ANALOG I/O MODULE
(CC-Link)

| MODEL | **61C** |

CONTENTS

1. 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:**
Analog I/O module .... (1)
Terminating resistor (110 Ω, 0.5 W).. (1)

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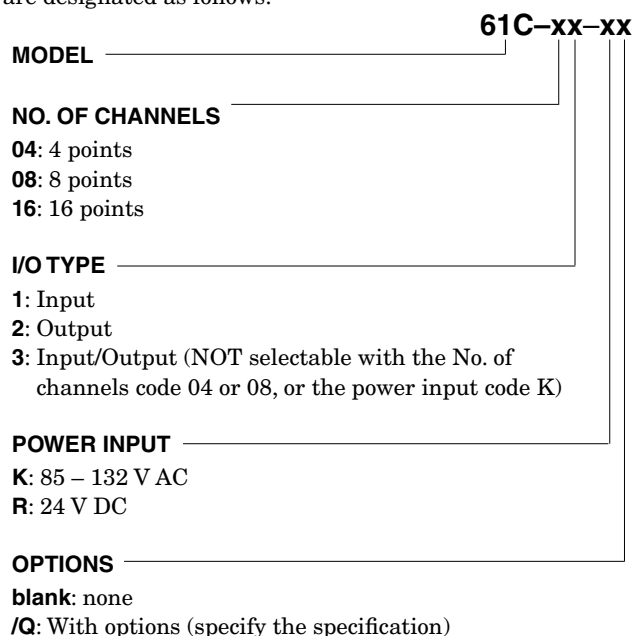Confirm Model No. marking on the product to be exactly what you ordered.

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

2. GENERAL DESCRIPTION

The model 61C, Analog I/O Module, is used as remote device for CC-Link.
Model number and suffix codes are designated as follows:

61C–xx–xx

MODEL

NO. OF CHANNELS
04: 4 points
08: 8 points
16: 16 points

I/O TYPE
1: Input
2: Output
3: Input/Output (NOT selectable with the No. of
   channels code 04 or 08, or the power input code K)

POWER INPUT
K: 85 – 132 V AC
R: 24 V DC

OPTIONS
blank: none
/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION : Q
COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

Various inputs and outputs are available by employing Mini-M series, Pico-M series or other signal conditioners. The 61C input module converts analog inputs (0 – 100%) proportionally into 16-bit signed binary signals. The one for output converts 16-bit signed binary signals proportionally into analog outputs (0 – 100%).
This instruction manual explains hardware specifications, component identification, and wiring instructions, etc.

3. POINTS OF CAUTION

■**POWER INPUT RATING & OPERATIONAL RANGE**
• Locate the power input rating marked on the product and confirm its operational range as indicated below:
   85 – 132V AC rating: 85 – 132V, 47 – 66 Hz, approx. 4VA
   24V DC rating: 24V ±10%, approx. 4W, approx. 160mA

■**GENERAL PRECAUTIONS**
• Before you remove the unit or mount it, turn off the power supply, input signal and output signal for safety.

■**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 -5 to +55°C (23 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.

4. INSTALLATION

Use the Installation Base (model: MxBS2).

5. HARDWARE SPECIFICATIONS

5.1 61C-x1 (No. of channels codes 04, 08, or 16 in x)

ITEM	SPECIFICATIONS	
Analog input	1 – 5 V DC (input resistance ≥ 1 MΩ)	
Protocol	CC-Link, Ver.1.10	
Digital output	16-bit signed binary (14 bits for data)	
I/O characteristics	0 – 10000 proportional to analog input 0 – 100%	
Maximum resolution	1 mV for 1 – 5 V DC range	
Accuracy	±0.1%	
No. of analog input channels	61C-041	4
	61C-081	8
	61C-161	16
Isolation	Input to CC-Link to power	
Required nodes	61C-041	1 (RX/RY 32 points each, RWr/RWw each 4 points)
	61C-081	2 (RX/RY 32 points each, RWr/RWw each 8 points)
	61C-161	4 (RX/RY 32 points each, RWr/RWw each 16 points)
Connection	CC-Link	Euro type connector terminal (applicable wire size: 0.2 – 2.5 mm^2, stripped length 7 mm)
	Input	Via the Installation Base (model: MxBS2)
	Power input	Via the Installation Base (model: MxBS2)
Noise immunity	500 V p-p, 1μsec.	
Dielectric strength	1500 V AC @ 1 minute (input to CC-Link to power)	
Insulation resistance	≥ 100 MΩ with 500 V DC (input to CC-Link to power)	
Weight	250 g (0.55 lb)	
Power input	61C-x1-K	85 – 132 V AC, 47 – 66 Hz
	61C-x1-R	24 V DC ±10%
Power consumption	61C-x1-K	approx. 4 VA
Current consumption	61D-x1-R	approx. 160 mA

5.2 61C-x2 (No. of channels codes 04, 08, or 16 in x)

ITEM	SPECIFICATIONS	
Analog output	1 – 5 V DC (load resistance ≥ 20 kΩ)	
Protocol	CC-Link, Ver.1.10	
Digital input	16-bit signed binary (14 bits for data)	
I/O characteristics	0 – 10000 proportional to analog output 0 – 100%	
Maximum resolution	1 mV for 1 – 5 V DC range	
Accuracy	±0.1% excluding the accuracy of I/O modules	
No. of analog output channels	61C-042	4
	61C-082	8
	61C-162	16
Isolation	Output to CC-Link to power	
Required nodes	61C-042	1 (RX/RY 32 points each, RWr/RWw each 4 points)
	61C-082	2 (RX/RY 32 points each, RWr/RWw each 8 points)
	61C-162	4 (RX/RY 32 points each, RWr/RWw each 16 points)
Connection	CC-Link	Euro type connector terminal (applicable wire size: 0.2 – 2.5 mm^2, stripped length 7 mm)
	Output	Via the Installation Base (model: MxBS2)
	Power input	Via the Installation Base (model: MxBS2)
Noise immunity	500 V p-p, 1 μsec.	
Dielectric strength	1500 V AC @ 1 minute (output to CC-Link to power)	
Insulation resistance	≥ 100 MΩ with 500 V DC (output to CC-Link to power)	
Weight	250 g (0.55 lb)	
Power input	61C-x2-K	85 – 132 V AC, 47 – 66 Hz
	61C-x2-R	24 V DC ±10%
Power consumption	61C-x2-K	approx. 4 VA
Current consumption	61C-x2-R	approx. 160 mA

5.3 61C-163

ITEM	SPECIFICATIONS		
Analog input	1 – 5 V DC (input resistance $\geq$ 1 MΩ)		
Analog output	1 – 5 V DC (load resistance $\geq$ 20 kΩ)		
Protocol	CC-Link, Ver.1.10		
Digital input	16-bit signed binary (14 bits for data)		
Digital output	16-bit signed binary (14 bits for data)		
I/O characteristics	0 – 10000 proportional to analog input / output 0 – 100%		
Maximum resolution	1 mV for 1 – 5 V DC range		
Accuracy	±0.1%		
No. of analog input channels	8		
No. of analog output channels	8		
Isolation	I/O to CC-Link to power.		
Required nodes	2 (RX/RY 32 points each, RWr/RWw each 8 points)		
Connection	CC-Link	Euro type connector terminal (applicable wire size: 0.2 – 2.5 mm^2, stripped length 7 mm)	
	I/O	Via the Installation Base (model: MxBS2)	
	Power input	Via the Installation Base (model: MxBS2)	
Noise immunity	500 V p-p, 1 µsec.		
Dielectric strength	1500 V AC @ 1 minute (I/O to CC-Link to power.)		
Insulation resistance	$\geq$ 100 MΩ with 500 V DC (I/O to CC-Link to power.)		
Weight	250 g (0.55 lb)		
Power input	24 V DC ±10%		
Current consumption	approx. 160 mA		

6. COMPONENT IDENTIFICATIONS & HARDWARE ADJUSTMENTS

Terminating Resistor
(accessory)
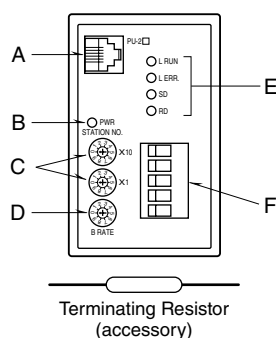
|	NAME	FUNCTIONS	
A	Modular jack for factory calibration	Used only for factory calibration.	
B	Power LED	MARKING (color)	FUNCTIONS
		PWR (green)	ON: Power is supplied.
			OFF: Power is not supplied.
C	Station No. setting	Selectable within 1 – 64. (factory set to: 00)	
D	Baud rate setting	SETTING	BAUD RATE
		0	156 kbps (factory default)
		1	625 kbps
		2	2.5 Mbps
		3	5 Mbps
		4	10 Mbps
		Other than 0 – 4	Not valid;
			L ERR. turns on as a transmission error.
E	Status indicator LED	MARKING (color)	FUNCTIONS
		L RUN (red)	ON: normal communication
			OFF: communication down (time-out error)
		L ERR. (red)	ON: transmission data error
			Blinking: transmission data error
			OFF: normal transmission
		SD (red)	ON when transmitting
		RD (red)	ON when receiving
F	Euro type connector terminal for CC-Link	For wiring to CC-Link	

7. TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

■ **EXTERNAL DIMENSIONS unit: mm (inch)**
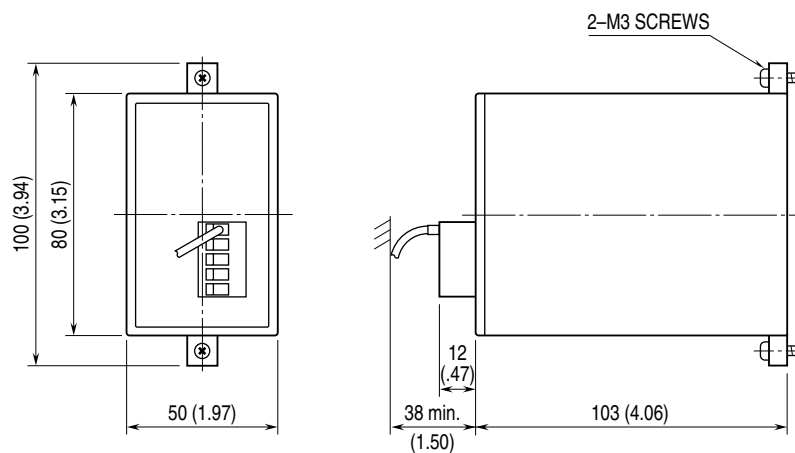
■ **CONNECTION DIAGRAM**
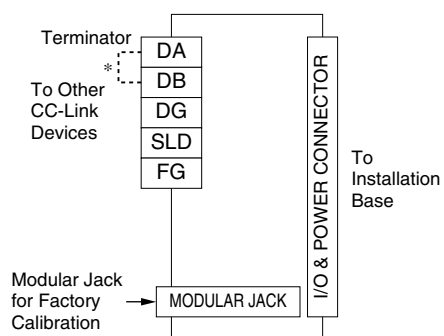
* Attach the terminating resistor when the module is
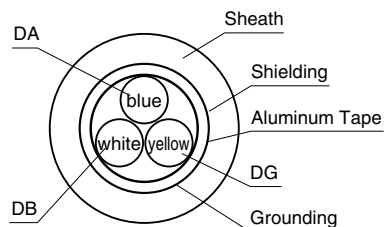 at the termination of a transmission line.

8. CONNECTING DATA LINK WIRES

The following explanations apply to the wires connecting the 61C to the Master Unit.

8.1 TWISTED-PAIR CABLE

The following types of wire are recommended for connecting the 61C to the Master Unit.
KURAMO ELECTRIC   FANC-SB 0.5 mm^2 × 3 or equivalent

8.2 POINTS OF CAUTION IN HANDLING WIRES

DO NOT apply extraordinary forces to the wires as explained in the following:
1) DO NOT SQUEEZE the wires with a sharp-edged tool.
2) DO NOT TWIST the wires extraordinarily.
3) DO NOT PULL the wires extraordinarily tight.
4) DO NOT TRAMPLE on the wires.
5) DO NOT PUT objects onto the wires.
6) DO NOT DAMAGE the insulation tube of wires.

8.3 WIRING DIAGRAM

Connect the 61C to the Master Unit as shown below.
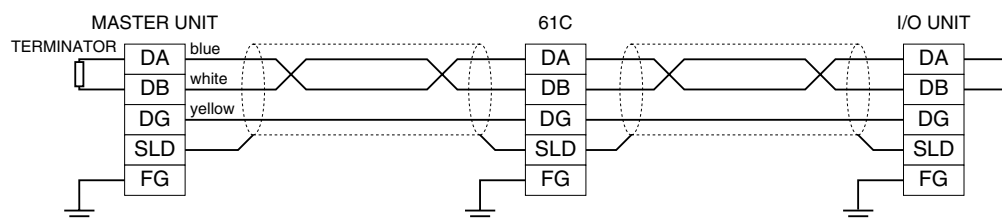
9. POINTS OF CAUTION IN CONNECTING WIRES

Appropriate precautions are required such as follows for protecting the system from external noise interference:
1) Separate analog I/O and communication wires from others in order to prevent surge or induction noises.
2) Separate power input wires (AC) from those for driving motors.
3) Do not install these wires next to main supply circuits or high voltage cables.
   Never bind them to these circuits.
4) Ground the shield of communication wires at one point.
   Consideration about locations of the ground may be necessary according to external noise interference.

10. I/O SIGNALS

10.1 REMOTE I/O

The 61C occupies from 1 up to 4 nodes according to the number of I/O channels. Regardless of the number of nodes, 32 bits are assigned to each of input and output for sending to/receiving from the Master Unit. One (1) bit among RXxB* is used as remote device (61C) READY signal, turned ON when the 61C is in normal operation.

    *. x = (Station No. × 2 − 1) H
      [example] Station No. = 9
         9 × 2 − 1 = 17 ✕ 11H
         READY signal is input at RX11B.

10.2 ASSIGNING REMOTE REGISTERS

(1) 61C-x1, 61C-163

The 61C-x1 does not use the remote registers for the direction from the Master to Remote (RWwn to RWwn+15).
The table below shows the data assignment of those for the direction from the Remote to Master.

DIRECTION	ADDRESS	CONTENTS	61C-041	61C-081, 163	61C-161	DEFAULT
61C ↓ Master	RWrn + 0	Ch. 1 digital output	✓	✓	✓	0
	RWrn + 1	Ch. 2 digital output	✓	✓	✓	0
	RWrn + 2	Ch. 3 digital output	✓	✓	✓	0
	RWrn + 3	Ch. 4 digital output	✓	✓	✓	0
	RWrn + 4	Ch. 5 digital output		✓	✓	0
	RWrn + 5	Ch. 6 digital output		✓	✓	0
	RWrn + 6	Ch. 7 digital output		✓	✓	0
	RWrn + 7	Ch. 8 digital output		✓	✓	0
	RWrn + 8	Ch. 9 digital output			✓	0
	RWrn + 9	Ch. 10 digital output			✓	0
	RWrn + 10	Ch. 11 digital output			✓	0
	RWrn + 11	Ch. 12 digital output			✓	0
	RWrn + 12	Ch. 13 digital output			✓	0
	RWrn + 13	Ch. 14 digital output			✓	0
	RWrn + 14	Ch. 15 digital output			✓	0
	RWrn + 15	Ch. 16 digital output			✓	0

(2) 61C-x2, 61C-163

The 61C-x2 does not use the remote registers for the direction from the Remote to Master (RWrn to RWrn+15).
The table below shows the data assignment of those for the direction from the Master to Remote.

| DIRECTION	ADDRESS	CONTENTS	61C-042	61C-082,163	61C-162	DEFAULT
Master ↓ 61C	RWwn + 0	Ch. 1 digital input	✓	✓	✓	0
	RWwn + 1	Ch. 2 digital input	✓	✓	✓	0
	RWwn + 2	Ch. 3 digital input	✓	✓	✓	0
	RWwn + 3	Ch. 4 digital input	✓	✓	✓	0
	RWwn + 4	Ch. 5 digital input		✓	✓	0
	RWwn + 5	Ch. 6 digital input		✓	✓	0
	RWwn + 6	Ch. 7 digital input		✓	✓	0
	RWwn + 7	Ch. 8 digital input		✓	✓	0
	RWwn + 8	Ch. 9 digital input			✓	0
	RWwn + 9	Ch. 10 digital input			✓	0
	RWwn + 10	Ch. 11 digital input			✓	0
	RWwn + 11	Ch. 12 digital input			✓	0
	RWwn + 12	Ch. 13 digital input			✓	0
	RWwn + 13	Ch. 14 digital input			✓	0
	RWwn + 14	Ch. 15 digital input			✓	0
	RWwn + 15	Ch. 16 digital input			✓	0

10.3 A/D CONVERSION

(1) 61C-x1, 61C-163

Analog input signal (0 – 100%) from signal conditioners is converted proportionally into digital data, provided to the Master Unit.
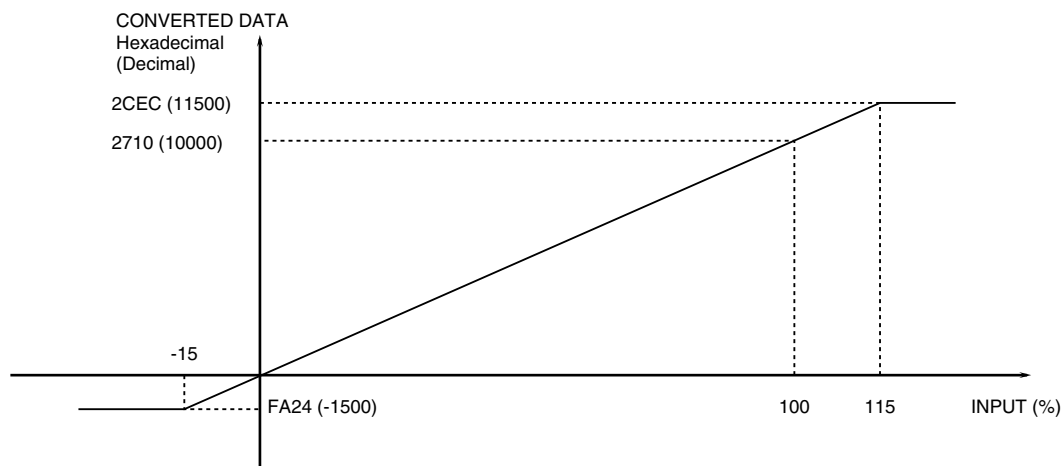
(2) 61C-x2, 61C-163

Digital input signal from the Master Unit is converted proportionally into analog output signal (0 – 100%).
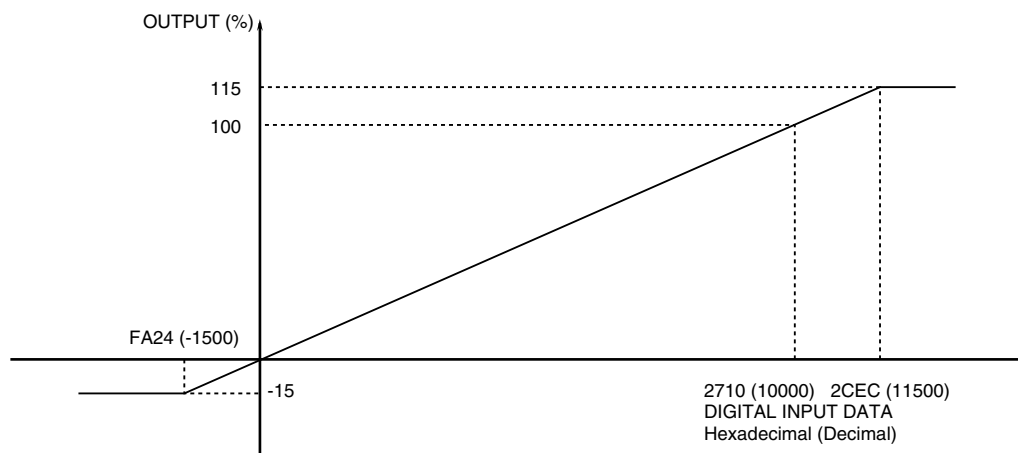
**(3) OUTPUT IN AN ABNORMALITY**

When an abnormality such like CPU error, STOP, time-out occurs at the PLC, the output signal of the 61C is maintained as HOLD (no clearing output signal, keeping the value just before the abnormality).

When the PLC recovers to normal operation and the 61C receives new data, the output restarts changing.

11. PARAMETERS SETTING BY PLC PROGRAM

11.1 GENERAL DESCRIPTION

The ladder diagram below shows a program example assuming that the master station's first I/O number is X/Y20 to 3F. For detailed information, refer to users manuals for the PLC CPU and the Master Unit.
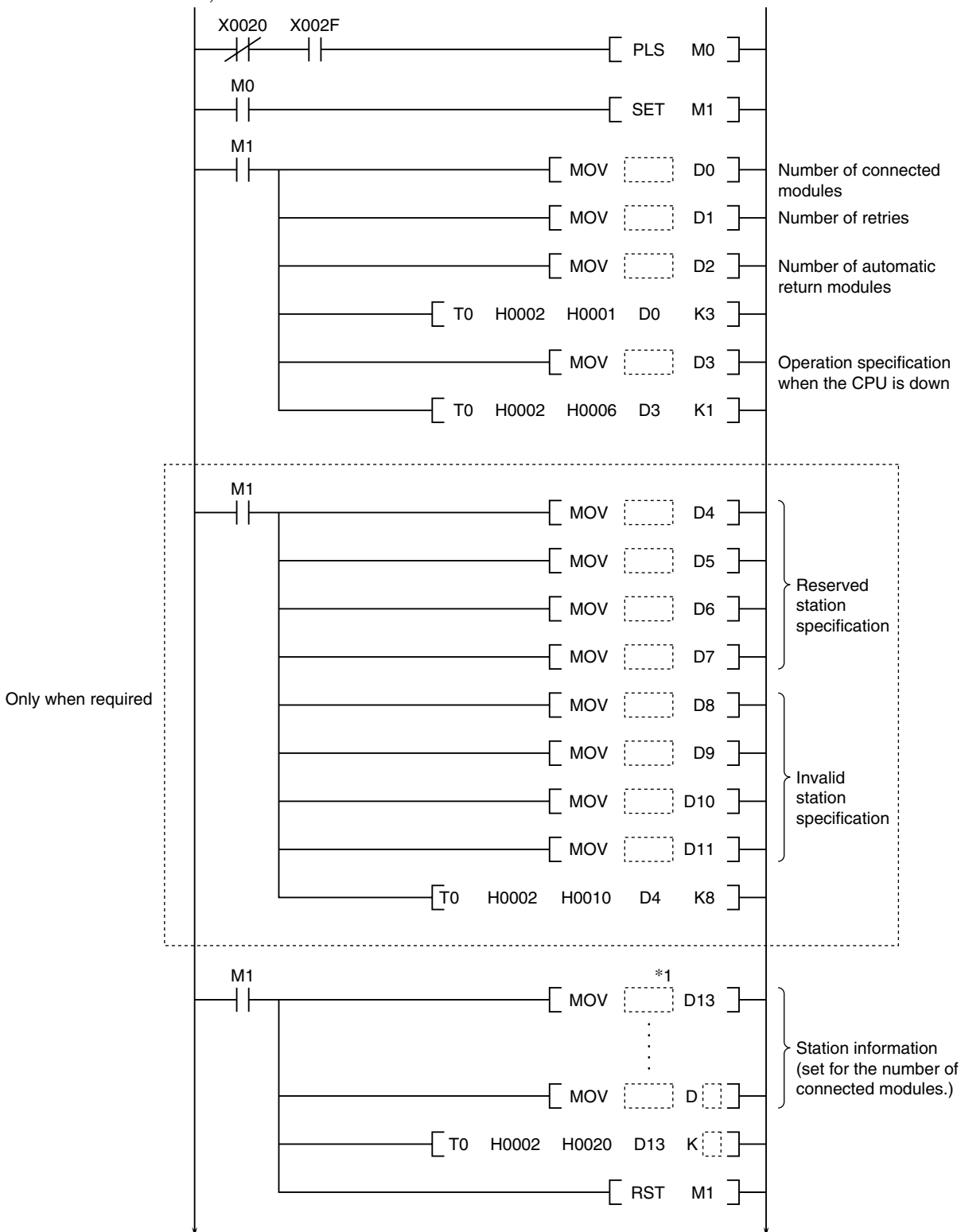
*1. [Example] 11xx for model 61C-04
12xx for model 61C-08, 61C-163
14xx for model 61C-16

xx = 61C Station No.

12. TROUBLESHOOTING

Basic troubleshooting methods are explained in this section.
For problems concerning the PLC CPU and Master Unit, consult users manuals for these units.

12.1 L ERR. INDICATOR BLINKING

CHECK	TROUBLESHOOTING
Have you changed the station No. and/or baud rate settings during normal operation?	Return these settings to the state when the unit operated normally.

12.2 L ERR. INDICATOR ON

CHECK	TROUBLESHOOTING
Are the station No. and/or baud rate settings correct?	Set them correctly.

12.3 L RUN INDICATOR OFF

Consult the users manual for the Master Unit.

12.4 UNABLE TO READ/WRITE DIGITAL VALUES?

CHECK	TROUBLESHOOTING
Is the L RUN indicator OFF?	Refer to Section "12.3 L RUN INDICATOR OFF".
Is the L ERR. indicator blinking or OFF?	Consult the users manual for the Master Unit.
Is the RUN indicator on the PLC CPU blinking or OFF?	Consult the users manual for the CPU.
Is the RUN indicator on the Master Unit OFF?	Consult the users manual for the Master Unit.
Are the RD/SD indicators on the Master Unit ON?	Consult the users manual for the Master Unit.
Are the wires for analog I/O properly connected to respective terminals? No wire breakdown?	Check these wires visually or check conductivity for each pair of wires.
[61C-x1, 61C-163] Remove analog input wires and apply test voltage to the terminals (e.g. Use a dry cell). Try to read out digital value.	If the digital value is read out normally, there are possibilities of noise interference via external wires. Check wiring and grounding.
[61C-x2, 61C-163] Remove analog output wires and connect a tester to the terminals. Try to read out digital value.	If the digital value is read out normally, there are possibilities of noise interference via external wires. Check wiring and grounding.

13. LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protectors for protection against induced lightning surges. Please contact us to choose appropriate models.