MITSUBISHI ELECTRIC

GRAPHIC OPERATION TERMINAL

GOT1000 Series

MES Interface Function Manual

for GT Works3

●SAFETY PRECAUTIONS●

(Always read these precautions before using this product.)

Before using the product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with only this product.

In this manual, the safety precautions are ranked as "WARNING" and "CAUTION".

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	CAUTION Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Note that the ⚠CAUTION level may lead to serious consequences according to the circumstances.

Always follow the precautions of both levels as they are important for personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design precautions]

⚠WARNING

● Before performing the test operation, read this manual carefully to understand the operation procedure.

Incorrect output or malfunctions may cause an accident.

● To maintain the security (confidentiality, integrity, and availability) of the GOT and the system against unauthorized access, DoS[*1] attacks, computer viruses, and other cyberattacks from unreliable networks and devices via network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

Mitsubishi Electric shall have no responsibility or liability for any problems involving GOT trouble and system trouble by unauthorized access, DoS attacks, computer viruses, and other cyberattacks.

*1 DoS: A denial-of-service (DoS) attack disrupts services by overloading systems or exploiting vulnerabilities, resulting in a denial-of-service (DoS) state.

CAUTIONS FOR USE

Cautions on the system configuration

(1) GOTs that support the MES interface function
GT16 and GT15 only support the function.
By installing the option OS into a GOT from GT Designer3, the MES interface function can be used.
For applicable models, refer to the following:
☞2.2 Connection between GOT and Controllers

(2) Option function board that supports the MES interface function
For the option function board that supports the MES interface function, refer to the following:
☞2.3 Required Equipment, Software and Option OS

(3) Relational databases that support the MES interface function
For the relational databases that support the MES interface function, refer to the following:
☞2.4.2 Server computer (SNTP server computer)

(4) Connection type used for the MES interface function
To utilize the MES interface function, the Ethernet connection is used.
Install an Ethernet communication unit, and configure the Ethernet setting in Communication Settings of GT Designer3.
For applicable Ethernet communication units, refer to the following:
☞2.3 Required Equipment, Software and Option OS
For the Ethernet connection, refer to the following.
☞GOT1000 Series Connection Manual (Mitsubishi Products) for GT Works3

INTRODUCTION

Thank you for purchasing the Mitsubishi Graphic Operation Terminal (GOT).

Before using the GOT, please read this manual carefully to understand the features and performance for correct handling.

CONTENTS

1. OVERVIEW

2. SYSTEM CONFIGURATION

3. SPECIFICATIONS

4. SETTINGS AND PROCEDURES BEFORE USE OF THE MES INTERFACE FUNCTION

7. DB CONNECTION SERVICE AND SETTING TOOL

8. TROUBLESHOOTING

APPENDICES

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REVISIONS

Intellectual Property Rights

MANUALS

The following table lists the manual relevant to this product.
Refer to each manual for any purpose.

■ Screen creation software manuals

Manual Name	Delivery method	Manual Number
GT Works3 Installation Instructions	Enclosed in product	–
GT Designer3 Version1 Screen Design Manual (Fundamentals) 1/2, 2/2	*1	SH-080866ENG
GT Designer3 Version1 Screen Design Manual (Functions) 1/2, 2/2	*1	SH-080867ENG
GT Simulator3 Version1 Operating Manual for GT Works3	*1	SH-080861ENG
GT Converter2 Version3 Operating Manual for GT Works3	*1	SH-080862ENG

*1   Contact your local distributor.

■ Connection manuals

Manual Name	Delivery method	Manual Number
GOT1000 Series Connection Manual (Mitsubishi Electric Products) for GT Works3	*1	SH-080868ENG
GOT1000 Series Connection Manual (Non-Mitsubishi Electric Products 1) for GT Works3	*1	SH-080869ENG
GOT1000 Series Connection Manual (Non-Mitsubishi Electric Products 2) for GT Works3	*1	SH-080870ENG
GOT1000 Series Connection Manual (Microcomputer, MODBUS Products, Peripherals) for GT Works3	*1	SH-080871ENG
GOT1000 Series Connection Manual (α2 Connection) for GT Works3	*1	JY997D39201

*1   Contact your local distributor.

■ Extended and option function manuals

Manual Name	Delivery method	Manual Number
GOT1000 Series Gateway Functions Manual for GT Works3	*1	SH-080858ENG
GOT1000 Series MES Interface Function Manual for GT Works3	*1	SH-080859ENG
GOT1000 Series User's Manual (Extended Functions, Option Functions) for GT Works3	*1	SH-080863ENG

*1   Contact your local distributor.

■ GT SoftGOT1000 manuals

Manual Name	Delivery method	Manual Number
GT SoftGOT1000 Version3 Operating Manual for GT Works3	*1	SH-080860ENG

*1   Contact your local distributor.

■ GT16 manuals

Manual Name	Delivery method	Manual Number
GT16 User's Manual (Hardware)	*1	SH-080928ENG
GT16 User's Manual (Basic Utility)	*1	SH-080929ENG
GT16 Handy GOT User's Manual	*1	JY997D41201 JY997D41202

*1　Contact your local distributor.

■ GT15 manuals

Manual Name	Delivery method	Manual Number
GT15 User's Manual	*1	SH-080528ENG

*1　Contact your local distributor.

■ GT14 manuals

Manual Name	Delivery method	Manual Number
GT14 User's Manual	*1	JY997D44801

*1　Contact your local distributor.

■ GT12 manuals

Manual Name	Delivery method	Manual Number
GT12 User's Manual	*1	SH-080977ENG

*1　Contact your local distributor.

■ GT11 manuals

Manual Name	Delivery method	Manual Number
GT11 User's Manual	*1	JY997D17501
GT11 Handy GOT User's Manual	*1	JY997D20101 JY997D20102

*1　Contact your local distributor.

■ GT10 manuals

Manual Name	Delivery method	Manual Number
GT10 User's Manual	*1	JY997D24701

*1　Contact your local distributor.

■ Creating a project

Obtaining the specifications and operation methods of GT Designer3	GT Designer3 Version1 Screen Design Manual (Fundamentals) 1/2, 2/2
Setting available functions on GT Designer3	
Creating a screen displayed on the GOT	
Obtaining useful functions to increase efficiency of drawing	
Setting details for figures and objects	GT Designer3 Version1 Screen Design Manual (Functions) 1/2, 2/2
Setting functions for the data collection or trigger action	
Setting functions to use peripheral devices	
Simulating a created project on a personal computer	GT Simulator3 Version1 Operating Manual for GT Works3

■ Connecting a controller to the GOT

Obtaining information of Mitsubishi Electric products applicable to the GOT	GOT1000 Series Connection Manual (Mitsubishi Electric Products) for GT Works3
Connecting Mitsubishi Electric products to the GOT	
Connecting multiple controllers to one GOT (Multi-channel function)	
Establishing communication between a personal computer and a controller via the GOT (FA transparent function)	
Obtaining information of Non-Mitsubishi Electric products applicable to the GOT	• GOT1000 Series Connection Manual (Non-Mitsubishi Electric Products 1) for GT Works3 • GOT1000 Series Connection Manual (Non-Mitsubishi Electric Products 2) for GT Works3
Connecting Non-Mitsubishi Electric products to the GOT	
Obtaining information of peripheral devices applicable to the GOT	GOT1000 Series Connection Manual (Microcomputer, MODBUS Products, Peripherals) for GT Works3
Connecting peripheral devices including a barcode reader to the GOT	
Connecting α2 with GOT	GOT1000 Series Connection Manual (α2 Connection) for GT Works3

■ Transferring data to the GOT

Writing data to the GOT	GT Designer3 Version1 Screen Design Manual (Fundamentals) 1/2, 2/2
Reading data from the GOT	
Verifying a editing project to a GOT project	

■ Others

Obtaining specifications (including part names, external dimensions, and options) of each GOT	• GT16 User's Manual (Hardware) • GT16 Handy GOT User's Manual • GT15 User's Manual
Installing the GOT	• GT14 User's Manual • GT12 User's Manual • GT11 User's Manual • GT11 Handy GOT User's Manual • GT10 User's Manual
Operating the utility	• GT16 User's Manual (Basic Utility) • GT16 Handy GOT User's Manual • GT15 User's Manual • GT14 User's Manual • GT12 User's Manual • GT11 User's Manual • GT11 Handy GOT User's Manual • GT10 User's Manual
Configuring the gateway function	GOT1000 Series Gateway Functions Manual for GT Works3
Configuring the MES interface function	GOT1000 Series MES Interface Function Manual for GT Works3
Configuring the extended function and option function	GOT1000 Series User's Manual (Extended Functions, Option Functions) for GT Works3
Using a personal computer as the GOT	GT SoftGOT1000 Version3 Operating Manual for GT Works3

ABBREVIATIONS AND GENERIC TERMS

■ GOT

Abbreviations and generic terms			Description
GOT1000 Series	GT1695	GT1695M-X	Abbreviation of GT1695M-XTBA, GT1695M-XTBD
	GT1685	GT1685M-S	Abbreviation of GT1685M-STBA, GT1685M-STBD
	GT1675	GT1675M-S	Abbreviation of GT1675M-STBA, GT1675M-STBD
		GT1675M-V	Abbreviation of GT1675M-VTBA, GT1675M-VTBD
		GT1675-VN	Abbreviation of GT1675-VNBA, GT1675-VNBD
	GT1672	GT1672-VN	Abbreviation of GT1672-VNBA, GT1672-VNBD
	GT1665	GT1665M-S	Abbreviation of GT1665M-STBA, GT1665M-STBD
		GT1665M-V	Abbreviation of GT1665M-VTBA, GT1665M-VTBD
	GT1662	GT1662-VN	Abbreviation of GT1662-VNBA, GT1662-VNBD
	GT1655	GT1655-V	Abbreviation of GT1655-VTBD
	GT16		Abbreviation of GT1695, GT1685, GT1675, GT1672, GT1665, GT1662, GT1655, GT16 Handy GOT
	GT1595	GT1595-X	Abbreviation of GT1595-XTBA, GT1595-XTBD
	GT1585	GT1585V-S	Abbreviation of GT1585V-STBA, GT1585V-STBD
		GT1585-S	Abbreviation of GT1585-STBA, GT1585-STBD
	GT157□	GT1575V-S	Abbreviation of GT1575V-STBA, GT1575V-STBD
		GT1575-S	Abbreviation of GT1575-STBA, GT1575-STBD
		GT1575-V	Abbreviation of GT1575-VTBA, GT1575-VTBD
		GT1575-VN	Abbreviation of GT1575-VNBA, GT1575-VNBD
		GT1572-VN	Abbreviation of GT1572-VNBA, GT1572-VNBD
	GT156□	GT1565-V	Abbreviation of GT1565-VTBA, GT1565-VTBD
		GT1562-VN	Abbreviation of GT1562-VNBA, GT1562-VNBD
	GT155□	GT1555-V	Abbreviation of GT1555-VTBD
		GT1555-Q	Abbreviation of GT1555-QTBD, GT1555-QSBD
		GT1550-Q	Abbreviation of GT1550-QLBD
	GT15		Abbreviation of GT1595, GT1585, GT157□, GT156□, GT155□
	GT145□	GT1455-Q	Abbreviation of GT1455-QTBDE, GT1455-QTBD
		GT1450-Q	Abbreviation of GT1450-QMBDE, GT1450-QMBD, GT1450-QLBDE, GT1450-QLBD
	GT14		Abbreviation of GT1455-Q, GT1450-Q
	GT1275	GT1275-V	Abbreviation of GT1275-VNBA, GT1275-VNBD
	GT1265	GT1265-V	Abbreviation of GT1265-VNBA, GT1265-VNBD
	GT12		Abbreviation of GT1275, GT1265
	GT115□	GT1155-Q	Abbreviation of GT1155-QTBDQ, GT1155-QSBDQ, GT1155-QTBDA, GT1155-QSBDA, GT1155-QTBD, GT1155-QSBD
		GT1150-Q	Abbreviation of GT1150-QLBDQ, GT1150-QLBDA, GT1150-QLBD
	GT11		Abbreviation of GT115□, GT11 Handy GOT,
	GT105□	GT1055-Q	Abbreviation of GT1055-QSBD
		GT1050-Q	Abbreviation of GT1050-QBBD
	GT104□	GT1045-Q	Abbreviation of GT1045-QSBD
		GT1040-Q	Abbreviation of GT1040-QBBD
	GT1030		Abbreviation of GT1030-LBD, GT1030-LBD2, GT1030-LBL, GT1030-LBDW, GT1030-LBDW2, GT1030-LBLW, GT1030-LWD, GT1030-LWD2, GT1030-LWL, GT1030-LWDW, GT1030-LWDW2, GT1030-LWLW, GT1030-HBD, GT1030-HBD2, GT1030-HBL, GT1030-HBDW, GT1030-HBDW2, GT1030-HBLW, GT1030-HWD, GT1030-HWD2, GT1030-HWL, GT1030-HWDW, GT1030-HWDW2, GT1030-HWLW
	GT1020		Abbreviation of GT1020-LBD, GT1020-LBD2, GT1020-LBL, GT1020-LBDW, GT1020-LBDW2, GT1020-LBLW, GT1020-LWD, GT1020LWD2, GT1020-LWL, GT1020-LWDW, GT1020-LWDW2, GT1020-LWLW
	GT10		Abbreviation of GT105□, GT104□, GT1030, GT1020

Abbreviations and generic terms				Description
GOT1000 Series	Handy GOT	GT16 Handy GOT	GT1665HS-V	Abbreviation of GT1665HS-VTBD
		GT11 Handy GOT	GT1155HS-Q	Abbreviation of GT1155HS-QSBD
			GT1150HS-Q	Abbreviation of GT1150HS-QLBD
	GT SoftGOT1000			Abbreviation of GT SoftGOT1000
GOT900 Series				Abbreviation of GOT-A900 series, GOT-F900 series
GOT800 Series				Abbreviation of GOT-800 series

■ Communication unit

Abbreviations and generic terms	Description
Bus connection unit	GT15-QBUS, GT15-QBUS2, GT15-ABUS, GT15-ABUS2, GT15-75QBUSL, GT15-75QBUS2L, GT15-75ABUSL, GT15-75ABUS2L
Serial communication unit	GT15-RS2-9P, GT15-RS4-9S, GT15-RS4-TE
RS-422 conversion unit	GT15-RS2T4-9P, GT15-RS2T4-25P
Ethernet communication unit	GT15-J71E71-100
MELSECNET/H communication unit	GT15-J71LP23-25, GT15-J71BR13
MELSECNET/10 communication unit	GT15-75J71LP23-Z[*1], GT15-75J71BR13-Z[*2]
CC-Link IE Controller Network communication unit	GT15-J71GP23-SX
CC-Link IE Field Network communication unit	GT15-J71GF13-T2
CC-Link communication unit	GT15-J61BT13, GT15-75J61BT13-Z[*3]
Interface converter unit	GT15-75IF900
Serial multi-drop connection unit	GT01-RS4-M
Connection Conversion Adapter	GT10-9PT5S
RS-232/485 signal conversion adapter	GT14-RS2T4-9P

*1 A9GT-QJ71LP23 + GT15-75IF900 set
*2 A9GT-QJ71BR13 + GT15-75IF900 set
*3 A8GT-J61BT13 + GT15-75IF900 set

■ Option unit

Abbreviations and generic terms		Description
Printer unit		GT15-PRN
Video/RGB unit	Video input unit	GT16M-V4, GT15V-75V4
	RGB input unit	GT16M-R2, GT15V-75R1
	Video/RGB input unit	GT16M-V4R1, GT15V-75V4R1
	RGB output unit	GT16M-ROUT, GT15V-75ROUT
Multimedia unit		GT16M-MMR
CF card unit		GT15-CFCD
CF card extension unit[*1]		GT15-CFEX-C08SET
External I/O unit		GT15-DIO, GT15-DIOR
Sound output unit		GT15-SOUT

*1 GT15-CFEX + GT15-CFEXIF + GT15-C08CF set.

■ Option

Abbreviations and generic terms		Description
Memory card	CF card	GT05-MEM-16MC, GT05-MEM-32MC, GT05-MEM-64MC, GT05-MEM-128MC, GT05-MEM-256MC, GT05-MEM-512MC, GT05-MEM-1GC, GT05-MEM-2GC, GT05-MEM-4GC, GT05-MEM-8GC, GT05-MEM-16GC
	SD card	NZ1MEM-2GBSD, NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD, L1MEM-2GBSD, L1MEM-4GBSD
Memory card adaptor		GT05-MEM-ADPC
Option function board		GT16-MESB, GT15-FNB, GT15-QFNB, GT15-QFNB16M, GT15-QFNB32M, GT15-QFNB48M, GT11-50FNB, GT15-MESB48M
Battery		GT15-BAT, GT11-50BAT
Protective Sheet	For GT16	GT16-90PSCB, GT16-90PSGB, GT16-90PSCW, GT16-90PSGW, GT16-80PSCB, GT16-80PSGB, GT16-80PSCW, GT16-80PSGW, GT16-70PSCB, GT16-70PSGB, GT16-70PSCW, GT16-70PSGW, GT16-60PSCB, GT16-60PSGB, GT16-60PSCW, GT16-60PSGW, GT16-50PSCB, GT16-50PSGB, GT16-50PSCW, GT16-50PSGW, GT16-90PSCB-012, GT16-80PSCB-012, GT16-70PSCB-012, GT16-60PSCB-012, GT16-50PSCB-012, GT16H-60PSC
	For GT15	GT15-90PSCB, GT15-90PSGB, GT15-90PSCW, GT15-90PSGW, GT15-80PSCB, GT15-80PSGB, GT15-80PSCW, GT15-80PSGW, GT15-70PSCB, GT15-70PSGB, GT15-70PSCW, GT15-70PSGW, GT15-60PSCB, GT15-60PSGB, GT15-60PSCW, GT15-60PSGW, GT15-50PSCB, GT15-50PSGB, GT15-50PSCW, GT15-50PSGW
	For GT14	GT14-50PSCB, GT14-50PSGB, GT14-50PSCW, GT14-50PSGW
	For GT12	GT11-70PSCB, GT11-65PSCB
	For GT11	GT11-50PSCB, GT11-50PSGB, GT11-50PSCW, GT11-50PSGW, GT11H-50PSC
	For GT10	GT10-50PSCB, GT10-50PSGB, GT10-50PSCW, GT10-50PSGW, GT10-40PSCB, GT10-40PSGB, GT10-40PSCW, GT10-40PSGW, GT10-30PSCB, GT10-30PSGB, GT10-30PSCW, GT10-30PSGW, GT10-20PSCB, GT10-20PSGB, GT10-20PSCW, GT10-20PSGW
Protective cover for oil		GT05-90PCO, GT05-80PCO, GT05-70PCO, GT05-60PCO, GT05-50PCO, GT16-50PCO, GT10-40PCO, GT10-30PCO, GT10-20PCO
USB environmental protection cover		GT16-UCOV, GT16-50UCOV, GT15-UCOV, GT14-50UCOV, GT11-50UCOV
Stand		GT15-90STAND, GT15-80STAND, GT15-70STAND, A9GT-50STAND, GT05-50STAND
Attachment		GT15-70ATT-98, GT15-70ATT-87, GT15-60ATT-97, GT15-60ATT-96, GT15-60ATT-87, GT15-60ATT-77, GT15-50ATT-95W, GT15-50ATT-85
Backlight		GT16-90XLTT, GT16-80SLTT, GT16-70SLTT, GT16-70VLTT, GT16-70VLTTA, GT16-70VLTN, GT16-60SLTT, GT16-60VLTT, GT16-60VLTN, GT15-90XLTT, GT15-80SLTT, GT15-70SLTT, GT15-70VLTT, GT15-70VLTN, GT15-60VLTT, GT15-60VLTN
Multi-color display board		GT15-XHNB, GT15-VHNB
Connector conversion box		GT11H-CNB-37S, GT16H-CNB-42S
Emergency stop sw guard cover		GT11H-50ESCOV, GT16H-60ESCOV
Wall-hanging fitting		GT14H-50ATT
Memory loader		GT10-LDR
Memory board		GT10-50FMB
Panel-mounted USB port extension		GT14-C10EXUSB-4S, GT10-C10EXUSB-5S

■ Software

Abbreviations and generic terms		Description
GT Works3		Abbreviation of the SW□DND-GTWK3-E and SW□DND-GTWK3-EA
GT Designer3		Abbreviation of screen drawing software GT Designer3 for GOT1000 series
GT Simulator3		Abbreviation of screen simulator GT Simulator3 for GOT1000/GOT900 series
GT SoftGOT1000		Abbreviation of monitoring software GT SoftGOT1000
GT Converter2		Abbreviation of data conversion software GT Converter2 for GOT1000/GOT900 series
GT Designer2 Classic		Abbreviation of screen drawing software GT Designer2 Classic for GOT900 series
GT Designer2		Abbreviation of screen drawing software GT Designer2 for GOT1000/GOT900 series
iQ Works		Abbreviation of iQ Platform compatible engineering environment MELSOFT iQ Works
MELSOFT Navigator		Generic term for integrated development environment software included in the SW□DNC-IQWK (iQ Platform compatible engineering environment MELSOFT iQ Works)
MELSOFT iQ AppPortal		SW DND-IQAPL-M type integrated application management software
GX Works3		Abbreviation of SW□DND-GXW3-E and SW□DND-GXW3-EA type programmable controller engineering software
GX Works2		Abbreviation of SW□DNC-GXW2-E and SW□DNC-GXW2-EA type programmable controller engineering software
Controller simulator	GX Simulator3	Abbreviation of GX Works3 with the simulation function
	GX Simulator2	Abbreviation of GX Works2 with the simulation function
	GX Simulator	Abbreviation of SW□D5C-LLT-E(-EV) type ladder logic test tool function software packages (SW5D5C-LLT (-EV) or later versions)
GX Developer		Abbreviation of SW□D5C-GPPW-E(-EV)/SW D5F-GPPW-E type software package
GX LogViewer		Abbreviation of SW□DNN-VIEWER-E type software package
PX Developer		Abbreviation of SW□D5C-FBDQ-E type FBD software package for process control
MT Works2		Abbreviation of motion controller engineering environment MELSOFT MT Works2(SW□DND-MTW2-E)
MT Developer		Abbreviation of SW□RNC-GSV type integrated start-up support software for motion controller Q series
MR Configurator2		Abbreviation of SW□DNC-MRC2-E type Servo Configuration Software
MR Configurator		Abbreviation of MRZJW□-SETUP□E type Servo Configuration Software
FR Configurator		Abbreviation of Inverter Setup Software (FR-SW□-SETUP-WE)
NC Configurator		Abbreviation of CNC parameter setting support tool NC Configurator
FX Configurator-FP		Abbreviation of parameter setting, monitoring, and testing software packages for FX3U-20SSC-H (SW□D5C-FXSSC-E)
FX3U-ENET-L Configuration tool		Abbreviation of FX3U-ENET-L type Ethernet module setting software (SW1D5-FXENETL-E)
RT ToolBox2		Abbreviation of robot program creation software (3D-11C-WINE)
MX Component		Abbreviation of MX Component Version□ (SW□D5C-ACT-E, SW□D5C-ACT-EA)
MX Sheet		Abbreviation of MX Sheet Version□ (SW□D5C-SHEET-E, SW□D5C-SHEET-EA)
CPU Module Logging Configuration Tool		Abbreviation of CPU Module Logging Configuration Tool (SW1DNN-LLUTL-E)

■ License key (for GT SoftGOT1000)

Abbreviations and generic terms	Description
License	GT15-SGTKEY-U, GT15-SGTKEY-P

■ Others

Abbreviations and generic terms	Description
IAI	Abbreviation of IAI Corporation
AZBIL	Abbreviation of Azbil Corporation (former Yamatake Corporation)
OMRON	Abbreviation of OMRON Corporation
KEYENCE	Abbreviation of KEYENCE CORPORATION
KOYO EI	Abbreviation of KOYO ELECTRONICS INDUSTRIES CO., LTD.
SHARP	Abbreviation of Sharp Corporation
JTEKT	Abbreviation of JTEKT Corporation
SHINKO	Abbreviation of Shinko Technos Co., Ltd.
CHINO	Abbreviation of CHINO CORPORATION
TOSHIBA	Abbreviation of TOSHIBA CORPORATION
TOSHIBA MACHINE	Abbreviation of TOSHIBA MACHINE CO., LTD.
HITACHI IES	Abbreviation of Hitachi Industrial Equipment Systems Co., Ltd.
HITACHI	Abbreviation of Hitachi, Ltd.
FUJI	Abbreviation of FUJI ELECTRIC CO., LTD.
PANASONIC	Abbreviation of Panasonic Corporation
PANASONIC INDUSTRIAL DEVICES SUNX	Abbreviation of Panasonic Industrial Devices SUNX Co., Ltd.
YASKAWA	Abbreviation of YASKAWA Electric Corporation
YOKOGAWA	Abbreviation of Yokogawa Electric Corporation
ALLEN-BRADLEY	Abbreviation of Allen-Bradley products manufactured by Rockwell Automation, Inc.
GE	Abbreviation of GE Intelligent Platforms
LS IS	Abbreviation of LS Industrial Systems Co., Ltd.
MITSUBISHI INDIA	Mitsubishi Electric India Pvt. Ltd.
SCHNEIDER	Abbreviation of Schneider Electric SA
SICK	Abbreviation of SICK AG
SIEMENS	Abbreviation of Siemens AG
RKC	Abbreviation of RKC INSTRUMENT INC.
HIRATA	Abbreviation of Hirata Corporation
MURATEC	Abbreviation of Muratec products manufactured by Muratec Automation Co., Ltd.
PLC	Abbreviation of programmable controller
Temperature controller	Generic term for temperature controller manufactured by each corporation
Indicating controller	Generic term for indicating controller manufactured by each corporation
Control equipment	Generic term for control equipment manufactured by each corporation
CHINO controller	Abbreviation of indicating controller manufactured by CHINO CORPORATION
PC CPU module	Abbreviation of PC CPU Unit manufactured by CONTEC CO., LTD
GOT (server)	Abbreviation of GOTs that use the server function
GOT (client)	Abbreviation of GOTs that use the client function
Windows$^®$ font	Abbreviation of TrueType font and OpenType font available for Windows$^®$ (Differs from the True Type fonts settable with GT Designer3)
Intelligent function module	Indicates the modules other than the PLC CPU, power supply module and I/O module that are mounted to the base unit
MODBUS$^®$ /RTU	Generic term for the protocol designed to use MODBUS$^®$ protocol messages on a serial communication
MODBUS$^®$ /TCP	Generic term for the protocol designed to use MODBUS$^®$ protocol messages on a TCP/IP network

HOW TO READ THIS MANUAL

The following symbols are used in this manual.

Display reference ahead

☞ Referring ahead and the reference manual have been described by the finger mark.

Display of chapter finding

The chapter on the page which is the opening in the index at the right of the page is understood at one view.

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2. SYSTEM CONFIGURATION

This chapter explains the system configuration available for the MES interface function.

2.1 System Configuration

2.1.1 Overall system configuration

This section shows the overall system configuration when using the MES interface function.

*1 The SNTP server computer and configuration computer can be shared as the server computer.
*2 For controllers available for the MES interface function, refer to the following manual.
☞ GOT1000 Series Connection Manual
*3 RS-232 or Ethernet connection is also available.
However, in Ethernet connection, the option OS cannot be installed.

2 - 1   2.1 System Configuration

1 OVERVIEW
2 SYSTEM CONFIGURATION
3 SPECIFICATIONS
4 SETTING AND PROCEDURES BEFORE USE OF THE MES INTERFACE FUNCTION
5 MES INTERFACE FUNCTION
6 MES INTERFACE FUNCTION SETTING
7 DB CONNECTION SERVICE AND SETTING TOOL
8 TROUBLE SHOOTING

Display of section and subsection title

The section and the sebsection on the open page are understood at one view.

The figure above is for explanation purposes only, and therefore differs from the actual pages.
There are also the following types of explanations.

DEFINITIONS AND DESCRIPTIONS OF TERMS

The following table shows the definitions and descriptions of the terms used in this manual.

Term	Description
Tag for Wonderware® Historian	Name for data unit in the database Wonderware® Historian.
MES	Abbreviation for Manufacturing Execution System The system that controls and monitors the plant status in real time to optimize production activities This enables speed-up of the responses to production plans and status changes and efficient production operation, optimizing the production activities.
ODBC	Abbreviation for Open Database Connectivity Standard specifications for software to access databases
SNTP	Abbreviation for Simple Network Time Protocol Protocol for synchronizing the time of computers via a TCP/IP network
SNTP server computer	Computer that provides time information to the GOT This can be shared with a server computer.
SQL	Abbreviation for Structured Query Language Data manipulation language and used for relational database operations
UTF-8	Method for converting character strings defined in Unicode into byte strings (Number strings)
XML	Abbreviation for eXtensible Markup Language Markup language for describing documentation, data meanings, and structures
Account	Represents the right to use a GOT or a server computer, or an ID necessary for its use.
Action	The unit for processing defined in the job. The unit for processing includes [Communication action] and [Transmit resource action] for communicating with a database, and [Operation action] for operating tag component values. [Communication action] is a processing unit for sending one SQL text (Select, Update, Insert, MultiSelect). [Transmit resource action] is the processing unit for sending each SQL text (Insert) for records in one resource data collected in the GOT. Up to 20 dyadic operations can be defined for [Operation action].
Application server computer	One of the server computers, which communicates by the MES interface function to run programs A database computer can be shared as an application server computer.
COMMIT	Processing that makes a permanent change to databases
Server service	Generic term for the services that a server computer to which the DB Connection Service is installed can offer. There are database server service and application server service. Database server service is a service for accessing a database. Application server service is a service for linking with a program.
Server computer	Generic term for database server computers and application server computers This computer can be shared as an SNTP server computer.
Job	A set of processings executed by a preset trigger
Configuration computer	A personal computer that runs GT Designer3 This is used to install the option OS into a GOT, to configure the Communication Settings, screens and MES interface function settings, and to download projects to the GOT. This can be shared as a server computer.

Term	Description
Time zone	Standard time zone for each region of the world
	Each nation uses the time difference (within ±12 hours) from the time at the Greenwich Observatory in the United Kingdom (GMT) as the standard time. The region using the same time difference is called a time zone. The standard time for Japan is 9 hours ahead of the GMT. Some nations adopt daylight-saving time in summer season in which clocks are set one hour ahead of the standard time.
Tag component (Component)	Generic term for components (Device data) making up a device tag (Tag) A set of data that contains the information on the GOT's internal devices, and the data type and devices required for access to the gateway devices
Data source	Connection information necessary for accessing data using ODBC
	With Windows®, a data source name is assigned to connection information for manegement. The database can be accessed via ODBC by specifying the data source name in the MES interface function.
Database (DB) or Relational database (RDB)	Data management method that follows relational data model logic One data is expressed as a collection of multiple items (Fields) and the data collection is expressed as a table. Data can be easily merged and selected using key data.
Database computer	One of the server computers, on which the database communicating with the GOT is run when the MES interface function is used.
Table	Data management format managed with relational databases It is a two-dimensional table format composed of rows and columns.
Device	Variety of memory data that each controller internally contains. There are devices handled in units of bits and those handled in units of words.
Device tag (Tag)	Data table that contains a set of information (Components) required to access the device data in the GOT
Transaction	Unit that multiple databases related to each other can be correctly processed all at once. Processing managed as transaction is either correctly completed or canceled with the rollback. Each database is processed by the action, and each transaction is processed by the job with the MES interface function.
Trigger conditions	Startup conditions for job operation
Trigger buffering	When too many trigger conditions (data transmission conditions) are met simultaneously, this function allows the system to buffer the data and the time that trigger conditions are met to the user area. The action (operation and transmission of the data) for the buffered data is executed later. Even when the data transmission triggers are activated frequently, no triggers are missed so that all the jobs are executed.
DB buffering	This function allows the system to temporarily store SQL texts that failed to be sent due to a communication error in a CF card and to resend the texts upon recovery.
Handshake	A constant exchange of signals between the sending and receiving ends to achieve high reliability
Field	Corresponds to a column in a relational database and indicates a type of data (Record attribute).
Variable (Temporary variable)	Variable that can be used in the same job when temporarily storing values selected from a database or when writing operation values to a database or tag components.
Record	Corresponds to a row in a relational database. One row (Record) stores the values of multiple columns (Fields).
Rollback	Processing for canceling changes to a database

1. OVERVIEW

The MES interface function allows SQL text transmission from a GOT to a database in the server computer connected via the Ethernet, enabling writing GOT's device values to the database and reading database values to set them to GOT's devices.
This direct communication with the server computer eliminates the need for gateway equipment, realizing reduction in the maintenance cost and improvement in reliability.

POINT

The MES interface function is available only for GT16 and GT15.
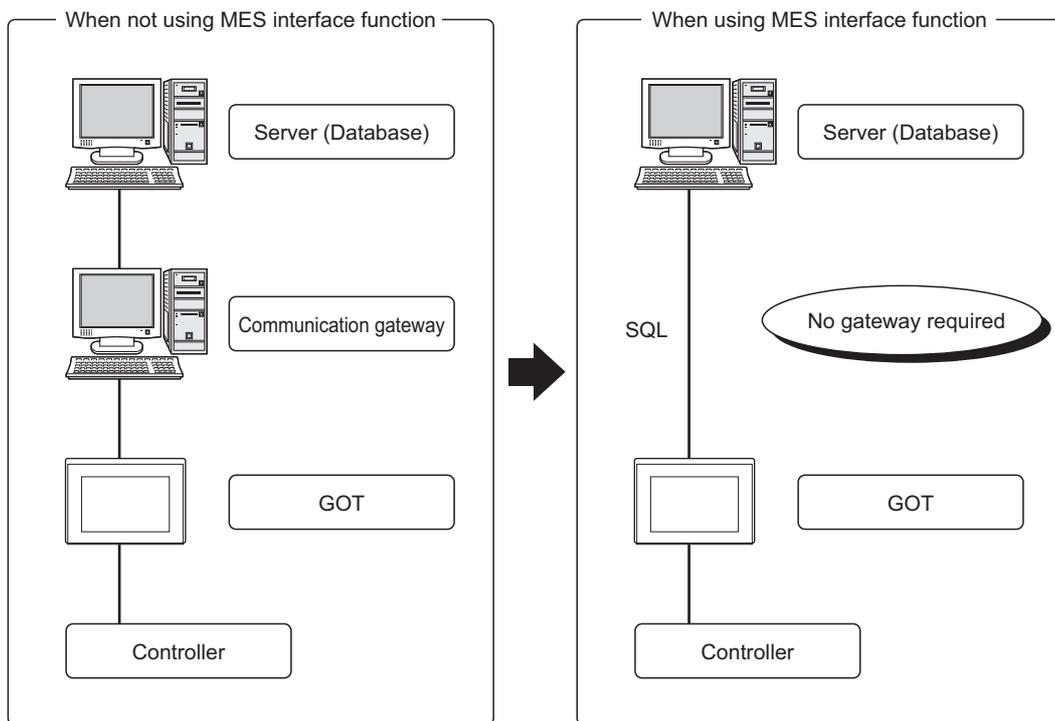
1.1　Features

This section explains the features of the MES interface function.

(1)　Simple setting enables connection to the information system without programming.
Access to information system databases can be realized simply by making the necessary settings with the setting tool.
Since there is no need to create programs for generating SQL texts, the engineering costs for system construction and the work period can be reduced.
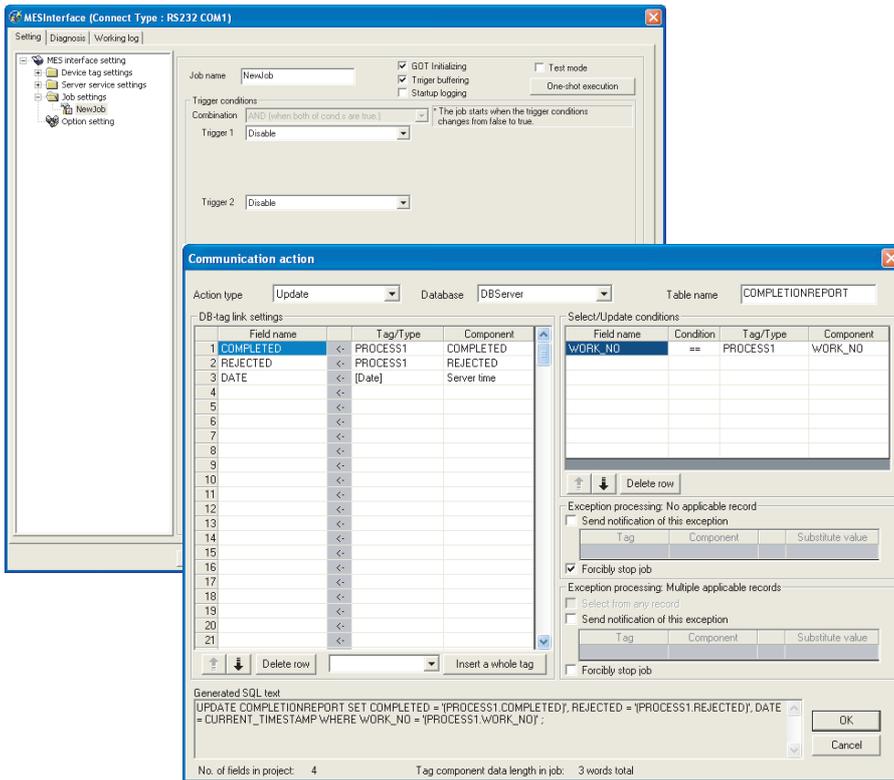
(2) Important data can be protected.

(a) Buffering of send data (SQL text) during a communication error
When an error occurs during communications with a database, the SQL texts failed to be sent can be buffered in the GOT.
After recovery, the buffered SQL texts are automatically sent to the database. (Manual operation is also possible.)

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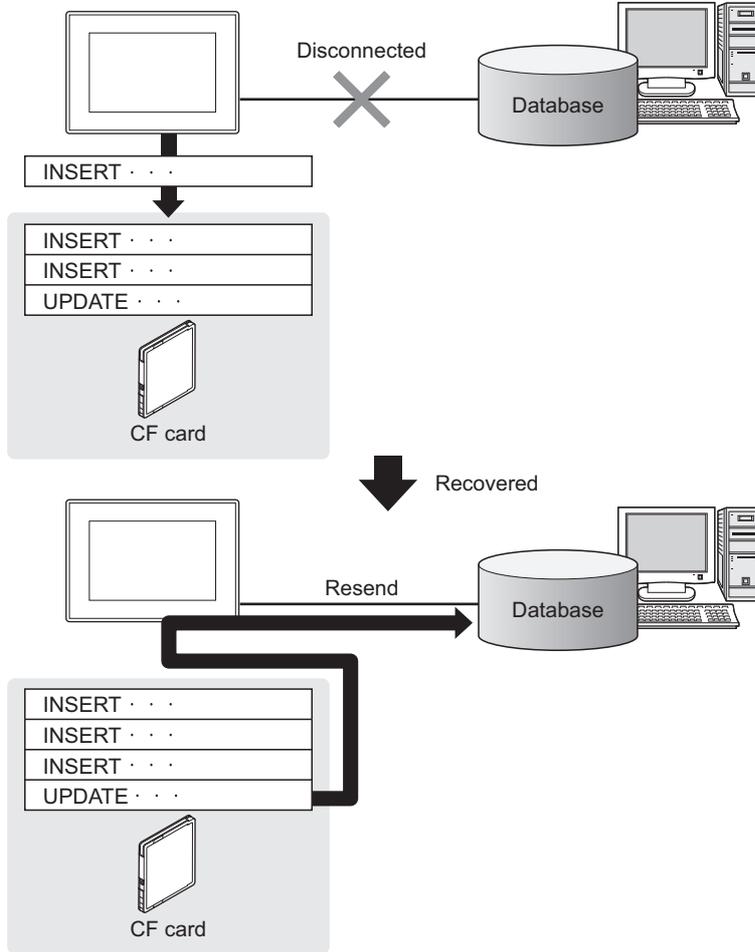
(b) Obtaining logs in the event of access errors
After connection to a database, if a communication error occurs, the error details can be recorded as a log on the database side.
Analyzing the log is useful for data protection and error analysis.
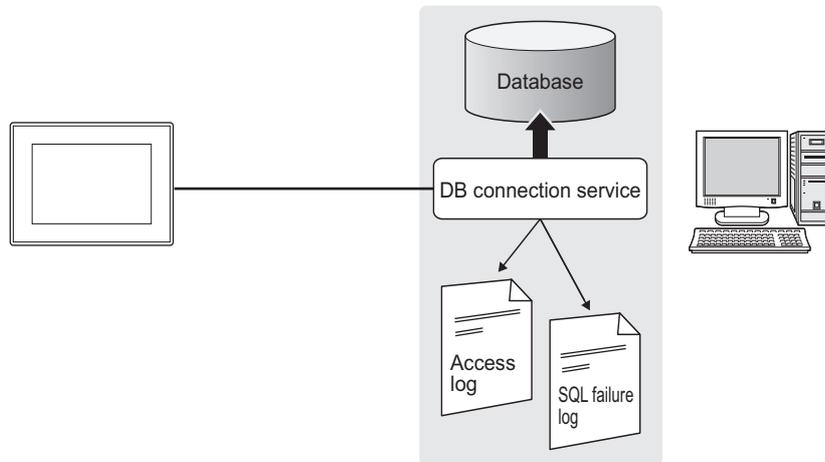
(3) The information system load can be reduced.
Data can be monitored on the GOT and when the conditions are met, the data can be sent to the information system.
This can reduce the information system load, compared to the case of the conventional system that constantly samples and monitors data.

[With the MES interface function]
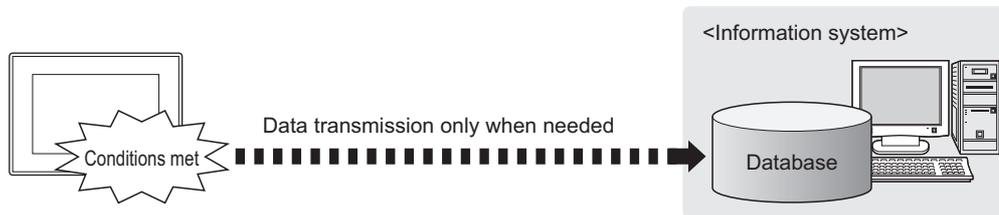
[Conventional system]
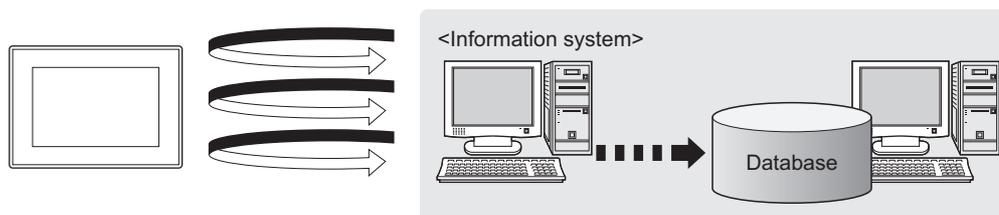
Constant sampling/monitoring from information system is required.

(4) Access independent of the database table configuration is possible.
Freely designed database tables can be used for access to databases.
The MES interface function offers not only the high flexibility in designing a new system but also the capability of reconstructing the existing system without changing the database tables.

(5) Various controller information can be stored and changed in the database.
Controllers can be connected in a variety of topologies and their information can be stored into a database via GOT devices.
Also, data read out from the database can be set to controllers as parameters via GOT devices.

PLC

Inverter

Servo

Microcomputer

Barcode reader

\<MES interface function\>

Status monitoring function
Script function
Gateway function

Data transmission

Data query

Database
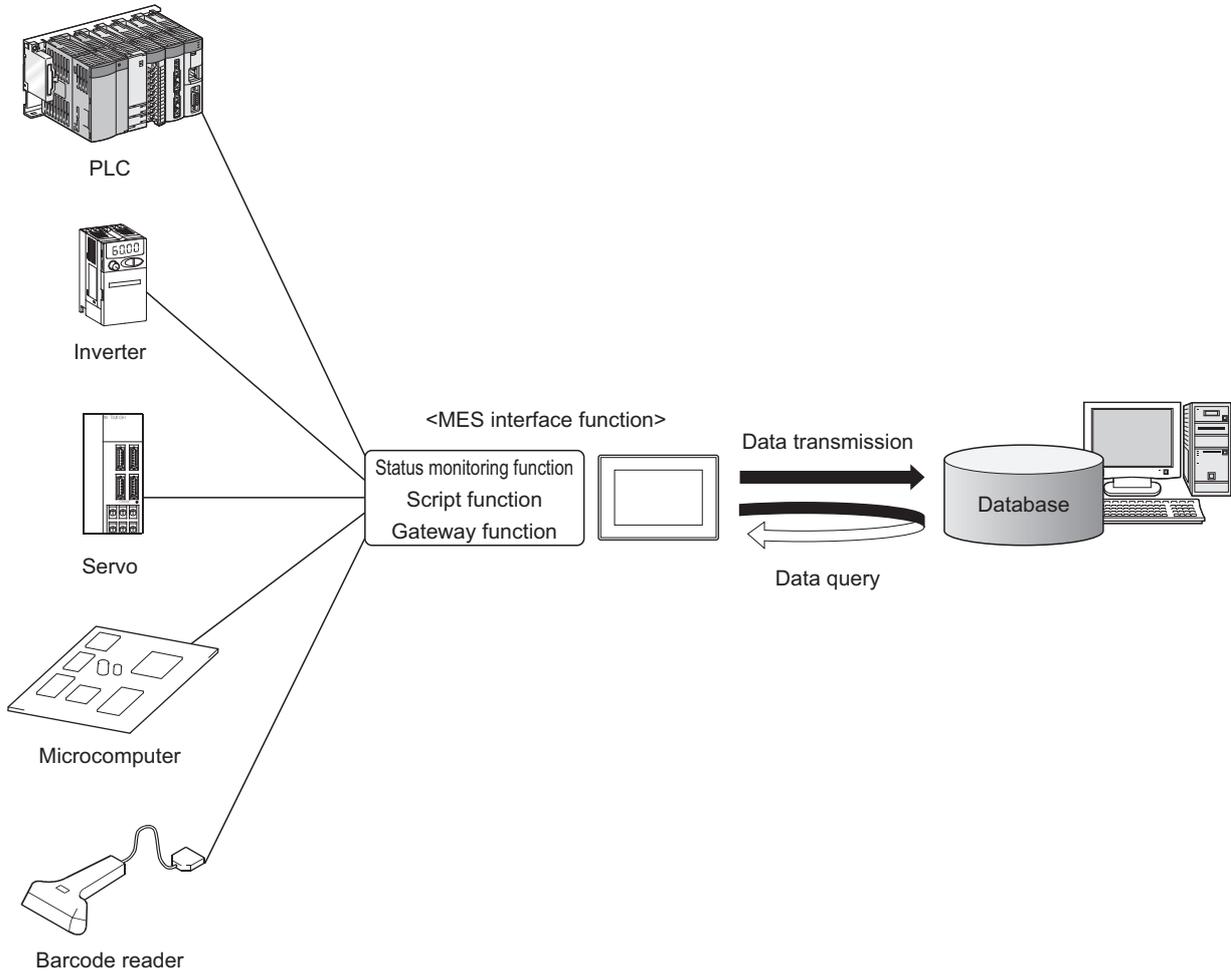
(6) Other features

(a) Reducing setting mistakes by use of tag names
Tag names can be assigned to devices.
Assigning recognizable tag names can reduce setting mistakes.

(b) Obtaining the exact time by time synchronization
By periodically obtaining the time from the SNTP server and updating the time of the GOT, the correct time can be ensured.

(c) Supporting system construction
The diagnostic function allows checking the operating status of the MES interface function (in real time, log).
Modification of the job status and test operation of a project under design is also possible.

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1.2 What is the MES Interface Function?

The items listed below are used with the MES interface function.
For equipment required for the MES interface function, refer to the following:

☞ 2.3 Required Equipment, Software and Option OS

Item	Description	Reference section
Option OS (MES Interface)	The option OS that runs on a GOT to realize the MES interface function.	Chapter 5.
MES interface function setting	This function allows the MES interface function setting in GT Designer3.	Chapter 6.
DB Connection Service	Software that runs on the server computer and links databases with the GOT. Install the software from either of the following. • GT Works2 CD • Disk3 folder in GT Works3 DVD	Chapter 7.
DB Connection Service Setting Tool	Software that runs on the server computer and changes the settings of the DB Connection Service. Install the software from the GT Works3 DVD.	Chapter 7.

2.   SYSTEM CONFIGURATION

This chapter explains the system configuration available for the MES interface function.

2.1   System Configuration

2.1.1   Overall system configuration

This section shows the overall system configuration when using the MES interface function.
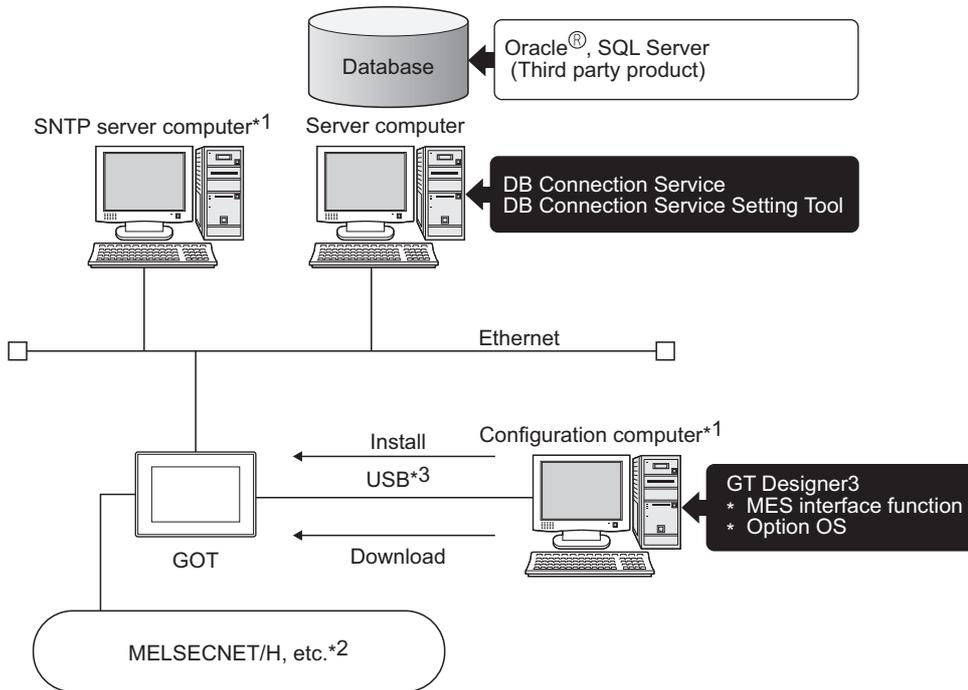
*1   The SNTP server computer and configuration computer can be shared as the server computer.
*2   For controllers available for the MES interface function, refer to the following.
        ☞ 2.2 Connection between GOT and Controllers
*3   RS-232 or Ethernet connection is also available.
        However, in Ethernet connection, the option OS cannot be installed.

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2.1.2 System configuration when installing software used for the MES Interface Function

The following shows system configuration when installing software used for the MES interface function.

(1) When installing the DB Connection Service and DB Connection Service Setting Tool on a server computer


```
GT Works3                                          Sever computer

       [CD]           Install  ==>       [Computer]

DB Connection Service
DB Connection Service Setting Tool                 Commercial product
```
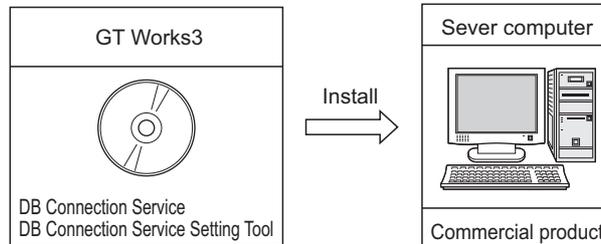
POINT

(1) When installing DB Connection Service on a database server computer, the ODBC setting for the database used must be made beforehand.

☞ 7.2 Setting ODBC of Database

(2) When installing DB Connection Service on an application server computer, an account for user program execution must be created beforehand.

---

(2) When installing GT Designer3 on a configuration computer


```
GT Works3                                          Configuration computer

       [CD]           Install  ==>       [Laptop]

GT Designer3                                       Commercial product
```
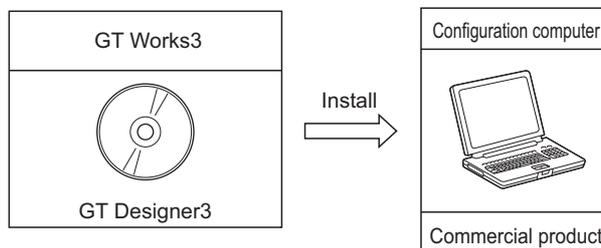
(3) When installing Option OS (MES Interface) on the GOT


```
Computer                   Option OS
                          (MES interface)          GOT
       [Laptop]
                           Install*1  ==>       [GOT display]
GT Designer3
    +
MES interface function
Commercial product
```
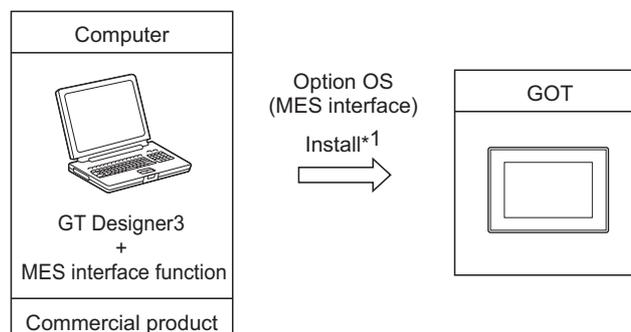
*1   For equipment used for installation, refer to the following manual:
      ☞ GT Works3 Version1 Installation Procedure Manual

2.2 Connection between GOT and Controllers

2.2.1 Connection type used for the MES Interface Function

The following table shows the GOT supporting the MES interface function and availability in each connection type.
For system configuration when using the MES interface function, refer to the following manual:

☞ GOT1000 Series Connection Manual for GT Works3 and a controller used

○: Applicable △: Partly restricted ×: Not applicable

Connection type		GT16[8]/GT15
Mitsubishi PLC connection[4]	Bus connection	○
	Direct CPU connection	○
	Computer link connection	○
	Ethernet connection[7]	○
	MELSECNET/H connection (PLC to PLC network)	○
	MELSECNET/10 connection (PLC to PLC network)	△[1]
	CC-Link IE controller network connection	○
	CC-Link IE field network connection	○
	CC-Link connection (Intelligent device station)	△[2]
	CC-Link connection (via G4)	○
Inverter connection		○[3]
Servo amplifier connection		○[3]
Robot controller connection[5]		○
CNC connection[6]	Serial connection	○
	Ethernet connection[7]	○
	MELSECNET/10 connection (PLC to PLC network)	△[1]
	CC-Link connection (Intelligent device station)	△[2]
Third party PLC connection	Serial connection	○
	Ethernet connection[7]	○
Third party safety controller connection		○
Third party servo amplifier connection		×
Third party robot controller connection		×
Third party temperature controller connection		○
Microcomputer connection	Serial connection	○
	Ethernet connection[7]	○
MODBUS®/RTU connection		○
MODBUS®/TCP connection		○

*1 For the MELSECNET/10 connection, use the MELSECNET/H communication unit.
    The MELSECNET/10 communication unit cannot be used.
*2 For the CC-Link connection, use the CC-Link communication unit (GT15-J61BT13).
    The CC-Link communication unit (GT15-75J61BR13-Z) cannot be used.
*3 For the inverter or servo amplifier connection, use the status observation function or the script function to assign devices.
    For how to assign devices, refer to the following:

    ☞ 2.2.2 Precautions for inverter or servo amplifier connection
*4 Including connection to the motion controller CPU (Q series and A series), CNC C70, and CRnQ-700
*5 Applicable to the CRnD-700 only. For the CRnQ-700, refer to the above Mitsubishi PLC connection.
*6 Applicable to the MELDAS C6/C64 only. For the CNC C70, refer to the above Mitsubishi PLC connection.
*7 For connecting GT16 to a device supporting 10BASE(-T/2/5), configure the network that supports both 10Mbps and 100Mbps
    communication speeds by using a switching hub.
*8 The GT1665HS-V cannot be used.

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Connection type examples for the case where the MES interface function cannot be used

(Example 1) When using GT11

Because the Ethernet communication unit is not mountable, the MES interface function cannot be used.

GT11   Ethernet communication
                             unit
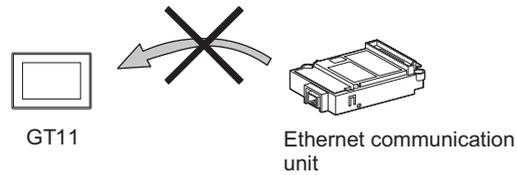
(Example 2) When using GT15

Since the CC-Link communication unit (GT15-75J61BR13-Z) is not mountable concurrently together with the Ethernet communication unit, the MES interface function cannot be used.

To utilize both of them concurrently, use another type of the CC-Link communication unit (GT15-J61BT13).

CC-Link communication unit
(GT15-75J61BR13-Z)

GT15

Ethernet communication
unit
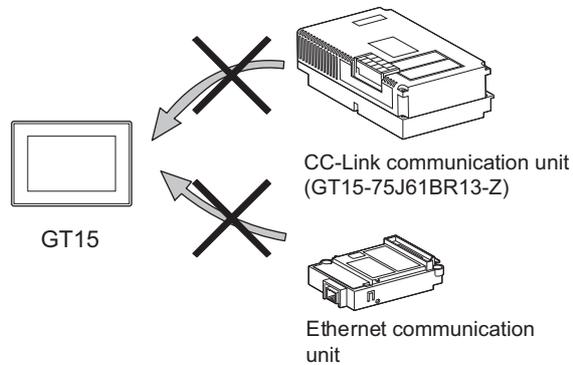
2.2.2 Precautions for inverter or servo amplifier connection

In the inverter or servo amplifier connection, the status observation function or the script function must be used for device assignment.

For the status observation function and the script function, refer to the following manual.

☞ GT Designer3 Version1 Screen Design Manual (Functions)

The following are device assignment examples.

Example 1) Setting for assigning devices of the inverter [FREQROL 500/700/800 Series, Sensorless servo] to the GOT's internal devices using the status observation function
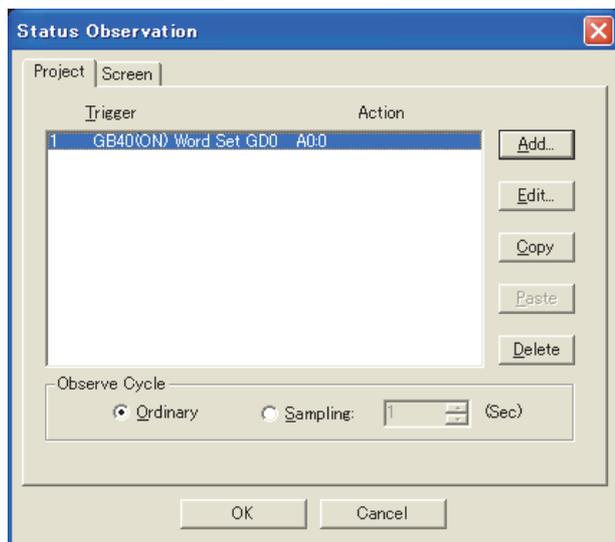
Example 2) Setting for assigning devices of the inverter [FREQROL 500/700/800 Series, Sensorless servo] to the GOT's internal devices using the status observation function

Setting item	Setting content	Remarks
Trigger	ON Device GB40	Ordinary (GB40 is always ON.)
Operation device	[w:GD0]=[0-0:w:A0];	Assigns devices A0 to A15 of the inverter that has channel No. 1 and station No. 0 to device GD0.
	[w:GD10]=[0-0:w:Pr0];	Assigns devices Pr 0 to Pr 15 of the inverter that has channel No. 1 and station No. 0 to device GD 10.
	[w:GD20]=[0-0:w:PG0];	Assigns devices PG0 to PG15 of the inverter that has channel No.1 and station No.0 to device GD20.
	[w:GD31600]=[@3:0-16:w:A0];	Assigns devices A0 to A15 of the inverter that has channel No.3 and station No.16 to device GD31600.

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2.3 Required Equipment, Software and Option OS

(1) Required equipment and software

The following table lists the equipment and software required for use of the MES interface function.

(a) GT16

Application		Required equipment/software	Module name
Executing the MES interface function on the GOT		Option function board	GT16-MESB
Connecting the GOT to Ethernet		Built-in Ethernet interface	-
Connecting the GOT to controllers		☞ GOT1000 Series Connection Manual for GT Works3 and a controller used	
Setting the MES interface function	Setting the MES interface function	GT Designer3 Version1.00A or later (MES interface function)	-
	DB buffering function, log output function, diagnostics function	CF card	GT05-MEM-128MC, GT05-MEM-256MC, GT05-MEM-512MC, GT05-MEM-1GC, GT05-MEM-2GC, GT05-MEM-4GC, GT05-MEM-8GC, GT05-MEM-16GC, Commercially available CF card (128MB or more)[1]

*1 Some models with the operations checked by our company are usable.
For the validated models, refer to Technical News GOT-A-0010 "List of Valid Devices Applicable for GOT1000 Series" separately available, or contact your local distributor.

For installation of the required equipment, refer to the following manual.

☞ GT16 User's Manual

For connection of the required equipment, refer to the following manual.

☞ GOT1000 Series Connection Manual for GT Works3 and a controller used

(b) GT15

Application		Required equipment/software	Module name
Executing the MES interface function on the GOT		Option function board	GT15-MESB48M
Connecting the GOT to Ethernet		Ethernet communication unit	GT15-J71E71-100
Connecting the GOT to controllers		☞ GOT1000 Series Connection Manual for GT Works3 and a controller used	
Setting the MES interface function	Setting the MES interface function	GT Designer3 Version1.00A or later (MES interface function)	-
	DB buffering function, log output function, diagnostics function	CF card	GT15-MEM-128MC GT15-MEM-256MC Commercially available CF card (128MB to 2GB)[1]

*1 Some models with the operations checked by our company are usable.
For the validated models, refer to Technical News GOT-A-0010 "List of Valid Devices Applicable for GOT1000 Series" separately available, or contact your local distributor.

For installation of the required equipment, refer to the following manual.

☞ GT15 User's Manual

For connection of the required equipment, refer to the following manual.

☞ GOT1000 Series Connection Manual for GT Works3 and a controller used

(2) Required option OS

The following shows the option OS required for use of the MES interface function.

Application	OS name
MES interface function	MES Interface

For installation of the required option OS, refer to the following manual.

☞ GT Designer3 Version1 Screen Design Manual (Fundamentals)

2.4 Operating Environment

2.4.1 Configuration computer

The operating environment for the configuration computer is identical to those for GT Designer3.
For the operating environment for GT Designer3, refer to the following manual.

☞GT Designer3 Version1 Screen Design Manual (Fundamentals)

2.4.2 Server computer (SNTP server computer)

This section explains the operating environment for the server computer.

Item		Description
Personal computer		A computer on which the following operating systems can run
OS(English version)		Microsoft® Windows Server® 2012 R2 *11*12*16*17*18*19*20
		Microsoft® Windows Server® 2012 *11*12*16*17*18*19*20
		Microsoft® Windows Server® 2008 R2 *11*12*16
		Microsoft® Windows Server® 2008 *11*12*16
		Microsoft® Windows Server® 2003 x64 Edition *4*5
		Microsoft® Windows Server® 2003 *4*5
		Microsoft® Windows® 2000 Server Service Pack2 or later *4
		Microsoft® Windows® 8.1 Enterprise *5*11*12*17*18*19*20
		Microsoft® Windows® 8.1 pro *5*11*12*17*18*19*20
		Microsoft® Windows® 8 Enterprise *5*11*12*17*18*19*20
		Microsoft® Windows® 8 pro *5*11*12*17*18*19*20
		Microsoft® Windows® 7 Ultimate *5*11*12*15*17
		Microsoft® Windows® 7 Enterprise *5*11*12*15*17
		Microsoft® Windows® 7 Professional *5*11*12*15*17
		Microsoft® Windows Vista® Ultimate *4*5*11*12
		Microsoft® Windows Vista® Enterprise *4*5*11*12
		Microsoft® Windows Vista® Business *4*5*11*12
		Microsoft® Windows® XP Professional *2*4*5
		Microsoft® Windows® 2000 Professional Service Pack2 *4
Computer	CPU	See "Performance required for personal computer and operating system to be used" below.
	Required memory	
Free hard disk space		64MB or more (After database installation)
Disk drive		DVD drive
Display		A display where the above OS and after-mentioned databases can run
Interface		Ethernet

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Item	Description
Software	When using the DB interface function: Relational database (any of the following) • Oracle® 12c[3] • Oracle® 11g[2] • Oracle® 10g[1] • Oracle® 9i[1] • Oracle® 8i[1] • Microsoft® SQL Server® 2012[2][6][7] • Microsoft® SQL Server® 2008 R2[2][6][7] • Microsoft® SQL Server® 2008[2][6][7] • Microsoft® SQL Server® 2005[1][6] • Microsoft® SQL Server® 2000[1][6] • Microsoft® SQL Server® 2000 Desktop Engine(MSDE 2000)[6] • Microsoft® Access® 2010[1][7][13][14] • Microsoft® Access® 2007[7][13][14] • Microsoft® Access® 2003[7][8] • Microsoft® Access® 2000[7][8] • Wonderware® Historian 9.0[9][10]
	When using the SNTP time synchronization function: SNTP server (Equipped as a standard to Windows® 2000 Server, Windows Server® 2003)
Others	The mouse, keyboard, and DVD drive must be compatible with the above OSs.

[1]   Only 32-bit is available.
[2]   32-bit and 64-bit are available.
[3]   Only 32-bit is available.
[4]   To install or operate DB Connection Service or DB Connection Service Setting Tool, the administrator authority is required.
[5]   The following functions are not available.
        If any of the following functions is used, this product many not operate normally.

• Activating the application with Windows® compatibility mode
• Fast user switching
• Change your desktop themes (fonts)
• Remote desktop
• DPI setting other than the normal size (For Windows® XP, Windows Vista®, Windows Server® 2003)
• Setting the size other than [Smaller - 100%] for the characters and images on the screen (For Windows® 7, Windows® 8)

[6]   Set [SQL Server and Windows] for the security authentication mode.
[7]   Up to 127 fields can be updated for a communication action.
[8]   Do not access the same file with multiple GOTs and MES interface modules simultaneously.
[9]   Only [Insert] can be used for the communication action.
[10]   The rollback cannot be used for inserting data to a database.
[11]   15GB or more of free space is required.
[12]   A standard user account or above is required.
[13]   Memo-type fields in Rich Text Format cannot be used.
[14]   A field having multiple values cannot be used.
[15]   Windows XP Mode is not supported.
[16]   Server Core installation is not supported. Be sure to perform a full installation.
[17]   Windows Touch and Touch are not supported.
[18]   Modern UI style is not supported.
[19]   Hyper-V is not supported.
[20]   It is necessary to install .NET FrameWorks3.5.
        When the Windows8 or Windows Server 2012 is used, it is necessary to activation [.NET FrameWorks3.5(including .NET2.0 and .NET3.0)] in the control panel at [Disable or Enable the Windows function]

Performance required for personal computer and operating system to be used

Operating system	Performance required for personal computer	
	CPU	Required memory
Microsoft® Windows® XP Professional	Intel Pentium® /Celeron® series CPU with clock speed of at least 300 MHz	512 MB or more
Microsoft® Windows® 2000 Professional		
Microsoft® Windows Server® 2003	Intel Pentium® /Celeron® series CPU with clock speed of at least 550 MHz	1GB or more
Microsoft® Windows® 2000 Server		
Microsoft® Windows® 8 Enterprise	Intel Core2 Duo series CPU with clock speed of at least 2GHz	64bit OS:2GB or more 32bit OS:1GB or more
Microsoft® Windows® 8 pro		
Microsoft® Windows® 8 Enterprise		
Microsoft® Windows® 8 pro		
Microsoft® Windows® 7 Ultimate	Intel Pentium® /Celeron® series CPU with clock speed of at least 1GHz	64bit OS:2GB or more 32bit OS:1GB or more
Microsoft® Windows® 7 Enterprise		
Microsoft® Windows® 7 Professional		
Microsoft® Windows Vista® Ultimate	Intel Pentium® /Celeron® series CPU with clock speed of at least 1GHz	1GB or more
Microsoft® Windows Vista® Enterprise		
Microsoft® Windows Vista® Business		
Microsoft® Windows Server® 2003 x64 Edition	Intel Pentium® /Celeron® series CPU with clock speed of at least 2GHz	2GB or more
Microsoft® Windows Server® 2008 R2		
Microsoft® Windows Server® 2008		
Microsoft® Windows Server® 2012 R2	Intel Core2 Duo series CPU with clock speed of at least 2GHz	2GB or more
Microsoft® Windows Server® 2012		

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How to set security authentication mode (SQL Server and Windows)

(1) For Microsoft® SQL Server 2012, Microsoft® SQL Server 2008 R2, Microsoft® SQL Server 2008, Microsoft®
     SQL Server 2005 and Microsoft® SQL Server 2000.
     Set the security authentication mode in the SQL Server Properties (Configure) screen.
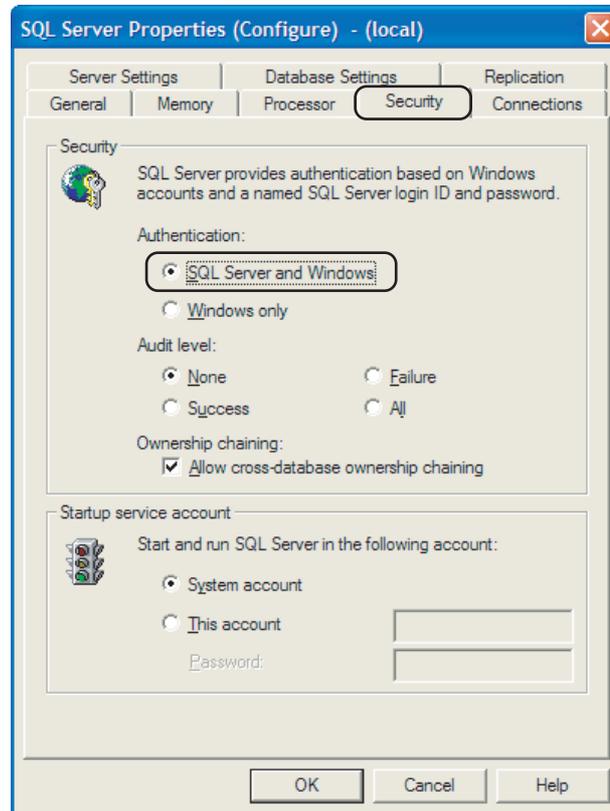
(2) For Microsoft® SQL Server 2000 Desktop Engine (MSDE 2000)
     When installing MSDE2000, specify a command parameter.
     setup sapwd = "sa" SECURITYMODE=SQL
     (sa: Specify an arbitrary password.)

2.5 Cautions on System Configuration

(1) Relational databases that support the MES interface function

For the relational databases that support the MES interface function, refer to the following:

☞ 2.4.2 Server computer (SNTP server computer)

(2) Notes when CF card is used

Insert the memory card into the A drive of the GOT.

The CF card cannot be used in B drive.

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3. SPECIFICATIONS

This chapter explains the performance specifications, functions and devices of the MES interface function.

3.1 Performance Specifications

The following are the performance specifications of the MES interface function.

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Item			Specifications	Reference section
DB interface	No. of connected databases		Up to 8 databases/project	6.6.1
	No. of connectable databases		• Oracle® 12c*5 • Oracle® 11g*4 • Oracle® 10g*3 • Oracle® 9i*3 • Oracle® 8i*3 • Microsoft® SQL Server 2012*4 • Microsoft® SQL Server 2008 R2*4 • Microsoft® SQL Server 2008*4 • Microsoft® SQL Server 2005*3 • Microsoft® SQL Server 2000*3 • Microsoft® SQL Server 2000 Desktop Engine(MSDE 2000) • Microsoft® Access 2013*3 • Microsoft® Access 2010*4 • Microsoft® Access 2007 • Microsoft® Access 2003 • Microsoft® Access 2000 • Wonderware® Historian 9.0	
	Job	Allowable number of settings	Up to 64 jobs/project	6.7.1
		Trigger buffering	Up to 128 tag components/tag	
	trigger conditions	No. of conditions can be combined	Up to 2 conditions • (Combination can be selected either AND or OR)/job	6.7.2
		Condition type	20 types (Time specification (6 types), Specified time period, comparison between tag component values (6 types), comparison between tag component value and constant value (6 types), At module startup) and Handshake operation	
		Validation interval	One second at the minimum	
	Action	Allowable number of settings	Up to 10 actions/job	6.8
		Communication action type	4 types (Select, Update, Insert, MultiSelect)	
		No. of communication action fields	Up to 8192 fields/project • [DB-Tag link setting]: Up to 256 rows/communication action • [Select/Update conditions]: Up to 8 rows/communication action • [Select sort settings]: Maximum 8 rows/communication action	6.8.1
		No. of records/data selectable for communication action	Up to 40000 records/MultiSelect communication action Up to 45000 words/job	
		No. of operations possible for operation action	(Up to 20 dyadic operations)/operation action	6.8.2
		Operators for operation action	6 types (Addition, subtraction, multiplication, division, remainder, character string combination)	
		No. of resource data send action fields	Maximum 8192 fields/project	6.8.3

Item			Specifications	Reference section
DB interface	Device tag	No. of tags	Up to 64 tags/project	6.5.3
		No. of tag components	Up to 256 tag components/tag Up to 4096 tag components/project	
		Data type	5 types (Signed single-precision integer type (16 bits), signed double-precision integer type (32 bits), single-precision floating point type (32 bits), bit type, character string type)	
		Character string length	Up to 32 characters	
		No. of statistical processings	Up to 64 tag components	
	Device tag	Statistical processing	6 types (Average, maximum, minimum, moving average[*1], moving maximum[*1], moving minimum[*1])	
	Program execution	Allowable number of settings	(Once before execution of the initial action + once after execution of the final action)/job	6.7.3
	DB buffering	Buffering capacity for communication errors[*2]	Maximum capacity: CF card capacity -32M bytes (16 Mbytes to 512 Mbytes)	6.9.2
Working log	Log capacity for MES interface function execution		Maximum capacity: 1 Mbyte (CF card)	6.11
	Log capacity for job execution events		Maximum capacity: 2 Mbytes (CF card)	

*1 [No. of samples] can be set up to 20.

*2 How to estimate the buffering time from the buffering capacity is shown below.

Buffering time = (Allowable No. of bufferings) ÷ (Frequency [times/hour]) [h]

Allowable No. of bufferings = (Capacity to be used) ÷ (SQL text length + Overhead (4 bytes))

SQL text length = Total field character length + 6 × No. of fields + Total data length + 20 [bytes]

[Calculation Example]

In the case of the capacity of 64 Mbytes, the field name of 16 characters, the data length of 32 characters, access to 256 fields by one action per job, and executing once per 30 seconds

SQL text length = (16 × 256) + 6 × 256 + (32 × 256) = 13844 [bytes]

Allowable No. of bufferings = (64 × 1024 × 1024) ÷ (13844 + 4) ≒ 4846

Buffering time = 4846 ÷ (60 ÷ 30 × 60) ≒ 40 [h]

*3 Only 32-bit is available.

*4 32-bit and 64-bit are available.

*5 Only 64-bit is available.

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3.2   GOT Devices Available for the MES Interface Function

The following are GOT devices that can be set in the Device tag settings of the MES interface function.

Type	Description	Available setting range
GOT bit register	Bit register inside the GOT Can be used as a bit device.	GB64 to GB65535[*1]
GOT data register	Data register inside the GOT Can be used as a word device.	GD0 to GD65535
GOT special register	Special register inside the GOT Stores GOT's internal information, communication status, error information, etc. Can be used as a word device.	GS0 to GS1023[*2]
Gateway device	Used when making interaction between the MES interface function and the gateway function. Virtual device for indirectly reading or writing the controller devices that are monitored by another GOT. Can be used as a word device.	1-1: EG0 to 239-64: EG32767[*3]

*1   For GB0 to GB63, refer to the following manual.

☞GT Designer3 Version1 Screen Design Manual (Fundamentals)

*2   Do not write any value to a write-prohibited GOT special register.
Setting a value to the GOT special register may affect the GOT operation.
For the GOT special register, refer to the following manual.

☞GT Designer3 Version1 Screen Design Manual (Fundamentals)

*3   Specify the gateway device in the following format.
(Network No.) - (Station No.) : EG (Device No.)
Network No. : 1 to 239
Station No. : 1 to 64
Device No. : 0 to 32767

POINT

The gateway function setting is required for use of the gateway devices.
For the gateway setting, refer to the following manual.
☞GOT1000 Series Gateway Functions Manual for GT Works3

3.3 Function List and Setting Item List

This section provides the lists of the functions and setting items that can be set for the MES interface function.

(1) MES interface function list

Function		Description	Reference section
DB interface function		Executes communication with the database in units of jobs.	5.1 6.7 6.8
	Tag function	Collects data in the internal devices or gateway devices of the GOT on the network in units of tags. Assigning a database field to a tag component allows reading or writing of a database value or device data that is specified by the tag component.	5.1.3 6.5
	Trigger monitoring function	Monitors values such as the time and tag values and, when the trigger condition changes from false to true (when the conditions are met), starts a job.	5.1.4 6.7.2
	Trigger buffering function	Allows the system to buffer the data and the time that trigger conditions are met to the user area of the GOT when too many trigger conditions (data transmission conditions) are met simultaneously. The action (operation and transmission of the data) for the buffered data is executed later. Even when the data transmission triggers are activated frequently, no triggers are missed so that all the jobs are executed.	5.1.5 6.7.1
	SQL text transmission (Communication action)	Automatically creates an SQL text and communicates with the database. The following three types of commands can be selected for the SQL text. • Select/MultiSelect • Update • Insert	5.1.6 6.8.1
	Arithmetic processing function (Operation action)	Allows operations of tag component values.	5.1.7 6.8.2
	Resource data send function (Resource data send action)	Sends the resource data collected in the GOT to the database. A SQL text (INSERT) is used for sending the resource data to the database.	5.1.8 6.8.3
	Program execution function	Executes programs in the application server computer before execution of the first action and after execution of the last one in a job.	5.1.9 6.7.3
	DB buffering function	Temporarily stores SQL texts into a CF card when they cannot be sent due to network disconnection or failure of the database server computer. After recovery, the buffered SQL texts are automatically sent to the database. (Manual operation is also possible.)	5.1.10 6.9.2 6.10.4 6.10.5
SNTP time synchronization function		Allows the time on the GOT to be synchronized with the time on the SNTP server computer on the network.	5.2 6.9.1
Diagnostics function		Used to stop/restart the MES interface function, check job operations and configure the settings.	6.10
DB server function		Allows direct access to a database upon request of the DB interface function.	7.1
	ODBC connection function	Executes the operation requested by the DB interface function or returns a response.	7.2
	Connection setting function	Restricts IP addresses of GOTs that can be connected to the database.	7.5
	Log output function	Outputs the execution status of DB Connection Service to the log.	7.8

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(2) List of the MES interface setting items

Function		Description	Reference section
Device tag settings		Configure the settings for the tag function.	6.5
	Array setting	Configure this setting when writing multiple records extracted from a database to the same tag component.	6.5.2
	Component setting	Configure the settings for assigning GOT devices to tags.	6.5.3
Server service settings		Configure the settings for access to a server computer.	6.6
Job settings		Configure the settings for the DB interface function.	6.7
	trigger conditions	Configure the settings for startup conditions of the job.	6.7.2
	Trigger buffering	Set whether to utilize the trigger buffering function or not.	6.7.1
	Communication action	Configure the settings for communications with a database.	6.8.1
	Operation action	Configure the settings for operation of tag component values.	6.8.2
	Resource data send action	Configure the settings for sending the resource data to the database.	6.8.3
	program execution	Configure the settings for the program execution function.	6.7.3
	DB buffering	Set whether to utilize the DB buffering function or not.	6.7.4
	One-shot execution	Execute a job as a one-shot task.	6.7.6
Option setting		Configure the SNTP time synchronization setting and the DB buffering function setting.	6.9
	SNTP time synchronization setting	Configure the settings for the SNTP time synchronization function.	6.9.1
	DB buffering setting	Configure the settings for the DB buffering function.	6.9.2
diagnosis		Perform the remote diagnosis for the MES Interface function.	6.10
	Status	The operation status of the option OS (MES Interface) can be checked.	6.10.1
	Operation	The operation status of the MES Interface function can be checked.	6.10.2
	Change Job Status	The job status can be changed.	6.10.3
	Connection result of previous job execution	Connection with the server computer set in [Server Service setting], which is made at the time of the previous job execution, can be displayed.	6.10.4
	DB buffering operation	The DB buffering can be operated.	6.10.5
MESI/F Log		Displays the working log of the MES Interface function.	6.11
	MES Interface Execute Log	Displays the MES Interface function execution log.	6.11.1
	Job Execute Log	Displays the job execution event log.	6.11.2

(3) List of setting items of DB Connection Service Setting Tool

Function	Description	Reference section
Service port	Specify the number of the port where the DB Connection Service operates.	
DB access timeout	Set a timeout time (unit: seconds) used when no response may be returned after requesting program execution or value writing/reading from the GOT to a database.	
IP address setting	Determine whether or not to restrict IP addresses of GOTs whose connection to DB Connection Service is permitted.	7.5
Output access log	Set whether or not to output the access log.	
Output SQL failed log	Set whether or not to output the SQL failure log.	

3.4 GOT Internal Device (GS)

3.4.1 GOT internal device list

The list of the GOT internal devices (GS) used for the MES interface module is shown below.

POINT

(1) For details of any other GOT internal devices (GS) than the shown areas used for the MES interface function, refer to the following manual.
☞ GT Designer3 Version1 Screen Design Manual (Fundamentals)

(2) Values stored in the GOT internal devices (GS) are cleared to 0 when the GOT is powered OFF and then ON or is reset.

GS	Application	Name	Initial value	Reference section
265	MES interface function area	SNTP time synchronization setting status 1: [Synchronize with SNTP] 0: [SNTP time synchronization setting not exist/failed]	0	3.4.2
266 to 272		SNTP time query result	0	
273		Use prohibited	-	-
274				
275		Monitoring interval timeout count	0	3.4.2
670		No. of trigger buffer data	0	
671		Trigger buffer overflow count	0	
672 to 675		Trigger buffer overflow flag for a job	0	

3.4.2 MES Interface Function area

This section explains the details of the special registers used for the MES interface function.

(1) SNTP time synchronization setting status (GS265)

(a) The setting status of the SNTP time synchronization setting is stored.
For the SNTP time synchronization setting, refer to the following.

☞ 6.9.1 Setting items in SNTP time synchronization setting
0: [SNTP time synchronization setting not exist/failed]
1: [Synchronize with SNTP]

(b) When the "Synchronize using SNTP" box is checked in the Option setting
This area is set when the clock time information was obtained from the SNTP server computer.
If it could not be obtained from the SNTP server computer, this area is not set since the operation for selection of [Synchronize with PLC CPU time] is performed (The time is synchronized with the time of the PLC CPU).

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(2) SNTP time query result (GS266 to GS272)

When the "Synchronize using SNTP" box is checked in in the Option setting, the time information obtained from the SNTP server is stored.

GS	Name	Description	Setting side
266	SNTP time query result (Year)	The four-digit year data is stored.	Set by the system
267	SNTP time query result (Month)	The month data, 01 to 12, is stored.	
268	SNTP time query result (Day)	The day data, 01 to 31, is stored.	
269	SNTP time query result (Hour)	The hour data, 00 to 23, is stored.	
270	SNTP time query result (Minute)	The minute data, 00 to 59, is stored.	
271	SNTP time query result (Second)	The second data, 00 to 59, is stored.	
272	SNTP time query result (Day of the week)	The day-of-the-week data is stored. 0: Sunday 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday	

(3) Monitoring interval timeout count (GS275)

The cumulative number of times that a monitoring interval timeout has occurred is stored.

If monitoring interval timeout occurs frequently, check the number of job settings and the trigger condition setting.

For the monitoring interval timeout, refer to the following:

☞ Appendix2 About Monitoring Interval Timeout

(4) No. of trigger buffer data (GS670)

The number of trigger buffer data is stored.

When many trigger buffer data is stored for a long time, the GOT becomes busy. As a result, some data may not be collected.

Check the number of job settings for which [Trigger buffering] is enabled and the trigger condition setting.

(5) Trigger buffer overflow count (GS671)

The cumulative number of times that a trigger buffer overflow has occurred is stored.

The trigger buffer overflow means that 129th trigger data is discarded without being buffered when 128 trigger data is already buffered.

If trigger buffer overflow occurs frequently, check the number of job settings for which [Trigger buffering] is enabled and the trigger condition setting.

(6) Trigger buffer overflow flag for a job (GS672 to GS675)

The flag indicates the status of trigger buffer overflow for each job.

When a trigger buffer overflow occurs for a job, the internal device corresponding to the job turns ON.

The following table shows the internal devices that are corresponding to jobs 1 to 64.

Name	Job and internal device															
GS672	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15
Jobs 1 to 16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GS673	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15
Jobs 17 to 32	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
GS674	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15
Jobs 33 to 48	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
GS675	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15
Jobs 49 to 64	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

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4. SETTINGS AND PROCEDURES BEFORE USE OF THE MES INTERFACE FUNCTION

This chapter explains the procedures and settings to be done before use of the MES interface function.

4.1 Settings and Procedures before Use of the MES Interface Function

The flowcharts for use of the MES interface function are shown here.

POINT

Start the server computer, and then the GOT.

(1) Starting the server computer

```
                    ┌──────────────────────────────┐
                    │ Procedure before operation    │
                    └──────────────────────────────┘
                                  │
      ┌───────────────────────────┼───────────────────────────┐
      │                           │                           │
 ┌─────────────────────────────────────────────────────────────────────────┐
 │  [🖥️] Server computer/SNTP server computer                                │
 └─────────────────────────────────────────────────────────────────────────┘
      │                           │                           │
 ┌─────────────────────┐ ┌─────────────────────────┐ ┌─────────────────────┐
 │ Database server     │ │ Application server       │ │ SNTP server         │
 │ computer *1         │ │ computer *2              │ │ computer *3         │
 └─────────────────────┘ └─────────────────────────┘ └─────────────────────┘
                                                                │
                                                      ┌─────────────────────┐
                                                      │ Start up the SNTP   │
                                                      │ server.             │
                                                      └─────────────────────┘
      │                           │
 ┌─────────────────────┐ ┌─────────────────────────┐
 │ Install a relational│ │ Create a user program.*5 │
 │ database and design │ │                          │
 │ a table.*4          │ │                          │
 └─────────────────────┘ └─────────────────────────┘
      │                           │
 ┌─────────────────────┐ ┌─────────────────────────┐
 │ Set the ODBC of the │ │ Create an account for    │
 │ database.           │ │ user program             │
 │                     │ │ execution. *6            │
 │ 7.2 Setting ODBC of │ │                          │
 │ Database            │ │                          │
 └─────────────────────┘ └─────────────────────────┘
      │                           │
      │                 ┌─────────────────────────┐
      │                 │ Perform login check with │
      │                 │ the account              │
      │                 │ for user program         │
      │                 │ execution. *7            │
      │                 └─────────────────────────┘
      │                           │
 ┌─────────────────────┐ ┌─────────────────────────┐
 │ Install DB Connection│ │ Install DB Connection   │
 │ Service and          │ │ Service and             │
 │ DB Connection Service│ │ DB Connection Service   │
 │ Setting Tool.        │ │ Setting Tool.           │
 │ 4.2 Installation and │ │ 4.2 Installation and    │
 │ Uninstallation       │ │ Uninstallation          │
 └─────────────────────┘ └─────────────────────────┘
      │                           │
 ┌─────────────────────┐ ┌─────────────────────────┐
 │ Change the settings  │ │ Change the settings of  │
 │ of DB Connection     │ │ DB Connection           │
 │ Service.             │ │ Service.                │
 │ 7.1 DB Connection    │ │ 7.1 DB Connection       │
 │ Service Functions    │ │ Service Functions       │
 └─────────────────────┘ └─────────────────────────┘
      │                           │
      └───────────────┬───────────┘
                ┌─────────────────┐
                │ Operation *8    │
                └─────────────────┘
```

*1   Be sure to make the settings to use the DB interface function.

☞ 5.1 DB Interface Function

*2   Make the settings when using the program execution function.

☞ 5.1.9 Program execution function

*3   Make the settings when using the time on the SNTP server computer with the SNTP time synchronization function.

☞ 5.2 SNTP Time Synchronization Function

*4   Restart the personal computer after installing the relational database.
       Communication with GOT may fail if not restarted.

*5   Create it only when necessary.
       An existing program, a program included in OS, or a commercially available program can also be used.

*6   Always set a password for the account for user program execution.
       Use of an account without password will result in execution failure by OS.

*7   If the login is not confirmed, the program execution function may not operate properly.
       When installing DB Connection Service and DB Connection Service Setting Tool, log in using a user name with administrative
       right.

*8   Do not log in the server computer using an account for user program execution during user program execution.
       Doing so may cause incorrect operation of the program execution function.

(2) Starting the GOT
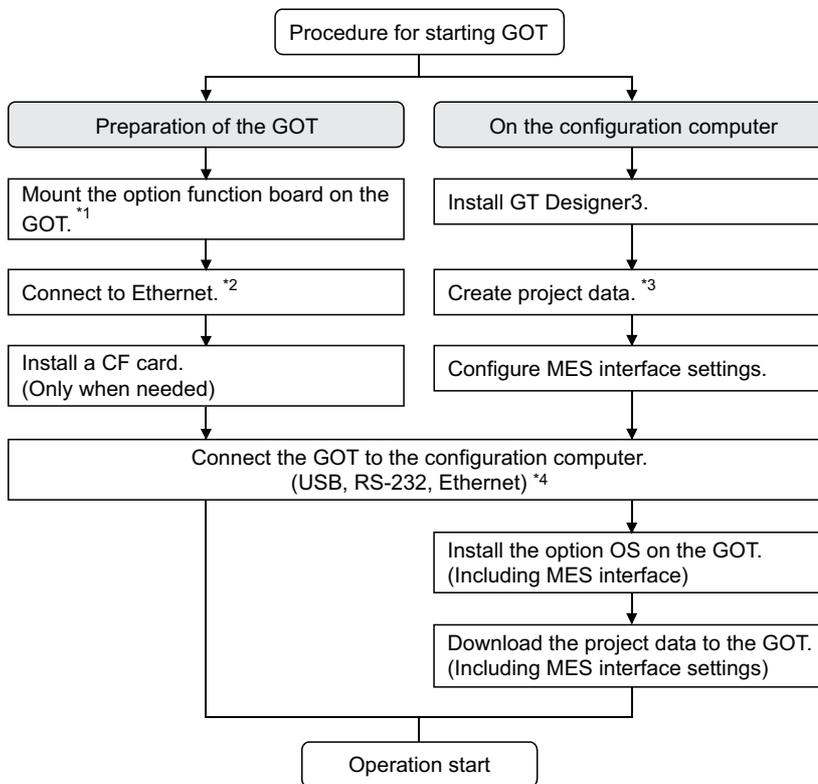
*1   For GT16, use the MES interface function board.
       For GT15, use the option function board with MES interface function.

*2   For GT16, use the built-in Ethernet interface.
       For connecting GT16 to a device supporting 10BASE(-T/2/5), configure the network that supports both 10Mbps and 100Mbps
       communication speeds by using a switching hub.
       For GT15, mount the Ethernet communication unit.

*3   Configure the Extend I/F Setting in Communication Settings of GT Designer3.
       In the Extend I/F Setting, select any of the following and set an IP address.
        • CH: * Driver: Ethernet download
        • CH: * Driver: Gateway
        • CH: 1 Driver: Ethernet(MELSEC), Q17nNC, CRnD-700
        • CH: 1 Driver: Ethernet(MELSEC), Q17nNC, CRnD-700,Gateway
       When using the MES interface function only on the Ethernet, the GOT port No. setting in Communication Detail Settings is
       ignored.

*4   In Ethernet connection, the option OS cannot be installed.
       To install the option OS, use USB or RS-232 connection.

4.2 Installation and Uninstallation

For how to install and uninstall each execution software for the MES interface function on the operating environment, refer to the following manual.

☞ GT Works3 Version1 Installation Procedure Manual

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5. MES INTERFACE FUNCTION

The MES interface function can be used on the GOT by installing the option OS (MES Interface).
This chapter describes the MES interface function.

POINT

The MES interface function settings are configured on the MES interface function setting screen of GT Designer3.
☞ 6. MES INTERFACE FUNCTION SETTING

5.1 DB Interface Function

The DB interface function executes access to the database in units of jobs.

5.1.1 DB interface function operation

The operation of the DB interface function is shown below.
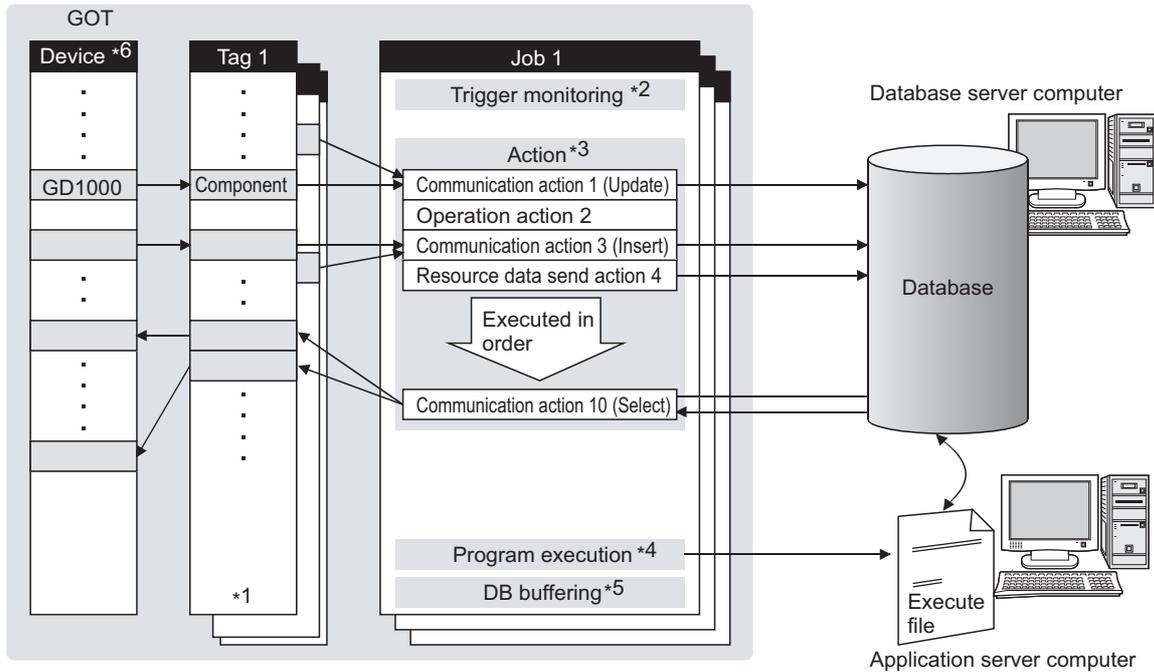
*1   Collects tag data. ☞ 5.1.3 Tag function

*2   Activates a job. ☞ 5.1.4 Trigger monitoring function

*3   Accesses the database and performs arithmetic processing.

      ☞ • 5.1.6 SQL text transmission (Communication action)

            • 5.1.7 Arithmetic processing function (Operation action)

            • 5.1.8 Resource data send function (Resource data send action)

*4   Executes programs. ☞ 5.1.9 Program execution function

*5   Temporarily stores SQL texts that cannot be sent due to a communication error.

      ☞ 5.1.10 DB buffering function

*6   For devices usable for the MES interface function, refer to the following.

      ☞ 3.2 GOT Devices Available for the MES Interface Function

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5.1.2 Job execution procedure

The following is the job execution procedure.

```
                          ┌──────────────┐
                          │    Start     │
                          └──────────────┘
                                 │
                                 ▼
                         ◇ Is the GOT working? ◇────Stopped──────────┐
                                 │                                   │
                              Working                                ▼
                                 │               ┌─────────────────────────────────────────────┐
                                 │               │ No job is executed during the stop.         │
                                 │               │ Activate the GOT.                           │
                                 │               │ ☞ • 6.10.1 Checking the MES Interface        │
                                 │               │       Function status (Status)              │
                                 │               │   • 6.10.2 Manipulating the MES Interface    │
                                 │               │       Function status (Operation)           │
                                 │               └─────────────────────────────────────────────┘
                                 │◄─────────────────────────────────────┘
                                 ▼
                         ◇ Is the job enabled? ◇────Disabled─────────┐
                                 │                                   │
                              Enabled                                ▼
                                 │               ┌─────────────────────────────────────────────┐
                                 │               │ The job is not executed when it is disabled. │
                                 │               │ Enable the job.                             │
                                 │               │ ☞ • 6.10.3 Changing the job status          │
                                 │               │       (Change job status)                   │
                                 │               └─────────────────────────────────────────────┘
                                 │◄─────────────────────────────────────┘
                                 ▼
          ┌──────────────────────────────────────────────────────┐
          │ Job execution starts when trigger conditions are met. │
          │ ☞ • 5.1.4 Trigger monitoring function                 │
          │   • 6.7.2 Setting items in Trigger conditions         │
          └──────────────────────────────────────────────────────┘
                                 │
                                 ▼
          ┌──────────────────────────────────────────────────────┐
          │ When [Handshake operation] is selected for Trigger    │
          │ conditions, tag component values are obtained again.   │
          └──────────────────────────────────────────────────────┘
                                 │
                                 ▼
                   ◇ Is the [Execute program before    ◇───Not checked───┐
                         action.] box checked? ◇                         │
                                 │                                       │
                              Checked                                    │
                                 ▼                                       │
          ┌──────────────────────────────────────────────────────┐      │
          │ The program in the application server computer is     │      │
          │ executed before execution of the first action.       │      │
          │ ☞ • 5.1.9 Program execution function                 │      │
          │   • 6.7.3 Setting items in Program execution         │      │
          └──────────────────────────────────────────────────────┘      │
                                 │◄──────────────────────────────────────┘
                                 ▼
                          (To the next page)
```

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(From the previous page)　　　　　　　Executed in order

```
Actions are executed.
Up to 10 actions can set for a job, and they are
executed in order.

   ☞  • 5.1.6 SQL text transmission (Communication action)
       • 5.1.7 Arithmetic processing function (Operation action)
       • 5.1.8 Resource data send function (Resource data send action)
       • 6.8 Job Settings - Actions
```

```
In Update/Insert actions, substitute or insert values are
committed to database.
```

Is the [Execute program after action.] box checked? ── Not checked

Checked

```
The program in the application server computer is
executed after execution of the last action.

   ☞  • 5.1.9 Program execution function
       • 6.7.3 Setting items in Program execution
```

```
If a value was written to a tag component, it is written
to the device data of the PLC CPU.
```

```
Job execution is completed.
```

End

POINT

For the case where an error occurs during job execution, refer to the following:

☞ 5.3 (2) When an error occurs in job execution

5.1.3　Tag function

The tag function collects device data of the GOTs on the network in units of tags.
Assigning a database field to a tag component allows reading or writing of a database value or device data that is specified by the tag component.
For the tag function setting, refer to the following:

☞ 6.5 Device Tag Settings

GOT

Device
GD1000
GD2000
GD2001

Read

Write

Device tag name: Process1

Component name	Device	Data type
Work_No.	GD1000	Single
Parameter	GD2000	Double
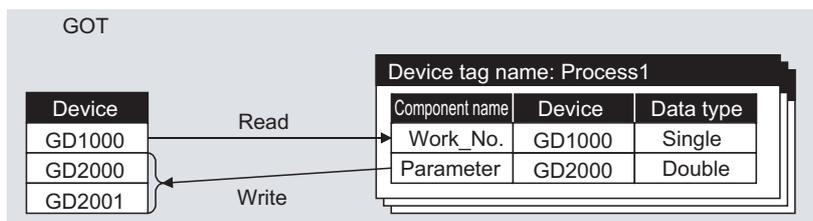
5.1.4   Trigger monitoring function

The trigger monitoring function monitors values such as the time and tag values and, when the trigger condition changes from false to true (when the condition is met), starts a job.
The following setting options are available as conditions for start.
- [Time specification startup]: Starts the job at the specified time.
- [Specified time period startup]: Starts the job at the specified intervals (Unit: Seconds).
- [Value monitoring startup]:
  Compares the actual tag component value with the condition value (tag component value or constant value) at every sampling times, and starts the job when the condition is met.
- [Handshake operation]:
  Starts the job on request from the GOT.
  Completion of job execution can be reported to the GOT.
- [At GOT startup]:
  Starts the job only once when the GOT starts up.

Two kinds of conditions can be used in combination for starting a job.
For the trigger monitoring function setting, refer to the following:

☞6.7.2 Setting items in Trigger conditions

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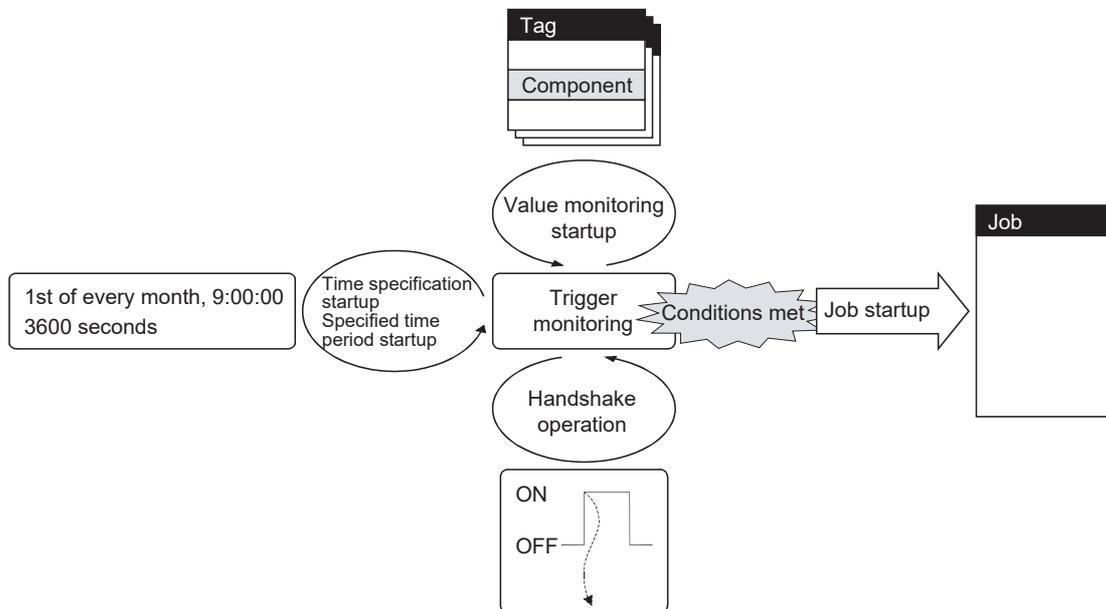
POINT

In [Value monitoring startup], tag component values used for triggering monitoring and those used in the activated job are collected at different timings without synchronization.

Job	
Trigger	When Tag 1Component A is 10
Action 1)	Add Tag 2 Component B to Tag 1 Component B.
Action 2)	Send Tag 3 Component C to database

Tag 1 Sampling cycle: 1s

Component name	Value
Component A	10
Component B	20

Sampling time 10:08:30

Tag 2 Sampling cycle: 60s

Component name	Value
Component B	5

Sampling time 10:08:00

Tag 3 Sampling cycle: 1s

Component name	Value
Component C	12
Component D	3
Component E	4
Component F	8
:	:

Sampling time 10:08:21
(Too many components, sampling delayed)

To synchronize collection of the above tag component values, perform either of the following (Plan 1) or (Plan 2).
(Plan 1)
Use [Handshake operation].

☞ 6.7.2 (8) Handshake operation

Job	
Trigger (Handshake operation setting)	When startup tag component turns ON
Action 1)	Add Tag 2 Component B to Tag 1 Component B.
Action 2)	Send Tag 3 Component C to database

Tag 1 Sampling cycle: 1s

Component name	Value
Component A	10
Component B	20

GOT device

Tag 2 Sampling cycle: 60s

Component name	Value
Component B	5

GOT device

Tag 3 Sampling cycle: 1s

Component name	Value
Component C	12
Component D	3
Component E	4
Component F	8
:	:

GOT device

(Plan 2)
Put the tag components used in a job into one tag.
Since the tag components collect the specified GOT device values during job execution, the execution time of the job is increased.

Job	
Trigger	When Tag 1Component A is 10
Action 1)	Add Tag 1 Component B' to Tag 1 Component B.
Action 2)	Send Tag 1 Component C to database

Tag 2 Sampling cycle: 3s

Component name	Value
Component A	10
Component B	20
Component B'	5
Component C	12
Component D	3
Component E	4
Component F	8
:	:

Sampling time 10:08:21
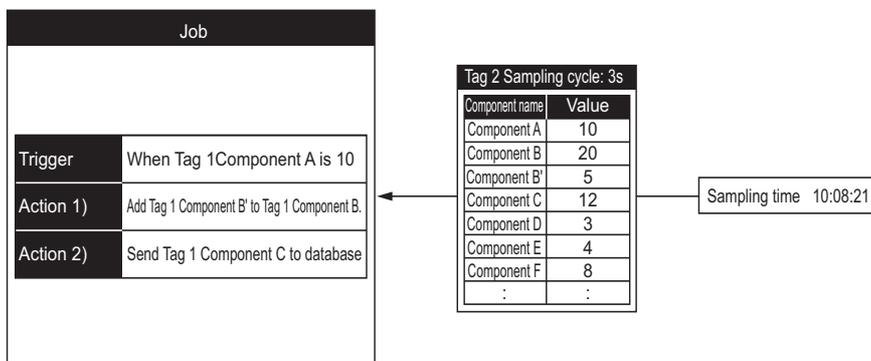
5.1.5 Trigger buffering function

When too many trigger conditions (data transmission conditions) are met simultaneously, the trigger buffering function allows the system to buffer the data and time trigger conditions are met to the user area of the GOT. The action (operation and transmission of the data) for the buffered data is executed later.
Even when the data transmission triggers are activated frequently, no triggers are missed so that all the jobs are executed.
Enable [Trigger buffering] in each job setting to utilize the trigger buffering function.

(1) Trigger buffering function
The following describes the behavior of a job for which [Trigger buffering] is enabled.

(a) When normal (Interval that trigger conditions are met is longer than processing time of action)
- When trigger conditions are met, the tag data and the time are stored in the trigger buffer.
- The action, which is specified by the data stored in the trigger buffer, is executed immediately.

[GOT]

[When normal]

Job 1 Trigger conditions are met → Trigger buffer → Job 1 Action is executed

Time

Time

Data transmission → Database
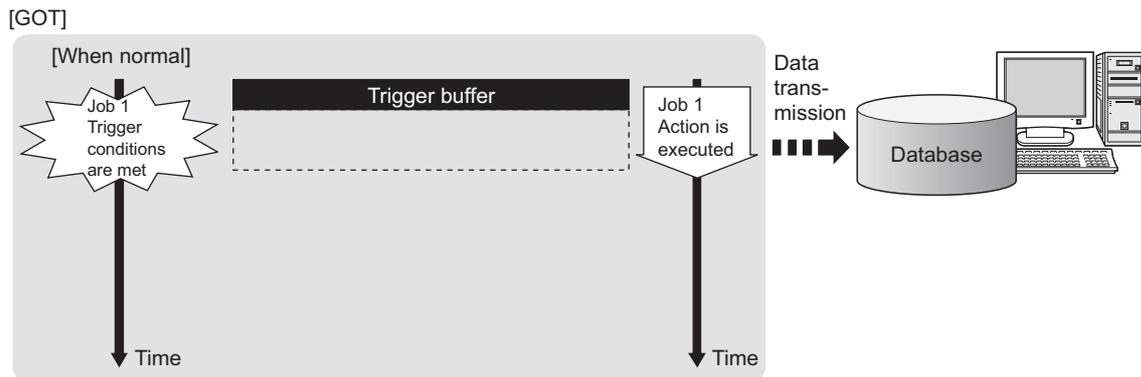
(b) When busy (Interval that trigger conditions are met is shorter than processing time of action)
- Tag data and time that conditions are met are stored to the trigger buffer every time the conditions are met.
- If an action cannot complete before another condition is met, up to 128 trigger data can be stored.
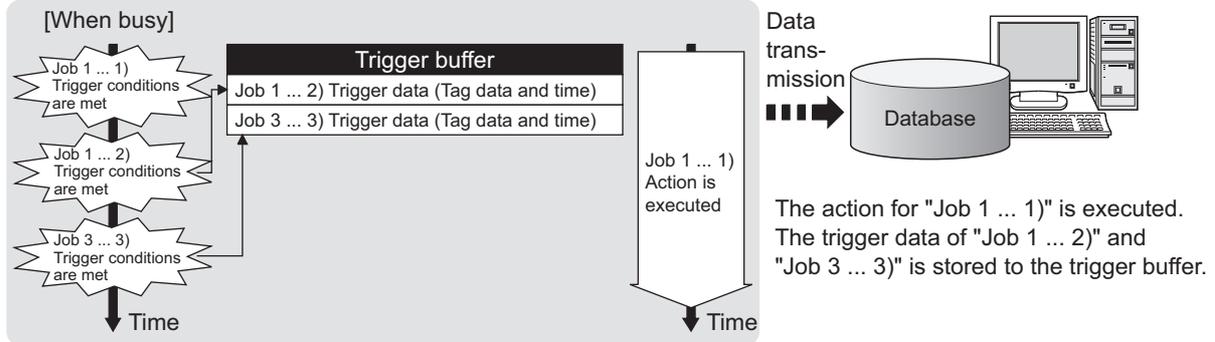
[GOT]

The action for "Job 1 ... 1)" is executed.
The trigger data of "Job 1 ... 2)" and "Job 3 ... 3)" is stored to the trigger buffer.

· The numbers 1) to 3) correspond to the order of that trigger conditions are met.
· In this example, the jobs 1 and 3 access the same database.

(c) When becoming less busy (Interval that trigger conditions are met is longer than processing time of action)
- The action, which is specified by the data stored in the trigger buffer, is read and executed sequentially.
- When the action for the trigger data in the trigger buffer completes, the trigger data is cleared, and another trigger data can be stored.
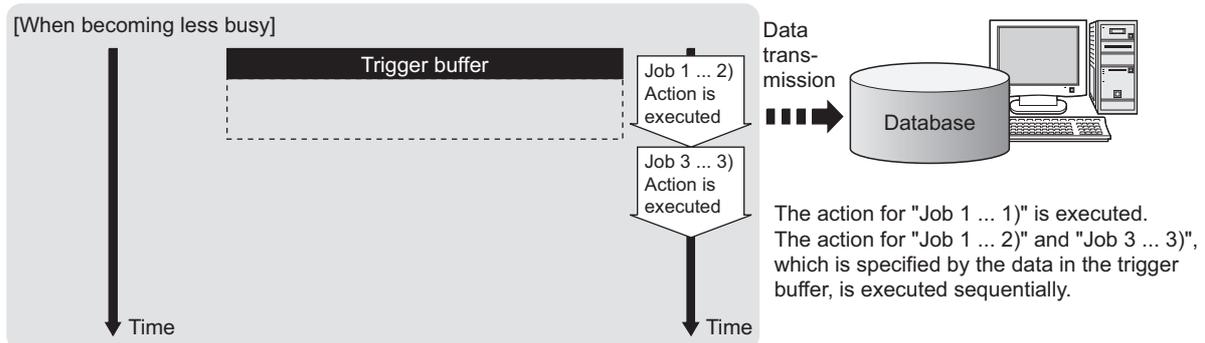
[GOT]

The action for "Job 1 ... 1)" is executed.
The action for "Job 1 ... 2)" and "Job 3 ... 3)",
which is specified by the data in the trigger
buffer, is executed sequentially.

· The numbers 1) to 3) correspond to the order of that trigger conditions are met.
· In this example, the jobs 1 and 3 access the same database.

POINT

(1) For job operation for which [Trigger buffering] is disabled, refer to the following:
    ☞ 5.3 (1) Operation behavior of jobs

(2) Whether the condition is changed from false to true is judged at collection of the tag.
    ☞ 6.7.2 Setting items in Trigger conditions

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(2) Maximum times of trigger buffering

    (a)   The trigger buffering function allows up to 128 trigger data (tag data and time) to be stored simultaneously. A job can be stored for unlimited number of times.

    (b)   Check status of the trigger buffering in the following.
           Number of jobs in the trigger buffer (GS670)

           [MES Interface] - [Diagnostics] tab (☞6.10.6 Checking the trigger buffering (Trigger buffering status))

    (c)   If 128 conditions are already met and another condition is met, the trigger of the new condition is discarded. Check the number of discards in the trigger buffer overflow (GS671).

(3) Clearing trigger buffer

Any of the following operation clears the trigger buffer.
- Power off the GOT.
- Reset the GOT (when changing the communication settings, etc.)
- Install the OS from GT Designer3
- Download project data, etc.
- Stop the MES interface function operation by [MES Interface] - [Diagnostics]

    (☞6.10.2 Manipulating the MES Interface Function status (Operation))

5.1.6 SQL text transmission (Communication action)

The SQL text transmission function allows automatic creation of SQL texts, enabling communications with the database.
The following three types of commands can be selected for the SQL text.
• Select/MultiSelect
• Update
• Insert
For the SQL text transmission setting, refer to the following:

(1) Select/MultiSelect

Select/MultiSelect is used to write a database value to a tag component value area or to store it in the temporary variable area by sending a SQL text to the database.
When a value is stored in the temporary variable area, it can be used as a variable for other actions.

(2) Update and Insert

Update and Insert are used to add a tag component value or a temporary variable to an SQL text and write the value to the database.

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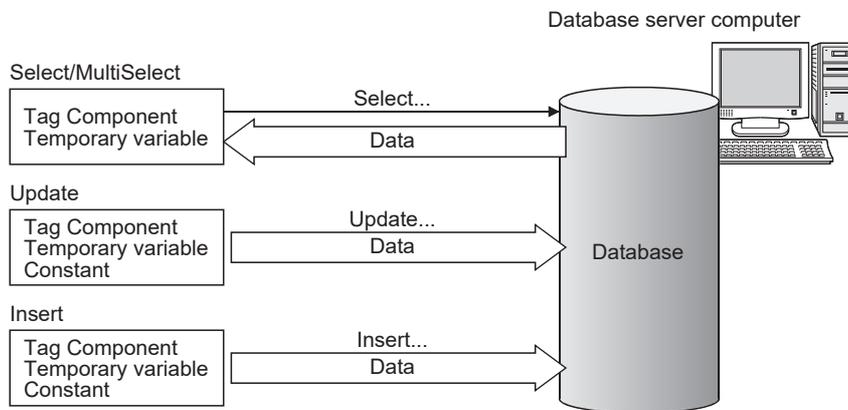
5.1.7 Arithmetic processing function (Operation action)

The arithmetic processing function performs operations for tag component values.
In this function, up to 20 dyadic operations can be processed per operation action.
By storing an operation result in the temporary variable area, complicated operations are also executable.
For the arithmetic processing function setting, refer to the following:

☞ 6.8.2 Setting items in Operation action

An operand is selectable from tag component, constant and temporary variable.

Temporary variable ⟵ Tag component Constant × Tag component Constant

Tag component ⟵ Temporary variable + Tag component Constant

The result can be assigned to a tag component or temporary variable.

Four operations and remainder can be specified by corresponding operators.

Up to 20 dyadic operations can be performed for one operation action.

Executed in order

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5.1.8 Resource data send function (Resource data send action)

The resource data send function allows the GOT to send resource data collected in a GOT buffering area and a CF card to a database.
Device values for controllers, alarm data for the GOT, and others can be stored to the database without any communication programs.
For the resource data send function settings, refer to the following.

👉 6.8.3 Setting items in Transmit resource action

Data transmission

Database

Time	No	Count
08:20:10	101	10
08:30:20	102	11
08:30:30	105	12

Logging data, alarm data and others
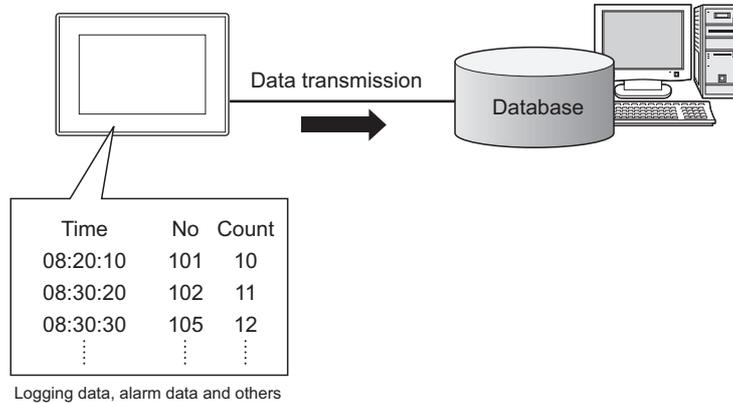
(1) Resource data send function

(a) Available data to be sent
For using the resource data send function, set [Transmit resource action] in the action for [Job settings].
The following resource data can be sent to a database.

Resource data		Description
Logging data		Logging data collected by the logging function
Alarm data	Advanced user alarm	Alarm data collected by the advanced user alarm observation setting
	Advanced system alarm	Alarm data collected by the advanced system alarm observation setting
Operation log data		GOT operation history data collected by the operation log function

(b) Resource data to be sent

1) Settings on the resource data send action for the collected resource data

The GOT sends the resource data before and after turning on the GOT.

Specifying the number of resource data and the time of collecting the data or others are available.

This setting allows the GOT to send resource data when the loads on the GOT and controllers are lower.

*Excluding logging data at the first action
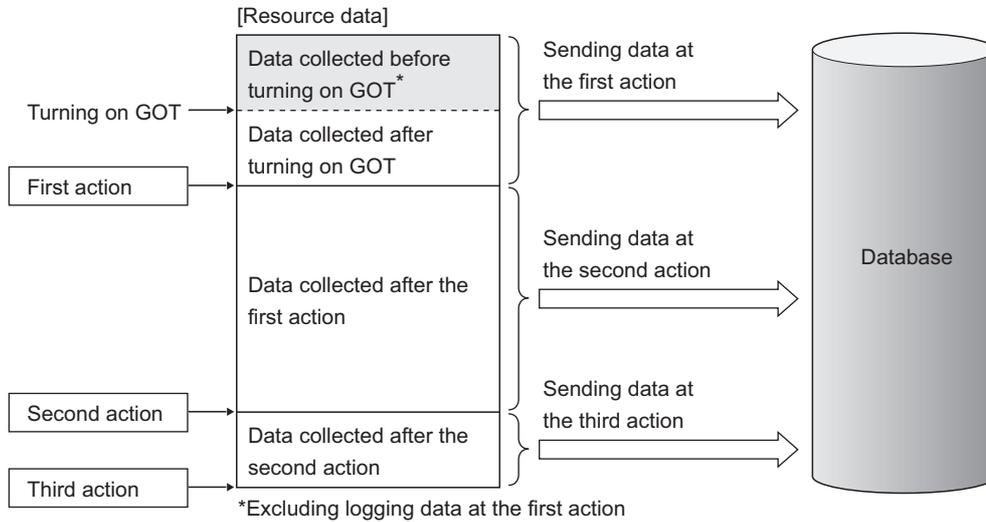
POINT

The GOT sends the resource data to the database only one time. The GOT does not send the sent data to the database on the subsequent actions. Unnecessary data is not stored to the database.
The GOT may send the sent data to the database in the following cases.
  • When turning on the GOT
  • When restarting the GOT (Downloading a project data or others)

6.12 Precautions

2) Sending one resource data at the multiple resource data send actions
When one resource data is sent at the multiple resource data send actions, the resource data is sent and stored to the database for each action.
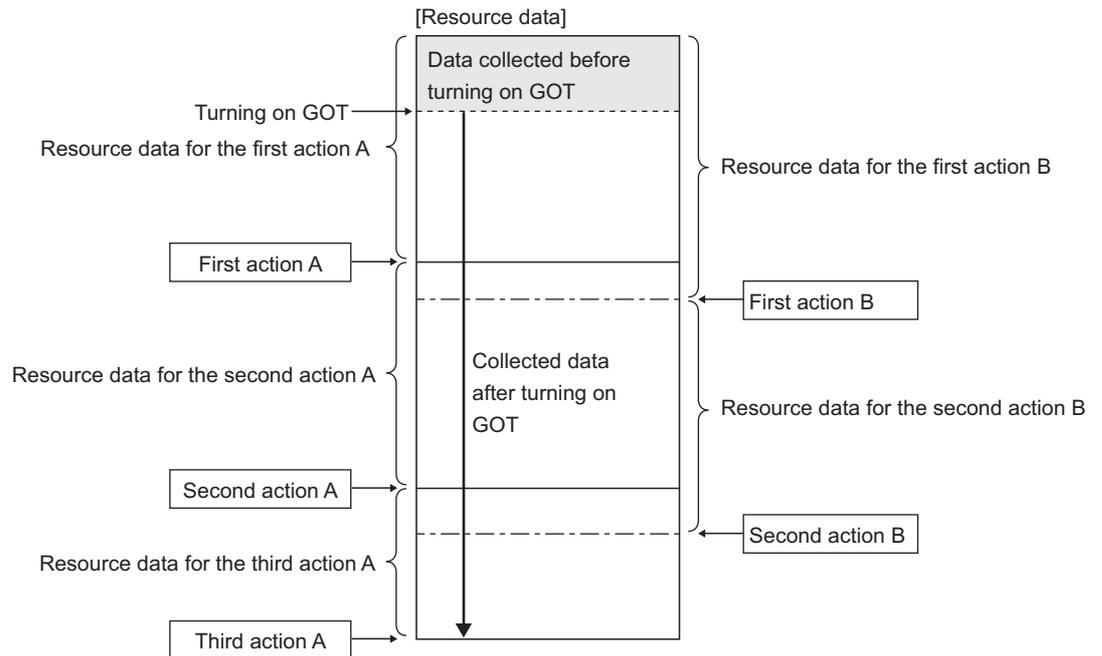
Resource data for the action A is sent again when the action B is executed.

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5.1.9　Program execution function

The program execution function is used for executing programs in the application server computer before execution of the first action and after execution of the last one in a job.
For the program execution function setting, refer to the following:

☞6.7.3 Setting items in Program execution
Programs that can be executed from [Command line] are applicable.

Since program execution is set on the application server computer as described below, more sophisticated data linkage can be realized.

(1) Before executing the first action of the job
By executing programs before the first action of the job, data required for the job can be produced on the database in advance.

(2) After executing the last action of the job
By executing programs after the last action of the job, data written to the database by the job can be utilized for programs on the application server computer.

5.1.10 DB buffering function

(1) DB buffering function

The DB buffering function temporarily stores SQL texts into a CF card when they cannot be sent due to network disconnection or failure of the database server computer.

After recovery, the buffered SQL texts are automatically sent to the database. (Manual operation is also possible.)
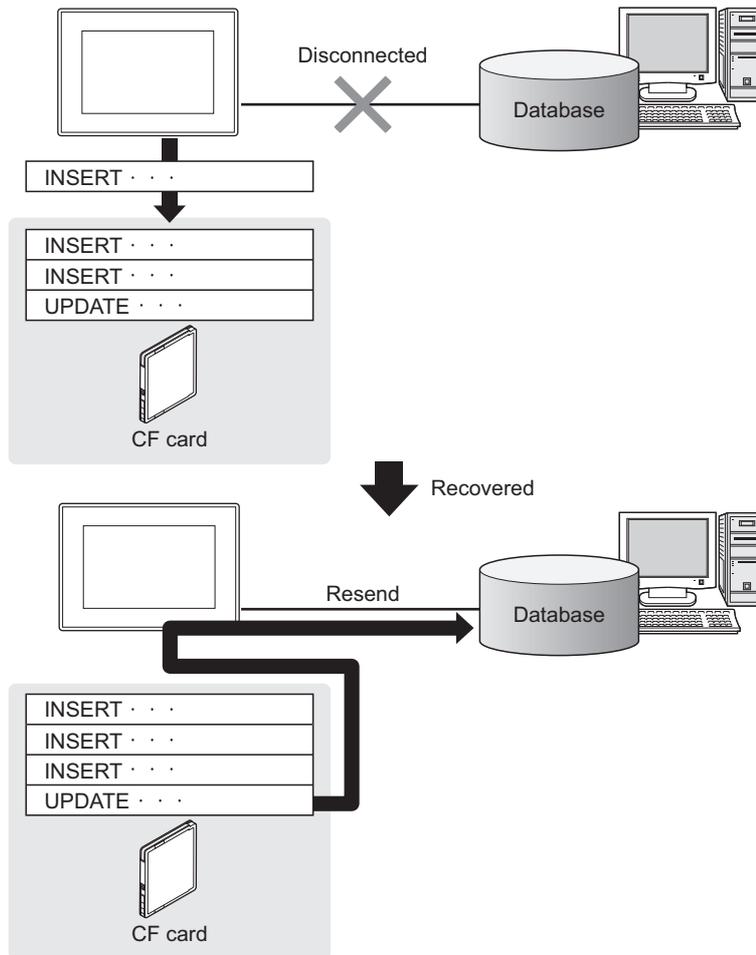
POINT

(1) To automatically send SQL texts after recovery, irrespective of transmission sequence, select the auto-resend processing.

☞ This section (5) (c) Automatically resending data after recovery

(2) To send SQL texts after recovery, without changing the transmission sequence, select the manual resend processing.

☞ This section (5) (d) Manually resending data

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(2) Factors for starting DB buffering

The DB buffering is conducted when SQL texts cannot be sent to the database by the following factors:

- Network disconnection
- Failure of the database server computer
- Failure of the database software

POINT

(1) If an error occurs when the sent SQL text is executed on the database, by some reason such as its incorrectness or inconsistency with the database, buffering is not performed and an SQL failure log is output on the database server computer.

☞7.1 DB Connection Service Functions

(2) When SQL texts cannot be sent to the database due to network disconnection or failure of the database server computer, DB buffering is not performed until the connection timeout is detected (approx. 10 seconds).

☞This section (7) When SQL texts cannot be sent to the database

Even if a trigger condition is met again during connection timeout detection, the corresponding job is not executed.

☞5.3 (1) Operation behavior of jobs

(3) If SQL texts cannot be sent to the database due to failure of database software, DB buffering is not performed until detection of DB access timeout.

☞This section (7) When SQL texts cannot be sent to the database

Time for detecting DB access timeout is set to 30 seconds by default.

☞7.5 (2) DB access timeout (required) (Range: 1 to 3600; Default: 30)

Even if a trigger condition is met again during detection of DB access timeout, the corresponding job is not executed.

☞5.3 (1) Operation behavior of jobs

(3) Jobs applicable to DB buffering

Jobs performing Update or Insert actions can be stored in the DB buffer.

The DB buffering is not available for jobs performing Select/MultiSelect action.

(4) Setting the DB buffering

Start

Configure the settings for the DB buffering function.

☞ 6.9.2 Setting items in DB buffering settings

Set whether to enable or disable the DB buffering for each job.

☞ 6.7.4 Setting items in DB Buffering

End
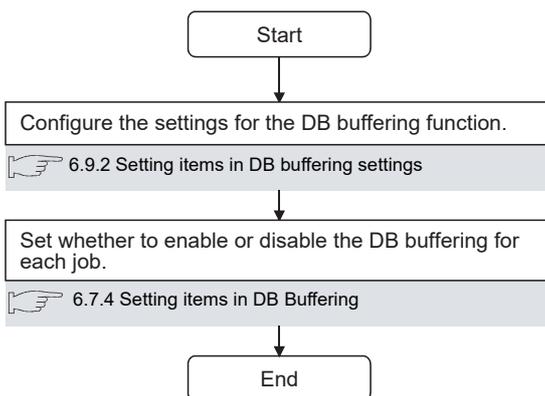
(5) DB buffering operation

(a) When no data are currently stored in the DB buffer
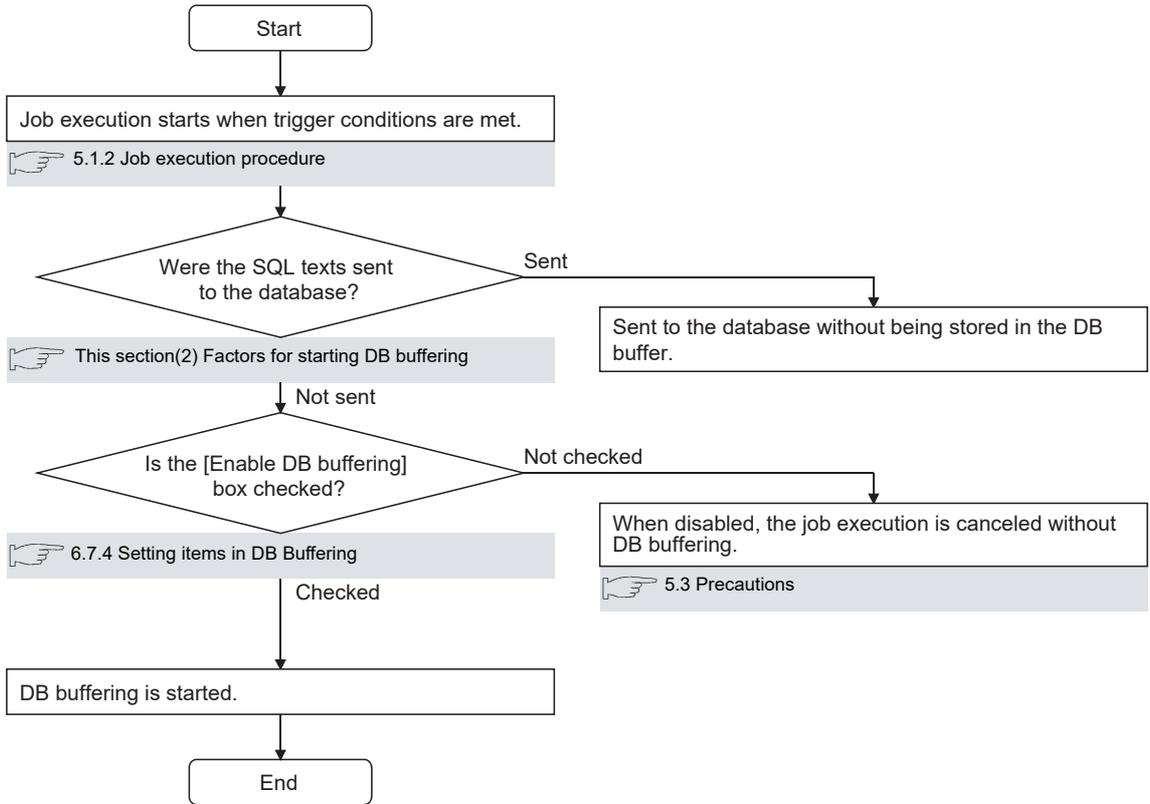
```
              ┌──────────────┐
              │    Start     │
              └──────────────┘
                     │
    ┌────────────────────────────────────────────┐
    │ Job execution starts when trigger conditions are met. │
    ├────────────────────────────────────────────┤
    │ ☞ 5.1.2 Job execution procedure            │
    └────────────────────────────────────────────┘
                     │
                     ▼
              ◇ Were the SQL texts sent ◇──── Sent ──────┐
              ◇ to the database?        ◇                │
                     │                        ┌──────────────────────────────┐
    ┌────────────────────────────────┐        │ Sent to the database without being stored in the DB │
    │ ☞ This section(2) Factors for starting DB buffering │        │ buffer.                        │
    └────────────────────────────────┘        └──────────────────────────────┘
                     │ Not sent
                     ▼
              ◇ Is the [Enable DB buffering] ◇──── Not checked ────┐
              ◇ box checked?              ◇                        │
                     │                        ┌──────────────────────────────┐
    ┌────────────────────────────────┐        │ When disabled, the job execution is canceled without │
    │ ☞ 6.7.4 Setting items in DB Buffering │        │ DB buffering.                  │
    └────────────────────────────────┘        ├──────────────────────────────┤
                     │ Checked                 │ ☞ 5.3 Precautions              │
                     ▼                        └──────────────────────────────┘
    ┌────────────────────────────────┐
    │ DB buffering is started.        │
    └────────────────────────────────┘
                     │
                     ▼
              ┌──────────────┐
              │     End      │
              └──────────────┘
```

POINT

Check the DB buffer status (No. of bufferings, utilization) and prevent the full status of the DB buffer.

☞ • 6.7.4 Setting items in DB Buffering

• 6.10.5 Manipulating DB buffering (DB buffering operation)

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(b) When some data are currently stored in the DB buffer

```
                          ┌──────────────┐
                          │    Start     │
                          └──────┬───────┘
                                 │
         ┌───────────────────────┴────────────────────────┐
         │ Job execution starts when trigger conditions are met. │
         ├────────────────────────────────────────────────┤
         │ ☞ Section 5.1.2 Job execution procedure        │
         └───────────────────────┬────────────────────────┘
                                 │
  Yes                    ╱─────────────────╲
 ◄───────────────────── ◄  Is "Manual resend" selected  ►
 │                       ╲     for the job?       ╱
 │          ┌──────────────────────────────────────────┐
 │          │ ☞ Section 6.7.4 Setting items in DB Buffering │
 │          └─────────────────┬────────────────────────┘
 │                         No │
 │                    ╱────────────────╲         Sent
 │                   ◄ Were the SQL texts sent  ►──────────────┐
 │                    ╲   to the database?   ╱                 │
 │       ┌────────────────────────────────────────┐   ┌─────────────────────────────┐
 │       │ ☞ This section (2) Factors for starting DB buffering │ │ ☞ (c) Automatically resending data │
 │       └────────────────────┬───────────────────┘   └─────────────────────────────┘
 │              Not sent      │
 └────────────────────────────┤
                    ╱─────────────────╲          Not checked
                   ◄ Is the [Enable DB buffering]  ►─────────────┐
                    ╲    box checked?      ╱                     │
        ┌────────────────────────────────────────┐   ┌───────────────────────────────────────┐
        │ ☞ Section 6.7.4 Setting items in DB Buffering │ │ When disabled, the job execution is canceled without │
        └────────────────────┬───────────────────┘   │ DB buffering.                          │
               Checked        │                       ├───────────────────────────────────────┤
                              │                       │ ☞ Section 5.3 Precautions              │
        ┌─────────────────────┴──────────┐            └───────────────────────────────────────┘
        │ DB buffering is started. *1     │
        └─────────────────────┬──────────┘
                              │
                       ┌──────┴───────┐
                       │     End      │
                       └──────────────┘
```

*1 When accumulated job data currently exist in the DB buffer.

Job settings		DB buffer
Job 1 (Auto)		Job 3_SQL TEXT (Auto)
Job 2 (Auto)	Stored in the order	Job 6_SQL TEXT (Manual)
Job 3 (Auto)	that trigger conditions	Job 4_SQL TEXT (Manual)
Job 4 (Manual)	are met.	Job 1_SQL TEXT (Auto)
Job 5 (Manual)		Job 2_SQL TEXT (Auto)
Job 6 (Manual)		Job 5_SQL TEXT (Manual)

POINT

Check the DB buffer status (No. of bufferings, utilization) and prevent the full status of the DB buffer.

☞ • Section 6.7.4 Setting items in DB Buffering

• Section 6.10.5 Manipulating DB buffering (DB buffering operation)

(c) Automatically resending data after recovery

```
                        ┌──────────────────┐
                        │      Start       │
                        └────────┬─────────┘
                                 │
      ┌──────────────────────────────────────────────────┐
   1) │ Execution of the job with Auto resend setting is started. │
      │ The job with Auto resend setting is sent to the database  │
      │ without being buffered.   *1                     │
      └──────────────────────────┬───────────────────────┘
                                 │
      ┌──────────────────────────────────────────────────┐
   2) │ In the order of storing the jobs data in the DB buffer, │
      │ the accumulated data of the jobs with Auto resend │
      │ setting are sent again.   *1                     │
      └──────────────────────────┬───────────────────────┘
                                 │
                          ◇──────────────◇        Yes
                         ╱ Is there any job for  ╲─────────┐
                         ╲ which Manual resend     ╱       │
                          ╲ is selected?         ╱         │
                           ◇──────┬──────◇                 │
                                  │ No                      ▼
                                  │          ┌──────────────────────────────────┐
                                  │       3) │ Job with Manual resend setting will not be sent even │
                                  │          │ after recovery.                  │
                                  │          ├──────────────────────────────────┤
                                  │          │ ☞  (d) Manually resending data   │
                                  │          └──────────────────────────────────┘
                        ┌─────────┴────────┐
                        │       End        │
                        └──────────────────┘
```

*1 Automatically resends job data after recovery.
    The numbers 1) to 3) correspond to those shown in the above.

Job settings	DB buffer	Database
Job 1 (Auto)	Job 3_SQL TEXT (Auto)	Job 10_SQL TEXT (Auto)
Job 2 (Auto)	Job 6_SQL TEXT (Manual)	Job 3_SQL TEXT (Auto)
Job 3 (Auto)	Job 4_SQL TEXT (Manual)	Job 1_SQL TEXT (Auto)
Job 4 (Manual)	Job 1_SQL TEXT (Auto)	Job 2_SQL TEXT (Auto)
Job 5 (Manual)	Job 2_SQL TEXT (Auto)	
Job 6 (Manual)	Job 5_SQL TEXT (Manual)	
.	3)	
.		
.		
Job 10 (Auto)		

2)

1)

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(d) Manually resending data

```
                              ┌─────────────────┐
                              │      Start      │
                              └────────┬────────┘
                                       ▼
┌──────────────────────────────────────────────┐    ┌──────────────────────────────────────────┐
│ Execute manual resend of the DB buffer data.  │    │ After line recovery, retry the manual       │
│ ▪ Request for resend on [MES interface         │    │ resend of DB buffer data.                   │
│   setting] - [Diagnosis] tab                   │    └──────────────────────────────────────────┘
│ ▪ Request for resend on [Resend DB buffer      │
│   request] of the specified tag component      │
│ ☞ • 6.9.2 Setting items in DB buffering        │
│     settings                                   │
│   • 6.10.5 Manipulating DB buffering (DB       │
│     buffering operation)                       │
└──────────────────────────────────────────────┘
```

☞ • This section (2) Factors for starting DB buffering

Were the SQL texts sent to the database? — Not sent

Sent

1) In the order of storage in the DB buffer, the accumulated data of the jobs with Manual resend setting are sent again. *1

2) If a job with manual resend setting is started during manual resending, its SQL texts are stored in the DB buffer and then sent to the database. *1

Has all the manual resend processing been completed? — Not completed

Completed

3) If a job with manual resend setting is started after completion of manual resending, its SQL texts are sent to the database if it is accessible, without being buffered. *1

Is there any job for which Auto resend is selected? — Yes

Data of the job with Auto Resend setting are sent again after recovery.

☞ (c) Automatically resending data after recovery

No

End

*1 Manually resending data
The numbers 1) to 3) correspond to those shown in the above.

Job setting	DB buffer	Database
Job 1 (Auto)	Job 3_SQL TEXT (Auto)	Job 6_SQL TEXT (Manual)
Job 2 (Auto)	Job 6_SQL TEXT (Manual)	Job 4_SQL TEXT (Manual)
Job 3 (Auto)	Job 4_SQL TEXT (Manual)	Job 5_SQL TEXT (Manual)
Job 4 (Manual)	Job 1_SQL TEXT (Auto)	Job 10_SQL TEXT (Manual)
Job 5 (Manual)	Job 2_SQL TEXT (Auto)	Job 11_SQL TEXT (Manual)
Job 6 (Manual)	Job 5_SQL TEXT (Manual)	
.		
.		
.		
Job 10 (Manual)	2)	
Job 11 (Manual)		

1)
3)

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POINT

If any of the jobs for which manual resend is selected exists in the DB buffer, it remains there after recovery until manual resend is executed.

(6) Clearing the DB buffer

The DB buffer is cleared by the following:

- After downloading the project data, for which the MES interface function is set, to the GOT, powering OFF and ON or restarting the GOT
- Clear request from [MES interface setting screen] - [Diagnosis tab].

  ☞ 6.10.5 Manipulating DB buffering (DB buffering operation)

- Clear request from [Clear DB buffer request] of the specified tag component

  ☞ 6.9.2 Setting items in DB buffering settings

(7) When SQL texts cannot be sent to the database

(a) When auto-send is selected for the job

1. If SQL texts cannot be sent to the database due to network disconnection or failure of the database server computer or database software, the system starts DB buffering after detection of a timeout.

2. After DB buffering is started, whether SQL texts can be sent to the database or not is checked every time each job is activated.

3. When the system has not been recovered from network disconnection or failure of the database server computer or database software, DB buffering is executed after detection of the timeout.

Recovery from network
disconnection

Job startup   Job startup   Job startup

After sending
SQL texts,
timeout detected   Sending SQL
                                                 texts

DB buffering executed   DB buffering execution   Auto-resending
                        after checking if SQL   DB buffer data
                        texts can be sent
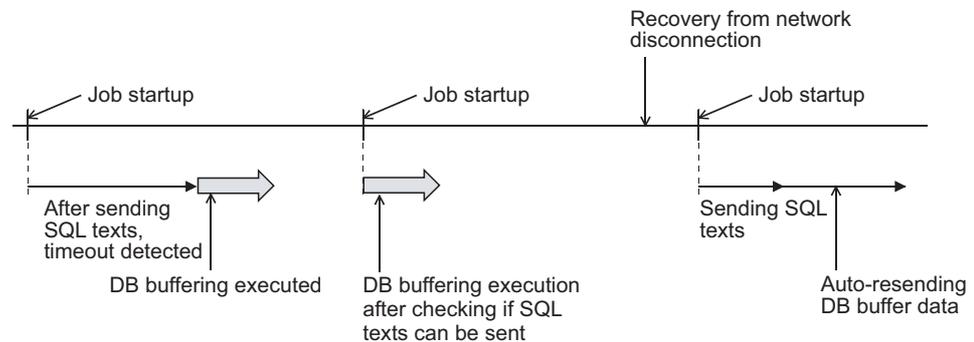
    (b)   When manual resend is selected for the job

       1. If SQL texts cannot be sent to the database due to network disconnection or failure of the database server computer or database software, the system starts DB buffering after detection of a timeout.

       2. After started, DB buffering is performed without checking whether SQL texts can be sent to the database or not for each job activation.

       3. The data stored in the DB buffer are resend when manual resend is executed.
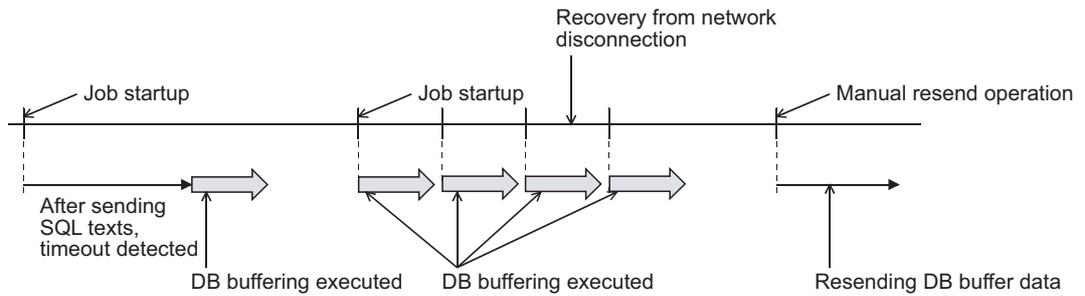
(8) Precaution on the DB buffering
Do not remove the CF card from the GOT during DB buffering.

5.2 SNTP Time Synchronization Function

The SNTP time synchronization function allows the time on the GOT to be synchronized with the time on the SNTP server computer on the network.
Time information is utilized for job start conditions or in send data to the database.
For the SNTP time synchronization function setting, refer to the following.

☞6.9.1 Setting items in SNTP time synchronization setting

POINT

For time synchronization with the SNTP server, pay attention to the following:
- When using the SNTP time synchronization function, do adjust the time in the time setting in Utility or in System Environment of GT Designer3.
  The SNTP time synchronization function does not work if the clock of the GOT is set to be adjusted to the clock data of external equipment.
- To write the clock time of the SNTP server to controllers, use [Broadcast].
  This function can be used in combination with [Broadcast].
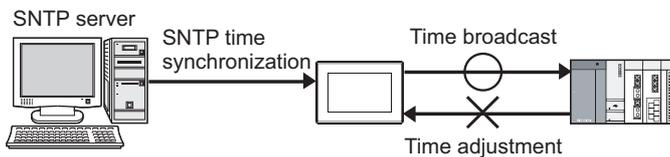
For [Adjust/Broadcast], refer to the following manual.

☞GT Designer3 Version1 Screen Design Manual (Fundamentals)

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5.3 Precautions

(1) Operation behavior of jobs

(a) When a trigger condition for a job is met again during execution of the job

1) Jobs for which [Trigger buffering] is disabled

A new job is not executed during execution of the previous job.

(Example)

When a trigger condition for a job is met again during execution of the job set to [Value monitoring startup]
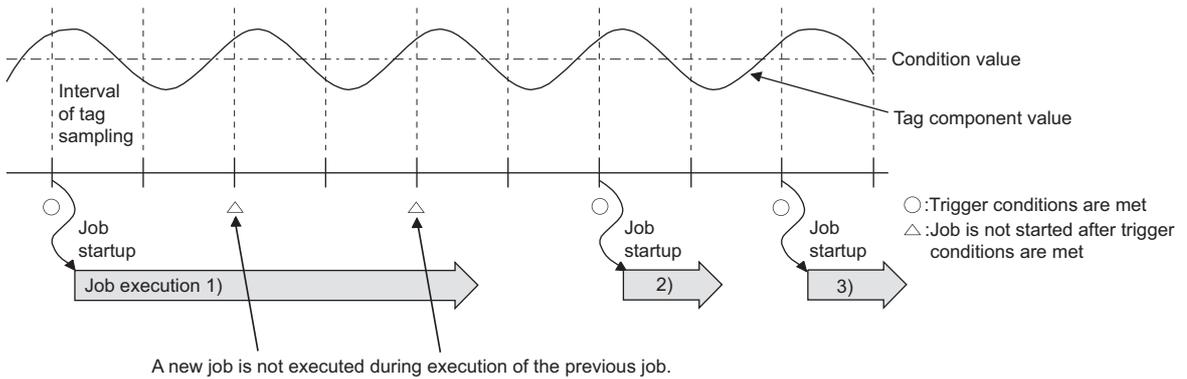
2) Jobs for which [Trigger buffering] is enabled

Trigger data is stored to the trigger buffer, and the job for the stored trigger data is executed after completion of the previous job.

(Example)

When a trigger condition for a job is met again during execution of the job set to [Value monitoring startup]
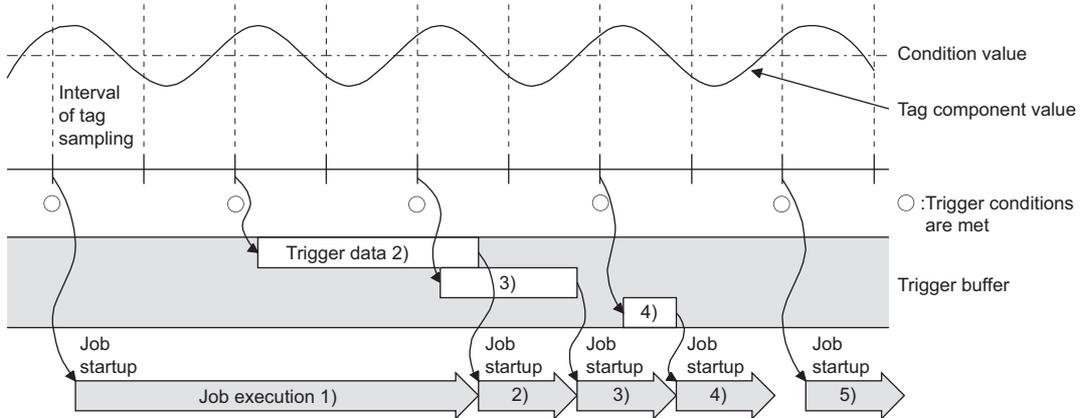
(b) When trigger conditions for multiple jobs are met concurrently

- Up to three jobs can start their executions concurrently in the order in [Job settings].
- After completion of these jobs, executions of the other jobs are started sequentially.
  Note that, if a job uses the same item in [Server service settings] that is currently used for another job, the job is not executed until another job execution is completed.

(c) When actions are set for a job
When actions are set for a job, if a communication error occurs, a timeout time will be generated.
In the case of multiple action settings, timeout time is generated for each action.
For the timeout time, refer to the following.

☞ 7.5 Setting Items of DB Connection Service Setting Tool

Timeout time occurs for each.
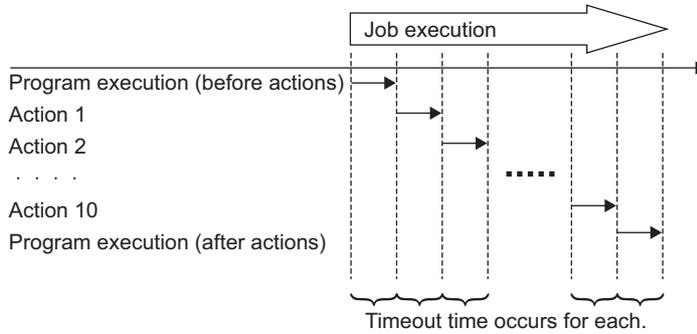
The time taken until completion of the job is obtained from the formula shown below.

No. of communications × Timeout time
No. of communications: Total number of set communication actions and program executions

Example) Time taken until completion of a job in the event of a communication error
No. of communications: 10 + 1 + 1 = 12

Time taken until job completion: 12 × 30s = 360s

Item	Setting
Communication action	12
Program execution (before action)	1
Program execution (after action)	1
Timeout	30 seconds

(d) Monitoring interval timeout
Depending on the number of set jobs or the trigger condition setting, the monitoring interval timeout may be generated.

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(2) When an error occurs in job execution

(a) The job execution is canceled when the error cause is the following:
  • Failure in device data writing due to network disconnection within the PLC system
  • Failure in device data writing, or operation error
  • Failure in access to the database (Except jobs for which [Enable DB buffering] is selected)
    ☞ 5.1.10 DB buffering function

(b) If a job execution is canceled, the operation processed before the error occurrence returns to the status before the job execution.

POINT

The following explains access to GOT device data and the database.

(1) GOT device data
Since all of data are written to the device data area in the GOT at a time upon completion of job execution, any change due to the error is not reflected in the device data of the GOT.

(2) Database
Rollback is executed assuming the time immediately before job activation as a commit point.

However, when the database is Wonderware® Historian, rollback is not executed.
When an error occurs during inserting data into a database, the data inserted into the database before occurring the error are reflected.

(c) When [Notify errors (job cancellation) that occur during job execution] has been selected, a value is assigned to the specified tag component.
    ☞ 6.7.5 Notify errors (job cancellation) that occur during job execution

6. MES INTERFACE FUNCTION SETTING

This chapter explains the setting of the MES interface function.

6.1 MES Interface Function Setting Screen

The MES interface function setting screen is a screen for configuring various settings required for the MES interface function.
In addition, the operation status of the MES interface function and the working log can be checked, and other operations such as stop/restart of the MES interface function can be also performed.

6.2 Displaying the MES Interface Function Setting Screen

1. Start GT Designer3.
For how to start GT Designer3, refer to the following manual.
☞ GT Designer3 Version1 Screen Design Manual (Fundamentals)

2. Perform the following:
- Select [Common] → [MES Interface] from the menu.

3. The MES interface screen is displayed. Configure the settings referring to the following descriptions.

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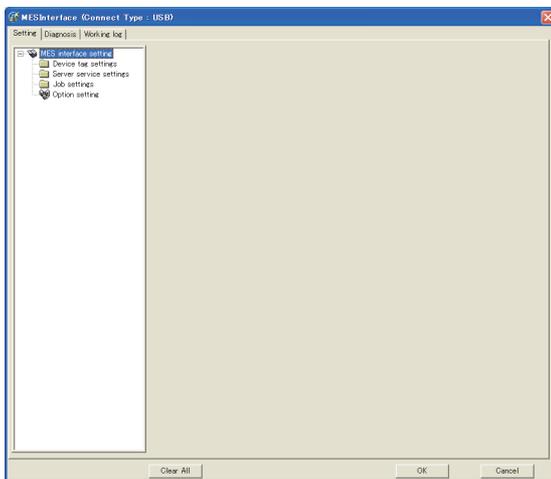
6.3 Screen Structure

This section explains the structure of the MES interface function setting screen.

6.3.1 Screen structure

Title bar

Tab

Edit items tree

☞ 6.3.2 Operations using the Edit items tree

Detailed setting edit screen
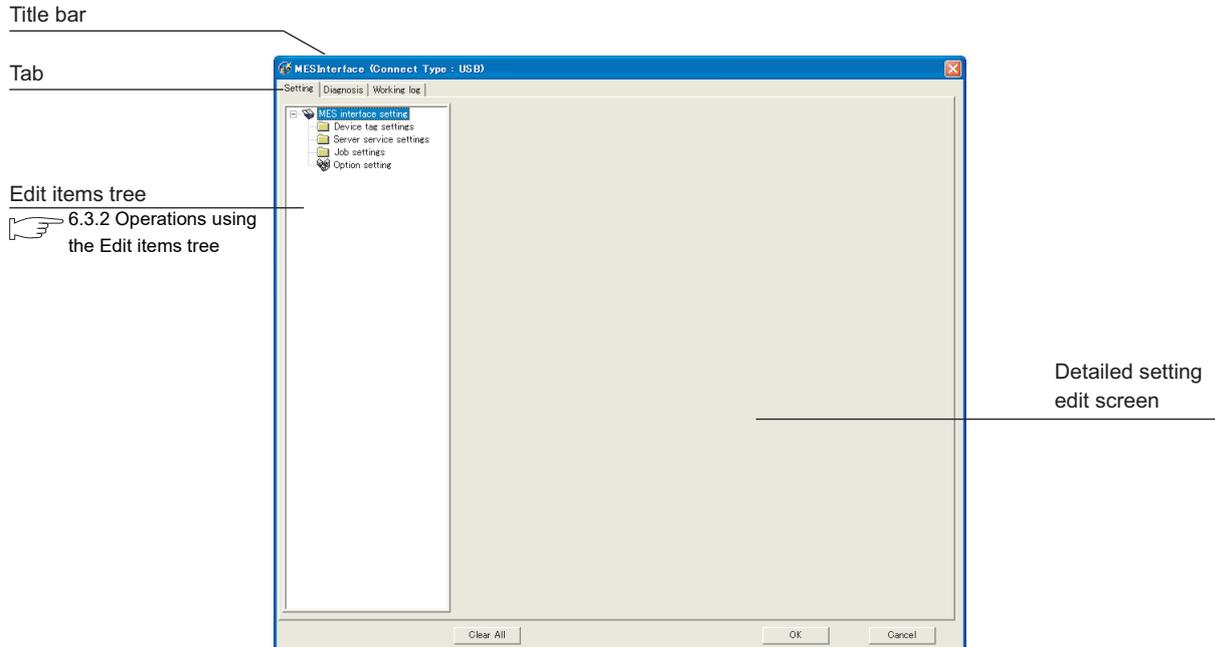
POINT

(1) Display on the title bar

On the title bar, the status of connection to the GOT is displayed.
The connection status displays are shown below.

Connection type	Display	Remarks
RS232	(Connect Type RS232 COM1)	Displays the communication port.
USB	(Connect Type USB)	-
Ethernet	(Connect Type Ethernet 192.168.3.10)	Displays the IP address.

(2) Column width adjustment

The column width of the tables can be adjusted on the MES interface function setting screen.
To adjust the width, drag the right boundary line of the column.
When only a part of a long item name is displayed, this adjustment is useful.

6.3.2 Operations using the Edit items tree

The Edit items tree shows overall MES interface function settings in a tree.
This section explains the operations using the Edit items tree.
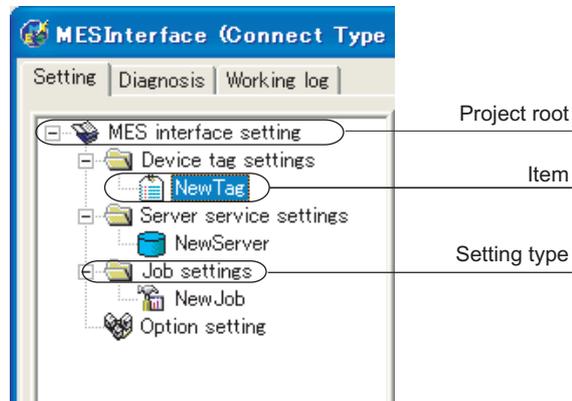
(1) Selecting an item

1. When double-clicking the project root or each setting type, some items are displayed.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.

(2) Adding an item

1. Selecting an item or a setting type to be added and performing either of the following will add the item.
   - Select an item of the same type or a setting type, right-click the mouse, and choose [Add].
   - Double-click a setting type that contains no item.

2. When the item is added properly, it is automatically selected and the edit screen is switched to the one for the added item.

POINT

Since the number of items that can be added is limited depending on the setting type, refer to the relevant section of each item.

(3) Deleting an item

1. Select an item to be deleted and right-click the mouse. Selecting [Delete] deletes the item.

POINT

For precautions on the item deletion, refer to the following.

☞ 6.12 (2) When deleting an item

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(4) Replicating an item

1. Select an item to be copied, right-click it to display the menu. Selecting [Copy & Paste] replicates the item.

2. When the item is added properly, it is automatically selected and the edit screen is switched to the one for the added item.

POINT

Since the number of items that can be added is limited depending on the setting type, refer to the relevant section of each item.

6.4 Setting

Configure the settings for the MES interface function.

1. Click the "Setting" tab.

2. The "Setting" sheet is displayed on the detailed setting edit screen.
For each of the setting items, refer to the section shown below.
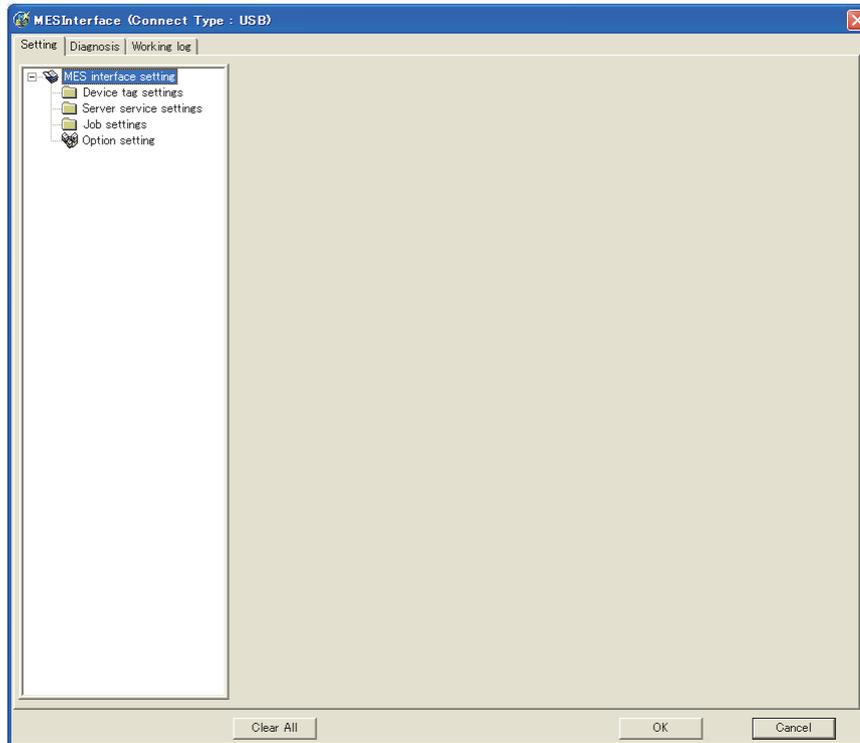
Item	Description	Reference section
Device tag settings	Configure the settings for the tag function.	6.6
Server service settings	Configure the settings for access to a server computer.	6.7
Job settings	Configure the settings for the DB interface function.	6.8
Option Setting	Configure the SNTP time synchronization setting and the DB buffering function setting.	6.9

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6.5 Device Tag Settings

Configure the settings for the tag function.
For the tag function, refer to the following:

☞5.1.3 Tag function
Configured tags are used in [Job settings], etc.

1. Double-clicking [Device tag settings] in the Edit items tree displays relevant items.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
Make the setting referring to the following descriptions.
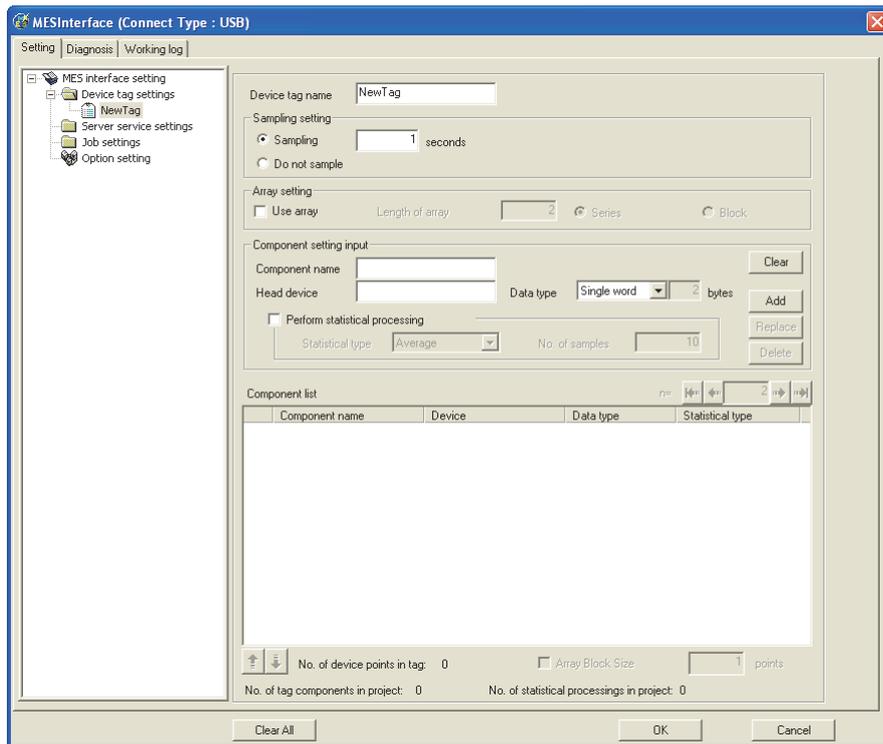
POINT

(1) How to add, delete, or copy an item
For addition, deletion or copying of items, refer to the following:

☞6.3.2 Operations using the Edit items tree

(2) When an item is added or copied, a "New Tag" item is added.

6.5.1 Setting items in Device tag settings

Up to 64 items can be set in [Device tag settings] within one project.

Item	Description
Device tag name	Enter a device tag name. (Up to 16 characters)
Sampling setting	Set whether to periodically sample the tag or not. Set a sampling interval to sample the tag.
Array setting	Set whether to use arrays for the tag or not. ☞ 6.5.2 Setting items in Array setting
Component setting input	Configure the tag component settings. ☞ 6.5.3 Setting items in Component setting
Component list	Displays a list of the components that have been already set. ☞ 6.5.3 Setting items in Component setting
Array block size	Make setting when changing the block size manually.
No. of tag components in project	Displays the number of all the tag components in the project.
No. of statistical processings in project	Displays the number of the components in the project, for which [Perform statisticcal processing] is selected.
No. of device points in tag	Displays the number of total device points used in [Device Tag setting].

(1) Device tag name (Up to 16 characters)

Enter a device tag name.

Configured tags are used in [Job settings], etc.

For characters that can be used for device tag names, refer to the following:

☞ Appendix2 About Monitoring Interval Timeout

Note that using the name same as the one set in [Server service settings] is not allowed.

(2) Sampling setting

(a) When sampling is enabled

The tag is sampled in the specified interval.

When selecting [Sampling], also set a sampling interval in units of seconds. The setting range for the interval is 1 to 32767 seconds.

(b) When sampling is disabled

The tag is not sampled.

When [Do not sample] is selected, statistical processing cannot be performed for tag component values.

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POINT

(1) The GOT becomes less busy if [Do not sample] is selected for the following tags.
- Tags only for writing
- Tags for sampling device values with the handshake operation.
  For the handshake operation, refer to the following:
  ☞6.7.2 (8) Handshake operation

(2) When [Do not sample] is selected, the setting items for reading tags cannot be selected for the tag. (Except cases that [Handshake operation] is set for the trigger conditions.)
- Tag component values that are set in [Select/Update conditions] in [Select] of [Communication action]

(3) When [Array setting] is set for the tag, [Do not sample] is fixed for the sampling setting.

6.5.2 Setting items in Array setting

An array is a data format, in which the specified number of data of the same data type are arranged sequentially.
The Array setting is set when writing multiple records extracted from a database to the same tag component.
Either of the following can be selected for device assignment to each tag component.
- Assigning consecutive devices to each tag component (series)
- Handling all tag components as a block and assigning the same kind of devices in a series of blocks (block)
Tags with array settings are used for [MultiSelect].
☞6.8.1 Setting items in Communication action

(1) Use array

When the [Use array] checkbox is checked, the tag is arranged as arrays.

POINT

(1) When the array setting is set, device data are not collected.

(2) The array setting is unavailable for the tags set for the actions in [Job settings].

(2) Length of array (Range: 2 to 40000, Default: 2)

Set the number of arrays for the tag.

(3) Series/Block (Default: Series)

Select a method for the array setting.

(a) Series

Devices of respective tag components are arranged consecutively.

(Example)When [Length of array] is set to 4 with [series] setting

Only the start device (device in n=1) need be set.

Devices in and after n=2 are configured automatically.

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(b) Block

Devices of all tag components are arranged as a block.

The size of the block can be changed in [array block size].

For [array block size], refer to the following.

☞6.5.3 Setting items in Component setting

Usually, the block size need not be changed because it is automatically adjusted to avoid device duplication.

(Example) When [Length of array] is set to 4 with [block] setting

Only the start device (device in n=1) need be set.

Devices in and after n=2 are configured automatically

	n=1	n=2	n=3	n=4
Component A	GD0	GD7	GD14	GD21
Component B	GD1 to GD2	GD8 to GD9	GD15 to GD16	GD22 to GD23
Component C	GD3 to GD6	GD10 to GD13	GD17 to GD20	GD24 to GD27

Block

POINT

When device types are different, [block] cannot be selected.

For the device types, refer to the following.

☞3.2 GOT Devices Available for the MES Interface Function

6.5.3 Setting items in Component setting

Configure the settings for assigning GOT devices to tags.
Up to 256 components can be set for one tag.
Up to 4096 components can be set for one project.

(Adding a component)
- Set required items in [Component setting input], and click the ⏢Add⏢ button.
- The component is added in [Component list].

(Modifying a component)
- When a component to be modified is selected in [Component list], its settings are displayed in [Component setting input].
- Modify the item settings in [Component setting input], and click the ⏢Replace⏢ button.

(Deleting a component)
- Select a component to be deleted in [Component list], and click the ⏢Delete⏢ button.

(Deleting the settings in [Component setting input])
- Clicking the ⏢Clear⏢ button deletes the settings in [Component setting input].

Item			Description
Component setting input	Component name		Enter a component name. (Up to 16 characters)
	Head device		Set device name.
	Data type		Select the data type of the sampling data.
	Character string length		Set a character string length when [String] is selected for [Data type].(1 to 32 characters)
	Perform statistical processing		Set whether to perform statistical processing or not.
Component List	Component name		Displays a component name.
	Device		Displays a device range used.
	Data type		Displays a data type.
	Statistical type		When [Perform statistical processing] is set, displays the type of statistical processing.
	Device [n]		When [Array setting] is set, displays the device range of array No.n. For a display example, refer to the following. ☞ 6.5.2 Setting items in Array setting
	n (Arrray No.)		Displays the array No. that is currently displayed in [Device [n]] of [Component List].
		|< button	If this is clicked, the device range of the first array is displayed in [Device [n]] of [Component List]. When the device range of the first array is already displayed, this button cannot be clicked.
		< button	If this is clicked, the device range of the previous array is displayed in [Device [n]] of [Component List]. When the device range of the first array is already displayed, this button cannot be clicked.
		> button	If this is clicked, the device range of the next array is displayed in [Device [n]] of [Component List]. When the device range of the last array is already displayed, this button cannot be clicked.
		>| button	If this is clicked, the device range of the last array is displayed in [Device [n]] of [Component List]. When the device range of the last array is already displayed, this button cannot be clicked.
	↑ button		Selecting a component in [Component List] and clicking the ↑ button reverses the order between the selected component and the one immediately above it. The ↑ button cannot be clicked on the first component.
	↓ button		Selecting a component in [Component List] and clicking the ↓ button reverses the order between the selected component and the one immediately below it. The ↓ button cannot be clicked on the last component.
Array block size			Make setting when changing the block size manually.

POINT

The following are displayed on the status bar of [Device Tag setting].
- [No. of tag components in project]
  The total number of tag components in the project is displayed.
- [No. of statistical processings in project]
  The number of component settings in the project, for which [Perform statistical processing] is checked, is displayed.
- [No. of device points in tag]
  The total number of device points used in [Device tag settings] is displayed.
  Up to 40000 device points can be set for a tag with [Array setting].

(1) Component name (Up to 16 characters)

Enter a component name.

For characters that can be used for component names, refer to the following:

☞ Appendix.1.2 Characters applicable to item names, component names, variable names, etc.

(2) Device

- Set a device type and an actual device number.
- Bit specification is not allowed for word devices.
- For accessible devices, refer to the following:

  ☞ 3.2 GOT Devices Available for the MES Interface Function

(3) Data type

Select the data type of the sampling data (device data).

Item	Description	Selectable Device
Single word	Handles data as single word data (16-bit Integer type).	Word
Double word	Handles data as double word data (32-bit Integer type).	Word
Real number	Handles data as floating point data.	Word
Bit	Handles data as bit data (in units of bits (0/1)).	Bit
String[*1]	Handles data as character strings.	Word

*1 When [Data type] is [String], device values are processed as follows:
- When the device value is not an ASCII code or JIS code
  It is replaced with "." (period: 2EH).
- When the device value is a model-dependent character
  The character code may be converted when an action is executed.
  ☞ Appendix.1.2 Characters applicable to item names, component names, variable names, etc.
- When the device value is a termination character (NULL code: 00H)
  The character data following it are ignored. (The character string is regarded as terminated.)

(4) Character string length (2 to 32 characters)

(a) Set a character string length when [String] is selected for [Data type].

(b) When [String] is selected, data are stored as follows:

1) When the value length is shorter than the character string length
   NULL codes (00H) are stored after the stored values.
   Example: "ABCD" is stored in the device of the tag component, whose character length is 8.

A	B	C	D				
41h	42h	43h	44h	00h	00h	00h	00h

2) When the value length is longer than the character string length
   The values whose quantity is equal to the character string length are stored.
   Example: "ABCD" is attempted to be stored in the device of the tag component, whose character length is 2.
   "AB"

(c) Odd numbers are not allowed for the character string length setting.
    Set an even number for the character string length.

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(5) Perform statistical processing

(a) Set whether to perform statistical processing or not.
Up to 64 components that have [Perform statistical processing] setting can be set in all projects. (Check [No. of statistical processings in project] on the status bar.)
When the [Perform statistical processing] box is checked, statistical processing is performed for tag component values.
Statistically processed values can be used by specifying the tag component values, for which [Perform statistical processing] is selected, in [Job setting].
Note that this setting is not available when:
  • [Do not sample] is selected in [Sampling setting].
  • The data type of the tag component is [String].
  • [Array setting] is set.

(b) When [Perform statistical processing] is selected, set the following items.

Item	Description
Statistical type	Select a type of the statistical processing.
No. of samples	Specify the number of samples when [Moving average], [Moving maximum], or [Moving minimum] is selected.

1) Statistical type
Select a type of the statistical processing.

Item	Description
Average[*1]	An average value after starting sampling
Maximum[*1]	The maximum value after starting sampling
Minimum[*1]	The minimum value after starting sampling
Moving average[*2 *3]	An average of the tag component values that are collected at sampling intervals for the number of times specified by [No. of samples] Since the processing range moves at each sampling, the latest value can be obtained.
Moving maximum[*2 *3]	The maximum value in the tag component values that are collected at sampling intervals for the number of times specified by [No. of samples] Since the processing range moves at each sampling, the latest value can be obtained.
Moving minimum[*2 *3]	The minimum value in the tag component values that are collected at sampling intervals for the number of times specified by [No. of samples] Since the processing range moves at each sampling, the latest value can be obtained.

[*1]   If a statistical value of [Average], [Maximum], or [Minimum] is reset, a value obtained after resetting will be stored.
  • How to reset a statistical value of [Average], [Maximum], or [Minimum]
  Perform substitution of some value for the relevant tag component using [Operation action] of a job.
  For operation actions, refer to the following:
  ☞6.8.2 Setting items in Operation action
  The statistical processing is reset and a value processed after the substitution is stored.
[*2]   Statistical values of [Moving average], [Moving maximum], and [Moving minimum] cannot be reset.
[*3]   When a tag component having [Moving average], [Moving maximum], or [Moving minimum] setting is specified in a job, the job is not activated until data are collected for the specified number of times after start of sampling.

2) No. of samples (2 to 20)

Specify the number of samples when [Moving average], [Moving maximum], or [Moving minimum] is selected.

(Moving average when [No. of samples] is 4)

<Change in tag component values>

1st	2nd	3rd
$\dfrac{1)+2)+3)+4)}{4}$	$\dfrac{2)+3)+4)+5)}{4}$	$\dfrac{3)+4)+5)+6)}{4}$
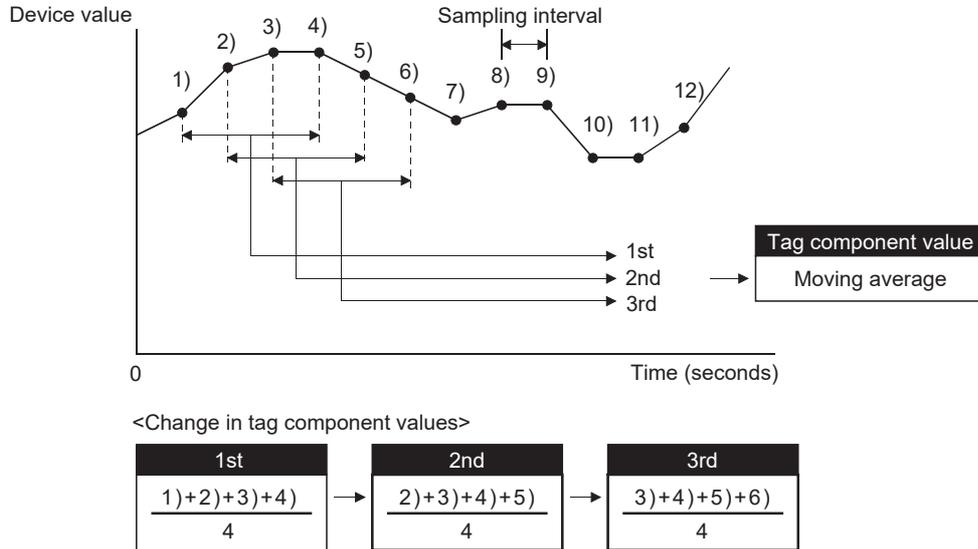
(6) n (Array No.)

When [Array setting] is set, the device range of array No.n, is displayed in [Device [n]] of [Component List].

To change the [Device [n]] display, use the following methods.

- Enter a value in the box.

- Change the value with the ⇤ , ← , ⇒ , or ⇥ button.

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(7) Array block size

When [block] is selected in [Array setting], [array block size] setting is available.

Usually, the block size need not be changed because the it is automatically adjusted to avoid duplication of components.

Change [array block size] when:

 • Setting a desired number for the start device No. of each block.
 • Adding any component in the future.

The following example explains the cases where [array block size] is manually set and is not set.

(Example) When [Component D] is to be added in the future

 • When 10 is set for [array block size], device numbers are not changed.
 • When nothing is set for [array block size], device numbers in and after array No.2 are changed.

[When the size is set]
(Array block size = 10)

	n=1	n=2	n=3
Component A	GD0	GD10	GD20
Component B	GD1 to GD2	GD11 to GD12	GD21 to GD22
Component C	GD3 to GD8	GD13 to GD18	GD23 to GD28
Component D	GD9	GD19	GD29

Component name	Device	Data type
Component A	GD0	Single word
Component B	GD1	Double word
Component C	GD3	String (12 characters)
Component D	GD9	Single word

Planned to be added →

[When the size is not set]

	n=1	n=2	n=3
Component A	GD0	GD9 →GD10	GD18 →GD20
Component B	GD1 to GD2	GD10 to GD11 →GD11 to GD12	GD19 to GD20 →GD21 to GD22
Component C	GD3 to GD8	GD12 to GD17 →GD13 to GD18	GD21 to GD26 →GD23 to GD28
Component D	GD9	GD19	GD29

(8) Precautions on [Component setting]

If a wrong device number is set for a component in [Component setting], an error will occur on another component that has the same access target CPU setting.

Correct the device number in [Component setting].

6.6 Server Service Settings

Configure the settings for the access to a server computer.
The set server service name is used in [Job setting].

1. Double-clicking [Server Service setting] in the Edit items tree displays relevant items.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
Make the setting referring to the following descriptions.

POINT

(1) How to add, delete, or copy an item
For addition, deletion or copying of items, refer to the following:
☞ 6.3.2 Operations using the Edit items tree

(2) When an item is added or copied, a "NewServer" item is added.

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6.6.1 Setting items in Server service settings

Up to 8 items can be set in [Server service settings] within one project.

Item	Description
Sever service name	Enter a server service name. (Up to 16 characters)
Server type	Select the server type of the server computer to be accessed.
IP address	Enter a decimal IP address of the server computer where DB Connection Service is installed.
Port No.	Set a port number of the server computer. (Range: 1024 to 65535, Default: 5112)
User name	Set a user name used to access the server computer. (Up to 30 characters)
Password/Confirm password	Set a password used to access the server computer. (Up to 30 characters)
Data source name	Set the name of the ODBC data source to be accessed.
Database type	Select the type of the database server.
Access error notification setting	Set whether to enable or disable notification of the access error status.
Connection timeout	In case a connection error occurs on the network between the GOT and the server computer, set a timeout time during which the GOT will detect the error. (Range: 1 to 180 seconds, Default: 10 seconds)

(1) Server service name (Up to 16 characters)

Enter a server service name.

The set server service name is used in [Job setting].

For characters that can be used for server service names, refer to the following:

☞ Appendix.1.2 Characters applicable to item names, component names, variable names, etc.

Note that using the name same as the one of the device tags set in [Device tag settings] is not allowed.

(2) Server type

(a) Select the server type of the server computer to be accessed.

Item	Description
Database server	Used in [Communication action] of [Job setting].
Application server	Used in [Program execution] of [Job setting].

(b) When [Database server] is selected, set the following items.

Item	Description
Data source name	Set the name of the ODBC data source to be accessed. For characters that can be used for data source names, refer to the following: ☞ Appendix.1.4 Characters applicable to field names, table names, etc.
Database type	Select the type of the database server.[*1] • Oracle 8i • Oracle 9i • Oracle 10g • SQL Server 2000/2005 • MSDE2000 • Access2000 • Access2003/2007 • Wonderware® Historian

*1 When using Oracle® 12c or Oracle® 11g, select [Oracle 10g].

When using Microsoft® SQL Server 2012, Microsoft® SQL Server 2008 R2, and Microsoft® SQL Server 2008, select [SQL Server 2000/2005].

When using Microsoft® Access® 2013 or Microsoft® Access® 2010, select [Access2003/2007].

(3) IP address

Enter a decimal IP address of the server computer where DB Connection Service is installed.

(4) Port No. (Range: 1024 to 65535, Default: 5112)

Set a port number of the server computer.

Set the same value in [Port No.] as the one set in [Service port] of DB Connection Service.

☞ 7.5 Setting Items of DB Connection Service Setting Tool

(5) User name (Up to 30 characters)

Set a user name used to access the server computer.

For characters that can be used for user names, refer to the following:

☞ Appendix.1.3 Characters applicable to character string constants, etc.

(a) When [Database server] is selected for [Server type]

Set a user name that is required for ODBC access.

(b) When [Application server] is selected for [Server type]

Set the account user name used for the operating system (OS) of the application server computer.

(6) Password/Confirm password (Up to 30 characters)

Set a password used to access the server computer.

For characters that can be used for passwords, refer to the following:

☞ Appendix.1.3 Characters applicable to character string constants, etc.

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(7) Access error notification setting

(a) [Notify the access error status.]

Set whether to enable or disable notification of the access error status.

If the [Notify the access error status.] box is checked, an error occurred in access to the server computer is reported to a tag component.

(b) When [Notify the access error status.] is selected, choose a tag component into whose device the access error status data is stored.

Tags that have a tag component with [Array setting] cannot be selected.

Data are stored as follows depending on the data type.

Data type of tag component	Description
Bit	OFF: Normal/Not accessed/Network line disconnected ON: Access error status
String	"0": Normal/Not accessed/Network line disconnected "1": Access error status
Other than the above	0: Normal/Not accessed/Network line disconnected 1: Access error status

(8) Connection timeout (Range: 1 to 180 seconds, Default: 10 seconds)

In case a connection error occurs on the network between the GOT and the server computer, set a timeout time during which the GOT will detect the error.

Usually, this setting is not needed.

In any of the following cases, adjust the connection timeout time if necessary.

(a) Reduce the connection timeout time to:
- Make the time elapsed from occurrence of a connection error to the start of DB buffering shorter.
- Make the time elapsed from occurrence of a connection error to notification of an access error and job cancellation shorter.

(b) Increase the connection timeout time when:
- A connection timeout occurs in spite of normal network condition.

POINT

The relation of the values set for [Connection timeout] and [DB access timeout time] in [DB Connection Service Setting Tool] must be as follows:

- Connection timeout value $\leqq$ DB access timeout value

6.7 Job Settings

Configure the settings for the DB interface function.
For the DB interface function, refer to the following:
☞5.1 DB Interface Function

1. Double-clicking [Job settings] in the Edit items tree displays relevant items.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
Make the setting referring to the following descriptions.
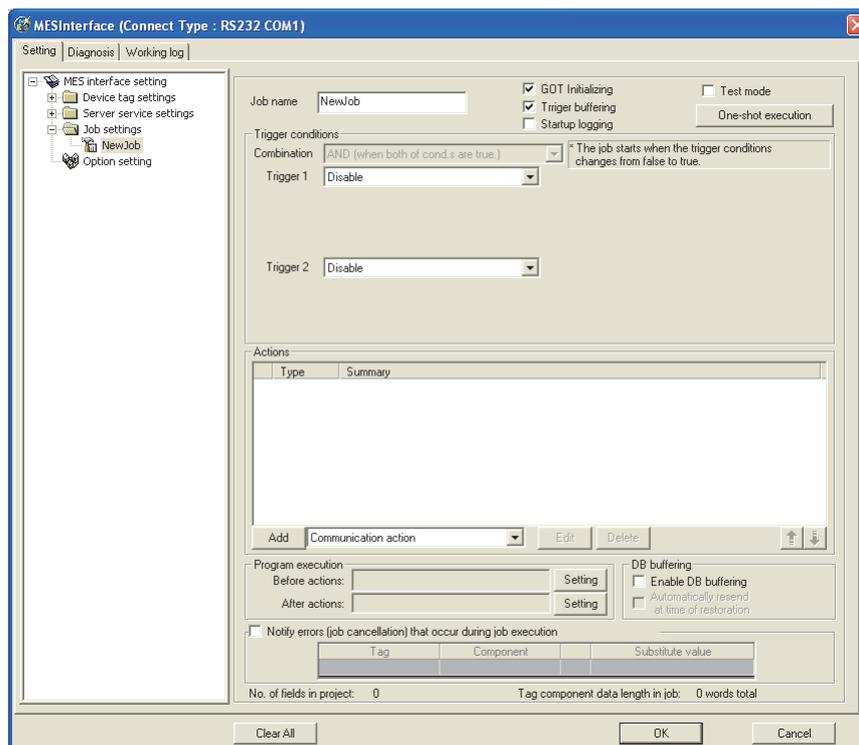
POINT

(1) How to add, delete, or copy an item
For addition, deletion or copying of items, refer to the following:
☞6.3.2 Operations using the Edit items tree

(2) When an item is added or copied, a "New Job" item is added.

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6.7.1 Setting items in Job settings

Up to 64 items can be set in [Job settings] within one project.
For job operations, refer to the following:

☞5.3 Precautions

Item	Description
Job name	Enter a job name. (Up to 16 characters)
GOT Initializing	Set whether to enable the job at startup of the GOT or not.
Trigger buffering	Set whether to enable the trigger buffering or not.
Startup logging	Set whether to output the startup history of the job to the log or not.
Test mode	Set whether to operate the job in test mode or not.
Trigger conditions	Configure the settings for startup conditions of the job. ☞6.7.2 Setting items in Trigger conditions
Action	Configure the action settings. ☞6.8 Job Settings - Actions
Program execution	Configure the settings for the program execution function. ☞6.7.3 Setting items in Program execution
DB buffering	Configure the settings for the DB buffering function. ☞6.7.4 Setting items in DB Buffering
Notify errors (job cancellation) that occur during job execution	Set whether to enable or disable notification of errors (job cancellation) that occur during job execution. ☞6.7.5 Notify errors (job cancellation) that occur during job execution
No. of fields in project	Displays the total number of fields in the project.
Tag component data length in job	Displays the total data length of the tag components in the job.

(1) Job name (Up to 16 characters)

Enter a job name.

For characters that can be used for job names, refer to the following:

☞Appendix.1.2 Characters applicable to item names, component names, variable names, etc.

(2) GOT Initializing

(a) Set whether to enable the job at startup of the GOT or not.

If the [GOT Initializing] box is not checked, the job is disabled at startup of the GOT. (Even if trigger conditions are met, the job is not executed.)

(b) When the GOT is ON, the enable/disable setting of the job can be changed in [Change Job Status] on the [Diagnosis] tab.

☞6.10.3 Changing the job status (Change job status)

(3) Trigger buffering

(a) Set whether to enable the trigger buffering function or not.

For the trigger buffering function, refer to the following:

☞5.1.5 Trigger buffering function

(b) Precautions for enabling [Trigger buffering]
  • [Handshake operation] cannot be selected for the trigger conditions.
  • A tag component cannot be selected for the substitution tag in [Operation action].
  • Tag component values cannot be set for [DB-tag link setting] in [Select] of [Communication action].
  • [Communication action] - [MultiSelect] cannot be selected.
  • Up to 4096 words can be used for the total data length of tag components in one job. (The current data length is displayed on the status bar of [Job setting].)

POINT

The total data length of tag components in one job is the total data length of tag components set in [Communication action] and [Operation action]. In [Communication action], tag components are set in [Select/Update conditions] and [DB-tag link setting].

All tags in one job are treated as different tags even if there are the same tags.

---

(4) Startup logging

(a) Set whether to output the startup history of the job to the log or not.

If this function is enabled, the job startup timing can be checked during system start-up or tune-up.

When the [Startup logging] box is checked, the startup history of the job (date and time, job name, trigger conditions) is saved on a CF card.

The startup log can be confirmed in [Job Execute Log] on the [Working log] tab.

☞6.11.2 Job Execute Log

(b) When the log capacity becomes full (Log capacity: 1MB × 2)

The first half of the data are deleted.

The latest log is stored after the remaining data.

(c) When this function is enabled, a processing time is required for saving or deleting the startup history of the job.

It is recommended to disable this function during system operation.

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(5) Test mode

(a) Set whether to operate the job in test mode or not.
Up to 4 jobs can be set to [Test mode].
When the [Test mode] box is checked, the test mode is activated, and execution details of the job can be confirmed before operation.
Job execution can be confirmed in [Job Execute Log] on the [Working log] tab.

(b) When [Test mode] is selected
The following are performed in the test mode.
Operations other than the following are identical to the actual operations.
- Startup data are logged.
- Detailed data are logged.
- Data are not written to GOT devices.
- No data are written to the database.

6.7.2 Setting items in Trigger conditions

Configure the settings for startup conditions of the job.
The job is activated when the trigger condition value is changed from false to true.
At the time of power-up, at restart of the MES interface function, or at the end of one-shot execution, all the conditions are initialized to false, and the job is started up when the initial condition is true.

Item	Description
Combination	Selects conjunction of Trigger 1 and 2.
Trigger 1	Selects Trigger 1.
Trigger 2	Selects Trigger 2.

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(1) Combination

    (a)   Selects a combination of [Trigger 1] and [Trigger 2].
- OR (When either of them is true, the result is true.)
- AND (When both of them are true, the result is true.)

When the combination result of [Trigger 1] and [Trigger 2] is changed from false to true, the job is activated.

    (b)   The following shows the timings at which the combination result of [Trigger 1] and [Trigger 2] is changed from false to true.
(In any other cases, because the combination result is not changed from false to true, the job is not activated.)

Combination	Trigger 1	Trigger 2	Combination result
OR (When either of them is true, the result is true.)	(Changed from false to true)	(Remained false)	(Changed from false to true)
	(Changed from false to true)	(Changed from false to true)	
	(Remained false)	(Changed from false to true)	
AND (When both of them are true, the result is true.)	(Changed from false to true)	(Remained true)	
	(Changed from false to true)	(Changed from false to true)	
	(Remained true)	(Changed from false to true)	

(2) Trigger 1, Trigger 2

Select items for [Trigger 1] and [Trigger 2], referring to this section (3) and subsequent descriptions.

Item	Description	Trigger 1	Trigger 2
Disable	No trigger conditions ☞ This section (3) Disable	○	○
Time specification startup	When the specified date, time and day of the week match the actual date, time and day of the week, the condition changes from false to true, resulting in job startup. ☞ This section (4) Time specification startup	○	○
Specified time period startup	The condition is alternated between true and false in the specified cycles (unit: seconds), and when it changes from false to true, the job is activated. ☞ This section (5) Specified time period startup	○	○
Value monitoring startup	The actual tag component value is compared with the condition value (tag component value or constant value) at every sampling times, and the job is activated when the condition changes from false to true. ☞ This section (6) Value monitoring startup	○	○
GOT Initializing	The job is activated only once when the GOT is started up. ☞ This section (7) GOT Initializing	○	○
Handshake operation	The job is activated when [Handshake startup] of the GOT turns ON. Upon completion of the job execution, [Completion notification] of the GOT turns ON. ☞ This section (8) Handshake operation	○	×

○: Selectable, × : Not selectable

(3) Disable

(a) When [Disable] is selected for [Trigger 1] or [Trigger 2]
Another trigger is regarded as a trigger condition.

(b) When [Disable] is selected for both [Trigger 1] and [Trigger 2]
The job is not activated by trigger conditions.
The job can be executed only by one-shot execution.

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(4) Time specification startup

(a) When the specified date, time and day of the week match the actual date, time and day of the week, the condition changes from false to true, resulting in job startup.

(b) When [Time specification startup] is selected, the date, time, and day of the week must be set.

1) Year, Month, Day, Hour, and Minute
   Directly enter the date and time.
   Matching with the actual date and time is not checked for any field that remains blank.

Item	Description
Year (4 digits)	0000 to 9999
Month	1 to 12
Day	1 to 31
Hour	0 to 23
Minute	0 to 59

2) Day:
   Specify a day of the week.
   Check the checkbox of the day to be specified.
   If no box is checked, it means "every day".

(Example) The following shows that the job is to be activated at 17:30 on Monday through Friday.

(Example) The following shows that the job is to be activated at 9:00 on the 1st day of every month.

POINT

If [Startup logging] is selected, each job startup can be confirmed with the time to the second in the startup log.
The startup log can be checked on the [Working log] tab.
☞6.11 Working Log

(5) Specified time period startup

(a) The condition is alternated between true and false in the specified cycles (unit: seconds), and when it changes from false to true, the job is activated.

(b) When [Specified time period startup] is selected, set the cycle.
(Range: 1 to 32767 seconds)

(Example)
The following shows that the job is activated at 60-second intervals for an hour from 12:00 to 13:00 every day.

(6) Value monitoring startup

(a) The actual tag component value is compared with the condition value (tag component value or constant value) at every sampling times, and the job is activated when the condition changes from false to true. Even if the trigger condition becomes true temporarily between samplings, the job is not activated unless it is true at time of sampling.
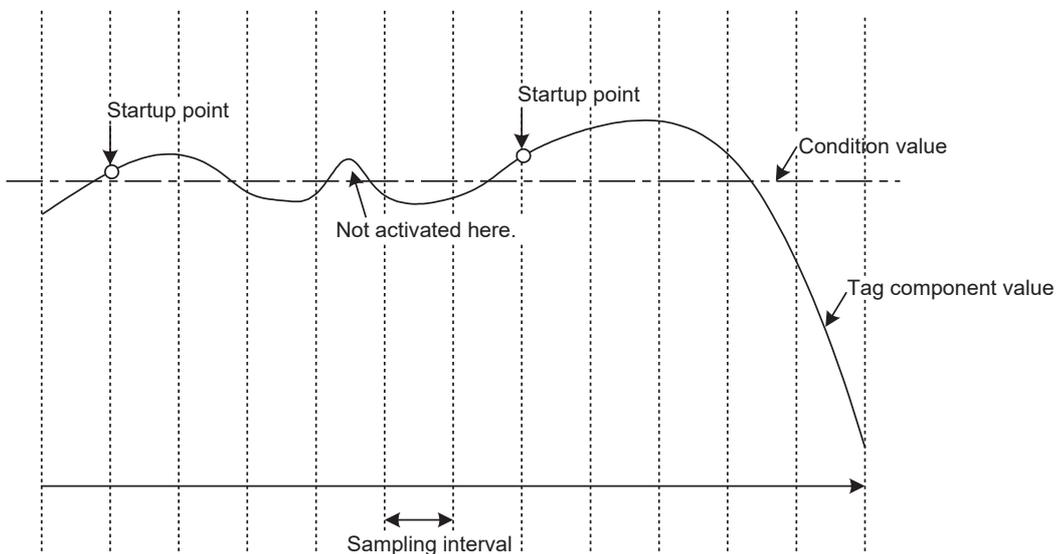
(b) When [Value monitoring startup] is selected, specify conditions for comparison.

1) Tag, Component
   Select a tag component to be compared with.
   Tags that have a tag component with [Array setting] cannot be selected.
2) Condition
   Select a condition for comparison.

Item	Description
=	The tag component value is equal to the condition value.
≠	The tag component value is not equal to the condition value.
≧	The tag component value is equal to or greater than the condition value. (Not selectable when [Data type] of the tag component is [bit] or [String])
>	The tag component value is greater than the condition value. (Not selectable when [Data type] of the tag component is [bit] or [String])
<	The tag component value is smaller than the condition value. (Not selectable when [Data type] of the tag component is [bit] or [String])
≦	The tag component value is equal to or smaller than the condition value. (Not selectable when [Data type] of the tag component is [bit] or [String])

3) Tag/Type
   Select a tag or constant that is used as a condition for comparison.
   Tags that have a tag component with [Array setting] cannot be selected.
4) Component
   Select or enter a component/constant value that is used as a condition for comparison.

   (Example)
   The following shows that the job is activated when the value of the tag component (Process 1, Temperature) reaches 45 or higher.

(Example)
To activate the job repeatedly while the condition of [Value monitoring startup] is met,
Make settings as follows:

Item	Description
Combination	AND (When both of them are true, the result is true.)
Trigger 1, Trigger 2	[Value monitoring startup], [Specified time period startup]

As the condition alternates between true and false as shown below, job startup can be repeated while the [Value monitoring startup] condition is met.
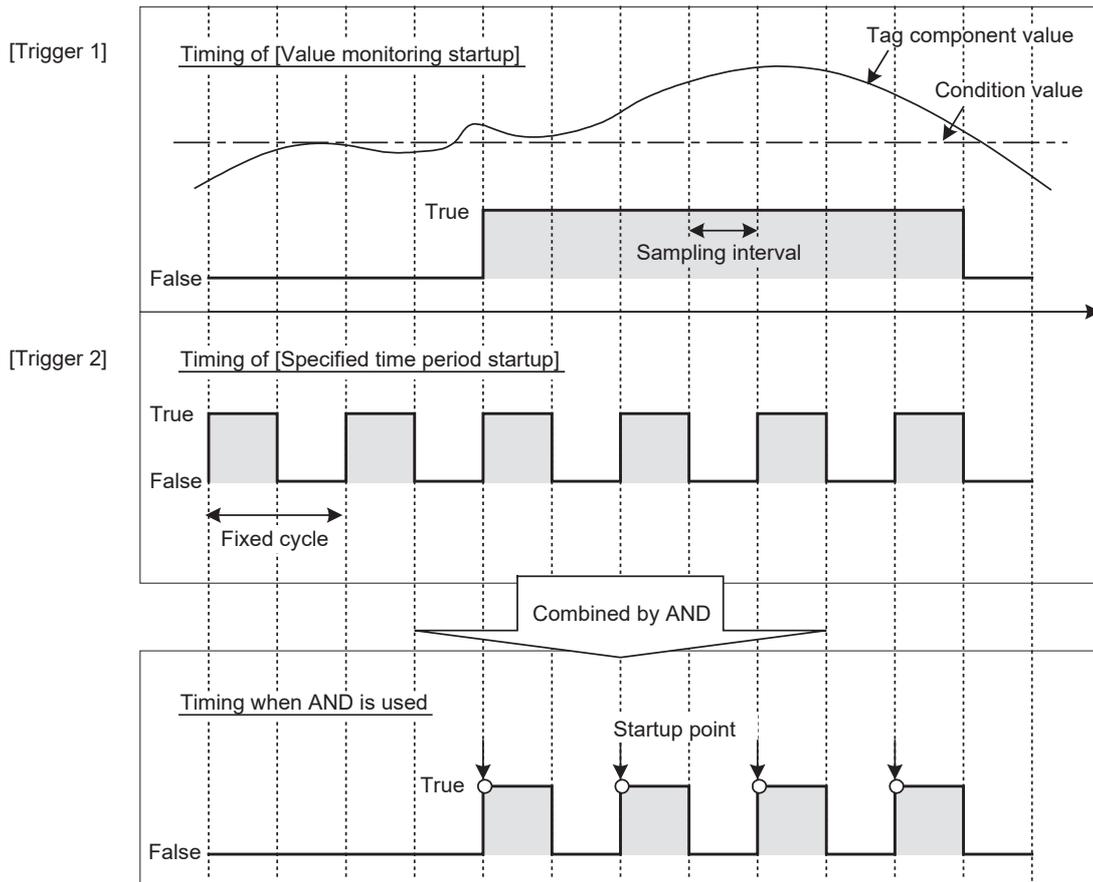
(7) GOT Initializing
The job is activated only once when the GOT is started up.

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(8) Handshake operation

   (a)   The job is activated when [Handshake startup] of the GOT turns ON.
         Upon completion of the job execution, [Completion notification] of the GOT turns ON.
         [Handshake operation] is a startup method by which completion of job execution can be notified to a GOT.
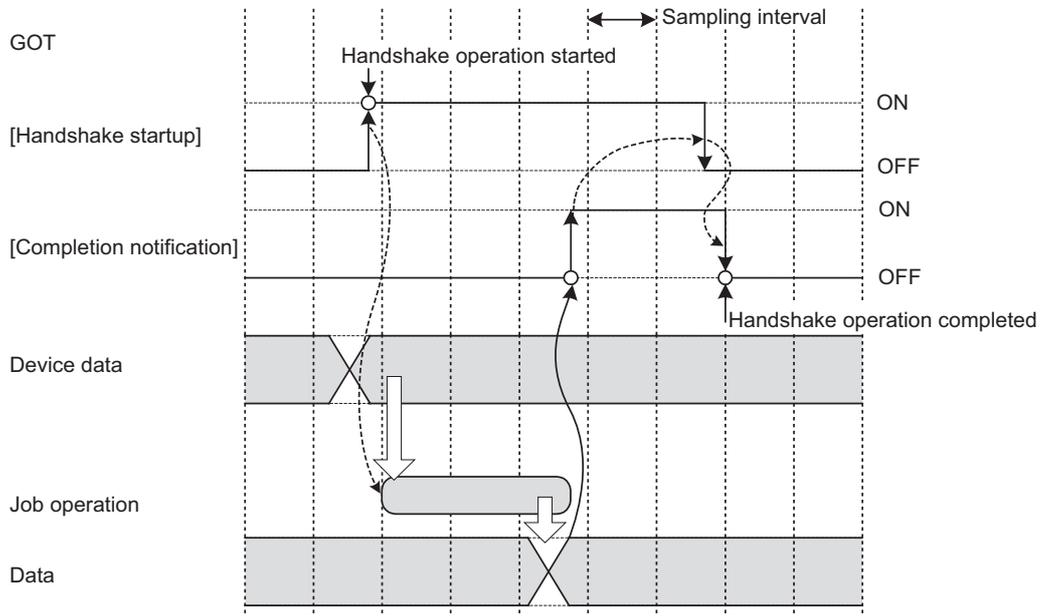
1. When [Handshake startup] turns ON in the sequence program, the GOT collects tag component values used for the job and executes the job.

2. Upon completion of the job execution, [Completion notification] of the GOT is turned ON.[*1]

3. After confirming that [Completion notification] is ON, turn OFF [Handshake startup] of the GOT.

4. When [Handshake startup] turns OFF, the GOT turns OFF [Completion notification], causing the handshake operation to be completed.

5. After confirming the completion of the handshake operation, the next job is executed.

   *1   If an error occurs during job execution, [Completion notification] does not turn ON.
          To detect such an error, enable [Notify errors (job cancellation) that occur during job execution].
          ☞ 6.7.5 Notify errors (job cancellation) that occur during job execution

   (b)   [Handshake operation] is selectable only in [Trigger 1].
         When [Handshake operation] is selected, selection is not allowed for [Trigger 2].
         For selection of [Handshake operation], set the following items.

Item	Description
Handshake startup	Select a tag component used to request for job startup. (Selectable only when [Data type] of the tag component is [bit]) Tags that have a tag component with [Array setting] cannot be selected.
Completion notification [*1]	Select a tag component that allows notification of execution completion of the job. (Selectable only when [Data type] of the tag component is [bit]) Tags that have a tag component with [Array setting] cannot be selected.

   *1   Do not specify the same [Completion notification] to multiple jobs.

6.7.3　Setting items in Program execution

Configure the settings for the program execution function.
For the program execution function, refer to the following:

☞5.1.9 Program execution function

1. Click the Setting button of [Before actions] or [After actions].
　　• Before actions:
　　　Set a program to be performed before execution of the first action of the job.
　　• After actions:
　　　Set a program to be performed after execution of the last action of the job.

2. [Program execution setting (before action)] or [Program execution setting (after action)] is displayed.
Make the setting referring to the following descriptions.
After completing the setting, click the OK button.

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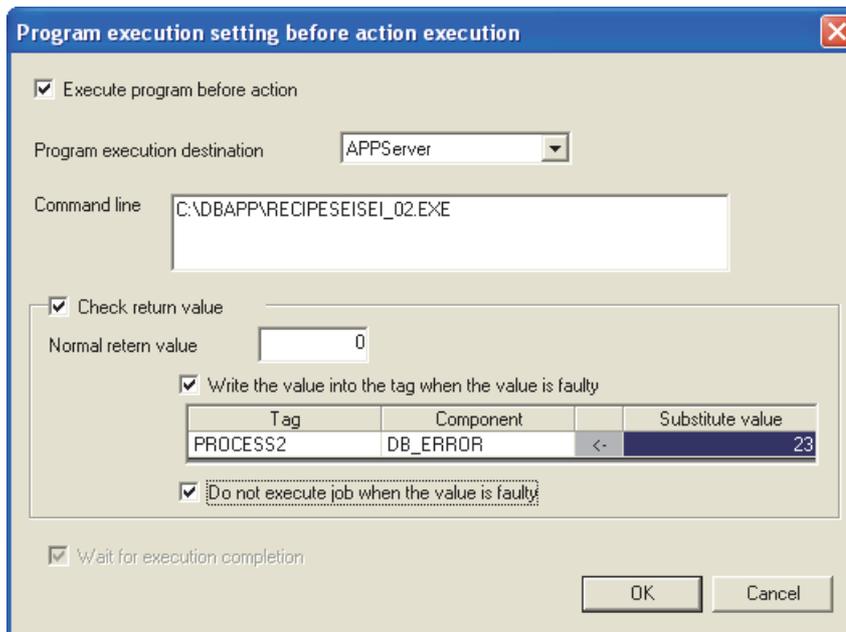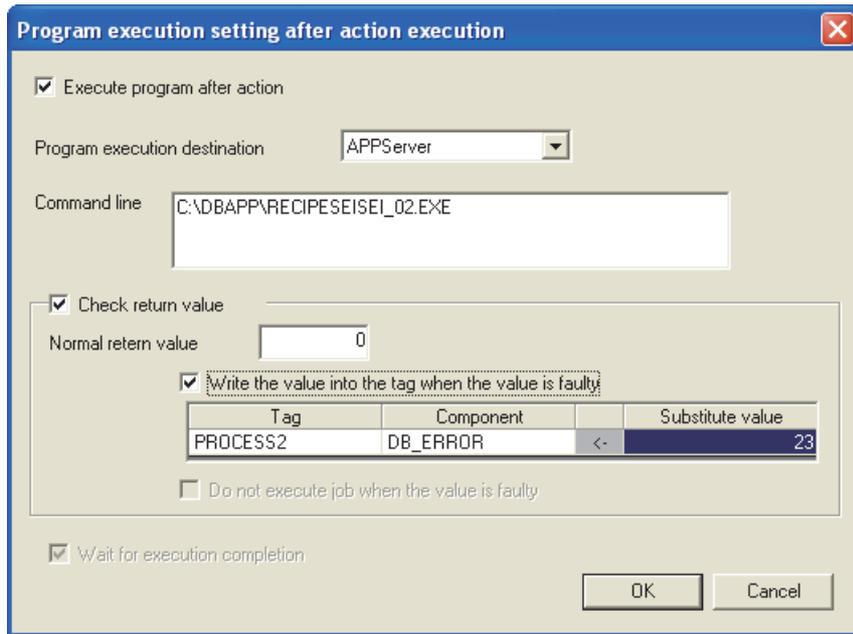
Item	Description
Execute program before (after) action	Set whether or not to enable program execution before or after execution of actions.
Program execution destination	Select an application server to be accessed.
Command line	Enter a command line for the program that is executed on the application server computer. (Up to 127 characters)
Check return value	Set whether to check the return value or not.
Wait for execution completion	Set whether or not to wait for execution completion of the program before executing the next processing.

(1) Execute program before action, or Execute program after action

(a) Set whether or not to enable program execution before or after execution of actions.

(b) When [Execute program before action] or [Execute program after action] is enabled, make the setting described in this section (2) and subsequent sections.

(2) Program execution destination
Select an application server to be accessed.

(3) Command line (Up to 127 characters)
Enter a command line for the program that is executed on the application server computer.[1][2]
For characters that can be used for command lines, refer to the following:
☞Appendix.1.1 ASCII code table

[1]   Programs that need to be run with administrator privileges (by a user in Administrators group) are not executable.
[2]   To execute a program including any displays, place the application server computer into the logon status.

(4) Check return value

(a) Set whether to check the return value or not.
When the [Check return value] box is checked, the return value (End code) of the executed program is checked.
If no return value is returned within the [DB access timeout] time set in DB Connection Service Setting Tool, a timeout error is detected and the job execution is canceled.
For [DB access timeout], refer to the following:

(b) When [Check return value] is selected, set the following items.
1) Normal return value (Default: 0)
   Set a normal return value.
2) Write the value into the tag when the value is faulty.
   When the [Write the value into the tag when the value is faulty] box is checked, if the return value is not normal, a value is assigned to the specified tag component.
   Set a tag component to which a value is assigned when this is selected.
   • Tag, Component
     Select a tag component to which a value is assigned.
     Tags that have a tag component with [Array setting] cannot be selected.
   • Substitute value
     Directly enter a substitute value.
3) Do not execute job when the value is faulty. ([Program execution setting (before action)] only)
   When the [Do not execute job when the value is faulty] box is checked, if the return value is faulty, the job execution is canceled.

(5) Wait for execution completion
If the [Wait for execution completion] box is checked, the next processing is executed after completion of the program execution.
When [Check return value] is selected, [Wait for execution completion] is always selected.

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6.7.4　Setting items in DB Buffering

Set whether to utilize the DB buffering function or not.
For the DB buffering function, refer to the following:
☞5.1.10 DB buffering function

Item	Description
Enable DB buffering	Set whether to enable the DB buffering or not.
Automatically resend at time of restoration	Set whether or not to automatically resend data after recovery. When the [Automatically resend at time of restoration] box is checked, resend processing is automatically performed after recovery. When the [Automatically resend at time of restoration] box is not checked, resend processing is manually performed after recovery.

POINT

Before resending data, the GOT communicates with the database.
At this time, if an action for communicating with the same database is set for a job, a long time is required for execution of the job.
In the case of a large buffering size, it is advisable to resend the data manually while any job that is set to communicate with the database is not in execution, so that no problem will arise even if the MES interface function processing is affected.

6.7.5　Notify errors (job cancellation) that occur during job execution

Set whether to enable or disable notification of errors (job cancellation) that occur during job execution.
Job execution is canceled when access to the database fails or when type mismatch is found.
☞5.2 SNTP Time Synchronization Function
　　6.12 (b) Operation of numerical values
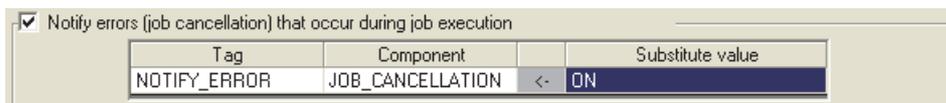
(1)　Notify errors (job cancellation) that occur during job execution

(a)　Set whether to enable or disable notification of errors (job cancellation) that occur during job execution. When [Notify errors (job cancellation) that occur during job execution] box is checked, if job execution is canceled, a value is assigned to the specified tag component.

(b)　When [Notify errors (job cancellation) that occur during job execution] has been selected, set a tag component to which a value is assigned.

　　1) Tag, Component
　　　　Select a tag component to which a value is assigned.
　　　　Tags that have a tag component with [Array setting] cannot be selected.
　　2) Substitute value
　　　　Directly enter a substitute value.

6.7.6　One-shot execution

Execute a job as a one-shot task.
Doing so allows the user to check the execution result of the currently editing [Job setting].

(1)　Procedure for one-shot execution

POINT

- In [One-shot execution], settings of [Startup logging] and [DB Buffering] are not executed.
- All of job operations running with the MES interface function are temporarily disabled during one-shot execution.

1. Click the ⌐One-shot execution⌐ button with the [Job settings] edit screen displayed.

2. Clicking the ⌐One-shot execution⌐ button performs one-shot job execution ignoring the trigger conditions.

3. Check the execution result shown in the [View details] dialog box, which is displayed after the execution.
For the display of the [View details] dialog box, refer to the following:
☞Section 6.11.2 (3) Updating the Job Execute Log

POINT

A dialog box indicating the current processing status is displayed until completion of one-shot execution.

(2)　Precautions for one-shot execution

(a) Precautions before one-shot execution
One-shot execution can be performed only when the MES interface function is active.
When the MES interface function is not active, check the status and restart the operation before starting one-shot execution.
For restart of the MES interface function, refer to the following:
☞6.10.2 Manipulating the MES Interface Function status (Operation)

(b) Precautions during one-shot execution
Do not perform the following during one-shot execution.
- Do not disconnect the cable that is connected to the GOT during one-shot execution.
  Doing so will cause the MES interface function to be inoperative.
- Do not remove the CF card from the GOT during one-shot execution.
  Doing so will cause the MES interface function to be inoperative.
If the MES interface function becomes inoperative, check the status and restart the operation on the Diagnosis tab.
For restart of the MES interface function, refer to the following:
☞6.10.2 Manipulating the MES Interface Function status (Operation)

(c) Connection result after the one-shot execution is performed
After you perform the one-shot execution to connect a database server computer, the connection result is not reflected to [Connection result of previous job execution] in the [Diagnosis] tab.

(d) Job execution result after the one-shot execution is performed
After you perform the one-shot execution to execute a job, the job execution result is not reflect to the database. (The rollback is executed.)

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6.8 Job Settings - Actions

The following shows types of actions.
Up to 10 actions can be set for one job.
- [Communication action]
  For communicating the GOT with a database
- [Operation action]
  For operating tag component values
- [Transmit resource action]
  For sending the resource data to the database

(Adding an action)
- Select [Communication action], [Operation action], or [Transmit resource action] from the list box next to the Add button, and click the Add button.

- The Communication action dialog box, the Operation action dialog box, or the Transmit resource action dialog box is displayed.
  - 6.8.1 Setting items in Communication action
  - 6.8.2 Setting items in Operation action
  - 6.8.3 Setting items in Transmit resource action

(Modifying an action)
- Select an action to be modified in [Action list], and click the Edit button.

- The Communication action dialog box, the Operation action dialog box, or the Transmit resource action dialog box is displayed.
  - 6.8.1 Setting items in Communication action
  - 6.8.2 Setting items in Operation action
  - 6.8.3 Setting items in Transmit resource action

(Deleting an action)
- Select an action to be deleted in [Action list], and click the Delete button.

(Copying an action)
- Select an action to be copied in [Action list], choose [Replicate the selected action] from the list box next to the Add button, and click the Add button.

(Copying an action of another job within the project)

1. Select [Replicate actions of other jobs] in the list box next to the Add button, and click the Add button.

2. The [Replicate actions] dialog box is displayed.
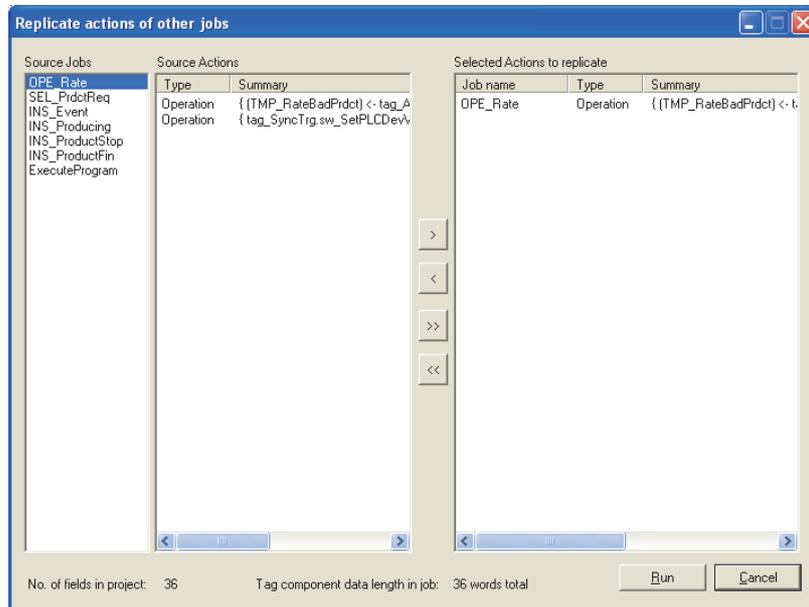
3. By repeating the following steps ④ to ⑥, set copy targets in [Selected Actions to replicate].

4. From [Source Jobs], select a job that includes a desired action.

5. Actions of the job selected in ④ are listed in [Source Actions]. Select an action to be copied. (Multiple selection is available.)

6. Clicking the > button displays the action(s) selected in ⑤ in [Selected Actions to replicate].

Item	Description
> button	Puts the action(s) selected in [Source Actions] into [Selected Actions to replicate].
>> button	Puts all of the actions in [Source Actions] into [Selected Actions to replicate].
< button	Deletes the action(s) selected in [Selected Actions to replicate] from the box.
<< button	Deletes all of the actions in [Selected Actions to replicate] from the box.

7. Clicking the Run button executes copying.
Copied actions are located after existing actions.

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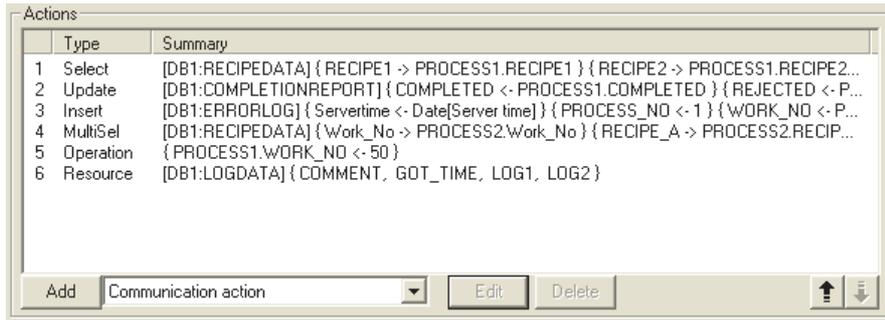
Item	Description
Type	The types of the existing actions are displayed.
Summary	Details of the existing actions are displayed.
↑ button	Selecting an action in [Action list] and clicking the ↑ button reverses the order between the selected one and the one immediately above it. The ↑ button cannot be clicked on the first action.
↓ button	Selecting an action in [Action list] and clicking the ↓ button reverses the order between the selected one and the one immediately below it. The ↓ button cannot be clicked on the last action.

POINT

When more than one action are set, they are executed in order, starting from the top.

(1) Type

The types of the existing actions are displayed.

Item	Description
Select	[Select] of [Communication action]
Update	[Update] of [Communication action]
Insert	[Insert] of [Communication action]
MultiSelect	[MultiSelect] of [Communication action]
Operation	[Operation action]
Resource	[Transmit resource action]

(2) Summary

Details of the existing actions are displayed.

(a) In the case of [Communication action]

Item	Description
Display format*1	[Database: Table name]{DB-tag link setting No.1}...{DB-tag link setting No.n} • Select: {DB-tag link setting} = {Field name -> Tag component/Constant value} • Update/Insert: {DB-tag link setting} = {Field name <- Tag component/Constant value}

(b) In the case of [Operation action]

Item	Description
Display format*1 *2	{Operation action No.1}...{Operation action No.n} • With substitution setting: {Operation action} = {Substitution tag component/Constant value <- Operation tag component/Constant value Operator Operation tag component/Constant value} • Without substitution setting: {Operation action} = {Substitution tag component/Constant value <- Operation tag component/Constant value}

(c) In the case of [Transmit resource action]

Item	Description
Display format	[Database: Table name]{Comment storing field name, Time storing field name, Field name No.1, ..., Field name No.n}

*1 Display format of the tag component/constant value

Item	Description
Tag component	Device tag name, component name
Numerical value	Numerical value
String	"Character string"
Date	GOT time: Date [GOT time] Server time: Date [Server time]
Date String	"Date [Date String]"
Variable	(Variable name)

*2 Display format of the operator

Item	Description
+ (Addition)	+
- (Subtraction)	-
× (Multiplication)	×
÷ (Division)	÷
% (Remainder)	%

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6.8.1 Setting items in Communication action

Configure the settings for communications with a database.

1. Performing the operation for adding or modifying an action displays the [Communication action] dialog box.
Make the setting referring to the following descriptions.
Clicking the | OK | button after setting adds or modifies the action.
For the operation for adding or modifying an action, refer to the following:
☞6.8 Job Settings - Actions

Item	Description
Action type	Select an action type.
Database	Select a database to be accessed.
Table name	Set a table name of the database to be accessed.
DB-tag link settings[*1]	Set assignments between field values and tag component values (or constant values).
Select/Update conditions[*1]	When [Select], [Update] or [MultiSelect] is selected for [Action type], set conditions for the records to be selected or updated.
Select sort settings[*1]	When [Select] or [MultiSelect] is selected for [Action type], set a condition for sorting selected records.
Exception process setting button	Set the processing to be performed in the following cases: No corresponding record exists when [Select], [Update], or [MultiSelect] is selected for [Action type]. Multiple corresponding records exist when [Select] or [Update] is selected for [Action type]. The number of records to be multi-selected is greater than the number of arrays set in [Array setting] of the tag when [MultiSelect] is selected for [Action type].
Multi select setting button	When [MultiSelect] is selected, detailed settings can be configured by clicking this.

(To the next page)

Item	Description
Generated SQL text	Displays SQL text that is generated in the currently editing [Communication action].
No. of fields in project	Displays the total number of fields in the project.
Tag component data length in job	Displays the total data length of the tag components in the job.
↑ button	Selecting a row and clicking the ↑ button reverses the order between the selected row and the one immediately above it. The ↑ button cannot be clicked on the first row.
↓ button	Selecting a row and clicking the ↓ button reverses the order between the selected row and the one immediately below it. The ↓ button cannot be clicked on the last row.
Delete row button	Selecting a row and clicking the Delete row button deletes the row.
Insert a whole tag button	• All of the tags set in [Device tag settings] are inserted into [Tag] and [Component]. • Select a row into which data are inserted and choose a tag in a list box next to the Insert a whole tag button. Clicking the Insert a whole tag button inserts all of the tag components into contiguous rows starting from the selected one. • The existing data set in the rows starting from the selected one are moved down.
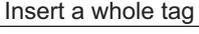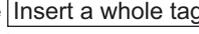
*1 Up to 8192 fields can be set in [DB-tag link settings], [Select/Update conditions] and [Select sort settings] for each project.
(Check [No. of fields in project] in the lower left of the Communication action dialog box.)

POINT

(1) Entry of [Component]

When data are entered in [Component] by [Insert a whole tag] or with the [Field name] space blank, the data are copied to the [Field name] space.
(Characters not allowed for [Field name] are not entered.)
Because of this, setting the same name to each of the field name and tag component name is useful.

(1) Action type

Select an action type.

Item	Description
Select[1]	[Select] substitutes a field value of the record, whose conditions are met, for a substitute value (tag component value/variable).
Update[1][2]	[Update] substitutes a substitute value (tag component value/variable) for a field value of the record whose conditions are met.
Insert	Generates a new value, and inserts an insert value (tag component value/constant value/variable) into a field of the generated record.
MultiSelect[1]	Substitutes field values of the records, whose conditions are met, for substitute values (tag component values).

*1 Cannot be selected when the database is Wonderware® Historian.
*2 With Microsoft® Access® 2000/2003/2007/2010, the following restrictions exist.
 • Up to 127 fields can be updated for a communication action.
 • Do not access the same file with multiple GOTs and MES interface modules simultaneously.

(2) Database

Select a database to be accessed.

(3) Table name (1 to 32 characters)

Set a table name of the database to be accessed.
For characters that can be used for table names, refer to the following:

☞Appendix.1.4 Characters applicable to field names, table names, etc.

(4) DB-tag link settings

Set assignments between field values and tag component values (or constant values).
Up to 256 rows can be set in [DB-tag link settings] for each communication action.

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(a) When [Select] is selected for [Action type]

[Select] substitutes a field value of the record, whose conditions are met, for a substitute value (tag component value/variable).

Set conditions of the record to be selected in [Select/Update conditions].

☞This section (5) Select/Update conditions

Conditions for sorting the selected records are set in [Select sort settings].

☞This section (6) Select sort settings

1) Field name (1 to 32 characters)

Set a field name for the field value to be selected.

For characters that can be used for field names, refer to the following:

☞Appendix.1.4 Characters applicable to field names, table names, etc.

2) Tag

Select a tag or variable for which a value is substituted.

Tags that have a tag component with [Array setting] cannot be selected.

3) Component

Select or directly enter a component value or a variable of the substitution target.

Database: DB1, Table name: RecipeData

Work_No	RECIPE1	RECIPE2	RECIPE3
:	:	:	:
536	5	32	1

| | Matched | Selected | Selected | Selected |

Tag component

Process1.Work_No	Process1.RECIPE1	Process1.RECIPE2	Process1.RECIPE3
536	5	32	1
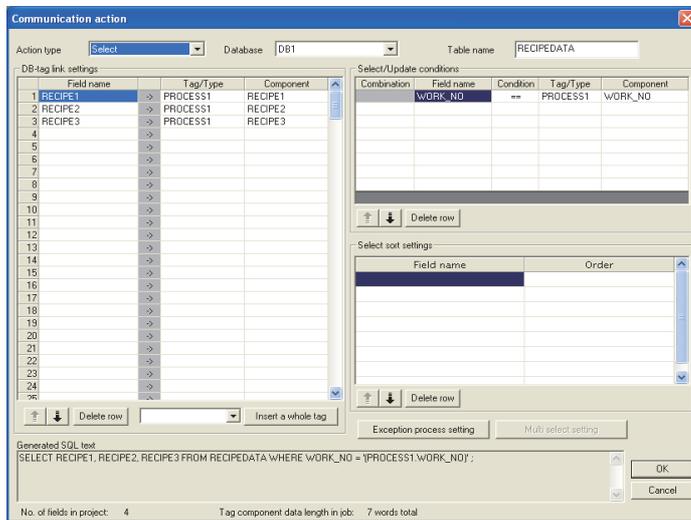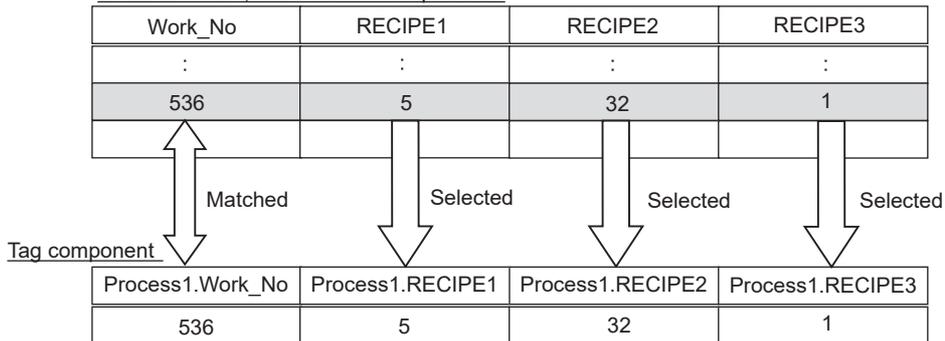
(b) When [Update] is selected for [Action type]

[Update] substitutes a substitute value (tag component value/variable) for a field value of the record whose conditions are met.

Set conditions of the record to be updated in [Select/Update conditions].

☞This section (5) Select/Update conditions

1) Field name (1 to 32 characters)

Set a field name for the field value to be updated.

For characters that can be used for field names, refer to the following:

☞Appendix.1.4 Characters applicable to field names, table names, etc.

2) Tag

Select a tag, constant, or variable which is substituted.

Tags that have a tag component with [Array setting] cannot be selected.

3) Component

Select or directly enter a Component value or a variable that is to be substituted.
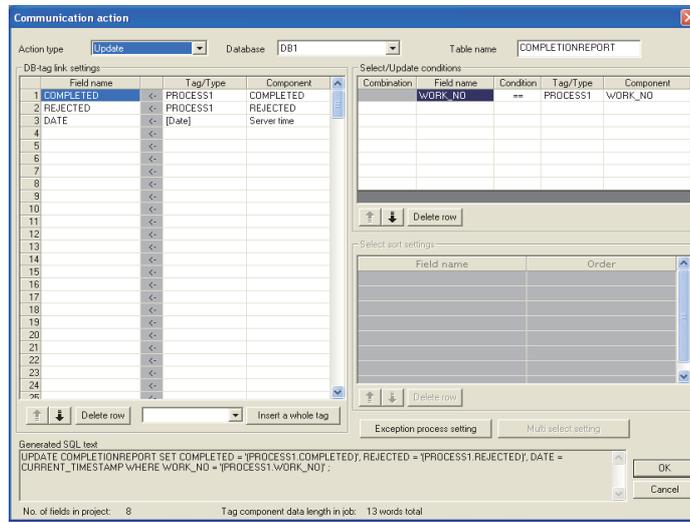
Database: DB1, Table name: CompletionReport

Work_No	Completed	Rejected	Date
:	:	:	:
536	496	32	2005.07.01 15:12:00

| | Matched | Updated | Updated | Updated |

Tag component

Process1.Work_No	Process1.Complete	Process1.Rejected	Constant: Server time
536	496	32	2005.07.01 15:12:00

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(c) When [Insert] is selected for [Action type]

[Insert] generates a new record, and inserts an insert value (tag component value/constant value/variable) into a field of the generated record.

1) Field name (1 to 32 characters)

Set a field name for the field value to be inserted.

For characters that can be used for field names, refer to the following:

☞Appendix.1.4 Characters applicable to field names, table names, etc.

2) Tag

Select a tag, constant, or variable which is substituted.

Tags that have a tag component with [Array setting] cannot be selected.

3) Component

Select or directly enter a Component value or a variable that is to be substituted.
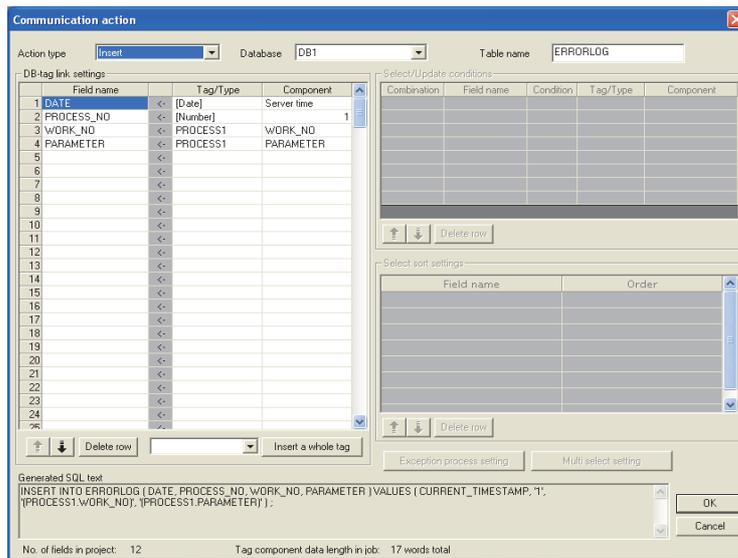
Database: DB1, Table name: ERRORLOG

Date	Process No	Work_No	Parameter
:	:	:	:
2005.07.01 15:12:00	1	536	8

| | Inserted | Inserted | Inserted | Inserted |

Tag component

Constant: GOT time	Constant: 1	Process1.Work_No.	Process1.Parameter
2005.07.01 15:12:00	1	536	8

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4) When the database is Wonderware® Historian, the following is inserted as one record to the database by executing [Communication action].
- Date and time when a communication action is executed
- Tag name set for [Field name]
- Tag component value or constant value set for [Component]

When multiple fields are set, the number of records to be inserted is equivalent to that of fields.
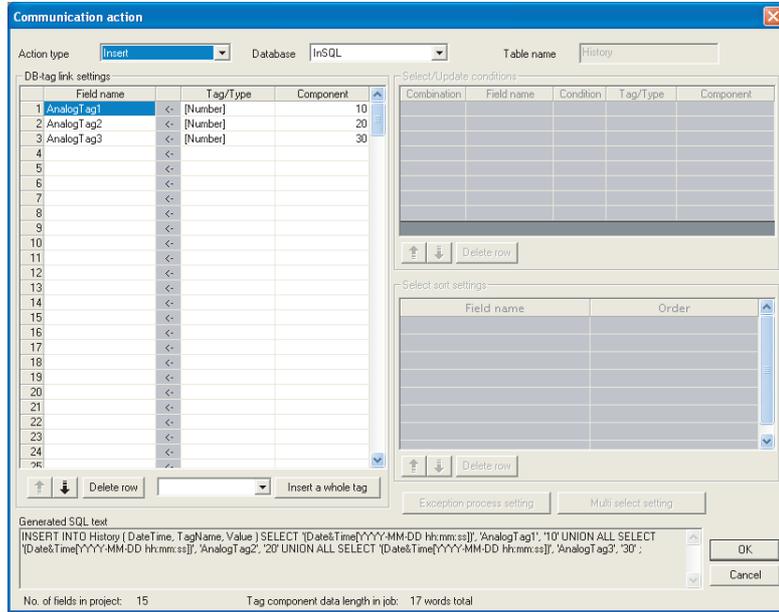
Database: InSQL Table name: History (fixed)

Field name	Tag component	Inserted	Datatime	TagName	Value
AnalogTag1	Equipment1Analog1	⇒	2006-10-20 15:30:00	AnalogTag1	10
AnalogTag2	Equipment1Analog2	⇒	2006-10-20 15:30:00	AnalogTag2	20
AnalogTag3	Equipment1Analog3	⇒	2006-10-20 15:30:00	AnalogTag3	30

(d) When [MultiSelect] is selected for [Action type]

[MultiSelect] substitutes field values of the records, whose conditions are met, for substitute values (tag component values).

Conditions for the redords to be selected are set in [Select/Update conditions].

☞This section (5) Select/Update conditions

Conditions for sorting the selected records are set in [Select sort settings].

☞This section (6) Select sort settings

1) Field name (Up to 32 characters)

Set a field name for the field values to be multi-selected.

For characters that can be used for field names, refer to the following.

☞Appendix.1.4 Characters applicable to field names, table names, etc.

2) Tag

Select a target tag.

Only the tags with [Array setting] can be selected.

3) Component

Select a target component.

POINT

When [MultiSelect] is used in a job, the total of [Tag component data length in job] must be 45000 words or less.

[Tag component data length in job] represents a total length of the tag component data set for the following:

- [DB-tag link settings] in [Communication action]
- [Select/Update conditions] in [Communication action]
- [Operation action]

Even if the same tag component is set more than once in the same job, each setting is handled separately.

(The number of settings can be confirmed on the status bar of [Job setting], or in the [Communication action] or [Operation action] dialog box.)

Database: DB1, Table name: RECIPEDATA

Work_No	RECIPE_A	RECIPE_B	RECIPE_C
:	:	:	:
536	5	32	1
537	6	33	0
538	7	34	1
539	8	35	0
540	9	36	1

| | Select-sorted (Ascending) | Selected | Selected | Matched (RECIPE_C=1) |

Tag component

Process1.Work_No[1]	Process1.RECIPE_A[1]	Process1.RECIPE_B[1]	Process1.RECIPE_C[1]
536	5	32	1

Process1.Work_No[2]	Process1.RECIPE_A[2]	Process1.RECIPE_B[2]	Process1.RECIPE_C[2]
538	7	34	1

Process1.Work_No[3]	Process1.RECIPE_A[3]	Process1.RECIPE_B[3]	Process1.RECIPE_C[3]
540	9	36	1

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(e) About tag components

Tag component values can be used as substitute/insert values for [Select], [Update], [Insert] or [MultiSelect], or as condition values of [Select/Update conditions].

The following table lists data types of tag components and those of assignable fields.

If the data type of a tag component does not match the one of its substitution target field, an error occurs, resulting in cancellation of job execution.

POINT

The data type of a tag component will change through operation processing of a job.

☞6.12 (b) Operation of numerical values

Data type of tag component	Data type of assignable field			
	Oracle® 12c Oracle® 11g Oracle® 10g Oracle® 9i Oracle® 8i	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE 2000	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	Wonderware® Historian
Bit type	NUMBER CHAR VARCHAR	bit int smallint tinyint float real char varchar text[1]	Yes/No type	Discrete Tag
(Numeric type: Integer) Single-precision type Double-precision type			Byte type Integer type Long integer type Single type Double type AutoNumber type Currency type Text type[1] [2] Memo type[1] [2]	Analog Tag(Integer)
(Numeric type: Floating point) Floating-point type [3]	NUMBER CHAR VARCHAR	float real char varchar text[1]	Single type Double type Text type[1] [2] Memo type[1] [2]	Analog Tag(Real)
Character string	CHAR VARCHAR	char varchar text[1]	Text type [2] Memo type [2]	String Tag

*1 Not available for [Select/Update conditions]

*2 Memo-type fields in Rich Text Format cannot be used with Microsoft® Access® 2013/2010/2007.

*3 Values are assigned with precision of six decimal digits.

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(f) About constants

Constants can be used as substitute/insert values for [Update] or [Insert], or as condition values of [Select/Update conditions].

The following table lists constant types and the data types of assignable fields.

If the type of a constant does not match the data type of its substitution target field, an error occurs, resulting in cancellation of job execution.

Constant type	Values that can be entered in [Component]	Data type of assignable field			
		Oracle® 12c Oracle® 11g Oracle® 10g Oracle® 9i Oracle® 8i	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE 2000	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	Wonderware® Historian
[Number]	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)	NUMBER	bit [*1] int [*1] smallint [*1] tinyint [*1] float real	Yes/No type Byte type Integer type Long integer type Single type Double type AutoNumber type Currency type	Discrete Tag Analog Tag(Integer) Analog Tag(Real)
[String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞ Appendix.1.3 Characters applicable to character string constants, etc.	CHAR VARCHAR	char varchar text [*3]	Text type [*5] Memo type [*5]	String Tag
[Date] [*2]	• When using the date and time of the database server: Select [Server time]. • When using the date and time of the GOT: Select [GOT time].	DATE	datetime smalldatetime	Date/Time type	- [*4]
[Date String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞ Appendix.1.3 Characters applicable to character string constants, etc. Specify the date and time of the GOT in the following format. Year (4 digits): YYYY Year (2 digits): YY Month (2 digits): MM Day (2 digits): DD Hour (2 digits): hh Minute (2 digits): mm Second (2 digits): ss Example: "YYYY-MM-DD hh:mm:ss" → "2005-07-01 15:12:00"	CHAR VARCHAR	char varchar text [*3]	Text type [*5] Memo type [*5]	String Tag

*1   Signed integer notation only

*2   Clock precision:

       When [GOT time] is selected: In units of seconds

       When [Server time] is selected: Depends on the database server.

*3   Not available for [Select/Update conditions]

*4   With Wonderware® Historian, only [GOT time] is assigned.

*5   Memo-type fields in Rich Text Format cannot be used with Microsoft® Access® 2013/2007/2010.

(g) About variables

Variables can be used as substitute/insert values for [Select], [Update] or [Insert], or as condition values of [Select/Update conditions].

The following table lists data types of variables and those of assignable fields.

If the type of a variable does not match the data type of its substitution target field, an error occurs, resulting in cancellation of job execution.

Up to 64 variables can be set for one job.

POINT

(1) A variable is valid only in a single job execution and is not held.

(2) The initial variable value before substitution processing is the numerical value of zero.

(3) The data type of a variable will change through operation processing of a job.

☞6.12 (b) Operation of numerical values

Data type of variable	Values (variable names) that can be entered in [Component]	Data type of assignable field			
		Oracle® 12c Oracle® 11g Oracle® 10g Oracle® 9i Oracle® 8i	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE 2000	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	Wonderware® Historian
Bit type	Up to 16 characters. For characters that can be used for variables, refer to the following: ☞Appendix.1.2 Characters applicable to item names, component names, variable names, etc.		bit int smallint tinyint float real char vachar text [1]	Yes/No type	Discrete Tag
(Numeric type: Integer) Single-precision type Double-precision type		NUMBER CHAR VARCHAR		Byte type Integer type Long integer type Single type Double type AutoNumber type Currency type Text type [1][2] Memo type [1][2]	Analog Tag(Integer)
(Numeric type: Floating point) Floating-point type [3]		NUMBER CHAR VARCHAR	float real char vachar text [1]	Single type Double type Text type [1][2] Memo type [1][2]	Analog Tag(Real)
Character string		CHAR VARCHAR	char vachar text [1]	Text type [2] Memo type [2]	String Tag

[1] Not available for [Select/Update conditions]

[2] Memo-type fields in Rich Text Format cannot be used with Microsoft® Access® 2013/2010/2007.

[3] Values are assigned with precision of six decimal digits.

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(5) Select/Update conditions
When [Select], [Update] or [MultiSelect] is selected for [Action type], set conditions for the records to be selected, updated or multi-selected.
When a field value of a record matches a condition value, the record is selected or updated.
Up to 8 rows can be set for one communication action in [Select/Update conditions].
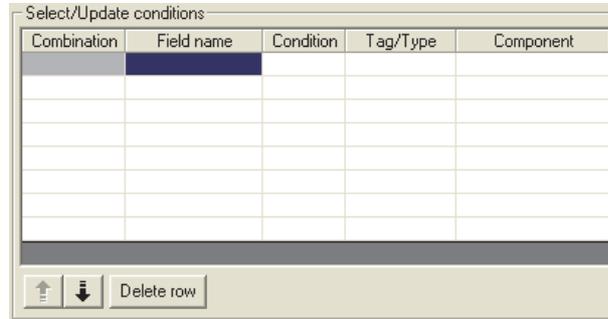
POINT

Exception processing is executed when records that meet [Select/Update conditions] are in the following cases.
• Records to be selected/updated/multi-selected do not exist.
• Multiple records exist for select/update.
• The number of records to be multi-selected is greater than the number of arrays set in [Array setting] of the tag.
For details of the exception processing, refer to the following.
☞ This section (7) Exception processing setting

(a) Combine
Select a method by which conditions set in respective lines are combined.
Select "AND" or "OR".
If "AND" and "OR" are combined, the database will process "AND" first and then "OR".

Item	Description
AND	The condition of the line just above the corresponding line and the condition of the corresponding line
OR	The condition of the line just above the corresponding line or the condition of the corresponding line

(b) Field name (1 to 32 characters)
Set a field name that is used for comparison.
For characters that can be used for field and table names, refer to the following:
☞ Appendix.1.4 Characters applicable to field names, table names, etc.

(c) Condition
Select a condition for comparison.

Item	Description
=	The field value is equal to the condition value.
≠	The field value is not equal to the condition value.
≧	The field value is equal to or greater than the condition value.
>	The field value is greater than the condition value.
<	The field value is smaller than the condition value.
≦	The field value is equal to or smaller than the condition value.

(d) Tag
Select a tag or constant that is used as a condition for comparison.
Tags that have a tag component with [Array setting] cannot be selected.

(e) Component
Select or directly enter a component/constant value that is used as a condition for comparison.
If [Variable] is selected for [Tag], select or directly enter a variable.

POINT

For tag components, constants or variables, refer to the following:
☞ • This section (4) (e) About tag components
• This section (4) (f) About constants
• This section (4) (g) About variables

(6) Select sort settings
When [Select] or [MultiSelect] is selected in [Action type], set conditions for sorting the records to be selected/multi-selected.
If multiple sort conditions are set, the database will process the conditions in order, starting from the top.
In [Select sort settings], settings of up to eight lines are allowed for each communication action.

(a) Field name (Up to 32 characters)
Set a field name for records to be selected.
For characters that can be used for field names and table names, refer to the following.
☞ Appendix.1.4 Characters applicable to field names, table names, etc.

(b) Order

Set the order of sorting the selected records.

Item	Description
Ascending order	Sorts the records so that the specified fields are arranged in ascending order.
Descending order	Sorts the records so that the specified fields are arranged in descending order.

Database (before sorting)

ORDER_NO	PRODUCT_CODE	DELIVERY_DATE
200	707	2007-01-31
201	662	2007-01-10
202	666	2007-01-29
203	662	2007-01-31
204	707	2007-01-10
205	666	2007-01-29
206	707	2007-01-10
207	662	2007-01-29
208	662	2007-01-31

Sorting conditions in [Select sort settings]

	Field name	Order
1)	DELIVERY_DATE	ASC
2)	ORDER_NO	DESC
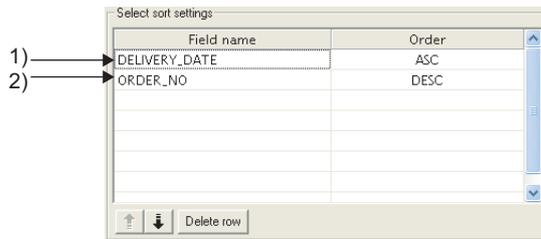
Selected records [sorting results]

ORDER_NO	PRODUCT_CODE	DELIVERY_DATE
206	707	2007-01-10
204	707	2007-01-10
201	662	2007-01-10
207	662	2007-01-29
205	666	2007-01-29
202	666	2007-01-29
208	662	2007-01-31
203	662	2007-01-31
200	707	2007-01-31

1) First, selected records are sorted in ascending order of DELIVERY_DATE.

2) Then, records of the same DELIVERY_DATE are sorted in descending order of ORDER_NO.

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(7) Exception processing setting

A click on the │Exception process setting│ button displays the [Exception process setting] dialog box.
(Example) When [Select] is selected for [Action type]
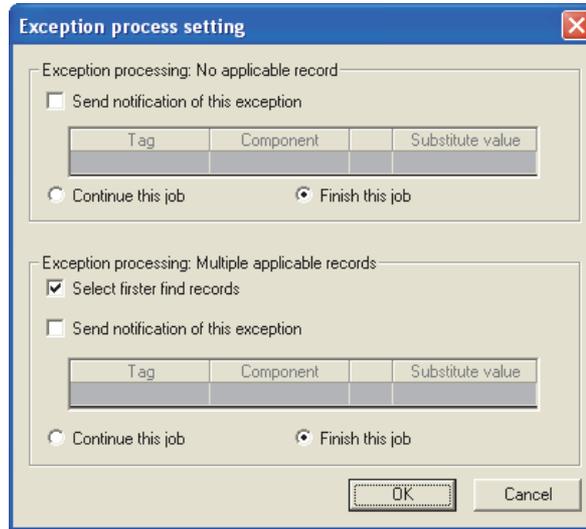
(a) Exception processing: No applicable record
When [Select], [Update] or [MultiSelect] is selected for [Action type], set processing for the case where there is no record to be selected, updated or multi-selected.

1) Send notification of this exception
When the [Send notification of this exception] box is checked, if there is no record to be selected, updated or multi-selected, assign a value to the specified tag component.
When [Send notification of this exception] is selected, set a tag component to which the value is assigned.
• Tag, Component
Select a tag component to which a value is assigned.
Tags that have a tag component with [Array setting] cannot be selected.
• Substitute value
Directly enter a substitute value.
2) Continue this job
After execution of exception processing described in the above 1), the system continues executions of other actions.
3) Finish this job (Default: Finish this job)
After execution of exception processing described in the above 1), the job is forcibly terminated without executing remaining actions.
At this time, substitute/insert values before exception processing execution are committed, and they are written to relevant tag components.

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POINT

(1) When a job is forcibly terminated, an error occurred during job execution (job cancellation) is not notified.
☞ 6.7.5 Notify errors (job cancellation) that occur during job execution

(2) If [Enable DB buffering] is selected for a job, its exception processing setting is disabled.
☞ 6.7.4 Setting items in DB Buffering

(b) Exception processing: Multiple applicable records
When [Select] or [Update] is selected for [Action type], set processing for the case where there are multiple records to be selected or updated.

1) Select firster find records (Default: Checked)
When [Select] is selected for [Action type], checking the [Select firster find records] box allows extraction of the head record from multiple applicable records.
When this checkbox is not checked, the select/update processing is not performed.

POINT

When [Update] is selected for [Action type], if multiple records to be updated exist, all of them are updated.

2) Send notification of this exception
When the [Send notification of this exception] box is checked, if multiple records to be selected or updated exist, assign a value to the specified tag component.
When [Send notification of this exception] is selected, set a tag component to which the value is assigned.
• Tag, Component
Select a tag component to which a value is assigned.
Tags that have a tag component with [Array setting] cannot be selected.
• Substitute value
Directly enter a substitute value.
3) Continue this job
After executions of exception processing described in the above 1) and 2), the system continues executions of other actions.
4) Finish this job (Default: Finish this job)
After execution of exception processing described in 1) and 2), the job is forcibly terminated without executing remaining actions.
At this time, substitute/insert values before exception processing execution are committed, and they are written to relevant tag components.

(1) When a job is forcibly terminated, an error occurred during job execution (job cancellation) is not notified.
　☞6.7.5 Notify errors (job cancellation) that occur during job execution

(2) If [Enable DB buffering] is selected for a job, its exception processing setting is disabled.
　☞6.7.4 Setting items in DB Buffering

(c) Exception processing: Applicable records overflow
When [MultiSelect] is selected for [Action type], set processing for the case where the number of records to be selected is greater than the number of arrays set in [Array setting].
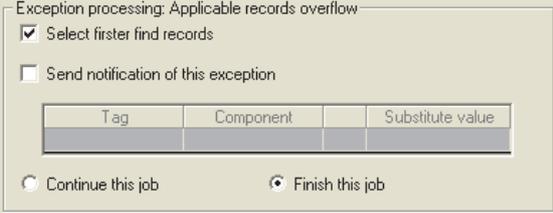
1) Select firster find records (Default: Checked)
When the [Select firster find records] checkbox is checked, if the number of records selected by [Select/Update conditions] is greater than the number of arrays set in [Array setting], records equivalent to the number of arrays are actually selected.
When this checkbox is not checked, the select processing is not performed.

If the [Select firster find records] checkbox is not checked, the following is performed.
　• When [Notify the number of acquired records] is set in [Multi select setting], 0 is notified.
　• When [Clear the unused tag components by zero] is set in [Multi select setting], 0 is assigned.
☞This section (8) Multi select setting

2) Send notification of this exception

If the [Send notification of this exception] checkbox is checked, a value is assigned to the specified tag component when the number of records selected by [Select/Update conditions] is greater than the number of arrays set in [Array setting].

[Array setting] is less than the number of records selected by [Select/Update conditions].

When selecting this, set a tag component to which a value is assigned.

- Tag, Component

Select a tag component to which a value is assigned.

Tags that have a tag component with [Array setting] cannot be selected.

- Substitute value

Directly enter a substitute value.

3) Continue this job

After executions of exception processing described in the above 1) and 2), the system continues executions of other actions.

4) Finish this job (Default: Finish this job)

After executions of exception processing described in the above 1) and 2), the system forcibly terminates the job without executing other actions.

At this time, substitute/insert values before execution of the exception processing are committed to the database, and data written to tag component are updated.

POINT

(1) When a job is forcibly terminated, an error occurred during job execution (job cancellation) is not notified.

☞ 6.7.5 Notify errors (job cancellation) that occur during job execution

(2) If [Enable DB buffering] is selected for a job, its exception processing setting is disabled.

☞ 6.7.4 Setting items in DB Buffering

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(8) Multi select setting

A click on the Multi select setting button displays the [Multi select setting] dialog box.
Complete the setting, referring to the following explanation.
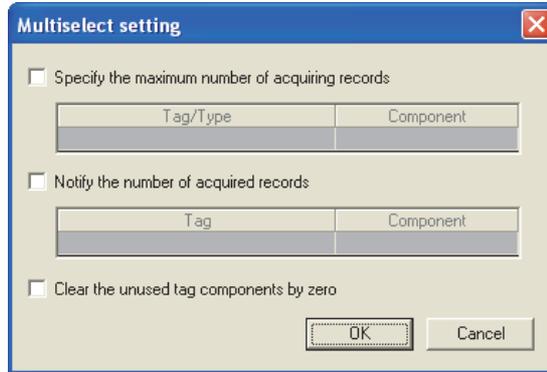
(a) Specify the maximum number of acquiring records
If the [Specify the maximum number of acquiring records] checkbox is checked, records of up to the specified number are acquired.
The GOT acquires the records in the order that the records are extracted from the database.
When selecting this, set a tag for which a value is specified.

1) Tab/Type
Select a tag for which a value is specified.
Tags that have a tag component with [Array setting] cannot be selected.

2) Component
Select or directly enter a component or a constant value to be specified.

Item	Values available for Component
[Number]	Within the range of 1 to 40000
Device tag	Single- or double-precision type tag component

POINT

(1) When the select sort settings are set, the GOT acquires the records in the set sorting orders.

(2) An error occurs if the specified tag component value is 0 or less.
☞ Section 5.3 (2) When an error occurs in job execution

(b) Send notificcation of selected record number
When the [Notify the number of acquired records] checkbox is checked, the number of actually acquired records is notified to the specified tag component.
When selecting this, set a tag component to which a value is notified.

• Tag
Select a tag component to which a value is notified.
Tags that have a tag component with [Array setting] cannot be selected.

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(c) Clear the unused tag components by zero

When the [Clear the unused tag components by zero] checkbox is checked, if the specified number of arrays of the tag component is less than the number of actually acquired records, zeros are assigned to other array areas.

(Example)

When the specified number of arrays of the tag component is "6" and the number of actually acquired records is "4":

Component name	Device	Data type
Component A	GB0	Bit
Component B	GD10	Double word
Component C	GD100	String (10 characters)

	n=1	n=2	n=3	n=4	n=5	n=6
Component A	GB0 9	GB1 4	GB2 7	GB3 1	GB4 0	GB5 0
Component B	GD10 482	GD12 623	GD14 769	GD16 154	GD18 0	GD20 0
Component C	GD100 Table	GD105 Data1	GD110 Data2	GD115 Data3	GD120 ""	GD125 ""

Acquired records

"0" is assigned to unassigned tag components. ("Null" for the character string type)

(9) Generated SQL text

The SQL text generated by the currently editing [Communication action] is displayed.

It indicates the display format of the tag component/constant value.

Note that data of Tag component, Date, Date String, and Variable are generated at job execution, and displayed in the format shown below. (It is different from the actual SQL text.)

Actions of [Select] and [MultiSelect] generate SQL texts with SELECT. With the SQL text, the user cannot identify which action is executed.

Item		Description
Tag component		'(Device tag name, component name)'
Numerical value		'Number'
String		'String'
Date	Oracle® 8i	GOT time: TO_DATE('(Date and time [YYYYMMDDhhmmss])', 'YYYYMMDDHH24MISS') Server time: sysdate
	Oracle® 12c Oracle® 11g Oracle® 10g Oracle® 9i	GOT time: TO_DATE('(Date and time [YYYYMMDDhhmmss])', 'YYYYMMDDHH24MISS') Server time: CURRENT_TIMESTAMP
	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE2000 Wonderware® Historian	GOT time: '(Date and time [YYYY-MM-DD hh:mm:ss])' Server time: CURRENT_TIMESTAMP
	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	GOT time: '(Date and time [YYYY-MM-DD hh:mm:ss])' Server time: NOW()
Date String		'(Date[String])'
Variable		'(Variable name)'

6.8.2 Setting items in Operation action

Configure the settings for operation of tag component values.
Up to 20 dyadic operations can be set for one operation action.

1. Performing the operation for adding or modifying an action displays the [Operation action] dialog box.
Make the setting referring to the following descriptions.
Clicking the ☐ OK ☐ button after setting adds or modifies the action.
For the operation for adding or modifying an action, refer to the following:
☞ 6.8 Job Settings - Actions

Item	Description
Substitution tag	Select a tag or variable to which a value is assigned. Tags that have a tag component with [Array setting] cannot be selected.
Component	Select or directly enter a component value or a variable of the substitution target.
Operation tag	Select a tag, constant, or variable which is computed. Tags that have a tag component with [Array setting] cannot be selected.
Component	Select or directly enter a component/constant value or a variable that is to be computed.
Operator	Select an operator. [ ] (None), [+] (Addition), [-] (Subtraction), [×] (Multiplication), [÷] (Division), [%] (Remainder)
↑ button	Selecting a row and clicking the ↑ button reverses the order between the selected row and the one immediately above it. The ↑ button cannot be clicked on the first row.
↓ button	Selecting a row and clicking the ↓ button reverses the order between the selected row and the one immediately below it. The ↓ button cannot be clicked on the last row.
Delete row button	Selecting a row and clicking the Delete row button deletes the row.
Tag component data length in job	Displays the total data length of the tag components in the job.

POINT

Operation actions are executed in order, from the top to the bottom.

(1) About constants

Constants can be used for [Operation tag] - [Component] and not for [Operator].
The following shows the constant types and values that can be entered in the [Component] column.

Constant type	Values that can be entered in [Component]
[Number]	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
[String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞ Appendix.1.3 Characters applicable to character string constants, etc.
[Date String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞ Appendix.1.3 Characters applicable to character string constants, etc. Specify the date and time of the GOT in the following format. Year (4 digits): YYYY Year (2 digits): YY Month (2 digits): MM Day (2 digits): DD Hour (2 digits): hh Minute (2 digits): mm Second (2 digits): ss Example: "YYYY-MM-DD hh:mm:ss" → "2005-07-01 15:12:00"

(2) About variables

Variables can be used for [Component] of [Substitution tag] or [Component] of [Operation tag].
By using a variable, a value computed in [Operation action] can be assigned to a database, or to a tag component (In the latter case, operation is performed based on a value extracted from the database).
The following table shows the variable types and values that can be entered in the [Component] column.
Up to 64 variables can be set for one job.

POINT

(1) A variable is valid only in a single job execution and is not held.

(2) The initial variable value before substitution processing is the numerical value of zero.

(3) The data type of a variable will change through operation processing of a job.
☞ 6.12 (b) Operation of numerical values

Variable type	Values (variable names) that can be entered in [Component]
[Variable]	Up to 16 characters For characters that can be used for variables, refer to the following: ☞ Appendix.1.2 Characters applicable to item names, component names, variable names, etc.

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(3) Setting example of [Operation action]
The following is a case in which correction power is calculated using a correction voltage and it is assigned to a tag component (Process 1.Correction power).
The tag component value (Process 1.Correction power) obtained from the following [Operation action] is:
(Process 1.Voltage × 100 + 50) × Currrent

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6.8.3 Setting items in Transmit resource action

Configure the settings for sending the resource data collected in a GOT to a database.

POINT

Before setting [Transmit resource action], configure the settings to collect the resource data (the logging setting, the advanced user alarm observation, the advanced system alarm observation, and the operation log setting).
For details, refer to the following manual.

☞ GT Designer3 Version1 Screen Design Manual (Functions)

The settings for collecting the resource data must be matched to the settings for the resource data send action. When the settings are not matched, an error may occur at the job execution.

Item	Description
Action type	Select an action type.
Database	Select a database to be accessed.
Table name	Select a table name of the database to be accessed.
Resource type	Select a resource data type.
Field name setting[*1]	Set the assignments between the resource data to be sent and the field value for the database.
Confirm setting button	Clicking this button checks that the settings for collecting the resource data are matched to the settings for the resource data send action. An error message is displayed when the settings are not matched. For the displayed error message, refer to the following. ☞ 6.12 Precautions
Logging ID/Alarm ID	Set the logging ID for the logging setting or the alarm ID that is set on the advanced alarm observation.
Operation log file	Clicking the Set operation log file name button displays the stored location for the operation log data to be sent.
Range of data	Specify the number of resource data to be sent for each action.
Generated SQL text	Displays the SQL text that is generated during editing the data for [Transmit resource action].

*1 Up to 8192 fields can be set in [Field name setting] for each project.
(Check [No. of fields in project] in the lower left of the Transmit resource action dialog box.)

(1) Action type

Select an action type.

The selectable action type is the insert only.

Item	Description
Insert	Generates a new record, and assigns a value (resource data) into a field.

(2) Database

Select a database to be accessed.

(3) Table name (1 to 32 characters)

Set a table name of the database to be accessed.

When the selected database is Wonderware$^®$ Historian, the table name is fixed to [History].

For characters that can be used for table names, refer to the following:

☞ Appendix.1.4 Characters applicable to field names, table names, etc.

(4) Resource type

(Default: Logging)

Select a resource data type.

Item	Description
Logging	Device values of a controller that are collected at any timing or in specified intervals.
Advanced user alarm	Alarm data that are collected in specified intervals for the advanced user alarm observation setting
Advanced system alarm	Alarm data for controllers and a network that are collected by the advanced system alarm observation setting
Operation log	GOT operation history data collected by the operation log function

(5) Field name setting

Set the assignments between the resource data to be sent and the field values for the database.

The resource data types vary according to [Resource type].

(Example) Screen for settings of sending logging data

Item	Description
Field name[*3][*5] (0 to 32 characters)	1) First row (comment)[*1] A field name for sending a comment to the database can be set. 2) Second row (time)[*1] A field name that specifies a date and time for a resource data send action can be set. 3) Third row or later (resource data) A field name for sending the resource data to the database can be set. Input the field name for [Insert data] to be sent.
Insert data[*2]	4) First row (0 to 32 characters, Default: Comment)[*1][*4] The comment to be inserted into the database can be set. 5) Second row (Default: GOT time) The date and time for inserting the data to the database can be selected from [GOT time] or [Server time]. 6) Third row or later (resource data) The list of resource data to be inserted to the database is displayed. ☞ This section (5) (a) When selecting [Logging] for [Resource type] This section (5) (b) When selecting [Advanced user alarm] for [Resource type] This section (5) (c) When selecting [Advanced system alarm] for [Resource type] This section (5) (d) When selecting [Operation Log] for [Resource type]

*1 When setting [Field name], fields for the stroring comment and the time data are created in the database. (The setting for the field name is not necessarily required.)

*2 When [Field name] is not inputted, no resource data is sent.

*3 For the types of data to be sent in the fields, refer to the following.

    ☞ This section (5) (e) Data types

*4 For characters that can be used for character strings, refer to the following:

    ☞ Appendix.1.3 Characters applicable to character string constants, etc.

*5 For characters that can be used for field and table names, refer to the following:

    ☞ Appendix.1.4 Characters applicable to field names, table names, etc.

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The following shows the resource data to be sent and the types of the data.

(a) When selecting [Logging] for [Resource type]
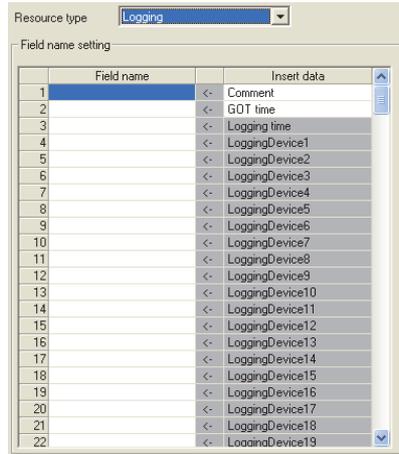
Insert data	Data type
Logging time	Date
LoggingDevice (1 to 250)[*1]	Numeric type (Integer, floating point)

*1   The numbers of 1 to 250 correspond to the rows set for the number of the block number in the logging setting.

(b) When selecting [Advanced user alarm] for [Resource type]
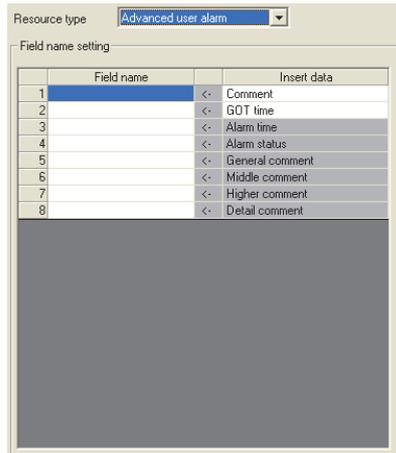
Insert data	Data type
Alarm time	Date
Alarm status	Character string
General comment[*1]	Character string
Middle comment[*1]	Character string
Higher comment[*1]	Character string
Detail comment[*1]	Character string

*1   The first column data of the column number set in the comment group is sent.

POINT

Up to 512 of one-byte and two-byte characters can be set in a comment for the advanced user alarm.
Set the length of character string on the database more than that for the comment.

    (c)   When selecting [Advanced system alarm] for [Resource type]

Insert data	Data type
Alarm time	Date
Alarm status	Character string
Comment	Character string

POINT

Up to 512 of one-byte and two-byte characters can be set in a comment for the advanced system alarm.
Set the length of character string on the database more than that for the comment.

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(d) When selecting [Operation Log] for [Resource type]
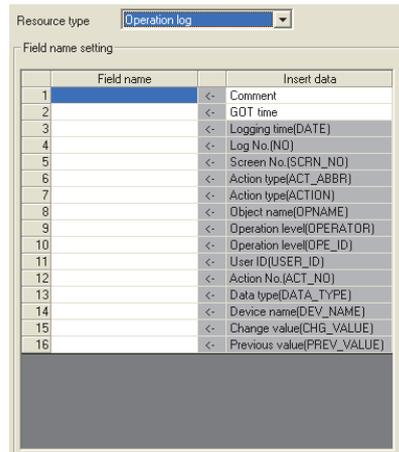
Insert data[*1]	Data type
Logging time(DATE)	Date
Log No.(NO)	Numeric type (Integer)
Screen No.(SCRN_NO)	Character string
Action type(ACT_ABBR)	Character string
Action type(ACTION)	Character string
Object name(OPNAME)	Character string
Operation level(OPERATOR)	Character string
Operation level(OPE_ID)	Numeric type (Integer)
User ID(USER_ID)	Numeric type (Integer)
Action No.(ACT_NO)	Numeric type (Integer)
Data type(DATA_TYPE)	Character string
Device name(DEV_NAME)	Character string
Change value(CHG_VALUE)	Character string
Previous value(PREV_VALUE)	Character string

*1   The data to be sent vary according to the operation log target.
      For details of the collected data in the operation log, refer to the following manual.

☞ GT Designer3 Version1 Screen Design Manual (Functions)

(e) Data types
The following table shows the data types of resource data and the data types of data to be sent in the field. When the data type of the resource data does not match that of data to be sent in the field, an error occurs, resulting in the cancellation of the job execution.

Data type of resource data	Data type of data to be sent in field			
	Oracle® 12c Oracle® 11g Oracle® 10g Oracle® 9i Oracle® 8i	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE 2000	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	Wonderware®Historian
Date	DATE	datetime smalldatetime	Date/Time type	String Tag
Character string	CHAR VARCHAR	char varchar text	Text type[*1] Memo type[*1]	String Tag[*2]
Numeric type	NUMBER CHAR VARCHAR	bit int smallint tinyint float real char varchar text	Yes/No type Byte type Integer type Long integer type Single type Double type AutoNumber type Currency type Text type[*1] Memo type[*1]	Discrete Tag Analog Tag(Integer) Analog Tag(Real) String Tag

*1   Memo-type fields in Rich Text Format cannot be used with Microsoft® Access® 2013/2010/2007.
*2   With Wonderware® Historian, only [GOT time] is sent.

(6) Logging ID/Alarm ID
When selecting [Logging] or [Advanced user alarm] for [Resource type], set the logging ID of logging data or the alarm ID for advanced user alarm data.

Logging ID/Alarm ID	1

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(7) Operation log file
The GOT displays the operation log file when [Operation log] is selected for [Resource type] only.

```
┌─ Operation log file ──────────────────────────────┐
│                           [ Set operation log file name ] │
│                                                    │
│   Drive Name    [                              ]   │
│                                                    │
│   Folder Name   [                              ]   │
│                                                    │
│   File Name     [                              ]   │
│                        _yyyymmdd_ssss.G10          │
└────────────────────────────────────────────────────┘
```

Clicking the Set operation log file name button displays the stored location for the operation log file.
The GOT can send the displayed operation log file to the database.
Inputting the data directly to [Drive Name], [Folder Name], and [File Name] are not available.

POINT

When the operation log settings are changed after setting [Transmit resource action], click the

 Set operation log file name button to set the operation log file again.
The settings for [Operation log file] are not automatically changed.
When the displayed data on [Operation log file] does not exist, an error occurs at the job execution.

---

(8) Range of data
Specify the maximum number of resource data to be sent for one resource data send action.
When [Operation Log] is selected for [Resource type], [Range of data] is fixed to [Latest data (days specified)].

```
┌─ Range of data ───────────────────────────────────┐
│   ○ Latest data (No. specified)      [      1 ]    │
│   ○ Latest data (time specified)     [      1 ] seconds │
│   ● Latest data (days specified)     [      1 ] days │
│   ○ All data                                       │
│                                                    │
│  To send large size data, resource data writing may be stopping long. │
│                                                    │
│  After GOT restart, it may be happened data resending. │
└────────────────────────────────────────────────────┘
```

Item	Description
Latest data (No. specified)	Specify the maximum number of resource data collected in the GOT after the last action. (Range:1 to 99999, Default:1)
Latest data (time specified)[1]	Specify the time period from the job execution time to the specified time for sending the collected resource data. (Range:1 to 99999, Default:1 (seconds))
Latest data (days specified)[1]	Specify the number of days including in the date at the job execution for sending the resource data. (This item cannot be specified for sending the logging data, the advanced user alarm data, and the advanced system alarm data.) (Range:1 to 400, Default:1 (days))
All data	All the resource data collected in the GOT after the last action.

For details of *1, refer to the following.

*1 Resource data to be sent after changing the GOT time and date

When changing the GOT time, the resource data to be sent may differ from the resource data to be sent without changing the GOT time.
The following shows the resource data to be sent after changing the GOT time and date.

(1) Logging data
  (a) Executing the next action before the time of the last action
    Example 1) Changing the time from 11:40 to 11:10, and executing the next action at 11:20
      : Time specified (300 seconds)

GOT time

Sending resource data
(last action)

A   B

(11:25) 11:30   11:40

Sending resource data
(next action)

C

11:10   11:20

Changing GOT time

<Resource data to be sent for the last action>
A:Data collected for the specified time (300 seconds)

<Resource data to be sent for the next action>
B:Data collected after the last action until changing
   the GOT time
C:Data collected for the specified time (300 seconds)

  (b) Executing the next action after the time of the last action
    Example 1) Changing the time from 11:40 to 11:20, and executing the next action at 11:35
      : Time specified (300 seconds)

GOT time

Sending resource data
(last action)

A   B   D

(11:25) 11:30 (11:35) 11:40

Sending resource data
(next action)

C

Changing GOT time → 11:20   11:35

<Resource data to be sent for the last action>
A:Data collected for the specified time (300 seconds)

<Resource data to be sent for the next action>
B,C:Data collected for the specified time (300
     seconds)
D:Data collected after the time of the next action (in
   the previous GOT time setting)

    Example 2) Changing the time from 11:58 to 12:58, and executing the next action at 13:00
      : Time specified (300 seconds)

GOT time

Sending resource data
(last action)

A

(11:25) 11:30   11:58

Sending resource data
(next action)

B

Changing GOT time → 12:58 13:00

<Resource data to be sent for the last action>
A:Data collected for the specified time (300 seconds)

<Resource data to be sent for the next action>
B:Data collected for the specified time (300 seconds)

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(2) Advanced user alarm data/advanced system alarm data
   (a) Executing the next action before the time of the last action
      (The GOT does not send all the data collected after the last acton.)
      Example 1) Changing the time from 11:40 to 11:00, and executing the next action at 11:20
          : Time specified (300 seconds)
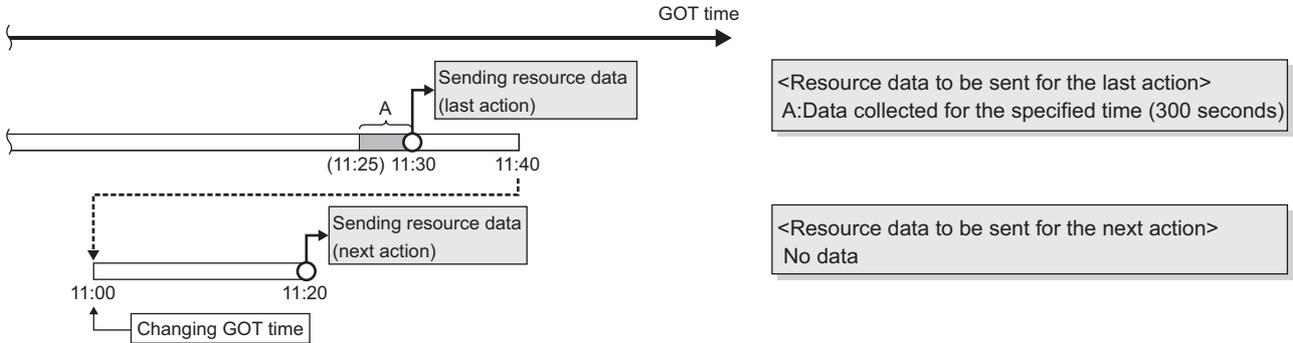
   (b) Executing the next action after the time of the last action
      Example 1) Changing the time from 11:40 to 11:20, and executing the next action at 11:35
          : Time specified (300 seconds)
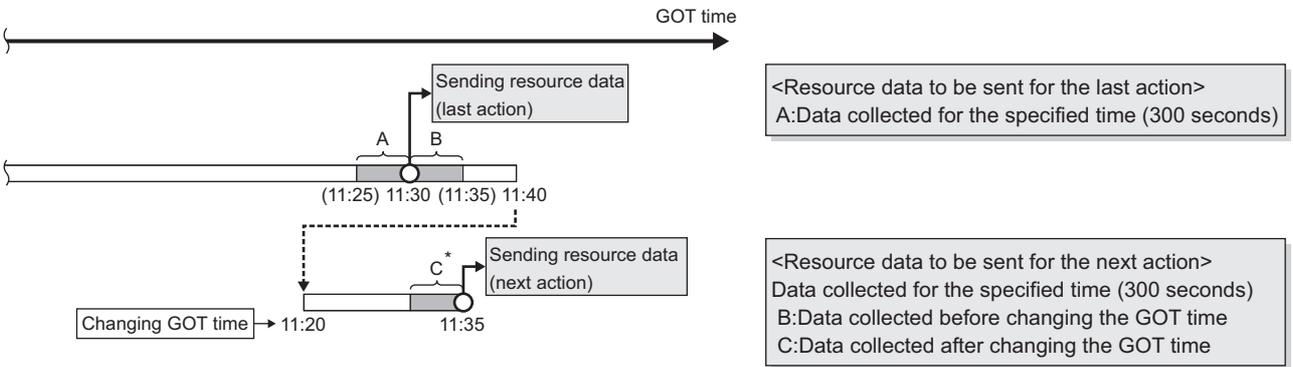
* The data collected before the last action are not sent by the next action even though the data is collected within the specified time.

(3) Operation log data
   (a) Executing the next action before the time of the last action
      (The GOT does not send all the data collected after the last acton.)
      Example 1) Changing the time from 0:40 to 23:40 on the previous day, and executing the next action at 23:50
          : Days specified (1 day)
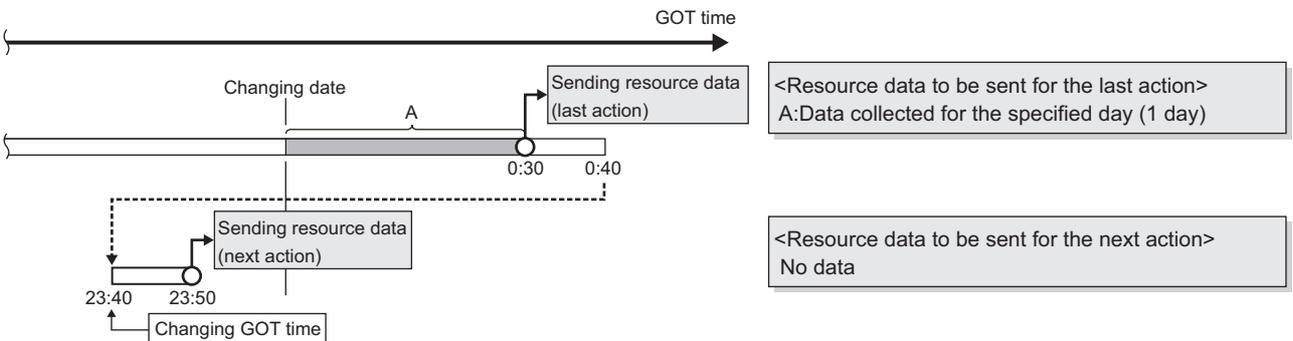
Example 2) Changing the time from 0:40 to 0:10 on the same day, and executing the next action at 0:20
: Days specified (1 day)
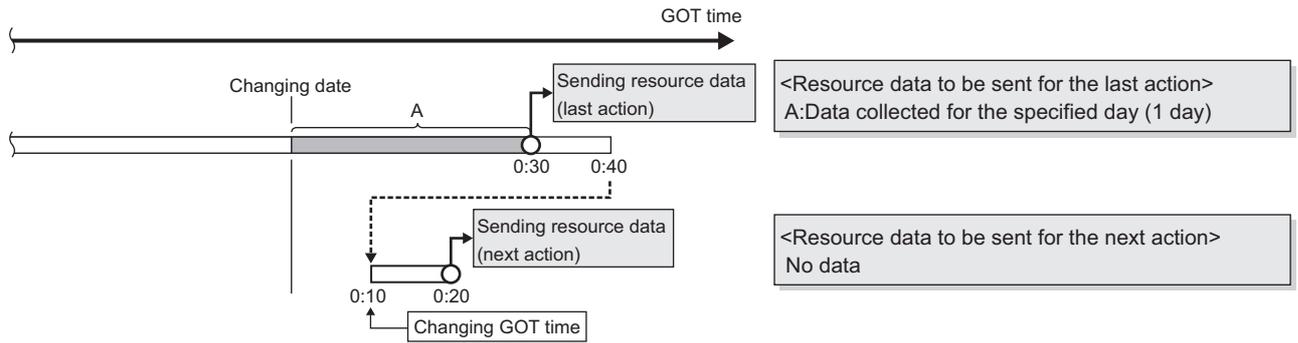
GOT time

Changing date

A

Sending resource data
(last action)

0:30   0:40

<Resource data to be sent for the last action>
A:Data collected for the specified day (1 day)

Sending resource data
(next action)

0:10   0:20

Changing GOT time

<Resource data to be sent for the next action>
No data

(b) Executing the next action after the time of the last action
Example 1) Changing the time from 23:40 to 0:10 on the next day, and executing the next action at 0:20
: Days specified (1 day)

GOT time

Sending resource data
(last action)

A

23:30   23:40

Changing date

<Resource data to be sent for the last action>
A:Data collected for the specified day (1 day)

B

Sending resource data
(next action)

Changing GOT time → 0:10   0:20

<Resource data to be sent for the next action>
B:Data collected for the specified day (1 day) after
the last action
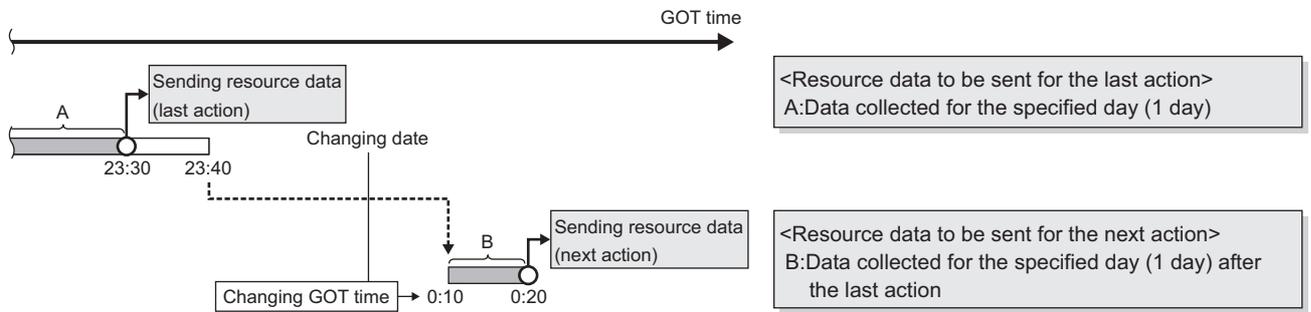
Example 2) Changing the time from 0:40 to 0:50 on the same day, and executing the next action at 1:00
: Days specified (1 day)
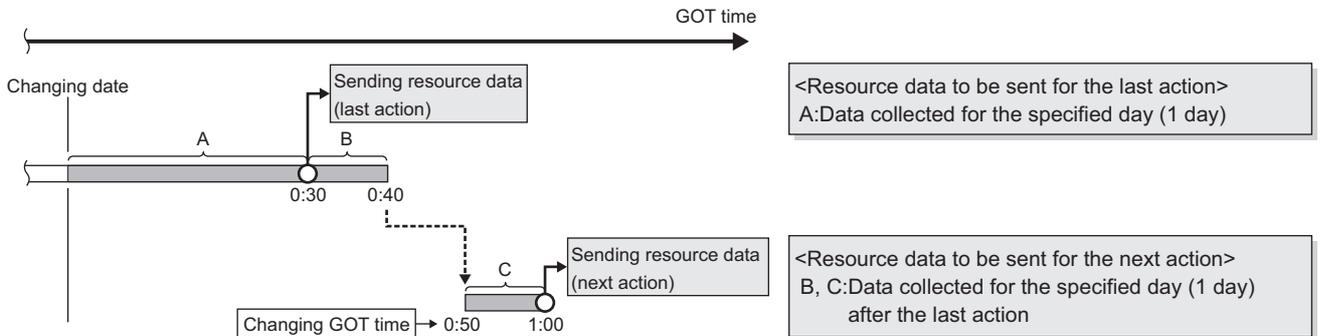
GOT time

Changing date

A   B

Sending resource data
(last action)

0:30   0:40

<Resource data to be sent for the last action>
A:Data collected for the specified day (1 day)

C

Sending resource data
(next action)

Changing GOT time → 0:50   1:00

<Resource data to be sent for the next action>
B, C:Data collected for the specified day (1 day)
after the last action

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(1) The GOT sends the resource data only one time, regardless of the settings for [Range of data]. The GOT does not send the sent data to the database.
The GOT may send the sent data when restarting the GOT for downloading the project data and others.
☞6.12 Precautions

(2) When an action fails due to the communication error between the GOT and the server computer or others, the GOT sends the failed action data at the next action.

(3) The time to complete the resource data send action (Reference value (seconds))
The following shows the resource data send time for the resource type, and the number of resource data (100, 500, 1000, 10000).
Under the following conditions, the values for sending data differ from the reference values in the following table.
• Loads on the GOT or loads on between the GOT and the server computer or others
• MES interface function setting

Resource type	Number of resource data			
	100	500	1000	10000
Logging[*1][*2]	7 (5)	31 (23)	59 (42)	582 (410)
Advanced user alarm[*3]	2	5	8	88
Advanced system alarm[*3]	2	5	8	-
Operation log[*4]	1	5	9	82

*1 The logging is collected by the buffer historical and the device points set to 250 points and a 100ms cycle for the logging setting.
*2 When collecting data every 100ms cycle is canceled, the value is shown in the parentheses.
*3 When sending the alarm comment with 512 one-byte characters.
*4 When the numbers of insert fields are 7 to 13 by one action.

6.8 Job Settings - Actions

(9) Generated SQL text

The SQL (INSERT) text generated by the currently editing data for [Transmit resource action] is displayed.

The SQL text shows the display type for the resource data, the character string, and the date.

The GOT does not send the resource data without setting the field name for [Field name setting]. The data with no field name are not included in the SQL text.

The following table shows the display type for the generated resource data and the date at the job execution. (The display type differs from the actual data at the job execution.)

Item		Description
Resource data[*1]		'Data name'
String		'String'

Date	Oracle® 8i	GOT time:
		  TO_DATE('(Date and time[YYYYMMDDhhmmss])',
		  'YYYYMMDDHH24MISS')
		Server time: sysdate

	Oracle® 12c
	Oracle® 11g
	Oracle® 10g
	Oracle® 9i
		GOT time:
		  TO_DATE('(Date and time[YYYYMMDDhhmmss])',
		  'YYYYMMDDHH24MISS')
		Server time: CURRENT_TIMESTAMP

	SQL Server® 2012 SQL Server® 2008 R2 SQL Server® 2008 SQL Server® 2005 SQL Server® 2000 MSDE2000 Wonderware® Historian	GOT time: '(Date and time[YYYY-MM-DD hh:mm:ss])' Server time: CURRENT_TIMESTAMP
	Access® 2013 Access® 2010 Access® 2007 Access® 2003 Access® 2000	GOT time: '(Date and time[YYYY-MM-DD hh:mm:ss])' Server time: NOW()

*1   For the data name, refer to the following.

    ☞ This section (5) Field name setting

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6.9 Option Setting

Configure the SNTP time synchronization setting and the DB buffering function setting.

1. Click [Option setting] in the Edit items tree.

2. The "option setting" area is displayed on the detailed setting edit screen.
Make the setting referring to the following descriptions.
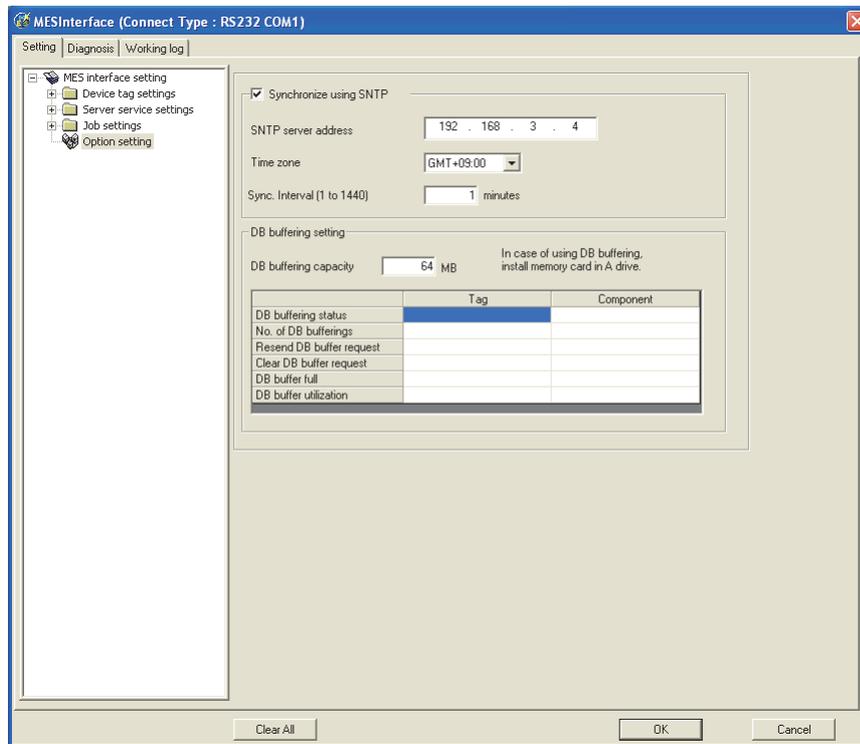
6.9.1 Setting items in SNTP time synchronization setting

Configure the settings for the SNTP time synchronization function.
Time is obtained from the SNTP server computer on the network and used on the GOT.

POINT

To synchronize the time between the GOT and other devices on the network, using the time on the SNTP server computer is recommended.

(1) Synchronize using SNTP

(a) When the [Synchronize using SNTP] box is checked, the time is adjusted to the time of the SNTP server computer on the network.
The timing is as follows:
- When powering ON the GOT from OFF
- When resetting the GOT
- Once for every interval specified in Sync. Interval

POINT

When the GOT time is set to be synchronized with the clock time of another controller by GT Designer3 and GOT utility, even if the [Synchronize using SNTP] box is checked, the SNTP time synchronization is not performed.
To use the SNTP time synchronization function, do not set the time adjustment settings on GT Designer3 or the GOT utility.
For details of the time adjustment settings, refer to the following manual.
☞GT Designer3 Version1 Screen Design Manual (Fundamentals)

(b) When [Synchronize using SNTP] is selected, set the following items.

Item	Description
SNTP server address (required)	Enter the IP address of the SNTP server or NTP server in decimal notation.
Time zone (required)	Select a time zone used for time synchronization. Japan Standard Time (GMT+09:00) is selected by default.
Sync. Interval (required)	Set an interval used for time synchronization. Default is 1 minute.

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(2) When time information is not obtainable from the SNTP server computer
When the GOT cannot obtain time information from the SNTP server computer due to failure of the network or time synchronization server, it behaves as follows:

    (a) When time information is not obtained at the time of powering ON the GOT from OFF, or resetting the GOT
       1) Time synchronization is not performed. (Clock data of the GOT are used as they are.)
       2) An error is output to the MES interface Execute Log.
       3) Time query is executed to the SNTP server computer after the interval specified for Sync. Interval.

    (b) When time information is not obtained once for each interval specified in Sync. Interval
       1) The GOT continues its operations based on the information that was successfully obtained by time query.
       2) If the previous time query was successful, an error is output to the MES interface Execute Log.
       3) Time query is executed to the SNTP server computer after the interval specified for Sync. Interval.

POINT

(1) When time query to the SNTP server computer is executed successfully, it can be also confirmed by the error log.
   • When succeeded in initial time query
    An error code is output to the MES interface Execute Log.
   • When failed in previous time query and succeeded this time
    An error code is output to the MES interface Execute Log.

(2) The MES interface Execute Log can be checked on the [Working log] tab.
    ☞6.11 Working Log

---

(3) Precautions on the time synchronization function

    (a) Synchronizing time with SNTP server computer
       When [Synchronize using SNTP] is selected, an SNTP server computer is required.
       Note that the SNTP server computer must have the time synchronization server function.

6.9.2   Setting items in DB buffering settings

Configure the settings for the DB buffering function.
For the DB buffering function, refer to the following:
☞5.1.10 DB buffering function
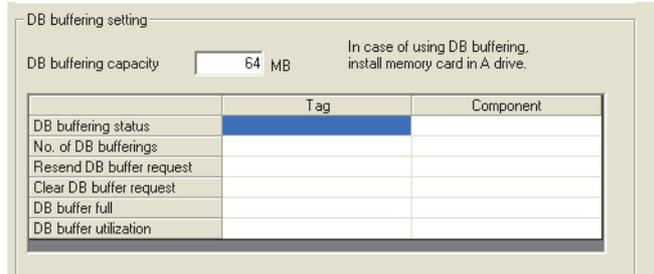
(1) DB buffering capacity (Range: 16MB to 512MB, Default: 64MB)
Set the capacity used for DB buffering out of the entire CF card capacity within the following range.
Maximum capacity = CF card capacity - 32M bytes

(2) DB buffering status

(a) Select a tag component into whose device whether data are currently accumulated in the DB buffer or not is stored.
Tags that have a tag component with [Array setting] cannot be selected.

(b) Data are stored as follows depending on the data type.

Data type of tag component	Description
Bit	OFF : Not accumulated ON : One or more data accumulated
String	"0" : Not accumulated "1" : One or more data accumulated
Other than the above	0 : Not accumulated 1 : One or more data accumulated

(3) No. of DB bufferings

(a) Select a tag component into whose device whether data are currently accumulated in the DB buffer or not is stored.
Tags that have a tag component with [Array setting] cannot be selected.

(b) Data are stored as follows depending on the data type.

Data type of tag component	Description
Bit	OFF : Not accumulated ON : One or more data accumulated
String	"0" : Not accumulated 1 or greater : Number of buffering data that are accumulated
Other than the above	0 : Not accumulated 1 or greater : Number of buffering data that are accumulated

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(4) Resend DB buffer request

(a) Select a tag component used to request for resend processing of the DB buffer.
Tags that have a tag component with [Array setting] cannot be selected.

(b) The following explains the operation of the resend processing using [Resend DB buffer request].

Data type of tag component	Description
Bit	The resend processing of the DB buffer is performed when the specified tag component is ON. Normal: Turns OFF after completion of the resend processing. [*1][*2] Error: Outputs an error code to MES interface Execute Log, and turns OFF.
String	The resend processing of the DB buffer is performed when "1" is written to the specified tag component. Normal: "0" is written after completion of the resend processing. [*1][*2] Error: Outputs an error to the MES interface Execute Log, and "0" is written.
Other than the above	The resend processing of the DB buffer is performed when "1" is written to the specified tag component. Normal: "0" is written after completion of the resend processing. [*1][*2] Error: Outputs an error to the MES interface Execute Log, and "0" is written.

*1 Do not change the value of the specified tag component until the resend processing is completed.
Even if the value changes, the resend processing is not interrupted.

*2 To make another DB buffer resend request after completion of resend processing, wait for a sampling interval of the specified tag component or more, and then set the device as follows:
- Bit type: ON
- Character string type: "1"
- Other than the above: 1

(5) Clear DB buffer request

(a) Select a tag component used to request for clear processing of the DB buffer.
Tags that have a tag component with [Array setting] cannot be selected.

(b) The following explains the operation of the clear processing using [Clear DB buffer request].

Data type of tag component	Description
Bit	The clear processing of the DB buffer is performed when the specified tag component is ON. Turns OFF after completion of the clear processing. *3*4 Clear DB buffer request Tag component value DB buffer clear processing — Execute clear
String	The DB buffer is cleared when "1" is written to the specified tag component. "0" is written after completion of the clear processing. *3*4
Other than the above (Including string)	The DB buffer is cleared when "1" is written to the specified tag component. "0" is written after completion of the clear processing. *3*4

*3 Do not change the value of the specified tag component until the clear processing is completed.
Even if the value changes, the clear processing is not interrupted.

*4 To make another DB buffer clear request after completion of clear processing, wait for a sampling interval of the specified tag component or more, and then set the device as follows:
- Bit type: ON
- Character string type: "1"
- Other than the above: 1

(6) DB buffering full

(a) Select a tag component into whose device the status of whether the DB buffer is full or not is stored.
Tags that have a tag component with [Array setting] cannot be selected.

(b) Data are stored as follows depending on the data type.

Data type of tag component	Description
Bit	OFF : DB buffer is not full. ON : DB buffer is full.
String	"0" : DB buffer is not full. "1" : DB buffer is full.
Other than the above	0 : DB buffer is not full. 1 : DB buffer is full.

(c) When the DB buffer becomes full, buffering operation will be stopped.
After buffering operation is stopped, even if a job for which DB buffering is enabled is activated, its SQL texts are discarded without being buffered.
Execution of a job for which DB buffering is enabled is not canceled.

POINT

Check [DB buffer utilization] shown in this section (7) to prevent the "DB buffer full" status.

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(7) DB buffer utilization

    (a) Select a tag component into whose device the utilization of the DB buffer area (unit: %) is stored. Tags that have a tag component with [Array setting] cannot be selected.

    (b) Data are stored as follows depending on the data type.

Data type of tag component	Description
Bit	OFF : Not accumulated ON : One or more data accumulated
String	"0" : Not accumulated Other than "0" : Utilization of DB buffer area (Unit: %)
Other than the above	0 : Not accumulated Other than 0 : Utilization of DB buffer area (Unit: %)

6.10 Diagnosis

Perform the remote diagnosis for the MES interface function.

1. Click the [Diagnosis] tab.

2. The [Diagnosis] sheet is displayed.
Operate it referring to the following descriptions.
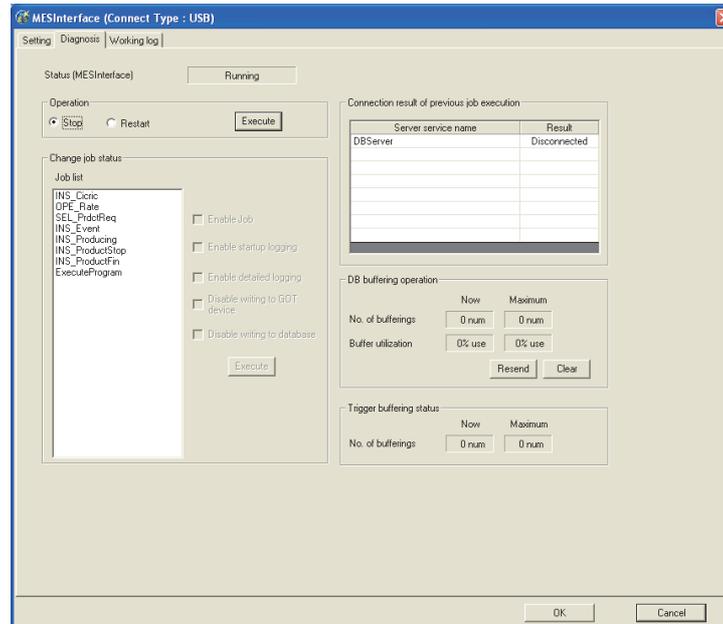
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6.10.1 Checking the MES Interface Function status (Status)

The operation status of the MES interface function can be checked.
The following explains the display of [Status].
The display of [Status] is updated every 3 seconds.

Status [MESInterface]	Running

Display	Description
Running	The MES interface function is working normally.
Stopped	The MES interface function is stopped. Even if trigger conditions are met, no job will be executed during stop of the function.
Initializing	The GOT is in process of powering from OFF to ON, or resetting. Even if trigger conditions are met, no job will be executed during initialization.
Starting	The MES interface function is starting up after processing of the above Initializing status. Even if trigger conditions are met, no job will be executed during startup.
Stopping	The MES interface function is being stopped.
Getting status	The MES interface function setting screen is attempting to acquire the status from the MES interface function.
Connection failed	The MES interface function setting screen failed to connect to the MES interface function and could not acquire the status.
Error	The MES interface setting has not been done, or the MES interface function is stopped due to an error.

6.10.2　Manipulating the MES Interface Function status (Operation)

The operation status of the MES interface function can be manipulated.
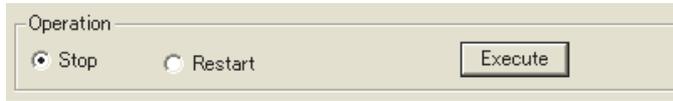
(1)　Stop

1.　Selecting the [Stop] radio button and clicking the ⌊Execute⌋ button stops the operation of the MES interface function.

POINT

If a job is in execution, the MES interface function will stop upon completion of the job.
For completion of a job in which a communication error has occurred, refer to the following:

☞ 5.3 (c) When actions are set for a job

(2)　Restart

1.　Selecting the [Restart] radio button and clicking the ⌊Execute⌋ button restarts the operation of the stopped MES interface function.

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6.10.3 Changing the job status (Change job status)

The job status can be changed.

POINT

The job status changed by this operation returns to the status set in [Job settings] by powering OFF and ON or resetting the GOT.
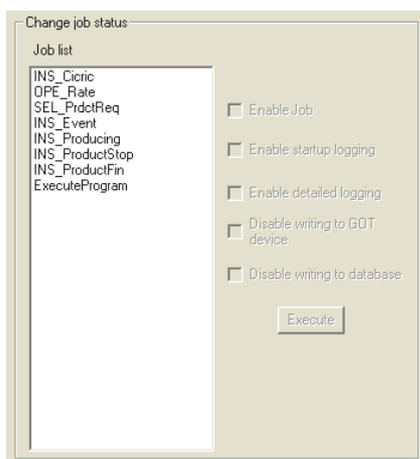
1. From [Job list], select the job whose status is to be changed.

2. Select a checkbox of the status to be changed.

Item	Description
Enable job	• Checked The job is enabled and thereby it is executed when the trigger conditions are met. • Not checked The job is disabled, and thereby it is not executed even if the trigger conditions are met.
Enable startup logging [*1]	• Checked The startup logging is enabled, and thereby startup records are logged. • Not checked The startup logging is disabled, and thereby startup records are not logged.
Enable detailed logging [*2]	• Checked The detailed logging is enabled, and thereby detailed records are logged. • Not checked The detailed logging is disabled, and thereby detailed records are not logged.
Disable writing to GOT device	• Checked Writing to PLC devices is disabled. • Not checked Writing to PLC devices is enabled.
Disable writing to database	• Checked [*3] Writing to the database is disabled. • Not checked Writing to the database is enabled.

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*1   The startup log can be confirmed in [Job Execute Log] on the [Working log] tab.

☞ 6.11.2 Job Execute Log

*2   [Enable detailed logging] is selectable only when [Test mode] is selected in [Job settings].

☞ 6.7.1 (5) Test mode

When [Enable detailed logging] is checked, [Enable startup logging] is also selected.

The detailed log can be confirmed in [Job Execute Log] on the [Working log] tab.

☞ 6.11.2 Job Execute Log

*3   When [Disable writing to database] is checked, the following processing are executed.
   • The SQL text is sent to a database, and then the rollback is executed at the last.
     Errors occur when the server service settings and the settings for the actions in [Job settings], including table names and field names, are incorrect.
     When an error occurs, check the settings.
   • With Wonderware® Historian, the following SQL text is sent because the rollback cannot be used.
     INSERT INTO History (Data Time, TagName,Value) SELECT TOP 0 NULL.
     NULL. NULL:
     Errors occur when the server service settings are incorrect.
     When an error occurs, check the server service settings.
     No error occurs even though the settings for the action in [Job settings] are incorrect.

3. Clicking the [Execute] button changes the job status.

6.10.4   Checking the connection of the previous job execution (Connection result of previous job execution)

Connection with the server computer set in [Server service settings], which is made at the time of the previous job execution, can be checked.
The following explains the display of [Connection result of previous job execution].
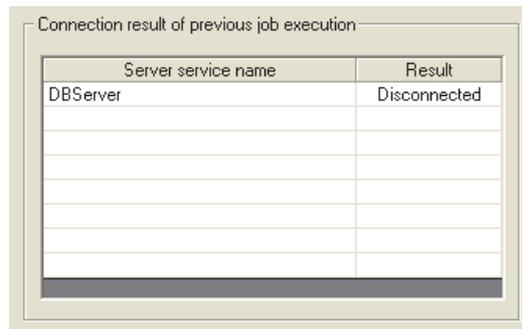
Displayed result	Description
Connected	Normally connected to the server computer at the time of the previous job execution.
Disconnected	Initial status (Not connected to the database server computer), or normal connection could not be established at the previous job execution and thereby the line was disconnected.

POINT

• The display of the connection result is not changed until the next job is executed to communicate the database server computer.
• The result of the one-shot communication with the database server computer is not reflected.

6.10.5　Manipulating DB buffering (DB buffering operation)

Operate the DB buffering.
For the DB buffering function, refer to the following:
☞5.1.10 DB buffering function

(1)　Number of bufferings and Buffer utilization

This section explains checking the number of data buffered, the current buffer utilizations, and the highest buffer utilizations of the DB buffering function.

Display	Description	
	Current value	Highest value[2]
No. of bufferings [1]	Shows the current number of bufferings (number of buffered jobs).	Shows the number of bufferings (number of buffered jobs) in the past.
Buffer utilization [1]	Shows the current buffer utilization.	Shows the highest buffer utilization in the past.

　*1　A value is not displayed when the value is being obtained or could not be obtained.
　*2　Any of the following operation clears the highest value.
　　• Power off the GOT.
　　• Reset the GOT (when changing the communication settings, etc.)
　　• Install the OS from GT Designer3
　　• Download project data, etc.
　　• Restart the MES interface function
　　• One-shot execution
　　　Note that the highest value is not cleared if the MES interface function was stopped by the diagnostics function.

(2)　Resending data stored in the DB buffer

1. Clicking the ⎡Resend⎤ button executes the resend processing of the SQL texts stored in the DB buffer, when manual resend is selected for the jobs of the SQL texts.
If resend processing fails, an error will be output to the MES interface Execute Log.

(3)　Clearing the DB buffer

1. Clicking the ⎡Clear⎤ button clears all of the SQL texts that are stored in the DB buffer.

6.10.6 Checking the trigger buffering (Trigger buffering status)

This section explains checking the number of data buffered, the current buffer utilizations, and the highest buffer utilizations of the trigger buffering function.
For the trigger buffering function, refer to the following:

☞ 5.1.5 Trigger buffering function

Trigger buffering status	Now	Maximum
No. of bufferings	0 num	0 num

Display	Description	
	Current value	Highest value[2]
No. of bufferings [1]	Shows the current number of bufferings (number of buffered jobs).	Shows the number of bufferings (number of buffered jobs) in the past.

[1] A value is not displayed when the value is being obtained or could not be obtained.
[2] Any of the following operation clears the highest value.
- Power off the GOT.
- Reset the GOT (when changing the communication settings, etc.)
- Install the OS from GT Designer3
- Download project data, etc.
- Restart the MES interface function
- One-shot execution

POINT

When a large number of data is buffered, check the number of job settings and the trigger condition setting.

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6.11 Working Log

The operation log of the MES interface function can be checked.
In [Working log], the MES interface Execute Log and the Job Execute Log of the GOT can be checked.

1. Click the [Working log] tab.

2. The [Working log] sheet is displayed.

3. Click the Acquire button.

4. Log data are displayed.
Operate this screen referring to the following descriptions.
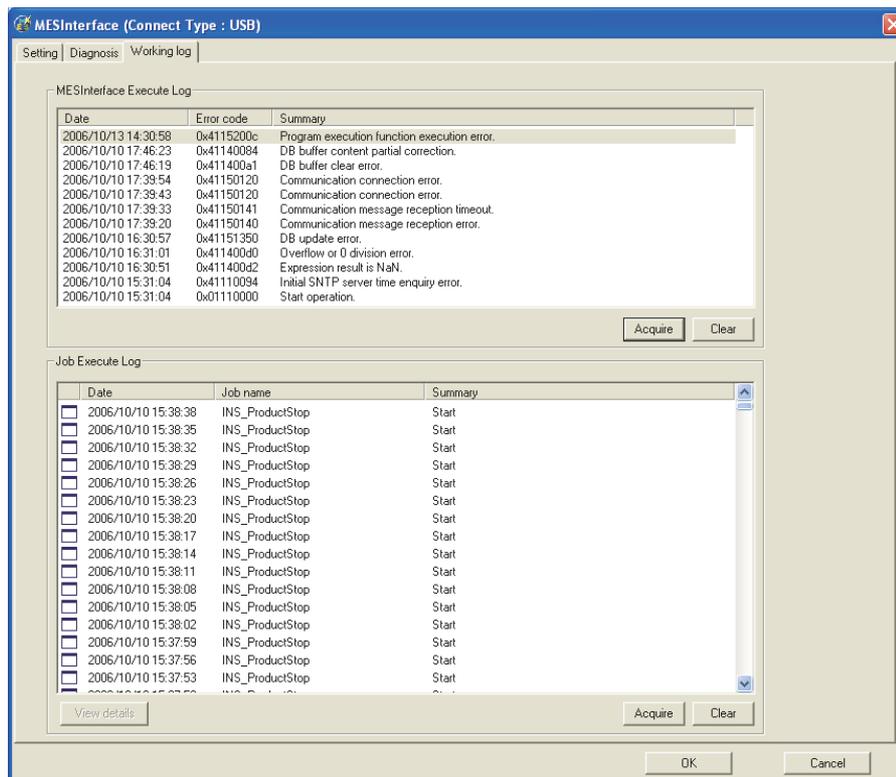
6.11.1 MES Interface Execute Log

(1) The MES interface function execution log is displayed.
Data displayed in the MES Interface Execute Log are shown below.

Item	Description
Date	Displays the date and time on which an error occurred.
Error code	Displays an error code of the error occurred. For error codes, refer to the following: ☞ 8.1 Error Handling and Recovery Method
Summary	Displays an error message.

(2) Updating the MES interface Execute Log

1. Clicking the ⎡Acquire⎤ button updates the MES interface Execute Log.

(3) Clearing the MES interface Execute Log

1. Clicking the ⎡Clear⎤ button clears the historical data in the MES interface Execute Log.

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6.11.2 Job Execute Log

This area displays event log data of the jobs whose executions have been completed.
There are two kinds of Job Execute Log data: [Startup log] and [Detailed log], by which the job startup history and job execution details can be checked respectively.

(1) Startup log

Startup log data of the jobs, each of which has [Startup logging] setting in [Job settings], are displayed.

☞6.7.1 (4) Startup logging

The following explains the display of the Startup log.

(a) Icon

The completion status of the job is displayed as an icon in the Job Execute Log area.
The following explains the status of each icon.

Icon	Description
	The job was completed normally. (No detailed log)
	The job was completed normally. (With detailed log) Selecting the job and clicking the ⬚ View details ⬚ button displays the [View details] dialog box.
	The job was canceled. (No detailed log)
	The job was canceled. (With detailed log) Selecting the job and clicking the ⬚ View details ⬚ button displays the [View details] dialog box.

(b) Date

The date and time of job startup is displayed.

(c) Job name

Started jobs are displayed.

(d) Summary

Trigger instructions are displayed.

Display	Description
Start	Shows that any job other than handshake operation was activated.
Handshake start	Shows that job execution of handshake operation was activated.
Handshake end	Shows that job execution of handshake operation was completed.

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(2) Detailed log

Detailed log data of the jobs, each of which has [Test mode] setting in [Job settings], are displayed.

☞6.7.1 (5) Test mode

POINT

Do not remove the CF card from the GOT during detailed log output.

1. Selecting a job of ▦ or ▦ icon and clicking the | View details | button displays the [View details] dialog box.

The following explains the display of the [View details] dialog box.
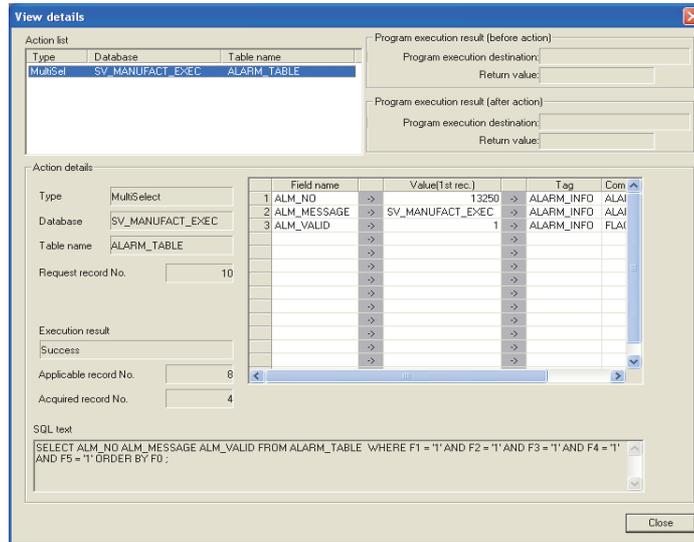
Item	Description
Action list	Displays a list of executed job actions. Selecting an action displays its action details.
Program execution result (before action)	Displays a program execution result before execution of the first action.
Program execution result (after action)	Displays a program execution result after execution of the last action.
Action details [*1] [*2] [*3]	Displays the action details.

*1   In the case of Communication action

	Display	Description
1)	Type, Database, Table name	Displays data of [Action type], [Database], and [Table name], which were set in [Communication action].
2)	Request record No.	Displays the number of records specified for [Specify the maximum number of acquiring records] in the Multi select setting screen for the communication action. When the number of records is not specified, [No specification] is displayed.

3)	Execution result	Displays the execution result of the SQL text.
		• When succeeded
		  [Success] is displayed.
		• When failed
		  [Failed] is displayed.

4)	Applicable record No. (Insert records No.)	• When [Select] or [MultiSelect] is selected for [Action type]
		  The number of records that meet the Select/Update conditions is displayed.
		• When [Update] is selected for [Action type]
		  The number of updated records is displayed.
		• When [Insert] is selected for [Action type] ([Insert records No.] is displayed.)
		  The number of inserted records is displayed.
		When the database is Wonderware® Historian, the number of inserted records is displayed as 0 with the following operations and settings.
		  • Test mode • One-shot execution
		  • Settings without writing to the database

5)	Acquired record No.	Displays the number of acquired records when [Select] or [MultiSelect] is selected for [Action type].
6)	DB-tag link settings	Displays data of [DB-tag link settings], which were set in [Communication action].
7)	SQL text	The SQL text executed in [Communication action] is displayed.

*2   In the case of Operation action
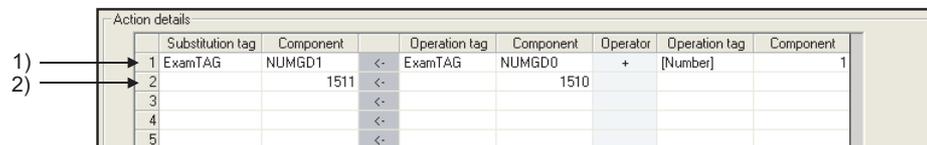
	Display	Description
1)	Upper row	Displays the settings of [Operation action].
2)	Lower row	Displays values calculated in [Operation action].

*3   In the case of Transmit resource action

	Display	Description
1)	Type, Database, Table name	Displays data of [Action type], [Database], and [Table name], which were set in [Communication action].

2)	Execution result	Displays the execution result of the SQL text.
		• When succeeded
		  [Success] is displayed.
		• When failed
		  [Failed] is displayed.

3)	Resource type, Logging ID/ Alarm ID, Operation log file	Displays the data of [Resource type], [Logging ID/Alarm ID], and [Operation log file] (the stored location for the operation log file) set for [Transmit resource action].

4)	Field name setting	Displays the field name set on [Field name setting] in [Transmit resource action] and the substitute value.
		• When the resource data to be sent exists
		  Displays the substitute value sent the first.
		• When the resource data to be sent does not exist. (all or part of the substitute value for the field)
		  No data is inserted to [Value(1st rec.)].

5)	No. of execute SQL	Displays the number of the SQL texts sent for [Transmit resource action]. Displays 0 in the following cases. • When sending no resource data (substitute values for all the fields) • When a communication error occurs between the GOT and the database • When the SQL text cannot be sent to the database.
6)	SQL text	Displays the SQL text executed for [Transmit resource action]. Displays no data when sending no resource data (all or part of substitute values for the field)

(3) Updating the Job Execute Log

1. Clicking the [Acquire] button updates the Job Execute Log.

(4) Clearing the Job Execute Log

1. Clicking the [Clear] button clears the Job Execute Log.

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6.12 Precautions

Precautions for the MES interface function setting are described below.

(1) When adding, editing or deleting a MES interface setting

Adding a new MES interface setting, or editing or deleting an existing one is performed on the MES interface function setting screen.

To newly add, edit or delete a MES interface setting, have the MES interface function setting screen displayed on GT Designer3.

(2) When deleting an item

Deleting an item such as [Device tag settings] is not allowed when the selected item is used for another item such as [Job settings].

As the error dialog box appears, identify the location, stop using it for another item, and then delete the item.
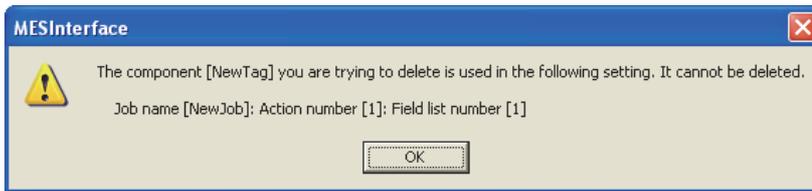
Up to ten locations of usage are displayed in the error dialog box.

If the item is used in 11 other items or more, the dialog box is displayed as shown below.
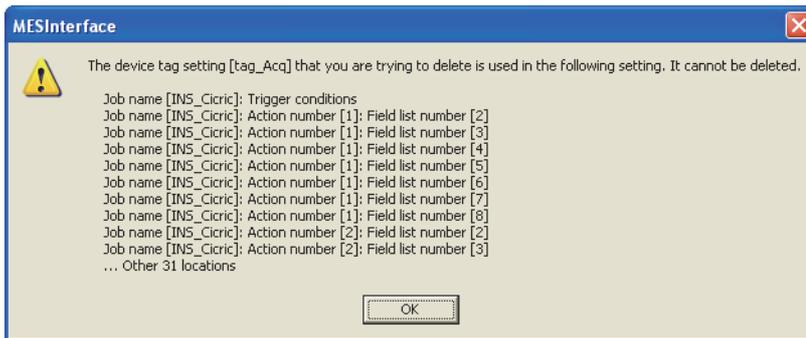
(3) Type mismatch

   (a) Value substitution

A value is assigned to a tag component after the type of the source is converted into the type of the tag component.

A value is assigned to a variable after the type of the variable is converted into the type of the substitution source.

(Example) Type conversion of tag components and variables

Because the operation result is out of the range for the integer type, the variable Temp1 is the floating-point type.

A value is assigned after being converted to the type for the tag component.
For example, when the tag component, Data1, is double-precision type data, the type of the variable, Temp1, is converted from floating-point to double-precision first, and then the converted value is assigned.

If a type that cannot be converted is assigned to a tag component, the job execution is canceled.

At this time, "Type conversion to tag component error" is displayed in the MES interface Execute Log.

(b) Operation of numerical values

There are two kinds of numerical values: Integer type and Floating-point type.

- Integer type : Represents the bit type, single-precision type, and double-precision type of tag components.
- Floating-point type : Represents the floating-point type of tag components.

The following table lists operation items and types of the results.

Item	Operation result
Operation of floating-point type	Floating-point type in all cases
Addition, subtraction, multiplication of Integer type	In the range from -2147483648 to 2147483647 : Integer type Exceeding the above range : Floating-point type
Division of Integer type	Divisible : Integer type Not divisible : Floating-point type
	When zero divide is executed, the job execution is canceled. At this time, "Zero divide error" is displayed in the MES interface Execute Log.

(c) Operation between character string type values

1) + operator

Combines character strings.

Example: "ABCDEFG" + "HIJ" → "ABCDEFGHIJ"

2) Other operators

When both of the operands can be converted to numerical values, the operation is performed using the numerical values.

Both or either of them cannot be converted to numerical values, the job execution is canceled.

At this time, "Operation error" is displayed in the MES interface Execute Log.

Example:"312" × "4" → "1248"

"31AH" × "4" → Cancellation of job execution

3) Operation between a character string type value and a numerical type value

Same as the case of the operation between character string type values

(4) Precautions resource data send action

(a) Checking resource data

The settings for collecting the resource data must be matched to the settings for the resource data send action. When the settings are not matched, an error may occur at the job execution.

When setting for the resource data send action, click the $\boxed{\text{Confirm setting}}$ button, and then check that [No problem in the resource setting.] is displayed.

When the resource data send action setting differs from the setting for collecting the resource data, the following error message are displayed.

Resource type	Error message	Corrective action
Logging	Logging function setting does not exist.	Set [Logging Setting].
	The logging ID is not available.	Set the logging ID in [Logging ID/Alarm ID] that is set for [Logging Setting].
Advanced user alarm	Advanced user alarm function setting does not exist.	Set [Advanced User Alarm Observation].
	The alarm ID is not available.	Set the alarm ID in [Logging ID/Alarm ID] that is set for [Advanced User Alarm Observation].
Advanced system alarm	Advanced system alarm function is not available.	Check [Use System Alarm] for [Advanced System Alarm].
Operation log	Operation log function is not available.	Check [Use Operation Log Settings] for [Operation Log Setting].
	The operation log file name is mismatch.	Click the Set operation log file name button to obtain the stored file for the operation log setting.

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(b) Conditions for sending the sent resource data

When restarting the GOT, the GOT may send the sent data.

Multiple records are created in the database when the GOT sends the sent data.

The following shows conditions for sending the sent resource data.

Resource type	Condition
Logging	No sent resource data is sent.
Advanced user alarm	• When restarting the GOT, the sent resource data is stored in the alarm log file.
Advanced system alarm	• When restarting the GOT, the sent resource data is stored in the alarm log file.
Operation log	• When restarting the GOT, the sent resource data is stored in the operation log file.

(c) Collecting no resource data when executing an action

1) When the data in the field set for [Field name setting] does not exist.

The GOT sends the data of "" (Null) to the field.

The following resource data shows the resource data types with no data depending on conditions.

Resource type	Insert data	Action execution
Logging	LoggingDevice	Sending no data
Advanced user alarm	Comments	Sending ""(Null) data
Advanced system alarm	None	-
Operation log	Object name(OPNAME), Operation level(OPERATOR), Operation level(OPE_ID), User ID(USER_ID), Action No.(ACT_NO), Data type(DATA_TYPE), Device name(DEV_NAME), Change value(CHG_VALUE), Previous value(PREV_VALUE)	Sending no data

POINT

Set "null-capable" in the fields for the database.

Without setting "null-capable", an error occurs at the job execution.

For the database setting, refer to the manual for the database to be used.

2) Collecting no resource data after the last action

The action is succeeded without communicating the GOT with the database. (The MESInterface Execute Log is output.)

The access log is not output to the server computer.

7. DB CONNECTION SERVICE AND SETTING TOOL

This chapter explains DB Connection Service and DB Connection Service Setting Tool.

7.1 DB Connection Service Functions

Installing DB Connection Service on the server computer allows to use the MES interface function of the GOT.
The following shows the functions of the DB Connection Service.

POINT

(1) It is necessary to install DB Connection Service on all the database server computers and application server computers to be accessed from the GOT.

(2) When using DB Connection Service on a database server computer, the ODBC setting for the database used must be made beforehand.
☞7.2 Setting ODBC of Database

(3) When using DB Connection Service on an application server computer, an account for user program execution must be created beforehand.

(4) Changes to the DB Connection Service settings are made with DB Connection Service Setting Tool.
☞7.5 Setting Items of DB Connection Service Setting Tool

(1) ODBC connection function
The OBDC connection function connects the GOT and the ODBC interface for database.
The following shows operation on the database server computer.
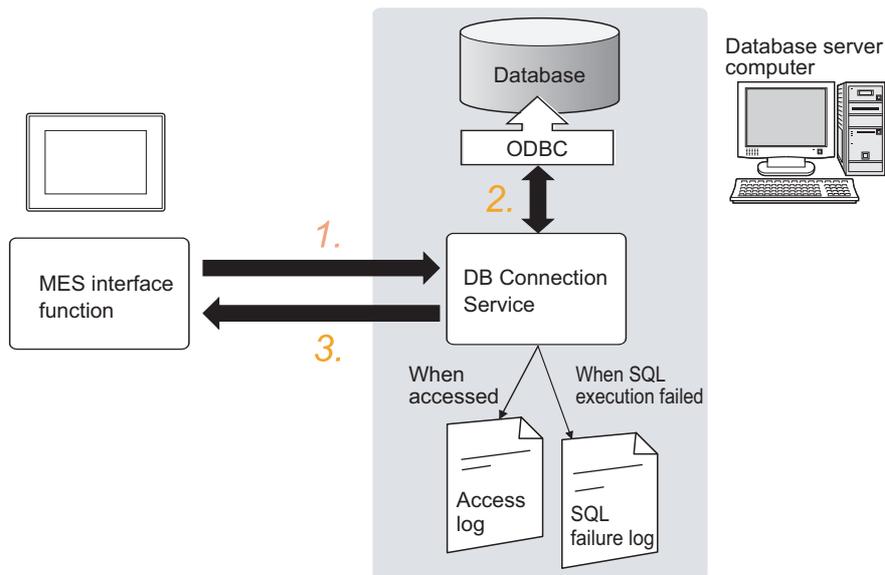
1. Receives SQL texts from the GOT.

2. Accesses the database via ODBC interface and executes the SQL text.

3. Sends the SQL text execution results to the GOT.

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(2) Program execution function

The program execution function executes a program on an application server computer upon request from the GOT.

The following shows operation on the application server computer.
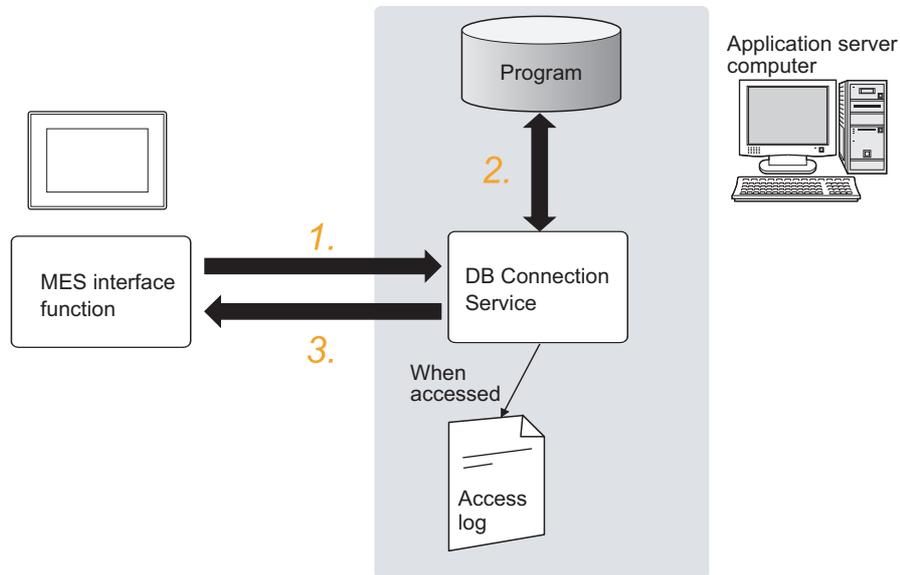
1. Receives a program execution request from the GOT.

2. Executes programs on the application server computer.

3. Sends the program execution results to the GOT.

(3) IP filter function (7.5 (3) Limit IP addresses which permit to connect)

The IP filter function allows specification of the IP address of the GOT that can connect to the DB Connection Service, ensuring the security of the server computer.

Batch specification using the mask bit length specification is possible.

If the IP filter function is not used, any GOT can connect to DB Connection Service.

(4) Log output function

DB Connection Service outputs an access log and an SQL failure log.

(a) Access log (7.5 (4) Output access log)

The communication contents between the GOT and DB Connection Service are output to the access log.

For access log specifications, refer to the following.

7.8.1 Access log

(b) SQL failure log (7.5 (5) Output SQL failed log)

If data cannot be updated/inserted normally due to an error such as no table at SQL text execution, the error information is output to the SQL failure log.

For SQL failure log specifications, refer to the following.

7.8.2 SQL failure log

7.2 Setting ODBC of Database

When using DB Connection Service on a database server computer, the ODBC setting for the database used must be done beforehand.
For the ODBC setting, refer to the following.

☞ Manuals and online help for the database software and operating system (OS) used

(1) When Oracle® 12c, 11g, 10g, 9i or 8i is used

(This section gives a setting example of using Oracle® 9i in Microsoft® Windows® XP Professional Operating System.)
Set the following conditions.

- Data source name [*1] : SAMPLEDS
- TNS Service Name [*2] : SAMPLETNS
- OracleHome: OraHome92

> [*1] Data source name can be set as desired.
> For [Data source name] in [Server service settings], use the name set with this setting.
>
> [*2] The TNS service name is the name for accessing an Oracle® database.
> The name is entered when installing Oracle® and creating a database instance.
> This can be checked with [Configuration and Migration Tools] - [Net Manager] - [Service naming] of Oracle®.

(Start)
↓
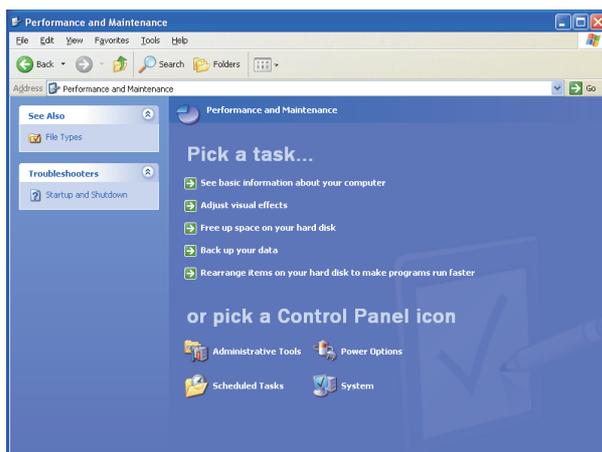
1. Clicking [Performance and Maintenance] in Control Panel displays the [Performance and Maintenance] dialog box.
To display Control Panel, select [Start] → [Control Panel].

↓
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↓
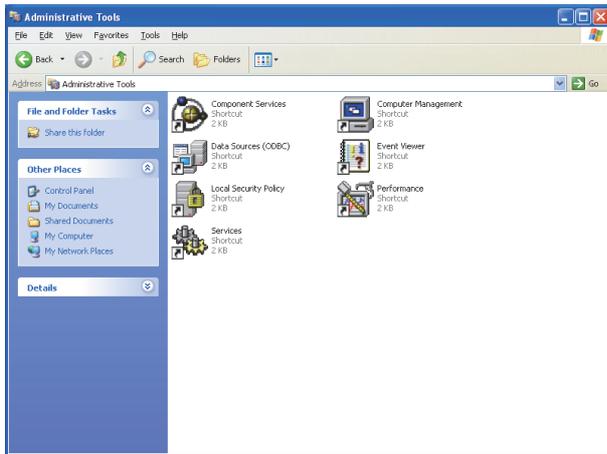
2. Double-clicking [Administrative Tools] displays the [Administrative Tools] dialog box.

↓
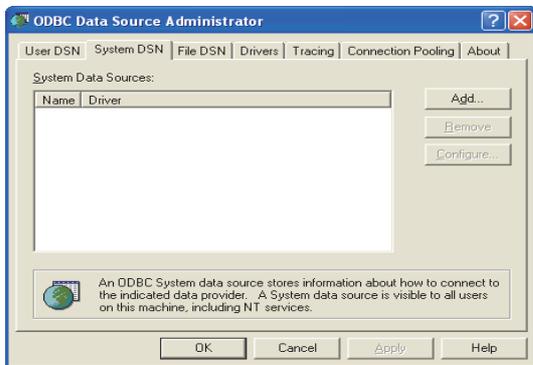
3. Double-clicking [Data Sources (ODBC)] displays the [ODBC Data Source Administrator] dialog box. Select the [System DSN] tab, and click the Add button.

↓
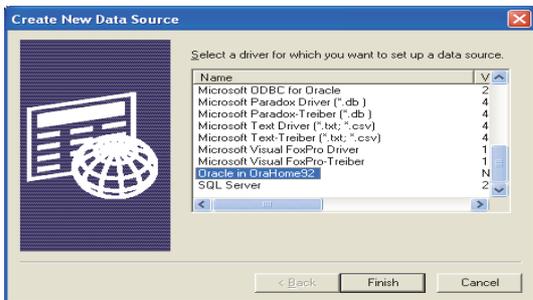
4. The [Create New Data Source] dialog box is displayed. Select [Oracle in OraHome92].

↓
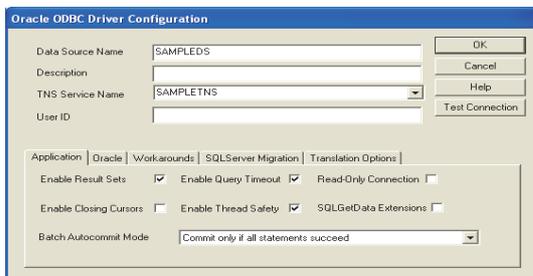
5. In the displayed [Oracle ODBC Driver Configuration] dialog box, set the following.
   - [Data source name]: SAMPLEDS
   - [TNS Service Name]: SAMPLETNS

6. Clicking the Connection test button displays the [Oracle ODBC Driver Connect] dialog box.

↓

(To the next page)

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↓

Oracle ODBC Driver Connect

Service Name

SAMPLETNS

User Name

Password

OK

Cancel

About...

↓

Testing Connection

Connection successful

OK

↓
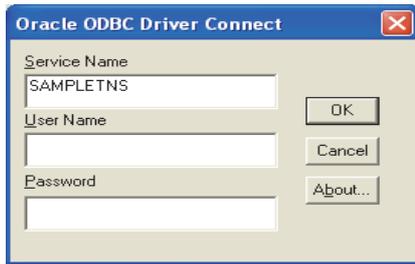
(Completed)

7. Enter the user name and password, then click the OK button.

8. If the connection is normal, the confirmation dialog box appears.

9. Click the OK button in the [Oracle ODBC Driver Configuration] dialog box.

10. Click the OK button in the [ODBC Data Source Administrator] dialog box.

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(2) **For Microsoft® SQL Server 2012, Microsoft® SQL Server 2008 R2, Microsoft® SQL Server 2008, Microsoft® SQL Server 2005, Microsoft® SQL Server 2000, MSDE 2000 and Wonderware® Historian 9.0**

(The following shows a setting example using Microsoft® SQL Server 2000 with Microsoft® Windows® XP Professional Operating System.)
Set the following conditions.

- Data source name[*1]: SAMPLEDS
- Server name[*2]: SAMPLESRV

    *1   Data source name can be set as desired.
            For [Data source name] in [Server service settings], use the name set with this setting.

    *2   The server name is the name for accessing a Microsoft® SQL Server 2000 database.
            This name is entered when installing Microsoft® SQL Server 2000.
            This can be checked with the SQL Server service manager server.

(Start)
↓

1. Clicking [Performance and Maintenance] on the Control Panel displays the [Performance and Maintenance] dialog box.
To display the Control Panel, select [Start] → [Control Panel].

↓

*2.* Clicking [Administrative Tools] displays [Administrative Tools] dialog box.

↓

3. Double clicking [Data Sources (ODBC)] displays [ODBC Data Source Administrator] dialog box.
Select the [System DSN] tab, then click the Add button.

↓

(To the next page)

↓

↓

↓

↓

↓
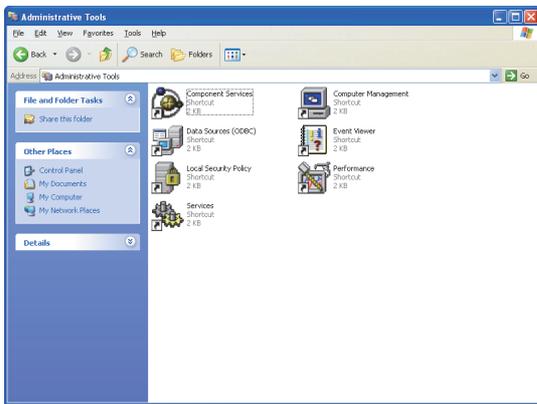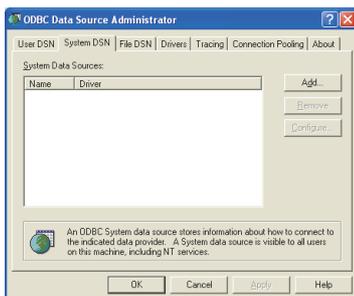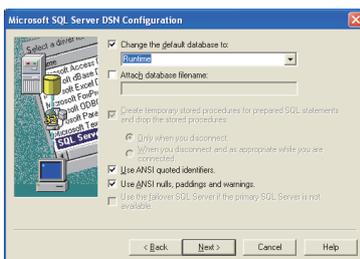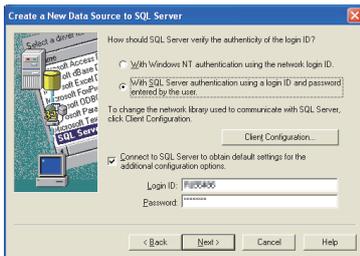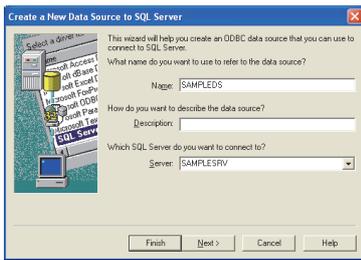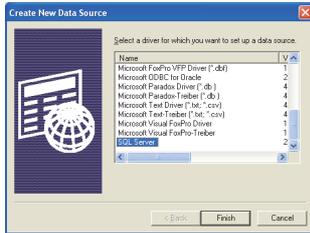
4. The [Create New Data Source] dialog box is displayed, then select [SQL Server].

5. The [Create a New Data Source to SQL Server] dialog box is displayed, then set the following.
- [Data source name]:SAMPLEDS
- [Server name]: SAMPLESRV

6. Select the [With SQL Server authentication using a login ID and password entered by the user.] radio button, then enter [Login ID] and [Password].

REMARKS

＜Setting Wonderware® Historian＞

Mark a check in [Change the default value to] and select [Runtime].

For SQL Server 2012, SQL Server 2008 R2, SQL Server 2008, SQL Server 2005, SQL Server 2000 and MSDE 2000, changing this setting is unnecessary.

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↓

SQL Server ODBC Data Source Test

Test Results

Microsoft SQL Server ODBC Driver Version 03.85.1117

Running connectivity tests...

Attempting connection
Connection established
Verifying option settings
Disconnecting from server

TESTS COMPLETED SUCCESSFULLY!

OK

7. In the [ODBC Microsoft SQL Server Setup] dialog box, click the [Test Data Source] button to check that the connection is normal.

8. Click the [OK] button in the [SQL Server ODBC Data Source Test] dialog box.

9. Click the [OK] button in the [ODBC Microsoft SQL Server Setup] dialog box.

10. Click the [OK] button in the [ODBC Data Source Administrator] dialog box.

↓

(End)

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(3) For Microsoft® Access® 2013/2010/2007/2003/2000

(The following shows a setting example using Microsoft® Access 2003 with Microsoft® Windows® XP Professional Operating System.)
Set the following conditions.

- Data source name*1: SAMPLEDS
- Database name*2: C \ mes \ sampledb.mdb

*1 Data source name can be set as desired.
  For [Data source name] in [Server service settings], use the name set with this setting.

*2 The database name is the name for accessing a Microsoft® Access 2003 database.

  Specify a database file path created with Microsoft® Access 2003.

(Start)
↓
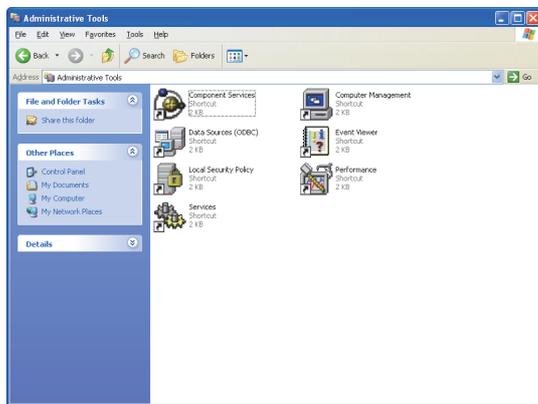
1. Clicking [Performance and Maintenance] on the Control Panel displays the [Performance and Maintenance] dialog box.
To display the Control Panel, select [Start] → [Control Panel].

↓

2. Clicking [Administrative Tools] displays [Administrative Tools] dialog box.

↓

3. Double clicking [Data Sources (ODBC)] displays [ODBC Data Source Administrator] dialog box. Select the [System DSN] tab, then click the Add button.

↓

(To the next page)
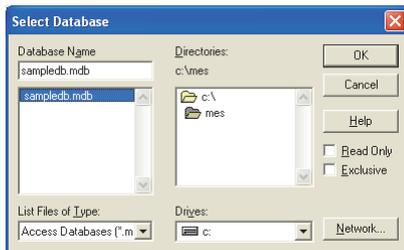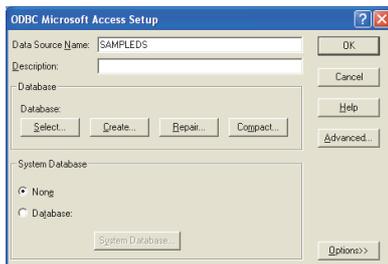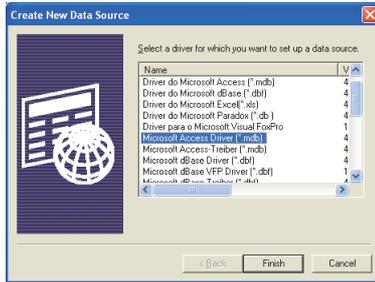
4. The [Create New Data Source] dialog box is displayed, then select [Microsoft Access Driver(*.mdb)].
For Microsoft® Access® 2007/2010
Select "Microsoft Access Driver(*.mdb. *accdb)".

↓

5. The [ODBC Microsoft Access Setup] dialog box is displayed. Set the following and click the [Database] selection button.
• [Data source name]:SAMPLEDS

↓

6. The [Select Database] dialog box is displayed. Select the following and click the ☐ OK button.
• [Folder]: C \ mes
• [Database Name]: sampledb.mdb

7. Click the ☐ OK button in the [ODBC Microsoft Access Setup] dialog box.

8. Click the ☐ OK button in the [ODBC Data Source Administrator] dialog box.

POINT

Precautions for using Access® 2013, Access® 2010 and Access® 2007
When using SELECT or MultiSelect for a field whose data type is the single type or the double type, set the following.
• Select [Microsoft Access Driver (*.mdb)] for the ODBC setting for the database.
• When the data base source file is *.accdb, convert it into *.mdb before using it.

7.3 Starting DB Connection Service Setting Tool

> **POINT**
>
> Only one DB Connection Service Setting Tool can be activated.

■ When Windows® 8.1, Windows® 8, Windows® 7, or Windows Vista® is used

1. Select [Start] → [All Programs] → [MELSOFT Application] → [MES Interface] → [DB connection service setting tool].

2. The following dialog box appears.
Click [Allow].
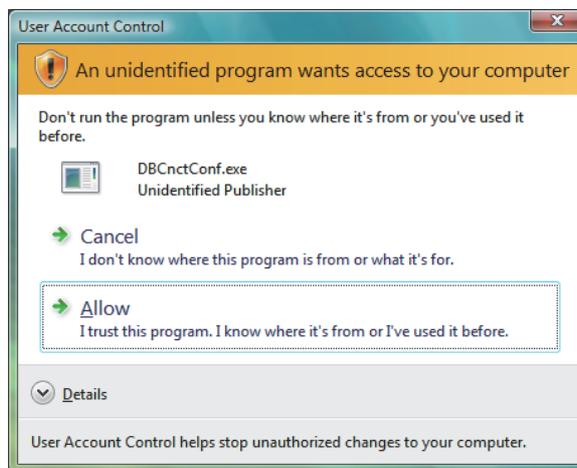
3. DB Connection Service Setting Tool is started.

■ When Windows® XP is used

Select [Start] → [All Programs] → [MELSOFT Application] → [MES Interface] → [DB connection service setting tool].
After selecting it, DB Connection Service Setting Tool is started.

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7.4 Screen Structure of DB Connection Service Setting Tool

This section explains the screen structure of DB Connection Service Setting Tool.

7.4.1 Screen structure

Menu

☞ 7.4.2 Menu configuration
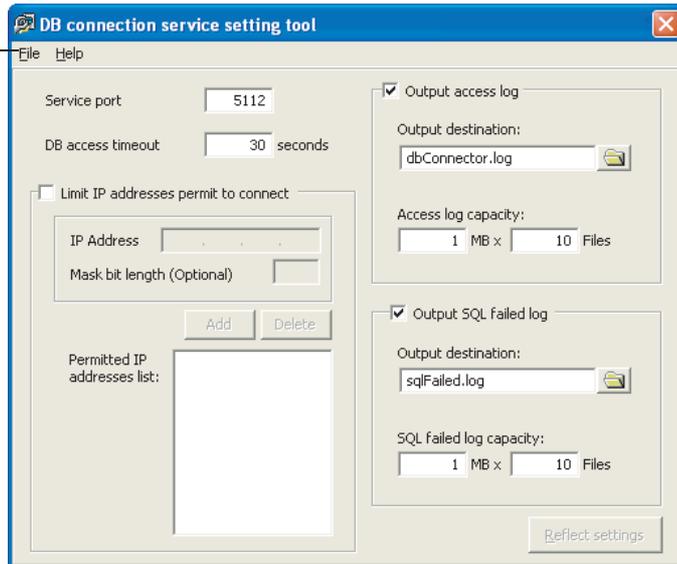
7.4.2 Menu configuration

This section shows each command provided on the menu bar.

(1) File

Item	Description	Reference section
Import	Imports an existing file.	7.6
Export	Exports the DB Connection Service Setting Tool to a file.	
Exit	Exits the DB Connection Service Setting Tool.	-

(2) Help
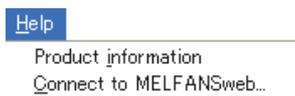
Item	Description	Reference section
Product information	Displays product information of the DB Connection Service Setting Tool.	7.7
Connect to MELFANSweb	Connects to the Mitsubishi Electric Factory Automation Global Website.	

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7.5 Setting Items of DB Connection Service Setting Tool

The following shows how to change the DB Connection Service settings.

1. Set the following items and click the ☐ Reflect settings ☐ button.

2. After updating the settings, check for an error by selecting [Administrative Tools] - [Event Viewer] in Windows®.

☞8.1 (2) Error checking procedure

POINT

(1) Change the DB Connection Service settings while a job using the DB Connection Service is not operating.
The status is as follows:
• The GOT is powered OFF.
• The MES interface function operation is stopped by [MES interface setting] - [Diagnosis] tab.
☞6.10.2 Manipulating the MES Interface Function status (Operation)

(2) If any changed settings are entered with a job using DB Connection Service being operating, the execution of the connected job is canceled and a communication error occurs.
Also, for a job to which [Enable DB buffering] is selected, SQLtexts are buffered in the DB buffer.
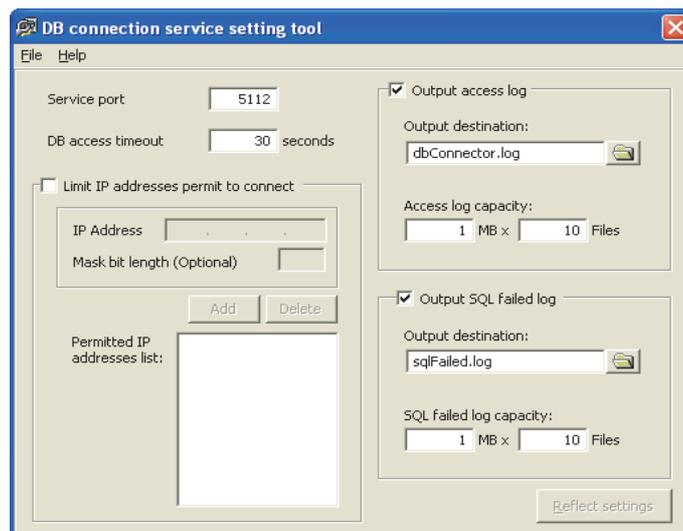
Item	Description
Service port (required)	Set the number of a port through which the DB Connection Service operates.
DB access timeout	Set a DB access timeout time (Unit: seconds) for writing/reading a database value from the GOT to the server computer, or for the case where no response is returned after request for program execution.
Limit IP addresses which permit to connect	Specify whether or not to set IP addresses to which connection is to be permitted.
Output access log	Set whether or not to output the access log.
Output SQL failed log	Set whether or not to output the SQL failure log.

(1) **Service port (required) (Range: 1024 to 65535, Default: 5112)**
Set the number of a port through which the DB Connection Service operates.
The specified port number is used for communications with the GOT.
Set the same value in [Service port] as the one set in [Port No.] in [Server service settings] under [MES interface setting].

☞6.6.1 Setting items in Server service settings

(2) DB access timeout (required) (Range: 1 to 3600; Default: 30)

Set a DB access timeout time (Unit: seconds) for writing/reading a database value from the GOT to the server computer, or for the case where no response is returned after request for program execution.
When a timeout occurs, the connection with the GOT is disconnected and job execution is canceled.

POINT

Set a value to [DB access timeout] so that the relation with a value set in [Connection timeout] in [MES Interface Configuration Tool] is as follows:

- Connection timeout value $\leqq$ DB access timeout value

(3) Limit IP addresses which permit to connect

(a) Specify whether or not to set IP addresses to which connection is to be permitted.
If the [limit IP addresses which permit to connect] box is checked, connection is permitted from only the GOT with the specified IP address.
For IP addresses that are permitted to connect to DB Connection Service, at least one IP address setting is required and up to 64 addresses can be set.
If the box is not checked, connection from any GOT will be permitted.

(b) When [limit IP addresses which permit to connect] is selected, set IP address(es).
1) Adding an IP address to permit its connection
   <Specifying individual IP addresses>

1. Set the following items and click the ☐Add☐ button.

Item	Description
IP address	Set an IP address in decimal notation so that its connection will be permitted.
Mask bit length	(Blank)

2. The IP address is added to the [Permitted IP addresses list].
(Example) 192.168.0.64

   <Specifying IP addresses in a batch>

1. Set the following items and click the ☐Add☐ button.

Item	Description
IP address	Set an IP address in decimal notation so that its connection will be permitted.
Mask bit length	Set the effective bit length of the set IP address. (Range: 1 to 32)

2. The IP address/mask bit length is added to the [Permitted IP addresses list].
(Example) 192.168.0.64/26

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(Example) Specifying IP addresses in a batch
If [192.168.0.64] is set for [IP address] and [26] for [Mask bit length], the IP addresses set for connection permission are [192.168.0.64] to [192.168.0.127], as the logical product is [192.168.0.64].

IP address permitted to connect

	192								168								0								?						
1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	?	?	?	?	?	?	?

Mask bit length (26)

	255								255								255								192						
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0

Logical product

IP address

	192								168								0								64						
1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

The range in which the logical product above is met is between 192.168.0.64 to 127.

	192								168								0								64						
1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

~

	192								168								0								127						
1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

2) Deleting an IP address with connection permission

1. Select the IP address to be deleted from [Permitted IP addresses list], then click the Delete button.

(4) Output access log
(Default: Output)

(a) Set whether or not to output the access log.

(b) When [Output access log] is selected, set the following items.

Item	Description
Output destination	Set the output destination of the log file.
Access log capacity	Set the capacity for one access log file and the number of files.

1) Output destination (Default: "dbConnector.log")
   Set the output destination of the log file.
   If no output destination is set, the log is output to the install folder.
   If a read-only file is specified, the log is not output and an [Access log output error] is output to [Event Viewer] of [Administrative Tools] in Windows®.

2) Access log capacity (Range: 1 to 10MB × 2 to 100 files, Default: 1MB × 10 files)
   Set the capacity for one access log file and number of files.
   If the log exceeds the capacity for one file, the data are copied to a file of the original name with a number attached and a new log file is created.
   If the total number of files exceeds the set number of files, files are deleted in order from the oldest one.

(Example) When [Output destination] is set as [dbConnector.log] and [Access capacity] as [1MB $\times$ 3 files]
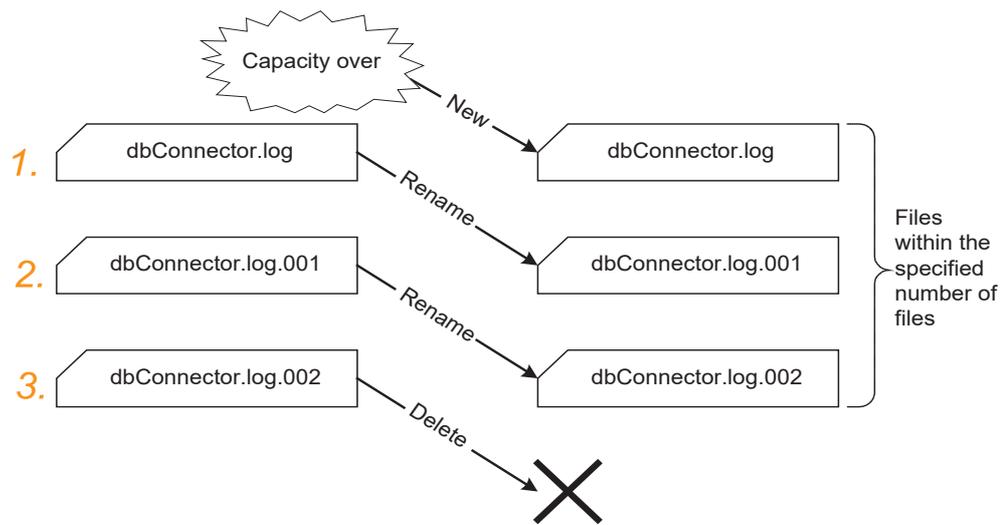
1. When [dbConnector.log] exceeds 1M byte, it is renamed as [dbConnector.log.001].
   A new [dbConnector.log] is created and logging resumes.

2. [dbConnector.log.001] is renamed as [dbConnector.log.002].

3. The total number of files exceeds 3 if [dbConnector.log.002] is renamed, therefore [dbConnector.log.002] is deleted.

(5) Output SQL failed log
(Default: Output)

(a) Set whether or not to output the SQL failure log.

(b) When [Output SQL failed log] is selected, set the following items.

Item	Description
Output destination	Set the output destination of the log file.
SQL failure log capacity	Set the capacity for one SQL failure log file and the number of files.

1) Output destination (Default: "SQLFailed.log")
   Set the output destination of the log file.
   If no output destination is set, the log is output to the install folder.
   If a read-only file is specified, the log is not output and an [SQL failure log output error] is output to [Event Viewer] of [Administrative Tools] in Windows$^{®}$.

2) SQL failure log capacity (Range: 1 to 10MB $\times$ 2 to 100 files, Default: 1MB $\times$ 10 files)
   Set the capacity for one SQL failure log file and the number of files.
   If the log exceeds the capacity for one file, the data are copied to a file of the original name with a number attached and a new log file is created.
   If the total number of files exceeds the set number of files, files are deleted in order from the oldest one.

7.6 Importing/Exporting Files

Import/export files.

(1) Import
An existing file can be imported.

1. Select [File] → [Import] from the menu.

2. The [Open] dialog box is displayed.
Set the following items, then click the Open button.
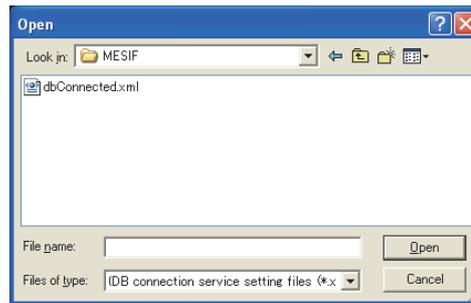
Item	Description
Look in	Select the location where the file is stored.
File name	Specify the name of the file to be imported.
Files of type	Select a type of the file to be imported. • DB connection service setting files

(2) Export
DB Connection Service Setting Tool can be exported to a file.

1. Select [File] → [Export] from the menu.

2. The [Save As] dialog box is displayed.
Set the following items, then click the button.
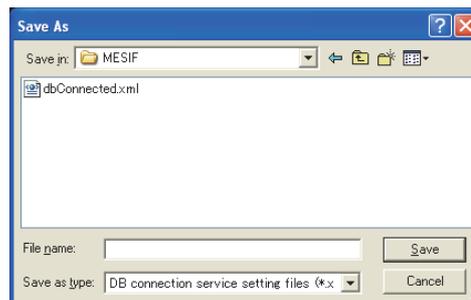
Item	Description
Save in	Select the location where the file is to be saved.
File name	Specify the name of the file to be saved.
Files of type	Select a type of the file to be saved. • DB connection service setting files

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7.7 Help

The product information of the DB Connection Service Setting Tool and the Connect to Mitsubishi Electric Factory Automation Global Website screen can be displayed.

(1) Product information

1. Select [Help] → [Product information] from the menu.

2. The [Product information] dialog box of the DB Connection Service Setting Tool is displayed.
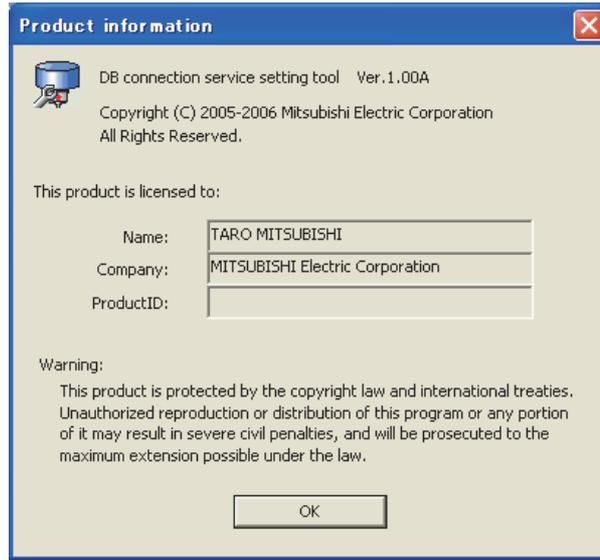
(2) Connect to Mitsubishi Electric Factory Automation Global Website

1. Select [Help] → [Connect to MELFANSweb] from the menu.

2. The [Connect to MELFANSweb] dialog box is displayed.

3. Click the [OK] to display the Mitsubishi Electric Factory Automation Global Website.

4. Online manuals and other information can be viewed on the website.

7.8 Output Log Specifications

The following shows the output log format for the access log and SQL failure log given in Section 7.8.1 and later.

[Date] [Error code] message   Line feed

Item				Description
Output character	First line			
		[Date]	Year	1st to 4th bytes from the line head	Four-digit integer for year (Numbers)
			Year - Month delimiter	5th byte from the line head	"/" (Slash: 2FH)
			Month	6th and 7th bytes from the line head	2-digit integer (01 to 12) (Numbers)
			Month - Day delimiter	8th byte from the line head	"/" (Slash: 2FH)
			Day	9th and 10th bytes from the line head	2-digit integer (01 to 31) (Numbers)
			Day - Hour delimiter	11th byte from the line head	" " (Space: 20H)
			Hour	12th and 13th bytes from the line head	2-digit integer (00 to 23) (Numbers)
			Hour - Minute delimiter	14th byte from the line head	":" (Colon: 3AH)
			Minute	15th and 16th bytes from the line head	2-digit integer (00 to 59) (Numbers)
			Minute - Second delimiter	17th byte from the line head	":" (Colon: 3AH)
			Second	18th and 19th bytes from the line head	2-digit integer (00 to 59) (Numbers)
			Second - Millisecond delimiter	20th byte from the line head	"." (Period: 2EH)
			Millisecond	21st to 23rd bytes from the line head	3-digit integer (000 to 999) (Numbers)
		Millisecond - Error code delimiter		24th byte from the line head	" " (Space: 20H)
		[Error code][1]		25th to 34th bytes from the line head	Alphanumeric character of "0x"+8-digithexadecimal
		Error code - Message delimiter		35th byte from the line head	" " (Space: 20H)
		Message		36th and later bytes from the line head	Compliant with the specifications of each log
		Line feed		End of line	CR + LF (0DH, 0AH)
	Second line (For database errors only)			
		Tab		Line head	TAB (09H)
		Database message header		2nd to 17th bytes from the line head	"Database Message "
		Database message header - Database message delimiter		18th byte from the line head	" " (Space: 20H)
		Database message		19th and later bytes from the line head	Error messages that the database outputs
		Line feed		End of line	CR + LF (0DH, 0AH)

[1]   For error codes, refer to the following:

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7.8.1 Access log

The following explains the access log contents.

(1) Service start/end

(a) Start

Item	Description
Output log format	[Date] [Error code] Service Start
Example	2005/07/01 12:00:00.000 0x00000000 Service Start

(b) End

Item	Description
Output log format	[Date] [Error code] Service Stop
Example	2005/07/01 12:00:00.000 0x00000000 Service Stop

(2) Connection/disconnection from the GOT

(a) Connection

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:MIFWS Connected:[Source IP]:[Target data source]: [Connection ID]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:MIFWS Connected:192.168.3.3:DataSource:ID

(b) Disconnection

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:MIFWS Disconnected:[Source IP]:[Target data source]:[Connection ID]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:MIFWS Disconnected:192.168.3.3:DataSource:ID

(3) Connection/disconnection to a database

(a) Connection

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:DB Connect:[Target data source]: [Connection ID]:[Connection result[*1]]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:DB Connect:DataSource:ID:Success

  *1 When succeeded: Success, when failed: Failed

(b) Disconnection

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:DB Disconnect:[Target data source]: [Connection ID]:[Disconnection result[*1]]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:DB Disconnect:DataSource:ID:Success

  *1 When succeeded: Success, when failed: Failed

(4) SQL text reception/processing results

(a) SELECT

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:[Processing result[*2]]([No. of selected records])
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:SQL<SELECT COL from TABLE;>:Success(1)

  *2 When succeeded: Success ([No. of selected records]), when failed: Failed (Line feed) Database message

(b) UPDATE

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:[Processing result[*3]]([No. of updated records])
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:SQL<UPDATE TABLE SET COL = ";>:Success(1)

  *3 When succeeded: Success ([No. of updated records]), when failed: Failed (Line feed) Database message

(c) INSERT

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:[Processing result*4]([No. of inserted records])
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:SQL<INSERT INTO TABLE (COL) VALUES (") ;>:Success(1)

*4   When succeeded: Success ([No. of inserted records]), when failed: Failed (Line feed) Database message

(d) COMMIT

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:COMMIT:[Processing result*5]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:COMMIT:Success

*5   When succeeded: Success, when failed: Failed (Line feed) Database message

(e) ROLLBACK

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:ROLLBACK:[Processing result*6]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:ROLLBACK:Success

*6   When succeeded: Success, when failed: Failed (Line feed) Database message

(f) GetNext (Request for next record)

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:GetNext:[Processing result*1]
Example	2005/07/01 12:00:00.000 0x00000000 SID 0:GetNext:Success

*1   When succeeded: Success, when failed: Failed (Line feed) Database message

(5) Program execution reception/processing results

Item	Description
Output log format	[Date] [Error code] SID ProgramExec:[Source IP]:<[Command line]>[Processing result*2]([Return value])
Example	2005/07/01 12:00:00.000 0x00000000 ProgramExec:192.168.3.3:<hoge.exe>:Success(0)

*2   When succeeded: Success ([Return value]), when failed: Failed only

7.8.2 SQL failure log

The following shows the SQL failure log contents.

Item	Description
Output log format	[Date] [Error code] [Target data source]:[SQL text]
Example	2005/07/01 12:00:00.000 0x00000000 DataSource:INSERT INTO TABLE (COL) VALUES (") ; Database Message 0x00000388 [Oracle][ODBC][Ora]ORA-00904: "NUM" :invalid identifier

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7.8 Output Log Specifications

8. TROUBLESHOOTING

8.1 Error Handling and Recovery Method

This section describes how to check an error output when using the MES interface function.

(1) Error checking and restoration
The following lists the points to be checked when an error occurred, and corresponding recovery methods.

Error type	Check point	Recovery method
MES interface setting error	• Check a warning dialog displayed when a setting out of the permitted range was made in the MES interface function setting.	• When a value out of the permitted range has been entered in the MES interface function setting, disable the entry and return to the previous status.
MES interface function execution error	• Check the GOT for a system alarm. • Check the MES interface Execute Log. • Check the status information. • Check the value of the tag component used for notification.	• If any problem is found in the setting, reconfigure the MES interface setting and restart the GOT. • For an error of the GOT or a controller, restore it to normal condition according to its specifications.
DB Connection Service setting error	• Check a warning dialog displayed when a setting out of the permitted range was made in DB Connection Service Setting Tool.	• When a value out of the permitted range has been entered in DB Connection Service Setting Tool, disable the entry and return to the previous status.
DB Connection Service execution error	• Check Event Viewer of Windows®. • Check the access log file. • Check the SQL log file.	• If any problem is found in the setting, reconfigure the settings in DB Connection Service Setting Tool and restart DB Connection Service. • If the server computer has a problem, resolve it and restart DB Connection Service.

POINT

If more than one error are displayed in the error log of [MESI/F Log] or by error dialog boxes, take corrective actions in chronological order.

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(2) Error checking procedure

For error codes, refer to the following:

☞8.2 Error Code List

Item	Checking procedure
MES interface function execution error	Shows how to check an error occurred in execution of the MES interface function.
System alarm checking procedure	• For the system alarm checking procedure, refer to the following manual. ☞GT Designer3 Version1 Screen Design Manual (Functions)
Working log checking procedure *1	• Connect the operating GOT to a configuration computer. • Display the Working log sheet in the MES interface setting. • Display the detailed log from the Working log sheet and check the data.
Status checking procedure	• Connect the operating GOT to a configuration computer. • Display the Diagnosis sheet in the MES interface setting and check the data.
Notification tag component value checking procedure	• Set a notification tag in the MES interface setting. • Add a setting for monitoring the tag value on the GOT screen. • On the GOT screen, check if an error or exception has occurred in the tag or not. • Notification tags can be set for the following four items: 　• [Job settings] - [Communication action] - [Exception process setting] - [Exception processing: No applicable record] 　• [Job settings] - [Communication action] - [Exception process setting] - [Exception processing: Multiple applicable records] 　• [Job settings] - [Communication action] - [Exception process setting] - [Exception processing: Applicable records overflow] 　• [Job settings] - [Notify errors (job cancellation) that occur during job execution] 　• [Server service settings] - [Access error notification setting]
DB Connection Service execution error	Shows how to check an error occurred in execution of DB Connection Service.
Windows® Event Viewer checking procedure	• From the Windows® start menu, select [Control Panel] - [Performance and Maintenance] - [Administrative Tools] - [Event Viewer]. (Windows® XP) • Select the Application log to display the list. • Click on [Source] (sorting the list by the source name), and check for "DB Connector."
Access log checking procedure	• In DB Connection Service Setting Tool, select [Output access log]. • Display the output file with Windows® Notepad.
SQL log checking procedure	• In DB Connection Service Setting Tool, select [[Output SQL failed log]. • Display the output file with Windows® Notepad.

*1   A CF card is required.

8.1.1 MES Interface Function setting

This section explains troubleshooting information on the setting of the MES interface function.

(1) Common to all settings

Symptom	Checked item	Corrective action
GT Designer3 cannot communicate with GOT.	Is the GOT communicating with another GT Designer3?	• Check that no other GT Designer3 is running and communicating on the same personal computer. • Check that GT Designer3 is not running and communicating on other personal computers.
	Is there any disconnection in the connection route?	• Connect the cables properly.
	Is there any problem on the personal computer?	• Replace it with another computer.
	Is the port number correct? (In RS-232 or Ethernet connection)	• Check the port number setting.
	Is the GOT connected to the network? (When using Ethernet connection)	• Issue the ping command from the personal computer to the GOT to confirm the network connection.
	Is the IP address setting correct? (When using Ethernet connection)	• Correct the IP address setting.
	Is there a firewall and/or a proxy server in the connection route? (In Ethernet connection)	• Ask your network administrator about the firewall and proxy server settings.
All the text is not displayed in a table. (The text display is truncated.)	Isn't the column width narrow?	• Adjust the column width of the table. ☞ 6.3.1 Screen structure

(2) [Device tag settings] (☞ 6.5 Device Tag Settings)

Symptom	Checked item	Corrective action
Unable to change or delete an item in [Device tag settings].	Is the selected item used in [Job settings]?	• As the error dialog box appears, identify the location, stop using it for another item, and then delete the item. • An item used for another item is unable to be deleted.
	Is the selected item used in [DB buffering setting] of [Option setting]?	
	Is the selected item used in [Access error notification setting] of [Server service settings]?	
Unable to set or change [Device tag name].	Is the same name used for [Server service name] or another [Device tag name]?	• Because a unique name must be used for [Server service name] and [Device tag name], use a different name.

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(3) [Job settings] ($\textcircled{\tiny{\text{☞}}}$6.7 Job Settings)

Symptom	Checked item	Corrective action
Unable to set [DB buffering setting].	Is there any Select action set for the job?	• Do not use Select actions in the job where DB buffering is enabled. • The DB buffering is not available for jobs performing Select actions.
Unable to set a new variable.	Are there 64 variables that were already defined in the job?	• Delete any unnecessary variable settings of the job. • Up to 64 variables can be set for one job.
Unable to select [Trigger 2] in [Trigger conditions].	Is [Handshake operation] selected for [Trigger 1]?	• Select any other than [Handshake operation] for [Trigger 1]. • When [Handshake operation] is selected, selection is not allowed for [Trigger 2].
Unable to set [Exception processing setting] in [Communication action].	Is the DB buffering enabled?	• Disable the DB buffering.
	Is [Insert] set for [Action type]?	• Set any other than [Insert] for [Action type].

(4) [Diagnosis] tab ($\textcircled{\tiny{\text{☞}}}$6.10 Diagnosis)

Symptom	Checked item	Corrective action
GT Designer3 cannot communicate with GOT.	Has Option OS (MES Interface) been installed?	• Install Option OS (MES Interface) on the GOT.

(5) [Working log] tab ($\textcircled{\tiny{\text{☞}}}$6.11 Working Log)

Symptom	Checked item	Corrective action
GT Designer3 cannot communicate with GOT.	Has Option OS (MES Interface) been installed?	• Install Option OS (MES Interface) on the GOT.
No log is displayed.	Is there a CF card inserted?	• Install a CF card. • Turn ON the CF card access switch.
	Is the MES interface function operating?	• On the Diagnosis tab, check the MES interface function status.
No execution result is displayed in spite of SNTP time synchronization setting.	Is the time adjust function of the GOT disabled?	• Check if Adjust is enabled with the Utility function of the GOT. • Check if Adjust is enabled in GT Designer3.

8.1.2 When using DB Connection Service Setting Tool

This section explains troubleshooting information on the setting of DB Connection Service Setting Tool.

☞ 7. DB CONNECTION SERVICE AND SETTING TOOL

Symptom	Checked item	Corrective action
Unable to start DB Connection Service Setting Tool.	Has DB Connection Service Setting Tool been already started?	• Terminate the already started DB Connection Service Setting Tool. • Only one DB Connection Service Setting Tool can be activated.
Unable to reflect the setting.	Was a user ID having the administrator authority used for the login?	• Log in again with a user ID having the administrator authority.
Unable to save the setting.	Is there no permitted IP address?	• Uncheck the [limit IP addresses which permit to connect] checkbox, or add an IP address for which connection is permitted.
[Access log output error] is recorded in [Event Viewer] of [Administrative Tools] in Windows®.	Is the file set in [Output destination] read-only?	• Correct the file specification.
	Is the access to the folder containing the file set in [Output destination] authorized?	• Check the right of access to the folder.
	Is the drive space of the server computer full?	• Check the free space on the drive.
[SQL failure log output error] is recorded in [Event Viewer] of [Administrative Tools] in Windows®.	Is the file set in [Output destination] read-only?	• Correct the file specification.
	Is the access to the folder containing the file set in [Output destination] authorized?	• Check the right of access to the folder.
	Is the drive space of the server computer full?	• Check the free space on the drive.

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8.2   Error Code List

The error code list is shown below.
For the error output checking method, refer to the following.

☞8.1 Error Handling and Recovery Method

8.2.1   Error log in the Working log

Error code	Error description and cause	Corrective action

0x41130001	Tag value collecting error	• The device value cannot be collected.
		  Check the device settings and the network
		  configuration.

0x41140029
 	
0x4114002A
	Setting read error	• The set data are erroneous.
		  Download them again.
		• In the case of one-shot job execution, the CF card may
		  corrupted. Replace the CF card.

0x4114002B	DB connection service communication error	• Check the Ethernet connection.
		• An Ethernet communication error has occurred.
		• Check if [Server service settings] are correct.
		  ☞6.6 Server Service Settings
		• Check if the ODBC setting is correct.
		  ☞7.2 Setting ODBC of Database

0x4114005F	Type conversion error	• The data cannot be converted to the specified type. • Change the setting so that type conversion will be available in any case.
0x41140061	Tag write error	• Failed to write data to the tag. • Check if data can written to the device specified for the tag component.
0x41140065	Failed to perform the tag access.	• Check if [Device tag settings] are correct. ☞6.5 Device Tag Settings
0x41140069	Tag value read error	• Failed to read data from the tag. • Check if [Device tag settings] are correct. ☞6.5 Device Tag Settings

0x41140077	Type conversion to tag component error	• The data could not be converted to the type specified
		  for the tag component.
		• Change the setting so that type conversion will be
		  available in any case.

0x41140081 0x41140083	DB buffer content error	• Data stored in the DB buffer are invalid. • The CF card may be corrupted. • Replace the CF card.

0x41140084	Partial correction of DB buffer content	• A part of invalid data in the DB buffer has been
		  corrected.
		• A part of the DB buffered data in the CF card may have
		  been corrupted.

0x41140086	DB buffer clear error	• Failed to clear the DB buffer. • The CF card may be corrupted. • Replace the CF card.

Error code	Error description and cause	Corrective action
0x41140087	DB buffer file error	• The DB buffer file is invalid. • The CF card may be corrupted. • Replace the CF card.
0x41140089	DB buffer content error	• Data stored in the DB buffer are invalid. • The CF card may be corrupted. • Replace the CF card.
0x41140093	DB buffer full error	• Because the DB buffer became full, the data could not be stored in the DB buffer. • Ensure the CF card capacity.
0x41140099	DB buffering error	• Failed in file operation during DB buffering operation. • Check the CF card, and if corrupted, replace it.
0x4114009F	DB buffer read error	• Data in the DB buffer could not be read normally. • Check the CF card, and if corrupted, replace it.
0x411400A1	DB buffer clear error	• Failed to clear the DB buffer. • Check the CF card, and if corrupted, replace it.
0x411400A3	DB buffer read error	• Data in the DB buffer could not be read normally. • Check the CF card, and if corrupted, replace it.
0x411400A5	DB buffer empty error	• The DB buffer is empty. • Check the CF card, and if corrupted, replace it.
0x411400A6	DB buffer content error	• Data stored in the DB buffer are invalid. • Check the CF card, and if corrupted, replace it.
0x411400B2 0x411400B6 0x411400BA 0x411400C0	Character string number conversion error	• Character strings could not be converted to numerical values. • Change the setting so that type conversion will be available in any case.
0x411400D0	Overflow or zero divide error	• Division by zero was attempted. • Change the setting to avoid division by zero.
0x411400D2	Operation error	• Invalid operation was performed. • Change the setting so that any invalid operation will not performed.
0x411400D4	Logging function is not running.	• Check that the option OS for the logging function for installed on the GOT. • Check that the logging setting is configured.
0x411400D6	Invalid logging ID.	• The logging ID is invalid. • Set the logging ID for the logging setting.
0x411400DC	Advanced system alarm function is not available.	• The advanced system alarm setting is invalid. • Set the advanced system alarm observation setting.
0x411400E2	Invalid alarm ID.	• The alarm ID is invalid. • Set the alarm ID for the advanced user alarm observation setting.

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Error code	Error description and cause	Corrective action
0x411400E8	Invalid max number of select record.	• The maximum number of obtained records is invalid. • Set the tag component value specified as the maximum number of records 1 or more.
0x411400EA	Operation log function is not running	• Check that the option OS for the operation log function is installed on the GOT. • Check that the operation log setting is configured.
0x411400EE	Unable to find the operation log file.	• The MES interface function in the GOT cannot access the operation log file.
0x411400F0	Unable to open the operation log file.	• Check that the CF card including the operation log file is installed in the GOT.
0x411400F2	Unable to acquire the operation log file.	

0x41150110	Communication start error	• An error occurred in the Ethernet communication, and the communication failed to start.
		• Check the Ethernet connection.
		• Check if [Server service settings] are correct.
		  ☞ 6.6 Server Service Settings
		• Check if the ODBC setting is correct.
		  ☞ 7.2 Setting ODBC of Database

0x41150120	Communication connection error	• An Ethernet communication error has occurred.
		• Check the Ethernet connection.
		• Check if [Server service settings] are correct.
		  ☞ 6.6 Server Service Settings
		• Check if the ODBC setting is correct.
		  ☞ 7.2 Setting ODBC of Database

0x41150121	Communication connection timeout	
0x41150130	Message transmission error	
0x41150131	Message transmission timeout	

0x41150140	Message reception error	• An Ethernet communication error has occurred.
		• Check the Ethernet connection.
		• Check if [Server Service setting] are correct.
		  ☞ 6.6 Server Service Settings
		• Check if the ODBC setting is correct.
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		• Check the error information of DB Connection Service (access log file).
		  ☞ 7.8.1 Access log

0x41150141	Message reception timeout	
0x41150160	DB transaction status error	
0x41150161	DB transaction start status error	• Check the transaction status of the database.
0x41150162	DB transaction end status error	
0x41150300	Unsupported DB Connection Service error	• The connection to unsupported DB Connection Service is failed. Check the version of DB Connection Service.
0x41150301	Unsupported communication timeout setting	• The connection to DB Connection Service with unsupported communication timeout is failed. • Check the version of DB Connection Service.

0x41151010	Database connection error	• An Ethernet communication error has occurred.
		• Check the Ethernet connection.
		• Check if [Server service settings] are correct.
		  ☞ 6.6 Server Service Settings
		• Check if the ODBC setting is correct.
		  ☞ 7.2 Setting ODBC of Database

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Error code	Error description and cause	Corrective action
0x41151110	Message reception error	• An Ethernet communication error has occurred. • Check the Ethernet connection. • Check if [Server Service setting] are correct. ☞ 6.6 Server Service Settings • Check if the ODBC setting is correct.
0x41151120	Received message data error	☞ 7.2 Setting ODBC of Database • Check the error information of DB Connection Service (access log file). ☞ 7.8.1 Access log
0x41151180	Waiting for DB access (program execution) completion timeout	• No response is received from DB Connection Service. Check the server and the network.
0x41151320	SELECT execution error	• Check the sent SQL text and database contents. • Check if the table and field settings are correct. ☞ 6.8 Job Settings - Actions
0x41151330	COMMIT execution error	
0x41151340	ROLLBACK execution error	
0x41151350	DB update error	
0x41151410	SQL execution error	
0x41151420	ODBC connection error during SQL execution	
0x41152005	Execution error (Program execution function)	• Check if the program specified with the program execution function is executable with the specified account.
0x41152006		
0x41152007	Specified program file not exist (Program execution function)	• There is no execution file of the program that is specified for the program execution function. • Check if the program specified with the program execution function is executable with the specified account.
0x41152008	Specified program file duplicated (Program execution function)	• There are more than one execution file of the program that is specified for the program execution function. • Check if the program specified with the program execution function is executable with the specified account.
0x41152009 to 0x41152014	Execution error (Program execution function)	• Check if the program specified with the program execution function is executable with the specified account.

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8.2.2　DB Connection Service

The DB Connection Service outputs errors to the Windows® Event Log, access log, and SQL failure log.
For Windows Vista®, DB Connection Service Client also outputs errors to Windows® Event Log.

(1)　Event log of Windows®

(a)　Event log output warning list of DB Connection Service (Source name: DBConnector)

Warning event ID	Error description and cause	Corrective action
1	There is no setting file. Start the service using the default setting.	• Configure the settings again with DB Connection Service Setting Tool. ☞7.5 Setting Items of DB Connection Service Setting Tool

(b)　Event log output warning list of DB Connection Service (Source name: DBConnector)

Error event ID	Error description and cause	Corrective action
1	Unable to start the service due to insufficient memory.	• Add more memory to the personal computer.
2	Unable to start the service due to insufficient resources.	
5	Failed to read the setting file. The service is stopped.	• Refer to the actions of error codes 101 to 129. • Actions are displayed with error codes 101 to 129.
6	Failed to initialize the log file. The service is stopped.	• Refer to the actions of error codes 401 to 403, and 501 to 503. • Actions are displayed with error codes 401 to 403, and 501 to 503.
9	The server port has already been opened. The service is stopped.	• Change the server port No. with DB Connection Service Setting Tool. ☞7.5 Setting Items of DB Connection Service Setting Tool
101	The computer ran out of memory while reading the setting file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
102	The setting file path is too long.	• Reinstall the DB Connection Service to the directory whose path name is shorter.
103	The setting file name indicates the directory.	• Reinstall the DB Connection Service.
104	The setting file could not be opened.	
105	Description of the setting file is not correct.	• Terminate other applications, and make the setting again with DB Connection Service Setting Tool. ☞7.5 Setting Items of DB Connection Service Setting Tool

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Error event ID	Error description and cause	Corrective action
108	The server port No. setting is not correct.	• Configure the settings again with DB Connection Service Setting Tool. ☞7.5 Setting Items of DB Connection Service Setting Tool
109	The server port No. setting is out of range.	
110	The timeout time setting is not correct.	
111	The timeout time setting is out of range.	
112	There are too many connection-permitted IP address settings.	
113	Description of the connection-permitted IP address setting is not correct.	
114	The mask bit length setting of the connection-permitted IP address is not correct.	
115	The mask bit length setting of the connection-permitted IP address is out of range.	
116	The access log setting is not correct.	
117	The setting of the access log file name is not correct.	
118	The access log file name is too long.	
119	The maximum file size setting for the access log is not correct.	
120	The maximum file size setting for the access log is out of range.	
121	The maximum number of access log files is not set correctly.	
122	The maximum number of access log files is out of range.	
123	The SQL failure log setting is not correct.	
124	The setting of the SQL failure log file name is not correct.	
125	The SQL failure log file name is too long.	
126	The maximum file size setting for the SQL failure log is not correct.	
127	The maximum file size setting for the SQL failure log is out of range.	
128	The maximum number of SQL failure log files is not set correctly.	
129	The maximum number of SQL failure log files is out of range.	
401	The computer ran out of memory when initializing the access log file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
402	The computer ran out of resources when initializing the access log file.	
403	The full path name of the access log file is too long.	• Shorten the path to the access log file with DB Connection Service Setting Tool. ☞7.5 Setting Items of DB Connection Service Setting Tool

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Error event ID	Error description and cause	Corrective action
404	The access log file could not be opened.	• If no directory exists for storing the access log file, create it. • When the attribute of the access log file is set to read-only, cancel the setting. • If read/write is disabled for the access log file, enable it in the security setting. • When the access log file name represents a directory, rename or delete the directory. • When the access log file has been open in another application, terminate the application. • Check the disk device for any fault.
405	The log could not be written to the access log file.	• When the disk space is full, ensure a free disk space. • When the access log file has been open in another application, terminate the application. • Check the disk device for any fault.
406	Failed to delete an old access log file.	• When the attribute of the oldest access log file is set to read-only, cancel the setting. • If read/write is disabled for the oldest access log file, enable it in the security setting. • When the oldest access log file has been open in another application, terminate the application. • Check the disk device for any fault.
407	Failed to rename the access log file.	• When the attributes of the new and old access log files are set to read-only, cancel the setting. • If read/write is disabled for the new and old access log files, enable it in the security setting. • When the new and old access log files have been open in another application, terminate the application. • Check the disk device for any fault.
501	The computer ran out of memory when initializing the SQL failure log file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
502	The computer ran out of resources when initializing the SQL failure log file.	
503	The full path name of the SQL failure log file is too long.	• Shorten the path to the SQL failure log file with DB Connection Service Setting Tool. ☞ 7.5 Setting Items of DB Connection Service Setting Tool
504	The SQL failure log file could not be opened.	• If no directory exists for storing the SQL failure log file, create it. • When the attribute of the SQL failure log file is set to read-only, cancel the setting. • If read/write is disabled for the SQL failure log file, enable it in the security setting. • When the SQL failure log file name represents a directory, rename or delete the directory. • When the SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.

Error event ID	Error description and cause	Corrective action
505	The log could not be written to the SQL failure log file.	• When the disk space is full, ensure a free disk space. • When the SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.
506	Failed to delete an old SQL failure log file.	• When the attribute of the oldest SQL failure log file is set to read-only, cancel the setting. • If read/write is disabled for the oldest SQL failure log file, enable it in the security setting. • When the oldest SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.
507	Failed to rename the SQL failure log file.	• When the attributes of the new and old SQL failure log files are set to read-only, cancel the setting. • If read/write is disabled for the new and old SQL failure log files, enable it in the security setting. • When the new and old SQL failure log files have been open in another application, terminate the application. • Check the disk device for any fault.

(c) Event log output error list of DB Connection Service Client (source name: DBCnctClient)

Error code	Error description and cause	Corrective action
50	Unable to start DB Connection Service Client.	• Terminate unnecessary applications. • Add more memory to the computer.
51		
52		
53		

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(2) Access log of DB Connection Service

Error code	Error description and cause	Corrective action
0x20100001	(Service Not Start.) Failed to start the service due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20100002	(Service Not Start.) Failed to start the service due to insufficient resources.	
0x20100011	(Service Not Start.) Failed to start the service due to failure of the server port initialization.	• If a firewall software has been installed, make the specified server port operational.
0x20100012	(Service Not Start.) Another application has opened the server port.	• Terminate the application that has opened the server port. • Set another server port No. with DB Connection Service Setting Tool. ☞ 7.5 Setting Items of DB Connection Service Setting Tool
0x20200001	(Not Initialize a service for each client: [IP address]) Failed to initialize a service for each client due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20200002	(Deny network connection request from [IP address]) Rejected the connection request from the non-permitted IP address.	• Using DB Connection Service Setting Tool, add the IP address to those with connection permission. ☞ 7.5 Setting Items of DB Connection Service Setting Tool
0x20300001	(SID [Session ID]: Request Receive Error: [IP address]) Failed to receive data due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20300010	(SID [Session ID]: Request Receive Error: [IP address]) Connection disconnected during request reception.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the GOT has not been turned off.
0x20300011	(SID [Session ID]: Request Receive Error: [IP address]) Timed out during request reception.	
0x20300012	(SID [Session ID]: Request Receive Error: [IP address]) Detected failure of the MES interface module while waiting for or receiving a request.	
0x20300013	(SID [Session ID]: Request Receive Error: [IP address]) Receive I/O error	
0x20300014	(SID [Session ID]: Request Receive Error: [IP address]) Buffer overrun (Request length exceeded)	• Check the source IP address setting. • Confirm the version of the Option OS (MES Interface).
0x20300015	(SID [Session ID]: Request Receive Error: [IP address]) Received an invalid request.	

Error code	Error description and cause	Corrective action
0x20310010	(SID [Session ID]: Response Transmit Error: [IP address]) Failed to transmit a response due to disconnection.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the GOT has not been turned off.
0x20310011	(SID [Session ID]: Response Transmit Error: [IP address]) Timed out during response transmission.	
0x20310012	(SID [Session ID]: Response Transmit Error: [IP address]) Detected failure of the MES interface module during response transmission.	
0x20310013	(SID [Session ID]: Response Transmit Error: [IP address]) Send I/O error	
0x20400001	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20400002	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection due to insufficient resources.	
0x20400010	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Invalid DB connection request	• Check the source IP address setting. • Confirm the version of the option OS (MES Interface).
0x20400020	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed to create a DB handle.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20400022	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection.	• Set correct data source name, user name, and password in [Server service settings] of [MES interface setting]. ☞6.6 Server Service Settings • Check if the personal computer is restarted after the database is installed. Restart the personal computer if not restarted.
0x20600001	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20600002	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution due to insufficient resources.	

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0x20600010	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Invalid SQL execution request	• Check the source IP address setting. • Confirm the version of the option OS (MES Interface).
0x20600020	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) DB Connection Service does not support the SQL instruction to be executed.	
0x20600021	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in preparation before SQL execution.	• Correctly set a database type for [DB server setting], a table name in the job for the communication action setting, or the resource data send action setting in [MES Interface]. ☞6.6 Server Service Settings
0x20600022	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed to obtain the number of fields in the record that is to be obtained by the SQL execution.	
0x20600023	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution.	• Correctly set a database type for [DB server setting], a table name, field names, Select/Update conditions, and types of the data to be stored in the fields in the job for the communication action setting or the resource data send action setting in [MES Interface]. ☞6.6 Server Service Settings
0x20600025	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) No record was updated or inserted by the SQL execution.	• In [MES interface setting], set update conditions correctly for the Communication action setting of the Job settings. ☞6.8.1 Setting items in Communication action • Check if the database has been filled with registered data.
0x2060002B	(SID [Session ID]: *** Transmitting Commit Success Response Failed. ***) Failed to transmit the COMMIT success response.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the GOT has not been turned off.
0x20700001	(ProgramExec: [IP address]: <...>: Failed) Failed in remote execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20700002	(ProgramExec: [IP address]: <...>: Failed) Failed in remote execution due to insufficient resources.	
0x20700010	(ProgramExec: [IP address]: <...>: Failed) Invalid remote execution request	• Check the source IP address setting. • Confirm the version of the option OS (MES Interface).

Error code	Error description and cause	Corrective action
0x20700020	(ProgramExec: [IP address]: <...>: Failed) Failed to log on in remote execution.	• In [MES interface setting], set correct user name and password for the application server setting. ☞6.6 Server Service Settings • Check if the user account is invalid or not by Administrative Tools of Windows®. • Check if the setting is forcing the user to enter password at next logon by Administrative Tools of Windows®. • Check if the user password is expired or not by Administrative Tools of Windows®.
0x20700021	(ProgramExec: [IP address]: <...>: Failed) Failed to load user profile during remote execution.	• No user profile for Windows® has been created. • Confirm that the user ID set for the application server setting of the MES interface setting can be used to log on Windows®, and reexecute.
0x20700023	(ProgramExec: [IP address]: <...>: Failed) Failed to generate process during remote execution.	• Check if the application to be executed in remote execution exists or not. • Check if the name of the application to be executed in remote execution is a directory. • Make a proper security setting for the application to be executed in remote execution.
0x20700024	(ProgramExec: [IP address]: <...>: Failed) Timeout or aborted of waiting to complete remote execution.	• Set the longer time to the DB access timeout for DB Connection Service Setting Tool. • Exit the application for the remote execution before logging off.
0x20800010	(SID [Session ID]: TCPOpen Request Error: [IP address]) Invalid TCPOpen request	• Check the source IP address setting. • Confirm the version of the option OS (MES Interface).

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Error code	Error description and cause	Corrective action
0x20600001	Failed in SQL execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20600002	Failed in SQL execution due to insufficient resources.	
0x20600020	DB Connection Service does not support the SQL instruction to be executed.	• Check the source IP address setting. • Confirm the version of the option OS (MES Interface).
0x20600021	Failed in preparation before SQL execution.	• Correctly set a database type for [DB server setting], a table name in the job for the communication action setting, or the resource data send action setting in [MES Interface]. ☞6.6 Server Service Settings
0x20600022	Failed to obtain the number of fields in the record that is to be obtained by the SQL execution.	
0x20600023	Failed in SQL execution.	• Correctly set a database type for [DB server setting], a table name, field names, Select/Update conditions, and types of the data to be stored in the fields in the job for the communication action setting or the resource data send action setting in [MES Interface]. ☞6.6 Server Service Settings
0x20600025	No record was updated or inserted by the SQL execution.	• In [MES interface setting], set update conditions correctly for the Communication action setting of the Job settings. ☞6.8.1 Setting items in Communication action • Check if the database has been filled with registered data.
0x2060002B	(Data source name: *** Transmitting Commit Success Response Failed. ***) Failed to transmit the COMMIT success response.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the GOT has not been turned off.

APPENDICES

Appendix1　Usable Characters and ASCII Code Tables by Setting Items

Appendix.1.1　ASCII code table

	2	3	4	5	6	7
0	(SP)	0	@	P	`	p
1	!	1	A	Q	a	q
2	[	2	B	R	b	r
3	#	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	\	l	|
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	

Appendix.1.2 Characters applicable to item names, component names, variable names, etc.

(1) ASCII characters
The shaded characters can be used.
(However, neither a number nor an underscore (_) can be used as the first character.)

	2	3	4	5	6	7
0	(SP)	0	@	P	`	p
1	!	1	A	Q	a	q
2	[	2	B	R	b	r
3	#	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	Åe	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	\	l		
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	

(2) Reserved terms
The following words are reserved terms and therefore cannot be used.

	Reserved terms
A	abstract
B	boolean, break, byte
C	case, catch, char, class, const, continue
D	DATETIME, debugger, default, delete, do, double
E	else, enum, event, exit, export, extends
F	false, final, finally, float, for, function
G	goto
I	if, implements, import, in, include, Infinity, instanceof, in, interface, invoke
L	long
N	NaN, native, new, null
O	oneshot
P	package, private, protected, public
R	return
S	short, static, super, switch, synchronized, SYSTEM
T	this, throw, throws, trace, transient, true, try, typeof
U	undefined
V	var, void, volatile
W	while, with

Appendix.1.3 Characters applicable to character string constants, etc.

The shaded characters can be used.

	2	3	4	5	6	7
0	(SP)	0	@	P	`	p
1	!	1	A	Q	a	q
2	[	2	B	R	b	r
3	#	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	\	l	|
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	

Appendix.1.4 Characters applicable to field names, table names, etc.

The shaded characters can be used.
(However, a number cannot be used as the first character.)

	2	3	4	5	6	7
0	(SP)	0	@	P	`	p
1	!	1	A	Q	a	q
2	[	2	B	R	b	r
3	#	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	I	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	\	l	|
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	

Appendix2 About Monitoring Interval Timeout

Depending on the number of set jobs or the trigger condition setting, the monitoring interval timeout may be generated in the MES interface function.
This section explains monitoring interval timeout.

POINT

Although up to 64 jobs can be registered and trigger conditions can be set to each of them, some adjustment in trigger condition settings is required depending on the number of the jobs.

(1) Monitoring interval timeout

The monitoring interval timeout means that the trigger detection time (the time provided for the trigger monitoring function to determine if the trigger conditions are met) becomes longer than the time limit of trigger occurrence (monitoring interval). When a monitoring interval timeout occurs, the job may not be executed even though set trigger conditions are met.
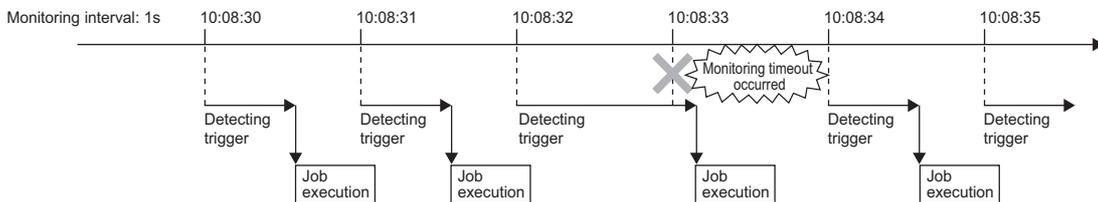
(2) Causes of monitoring interval timeout

A monitoring interval timeout occurs when the total jobs cannot be processed in a monitoring interval.
The monitoring interval includes the following sampling intervals.
- Sampling interval set for [Sampling setting] in [Device tag settings] when selecting [Value monitoring startup] or [Handshake operation] for [Trigger conditions] in [Job settings]

    ☞ 6.5 Device Tag Settings

- Sampling interval set for [Trigger conditions] when selecting [Specified time period startup] for [Trigger conditions] in [Job settings]

    ☞ 6.7.2 Setting items in Trigger conditions

HINT

In the following cases, monitoring interval timeouts do not occur.
- When selecting [Time specification startup] or [GOT Initializing] for [Trigger conditions] in [Job settings]
- When the total jobs are processed in a monitoring interval

(Example 1)
When the time for trigger detection is shorter than the monitoring interval
Since processing for trigger detection is performed within each monitoring interval, no monitoring interval timeout occurs.
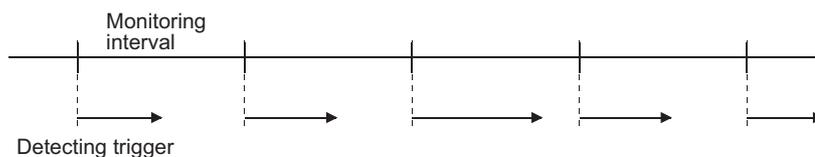
(Example 2)

When the time for trigger detection is longer than the monitoring interval

Since processing for trigger detection cannot be completed within each monitoring interval, monitoring interval timeout occurs.

The processing for trigger detection is performed at the next timing after the monitoring interval.
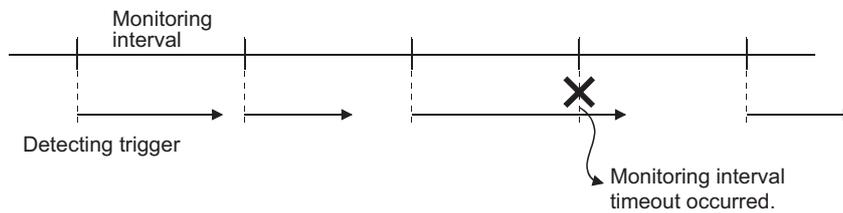
POINT

If the monitoring interval timeout has occurred, set a monitoring interval longer than the processing time described in This section (4) in each of all jobs.

(3) How to check the monitoring interval timeout

The monitoring interval timeout can be checked in the Monitoring interval timeout count area (GS275).

For the Monitoring interval timeout count area, refer to the following.

☞ 3.4.2 (3) Monitoring interval timeout count (GS275)

(4) Processing time for trigger detection

Total number of trigger conditions × 100 (ms) can be assumed as a processing time for trigger detection.

Total number of trigger conditions is the total of those set for individual jobs.

Note that [Trigger 1] and [Trigger 2] are counted separately.

Also, [Handshake operation] must be counted as "2" for each.

(Example 3)

Processing time for trigger detection, which is required for [Job settings] shown below

Since the number of trigger conditions is 12, the assumed processing time for trigger detection is: 12 × 100 = 1200 (ms)

Setting a value of 1200ms or longer to the monitoring interval in all jobs can prevent occurrence of the monitoring interval timeout.

Job name	Trigger conditions [Trigger 1]	Trigger conditions [Trigger 2]
Job 1	[Value monitoring startup]	[Value monitoring startup]
Job 2	[Value monitoring startup]	[Value monitoring startup]
Job 3	[Handshake operation]	-
Job 4	[Specified time period startup]	-
Job 5	[Time specification startup]	-
Job 6	[Value monitoring startup]	[Value monitoring startup]
Job 7	[Handshake operation]	-

Appendix3   Warning Messages in Windows Vista(R)

Appendix.3.1   Overview of warning messages

In Windows Vista®, a User Account Control feature has been added.
When installing/uninstalling GT Works3, or starting [DB Connection Service Setting Tool], a warning message is displayed.

Appendix.3.2   Methods for disabling warning messages

POINT

The User Account Control (UAC) is provided to protect the system from being destroyed (e.g. prevention of start-up of a program which will execute an unintended operation).
Before taking either of the methods described below, understand that the security function offered by UAC will be disabled and consider the risk.

The following two methods are available for preventing warning messages.

(1)   Disabling the User Account Control function
The following shows a procedure for disabling the User Account Control function.
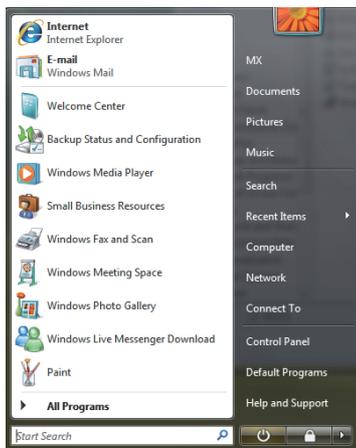
↓
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1.   Select [Start] - [Control Panel].

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↓

↓

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↓
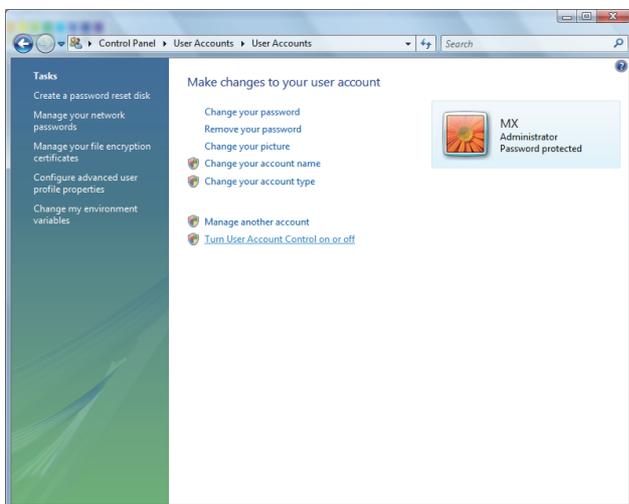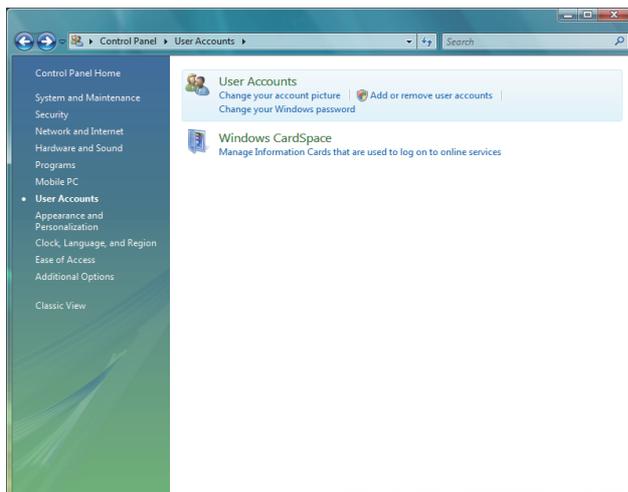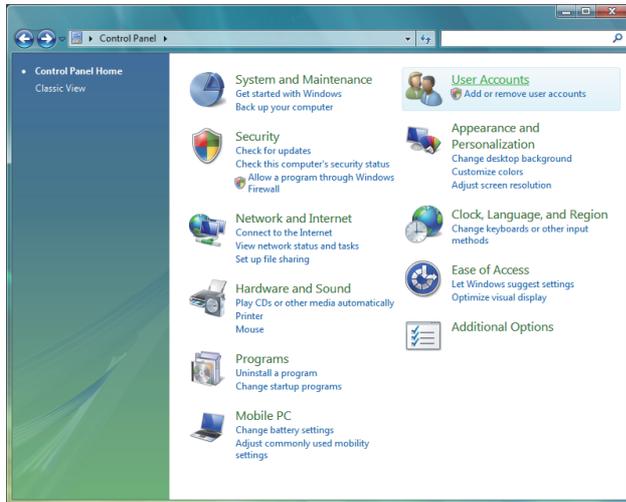
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2. Select [User Accounts].

3. Select [User Accounts].

4. Select [Turn User Account Control on or off]. When User Account Control is enabled in Windows Vista®, the following screen appears. Click the Continue button.
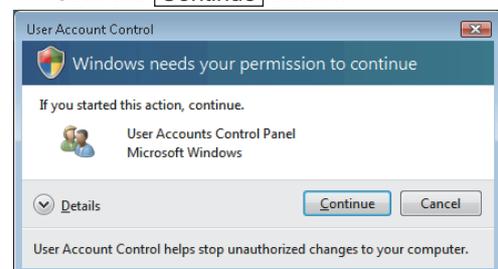
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↓
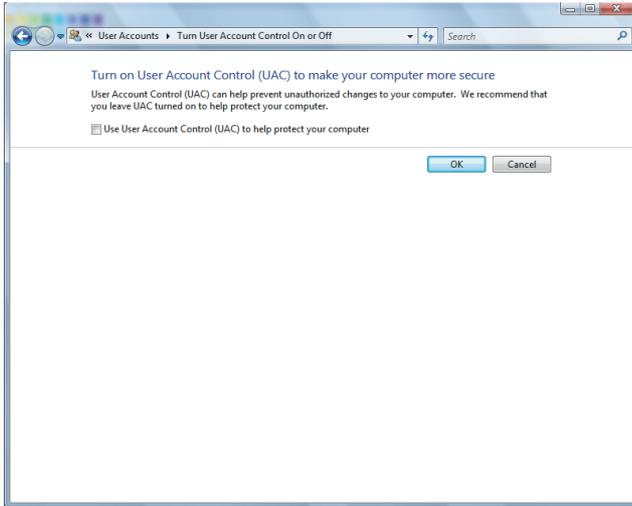
(End)

5. Deselect [Turn on User Account Control (UAC) to make your computer more secure].

(2) Method for permitting programs without any warning message
The following shows a procedure for permitting programs without any warning message.

↓
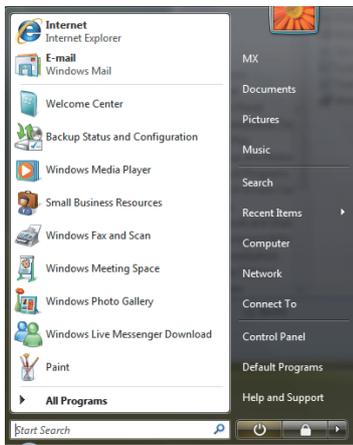
1. Select [Start] - [Control Panel].

↓

2. Select [Classic View].

↓
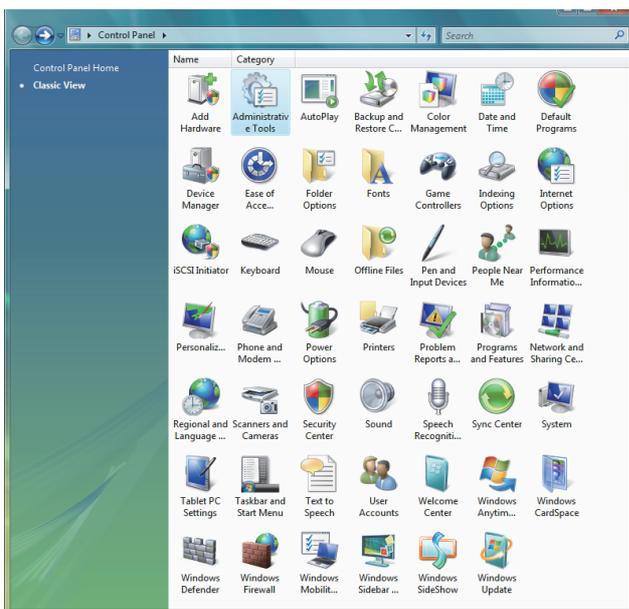
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3. Select [Administrative Tools].

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↓
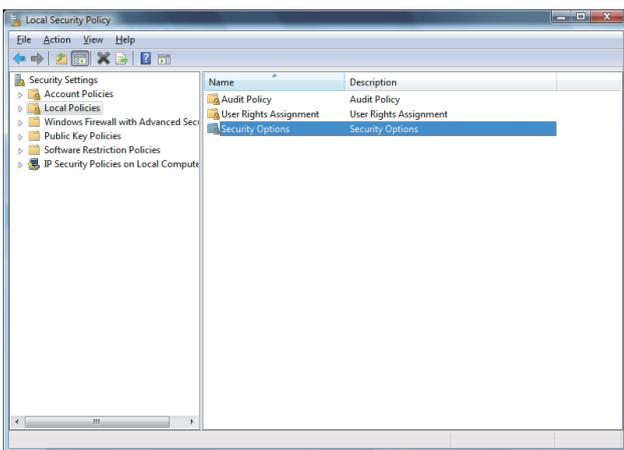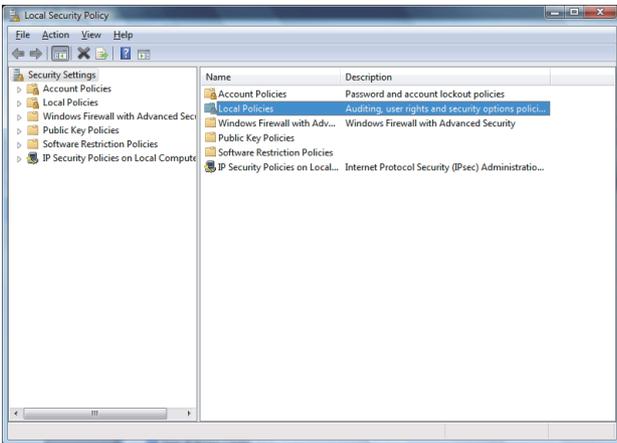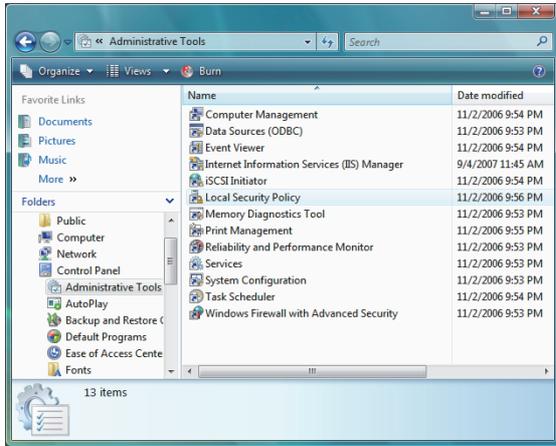
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4. Select [Local Security Policy].
When User Account Control is enabled in Windows Vista®, the following screen appears.
Click the Continue button.
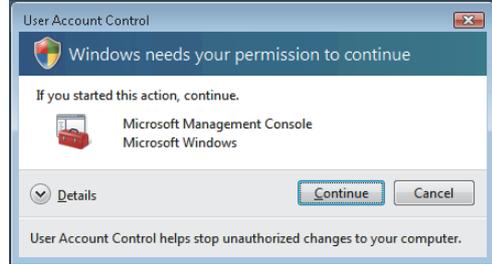
5. Select [Local Policies].

6. Select [Security Options].

(From the previous page)

↓

↓

↓
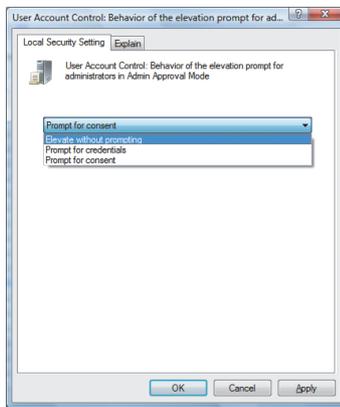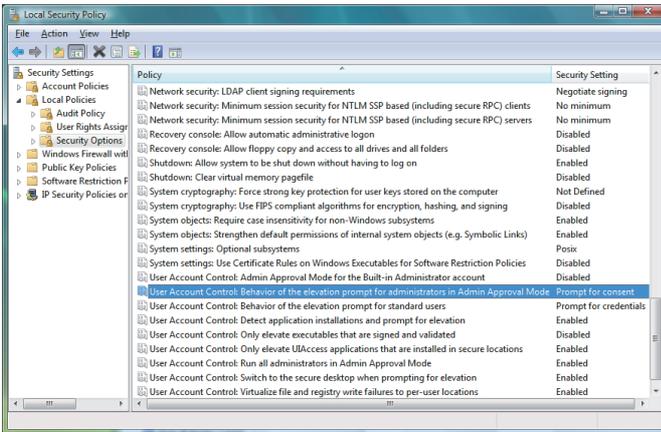
(End)

7. Select [User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode, Prompt for consent].

8. Select [Elevate without prompting] on the [Local Security Setting] tab, and click the ☐ OK button.

Appendix4   Tables for Used Terms

In GT Designer3, some different terms are used for the same meaning on the MES interface function setting screen and other setting screens.
They are listed in the tables shown below.

(1)   In the case of Device tag settings

MES interface function setting	Others
Single word	Signed Decimal (Data length: 16 bits) Signed BIN Signed BIN16
Double word	Signed Decimal (Data length: 32 bits) Signed BIN32
Real number	Real
String	ASCII Display
bytes	Digits

(2)   In the case of Job settings

MES interface function setting	Others
Specified time period startup	Sampling
Value monitoring startup	Rise Fall
=	==
≠	!=
<-	=
Variable	temporary works

Appendix5 Application Example of MES Interface Function

The following is an example of the system where the MES interface function is used.

Example) A system where manufacturing information is collected in a GOT and managed in a database

In the company-wide integrated system in which parts acceptance, manufacturing processing, assembly, shipment, and inventory control are managed, information of the actual performance is managed in a database using the MES interface function.

A process line control PLC handles information on process line (equipment) stop, running time, down time, quantity of production, and the number of rejected products.

On the GOT, the status of each process line is displayed, allowing control by operators.

By the MES interface function, the termination time of the process line, regularly-checked operation rate, and fraction defective information are managed.

The system configuration is illustrated below.

Database

<Server computer>
IP address: 192.168.11.1

Ethernet

<GOT>
IP address: 192.168.11.101

Engineering process

Process line
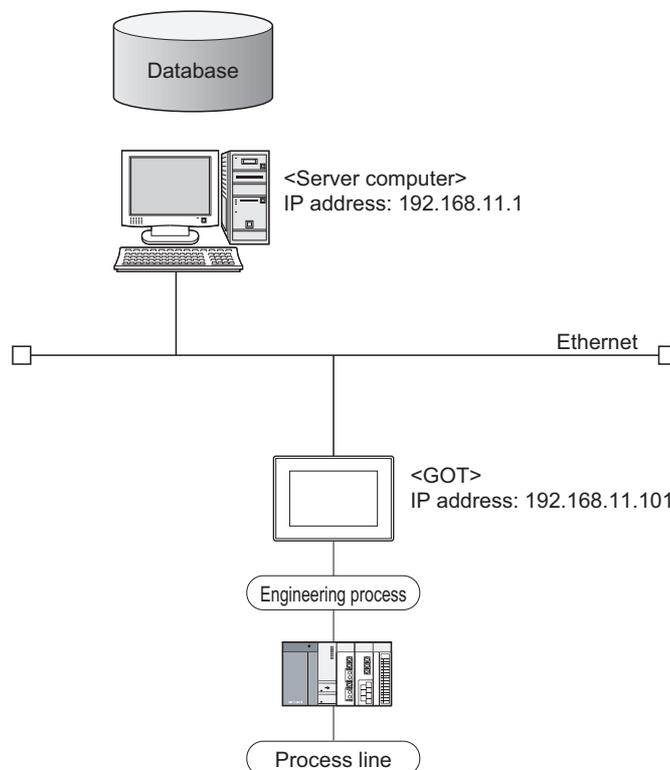
(1) Setup on the server computer (database)

The actual performance for every 5 seconds, and fraction defective and operation rate for every hour are managed using the database.

(a) Table setting
- Table name: PROCESS
- Field:

Name	Data type	Size	Scale	NULL	Default
DATETIME	CHAR	32		Possible	
PERFORMANCE	NUMBER	10	0	Possible	
REJECT	NUMBER	10	1	Possible	
WORKINGRATE	NUMBER	10	1	Possible	

- ODBC setting
  ODBC data source name: PROCESS
  Driver: OracleHome2
  TNS service name: PROCESS
- DB Connection Service setting
  Service port No.: 5112
  Timeout: 10 seconds

(2) Setup on the configuration computer (GT Designer3)

(a) IP address setting
- Communication Settings
  Extend I/F-1: 1
  CH No.: *
  Driver: Ethernet Download
- Detailed setting
  IP address: 192.168.11.101
  Ethernet Download: 5014
  Default Gateway: 0.0.0.0
  Subnet mask: 255.255.255.0

(b) Script

No.	Trigger	Operation	Remarks
1	During M101=ON	[w:GD540]=[w:D540]; [w:GD542]=[w:D542]; [b:M101]=0;	M101: Operation stop flag D540: Operation time D542: Accumulated down time
2	When M102 rises	[w:GD544]=[w:D544]; [w:GD546]=[w:D546]; [b:GB102]=[b:M102]; [b:M102]=0;	M102: Completion notification (The GOT collects PLC information upon completion of the processing.)

(c) Screen design

For how to create the screens, refer to the following manual.

☞ GT Designer3 Version1 Screen Design Manual (Fundamentals)

(d) MES interface setting
   • Device tag settings

Device tag name	Sampling cycle	Component name	Data type	Device
Normal sampling	5 seconds	Operation time	Single word	GD540
		Accumulated down time	Single word	GD542
		Performance	Single word	GD544
		Rejected	Single word	GD546
		Fraction defective	Real number	GD548
		WorkingRate	Real number	GD550
Sync. trigger	5 seconds	Stop flag	Bit	GB101

   • Server service settings

Service name	Type	IP address/Port No.
DBServer	Database server	192.168.11.1

   • Job settings

Job name	Trigger	Processing	Remarks
Startup	Startup	• Initializing tags	
Status report	Value monitoring GB102=ON	• Inserting the time and performance data into the database (DBServer)	Calculation of the operation rate
Regular report	Specified time period 1 hour	• Calculating fraction defective from the actual performance and the number of rejected products • Calculating the operation rate from the operation time and the accumulated down time • Inserting the time, operation rate and fraction defective into the database (DBServer)	• Temporary variables F_DEFECT: Fraction defective OPERAT_R: Operation rate

(3) Operation results

The operation results (database data) of the above system are as follows:

DATETIME	PERFORMANCE	REJECT	WORKINGRATE
2006/3/2 10:12:01	1		
2006/3/2 10:24:32	2		
2006/3/2 10:53:17	3		
2006/3/2 11:00:00		0	87.35
2006/3/2 11:05:42	4		
2006/3/2 11:17:31	5		
:	:	:	:

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REVISIONS

Print Date	* Manual Number	Revision
Oct., 2009	SH(NA)-080859ENG-A	First printing : GT Desiger3 Version 1.01B
Jan., 2010	SH(NA)-080859ENG-B	GT Desiger3 Version 1.10L Compatible with the microcomputer connection (Ethernet)
Jun., 2010	SH(NA)-080859ENG-C	GT Desiger3 Version 1.17T Compatible with MELSEC-WS and SICK safety controller
Jan., 2011	SH(NA)-080859ENG-D	GT Desiger3 Version 1.23Z Windows® 7 and Windows Server® 2008 are added to the OS used for the server computer.
Jul., 2011	SH(NA)-080859ENG-E	GT Designer3 Version1.31H • Compatible with the CC-Link IE Field Network connection • Microsoft® Windows Server® 2003 x64 Edition English version is added to the OS used for the server computer. • Oracle® 11g and Microsoft® SQL Server 2008 are added to the database used for the server computer.
Apr., 2012	SH(NA)-080859ENG-F	GT Designer3 Version1.45X Microsoft® Access® 2010 is added to the database used for the server computer.
Nov., 2012	SH(NA)-080859ENG-G	• The information site on the Internet is changed to the Mitsubishi Electric Factory Automation Global Website. • SAFETY PRECAUTIONS changed
Feb., 2013	SH(NA)-080859ENG-H	GT Designer3 Version1.67V • Microsoft® SQL Server 2012 and Microsoft® SQL Server 2008 R2 are added to the database used for the server computer.
Jun., 2013	SH(NA)-080859ENG-I	GT Designer3 Version1.74C. • Windows® 8 is added to the OS available for the personal computer for the server.
Sep., 2013	SH(NA)-080859ENG-J	Compatible with GT Designer3 Version1.100E
Jan., 2014	SH(NA)-080859ENG-K	Compatible with GT Designer3 Version1.108N
Oct., 2014	SH(NA)-080859ENG-L	Compatible with GT Designer3 Version1.122C • Microsoft® Windows Server® 2012 R2, Microsoft® Windows Server® 2012, Microsoft® Windows Server® 2008 R2, Microsoft® Windows 8.1 Enterprise, Microsoft® Windows 8.1 Pro is added to the OS used for the server computer. • Oracle 12c and Microsoft® Access2013 is added to the database used for the server computer.
Jan., 2017	SH(NA)-080859ENG-M	• Writing errors have been corrected.
Oct., 2019	SH(NA)-080859ENG-N	• Writing errors have been corrected.
Oct., 2020	SH(NA)-080859ENG-O	• Writing errors have been corrected.
Oct., 2022	SH(NA)-080859ENG-P	Some corrections
Apr., 2023	SH(NA)-080859ENG-Q	Some corrections

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The screens (screenshots) are used in accordance with the Microsoft Corporation guideline.

GRAPHIC OPERATION TERMINAL

GOT1000 Series

MES Interface Function Manual

for GT Works3

MODEL	SW1-GTD3-O(MES)-E
MODEL CODE	————
SH(NA)-080859ENG-Q(2304)MEE	

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