OMRON

Smart Sensor

Vision Sensor with built-in LCD monitor

ZFX-C10

Serial Communication Command Reference

Cat. No. Z252-E1-03

Introduction

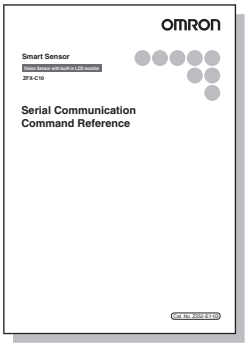
Thank you for purchasing the ZFX-C.
This manual provides information regarding functions, performance and operating methods that are required for using the ZFX-C.
When using the ZFX-C, be sure to observe the following:

- The ZFX-C must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

Manuals Provided with this Product

User's Manual

This manual describes basic operations, such as installation and connections, and information on settings and specifications to ensure safe and correct use of this product.



Serial Communication Command Reference (this document)

This manual provides reference information for when this product performs communications with an external device, such as a PC or a programmable controller, via the serial interface.

Contents

Communication Interface Specifications

You can use the USB port or RS-232C/422 connector of the Controller to perform serial communication with external devices such as a personal computer or programmable controller.
Serial communication functions in the RUN mode. Communication cannot be performed in the ADJ or MENU modes.

<USB>

This interface allows Full speed (12 Mbps) communications compliant with USB2.0 with a PC equipped with the same USB interface.

Synchronization method	Start-stop
Transmission code	ASCII (Binary format can be selected only when outputting measurement values set at [Setup] - [Support] - [Calculation] - [Data].)
Communication speed	USB2.0-compliant
Data length	-
Parity	-
Stop bit	-
Delimiter	CR, LF, CR+LF
Transmission protocol	Normal (Note, however, that XMODEM protocol is used when sending image data, system data and other data.)

<RS-232C/422>

This interface allows data communications compliant with the EIA RS-232C/422 standards up to a maximum speed of 115200 bps.

Synchronization method	Start-stop
Transmission code	ASCII (Binary format can be selected only when outputting measurement values set at [Setup] - [Support] - [Calculation] - [Data].)
Communication speed	9600, 19200, 38400, 57600, 115200
Data length	7 bits, 8 bits
Parity	None, even, odd
Stop bit	1 bit, 2 bits
Delimiter	CR, LF, CR+LF
Transmission protocol	Normal (Note, however, that XMODEM protocol is used when sending image data, system data and other data.)

For details on how to set the communication specifications, refer to the User's Manual.

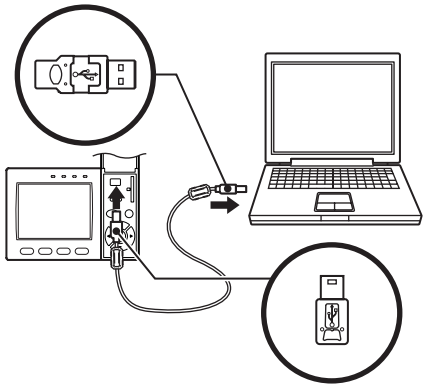
<Ethernet>

Communication protocol	TCP/IP
Transmission mode	Peer to Peer

Connection

Connecting a PC

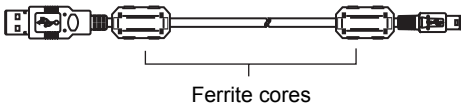
<USB>



Use a USB cable (ZFX-XUSB) to connect the Controller to the PC.

Important

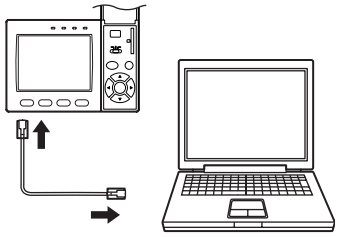
- When connecting the PC, refer to the Instruction Manual for the PC.
- Attach the ferrite cores supplied to both ends of the USB cable.



Note

Installation of the USB driver is necessary only when connecting an external device to the USB interface for the first time.
For the USB driver, please contact your OMRON representative.

<Ethernet>



Use a commercially available LAN cable to connect the Controller to the PC.

There are two ways of making the LAN connection to the PC, directly to the PC or via a hub.

Important

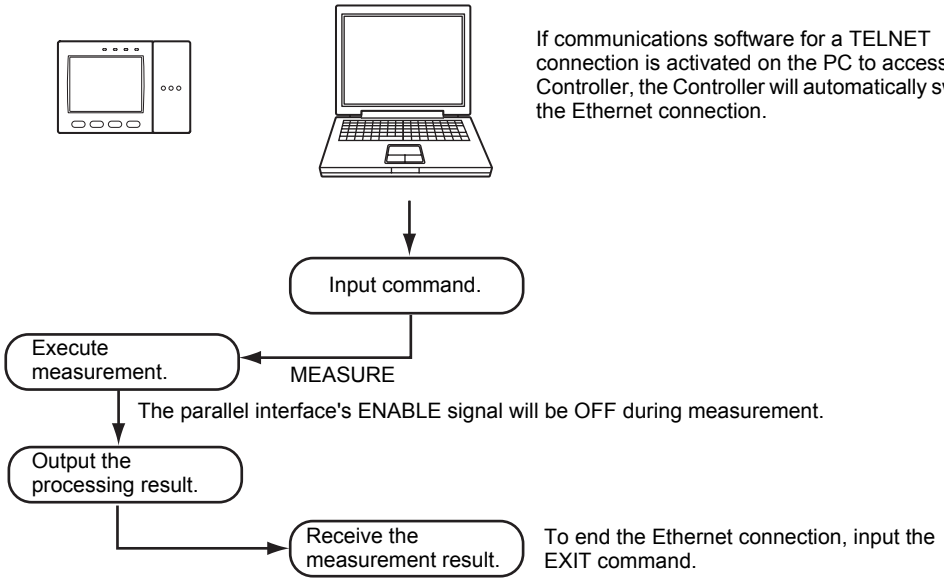
The following communications are not possible:

- Communications with the Controller from outside the LAN
- Communications between the Controller and two or more PCs
- Communications between Controllers
- Communications between the Controller and the PLC

• 1:1 Connection

When connecting the Controller directory to the PC, use a 10BASE-T or 100BASE-TX cross cable (Category 5 or higher). Limit the cable length to 30 m.

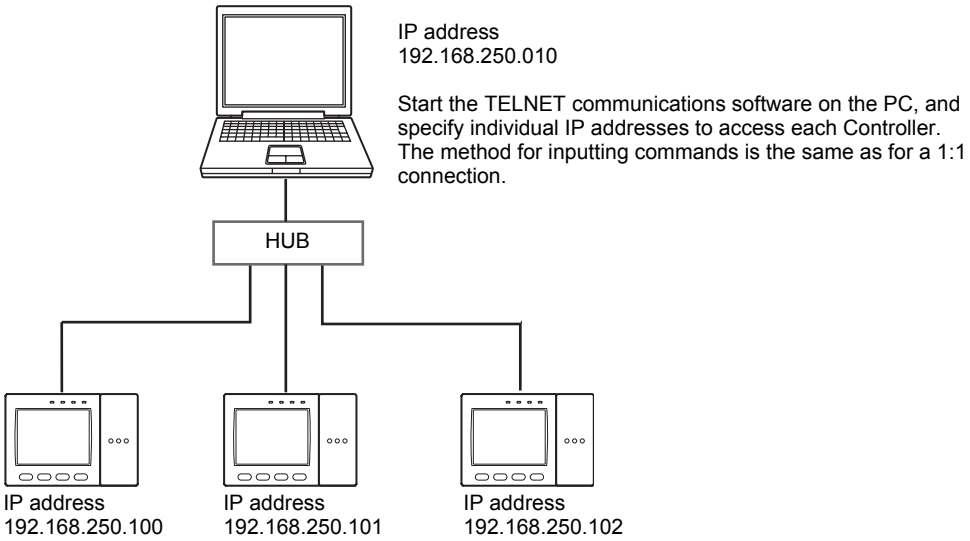
Example: A measurement command is input and the result is acquired.



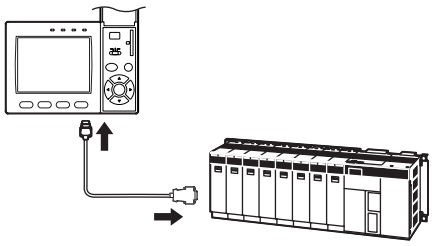
• 1:N Connection

When connecting two or more Controllers to one PC via a hub, use a 10BASE-T or 100BASE-TX straight cable (Category 5 or higher). Also, limit the cable lengths between the PC and the hub, and the Controllers and the hub to 30 m, respectively. Be sure to set unique IP addresses to each Controller. Do not set duplicate IP addresses to Controllers.

Example:



Connecting a PLC



Use the exclusive RS-232C cable (ZFX-XPT2A) / RS-422 cable (ZFX-XPT2B) to connect the Controller to a PLC.

Important

When connecting to a PLC, refer to the Instruction Manual for the PLC.

About Communication Commands

Command/Response Format

< Command >

< Response >

When processing ends successfully

When processing fails

Command data	Specifies the command and parameters in ASCII code.
Response data	Stores the acquired data.
Delimiter	This control code indicates the end of the data.
Record separator	This delimiter is appended to one session's worth of output data. (default delimiter: CR)

Configuration of Measurement Value Data

The following explains the output format of measurement values.
To output measurement values by serial communication, the following items must be set.

Note

Output content
Set the output content as an expression.
Set the output content at [Setup] - [Support] - [Calculation] - [Data].

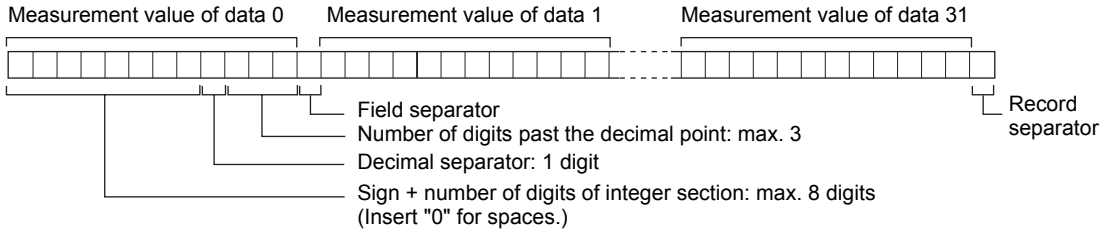
Output destination
Specify [RS-232C/422] or [USB] at [System] - [Output] - [Data output].

Output format
Set the output format at [System] - [Output] - [Serial output].

For detailed settings, refer to the User's Manual.

ASCII Format

Up to 32 results are output as a data structure of fixed length of up to 12 characters including the sign.



Sign	The sign of the measurement value is stored. Plus: 0/Minus: -
Number of digits of integer section	"0" is inserted in spaces in the integer section and digits past the decimal point. When a value is greater than the preset number of digits, all digits other than the sign digit become "9". Output range: -9999999.999 to 09999999.999
Number of digits past the decimal point	
Decimal separator	
Field separator	
Record separator	

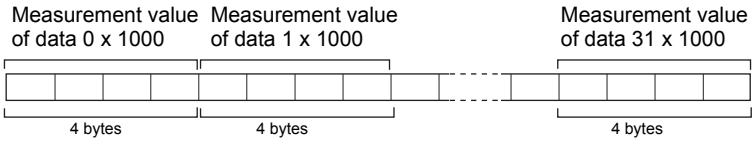
Example: Number of digits of integer section: 7, number of digits past the decimal point: 3, decimal separator: period

< Measurement value >	< Data structure >
123456.789	0 1 2 3 4 5 6 . 7 8 9 CR
4567.8	0 0 0 4 5 6 7 . 8 0 0 CR
-4567.8	- 0 0 4 5 6 7 . 8 0 0 CR

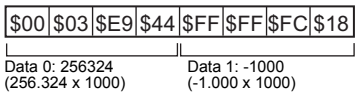
Binary Format

The value obtained by multiplying the measurement value by 1000 is output continuously as four bytes per single data item. Minus values are output as 2's complement. Up to 32 results can be output.
The binary format differs from the ASCII format in that data separators, such as field separator or record separator, do not exist.

Output range: -2147483.648 to 2147483.647



Example: Data 0 "256.324" and data 1 "-1.000"



Note

- A value obtained by multiplying by 1000 also is output as the judgment result (JG).
  OK: 0
  NG: -1000 (-1 x 1000)
- When the measurement value is less than -2147483.648, "-2147483.648" is output.
  When the measurement value is greater than 2147483.647, "2147483.647" is output.

Available Commands

Bank Control Commands

Command name	Description	Page
BANK (or BK)	This command acquires the current bank No.	p.11
	This command switches the bank to be used.	p.11
BANKGROUP (or BG)	This command acquires the current bank group No.	p.12
	This command switches the bank group to be used.	p.12

Measurement Control/Measurement Value Acquisition Commands

Command name	Description	Page
MEASDATA (or MD)	This command acquires the measurement result of the measurement item.	p.13
MEASURE (or M)	This command executes a single measurement.	p.14
	This command starts continuous measurement.	p.15
	This command ends continuous measurement.	p.15

Setting Acquisition/Change Commands

Command name	Description	Page
DATE (or DT)	This command acquires the date and time of the calendar timer incorporated into the Controller.	p.16
	This command changes the date and time of the calendar timer incorporated into the Controller.	p.16
MODELSET (or MS)	This command re-registers the model of the specified item. It does not reset filters, etc.	p.17
PASSWORD (or PW)	This command acquires the currently set password.	p.17
	It sets and changes the password character string.	p.18
VERGET (or VR)	This command acquires the version information of the Controller.	p.18

Backup/Restore Commands

Command name	Description	Page
BGRLOAD (or GL)	This command uploads bank group data to the Controller from an external device.	p.19
	This command uploads bank group data to the Controller from an SD card.	p.19
BGRSAVE (or GS)	This command backs up bank group data to an external device from the Controller.	p.20
	This command backs up bank group data to an SD card from the Controller.	p.20
BNKLOAD (or BL)	This command uploads bank data to the Controller from an external device.	p.21
	This command uploads bank data to the Controller from an SD card.	p.21
BNKSAVE (or BS)	This command backs up bank data to an external device from the Controller.	p.22
	This command backs up bank data to an SD card from the Controller.	p.22
DATASAVE (or SV)	This command saves the current settings to the Controller.	p.23
IMGLOAD (or IL)	This command uploads image data to the Controller from an external device.	p.23
	This command uploads image data to the Controller from an SD card.	p.24

Command name	Description	Page
IMGSAVE (or IS)	This command backs up image data to an external device from the Controller.	p.25
	This command backs up image data to an SD card from the Controller.	p.26
SYSLOAD (or SL)	This command uploads system data to the Controller from an external device.	p.27
	This command uploads system data to the Controller from an SD card.	p.27
SYSSAVE (or SS)	This command backs up system data to an external device from the Controller.	p.28
	This command backs up system data to an SD card from the Controller.	p.28

Utility Commands

Command name	Description	Page
RESET (or RS)	This command restarts the Controller.	p.29
EXIT	This command ends the TELNET connection for Ethernet communications and disconnects the line.	p.29

Bank Control Commands

Acquiring/Switching the Bank No. < BANK command >

Acquiring a bank No.

This command acquires the current bank No.

< Command format >

BANK$_{CR}$ or BK$_{CR}$

< Response format >

When processing ends successfully

□□$_{CR}$
Bank No. (max. 2 digits)

OK$_{CR}$

When processing fails

ER$_{CR}$

< Explanation of parameters >

Bank No.	The acquired bank No. is returned. (0 to 31)

Switching to another bank

This command switches the bank to be used.

< Command format >

BANK□□□$_{CR}$ or BK□□□$_{CR}$

Bank No. (max. 2 digits)

Bank No. (max. 2 digits)

< Response format >

When processing ends successfully

OK$_{CR}$

When processing fails

ER$_{CR}$

< Explanation of parameters >

Bank No.	Specifies the bank No. after the bank is switched. (0 to 31)

Acquiring/Switching the Bank Group No. < BANKGROUP command >

Acquiring a bank group No.

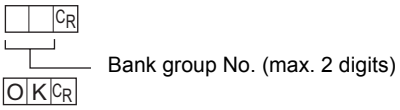
This command acquires the current bank group No.

< Command format >

BANKGROUP$_{CR}$ or BG$_{CR}$

< Response format >

When processing ends successfully



When processing fails

ER$_{CR}$

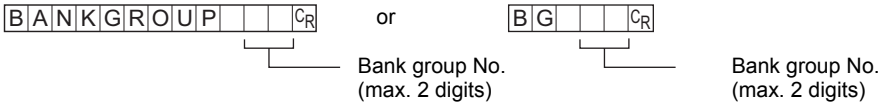
< Explanation of parameters >

Bank group No.	The acquired bank group No. is returned. (0 to 31)

Switching bank group Nos.

This command switches the bank group to be used.

< Command format >



< Response format >

When processing ends successfully

OK$_{CR}$

When processing fails

ER$_{CR}$

< Explanation of parameters >

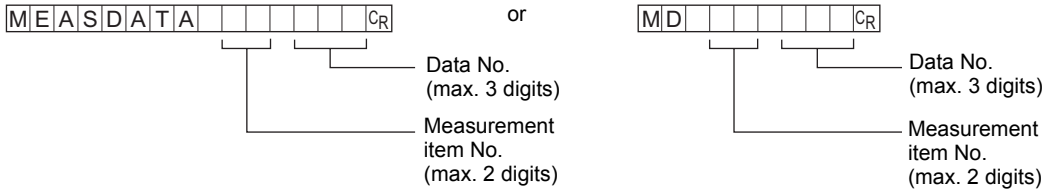
Bank group No.	Specifies the bank group No. after the bank group is switched. (0 to 31)

Measurement Control/Measurement Value Acquisition Commands

Acquiring the Measurement Result of the Measurement Item < MEASDATA command >

This command acquires the measurement result of the measurement item.

< Command format >



< Response format >

When processing ends successfully

Measurement value CR

OK CR

When processing fails

ER CR

< Explanation of parameters >

Measurement item No.	Specifies the measurement item No. (0 to 31)
Data No.	Specifies the data No. (0 to 127) For details, see "Parameter List (p.30)."
Measurement value	The acquired measurement value is returned in ASCII code. The measurement value is not dependent on the format (ASCII/binary) specified in the output conditions. • Minus sign: -, plus sign: none • The size of the integer section is variable. • The decimal point is indicated by a period ".". • The maximum number of digits past the decimal point is three.

Executing Measurement < MEASURE command >

Executing a Single Measurement

This command executes a single measurement.

< Command format >

M E A S U R E CR or M CR

< Response format >

When processing ends successfully

Measurement value CR

O K CR

When processing fails

E R CR

< Explanation of parameters >

Measurement value	The acquired measurement value is returned. The measurement value is output in the format (ASCII/binary) specified in the output conditions. Configuration of Measurement Value Data p.7

Important

Measurement values are output only when an expression is set at [Setup] - [Support] - [Calculation] - [Data], and [RS-232C/422] or [USB] is specified at [System] - [Output] - [Data output].

Starting Continuous Measurement

< Command format >

MEASURE /C$_{CR}$ or M /C$_{CR}$

< Response format >

When processing ends successfully

Measurement value $_{CR}$ (for number of continuous measurements)

OK$_{CR}$

When processing fails

ER$_{CR}$

Ending Continuous Measurement

< Command format >

MEASURE /E$_{CR}$ or M /E$_{CR}$

< Response format >

When processing ends successfully

OK$_{CR}$

When processing fails

ER$_{CR}$

Setting Acquisition/Change Commands

Acquiring/Changing the Date Setting < DATE command >

Acquiring the date setting

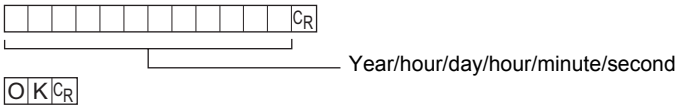
This command acquires the date and time of the calendar timer incorporated into the Controller.

< Command format >

D A T E CR or D T CR

< Response format >

When processing ends successfully



O K CR

When processing fails

E R CR

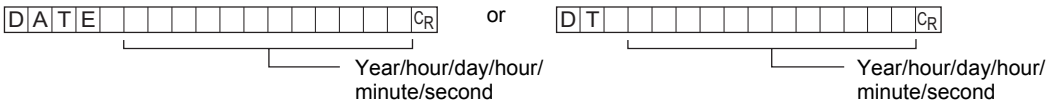
< Explanation of parameters >

Year/hour/day/hour/ minute/second	The acquired date and time are returned as numerical values of two digits each. Example: 060301120020 → 12:00:20 on March 1st, 2006.

Changing the Date Setting

This command changes the date and time of the calendar timer incorporated into the Controller.

< Command format >



< Response format >

When processing ends successfully

O K CR

When processing fails

E R CR

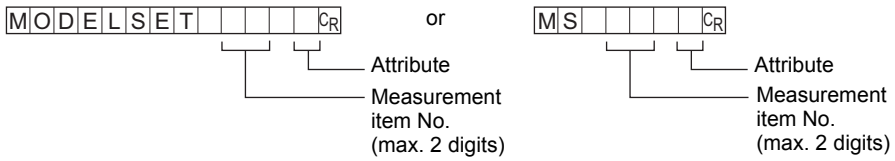
< Explanation of parameters >

Year/hour/day/hour/ minute/second	Specifies the date and time. Example: 060301120020 → 12:00:20 on March 1st, 2006

Re-registering the Model of the Specified Item < MODELSET command >

This command re-registers the model of the specified item. It does not reset filters, etc.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

Measurement item No.	Specifies the measurement item No. Measurement items: 0 to 31 Position correction items: 0 to 1
Attribute	Specifies measurement item or position correction item. 0: Measurement item 1: Position correction item Default is measurement item.

Acquiring/Changing Passwords < PASSWORD command >

Acquiring the password

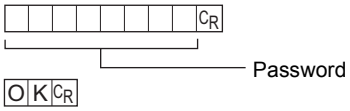
This command acquires the currently set password.

< Command format >

PASSWORD CR or PW CR

< Response format >

When processing ends successfully



OK CR

When processing fails

ER CR

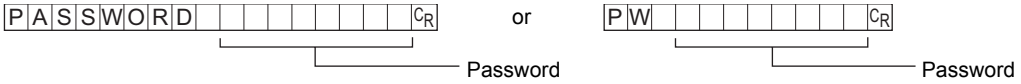
< Explanation of parameters >

Password	A password of any eight alphanumeric characters is returned.

Setting/Changing the password

This command sets and changes the password character string.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

Password	Specifies a password of any eight alphanumeric characters.

Acquiring the Version No. < VERGET command >

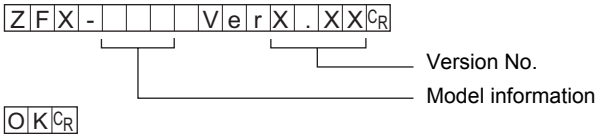
This command acquires the version information of the Controller.

< Command format >

VERGET CR or VR CR

< Response format >

When processing ends successfully



OK CR

When processing fails

ER CR

< Explanation of parameters >

Model information	The model No. of the Controller is returned.
Version No.	The version No. of the Controller's firmware is returned.

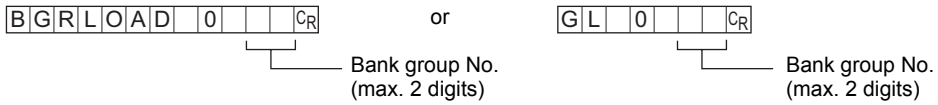
Backup/Restore Commands

Uploading Bank Group Data < BGRLOAD command >

Uploading bank group data to the Controller from an external device

This command uploads the bank group data to the Controller by XMODEM protocol. The bank group data is loaded to the specified bank group No.

< Command format >



< File transfer >

The bank group data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

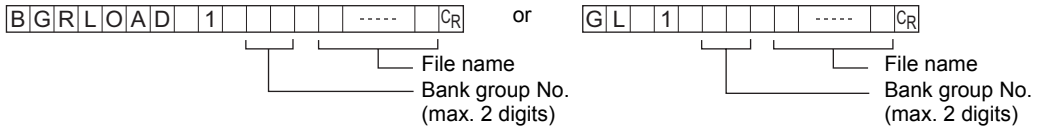
< Explanation of parameters >

Bank group No.	Specifies the bank group No. to upload. (0 to 31)

Uploading bank group data to the Controller from an SD card

This command uploads bank group data to the Controller from an SD card.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

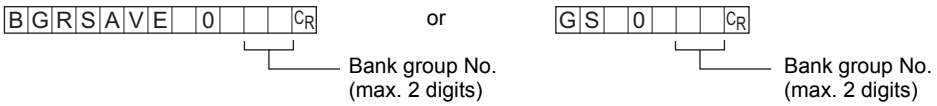
Bank group No.	Specifies the bank group No. to upload. (0 to 31)
File name	Specifies the file name within eight alphanumeric characters. (An extension is not required.)

Backing up Bank Group Data < BGRSAVE command >

Backing up bank group data to an external device from the Controller

This command backs up the bank group data from the Controller by XMODEM protocol.

< Command format >



< File transfer >

The bank group data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

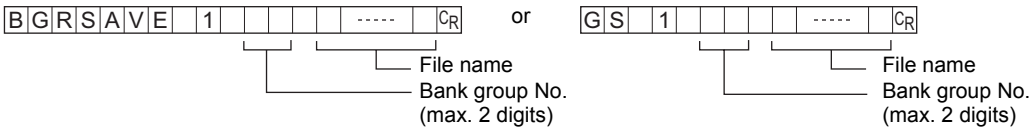
< Explanation of parameters >

Bank group No.	Specifies the bank group No. to back up. (0 to 31)

Backing up bank group data to an SD from the Controller

This command backs up bank group data to an SD card from the Controller.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

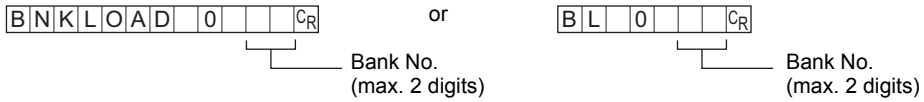
Bank group No.	Specifies the bank group No. to back up. (0 to 31)
File name	The file can be given any name within eight alphanumeric characters. (An extension is not required.)

Uploading Bank Data < BNKLOAD command >

Uploading bank data to the Controller from an external device

This command uploads the bank data to the Controller by XMODEM protocol.

< Command format >



< File transfer >

The bank data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

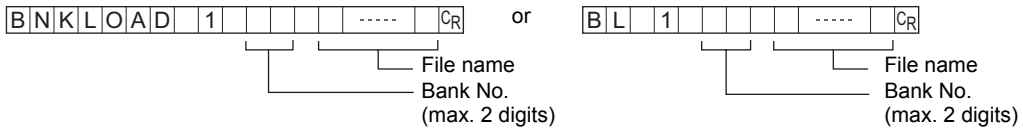
< Explanation of parameters >

Bank No.	Specifies the bank No. to upload. (0 to 31)

Uploading bank data to the Controller from an SD card

This command uploads bank data to the Controller from an SD card.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

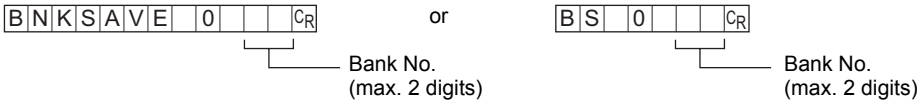
Bank No.	Specifies the bank No. to upload. (0 to 31)
File name	Specifies the file name within eight alphanumeric characters. (An extension is not required.)

Backing up Bank Data < BNKSAVE command >

Backing up bank data to an external device from the Controller

This command backs up the bank data from the Controller by XMODEM protocol.

< Command format >



< File transfer >

The bank data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

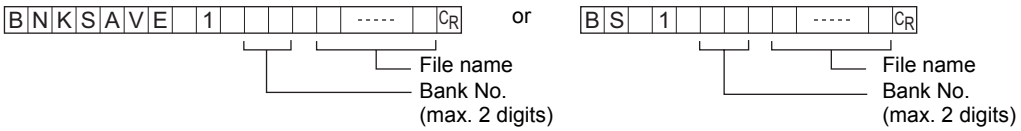
< Explanation of parameters >

Bank No.	Specifies the bank No. to back up. (0 to 31)

Backing up bank data to an SD card from the Controller

This command backs up bank data to an SD card from the Controller.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

Bank No.	Specifies the bank No. to back up. (0 to 31)
File name	The file can be given any name within eight alphanumeric characters. (An extension is not required.)

Saving the Current Settings to the Controller < DATASAVE command >

This command saves the current settings to the Controller.
No parameters are provided for this command.

< Command format >

DATASAVE$_{CR}$ or SV$_{CR}$

< Response format >

When processing ends successfully

OK$_{CR}$

When processing fails

ER$_{CR}$

Uploading Image Data < IMGLOAD command >

Uploading image data to the Controller from an external device

This command uploads image data to the Controller by XMODEM protocol.

< Command format >

IMGLOAD 0 ☐☐ $_{CR}$ or IL 0 ☐☐ $_{CR}$

Save memory No. (max. 2 digits)

Save memory No. (max. 2 digits)

< File transfer >

The image data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY$_{CR}$

When processing ends successfully

OK$_{CR}$

When processing fails

ER$_{CR}$

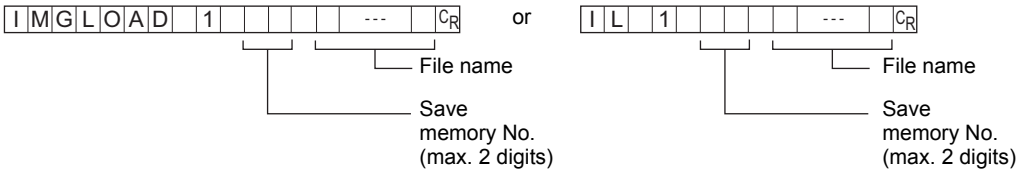
< Explanation of parameters >

Save memory No.	Specifies the No. of the save memory for saving the image data to. (0 to 99)

Uploading image data to the Controller from an SD card

This command uploads image data to the Controller from an SD card.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

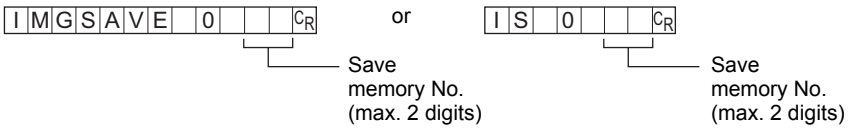
Save memory No.	Specifies the No. of the save memory for saving the image data to. (0 to 99)
File name	Specifies the file name (within 8 characters, excluding the file extension). File extensions ".GRY" (image captured by a monochrome camera) or ".BYR" (image captured by a color camera) are allowed.

Backing up Image Data < IMGSAVE command >

Backing up image data from the Controller to an external device

This command backs up image data from the Controller by XMODEM protocol.

< Command format >



< File transfer >

The image data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

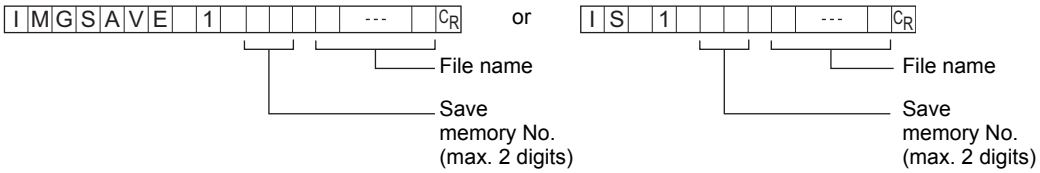
< Explanation of parameters >

Save memory No.	Specifies the No. of the save memory for backing up the image data to. (0 to 99) When "-1" is specified for the Save memory No., the latest image data of camera 0 is specified.

Backing up image data from the Controller to an SD card

This command backs up image data from the Controller to an SD card.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

When an SD card is not inserted

ER 0 CR

When there is no free space on the SD card

ER 1 CR

< Explanation of parameters >

Save memory No.	Specifies the No. of the save memory for backing up the image data to. (0 to 99) When "-1" is specified for the Save memory No., the latest image data is specified.
File name	Files can be given any file name up to 5 characters long. (Entry of a file extension is not necessary.)

Uploading System Data < SYSLOAD command >

Uploading system data to the Controller from an external device

This command uploads the system data to the Controller by XMODEM protocol.
No parameters are provided for this command.

< Command format >

SYSLOAD 0 CR or SL 0 CR

< File transfer >

The system data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READY CR

When processing ends successfully

OK CR

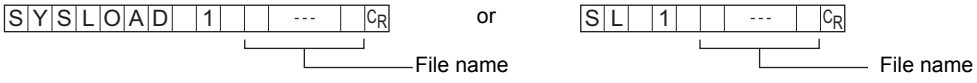
When processing fails

ER CR

Uploading system data to the Controller from an SD card

This command uploads system data to the Controller from an SD card.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

File name	Specifies the file name within eight alphanumeric characters. (An extension is not required.)

Backing up System Data < SYSSAVE command >

Backing up system data to an external device from the Controller

This command backs up the system data from the Controller by XMODEM protocol.
No parameters are provided for this command.

< Command format >

SYSSAVE 0CR or SS 0CR

< File transfer >

The system data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1K) is not supported.

< Response format >

READYCR

When processing ends successfully

OKCR

When processing fails

ERCR

Backing up system data to an SD card from the Controller

This command backs up system data to an SD card from the Controller.

< Command format >

SYSSAVE 1 --- CR or SS 1 --- CR

File name File name

< Response format >

When processing ends successfully

OKCR

When processing fails

ERCR

< Explanation of parameters >

File name	The file can be given any name within eight alphanumeric characters. (An extension is not required.)

Utility Commands

Restarting the Controller < RESET command >

This command restarts the Controller.
No parameters are provided for this command.

< Command format >

R E S E T C_R or R S C_R

< Response format >

When processing ends successfully
None

When processing fails
E R C_R

Ending Ethernet Communications < EXIT command >

This command ends the TELNET connection for Ethernet communications and disconnects the line.
No parameters are provided for this command.

< Command format >

E X I T C_R

< Response format >

When processing ends successfully
None

When processing fails
E R C_R

Parameter List

MEASDATA Command

Shape inspection parameters

Pattern search

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Correlation	0 to 100
2	Measurement position X	-9999.999 to 9999.999
3	Measurement position Y	-9999.999 to 9999.999
4	Measurement angle	-180 to 180
5	Search number	0 to 99
6	Reference position X	-9999.999 to 9999.999
7	Reference position Y	-9999.999 to 9999.999
8	Reference angle	-180 to 180
9	Position difference X	-9999.999 to 9999.999
10	Position difference Y	-9999.999 to 9999.999
11	Angle difference	-180 to 180

Sensitive search

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Correlation	0 to 100
2	Measurement position X	-9999.999 to 9999.999
3	Measurement position Y	-9999.999 to 9999.999
4	Measurement angle	-180 to 180
5	Solid color rate	0 to 100

Size inspection parameters

Area

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Area	0 to 9999999.999
2	Gravity position X	-9999.999 to 9999.999
3	Gravity position Y	-9999.999 to 9999.999
4	Axis angle	-9999.999 to 9999.999
5	Reference area	0 to 9999999.999
6	Reference position X	-9999.999 to 9999.999
7	Reference position Y	-9999.999 to 9999.999
8	Reference axis angle	-180.0 to 180.0
9	Area difference	-9999999.999 to 9999999.999
10	Position difference X	-9999.999 to 9999.999
11	Position difference Y	-9999.999 to 9999.999
12	Axis angle difference	-180.0 to 180.0

Edge inspection parameters

Position

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Edge position X	-9999.999 to 9999.999
2	Edge position Y	-9999.999 to 9999.999
3	Reference position X	-9999.999 to 9999.999
4	Reference position Y	-9999.999 to 9999.999
5	Position difference X	-9999.999 to 9999.999
6	Position difference Y	-9999.999 to 9999.999

Width

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Edge width	0 to 9999.999
2	Edge position X1	-9999.999 to 9999.999

Data No.	Parameter	Output Range
3	Edge position Y1	-9999.999 to 9999.999
4	Edge position X2	-9999.999 to 9999.999
5	Edge position Y2	-9999.999 to 9999.999
6	Reference edge width	0 to 9999.999
7	Reference edge position X1	-9999.999 to 9999.999
8	Reference edge position Y1	-9999.999 to 9999.999
9	Reference edge position X2	-9999.999 to 9999.999
10	Reference edge position Y2	-9999.999 to 9999.999
11	Width difference	-9999.999 to 9999.999
12	Position difference X1	-9999.999 to 9999.999
13	Position difference Y1	-9999.999 to 9999.999
14	Position difference X2	-9999.999 to 9999.999
15	Position difference Y2	-9999.999 to 9999.999

Count

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Number of edges	0 to 255
2	Average pitch	0 to 9999.999
3	Minimum pitch	0 to 9999.999
4	Maximum pitch	0 to 9999.999
5	Average width	0 to 9999.999
6	Minimum width	0 to 9999.999
7	Maximum width	0 to 9999.999
8	Pitch 1	0 to 9999.999
9	Width 1	0 to 9999.999
10	Pitch 2	0 to 9999.999
11	Width 2	0 to 9999.999
:	:	0 to 9999.999
506	Pitch 255	0 to 9999.999
507	Width 255	0 to 9999.999

Angle

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Angle	-180.00 to 180.00
2	Edge position X1	-9999.999 to 9999.999

Data No.	Parameter	Output Range
3	Edge position Y1	-9999.999 to 9999.999
4	Edge position X2	-9999.999 to 9999.999
5	Edge position Y2	-9999.999 to 9999.999
6	Reference angle	-180.00 to 180.00
7	Reference position X1	-9999.999 to 9999.999
8	Reference position Y1	-9999.999 to 9999.999
9	Reference position X2	-9999.999 to 9999.999
10	Reference position Y2	-9999.999 to 9999.999
11	Angle difference	-180.00 to 180.00
12	Position difference X1	-9999.999 to 9999.999
13	Position difference Y1	-9999.999 to 9999.999
14	Position difference X2	-9999.999 to 9999.999
15	Position difference Y2	-9999.999 to 9999.999

Brightness and color inspection parameters

Brightness

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Density average	0 to 255.0
2	Density deviation	0 to 127.0
3	Reference density average	0 to 255.0
4	Reference density deviation	0 to 127.0
5	Density average difference	0 to 255.0
6	Density deviation difference	0 to 127.0

Hue

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Hue	0 to 360.0
2	Saturation	0 to 100.0
3	Value	0 to 100.0
4	Hue deviation	0 to 180.0
5	Saturation deviation	0 to 50.0
6	Value deviation	0 to 50.0
7	Reference hue	0 to 360.0

Data No.	Parameter	Output Range
8	Reference saturation	0 to 100.0
9	Reference value	0 to 100.0
10	Hue difference	-360.0 to 360.0
11	Saturation difference	-100.0 to 100.0
12	Value difference	-100.0 to 100.0
13	Reference hue deviation	0 to 180.0
14	Reference saturation deviation	0 to 50.0
15	Reference value deviation	0 to 50.0
16	Hue deviation difference	-180.0 to 180.0
17	Saturation deviation difference	-50.0 to 50.0
18	Value deviation difference	-50.0 to 50.0
19	Maximum hue	0 to 360.0
20	Minimum hue	0 to 360.0
21	Maximum saturation	0 to 100.0
22	Minimum saturation	0 to 100.0
23	Maximum value	0 to 100.0
24	Minimum value	0 to 100.0

Parameters for inspection by individual application

Defect

Data No.	Parameter	Output Range
0	Judgment result	0: OK -1: NG -2: not measured
1	Defect	0 to 255
2	Maximum density	0 to 255
3	Minimum density	0 to 255
4	Number of defects	0 to 255
5	Defect position X	-9999.999 to 9999.999
6	Defect position Y	-9999.999 to 9999.999
7	Reference position X	-9999.999 to 9999.999
8	Reference position Y	-9999.999 to 9999.999
9	Position difference X	-9999.999 to 9999.999
10	Position difference Y	-9999.999 to 9999.999

Example of Usage

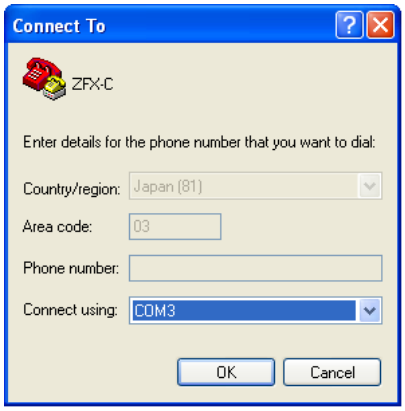
The following describes an example procedure to communicate by non-procedural commands using Windows standard tool HyperTerminal.

1 Start up HyperTerminal.

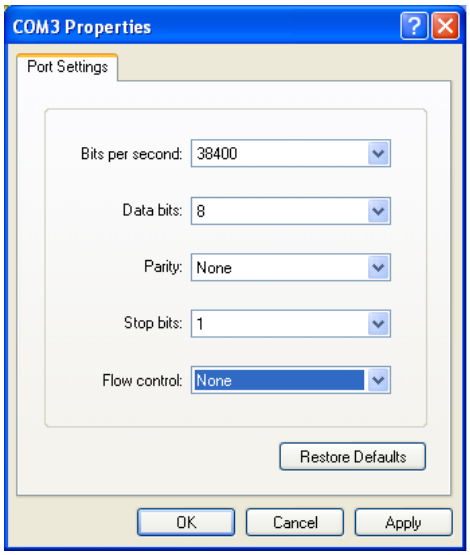
HyperTerminal is located under [Program]-[Accessory]-[Communication].

1-1 Enter an appropriate project name, and select OK.

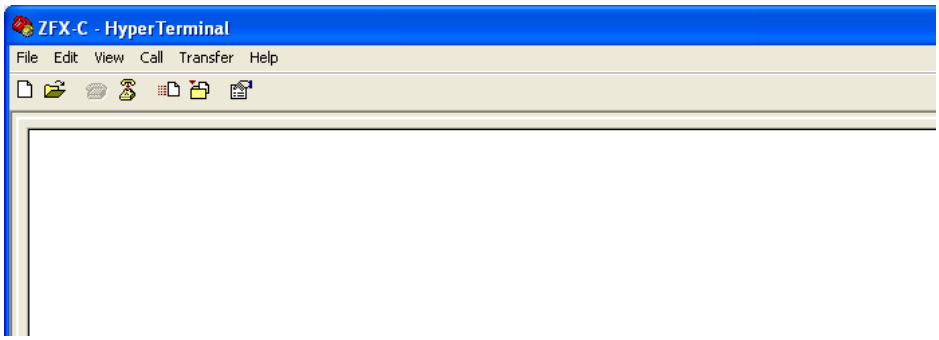
1-2 Select the COM port connected to the ZFX-C in the Connect using field.



1-3 Set the communication conditions.

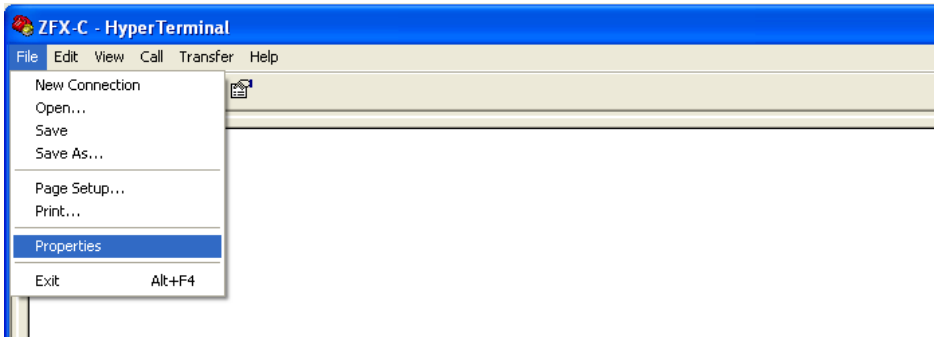


1-4 HyperTerminal is started up.

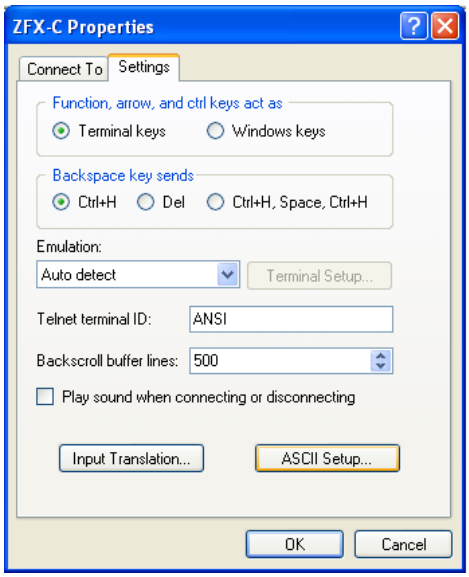


2 To facilitate command transactions, set echo and other communication conditions.

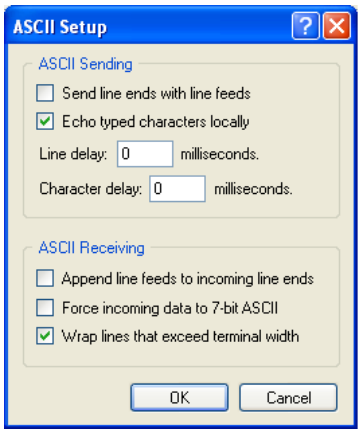
2-1 Open [Property].



2-2 Select the Settings tab, and then [ASCII Setup].



2-3 Mark the following checkboxes, and click OK to complete the setting.

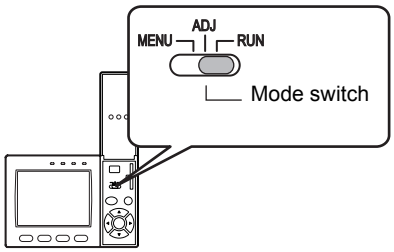


3 Set the communication conditions for the ZFX-C.

Set [System]-[Comm] to match the above settings.

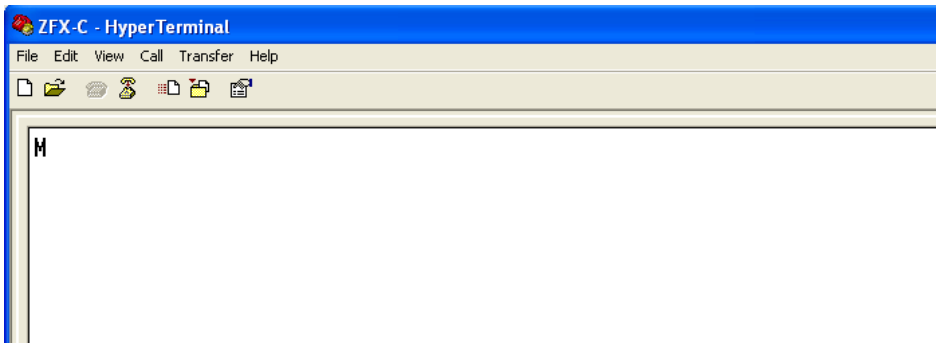
For details on how to set the communication specifications, refer to the User's Manual.

4 Switch the ZFX-C to the RUN mode.

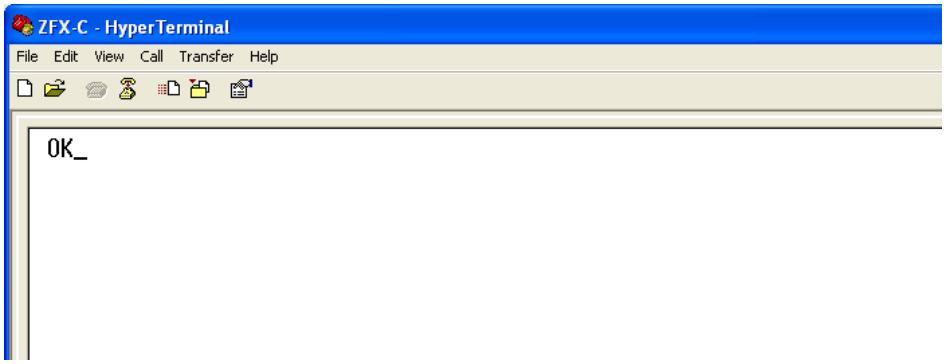


5 Execute non-procedural communication.

5-1 Enter a command, and then press the return key.



5-2 The returned value corresponding to the command is returned from the Controller.



Version Upgrade Information

The following describes the content of the software version upgrade.

Ver1.00 to Ver1.10

Changes
The following backup and restore commands can now be used in Ethernet communications, too: BGRLOAD, BGRSAVE, BNKLOAD, BNKSAVE, SYSLOAD, SYSSAVE

Ver1.10 to Ver1.20

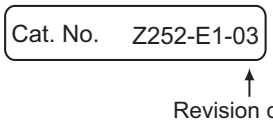
Changes
The following image data backup/restore commands have been newly added: IMGLOAD, IMGSAVE

Ver1.20 to Ver1.30

Changes
"Angle" has been newly added to the edge inspection parameters of the MEASDATA command.

Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and back covers of this manual.



Revision code	Date	Revised contents
01	June 2007	Original production
02	August 2007	New commands as explained in "Version Upgrade Information" added (Ver1.20)
03	November 2007	New command parameters as explained in "Version Upgrade Information" added (Ver1.30)

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