GATEWAY MODULE

MODEL **R7G-SC-SHL**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:
Gateway module...(1)

■ MODEL NO.
Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL
This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANG
• Locate the power input rating marked on the product and confirm its operational range as indicated below:
  24V DC rating: 24V ±10%, approx. 1.8W

■ GENERAL PRECAUTIONS
• Before you remove the unit or mount it, turn off the power supply for safety.
• DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

■ ENVIRONMENT
• Indoor use.
• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
• Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
• Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.
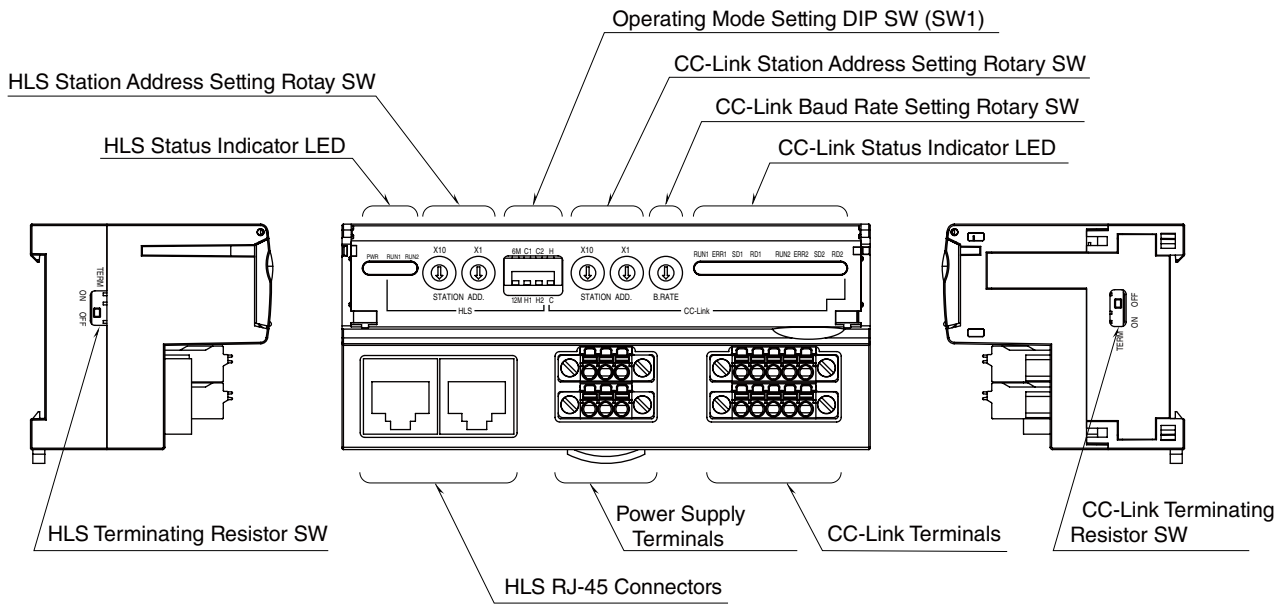
■ WIRING
• Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ AND ....
• The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATION

Operating Mode Setting DIP SW (SW1)

HLS Station Address Setting Rotay SW

CC-Link Station Address Setting Rotary SW

HLS Status Indicator LED

CC-Link Baud Rate Setting Rotary SW

CC-Link Status Indicator LED

HLS Terminating Resistor SW

Power Supply Terminals

CC-Link Terminals

CC-Link Terminating Resistor SW

HLS RJ-45 Connectors

■ STATUS INDICATOR LED

HLS ID	COLOR	FUNCTION
PWR	Green	Turns on when the internal 5V is supplied normally.
RUN1/ RUN2	Green	Turns on when the refresh data is received normally.

| CC-Link ID	COLOR	FUNCTION
RUN1/ RUN2	Red	Turns on when the refresh data is received normally.
ERR1/ ERR2	Red	Turns on when the received data is abnormal.
SD1/ SD2	Red	Turns on when the module is transmitting.
RD1/ RD2	Red	Turns on when the module is receiving.

■ CC-Link STATION ADDRESS

Station Address is selected between 1 and 63 in decimal. The left switch determines the tenth place digit, while the right switch does the ones place digit of the address. Setting "n" with the rotary switches, the addresses are assigned to n, n+1 for CH1, CH2 respectively.

* For CC-Link network parameters, the following station information for two stations is required.

Station type: Remote I/O, Data allocation: 1

Station Address Setting (x1)

Station Address Setting (x10)
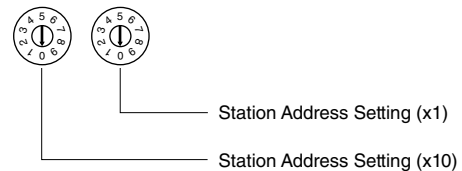
■ HLS STATION ADDRESS

Station Address is selected between 01H and 3FH in hexadecimal. The left switch determines the sixteenths place digit, while the right switch does the ones place digit of the address.
Setting "m" with the rotary switches, the addresses are assigned to m, m+1 for CH1, CH2 respectively.

Station Address Setting (x1)

Station Address Setting (x16)
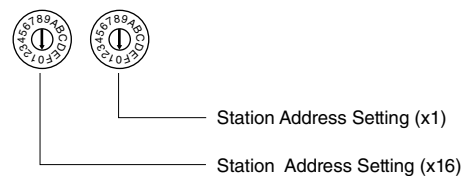
■ **OPERATING MODE**

• **HLS transfer rate (SW1-1)**

HLS TRANSFER RATE	CH1, CH2
	SW1-1
12Mbps (*)	12M
6Mbps	6M

• **HLS output at the loss of communication (SW1-2, 1-3)**

HLS OUTPUT AT THE LOSS OF COMMUNICATION	CH1	CH2
	SW1-2	SW1-3
Hold the output (*) (maintains the last data received normally)	H1	H2
Reset the output (turned off)	C1	C2

• **CC-Link output at the loss of communication (SW1-4)**

CC-Link OUTPUT AT THE LOSS OF COMMUNICATION	CH1, CH2
	SW1-4
Hold the output (*) (maintains the last data received normally)	H
Reset the output (turned off)	C

(*) Factory setting

■ **CC-Link BAUD RATE**

Baud Rate is selected with the rotary switch.

0 : 156 kbps
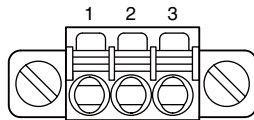1 : 625 kbps
2 : 2.5 Mbps
3 : 5 Mbps
4 : 10 Mbps

Baud Rate Setting

■ **TERMINATING RESISTOR**

To use the terminating resistor, turn the switch ON, and OFF to invalidate. (Factory setting OFF)
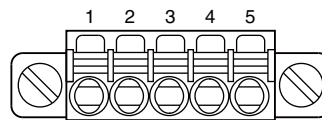
■ **POWER SUPPLY AND TRANSMISSION WIRING**

• **Power supply**

1 2 3

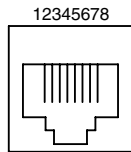1. +24V   Power Supply (24V DC)
2. 0V   Power Supply (0V)
3. FG   FG

• **CC-Link**

1 2 3 4 5

1. DA   blue
2. DB   white
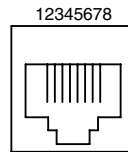3. DG   yellow
4. SLD   Shield
5. FG   FG

• **HLS**
Full-duplex communication

12345678

1. NC   No connection
2. NC   No connection
3. TXD+ Network (Slave, transmission +)
4. TXD− Network (Slave, transmission −)
5. RXD+ Network (Master, transmission+)
6. RXD− Network (Master, transmission−)
7. NC   No connection
8. SLD1 Shield

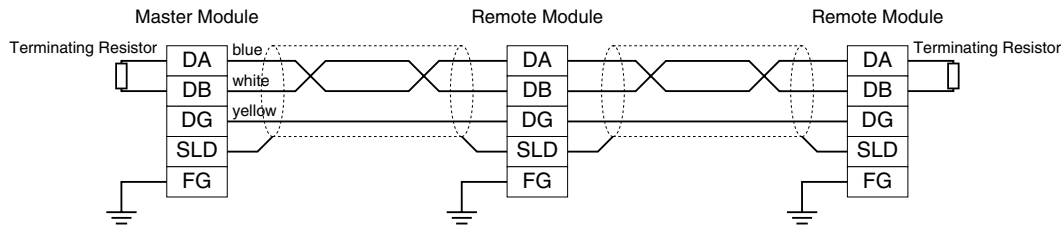**Half-duplex communication**

12345678

1. NC   No connection
2. NC   No connection
3. TR+   Network (+)
4. TR−   Network (−)
5. NC   No connection
6. NC   No connection
7. NC   No connection
8. SLD1 Shield

■ **Master Module wirng**
• **CC-Link**

Master Module | Remote Module | Remote Module
Terminating Resistor   DA blue / DB white / DG yellow / SLD / FG
DA / DB / DG / SLD / FG
DA / DB / DG / SLD / FG   Terminating Resistor

• **HLS**
Full-duplex communication

Master Module | Slave Module | Slave Module
Terminating Resistor   TXD− / TXD+
Terminating Resistor   RXD− / RXD+ / SLD1
RXD− / RXD+ / TXD− / TXD+ / SLD1
RXD− / RXD+ / TXD− / TXD+ / SLD1   Terminating Resistor / Terminating Resistor

Half-duplex communication

Master Module | Slave Module | Slave Module
Terminating Resistor   TR+ / TR− / SLD1
TR+ / TR− / SLD1
TR+ / TR− / SLD1   Terminating Resistor

STATUS INDICATOR LED

RUNx	ERRx	SDx *[1]	RDx	STATUS *[2]
ON	BL	BL	ON	Communicates normally with occasional CRC errors due to noise interference.
ON	BL	BL	ON	Communicates normally but the Baud Rate and/or Station Address switches failed. ERRx LED blinks approximately in 0.5 seconds intervals.
ON	BL	BL	OFF	----
ON	BL	OFF	ON	CRC error found in the received data. Unable to respond.
ON	BL	OFF	OFF	----
ON	OFF	BL	ON	Normal communication
ON	OFF	BL	OFF	----
ON	OFF	OFF	ON	Unable to receive data addressed to the station.
ON	OFF	OFF	OFF	----
OFF	BL	BL	ON	Performs the interval-timed responses but CRC error found in receiving the refresh data.
OFF	BL	BL	OFF	----
OFF	BL	OFF	ON	CRC error found in the data addressed to the station.
OFF	BL	OFF	OFF	----
OFF	OFF	BL	ON	Link is not started.
OFF	OFF	BL	OFF	----
OFF	OFF	OFF	ON	No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master)
OFF	OFF	OFF	OFF	Unable to receive data due to wire breakdown
OFF	ON	OFF	ON/OFF	Faulty Baud Rate and/or Station Address setting
OFF	OFF	OFF	OFF	Power input removed. Or power supply failure.

OFF = OFF, ON = ON, BL = Blinking
*1. SDx LED may look not blinking but ON with high baud rate and fewer connected modules.
*2. LEDs indicated with "----" in STATUS rarely occurs in normal operation (LED failure or the like as possible cause).
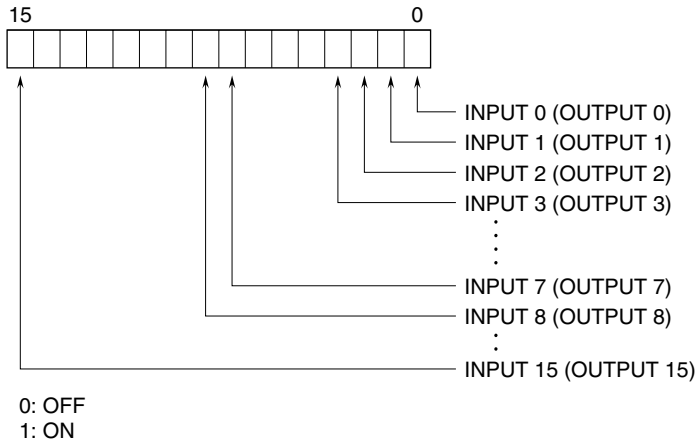
DATA ALLOCATION
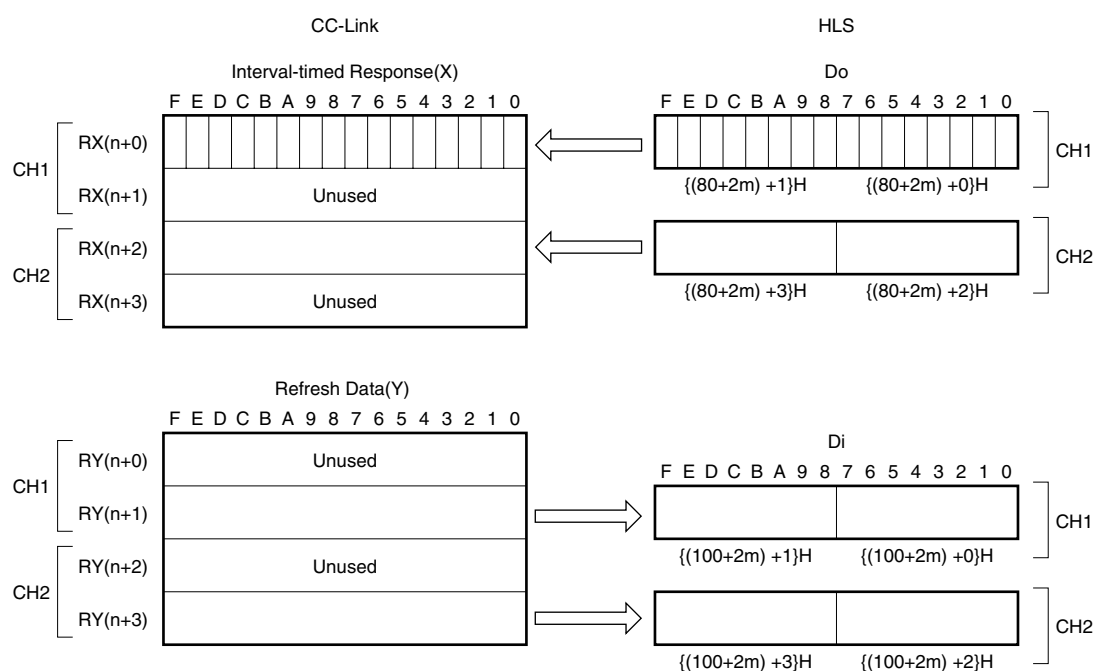
n: CC-Link station address selected with rotary SW.
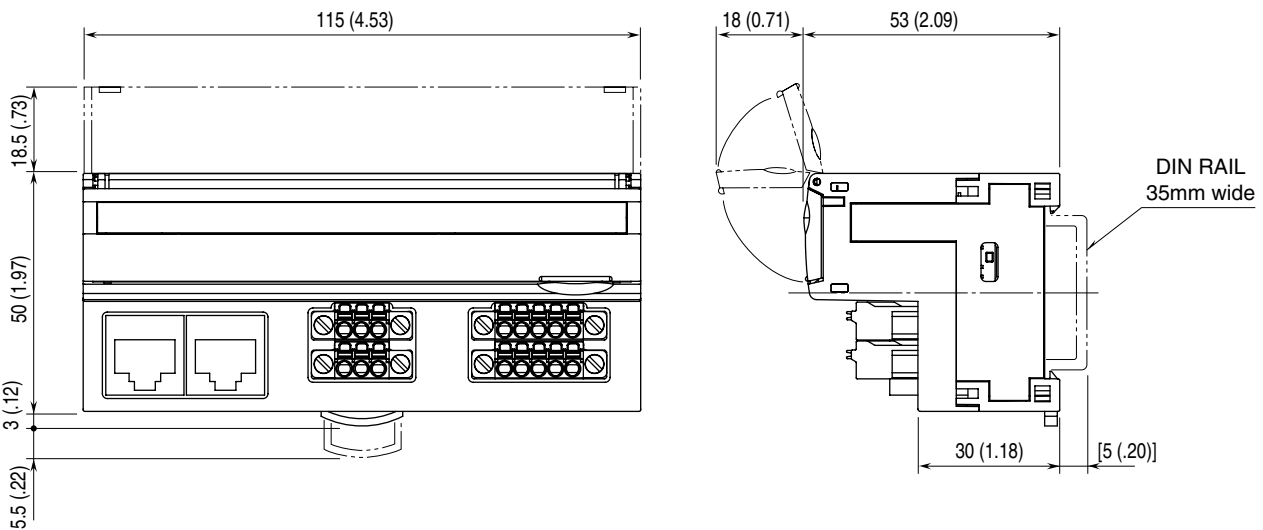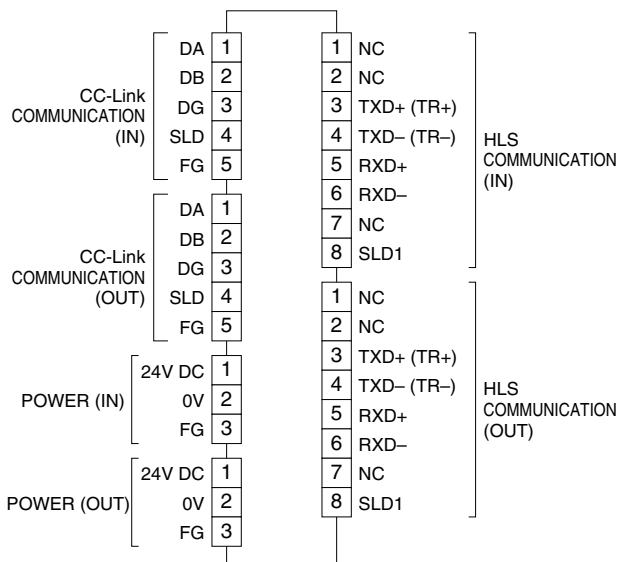m: HLS module address selected with rotary SW.

I/O DATA DESCRIPTIONS

```
15                                    0
```

INPUT 0 (OUTPUT 0)
INPUT 1 (OUTPUT 1)
INPUT 2 (OUTPUT 2)
INPUT 3 (OUTPUT 3)
INPUT 7 (OUTPUT 7)
INPUT 8 (OUTPUT 8)
INPUT 15 (OUTPUT 15)

0: OFF
1: ON

TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm (inch)

115 (4.53)
18.5 (.73)
50 (1.97)
3 (.12)
5.5 (.22)

18 (0.71)   53 (2.09)

DIN RAIL
35mm wide

30 (1.18)   [5 (.20)]

■ CONNECTION DIAGRAM

CC-Link COMMUNICATION (IN)
DA	1
DB	2
DG	3
SLD	4
FG	5

CC-Link COMMUNICATION (OUT)
DA	1
DB	2
DG	3
SLD	4
FG	5

POWER (IN)
24V DC	1
0V	2
FG	3

POWER (OUT)
24V DC	1
0V	2
FG	3

HLS COMMUNICATION (IN)
1	NC
2	NC
3	TXD+ (TR+)
4	TXD– (TR–)
5	RXD+
6	RXD–
7	NC
8	SLD1

HLS COMMUNICATION (OUT)
1	NC
2	NC
3	TXD+ (TR+)
4	TXD– (TR–)
5	RXD+
6	RXD–
7	NC
8	SLD1

WIRING INSTRUCTIONS

■ POWER SUPPLY, CC-Link

Applicable wire size: $0.2 – 1.5$ mm^2
Stripped length: 10 mm
Recommended solderless terminal:
AI 0,25-12BU 0.25 mm^2 (Phoenix Contact)
AI 0,34-12TQ 0.34 mm^2 (Phoenix Contact)
AI 0,5-10WY 0.5 mm^2 (Phoenix Contact)
AI 0,75-10GY 0.75 mm^2 (Phoenix Contact)
A1-10 1.0 mm^2 (Phoenix Contact)
A1,5-–10 1.5 mm^2 (Phoenix Contact)

■ HLS

Recommended cable connector: TM21P-88P
(Hirose Electric) (not included in the package)

TIMING AT DATA COMMUNICATION

In this module, the transmission between CC-Link and HLS is not synchronized. Therefore, if one of the networks read the transmitted data before the completion of its update by the other network, the data may be uncertain as 16-bit data. If the correct 16-bit data is necessary, arrange the host application program.

For example, the initial data transmitted from HLS to CC-Link is 0000 | 0000 | 0000 | 0000 (T_0). When the HLS changes the data to 0000 | 0000 | 0000 | 0111 at THA, and CC-Link read it simultaneously (T_{CA} = T_{HA}), the 3 LSBs are uncertain at the moment. The 3 LSBs are possibly 000, 001, 010, 011, 100, 101 or 110. When the HLS does not change the data until the CC-Link reads it next time (T_{CA}+1), the CC-Link can read correctly. When the CC-Link transmits and HLS reads data, they do the same with the above.

When the 16 bits are independent data (e.g. discrete I/Os), the above phenomenon seems as the delay of 1 scan time. When the 16-bit data is one word or the combinations of the bits have certain definition, you must be careful.

In order to avoid reading uncertain as 16-bit data, arrange the host application program. For example, the transmitting network does not change the data longer than receiving network's update time. The receiving network reads at least twice and until the two sequential data sets are identical.

HLS Update Timing	HLS Transmitting Data	CC-Link Receiving data	CC-Link Update Timing	
T_0	0000 | 0000 | 0000 | 0000		T_0	
:	:	:		
T_{HA}	0000 | 0000 | 0000 | 0111	0000 | 0000 | 0000 | 0xxx	T_{CA}	↑ The LSBs of T_{CA} are uncertain.
T_{HA+1}	0000 | 0000 | 0000 | 0111			
T_{HA+2}	0000 | 0000 | 0000 | 0111			
T_{HA+3}	0000 | 0000 | 0000 | 0111			↓
T_{HA+4}	0000 | 0000 | 0000 | 0111	0000 | 0000 | 0000 | 0111	T_{CA+1}	Receives the correct data.
T_{HA+5}	0000 | 0000 | 0000 | 0111			
T_{HA+6}	0000 | 0000 | 0000 | 0111			
T_{HA+7}	0000 | 0000 | 0000 | 0111			
T_{HA+8}	0000 | 0000 | 0000 | 0111	0000 | 0000 | 0000 | 0111	T_{CA+2}	CC-Link received data is fixed.
:	:	:	:	