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KYOWA

INSTRUCTION MANUAL
EDX-5000A
MEMORY RECORDER / ANALYZER
(FOR CONTROL COMMAND)

Thank you for purchasing KYOWA's product EDX-5000A Memory Recorder / Analyzer.
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-5000A.
For hardware, see the "EDX-5000A Memory Recorder / Analyzer Instruction Manual for Hardware", for software operation, see the "Instruction Manual of the DCS-100A Dynamic Recording Software (For EDX-5000A 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-5000A Memory Recorder / Analyzer Instruction Manual for Hardware," "CONTROL COMMAND," etc.)
- Personal Computer is described as the PC and EDX-5000A, 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, CDV-46AS
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

- Optional cards may be described with Model names.

GPS/Multi-channel CAN card	EGPC-50A

- Conditioner card may be simply described as "Conditioner."
- Input CH of the analog conditioner may be described as "Analog CH."
- CH Nos. of the analog conditioner is described as "CH1, CH2, to CH80."
- The required condition for measuring the CAN data by using the EGPC-50A is described as "ECAN condition."
- The measured CAN ID of the EGPC-50A is described as "ECAN-ID."
  The measured CAN channel of the EGPC-50A is described as "ECAN-CH."
- The measured CAN data of the EGPC-50A 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, it is described as "Stand-alone."
- 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 9’ 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)
- Notation “0x****” on and after then describes a hexadecimal value.

- **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 between the EDX and the PC. By using this control command, it becomes possible to control up to 10 EDX, and you can create your own EDX control software.

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-5000A Memory Recorder / Analyzer Instruction Manual for Hardware" when required.

When using the LAN interface, the PC communicates with the EDX by using API (Application Program Interface) called socket. A socket is a communication API that using the TCP/IP protocol. PC is the TCP client and EDX is the TCP server.

The PC sends the control command data (hereinafter referred to as the Command packet) to the EDX using data transfer function of the socket and receives the response data (hereinafter referred to as the Response packet) from the EDX using data receiving function.

When the EDX received a command packet from the PC, the EDX execute the prescribed action and send a response packet.

NOTE

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, programing language, etc.

MEMO

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-5000A Memory Recorder / Analyzer Instruction Manual for Hardware” when required.

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.

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

3-1 SETTING THE PC AND EDX

Since the TCP/IP is used, it is required to set enabled IP address, subnet mask, gateway address, etc. on the PC and EDX. 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.

3-2 PORT NUMBER

When you control EDX using control commands, please use the port number : **34430** of TCP/IP.

NOTE

- EDX is using the communication port of 34430.
  The communication port of 34430 is an object for control commands.
- When setting firewall, etc. on the PC side, the LAN communication may be suspended.
  Set an appropriate setting, that enables communication with the EDX.
- EDX needs to be online mode for control the EDX by the PC.
  (For details, see "EDX-5000A Memory Recorder / Analyzer Instruction Manual for Hardware", "INSTRUCTION MANUAL EDX-5000A Memory Recorder/Analyzer [For EDX-3000B compatible software]."

3-3 OUTLINE OF COMMUNICATION PROCEDURES

Socket API (function) provided on the PC side is used for sending and receiving Command and Response packets.
The PC sends various requests such as conntect, disconnect, data transfer, and data receive to the EDX and the EDX returns response to the above requests to the PC.

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.

4 CONTROL COMMAND SEND/RECEIVE PROTOCOL

4-1 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-5000A" (" " 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 "5-3-11 Obtain the monitor data [Only analog CH data and digital CH data] (GMD)" and "5-3-12 Obtain the monitor data (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.

4-2 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-5000A" (" " 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 "5-3-11 Obtain the monitor data [Only analog CH data and digital CH data] (GMD)" and "5-3-12 Obtain the monitor data (GDC)."
4	EDX status	DWORD	4	EDX status For details, see "4-3EDX STATUS."
5	EDX error status	DWORD	4	EDX error status For details, see "4-4ERROR STATUS OF EDX."
6	Input over status	DWORD	10	Indicates whether every input exceeds or not. For details, see "4-5INPUT OVER STATUS."
7	Reserved	char	2	
8	The number of recorded data	INT64	8	The number of recorded data in the current data recording operation. To be cleared (0) when monitoring is stopped.
9	File name	char	22	File name (maximum 20 characters) (*1)
10	File No.	WORD	2	File No. (0 to 9999) following after the file name (*1)
11	The number of repeat times	WORD	2	The number of repeat times (0 to 9999) during repetition measurements. (*1)
12	Reserved	char	2	
13	Next interval start time	WORD	2	Year (2017 to 2099) (*2)
		BYTE	1	Month (1 to 12) (*2)
		BYTE	1	Day (1 to 31) (*2)
		BYTE	1	Hour (0 to 23) (*2)
		BYTE	1	Minute (0 to 59) (*2)
		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
14	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, GDC, GMR).
15	EDX-ID No.	char	1	-1: Stand-alone 0: Synchronous master 1 to 9: Synchronous slave
16	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
17	Voice-memo recordable time	WORD	2	0 to 60 sec
18	The number of voice-memo recordable times	BYTE	1	0 to 254 times
19	Reserved	char	1	
20	The number of recordable data	INT64	8	The number of recordable data under the current measuring conditions. (*3) During the monitoring only.
21	Latitude	double	8	(*4)
22	Longitude	double	8	(*4)
23	North latitude or South latitude	BYTE	1	0: North latitude 1: South latitude (*4)
24	East longitude or West longitude	BYTE	1	0: East longitude 1: West longitude (*4)
25	The number of satellites	BYTE	1	0 or more
26	Reserved	char	1	
Total			128	

(*1) For the data file name, see "4-6RECORDED 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 data drive

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 data drive
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.

NOTE

- The size of Response packet is maximum 200 MB (209,715,200 bytes).
- Make sure the memory has enough free space to save the response packets.
- If an error occurred during control command process, the error code is returned without returning the response data stated in the control commands. For details, see "4-7 ERROR CODE."

4-3 EDX STATUS

4-3-1 List of the 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 "5-2 ENABLE OR DISABLE CONTROL COMMANDS."

Bit Value	Contents
0x00000001	Monitoring available status
0x00000002	During the monitoring (measurements)
0x00000004	(Reserved)
0x00000008	(Reserved)
0x00000010	Recording the manual-measurement data
0x00000020	Pausing the manual-measurement-data recording (The recording data is paused, only monitoring data.)
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	Operation status is locking
0x00080000	Files are able to delete
0x00100000	Operation mode (0 = Offline controlling, 1 = Online controlling)
0x00200000	Connecting the GPS sensor (0 = Unconnected, 1 = Connected)
0x00400000	Receiving GPS data (1 = Outputing 1PPS)
0x00800000	Online controlling (1 = Connecting)
0x01000000	Outputting the CAN (Option)
0x02000000	(Reserved)
0x04000000	Over data is generated during the monitoring. (Some CH are exceeded upper limit or lower limit.)
0x08000000	Discontinuous monitor data (The buffer for storing monitoring data overflowed because the PC had not obtained monitor data.)
0x10000000	Refreshin the battery
0x20000000	(Reserved)
0x40000000	Shut down notification(1 = Received)
0x80000000	Error occurred status (1 = Error occurring, 0 = No error) (For details, see “4-4 ERROR STATUS OF EDX”)

4-3-2 Detailed specifications of the EDX status

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

- Monitor available status (0x00000001)

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 MES command.
When the INI command is properly ended.
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 MES command.
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 monitor (0x00000002)

To set:

When start monitoring data by using the STA command
When start recording data by using the REC 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 (0x00000010)

To set:

When start recording data by using the REC command or REC 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 (0x00000020)

To set:

When pausing the recording by using the PAU command or REC button during manual measurements (the number of repeat times = 1)

To clear:

When start recording data.
When stop recording data.

- Waiting for trigger measurements (0x00000040)

To set:

When start waiting for trigger measurements by using the REC command or REC 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 (0x00000080)

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 (0x00000100)

To set:

When start waiting for interval measurements by using the REC command or REC 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 (0x00000200)

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 (0x00001000)

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-5000A Memory Recorder / Analyzer Instruction Manual for Hardware."

To clear:

When stop recording voice memo.

- Outputting the + CAL (0x00002000)

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 monitoring 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 (0x00004000)

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 (0x00008000)

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) (0x00010000)

To set:

When receiving a command from the PC.

To clear:

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

- Operation status is locking (0x00040000)

To set:

When locked by using the LOC command.

To clear:

When unlocked by using the LOC command.

- Being able to delete file (0x00080000)

To set:
When the monitoring is stoped after recording.
To clear:
When the monitoring is started.
When the file is deleted.

- Operation mode (0x00100000)

To set:
When the operation mode is set online mode.
To clear:
When the operation mode is set offline mode.

- Connecting the GPS sensor (0x00200000)

To set:
When connecting the GPS sensor to the EGPC-50A.
To clear:
When dis-connecting the GPS sensor from the EGPC-50A.

- Receiving GPS data (0x00400000)

To set:
When the GPS sensor is positioning state.
To clear:
When the GPS sensor is not positioning state.

- Connecting online (0x00800000)

To set:
When the LAN connection is established.
To clear:
When the LAN connection is disconnected.

- Outputting the CAN (0x01000000)

To set:
When the CAN output (when starting), the CAN output (when stopping), or the CAN output test is started by the Option CAN module.
To clear:
When the CAN output (when starting), the CAN output (when stopping), or the CAN output test is ended by the Option CAN module.

- Over data is generated during the monitoring (0x04000000)

To set:
When the sensor's input exceeds the pre-set upper-limit value or lower-limit value during the monitoring.
To clear:
When starting the monitoring.
When executing balance or internal sensitivity compensation.
When executing the over reset.

- Discontinuous monitor data (0x08000000)

To set:

When the internal FIFO memory becomes full.

To clear:

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

- Refreshing the battery (0x10000000)

To set:

When the command of refreshing battery (BAT1) is executed.

To clear:

When a discharging is finished.

When the EDX is shutdowned.

When switching to DC power supply drive.

- Shut down notification (0x40000000)

To set:

When the EDX is shutdowning.

To clear:

When the EDX start.

- Error occurred status (0x80000000)

To set:

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

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

To clear:

When the error status of the EDX is 0x00000000.

NOTE

- When the status of the return value, after sending the control command, is 0x00010000, the processing of the control command is no yet completed.
- Check the status until the bit of the 0x00010000 returns 0.
- To shut down the system, set the shut down notification (0x40000000).

- The behavior of EDX and EDX status are as follows.

Monitor 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.

- Operation mode of the EDX

Offline controlling: Controlling the EDX by the EDX itself.
(The EDX cannot be controlled through commands from the PC)

Online controlling: Controlling the EDX through commands from the PC.
CH conditions or measuring conditions cannot be changed from the EDX software.
However, you can perform partial operations such as “Start recording” or “Conduct balance” with switch on the EDX.

*For online controlling mode, refer to the “INSTRUCTION MANUAL EDX-5000A Memory Recorder/Analyzer [Main Unit Software Manual]” and “INSTRUCTION MANUAL EDX-5000A Memory Recorder/Analyzer [For EDX-3000B compatible software].”

4-4 ERROR STATUS OF EDX

4-4-1 List of the 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.(*1)
0x00000002	Oscillator for DPM card is faulty.(*2)
0x00000004	External clock error. (*3)
0x00000008	Write error. (*1)
0x00000010	Error occurred while controlling the sub CPU board(*4)
0x00000020	Error occurred while controlling the Display board. (*4)
0x00000040	Error occurred while controlling the CPU board. (*4)
0x00000080	Error occurred while controlling the Voice board. (*4)
0x00000100	File No. error. (*1) (The file number overflowed which increase automatically.)
0x00000200	Other system errors. (*4)
0x00000400	CFV-40A update required. About the related slot number, see 0x00400000 to 0x80000000.
0x00000800	Cannot recognize the synchronous slaves.
0x00001000	Parameter error of synchronous slaves
0x00002000	(Reserved)
0x00004000	(Reserved)
0x00008000	Error occurred when battery refreshing.
0x00010000	(Reserved)
0x00020000	(Reserved)
0x00040000	(Reserved)
0x00080000	(Reserved)
0x00100000	Error occurred in the option module.
0x00200000	(Reserved)
0x00400000	Error occurred in the slot 9 conditioner card
0x00800000	Error occurred in the slot 10 conditioner card
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	Error occurred in the slot 5 conditioner card
0x20000000	Error occurred in the slot 6 conditioner card
0x40000000	Error occurred in the slot 7 conditioner card
0x80000000	Error occurred in the slot 8 conditioner card

(*1) Enabled only during monitoring.

(*2) Enabled only during monitoring. Monitoring is not stopped even if error occurs.
While the monitoring is in stop status, the status is “0.”

(*3) Enabled only during monitoring. If error occurs, the monitoring is stopped.

(*4) Error occurred arbitrary timing. For clearing, operate command communication or switch operation.

4-4-2 Detailed specifications of the error status of EDX

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. (0x00000001)

To set:

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.

To clear:

When start monitoring data, or when the following recording data is prepared after recording, after deleting files (by the FDF command).

- Oscillator for DPM card is faulty. (0x00000002)

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. (0x00000004)

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-5000A Memory Recorder / Analyzer 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.

- Write error. (0x00000008)

To set:

When error occurred during writing KS2 file.

To clear:

When recording is finished.

- Error occurred while controlling the sub CPU board. (0x00000010)

To set:

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

When an error occurs on the sub CPU board during the monitoring.

To clear:

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

- Error occurred while controlling the display board. (0x00000020)

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 sub CPU board. (0x00000040)

To set:

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

When an error occurs on the sub CPU board during the monitoring.

To clear:

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

- Error occurred while controlling the Voice board. (0x00000080)

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. (0x00000100)

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).

- Other system error. (0x00000200)

To set:

When error that is unexpected occurred.

To clear:

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

- CFV-40A update required. (0x00000400)

To set:

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

- Cannot recognize the synchronous slaves. (0x00000800)

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. (0x00001000)

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 during battery refreshing. (0x00008000)

To set:

When the EDX that is not connected AC power supply execute battery refreshing.

To clear:

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

- Optional card error. (0x00100000)

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.

- Error occurred in the slot 1 to 10 conditioner cards. (0x00400000 to 0x80000000)

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 is old.

To clear:

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

4-5 INPUT OVER STATUS

The input over status is 80-bit numeric value. The most significant bit is corresponding to the CH80 and the least significant bit, to the CH1.

When the input signal exceeds the pre-set range during the monitoring, the relevant bit is set.

(For example, when the CH1-input and CH31-input exceed during the monitoring, 0x00000000000040000001 is set.)

The 80-bit numeric value indicates the history of the excessive inputs. The 80-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 monitoring 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).

4-6 RECORDED FILE NAME

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

○○○****_Δ□□□□_◊.KS2

○○○	: Arbitrary file name (maximum 20 characters)
****	: File No. (0000 to 9999) Automatically incremented every time recording ends.
Δ	: 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 D: Digital 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 9) during the synchronous operation
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. 0)
TEST0000_0.KS2

[Example 3]
Suppose the EDX is stand-alone, interval measurement (file No. 0, the number of repeat times = 0)
TEST0000_I0000.KS2

[Example 4]
Suppose the EDX is synchronous slave (ID = 1), interval measurement
(File No. 0, the number of repeat times = 0)
TEST0000_I0000_1.KS2

4-7 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	Undefined (system reserved)
-5	Remaining capacity of the data drive 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 monitoring is stopped because the file No. is the maximum value.
-15	The monitoring 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 occurred while accessing.
-21	CFV-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.
-24	Cannot execute because of the AC power is not supplied.

5 CONTROL COMMAND

5-1 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	29
	Set/load the monitor data output condition	SMD	30
	Set/load the measuring condition	MES	32
	Initialize the measuring condition	INI	35
Execute	Start monitoring	STA	36
	Start recording	REC	36
	Stop the monitoring/recording	STP	37
	Pause the recording operation	PAU	38
	Execute CAL/Stop CAL/Over reset	CAL	39
	Execute balance/Load balance results	BAL	40
	Obtain the monitor data	GMD	42
	Obtain the monitor data	GDC	46
	Obtain the monitor data (designate CH)	GMR	53
	Output the CAN manually	CMO	58
	Execute/load the CAN output test.	CSC	58
Environment	Set/load the keylock status	LOC	61
	Set/load the time	TIM	62
	Load the system information	SYS	63
	Load the card information	CAD	64
	Check the device/slot	EDX	66
File	Obtain the remaining capacity of the CF card.	FFR	67
	Open file	FOF	68
	Load file data	FRF	69
	Seek file	FSF	70
	Close file	FCF	71
	Delete file	FDF	72
	Start finding file	FFF	73
	Continue finding file	FFN	75
	End finding file	FFC	76
	Delete last recorded data files	FDK	77
Others	Load/write the TEDS information	TED	78
	Execute battery refreshing / Read the status	BAT	85
	Load/write the user data	URW	86
	Load the EDX status	---	87
	Measuring/Obtaining average value	AVG	88

5-2 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 "EDX STATUS."

(1) For stand-alone and synchronous master EDX (Monitoring is in stop status)

Command	Stopping monitoring				
	Monitoring disable status	Monitoring available status	Finding file	Opening file	Executing BAL and AVG (*1)
DFN		✓			
SMD	✓	✓			
MES	✓	✓			
INI	✓	✓			
STA		✓			
REC					
STP					
PAU					
CAL		✓			
BAL		✓			
GMD					
GDC					
GMR				✓	
CMO		✓			
CSC		✓			
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)			
TED	✓	✓			
BAT	✓	✓			
URW	✓	✓			
AVG		✓			

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

(*1) EDX status while executing balance, internal sensitivity compensation.
(*2) Enabled only during opening file.
(*3) Enabled only during finding file.
(*4) It is valid only until starting the monitoring from after recording (Monitoring is in stop state).

(2) For stand-alone and synchronous master EDX (Monitoring is in operating status)

Command	Monitoring	Manual measurement		Trigger measurement		Interval measurement	
		Recording	Pausing	Waiting	Recording	Waiting	Recording
DFN	✓	✓	✓	✓	✓	✓	✓
SMD	✓	✓	✓	✓	✓	✓	✓
MES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INI							
STA							
REC	✓		✓				
STP	✓	✓	✓	✓	✓	✓	✓
PAU		✓(*1)					
CAL	✓	✓	✓	✓	✓	✓	✓
BAL	✓		✓				
GMD	✓	✓	✓	✓	✓	✓	✓
GDC	✓	✓	✓	✓	✓	✓	✓
GMR	✓	✓	✓	✓	✓	✓	✓
CMO	✓	✓	✓	✓	✓	✓	✓
CSC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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							
TED							
BAT							
URW							
AVG							

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

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

(3) Synchronous slave EDX (Monitoring is in stop status)

Command	Stopping monitoring				
	Monitoring disable status	Monitoring available status	Finding file	Opening file	Executing BAL and AVG (*1)
DFN		✓		✓	
SMD	✓	✓			
MES	✓	✓		N/A	
INI	✓	✓			
STA					
REC					
STP					
PAU					
CAL					
BAL					
GMD					
GDC					
GMR				✓	
CMO					
CSC					
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					
TED	✓	✓			
BAT	✓	✓			
URW	✓	✓			
AVG					

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

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

(4) Synchronous slave EDX (Monitoring is in operating status)

Command	Monitoring	Manual measurement		Trigger measurement		Interval measurement	
		Recording	Pausing	Waiting	Recording	Waiting	Recording
DFN	✓	✓	✓	✓	✓	✓	✓
SMD	✓	✓	✓	✓	✓	✓	✓
MES	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INI							
STA							
REC							
STP							
PAU							
CAL							
BAL							
GMD	✓	✓	✓	✓	✓	✓	✓
GDC	✓	✓	✓	✓	✓	✓	✓
GMR	✓	✓	✓	✓	✓	✓	✓
CMO							
CSC							
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							
TED							
BAT							
URW							
AVG							

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

5-3 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 "4 CONTROL COMMAND SEND/RECEIVE PROTOCOL."

NOTE

Although response data is almost 2bytes or more, PC might receive 1byte Data.
In this case, error occurred and the EDX is returning error code as the response data. For details, see “4-7ERROR CODE”

5-3-1 Obtain data file name (DFN)

Obtain the pre-set data file name.

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

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier:3 bytes)
  Command identifier: DFN
  Parameter: None

- Response packet
  Response data: 48 byte (See the table below)

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 error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

NOTE

- For synchronous operation, when the monitoring is started, the final file information is from the synchronous master to synchronous slave EDX. Therefore, for synchronous slave EDX, results of this command may differ before and after starting the monitoring.

- To obtain the correct data file name, execute this command during the monitoring.

5-3-2 Set/load the monitor data output condition (SMD)

Sets and loads the monitor data output condition.

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

- Command packet (When setting)
  The number of transferred bytes: 12 bytes (Command identifier: 3 bytes + Parameter: 9 bytes)
  Command identifier: SMD
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
2	Parameter 2	Monitor data output mode (*1) -1: No monitor data output 0: Continuous monitor data output mode 1: Intermittent monitor data output mode (Master) 2: Intermittent monitor data output mode (Slave)	char	1
3	Parameter 3	Reserved	char	7
Total number of parameter bytes				9

- Response packet (When setting)
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

(*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 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 or 2)
  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.

MEMO

"1 : Intermittent monitor data output mode (Master)" of Parameter 2 is arbitrary EDX for outputting monitor data.
There is no relation between the Monitor data output mode = "1 (Master)" / "2 (Slave)" and the "Master EDX" / "Slave EDX" in synchronous operation.

The following shows examples of obtaining monitor data of four EDX units (ID = 0, 1, 2, and 3) in synchronous operation by setting the mode to intermittent monitor data output mode.

Ex. 1) Monitor data output mode when obtaining monitor data of all the EDX units.
Set '1' to ID = 0 and '2' to ID = 1, 2, and 3.
Ex. 2) Monitor data output mode when obtaining monitor data of EDX of only ID = 0 and ID = 3.
Set '1' to ID = 0, '2' to ID = 3, and '-1' to ID = 1 and 2.

Ex. 3) Monitor data output mode when obtaining monitor data of EDX of only ID = 1 and ID = 3.
Set '1' to ID = 1, '2' to ID = 3 and '-1' to ID = 0 and 2.

- Command packet (When loading)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: SMD
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet (When loading)
  Response data: 8 byte (See the table below)

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 (Master) 2: Intermittent monitor data output mode (Slave)	char	1
2	Response data 2	Reserved	char	3
3	Response data 3	The number of monitor output data per CH. Enabled only when monitor output mode is 1 or 2	DWORD	4
Total number of response data bytes				8

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

See also "5-3-11 Obtain the monitor data [Only analog CH data and digital CH data] (GMD)", "5-3-12 Obtain the monitor data (GDC)".

NOTE

When setting with the SMD command during synchronous operation, first set it from the one with the smaller ID of the slave EDX and finally set it to the master EDX.

5-3-3 Set/load the measuring condition (MES)

The EDX sets/loads the measuring conditions.

Check parameters for starting the monitoring by using the STA command.

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

- Command packet (When setting)

  The number of transferred bytes: 188008 bytes

  (Command identifier: 3 bytes + Parameter: 188005 bytes)

  Command identifier: MES

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
2	Parameter 2	Reserved	char	4
3	Parameter 3	Measuring conditions to be set in the EDX	---	188000
Total number of parameter bytes				188005

- Response packet (When setting)
  Respnse data: 4 bytes (See the table below)

  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, the monitoring cannot be started.

Results (bit)	Contents
0x00000000	Check results are OK and starting the monitoring 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	Digital trigger measuring condition error
0x00000040	External trigger measuring condition error
0x00000080	CAN trigger measuring condition error
0x00000100	Complex trigger condition error
0x00000200	Sampling frequency error
0x00000400	Remaining capacity of the data drive is not enough.
0x00000800	Monitor data output condition error
0x00001000	DPM card error
0x00002000	Four arithmetic operations condition setting error
0x00004000	Undefined (system reserved)
0x00008000	No measurement target exists.
0x00010000	Manual measuring condition error
0x00020000	Arithmetic processing condition 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)

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

NOTE

When setting with the MES command during synchronous operation, first set it from the one with the smaller ID of the slave EDX and finally set it to the master EDX.

- Command packet (When loading)
  The number of transferred bytes: 8 bytes (Command identifier: 3 bytes + Parameter: 5 bytes)
  Command identifier: MES
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
2	Parameter 2	Reserved	char	4
Total number of parameter bytes				5

- Response packet (When loading)
  Response data: 188000 (See the table below)

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Measuring conditions to be set in the EDX For details, see “6 MEASURING CONDITION FORMAT”	---	188000
Total number of response data bytes				188000

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

5-3-4 Initialize the measuring condition (INI)

Initializes the measuring conditions (parameters) in the EDX.

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

- Command packet
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: INI
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Initialization mode 0: Initializes measuring condition, user's unit, etc. ("Synchronous operation mode", "The total number of connected units during the synchronous operation", "The total number of connected EDX-3000B during the synchronous operation" and "The total number of connected EDX-200A during the synchronous operation" are not initialized.)	BYTE	1
Total number of parameter bytes				1

- Response packet
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

- Remarks: After sending the INI command, the EDX is in the following status.

Measuring Condition

The number of recording channels: Measure all the recording available channels.
Channel condition: Default value of every conditioner card
For details, see "6-4 VALUES OF CONDITIONER CARDS."
BAL value: 0
Internal sensitivity value: 0

* For other parameters, see "6 MEASURING CONDITION FORMAT" and "7 ECAN CONDITIONS FORMAT".

MEMO

For online controlling mode, refer to the "INSTRUCTION MANUAL EDX-5000A Memory Recorder/Analyzer [Main Unit Software Manual]" and "INSTRUCTION MANUAL EDX-5000A Memory Recorder/Analyzer [For EDX-3000B compatible software]."

5-3-5 Start monitoring (STA)

Starts monitoring and moves to the monitoring status.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: STA
  Parameter: None

- Response packet
  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

MEMO

To execute the command, monitoring available status is required.

5-3-6 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.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: REC
  Parameter: None

- Response packet
  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

MEMO

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

5-3-7 Stop the monitoring/recording (STP)

Stops the monitoring 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 monitoring.

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.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: STP
  Parameter: None

- Response packet
  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

MEMO

When “After recording, restart the monitoring”, in ‘General information’ of measuring condition is set to 1 (No), the EDX is not moved to the monitoring status and monitoring is in stopped status.
For details, see “6MEASURING CONDITION FORMAT”.

5-3-8 Pause the recording operation (PAU)

Pauses the recording operation of manual measurements.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: PAU
  Parameter: None

- Response packet
  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

MEMO

- The command is available when satisfying the following all conditions.
  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 “6MEASURING CONDITION FORMAT”

5-3-9 Execute CAL/Stop CAL/Over reset (CAL)

Outputs the CAL value, stops outputting the CAL value, and resets the over status during the monitoring.

- Target EDX: Stand-alone and synchronous master

- Command packet

  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)

  Command identifier: CAL

  Parameter: See the table below.

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

- Response packet

  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

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.

5-3-10 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.

- Target EDX: Stand-alone and synchronous master

- Command packet (When execute)

  The number of transferred bytes: 5 bytes (Command identifier: 3 bytes + Parameter: 2 bytes)

  Command identifier: BAL

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Balance executing mode (0x00: Load BAL results, 0x01: Execute) Set 0x01.	BYTE	1
2	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 parameter bytes				2

- Response packet

  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

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.

- Command packet (When loading)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: BAL
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Balance executing mode (0x00: Load results, 0x01: Execute) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet (When loading)
  Response data: 80 bytes × the number of connected units = 80 to 800 bytes

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Balance/internal sensitivity compensation results 1 byte × 80 channels × the number of connected units = 80 to 800 bytes -1: No card or no function 0: OK 1: NG 2: OFF 3: ENG (EEPROM access error) 4: SensorNG(internal sensitivity compensation error)	char	80 × the number of connected units
Total number of response data bytes				80 to 800

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

NOTE

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

5-3-11 Obtain the monitor data [Only analog CH data and digital CH data] (GMD)

Obtains monitor data.

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

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

- Command packet

  The number of transferred bytes: 7 bytes (Command identifier: 3 bytes + Parameter: 4 bytes)

  Command identifier: GMD

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
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 parameter bytes				4

- Response packet

  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.)

NOTE

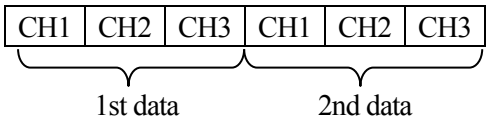
With regard to obtains monitor data, See also "5-3-2Set/load the monitor data output condition (SMD)."

NOTE

- The maximum value of the parameter 1 is 20,000.
- 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.
- If the Digital input is set in the digital input/output function, the number of the digital input channel is 1.

- Monitor data assignment
  With the A/D data format of 16 bits, for analog CH, monitor data is 1CH = 2 bytes (data type is “short”).
  With the A/D data format of 24 bits, for analog CH, monitor data is 1CH = 4 bytes (data type is “long”).
  When “6 MEASURING CONDITION FORMAT”-“No.25 Arithmetic operation items”
  is setted “Four arithmetic operation” (0x20), monitor data is 1CH = 8 bytes (data type is “double”).
  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) for 2 sampling events.
  Total size of the monitor data
  With 16 bits: (analog 3 channels × 2 bytes) × 2 times = 12 bytes
  With 24 bits: (analog 3 channels × 4 bytes) × 2 times = 24 bytes
  When using four arithmetic operation:
  (analog 3 channels × 8 bytes) × 2 times = 48 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.

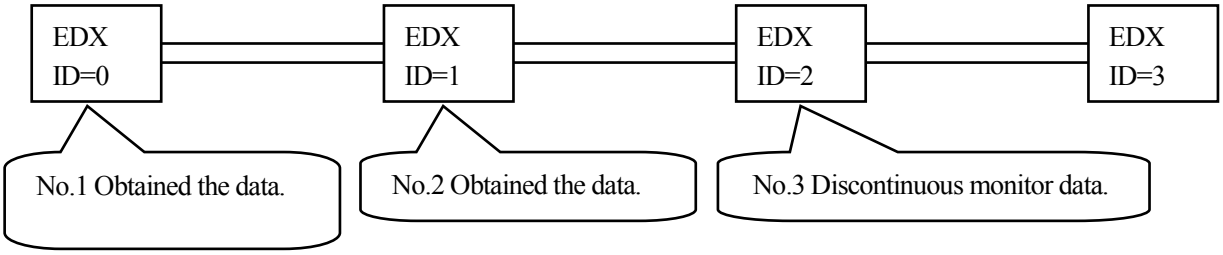
- When the monitoring is not available status.
  If the GMD command is executed in the above status, only the header section (no monitor data) is returned.

- 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.

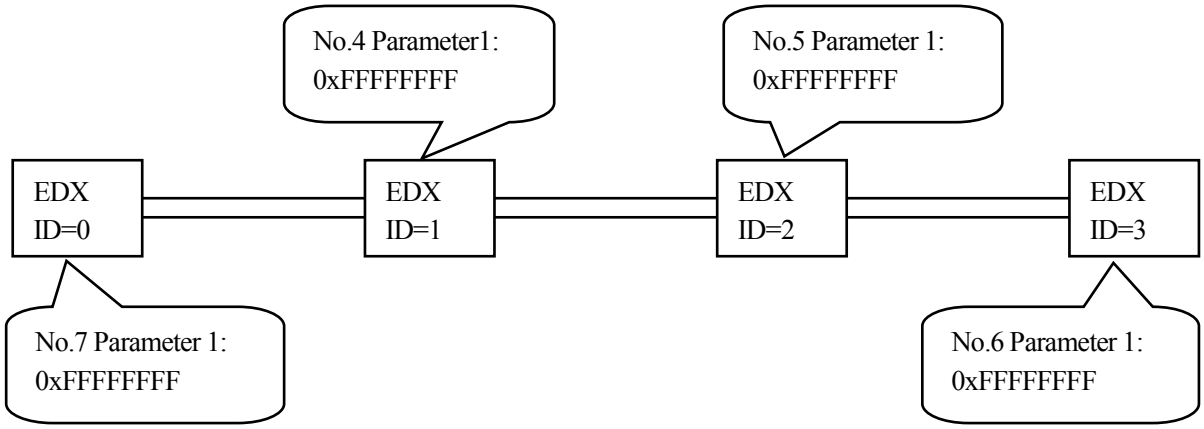
  In synchronous operation, when an EDX status is 'Discontinuous monitor data' status, the synchronous monitor data of every unit will not be obtained. At that time, set the parameter1 "0xFFFFFFFF" and send the GMD command to all slave units. Then, set the parameter1 "0xFFFFFFFF" and send the GMD command 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.

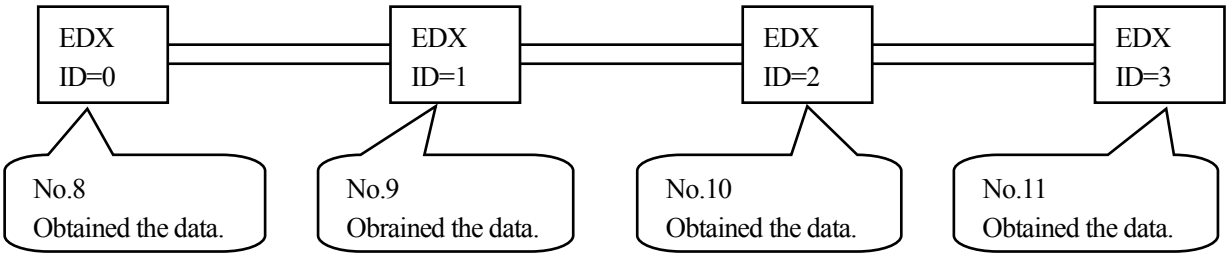
1. When obtaining the monitor data from the master unit to slave units(No.1, 2), the slave EDX (ID=2) status is " Discontinuous monitor data" status (No.3).



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.



NOTE

- Monitor data of the EDX is sent to the PC through the internal FIFO memory.
  To obtaion 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.

- With the 'Discontinuous monitor data' status set in the EDX, no new monitor data is stored 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] = 33,554,432 / (2*[the number of analog channels to be measured + the number of digital channels to be measured] × sampling frequency [Hz])

With 24 bits

> FIFO storage available time [sec] = 33,554,432 / (4*[the number of analog channels to be measured + the number of digital channels to be measured] × sampling frequency [Hz])

[Example]
Support the number of channels to be measured is 32, sampling frequency is 10 kHz, with 24 bits
33,554,432 / (4 * 32 * 10,000) = Approx. 26 [sec]

[Example]
Support the number of analog channels to be measured is 24, the number of digital channels to be measured is 1, sampling frequency is 1 kHz, with 16 bits
33,554,432 / (2 * (24 + 1) * 1,000) = Approx. 671 [sec]

[Example]
Support the number of analog channels to be measured is 24, the number of digital channels to be measured is 1, sampling frequency is 1 kHz, with 24 bits
33,554,432 / (4 * (24 + 1) * 1,000) = Approx. 336 [sec]

[Example]
Support the number of analog channels to be measured is 24, the number of digital channels to be measured is 1, sampling frequency is 1 kHz, with using four arithmetic.
33,554,432 / (8 * (24 + 1) * 1,000) = Approx. 168 [sec]

5-3-12 Obtain the monitor data (GDC)

Obtains monitor data.

To get monitor data be have to set using SMD command in advance.

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

- Command packet
  The number of transferred bytes: 15 bytes (Command identifier: 3 bytes + Parameter: 12 bytes)
  Command identifier: GDC
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	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. For details, see "5-3-11Obtain the monitor data [Only analog CH data and digital CH data] (GMD)."	DWORD	4
2	Parameter 2	Reserved	char	8
Total number of parameter bytes				12

NOTE

- The maximum value of the parameter 1 is 20,000.
- 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.
- If the Digital input is set in the digital input/output function, the number of the digital input channel is 1.

- Response packet

  Response data: (See the table below)

No.	Name	Contents	Types of Variables	The number of Bytes
1	Response data 1	The number of analog channels	WORD	2
2	Response data 2	Reserved	char	2
3	Response data 3	The number of digital channels	WORD	2
4	Response data 4	The number of arithmetic channels	WORD	2
5	Response data 5	The number of monitor data / CH	DWORD	4
6	Response data 6	Reserved	char	12
7	Response data 7	Types of monitor data (1: short, 2: long, 4: double)	BYTE	1
8	Response data 8	CAN bus status of the EGPC-50A (port 1) -1: No channel, 0: OK, 1: NG (Bus error)	char	1
9	Response data 9	CAN bus status of the EGPC-50A (port 2) -1: No channel, 0: OK, 1: NG (Bus error)	char	1
10	Response data 10	Reserved	char	23
11	Response data 11	The number of ECAN-IDs to be measured	WORD	2
12	Response data 12	The number of ECAN monitor data(1ID: 24 bytes fixed)	DWORD	4
13	Response data 13	The number of recorded ECAN data	INT64	8
14	Response data 14	The number of recorded counter value The recorded counter value of the monitor data, at the head, of the response data.	UINT64	8
15	Response data 15	ECAN CH over information (in binary digit)	BYTE	1
16	Response data 16	Reserved	char	3
17	Response data 17	The number of ECAN overflow messages (*1)	DWORD	4
18	Response data 18	GPS status (0: OFF, 1: ON)	BYTE	1
19	Response data 19	GPS data (0: OFF, 1: ON)	BYTE	1
20	Response data 20	Reserved	char	2
21	Response data 21	The number of GPS status bytes (128 bytes fixed)	DWORD	4
22	Response data 22	The number of GPS data bytes	DWORD	4
23	Response data 23	The number of recorded GPS data bytes	UINT64	8
24	Response data 24	Reserved	char	28
25	Response data 25	Monitor data array (analog/digital CH data)	---	A
26	Response data 26	Monitor data array (ECAN data)	---	B
27	Response data 27	GPS status (The parameter 18 should be 1: ON.)	---	C
28	Response data 28	GPS data (The parameter 19 should be 1: ON.)	---	D
Total number of response data bytes				128+ A+B+C+D

(*1) When the number of ECAN overflow messages is 1 or more, the ECAN overflow occurs.
For details, see "EDX-5000A Memory Recorder / Analyzer Instruction Manual for Hardware."

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

◆ 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 11 (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 "7-2-12 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.

◆ 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
			Milli second 0:0msec 2:200msec 4:400msec 6:600msec 8:800msec	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.

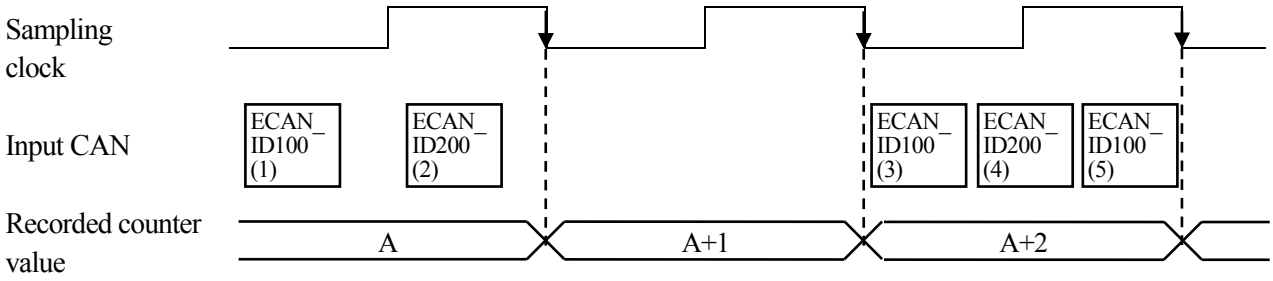
  When the EDX receives some CAN data frames, having the same ID conditions, during one sampling event, the EDX obtains the latter CAN data frame as the ECAN data.

  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 EGPC-50A 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

- Analog / Digital 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	1,000 Hz (sampling period: 0.001[sec])
Analog channel conditions	CH1, CH2
DIO conditions	D1
ECAN conditions	ECAN_ID0 (ID conditions No. 0) ECAN_ID1 (ID conditions No. 1)

Response data: 4	The number of normal/high-speed monitor data/CH: 5
Response data: 13	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)	D1(1)	CH1(2)	CH2(2)	D1(2)

1st data　　2nd data

CH1(3)	CH2(3)	D1(3)	CH1(4)	CH2(4)	D1(4)

3rd data　　4th data

CH1(5)	CH2(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]	Analog / Digital channels	ECAN data
6	0.000	CH1(1), CH2(1), D1(1)	ECAN_ID0(1)
7	0.001	CH1(2), CH2(2), D1(2)	ECAN_ID0(2), ECAN_ID1(3)
8	0.002	CH1(3), CH2(3), D1(3)	
9	0.003	CH1(4), CH2(4), D1(4)	ECAN_ID0(4)
10	0.004	CH1(5), CH2(5), D1(5)	ECAN_ID1(5)

- GPS status
  If use the EGPC-50A, GPS status can be get.
  Output On/OFF can be set by "5-3-2 Set/load the monitor data output condition (SMD)."

- GPS data
  If use the EGPC-50A, GPS data in the EDX, at the time when the GDC command is executed, can be get.
  Output ON/OFF can be set by "5-3-2 Set/load the monitor data output condition (SMD)."

NOTE

- For others, see the GMD command.
- For obtaining the monitor data, see also "5-3-2Set/load the monitor data output condition (SMD)", "5-3-11Obtain the monitor data [Only analog CH data and digital CH data] (GMD)"

5-3-13 Obtain the monitor data [Assign CH that obtain the data] (GMR)

Obtains monitor data.

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

- Command packet

  The number of transferred bytes: 103 bytes (Command identifier: 3 bytes + Parameter: 100 bytes)

  Command identifier: GMR

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Monitor data point -1 : The next position of the data that got last. 0~ : Arbitary position For the slave EDX, Setting the monitor data point value that obtained the master EDX.	INT64	8
2	Parameter 2	The number of monitor data -N:Obtaining N datas from latest data (N : 1~20000) 0:Obtaining maximum number of data 1~20000 : Obtaining arbitaly number of data For the slave EDX, Setting the number of monitor data that obtained the master EDX.	long	4
3	Parameter 3	Analog channels ● In binary digit. ● LSB is corresponded to CH1 of each slot. ● The front byte is corresponded slot 1. ● The value of not existing channel or slot is not outputted.	BYTE	10
4	Parameter 4	Digital channels ● In binary digit. ● LSB is corresponded to LSB of DIO. ● The bit that set as DI are outputted.	BYTE	1
5	Parameter 5	Reserved	char	1
6	Parameter 6	Arithmetic channels ● In binary digit. ● LSB of the front byte is corresponded to CH 1 of arithmetic channel. ● The value of not existing channel is not outputted.	BYTE	8
7	Parameter 7	ECAN channels ● In binary digit. ● LSB of the front byte is corresponded to CH 1 of CAN channel. ● The value of not existing channel is not outputted.	BYTE	64

8	Parameter 8	GPS channels ● In binary digit. ● Each bit is corresponded to below channels. (Little endian) 0x00000001: Latitude (+: North latitude) 0x00000002: Longitude (+: East longitude) 0x00000004: The number of satellites 0x00000008: Positioning state 0x00000010: Year 0x00000020: Month 0x00000040: Day 0x00000080: Hour 0x00000100: Minute 0x00000200: Second 0x00000400: Milli second 0x00000800: Speed 0x00001000: Angle (TN: 0 degree) 0x00002000: Magnetic declination (+: East) 0x00004000: Altitude above sea level 0x00008000: Geoidal height 0x00010000: Horizontal dilution of precision 0x00020000: Position dilution of precision 0x00040000: Vertical dilution of precision	DWORD	4
Total number of parameter bytes				100

MEMO

● When obtaining the all lates monitor data of assigned channel, set the parameters as below.
Monitor data point (Parameter 1) : -1
The number of monitor data (Parameter 2) : 0
Chnnels (Parameter 3 to 8) : Setting the CH that you want to obtain the data.

● When setting "-N (N:1 to 20000)" to "the number of monitor data (Parameter 2)", "monitor data point (Parameter 1)" is invalid.

● When not storing the number of data that set to "the number of monitor data (Parameter 2)" in the memory of EDX, the number of response packet is 0.

- Response packet

  Response data: (See the table below)

No.	Name	Contents	Types of Variables	The number of Bytes
1	Response data 1	Monitor data point ● The monitor data point of response packet	INT64	8
2	Response data 2	The number of analog channel's monitor data ● The number of analog channel's monitor data that is included in response packet. ● This value is used by digital channels and arithmetic channels too.	DWORD	4
3	Response data 3	Analog channels ● Analog channels that are included in response packet ● In binary digit. ● Bit order is common to parameter 3 of command packet.	BYTE	10
4	Response data 4	Digital channels ● Digital channels that are included in response packet ● In binary digit. ● Bit order is common to parameter 4 of command packet.	BYTE	1
5	Response data 5	Reserved	char	1
6	Response data 6	Arithmetic channels ● Arithmetic channels that are included in response packet. ● In binary digit ● Bit order is common to parameter 6 of command packet.	BYTE	8
7	Response data 7	ECAN channels ● ECAN channels that are included in response packet. ● In binary digit. ● Bit order is common to parameter 7 of command packet.	BYTE	64
8	Response data 8	GPS channels ● GPS channels that are included in response packet. ● In binary digit. ● Bit order is common to parameter 8 of command packet.	DWORD	4
9	Response data 9	Monitor data of analog channels ● Data is arranged for each channel. [Example] CH1-1,..,CH1-N, CH2-1,…,CH2-N,… ● The number of data that is stored is able to obtain from "Response data 2."	double	*
10	Response data 10	Monitor data of digital channels ● Data is arranged for each bit. ● The number of data that is stored is able to obtain from "Response data 2."	double	*

<table>
<tr><td>11</td><td>Response data 11</td><td colspan="3">Monitor data of arithmetic channels
● Data is arranged for each channel.
● The number of data that is stored is able to obtain from “Response data 2.”</td><td>double</td><td>*</td></tr>
<tr><td rowspan="8">12</td><td rowspan="8">Response data 12</td><td rowspan="6">ECAN channel 1</td><td colspan="2">The number of monitor data</td><td>DWORD</td><td>4</td></tr>
<tr><td rowspan="3">Monitor data 1</td><td>The position of monitor data 1</td><td>UINT64</td><td>8</td></tr>
<tr><td>The value of monitor data1</td><td>double</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Monitor data N</td><td>Monitor data</td><td>*</td><td>16</td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
<tr><td>ECAN channel N</td><td colspan="3">Monitor data</td><td>*</td><td>*</td></tr>
<tr><td rowspan="8">13</td><td rowspan="8">Response data 13</td><td rowspan="6">GPS channel 1</td><td colspan="2">The number of monitor data</td><td>DWORD</td><td>4</td></tr>
<tr><td rowspan="3">Monitor data 1</td><td>The position of monitor data 1</td><td>UINT64</td><td>8</td></tr>
<tr><td>The value of monitor data 1</td><td>double</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Monitor data N</td><td>Monitor data</td><td>*</td><td>16</td></tr>
<tr><td></td><td colspan="3"></td><td></td></tr>
<tr><td>GPS channel N</td><td colspan="3">Monitor data</td><td>*</td><td>*</td></tr>
<tr><td colspan="6">Total number of response data bytes</td><td>*</td></tr>
</table>

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

NOTE

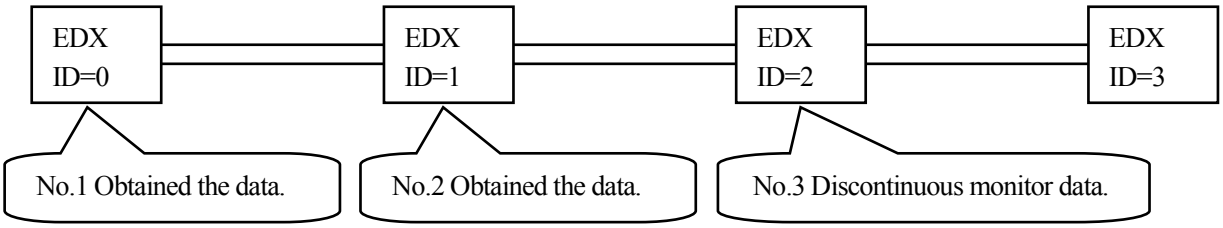
The size of GMR command’s response packet is changed by “The number of monitor data (Parameter 2)” and the setting of channels (Parameter 3 to 8). The size of response packet is up to 200 MB (209715200 bytes). If a software that you create cannot receive large packet, reducing “The number of monitor data (Parameter 2)” and the number of channel (Parameter 3 to 8).

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

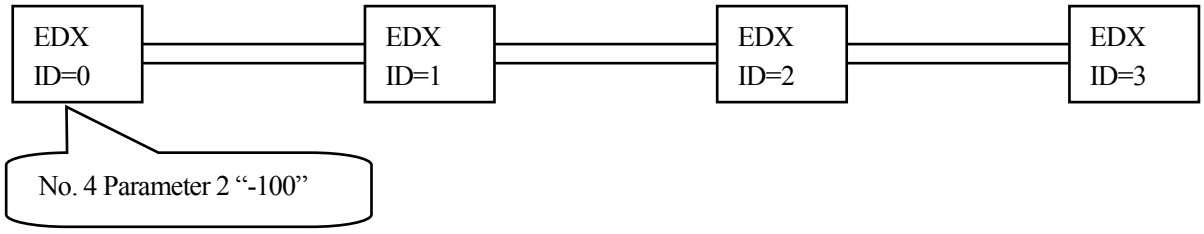
  In synchronous operation, when an EDX status is ‘Discontinuous monitor data’ status, the synchronous monitor data of every unit will not be obtained. At that time, set the parameter 2 “-N (N:1 to 20,000)” , set the parameter 3 to 8 necessary CH, and send GMR command to the master EDX. By obtaining the latest monitor data point from the “Response data 1” of response packet, it is possible to obtain the synchronous monitor data again.

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

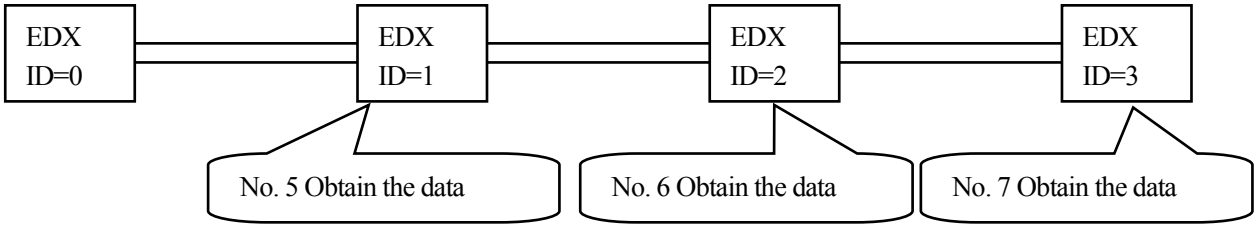
1. When obtaining the monitor data from the master unit to slave units(No.1, 2), the slave EDX (ID=2) status is "Discontinuous monitor data" status (No.3).



2. Set the parameter 2 “-100” and send the GMR command to the master EDX. (No. 4)



3. Obtain the latest monitor data point from “Response data 1” of the response packet, and obtain the monitor data for each slave EDX using the monitor data point. (No. 5 to 7)
You will obtain the synchronous monitor data of every unit.



5-3-14 Output the CAN manually (CMO)

Outputs the CAN manually by the EGPC-50A.

The slave EDX unit outputs the CAN manually when sending the command to the synchronous master.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: CMO
  Parameter: None

- Response packet
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

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 "7 ECAN CONDITIONS FORMAT."

5-3-15 Execute/load the CAN output test. (CSC)

Executes the CAN output test by the EGPC-50A.

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.

- Target EDX: Stand-alone and synchronous master

- Command packet (When outputing)
  The number of transferred bytes: 8 bytes (Command identifier: 3 bytes + Parameter: 5 bytes)
  Command identifier: CSC
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Output) Set 0x01.	BYTE	1
2	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
3	Parameter 3	Reserved	char	3
Total number of parameter bytes				5

- Response packet (When outputting)
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

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 "4-3 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]

- Command packet (When loading)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 bytes)
  Command identifier: CSC
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Output) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet (When loading)
  Response data: 5120 byte (See the table below)

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
		.				
		10th unit				512
Total number of response data bytes (32 conditions + reserved 96 bytes)×4 types×10 units						5120

(*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.

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

5-3-16 Set/load the keylock status (LOC)

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

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

- Command packet (When setting)
  The number of transferred bytes: 8 bytes (Command identifier: 3 bytes + Parameter: 5 bytes)
  Command identifier: LOC
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
2	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
3	Parameter 2	Keylock status (1: Valid, 0: Invalid) (0x01: REC, 0x02: STOP, 0x04:BAL, 0x08: OPT.)	BYTE	1
4	Parameter 3	Reserved	char	3
Total number of parameter bytes				5

- Response packet (When setting)
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

- Command packet (When loading)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 bytes)
  Command identifier: LOC
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet
  Response data: 4 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

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

5-3-17 Set/load the time (TIM)

Sets and loads the date and time.

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

- Command packet (When setting)

  The number of transferred bytes: 12 bytes (Command identifier: 3 bytes + Parameter: 9 bytes)

  Command identifier: TIM

  Parameter: See the table below.

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.		BYTE	1
2	Parameter 2	Date	Year (2017 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
3	Parameter 3	Reserved		char	1
Total number of parameter bytes					9

- Response packet

  Response data: Standard type (1 byte) (See “4-7ERROR CODE”)

- Command packet (When loading)

  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)

  Command identifier: TIM

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of parameter bytes				2

- Response packet (When loading)

  Response data: 8 byte (See the table below)

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Response data 1	Date	Year (2017 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

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

MEMO

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

5-3-18 Load the system information (SYS)

Loads the system information of the EDX.

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

- Command packet
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: SYS
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Load mode 0: Device configuration 1: Card information + Hardware version	BYTE	1
Total number of parameter bytes				1

- Response packet (Load mode = 0)
  Response data: 348 byte (See the table below)

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 10	BYTE	1
4	Response data 4	Optional module type		BYTE	1
5	Response data 5	Reserved		char	3
6	Response data 6	Device ID		char	1
7	Response data 7	Chassis size (64, 80)		BYTE	1
8	Response data 8	Computer name		char	16
9	Response data 9	IP address		char	16
10	Response data 10	Data folder name		char	260
Total number of response data bytes					348

- Response packet (Load mode = 1)

  Response data: 1428 byte (See the table below)

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Slot 1 conditioner card information	char	68
.	.	.	.	.
10	Response data 10	Slot 10 conditioner card information	char	68
11	Response data 11	Optional slot information	char	68
12	Response data 10	Hardware information 1	char	68
.	.	.	.	.
21	Response data 21	Hardware information 10	char	68
Total number of response data bytes				1428

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

NOTE

All the response data 1 to 21 in load mode = 1 is character string.
Note that display contents may be changed without prior notice.

5-3-19 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

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

- Command packet

  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: CAD
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Reserved	char	1
Total number of parameter bytes				1

- Response packet

  Response data: 29000 byte (See the table below)

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
		.				.
		Slot 10	Total number of slot 10 bytes			2900
Total number of response data bytes						29000

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

NOTE

A character string may not contain a NULL code.

5-3-20 Check the device/slot (EDX)

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

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

- Command packet
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: EDX
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Operation mode 0:All CH LEDs flash 1 to 10:CH LED of the assigned number slot flashes	BYTE	1
Total number of parameter bytes				1

- Response packet
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

NOTE

- The EDX command is not available during A/D conversion.
- LEDs flash whether or not a conditioner card is installed.
- When the slot that is not exist is assigned to the parameter 1, executing anything.
- The operational mode 0-10 truns on SEL LED of DBS-120A-8 and VI-8A together, when DBS-120A-8 and VI-8A is connected to the target slot.

5-3-21 Obtain CF card remaining capacity (FFR)

Checks the remaining capacity of the CF card

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

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: FFR
  Parameter: None

- Response packet
  Response data: 16 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

Since remaining capacity of the data drive shuch as HDD, SSD is a value obtained by subtracting system reserve area, it shall be smaller than a value indicated on the EDX. When the destination media is data drive, the system reserve area is about 1 GB.

5-3-22 Open file (FOF)

Open the file to be loaded or to be written.

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

- Command packet

  The number of transferred bytes: 52 bytes (Command identifier: 3 bytes + Parameter: 49 bytes)

  Command identifier: FOF

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Open mode (0: Load)	BYTE	1
2	Parameter 2	File name Be sure to set the extension.	char	48
Total number of parameter bytes				49

- Response pacekt

  Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

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, FCF, DFN and GMR.
- To close the file, execute the FCF command.

5-3-23 Load file data (FRF)

Loads the file data opened by using the FOF command.

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

- Command packet

  The number of transferred bytes: 7 bytes (Command identifier: 3 bytes + Parameter: 4 bytes)

  Command identifier: FRF

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	The number of bytes to be loaded (maximum 4,000,000 bytes)	DWORD	4
Total number of parameter bytes				4

- Response packet

  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 4,000,000 bytes)	---	---
Total number of response data bytes				6 to

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

Data size that can be loaded at a time by using the command is maximum 4,000,000 bytes.
To load a file exeeceding 4,000,000 bytes, repeat the command for the number of required times.

5-3-24 Seek file (FSF)

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

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

- Command packet

  The number of transferred bytes: 12 bytes (Command identifier: 3 bytes + Parameter: 9 bytes)

  Command identifier: FSF

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Loading-start position 0: Head of the file 1: Current loading positiona 2: End of the file	BYTE	1
2	Parameter 2	Moving amount of file read position	INT64	8
Total number of parameter bytes				9

- Response packet

  Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

5-3-25 Close file (FCF)

Closes the file data opened by using the FOF command.

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

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: FCF
  Parameter: None

- Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

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

5-3-26 Delete file (FDF)

Deletes the file.

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

- Command packet

  The number of transferred bytes: 51 bytes (Command identifier: 3 bytes + Parameter: 48 bytes)

  Command identifier: FDF

  Parameter: See the table below.

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

- Response packet

  Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

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

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

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

[Example 3]
To delete 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 deleting files with the file name of "TEST" and file No. 20 to file No. 29.
Set 'TEST002?.KS2' to the parameter 1.

5-3-27 Start finding file (FFF)

Starts finding the file.

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

- Command packet

  The number of transferred bytes: 51 bytes (Command identifier: 3 bytes + Parameter: 48 bytes)

  Command identifier: FFF

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	File name to be found (including the extension)	char	48
Total number of parameter bytes				48

- Response packet

  Response data: 68 byte (See the table below)

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 (2017 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
				Reserved	char	1
Total number of response data bytes						68

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

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.
- 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.

5-3-28 Continue finding file (FFN)

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

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

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: FFN
  Parameter: None

- Response packet
  Response data: 68 byte (See the table below)

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 (2017 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
				Reserved	char	1
Total number of response data bytes						68

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

When the file find result of the response data is '-1' (Error or no file), the EDX status of the "Opening the file or finding the file by using ther control command" is cleared.

5-3-29 End finding file (FFC)

Ends the finding of files started by the FFF command.

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

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: FFC
  Parameter: See the table below.

- Response packet
  Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

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.

5-3-30 Delete last recorded data files (FDK)

Deletes the last recorded data files.

- Target EDX: Stand-alone and synchronous master

- Command packet
  The number of transferred bytes: 3 bytes (Command identifier: 3 bytes)
  Command identifier: FDK
  Parameter: None

- Response packet
  Response data: 2 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

- After the recording is finished, send a command with monitoring in stop status.
- The command is not available during "waiting for interval measurements", "waiting for trigger measurements" or during recording data.
- Delete the last data files(KS2/WAV/AVI/CSV/E4A/NMEA etc.). File numbers are decremented.
- Manual measurements (the number of repeat times = 1) or trigger measurements (the number of repeat times = 1) only.

5-3-31 Load/write the TEDS information (TED)

Loads and writes the TEDS information of 80 channels at the same time.

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

MEMO

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

- Command packet (When setting)

  The number of transferred bytes: 2579 bytes (Command identifier: 3 bytes + Parameter: 2576 bytes)

  Command identifier: TED

  Parameter: See the table below.

No.	Name	Contents		Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.		BYTE	1
2	Parameter 2	Target channel to be written (in binary digit) [Example] Suppose the target CH is CH1, CH2, and CH32. Set 0x0000000000080000003.		BYTE	10
3	Parameter 3	Reserved		char	5
4	Parameter 4	Character strings to be written in the user data 1 (for 80 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
			.	.	.
			CH80 data to be written	char	32
Total number of parameter bytes					2576

- Response packet (When setting)

  Response data: 80 byte (See the table below)

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Wrote result 1 byte × 80 channels = 80 bytes -1: No card or no function 0: OK 1: NG 2: OFF (not target)	char	80
Total number of response data bytes				80

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

- Command packet (When loading)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 byte)
  Command identifier: TED
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet (When loading)
  Response data: 53460 byte (See the table below)

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 CH80 TEDS information			660
Total number of response data bytes					53460

When error occurred, the EDX returns 1 byte error code. (See “4-7ERROR CODE”)

(*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

[From the previous page]

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

[From the previous page]

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).

5-3-32 Execute battery refreshing / Read the status (BAT)

Reads the battery status and executes battery refreshing.

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

- Command packet (When execute)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 bytes)
  Command identifier: BAT
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Read status, 0x01: Execute refreshing) Set 0x01.	BYTE	1
Total number of parameter bytes				1

- Response packet (When execute)
  Response data: Standard type (1 byte) (See "4-7ERROR CODE")

- Command packet (When read)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 bytes)
  Command identifier: BAT
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Read status, 0x01: Execute refreshing) Set 0x00.	BYTE	1
Total number of parameter bytes				1

- Response packet (When read)
  Response data: 2 bytes (See the table below)

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	Status 0x0001: Battery driving 0x0002: Discharging 0x0004: Charging 0x0008: When full charge of battery 0x0010: Changing the state 0x0020: Refreshing 0x8000: Error occured	WORD	2
Total number of response data bytes				2

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

5-3-33 Load/write the user data (URW)

Load and write the arbitrary user data.

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

- Command packet (When setting)

  The number of transferred bytes: 40 bytes (Command identifier: 3 bytes + Parameter: 37 bytes)

  Command identifier: URW

  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Parameter mode (0x00: Load, 0x01: Set) Set 0x01.	BYTE	1
2	Parameter 2	Writing No. (0 to 19)	BYTE	1
3	Parameter 3	Reserved	char	3
4	Parameter 4	User data	char	32
Total number of transferred bytes				37

- Response data (When setting): Standard type (1 byte) (See "4-7ERROR CODE")

- Command packet (When loading)

  The number of transferred bytes: 5 bytes (Command identifier: 3 bytes + Parameter: 2 bytes)

  Command identifier: URW

  Parameter: See the table below.

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

- Response packet

  Response data: 32 byte (See the table below)

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

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

MEMO

Writing No. 0 and writing No. 1 are used in the EDX of the device name.

5-3-34 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.

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

- Command packet
  The number of transferred bytes: 0 bytes
  Command identirifer: None
  Parameter: None

- Response packet
  Response data: 0 byte

5-3-35 Measuring/Obtaining Average Value (AVG)

Measures analog CHs of measurement target with 1kHz sampling frequency and obtains the average value.

- Target EDX: Stand-alone and synchronous master

- Command packet (When conducting)
  The number of transferred bytes: 5 bytes (Command identifier: 3 bytes + Parameter: 2 bytes)
  Command identifier: AVG
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Average value measurement mode (0x00: Read results, 0x01: Conduct) Set 0x01.	BYTE	1
2	Parameter 2	Average value obtaining time (sec) 0 to 10 Set '0' to obtain the average data of approx.. 1 second.	BYTE	1
Total number of transferred bytes				2

- Response data (When setting): Standard type (1 byte) (See "4-7ERROR CODE")

MEMO

After conducting the AVG command, check the EDX status is not "Executing the command(Busy)" with the status read command. After confirming that the average value measurement is finished, read the results.

- Command packet (When reading the results)
  The number of transferred bytes: 4 bytes (Command identifier: 3 bytes + Parameter: 1 bytes)
  Command identifier: AVG
  Parameter: See the table below.

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Parameter 1	Average value measurement mode (0x00: Read results, 0x01: Conduct) Set 0x00.	BYTE	1
Total number of transferred bytes				1

- Response packet
  Response data: 4 bytes × 32CH × the number of connected units = 320 to 3200 bytes

No.	Name	Contents	Types of Variables	The Number of Bytes
1	Response data 1	A/D conversion average value of measured CHs Regardless of whether or not CHs are measured, measured results are output for 80 CHs × the number of connected units. Data of not measured CH shall be '0.'	long	4 × 80CHs × the number of connected units
Total number of response data bytes				320 to 3200

When error occurred, the EDX returns 1 byte error code. (See "4-7ERROR CODE")

NOTE

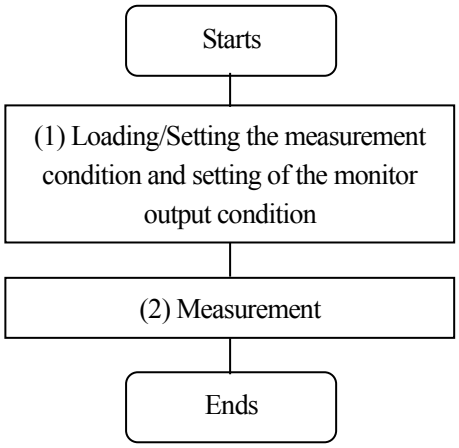
- Conducting this command is only available when A/D conversion is stopping in A/D conversion enabled status.
- While measuring the average value, no command other than reading the status is available.

5-4 Control flow

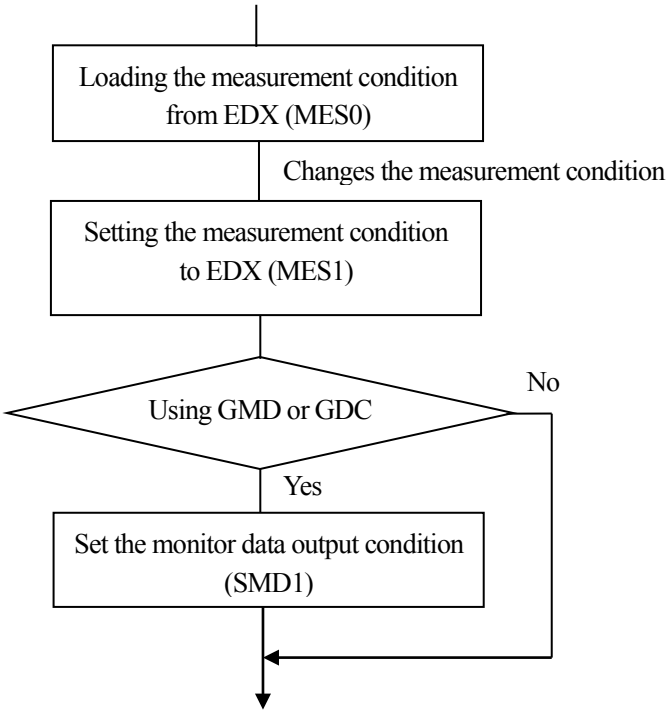
This chapter shows examples of command sending / receiving when standalone or synchronous operation.

5-4-1 Standalone

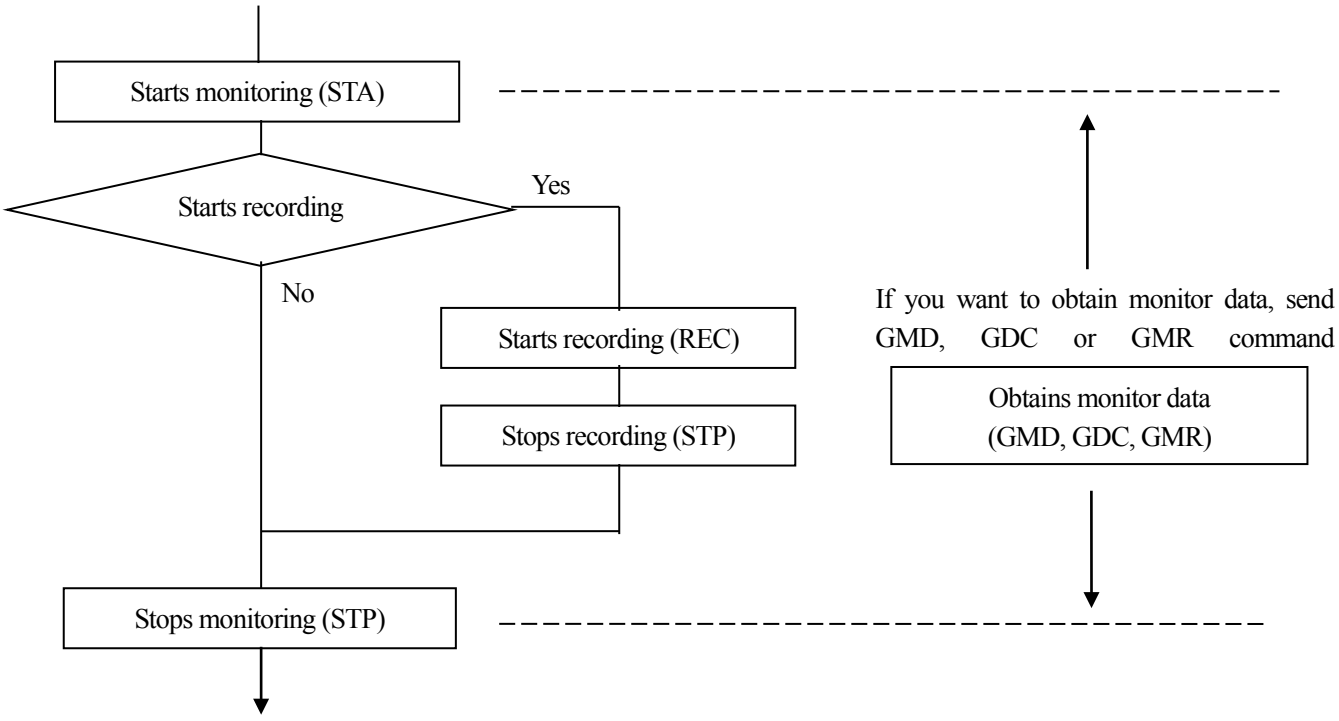
Overall flow



(1) Loading / Setting the measurement condition and setting of the monitor data coutput condtion.

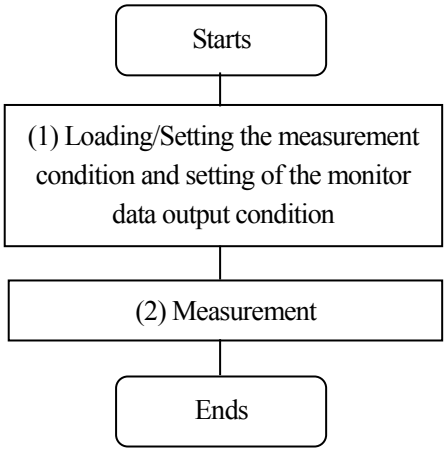


(2) Measurement

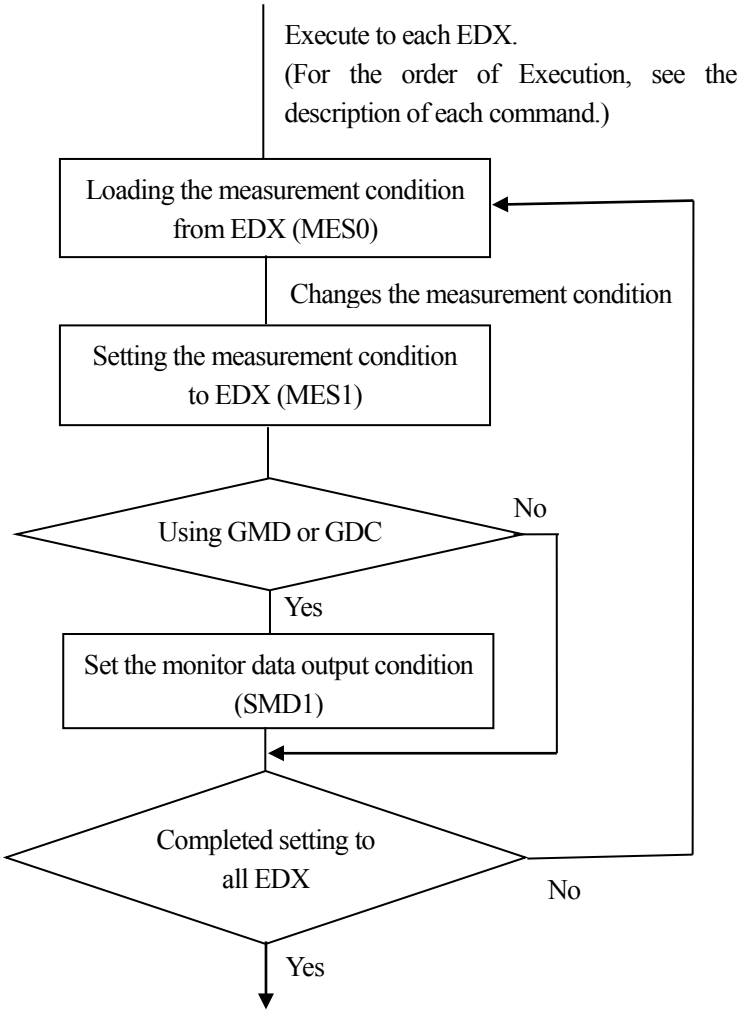


5-4-2 Synchronous operation

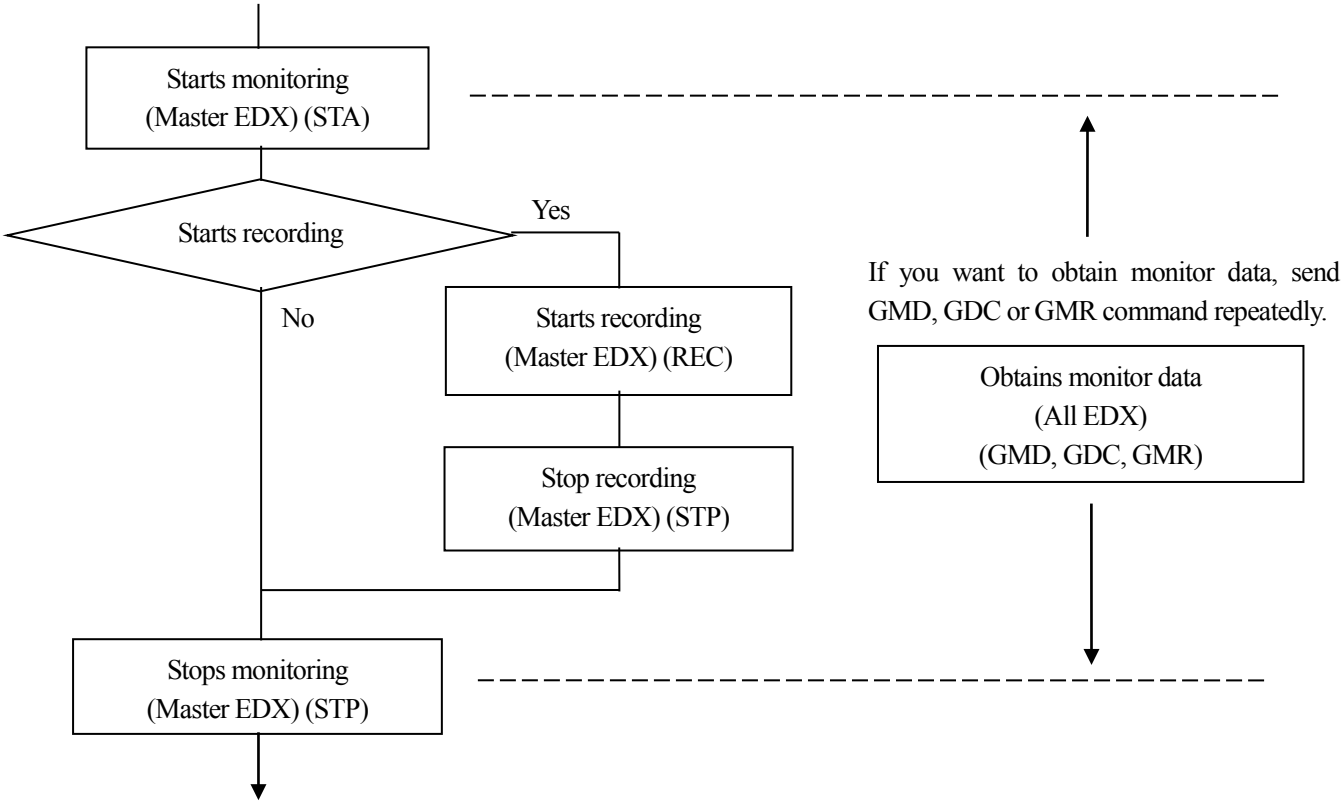
Overall flow



(1) Loading/Setting the measurement condition and setting of the monitor data output condition.



(2) Measurement



6 MEASURING CONDITION FORMAT

6-1 MEASURING CONDITION FORMAT

This section shows the measurement condition format of MES command. The shaded portion indicates the initial setting value.

The whole size: 188,000 bytes

No.	Classification	Contents	Types of Variables	The Number of Bytes
1	General Information 560 bytes	Device ID ("EDX-5000A" fixed, " " is not included.)	char	20
		Parameter format version (1 fixed)	WORD	2
		KS2 based language (0: Japanese, 1: English)	BYTE	1
		Chassis size (64/80)	BYTE	1
		Slot1 card type No. (*1)	BYTE	1
		•	•	•
		Slot10 card type No. (*1)	BYTE	1
		Optional card type No. (0:Not implemented, 1: Unknown, 5: EGPC-50A)	BYTE	1
		Reserved	char	5
		Synchronous operation mode (loading only) -1: Stand-alone, 0: Synchronous master, 1 to 9: Synchronous slaves	char	1
		The total number of connected units during the synchronous operation (Initial value 1)	BYTE	1
		Reserved	char	2
		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 monitoring (0: Yes, 1: No)	BYTE	1
		Option button 0: OFF, 1: Start monitoring, 2: Delete the recorded data, 3: CAL, 4: Over reset	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)	BYTE	1

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No.	Classification	Contents	Types of Variables	The Number of Bytes
		PAUSE function 0: Valid, 1: Invalid	BYTE	1
		When executing balance, executing internal sensitivity compensation 0: Invalid, 1: Valid	BYTE	1
		Chassis size to be stored in data file 0:Fixed(80CH), 1: Variable(80CH/64CH)	BYTE	1
		Balance standard value (Initial value: 50) 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) (Initial value: "")	char	8
		Arbitrary unit 2 (maximum 7 characters) (*3) (Initial value: "")	char	8
		Arbitrary unit 3 (maximum 7 characters) (*3) (Initial value: "")	char	8
		Correction value of slot 1 custom cable (*4) (Initial value: 0)	double	8
		·	·	·
		Correction value of slot10 custom cable (*4) (Initial value: 0)	double	8
		Input cable of Slot 1 (*4) (Initial value: 2)	BYTE	1
		·	·	·
		Input cable of Slot 10 (*4) (Initial value: 2)	BYTE	1
		Reserved	char	382
2	Recorded file information 400 bytes	Recorded file name (maximum 20 characters) (Initial value: "TEST")	char	22
		File No. (0 to 9999) (*3) (Initial value: 0)	WORD	2
		File title (maximum 40 characters) (Initial value: """")	char	44
		Destination of saving file (Initial value: "D:\Data")	char	256
		Reserved	char	76
3	Measuring Condition (Common Condition) 64 bytes	Sampling frequency (1 to 200000 Hz) (Initial value: 1000)	DWORD	4
		Sampling frequency type (0: Internal, 1: External)	BYTE	1
		Reserved	char	1
		Division value for the low-speed sampling frequency (0, 1: No, 2 to 65534: Division value) (Initial value: 1)	WORD	2
		Digital filtering (0: OFF, 1: ON)	BYTE	1
		Saving movie (0: Invalid, 1: Valid)	BYTE	1
		Reserved	char	2
		Default value of the CH No. (*5) (Initial value: 0) For coupling data files recorded by the synchronous operation.	WORD	2

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No.	Classification	Contents	Types of Variables	The Number of Bytes
3	Measuring Condition (Common Condition) 64 bytes	Reserved	char	2
		Measuring mode 0: Manual, 1: Interval, 2: Analog trigger, 3: Digital trigger, 4: External trigger, 6: Complex trigger	BYTE	1
		Reserved	char	3
		The number of analog channels to be recorded (The number of Meas-ON analog channels in the analog channel conditions) (Initial value: All channels)	WORD	2
		Digital input/output settings (in binary digit, multiple bits available) Specify all modes in use. 0x00: OFF 0x01: Digital input 0x02: Remote control mode(*11) 0x04: Digital output	BYTE	1
		Reserved	char	1
		CAN measurement by using optional card (0:OFF, 1:ON)	BYTE	1
		Time synchronization function by using optional card (0:OFF, 1:ON(*11))	BYTE	1
		Recording GPS data by using optional card (0:OFF, 1:ON(*11))	BYTE	1
		Reserved	char	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
		Reserved	char	34
4	Measuring Condition (*4) (For manual measurements) 32 bytes	The number of recorded data (Initial value: 0) (0 or 2 to the number of recordable data)	INT64	8
		The number of repeat times (Initial value: 1) (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 (*4) (for interval measurements) 32 bytes	The number of recorded data (Initial value: 0) (0 , or 2 to the number of recordable data)		INT64	8
		Interval start time (*6)	Year (2017 to 2099) (Initial value: 0)	WORD	2
			Month (1 to 12) (Initial value: 0)	BYTE	1
			Day (1 to 31) (Initial value: 0)	BYTE	1
			Hour (0 to 23) (Initial value: 0)	BYTE	1
			Minute (0 to 59) (Initial value: 0)	BYTE	1
			Second (0 to 59) (Initial value: 0)	BYTE	1
			Reserved	char	1
		Interval (10 to) (*7) (Initial value: 0)		DWORD	4
		The number of interval times (0 to 9999, 0: Infinite)		WORD	2
		Reserved		char	10
6	Measuring Condition (*4) (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 4194304) (*8) (Initial value: 0)		DWORD	4
		Post-trigger delay amount (0 to 4194304) (*8) (Initial value: 0)		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
7	Measuring Condition (*3) (For analog trigger measurements) 48 bytes	Start trigger CH (Initial value: 0) (1 to 80, analog channels to be measured)		BYTE	1
		Start trigger slope (0: UP, 1: DOWN)		BYTE	1
		Reserved		char	2
		Start trigger level: (±32000, ±8192000) (*9) (Initial value: 0)		Long	4
		Reserved		char	16
		End trigger CH (1 to 80, analog channels to be measured) (Initial value: 0)		BYTE	1
		End trigger slope (0: UP, 1: DOWN)		BYTE	1
		Reserved		char	2
		End trigger level: (±32000, ±8192000) (*9) (Initial value: 0)		Long	4
		Reserved		char	16

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No.	Classification	Contents	Types of Variables	The Number of Bytes
8	Measuring Condition (*3) (For digital trigger conditions) 16 bytes	Start trigger bit (1 to 8) (Initial value: 0)	BYTE	1
		Start trigger level (0 or 1)	BYTE	1
		Reserved	char	6
		End trigger bit (1 to 8) (Initial value: 0)	BYTE	1
		End trigger level (0 or 1)	BYTE	1
		Reserved	char	6
9	Measuring Condition (*3) (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
11	Measuring Condition (*3) (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
12	Measuring Condition (*3) (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 (Initial value: 0) (1 to 80, 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) (*9) (Initial value: 0)	long	4
		Start digital bit level 1 (0x00 to 0xFF) (Initial value: 0x00)	WORD	2
		Start 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
.	.	.	.	.
15	Measuring Condition (*3) (No. 4 for start complex trigger measurements) 32 bytes	Ditto	---	32
16	Measuring Condition (*3) (For start complex trigger measurements) 432 bytes	Reserved	char	432
17	Measuring Condition (*3) (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.)	BYTE	1
		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 (*3) (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 80, analog channels to be measured) (Initial value: 0)	BYTE	1
		End trigger slope 1 (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level 1: (±32000, ±8192000) (*10) (Initial value: 0)	long	4
		End digital bit level 1 (0x00 to 0xFF) (Initial value: 0x00)	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
.	.	.	.	.
21	Measuring Condition (*3) (No. 4 for end complex trigger measurements) 32 bytes	Ditto	---	32
22	Measuring Condition (*3) (For end complex trigger measurements) 432 bytes	Reserved	char	432
23	Analog channel condition (CH1 condition) (*10) 96 bytes *7680 bytes for 80 channels	Measurement -1: No card or no channel 0: Not to be measured 1: To be measured	char	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) (Initial value: 0)	char	1
		Channel name (maximum 40 characters) (Initial value: “”)	char	44
		Check the over status (+ side) (Initial value: 100)	char	1
		Check the over status (- side) (Initial value: 100)	char	1
		Reserved	char	2
		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	12
	.	.	.	.
	Analog channel condition (CH80 condition) (*10)	Ditto	---	96

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No.	Classification	Contents	Types of Variables	The number of Bytes
24	Digital input/output condition (Bit No. 1) 64 bytes	Bit input/output setting 0: OFF 1: Digital input 2: Remote control mode (*11) 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 CAN-CH range only. 8: An CAN-CH is exceeding its range.	BYTE	1
		Analog-exceeding channel (0: All channels, 1 to 80: Specified channel)	BYTE	1
		ECAN-exceeding channel (0: OFF, 1 to 512: Specified channel)	WORD	2
		Reserved	char	2
		Bit name (Initial value: “”)	char	44
		Reserved	char	12
	.	.	.	.
	Digital input/output condition (Bit No. 8) 64 bytes	Ditto	---	64
25	Arithmetic condition (Common condition) 16 bytes	Arithmetic operation items 0x00: No arithmetic operation 0x20: Four arithmetic operation *When using the four arithmetic operation, the type of data that obtain by GMD and GDC command is “double”.	WORD	2
		Reserved	char	14
	Four arithmetic condition (CH1) 256 bytes *16384 bytes for 64 CH	Calculation ON / OFF (0: OFF, 1: ON)	BYTE	1
		Unit No. (0 to 62) (Initial value: 0)	BYTE	1
		Number of decimal places (-1: Auto, 0 to 8)	char	1
		Reserved	char	1
		CH name (maximum 40 characters) (Initial value “”)	char	44
		Arithmetic expression (maximum 200 characters) (*13) (Initial value: “”)	char	200
		Arithmetic zero offset value (Initial value: 0)	double	8

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No.	Classification	Contents	Types of Variables	The number of Bytes
25	.	.	.	.
	Four arithmetic condition (CH64)	Ditto	-	256
26	ECAN condition	The condition of option module (*12)	char	160,000
27	Reserved	Reserved	char	960

(*1) For details, see “6-3 CONDITIONER CARD TYPE NO.”.
To be error if it differs with the actual card configuration.

(*2) The unit is assigned to the unit No. 60 to unit No. 62.
(For details, see "6-2UNIT NO. AND UNIT CHARACTER STRING")

(*3) For the stand-alone and synchronous master only.

(*4) For details, see “6-5CORRRECTION VALUE OF CUSTOM CABLE / INPUT CABLE”.

(*5) 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.

[Example 1]

Synchronous operation mode	Slot type	Default value of the CH No.
Master (ID = 0)	10-slot	0
Slave 1 (ID = 1)	8-slot	80
Slave 2 (ID = 2)	10-slot	160

[Example 2]

Synchronous operation mode	Slot type	Default value of the CH No.
Master (ID = 0)	8-slot	0
Slave 1 (ID = 1)	10-slot	80
Slave 2 (ID = 2)	8-slot	160
Slave 3 (ID = 3)	10-slot	240

(*6) If '0' is set to all the interval start time, no interval start time is specified.
At this time, the first recording starts within 10 seconds after receiving the REC command.

(*7) 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.)

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

With 16 bits

Available delay amount = (8 * 1,024 * 1,024)/(2 * [the number of analog channels to be measured])

With 24 bits

Available delay amount = (8 * 1,024 * 1,024)/(4 * [the number of analog channels to be measured])

*The pre-trigger delay, while measuring CAN data by using the option module, is maximum 1 [sec].

(*9) 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 32,000.
  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 8,192,000.
  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.

(*10) 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.'

(*11) During the synchronous operation, the setting is available on the master EDX only.

(*12) For details, see "7 ECAN CONDITIONS FORMAT."

(*13) A character string may not contain a NULL code.

6-2 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			

6-3 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 to 5	(Reserved)	(*1)
6	CTA-40A	
7	(Reserved)	(*1)
8	DPM-42A	
9	CCA-40A	
10	CFV-40A	
11 and 12	(Reserved)	(*1)
13	Not applicable card	Installation slot error
14	CDV-40A-F	
15	DPM-42A-F	
16	CCA-40A-F	
17 to 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 to 34	(Reserved)	(*1)
35	CDV-44AS	
36	(Reserved)	(*1)
37	CDA-44AS	
38	CDA-45AS	
39	CVM-40A	
40	(Reserved)	(*1)
41	AD-40AS	
42	AD-40AS-F	
43 and 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.

6-4 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 3: 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% 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% 2: SHUNT	

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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: 5000 uε 1: 10k uε 2: 50k uε 3: 100k uε 4: 500k 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%

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Card type	Card type No.	41 : AD-40AS 42 : AD-40AS-F
Mode		0: Voltage
Range		0:5V 1:10V 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(AD-40AS-F only)
High Pass Filter		***
CAL Range		0:TEST

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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%

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Card type	Card type No.	47 : CDV-46AS	
Mode		0: Strain (ON) 1:Strain (OFF)	2: Voltage (ON) 3: Voltage (OFF)
Range		0:2kμε 1:5kμε 2:10kμε 3:20kμε 4:50kμε 5:100kμε 6:OFF	0:1.0V 1:2.0V 2:5.0V 3:10.0V 4:20.0V 5:50.0V 6:OFF
Low pass filter		0:FLAT 1:1kHz 2:300 Hz 3:100 Hz 4:30 Hz 5:10 Hz	
High Pass Filter		0:OFF 1:0.2Hz	
CAL Range		0:100% 1:50% 2:SHUNT	

6-5 CORRRECTION VALUE OF CUSTOM CABLE / INPUT CABLE

When using CDV-40A/B series or CVM-40A/41A series, set the setting value of input cable that is shown below.
(The shaded portion indicates the initial setting value.)

Setting value of input cable	CDV-40A/B serires	CVM-40A/41A series
0	Not setting.	Not setting.
1	U-40~48 (0.5m)	U-121 (0.5m)
2	U-39 (1.0m)	U-122 (1.0m)
3	U-38 (1.5m)	U-123 (1.5m)
4	custom cable	custom cable

When using the conditioner card that is not CDV-40A/B series and CVM-40A/41A series, set the setting value of input cable "0 (Not setting)."
Correction value of custom cable is enable when the setting value of input cable is "4 (custom cable)."
In other case, set "0" to the correction value.
The input range of custom cable correction value is -1 to 49.

NOTE

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

- Correction value of custom cable is the value that the displaying value of the cable correction value in ETA-55A, ELA-55A or DCS-100A minus 1.
- When setting "0 (Not setting)" to the value of input cable for CDV-40A/B series or CVM-40A/41A, correcting the value of input cable as below by the correction value of custom cable.

  When the correction value of custom cable is "0" : The value of input cable is corrected "2 (1.0m)"
  When the correction value of custom cable is not "0" : The value of input cable is corrected "4 (custom cable)"

7 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).

7-1 ECAN CONDITIONS FORMAT

The whole size: 160000 bytes
The shaded portion indicates the initial setting value.

No.	Classification	Contents	Types of Variables	The number of Bytes
1	General Information 96 bytes	Device ID ("EGPC-50A" fixed, " " is not included.)	char	20
		Parameter format version (1 fixed)	WORD	2
		The number of ECAN-IDs to be measured (0 to 512) (Initial value: 0)	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) (Initial value: 0)	WORD	2
		Start trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		Start trigger level (physical value) (Initial value: 0)	double	8
		Reserved	char	20
		End trigger channel (1 to 512) (Initial value: 0)	WORD	2
		End trigger slope (0: UP, 1: DOWN)	BYTE	1
		Reserved	char	1
		End trigger level (physical value) (Initial value: 0)	double	8
		Reserved	char	20
4	Digital trigger conditions 16 bytes	Start trigger channel (1 to 512) (Initial value: 0)	WORD	2
		Start trigger bit (1 to 64) (Initial value: 0)	BYTE	1
		Start trigger level (0 or 1)	BYTE	1
		Reserved	char	4
		End trigger channel (1 to 512) (Initial value: 0)	WORD	2
		End trigger bit (1 to 64) (Initial value: 0)	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) (Initial value: 0)	WORD	2
		Start trigger level 1 (physical value) (Initial value: 0)	double	8
		Start digital bit level 1 (0 or 1) (Initial value: 0) (in binary digit, multiple bits not available) For details, see ”7-2-6 Start complex trigger conditions No. 1 to 4.”	UINT64	8
		Start digital bit status 1 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available) For details, see ”7-2-6 Start complex trigger conditions No. 1 to 4.”	UINT64	8
		Reserved	char	36
.	.	.	.	.
9	Start complex trigger Condition 4 64 bytes	Ditto	---	64
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

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No.	Classification	Contents	Types of Variables	The number of Bytes
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) (Initial value: 0)	WORD	2
		End trigger level 1 (physical value) (Initial value: 0)	double	8
		End digital bit level 1 (0 or 1) (Initial value: 0) (in binary digit, multiple bits not available) For details, see "7-2-8 End complex trigger conditions, No. 1 to 4."	UINT64	8
		End digital bit status 1 (0: N/A, 1: Trigger) (in binary digit, multiple bits not available) For details, see "7-2-8 End complex trigger conditions, No. 1 to 4."	UINT64	8
		Reserved	char	36
.	.	.	.	.
14	End complex trigger Condition 4 64 bytes	Ditto	---	64
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) (Initial value: 0)	double	8
		Minimum value (physical value) (Initial value: 0)	double	8
		Reserved	char	44
	.	.	.	.
	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) (Initial value: 2) For details, see "7-2-10 Communication conditions (Port 1 or port 2)."	BYTE	1
		Sample Point (Initial value: 0) (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) (Initial value: "")	char	44
		Reserved	char	20
	.	.	.	.
	Node information (No. 511) 64 bytes	Ditto	---	64
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) (Initial value: 7)	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. (Initial value: -1)	DWORD	4
		ID name (maximum 40 characters) (Initial value: "")	char	44
		Reserved	char	8
	.	.	.	.
	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) (Initial value: 0)	BYTE	1
		Bit length (1 to 64) (Initial value: 16)	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 (Initial value: “”)	char	10
		ID conditions No.(0 to 511) (Initial value: 0)	short	2
		Calibration coefficient (Initial value: 1)	double	8
		Offset (Initial value: 0)	double	8
		Channel name (maximum 40 characters) (Initial value: “”)	char	44
		Reserved	char	16
	.	.	.	.
	Conditions of the channel 512 96 bytes	Ditto	---	96
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 (Initial value: 0x00)	BYTE	1
		Reserved	char	3
		Output (when starting), the number of IDs (0 to 32) (Initial value: 0)	WORD	2
		Output (when stopping), the number of IDs (0 to 32) (Initial value: 0)	WORD	2
		Interval output, the number of IDs (0 to 32) (Initial value: 0)	WORD	2
		Manual output, the number of IDs (0 to 32) (Initial value: 0)	WORD	2
		Interval output, pitch (100 to 100000 [msec]) (Initial value: 0)	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) (Initial value: 0)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID (Initial value: 0)	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths) (Initial value: 0x0000000000000000)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec]) (Initial value: 100)	WORD	2
		Rx frame ID (Initial value: 0)	DWORD	4
		Reserved	char	8
	.	.	.	.
	CAN output (when starting), conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136
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) (Initial value: 0)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID (Initial value: 0)	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths) (Initial value: 0x0000000000000000)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec]) (Initial value: 100)	WORD	2
		Rx frame ID (Initial value: 0)	DWORD	4
		Reserved	char	8
	.	.	.	.
	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
23	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) (Initial value: 0)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID (Initial value: 0)	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths) (Initial value: 0x0000000000000000)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec]) (Initial value: 100)	WORD	2
		Rx frame ID (Initial value: 0)	DWORD	4
		Reserved	char	8
	.	.	.	.
	CAN output Interval output, conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136
24	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) (Initial value: 0)	BYTE	1
		Port No. (0: Port 1, 1: Port 2)	BYTE	1
		Tx frame ID (Initial value: 0)	DWORD	4
		Output data (0x00 to 0xFF/byte, for the number of data lengths) (Initial value: 0x0000000000000000)	BYTE	8
		Confirmation ON/OFF (0: OFF, 1: ON)	BYTE	1
		Reserved	char	1
		Timeout period (10 to 1000 [msec]) (Initial value: 100)	WORD	2
		Rx frame ID (Initial value: 0)	DWORD	4
		Reserved	char	8
		Output ON/OFF (0: OFF, 1: ON)	BYTE	1
	.	.	.	.
	CAN output Manual output, conditions (No.32) 32 bytes	Ditto	---	32
	Reserved	Reserved	char	3136
25	Reserved	Reserved	char	27232

7-2 SUPPLEMENT OF SETTING ECAN CONDITIONS

7-2-1 General information

(1) Device ID
Describe the "EGPC-50A" 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 EGPC-50A.
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 "7-2-12 ID conditions (No. 0 to No. 511)."

7-2-2 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 "6 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)	Analog trigger conditions ● Start trigger channel ● Start trigger slope ● Start trigger level
3 (Digital trigger)	Digital trigger conditions ● Start trigger channel ● Start trigger bit ● Start trigger level
6 (Complex trigger)	Start complex trigger, common condition ● Start AND/OR setting 1 to 3
	Start complex trigger conditions No. 1 to 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)	Analog trigger conditions ● End trigger channel ● End trigger slope ● End trigger level
3 (Digital trigger)	Digital trigger conditions ● End trigger channel ● End trigger bit ● End trigger level
6 (Complex trigger)	End complex trigger, common condition ● End AND/OR setting 1 to 3
	End complex trigger conditions, No. 1 to 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

7-2-3 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.

7-2-4 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

7-2-5 Start complex trigger, common condition

(1) Start AND/OR setting 1
Set the AND/OR settings in No. 1 and No.2 of ”7-2-6 Start complex trigger conditions No. 1 to 4."
0 (OR) or 1 (AND)

(2) Start AND/OR setting 2
Set the AND/OR settings in No.3 and No. 4 of "7-2-6 Start complex trigger conditions No. 1 to 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)

7-2-6 Start complex trigger conditions No. 1 to 4

(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 "(5) Start digital bit level" or "(6) 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

7-2-7 End complex trigger, common condition

(1) End AND/OR setting 1
Set the AND/OR settings in No. 1 and No. 2 of "7-2-8 End complex trigger conditions, No. 1 to 4."
0 (OR) or 1 (AND)

(2) End AND/OR setting 2
Set the AND/OR settings in No. 3 and No. 4 of "7-2-8 End complex trigger conditions, No. 1 to 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)

7-2-8 End complex trigger conditions, No. 1 to 4

(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 “(5) End digital bit level" or "(6) 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

7-2-9 Digital input/output, Bit No. 1 to 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-5000A Memory Recorder / Analyzer 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.

7-2-10 Communication conditions (Port 1 or port 2)

Set the communication conditions of the EGPC-50A. 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)

s

(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 EGPC-50A is valid.

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

7-2-11 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."

7-2-12 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 EGPC-50A records data in fixed-length packets (known as "data frame"). The term "ID" is a storing box of data frames. The EGPC-50A have 512 boxes. The ID conditions of the EGPC-50A 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 "7-2-11 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 "(2) Data frame format.")

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."

7-2-13 Channel condition (CH1 to CH512)

There are 512 channel conditions.

With the EGPC-50A, 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) Calibration coefficient/offset"

-1 (Arbitrary unit), 0 to 62

For unit No. and unit character string, see "6-2 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

(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 "6-2 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 "7-2-12 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.”

7-2-14 CAN output general conditions

For setting the general conditions of the CAN output.

For details, see "EDX-5000A Memory Recorder / Analyzer 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 "7-2-15 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 "7-2-16 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 "7-2-17 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 "7-2-18 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 100,000 [msec], by every 100 [msec]

7-2-15 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 1,000 [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.")

7-2-16 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 "7-2-15 CAN output (when starting), conditions (No.1 to No. 32)".

7-2-17 CAN interval output, conditions (No.1 to No. 32)

The interval output transfers the CAN data frame with the pitch, pre-set in the "7-2-14 CAN output general conditions."

Capable of setting maximum 32 conditions.

The setting items are the same as the "7-2-15 CAN output (when starting), conditions (No.1 to No. 32)".

7-2-18 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 "7-2-15 CAN output (when starting), conditions (No.1 to No. 32)".

MEMO

For details, see "EDX-5000A Memory Recorder / Analyzer Instruction Manual for Hardware."