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OMRON

Open Network for High-Speed Control

CompoNet

Fast and Intelligent

realizing

MEMO

Communications Specifications

Item	Specification
Communications protocol	CompoNet Network protocol
Types of communications	Remote I/O communications (programless, constant sharing of data with Slave Units) and message communications (explicit message communications as required with Slave Units and FINS message communications as required with controllers) *1
Baud rate	4 Mbps *2, 3 Mbps, 1.5 Mbps, 93.75 kbps
Modulation	Base-band
Coding	Manchester code
Error control	Manchester code rules, CRC
Communications media *3	The following media can be used. • Round cable I 2-wire 0.75 mm^2 • Round cable II 4-wire 0.75 mm^2 • Flat Cable I
Communications distance and wiring	Refer to *Cable Types, Baud Rates, and Maximum Distances* in the *Master Unit Operation Manual*.
Connectable Master Units	CompoNet Master Units
Connectable Slave Units	CompoNet Slave Units
Maximum I/O capacity	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)
Maximum number of nodes	Word Slave Units: 64 input nodes and 64 output nodes Bit Slave Units: 128 input nodes and 128 output nodes Repeater Units: 64 nodes
Bits allocated per node address	Word Slave Units: 16 bits Bit Slave Units: 2 bits
Maximum number of nodes per trunk line or sub-trunk line	32 nodes (Slave Units and Repeater Units)
Applicable node addresses	Word Slave Units: IN0 to IN63 and OUT0 to OUT63 Bit Slave Units: IN0 to IN127 and OUT0 to OUT127 Repeater Units: 0 to 63
Repeater Unit application conditions	Up to 64 Repeater Units can be connected per network (i.e., per Master Unit). Up to 32 Repeater Units can be connected per trunk line or per sub-trunk line. When Repeater Units are connected in series from the Master Unit, up to two extra segment layers can be created (i.e., up to 2 Repeater Units are allowed between a Slave Unit and the Master Unit).
Signal lines	Two lines: BDH (communications data high) and BDL (communications data low)
Power lines	Two lines: BS+ and BS– (power for communications and internal Slave Unit circuits) • Power is supplied from the Master Unit or Repeater Units.
Communications power supply voltage	24 VDC ±10%
Connection forms	Round cable II (4-wire) or Flat cable I at baud rate of 93.75 kbits/s: No restrictions Other cables or baud rates: Trunk line and branch lines
	Connections for Slave Units and Repeater Units: T-branch or multidrop connections

*1 FINS message communications are supported by CJ-series Controllers only.
*2 A baud rate of 4 Mbps is not supported for branch lines and thus cannot be used for Slave Units with Cables (i.e., Bit Slave Units).
*3 Round cable I, round cable II and Flat Cable I are all different types of cable. To use more than one type of cable at a time, Repeater Units must be used to separate them on trunk lines and sub-trunk lines.

MEMO

CompoNet Master Units

CJ/CS-series Master Unit Specifications

Item / Model	CJ1W-CRM21	CS1W-CRM21
Applicable Controller	NJ *1 / CJ-series	CS-series
Unit classification	CJ-series Special I/O Unit	CS-series Special I/O Unit
Current consumption (Power supplied from Power Supply Unit)	400 mA max. at 5 VDC	
Communications power supply connector	One connector for the communications power supply is required for a Slave or Repeater Unit on the trunk line when using Round Cable II or Flat Cable I. *2	
Communications power supply connector allowable current capacity	5 A max. (4 A max. for UL rating) When UL standards are being applied to your equipment, be sure the maximum allowable current is 4 A.	
Maximum number of mountable Master Units	One word number assigned: 40 Units Two word numbers assigned: 40 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units	One word number assigned: 80 Units Two word numbers assigned: 48 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units
Mounting location	According to NJ/CJ/CS-series Special I/O Unit specifications.	
Communications power ON/OFF monitoring	The ON/OFF status of the communications power supply can be detected at the communications power supply connector.	
Data stored in Master Unit (built-in EEPROM)	1) The following device parameters: • Registration Table • Registration Table Check Type • Registered Slave Unit Participation Monitoring Time, Registered Slave Unit Participation Standby Mode, and Event Disable Setting • Software Settings Table • Manual I/O Communications Start Mode • Communications Error Input Data Zero Clear Mode • Network settings 2) Part of error history (depends on type of error; mainly serious error related to communications stopping)	
Noise immunity	Conforms to IEC 61000-4-4 2 kV (applied to power supply).	
Vibration resistance	10 to 61.2 Hz with single-amplitude of 0.1 mm, 61.2 to 150 Hz and 14.7 m/s^2 in X, Y, and Z directions for 80 min each (sweep time of 8 min × 10 sweeps = 80 min)	
Shock resistance	196 m/s^2 (3 times each in X, Y, and Z directions)	
Dielectric strength	500 VAC (between isolated circuits)	
Insulation resistance	20 MΩ min. (between isolated circuits)	
Ambient operating temperature	0 to 55°C	
Ambient operating humidity	10 to 90% (no condensation)	
Ambient operating atmosphere	No corrosive gases	
Storage temperature	–20 to 75°C	
Weight	130 g max. (Master Unit only)	190 g max. (Master Unit only)

*1 Supported only CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.
*2 Communications power does not need to be supplied to the Master Unit.

CJ-series CompoNet Master Units

CJ1W-CRM21

NJ/CJ-series CompoNet Master Units Increase the Range of Applicability of Sensors and Actuators.

The NJ/CJ-series CompoNet Master Unit manages the CompoNet network, controls communications between the Controller and Slave Units, and handles I/O data and message data.

- Setup is simple. Make the master's mode settings and set the baud rate, and you're ready to go.
- Control up to 2,560 I/O points and 384 nodes with one Master Unit.
- Intuitive memory mapping with separate areas for Word Slave Units and Bit Slave Units.
- Seven-segment display helps with startup and enables prompt detection of problems.
- Collect information from Slave Units using message communications, or use message communications to set parameters.
- Inherits the ease of use of the CompoBus/S.
- Flexible I/O allocations with software setting function.

Ordering Information

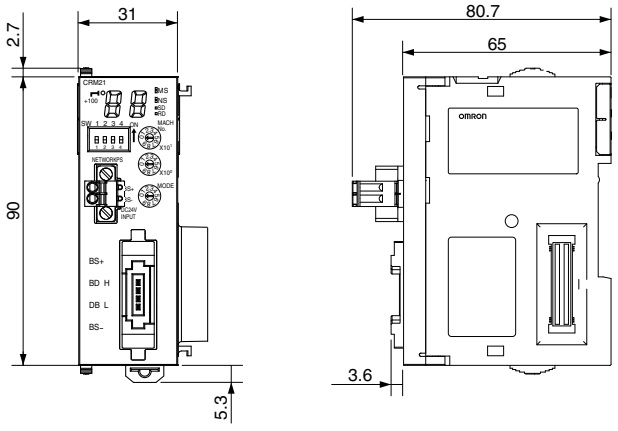
Name	Specifications		Number of unit numbers allocated	Power consumption (A)			Model
	Types of communications	Maximum number of I/O points per Master Unit		5-V system	24-V system	26-V system	
CJ1 Special I/O Unit *	• Remote I/O communications • Message communications	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)	1, 2, 4, or 8	0.4	---		CJ1W-CRM21

* These Units are also available with a DCN-TB4 Terminal Conversion Adapter included in the package. Add "(-B)" to the end of the model number to receive the Adapter as well.

Dimensions

(Unit: mm)

CJ1W-CRM21



CS-series CompoNet Master Units

CS1W-CRM21

CS-series CompoNet Master Units Increase the Range of Applicability of Sensors and Actuators.

The CS-series CompoNet Master Unit manages the CompoNet network, controls communications between the PLC and Slave Units, and handles I/O data and message data.

- Setup is simple. Make the master's mode settings and set the baud rate, and you're ready to go.
- Control up to 2,560 I/O points and 384 nodes with one Master Unit.
- Intuitive memory mapping with separate areas for Word Slave Units and Bit Slave Units.
- Seven-segment display helps with startup and enables prompt detection of problems.
- Collect information from Slave Units using message communications, or use message communications to set parameters.
- Inherits the ease of use of the CompoBus/S.
- Flexible I/O allocations with software setting function.

Ordering Information

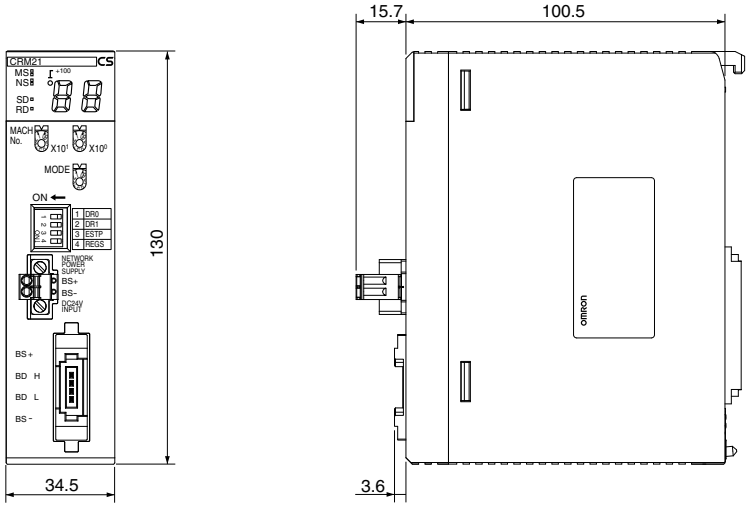
Name	Specifications		Number of unit numbers allocated	Power consumption (A)			Model
	Types of communications	Maximum number of I/O points per Master Unit		5-V system	24-V system	26-V system	
CS1 Special I/O Unit *	• Remote I/O communications • Message communications	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)	1, 2, 4, or 8	0.4		---	CS1W-CRM21

* These Units are also available with a DCN-TB4 Terminal Conversion Adapter included in the package. Add "(-B)" to the end of the model number to receive the Adapter as well.

Dimensions

(Unit: mm)

CS1W-CRM21



OMRON

CompoNet Master Board for PCI Bus/CompactPCI Bus
3G8F7-CRM21

CompoNet Master Board for PC which provides ultra-high speed control

- Windows-base environment. Compatible with other OS, too when shared memory area is used.
- Combine PC with High-speed communication network "CompoNet" to achieve further fast communications.
- Familiar C/C++/VB based programming.

Ordering Information

Name	Specification	Model
CompoNet Master Board for PCI Bus	PCI bus Rev2.2 5V	**3G8F7-CRM21**

General Specifications

Item	Specifications
	3G8F7-CRM21 (PCI)
Bus specification	PCI bus Rev2.2 5 V
Number of mountable boards	4 pieces
Compatible OS	Microsoft Windows 2000 / XP (32 Bit version) / Vista (32 Bit version) / 7 (32 Bit version) Other OS can be used, when the shared memory interface is directly accessed.
Weight	90 g max.
Operation voltage	Internal power supply: 5 VDC±5% 3.3 VDC is not used.
Consumption current	Internal power supply: 5 VDC and 1.5 A max Communications power supply: 24 VDC and 80 mA max
Vibration resistance	10 to 57 Hz, Amplitude 0.075 mm, 57 to 150 Hz Acceleration 9.8 m/s^2, 80 min in each direction of X, Y and Z (8 min of each sweep time × 10 sweeps = total 80 min)
Shock resistance	147 m/s^2, 3 times in each direction of X, Y and Z.
Ambient operating temperature	0 to 55°C
Ambient operating humidity	0% to 80% RH (with no condensation)
Ambient operating atmosphere	No corrosive gas
Storage temperature	-20 to +60°C

Development Environment

- Microsoft Visual C++ (Ver 6.0 to Ver 2008)
- Microsoft Visual Basic (Ver 6.0)
- CodeGear C++Builder (Ver 5 to Ver 2009)

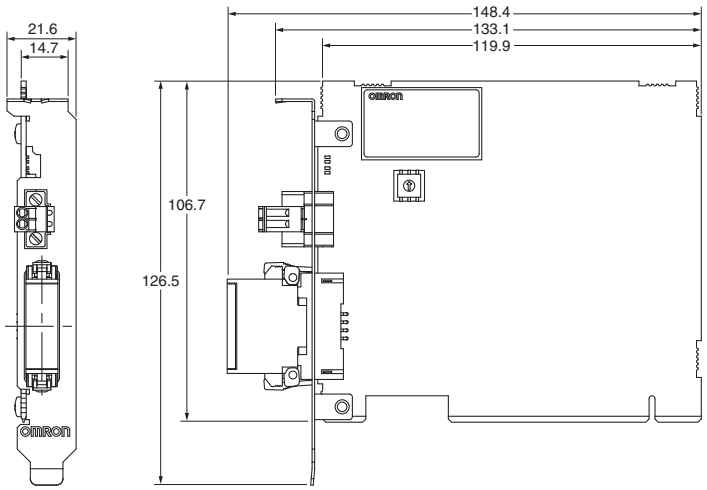
Precautions for Correct Use

When you use the Board in an OS other than Windows by directly accessing the shared memory interface, provide the development environment applicable for the OS.

Dimensions

(unit: mm)

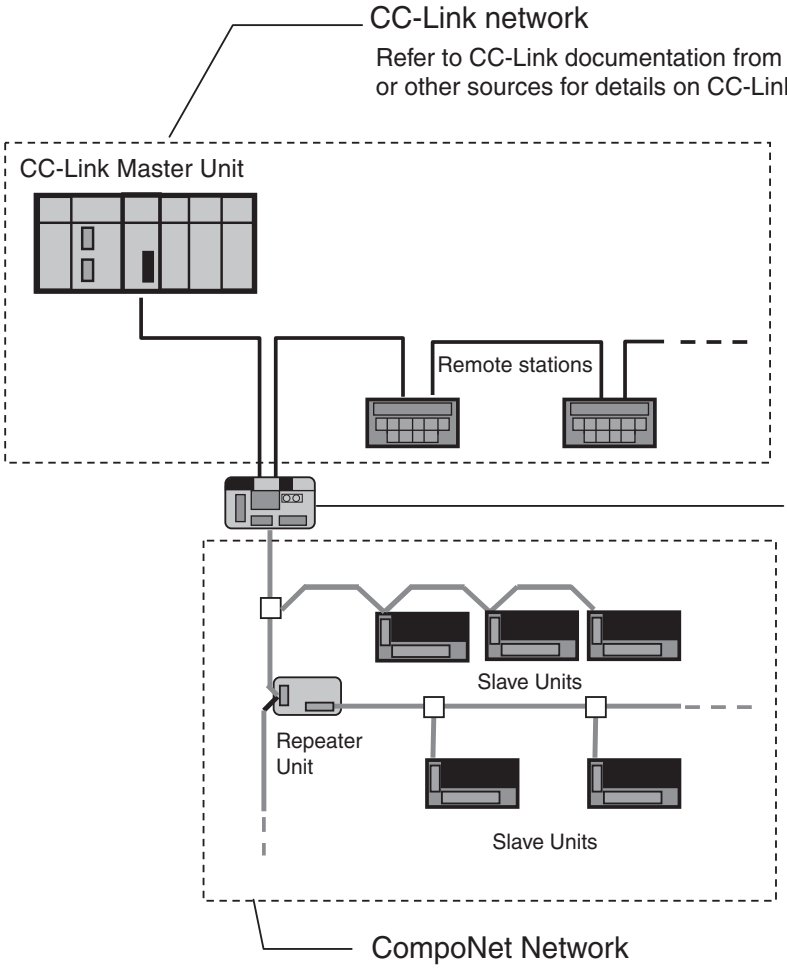
3G8F7-CRM21 (PCI)



CompoNetGatewayUnit

Overview of Gateway Unit

The CompoNet Gateway Unit works as a converter to connect CompoNet with another network with different protocol.
The GQ-CRM21 CompoNet Gateway Unit for CC-Link provides one CC-Link port and one CompoNet port. It cyclically transfers I/O data between the CompoNet Slave Units and the CC-Link Master Unit.



CompoNet Setting

■ Setting the Communications Mode

To use the Gateway Unit, select the communications mode with the setting switches on the Gateway Unit. The below table lists the number of Slave Units (Word Slave Units and Bit Slave Units) and Control Points (the range of buffer memory allocated to the Gateway Unit in the CC-Link Master Unit) in each communications mode. (Refer to *CompoNet Gateway Unit for CC-Link Operation Manual* (Cat. No. W489) for details.)

The expanded cyclic setting (a network parameter set with the GX-Developer) in the CC-Link station information must be changed according to the communications mode.

Mode number	Name	Connectable node addresses	Number of connected nodes	Control Points	CC-Link version and expanded cyclic setting
0	Communications mode 0	Word Slave Unit: IN 0 to IN 63 and OUT 0 to OUT 63 Bit Slave Unit: IN 0 to IN 127 and OUT 0 to OUT 127	Word Slave Unit IN 64/OUT 64 Bit Slave Unit IN 128/OUT 128	Word Slave Unit: 1,024 inputs and 1,024 outputs Bit Slave Unit: 256 inputs and 256 outputs	Version 2, octuple (default)
1	Communications mode 1	Word Slave Unit: IN 0 to IN 31 and OUT 0 to OUT 31 Bit Slave Unit: IN 0 to IN 95 and OUT 0 to OUT 95	Word Slave Unit IN 32/OUT 32 Bit Slave Unit IN 96/OUT 96	Word Slave Unit: 512 inputs and 512 outputs Bit Slave Unit: 192 inputs and 192 outputs	Version 2, quadruple
2	Communications mode 2	Word Slave Unit: IN 0 to IN 15 and OUT 0 to OUT 15 Bit Slave Unit: IN 0 to IN 47 and OUT 0 to OUT 47	Word Slave Unit IN 16/OUT 16 Bit Slave Unit IN 48/OUT 48	Word Slave Unit: 256 inputs and 256 outputs Bit Slave Unit: 96 inputs and 96 outputs	Version 2, double
3	Communications mode 3	Word Slave Unit: IN 0 to IN 7 and OUT 0 to OUT 7 Bit Slave Unit: IN 0 to IN 15 and OUT 0 to OUT 15	Word Slave Unit IN 8/OUT 8 Bit Slave Unit IN 16/OUT 16	Word Slave Unit: 128 inputs and 128 outputs Bit Slave Unit: 32 inputs and 32 outputs	Version 1
4	Communications mode 4	Word Slave Unit: IN 0 to IN 63 and OUT 0 to OUT 63 Bit Slave Unit: IN 0 to IN 127 and OUT 0 to OUT 127	Word Slave Unit IN 64/OUT 64 Bit Slave Unit IN 128/OUT 128	Word Slave Unit: 1,024 inputs and 1,024 outputs Bit Slave Unit: 256 inputs and 256 outputs	Version 2, quadruple
5	Communications mode 5	Word Slave Unit: IN 0 to IN 31 and OUT 0 to OUT 31 Bit Slave Unit: IN 0 to IN 95 and OUT 0 to OUT 95	Word Slave Unit IN 32/OUT 32 Bit Slave Unit IN 96/OUT 96	Word Slave Unit: 512 inputs and 512 outputs Bit Slave Unit: 192 inputs and 192 outputs	Version 2, double
6	Communications mode 6	Word Slave Unit: IN 0 to IN 15 and OUT 0 to OUT 15 Bit Slave Unit: IN 0 to IN 47 and OUT 0 to OUT 47	Word Slave Unit IN 16/OUT 16 Bit Slave Unit IN 48/OUT 48	Word Slave Unit: 256 inputs and 256 outputs Bit Slave Unit: 96 inputs and 96 outputs	Version 1
7 to 9	Reserved	---	---	---	---

CompoNet Gateway Unit for CC-Link

GQ-CRM21

"Easy" and "Flexible" system expansion with linked CC-Link and CompoNet.

- Branching is easily made with CompoNet. Wiring material cost can be reduced.
- Bit-level I/O distribution reduces wiring in the system.
- A wide variety of CompoNet Slave Units contribute to system size reduction.
- Seven-segment Display on the Gateway Unit helps to detect errors on site.
- The Participation Flags and Communications Error Flags can be checked at the Host Controller to detect the location and content of the error.

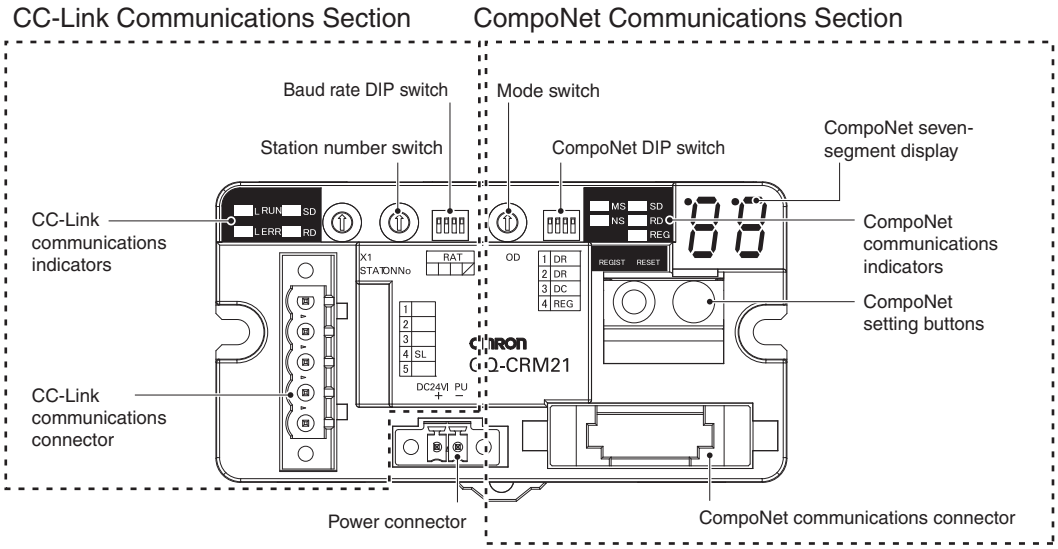
Ordering Information

Name	Specifications					Model
	CC-Link Communications Specification			CompoNet Communications Specification		
	Station Type	Number of stations occupied	CC-Link Version	Types of communications	Maximum I/O capacity	
CompoNet Gateway Unit for CC-Link	Remote device stations	4	Version 1.10 or 2.00 (Selected using mode switch.)	Remote I/O Communications	Word Slave Units: 2,048 I/O points total (1,024 inputs and 1,024 outputs) Bit Slave Units: 512 I/O points total (256 inputs and 256 outputs)	GQ-CRM21

Master Unit Specifications

Item		Specification
Unit power supply voltage		21.6 to 26.4 VDC (24 VDC±10%) (Supplied from power supply connector.)
Current consumption	Communications power supply	3.80 A at 24 VDC
	Internal current power consumption	0.13 A at 24 VDC
Noise immunity		Conforms to IEC 61000-4-4, 2.0 kV
Vibration resistance		Malfunction: 10 to 60 Hz with 0.7-mm double amplitude, 60 to 150 Hz, 50 m/s² for 80 min in X, Y, and Z directions
Shock resistance		150 m/s², 3 times in 6 directions on 3 axes
Dielectric strength		500 VAC
Installation method		Mounted to DIN Track or by using M4 screws
Ambient operating temperature		0 to 55 °C
Ambient operating humidity		10% to 90% (with no condensation)
Ambient storage temperature		-25 to 65 °C
Weight		110 g max.
Ambient operating atmosphere		No corrosive gases

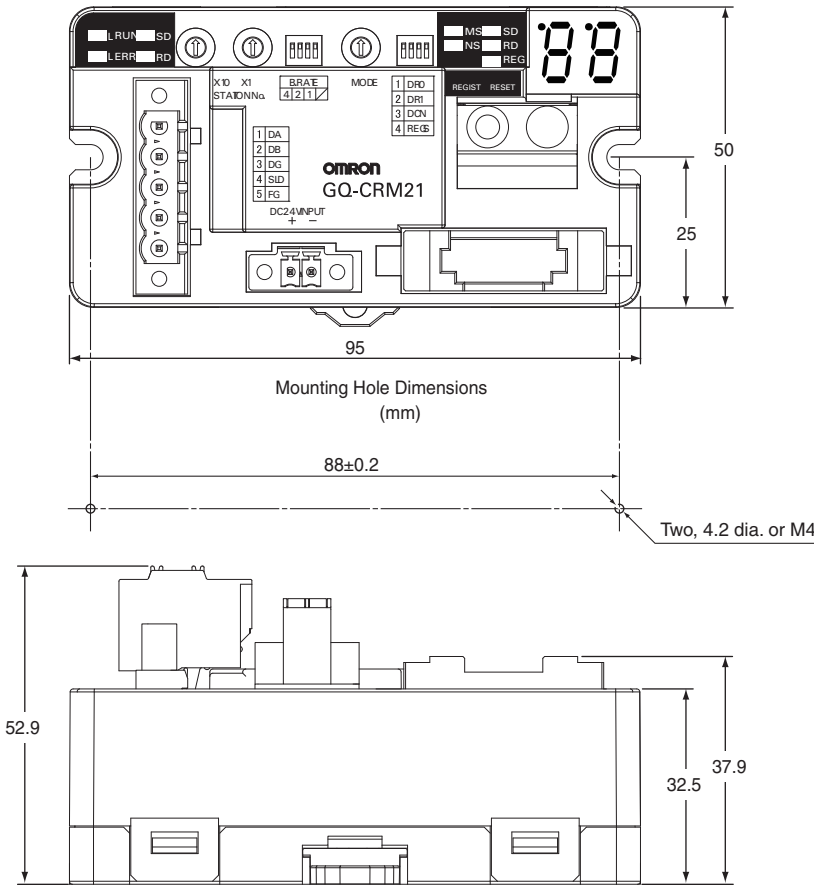
Component Names and Functions



Dimensions

(Unit: mm)

GQ-CRM21



CC-Link Communications Specifications

Item	Specification
Version	CC-Link version 1.10 or 2.00 (Selected using mode switch.)
Baud rate	156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, or 10 Mbps
Communications method	Broadcast polling
Synchronization method	Frame synchronization
Encoding	NRZI
Transmission path	Bus (Conforms to RS-485.)
Transmission format	Conforms to HDLC.
Communications media	CC-Link cable (shielded, 3-core twisted-pair cable)
Number of connected nodes	Depends on specifications of the CC-Link master station.
Remote stations	1 to 61 (Four station numbers are allocated starting from the specified station number.)
Error control	CRC ($X^{16} + X^{12} + X^5 + 1$)
RAS functions	Automatic recovery function, slave cutoff, data link status checks, offline testing
Allocated station numbers	Allocated four stations numbers as a remote device station

CompoNet Slave Unit

Smart Functions

The Slave Units provide Smart Functions that powerfully aid in everything from building the system and initial system startup to preventive system maintenance. The Smart Functions include functions for monitoring the operation time, changes in operating values, and other values, as well as functions that provide warnings for maintenance based on ON/OFF counts, total operating time, and other counted values.

■ CompoNet Slave Unit Functions

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units				
	2-tier Terminal block				
	CRT1-□D08(-1)		CRT1-□D16(-1)		
Function	**Input Units**	**Output Units**	**Input Units**	**Output Units**	**I/O Units**
Operation Time Monitor	Yes				
Contact Operation Monitor*	Yes				
Total ON Time Monitor*	Yes				
Automatic Baud Rate Detection	Yes				
Unit Conduction Time Monitor	Yes				
Naming Units	Yes				
Naming Connected Devices	Yes				
Network Power Voltage Monitor	Yes				
I/O Power Status Monitor	Yes				
Communications Error History Monitor	Yes				
Input Filter	Yes	---	Yes	---	Yes
Communications Error Output	---	Yes	---	Yes	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	---	Yes
Power Short-circuit Detection	---				
Unconnected Line Detection	---				
Load Short-circuit Detection	---				
Disconnected Line Detection	---				
Removable Terminal Block Structure	Yes				
Expansion Using Expansion Units	---		Yes		---
Scaling	---				
Last Maintenance Date	Yes				
Cumulated Count	---				
Moving Average	---				
Setting the Number of AD Conversion Points	---				
Rate of Change	---				
Comparator	---				
Peak/Bottom Hold	---				
Top/Valley Hold	---				
User Adjustment	---				
Top/Valley Count	---				
Temperature Range Total Time Count	---				
Input Temperature Variation Detection	---				
Input Error Detection Disable Function	---				

Reducing System Startup Time

- Network Power Voltage Monitor
- Input Filter
- Preventing Malfunctions Caused by Inrush Current at Startup
- Automatic Baud Rate Detection
- Scaling
- User Adjustment
- Cumulative Counter
- Moving Average
- Setting the Number of AD Conversion Point
- Peak/Bottom Hold
- Top/Valley Hold
- Rate of Change

Reducing Downtime

- Naming Units
- Naming Connected Devices
- I/O Power Status Monitor
- Power Short-circuit Detection
- Unconnected Line Detection
- Disconnected Line Detection

Improving Maintenance

- Operation Time Monitor
- Contact Operation Monitor
- Unit Conduction Time Monitor
- Total ON Time Monitor
- Network Power Voltage Monitor
- Communications Error History Monitor
- Last Maintenance Date
- Comparator
- Communications Error Output

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units			
	2-tier Terminal block			
	CRT1-ROS08	CRT1-ROS16	CRT1-ROF08	CRT1-ROF16
Function	**Output Units**		**Output Units**	
Operation Time Monitor	Yes		Yes	
Contact Operation Monitor*	Yes		Yes	
Total ON Time Monitor*	Yes		Yes	
Automatic Baud Rate Detection	Yes		Yes	
Unit Conduction Time Monitor	Yes		Yes	
Naming Units	Yes		Yes	
Naming Connected Devices	Yes		Yes	
Network Power Voltage Monitor	Yes		Yes	
I/O Power Status Monitor	---		---	
Communications Error History Monitor	Yes		Yes	
Input Filter	---		---	
Communications Error Output	Yes		Yes	
Preventing Malfunctions Caused by Inrush Current at I/O Startup	---		---	
Power Short-circuit Detection	---		---	
Unconnected Line Detection	---		---	
Load Short-circuit Detection	---		---	
Disconnected Line Detection	---		---	
Removable Terminal Block Structure	Yes		Yes	
Expansion Using Expansion Units	---	Yes	---	Yes
Scaling	---		---	
Last Maintenance Date	Yes		Yes	
Cumulated Count	---		---	
Moving Average	---		---	
Setting the Number of AD Conversion Points	---		---	
Rate of Change	---		---	
Comparator	---		---	
Peak/Bottom Hold	---		---	
Top/Valley Hold	---		---	
User Adjustment	---		---	
Top/Valley Count	---			
Temperature Range Total Time Count	---			
Input Temperature Variation Detection	---			
Input Error Detection Disable Function	---			

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units			
	3-tier Terminal block			
	CRT1-□D08TA(-1) (without Short-circuit and Disconnected Line Detection)		CRT1-□D08TAH(-1) (with Short-circuit and Disconnected Line Detection)	
Function	**Input Units**	**Output Units**	**Input Units**	**Output Units**
Operation Time Monitor	Yes			
Contact Operation Monitor*	Yes			
Total ON Time Monitor*	Yes			
Automatic Baud Rate Detection	Yes			
Unit Conduction Time Monitor	Yes			
Naming Units	Yes			
Naming Connected Devices	Yes			
Network Power Voltage Monitor	Yes			
I/O Power Status Monitor	Yes			
Communications Error History Monitor	Yes			
Input Filter	Yes	---	Yes	---
Communications Error Output	---	Yes	---	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	---
Power Short-circuit Detection	---		Yes	---
Unconnected Line Detection	---		Yes	---
Load Short-circuit Detection	---		---	Yes
Disconnected Line Detection	---		---	Yes
Removable Terminal Block Structure	Yes			
Expansion Using Expansion Units	---			
Scaling	---			
Last Maintenance Date	Yes			
Cumulated Count	---			
Moving Average	---			
Setting the Number of AD Conversion Points	---			
Rate of Change	---			
Comparator	---			
Peak/Bottom Hold	---			
Top/Valley Hold	---			
User Adjustment	---			
Top/Valley Count	---			
Temperature Range Total Time Count	---			
Input Temperature Variation Detection	---			
Input Error Detection Disable Function	---			

***** The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units					
	3-tier Terminal block					
	CRT1-□D16TA(-1) (without Short-circuit and Disconnected Line Detection)			CRT1-□D16TAH(-1) (with Short-circuit and Disconnected Line Detection)		
Function	**Input Units**	**Output Units**	**I/O Units**	**Input Units**	**Output Units**	**I/O units**
Operation Time Monitor	Yes					
Contact Operation Monitor*	Yes					
Total ON Time Monitor*	Yes					
Automatic Baud Rate Detection	Yes					
Unit Conduction Time Monitor	Yes					
Naming Units	Yes					
Naming Connected Devices	Yes					
Network Power Voltage Monitor	Yes					
I/O Power Status Monitor	Yes					
Communications Error History Monitor	Yes					
Input Filter	Yes	---	Yes	Yes	---	Yes
Communications Error Output	---	Yes	Yes	---	Yes	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	Yes	---	Yes
Power Short-circuit Detection	---			Yes	---	Yes
Unconnected Line Detection	---			Yes	---	Yes
Load Short-circuit Detection	---			---	Yes	Yes
Disconnected Line Detection	---			---	Yes	Yes
Removable Terminal Block Structure	Yes					
Expansion Using Expansion Units	---					
Scaling	---					
Last Maintenance Date	Yes					
Cumulated Count	---					
Moving Average	---					
Setting the Number of AD Conversion Points	---					
Rate of Change	---					
Comparator	---					
Peak/Bottom Hold	---					
Top/Valley Hold	---					
User Adjustment	---					
Top/Valley Count	---					
Temperature Range Total Time Count	---					
Input Temperature Variation Detection	---					
Input Error Detection Disable Function	---					

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units	
	Units with e-CON Connectors	
	CRT1-V□D08S(-1)	
Function	Input Units	Output Units
Operation Time Monitor	Yes	
Contact Operation Monitor*	Yes	
Total ON Time Monitor*	Yes	
Automatic Baud Rate Detection	Yes	
Unit Conduction Time Monitor	Yes	
Naming Units	Yes	
Naming Connected Devices	Yes	
Network Power Voltage Monitor	Yes	
I/O Power Status Monitor	---	Yes
Communications Error History Monitor	Yes	
Input Filter	Yes	---
Communications Error Output	---	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---
Power Short-circuit Detection	---	
Unconnected Line Detection	---	
Load Short-circuit Detection	---	
Disconnected Line Detection	---	
Removable Terminal Block Structure	---	
Expansion Using Expansion Units	---	
Scaling	---	
Last Maintenance Date	Yes	
Cumulated Count	---	
Moving Average	---	
Setting the Number of AD Conversion Points	---	
Rate of Change	---	
Comparator	---	
Peak/Bottom Hold	---	
Top/Valley Hold	---	
User Adjustment	---	
Top/Valley Count	---	
Temperature Range Total Time Count	---	
Input Temperature Variation Detection	---	
Input Error Detection Disable Function	---	

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units					
	Units with e-CON Connectors					
	CRT1-□D16S(-1) (without Short-circuit and Disconnected Line Detection)			CRT1-□D16SH(-1) (with Short-circuit and Disconnected Line Detection)		
Function	**Input Units**	**Output Units**	**I/O Units**	**Input Units**	**Output Units**	**I/O units**
Operation Time Monitor	Yes					
Contact Operation Monitor*	Yes					
Total ON Time Monitor*	Yes					
Automatic Baud Rate Detection	Yes					
Unit Conduction Time Monitor	Yes					
Naming Units	Yes					
Naming Connected Devices	Yes					
Network Power Voltage Monitor	Yes					
I/O Power Status Monitor	---	Yes	Yes	---	Yes	Yes
Communications Error History Monitor	Yes					
Input Filter	Yes	---	Yes	Yes	---	Yes
Communications Error Output	---	Yes	Yes	---	Yes	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	Yes	---	Yes
Power Short-circuit Detection	---			Yes	---	Yes
Unconnected Line Detection	---			Yes	---	Yes
Load Short-circuit Detection	---			---	Yes	Yes
Disconnected Line Detection	---			---	Yes	Yes
Removable Terminal Block Structure	---					
Expansion Using Expansion Units	---					
Scaling	---					
Last Maintenance Date	Yes					
Cumulated Count	---					
Moving Average	---					
Setting the Number of AD Conversion Points	---					
Rate of Change	---					
Comparator	---					
Peak/Bottom Hold	---					
Top/Valley Hold	---					
User Adjustment	---					
Top/Valley Count	---					
Temperature Range Total Time Count	---					
Input Temperature Variation Detection	---					
Input Error Detection Disable Function	---					

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units					
	Units with e-CON Connectors					
	CRT1-□D32S(-1) (without Short-circuit and Disconnected Line Detection)			CRT1-□D32SH(-1) (with Short-circuit and Disconnected Line Detection)		
Function	**Input Units**	**Output Units**	**I/O Units**	**Input Units**	**Output Units**	**I/O units**
Operation Time Monitor	Yes					
Contact Operation Monitor*	Yes					
Total ON Time Monitor*	Yes					
Automatic Baud Rate Detection	Yes					
Unit Conduction Time Monitor	Yes					
Naming Units	Yes					
Naming Connected Devices	Yes					
Network Power Voltage Monitor	Yes					
I/O Power Status Monitor	---	Yes	Yes	---	Yes	Yes
Communications Error History Monitor	Yes					
Input Filter	Yes	---	Yes	Yes	---	Yes
Communications Error Output	---	Yes	Yes	---	Yes	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	Yes	---	Yes
Power Short-circuit Detection	---			Yes	---	Yes
Unconnected Line Detection	---			Yes	---	Yes
Load Short-circuit Detection	---			---	Yes	Yes
Disconnected Line Detection	---			---	Yes	Yes
Removable Terminal Block Structure	---					
Expansion Using Expansion Units	---					
Scaling	---					
Last Maintenance Date	Yes					
Cumulated Count	---					
Moving Average	---					
Setting the Number of AD Conversion Points	---					
Rate of Change	---					
Comparator	---					
Peak/Bottom Hold	---					
Top/Valley Hold	---					
User Adjustment	---					
Top/Valley Count	---					
Temperature Range Total Time Count	---					
Input Temperature Variation Detection	---					
Input Error Detection Disable Function	---					

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.

Yes: Supported, ---: Not supported

Unit	Digital I/O Slave Units				
	Units with MIL Connectors				
	CRT1-V□D16ML(-1)		CRT1-V□D32ML(-1)		
Function	Input Units	Output Units	Input Units	Output Units	I/O Units
Operation Time Monitor	Yes				
Contact Operation Monitor*	Yes				
Total ON Time Monitor*	Yes				
Automatic Baud Rate Detection	Yes				
Unit Conduction Time Monitor	Yes				
Naming Units	Yes				
Naming Connected Devices	Yes				
Network Power Voltage Monitor	Yes				
I/O Power Status Monitor	Yes				
Communications Error History Monitor	Yes				
Input Filter	Yes	---	Yes	---	Yes
Communications Error Output	---	Yes	---	Yes	Yes
Preventing Malfunctions Caused by Inrush Current at I/O Startup	Yes	---	Yes	---	Yes
Power Short-circuit Detection	---				
Unconnected Line Detection	---				
Load Short-circuit Detection	---				
Disconnected Line Detection	---				
Removable Terminal Block Structure	---				
Expansion Using Expansion Units	---				
Scaling	---				
Last Maintenance Date	Yes				
Cumulated Count	---				
Moving Average	---				
Setting the Number of AD Conversion Points	---				
Rate of Change	---				
Comparator	---				
Peak/Bottom Hold	---				
Top/Valley Hold	---				
User Adjustment	---				
Top/Valley Count	---				
Temperature Range Total Time Count	---				
Input Temperature Variation Detection	---				
Input Error Detection Disable Function	---				

* The Contact Operation Monitor and the Total ON Time Monitor cannot be used at the same time for the same contact.