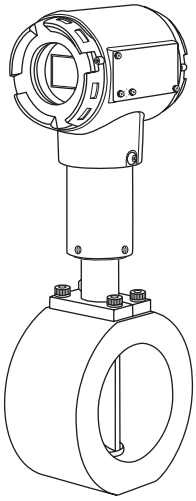
No. CP-SP-1160E

CML/CMF050 Series
High-Flow Mass Flow Meter

User's Manual
Communications



Thank you for purchasing the CML/CMF050 Series High-Flow Mass Flow meter.

This manual contains information for ensuring correct use of the CML/CMF050 Series communication functions.

This manual should be read by those who design and maintain devices that use the CML/CMF050 Series communication functions. Be sure to keep this manual nearby for handy reference.

Azbil Corporation

IMPORTANT

If it is necessary to change the parameters of the CML/CMF050 Series frequently by communication, write data at addresses of RAM. The guaranteed data write count at the EEPROM addresses is limited to 100,000 times.

Note that the data in RAM is cleared, and the data in EEPROM is copied on RAM if the power supply to the CML/CMF050 Series interrupted.

Please read the "Terms and Conditions" from the following URL before ordering or use:

http://www.azbil.com/products/bi/order.html

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact the azbil Group.

In no event is Azbil Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

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Conventions Used in This Manual

■ To prevent injury to the operator and others, and to prevent property damage, the following types of safety precautions are indicated:

⚠**WARNING**	Warnings are indicated when mishandling this product might result in death or serious injury.
⚠**CAUTION**	Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

■ In describing the product, this manual uses the icons and conventions listed below.


Use caution when handling the product.


The indicated action is prohibited.


Be sure to follow the indicated instructions.

Handling Precautions:
Handling Precautions indicate items that the user should pay attention to when handling the CML/CMF050 Series.

Note: Notes indicate information that might benefit the user.

☞: This indicates the item or page that the user is requested to refer to.

(1), (2), (3): Numbers within parentheses indicate steps in a sequence or parts of an explanation.

⚠WARNING

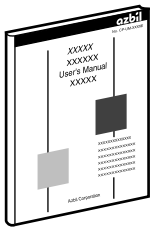
	Make sure that the FG terminal is properly grounded with a resistance of less than 100 Ω. Failure to do so might cause an electrick shock or fire.
	Befor wiring the device, be sure to turn the power OFF. Failure to do so might cause electrick shock.
	Do not touch electrically charged part such as a power terminal. Doing so might cause electrick shock.
	Do not disassemble the device. Doing so might cause electrick shock or faulty operation.

⚠CAUTION

	Wire the device properly according to instructions. Use the type of wire specified in the user's manual and follow recognized installation methods. Failure to do so might cause electric shock, fire or faulty operation.
	Firmly tighten the terminal screws at the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
	Do not use unused terminals as relay terminals. Doing so might cause electrick shock, fire or faulty operation.

The Role of This Manual

Two manuals have been prepared for the CML/CMF050 Series. Read the manual according to your specific requirements. The below lists all the manuals that accompany the CML/CMF050 Series and gives a brief outline of the manual. If you do not have the required manual, contact the azbil Group or your dealer.

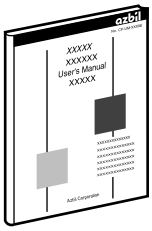


CML Series High-Flow Mass Flow Meter

Manual No. CP-SP-1161E

First-time users of the CML Series, and those in charge of maintenance or hardware design for incorporating a CML Series flowmeter in instrumentation should read this manual.

This manual outlines the product, tells how to install, wire, and incorporate the product into instrumentation, and describes its operation, inspection and maintenance, troubleshooting, and hardware specifications.



CML/CMF050 Series High-Flow Mass Flow Meter : Communications

Manual No.CP-SP-1160E

This manual.
Those using the communications functions of the CML/CMF050 Series should read this manual.
This manual describes an outline of communications, wiring, communications procedures, CML/CMF050 Series communications data, trouble-shooting, and communications specifications.

Organization of This User's Manual

This manual is organized as follows:

Chapter 1. OUTLINE

This chapter briefly describes communication functions of the CML/CMF050 Series.

Chapter 2. WIRING

This chapter describes RS-485 wiring methods to make a communication link between the CML/CMF050 Series and other instruments.

Chapter 3. SETTING

This chapter describes CML/CMF050 Series communication settings.

Chapter 4. COMMUNICATION PROCEDURE

This chapter describes communication procedures, message configuration, data read/write and signal timing operations.

Chapter 5. COMMUNICATION DATA TABLE

This chapter provides various data address tables for communications on the CML/CMF050 Series.

Chapter 6. COMMUNICATION PROGRAM FOR MASTER STATION

This chapter gives precautions for programming and an example of a communication program for the CML/CMF050 Series.

Chapter 7. TROUBLESHOOTING

This chapter describes checkpoints to diagnose failures in CML/CMF050 Series communications.

Chapter 8. SPECIFICATIONS

This chapter lists communication specifications for the CML/CMF050 Series.

Contents

Chapter 5. COMMUNICATION DATA TABLE

Chapter 6. TROUBLESHOOTING

Chapter 7. SPECIFICATIONS

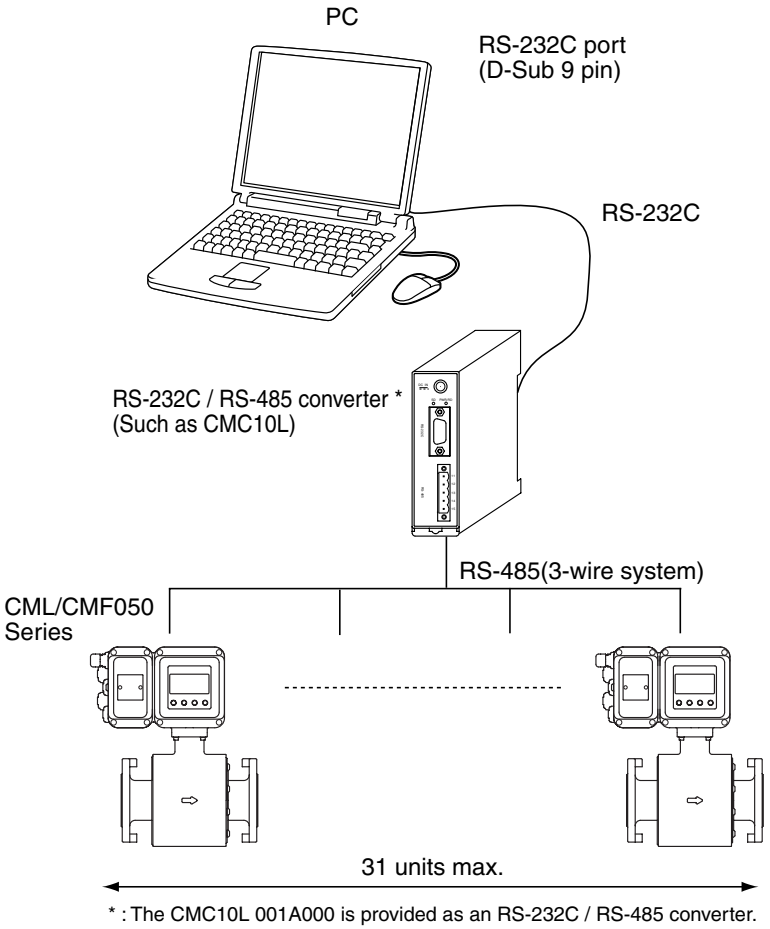
Chapter 1. OVERVIEW

The CML/CMF050 is able to communicate the set points and data with a PC and PLC through an RS-232C/RS-485 converter using a user-configured program. Also, the CML/CMF050 is called a slave station and a PC or PLC is called a master station.
The communication protocol can be selected from the Controller Peripheral Link (CPL) communications (Azbil Corporation's host communication protocol). This chapter describes the CPL communications.

■ Features

The features of the CML/CMF050's communications function are as follows:

- Up to 31 units can be connected to a single master station as a host device.
- When the communication specifications of the host device conform to the RS-232C interface, the communication converter CMC10L (sold separately) is required. The CMC10L allows the conversion between RS-232C and RS-485.
- Almost all of the device parameters can be communicated.
  For details on communication parameters, refer to;
  ☞ Chapter 5, COMMUNICATION DATA TABLE.



* : The CMC10L 001A000 is provided as an RS-232C / RS-485 converter.

Chapter 2. WIRING

⚠ WARNING

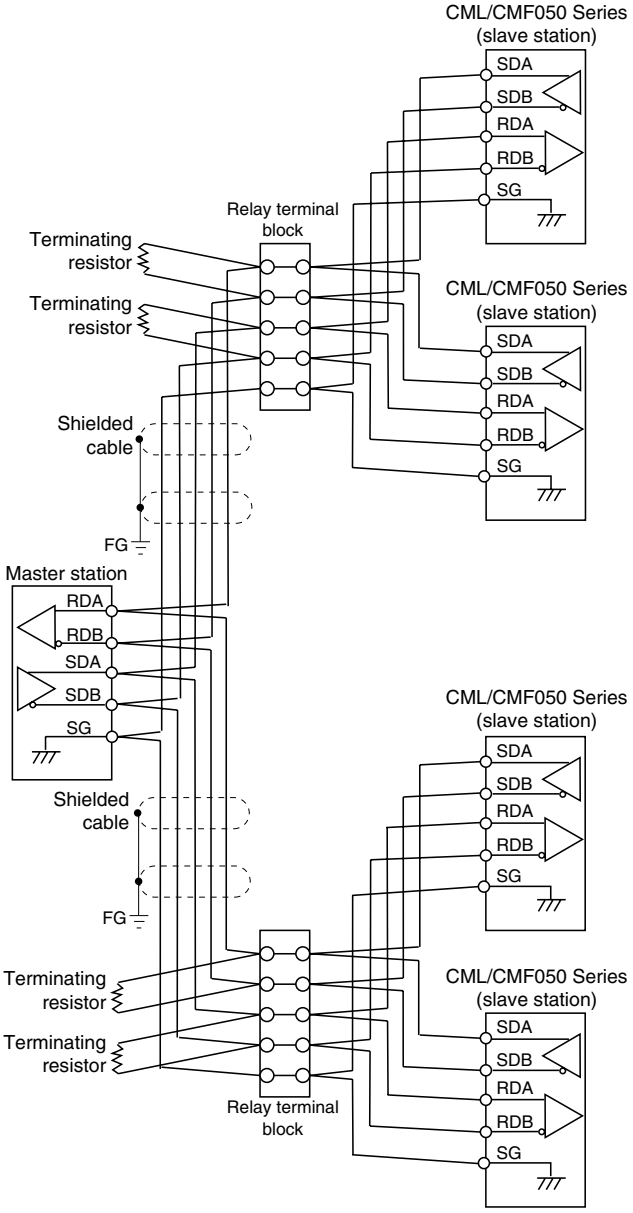
- Make sure that the FG terminal is properly grounded with a resistance of less than 100 Ω. Failure to do so might cause an electrick shock or fire.
- Befor wiring the device, be sure to turn the power OFF. Failure to do so might cause electrick shock.
- Do not touch electrically charged part such as a power terminal. Doing so might cause electrick shock.

⚠ CAUTION

- Wire the device properly according to instructions. Use the type of wire specified in the user's manual and follow recognized installation methods. Failure to do so might cause electric shock, fire or faulty operation.
- Firmly tighten the terminal screws at the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
- Do not use unused terminals as relay terminals. Doing so might cause electrick shock, fire or faulty operation.

■ Connection with 5-wire system

To communication with the 3-wire system, connect as follows:

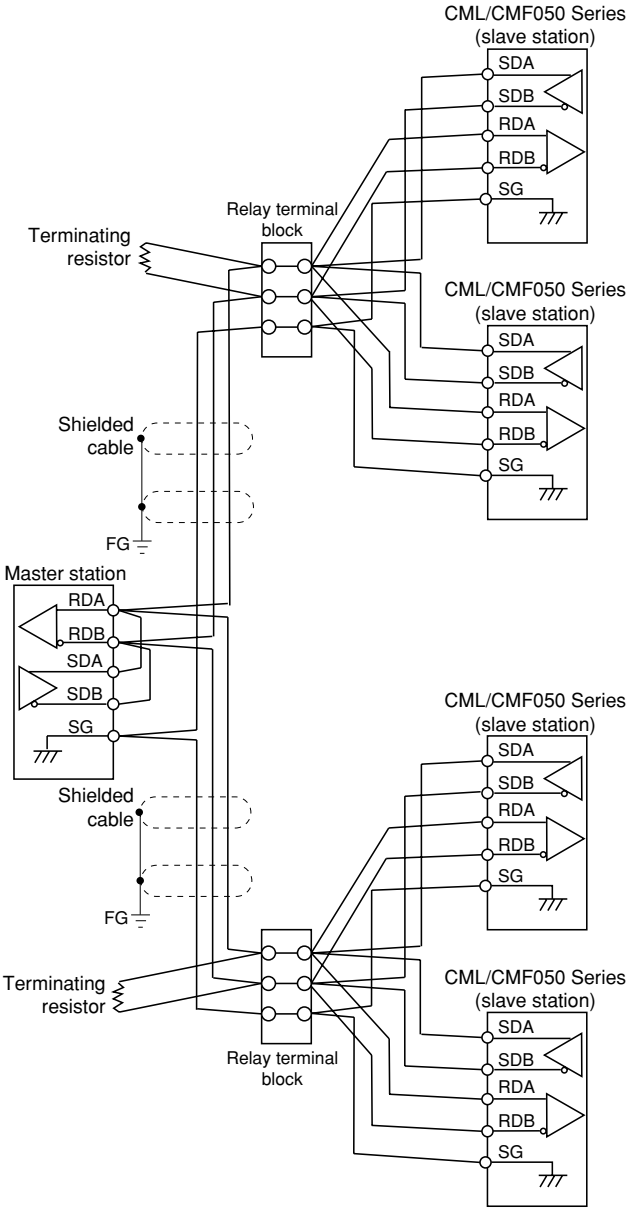


! Handling Precautions

- Connect one terminating resistor of 150Ω±5%, 1/2W min. to the device at each end of the transmission line.
- The cable to the relay terminal block from the CML/CMF050 Series must be as short as possible.
- The FG grounding must not be made at the both shielded wire ends but only at one location.
- Be sure to connect SG terminals each other. Failure to do so might cause unstable communications.

■ Connection with 3-wire system

To communication with the 3-wire system, connect as follows:



! Handling Precautions

- Connect one terminating resistor of 150Ω±5%, 1/2W min. to the device at each end of the transmission line.
- The cable to the relay terminal block from the CML/CMF050 Series must be as short as possible.
- The FG grounding must not be made at the both shielded wire ends but only at one location.
- Be sure to connect SG terminals each other. Failure to do so might cause unstable communications.
- On 3-wire system, Azbil Corporation's CMC10L001A000 controller can be used as a converter of the host station.

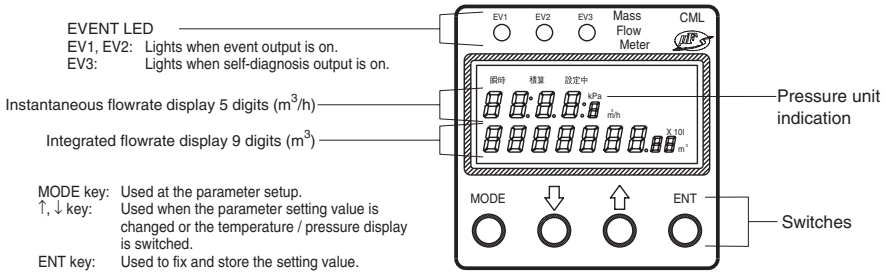
Chapter 3. SETTING

To operate the RS-485 communications functions, suit the communication parameters and station adress of this device to this device to the setting of the master station.

■ Communication function setup

● Setting method

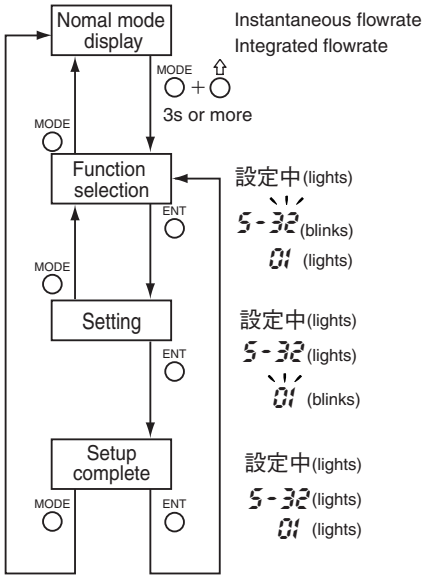
Setting are as follows:



(1) When the display section indicates the instantaneous flowrate value or integrated flowrate value, hold down the MODE and ⇧ keys simultaneously for 3s or longer.

(2) The [設定中] sign lights, and the function type is indicated in the instantaneous flowrate display section, and the setup content is indicated in the integrated flowrate display.
At this moment, the lower 2 digits indicate the current setting value. Also, the function type (number) blinks.

Display example



(3) Pressing the ⇩ key moves the setup to the next mode number. Pressing the ⇧ key returns the setup to the previous mode number.
Pressing the ⇩ key again while S-32 is displayed returns the display to S-01.
Pressing the ⇧ key while S-01 is displayed moves the display to S-32.

(4) When the setup value has become the target mode number, press the ENT key while the value is blinking.

(5) This selects the mode number. The mode number lights, and the setup (number) blinks.

(6) Press the ⇧ or ⇩ key to select the target setup value in the lower 2 digits of the integrated flowrate display section, and then press the ENT key.

(7) The setup value is fixed and lights.

(8) When continuing the setup, press the ENT key again and repeat the (3) to (7) operations.

! Handling Precautions

- Pressing the MODE key during (2) to (3), and (7) operations returns the display section to instantaneous flowrate indication.
- Pressing the MODE key during (5) to (6) operations returns the display section to (2) operation.

● Setup item

Mode	Function	Setup	Factry setting	Note
S-30	Station adress	00 : Communication function is disabled. 01 to 7F : Station adress(hexadecimal)	00	No communication when set at 00. Set an address different from other slave stations.
S-31	Transmission speed	00 : 9600bps 01 : 4800bps	01	
S-32	Data format	8-bit data, even parity, 1 stop bit 8-bit data, no parity, 2 stop bits	01	

Chapter 4. COMMUNICATION PROCEDURE

4 - 1 Communication Procedure and Message Structure

■ Communication procedures

The communication procedure is as follows:

(1)The instruction message is sent from the host device (master station) to one unit (slave station) to communicate with.

(2)The slave station receives the instruction message, and performs read or write processing according to the content of the message.

(3)The slave station sends a message corresponding to the processing content as a response message.

(4)The master station receives the response message.

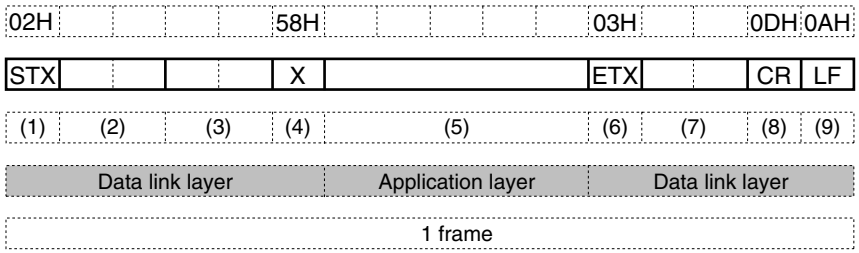
■ Message structure

The following shows the message structure:

Messages are broadly classified into two layers; the data link layer and the application layer.

- Data link layer
  This layer contains the basic information required for the communication such as the destination of the communication message and the check information of the message.
- Application layer
  Data is read and written in this layer. The content of the layer varies according to the purpose of the message.

Messages comprise parts (1) to (9) as shown in the figure below.
The command (details sent from the master station) and the response (details returned from the slave station) are stored in the application layer.



(1) STX (start of message)
(2) Station address
(3) Sub-address
(4) Device code
(5) Send message = command,
response message = response
(6) ETX (end of command/response)
(7) Checksum
(8) CR (delimiter)
(9) LF (delimiter)

■ Data link layer

● Outline

The data link layer is of a fixed length. The position of each data item and the number of its characters are already decided. Note, however, that the data positions of the data link layer from ETX onwards shift according to the number of characters in the application layer. The character length, however, remains unchanged.

● Description of data items

• STX (02H)
When STX is received, the device judges this to be the start of the send message. For this reason, the device returns to the initial state whatever reception state it was in, and processing is started on the assumption that the STX, the first character, has been received. The purpose of this is to enable recovery of the device's response at the next correct message (e.g. RETRY message) from the master station in the event that noise, for example, causes an error in the sent message.

• Station address
Of the messages sent by the master station, the device creates response messages only when station addresses are the same. Station addresses in the messages are expressed as two-digit hexadecimal characters.
The station address is set up by the station address setting switch. However, when the station address is set to 0, the device creates no response even if station addresses match.
The device returns the same station address as that of the received message.

• Sub-address
This unit does not use the sub-address. For this reason, set "00" (30H 30H).
The device returns the same sub-address as that of the received message.

• Device code
The device sets X (58H) or x (78H) as the device code. This code is determined for each device series, and other codes cannot be selected. The device returns the same device code as that of the received message. X (58H) is used as the default, and x (78H) is used for judging the message as the resend message.

• ETX
ETX indicates the end of the application layer.

• Checksum
This value is for checking whether or not some abnormality (e.g. noise) causes the message content to change during communications.
The checksum is expressed as two hexadecimal characters.

• How to calculate a checksum
(1) Add the character codes in the message from STX through ETX in single byte units.
(2) Take two's complement of the low-order one byte of the addition result.
(3) Convert the obtained two's complement to a two-byte ASCII code.

The following is a sample checksum calculation:
[Sample message]

STX: 02H
'0': 30H (first byte of the station address)
'1': 31H (second byte of the station address)
'0': 30H (first byte of the sub-address)
'0': 30H (second byte of the sub-address)
'X': 58H (device code)
'R': 52H (first byte of the command)
'S': 53H (second byte of the command)
(omitted)
ETX: 03H

(1) Add the character codes in the message from STX through ETX in single byte units.
The add operation in single byte units is as follows:
02H + 30H + 31H + 30H + 30H + 58H + 52H + 53H + • • • + 03H.
Assume that the result is 376H.

(2) The low-order one byte of the addition result 376H is 76H. The two's complement of 76H is 8AH.

(3) Convert the obtained 8AH to a two-byte ASCII code.
The result is:
'8': 38H
'A': 41H,
and the two bytes, '8'(38H) and 'A'(41H), are the checksum.

• CR/LF
This indicates the end of the message. Immediately after LF is received, the device enters a state allowed to process the received message.

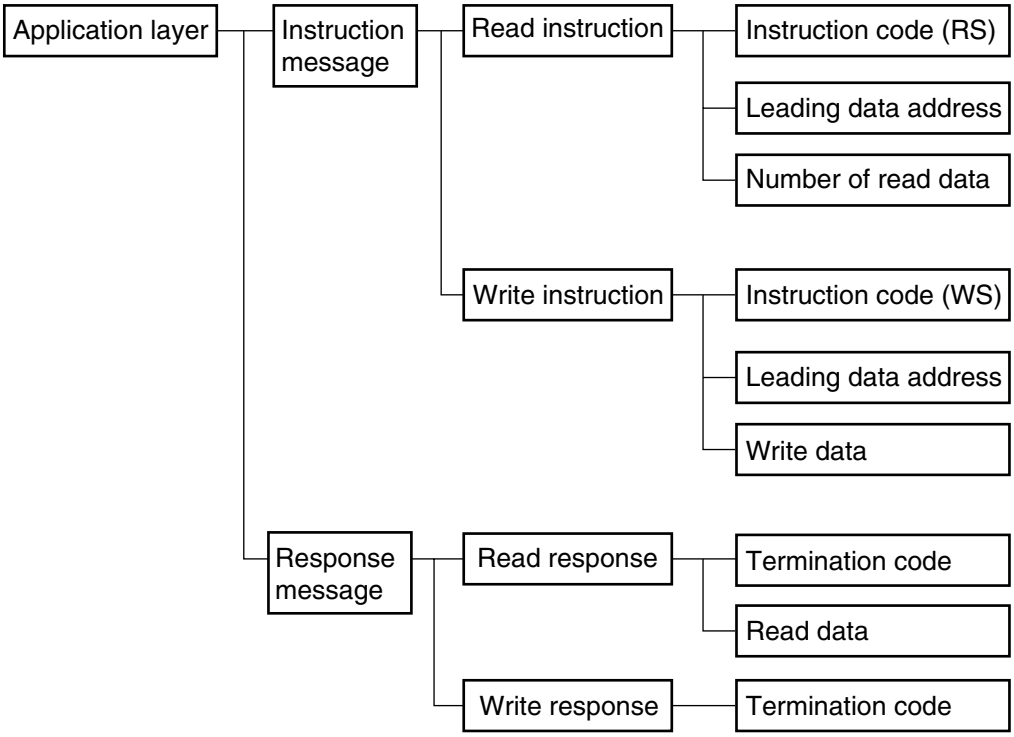
Handling Precautions

- If one of the following error occurs in the data link layer, the CML/CMF050 series does not respond:
  - The communication conditions for both stations do not match (different trancemission speed or different data format etc.).
  - The received station address differs from the stations do not match (diffrent trancemission speed or diffrent data format etc.).
  - STX, ETX, CR and LF are not placed at the correct positiion.
  - The device code is neither "X" nor "x"
  - The station address, sub address or checksum are not two characters long.
  - The calculation result of the checksum does not match the checksum of the received message.
  - The characters except predefined are included in a message.
  - Unnecessary characters are received behind the CR and LF.
- Use upper-case characters "A" to "F" in the hexadecimal numeric for the station address and checksum.

4 - 2 Application Layer

■ Outline

- The application layer contains instructions, data, data count and termination code.
- In the application layer, the instruction message and response message have a different structure.
- There are two types of instruction messages: read instructions and write instructions. Each of these instruction messages have their own responses.
- A termination code indicates how an instruction message has been processed.



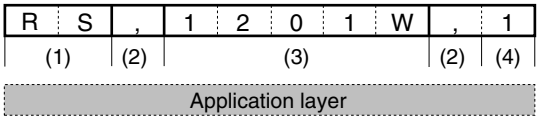
4 - 3 Description of Commands

■ Continuous data read command (RS command)

This command reads data of continuous addresses by a single command.

● Send message

This command enables the content of continuous data addresses starting with the specified read start address to be read as a single message. The figure below shows the structure of the application layer of the send message when the data is read.

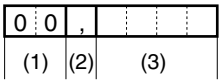


(1) Continuous read command
(2) Data delimiter
(3) Data address
(4) Number of read data

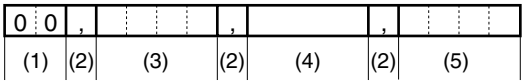
● Response message

If the message is correctly received, a response message corresponding to the command content is returned.
The figure below shows the structure of the application layer of the response message when the data is read.

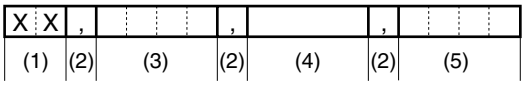
• Normal termination (reading of single data item)



• Normal termination (reading of multiple data items)



• Warning termination



• Error termination

The termination code is entered at XX.
For details of codes, refer to;
☞ 4-4, Termination Code Table (on page 14).

(1) Termination code
(2) Data delimiter
(3) Data
(4) Data 2 to (n-1)
(5) Data n

■ Continuous data write command (WS command)

This command writes data to continuous addresses.

● Send message

The figure below shows the structure of the application layer of the send message for the data write command.

W	S	,	2	0	0	2	W	,	1	,	6	5
(1)		(2)	(3)					(2)	(4)	(2)	(5)	

(1) Write command
(2) Data delimiter
(3) Start write data address
(4) Write data (first word)
(5) Write data (second word)

● Response message

The figure below shows the structure of the application layer of the response message for the data write command.

• Normal termination

0	0
(1)	

• Warning termination or error termination

X	X
(1)	

The termination code is entered at XX.
For details of codes, refer to;
☞ 4-4, Termination Code Table (on page 14).

(1) Termination code

■ Numeric expression in the application layer

Rule: All the numeric, number of read data, write data and read data in the data address follow the rules given below

- When a numeric is nagative, prefix the numeric with a minus sign"-"(2DH).
  Example : "-123"(2DH, 31H, 32H, 33H)
- When a numeric is zero, use one "0".
  Example : "0" (30H). "00"(30H,30H) is not allowed.
- When a numeric is positive, do not prefix the numeric with a plus sign "+".
- Do not add extra zeros or spaces befor a numeric.
  Example : "0123" and "_123" are not allowed.

4 - 4 Termination Code Table

Termination code	Type	Contents and action
00	Normal	Normal end
41	Error	"WS" or "RS" has not been set. All messages are aborted.
43	Error	"ETX" is not set on the correct position. "." is not set after the address. All messages are aborted.
46	Error	The address is erroneous, or "W" is lacked in the address. All messages are aborted.
47	Error	The number of read data is error. All messages are aborted.
48	Error	The written data is error. Writing has been executed except for the error address.
99	Error	An undefined command or other message error. All messages are aborted.

4 - 5 Timing Specifications

■ Timing specifications for instruction and response message

The cautions below are required with regard to the timing to transmit a instruction message from the master station and a response message from the slave station.

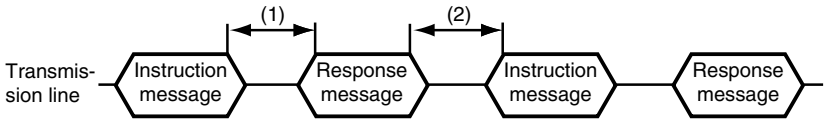
● Response monitor time

The maximum response time from the end of the instruction message transmission by the master station until when the master station receives a response message from the slave station is two seconds ((1) in the figure below). So, the response monitor time should be set to two seconds.
Generally, when a response time-out occurs, resent the instruction message.

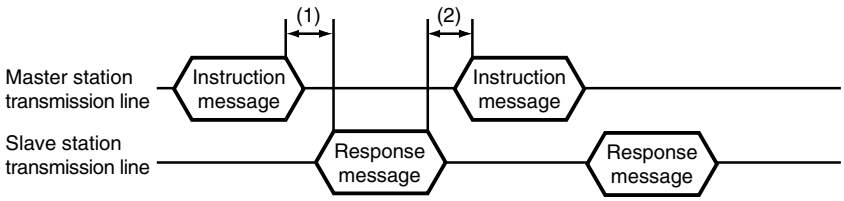
● Transmission start time

A wait time of 100ms is required before the master station starts to transmit the next instruction message (to the same slave station or a different slave station) after the end of receiving response message ((2) in the figure below).

• RS-485 3-wire system



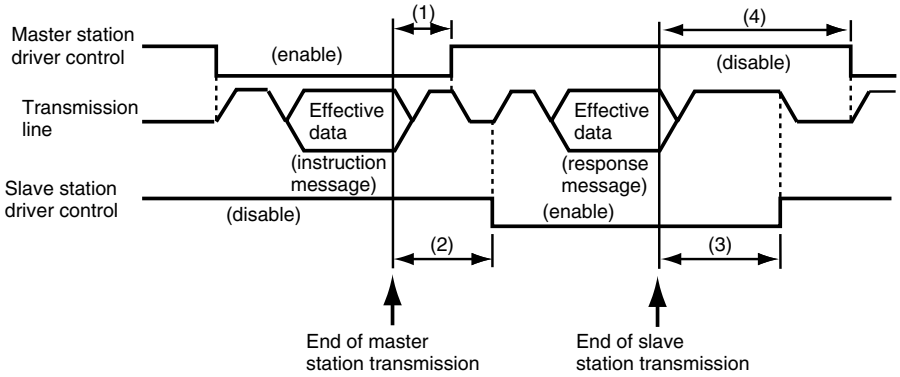
• RS-485 5-wire system



(1) End of master station transmission -
Transmission start time of slave station = Max. 2000ms
(2) End of slave station transmission -
Transmission start time of master station = Min. 100ms

■ RS-485 driver control timing specifications

When the transmission/reception on the RS-485 3-wire system is directly controlled by the master station, care should be paid to the following timing:



(1) End of master station transmission - Driver disable time = 500µs max.
(2) End of slave station reception - Driver enable time = 30ms min.
(3) End of slave station transmission - Driver disable time = 10ms max.
(4) End of master station reception - Driver enable time = 50ms min.

Chapter 5. COMMUNICATION DATA TABLE

5 - 1 Basic Communication Data Processing

■ Communication data types and formats

● Types of communication data

The communications data are categorized as follow:

- Instantaneous flow rate data (such as instantaneous flowrate)
- Integrated flow data
- Function setup data
- Parameter setup data

● Format of communication data

Communication data is classified into the following formats:

- Numeric data: Data indicating a numeric value (PV, SP, etc.).
- Bit data: Data where each bit is significant (alarms, etc.). Bit data must be composed by transmission and decomposed by reception.

■ Communication data storage memory

● Memory type

The communication data are stored in the following two types of memory:

- RAM: Stored data is cleared when the power is turned OFF. However data can be written to this memory any number of times.
- EEPROM: Stored data is retained even when the power is turned OFF, whereas data write operations are limited to a total of 100,000 times owing to device characteristics.

● Communication object memory

In communication, it is necessary to read/write data from/into the abovementioned two types of memory according to the purpose and use. There is a difference between the object memories as follows:

- RAM: Data is read/written from/into RAM only. If the power supply is turned off after writing data into RAM, and then it is turned on again, the data in EEPROM is copied on RAM, so the data in RAM becomes the same as in EEPROM.
- EEPROM: Data are written in both RAM and EEPROM.

■ Number of read data / write word

The number of data which can be continuously read/written by once communication is as shown in the table below.

	RAM	EEPROM
Read	1 to 8	1 to 8
Write	1 to 4	1 to 4

■ Data unit and decimal point position

Read/write data is not appended with a decimal point.
The unit and decimal point position is determined for each data item.
For details, refer to;
☞ CML series High-Flow Mass Flow Meter user's manual
No. CP-SP-1161E.

5 - 2 Communication Data Table

■ Operating status data

RAM			Data range	Description
Address	R	W		
1201	❍	×	Instantanous flow rate (absolute value)*1	Instantaneous flow rate (lower)
1202	❍	×	(Unit: enlarge a flow rate(L/sec)4,096 times)*2	Instantaneous flow rate (upper)
1203	❍	×	0 to 1100 kPa	Pressure (0 to 1100kPa)
1204	❍	×	Output + 30(offset)	Temperature(-30 to +70˚C)
1205	❍	×	bit 7: Sensor 1 speed abnomally low bit 6: Sensor 1 speed abnomally high bit 5: Sensor 2 speed abnomally low bit 4: Sensor 2 speed abnomally high bit 3: Thermistor abnomally low bit 2: Thermistor abnomally high bit 1: Pressure sensor abnomally low bit 0: Pressure sensor abnomally high	Alarm status flag 1
1206	❍	×	bit 7: Undefined (fixed 0) bit 6: Undefined (fixed 0) bit 5: Undefined (fixed 0) bit 4: Event output EV1 ON bit 3: Event output EV2 ON bit 2: Excessive flow rate range bit 1: Negative output is detected by sensor bit 0: Reverse flow occurs	Alarm status flag 2
1207-1399	❍	×	(fixed 0)	Undefined data area

*1 : The instantaneous flow rate is displayed an absolte value. If reverse flow occurs, the bit 0 (reverse flow occurs) of the alarm status bit 2 (address 1206) becomes 1.

*2 : The indicated instantaneous flow rate is enlarged a flow rate (L/sec) 4,096 times).
This flow rate can be converted to [m^3/h] as follows:
Instantaneous flow

To convert [m^3/h] unit → Readout data ÷ 4096 X 60 X 60 ÷ 1000
To convert [L/min] unit → Readout data ÷ 4096 X 60
To convert [L/sec] unit → Readout data ÷ 4096

■ Integrated flow rate data

RAM			EEPROM			Data range	Description
Address	R	W	Address	R	W		
1601	❍	❍	4601	❍	❍	0 to 9 (BCD)	Integrated flow rate (lower 1 digit)
1602	❍	❍	4602	❍	❍	0 to 9999 (BCD)	Integrated flow rate (middle 4 digits)
1603	❍	❍	4603	❍	❍	0 to 9999 (BCD)	Integrated flow rate (upper 4 digits)
1604-1799	❍	×	4604 × 4799	❍	×	(fixed 0)	Undefined data area

Note : Integrated flow rate corresponds to the LCD display digits. 0 to 9999999.99(m^3/h)

LCD display digit	7^{th}	6^{th}	5^{th}	4^{th}	3^{rd}	2^{nd}	1^{st}	Tenths digit	Hundredths digit
Communicaion data	1603W First 4 digits				1602W Next 4 digits				1601W Last digit

For an integrated flow rate of 1234567.89, the three addresses and data are as follows:

Address	Data (BCD)
1601W	9
1602W	5678
1603W	1234

■ Function setup data

RAM			EEPROM			Data range	Description
Address	R	W	Address	R	W		
2001	❍	❍	5001	❍	❍	0: Key lock OFF 1: Key lock ON	Key lock setup
2002	❍	❍	5002	❍	❍	0: Instantaneous flow rate 1: Instantanepus flow rate +integrated flow rate 2: Instantaneous flow rate + temperature + pressure	Display setup
2003	❍	❍	5003	❍	❍	(fixed 0)	-
2004	❍	❍	5004	❍	❍	0: Low limit event of instantaneous flow tate 1: Pressure falling down event	Event output EV2 selection
2005	❍	❍	5005	❍	❍	0: OFF 1: ON	On deley setup of the event output EV1
2006	❍	❍	5006	❍	❍	0: OFF 1: ON	On deley setup of the event output EV2
2007	❍	❍	5007	❍	❍	0: OFF 1: ON	Event standby setup
2008	❍	❍	5008	❍	❍	0: Air 1: Oxygen 2: Carbon dioxide(CO_2) 3: Argon 4: City gas 13A (46MJ) 5: Butane 6: Propane 7: Laughing gas 9: City gas 13A (45MJ)	Gas type selection
2009	❍	❍	5009	❍	❍	0 to 35: Reference temperature 0 to 35 ˚C	Reference temperature of flow rate conversion setup
2010	❍	❍	5010	❍	❍	0: No low flow cut 1: Q_{max} / 1280 2: Q_{max} / 320 3: Q_{max} / 160	Low flow cut setup
2011	❍	❍	5011	❍	❍	1: 10l / pluse 2: 100L / pluse 3: 1000L / pluse	Pluse weight of the integrated pulse output 1
2030	❍	×	5030	❍	×	00-7F: Station adress	CPL communication address
2031	❍	×	5031	❍	×	00: 9600 bps 01: 4800 bps	Transmission speed
2032	❍	×	5032	❍	×	00: 8-bit data, 1 stop bit, even parity 01: 8-bit data, 2 stop bits, no parity	Data format
2033-2199	❍	×	5033-5199	❍	×	(fixed 0)	Undefined data area

■ Parameter setup data

RAM			EEPROM			Data range	Description
Address	R	W	Address	R	W		
2201	❍	❍	5201	❍	❍	-	-
2202	❍	❍	5202	❍	❍	-	-
2203	❍	❍	5203	❍	❍	0 to 9999 (m3/h)	Upper limit of the instantaneous flow rate (EV1)
2204	❍	❍	5204	❍	❍	0 to 100 (m3/h)	Hysteresis setup of the event output EV1
2205	❍	❍	5205	❍	❍	0 to 60 (s)	On delay of the event output EV1
2206	❍	❍	5206	❍	❍	-	-
2207	❍	❍	5207	❍	❍	-	-
2208	❍	❍	5208	❍	❍	0 to 9999 (m3/h)	Lower limit of the instantaneous flow rate (EV2)
2209	❍	❍	5209	❍	❍	0 to 100 (m3/h or kPa)	Hysteresis setup of the event output EV2
2210	❍	❍	5210	❍	❍	0 to 60 (s)	On delay of the event output EV2
2211	❍	❍	5211	❍	❍	100 to 4500	Gas conversion factor *
2212	❍	❍	5212	❍	❍	0 to 15	Low speed sensor averaging
2213	❍	❍	5213	❍	❍	0 to 15	High speed sensor averaging
2214	❍	❍	5214	❍	❍	0 to 1000 (kPa)	Pressure falling down event setup
2215	❍	❍	5215	❍	❍	0 to 125 (%)	Burnout setup
2216	❍	❍	5216	❍	❍	0 to 9999 (m3/h)	Span setup of 4-20 mA output
2217-2399	❍	❍	5217-5399	❍	❍	(fixed 0)	Undefined data area

*The data range of 100 to 4500 for the gas conversion factor means 10.0 to 450.0 %.

Chapter 6. TROUBLESHOOTING

■ Check items in case communication is disabled

(1) Check the power supply.

(2) Check the wiring.

(3) Check if the communication conditions for the CML/CMF050 meet those for the host computer.

(4) Check if the destination address of the command frame transmitted from the host computer meets the address set to the CML/CMF050 Series.
The address of the CML/CMF050 set to "0" for factory setting.
Even when the destination address of the command frame is set to 00 (30H, 30H), the CML/CMF050 does not respond to such a message.

(5) Use the upper-case character codes for all the character codes other than the device code ("X" or "x").

(6) Are those multi-dropped units belong operated themselves with different station address setups.

(7) Is the communication timing conformed with the Section 4-5 Timing Specifications (page 14).

Chapter 7. SPECIFICATIONS

■ RS-485 specifications

Item	Remarks
Transmission mode	Balanced
Transmission line	5-wire system / 3-wire system
Transmission speed (bps)	9600, 19200
Transmission distance	500m max.
Communications flow	Half duplex
Synchronization	Start-stop synchronization
Data format	8 data bits, 1 stop bit, even parity 8 data bits, 2 stop bits, no parity
Error detection	Parity check, checksum
Station address	00 to 7F (Communication function is inhibited when set to “00”.)
Network type	1: N (31 units max.)

Revision History

Printed date	Manual Number	Edition	Revised pages	Description
Sep. 2008	**CP-SP-1160E**	**1st Edition**		
Apr. 2012		**2nd Edition**		Company name changed.

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