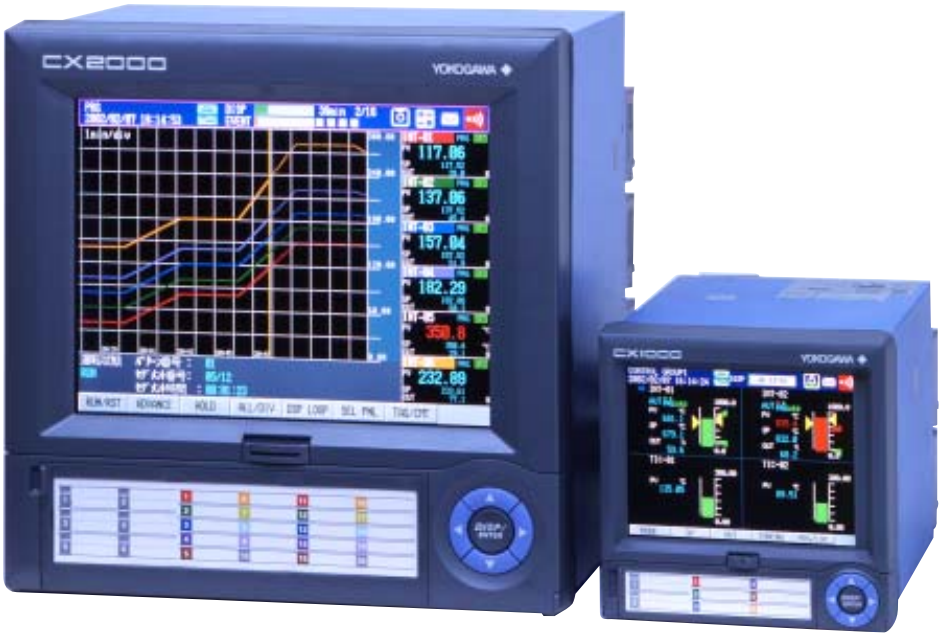
Technical Information

TI 04L31C02-00E

DAQSTATION
Control Measurement Station
CX1000/CX2000
Ladder Communication with PLC



YOKOGAWA
Yokogawa Electric Corporation

TI 04L31C02-00E

1st Edition Aug. 2002

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DAQSTATION
Control Measurement Station
CX1000/CX2000
Ladder Communication with PLC

TI 04L31C02-00E 1st Edition

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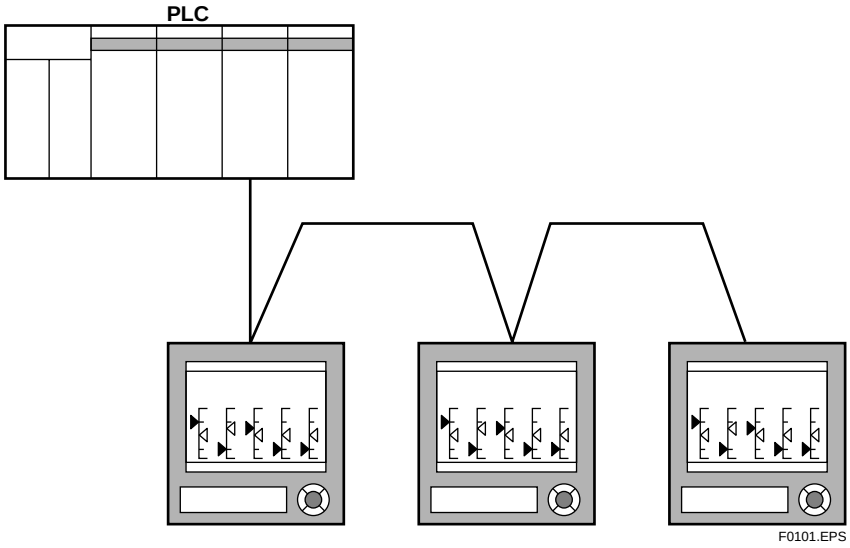
1. Foreword

1.1 Overview

With Ladder communication of CX1000/CX2000, CX can communicate with PLC such as FA-M3, YOKOGAWA, and MELSEC, MITSUBISHI. It is possible to write/read CX data and give versatile command to PLC.

It is necessary to have communication port (RS-422/485 or RS-232C) and Ladder communication as option. Also, it is necessary to have communication module (F3RZ91-ON) for FA-M3 and computer link unit (no handshaking mode) for MELSEC.



1.2 Benefit

– The analog data can be transferred to PLC register.

– The parameters such as SP (set point) and PID of CX can be changed from PLC.

– Versatile control can be used with the ladder sequence.

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2. Contents of Write/Read

■ Parameters of Write/Read

– Communication registers data
– Memory start/stop
– Alarm ACK, Math START/STOP
– Record of Manual trigger/Manual sample/Snap shot/Display data/Event data
– Write massage
– Return to operation display
– Alarm setting point of measurement/Math channels
– Parameters for each loops
– Parameters for each loop PID
– Alarm setting points for each control loops
– Program operation parameters

■ Parameters of Read

– Measuring data
– Alarm status of measuring data
– Math data
– Alarm status of Math data
– Control data
– Alarm status of control data
– Time

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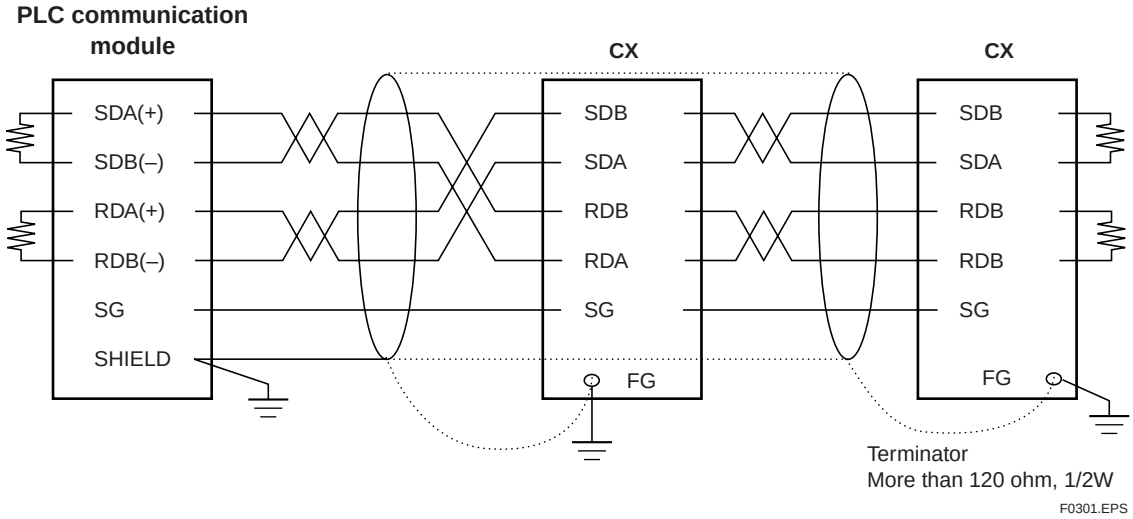
3. Communication

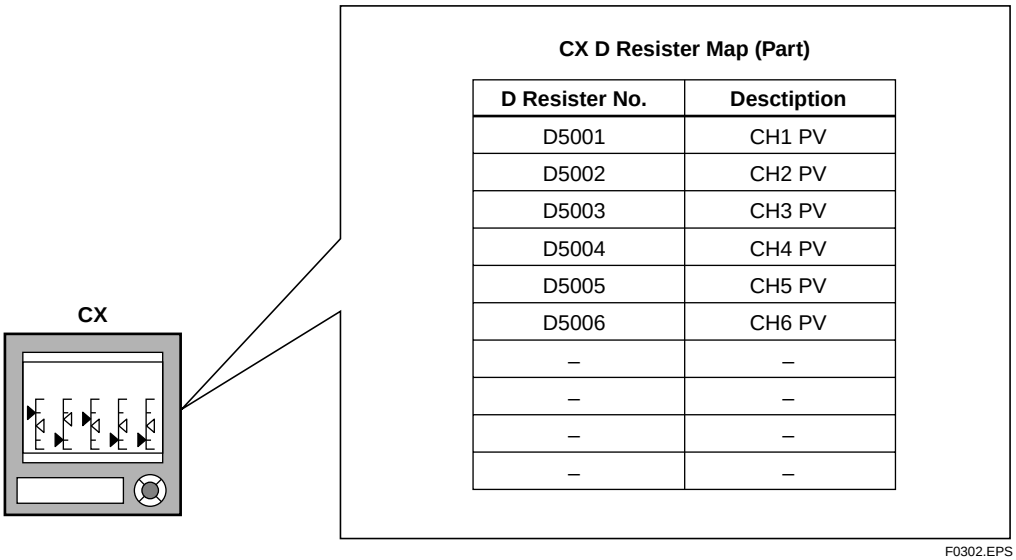
3.1 Wiring



Note: The plus/minus polarity of transmission/reception is opposite for some models.

3.2 D Register Configuration

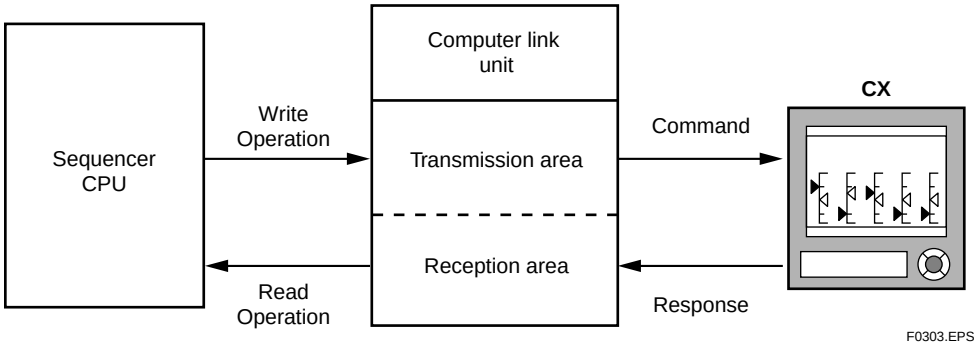
All process data and setting parameters of CX are assigned to “D” registers. After D registers number of CX are specified, the data is written/read in the ladder program.



D Resister No.	Desctiption
D5001	CH1 PV
D5002	CH2 PV
D5003	CH3 PV
D5004	CH4 PV
D5005	CH5 PV
D5006	CH6 PV
–	–
–	–
–	–
–	–

3.3 Ladder Communication Configuration

The command from PLC CPU is once put in the send area of computer link unit. Then, it is transferred to D register of CX.



3.4 Command Format

The following table is transmissin command from PLC to CX.

Bytes	1	1	2	1		1		2	1	1
BCD digits	2	2	4	1	1	1	1	4	2	2
Command/ Response source	Station No.	CPU No. (01)	D Register No.	0	5th digit	R/W	+/–	Read/Write data	CR (0D)	LF (0A)

T0301.EPS

– Station number (1-32) : ID number for CX

– CPU number : Always 01

– D register number : BCD (4 digits)

In case of using BCD data of 5 digits, 5th digit will be used in separate position(see above figure)

– 0 : Always 0

– 5th digit : read/write data of 5th digit

– R/W : 0 is read, 1 is write

– +/– : 0 is positive data (+), 1 is negative data (–)

– Read/Write : Specifies the number of data points to be read when reading

Specifies the data to be written using 4 digit BCD excluding the decimal point when writing

– CR, LF : Terminator that tells command end

3.5 Read of Parameter from CX

The construction of read parameter from CX

Command from PLC

Bytes	1	1	2	1		1		2	1	1
BCD digits	2	2	4	1	1	1	1	4	2	2
Command	Station No.	CPU No. (01)	D Register No.	0	0	0	0	Data number of read	CR (0D)	LF (0A)

T0302.EPS

CX response

Bytes	1	1	2	1		1		2	1		1		2
BCD digits	2	2	4	1	1	1	1	4	1	1	1	1	4
Command	Station No.	CPU No. (01)	D Register No.	0	5th digit	0	+/–	Data 1	0	5th digit	0	+/–	Data 2

...	1		1		2	1	1
...	1	1	1	1	4	2	2
...	0	5th digit	0	+/–	Data n	CR (0D)	LF (0A)

T0303.EPS

Examples of reading third channel communication register data (D register 0003) in station number 01

Command 01010003000000010D0A

Response will be returned from CX as 200 (BCD)

Response 01010003000002000D0A

3.6 Write of Parameter from PLC

Write from host(computer)

Command from host(computer)

Bytes	1	1	2	1		1		2	1	1
BCD digits	2	2	4	1	1	1	1	4	2	2
Command	Station No.	CPU No. (01)	D Register No.	0	5th digit	1	+/–	dddd	CR (0D)	LF (0A)

T0304.EPS

Response from CX

Bytes	1	1	2	1		1		2	1	1
BCD digits	2	2	4	1	1	1	1	4	2	2
Command	Station No.	CPU No. (01)	D Register No.	0	5th digit	1	+/–	dddd	CR (0D)	LF (0A)

T0305.EPS

Example of writing data 200 (00C8 (hex)) to the first target set point (D register1101)

Command 01011101001002000D0A

The below response will be returned from CX

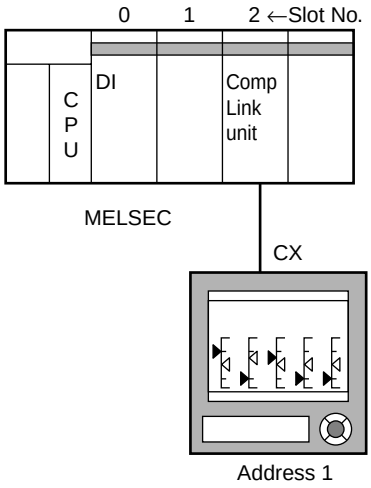
Response 01011101001002000D0A

In CX writing, reception command is returned as response. To understand if it is written correctly, please check the value by reading register.

4 Ladder Communication with MELSEC

4.1 Communication Procedure

Example of reading 4 measured data CH1 - CH4

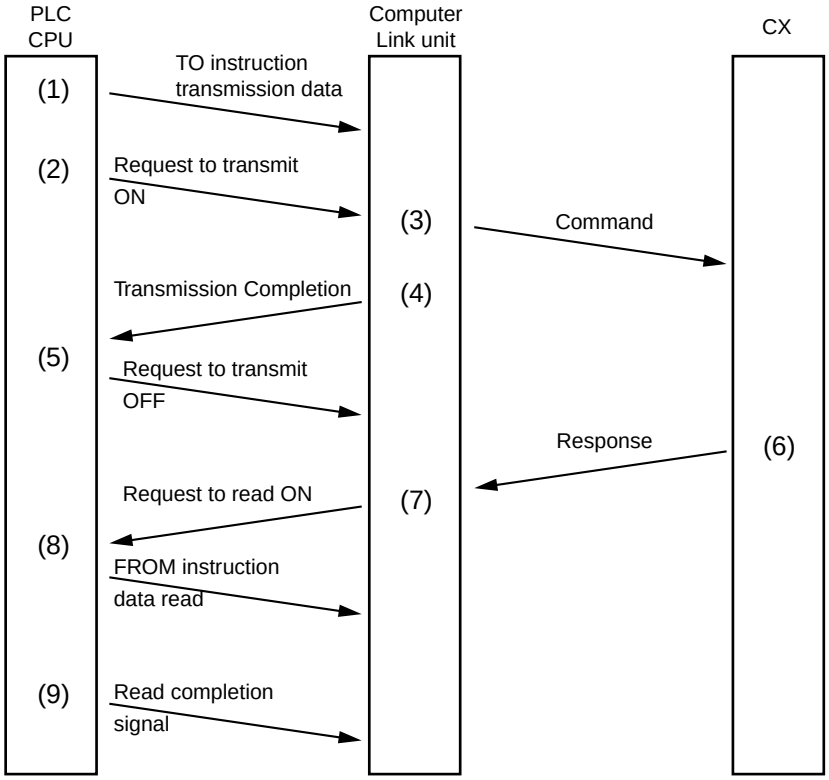


D register (part)

D register No.	Description
D5001	CH1 PV
D5002	CH2 PV
D5003	CH3 PV
D5004	CH4 PV
D5005	CH5 PV
D5006	CH6 PV
–	–
–	–
–	–
–	–

F0401.EPS

4.2 Transmission



(1) Read or write instruction is transferred from PLC CPU to buffer for transmission of computer link unit.

(2) (3) Turn request to transmit ON, the command is sent to CX.

(4) (5) After sending, transmission completion returns and request to transmit turns OFF.

(6) CX returns response in acceptance of Command.The data is once kept in buffer for receiving at computer link unit.

(7) (8) After receiving from CX, request to read turns ON and FROM instruction is executed (FROM instruction transfers data of computer link unit to D register.)

(9) After transmission, read completion signal turns ON, and reception of read signal turns OFF.

F0402.EPS

Read/write transmission instruction from PLC is done by following procedure

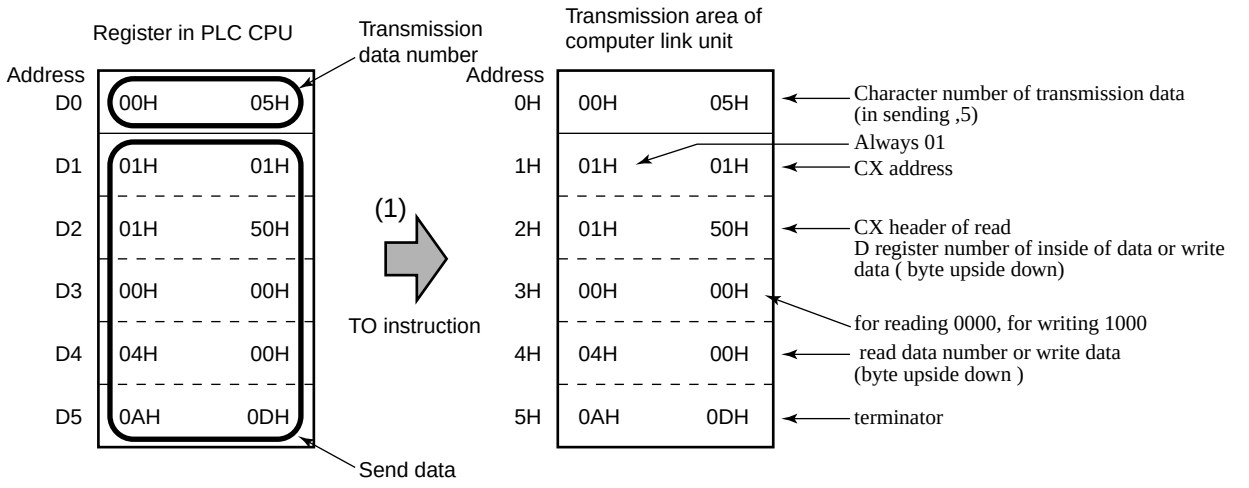
(1) The transmission data is transferred from sequencer CPU to transmission area of computer link unit by TO instruction.

(2) Request to transmission is sent from sequencer CPU to computer link unit.

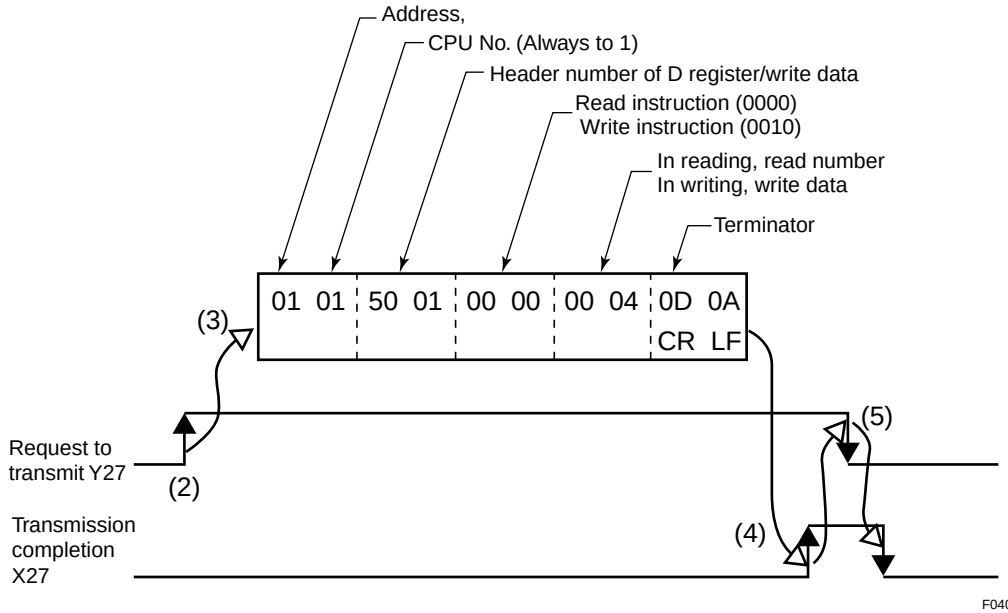
(3) Transmission data that is written in transmission area of computer link unit is output to CX.

(4) After transmission completion, the transmission completion flag of computer link unit turns ON.

(5) Turn the request to transmit OFF.



F0403.EPS



F0404.EPS

4.3 Reception

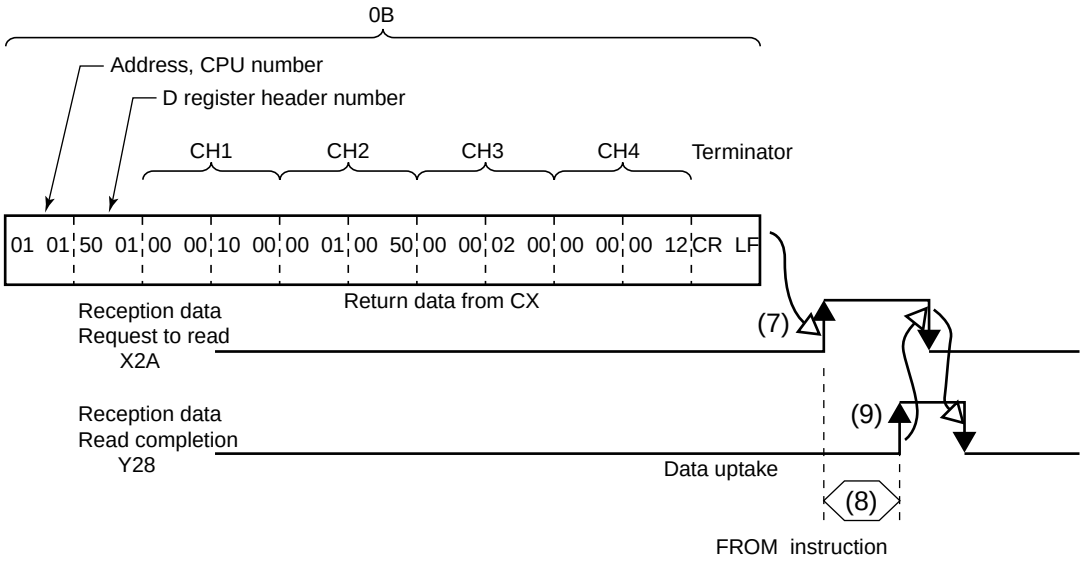
Reception procedure is followed by (6)-(9)

(6) Computer link unit receives CX response, keeps data in butter for reception area.

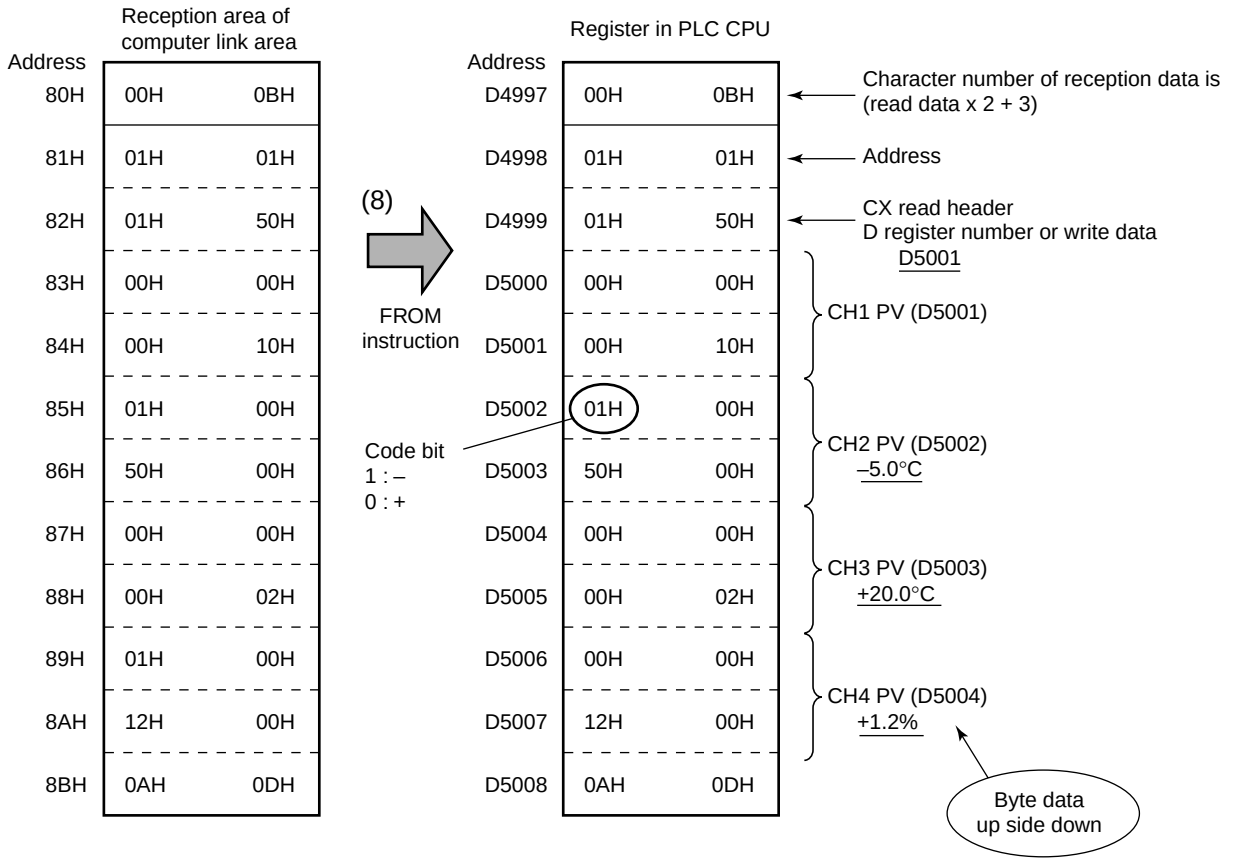
(7) In receiving terminator (CR LF), Reception read flag at computer link unit turns ON.

(8) PLC CPU read reception data at computer link unit by FROM instruction

(9) Read completion signal of reception data is sent.



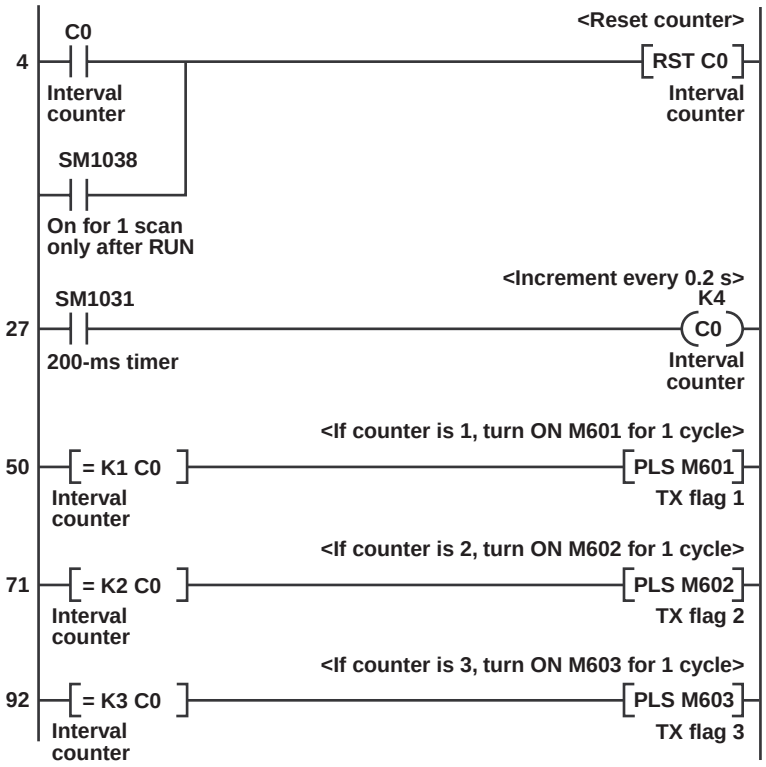
F0405.EPS


Reception area of computer link area
Address
80H 00H 0BH
81H 01H 01H
82H 01H 50H
83H 00H 00H
84H 00H 10H
85H 01H 00H
86H 50H 00H
87H 00H 00H
88H 00H 02H
89H 01H 00H
8AH 12H 00H
8BH 0AH 0DH
(8)
FROM instruction
Code bit
1 : –
0 : +
Register in PLC CPU
Address
D4997 00H 0BH
D4998 01H 01H
D4999 01H 50H
D5000 00H 00H
D5001 00H 10H
D5002 01H 00H
D5003 50H 00H
D5004 00H 00H
D5005 00H 02H
D5006 00H 00H
D5007 12H 00H
D5008 0AH 0DH
Character number of reception data is (read data x 2 + 3)
Address
CX read header
D register number or write data
D5001
CH1 PV (D5001)
CH2 PV (D5002)
–5.0°C
CH3 PV (D5003)
+20.0°C
CH4 PV (D5004)
+1.2%
Byte data up side down

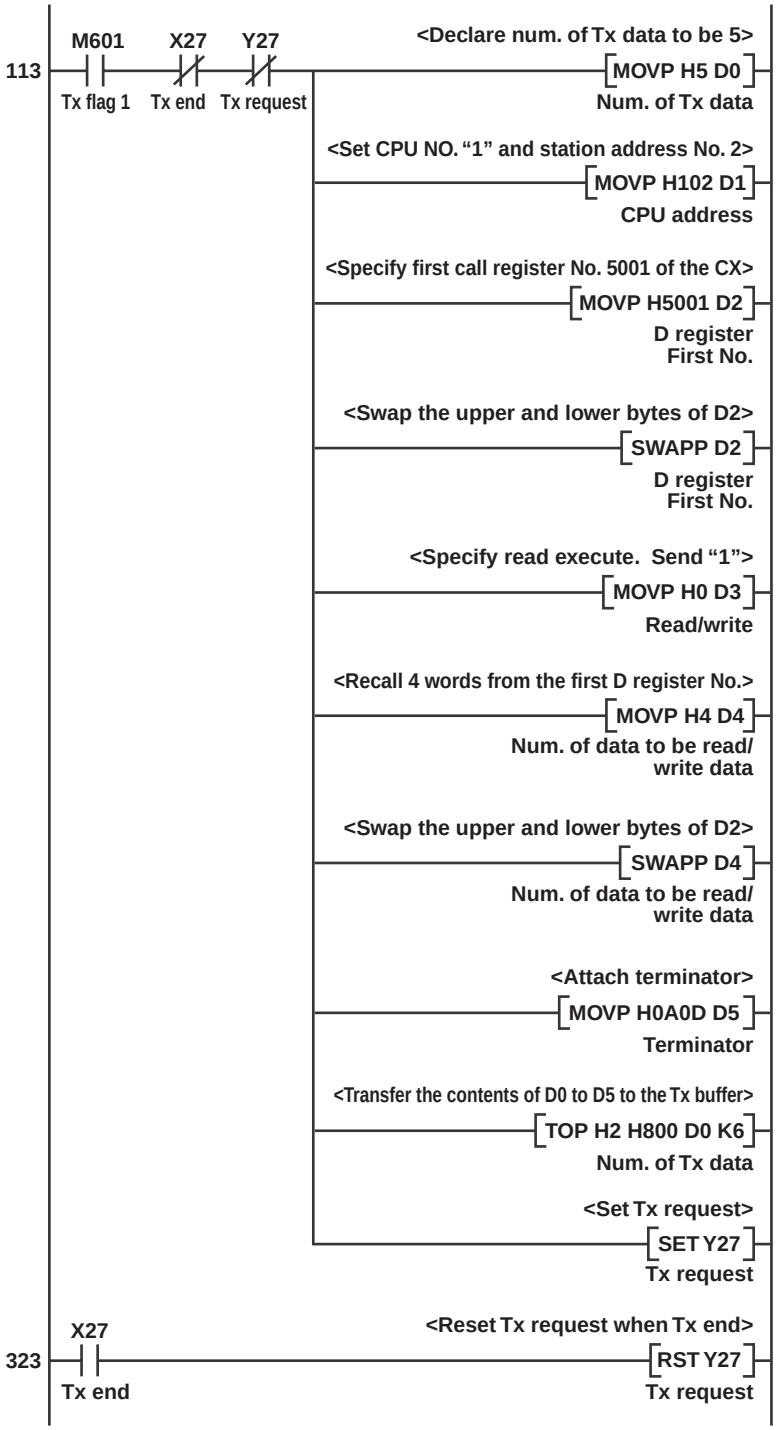
F0406.EPS

4.4 Sample Program

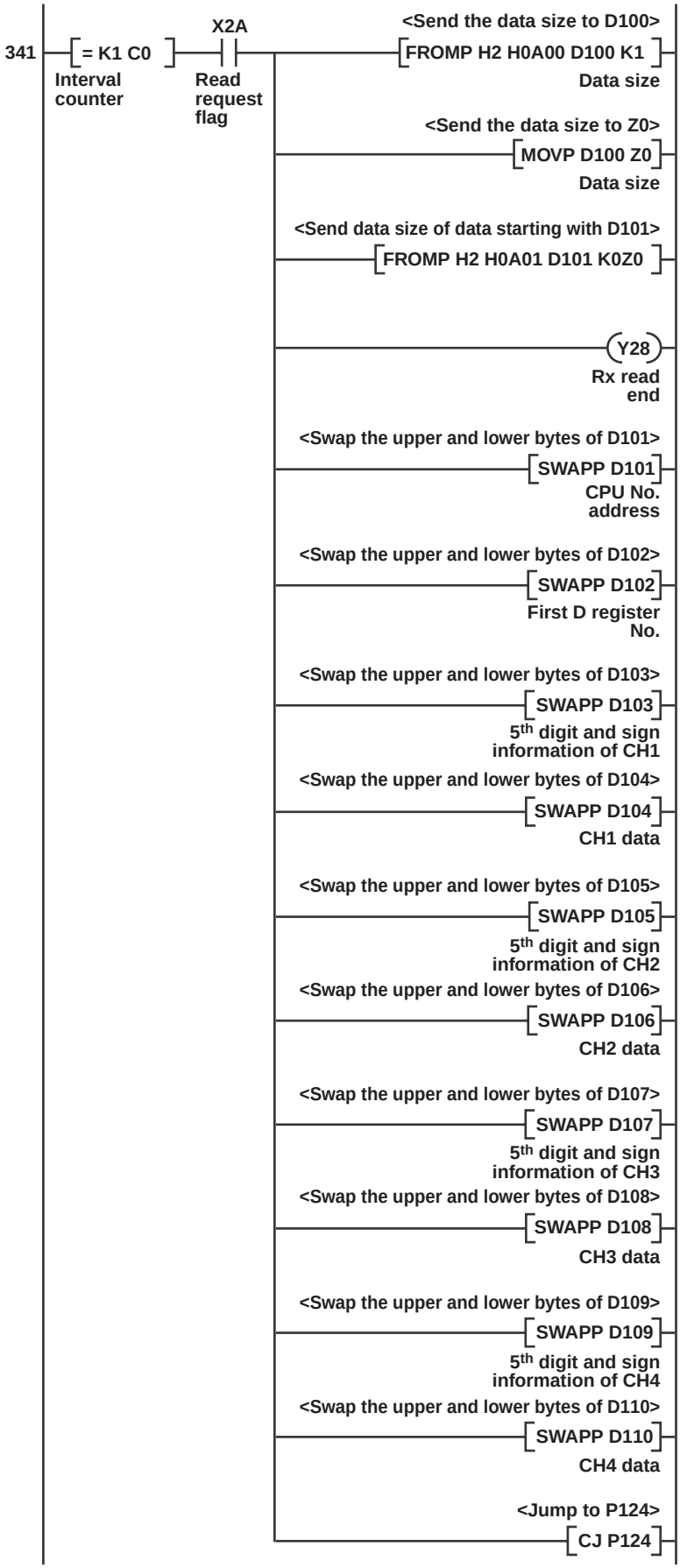
- **Transmission interval processing**



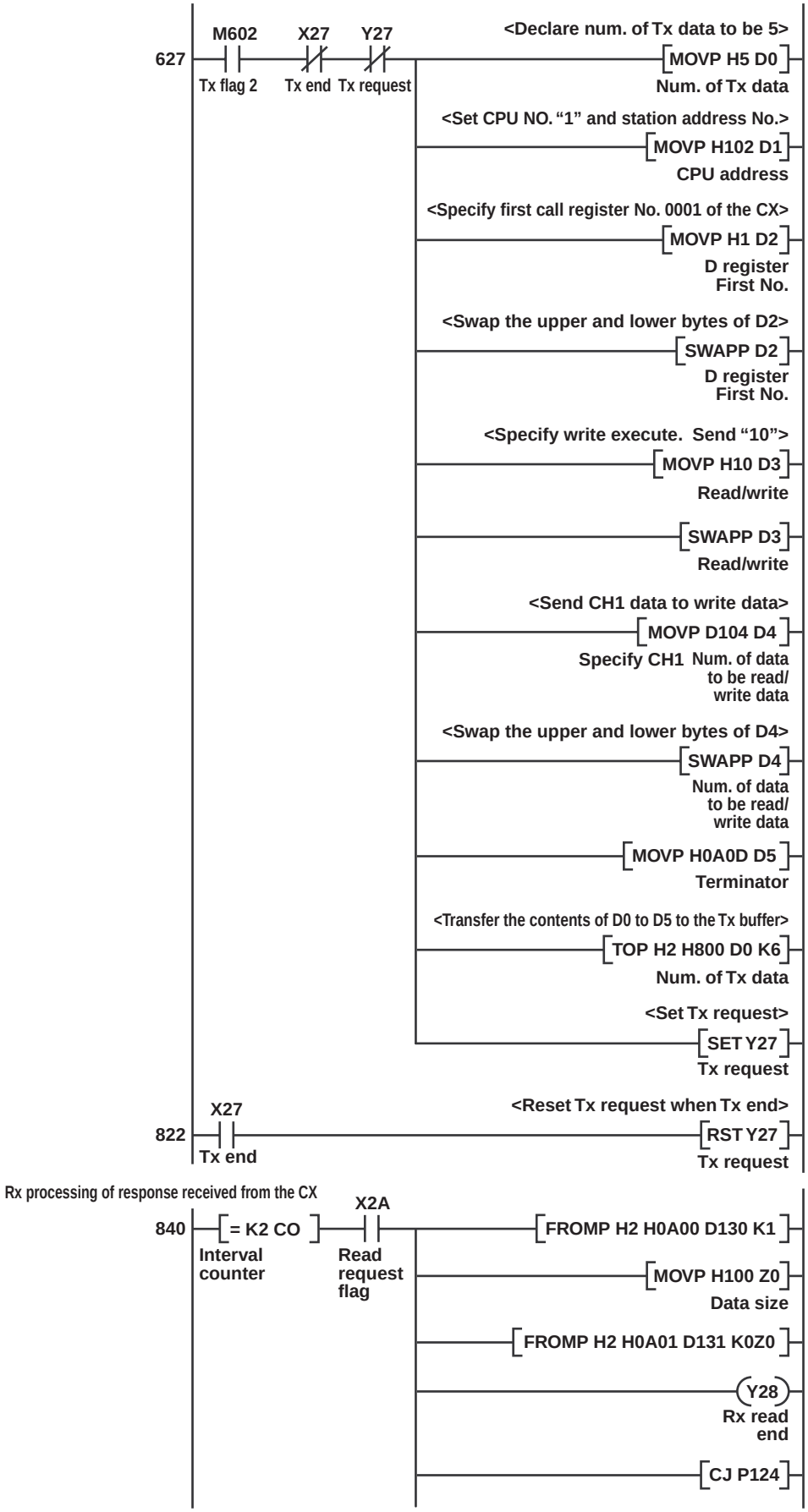
- **Read command transmission processing: If M601 is ON, send a command to lead CH1 to 4.**



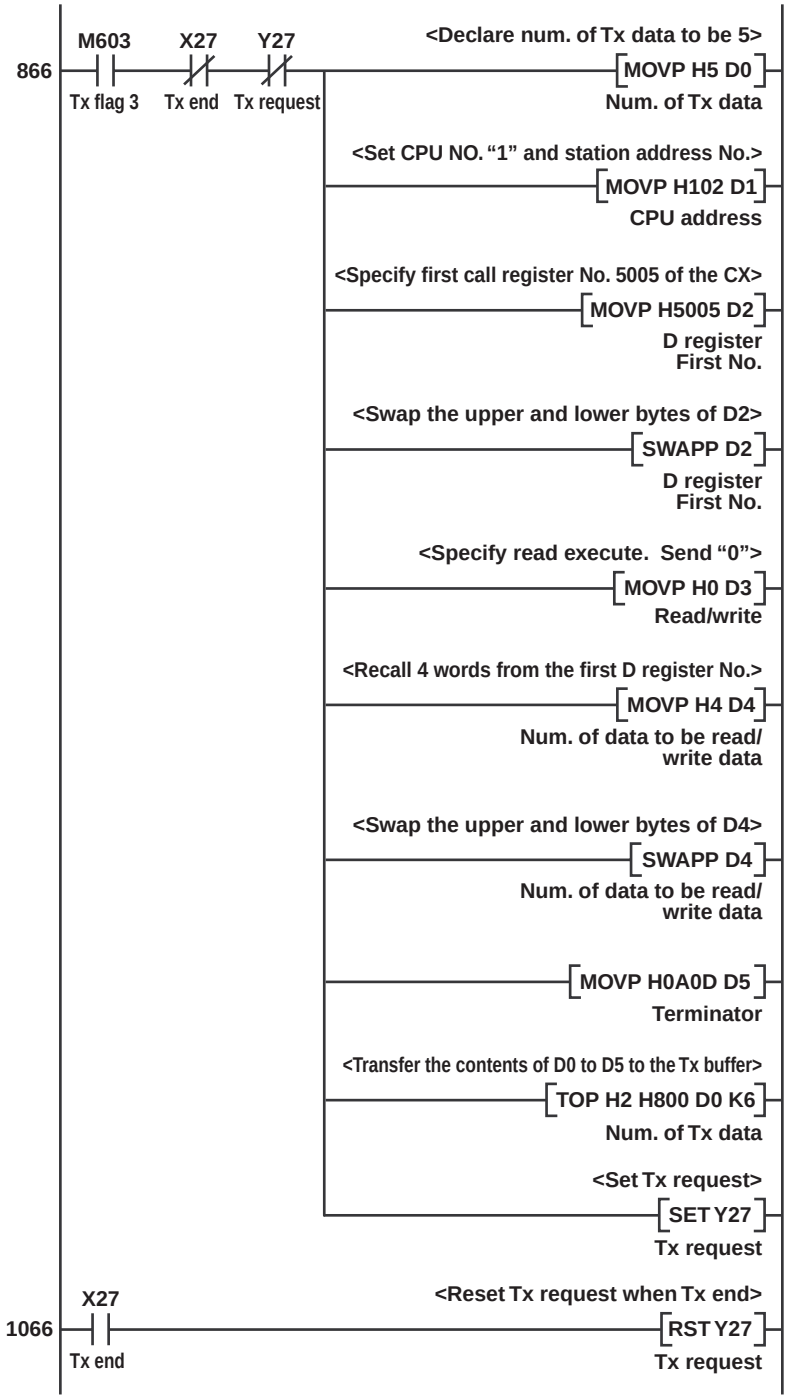
- **Reception processing: Receive data of CH1 to 4.**



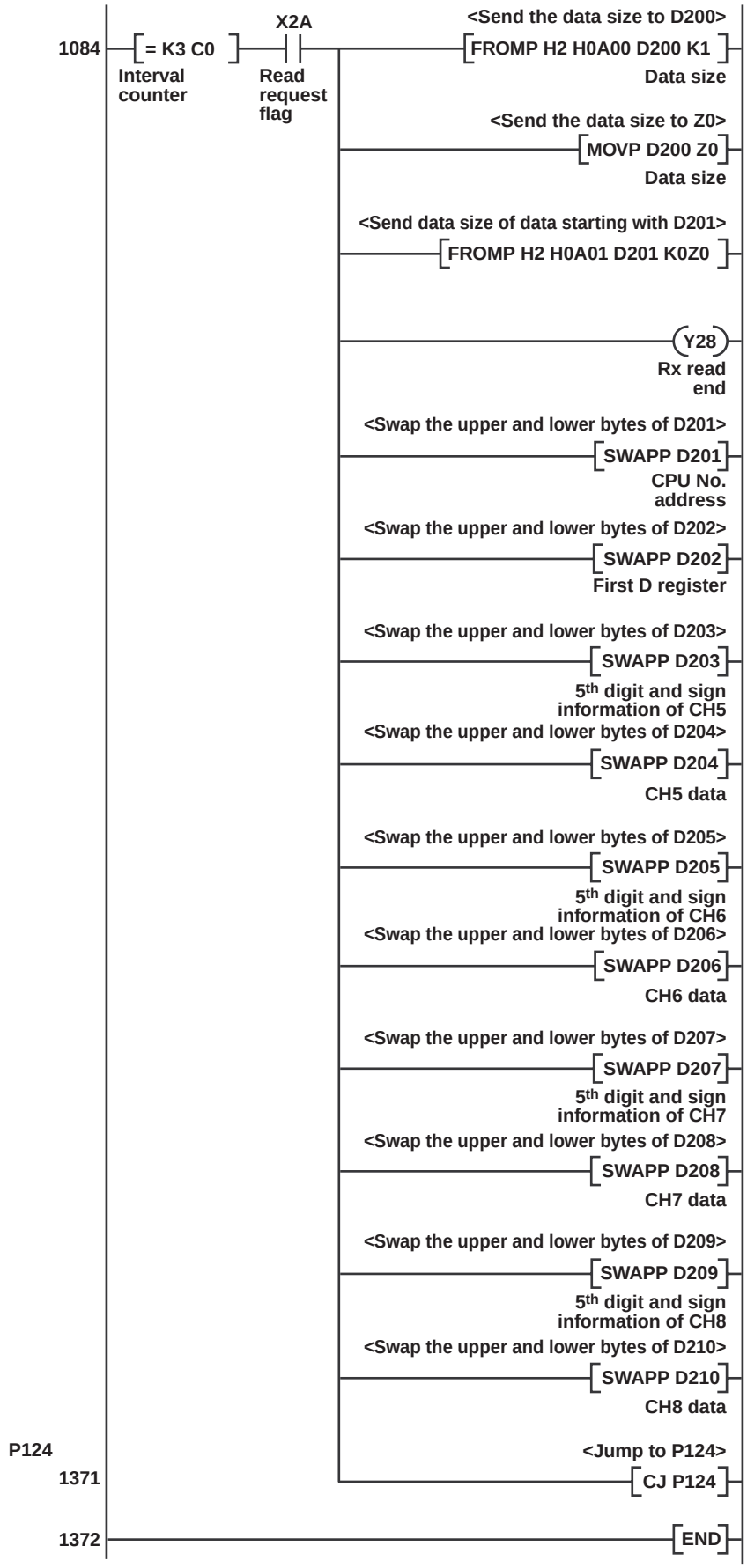
- **Write processing: If M602 is set, write the CH1 data to communication register C1.**



- **Read command transmission processing: If M603 is ON, send a command to lead CH5 to 8.**

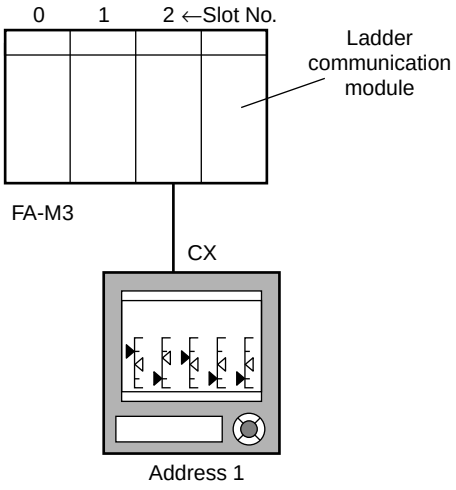


- **Reception processing: Receive the data of CH5 to CH8.**



5. Ladder Communication with FA-M3

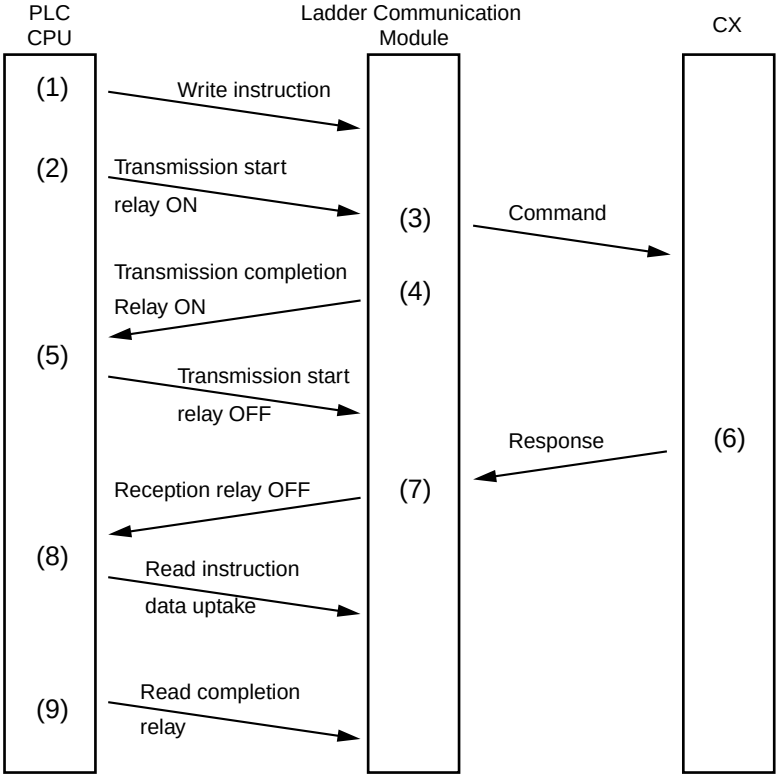
5.1 Communication Procedure



Digital control D register map (part)

D register No.	Description
D5001	CH1 PV
D5002	CH2 PV
D5003	CH3 PV
D5004	CH4 PV
D5005	CH5 PV
D5006	CH6 PV
–	–
–	–
–	–
–	–

F0501.EPS



(1) Read or Write command is transferred to output module of ladder communication by PLC WRITE command.

(2) (3) Request to transmit signal turns ON, instruction is sent to CX.

(4) (5) After transmission completion, transmission completion signal turns ON and request to transmit signal turns OFF.

(6) CX returns responses, and keeps it once in receiving buffer of computer link unit.

(7) (8) After receiving from CX, reception relay signal turns ON and READ instruction is executed. Data of link units is transferred to register D.

(9) After completing transfer, read relay signal turn ON. Reception signal turns OFF and read relay turns OFF

F0502.EPS

5.2 Transmission

Transmission procedure of read/write command is followed by (1)-(5)

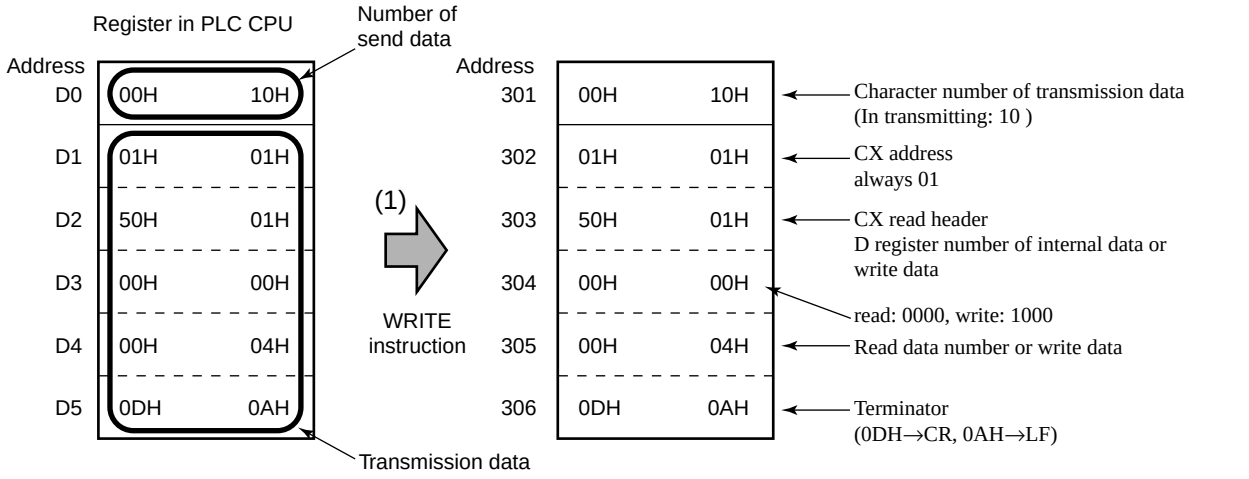
(1) Transmission data is transmitted from sequencer CPU to transmission area of computer link unit by WRITE instruction.

(2) Request to transmit signal is output to computer link unit.

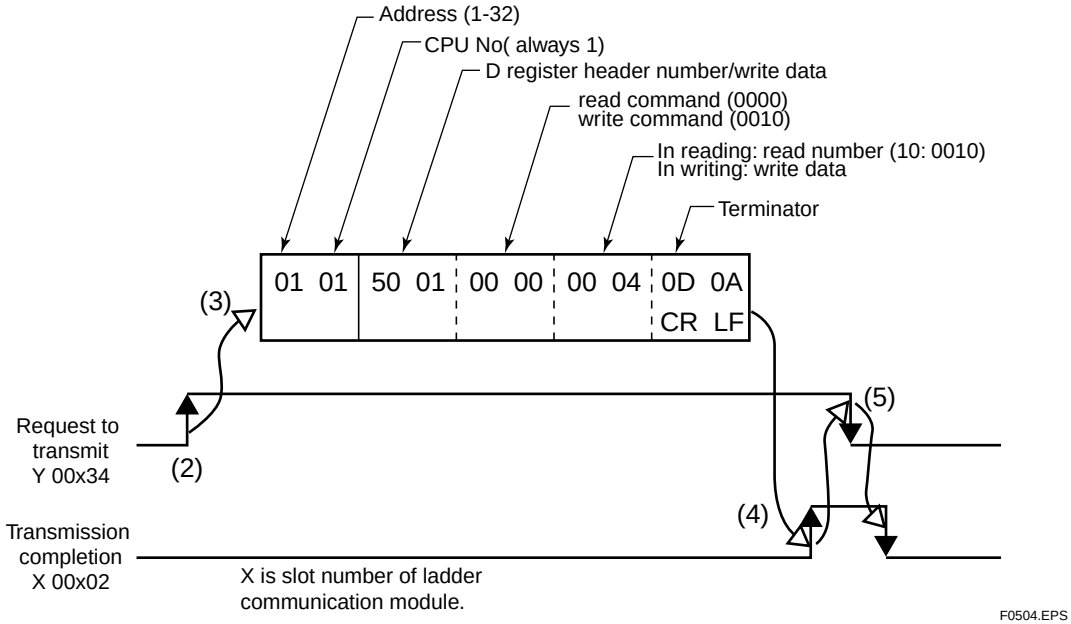
(3) Transmission data that is put in computer link unit is output to CX.

(4) After transmission, transmission completion flag of computer link unit turns ON.

(5) Request to transmit signal turns OFF.



F0503.EPS



F0504.EPS

5.3 Reception

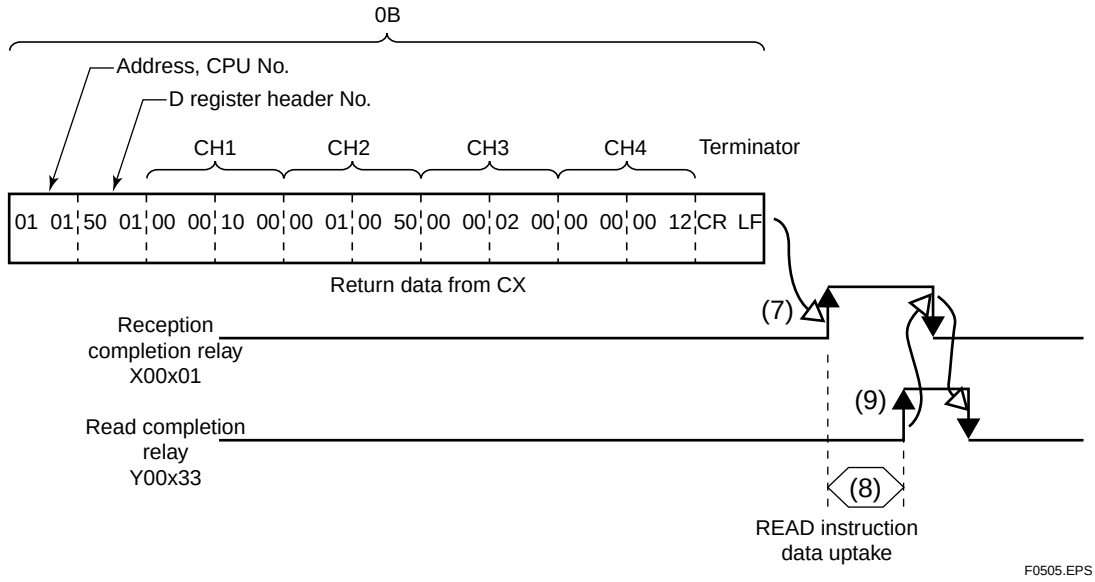
Reception procedure is followed by (6)-(9).

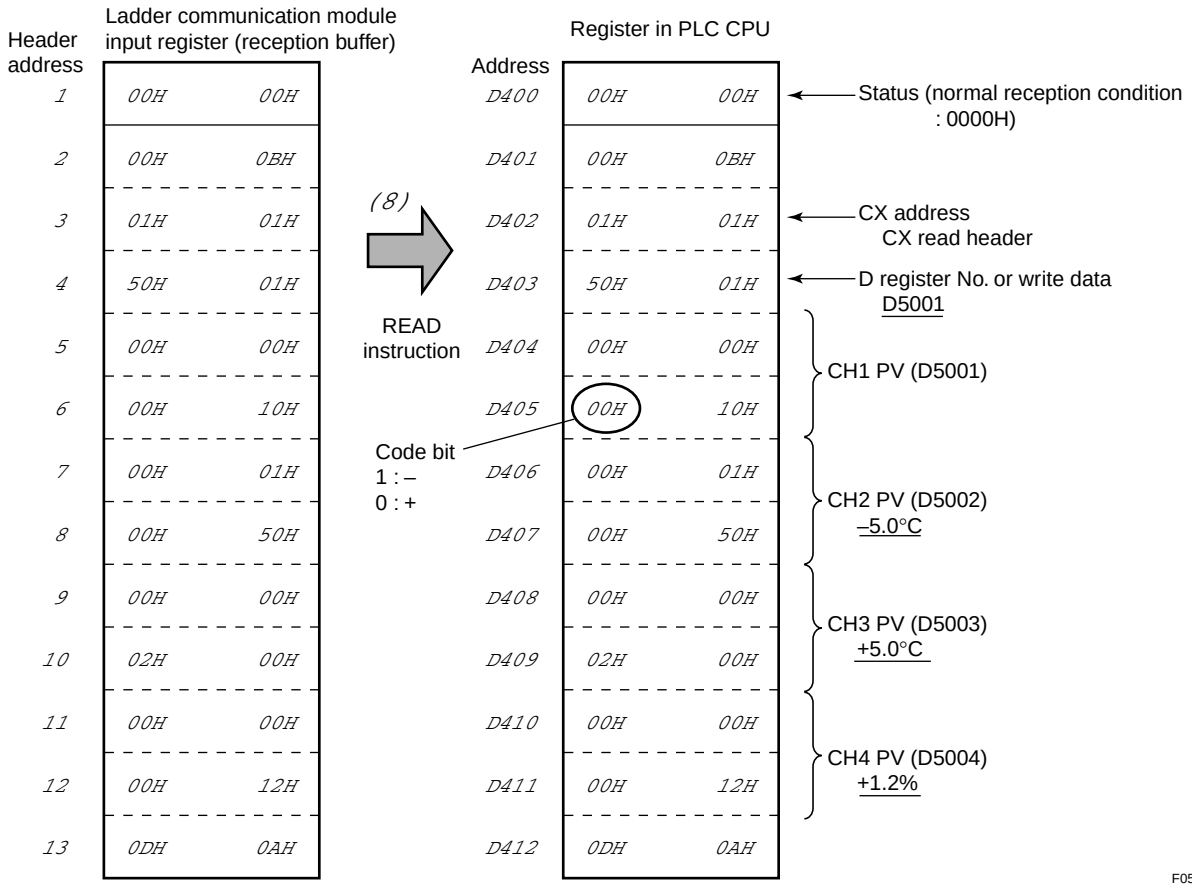
(6) Ladder communication module receives CX response, and keeps data in reception area.

(7) After receiving terminator (CR LF), read reception flag of ladder communication module turns ON.

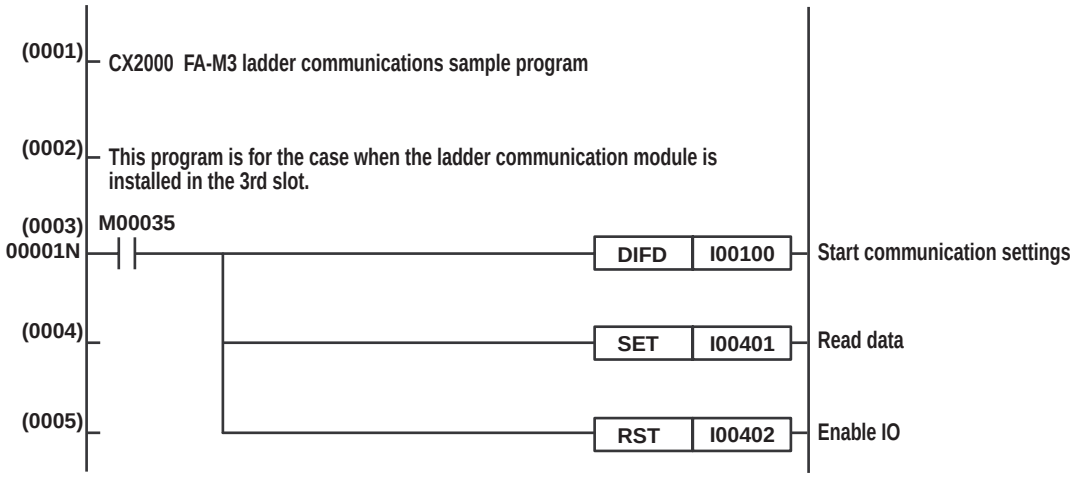
(8) PLC CPU reads reception data by READ instruction.

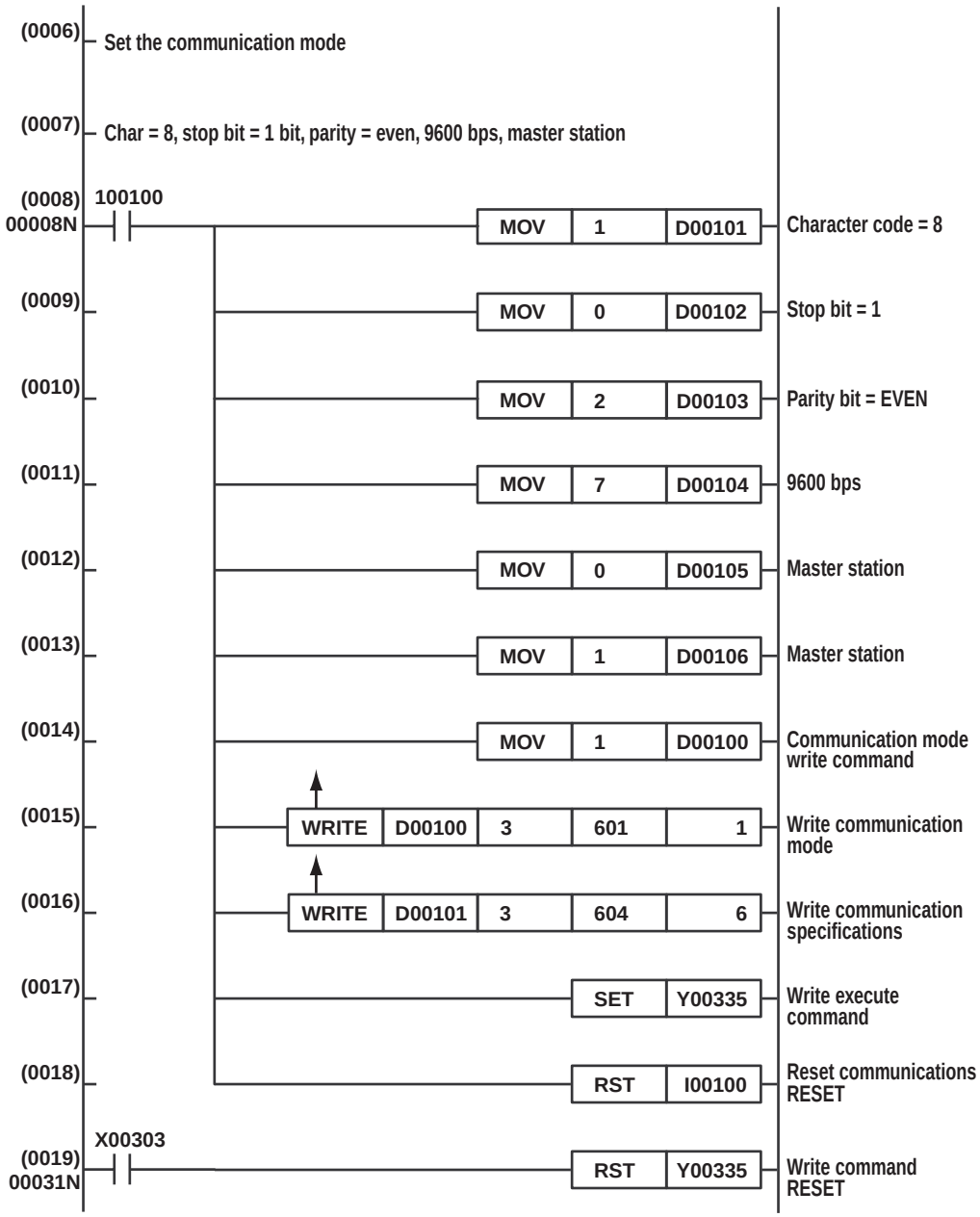
(9) Reception data of read completion signal is output.

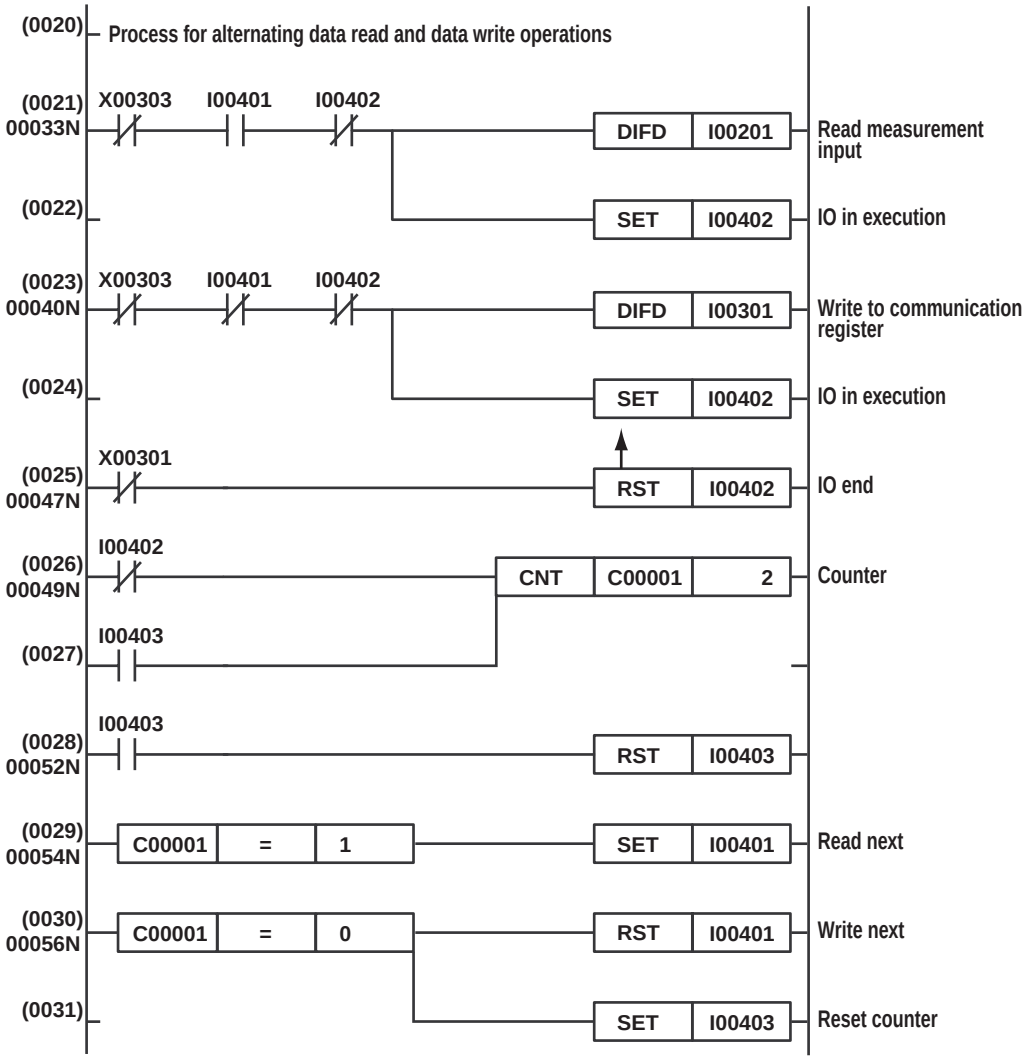


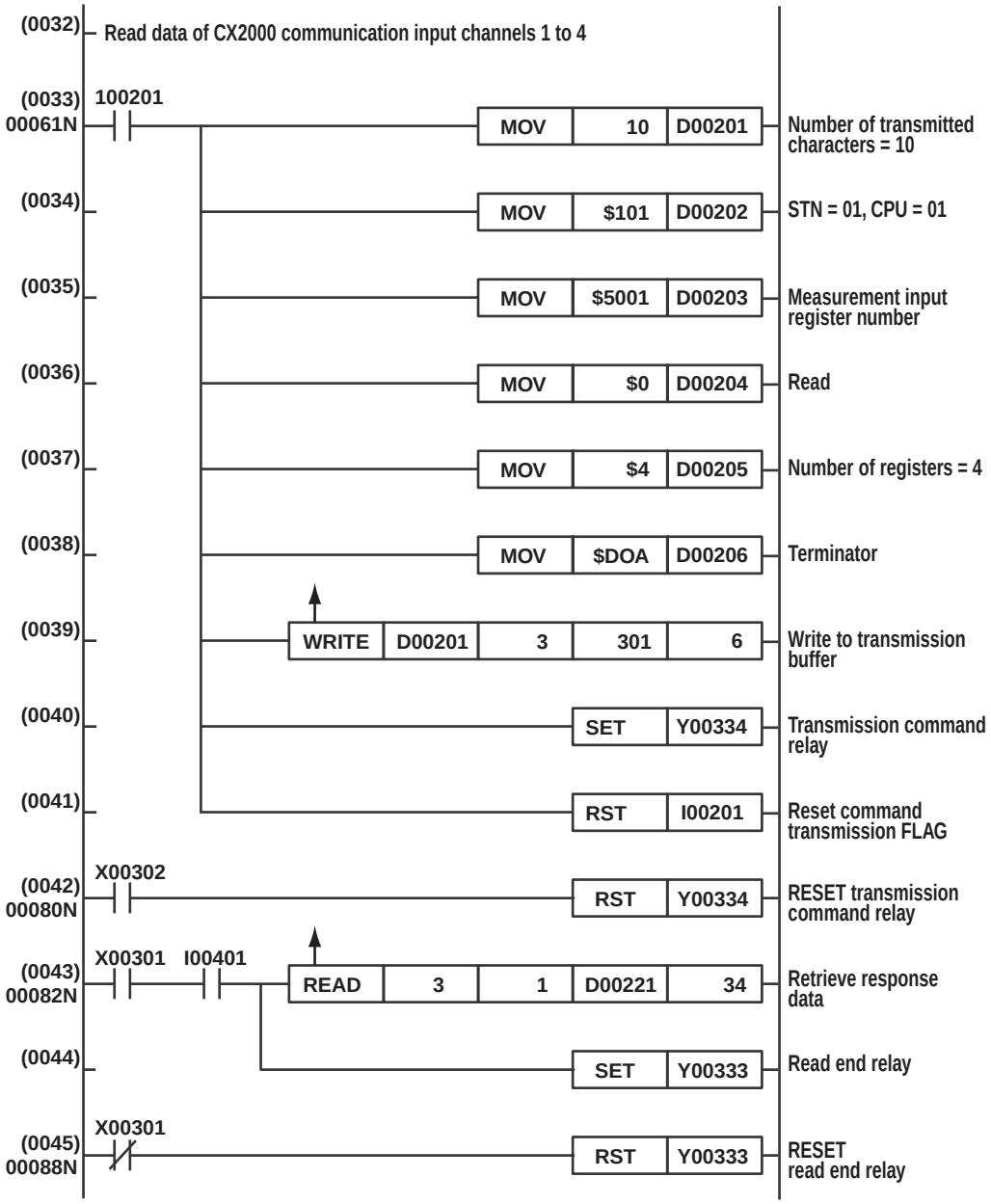

Header address
Ladder communication module input register (reception buffer)
Register in PLC CPU
Address
1 00H 00H
2 00H 0BH
3 01H 01H
4 50H 01H
5 00H 00H
6 00H 10H
7 00H 01H
8 00H 50H
9 00H 00H
10 02H 00H
11 00H 00H
12 00H 12H
13 0DH 0AH
D400 00H 00H
D401 00H 0BH
D402 01H 01H
D403 50H 01H
D404 00H 00H
D405 00H 10H
D406 00H 01H
D407 00H 50H
D408 00H 00H
D409 02H 00H
D410 00H 00H
D411 00H 12H
D412 0DH 0AH
(8)
READ instruction
Code bit
1 : –
0 : +
Status (normal reception condition : 0000H)
CX address
CX read header
D register No. or write data
D5001
CH1 PV (D5001)
CH2 PV (D5002)
–5.0°C
CH3 PV (D5003)
+5.0°C
CH4 PV (D5004)
+1.2%
F0506.EPS

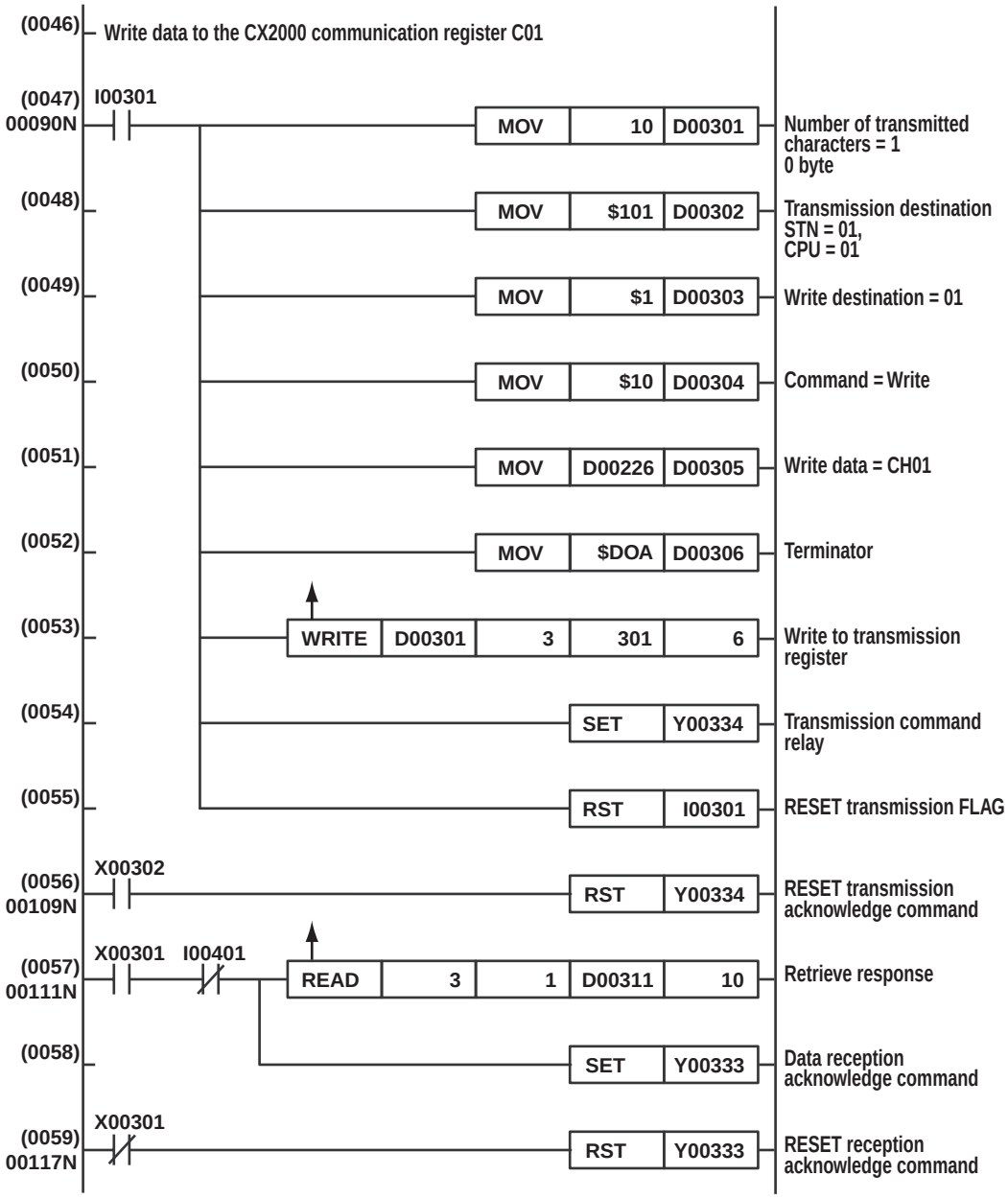
5.4 Sample Program




(0006)
Set the communication mode
(0007)
Char = 8, stop bit = 1 bit, parity = even, 9600 bps, master station
(0008)
100100
00008N
MOV 1 D00101
Character code = 8
(0009)
MOV 0 D00102
Stop bit = 1
(0010)
MOV 2 D00103
Parity bit = EVEN
(0011)
MOV 7 D00104
9600 bps
(0012)
MOV 0 D00105
Master station
(0013)
MOV 1 D00106
Master station
(0014)
MOV 1 D00100
Communication mode write command
(0015)
WRITE D00100 3 601 1
Write communication mode
(0016)
WRITE D00101 3 604 6
Write communication specifications
(0017)
SET Y00335
Write execute command
(0018)
RST I00100
Reset communications RESET
X00303
(0019)
00031N
RST Y00335
Write command RESET


(0020)
Process for alternating data read and data write operations
(0021)
00033N
X00303
I00401
I00402
DIFD
I00201
Read measurement input
(0022)
SET
I00402
IO in execution
(0023)
00040N
X00303
I00401
I00402
DIFD
I00301
Write to communication register
(0024)
SET
I00402
IO in execution
(0025)
00047N
X00301
RST
I00402
IO end
(0026)
00049N
I00402
CNT
C00001
2
Counter
(0027)
I00403
(0028)
00052N
I00403
RST
I00403
(0029)
00054N
C00001
=
1
SET
I00401
Read next
(0030)
00056N
C00001
=
0
RST
I00401
Write next
(0031)
SET
I00403
Reset counter


(0032)
Read data of CX2000 communication input channels 1 to 4
(0033)
00061N
100201
MOV 10 D00201
Number of transmitted characters = 10
(0034)
MOV $101 D00202
STN = 01, CPU = 01
(0035)
MOV $5001 D00203
Measurement input register number
(0036)
MOV $0 D00204
Read
(0037)
MOV $4 D00205
Number of registers = 4
(0038)
MOV $DOA D00206
Terminator
(0039)
WRITE D00201 3 301 6
Write to transmission buffer
(0040)
SET Y00334
Transmission command relay
(0041)
RST I00201
Reset command transmission FLAG
(0042)
00080N
X00302
RST Y00334
RESET transmission command relay
(0043)
00082N
X00301 I00401
READ 3 1 D00221 34
Retrieve response data
(0044)
SET Y00333
Read end relay
(0045)
00088N
X00301
RST Y00333
RESET read end relay


(0046)
Write data to the CX2000 communication register C01
(0047)
00090N
I00301
MOV 10 D00301
Number of transmitted characters = 1
0 byte
(0048)
MOV $101 D00302
Transmission destination
STN = 01,
CPU = 01
(0049)
MOV $1 D00303
Write destination = 01
(0050)
MOV $10 D00304
Command = Write
(0051)
MOV D00226 D00305
Write data = CH01
(0052)
MOV $DOA D00306
Terminator
(0053)
WRITE D00301 3 301 6
Write to transmission register
(0054)
SET Y00334
Transmission command relay
(0055)
RST I00301
RESET transmission FLAG
(0056)
00109N
X00302
RST Y00334
RESET transmission acknowledge command
(0057)
00111N
X00301
I00401
READ 3 1 D00311 10
Retrieve response
(0058)
SET Y00333
Data reception acknowledge command
(0059)
00117N
X00301
RST Y00333
RESET reception acknowledge command

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Appendix1. Writing/Reading Parameters

D register No.	Description	Setting value	Read/ Write
D0001-D0030	Communication register data	–32768-32767	R/W
D0101	All control loops start/stop	0 : Stop 1 : Start	W(*1)
D0301	Memory start/stop	0 : memory stop 1 : memory start	R/W
D0302	Alarm ACK	In Write 0 : Alarm ACK In Read 0 : Alarm light out 1 : Alarm light 2 : Alarm blink	R/W
D0303	Math Start/Stop	0 : Math stop 1 : Math start 2 : Math reset	R/W
D0304	Manual trigger/Manual sample/ snap shot/store display data to medium/ sore event data to medium	0 : Manual sample 1 : Manual trigger 2 : snap shot 3 : store display data to medium 4 : sore event data to medium	W(*1)
D0305	Write message	1-8 : Message number	W(*1)
D0306	Return to operation screen	0: Return to operation screen	W
D0501	Alarm setting of Measured channel 1 (Alarm No.1)	Value within Measurement range, no decimal point	R/W
D0502	Alarm setting of Measurement channel 1 (Alarm No. 2)	Value within Measurement range, no decimal point	R/W
D0503	Alarm setting of Measurement channel 1 (Alarm No. 3)	Value within Measurement range, no decimal point	R/W
D0504	Alarm setting of Measurement channel 1 (Alarm No. 4)	Value within Measurement range, no decimal point	R/W
D0577	Alarm setting of measurement channel 20 (Alarm No. 1)	Value within Measurement range, no decimal point	R/W
D0578	Alarm setting of measurement channel 20 (Alarm No. 2)	Value within Measurement range, no decimal point	R/W
D0579	Alarm setting of measurement channel 20 (Alarm No. 3)	Value within Measurement range, no decimal point	R/W
D0580	Alarm setting of measurement channel 20 (Alarm No. 4)	Value within Measurement range, no decimal point	R/W
D0601	Alarm setting of Math channel 1 Upper 5 digit of alarm No. 1	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0602	Alarm setting of Math channel 1 Lower 5 digit of alarm No. 1		R/W
D0603	Alarm setting of Math channel 1 Upper 5 digit of alarm No. 2	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0604	Alarm setting of Math channel 1 Lower 5 digit of alarm No. 2		R/W
D0605	Alarm setting of Math channel 1 Upper 5 digit of alarm No. 3	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0606	Alarm setting of Math channel 1 Lower 5 digit of alarm No. 3		R/W
D0607	Alarm setting of Math channel 1 Upper 5 digit of alarm No. 4	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0608	Alarm setting of Math channel 1 Lower 5 digit of alarm No. 4		R/W
D0833	Alarm setting of Math channel 60 Upper 5 digit of alarm No. 1	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0834	Alarm setting of Math channel 60 Lower 5 digit of alarm No. 1		R/W

AF01_1.EPS

D register No.	Description	Setting value	Read/ Write
D0835	Alarm setting of Math channel 60 Upper 5 digit of alarm No. 2	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0836	Alarm setting of Math channel 60 Lower 5 digit of alarm No. 2		R/W
D0837	Alarm setting of Math channel 60 Upper 5 digit of alarm No. 3	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0838	Alarm setting of Math channel 60 Lower 5 digit of alarm No. 3		R/W
D0839	Alarm setting of Math channel 60 Upper 5 digit of alarm No. 4	For reading, value aligned upper 5 digits with lower 5 digits within Math channel span and no decimal point . For writing, setting is available in -99999-99999 and is written in either lower or upper register.	R/W
D0840	Alarm setting of Math channel 60 Lower 5 digit of alarm No. 4		R/W

AF01_2.EPS

Parameter of loop 1

D register No.	Classification	Description	Setting value	Read/ Write
D1001	Parameter for each loop	Bias use or not, bias value, bias input kinds to PV1	–100% - 100% of measurement input range span width : bias value(bias ON) –30001 - -32768,30001-32767 : bias use OFF	R/W
D1002		Bias use or not, bias value, bias input kinds to PV2	–100% - 100% of measurement input range span width : bias value(bias ON) –30001 - –32768,30001-32767 : bias use OFF	R/W
D1003		Bias use or not, bias value, bias input kinds to remote SP	–100% - 100% of measurement input range span width : bias value(bias ON) –30001 - –32768,30001-32767 : bias use OFF	R/W
D1004		Filter input kinds, filter use or not, filter value to PV1	0 1-120 : filter value (filter ON) –30001 - –32768,30001 - 32767 : Filter OFF	R/W
D1005		Filter input kinds, filter use or not, filter value to PV2	0 1-120 : filter value (filter ON) –30001 - –32768,30001 - 32767 : Filter OFF	R/W
D1006		Filter input kinds, filter use or not, filter value to remote SP	0 1-120 : filter value (filter ON) –30001 - –32768,30001 - 32767 : Filter OFF	R/W
D1007		With or without Ratio setting and ratio value	1-9999 : ratio setting value (ratio setting ON) –30001 - –32768, 3000 - 32767 : ratio setting OFF	R/W
D1008		Anti-reset windup ON/OFF	0 : Anti-reset windup OFF 1 : Anti-reset windup ON	R/W
D1009		Unit of ramp rate time unit	0 : Hour 2: Second 1 : Minute	R/W
D1010		Target SP ascending ramp rate setting	From 1 value, Max. PV input range with no decimal point. –30001 - –32768,30001-32767 : Setting OFF	R/W
D1011		Target SP descending ramp rate setting	From 1 value, Max. PV input range with no decimal point –30001 - –32768,30001-32767 : Setting OFF	R/W
D1012		Auto/Man/Cas switching in cascade operation	0 : Auto switching 1 : Manual switching 2 : Cascade switching	R/W
D1013		Target SP setting	1 - 8 : Target SP No.	R/W
D1014		Run/Stop switching	0 : Stop 1 : Run	R/W
D1015		Remote/local switching	0 : Local 1 : Remote	R/W
D1016		Present use of PID No.	1-8 : PID No.	R
D1017		Value of Manual OUT	–50 - 1050 : –5.0% - 105.0%	R/W
D1018		Autotuning status	0 : not AT status 1: AT status	R

AF02.EPS

D register No.	Classification	Description	Setting value	Read/ Write
D1101	Parameter of PID No.1 of loop 1	Set point (SP)	Value, within measurement input range, no decimal point	R/W
D1102		Proportion band (P)	1 - 9999 : 0.1 - 999.9%	R/W
D1103		Integral time (I)	0-6000	R/W
D1104		Differential (D)	0-6000	R/W
D1105		Upper limit of output	–50 - 1050 : –5.0% - 105.0%	R/W
D1106		Lower limit of output	–50 - 1050 : –5.0% - 105.0%	R/W
D1107		With or without shutdown function	0 : OFF 1 : ON	R/W
D1108		Manual reset	–50 - 1050 : –5.0% - 105.0%	R/W
D1109		Hysteresis of setting value	Value, within measurement input range, no decimal point	R/W
D1110		action point of Hysteresis	0 : OFF 1 : Upper 2 : Lower	R/W
D1111		Direct/reverse switching setting	0 : Reverse 1 : Direct	R/W
D1112		Preset output	–50-1050 : –5.0%-105.0%	R/W
D1125	Control alarm setting for PID number 1 of loop 1.	Alarm setting for control (alarm level 1)	It depends on alarm kinds as follows. Measurement/setting alarm: Value, within measurement input range, no decimal point Deviation alarm: value, no decimal point within EUS0.0-100.0% of measurement input range. Output alarm: –50-1050 : –5.0%-105.0%	R/W
D1126		Alarm setting for control (Alarm level 2)	Same as above	R/W
D1127		Alarm setting for control (Alarm level 3)	Same as above	R/W
D1128		Alarm setting for control (Alarm level 4)	Same as above	R/W
D1131-D1149	PID parameter for PID number 1 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1155-D1158	Control alarm setting for PID number 2 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1161-D1179	PID parameter for PID number 3 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1185-D1188	Control alarm setting for PID number 3 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1191-D1209	PID parameter for PID number 4 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1215-D1218	Control alarm setting for PID number 4 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1221-D1239	PID parameter for PID number 5 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1245-D1248	Control alarm setting for PID number 5 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1251-D1269	PID parameter for PID number 6 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1275-D1278	Control alarm setting for PID number 6 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1281-D1299	PID parameter for PID number 7 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1305-D1308	Control alarm setting for PID number 7 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1311-D1329	PID parameter for PID number 8 of loop 1	Same parameter as PID number 1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D1335-D1338	Control alarm setting for PID number 8 of loop 1	Same control alarm setting for PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

AF03.EPS

Parameter of loop 2

D register No.	Classification	Description	Setting value	Read/ Write
D1501-D1518	Each loop parameter	Same as parameter of loop 1	Same range as parameter of loop 1	R/W
D1601-D1619	PID parameter of PID number 1 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1625-D1628	Control alarm setting for PID parameter 1 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1631-D1649	PID parameter of PID number 2 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1655-D1658	Control alarm setting for PID parameter 2 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1661-D1679	PID parameter of PID number 3 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1685-D1688	Control alarm setting for PID parameter 3 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1691-D1709	PID parameter of PID number 4 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1715-D1718	Control alarm setting for PID parameter 4 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1721-D1739	PID parameter of PID number 5 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1745-D1748	Control alarm setting for PID parameter 5 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1751-D1769	PID parameter of PID number 6 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1775-D1778	Control alarm setting for PID parameter 6 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1781-D1799	PID parameter of PID number 7 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1805-D1808	Control alarm setting for PID parameter 7 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D1811-D1829	PID parameter of PID number 8 of loop 2	Same PID parameter of PID number1 of loop 1	PID parameter range of PID number 1 of loop 1	R/W
D1835-D1838	Control alarm setting for PID parameter 8 of loop 2	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

AF04.EPS

Parameter of loop 3

D register No.	Classification	Description	Setting value	Read/ Write
D2001-D2018	Each loop parameter	Same parameter as loop 1	Same range as parameter of loop 1	R/W
D2101-D2119	PID parameter of PID number 1 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2125-D2128	Control alarm setting for PID parameter 1 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2131-D2149	PID parameter of PID number 2 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2155-D2158	Control alarm setting for PID parameter 2 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2161-D2179	PID parameter of PID number 3 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2185-D2188	Control alarm setting for PID parameter 3 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2191-D2209	PID parameter of PID number 4 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2215-D2218	Control alarm setting for PID parameter 4 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2221-D2239	PID parameter of PID number 5 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2245-D2248	Control alarm setting for PID parameter 5 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2251-D2269	PID parameter of PID number 6 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2275-D2278	Control alarm setting for PID parameter 6 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2281-D2299	PID parameter of PID number 7 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2305-D2308	Control alarm setting for PID parameter 7 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2311-D2329	PID parameter of PID number 8 of loop 3	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2335-D2338	Control alarm setting for PID parameter 8 of loop 3	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

AF05.EPS

Parameter of loop 4

D register No.	Classification	Description	Setting value	Read/ Write
D2501-D2518	Parameter for each loops	Same parameter as loop 1	Same range as parameter of loop 1	R/W
D2601-D2619	PID parameter of PID number 1 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2625-D2628	Control alarm setting for PID parameter 1 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2631-D2649	PID parameter of PID number 2 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2655-D2658	Control alarm setting for PID parameter 2 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2661-D2679	PID parameter of PID number 3 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2685-D2688	Control alarm setting for PID parameter 3 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2691-D2709	PID parameter of PID number 4 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2715-D2718	Control alarm setting for PID parameter 4 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2721-D2739	PID parameter of PID number 5 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2745-D2748	Control alarm setting for PID parameter 5 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2751-D2769	PID parameter of PID number 6 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2775-D2778	Control alarm setting for PID parameter 6 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2781-D2799	PID parameter of PID number 7 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2805-D2808	Control alarm setting for PID parameter 7 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D2811-D2829	PID parameter of PID number 8 of loop 4	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D2835-D2838	Control alarm setting for PID parameter 8 of loop 4	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

AF06.EPS

Parameter of loop 5

D register No.	Classification	Description	Setting value	Read/ Write
D3001-D3018	Parameter for each loops	Same parameter as loop 1(*2)	Same range as parameter of loop 1	R/W
D3101-D3119	PID parameter of PID number 1 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3125-D3128	Control alarm setting for PID parameter 1 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3131-D3149	PID parameter of PID number 2 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3155-D3158	Control alarm setting for PID parameter 2 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3161-D3179	PID parameter of PID number 3 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3185-D3188	Control alarm setting for PID parameter 3 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3191-D3209	PID parameter of PID number 4 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3215-D3218	Control alarm setting for PID parameter 4 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3221-D3239	PID parameter of PID number 5 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3245-D3248	Control alarm setting for PID parameter 5 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3251-D3269	PID parameter of PID number 6 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3275-D3278	Control alarm setting for PID parameter 6 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3281-D3299	PID parameter of PID number 7 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3305-D3308	Control alarm setting for PID parameter 7 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3311-D3329	PID parameter of PID number 8 of loop 5	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3335-D3338	Control alarm setting for PID parameter 8 of loop 5	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

AF07.EPS

Parameter of loop 6

D register No.	Classification	Description	Setting value	Read/ Write
D3501-D3518	Parameter for each loop	Same as parameter of loop 1(*2)	Same range as parameter of loop 1	R/W
D3601-D3619	PID parameter of PID number 1 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3625-D3628	Control alarm setting for PID parameter 1 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3631-D3649	PID parameter of PID number 2 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3655-D3658	Control alarm setting for PID parameter 2 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3661-D3679	PID parameter of PID number 3 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3685-D3688	Control alarm setting for PID parameter 3 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3691-D3709	PID parameter of PID number 4 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3715-D3718	Control alarm setting for PID parameter 4 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3721-D3739	PID parameter of PID number 5 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3745-D3748	Control alarm setting for PID parameter 5 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3751-D3769	PID parameter of PID number 6 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3775-D3778	Control alarm setting for PID parameter 6 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3781-D3799	PID parameter of PID number 7 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3805-D3808	Control alarm setting for PID parameter 7 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W
D3811-D3829	PID parameter of PID number 8 of loop 6	Same PID parameter of PID number1 of loop 1	Same range as PID parameter for PID number 1 of loop 1	R/W
D3835-D3838	Control alarm setting for PID parameter 8 of loop 6	Same control alarm setting as PID number 1 of loop 1	Same range as control alarm setting for PID number 1 of loop 1	R/W

*1 : In case of reading register of only Write, O will be returned.

*2 : Loop 5 and loop 6 don't have bias setting, filter setting, ratio setting, and remote/local switching for Remote and PV range.

AF08.EPS

Program operation parameter

D register No.	Description	Settings	Read/ Write
D4001	Program operation RUN/STOP	0 : STOP 1 : RUN	R/W
D4002	HOLD for program operation	0 : not Hold 1 : HOLD	R/W
D4003	Segment Advance	1 : Advance request	W
D4004	Pattern number switching in case of Stop of program operation	1 : Pattern number 1 : 30 : Pattern number 30	W
D4005	Pattern number of operation	1 : Pattern number 1 : 30 : Pattern number 30	R
D4006	Segment number during operation	0-99, however 0 is time after stating program operation until program pattern start.	R
D4007	Rest of segment time during operation (hh, hour)	0-99(*3)	R
D4008	Rest of segment time during operation (mm , minute)	0-59(*3)	R
D4009	Rest of segment time during operation (ss, second)	0-59(*3)	R
D4010	Waite status	0 : not available, 1 : in being Wait	R
D4011	Process time of wait time during being wait (hh, hour)	0-99(*3)	R
D4012	Process time of wait time during being wait (mm, minute)	0-59(*3)	R
D4013	Process time of wait time during being wait (ss, second)	0-59(*3)	R
D4014	Repeat Number during operation	0-999	R
D4015	Rest of repeat number during operation	0-999	R
D4016	Repeat start number during operation	1-99	R
D4017	Repeat end number during operation	1-99	R
D4018	Pattern end signal	0 : not available, 1: Pattern end	R
D4019	Time event status	(*4)	R
D4020	PV event status	(*4)	R

*3 : For rest of segment time and Process time of wait time (hh hour, mm minute, ss second), 3 registers hh, mm, and ss have to be read.
*4 : Each bit of registers expresses an event status.
If each bit is 1, the event that corresponds to is ON.

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Bit	Event No.	Setting
0	1	0: event OFF 1: Event ON
1	2	0: event OFF 1: Event ON
2	3	0: event OFF 1: Event ON
3	4	0: event OFF 1: Event ON
4	5	0: event OFF 1: Event ON
5	6	0: event OFF 1: Event ON
6	7	0: event OFF 1: Event ON
7	8	0: event OFF 1: Event ON
8	9	0: event OFF 1: Event ON
9	10	0: event OFF 1: Event ON
10	11	0: event OFF 1: Event ON
11	12	0: event OFF 1: Event ON
12	13	0: event OFF 1: Event ON
13	14	0: event OFF 1: Event ON
14	15	0: event OFF 1: Event ON
15	16	0: event OFF 1: Event ON

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In reading these data with ladder communication, the value needs to be transferred to 16 bit coded integer in upperhand host because the data that is transferred to BCD returns.

Parameter for reading

Reference No.	Description	Data	Read/ Write
D5001	Measurement data	Measurement data of CH1	R
D5020	Measurement data	Measurement data of CH30	R
D5501	Measurement data alarm status	Measurement data alarm status of CH01 (*5)	R
D5520	Measurement data alarm status	Measurement data alarm status of CH01 (*5)	R
D6001	Math data	Math data of CH31 (high order of 5 digit)	R
D6002	Math data	Math data of CH31 (low order of 5 digit)	R
D6059	Math data	Math data of CH60 (high order of 5 digit)	R
D6060	Math data	Math data of CH60 (low order of 5 digit)	R
D6501	Math data alarm status	Math data alarm status of CH31 (*5)	R
D6530	Math data alarm status	Math data alarm status of CH60 (*5)	R
D7001	Control data	Control data 0f CH101	R
D7018	Control data	Control data 0f CH118	R
D7501	Control data alarm status	Control data alarm status of CH101 (A2A1) (*6)	R
D7502	Control data alarm status	Control data alarm status of CH101 (A4A3) (*6)	R
D7535	Control data alarm status	Control data alarm status of CH101 (A2A1) (*6)	R
D7536	Control data alarm status	Control data alarm status of CH101 (A4A3) (*6)	R
D7614	Control alarm status (1-4 loops)	Alarm status at 1-4 level for each 1, 2, 3, 4 loop (*7)	
D7615	Control alarm status (6-6 loops)	Alarm status at 1-4 level for each 5-6 loop (*7)	
D9001	Year	Year (4 digits)	R
D9002	Month	1-12	R
D9003	Date	1-31	R
D9004	Hour	0-59	R
D9005	Minute	0-59	R
D9006	seconds	0-99	R
D9007	Mm	0-07 125ms unit	R
D9008	Summer, winter	0 : winter time 1 : summer time	R

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*5 : Measurement data and Math data alarm statuses are set at 16 bit integer by the order, alarm level 2, alarm level 1, alarm level 4, and alarm level 4. 0-8 value is set for each alarm level with 4 bit. This 0-8 corresponds to high/low limit, differential high/low limit, high/low limit of rate-of-change, high/low limit of delay.
In reading these data with ladder communication, the value needs to be transferred to 16 bit coded integer at upperhand host because the data that is transferred to BCD returns

*6 : Control data alarm status is set by order, alarm level 2, alarm level 1. For 2nd register, order of alarm status is level 4 and level 3. 0, 21-30 are set with 8 bits for an alarm level. These 21-30 corresponds to high/low limit, differential high/low limit, high/low limit of rate-of-change, high/low limit of delay. This is also needed to transfer from BCD data to 16 bits coded integer.

*7 : In control alarm status of D755 and D7552, each 16 bit coded register expresses each alarm level of loops. If an alarm level for each loop is ON regardless of any kinds of alarm, the corresponding bit is 1. In reading these data with ladder communication, the value needs to be transferred to 16 bit coded integer in upper hand host because the data that is transferred to BCD returns.
In reading D7551 and D7552 for loop model and reading D7552 for loop model, and 4 loop model(or in selecting 4 loop use for 6 loop model), error(error code 2) returns.

D7551 Bit configuration for control data alarm status (1-4 loop)

Bit	
0	Loop 1 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
1	Loop 1 alarm at level 2 (If 1, alarm ON. If 0, alarm off)
2	Loop 1 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
3	Loop 1 alarm at level 4 (If 1, alarm ON. If 0, alarm off)
4	Loop 2 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
5	Loop 2 alarm at level 2 (If 1, alarm ON. If 0, alarm off)
6	Loop 2 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
7	Loop 2 alarm at level 4 (If 1, alarm ON. If 0, alarm off)
8	Loop 3 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
9	Loop 3 alarm at level 2 (If 1, alarm ON. If 0, alarm off))
10	Loop 3 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
11	Loop 3 alarm at level 4 (If 1, alarm ON. If 0, alarm off))
12	Loop 4 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
13	Loop 4 alarm at level 2 (If 1, alarm ON. If 0, alarm off)
14	Loop 4 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
15	Loop 4 alarm at level 4 (If 1, alarm ON. If 0, alarm off)

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D7552 Bit configuration for control data alarm status (5-6 loop)

Bit	
0	Loop 5 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
1	Loop 5 alarm at level 2 (If 1, alarm ON. If 0, alarm off)
2	Loop 5 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
3	Loop 5 alarm at level 4 (If 1, alarm ON. If 0, alarm off)
4	Loop 6 alarm at level 1 (If 1, alarm ON. If 0, alarm off)
5	Loop 6 alarm at level 2 (If 1, alarm ON. If 0, alarm off)
6	Loop 6 alarm at level 3 (If 1, alarm ON. If 0, alarm off)
7	Loop 6 alarm at level 4 (If 1, alarm ON. If 0, alarm off)
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