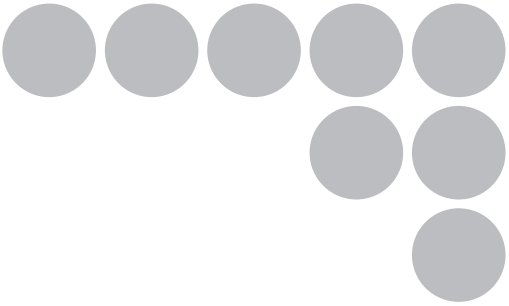
OMRON

Smart Sensor

Vision Sensor with built-in LCD monitor

ZFX-C



Serial Communication Command Reference

Cat. No. Z265-E1-06A

Introduction

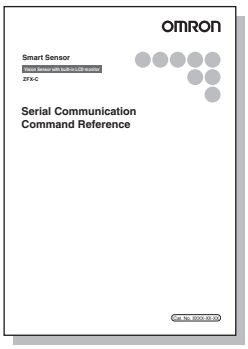
Thank you for purchasing the ZFX-C.
This manual provides information regarding functions, performance and operating methods that are required for using the ZFX-C.
When using the ZFX-C, be sure to observe the following:

- 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 document)

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 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.

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■ Differences in functions between controllers

This manual is intended for following Controllers. Unless otherwise specified, explanations are given for the ZFX-C20/C25. The following table summarizes the main differences.

Item		ZFX-C20/C25	ZFX-C10H/C15H	ZFX-C10/C15	ZFX-C20-CD/C25-CD	ZFX-C10H-CD/C15H-CD	ZFX-C10-CD/C15-CD
Number of connected cameras		2	1	1	2	1	1
Available measurement items	Shape inspection	Pattern Search Sensitive Search Flexible Search Graphic Search		Pattern search Sensitive search	Pattern Search Graphic Search Flexible Search Sensitive Search		Pattern search Sensitive search
	Size inspection	Area, Labeling		Area	Area, Labeling		Area
	Edge inspection	Position, Width, Count, Angle					
	Brightness/color inspection	Brightness, HUE					
	Application-based inspection	Grouping, Defect		Defect	Grouping, Defect, Barcode, 2D code		Defect, Barcode, 2D code
Available position correction items		All available		Edge position Area 1 model 2 model Angle	All available		Edge position Area 1 model 2 model Angle
Number of measurement items that can be measured simultaneously		Max. 128 items/bank		Max. 32 items/bank	Max. 128 items/bank		Max. 32 items/bank
Logging monitor function		Available		Not available	Available		Not available

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.

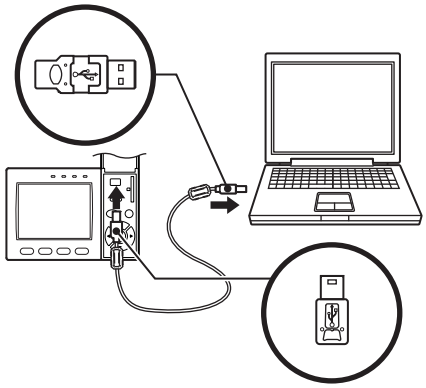
<Ethernet>

Communication protocol	TCP/IP
Transmission mode	Peer to Peer

Connection

Connecting a PC

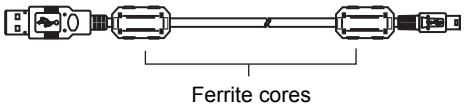
<USB>



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

Important

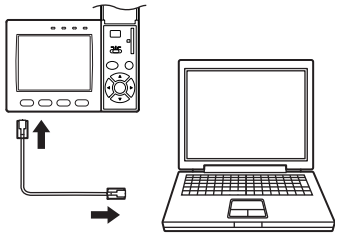
- When connecting the PC, refer to the Instruction Manual for the PC.
- Attach the ferrite cores supplied to both ends of the USB cable.



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

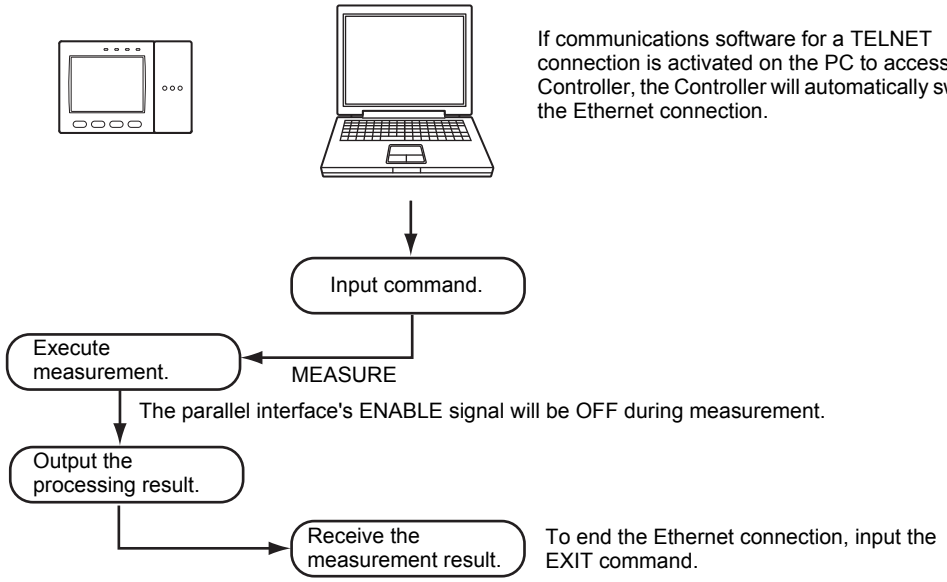
The following communications are not possible:

- 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.

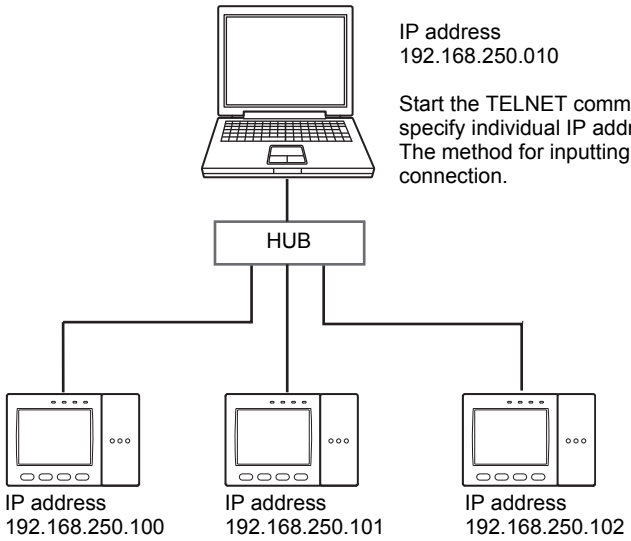
Example: A measurement command is input and the result is acquired.



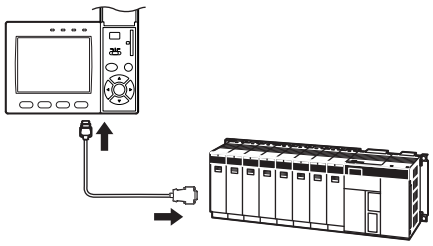
• 1:N Connection

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].

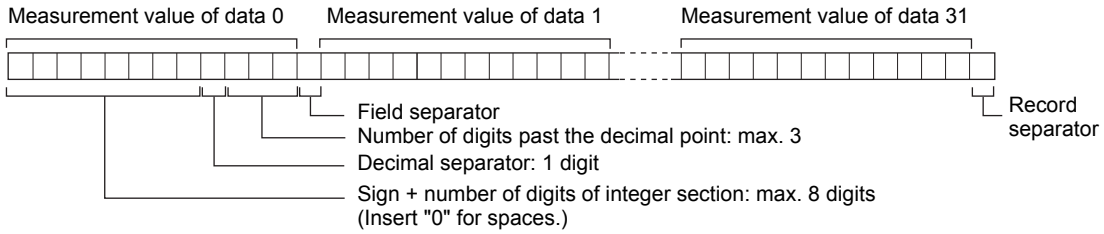
Output destination
Specify [RS-232C/422] or [USB] at [System] - [Output] - [Data output].

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	

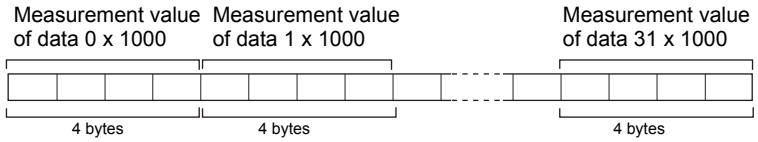
Example: Number of digits of integer section: 7, number of digits past the decimal point: 3, decimal separator: period

< 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

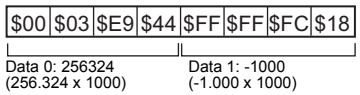
Binary Format

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.12
	This command switches the bank to be used.	p.12
BANKGROUP (or BG)	This command acquires the current bank group No.	p.13
	This command switches the bank group to be used.	p.13

Measurement Control/Measurement Value Acquisition Commands

Command name	Description	Page
MEASDATA (or MD)	This command acquires the measurement result of the measurement item.	p.14
MEASURE (or M)	This command executes a single measurement.	p.15
	This command starts continuous measurement.	p.16
	This command ends continuous measurement.	p.16
	This command performs re-measurement using saved images.	p.16

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.17
	This command changes the date and time of the calendar timer incorporated into the Controller.	p.17
MODELSET (or MS)	This command re-registers the model of the specified item. It does not reset filters, etc.	p.18
MEASPARA (or MP)	This command acquires the detailed conditions and thresholds of specified measurement items.	p.19
	This command sets the detailed conditions and thresholds of specified measurement items.	p.19
POSIPARA (or PP)	This command acquires the detailed conditions and the threshold value of position shift correction.	p.21
	This command sets the detailed conditions and the threshold value of position shift correction.	p.21
PASSWORD (or PW)	This command acquires the currently set password.	p.23
	It sets and changes the password character string.	p.23
VERGET (or VR)	This command acquires the version information of the Controller.	p.24

Backup/Restore Commands

Command name	Description	Page
BGRLOAD (or GL)	This command uploads bank group data to the Controller from an external device.	p.25
	This command uploads bank group data to the Controller from an SD card.	p.25
BGRSAVE (or GS)	This command backs up bank group data to an external device from the Controller.	p.26
	This command backs up bank group data to an SD card from the Controller.	p.26
BNKLOAD (or BL)	This command uploads bank data to the Controller from an external device.	p.27
	This command uploads bank data to the Controller from an SD card.	p.27

Command name	Description	Page
BNKSAVE (or BS)	This command backs up bank data to an external device from the Controller.	p.28
	This command backs up bank data to an SD card from the Controller.	p.28
DATASAVE (or SV)	This command saves the current settings to the Controller.	p.29
IMGLOAD (or IL)	This command uploads image data to the Controller from an external device.	p.29
	This command uploads image data to the Controller from an SD card.	p.30
IMGSAVE (or IS)	This command backs up image data to an external device from the Controller.	p.31
	This command backs up image data to an SD card from the Controller.	p.32
SYSLOAD (or SL)	This command uploads system data to the Controller from an external device.	p.33
	This command uploads system data to the Controller from an SD card.	p.33
SYSSAVE (or SS)	This command backs up system data to an external device from the Controller.	p.34
	This command backs up system data to an SD card from the Controller.	p.34

Utility Commands

Command name	Description	Page
CLRMEAS (or CM)	Clears measurement results.	p.35
CLRERR (or CE)	Clears error output results.	p.35
ERRHISTORY (or EH)	Outputs a history of up to five of the latest errors.	p.36
CAPTURE(CP)	Executes display capture, and outputs this to the host or SD card as an image.	p.37
RESET (or RS)	This command restarts the Controller.	p.38
EXIT	This command ends the TELNET connection for Ethernet communications and disconnects the line.	p.38

Bank Control Commands

Acquiring/Switching the Bank No. < BANK command >

Acquiring a bank No.

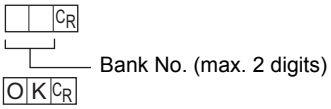
This command acquires the current bank No.

< Command format >

B A N K CR or B K CR

< Response format >

When processing ends successfully



When processing fails

E R CR

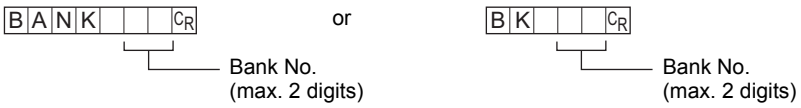
< Explanation of parameters >

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 >



< Response format >

When processing ends successfully

O K CR

When processing fails

E R 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.

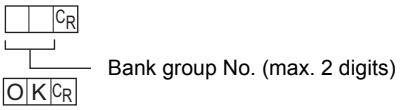
This command acquires the current bank group No.

< Command format >

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

< Response format >

When processing ends successfully



When processing fails

ER$_{CR}$

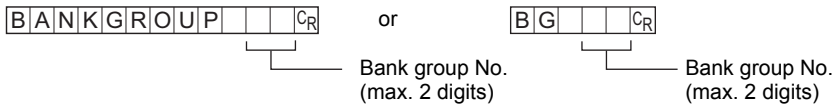
< Explanation of parameters >

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 >

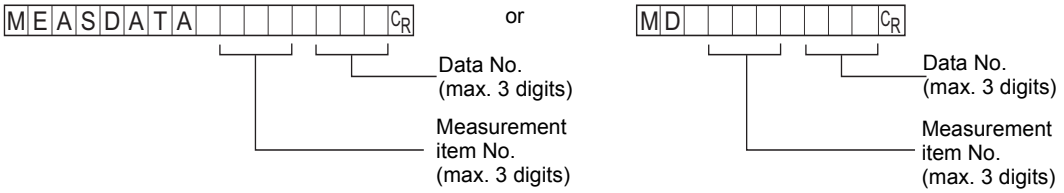
Bank group No.	Specifies the bank group No. after the bank group is switched. (0 to 31)

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 127 (ZFX-C20/C25/C10H/C15H), 0 to 31 (ZFX-C10/C15))
Data No.	Specifies the data No. (0 to 127) For details, see "Parameter List (p.39)."
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 C_R or M C_R

< Response format >

When processing ends successfully

Measurement value C_R

O K C_R

When processing fails

E R C_R

< 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.8

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$_R$ or M /C$_R$

< Response format >

When processing ends successfully

Measurement value $_R$ (for number of continuous measurements)

OK$_R$

When processing fails

ER$_R$

Ending Continuous Measurement

< Command format >

MEASURE /E$_R$ or M /E$_R$

< Response format >

When processing ends successfully

OK$_R$

When processing fails

ER$_R$

Performing re-measurement using saved images

< Command format >

MEASURE /I $_R$ or M /I $_R$

Save memory No. (max. 2 digits)

Save memory No. (max. 2 digits)

< Response format >

When processing ends successfully

Measurement value $_R$

OK$_R$

When processing fails

- Measurement images are not stored in the specified save memory No.
- [Image storage] option is set to OFF

ER$_R$

< Explanation of parameters >

Measurement value	The re-measurement value for the saved image of specified save memory No. is returned. When the save memory No. is omitted, the re-measurement value for the latest saved image is returned. Configuration of Measurement Value Data p.8

Setting Acquisition/Change Commands

Acquiring/Changing the Date Setting < DATE command >

Acquiring the date setting

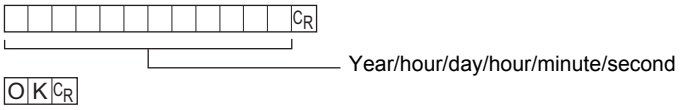
This command acquires the date and time of the calendar timer incorporated into the Controller.

< 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

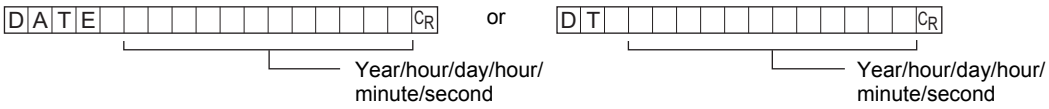
< Explanation of parameters >

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

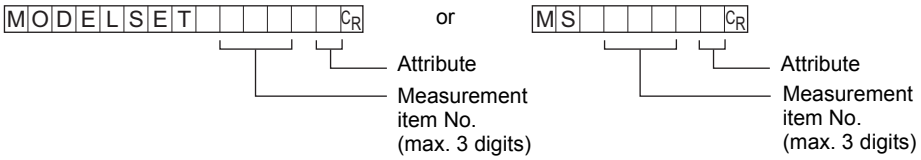
Re-registering the Model of the Specified Item < MODELSET command >

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

Important

The execution of this command does not re-register any model for the flexible search, graphic search and grouping items.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

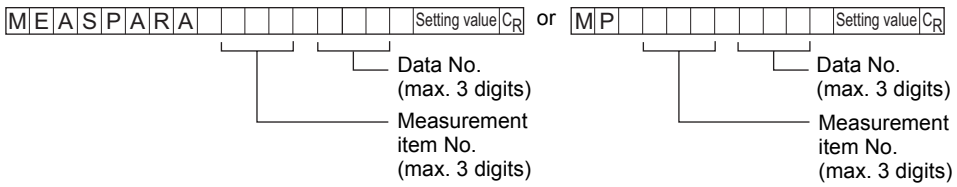
Measurement item No.	Specifies the measurement item No. Measurement items: 0 to 127 (ZFX-C20/C25/C10H/C15H), 0 to 31 (ZFX-C10/C15) Position correction items: 0 to 3 0: Position correction 0 of camera 0 1: Position correction 1 of camera 0 2: Position correction 0 of camera 1 3: Position correction 1 of camera 1
Attribute	Specifies measurement item or position correction item. 0: Measurement item 1: Position correction item Default is measurement item.

Setting/Acquiring the Measurement Conditions < MEASPARA command >

Setting measurement conditions

This command sets the detailed conditions and thresholds of specified items.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

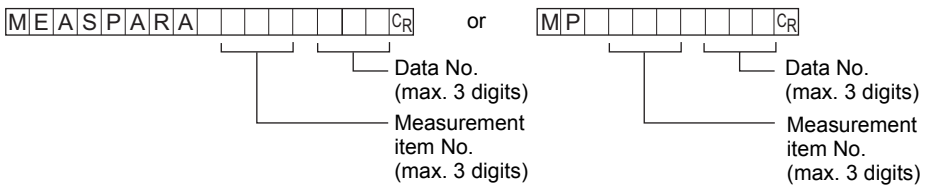
< Explanation of parameters >

Measurement item No.	Specifies the measurement item No.
Data No.	Specifies the data No. For details, see "Parameter List (p.47)."
Setting value	Specifies the setting value. For details, see "Parameter List (p.47)."

Acquiring measurement conditions

This command acquires the detailed conditions and thresholds of specified items.

< Command format >



< Response format >

When processing ends successfully

Acquired value CR

OK CR

When processing fails

ER CR

< Explanation of parameters >

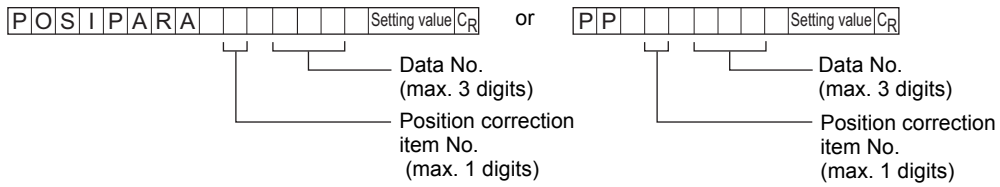
Measurement item No.	Specifies the measurement item No. (0 to 127)
Data No.	Specifies the data No. (0 to 127) For details, see "Parameter List (p.39)."
Acquired value	The detailed conditions and thresholds of specified items is returned. For details, see "Parameter List (p.39)."

Setting/Acquiring Position Shift Correction Condition< POSIPARA Command >

Setting position shift correction conditions

This command sets the detailed conditions and thresholds of position shift correction.

< Command format >



< Response format >

When processing ends successfully

OK CR

When processing fails

ER CR

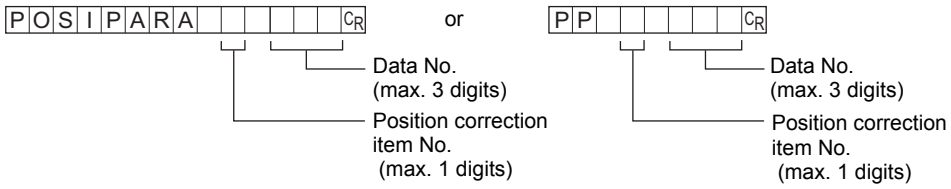
< Explanation of parameters >

Position correction item No.	Specifies the position correction item No. (0 to 3) Item Nos are assigned as follows: 0: Position correction0 of camera0 1: Position correction1 of camera0 2: Position correction0 of camera1 3: Position correction1 of camera1
Data No.	Specifies the data No. (0 to 127) For details, see "Parameter List (p.39)."
Setting value	Specifies the setting value. For details, see "Parameter List (p.39)."

Acquiring position shift correction conditions

This command acquires the detailed conditions and thresholds of position shift correction.

< Command format >



< Response format >

When processing ends successfully

Acquired value$_{CR}$
O K$_{CR}$

When processing fails

E R$_{CR}$

< Explanation of parameters >

Position correction item No.	Specifies the position correction item No. (0 to 3) Item Nos are assigned as follows: 0: Position correction0 of Camera0 1: Position correction1 of Camera0 2: Position correction0 of Camera1 3: Position correction1 of Camera1
Data No.	Specifies the data No. (0 to 127) For details, see "Parameter List (p.39)."
Acquired value	The detailed conditions and thresholds of position correction is returned. For details, see "Parameter List (p.39)."

Acquiring/Changing Passwords < PASSWORD command >

Acquiring the password

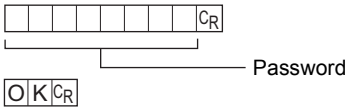
This command acquires the currently set password.

< Command format >

P A S S W O R D CR or P W CR

< Response format >

When processing ends successfully



O K CR

When processing fails

E R CR

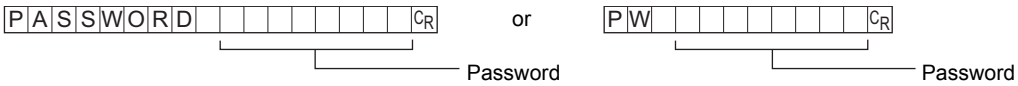
< Explanation of parameters >

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

O K CR

When processing fails

E R 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

ZFX-□□□ Ver X.XX$_{CR}$

Version No.

Model information

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.

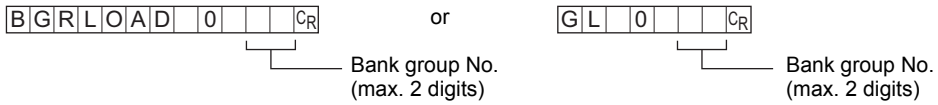
Backup/Restore Commands

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

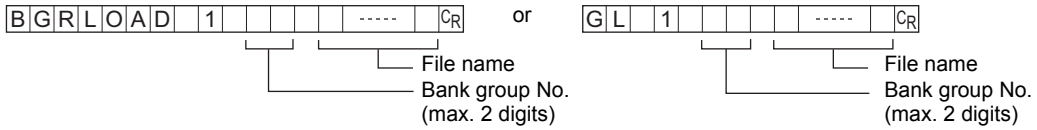
< Explanation of parameters >

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 >

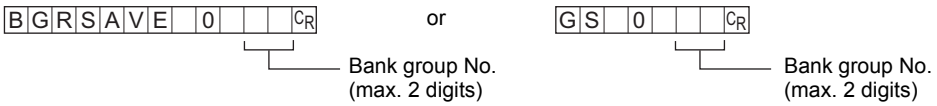
Bank group No.	Specifies the bank group No. to upload. (0 to 31)
File name	Specifies the file name within eight alphanumeric characters. (An extension is not required.)

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

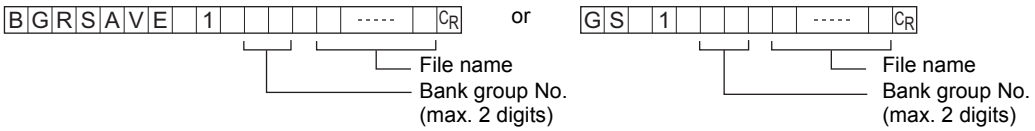
< Explanation of parameters >

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 >

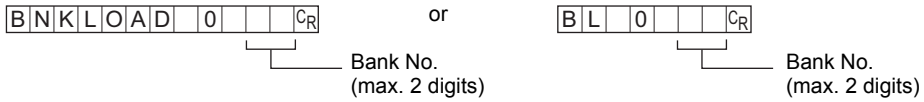
Bank group No.	Specifies the bank group No. to back up. (0 to 31)
File name	The file can be given any name within eight alphanumeric characters. (An extension is not required.)

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

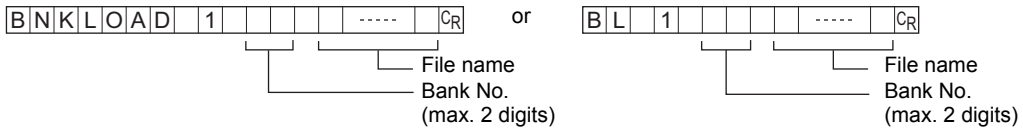
< Explanation of parameters >

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 >

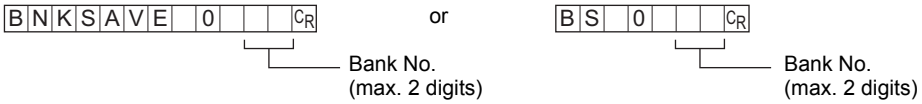
Bank No.	Specifies the bank No. to upload. (0 to 31)
File name	Specifies the file name within eight alphanumeric characters. (An extension is not required.)

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

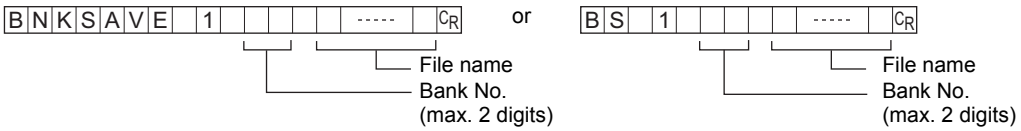
< Explanation of parameters >

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

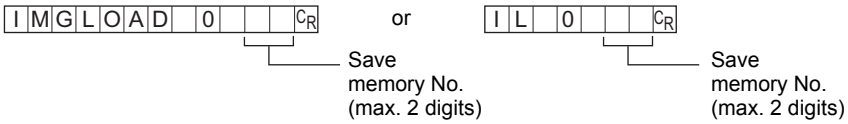
ER$_{CR}$

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 >



< 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$_{CR}$

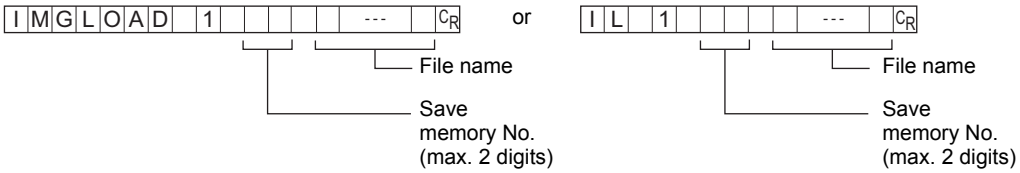
< Explanation of parameters >

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 >

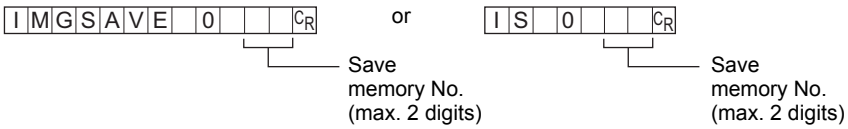
Save memory No.	Specifies the No. of the save memory for saving the image data to. (0 to 99)
File name	Specifies the file name (within 8 characters, excluding the file extension). File extensions ".GRY" (image captured by a monochrome camera) or ".BYR" (image captured by a color camera) are allowed.

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

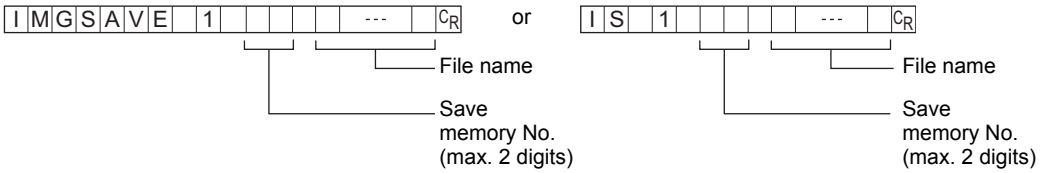
< Explanation of parameters >

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. When "-2" is specified for the Save memory No., the latest image data of camera 1 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.) When performing measurement on two cameras, the image data of both cameras is saved. In this case, the file names are automatically appended with "C0" and "C1". Image data from camera 0: file name_C0.BYR or file name_C1.GRY Image data from camera 1: file name_C1.BYR or file name_C1.GRY

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 >

S	Y	S	L	O	A	D		0	CR

or

S	L		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 >

R	E	A	D	Y	CR

When processing ends successfully

O	K	CR

When processing fails

E	R	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 >

S	Y	S	L	O	A	D		1				---		CR

File name

or

S	L		1				---		CR

File name

< Response format >

When processing ends successfully

O	K	CR

When processing fails

E	R	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 >

S	Y	S	S	A	V	E		0	CR

or

S	S		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 >

R	E	A	D	Y	CR

When processing ends successfully

O	K	CR

When processing fails

E	R	CR

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 >

S	Y	S	S	A	V	E		1			---		CR

File name

or

S	S		1			---		CR

File name

< Response format >

When processing ends successfully

O	K	CR

When processing fails

E	R	CR

< Explanation of parameters >

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

Utility Commands

Clearing Measurement Values < CLRMEAS Command >

This command clears the following measurement results.

- Judgment results and measurement values of measurement items
- Judgment results and measurement values of expressions
- Logging data
- Parallel external output signals (OR, DO0 to DO15)

No parameters are provided for this command.

< Command format >

C L R M E A S CR or C M CR

< Response format >

When processing ends successfully

O K CR

When processing fails

E R CR

Clearing Error Output < CLRERR Command >

Clears the error output results.
The parallel external output signal (ERROR) is turned OFF to turn the ERROR LED OFF.
No parameters are provided for this command.

< Command format >

C L R E R R CR or C E CR

< Response format >

When processing ends successfully

O K CR

When processing fails

E R CR

Outputting the Error History < ERRHISTORY Command >

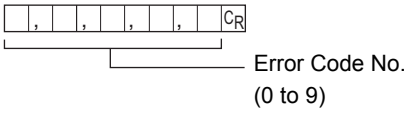
This command outputs a history of up to five of the latest errors.
This command shows information of up to five of the latest errors by error code No. (0 to 9).
"-1" is returned other than error code No. if the number of error occurrences does not exceed five.

< Command format >

ERRHISTORY$_{CR}$ or EH$_{CR}$

< Response format >

When processing ends successfully



When no error occurs

-1, -1, -1, -1, -1$_{CR}$

Example: When handshaking timeout error occurs two times

3, 3, -1, -1, -1$_{CR}$

When processing fails

ER$_{CR}$

< Explanation of parameters >

Error Code No.	Description
0	Trigger input error
1	Parallel command error
2	SD CARD access error
3	Parallel timeout error
4	USB connection error
5	LAN connection error
6	Image input error
8	VDIN timeout error
9	Camera communication error

Executing Display Capture to Output an Image < CAPTURE Command >

This command executes display capture.
Captured images are output to the SD card or external devices.

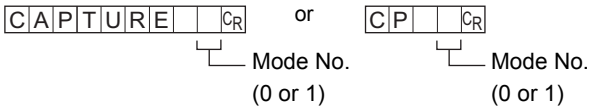
Important

When parameter (mode No.) input is omitted, captured images are output to the SD card.

Note

Captured images are transferred to external devices by XMODEM protocol.
Images are sent in bitmap format. Save the images with ".BMP" file extensions.

< Command format >



< File transfer >

When the mode No. is set to 0 and the image is output to external devices, the image data is transferred by XMODEM (-CRC or SUM) after READY is received. XMODEM (-1k) is not supported.

< Response format >

When Mode No. is set to 0:

READY CR

When processing ends successfully

OK CR

When processing fails

ER CR

When Mode No. is set to 1 or omitted:
When processing ends successfully

OK CR

When processing fails

ER CR

< Explanation of parameters >

Mode No.	Description
0	Display capture is executed and the captured display is output as an image to external devices.
1 or omitted	Display capture is executed and the captured display is output as an image to SD card. The captured image is stored to CAPTURE directory in the SD card.

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

Graphic search (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

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

Flexible search (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

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

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

Labeling (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

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	Number of labels	0 to 65535
5	Axis angle	-180.0 to 180.0
6	Perimeter	0 to 9999.999
7	Length X	0 to 9999.999
8	Length Y	0 to 9999.999
9	Roundness	0 to 1.0
10	Reference area	0 to 9999999.999
11	Reference position X	-9999.999 to 9999.999
12	Reference position Y	-9999.999 to 9999.999
13	Reference axis angle	-180.0 to 180.0
14	Reference perimeter	0 to 9999.999
15	Reference length X	0 to 9999.999
16	Reference length Y	0 to 9999.999
17	Reference roundness	0 to 1.0
18	Area difference	-9999999.999 to 9999999.999
19	Position difference X	-9999.999 to 9999.999
20	Position difference Y	-9999.999 to 9999.999
21	Axis angle difference	-180.0 to 180.0
22	Perimeter difference	-9999.999 to 9999.999
23	Length X difference	-9999.999 to 9999.999
24	Length Y difference	-9999.999 to 9999.999
25	Roundness difference	-1.0 to 1.0

Multi Color

Data No.	Parameter	Output Range
0	Judgment result	0 : OK -1 : NG -2 : not measured
1	Individual area1	0 to 9999999.999
2	Individual area2	0 to 9999999.999
3	Individual area3	0 to 9999999.999
4	Individual area4	0 to 9999999.999
5	Individual reference area1	0 to 9999999.999
6	Individual reference area2	0 to 9999999.999

Data No.	Parameter	Output Range
7	Individual reference area3	0 to 9999999.999
8	Individual reference area4	0 to 9999999.999
9	Individual difference area1	-9999999.999 to 9999999.999
10	Individual difference area2	-9999999.999 to 9999999.999
11	Individual difference area3	-9999999.999 to 9999999.999
12	Individual difference area4	-9999999.999 to 9999999.999

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
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

Data No.	Parameter	Output Range
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
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
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

Data No.	Parameter	Output Range
23	Maximum value	0 to 100.0
24	Minimum value	0 to 100.0

Parameters for inspection by individual application

Grouping (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

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	Index No.	0 to 633

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

Barcode, 2D Code (available only on ZFX-C2_-CD/C1_-CD/C1_H-CD)

Data No.	Parameter	Output Range
0	Judgment result	0 : OK -1 : NG -2 : not measured
1	Index	0 to 31: Master data No. of verification results -2: Verification results OFF or read error -1: Verification results NG
2	Num. of characters	0 to 1024

Data No.	Parameter	Output Range
3	Characters	Text string (0 to 1024 characters) Character codes that cannot be displayed (e.g. control codes) are displayed as spaces.

When text strings are output, the following control codes are converted before they are output.

When setting text strings, use the codes in the "After conversion" column.

Text code	Before conversion	After conversion
Comma	&h2C	&h8540
Tab	&h09	&h8541
Space	&h20	&h8542
CR	&h0D	&h8543
LF	&h0A	&h8544

Shape inspection parameters

Pattern search

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
53	Rotation range	0 to 180
54	Skipping angle	0: 1°, 1: 2°, 2: 3°, 3: 5°, 4: 10°, 5: 15°, 6: 20°, 7: 30°
55	Interpolation	0: OFF, 1: ON
56	Verification	0: OFF, 1: ON
57	Candidate level	0 to 100
58	Calibration	0: OFF, 1: ON
59	Coordinates mode	0: Normal 1: Pos. correction
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Angle upper limit value	-180 to 180
78	Angle lower limit value	-180 to 180
79	Count upper limit value	0 to 99
80	Count lower limit value	0 to 99

Graphic search (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
53	Rotation range	0 to 180
54	Skipping angle	0: 1°, 1: 2°, 2: 3°, 3: 5°, 4: 10°, 5: 15°, 6: 20°, 7: 30°
55	Interpolation	0: OFF, 1: ON
57	Candidate level	0 to 100
58	Noise level	0 to 255
59	Calibration	0: OFF, 1: ON
60	Coordinates mode	0: Normal, 1: Pos. correction
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100

Data No.	Parameter	Output Range
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Angle upper limit value	-180 to 180
78	Angle lower limit value	-180 to 180

Flexible search (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
52	Verification	0: OFF, 1: ON
53	Candidate level	0 to 100
54	Calibration	0: OFF, 1: ON
55	Coordinates mode	0: Normal, 1: Pos. correction
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Model No. upper limit value	0 to 35
78	Model No. lower limit value	0 to 35

Sensitive search

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
52	Sensitivity	0: Low, 1: Middle 2: High
54	Rotation range	0 to 180
55	Skipping angle	0: 1°, 1: 2°, 2: 3°, 3: 5°, 4: 10°, 5: 15°, 6: 20°, 7: 30°
56	Interpolation	0: OFF, 1: ON
57	Verification	0: OFF, 1: ON
58	Candidate level	0 to 100
59	Calibration	0: OFF, 1: ON
60	Solid color check	0: OFF, 1: ON
61	Coordinates mode	0: Normal 1: Pos. correction
62	Output position	0: Difference position, 1: Center position
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100
73	X upper limit value	-9999.999 to 9999.999

Data No.	Parameter	Output Range
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Angle upper limit value	-180 to 180
78	Angle lower limit value	-180 to 180
79	Solid color rate upper limit value	0 to 100
80	Solid color rate lower limit value	0 to 100

Size inspection parameters

Area

Data No.	Parameter	Output Range
52	Measure axis angle	0: OFF, 1: ON
53	Fill profile	0: OFF, 1: ON
54	Calibration	0: OFF, 1: ON
55	Coordinates mode	0: Normal 1: Pos. correction
71	Area upper limit value	0.000 to 9999999.999
72	Area lower limit value	0.000 to 9999999.999
73	Gravity position X upper limit value	-9999.999 to 9999.999
74	Gravity position X lower limit value	-9999.999 to 9999.999
75	Gravity position Y upper limit value	-9999.999 to 9999.999
76	Gravity position Y lower limit value	-9999.999 to 9999.999
77	Axis angle upper limit value	-90.00 to 90.00
78	Axis angle lower limit value	-90.00 to 90.00

Labeling (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

Data No.	Parameter	Output Range
51	Labeling mode	0: Normal, 1: Precision
52	Sort mode	0: Area descending order, 1: Area ascending order, 2: X gravity descending order, 3: X gravity ascending order, Y gravity descending order, Y gravity ascending order
53	Label No.	0 to 2499
54	Measure axis angle	0: OFF, 1: ON
55	Measure perimeter	0: OFF, 1: ON
56	Measure roundness	0: OFF, 1: ON
57	Filling up holes	0: OFF, 1: ON
58	Outside trimming	0: OFF, 1: ON
59	Noise area upper limit value	0.000 to 9999999.999

Data No.	Parameter	Output Range
60	Noise area lower limit value	0.000 to 9999999.999
61	Calibration	0: OFF, 1: ON
62	Coordinates mode	0: Normal, 1: Pos. correction
71	Area upper limit value	0.000 to 9999999.999
72	Area lower limit value	0.000 to 9999999.999
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Axis angle upper limit value	-90.00 to 90.00
78	Axis angle lower limit value	-90.00 to 90.00
79	Perimeter upper limit value	0.000 to 9999999.999
80	Perimeter lower limit value	0.000 to 9999999.999
81	Length X upper limit value	0.000 to 9999.999
82	Length X lower limit value	0.000 to 9999.999
83	Length Y upper limit value	0.000 to 9999.999
84	Length Y lower limit value	0.000 to 9999.999
85	Roundness upper limit value	0.00 to 2.00
86	Roundness lower limit value	0.00 to 2.00
87	Number of labels upper limit value	0 to 65535
88	Number of labels upper limit value	0 to 65535

Multi Color

Data No.	Parameter	Range
53	Fill profile	0: OFF, 1: ON
54	Calibration	0: OFF, 1: ON
55	Coordinates mode	0: Normal, 1: Pos. correction
56	Auto THset +/-	0.000 to 9999999.999
57	Area judgment (upper limit)	0.000 to 9999999.999
58	Area judgment (lower limit)	0.000 to 9999999.999
71	Individual area1 upper limit value	0.000 to 9999999.999
72	Individual area1 lower limit value	0.000 to 9999999.999
73	Individual area2 upper limit value	0.000 to 9999999.999
74	Individual area2 lower limit value	0.000 to 9999999.999
75	Individual area3 upper limit value	0.000 to 9999999.999
76	Individual area3 lower limit value	0.000 to 9999999.999
77	Individual area4 upper limit value	0.000 to 9999999.999
78	Individual area4 lower limit value	0.000 to 9999999.999

Edge inspection parameters

Position

Data No.	Parameter	Output Range
51	Measurement mode	0:Average, 1: Peak, 2: Bottom
52	Color mode	0: Color filter, 1: Color Pickup
53	Split size	1 to 99
54	Color	0: Light → Dark, 1: Dark → Light
55	Edge level	1 to 99
56	Noise level	0 to 255
57	Noise width	0 to 255
58	Calibration	0: OFF, 1: ON
59	Coordinates mode	0: Normal, 1: Pos. correction
71	X upper limit value	-9999.999 to 9999.999
72	X lower limit value	-9999.999 to 9999.999
73	Y upper limit value	-9999.999 to 9999.999
74	Y lower limit value	-9999.999 to 9999.999

Width

Data No.	Parameter	Output Range
51	Measurement mode	0: Average, 1: Maximum, 2: Minimum
52	Color mode	0: Color filter, 1: Color Pickup
53	Split size	1 to 99
54	Color1	0: Light → Dark, 1: Dark → Light
55	Edge level1	1 to 99
56	Noise level1	0 to 255
57	Noise width1	0 to 255
58	Color2	0: Light → Dark, 1: Dark → Light
59	Edge level2	1 to 99
60	Noise level2	0 to 255
61	Noise width2	0 to 255
62	Calibration	0: OFF, 1: ON
63	Coordinates mode	0: Normal, 1: Pos. correction
71	Edge width upper limit value	0.000 to 9999.999
72	Edge width lower limit value	0.000 to 9999.999
73	Edge position X1 upper limit value	-9999.999 to 9999.999
74	Edge position X1 lower limit value	-9999.999 to 9999.999
75	Edge position Y1 upper limit value	-9999.999 to 9999.999
76	Edge position Y1 lower limit value	-9999.999 to 9999.999
77	Edge position X2 upper limit value	-9999.999 to 9999.999
78	Edge position X2 lower limit value	-9999.999 to 9999.999
79	Edge position Y2 upper limit value	-9999.999 to 9999.999
80	Edge position Y2 lower limit value	-9999.999 to 9999.999

Count

Data No.	Parameter	Output Range
51	Search mode	0: Normal, 1: Fine
52	Color mode	0: Color filter, 1: Color Pickup
53	Target color	0: Light, 1: Dark
54	Edge level	1 to 99
55	Noise level	0 to 255
56	Noise width	0 to 255
57	Calibration	0: OFF, 1: ON
71	Number of edges upper limit value	0 to 255
72	Number of edges lower limit value	0 to 255
73	Average pitch upper limit value	0.000 to 9999.999
74	Average pitch lower limit value	0.000 to 9999.999
75	Average width upper limit value	0.000 to 9999.999
76	Average width lower limit value	0.000 to 9999.999

Angle (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

Data No.	Parameter	Output Range
51	Color mode	0: Color filter, 1: Color Pickup
52	Measurement mode1	0:Average, 1: Peak, 2: Bottom
53	Split size1	1 to 99
54	Color1	0: Light → Dark, 1: Dark → Light
55	Edge level1	1 to 99
56	Noise level1	0 to 255
57	Noise width1	0 to 255
58	Measurement mode2	0:Average, 1: Peak, 2: Bottom
59	Split size2	1 to 99
60	Color2	0: Light → Dark, 1: Dark → Light
61	Edge level2	1 to 99
62	Noise level2	0 to 255
63	Noise width2	0 to 255
64	Calibration	0: OFF, 1: ON
65	Coordinates mode	0: Normal, 1: Pos. correction
71	Angle upper limit value	-180.00 to 180.00
72	Angle lower limit value	-180.00 to 180.00
73	Region1 X upper limit value	-9999.999 to 9999.999
74	Region1 X lower limit value	-9999.999 to 9999.999
75	Region1 Y upper limit value	-9999.999 to 9999.999
76	Region1 Y lower limit value	-9999.999 to 9999.999
77	Region2 X upper limit value	-9999.999 to 9999.999
78	Region2 X lower limit value	-9999.999 to 9999.999
79	Region2 Y upper limit value	-9999.999 to 9999.999
80	Region2 Y lower limit value	-9999.999 to 9999.999

Brightness and color inspection parameters

Brightness

Data No.	Parameter	Output Range
71	Density average upper limit value	0.0 to 255.0
72	Density average lower limit value	0.0 to 255.0
73	Density deviation upper limit value	0.0 to 127.0
74	Density deviation lower limit value	0.0 to 127.0

Hue

Data No.	Parameter	Output Range
51	Deviation	0: OFF, 1:ON
71	Hue upper limit value	0.0 to 360.0
72	Hue lower limit value	0.0 to 360.0
73	Saturation upper limit value	0.0 to 100.0
74	Saturation lower limit value	0.0 to 100.0
75	Value upper limit value	0.0 to 100.0
76	Value lower limit value	0.0 to 100.0
77	Hue deviation upper limit value	0.0 to 180.0
78	Hue deviation lower limit value	0.0 to 180.0
79	Saturation deviation upper limit value	0.0 to 50.0
80	Saturation deviation lower limit value	0.0 to 50.0
81	Value deviation upper limit value	0.0 to 50.0
82	Value deviation lower limit value	0.0 to 50.0

Parameters for inspection by individual application

Grouping (available only on ZFX-C2_/C1_H/C2_-CD/C1_H-CD)

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
52	Verification	0: OFF, 1: ON
53	Candidate level	0 to 100
54	Calibration	0: OFF, 1: ON
55	Coordinates mode	0: Normal, 1: Pos. correction
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Index No. upper limit value	0 to 63
78	Index No. lower limit value	0 to 63

Defect

Data No.	Parameter	Output Range
52	Detection size	4 to 64
53	Detection interval	4 to 64
54	Noise level	0 to 255
55	Calibration	0: OFF, 1: ON
56	Coordinates mode	0: Normal, 1: Pos. correction
71	Defect	0 to 255
72	Density upper limit value	0 to 255
73	Density lower limit value	0 to 255
74	Number of defects upper limit value	0 to 255
75	Number of defects lower limit value	0 to 255

Barcode (available only on ZFX-C2_-CD/C1_-CD/C1_H-CD)

Data No.	Parameter	Range
52	Verification func.	0: OFF, 1: ON
53	Verified master data	0: All master data, 1: Master0, 2: Master1, 3: Master2, ... 32: Master31
54	Partial verification	0: OFF, 1: ON
55	Last compared digit	1 to 1024
56	First compared digit	1 to 1024
57	Output characters	0: OFF, 1: ON
59	Error string	1 to 20 characters

Data No.	Parameter	Range
60	Partial output	0: OFF, 1: ON
61	Last output digit	1 to 1024
62	First output digit	1 to 1024
63	Measurement control	0: OFF, 1: ON
64	Code type	0: JAN/EAN/UPC 1: Code39 2: Codabar 3: ITF 4: Code93 5: Code128/GS1-128 6: GS1 DataBar 7: Pharmacode
65	Timeout time (ms)	1 to 9999
66	Check digit	0: OFF, 1: ON
67	Composite component	0: OFF, 1: ON
68	Direction (Pharma)	0: Horizontal mode, 1: Vertical mode
69	Reverse decode (Pharma)	0: OFF, 1: ON
71	Num. of characters upper limit value	1 to 1024
72	Num. of characters lower limit value	1 to 1024
74	Characters threshold	1 to 32 characters
155+N	Master data for master data N	1 to 10 characters (excluding NULL)
187+N	Verified master data for master data N	1 to 32 characters
219+N	First meas. Item No. for master data N	1 to 127 (ZFX-C1_-CD: 1 to 31)
251+N	Last meas. Item No. for master data N	1 to 127 (ZFX-C1_-CD: 1 to 31)

2D Codes (available only on ZFX-C2_-CD/C1_-CD/C1_H-CD)

Data No.	Parameter	Range
52	Verification func.	0: OFF, 1: ON
53	Verified master data	0: All master data, 1: Master0, 2: Master1, 3: Master2, ... 32: Master31
54	Partial verification	0: OFF, 1: ON
55	Last compared digit	1 to 1024
56	First compared digit	1 to 1024
57	Output characters	0: OFF, 1: ON
59	Error string	1 to 20 characters
60	Partial output	0: OFF, 1: ON
61	Last output digit	1 to 1024
62	First output digit	1 to 1024
63	Measurement control	0: OFF, 1: ON

Data No.	Parameter	Range
64	Code type	0: Data Matrix (EC200) 1: QR Code 2: MicroQR Code 3: PDF417 4: MicroPDF417 5: Maxi Code 6: AZtec Code 7: Codablock
65	Timeout time (ms)	1 to 9999
66	Mirror	0: Normal, 1: Reverse
67	Code color	0: Black, 1: White, 2: Black & White
68	Shape (Data Matrix)	0: Square, 1: Square & Rectangle
71	Num. of characters upper limit value	1 to 1024
72	Num. of characters lower limit value	1 to 1024
74	Characters threshold	1 to 32 characters
155+N	Master data for master data N	1 to 10 characters (excluding NULL)
187+N	Verified master data for master data N	1 to 32 characters
219+N	First meas. Item No. for master data N	1 to 127 (ZFX-C1_-CD: 1 to 31)
251+N	Last meas. Item No. for master data N	1 to 127 (ZFX-C1_-CD: 1 to 31)

Position shift correction parameters

2 model search

Data No.	Parameter	Output Range
51	Search mode	0: Hi-speed, 1: Normal, 2: Precision
53	Rotation range	0 to 180
54	Skipping angle	0: 1°, 1: 2°, 2: 3°, 3: 5°, 4: 10°, 5: 15°, 6: 20°, 7: 30°
55	Interpolation	0: OFF, 1: ON
56	Verification	0: OFF, 1: ON
57	Candidate level	0 to 100
71	Correlation upper limit value	0 to 100
72	Correlation lower limit value	0 to 100
73	X upper limit value	-9999.999 to 9999.999
74	X lower limit value	-9999.999 to 9999.999
75	Y upper limit value	-9999.999 to 9999.999
76	Y lower limit value	-9999.999 to 9999.999
77	Angle upper limit value	-180 to 180
78	Angle lower limit value	-180 to 180

Example of Usage

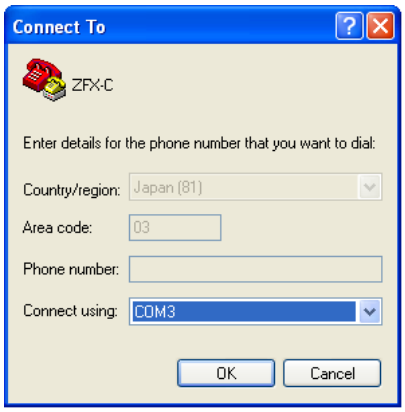
The following describes an example procedure to communicate by non-procedural commands using Windows standard tool HyperTerminal.

1 Start up HyperTerminal.

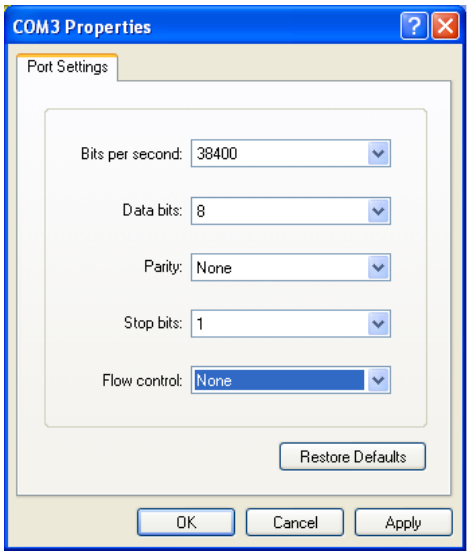
HyperTerminal is located under [Program]-[Accessory]-[Communication].

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

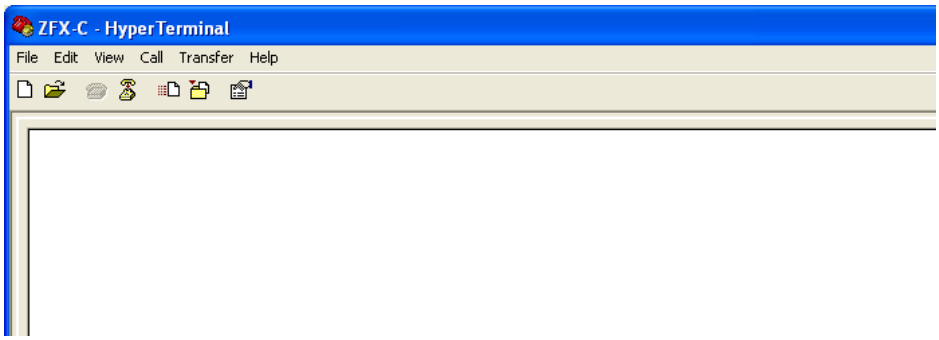
1-2 Select the COM port connected to the ZFX-C in the Connect using field.



1-3 Set the communication conditions.

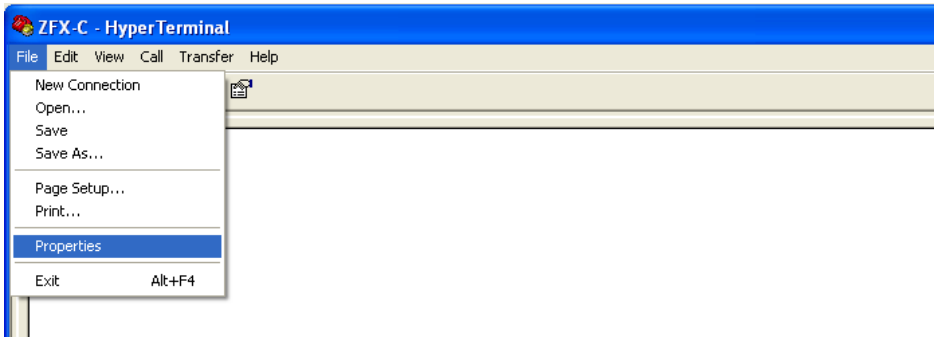


1-4 HyperTerminal is started up.

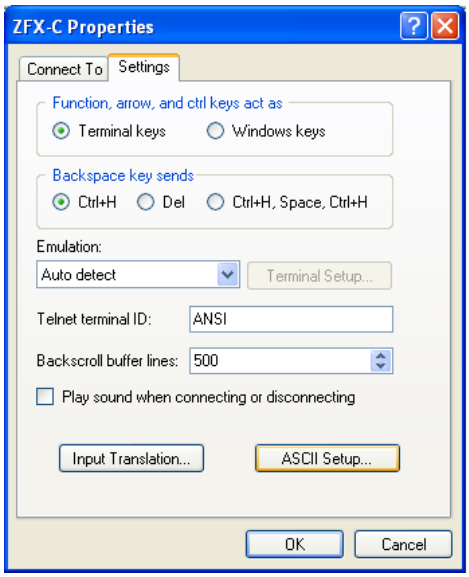


2 To facilitate command transactions, set echo and other communication conditions.

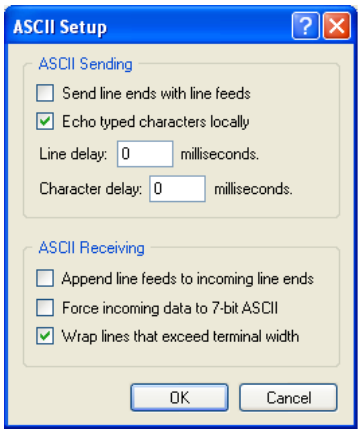
2-1 Open [Property].



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



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

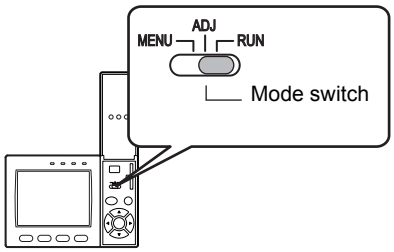


3 Set the communication conditions for the ZFX-C.

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

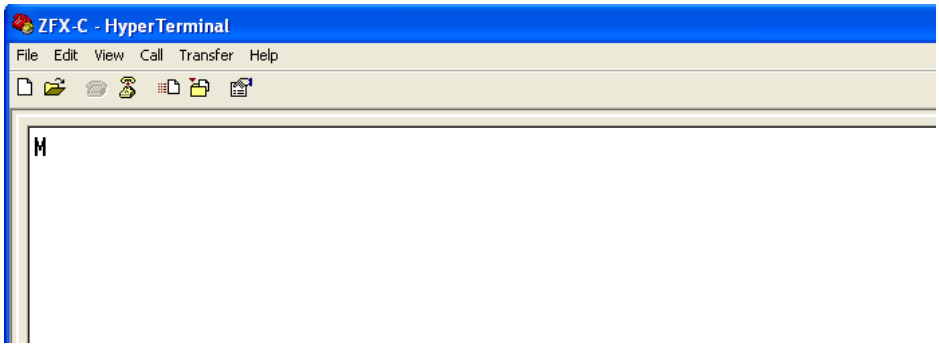
For details on how to set the communication specifications, refer to the User's Manual.

4 Switch the ZFX-C to the RUN mode.

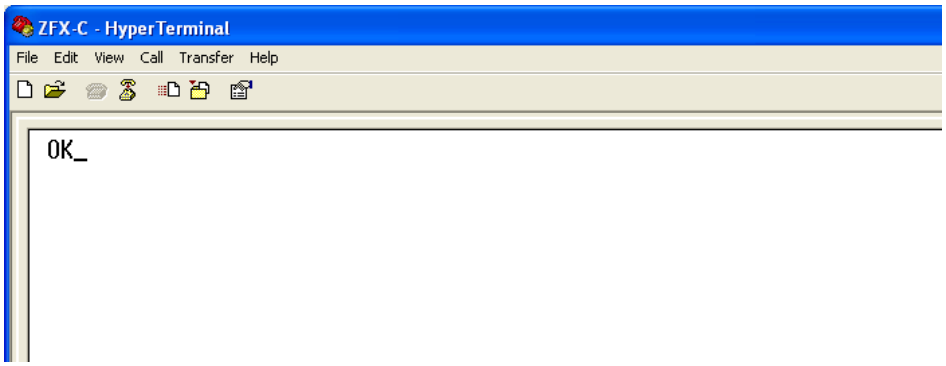


5 Execute non-procedural communication.

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.

Ver1.30 to Ver1.50

Changes
The following commands were added: MEASPARA, POSIPARA, CLRMEAS, CLRERR, ERRHISTORY, CAPTURE The new feature to re-measure the saved image has been added to the MEASURE command.

Ver1.50 to Ver1.61

Changes
The "Multi colors" inspection item was added. "Barcode" and "2D codes" inspection was added (available only on ZFX-C2_-CD/C1_-CD/C1_H-CD).

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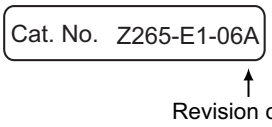
Revision History

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)
04	March 2008	Inclusion of information of ZFX-C20/C25, ZFX-C10H/C15H and ZFX-C10/C15 Controllers
05	September 2008	New commands as explained in "Version Upgrade Information" added (Ver1.50)
06	March 2009	• New details as explained in "Version Upgrade Information" added (Ver1.61) • ZFX-C2_-CD/C1_H-CD/C1_-CD information added
06A	February 2011	Minor corrections (p.19)

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