	Current input L1
5	Current input N1
6	Current input L2
7	Current input N1
8	Current input L3
9	Current input N3

LED Indicator



LED no.	LED function / description	LED color
0	Status	Green
1	Voltage input channel 1	Green
2	Current input channel 1	Green
3	Voltage input channel 2	Green
4	Current input channel 2	Green
5	Voltage input channel 3	Green
6	Current input channel 3	Green

LED Channel Status

Status	LED	Indicates
Over voltage	Voltage input LED: Off	Error occurred
	Voltage input LED: Green	Normal operation
Under voltage	Voltage input LED: Off	Error occurred
	Voltage input LED: Green	Normal operation
Over current	Current input LED: Off	Error occurred
	Current input LED: Green	Normal operation
No signal	Voltage input LED: Off Current input LED: Off	Error occurred
	Voltage input LED: Green Current input LED: Green	Normal operation
G-Bus status	Status LED: Off	Disconnection
	Status LED: Green	Connection

* Please refer to Input Image Data.(Error Byte)

Mapping Data Into the Image Table

Byte	Output data	Input data
0	Control byte 0	Status byte 0
1	Control byte 1	Status byte 1
2	Control byte 2	Status byte 2
3	Control byte 3	Status byte 3
4	Not used	Error byte 0
5		Error byte 1
6		Error byte 2
7		Reserved
8		Process value 1
9		
10		
11		
12		Process value 2
13		
14		
15		
16		Process value 3
17		
18		
19		
20		Process value 4
21		
22		
23		

Input Image Value

Status bytes

Status byte 0							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**

RES	Measure select	CON_ID

Measure select			
	0	=	Voltage
	1	=	Current
	2	=	Power
	3	=	PF
	4	=	Phase angle
	5	=	Frequency
	6	=	Energy
	7	=	Reserved

RES	Resetting all min / max / energy values
CON_ID	CON_ID

Status byte 1

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved	Measure select			CON_ID			

Measure select			
	0	=	Voltage
	1	=	Current
	2	=	Power
	3	=	PF
	4	=	Phase angle
	5	=	Frequency
	6	=	Energy
	7	=	Reserved

CON_ID	CON_ID

Status byte 2

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Reserved	Measure Select			CON_ID			

Measure select			
	0	=	Voltage
	1	=	Current
	2	=	Power
	3	=	PF
	4	=	Phase angle
	5	=	Frequency
	6	=	Energy

	7	=	Reserved				
CON_ID	CON_ID						

Status byte 3							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Reserved	**Measure select**			**CON_ID**			
Measure select	0 = Voltage 1 = Current 2 = Power 3 = PF 4 = Phase angle 5 = Frequency 6 = Energy 7 = Reserved						
CON_ID	CON_ID						

Error bytes

Error byte 0							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
ERR_VL2	**VL2_Error code**			**ERR_VL1**	**VL1_Error code**		
ERR_VL1	Phase 1 voltage input ERROR 0 = OK 1 = Error occurred						
ERR_VL2	Phase 2 voltage input ERROR 0 = OK 1 = Error occurred						
Error byte 1							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
ERR_IL1	**IL1_Error code**			**ERR_VL3**	**VL3_Error code**		
ERR_VL3	Phase 3 voltage input ERROR 0 = OK 1 = Error occurred						
ERR_IL1	Phase 1 current input ERROR 0 = OK 1 = Error occurred						
Error byte 2							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
ERR_IL3	**IL3_Error code**			**ERR_IL2**	**IL2_Error code**		
ERR_IL2	Phase 2 current input ERROR 0 = OK 1 = Error occurred						

ERR_IL3	Phase 3 current input ERROR 0 = OK 1 = Error occurred
Error code	0 = No error 1 = Over input 2 = Under input 3 = No connect

Process value bytes

Process value 0-0 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc0[7 : 0]							
Proc0[7 : 0]		Process value 0 of status byte 0					
Process value 0-1 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc0[15 : 8]							
Proc0[15 : 8]		Process value 0 of status byte 0					
Process value 0-2 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc0[23 : 16]							
Proc0[23 : 16]		Process value 0 of status byte 0					
Process value 0-3 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc0[31 : 24]							
Proc0[31 : 24]		Process value 0 of status byte 0					
Process value 1-0 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc1[7 : 0]							
Proc1[7 : 0]		Process value 1 of status byte 1					
Process value 1-1 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc1[15 : 8]							
Proc1[15 : 8]		Process value 1 of status byte 1					
Process value 1-2 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc1[23 : 16]							
Proc1[23 : 16]		Process value 1 of status byte 1					
Process value 1-3 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc1[31 : 24]							
Proc1[32 : 24]		Process value 1 of status byte 1					

Process value 2-0 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc2[7 : 0]							
Proc2[7 : 0]		Process value 2 of status byte 2					
Process value 2-1 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc2[15 : 8]							
Proc2[15 : 8]		Process value 2 of status byte 2					
Process value 2-2 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc2[23 : 16]							
Proc2[23 : 16]		Process value 2 of status byte 2					
Process value 2-3 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc2[31 : 24]							
Proc2[31 : 24]		Process value 2 of status byte 2					
Process value 3-0 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc3[7 : 0]							
Proc3[7 : 0]		Process value 3 of status byte 3					
Process value 3-1 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc3[15 : 8]							
Proc3[15 : 8]		Process value 3 of status byte 3					
Process value 3-2 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc3[23 : 16]							
Proc3[23 : 16]		Process value 3 of status byte 3					
Process value 3-3 byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Proc3[31 : 24]							
Proc3[31 : 24]		Process value 3 of status byte 3					

Output Image Value

Control byte 0							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
RESET	**Measure select**			**CON_ID**			

Measure select	0 = Voltage 1 = Current 2 = Power 3 = PF 4 = Phase angle 5 = Frequency 6 = Energy 7 = Reserved
RESET	Resetting all of the min/max energy values
CON_ID	CON_ID

Control byte 1							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Reserved	**Measure select**			**CON_ID**			

Measure select	0	=	Voltage
	1	=	Current
	2	=	Power
	3	=	PF
	4	=	Phase angle
	5	=	Frequency
	6	=	Energy

		7	=	Reserved				
CON_ID		CON_ID						
Control byte 2								
Bit 7	**Bit 6**	**Bit 5**			**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Reserved	**Measure select**					**CON_ID**			
Measure select		0	=	Voltage					
		1	=	Current					
		2	=	Power					
		3	=	PF					
		4	=	Phase angle					
		5	=	Frequency					
		6	=	Energy					
		7	=	Reserved					
CON_ID		CON_ID						
Control byte X3								
Bit 7	**Bit 6**	**Bit 5**			**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Reserved	**Measure select**					**CON_ID**			

Measure select	0 = Voltage 1 = Current 2 = Power 3 = PF 4 = Phase angle 5 = Frequency 6 = Energy 7 = Reserved
CON_ID	CON_ID

CON_ID	**Measured value**	**Data type**	**Scaling**
Measure select = Voltage			
00	RMS voltage L1-N	uint32	0.01 V
01	RMS voltage L2-N	uint32	0.01 V
02	RMS voltage L3-N	uint32	0.01 V
03	Max. RMS voltage L1-N	uint32	0.01 V
04	Max. RMS voltage L2-N	uint32	0.01 V
05	Max. RMS voltage L3-N	uint32	0.01 V
06	Min. RMS voltage L1-N	uint32	0.01 V
07	Min. RMS voltage L2-N	uint32	0.01 V
08	Min. RMS voltage L3-N	uint32	0.01 V
09	Reserved		
0A			
0B			
0C			

0D			
0E			
0F			
CON_ID	**Measured value**	**Data type**	**Scaling**
Measure select = Current			
00	RMS Current L1-N	uint32	0.001 A
01	RMS Current L2-N	uint32	0.001 A
02	RMS Current L3-N	uint32	0.001 A
03	Max. RMS Current L1-N	uint32	0.001 A
04	Max. RMS Current L2-N	uint32	0.001 A
05	Max. RMS Current L3-N	uint32	0.001 A
06	Min. RMS Current L1-N	uint32	0.001 A
07	Min. RMS Current L2-N	uint32	0.001 A
08	Min. RMS Current L3-N	uint32	0.001 A
09	Reserved		
0A			

0B	
0C	
0D	
0E	
0F	

CON_ID	Measured value	Data type	Scaling
Measure select = Power			
00	Apparent power L1	uint32	0.01VA
01	Apparent power L2	uint32	0.01VA
02	Apparent power L3	uint32	0.01VA
03	Active power L1	int32	0.01W
04	Active power L2	int32	0.01W
05	Active power L3	int32	0.01W
06	Max. active power L1	int32	0.01W
07	Max. active power L2	int32	0.01W
08	Max. active power L3	int32	0.01W
09	Min. active power L1	int32	0.01W
0A	Min. active power L2	int32	0.01W
0B	Min. active power L3	int32	0.01W
0C	Reactive power L1	int32	0.01VAR
0D	Reactive power L2	int32	0.01VAR
0E	Reactive power L3	int32	0.01VAR
CON_ID	**Measured value**	**Data type**	**Scaling**
Measure select = Energy			
00	Apparent energy L1	uint32	
01	Apparent energy L2	uint32	

02	Apparent energy L3	uint32	Set the parameter
03	Total apparent energy	uint32	
04	Active energy L1	int32	
05	Active energy L2	int32	
06	Active energy L3	int32	
07	Total active energy	int32	
08	Reactive energy L1	int32	
09	Reactive energy L2	int32	
0A	Reactive energy L3	int32	
0B	Total reactive energy	int32	
0C	Reserved		
0D			
0E			
0F			
CON_ID	**Measured value**	**Data type**	**Scaling**

Measure select = Power factor			
00	Power factor L1	int32	0.01
01	Power factor L2	int32	0.01
02	Podwr factor L3	int32	0.01
03			
04			

05			
06			
07			
08			
09	Reserved		
0A			
0B			
0C			
0D			
0E			
0F			
CON_ID	**Measured value**	**Data type**	**Scaling**
Measure Select = Frequency			
00	Supply network frequency L1	uint32	0.01 Hz
01	Supply network frequency L2	uint32	0.01 Hz
02	Supply network frequency L3	uint32	0.01 Hz
03	Max. supply network frequency L1	uint32	0.01 Hz
04	Max. supply network frequency L2	uint32	0.01 Hz
05	Max. supply network frequency L3	uint32	0.01 Hz
06	Min. supply network frequency L1	uint32	0.01 Hz
07	Min. supply network frequency L2	uint32	0.01 Hz

08	Min. supply network frequency L3	uint32	0.01 Hz
09	Reserved		
0A			
0B			
0C			
0D			
0E			

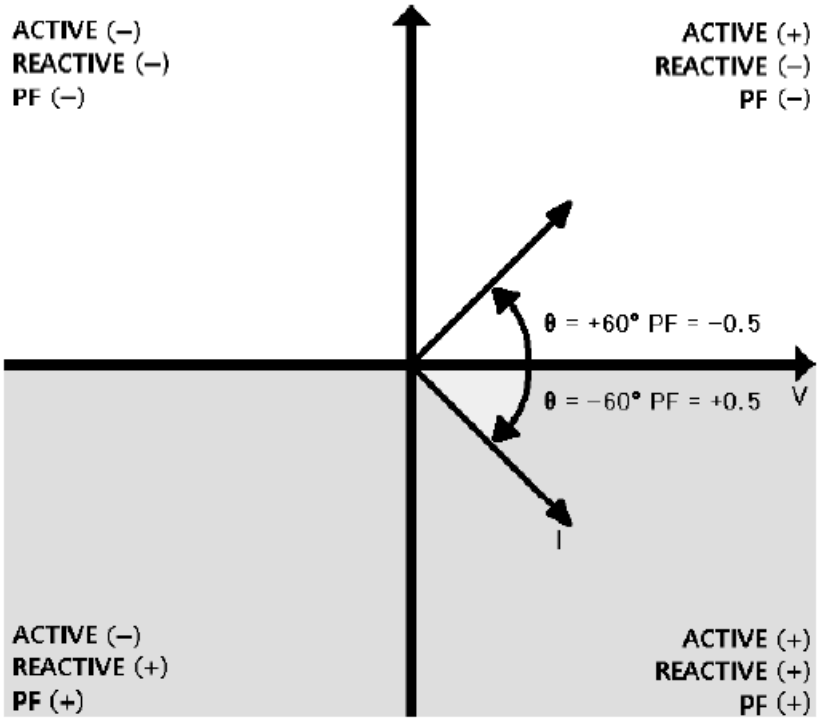
Parameter Data

Valid Parameter length: 5 Bytes

<table>
<tr><td></td><td>Bit#7</td><td>Bit#6</td><td>Bit#5</td><td>Bit#4</td><td>Bit#3</td><td>Bit#2</td><td>Bit#1</td><td>Bit#0</td></tr>
<tr><td rowspan="2">Byte#0</td><td colspan="8">CT sensor 1 : x</td></tr>
<tr><td colspan="8">Value for the current transformer ratio divisor</td></tr>
<tr><td rowspan="8">Byte#1</td><td>Bit#7</td><td>Bit#6</td><td>Bit#5</td><td>Bit#4</td><td>Bit#3</td><td>Bit#2</td><td>Bit#1</td><td>Bit#0</td></tr>
<tr><td>Frequency</td><td colspan="3">Scaling for energy values</td><td colspan="4">CT sensor 1 : x</td></tr>
<tr><td>0 = 45 – 55 Hz</td><td colspan="3">0 = 1m Wh/VARh/VAh</td><td colspan="4">Value for the current transformer ratio divisor</td></tr>
<tr><td>1 = 55 – 65 Hz</td><td colspan="3">1 = 0.01 Wh/VARh/VAh</td><td colspan="4" rowspan="6"></td></tr>
<tr><td rowspan="5"></td><td colspan="3">2 = 0.1 Wh/VARh/VAh</td></tr>
<tr><td colspan="3">3 = 1 Wh/VARh/VAh</td></tr>
<tr><td colspan="3">4 = 0.01k Wh/VARh/VAh</td></tr>
<tr><td colspan="3">5 = 0.1k Wh/VARh/VAh</td></tr>
<tr><td colspan="3">6 = 1k Wh/VARh/VAh</td></tr>
<tr><td colspan="3">7 = Reserved</td></tr>
<tr><td rowspan="3">Byte#2</td><td>Bit#7</td><td>Bit#6</td><td>Bit#5</td><td>Bit#4</td><td>Bit#3</td><td>Bit#2</td><td>Bit#1</td><td>Bit#0</td></tr>
<tr><td colspan="8">Overvoltage threshold Lx (value) resolution 0.2 V</td></tr>
<tr><td colspan="8">Overvoltage threshold = 250 V + value * 0.2 V (max. 300 V)</td></tr>
<tr><td rowspan="3">Byte#3</td><td>Bit#7</td><td>Bit#6</td><td>Bit#5</td><td>Bit#4</td><td>Bit#3</td><td>Bit#2</td><td>Bit#1</td><td>Bit#0</td></tr>
<tr><td colspan="8">Undervoltage threshold Lx (value) resolution 0.5 V</td></tr>
<tr><td colspan="8">Undervoltage threshold = 0 V + value * 0.5 V (max. 125 V)</td></tr>
<tr><td rowspan="3">Byte#4</td><td>Bit#7</td><td>Bit#6</td><td>Bit#5</td><td>Bit#4</td><td>Bit#3</td><td>Bit#2</td><td>Bit#1</td><td>Bit#0</td></tr>
<tr><td colspan="8">Overcurrent threshold Lx (value) Resolution 2 mA</td></tr>
<tr><td colspan="8">Overcurent threshold = 0.8 A + value * 0.002 A (max. 1.3 A)</td></tr>
</table>

NOTE

- Set frequency to get the correct power factor and energy.



NOTE

- The reactive power measurement is negative when the load is capacitive, and when the load is inductive. The sign of the reactive power can therefore be used to reflect the sign of the power factor.

Power factor = (Sign fundamental reactive power) * (abs (Active power)) / Apparent power)

Example of setting

- **Read data:** Phase1 RMS Voltage / RMS Current / Apparent power / Active power.
- **Input value:** 220 V, 1000 A, PF 0.5.
- **Parameter:** CT 1: 1000, input frequency 55-65 Hz, overvoltage threshold 260 V, other is Default(0).

Overvoltage threshold = (260 V (user setting value) – 250 V (default setting value)) / 0.2 V. Resolution: 0.2 V.

Overcurrent threshold = 1000 A (user setting CT 1: 1000) = ((1 A (user setting value) – 0.8 (default setting value)) / 0.001) * 1000 (CT). Resolution: 0.001 A.

All of default value is 0.

1. Set the Parameter.

Parameter	Value
CT sensor 1 : x (12 bit)	001111101000 (bit) Set CT 1000
Scaling for energy values (3 bit)	000 (bit) Set 1m Wh/VARh/VAh
Frequency (1 bit)	1 (bit) Set 55-65 Hz
Overvoltage threshold Lx (8 bit)	00110010 (bit) Set 260 V
Undervoltage threshold Lx (8 bit)	00000000 (bit) Set 0 V (default)
Overcurrent threshold Lx(8 bit)	00000000 (bit) Set 0.8 A (default)
All of parameter	E8 83 32 00 00 (Byte hex)

2. Set the Control byte (see chapter Output image value).

	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
Control byte #0	**RES**	**Measure select (Voltage)**			**CON_ID (RMS voltage L1-N)**			
	0	0	0	0	0	0	0	0
Control byte #1	**Reserved**	**Measure select (Current)**			**CON_ID (RMS current L1-N)**			
	0	0	0	1	0	0	0	0
Control byte #2	**Reserved**	**Measure select (Power)**			**CON_ID (Apparent power L1)**			
	0	0	0	1	0	0	0	0
Control byte #3	**Reserved**	**Measure select (Power)**			**CON_ID (Active power L1)**			
	0	0	0	1	0	0	1	1

3. Check the Status byte. When Status byte and Control byte are the same, the Process value is updated.

	Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
Status byte #0	**RES**	**Measure select (Voltage)**			**CON_ID (RMS voltage L1-N)**			
	0	0	0	0	0	0	0	0
Status byte #0	**Reserved**	**Measure select (Current)**			**CON_ID (RMS current L1-N)**			
	0	0	0	1	0	0	0	0
Status byte #0	**Reserved**	**Measure select (Power)**			**CON_ID (Apparent power L1)**			
	0	0	0	1	0	0	0	0
Status byte #0	**Reserved**	**Measure select (Power)**			**CON_ID (Active power L1)**			
	0	0	0	1	0	0	1	1

4. Check the Process value.

Process value#0 (RMS Voltage)	000055F0(Dword hex) 22000(Dec) 220 V
Process value#1 (RMS Current)	000F4240(Dword hex) 1000000(Dec) 1000 A
Process value#2 (Apparent power)	014FB180(Dword hex) 22000000(Dec) 220 kVA
Process value#3 (Active power)	00A7D8C0(Dword hex) 11000000(Dec) 110 kW

Hardware Setup

CAUTION

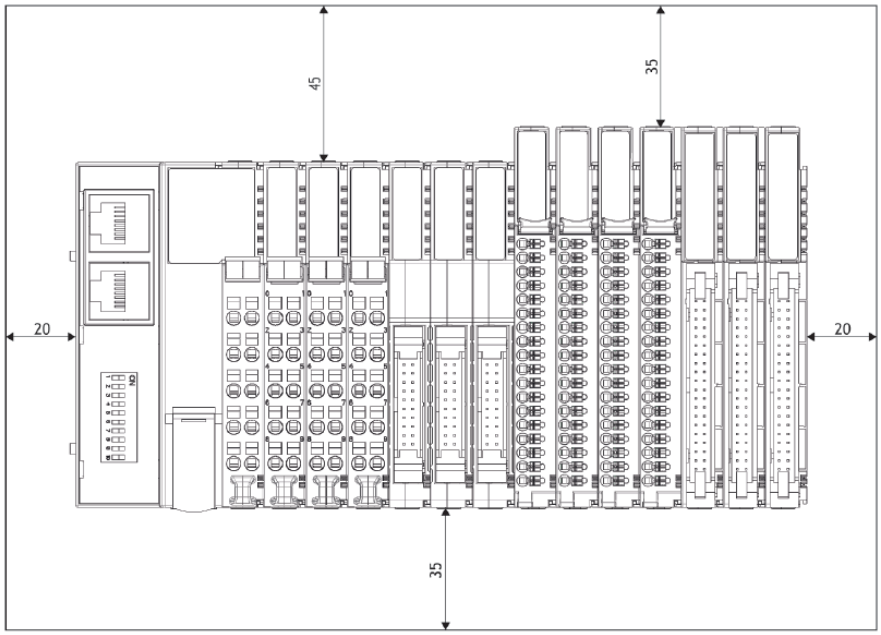
- Always read this chapter before installing the module!
- Hot surface! The surface of the housing can become hot during operation. If the device is used in high ambient temperatures, always let the device cool down before touching it.
- Working on energized devices can damage the equipment! Always turn off the power supply before working on the device.

Space Requirements

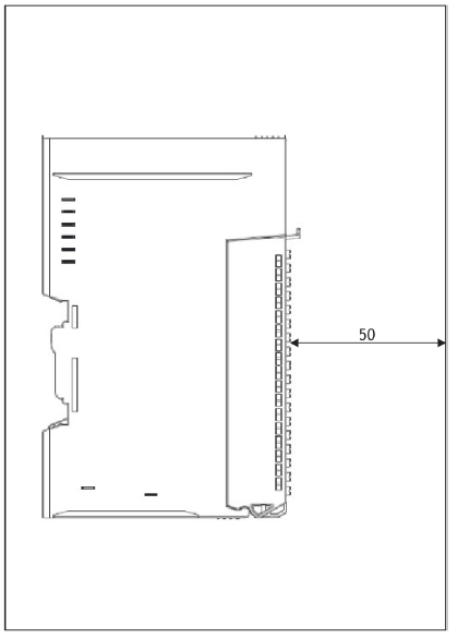
The following drawings show the space requirements when installing the G-series modules. The spacing creates space for ventilation, and prevents conducted electromagnetic interference from influencing the operation. Installation position is valid vertical and horizontal. The drawings are illustrative and may be out of proportion.

CAUTION

NOT following the space requirements may result in damaging the product.



Vertical and horizontal space requirements



Required distance to door

Mount Module to DIN Rail

The following chapters describe how to mount the module to the DIN rail.

CAUTION

The module must be fixed to the DIN rail with the locking levers.

Mount GL-9XXX or GT-XXXX Module

The following instructions apply to these module types:

- GL-9XXX
- GT-1XXX
- GT-2XXX
- GT-3XXX
- GT-4XXX
- GT-5XXX
- GT-7XXX

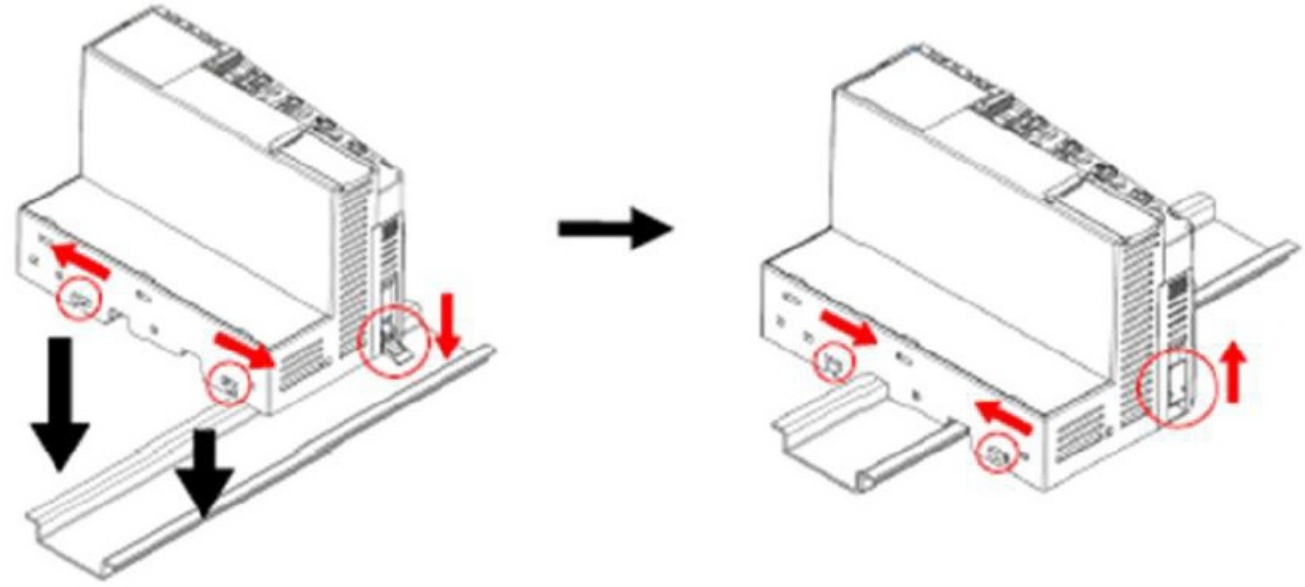
GN-9XXX modules have three locking levers, one at the bottom and two on the side. For mounting instructions, refer to Mount GN-9XXX Module.

Mount to DIN rail

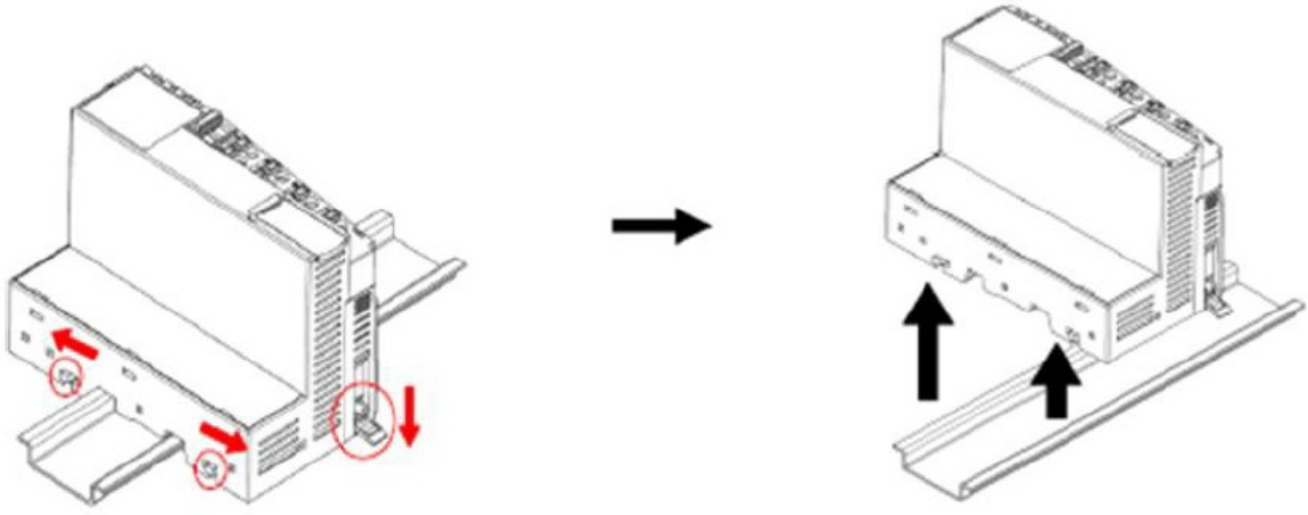
Dismount from DIN rail

Mount GN-9XXX Module

To mount or dismount a network adapter or programmable IO module with the product name GN-9XXX, for example GN-9251 or GN-9371, see the following instructions:



Mount to DIN rail



Dismount from DIN rail

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FAQ

- **Q: What do the LED indicators signify?**
  - **A:** The LED indicators show the status of each channel on the module. Refer to the LED Channel Status section in the manual for detailed information.
- **Q: How do I ensure safety while using the product?**
  - **A:** Make sure to follow the general safety requirements mentioned in the manual. Ensure proper grounding and avoid touching conductive components to prevent damage from electrostatic discharge.

Documents / Resources

	Beijer ELECTRONICS GT-3901 Analog Input Module [pdf] User Manual GT-3901 Analog Input Module, GT-3901, Analog Input Module, Input Module, Module

References

- User Manual