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KYOWA

INSTRUCTION MANUAL
EDX-200A
UNIVERSAL RECORDER
(FOR CONTROL COMMAND)

Thank you for purchasing KYOWA's product EDX-200A Universal Recorder.
Read this Instruction Manual carefully in order to make full use of the high performance capabilities of the product.
Do not use the product in methods other than described in this Manual.

This Manual only describes Control Command of the EDX-200A.
For hardware, see the "EDX-200A Universal Recorder Instruction Manual for Hardware", for software operation, see the "Instruction Manual of the DCS-100A Dynamic Recording Software (For EDX-200A Operation)."

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NOTATIONS USED IN THE INSTRUCTION MANUAL

This Instruction Manual is written based on the assumption that customers fully understand basic knowledge and terms related to method for creating software including the PC, TCP/IP communication, program language, etc.

Informational Notes

- Related and reference items are enclosed with bracket quotation marks " ". In addition, header No. and header character string may be adopted. ("EDX-200A Universal Recorder Instruction Manual for Hardware," "7 CONTROL COMMAND," etc.)
- Personal Computer is described as the PC and EDX-200A, as the EDX.
- Conditioner cards may be described with Model names.

Strain/Voltage/Acceleration Measurement Card:	CVM-40A, CVM-41A
Strain/Voltage Measurement Card:	CDV-40B/A, CDV-40B/A-F
Dynamic Strain Measurement Card:	DPM-42B/A, DPM-42B/A-F
	DPM-42B-I, DPM-42B-I-F
Thermocouple card:	CTA-40A
F/V Converter Card:	CFV-40A
Charge Amplifier Card:	CCA-40A, CCA-40A-F
Strain/Voltage Measurement Insulation Card:	CDV-44AS
Direct rated current expansion card (120 ohm):	CDA-44AS
Direct rated current expansion card (350 ohm):	CDA-45AS
A/D Converter Card	AD-40AS, AD-40AS-F
CAN card (1 port, maximum 128 channels):	CAN-40A
CAN card (2 ports, maximum 256 channels):	CAN-41A

- Optional cards may be described with Model names.

Multi-channel CAN card	ECAN-40A
Time Synchronization Card	ETIM-40A
GPS/Multi-channel CAN card	EGPC-40A

- Conditioner card may be simply described as "Conditioner."
  In addition, the CAN-40A and CAN-41A may be described as "CAN card," and conditioner cards other than the CAN cards, as "Analog conditioner (card)."
- Input CH of the analog conditioner may be described as "Analog CH."
- CH Nos. of the analog conditioner is described as "CH1, CH2, to CH32."
- The required condition for measuring the CAN data by using the CAN-40A and CAN-41A is described as "CAN condition."
- The required condition for measuring the CAN data by using the ECAN-40A and EGPC-40A is described as "ECAN condition."
- The measured CAN ID of the ECAN-40A and EGPC-40A is described as "ECAN-ID."
  The measured CAN channel of the ECAN-40A and EGPC-40A is described as "ECAN-CH."
- The measured CAN data of the ECAN-40A and EGPC-40A is described as "ECAN data."
- Low pass filter may be simply described as "LPF," and High pass filter, as "HPF."
- When the EDX is solely used (with ID No. set to F), it is described as "Stand-alone."
- When controlling the EDX by using commands from the PC, it is described as "online measurement."When controlling the EDX by key operations on the front panel, it is described as "offline measurement."
- The EDX with the ID No. set to ‘0’ in synchronous operation is described as "Master" or "Synchronous master."
- The EDX with the ID No. set to ‘1 to 7’ in synchronous operation is described as "Slave" or "Synchronous slave."
- Unless otherwise specified, prefix that is expressing the size is described as follows.
  "K" (Kilo) = 1024, "M" (Mega) = 1024^2, and "G" (Giga) = 1024^3
  (1K byte = 1,024 bytes, 1M byte = 1,048,576 bytes 1G bytes = 1,073,741,824 bytes)

Precautions

The following messages are provided for reference purpose as necessary to attract your attention to information that requires special care when handling the EDX.

Examples of Notations

NOTE

Essential precautions required when handling the EDX.

MEMO

Reference items required when handling the EDX.

1 OUTLINE

This Instruction Manual is to define Communication Command through LAN interface or USB interface between the EDX-200A (hereinafter referred to as the EDX) and the Personal Computer (hereinafter referred to as the PC). The EDX and the PC is connected via LAN or USB, thereby enabling the PC to control the EDX with the Communication Command. This Instruction Manual is written based on the assumption that customers fully understand basic knowledge of the LAN and USB including programming using the TCP/IP or socket. For details, refer to commercially available textbooks, etc.
In addition, for how to connect the EDX and the PC, how to prepare the EDX for every communication interface, and for details of conditioners, see the "EDX-200A Universal Recorder Instruction Manual for Hardware" when required.

NOTE

The USB interface is applicable only on Windows OS.

When control command data (hereinafter referred to as the Command packet) is sent to the EDX from the PC, the EDX executes the specified operation and processing and then, returns the response data (hereinafter referred to as the Response packet) to the PC. The LAN interface and USB interface have common command-packet format and common response-packet format.

When using the LAN interface, the PC communicates with the EDX by using API (Application Program Interface) called socket. The socket is a communication API using the TCP/IP protocol and normally it is provided as OS or middleware package. The PC sends the Command packet to the EDX using data transfer function of the socket and receives the Response packet from the EDX using data receiving function.

When using the USB interface, the PC communicates with the EDX by using the dedicated USB device driver, which controls the EDX. The PC sends the Command packet to the EDX using data transfer function of the USB device driver and receives the Response packet from the EDX using data receiving function.

2 TYPES OF VARIABLES

This chapter is to define various types of variables used in Command packet and Response packet.
Assignment of variables with more than 2 bytes is in little endian format.

MEMO

Notation "0x****" on and after then describes a hexadecimal value.

Types of variables	The Number of Bytes	Notation	Supplement
signed char	1	char	8-bit variable with sign
unsigned char	1	BYTE	8-bit variable without sign
signed short	2	short	16-bit variable with sign
unsigned short	2	WORD	16-bit variable without sign
signed long	4	long	32-bit variable with sign
unsigned long	4	DWORD	32-bit variable without sign
signed int64	8	INT64	64-bit variable with sign
unsigned int64	8	UINT64	64-bit variable without sign
Float	4	float	Single precision floating decimal point variable
Double	8	double	Double precision floating decimal point variable

3 COMMUNICATION VIA LAN INTERFACE

When controlling the EDX through LAN (TCP/IP), the PC is a TCP client and the EDX is the TCP server.
The PC sends various requests such as connect, disconnect, data transfer, and data receive to the EDX and the EDX returns response to the above requests to the PC.
When LAN connection is successfully established with the PC, the REMOTE LED lights up in green to indicate that the EDX is in remote operating status through LAN.

3-1 SETTING THE EDX

Since the TCP/IP is used, it is required to set enabled IP address, subnet mask, gateway address, etc. on the EDX side. When using a network that is closed only between the PC and EDX, users can freely set each of the addresses. However, when using the EDX by connection to the existing network, consult the Network Administrator in advance. It is necessary to set the communication interface of EDX to "LAN". For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

NOTE

The EDX cannot obtain dynamic IP addresses such as DHCP.

3-2 SETTING THE PC

Create a control program using socket API on user's side.
When you control EDX using control commands, please use the port number : **34420** of TCP/IP.

NOTE

- EDX is using the communication port of 34381, 34385, 34420, and 34421.
  The communication port of 34420 is an object for control commands.For other communication ports 34381, 34385, 34421 are reserved, please do not use.
- When setting firewall, etc. on the PC side, the LAN communication may be suspended.
  Set an appropriate setting that enables communication with the EDX.

3-3 OUTLINE OF COMMUNICATION PROCEDURES

Socket API (function) provided on the PC side is used for sending and receiving Command and Response packets.
For details, refer to the relevant API materials, etc. In addition, for format of the Command or Response packets, see "5 CONTROL COMMAND SEND/RECEIVE PROTOCOL."

Outline of LAN communication procedures is described in the following.

(1) Prepare a socket corresponding to port No. and set necessary optional, etc.
(2) Send connection request to the EDX ("connect").
(3) Send Command packet to the EDX through the socket ("send").
(4) Receive Response packet to the EDX through the socket ("recv").
(5) Repeat procedures in items (3) and (4) when necessary.
(6) Send shutdown request to the EDX ("shutdown").
(7) Release the socket.

NOTE

The maximum data size that EDX can receive at once is 35K bytes. Therefore, when the size of a command packet is larger than 35 K bytes, it is divided into 35K bytes or less and send it to EDX.

4 COMMUNICATION VIA USB INTERFACE

When controlling the EDX through the USB interface, the application program makes a demand to the EDX for control command send/receive request through KYOWA's USB communication API library (EDX200.DLL) function dedicated for the EDX.

NOTE

- The USB interface is applicable only on Windows OS.
- When connecting the EDX to the PC by using the USB interface, the EDX requires the user to install the USB device driver for the EDX to work properly. For how to install the USB device driver, see the "EDX-200A Universal Recorder Instruction Manual for Hardware."

4-1 SETTING THE EDX

It is necessary to set the communication interface of EDX to "USB." For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

4-2 ESSENTIAL FILES

The following files are essential for creating and executing an application program.
The following files are saved in the DVD, "EDX-200A" - "USBLIB" folder, attached to the EDX.

(1) EDX200.H	API defined file (required when creating the program) Should be included in the API using source file.
(2) EDX200.LIB	API import library (required when creating the program) Should be linked to the library when creating the program.
(3) EDX200.DLL	API library main body (required when executing the program) Should be copied to the same folder with the application program.

4-3 API FUNCTION

4-3-1 List of API function

Function	Command Name
USB library start processing	EDX200_UsbOpen()
USB library end processing	EDX200_UsbClose()
Receive time-out time	EDX200_UsbSetTimeOut()
Connection check	EDX200_UsbConnectCheck()
Send Command	EDX200_UsbSendCmd()
Receive Command	EDX200_UsbReceiveCmd()
Target reset	EDX200_UsbTargetReset()
Obtain the number applicable to the EDX model	EDX200_UsbGetType()

4-3-2 List of return value of API function

Return values of the API function are as follows.

Return value	Results
0	Normally ended
Numerical value of 1 and more	The number of received bytes *EDX200_UsbReceiveCmd() only
-2	The argument is faulty.
-100	The ID No. device, specified by the argument, does not exist.
-101	Communication error or time-out error
-102	Internal DLL error

4-3-3 Details of API function

(1) EDX200_UsbOpen

Function	Initialization of USB library
Definition	int EDX200_UsbOpen(void)
Return value	See the list of return values.
Memo	Do not forget to execute the function when starting the application program. By activating this function, initialization of the DLL and EDX's contact-monitoring-process are executed inside the PC. After executing this function, connect the EDX to the PC. The REMOTE LED lights up in orange to indicate that the EDX is in remote operating status through USB.

(2) EDX200_UsbClose

Function	USB library end processing
Definition	int EDX200_UsbClose(void)
Return value	See the list of return values.
Memo	Do not forget to execute the function when ending the application program. By activating this function, the DLL-using resource is released. After executing this function, the REMOTE LED lights out to indicate that the EDX is not in remote operating status.

(3) EDX200_UsbSetTimeOut

Function	Setting the receive time-out time
Definition	int EDX200_ UsbSetTimeOut (WORD wTimeOut)
Argument	wTimeOut Time-out time (0 to 300 [sec], Default: 15 [sec])
Return value	See the list of return values.
Memo	

(4) EDX200_UsbConnectCheck

Function	Returns the status of the connected EDX.
Definition	int EDX200_ UsbConnectCheck(WORD *pwConnect)
Argument	pwConnect Storage destination of the EDX status
Return value	See the list of return values.
Memo	The ID No. of the connected EDX is returned to the argument pwConnect in binary digit. If the EDX is being connected, the relevant bit is ‘1’ The EDX with the ID No. '0' is relevant to bit '0' and the EDX with the ID No. 'F', to bit '15.' [Example] When one EDX with the ID No. ‘F’ is connected, 0x8000 is returned. [Example] When two EDX units with the ID No. ‘0’ and with the ID No. '1' are connected, 0x0003 is returned.

(5) EDX200_UsbSendCmd

Function	Sending command packet	
Definition	int EDX200_ UsbSendCmd(int nIdNo, DWORD dwSendByte, void *pSendCmd)	
Argument	nIdNo	ID No. (0 to 7, and 15, note that the ID No. 15 = ID No. F) of the send-destination EDX
	dwSendByte	Size of the command packet to be sent (byte)
	pSendCmd	Storage destination for the command packet to be sent
Return value	See the list of return values.	
Memo	The maximum command packet size is 2M bytes. To be error when the send-destination EDX is not connected. Before executing this function, check whether the send-destination EDX is connected by using the EDX200_UsbConnectCheck() function.	

(6) EDX200_UsbReceiveCmd

Function	Receiving response packet	
Definition	int EDX200_ UsbReceiveCmd(int nIdNo, void *pReceiveCmd, DWORD dwReceiveSize)	
Argument	nIdNo	ID No. (0 to 7, and 15, note that the ID No. 15 = ID No. F) of the receive-destination EDX
	pReceiveCmd	Storage destination for the response packet to be received
	dwReceiveSize	Size of the storage destination for the response packet to be received (byte)
Return value	See the list of return values.	
Memo	The maximum response packet size is 2M bytes. To be error when the receive-destination EDX is not connected. Before executing this function, check whether the receive-destination EDX is connected by using the EDX200_UsbConnectCheck() function. Size of the storage destination for storing the response packet varies with the command. Make sure the storage has enough free space to save the response packets.	

(7) EDX200_UsbTargetReset

Function	After disconnecting the USB connection of the EDX with the specified ID No., reconnect the USB connection.	
Definition	int EDX200_UsbTargetReset (int nIdNo)	
Argument	nIdNo	ID No. (0 to 7, and 15, note that the ID No. 15 = ID No. F) of the EDX
Return value	See the list of return values.	
Memo	To be error when the EDX with the specified ID No. is not connected. Before executing this function, check whether the EDX with the specified ID No. is connected by using the EDX200_UsbConnectCheck () function.	

(8) EDX200_UsbGetType

Function	Obtain the number applicable to the EDX model with the specified ID No.	
Definition	int EDX200_UsbGetType (int nIdNo, WORD *pwType)	
Argument	nIdNo	ID No. (0 to 7, and 15, note that the ID No. 15 = ID No. F) of the EDX
	pwType	Storage destination for the number applicable to the EDX model
Return value	See the list of return values.	
Memo	pwType: 0 When the EDX with the specified ID No. is not connected. pwType: 1 When the EDX with the specified ID No. is EDX-100A. pwType: 2 When the EDX with the specified ID No. is EDX-200A.	

4-4 OUTLINE OF COMMUNICATION PROCEDURES

The API (function) of the USB communication API library is used for sending and receiving command packets and response packets. For formats of the Command or Response packets, see "5 CONTROL COMMAND SEND/RECEIVE PROTOCOL" and after.

Outline of USB communication procedures is described in the following.
(1) Call EDX200_UsbOpen() function and initialize the USB library.
(2) Prepare command packets.
(3) Call EDX200_UsbConnect Check() function and check the connected status of the EDX.
(4) Call EDX200_UsbSendCmd() and send the Command packet to the EDX.
(5) Call EDX200_UsbConnect Check() function and check the connected status of the EDX.
(6) Call EDX200_UsbReceiveCmd() and receive the Response packet from the EDX.
(7) Repeat procedures in items (2) to (6) when necessary.
(8) Call EDX200_UsbClose() function and end the USB library.

MEMO

The PC can communicate with the EDX-100A by using the USB communication API library. In this case, use the Command packets and Response packets for the EDX-100A. For details, see "EDX-100A Universal Recorder Instruction Manual for Control command." Be sure to install the USB device driver for the EDX-100A in advance.

NOTE

After calling the EDX200_UsbOpen(), be sure to call the EDX200_UsbClose() before unloading the API library (EDX200.DLL) or before exiting the control program. Or, the control program will remain in memory in an abnormal state. Note that you will not start the control program since then.

5 CONTROL COMMAND SEND/RECEIVE PROTOCOL

5-1 COMMAND PACKET (PC to EDX)

This section describes format used for sending Command packet to the EDX from the PC.
The Command packet is composed of fixed length header section, fixed length command identifier, and variable length parameter section.
According to the respective control commands, after constructing an appropriate Command packet, the Command packet is sent to the EDX from the PC.

Header section (128 bytes fixed)	Command identifier (3 bytes fixed)	Parameter section (Variable length)

Description of Items

- Header: Always add the following format header at the head of the control command.

No.	Item Name	Types of Variables	The Number of Bytes	Contents
1	Model name	char	20	Fixed character string of the "EDX" (" " is not included.)
2	The number of transferred bytes	DWORD	4	Command identifier + The number of parameter bytes
3	Monitor data point	DWORD	4	During the synchronous operation only Used for obtaining monitor data. For details, see "7-3-12 Obtain the monitor data (GMD)", "7-3-13 Obtain the monitor data during the dual-sampling mode (GDD)" and "7-3-14 Obtain the monitor data when using the optional card (GDC)."
4	Reserved	char	100	
Total			128	

- Command identifier: Character string of ASCII code (3 alphabets, uppercase characters)
- Parameter: When parameters are required for the command, additionally mention it just after the command.

NOTE

- When defining the structure variable, take care to the data packing.
- When constructing a header section on the PC, after initializing the entire header section with "0x00," set the required items.

5-2 RESPONSE PACKET (EDX to PC)

After sending the Command packet from the PC to the EDX, since the EDX returns the Response packet to the PC, the PC must receive the Response packet from the EDX.
The Response packet is composed of fixed length header and variable length response data sections.
The size and format of the response data section depends on the command that is sent to the EDX from the PC just before.
Format of the Response packet is as follows.

Header section (128 bytes fixed)	Response data section (Variable length)

Description of Items

- Header: Always add the following format header at the head of the Response packet.

No.	Item Name	Types of Variables	The Number of Bytes	Contents
1	Model name	char	20	Fixed character string of the "EDX-200A" (" " is not included.)
2	The number of response data bytes	DWORD	4	Size of response data section '0': Only header section with no response data section
3	Monitor data point	DWORD	4	During the synchronous operation only Used for obtaining monitor data. For details, see "7-3-12 Obtain the monitor data (GMD) " and "7-3-13 Obtain the monitor data during the dual-sampling mode (GDD) " and "7-3-14 Obtain the monitor data when using the optional card (GDC)."
4	EDX status	DWORD	4	EDX status For details, see "5-3 EDX STATUS."
5	EDX error status	DWORD	4	EDX error status For details, see "5-4 ERROR STATUS OF EDX."
6	Input over status	DWORD	4	Indicates whether every input exceeds or not. For details, see "5-5 INPUT OVER STATUS."
7	The number of recorded data	INT64	8	The number of recorded data in the current data recording operation. To be cleared (0) when A/D conversion is stopped. During the dual-sampling mode, the number of recorded data (high-speed) appears.
8	File name	char	22	File name (maximum 20 characters) **(*1)**
9	File No.	WORD	2	File No. (0 to 9999) following after the file name **(*1)**
10	The number of repeat times	WORD	2	The number of repeat times (0 to 9999) during repetition measurements. **(*1)** During the dual-sampling mode, the number of repeat times (high-speed) appears.
11	Next interval start time	WORD	2	Year (2011 to 2099) **(*2)**
12		BYTE	1	Month (1 to 12) **(*2)**
13		BYTE	1	Day (1 to 31) **(*2)**
14		BYTE	1	Hour (0 to 23) **(*2)**
15		BYTE	1	Minute (0 to 59) **(*2)**
16		BYTE	1	Second (0 to 59) **(*2)**
		char	1	Reserved

[From the previous page]

No.	Item Name	Types of Variables	The Number of Bytes	Contents
17	Response data type	BYTE	1	0: Sends the header section only. No response data 1: Response data corresponding to the control command 2: Response data to monitor data obtaining command (GMD, GDD, GDC).
18	EDX-ID No.	char	1	-1: Stand-alone 0: Synchronous master 1 to 7: Synchronous slave
19	Connected status of the slave EDX	WORD	2	Master EDX only. The connected status of the slave EDX is displayed in binary digit. [Example 1] When one EDX with the ID No. 3 is connected to 0x0004 [Example 2] When three EDX units with the ID No. 1, ID No. 2, and ID No. 3 are connected to 0x0007
20	Voice-memo recordable time	WORD	2	0 to 1048 sec
21	The number of voice-memo recordable times	BYTE	1	0 to 254 times
22	Reserved	char	3	
23	The number of recordable data	INT64	8	The number of recordable data under the current measuring conditions. (*3) During the A/D conversion only. During the dual-sampling mode, the number of recordable data (high-speed) appears.
24	Reserved	char	28	
Total			128	

(*1) For the data file name, see "5-6 RECORDED FILE NAME."

(*2) To be ‘0’ except when the EDX is in interval measurements or to be '0' when the EDX is synchronous slave.

(*3) The number of recordable data

According to the measuring mode, the number of recorded data is as follows.

Manual measurements (without the specified number of data):
The number of data can be stored in the CF card

Manual measurements (with the specified number of data):
The specified number of data

Trigger measurements (Start only): The number of pre-data + the number of pre-data + the specified number of data

Trigger measurements (Start + End):
Before the end trigger, The number of data can be stored in the CF card
After the end trigger, The number of saved data (by the end trigger) + Post-trigger delay amount

Interval measurements: The specified number of data

- Response data section

The response data section is variable length data. The contents and data size vary with the control commands.
For details, see "7-3 DETAILED SPECIFICATIONS OF CONTROL COMMANDS."

NOTE

- The size of the Response packet is maximum 2 MB (2,097,152 bytes).
- Make sure the memory has enough free space to save the response packets.

5-3 EDX STATUS

The EDX status is stored in the header section of Response packet. The EDX status is 32-bit numeric value. The status of the EDX can be checked by using the 32-bit numeric value. Every bit is independent. Some bits may be set together at the same time. Depending on the status of the EDX, there may be a limit when executing the command. See also "7-2 ENABLE OR DISABLE CONTROL COMMANDS."

Bit Value	Contents
0x00000001	A/D conversion available status
0x00000002	During the A/D conversion (measurements)
0x00000004	(Reserved)
0x00000008	(Reserved)
0x00000010	Recording the manual-measurement data
0x00000020	Pausing the manual-measurement-data recording
0x00000040	Waiting for trigger measurements
0x00000080	Recording the trigger-measurement data
0x00000100	Waiting for interval measurements
0x00000200	Recording the interval-measurement data
0x00000400	(Reserved)
0x00000800	(Reserved)
0x00001000	Recording voice memo
0x00002000	Outputting the + CAL
0x00004000	Outputting the - CAL
0x00008000	Opening the file or finding the file by using the control command
0x00010000	Executing the command(Busy)
0x00020000	(Reserved)
0x00040000	Inserting the CF card
0x00080000	Accessing to the CF card
0x00100000	Battery alarm
0x00200000	Connecting the GPS sensor (ETIM-40A)
0x00400000	(Reserved)
0x00800000	On-line controlling
0x01000000	Outputting the CAN (ECAN-40A)
0x02000000	(Reserved)
0x04000000	Over data is generated during the A/D conversion.
0x08000000	Discontinuous monitor data
0x10000000	(Reserved)
0x20000000	(Reserved)
0x40000000	(Reserved)
0x80000000	Error (For details, see "5-4 ERROR STATUS OF EDX.")

The conditions to which EDX status is set, and the conditions to which EDX status is cleared are shown below.

- A/D conversion available status

To set:

When no error occur in the measuring-condition-checking while setting measuring conditions at startup.
When no error occurs in the measuring-condition-checking while setting measuring conditions by using the MCF command, MES command, or LOAD button.
When the INI command is properly ended.
When no error occurs in the measuring-condition-checking while inserting or removing the CF card.
When no error occurs in the measuring-condition-checking when start monitoring data by using the OPT. button (when the start monitoring function is assigned).

To clear:

When an error occurs in the measuring-condition-checking while setting measuring conditions at startup.
When an error occurs in the measuring-condition-checking while setting measuring conditions by using the MCF command, MES command, or LOAD button.
When an error occurs in the measuring-condition-checking while inserting or removing the CF card.
When an error occurs in the measuring-condition-checking when start monitoring data by using the OPT. button (when the start monitoring function is assigned).

- During the A/D conversion

To set:

When start monitoring data by using the STA command
When start recording data by using the REC/PAUSE button while the EDX is in stop mode.
When start monitoring data by using the OPT. button (when the start monitoring function is assigned)

To clear:

When stop monitoring data.

- Recording the manual-measurement data

To set:

When start recording data by using the REC command or REC/PAUSE button when the manual measurement is included in the measuring mode.

To clear:

When the specified number of data recording is ended.
When stop recording data.
When pause recording data.

- Pausing the manual-measurement-data recording

To set:

When pausing the recording by using the PAU command or REC/PAUSE button during manual measurements (normal-sampling mode, the number of repeat times = 1)

To clear:

When start recording data.
When stop recording data.

- Waiting for trigger measurements

To set:

When start waiting for trigger measurements by using the REC command or REC/PAUSE button when the trigger measurement is included in the measuring mode.

To clear:

When canceling the waiting for trigger measurements by using the STOP command or STOP button.

When a trigger measurement starts by a trigger event.

- Recording the trigger-measurement data

To set:

When a trigger measurement starts by a trigger event during the "waiting for trigger measurement" status.

To clear:

When the specified number of data recording is ended.

When stop recording data.

- Waiting for interval measurements

To set:

When start waiting for interval measurements by using the REC command or REC/PAUSE button when the interval measurement is included in the measuring mode.

To clear:

When canceling the waiting for interval measurements by using the STOP command or STOP button.

When an interval measurement starts by specifying interval conditions.

- Recording the interval-measurement data

To set:

When an interval measurement starts by satisfying interval conditions during the "waiting for interval measurement" status.

To clear:

When the specified number of data recording is ended.

When stop recording data.

- Recording voice memo

To set:

When start recording data by pressing the VOICE MEMO switch of the Remote Control Unit RCU-42A with fulfilling the operating condition of the voice memo function. For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

To clear:

When stop recording voice memo.

- Outputting the + CAL

To set:

When start outputting + CAL by using the CAL (+CAL) command during the A/D conversion.

When start outputting +CAL by using the OPT. button (when the output/stop CAL function is assigned) during the A/D conversion and during not outputting CAL.

To clear:

When stop outputting the CAL by using the CAL (OFF) command.

When start outputting the -CAL by using the CAL (-CAL) command.

When start outputting -CAL by using the OPT. button (when the output/stop CAL function is assigned)

When the recordings (including the manual measurements, trigger measurements, and interval measurements) are ended.

When executing balance or internal sensitivity compensation.

- Outputting the - CAL

To set:

When start outputting - CAL by using the CAL (-CAL) command during the A/D conversion.

When start outputting -CAL by using the OPT. button (when the output/stop CAL function is assigned) during the A/D conversion and during outputting +CAL.

To clear:

When stop outputting the CAL by using the CAL (OFF) command.

When start outputting the +CAL by using the CAL (+CAL) command.

When stop outputting CAL by using the OPT. button (when the output/stop CAL function is assigned)

When the recordings (including the manual measurements, trigger measurements, and interval measurements) are ended.

When executing balance or internal sensitivity compensation.

- Opening the file or finding the file by using the control command

To set:

When the FOF command and FFF command are properly ended.

To clear:

When the FCF command and FFC command are properly ended.

- Executing the command(Busy)

To set:

When receiving a command from the PC.

To clear:

When the response data to be sent becomes available after executing the command.

- Inserting the CF card

To set:

When inserting the CF card.

To clear:

When removing the CF card.

- Accessing to the CF card

To set:

When the FDF command and FDK command are properly ended.

When deleting the recorded data by using the OPT. function (when the delete the recorded data function is assigned)

To clear:

When the file deleting is ended.

- Battery alarm

To set:

When the residual capacity of the built-in backup battery is short.

- Connecting the GPS sensor

To set:

When connecting the GPS sensor to the ETIM-40A.

To clear:

When dis-connecting the GPS sensor from the ETIM-40A.

- On-line controlling

To set:

When LAN connection or USB connection is successfully established.

To clear:

When LAN connection or USB connection is disconnected.

- Outputting the CAN

To set:

When the CAN output (when starting), the CAN output (when stopping), or the CAN output test is started by the ECAN-40A or EGPC-40A.

To clear:

When the CAN output (when starting), the CAN output (when stopping), or the CAN output test is ended by the ECAN-40A or EGPC-40A.

- Over data is generated during the A/D conversion.

To set:

When the sensor's input exceeds the pre-set upper-limit value or lower-limit value during the A/D conversion.

To clear:

When starting the A/D conversion.

When executing balance or internal sensitivity compensation.

When executing the over reset.

- Discontinuous monitor data

To set:

When the internal FIFO memory becomes full.

To clear:

When the command response packet or header response packet (EDX status) is transmitted.

- Error

To set:

When the error status of the EDX is not 0x00000000.

For details, see "5-4 ERROR STATUS OF EDX."

To clear:

When the error status of the EDX is 0x00000000.

MEMO

- When the status of the return value, after sending the control command, is 0x00010000, the processing of the control command is not yet completed.
- Check the status until the bit of the 0x00010000 returns 0.

MEMO

The A/D behavior and EDX status are as follows.

● A/D conversion available status:	0x00000001 is set.
● Monitoring:	0x00000003 is set and 0x00000010 to 0x00000200 is cleared.
● Recording the manual-measurement data:	0x00000013 is set.
● Pausing the manual-measurement-data recording:	0x00000023 is set.
● Waiting for trigger measurements:	0x00000043 is set.
● Recording the trigger-measurement data:	0x00000083 is set.
● Waiting for interval measurements:	0x00000103 is set.
● Recording the interval-measurement data:	0x00000203 is set.

5-4 ERROR STATUS OF EDX

The error status of the EDX is 32-bit numeric value.
When hardware related error occurred in the EDX, the following bit is set. Details of error contents can be checked with these error statuses.

Bit Value	Contents
0x00000001	Folder capacity for storing the measured data is not enough.
0x00000002	Oscillator for DPM card is faulty.
0x00000004	External clock error
0x00000008	CF card access error
0x00000010	(Reserved)
0x00000020	Error occurred while controlling the Display board.
0x00000040	Error occurred while controlling the CPU board.
0x00000080	Error occurred while controlling the Voice board.
0x00000100	File No. error
0x00000200	(Reserved)
0x00000400	CFV-40A and CAN-40A update required. About the related slot number, see 0x01000000 to 0x08000000.
0x00000800	Cannot recognize the synchronous slaves.
0x00001000	Parameter error of synchronous slaves
0x00002000	(Reserved)
0x00004000	(Reserved)
0x00008000	(Reserved)
0x00010000	(Reserved)
0x00020000	(Reserved)
0x00040000	(Reserved)
0x00080000	(Reserved)
0x00100000	(Reserved)
0x00200000	(Reserved)
0x00400000	(Reserved)
0x00800000	(Reserved)
0x01000000	Error occurred in the slot 1 conditioner card
0x02000000	Error occurred in the slot 2 conditioner card
0x04000000	Error occurred in the slot 3 conditioner card
0x08000000	Error occurred in the slot 4 conditioner card
0x10000000	Optional card error
0x20000000	(Reserved)
0x40000000	(Reserved)
0x80000000	(Reserved)

The conditions to which EDX error status is set, and the conditions to which EDX error status is cleared are shown below.

- Folder capacity for storing the measured data is not enough.

To set:

When inserting a CF card, when start monitoring data, or when the following recording data is prepared after recording ends by measurement with repetition, since the remaining capacity is not enough, file data cannot be recorded under the current conditions.

(With the dual-sampling mode, either high-speed or low-speed matches the above item, the bit is set.)

When starting a recording with the CF card data folder "EDX200A.99" where 1000 or more files are saved.

For details of data folder, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

To clear:

When inserting a CF card, when start monitoring data, or when the following recording data is prepared after recording, after deleting files (by the FDF command or FDK command), after quick formatting (by the FDF command), single file or more data can be recorded under the current conditions without the CF card data folder "EDX200A.99" where 1000 or more files are saved.

For details of data folder, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

(With the dual-sampling mode, both high-speed + low-speed match the above item, the bit is set.)

- Oscillator for DPM card is faulty.

To set:

When the inputting oscillator signal is faulty while using a DPM card with the external oscillator. For details, see "DPM-42A/DPM-42A-F Dynamic Strain Amplifier Card Instruction Manual for EDX-2000A" and "DPM-42B/DPM-42B-I/DPM-42B-F/DPM-42B-I-F Instruction Manual for EDX series."

When the synchronous cable (N-95) is not properly connected during the synchronous operation.

To clear:

When inputting the correct oscillator signal.

- External clock error

To set:

When the inputting external clock signal level is not within the specifications while using the external-clock-input function. (For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware.")

When the synchronous cable (N-95) is not properly connected during the synchronous operation.

To clear:

When inputting the correct external clock signal.

- CF card access error

To set:

When an error occurs while creating a new recorded file or while writing data.

To clear:

When creating a new recorded file or writing data is properly ended.

When inserting or removing the CF card.

- Error occurred while controlling the display board.

To set:

When an error occurs on the Display board while preparing the EDX at startup.

To clear:

When sending or receiving a command or when pressing a button.

- Error occurred while controlling the CPU board.

To set:

When an error occurs on the CPU board while preparing the EDX at startup.

When an error occurs on the CPU board during the A/D conversion.

To clear:

When sending or receiving a command or when pressing a button.

- Error occurred while controlling the Voice board.

To set:

When an error occurs on the Voice board while preparing the EDX at startup.

When start recording voice memo, an error occurs on the Voice board.

When the recording data in which the voice memo was recorded is stopped, an error occurs on the Voice board.

To clear:

When sending or receiving a command or when pressing a button.

- File No. error

To set:

When start measuring data with the file No. exceeding 9999.

To clear:

When start measuring data with the correct file No. (0 to 9999).

- CFV-40A and CAN-40A update required.

To set:

When checking conditioner cards at startup, the FPGA version of the CFV-40A or CAN-40A is old.

- Cannot recognize the synchronous slaves.

To set:

When start monitoring data, when start recording data, when pausing recording, when executing CAL, when executing balance, when executing internal sensitivity compensation, and when deleting the last recorded data files, slave units cannot be recognized in synchronous operation.

To clear:

When setting the measuring conditions in synchronous operation or start monitoring data in synchronous operation, slave units can be recognized.

- Parameter error of synchronous slaves

To set:

When monitoring data or start recording data in synchronous operation, a parameter error occurs in slave units.

To clear:

When monitoring data or start recording data in synchronous operation, no parameter error occurs in slave units.

- Error occurred in the slot 1 to 4 conditioner cards

To set:

When checking conditioner cards at startup, when executing balance, or when executing internal sensitivity compensation, an EEPROM access error to every conditioner card occurs.

When checking conditioner cards at startup, the FPGA version of the CFV-40A or CAN-40A is old.

To clear:

When sending or receiving a command or when pressing a button.

- Optional card error

To set:

When an error occurs in the optional card while using functions of the optional cards.

To clear:

When sending or receiving a command or when pressing a button.

5-5 INPUT OVER STATUS

The input over status is 32-bit numeric value. The most significant bit is corresponding to the CH32 and the least significant bit, to the CH1.
When the input signal exceeds the pre-set range during the A/D conversion, the relevant bit is set.
(For example, when the CH1-input and CH31-input exceed during the A/D conversion, 0x40000001 is set.)
The 32-bit numeric value indicates the history of the excessive inputs. The 32-bit numeric value is not cleared even if the input exceeding status is canceled. The following conditions should be used to clear the status.

- When A/D conversion is temporarily paused and started once again.
- When executing the start-recording operation (REC).
- When executing balance or internal sensitivity compensation.
- When executing the over reset command (CAL3).

MEMO

During the dual-sampling mode, if the sampling condition of a channel is high-speed + low-speed, either high-speed or low-speed exceeds the pre-set range, the bit is set.

5-6 RECORDED FILE NAME

The name of the data file, recorded in the EDX, is as follows.

○○○********_△□□□□_◊_▲.KS2

○○○	: Arbitrary file name (maximum 20 characters)
********	: File No. (0000 to 9999) Automatically incremented every time recording ends.
△	: Measuring mode when setting the number of repeat times M: Manual measurement (when the number of repeat times is 2 or larger) I: Interval measurement A: Analog trigger measurement E: External trigger measurement C: Complex trigger measurement
□□□□	: The number of repeat times (0000 to 9999) Automatically incremented every time recording ends.
◊	: EDX-ID No. (0 to 7) during the synchronous operation
▲	: The sampling mode (high-speed: H, low-speed: L) of the dual-sampling mode
KS2	: The file extension is KS2 fixed.

[Example 1]
Suppose the EDX is stand-alone, manual measurement (file No. 0)
TEST0000.KS2

[Example 2]
Suppose the EDX is synchronous master (ID = 0), manual measurement (file No. 1)
TEST0001_0.KS2

[Example 3]
Suppose the EDX is stand-alone, interval measurement (file No. 2, the number of repeat times = 3)
TEST0002_I0003.KS2

[Example 4]
Suppose the EDX is synchronous master (ID = 0), analog trigger measurement
(File No. 4, the number of repeat times = 5, high-speed)
TEST0004_A0005_0_H.KS2

NOTE

- In the actual measurements, file No. and the number of repeat times may exceed 10000.

- Recording CAN data by using the ECAN-40A and EGPC-40A
  When recording CAN data by using the ECAN-40A or EGPC-40A, the EDX-200A creates the E4A file (extension: .E4A).

Normal-sampling Mode:	The E4A file is named in the same way as the KS2 file.
Dual-sampling Mode:	The E4A file is named in the same way as that of the high-speed sampling in the KS2 file.

- Recording GPS data by using the ETIM-40A and EGPC-40A
  When recording GPS data by using the ETIM-40A or EGPC-40A, the EDX-200A creates the NMEA file (extension: .NMEA).

Normal-sampling Mode:	The NMEA file is named in the same way as the KS2 file.
Dual-sampling Mode:	The NMEA file is named in the same way as that of the low-speed sampling in the KS2 file.

6 ERROR CODE

Error code is indicated with 1 byte of the char type.
If it is stated as 'Standard type' in response data of control commands, the response data is the error code.
In addition, if an error occurred during control command process, this error code is returned without returning the response data stated in the control commands.
The list of error codes are as follows.

Error code No.	Contents
0	Normally ended
-1	Unknown command
-2	Parameter error
-3	Context error (Cannot execute in the current EDX status.)
-4	No CF card inserted.
-5	Remaining capacity of the CF card is not enough.
-6	No file
-7	Loading error
-8	Writing error
-9	No target
-10	Cannot execute because the file is operating by control commands.
-11	Undefined (system reserved)
-12	Cannot execute the setting/loading because of the hardware error.
-13	The interval measurement is ended.
-14	The A/D conversion is stopped because the file No. is the maximum value.
-15	The A/D conversion is stopped because the number of repeat times is the maximum value. (The file No. is already incremented.)
-16	Undefined (system reserved)
-17	Undefined (system reserved)
-18	Undefined (system reserved)
-19	The hardware configuration is not correct (cannot recognize the number of pre-set slave units).
-20	Cannot load the TEDS information or an error occurs while accessing.
-21	CFV-40A and CAN-40A update required. For the STA, MES1, etc. only.
-22	Cannot execute because of the setting error of the slave EDX.
-23	Cannot execute because of the external clock error.

7 CONTROL COMMAND

7-1 LIST OF CONTROL COMMANDS

The list of control commands are as follows.

Type	Contents	Command Name	Ref. Page
Measuring Condition	Obtain data file name	DFN	34
	Set/load the monitor data output condition	SMD	35
	Save/load the measuring condition file	MCF	39
	Set/load the measuring condition	MES	40
	Initialize the measuring condition	INI	44
Execute	Start A/D conversion	STA	46
	Start recording	REC	47
	Stop the A/D conversion/recording	STP	48
	Pause the recording operation	PAU	49
	Execute CAL/Stop CAL/Over reset	CAL	50
	Execute balance/Load balance results	BAL	51
	Obtain the monitor data	GMD	53
	Obtain the monitor data during the dual-sampling mode.	GDD	58
	Obtain the monitor data when using the optional card.	GDC	62
	Output the CAN manually	CMO	71
	Execute/load the CAN output test.	CSC	72
	Control the digital output	DOO	76
Environment	Set/load the keylock status	LOC	77
	Set/load the time	TIM	78
	Load the system information	SYS	80
	Load the card information	CAD	83
	Check the device/slot	EDX	85
File	Obtain the remaining capacity of the CF card.	FFR	86
	Open file	FOF	87
	Load file data	FRF	88
	Seek file	FSF	89
	Close file	FCF	90
	Delete file	FDF	91
	Start finding file	FFF	93
	Continue finding file	FFN	95
	End finding file	FFC	96
	Delete last recorded data files	FDK	97
Others	Set/load the TCP/IP information	NET	98
	Set/load the IP address information For synchronous operation with LAN cables.	IPA	99
	Load/write the TEDS information	TED	101
	Load/write the user data	URW	109
	Load the EDX status	---	110

7-2 ENABLE OR DISABLE CONTROL COMMANDS

Usable commands may be limited by the status of the EDX or the synchronous operation status.
Available the command is listed in the following table. For the status of the EDX, see "5-3 EDX STATUS."

(1) For stand-alone and synchronous master EDX (A/D conversion is in stop status)

Command	Stopping A/D conversion				
	A/D conversion disable status	A/D conversion available status	Finding file	Opening file	Executing BAL and AVG (*1)
DFN		✓			
SMD	✓	✓			
MCF	✓	✓			
MES	✓	✓			
INI	✓	✓			
STA		✓			
REC					
STP					
PAU					
CAL		✓			
BAL		✓			
GMD					
GDD					
GDC					
CMO		✓			
CSC		✓			
DOO	✓	✓			
LOC	✓	✓			
TIM	✓	✓			
SYS	✓	✓			
CAD	✓	✓			
EDX	✓	✓			
FFR	✓	✓			
FOF	✓	✓			
FRF	✓(*2)	✓(*2)		✓	
FSF	✓(*2)	✓(*2)		✓	
FCF	✓(*2)	✓(*2)		✓	
FDF	✓	✓			
FFF	✓	✓			
FFN	✓(*3)	✓(*3)	✓		
FFC	✓(*3)	✓(*3)	✓		
FDK		✓(*4)			
NET	✓	✓			
IPA	✓	✓			
TED	✓	✓			
URW	✓	✓			

✓: Available commands N/A: Non applicable (Only loading is enabled)

(*1) EDX status while executing balance, internal sensitivity compensation, or measuring average value.
(*2) Enabled only during opening file.
(*3) Enabled only during finding file.

(*4) It is valid only until starting the A/D conversion from after recording (A/D conversion is in stop state).

(2) For stand-alone and synchronous master EDX (A/D conversion is in operating status)

Command	Monitoring	Manual measurement		Trigger measurement		Interval measurement	
		Recording	Pausing	Waiting	Recording	Waiting	Recording
DFN	✓	✓	✓	✓	✓	✓	✓
SMD	✓	✓	✓	✓	✓	✓	✓
MCF							
MES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INI							
STA							
REC	✓		✓				
STP	✓	✓	✓	✓	✓	✓	✓
PAU		✓(*1)					
CAL	✓	✓	✓	✓	✓	✓	✓
BAL	✓		✓				
GMD	✓	✓	✓	✓	✓	✓	✓
GDD	✓	✓	✓	✓	✓	✓	✓
GDC	✓	✓	✓	✓	✓	✓	✓
CMO	✓	✓	✓	✓	✓	✓	✓
CSC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DOO	✓	✓	✓	✓	✓	✓	✓
LOC	✓	✓	✓	✓	✓	✓	✓
TIM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SYS	✓	✓	✓	✓	✓	✓	✓
CAD	✓	✓	✓	✓	✓	✓	✓
EDX							
FFR							
FOF							
FRF							
FSF							
FCF							
FDF							
FFF							
FFN							
FFC							
FDK							
NET	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TED							
URW							

✓: Available commands N/A: Non applicable (Only loading is enabled)

(*1) Enabled only during recording data in manual measurements.

(3) Synchronous slave EDX (A/D conversion is in stop status)

Command	Stopping A/D conversion				
	A/D conversion disable status	A/D conversion available status	Finding file	Opening file	Executing BAL and AVG (*1)
DFN		✓			
SMD	✓	✓			
MCF	✓	✓			
MES	✓	✓			
INI	✓	✓			
STA					
REC					
STP					
PAU					
CAL					
BAL					
GMD					
GDD					
GDC					
CMO					
CSC					
DOO	✓	✓			
LOC	✓	✓			
TIM	✓	✓			
SYS	✓	✓			
CAD	✓	✓			
EDX	✓	✓			
FFR	✓	✓			
FOF	✓	✓			
FRF	✓(*2)	✓(*2)		✓	
FSF	✓(*2)	✓(*2)		✓	
FCF	✓(*2)	✓(*2)		✓	
FDF	✓	✓			
FFF	✓	✓			
FFN	✓(*3)	✓(*3)	✓		
FFC	✓(*3)	✓(*3)	✓		
FDK					
NET	✓	✓			
IPA	✓	✓			
TED	✓	✓			
URW	✓	✓			

✓: Available commands N/A: Non applicable (Only loading is enabled)

(*1) EDX status while executing balance, internal sensitivity compensation, or measuring average value.
(*2) Enabled only during opening file.
(*3) Enabled only during finding file.

(4) Synchronous slave EDX (A/D conversion is in operating status)

Command	Monitoring	Manual measurement		Trigger measurement		Interval measurement	
		Recording	Pausing	Waiting	Recording	Waiting	Recording
DFN	✓	✓	✓	✓	✓	✓	✓
SMD	✓	✓	✓	✓	✓	✓	✓
MCF							
MES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INI							
STA							
REC							
STP							
PAU							
CAL							
BAL							
GMD	✓	✓	✓	✓	✓	✓	✓
GDD	✓	✓	✓	✓	✓	✓	✓
GDC	✓	✓	✓	✓	✓	✓	✓
CMO							
CSC							
DOO	✓	✓	✓	✓	✓	✓	✓
LOC	✓	✓	✓	✓	✓	✓	✓
TIM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SYS	✓	✓	✓	✓	✓	✓	✓
CAD	✓	✓	✓	✓	✓	✓	✓
EDX							
FFR							
FOF							
FRF							
FSF							
FCF							
FDF							
FFF							
FFN							
FFC							
FDK							
NET	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TED							
URW							

✓: Available commands N/A: Non applicable (Only loading is enabled)

7-3 DETAILED SPECIFICATIONS OF CONTROL COMMANDS

This section describes detailed information for every control command.
When sending the control command from the PC to the EDX, construct a command packet with header (128-byte fixed length), command identifier (3-byte fixed length), and parameter (variable length). The number of transferred bytes in the header section includes the total number of bytes of the command identifier and parameter.
The PC receives the response packet added with header section (128-byte fixed length) at the head from the EDX. Since the size of response data succeeding the header section is written with the number of response data bytes in the header, the PC can receive the entire response packet from the EDX.
For command packets and response packets see "5 CONTROL COMMAND SEND/RECEIVE PROTOCOL."

MEMO

- Although response data is almost 2bytes or more, PC might receive 1byte Data.
  In this case, error occurred and the EDX is returning error codes as the response data. For details, see "6 ERROR CODE."

7-3-1 Obtain data file name (DFN)

Obtain the pre-set data file name.

- Command: DFN
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	DFN	char	3
Total number of transferred bytes				3

- Response data: 48 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Data file name with extension [Example] TEST0000_I0000_0.KS2	char	48
Total number of response data bytes				48

When the A/D conversion is not in available status, all the response data 1 shall be '0x00.'

NOTE

- For synchronous operation, when the A/D conversion is started, the final file information is set from the synchronous master to synchronous slave EDX. Therefore, for synchronous slave EDX, results of this command may differ before and after starting the A/D conversion.
- To obtain the correct data file name, execute this command during the A/D conversion.

7-3-2 Set/load the monitor data output condition (SMD)

Sets and loads the monitor data output condition.

- Command: SMD
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 12 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	SMD	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	Monitor data output mode **(*1)** -1: No monitor data output -0: Continuous monitor data output mode -1: Intermittent monitor data output mode	char	1
4	Parameter 3	Dual-sampling monitor data output mode **(*2)** 0: Dual-sampling OFF (GMD, GDC) 1: High-speed monitor data + low-speed monitor data (GDD, GDC) 2: High-speed monitor data only (GDD, GDC) 3: Low-speed monitor data only (GDD, GDC)	BYTE	1
5	Parameter 4	Output the monitor data of the ECAN data (*3) 0:OFF (GMD, GDD, GDC) 1:ON (GDC)	BYTE	1
6	Parameter 5	Output the GPS status **(*3)** 0: OFF (GMD, GDD, GDC) 1: ON (GDC)	BYTE	1
7	Parameter 6	Output the GPS data (*3) 0: OFF (GMD, GDD, GDC) 1: ON (GDC)	BYTE	1
8	Parameter 7	Reserved	char	3
Total number of transferred bytes				12

- Response data: Standard type (1 byte)

(*1) Monitor data output mode

- When no monitor data is output (Monitor data output mode = -1)
  Not outputting monitor data.
  Even if monitor data obtaining command (GMD, GDD, or GDC) is sent, the number of monitor data is always '0.'
  When the EDX is in off-line status, this mode is automatically set.
- For continuous monitor data output mode (Monitor data output mode = 0)
  Monitor data of all the connected EDX units is continuously obtained.
  Depending on the number of connected EDX units and PC's performance, all the monitor data may not be obtained.
- For intermittent monitor data output mode (Monitor data output mode = 1)
  Monitor data is intermittently obtained.
  Although the obtained data is continuous monitor data, it lacks in continuity with data of the monitor data obtained the next time.

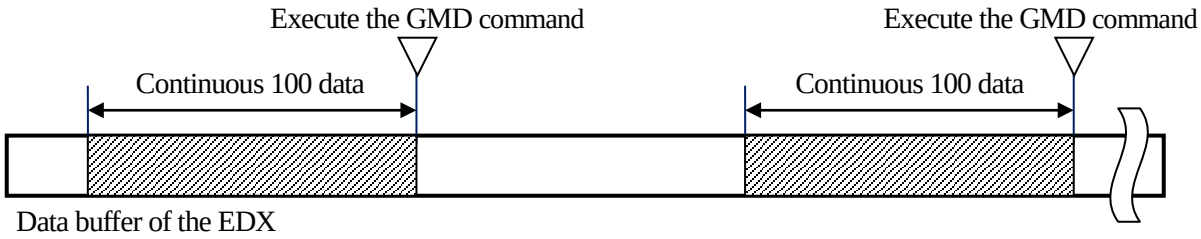
[Example]

Obtaining the monitor data with the intermittent monitor data output mode

Suppose the parameter 1 (the number of obtained data/CH) of the GMD (GDD or GDC) is 100.

Indicates the data buffer of the EDX. Suppose data stores from left to right.

Indicates the range of the obtained data.



(*2) Dual-sampling monitor data output mode

According to parameter values, available the monitor data command and monitor data are varied.
These are listed in the following table.

	Available the monitor data command			Available monitor data	
Parameter values	GMD	GDD	GDC	Normal-sampling mode	Dual-sampling mode
0 (Dual-sampling OFF)	✓		✓	All channels	High-speed channels only
1 (High-speed monitor data + low-speed monitor data)		✓	✓	All channels	High-speed channels + low-speed channels
2 (High-speed monitor data only)		✓	✓	All channels	High-speed channels only
3 (Low-speed monitor data only)		✓	✓	All channels	Low-speed channels only

✓: Available commands

(*3) Output the monitor data of the ECAN data/output the GPS status/output the GPS data by an optional card.
When using the functions of the optional card, available the monitor data command is GDC only.
For details, see "7-3-14 Obtain the monitor data when using the optional card (GDC)".

MEMO

Available information varies with the monitor data command.
For details, see "7-3-12 Obtain the monitor data (GMD)", "7-3-13 Obtain the monitor data during the dual-sampling mode (GDD)" and "7-3-14 Obtain the monitor data when using the optional card (GDC)."

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	SMD	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 8 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Monitor data output mode -1: No monitor data output 0: Continuous monitor data output mode 1: Intermittent monitor data output mode	char	1
2	Response data 2	Dual-sampling monitor data output mode 0: Dual-sampling OFF (GMD, GDC) 1: High-speed monitor data + low-speed monitor data (GDD, GDC) 2: High-speed monitor data only (GDD, GDC) 3: Low-speed monitor data only (GDD, GDC)	BYTE	1
3	Response data 3	Output the monitor data of the ECAN data 0: OFF (GMD, GDD, GDC) 1: ON (GDC)	BYTE	1
4	Response data 4	Output the GPS status 0: OFF (GMD, GDD, GDC) 1: ON (GDC)	BYTE	1
5	Response data 5	Output the GPS data 0: OFF (GMD, GDD, GDC) 1: ON (GDC)	BYTE	1
6	Response data 6	Reserved	char	3
Total number of response data bytes				8

MEMO

See also "7-3-12 Obtain the monitor data (GMD)", "7-3-13 Obtain the monitor data during the dual-sampling mode (GDD)" and "7-3-14 Obtain the monitor data when using the optional card (GDC)".

7-3-3 Save/load the measuring condition file (MCF)

Saves measuring conditions, pre-set in the EDX, to the CF card or loads measuring conditions, stored in the CF card, and sets the obtained measuring conditions in the EDX.

- Command: MCF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	MCF	char	3
2	Parameter 1	Save/load the measuring condition file mode 0: Load 1: Save	BYTE	1
Total number of transferred bytes				4

- Response data: Standard type (1 byte)

MEMO

- When the parameter 1 is set Load (0), measuring conditions stored in the CF card is set in the EDX and the measuring conditions are automatically checked on the EDX side.
- When the parameter 1 is set Save (1), measuring conditions are automatically checked on the EDX side. Only when the status is available for starting A/D conversion, after updating the measuring condition in the EDX, the checked measuring conditions are saved in the CF card.
- The EDX also loads/saves the arbitrary digital filter conditions and ECAN conditions.

NOTE

- If software version at EDX-200A is less than 01.20, the measurment condition saved by version 01.20 or higher not be able to load.

7-3-4 Set/load the measuring condition (MES)

The EDX sets/loads the measuring conditions, arbitrary digital filter conditions and ECAN conditions. Check parameters for starting the A/D conversion by using the STA command.

- Command: MES
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 40008 to 208008 bytes (*1)
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	MES	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	Set the ECAN conditions (0: None, 1: Set)	BYTE	1
4	Parameter 3	Reserved	char	2
5	Parameter 4	Set the arbitrary digital filter conditions (0: None, 1: Set)	BYTE	1
6	Parameter 5	Measuring conditions to be set in the EDX	---	40000
7	Parameter 6	Arbitrary digital filter conditions to be set in the EDX The parameter 4 should be 1 (Set).	---	(8000) (*1)
8	Parameter 7	ECAN conditions to be set in the EDX The parameter 2 should be 1 (Set).	---	(160000) (*1)
Total number of transferred bytes				40008 to 208008 (*1)

(*1) The number of transferred bytes varies with the presence or absence of the arbitrary digital filter conditions and ECAN conditions.

Measuring conditions only: 40008 bytes
Measuring conditions + arbitrary digital filter conditions: 48008 bytes
Measuring conditions + ECAN conditions: 200008 bytes
Measuring conditions + arbitrary digital filter conditions + ECAN conditions: 208008 bytes

MEMO

- For the parameter 5, see "8 MEASURING CONDITION FORMAT."
- For the parameter 6, see "9 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT."
- For the parameter 7, see "10 ECAN CONDITIONS FORMAT."

- Response data

Results of the measuring-condition-checking

Measuring condition check results is defined with 32-bit numeric value as shown in the following table.

When the result is not 0x00000000, A/D conversion cannot be started.

Results (bit)	Contents
0x00000000	Check results are OK and starting the A/D conversion is available.
0x00000001	Channel condition error
0x00000002	CAN condition error
0x00000004	Data file name error or file No. error
0x00000008	Interval measuring condition error
0x00000010	Analog trigger measuring condition error
0x00000020	Undefined (system reserved)
0x00000040	External trigger measuring condition error
0x00000080	Undefined (system reserved)
0x00000100	Complex trigger condition error
0x00000200	Sampling frequency error
0x00000400	Remaining capacity of the CF card is not enough.
0x00000800	Monitor data output condition error
0x00001000	DPM card error
0x00002000	Undefined (system reserved)
0x00004000	No CF card inserted.
0x00008000	No measurement target exists.
0x00010000	Manual measuring condition error
0x00020000	Digital filter setting error
0x00040000	General information error
0x00080000	Measuring condition (common condition) error
0x00100000	Undefined (system reserved)
0x00200000	Undefined (system reserved)
0x00400000	Undefined (system reserved)
0x00800000	Undefined (system reserved)
0x01000000	Undefined (system reserved)
0x02000000	Undefined (system reserved)
0x04000000	Undefined (system reserved)
0x08000000	Undefined (system reserved)
0x10000000	Undefined (system reserved)
0x20000000	Undefined (system reserved)
0x40000000	Undefined (system reserved)
0x80000000	Undefined (system reserved)

* Note that the undefined (system reserved) result is 0.

NOTE

- When issuing the command to the synchronous master, every status of the synchronous-connected EDX is checked and is setting logical add as the result. That is to say, A/D conversion cannot be started unless status of the synchronous-connected EDX are all passed.

- With the stand-alone and synchronous master, when many recorded data files exist in the CF card, the EDX takes some time to answer the command. Because when executing the command, the EDX is checking whether the data file names in the CF card are overlapping. The more files the CF card stores, the more time it will take to process.
  Therefore, when creating multiple files in the CF card, we recommend you to collect data early and delete files in the CF card or replace the CF card with a new one.

- When the "File overwrite check" is 1 (No), the EDX will not check whether files are overlapping. For details, see "8 MEASURING CONDITION FORMAT."

♦♦♦When loading♦♦♦

- The number of transferred bytes: 8 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	MES	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
3	Parameter 2	Load the ECAN conditions (0: None, 1: Load)	BYTE	1
4	Parameter 3	System reserved	char	2
5	Parameter 4	Load the arbitrary digital filter conditions (0: None, 1: Load)	BYTE	1
Total number of transferred bytes				8

- Response data: 40000 to 208000 bytes (*1)

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Measuring conditions to be set in the EDX	---	40000
2	Response data 2	Arbitrary digital filter conditions pre-set in the EDX The parameter 4 should be 1 (Yes).	---	(8000) (*1)
3	Response data 3	Measuring conditions pre-set in the EDX The parameter 2 should be 1 (Yes).	---	(160000) (*1)
Total number of response data bytes				40000 to 208000 (*1)

(*1) The number of transferred bytes varies with the presence or absence of the arbitrary digital filter conditions and ECAN conditions.

Measuring conditions only:	40000 bytes
Measuring conditions + arbitrary digital filter conditions:	48000 bytes
Measuring conditions + ECAN conditions:	200000 bytes
Measuring conditions + arbitrary digital filter conditions + ECAN conditions:	208000 bytes

MEMO

- For the response data 1, see "8 MEASURING CONDITION FORMAT."
- For the response data 2, see "9 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT."
- For the response data 3, see "10 ECAN CONDITIONS FORMAT."

7-3-5 Initialize the measuring condition (INI)

Initializes the measuring conditions (parameters) in the EDX.

- Command: INI
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	INI	char	3
2	Parameter 1	Initialization mode 0: Initializes measuring condition, user's unit, etc. (TCP/IP related conditions are not initialized.) 1: All the conditions are initialized to the factory default. Since the TCP/IP related conditions are also initialized, after receiving the response data, communication may not be available.	BYTE	1
Total number of transferred bytes				4

- Response data: Standard type (1 byte)
- Remarks: After sending the INI command, the EDX is in the following status.

Measuring Condition

Measuring mode:	Manual measurement
Sampling frequency:	1k Hz
A/D data format:	16 bits
The number of recorded data:	0 (data is recorded until stopped)
The number of recording channels:	Measure all the recording available channels.
Channel condition:	Default value of every conditioner card For details, see "8-14 VALUES OF CONDITIONER CARDS."
File name:	TEST
File No.:	0
User's unit:	"" (Clear)
Beep sound when the input data exceeded:	OFF
Operation (beep) sound:	ON (high pitch sound)
File overwrite check:	0 (Yes)
Re-start the A/D conversion after The recording is finished:	0 (Yes)
Option button:	0 (OFF)
Oscillator:	0 (internal)
Total length of synchronous cables:	0 (within 50 m)
Balance standard value:	50 (Within ±5.0%)

* Note that other parameters are cleared zero.

TCP/IP related conditions

IP address:	192.168.200.200
Subnet Mask:	255.255.255.0
Gateway address:	0.0.0.0

NOTE

- With the command, items described in the "8 MEASURING CONDITION FORMAT" are initialized.
  The following items are not initialized.
  Date and Time
  Settings of synchronous operations (synchronous operation mode and the number of connected units)

- The file No. may vary depending on the status of the save destination.

7-3-6 Start A/D conversion (STA)

Starts A/D conversion and moves to the monitoring status.

- Command: STA
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	STA	char	3
Total number of transferred bytes				3

- Response data: Standard type (1 byte)

MEMO

To execute the command, A/D conversion available status is required.

7-3-7 Start recording (REC)

Starts recording data.

For manual measurements: The first recording operation starts when the EDX is monitoring data. The recording operation re-starts when the EDX is pausing the recording operation.

For trigger measurements: The first "waiting for trigger measurements" status starts. When the EDX is in the "waiting for trigger measurements" status with the start manual trigger: ON during complex trigger measurements, the recording operation starts. When the EDX is recording data with the end manual trigger: ON during complex trigger measurements, the recording operation stops.

For interval measurements: The first "waiting for interval measurements" status starts.

- Command: REC
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	REC	char	3
Total number of transferred bytes				3

- Response data: Standard type (1 byte)

MEMO

The command is available during monitoring data or during pausing only.

7-3-8 Stop the A/D conversion/recording (STP)

Stops the A/D conversion or data recording.

After sending the STP command, the EDX will operate as follows.

- When the EDX is recording data or is pausing.
  Ends the data recording and moves to the monitoring status.
- When the EDX is monitoring data: Stops the A/D conversion.
- When the EDX is in the "waiting for trigger measurements" status:
  Ends the "waiting for trigger measurements" status and moves to the monitoring status.
- When the EDX is in the "waiting for interval measurements" status:
  Ends the "waiting for interval measurements" status and moves to the monitoring status.

- Command: STP
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	STP	char	3
Total number of transferred bytes				3

- Response data: Standard type (1 byte)

MEMO

- When "After recording, restart the A/D conversion," in ‘General information’ of Measuring condition is set to 1 (No), the EDX is not moved to the monitoring status and A/D conversion is in stopped status. For details, see "8 MEASURING CONDITION FORMAT."

7-3-9 Pause the recording operation (PAU)

Pauses the recording operation of manual measurements.

- Command: PAU
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	PAU	char	3
Total number of transferred bytes				3

- Response data: Standard type (1 byte)

MEMO

- The command is available when satisfying the following all conditions.
  Normal-sampling Mode
  Manual measurements (the number of repeat times = 1)
  Recording data

- When the PAUSE function in ‘General information’ of Measuring condition is 1: Invalid, the PAU command is always invalid. For details, see "8 MEASURING CONDITION FORMAT."

7-3-10 Execute CAL/Stop CAL/Over reset (CAL)

Outputs the CAL value, stops outputting the CAL value, and resets the over status during the A/D conversion.

- Command: CAL
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	CAL	char	3
2	Parameter 1	CAL executing status (0: OFF, 1: +CAL, 2: -CAL, 3: Over reset)	BYTE	1
Total number of transferred bytes				4

- Response data: Standard type (1 byte)

MEMO

- Be sure to set the target channels and CAL value to be output by using the MES command in advance.
- Regardless of the target channels, the over reset is executed all channels at the same time.

7-3-11 Execute balance/Load balance results (BAL)

Executes balance, internal sensitivity compensation, initializes internal sensitivity compensation results and obtains the results of the said operations.
To execute the command, set a target CH in advance.
To set the balance target CH and internal-sensitivity-compensation target CH, use the MES command.

- Command: BAL
- Target EDX: Stand-alone and synchronous master

♦♦♦When executing ♦♦♦

- The number of transferred bytes: 5 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	BAL	char	3
2	Parameter 1	Balance executing mode (0x00: Load BAL results, 0x01: Execute) Set 0x01.	BYTE	1
3	Parameter 2	Balance executing mode 0: Executing balance 1: Executing internal sensitivity compensation 2: Initializing the internal sensitivity compensation results	BYTE	1
Total number of transferred bytes				5

- Response data: Standard type (1 byte)
- Remarks: After executing the BAL command, use the status load command to check the EDX status. After checking that the status is not in "Executing the command (Busy)" status, load the checked results.

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	BAL	char	3
2	Parameter 1	Balance executing mode (0x00: Load results, 0x01: Execute) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 32 bytes × the number of connected units = 32 to 256 bytes

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Balance/internal sensitivity compensation results 1 byte × 32 channels × the number of connected units = 32 to 256 bytes -1: No card or no function 0: OK 1: NG 2: OFF 3: ENG (EEPROM access error)	char	32 × the number of connected units
Total number of response data bytes				32 to 256

NOTE

While executing the balance/internal sensitivity compensation, no commands are available other than the status load command.

7-3-12 Obtain the monitor data (GMD)

Obtains monitor data.

Set the monitor data output mode by using the SMD command in advance.

- Command: GMD
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When executing♦♦♦

- The number of transferred bytes: 7 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	GMD	char	3
2	Parameter 1	The number of monitor data/CH Note that the value to be set varies with the monitor data output mode of the SMD command. ● Continuous monitor data output mode Master: Set 0. Slave: Set the number of data/CH obtained from the master. ● Intermittent monitor data output mode Set the number of data/CH. *Special usage When setting "0xFFFFFFFF" or "0xFFFFFFFE" in the parameter, the EDX-200A operates as follows. 0xFFFFFFFF: Clear the " Discontinuous monitor data" status. 0xFFFFFFFE: Request the response without monitor data.	DWORD	4
Total number of transferred bytes				7

- Response data: Monitor data (The number of bytes varies with the settings of the SMD command, the number of channels to be measured, and command executing timing.)

MEMO

With regard to obtains monitor data, See also "7-3-2 Set/load the monitor data output condition (SMD)."

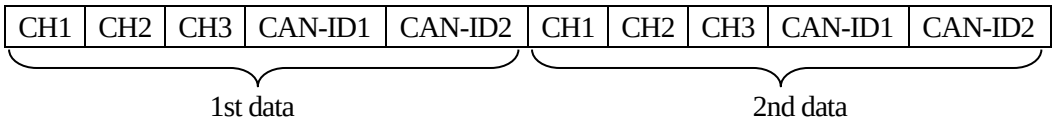
MEMO

- The maximum value of the parameter 1 is as follows.
  With 16 bits:
  512 * 1024/ (2 * [the number of analog channels to be measured] + 8 * [the number of CAN-IDs to be measured])
  With 24 bits:
  512 * 1024/ (4 * [the number of analog channels to be measured] + 8 * [the number of CAN-IDs to be measured])
  * The CAN-ID in this section indicates the CAN data of the CAN-40A/41A.

- If the number of the specified data is not yet stored in the internal FIFO memory, only the header section (the number of response data bytes = 0) is returned.

- Monitor data assignment
  With the A/D data format of 16 bits, for analog CH, monitor data is 1CH = 2 bytes.
  With the A/D data format of 24 bits, for analog CH, monitor data is 1CH = 4 bytes.
  Regardless of the A/D data format, the CAN data of the CAN-40A/41A is 1ID = 8 bytes.
  The monitor data of one sampling is assigned in due order from analog CH1, CH2, and CH3.

  [Example]
  When measuring 3 analog data (CH1, CH2, CH3) and 2 CAN data of the CAN-40A/41A(CAN-ID1 and CAN-ID2) for 2 sampling events.
  Total size of the monitor data
  With 16 bits: (analog 3 channels × 2 bytes + CAN 2IDs × 8 bytes) × 2 times = 44 bytes
  With 24 bits: (analog 3 channels × 4 bytes + CAN 2IDs × 8 bytes) × 2 times = 56 bytes



- When monitor data output mode of the SMD command is 0 to 1 in synchronous operation
  For obtaining the monitor data in synchronous operation, firstly obtain the monitor data of the master EDX. Then, obtain the monitor data of the slave EDX. For the master EDX, the general method is used for sending the GMD command. However, for the slave EDX, the GMD command is sent by the following method.
  (1) Receives the response data (monitor data) after sending the GMD command to the master EDX.
  (2) When receiving the response data, temporarily store the monitor data point value of header section.
  (3) Substitutes the monitor data point value stored in the header section (item 2) when the GMD command is sent to the slave EDX. If unusual value is specified for the monitor data point, the slave EDX returns only the header section (no monitor data).
  (4) Receives the response data (monitor data) of the GMD command.
  The above monitor data is synchronizing with the monitor data of the master EDX.

- When monitor data output mode of the SMD command is -1.
  If the GMD command is executed in the above status, only the header section (no monitor data) is returned.

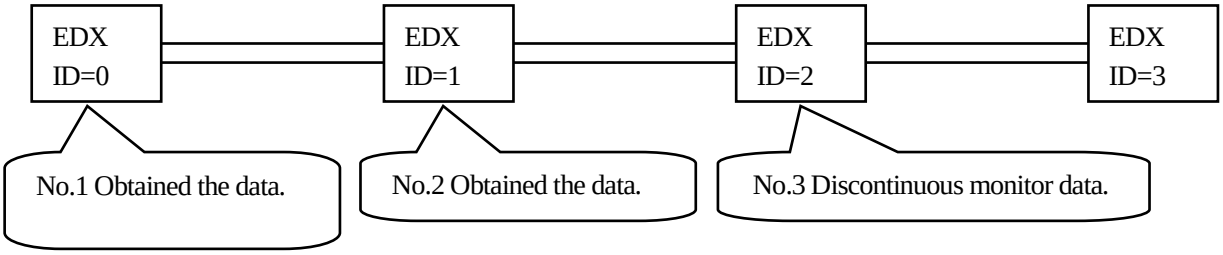
- When the A/D conversion is not available status.
  If the GMD command is executed in the above status, only the header section (no monitor data) is returned.

- When the EDX status is " Discontinuous monitor data" status.
  When the EDX status is ‘Discontinuous monitor data’ status at executing the GMD command, the response data of the GMD command is header section only (no monitor data).
  Later, the " Discontinuous monitor data" status will be cleared for outputting the monitor data again.

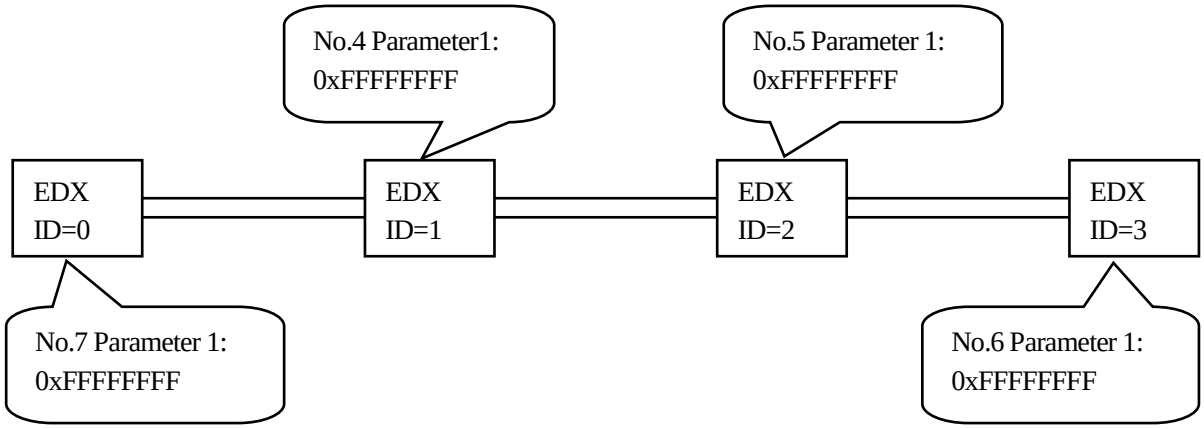
  In synchronous operation, when an EDX status is ‘Discontinuous monitor data’ status, the synchronous monitor data of every unit will not be obtained. At that time, set the parameter1 "0xFFFFFFFF" and send the GMD command to all slave units. Then, set the parameter1 "0xFFFFFFFF" and send the GMD command to the master unit.
  After then, obtain the monitor data from the master unit to slave units again. You will obtain the synchronous monitor data of every unit.

[Example]
Synchronous operation: 4 units
Slave EDX (ID=2) status is " Discontinuous monitor data" status.

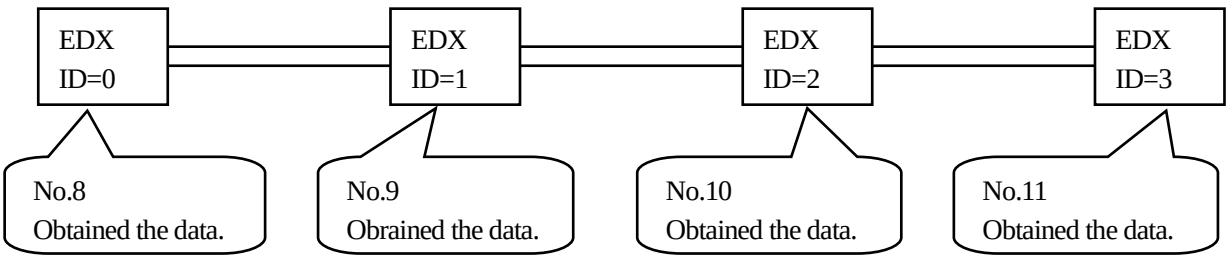
1. When obtaining the monitor data from the master unit to slave units(No.1, 2), the slave EDX (ID=2) status is " Discontinuous monitor data" status (No.3).



2. Set the parameter1 "0xFFFFFFFF" and send the GMD command to all slave units (No.4,5,6). Then, set the parameter1 "0xFFFFFFFF" and send the GMD command to the master unit (No.7).



3. Obtain the monitor data from the master unit to slave units again (No.8,9,10,11).
   You will obtain the synchronous monitor data of every unit.



MEMO

- Monitor data of the EDX is sent to the PC through the internal FIFO memory.
  To obtain the continuous data by the PC, continuously obtain the A/D data by using the GMD command before the internal FIFO memory becomes full. If the internal FIFO memory becomes full, the EDX status of the 'Discontinuous monitor data' is set to have the A/D data in discontinuous state.

- With the 'Discontinuous monitor data' status set in the EDX, no new monitor data is stored in the internal FIFO memory. If the 'Discontinuous monitor data' status is cleared, data in the internal FIFO memory is also cleared to newly store the monitor data.

- The maximum storage time of the internal FIFO memory is roughly calculated by the following calculation formula.

With 16 bits

FIFO storage available time [sec] = 4194304/((2*[the number of analog channels to be measured] + 8* [the number of CAN-IDs to be measured]) × sampling frequency [Hz])

With 24 bits

FIFO storage available time [sec] = 4194304/((4*[the number of analog channels to be measured] + 8* [the number of CAN-IDs to be measured]) × sampling frequency [Hz])

* The CAN-ID in this section indicates the CAN data of the CAN-40A/41A.

[Example]
Suppose the number of channels to be measured is 32, sampling frequency is 10 kHz, with 24 bits
4194304 / (4 * 32 * 10000) = Approx. 3.28 [sec]

[Example]
Suppose the number of analog channels to be measured is 24, the number of CAN-IDs is 32, sampling frequency is 1 kHz, with 16 bits
4194304 / ((2 * 24 + 8 * 32) * 1000) = Approx. 13.80 [sec]

[Example]
Suppose the number of analog channels to be measured is 24, the number of CAN-IDs is 32, sampling frequency is 1 kHz, with 24 bits
4194304 / ((4 * 24 + 8 * 32) * 1000) = Approx. 11.92 [sec]

7-3-13 Obtain the monitor data during the dual-sampling mode (GDD)

Obtains monitor data.
Set the monitor data output mode by using the SMD command in advance.

- Command: GDD
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When executing ♦♦♦

- The number of transferred bytes: 15 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	GDD	char	3
2	Parameter 1	The number of monitor data/CH (high-speed) Note that the value to be set varies with the monitor data output mode of the SMD command. ● Continuous monitor data output mode Master: Set 0. Slave: Set the number of data/CH obtained from the master. ● Intermittent monitor data output mode Set the number of data/CH. *Special usage When setting "0xFFFFFFFF" or "0xFFFFFFFE" in the parameter, the EDX-200A operates as follows. 0xFFFFFFFF: Clear the " Discontinuous monitor data" status. 0xFFFFFFFE: Request the response without monitor data. For details, see "7-3-12 Obtain the monitor data (GMD)."	DWORD	4
3	Parameter 2	Reserved	char	8
Total number of transferred bytes				15

- Response data: Monitor data information, monitor data
  (The number of bytes varies with the settings of the SMD command, the number of channels to be measured, and command executing timing.)

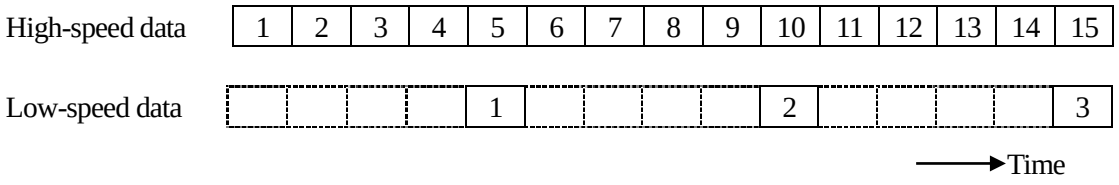
No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	The number of high-speed analog channels	WORD	2
2	Response data 2	The number of high-speed CAN-IDs of the CAN-40A/41A (1ID: 8 bytes fixed)	WORD	2
3	Response data 3	Reserved	char	4
4	Response data 4	The number of high-speed monitor data/CH When there is no high-speed monitor data, the EDX obtains the number of data by assuming that the high-speed monitor data is set.	DWORD	4
5	Response data 5	The number of low-speed analog channels	WORD	2
6	Response data 6	The number of low-speed CAN-IDs of the CAN-40A/41A (1ID: 8 bytes fixed)	WORD	2
7	Response data 7	Reserved	char	4
8	Response data 8	The number of low-speed monitor data/CH	DWORD	4
9	Response data 9	Data type of the monitor data 1: short, 2: long	BYTE	1
10	Response data 10	Reserved	char	7
11	Response data 11	The number of low-speed recordable data	INT64	8
12	Response data 12	The number of low-speed recorded data	INT64	8
13	Response data 13	The number of low-speed repeat times	WORD	2
14	Response data 14	Reserved	char	14
15	Response data 15	Array of the monitor data (high-speed channel data)		A
16	Response data 16	Array of the monitor data (low-speed channel data)		B
Total number of transferred bytes				64+A+B

- The number of monitor data/CH
  Set the number of high-speed monitor data.
  When there is no high-speed monitor data, by assuming that the high-speed monitor data will be obtained, be sure to specify the number of high-speed monitor data.
  The low-speed monitor data that matches the specified number of high-speed monitor data automatically is obtained.

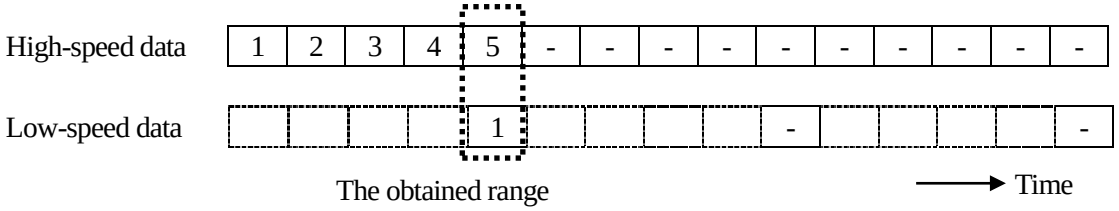
  [Example]

Dual-sampling Mode:	ON
Sampling frequency (high-speed):	5 Hz
Sampling frequency (low-speed):	1 Hz
Channel condition:	CH1 (low-speed)
Monitor data output mode:	Intermittent monitor data output mode

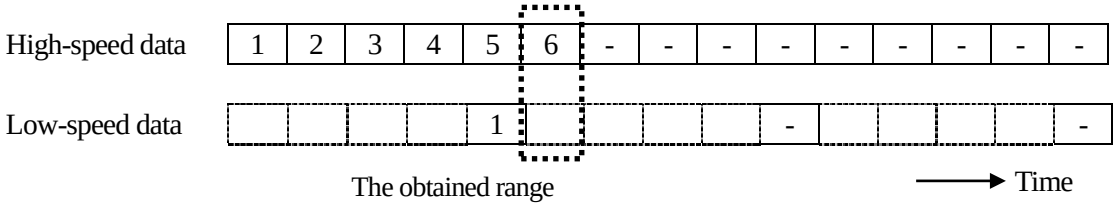
  ◆ After starting the A/D conversion, low-speed data is obtained at every multiple of 5 of the high-speed data (Division Value).
  (The box indicates internal FIFO memory. A number indicates the number of data since the beginning of the A/D conversion.)



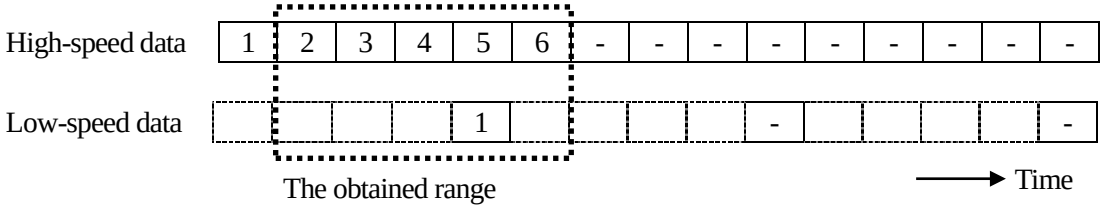
- Execute the GDD command at the 5th data when the number of monitor data = 1.
  Obtain 1 high-speed data and 1 low-speed data.



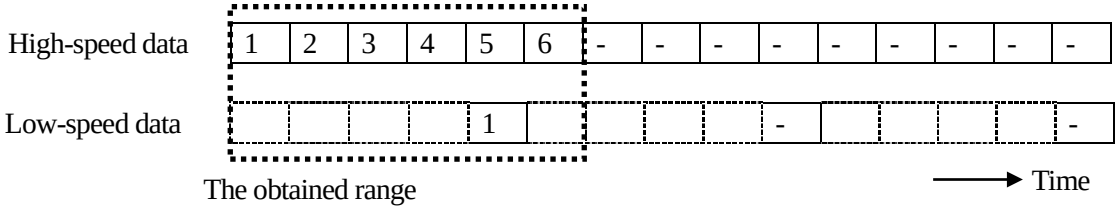
- Execute the GDD command at the 6th data when the number of monitor data = 1.
  Obtain 1 high-speed data.
  No low-speed data is obtained since the low-speed data is not within the obtained range.



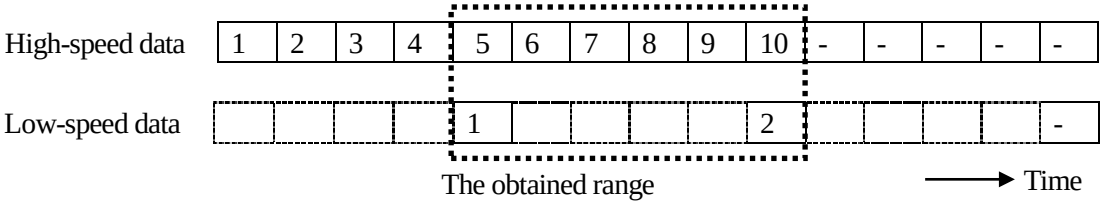
- Execute the GDD command at the 6th data when the number of monitor data = 5.
  Obtain 5 high-speed data and 1 low-speed data.



- Execute the GDD command at the 6th data when the number of monitor data = 6.
  Obtain 6 high-speed data and 1 low-speed data.



- Execute the GDD command at the 10th data when the number of monitor data = 6.
  Obtain 6 high-speed data and 2 low-speed data.



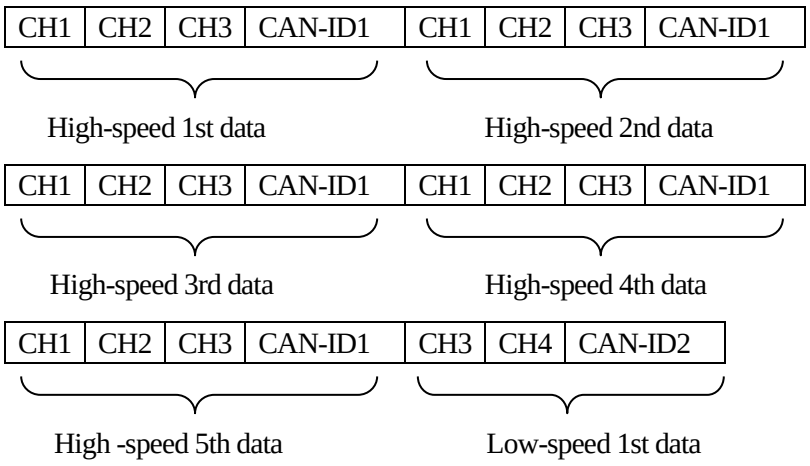
NOTE

When using the digital filtering, due to the settling time, the head of the internal FIFO memory do not always start from the 1st data as described above. For details, see "8-3 FIXED DIGITAL FILTER.", "8-4 ARBITRARY DIGITAL FILTER."

- Monitor data assignment
  [Example]

Sampling frequency (high-speed):	5 Hz
Sampling frequency (low-speed):	1 Hz
Channel condition:	CH1 (high-speed), CH2 (high-speed), CH3 (high-speed + low-speed), CH4 (low-speed)
CAN condition (CAN-40A/41A):	CAN-ID1 (high-speed), CAN-ID2 (low-speed)
Monitor data output mode:	Continuous monitor data output mode

The monitor data assignment when the number of monitor data = 5.



MEMO

- For others, see the GMD command.
- For obtaining the monitor data, see "7-3-2 Set/load the monitor data output condition (SMD)."
  See also "7-3-12 Obtain the monitor data (GMD)."

7-3-14 Obtain the monitor data when using the optional card (GDC)

Obtains monitor data.
Please use the GDC command to get the ECAN data and digital-input-channel data, GPS status and GPS data by an optional card.
To get monitor data be have to set using SMD command in advance.

- Command: GDC

- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 15 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Command Name	GDC	char	3
2	Parameter 1	The number of monitor data/CH (high-speed) Note that the value to be set varies with the monitor data output mode of the SMD command. ● Continuous monitor data output mode Master: Set 0. Slave: Set the number of data/CH obtained from the master. ● Intermittent monitor data output mode Set the number of data/CH. *Special usage When setting "0xFFFFFFFF" or "0xFFFFFFFE" in the parameter, the EDX-200A operates as follows. 0xFFFFFFFF: Clear the " Discontinuous monitor data" status. 0xFFFFFFFE: Request the response without monitor data. For details, see "7-3-12 Obtain the monitor data (GMD)."	DWORD	4
3	Parameter 2	Reserved	char	8
Total number of transferred bytes				15

MEMO

- The maximum value of the parameter 1 is as follows.
  With 16 bits:
  512 * 1024/ (2 * [the number of analog channels to be measured + the number of digital-input channels to be measured] + 8 * [the number of CAN-IDs to be measured])
  With 24 bits:
  512 * 1024/ (4 * [the number of analog channels to be measured + the number of digital-input channels to be measured] + 8 * [the number of CAN-IDs to be measured])
  * The CAN-ID in this section indicates the CAN data of the CAN-40A/41A.

- If the number of the specified data is not yet stored in the internal FIFO memory, the response data 1 to 28 (the number of response data bytes = 128) is returned.

- If the Digital input is set in the digital input/output function, the number of the digital-input channel is 1.

- Response data: Monitor data information, monitor data (The number of bytes varies with the settings of the SMD command, the number of channels to be measured, and command executing timing.)

No.	Name	Contents	Types of Variables	The number of Bytes
1	Response data 1	The number of normal/high-speed analog channels	WORD	2
2	Response data 2	The number of normal/high-speed CAN-IDs (CAN-40A/41A, 1ID: 8 bytes fixed)	WORD	2
3	Response data 3	The number of normal/high-speed digital-input channels	WORD	2
4	Response data 4	Reserved	char	2
5	Response data 5	The number of normal/high-speed monitor data/CH ● When there is no high-speed monitor data, the EDX obtains the number of data by assuming that the high-speed monitor data is set.	DWORD	4
6	Response data 6	The number of low-speed analog channels	WORD	2
7	Response data 7	The number of low-speed CAN-IDs (CAN-40A/41A) (1ID: 8 bytes fixed)	WORD	2
8	Response data 8	The number of low-speed digital-input channels * Low-speed sampling is recording GPS data only: 1	WORD	2
9	Response data 9	Reserved	char	2
10	Response data 10	The number of low-speed monitor data/CH	DWORD	4
11	Response data 11	Types of monitor data (1: short, 2: long)	BYTE	1
12	Response data 12	CAN bus status of an optional card (port 1) -1: No channel, 0: OK, 1: NG (Bus error)	char	1
13	Response data 13	CAN bus status of an optional card (port 2) -1: No channel, 0: OK, 1: NG (Bus error)	char	1
14	Response data 14	Reserved	char	5
15	Response data 15	The number of low-speed recordable data	INT64	8
16	Response data 16	The number of low-speed recorded data	INT64	8
17	Response data 17	The number of low-speed repeat times	WORD	2
18	Response data 18	The number of ECAN-IDs to be measured	WORD	2
19	Response data 19	The number of ECAN monitor data (1ID: 24 bytes fixed)	DWORD	4
20	Response data 20	The number of recorded ECAN data	INT64	8
21	Response data 21	The number of normal/high-speed recorded counter value The recorded counter value of the monitor data, at the head, of the response data.	UINT64	8
22	Response data 22	ECAN CH over information (in binary digit)	BYTE	1
23	Response data 23	Reserved	char	3

[From the previous page]

No.	Name	Contents	Types of Variables	The number of Bytes
24	Response data 24	The number of ECAN overflow messages (*1)	DWORD	4
25	Response data 25	GPS status of the ETIM-40A (0: OFF, 1: ON)	BYTE	1
26	Response data 26	GPS data (0: OFF, 1: ON)	BYTE	1
27	Response data 27	Reserved	char	2
28	Response data 28	The number of GPS status bytes (128 bytes fixed)	DWORD	4
29	Response data 29	The number of GPS data bytes	DWORD	4
30	Response data 30	The number of recorded GPS data bytes	UNIT64	8
31	Response data 31	Reserved	char	28
	Total number of header section			128
32	Response data 32	Monitor data array (Normal and high-speed channel data)	---	A
33	Response data 33	Monitor data array (low-speed channel data)	---	B
34	Response data 34	Monitor data array (ECAN data)	---	C
35	Response data 35	GPS status (The parameter 25 should be 1: ON.)	---	D (0 or 128)
36	Response data 36	GPS data (The parameter 26 should be 1: ON.)	---	E
Total number of transferred bytes				128 +A+B+C +D+E

(*1) When the number of ECAN overflow messages is 1 or more, the ECAN overflow occurs.
For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

◆ Details of ECAN data

Classification	No.	Contents	Types of Variables	The number of Bytes
Single data (1st data) 24 bytes	1-1	Measured ID No.(0 to 511) (*2)	WORD	2
	1-2	Reserved	char	2
	1-3	Recorded counter value (*3) The counter value while recording data	UINT64	8
	1-4	Measured data (ECAN data)	BYTE	8
	1-5	Reserved	char	4
Single data ("N"th data (*1)) 24 bytes	N-1	Measured ID No.	WORD	2
	N-2	Reserved	char	2
	N-3	Recorded counter value	UINT64	8
	N-4	Measured data	BYTE	8
	N-5	Reserved	char	4

(*1): When the response data 19 (The number of ECAN monitor data) is N.

(*2): Measured ID Number: The consecutive numbers from 0 are given to "ID conditions" of the "ECAN conditions" setting as measurement "ON."
For details of ID conditions, see "10-2-18 ID conditions (No. 0 to No. 511)."
[Example]
Suppose as follows.
The number of ECAN-IDs to be measured: 2
ID conditions (No. 100): Measurement ON
ID conditions (No. 200): Measurement ON
The measured ID No., attached to the obtained ECAN data, and ID conditions, pre-set in the ECAN conditions, are as follows.

- When the ECAN data has the "Measured ID No. 0":
  The ECAN data was obtained based on the ID conditions of ECAN conditions (No. 100).
- When the ECAN data has the "Measured ID No. 1":
  The ECAN data was obtained based on the ID conditions of ECAN conditions (No. 200).

(*3): The recorded counter value synchronizes with the sampling clock.
The response data 21 also synchronizes with the sampling clock.

◆ Details of GPS status

Name	No.	Contents		Types of Variables	The number of Bytes
Response data 32	1	Latitude (+: North latitude, -: South latitude) (-90.0000 to 90.0000)		double	8
	2	Longitude (+: East longitude, -: West longitude) (-180.0000 to 180.0000)		double	8
	3	The number of satellites (0 to 12)		BYTE	1
	4	Positioning state (0: ERROR, 1: OK)		BYTE	1
	5	Reserved		char	6
	6	Current date and time (UTC)	Year (2011 to 2099)	WORD	2
			Month (1 to 12)	BYTE	1
			Day (1 to 31)	BYTE	1
			Hour (0 to 23)	BYTE	1
			Minute (0 to 59)	BYTE	1
			Second (0 to 59)	BYTE	1
			Reserved	BYTE	1
	7	Speed (0 to 1851.8148 km/h)		Float	4
	8	Angle (TN: 0 degree) (0 to 359.9)		Float	4
	9	Magnetic declination (+: East, -: West) (-180 to 180)		Float	4
	10	Altitude above sea level (-9999.9 to 99999.9)		Float	4
	11	Geoidal height (-999.9 to 9999.9)		Float	4
	12	Horizontal dilution of precision (0.5 to 99.9)		Float	4
	13	Position dilution of precision (0.5 to 99.9)		Float	4
	14	Vertical dilution of precision (0.5 to 99.9)		Float	4
	15	Reserved		char	64
Total					128

- ECAN data

  Although the EDX obtains other channel data every sampling event, the EDX obtains the ECAN data only when the CAN data frame is received during one sampling event.

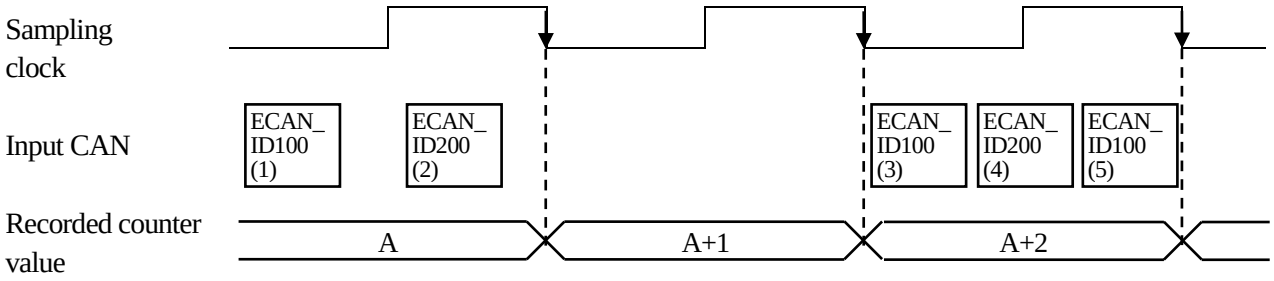
  When the EDX receives some CAN data frames, having the same ID conditions, during one sampling event, the EDX obtains the latter CAN data frame as the ECAN data.

  When the EDX receives some CAN data frames, having different ID conditions, during one sampling event, the "Recorded counter values" attached to every ECAN data are the same value. Note that multiple data, having the same recorded counter value, may exist.

[Example]

ECAN data timing and data assignment

ECAN conditions: ECAN_ID100 (Measured ID No.100),
ECAN_ID200 (Measured ID No.200)



When inputting CAN to the ECAN-40A or EGPC-40A as described above, suppose the first sampling clock's recorded counter falling edge, is "A". The data assignment is as follows.

ID0(1)			ID1(2)		
Measured ID No. = 0	Recorded counter value = A	ECAN_ ID100 (1) data	Measured ID No. = 1	Recorded counter value = A	ECAN_ ID200 (2) data

ID0(5)			ID1(4)		
Measured ID No. = 0	Recorded counter value = A + 2	ECAN_ ID100 (5) data	Measured ID No. = 1	Recorded counter value = A + 2	ECAN_ ID200(4) data

MEMO

Monitor data by the GDC command is based on normal/high speed channels.
The GDC command returns the low-speed data (or ECAN data) which obtained from the EDX while logging the monitor data of normal/high-speed channels.

- Normal/high-speed data and ECAN data

  This section describes the data assignment, normal-speed data/high-speed data, and ECAN data, based on the following conditions.

  [Example]

Sampling frequency	1000 Hz (sampling period: 0.001[sec])
Channel conditions	CH1, CH2
CAN conditions (CAN-40A/41A)	CAN-ID1
DIO conditions	D1
ECAN conditions	ECAN_ID0 (ID conditions No. 0) ECAN_ID1 (ID conditions No. 1)

Response data: 5	The number of normal/high-speed monitor data/CH: 5
Response data: 21	The number of normal/high-speed recorded counter value: 6
1st data of the ECAN data	Measured ID No.: 0, Recorded counter value: 6
2nd data of the ECAN data	Measured ID No.: 0, Recorded counter value: 7
3rd data of the ECAN data	Measured ID No.: 1, Recorded counter value: 7
4th data of the ECAN data	Measured ID No.: 0, Recorded counter value: 9
5th data of the ECAN data	Measured ID No.: 1, Recorded counter value: 10

The data assignment is as follows.

CH1(1)	CH2(1)	CAN-ID1(1)	D1(1)	CH1(2)	CH2(2)	CAN-ID1(2)	D1(2)
1st data				2nd data			

CH1(3)	CH2(3)	CAN-ID1(3)	D1(3)	CH1(4)	CH2(4)	CAN-ID1(4)	D1(4)
3rd data				4th data			

CH1(5)	CH2(5)	CAN-ID1(5)	D1(5)	ECAN_ID0(1)		
				Measured ID No. = 0	Recorded counter value =6	ECAN_ID0 data
5th data				1st data of the ECAN data		

ECAN_ID0(2)			ECAN_ID1(3)		
Measured ID No. = 0	Recorded counter value =7	ECAN_ID0 data	Measured ID No. = 1	Recorded counter value =7	ECAN_ID1 data
2nd data of the ECAN data			3rd data of the ECAN data		

ECAN_ID0(4)			ECAN_ID1(5)		
Measured ID No. = 0	Recorded counter value =9	ECAN_ID0 data	Measured ID No. = 1	Recorded counter value =10	ECAN_ID1 data
4th data of the ECAN data			5th data of the ECAN data		

The data reproducing positions are as follows.

Recorded counter value	Time [sec]	Normal/high-speed channels	ECAN data
6	0.000	CH1(1), CH2(1), CAN-ID1(1), D1(1)	ECAN_ID0(1)
7	0.001	CH1(2), CH2(2), CAN-ID1(2), D1(2)	ECAN_ID0(2), ECAN_ID1(3)
8	0.002	CH1(3), CH2(3), CAN-ID1(3), D1(3)	
9	0.003	CH1(4), CH2(4), CAN-ID1(4), D1(4)	ECAN_ID0(4)
10	0.004	CH1(5), CH2(5), CAN-ID1(5), D1(5)	ECAN_ID1(5)

- GPS status
  If use the ETIM-40A, GPS status can be get.
  Output On/OFF can be set by "7-3-2 Set/load the monitor data output condition (SMD)."

- GPS data
  If use the ETIM-40A or EGPC-40A, GPS data in the EDX, at the time when the GDC command is executed, can be get.
  Output ON/OFF can be set by "7-3-2 Set/load the monitor data output condition (SMD)."

MEMO

- For others, see the GMD command and GDD command.

- For obtaining the monitor data, see also "7-3-2 Set/load the monitor data output condition (SMD)", "7-3-12 Obtain the monitor data (GMD)", and "7-3-13 Obtain the monitor data during the dual-sampling mode (GDD)."

7-3-15 Output the CAN manually (CMO)

Outputs the CAN manually by the ECAN-40A or EGPC-40A.
The slave EDX unit outputs the CAN manually when sending the command to the synchronous master.

- Command: CMO
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The number of Bytes
1	Command Name	CMO	char	3
Total number of transferred bytes				3

- Response data: Standard type (1 byte)

MEMO

The EDX outputs CAN data based on the "CAN manual output, conditions" in the ECAN conditions. Note that the EDX outputs nothing when all conditions are OFF.
For details, see "10 ECAN CONDITIONS FORMAT."

7-3-16 Execute/load the CAN output test. (CSC)

Executes the CAN output test by the ECAN-40A or EGPC-40A.
The CSC command is available when the A/D conversion in stop status. The EDX executes the CAN output test based on the pre-set ECAN conditions.
You can check the confirmation and communication error by executing the "CAN output test" actually.
The slave EDX unit executes the CAN output test when sending the command to the synchronous master.

- Command: CSC
- Target EDX: Stand-alone and synchronous master

◆◆◆When outputting◆◆◆

- The number of transferred bytes: 8 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Command Name	CSC	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Output) Set 0x01.	BYTE	1
3	Parameter 2	Output mode (in binary digit, multiple bits available) 0x01: Output (when starting) 0x02: Output (when stopping) 0x04: Interval output 0x08: Manual output	BYTE	1
4	Parameter 3	Reserved	char	3
Total number of transferred bytes				8

- Response data: Standard type (1 byte)

MEMO

- When executing the multiple "CAN output test", the EDX executes the "Output (when starting)" → "Interval output" → "Manual output" → "Output (when stopping)".

- While executing the "CAN output test", "Executing the command (Busy)" flag (0x00010000) would be set at the EDX status. Make sure the "CAN output test" completes correctly by checking this flag.
  For details, see "5-3 EDX STATUS."

*Note that the processing takes long time depending on the conditions and the confirmation ON/OFF.

[Example]
Suppose all conditions are set as follows.

Output ON/OFF:	1 (ON)
Confirmation ON/OFF:	1 (ON)
Timeout period:	1000 [msec]

*All conditions are as follows.

Output (when starting):	32 conditions
Output (when stopping):	32 conditions
Interval output:	32 conditions
Manual output:	32 conditions

When executing the "CAN output test" by using the CSC command with no response at all, it takes approximately 128 [sec] for completing.

4[output mode] × 32[conditions] × 1000[msec] = 128[sec]

◆◆◆ When loading ◆◆◆

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Command Name	CSC	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Execute) Set 0x00.	BYTE	1
Total number of transferred bytes				4

● Response data: 4096 byte

No.	Name	Contents (*1)			Types of Variables	The number of Bytes
1	Response data 1	1st unit	Results of the output (when starting)	Condition No. 1, result data	char	1
				Condition No. 2, result data	char	1
				⋮		
				Condition No. 32, result data	char	1
				Reserved	char	96
			Results of the output (when stopping)	Condition No. 1, result data	char	1
				Condition No. 2, result data	char	1
				⋮		
				Condition No. 32, result data	char	1
				Reserved	char	96
			Results of the interval output	Condition No. 1, result data	char	1
				Condition No. 2, result data	char	1
				⋮		
				Condition No. 32, result data	char	1
				Reserved	char	96
			Results of the manual output	Condition No. 1, result data	char	1
				Condition No. 2, result data	char	1
				⋮		
				Condition No. 32, result data	char	1
				Reserved	char	96
		2nd unit				512
		⋮				
		8th unit				512
Total number of response data bytes (32 conditions + reserved 96 bytes)×4 types×8 units						4096

(*1) Details of the result data

-1	:N/A	CAN output test: OFF, before executing the CAN output test
0	:OK	No communication error, got response.
1	:NG	Timeout (no response)
2	:OFF	Confirmation OFF
3	:Communication error	Communication error occurs.

7-3-17 Control the digital output (DOO)

Controls the digital output function by an optional card.

The EDX-200A software version should be version 01.40 or higher.

- Command: DOO
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes 8 bytes
- Parameter See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Command	DOO	char	3
2	Parameter 1	Output bit (0x00 to 0xFF) **(*1)** Set the target bit to be controlled. 0: Non-Target, 1: Target	BYTE	1
3	Parameter 2	Output level (0x00 to 0xFF) **(*1)** Set the output level. 0: High level, 1:Low level	BYTE	1
4	Parameter 3	Reserved	char	14
Total number of transferred bytes				19

(*1): The MSB is 8th bit and LSB is 1st bit.

[Example]

When the 1st bit is High level, 3rd bit is High level, and 8th bit is Low level, set the parameters as follows.

Output bit: 0x85

Output level: 0x05

- Response data: Standard type (1 byte)

NOTE

- Before using the DOO command, be sure to set the Digital input/output condition (Measuring conditions No. 28) as follows.
  Bit input/output setting: 4 (Digital output)
  Digital output function: 9 (Control the digital output)
  In addition, to use the digital output, set the "Digital input/output settings (Measuring conditions No.3)": 0x04.
  For details, see "8-1 MEASURING CONDITION FORMAT" and "8-5 DIGITAL INPUT/OUTPUT FUNCTION."

7-3-18 Set/load the keylock status (LOC)

Locks the button operation on the front panel and the remote controller or loads the keylock status.

- Command: LOC
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 8 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	LOC	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	Keylock status (1: Valid, 0: Invalid) (0x01: REC/PAUSE, 0x02: STOP, 0x04:BAL, 0x08: OPT., 0x10: LOAD)	BYTE	1
4	Parameter 3	Reserved	char	3
Total number of transferred bytes				8

- Response data: Standard type (1 byte)

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	LOC	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 4 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Keylock status (1: Valid, 0: Invalid) (0x01: REC/PAUSE, 0x02: STOP, 0x04:BAL, 0x08: OPT., 0x10: LOAD)	BYTE	1
2	Response data 2	Reserved	char	3
Total number of response data bytes				4

MEMO

- The current keylock status is cleared when a connection with the PC is disconnected or when restarting the EDX again.
- For synchronous slaves, regardless of the LOC command, all keylock settings are ignored.

7-3-19 Set/load the time (TIM)

Sets and loads the date and time.

- Command: TIM
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 12 bytes
- Parameter: See the table below.

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Command Name	TIM		char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.		BYTE	1
3	Parameter 2	Date	Year (2011 to 2099)	WORD	2
			Month (1 to 12)	BYTE	1
			Day (1 to 31)	BYTE	1
			Hour (0 to 23)	BYTE	1
			Minute (0 to 59)	BYTE	1
			Second (0 to 59)	BYTE	1
4	Parameter 3	Reserved		char	1
Total number of transferred bytes					12

- Response data: Standard type (1 byte)

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	TIM	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 8 byte

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Response data 1	Date	Year (2011 to 2099)	WORD	2
			Month (1 to 12)	BYTE	1
			Day (1 to 31)	BYTE	1
			Hour (0 to 23)	BYTE	1
			Minute (0 to 59)	BYTE	1
			Second (0 to 59)	BYTE	1
2	Response data 2	Reserved		char	1
Total number of response data bytes					8

MEMO

Although the time can be set for synchronous slaves, when starting the measurement by synchronous operation, the time will be automatically set to the time of the synchronous master.

7-3-20 Load the system information (SYS)

Loads the system information of the EDX.

- Command: SYS
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	SYS	char	3
2	Parameter 1	Load mode 0: Device configuration 1: Card information + Hardware version	BYTE	1
Total number of transferred bytes				4

- Load mode = 0
- Response data: 344 byte

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Response data 1	Model name		char	20
2	Response data 2	Software version		char	20
3	Response data 3	Card type	Slot 1	BYTE	1
			Slot 2	BYTE	1
			Slot 3	BYTE	1
			Slot 4	BYTE	1
			Optional slot	BYTE	1
4	Response data 4	Reserved		char	3
5	Response data 5	Device ID		char	1
6	Response data 6	Chassis size (8/16/32)		BYTE	1
7	Response data 7	Additional function flags **(*1)**		WORD	2
8	Response data 8	The number of files in the data folder in the CF card		DWORD	4
9	Response data 9	Reserved		char	288
Total number of response data bytes					344

(*1) Details of the additional function flags

Applicable functions vary with the EDX software version.

The additional function flags indicate the applicable functions.

Software version	Additional function flags	Contents of the additional function
Lower than the version 01.20	0x0000	No additional function
Version 01.20 and higher	0x0001	Applicable to the ECAN-40A and an arbitrary digital filter.
Version 01.30 and higher	0x0003	Applicable to the ETIM-40A (also applicable to the above)
Version 01.40 and higher	0x0007	Applicable to the EGPC-40A Added the ETIM-40A functions (Recording GPS data and "Point ZERO"measurement) Applicable to the quick formatting by the FDF command (including the above contents)

- Load mode = 1
- Response data: 1360 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Slot 1 conditioner card information	char	68
.	.	.	.	.
4	Response data 4	Slot 4 conditioner card information	char	68
5	Response data 5	Optional slot information	char	68
9	Response data 6	Reserved (68 bytes × 5 = 340 bytes)	char	340
10	Response data 10	Hardware information 1	char	68
.	.	.	.	.
19	Response data 19	Hardware information 10	char	68
Total number of response data bytes				1360

NOTE

All the response data 1 to 19 in load mode = 1 is character string.
Note that display contents may be changed without prior notice.

7-3-21 Load the card information (CAD)

Loads the attribute value of the conditioner card installed in the EDX.
The property value includes various information such as card type Nos., the number of available modes and available mode value, the number of available ranges and available range value, and corresponding

- Command: CAD
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	CAD	char	3
2	Parameter 1	Reserved	char	1
Total number of transferred bytes				4

- Response data: 11600 byte

No.	Name	Contents			Types of Variables	The Number of Bytes
1	Response data 1	Slot 1	Model name		char	20
			Card type No.		BYTE	1
			The number of modes		BYTE	1
			The number of high pass filter		BYTE	1
			The number of low pass filter		BYTE	1
			The number of ranges (for 8 modes)		BYTE	8
			The number of CALs (for 8 modes)		BYTE	8
			Mode character string (12 bytes/1 item × 8 = 96)		char	96
			Range character string: 12 bytes/1 item, 14 items for every mode (12 × 14 = 168)	Mode No. 1	char	168
				Mode No. 2	char	168
				Mode No. 3	char	168
				Mode No. 4	char	168
				Mode No. 5	char	168
				Mode No. 6	char	168
				Mode No. 7	char	168
				Mode No. 8	char	168
			High pass filter character string (12 bytes/1 item × 3 = 36)		char	36
			Low pass filter character string (12 bytes/1 item × 10 = 120)		char	120
			CAL character string: 12 bytes/1 item, 8 items for every mode (12 × 8 = 96)	Mode No. 1	char	96
				Mode No. 2	char	96
				Mode No. 3	char	96
				Mode No. 4	char	96
				Mode No. 5	char	96
				Mode No. 6	char	96
				Mode No. 7	char	96
				Mode No. 8	char	96
			Range value (float: 4 bytes): 14 items for every mode (4 × 14 = 56)	Mode No. 1	float	56
				Mode No. 2	float	56
				Mode No. 3	float	56
				Mode No. 4	float	56
				Mode No. 5	float	56
				Mode No. 6	float	56
				Mode No. 7	float	56
				Mode No. 8	float	56
			Low pass filter value (float: 4 bytes × 10 = 40)		float	40
			Range unit No. (8)		BYTE	8
			Total number of slot 1 bytes			2900
		.				.
		Total number of slot 4 bytes				2900
Total number of response data bytes						11600

NOTE

The card type No. is available for the CAN-40A and CAN-41A.

7-3-22 Check the device/slot (EDX)

Flashes the CH LED of the target EDX, or turn on all LED except BUSY LED.

- Command: EDX
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	EDX	char	3
2	Parameter 1	Operation mode 0:All CH LEDs flash 1:CH LED of slot1 flashes 2:CH LED of slot2 flashes 3:CH LED of slot3 flashes 4:CH LED of slot4 flashes 10:All LEDs flashes green(3 sec, except BUSY LED) 11:All LEDs flashes red(3 sec, except BUSY LED) 12:All LEDs flashes orange(3 sec, except BUSY LED)	BYTE	1
Total number of transferred bytes				4

- Response data: Standard type (1 byte)

MEMO

- The EDX command is not available during A/D conversion.
- LEDs flash whether or not a conditioner card is installed.
- The operational mode 0-4 turns on SEL LED of DBS-120A-8 and VI-8A together, when DBS-120A-8 and VI-8A is connected to the target slot.

7-3-23 Obtain CF card remaining capacity (FFR)

Checks the remaining capacity of the CF card

- Command: FFR
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FFR	char	3
Total number of transferred bytes				3

- Response data: 16 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Remaining capacity of the CF card	INT64	8
2	Response data 2	Total capacity of the CF card	INT64	8
Total number of response data bytes				16

MEMO

Since the remaining capacity of the CF card is a value after subtracting the system reserve area (approx. 8M bytes), it shall be a value smaller than a value indicated on the PC.

7-3-24 Open file (FOF)

Open the file to be loaded or to be written.

NOTE

- Target files are files saved in the data folder in the CF card.
- The command is not able to specify the folder. When multiple same name files exist in the CF card, the command will open any of the files.

- Command: FOF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 52 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FOF	char	3
2	Parameter 1	Open mode (0: Load)	BYTE	1
3	Parameter 2	File name Be sure to set the extension.	char	48
Total number of transferred bytes				52

- Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File open results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

MEMO

- When the file open results of the response data is '0' (Normally ended), the EDX status is "Opening the file or finding the file by using the control command." At this time, commands available to be executed are FRF, FSF, and FCF.
- To close the file, execute the FFC command.
- For the EDX status, see "5-3 EDX STATUS."

7-3-25 Load file data (FRF)

Loads the file data opened by using the FOF command.

- Command: FRF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 7 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FRF	char	3
2	Parameter 1	The number of bytes to be loaded (maximum 65000 bytes)	DWORD	4
Total number of transferred bytes				7

- Response data: 6 bytes + the number of bytes to be loaded

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Loaded result (0: Normally ended. -1: Error) Only when the loaded result is '0' (Normally ended), values on and after the response data 2 are available.	short	2
2	Response data 2	The number of actually loaded bytes (the number of bytes of the response data 3)	DWORD	4
3	Response data 3	The loaded data (0 to 65,000 bytes)	---	---
Total number of response data bytes				6 to

MEMO

Data size that can be loaded at a time by using the command is maximum 65000 bytes.
To load a file exceeding 65,000 bytes, repeat the command for the number of required times.

7-3-26 Seek file (FSF)

Changes the loading start position of the file data opened by using the FOF command.

- Command: FSF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 12 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FSF	char	3
2	Parameter 1	Loading-start position 0: Head of the file 1: Current loading position 2: End of the file	BYTE	1
3	Parameter 2	Moving amount of file read position	INT64	8
Total number of transferred bytes				12

- Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File seek results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

NOTE

Although the types variables of ‘Moving amount of file read position’ in the above parameter 2 is INT64, the actual available range is limited to long (-2,147,483,648 to +2,147,483,647).

7-3-27 Close file (FCF)

Closes the file data opened by using the FOF command.

- Command: FCF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FCF	char	3
Total number of transferred bytes				3

- Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File close results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

MEMO

- When the file close results of the response data is '0' (Normally ended), the EDX status of the "Opening the file or finding the file by using the control command" is cleared.
- For the EDX status, see "5-3 EDX STATUS."

7-3-28 Delete file (FDF)

Deletes the file.

NOTE

- Target files are files saved in the data folder in the CF card.
- The quick formatting will delete all files and folders, saved in the CF card.
- To execute the quick formatting, make sure the EDX-200A software version should be version 01.40 or higher.
- The command is not able to specify the folder. When multiple same name files exist in the CF card, the command will delete any of the files.

- Command: FDF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 51 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FDF	char	3
2	Parameter 1	File name to be deleted (including the extension) Specify the "*.*" for quick formatting.	char	48
Total number of transferred bytes				51

● Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File delete results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

- Remarks:

Before completing the file deletion or before completing the quick formatting, the command sends the response data.
While deleting the file or while quick formatting, the EDX status is 'Accessing to the CF card'.
To check whether the file deletion is completed or not or to check whether the quick formatting is completed or not, check the 'Accessing to the CF card ' status is cleared.
When the EDX status is 'Accessing to the CF card ', sending commands is not available except the "Load the EDX status."

MEMO

- Capable of deleting files other than the KS2 files.
- To delete files, do not use wildcards including question mark (?) and asterisk (*) in the file names, specified in the parameter.
  (Exception: For quick formatting, specify the “*.*“ in the file names, specified in the parameter.)
  To delete multiple files, specify every file name and execute the command one by one.
- The quick formatting will delete the management domain only.

7-3-29 Start finding file (FFF)

Starts finding the file.

NOTE

- Target files are saved in the data folder in the CF card.

- Command: FFF
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 51 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FFF	char	3
2	Parameter 1	File name to be found (including the extension)	char	48
Total number of transferred bytes				51

- Response data: 68 byte

No.	Name	Contents			Types of Variables	The Number of Bytes
1	Response data 1	File find results (0: Normally ended, -1: Error or no file) Only when the file find result is '0' (Normally ended), values on and after the response data 3 are available.			short	2
2	Response data 2	Reserved			char	2
3	Response data 3	File information	File name (including the extension)		char	48
			File size		INT64	8
			File creation date	Year (2011 to)	WORD	2
				Month (1 to 12)	BYTE	1
				Day (1 to 31)	BYTE	1
				Hour (0 to 23)	BYTE	1
				Minute (0 to 59)	BYTE	1
				Second (0 to 59)	BYTE	1
			Type (0: File, 1: Folder)		BYTE	1
Total number of response data bytes						68

MEMO

- When the file find results of the response data is '0' (Normally ended), the EDX status is "Opening the file or finding the file by using the control command." At this time, commands available to be executed are FFN and FFC.
- To end the file finding, execute the FFC command.
- For the EDX status, see "5-3 EDX STATUS."

MEMO

- Question mark (?) or asterisk (*) can be specified to the "file name to be found" in the parameter 1.
  Question mark '?' is an arbitrary 1-byte character and '*,' an arbitrary character string.
  (No need to specify ' '.)

[Example 1]
To find all files
Set '*' to the parameter 1.

[Example 2]
To find all files with character string 'TEST' at the head of the file
Set 'TEST*.KS2' to the parameter 1.

[Example 3]
To find all files which executed the analog trigger of synchronous operation master (ID = 0).
Set '*_A*_0.KS2' to the parameter 1.

[Example 4]
To start finding files with the file name of "TEST" and file No. 20 to file No. 29.
Set 'TEST002?.KS2' to the parameter 1.

7-3-30 Continue finding file (FFN)

Continues finding the file next to the file started by the FFF command.

- Command: FFN
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FFN	char	3
Total number of transferred bytes				3

- Response data: 68 byte

No.	Name	Contents			Types of Variables	The Number of Bytes
1	Response data 1	File find results (0: Normally ended, -1: Error or no file) Only when the file find result is '0' (Normally ended), values on and after the response data 3 are available.			short	2
2	Response data 2	Reserved			char	2
3	Response data 3	File information	File name (including the extension)		char	48
			File size		INT64	8
			File creation date	Year (2011 to)	WORD	2
				Month (1 to 12)	BYTE	1
				Day (1 to 31)	BYTE	1
				Hour (0 to 23)	BYTE	1
				Minute (0 to 59)	BYTE	1
				Second (0 to 59)	BYTE	1
			Type (0: File, 1: Folder)		BYTE	1
Total number of response data bytes						68

MEMO

- When the file find results of the response data is '-1' (Error or no file), the EDX status of the "Opening the file or finding the file by using the control command" is cleared.
- For the EDX status, see "5-3 EDX STATUS."

7-3-31 End finding file (FFC)

Ends the finding of files started by the FFF command.

- Command: FFC
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 3 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FFC	char	3
Total number of transferred bytes				3

- Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File finding end results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

MEMO

- When the file finding end results of the response data is ‘0’ (Normally ended), the EDX status of the “Opening the file or finding the file by using the control command" is cleared.
- For the EDX status, see "5-3 EDX STATUS."

7-3-32 Delete last recorded data files (FDK)

Deletes the last recorded data files.

- Command: FDK
- Target EDX: Stand-alone and synchronous master
- The number of transferred bytes: 3 bytes
- Parameter: None

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	FDK	char	3
Total number of transferred bytes				3

- Response data: 2 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	File delete results (0: Normally ended, -1: Error)	short	2
Total number of response data bytes				2

NOTE

- After the recording is finished, send a command with A/D conversion in stop status.
- The command is not available during "waiting for interval measurements", "waiting for trigger measurements" or during recording data.
- Delete the last recorded KS2 file. File numbers are decremented.
- Manual measurements (the number of repeat times = 1) or trigger measurements (the number of repeat times = 1) only.
- With the dual-sampling mode, 2 data files, including one high-speed data file and one low-speed data file, are deleted.
- While measuring CAN by using the optional card, the E4A format files are also deleted.
- While measuring GPS data by using the optional card, the NMEA format file are also deleted.

7-3-33 Set/load the TCP/IP information (NET)

Sets or loads the IP address, subnet mask, and default gateway of the EDX.

- Command: NET
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 56 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	NET	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	IP address (Example: 192.168.200.200)	char	16
4	Parameter 3	Subnet Mask (Example: 255.255.255.0)	char	16
5	Parameter 4	Default gateway address (Example: 0.0.0.0)	char	16
6	Parameter 5	Reserved	char	4
Total number of transferred bytes				56

- Response data: Standard type (1 byte)

MEMO

When setting the TCP/IP information with the command, setting contents are only saved in the non-volatile memory in the EDX. The changed contents are not immediately reflected in the EDX.
The changed contents are reflected when the power is started up the next time.

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	NET	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

●Response data: 52 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	IP address (Example: 192.168.200.200)	char	16
2	Response data 2	Subnet Mask (Example: 255.255.255.0)	char	16
3	Response data 3	Default gateway address (Example: 0.0.0.0)	char	16
4	Response data 5	Reserved	char	4
Total number of response data bytes				52

7-3-34 Set/load the IP address information (IPA)

Sets and loads the IP address information which is used for communication between EDX units in synchronous operation with LAN cables.

NOTE

- The IPA command will not change the IP address of the EDX units.
  To change the IP of the EDX units, use the NET command. For details, see "7-3-33 Set/load the TCP/IP information (NET)."

- Command: IPA
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 164 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	IPA	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	ID=0: IP address (Example:192.168.200.200)	char	16
4	Parameter 3	ID=1: IP address (Example:192.168.200.201)	char	16
5	Parameter 4	ID=2: IP address (Example:192.168.200.202)	char	16
6	Parameter 5	ID=3: IP address (Example:192.168.200.203)	char	16
7	Parameter 6	ID=4: IP address (Example:192.168.200.204)	char	16
8	Parameter 7	ID=5: IP address (Example:192.168.200.205)	char	16
9	Parameter 8	ID=6: IP address (Example:192.168.200.206)	char	16
10	Parameter 9	ID=7: IP address (Example:192.168.200.207)	char	16
11	Parameter 10	Reserved	char	32
Total number of transferred bytes				164

MEMO

- For empty parameters, set 0x00 (16 bytes).
- The usage of IPA command varies with the EDX-200A software version.

  [The EDX-200A software version is lower than version 01.40.]
  To set measuring conditions or to start measurements, communications between EDX units are necessary. In synchronous operation with LAN cables, set every IP address of connected EDX units by using the IPA command in advance.

  [The EDX-200A software version is version 01.40 or higher.]
  Since the same setup as this command was became possible according to the measurement condition, the IPA command is not required.
  For details, see "8 MEASURING CONDITION FORMAT."
  IP address information of each EDX - Measuring conditions No. 1(General information)

- When the IP address of the send-destination EDX does not match the parameter of the IPA command (IP address information of the applicable ID), parameter error occurs.

- Response data: Standard type (1 byte)

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	IPA	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 160 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	ID = 0: IP Address	char	16
2	Response data 2	ID = 1: IP Address	char	16
·	·	·	·	·
8	Response data 8	ID = 7: IP Address (for 8 units)	char	16
9	Response data 9	Reserved	char	32
Total number of response data bytes				160

7-3-35 Load/write the TEDS information (TED)

Loads and writes the TEDS information of 32 channels at the same time.

MEMO

- For details of TEDS, see IEEE1451.4 standard.
- The target to be written is data in the TEDS user data 1.

- Command: TED
- Target EDX: Stand-alone, synchronous master, synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 1040 bytes
- Parameter: See the table below.

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Command Name	TED		char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.		BYTE	1
3	Parameter 2	Target channel to be written (in binary digit) [Example] Suppose the target CH is CH1, CH2, and CH32. Set 0x80000003.		DWORD	4
4	Parameter 3	Reserved		char	8
5	Parameter 4	Character strings to be written in the user data 1 (for 32 channels). (Maximum 28 characters + Null code)/CH	CH1 data to be written	char	32
			CH2 data to be written	char	32
			CH3 data to be written	char	32
			.	.	.
			CH32 data to be written	char	32
Total number of transferred bytes					1040

- Response data: 32 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Wrote result 1 byte × 32 channels = 32 bytes -1: No card or no function 0: OK 1: NG 2: OFF (not target)	char	32
Total number of response data bytes				32

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	TED	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of transferred bytes				4

- Response data: 21120 byte

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Response data 1	Template ID No. (*1)		BYTE	1
		Validity of Template ID No. (0: Invalid, 1: Valid) (*2)		BYTE	1
		Reserved		char	2
		Basic information (*3)	Unique Registration Number	INT64	8
			Manufacture ID	WORD	2
			Model Number	WORD	2
			Version Letter	char	2
			Version Number	WORD	2
			Serial Number	DWORD	4
		Standard information (*4)		char	100
		User data	User data 1	char	32
			User data 2	char	480
			Available size of the user data 2	DWORD	4
		Reserved	Mode No.	BYTE	1
			Range No.	BYTE	1
			Low pass filter No.	BYTE	1
			Unit No.	BYTE	1
			Calibration coefficient	float	4
			Editable or non-editable user data 1 (*5) (0: Non-editable, 1: Editable)	BYTE	1
			Reserved	char	11
		Total number of CH1 TEDS information			660
		.			.
		Total number of CH32 TEDS information			660
Total number of response data bytes					21120

(*1) Template ID No.

- Template ID No. and Sub ID are identification numbers originally defined for the EDX. (See the following table.)
- The following Standard Template IDs are the Template IDs defined by the IEEE1451.4 standard.

Template ID No.	Contents
0	No card is installed or no TEDS information
1	Not applicable TEDS information
2	Standard Template ID= 0, Sub ID=0
3	Standard Template ID= 24, Sub ID=0
4	Standard Template ID= 25, Sub ID=0
5	Standard Template ID= 25, Sub ID=1
6	Standard Template ID= 30, Sub ID=0
7	Standard Template ID= 30, Sub ID=1
8	Standard Template ID= 33, Sub ID=0
9	Standard Template ID= 36, Sub ID=0

(*2) Template ID No.

Flag to indicate whether the standard information is valid or invalid.

(*3) Basic information

Valid only when the template ID No. is 2 or more.

(*4) Standard information

Contents and the number of bytes vary with the template ID No.
(Valid only when the template ID No. is 2 or more.)
The standard information of every template ID No. is described in the following table.
(The contents are based on the IEEE1451.4 standard.)

(*5) Editable or non-editable user data 1

Flag to indicate whether the user data 1 is editable or non-editable (1: Editable).

Template ID No.	Contents	Types of Variables	The Number of Bytes
2	Standard Template ID	BYTE	1
	Polarity (sign) (0: Positive, 1: Negative)	BYTE	1
	Sensitivity direction (0: X, 1: Y, 2: Z, 3: N/A)	BYTE	1
	Reserved	char	1
	Calibration Date (e.g. "2005/01/01")	char	16
	Sensitivity @ reference condition [V/(m/s^2)]	float	4
	Reference frequency [Hz]	float	4
	High-pass cut-off frequency (F hp) [Hz]	float	4
	Measurement location ID (0 to 511)	WORD	2
	Reserved	char	2
	Total number of template ID No. 2		36

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Template ID No.	Contents	Types of Variables	The Number of Bytes
3	Standard Template ID	BYTE	1
	Polarity (sign) (0: Positive, 1: Negative)	BYTE	1
	Sensitivity direction (0: X, 1: Y, 2: Z, 3: N/A)	BYTE	1
	Reserved	char	1
	Sensitivity @ reference condition [V/(ms^2)]	float	4
	Reference frequency [Hz]	float	4
	High-pass cut-off frequency [Hz]	float	4
	Low-pass cut-off frequency [Hz]	float	4
	Resonance frequency (fres) [Hz]	float	4
	Quality factor at fres	float	4
	Amplitude slope (a) [%/decade]	float	4
	Temperature Coefficient (b) [%/degC]	float	4
	Reference temperature [degC]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Measurement location ID (0 to 2047)	WORD	2
	Reserved	char	2
	Total number of template ID No. 3		60
4	Standard Template ID	BYTE	1
	Sensitivity direction (0: X, 1: Y, 2: Z, 3: N/A)	BYTE	1
	Transducer Electrical Signal Type (0: Voltage Sensor)	BYTE	1
	Mapping Method (0: Linear)	BYTE	1
	AC or DC coupling (0: DC, 1: AC, 1 = fixed)	BYTE	1
	Polarity (sign) (0: Positive, 1: Negative)	BYTE	1
	Reserved	char	2
	Sensitivity @ reference condition [V/(ms^2)]	float	4
	High-pass cut-off frequency [Hz]	float	4
	Transducer weight [g]	float	4
	Reference frequency [Hz]	float	4
	Reference temperature [degC]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 4		52

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Template ID No.	Contents	Types of Variables	The Number of Bytes
5	Standard Template ID	BYTE	1
	Sensitivity direction (0: X, 1: Y, 2: Z, 3: N/A)	BYTE	1
	Transducer Electrical Signal Type (0: Voltage Sensor)	BYTE	1
	Mapping Method (0: Linear)	BYTE	1
	AC or DC coupling (0: DC, 1: AC)	BYTE	1
	Polarity (sign) (0: Positive, 1: Negative)	BYTE	1
	Reserved	char	2
	Sensitivity @ reference condition [V/(ms^2)]	float	4
	High-pass cut-off frequency [Hz]	float	4
	Transducer weight [g]	float	4
	Reference frequency [Hz]	float	4
	Reference temperature [degC]	float	4
	Low-pass cut-off frequency [Hz]	float	4
	Resonance frequency (fres) [Hz]	float	4
	Quality factor at fres	float	4
	Amplitude slope (a) [%/decade]	float	4
	Temperature Coefficient (b) [%/degC e]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 5		72
6	Standard Template ID	BYTE	1
	Physical Measurand	BYTE	1
	Transducer Electrical Signal Type (0: Voltage Sensor)	BYTE	1
	Full-Scale Electrical Value Precision	BYTE	1
	Mapping Method (0: Linear)	BYTE	1
	AC or DC coupling (0: DC, 1: AC)	BYTE	1
	Reserved	char	2
	Minimum physical value	float	4
	Maximum physical value	float	4
	Minimum voltage output [V]	float	4
	Maximum voltage output [V]	float	4
	Sensor output impedance [ohms]	float	4
	Response Time [sec]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 6		56

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Template ID No.	Contents	Types of Variables	The Number of Bytes
7	Standard Template ID	BYTE	1
	Physical Measurand	BYTE	1
	Power-supply type (0: DC, 1: Bipolar DC, 2: AC (rms))	BYTE	1
	Transducer Electrical Signal Type (0: Voltage Sensor)	BYTE	1
	Full-Scale Electrical Value Precision	BYTE	1
	Mapping Method (0: Linear)	BYTE	1
	AC or DC coupling (0: DC, 1: AC)	BYTE	1
	Reserved	char	1
	Minimum physical value	float	4
	Maximum physical value	float	4
	Minimum voltage output [V]	float	4
	Maximum voltage output [V]	float	4
	Sensor output impedance [ohms]	float	4
	Response Time [sec]	float	4
	Power-supply level,nominal [V]	float	4
	Power-supply level,min [V]	float	4
	Power-supply level,max [V]	float	4
	Max current at nominal power level [A]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 7		72
8	Standard Template ID	BYTE	1
	Physical Measurand	BYTE	1
	Transducer Electrical Signal Type (3: Bridge Sensor)	BYTE	1
	Full-Scale Electrical Value Precision	BYTE	1
	Mapping Method (0: Linear)	BYTE	1
	Bridge Type (0:QUARTER,1:HALF,2:FULL)	BYTE	1
	Reserved	char	2
	Minimum physical value	float	4
	Maximum physical value	float	4
	Minimum electrical output [V/V]	float	4
	Maximum electrical output [V/V]	float	4
	Bridge element impedance [ohms]	float	4
	Response Time [sec]	float	4
	Excitation level,nominal [V]	float	4
	Excitation level,min [V]	float	4
	Excitation level,max [V]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 8		68

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Template ID No.	Contents	Types of Variables	The Number of Bytes
9	Standard Template ID	BYTE	1
	Transducer Electrical Signal Type (0: Voltage Sensor)	BYTE	1
	Mapping Method (4: Thermocouple)	BYTE	1
	Thermocouple type (0 to 8) 0: B type, 1: E Type, 2: J Type, 3: K Type 4: N Type, 5: R Type, 6: S Type, 7: T Type, 8: non-standard	BYTE	1
	Cold-junction compensation required (0: CJC required, 1: Compensated)	BYTE	1
	Reserved	char	3
	Minimum temperature [degC]	float	4
	Maximum temperature [degC]	float	4
	Minimum voltage output [V]	float	4
	Maximum voltage output [V]	float	4
	Thermocouple resistance [ohms]	float	4
	Sensor Response Time [sec]	float	4
	Calibration Date (e.g. "2005/01/01")	char	16
	Calibration Initials (Max 3chrs. e.g. "TK ")	char	4
	Calibration period [days]	WORD	2
	Measurement location ID (0 to 2047)	WORD	2
	Total number of template ID No. 9		56

MEMO

Validity of Basic information, Standard information, and User Data information

(1) When the template ID No. = 0

- The template ID No. is always 0 (Invalid).
- The Basic information is invalid.
- The Standard information is invalid.
- The User Data information is invalid.

(2) When the template ID No. = 1

- The template ID No. is always 0 (Invalid).
- The Basic information is valid.
- The Standard information is invalid.
- The User Data information is invalid.

(3) When the template ID No. >= 2

- The Basic information is valid.
- When the template ID No. is 1 (valid), the Standard information is correct data.
- When the template ID No. is 0 (invalid), the Standard information is not correct or the current sensor does not match the current conditioner card.
- The User Data information is valid only when the Basic information's Manufacture ID is 58 (KYOWA).

7-3-36 Load/write the user data (URW)

Load and write the arbitrary user data.

- Command: URW
- Target EDX: Stand-alone, synchronous master, and synchronous slave

♦♦♦When setting♦♦♦

- The number of transferred bytes: 40 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	URW	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	Writing No. (0 to 19)	BYTE	1
4	Parameter 3	Reserved	char	3
5	Parameter 4	User data	char	32
Total number of transferred bytes				40

- Response data: Standard type (1 byte)

♦♦♦When loading♦♦♦

- The number of transferred bytes: 4 bytes
- Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Command Name	URW	char	3
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
3	Parameter 2	Reading No. (0 to 19)	BYTE	1
Total number of transferred bytes				5

- Response data: 32 byte

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	User data	char	32
Total number of response data bytes				32

MEMO

- No.0 writing is used in the EDX of the device name. The character string in the writing No. 0 appears on the small indicator of the EDX. For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

- After the initialization by using the INI command, the writing No. 0 will be the default character string ("200A-" + "serial No."). The character strings, saved in the writing No. 1 to writing No. 19, will be cleared by zero.

  [Example]

  Suppose the serial No. is EDX200001.

  The default character string, saved in the writing No. 0, is 200A-EDX200001.

7-3-37 Load the EDX status

Generally, since the EDX status is stored in the header section of the response packet, the EDX status can be obtained by executing any command and by referring to the header section of the response packet.
However, when it is required to check the EDX status before issuing the command to the EDX or when the next command cannot be issued unless after checking whether or not processing requiring a certain time in the EDX is surely finished, it is required to obtain the EDX status.
In the above cases, when only the header section of the command packet (additional data size: 0) is sent to the EDX, the response packet only storing the header section is returned. After checking the status items of the response packet header section, the EDX status can be obtained.

- Command: None
- Target EDX: Stand-alone, synchronous master, and synchronous slave
- The number of transferred bytes: 0 bytes
- Parameter: None
- Response data: 0 byte

8 MEASURING CONDITION FORMAT

Measuring condition format exchanged between PC and EDX by using the "Set/load the measuring condition (MES)" command. The measuring condition format is shown below.

8-1 MEASURING CONDITION FORMAT

The whole size: 40000 bytes

No.	Classification	Contents	Types of Variables	The Number of Bytes
1	General Information 560 bytes	Device ID ("EDX-200A" fixed, " " is not included.)	char	20
		Parameter format version (1 fixed)	WORD	2
		KS2 based language (0: Japanese, 1: English)	BYTE	1
		Chassis size (8/16/32)	BYTE	1
		Slot1 card type No. (*1)	BYTE	1
		Slot2 card type No. (*1)	BYTE	1
		Slot3 card type No. (*1)	BYTE	1
		Slot4 card type No. (*1)	BYTE	1
		Optional card type No. (*2)	BYTE	1
		Reserved	char	11
		Synchronous operation mode (loading only) -1: Stand-alone, 0: Synchronous master, 1 to 7: Synchronous slaves	char	1
		Synchronous operation connection (LAN connection only) 0: Synchronous cable, 1: LAN cable	BYTE	1
		The total number of connected units during the synchronous operation	BYTE	1
		Reserved	char	2

No.	Classification	Contents		Types of Variables	The Number of Bytes
1	General Information 560 bytes	Oscillator (0: internal, 1: external)		BYTE	1
		Beep sound when the input data exceeded (Over beep) (0: OFF, 1: During the input data exceeded, 2: By executing the STOP/PAUSE operation)		BYTE	1
		Beep sound while monitoring data (0: OFF, 1: ON) Only when the "Beep sound when the input data exceeded" is 1 or 2, the ON setting of the "Monitoring beep sound" is valid.		BYTE	1
		Operation (beep) sound 0: OFF, 1: ON (high pitch sound), 2: ON (low pitch sound)		BYTE	1
		After recording is finished, restart the A/D conversion (0: Yes, 1: No)		BYTE	1
		Option button 0: OFF, 1: Start monitoring, 2: Delete the recorded data, 3: CAL, 4: Over reset, 5:CAN manual output		BYTE	1
		File overwrite check (0: Yes, 1: No)		BYTE	1
		Total length of synchronous cables (0: 50 m or less, 1: 500 m or less, 2: 1000 m or less		BYTE	1
		A/D data format 0: 16 bits (short), 1: 24 bits (Long) For using the digital filtering or dual-sampling, be sure to set 1: 24 bits (Long).		BYTE	1
		PAUSE function 0: Valid, 1: Invalid		BYTE	1
		Reserved		char	1
		Balance standard value 1 to 50 %; set the 10-time value. [Example] Set 50 for 5%.		WORD	2
		Reserved		char	6
		Arbitrary unit 1 (maximum 7 characters) (*3)		char	8
		Arbitrary unit 2 (maximum 7 characters) (*3)		char	8
		Arbitrary unit 3 (maximum 7 characters) (*3)		char	8
		Slot 1, custom-made cable correction value (*4)		double	8
		Slot 2, custom-made cable correction value (*4)		double	8
		Slot 3, custom-made cable correction value (*4)		double	8
		Slot 4, custom-made cable correction value (*4)		double	8
		Slot 1, input cable No. (*4)		BYTE	1
		Slot 2, input cable No. (*4)		BYTE	1
		Slot 3, input cable No. (*4)		BYTE	1
		Slot 4, input cable No. (*4)		BYTE	1
		Reserved		char	68
		Time zone information (minutes) for time synchronization function [Example] Suppose the area is 9 hours ahead of the Standard Time (ST): -540		short	2
		Reserved		char	6
		IP address information of each EDX (for synchronous operation via the LAN cables)	ID = 0: IP Address	char	16
			ID = 1: IP Address	char	16
			ID = 2: IP Address	char	16
			ID = 3: IP Address	char	16
			ID = 4: IP Address	char	16
			ID = 5: IP Address	char	16
			ID = 6: IP Address	char	16
			ID = 7: IP Address	char	16
		Reserved		char	268

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No.	Classification	Contents	Types of Variables	The Number of Bytes
2	Recorded file information 400 bytes	Recorded file name (maximum 20 characters)	char	22
		File No. (0 to 9999) (*5)	WORD	2
		File title (maximum 40 characters)	char	44
		Reserved	char	332
3	Measuring Condition (Common Condition) 96 bytes	Sampling frequency (high-speed, 1 to 100000 Hz)	DWORD	4
		Sampling frequency type (0: Internal, 1: External)(*6)	BYTE	1
		Dual-sampling (0: OFF, 1: ON)	BYTE	1
		Reserved	char	2
		Division value for the low-speed sampling frequency (0: No, 4 to : Division value)	DWORD	4
		Reserved	char	2
		Digital filtering (0: OFF, 1: ON)	BYTE	1
		Reserved	char	5
		Default value of the CH No. (*7) For coupling data files recorded by the synchronous operation.	WORD	2
		Default value of the CAN-ID No. (*7) For coupling data files recorded by the synchronous operation.	WORD	2
		Measuring mode (high-speed) 0: Manual, 1: Interval, 2: Analog trigger, 4: External trigger, 6: Complex trigger, 10: PC recording (*8)	BYTE	1
		Reserved	char	1
		Measuring mode (low-speed) 0: Manual, 1: Interval	BYTE	1
		Low noise mode (0:OFF, 1:ON) In dual sampling mode, when only the low speed CH is the measurement ON, it is valid. If it turns ON, "_L" stops attaching to a recorded file name. Moreover, the display of "L" and "Low" of the low-speed information of the small display for indication is lost.	BYTE	1
		The number of analog channels to be recorded (The number of Meas-ON analog channels in the analog channel conditions)	WORD	2
		Reserved	char	2

[From the previous page]

No.	Classification	Contents	Types of Variables	The Number of Bytes
3	Measuring Condition (Common Condition) 96 bytes	Digital input/output settings (in binary digit, multiple bits available) Specify all modes in use. 0x00: OFF 0x01: Digital input 0x02: Remote control mode 0x04: Digital output	BYTE	1
		Digital-input channels, dual-sampling mode 0: High-speed 1: Low-speed 2: High-speed and low-speed	BYTE	1
		CAN measurement by using optional card (0:OFF, 1:ON)	BYTE	1
		Reserved	char	1
		Time synchronization function by using optional card (0:OFF, 1:ON)	BYTE	1
		Recording GPS data by using optional card (0:OFF, 1:ON)	BYTE	1
		Order of high-pass filter (0: OFF, 1 to 8: Order) For an arbitrary digital filter.	BYTE	1
		Order of low-pass filter (0: OFF, 1 to 8: Order) For an arbitrary digital filter.	BYTE	1
		Settling time (specify the number of data) For an arbitrary digital filter.	DWORD	4
		Reserved		52
4	Measuring Condition (*5) (For manual measurements) 32 bytes	The number of recorded data (0 or 2 to the number of recordable data)	INT64	8
		The number of repeat times (0 to 9999, 0: Infinite)	WORD	2
		Reserved	char	22

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No.	Classification	Contents		Types of Variables	The Number of Bytes
5	Measuring Condition (*5) (for interval measurements) 32 bytes	The number of recorded data (2 to the number of recordable data)		INT64	8
		Interval start time (*9)	Year (2011 to 2099)	WORD	2
			Month (1 to 12)	BYTE	1
			Day (1 to 31)	BYTE	1
			Hour (0 to 23)	BYTE	1
			Minute (0 to 59)	BYTE	1
			Second (0 to 59)	BYTE	1
			Reserved	char	1
		Interval (10 to) (*10)		DWORD	4
		The number of interval times (0 to 9999, 0: Infinite)		WORD	2
		Reserved		char	10
6	Measuring Condition (*5) (common for trigger measurements) 32 bytes	The number of trigger recorded data With the end trigger: 0 Without the end trigger: 2 to the number of recordable data		INT64	8
		Pre-trigger delay amount (0 to 524288) (*11)		DWORD	4
		Post-trigger delay amount (0 to 524288) (*11)		DWORD	4
		The number of trigger repeat times (0 to 9999, 0: Infinite)		WORD	2
		End trigger (0: No, 1: Yes)		BYTE	1
		Reserved		char	13

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No.	Classification	Contents	Types of Variables	The Number of Bytes
7	Measuring Condition (*5) (For analog trigger measurements) 48 bytes	Start trigger CH (1 to 32, analog channels to be measured)	BYTE	1
		Start trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	2
		Start trigger level: (±32000, ±8192000) (*12)	Long	4
		Reserved	char	16
		End trigger CH (1 to 32, analog channels to be measured)	BYTE	1
		End trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	2
		End trigger level: (±32000, ±8192000) (*12)	Long	4
		Reserved	char	16
8	Measuring Condition (*5) (For digital trigger conditions) 16 bytes	Start trigger bit (1 to 8)	BYTE	1
		Start trigger level (0 or 1)	BYTE	1
		Reserved	char	6
		End trigger bit (1 to 8)	BYTE	1
		End trigger level (0 or 1)	BYTE	1
		Reserved	char	6
9	Measuring Condition (*5) (for external trigger measurements) 16 bytes	Start trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	7
		End trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	7
10	Reserved 32 bytes	Reserved	char	32

[From the previous page]

No.	Classification	Contents	Types of Variables	The Number of Bytes
11	Measuring Condition (*5) (common for start complex trigger measurements) 48 bytes	Start AND/OR setting 1 (0: OR, 1: AND) (Set AND/OR settings of start analog trigger CH1 and CH2.)	BYTE	1
		Start AND/OR setting 2 (0: OR, 1: AND) (Set AND/OR settings of start analog trigger CH3 and CH4.)	BYTE	1
		Start AND/OR setting 3 (0: OR, 1: AND) (Set AND/OR settings of start AND/OR setting 1 and start AND/OR setting 2.)	BYTE	1
		Start AND/OR setting 4 (0: OR, 1: AND) (Set AND/OR settings of start AND/OR setting 3 and start AND/OR setting 5.)	BYTE	1
		Start AND/OR setting 5 (0: OR, 1: AND) (Set AND/OR settings of start external trigger and start ECAN trigger.)	BYTE	1
		Reserved	char	27
		Start external trigger (0: No, 1: Yes)	BYTE	1
		Start external trigger slope (0: UP, 1: DOWN)	BYTE	1
		Start ECAN trigger (0: No, 1: Yes)	BYTE	1
		Start manual trigger (0: No, 1: Yes)	BYTE	1
		Reserved	char	12

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No.	Classification	Contents	Types of Variables	The Number of Bytes
12	Measuring Condition (*5) (No. 1 for start complex trigger measurements) 32 bytes	Condition of the start trigger channel 1 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		Start trigger channel 1 (1 to 32, analog channels to be measured)	BYTE	1
		Start trigger slope 1 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level 1: (±32000, ±8192000) (*12)	long	4
		Start digital bit level 1 (0x00 to 0xFF)	WORD	2
		Start digital bit status 1 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20
13	Measuring Condition (*5) (No. 2 for start complex trigger measurements) 32 bytes	Condition of the start trigger channel 2 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		Start trigger CH 2 (1 to 32, analog channels to be measured)	BYTE	1
		Start trigger slope 2 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level 2: (±32000, ±8192000) (*12)	long	4
		Start digital bit level 2 (0x00 to 0xFF)	WORD	2
		Start digital bit status 2 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20
14	Measuring Condition (*5) (No. 3 for start complex trigger measurements) 32 bytes	Condition of the start trigger CH3 (0: None, 1: Analog channel, 2: Digital channel))	BYTE	1
		Start trigger CH 3 (1 to 32, analog channels to be measured)	BYTE	1
		Start trigger slope 3 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level 3: (±32000, ±8192000) (*12)	long	4
		Start digital bit level 3 (0x00 to 0xFF)	WORD	2
		Start digital bit status 3 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20

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No.	Classification	Contents	Types of Variables	The Number of Bytes
15	Measuring Condition (*5) (No. 4 for start complex trigger measurements) 32 bytes	Condition of the start trigger CH4 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		Start trigger CH 4 (1 to 32, analog channels to be measured)	BYTE	1
		Start trigger slope 4 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level 4: (±32000, ±8192000) (*12)	long	4
		Start digital bit level 4 (0x00 to 0xFF)	WORD	2
		Start digital bit status 4 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	24
16	Measuring Condition (*5) (For start complex trigger measurements) 432 bytes	Reserved	char	432
17	Measuring Condition (*5) (common for end complex trigger measurements) 48 bytes	End AND/OR setting 1 (0: OR, 1: AND) (Set AND/OR settings of end analog trigger CH1 and CH2.)	BYTE	1
		End AND/OR setting 2 (0: OR, 1: AND) (Set AND/OR settings of end analog trigger CH3 and CH4.)		
		End AND/OR setting 3 (0: OR, 1: AND) (Set AND/OR settings of end AND/OR setting 1 and start AND/OR setting 2.)	BYTE	1
		End AND/OR setting 4 (0: OR, 1: AND) (Set AND/OR settings of end AND/OR setting 3 and end AND/OR setting 5.)	BYTE	1
		End AND/OR setting 5 (0: OR, 1: AND) (Set AND/OR settings of end AND/OR setting 3 and end external trigger.)	BYTE	1
		Reserved	char	27
		End external trigger (0: No, 1: Yes)	BYTE	1
		End external trigger slope (0: UP, 1: DOWN)	BYTE	1
		End ECAN trigger (0: No, 1: Yes)	BYTE	1
		End manual trigger (0: No, 1: Yes)	BYTE	1
		Reserved	char	12
18	Measuring Condition (*5) (No. 1 for end complex trigger measurements) 32 bytes	Condition of the end trigger CH1 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		End trigger CH1 (1 to 32, analog channels to be measured)	BYTE	1
		End trigger slope 1 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level 1: (±32000, ±8192000) (*12)	long	4
		End digital bit level 1 (0x00 to 0xFF)	WORD	2
		End digital bit status 1 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20

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No.	Classification	Contents	Types of Variables	The Number of Bytes
19	Measuring Condition (*5) (No. 2 for end complex trigger measurements) 32 bytes	Condition of the end trigger CH2 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		End trigger CH2 (1 to 32, analog channels to be measured)	BYTE	1
		End trigger slope 2 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level 2: (±32000, ±8192000) (*12)	long	4
		End digital bit level 2 (0x00 to 0xFF)	WORD	2
		End digital bit status 2 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20
20	Measuring Condition (*5) (No. 3 for end complex trigger measurements) 32 bytes	Condition of the end trigger CH3 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		End trigger CH3 (1 to 32, analog channels to be measured)	BYTE	1
		End trigger slope 3 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level 3: (±32000, ±8192000) (*12)	long	4
		End digital bit level 3 (0x00 to 0xFF)	WORD	2
		End digital bit status 3 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20
21	Measuring Condition (*5) (No. 4 for end complex trigger measurements) 32 bytes	Condition of the end trigger CH4 (0: None, 1: Analog channel, 2: Digital channel)	BYTE	1
		End trigger CH4 (1 to 32, analog channels to be measured)	BYTE	1
		End trigger slope 4 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level 4: (±32000, ±8192000) (*12)	long	4
		End digital bit level 4 (0x00 to 0xFF)	WORD	2
		End digital bit status 4 (0: N/A, 1: Trigger)	WORD	2
		Reserved	char	20
22	Measuring Condition (*5) (For end complex trigger measurements) 432 bytes	Reserved	char	432

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No.	Classification	Contents	Types of Variables	The Number of Bytes
23	Analog channel condition (CH1 condition) (*13) 100 bytes *3200 bytes for 32 channels	Measurement -1: No card or no channel 0: Not to be measured 1: To be measured	BYTE	1
		Mode No. (0 to)	BYTE	1
		Range No. (0 to)	BYTE	1
		High pass filter No. (0 to)	BYTE	1
		Low pass filter No. (0 to)	BYTE	1
		BAL ON/OFF(0: OFF, 1: ON , 2:NONE (only CVM-40A and CVM-41A))	BYTE	1
		CAL ON/OFF(0: OFF, 1: ON)	BYTE	1
		CAL range No. (0 to)	BYTE	1
		Calibration coefficient	double	8
		Offset	double	8
		Unit No. (0 to 62)	BYTE	1
		Internal sensitivity compensation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Card type No.	BYTE	1
		The number of digits after decimal point (-1: Auto, 0 to 8)	char	1
		Channel name (maximum 40 characters)	char	44
		Check the over status (+ side)	char	1
		Check the over status (- side)	char	1
		Dual-sampling 0: High-speed, 1: Low-speed, 2: High-speed + low-speed	BYTE	1
		Reserved	char	1
		Low pass filter, cut-off frequency 0: OFF, 1 to: Setting value	DWORD	4
		High pass filter, cut-off frequency 0: OFF, 1 to: Setting value	DWORD	4
		Reserved	char	16
	Analog channel condition (CH2 condition) (*13)	Ditto	---	100
	Analog channel condition (CH3 condition) (*13)	Ditto	---	100
	.	.	.	.
	Analog channel condition (CH32 condition) (*13)	Ditto	---	100

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No.	Classification	Contents	Types of Variables	The Number of Bytes
24	CAN information (General Information) 48 bytes	The number of CAN-IDs (0 to 32)	BYTE	1
		How to extract CAN-CH conditions (0: Start bit + bit length, 1: start position + end position)	BYTE	1
		Reserved	char	46
25	CAN information (Communication condition 1) 16 bytes	Communication standard (0: High-speed, 1: Low-speed)	BYTE	1
		Communication speed (0 to 10)	BYTE	1
		Sample point (0 to 25)	BYTE	1
		The number of sampling times (0: 1 time, 1: 3 times)	BYTE	1
		Resynchronization jump width (0: 1 to 3: 4)	BYTE	1
		Termination resistor (0: OFF, 1: ON)	BYTE	1
		Reserved	char	10
	CAN information (Communication condition 2) 16 bytes	Ditto	---	16
26	CAN information (ID1 conditions) 64 bytes *2048 bytes for 32 IDs	Measurement (0: Not to be measured, 1: To be measured)	BYTE	1
		Format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (1 to 8)	BYTE	1
		Endian (0: Little, 1: Big)	BYTE	1
		LSB/MSB (0: LSB, 1: MSB)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Dual-sampling 0: High-speed, 1: Low-speed, 2: High-speed + low-speed	BYTE	1
		Reserved	char	1
		Frame ID No.	DWORD	4
		ID name (maximum 40 characters)	char	44
		Reserved	char	8
	CAN information (ID2 conditions)	Ditto	---	64
	CAN information (ID3 conditions)	Ditto	---	64
	.	.	.	.
	CAN information (ID32 conditions)	Ditto	---	64

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No.	Classification	Contents	Types of Variables	The Number of Bytes
27	CAN information (CAN-CH1 conditions) 72 bytes *18,432 bytes for 32 IDs (8 channels/ID)	Measurement (0: OFF, 1: ON)	BYTE	1
		Start bit (0 to 63)	BYTE	1
		Bit length (1 to 64)	BYTE	1
		Data type 0: :Signed (signed integer) 1: Unsigned (unsigned integer) 2:Float(single precision floating decimal point) 3: Double (double precision floating decimal point)	BYTE	1
		Calibration coefficient	double	8
		Offset9:	double	8
		Channel name (maximum 40 characters)	char	44
		Unit No. (0 to 62)	BYTE	1
		The number of digits after decimal point (-1: Auto, 0 to 8)	char	1
		Reserved	char	6
	CAN information (CAN-CH2 conditions) 72 bytes	Ditto	---	72
	CAN information (CAN-CH3 conditions) 72 bytes	Ditto	---	72
	.	.	.	.
	CAN information (CAN-CH256 conditions) 72 bytes	Ditto	---	72

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No.	Classification	Contents	Types of Variables	The number of Bytes
28	Digital input/output condition (Bit No. 1) 64 bytes	Bit input/output setting 0: OFF 1: Digital input 2: Remote control mode (*14) 4: Digital output	BYTE	1
		Remote control mode function 0: OFF 1: Start monitoring data 2: Stop monitoring data 3: Start recording data/Pause recording data 4: Balance adjustment 5: OPT. button	BYTE	1
		Digital output function 0: OFF 1: While recording data 2: Trigger signal 3: BUSY 4: While monitoring data 5: While exceeding the analog channel range only. 6: An analog channel is exceeding its range. 7: While exceeding the ECAN-CH range only. 8: An ECAN-CH is exceeding its range. 9: Command control (DOO command)	BYTE	1
		Analog-exceeding channel (0: All channels, 1 to 32: Specified channel)	BYTE	1
		ECAN-exceeding channel (0: OFF, 1 to 512: Specified channel)	WORD	2
		Reserved	char	2
		Bit name	char	44
		Reserved	char	12
	Digital input/output condition (Bit No. 2) 64 bytes	Ditto	---	64
	Digital input/output condition (Bit No. 3) 64 bytes	Ditto	---	64
	.	.	.	.
	Digital input/output condition (Bit No. 8) 64 bytes	Ditto	---	64
29	Reserved	Reserved	char	13248

(*1) For details, see "8-12 CONDITIONER CARD TYPE NO."
To be error if it differs with the actual card configuration.

(*2) For details, see "8-13 OPTIONAL CARD TYPE No."
To be error if it differs with the actual card configuration.

(*3) The unit is assigned to the unit No. 60 to unit No. 62.
(For details, see "8-11 UNIT NO. AND UNIT CHARACTER STRING.")

(*4) For details, see “8-15 CUSTOM-MADE CABLE CORRECTION VALUES AND INPUT CABLE.”

(*5) Synchronous slaves ignore the settings.

(*6) For details of the external-clock-input function, see “EDX-200A Universal Recorder Instruction Manual for Hardware.”

(*7) For coupling data files by using the DAS-200A.
For coupling data files by using the DAS-200A, see as follows.

○ Set the first analog channel No. and first CAN-ID No.

- The analog channel No. and CAN-ID No. are started from 0.
- The default value of the CH No. varies with the chassis size.
  The default value of the CH No. of the master EDX is always 0.
  For the CH No. of the second unit and after, add 32 (if the previous EDX is 4-slot) or add 16 (if the previous EDX is 2-slot).
- The default value of the CAN-ID varies with the installation status of CAN cards.
  The default value of the CAN-ID of the master EDX is always 0.
  For the CAN-ID of the second unit and after, add 16 (if the CAN-40A is installed in the previous EDX) or add 32 (if the CAN-41A is installed in the previous EDX).

[Example 1]

Synchronous operation mode	Slot type	CAN Card	Default value of the CH No.	Default value of the CAN-ID
Master (ID = 0)	4-slot	CAN-41A (32 IDs)	0	0
Slave 1 (ID = 1)	2-slot	None	32	32
Slave 2 (ID = 2)	4-slot	CAN-41A (32 IDs)	48	32

[Example 2]

Synchronous operation mode	Slot type	CAN Card	Default value of the CH No.	Default value of the CAN-ID
Master (ID = 0)	2-slot	None	0	0
Slave 1 (ID = 1)	4-slot	CAN-40A (16 IDs)	16	0
Slave 2 (ID = 2)	2-slot	CAN-41A (32 IDs)	48	16
Slave 3 (ID = 3)	4-slot	None	64	48

(*8) The A/D conversion can be started without a CF card.
The EDX is in monitoring status. Data recording, etc. is executed by the PC.

(*9) If ‘0’ is set to all the interval start time, no interval start time is specified.
At this time, when the digital filtering is 0 (OFF), the first recording starts within 10 seconds after receiving the REC command. When the digital filtering is 1 (ON), the first recording starts within 20 seconds after receiving the REC command.

(*10) Specify the recording time, calculated from the number of interval recorded data, + **α** (sec).
(For the stand-alone EDX, α is 10 or more. For the synchronous operation, α is 30 or more.)

(*11) Available delay amount (the number of data) varies with the number of channels to be measured and remaining capacity of the CF card. Available delay amount is roughly calculated by the following calculation formula.

With 16 bits

Available delay amount = (1024 * 1024)/(2 * [the number of analog channels to be measured] + 8 * [the number of CAN-IDs to be measured])

With 24 bits

Available delay amount = (1024 * 1024)/(4 * [the number of analog channels to be measured] + 8 * [the number of CAN-IDs to be measured])

* The CAN-ID in this section indicates the CAN data of the CAN-40A/41A.

MEMO

- The pre-trigger delay, while measuring CAN or while recording GPS data by using the optional card, is maximum 1 [sec].

(*12) Trigger level is a threshold value with analog CH set as a trigger source and is set with A/D conversion value.

- With 16 bits, the full scale of the A/D conversion value of analog CH is 32000.
  For example, with the strain range of 1000 μm/m, when 500 μm/m relevant strain is input, the A/D conversion value is 16000.
- With 24 bits, the full scale of the A/D conversion value of analog CH is 8192000.
  For example, with the strain range of 1000 μm/m, when 500 μm/m relevant strain is input, the A/D conversion value is 4096000.
  With 24 bits, note that the available trigger levels are multiples of 256.

(*13) Available range of the analog channel conditions vary with the installed conditioner card.
For items other than Measurement, if there is no setting item or if the item is invalid, set ‘0.’

(*14) During the synchronous operation, the remote control mode is available on the master EDX only.

MEMO

- Initialize the area indicated as ‘Reserved’ or unused area with ‘0.’
- For the values of analog conditioner cards, see "8-12 CONDITIONER CARD TYPE NO.

8-2 DUAL-SAMPLING MODE

8-2-1 Outline

When using the dual-sampling mode, be aware of the following points.

- Recording is allowed when the A/D data format is 24 bits.
- The external-clock-input function is not allowed.
- Set the sampling frequency (high-speed) 5 Hz or more for the 1/2/5 system, 8 Hz or more for the 2^n system.
- The range of the sampling frequency (low-speed) varies with the sampling frequency (high-speed).
- The combination of measuring mode (high-speed) and measuring mode (low-speed) is limited.
- PAUSE function is not allowed while recording operation.

8-2-2 Details of parameters

When using the dual-sampling mode, set parameters as follows.

(1) A/D data format - General information, No. 1
Set 1: 24 bits.

(2) Sampling frequency (high-speed) - Measuring conditions, No. 3 (Common Condition)
Set 5 Hz or more for the 1/2/5 system, 8 Hz or more for the 2^n system.

(3) Sampling frequency type - Measuring conditions, No. 3 (Common Condition)
Set 0: Internal.

(4) Dual-sampling - Measuring conditions, No. 3 (Common Condition)
When using the dual-sampling mode, set 1: ON.

(5) Measuring mode (high-speed)/measuring mode (low-speed) - Measuring conditions, No. 3 (Common Condition)
Available measurements in the dual-sampling mode are as follows.

Table: Available measurements in the dual-sampling mode

High-speed sampling channel	Low-speed sampling channel
Manual measurement	Manual measurement
Trigger measurement	Manual measurement
	Interval measurement
Interval measurement	Interval measurement

MEMO

- With the dual-sampling mode, the range of the "CAN measurement by using optional card" is the same as that of the range (high-speed).
- With the dual-sampling mode, the range of the "Recording GPS data by using optional card" is the same as that of the range (low-speed).

NOTE

When using the time synchronization function in the dual-sampling mode, please set up so that the high-speed channels and low-speed channels of the measurement ON exist.

(6) Division value for the low-speed sampling frequency - Measuring conditions, No. 3 (Common Condition)
The value to set up is calculated from the relation between a high-speed sampling frequency (Sf) and a low-speed sampling frequency (Ss).

Division value for the low-speed sampling frequency = Sf/Ss

Be sure to specify the following conditions.

- Available sampling frequency (high-speed) (Sf) is as follows.
  1/2/5 system: 1 Hz to 100k Hz, 2^n system: 2 Hz to 65536 Hz
- Available sampling frequency (low-speed) (Ss) is as follows.
  1/2/5 system: Divide the 1/2/5 system of the high-speed sampling, where $Ss \leq Sf/4$
  2^n system: Divide the 2^n system of the high-speed sampling, where $Ss \leq Sf/4$

Table: Available sampling frequency of the dual-sampling mode

High-speed sampling [Hz]	Low-speed sampling [Hz]
100k	20k, 10k, 5k, 2k, 1k, 500, 200, 100, 50, 20, 10, 5, 2, 1
50k	10k, 5k, 2k, 1k, 500, 200, 100, 50, 10, 10, 5, 2, 1
20k	5k, 2k, 1k, 500, 200, 100, 50, 5, 10, 5, 2, 1
10k	2k, 1k, 500, 200, 100, 50, 20, 10, 5, 2, 1
5k	1k, 500, 200, 100, 50, 20, 10, 5, 1, 1
2k	500200100,50,20,10,5,2,1
1k	200100,50,20,10,5,2,1
500	100,50,20,10,5,2,1
200	50, 20, 10, 5, 2,1
100	20, 10, 5, 2, 1
50	10, 5, 2, 1
20	5, 2, 1
10	2,1
5	1
2,1	(setting not available)
65536	16384, 8192, 4096, 2048, 1024, 512, 256, 128, 64, 32, 16, 8, 4, 2
32768	8192, 4096, 2048,1024, 512, 256, 128, 64, 32, 16, 8, 4, 2
16384	4096, 2048, 1024, 512, 256, 128, 64, 32, 16, 8, 4, 2
8192	2048, 1024, 512, 256, 128, 64, 32, 16, 8, 4, 2
4096	1024, 512, 256, 128, 64, 32, 16, 8, 4, 2
2048	512256128,64,32,16,8,4,2
1024	256128,64,32,16,8,4,2
512	128,64,32,16,8,4,2
256	64, 32, 16, 8, 4,2
128	32, 16, 8, 4, 2
64	16, 8, 4, 2
32	8,4, 2
16	4,2
8	2
4,2	(setting not available)

(7) Dual-sampling - Analog channel conditions, No, 23

3 types: "High-speed", "Low-speed", "High-speed + low-speed"

Note that one "high-speed + low-speed" channel is counted as 2 channels.

[Example]

When measuring 5 channels (the 1st channel: high-speed, 2nd channel: high-speed + low-speed, 3rd channel: low-speed, 4th channel; high-speed + low-speed, and 5th channel: high-speed), the number of channels to be measured is 7. At this time, available sampling frequency is maximum 20k Hz for the 1/2/5 system, maximum 32768 Hz for the 2^n system.

See the following MEMO.

(8) Dual-sampling - CAN information, No. 26 (ID conditions)

3 types: "High-speed", "Low-speed", "High-speed + low-speed"

When measuring CAN data by using CAN cards, available sampling frequency is maximum 2k Hz for the 1/2/5 system, maximum 2048 Hz for the 2^n system.

(9) Digital-input channels, dual-sampling mode - Measuring conditions No. 3 (common condition)

3 types: "High-speed", "Low-speed", "High-speed and low-speed"

Digital-input channels: When the sampling frequency exceeds 10k Hz, the sampling frequency and the number of channels will be limited.

MEMO

○ The number of channels to be measured

The sampling frequency and the maximum number of channels to be measured are as follows.

Normal-sampling Mode

320,000 ≥ Sampling frequency [Hz] × The maximum number of channels to be measured

Dual-sampling Mode

320,000 ≥ Sampling frequency (high-speed) [Hz] × The maximum number of channels to be measured

[Example 1]

Suppose the sampling frequency is 50k Hz.

The maximum number of channels to be measured is as follows.

320,000 ÷ 50,000 [Hz] = 6.4 [CH]

The maximum number of channels to be measured is maximum 6 channels.

[Example 2]

Suppose the number of channels to be measured is 7.

The sampling frequency is as follows.

320,000 ÷ 7 [CH] = 45714.2 [Hz]

Available sampling frequency is maximum 20k Hz for the 1/2/5 system, maximum 32768 Hz for the 2^n system.

Digital-input channels: When the sampling frequency exceeds 10k Hz, the sampling frequency and the number of channels will be limited.

8-3 FIXED DIGITAL FILTER

This section describes how to set the "fixed digital filter" by selecting the cut-off frequency in the EDX.

8-3-1 Outline

When using the fixed digital filter, be aware of the following points.

- Recording is allowed when the A/D data format is 24 bits.
- The range of the cutoff frequency varies with the sampling frequency (high-speed).
- The sampling frequency (high-speed) is limited to 20 Hz or more.

8-3-2 Specifications of the fixed digital filter

The specifications of the fixed digital filter are described as follows.

8th-order butterworth lowpass filter (IIR)
Amplitude Ratio at the cutoff point -3dB
Attenuation characteristics -48dB/oct.

[NOTE] The fixed digital filter can be used with the built-in low-pass filer of conditioner cards.
The fixed digital filter is not available with the CAN data and digital input data.

8-3-3 Details of parameters

When using the fixed digital filter, set parameters as follows.

(1) A/D data format - General information, No. 1
Set 1: 24 bits.

(2) Digital filtering - Measuring conditions, No. 3 (Common Condition)
Set 1: ON.

(3) Order of low-pass filter - Measuring conditions No. 3 (Common Condition)
Order of high-pass filter - Measuring conditions No. 3 (Common Condition)
Set both to "0: OFF."

MEMO

- When the order of low-pass filter and order of high-pass filter in the measuring conditions (common condition) are both "0: OFF", the filter is fixed digital filter.
- When the order of low-pass filter or order of high-pass filter in the measuring conditions (common condition) is not "0: OFF", the filter is arbitrary digital filter. For details, see "8-4 ARBITRARY DIGITAL FILTER."

NOTE

Note that you cannot use the fixed digital filter and arbitrary digital filter at the same time.

(4) Digital filtering and cutoff frequency - Analog channel conditions, No. 23 (LPF)

The available cutoff frequency (Fc) is based on the sampling frequency (Fs).

1/2/5 system: $Fs/500 \leq Fc \leq Fs/20$

2^n system: $Fs/256 \leq Fc \leq Fs/16$

Table: Sampling frequency and cutoff frequency (1/2/5 system)

Sampling Frequency (Hz)	Available cutoff frequency [Hz]
100k	5k, 2k, 1k, 500, 200
50k	2k, 1k, 500, 200, 100
20k	1k, 500, 200, 100, 50
10k	500, 200, 100, 50, 20
5k	200, 100, 50, 20, 10
2k	100, 50, 20, 10, 5
1k	50, 20, 10, 5, 2
500	20, 10, 5, 2, 1
200	10, 5, 2, 1
100	5,2, 1
50	2,1
20	1
10,5, 2,1	(setting not available)

Table: Sampling frequency and cutoff frequency (2^n system)

Sampling Frequency (Hz)	Available cutoff frequency [Hz]
65536	4096, 2048, 1024, 512, 256
32768	2048,1024, 512,256,128
16384	1024, 512, 256, 128, 64
8192	512256128, 64,132
4096	256, 128, 64, 32, 16
2048	128, 64, 32, 16, 8
1024	64, 32, 16, 8, 4
512	32, 16, 8, 4, 2
256	16, 8, 4, 2
128	8,4, 2
64	4,2
32	2
16,8, 4,2	(setting not available)

MEMO

- When using the digital filtering, immediately after starting A/D conversion, data is not stable. Therefore, during the time required to stable a data (referred to as the settling time), "no monitor data" is returned even if the GMD command, GDD command, or GDC command is sent.

- The settling times are as follows.

Table: The settling time of the digital filtering based on the 1/2/5 system

Fs [Hz]	Fc [Hz]	Settling time [ms]
100k	5k	0.6
	2k	1.3
	1k	2.6
	500	5.1
	200	10.3
50k	2k	1.5
	1k	2.6
	500	5.1
	200	12.8
	100	25.7
20k	1k	3.0
	500	5.9
	200	12.9
	100	25.7
	50	51.3
10k	500	6.0
	200	12.9
	100	25.7
	50	51.4
	20	128.3
5k	200	14.8
	100	25.8
	50	51.4
	20	128.4
	10	256.6

Fs [Hz]	Fc [Hz]	Settling time [ms]
2k	100	30.0
	50	59.0
	20	128.5
	10	257.0
	5	513.0
1k	50	60.0
	20	129.0
	10	257.0
	5	514.0
	2	1283.0
500	20	148.0
	10	258.0
	5	514.0
	2	1284.0
	1	2566.0
200	10	300.0
	5	590.0
	2	1285.0
	1	2570.0
100	5	600.0
	2	1290.0
	1	2570.0
50	2	1480.0
	1	2580.0
20	1	3000.0

Table: The settling time of the digital filtering based on the 2^n system

Fs [Hz]	Fc [Hz]	Settling time [ms]
65536	4096	0.7
	2048	1.4
	1024	2.5
	512	5.0
	256	10.0
32768	2048	1.5
	1024	2.9
	512	5.0
	256	10.0
	128	20.1
16384	1024	2.9
	512	5.8
	256	10.1
	128	20.1
	64	40.1
8192	512	5.9
	256	11.6
	128	20.1
	64	40.2
	32	80.2
4096	256	11.7
	128	23.2
	64	40.3
	32	80.3
	16	160.4

Fs [Hz]	Fc [Hz]	Settling time [ms]
2048	128	23.4
	64	46.4
	32	80.6
	16	160.6
	8	320.8
1024	64	46.9
	32	92.8
	16	161.1
	8	321.3
	4	641.6
512	32	93.8
	16	185.5
	8	322.3
	4	642.6
	2	1283.2
256	16	187.5
	8	371.1
	4	644.5
	2	1285.2
	1	2566.4
128	8	375.0
	4	742.2
	2	1289.1
	1	2570.3
64	4	750.0
	2	1484.4
	1	2578.1
32	2	1500.0
	1	2968.8
16	1	3000.0

The "no monitor data" status occurs when start monitoring data, start waiting for interval measurements, start waiting for trigger measurements, start recording data for the first time in manual measurements, start recording data in interval measurements, when re-start monitoring data after the recording is finished, and executing balance or executing internal sensitivity compensation.

When the measuring mode (high-speed) is the trigger, dual-sampling mode, "no monitor data" status occurs when start monitoring data or when re-start monitoring data after the recording is finished.

8-4 ARBITRARY DIGITAL FILTER

This section describes how to set the arbitrary digital filter that sets the cutoff frequency by 1 Hz. You can select either low-pass filter or high-pass filter on an arbitrary digital filter.

8-4-1 Outline

When using the arbitrary digital filter, be aware of the following points.

- The EDX software version should be version 01.20 or higher.
- Recording is allowed when the A/D data format is 24 bits.
- The range of the cutoff frequency varies with the sampling frequency (high-speed).
- The sampling frequency (high-speed) is limited to 3Hz or more.
- Set the measuring conditions and arbitrary digital filter conditions by using the MES command.

8-4-2 Specifications of the arbitrary digital Filter

The specifications of the arbitrary digital filter are described as follows.

Butterworth filter (IIR)

Filter type	Low pass filter, high-pass filter
Order of filter	1 to 8th
Amplitude Ratio at the cutoff point	-3dB
Attenuation characteristics	-6×N dB/oct. (N: Order of filter)

[NOTE] The fixed digital filter can be used with the built-in low-pass filer of conditioner cards.
The fixed digital filter is not available with the CAN data and digital input data.

8-4-3 Details of Parameters

When using an arbitrary digital filter, set parameters as follows.

(1) A/D data format - General information No. 1
Set 1: 24 bits.

(2) Digital filter setting - Measuring conditions, No. 3 (Common Condition)
Set 1: ON.

(3) Order of low-pass/ high-pass filter - Measuring conditions No. 3 (Common Condition)
Set the order of low-pass filter (1 to 8th) and order of high-pass filter (1 to 8th).
Note that the order is common to all channels.

MEMO

- When the order of low-pass filter and order of high-pass filter in the measuring conditions (common condition) are both "0: OFF", the filter is fixed digital filter. For details, see "8-3 FIXED DIGITAL FILTER."
- When the order of low-pass filter or order of high-pass filter in the measuring conditions (common condition) is not "0: OFF", the filter is arbitrary digital filter.

NOTE

Note that you cannot use the fixed digital filter and arbitrary digital filter at the same time.

(4) Low-pass/high-pass filter, cut-off frequency - Analog channel conditions No. 23

The available cutoff frequency (Fc, by every 1 [Hz]) is based on the sampling frequency (Fs).

$Fs/1000 \leqq Fc \leqq Fs/2.5$

When using the low-pass filter and high-pass filter at the same time, the cut-off frequency of the low-pass filter (Fc) and the cut-off frequency of the high-pass filter (Fc) are limited as follows.

Fc (High-pass filter) < Fc (Low-pass filter)

[Example]

When the sampling frequency (Fs) is 1073 Hz, the range of the cutoff frequency (Fc) is as follows.

$2 \leqq Fc \leqq 429$

Lower limit of the cut-off frequency	:Fs/1000	= 1073/1000	= 1.073	2 [Hz]
Upper limit of the cut-off frequency	:Fs/2.5	= 1073/2.5	= 429.2	429 [Hz]

(5) Arbitrary digital filter conditions

Set the measuring conditions and arbitrary digital filter conditions by using the MES command.

To set an arbitrary digital filter conditions, obtain parameters by using the digital filter library.

For details, see "9 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT."

(6) Settling time (the number of data) - Measuring conditions No. 3 (common condition)

Obtain the number of data, applicable to the settling time, by using the digital filter library.

For details, see "9 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT."

During the synchronous operation, set the maximum settling time (the number of data) to all units.

For details, see the MEMO in the "8-3 FIXED DIGITAL FILTER."

MEMO

The arbitrary digital filter requires the filter library and arbitrary digital filter conditions. Therefore, the settings of the arbitrary digital filter have complexity than that of the fixed digital filter.

8-5 DIGITAL INPUT/OUTPUT FUNCTION

8-5-1 Outline

When using the digital input/output function, be aware of the following points.

- The ECAN-40A, ETIM-40A, or EGPC-40A should be installed in the optional card slot.
- The EDX-200A software version should be version 01.40 or higher.
- Digital-input channels:
  When the sampling frequency exceeds 10k Hz, the sampling frequency and the number of channels will be limited.
- To use the "7: While exceeding the ECAN-CH range only." and "8: An ECAN-CH is exceeding its range." of the digital output functions, set the measuring conditions and ECAN conditions by using the MES command. The sampling frequency should be 5kHz or less.

8-5-2 Details of Parameters

When using the digital input/output function, set parameters as follows.

(1) Bit input/output setting - Digital input/output condition No. 28 (Bit No. 1to Bit No. 8)
Set the function of every bit.
0: OFF, 1: Digital input, 2: Remote control mode, 3: Digital output

(2) Digital-input channels, dual-sampling mode - Measuring conditions No. 3 (common condition)
When using the digital input, set the digital-input channels to the dual sampling mode.

Normal-sampling mode:	0 (High-speed)
Dual-sampling mode:	0 (High-speed), 1 (Low-speed), 2 (High-speed and low-speed)

(3) Remote control mode function - Digital input/output condition No. 28 (Bit No. 1 to Bit No. 8)
When using the remote control mode, set the function to be operated on the remote control mode.
During the synchronous operation, the remote control mode is available on the master EDX only.

(4) Digital output function - Digital input/output condition No. 28 (Bit No. 1 to Bit No. 8)
When using the digital output, set the output signal of the digital output.

(5) Analog-exceeding channel - Digital input/output condition No. 28 (Bit No. 1 to Bit No. 8)
To use the "5: While exceeding the analog channel range only." and "6: An analog channel is exceeding its range.", set the target analog channel.

(6) ECAN-exceeding channel - Digital input/output condition No. 28 (Bit No. 1 to Bit No. 8)
To use the digital output function; 7 (While exceeding the ECAN-CH range only) and 8 (An ECAN-CH is exceeding its range), set the target ECAN-CH.
Also set the ECAN conditions. For details, see "10 ECAN CONDITIONS FORMAT".

(7) Digital input/output settings - Measuring conditions, No. 3 (common condition)
Set the all bits applicable to the function, pre-set in the "Bit input/output setting - Digital input/output condition No. 28 (Bit No. 1 to Bit No. 8)."

[Example]
Suppose the Bit No. 1 to Bit No. 4 are digital input.
Set "0x01".

[Example]
Suppose the Bit No. 1 to Bit No. 4 are digital input, Bit No. 7 is remote control mode, and Bit No. 8 is digital output.
Set "0x07".

MEMO

The data size of the digital-input channels is fixed in spite of the number of bits, pre-set in the digital input.
16-bit mode: 16 bits
24-bit mode: 32 bits
The bits other than "1: Digital input" are always 0.

8-6 CAN MEASUREMENT BY USING OPTIONAL CARD

8-6-1 Outline

When measuring CAN by using the optional card, be aware of the following points.

- The EDX-200A software version should be version 01.40 or higher.
- The ECAN-40A or EGPC-40A should be installed in the optional card slot.
- Set the measuring conditions and ECAN conditions by using the MES command.
- PAUSE function is not allowed while recording operation

8-6-2 Details of parameters

(1) CAN measurement by using optional card - Measuring conditions, No. 3 (common condition)
Set "1 (ON)."

(2) ECAN conditions
(For details, see "10 ECAN CONDITIONS FORMAT.")

8-7 INTERVAL MEASUREMENT (GPS SYNCHRONIZATION) BY USING OPTIONAL CARD

8-7-1 Outline

When using the interval measurement (GPS synchronization) by using the optional card, be aware of the following points.

- The EDX-200A software version should be version 01.40 or higher.
- The ETIM-40A or EGPC-40A should be installed in the optional card slot.
- To operate multiple units synchronously, install the ETIM-40A or EGPC-40A in the synchronous master.
  Using the interval measurement (GPS synchronization) on the slave's ETIM-40A or on the slave's EGPC-40A is not allowed.
- The external-clock-input function is not allowed.
- The Measuring mode (high-speed) is Interval mode only.

8-7-2 Details of Parameters

When using the interval measurement (GPS synchronization) by using the optional card, set parameters as follows.

(1) Time zone information - General information No. 1
Set the time zone information of the pre-set area.
[Example]
When setting the measuring conditions at the area, where 9 hours ahead of the Standard Time (ST), set "-540 (minutes)".
When the time zone information is "-540 (minutes)" and the interval start time is "2013/12/17 09:20:46", the EDX starts recording data at 2013/12/17 00:20:46 (in UTC).

(2) Measuring mode (high-speed)/measuring mode (low-speed) - Measuring conditions No. 3 (common condition)
Set "1 (Interval)."

(3) Time synchronization function by using optional card - Measuring conditions, No. 3 (common condition)
Set "1 (ON)."

(4) Measuring conditions No. 5 (interval conditions)
Set the interval conditions.

NOTE

- When using the interval measurement (GPS synchronization) in the dual-sampling mode, please set up so that the high-speed channels and low-speed channels of the measurement ON exist.

8-8 "POINT ZERO" MEASUREMENT BY USING OPTIONAL CARD

8-8-1 Outline

When using the "Point ZERO" measurement by using the optional card, be aware of the following points.

- The EDX-200A software version should be version 01.40 or higher.
- The ETIM-40A or EGPC-40A should be installed in the optional card slot.
- To operate multiple units synchronously, install the ETIM-40A or EGPC-40A in the synchronous master. Using the "Point ZERO" measurement on the slave's ETIM-40A or on the slave's EGPC-40A is not allowed.
- The external-clock-input function is not allowed.
- The Measuring mode (high-speed) is Manual mode only. The number of repeat times should be 1 (1 time).
- PAUSE function is not allowed while recording operation.

8-8-2 Details of Parameters

When using the "Point ZERO" measurement by using the optional card, set parameters as follows.

(1) Time zone information - General information No. 1
Set the time zone information of the pre-set area.
[Example]
When setting the measuring conditions at the area, where 9 hours ahead of the Standard Time (ST), set "-540 (minutes)".

(2) Measuring mode (high-speed)/measuring mode (low-speed) - Measuring conditions No. 3 (common condition)
Set "0 (Manual)."

(3) Time synchronization function by using optional card - Measuring conditions No. 3 (common condition)
Set 1 (ON).

(4) Measuring conditions No. 4 (manual conditions)
Set the manual conditions.
The number of repeat times should be 1 (1 time).

NOTE

- When using the "Point ZERO" measurement in the dual-sampling mode, please set up so that the high-speed channels and low-speed channels of the measurement ON exist.

8-9 RECORDING GPS DATA BY USING OPTIONAL CARD

8-9-1 Outline

When recording GPS data by using the optional card, be aware of the following points.

- The EDX-200A software version should be version 01.40 or higher.
- The ETIM-40A or EGPC-40A should be installed in the optional card slot.
- To record GPS data, be sure to measure GPS data and the other 1 channel data (minimum).
- To operate multiple units synchronously, install the ETIM-40A or EGPC-40A in the synchronous master.
- Using the recording GPS data function on the slave's ETIM-40A or on the slave's EGPC-40A is not allowed.
- PAUSE function is not allowed while recording operation.

8-9-2 Details of Parameters

(1) Recording GPS data by using optional card - Measuring conditions No. 3 (common condition)
Set 1 (ON).

8-10 SUPPLEMENT OF SETTING CAN INFORMATION (CAN-40A/41A)

This section describes how to set the conditions by using the CAN-40A/41A.

8-10-1 CAN information (general information)

(1) The number of CAN-IDs
Sets the total number of IDs of the target CAN-ID. The total number range is 0 to 32. Set “0” for not using a CAN-40A/41A.
The number of CAN-IDs should be the total number of measurement ON (Measurement: 1 = Measure) IDs.

(2) How to extract CAN-CH conditions
Sets the cutout method of the CAN-CH conditions.
To decide how to cutout CH conditions of the CAN-40A/41A when reproducing the data file recorded with data reproduction and analyzing software such as the DAS-200A.
Ranges are 0: Start bit + bit length or 1: start position + end position.
The cutout method has no influence on data recording. For not using, set “0.”

8-10-2 CAN information (communication condition 1 and 2)

Sets communication conditions of CAN-40A/41A. The communication condition 1 is for port 1 and communication condition 2 is for port 2.
CAN-40A: Port 1 only (Set “0” to every condition in the communication condition 2.)
CAN-41A: Port 1 and port 2 for not using either one port, set "0" to every condition in the remaining port.

(1) Communication standard
Sets the communication standard of the target CAN bus.
0: High-speed or 1: Low-speed

(2) Communication speed
Sets the communication speed of the CAN bus.
Setting values are described as follows.

Value	Communication speed (kbps)	Available or not available	
		High-speed	Low-speed
0	1000	✓	
1	800	✓	
2	500	✓	
3	250	✓	
4	125	✓	✓
5	100	✓	✓
6	83.3	✓	✓
7	62.5	✓	✓
8	50	✓	✓
9	33.3	✓	✓
10	25	✓	✓
11	20	✓	✓
12	10	✓	✓

✓: Available

(3) Sample point

It is as follows by whether transmission speed is 800 [kbps].

Communication speed: Not 800 [kbps]

Value	Sample point
0	85% (TSEG1 = 16, TSEG2 = 3), 40M Hz
1	80% (TSEG1 = 15, TSEG2 = 4), 40M Hz
2	75% (TSEG1 = 14, TSEG2 = 5), 40M Hz
3	70% (TSEG1 = 13, TSEG2 = 6), 40M Hz
4	65% (TSEG1 = 12, TSEG2 = 7), 40M Hz
5	60% (TSEG1 = 11, TSEG2 = 8), 40M Hz
6	80% (TSEG1 = 7, TSEG2 = 2), 40M Hz
7	70% (TSEG1 = 6, TSEG2 = 3), 40M Hz
8	60% (TSEG1 = 5, TSEG2 = 4), 40M Hz
9	87.5% (TSEG1 = 13, TSEG2 = 2), 32M Hz
10	81.3% (TSEG1 = 12, TSEG2 = 3), 32M Hz
11	75.0% (TSEG1 = 11, TSEG2 = 4), 32M Hz
12	68.8% (TSEG1 = 10, TSEG2 = 5), 32M Hz
13	62.5% (TSEG1 = 9, TSEG2 = 6), 32M Hz
14	56.3% (TSEG1 = 8, TSEG2 = 7), 32M Hz
15	75.0% (TSEG1 = 5, TSEG2 = 2), 32M Hz
16	62.5% (TSEG1 = 4, TSEG2 = 3), 32M Hz

Communication speed: 800 [kbps]

Value	Sample point
17	85% (TSEG1 = 16, TSEG2 = 3), 32M Hz
18	80% (TSEG1 = 15, TSEG2 = 4), 32M Hz
19	75% (TSEG1 = 14, TSEG2 = 5), 32M Hz
20	70% (TSEG1 = 13, TSEG2 = 6), 32M Hz
21	65% (TSEG1 = 12, TSEG2 = 7), 32M Hz
22	60% (TSEG1 = 11, TSEG2 = 8), 32M Hz
23	80% (TSEG1 = 7, TSEG2 = 2), 32M Hz
24	70% (TSEG1 = 6, TSEG2 = 3), 32M Hz
25	60% (TSEG1 = 5, TSEG2 = 4), 32M Hz

(4) The number of sampling times

Sets the number of sampling times.

0: 1 time or 1: 3 times

The number of sampling times: 1 (3 times) is available when the communication standard is 0: High-speed only. Note that the communication speed will be limited.

NOTE

When the communication standard is 0: High-speed + the number of sampling times is 1: 3 times, available communication speeds are 4 types; 1000, 800, 500, and 250 [kbps].

(5) Resynchronization jump width

Sets the resynchronization jump width. The values are as follows.

Value	Resynchronization jump width [TQ]
0	1
1	2
2	3
3	4

NOTE

The TSEG2 value of the sample point and Resynchronization jump width should satisfy the following.

(Resynchronization jump width) <= (TSEG2 value of the sample point)

(6) Termination resistor

Sets whether the terminating resistor on a CAN card is valid.

0 (OFF: Invalid) or 1 (ON: Valid)

8-10-3 CAN information (ID1 to ID32)

Sets ID conditions of CAN-40A/41A. The CAN-40A/41A records data in fixed-length packets (known as “data frame”). The term “ID” is a storing box of data frames. The CAN-40A has 16 boxes and CAN-41A has 32 boxes. The ID conditions of CAN cards are conditions for storing data frames to the “box.”
The data frame is 8-byte fixed length. If you select ON in the following item (1), 8-bytes data/ID is recorded.
If you try to measure all IDs , the data volume/sampling is as follows.
CAN-40A: 8 × 16 = 128 bytes
CAN-41A: 8 × 32 = 256 bytes
CAN-40A: ID1 to ID16 are available. Set “0” to ID17 to ID32.
CAN-41A: ID1 to ID32 are available.

(1) Measurement
Sets whether the ID is to be measured or not to be measured.
0 (OFF: Not to be measured) or 1 (ON: To be measured)

(2) Format
Sets the format of the frame ID No. (see "(7) Frame ID No. in the 8-10-3 CAN information (ID1 to ID32).").
0: Standard format or 1: Extension format
For the standard format: The frame ID No. is 0 to 7FFh (11 bits)
For the extension format: The frame ID No. is 0 to 1FFFFFFFh (29 bits)
Make sure the item matches the settings of the CAN-data-output equipment.

(3) Data length
Sets the valid data length of the data frame. The data frames covered by the EDX are 8-byte fixed length. If data less than 8 bytes is output from the CAN-data-output-equipment, 0 is added to satisfy the 8-byte fixed length.
0 (1-byte fixed) to 7 (8-byte fixed)
Make sure the item matches the settings of the CAN-data-output equipment.

(4) Endian
Sets the data frame assignment.
0 (Little) or 1 (Big)
Make sure the item matches the settings of the CAN-data-output equipment.

(5) LSB/MSB (0: LSB, 1: MSB)
Sets the LSB side or MSB side when cutout the CAN-CH data.
When the (4) Endian is 1: Big, 0: LSB or 1: MSB can be selected.
When the (4) Endian is 0: Little, set 0: LSB.

(6) Port No.
Sets the port No.

(7) Frame ID No.

Sets the data frame ID No.

The range of the data frame ID No. depends on the format. (See the item (2) Format in the "8-10-3 CAN information (ID1 to ID32).")

NOTE

Make sure the frame ID numbers will not overlap.

However, overlapping frame ID numbers are available under the following conditions.

- Having different port No. (CAN-41A)
- Having different format.

(8) ID name

Sets the ID name within 40 characters (optional).

For not using, set “0.”

8-10-4 CAN information (CH1 to CH256)

With the CAN-40A/41A, one data frame is divided (cutout) into maximum 8 data items. CH numbers are allocated to the divided data for management. The CAN-CH conditions are for setting the cutout conditions of a data frame. With the EDX, you can display the cutout data in physical quantity by multiplying coefficients. You can also treat the divided data as well as analog CH data.
Since every CAN-CH condition has setting conditions of 8 channels/ID, the EDX has 8 CHs × 32 IDs = 256 CHs.
The CAN-ID No. and CAN-CH No. are as follows.

CAN-ID No.	CAN-CH No.	Remarks
1	1 to 8	For CAN-40A and CAN-41A
2	9 to 16	
3	17 to 24	
. . .		
16	121 to 128	
17	129 to 136	CAN-41A only
18	137 to 144	
. . .		
32	249 to 256	

*Since the number of CAN-IDs of the CAN-40A is 16, the first 128 channels are valid.

(1) Measurement
Sets whether CAN-CH conditions are valid or invalid.
0 (OFF: Not to be measured) or 1 (ON: To be measured)
Note that 1 (ON: To be measured) indicates valid conditions and 0 (No: Not to be measured): invalid conditions.
When the CAN-ID is 1 (ON: To be measured), make sure the least one of the applicable CAN-CH conditions is 1 (ON: To be measured).

(2) Start bit
Sets the cutout-start position in bits.
0 to 63

(3) Bit length
Sets the cutout-data size in bits.
1 to 64

(4) Data type
Sets the cutout-data type.
0 to 3

No.	Notation	Details
0	Signed	Signed integer
1	Unsigned	Unsigned integer
2	Float	Single precision floating decimal point variable (bit length: 32 bits)
3	Double	Double precision floating decimal point variable (bit length: 64 bits)

(5) Calibration coefficient/offset
Sets multiplier (Calibration coefficient: A) and additional value (Offset: B) for converting the cutout data into physical quantity. Sets A and B in the double precision floating decimal point variable (Double).
Suppose the cutout data is X. The physical quantity to be converted (Y) is Y = AX + B.

(6) Name
Sets the CH name within 40 characters (optional).
For not using, set “0.”

(7) Unit No.
Sets the unit of the converted physical quantity, based on the above item (5) Calibration coefficient/offset in the "8-10-4 CAN information (CH1 to CH256)", to Unit No.
0 to 62
For details, see "8-11 UNIT NO. AND UNIT CHARACTER STRING."

8-11 UNIT NO. AND UNIT CHARACTER STRING

Unit No. and unit character string, used in the EDX, are as follows.
Unit character string may partially differ according to setting of “KS2 based language” (Japanese or English) of measuring condition parameter.
Unit Nos. 60 to 62 are user defined units.

No.	Unit character string		No.	Unit character string	
	Japanese	English		Japanese	English
0	με	um/m	32	%	
1	ε	e	33	dB	
2	mV		34	ppm	
3	V		35	cm/s	
4	mA		36	m/s	
5	A		37	m/min	
6	mm		38	km/h	
7	cm		39	Hz	
8	m		40	kHz	
9	℃	degC	41	MHz	
10	℉	degF	42	°	deg
11	gf/cm2		43	deg	
12	kgf/mm2		44	rad	
13	kgf/cm2		45	kN	
14	kgf/m2		46	kNm	
15	mmHg		47	kW	
16	kPa		48	rpm	
17	MPa		49	cm/s2	
18	g		50	m/s2	
19	Kg		51	G	
20	ton		52	daN	
21	gf		53	mile/h	
22	kgf		54	*100kpa	
23	tonf		55	deg/s	
24	N		56	msec	
25	kgf·mm	Kgf.mm	57	sec	
26	kgf·cm	Kgf.cm	58	min	
27	kgf·m	Kgf.m	59	hour	
28	Nm		60	(User defined unit)	
29	Ω	OHM	61	(User defined unit)	
30	kΩ	kOHM	62	(User defined unit)	
31	MΩ	MOHM			

8-12 CONDITIONER CARD TYPE NO.

Conditioner card type Nos. used in commands and condition files are as follows.

Card type No.	Card Name	Remarks
0	No card	
1	Unknown card	
2	CDV-40A	
3	(Reserved)	(*1)
4	(Reserved)	(*1)
5	CAN-40A	
6	CTA-40A	
7	(Reserved)	(*1)
8	DPM-42A	
9	CCA-40A	
10	CFV-40A	
11	(Reserved)	(*1)
12	(Reserved)	(*1)
13	Not applicable card	Installation slot error
14	CDV-40A-F	
15	DPM-42A-F	
16	CCA-40A-F	
17	(Reserved)	(*1)
18	(Reserved)	(*1)
19	(Reserved)	(*1)
20	(Reserved)	(*1)
21	(Reserved)	(*1)
22	(Reserved)	(*1)
23	CAN-41A	
24	(Reserved)	(*1)
25	(Reserved)	(*1)
26	DPM-42B-I	
27	DPM-42B-I-F	
28	DPM-42B	
29	DPM-42B-F	
30	CDV-40B	
31	CDV-40B-F	
32	(Reserved)	(*1)
33	(Reserved)	(*1)
34	(Reserved)	(*1)
35	CDV-44AS	
36	(Reserved)	(*1)
37	CDA-44AS	
38	CDA-45AS	
39	CVM-40A	
40	(Reserved)	

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Card type No.	Card Name	Remarks
41	AD-40AS	
42	AD-40AS-F	
43	(Reserved)	(*1)
44	(Reserved)	(*1)
45	CVM-41A	
46	(Reserved)	(*1)
47	CDV-46AS	
48	(Reserved)	(*1)

(*1) When the reserve No. is returned from the EDX, the card is a custom-made card.

8-13 OPTIONAL CARD TYPE No.

Optional card type Nos. used in commands and condition files are as follows.

Card type No.	Card Name	Remarks
0	No card	
1	Unknown card	
2	ECAN-40A	
3	ETIM-40A	
4	EGPC-40A	

8-14 VALUES OF CONDITIONER CARDS

Values of conditioner cards are as follows.
(Shaded portions indicate initial values.)

Card type	Card type No.	2: CDV-40A 14: CDV-40A-F 30: CDV-40B 31: CDV-40B-F		10: CFV-40A	6: CTA-40A	
Mode		0: Strain	1: Voltage	0: ZC/S 1: ZC/N 2: TTL	0: K (ON) 1: K (OFF)	2: T (ON) 3: T (OFF)
Range		0: 500 uε 1: 1k uε 2: 2k uε 3: 5k uε 4: 10k uε 5: 20k uε 6: 50k uε 7: OFF	0: 0.1 V 1: 0.2V 2: 0.5V 3: 1.0V 4: 2.0V 5: 5.0V 6: 10.0 V 7: OFF	0: 50 Hz 1: 100 Hz 2: 500 Hz 3: 1k Hz 4: 2k Hz 5: 5k Hz 6: 10k Hz 7: 20k Hz 8: OFF	0: 240degC 1: 480degC 2: 1230degC 3:OFF	0: 210degC 1: 400degC 2: OFF
Low pass filter		0: FLAT 1: 10k Hz 2: 3k Hz 3: 1kHz 4: 300 Hz 5: 100 Hz 6: 30 Hz 7: 10 Hz 8: AUTO (CDV-40A-F and CDV-40B-F only)		***	***	
High Pass Filter		0: OFF 1: 0.2Hz 2: 1Hz		0: OFF 1: ON	***	
CAL Range		0: 100% 1: 50% 2: SHUNT	0: 100% 1: 50%	0: 100% 1: 50%	0: 100% 1: 50% 2: CHECK	

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Card type	Card type No.	9: CCA-40A 16: CCA-40A-F	8: DPM-42A 15: DPM-42A-F 28: DPM-42B 29: DPM-42B-F 26: DPM-42B-I 27: DPM-42B-I-F	
Mode		0: Voltage	0: BV (2.0 V)	1: BV (0.5 V)
Range		0: 20 mV 1: 50 mV 2: 100 mV 3: 200 mV 4: 500 mV 5: 1000 mV 6: 2000 mV 7: 5000 mV 8: OFF	0: 200 uε 1: 500 uε 2: 1k uε 3: 2k uε 4: 5k uε 5: 10k uε 6: 20k uε 7: OFF	0: 1k uε 1: 2k uε 2: 5k uε 3: 10k uε 4: 20k uε 5: 50k uε 6: OFF
Low pass filter		0: FLAT 1: 10k Hz 2: 3k Hz 3: 1kHz 4: 300 Hz 5: AUTO (CCA-40A-F only)	0: FLAT 1: 1k Hz 2: 300 Hz 3: 100 Hz 4: 30 Hz 5: 10 Hz 6: AUTO (DPM-42A-F, DPM-42B-F, and DPM-42B-I-F only)	
High Pass Filter		***	***	
CAL Range		0: DC100% 1: DC50% 2: AC100% 3: AC50%	0: 100% 1: 50% 2: SHUNT	

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Card type	Card type No.	35: CDV-44AS		37: CDA-44AS 38: CDA-45AS	
Mode		0: Strain (ON) 1: Strain (OFF)	2: Voltage (ON) 3: Voltage (OFF)	0: Strain (ON) 1: Strain (OFF)	2: Voltage (ON) 3: Voltage (OFF)
Range		0: 500 uε 1: 1k uε 2: 2k uε 3: 5k uε 4: 10k uε 5: 20k uε 6: OFF	0: 1.0 V 1: 2.0 V 2: 5.0 V 3: 10.0 V 4: 20.0 V 5: 50.0 V 6: OFF	0: 500 uε 1: 1k uε 2: 2k uε 3: 5k uε 4: 10k uε 5: 20k uε 6: OFF	0: 1.0 V 1: 2.0 V 2: 5.0 V 3: 10.0 V 4: 20.0 V 5: 50.0 V 6: OFF
Low pass filter		0: FLAT 1: 1k Hz 2: 300 Hz 3: 100 Hz 4: 30 Hz 5: 10 Hz		0: FLAT 1: 100 Hz 2: 30 Hz 3: 10 Hz 4: 3 Hz 5: 1 Hz	
High Pass Filter		0: OFF 1: 0.2 Hz		0: OFF 1: 0.2 Hz	
CAL Range		0: 100% 1: 50% 2: SHUNT	0: 100% 1: 50%	0: 100% 1: 50% 2: SHUNT	0: 100% 1: 50%

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Card type	Card type No.	47: CDV-46AS		41 : AD-40AS 42 : AD-40AS-F
Mode		0: Strain (ON) 1: Strain (OFF)	2: Voltage (ON) 3: Voltage (OFF)	0: Voltage
Range		0: 2k uε 1: 5k uε 2: 10k uε 3: 20k uε 4: 50k uε 5: 100k uε 6: OFF	0: 1.0 V 1: 2.0 V 2: 5.0 V 3: 10.0 V 4: 20.0 V 5: 50.0 V 6: OFF	0:5V 1:10V 2:OFF
Low pass filter		0: FLAT 1: 1k Hz 2: 300 Hz 3: 100 Hz 4: 30 Hz 5: 10 Hz		0: FLAT 1: 10k Hz 2: 3k Hz 3:1kHz 4: 300 Hz 5: 100 Hz 6: 30 Hz 7: 10 Hz 8:AUTO(AD-40AS-F only)
High Pass Filter		0: OFF 1: 0.2 Hz		***
CAL Range		0: 100% 1: 50% 2: SHUNT	0: 100% 1: 50%	0:TEST

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Card type	Card type No.	39: CVM-40A			
Mode		0: Strain (2 V)	1: Strain (5 V)	2: Voltage 3: Voltage (2 V) 4: Voltage (5 V)	5: Piezoelectric
Range		0: 5k uε 1: 10k uε 2: 50k uε 3: 100k uε 4: 500k uε 5: OFF	0: 5k uε 1: 10k uε 2: 50k uε 3: 100k uε 4: 200k uε 5: OFF	0: 1.0 V 1: 5.0 V 2: 10.0 V 3: 50.0 V 4: OFF	0: 100 mV 1: 500 mV 2: 1000 mV 3: 5000 mV 4: OFF
Low pass filter		0: FLAT 1: 3k Hz 2: 1k Hz 3: 300 Hz 4: 100 Hz 5: 30 Hz 6: AUTO			
High Pass Filter		0: OFF 1: 0.2 Hz 2: 1 Hz			***
CAL Range		0: 100% 1: 50% 2: SHUNT	0: 100% 1: 50%		0: DC100% 1: DC50%

Card Type	Card type No	45:CVM-41A				
Mode		0: Strain (2 V)	1: Strain (5 V)	2: Strain (10 V)	3: Voltage 4: Voltage (2 V) 5: Voltage (5 V) 6: Voltage (10 V)	7: Piezoelectric
Range		0:2k uε 1:5k uε 2:10k uε 3:20k uε 4:50k uε 5:100k uε 6:200k uε 7:500k uε 8:OFF	0:2k uε 1:5k uε 2:10k uε 3:20k uε 4:50k uε 5:100k uε 6:200k uε 7:OFF	0:2k uε 1:5k uε 2:10k uε 3:20k uε 4:50k uε 5:100k uε 6:OFF	0:1.0 V 1:2.0 V 2:5.0 V 3:10.0 V 4:20.0 V 5:50.0 V 6:OFF	0:100 mV 1:200 mV 2:500 mV 3:1000 mV 4:2000 mV 5:5000 mV 6:OFF
Low pass filter		0:FLAT 1:3k Hz 2:1k Hz 3:300 Hz 4:100 Hz 5:30 Hz 6:AUTO				
High Pass Filter		0:OFF 1:0.2 Hz 2:1 Hz				***
CAL Range		0:100% 1:50% 2:SHUNT			0:100% 1:50%	0:DC100% 1:DC50%

8-15 CUSTOM-MADE CABLE CORRECTION VALUES AND INPUT CABLE

When using the CDV-40B/A series and CVM-40A/41A series, select the following input cable No.
(Shaded portions indicate initial values.)

Input cable No.	CDV-40B/A series	CVM-40A/41A series
0	Unspecified	Unspecified
1	U-40 to 48 (0.5 m)	U-121 (0.5 m)
2	U-39 (1.0 m)	U-122 (1.0 m)
3	U-38 (1.5 m)	U-123 (1.5 m)
4	Custom-made cable	Custom-made cable

When using conditioner cards (excluding the CDV-40B/A series and CVM-40A/41A series), select the input cable No. "0 (Unspecified)."
When the input cable No. is "4 (custom-made cable)", enter the custom-made cable correction values "-1 to 49."
When the input cable No. is not "4 (custom-made cable)", enter the custom-made cable correction values "0".
Input ranges of the custom-made cable correction values are -1 to 49.

NOTE

- If you use this function,the EDX-200A software version should be version 01.50 or higher.
- The internal sensitivity compensation uses the input cable No. and custom-made cable correction values. After changing the input cable No. and custom-made cable correction values, be sure to execute the internal sensitivity compensation again.

MEMO

- The custom-made cable correction values are as follows.
  Custom-made cable correction value = (Indicating value of the DCS-100A cable correction value) -1
- When using the CDV-40B/A series and CVM-40A/41A series with the input cable No. "0 (Unspecified)", based on the custom-made cable correction value, the input cable No. will be changed.
  Custom-made cable correction value: 0 — The input cable No. will be changed to 2 (1.0 m).
  Custom-made cable correction value: Not 0 — The input cable No. will be changed to 4 (custom-made cable).

9 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT

Arbitrary digital filter conditions format by using the "Set/load the measuring condition (MES)" command between the PC and EDX. To obtain the filter coefficient of an arbitrary digital filter conditions, use the accessory digital filter library.
The format of an arbitrary digital filter conditions is described as follows.

MEMO

- The arbitrary digital filter conditions are essential for using an arbitrary digital filter.
  Also set the measuring conditions. For details, see "8-4 ARBITRARY DIGITAL FILTER."

- The arbitrary digital filter conditions are not required when using the fixed digital filter.

9-1 ARBITRARY DIGITAL FILTER CONDITIONS FORMAT

The whole size: 8000 bytes

No.	Classification	Contents	Types of Variables	The number of Bytes
1	General Information 128 bytes	Device ID (”EDX-200A-ADF”fixed, ”” is not included.)	char	20
		Parameter format version (1 fixed)	WORD	2
		The number of setting channels (32 fixed)	WORD	2
		The number of filter coefficients (40 fixed)	WORD	2
		The number of bytes/CH (192 bytes)	WORD	2
		Reserved	char	100
2	Filter coefficient, CH1 192 bytes	Filter coefficient, No. 1	float	4
		Filter coefficient, No. 2	float	4
		.	.	.
		Filter coefficient, No. 40	float	4
		Reserved	char	32
	Filter coefficient, CH2 192 bytes	Ditto	---	192
	Filter coefficient, CH3 192 bytes	Ditto	---	192
	.	.	.	.
	Filter coefficient, CH32 192 bytes	Ditto	---	192
3	Reserved	Reserved	char	1728

NOTE

With the channels, not setting arbitrary digital filters, be sure to set the filter coefficient "0".

9-2 DIGITAL FILTER LIBRARY

The digital filter library creates the measuring conditions, required for the arbitrary digital filter function, and parameters of the arbitrary digital filter conditions.

9-2-1 Essential files

The following files are essential for creating and executing an application program.
The following files are saved in the DVD, "EDX-200A" - "ADFLIB" folder, attached to the EDX.

(1) siEDX200AFltAlgo.h — API defined file (required when creating the program)
Should be included this file to the source file when using the API.

(2) siEDX200AFltAlgo.lib — API import library (required when creating the program)
Should be linked this library when creating the program.

(3) siEDX200AFltAlgo.dll — API library main body (required when executing the program)
Should be copied to the same folder with the application program.

9-2-2 API function

9-2-2-1 Constant list

Constant	Value	Contents
SI_EDX200A_FILTER_DLL_MAX_CH	32	The number of channels
SI_EDX200A_FILTER_DLL_COEFFS	40	The number of filter coefficients

9-2-2-2 API function

Function	Function Name
Obtain the arbitrary digital filter parameters for the EDX.	siFltAlgo_GetEDX200APrm

9-2-2-3 List of Return Value of API Functions

Return value of the API function is described in the following table.

Return value	Results
0	Normally ended
1	Parameter error

9-2-2-4 Details of API functions

●siFltAlgo_GetEDX200APrm

Function	Obtain the arbitrary digital filter parameters for the EDX.
Definition	int __stdcall siFltAlgo_GetEDX200APrm(_SI_EDX200A_FILTER_DLL_200APRMIN *p200APrmIn, _SI_EDX200A_FILTER_DLL_200APRMOUT *p200APrmOut)
Return value	See the list of return values.
Memo	*p200APrmIn: A pointer of the structure for setting the filter conditions to the DLL. *p200APrmOut: A pointer of the parameter structure, essential for the EDX. ● Returns the arbitrary digital filter parameters to the *p200APrmOut, based on the filter conditions of the p200APrmIn. ● Sets/obtains the arbitrary digital filter parameters of 32 channels at one time. ● For details of the Structure _SI_EDX200A_FILTER_DLL_200APRMIN and _SI_EDX200A_FILTER_DLL_200APRMOUT, see "9-2-2-5 Details of structures in the API functions."

9-2-2-5 Details of structures in the API functions

(1) Structure_SI_EDX200A_FILTER_DLL_200APRMIN
Parameter structures for calculating the EDX's filter coefficient (272 bytes)

```
typedef struct _SI_EDX200A_FILTER_DLL_200APrmIn
{
  _SI_EDX200A_FILTER_DLL_ALLINFO      AInfo;
  _SI_EDX200A_FILTER_DLL_DHINFO       CInfo[SI_EDX200A_FILTER_DLL_MAX_CH];
} _SI_EDX200A_FILTER_DLL_200APRMIN;
```

Member	Description
AInfo	General Information ● Set the common conditions of all channels. For details, see the following " (3) Structure_SI_EDX200A_FILTER_DLL_ALLINFO."
CInfo	Individual information [CH No. (0 to 31)] ● Set the filter conditions of every channel. For details, see the following "(4) Structure_SI_EDX200A_FILTER_DLL_DHINFO."

(2) Structure_SI_EDX200A_FILTER_DLL_200APRMOUT

Structures for storing the EDX's filter coefficient and settling time (5124 bytes)

```
typedef struct _SI_EDX200A_FILTER_DLL_200APrmOut
{
 unsigned long    SettleTime;
 float            Coeffs[SI_EDX200A_FILTER_DLL_MAX_CH][SI_EDX200A_FILTER_DLL_COEFFS];
} _SI_EDX200A_FILTER_DLL_200APRMOUT;
```

Member	Description
SettleTime	Settling time (the number of data) ● Stores the calculated settling time (the number of data), based on the pre-set conditions in the item "(1) Structure_SI_EDX200A_FILTER_DLL_200APRMIN." ● Set the settling time in the "Settling time (the number of data) - Measuring conditions No. 3 (common condition)". (For details, see "8-4-3 Details of Parameters.") ● To prevent the long-period no-data status during the settling time, the maximum settling time is 3 seconds.
Coeffs	Filter coefficient [CH No. (0 to 31)] [filter coefficient (0 to 39)] ● Stores the calculated filter coefficient, based on the pre-set conditions in the "(1) Structure_SI_EDX200A_FILTER_DLL_200APRMIN." ● Input the stored filter coefficient in the Filter coefficient No. 1 to No. 40 on the arbitrary digital filter conditions of every channel. ● The array and the filter coefficient in the arbitrary digital filter conditions are described as follows.

Array	Arbitrary digital Filter conditions
Coeffs[0][0]	Filter coefficient, CH1, No. 1
Coeffs[0][1]	Filter coefficient, CH1, No. 2
・	・
Coeffs[31][39]	Filter coefficient, CH32, No. 40

(3) Structure_SI_EDX200A_FILTER_DLL_ALLINFO
General Information (16 bytes)

```
typedef struct _SI_EDX200A_FILTER_DLL_AllInfo
{
 unsigned long          Fs;
 unsigned char          OrderL;
 unsigned char          OrderH;
 char                   Reserve1[10];
} _SI_EDX200A_FILTER_DLL_ALLINFO;
```

Member	Description
Fs	Sampling frequency (3 to 100000Hz) ● Set the same value as the sampling frequency (high-speed) in the measuring conditions. ● The range of the cutoff frequency varies with the sampling frequency. For details, see the item "(4) Low pass filter, cut-off frequency/high-pass filter cut-off frequency - Analog channel conditions No. 23" in the "8-4 ARBITRARY DIGITAL FILTER."
OrderL	Order of low-pass filter (0: OFF, 1 to 8: Order) ● Set the same value as the order of low-pass filter in the measuring conditions. ● Note that the order is common to all channels. ● To set the order of low-pass filter OFF, set "0 (OFF)."
OrderH	Order of high-pass filter (0: OFF, 1 to 8: Order) ● Set the same value as the order of high-pass filter in the measuring conditions. ● Note that the order is common to all channels. ● To set the order of high-pass filter OFF, set "0 (OFF)."
Reserve1	Reserved

(4) Structure_SI_EDX200A_FILTER_DLL_DHINFO
Individual Information (256 bytes)

```
typedef struct _SI_EDX200A_FILTER_DLL_ChInfo
{
 unsigned long          CfL;
  unsigned long         CfH;
} _SI_EDX200A_FILTER_DLL_DHINFO;
```

Member	Description
CfL	Low-pass filter, cut-off frequency (0: Filtering OFF, 1 to 40000 Hz) ● Set the same value as the low-pass filter, cut-off frequency in the measuring conditions of every channel. ● The range of the cutoff frequency varies with the sampling frequency. For details, see the item " (4) Low pass filter, cut-off frequency/high-pass filter cut-off frequency - Analog channel conditions No. 23" in the "8-4 ARBITRARY DIGITAL FILTER."
CfH	High-pass filter, cut-off frequency (0: Filtering OFF, 1 to 40000 Hz) ● Set the same value as the high-pass filter, cut-off frequency in the measuring conditions of every channel. ● The range of the cutoff frequency varies with the sampling frequency. For details, see the item " (4) Low pass filter, cut-off frequency/high-pass filter cut-off frequency - Analog channel conditions No. 23" in the "8-4 ARBITRARY DIGITAL FILTER."

9-2-3 Using procedures

This section describes how to use the arbitrary digital filter function.

(1) Create the measuring conditions. For details, see "8 MEASURING CONDITION FORMAT" and "8-4 ARBITRARY DIGITAL FILTER."
(2) Set "Structure_SI_EDX200A_FILTER_DLL_200APRMIN" based on the measuring conditions to be set.
(3) Obtain the arbitrary digital filter parameters by calling the API function "siFltAlgo_GetEDX200APrm()".
(4) Creates the arbitrary digital filter conditions, based on the filter coefficient stored in the "Structure_SI_EDX200A_FILTER_DLL_200APRMOUT".
(5) During the synchronous operation, execute the above item (1) to (4) to every EDX.
(6) Sets the settling time (the number of data), stored in the "Structure_SI_EDX200A_FILTER_DLL_200APRMOUT", to the measuring conditions.
During the synchronous operation, set the maximum settling time (the number of data) to all units.
(7) Transfer the measuring conditions and arbitrary digital filter conditions to the EDX by using the control commands ("7-3-4 Set/load the measuring condition (MES)").

NOTE

Note that you cannot use the fixed digital filter and arbitrary digital filter at the same time.

10 ECAN CONDITIONS FORMAT

ECAN conditions format by using the "Set/load the measuring condition (MES)" command between the PC and EDX. The ECAN conditions format is required for the CAN measurement by using optional card.
The format of the ECAN conditions is described as follows.

MEMO

Before measuring CAN by using the optional card, make sure the "CAN measurement by using optional card - Measuring conditions, No. 3 (common condition)" is 1 (ON).

10-1 ECAN CONDITIONS FORMAT

The whole size: 160000 bytes

No.	Classification	Contents	Types of Variables	The number of Bytes
1	General Information 96 bytes	Device ID ("ECAN-40A" fixed, " " is not included.)	char	20
		Parameter format version (1 fixed)	WORD	2
		The number of ECAN-IDs to be measured (0 to 512)	WORD	2
		Reserved	char	72
2	CAN trigger General conditions 16 bytes	Start CAN trigger mode 0: OFF 2: Analog trigger 3: Digital trigger 6: Complex trigger	BYTE	1
		End CAN trigger (0: OFF, 1: ON)	BYTE	1
		End CAN trigger mode 0: OFF 2: Analog trigger 3: Digital trigger 6: Complex trigger	BYTE	1
		Reserved	char	13
3	Analog trigger conditions 64 bytes	Start trigger channel (1 to 512)	WORD	2
		Start trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level (physical value)	double	8
		Reserved	char	20
		End trigger channel (1 to 512)	WORD	2
		End trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level (physical value)	double	8
		Reserved	char	20
4	Digital trigger conditions 16 bytes	Start trigger channel (1 to 512)	WORD	2
		Start trigger bit (1 to 64)	BYTE	1
		Start trigger level (0 or 1)	BYTE	1
		Reserved	char	4
		End trigger channel (1 to 512)	WORD	2
		End trigger bit (1 to 64)	BYTE	1
		End trigger level (0 or 1)	BYTE	1
		Reserved	char	4

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No.	Classification	Contents	Types of Variables	The number of Bytes
5	Start complex trigger (Common Condition) 32 bytes	Start AND/OR setting 1 (0: OR, 1: AND) Set AND/OR settings of start complex trigger condition 1 and start complex trigger condition 2.	BYTE	1
		Start AND/OR setting 2 (0: OR, 1: AND) Set AND/OR settings of start complex trigger condition 3 and start complex trigger condition 4.	BYTE	1
		Start AND/OR setting 3 (0: OR, 1: AND) Set AND/OR settings of start AND/OR setting 1 and start AND/OR setting 2.	BYTE	1
		Reserved	char	29
6	Start complex trigger Condition 1 64 bytes	Start trigger condition No. 1 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		Start analog trigger slope 1 (0: UP, 1: DOWN)	BYTE	1
		Start trigger channel 1 (1 to 512)	WORD	2
		Start trigger level 1 (physical value)	double	8
		Start digital bit level 1 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		Start digital bit status 1 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36
7	Start complex trigger Condition 2 64 bytes	Start trigger condition No. 2 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		Start analog trigger slope 2 (0: UP, 1: DOWN)	BYTE	1
		Start trigger channel 2 (1 to 512)	WORD	2
		Start trigger level 2 (physical value)	double	8
		Start digital bit level 2 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		Start digital bit status 2 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36
8	Start complex trigger Condition 3 64 bytes	Start trigger condition No. 3 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		Start analog trigger slope 3 (0: UP, 1: DOWN)	BYTE	1
		Start trigger channel 3 (1 to 512)	WORD	2
		Start trigger level 3 (physical value)	double	8
		Start digital bit level 3 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		Start digital bit status 3 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36

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No.	Classification	Contents	Types of Variables	The number of Bytes
9	Start complex trigger Condition 4 64 bytes	Start trigger condition No. 4 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		Start analog trigger slope 4 (0: UP, 1: DOWN)	BYTE	1
		Start trigger channel 4 (1 to 512)	WORD	2
		Start trigger level 4 (physical value)	double	8
		Start digital bit level 4 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		Start digital bit status 4 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36
10	End complex trigger (Common Condition) 32 bytes	End AND/OR setting 1 (0: OR, 1: AND) Set AND/OR settings of end complex trigger condition 1 and end complex trigger condition 2.	BYTE	1
		End AND/OR setting 2 (0: OR, 1: AND) Set AND/OR settings of end complex trigger condition 3 and end complex trigger condition 4.	BYTE	1
		End AND/OR setting 3 (0: OR, 1: AND) Set AND/OR settings of end AND/OR setting 1 and end AND/OR setting 2.	BYTE	1
		Reserved	char	29
11	End complex trigger Condition 1 64 bytes	End trigger condition No. 1 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		End analog trigger slope 1 (0: UP, 1: DOWN)	BYTE	1
		End trigger channel 1 (1 to 512)	WORD	2
		End trigger level 1 (physical value)	double	8
		End digital bit level 1 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		End digital bit status 1 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36
12	End complex trigger Condition 2 64 bytes	End trigger condition No. 2 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		End analog trigger slope 2 (0: UP, 1: DOWN)	BYTE	1
		End trigger channel 2 (1 to 512)	WORD	2
		End trigger level 2 (physical value)	double	8
		End digital bit level 2 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		End digital bit status 2 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36

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No.	Classification	Contents	Types of Variables	The number of Bytes
13	End complex trigger Condition 3 64 bytes	End trigger condition No. 3 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		End analog trigger slope 3 (0: UP, 1: DOWN)	BYTE	1
		End trigger channel 3 (1 to 512)	WORD	2
		End trigger level 3 (physical value)	double	8
		End digital bit level 3 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		End digital bit status 3 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36
14	End complex trigger Condition 4 64 bytes	End trigger condition No. 4 (0: Not in use, 1: Analog, 2: Digital)	BYTE	1
		End analog trigger slope 4 (0: UP, 1: DOWN)	BYTE	1
		End trigger channel 4 (1 to 512)	WORD	2
		End trigger level 4 (physical value)	double	8
		End digital bit level 4 (0 or 1) (in binary digit, multiple bits not available)	UINT64	8
		End digital bit status 4 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available)	UINT64	8
		Reserved	char	36

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No.	Classification	Contents	Types of Variables	The number of Bytes
15	Digital input/output Bit No. 1 ECAN-exceeding channel, conditions 64 bytes	Digital output conditions 0 (OFF) or 1 (ON)	BYTE	1
		Reserved	char	3
		Maximum value (physical value)	double	8
		Minimum value (physical value)	double	8
		Reserved	char	44
	Digital input/output Bit No. 2 ECAN-exceeding channel, conditions 64 bytes	Ditto	---	64
	Digital input/output Bit No. 3 ECAN-exceeding channel, conditions 64 bytes	Ditto	---	64
	.	.	.	.
	Digital input/output Bit No. 8 ECAN-exceeding channel, conditions 64 bytes	Ditto	---	64

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No.	Classification	Contents	Types of Variables	The number of Bytes
16	Communication conditions (port 1) 16 bytes	Communication standard (0: High-speed, 1: Low-speed)	BYTE	1
		Communication speed (0 to 12) For details, see "10-2-16 Communication conditions (Port 1 or port 2)".	BYTE	1
		Sample Point (fixed, varies with the communication speed) 1:80.0%(TSEG1=15, TSEG2=4), 48MHz 9:87.5%(TSEG1=13, TSEG2=2), 48MHz 11:75.0%(TSEG1=11, TSEG2=4), 48MHz	BYTE	1
		Sample Times (0: Fixed, Sample Times: 1)	BYTE	1
		Resynchronization jump width (1 fixed, resynchronization jump width: 2)	BYTE	1
		Termination resistor (0: OFF, 1: ON)	BYTE	1
		Reserved	char	10
	Communication conditions (port 2) 16 bytes	Ditto	---	16
17	Node information (No. 0) 64 bytes	Node name (maximum 40 characters)	char	44
		Reserved	char	20
	Node information (No. 1) 64 bytes	Ditto	---	64
	Node information (No. 2) 64 bytes	Ditto	---	64
	.	.	.	.
	Node information (No. 511) 64 bytes	Ditto	---	64

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No.	Classification	Contents	Types of Variables	The number of Bytes
18	ID conditions (No. 0) 64 bytes	Measurement ON/OFF (0: OFF, 1: ON)	BYTE	1
		Data frame format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (0:1byte to 7:8byte)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Node information No. -1: N/A, 0 to 511: Specified node No.	short	2
		Reserved	char	2
		Frame ID No.	DWORD	4
		ID name (maximum 40 characters)	char	44
		Reserved	char	8
	ID conditions (No. 1) 64 bytes	Ditto	---	64
	ID conditions (No. 2) 64 bytes	Ditto	---	64
	.	.	.	.
	ID conditions (No. 511) 64 bytes	Ditto	---	64

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No.	Classification	Contents	Types of Variables	The number of Bytes
19	Conditions of the channel 1 96 bytes	Measurement ON/OFF (0: OFF, 1: ON)	BYTE	1
		Start bit (0 to 63)	BYTE	1
		Bit length (1 to 64)	BYTE	1
		Data type 0: :Signed (signed integer) 1: Unsigned (unsigned integer) 2:Float(single precision floating decimal point) 3: Double (double precision floating decimal point)	BYTE	1
		Unit No. (-1: Arbitrary unit, 0 to 62)	char	1
		The number of digits after decimal point (-1: Auto, 0 to 8)	char	1
		Endian (0: Little, 1: Big)	BYTE	1
		Reserved	char	1
		Unit character string	char	10
		ID conditions No.(0 to 511)	short	2
		Calibration coefficient	double	8
		Offset	double	8
		Channel name (maximum 40 characters)	char	44
		Reserved	char	16
	Conditions of the channel 2 96 bytes	Ditto	---	96
	Conditions of the channel 3 96 bytes	Ditto	---	96
	.	.	.	.
	Conditions of the channel 512 96 bytes	Ditto	---	96

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No.	Classification	Contents	Types of Variables	The number of Bytes
20	CAN output General conditions 128 bytes	CAN output mode (in binary digit, multiple bits available) 0x01: Output (when starting) 0x02: Output (when stopping) 0x04: Interval output 0x08: Manual output	BYTE	1
		Reserved	char	3
		Output (when starting), the number of IDs (0 to 32)	WORD	2
		Output (when stopping), the number of IDs (0 to 32)	WORD	2
		Interval output, the number of IDs (0 to 32)	WORD	2
		Manual output, the number of IDs (0 to 32)	WORD	2
		Interval output, pitch (100 to 100000 [msec])	DWORD	4
		Reserved	char	112

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No.	Classification	Contents	Types of Variables	The number of Bytes
21	CAN output (when starting), conditions (No.1) 32 bytes	Output ON/OFF (0: OFF, 1: ON)	BYTE	1
		Data frame format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (1 to 8)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec])	WORD	2
		Rx frame ID	DWORD	4
		Reserved	char	8
	CAN output (when starting), conditions (No.2) 32 bytes	Ditto	---	32
	CAN output (when starting), conditions (No.3) 32 bytes	Ditto	---	32
	.	.	.	.
	CAN output (when starting), conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136

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No.	Classification	Contents	Types of Variables	The number of Bytes
22	CAN output (when stopping), conditions (No.1) 32 bytes	Output ON/OFF (0: OFF, 1: ON)	BYTE	1
		Data frame format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (1 to 8)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec])	WORD	2
		Rx frame ID	DWORD	4
		Reserved	char	8
	CAN output (when stopping), conditions (No.2) 32 bytes	Ditto	---	32
	CAN output (when stopping), conditions (No.3) 32 bytes	Ditto	---	32
	.	.	.	.
	CAN output (when stopping), conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136

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No.	Classification	Contents	Types of Variables	The number of Bytes
	CAN output Interval output, conditions (No.1) 32 bytes	Output ON/OFF (0: OFF, 1: ON)	BYTE	1
		Data frame format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (1 to 8)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec])	WORD	2
		Rx frame ID	DWORD	4
		Reserved	char	8
23	CAN output Interval output, conditions (No.2) 32 bytes	Ditto	---	32
	CAN output Interval output, conditions (No.3) 32 bytes	Ditto	---	32
	.	.	.	.
	CAN output Interval output, conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136

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No.	Classification	Contents	Types of Variables	The number of Bytes
	CAN output Manual output, conditions (No.1) 32 bytes	Output ON/OFF (0: OFF, 1: ON)	BYTE	1
		Data frame format (0: Standard format, 1: Extension format)	BYTE	1
		Data length (1 to 8)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec])	WORD	2
		Rx frame ID	DWORD	4
		Reserved	char	8
24	CAN output Manual output, conditions (No.2) 32 bytes	Ditto	---	32
	CAN output Manual output, conditions (No.3) 32 bytes	Ditto	---	32
	.	.	.	.
	CAN output Manual output, conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136
25	Reserved	Reserved	char	27232

10-2 SUPPLEMENT OF SETTING ECAN CONDITIONS

10-2-1 General information

(1) Device ID
Describe the "ECAN-40A" in character string.
" " is not included.

(2) Parameter format version
Set "1".

(3) The number of ECAN-IDs to be measured
Set the total number of IDs of the target ECAN-ID. The total number range is 0 to 512.
Set “0” for not measuring CAN by using the ECAN-40A or EGPC-40A.
The number of ECAN-IDs to be measured should be the total number of measurement ON IDs, where the Measurement ON/OFF is 1 (ON) in the "10-2-18 ID conditions (No. 0 to No. 511)."

10-2-2 CAN trigger general conditions

For setting the CAN trigger.
Before setting the CAN trigger, make sure the measuring conditions are as follows.

When using the start CAN trigger:
- Measuring mode (high-speed) of the measuring conditions (common condition) 6: Complex trigger
- Start ECAN trigger of the measuring conditions of the measuring conditions (Start complex trigger, common condition) 1 (Yes)

When using the end CAN trigger:
- Measuring mode (high-speed) of the measuring conditions (common condition) 6: Complex trigger
- End ECAN trigger of the measuring conditions of the measuring conditions (End complex trigger, common condition) 1 (Yes)

For details, see "8 MEASURING CONDITION FORMAT."

(1) Start CAN trigger mode
0 (OFF), 2 (Analog trigger), 3 (Digital trigger), or 6 (Complex trigger)

Values	Operating conditions
0 (OFF)	None
2 (Analog trigger)	10-2-3 Analog trigger conditions ● Start trigger channel ● Start trigger slope ● Start trigger level
3 (Digital trigger)	10-2-4 Digital trigger conditions ● Start trigger channel ● Start trigger bit ● Start trigger level
6 (Complex trigger)	10-2-5 Start complex trigger, common condition ● Start AND/OR setting 1 to 3
	10-2-6 Start complex trigger conditions No. 1 to 10-2-9 Start complex trigger conditions No. 4 ● Start trigger condition ◆ Start trigger condition: None Not in use ◆ Start trigger condition: Analog Start analog trigger slope Start trigger channel Start trigger level ◆ Start trigger condition: Digital Start trigger channel Start digital bit level Start digital bit status

(2) End CAN trigger
To set the End CAN trigger, set 1 (ON).
For not using, set “0 (OFF).”

(3) End CAN trigger mode
The above item (2) should be the (ON).
0 (OFF), 2 (Analog trigger), 3 (Digital trigger), or 6 (Complex trigger)

Values	Operating conditions
0 (OFF)	None
2 (Analog trigger)	10-2-3 Analog trigger conditions ● End trigger channel ● End trigger slope ● End trigger level
3 (Digital trigger)	10-2-4 Digital trigger conditions ● End trigger channel ● End trigger bit ● End trigger level
6 (Complex trigger)	10-2-10 End complex trigger, common condition ● End AND/OR setting 1 to 3
	10-2-11 End complex trigger conditions, No. 1 to 10-2-14 End complex trigger conditions, No. 4 ● End trigger condition ◆ End trigger condition: None Not in use ◆ End trigger condition: Analog End analog trigger slope End trigger channel End trigger level ◆ End trigger condition: Digital End trigger channel End digital bit level End digital bit status

10-2-3 Analog trigger conditions

(1) Start trigger channel
Set the start trigger channel.
1 to 512

(2) Start trigger slope
Set the start trigger slope.
0 (UP) or 1 (DOWN)

(3) Start trigger level (physical value)
Set the start trigger level. Set the physical value.

(4) End trigger channel
Set the end trigger channel.
1 to 512

(5) End trigger slope
Set the end trigger slope.
0 (UP) or 1 (DOWN)

(6) End trigger level (physical value)
Set the end trigger level. Set the physical value.

10-2-4 Digital trigger conditions

(1) Start trigger channel
Set the start trigger channel.
1 to 512

(2) Start trigger bit
Set the start trigger bit.
1 to 64

(3) Start trigger level
Set the bit level (value to be triggered) of the start trigger.
0 or 1

(4) End trigger channel
Set the end trigger channel.
1 to 512

(5) End trigger bit
Set the end trigger bit.
1 to 64

(6) End trigger level
Set the bit level (value to be triggered) of the end trigger.
0 or 1

10-2-5 Start complex trigger, common condition

(1) Start AND/OR setting 1
Set the AND/OR settings in "10-2-6 Start complex trigger conditions No. 1" and "10-2-7 Start complex trigger conditions No. 2."
0 (OR) or 1 (AND)

(2) Start AND/OR setting 2
Set the AND/OR settings in "10-2-8 Start complex trigger conditions No. 3" and "10-2-9 Start complex trigger conditions No. 4."
0 (OR) or 1 (AND)

(3) Start AND/OR setting 3
Set the AND/OR settings in the above item (1) "Start AND/OR setting 1" and item (2) "Start AND/OR setting 2."
0 (OR) or 1 (AND)

10-2-6 Start complex trigger conditions No. 1

(1) Start trigger condition
Set the start trigger conditions.
0 (Not in use), 1 (Analog), or 2 (Digital)

(2) Start analog trigger slope
Set the start trigger slope.
0 (UP) or 1 (DOWN)
Available when the above item (1) "Start trigger condition" is 1 (Analog).

(3) Start trigger channel
Set the start trigger channel.
1 to 512

(4) Start Trigger Level
Set the start trigger level. Set the physical value.
Available when the above item (1) "Start trigger condition" is 1 (Analog).

(5) Start digital bit level

Set the bit level (value to be triggered) of the start trigger.
Note that the LSB should be the 1st bit and the MSB should be the 64th bit.
Note that you cannot set multiple bits at the same time.

(6) Start digital bit status

Set the start trigger bit.
Note that the LSB should be the 1st bit and the MSB should be the 64th bit.
Note that you cannot set multiple bits at the same time.

Suppose the complex trigger condition is "Start digital bit level" or "Start digital bit status".

[Example]

Suppose the trigger bit is 3rd and the trigger level is 1.

Digital bit level	0x0000000000000004
Digital bit status	0x0000000000000004

[Example]

Suppose the trigger bit is 3rd and the trigger level is 0.

Digital bit level	0x0000000000000000
Digital bit status	0x0000000000000004

10-2-7 Start complex trigger conditions No. 2
The same as the "10-2-6 Start complex trigger conditions No. 1".

10-2-8 Start complex trigger conditions No. 3
The same as the "10-2-6 Start complex trigger conditions No. 1".

10-2-9 Start complex trigger conditions No. 4
The same as the "10-2-6 Start complex trigger conditions No. 1".

10-2-10 End complex trigger, common condition

(1) End AND/OR setting 1
Set the AND/OR settings in "10-2-11 End complex trigger conditions, No. 1" and "10-2-12 End complex trigger conditions, No. 2."
0 (OR) or 1 (AND)

(2) End AND/OR setting 2
Set the AND/OR settings in "10-2-13 End complex trigger conditions, No. 3" and "10-2-14 End complex trigger conditions, No. 4."
0 (OR) or 1 (AND)

(3) End AND/OR setting 3
Set the AND/OR settings in the item "(1) End AND/OR setting 1" and item "(2) End AND/OR setting 2."
0 (OR) or 1 (AND)

10-2-11 End complex trigger conditions, No. 1

(1) End trigger conditions
Set the end trigger conditions.
0 (Not in use), 1 (Analog), or 2 (Digital)

(2) End analog trigger slope
Set the end trigger slope.
0 (UP) or 1 (DOWN)
Available when the above item "(1) End trigger conditions" is 1 (Analog).

(3) End trigger channel
Set the end trigger channel.
1 to 512

(4) End trigger level
Set the end trigger level. Set the physical value.
Available when the above item "(1) End trigger conditions" is 1 (Analog).

(5) End digital bit level
Set the bit level (value to be triggered) of the end trigger.
Note that the LSB should be the 1st bit and the MSB should be the 64th bit.
Note that you cannot set multiple bits at the same time.

(6) End digital bit status
Set the end trigger bit.
Note that the LSB should be the 1st bit and the MSB should be the 64th bit.
Note that you cannot set multiple bits at the same time.

Suppose the complex trigger condition is "End digital bit level" or "End digital bit status".

[Example]
Suppose the trigger bit is 3rd and the trigger level is 1.

Digital bit level	0x0000000000000004
Digital bit status	0x0000000000000004

[Example]
Suppose the trigger bit is 3rd and the trigger level is 0.

Digital bit level	0x0000000000000000
Digital bit status	0x0000000000000004

10-2-12 End complex trigger conditions, No. 2
The same as the "10-2-11 End complex trigger conditions, No. 1".

10-2-13 End complex trigger conditions, No. 3
The same as the "10-2-11 End complex trigger conditions, No. 1".

10-2-14 End complex trigger conditions, No. 4
The same as the "10-2-11 End complex trigger conditions, No. 1".

10-2-15 Digital input/output, Bit No. 1 to Bit No. 8, ECAN-exceeding channel, conditions
Set the threshold value for using the digital output function; 7 (While exceeding the ECAN-CH range only) and 8 (An ECAN-CH is exceeding its range). You can set the threshold values for 8 bits. Every bit No. matches the bit No. of the digital input/output port. For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

(1) Digital output conditions
0 (OFF) or 1 (ON)
To use the "ECAN-exceeding channel" function, set the target channels in the "ECAN-exceeding channel - Digital input/output condition No. 28 (having the same bit No.)". Note that the bit input/output conditions should be 3 (Digital output) and the digital output function should be 7 (While exceeding the ECAN-CH range only) or 8 (An ECAN-CH is exceeding its range).

(2) Maximum value/Minimum value
Set the threshold value. Set the physical value.

10-2-16 Communication conditions (Port 1 or port 2)

Set the communication conditions of the ECAN-40A and EGPC-40A. The communication conditions (Port 1) is for CAN port 1 and communication conditions (Port 2) is for CAN port 2. For not using either one port, set "0" to every condition in the remaining port.

(1) Communication standard

Set the communication standard of the target CAN bus.

0 (High-speed) or 1 (Low-speed)

(2) Communication speed

Set the communication speed of the CAN bus.

Available values are 0 to 12.

Values	Communication speed (kbps)	Available or not available	
		High-speed	Low-speed
0	1000	✓	
1	800	✓	
2	500	✓	
3	250	✓	
4	125	✓	✓
5	100	✓	✓
6	83.3	✓	✓
7	62.5	✓	✓
8	50	✓	✓
9	33.3	✓	✓
10	25	✓	✓
11	20	✓	✓
12	10	✓	✓

✓: Available

(3) Sample point

The sample points (fixed, varies with the communication speed) are as follows.

Communication speed (kbps)	Values	Sample point
1000	11	75.0%(TSEG1=11, TSEG2=4), 48MHz
800	1	80.0%(TSEG1=15, TSEG2=4), 48MHz
Others	9	87.5%(TSEG1=13, TSEG2=2), 48MHz

(4) Sample Times

0 (Sample Times: 1) only.

(5) Resynchronization jump width

1 (resynchronization jump width: 2) only.

(6) Termination resistor

Set whether the termination resistor on the ECAN-40A or EGPC-40A is valid.

0 (OFF: Invalid) or 1 (ON: Valid)

10-2-17 Node information (No. 0 to No. 511)

There are 512 Node information. Every Node information has serial No. (from No. 0 to No. 511). The serial No. is the Node information No., used in the following ID conditions.

(1) Node Name

Sets the Node name within 40 characters (optional).

For not using, set “0.”

10-2-18 ID conditions (No. 0 to No. 511)

There are 512 ID conditions. Every ID conditions has serial No. (from No. 0 to No. 511). The serial No. is the ID conditions No., used in the following channel conditions. The ID conditions No. is also attached to the ECAN data of the monitor data.

The ECAN-40A and EGPC-40A records data in fixed-length packets (known as “data frame”). The term “ID” is a storing box of data frames. The ECAN-40A and EGPC-40A have 512 boxes. The ID conditions of the ECAN-40A and EGPC-40A are conditions for storing data frames to the “box.”

The data frame is 8-byte fixed length. If you select ON in the following item (1), 8-bytes data/ID is recorded.

(1) Measurement ON/OFF

Set whether the ID is to be measured or not to be measured.

0 (OFF: Not to be measured) or 1 (ON: To be measured)

(2) Data frame format

Set the format of the frame ID No.

0: Standard format or 1: Extended format

For the standard format: The frame ID No. is 0 to 7FFh (11 bits)

For the extended format: The frame ID No. is 0 to 1FFFFFFFh (29 bits)

Make sure the item matches the settings of the CAN-data-output equipment.

(3) Data length

Set the valid data length of the data frame. The data frames covered by the EDX are 8-byte fixed length. If data less than 8 bytes is output from the CAN-data-output-equipment, 0 is added to satisfy the 8-byte fixed length.

0 (1-byte fixed) to 7 (8-byte fixed)

Make sure the item matches the settings of the CAN-data-output equipment.

(4) Port No.
Set the port No.
0: (Enable port1) or 1: (Enable port2)

(5) Node information No.
Set the No. of the Node information, used in the ID.
-1, 0 to 511
If node information don't used, set the number of -1.
For details, see "10-2-17 Node information (No. 0 to No. 511)."

(6) Frame ID No.
Set the ID No. of the data frame.
The range varies with the data frame format. (For details, see "10-2-18 ID conditions (No. 0 to No. 511).")

NOTE

Make sure the frame ID numbers will not overlap.
However, overlapping frame ID numbers are available under the following conditions.

- Having different port No.
- Having different data frame format.

(7) ID name
Sets the ID name within 40 characters (optional).
For not using, set "0."

10-2-19 Channel condition (CH1 to CH512)

There are 512 channel conditions.

With the ECAN-40A or EGPC-40A, one data frame is divided (cutout) into multiple data. CH numbers are allocated to the divided data for management. The channel conditions are for setting the cutout conditions of a data frame. With the EDX, you can display the cutout data in physical quantity by multiplying coefficients. You can also treat the divided data as well as analog CH data.

(1) Measurement ON/OFF

Set whether channel conditions are valid or invalid.

0 (OFF: Invalid) or 1 (ON: Valid)

When the ID conditions is 1 (ON: To be measured), make sure the least one of the applicable channel conditions is 1 (ON: To be measured).

(2) Start Bit

Sets the cutout-start position in bits. 0 to 63

(3) Bit Length

Sets the cutout-data size in bits. 1 to 64

(4) Data Type

Sets the cutout-data type. 0 to 3

No.	Notation	Details
0	Signed	Signed integer
1	Unsigned	Unsigned integer
2	Float	Single precision floating-point number (bit length: 32 bits)
3	Double	Double precision floating-point number (bit length: 64 bits)

(5) Unit No.

Set the unit No. of the converted physical value, based on the"10-2-19 (10) Calibration coefficient/offset"

-1 (Arbitrary unit), 0 to 62

For unit No. and unit character string, see "8-11 UNIT NO. AND UNIT CHARACTER STRING."

(6) The number of digits after decimal point

The EDX saves it in the recorded data file (extension: E4A) for data reproduction (DAS-200A).

-1 (AUTO), 0 to 8

For the recorded data files, see "EDX-200A Universal Recorder Instruction Manual for E4A File Format."

(7) Endian

Sets the data frame assignment.

0 (Little) or 1 (Big)

Make sure the item matches the settings of the CAN-data-output equipment.

(8) Unit character string

Set the unit character string.

For unit No. and unit character string, see "8-11 UNIT NO. AND UNIT CHARACTER STRING."

(9) ID conditions No.

Set the No. of the ID conditions, used in the channel conditions.

0 to 511

For details, see "10-2-18 ID conditions (No. 0 to No. 511)."

(10) Calibration coefficient/offset

Sets multiplier (Calibration coefficient: A) and additional value (Offset: B) for converting the cutout data into physical quantity.

Sets A and B in the double precision floating decimal point variable (Double).

Suppose the cutout data is X.

The physical quantity to be converted (Y) is $Y = AX + B$.

(11) CH name

Sets the CH name within 40 characters (optional).

For not using, set “0.”

10-2-20 CAN output general conditions

For setting the general conditions of the CAN output.
For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."

(1) CAN output mode
Set the CAN output mode.
Set a bit applicable to the target mode.
Note that you can set multiple modes at the same time.

Values	Mode
0x01	Output (when starting)
0x02	Output (when stopping)
0x04	Interval output
0x08	Manual output

(2) Output (when starting), the number of conditions
Set the number of conditions, where the output ON/OFF is 1 (ON), in the "10-2-21 CAN output (when starting), conditions (No.1 to No. 32)."
0 to 32

(3) Output (when stopping), the number of conditions
Set the number of conditions, where the output ON/OFF is 1 (ON), in the "10-2-22 CAN output (when stopping), conditions (No.1 to No. 32)."
0 to 32

(4) Interval output, the number of conditions
Set the number of conditions, where the output ON/OFF is 1 (ON), in the "10-2-23 CAN interval output, conditions (No.1 to No. 32)."
0 to 32

(5) Manual output, the number of conditions
Set the number of conditions, where the output ON/OFF is 1 (ON), in the "10-2-24 CAN manual output, conditions (No.1 to No. 32)."
0 to 32

(6) Interval output, pitch
Set the pitch of the interval conditions.
100 to 100000 [msec], by every 100 [msec]

10-2-21 CAN output (when starting), conditions (No.1 to No. 32)

The "Output (when starting)" transfers the CAN data frame when starting the A/D conversion.
Capable of setting maximum 32 conditions.

(1) Output ON/OFF
Set the measurement ON/OFF of every condition.
0 (OFF) or 1 (ON)

(2) Data frame format
Set the format of the Tx frame ID No./Rx frame ID No.
0 (Standard format) or 1 (Extended format)
For the standard format: The frame ID No. is 0 to 7FFh (11 bits)
For the extended format: The frame ID No. is 0 to 1FFFFFFFh (29 bits)

(3) Data length
Set the valid data length of the data frame.
1 to 8 [bytes]

(4) Port No.
Set the port No. to output the data frame.
0 (Port 1) or 1 (Port 2)

(5) Tx frame ID
Set the ID No. of the Tx data frame.
The range varies with the data frame format. (For details, see the item (2) "Data frame format.")

(6) Output data
Set the data of the CAN data frame to be transferred.
The setting value is 0x00 to 0xFF/byte. Set the items for the number of bytes, pre-set in the item (3) "Data length."

(7) Confirmation ON/OFF
Conforms the response after the data frame transmission.
0 (OFF: Not to be checked) or 1 (ON: To be checked)

MEMO

- The confirmation ON/OFF is whether the EDX receives the frame ID, pre-set in the item (9) "Rx frame ID."
- The Rx frame ID on the confirmation is an arbitrary data.

(8) Timeout period
Set the timeout period when the above item is 1 (ON: To be checked).
When there is no response, the EDX waits for the timeout period and goes to the next output condition
0 (OFF), 10 to 1000 [msec]

(9) Rx frame ID
Set the data frame ID No. to be received as response data when the above item is 1 (ON: To be checked).
The range varies with the data frame format. (For details, see the item (2) "Data frame format.")

10-2-22 CAN output (when stopping), conditions (No.1 to No. 32)
The "Output (when stopping)" transfers the CAN data frame when stopping the A/D conversion.
Capable of setting maximum 32 conditions.
The setting items are the same as the "10-2-21 CAN output (when starting), conditions (No.1 to No. 32)".

10-2-23 CAN interval output, conditions (No.1 to No. 32)
The interval output transfers the CAN data frame with the pitch, pre-set in the "10-2-20 CAN output general conditions."
Capable of setting maximum 32 conditions.
The setting items are the same as the "10-2-21 CAN output (when starting), conditions (No.1 to No. 32)".

10-2-24 CAN manual output, conditions (No.1 to No. 32)
The manual output transfers the CAN data frame by using the CMO command.
Capable of setting maximum 32 conditions.
The setting items are the same as the "10-2-21 CAN output (when starting), conditions (No.1 to No. 32)".

MEMO

For details, see "EDX-200A Universal Recorder Instruction Manual for Hardware."