IM-A-1518 May 2026

KYOWA

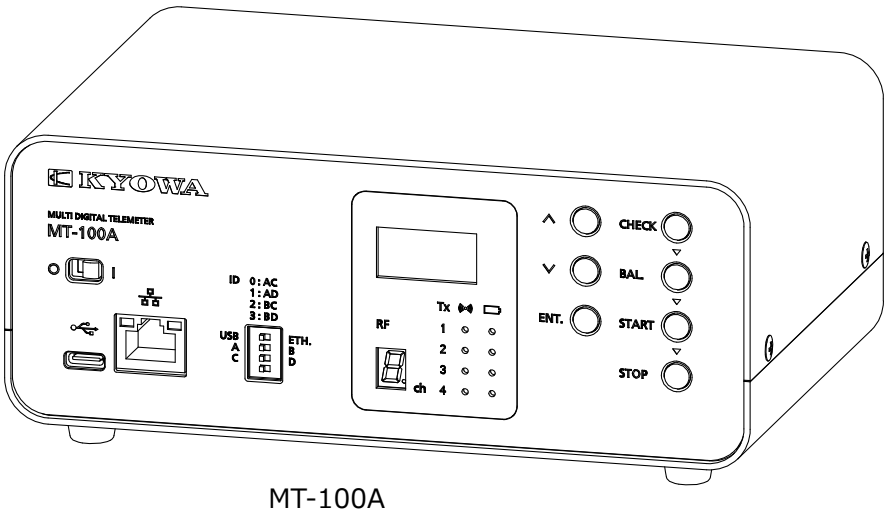
INSTRUCTION MANUAL

MT-100A Series

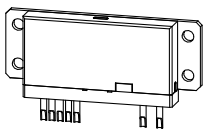
MULTI DIGITAL TELEMETER

Control Command Edition

Multi Digital Telemetry Receiver : MT-100A



MT-100A



MT-101A-S

Business use only

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Contents

INTRODUCTION (PLEASE READ BEFORE USE)

ABOUT THIS DOCUMENT

Thank you for purchasing this KYOWA product.
This instruction manual (hereinafter referred to as **this document**) describes the connection methods with a PC, the functions of control commands, and the usage methods for the MT-100A series (hereinafter referred to as **product**).

To ensure safe and proper use of this product, please read and fully understand this document before operation. After reading, keep it in a safe, accessible place for future reference.

Precautions in this document:

- Use this product as described in this document.
- The company names and product names described in this document are trademarks or registered trademarks of their respective companies.
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- Please refer to our product website (https://product.kyowa-ei.com/en) for the latest information.
- The contents of this document and the specifications of the main unit software may be changed without notice.

RELATED INSTRUCTION MANUALS

This product includes the following documents. Please refer to them according to your application.

Name	Content
MT-100A Series INSTRUCTION MANUAL Hardware Edition	The document is the instruction manual for the hardware of this product. It describes the hardware functions, usage method, wiring method, and operating procedure for this product
MT-100A Series INSTRUCTION MANUAL Control Command Edition (**This document**)	The document is the instruction manual for the control commands of this product. It describes a list and descriptions of the control commands used with this product.
MT-10A Control Software INSTRUCTION MANUAL	The document is the instruction manual for the control software (MT-10A). It describes the connection procedures, operating methods, and specifications for the software.
MT-100A Series PRECAUTIONS FOR USING WIRELESS PRODUCTS	The document is the precautions for using radio wave for the product. It describes precautions for using wireless communication and the certifications of usable countries for this product.
MT-100A Multi Digital Telemetry Receiver READ BEFORE USING THE PRODUCT	The document describes the pre-operation checks and the package contents to ensure the safe and proper use of the Multi digital telemetry receiver (MT-100A).
MT-101A-S Strain Transmitter READ BEFORE USING THE PRODUCT	The document describes the pre-operation checks and the package contents to ensure the safe and proper use of the strain transmitter (MT-101A-S).

NOTATION IN THIS DOCUMENT

Notations Used in This document

Terms Used in This document

The following terms are used to refer to related products in this document.

- The MT-100A series is collectively referred to as **this product**.
- The MT-100A receiver of the MT-100A series is referred to as the **receiver.**
- The MT-101A-S transmitter of the MT-100A series is referred to as the **transmitter**.
- The MT-10A control software for the MT-100A series is referred to as the **control software**.

In addition, the terms used in this document are defined as follows.

Terms	Content
Command packet	Control command data from the PC to the receiver
Response packet	Response data for control command data from the receiver to the PC
Standalone	Independent operation of the receiver with the Receiver ID set to 0 (MAIN)

Unit Prefixes

The following definitions apply to unit prefixes in this document.

Prefixes	Content
K (Kilo)	1 Kbyte = 1024 = 1024 Byte
M (Mega)	1 Mbyte = 1024^2 = 1,048,576 Byte
G (Giga)	1 Gbyte = 1024^3 = 1,073,741,824 Byte

Variable Types

The definitions of variable types used in command packets and response packets in this document are shown below. Variables of 2 bytes or more are in little-endian format.

Variable Types	Byte	Notation	Content
signed char	1	char	Signed 8-bit variable
unsigned char	1	BYTE	Unsigned 8-bit variable
signed short	2	short	Signed 16-bit variable
unsigned short	2	WORD	Unsigned 16-bit variable
signed long	4	long	Signed 32-bit variable
unsigned long	4	DWORD	Unsigned 32-bit variable
signed int64	8	INT64	Signed 64-bit variable
unsigned int64	8	UINT64	Unsigned 64-bit variable
Float	4	float	Single-precision floating-point variable
Double	8	double	Double-precision floating-point variable

Other Symbols

The following symbols are used in this document.

Symbol	Content
	Indicates content that may be helpful as a reference for handling this product.
[ ]	Names of commands, API functions, etc., are enclosed in brackets [ ]. Example: [STA] Command, [Mt100Usb_Open] .
“ ”	References to other parts of this document are enclosed in double quotation marks (“ “) and function as links in this document. Example: For details on notation, please refer to “Notation in this document.”
*	Indicates the presence of a footnote or annotation for a term or content, which is provided below it.

1. OVERVIEW

This document defines the communication commands between the receiver of this product and a PC. This product uses a LAN or USB interface for communication. To control this product, the PC uses these commands.

When the PC sends a command packet to the receiver, this product executes the specified operation and returns a response packet. The formats of the command packet and the response packet are the same for both the LAN and USB interfaces.

When using a LAN, the PC uses the socket API (Application Program Interface) to communicate with the receiver. The socket is a communication API that uses the TCP/IP protocol. Sockets are usually provided as an OS or a middleware package. To send a command packet, the PC uses the data transmission function of the socket. To receive a response packet, the PC uses the data reception function.

When using a USB, the PC communicates via a dedicated USB driver to control the receiver. To send a command packet, the PC uses the data transmission function of the USB driver. To receive a response packet, the PC uses the data reception function.

- This document assumes basic knowledge of LAN, USB, TCP/IP, and socket programming. For details on each technology, please refer to commercially available books.
- For details on the usage method of the hardware of this product, please refer to the MT-100A Series INSTRUCTION MANUAL Hardware Edition.

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2. COMMUNICATION VIA USB INTERFACE

The receiver can be controlled via the USB interface. In this case, the PC sends commands to the receiver via the provided dedicated USB communication API library, and the receiver returns a response.

	・ Only Windows OS is supported for the USB interface. ・ When connecting the receiver to a PC via USB, you may be prompted to install the USB driver. In this case, download the USB Driver from the Kyowa website (https://www.kyowa-ei.com/en) and install it.

2-1. RECEIVER SETTINGS

Change the receiver connection interface setting to USB Connection.
For setting methods, please refer to the “MT-100A Series INSTRUCTION MANUAL Hardware Edition”.

2-2. PC SETTINGS

Create an application program using sockets. Use the dedicated USB communication API library to send and receive command and response packets.

	・ For details on the API library, please refer to "2-3 USB COMMUNICATION API LIBRARY". ・ For details on the packet format, please refer to "6 CONTROL COMMANDS".

2-3. USB COMMUNICATION API LIBRARY

2-3-1.Required Files

Download and extract the dedicated USB communication API library from our website. Extracting the file creates two folders: DLL (32-bit version) and DLL64 (64-bit version). Each folder contains the files required to create and execute the application program. Use the folder that matches the architecture (32-bit or 64-bit) of the control program you are developing.

File Name	Content
Mt100Usb.h	API definition file. Required for program development. Include in source files.
Mt100Usb.lib	API import library. Required for program development. Link to your program.
Mt100Usb.dll	Main API library file. Required for program execution (runtime). Copy to the application folder.

2-3-2.API Function List

The API functions supported by this library are listed below.

API Function	Function
Mt100Usb_Open()	USB library initialization
Mt100Usb_Close()	USB library termination
Mt100Usb_SetTimeOut()	Receive timeout setting
Mt100Usb_CheckConnect()	Connection check
Mt100Usb_SendCmd()	Command transmission
Mt100Usb_ReceiveCmd()	Command reception
Mt100Usb_Reconnect()	Receiver reconnection

2-3-3.List of API Return Values

The following return values are common to all API functions.

Return Value	Result
0	Successful completion
-1	Invalid argument
-2	Device with the specified ID does not exist
-3	Communication error or timeout
-4	Internal DLL error
-5	The DLL is in use by another process
-6	The DLL is not opened

2-3-4.API Function Details

Mt100Usb_Open (USB library open)

Definition	long Mt100Usb_Open (void)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	This function must be executed when starting the application program. Executing this function initializes the DLL and starts the internal process for monitoring the receiver connection.

Mt100Usb_Close (USB Library close)

Definition	long Mt100Usb_Close (void)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	This function must be executed when starting the application program. This function releases the resources used by the DLL.

Mt100Usb_SetTimeOut (Receive timeout setting)

Definition	long Mt100Usb_SetTimeOut (WORD wTimeOut)
Arguments	wTimeOut: Timeout duration (0 to 300 sec)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	The default timeout is 5 sec if this API is not used.

Mt100Usb_CheckConnect (Connection check)

Definition	long Mt100Usb_CheckConnect (WORD *pwConnect)
Arguments	pwConnect: Pointer to store the receiver connection status
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	Stores the connected receiver IDs in the pwConnect argument using a bitmask. If a receiver is connected, the corresponding bit is set to 1. Receiver ID 0 corresponds to Bit 0; Receiver ID 1 corresponds to Bit 1. Ex 1) If only Receiver ID 0 is connected, 0x0001 is returned (stored). Ex 2) If both Receiver ID 0 and Receiver ID 1 are connected, 0x0003 is returned (stored).

Mt100Usb_SendCmd (Command packet transmission)

Definition	long Mt100Usb_SendCmd (WORD wIdNo, void *pBuff, DWORD dwSendSize)
Arguments	wIdNo: Destination receiver ID (0 to 3) pBuff: Buffer containing the command packet to be sent dwSendSize: Size of the command packet to be sent (in bytes)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	The maximum size of the command packet is 1 MB. An error occurs if the destination receiver is not connected. Before using this function, verify whether the destination receiver is connected using [Mt100Usb_CheckConnect].

Mt100Usb_ReceiveCmd (Response packet reception)

Definition	long Mt100Usb_ReceiveCmd (WORD wIdNo, void *pBuff, DWORD dwBuffSize, DWORD *pdwRecvSize)
Arguments	wIdNo: Target receiver ID (0 to 3) pBuff: Buffer to store the received response packet dwBuffSize: Size of the receive buffer (in bytes) pdwRecvSize: Pointer to store the size of the received response packet (in bytes)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	The maximum size of the response packet is 2 MB. The required size of the receive buffer varies depending on the executed command. Ensure that you allocate a buffer large enough to store the response data for each command. An error occurs if the target receiver is not connected. Before using this function, verify whether the target receiver is connected using [Mt100Usb_CheckConnect].

Mt100Usb_Reconnect (Reconnecting to the receiver)

Definition	long Mt100Usb_Reconnect (WORD wIdNo)
Arguments	wIdNo: Target receiver ID to reconnect (0 to 3)
Return Value	Please refer to the "2-3-3 List of API Return Values".
Remarks	An error occurs if the receiver with the specified ID is not connected. Before using this function, verify whether the receiver with the specified ID is connected using [Mt100Usb_CheckConnect].

2-4. USB COMMUNICATION PROCEDURE

The following describes the procedure for communication using the USB connection.

(1) Call [Mt100Usb_Open] to initialize the API library.
(2) Prepare the command packet.
(3) Call [Mt100Usb_CheckConnect] to verify the receiver connection status.
(4) Call [Mt100Usb_SendCmd] to send the command packet to the receiver.
(5) Call [Mt100Usb_CheckConnect] to verify the receiver connection status.
(6) Call [Mt100Usb_ReceiveCmd] to receive the response packet from the receiver.
(7) Repeat steps (2) through (6) as necessary.
(8) Call [Mt100Usb_Close] to terminate the API library.

	・ After calling [Mt100Usb_Open], be sure to call [Mt100Usb_Close] when unloading this API library (Mt100Usb.dll) or terminating the application program. If the API library is unloaded or the application is terminated without calling [Mt100Usb_Close], the application program will remain resident in the PC memory in an abnormal state, preventing the application from starting successfully in subsequent attempts. ・ If [Mt100Usb_SendCmd] is called multiple times consecutively, [Mt100Usb_ReceiveCmd] will retrieve the response packet corresponding to the last command packet sent.

3. COMMUNICATION VIA LAN INTERFACE

The receiver can be controlled via LAN (TCP/IP). In this case, the PC acts as a TCP client and the receiver acts as a TCP server. The PC sends requests for connection, disconnection, data transmission, and data reception to the receiver. The receiver returns a response to each request from the PC.

3-1. RECEIVER SETTINGS

Change the receiver connection interface setting to LAN Connection.
For setting methods, please refer to the “MT-100A Series INSTRUCTION MANUAL Hardware Edition”.

Since TCP/IP is used, the receiver requires valid settings for the IP address, subnet mask, gateway address, etc. If using a closed network consisting only of the PC and the receiver, the user may set any address. However, if connecting to an existing network, consult your network administrator.

3-2. PC SETTINGS

Set the TCP/IP port number to **34450**.
Create an application program using sockets. Use the socket API functions available on the PC to send and receive command and response packets. For details, please refer to the relevant API documentation.

	・ LAN communication may be blocked depending on the PC's firewall or other security settings. Adjust the firewall settings appropriately to allow communication with the receiver. ・ For details on the packet format, please refer to "6 CONTROL COMMANDS".

3-3. LAN COMMUNICATION PROCEDURE

The following describes the procedure for communication using the LAN connection.

(1) Prepare a socket corresponding to the port number and configure necessary options.
(2) Send a connection request (connect) to the receiver.
(3) Send a command packet to the receiver via the socket (send).
(4) Receive a response packet from the receiver via the socket (recv).
(5) Repeat steps (3) and (4) as necessary.
(6) Send a disconnection request (shutdown).
(7) Release the socket used.

	・ Disconnecting the LAN cable during communication triggers a communication lockout of up to 2 minutes due to network status verification specifications; this is not a malfunction, so please wait at least 2 minutes before reconnecting.

4. CONTROL COMMAND TRANSMISSION/RECEPTION PROTOCOL

4-1. COMMAND PACKET (PC -> RECEIVER)

The command packet consists of a fixed-length header, a fixed-length command identifier, and a variable-length transmission data section. Construct the appropriate command packet according to each control command, and then send it from the PC to the receiver.
The format for sending a command packet from the PC to the receiver is shown below.

Header Section (Fixed 192 bytes)	Transmission Data Section	
	Command Identifier (Fixed 3 bytes)	Parameter Sections (Variable length)

4-1-1.Description of Each Item

Header Section

The header in the following format is added to the beginning of the control packet.

No.	Name	Content	Variable Type	Bytes
1	Device ID	MT-100	char	32
2	Transmission Data Size	Total bytes of Command Identifier + Parameter Sections	DWORD	4
3	Reserved	(Reserved)	---	156
Total bytes of Header Section				192

Command Identifier

A character string using ASCII code (three uppercase alphabetic characters).

Parameters

If parameters are required in the Transmission Data Section, they are appended immediately after the Command Identifier.

- The Device ID is a fixed string unique to this product.
- Reserved fields are set to 0.
- When defining the structure of a control command, set the packing correctly.
- When constructing the header section on the PC, initialize the entire area with 0x00 before setting the required items.

4-2. RESPONSE PACKET (RECEIVER -> PC)

The response packet consists of a fixed-length header section (containing common information for each receiver during synchronization and individual transmitter information) and a variable-length response data section.

The size and format of the response data section depend on the command previously sent from the PC to the receiver. After sending a command packet from the PC to the receiver, the receiver returns a response packet; therefore, the PC must always receive (read) the response packet.

The format of the response packet is shown below.

<table>
<tr><td colspan="6">Header Section (Fixed 192 bytes)</td><td rowspan="3">Response Data Section (Variable length)</td></tr>
<tr><td rowspan="2">Common Information (64 bytes)</td><td colspan="5">Individual Transmitter Information (Fixed 128 bytes)</td></tr>
<tr><td>Transmitter No. 1 (8 bytes)</td><td>Transmitter No. 2 (8 bytes)</td><td>Transmitter No. 3 (8 bytes)</td><td>Transmitter No. 4 (8 bytes)</td><td>Reserved (96 bytes)</td></tr>
</table>

4-2-1.Description of Each Item

Header Section

The header in the following format is added to the beginning of the response packet.

Common Information

No.	Name	Content	Variable Type	Bytes
1	Device ID	MT-100	char	32
2	Response Data Size	Indicates the size of the response data section. If 0, there is only a header and no response data section.	DWORD	4
3	MT Status	Indicates the receiver status. Please refer to "4-3 MT Status".	DWORD	4
4	MT Error Status	Indicates the error occurrence status of the receiver. Please refer to "4-4 MT Error Status".	DWORD	4
5	Input Over Status	Displays the input over status. Please refer to "4-5 Input Over Status".	DWORD	4
6	Receiver ID	0: Receiver ID: 0 (AC), MAIN 1: Receiver ID: 1 (AD), SUB1 2: Receiver ID: 2 (BC), SUB2 3: Receiver ID: 3 (BD), SUB3	BYTE	1
7	Reserved	(Reserved)	---	15
Total bytes of Common Information in Header Section				64

- The Device ID is a fixed string unique to this product.
- Reserved fields are set to 0.

Individual Transmitter Information

No.	Name		Content	Variable Type	Bytes
1	Transmitter No. 1 Data	Transmitter Supply Voltage	Supply voltage value of the transmitter	WORD	2
		Wireless Signal	0: No signal 1: Weak 2: Medium 3: Good	BYTE	1
		Reserved	(Reserved)	---	5
		Subtotal bytes of Transmitter No. 1 Individual Information			8
2	Transmitter No. 2 Data				8
3	Transmitter No. 3 Data				8
4	Transmitter No. 4 Data				8
5	(Reserved)			---	96
Total bytes of Individual Transmitter Information in Header Section					128

- Only when the receiver and the transmitter communicate wirelessly is the individual transmitter information updated.
- The transmitter supply voltage can be converted into a physical value (voltage) using the following formula:

$$\text{Physical value (Voltage)} = \text{Acquired Value} \times 6 / 16384$$

Example: When the acquired value is 8192, the transmitter supply voltage is as follows:

$$8192 \times 6 / 16384 \approx 3\,\text{V}$$

Response Data Section

The Response Data Section contains variable-length data. Its content and data size vary depending on each control command. For details, please refer to "6 CONTROL COMMANDS"

- Reserved fields are set to 0.
- The maximum size of a response packet is approximately 1 Mbyte (1,048,576 bytes). Ensure that you allocate sufficient memory to store the received response packet.
- If an error occurs during command processing (e.g., invalid command, parameter error), the Response Data Section will return a standard type (error code).
- If the MT Status is "Busy" (command in progress), only the Header Section will be returned.

4-3. MT STATUS

The MT Status is a 32-bit value that indicates the receiver status and is stored in the header section of the response packet. Each bit functions independently, and multiple bits may be set simultaneously. Depending on the receiver status, certain command executions may be restricted.

4-3-1.MT Status List

The following table shows the status for each bit value of the MT Status.

Bit Value	Content
0x00000001	Measurement Ready
0x00000002	Measurement in Progress
0x00000004	Command in Progress (Busy)
0x00000008	(Reserved)
0x00000010	(Reserved)
0x00000020	(Reserved)
0x00000040	(Reserved)
0x00000080	(Reserved)
0x00000100	Balance Check Results Available
0x00000200	Transmitter Search Results Available
0x00000400	RF Status Check Results Available
0x00000800	(Reserved)
0x00001000	(Reserved)
0x00002000	(Reserved)
0x00004000	(Reserved)
0x00008000	(Reserved)
0x00010000	(Reserved)
0x00020000	(Reserved)
0x00040000	(Reserved)
0x00080000	(Reserved)
0x00100000	Transmitter Search in Progress
0x00200000	(Reserved)
0x00400000	Pair-Setting in Progress
0x00800000	RF Status Check in Progress

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Bit Value	Content
0x01000000	(Reserved)
0x02000000	(Reserved)
0x04000000	(Reserved)
0x08000000	(Reserved)
0x10000000	(Reserved)
0x20000000	(Reserved)
0x40000000	(Reserved)
0x80000000	Error Occurrence Status

・ Reserved fields are set to 0.

4-3-2.MT Status Details

The following describes the conditions under which each MT Status bit is set or cleared.

Measurement Ready (0x00000001)

Set condition	・ When the measurement condition check result is 0x00000000 during the execution of measurement condition settings via the [MES] command. ・ When the [INI] command completes successfully.
Clear condition	・ When the measurement condition check result is a value other than 0x00000000 during the execution of measurement condition settings via the [MES] command.

Measurement in Progress (0x00000002)

Set condition	・ When measurement is started via the START switch or the [STA] command.
Clear condition	・ When measurement is stopped via the STOP switch or the [STP] command.

Command in Progress (Busy) (0x00000004)

Set condition	· When a command is received from the PC.
Clear condition	· When command execution is completed and the response packet is ready to be sent.

	· While a command is in progress (Busy: 0x00000004), the response data contains only the header section. · If the Command in Progress bit (0x00000004) is 1 after sending a control command, the command is still being executed. Continue to check the MT Status and wait for the process to complete until this bit becomes 0.

Balance Check Results Available (0x00000100)

Set condition	· When balance check is successfully completed via the BAL switch, CHECK switch, or [CCH] command.
Clear condition	· When the [CCH] command (Balance Check execution or read) is executed. · When the measurement condition check result is OK (0x00000000) during the execution of measurement condition settings via the [MES] command. · When measurement is started via the START switch or the [STA] command. · When the [INI] command completes successfully.

Transmitter Search Results Available (0x00000200)

Set condition	· When the transmitter search via the [SCH] command is successfully completed.
Clear condition	· When the [SCH] command (Transmitter Search execution or read) is executed. · When the measurement condition check result is OK (0x00000000) during the execution of measurement condition settings via the [MES] command. · When measurement is started via the START switch or the [STA] command. · When the [INI] command completes successfully.

RF Status Check Results Available (0x00000400)

Set condition	・ When the RF status check via the [RFC] command is successfully completed.
Clear condition	・ When the [RFC] command (RF Status Check execution or read) is executed. ・ When the measurement condition check result is OK (0x00000000) during the execution of measurement condition settings via the [MES] command. ・ When measurement is started via the START switch or the [STA] command. ・ When the [INI] command completes successfully.

Transmitter Search in Progress (0x00100000)

Set condition	・ When the transmitter search is executed via the [SCH] command.
Clear condition	・ When the transmitter search process is completed.

Pair-Setting in Progress (0x00400000)

Set condition	・ When the pair-setting is executed via the [PSE] command.
Clear condition	・ When the pair-setting process is completed.

RF Status Check in Progress (0x00800000)

Set condition	・ When the RF status check is executed via the [RFC] command.
Clear condition	・ When the RF status check in progress is completed.

Error Occurrence Status (0x80000000)

Set condition	・ When the MT Error Status is non-zero (any value other than 0x00000000).(For details, please refer to "4-4 MT ERROR STATUS".)
Clear condition	・ When the MT Error Status is 0x00000000.

4-4. MT ERROR STATUS

The MT Error Status is a 32-bit value that indicates the error status of the receiver. It is stored in the header section of the response packet.

4-4-1.MT Error Status List

The following table shows the error state for each bit value

Bit Value	Content
0x00000001	Inter-receiver synchronization function Setting Error
0x00000002	Measurement Data Discontinuity Error
0x00000004	(Reserved)
0x00000008	(Reserved)
0x00000010	Transmitter No. 1 Setting Error
0x00000020	Transmitter No. 2 Setting Error
0x00000040	Transmitter No. 3 Setting Error
0x00000080	Transmitter No. 4 Setting Error
0x00000100	(Reserved)
0x00000200	(Reserved)
0x00000400	(Reserved)
0x00000800	(Reserved)
0x00001000	Wireless Module 1 Access Error
0x00002000	Wireless Module 2 Access Error
0x00004000	FPGA Access Error
0x00008000	(Reserved)
0x00010000	EEPROM Access Error
0x00020000	EEPROM Data Error
0x00040000	SRAM Access Error
0x00080000	(Reserved)
0x00100000	Transmitter Access Error
0x00200000	(Reserved)
0x00400000	(Reserved)
0x00800000	(Reserved)

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Bit Value	Content
0x01000000	(Reserved)
0x02000000	(Reserved)
0x04000000	(Reserved)
0x08000000	(Reserved)
0x10000000	(Reserved)
0x20000000	(Reserved)
0x40000000	(Reserved)
0x80000000	(Reserved)

・ Reserved fields are set to 0.

4-4-2.MT Error Status Details

The following describes the conditions under which each MT Error Status bit is set or cleared.

Inter-receiver synchronization function Setting Error (0x00000001)

Set condition	・ During the Measurement in Progress, when the number of transmitter pairs configured and the output data rate set for receivers SUB1 to SUB3 (Receiver IDs 1 to 3) exceed the specified range for the MAIN receiver (Receiver ID 0).
Clear condition	・ When measurement is stopped via the STOP switch or the [STP] command.

Measurement Data Discontinuity Error (0x00000002)

Set condition	・ When the internal memory for storing measurement data becomes full.
Clear condition	・ When the [GMD] command is sent with Parameter 1 set to 0xFF. ・ When measurement is stopped via the STOP switch or the [STP] command.

Transmitter No. 1 Setting Error (0x00000010)

Set condition	· When the settings for Transmitter No. 1 via the [MES] command fail.
Clear condition	· When the settings for Transmitter No. 1 via the [MES] command are successful. · When pair-setting via the [PSE] command is successfully completed.

	· If the Transmitter No. 1 Setting Error (0x00000010) is set, the Transmitter No. 1 setting values stored in both the receiver and the transmitter will revert to their pre-configuration values; please re-configure Transmitter No. 1 using the [MES] command.

Transmitter No. 2 Setting Error (0x00000020)

Set condition	· When the settings for Transmitter No. 2 via the [MES] command fail.
Clear condition	· When the settings for Transmitter No. 2 via the [MES] command are successful. · When pair-setting via the [PSE] command is successfully completed.

	· If the Transmitter No. 2 Setting Error (0x00000020) is set, the Transmitter No. 2 setting values stored in both the receiver and the transmitter will revert to their pre-configuration values; please re-configure Transmitter No. 2 using the [MES] command.

Transmitter No. 3 Setting Error (0x00000040)

Set condition	· When the settings for Transmitter No. 3 via the [MES] command fail.
Clear condition	· When the settings for Transmitter No. 3 via the [MES] command are successful. · When pair-setting via the [PSE] command is successfully completed.

	· If the Transmitter No. 3 Setting Error (0x00000040) is set, the Transmitter No. 3 setting values stored in both the receiver and the transmitter will revert to their pre-configuration values; please re-configure Transmitter No. 3 using the [MES] command.

Transmitter No. 4 Setting Error (0x00000080)

Set condition	· When the settings for Transmitter No. 4 via the [MES] command fail.
Clear condition	· When the settings for Transmitter No. 4 via the [MES] command are successful. · When pair-setting via the [PSE] command is successfully completed.

	· If the Transmitter No. 4 Setting Error (0x00000080) is set, the Transmitter No. 4 setting values stored in both the receiver and the transmitter will revert to their pre-configuration values; please re-configure Transmitter No. 4 using the [MES] command.

Wireless Module 1 Access Error (0x00001000)

Set condition	· When an error occurs while accessing Wireless Module 1.
Clear condition	· None.

	· If the Wireless Module 1 access error (0x00001000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

Wireless Module 2 Access Error (0x00002000)

Set condition	· When an error occurs while accessing Wireless Module 2.
Clear condition	· None.

	· If the Wireless Module 2 access error (0x00002000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

FPGA Access Error (0x00004000)

Set condition	· When an error occurs while accessing FPGA.
Clear condition	· None.

	· If the FPGA access error (0x00004000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

EEPROM Access Error (0x00010000)

Set condition	· When an error occurs while accessing EEPROM.
Clear condition	· None.

	· If the EEPROM access error (0x00010000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

EEPROM Data Error (0x00020000)

Set condition	· When invalid data is detected in the receiver's EEPROM during startup.
Clear condition	· None.

	· If the EEPROM data error (0x00020000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

SRAM Access Error (0x00040000)

Set condition	· When an error occurs while accessing SRAM.
Clear condition	· None.

	· If a SRAM access error (0x00040000) is set, restart the receiver and check if the error status is cleared. If the error persists even after multiple restarts, the receiver may be malfunctioning.

Transmitter Access Error (0x00100000)

Set condition	· When an internal error occurs in the transmitter.
Clear condition	· When pair-setting via the [PSE] command is successfully completed.

	· If a transmitter access error (0x00100000) occurs, restart all transmitters and repeat the pairing process to verify if the error status clears. If the error persists after repeated restarts, the transmitter may be malfunctioning.

4-5. INPUT OVER STATUS

The Input Over Status is a 32-bit value indicating the input over-range state of each transmitter. The Least Significant Bit (Bit 0) corresponds to Transmitter No. 1, and Bit 3 corresponds to Transmitter No. 4. (Bits 4 through the Most Significant Bit are reserved). If an input exceeds the specified value during measurement, the corresponding bit is set to "1".
(For example, if Transmitter No. 4 and Transmitter No. 1 both detect an input over-range during measurement, the value becomes 0x00000009.)

The bit for the corresponding transmitter is set when either of the following conditions is met:

$$\text{Measured values} < \text{Range} \times \text{Lower Threshold for Error Output} / 100$$
$$\text{Measured values} > \text{Range} \times \text{Upper Threshold for Error Output} / 100$$

Example:

When the Measurement Range is 1000×10^{-6} strain, the Lower Threshold for Error Output is -20%, and the Upper Threshold for Error Output is 50%, an Input Over Status occurs if either of the following conditions is met:

$$\text{Measured values} < 1000 \times -20/100 = -200 \times 10^{-6}\text{strain}$$
$$\text{Measured values} > 1000 \times 50/100 = 500 \times 10^{-6}\text{strain}$$

Additionally, these bits function as an input over-range history; they are not cleared even if the input over-range state is resolved. The bits are cleared only under the following conditions:

- When measurement is stopped and then restarted.
- When a balance operation is executed.
- When the Over-range Reset command [ROS] is executed.

(Blank)

5. Error Code

The error code is 1-byte char type data. This error code is returned in either of the following cases:

- When the response data is specified as the Standard Type.
- When an error occurs during command processing (In this case, the normal response data is not returned).

The following table lists the error codes.

Error Code	Content
0	Normal Completion
-1	Unknown Command
-2	Parameter Error
-3	Unable to execute due to Output Interface setting error
-4	Unable to execute due to wireless communication error
-5	Unable to execute due to receiver synchronization function setting error
-6	Unable to execute due to mode mismatch
-7	(Reserved)
-8	(Reserved)
-9	(Reserved)
-10	(Reserved)
-11	(Reserved)
-12	Cannot execute due to invalid memory content
-13	(Reserved)
-14	(Reserved)
-15	(Reserved)
-16	(Reserved)
-17	(Reserved)
-18	Cannot execute because the system is not in a Measurement Ready state
-19	(Reserved)
-20	(Reserved)
-21	(Reserved)
-22	(Reserved)
-23	(Reserved)
-24	(Reserved)
-25	(Reserved)

(Blank)

6. CONTROL COMMANDS

6-1. CONTROL COMMAND LIST

The following table lists the available control commands.

Category	Content	Command	Page
Measurement Conditions	Measurement Condition Settings	MES	6-4
	Measurement Condition Initialization	INI	6-9
Execution	Transmitter Search	SCH	6-11
	Pair-setting	PSE	6-14
	RF Status Check	RFC	6-18
	Transmitter Sleep	SLP	6-22
	Measurement Start	STA	6-24
	Measurement Stop	STP	6-25
	Input Over status Reset	ROS	6-26
	Balance / Sensor Check	CCH	6-27
	Get Monitor Data	GMD	6-30
Information	System Information Read	SYS	6-38
Other	TCP/IP Information	NET	6-41
	MT Status Read	---	6-44
	System Reboot	RBT	6-45

6-2. CONTROL COMMAND AVAILABILITY

Restrictions may apply to the available control commands depending on the receiver status or the synchronization connection status. For details on the receiver status, please refer to "4-3 MT STATUS". The following table lists the restrictions for control command availability.

Command	Not Ready for Measurement	Measurement Ready	Measuring	Busy
MES	**A**	**A**	**R**	**N**
INI	**A**	**A**	**N**	**N**
SCH	**A**	**A**	**N**	**N**
PSE	**A**	**A**	**R**	**N**
RFC	**A**	**A**	**N**	**N**
SLP	**A**	**A**	**N**	**N**
STA	**N**	**A *1**	**N**	**N**
STP	**N**	**N**	**A *1**	**N**
ROS	**A**	**A**	**A**	**N**
CCH	**N**	**A**	**N**	**N**
GMD	**N**	**A**	**A**	**N**
SYS	**A**	**A**	**R**	**N**
NET	**A**	**A**	**R**	**N**
RBT	**A**	**A**	**N**	**N**
A : Available, R : Restricted, N : Not Available				

*1. Only the MAIN receiver and standalone can be executed.

6-3. CONTROL COMMAND DETAILS

Command packets sent from the PC to the receiver consist of a header (192 bytes), a command identifier (3 bytes), and parameters (variable length). The transmission data size within the header describes the total size of the command identifier and parameters.
The response packet from the receiver has a header (192 bytes) attached at the beginning. The response data size within the header indicates the size of the data following the header. Receive the entire packet based on this value.

	・ For details on command packets and response packets, please refer to “4 CONTROL COMMAND TRANSMISSION/RECEPTION PROTOCOL". ・ Set all reserved areas in the command packet to 0. ・ If only 1 byte is received despite the specified response data size being 2 bytes or more, an internal error has occurred. Process this 1 byte as an Error Code. Please refer to "5 Error Code" for more information.

Details of each control command are provided on the following pages.

6-3-1.Measurement Condition Settings [MES]

This command is used to set or read measurement conditions. During settings, the command validates the parameters to ensure the system is ready to start measurement via the [STA] command. During reading, it retrieves the measurement conditions stored in the receiver.

Command Identifier: MES

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Setting

	・ If the transmitter settings fail due to a communication error, the set values retained in the receiver and the transmitter return to the previous values. At this time, the MT error status of the transmitter is set as follows. - 0x00000010: Transmitter No. 1 setting error - 0x00000020: Transmitter No. 2 setting error - 0x00000040: Transmitter No. 3 setting error - 0x00000080: Transmitter No. 4 setting error

Transmission Data Section

Data Size: 900 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	MES	char	3
2	Parameter 1	MES Command Mode: 0x01 (Setting)	BYTE	1
3	Parameter 2	Measurement conditions to be set	---	896
Total Bytes of Transmission Data Section				900

	・ For details on the format of parameter 2, please refer to ”7 MEASUREMENT CONDITION FORMAT”

Response Data Section

Data Size: 4 Bytes

Response Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Response Data 1	Measurement condition check result	DWORD	4
Total Bytes of Response Data Section				4

・ For details on the measurement condition check result of Response Data 1, please refer to”Measurement Condition Check Results”

Measurement Condition Check Results

The measurement condition check result is returned as a 32-bit value (bit flags). If the result is any value other than 0x00000000, measurement cannot be started.

The following table defines each bit for the measurement condition check results.

Result (Bit)	Description	
0x00000000	Normal Completion	Check result: Normal (Measurement can be started)
0x00000001	General Info Error	General info setting is out of range. (Also set if 0x00000002, 0x00000004, or 0x00000008 occurs.)
0x00000002	Output Setting Error	Setting for output interface, error during measurement, or buzzer is out of range.
0x00000004	Transmit Data Rate Error	Transmission data rate is out of range.
0x00000008	Transmitter Info Error	Sleep time setting is out of range.
0x00000010	Reserved	(Reserved)
0x00000020	Reserved	(Reserved)
0x00000040	Reserved	(Reserved)
0x00000080	Reserved	(Reserved)
0x00000100	Transmitter No.1 Error	Setting for Transmitter No.1 is out of range.
0x00000200	Transmitter No.2 Error	Setting for Transmitter No.2 is out of range.
0x00000400	Transmitter No.3 Error	Setting for Transmitter No.3 is out of range.
0x00000800	Transmitter No.4 Error	Setting for Transmitter No.4 is out of range.
0x00001000	Reserved	(Reserved)
0x00002000	Reserved	(Reserved)
0x00004000	Reserved	(Reserved)
0x00008000	Reserved	(Reserved)
0x00010000	Range Setting Error	Range number settings are out of range.
0x00020000	Bridge Resistance Error	Bridge resistance setting value is out of range.
0x00040000	Output Data Rate Error	Output data rate is out of range for the pair-setting conditions.
0x00080000	Threshold Check Error	Upper/lower limit threshold settings are out of range.

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Result (Bit)	Description	
0x00100000	Reserved	(Reserved)
0x00200000	Reserved	(Reserved)
0x00400000	Reserved	(Reserved)
0x00800000	Reserved	(Reserved)
0x01000000	CAN Output Error	CAN output settings are out of range. (Also set if 0x02000000 or 0x04000000 occurs.)
0x02000000	CAN Comm. Setting Error	CAN communication settings (ID format, baud rate, or CAN FD data bit rate) are out of range.
0x04000000	CAN Message ID Error	CAN Message ID is out of range or duplicated. (Duplication is allowed for CAN FD output Message IDs.)
0x08000000	Reserved	(Reserved)
0x10000000	Reserved	(Reserved)
0x20000000	Reserved	(Reserved)
0x40000000	Reserved	(Reserved)
0x80000000	Reserved	(Reserved)

- Reserved fields are set to 0.

Command Mode: Read

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	MES	char	3
2	Parameter 1	MES Command Mode: 0x00 (Read)	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 896 Bytes

Response Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Response Data 1	Measurement conditions set in the receiver	DWORD	896
Total Bytes of Response Data Section				896

· For details on the format of Response Data 2, please refer to”7 MEASUREMENT CONDITION FORMAT”

6-3-2.Measurement Condition Initialization [INI]

This command initializes the current measurement conditions set on the receiver.

- To initialize multiple targets, execute this command for each target one by one.
- Initializing either the transmitter or the receiver will reset the pair-settings. As a result, communication with the transmitter will be lost immediately after the response data is received.
- Each parameter will be reset to the value indicated in the shaded areas of "7 MEASUREMENT CONDITION FORMAT". When the receiver is initialized, the following statuses will be applied:
  - Receiver ID: No change
  - Output Interface: No change
  - Paired Transmitters: All unpaired

Command Identifier: INI

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 10 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	INI	char	3
2	Parameter 1	(Reserved)	---	1
3	Parameter 2	Target for Initialization: 0x00 (Receiver)	BYTE	1
4	Parameter 3	(Reserved)	---	3
5	Parameter 4	Receiver Initialization Mode 0x00: Initialize measurement conditions 0x01: Factory default	BYTE	1
6	Parameter 5	(Reserved)	---	1
Total Bytes of Transmission Data Section				10

	・ Reserved fields are set to 0. ・ When Parameter 4 is used to perform initialization (factory default), the LAN connection settings are reset to the values shown below. Consequently, the current communication may be disconnected immediately after the response packet is received. - MT-100A IP Address: 192.168.70.100 - Subnet Mask: 255.255.255.0 - Default Gateway: 0.0.0.0

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

6-3-3.Transmitter Search [SCH]

This command is used to search for nearby transmitters or retrieve the search results. During a search, the system detects up to 16 active transmitters in the vicinity. During reading, it retrieves the information of the detected transmitters.

	・ The RFCH can be changed by re-executing the pair-setting process with this command.

Command Identifier: SCH

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Execute

	・ A maximum of 16 transmitters can be detected in a single search. ・ No other commands will be accepted from the time this command is sent until the process is complete. ・ The execution status can be monitored using the following bits in the MT Status: - 0x00000004: Command in Progress (Busy) - 0x00100000: Transmitter Search in Progress

Transmission Data Section

Data Size: 6 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	SCH	char	3
2	Parameter 1	SCH Command Mode: 0x01 (Execute)	BYTE	1
3	Parameter 2	(Reserved)	---	2
Total Bytes of Transmission Data Section				6

	・ Reserved fields are set to 0.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

Command Mode: Read

	· Before reading the results, always check the MT Status. Confirm that the status is not Command in Progress (Busy) (0x00000004) before executing the result read command. · For detail on the MT status, please refer to “4-3 MT STATUS”.

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	SCH	char	3
2	Parameter 1	SCH Command Mode: 0x00 (Read)	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 2176 Bytes

Response Data: Refer to the table below

No.	Name	Content		Variable Type	Bytes
1	Response Data 1	(Reserved)		----	1
2	Response Data 2	Number of transmitters detected		BYTE	1
3	Response Data 3	(Reserved)		---	126
4	Response Data 4	Detected Transmitter 1 Data	Transmitter Model Name	char	16
			Transmitter Serial Number	char	16
			Transmitter Firmware Version	char	16
			Transmitter Type 1: Strain	BYTE	1
			Transmitter RFCH	BYTE	1
			(Reserved)	---	6
			Transmitter Device Address	BYTE	6
			(Reserved)	---	2
			Serial Number of the currently paired receiver	char	16
			(Reserved)	---	48
		Subtotal Bytes of Transmitter 1 Data			128
5	Response Data 5	Detected Transmitter 2 Data			128
...	...	...			...
19	Response Data 19	Detected Transmitter 16 Data			128
Total Bytes of Response Data Section					2176

- Reserved fields are set to 0.

6-3-4.Pair-Setting [PSE]

This command is used to execute pair-setting with transmitters or retrieve the results. During execution, it performs pair-setting with up to 4 specified transmitters. During reading, it retrieves the pair-setting results.

	・ To change the RFCH, perform the pair-setting again using this command.

Command Identifier: PSE

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Execute

	・ Before performing pair-setting, use the [SCH] command to retrieve the transmitter's information. ・ No other commands will be accepted from the time this command is sent until the process is complete. ・ The execution status can be monitored using the following bits in the MT Status: - 0x00000004: Command in Progress (Busy) - 0x00400000: Pair-setting in progress ・ Transmitters for pairing must be specified in sequential order starting from No.1. It is not possible to skip numbers. ・ Example: If Parameter 4 is set to 2, you cannot pair No.1 and No.3. In this case, the combination must be No.1 and No.2.

Transmission Data Section

Data Size: 136 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	PSE	char	3
2	Parameter 1	PSE Command Mode: 0x01 (Execute)	BYTE	1
3	Parameter 2	(Reserved)	---	1
4	Parameter 3	RFCH to be set	BYTE	1
5	Parameter 4	Total number of transmitters to pair 0x01: Transmitter No.1 only 0x02: Transmitters No.1 to No.2 0x03: Transmitters No.1 to No.3 0x04: Transmitters No.1 to No.4	BYTE	1
6	Parameter 5	(Reserved)	---	1

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No.	Name	Content		Variable Type	Bytes
7	Parameter 6	Transmitter No.1 Setting Data	Transmitter Device Address	BYTE	6
			Transmitter RFCH 0x00 to 0x0F	BYTE	1
			(Reserved)	---	1
		Subtotal Bytes of Transmitter Data			8
8	Parameter 7	Transmitter No.2 Setting Data			8
9	Parameter 8	Transmitter No.3 Setting Data			8
10	Parameter 9	Transmitter No.4 Setting Data			8
11	Parameter 10	(Reserved)		---	96
Total Bytes of Transmission Data Section					136

- Reserved fields are set to 0.
- Configure parameters 6 to 9 with the Transmitter Device Address and the Transmitter RFCH retrieved using the [SCH] command.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

Command Mode: Read

- Before reading the results, always check the MT Status. Confirm that the status is not Command in Progress (Busy) (0x00000004) before executing the result read command.
- For detail on the MT status, pleaes refer to “4-3 MT STATUS”.

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	PSE	char	3
2	Parameter 1	PSE Command Mode: 0x00 (Read)	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 1032 Bytes

Response Data: Refer to the table below

No.	Name	Content		Variable Type	Bytes
1	Response Data 1	(Reserved)		---	2
2	Response Data 2	Pairing Result 0x00: Pairing failed 0x01: 1 paired transmitter 0x02: 2 paired transmitters 0x03: 3 paired transmitters 0x04: 4 paired transmitters		BYTE	1
3	Response Data 3	(Reserved)		---	1
4	Response Data 4	Transmitter No.1 Data	Transmitter Firmware Version	char	16
			Transmitter Type 1: Strain	char	1
			(Reserved)	---	7
			Transmitter Model Name	BYTE	16
			(Reserved)	---	16
			Transmitter Device Address	BYTE	6
			(Reserved)	---	2
		Subtotal Bytes of Transmitter Data			64
5	Response Data 5	Transmitter No.2 Data			64
6	Response Data 6	Transmitter No.3 Data			64
7	Response Data 7	Transmitter No.4 Data			64
8	Response Data 8	(Reserved)		---	768
Total Bytes of Response Data Section					1032

- Reserved fields are set to 0.

6-3-5.RF Status Check [RFC]

This command performs an RF status check (verification of wireless signal strength levels) for the transmitters that are currently paired.

	・ If the RFCH is changed after checking the RF status, the pair-setting process must be re-executed using the [PSE] command.

Command Identifier: RFC

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Execute

	・ This command cannot be executed if no transmitters are paired. ・ No other commands will be accepted from the time this command is sent until the process is complete. ・ The execution status can be monitored using the following bits in the MT Status: - 0x00000004: Command in Progress (Busy) - 0x00800000: RF status check in progress

Transmission Data Section

Data Size: 8 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	RFC	char	3
2	Parameter 1	RFC Command Mode: 0x01 (Execute)	BYTE	1
3	Parameter 2	(Reserved)	---	2
4	Parameter 3	Target RFCH (Bit-mapped: LSB corresponds to CH0, CH1, ..., CHF) 0x0001: RFCH 0 0x0002: RFCH 1 ... 0x8000: RFCH F	WORD	2
Total Bytes of Transmission Data Section				8

	・ Reserved fields are set to 0.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

Command Mode: Read

	· Before reading the results, always check the MT Status. Confirm that the status is not Command in Progress (Busy) (0x00000004) before executing the result read command. · For detail on the MT status, pleaes refer to “4-3 MT STATUS”.

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	RFC	char	3
2	Parameter 1	RFC Command Mode: 0x00 (Read)	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 544 Bytes

Response Data: Refer to the table below

No.	Name	Content		Variable Type	Bytes
1	Response Data 1	(Reserved)		---	32
2	Response Data 2	Transmitter No.1 RF Status Data	Antenna 1 RF Status (RFCH 0) 0x00: No signal 0x01: Weak 0x02: Medium 0x03: Good	BYTE	1
			Antenna 2 RF Status (RFCH 0)	BYTE	1
			Antenna 1 RF Status (RFCH 1)	BYTE	1
			Antenna 2 RF Status (RFCH 1)	BYTE	1
			…	…	…
			Antenna 1 RF Status (RFCH F)	BYTE	1
			Antenna 2 RF Status (RFCH F)	BYTE	1
		Subtotal Bytes of Transmitter RF Status Data			32
3	Response Data 3	Transmitter No.2 RF Status Data			32
4	Response Data 4	Transmitter No.3 RF Status Data			32
5	Response Data 5	Transmitter No.4 RF Status Data			32
6	Response Data 6	(Reserved)		---	384
Total Bytes of Response Data Section					544

- Reserved fields are set to 0.
- The RF status for channels (RFCH) that were not specified is set to 0.
- The RF status data for transmitters that are not paired is set to 0.

6-3-6.Transmitter Sleep [SLP]

This command configures the transmitter sleep settings. Upon execution, the transmitter first enters Pre-sleep state. After remaining in Pre-sleep state for approximately 3 minutes, it automatically transitions to Sleep state.

- To put multiple transmitters into sleep mode, execute this command for each transmitter one by one.
- If this command is executed again while the transmitter is in Pre-sleep state, Pre-sleep status is canceled and the transmitter returns to Standby state.
- Wireless communication is unavailable while the transmitter is in Sleep state. To exit Sleep state, wait for the configured time to elapse or cycle the power of the transmitter (OFF then ON).
- The sleep duration follows the value set in the Measurement Condition Format via the [MES] command. The total sleep time includes the Pre-sleep duration (approx. 3 minutes).
  Example: If the sleep time is set to 1 hour (3600 seconds), the transmitter will be in Pre-sleep state for approx. 3 minutes, followed by 57 minutes of Sleep state.

Command Identifier: SLP

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 8 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	SLP	char	3
2	Parameter 1	(Reserved)	---	1
3	Parameter 2	Target Transmitter 0x00: (Reserved) 0x01: Transmitter No.1 0x02: Transmitter No.2 0x03: Transmitter No.3 0x04: Transmitter No.4	BYTE	1
4	Parameter 3	(Reserved)	---	3
Total Bytes of Transmission Data Section				8

- Reserved fields are set to 0.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

6-3-7.Measurement Start [STA]

This command starts the measurement when the receiver is in a measurement ready state.

	· Ensure that the MT status is Measurement Ready (0x00000001) before executing this command. For detail on MT Status, please refer to “4-3 MT STATUS”. · Ensure that the MT status is not Command in Progress (Busy) (0x00000004) when stopping measurement. For detail on MT Status, please refer to “4-3 MT STATUS”.

Command Identifier: STA

Target Device: Standalone, MAIN (Receiver ID: 0)

Transmission Data Section

Data Size: 3 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	STA	char	3
Total Bytes of Transmission Data Section				3

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

6-3-8.Measurement Stop [STP]

This command stops the measurement while the receiver is in the process of measuring.

	· After sending this command, ensure the MT status is not Command in Progress (Busy) (0x00000004) before proceeding to the next command. For detail on MT Status, please refer to “4-3 MT STATUS”.

Command Identifier: STP

Target Device: Standalone, MAIN (Receiver ID: 0)

Transmission Data Section

Data Size: 3 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	STP	char	3
Total Bytes of Transmission Data Section				3

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

6-3-9.Input Over Status Reset [ROS]

This command clears the Input Over status that occurred during measurement.

	・ For details on the input over status, please refer to “4-5 INPUT OVER STATUS”.

Command Identifier: ROS

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 3 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	ROS	char	3
Total Bytes of Transmission Data Section				3

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

6-3-10. Balance / Sensor Check [CCH]

This command is used to execute a balance adjustment and sensor check, or to retrieve the results. During execution, it operates the specified functions. During reading, it retrieves the execution results.

	· For details on the balance and sensor check functions, please refer to the " MT-100A Series INSTRUCTION MANUAL Hardware Edition". · These functions follow the values defined in the Measurement Condition Format set via the [MES] command.

Command Identifier: CCH

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Execute

	· No other commands will be accepted from the time this command is sent until the process is complete. · The execution status can be monitored using the following bit in the MT Status: - 0x00000004: Command in Progress (Busy)

Transmission Data Section

Data Size: 8 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	CCH	char	3
2	Parameter 1	CCH Command Mode: 0x01 (Execute)	BYTE	1
3	Parameter 2	Target Function (Bit-mapped, multiple selection allowed) 0x01: Balance 0x02: Sensor Check	BYTE	1
4	Parameter 3	(Reserved)	---	3
Total Bytes of Transmission Data Section				8

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

Command Mode: Read

	・ Before reading the results, always check the MT Status. Confirm that the status is not Command in Progress (Busy) (0x00000004) before executing the result read command. ・ For detail on the MT status, pleaes refer to “4-3 MT STATUS”.

Transmission Data Section

Data Size: 8 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	CCH	char	3
2	Parameter 1	CCH Command Mode: 0x00 (Read)	BYTE	1
3	Parameter 2	(Reserved)	---	4
Total Bytes of Transmission Data Section				8

	・ Reserved fields are set to 0.

Response Data Section

Data Size: 1032 Bytes

Response Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Response Data 1	Target Function (Bit-mapped) 0x01: Balance 0x02: Sensor Check	BYTE	1
2	Response Data 2	(Reserved)	---	7

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No.	Name	Content		Variable Type	Bytes
3	Response Data 3	Transmitter No.1 CCH Data	Balance Result -2: Communication error 0: OK 1: NG 2: Feature OFF	char	1
			(Reserved)	---	7
			Sensor Check Result -2: Communication error 0: OK 1: Resistance NG	char	1
			(Reserved)	---	3
			Sensor Check Input resistance (Unit: Ohm)	WORD	2
			(Reserved)	---	50
		Subtotal Bytes of Transmitter CCH Data			64
4	Response Data 4	Transmitter No.2 CCH Data			64
5	Response Data 5	Transmitter No.3 CCH Data			64
6	Response Data 6	Transmitter No.4 CCH Data			64
7	Response Data 7	(Reserved)		---	768
Total Bytes of Response Data Section					1032

- Reserved fields are set to 0.
- If the sensor check input resistance value is outside the configured range or exceeds 1500 Ohm, 1 (Resistance NG) is stored in the sensor check result.
- If the sensor check input resistance value is less than 0 Ohm or 9999 Ohm or more, the value 9999 Ohm is stored as the input resistance.

6-3-11. Get Monitor Data [GMD]

This command is used to retrieve measurement data from each transmitter and to clear data discontinuity statuses. During reading, this command retrieves the monitor data (measurement data acquired from each transmitter). During data discontinuity clearing, this command clears the discontinuity status of the measurement data caused by a FIFO full condition.

	· This command is only valid when the device is in a measurement state and the output interface is set to USB / ETH.

Command Identifier: GMD

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Read

	· To acquire continuous measurement data on a PC, you must continue retrieving data using this command before the FIFO memory becomes full. If the FIFO memory becomes full, the Measurement Data Discontinuity bit (0x00000002) in the MT Error Status is set, and data continuity will be lost. · Measurement data is transferred to the PC via the internal FIFO memory. The maximum capacity for storing measurement data within the receiver is 1 MByte (1,048,576 bytes). The approximate maximum time that data can be stored in the FIFO memory is calculated using the following formula: FIFO Storage Capacity Time =1048576 / ((4 × Number of Measurement CHs + 4 + 8) × Transmission Data Rate) Example: When the number of measurement channels is 4 and the transmission data rate is 1000 Hz: 1,048,576 / ((4×4+4+8) × 1,000) = Approx. 37 seconds

Transmission Data Section

Data Size: 16 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	GMD	char	3
2	Parameter 1	GMD Command Mode: 0x00 (Read)	BYTE	1
3	Parameter 2	MAIN Receiver: 0 SUB Receiver: Number of data points per transmitter (Equivalent to Response Data 5 of the MAIN receiver)	DWORD	4
4	Parameter 3	MAIN Receiver: 0 SUB Receiver: Starting timestamp counter of the data (Equivalent to Response Data 6 of the MAIN receiver)	UINT64	8
Total Bytes of Transmission Data Section				16

Response Data Section

Data Size: 32 + A Bytes (Depends on the amount of measurement data)

Response Data: Standard Type

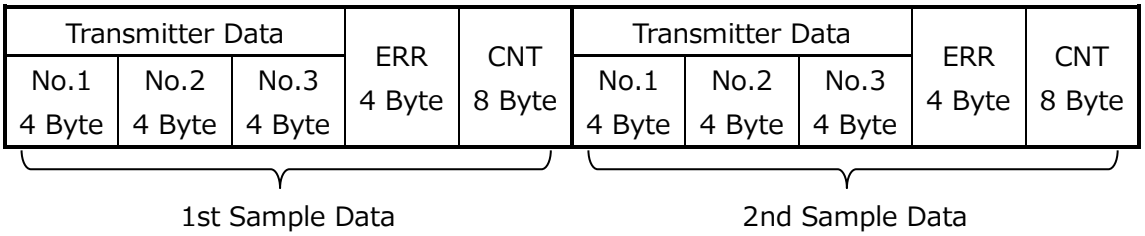
No.	Name	Content	Variable Type	Bytes
1	Response Data 1	Number of the paired transmitters (0 to 4)	BYTE	1
2	Response Data 2	Data size per sample (Bytes)	BYTE	1
3	Response Data 3	Byte size of timestamp counter: 8 (8 Bytes, Fixed)	BYTE	1
4	Response Data 4	(Reserved)	---	1
5	Response Data 5	Number of data points retrieved per transmitter	DWORD	4
6	Response Data 6	Timestamp counter of the first retrieved data point	UINT64	8
7	Response Data 7	Transmitter No.1 Data Type 0: No pairing set 1: Measurement data (Strain value)	char	1
8	Response Data 8	Transmitter No.2 Data Type	char	1
9	Response Data 9	Transmitter No.3 Data Type	char	1
10	Response Data 10	Transmitter No.4 Data Type	char	1
11	Response Data 11	(Reserved)	---	12
Subtotal Bytes of Response Data 1 to 11 (Header)				32
12	Response Data 12	Measurement Data Array	---	A
Total Bytes of Response Data Section				32+A

- Reserved fields are set to 0.
- if no transmitters are paired, Response Data 5 will be 0.
- For details on the measurement data array, please refer to the "Measurement Data Array" section described later.

Measurement Data Array

Although the measurement data resolution for each transmitter is 24-bit, 4 bytes (long type) are used per sample within the measurement data array. The data is organized sequentially from Transmitter No.1 to No.4.
An Error Flag of 4 bytes (DWORD type) is appended after the measurement data. For details on the error flag, please refer to "Measurement Data During Wireless Communication Errors."
Timestamp Counter of 8 bytes (UINT64 type) is appended after the ERR. The initial value of the CNT is 0 and increments by 1 for each sample.

Example: 3 transmitters (No.1, No.2, No.3) with Timestamp Counter enabled Total measurement data size for 2 samples:
48 bytes = (Transmitter Data (4 bytes) × 3 units + ERR (4 bytes) + CNT (8 bytes)) × 2 cycles



- If this command is executed when the MT Status is not in Measurement in Progress (0x00000002), the Response Data Section will return only the header.

The measurement data reaches its maximum value of 7,000,000 at the maximum of the current range. Therefore, the conversion from the acquired measurement data to a physical value is as follows:

Physical Value = Measurement Data × Measurement Range / 7,000,000

Example: Range 1000 × 10^{-6} strain, Measurement Data 3,500,000 The measured strain value is calculated as follows:

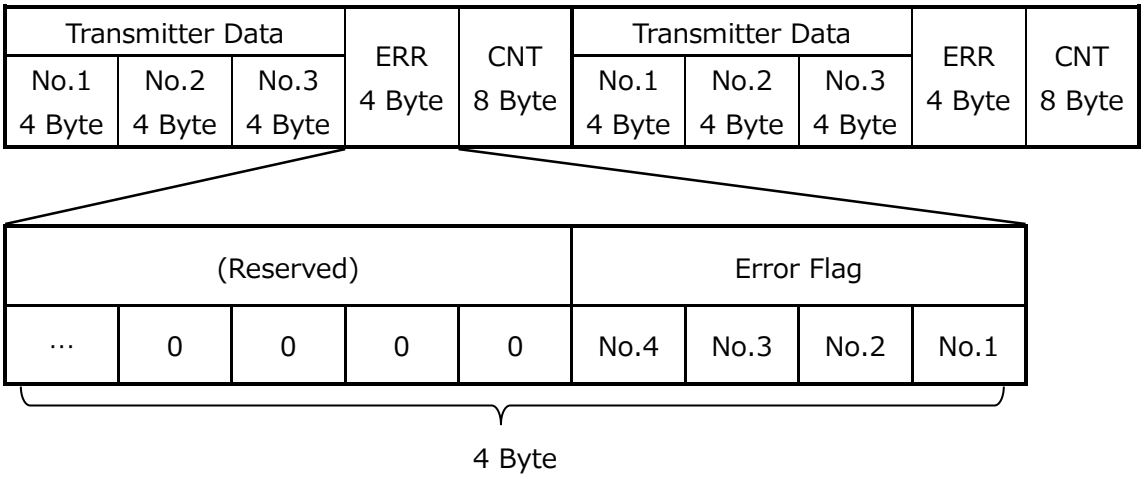
1000 × 10^{-6} × 3,500,000 / 7,000,000 = 500 × 10^{-6} Strain

Measurement Data During Wireless Communication Errors.

If a wireless communication error occurs between a transmitter and the receiver, the measurement data for that interval will be lost.

Data lost due to communication errors is interpolated using the last valid data point from before the error occurred. Additionally, an error flag is stored in the ERR field to indicate that measurement data could not be acquired. The error flags for each transmitter are as follows:

- 0x00000001: Transmitter No.1 Error Flag
- 0x00000002: Transmitter No.2 Error Flag
- 0x00000004: Transmitter No.3 Error Flag
- 0x00000008: Transmitter No.4 Error Flag



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Command Mode: Data Discontinuity Clearing

- If the "Measurement Data Discontinuity" (0x00000002) bit in the MT Error Status is set, the continuity of the measurement data has been lost. In this state, new measurement data will not be stored in the FIFO memory. To resolve this, perform one of the following:
  - Stop the measurement once and then restart it.
  - Set Parameter 1 of this command to 0xFF and execute the discontinuity clear.
- When clearing the discontinuity during synchronous measurement, send this command to all SUB receivers first. Afterward, send the command to the MAIN receiver.
- For details on clearing discontinuity during synchronous measurement, please refer to "When Measurement Data Discontinuity Occurs"

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	GMD	char	3
2	Parameter 1	GMD Command Mode: 0xFF (Data Discontinuity Clearing)	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

When Measurement Data Discontinuity Occurs

If the MT Error Status indicates "Measurement Data Discontinuity" (0x00000002), you cannot retrieve the measurement data that was lost during the discontinuity, even if you execute this command.In this case, you must either:

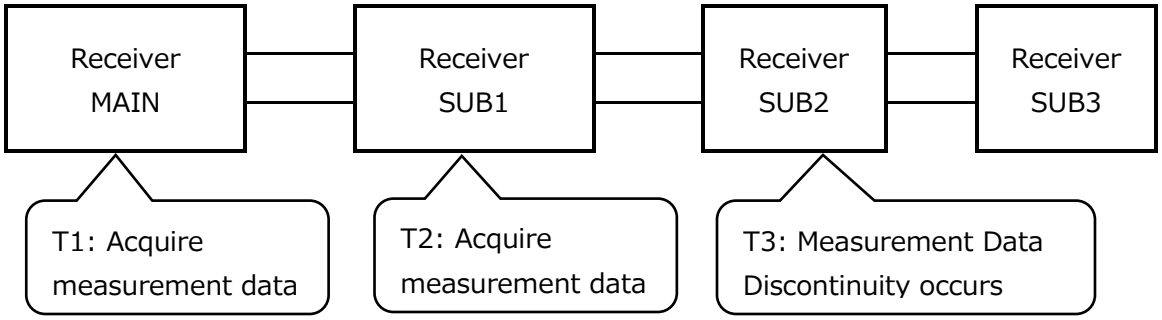
- Stop the measurement once and restart it.
- Execute the "Data Discontinuity Clear" by setting Parameter 1 of this command to 0xFF.

Procedure for Clearing Discontinuity During Synchronous Measurement:

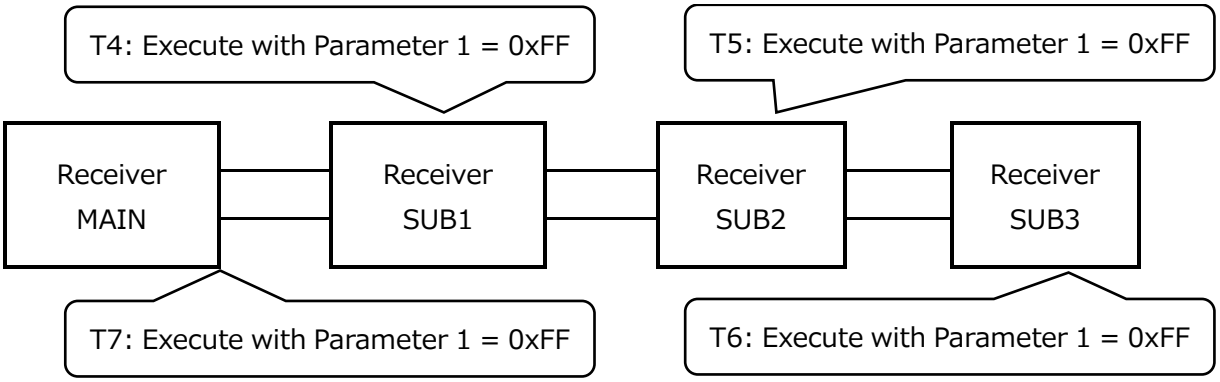
(1) Set Parameter 1 to 0xFF and execute this command for all SUB receivers (SUB1 to SUB3).
(2) Set Parameter 1 to 0xFF and execute this command for the MAIN receiver (MAIN).

Example: Recovery during 4-unit synchronous operation (Discontinuity occurs at Receiver SUB2)

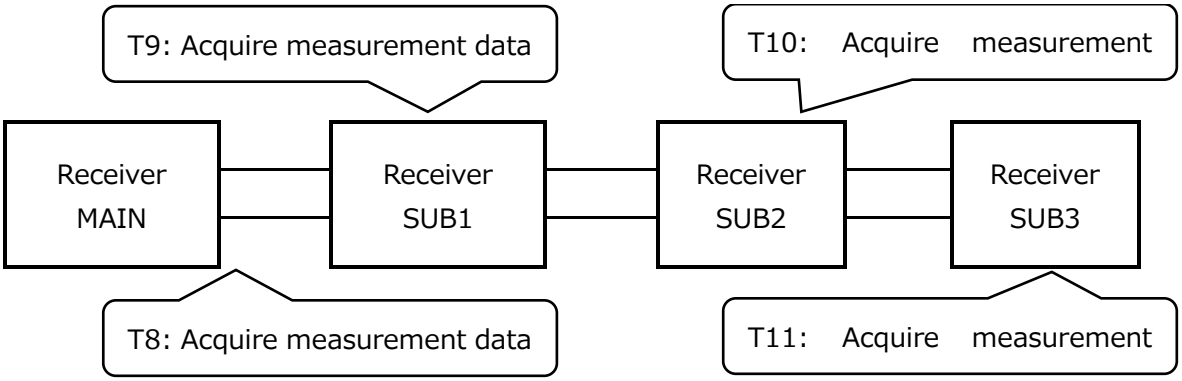
Step 1: Detection While retrieving measurement data sequentially starting from MAIN receiver (T1, T2), a data discontinuity occurs at SUB2 receiver (T3).



Step 2: Clearing the Status Execute this command with Parameter 1 set to 0xFF for all SUB receivers (T4, T5, T6). Finally, execute it for the MAIN receiver (T7).



Step 3: Resuming Acquisition Retrieve the measurement data again, starting from MAIN receiver in order (T8, T9, T10, T11). The measurement data retrieved from each receiver is now synchronized.



6-3-12. System Information Read [SYS]

This command reads the system information of the transceiver once.

Command Identifier: SYS

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 4 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	SYS	char	3
2	Parameter 1	Read Content 0x00: Receiver information only 0x01: Receiver information and Transmitter information	BYTE	1
Total Bytes of Transmission Data Section				4

Response Data Section

Data Size: 2304 Bytes

Response Data: Refer to the table below

No.	Name	Content		Variable Type	Bytes
1	Response Data 1	Receiver Information	Receiver Model Name	char	16
			(Reserved)	---	16
			CPU Firmware Version	char	16
			FPGA Firmware Version	char	16
			Wireless Module 1 Firmware Version	char	16
			Wireless Module 2 Firmware Version	char	16
			Receiver Type Number: 0x00 (Fixed)	BYTE	1
			Receiver RFCH 0x00 to 0x0F	BYTE	1
			(Reserved)	---	30
			Wireless Module 1 Device Address	BYTE	6
			(Reserved)	---	26
			Wireless Module 2 Device Address	BYTE	6
			(Reserved)	---	26
			Receiver Serial Number	char	16
			(Reserved)	---	48
		Subtotal Bytes of Receiver Information			256

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No.	Name	Content		Variable Type	Bytes
2	Response Data 2	Transmitter No.1 Information	Transmitter Model Name	char	16
			(Reserved)	---	16
			Transmitter Firmware Version	char	16
			Transmitter Type 0: None 1: Strain	char	1
			(Reserved)	---	15
			Transmitter Device Address	BYTE	6
			(Reserved)	---	26
			Receiver Serial Number	char	16
			(Reserved)	---	16
		Subtotal Bytes of Transmitter Information			128
3	Response Data 3	Transmitter No.2 Information			128
4	Response Data 4	Transmitter No.3 Information			128
5	Response Data 5	Transmitter No.4 Information			128
6	Response Data 6	(Reserved)		---	1536
Total Bytes of Response Data Section					2304

- Reserved fields are set to 0.
- Regardless of the value of Parameter 1, the total size of the Response Data Section is fixed at 2304 bytes.
- If Parameter 1 is set to 0x00, all values from Response Data 2 onwards will be 0.
- If Parameter 1 is set to 0x01, the transmitter information retrieved will be for the transmitters currently paired with the receiver.

6-3-13. TCP/IP Information [NET]

This command configures or reads the receiver's LAN connection information (IP address, subnet mask, default gateway).

Command Identifier: NET

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Command Mode: Setting

- When this command is executed, the changes are not reflected immediately, but the settings are saved to the receiver's internal non-volatile memory. The settings are read and applied when the power is turned on.

Transmission Data Section

Data Size: 132 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	NET	char	3
2	Parameter 1	NET Command Mode: 0x01 (Setting)	BYTE	1
3	Parameter 2	IP address (Example: 192.168.200.200)	char	16
4	Parameter 3	Subnet mask (Example: 255.255.255.0)	char	16
5	Parameter 4	Default gateway (Example: 0.0.0.0)	char	16
6	Parameter 5	(Reserved)	---	80
Total Bytes of Transmission Data Section				132

- Reserved fields are set to 0.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

Command Mode: Read

Transmission Data Section

Data Size: 6 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	NET	char	3
2	Parameter 1	NET Command Mode: 0x00 (Read)	BYTE	1
3	Parameter 2	Read Content 0x00: Stored values in non-volatile memory 0x01: Current operating settings	BYTE	1
4	Parameter 3	(Reserved)	---	1
Total Bytes of Transmission Data Section				6

- Reserved fields are set to 0.

Response Data Section

Data Size: 128 Bytes

Response Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Response Data 1	IP address	char	16
2	Response Data 2	Subnet mask	char	16
3	Response Data 3	Default gateway	char	16
4	Response Data 4	(Reserved)	---	16
5	Response Data 5	Wireless Module 1 Device Address	BYTE	6
6	Response Data 6	(Reserved)	---	26
7	Response Data 7	Wireless Module 2 Device Address	BYTE	6
8	Response Data 8	(Reserved)	---	26
Total Bytes of Response Data Section				128

- Reserved fields are set to 0.

6-3-14. MT Status Read

The MT Status is included in the header of the response packet for all commands. Therefore, you can obtain the MT Status by checking the response whenever any command is sent.
If you wish to check only the MT Status without sending a specific command, send a packet with the data size set to 0 (Header only). The receiver will return a header-only response, allowing you to confirm the current status.

Command Identifier: None (Send header only)
Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 0 Bytes
Transmission Data: None

Response Data Section

Data Size: 0 Bytes
Response Data: None

6-3-15. System Reboot [RBT]

This command executes a reboot (software reset) for the receiver and transmitters.

	· Before executing this command, check the MT Status to confirm that the device is in the Measurement Ready (0x00000001). For detail on MT Status, please refer to "4-3 MT STATUS". · After this command is executed and the response data is sent, the device will not accept any further operations until the software reset is complete. · When the receiver reboots, the USB and LAN connections will be disconnected.

Command Identifier: RBT

Target Device: Standalone, MAIN or SUB1 to 3 (Receiver ID: 0 to 3)

Transmission Data Section

Data Size: 8 Bytes

Transmission Data: Refer to the table below

No.	Name	Content	Variable Type	Bytes
1	Command Identifier	RBT	char	3
2	Parameter 1	(Reserved)	---	1
3	Parameter 2	Target for reboot 0x00: Receiver 0x01: Transmitter No.1 0x02: Transmitter No.2 0x03: Transmitter No.3 0x04: Transmitter No.4	BYTE	1
4	Parameter 3	(Reserved)	---	3
Total Bytes of Transmission Data Section				8

	· Reserved fields are set to 0.

Response Data Section

Data Size: 1 Bytes

Response Data: Standard Type

(Blank)

7. MEASUREMENT CONDITION FORMAT

This format is the measuring conditions exchanged between the PC and the receiver using the MES control command.

7-1. MEASUREMENT CONDITION FORMAT STRUCTURE

The measurement condition format is shown below. (The shaded areas represent the default values.)

Total Size: 896 Bytes

No.	Category	Content	Variable Type	Bytes
1	General Information (512 Bytes)	Device ID (Read-only) MT-100	char	32
		Parameter File Version (Read-only) 1 (Fixed)	WORD	2
		(Reserved)	---	2
		Receiver Type Number (Read-only) 0 (Fixed)	BYTE	1
		(Reserved)	---	3
		Number of Paired Transmitters (Read-only) 0: 0 (No Pairing) 1: 1 transmitter 2: 2 transmitters 3: 3 transmitters 4: 4 transmitters	BYTE	1
		(Reserved)	---	7
		Transmitter No.1 Type (Read-only) 0: None (No Pairing) 1: Strain	BYTE	1
		Transmitter No.2 Type (Read-only) 0: None (No Pairing) 1: Strain	BYTE	1
		Transmitter No.3 Type (Read-only) 0: None (No Pairing) 1: Strain	BYTE	1
		Transmitter No.4 Type (Read-only) 0: None (No Pairing) 1: Strain	BYTE	1
		(Reserved)	---	12

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No.	Category	Content	Variable Type	Bytes
1	General Information (512 Bytes)	Wireless Module 1 Device Address (Read-only)	BYTE	6
		(Reserved)	---	2
		Wireless Module 2 Device Address (Read-only)	BYTE	6
		(Reserved)	---	2
		Transmitter No.1 Device Address (Read-only) 000000000000	BYTE	6
		(Reserved)	---	2
		Transmitter No.2 Device Address (Read-only) 000000000000	BYTE	6
		(Reserved)	---	2
		Transmitter No.3 Device Address (Read-only) 000000000000	BYTE	6
		(Reserved)	---	2
		Transmitter No.4 Device Address (Read-only) 000000000000	BYTE	6
		(Reserved)	---	2
		(Reserved)	---	96
		Receiver ID (Read-only) 0: Receiver ID 0 (AC), MAIN 1: Receiver ID 1 (AD), SUB1 2: Receiver ID 2 (BC), SUB2 3: Receiver ID 3 (BD), SUB3	BYTE	1
		Connection interface (Read-only) 0: USB Connection 1: LAN Connection	BYTE	1
		Output Interface 0: Analog Output 1: USB / ETH. 2: CAN	BYTE	1
		Buzzer Enable (*Sounds only for measurement errors) 0: Disable 1: Enable	BYTE	1

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No.	Category	Content	Variable Type	Bytes
1	General Information (512 Bytes)	Measurement Error 0: Communication Error 1: Threshold Error 2: Communication and Threshold Errors	BYTE	1
		RFCH (Read-only) 0x00 to 0x0F	BYTE	1
		Send Data Rate *2 (Read-only) 0: 2.5 Hz (Maximum Output Data Rate 50 Hz) 1: 5 Hz (Maximum Output Data Rate 100 Hz) 2: 25 Hz (Maximum Output Data Rate 500 Hz) 3: 50 Hz (Maximum Output Data Rate 1000 Hz) 4: 100 Hz (Maximum Output Data Rate 2000 Hz) 5: 200 Hz (Maximum Output Data Rate 4000 Hz) 6: 400 Hz (Maximum Output Data Rate 8000 Hz)	BYTE	1
		(Reserved)	---	1
		Transmitter Sleep Time (Unit: seconds) 1800 to 864000 (Default value: 3600)	DWORD	4
		Measurement Data Packet Retransmission Count *3 (Read-only) Maximum Output Data Rate 8000 Hz: 4 Maximum Output Data Rate Other than 8000 Hz: 8	BYTE	1
		(Reserved)	---	3
		IP address (Read-only) 192.168.70.100	char	16
		Subnet mask (Read-only) 255.255.255.0	char	16
		Default gateway (Read-only) 0.0.0.0	char	16
		(Reserved)	---	240
		Subtotal Bytes of General Information		512

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*2. The Send Data Rate represents the rate at which the transmitter sends measurement data packets. This value is automatically determined by the maximum Output Data Rate.

*3. The measurement data packet retransmission count represents the number of retransmissions for measurement data packets sent from the transmitter. This value is automatically determined by the maximum Output Data Rate.

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No.	Category	Content	Variable Type	Bytes
2	Transmitter No.1 Configuration (16 Bytes)	(Reserved)	---	1
		Measurement Range Number *4 1 to 6	BYTE	1
		Balance ON/OFF 0: OFF 1: ON	BYTE	1
		(Reserved)	---	1
		Bridge Resistance for Sensor Check (Unit: Ohm) 120 to 1000	WORD	2
		(Reserved)	---	1
		Output Data Rate 0: 50 Hz 1: 100 Hz 2: 500 Hz 3: 1000 Hz 4: 2000 Hz 5: 4000 Hz 6: 8000 Hz	BYTE	1
		Error Output Upper Threshold -100% to 100%	char	1
		Error Output Lower Threshold -100% to 100%	char	1
		(Reserved)	---	6
		Subtotal Bytes of Transmitter configuration		16
	Transmitter No.2 Configuration			16
	Transmitter No.3 Configuration			16
	Transmitter No.4 Configuration			16
	(Reserved)		---	192
	Subtotal Bytes of Transmitter Configuration			256

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*4. Measurement Range Number depends on transmitter type. For details on Measurement Range Number, please refer to”7-2 MEASUREMENT RANGE”.

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No.	Category	Content	Variable Type	Bytes
3	CAN Output Configuration	CAN Format 0: CAN Standard 1: CAN Extended 2: CAN FD Standard 3: CAN FD Extended	BYTE	1
		Terminating resistor Enable 0: Disable 1: Enable	BYTE	1
		Communication Speed 0: 1000 kbps 1: 800 kbps 2: 500 kbps 3: 250 kbps 4: 125 kbps 5: 100 kbps 6: 83.3 kbps 7: 62.5 kbps 8: 50 kbps 9: 33.3 kbps 10: 25 kbps 11: 20 kbps 12: 10 kbps	BYTE	1
		CAN FD Data Phase Communication Speed *5 0: 5 Mbps 1: 4 Mbps 2: 2 Mbps 3: 1 Mbps 4: 0.5 Mbps 5: OFF	BYTE	1
		(Reserved)	---	44

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*5. CAN FD data phase communication speed is limited by the communication speed. For details on the CAN FD data phase communication speed, please refer to the " MT-100A Series INSTRUCTION MANUALHardware Edition".

(Continued from previous page)

No.	Category	Content	Variable Type	Bytes
3	CAN Output Configuration	CAN FD Data Frame Message ID *6*7 CAN FD Standard: 0x0 to 0x7FF CAN FD Extended: 0x0 to 0x1FFFFFFF (Default value: 0x6)	DWORD	4
		CAN Data Frame Message ID *6*7 (Timestamp Counter) CAN Standard: 0x0 to 0x7FF CAN Extended: 0x0 to 0x1FFFFFFF (Default value: 0x1)	DWORD	4
		CAN Data Frame Message ID *6*7 (Transmitter No.1 Data) CAN Standard: 0x0 to 0x7FF CAN Extended: 0x0 to 0x1FFFFFFF (Default value: 0x2)	DWORD	4
		CAN Data Frame Message ID *6*7 (Transmitter No.2 Data) CAN Standard: 0x0 to 0x7FF CAN Extended: 0x0 to 0x1FFFFFFF (Default value: 0x3)	DWORD	4
		CAN Data Frame Message ID *6*7 (Transmitter No.3 Data) CAN Standard: 0x0 to 0x7FF CAN Extended: 0x0 to 0x1FFFFFFF (Default value: 0x4)	DWORD	4
		CAN Data Frame Message ID *6*7 (Transmitter No.4 Data) CAN Standard: 0x0 to 0x7FF CAN Extended: 0x0 to 0x1FFFFFFF (Default value: 0x5)	DWORD	4
		(Reserved)	---	56
		Subtotal Bytes of CAN Output Configuration		128
Total Bytes of The Measurement Condition Format				896

*6. Set a unique value for each Message ID.

*7. The setting range of the Message ID varies depending on the used CAN format. If a value outside the range is set, a communication error may occur.

	・ Reserved fields are set to 0. ・ Do not set any value outside the range for each parameter. Setting an out-of-range value may prevent the product from operating normally.

7-2. MEASUREMENT RANGE

The measurement range settings for each transmitter are shown below.
(The shaded areas indicate the default settings.)

Transmitter Type	Strain
Measurement Range	1: 1000 × 10^{-6} strain 2: 2500 × 10^{-6} strain 3: 5000 × 10^{-6} strain 4: 10000 × 10^{-6} strain 5: 25000× 10^{-6} strain 6: 50000 × 10^{-6} strain

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