Instruction Manual

RS-485 INTERFACE FOR MICRO JET RECORDER

TYPE: PHA PHC

Fuji Electric Systems Co., Ltd.

INP-TN506547c-E

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Note

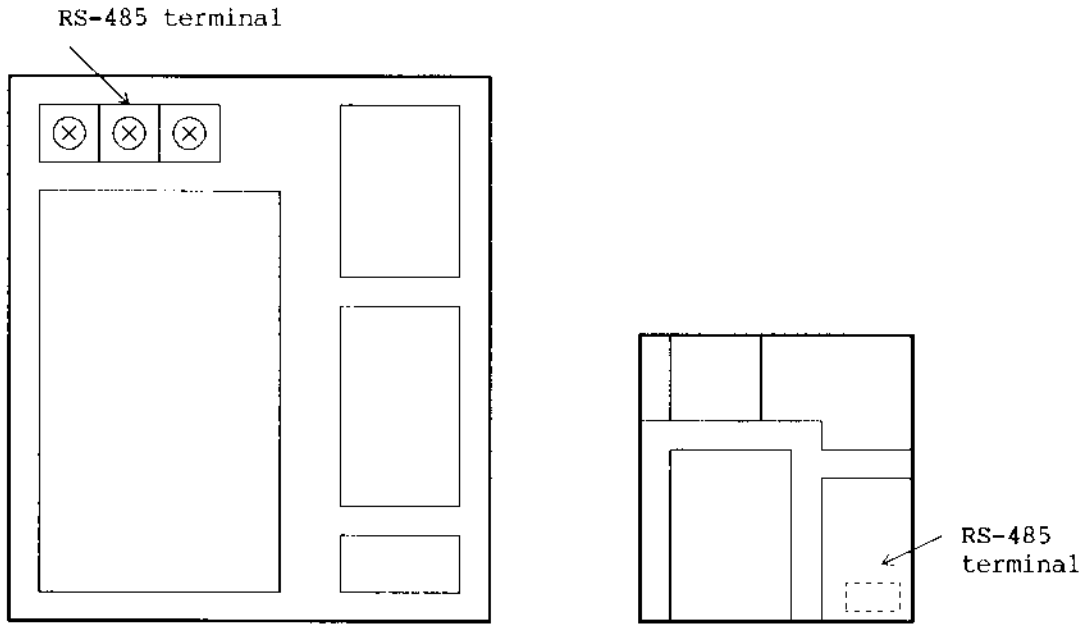
- Description in this manual will be changed without prior notice.
- The contents of this manual have been prepared carefully. However, it should be noted that Fuji is not responsible for any loss caused indirectly from errors in writing or missing of information.

1. PREFACE

This instruction manual describes the RS-485 interface used as an optional function for the PH series microjet recorder.
Before using the RS-485 interface, be sure to read through this manual to ensure its maximum performance.

2. CHECK ON PRODUCT DELIVERED

The RS-485 interface is self-contained in the recorder.
Upon receiving the recorder, check to make sure that there is a terminal for RS-485 on the rear panel.



Type: PHA　　Type: PHC

3. TRANSMISSION FUNCTIONS

A maximum of 31 microjet recorders can be connected to the personal computer serial port. Various data can be exchanged by connecting personal computer and recorder. (The recorder can be connected to a personal computer equipped with RS-485 serial port. For a personal computer equipped with RS232C port alone, a line converter is required for connection.)

Transmission Access Table

	Item	READ	WRITE
Operation	Record start/stop	×	×
	Instantaneous value list print	×	×
	Chart high-speed feed	×	×
Display	Measured value	○	×
	Time	○	×
	Alarm	○	×
	Chart end	○	×
	Carriage error	○	×
	Burnout	○	×
	Over/under range	○	×
Manual print	Set value list print	×	×
	Test pattern print	×	×
	Scale print	×	×
	Daily report cumulative print	×	×
	Message print	×	○
Setting	Main chart speed	○	○
	Sub-chart speed	○	○
	Time setting	×	○
	Ink alarm clear	×	×
	Chart illumination lamp ON/OFF	○	○
Alarm	Alarm ON/OFF	○	○
	Alarm set value	○	○
	Output relay No.	○	○
Recording mode	Record mode	○	○
	Fixed time print ON/OFF	○	○
	Scale print ON/OFF	○	○
	Logging interval	○	○
	Record format	○	○
	Auto range channel ON/OFF	○	○
	Zoom record channel ON/OFF	○	○
	Zoom record position	○	○
	Zoom boundary value	○	○
	Zone record division number	○	○
	Zone record channel zone No.	○	○

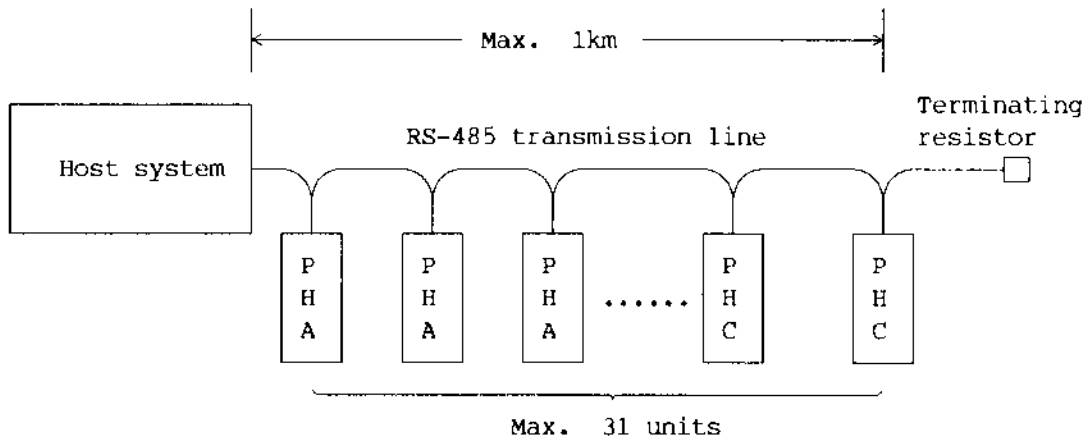
	Item	READ	WRITE
Range	Record range	○	○
	Kinds and units of input	○	○
	Input filter value	○	○
	Scaling ON/OFF	○	○
	Router ON/OFF	○	○
	Measuring range	○	○
	Industrial values	○	○
	Decimal point position	○	○
	Industrial units	○	○
	Differential operation channel No.	○	○
	Tag No.	○	○
Daily report	Daily report ON/OFF	○	○
	Auto print ON/OFF	○	○
	Operation start/end time	○	○
	Channel ON/OFF	○	○
	Daily report data	○	×
	Average value data	○	×
	Maximum value data	○	×
	Minimum value data	○	×
Integration	Integration ON/OFF	○	○
	Auto print ON/OFF	○	○
	Operation start/end time	○	○
	Channel ON/OFF	○	○
	Integrated data	○	×
	Integration total data	○	×
Transmission	Station No.	○	○
	Transmission speed	○	○
	Stop bit	○	○
	Parity	○	○
	Data type	○	○
Message	Message character data	○	○
	Print start position	○	○
	Print color	○	○
	Print start time	○	○
	Print timing	○	○
	Print interval	○	○
	Print timing alarm channel	○	○
	Print timing alarm ON/OFF	○	○
	Print timing alarm types	○	○

(Note 1) ○ : Possible
× : Not possible
(Note 2) READ: Data from recorder to personal computer
WRITE: Data from personal computer to recorder

4. TRANSMISSION SPECIFICATIONS

Item	Specification	Remarks
Physical interface	RS-485	
Communication system	Half-duplex communication system	
Synchronizing system	Start-stop synchronizing	
Data length	8 bits	
Parity	Odd or even number parity (or without parity)	Setting by front panel key
Stop bit	1 or 2 bits	Setting by front panel key
Response	ACK, NACK system	
Error control system	Parity and BCC (*1)	
Connection control system	Polling/selecting system	
Transmission rate	9600 or 19200 bps	Setting by front panel key
Transmission block length	Max. 18 words (36 bytes), without BCC	
Transmission distance	Total length; max. 1km	
Transmission cable	Twisted paired cable with shield	
Number of connectable units	Max. 31 units	

Connection



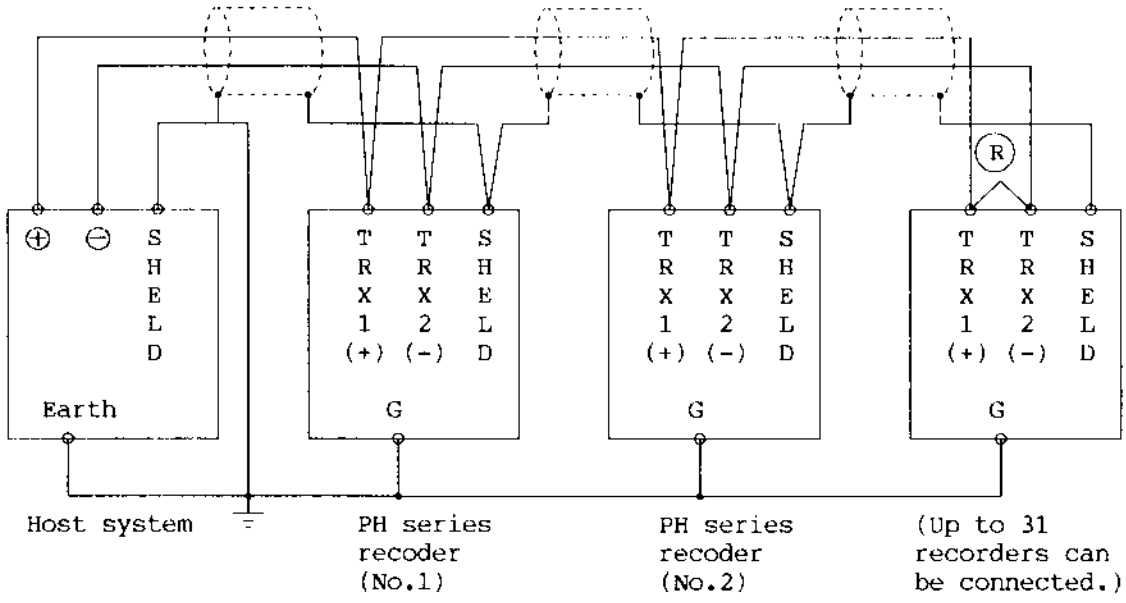
(*1) BCC: Block check character (horizontal parity)

5. WIRING

5.1 RS-485 transmission cable wiring

Connect the recorder to the host system.

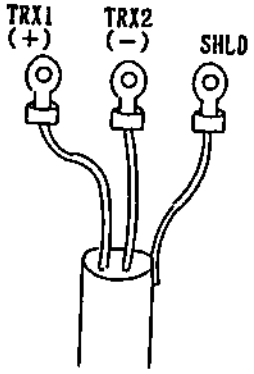
① Each device, with the exception of the host system, has its own station No. to perform 1:1 transmission with the device designated to the host system. Make sure that the station No. is not the same as the station No. of other instruments connected to the RS-485 transmission line.
② The transmission cable must be separated from the power cable and other cables which are deemed to generate noise, in order to eliminate the effect of inductive noise. Avoid parallel wiring.
③ The transmission cable should be a twisted-pair shield cable (characteristic impedance: 100Ω , capacitance: 250pF/m).
④ The shield of the transmission cable should be grounded at the earth point of the host system.



(Note) Terminating resistor (R) should be 100Ω , 1/2W.

⑤ Do not short the transmission terminals ⊕ and ⊖, as it damages the transmission circuit.

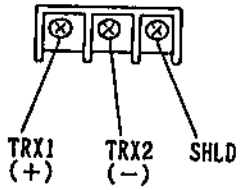
5.2 Treatment of transmission cable



As shown in the diagram at left, the cable end should be treated. Then, the cable should be connected to the personal computer through each recorder.

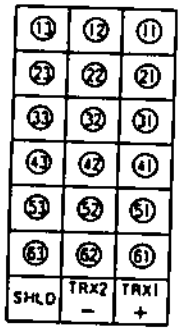
5.3 Terminal diagram

PHA:



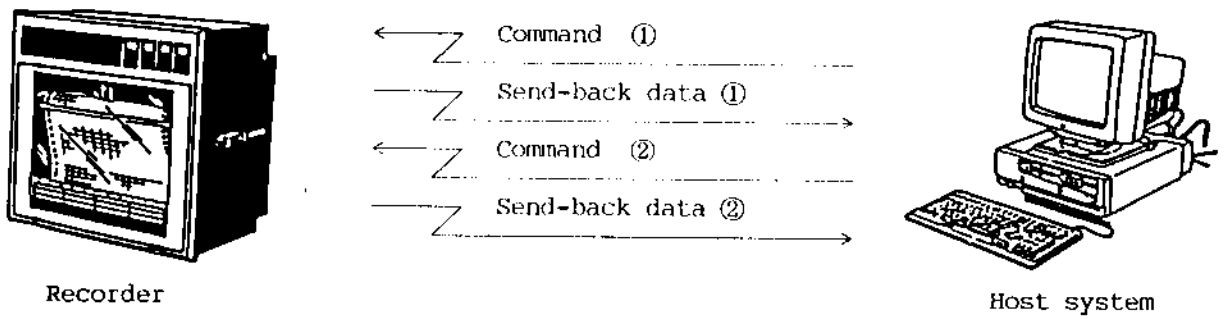
The terminals are fitted with M4 screws.

PHC:



6. TRANSMISSION PROCEDURES

Transmission data 1 message (Within 38 bytes) is sent back when 1 message (within 38 bytes) of command is received from the host system.



Hand-shake operation in the order of command ① ⟷ send-back data ①, command ② ⟷ send-back data ②. Receive the send-back data.

(Note) For communication, turn ON the power switch of the recorder. Communication is started when the measured data appears on the display section.

7. SETTING OF TRANSMISSION PARAMETERS

Transmission parameters can be set by using the recorder keys or from the host system.

Setting items

Set the following items required for transmission.

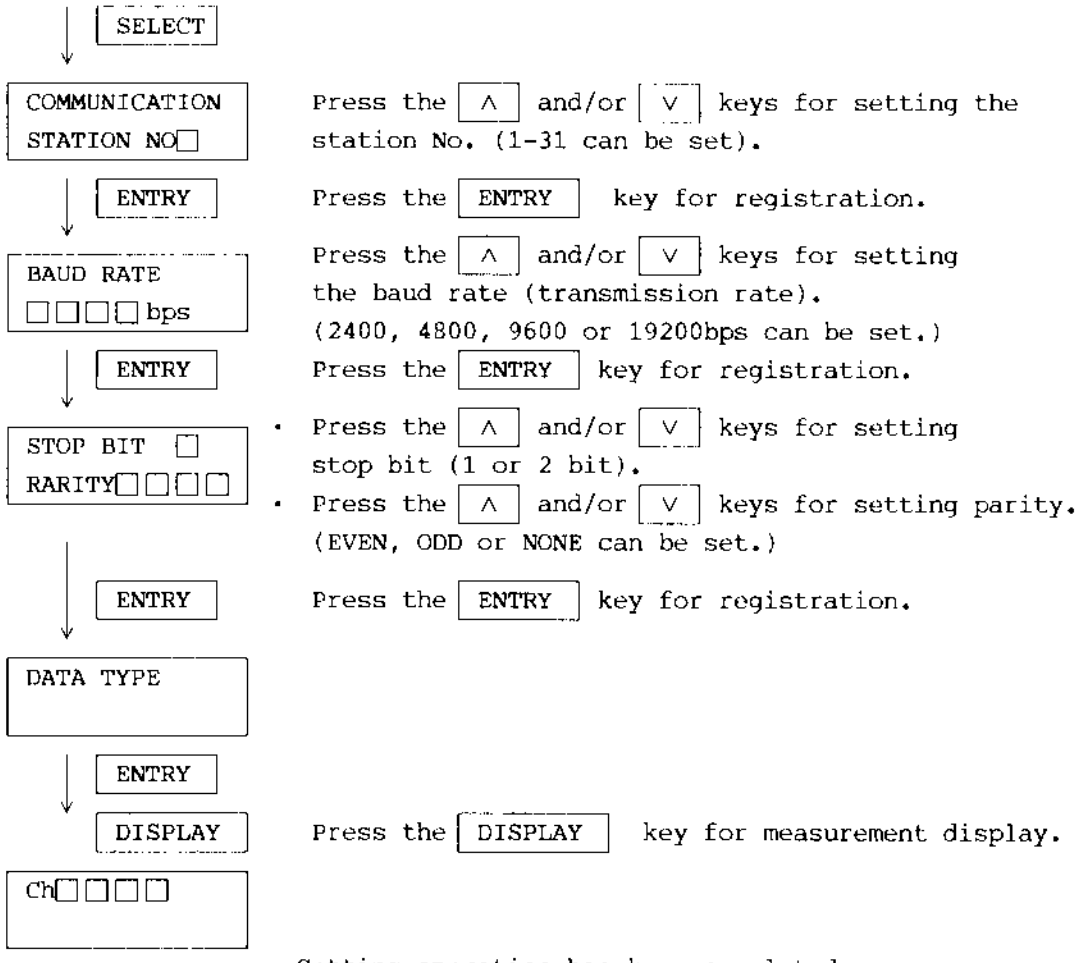
① Station No. • • • 1-31 can be set (initial set value: 1).
② Baud rate (transmission rate) • • • 2400, 4800, 9600 or 19200bps can be set (initial set value: 19200).
③ Stop bit • • • 1 or 2 bit can be set (initial set value: 1).
④ Parity • • • EVEN, ODD, NONE (initial set value: ODD)
⑤ Data type • • • Parameter for T-link transmission. Need not setting.

Setting proceudres (setting by recorder keys)

① Turn ON the power switch of the recorder.

② Press the [SELECT] key several times to give the transmission display.

Then, set it using the following procedures.



- Setting operation has been completed. -

* When transmission data have been re-written, turn OFF the power for the recorder temporarily to obtain effective data.

8. TRANSMISSION DATA AND FORMAT

8.1 Kinds of messages

Messages used for transmission between control station (host system) and controlled station (recorder) are classified into the following 5 messages.

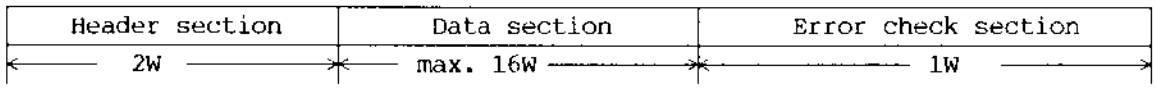
Table 8-1 Kinds of messages

Message	Transmission direction	Description
Polling message	Ⓜ → Ⓢ	Message for reading file of recorder
Selecting message	Ⓜ → Ⓢ *	Message for writing in file of recorder
ACK 1 message	Ⓢ → Ⓜ *	ACK message for polling message
ACK 2 message	Ⓢ → Ⓜ	ACK message for selecting message/ control message
NACK message	Ⓢ → Ⓜ	NACK message for selecting message/ control message

Ⓜ : Master (host system)
Ⓢ : Slave (PHA/PHC)
ACK : Acknowledge
NACK: Negative Acknowledge

Asterisked (*) item shows message with data
(Note) There is no NACK message for polling message.

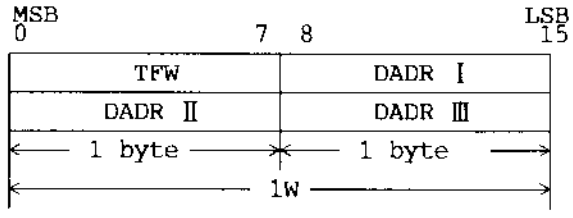
8.2 Formats of messages



The selecting message and ACK 1 message containing data are each composed of 2W header, 16W (or less) data and 1W error check sections as shown in the above format. Other messages without data are composed of a fixed length of 2W header section only.

(1) Header section

The header section is composed of 1 byte Transmission Function Word (TFW) and 3 bytes of data address word, a total of 2W.



Header section

Elements of the header section in the unit of byte are explained in the following.

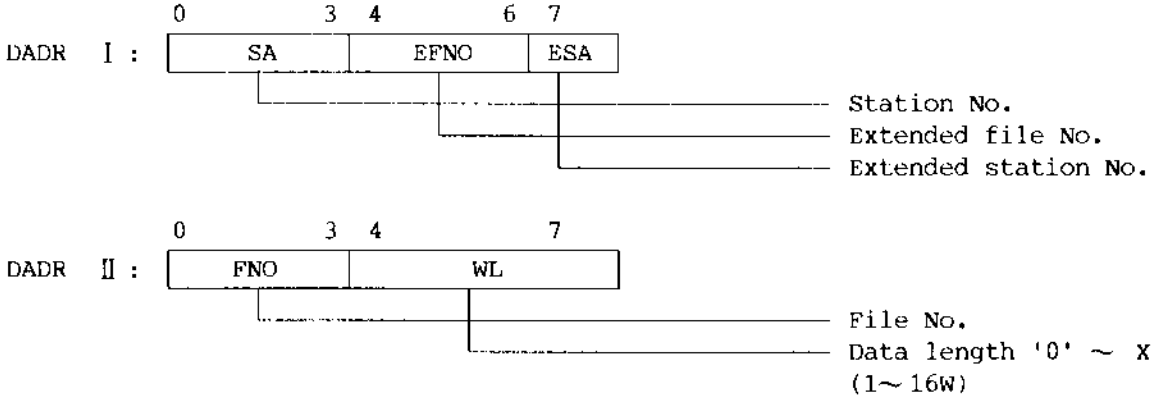
(a) Transmission function word (TFW)
Transmission function word is classified as shown in the following table.

Table 8.2 Tramsmission function word

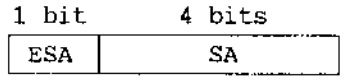
Function word	Symbol	Code	Meaning of function word
Polling	POL	(Note 1) X'D4'	Code of polling message
Selecting	SEL	X'69'	Code of selecting message
Acknowledge 1	ACK1	X'AC'	Code of ACK 1 message
Acknowleage 2	ACK2	X'C5'	Code of ACK 2 message
Negative Acknowleage	NACK	X'1B'	Code of NACK message

Note 1) X'**' is a hexadecimal expression.

(b) Data zone designation

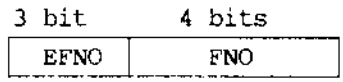


- The station No. of the controlled station connected to the line is designated by 5 bits with ESA and SA as shown in the following.



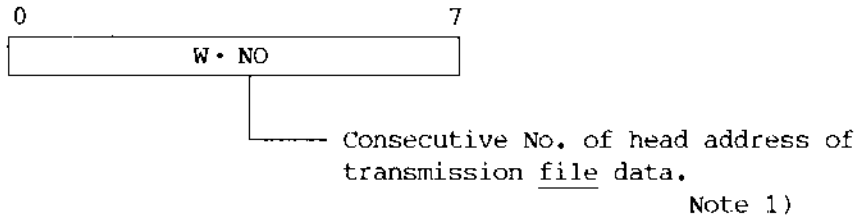
X'01'～X'1F'
(Station 1 ～ 31)

- Transmission destination file No. is also designated by 7 bits with EFNO and FNO.



X'00'～X'7F'
(File No.0 ～ 127)

DADR Ⅲ : In case where function word is POL, SEL or ACK1, or ACK2 for selecting.



In case where function word is NACK

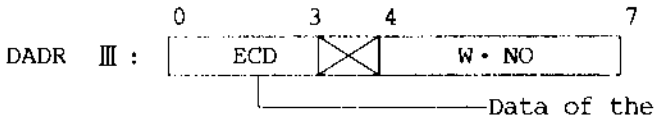
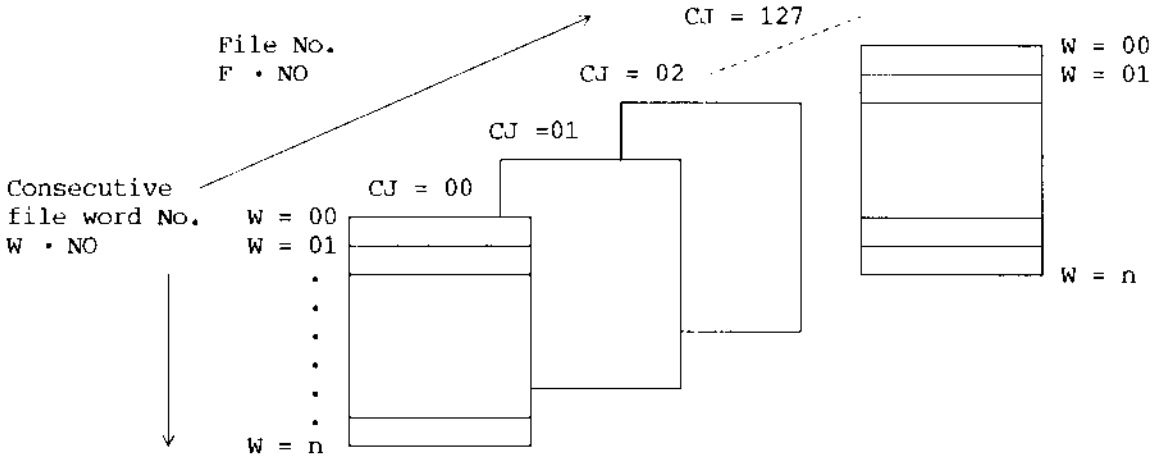


Table 8.3 Error code

Error code	Cause of NACK
X'1'	Receive buffer full
X'2'	Occurrence of parity or flaming error
X'3'	Occurrence of BCC error
X'4'	Occurrence of file protect error

Note 1) The controlled station file is composed as shown below.

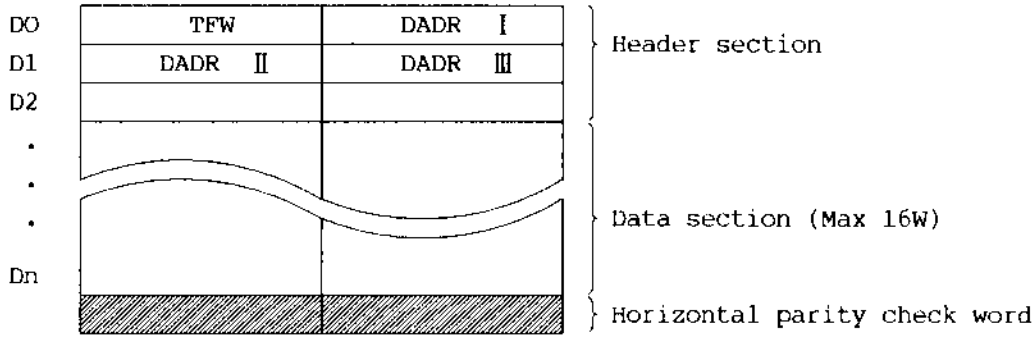


(2) Data section

This is composed of data with word length designated by DADR Ⅱ W.L of header section. The 1W data on transmission line is transmitted in the order of upper byte to lower byte.

(3) Error check section (BCC)

This is composed of horizontal parity check word, 1W up to the final word of data section from the header section.



Calculation of horizontal parity check word

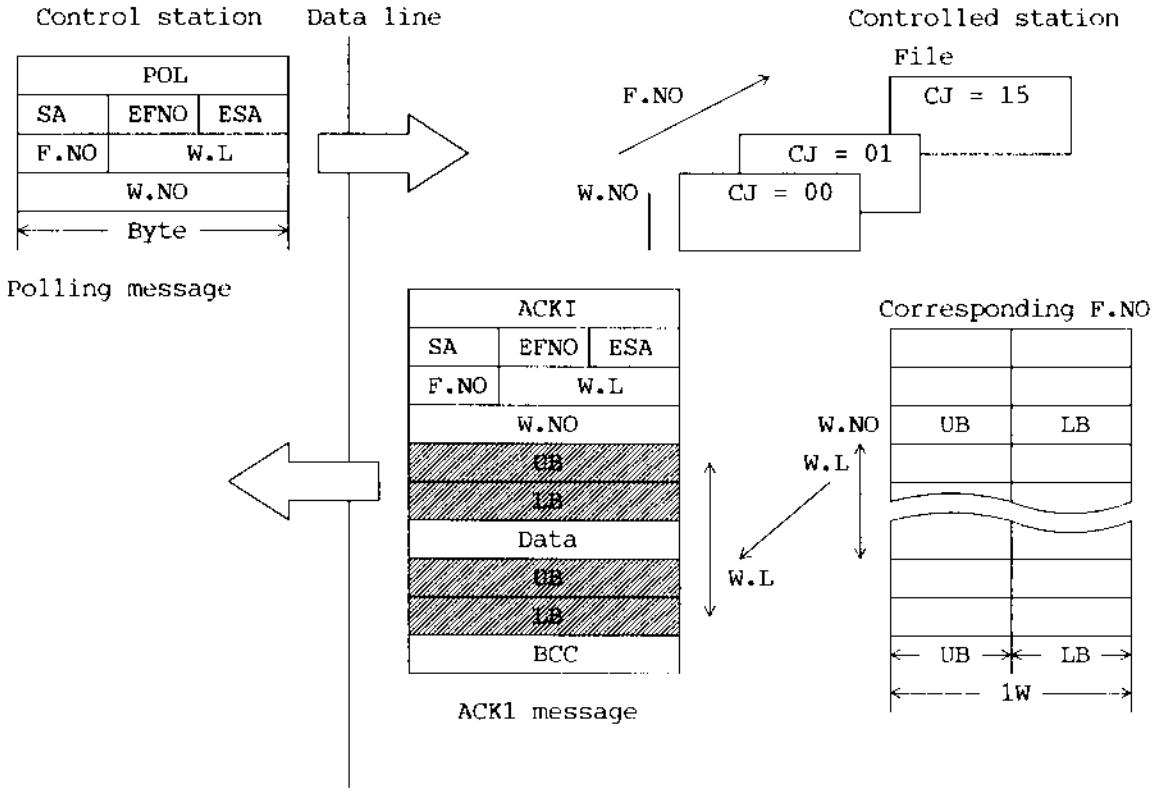
Horizontal parity check word = X' FFFF' ∀DO∀D1∀D2∀ ....∀Dn

∀ shows the calculation of exclusive-OR.

8.3 Examples of message communication

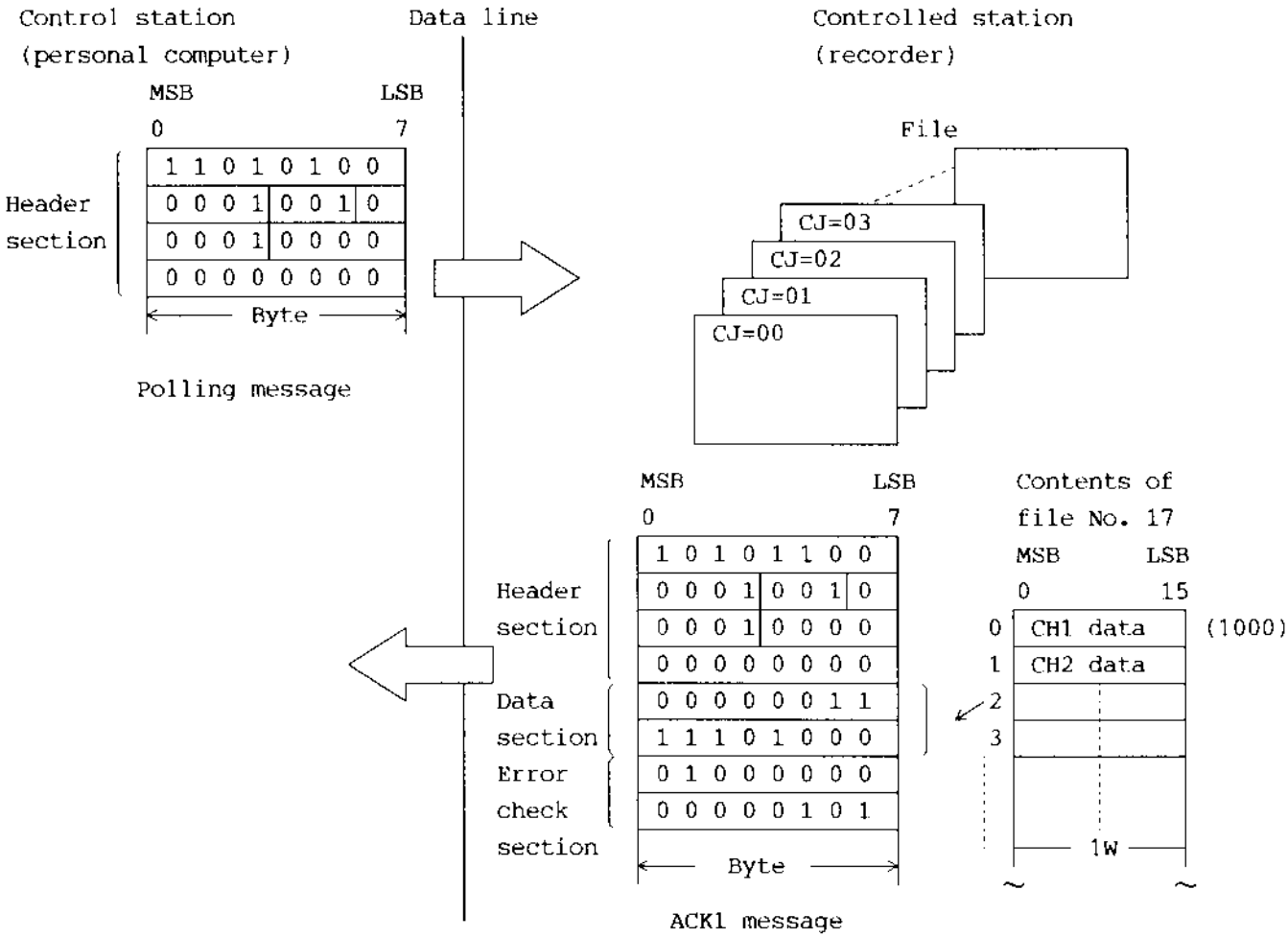
Comminicatiom message is described in the unit of characters (bytes) according to transmission format.

(1) Polling message



Example 1

Request (READ) for CH1 measured value from personal computer to the station No. 1 recorder



[Sample program in Example 1]

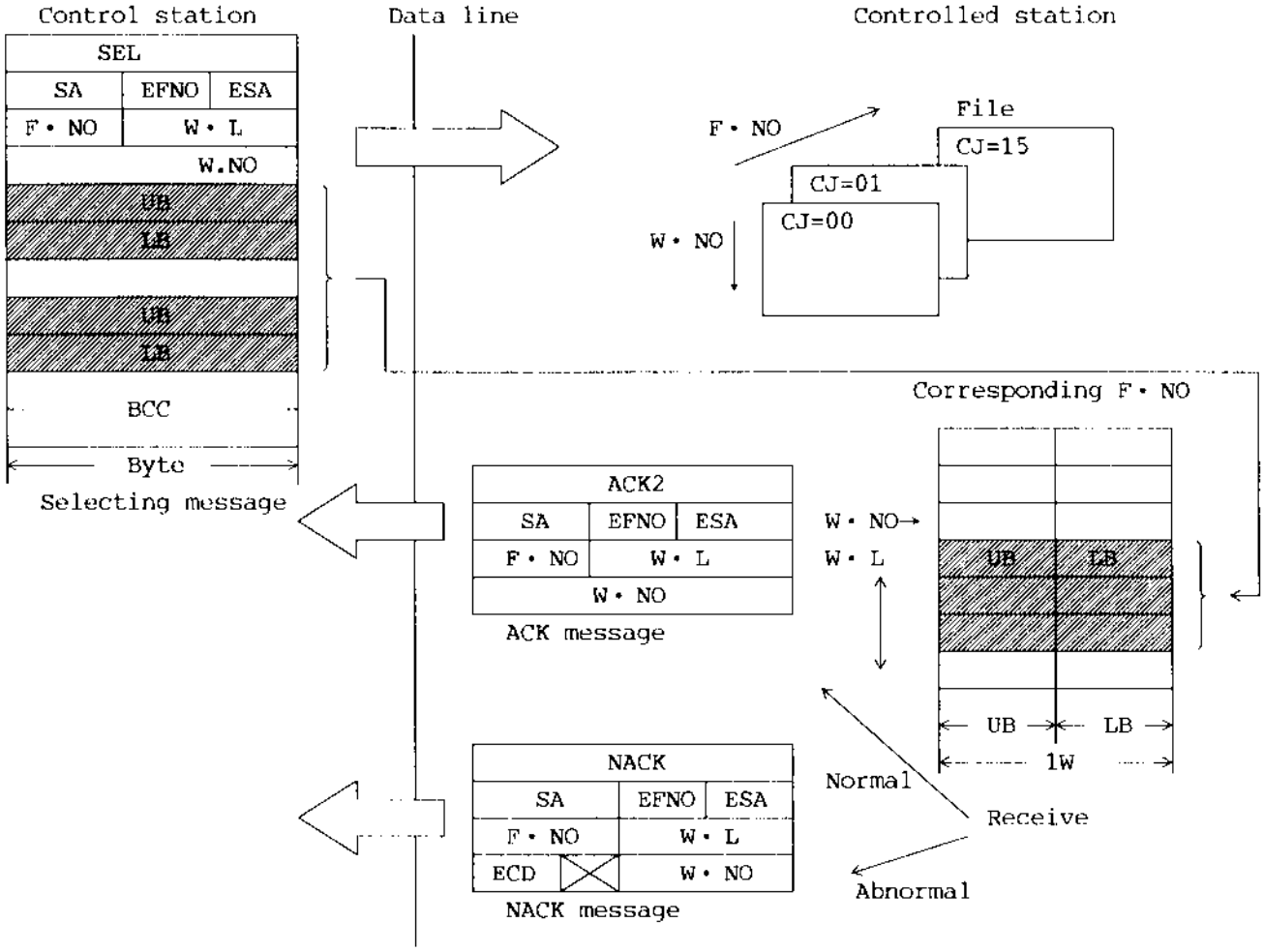
Using BASIC language of personal computer (PC9801, NEC, JAPAN), poling message program in Example 1 is shown in the following.

```
10  OPEN "COM1:N83NN" AS "#1
20  PRINT #1, CHR$(&HD4)+CHR$(&H12)+CHR$(&H10)+CHR$(&H0):
30  X$=INPUT$(1,#1)
40  PRINT HEX$(ASC(X$))
50  GOTO 30
60  END
```

[After execution]

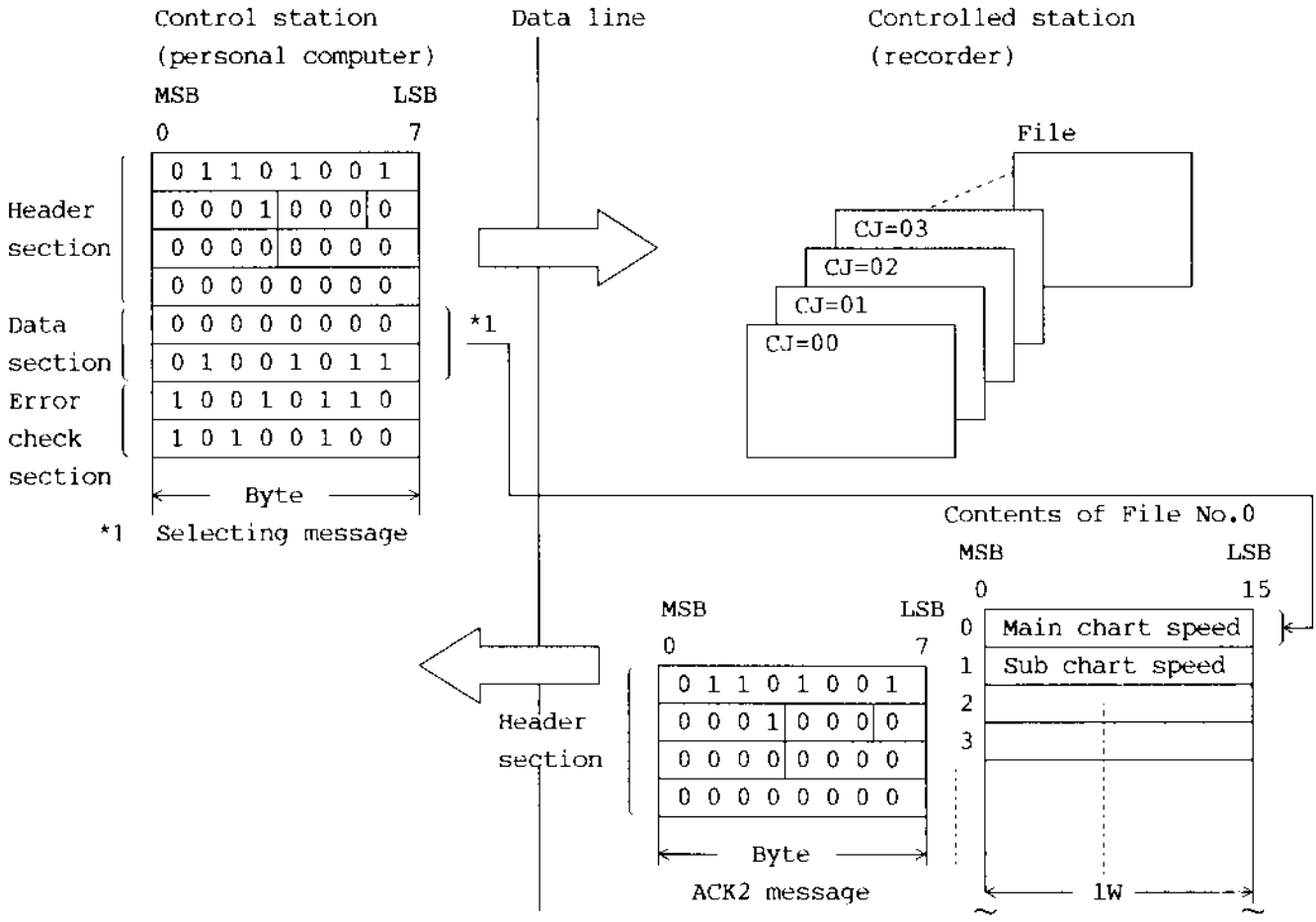
```
RUN
AC
12
10
00
03
     | Data section (CH1 input data)
E8
40
05
```

(2) Selecting message



Example 2

Setting (WRITE) of main chart speed from personal computer to the station No. 1 recorder (setting: 75mm/h).



[Sample program in Exampale 2]

Using BASIC language of personal computer (PC9801, NEC, JAPAN), selecting messaage program in Example 2 is shown in the following.

```
10  OPEN "COM1:N83NN" AS "#1
20  PRINT #1, CHR$(&H69)+CHR$(&H10)+CHR$(&H00)+CHR$(&H00)+CHR$(&H00)+
    CHR$(&H4B)+CHR$(&H96)+CHR$(&HA4);
30  X$=INPUT$(1,#1)
40  PRINT HEX$(ASC(X$))
50  GOTO 30
60  END
```

[After execution]

```
RUN
C5
10
00
00
```

9. TRANSMISSION CONTROL PROCEDURES

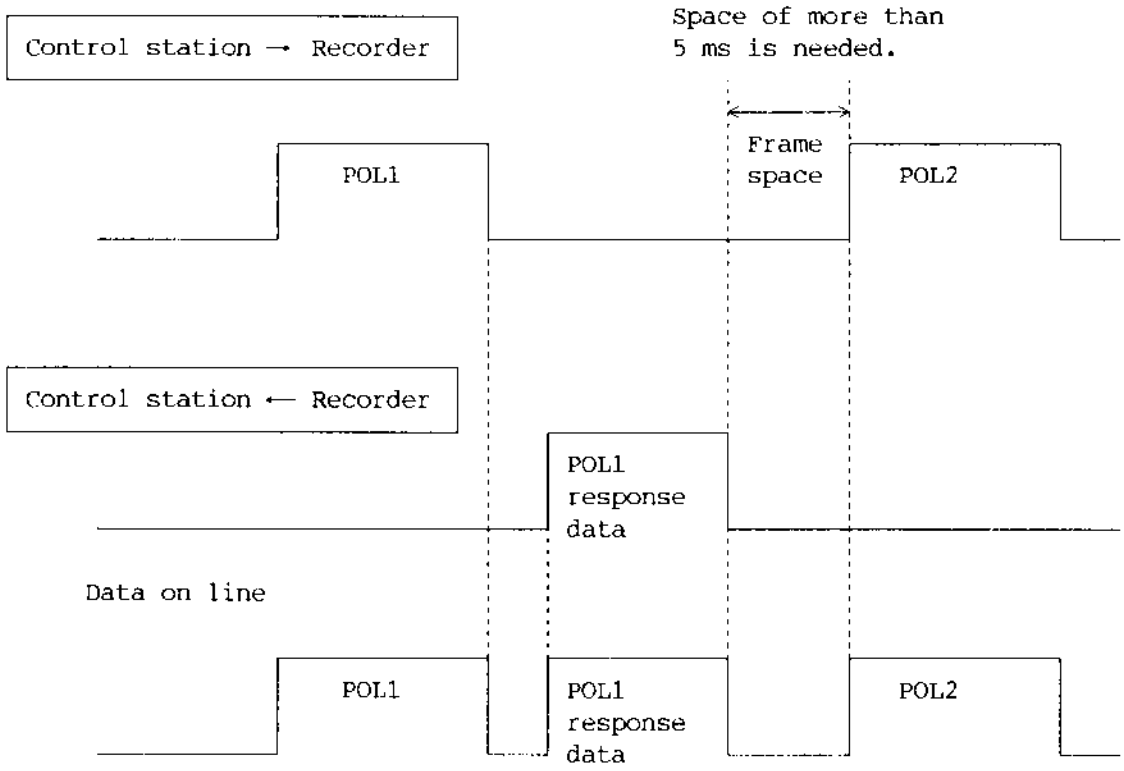
In general, transmission control procedure is divided into the following 3 phases.

(1) Data link setup
(2) Data transfer
(3) Data link release

In this transmission system, the data link setup (1) serves for the data link release (3) of the previous frame, so the space between frames must be secured correctly. The time required for spacing the frames is more than 5 msec.

Polling message or selecting message from the control station and corresponding response message from the controlled station are called the polling frame and the selecting frame, respectively.

In other words, when the controlled station has not received one character data for more than 5 msec on the line, the data link initializes receptions based on the judgement that a new frame is started.
During reception (during transmission from control station), when the character space is 2.5 msec, or more, the controlled station is automatically initialized and the data which have been received are completely cleared. Under the condition of initialized reception, the first character is limited to transmission functions words (POL, SEL), so a series of messages starting with other charactrers are all disregarded.
In the controlled station, when the function words are "POL", the header section, that is, only 2 words are taken, and in the case of "SEL", the data (data section) of the data length shown in the header section are taken, while others are all disregarded.



* Data response time of PHA and PHC is 1 second (Max).
For time-out detection with personal computer, the time required for time-out detection should be more than 1 second.

10. INTERNAL FILE SPECIFICATIONS

10.1 Parameter file

File No.	Name	Access	File size
0	Parameter file	READ/WRITE	16 words

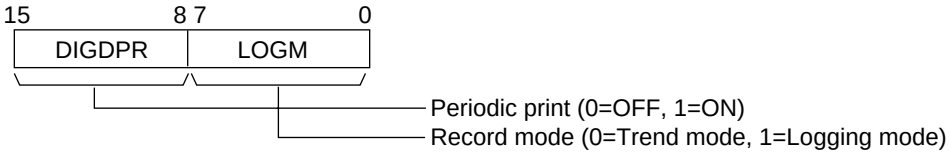
General

This file is used for setting the chart speed, recording mode, etc.

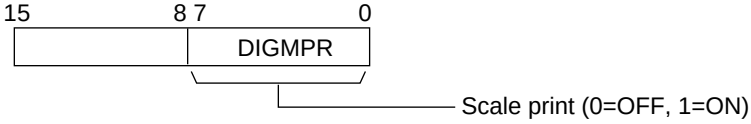
Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)
0	CHART1		Main chart speed	mm/h	5 to 1500
1	CHART2		Sub-chart speed	mm/h	5 to 1500
2	DIGDPR	LOGM	Periodic print/record print		See the following description in (1).
3		DIGMPR	/scale print		See the following description in (2).
4	LOGINT		Logging interval	min.	10 to 60
5	RECTYP		Record format		0=Standard, 1=Auto range recording, 2=Zone recording, 3=Zoom recording
6	ZCNT		Zone divisions		PHA : 2 to 4 PHC : 2 to 3
7	LAMPM		Chart illumination		0=Goes out, 1=Lights
8	ROUT	DAYREP	Daily report auto print/ daily report function		See the following description in (3).
9	RSTOP	RSTART	Daily report function stop time/start time		See the following description in (4).
10	SOUT	DATSUM	Data sum list auto print/ data sum function		See the following description in (5).
11	SSTOP	SSTART	Data sum function stop time/ start time		See the following description in (6).
12	SPO	STNO	Transmission baud rate/ station No.		See the following description in (7).
13	PRT	STP	Parity/stop bit		See the following description in (8).
14		TIOD	Construction of T-link I/O transmission		See the following description in (9).
15		TOTAL	Printing of only integrated value Printing function ON/OFF		See the following description in (10).

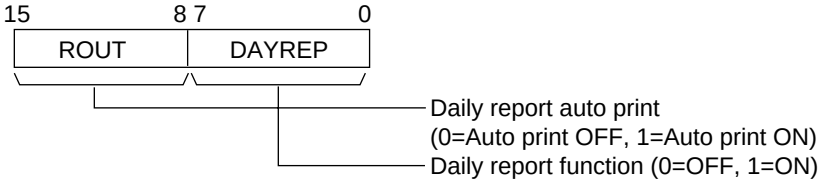
(1) DIGDPR/LOGM



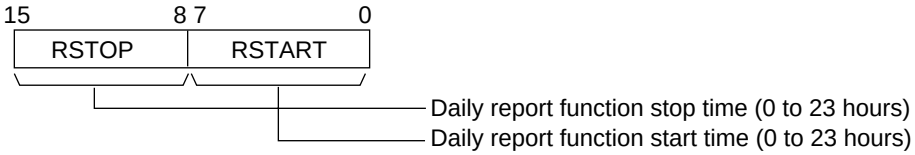
(2) DIGMPR



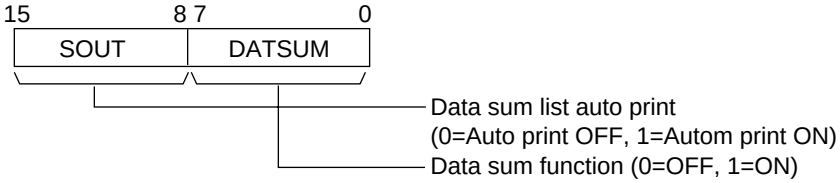
(3) ROUT/DAYREP



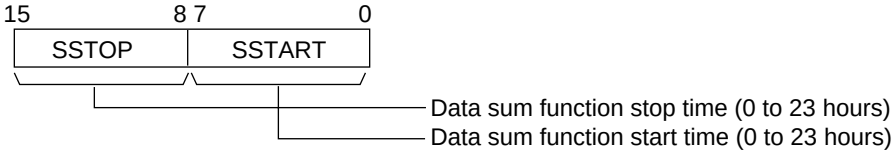
(4) RSTOP/RSTART



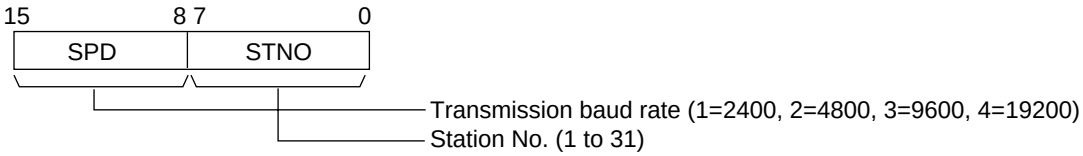
(5) SOUT/DATSUM



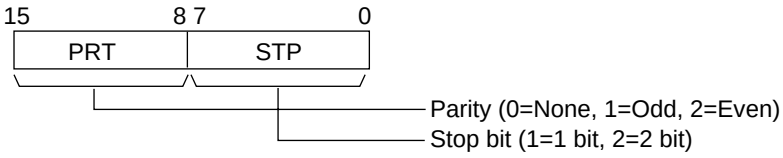
(6) SSTOP/SSTART



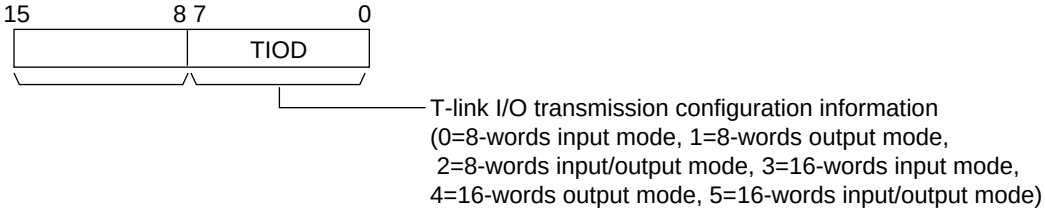
(7) SPD/STNO



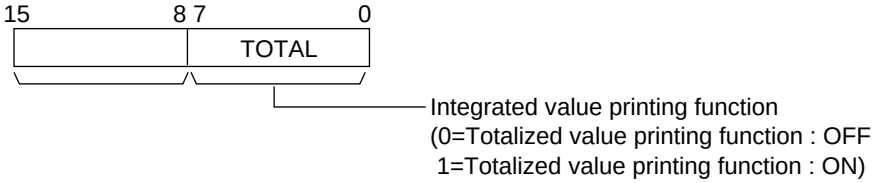
(8) PRT/STP



(9) TIOD



(10) TOTAL



Note) When transmission data is rewritten, turn OFF the power source of the recorder once or else the data can not be rewritten.

10.2 Range file

File No.	Name	Access	File size
1 to 12	Range file	READ/WRITE	32 words each

General

This file is used for setting the input type, record range, tag No. and other data of each input channel. File No. 1 to 12 correspond to CH1 to 12. (CH1 to CH6 for PHC)

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)
0	TAG(1)	TAG(0)	TAG No.		Set tag No. (8 digits) by ASCII codes. See the following description in (1).
1	TAG(3)	TAG(2)			
2	TAG(5)	TAG(4)			
3	TAG(7)	TAG(6)			
4	DFIST		Input filter	sec.	0 to 900 (No input filter is provided at 0.)
5	UNIT	TYPE	Unit/input type		See the following description in (2).
6	POINT		Position of industrial value decimal point		0 to 5
7	RMIN		Record range (0% side)		Depends upon the input types. See the following description in (2).
8	RMAX		Record range (100% side)		
9	MMIN		Measurerment range (base scale)		DC voltage input only -5500 to 5500.
10	MMAX		Measurerment range (full scale)		
11	SMIN		Industrial value (base scale)		DC voltage input only -32767 to 32767.
12	SMAX		Industrial value (full scale)		
13	ROOT	SCAL	Square-root extraction/scaling		See the following description in (3).
14	SUB		Subtract operation channel No.		0 to 12 (No subtract operation at 0.)
15	SEK	NIP	Summation/daily report		See the following description in (4).
16	ZONE		Specified zone for zone record		PHA : 1 to 4 PHC : 1 to 3
17	ZOOM	ARNG	Zoom record/auto range record		See the following description in (5).
18	ZMBDY1		Zoom recording boundary value ①	Industrial value	Depends upon the input types.
19	ZMBDY2		Zoom recording boundary value ②		
20	ZMPCT1		Zoom recording chart position ①	%	0 to 100
21	ZMPCT2		Zoom recording chart position ②		
22	TAI	COLOR	Logarithm operation/ Printing color		See the following description in (6).
23	PVSIFT		PV shift value	Industrial value	-32767 to 32767
24	PVGAIN		PV gain	%	0.01 to 327.67
28			(Spare)		
29			(Spare)		
30			(Spare)		
31			(Spare)		

(1) TAG No. (TAG (0) to TAG (7))

Set tag No. (max. 8 digits) by ASCII codes as follows.

(Example)

(TAG No.)
Setting of TAG 12345 →

TAG (1)	A	T	TAG (0)
TAG (3)	1	G	TAG (2)
TAG (5)	3	2	TAG (4)
TAG (7)	5	4	TAG (6)

(2) Setting of input types and record range

Table 10-1

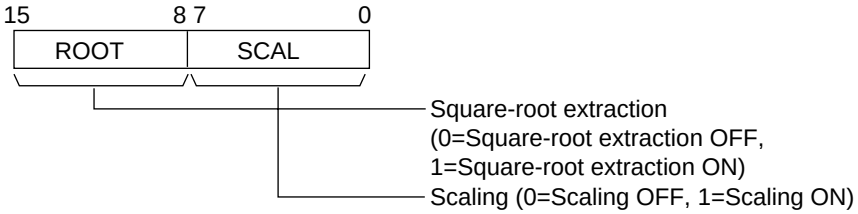
	Input type	Input type code	Record range setting	Remarks
Thermo-couple	K	1	-2300 to 14000	Corresponds to -230.0 to 1400.0°C
	E	2	-2300 to 8300	Corresponds to -230.0 to 830.0°C
	J	3	-2300 to 11300	Corresponds to -230.0 to 1130.0°C
	T	4	-2300 to 4300	Corresponds to -230.0 to 430.0°C
	R	5	-300 to 17900	Corresponds to -30.0 to 1790.0°C
	S	6	-300 to 17900	Corresponds to -30.0 to 1790.0°C
	B	7	3700 to 17900	Corresponds to 370.0 to 1790.0°C
	N	8	-300 to 13300	Corresponds to -30.0 to 1330.0°C
	W	9	-300 to 17900	Corresponds to -30.0 to 1790.0°C
	L	10	-2300 to 9300	Corresponds to -230.0 to 930.0°C
	U	11	-2300 to 4300	Corresponds to -230.0 to 430.0°C
	PN	12	-300 to 13300	Corresponds to -30.0 to 1330.0°C
Resistance thermometer	Pt100Ω	13	-2300 to 6300	Corresponds to -230.0 to 630.0°C
	JPt100Ω	14	-2300 to 6300	Corresponds to -230.0 to 630.0°C
DC voltage	±50mV	15	-5500 to 5500	Corresponds to -55.00 to 55.00°C
	±500mV	16	-5500 to 5500	Corresponds to -550.0 to 550.0°C
	±5V	17	-5500 to 5500	Corresponds to -5.500 to 5.500°C
	±50V	18	-5500 to 5500	Corresponds to -55.00 to 55.00°C
Transmission	COM	19	-32767 to 32767	Corresponds to 10^{-9} to 10^{9}
Logarithm operation ON			-9×2048 to 9×2048	

- When scaling is used at DC voltage input, record range from -32767 to 32767 can be set.
- When the unit is 02 (˚F) at thermocouple or resistance bulb input, record range should be set within (above-mentioned record range × 1.8+32).
- With logarithm operation ON, record range, industrial value and zoom recording boundary value should be set by a magnification of 2048 within the range from -9×2048 to 9×2048.

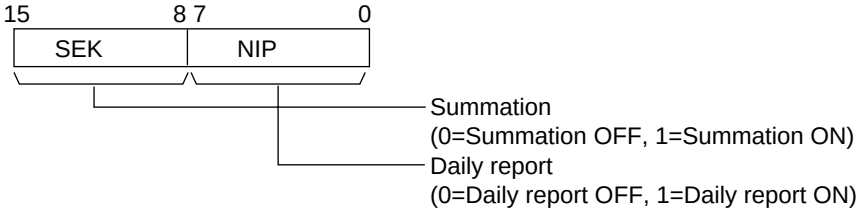
  (Example)

  When setting a record range of 10^{-3} to 10^{5}, set -6144 (-3×2048) in the 0% record range and 10240 (5×2048) in 100% record range.

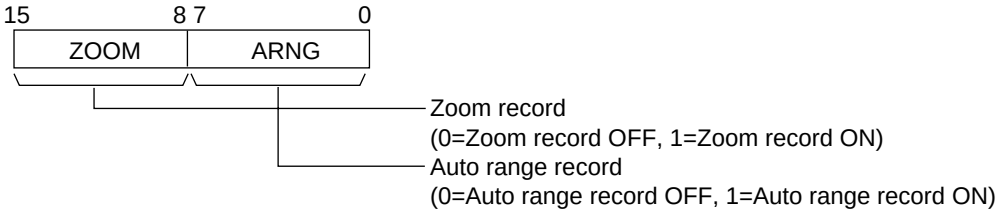
(3) ROOT/SCAL (at DC voltage input only)



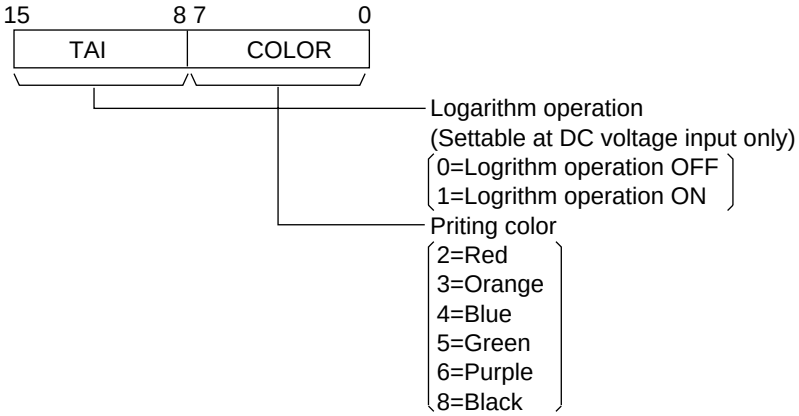
(4) SEK/NIP



(5) ZOOM/ARNG



(6) TAI/COLOR



10.3 Alarm setting file

File No.	Name	Access	File size
13	Alarm setting file	READ/WRITE	144 words

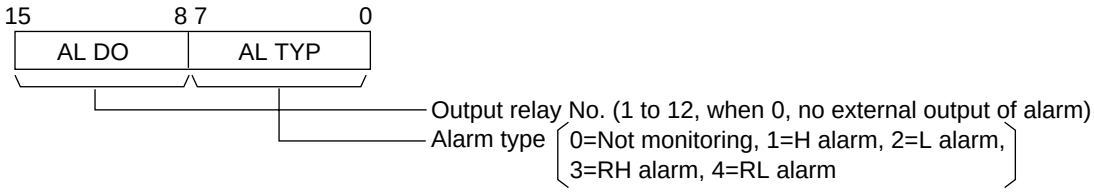
General

This file is used for alarm setting (alarm No. 1 to 4) to input channels CH1 to CH12 for PHA. (CH1 to CH6 for PHC)

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)	
0	AL1DO	AL1TYP	Output relay No./alarm type		See the following Item (1).	Setting of CH1.
1	AL1		Alarm No. 1 setting value	Industrial value	Differs depending on the input type.	
2	AL2DO	AL2TYP	Output relay No./alarm type		See the following Item (1).	
3	AL2		Alarm No. 2 setting value	Industrial value	Differs depending on the input type.	
4	AL3DO	AL3TYP	Output relay No./alarm type		See the following Item (1).	
5	AL3		Alarm No. 3 setting value	Industrial value	Differs depending on the input type.	
6	AL4DO	AL4TYP	Output relay No./alarm type		See the following Item (1).	
7	AL4		Alarm No. 4 setting value	Industrial value	Differs depending on the input type.	
8			(Spare)			
9			(Spare)			
10			(Spare)			
11			(Spare)			
12	AL1DO	AL1TYP	Output relay No./alarm type		See the following Item (1).	Setting of CH2.
13	AL1		Alarm No. 1 setting value	Industrial value	Differs depending on the input type.	
138	AL4DO	AL4TYP	Output relay No./alarm type		See the following Item (1).	Setting of CH12.
139	AL4		Alarm No. 4 setting value	Industrial value	Differs depending on the input type.	
140			(Spare)			
141			(Spare)			
142			(Spare)			
143			(Spare)			

(1) Output relay No., alarm type



Each alarm of alarm No. 1 to 4 should be set in the same format.
When an output relay No. is specified from the plural printer at the same time, the output relay is ON when any alarm occurs.

Alarm setting value

Set an alarm setting value in terms with an industrial value. The setting range is the same as in the "record range setting" given in Table 10-1 (Item 10.2).

With logarithm operation ON, avoid setting RH alarm and RL alarm for the alarm type.
With logarithm operation ON, calculate the H and L alarm setting values from the following expression.
Alarm setting value=Log_{10} (real number) $\times$ 2048 + index $\times$ 2048

(Example)

When setting "3.1×10^{-2}" for the alarm setting value, set "-3090" from the following expression.
Alarm setting value =$Log_{10}3.1 \times 2048 + (-2) \times 2048 = -3090$

10.4 System file

File No.	Name	Access	File size
14	System file	READ/WRITE	32 words

General

Data required for internal operation of PHA and PHC are stored in system file to read RAS data such as present time (date, time), ink empty, etc., in the recorder.

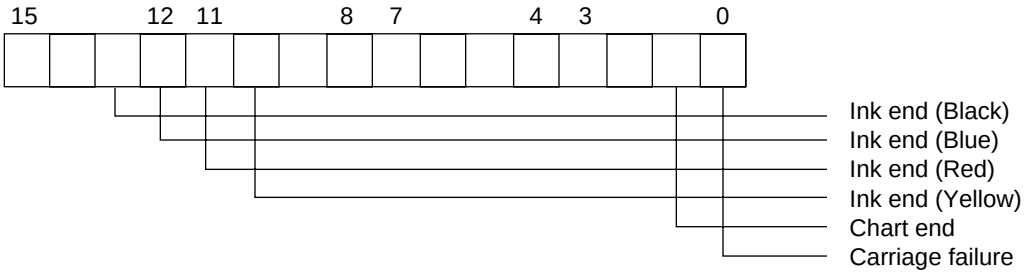
Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)	
0 • • • •						
8	MONTH	YEAR	Present time (date, time)		YEAR : (lower significant 2 ditits) MONTH : (1 to 12) DAY : (1 to 31) HOUR : (0 to 23) MINUT : (0 to 59)	
9	HOUR	DAY				
10		MINUT				
• • • •						
24	RAS		RAS data		See the following description in (1).	
•			(spare)			
30	MSTA	HSTA	Periodic print start time.	min. hours	0 to 59	0 to 23
31	MKAN	HKAN	Periodic print interval.	min. hours	0 to 59	0 to 24

MINUT : minute

(1) RAS data

Bit data are stored as shown below.



(2) Periodic print interval

- Periodic print is not done, if the periodic print interval is 0.
- The periodic print interval can not be set to any interval exceeding 24 hours.

10.5 Command file

File No.	Name	Access	File size
15	Command file	READ/WRITE	8 words

General

The command file is used for setting data required for internal operation of PHA and PHC. It is able to change the date, time in the recorder and to print message.

Configuration

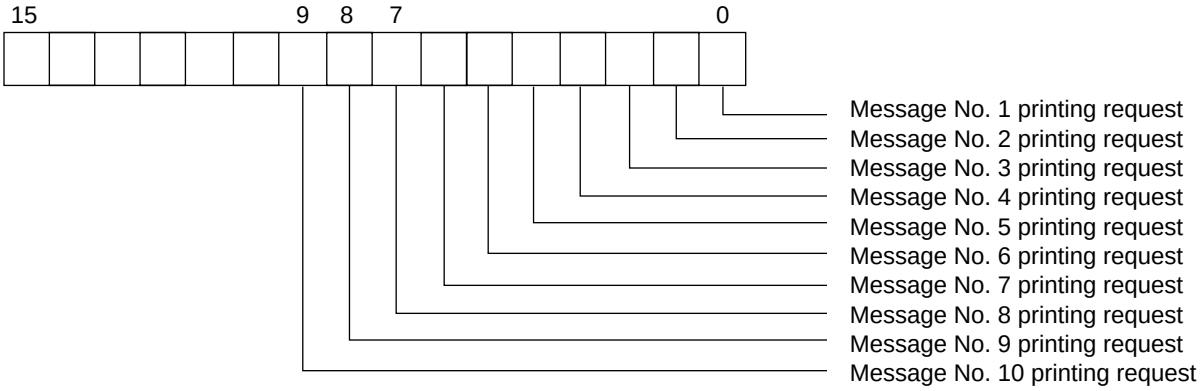
WNo.	Abbreviations		Name	Unit	Range of values (setting range)
0	YEAR	SET	SET : Set command		YEAR : (lower significant 2 ditits) MONTH : (1 to 12) DAY : (1 to 31) HOUR : (0 to 23) MINUT : (0 to 59)
1	DAY	MONTH			
2	MINUT	HOUR			
• • •					
• • •			(Spare)		
7	MESRE		Message printing		See the following description in (2).

(1) Date, time setting

After setting YEAR, MONTH, DAY, HOUR and MINUT of this file, the date, time in the recorder can be set by writing “1” in SET (set command).
(Set command and time can be set at the same time.)
After the time in the recorder has been set, the set command is automatically cleared to “0”.

(2) Message printing

Each message is stored by the bit information as shown below.
The printing request is held, if a message is being printed.
The message printing request bit is cleared automatically after the printing request has been held.



10.6 Input failure information file

File No.	Name	Access	File size
16	Input failure information file	READ only	6 words

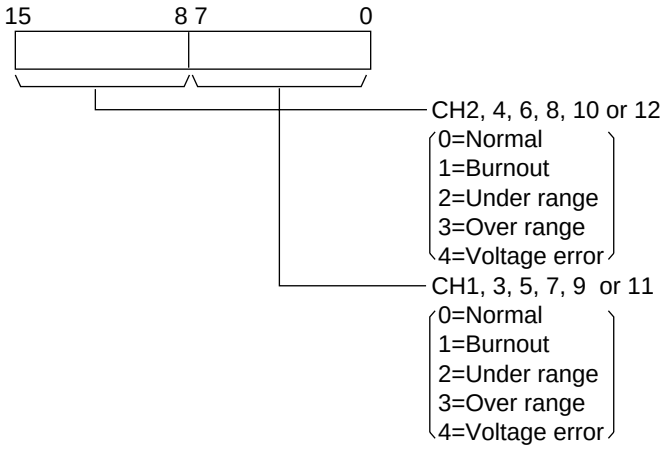
General

This file is used to store abnormal data on inputs, CH1 to CH12 for PHA and CH1 to CH6 for PHC. It is able to read burnout, over/under range and voltage error.

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)
0	CH2	CH1	Failure information of each input		See the following description in (1).
1	CH4	CH3			
2	CH6	CH5			
3	CH8	CH7			
4	CH10	CH9			
5	CH12	CH11			

(1) Input failure information



10.7 Input data file

File No.	Name	Access	File size
17	Input data file	READ only	12words

General

This file is used to store input data of the recorder.

It is able to read input data CH1 to CH12 for PHA and CH1 to CH6 for PHC in industrial value.

Configuration

WNo.	Abbreviations	Name	Unit	Range of values (setting range)
0	PV1	CH1 measuring data	IV*	Depends upon the input types.
1	PV2	CH2 measuring data	IV	Depends upon the input types.
2	PV3	CH3 measuring data	IV	Depends upon the input types.
3	PV4	CH4 measuring data	IV	Depends upon the input types.
4	PV5	CH5 measuring data	IV	Depends upon the input types.
5	PV6	CH6 measuring data	IV	Depends upon the input types.
6	PV7	CH7 measuring data	IV	Depends upon the input types.
7	PV8	CH8 measuring data	IV	Depends upon the input types.
8	PV9	CH9 measuring data	IV	Depends upon the input types.
9	PV10	CH10 measuring data	IV	Depends upon the input types.
10	PV11	CH11 measuring data	IV	Depends upon the input types.
11	PV12	CH12 measuring data	IV	Depends upon the input types.

IV: Industrial value

① All the measured data are stored in industrial value (without decimal point).
The values are the same as shown in Table 10-1 (Item 10.2).

② When the input is “burnout”, “over/under range” or “voltage error”, the data becomes maximum or minimum in the range of the above value.

10.8 Alarm output file

File No.	Name	Access	File size
19	Alarm output file	READ only	36 words

General

This file is used to store the alarm data in the unit of byte.

It is able to read the alarm data being detected.

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)
0	ALM2	ALM1	CH1 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
1	ALM4	ALM3			
2	(Auxiliary)				
3	ALM2	ALM1	CH2 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
4	ALM4	ALM3			
5	(Auxiliary)				
6	ALM2	ALM1	CH3 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
7	ALM4	ALM3			
8	(Auxiliary)				
9	ALM2	ALM1	CH4 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
10	ALM4	ALM3			
11	(Auxiliary)				
12	ALM2	ALM1	CH5 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
13	ALM4	ALM3			
14	(Auxiliary)				
15	ALM2	ALM1	CH6 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
16	ALM4	ALM3			
17	(Auxiliary)				
18	ALM2	ALM1	CH7 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
19	ALM4	ALM3			
20	(Auxiliary)				
21	ALM2	ALM1	CH8 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
22	ALM4	ALM3			
23	(Auxiliary)				
24	ALM2	ALM1	CH9 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
25	ALM4	ALM3			
26	(Auxiliary)				
27	ALM2	ALM1	CH10 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
28	ALM4	ALM3			
29	(Auxiliary)				
30	ALM2	ALM1	CH11 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
31	ALM4	ALM3			
32	(Auxiliary)				
33	ALM2	ALM1	CH12 alarm occurrence information	____	0=No alarm occurrence 1=Alarm occurrence
34	ALM4	ALM3			
35	(Auxiliary)				

10.9 Transmission input data file

File No.	Name	Access	File size
21	Transmission input data file	WRITE only	12 words

General

This file is used to store transmission data to PH series recorder.

Transmission data (CH1 to 12 for PHA, CH1 to 6 for PHC) can be written in each channel with industrial values

Configuration

WNo.	Abbreviations	Name	Unit	Range of values (setting range)
0	CV1	CH1 transmission input data	IV*	Depends upon the input types.
1	CV2	CH2 transmission input data	IV	Depends upon the input types.
2	CV3	CH3 transmission input data	IV	Depends upon the input types.
3	CV4	CH4 transmission input data	IV	Depends upon the input types.
4	CV5	CH5 transmission input data	IV	Depends upon the input types.
5	CV6	CH6 transmission input data	IV	Depends upon the input types.
6	CV7	CH7 transmission input data	IV	Depends upon the input types.
7	CV8	CH8 transmission input data	IV	Depends upon the input types.
8	CV9	CH9 transmission input data	IV	Depends upon the input types.
9	CV10	CH10 transmission input data	IV	Depends upon the input types.
10	CV11	CH11 transmission input data	IV	Depends upon the input types.
11	CV12	CH12 transmission input data	IV	Depends upon the input types.

IV: Industrial value

① Input data can be recorded, printed and displayed, after the input data “0 to 10000” are converted to the base scale to full scale of the industrial value.

10.10 Message file

File No.	Name	Access	File size
22	Message file	READ/WRITE	120 words

General

This file is used to store message character data, printing colors, printing positions, printing timing, etc. in message printing.
Message data can be changed.

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)	
0	MES(1)	MES(0)	Message character data		Set message character data (16 digits) by ASCII codes. See the following description in (1).	Message No. 1 setting
1	MES(3)	MES(2)				
2	MES(5)	MES(4)				
3	MES(7)	MES(6)				
4	MES(9)	MES(8)				
5	MES(11)	MES(10)				
6	MES(13)	MES(12)				
7	MES(15)	MES(14)				
8	MPOS	MCOL	Printing start position/ printing color		See the following description in (2).	
9	MSTR	MTIM	Printing start time/ printing timing		See the following description in (3).	
10	MACH	MINT	Alarm CH/printing interval		See the following description in (4).	Message No. 2 setting
11	MAON	MAHL	Alarm ON/OFF /Alarm No.		See the following description in (5).	
118						Message No. 10 setting
119						

(1) Message character data (MES(0) to MES(15))

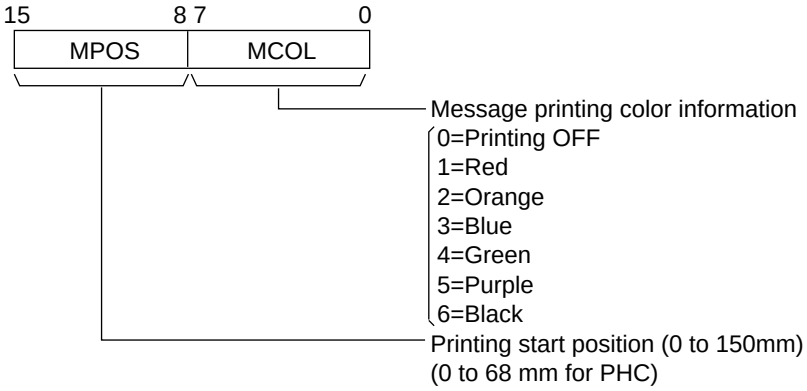
Set message character data (max. 16 digits) by ASCII codes as follows.

(Example)

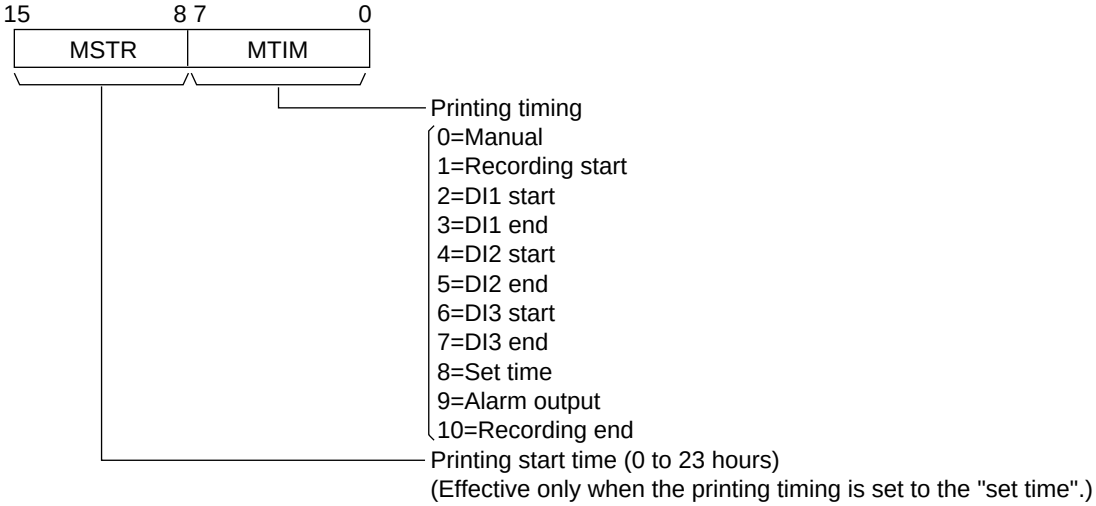
(Message character data)
Setting of MESSAGE123456789 →

MES (1)	E	M	MES (0)
MES (3)	S	S	MES (2)
MES (5)	G	A	MES (4)
MES (7)	1	E	MES (6)
MES (9)	3	2	MES (9)
MES (11)	5	4	MES (10)
MES (13)	7	6	MES (12)
MES (15)	9	8	MES (14)

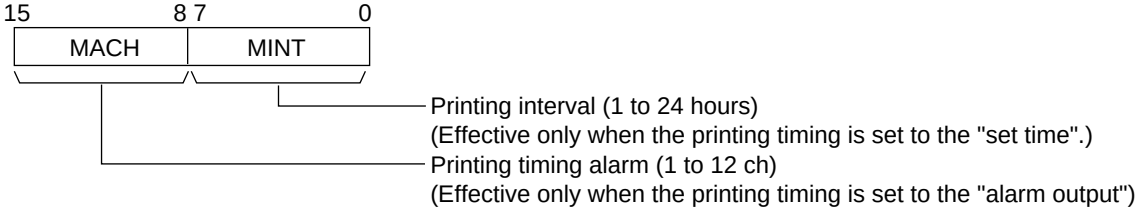
(2) MPOS/MCOL



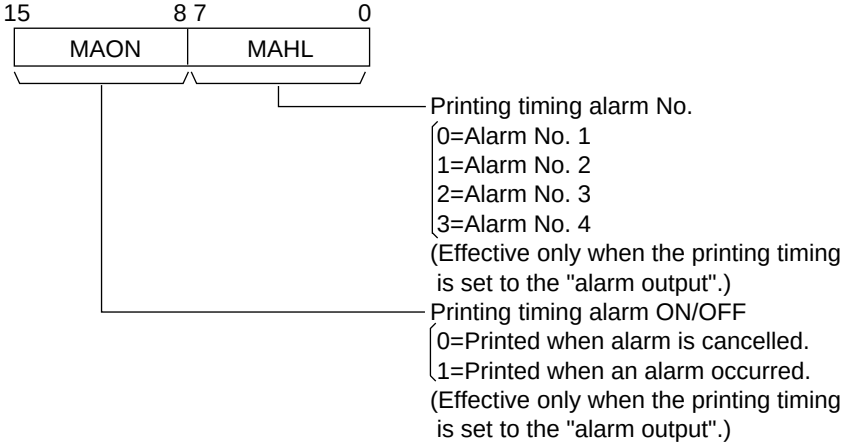
(3) MSTR/MTIM



(4) MACH/MINT



(5) MAON/MAHL



10.11 Daily report file

File No.	Name	Access	File size
33 to 35	Daily report file	READ only	256 words each

General

This daily report file is used to store instantaneous values every hour within the start and end time, generated time of these instantaneous values, average value of instantaneous values, the maximum value and its generated time, and minimum value and its generated time.

These daily report data can be read, and the daily report file is rewritten at the end time of the daily report.

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)	
0 to 144			(Spare)			
145	DAY	MONTH	Instantaneous value data set time	Day/Month	1 to 31/ 1 to 21	Instantaneous value data at start time
146	MINUT	HOUR		Minute/Hour	0 to 59/0 to 23	
147	NV1		CH1 instantaneous value data	Industrial value	Depends upon the input types.	
148	NV2		CH2 instantaneous value data	Industrial value	Depends upon the input types.	
149	NV3		CH3 instantaneous value data	Industrial value	Depends upon the input types.	
150	NV4		CH4 instantaneous value data	Industrial value	Depends upon the input types.	
151	NV5		CH5 instantaneous value data	Industrial value	Depends upon the input types.	
152	NV6		CH6 instantaneous value data	Industrial value	Depends upon the input types.	
153	NV7		CH7 instantaneous value data	Industrial value	Depends upon the input types.	
154	NV8		CH8 instantaneous value data	Industrial value	Depends upon the input types.	
155	NV9		CH9 instantaneous value data	Industrial value	Depends upon the input types.	
156	NV10		CH10 instantaneous value data	Industrial value	Depends upon the input types.	
157	NV11		CH11 instantaneous value data	Industrial value	Depends upon the input types.	
158	NV12		CH12 instantaneous value data	Industrial value	Depends upon the input types.	
159	DAY	MONTH				Instantaneous value data after 1 hour
File 33 251	NV7					Instantaneous value data after 7 hours
252	NV8					
253	NV9					
254	NV10					
255	NV11					
0	NV12					
1	DAY	MONTH				Instantaneous value data after 8 hours
File 34 220	NV8					Instantaneous value data after 23 hours
221	NV9					
222	NV10					
223	NV11					
224	NV12					

	WNo.	Abbreviations	Name	Unit	Range of values (setting range)
	225	ANV1	CH1 average value	Industrial value	Depends upon the input types.
	226	ANV2	CH2 average value	Industrial value	Depends upon the input types.
	227	ANV3	CH3 average value	Industrial value	Depends upon the input types.
	234	ANV10			
	235	ANV11			
	236	ANV12			
	237	MINUT HOUR	CH1 maximum value time	Minute/Hour	0 to 59/0 to 23
	238	MAX1	CH1 maximum value	Industrial value	Depends upon the input types.
	239	MINUT HOUR	CH2 maximum value time	Minute/Hour	0 to 59/0 to 23
	240	MAX2	CH2 maximum value	Industrial value	Depends upon the input types.
	241	MINUT HOUR	CH3 maximum value time	Minute/Hour	0 to 59/0 to 23
	242	MAX3	CH3 maximum value	Industrial value	Depends upon the input types.
File 34					
	254	MAX9	CH9		
	255	MINUT HOUR	CH10		
	0	MAX10	CH10		
	1	MINUT HOUR	CH11		
	2	MAX11	CH11		
	3	MINUT HOUR	CH12		
File 35	4	MAX12	CH12		
	5	MINUT HOUR	CH1 minumum value time	Minute/Hour	0 to 59/0 to 23
	6	MIN1	CH1 minumum value	Industrial value	Depends upon the input types.
	7	MINUT HOUR	CH2 minumum value time	Minute/Hour	0 to 59/0 to 23
	27	MINUT HOUR	CH12		
	28	MIN2	CH12		
	29 • • • 255		(Spare)		

① Instantaneous value data, average value data, maximum value data, and minimum value data are stored as industrial values (without decimal point), and the range of these values meets the “record range setting” in Table 10-1 (Item 10.2).

② If an input is a burnout, over/under range or voltage error, instantaneous value data is either maximum or minimum value within the above range of values.

10.12 Totalization file

File No.	Name	Access	File size
37, 38	Totalization file	READ only	256 words each

General

This totalization file is used to store the integrated values every hour within the integration start and end time, integration end time, and the total of integrated values.
The totalization file is rewritten at the integration end time.
These integrated data can be read.

Configuration

WNo.	Abbreviations		Name	Unit	Range of values (setting range)	
0 • • • 124			(Spare)			
125	DAY	MONTH	Integrated end time	Day/Month	1 to 31/ 1 to 12	Integrated data at 1 hour after the integration start time
126	MINUT	HOUR		Minute/Hour	0 to 59/0 to 23	
127	SV1		CH1 integrated data	Industrial value	Depends upon the input types.	
128	SV2		CH2 integrated data	Industrial value	Depends upon the input types.	
129	SV3		CH3 integrated data	Industrial value	Depends upon the input types.	
130	SV4		CH4 integrated data	Industrial value	Depends upon the input types.	
131	SV5		CH5 integrated data	Industrial value	Depends upon the input types.	
132	SV6		CH6 integrated data	Industrial value	Depends upon the input types.	
133	SV7		CH7 integrated data	Industrial value	Depends upon the input types.	
134	SV8		CH8 integrated data	Industrial value	Depends upon the input types.	
135	SV9		CH9 integrated data	Industrial value	Depends upon the input types.	
136	SV10		CH10 integrated data	Industrial value	Depends upon the input types.	Integrated data at 1 hour after (integration start+1) hours
137	SV11		CH11 integrated data	Industrial value	Depends upon the input types.	
138	SV12		CH12 integrated data	Industrial value	Depends upon the input types.	
139	DAY	MONTH				
• • •						
File 37 • • •						
253	SV1					
254	SV2					
255	SV3					Integrated data at 1 hour after (integration start+9) hours
0	SV4					
1	SV5					
2	SV6					
• • •						
File 38 • • •						
201	NV9					Integrated data at 1 hour after (integration start +23) hours
202	NV10					
203	NV11					
204	NV12					

WNo.	Abbreviations	Name	Unit	Range of values (setting range)
205	SVT01	CH1 integration total data	Industrial value	-999999 to 999999
206				
207	SVT02	CH2 integration total data	Industrial value	-999999 to 999999
208	SVT03	CH3 integration total data	Industrial value	-999999 to 999999
209				
210	SVT04	CH4 integration total data	Industrial value	-999999 to 999999
211	SVT05	CH5 integration total data	Industrial value	-999999 to 999999
212				
213	SVT06	CH6 integration total data	Industrial value	-999999 to 999999
214	SVT07	CH7 integration total data	Industrial value	-999999 to 999999
215				
216	SVT08	CH8 integration total data	Industrial value	-999999 to 999999
217	SVT09	CH9 integration total data	Industrial value	-999999 to 999999
218				
219	SVT010	CH10integration total data	Industrial value	-999999 to 999999
220	SVT011	CH11 integration total data	Industrial value	-999999 to 999999
221				
222	SVT012	CH12 integration total data	Industrial value	-999999 to 999999
223 ⋮ 225		(Spare)		

① All integrated data and integration total data are stored as industrial values (without decimal point) and the range of integrated data values meets the “record range setting” in Table 10-1 (Item 10.2).

② If an input is a burnout, over/under range or voltage error, the integrated data is either maximum or minimum value within the above range of values.

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