FANUC Robot series

ZDT (On-Premise)

OPERATOR'S MANUAL

B-84064EN/07

- **Original Instructions**

Thank you very much for purchasing FANUC Robot.
Before using the Robot, be sure to read the "FANUC Robot series SAFETY HANDBOOK (B-80687EN)" and understand the content.

The products in this manual are controlled based on Japan's "Foreign Exchange and Foreign Trade Law". The export from Japan may be subject to an export license by the government of Japan.
Further, re-export to another country may be subject to the license of the government of the country from where the product is re-exported. Furthermore, the product may also be controlled by re-export regulations of the United States government.
Should you wish to export or re-export these products, please contact FANUC for advice.

In this manual, we endeavor to include all pertinent matters. There are, however, a very large number of operations that must not or cannot be performed, and if the manual contained them all, it would be enormous in volume. It is, therefore, requested to assume that any operations that are not explicitly described as being possible are "not possible".

SAFETY PRECAUTIONS

This chapter describes the precautions which must be followed to enable the safe use of the robot. Before using the robot, be sure to read this chapter thoroughly.

For detailed functions of the robot operation, read the relevant operator's manual to understand fully its specification.

For the safety of the operator and the system, follow all safety precautions when operating a robot and its peripheral equipment installed in a work cell.
For safe use of FANUC robots, you must read and follow the instructions in “FANUC Robot series SAFETY HANDBOOK (**B-80687EN)**”.

1 PERSONNEL

Personnel can be classified as follows.

Operator:
- Turns the robot controller power ON/OFF
- Starts the robot program from operator panel

Programmer or Teaching operator:
- Operates the robot
- Teaches the robot inside the safeguarded space

Maintenance technician:
- Operates the robot
- Teaches the robot inside the safeguarded space
- Performs maintenance (repair, adjustment, replacement)

- The operator is not allowed to work in the safeguarded space.
- The programmer or teaching operator and maintenance technician are allowed to work in the safeguarded space. Works carried out in the safeguarded space include transportation, installation, teaching, adjustment, and maintenance.
- To work inside the safeguarded space, the person must be trained on proper robot operation.

Table 1 (a) lists the work outside the safeguarded space. In this table, the symbol "○" means the work allowed to be carried out by the specified personnel.

Table 1 (a) List of work outside the Safeguarded Space

	Operator	Programmer or Teaching operator	Maintenance technician
Turn power ON/OFF to Robot controller	○	○	○
Select operating mode (AUTO/T1/T2)		○	○
Select remote/local mode		○	○
Select robot program with teach pendant		○	○
Select robot program with external device		○	○
Start robot program with operator's panel	○	○	○
Start robot program with teach pendant		○	○
Reset alarm with operator's panel		○	○
Reset alarm with teach pendant		○	○
Set data on teach pendant		○	○
Teaching with teach pendant		○	○
Emergency stop with operator's panel	○	○	○
Emergency stop with teach pendant	○	○	○
Operator's panel maintenance			○
Teach pendant maintenance			○

During robot operation, programming and maintenance, the operator, programmer, teaching operator and maintenance technician take care of their safety using at least the following safety protectors.

- Use clothes, uniform, overall adequate for the work
- Safety shoes
- Helmet

2 DEFINITION OF SAFETY NOTATIONS

To ensure the safety of users and prevent damage to the machine, this manual indicates each precaution on safety with "**WARNING**" or "**CAUTION**" according to its severity. Supplementary information is indicated by "**NOTE**". Read the contents of each **"WARNING"**, "**CAUTION**" and "**NOTE**" before using the robot.

Symbol	Definitions
⚠**WARNING**	Used if hazard resulting in the death or serious injury of the user will be expected to occur if he or she fails to follow the approved procedure.
⚠**CAUTION**	Used if a hazard resulting in the minor or moderate injury of the user, or equipment damage may be expected to occur if he or she fails to follow the approved procedure.
NOTE	Used if a supplementary explanation not related to any of WARNING and CAUTION is to be indicated.

PREFACE

This chapter explains the manual plan at the usage of Zero Down Time.

About this manual

"ZDT (On-Premise) OPERATOR'S MANUAL (B-84064EN)" describes the following items about Zero Down Time.

- Zero Down Time configuration
- Zero Down Time function
- Server software configuration
- Robot controller configuration
- Referring to data
- License management
- Server software management

Using this manual

Each chapter of the manual describes a single operation of Zero Down Time. The user can select and read chapters describing required operations.

Chapter	Descriptions
Chapter 1 ZERO DOWN TIME OVERVIEW	Describes system configuration of Zero Down Time and function list.
Chapter 2 ZERO DOWN TIME SYSTEM CONSTRUCTION	Describes how to configure the data collector, the data server, the data collection service, the Integrated server and the robot controller.
Chapter 3 REFERRING TO DATA	Describes how to use the Web portal and details of each screen.
Chapter 4 ZERO DOWN TIME SETTINGS	Describes how to configure functions that use the data collection service, email notification and data deletion.
Chapter 5 SERVER MANAGEMENT AND CONFIGURATION	Describes how to use the data collector web service and the data server web service.
Chapter 6 INTEGRATED SERVER	Describes how to use the Integrated portal and the Integrated server web service.
Chapter 7 RESTRICTIONS	Describes restrictions of Zero Down Time.
Chapter 8 TROUBLESHOOTING	Describes troubleshooting.

Trademarks of Other Companies Mentioned in This Manual

Companies	Registered trademarks or trademarks
Microsoft	Microsoft, Windows, Internet Explorer
Apple	macOS, Safari, iPad, iPhone
Cisco	IOS Cisco UCS
Google	Google Chrome
Intel	Intel, Intel Core, Xeon
VMware	VMware ESXi, VMware Workstation Pro, VMware vSphere, VMware vSphere Web Client, VMware Workstation Player
Canonical	Ubuntu
PostgreSQL	PostgreSQL
Joyent	Node.js
Oracle	Oracle, Java
Karsten Manufacturing	Ping
F5 NETWORKS	Nginx

Note that "™" or "®" is not used in the text, figures, and tables in this manual.

TABLE OF CONTENTS

APPENDIX

1 ZERO DOWN TIME OVERVIEW

1.1 PREFACE

Zero Down Time (ZDT) is a function to collect and analyze robot data for maintenance received over a network. This function can be used to help improve robot uptime by providing notification of malfunction of mechanical parts and errors in robot control systems before robots completely malfunction as well as notification of maintenance schedules.

ZDT provides the following functionality.

- Mechanical Parts Status Checks - Reducer diagnosis, motor torque, servo off alarm history, etc.
- Process Status Checks - vision detection results, weld information, etc.
- System Status Checks - Uptime, Error information, program change logs, memory usage statistics, etc.
- Maintenance Status Checks - Grease/ battery replacement schedules, etc.

All above information from robot is saved in local data server, which can be viewed through web browser on PC and smart devices.

NOTE

ZDT (on premise) was designed under the assumption that it will be used in on-premise environments.
Therefore, use ZDT only in an on-premise environment.
Do not operate ZDT in any manner not described in the manual, such as storing certificates or private keys on the ZDT server.

1.2 SYSTEM CONFIGURATION

The following figure illustrates the ZDT system configuration.

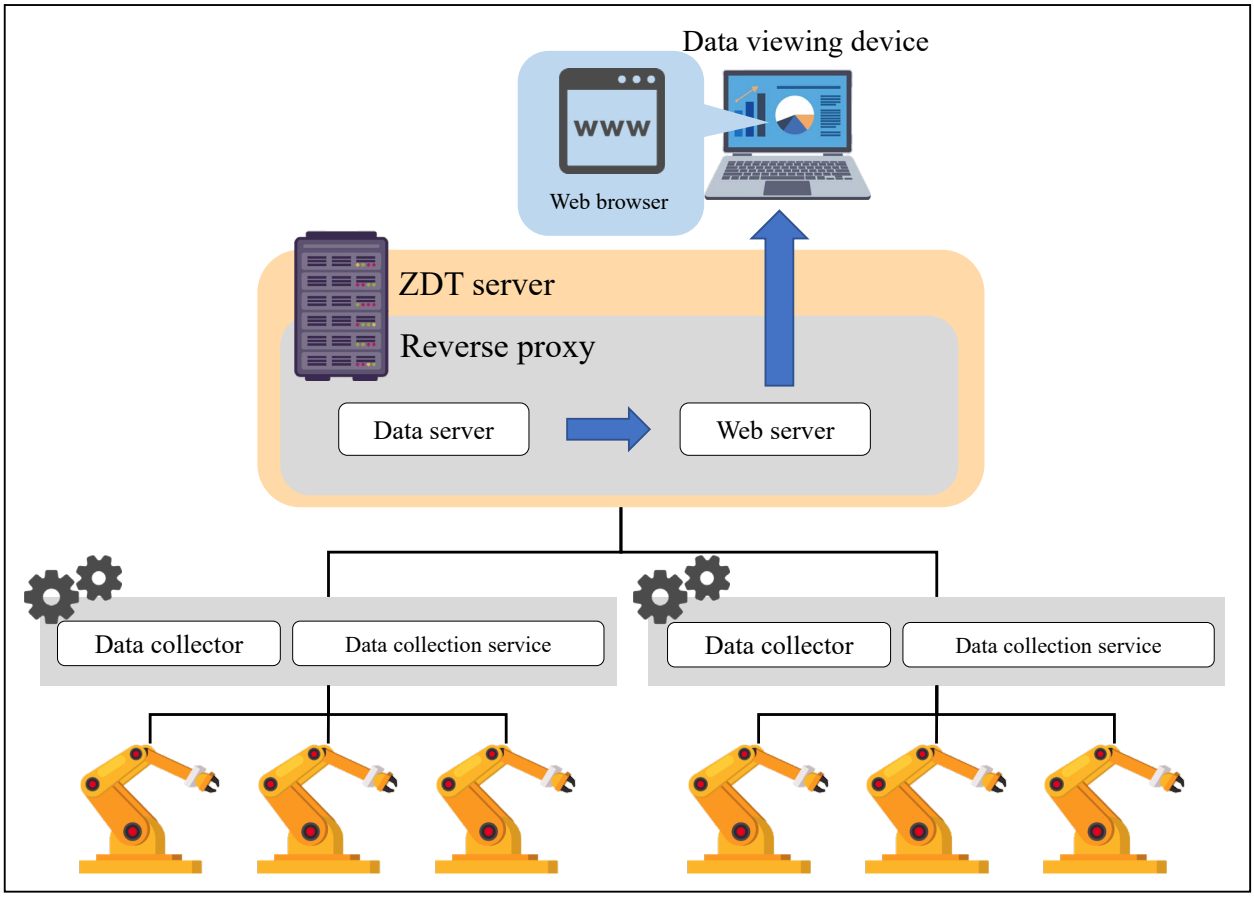


Fig. 1.2 (a) ZDT System Configuration

1.2.1 Robots - ZDT Clients

Robots send various maintenance data to the data collector according to their configurations.

Refer to “2.2 EQUIPMENT PREPARATION” and “2.9 ROBOT CONFIGURATION” for more information on robot order configurations and configuring robot to send data.

1.2.2 Data Collector

Data collector checks transmitted data and provide buffers.

By checking the transmitted data, data collector verifies the validity of the data sent by robots. Only valid data is forwarded to the data server.
Buffers are used to temporarily store and smooth data when the amount of data received exceeds the processing capacity of servers so that data is forwarded more consistently.

Refer to “2.2 EQUIPMENT PREPARATION” for more information on data collector specifications.

1.2.3 Data Collection Service

The data collection service collects all backups of robot data, servo data such as pulse counts, axis positions, Q phase current, and other information.

The data collection service is different from the data collector that processes data sent by robots in that it retrieves data from robots per specified schedules and then forwards this data to the data server.

Refer to “2.2 EQUIPMENT PREPARATION” for more information on data collection service specifications.

1.2.4 ZDT Server

ZDT server is configured with data server and Web server services.

The data server stores data periodically sent by robots in a database. The Web server aggregates and provides access to this data through a Web portal.

1.2.4.1 Server Configuration

ZDT is implemented using virtualization software (VMware ESXi™ and VMware Workstation™) so that two software applications with different roles (data collector and ZDT server) can be built in separate virtualized environments on the same physical server. The following figure illustrates the configuration of each server.

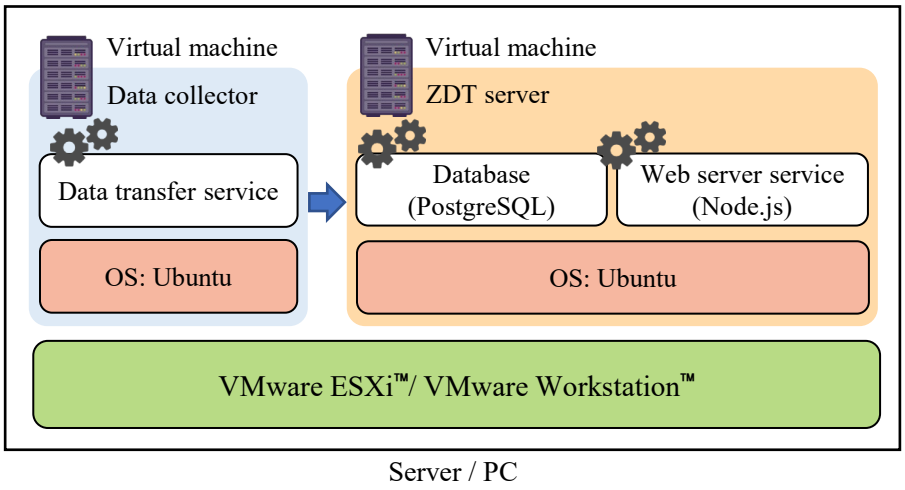


Fig. 1.2.4.1 (a) Server configuration (Single physical server)

Each software component can also be installed on a different physical server as illustrated in the following figure.

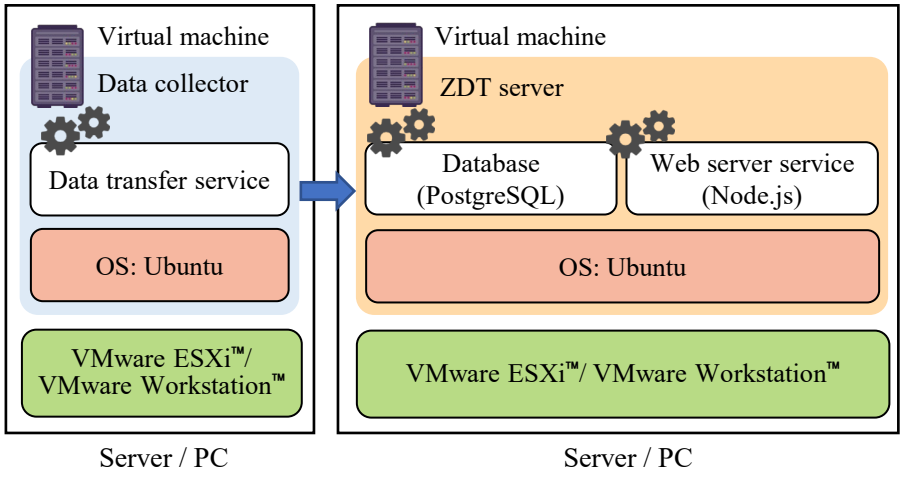


Fig. 1.2.4.1 (b) Server configuration (Multiple physical servers)

Integrated server

If multiple ZDT servers are implemented, the web portal site displaying the operational state and the diagnostics result will be separated. However, the integrated server allows you to monitor this information summarizing on one page (Integrated portal). Each web portal can be accessed from the integrated portal.

The integrated server is implemented on virtualization software as a virtual machine the same as Data collector and ZDT server, and used with ZDT servers registered.

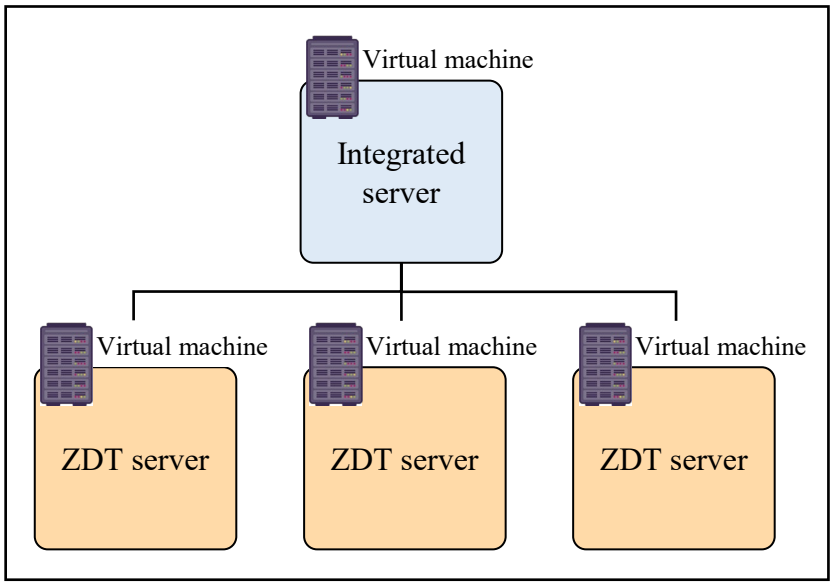


Fig. 1.2.4.1 (c) Integrated server

Refer to “2.2 EQUIPMENT PREPARATION” for more information on ZDT server specifications.

1.2.5 Data Viewing Device

Robot data aggregated by the data server is viewed via a Web browser. The Web portal made available by the Web server running on the data server is accessed with a Web browser.
The ZDT Web portal supports the following operating systems and browsers.

Table 1.2.5 (a) Supported OS and browsers

OS	OS Version	Browser Name	Browser Version
Windows	10/8.1/8/7	Google Chrome Microsoft Edge	Latest version
Mac OS X	Latest version	Google Chrome, Safari	Latest version
iOS	Latest version	Google Chrome, Safari	Latest version

Refer to “3 REFERRING TO DATA” for more information.

NOTE
Internet Explorer 10 and earlier versions are not supported.

1.3 FUNCTION LIST

In addition to the basic package with basic functions for failure prediction and preventive maintenance, ZDT provides optional packages (spot package and arc package) that can be selected according to the robot application.

Each package has the following functions.
Functions supported by the Zero Down Time option (R854) are indicated by "✓", and functions requires options other than R854 are indicated by "(✓)".

Table 1.3 (a) Function list

Package	Function	Robot Software			Note
		R-30*i*A	R-30*i*B	R-30*i*B Plus	
		7DA7 (V7.70) 55 version or later	7DC3 (V8.30) 20 version or later	7DF1 (V9.10) 04 version or later	
Basic	Reducer Diagnosis	✓	(✓)	(✓)	Specify *i*RDiagnostics (R765) from 7DC3 series or later.
	Drive Health	✓	(✓)	(✓)	
	Servo Off Event	✓	(✓)	(✓)	
	Servo Data		✓	✓	
	Axis Odometer	✓	(✓)	✓	Specify *i*RDiagnostics (R765), Maintenance Reminder (J771) for 7DC3 series. For R-30*i*B Plus, it is supported from 7DF1/08.
	Brake Check	(✓)	(✓)	(✓)	Specify brake check function option (J951).
	Running Data		✓	✓	
	Power Consumption		(✓)	(✓)	Specify *i*RDiagnostics (R765). For 7DC3, it is supported from version 53 or later for R651 Standard Setting, and from version 23 or later for R650 North America Setting. R-30*i*B Plus is supported from 7DF1/07.
	Alarm Log		✓	✓	

Package	Function	Robot Software			Note
		R-30*i*A	R-30*i*B	R-30*i*B Plus	
		7DA7 (V7.70) 55 version or later	7DC3 (V8.30) 20 version or later	7DF1 (V9.10) 04 version or later	
Basic	User Message		✓	✓	
	Variable Change Log		✓	✓	
	TP Program Change Log		✓	✓	
	Running Status Log		✓	✓	In 7DC3 series, supported from version 32
	Pulsecoder Battery Low		✓	✓	
	CPU Battery Low		✓	✓	
	Vision		(✓)	(✓)	Specify Vision Option (J901, J902, J909, etc.).
	Process Logger		(✓)	(✓)	Specify Process Logger (R758).
	Maintenance Reminder		(✓)	(✓)	Specify Maintenance Reminder (7DC3 series:J771,7DF1 series:J766).
	Intelligent Grease Change Reminder		(✓)	(✓)	In 7DC3 series, supported from version 44. **(*)**
	Intelligent Cable Change Reminder		(✓)	(✓)	In 7DC3 series, supported from version 44. For R-30*i*B Plus, it is supported from 7DF1/15. **(**)**
	Controller Memory Statistics		✓	✓	In 7DC3 series, supported from version 26
	Email Notification	✓	✓	✓	
	Change Notification		✓	✓	
	Data Monitor	✓	✓	✓	Current command and Current feedback are supported from R-30iB.

Package	Function	Robot Software			Note
		R-30*i*A	R-30*i*B	R-30*i*B Plus	
		7DA7 (V7.70) 55 version or later	7DC3 (V8.30) 20 version or later	7DF1 (V9.10) 04 version or later	
Spot	Servo Gun Diagnosis	(✓)	(✓)	(✓)	Specify Servo Gun Option (J643),Servo Gun Axis (H869).
	Pressure Check		(✓)	(✓)	Specify Servo Gun Option (J643),Servo Gun Axis (H869). In 7DC3 series, supported from version 46
	Servo Tip Dress		(✓)	(✓)	In 7DC3 series, supported from version 39 For R-30*i*B Plus, it is supported from 7DF1/08. (***)
	Tip Wear Diagnosis (Wear Rate)		(✓)	(✓)	Specify Servo Gun Option (J643), Servo Gun Axis (H869).
	Tip Wear Diagnosis (Wear Percentages)		(✓)	(✓)	Specify Servo Gun Option (J643), Servo Gun Axis (H869).
	Spot Weld Log		(✓)	(✓)	Specify Servo Gun (J643), Servo Gun Axis (H869). In 7DC3 series, supported from version 66. For R-30*i*B Plus, supported from 7DF1/39, 7DF3/23 or 7DF5/25.
	Spot Weld Schedule Change Log		(✓)		Specify Integral Weld Control for DENGENSHA (R565). In 7DC3 series, supported from version 66.
Arc	Arc Weld Health			(✓)	Specify Arc Tool (H541) or LR Arc Tool (H574). In 7DF1 series, supported from version 17.

Package	Function	Robot Software			Note
		R-30*i*A	R-30*i*B	R-30*i*B Plus	
		7DA7 (V7.70) 55 version or later	7DC3 (V8.30) 20 version or later	7DF1 (V9.10) 04 version or later	
Arc	Arc Weld Log			(✓)	In 7DF3 series, supported from version 16. In 7DF5 series, supported from version 10. (Unsupported in 7DF1) (****)

(*)
Specify Maintenance Reminder (J771) and Intelligent Grease Change Reminder Add-on (J766) for R-30*i*B.
Specify Maintenance Reminder (J766) for R-30*i*B Plus.

(**)
Specify Maintenance Reminder (J771) and Intelligent Cable Change Reminder Add-on (S511) for R-30*i*B.
Specify Maintenance Reminder (J766) and Intelligent Cable Change Reminder Add-on (S511) for R-30*i*B Plus.

(***)
Specify Servo Gun Option (J643), Servo Gun Axis (H869), and Servo Tip Dress (R708).

(****)
Specify Arc Tool (H541) or LR Arc Tool (H574).
Specify Arc Abnormal Monitor Function (J987).

2 ZERO DOWN TIME SYSTEM CONSTRUCTION

2.1 SYSTEM UP PROCEDURE

Use the following procedure to system up the ZDT.

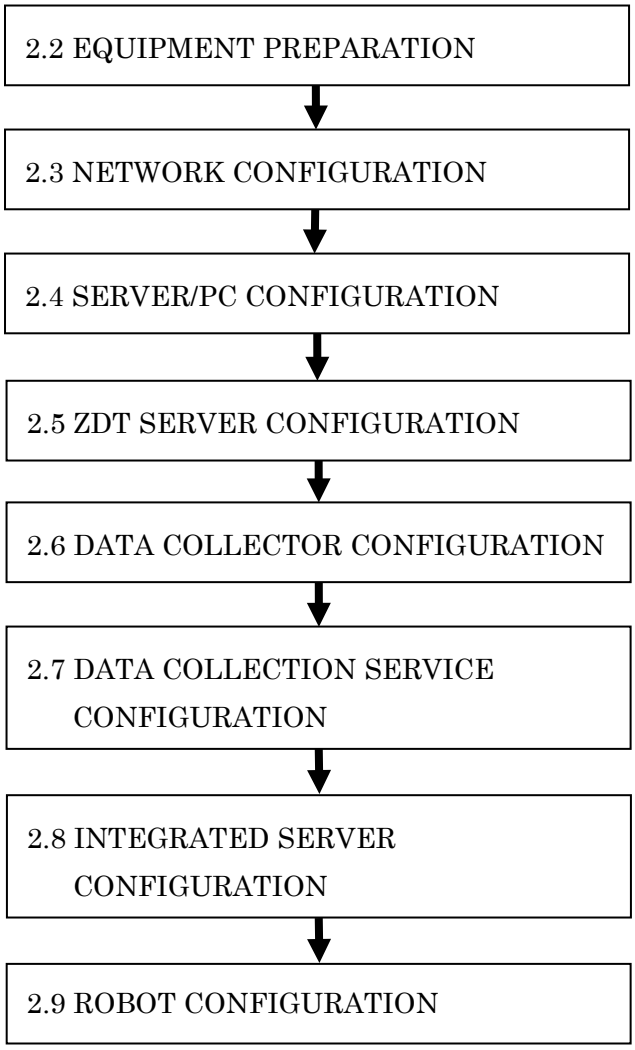


Fig. 2.1 (a) System up procedure

2.2 EQUIPMENT PREPARATION

2.2.1 Hardware Requirements

The following hardware is required to implement ZDT.

Table 2.2.1 (a) Hardware requirements

Equipment	Description
Data collector and ZDT server	Server or generic PC If using a generic PC, make sure to select a model that can run continuously for extended periods of time.
LAN equipment	Ethernet switches, Ethernet cables (Cat 5e or better is recommended), etc.
Wireless LAN equipment	Wireless LAN controllers, access points, etc. This equipment is necessary to enable access to the Web portal site from iOS devices.
PC or iOS devices including iPhones and iPads	This equipment is required to access the Web portal site.

- The data collector and ZDT server can be implemented as one physical server or as separate physical server.

The following table describes the recommended server environment.

Table 2.2.1 (b) Recommended server environment

Package	CPU	Memory	Storage
Standard	Intel® Core™ i7 12 cores or higher recommended	24GB	0.5 TB
Middle	Intel® Core™ i9 16 cores or higher recommended	32GB	1.5 TB
Large	Intel® Xeon® 16 cores or higher recommended	64GB	5.0 TB (RAID 5 configuration is recommended)

SSD for data center is recommended for storage

2.2.2 Software Requirements

The following software is required to implement ZDT.

Server Software

Basic functionality (required)

Select one of the following software according to the number of robot controllers to be connected and the application.

Table 2.2.2 (a) Server software - basic functionality

Product Name	Model Number	No. of units used
ZDT (On-Premise) / Standard package	A08B-9410-J780	25 or fewer
ZDT (On-Premise) / Middle package	A08B-9410-J781	100 or fewer
ZDT (On-Premise) / Large package	A08B-9410-J782	150 or fewer

Spot welding, arc welding functionality (optional)

Select one of the following packages if you want to use the spot welding or arc welding functionality on robots where the basic functionality has been installed.

Table 2.2.2 (b) Server software - optional functionality

Product Name	Model Number	Description
ZDT (On-Premise) / Spot Standard package	A08B-9410-J783	25 or fewer
ZDT (On-Premise) / Spot Middle package	A08B-9410-J784	100 or fewer
ZDT (On-Premise) / Spot Large package	A08B-9410-J785	150 or fewer
ZDT (On-Premise) / Arc Standard package	A08B-9410-J786	25 or fewer
ZDT (On-Premise) / Arc Middle package	A08B-9410-J787	100 or fewer
ZDT (On-Premise) / Arc Large package	A08B-9410-J788	150 or fewer

NOTE
The number of optional packages (spot package or arc package) must be less than or equal to the number of basic packages.

VMware ESXi™ 6.0 or later, VMware Workstation™ 14 Pro or later, or VMware Workstation Player™ (Windows version)

This is virtualization software provided by VMware. ZDT's server software runs as a virtual machine on this virtualization software. ESXi is the hypervisor that is typically installed on server. Workstation is the host that is installed on Windows PCs.
Refer to the official VMware website for more information on this software.

Robot Software

The following robot software is required. Depending on the function, a version newer than the listed version may be required. Refer to “1.3 FUNCTION LIST” for more information on the version for each function.

R-30*i*A controller: 7DA7 (V7.70) / 55 or later
R-30*i*B controller: 7DC3 (V8.30) / 20 or later
R-30*i*B Plus controller: 7DF1 (V9.10) / 04 or later

Software Option

The following software option is required.

Table 2.2.2 (b) Software option

Product Name	Model Number	Description
Zero Down Time Option	A05B-2600-R854	This software provides basic functionality and so is required.

ZDT -compatible software options (R-30*i*B, R-30*i*B Plus)

The following table describes the optional ZDT software components that are available. Implementing optional ZDT components enables users to view various information from the Web portal.

Table 2.2.2 (c) ZDT –compatible software options

Product Name	Model Number	Description
*i*RDiagnostics	A05B-2600-R765	This software component sends results of reducer diagnosis, drive health,servo off logs, and power consumption information to server.
Process Logger	A05B-2600-R758	Sends data to server when process information of spot welding or arc welding contains errors.

Product Name	Model Number	Description
Maintenance Reminder	A05B-2600-J771 A05B-2670-J766	Sends information on robot maintenance and part replacement schedules to server.
Maintenance Reminder / Intelligent Grease Change Reminder Add-on	A05B-2600-J766	This is an add-on function for the Maintenance Reminder. Sends grease replacement schedules estimated from running conditions of robots to server. For 7DF1 (V9.10) series, the Maintenance Reminder contains this add-on.
Maintenance Reminder / Intelligent Cable Change Reminder Add-on	A05B-2600-S511	This is an add-on function for the Maintenance Reminder. Sends cable replacement schedules estimated from running conditions of robots to server.
Vision Option	A05B-2600-J901, J902, J909, etc.	Sends vision detection results to server. Cameras and other hardware are required to support this feature.
Servo Gun Option Servo Gun Axis	A05B-2600-J643 A05B-2600-H869	Sends gun diagnosis information to server.
Servo Tip Dress	A05B-2600-R708	Sends the results of tip dressing to the server.
Brake Check	A05B-2600-J951	Sends the results of brake check to the server.
Arc Abnormal Monitor	A05B-2600-J987	Sends the arc welding information to the server.

NOTE

Supported features vary depending on the version of robot software. Refer to corresponding manuals for more information.

When using the data collection service, the R553 HMI DEVICE (SNPX) option is necessary only when R650 North America Setting is selected. For R651 Standard Setting, no option is necessary.

2.3 NETWORK CONFIGURATION

As illustrated in the following figure, robots, servers, PCs, and data viewing devices connect to the network via Ethernet. We recommend using Cat 5e or better Ethernet cables to connect devices.

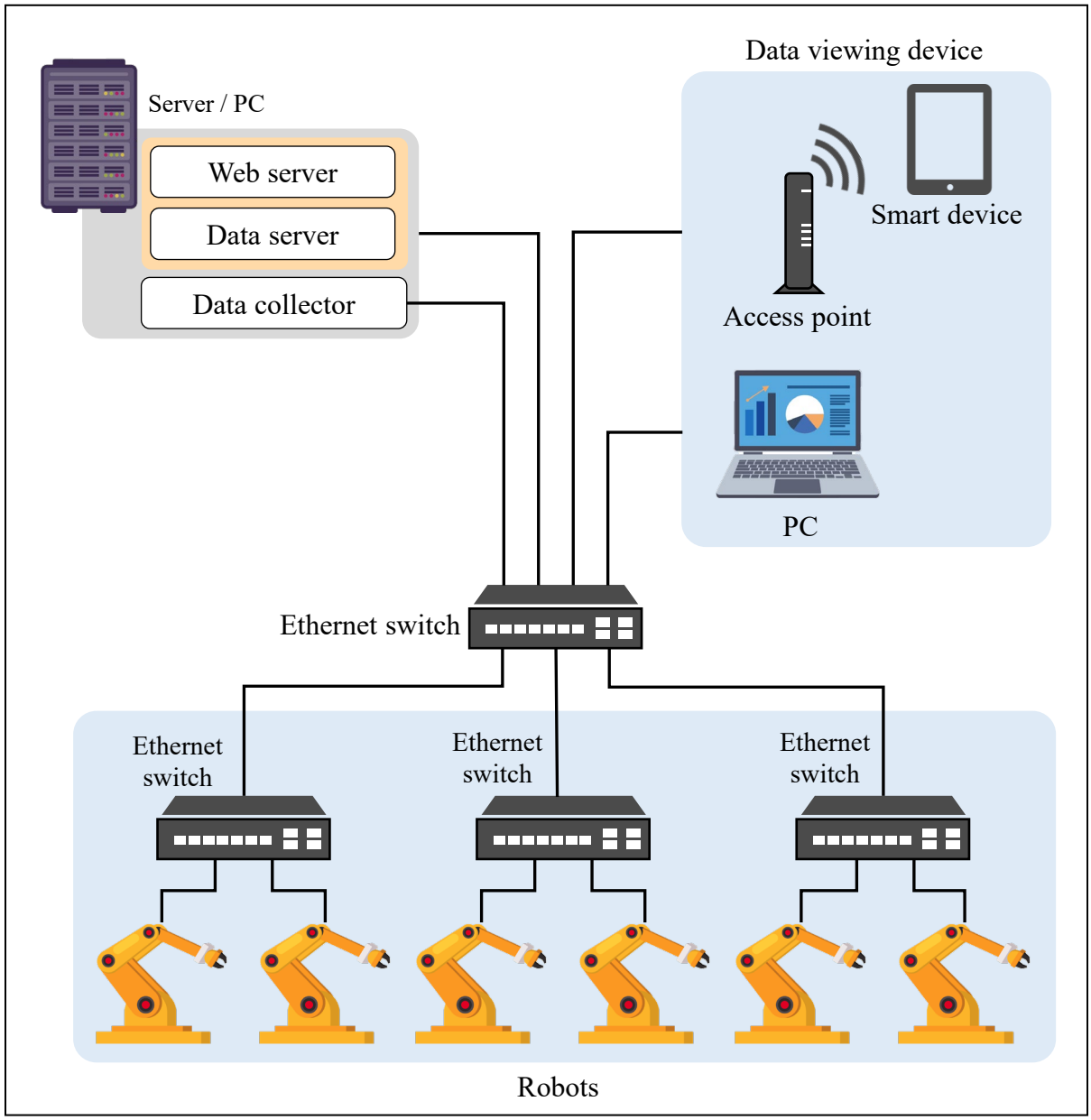


Fig. 2.3 (a) Network configuration

2.3.1 Network Ports

Virtual machines use the following network ports. Configure firewalls and other security devices as necessary to allow communication over these ports.

Table 2.3.1 (a) Data collector

Port	Description
TCP/80	Used to access the Management site for data collector. Used to transfer received ZDT data to ZDT servers.
TCP/6063	Used to receive ZDT data from robots.
UDP/123	Used for NTP synchronization.

Table 2.3.1 (b) Data collection service

Port	Description
TCP/60008	Used to access robots and collect data.
TCP/21, 22	Port 21 is used to retrieve robot backup data via FTP. Port 22 is used to transfer backup data via SCP.
TCP/5432	Used to access databases.
UDP/123	Used for NTP synchronization.

Table 2.3.1 (c) ZDT server

Port	Description
TCP/80	Used to receive ZDT data sent from data collector or as a reverse proxy for HTTP access to the API, Web portal, or ZDT server management. This port number can be changed, but it usually does not need to be changed. For information about how to change it, refer to “Appendix A.1.3 Changing the Reverse Proxy Port Number”.
TCP/8005, 9007	Port numbers 9007 and 8005 are used by Tomcat (for receiving ZDT data sent by data collector and for API functionality). Outside access is handled by reverse proxy.
TCP/9005, 9006	Port number 9005 is used for the Web portal, and port number 9006 is used for the management screen. Outside access is accepted via reverse proxy.
TCP/3000	Used for WebSocket communication.
TCP/25, 465, 587	Used to send email.
TCP/22	Used to retrieve robot backup data via SSH.
TCP/5432	Used to access databases.
UDP/123	Used for NTP synchronization.

2.4 SERVER/PC CONFIGURATION

This section describes examples of configuring servers and PCs.

If using servers installed with VMware ESXi, refer to “2.4.1 Cisco UCS Server Configuration”. If using Windows PCs installed with VMware Workstation Pro, refer to “2.4.2 PC Configuration”.

2.4.1 Cisco UCS Server Configuration

This section describes the configuration of a Cisco UCS server as an example of the server configuration process.
Refer to the Cisco UCS server manual for more information on configuring individual settings. Manuals are available for download from the Cisco Systems official website.

2.4.1.1 CIMC configuration

The Cisco Integrated Management Controller (CIMC) is the management module provided as standard equipment with Cisco UCS servers. This module enables the server to be managed remotely using a web browser.

Use CIMC to configure the following settings.

- **Set an IP address (CIMC console)**
  Set the IP address for external access to CIMC.

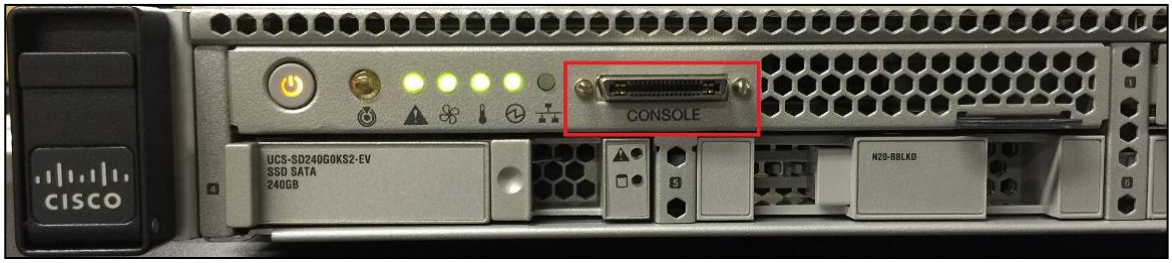
- **Install VMware ESXi™**
  Install VMware ESXi™ on the UCS server.

- **Set an IP address (VMware ESXi™)**
  Set the IP address for connecting to ESXi from VMware vSphere Client.

- **Register the VMware ESXi™ license**
  Register the license for connecting to ESXi from vSphere Web Client.

Step

1 On the back panel, connect the power cables to the power supplies. On the front panel, connect the KVM cable to the console port to establish a connection between the server and a PC with display and keyboard.



Front panel - Connect the KVM cable to the console port

Back panel - Connect two power cables

Fig. 2.4.1.1 (a) Connect power cables and KVM cable

2 Press the power button on the front panel to start up the UCS server.

3 Once the following screen is displayed, press the [F8] key to open the CIMC Configuration screen.

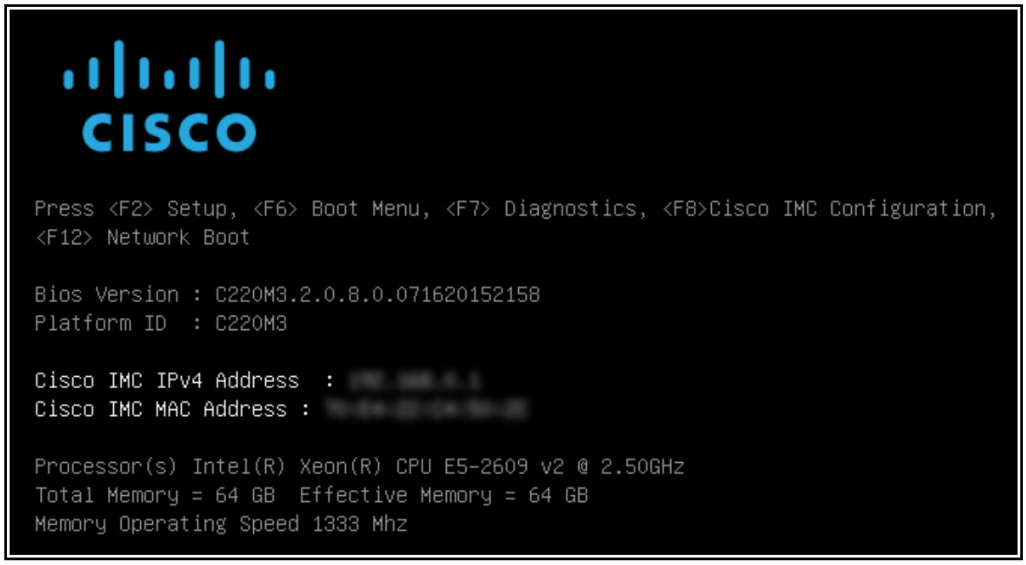


Fig. 2.4.1.1 (b) CIMC console screen

4 Once the Configuration screen is displayed, configure the NIC, IP address, and VLAN settings in accordance with your environment.
In this example, the NIC mode is set to “Shared LOM” and NIC redundancy is set to “Active-standby”.

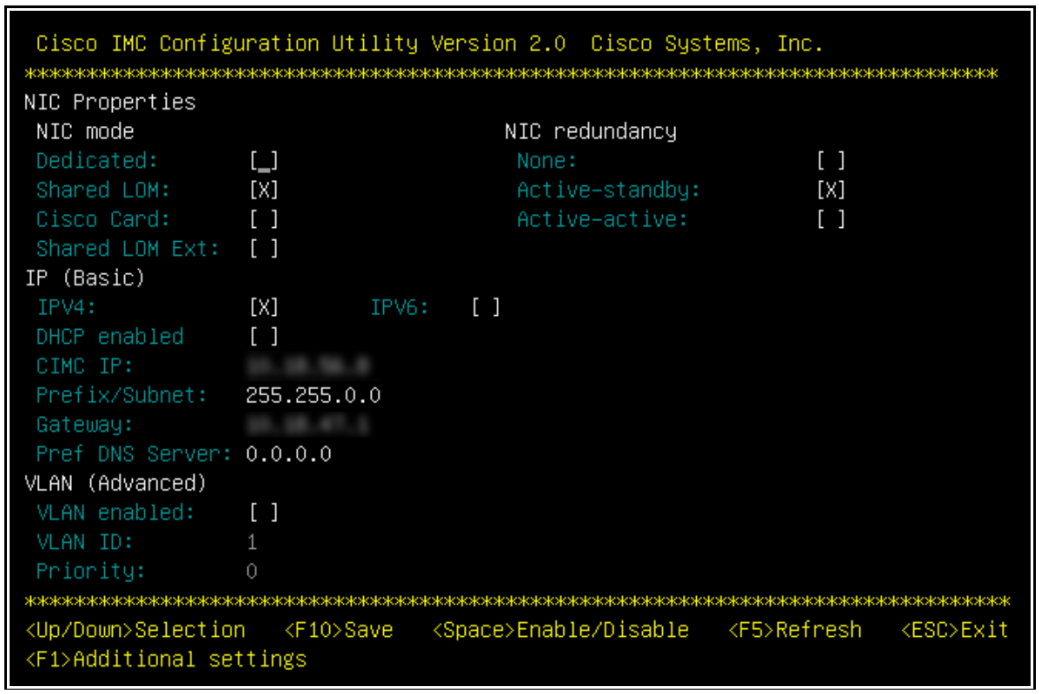


Fig. 2.4.1.1 (c) CIMC configuration screen

5 Once all settings have been configured, press the [F10] key to save the configuration. Then, press the [ESC] key to exit the configuration utility.

2.4.1.2 VMware ESXi™ installation

This section describes the procedure to use CIMC and install VMware ESXi™ to a UCS server.

Login to CIMC

Step

1 Connect an Ethernet cable between the PC and UCS server. Connect the cable to the Ethernet port on the back panel of the UCS server.

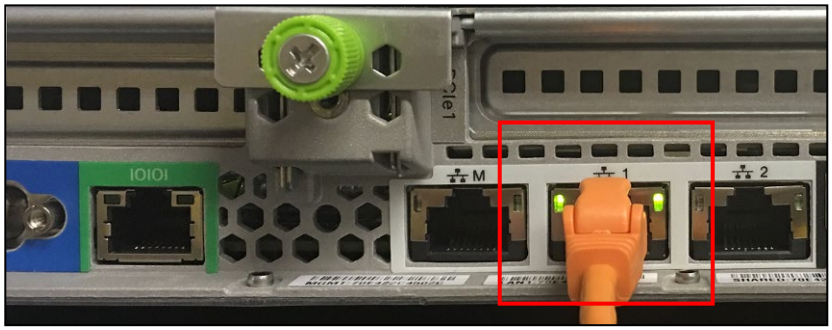


Fig. 2.4.1.2 (a) Ethernet port

2 Enter the CIMC IP address into Internet Explorer to access the CIMC.

3 Once the CIMC login screen is displayed, enter the username and password to login (default username: admin, default password: password).

Fig. 2.4.1.2 (b) CIMC login screen

NOTE

If the warning “Your connection is not private” is displayed on your browser, click “Advanced”, and then click “Proceed to ***.***.***.*** (unsafe)”.

The CIMC username and password may be different from their defaults. Contact Cisco Systems if you cannot log in.

Start Up the KVM Console

Step

1 Once you have logged into CIMC, click “HTML based KVM” from “Launch KVM”.

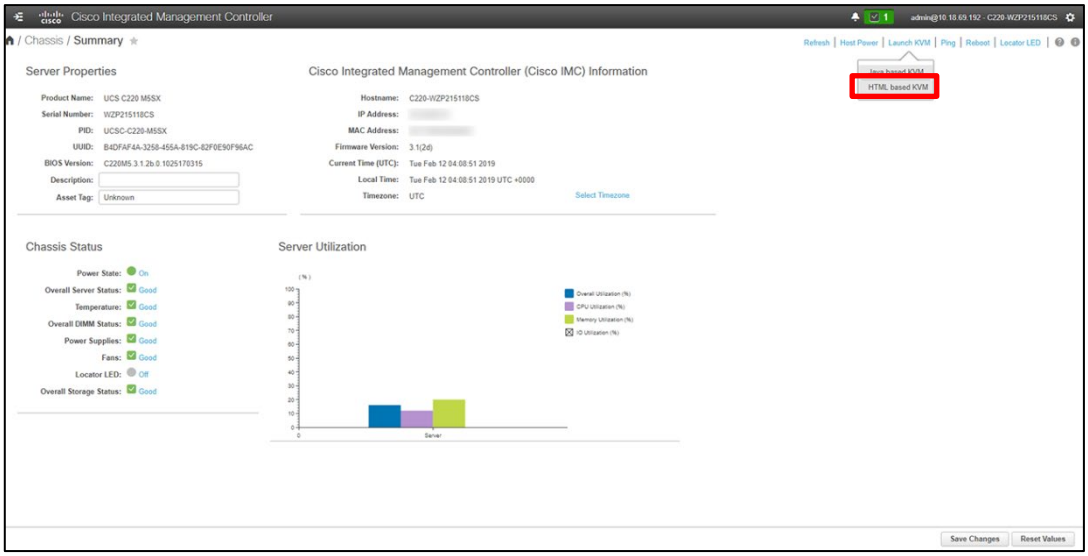


Fig. 2.4.1.2 (c) CIMC

2 The UCS screen will be displayed in the KVM Console after the KVM Console starts.

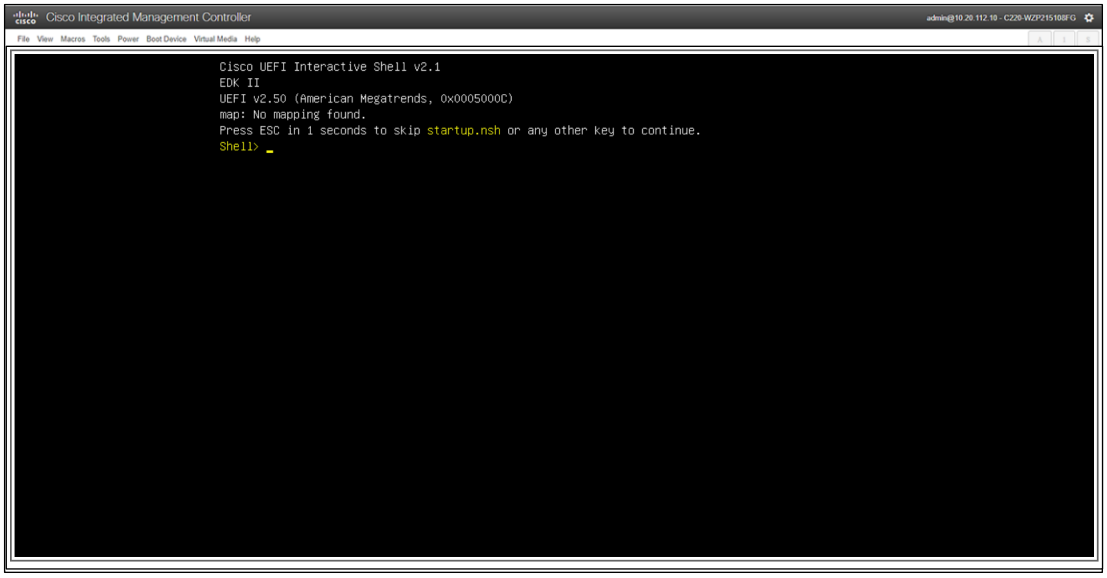


Fig. 2.4.1.2 (d) KVM console

VMware ESXi™ Installation

Step

1 Download the installer iso image for VMware ESXi™ 6.7 or later from the VMware website.
https://www.vmware.com

2 From the KVM Console menu, select “Virtual Media”, then “Activate Virtual Devices”, and then “Map CD/DVD”.

Fig. 2.4.1.2 (e) Map CD/DVD

3 Select the downloaded ISO image and click “Drive Mapping”.

4 From the KVM Console menu, click “Macro”, then “Static Macro”, and then “Ctrl + Alt + Del” to restart.

5 Once the device restarts, press the [F6] key to display the boot menu.

6 Once the “Please select boot device” screen is displayed, select “Cisco vKVM-Mapped vDVD1.24”.

Fig. 2.4.1.2 (f) Select boot device

7 The VMware ESXi™ installer starts.

Refer to the VMware ESXi™ manual for the rest of the procedure.
After installation, you must set the IP address and register the license for connecting to ESXi from VMware vSphere Client. Refer to the VMware ESXi™ manual for how to configure the settings.
The manual can be downloaded from the VMware web site.

NOTE
If the Cisco UCS server has multiple CPUs, license keys must be combined. Refer to the VMware website for more information.

2.4.2 PC Configuration

2.4.2.1 VMware Workstation Pro installation

Client PCs must be installed with VMware Workstation Pro so that virtual machines can be created and network and other configuration changes can be made.

Step

1 Download the VMware Workstation Pro installer from the VMware website.
http://www.vmware.com
2 Once the “VMware Workstation Pro Setup” screen is displayed, click “Next”.

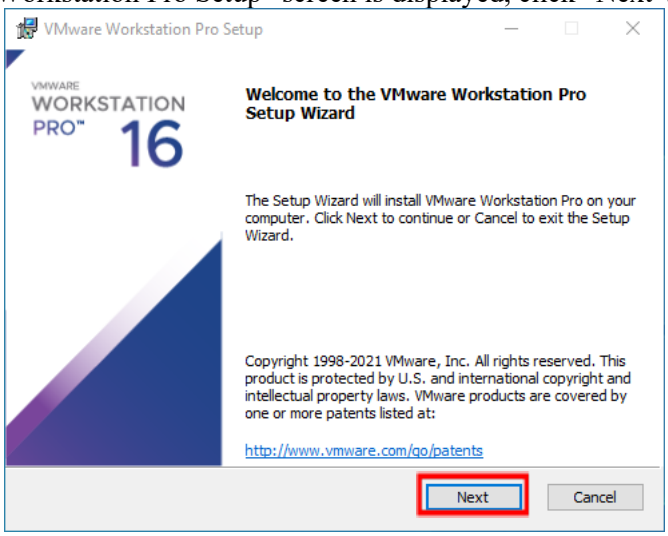


Fig. 2.4.2.1 (a) Setup screen

3 Once the “End-User License Agreement” window is displayed, confirm the terms of the license, select “I accept the terms in the License Agreement”, and then click “Next”.

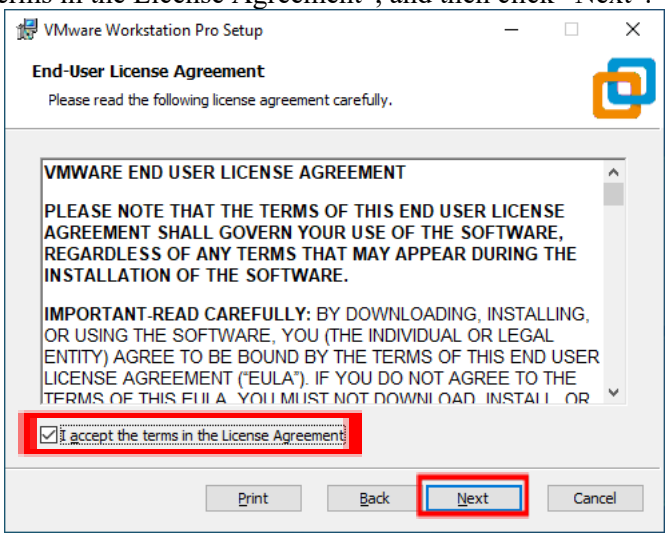


Fig. 2.4.2.1 (b) End-user license agreement

4 Once the “Custom Setup” screen is displayed, select the installation folder and click “Next”.

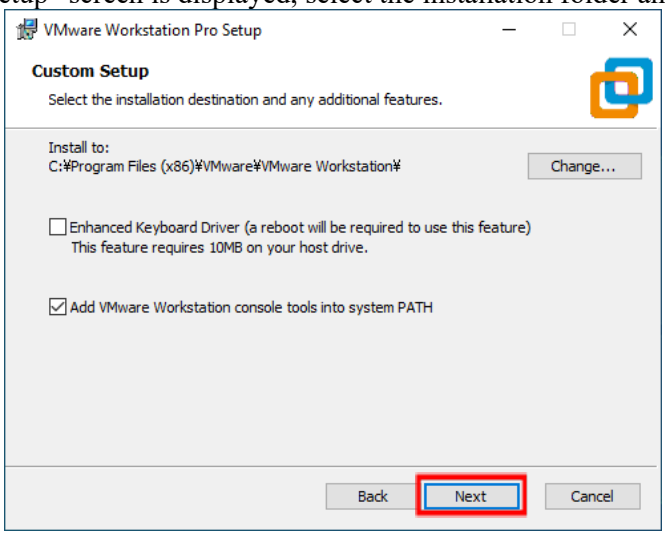


Fig. 2.4.2.1 (c) Custom setup

5 Once the “User Experience Settings” screen is displayed, select the check boxes as necessary and then click “Next”.

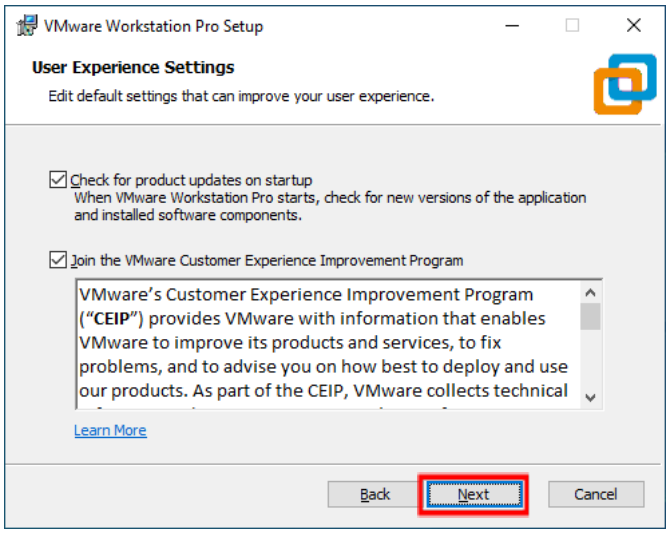


Fig. 2.4.2.1 (d) User experience settings

6 Once the “Shortcuts” screen is displayed, select the check boxes to create the desired shortcuts and then click “Next”.

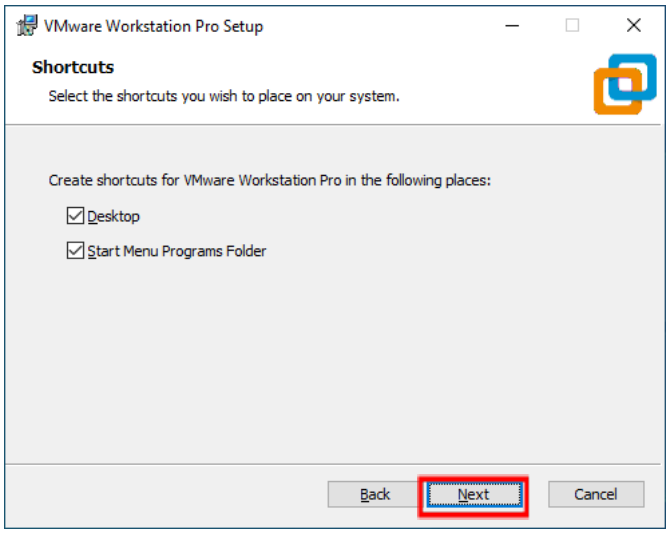


Fig. 2.4.2.1 (e) Create shortcuts

7 Once the “Ready to Install VMware Workstation Pro” screen is displayed, click “Install”.

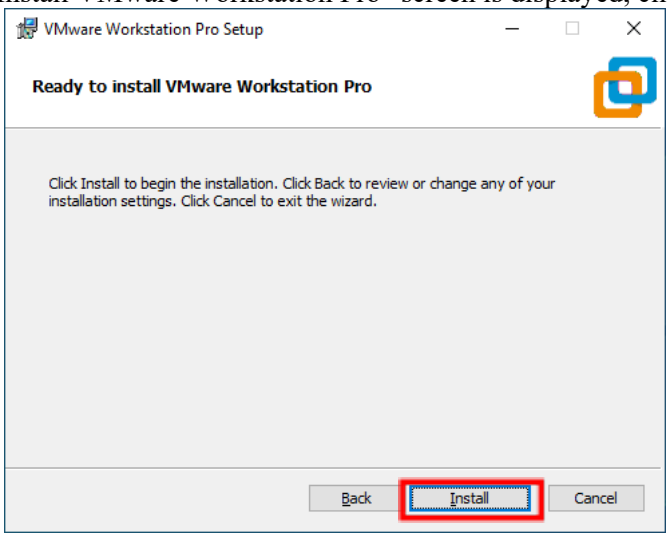
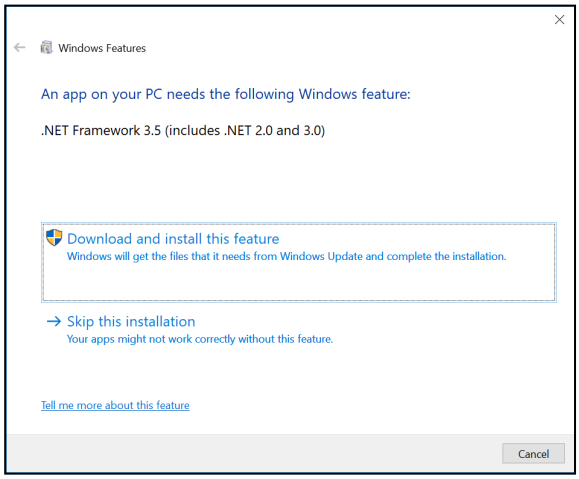


Fig. 2.4.2.1 (f) Ready to install

NOTE

The following screen will be displayed if .NET Framework 3.5 is not already installed on the PC. Download and install this software.



8 Once the installation is complete, click “Finish”.

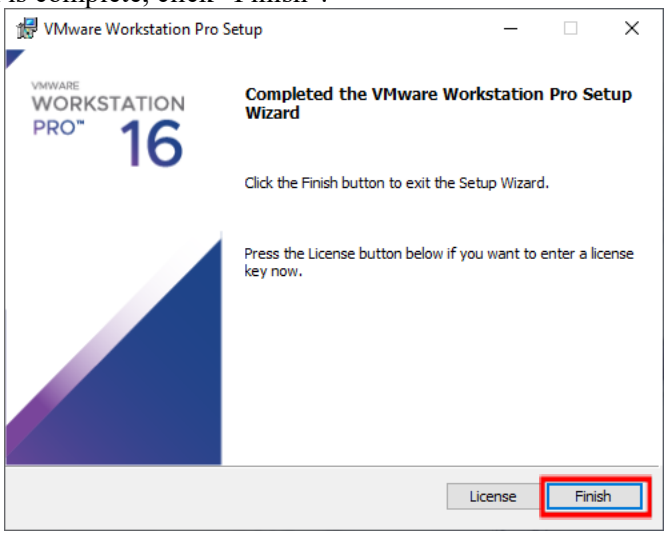


Fig. 2.4.2.1 (g) Completed installation

NOTE
If you use VMware Workstation Pro, Virtualization feature (Intel VT-x/AMD-V) must be enabled in the BIOS settings on your PC. The way to enable virtualization feature differ in PC vendor. Refer to the user’s manual of your PC.

2.4.2.2 VMware Workstation Pro License registration

This section describes the procedure to register the VMware WorkStation Pro license.

Step

1 Start VMware Workstation Pro. From the “Help” menu, click “Enter a License Key”.

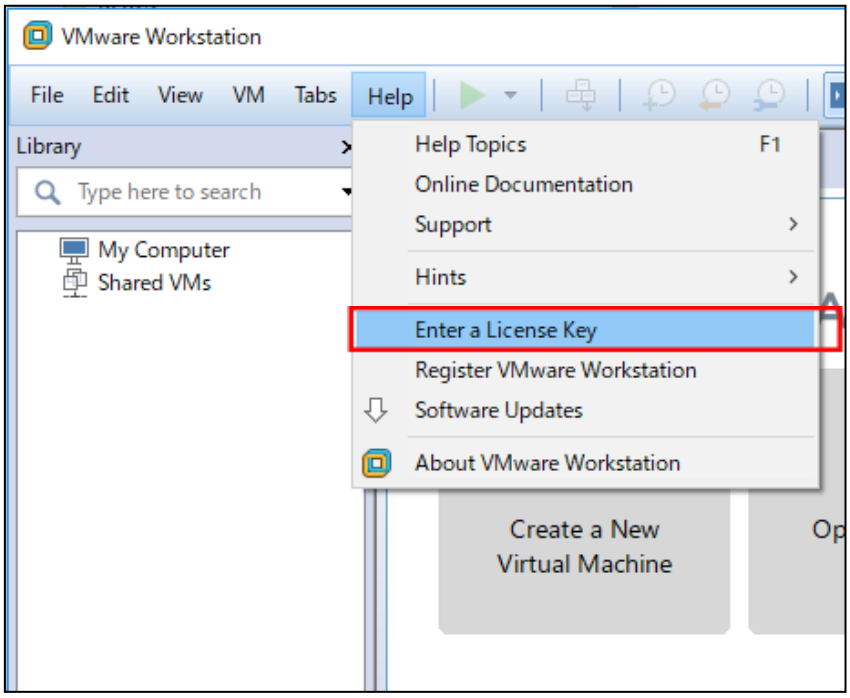


Fig. 2.4.2.2 (a) License registration

2 Enter the license key and then click “OK”.

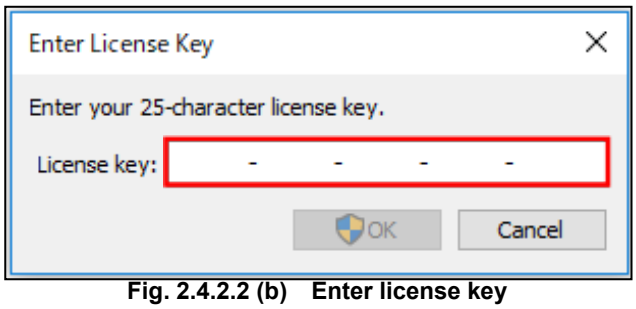


Fig. 2.4.2.2 (b) Enter license key

2.5 ZDT SERVER CONFIGURATION

2.5.1 Virtual Machine Creation

Import and use the OVF template included in the ZDT installation DVDs to create ZDT server virtual machines.
If the ZDT server is configured on a physical server, use the procedure in "VMware ESXi Environments".
If the ZDT server is configured on a Windows PC, use the procedure in "VMware Workstation Pro Environments".

VMware ESXi Environments

Step

1 Start vSphere Web Client and connect to ESXi.
2 After clicking "Host" in the navigator, click "Create/register a virtual machine".
3 Once the "New virtual machine" screen is displayed, select "Deploy a virtual machine from an OVF or OVA file", and then click "Next".

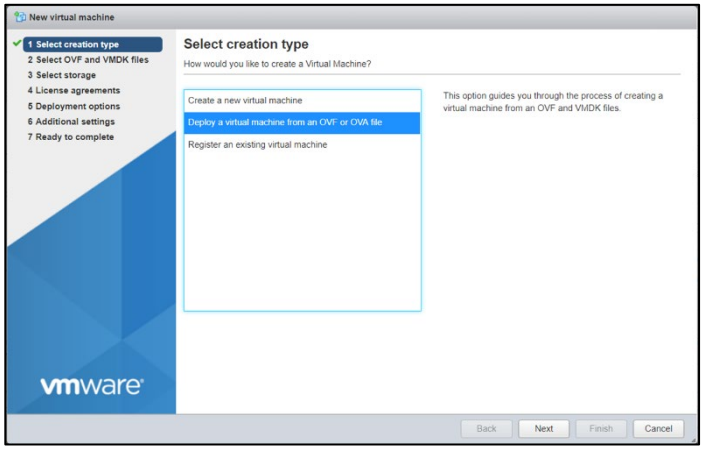


Fig. 2.5.1 (a) Select creation type

4 Once the "Select OVF and VMDK files" screen is displayed, enter a name for the virtual machine. Then, drag and drop "ZDT_DataServer_VX.X.X.ova" from DVD Disc2 into the "Click to select files or drag/drop" area, and click "Next".
In this example, "zdt_dataserver" is the configured name.

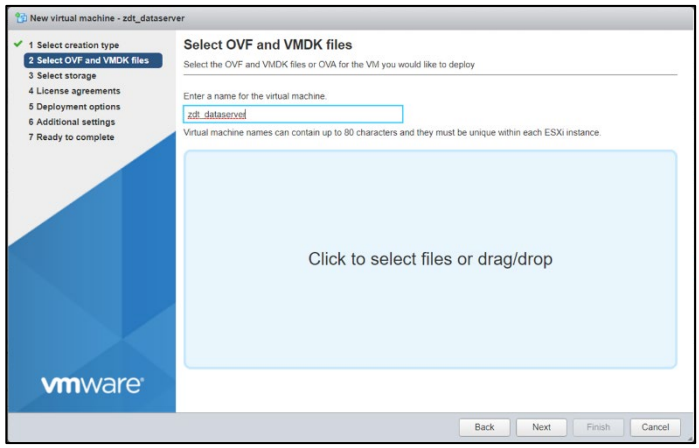


Fig. 2.5.1 (b) Select OVF and VMDK files

5 Once the “Select storage” screen is displayed, click “Next”.

6 Once the “Deployment options” screen is displayed, select “Thick”, and then click “Next”.

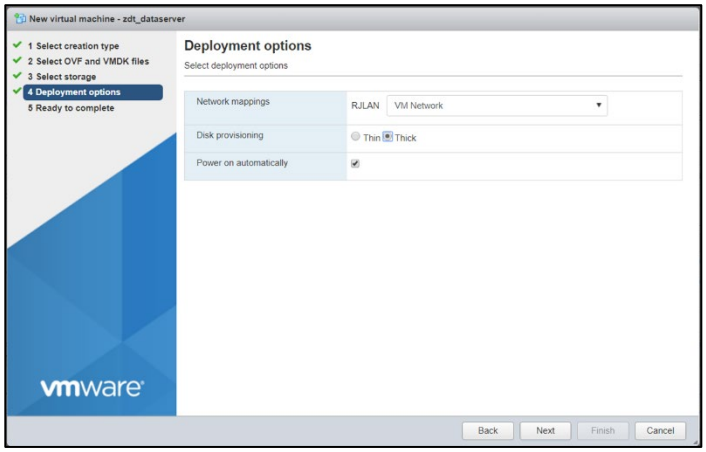


Fig. 2.5.1 (c) Deployment options

7 Once the “Ready to complete” screen is displayed, confirm the contents, and then click “Finish”.

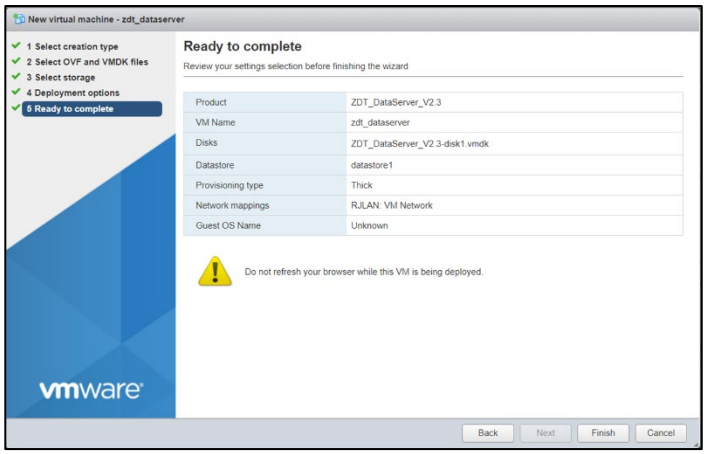


Fig. 2.5.1 (d) Ready to complete

8 Once “Completed successfully” is displayed in “Result” at the bottom right of the screen, virtual machine creation is finished.

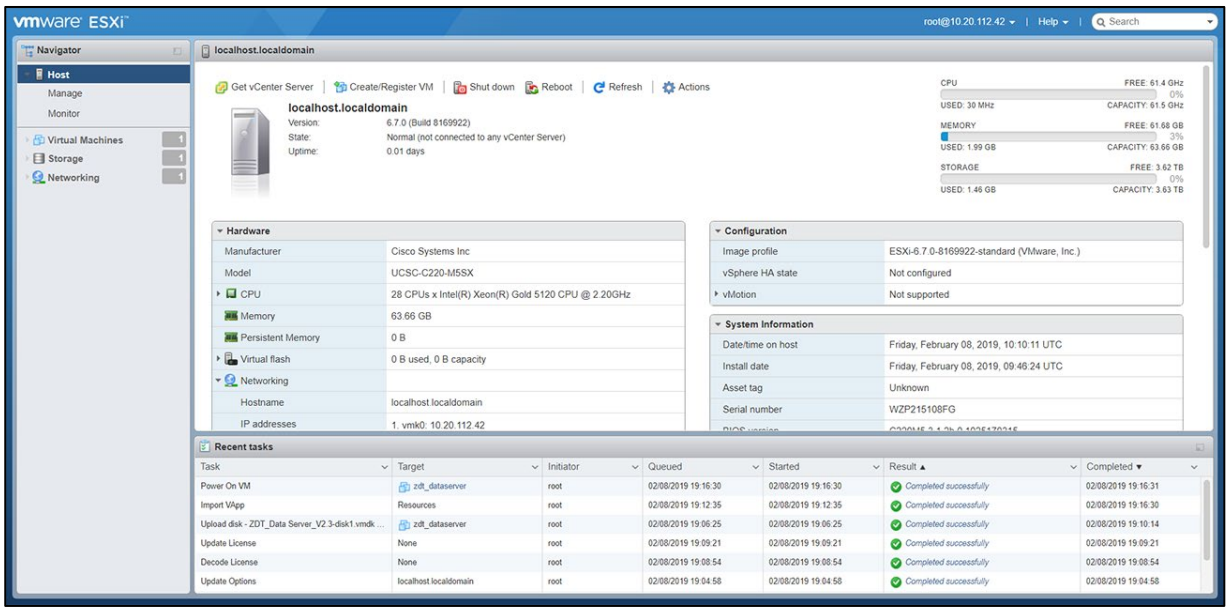


Fig. 2.5.1 (e) Completion of virtual machine creation

VMware Workstation Pro Environments

Step

1 Start VMware Workstation Pro.

2 From the “File” menu, click “Open” and select “ZDT_DataServer_VX.X.X.ova” on disc 2 of the installation DVDs.

3 Once the “Import Virtual Machine” screen is displayed, click “Import”. Change the name of the virtual machine as necessary.

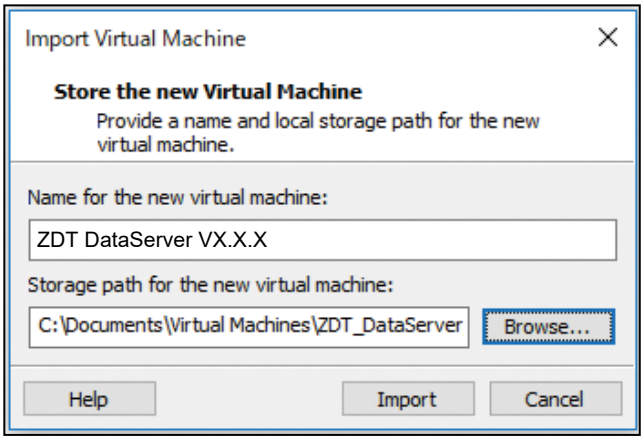


Fig. 2.5.1 (f) Import virtual machine

2.5.2 Hardware Configuration

The ZDT server virtual machine are allocated with the following recommended memory and CPU as the standard configuration.

- Memory: 8GB/12GB/18GB (Standard/Middle/Large)
- CPUs: 3/5/6 (Standard/Middle/Large)

To change the allocation, display the ZDT_DataServer properties and change the allocation on the Hardware tab.
If you will be using the spot weld log and the spot weld schedule change log, change the allocation as follows.

- Memory: 10GB/14GB/20GB (Standard/Middle/Large)
- CPUs: 5/7/8 (Standard/Middle/Large)

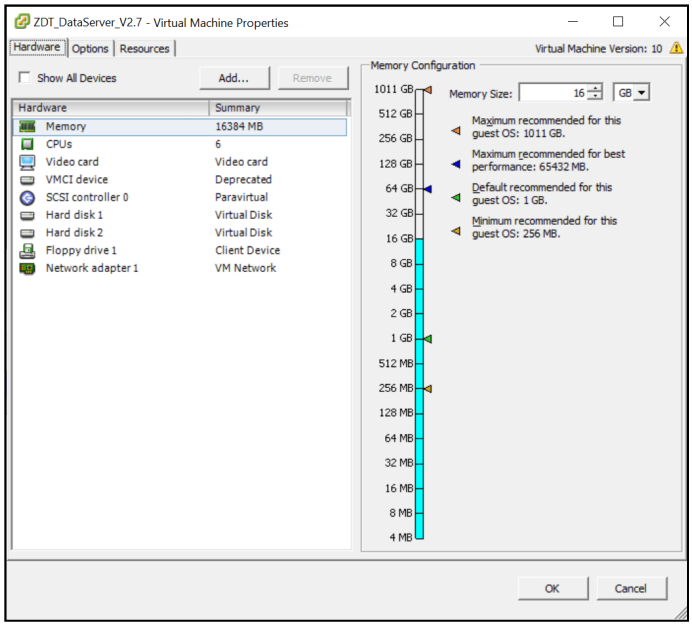


Fig. 2.5.2 (a) Virtual machine properties

2.5.3 Network Configuration

At the time of the initial setting, you can interactively configure the network settings.

Step

1 Right-click the created virtual machine then click “Power on”.
2 Click “Open browser console” to boot the console.

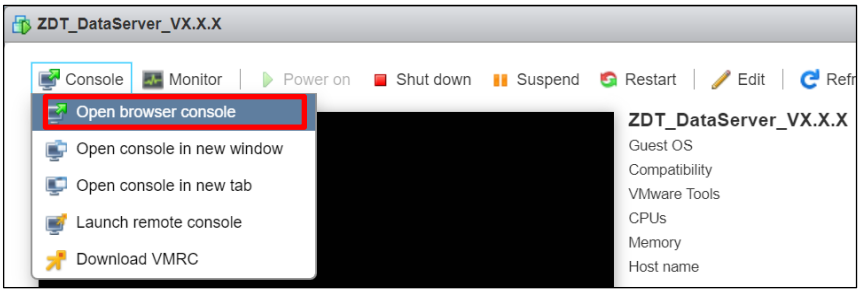


Fig. 2.5.3 (a) Boot the console

3 When you boot the console, a message to encourage you to specify the network setting of the ZDT server only when in the initial setting.
Enter “y” then press Enter key to specify the fixed IP address.
By following the instructions in the screen, enter the IP address, the default gateway, and the subnet mask according to your environment then press Enter key.
*If the network setting of the ZDT server is not started and a login screen in step 4 is shown, refer to “Appendix A.1.1 Changing the Network Configuration (if the network setting was not specified when in the initial setting).”

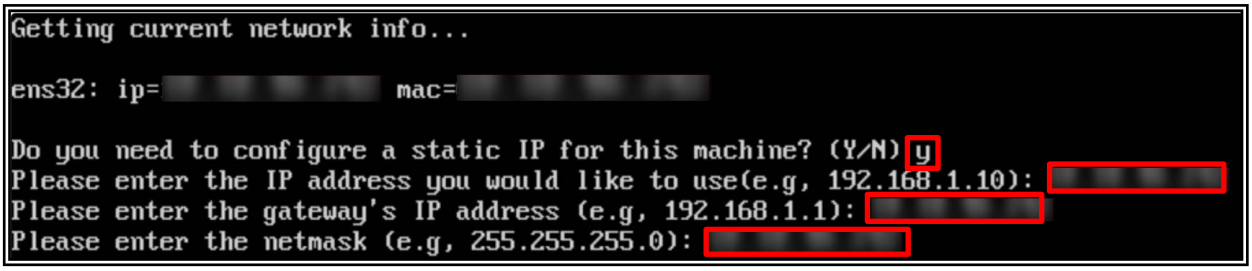


Fig 2.5.3 (b) Enter the network information

Check if the contents are correct, enter “y” then press Enter to complete the setting.

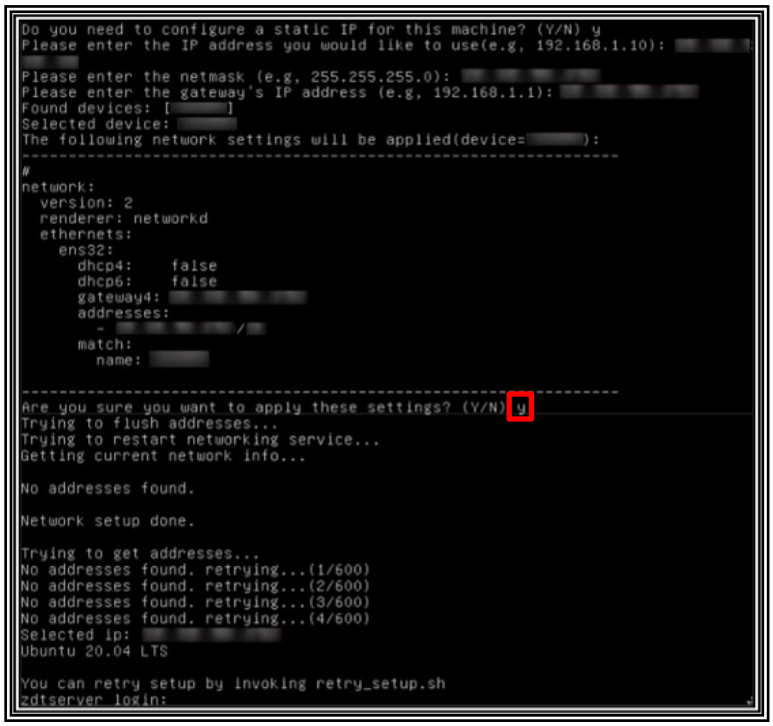


Fig. 2.5.3 (c) Check the network setting

4 Enter the following username and the initial password to log in.

zdtserver login: **zdtuser**
Password: **zdtuser**

5 Enter the following command to check if the IP address and the subnet mask that was specified by the Step 3 above were reflected.

zdtuser@zdtserver:~$ **ip␣addr␣show**

*Since the subnet mask is displayed as the number of bits, the subnet mask that was set in step 3 above is converted to a bit indication.
For example: 255.255.255.0 → 24 (bit indication), 255.255.128.0 → 17, 255.0.0.0 → 8

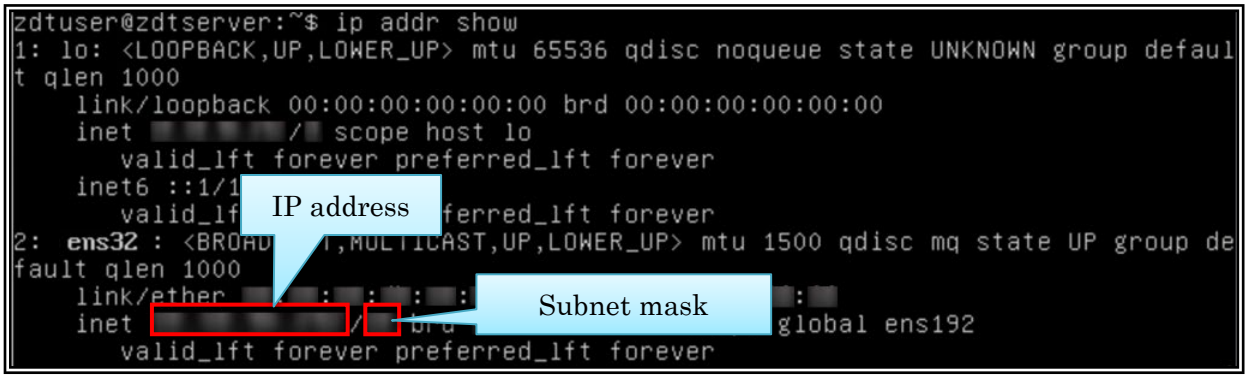


Fig. 2.5.3 (d) Check the network settings (IP address, subnet mask)

6 Enter the following command and confirm that the default gateway set in step 3 above has been reflected.

zdtuser@zdtserver:~$ **ip route show**

Fig. 2.5.3 (e) Check the network settings (default gateway)

If you do not set the network settings at the first startup, you can recall the network settings from the console again. Refer to “Appendix A.1.1 Changing the Network configuration (if the network setting was not specified when in the initial setting)” for details.

The network settings can be configured with the following methods.
- ZDT server management screen

Refer to “5.2.8.1 Environment settings” for how to configure the settings.
- Console

Refer to “Appendix A.1.2 Changing the Network Configuration (Console)” for how to configure the settings.

2.5.4 Time Configuration

NTP server can be configured on the ZDT server to synchronize the system time between servers and robot controllers. By default, the synchronization with NTP server is disabled. Change these settings as necessary for your environment.
Log into the ZDT Server Management and change settings as necessary. Refer to “5.2.9.1 Environment settings” for more information.

2.5.5 Changing Login Passwords

Login passwords are configured on the ZDT Server Management screen.
Refer to “5.2.9.1 Environment settings” for more information.
After you change a password on the ZDT Server Management screen, the data collection service must be restarted in order to perform robot backup, etc.
For information on restarting the data collection service, refer to step 3 in “2.7.6 Configuring Configuration Files”.

2.5.6 Expanding Disk Capacity

The virtual disks for the ZDT server are configured as follows. Expand the disk as necessary to match the capacity of the disk on your server or PC.

Table 2.5.6 (a) Hard disk configuration

Item	Stored data	Initial size	Mount point
Hard disk 1	Everything (such as the OS) except for data	30G	/
Hard disk 2	Data (DB data, robot backup)	100G	/home/zdtuser/zdt/data

Refer to “Appendix A.4 Expanding Disk Capacity” for the procedure for expanding the disk capacity.

2.5.7 REGISTERING LICENSES

2.5.7.1 LICENSE REGISTRATION PROCESS FLOW

The following procedures are used to register licenses.

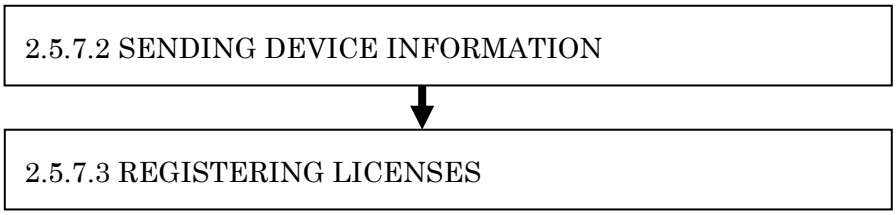


Fig. 2.5.7.1 (a) License Registration Process Flow

After registering the licenses, select the robot that itsdata needs to be saved to the ZDT server as necessary.
In addition, to renew the license after registering the license, use Return license.
Refer to “5.2.11 License” for details.

2.5.7.2 SENDING DEVICE INFORMATION

The ZDT server management web service is used to register licenses.

Step

1 Use either of the following methods to display the login screen.

- From the Web portal header, click the “Settings” button, and then select “Data Server Management”.
- Enter the following URL into the browser’s address bar.
  http://<IP address of ZDT server>/management

Once the following screen is displayed, enter the user name of “zdtadmin” and the password of “zdtadmin”, and then click “Login”.

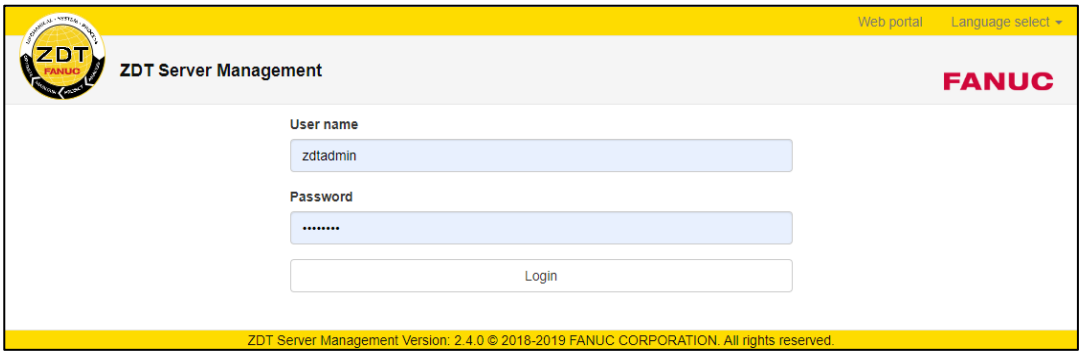


Fig. 2.5.7.2 (a) Login Screen

2 From the left menu, click “License” to display the sub-menu, and then click “Management”.

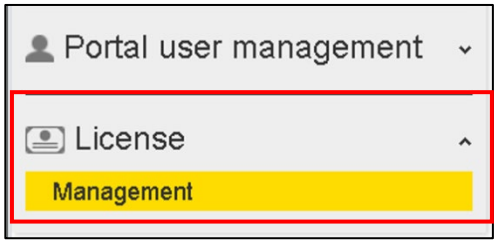


Fig. 2.5.7.2 (b) License menu

3 Click “Get device info file” on the detail screen, and then click “Download” to download the file that describes the information needed to generate license keys. Attach the downloaded file to an email message and send this message to one of our Sales representatives. When your product is a spot package or an arc package, also attach the file containing the serial number stored in the media.

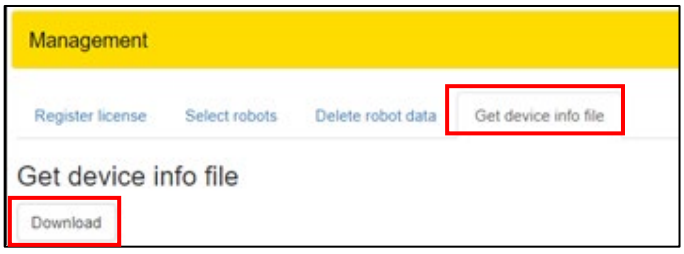


Fig. 2.5.7.2 (c) Get device info file

2.5.7.3 REGISTERING LICENSES

One of our sales representatives will send you license keys after receiving your device information. Register licenses with the following procedure.

Step

1 From the menu on the ZDT server management web service, click “License” to display the sub-menu, and then click “Management”.
2 Click the “Register license” tab on the detail screen, enter the license key into the “License key” input field, and then click the “Apply” button.

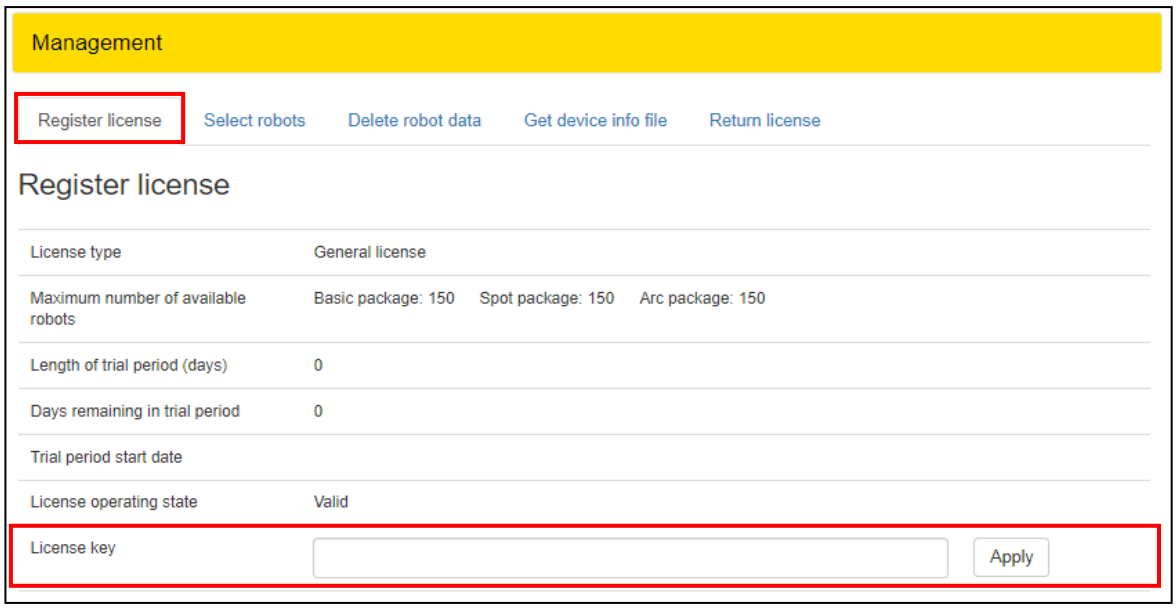


Fig. 2.5.7.3 (a) Registering Licenses

The following table describes the information that is displayed.

Table 2.5.7.3 (a) Registering Licenses

Item	Description
License type	Displays the type of the registered license (general license or trial license).
Maximum number of available robots	Displays the maximum number of robots from which the ZDT server can store data. This number varies depending on the ZDT options license.
Length of trial period (days)	Displays the number of days of the trial period for a trial license.
Days remaining in trial period	Displays the number of days remaining for a trial license.
Trial period start date	Displays the date that the trial license was registered, which serves as the start date of the trial.
License operating state	Displays the status of registered license (valid, invalid, returned).
License key	This input field is used to register license keys sent by our sales representatives.

2.5.7.4 USING LICENSES

After registering the licenses, select the robot that its data needs to be saved to the ZDT server using the license on the “License” screen of the ZDT server management web service.
Do this setting if a robot subjected for data-saving needs to be selected at the timing of system up.
For details such as the screen items or the notes to consider, refer to “Select robots” in “5.2.11.1 Management”.

The typical procedure is shown as following.

Step

1 From the menu on the ZDT server management web service, click “License” to display the sub-menu, and then click “Management”.
2 Click the “Select robots” tab on the detail screen, select the robots from which you want the ZDT server to store data, and then click the “Apply” button.

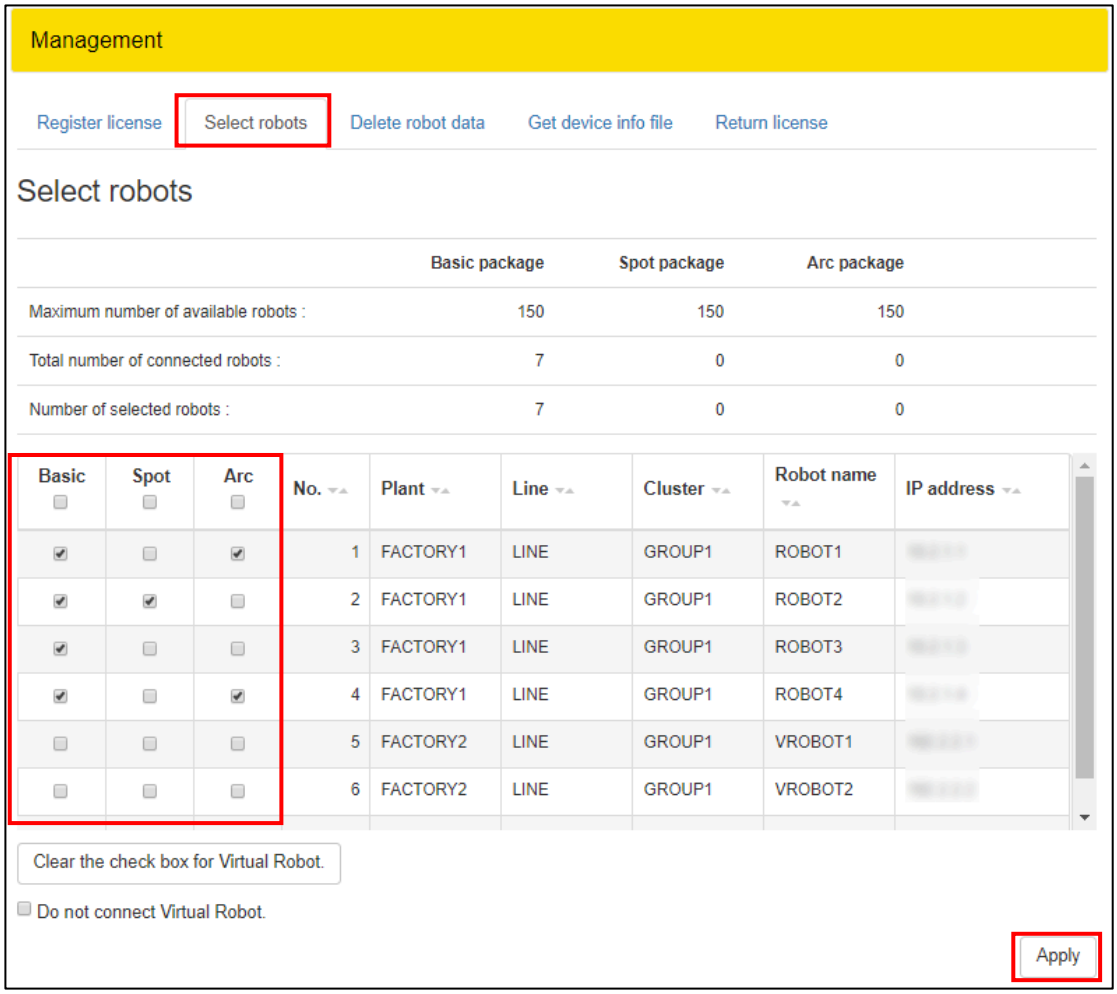


Fig. 2.5.7.1 (a) Select robots

2.5.8 Operational Check

This section describes the procedure to check ZDT server operation.

Step

1 Enter "http://***.***.***.***" into the web browser's address bar.
The "***.***.***.***" portion represents the ZDT server IP address.
* If the port number was set to something other than 80 in "Appendix A.1.3 Changing the Reverse Proxy Port Number", enter the following address.
http:// ***.***.***.***:[reverse proxy port number]

2 The ZDT server is operating correctly if the following screen is displayed.

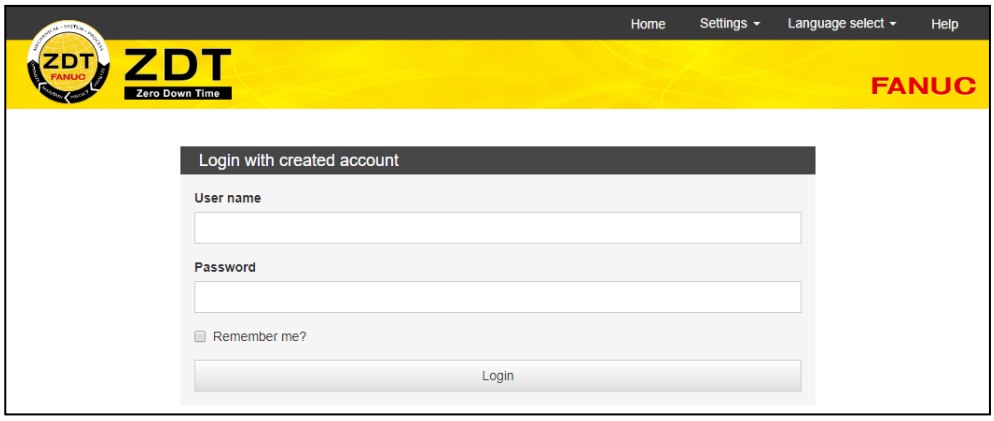


Fig. 2.5.8 (a) Check ZDT server operation

NOTE
Refer to "Appendix A.1.3 Changing the Reverse Proxy Port Number" to change the reverse proxy port number (only if it is not work properly because of the wrong reverse proxy number).

2.6 DATA COLLECTOR CONFIGURATION

2.6.1 Virtual Machine Creation

Import and use the OVF template included in the ZDT installation DVDs to create data collector.
If the ZDT server is configured on a physical server, use the procedure in “VMware ESXi Environments”.
If the ZDT server is configured on a Windows PC, use the procedure in “VMware Workstation Pro Environments”.

VMware ESXi Environments

Step

1 Start vSphere Web Client and connect to ESXi.
2 After clicking “Host” in the navigator, click “Create/register a virtual machine”.
3 Once the “New virtual machine” screen is displayed, select “Deploy a virtual machine from an OVF file or OVA file”, and then click “Next”.
4 Once the “Select OVF and VMDK files” screen is displayed, enter a name for the virtual machine. Then, drag and drop “ZDT_DataCollector_VX.X.X.ova” from DVD Disc1 into the “Click to select files or drag/drop” area, and click “Next”.
5 Once the “Select storage” screen is displayed, click “Next”.
6 Once the “Deploy options” screen is displayed, select “Thick”, and then click “Next”.
7 Once the “Ready to Complete” screen is displayed, click “Finish”.
8 Once the virtual machine has been deployed, click “Close”.
9 Once “Completed successfully” is displayed in “Result” at the bottom right of the screen, virtual machine creation is finished.

VMware Workstation Pro Environments

Step

1 Start VMware Workstation Pro.
2 From the “File” menu, click “Open” and select “ZDT_DataCollector_VX.X.X.ova” on disc 1 of the installation DVDs.
3 Once the “Import Virtual Machine” screen is displayed, click “Import”. Change the name of the virtual machine as necessary.

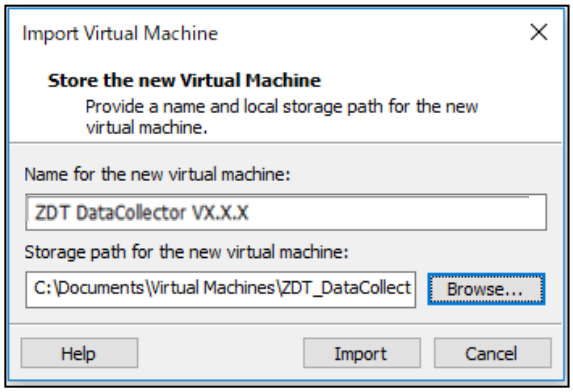


Fig. 2.6.1 (a) Import virtual machine

2.6.2 Hardware Configuration

The data collector virtual machine should be allocated with the following recommended memory and CPUs as the standard configuration.

- Memory: 16 GB
- CPUs: 6

Refer to “2.5.2 Hardware Configuration” for more information on changing allocations.

2.6.3 Network Configuration

Step

1 Right-click on the virtual machine just created and click “Power on”.
2 Start the console.
3 You must agree to the license agreement the first time you start the data collector. Enter “y” and press the [Enter] key to agree and continue.
4 Next, configure the network settings of the data collector.
Enter “y” and press the [Enter] key to configure a static IP address.
Follow the instructions to configure the IP address, subnet mask, default gateway, and DNS server address in accordance with your environment.
Confirm the configuration is correct, enter “y” and press the [Enter] key to finish the configuration.

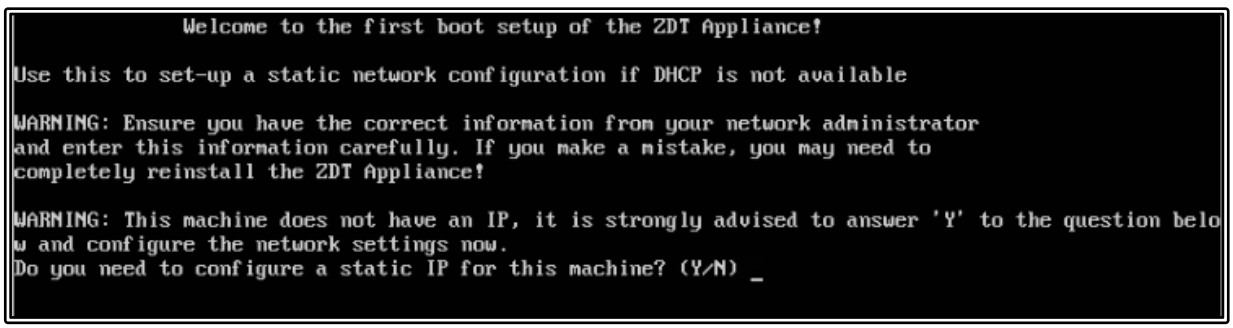


Fig. 2.6.3 (a) Console

5 Once the Ubuntu login screen is displayed, enter the following username and default password to log in.

zdtdc login: **zdtuser**
Password: **zdtuser**

6 Next, edit the ZDT configuration file. Enter the following command and press the [Enter] key.

zdtuser@zdtdc:~$ **sudo␣vi␣/opt/fanuc/zdtdc/zdtUtils.dll.config**

```
Ubuntu 14.04.3 LTS zdtdc tty1

zdtdc login: zdtuser
Password:
Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.16.0-57-generic x86_64)
Last login: Fri Jan 29 03:38:04 JST 2016 on tty1
zdtuser@zdtdc:~$ sudo vi /opt/fanuc/zdtdc/zdtUtils.dll.config_
```

Fig. 2.6.3 (b) Start vi editor

7 Open the configuration file and then edit the following parameters.
Configure the value of <add key="ListenerIP" value="***.***.***.***" /> to the IP address of the data collector.
Configure the value of <add key="OnPremiseIP" value="***.***.***.***" /> to the IP address of the ZDT server.
Configure the value of <add key="OnPremisePort" value="****" /> to the port number of the ZDT server. (Ver. 2.7 or later: 80, Ver. 2.6 or earlier: 8080)

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
  <appSettings>
    <add key="ListenerIP" value="[redacted]" />
    <add key="AllowIPAddressExport" value="0" />
    <add key="AllowRobotControllerDeletes" value="1" />
    <add key="AutoDeleteMessageStatistics" value="0" />
    <add key="SendToFACServer" value="0" />
    <add key="SendToPreDSX" value="0" />
    <add key="SendToDSX" value="1" />
    <add key="SendToOnPremise" value="0" />
    <add key="OnPremiseIP" value="[redacted]" />
    <add key="OnPremisePort" value="8080" />
    <add key="OnPremiseUseSSL" value="0" />
```

Fig. 2.6.3 (c) Configure configuration file

8 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the "**:wq**" command to save the edited content.
9 Next, you need to edit another configuration file. Enter the following command and press the [Enter] key.

zdtuser@zdtdc:~$ **sudo␣vi␣/usr/share/fanuc/zdtdc/siteSettings.xml**

10 Open the configuration file and then edit the following parameters.
Configure the value of <add key="ListenerIP" value="***.***.***.***" /> to the IP address of the data collector.

Configure the value of <add key="OnPremiseIP" value="***.***.***.***" /> to the IP address of the ZDT server.
Configure the value of <add key="OnPremisePort" value="****" /> to the port number of the ZDT server. (Ver. 2.7 or later: 80, Ver. 2.6 or earlier: 8080)

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
  <appSettings>
    <add key="ListenerIP" value="                " />
    <add key="SendToFACServer" value="0" />
    <add key="SendToPreDSX" value="0" />
    <add key="SendToDSX" value="0" />
    <add key="SendToOnPremise" value="1" />
    <add key="OnPremiseIP" value="               " />
    <add key="OnPremisePort" value="8080" />
    <add key="OnPremiseUseSSL" value="0" />
    <add key="OnPremiseBaseUrl" value="/ZDTDCData/" />
    <add key="OnPremiseIncludeMessageTypeInUrl" value="0" />
    <add key="EnableControllersInfoMessages" value="0" />
    <add key="EnableLegacyPullScheduleMessages" value="0" />
    <add key="EnableMessageStatsMessages" value="0" />
    <add key="EnableProcessStatsMessages" value="0" />
  </appSettings>
</configuration>
```

Fig. 2.6.3 (d) Configure configuration file

11 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the "**:wq**" command to save the edited content.

12 Enter the following command to restart the data collector.

zdtuser@zdtdc:~$ **sudo␣shutdown␣-r␣now**

13 Enter the following command to confirm that settings have been updated.

zdtuser@zdtserver:~$ **ifconfig**

NOTE
The default keyboard layout is Japanese. Configure the keyboard layout as necessary.
Enter the following command to configure the keyboard layout.

zdtuser@zdtserver:~$ **sudo␣dpkg-reconfigure␣keyboard-configuration**

Configure each setting for the keyboard to be used according to the setup wizard that will be displayed.

If you change the network settings again after the initial settings, the network settings can be configured via the console or the data collector management web service.

NOTE
Configure the IP address setting in the "zdtUtils.dll.config" and "siteSettings.xml" according to the above procedure.

- Data collector management service

1 Access the data collector management web service (refer to “5.1 DATA COLLECTOR MANAGEMENT WEB SERVICE”).
2 On the Network Configuration screen, enter “Static IP Address”, “Subnet Mask”, and “Gateway IP Address”, and then click the “Save” button.

- Console
  Refer to “Appendix A.2.1 Changing the Network Configuration (Console)” for the procedure to change the network settings via the console.

2.6.4 Time Configuration

Establish a connection to the NTP server running on the ZDT server to synchronize with the ZDT server time.

Step

1 Access the data collector management web service (Please refer to “5.1 DATA COLLECTOR MANAGEMENT WEB SERVICE”).
2 In the “Network Configuration” screen, enter the IP address of the ZDT server in the “NTP Server address(es)”, and click “Save”.

NOTE
The default time zone of the data collector is Asia/Tokyo. Configure the time zone as necessary.
Use the “Admin” screen on the data collector management web service to configure the time zone. Please refer to “5.1.6.1 Changing the time zone” for more information.

2.6.5 Changing Login Passwords

Use the passwd command to change the password used to log into the data collector console. After entering the following command, the system will prompt you to enter the current password and a new password.

zdtuser@zdtdc:~$ **sudo␣passwd␣zdtuser**

2.6.6 Operational Check

This section describes the procedure to check data collector operation.

Step

1 Enter the following URL into the web browser’s address bar.

https://<IP address of the data collector>:443

2 Once the following screen is displayed, enter the user name of "admin" and the password of "admin" and then click “Login”. If the screen is not displayed, please wait for a while since it takes time for the server to start after the power is turned on.

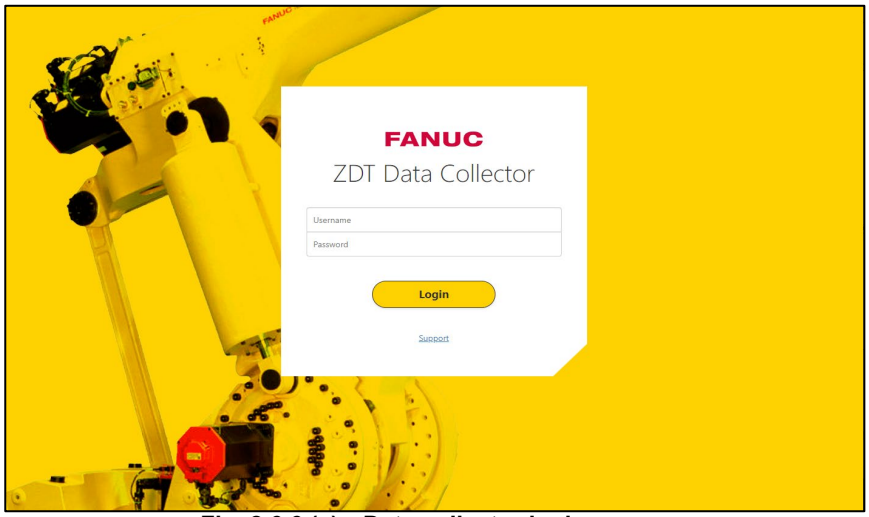


Fig. 2.6.6 (a) Data collector login screen

3 The data collector is operating correctly if each process is running as evidenced on the “ZDT Data Collector” - “Home” screen.

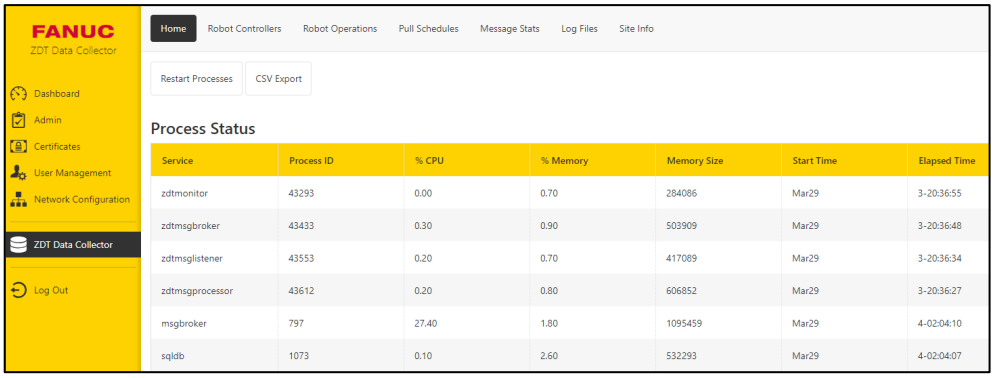


Fig. 2.6.6 (b) Check data collector operation

2.7 DATA COLLECTION SERVICE CONFIGURATION

The following data is retrieved by using the data collection service. Install this service as necessary.

- All backups of robots
- Servo data including pulse counts, axis positions, and Q phase current
- Vision Offset Data
- Program Information When Alarm Occurred
- Data Monitor
- LOGBOOK
- Operation Status (TP enable signal, Weld enable signal)

2.7.1 Virtual Machine Creation

Import and use the OVF template included in the ZDT installation DVDs to create data collection service virtual machines.

Use the same procedure as used for the ZDT server and data collector to install the "ZDT_DataCollectionService_VX.X.X.ova" file on disc 1 of the installation DVDs.

2.7.2 Hardware Configuration

The data collection service virtual machine should be allocated with the following recommended memory and CPUs as the standard configuration.

- Memory: 4GB/6GB/8GB (Standard/Middle/Large)
- CPUs: 2

Refer to "2.5.2 Hardware Configuration" for more information on changing allocations.

2.7.3 Network Configuration

At the time of the initial setting, you can interactively configure the network settings.

Step

1 Right-click the created virtual machine then click "Power on".
2 Click "Open browser console" to boot the console.

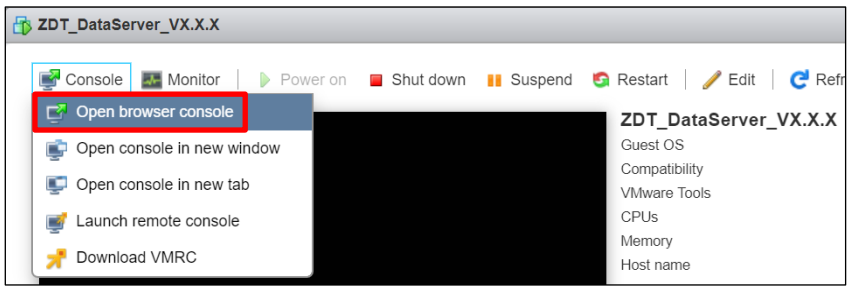


Fig. 2.7.3 (a) Boot the console

3 When you boot the console, a message to encourage you to specify the network setting of the ZDT server only when in the initial setting.
Enter "y" then press Enter key to specify the fixed IP address.
By following the instructions in the screen, enter the IP address, the default gateway, and the subnet mask according to your environment then press Enter key.

*If the network setting of the ZDT server is not started and a login screen in step 5 is shown, refer to the next section “Spefiy the network setting again in the case that it was not specified when in the initial setting.”

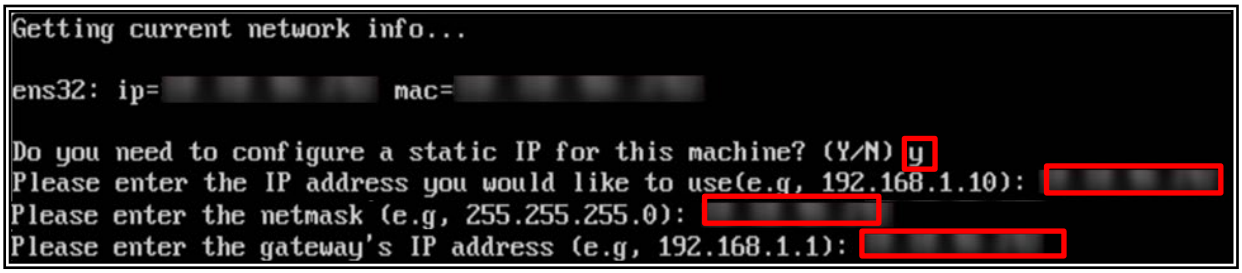


Fig. 2.7.3 (b) Enter the network information

Check if the content is correct and enter “y”. Then press Enter to complete the setting.

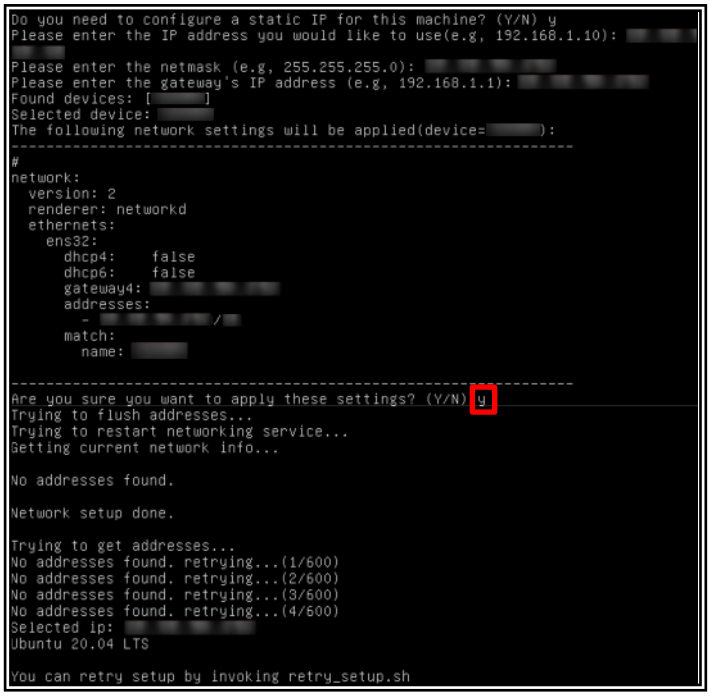


Fig. 2.7.3 (c) Check the network setting

4 Enter “y” then press Enter to specify the connection with the ZDT server.
Enter the IP address of the ZDT server following the instruction on the screen then press Enter key.

Fig. 2.7.3 (d) Enter the connection information with the ZDT server.

Check if the IP address you entered. Then enter “y” and press the “Enter” key to complete the setting.

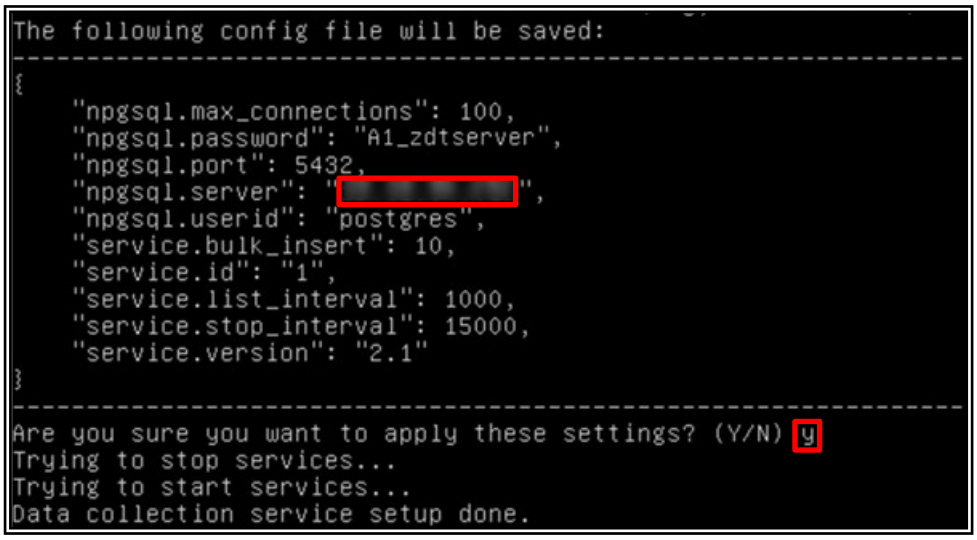


Fig. 2.7.3 (e) Check the connection setting with the ZDT server

5 Enter the following username and the initial password to log in.

DataCollection login: **zdtuser**
Password: **zdtuser**

6 Enter the following command to check if the IP address and the subnet mask that was specified by the step 3 above by entering the following command.

zdtuser@DataCollection:~$ **ip␣addr␣show**

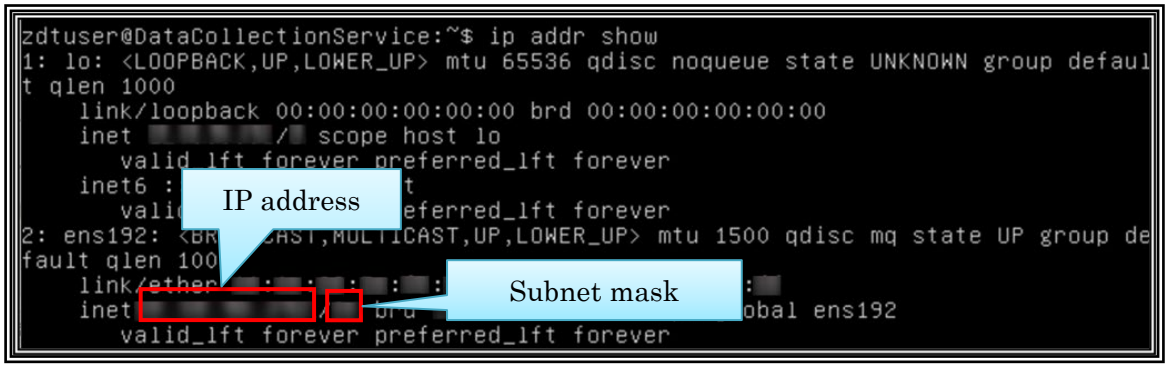


Fig. 2.7.3 (f) Check the network settings (IP address, subnet mask)

7 Enter the following command to check if the default gateway specified by the step 3 above was reflected.

zdtuser@DataCollection:~$ **ip route show**

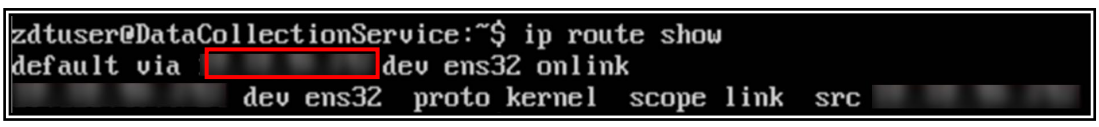


Fig. 2.7.3 (g) Check the network settings (default gateway)

8 Check if the ZDT server IP address that was specified by the step 4 above was reflected Enter the following command to open the setting file by read-only.

zdtuser@DataCollection:~$ **view␣zdt/bin/RobotDataCollectionService.conf**

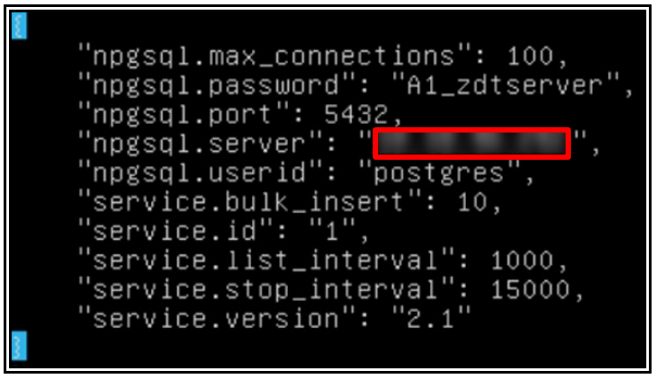


Fig. 2.7.3 (h) Check the connection setting with the ZDT server

Check if the IP address of the ZDT server is correct.

If you do not specify the network setting when in the initial setting, you can call the network setting from the console again. Refer to " Appendix A.3.1 Changing the Network Configuration (Console)" for more information.

2.7.4 Time Configuration

Establish a connection to the NTP server running on the ZDT server to synchronize with the ZDT server time.

Step

1 Enter the following command to synchronize with the ZDT server time. The "***.***.***.***" portion represents the ZDT server IP address you need to enter.

zdtuser@DataCollection:~$ **sudo␣service␣ntp␣stop**
zdtuser@DataCollection:~$ **sudo␣ntpdate␣*****.***.***.***

2 Next, enter the following command to open the NTP configuration file.

zdtuser@DataCollection:~$ **sudo␣vi␣/etc/ntp.conf**

3 Open the configuration file, press the [i] key to enter to edit mode, then edit the following parameters. Enter the ZDT IP address in server ***.***.***.*** iburst ***.***.***.***.

```
# Specify one or more NTP servers.

# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
# more information.
#server 0.ubuntu.pool.ntp.org
#server 1.ubuntu.pool.ntp.org
#server 2.ubuntu.pool.ntp.org
#server 3.ubuntu.pool.ntp.org

# Use Ubuntu's ntp server as a fallback.
#server ntp.ubuntu.com

# Use ZDT data server's ntp server
server [redacted] iburst
```

Fig. 2.7.4 (a) Configure NTP configuration file

4 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the ":wq" command to save the edited content.

5 Enter the following command to restart the NTP service and enable the settings.

zdtuser@DataCollection:~$ **sudo␣service␣ntp␣start**

6 Use the "ntpq␣-p" command to confirm that the data collector time is synchronized with the NTP server running on the ZDT server. Confirm that the ZDT server IP address will be displayed and that the asterisk (*) will be displayed at the left-most side indicating that time is synchronized.

```
zdtuser@zdtdc:~$ ntpq -p
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
*[redacted]      LOCAL(0)         6 u    4   64   77    0.229  -335.41  19.793
```

Fig. 2.7.4 (b) Check synchronization status

2.7.5 Changing Login Passwords

Change the login password as necessary.

Refer to "2.6.5 Changing Login Passwords" for more information on changing passwords.

2.7.6 Configuring Configuration Files

The IP address to the ZDT server to which data is sent must be configured.

Step

1 Enter the following command to open the configuration file.

zdtuser@DataCollection:~$ **sudo␣vi␣zdt/bin/RobotDataCollectionService.conf**

2 Open the configuration file, edit the following parameters, and then save the file.

The following parameter configures the ZDT server.

(1) npgsql.server: ZDT server IP address

The following parameter configures this service.

(2) service.id: Service ID (This ID is used to identify connected robots. Configure a unique ID using integers.)

The following is the configuration of IP mapping when the network between data collection service and the robot is different (set as needed).

(3) debug: {port}: data collection service IP: robot IP

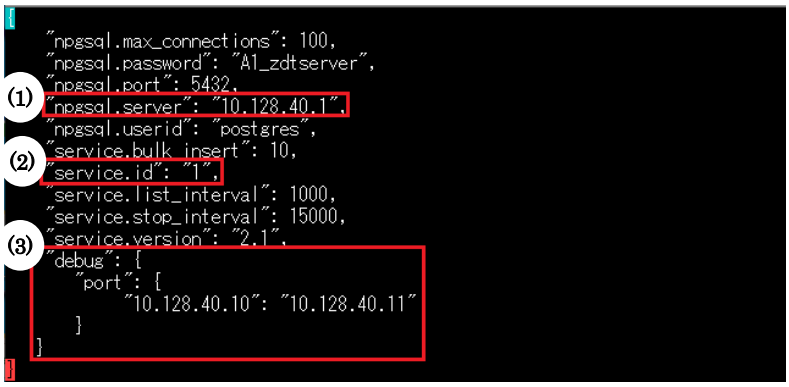


Fig. 2.7.6 (a) Configure configuration file

*If you map the multiple IPs, set each IP separated by commas (,).

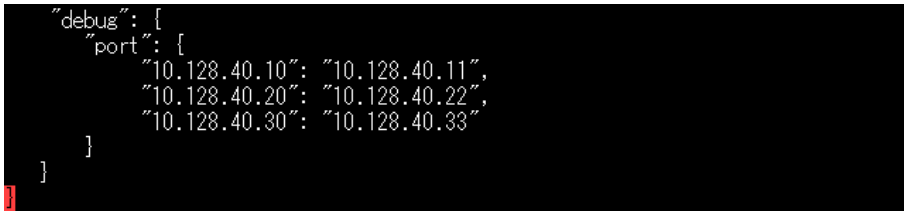


Fig. 2.7.6 (b) Configure configuration file (IP settings for multiple IPs)

*If you collect data from the IP address of the same robot, specify the port number.

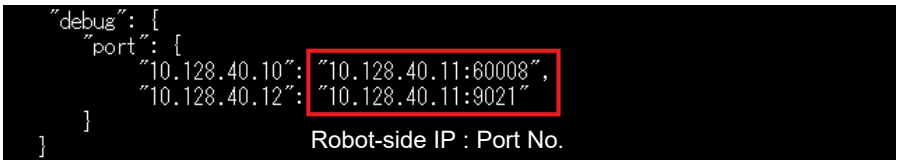


Fig .2.7.6 (c) Configure configuration file (port number setting)

NOTE

If the network between data collection service and the robot is different, data for only the following 2 models can be collected.

- 5.2 ROBOT BACKUP
- 5.3 SERVO DATA

3 Enter the following command to restart the data collection service.

zdtuser@DataCollection:~$**sudo␣shutdown␣-r␣now**

2.7.7 Operational Check

Enter the following command to check the operational state of the data collection service.

```
zdtuser@DataCollection:~$ sudo systemctl status zdt
```

If “active (running)” is displayed as in the following screen, the data collection service is running.

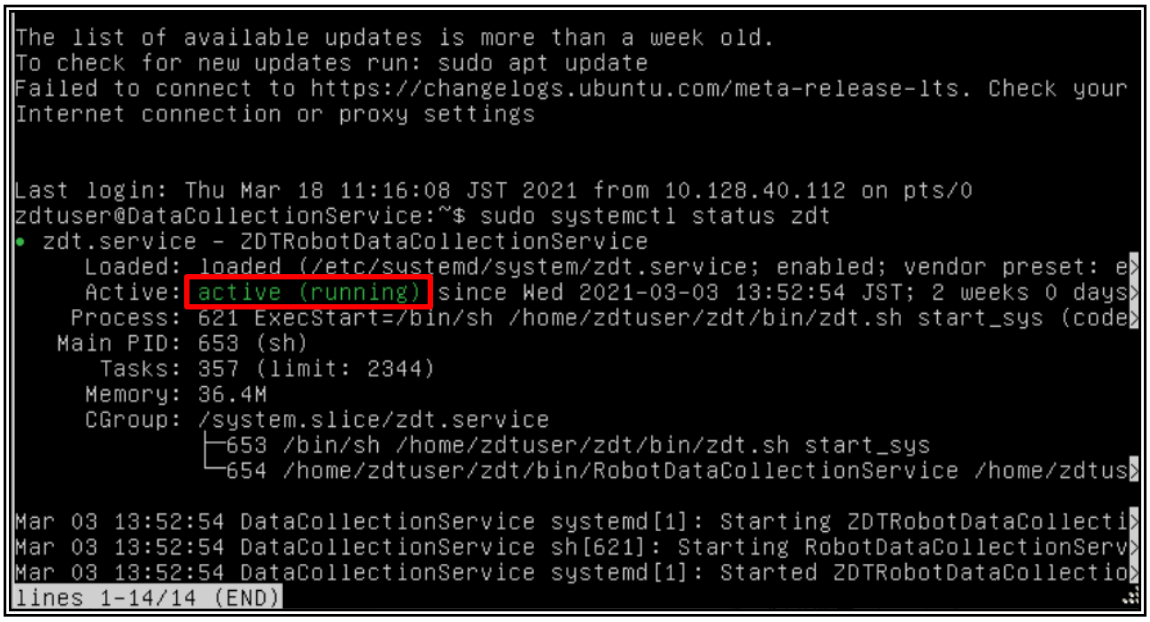


Fig. 2.7.7 (a) Check data collection service operation

If the message “inactive (dead)” is displayed, the data collection service is not running. Make sure the network settings and other configuration file settings are configured correctly. Make sure the data collection service can communicate with the ZDT server. Then, enter the following command to restart the data collection service.

```
zdtuser@DataCollection:~$ sudo systemctl restart zdt
```

2.8 INTEGRATED SERVER CONFIGURATION

The integrated server allows you to monitor the web portal of multiple ZDT servers summarizing on one page (Integrated portal). Each web portal can be accessed from the integrated portal. Install this server as necessary.

2.8.1 Virtual Machine Creation

Import and use the OVF template included in the ZDT installation DVDs to create integrated server.

Use the same procedure as used for the ZDT server and data collector to install the "ZDT_IntegratedServer_VX.X.X.ova" file on disc 2 of the installation DVDs.

2.8.2 Hardware Configuration

The integrated server virtual machine should be allocated with the following recommended memory and CPUs as the standard configuration.

- Memory: 8GB
- CPUs: 2

Refer to "2.5.2 Hardware Configuration" for more information on changing allocations.

2.8.3 Network Configuration

Use the same procedure as that used for the ZDT server to configure the network settings.

Refer to "2.5.3 Network Configuration" for more information on configuring network settings.

* In the reference material above, read the host name as "integratedserver", which is the host name of the integrated server.

For example: Logging in to the integrated server

integratedserver login: **zdtuser**
Password: **zdtuser**

2.8.4 Time Configuration

Establish a connection to the NTP server running on the ZDT server to synchronize with the ZDT server time.

Refer to "2.5.4 Time Configuration" for more information on configuring time settings.

2.8.5 Changing Login Passwords

Change the login password as necessary.

Refer to "2.5.5 Changing Login Passwords" for more information on changing passwords.

* In the reference material above, read the host name as "integratedserver", which is the host name of the integrated server.

For example: Changing the integrated server password

zdtuser@**integratedserver**:~$ **sudo␣passwd␣zdtuser**

2.9 ROBOT CONFIGURATION

This section describes the procedures to configure robots to send data to the data collector.
Use the following procedure to display the “Settings” screen.

NOTE
In case of R-30*i*A controller, robots can be configured from the data collecotor via the network. Refer to “5.1.10.3 Robot Operations” for more information.

Step

1 Press the [MENU] key to display the “Screen” menu.
2 Press “SETUP” and select “ZDT Client”. Move the cursor to “ZDT Client” and then press [i] key + [FCTN] key. Select “ZDT Client Details” or “<*DETAIL*>” to display the advanced settings screen.

2.9.1 ZDT Clients

The ZDT client is enabled or disabled to enable or disable sending of all ZDT data.

Step

1 To enable the sending of ZDT data, move the cursor to “1 ZDT Client” and press F4, “ENABLED”.

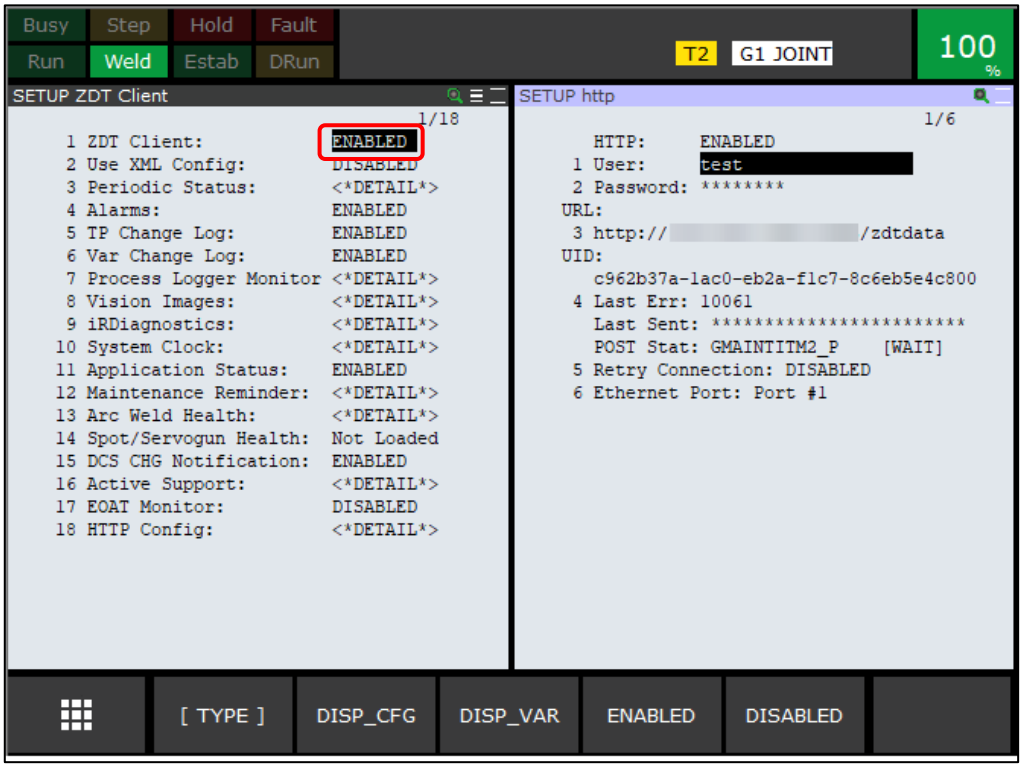


Fig. 2.9.1 (a) ZDT Client

2.9.2 Using XML Configuration Data

ZDT can be configured using customer configuration files in XML format.
The following parameters can be configured this way.

- Plant
- Line
- Cluster
- Ethernet port used by ZDT
- URL of active data collector
- Advanced alarm message settings (**not normally used**)

Step

1 To use XML configuration files, first create a configuration file named RCMCFG.xml that defines the parameters.
Create this file by editing the default file in the robot controller.
Make a copy of the default file by displaying the file screen, press F4, and then select “BACKUP” and then “All of above”. Save the file to a memory card (MC:) or other media.
2 Load the created RCMCFG.xml file into the memory card (MC:) or other media.
3 Load the file from the file screen or ZDT client and then enable the “2 Use XML Config” setting. Refer to “2.9.2.3 Loading RCMCFG.xml Files” for more information.

Parameters configured using a custom configuration file cannot be changed manually. To change settings manually, first you must disable the “Use “XML Config” setting under “ZDT Client”.

2.9.2.1 Format of the RCMCFG.xml file

This table describes the elements and their attributes that can be used in the RCMCFG.xml file.

Table 2.9.2.1 (a) Elements and their attributes list

Element	Parent element	Depth	Description
<RCMCFG>	None	0	This is the root element.
<PLANT>	<RCMCFG>	1	Defines plant information. The following attributes can be defined. • **name** Specifies a name for the plant. (Up to 59 characters and <>"& cannot be input)
<LINE>	<PLANT>	2	Defines line information for the plant. This element is a child element of the PLANT element. The following attributes can be defined. • **name** Specifies a name for the line in the plant. (Up to 59 characters and <>"& cannot be input)
<CLUSTER>	<LINE>	3	Defines cluster information for the plant. This element is a child element of the LINE element. The following attributes can be defined. • **name** Specifies a name for the group. (Up to 59 characters and <>"& cannot be input) • **ipgroup** Specifies the first 3 octets of the IP address. This attribute is required. • **ipset** Specifies the last octet of the IP address. This attribute is required. The following two methods are available to specify ipset. If all robots in the group are configured with contiguous IP addresses, set a range, such as [ipset=”100-200”]. If IP addresses are not contiguous, specify the last octet of each address, such as [ipset=”123, 178, 200”]. The cluster information of the first row that matches the robot controller IP address is configured.
<ETHPORT>	<RCMCFG>	1	Defines the Ethernet port used by ZDT. Either Port 1 or Port 2 can be specified.
<HTTP>	<RCMCFG>	1	Defines advanced data collector settings.
<URL>	<HTTP>	2	Defines the URL to the active data collector. The following attributes can be defined. • **method** Specifies the HTTP method. Set the method to POST.
<AUTH>	<HTTP>	2	**This element is not normally used.** Defines authentication information for the data collector. The following attributes can be defined. • **user** Specifies a user name. • **pwd** Specifies the data collector password.

Element	Parent element	Depth	Description
<SEVERITY>	<RCMCFG>	1	**This element is not normally used.** Defines the severity of alarms for which alarm messages are sent. The following attributes can be defined. • **name** Specifies alarm severity. Options include “NONE”, ”WARN”, ”PAUSE”, ”STOP”, ”SERVO”, ”SERVO2”, ”ABORT”, ”SYSTEM”, ”NO DISP”, and ””. • **global** Specifies the alarm applicability scope. When set to "TRUE", global alarms define the scope. When set to "FALSE" local alarms define the scope. This attribute is only applicable to the pause, stop, and abort alarm severities. This attribute is ignored for all other severities. • **send** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered. • **alert** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered.
<CATEGORY>	<RCMCFG>	1	**This element is not normally used.** Defines the type of alarm for which alarm messages are sent. The following attributes can be defined. • **name** Specifies the type of alarm. Options include “MOTION”, “APPL”, “PWD”, “COMM”, and “SYSTEM”. • **send** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered. • **alert** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered.
<FILE>	<SEVERITY> <CATEGORY> <ERROR>	2/3	**This element is not normally used.** Defines the type of alarm for which alarm messages are sent. The following attributes can be defined. • **name** Specifies the name of the attachment. (Up to 59 characters and <>"& cannot be input)
<ERTYPE>	<RCMCFG>	1	**This element is not normally used.** Defines alarm IDs and such for specific alarms. The following attributes can be defined. • **name** Specifies the alarm ID. (Up to 59 characters and <>"& cannot be input)

Element	Parent element	Depth	Description
<ERROR>	<ERTYPE>	2	**This element is not normally used.** Defines the specific alarm for which alarm messages are sent. The following attributes can be defined. • **code** Specifies an alarm number. When the sev attributed is configured, asterisks (*) can be used. • **sev** Specifies alarm severity. • **global** Specifies the alarm applicability scope. When set to "TRUE", global alarms define the scope. When set to "FALSE" local alarms define the scope. • **send** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered. • **alert** If set to "TRUE", an alarm message is sent as soon as an alarm of the specified severity is triggered. • **freq, dur** When using this element, you need to configure both freq and dur. An alarm message is sent when the set alarm occurs more than the number set in “freq”. “dur” specifies the number of seconds that must elapse before an alarm message is sent. Measurement starts from the first occurrence of the set alarm. The conditions are judged when the set alarm is occurred. If both conditions are satisfied, an alarm message is sent once, and the count of alarm occurrences is reset.

2.9.2.2 Sample RCMCFG.xml file

The following figure illustrates a sample RCMCFG.xml file.

NOTE
Do not copy this sample as doing so may result in XML syntax errors. Make sure to make a copy of the default file in the robot controller and edit this copy.

```
<?xml version=”1.0” ?>
<RCMCFG>
  <!--       Please edit this info as per your plant        -->
  <PLANT name=”plant”>
    <LINE name ="line">
      <CLUSTER name ="cluster" ipgroup="172.30.1" ipset="0-254" />
    </LINE>
  </PLANT>
  <ETHPORT> Port2</ETHPORT>
  <HTTP disable="0">
    <URL method="POST">http://172.30.1.40:6063/ZDTData/</URL>
    <AUTH user="test" pwd="password"/>
  </HTTP>
  <!— — Power message, one of its availability invokes periodic status message –>
  <ERTYPE name ="SYST">
    <ERROR code ="26">
      <FILE name="MD:errhist.ls"/>
      <FILE name="MD:errmot.ls"/>
    </ERROR>
  </ERTYPE>
  <!— Severity based configuration –>
  <SEVERITY name ="PAUSE" send ="TRUE"/>
  <SEVERITY name ="STOP" send ="TRUE"/>
  <SEVERITY name ="ABORT" send ="TRUE"/>
  <SEVERITY name ="SERVO" send ="TRUE"/>
  <!-- Messaging library settings -->
  <!-- *WARNING* Make sure maxinst < 128!! it gets converted to signed byte then ushort -->
  <MSGLIB maxmem="204800" msglim="10240">
    <MSG varname="GCOND_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GSRVOF_BIN_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GSRVOF_DTL_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GJOB_DATA_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GFLEX_DATA_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GFLEX_IO_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="GODOMETER_P" initinst="5" maxinst="5" prior="1"/>
    <MSG varname="CINFO_P" initinst="1" maxinst="5" prior="0"/>
    <MSG varname="GINFO_P" initinst="1" maxinst="8" prior="0"/>
    <MSG varname="VARCHG_P" initinst="1" maxinst="10" prior="0"/>
    <MSG varname="ALARM_MSG_P" initinst="1" maxinst="20" prior="0"/>
    <MSG varname="TPPRG_CHG_P" initinst="1" maxinst="10" prior="0"/>
    <MSG varname="CMEMORY_P" initinst="1" maxinst="5" prior="0"/>
    <MSG varname="RTC_P" initinst="1" maxinst="5" prior="0"/>
    <MSG varname="MBE_P" initinst="1" maxinst="5" prior="0"/>
    <MSG varname="SVGUN_DIAG_P" initinst="5" maxinst="5" prior="0"/>
    <MSG varname="SVGUN_CAP_P" initinst="5" maxinst="5" prior="0"/>
    <MSG varname="PLOG_STAT_P" initinst="1" maxinst="50" prior="0"/>
    <MSG varname="APP_DATA_P" initinst="5" maxinst="5" prior="0"/>
    <MSG varname="GMAINT_ITM_P" initinst="1" maxinst="50" prior="0"/>
    <MSG varname="GMAINT_EVT_P" initinst="1" maxinst="50" prior="0"/>
    <MSG varname="GMNT_HEAD_P" initinst="1" maxinst="5" prior="0"/>
    <MSG varname="VIS_RUNDAT_P" initinst="1" maxinst="10" prior="1"/>
    <MSG varname="VIS_RUNRES_P" initinst="1" maxinst="100" prior="1"/>
    <MSG varname="IRC_GNRC_P" initinst="1" maxinst="50" prior="1"/>
    <MSG varname="BATT_LOW2_T" initinst="1" maxinst="5" prior="0"/>
  </MSGLIB>
</RCMCFG>
```

2.9.2.3 Loading RCMCFG.xml files

Use the following procedure to load RCMCFG.xml files.

Loading Files from the File Screen

Load the RCMCFG.xml file from the file screen. The file must be named "RCMCFG.xml".

Loading Files from the ZDT Client

Step

1 At the “HTTP Config” advanced settings screen, press F2, “Import”.
2 Press F4, “RCMCFG”.
3 Set “From Path” to the device where the RCMCFG.xml file is stored. Set “From Filename” to RCMCFG.xml.
4 Press F2, “DO_COPY”.
5 Once the “OverWrite?” is displayed, press F4, “YES”.
6 Press F5, “Finish”.
7 Press F3, “REINIT” and confirm that the “REINIT Successful” message will be displayed.

Fig. 2.9.2.3 (a) Load RCMCFG.XML

2.9.3 Periodic Status

The “Periodic Status” setting is used to configure the frequency at which basic information such as robot controller configuration information and diagnostics files (*.dg).
The default setting is 86,400 seconds (24 hours).

Step

1 To change the setting, set the “1 Status Timer” setting on the advanced settings screen to a value between the range of 900 to 2,147,483,646 seconds.
2 Restart the controller to update the changes.

Fig. 2.9.3 (a) Periodic status

2.9.4 Alarm Log

This item allows the robot to send alarm information to ZDT server.

Step

1 To use the alarm log, move the cursor to “4 Alarms” and press F4, “ENABLED”. When enabled, a log of all alarms with PAUSE, ABORT, STOP, SERVO severity will be sent.

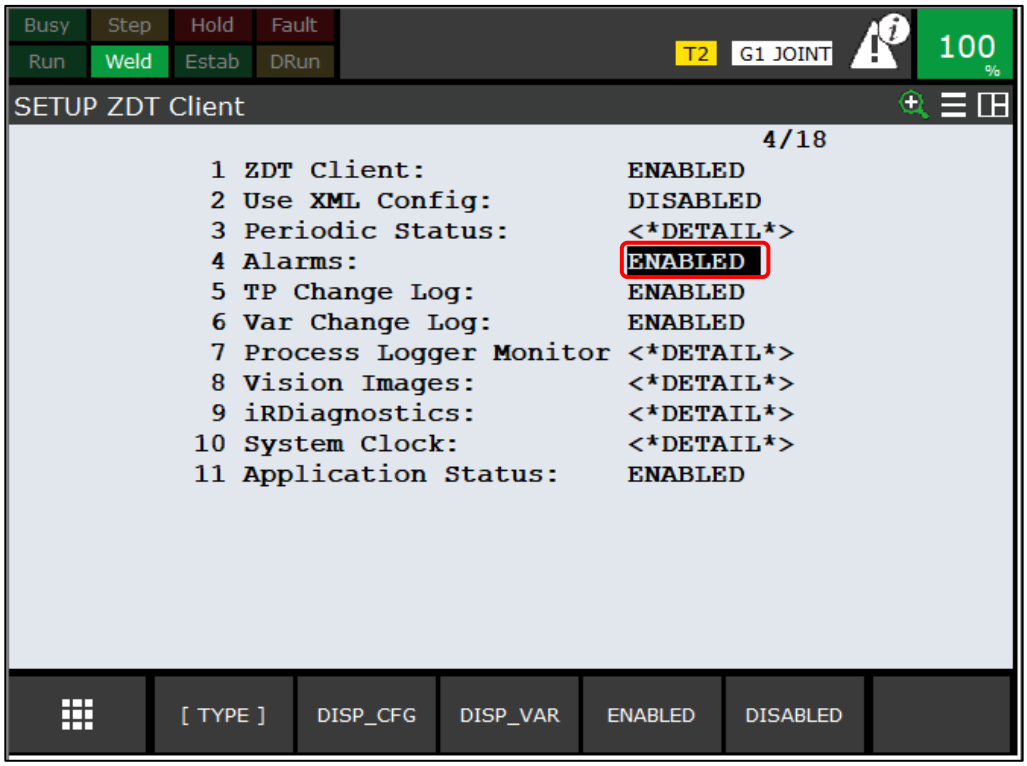


Fig. 2.9.4 (a) Alarms

2.9.5 TP Program Change Log

This item allows the robot to send TP program change event to the server.
The following changes are logged.

- Creation and deletion of TP programs
- Insertions, deletions, and changes of rows in TP programs
- Changes to teaching positions
- Changes to attributes
- Insertions, deletions, and changes executed while background edit

Step

1 To use the TP program change log, move the cursor to “5 TP Change Log” and press F4 “ENABLED”.
To notify the background edit log, move the cursor to “1 Background Edit Log” and press F4 “ENABLED”.

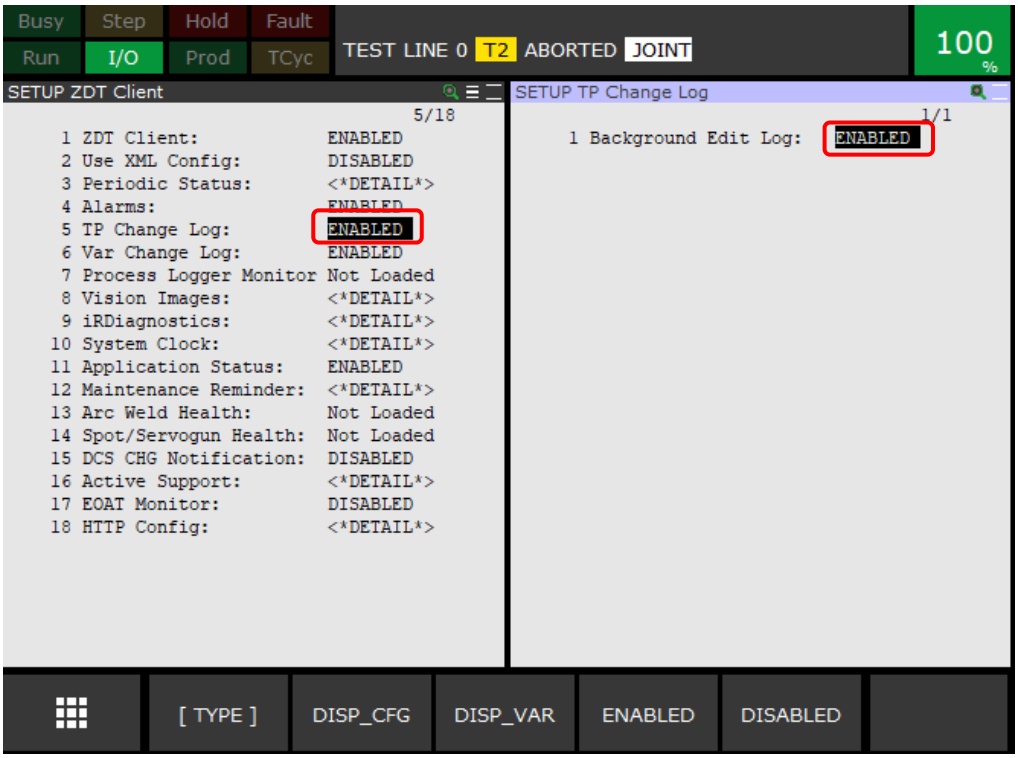


Fig. 2.9.5 (a) TP change log

NOTE
If the background edit is executed when the teach pendant is enabled, the insertions, deletions, and changes executed while background edit will be notified even if the value of “Background Edit Log” is “DISABLED”.

2.9.6 Var Change Log

This item allows the robot to send variable change event to the server.
Changes to the following variables are logged.

- System variables
- Registers
- String registers
- Position registers
- Coordinate system
- KAREL variables
- I/O

Step

1 To use the var change log, move the cursor to “6 Var Change Log” and press F4, “ENABLED”.

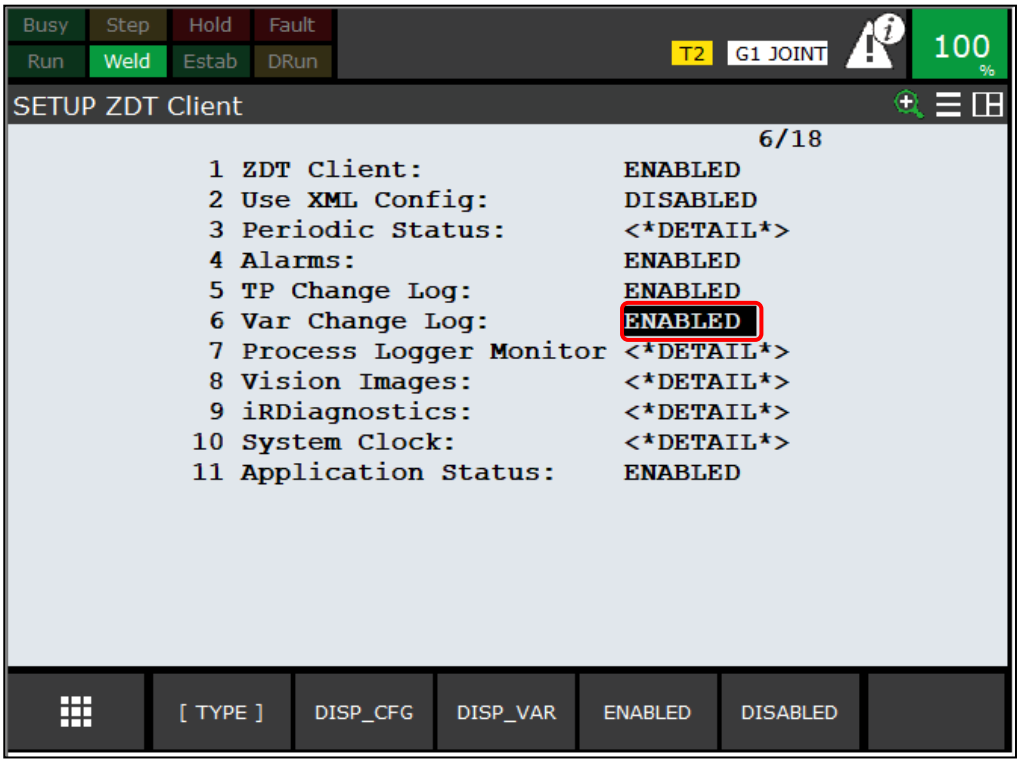


Fig. 2.9.6 (a) Var change log

2 Create an XML file offline named "varchg.xml" that defines the variables logged.
3 Save the varchg.xml file to a memory card (MC:) or other media.
4 On the file screen, move the cursor to the file and then press F3, “Load”.
5 Restart the robot controller to update the changes.

2.9.6.1 varchg.xml file format

This section describes the elements and their attributes that can be used in the varchg.xml file.

<CHANGELOG> element

This is the root element. Each varchg.xml file must have one instance of this element.

<VARCHG> element

This attribute defines a logged variable. An instance of this element must be used for each variable you want to log. The VARCHG element has the following attributes.

- **var**
  This attribute specifies the name of the variable. This attribute is required to log system variables, registers, string registers, position registers, and KAREL variables. Refer to "2.9.6.2 var Attribute" for more information on configuring this attribute.

- **io_type**
  This attribute specifies the I/O type. This attribute is required to log I/O.
  Refer to "2.9.6.3 io_type Attribute" for more information on configuring this attribute.

- **io_index**
  This attribute specifies an I/O number. This attribute is required to log I/O.

- **prog**
  This attribute specifies the KAREL program that defines KAREL variables. This attribute is required to log KAREL variables.

- **title**
  This attribute is used to add a descriptive title to variable change logs. This attribute is used to configure custom text strings, system variables, KAREL variables, and string registers. This attribute is optional. If this attribute is not defined, the "Program name" variable name is used as the title.

- **dict**
  This attribute specifies the name of a user dictionary. This attribute is used in conjunction with the ele_no attribute to specify parameters in user dictionaries. The specified parameter is used as the title. Use this attribute to define different titles for different languages. This attribute is optional. Do not use the title attribute if using the dict attribute.
  Refer to the KAREL reference manual for more information on creating user dictionaries.

- **ele_no**
  This attribute specifies an element number within a user dictionary. This attribute is optional.

- **subtype**
  This attribute is used to add a descriptive sub-title to variable change logs This attribute is used to configure custom text strings, system variables, KAREL variables, and text string registers. This attribute is optional. Operation is the same as for the title attribute if not defined.

- **subt_dict**
  Similar to the dict attribute, this attribute specifies the name of a user dictionary. This attribute is used in conjunction with the subt_ele attribute to specify parameters in user dictionaries. The specified parameter is used as the sub-title. Use this attribute to define different sub-titles for different languages. This attribute is optional. Do not use the subtype attribute if using the subt_dict attribute.

- **subt_ele**
  Similar to the ele_no attribute, this attribute specifies an element number within a user dictionary. This attribute is optional.

<EXCLUDE> element

This element is used to specify specific variables in arrays and structures that you do not want to log. The EXCLUDE element is a child element of the VARCHG element. The EXCLUDE element has the following attributes.

- **field**
  This attribute is used to specify the name of parameters to exclude from logging. Excluded parameters are child elements of variables specified with the VARCHG element (parent). If the variable is part of an array structure, the entire corresponding structure within the array is excluded. This attribute is required.

The following figure illustrates an example description of the EXCLUDE element.

```
<VARCHG var="$STYLE_NAME">
    <EXCLUDE field="$STYLE_NAME[2]"/>
    <EXCLUDE field="$STYLE_NAME[3]"/>
    <EXCLUDE field="$STYLE_NAME[9]"/>
    <EXCLUDE field="$STYLE_NAME[10]"/>
</VARCHG>
```

In this example, the $STYLE_NAME[2], $STYLE_NAME[3], $STYLE_NAME[9], and $STYLE_NAME[10] variables will not be logged.

NOTE
The EXCLUDE element is used for variable arrays or variable structures.

<ENUM> element

This element defines enumeration values. Enumeration values are used to convert numbers into custom text strings to be transmitted when logged variable values are numbers. The ENUM element is a child element of the VARCHG element. The ENUM element has the following attributes.

- **value**
  This attribute specifies the number you want to convert. This attribute is required.

- **string**
  This attribute specifies the text string into which a number is converted. This attribute is used to configure custom text strings, system variables, KAREL variables, and text string registers. This attribute is required. To configure KAREL variables, configure using the following format: [KAREL program name]KAREL variable name.

The following figure illustrates an example description of the ENUM element.

```
<VARCHG var="$ACC_MINLMT">
   <ENUM value="1" string="Minimum limit of ACC is 1."/>
   <ENUM value="2" string="Minimum limit of ACC is 2."/>
</VARCHG>
```

In this example, when the value of $ACC_MINLMT is "1", the "Minimum limit of ACC is 1." text string will be displayed instead of the actual value. Similarly, when the value is "2", the "Minimum limit of ACC is 2." text string is displayed.
The actual value will be displayed for all values not specified by the ENUM element.

```
<VARCHG var="$ACC_MINLMT" title="$APPLICATION[1]">
   <ENUM value="1" string="$STRREG[1]"/>
   <ENUM value="2" string="[my_k_prog]my_k_str"/>
</VARCHG>
```

In this example, when the value of $ACC_MINLMT is "1", the text string currently stored in String Registers [1] will be displayed instead of the actual value. Similarly, when the value is "2", the text string currently assigned to the my_k_str KAREL Variables in the my_k_prog KAREL program will be displayed.

NOTE

The value set by the string attribute must be a text string for operation to execute as intended. If the attribute is set to a number, the system will try to parse the value as a text string, which will result in the display of a meaningless text string. Configure text strings using alphanumeric characters and symbols.

The following figure illustrates an example description of a varchg.xml file.

```
<?xml version="1.0" ?>
<CHANGELOG>
   <VARCHG prog="my_prog" var="my_var" />
   <VARCHG prog="PKMAIN" var="parts_picked" dict="PICK" ele_no="12" subt_dict="PICK" subt_ele="11"/>
   <VARCHG var="$POSREG[1,1]" title="Job 1 Positions" subtype="Job Vars"/>
   <VARCHG var="$NUMREG[1]" dict="X0PT" ele_no="6"/>
   <VARCHG var="$STRREG[1]" dict="X0PT" ele_no="7" subt_dict="X0PT" subt_ele="20"/>
   <VARCHG var="$UI_CONFIG.$TIMEOUT" title="iPendant Time Out" subtype="UI Configuration"/>
   <VARCHG var="$UI_CONFIG.$READONLY[2]" title="Navigate iPendant RW Access" subtype="UI
   Configuration"/>
   <VARCHG io_type="DIN" io_index="1"/>
   <VARCHG io_type="DIN" io_index="2"/>
</CHANGELOG>
```

2.9.6.2 var Attribute

The following table describes the types of values to which the var attribute can be set.

Table 2.9.6.2 (a) var Attribute

Variable	Settings	Example
System Variables	Sets the name of a System Variables. If an argument is not used to specify a particular System Variables in an array, the entire variable array will be logged.	var="$MNUFRAME[1,1]" var="$MNUFRAME"
Numeric Registers	**$NUMREG[i]** i: Register number (omissible) All registers will be logged if the register number is omitted.	var="$NUMREG[1]" var="$NUMREG"
String Registers	**$STRREG[i]** i: String register number (omissible) All string registers will be logged if the string register number is omitted.	var="$STRREG[1]" var="$STRREG"
Position Registers	**$POSREG[group,i]** group: Group number (omissible) All Position Registers will be logged if the group number is omitted. i: Position registers number (omissible) All position registers in the specified group will be logged if the position register number is omitted.	var="$POSREG[1,1]" var="$POSREG[1]" var="$POSREG"
User Coordinate System Number	**$MNUFRAMENUM[group]** group: Group number (omissible) All user coordinates will be logged if the group number is omitted.	var="$MNUFRAMENUM[1]" var="$MNUFRAMENUM"
User Coordinate System	**$MNUFRAME[group,i]** group: Group number (omissible) All user coordinates will be logged if the group number is omitted. i: User Coordinate System Number (omissible) All user coordinates in the specified group will be logged if the user coordinates number is omitted.	var="$MNUFRAME[1,1]" var="$MNUFRAME"
Tool Coordinate System Number	**$MNUTOOLNUM[group]** group: Group number (omissible) All tool coordinate numbers will be logged if the group number is omitted.	var="$MNUTOOLNUM[1]" var="$MNUTOOLNUM"
Tool Coordinate System	**$MNUTOOL[group,i]** group: Group number (omissible) All tool coordinates will be logged if the group number is omitted. i: Tool Coordinate System Number (omissible) All tool coordinates in the specified group will be logged if the tool coordinates number is omitted.	var="$MNUTOOL[1,1]" var="$MNUTOOL"
KAREL Variables	Specifies the name of the KAREL variable defined in a KAREL program.	var="my_var" var="parts_picked"

2.9.6.3 io_type Attribute

The following list describes the values to which the io_type attribute can be set.

- Digital input: DIN
- Digital output: DOUT
- Analog input: ANIN
- Analog output: ANOUT
- Group input: GPIN
- Group output: GPOUT
- PLC input: PLCIN
- PLC output: PLCOUT
- Robot input: RI
- Robot output: RO
- Operator's panel input: SOPIN
- Control panel output: SOPOUT
- Teaching panel input: TPIN
- Teaching panel output: TPOUT
- Weld input: WI
- Weld output: WO
- Peripheral device input: UOPIN
- Peripheral device output: UOPOUT
- Laser input: LDIN
- Laser output: LDOUT
- Weld stick input: WSIN
- Weld stick output: WSOUT
- Laser analog input: LANIN
- Laser analog output: LANOUT
- Tool output: TOOL
- Brake output: BRAKE
- Emergency stop: ESTOP

2.9.6.4 Changing the log check frequency

The log feature checks specified variables and I/O once every 60 seconds by default. To change the log check frequency, change the value of $RCMCFG.$VARCHG_TIME from the system variables screen.

The minimum log check interval is 15 seconds.

2.9.7 Process Logger (Optional)

The process logger verifies weld information after each weld completion, monitors for errors, and sends weld information as notification when an error occurs.

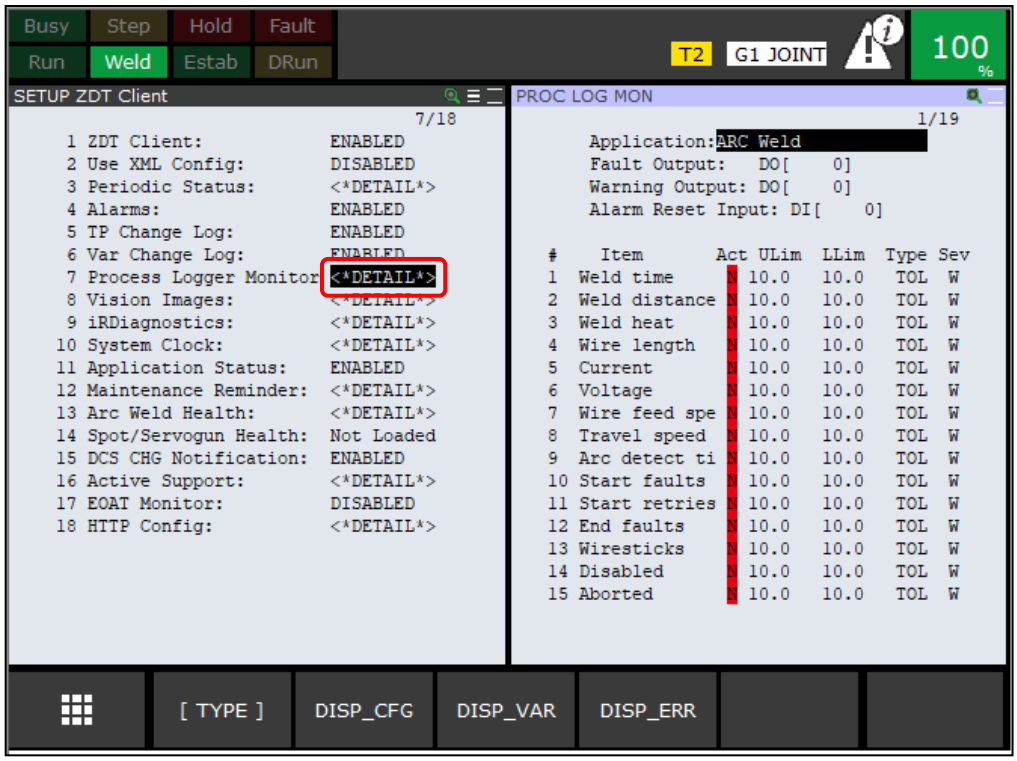


Fig. 2.9.7 (a) Process logger monitor

Refer to “PROCESS LOGGER” in “FANUC Robot series Spot Welding Function OPERATOR’S MANUAL (B-83284EN-4)” for more information on configuring the process information logger.

NOTE
The process logger option (A05B-2600-R758) is required to use this feature.

2.9.8 Vision Images (Optional)

This feature sends the final *i*RVision detection results. This feature sends information similar that sent by the Vision runtime, including detected images, number of detections, and detection positions.

The advanced settings contain settings related to the transmission of vision detection results.

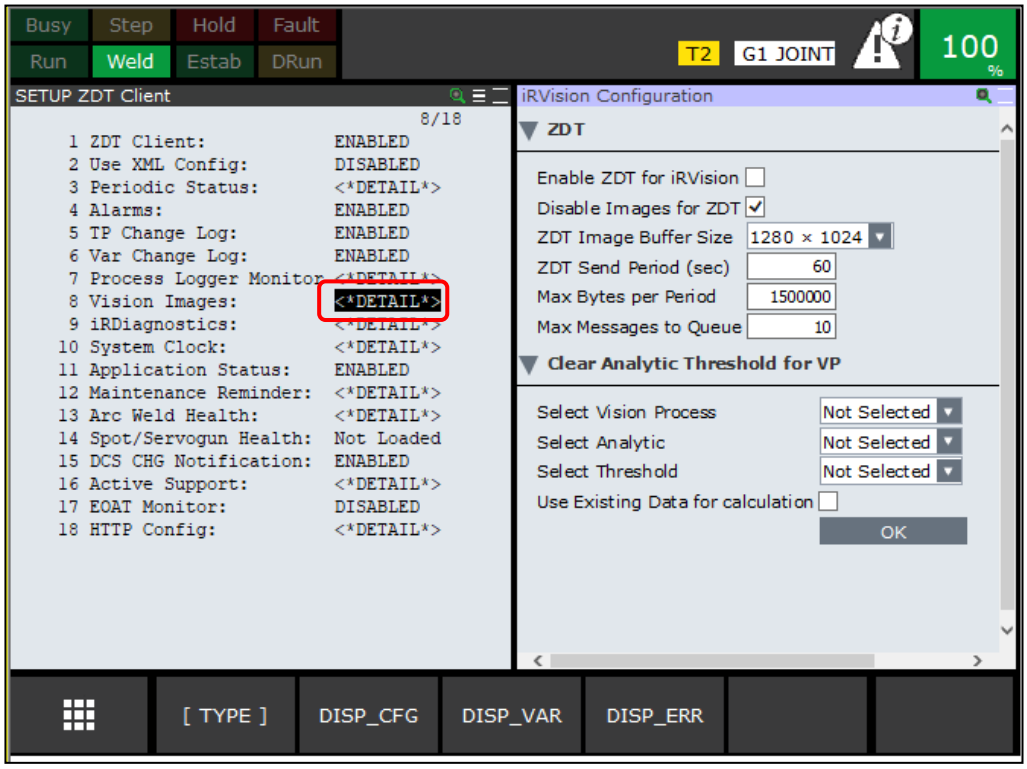


Fig. 2.9.8 (a) Vision images

This section describes only the settings related to ZDT. Refer to "FANUC Robot series R-30*i*B/R-30*i*B Mate CONTROLLER *i*RVision OPERATOR'S MANUAL (Reference) (B-83304EN)" for more information on other settings.

Table 2.9.8 (a) Vision images configuration

Parameter	Description
Disable Image for ZDT	Disables the storage of images for ZDT.
ZDT Image Buffer Size	The following two options are available in selecting the maximum size of detection images that are transmitted. • 640 x 512 This is the default size setting. If an image captured by a camera is larger than this size, the image is reduced in size. • 1280 x 1024 If an image is larger than 640 x 512 while this option is selected, the high-definition images are sent to ZDT. This setting can only be selected when the active monitor buffer size is also set to 1280 x 1024.

The IRVIZDT KAREL program must be executed after the vision detection command to send vision detection results to the ZDT server.

2.9.8.1 IRVIZDT

This program sends the final *i*RVision detection results to the ZDT server.
This KAREL program uses the following arguments.

Argument 1: Text string

Specifies a text string describing the send data. This text string is displayed in the [Description] section of the vision detection results when viewed via the Web portal.

Argument 2: Severity

Specifies the severity of the send data using integers within a range from 0 to 3. The Web portal changes the background color of the vision detection image in accordance with the specified severity.

0: This severity is used to indicate general informational notifications such as job completions. The Web portal sets the background color of detection images to white for this severity.
1: This severity is used to indicate general informational notifications such as job completions. The Web portal sets the background color of detection images to green for this severity.
2: This severity is used to indicate when possible issues have occurred. The Web portal sets the background color of detection images to yellow for this severity.
3: This severity is used to indicate when issues have occurred. The Web portal sets the background color of detection images to red for this severity.

The following figure illustrates an example of using IRVIZDT.

```
1: VISION RUN FIND 'VP1'
2: VISION GET_OFFSET 'VP1' VR[1] JMP,LBL[998]
3: R[1]=VR[1].MEAS[1]
4: IF R[1:score]<60, CALL IRVIZDT ('Score is low',2)
5: CALL PICK
6:
7: IF RI[1:SENSOR]=OFF JMP,LBL[999]
8: CALL DROP
9: END
10:
11: LBL[998]
12: CALL IRVIZDT ('Part not found',3)
13: END
14:
15: LBL[999]
16: CALL IRVIZDT ('Pick failed',3)
17: END
```

This example program sends vision detection results depending on conditions. This program sends detection results to the ZDT server in the following scenarios.

- Workpieces are undetected
  When a detection cannot be made, the command to retrieve correction data at the second line fails. In this case, the program jumps to label 998, and a notification that a detection failure occurred is sent at line 12. This is the most typical example of usage.

- Detection scores fall below a threshold
  Measurement 1 is checked at line 4, and a notification is sent if the measurement has dropped below the threshold. (In this example, the vision program is configured to use the measurement output tool to output the score as measurement 1.)
  If a detection is made even though the score is low, this is not considered to be a problem in running the line, and so the workpiece will continue to be picked up. This is an example of a precautionary notification.

- Robot failed to pick up workpiece
  An adhesion check is performed at line 7. Lack of adhesion is determined as a pickup failure, and so the program jumps to label 999, and a notification of a pickup failure is sent at line 16. There are various reasons for pickup failures. The image sent to the ZDT server is used to determine whether a false detection was made.

NOTE
The vision option (A05B-2600-J901 or similar) is required to detect vision images.

2.9.9 *i*RDiagnostics (Optional)

*i*RDiagnostics provides notification of reducer diagnosis, servo off alarm events, and job data.

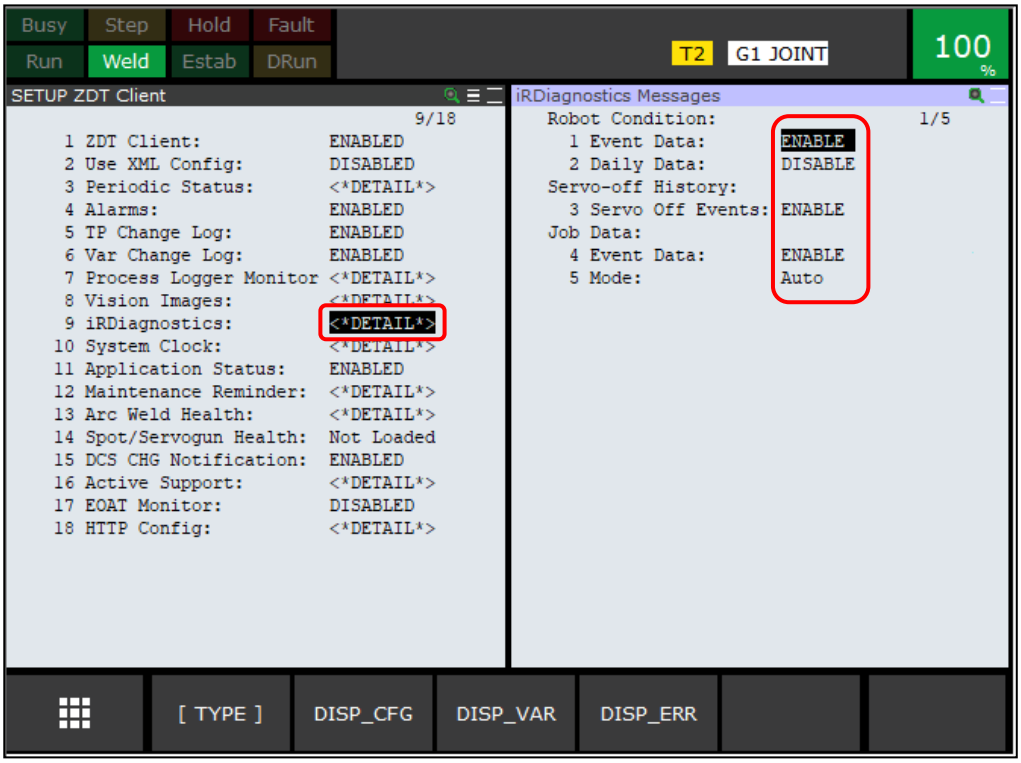


Fig. 2.9.9 (a) *i*RDiagnostics

To enable *i*RDiagnostics in ZDT, enable the following settings on the advanced settings screen for “9 TROUBLESHOOTING”.

Table 2.9.9 (a) *i*RDiagnostics configuration

Parameter		Description
Reducer Diagnosis	Event Data	Enables/disables the sending of diagnostics results when the reducer diagnosis program is executed. If it is enabled, the axis odometer value is also sent. Data is sent once the reducer diagnosis program completes. When the reducer diagnossi program is called from the main program, data is sent once the main program completes.
	Daily Data	Enables/disables periodic transmission of diagnostics results. When enabled, the diagnostics results produced the last time the reducer diagnosis program was executed is sent at regular intervals. The axis odometer value is also sent.
Servo-Off History	Servo Off Events	Enables/disables the sending of servo off alarm events that occur when servo off alarms are triggered.
Job Data	Event Data	Enables/disables the sending of job data including Torque, Disturbance Torque, Err. Cnt. and Energy Data. When enabled, data is sent once an executed program completes. The power data is available use in version 9 or later.
	Mode	Specifies the trigger mode for job data.

Refer to "*i*RDIAGNOSTICS" in "FANUC Robot series Optional Function OPERATOR'S MANUAL (B-83284EN-2)" for more information on creating and configuration reducer diagnosis programs.

NOTE
The *i*RDiagnostics option (A05B-2600-R765) is required to use this feature.

2.9.9.1 Job data

Job data settings almost never need special configuration as the recording of data is automatically started/stopped depending on the execution states of TP programs. If a STYLE program is started from a PLC, for example, the system starts recording data as soon as the STYLE program starts. This data is sent after the STYLE program ends.
Special configuration is required if using multitasking programs or looping programs.

Mode Selection

Select one of the following modes. Auto mode is selected by default.

- Auto
- Auto (sub-progs)
- I/O Trigger
- I/O by Group
- Manual

Each mode supports Torque and Energy Data.

Auto

In Auto mode, data recording starts automatically at the start of TP program execution, and data is sent at the end of TP program execution.
All group data is recorded for multi-groups. Program names are taken from TP program names.

Auto (sub-progs)

Auto (sub-progs) mode is for programs that loop continuously. When this mode is selected, data recording starts when a sub program with operation instructions is called from the main program, and data is transmitted when returning from the sub program to the main program.

NOTE
The data of the main program itself is not recorded. The data of the program called from the sub program is recorded as the data of the calling sub program.

I/O Trigger

In I/O Trigger mode, data is transmitted using the specified I/O signals values as a trigger. This mode can be used when turning I/O signals on and off at every cycle. This mode can be used, for example, when using DI[1] to close grippers and pick up a part at the start of a cycle and opening grippers to release a part at the end of a cycle.

Specify the I/O to be monitored from the following settings to use this mode.

Table 2.9.9.1 (a) I/O trigger configuration

Item	Description
I/O Type	Specifies the type of I/O to monitor.
I/O Number	Specifies the I/O number to monitor.
I/O Detection	Specifies the I/O detection condition. Falling: Recording starts when a signal falls (turns off), and data is transmitted when the signal rises (turns on). Rising: Recording starts when a signal rises (turns on) and data is transmitted when the signal falls (turns off). Data is transmitted after the status of the I/O being monitored changes 10 times by default. To change the number of times it takes to send data, change the value of the system variable $CONDET_TRIG.$ DELAY.
Configuring Program Names	In I/O trigger mode, any program name can be specified using the following method. Manual: the specified I/O value is added to the end of the "job" text string, which is used as the program name. For example, if AI is specified for the I/O type and 3 is specified for the I/O number and the value of AI[3] is 2, the program name is "job2". STYLE: the name of the STYLE program configured via the STYLE Settings screen is used as the program name. The STYLE number is specified by I/O. For example, if GI is specified for I/O type and 5 is specified for I/O number and the value of GI[5] is 1, the STYLE program name with STYLE number 1 is used.

I/O by Group

In this mode, separate I/O triggers can be used for each operation group. Contact one of our sales representatives for more information.

Manual

In manual mode, recording of data is started and stopped by changing the value of the $CONDET_CFG.$STATE system variable.

Start recording: $CONDET_CFG.$STATE = 1
Stop recording: $CONDET_CFG.$STATE = 3
The following figure illustrates an example of a TP program.

```
// Starts recording data for group 1 (GP: 1)
$CONDET_CFG.$STATE = 1
// Normal operation lines
……
// Stops recording data for group 1 (GP: 1)
$ CONDET_CFG.$STATE = 3
// Standby for completion of transmission
Wait ($CONDET_CFG.$STATE = 0)
// Resumes program flow
……
```

All group data is recorded for multi-groups. The default name of the program is "_MAIN_".

2.9.10 System Clock

This clock keeps the internal system time of the robot controller.
System Clock is included in the data sent to ZDT and is used in viewing data on the Web portal. As such, this time must be configured accurately. Here, establish a connection to the NTP server running on the ZDT server to synchronize with the ZDT server time.

Step

1 To configure the NTP client, move the cursor to “10 System Clock” and then press the [F2] key, ”ADV” on the advanced settings screen.

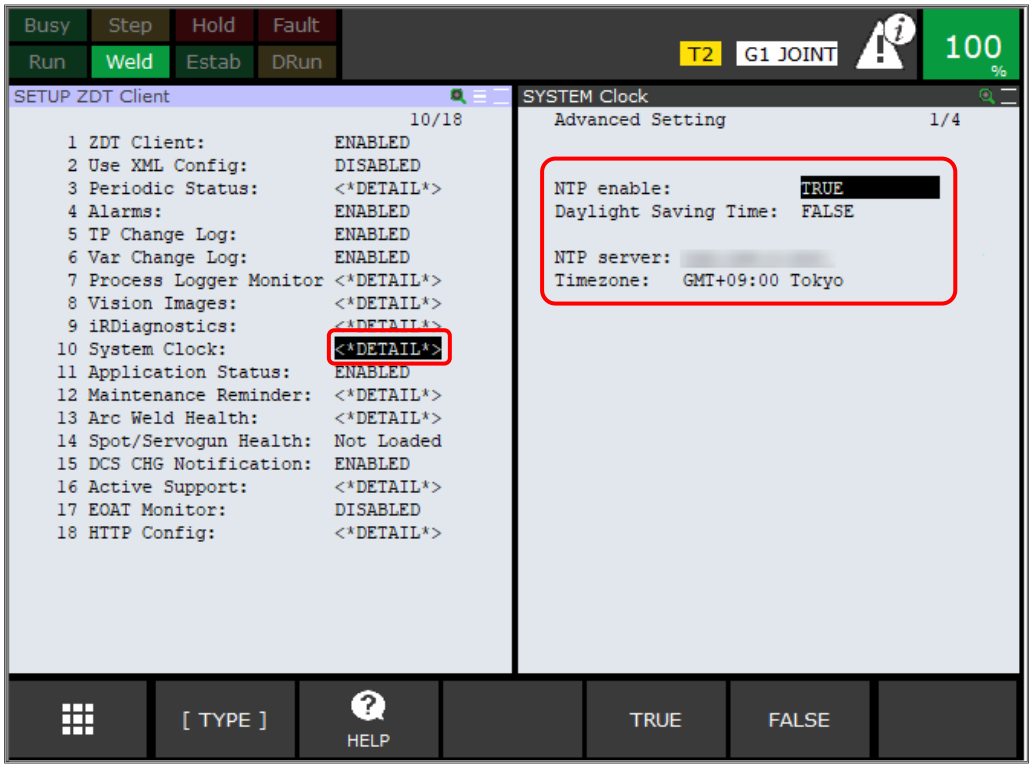


Fig. 2.9.10 (a) System clock

2 Configure the following parameters on the advanced settings screen.

Table 2.9.10 (a) System clock setting

Parameter	Description
NTP enable	Enables/disables the NTP client.
Daylight Saving Time	Enables/disables DST.
NTP Server	Configures the IP address of the NTP server.
Time zone	Used to select your local time zone.

2.9.11 Application Status

Application status notifications include robot uptime information such as per-hour uptime status and total number of cycles.

Step

1 To enable application status, move the cursor to “11 Application Status” and press F4, “ENABLED”.

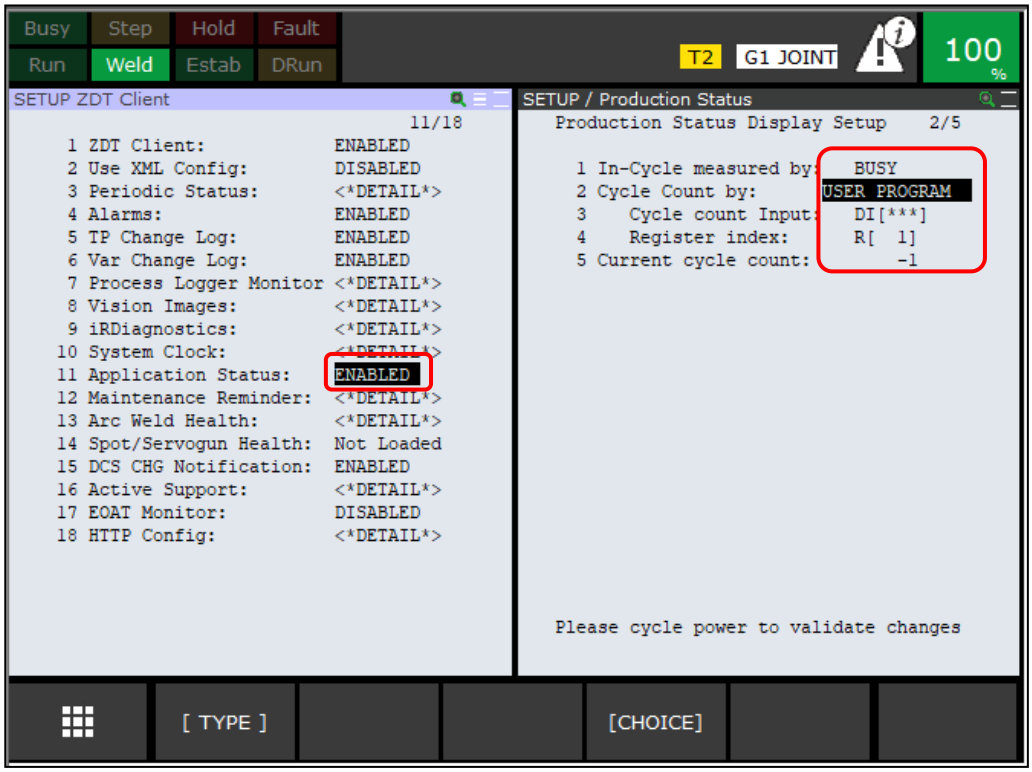


Fig. 2.9.11 (a) Application status

2 Configure the following parameters on the advanced settings screen.

Table 2.9.11 (a) Application status

Parameter	Description
In- Cycle measured by	Select from the following count conditions. • BUSY Determines that a cycle is in progress when a program is running. • MOTION Determines that a cycle is in progress when the robot is moving.
Cycle Count by	Select from the following types of information for which you want repetitions counted. • PROGRAM RUN Counts the number of times a program was executed in Auto mode. • UOP PROD_START Counts the number of times a program was executed by the input of PROD_START from the UI. • INPUT PORT Counts the number of times the DI specified by cycle count Input turns on. • USER PROGRAM Use a register to store the cycle count. The user program is responsible for updating the value.

Parameter	Description
Cycle count Input	This setting is used in conjunction with the "Input Port" option of the Cycle Count by setting. Specifies the DI number that is counted.
Register index	This setting is used in conjunction with the "User Program" option of the Cycle Count by setting. Specifies the register number that is counted.
Current cycle count	Displays the current cycle count. This value can be edited directly.

2.9.12 Maintenance Reminder (Optional)

Maintenance Reminder is sent as notification of robot/system maintenance and part replacement schedules.

Step

1 To enable Maintenance Reminder in ZDT, display the advanced settings screen for “12 Maintenance Reminder”, move the cursor to “Send ZDT message”, and press F4, “ENABLE”.

Fig. 2.9.12 (a) Maintenance reminder

2 Configure the following parameters on the advanced settings screen.

Table 2.9.12 (a) Maintenance reminder

Parameter	Description
Send ZDT message	Enables/disables the sending of maintenance reminder messages. This feature cannot be enabled if the “ZDT client” is disabled.
Periodic Timer	Specifies the frequency at which maintenance reminder messages are sent when “Send ZDT Messages” is enabled. The default setting is 24 hours. The valid range of this setting is between 1 and 999 hours.
Last Message Sent	Displays the time that the last message was sent by the maintenance reminder feature.
Message version	Configures the version of maintenance schedule messages. The default setting is 1. Set this to a value of 0 if using ZDT v1.0.

Maintenance Reminder messages are sent at the following timings when Send ZDT Messages is enabled.

- Per the configured Periodic Timer
- Output of maintenance schedule notification warnings
- Operation to complete maintenance
- Operation to perform updates

Refer to “MAINTENANCE REMINDER” in “FANUC Robot series Optional Function OPERATOR’S MANUAL (B-83284EN-2)” for more information on this feature.

NOTE
The maintenance reminder option (A05B-2600-J771 or A05B-2670-J766) is required to use this feature.

2.9.13 Arc Weld Health (Arc Tool Option)

The arc weld health feature sends notification of weld instability and other weld information.

The following information is sent by this feature.

- Program Name
- Weld ID
- Current
- Voltage
- Wire Feed Speed
- Weld Time
- Weld Distance
- Weld Heat Input
- Wire Consumption
- Arc Detection Time
- Unstable Welding Counts at Arc Start
- Unstable Welding Counts at During Welding
- Unstable Welding Counts at Arc End

Step

1 Perform the Controlled Start, and then confirm the Weld ID in the ArcTool Setup screen. When it is disabled, please enable it.
2 Enable the setting, and then perform the Cold Start.
3 To enable arc weld analysis, display the advanced settings screen for “13 Arc Weld Health”, move the cursor to “1 Arc Weld Health”, and press F4, “ENABLED”.

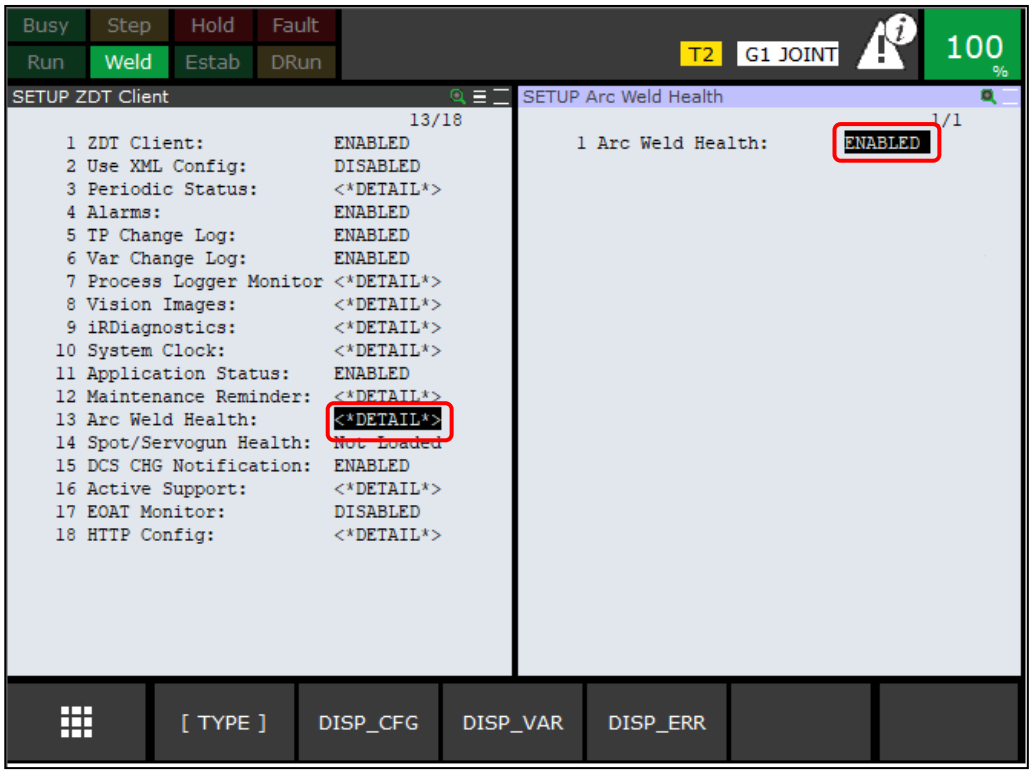


Fig. 2.9.13 (a) ARC weld health

4 Enter the Weld ID except for 0 to the Weld End instruction in the program. Refer to “4.1.4 Teaching Weld ID” in “FANUC Robot series R-30iB/R-30iB Mate/R-30iB Plus CONTROLLER Arc Welding Function OPERATOR’S MANUAL” for more information on the Weld ID.
5 Once enabled, analysis information is sent after completion of an arc weld executed in response to the arc weld command.

NOTE
The following software is required to use arc weld health.
- Software Version: V9.10P/06 (7DF1/06) or later
- Applications: Arc Tool (H541) and LR Arc Tool (H574)

2.9.14 Spot/Servogun Health (Spot Tool+ Option)

The spot/servogun health feature sends notification when symptoms of servo gun mechanism issues are detected.

The gun diagnosis feature detects increases in friction in the servo gun mechanism and prompts users to inspect the mechanism and readjust pressure values.
The pressure check function checks the data related to the servo gun’s pressure and then suggests inspecting the mechanical unit or readjusting the pressure.
The spot weld log function notifies the history and details of each spot.
The tip wear diagnostics and gun tuning diagnostics features are not used.

Step

1 To enable gun diagnosis, display the advanced settings screen for “14 Spot/Servogun Health”, move the cursor to “2 Gun diag function”, and press F4, “ENABLE”.
To use the pressure check function, move the cursor to “1. Pressure diag function”, and then press F4, “ENABLE”.
To use the spot weld log function, move the cursor to “5 Spot log function”, and then press F4, “ENABLE”.

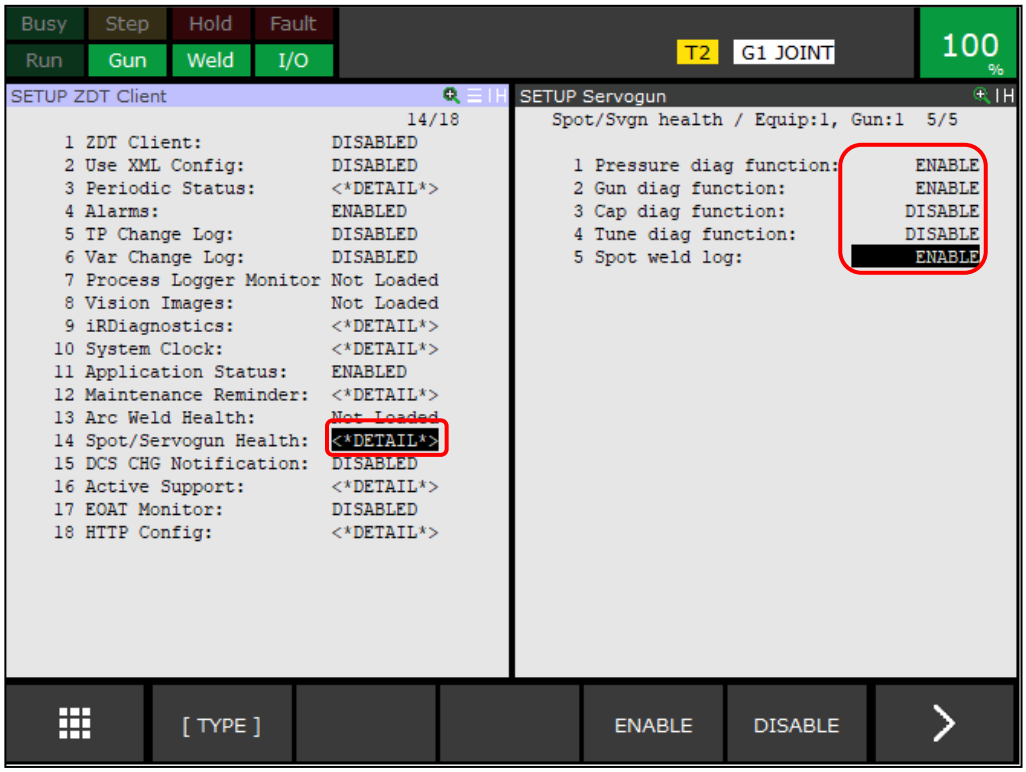


Fig. 2.9.14 (a) Spot/Servogun health

2 If you execute the tip wear measurement program that is provided by the Servo Gun Function, assessment information is sent once after after 10:00 AM. The pressure diagnosis is recorded when the tip is replaced.

Refer to “TIP WEAR DOWN COMPENSATION” in “FANUC Robot series R-30*i*B/R-30*i*B Plus CONTROLLER Servo Gun Function OPERATOR’S MANUAL (B-83264EN)” for more information on the servo gun and tip wear measurement.

Pressure Check Function - Updating the Base Value

In the pressure check, the diagnosis is performed by comparing the amount of pressing from the mastering position when pressure is applied with the obtained base value. If the mastering position is changed, the base value for the pressure check needs to be updated.

Procedure

1 To update the reference value for the pressure diagnosis, move the cursor to “2 Pressure diag function” on the details screen for “14 Spot/Servogun Health”, and press F5 “>”.
2 Press F1 “UpdtBench”.
3 Press F4 “OK”.

2.9.15 HTTP Config

NOTE
The following software is required to use spot/servogun diagnostics.
- Applications: Spot Tool+ (H590)
- Software Versions: Servo Gun Axis (H869) and Servo Gun Option (J643)

These communication settings must be configured to enable robot controllers to send data to ZDT servers.

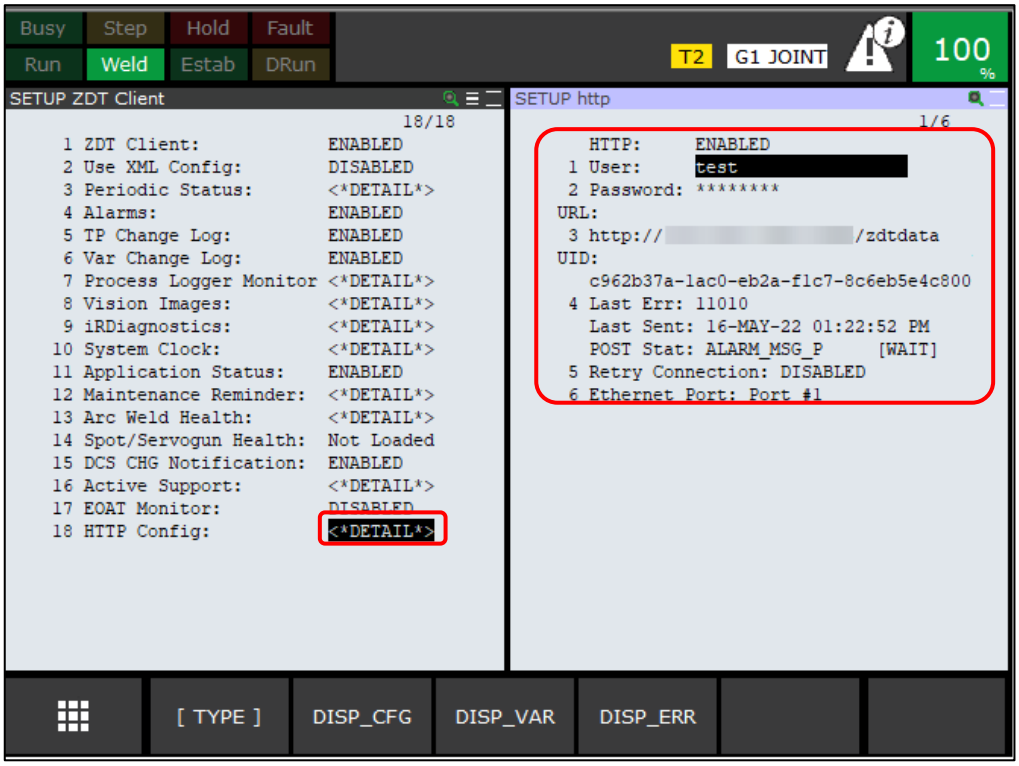


Fig. 2.9.15 (a) HTTP config

Step

1 Configure the following settings at the “18 HTTP Config” advanced settings screen.

Table 2.9.15 (a) HTTP config

Parameter	Description
User	This element is not used.
Password	This element is not used.
URL	Configures the URL to the active data collector. Enter the URL in the following format. http://<IP address of data collector>:6063/zdtdata
UID	Displays the controller ID.
Last Err	Displays the number of the last ZDT error.
Last Sent	Displays the date and time of the last message sent.
POST Stat	Displays the transmission status of the last message that was sent.
Retry Connection	If message transmission fails, retry.
Ethernet Port	Used to configure the port number used for ZDT. Press F4 to select “Port #1” or press F5 to select “Port #2”.

2 Once configuration changes have been made on the advanced settings screen, restart the robot controller.

3 Press F1, “Test” to send a test message. The possible messages that can be displayed in the test results are as follows.

Test Successful
This message indicates that the communication test was successful. The configuration is correct.

Host OK, Service NOK
This message indicates that the data collector service is not responding. Check the URL and data collector configuration.

Ping: Invalid host.
This message indicates that there was no PING response. Check the network configuration and the Ethernet connection.

2.9.16 Host Communication Settings

The settings of robot controller IP address and name of the robot are made via the Host Communication Settings of the teaching panel.
Use the following procedure to display the “Settings” screen.

Step

1 Press the [MENU] key to display the “Screen” menu.
2 Press “SETUP” and then select “Host Comm”.
3 After you have finished the settings, restart the robot controller, or execute “INIT”.

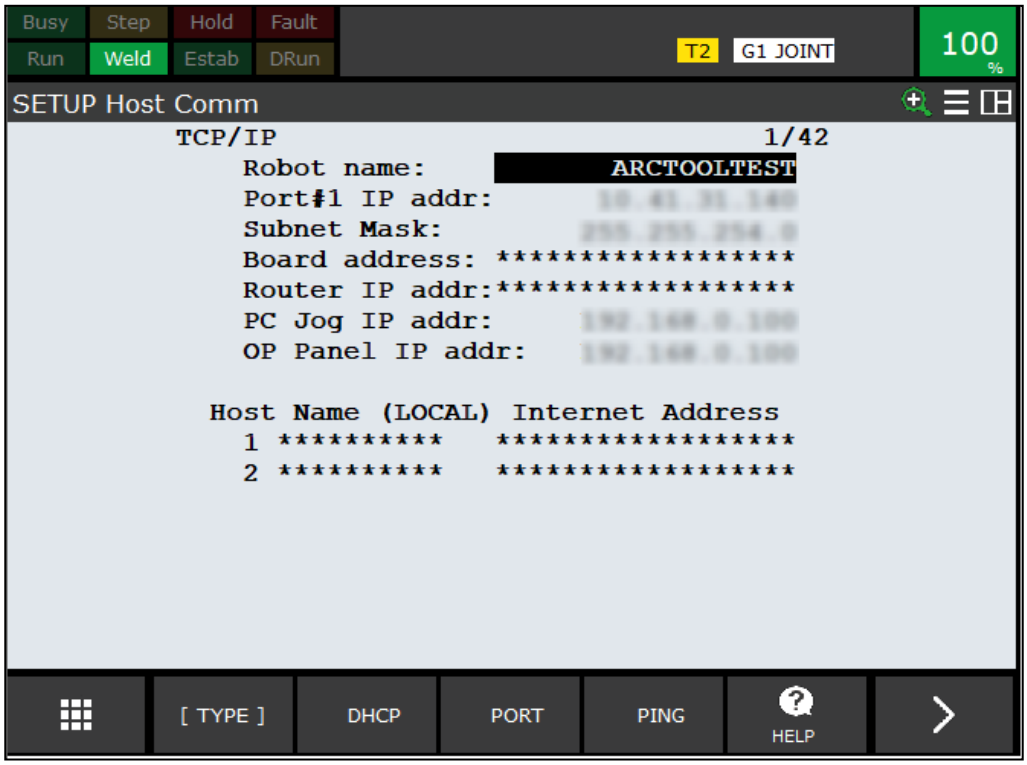


Fig. 2.9.16 (a) Host Comm

2.10 KAREL PROGRAM

By calling the KAREL program from the robot program, some information needed for the ZDT operation (which is retrieved in conjunction with the execution of the robot program) is automatically sent to the ZDT server.

The following KAREL programs are available.

- IRC_STATUS
- IRC_MSG

2.10.1 Sending Uptime Status Information (IRC_STATUS)

Execute the IRC_STATUS KAREL program to send robot status information (running, idle, alarm triggered) to ZDT server.

NOTE
1 With the following or later version of the robot software, it is not necessary to execute the KAREL program.
7DC3 (V8.30) / 20, 7DF1 (V9.10) / 01
2 If the robot software is the following versions, set the system variable "$RCMCFG.$CSTAT_ENB" to True.
7DC3 (V8.30) / 32 to 7DC3 (V8.30) / 37, or under 7DF1 (V9.10) / 08

The two following arguments must be specified to run IRC_STATUS. Ex.: Call IRC_STATUS (2, 'Paused')

Table 2.9.17 (a) IRC_STATUS arguments

Name	Data type	Description
Status	Integer	Specify one of the following robot running states. • 1 Running • 2 Idle • 3 Alarm Triggered
Label	Characters [32]	Up to 32 characters of text that represents the current status.

2.10.2 Sending User Messages (IRC_MSG)

Execute the IRC_MSG KAREL program to send any user message to the ZDT server.

The three following arguments must be specified to run IRC_MSG. Ex.: Call IRC_MSG ('PROCESS1', 'PROCESS1 started' ,1)

Table 2.9.18 (a) IRC_MSG arguments

Name	Data type	Description
Message Type	Text string [32]	32-character label used to group messages.
Message Text	Text string [32]	Up to 32 characters of text used to create the message that is displayed.
Background Color	Integer	Specify one of the following background colors for messages. • 0 White • 1 Green • 2 Yellow • 3 Red

NOTE

To send a user message continuously, execute the IRC_MSG KAREL program after taking at least 3-second interval using wait instruction, and etc.
The waiting time can be shorten by setting thr_duration, KAREL variable in IRC_MSG.PC, to 0 or smaller value before every time sending IRC_MSG.
However, since network bandwidth is limited, sending a large number of messages continuously is not recommended.

3 REFERRING TO DATA

To refer to the robot data collected in the ZDT server, access the Web portal made available on the ZDT server from the Web browser.

NOTE
For referencing data on the ZDT server from customer's software, refer to "Zero Down Time Interface Specification Document" included in the ZDT installation DVD.

3.1 CREATING AN ACCOUNT

First, create a user account to log into the Web portal.

Step

1 Transit to the administrator login screen by one of the following operations.
- Access the following URL through a web browser.
  http://<IP address of the ZDT server>/ZDTWebPortal/Account/Register
- Click the "Create a new account" link button in the login screen.
  Refer to "3.2.1 Create a new account" for details.

2 When the following screen pops up, enter the username of the administrator account: zdtadmin and the initial password zdtadmin, and then click "OK".

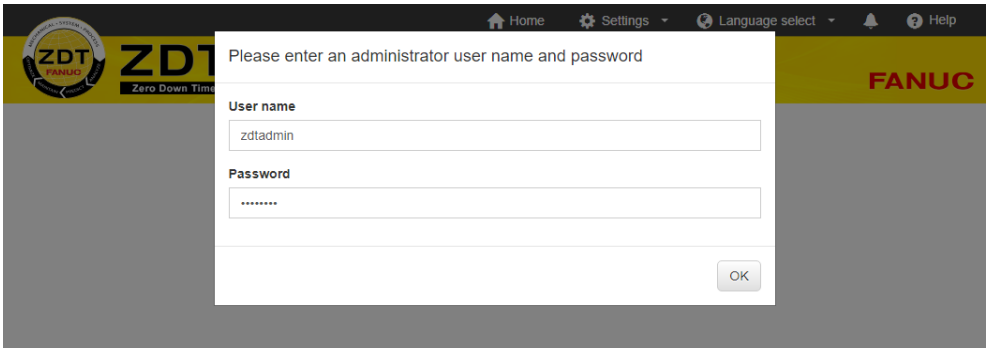


Fig. 3.1 (a) Administrator login screen

3 Enter the items of user name, password and confirm password.
If you check "I agree to the following",
The "Register" button is enabled. Click the "Register" button.

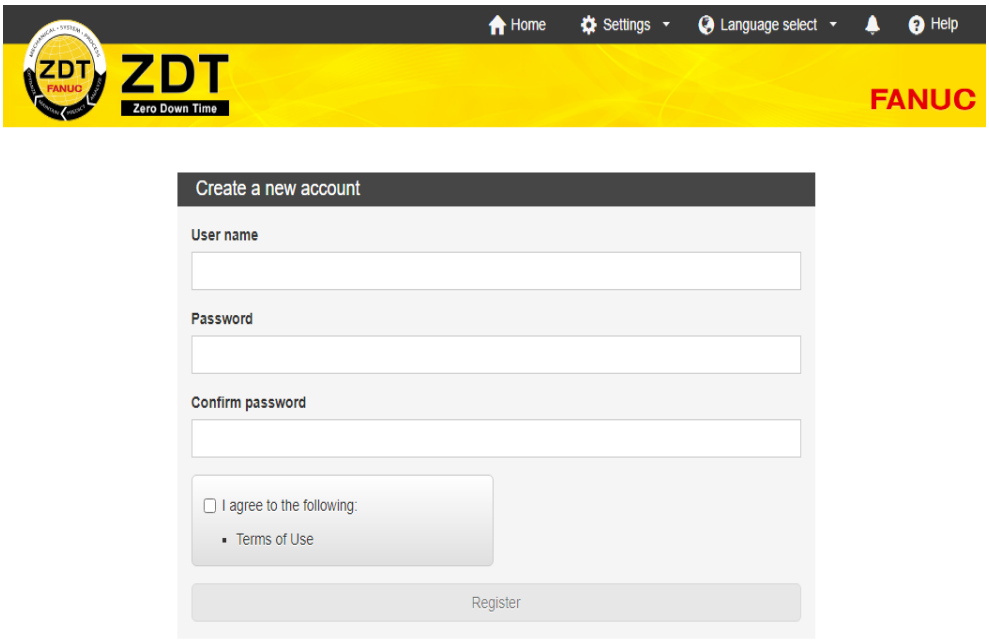


Fig. 3.1 (b) User account creation screen

NOTE

The user name must be 1 to 50 characters long, and the password must be 1 to 50 characters long of alphanumeric.

A maximum of 30 user accounts can be created.

The created user account can be managed on the ZDT server management web service. Refer to “5.2.9 Portal User Management” for more information.
When you click the links for the terms of use, a PDF will be displayed in a separate tab. If you select Japanese in the language selection, the PDF file is displayed in Japanese, and if other languages are selected, the PDF file is displayed in English.

3.2 LOGIN

Log into the Web portal using the created user account.

Step

1 Launch a web browser and enter the following URL into the address bar.
http://<IP address of the ZDT server>

2 Once the following login screen is displayed, enter the user name and password of the created user account, and then click “Login”.

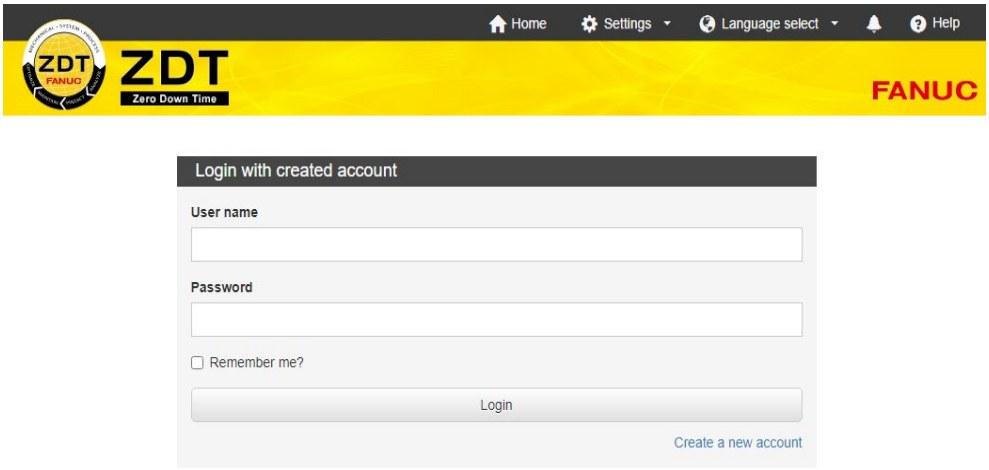


Fig. 3.2 (a) Login screen

Add a check mark to “Remember me?” and log in. Then the login state is maintained even after the browser is closed.

NOTE
If “Continue where you left off” of your web browser is enabled, the login state is maintained even if “Remember me?” is not checked.

3.2.1 Create a new account

When you click the “Create a new account” link button under the login button, the screen transits to the account creation screen.

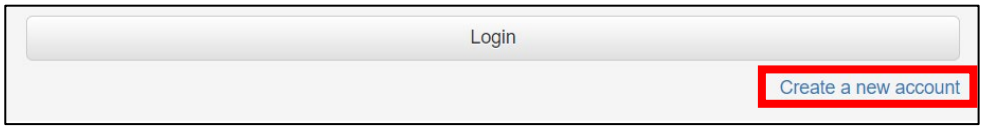


Fig. 3.2.1 (a) “Create a new account” link button

NOTE
For operations after the screen transitions to the account creation screen, refer to “3.1 CREATING AN ACCOUNT”.

3.3 HOME SCREEN

The home screen is displayed when logging into the Web portal.
The home screen allows you to check the statuses of all robot controllers connected to ZDT.

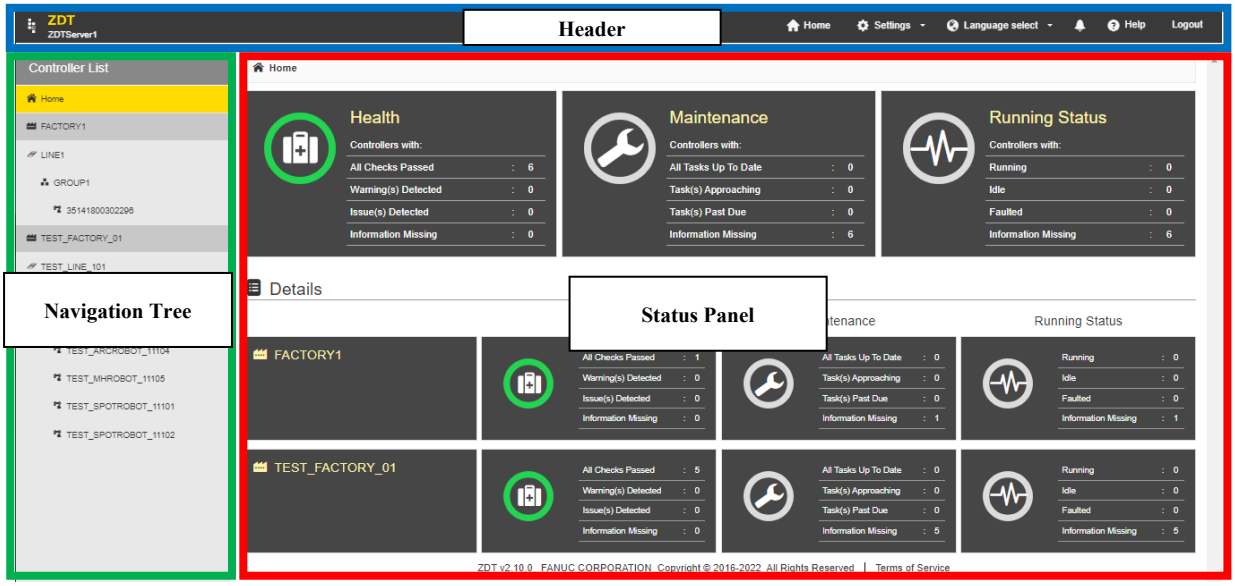


Fig. 3.3 (a) Home screen

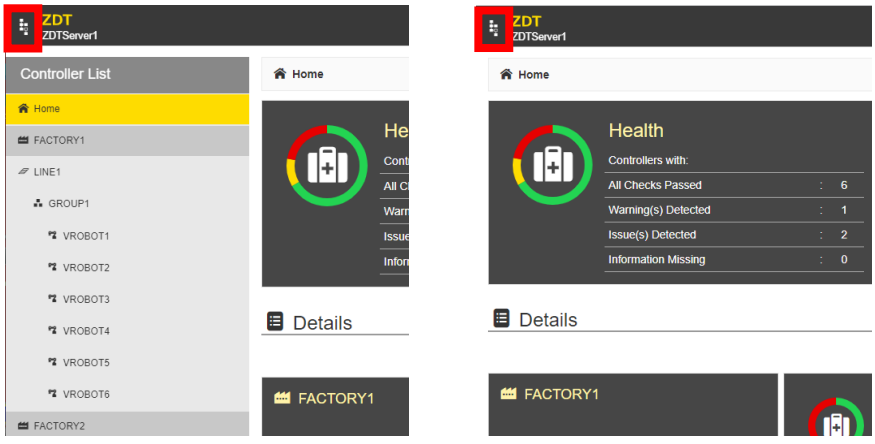
The home screen consists of the header, navigation tree and status panel.

3.4 HEADER

Use the header to show/hide the navigation tree, display server names, transition to the home screen or settings screen, change languages, display the online help and log out.

3.4.1 Show / Hide of Navigation Tree

Click the tree icon at the left of the header to switch between show and hide of the navigation tree.



Show **Hide**

Fig. 3.4.1 (a) Show / hide of navigation tree

3.4.2 Display Server Name

Below "ZDT" in the left of the header, the server name of the connection destination is displayed. However, if the server name is unregistered, the IP address is displayed. For how to register a server name, refer to "5.2.8.1 Environment settings".

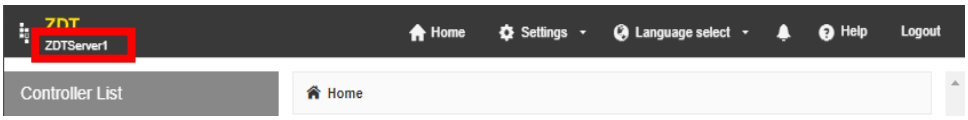


Fig. 3.4.2 (a) Display server name

3.4.3 Home

Click the “Home” button at the right of the header to transition to the home screen. You can also transition to the home screen by clicking “ZDT” at the upper left of the header.

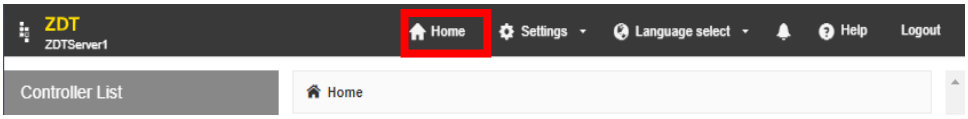


Fig. 3.4.3 (a) Home button

3.4.4 Settings

Click the “Settings” button at the right of the header to show a menu with the names of the settings screens that can be displayed. Select “Data Server Management” to transition to the ZDT Server Management screen.

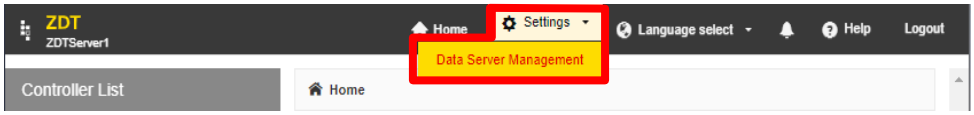


Fig. 3.4.4 (a) Settings button

3.4.5 Language Select

Click the “Language select” button at the right of the header to show a menu with the languages that can be displayed. Options include English, Japanese, Chinese (Simplified), Chinese (Traditional), and German.

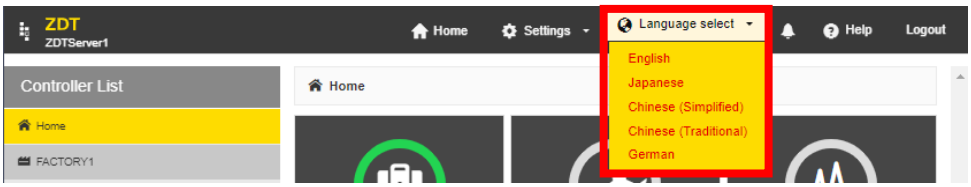


Fig. 3.4.5 (a) Language select button

NOTE

The languages that can be selected from the pull-down menu can be changed with the ZDT server management web service. Refer to “4.11 LANGUAGE” for more information.

Data sent from a robot such as alarm logs are displayed in a language of dictionary selected for the robot.

3.4.6 Notifications

Click the notification icon (bell) on the right of the header to display the Notifications screen. In the notification list, users can check notifications from TP programs, the variable change log, and the spot weld schedule change log that match user-specified conditions. The number of unread notifications is displayed in a red badge on the notification icon.
On the Notifications screen, the number of unread notifications for TP programs, the variable change log, and the spot weld schedule change log is displayed on their respective tabs.
Unread records in the notification list are displayed with a blue background, and read records are displayed with a white background.

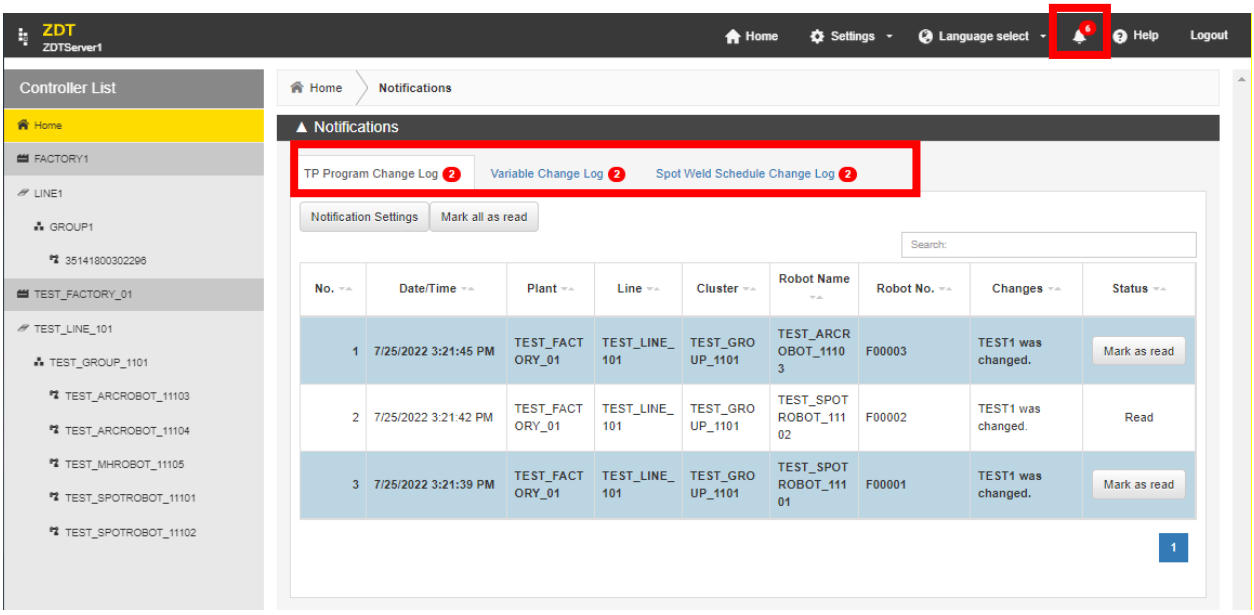


Fig. 3.4.6 (a) Notification icon and notification list

Each item is described as follows.

Table 3.4.6 (a) Notification list

Item	Description
No.	A sequential number assigned in reverse chronological order.
Date/Time	The date and time of the notification.
Plant	The plant of the robot that issued the notification.
Line	The line of the robot that issued the notification.
Cluster	The cluster of the robot that issued the notification.
Robot Name	The name of the robot that issued the notification.
Robot No.	The number of the robot that issued the notification.
Changes	Displays the changes in the notification message. The changes are set in the notification details conditions. The changes that are displayed are as follows: the program name for TP programs, the variable name for the variable change log, and the item name for the spot weld schedule change log.

Item	Description
Status	Indicates the read/unread status. For an unread notification, a button to mark it as read is displayed. Also, if you click the “Mark all as read” button, the statuses of all notifications in the selected tab are changed to read.

If you click the “Notification Settings” button on the Notifications screen, the Notification Settings screen is displayed. You can set the conditions for what is displayed on the Notifications screen in the individual TP Program Change Log, Variable Change Log, and Spot Weld Schedule Change Log tabs.

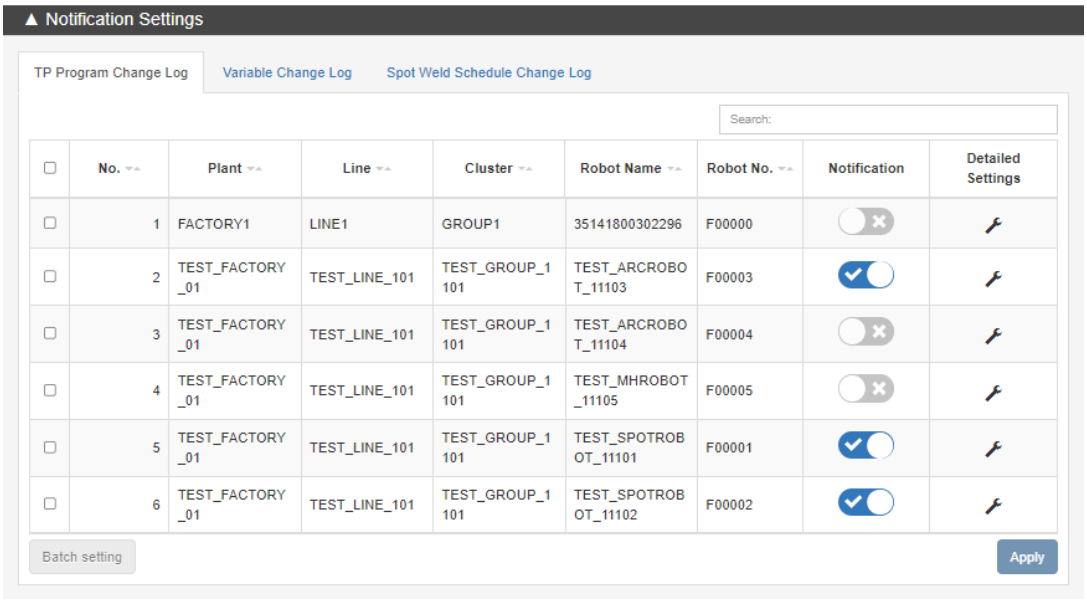


Fig. 3.4.6 (b) Notification Settings

If you click either the individual setting icon in Detailed Settings or the “Batch setting” button, a detailed settings screen is displayed. In the detailed settings, you can set the notification settings conditions and the execution conditions for mail notifications. The conditions for notification settings are set as follows: “Program” in TP Program, “Variable” in Variable Change Log, and “Item Name” in Spot Weld Schedule Change Log. If you enable the Email option, an email is sent when a notification is issued for the set condition.

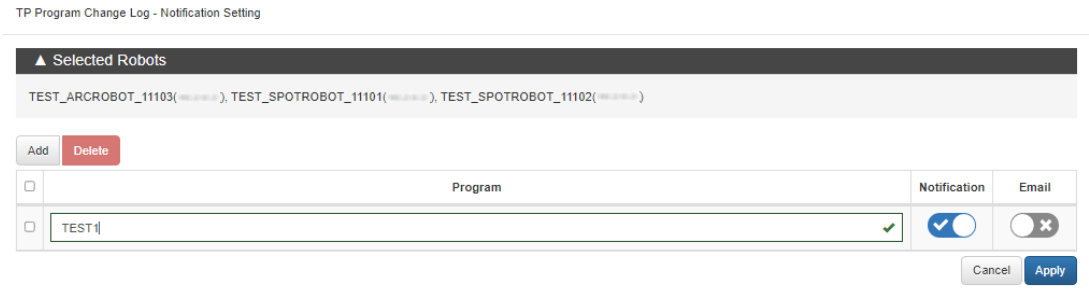


Fig. 3.4.6 (c) Detailed Settings

3.4.7 Help

Click the “Help” button at the right of the header to display the online help.

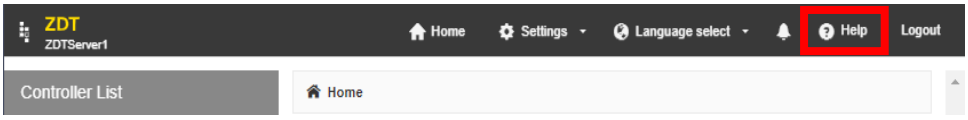


Fig. 3.4.7 (a) Help button

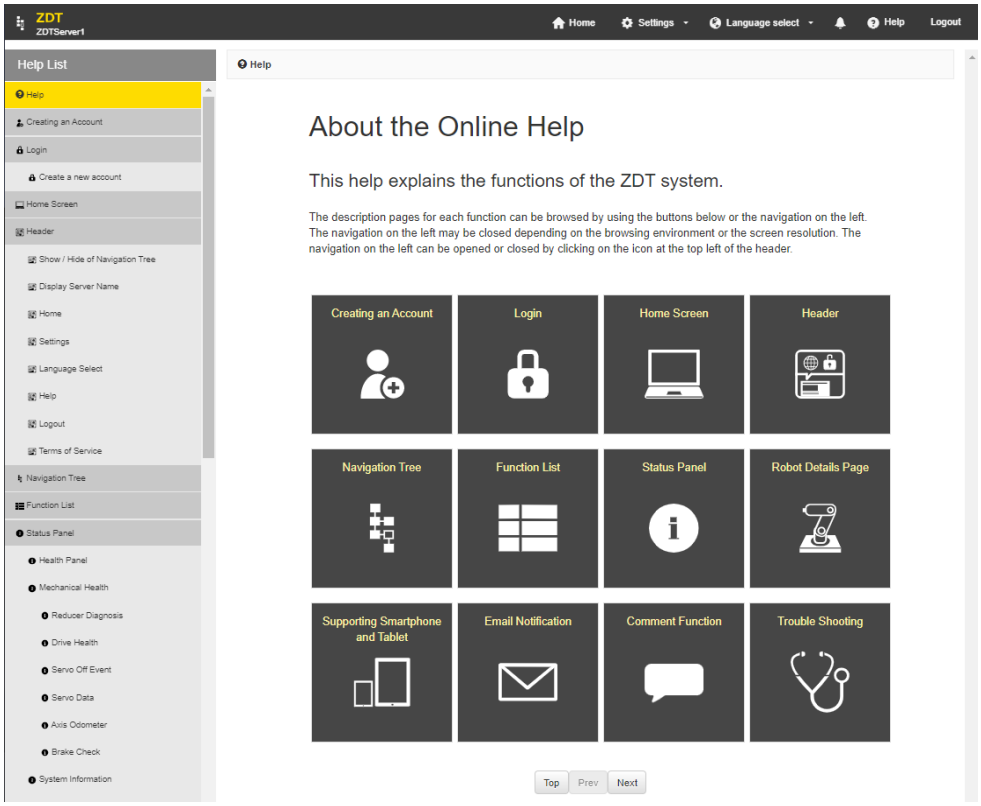


Fig. 3.4.7 (b) Online help

3.4.8 Logout

Click the “Logout” button at the right of the header to log out of the Web portal.

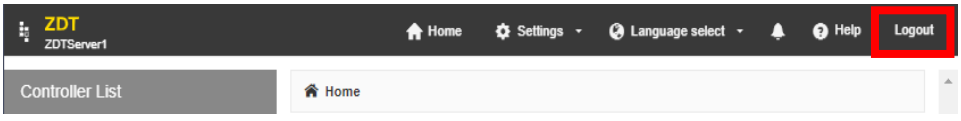


Fig. 3.4.8 (a) Logout button

3.4.9 Terms of Service

When you click the “Terms of Service” link button on the right of the footer, the Terms of Service screen is displayed.

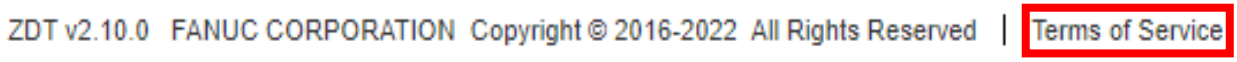


Fig. 3.4.9 (a) “Terms of Service” link button

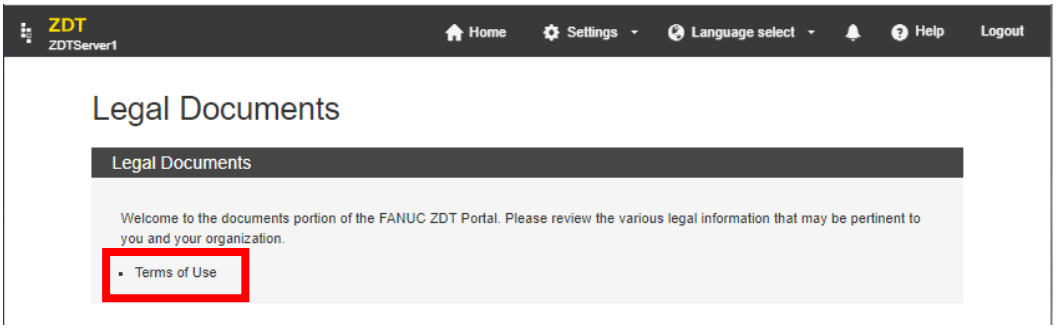


Fig. 3.4.9 (b) Terms of Service screen

When you click the links for the terms of use, a PDF will be displayed in a separate tab. If you select Japanese in the language selection, the PDF file is displayed in Japanese, and if other languages are selected, the PDF file is displayed in English.

3.5 NAVIGATION TREE

The navigation tree displays the list of the robot controllers connected to ZDT.
The list of the controllers is displayed in a hierarchical structure of “Home” - “Factory” - “Line” - “Cluster” - “Robot”. Click each item to move to the detailed page. Clicking “Home” will move to the home screen.

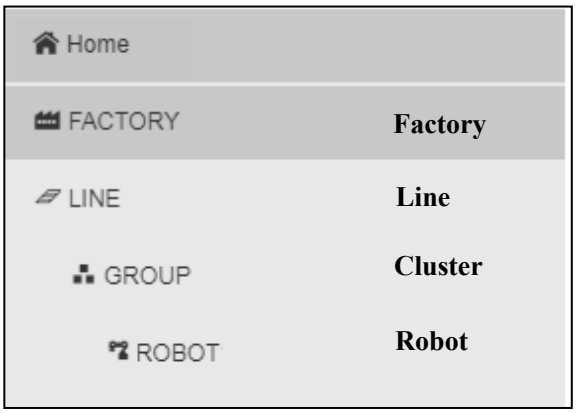


Fig. 3.5 (a) Navigation tree

If “Factory name”, “Line name”, and “Cluster name” are not set in the ZDT client setting of the robot controller or the ZDT server management web service location setting, “Unknown” will be displayed.

3.6 STATUS PANEL

The status panel includes 3 items: Health, Maintenance and Running Status. The number of robot controllers for each status is tallied and displayed.

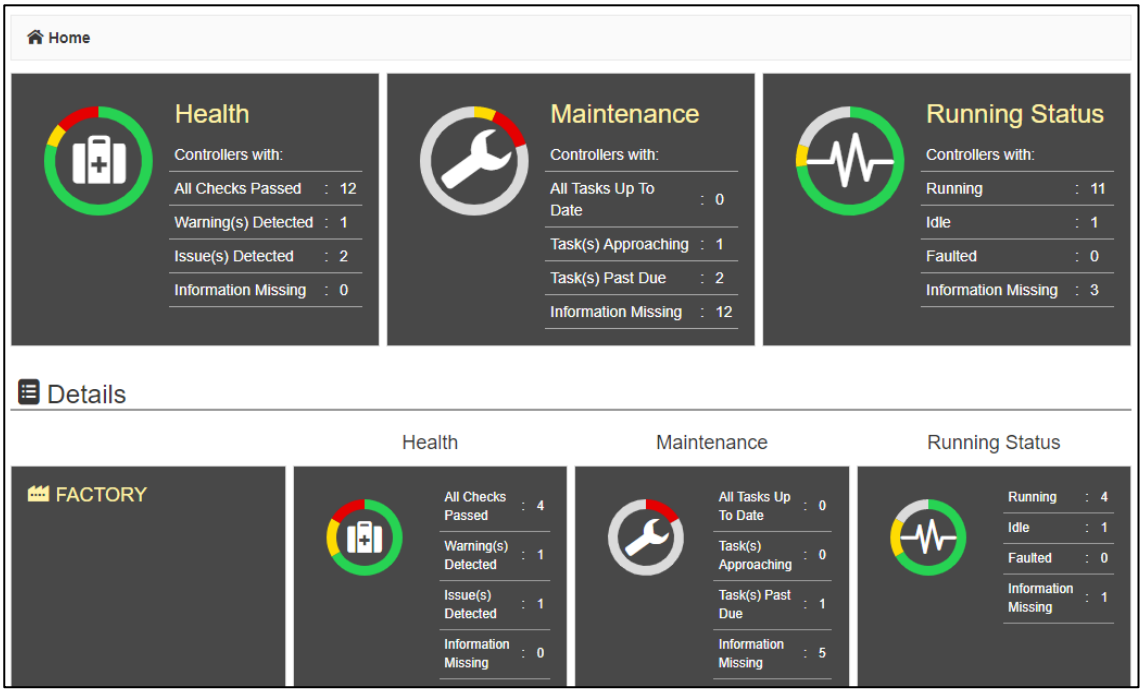


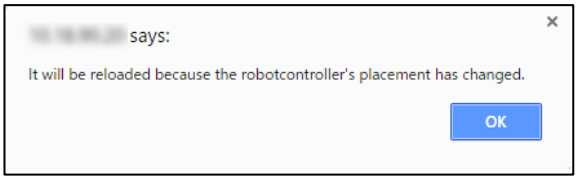
Fig. 3.6 (a) Status panel

The above status panel shows the tallied results of robots in the location currently selected.
For example, when “Home” is selected, the tallied results of all the robots are displayed. When “Factory A” is selected, the tallied results of Factory A are displayed.

The detailed status panel shows the tallied results of robots in the hierarchy 1 level lower than the location currently selected.
For example, when “Home” is selected, the tallied results of the robots for each factory are displayed. When “Factory A” is selected, the tallied results of each line in Factory A are displayed.

NOTE

The following message is displayed when there is a controller connected to ZDT for the first time, or there is a controller of which any one of the factory name, line name, cluster name and robot name is changed. When this message is displayed, press the “OK” button.



3.6.1 Health Panel

The health panel diagnoses the state of each robot and control device from the data of mechanical health, system information and process health, and classifies it to 4 categories: All Checks Passed, Warning(s) Detected, Issue(s) Detected and Information Missing. Then, the number of robots in each category is tallied and displayed.
The round icon on the left side of the panel shows the proportion of each status with the following colors.
(All Checks Passed: green, Warning(s) Detected: yellow, Issue(s) Detected: red, Information Missing: gray)

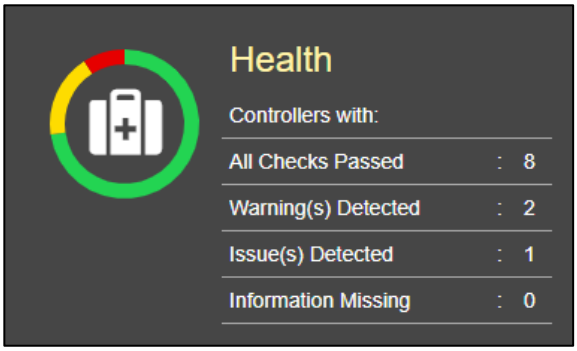


Fig. 3.6.1 (a) Health panel

The status displayed on the health panel is classified according to the following definitions.

Table 3.6.1 (a) Status displayed on health panel

Status	Description
All Checks Passed	The mechanical health, system information and the process health are all in Good state.
Warning(s) Detected	Either the mechanical health or the process health, or both are in Warning state.
Issue(s) Detected	The mechanical health, system information or the process health is in Issue state.
Information Missing	There is no data to health.

Clicking the health panel will display the health list. The health list shows the statuses of mechanical health, system information and process health of all robots in the location currently selected.
Also, clicking the tally area for each status will display the robot list in clicked state. For example, clicking “Warning(s) Detected” on the panel will display the list of robots which have been diagnosed as Warning.

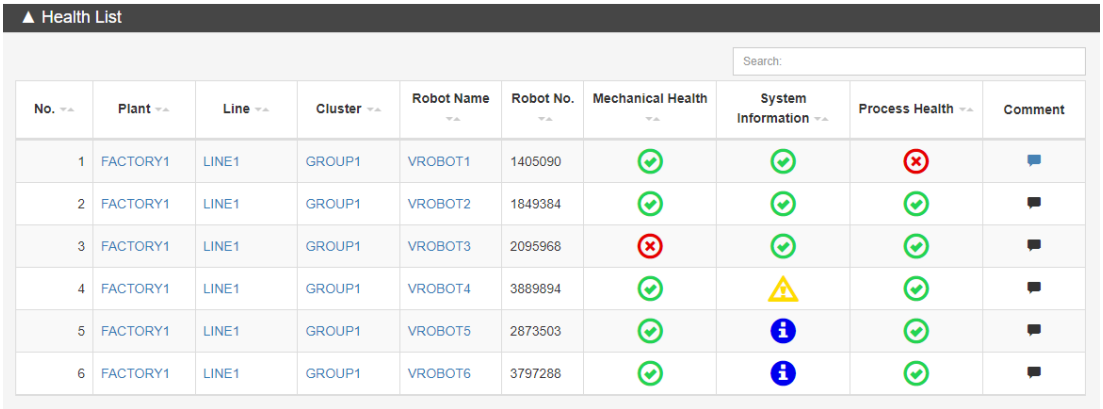


Fig. 3.6.1 (b) Health panel

3.6.2 Mechanical Health

The mechanical health allows you to view the following information.

- Reducer Diagnosis
- Drive Health
- Servo Off Event
- Servo Data
- Axis Odometer
- Brake Check

Clicking on the mechanical health icon will display the following screen, and the diagnosis results can be confirmed in the “Result” column. Click each item to confirm the details.
Each information is displayed in the order of updating date and time.

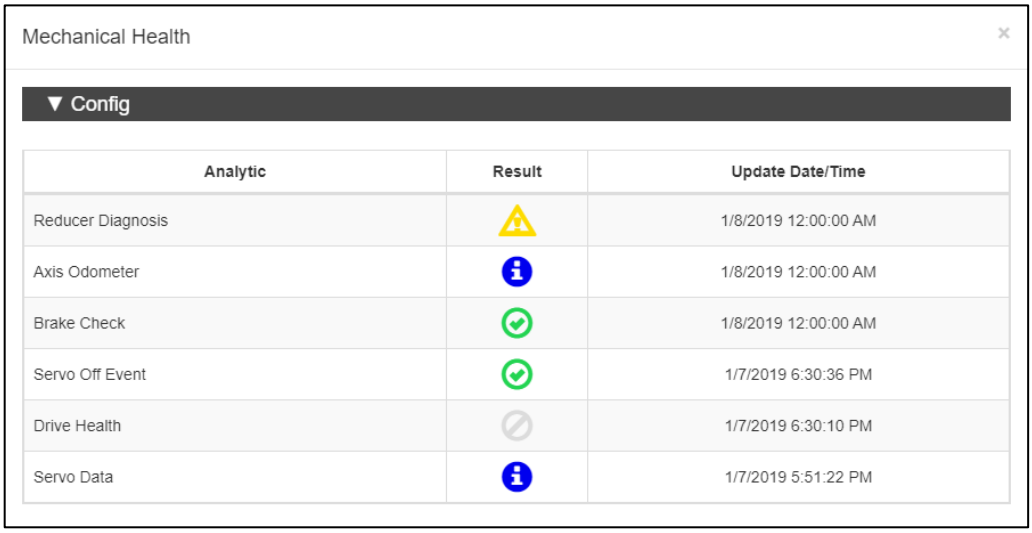


Fig. 3.6.2 (a) Mechanical health

3.6.2.1 Reducer diagnosis

The reducer diagnosis can be used in the basic package. The reducer diagnosis displays the degradation level of the reducer at each axis in time series. Here, the red line is indicating the threshold of the degradation level. If the degradation level exceeds the threshold, it is judged that the reducer is abnormal. In such a case, check the status of the reducer.

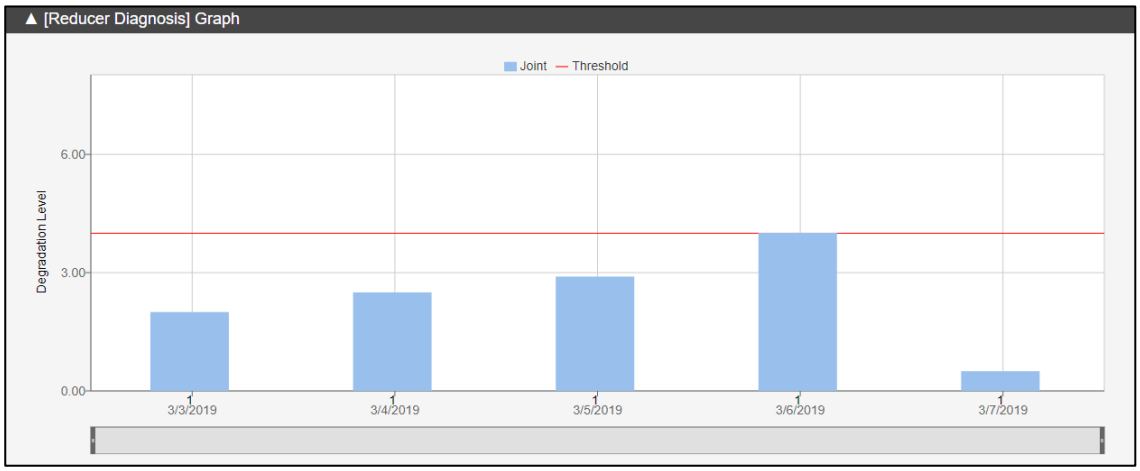


Fig. 3.6.2.1 (a) Reducer diagnosis (graph)

▲ [Reducer Diagnosis] Table

Date/Time	Diagnosis Date/Time	Joint	Degradation Level
3/3/2019 10:00:00 AM	3/3/2019 9:00:00 AM	1	2.00
3/4/2019 10:00:00 AM	3/4/2019 9:00:00 AM	1	2.50
3/5/2019 10:00:00 AM	3/5/2019 9:00:00 AM	1	2.90
3/6/2019 10:00:00 AM	3/6/2019 9:00:00 AM	1	4.01
3/7/2019 10:00:00 AM	3/7/2019 9:00:00 AM	1	0.50

Fig. 3.6.2.1 (b) Reducer diagnosis (table)

If a base value is not registered, both the degradation level and threshold are 0.

Each item is described as follows.

Table 3.6.2.1 (a) Reducer diagnosis

Item	Description
Date/Time	The date and the time that the robot created the message.
Diagnosis Date/Time	The date and the time that the latest measurement was performed.
Joint	The number of the axis being measured.
Degradation Level	The degradation level of the reducer.

The status of the reducer diagnosis is classified according to the following definitions.

Table 3.6.2.1 (b) Status of reducer diagnosis

Status	Icon	Description
Good		The most recent degradation levels of all axes are within the threshold.
Warning		The most recent degradation levels of at least 1 axis are over the threshold.
Information Missing		A base value is not registered.

3.6.2.2 Drive health

The drive health can be used in the basic package. The drive health comprises the motor health and PPM (condition).

Motor Health

The maximum values of motor health, torque, disturbance torque (external force to which the robot is subjected), and error counts (servo delay amount) during 1 cycle of torque are displayed in chronological order. The torque and the disturbance torque are displayed with the proportions to the maximum output of amplifier.

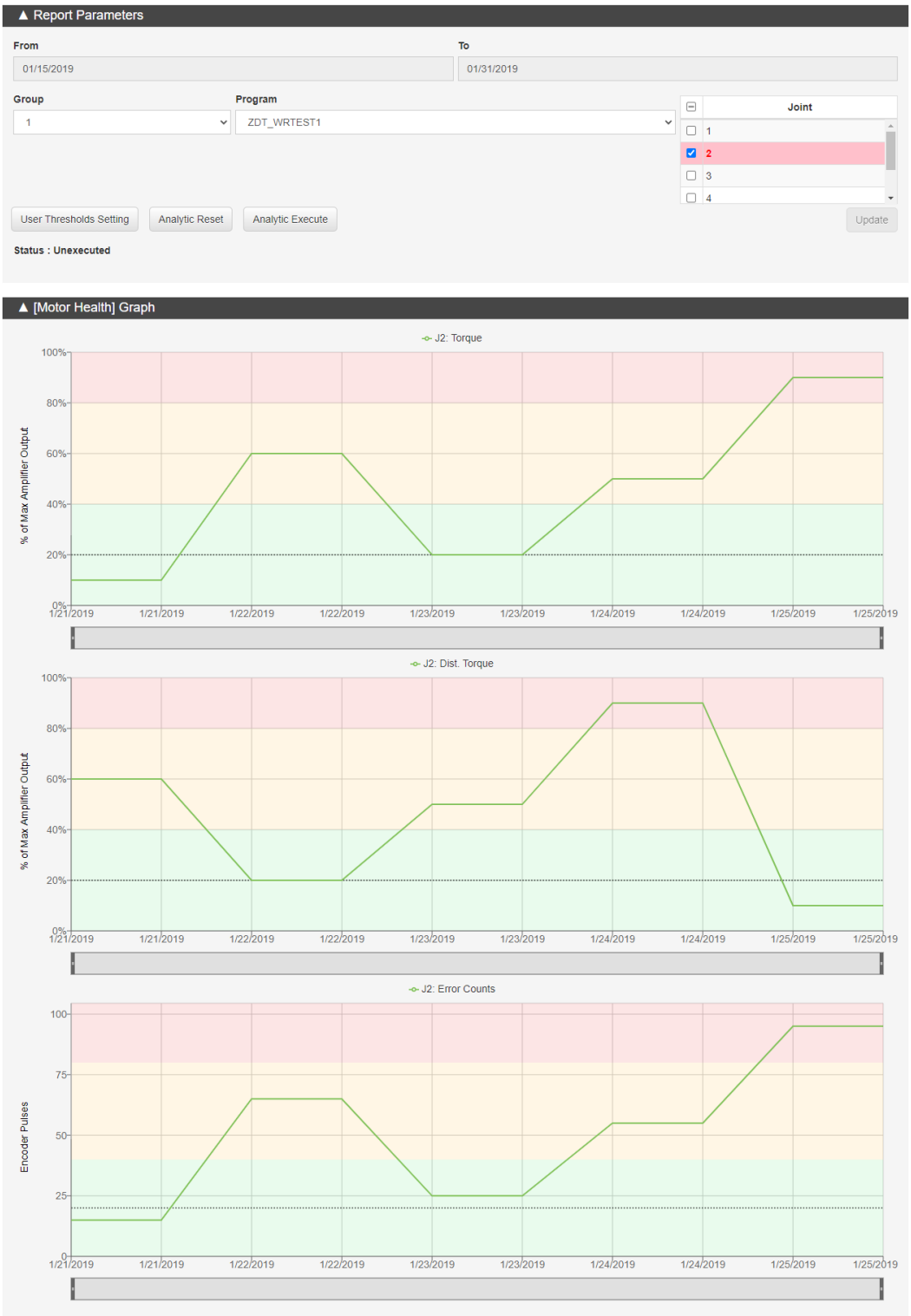
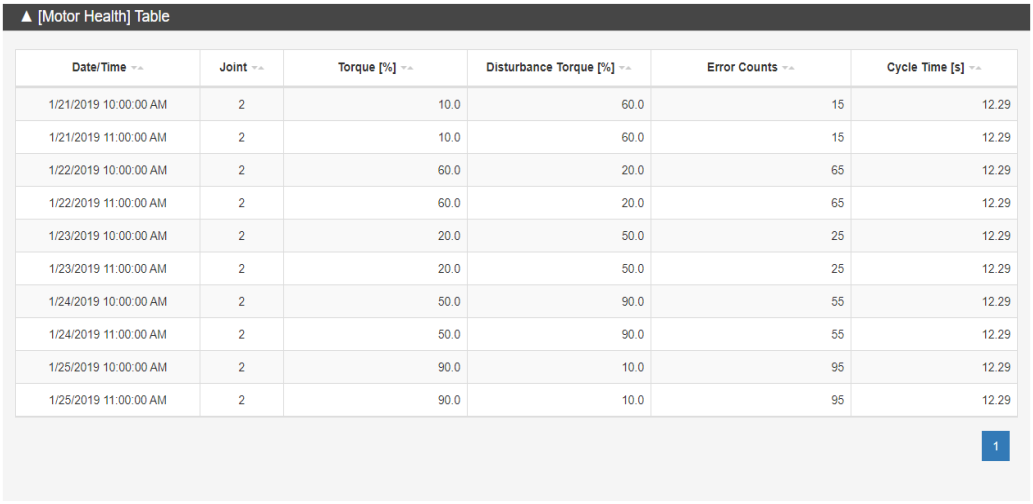


Fig. 3.6.2.2 (a) Motor health (graph)


▲ [Motor Health] Table

Date/Time	Joint	Torque [%]	Disturbance Torque [%]	Error Counts	Cycle Time [s]
1/21/2019 10:00:00 AM	2	10.0	60.0	15	12.29
1/21/2019 11:00:00 AM	2	10.0	60.0	15	12.29
1/22/2019 10:00:00 AM	2	60.0	20.0	65	12.29
1/22/2019 11:00:00 AM	2	60.0	20.0	65	12.29
1/23/2019 10:00:00 AM	2	20.0	50.0	25	12.29
1/23/2019 11:00:00 AM	2	20.0	50.0	25	12.29
1/24/2019 10:00:00 AM	2	50.0	90.0	55	12.29
1/24/2019 11:00:00 AM	2	50.0	90.0	55	12.29
1/25/2019 10:00:00 AM	2	90.0	10.0	95	12.29
1/25/2019 11:00:00 AM	2	90.0	10.0	95	12.29

1

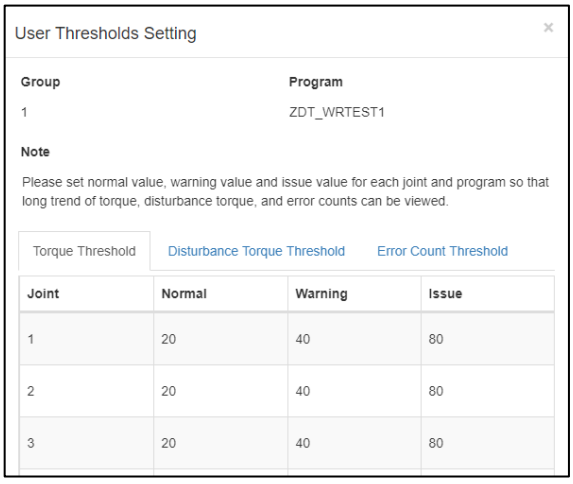
Fig. 3.6.2.2 (b) Motor health (table)

Each item is described as follows.

Table 3.6.2.2 (a) Motor health

Item	Description
Date/Time	The date and time of measurement of the motor health.
Joint	The number of the axis being measured.
Torque [%]	The maximum torque value during 1 cycle. The proportion of the maximum output of amplifier is displayed.
Disturbance Torque [%]	The maximum disturbance torque value during 1 cycle. The proportion of the maximum output of amplifier is displayed.
Error Counts	The maximum number of errors during 1 cycle.
Cycle Time [s]	The length of time (in seconds) of 1 cycle.

Also, clicking the User Thresholds Setting button in Report Parameters allows the users to manually set the Normal, Warning, and Issue values for torque, disturbance torque, and error counts per program and per axis. The background of the graph will be filled with green, yellow or red in accordance with the set value. This allows you to confirm trends in change of torque, disturbance torque and error count, spanning a long period of time. Even if you do not set the Normal, Warning, and Issue values, analysis will be performed.


User Thresholds Setting

Group: 1

Program: ZDT_WRTEST1

Note

Please set normal value, warning value and issue value for each joint and program so that long trend of torque, disturbance torque, and error counts can be viewed.

Torque Threshold | Disturbance Torque Threshold | Error Count Threshold

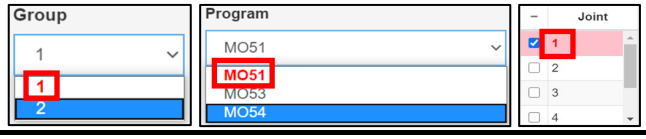
Joint	Normal	Warning	Issue
1	20	40	80
2	20	40	80
3	20	40	80

Fig. 3.6.2.2 (c) User thresholds setting

NOTE

If multiple axes are selected in the parameter setting, the threshold is not displayed in the graph.

If an abnormality is detected by motor health analysis, or if a threshold value (issue value) is set and the threshold value (issue value) is exceeded by any of torque, disturbance torque and error counts, the search parameter (group, program and axis) are displayed in red and bold letter if any abnormality was detected.



If any abnormality was detected in the motor health analysis or PPM axis diagnosis analysis, red vertical lines are displayed in the motor health and PPM graphs.

Fig. 3.6.2.2 (d) Red vertical lines display when an error is detected in motor health analysis or PPM-axis analysis

Fig. 3.6.2.2 (e) Mortor health analysis buttons and status

In the parameter setting, there are the “Analytic Reset” and “Analytic Execute” buttons for motor health analysis.
Analysis reset resets the data analysis. If you reset it, the status of the analysis result turns to not executed. In the following analysis, the data older than the reset date and time is not used. For multi-groups, the data is also reset for separate groups with the same program name.
Analysis execution executes the data analysis manually. The analysis is executed for all the robots and programs other than the timing that the analysis is automatically executed.
Status shows the latest status of the analysis by the program.

Table 3.6.2.2 (b) Analysis status

Status	Description
Unexecuted	No analysis is performed
During Analyzing	Analysis is in progress.
Analyzed	One or more of analysis was executed at least. The analysis result (good or issue) and the date and time of the latest data that the analysis was executed.
Collecting	Collecting data required for analysis.

NOTE
If a main program has several sub programs, change the mode selection for the job data to Auto (sub-progs) to reduce the amount of analysis error.
Refer to “2.9.9.1 Job data” for the job data settings.

PPM (Production Path Monitor)

PPM displays the degradation level of the reducer for each joint in chronological order.
To use PPM, all of the following conditions must be met.

- Remote mode execution
- Auto-mode execution
- Override 100% execution
- No interruptions

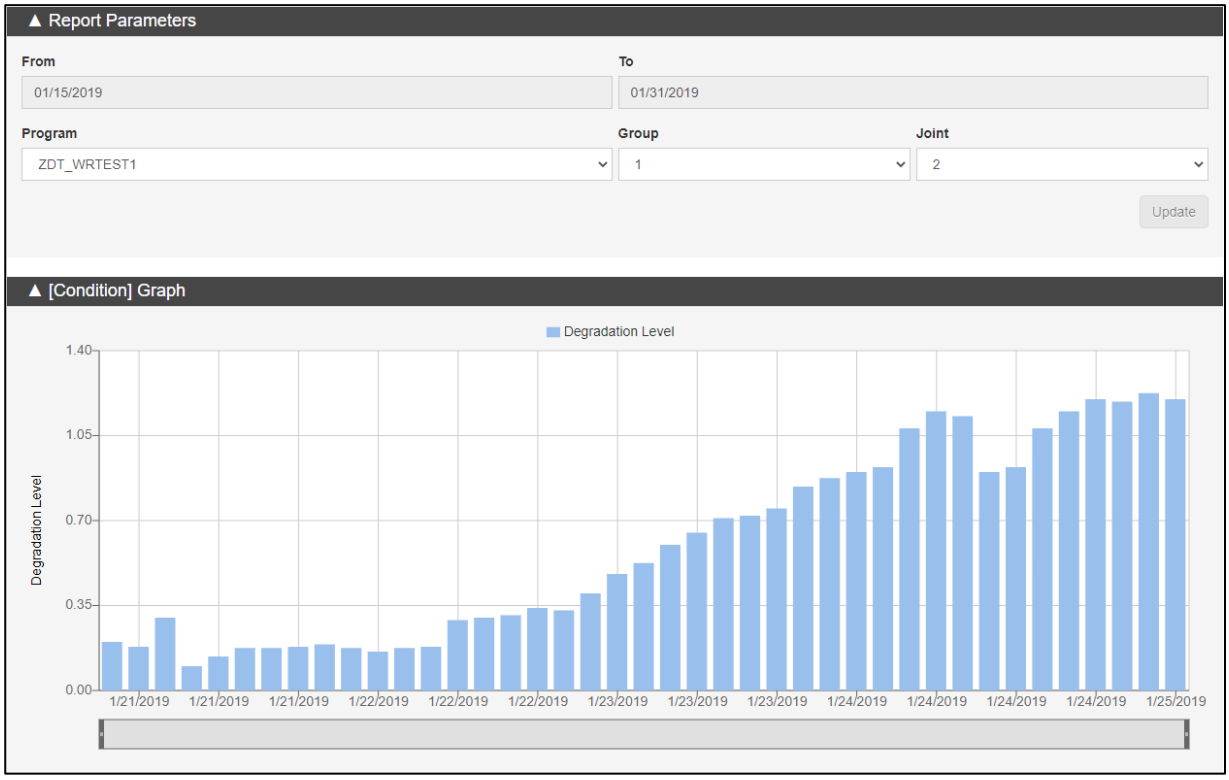
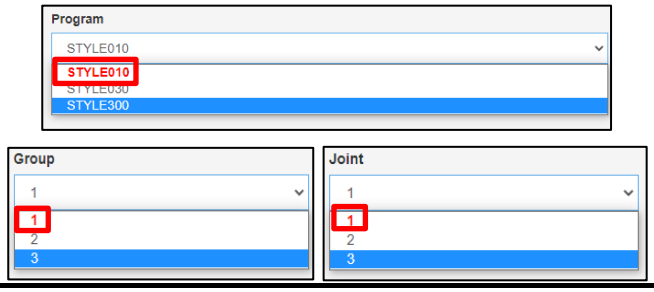


Fig. 3.6.2.2 (f) PPM (graph)

NOTE

When the pulldown of the search parameter (group, program, axis) is selected, the parameter that detected abnormality on PPM axis assessment analysis is shown in red and bold letters.



The status of the drive health (motor health, PPM)

The status are classified by the definition shown in the following table.

Table 3.6.2.2 (c) Status of drive health

Status	Icon	Description
Good		No abnormality was detected in the motor health analysis or the PPM axis diagnosis analysis. If thresholds are set for motor health, then the torque, disturbance torque, and error count were also all under the warning value in all programs in the last 24 hours.
Warning		If thresholds are set for motor health, the torque, disturbance torque and error counts within the most recent 24 hours are over the warning value, and within the issue value in at least 1 program.
Issue		Some abnormalities were detected in the motor health analysis or the PPM axis diagnosis analysis. Or if thresholds are set for motor health, the torque, disturbance torque and error counts within the most recent 24 hours are over the issue value in at least 1 program.
Unknown		Motor health analysis and PPM axis diagnosis analysis have not been executed. Or, there is no data within the most recent 24 hours or the motor health thresholds are not set.

NOTE

For information about thresholds for motor health, refer to “3.6.2.2 (c) Threshold settings”.
PPM is supported from robot controller version 56 in 7DC3 series, version 28in 7DF1 series, version 06 in 7DF3 series.

3.6.2.3 Servo off event

The servo off event can be used in the basic package. The servo off event displays the log of the servo off count and the servo alarm that have occurred during the operation of a robot.

Servo Off Count

Displays the servo off count for each axis. The display of the graph for the servo off count can be switched between the accumulated count from the time the robot was first started until today and the count for each date. Clicking the graph will display the detailed graph.

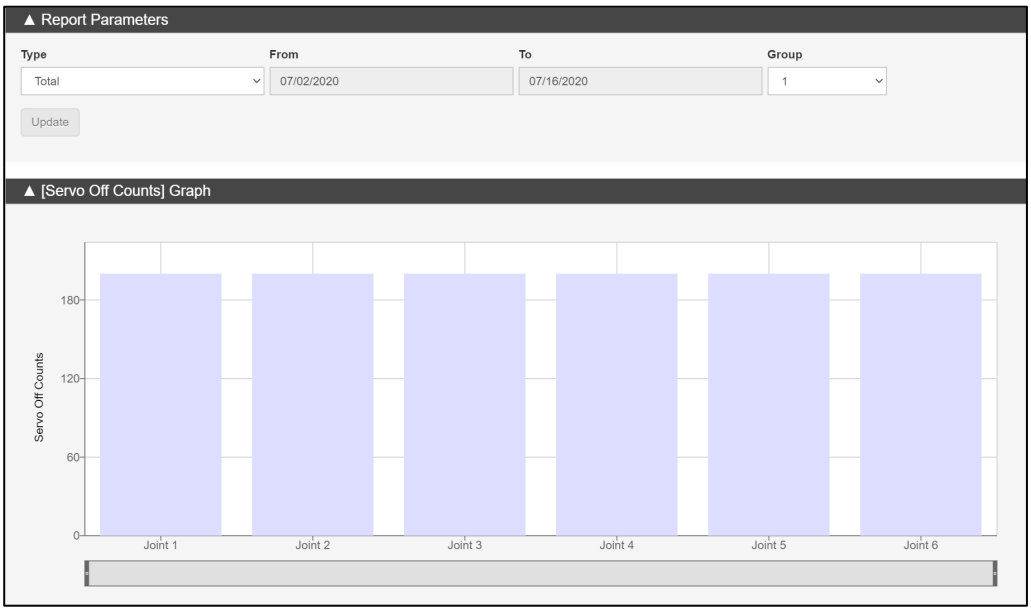


Fig. 3.6.2.3 (a) Servo off count (Total)

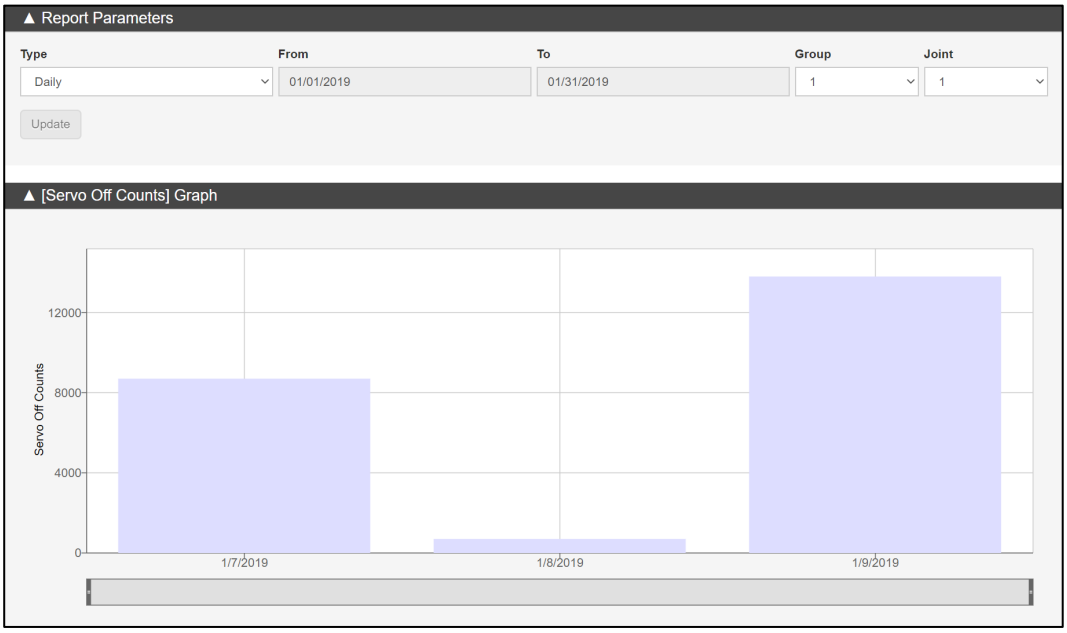


Fig. 3.6.2.3 (b) Servo off count (Daily)

NOTE
For the display of count for each date, the count on the day when the servo off has occurred for the first time is not displayed.

The speed and torque when the servo off has occurred are displayed by categorizing in total of 15 levels, constructed of 5 levels for speed (low speed, mid-low speed, middle speed, mid-high speed, and high speed) and 3 levels for torque (green: low torque, yellow: middle torque, and red: high torque) in the detailed graph.

Speed	Low Speed	Mid-Low Speed	Middle Speed	Mid-High Speed	High Speed
Range	0% to 10%	11% to 30%	31% to 50%	51% to 70%	71% to 100%

Torque	Low Torque	Middle Torque	High Torque
Range	0% to 30%	31% to 60%	61% to 100%

Fig. 3.6.2.3 (c) Servo off count detail

NOTE
For the old robot, the horizontal axis has 2 items (low speed, high speed) and the vertical axis has 2 series (low torque, high torque). It is displayed as a 2x2 graph.

Servo Alarm List

The occurrence history of the servo alarm is displayed.

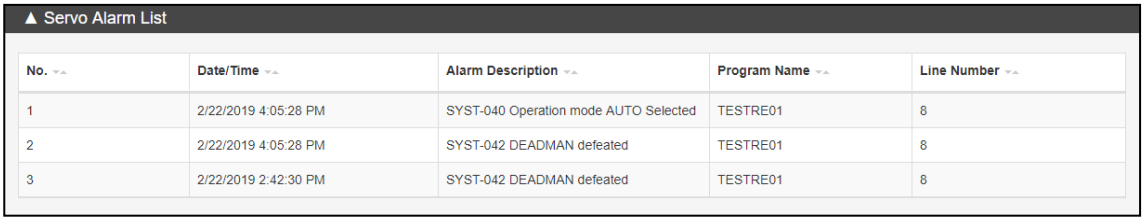


Fig. 3.6.2.3 (d) Servo alarm list

Each item is described as follows.

Table 3.6.2.3 (a) Servo alarm list

Item	Description
Date/Time	Date and time the servo alarm has occurred
Alarm Description	Content of the servo alarm
Program Name	Program name that has been executed when the servo alarm has occurred
Line Number	Line number of the program that has been executed when the servo alarm has occurred

The status of the servo off event is classified according to the following definitions.

Table 3.6.2.3 (b) Status of servo off event

Status	Icon	Description
Good		The number of servo off occurrences within the most recent 24 hours is less than 50.
Issue		The number of servo off occurrences within the most recent 24 hours is 50 or more.

3.6.2.4 Servo data

The servo data can be used in the basic package. The servo data displays the pulse counts, axis positions, and Q phase currents for each program.

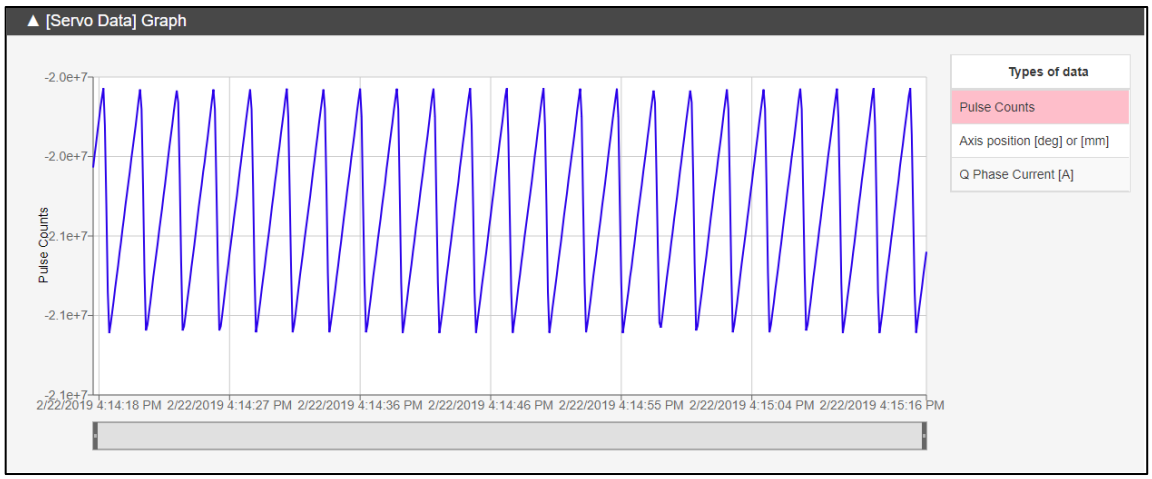


Fig. 3.6.2.4 (a) Servo data (graph)

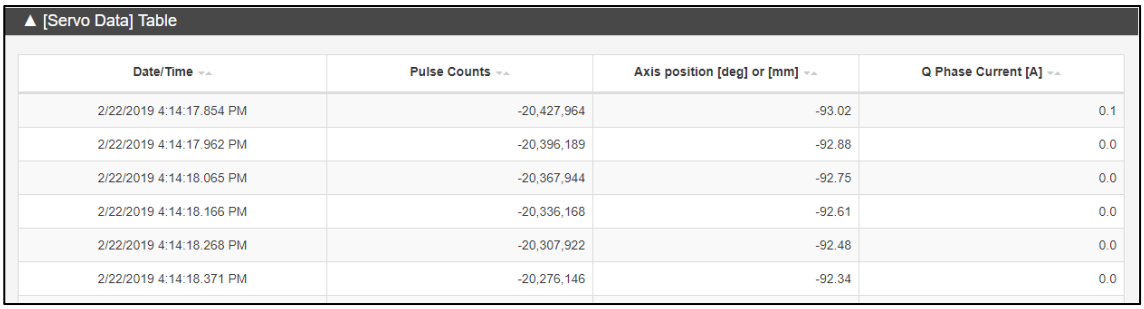


Fig. 3.6.2.4 (b) Servo data (table)

Each item is described as follows.

Table 3.6.2.4 (a) Servo data

Item	Description
Date/Time	The date and time on which measurement was made.
Pulse Counts	The pulse count value.
Axis position [deg] or [mm]	The axis position value. This displays the angle or the distance.
Q Phase Current [A]	The Q phase current value.

NOTE
When retrieving the servo data, the data collection service must be installed and configured.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.
When collecting in register mode, finish collection in about 5 to 10 minutes.

3.6.2.5 Axis odometer

The axis odometer can be used in the basic package. The axis odometer measures the total amount of operation of each axis in each group and displays the results in time series. The unit for the amount of operation displayed on the Y axis can be switched between ‘rev’ (revolutions) and ‘deg’ (angle [=revolutions x 360] in exponent notation) for rotating axes, and between km and mm for linear movement axes.

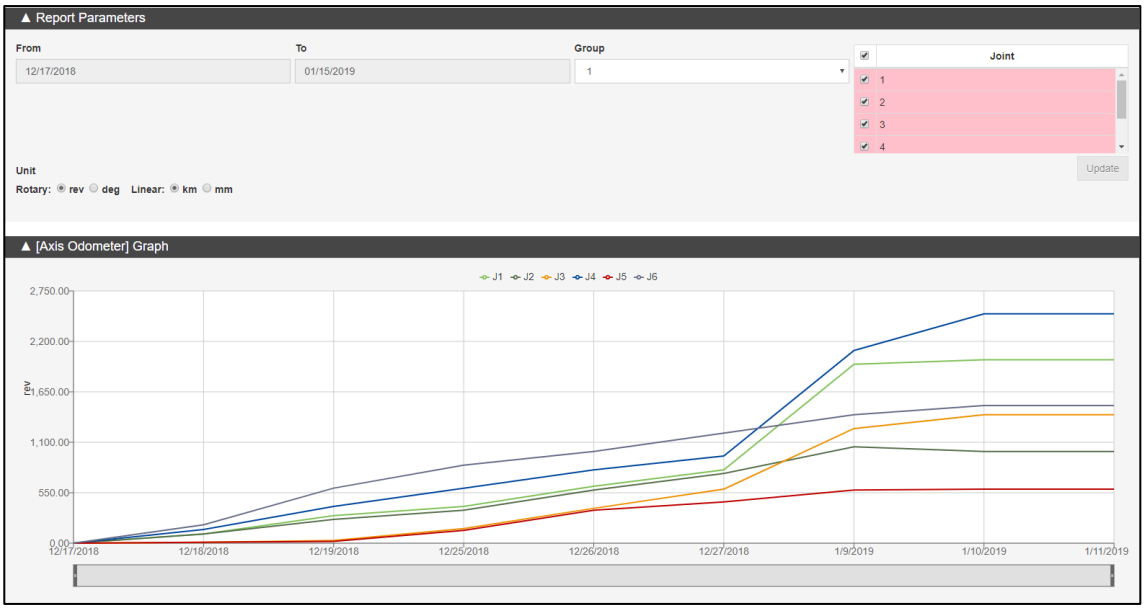


Fig. 3.6.2.5 (a) Axis Odometer (graph)

▲ [Axis Odometer] Table

Date/Time	Joint	Axis Odometer [rev]
2/22/2019 2:21:08 PM	1	46.05
2/22/2019 2:23:42 PM	1	46.37
2/22/2019 2:26:12 PM	1	46.70
2/22/2019 2:28:42 PM	1	47.02

Fig. 3.6.2.5 (b) Axis Odometer (table)

Each item is described as follows.

Table 3.6.2.5 (a) Axis Odometer

Item	Description
Date/Time	The date and time on which measurement was made.
Joint	The number of the axis being measured.
Axis Odometer (rev/deg or km/mm)	The total measured axis operation. The unit is linked with the display of the graph Y axis.

3.6.2.6 Brake check

The brake check can be used in the basic package. The brake check shows the brake check result history.

▲ Report Parameters

From 01/01/2019 To 01/15/2019 Group 1 Update

▲ Brake Check List

No.	Date/Time	J1	J2	J3	J4	J5	J6
1	1/8/2019 12:00:00 AM	✓	✓	✓	✓	✓	✓
2	1/7/2019 12:00:00 PM	✓	✓	✓	✓	✓	✓
3	1/7/2019 12:00:00 AM	✓	✓	✓	✓	✓	✓
4	1/6/2019 12:00:00 AM	✓	✓	✓	✓	✓	✓
5	1/5/2019 8:00:00 AM	✓	✓	✓	✓	✓	✓
6	1/4/2019 4:00:00 PM	✓	✓	✓	✓	✓	✓
7	1/4/2019 8:00:00 AM	✓	✓	✓	✓	✓	✓
8	1/3/2019 4:00:00 PM	✓	✓	✓	✓	✓	✓
9	1/3/2019 8:00:00 AM	✓	✓	⚠	⚠	✓	✓
10	1/2/2019 4:00:00 PM	✓	✓	⚠	⚠	✓	✓

Showing 1 to 10 of 11 entries. 1 2 >

Fig. 3.6.2.6 (a) Brake check (table)

Each item is described as follows.

Table 3.6.2.6 (a) Brake check

Item	Description
Date/Time	The date and time on which measurement was made.
Brake check results for each axis	Brake check results for each axis Good ✓ Warning ⚠

The brake check statuses are defined as follows.

Table 3.6.2.6 (b) Brake check statuses

Status	Icon	Description
Good		The result of the most recent brake check was normal.
Warning		The result of the most recent brake check indicates warning.

In order to collect the brake check result data, it is necessary to enter the CSV format setting command in "Manage Robot Controllers" on the "Robot Operations" screen of the data collector.
For the CSV format setting command, please refer to "5.1.10 ZDT Data Collector".

The following is an example of a command to add a brake check result data collection setting.

7,10.22.58.167,1,1,0,23,0,GBRAKE_CHK_T

The meaning of the command is explained below. Please refer to "Formatting CSV Commands" for more information.

Command, IP, Frequency_type, Frequency Number, D, H, M, ZDT_Messages

3.6.3 System Information

The "System Information" is used to view the following information.

- Running Data
- Power Consumption
- Alarm Log
- User Message
- Variable Change Log
- TP Program Change Log
- Running Status Log
- Pulsecoder Battery Low
- CPU Battery Low
- Controller Memory Statistics
- Data Monitor
- LOGBOOK

Clicking the system information icon will display the following screen. Clicking the information icon of each item will allow you to confirm the details. However, in the "Result" column for the Pulsecoder Battery Low, which displays information about the backup battery for the Pulsecoder data, and the CPU Battery Low, which displays information about the backup battery for the memory, you can only confirm the diagnosis results.
Every piece of information is displayed in the order of updating date and time.

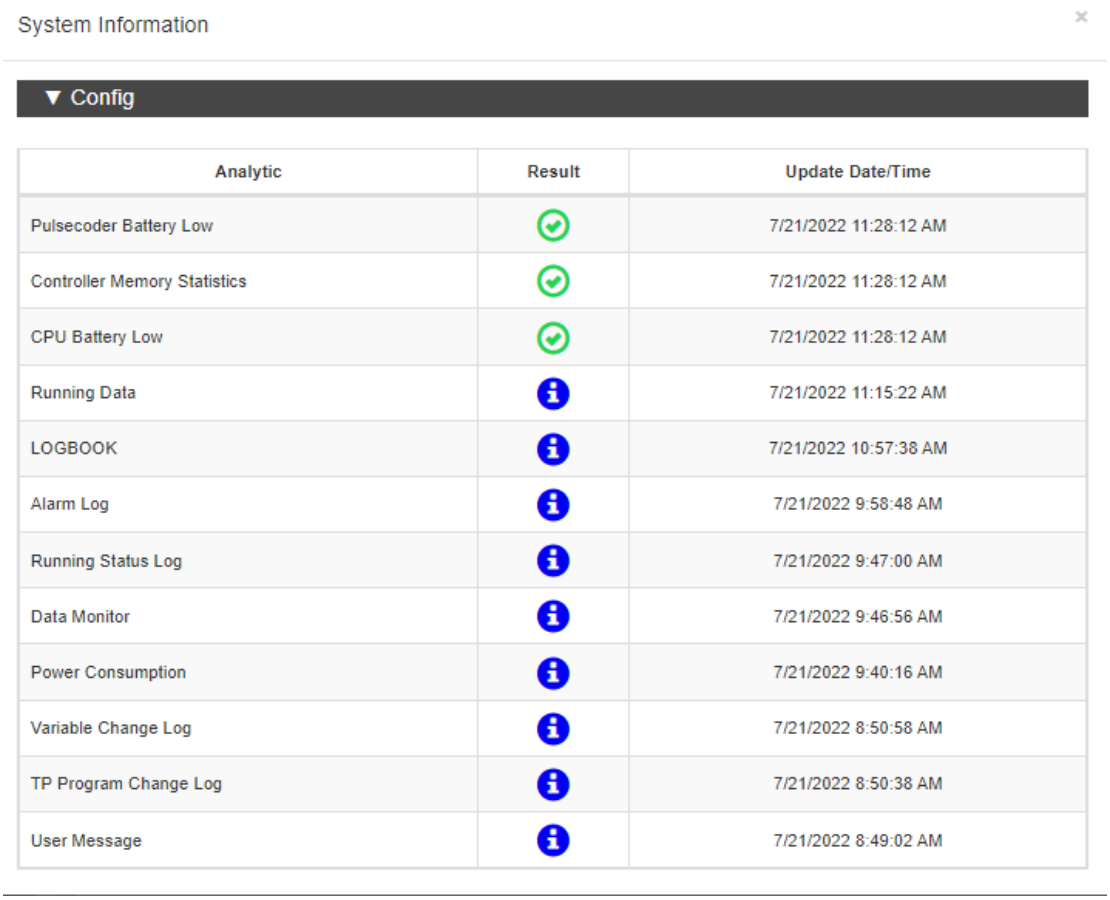


Fig. 3.6.3 (a) System information

The status of Pulsecoder Battery Low and CPU Battery Low is classified according to the following definitions.

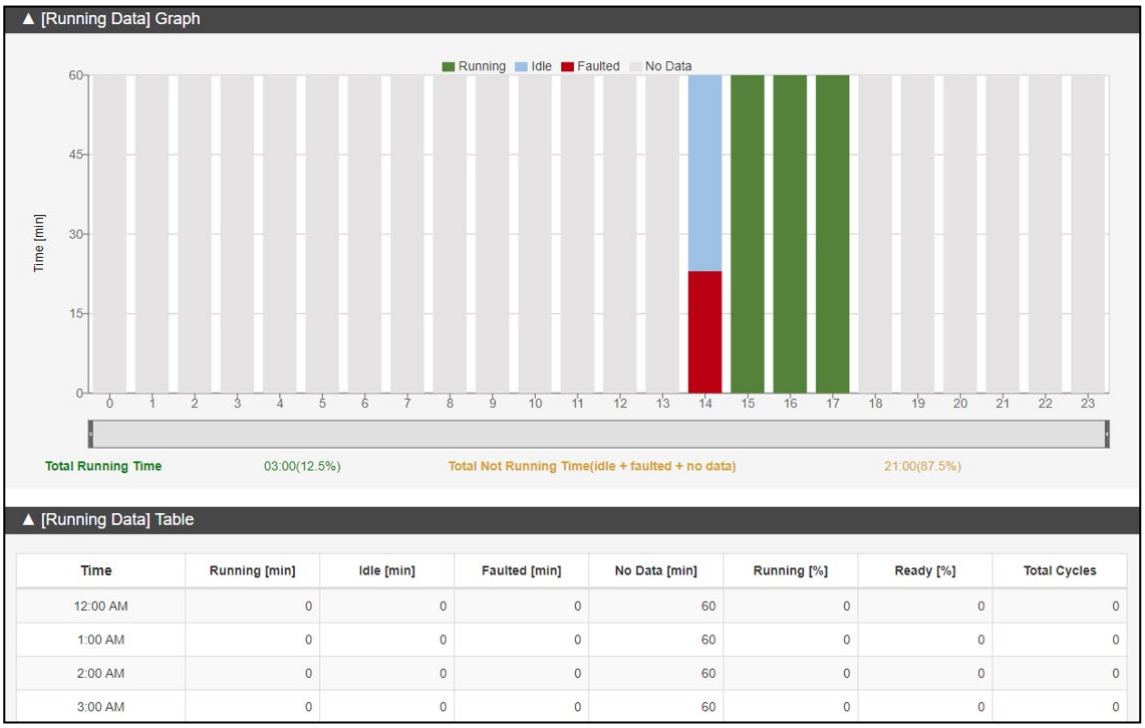
Table 3.6.3 (a) Status of Pulsecoder battery low and CPU battery low

Status	Icon	Description
Good		The battery voltage is maintaining a good value.
Issue		The battery voltage has dropped or is zero.

NOTE
If the diagnosis results of the Pulsecoder Battery Low or the CPU Battery Low is “Issue”, follow the instructions in the Operator's manual for your model to replace the battery.

3.6.3.1 Running data

The running data can be used in the basic package. The running data displays the operation performance of the robot per hour. The total running time and not-running time displayed at the bottom of the graph are the tallied results for the day respectively.



Time	Running [min]	Idle [min]	Faulted [min]	No Data [min]	Running [%]	Ready [%]	Total Cycles
12:00 AM	0	0	0	60	0	0	0
1:00 AM	0	0	0	60	0	0	0
2:00 AM	0	0	0	60	0	0	0
3:00 AM	0	0	0	60	0	0	0

Fig. 3.6.3.1 (a) Running data

Each item is described as follows.

Table 3.6.3.1 (a) Running data

Item	Description
Running [min]	Period when the robot is operating within 60 minutes
Idle [min]	Period when the robot is being stopped within 60 minutes
Faulted [min]	Period when the robot is being stopped due to alarm within 60 minutes
No Data [min]	Period without running data
Running [%]	Proportion of period when the robot is operating within 60 minutes
Ready [%]	Proportion of period when the robot is not being stopped due to alarm within 60 minutes
Total Cycles	Total cycles up until now

NOTE
The tallied results of running time and total cycles differ depending on the setting of the robot. Refer to “2.9.11 Application Status” for more information.

3.6.3.2 Power consumption

The power consumption can be used in the basic package. The power consumption displays the estimated power consumption for each program. When multiple programs are selected, the total power consumption of the selected programs is displayed.

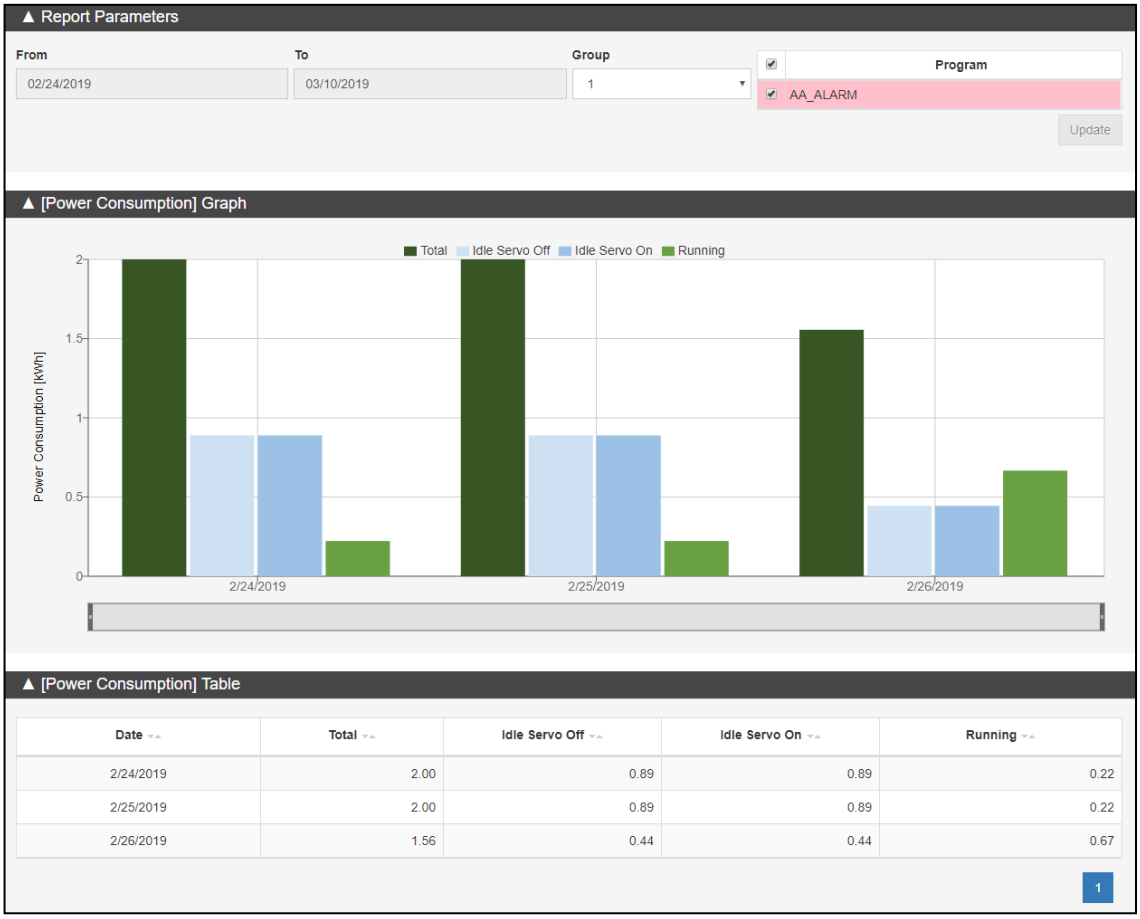


Fig. 3.6.3.2 (a) Power consumption

Each item is described as follows.

Table 3.6.3.2 (a) Power consumption

Item	Description
Running	Amount of power consumed when the robot is operating
Idle Servo On	Amount of power consumed when the robot is stopped and the servo is turned on from when the previous program has finished until the current program has finished
Idle Servo Off	Amount of power consumed when the robot is stopped and the servo is turned off from when the previous program has finished until the current program has finished
Total	Total power consumptions of the above 3 items

3.6.3.3 Alarm log

The alarm log can be used in the basic package.
The alarm log graph displays a summary table of the number of occurrences for each alarm and a graph of the number of occurrences for each day for each alarm. The alarm log list displays the occurrence history of the alarm. The background color of the alarm message changes based on the severity of the alarm. When an alarm has occurred and the robot has stopped while executing the program, you can confirm on which line of the program the robot has stopped.

If you click the CSV button at the upper right of the list, you can download the alarm log as a CSV file.
Click the “Select columns” button to show or hide the items displayed in “List”.

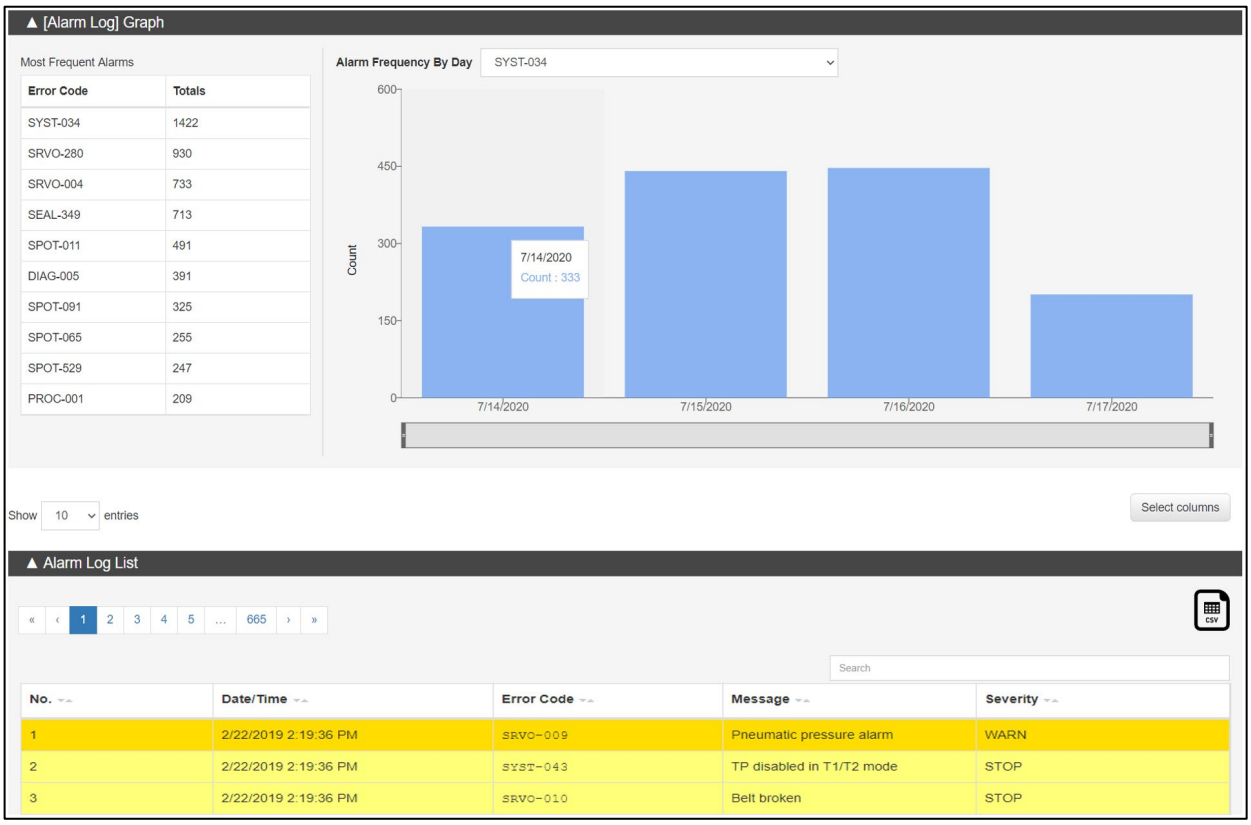


Fig. 3.6.3.3 (a) Alarm log

Also, clicking the following buttons will display logs filtered by the alarm severity. In initial state, all alarm severities are selected.

Fig. 3.6.3.3 (b) Alarm severities button

NOTE

Up to the latest 10,000 logs during the specified period are displayed on this screen.
As for the count table of the outbreak number of times every alarm, it is displayed ten cases in descending order of the number of occurrences.
The background color of the alarm message basically changes depending on the severity of the alarm.
When the alarm code is "OS -000", it is displayed in blue.
Moreover, since the severity of this code is "WARN", the display/non-display can be switched using the "WARN" button.

The data collection service must be installed and configured to obtain the program information when an alarm occurs.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.

3.6.3.4 User message

The user message can be used in the basic package. The user message displays the history of any user message sent by executing IRC_MSG. The background color of the user message changes depending on the value assigned to the third argument of IRC_MSG.
Click the “Select columns” button to show or hide the items displayed in “List”.

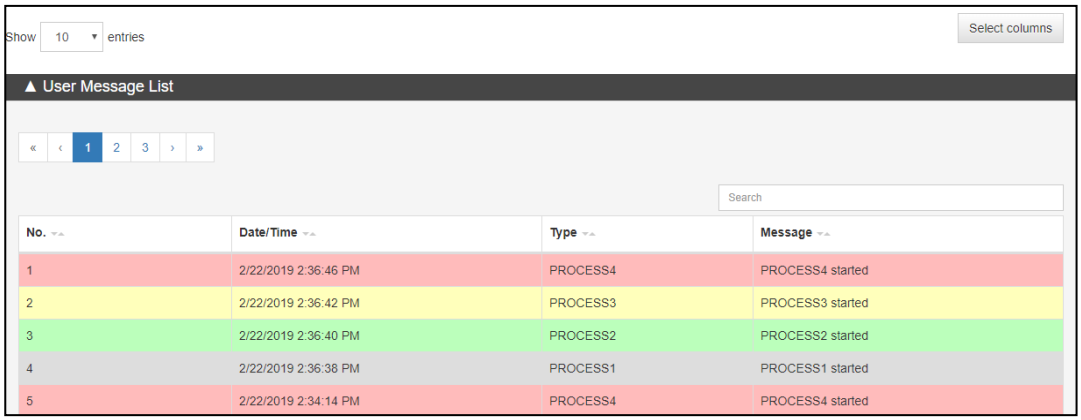


Fig. 3.6.3.4 (a) User message

Also, clicking the following buttons will display logs filtered by the value assigned to the third argument of IRC_MSG. In initial state, all the values are selected.

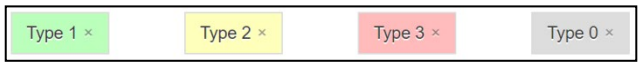


Fig. 3.6.3.4 (b) Type button

3.6.3.5 Variable change log

The variable change log can be used in the basic package. The variable change log displays the change history of the monitored system variable, I/O, register, and KAREL variable.
Click the “Select columns” button to show or hide the items displayed in “List”.

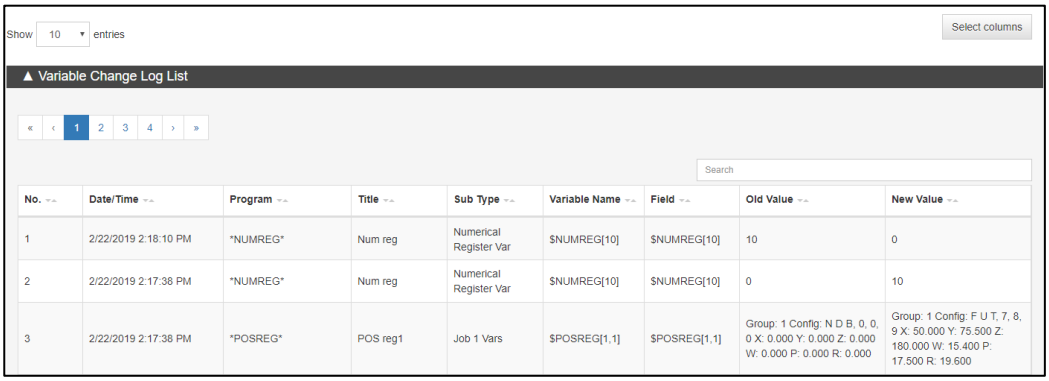


Fig. 3.6.3.5 (a) Variable change log

Each item is described as follows.

Table 3.6.3.5 (a) Variable change log

Item	Description
Date/Time	This is the date and time it was changed.
Program	This is the KAREL program name where the monitored KAREL variable specified with the prog attribute in the <VARCHG> tag of the varchg.xml file is defined.
Title	This is an arbitrary description specified in the title attribute of the <VARCHG> tag of the varchg.xml file.
Sub Type	This is an arbitrary description specified in the subtype attribute of the <VARCHG> tag of the varchg.xml file.
Variable Name	This is the name of the monitored variable.
Field	This is the field that includes the variable to be monitored.
Old Value	This is the value of the monitored variable before change.
New Value	This is the value of the monitored variable after change.
Comment	This comment is for when a monitored variable has been changed. Only comments associated with registers (value, string, position) are displayed.

3.6.3.6 TP program change log

The TP program change log can be used in the basic package. The TP program change log displays the TP program change log history.
A CSV file of the TP program change log can be downloaded by clicking the “CSV” button on the upper-right of the list.
Click the “Select columns” button to show or hide the items displayed in “List”.

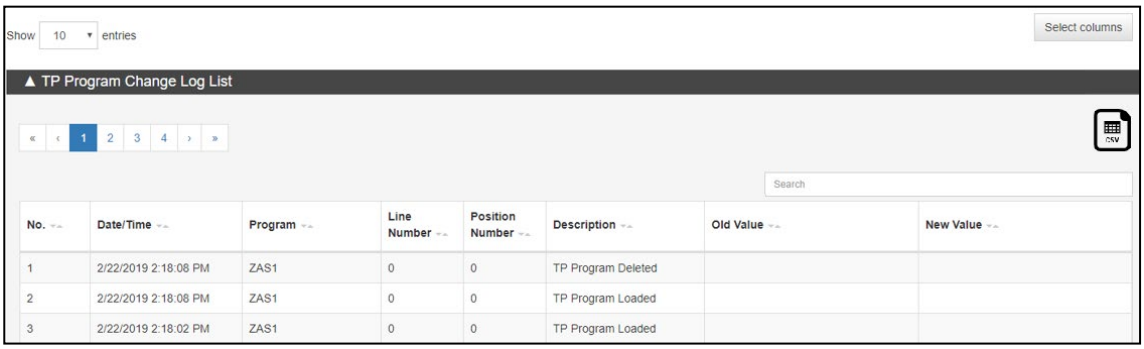


Fig. 3.6.3.6 (a) TP program change log

Each item is described as follows.

Table 3.6.3.6 (a) TP program change log

Item	Description
Date/Time	This is the date and time it was changed.
Program	This is the changed program name.
Line Number	This is the changed line number.
Position Number	This is the position number when the taught position is changed.
Description	This is the content of the program change.
Old Value	This is the content before the change.
New Value	This is the content after the change.

3.6.3.7 Running status log

The running status log can be used in the basic package. The running status log displays the running status history of a robot. The history is updated when the running status (operating, stopped, alarm occurrence) of the robot has changed.

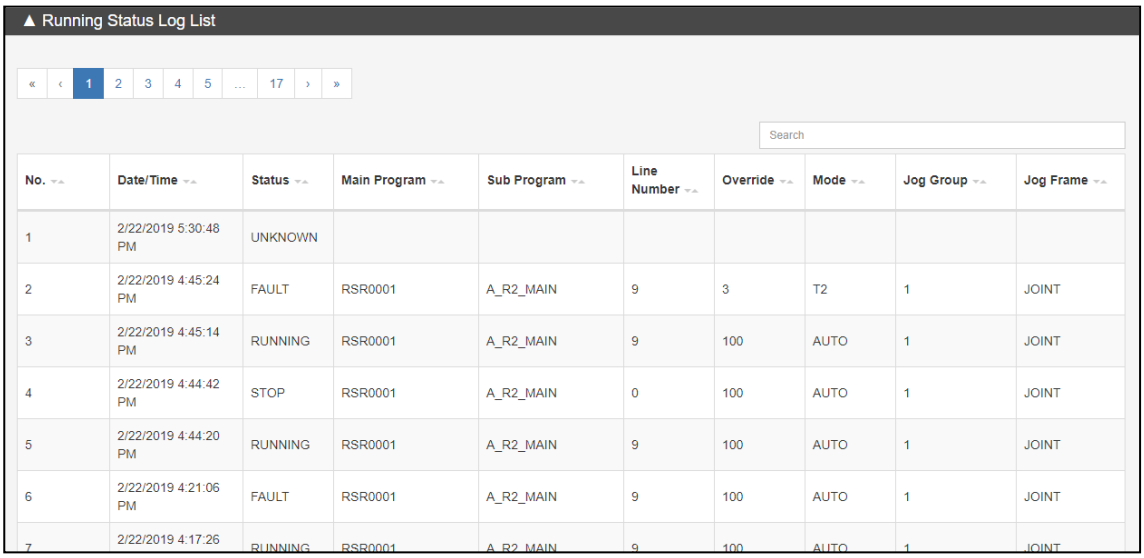


Fig. 3.6.3.7 (a) Running status log

Each item is described as follows.

Table 3.6.3.7 (a) Running change log

Item	Description
Date/Time	This is the date and time the history is updated.
Status	This shows the operation status. RUNNING, STOP, FAULT, and UNKNOWN mean the robot is operating, the robot is stopped, an alarm is occurring, and no data for the most recent 30 minutes (default), respectively.
Main Program	This is the main program that has been executed.
Sub Program	This is the sub program that has been executed.
Line Number	This is the line number of the sub program that has been executed.
Override	This is the override that has been set.
Mode	This is the operation mode that has been set.
Jog Group	This is the jog group that has been set.
Jog Frame	This is the jog frame that has been set.

3.6.3.8 Controller memory statistics

The controller memory statistics can be used in the basic package. The controller memory statistics display the usage status of the robot's controller memory in time series. Usage statistics are calculated with the average value for each hour and displayed with the average value for each day. Here, the dashed yellow line represents the warning limit of the usage level, and the red line represents the critical limit of the usage level. When the warning limit or critical limit is reached, it is notified by email and Web portal.

Fig. 3.6.3.8 (a) Controller memory (graph)

▲ [Controller Memory Statistics] Table

Yellow: Less than the warning limit, above the critical limit
Red: Less than the critical limit

Date/Time	Memory Type	Available Memory [MB]	Warning Limit [MB]	Critical Limit [MB]
12/4/2019 2:08:45 PM	TEMP	0.300	1.00	0.30
12/5/2019 2:08:45 PM	TEMP	0.290	1.00	0.30
12/6/2019 2:08:45 PM	TEMP	0.290	1.00	0.30
12/7/2019 2:08:45 PM	TEMP	0.280	1.00	0.30
12/8/2019 2:08:45 PM	TEMP	0.280	1.00	0.30
12/9/2019 2:08:45 PM	TEMP	0.270	1.00	0.30
12/10/2019 2:08:45 PM	TEMP	0.270	1.00	0.30
12/11/2019 2:08:45 PM	TEMP	2.500	1.00	0.30
12/12/2019 2:08:45 PM	TEMP	2.498	1.00	0.30

1

Fig. 3.6.3.8 (b) Controller memory (Table)

Each item is described as follows.

Table 3.6.3.8 (a) Controller Memory

Item	Description
Date/Time	The date and time on which measurement was made.
Memory Type	This is the memory type of the robot controller.
Available Memory	Displays the free space of each available memory in the controller.
Warning Limit	Displays the warning limit of each memory available in the controller.
Critical Limit	Displays the critical limit for each memory available in the controller.

The status of the controller memory is classified according to the following definitions.

Table 3.6.3.8 (b) Controller memory statistics

Status	Icon	Description
Good		For all memory types, available memory is greater than or equal to the warning limit.
Warning		For all memory types, the available memory is greater than or equal to the critical limit, and for any of the memory types, the available memory is less than the warning limit.
Issue		For one of the memory types, the available memory is less than the critical limit.

The following 6 memory types are supported.

Table 3.6.3.8 (c) Memory Type

Memory Type	Memory Unit	Description
TEMP	MB	TEMP memory is DRAM. If the memory is low, it may affect the operation of the system.
MBEC	KB	MBEC memory is used to receive data from the communication CPU. If the memory is low, communication between the main CPU and the communication CPU may be hindered.
MBEM	KB	The MBEM memory is used to receive data from the main CPU. If the memory is low, communication between the main CPU and the communication CPU may be hindered.
PERM	KB	The PERM is system memory. If the memory is low, it may affect the operation of the system.
TPP	KB	TPP is the teach pendant program memory. If the memory is low, loading of new programs may be hindered.
FROM	MB	The FROM is flash memory. If the memory is low, loading of new functions may be hindered.

3.6.3.9 Data Monitor

The data monitor can be used in the basic package. The data monitor obtains values such as the coordinate and torque values from the robot when an alarm occurs and displays them in a graph and table for each date and time on which an alarm occurred. You can confirm the data from when an alarm occurred, for example, to help determine the cause of the alarm.

Buttons are provided to display the Alarm Log screen, TP Program Change Log screen, LOGBOOK screen, and Spot Weld Log screen in order to refer to detailed data. Clicking one of these buttons displays the details screen for the respective function in a separate tab.

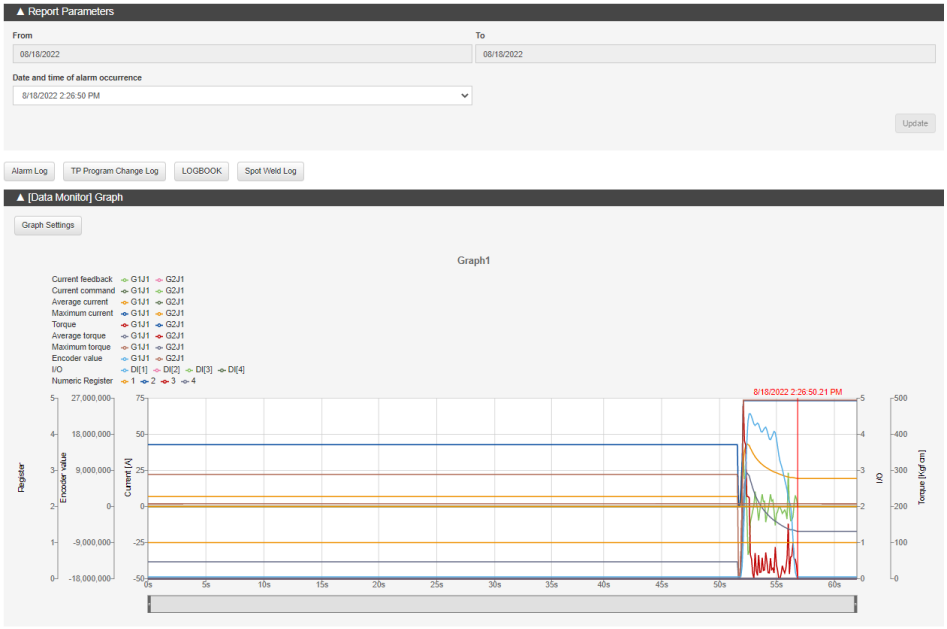


Fig. 3.6.3.9 (a) Data monitor (graph)

NOTE

To retrieve the data monitor, the data collection service must be installed and configured.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.
Refer to “4.6 DATA MONITOR SETTINGS” for details about the data monitor collection settings.

Also, you can click the “Graph Settings” button to display the Graph Settings screen, where you can set which data to display in the graph. The types of data are “Current”, “I/O”, “Encoder value”, “Torque”, and “Register”.
You can click the “Add a graph” button to add a graph settings tab. By configuring the graph settings on each tab, you can display multiple graphs in the graph area.
To delete a graph, click the × button on the applicable graph settings tab, and then click the Register button.

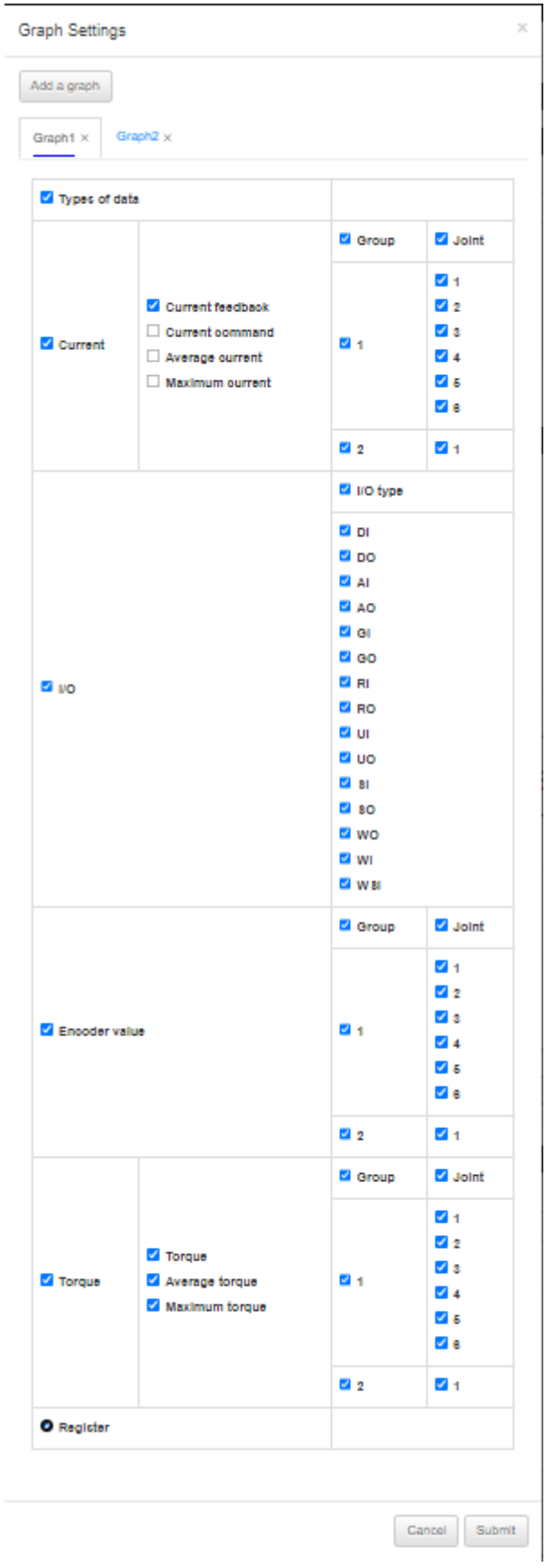


Fig. 3.6.3.9 (b) Data monitor (graph settings)

At the top of the table area, “coordinate values / tool coordinates / user coordinates” are displayed. Coordinate values are divided into tabs based on group number, like “G1” and “G2”, and you can confirm the coordinate values for each group by clicking its tab.
Also, by clicking the graph, the date/time and coordinate values are updated to reflect the place where you clicked.

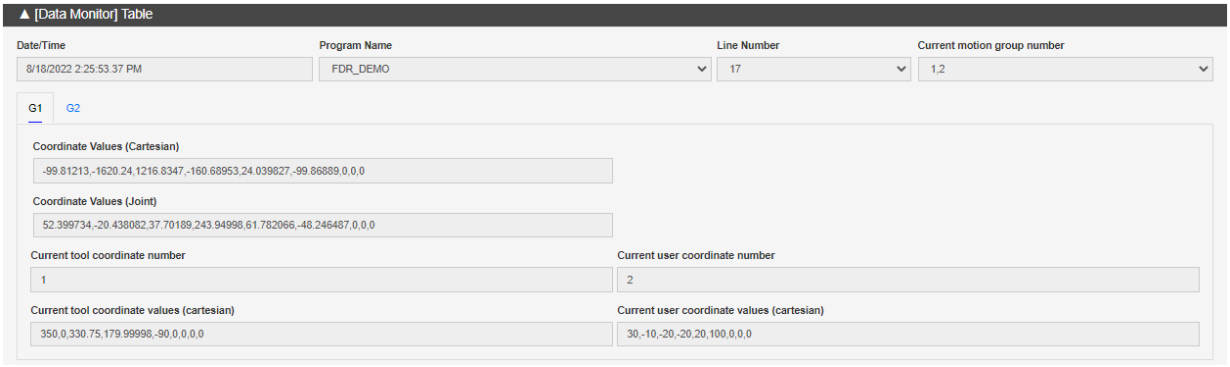


Fig. 3.6.3.9 (c) Data monitor (table): Coordinate values

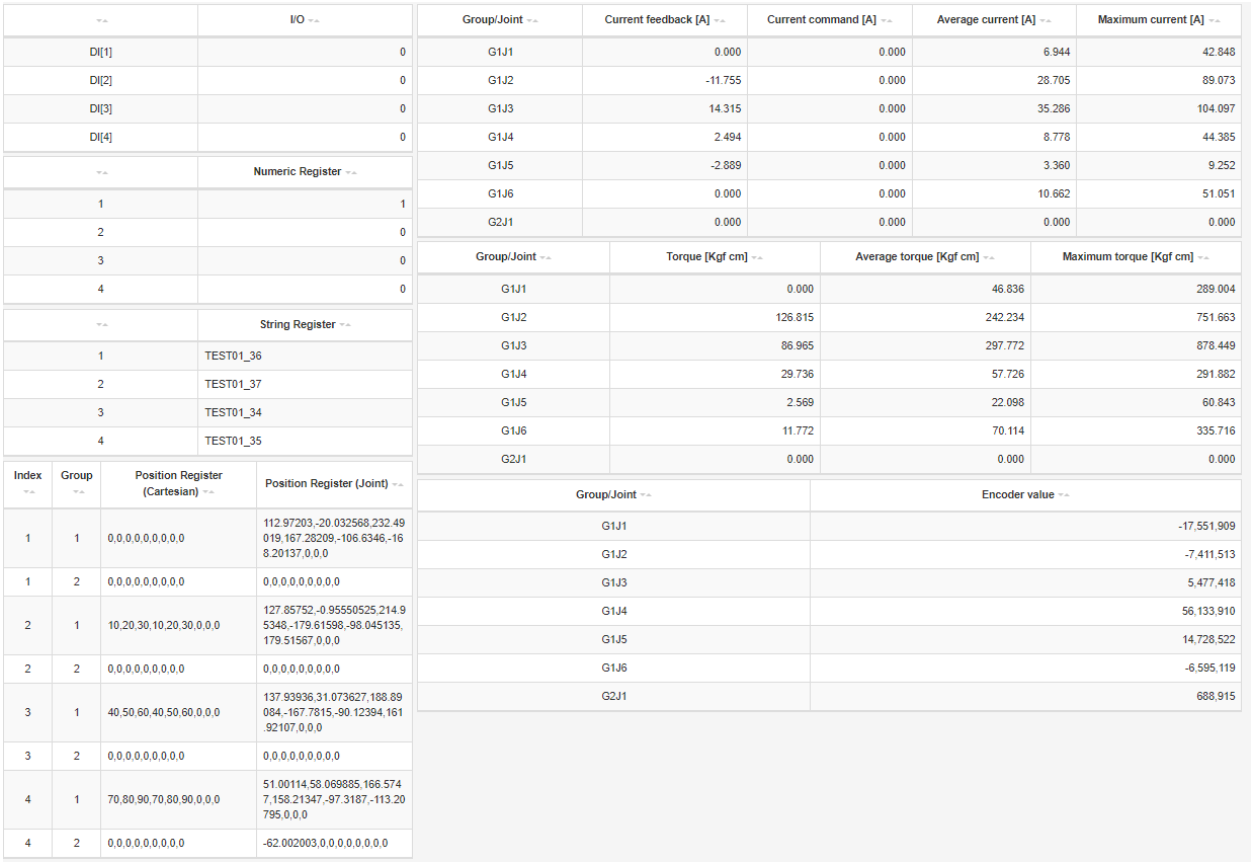
Each item is described as follows.

Table 3.6.3.9 (a) Data monitor: Coordinate values

Item	Description
Date/Time	The date and time on which the data monitor was obtained.
Program Name	The name of the program that was executing when the data was obtained.
Line Number	The line number of the program that was executing when the data was obtained.
Current motion group number	The motion group number of the program that was executing when the data was obtained.
Coordinate Values (Cartesian)	The coordinate values (Cartesian) from when the data was obtained.
Coordinate Values (Joint)	The coordinate values (Joint) from when the data was obtained.
Current tool coordinate number	The tool coordinate number from when the data was obtained.
Current tool coordinate values (Cartesian)	The tool coordinate values (Cartesian) from when the data was obtained.
Current tool coordinate values (joint)	The tool coordinate values (Joint) from when the data was obtained.
Current user coordinate number	The user coordinate number from when the data was obtained.
Current user coordinate values (Cartesian)	The user coordinate values (Cartesian) from when the data was obtained.
Current user coordinate values (joint)	The user coordinate values (Joint) from when the data was obtained.

NOTE
- In the case of a KAREL program, “Program Name”, “Line Number”, and “Current motion group number” are not displayed.
- In a situation where “Current motion group number” cannot be obtained, “Program Name” and “Line Number” are not displayed.

The data for items for which collection was enabled in the data monitor collection settings is displayed under the table area. For items for which collection was disabled, “There is no data to display” is displayed.
Also, by clicking the graph, the parameters are updated to reflect the place where you clicked.



	I/O
DI[1]	0
DI[2]	0
DI[3]	0
DI[4]	0

	Numeric Register
1	1
2	0
3	0
4	0

	String Register
1	TEST01_36
2	TEST01_37
3	TEST01_34
4	TEST01_35

Index	Group	Position Register (Cartesian)	Position Register (Joint)
1	1	0,0,0,0,0,0,0,0,0	112.97203,-20.032568,232.49019,167.28209,-106.6346,-168.20137,0,0,0
1	2	0,0,0,0,0,0,0,0,0	0,0,0,0,0,0,0,0,0
2	1	10,20,30,10,20,30,0,0,0	127.85752,-0.95550525,214.95348,-179.61598,-98.045135,179.51567,0,0,0
2	2	0,0,0,0,0,0,0,0,0	0,0,0,0,0,0,0,0,0
3	1	40,50,60,40,50,60,0,0,0	137.93936,31.073627,188.89084,-167.7815,-90.12394,161.92107,0,0,0
3	2	0,0,0,0,0,0,0,0,0	0,0,0,0,0,0,0,0,0
4	1	70,80,90,70,80,90,0,0,0	51.00114,58.069885,166.5747,158.21347,-97.3187,-113.20795,0,0,0
4	2	0,0,0,0,0,0,0,0,0	-62.002003,0,0,0,0,0,0,0,0

Group/Joint	Current feedback [A]	Current command [A]	Average current [A]	Maximum current [A]
G1J1	0.000	0.000	6.944	42.848
G1J2	-11.755	0.000	28.705	89.073
G1J3	14.315	0.000	35.286	104.097
G1J4	2.494	0.000	8.778	44.385
G1J5	-2.889	0.000	3.360	9.252
G1J6	0.000	0.000	10.662	51.051
G2J1	0.000	0.000	0.000	0.000

Group/Joint	Torque [Kgf cm]	Average torque [Kgf cm]	Maximum torque [Kgf cm]
G1J1	0.000	46.836	289.004
G1J2	126.815	242.234	751.663
G1J3	86.965	297.772	878.449
G1J4	29.736	57.726	291.882
G1J5	2.569	22.098	60.843
G1J6	11.772	70.114	335.716
G2J1	0.000	0.000	0.000

Group/Joint	Encoder value
G1J1	-17,551,909
G1J2	-7,411,513
G1J3	5,477,418
G1J4	56,133,910
G1J5	14,728,522
G1J6	-6,595,119
G2J1	688,915

Fig. 3.6.3.9 (d) Data monitor (table): Collection items

Each item is described as follows.

Table 3.6.3.9 (b) Data monitor: Collection items

Item	Description
I/O Type	Displays the I/O Type. There are 15 I/O types (DI/DO/AI/AO/GI/GO/RI/RO/UI/UO/SI/SO/WO/WI/WSI). The number in [ ] to the right of the I/O type indicates the index value.
I/O	Displays the I/O value that corresponds to the index for each I/O type.
Index	The index value of each register.
Numeric Register	Displays the numeric register that corresponds to the index.
String Register	Displays the string register that corresponds to the index.
Group	The group number of the position register.
Position Register (Cartesian)	Displays the position register (Cartesian) that corresponds to the index.
Position Register (Joint)	Displays the position register (joint) that corresponds to the index.
Group/Joint	The group and joint. Groups that begin with G1 and joints that begin with J1 are displayed together.
Current feedback [A]	The electrical current feedback value from when the data was obtained.
Current command [A]	The electrical current command value from when the data was obtained.
Average current [A]	The average electrical current value from when the data was obtained.
Maximum current [A]	The maximum electrical current value from when the data was obtained.
Torque [Kgf cm]	The torque value from when the data was obtained.
Average torque [Kgf cm]	The average torque value from when the data was obtained.
Maximum torque [Kgf cm]	The maximum torque value from when the data was obtained.
Encoder value	The encoder value from when the data was obtained.

3.6.3.10 LOGBOOK

LOGBOOK can be used in the basic package. LOGBOOK displays the operation history of the teach pendant that was obtained from the robot. The operation history in LOGBOOK is obtained at the occurrence and resolution of an alarm, and once every hour.
The contents of LOGBOOK can be downloaded as a CSV file.

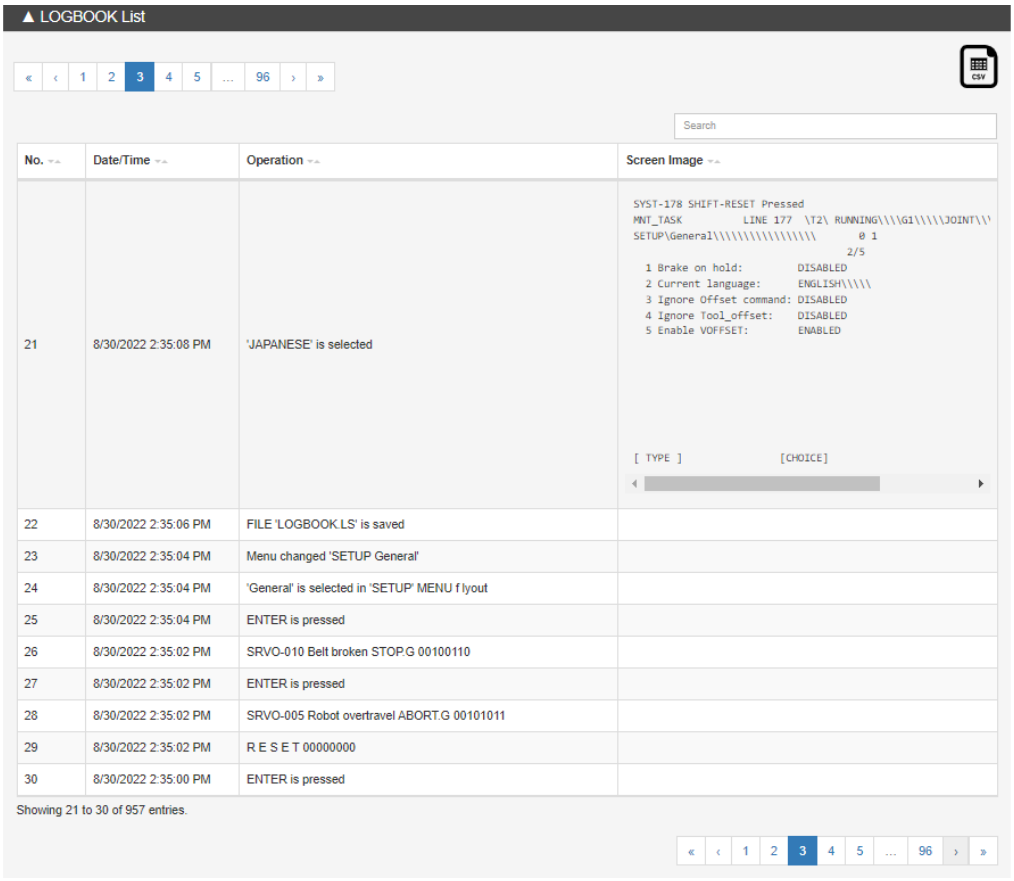


Fig. 3.6.3.10 (a) LOGBOOK list

Each item is described as follows.

Table 3.6.3.10 (a) LOGBOOK list

Item	Description
No.	A sequential number assigned in reverse chronological order.
Date/Time	The date and time an operation with the teach pendant was performed.
Operation	A description of the operation performed with the teach pendant.
Screen Image	An image of the teaching pendant screen of the teach pendant.

NOTE
To retrieve LOGBOOK, the data collection service must be installed and configured. Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.

3.6.4 Process Health

The process health allows you to check the following information.

- Vision
- Process Logger
- Arc Weld Health
- Arc Weld Log
- Servo Gun Diagnosis
- Pressure Check
- Servo Tip Dress
- Tip Wear Diagnosis (Tip Wear Rate)
- Tip Wear Diagnosis (Tip Wear Percentages)
- Spot weld log
- Spot Weld Schedule Change Log

Clicking on the process health icon will display the following screen, and the diagnosis results can be confirmed in the “Result” column. Click each item to confirm the details.
Every piece of information is displayed in the order of updating date and time.

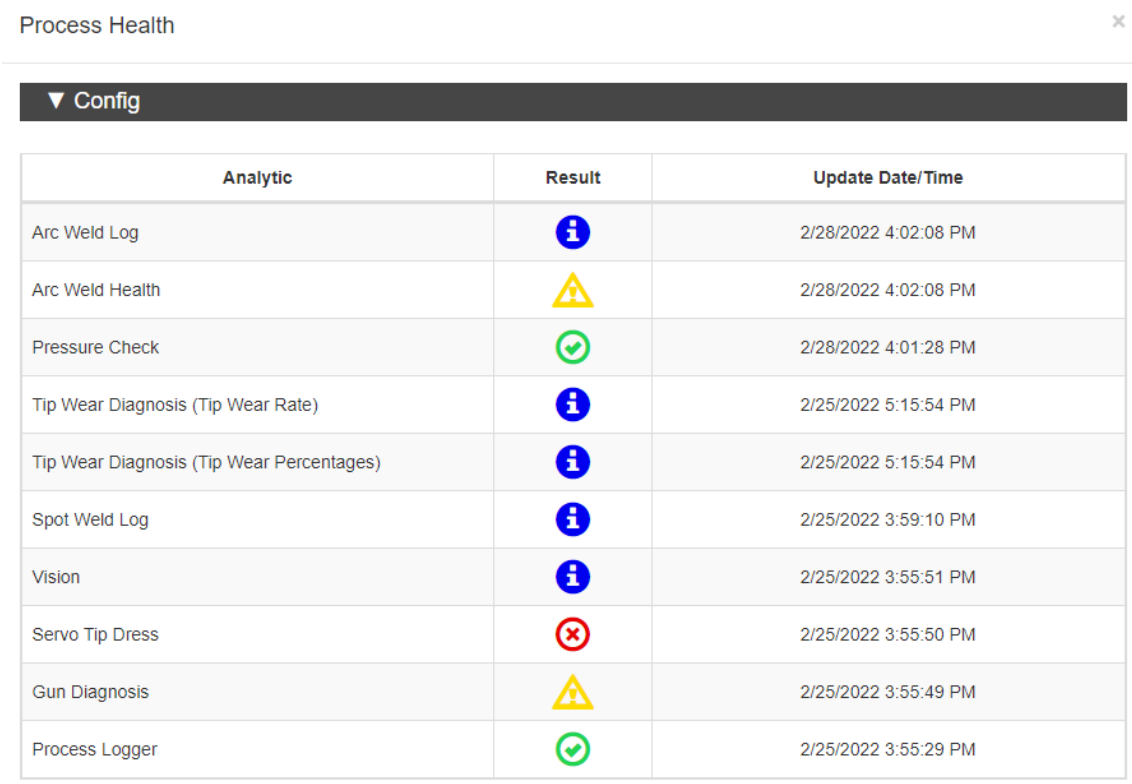


Fig. 3.6.4 (a) Process health

3.6.4.1 Vision

The vision can be used the basic package. The vision displays the detection results of the vision. The cause of an error can be analyzed from the image.

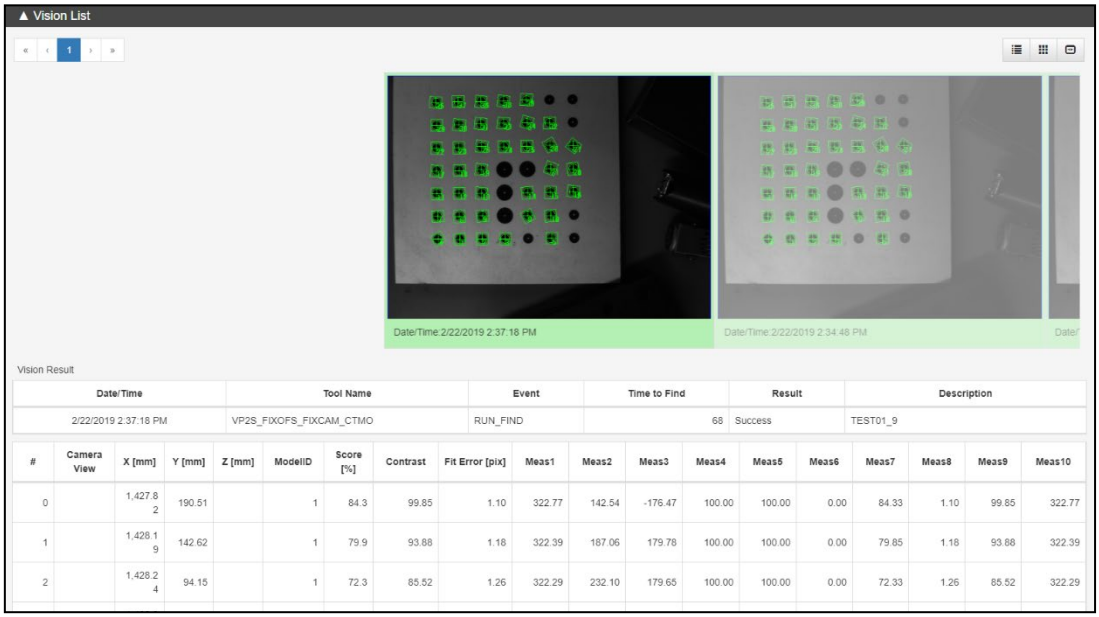


Fig. 3.6.4.1 (a) Vision

Also, the value of the vision offset data is displayed by linking it with the detection results.

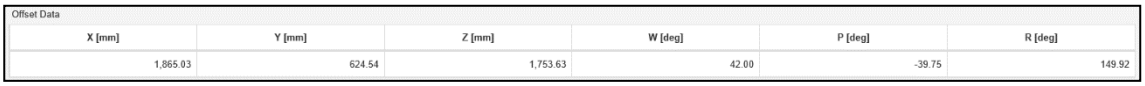


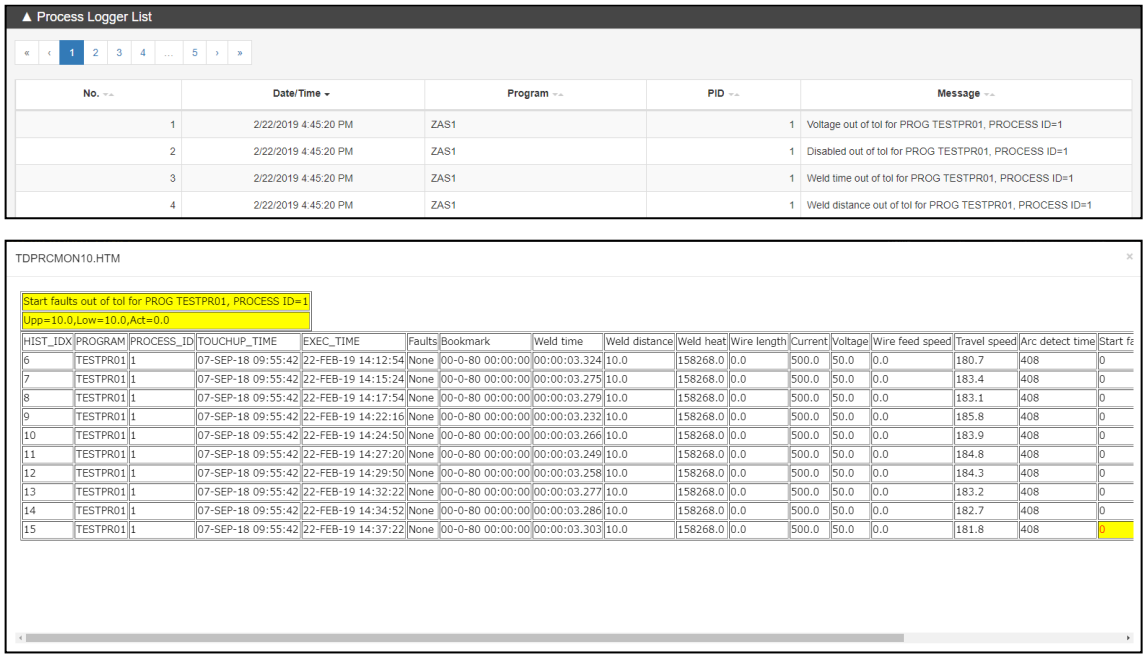
Fig. 3.6.4.1 (b) Vision offset data

NOTE

To retrieve the vision offset data, the data collection service must be installed and configured.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.

3.6.4.2 Process logger

The process logger can be used in the basic package. The process logger displays the history of welding abnormality detected when the spot welding or arc welding has finished. Click history to refer to the detailed information.



▲ Process Logger List

« ‹ 1 2 3 4 ... 5 › »

No.	Date/Time	Program	PID	Message
1	2/22/2019 4:45:20 PM	ZAS1	1	Voltage out of tol for PROG TESTPR01, PROCESS ID=1
2	2/22/2019 4:45:20 PM	ZAS1	1	Disabled out of tol for PROG TESTPR01, PROCESS ID=1
3	2/22/2019 4:45:20 PM	ZAS1	1	Weld time out of tol for PROG TESTPR01, PROCESS ID=1
4	2/22/2019 4:45:20 PM	ZAS1	1	Weld distance out of tol for PROG TESTPR01, PROCESS ID=1

TDPRCMON10.HTM

Start faults out of tol for PROG TESTPR01, PROCESS ID=1
Upp=10.0,Low=10.0,Act=0.0

HIST_IDX	PROGRAM	PROCESS_ID	TOUCHUP_TIME	EXEC_TIME	Faults	Bookmark	Weld time	Weld distance	Weld heat	Wire length	Current	Voltage	Wire feed speed	Travel speed	Arc detect time	Start fa
6	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:12:54	None	00-0-80 00:00:00	00:00:03.324	10.0	158268.0	0.0	500.0	50.0	0.0	180.7	408	0
7	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:15:24	None	00-0-80 00:00:00	00:00:03.275	10.0	158268.0	0.0	500.0	50.0	0.0	183.4	408	0
8	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:17:54	None	00-0-80 00:00:00	00:00:03.279	10.0	158268.0	0.0	500.0	50.0	0.0	183.1	408	0
9	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:22:16	None	00-0-80 00:00:00	00:00:03.232	10.0	158268.0	0.0	500.0	50.0	0.0	185.8	408	0
10	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:24:50	None	00-0-80 00:00:00	00:00:03.266	10.0	158268.0	0.0	500.0	50.0	0.0	183.9	408	0
11	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:27:20	None	00-0-80 00:00:00	00:00:03.249	10.0	158268.0	0.0	500.0	50.0	0.0	184.8	408	0
12	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:29:50	None	00-0-80 00:00:00	00:00:03.258	10.0	158268.0	0.0	500.0	50.0	0.0	184.3	408	0
13	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:32:22	None	00-0-80 00:00:00	00:00:03.277	10.0	158268.0	0.0	500.0	50.0	0.0	183.2	408	0
14	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:34:52	None	00-0-80 00:00:00	00:00:03.286	10.0	158268.0	0.0	500.0	50.0	0.0	182.7	408	0
15	TESTPR01	1	07-SEP-18 09:55:42	22-FEB-19 14:37:22	None	00-0-80 00:00:00	00:00:03.303	10.0	158268.0	0.0	500.0	50.0	0.0	181.8	408	0

Fig. 3.6.4.2 (a) Process logger

The status displayed on the process logger is classified according to the following definitions.

Table 3.6.4.2 (a) Status displayed on process logger

Status	Icon	Description
Good		There was no error within the most recent 24 hours.
Warning		There was at least one error within the most recent 24 hours.

3.6.4.3 Arc weld health

The arc weld health can be used in the arc package. The arc weld health displays the rankings of locations where weld is unstable and the average weld information.

In the ranking, the number of times weld has become unstable for each program and each weld ID is tallied, and the rankings of unstable weld locations are displayed. The unstable weld count is classified into 3 categories: Arc start, Welding and Arc end. Also, clicking a weld location in the rankings will display the detailed information of the selected weld location in graph.

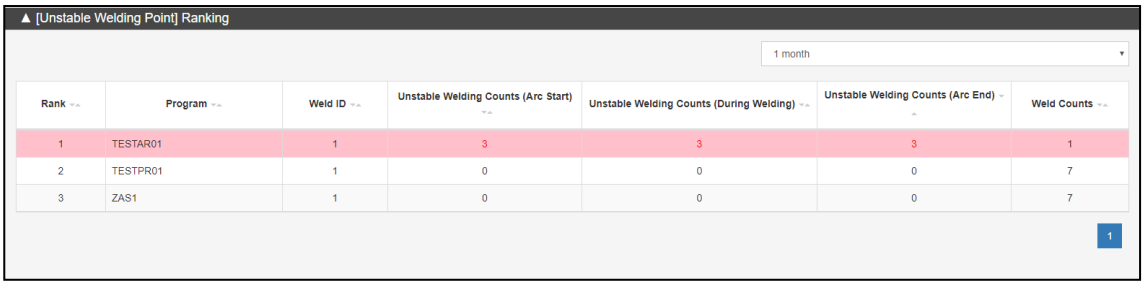


Fig. 3.6.4.3 (a) Ranking of unstable welding point

The graph shows the unstable weld count (stacked bar graph) and the average values (line graph) of weld information such as current, voltage and wire speed in time series.

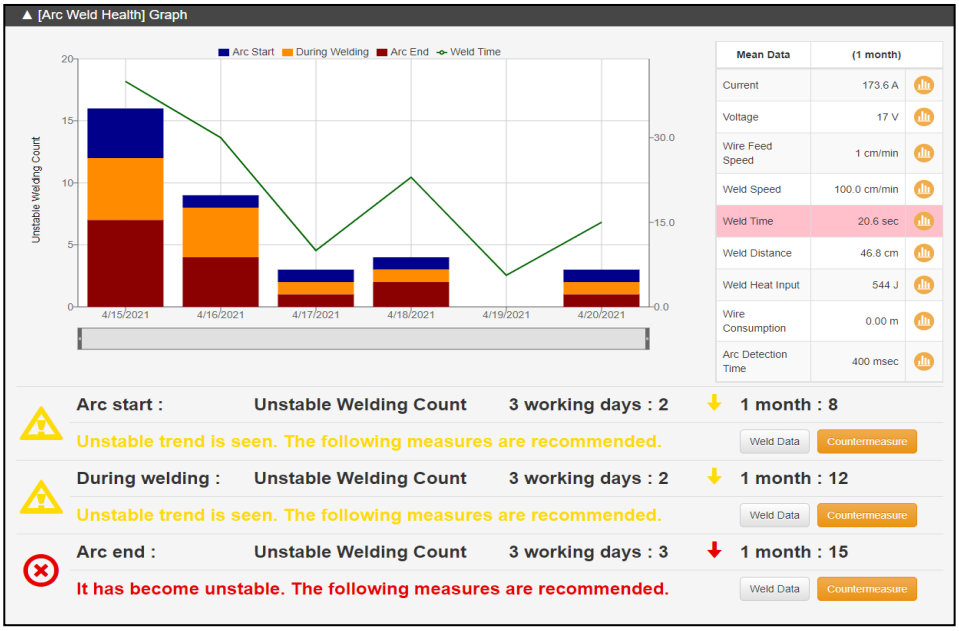


Fig. 3.6.4.3 (b) Arc weld health

Also, clicking the button will allow you to confirm the data distribution in histogram.

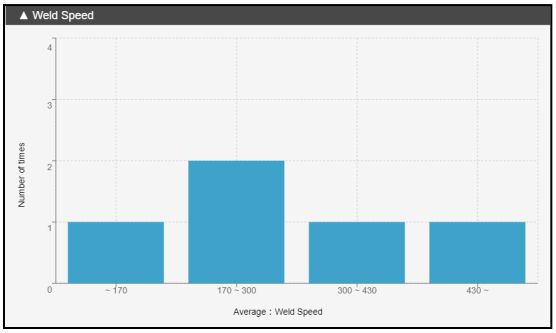


Fig. 3.6.4.3 (c) Histogram

The status of the arc weld health is classified according to the following definitions.

Table 3.6.4.3 (a) Status of arc weld health

Status	Icon	Description
Good		The unstable weld count is 0 in the most recent 3 operation days.
Warning		The unstable weld count is 1 or more and less than 3 in the most recent 3 operation days.
Issue		The unstable weld count is 3 or more in the most recent 3 operation days.
Decrease in instability		The unstable weld count has decreased when comparing the most recent 3 operation days with 3 operation days before those days.
No change in instability		The unstable weld count has not changed when comparing the most recent 3 operation days with 3 operation days before those days.
Increase in instability		The unstable weld count has increased when comparing the most recent 3 operation days with 3 operation days before those days.

If the weld is judged to be unstable, the “Weld Data” and “Countermeasure” buttons are displayed. Clicking the “Weld Data” button allows you to confirm detailed information on the “Arc Weld Log” screen. Clicking the “Countermeasure” button will allow you to confirm countermeasures for each weld location.

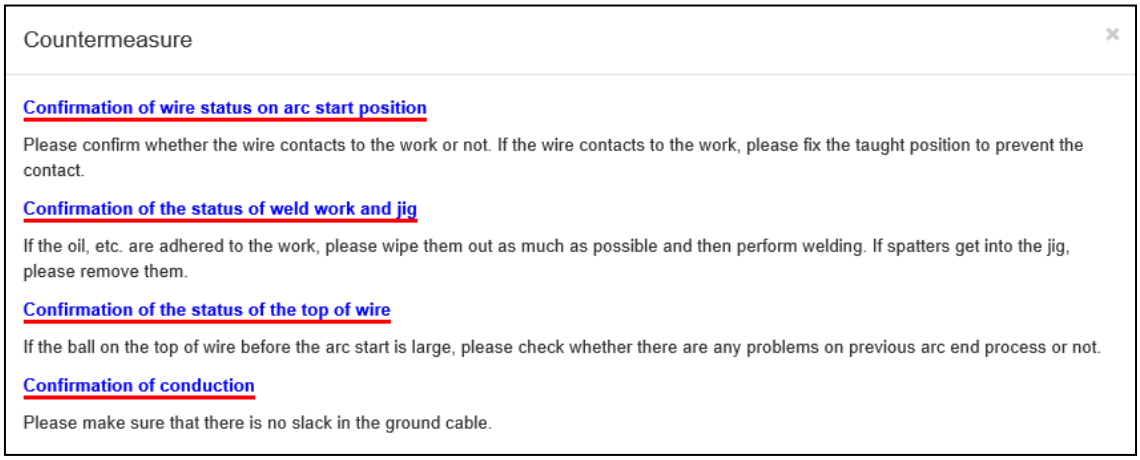


Fig. 3.6.4.3 (d) Countermeasure

3.6.4.4 Arc weld log

The arc weld log can be used in the arc package. The average data by weld is displayed in the average weld data graph and table. Also, if you click a row in the average weld data table, the actual current and voltage data from the arc weld start command to the arc weld finish command is displayed in the detailed arc weld data graph.

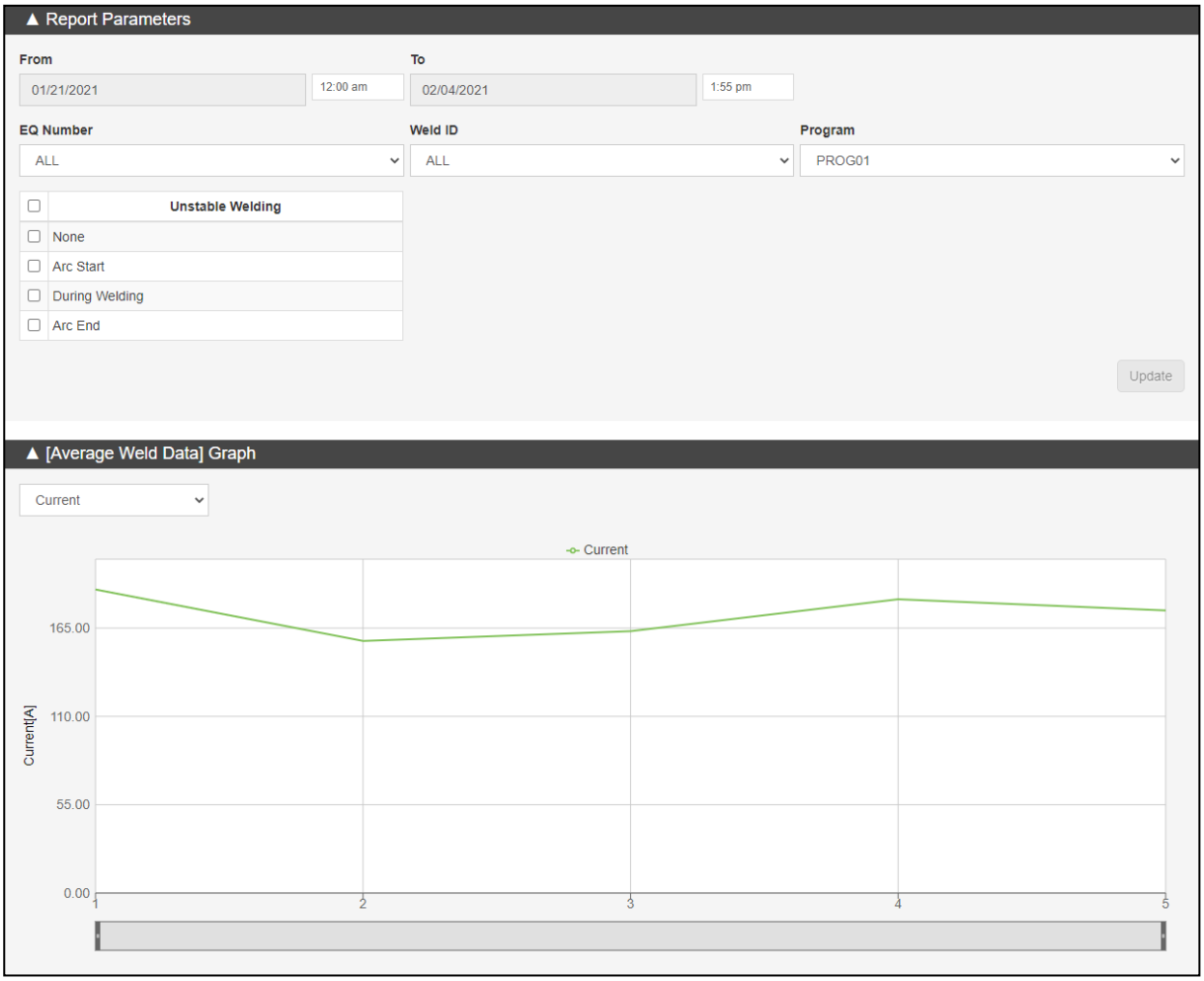


Fig. 3.6.4.4 (a) Arc welding log - average weld data (graph)

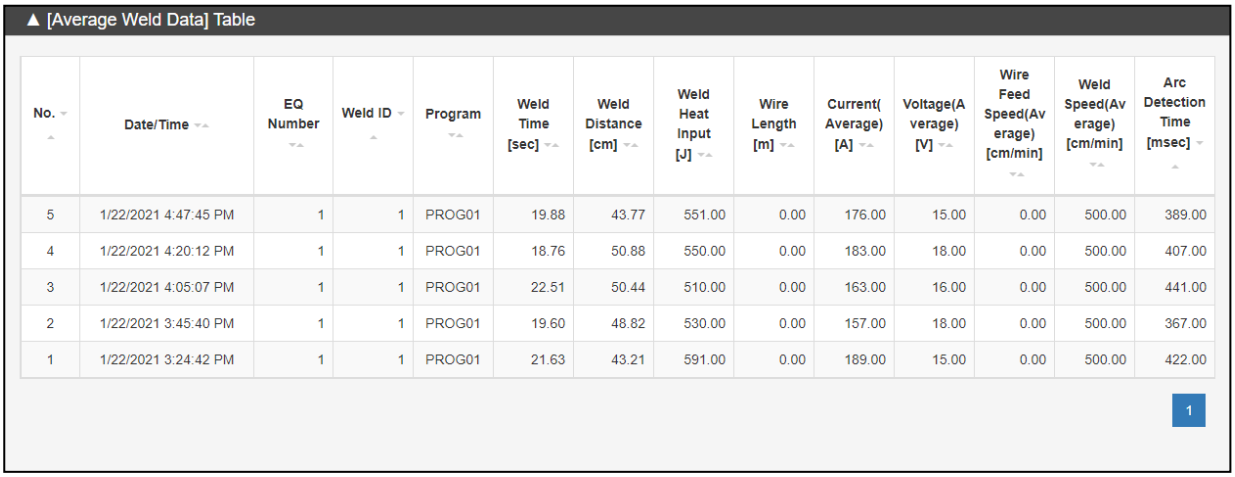


Fig. 3.6.4.4 (b) Arc welding log - average weld data (table)

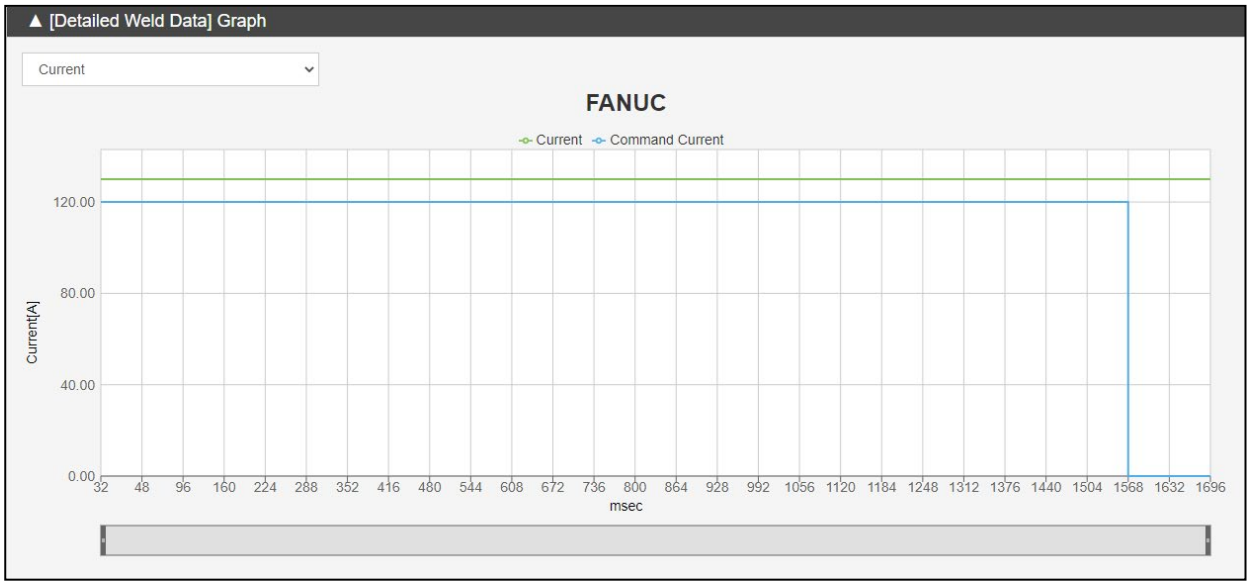


Fig. 3.6.4.4 (c) Arc welding log - detailed weld data

Each item is described as follows.

Table 3.6.4.4 (a) Arc welding log - average weld data

Item	Description
No.	Serial number given in descending order of Date/Time.
Date/Time	The date and time welding was performed.
EQ Number	The device number of the welding device.
Weld ID	The weld ID.
Program	The name of the program that performed welding.
Weld Time [sec]	The length of time from when the weld start command was executed until the weld finish command was executed.
Weld Distance [cm]	The distance that welding was performed.
Weld Heat Input [J]	The amount of heat applied to the workpiece through the weld.
Wire Length [m]	The length of wire used for the weld.
Current (Average) [A]	The average of the actual current used for the weld.
Voltage (Average) [V]	The average of the actual voltage used for the weld.
Wire Feed Speed (Average) [cm/min]	The average wire feed speed used for the weld.
Weld Speed (Average) [cm/min]	The average speed of the robot during the weld.
Arc Detection Time [msec]	The length of time needed to determine that an arc has formed.

Table 3.6.4.4 (b) Arc welding log - detailed weld data

Item	Description
Power manufacturer name	The power manufacturer name is displayed above the graph legend.
msec	Welding time is displayed in millisecond units.
Current [A]	Displays the return current value from the welder.
Command Current [A]	The command value of the weld current.
Voltage [V]	Displays the return voltage value from the welder.
Command Voltage [V]	The command value of the weld voltage.

NOTE
The following is required to display detailed weld data.
・Arc Monitor option (J987)
・Set “Arc Weld Log” in Arc Monitor screen to “ENABLED” （Default: ENABLED）

3.6.4.5 Servo gun diagnosis

The servo gun diagnosis can be used in the spot package. The servo gun diagnosis displays the disturbance torque (friction) of a gun axis for each gun ID chronologically. Here, the blue line is indicating the base value of the disturbance torque. By comparing the base value with the disturbance torque, the increase/decrease tendency of the disturbance torque can be checked. The red line is indicating the threshold of the disturbance torque. If the disturbance torque exceeds the threshold, it is judged that the servo gun is abnormal. In such a case, check the status of the servo gun.

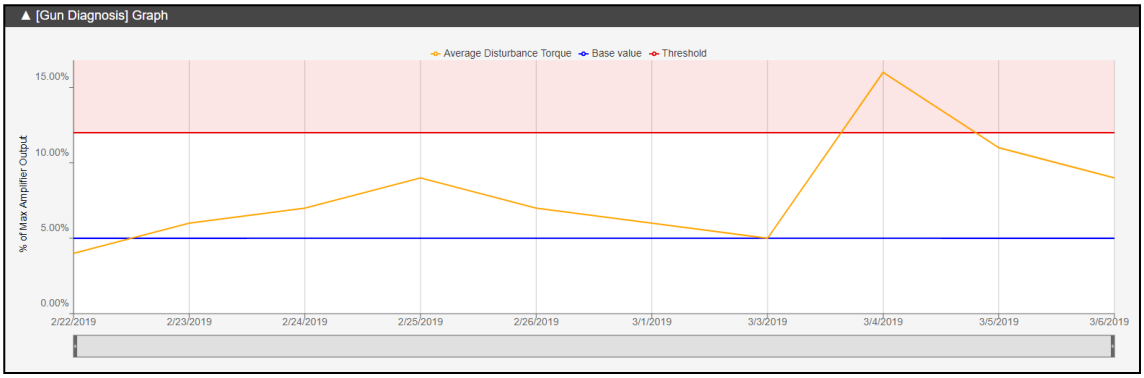


Fig. 3.6.4.5 (a) Servo gun diagnosis

The base value and threshold are calculated based on the first 5 data and set. Clicking the “Reset base value” button will reset both the base value and threshold, and they are set again based on the next 5 data sent thereafter.

The status of the servo gun diagnosis is classified according to the following definitions.

Table 3.6.4.5 (a) Status of servo gun diagnosis

Status	Icon	Description
Good		The most recent disturbance torque is at or below the threshold for all gun IDs.
Warning		The most recent disturbance torque exceeds the threshold for at least 1 gun ID.
Unknown		The threshold has not been set.

3.6.4.6 Pressure check

The pressure check can be used in the spot package. The pressure check displays the base value and the measured value of the pressure applied to the servo gun tip for each gun ID. Displayed on the X-axis of the graph can be switched between the date/time of diagnosis and the torque value by selecting "XAxis Selection" in the parameter settings. If the measured value exceeds the base value threshold, it is judged that the servo gun is abnormal. In such a case, check the state of the servo gun.

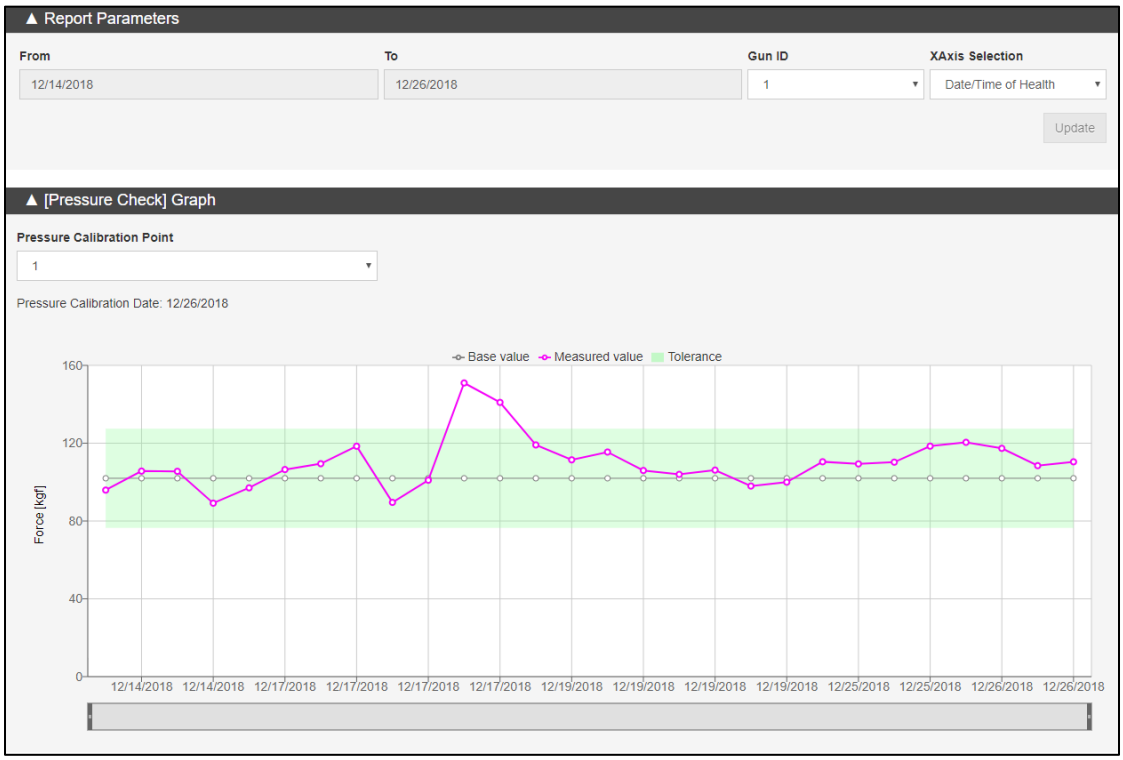


Fig. 3.6.4.6 (a) Pressure check (graph)

▲ [Pressure Check] Table

No.	Date/Time	Torque [%]	Lower Threshold [kgf]	Upper Threshold [kgf]	Base value [kgf]	Measured [kgf]
1	12/14/2018 1:20:01 PM	10.00	76.48	127.46	101.97	95.89
2	12/14/2018 1:20:02 PM	10.00	76.48	127.46	101.97	105.66
3	12/14/2018 1:20:03 PM	10.00	76.48	127.46	101.97	105.54
4	12/14/2018 1:20:04 PM	10.00	76.48	127.46	101.97	89.17
5	12/14/2018 1:20:05 PM	10.00	76.48	127.46	101.97	97.05
6	12/17/2018 1:20:06 PM	10.00	76.48	127.46	101.97	106.45

Fig. 3.6.4.6 (b) Pressure check (table)

Each item is described as follows.

Table 3.6.4.6 (a) Pressure check

Item	Description
No.	The order in which measurement was performed. This is displayed only when “Diagnosis Date/Time” is selected in “X Axis Selection”.
Date/Time	The date and time on which measurement was performed. This is displayed only when “Diagnosis Date/Time” is selected in “X Axis Selection”.
Pressure Calibration Point	The pressure calibration point. This is displayed only when “Torque Value” is selected in “X Axis Selection”.
Torque [%]	The torque value of the servo gun.
Lower Threshold [kgf]	The threshold lower limit. This indicates numeric value that corresponds to 75% of the base value.
Upper Threshold [kgf]	The threshold upper limit. This indicates numeric value that corresponds to 125% of the base value.
Base value [kgf]	The base value for pressure.
Measured [kgf]	The measured value of pressure. This is displayed green if it does not reach the base value’s threshold and in red if it meets or exceeds the base value’s threshold.

The status of the pressure check is classified according to the following definitions.

Table 3.6.4.6 (b) Status of pressure check

Status	Icon	Description
Good		For all gun IDs, none of the measured values of pressure reach the base value’s threshold.
Issue		The measured value of pressure for at least 1 gun ID reaches or exceeds the base value’s threshold.

3.6.4.7 Servo tip dress

The servo tip dress can be used in the spot package. The servo tip dress records the results of each tip dressing and displays the torque chronologically. There are two types of graphs. One displays the values and thresholds of the max torque and the min torque during tip dressing, along with the alarm and the occurrence date and time for values exceeding the threshold. In addition, the other graph displays the torque and tip distance during tip dressing, etc., and clicking on the legend switches between showing and hiding the graph.

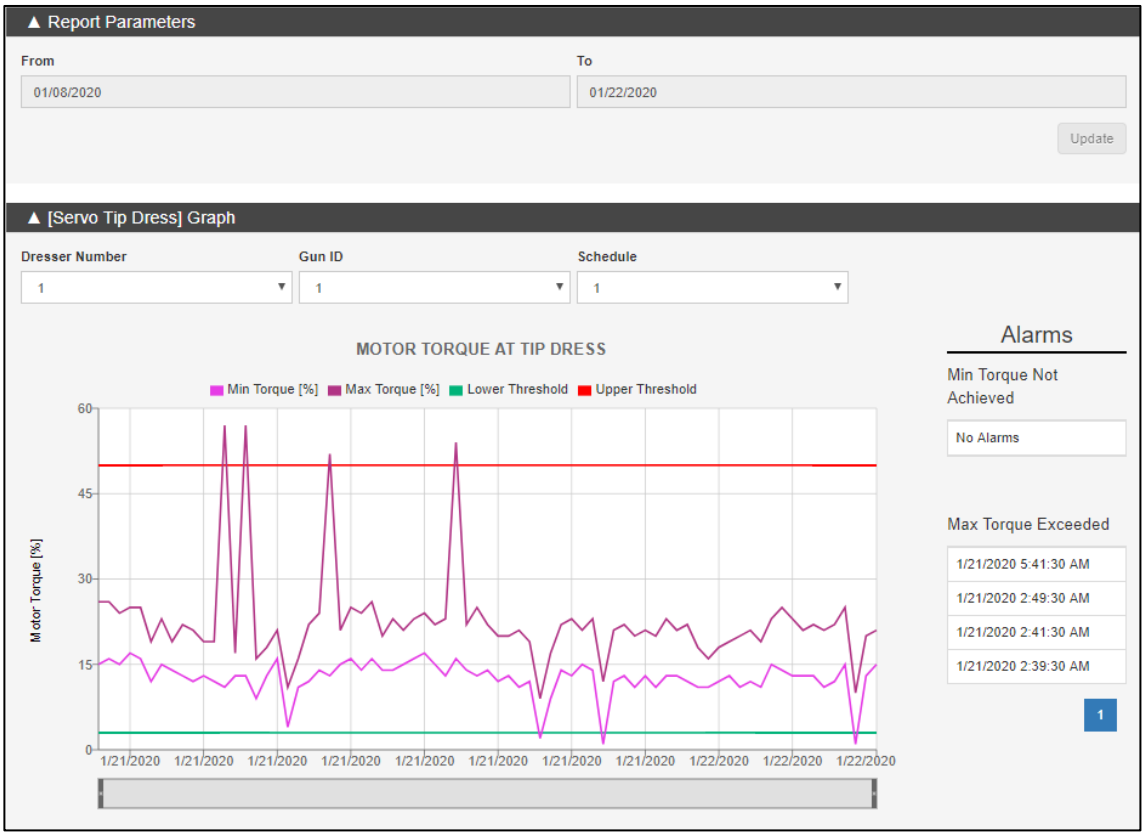


Fig. 3.6.4.7 (a) Servo tip dress

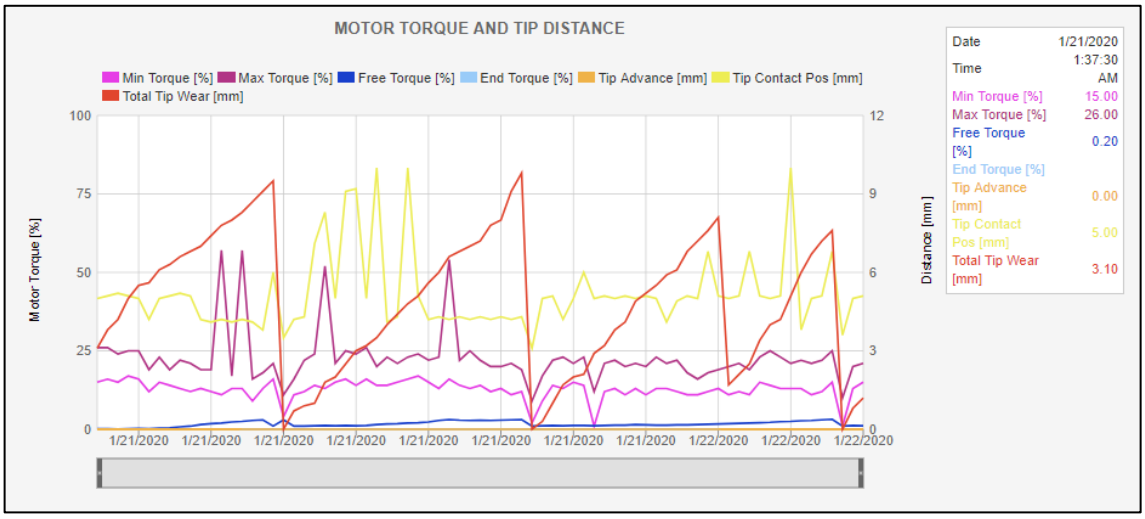


Fig. 3.6.4.7 (b) Servo tip dress

Each item is described as follows.

Table 3.6.4.7 (a) Servo tip dress

Item	Unit	Description
Min Torque	%	This is the minimum increase in torque relative to that measured torque when the gun is not in contact.
Max Torque	%	This is the maximum increase in torque relative to that measured when the gun is not in contact.
Free Torque	%	This is the torque measured when the gun is not in contact.
End Torque	%	This is the end torque value.
Tip Advance	mm	This is the distance that the movable tip has moved in the pressing direction from the time when the pressure was reached until the dress was completed.
Tip Contact Pos	mm	This is the position of the movable tip when the torque has increased (it can be determined that the gun has contacted the cutter) relative to the torque measured when the gun is not in contact.
Total Tip Wear	mm	This is total tip wear.

The status of the servo tip dress is classified according to the following definitions.

Table 3.6.4.7 (b) Status of servo tip dress

Status	Icon	Description
Good		All torques during dressing are within the threshold.
Issue		The max torque during dressing exceeds or is below the threshold value.

3.6.4.8 Tip wear diagnosis (tip wear rate)

The tip wear diagnosis (tip wear rate) can be used in the spot package. The tip wear diagnosis (tip wear rate) displays the wear rate (amount of wear per 1000 spots) of each tip for each gun ID. The tip's wear rate displayed on the Y-axis of the graph can be switched by selecting "Tip Selection" in the parameter settings. Displayed on the X-axis of the graph can be switched between the Test Date and Test # by selecting "XAxis Selection" in the parameter settings.

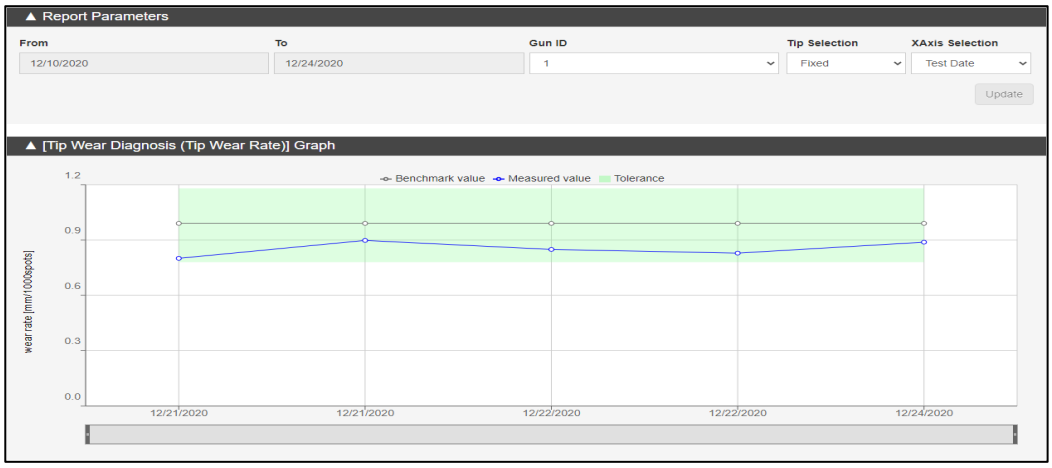
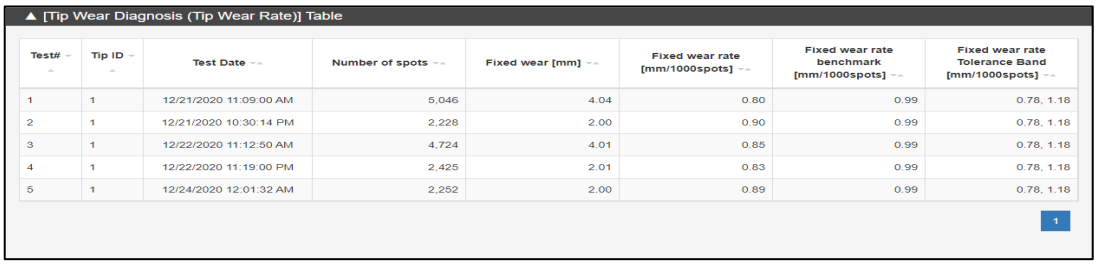


Fig. 3.6.4.8 (a) Tip wear diagnosis (tip wear rate) (graph)


▲ [Tip Wear Diagnosis (Tip Wear Rate)] Table

Test#	Tip ID	Test Date	Number of spots	Fixed wear [mm]	Fixed wear rate [mm/1000spots]	Fixed wear rate benchmark [mm/1000spots]	Fixed wear rate Tolerance Band [mm/1000spots]
1	1	12/21/2020 11:09:00 AM	5,046	4.04	0.80	0.99	0.78, 1.18
2	1	12/21/2020 10:30:14 PM	2,228	2.00	0.90	0.99	0.78, 1.18
3	1	12/22/2020 11:12:50 AM	4,724	4.01	0.85	0.99	0.78, 1.18
4	1	12/22/2020 11:19:00 PM	2,425	2.01	0.83	0.99	0.78, 1.18
5	1	12/24/2020 12:01:32 AM	2,252	2.00	0.89	0.99	0.78, 1.18

1

Fig. 3.6.4.8 (b) Tip wear diagnosis (tip wear rate) (table)

Each item is described as follows.

Table 3.6.4.8 (a) Tip wear diagnosis (tip wear rate)

Item	Description
Test#	A number starting at 1 from the beginning of the table.
Tip ID	The tracing number of the cap.
Test Date	The date and time on which the diagnosis was executed.
Number of spots	The number of spot welds after changing the cap.
Fixed wear [mm]	Amount of wear on the fixed tip.
Fixed wear rate [mm/1000spots]	The wear rate (amount of wear per 1000 spots) of the fixed tip.
Fixed wear rate benchmark [mm/1000spots]	The benchmark value for the wear rate of the fixed tip.
Fixed wear rate Tolerance Band [mm/1000spots]	Threshold for the wear rate of the fixed tip.
Movable wear [mm]	Amount of wear on the movable tip.
Movable wear rate [mm/1000spots]	The wear rate of the movable tip. The (amount of wear per 1000 spots).
Movable wear rate benchmark [mm/1000spots]	The benchmark value for the wear rate of the movable tip.
Movable wear rate Tolerance Band [mm/1000spots]	Threshold for the wear rate of the movable tip.

3.6.4.9 Tip wear diagnosis (tip wear percentages)

The tip wear diagnosis (tip wear percentages) can be used in the spot package. The tip wear diagnosis (tip wear percentages) displays the ratio of the amount of wear on the fixed or movable tip to the total amount of wear of the movable and fixed tips for each gun ID. The tip's wear ratio displayed on the Y-axis of the graph can be switched by selecting "Tip Selection" in the parameter settings. Displayed on the X-axis of the graph can be switched between the Test Date and Test # by selecting "XAxis Selection" in the parameter settings.

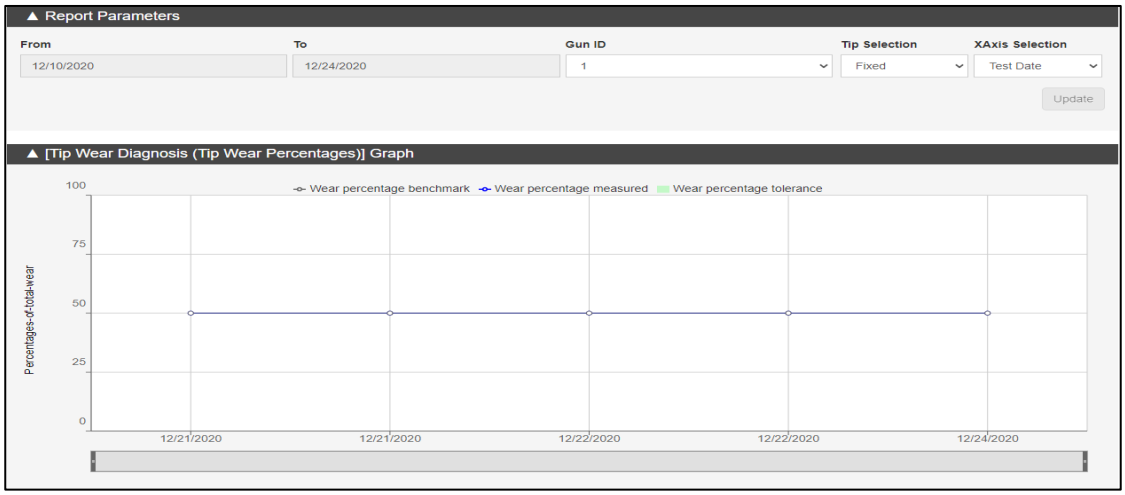


Fig. 3.6.4.9 (a) Tip wear diagnosis (tip wear percentages) (graph)

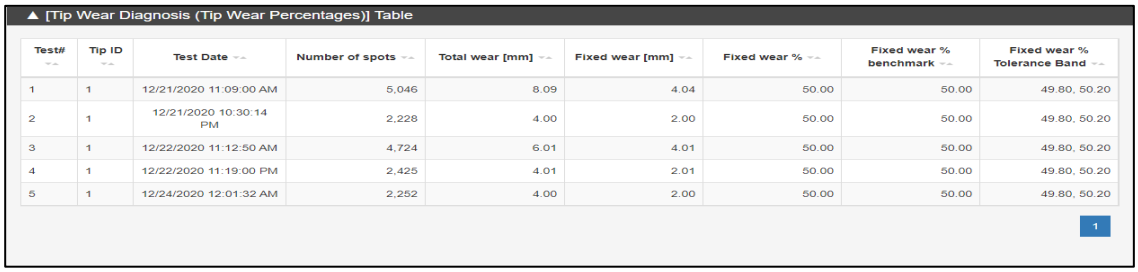


Fig. 3.6.4.9 (b) Tip wear diagnosis (tip wear percentages) (table)

Each item is described as follows.

Table 3.6.4.9 (a) Tip wear diagnosis (tip wear percentages)

Item	Description
Test#	A number starting at 1 from the beginning of the table.
Tip ID	The tracing number of the cap.
Test Date	The date and time on which the diagnosis was executed.
Number of spots	The number of spot welds after changing the cap.
Total wear [mm]	The total amount of wear of the movable tip and the fixed tip.
Fixed wear [mm]	Amount of wear on the fixed tip.
Fixed wear %	The percentage of the amount of wear of the fixed tip to the total amount of wear of the movable and fixed tips.
Fixed wear % benchmark	The benchmark value for the wear rate of the fixed tip.
Fixed wear % Tolerance Band	Threshold for the wear rate of the fixed tip.
Movable wear [mm]	Amount of wear on the movable tip.
Movable wear %	The percentage of the amount of wear of the movable tip to the total amount of wear of the movable and fixed tips.
Movable wear % benchmark	The benchmark value for the wear rate of the movable tip.

Item	Description
Movable wear % Tolerance Band	Threshold for the wear rate of the movable tip.

3.6.4.10 Spot weld log

The spot weld log function can be used in the spot package. The spot weld log function gathers a variety of data during spot welding and displays them in tables and graphs. With the spot weld log function, "Program Execution History" and "Spot Weld Log" can be checked.

Program execution history

Displays the program execution history. The logs for each spot weld program execution are displayed in chronological order, including spot count and whether there is any human intervene, which can be used for managing changes.

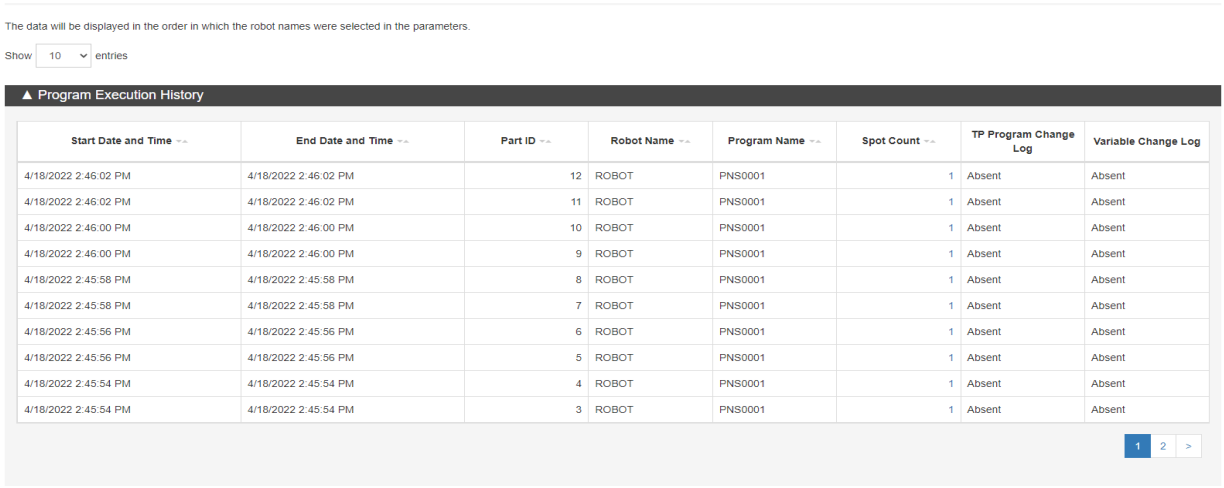


Fig. 3.6.4.10 (a) Program execution history (table)

Each item is described as follows.

Table 3.6.4.10 (a) Program execution history

Item	Description
Start Date and Time	The starting date and time. Format: MM/DD/YYYY hh:mm:ss
End Date and Time	The ending date and time. Format: MM/DD/YYYY hh:mm:ss
Part ID	The serial ID of the manufactured part.
Robot Name	The robot name that was set on the host screen.
Program Name	The program name at the time of welding.
Spot Count	The number of spots welded during welding.
TP Program Change Log	Displays whether there was a TP program change (“Present”) or not (“Absent”).
Variable Change Log	Displays whether there was a change in the variables (“Present”) or not (“Absent”).

NOTE
A part ID must be set in the Program Execution History.
If a part ID is not set, it will be “Not set”, and the Program Execution History cannot be used correctly.
Contact a sales representative to learn how to set the part ID.

Spot weld log

Displays details for each spot. Detailed information for each spot is displayed in the table, and the following data can be displayed as a graph.

- Waveform Data
- Gun Axis Torque
- Weld Current
- Weld Resistance
- Thickness Trend
- Thickness Difference
- Tip Wear

The log is useful for checking issues that occur for individual spots during welding.

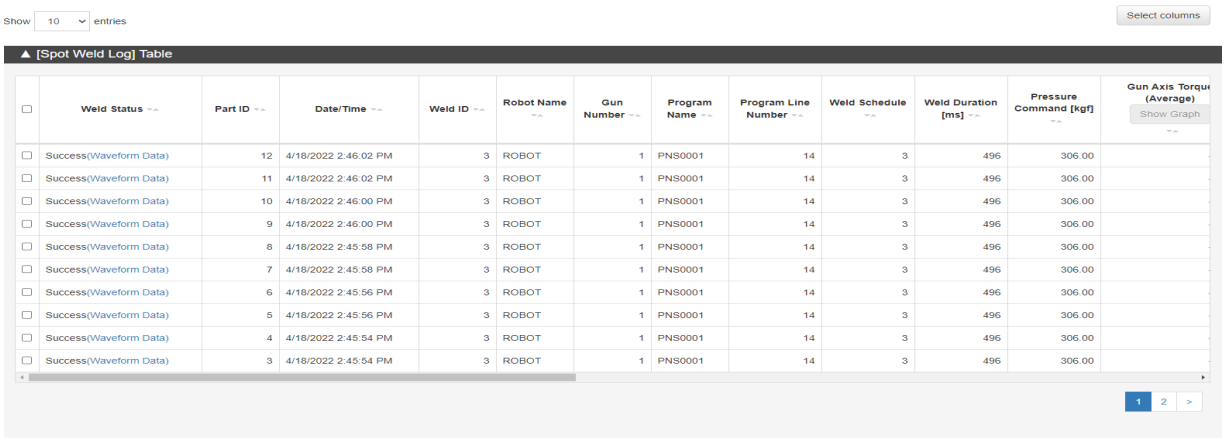


Fig. 3.6.4.10 (b) Spot weld log (table)

Table 3.6.4.10 (b) Spot weld log

Item	Description
Weld Status	The result of a spot weld (Success, Fail, Noweld, Weld Simulation, Retry Success)
Part ID	The serial ID of the manufactured part.
Date/Time of Weld	The date and time the spot weld was made. Format: MM/DD/YYYY hh:mm:ss
Weld ID	An ID to differentiate the weld from other welds.
Robot Name	The robot name that was set on the host screen.
Gun Number	The gun number used during welding.
Program Name	The program name at the time of welding.
Program Line Number	The program line number at the time of welding.
Weld Schedule	The weld schedule number sent to the spot weld timer.
Weld Duration [ms]	The length of time from when the robot sent the weld schedule until the weld complete signal was received.
Pressure Command [kgf]	The target (set) pressure at the time of welding.
Gun Axis Torque (Average)	The average gun axis torque.
Weld Current [A] (Average)	The weld current value received from the welding equipment.
Weld Resistance [μΩ] (Average)	The electrical resistance value received from the welding equipment.
Thickness Before Weld [mm]	The thickness before the weld.
Thickness After Weld [mm]	The thickness after the weld.
Thickness Difference [mm]	The difference between thickness after the weld and the thickness before the weld.
Movable wear [mm]	The amount of wear on the movable tip.
Fixed wear [mm]	The amount of wear on the fixed tip.

Item	Description
Time to Reach Pressure [ms]	The length of time from starting to apply pressure to the panel until the target pressure was reached.
Position when Pressure Reached [ms]	The position of the gun axis when the target pressure was reached.

Waveform Data Graph Display

Clicking [Waveform Data] in the [Weld Status] field for an individual spot displays a graph of the waveform data for that spot.

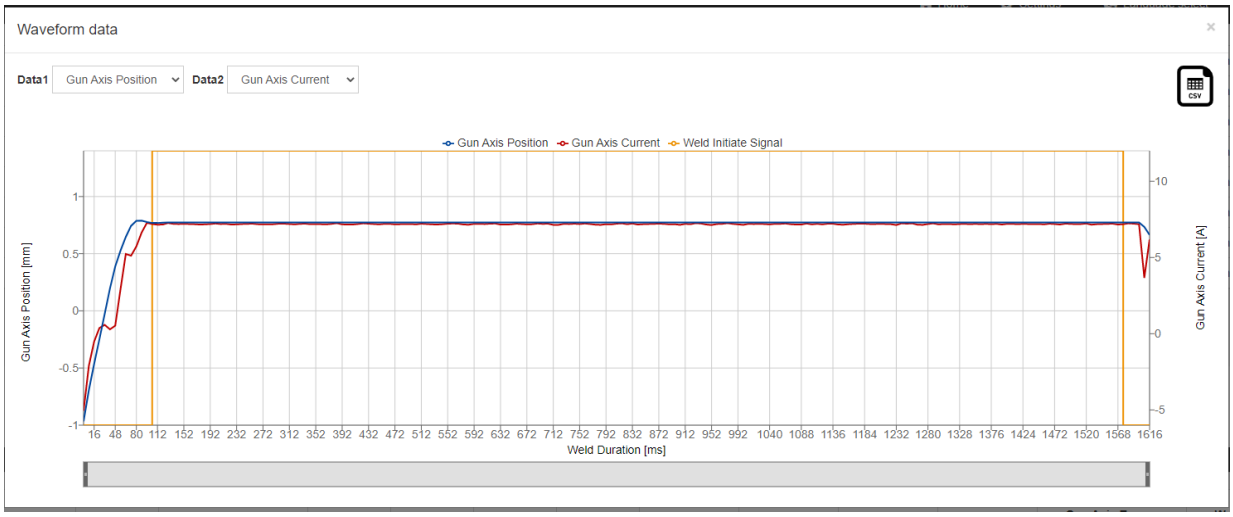


Fig. 3.6.4.10 (c) Spot weld log (waveform data graph)

You can change which items are displayed in the waveform data graph from the pull-down menu in the upper left. You can download the waveform data displayed in the graph as a CSV file by clicking the CSV button in the upper right.

Gun Axis Torque Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Graph] button in the [Gun Axis Torque (Average)] field displays a graph of the gun axis torque of the selected points.

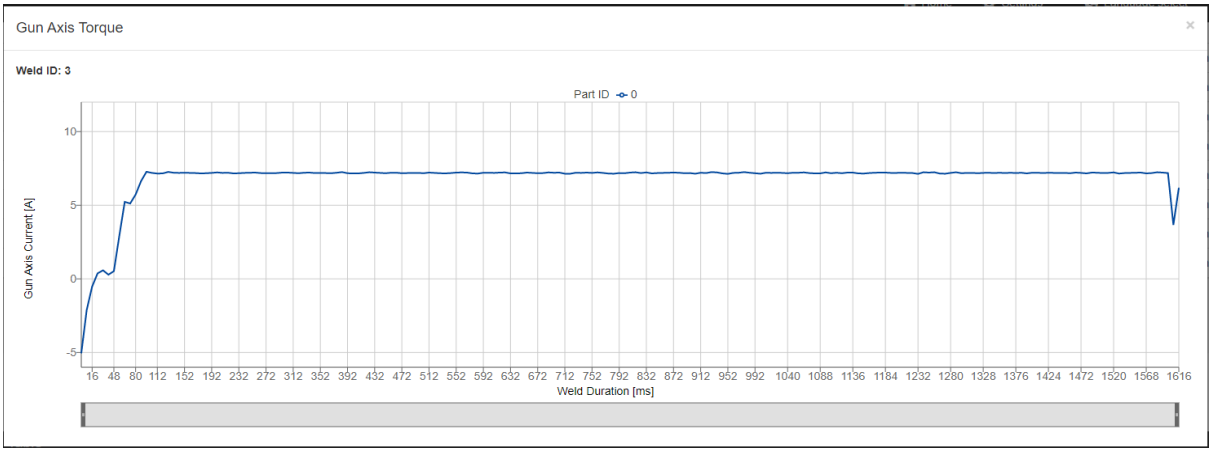


Fig. 3.6.4.10 (d) Spot weld log (gun axis torque graph)

NOTE
A maximum of 5 points can be displayed in the gun axis torque graph.

Weld Current Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Graph] button in the [Weld Current [A] (Average)] field displays a graph of the weld current of the selected points.

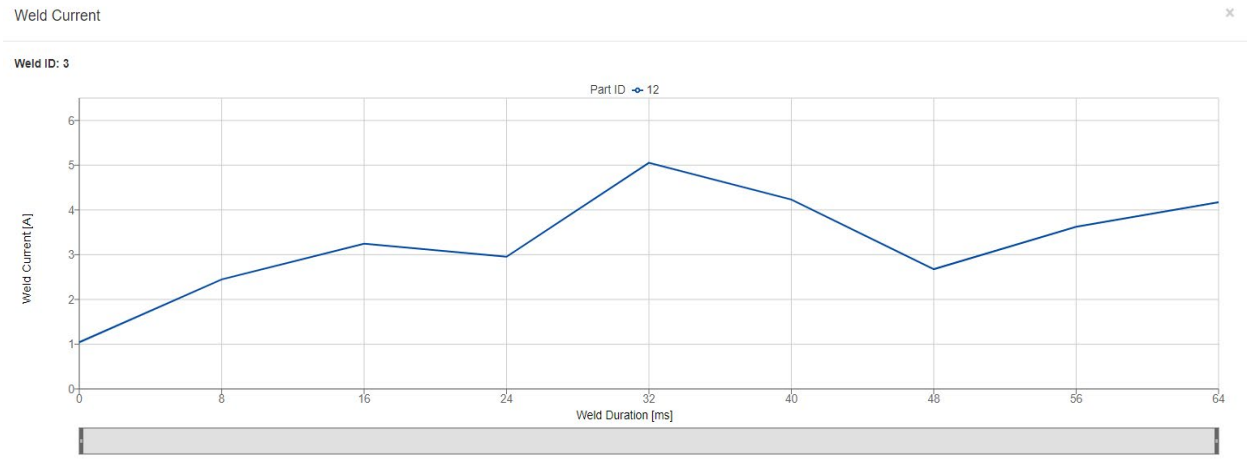


Fig. 3.6.4.10 (e) Spot weld log (weld current graph)

NOTE
A maximum of 5 points can be displayed in the weld current graph.

Weld Resistance Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Graph] button in the [Weld Resistance [μΩ] (Average)] field displays a graph of the weld resistance of the selected points.

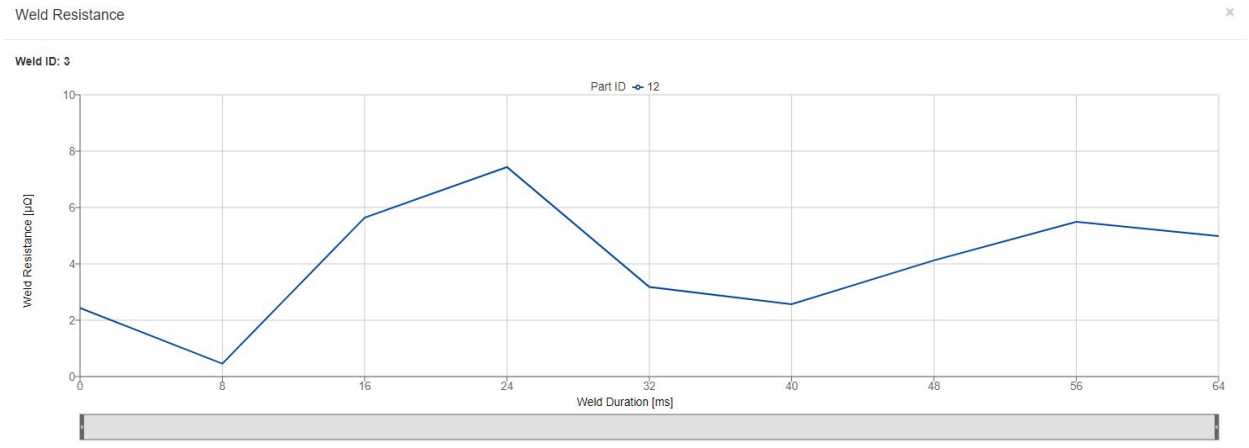


Fig. 3.6.4.10 (f) Spot weld log (weld resistance graph)

NOTE
A maximum of 5 points can be displayed in the weld resistance graph.

Thickness Trend Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Show Graph] button in the [Thickness Before Weld [mm]] or [Thickness After Weld [mm]] field displays a graph of the thickness trend of the selected points.

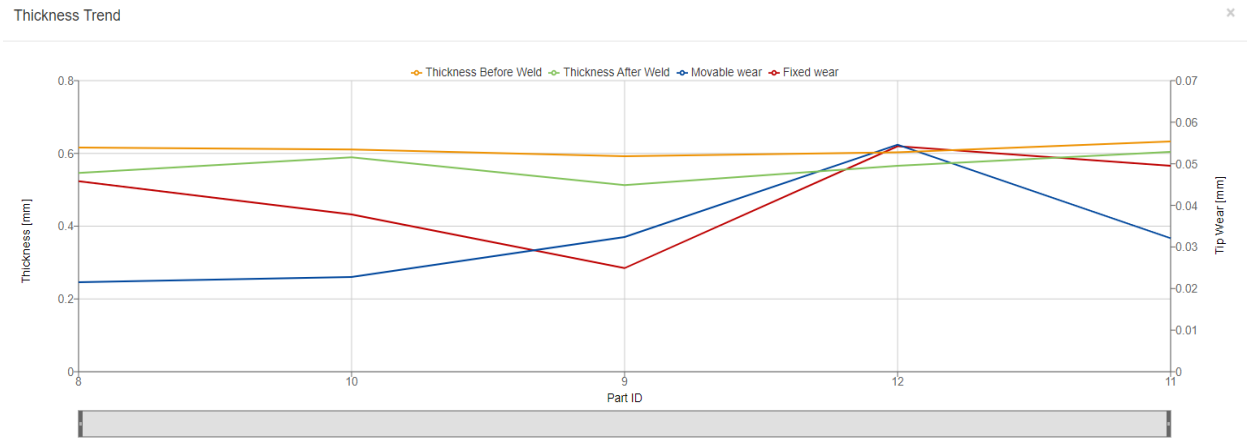


Fig. 3.6.4.10 (g) Spot weld log (thickness trend graph)

Thickness Difference Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Show Graph] button in the [Thickness Difference [mm]] (Average)] field displays a graph of the weld current of the selected points.

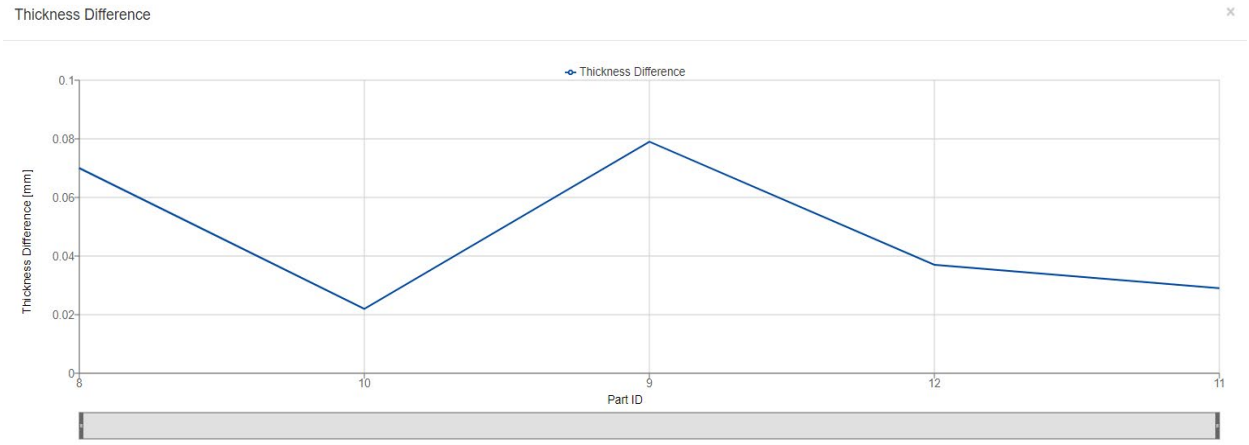


Fig. 3.6.4.10 (h) Spot weld log (thickness difference graph)

Tip Wear Graph Display

Selecting the check boxes of the point data to display in a graph and clicking the [Show Graph] button in the [Movable wear [mm]] or [Fixed wear [mm]] field displays a graph of the tip wear of the selected points.

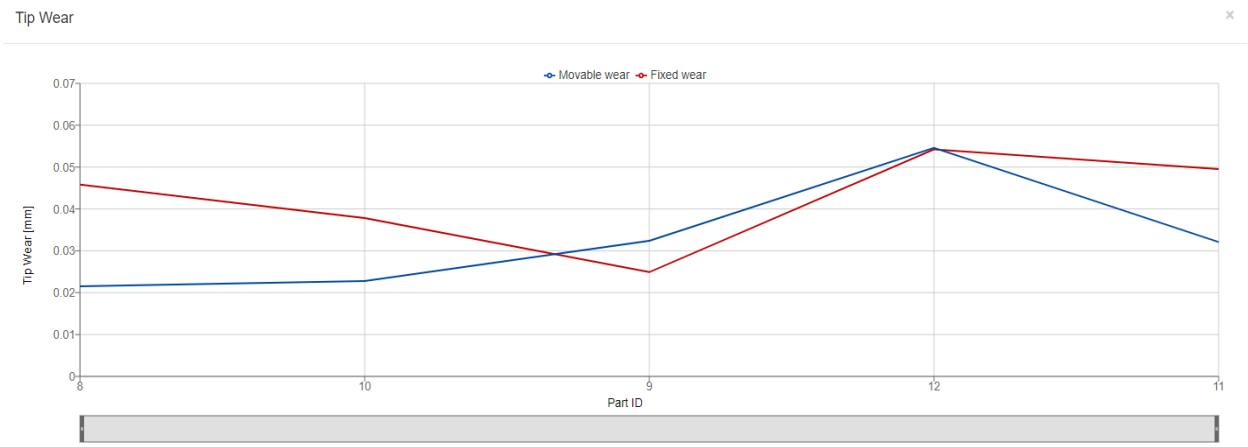


Fig. 3.6.4.10 (i) Spot weld log (tip wear graph)

3.6.4.11 Spot weld schedule change log

The spot weld schedule change log can be used in the spot package. The spot weld schedule change log monitors the weld schedule of the robot's internal timer and displays the change history.

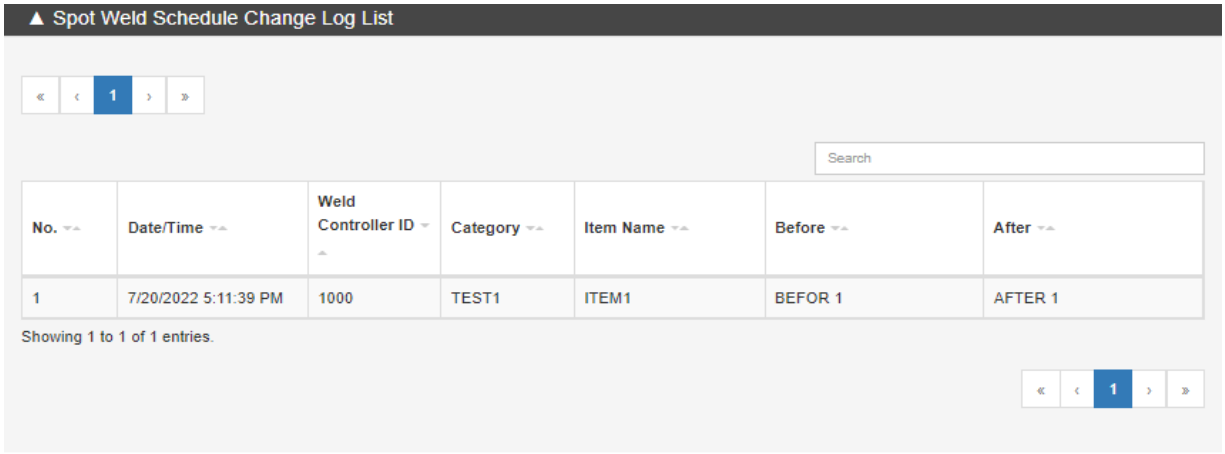


Fig. 3.6.4.11 (a) Spot weld schedule change log list

Each item is described as follows.

Table 3.6.4.11 (a) Spot weld schedule change log

Item	Description
No.	A sequential number assigned in reverse chronological order.
Date/Time	The date and time on which the spot weld log schedule was changed.
Weld Controller ID	The number of the welder.
Category	The category name of the weld schedule.
Item Name	The item name that was changed in the weld schedule.
Before	The value before the change in the weld schedule.
After	The value after the change in the weld schedule.

3.6.5 Maintenance Panel

The maintenance panel diagnoses the condition of each robot based on the maintenance timing information, and classifies the status of each robot into 4 categories: All Tasks Up To Date, Task(s) Approaching, Task(s) Past Due and Information Missing. Then, the tallied results are displayed.
The round icon on the left side of the panel shows the proportion of each status with the following colors. (All Tasks Up To Date: green, Task(s) Approaching: yellow, Task(s) Past Due: red, Information Missing: gray)

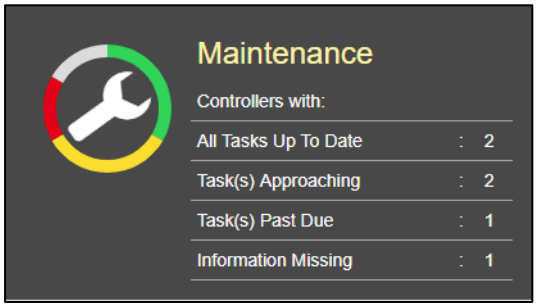


Fig. 3.6.5 (a) Maintenance panel

The status displayed on the maintenance panel is classified according to the following definitions.

Table 3.6.5 (a) Status displayed on maintenance panel

Status	Description
All Tasks Up To Date	There are no maintenance items for which the maintenance timing is approaching or has expired.
Task(s) Approaching	The time limit for maintenance is approaching for at least 1 maintenance item.
Task(s) Past Due	The time limit for maintenance has expired for at least 1 maintenance item.
Information Missing	There is no data.

Clicking the maintenance panel will display the maintenance list. The maintenance list displays the maintenance statuses of all robots in the hierarchy currently selected.
Also, clicking the tally area for each status will display the robot list in clicked state. For example, clicking Task(s) Approaching will display the list of robots whose maintenance status is Task(s) Approaching.

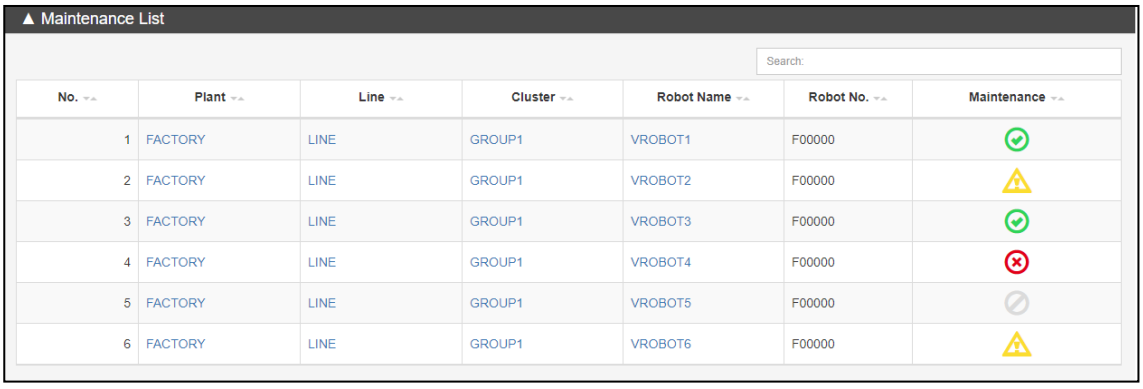


Fig. 3.6.5 (b) Maintenance list

3.6.6 Maintenance Health

In addition to the maintenance history up to now, the maintenance timing displays the time that remains until the next maintenance and the service time limit (time limit for the next maintenance) estimated based on the current operation time, for each maintenance item such as inspection and parts replacement. If the time limit for maintenance approaches, perform maintenance systematically.
The service time limit for the item that maintenance have been completed is reset when a completion operation for the item has been performed on the teach pendant's screen. Items which need to be performed only once, such as the first mechanical check, will be disappeared from the list.
The history of a completion operation is displayed on the maintenance history. You can input description freely into the “Memo” field and save it.

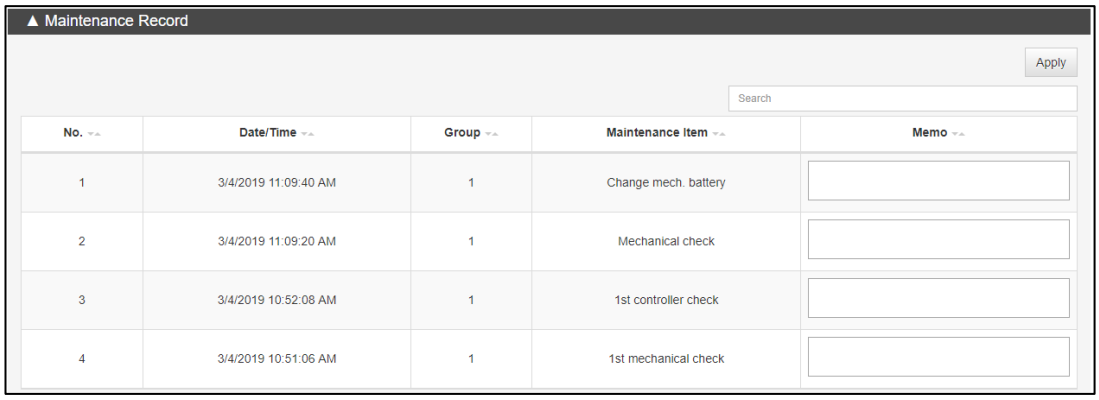


Fig. 3.6.6 (a) Maintenance history

NOTE
Items for which maintenance has been marked as complete on the teach pendant’s screen are recorded in the maintenance history. Reset operations are not reflected here.

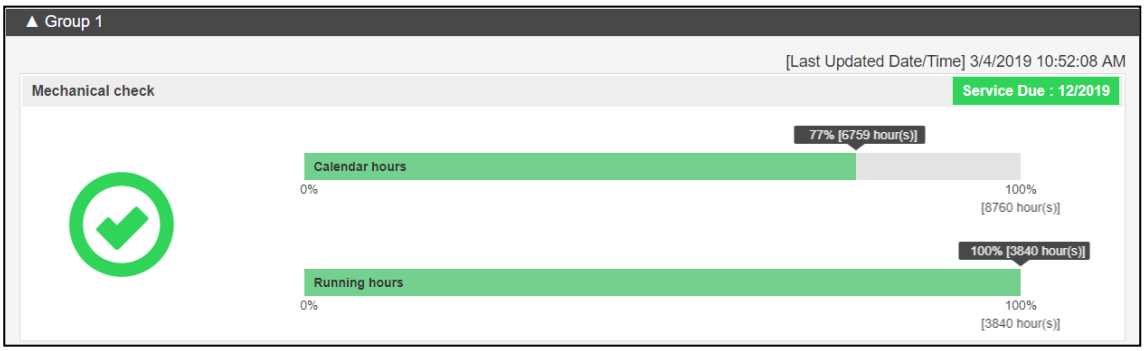


Fig. 3.6.6 (b) Maintenance health

The status of the maintenance timing is classified according to the following definitions.

Table 3.6.6 (a) Status of maintenance health

Status	Icon	Description
All Tasks Up To Date		There are no maintenance items for which the time limit for maintenance is approaching or has expired.
Task(s) Approaching		The time limit for maintenance is approaching for at least 1 maintenance item.
Task(s) Past Due		The time limit for maintenance has expired for at least 1 maintenance item.

Status	Icon	Description
Information Missing		There is no data.

3.6.7 Running Status Panel

The running status panel classifies the status of each robot into 4 categories: Running, Idle, Faulted, and Unknown. Then, the tallied results are displayed.
The round icon on the left side of the panel shows the proportion of each status with the following colors. (Running: green, Idle: yellow, Faulted: red, Information Missing: gray)

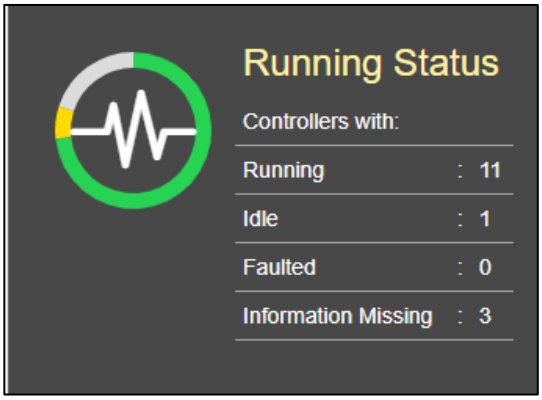


Fig. 3.6.7 (a) Running status panel

The status displayed on the running status panel is classified according to the following definitions.

Table 3.6.7 (a) Status displayed on running status panel

Status	Description
Running	The program is being executed.
Idle	The robot is being stopped.
Faulted	An alarm has occurred.
Information Missing	There is no data for the most recent 30 minutes.

Clicking the running status panel will display the running status list. The running status list displays the operation statuses of all robots in the hierarchy currently selected.
Also, clicking the tally area for each status will display the robot list in clicked state. For example, clicking “Faulted” will display the list of robots whose operation status is “Faulted”.

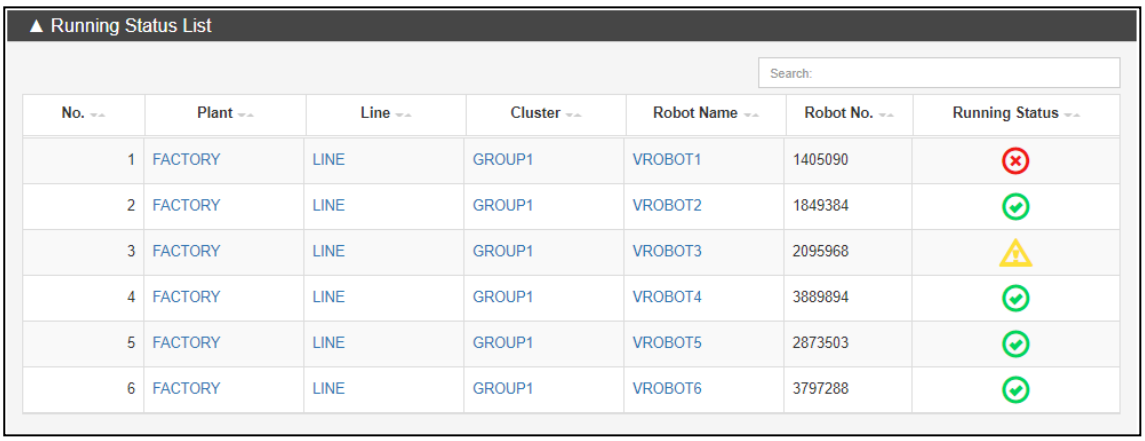


Fig. 3.6.7 (b) Running status list

3.7 ROBOT DETAILS PAGE

The robot details page displays the details of the configuration structure information of robots, health, maintenance and operation status.

Use either of the following methods to move to the robot details page.

- Click the robot on the navigation tree.
- Click the robot in the status panel of the details on the home screen.
- Click the robot on the health list, maintenance list or running status list.

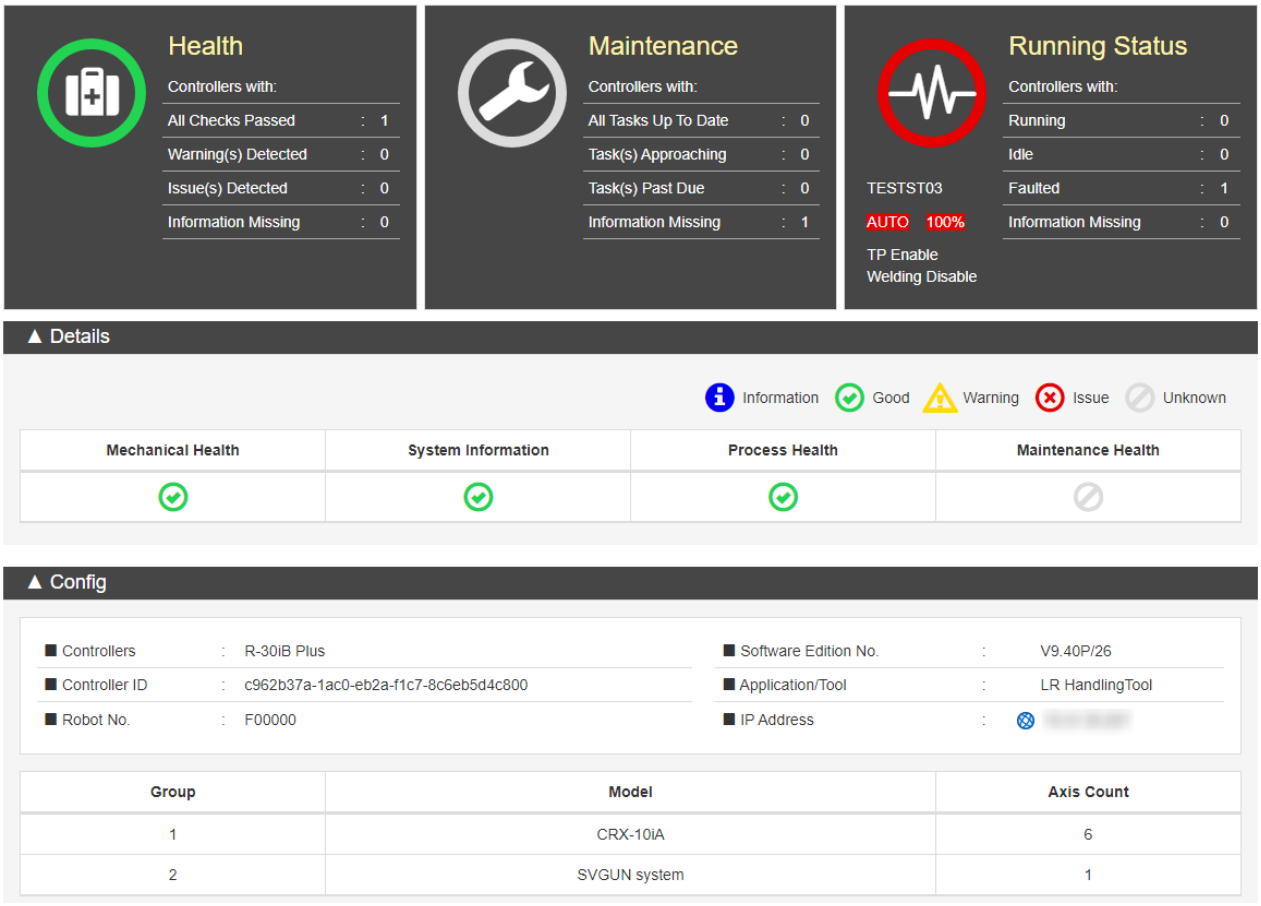


Fig. 3.7 (a) Robot details page

3.7.1 Status Panel

You can check the status of the assessment, maintenance timing and the running status. If there is any data of the running status log, a program, a mode and an override are shown in the lower left of the running status panel.
If the operation status panel settings in the data collection service is enabled, the status of the TP enabled signal and the weld-enabled signal (enabled or disabled) in the lower left of the running status panel.

NOTE
To display the TP enabled signal and the weld-enabled signal, the data collection service must be installed and configured.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” for more information.

3.7.2 Details

The mechanical health, system information, process health and maintenance can be confirmed.

3.7.3 Config

Information regarding the controller such as software version of the controller, application/tool, etc. can be confirmed. The group information can also be confirmed.
When you click the link button of the IP address, a robot website of the corresponding robot is shown in a different tab.

3.7.4 File List

The order information, version, memory usage amount of memory used, intranet settings can be confirmed.

3.8 SUPPORTING SMARTPHONE AND TABLET

The Web portal of ZDT employs the responsive Web design, with which the layout and design of each page are changed according to the width of a browser. Since the layout and design of each page are optimized according to the width of a browser, comfortable operation is enabled even on a device with a small screen.

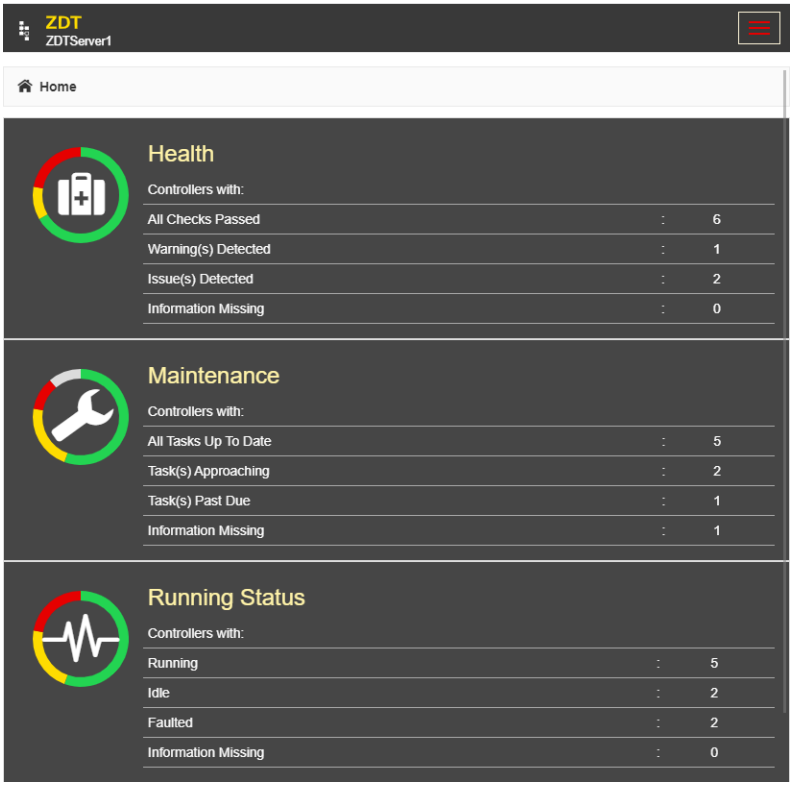


Fig. 3.8 (a) Supporting smartphone and tablet

NOTE
Online help and ZDT server management web service are not supported.

3.9 EMAIL NOTIFICATION

ZDT enables email notification when a specific change is observed in the robot's status.
If any specific change is found in the initial setting, it is notified by Email every time. The sending interval can be changed by the ZDT server management Web service. Refer to "4.8.1 Settings for Sending Mail".

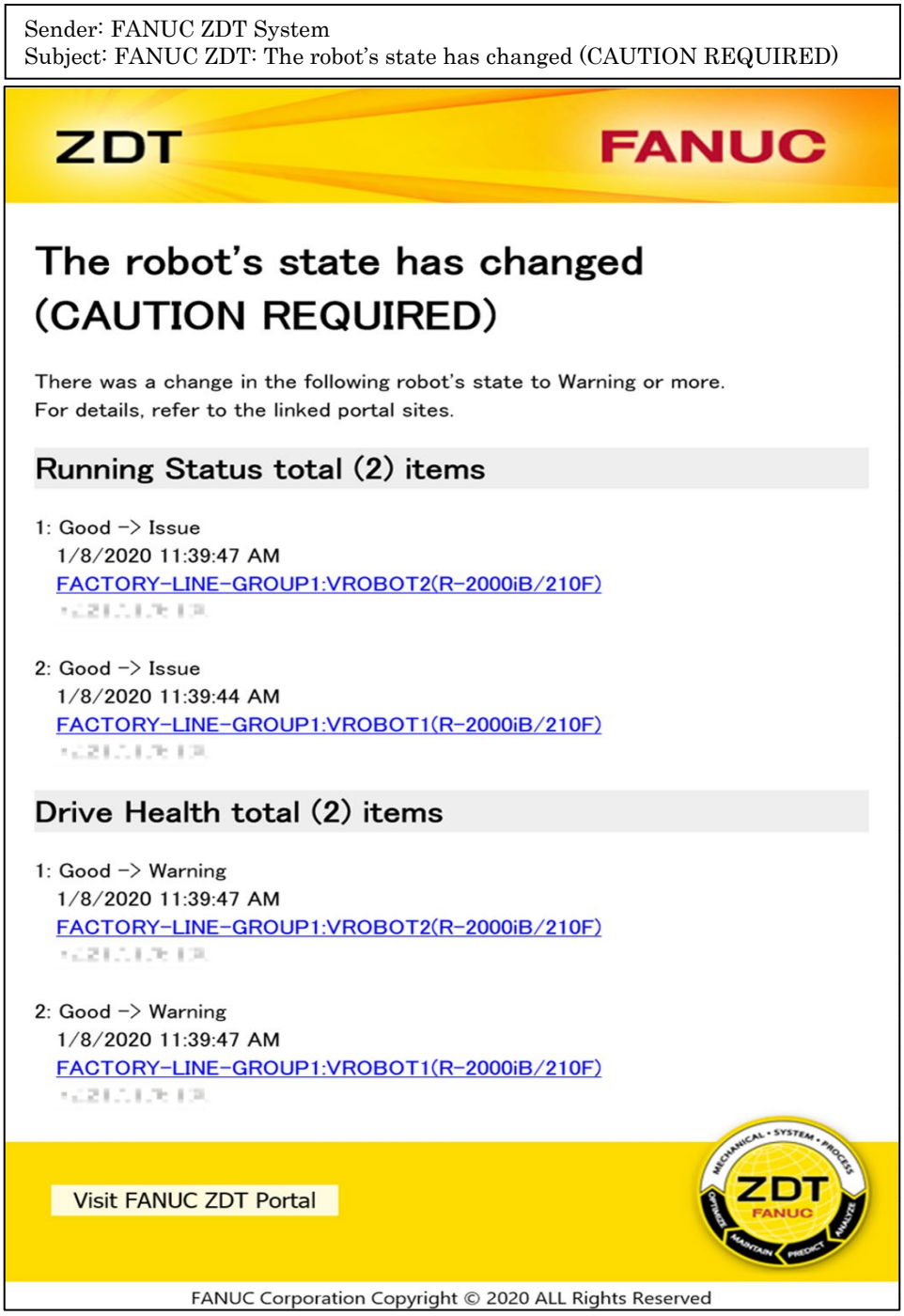


Fig. 3.9 (a) Email notification

Also, notification contents for a day can be tallied and sent by email once per day as daily report.
Note that under the default settings, the daily report is sent at 12:05 AM (00:05) every day. The time at which the report is sent can be changed with the ZDT server management web service. Refer to “4.8.1 Settings for sending mail” for more information.

Sender: FANUC ZDT System
Subject: FANUC ZDT: Daily Report

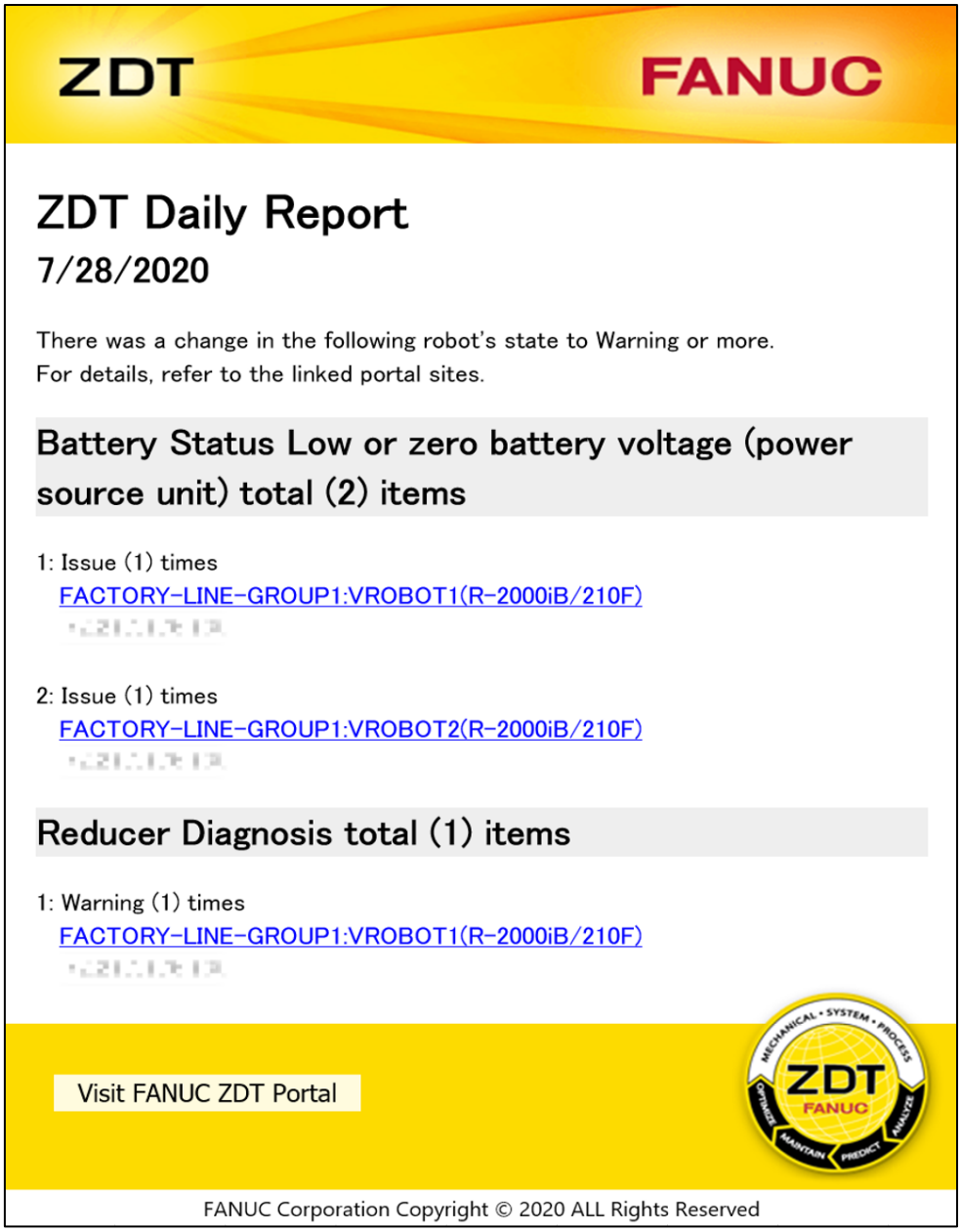


Fig. 3.9 (b) Daily report

Notifications are sent only when the following changes are observed in the robot's status.

Table 3.9 (a) Status changes to be notified

Item	Status
Reducer Diagnosis	Information Missing -> Warning Good -> Warning
Drive Health	Information Missing -> Warning Information Missing -> Issue Good -> Warning Good -> Issue Warning -> Issue
Servo Off Event	Good -> Issue
Process Logger	Good -> Warning
Servo Gun Diagnosis	Information Missing -> Warning Good -> Warning
Pressure Check	Good -> Issue
Arc Weld Health	Good -> Warning Good -> Issue Warning -> Issue
Maintenance Health	All Tasks Up To Date -> Task(s) Approaching All Tasks Up To Date -> Task(s) Past Due Task(s) Approaching -> Task(s) Past Due
Running Status	Information Missing -> Faulted Running -> Faulted Idle -> Faulted
Pulsecoder Battery Low CPU Battery Low	Good -> Issue
Controller Memory Statistics	Good -> Issue Warning -> Issue
Servo Tip Dress	Good -> Issue

For the definition of each status, refer to "3.6.2 Mechanical Health", "3.6.3 System Information", "3.6.4 Process Health", "3.6.6 Maintenance Health" and "3.6.7 Running Status Panel".

NOTE

To send emails, email transmission settings and SMTP server must be prepared. Refer to "4.8 EMAIL NOTIFICATION" for more information.

Email notification may not be sent and may not be reflected in the daily report if the robot's status changes at intervals of less than 30 seconds.

3.10 COMMENT FUNCTION

The comment function can be used in the basic package. Remarks about the health data, their replies, etc., can be left as comments.
Click the comment icon on the Health List screen (3.6 HEALTH LIST) to transit to the Comment List screen. Comments can also be entered on the Comment List screen.
The color of the comment icon differs depending on whether an item has comments, but you can click either.

(Has comments: blue; No comments: black)

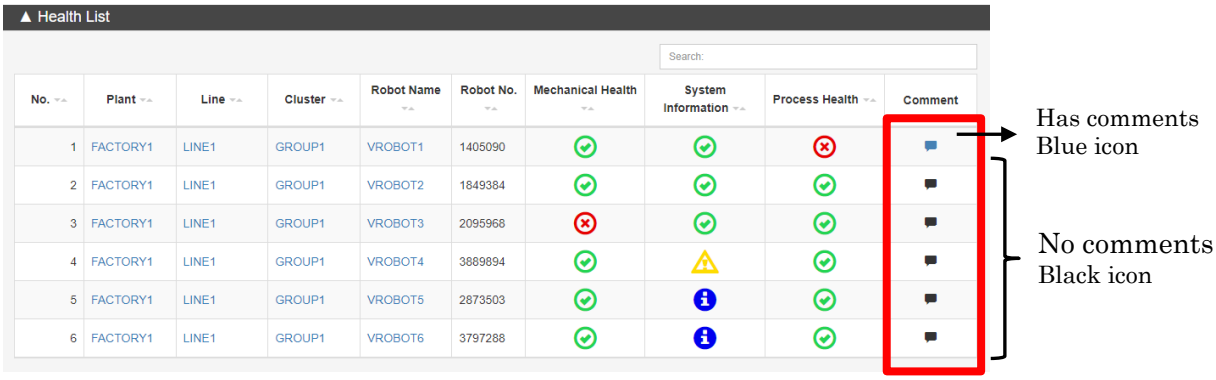


Fig. 3.10 (a) Health List

Enter and register comments on the Comment List screen.

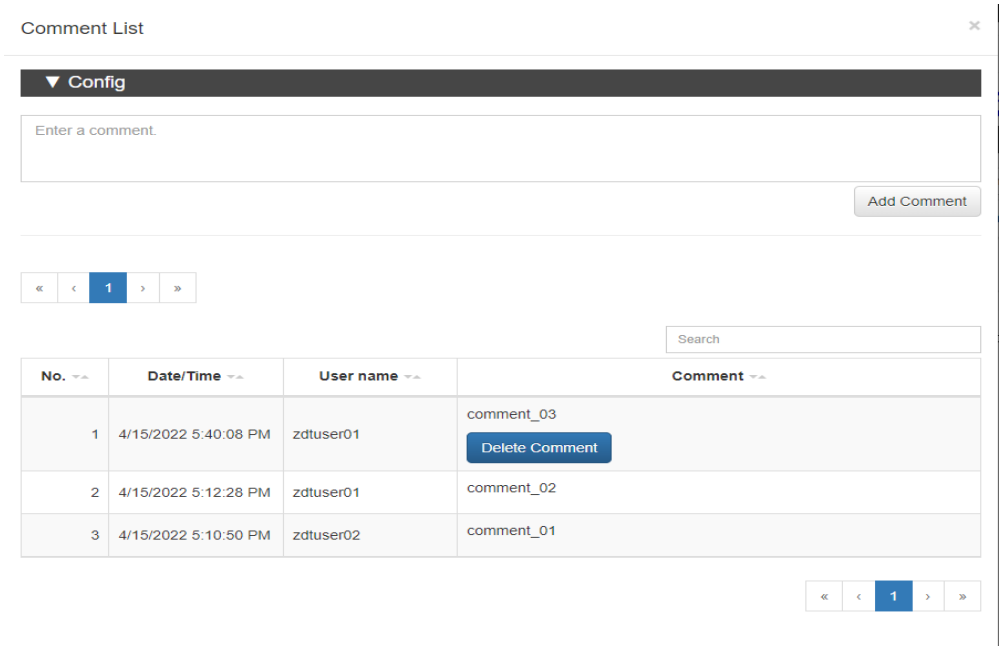


Fig. 3.10 (b) Comment list

Each item is described as follows.

Table 3.10 (a) Comment list

Item	Description
New comment entry field	An area for entering comments.
“Add Comment” button	A button to register the entered comment.
Page buttons	Buttons to change which page of the comment list is displayed.
Search term entry area	An area for entering search keywords.
Comment list table	A table that displays a list of registered comments.
No.	Item number. (The data with the most recent registration date is always “1”.)
Date/Time	The date and time the comment was made (registered). Format: MM/DD/YYYY HH:MM:SS
User ID	Login user ID of the user who made (registered) the comment.
Comment	Contents of the created (registered) comment.
“Delete Comment” button	Button to delete the created (registered) comment.

NOTE
- A maximum of 200 characters can be entered in the comment entry field.
- A maximum of 10,000 comments can be registered. If the maximum number of comments (10,000) is exceeded, comments can be registered but data with the oldest date/time will no longer be displayed in the comment list.
- Only comments made by the logged-in user can be deleted.
- Only the most recent comment can be deleted.
- Only comments registered within the past 30 minutes can be deleted.

4 ZERO DOWN TIME SETTINGS

This chapter describes the following ZDT settings.

- Data collection service
- Robot backup
- Servo data
- Vision offset data
- Program info at alarm
- Data monitor settings
- Operation Status Panel Settings
- Email notification
- Settings for data deletion
- Location settings
- Languages
- CSV export settings

These settings are configured via the ZDT server management web service.
Use either of the following methods to display the login screen.

- From the Web portal header, click the “Settings” button and then select “Data Server Management”.
- Enter the following URL into the browser’s address bar.
  http://<IP address of ZDT server>/management

Once the following screen is displayed, enter the user name of “zdtadmin” and the password of “zdtadmin” and then click “Login”.

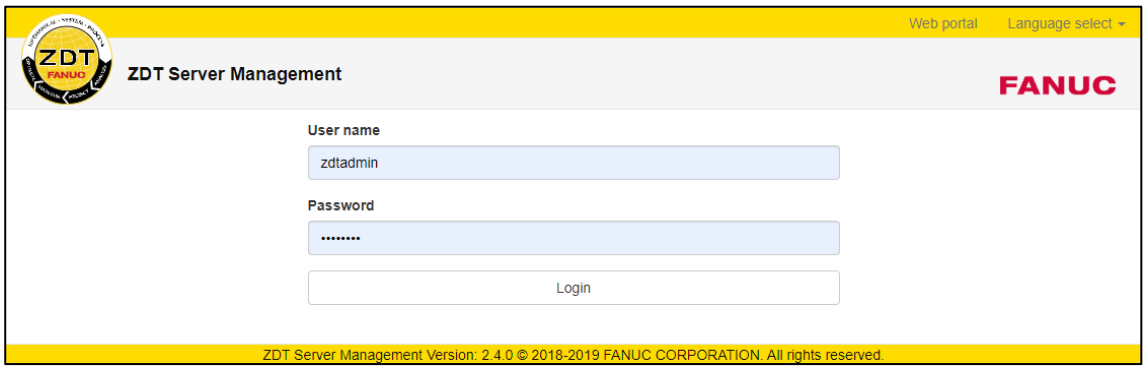


Fig. 4 (a) Login screen

4.1 DATA COLLECTION SERVICE

The following data is retrieved by using the data collection service.

- All backups of robot controllers
- Servo data including pulse counts, axis positions, and Q phase current
- Vision offset data
- Program info at alarm
- Data monitor settings
- Operation Status Panel Settings

This section describes the assignment setting of which robot controller information is retrieved by the data collection service. If using multiple data collection services, each service must be configured to retrieve data from the target robot controllers.
Service IDs are used to identify data collection services. Make sure each service ID is unique.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Data collection service”.
Click the “Add service ID”, “Delete service ID”, or “Select robots” tab located at the upper left of the screen to access the corresponding settings.

4.1.1 Add Service ID

Add service ID of data collection services to be used.

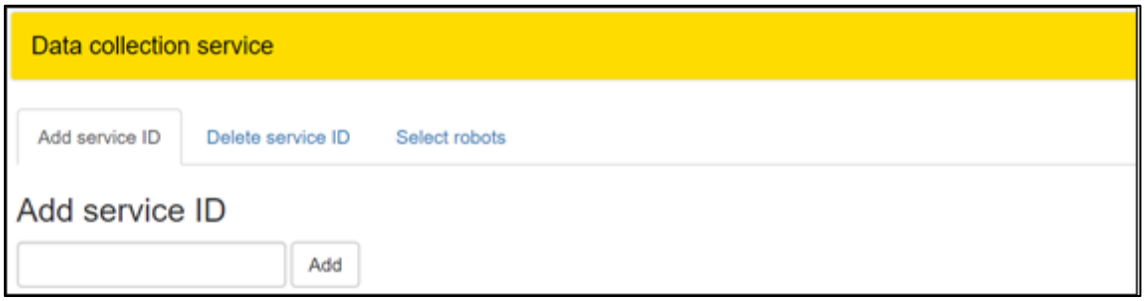


Fig. 4.1.1 (a) Add service ID

Use the following procedure to add service ID.

Step

1 Enter a service ID.
2 Click the “Add” button.

4.1.2 Delete Service ID

Delete service ID of data collection services that are not used. Deleting the service ID will cancel the assignments of robots.

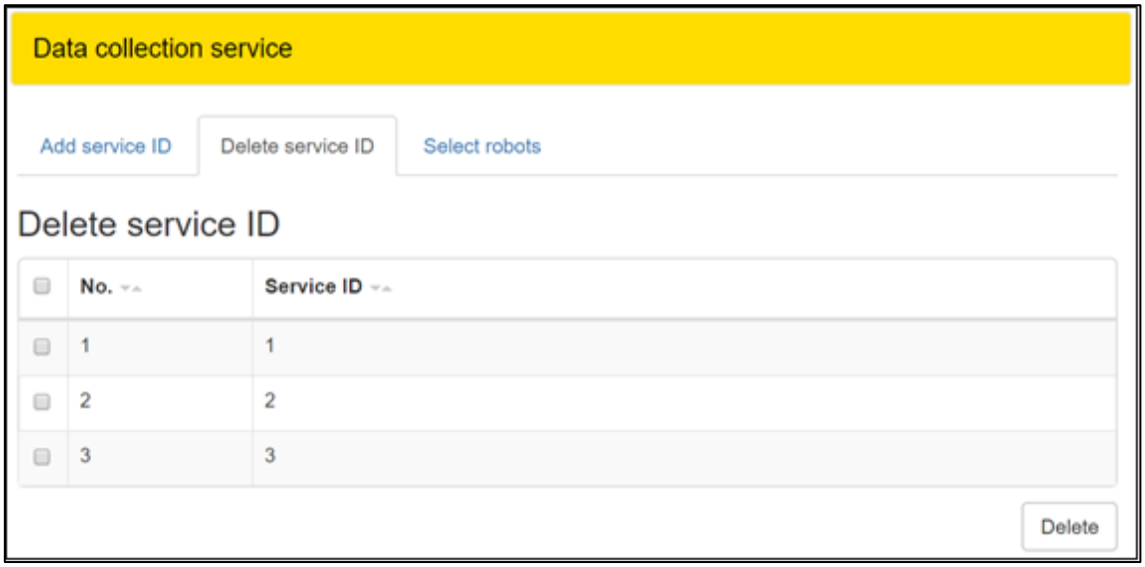


Fig. 4.1.2 (a) Delete service ID

Use the following procedure to delete service ID.

Step

1 Select the check box of the desired service ID.
2 Click the “Delete” button.

4.1.3 Select Robots

For each service ID, select a robot controller whose data is collected by the data collection service.

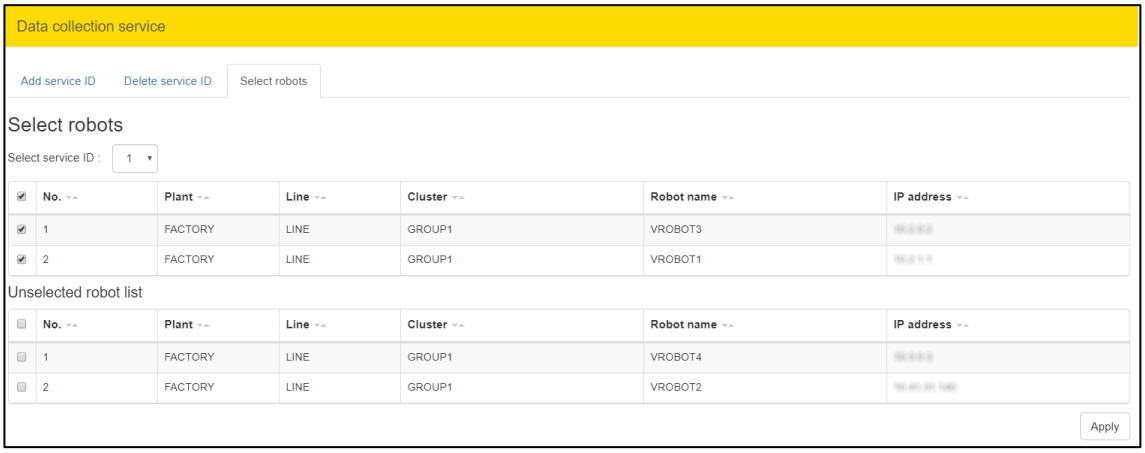


Fig. 4.1.3 (a) Select robots

The following table describes the information that is displayed.

Table 4.1.3 (a) Select robots

Item	Description
Select service ID	This menu is used to select the desired service ID to configure.
Check box column	Used to select the desired robot controllers. Select the check box at the top of the column to select all robot controllers

Item	Description
	simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Apply button	Used to save the state of selected/deselected robot controllers.

Use the following procedure to select robots.

Step

1 Select the desired service ID to configure.
2 Select the check box for the robot controllers you want to assign to this service ID.
3 Click the “Apply” button.

4.2 ROBOT BACKUP

By using the data collection service, you can retrieve all backups of robot controllers connected to the ZDT server and manage these backup files.
All backups of robot controllers are retrieved via FTP and stored in the ZDT server per the configured backup schedule.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Robot backup” to display the following information.

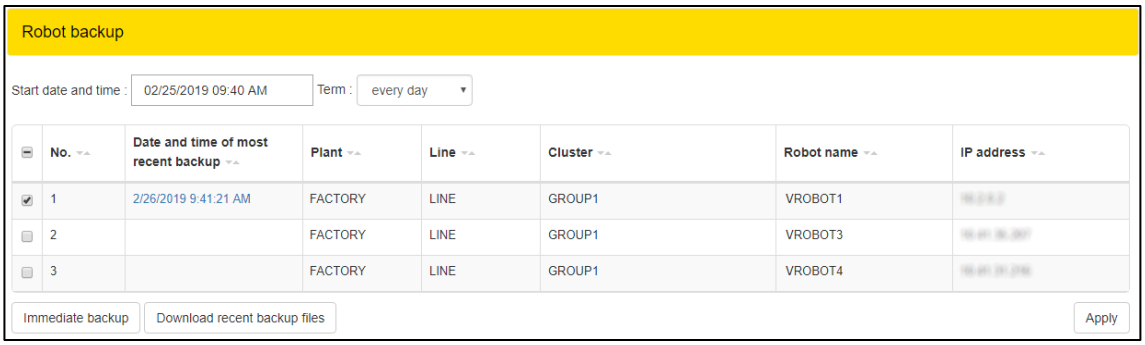


Fig. 4.2 (a) Robot backup

NOTE

In most cases, robot backup does not affect the robot cycle time, but due to the wide range of software and hardware products that can communicate with the robot controller, it is recommended that you schedule a backup while the robot is not working.

The data collection service must be installed and configured before the all backup can be retrieved.
Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION” and “4.1 DATA COLLECTION SERVICE” for more information.

Make sure to confirm operation before retrieving backups of robots in production.

The following table describes the information that is displayed.

Table 4.2 (a) Robot backup

Item	Description
Start date and time	This field is used to select the initial date and time at which the backup process starts.
Term	This menu is used to select the frequency of backup retrievals.
Check box column	Used to select the desired robot controllers to retrieve the all backup. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Date and time of most recent backup column	Displays the date and time of the most recently retrieved all backup. Click here to check all previously retrieved backups.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Immediate backup button	Starts the all backup retrieving process immediately for the selected robot controllers.
Download recent backup files button	Downloads the latest all backups for the selected robot controllers.

Use the following procedure to retrieve backups.

To retrieve a backup immediately

Step

1 Select the check box for the desired robot controllers.
2 Click the “Immediate backup” button to start retrieving a backup.

To retrieve backups by configuring the schedule

Step

1 Select the check box for the desired robot controllers.
2 Configure the “Start date and time” field and select the backup frequency from the “Term” menu. Configure the “Start date and time” field with a future time in reference to the current system time of the data collection service. Configuring a time in the past will result in the backup processing not starting.
3 Click the “Apply” button.
4 The initial backup retrieving process starts when the system time of the data collection service matches the time configured in the “Start date and time” field. Afterwards, backups are retrieved per the setting selected in the “Term” menu.

The files backed up can be downloaded with the following methods.

Download recent backup files

Select the robot, and click the “Download recent backup files” button to download the latest backup files of the selected robot all together.

Downloading from a List of Backups

Click the latest backup time stamp in the “Date and time of most recent backup” column to display a list of previously retrieved all backups.

Click the desired file from the list of backups to start downloading that file. Alternatively, click "Download all backup files" to download all of the all backups displayed on the list.

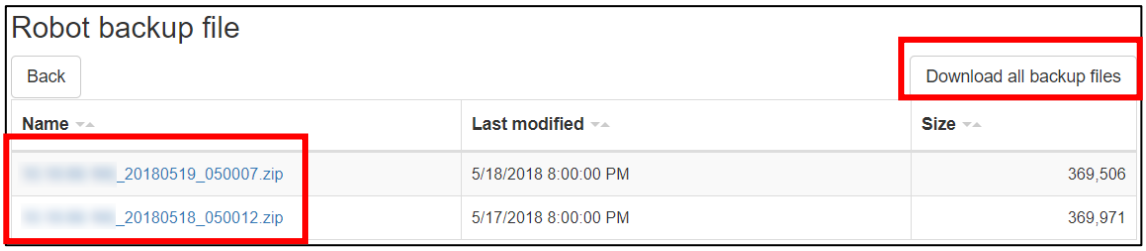


Fig. 4.2 (b) Robot backup file

NOTE
Backups cannot be retrieved if the robot controller is configured with a password.

If the system times between the ZDT server and data collection service are not synchronized, the timing at which the backup process starts may not occur as desired.
Make sure the times are synchronized.

4.3 SERVO DATA

Servo data settings are used to configure the retrieval of servo data. Once these settings are configured, pulse counts, axis positions, and Q phase current for each program can be viewed on the Web portal.

From the side menu, click "Data Collection Settings" to display the sub-menu and then click "Servo data" to display the following information.

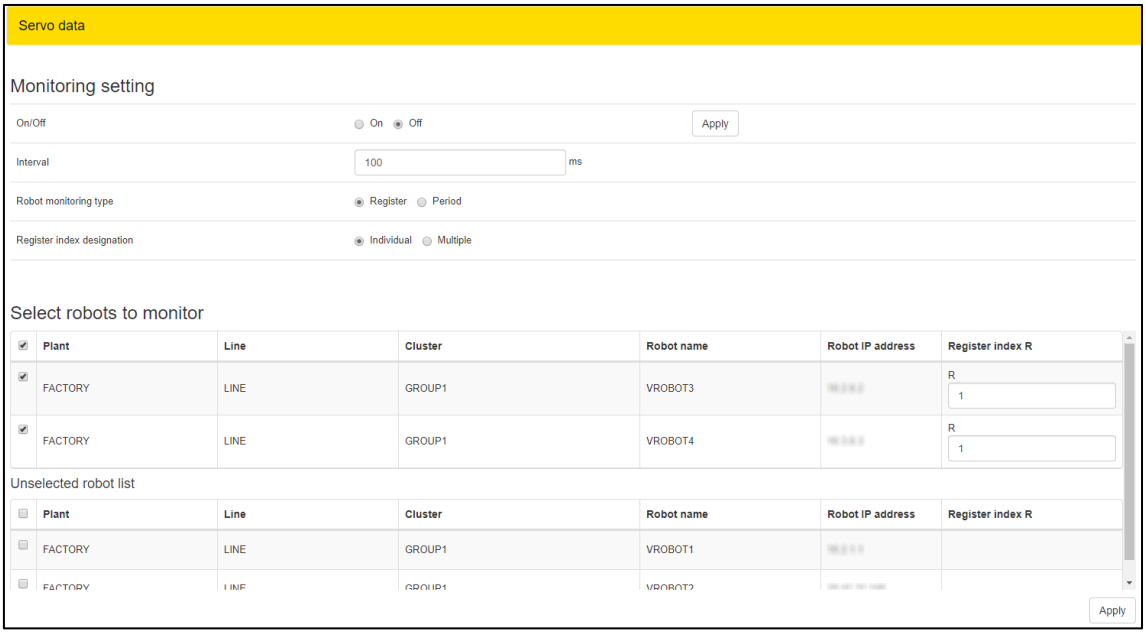


Fig. 4.3 (a) Servo data

The following table describes the information that is displayed.

Table 4.3 (a) Servo data

Item	Description
On/Off	Select either the “On” or “Off” radio button and then click the “Apply” button to the right to enable or disable the retrieval of servo data.
Interval	Configures the servo data retrieval interval. The default setting is 100 ms. Configure an integer value of at least 100 ms.
Robot monitoring type	Select either the “Register” radio button or “Period” radio button to select the robot monitoring type for servo data. • Register Monitors the specified register value and retrieves servo data whenever the value is at least 1. Data is not retrieved as long as the value is 0. • Period Retrieves servo data according to the specified period.
Register index designation	This setting must be configured if using register as the robot monitoring type. Select either the individual or multiple type of register index designation to be monitored. • Individual A register number is configured for each robot controller. • Multiple One register number is configured for all robot controllers. Click the “Set” button to apply the configured register numbers.
Period	This setting must be configured if using period as the robot monitoring type. Retrieves servo data according to the specified period. Configure an integer value between 1 second and 1,000 seconds.
Check box column	Used to select the desired robot controllers from which to retrieve servo data. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Apply button	Saves the servo data configuration.

Use the following procedure to configure servo data retrieval settings.

To Retrieve the Data by Monitoring the Register

Step

1 Configure “Interval” with the interval used for servo data retrieval.
2 Select the “Register” radio button for the “Robot monitoring type” setting.
3 Select either the “Individual” or “Multiple” radio button for the “Register index designation” setting.
4 Select the check boxes for the desired robot controllers.
5 If the “Individual” radio button was selected in step 3, set a register number for each selected robot controller. If the “Multiple” radio button was selected in step 3, enter a register number into the “Register index designation” setting and then click the “Set” button to set this register number for all robot controllers.
6 Click the “Apply” button at the lower right.
7 Select the “On” radio button for the “On/Off” setting and then click the “Apply” button to the right to start retrieving servo data.

To Retrieve the Data by Specifying the Period

Step

1 Configure “Interval” with the interval used for servo data retrieval.
2 Select the “Period” radio button for the “Robot monitoring type” setting.
3 Configure “Period” with the desired period that will be used for servo data retrieval.

4 Select the check boxes for the desired robot controllers.
5 Click the “Apply” button at the lower right.
6 Select the “On” radio button for the “On/Off” setting and then click the “Apply” button to the right to start retrieving servo data.

NOTE

If using the “Register” for robot monitoring type, make sure to turn off data retrieval or set the register values to 0. Failure to do so may result in the ZDT server running out of storage capacity preventing services from starting.

The data retrieval interval fluctuates depending on ZDT server hardware performance, the number of robots monitored, and network congestion. As such, accuracy of timing is not guaranteed.

4.4 VISION OFFSET DATA

Vision offset data settings are used to configure the retrieval of vision offset data. Once these settings are configured, you can view the offset values associated with vision detections.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Vision offset data” to display the following information.

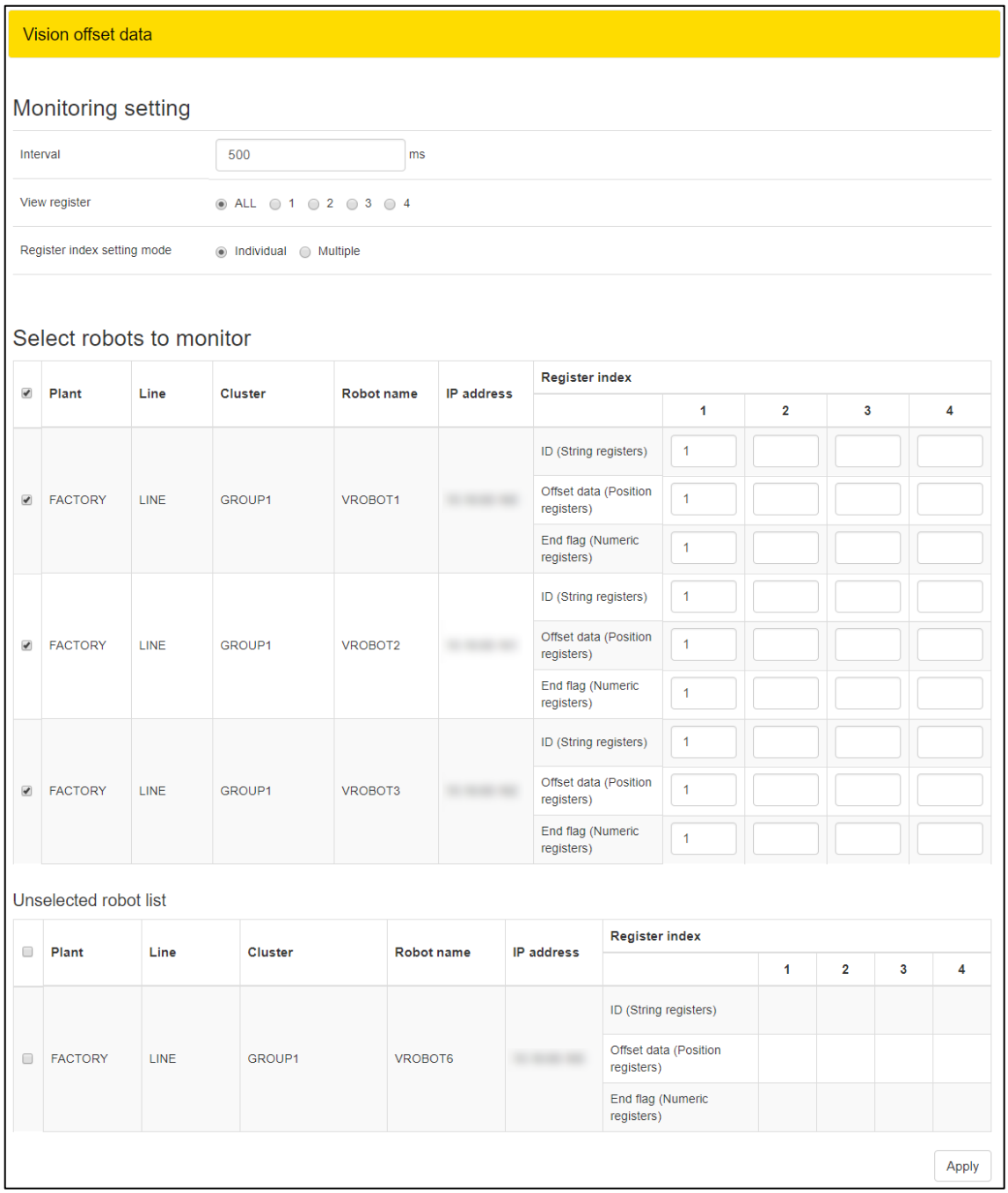


Fig. 4.4 (a) Vision offset data

The following table describes the information that is displayed.

Table 4.4 (a) Vision offset data

Item	Description
Interval	Used to specify the monitoring interval for registers used to retrieve vision offset data. The default setting for the retrieval interval is 500 ms.
View register	Select the “All”, “1”, “2”, “3”, or “4” radio button to choose the register number group you want to view.
Register index setting mode	Select either the “Individual” or “Multiple” radio button for the register index designation setting. • Individual A register number group is configured for each robot controller. • Multiple One register number group is configured for all robot controllers. Click the “Set” button to apply the configured register number groups.
Check box column	Used to select the desired robot controllers from which to retrieve vision offset data. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot Name column	Displays the name of the robot configured for the robot controller.
IP Address column	Displays the IP address of the robot controller.
Register Index	Used to configure register number group including string registers, position registers, and numeric registers used to retrieve vision offset data. Up to four groups can be configured.
ID (String registers)	Used to specify the number for string registers used to retrieve vision offset data. String register values specified here are used to map vision detection results data retrieved using the IRVIZDT command to the vision offset data.
Offset data (Position registers)	Used to specify the number for position registers used to retrieve vision offset data. Position register values configured here are retrieved as vision offset data.
End flag (Numeric registers)	Used to specify the number for numeric registers used to retrieve vision offset data. Numeric register values specified here are monitored according to the interval specified with the “Interval” setting. When the value is 1, the values of the string and position registers are retrieved. Data is not retrieved as long as the value is 0.
Apply button	Saves the vision offset data configuration.

Use the following procedure to configure vision offset data retrieval settings.
As an example here, the number for string, position, and numeric registers used will be set to 1.

ZDT Server Management Web Service Procedure

Step

1 Set the “Interval” setting to the desired register monitoring interval.
2 Select the “1” radio button for the “View register” setting.
3 Select either the “Individual” or “Multiple” radio button for the “Register index setting mode” setting.
4 Select the check box for the desired robot controllers to retrieve vision offset data.
5 If the “Individual” radio button was selected in step 3, set a register number group for each selected robot controller. If the “Multiple” radio button was selected in step 3, enter a register number group into the “Register index designation” setting and then click the “Set” button to set this register number group for all robot controllers. Enter “1” for the string, position, and numeric registers.

6 Click the “Apply” button.

Robot Controller Program Procedure

Step

1 After executing the vision detection command, retrieve the correction data and copy this to the specified position registers.

```
VISION RUN_FIND 'VISION'
VISION GET_OFFSET 'VISION' VR [1] JMP LBL [10]
PR [1] = VR [1].FOUND_POS [1]"
```

2 Execute the IRVIZDT command and send the vision detection results to the ZDT server.

Enter some unique text string such as a part ID into the specified string register and then specify this string register as an argument 1 for the IRVIZDT command.
String registers are used to map and display two types of data retrieved at different timings using different methods. These two types of data include the vision detection results sent using the IRVIZDT command and the vision offset data retrieved from the data collection service. Text strings entered into string registers must be changed each time data is retrieved.

```
R[10] = R[10] + 1
SR[1]=R[10]
CALL IRVIZDT (SR[1], 1)
```

3 Enter “1” for the specified numeric registers. The data collection service retrieves data from the specified position and string registers after confirmation that the specified numeric register value is 1.

4 Finally, enter “0” for the specified register.
If you enter “0” immediately after changing the specified numeric register to “1”, the data in the position and string registers cannot be retrieved. Enter “0” for the specified numeric register after waiting at least the time of the numeric register monitoring interval to elapse.

The following figure illustrates a sample program.

```
VISIONOFFSET                                  ^ i
                                             1/16
   1:J @P[1] 100% FINE
   2:  VISION RUN_FIND 'VISION'
   3:  VISION GET_OFFSET 'VISION' VR[1]
    :  JMP LBL[10]
   4:  PR[1]=VR[1].FOUND_POS[1]
   5:J @P[2] 100% FINE VOFFSET,VR[1]
   6:  CALL PICK
   7:J @P[1] 100% FINE
   8:  R[10]=R[10]+1
   9:  SR[1]=R[10]
  10:  CALL IRVIZDT(SR[1],1)
  11:  R[1]=1
  12:  WAIT   1.00(sec)
  13:  R[1]=0
  14:  LBL[10]
  15:  CALL IRVIZDT('Failed',3)
[End]
```

Fig. 4.4 (b) Sample program

4.5 PROGRAM INFO AT ALARM

These settings are used to configure the retrieval of Program info at alarm. Once these settings are configured, the name of the program and line number that triggered an alarm can be viewed.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Program info at alarm” to display the following information.

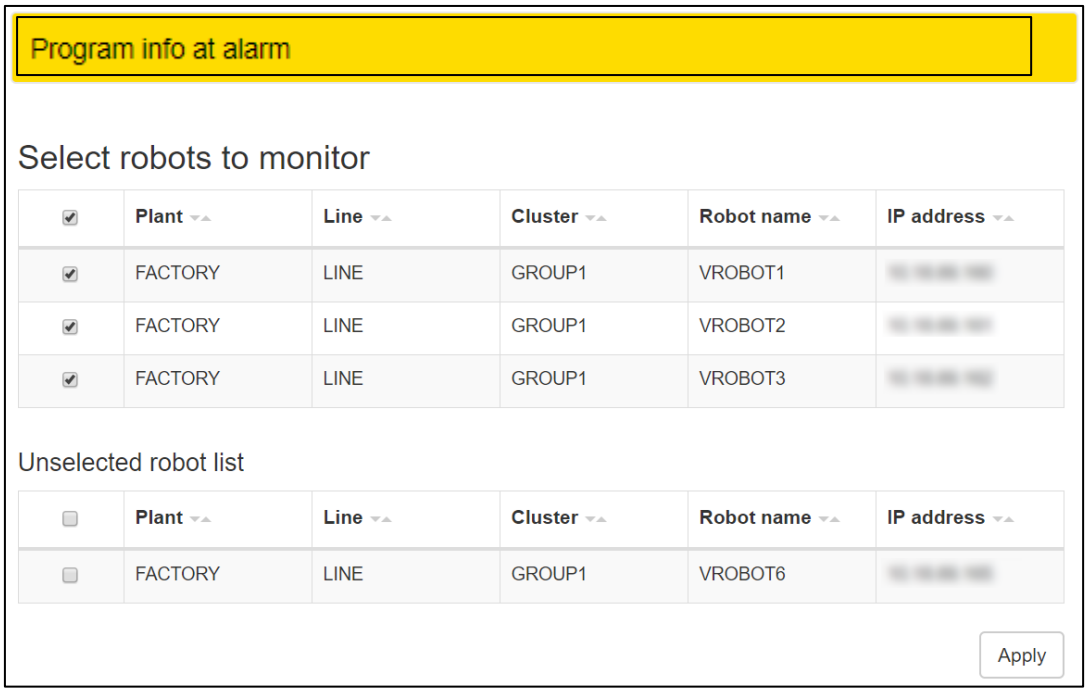


Fig. 4.5 (a) Program info at alarm

The following table describes the information that is displayed.

Table 4.5 (a) Program info at alarm

Item	Description
Check box column	Used to select the desired robot controllers from which program information is retrieved when an alarm occurs. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Apply button	Saves the configuration of the Program info at alarm.

Use the following procedure to configure these settings.

Step

1 Select the check boxes for the desired robot controllers from which program information is retrieved when an alarm occurred.
2 Click the “Apply” button.

4.6 DATA MONITOR SETTINGS

You can configure the settings for obtaining the data monitor. By configuring these settings, you can check the values of the robot information (such as the amount of torque and the coordinate values) when an alarm occurs.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Data monitor settings” to display the following information.

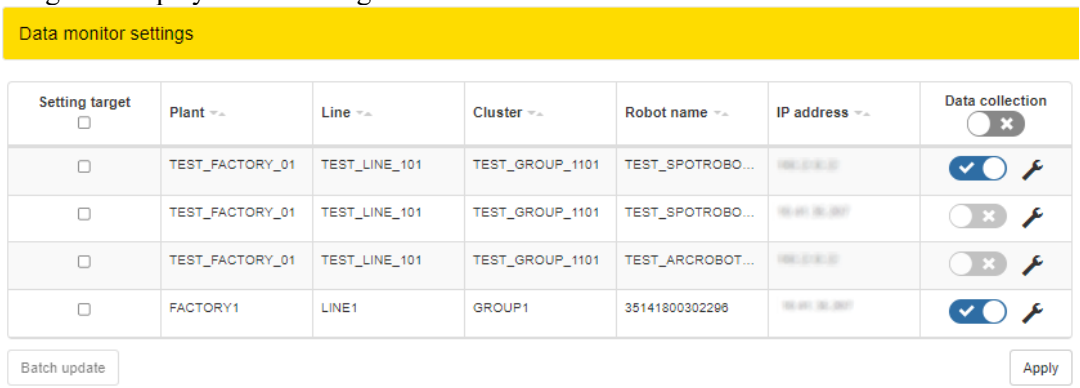


Fig. 4.6 (a) Data monitor settings

The displayed items are described as follows.

Table 4.6 (a) Data monitor settings

Item	Description
Setting target column	Used to select the desired robot controllers from which to retrieve data monitor. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Data collection column Switch	Selects whether to perform data monitor collection with the On/Off switch. You can select all robot controllers by setting the switch at the top of the column to On, and you can deselect all robot controllers by setting it to Off.
Data collection column Individual Settings icon	Opens the Detail settings screen for data monitor collection for just the selected robot controller.
Batch update button	Opens the Detail settings screen for data monitor collection for all the robot controllers selected in the Setting target column.
Apply button	Saves the configuration of Data monitor settings.

The procedure for configuring the data monitor collection settings is as follows.

Step

1 Select the Setting target check boxes of the robot controllers from which to collect data.
2 Click the Individual Settings icon in Data collection or the “Batch update” button to open the Detail settings screen.
3 On the Detail settings screen, select whether to execute data collection with the On/Off switch.
(If the “Batch update” button was selected, the setting is applied to all robots selected with Setting target.)

4 Set the Data collection switch to On for the robot controllers for which you want to display the data monitor.
5 Click the “Apply” button.

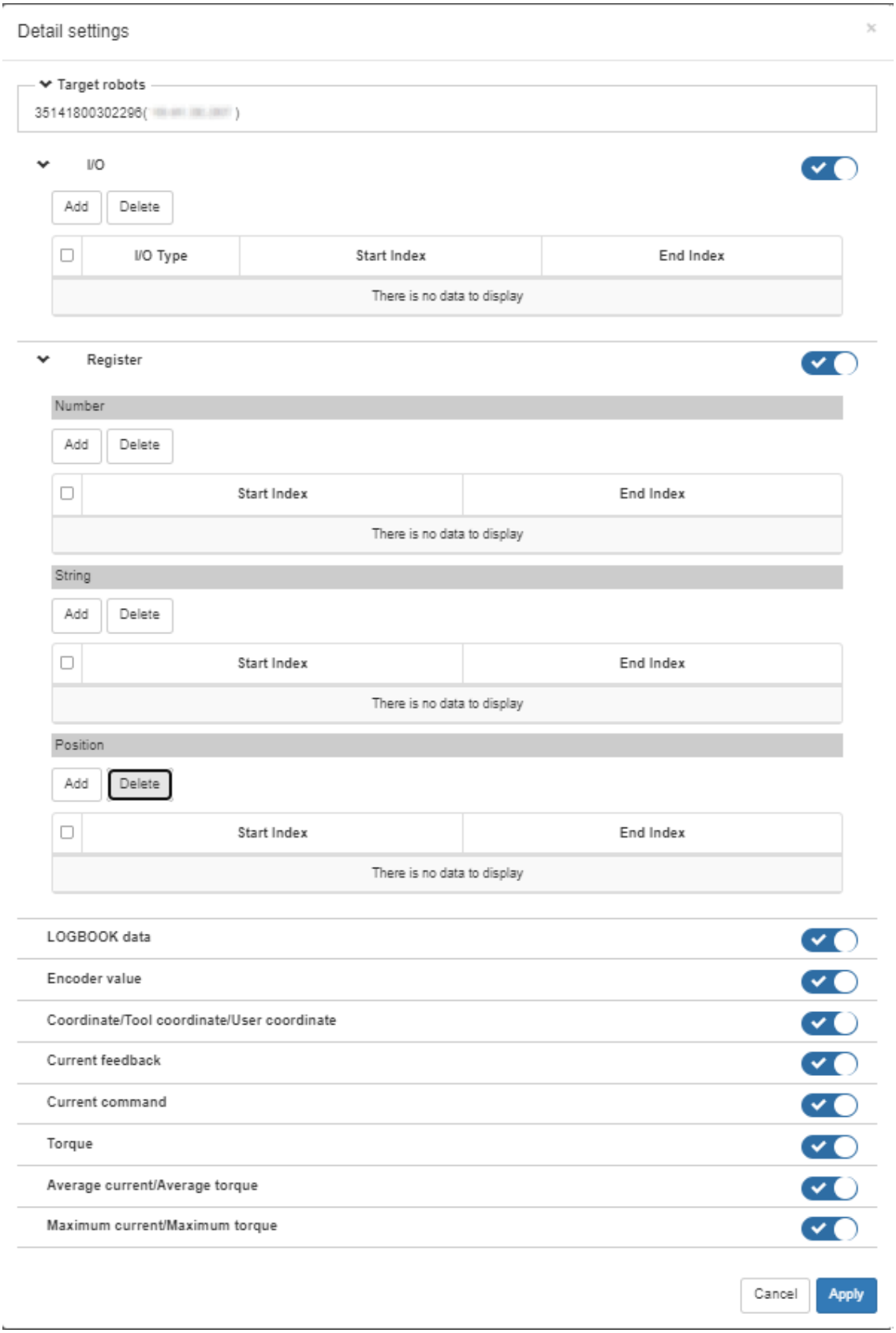


Fig. 4.6 (b) Detail settings

Table 4.6 (b) Detail settings

Item	Description
Target robots	Displays the robot names and IP addresses of the robots whose detailed settings are being configured. If this screen was opened with the “Batch update” button, all robots selected in Setting target are displayed.
I/O	Set I/O data collection to On/Off with the toggle switch. Click the accordion to display the I/O settings screen. You can select the I/O type from among the 15 types (DI/DO/AI/AO/GI/GO/RI/RO/UI/UO/SI/SO/WO/WI/WSI).
Register	Set register data collection to On/Off with the toggle switch. Click the accordion to display the register settings screen. You can set register collection from among three types (numeric register / string register / position register).
LOGBOOK data	Set LOGBOOK data collection to On/Off with the toggle switch.
Encoder value	Set encoder value data collection to On/Off with the toggle switch.
Coordinate/Tool coordinate/User coordinate	Set coordinate / tool coordinate / user coordinate data collection to On/Off with the toggle switch.
Current feedback	Set electrical current feedback data collection to On/Off with the toggle switch.
Current command	Set electrical current command data collection to On/Off with the toggle switch.
Torque	Set torque data collection to On/Off with the toggle switch.
Average current/Average torque	Set average current / average torque collection to On/Off with the toggle switch.
Maximum current/Maximum torque	Set maximum current / maximum torque data collection to On/Off with the toggle switch.
Apply button	Saves the detailed settings.

The procedure for configuring the detailed settings is as follows.

Step

1 Set the switch to On for the items for which data will be collected.
2 Click the “Apply” button.

To Collect I/O Data

1 Set the switch for the I/O item to On.
2 Click the accordion, and then click the “Add” button.
3 Set the I/O type, the starting index, and the ending index.
4 Click the “Apply” button.

NOTE
- A maximum of 20 entries can be registered.
- The maximum index range is 10.
- If there is only one index, enter the same value for the starting and ending indexes.
- Index ranges cannot overlap.

To Collect Register Data

1 Set the switch for the I/O item to On.
2 Click the accordion, and then click “Add” button of the register to collect.
3 Set the starting index and the ending index.
4 Click the “Apply” button.

NOTE
- The maximum index range is 10.
- If there is only one index, enter the same value for the starting and ending indexes.
- Index ranges cannot overlap.

4.7 OPERATION STATUS PANEL SETTINGS

You can set whether to display the enable signals on the operation status panel. By configuring these settings, you will be able to confirm the status of the TP enable signal and the weld enable signal on the operation status panel.

From the side menu, click “Data Collection Settings” to display the sub-menu and then click “Operation Status Panel Settings” to display the following information.

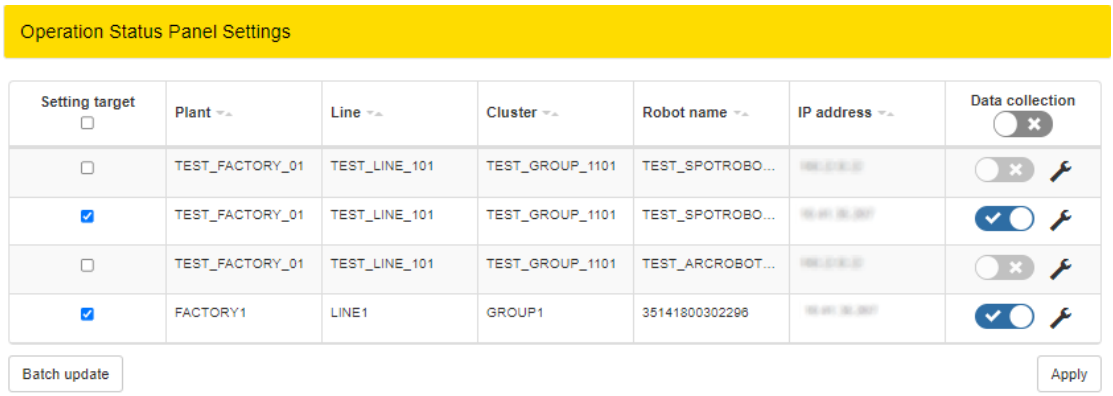


Fig. 4.7 (a) Operation status panel settings

The displayed items are described as follows.

Table 4.7 (a) Operation status panel settings

Item	Description
Setting target column	Used to select the desired robot controllers from which to retrieve the enable signals. Select the check box at the top of the column to select all robot controllers with detailed settings simultaneously. Deselect the check box to deselect all robot controllers.
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address of the robot controller.
Data collection column Switch	Selects whether to display the enable signals with the On/Off switch. You can select all robot controllers by setting the switch at the top of the column to On, and you can deselect all robot controllers by setting it to Off.

Item	Description
Data collection column Individual Settings icon	Opens the Detail settings screen for setting the display of the enable signals for just the selected robot controller.
Batch update button	Opens the Detail settings screen for displaying the enable signals for all the robot controllers selected in the Setting target column.
Apply button	Saves the configuration of Operation Status Panel Settings.

The procedure for configuring the settings is as follows.

Step

1 Select the Setting target check boxes of the robot controllers from which you want to obtain the enable signals.
2 Click the Individual Settings icon in Data collection or the “Batch update” button to open the Detail settings screen.
3 On the Detail settings screen, select whether to execute data collection with the On/Off switch.
(If the “Batch update” button was selected, the setting is applied to all robots selected with Setting target.)
4 Set the Data collection switch to On for the robot controllers for which you want to display the enable signals.
5 Click the “Apply” button.

Fig. 4.7 (b) Detail settings

4.8 EMAIL NOTIFICATION

These settings are used to configure email notifications sent when robot status changes and daily reports containing notification statistics.

From the side menu, click “ZDT settings” to display the sub-menu and then click “Email notification”.
Click the “Settings for sending mail”, “Add destination mail address”, or “Delete destination mail address” tab located at the upper left of the screen to access the corresponding settings.
By switching the tab on the upper left of the screen, you can specify the email destination, the deletion of the email sending destination, and the specific setting for each Email address as a destination. You can also add an Email destination Email address.

4.8.1 Settings for Sending Mail

These settings are used to send email. Configure these settings in accordance with your SMTP server configuration.

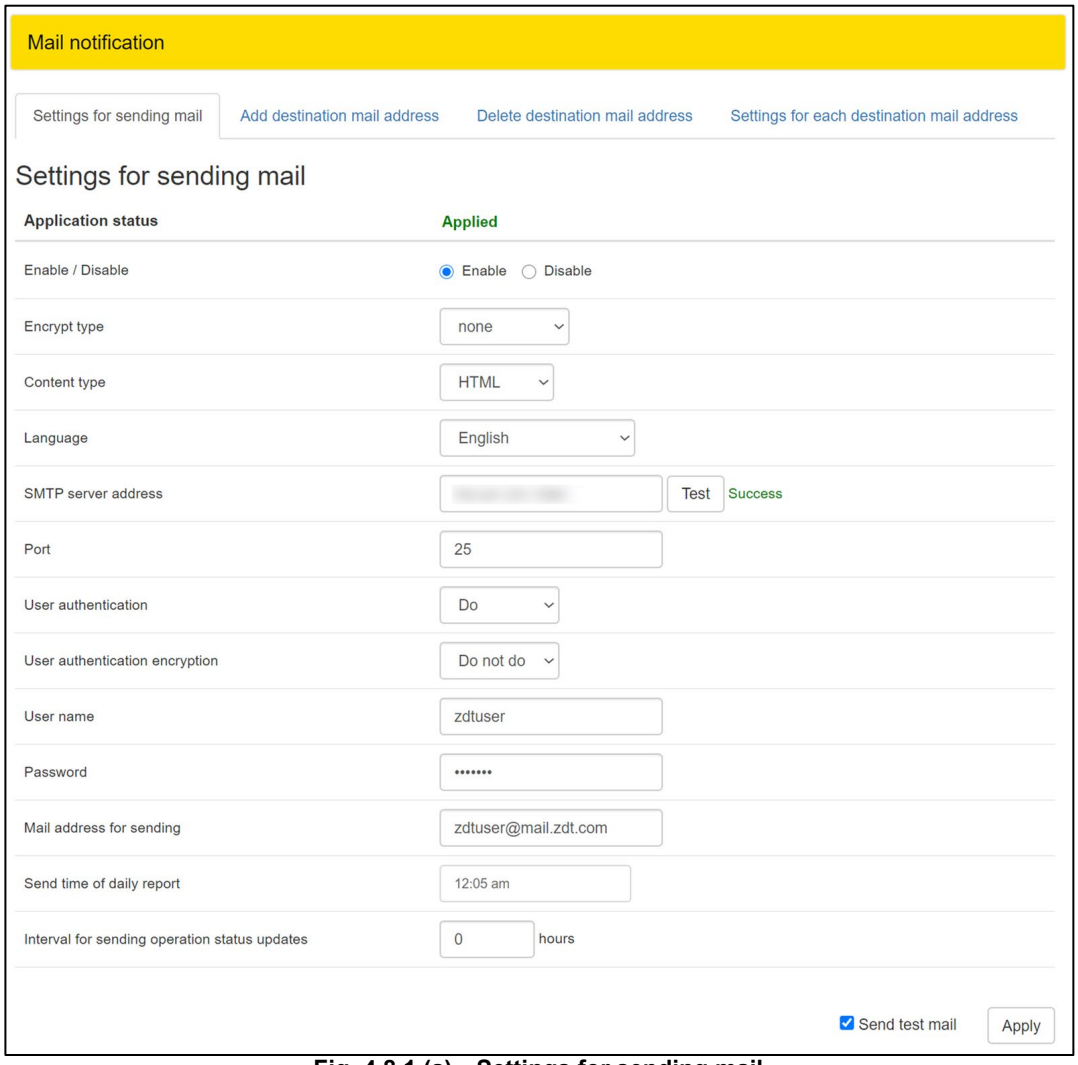


Fig. 4.8.1 (a) Settings for sending mail

The following table describes the information that is displayed.

Table 4.8.1 (a) Settings for sending mail

Item	Description
Enable/Disable	Set whether to enable or disable the email sending settings. To send email notifications and/or daily reports, configure the following settings and select “Enable”.
Encrypt type	This menu is used to select the type of data encryption used when sending email. Options include “None”, “SLL/TLS”, and “STARTTLS”.
Content type	Select either “Text” or “HTML” from this menu to choose the format of email body content.
Language	This menu is used to select the display language. Options include “English”, “Japanese”, “Chinese (Simplified)”, “Chinese (Traditional)” and “German”.
SMTP server address	Used to enter the IP address of the SMTP server. Click the “Test” button to the right to test that the configured IP address, encryption type, and port number are valid.
Port	Used to configure the port number used for SMTP server connections. This is normally configured automatically in accordance with the selected encryption type.
User authentication	Select either “Do” or “Do not do” for user authentication.
User authentication encryption	Select either “Do” or “Do not do” for user authentication encryption.
User name	Used to configure a user name registered with the SMTP server.
Password	Used to configure a password registered with the SMTP server.
Mail address for sending	Used configure the email address used to send email.
Daily report sending time	Set the time at which the daily report email is sent. The default setting is 12:05 AM (00:05).
Email sending interval of running status notification	It specifies the Email interval that is sent when the running status changes during faulted. You can set it by the interval of n time (0 to 24). No Email is sent even though any change of the status is detected for n hours after the final email sent.
Send test mail	Select this check box to send a test email message to the destination email address when the “Apply” button is clicked.
Apply button	Saves the email settings configuration.

Use the following procedure to configure email settings.

Step

1 Configure each setting.
2 Click the “Test” button to test that the configured IP address, encryption type, and port number are valid.
3 Select the “Send test mail” check box.
4 Click the “Apply” button.

NOTE

A separate SMTP server must be on the same network as the ZDT server in order to send email.

This feature may not function properly depending on the type and configuration of your SMTP server.
Those configurations of the mail server that have been confirmed for operation are as follows:

- Postfix 2.11.0 / Dovecot 2.2.9
- Microsoft Exchange Server 2010

4.8.2 Add Destination Mail Address

This tab is used to add destination email addresses.

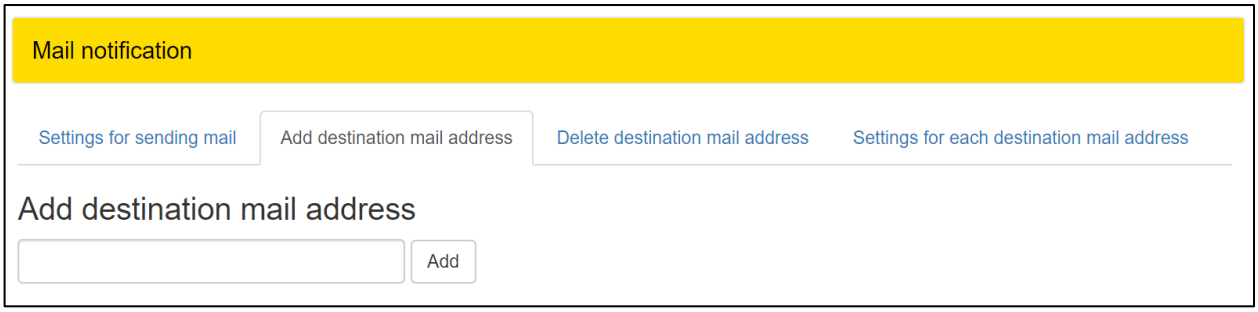


Fig. 4.8.2 (a) Add destination mail address

Use the following procedure to add destination email addresses.

Step

1 Enter the desired email address.
2 Click the “Add” button.

4.8.3 Delete Destination Mail Address

This tab is used to delete destination email addresses.

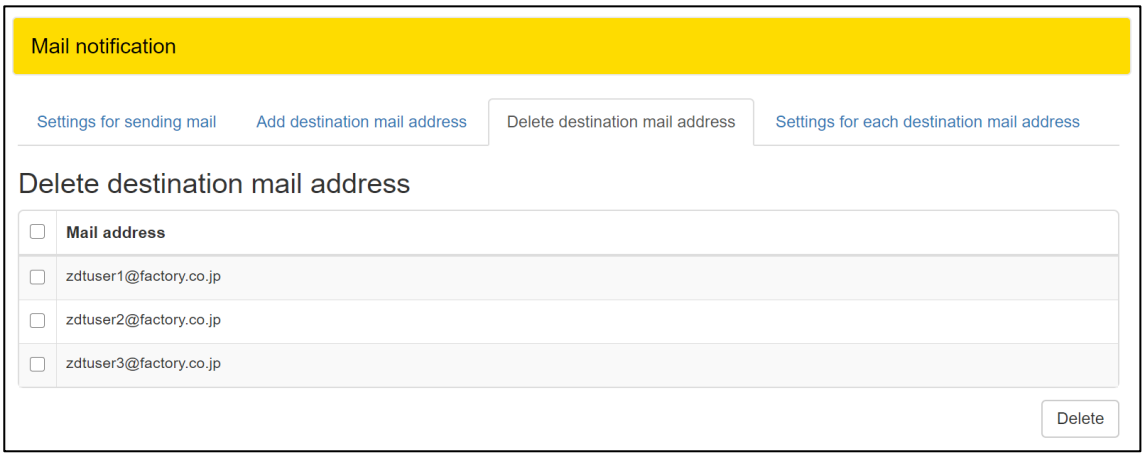


Fig. 4.8.3 (a) Delete destination mail address

Use the following procedure to delete destination email addresses.

Step

1 Select the check box for the desired destination email addresses.
2 Click the “Delete” button.

4.8.4 Settings for each Destination Mail Address

You can specify a sending setting for the email as a destination by the plant or by the line.

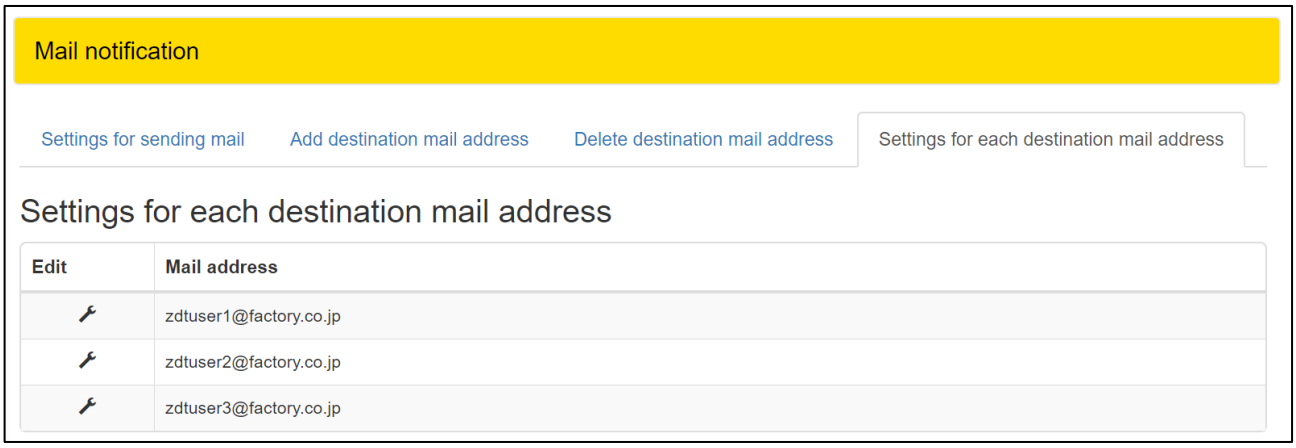


Fig. 4.8.4 (a) Settings for each destination mail address

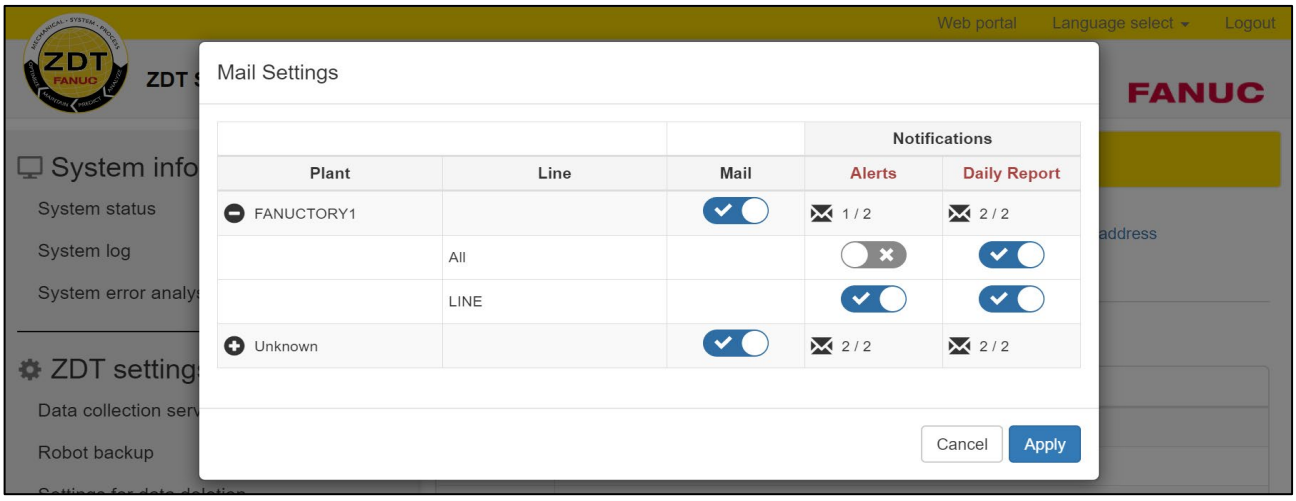


Fig. 4.8.4 (b) Settings for each destination mail address

The setting steps of the settings for each destination mail address are as follows.

Step

1 Click the edit column of the target Email address column from the list.
2 Specify the Email column switch. If it is tuned off, the Email sent to the correspondent plant is stopped.
3 Specify the switch of the notification column.
4 Click “Apply” button.

NOTE
If the “All” switch is turned On, Email is sent to all lines even though the respective line’s switch is Off.
If “All” switch turned off, Emails for the line turned On are sent.

4.9 SETTINGS FOR DATA DELETION

The ZDT server periodically deletes old data that has exceeded the configured data storage period. This storage period is configured in the settings for data deletion. The data that is deleted includes ZDT server log files and the following robot data.

- Reducer Diagnosis
- Servo Off Event
- Servo Data
- Axis Odometer
- Running Data
- Power Consumption
- Alarm Log
- User Message
- Variable Change Log
- TP Program Change Log
- Running Status log
- Vision
- Arc Weld Health
- Servo Gun Diagnosis
- Pressure Check
- ZDT server log files
- Maintenance History
- Process Logger
- Controller Memory Statistics
- Servo Tip Dress
- CPU Battery Low
- Pulsecoder Battery Low
- Tip Wear Diagnosis
- Brake Check
- Arc Weld Log
- Spot Weld Log
- Data Monitor
- LOGBOOK
- Drive Health (Motor Health)
- Drive Health (PPM)

NOTE
For Drive Health (Motor Health) , data to be used in analyzing will not deleted even if it expires the storage period.

From the side menu, click “ZDT settings” to display the sub-menu and then click “Settings for data deletion” to display the following information.

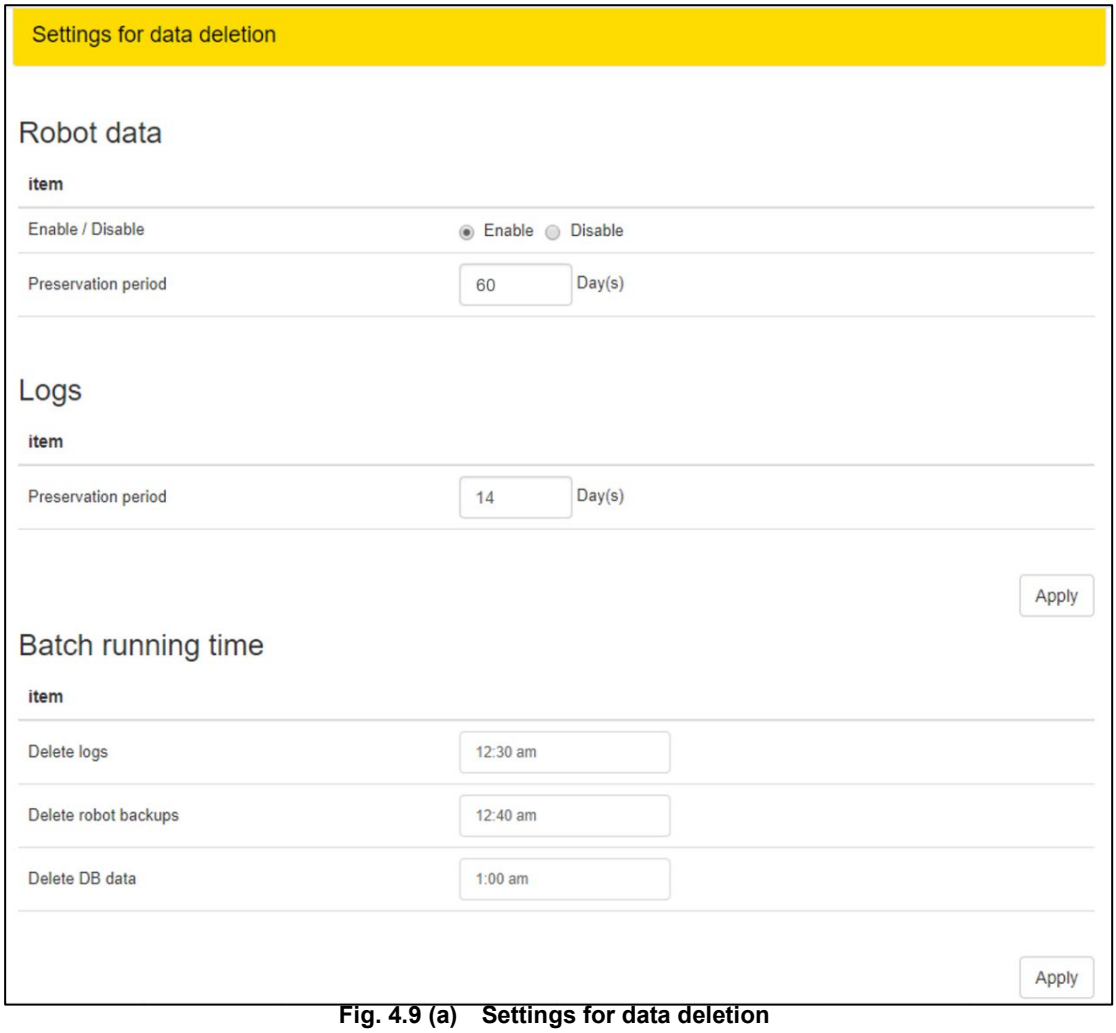


Fig. 4.9 (a) Settings for data deletion

The following table describes the information that is displayed.

Table 4.9 (a) Settings for data deletion

Item	Description
Robot data	These settings are used to enable/disable the deletion of robot controller data and configure the storage period. The default setting is 60 days. The maximum value is 365 days.
Logs	This setting is used to configure the storage period for ZDT server log files. The default setting is 14 days. The maximum value is 365 days.
Apply button	Saves the configured data storage periods and the Enable/Disable setting for robot data deletion.
Batch running time	Set the schedules for deleting the logs, the robot backup, and DB data. The default settings are: 12:30 AM (00:30) for log deletion, 12:40 AM (00:40) for robot backup deletion, and 1:00 AM (01:00) for DB data deletion.
Apply button	Used to save the batch run schedule.

NOTE
If you disable the deletion of robot data, make sure to periodically check the amount of disk space available on the ZDT server.
Enable robot data deletion if the free disk space becomes low.

Use the following procedure to configure settings for data deletion.

Step

1 Select either the “Enable” or “Disable” radio button to enable or disable robot data deletion.
2 If you enabled robot data deletion in step 1, enter a storage period for robot data.
3 Enter a storage period for log files.
4 Click the “Apply” button under “Logs”.
5 Set the times at which to delete the logs, robot backup, and DB data.
6 Click the “Apply” button under “Batch running time”.

4.10 LOCATION SETTINGS

The location information (plant name, line name, cluster name) of robot controllers that are connected to the ZDT server can be changed.
From the side menu, click “ZDT settings” - “Location settings” to display the following screen.

NOTE
1 If plant name, line name and cluster name have been set in the ZDT client settings on the robot controller, the location information will be overwritten on the timing when the new data is received.
2 For plant name, line name and cluster name settings that are “Unknown”, the values set in this “Location settings” screen will be applied.

Fig. 4.10 (a) Location setting

The following table shows the description of the displayed items.

Table 4.10 (a) Location setting

Item	Description
Add node button	A modal screen to add a child node to the selected node is shown. It is activated during selecting the home, the plant and the line nodes.
Edit node button	A modal screen to change the name of the selected node. It is activated during selecting the home, the plant and the line nodes.

Item	Description
Delete node button	The selected node is deleted. If a robot control device exists under it, a modal screen is displayed. It is activated during selecting the home, the plant and the line nodes.
Home node	This is a route node of the location. You cannot edit it.
Plant node	It shows the plant name that was specified by the robot controller.
Line node	It shows the line name that was specified by the robot controller.
Cluster node	It shows the cluster name that was specified by the robot controller.
Robot name leaf	It shows the robot name that was specified by the robot controller.
Controller ID	The ID of the robot controller is shown when the robot name leaf is being selected.
IP address	The IP address of the robot controller is shown when the robot name leaf is being selected.
Apply button	It saves the location setting.

How to specify the location setting is as follows.

Step (relocate the robot lead)

1 Drag the leaf of the robot controller to be relocated to the node of the relocation destination cluster's node
2 Click "Apply" button.

Step (add a node)

1 Select the parent node of the node to be added.
2 Click "Add a node" button.
3 Enter the "Name".
4 Click "Apply" button in the modal screen.
5 Click "Apply" button in the location setting screen.

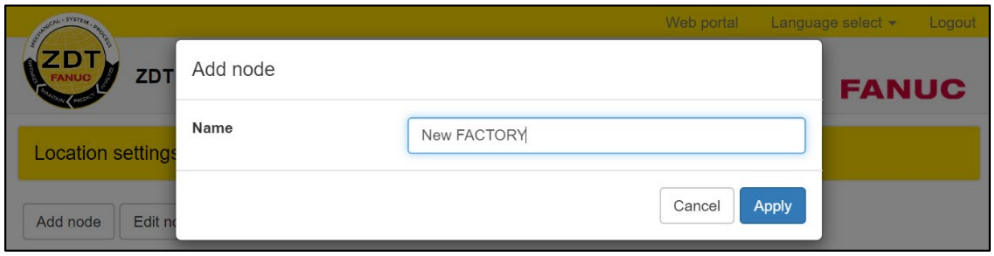


Fig.4.10 (b) Location setting node addition

Step (edit a node)

1 Select a node to change the name.
2 Click "Edit node button".
3 Select an item from the list or enter the name directly.
4 Click "Apply" button in the modal screen.
5 Click "Apply" button in the location setting screen.

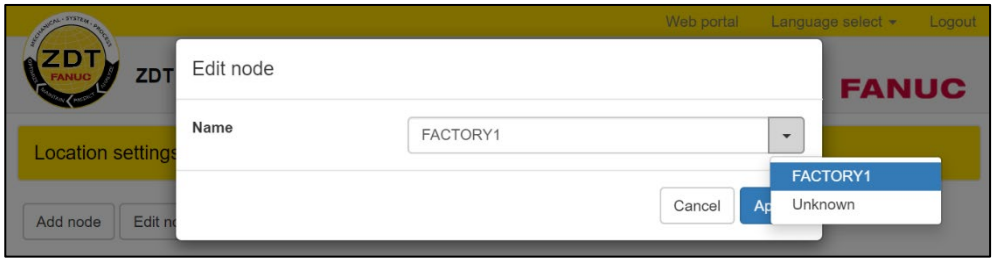


Fig. 4.10 (c) Location setting edit node

Step (delete a node)

1 Select the node to delete.
2 Click “Delete node” button. If there is no robot control device under it, the node is deleted by clicking the button. If a robot controller exists under it, follow the following steps to delete a child node.
3 Select a cluster of the relocation target from the list.
4 Click “Apply” button in the modal screen.
5 Click “Apply” button in the location setting screen.

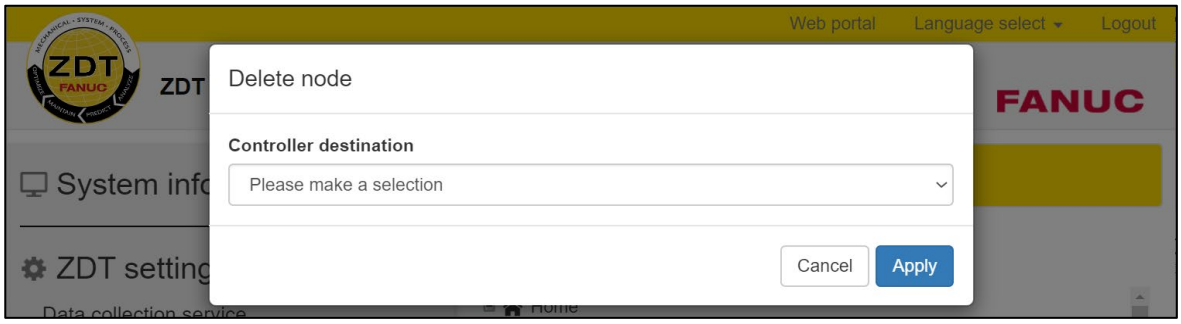


Fig. 4.10 (d) Location setting delete a node

4.11 LANGUAGES

You can configure which languages can be selected when the Language select button is clicked to change the display language of the menu. These settings can be configured for both the Web portal and the ZDT server management web service separately.
From the side menu, click “ZDT settings” to display the sub-menu and then click “Languages” to display the following information.

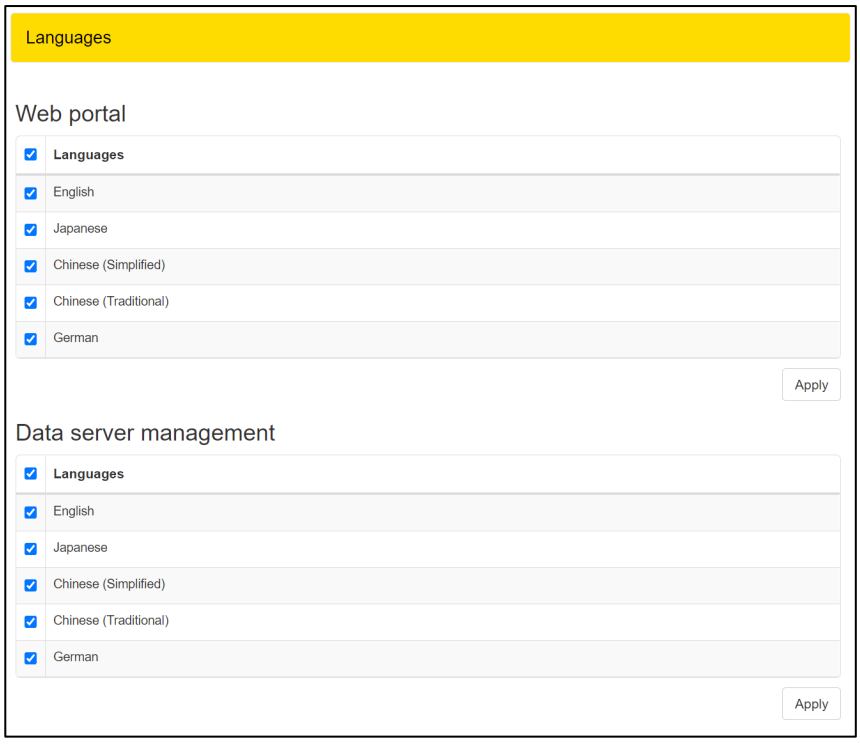


Fig. 4.11 (a) Languages

The items displayed for Web portal (for the Web portal screens) and Data server management (for ZDT server management web service) are described below.

Table 4.11 (a) Languages

Item	Description
Check box column	Select the languages you want to display as options when the Language select button is clicked. Select the check box at the top of the column to select all languages simultaneously. Deselect the check box to deselect all languages.
Language column	Displays all supported languages (English, Japanese, Chinese (Simplified), Chinese (Traditional), and German).
Apply button	Used to save the language settings.

Use the following procedure to set the languages.

Step

1 Select the check boxes of the languages you want to display as options when the Language select button is clicked.
2 Click the “Apply” button.

NOTE
Select at least one language in both Web portal and Data server management.

4.12 CSV EXPORT SETTINGS

You can configure the CSV export settings. By configuring these settings, data received from robots can be exported as a CSV file to an FTP server.

From the side menu, click “ZDT settings” to display the sub-menu and then click “CSV export settings” to display the following information.

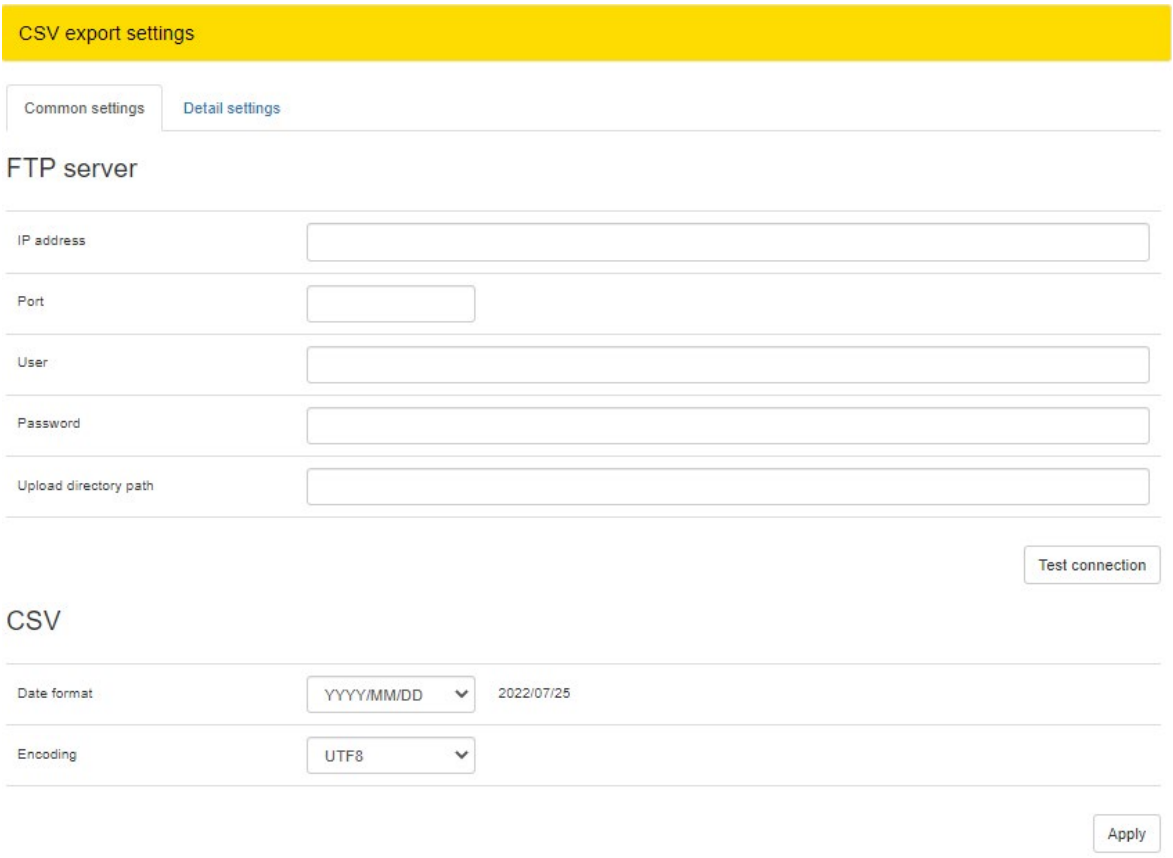


Fig. 4.12 (a) CSV export settings - Common settings

The displayed items are described as follows.

Table 4.12 (a) CSV export settings - Common settings

Item	Description
IP address	Set the IP address of the FTP server.
Port	Set the port number of the FTP server.
User	Set the user name for the FTP server.
Password	Set the password for the FTP server.
Upload directory path	Set the path of the directory for uploading to the FTP server.
Test connection button	Perform a test connection to the configured FTP server.
Date format	Set one of the following six types as the date format for exported CSV files from the menu. • YYYY/MM/DD • YYYY-MM-DD • MM/DD/YYYY

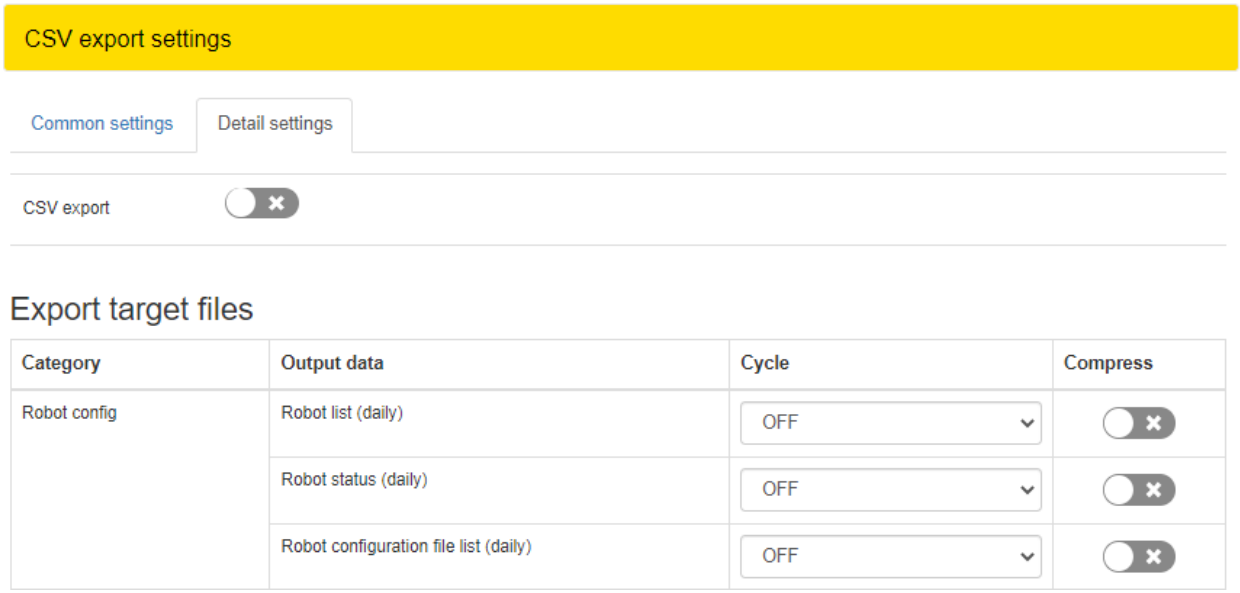
Item	Description
	• MM-DD-YYYY • DD/MM/YYYY • DD-MM-YYYY An example of the selected format is displayed to the right of the menu.
Encoding	Set one of the following two types as the character encoding for exported CSV files from the menu. • UTF8 • SJIS
Apply button	Saves the common settings of the CSV export settings.

The procedure for configuring the settings is as follows.

Step

1 Set the IP address, port number, user name, password, and upload directory path of the FTP server to use.
2 Click the “Test connection” button to confirm the connection to the FTP server.
3 If the test is successful, a “Success” label is displayed to the left of the “Test connection” button.
4 Set the date format and character encoding for exported CSV files.
5 Click the “Apply” button.

Click the “Detail settings” tab in the CSV export settings to display the following information.



Mechanical health	Reducer diagnosis results	OFF	
	Axis odometer	OFF	
	Motor health	OFF	
	Motor health status	OFF	
	Drive health diagnosis results	OFF	
	Servo off counts details (daily)	OFF	
	Servo alarm log	OFF	
	Brake diagnosis results	OFF	
System information	Alarm log	OFF	
	User message	OFF	
	Running data	OFF	
	TP program change log	OFF	
	Variable change log	OFF	
	Power consumption data	OFF	
	Running status log	OFF	
	CPU battery condition	OFF	
	Pulsecoder battery condition	OFF	
	Controller memory	OFF	
	LOGBOOK data	OFF	
	Data monitor data	OFF	

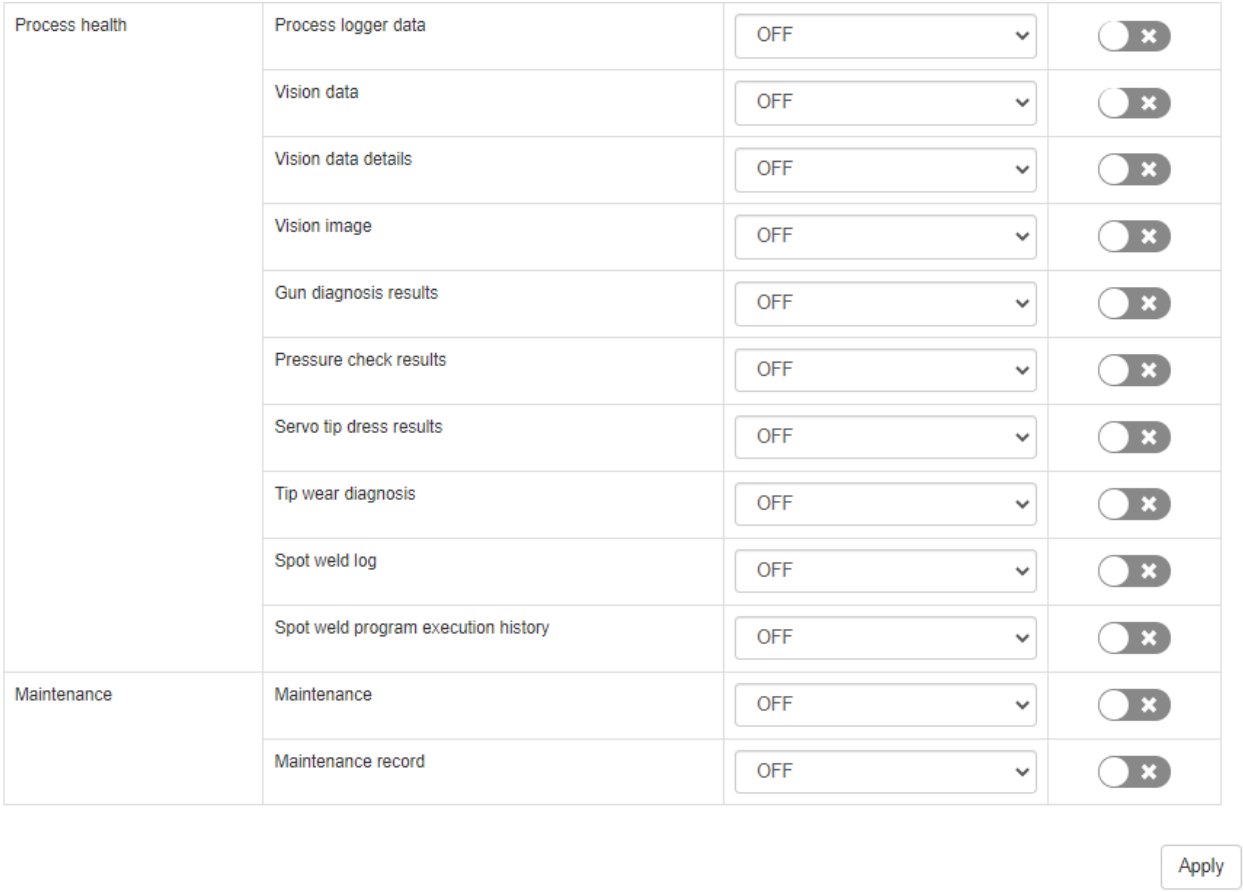


Fig. 4.12 (b) CSV export settings - Detail settings

The displayed items are described as follows.

Table 4.12 (b) CSV export settings - Detail settings

Item	Description
CSV export switch	Select whether to execute CSV exporting with the On/Off switch.
Export target files: Category column	The following categories are displayed, which contain the individual export data items that can be exported in CSV files. • Robot config • Mechanical health • System information • Process health • Maintenance
Export target files: Output data column	The following export data items are displayed as the items that can be exported in CSV files. Each of these export data items are exported as a CSV file. • Robot list (daily) • Robot status (daily) • Robot configuration file list (daily) • Reducer diagnosis results • Axis odometer • Motor health • Motor health status • Drive health diagnosis results • Servo off counts details (daily) • Servo alarm log • Brake diagnosis results

	• Alarm log • User message • Running data • TP program change log • Variable change log • Power consumption data • Running status log • CPU battery condition • Pulsecoder battery condition • Controller memory • LOGBOOK data • Data monitor data • Process logger data • Vision data • Vision data details • Vision image • Gun diagnosis results • Pressure check results • Servo tip dress results • Tip wear diagnosis • Spot weld log • Spot weld program execution history • Maintenance • Maintenance record
Export target files: Cycle column	Select the cycle at which CSV files are exported from the following. • OFF • Immediate • Every hour • Every 2 hours • Every 4 hours • Every 8 hours • Every 12 hours • Every 24 hours “Immediate” cannot be selected for the following export data items. • Robot status (daily) • Reducer diagnosis results • Motor health • Motor health status • Drive health diagnosis results • Power consumption data • CPU battery condition • Pulsecoder battery condition • Controller memory • Vision data • Vision data details • Vision image • Gun diagnosis results • Pressure check results • Servo tip dress results • Spot weld log • Spot weld program execution history
Export target files: Compress column	Set the switch to On to compress exported CSV files.
Apply button	Saves the detailed settings for CSV export.

The procedure for configuring the settings is as follows.

Step

1 Save the common settings of the CSV export settings in advance.
2 Set the CSV export switch to On.
3 Set the cycle of items to export as CSV files to a value other than OFF.
4 To compress exported CSV files, set the compress switches to On.
5 Click the “Apply” button.

Note

CSV files will be exported according to the CSV export switch and at the cycles specified for the export data items.
CSV files will not be exported if the “CSV export” switch is On but “Cycle” is OFF, or if the “CSV export” switch is Off but “Cycle” value is set other than OFF.

5 SERVER MANAGEMENT AND CONFIGURATION

5.1 DATA COLLECTOR MANAGEMENT WEB SERVICE

The following information can be verified via the data collector management web service.

- Dashboard
  Display a snapshot of the data collector performance and communication with the associated robots.
- Admin
  Backup and restore the system software, and change the admin password.
- Certificates **(not used)**
  Manage certificates on the data collector.
- User Management **(not used)**
  Manage user roles and user access.
- Network Configuration
  Make changes to the network settings.
- ZDT Data Collector
  Display dynamically updated information about the system, and the robots that provide data.

5.1.1 Login

Enter the following URL into the browser's address bar to display the login page.

https://<IP address of the data collector>:443

Once the following page is displayed, enter the username/ID of "admin" and the password of "admin" and then click "Login".

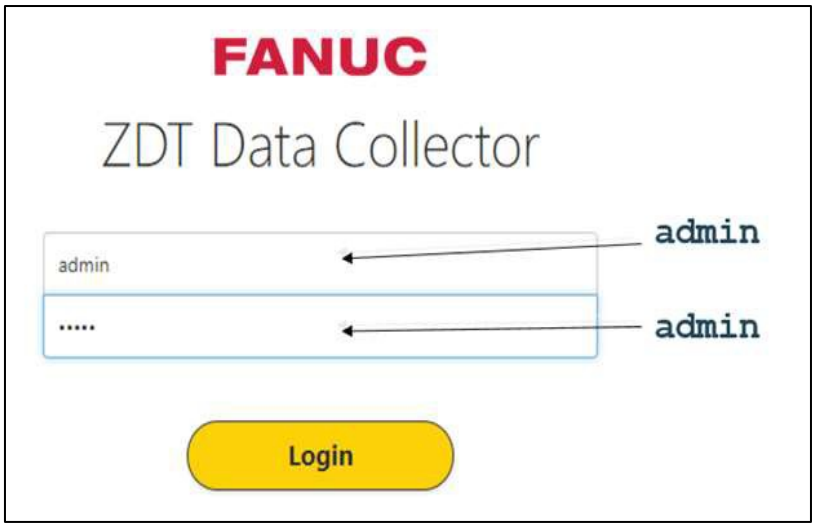


Fig. 5.1.1 (a) Login

NOTE
If the warning “Your connection is not private” is displayed on your browser, click “Advanced”, and then click “Proceed to ***.***.***.*** (unsafe)”.

5.1.2 Screen Configuration

The following data collector management web page will be displayed after successfully logged in.

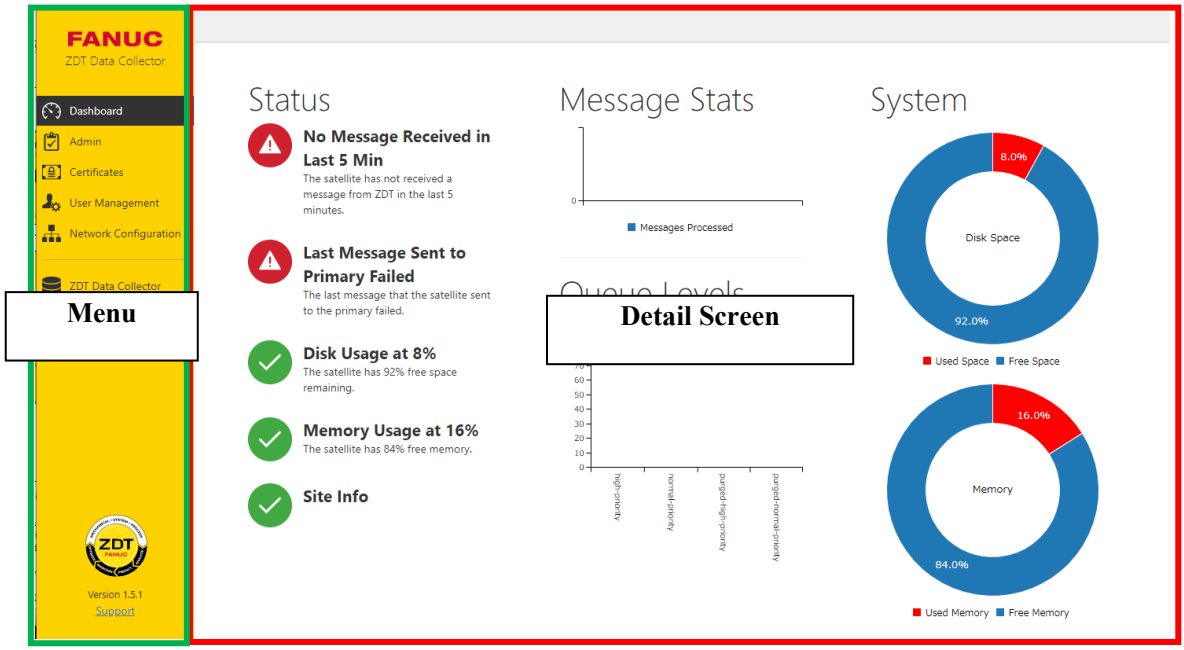


Fig. 5.1.2 (a) Screen Configuration

The data collector management web page consists of a menu and a detail screen.

5.1.3 Menu

The menu contains the following items.

- Dashboard
- Admin
- Certificates **(not used)**
- User Management **(not used)**
- Network Configuration
- ZDT Data Collector
- Log Out

Click each item to display information on the detail screen.

5.1.4 Detail Screen

The detail screen displays the information corresponding to the item selected in the menu.

5.1.5 Dashboard

The “Dashboard” screen is used to view a snapshot of the ZDT data collector system performance and communication with the associated robots.

Status

The Status field provides a high-level snapshot of critical tasks and system performance.

The following table describes the information that is displayed.

Table 5.1.5 (a) Status

Item	Description
Message received	The message reception status • Green – Messages have been received from robots within the past 5 minutes. • Red – No messages have been received from robots within the past 5 minutes.
Last Message Sent	Result of the last message to the cloud server In ZDT (On-Premise), it will always be red. • Green – The last message sent to the cloud server succeeded. • Red – The last message to the cloud server failed.
Disk Usage	The disk utilization • Green – Disk usage is under 90%. • Red – Disk usage is over 90%.
Memory Usage	The memory utilization • Green - Memory usage is under 90%. • Red - Memory usage is over 90%.

Message Stats

This filed shows the number of messages received from the robots over time.

Queue Levels

This field shows the percentage full for each message queue (0-100%).
For example, the message queue displays a large volume of messages if the ZDT data collector is not processing the influx of data fast enough.

System

The charts in the System field show the memory and disk usage data as a graph.

5.1.6 Admin

The “Admin” screen is used to perform the following operation.

- Changing the time zone
- Downloading system logs
- Changing the admin password

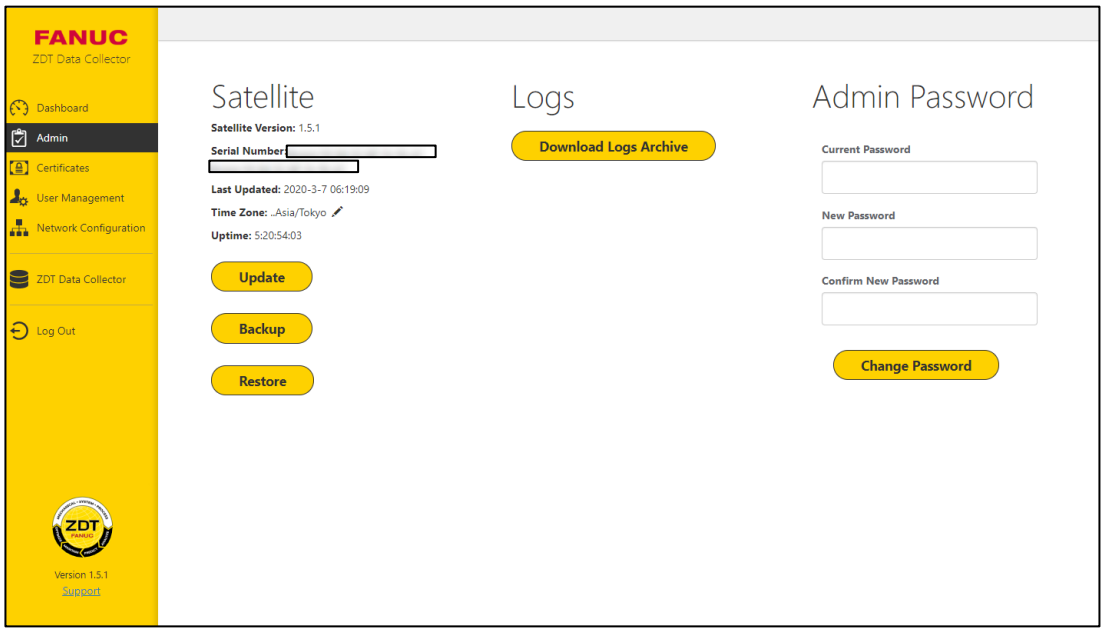


Fig. 5.1.6 (a) Admin

5.1.6.1 Changing the time zone

Click the pen icon and select a new time zone, and click “Update”.

5.1.6.2 Downloading system logs

Click “Download Logs Archive” to download system logs.
If ZDT is not functioning properly, click “Download Logs Archive” to save the log files. Then contact one of our sales representatives.

5.1.6.3 Changing the admin password

The admin password can be changed in the Admin Password field.
Enter the current admin password in “Current Password” and enter and re-enter a new password in “New Password”, and then click “Change Password” to change the admin password.

5.1.7 Certificates

The “Certificates” screen is used to manage security certificates on the data collector.
This screen is not used for ZDT (On-Premise).

5.1.8 User Management

The “User Management” screen is used to perform the following operation.
This screen is not used for ZDT (On-Premise).

5.1.9 Network Configuration

The “Network Configuration” screen is used to make changes to the network settings.

Network Settings

The network settings of the data collector can be changed in the Network Configuration field.

The following table describes the information that is displayed.

Table 5.1.9 (a) Network Settings

Item	Description
Hostname	The hostname of the data collector
Use Different Inbound/Outbound Addresses	Used to configure different IP addresses for inbound/outbound traffic This filed is not used for ZDT (On-Premise).
Static IP Address	The static IP address of the data collector
Subnet Mask	The subnet mask of the data collector
Gateway IP Address	The default gateway of the data collector
DNS server IP address(es)	The IP address of the DNS server
DNS search extension(s)	The DNS search extensions
NTP Server address(es)	The IP address of NTP server

Use the following procedure to change the network settings.

Step

1 Enter the static IP address, subnet mask, and default gateway. Enter the IP address of the DNS server as necessary.
2 Click “Save”.

Proxy

The Proxy filed is used to use a proxy server to send data from the data collector to the cloud server.
This filed is not used for ZDT (On-Premise).

Primary

The Primary field is used to configure the address and port number of the cloud server.
This filed is not used for ZDT (On-Premise).

5.1.10 ZDT Data Collector

The following information can be verified in the “ZDT Data Collector” screen.

- Home.
- Robot Controllers
- Robot Operations
- Pull Schedules
- Message Stats.
- Log Files
- Site Info

5.1.10.1 Home

The “Home” screen is used to view the processes running on the data collector and queue status.

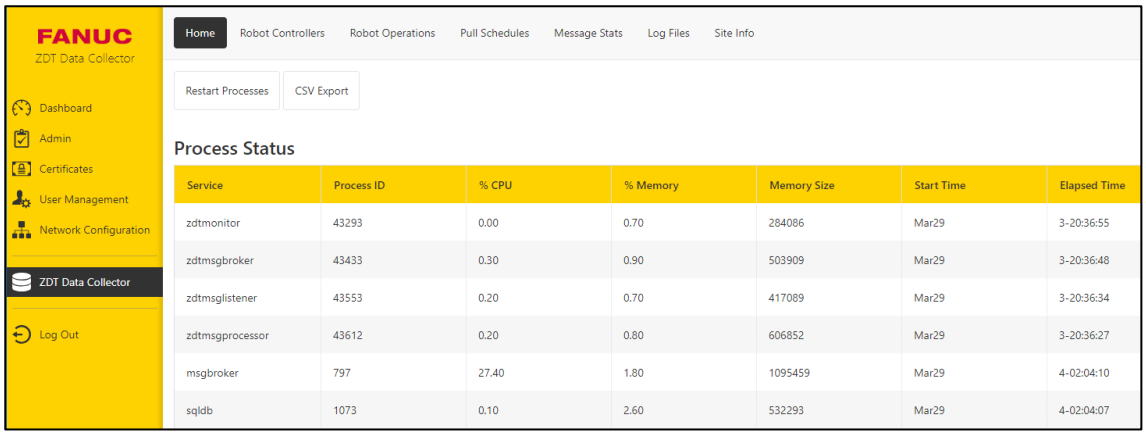


Fig. 5.1.10.1 (a) Home

Process Status

The Process Status field displays the processes running on the data collector.

The following table describes the information that is displayed.

Table 5.1.10.1 (a) Process Status

Item	Description
Service	Service name
Process ID	The process ID
% CPU	The percentage of system CPU that the process is using
% Memory	The portion of system memory that process is using
Memory Size	The amount of memory that this process is using
Start Time	When the process began running
Elapsed Time	How long it has been running

It takes time for processes to start up on power-on.
If any service has stopped, click “Restart Processes” to restart processes, or else restart the data collector

Queue Status

The Queue Status field displays the queue status.

The following table describes the information that is displayed.

Table 5.1.10.1 (b) Queue Status

Item	Description
Queue	Message queue name
Message Count	Number of messages in this queue
Rate In	Incoming message rate
Rate Out	Outgoing message rate
Memory Size	Amount of memory used by this queue

5.1.10.2 Robot controllers

The “Robot Controllers” screen is used to view information on robot controllers that send data to the data collector. The data is dynamically updated every 5 seconds.

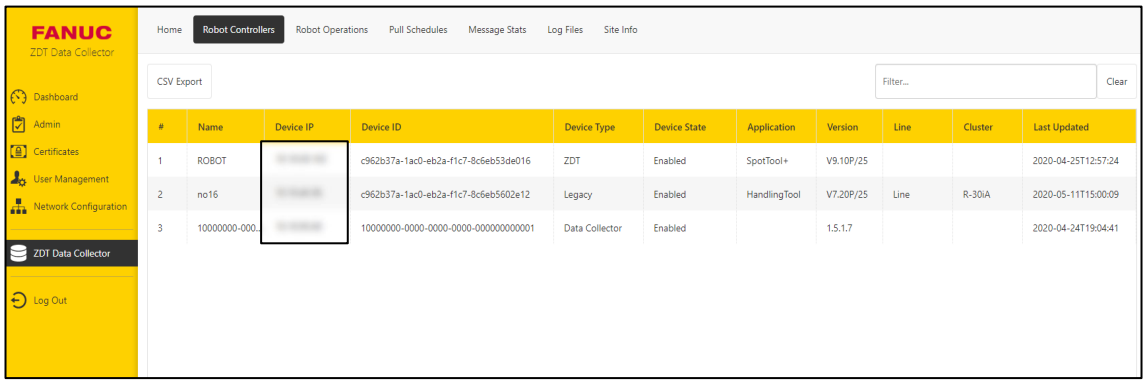


Fig. 5.1.10.2 (a) Robot Controllers

The following table describes the information that is displayed.

Table 5.1.10.2 (a) Robot Controllers

Item	Description
Name	The robot name
Device IP	The robot IP address
Device ID	The globally unique ID of the robot
Device Type	The device type Legacy: R-30*i*A, ZDT: R-30*i*B or later
Device State	The current state of the device, such as Enabled or Disabled
Application	The name of the application tool installed on the robot. For example; SpotTool+
Version	The system software version installed on the robot
Line	The line name
Cluster	The cluster name
Last Updated	When last message received from the robot

If no information is displayed here, the robot controller may not be sending messages correctly, or the data collector is not running properly.

Enter a text string into the text box at the upper right and click “Filter Page” to filter the display by the entered text string. Click “Clear” to clear the filter.

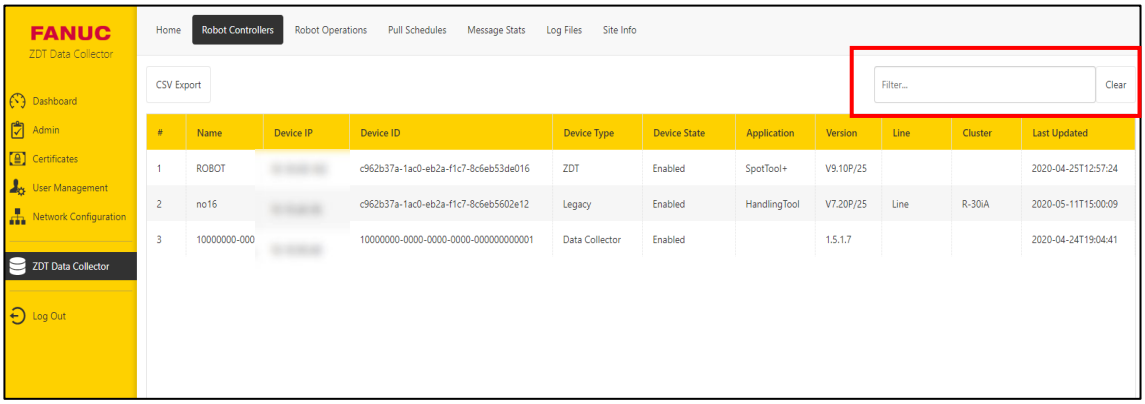


Fig. 5.1.10.2 (b) Filtering

5.1.10.3 Robot operations

The “Robot Operations” screen is used to manage the data pull schedule of robot controllers.

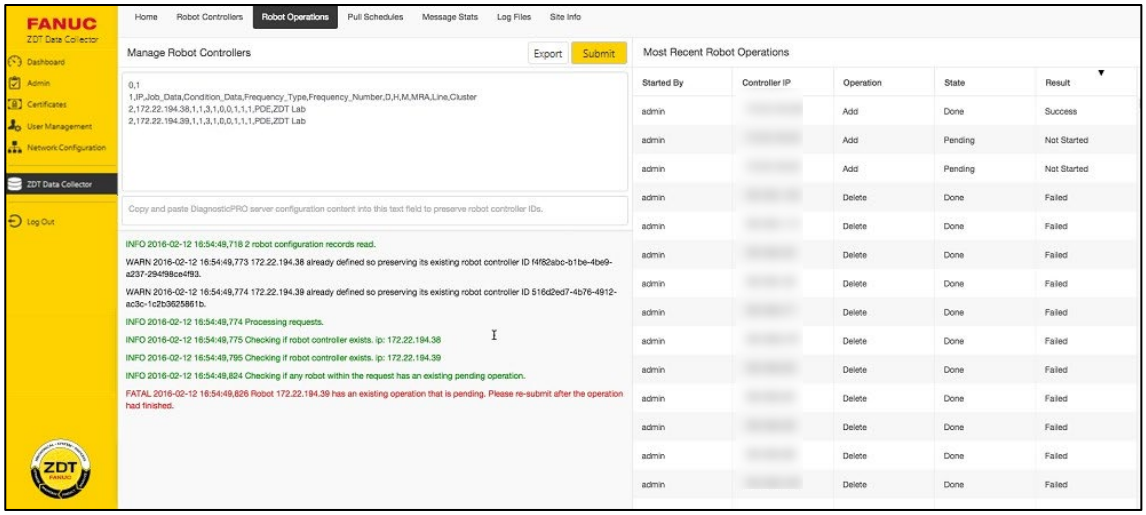


Fig. 5.1.10.3 (a) Robot Operations

Manage Robot Controllers

The Manage Robot Controllers field is used to configure data pull schedule for R-30*i*A robot controllers. Enter configuration commands in CSV format, and click “Submit” to perform configuration.

The following figure illustrates an example commands that add pull schedule.

```
0,1,,,,,,,
1,IP,Job_Data,Condition_Data,Frequency_Type,Frequency
Number,D,H,M,MRA,Line,Cluster,Controller_ID,Disable
2,10.22.58.167,1,1,1,1,0,14,0,1,Line1,Cluster1,80d63113-60e5-44cc-8bc6-a57bcb0b8ec6,0
```

NOTE

The first two lines are optional.

Each command needs to be executed in a statethat the robot controller and the data collector can communicate.
If the communication is not possible, the command execution will fail.

Output is displayed in the bottom left field. Successful operations output is displayed in green, failed operations output is displayed in red.

CSV Column Definitions

The following table describes each column definition.

Table 5.1.10.3 (a) CSV Column Definitions

Item	Description
Command Type	Command type to execute 0: File format version (optional) 1: Header labels (optional) 2: Add robot controller pull schedule 3: Delete the robot pull schedule (only the IP is required) 4: Disable the robot pull schedule (only the IP is required) 5: Enable the robot pull schedule (only the IP is required)

Item	Description
Command Type	6: Pull robot controller now (only the IP is required) 7: Add robot controller pull schedule (for R-30*i*B or later) 8: Get the robot controller ID (only the IP is required)
IP	IP address of the robot controller being added
Job_Data	Enable/disable push the job data (torque, disturbance torque, error count) 0: Disable push data 1: Enable push data
Condition_Data	Enable/disable pull the reducer diagnosis data 0: Disable pull data 1: Enable pull data
Frequency_Type	Frequency type for pull data 0: Hourly pull trigger, 1: Daily pull trigger, 2: Weekly pull trigger
Frequency Number	Number of hours/days/weeks (depending on type above) between issuing the pull
D	Day of the week for weekly pull operation to trigger 0: Sunday, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, 6: Saturday
H	Hour for daily/weekly pull operation to trigger The values are 0-23 (0: midnight).
M	Minutes after the hour for daily/weekly pull operation to trigger The values are 0-56.
MRA	Enable/disable collection of servo-off detail data In addition, a memory card must be inserted in the controller to store the data temporarily. 0: Disable servo-off detail file collection 1: Enable servo-off detail file collection
Line	Name of the line that the robot is on This name is not used for ZDT (On-Premise).
Cluster	Name of the cluster that the robot is in This name is not used for ZDT (On-Premise)
Controller_ID	GUID of the robot controller being added Use the command 8 to get controller ID For example: 8,robot controller's IP address
Disable	(Optional) An additional field is used to disable the robot when adding it to the data collector. This field is typically used only when restoring from a backup if the robot controller was disabled when the backup occurred.

Most Recent Robot Operations

The Most Recent Robot Operations field displays a history of recent operations.

The following table describes the information that is displayed.

Table 5.1.10.3 (b) Most Recent Robot Operations

Item	Description
Start Time	The date and time when the operation was performed
Started By	The user who performed the operation
Controller IP	The IP address of the robot that performed the configuration command
Operation	The operation that was performed
Result	The result of the operation

Use the following procedure to add data pull schedule for R-30*i*A robot controllers.

Step

1 Enter the following command and click “Submit” to get the controller ID of the robot controller for which you want to add pull schedule. In this example, “10.22.58.167” is the robot controller IP address.

8, 10.22.58.167

2 Once the “Result” in the command history added in “Most Recent Robot Operations” field is changed to “Success”, click it and write down the ID strings displayed in “INFO controller_id” of detailed screen. In this example,
“80d63113-60e5-44cc-8bc6-a57bcb0b8ec6” is the controller ID.

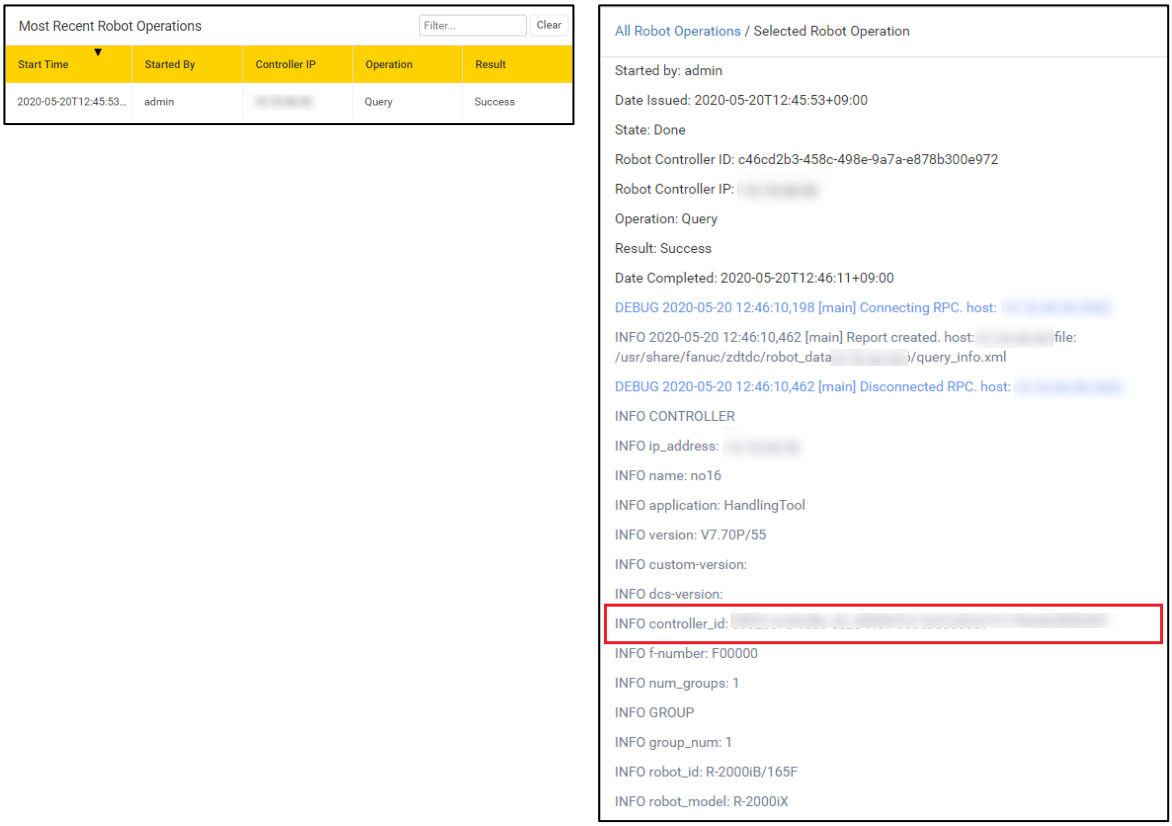


Fig. 5.1.10.3 (b) Most Recent Robot Operations

3 Once the controller ID is acquired, enter the following command, and click “Submit” to delete the history of the command that was just executed.

3, 10.22.58.167

4 Once the command history is removed, enter the following command, and click “Submit” to add data pull schedule. Please refer to “CSV Column Definitions” for commands.

2,10.22.58.167,1,1,0,1,0,0,0,1,line,cluster, 80d63113-60e5-44cc-8bc6-a57bcb0b8ec6,0

5.1.10.4 Pull schedules

The “Pull Schedules” screen is used to view statistics such as the types of messages that the data collector has received and the number of messages received.
Once you click “Pull” at the top of the screen, the pull schedules of robot data will be displayed. “Backup” is not used for ZDT (On-Premise).

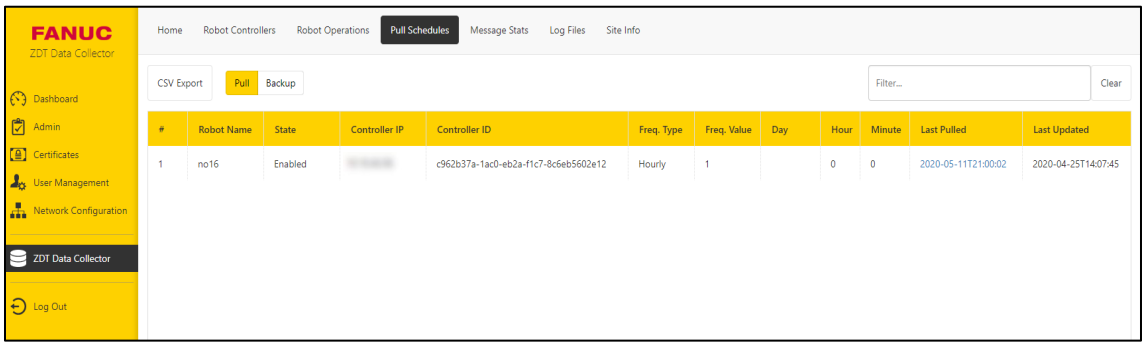


Fig. 5.1.10.4 (a) Pull Schedules

The following table describes the information that is displayed.

Table 5.1.10.4 (a) Pull Schedules

Item	Description
Robot Name	The device name
State	The state of data pull schedule (Enabled/Disabled)
Controller IP	The device IP address
Controller ID	The device unique ID
Freq. Type	Defines if the data is pulled by minutes or other values
Freq. Value	How often the data is pulled
Day, Hour, Minute	Times at which the pull is scheduled
Last Pulled	When data was last pulled
Last Updated	When the pull schedule was last updated

5.1.10.5 Message stats

The “Message Stats” screen is used to view statistics such as the types of messages that the data collector has received and the number of messages received.
Click “Reset Statistics” to reset the statistics. Click “Delete Statistics” to delete all information.

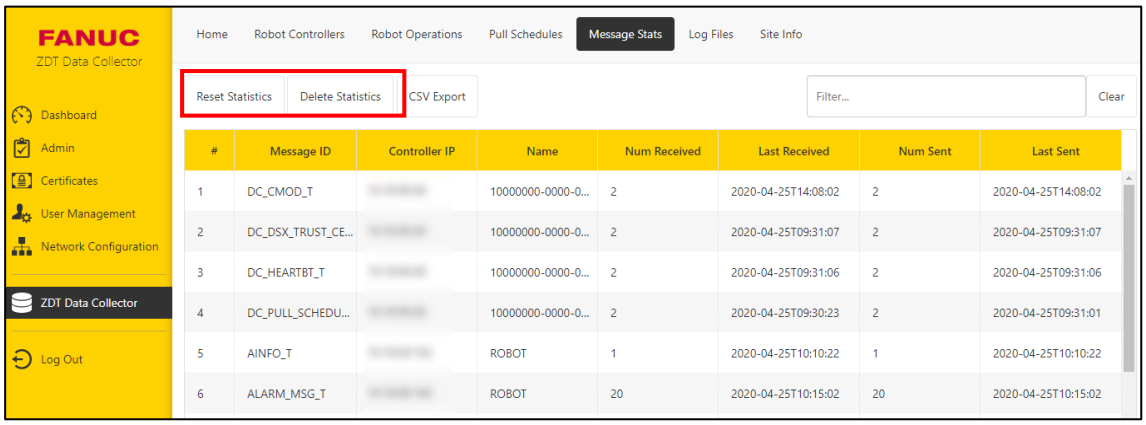


Fig. 5.1.10.5 (a) Message Stats

The following table describes the information that is displayed.

Table 5.1.10.5 (a) Message Stats

Item	Description
Message ID	The message name
Controller IP	The robot IP address
Name	The robot name
Num Received	The number of messages received since the last reset
Last Received	When the last message was received
Num Sent	The number of messages sent on
Last Sent	When the last message of this type from this robot was sent

5.1.10.6 Log files

The “Log Files” screen is used to view log information on processes running on the data collector. If ZDT is not functioning properly, click “Download Log Files” to save the log files. Then contact one of our sales representatives.

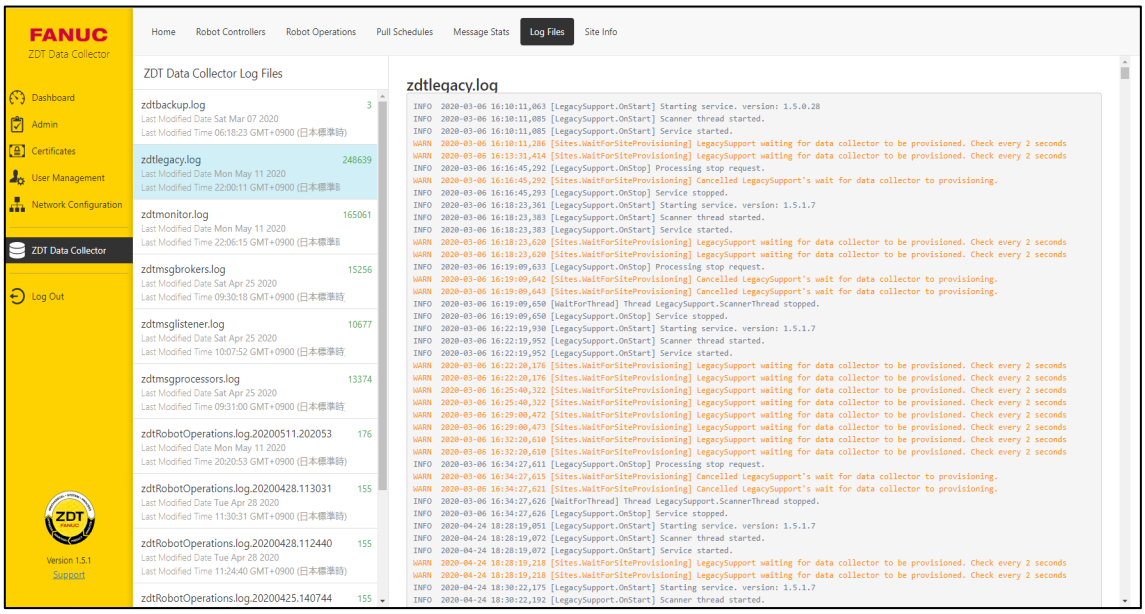


Fig. 5.1.10.6 (a) Log Files

5.1.10.7 Site info

The “Site Info” screen is used to view detailed data collector information.

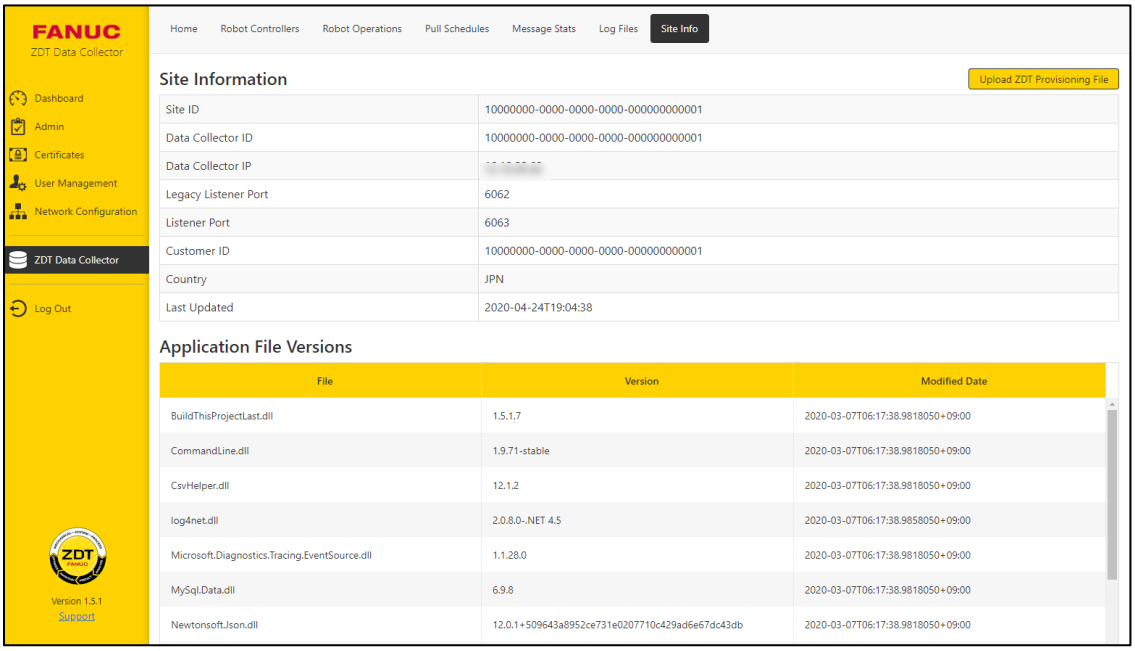


Fig 5.1.10.7 (a) Site Info

Site Information

The “Site Information” field displays information on the data collector.

The following table describes the information that is displayed.

Table 5.1.10.7 (a) Site Information

Item	Description
Site ID	The globally unique ID of the site the ZDT data collector is monitoring In ZDT (On-Premise), the following ID is displayed. 10000000-0000-0000-0000-000000000001
Data Collector ID	The globally unique ID of this ZDT Data Collector In ZDT (On-Premise), the following ID is displayed. 10000000-0000-0000-0000-000000000001
Data Collector IP	The server IP address
Legacy Listener Port	The port number that the data collector uses to receive messages from R-30*i*A robot controllers. Normally 6062
Listener Port	The port number that the data collector uses to receive messages from robot controllers. Normally 6063
Customer ID	The customer’s globally unique ID In ZDT (On-Premise), the following ID is displayed. 10000000-0000-0000-0000-000000000001
Country	The country where the collector is installed In ZDT (On-Premise), “JPN” is displayed.
Last Updated	The date/time that the site was last updated

“Upload ZDT Provisioning File” is not used for ZDT (On-Premise).

Application File Versions, Web API File Versions

The “Application File Versions” field displays additional data for the library files used for the Application, Web, and Web API files
The following table describes the information that is displayed.

Fig.5.1.10.7 (b) Application File Versions, Web API File Versions

Item	Description
File	The application file name
Version	The version number of the application file
Modified date	The date/time stamp of the application

5.1.11 Log out

This option is used to log out from the data collector management web page.

5.2 ZDT SERVER MANAGEMENT WEB SERVICE

The following information can be verified via the ZDT server management web service.

- System info
  ZDT server operational status
- Data Collection Settings
  Settings of each of the data collection service functions
- ZDT settings
  Settings for specific features such as periodic backing up of robot controller data
- OS settings
  ZDT server environment settings such as time and network settings
- Portal user management
  Used to change the password of the Web portal administrator account, delete portal users, and Home Screen preferences
- License
  Used to manage the ZDT server license

5.2.1 Login

Use either of the following methods to display the login page.

- From the Web portal header, click the “Settings” button, and then select “Data Server Management”.
- Enter the following URL into the browser’s address bar.
  http://<IP address of ZDT server>/management

Once the following page is displayed, enter the user name of “zdtadmin” and the password of “zdtadmin”, and then click “Login”.

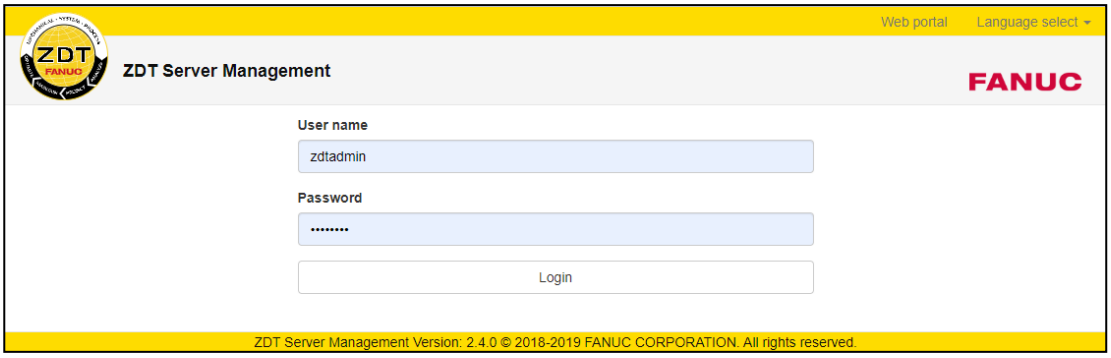


Fig. 5.2.1 (a) Login Screen

NOTE
The password “zdtadmin” is valid only if it has not been changed from the default. If the password was changed using the function described later in “5.2.10.1 Manager account management”, log in with the registered password.

5.2.2 Screen Configuration

The following ZDT server management web page will be displayed after a successful login.

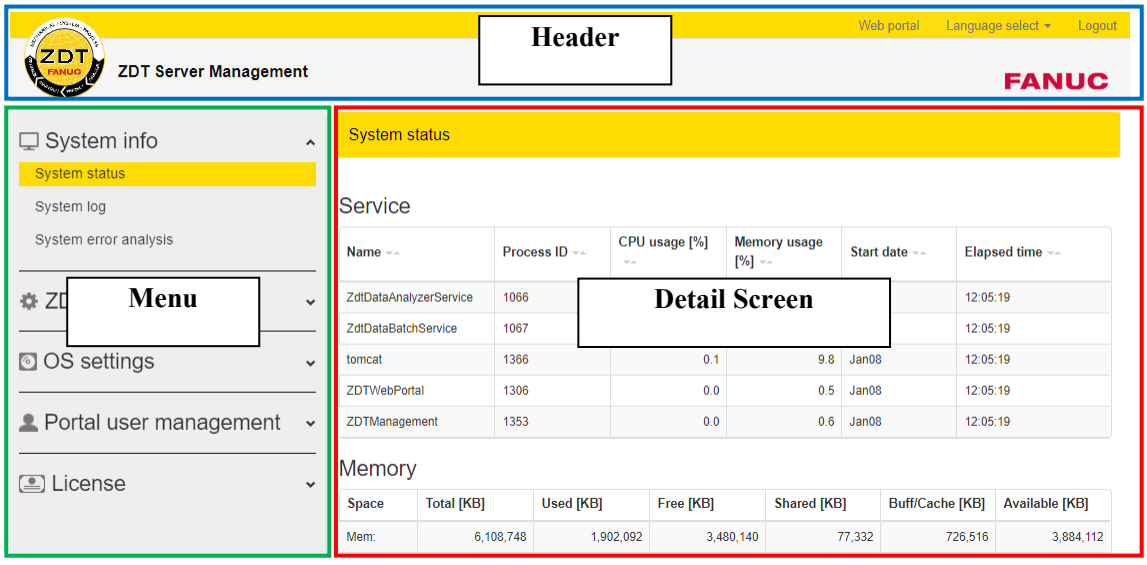


Fig. 5.2.2 (a) Screen Configuration

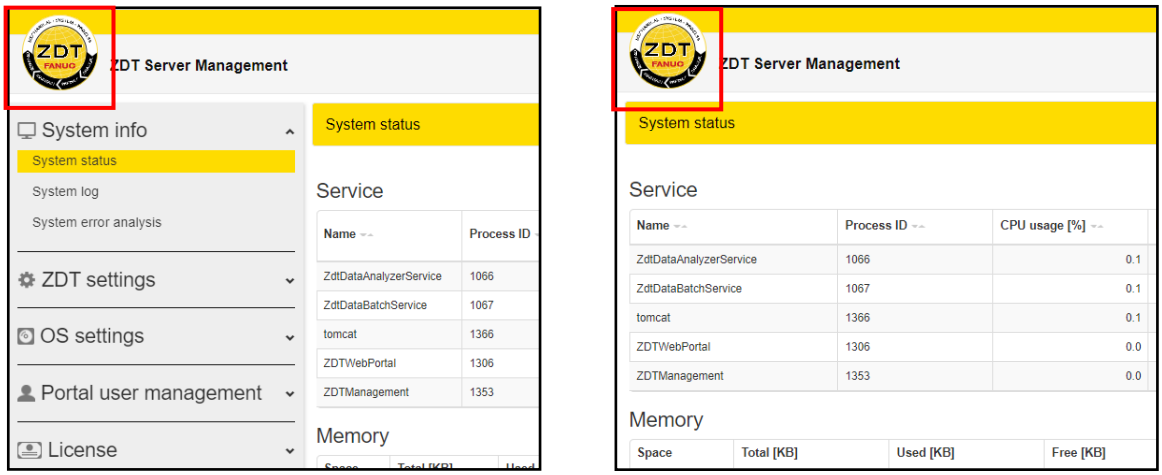
The ZDT server management web page consists of a header, menu, and a detail screen.

5.2.3 Header

The header is used to show/hide the menu, transition to the Web portal, change languages, and log out.

5.2.3.1 Show/Hide of the menu

Click the “ZDT” icon at the left side of the header to show/hide the menu.



Show Hide

Fig. 5.2.3.1 (a) Show/Hide of the Menu

5.2.3.2 Transition to the web portal

Click the “Web Portal” button at the right side of the header to transition to the Web portal.

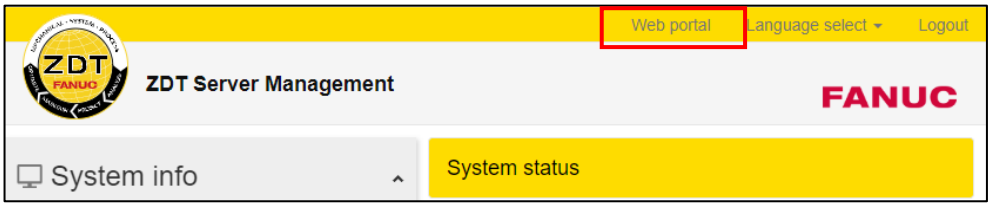


Fig. 5.2.3.2 (a) Web Portal button

5.2.3.3 Language selection

Click the “Language Select” menu at the right side of the header to change the display language. Options include English, Japanese, Chinese (Simplified), Chinese (Traditional), and German.

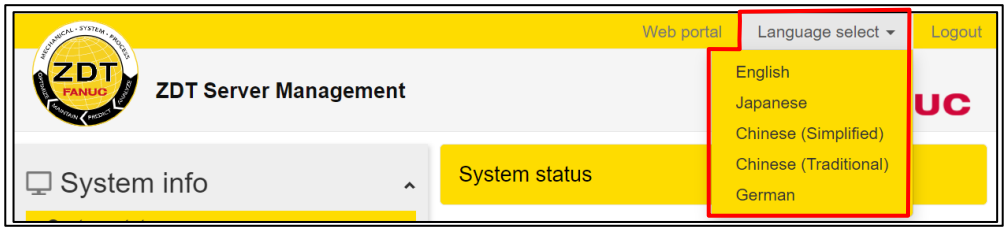


Fig. 5.2.3.3 (a) Language select button

5.2.3.4 Logout

Click the “Logout” button at the right side of the header to logout of the ZDT server management web page.

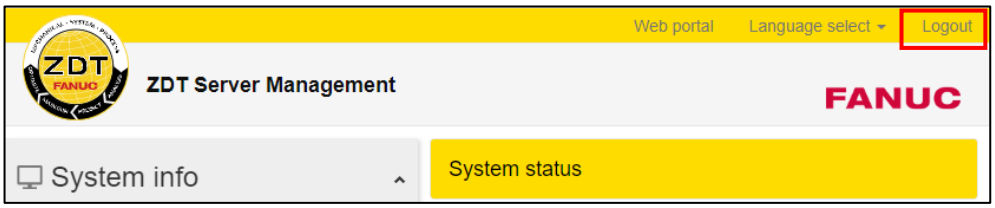


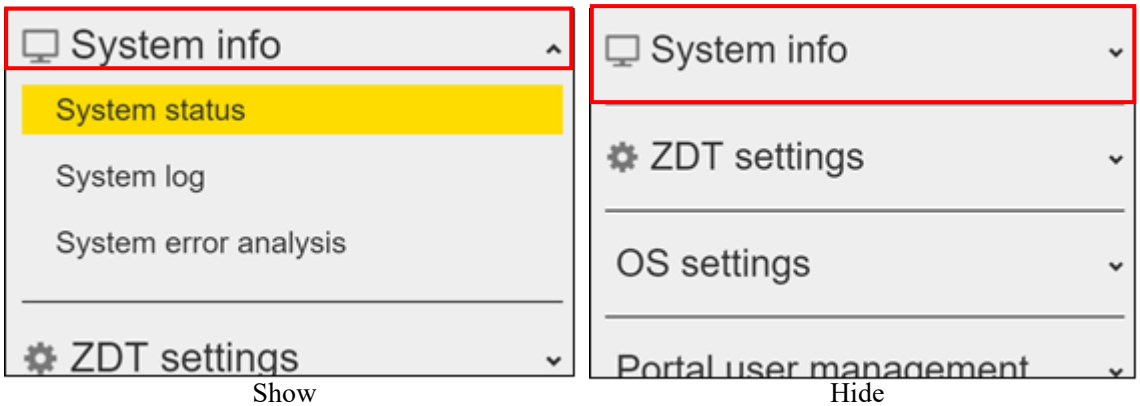
Fig. 5.2.3.4 (a) Logout button

5.2.4 Menu

The menu contains the following items.

- System info
  - System status
  - System log
  - System error analysis
- Data Collection Settings
  - Data collection service
  - Robot backup
  - Servo data
  - Vision offset data
  - Program information when alarm occurred
  - Data monitor settings
  - Operation Status Panel Settings
- ZDT settings
  - Settings for data deletion
  - CSV export settings
  - Email notification
  - Location settings
  - Languages
- OS settings
  - Environment settings
  - Power
  - Disk expansion
- Portal user management
  - Manager account management
  - Delete portal user
  - Home Screen Settings
- License
  - Management

Click each item to show/hide its sub-menu.



Show Hide

Fig. 5.2.4 (a) Show/Hide of the Sub-menu

Click an item in the sub-menu to display information and settings on the detail screen.

5.2.5 Detail Screen

The detail screen displays the information and settings corresponding to the item selected in the menu.

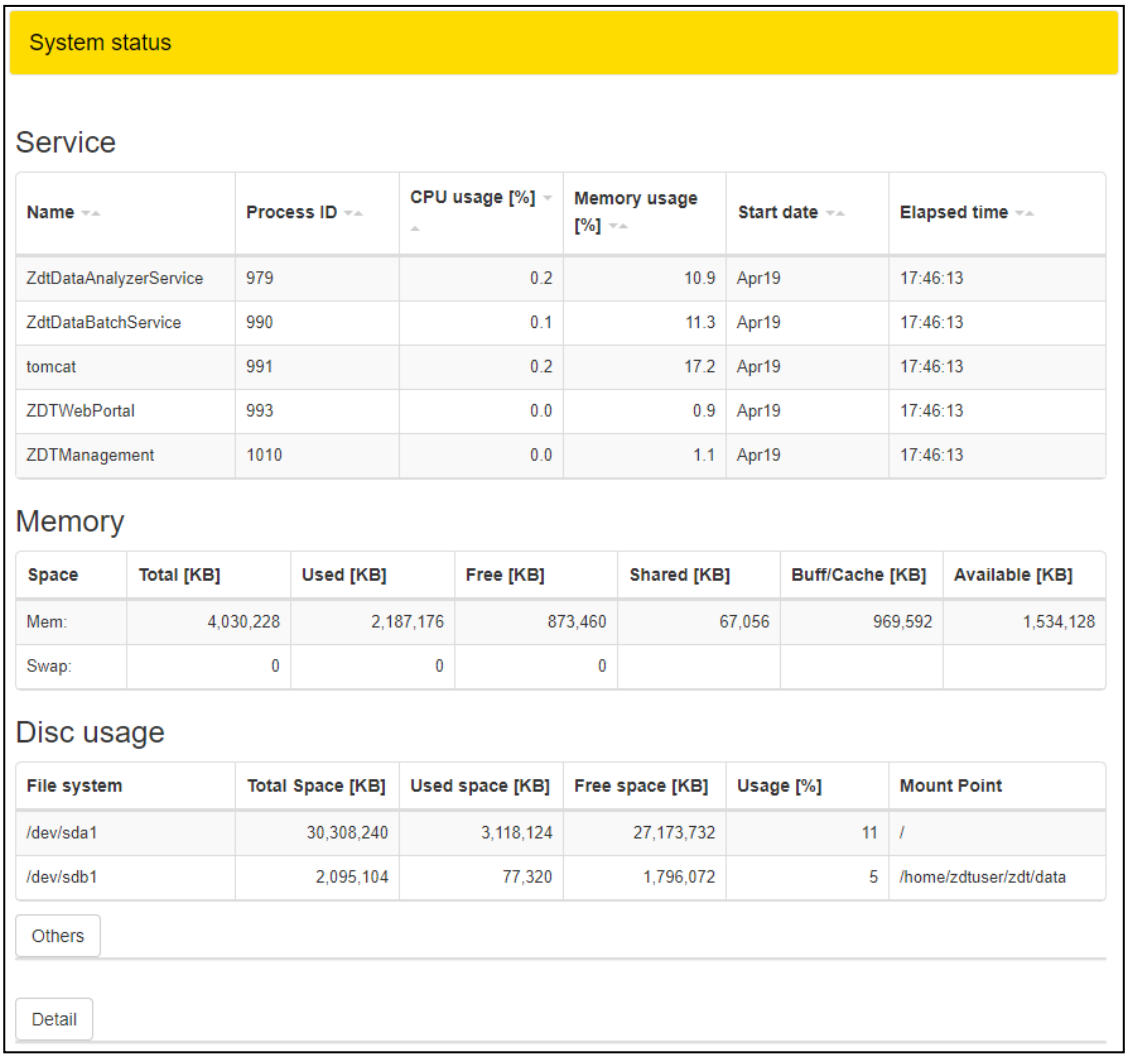
5.2.6 System Info

The “System info” is used to view the following information.

- System status
- System log
- System error analysis

5.2.6.1 System status

The “System status” screen is used to view information on the status of services running on the ZDT server and statistics on memory and disk usage.



System status

Service

Name	Process ID	CPU usage [%]	Memory usage [%]	Start date	Elapsed time
ZdtDataAnalyzerService	979	0.2	10.9	Apr19	17:46:13
ZdtDataBatchService	990	0.1	11.3	Apr19	17:46:13
tomcat	991	0.2	17.2	Apr19	17:46:13
ZDTWebPortal	993	0.0	0.9	Apr19	17:46:13
ZDTManagement	1010	0.0	1.1	Apr19	17:46:13

Memory

Space	Total [KB]	Used [KB]	Free [KB]	Shared [KB]	Buff/Cache [KB]	Available [KB]
Mem:	4,030,228	2,187,176	873,460	67,056	969,592	1,534,128
Swap:	0	0	0			

Disc usage

File system	Total Space [KB]	Used space [KB]	Free space [KB]	Usage [%]	Mount Point
/dev/sda1	30,308,240	3,118,124	27,173,732	11	/
/dev/sdb1	2,095,104	77,320	1,796,072	5	/home/zdtuser/zdt/data

Others

Detail

Fig. 5.2.6.1 (a) System Status

The following table describes the information that is displayed.

Table 5.2.6.1 (a) Services

Item	Description
Name	Displays the name of services.
Process ID	Displays the process ID.
CPU usage [%]	Displays the CPU utilization of the process.
Memory usage [%]	Displays the memory utilization of the process.
Start time	Displays the time that the service started.
Elapsed time	Displays the time that has elapsed since the process has started.

Table 5.2.6.1 (b) Memory

Item	Description
Space	Displays the memory space.
Total [KB]	Displays the total amount of physical memory.
Used [KB]	Displays the amount of memory that is used.
Free [KB]	Displays the amount of memory that is not used.
Shared [KB]	Displays the amount of memory that can be shared.
Buff/Cache [KB]	Displays the amount of memory that has been buffered/cached.
Available [KB]	Displays the amount of memory that is available.

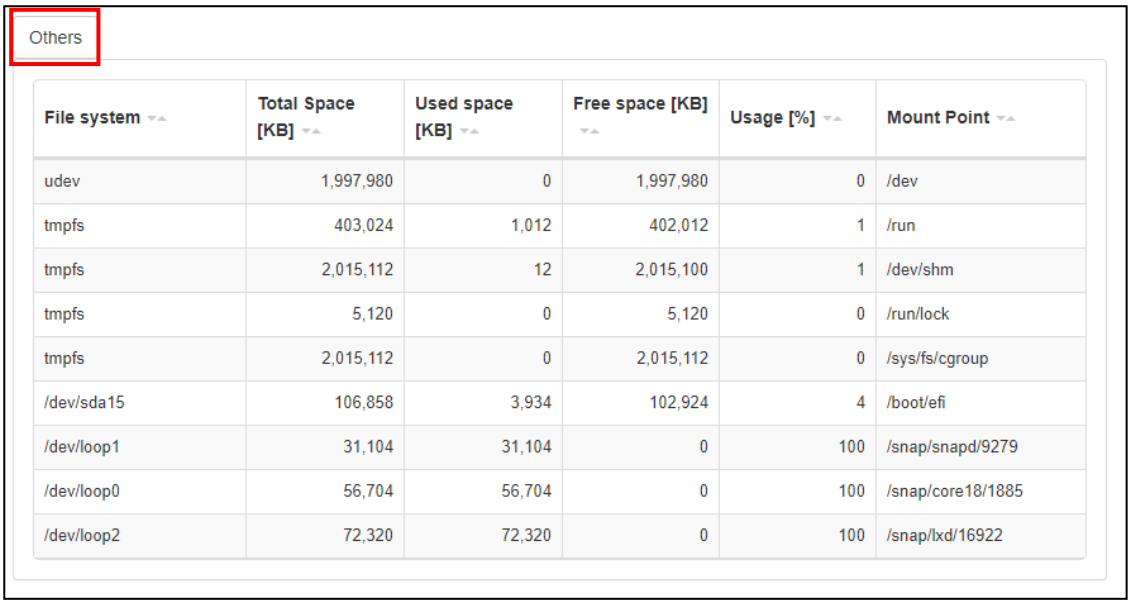
Table 5.2.6.1 (c) Disk usage

Item	Description
File system	Displays the name of the file system.
Total Space [KB]	Displays the total amount of space.
Used space [KB]	Displays the amount of space that is used.
Free space [KB]	Displays the amount of space that is available.
Usage [%]	Displays the disk usage.
Mount Point	Displays the hierarchical location where the disk is mounted.

Table 5.2.6.1 (d) Detailed information

Item	Description
Device size	Displays the entire device size.
Allocated	Displays the total amount of space that has been allocated. Allocation is performed dynamically according to the amount used.
Unallocated	Displays the total amount of space that has not been allocated.
In use	Displays the total amount of space that is in use.
Free capacity	Displays the total amount of space that is available.
Global reserve	Displays the amount of space that is reserved for operations by the file system.
Data	Displays the usage state of space that has been allocated for actual data.
Metadata	Displays the usage state of space that has been allocated for metadata (directory structure, file names, etc.).
System	Displays the usage state of space that has been allocated for the system.

Click the “Others” button in the upper left to view disk usage statistics on other file systems.

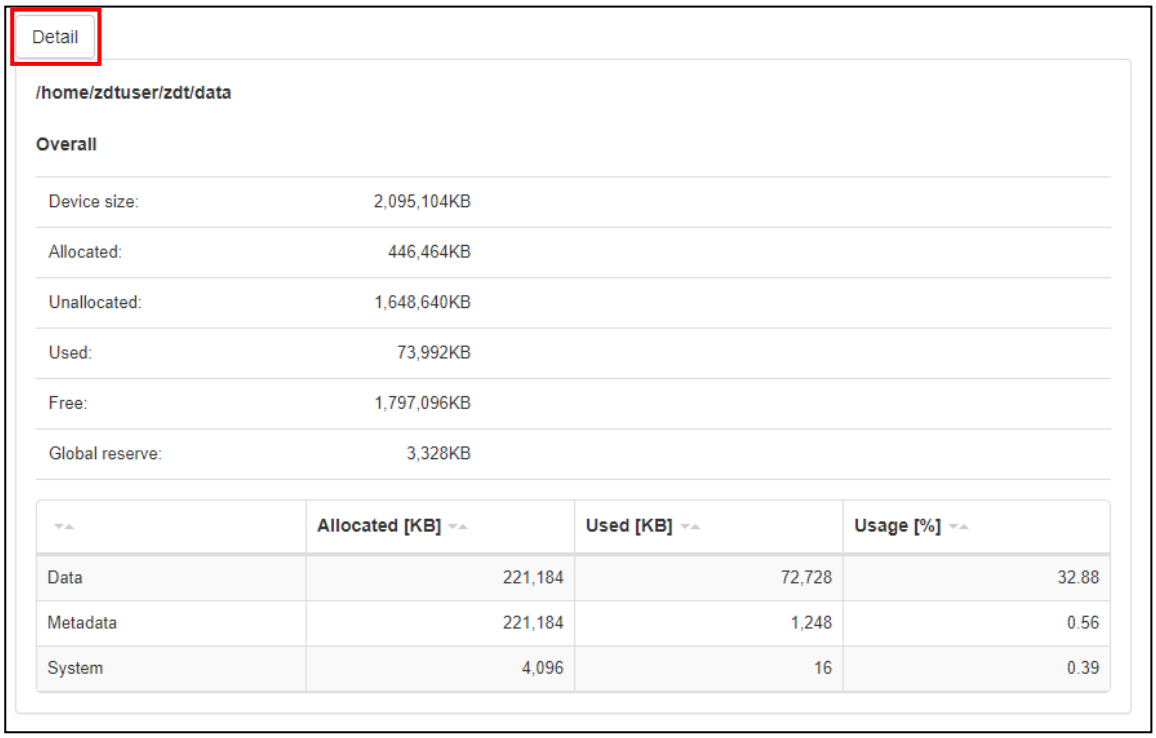


Others

File system	Total Space [KB]	Used space [KB]	Free space [KB]	Usage [%]	Mount Point
udev	1,997,980	0	1,997,980	0	/dev
tmpfs	403,024	1,012	402,012	1	/run
tmpfs	2,015,112	12	2,015,100	1	/dev/shm
tmpfs	5,120	0	5,120	0	/run/lock
tmpfs	2,015,112	0	2,015,112	0	/sys/fs/cgroup
/dev/sda15	106,858	3,934	102,924	4	/boot/efi
/dev/loop1	31,104	31,104	0	100	/snap/snapd/9279
/dev/loop0	56,704	56,704	0	100	/snap/core18/1885
/dev/loop2	72,320	72,320	0	100	/snap/lxd/16922

Fig. 5.2.6.1 (b) Disk usage

By clicking the “Details” button, you can check the details of the usage of the device for storing data (/dev/sdb1).



Detail

/home/zdtuser/zdt/data

Overall

Device size:	2,095,104KB
Allocated:	446,464KB
Unallocated:	1,648,640KB
Used:	73,992KB
Free:	1,797,096KB
Global reserve:	3,328KB

	Allocated [KB]	Used [KB]	Usage [%]
Data	221,184	72,728	32.88
Metadata	221,184	1,248	0.56
System	4,096	16	0.39

Fig. 5.2.6.1 (c) Usage details of /dev/sdb1

5.2.6.2 System log

The following log information on services running on the ZDT server can be viewed. The application log mainly shows the log of received data, and the service log mainly shows the log of analyzed data. If ZDT is not functioning properly, click the “Download all” button at the upper left to save the log files. Then contact one of our sales representatives.

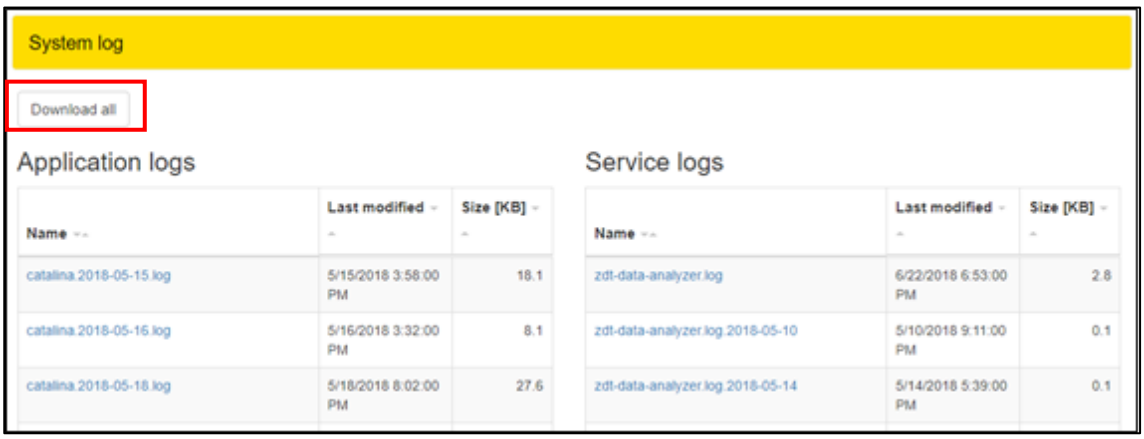


Fig. 5.2.6.2 (a) System log

5.2.6.3 System error analysis

If an error occurs in the ZDT server, identify the service causing the error and then restart that service. You can also check the reception status of the message sent from the data collector management web service.

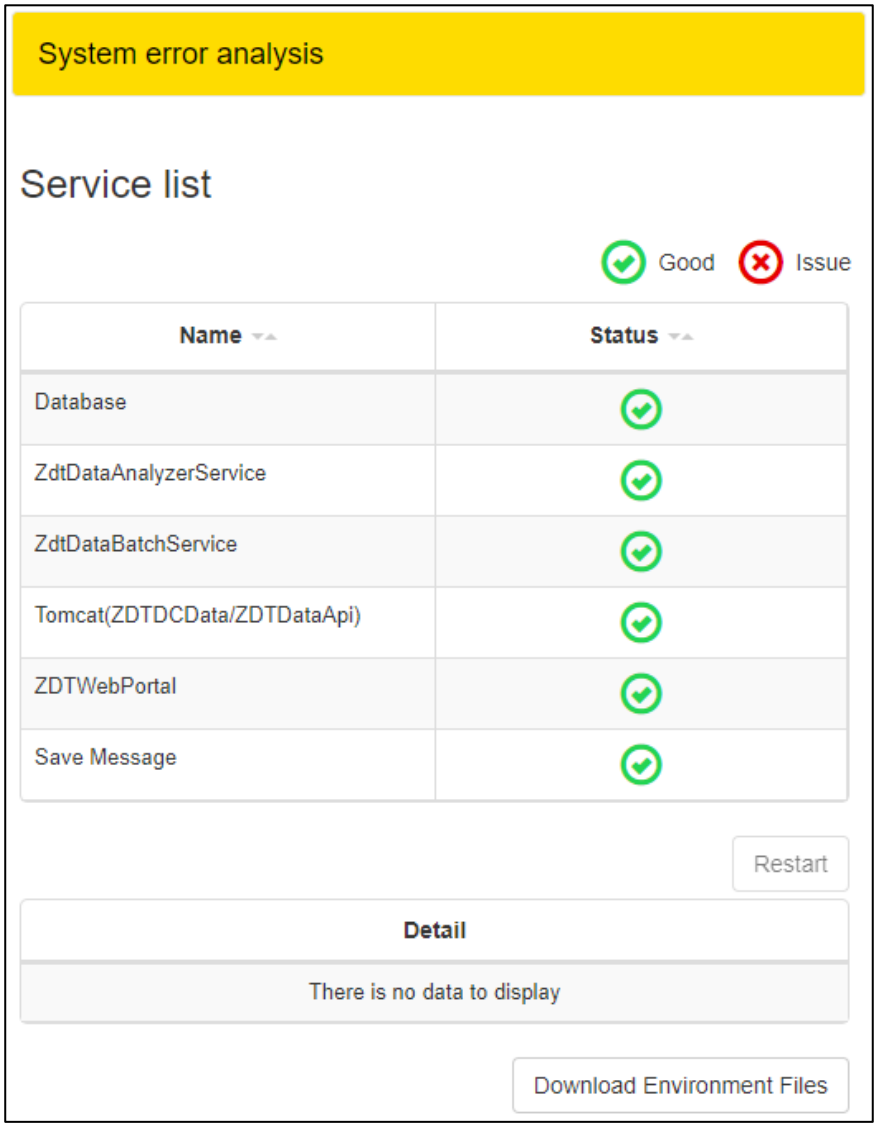


Fig. 5.2.6.3 (a) System error analysis

The following table describes the service running states.

Table 5.2.6.3 (a) Service operational status

Status	Icon	Description
Good		The service is running normally.
Issue		An error has occurred in the service.

If an error occurs, a warning message like the following appears above the details table. Click the service to view details.
Click the “Restart” button to restart the service.

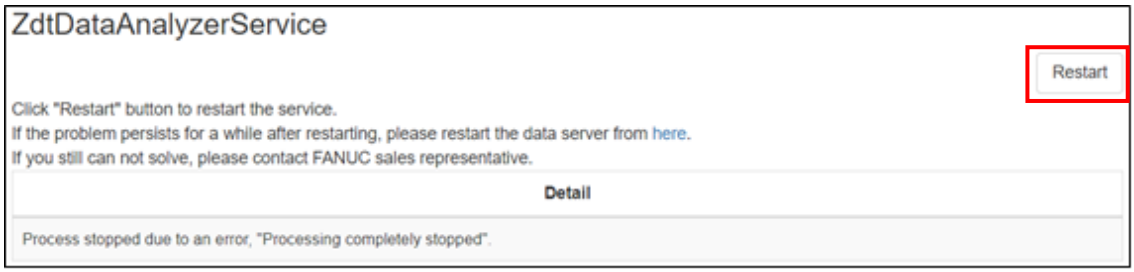


Fig. 5.2.6.3 (b) Restart of system

NOTE
Services running normally cannot be restarted.

You can check the reception status of messages sent from the data collector management web service by clicking “Save Message” of the service.
You can reset the reception status of the message by clicking the “Reset” button.

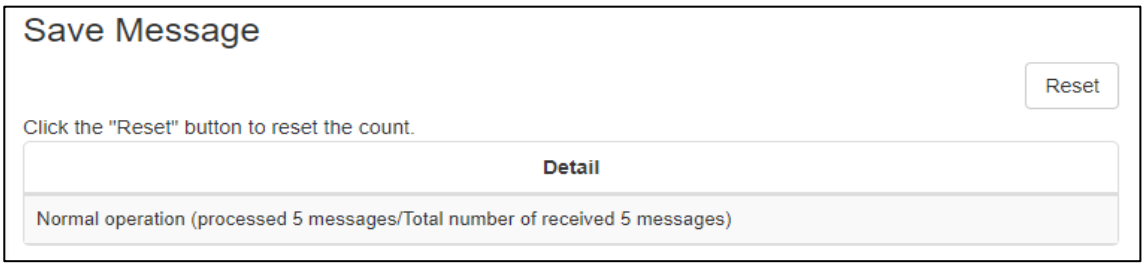


Fig. 5.2.6.3 (c) Resetting message reception status

NOTE
If the license is deactivated, “Issue” is displayed as the service running status in “Save Message”. Refer to “2.5.7 REGISTERING LICENSES” for more information on registering licenses.

You can click the “Download Environment Files” button to download the settings file of the ZDT server, etc.
If the error is still not resolved after restarting, save this file along with the log file, and then contact one of our sales representatives.

5.2.7 Data Collection Settings

The “Data Collection Settings” screen contains the following settings.

- Data collection service
- Robot backup
- Servo data
- Vision offset data
- Program information when alarm occurred
- Data monitor settings
- Operation Status Panel Settings

Refer to “4 ZERO DOWN TIME SETTINGS” for more information.

5.2.8 ZDT Settings

The “ZDT settings” screen contains the following settings.

- Settings for data deletion
- CSV export settings
- Email notification
- Location settings
- Languages

Refer to “4 ZERO DOWN TIME SETTINGS” for more information.

5.2.9 OS Settings

The “OS Settings” screen contains the following settings.

- Environment settings
- Power
- Disk expansion

5.2.9.1 Environment settings

Click the “Network”, “Time”, “Server name” or “User” tab located at the upper-left of the detail screen to access the corresponding settings.

Network

This tab contains ZDT server network settings.

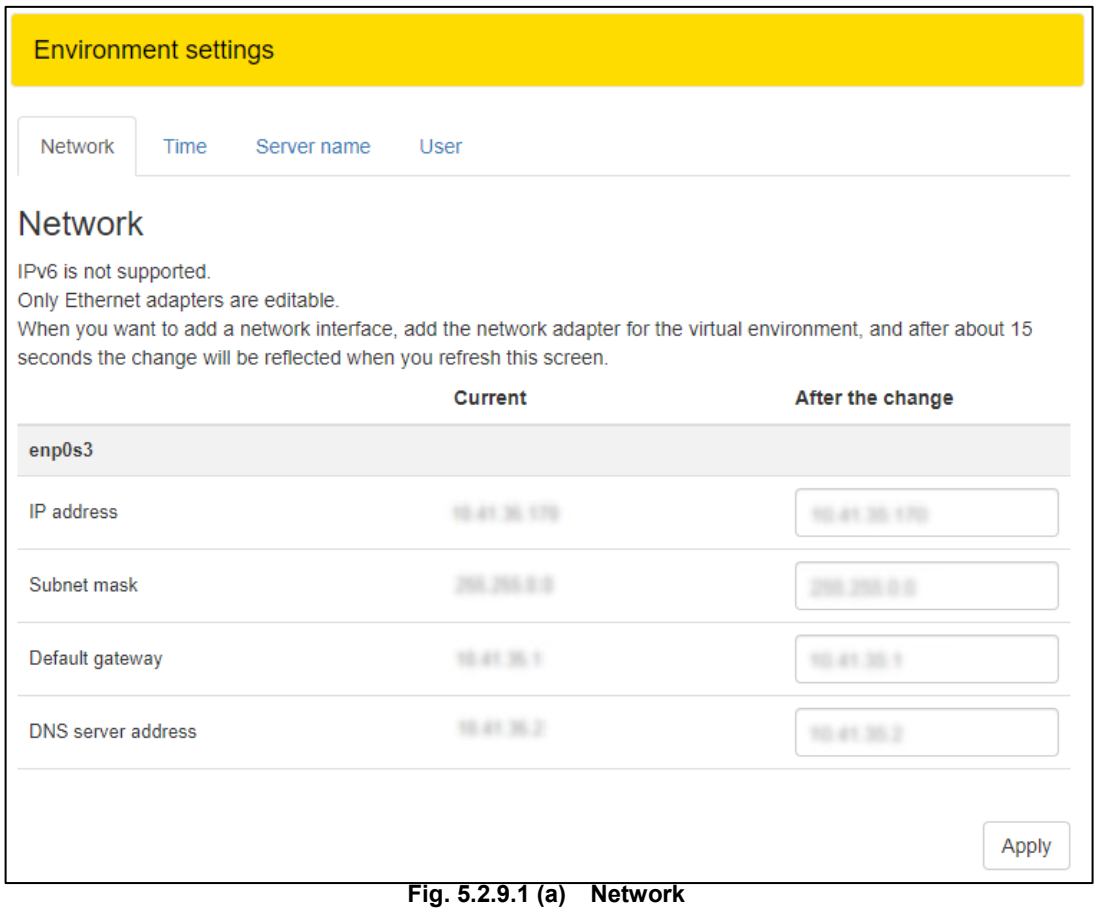


Fig. 5.2.9.1 (a) Network

The following table describes the information that is displayed.

Table 5.2.9.1 (a) Network

Item	Description
IP address	Used to configure the IP address of the ZDT server.
Subnet mask	Used to configure the subnet mask for the ZDT server.
Default gateway	Used to configure the default gateway for the ZDT server.
DNS server address	Used to configure the IP address of the DNS server.
Apply button	Used to save the configured network settings.

Use the following procedure to change network configurations.

Step

1 Enter the IP address, subnet mask, and default gateway. Enter the IP address of the DNS server as necessary.
2 Click the “Apply” button.
3 After you have finished the settings, restart the robot controller, or execute “INIT”.

NOTE

Only the network interface for Ethernet can be set on this screen. Also, if you want to add a network interface, add a network adapter to the virtual environment, wait about 15 seconds and update this screen to reflect the changes. If you deleted the network adapter, restart the virtual environment to apply the change. Refer to “2.5.3 Network Configuration” to configure network settings in this scenario as necessary.

If DHCP is configured, network settings cannot be configured on this screen.

After configuring network settings, the Web portal and ZDT server management web page must be reopened using the new network settings.

Time

This tab contains ZDT server time settings.
Time settings can be automatically configured via synchronization with an NTP server or manually configured.

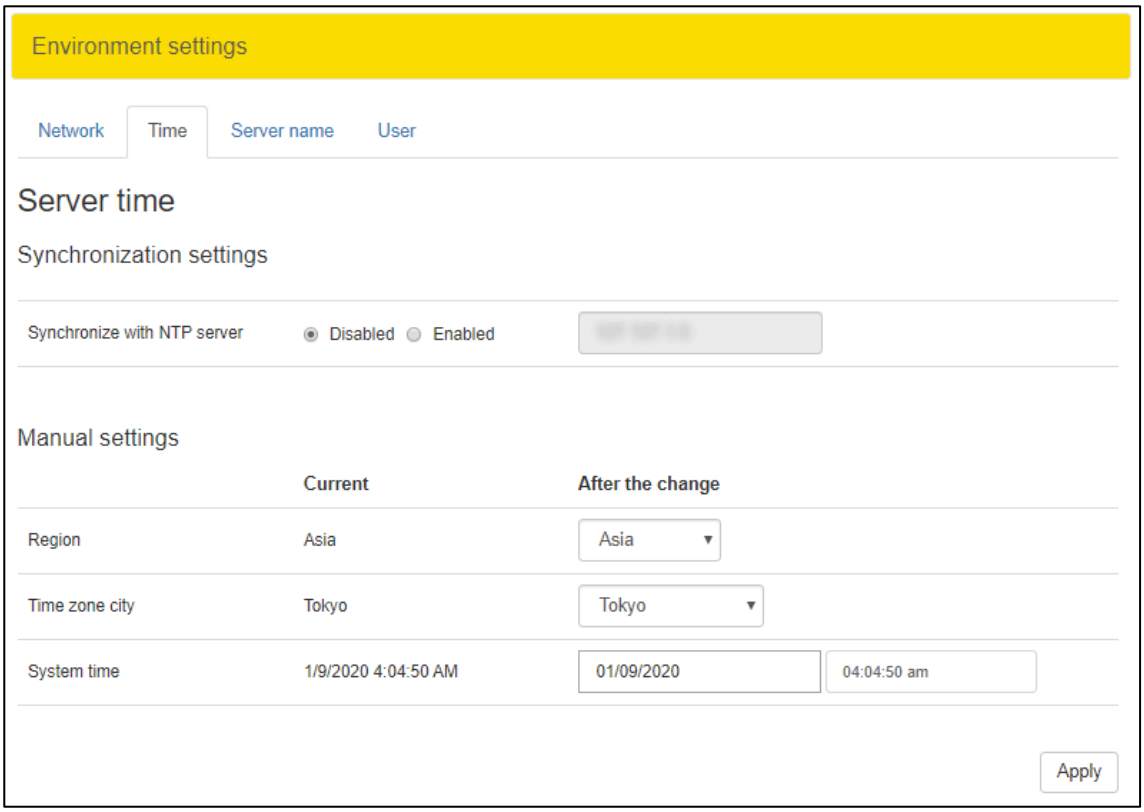


Fig. 5.2.9.1 (b) Time

The following table describes the information that is displayed.

Table5.2.9.1 (b) Time

Item	Description
Synchronize with NTP server	To automatically configure time settings via synchronization with an NTP server, select “Enabled” and configure the IP address to a valid NTP server. * To use ZDT server as NTP server, set the NTP server IP address to 127.127.1.0.
Region	This menu is used to select the region for the date and time settings.

Item	Description
Time zone city	This menu is used to select the time zone for the date and time settings. * If the time zone consists of two levels (to include the city), it is displayed as “Time zone/city”.
System time	These fields are used to configure the date and time.
Apply button	Used to save time settings.

Use the following procedure to configure time settings.

Enabling Synchronize with an NTP Server

Step

1 Select the “Enabled” radio button and then enter the IP address for a valid NTP server.
2 Click the “Apply” button.

Manual Configuration

Step

1 Select the “Disabled” radio button.
2 Configure the region, time zone, and system time settings.
3 Click the “Apply” button.

Server name

This tab is used to change the ZDT server name.
The initial setting is the IP address of the ZDT server.

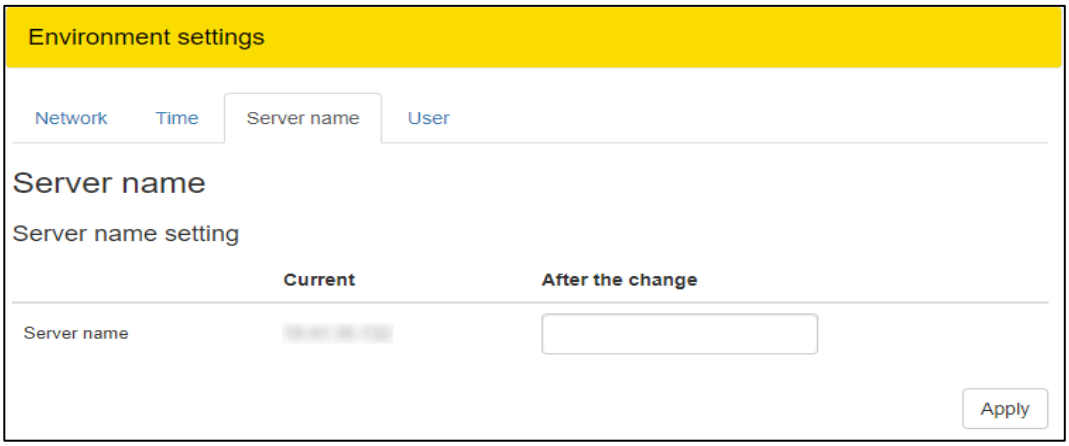


Fig. 5.2.9.1 (c) Server name

Use the following procedure to change the ZDT server name.

Step

1 Enter the new server name in “After the change”.
2 Click the “Apply” button.

User

This tab is used to change the password of the Ubuntu user used to run the ZDT server.

Fig. 5.2.9.1 (d) User

Use the following procedure to change the password.

Step

1 Enter a new password in “New password”.
2 Re-enter the new password in “Confirm new password”.
3 Click the “Apply” button.

NOTE
The user name cannot be changed.

After you change a password, restart the data collection service in order to perform robot backup, etc.
For information on restarting the data collection service, refer to step 3 in “2.7.6 Configuring Configuration Files”.

5.2.9.2 Power

This screen is used to restart and shut down the ZDT server.

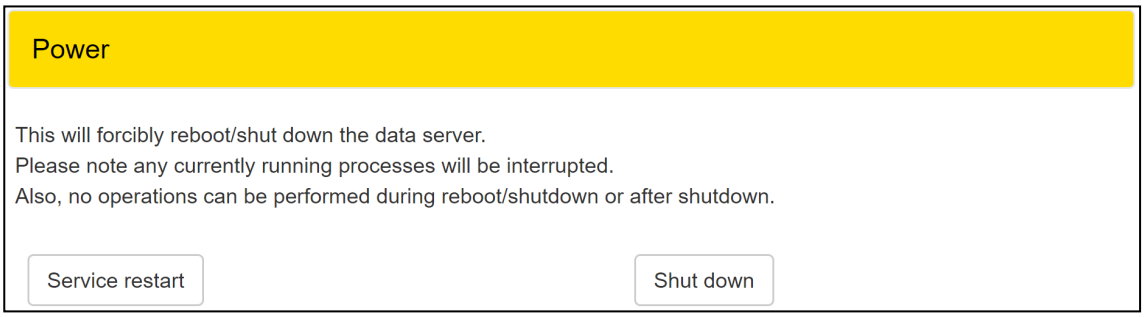


Fig. 5.2.9.2 (a) Power

Click the “Service restart” button to restart the ZDT server.
Click the “Shut down” button to shut down the ZDT server.

NOTE
The ZDT server management web service cannot be used during the restart process or after shutting down the ZDT server.

5.2.9.3 Disk expansion

The data disk in a ZDT server is initially configured with 100 GB of disk space. This can be expanded in accordance with the disk space available to your server or Windows PC.

First, refer to “VMware ESXi Environments” or “VMware Workstation Pro Environments” in “Appendix A.4 Expanding Disk Capacity” to expand the virtual disk capacity.
After expanding the virtual disk capacity, use the following procedure to expand disk capacity of the ZDT server.

Step

1 On the “System status” screen, check the disk capacity.

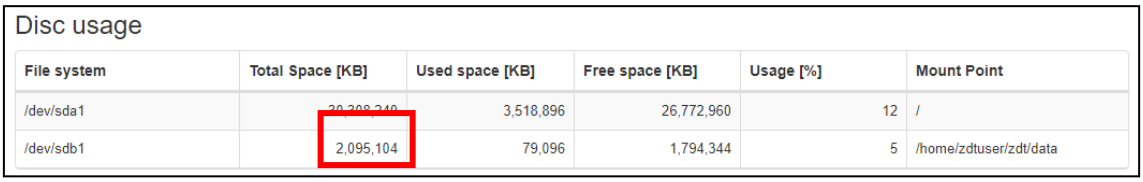


Fig. 5.2.9.3 (a) System status screen

2 On the “Disk expansion” screen, click the “Expansion” button.

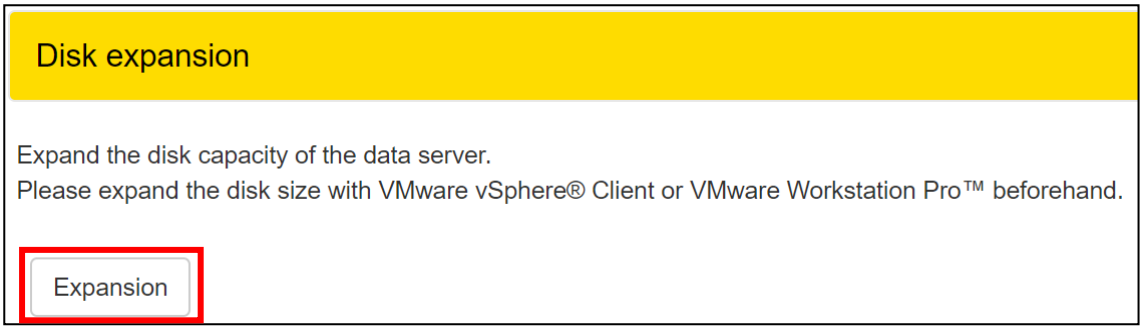


Fig. 5.2.9.3 (b) Disk expansion

3 Verify that the disk capacity on the “System status” screen has been increased.

5.2.10 Portal User Management

The “Portal user management” screen contains the following settings.

- Manager account management
- Delete portal user
- Home Screen Settings

5.2.10.1 Manager account management

These settings are used to change the password of the administrator account.
The default user ID is “zdtadmin” and the default password is also “zdtadmin”.
Click the “Reset” button to reset the password to its default.

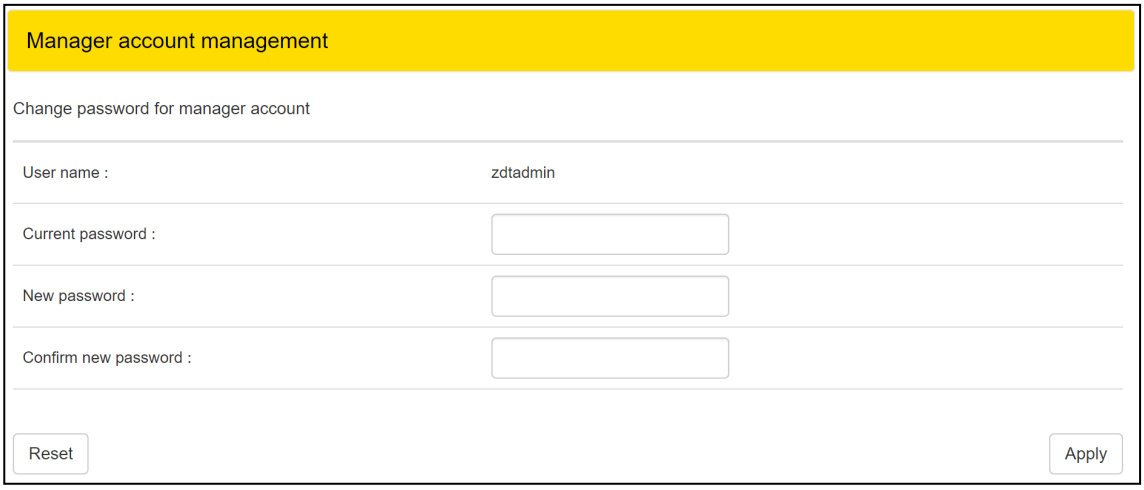


Fig. 5.2.10.1 (a) Manager account management

Use the following procedure to change the administrator account password.

Step

1 Enter the current password into the “Current password” field.
2 Enter a new password into the “New password” field.
3 Enter the password again into the “Confirm new password” field.
4 Click the “Apply” button

NOTE
The user name of the administrator account cannot be changed.

The administrator account is used to create Web portal users, in addition to logging in to the ZDT server administrator Web service. For details, refer to “3.1 CREATING AN ACCOUNT” and “5.2.1 Login”.

5.2.10.2 Delete portal user

This screen is used to delete Web portal users.

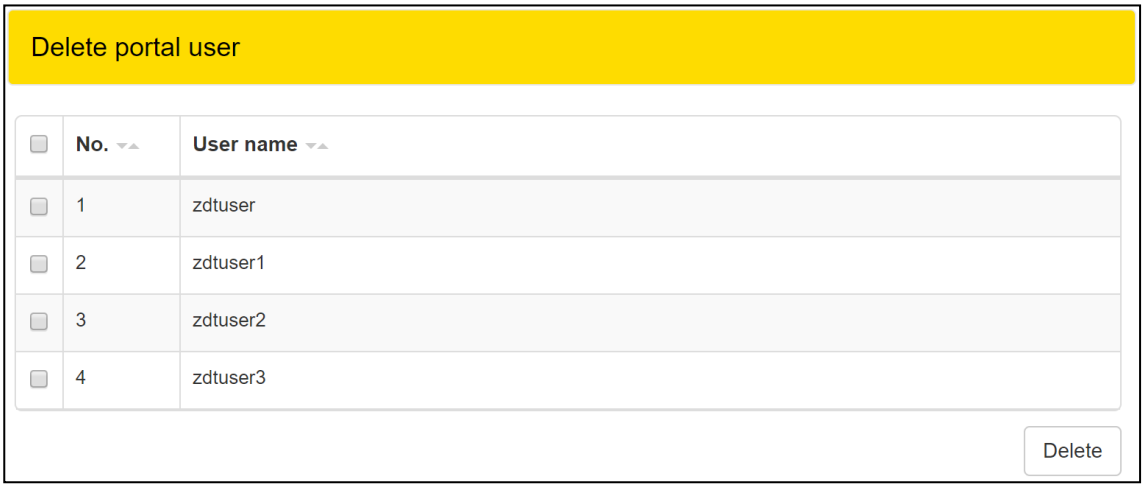


Fig. 5.2.10.2 (a) Delete portal user

Use the following procedure to delete Web portal users.

Step

1 Select the check box for the desired Web portal users.
2 Click the “Delete” button.

5.2.10.3 Home Screen Settings

Web portal home screen settings for portal users can be browsed or edited.
By editing the home screen settings, you can control the visibility of the status panel of the home screen and accessibility to the list screen.

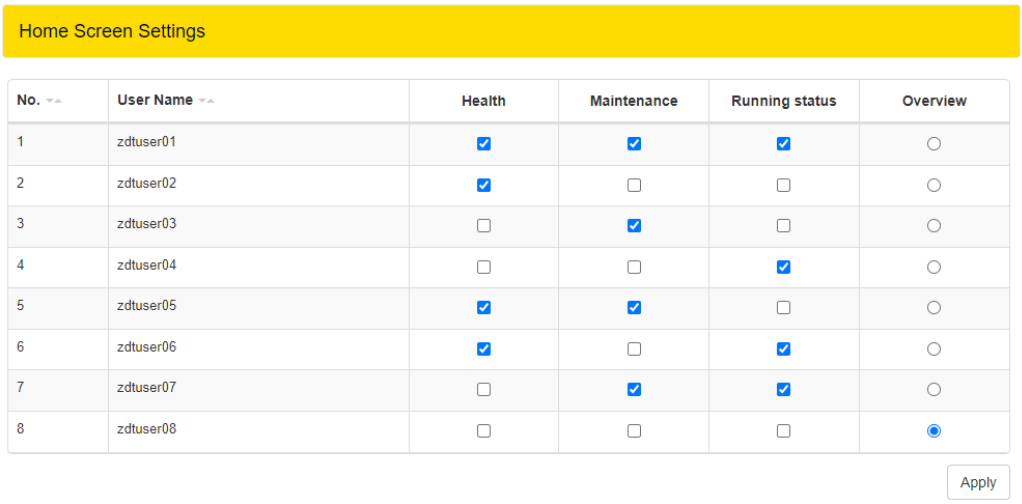


Fig. 5.2.10.3 (a) Home Screen Settings

Use the following procedure to configure the home screen settings.

Step

1 Select the settings of the users “Health” “Maintenance” “Running Status” “Description” (*) you want to set.

NOTE
By selecting the “Description”, checks for the other settings will be removed.

2 Click the “Apply” button.

Home screen is displayed like following depending on the settings.

(1) Screen when [Health/Maintenance/Running Status] are selected.

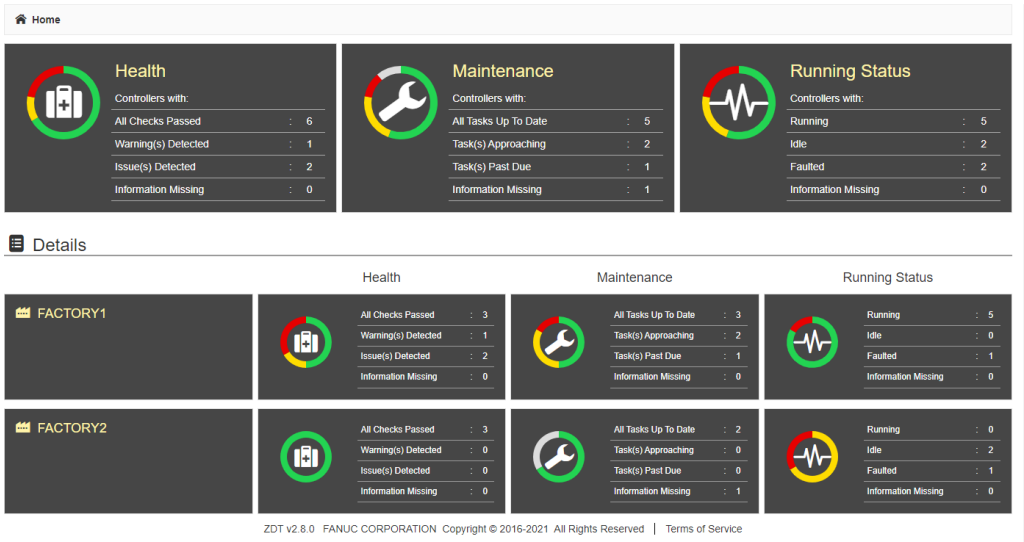


Fig. 5.2.10.3 (b) Home Screen

(2) Screen when [Health] is selected.

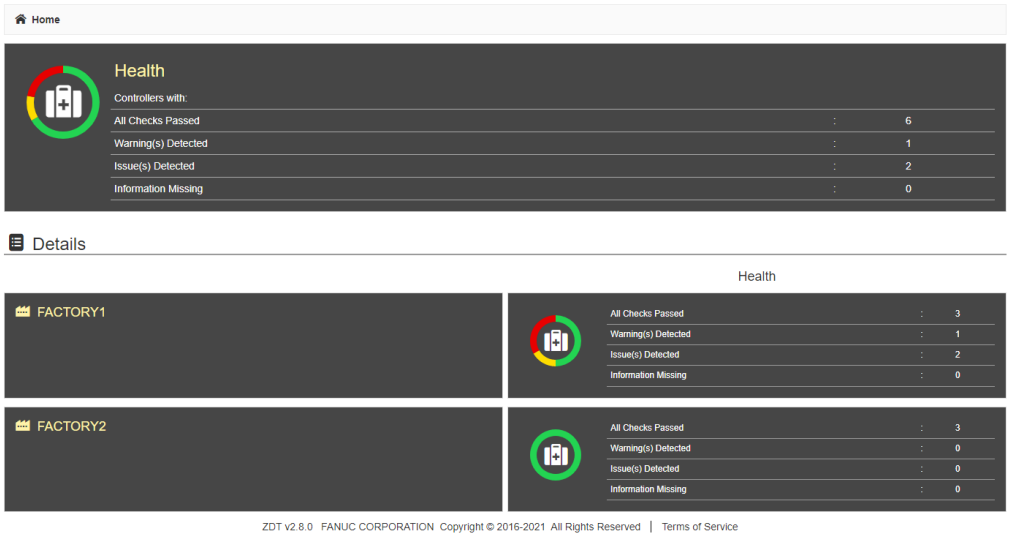


Fig 5.2.10.3 (c) Home Screen

(3) Screen when [Health/Maintenance] are selected.

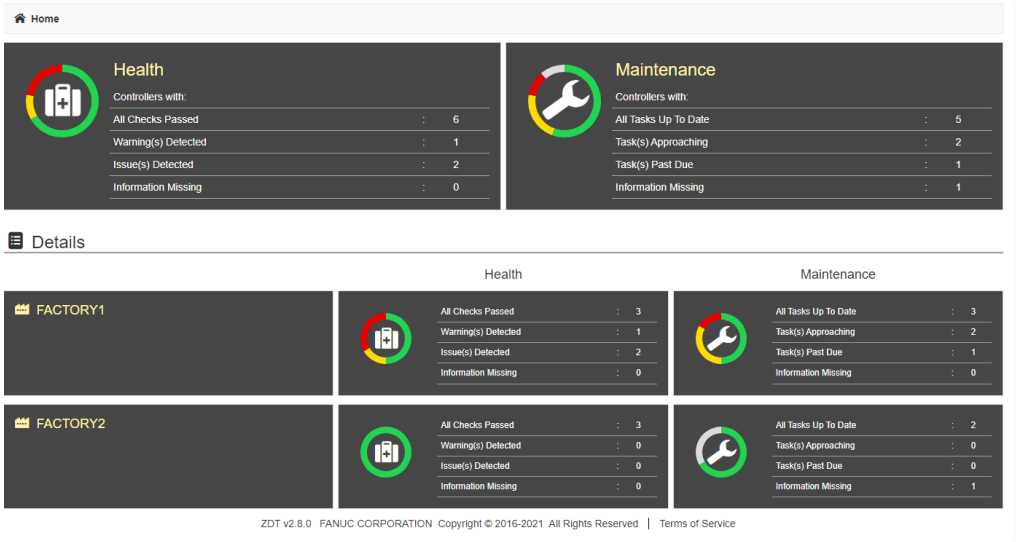


Fig 5.2.10.3 (d) Home Screen

(4) Screen when [Description] is selected.

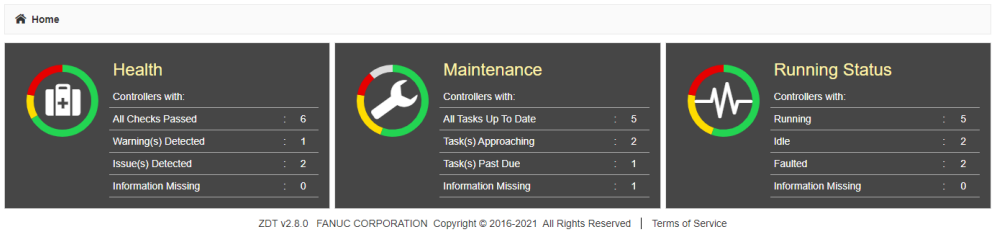


Fig 5.2.10.3 (e) Home Screen

5.2.11 License

The “License” screen contains the following settings.

- Management

5.2.11.1 Management

ZDT licenses must be managed for each ZDT server that stores ZDT data. For each license, the number of robot controllers for which data is stored must also be managed.

Click the “Register Licenses”, “Select robots”, “Delete robot data”, “Get device info file” or “Return license” tab located at the upper left of the detail screen to access the corresponding settings.

Register license

This tab is used to register issued licenses on the ZDT server. Refer to “2.5.7 REGISTERING LICENSES” for more information.

Select robots

This tab is used to enable/disable the storing of data for each robot controller.

The number of robots for which data can be stored on the ZDT server is restricted by the license. Data sent from robots not authenticated by a license will be discarded instead of stored in the database.

When data is received from a robot for the first time, a license will be enabled automatically if there are available licenses.

From the ZDT server management web service, select the robots from which you want the ZDT server to accept data.

Step

1 From the menu on the ZDT server management web service, click “License” to display the sub-menu, and then click “Management”.
2 Click the “Select robots” tab on the detail screen, select the robots from which you want the ZDT server to store data, and then click the “Apply” button.

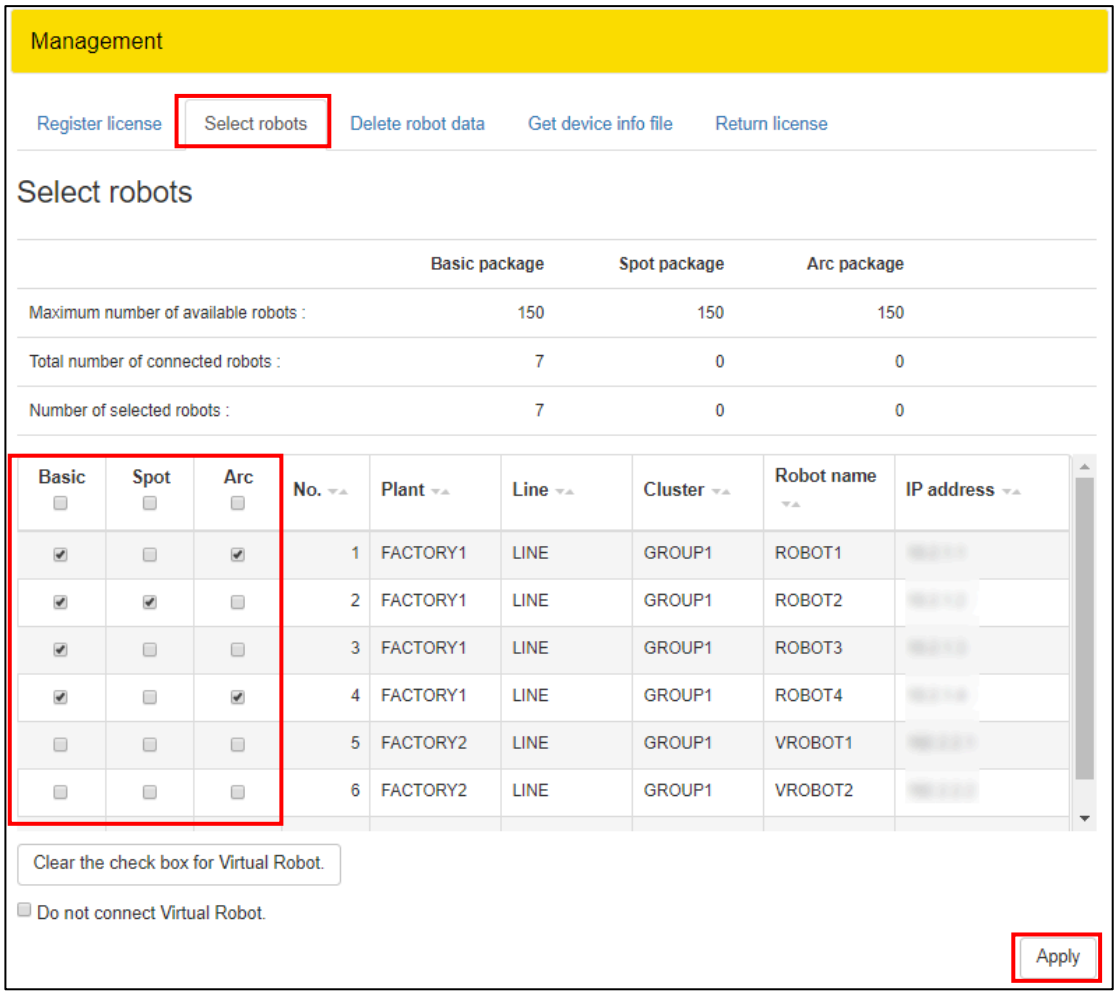
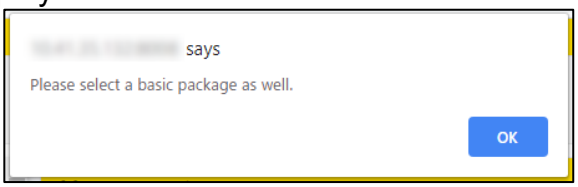


Fig. 5.2.11.1 (a) Select robots

NOTE

The automatic enabling of a license is performed only the first time that data is received for a robot controller or package type.

When selecting an option package, be sure to also select the basic package. If the "Apply" button is clicked with only an option package selected, the following error message is displayed.



The following information is displayed in the upper left of the screen.

Table 5.2.11.1 (a) Select robots

Item	Description
Maximum number of available robots	Displays the maximum number of robots from which the ZDT server can store data. This number varies depending on the ZDT options license.
Total number of connected robots	Displays the number of robots that are sending data to the ZDT server.
Number of selected robots	Displays the number of robots from which the ZDT server stores data.

A list of robots that send data to the ZDT server is also displayed in table format. The following table describes each column of the table.

Table 5.2.11.1 (b) Select robots

Column	Description
Basic	Activates/deactivates the basic package license.
Spot	Activates/deactivates the spot package license.
Arc	Activates/deactivates the arc package license.
No.	Sequence number
Plant	Displays the name of the plant configured via the robot controller or the management web service.
Line	Displays the name of the line configured via the robot controller or the management web service.
Cluster	Displays the name of the group configured via the robot controller or the management web service.
Robot name	Displays the name of the robot configured via the robot controller.
IP address	Displays the IP address of the robot.

NOTE

When the package license is deactivated, no data is saved even when data is sent from the robot.

When the package license is switched from activated to deactivated, the validity period data is displayed.

Click the “Clear the check box for Virtual Robot” button to turn off all of the package license check boxes of the virtual robots among the robots displayed in the list.

When connecting a new virtual robot to the ZDT with all package licenses unchecked, follow the steps below.

Step

1 From the menu on the ZDT server management web service, click “License” to display the sub-menu, and then click “Management”.
2 Click the “Select robots” tab on the detail screen, and then check the “Do not connect Virtual Robot.” check box.
3 Click the “Apply” button.
4 Connect a new virtual robot to the ZDT.

NOTE

This does not apply to a virtual robot connected with “Do not connect Virtual Robot” turned OFF. Click the “Clear the check box for Virtual Robot” button, and then click the “Apply” button.

When the “Do not connect Virtual Robot” function is ON, the newly connected virtual robot is not displayed in the “Location settings” and the Web portal on the ZDT Server Management screen.

Delete robot data

This tab is used to delete robot controller data that are not stored in the ZDT server.
Refer to “4.9 SETTINGS FOR DATA DELETION” for more information on delete robot data.

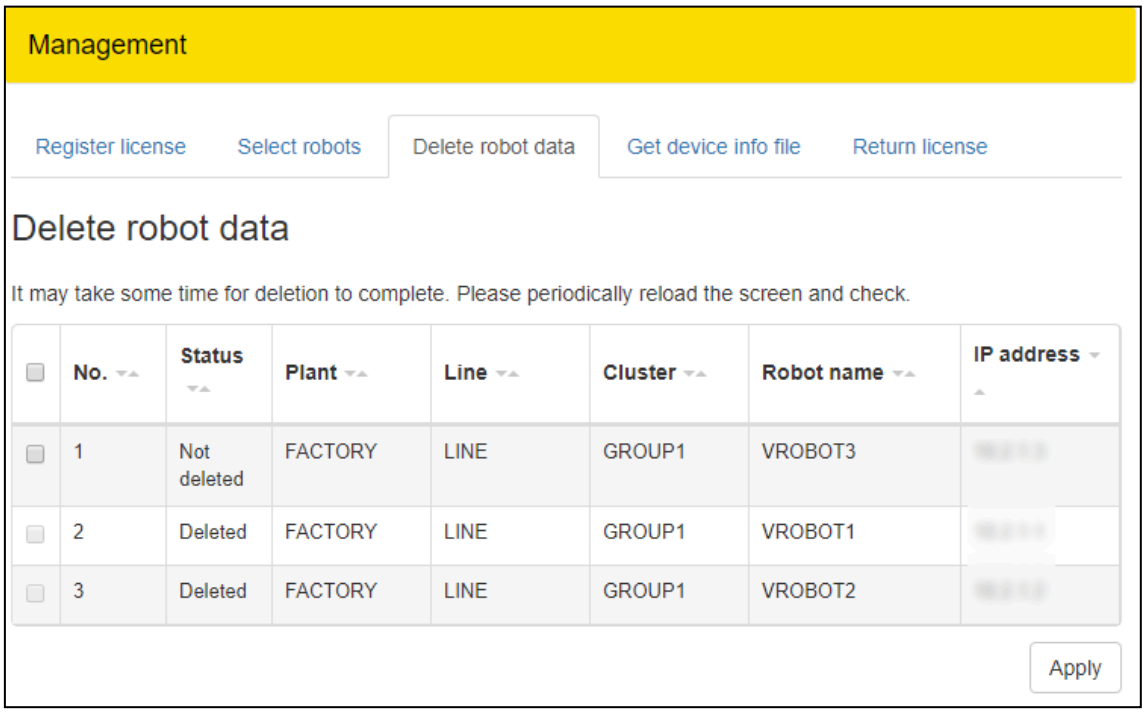


Fig. 5.2.11.1 (b) Delete robot data

The following table describes the information that is displayed.

Table 5.2.11.1 (c) Delete robot data

Item	Description
Check box column	Used to select the robot controller for which you want to delete its data. Select the check box at the top of the column to select all robot controllers simultaneously. Deselect the check box to deselect all robot controllers.
Status column	Displays the status of the robot data deletion.

Item	Description
Plant column	Displays the name of the plant configured for the robot controller.
Line column	Displays the name of the line configured for the robot controller.
Cluster column	Displays the name of the cluster configured for the robot controller.
Robot name column	Displays the name of the robot configured for the robot controller.
IP address column	Displays the IP address configured for the robot controller.
Apply button	Deletes robot data.

Use the following procedure to delete robot data.

Step

1 Select the desired robot controllers.
2 Click the “Apply” button.

Get device info file

This tab is used to download the device information necessary to issue licenses. Refer to “2.5.7.2 SENDING DEVICE INFORMATION” for more information.

Return License

You can return the required license when upgrading the ZDT, renewing or adding a license.

When renewing a license, return the license and reissue a new license. The following procedures are used to return licenses.

Step

1 From the menu on the ZDT server management web service, click “License” to display the sub-menu, and then click “Management”.
2 Click the “Return license” tab on the detail screen, and then click the “Return” button.

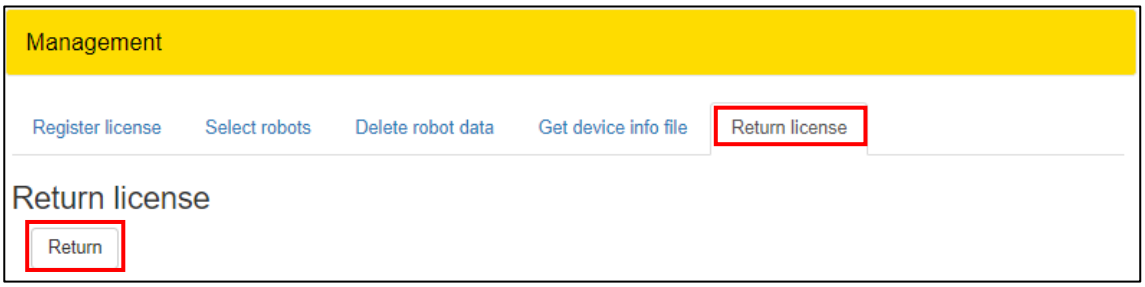


Fig. 5.2.11.1 (c) Returning Licenses

3 Click the “OK” button on the screen to confirm whether to execute return. The license is downloaded. Attach the downloaded file to an email message and send this message to one of our Sales representatives.

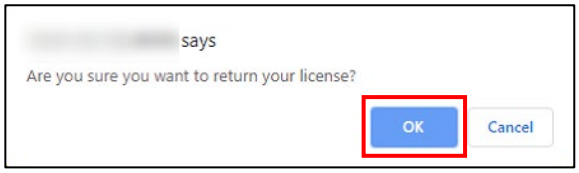


Fig. 5.2.11.1 (d) Returning license

NOTE
Once the license is returned, the ZDT server will no longer be able to collect data.

Data collected in the past can be viewed from the Web portal.

5.3 DATA BACKUP AND RESTORE

This section explains how to back up and restore the robot data saved on the ZDT server.

5.3.1 Installing pgAdmin

pgAdmin is an open-source software for managing PostgreSQL. Data can be backed up and restored by using pgAdmin. Here, installation of the Windows version is explained.

Step

1 Download pgAdmin 4.

NOTE
The latest version of pgAdmin is recommended."

Here is an example of how to download the installer. Access the web site (https://www.pgadmin.org/) and download it following the step below.

(How to download)
[Quick Links Download] – [pgAdmin 4 items Windows] – [Download pgAdmin 4 any version] – [Files of the pgadmin4-[*.*]-x64.exe]

Fig. 5.3.1 (a) An example of how to download

2 Complete the installation by following the installation wizard. If you click "Help" – "About pgAdmin4", you can check the version No.

Fig. 5.3.1 (b) How to check the version No. in pgAdmin 4

5.3.2 Data backup

This section explains how to perform a data backup.

Step

1 Start pgAdmin and connect to the ZDT server. Either right-click “Servers” in “Browser” and then click “Create” – “Server” from the context menu, or else from the “Object” menu, click “Create” – “Server”.

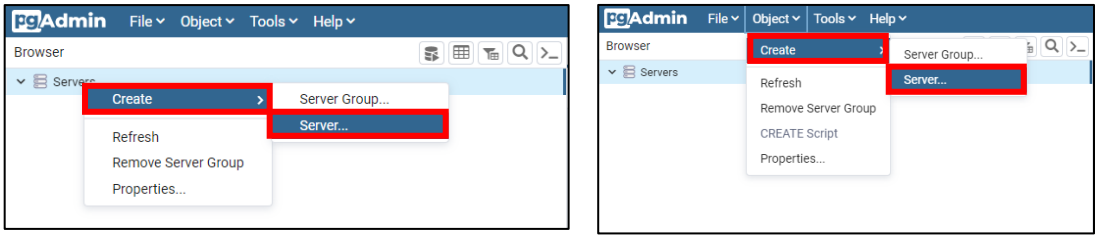


Fig. 5.3.2 (a) Adding a server

2 On the “Create - Server” screen that is displayed, enter a name in “Name” on the “General” tab, enter the ZDT server’s IP address in “Host name/address” and ‘A1_zdtserver’ in “Password”, and check “Save password?” on the “Connection” tab, and then click “Save”.

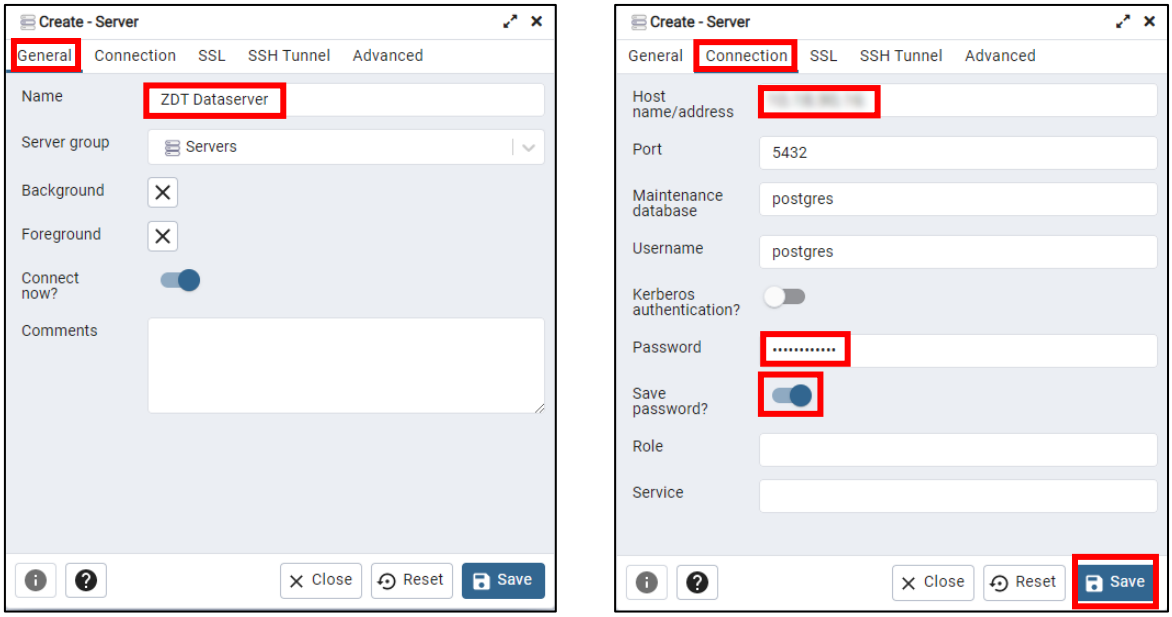


Fig. 5.3.2 (b) Connection settings

3 If the connection to the ZDT server is successful, the server's information is displayed in "Browser". From the "Browser" tree, right-click "ReportDB", and then click "Backup" in the context menu.

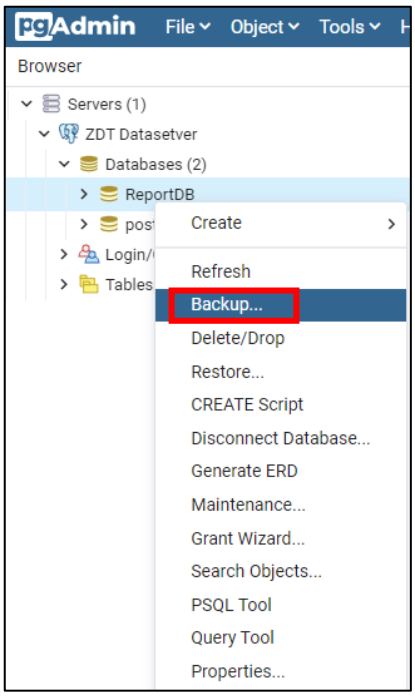


Fig. 5.3.2 (c) Backing up

4 Specify a file name, and then click "Backup".

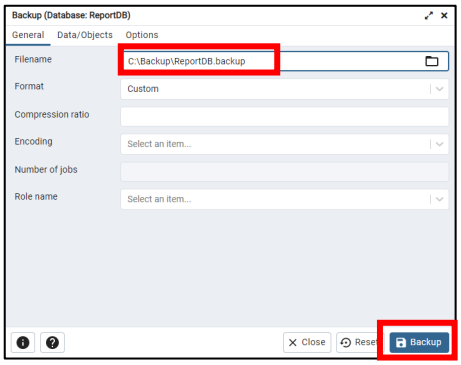


Fig.5.3.2 (d) Backing up

NOTE

For Fig. 5.3.2 (d), specify a full path (directory path + file name) of the backup as above "Filename". If you specify only the file name, the directory to save the file becomes unknown and you may lose the file. Specify the file name extension as ".backup".
If you specify the existing full path (directory path + file name), the file will be overwritten.

The time required for backup varies significantly on the data size registered to ReportDB. (It will take a few seconds to a few minutes if the amount of data is small. If it is large, it will take a few hours to tens of hours.)

5.3.3 Data restore

This section explains how to perform a data restore.

Step

1 If you are using the data collection service, shut down the data collection service first.
2 At the ZDT server console, enter the following command to stop the currently running ZDT program, and then restart PostgreSQL.

```
zdtuser@zdtserver:~$ sudo␣zdt_stop_services.sh
```

3 Start pgAdmin and connect to the ZDT server. Refer to steps 3 and 4 in “5.3.2 Data backup” for details.
4 From the “Browser” tree, right-click “ReportDB”, and then click “Restore” in the context menu.

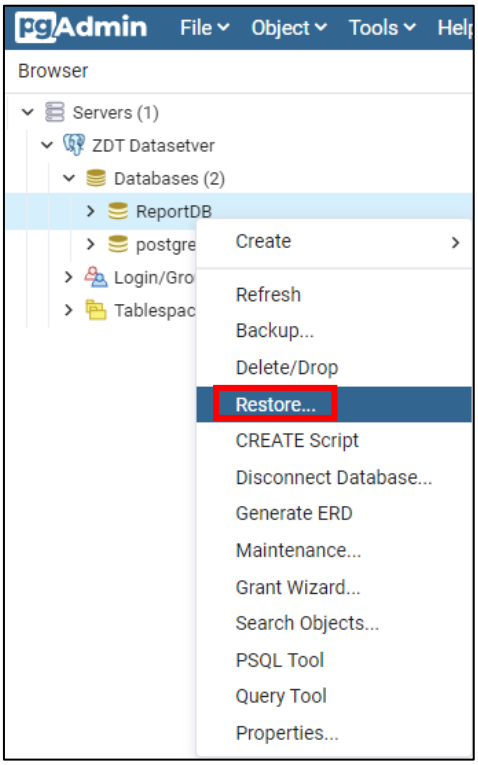


Fig. 5.3.3 (a) Restoring

5 Specify the backup file to restore, and then click “Restore”.

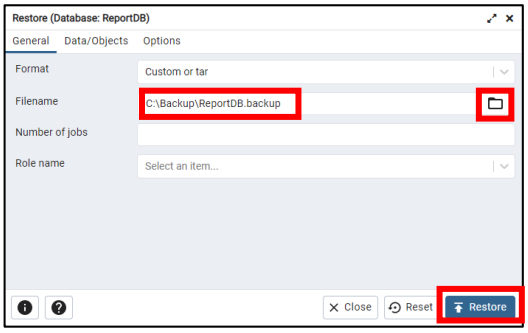
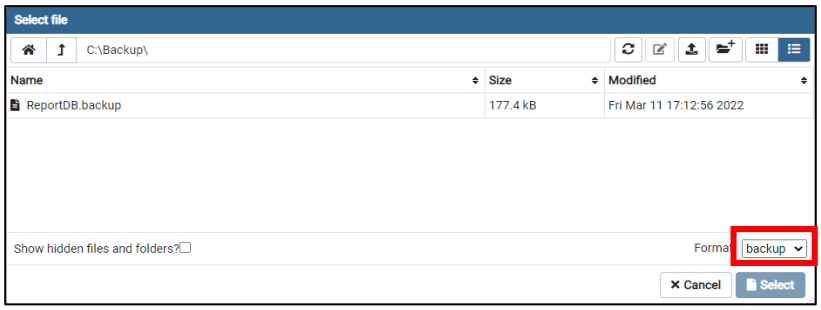


Fig. 5.3.3 (b) Restorlng

NOTE

If you specify the file for restore using "**…**" in the right of Fig. 5.3.3 (b) Restoring, the extension ".backup" is specified by default as follows. Therefore, the file other than the extension ".backup" is not shown.



6 When the restoration has finished, enter the following command at the ZDT server console to restart the ZDT server.

```
zdtuser@zdtserver:~$ sudo␣reboot
```

7 To use the data collection service, start the data collection service separately.

NOTE

Data with matching keys is not overwritten.
To return to the backed-up data, Rename or remove the existing ReportDB, create an empty ReportDB, and Restore it there.

The restoration is successful even if "Failed (End Code: 1)" is displayed after restoring data.

If data is restored to another ZDT server by upgrading server software, etc., the registered license will be invalidated. Reissue the license.

ZDT server management web service settings are not restored. Set again.

Backup and restoration of the backup file of the robot acquired by the data collection service is not possible with this procedure. Download and manage the necessary files from the ZDT server management web service.

5.4 ZDT SERVER UPGRADE

Here is the explanation of how to upgrade when you buy the upgrade package. The upgrade flow is as follows. We call the existing ZDT server as the old ZDT server and the ZDT server of the upgrade destination as the new ZDT server.

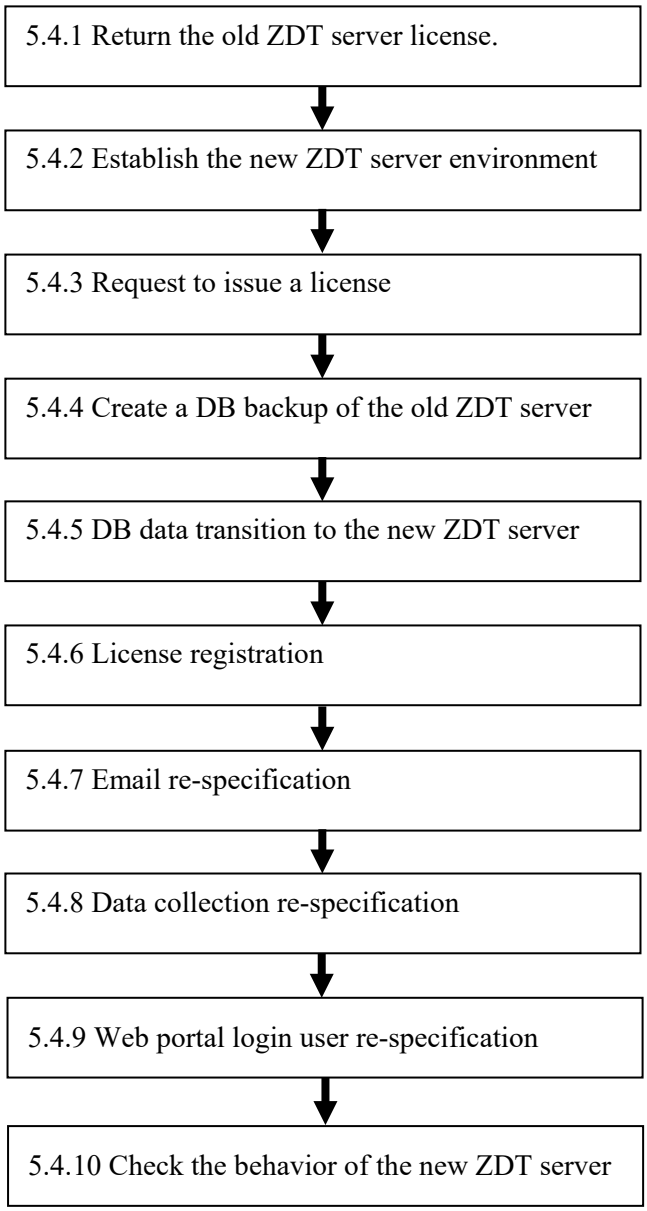


Fig. 5.4 (a) ZDT server upgrade flow

5.4.1 Return the old ZDT server license

You need to return the license of the existing ZDT server. Here is an explanation of how to return it.

NOTE
1 If you return the license, you cannot download a backup file of a robot from the ZDT server management web service. No backup file of a robot is also transferred to the new ZDT server environment. You need to download necessary files from the ZDT server management web service before returning the license.
2 You cannot save various data of the robot after returning the license. You can refer the data you saved before returning the license from the Web portal.
3 If you use “License allocation function” of the integrated server management, you need to return all the license of the ZDT servers that you moved the license.
4 If the old ZDT version is V1.x, you cannot move the data when upgrade.

When the old ZDT version is after V2.4

Refer to “5.2.11.1 Management” for the procedure to return licenses.

If you return the license by using the ZDT server management web service, the license file to return is downloaded automatically. Save the downloaded file to use it in “5.4.3 Request to issue a license”.

When the old ZDT version is V2.0, V2.1, V2.2, and V2.3

Refer to “Appendix A.5 ZDT Server Upgrade (When the old ZDT version is V2.0, V2.1, V2.2, and V2.3)” for the procedure to return licenses for V2.0, V2.1, V2.2, and V2.3.

5.4.2 Establish a new ZDT server

Here is the explanation of how to establish the new ZDT server environment.

Step
1 Specify the ZDT server. Refer to “2.5 ZDT SERVER CONFIGURATION” for details.
2 Acquire the device information by the same environment. Download the necessary device information file to issue a license key by referring “2.5.7.2 SENDING DEVICE INFORMATION”. Save the downloaded file to use it in “5.4.3 Request to issue a license”.

5.4.3 Request to issue a license

When issuing a license of the upgraded package, you need the license returned from the old ZDT server and the device information file of the new ZDT server.
Send the file downloaded by “5.4.1 Return the old ZDT server license” and the device information file acquired in “5.4.2 Establish a new ZDT server” to one of our sales representatives. If you bought a spot package and an arc package, send the file within the media that has a serial number additionally.

NOTE
If you used the “License allocation function” of the integrated server management, send all the licenses of ZDT servers that moved the license.

5.4.4 Create a DB backup of the old ZDT server

Next, transfer data from the old ZDT server to the new ZDT server. Here is the explanation about the data backup of the old ZDT server.

NOTE
If you do not need to transfer data to the new ZDT server, this step is unnecessary.

When the old ZDT version is after V2.1

Step

1 Database backup
Acquire the database backup. Refer to “Data backup” in “5.3.2 Data Backup” for details.

2 Backup the setting table
Open in order from “ReportDB” – “Schemas” – “Tables” in the “Browser” tree of pgAdmin4. Then right-click “settings” and click “Backup” from the context menu.

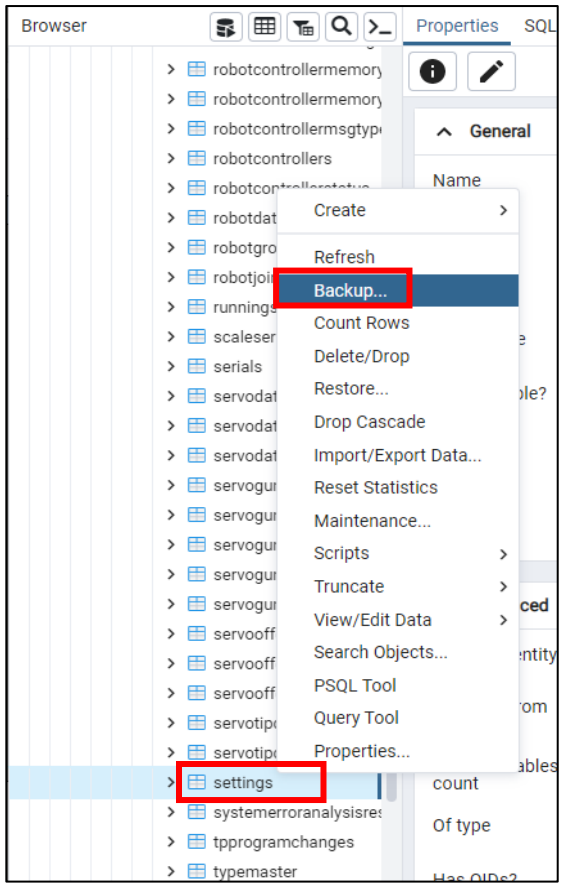


Fig. 5.4.4 (a) Backing up

Set the Filename and Format. Name the file as “settings.backup” and specify the full path “directory path + file name”. Set the Format as “Plain”, then click “Backup”.

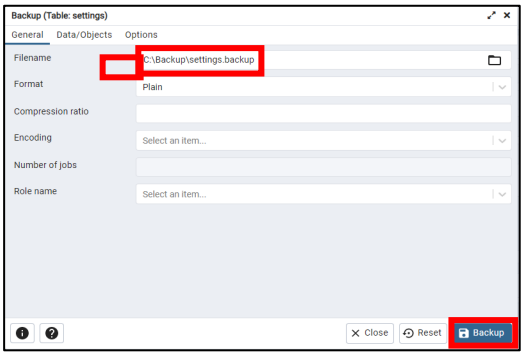


Fig. 5.4.4 (b) Backing up

When the old ZDT server version is V2.0

Refer to “Appendix A.5.2 Create a DB backup of the old ZDT server” for the procedure to create a backup of the DB for V2.0.

5.4.5 DB data transition to the new ZDT server

Here is the explanation of how to restore the backup to the new ZDT server.

> **NOTE**
> If no data is transferred to the new ZDT server, this step is unnecessary.

When the old ZDT server version is V2.1 or higher

Step

1 Stop the data collection service if you use it.
Click “Shut down” on the virtual machine of the data collection service.

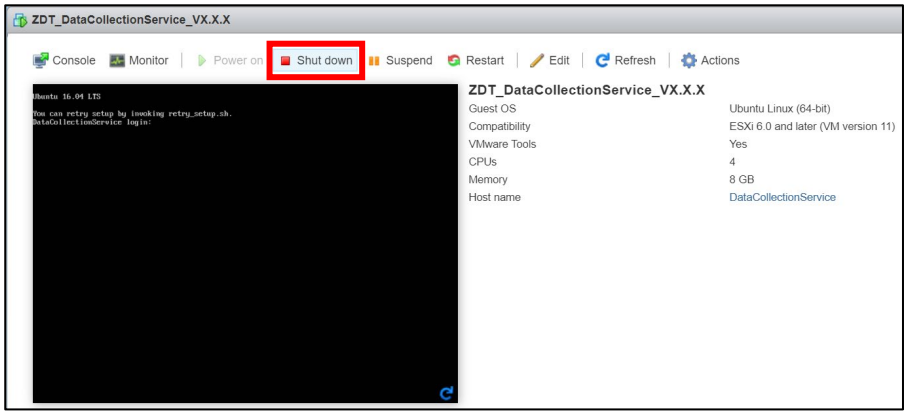


Fig. 5.4.5 (a) Stop the data collection service

2 If the virtual machine of the new ZDT server that is the data transfer target is halted, start it.
Click “Power on” of the new ZDT server virtual machine.

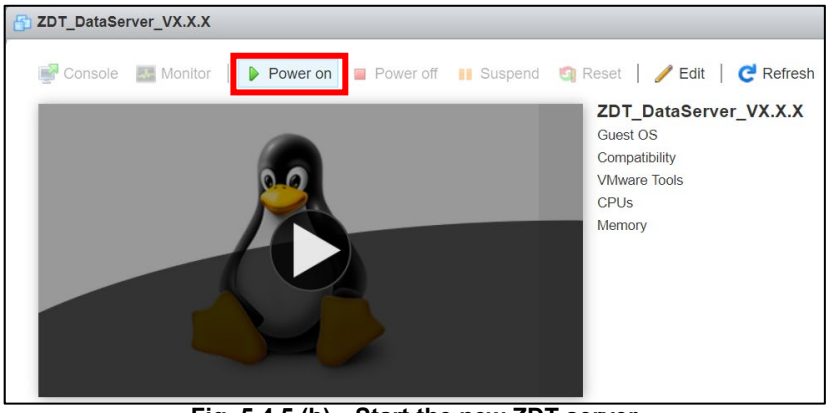


Fig. 5.4.5 (b) Start the new ZDT server

3 Enter the following command on the new ZDT server console.

zdtuser@zdtserver:~$ **sudo␣zdt_stop_services.sh**

4 Restore the backup file that was created on Step 1 of "5.4.4 Create a DB backup of the old ZDT server" above to the ReportDB of the new ZDT server.

NOTE

Refer to steps 3 to 5 in "5.3.3 Data restore" for the procedure to restore ReportDB. Restart of the ZDT server and start of the data collection service that is after Step 6 is unnecessary.

5 Locate the backup file "settings.backup" that was created on "5.4.4 Create a DB backup of the old ZDT server" above to the new ZDT server. Use a file transfer tool such as WinSCP and locate it in the following directory.

Directory: /home/zdtuser/zdt/tmp
File placement example: /home/zdtuser/zdt/tmp/settings.backup

The file protocol and the port number, the connection user and the password are as follows:

- File protocol: SFTP
- Port number: 22
- user: zdtuser
- password: zdtuser

*If you changed the login password in "2.5.5 Changing Login Passwords", use the changed password.

6 Enter the following command on the new ZDT server console.

zdtuser@zdtserver:~$ **sudo␣zdt_settings_restore.sh**

7 Restart the new ZDT server.
Click "Restart" of the new ZDT server virtual machine.

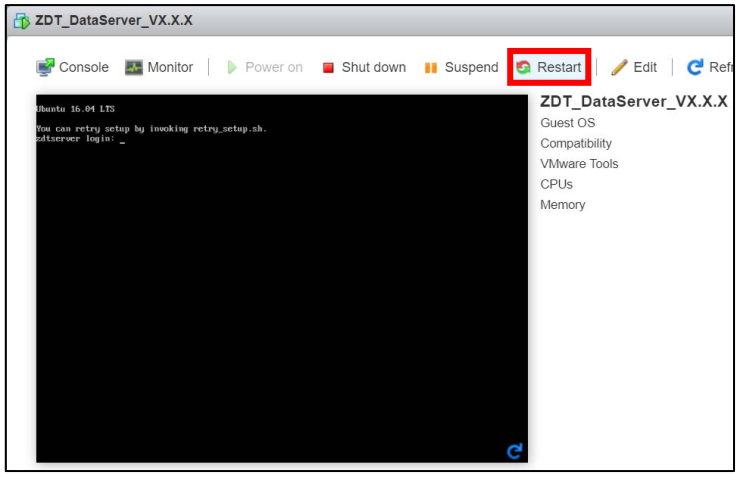


Fig. 5.4.5 (c) Restart the new ZDT server.

8 Start the data collection service if you use it.
Click “Power on” of the data collection service virtual machine.

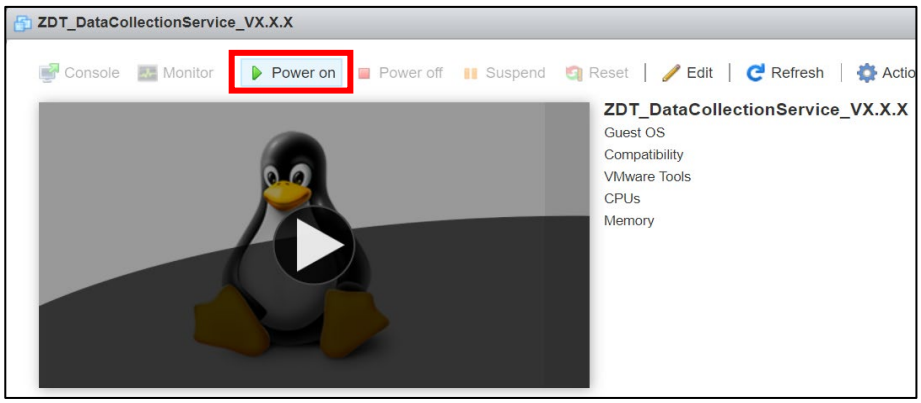


Fig. 5.4.5 (d) Start the data collection service

When the old ZDT server version is V2.0

Refer to “Appendix A.5.3 DB data transition to the new ZDT server” for the procedure to migrate a V2.0 DB.

5.4.6 License registration

Use the license key that was newly published from one of our sales representatives in “5.4.3 Request to issue a license”. Register a new license using the ZDT server management Web service of the new ZDT server. Refer to “2.5.7 RESISTERING LICENSES” for details.

Check if the robot package license is activated. Click “License” from the ZDT server management Web service menu and click the displayed “Management”. Refer to “Select robots” in “5.2.11.1 Management” for details.

NOTE
If the old ZDT server version is V2.1, V2.2, or v2.3, all the package licenses of the robot become invalid after upgrading. Check to package licenses of each robot to activate them.

5.4.7 Email re-specification

Email transmission setting and the Email destination address settings are not transferred. Specify them again if necessary. Refer to “4.8 EMAIL NOTIFICATION” for details.

NOTE
If you do not use the Email function, this step is unnecessary.

5.4.8 Data collection re-specification

If the old ZDT server version is V2.0, or V2.4 or higher, the following data collection settings are not transferred. Specify them if necessary.

1 Data collection service
Refer to “4.1 DATA COLLECTION SERVICE” for details.

2 Robot backup
Refer to “4.2 ROBOT BACKUP” for details.

3 Servo data
Refer to “4.3 SERVO DATA” for details.

4 Vision offset data
Refer to “4.4 VISION OFFSET DATA” for details.

5 Program information when an alarm is issued
Refer to “4.5 PROGRAM INFO AT ALARM” for details.

NOTE
If you do not use the data collection service, this step is unnecessary.

5.4.9 Web portal login user re-specification

Login users of the Web portal are not transferred. So, they need to be created again.
Refer to “3.2.1. Create a new account” for details.

5.4.10 Check the behavior of the new ZDT server

Check if the new ZDT server works correctly.

ZDT server management screen

Check the following items.

1 The status of all services is “Correct”
Click “System info” from the ZDT server management web service menu and click the displayed “System error analysis”. Check all the services are good. Refer to “5.2.6.3 System error analysis” for details.

2 Data deletion setting is transferred from the old ZDT server correctly
Click “ZDT setting” from the ZDT server management Web service menu and click the displayed “Data deletion setting”. Check if the setting value are transferred from the old ZDT server correctly.

NOTE

This setting is inherited by the version V2.1 or higher of the old ZDT. Only when the version is V2.0, specify it again if necessary. Refer to “4.9 SETTINGS FOR DATA DELETION” for details.

If the user password for Ubuntu was changed in an older version of ZDT, change it in the ZDT server management Web service. For information on how to set the password, refer to “User” in “5.2.9.1 Environment settings”.

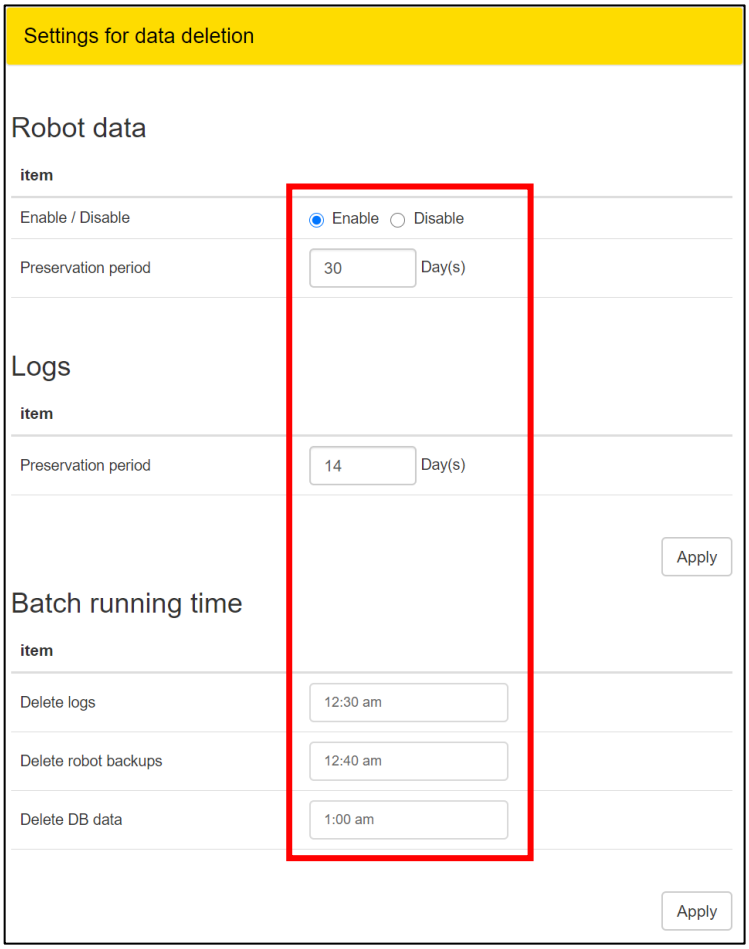


Fig. 5.4.10 (a) Data deletion setting

Web portal

Check the following items.

1 Robots are displayed in the Controller list.
Click the tree icon in the left of the Web portal header. Check if the robots are displayed in the Controller list.

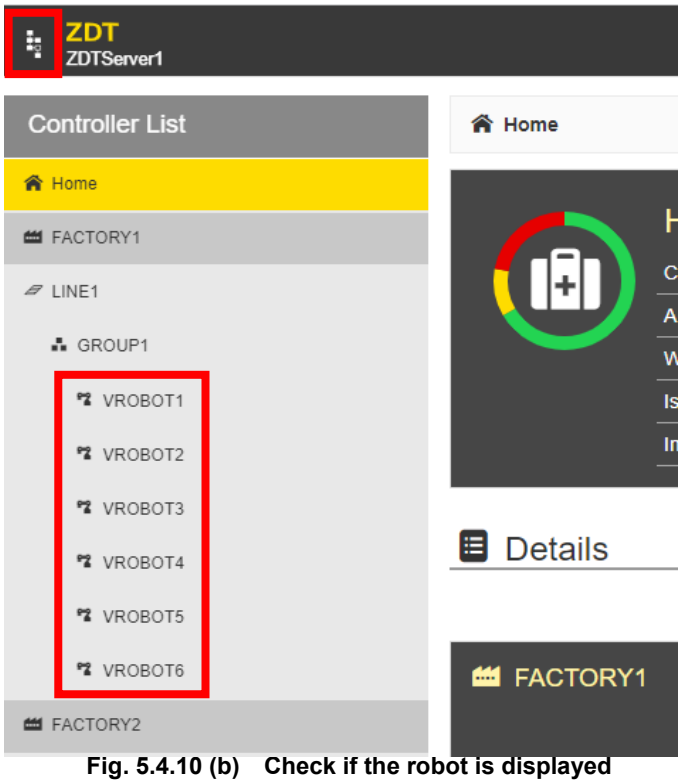


Fig. 5.4.10 (b) Check if the robot is displayed

2 The robot detail page is displayed
Check if the robot detail screen is displayed after clicking the robot on the Web portal by multiple robots. Refer to “3.7 ROBOT DETAILS PAGE” for details.

3 Whether you received a variety of data from the robot or not
Check if the robot data is received on the Web portal after a while after you registered the license to the new ZDT server and connected the robot.

4 Final check on the next day
On the next day of the registration, check if the status of all services are “Good” from the ZDT server management screen.

6 INTEGRATED SERVER

6.1 INTEGRATED PORTAL

The Integrated portal allows you to monitor the statuses of all ZDT servers registered to the Integrated server on the status panel. The Web portal of each server can be accessed without login operation.

6.1.1 Creating an Account

Create a user account to log into the Integrated portal the same as the Web portal.
Refer to “3.1 CREATING AN ACCOUNT” on step.

NOTE
A user account that is the same as the ZDT server to be registered to the integrated portal is necessary.

6.1.2 Login

Log into the Integrated portal using the created user account.
Refer to “3.2 LOGIN” on step.

6.1.3 Screen Configuration

The home screen is displayed when logging into the Integrated portal.
The home screen allows you to check the status panels of all ZDT servers registered to the Integrated server.

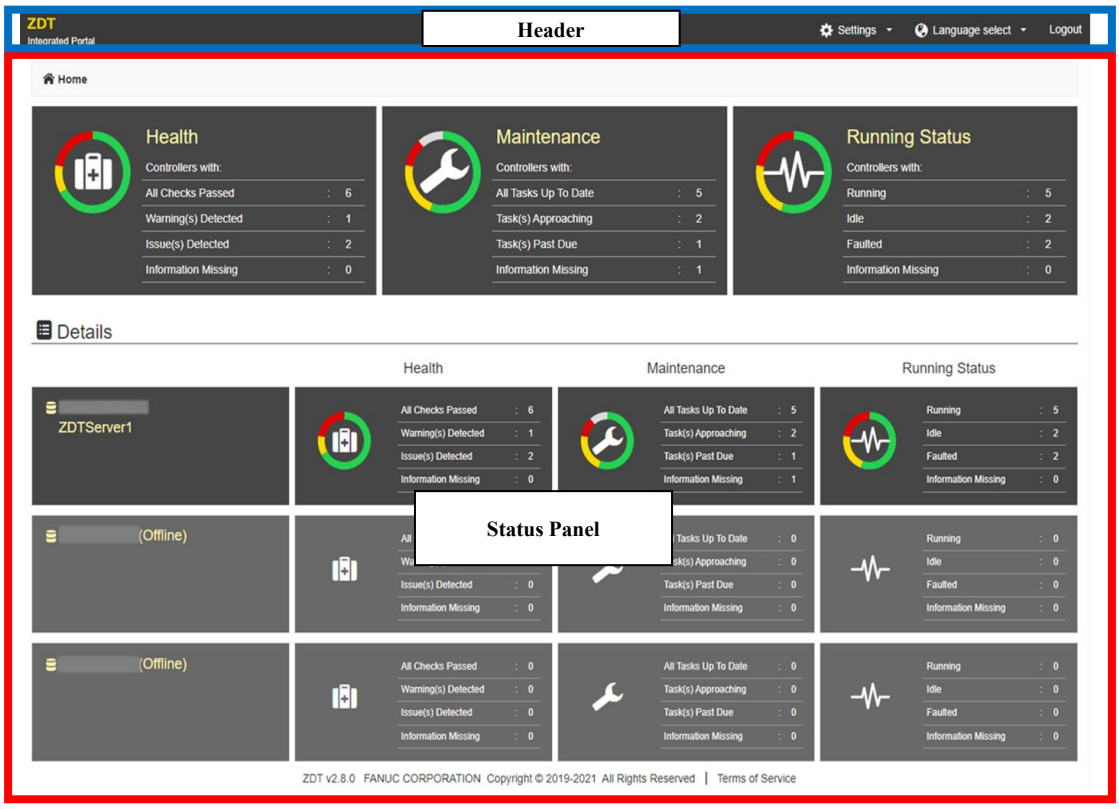


Fig. 6.1.3 (a) Screen configuration

The home screen consists of the header and status panel.

6.1.4 Header

Use the header to transition to settings screen, change languages and log out. The function of each menu is the same as that of the Web portal.

6.1.5 Status Panel

The status panel includes 3 items: Health, Maintenance and Running Status the same as that of the Web portal. The number of robot controllers for each status is tallied and displayed.

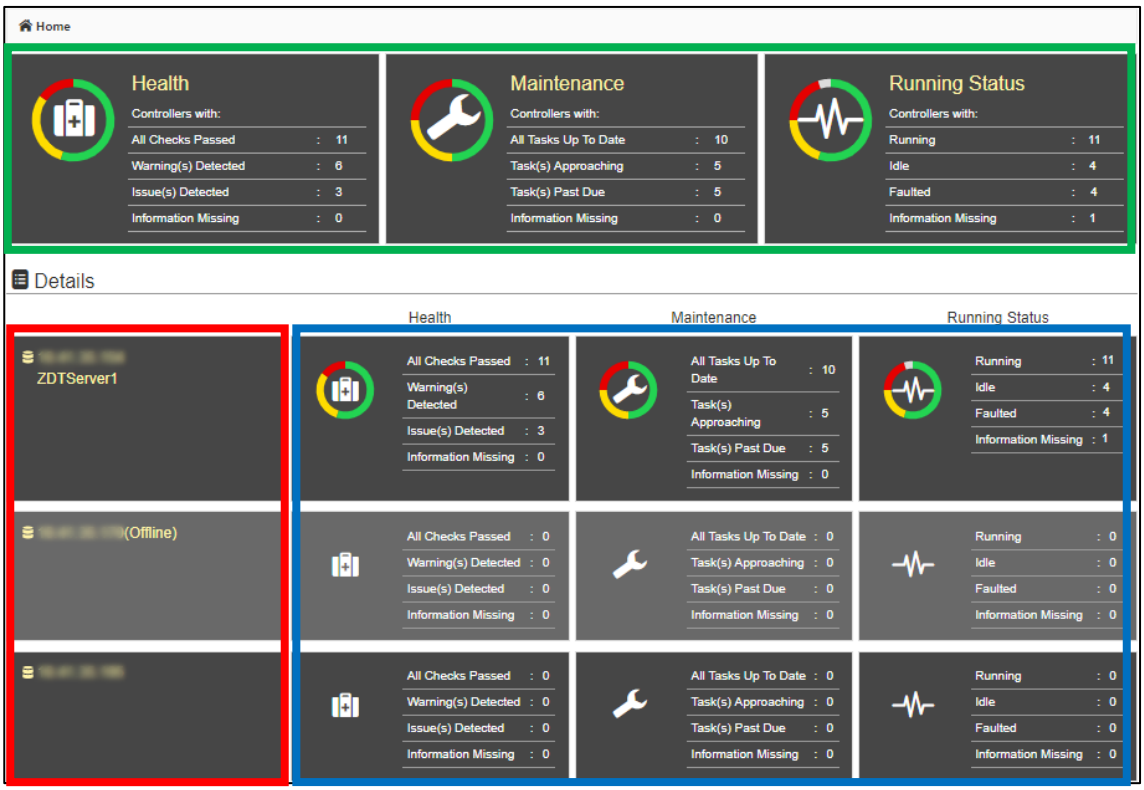


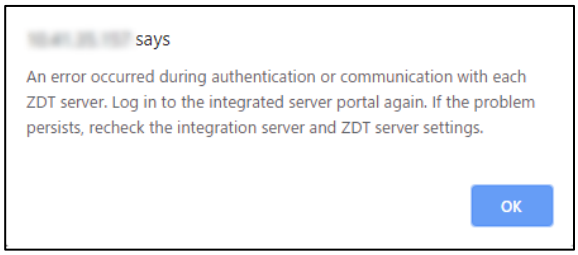
Fig. 6.1.5 (a) Status panel

The above status panel (green border) shows the tallied results of all ZDT servers registered to the Integrated server.

The detailed status panel (blue border) shows the tallied results of robots for each ZDT server. The far left panel (red border) shows the IP address and the server name of the ZDT server (the first panel). If the Integrated server cannot communicate with the ZDT server, the panel will show the IP address followed by “(Offline)” (the second panel). If the server name has not been set, the panel will show only the IP address (the third panel).

The detailed status panel is a link. Clicking the red border will display the home screen of the ZDT server. Clicking the blue border will display the health list. However, if the server is offline, it will not be displayed even though you click it.

NOTE
The following message will be displayed when a communication error occurred between the Integrated server and the ZDT server.



6.2 INTEGRATED SERVER MANAGEMENT WEB SERVICE

The following information can be verified and configured via the Integrated server management web service.

- System info
  Integrated server operational status
- ZDT settings
  ZDT server registration and settings for the display language on the Integrated server
- OS settings
  Integrated server environment settings such as time and network settings
- Integrated portal user management
  Used to change the password of the Integrated portal administrator account and delete portal users
- License
  Used to assign the ZDT server license

6.2.1 Login

Use the same methods as the ZDT server management web service to display the login page.
Refer to “5.2.1 Login” on step.

6.2.2 Screen Configuration

The following Integrated server management web page will be displayed after a successful login.

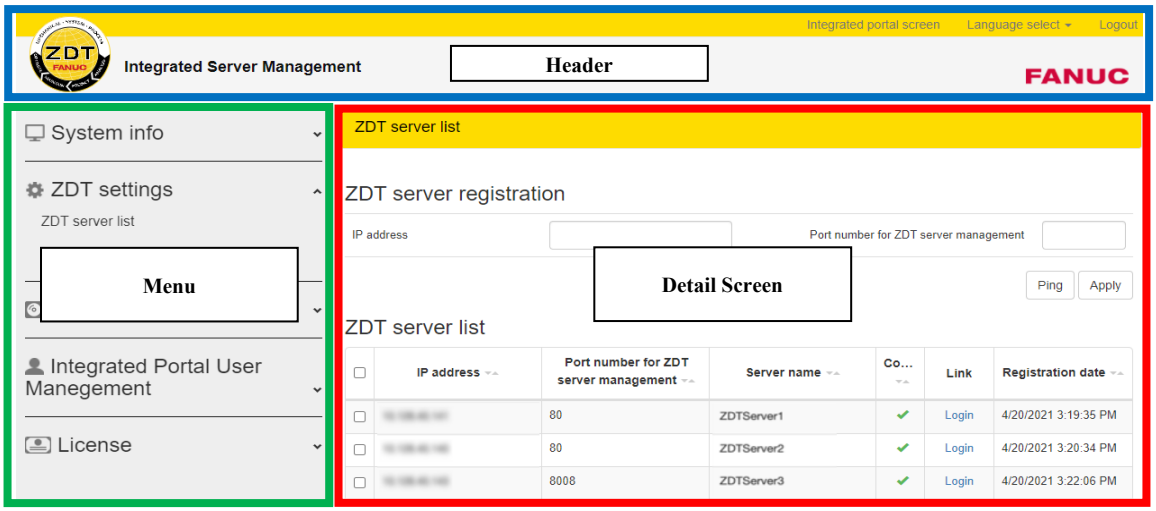


Fig. 6.2.2 (a) Screen Configuration

The Integrated server management web page consists of a header, menu, and a detail screen.

6.2.3 Header

The header is used to show/hide the menu, transition to the Integrated portal, change languages, and log out. The function of each menu is the same as that of the Web portal.

6.2.4 Menu

The menu contains the following items.

- System info
  - System log
- ZDT settings
  - ZDT server list
  - Languages
- OS settings
  - Environment settings
  - Power
- Portal user management
  - Manager account management
  - Delete portal user
- License
  - Management

6.2.5 Detail Screen

The detail screen displays the information and settings corresponding to the item selected in the menu.

6.2.6 System Info

The “System info” is used to view the following information.

- System log

6.2.6.1 System log

The following log information on services running on the Integrated server can be viewed. If ZDT is not functioning properly, click the “Download all” button at the upper left to save the log files. Then contact one of our sales representatives.

6.2.7 ZDT Settings

The “ZDT settings” screen contains the following settings.

- ZDT server list
- Languages

6.2.7.1 ZDT server list

The “ZDT server list” screen is used to register ZDT servers to the Integrated server.
The network connection status of registered ZDT servers can be verified and the ZDT server management web service can be opened.

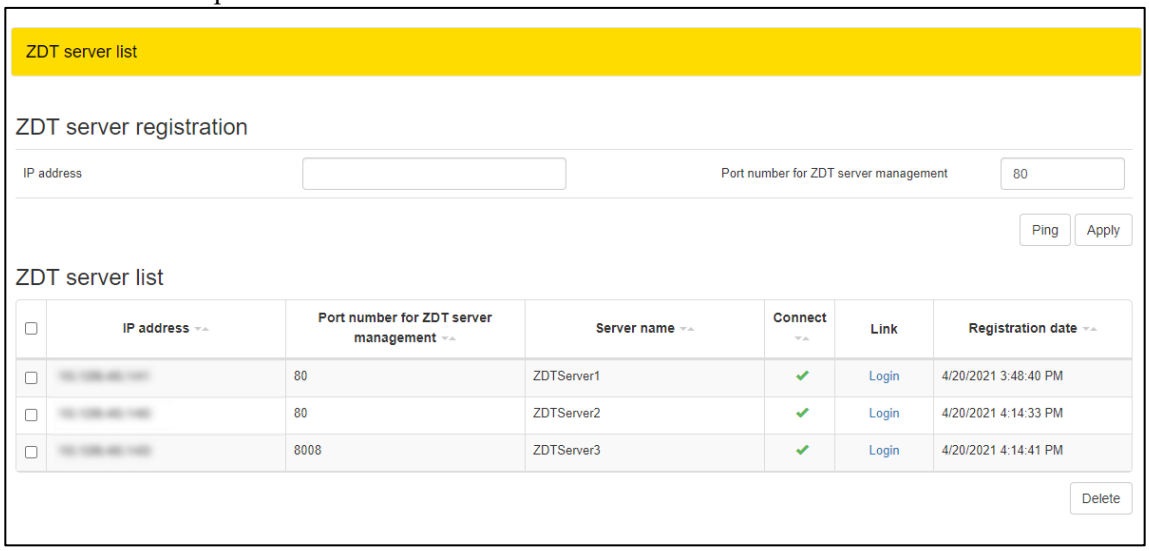


Fig. 6.2.7.1 (a) ZDT server list

Use the following procedure to register ZDT servers.

Step

1 Enter the IP address of desired ZDT server in the “IP address” text box.
2 Enter the ZDT server management port number of the ZDT server to be register in the “ZDT Server Management Port Number” text box. If the port number has not been changed, use port 80, which is displayed by default. The default port numbers for ZDT server management are as follows.
  Ver. 2.7 or later: 80
  Ver. 2.6 or earlier: 8008
3 Click the “Ping” button to verify network connectivity.

If it succeeds, a check mark and the version of the ZDT server is shown on the right of “Ping” button.
If the version could not be acquired, the error message “The version information of the ZDT server could not be acquired.” is displayed.

Fig. 6.2.7.1 (b) The screen when the connection established and the version of the ZDT server could be acquired

If it fails, the error message “Ping failed” will be displayed.

4 Click the “Apply” button.
A registered ZDT server will be added to the ZDT server list.
If the IP address has already been registered, the server cannot be registered with the error message “The IP address is already registered.”.

NOTE
If “The version information of the ZDT server could not be acquired.” is displayed when you click the “Ping” button, check the following.
• The port number for ZDT server management may have been entered incorrectly. Check that the port number for the ZDT server management Web service of the server being registered has not been changed.

• The required services may not have been started. From “System Error Analysis” in the ZDT server management Web service of the server being registered, check that the status of Tomcat is “Good”.

• Check that the version of the ZDT server being registered is Ver. 2.4 or later.

6.2.7.2 Languages

You can configure which languages can be selected when the Language select button is clicked to change the display language of the menu.

6.2.8 OS Settings

The “OS Settings” screen contains the following settings. The content of each item is the same as that of the ZDT server management Web service.

- Environment settings
- Power

6.2.9 Integrated Portal User Management

The “Integrated Portal user management” screen contains the following settings. The content of each item is the same as that of the ZDT server management Web service.

- Manager account management
- Delete portal user

6.2.10 License

The “License” screen contains the following settings.

- Management

6.2.10.1 Management

The license registration is not required for the Integrated server itself. The “Management” screen is used to transfer licenses between ZDT servers registered on the Integrated server.

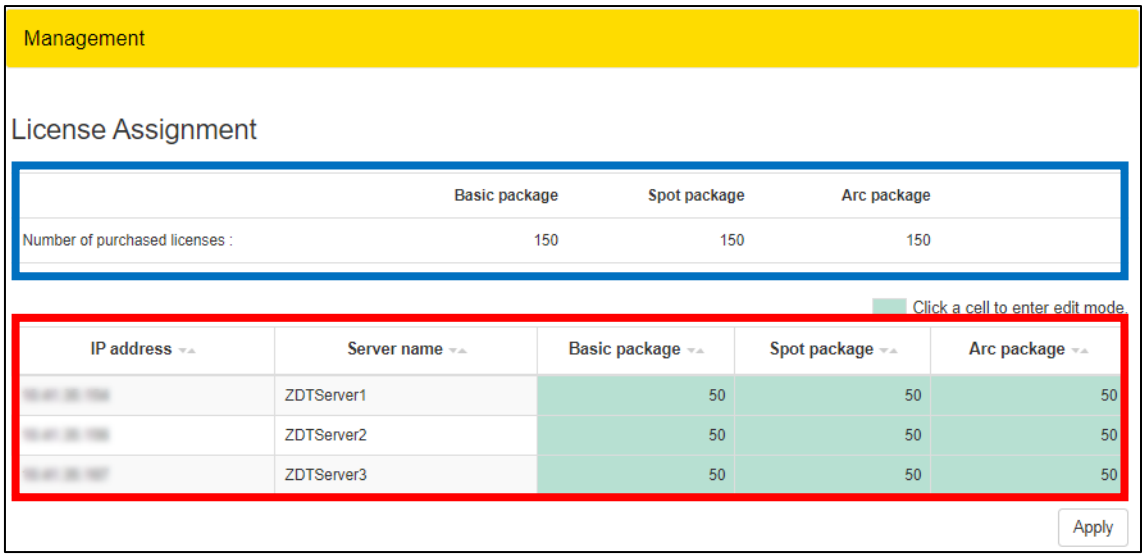
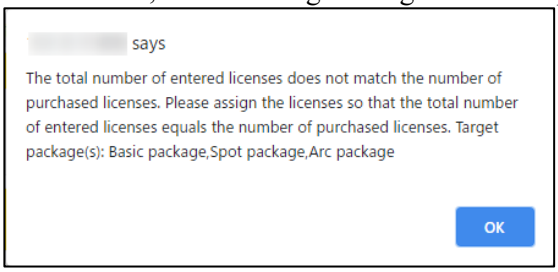


Fig. 6.2.10.1 (a) License Assignment

The “Number of purchased licenses” (blue border) shows the total number of licenses of all ZDT servers registered on the Integrated server, and the red border shows the number of licenses for each ZDT server. Click green cells to specify the number of licenses by directly entering the numbers. The total number of the licenses assigned to all ZDT servers must be the same as the “number of purchased license”.
If the number of licenses is not the same, the following message will be displayed.



If there is a server that cannot communicate with the Integrated server among the registered ZDT servers, or if there is a server that has returned the license, the license cannot be transferred.

NOTE
ZDT servers with a version different from the Integrated server are not displayed in the list.
Contact one of our sales representatives whether the specified ZDT version can be used.

7 RESTRICTIONS

This chapter describes the restrictions on the ZDT.

- The FANUC ZDT supports the robot software version of 7DA7 (V7.70) / 55 or later, and 7DC3 (V8.30) / 20 or later, and 7DF1 (V9.10).

- To access a web portal from Mac OS or iOS, update the operating system to the latest version.

- Number of allowable connections to the ZDT servers
  The number of allowable connections from web portals to the ZDT server is restricted as specified below:
  Up to 30 web portals.

- Do not upgrade the operating system or a package installed in a virtual machine running on a server or Windows PC. Otherwise, the system may be unable to operate normally.

- If a web browser setting to enlarge the page view is enabled, pages may be displayed incorrectly.

- If the Cookie setting of Web browser has been disabled, pages may be displayed incorrectly. Make sure to enable the Cookie setting before use.

8 TROUBLESHOOTING

This chapter describes problems that may occur in the operation of the ZDT and how to solve the problem.

If a problem occurs, first see the system error analysis screen on the ZDT Server Management Screen.
If the problem cannot be solved with the measures described below, contact our sales person.

The Web portal is inaccessible from a Web browser.

The PC on which a Web browser is running may be unable to communicate with the ZDT server.

- **If VMware ESXi is installed in the server:**

By using the Ping command, check for communication among the PC, CIMC, ESXi, and ZDT server.
If none of them is communicable, there may be a problem on the network; contact your network administrator.
If only the ZDT server is not communicable, check the network settings of the ZDT server and the network settings of ESXi.
If the ZDT server is communicable, restart the ZDT server.

- **If VMware Workstation Pro is installed in the Windows PC:**

By using the Ping command, check for communication between the PC and the ZDT server.
By using VMware Workstation Pro, check the settings of the network adapters and the settings of the virtual network.
If the ZDT server cannot be communicable, there may be a problem on the network; contact your network administrator.

No information about the robot connecting to the ZDT server is displayed.

The possible causes are as described as followings:

1 No data is sent from the robot.
Restart the robot.

2 The robot is not communicable with the Data Collector.
Check whether there is a log about data sent from the robot by using the management web service of the Data Collector.
If there is a log about it, the robot is properly communicating with the Data Collector.
If there is no log about it, by using the Ping command, check for communication between the robot controller and the Data Collector. In addition, check that data transmission is enabled, the facility name, line name, and cluster name are specified, and the HTTP settings are correctly set in the settings for the ZDT client on the controller. For details, refer to “2.9 ROBOT CONFIGURATION”.
If the settings are correctly configured, restart the Data Collector.

3 The Data Collector is not communicable with the ZDT server.
By using the Ping command, check communication between the Data Collector and the ZDT server.
In addition, check the IP address of the ZDT server specified on the Data Collector. For details, refer to “2.6.3 Network Configuration”.

4 The number of robots connected exceeds the number of robots allowed by the license.
By using the ZDT Server Management Screen, check the number of robots connected and selected robots. Refer to “Select robots” in “5.2.11.1 Management” for details.

If the problem persists even after the measures are taken, try to restart the server or Windows PC.

The ZDT Server Management Screen is not displayed from the Web portal.

Refer to “2.5.3 Network Configuration” and check that the network settings are proper.

Time synchronization cannot be done.

Refer to “2.5.4 Time Configuration” and check the synchronization settings of NTP server in “5.2.9.1 Environment settings”.

The details screen for a robot connected to the ZDT server is not displayed.

Refer to “2.9 ROBOT CONFIGURATION” and check the settings for information to be displayed.

The result of the drive health in the mechanical diagnosis is displayed as "Unknown".

The motor health analysis or the PPM axis diagnosis analysis may take some time. In this case, the status judgment may become unknown. Check it on the Web portal again after some time.

A threshold for the motor health of the drive health in the mechanical health cannot be set.

If a proxy server is set on a data reference PC, data sent through the proxy server may be changed and it may cause improper data transmission. Disable the proxy server settings.

The reducer diagnosis graph in the mechanical diagnosis is not displayed.

Run the reducer diagnosis program, register the reference value, and then execute the diagnosis program again.

A degradation level of the reducer diagnosis graph in the mechanical diagnosis is set to 0.

The reference value for the reducer diagnosis has not been registered. Register the reference value after executing the reducer diagnosis program.

No servo off event in the mechanical diagnosis is displayed.

A servo off history is not sent until a servo off alarm is generated.

No servo data is retrieved in the mechanical diagnosis.

Refer to “2.7 DATA COLLECTION SERVICE CONFIGURATION”, and then check the settings and restart.

Mail notification cannot be received.

The possible causes are as described as followings:

1 It takes time to start sending email.
It may take about 15 minutes or less before transmission of an email notification starts when a robot status change is reflected onto a Web portal.

2 Received email is regarded as junk email.
Received email may be regarded as junk email. Check and change the email filter settings.

3 The ZDT server is not communicable with the SMTP server.
In the settings for sending mail screen on the ZDT Server Management Screen, click “Test” button to check that the IP address, encryption type, and port number are valid.
If “Success” is displayed on the right side of the “Test” button, the settings are valid.
If “Failed” is displayed on the right side of the button, check the network settings of the ZDT server and the network settings of the SMTP server to confirm that they are on the same network. In addition, check the settings of the SMTP server to confirm that the encryption type and port number are proper on the email settings screen.

4 Test email cannot be sent.
The SMTP server may not support the specified encryption type. Check for the settings of the SMTP server. To use “SSL/TLS” or “STARTTLS”, registration of a digital certificate with the ZDT server and other settings may need to be made; contact your SMTP server administrator.
The SMTP server may not support the specified user authentication type. Check for the settings of the SMTP server. The ZDT server does not support “DIGEST-MD5” for user authentication. Disable user authentication on the SMTP server or change the user authentication setting to a setting “CRAM_MD5” is applicable to.

If the problem persists even after the measures are taken, try to use another type of SMTP server.

APPENDIX

A. SETTINGS KNOW-HOW

This chapter describes the operations to be performed as necessary in the ZDT server settings, etc.

A.1 ZDT SERVER

A.1.1 Changing the Network Configuration (If the network setting was not specified when in the initial setting)

Step

1 Start the console from VMware vSphere Client, Web Client, and VMware Workstation.
2 Once the login screen of Ubuntu is displayed, enter the following initial user name and the initial password to log in.

zdtserver login: **zdtuser**
Password: **zdtuser**

3 Once you logged in, enter the following command to specify the network setting.

zdtuser@zdtserver:~$ **sudo␣retry_setup.sh**

4 Follow the initial setting steps for subsequent operations (excluding the login step).

If you want to change the network setting, you can specify it by using the ZDT server management screen and using the console.

A.1.2 Changing the Network Configuration (Console)

If you cannot connect to the ZDT server management screen, you can specify it by the following steps from the console.

NOTE
The keyboard layout of the virtual machine is Japanese by default. Specify the keyboard layout if necessary. If you specify the keyboard layout, enter the following command.

zdtuser@zdtserver:~$ **sudo␣dpkg-reconfigure␣keyboard -configuration**

Specify each item according to the keyboard you use following the displayed setting wizard.

Step

1 Start the console from the VMware vSphere Client, Web Client, or VMware Workstation.
2 Once the Ubuntu login screen is displayed, enter the following default username and password to log in.

zdtserver login: **zdtuser**
Password: **zdtuser**

3 Once you are logged in, configure the network settings.
Enter the following command to check the current network interface settings. By default, the ens192 and other interfaces are configured.

zdtuser@zdtserver:~$ **ip␣addr␣show**

```
zdtuser@zdtserver:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet [redacted] scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens192: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group de
fault qlen 1000
    link/ether [redacted] brd [redacted]
    inet [redacted] brd [redacted] scope global ens192
       valid_lft forever preferred_lft forever
```

Fig. A.1.2 (a) Confirm network configuration

4 Start the vi editor and configure the network settings.
Enter the following command and press the [Enter] key.

zdtuser@zdtserver:~$ **sudo␣vi␣/etc/netplan/99_config.yaml**

5 Open the file “99_config.yaml” and press the [i] key to enter Edit mode. Configure the IP address, subnet mask, and default gateway in accordance with your environment. By default, ens192 and other network interfaces are configured. If your environment has different interfaces from those checked in step 3, change the name of the interface. Set the subnet mask as a number of bits.
For example: 255.255.255.0 → 24 (bit indication), 255.255.128.0 → 17, 255.0.0.0 → 8

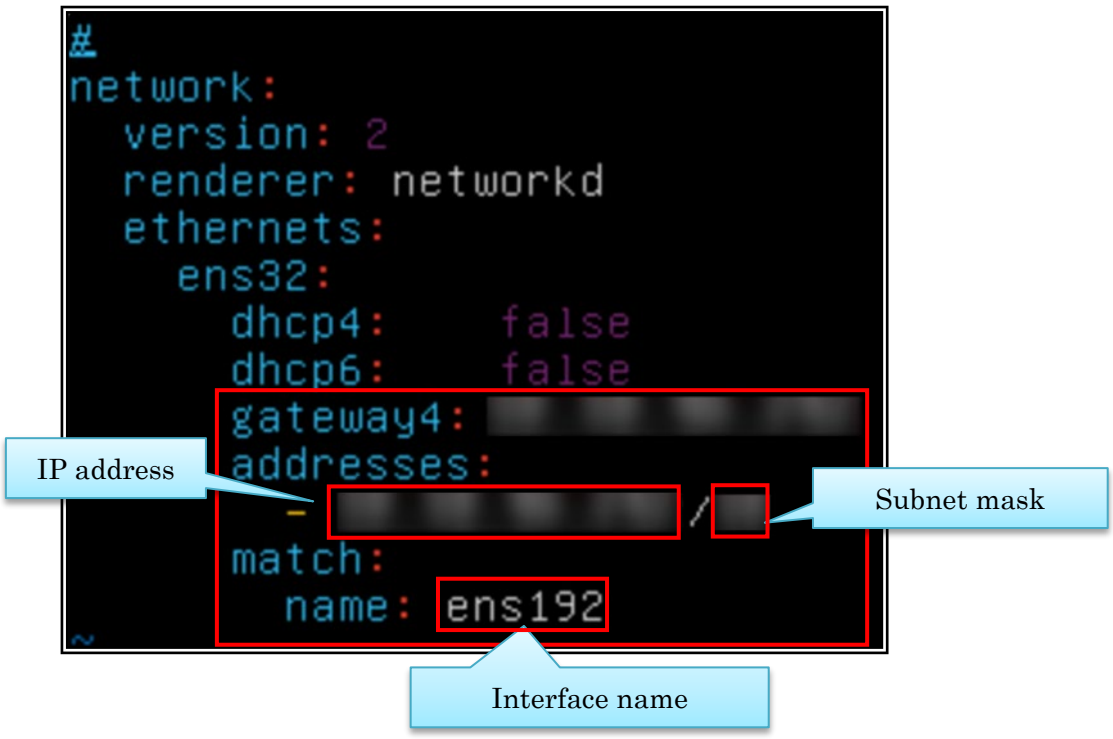


Fig.A.1.2 (b) Network configuration

6 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the "**:wq**" command to save the edited content.
7 Next, change the URLs of the Web portal and ZDT Server Management. Enter the following command and press the [Enter] key.

zdtuser@zdtserver:~$ **sudo␣vi␣zdt/conf/server.json**

8 Open the configuration file and then press the [i] key to enter Edit mode. Then, change the IP address for the ZDT server.

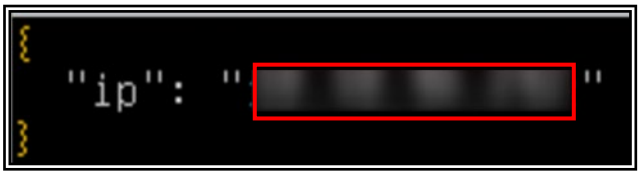


Fig. A.1.2 (c) Change URLs of the Web portal and ZDT server management Web service

9 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the "**:wq**" command to save the edited content.
10 Enter the following command and press the [Enter] key.
11 Enter the following command to restart the ZDT server.

zdtuser@zdtserver:~$ **sudo␣shutdown␣-r␣now**

12 Login again and enter the following command to confirm that settings have been reflected.

zdtuser@zdtserver:~$ **ip␣addr␣show**

A.1.3 Changing the Reverse Proxy Port Number

NOTE
It is usually not necessary to change the reverse proxy port number.
Only if any problem occurs in operation check, change it by following the steps in this section.

The default value of the reverse proxy port number can be changed with the following steps.

NOTE
For information about the default port numbers and port numbers that cannot be changed, refer to the table 2.3.1 (c) ZDT server in "2.3.1 Network Ports".

Step

1 Start a console from VMware vSphere Client, Web Client, or VMware Workstation.
2 When the Ubuntu login screen appears, input a user name and password to log in.
3 After logging in, execute the script for changing the port number. Input the following command.

zdtuser@zdtserver:~$ **sudo␣zdt_port_change.sh**

To change the port number, enter "y" and press the Enter key.
Enter the port number you want to use and press the Enter key. The reverse proxy will restart, and the setting is complete.

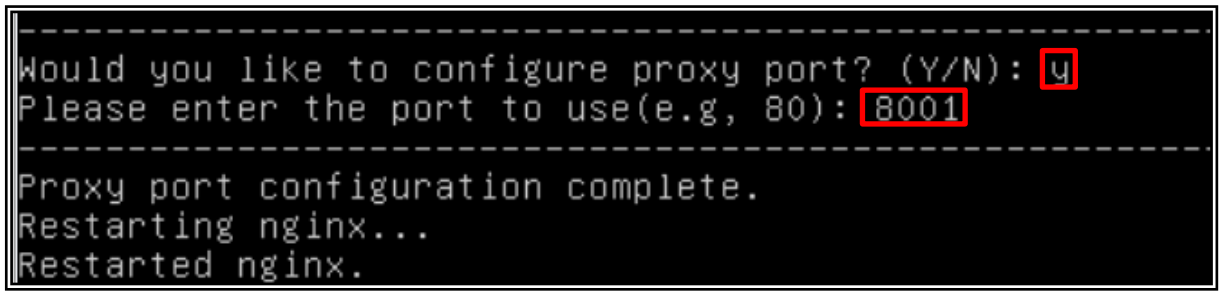


Fig. A.1.3 (a) Changing the reverse proxy port number

4 Access the Web portal screen and confirm that the port number has been changed. For information about confirming, refer to “2.5.8 Operational Check”.

A.2 DATA COLLECTOR

A.2.1 Changing the Network Configuration (Console)

Step

1 Start the vi editor and configure the network settings.
Enter the following command and press the [Enter] key.

zdtuser@zdtdc:~$ **sudo␣vi␣/etc/network/interfaces**

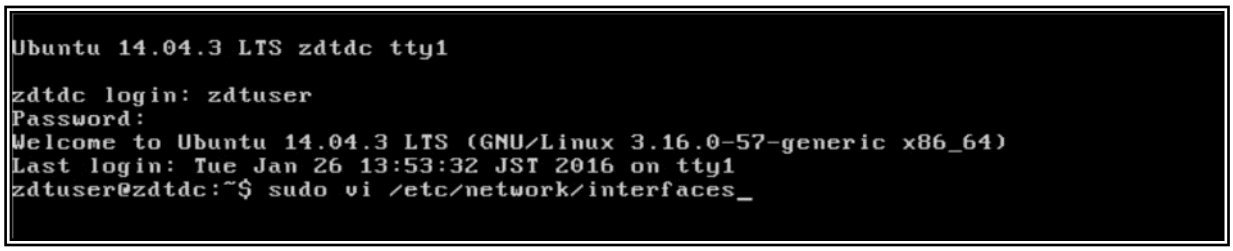


Fig. A.2.1 (a) Start vi editor

2 Open the interfaces file and press the [i] key to enter Edit mode. Configure the IP address, subnet mask, default gateway, and DNS server address for the eth0 interface in accordance with your environment.

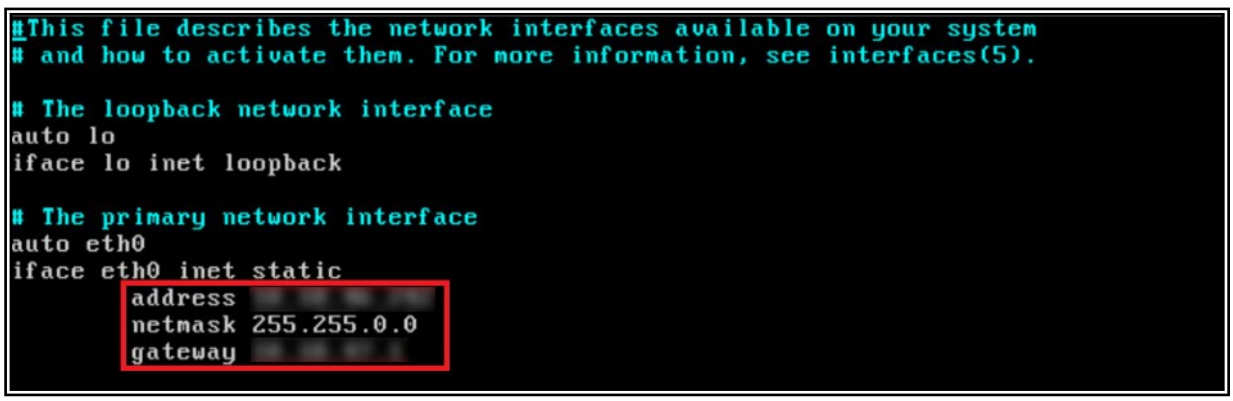


Fig. A.2.1(b) Network configuration

3 Once you have finished editing the file, press the [ESC] key to exit out of edit mode. Use the "**:wq**" command to save the edited content.

4 Enter the following command to restart the data collector.

zdtuser@zdtdc:~$ **sudo␣shutdown␣-r␣now**

A.3 DATA COLLECTION SERVICE

A.3.1 Changing the Network Configuration (Console)

Step

1 Start the console from VMware vSphere Client, Web Client, and VMware Workstation.
2 Once the login screen of Ubuntu is displayed, enter the following initial username and the initial password to log in.

DataCollection login: **zdtuser**
Password: **zdtuser**

3 After you logged in, enter the following command to specify the network setting.

DataCollection@zdtserver:~$ **sudo␣retry_setup.sh**

Follow the initial setting steps for subsequent operations (excluding the login step).

If you change the network settings after the initial settings, edit only the "/etc/netplan/99_config.yaml" with the same steps for ZDT server.
* For the detailed procedure, refer to the step 5 of "A.1.2 Changing the Network Configuration (Console)".

A.4 Expanding Disk Capacity

This section describes the procedure to expand disk capacity.
Disk capacity can be expanded via the console or the ZDT Server Management screen.

First, expand the virtual disk capacity. In this example, the disk capacity will be expanded to 200GB.

NOTE
Normally, the capacity of hard disk 1 does not need to be expanded.

The capacity of hard disk 1 can be expanded up to a maximum of 2TB. If you set a capacity greater than 2TB and then perform the following operation to expand the capacity, the virtual machine will no longer start up.

If there is a snapshot, delete it, or else the following operations cannot be done.

Checking the Status of the Expanded Target Disk

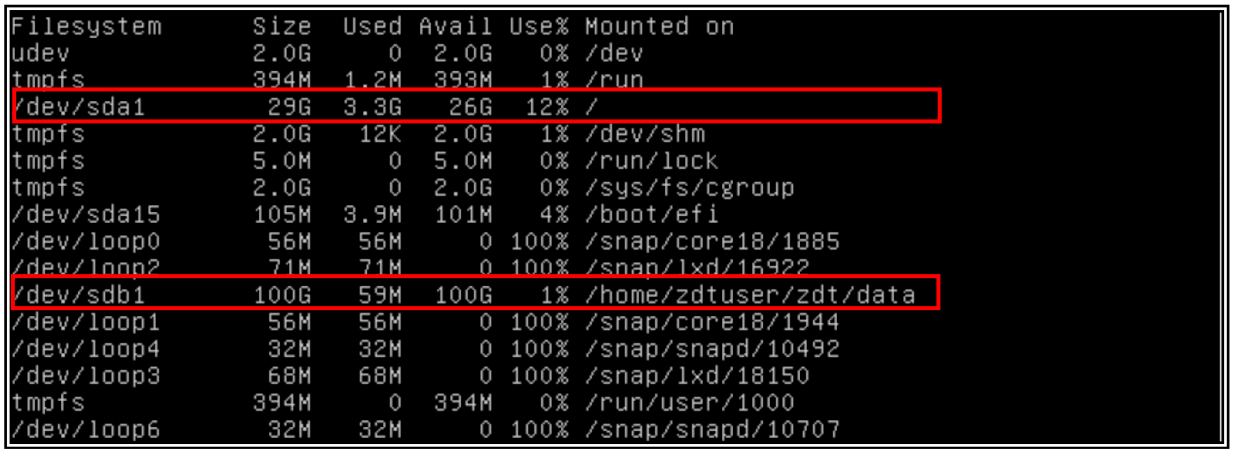
The status of the disk can be checked via the console or the ZDT Server Management screen.
This section describes how to check the disk via the console.

Procedure

1 Turn on the virtual machine and start a console.
2 When the Ubuntu login screen appears, input a user name and password to log in.
3 After logging in, use the df command to check the status of the disk. Input the following command.

zdtuser@zdtserver:~$ **df␣ -h**

4 Check the available space of the /dev/sda1 and /dev/sdb1 rows in the Filesystem column. If the available space of /dev/sda1 is low, hard disk 1 should be expanded. If the available space of /dev/sdb1 is low, hard disk 2 should be expanded.



```
Filesystem      Size  Used Avail Use% Mounted on
udev            2.0G     0  2.0G   0% /dev
tmpfs           394M  1.2M  393M   1% /run
/dev/sda1        29G  3.3G   26G  12% /
tmpfs           2.0G   12K  2.0G   1% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           2.0G     0  2.0G   0% /sys/fs/cgroup
/dev/sda15      105M  3.9M  101M   4% /boot/efi
/dev/loop0       56M   56M     0 100% /snap/core18/1885
/dev/loop2       71M   71M     0 100% /snap/lxd/16922
/dev/sdb1       100G   59M  100G   1% /home/zdtuser/zdt/data
/dev/loop1       56M   56M     0 100% /snap/core18/1944
/dev/loop4       32M   32M     0 100% /snap/snapd/10492
/dev/loop3       68M   68M     0 100% /snap/lxd/18150
tmpfs           394M     0  394M   0% /run/user/1000
/dev/loop6       32M   32M     0 100% /snap/snapd/10707
```

Fig. A.4 (a) df execution results

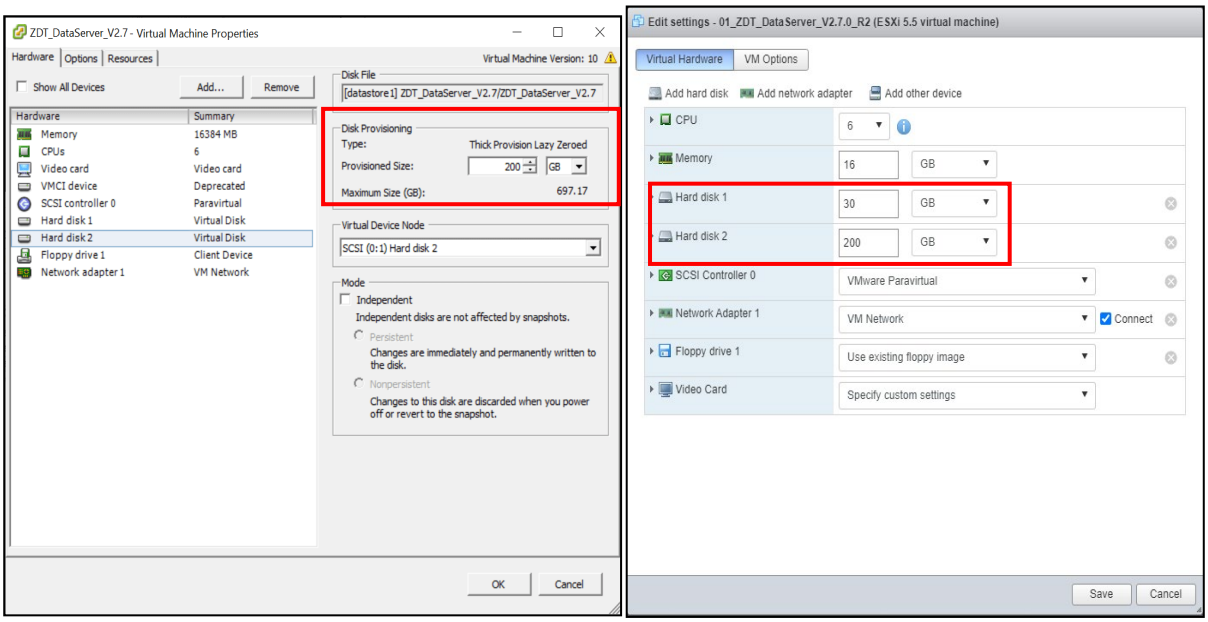
Expanding Disk Capacity (VMware ESXi)

Step

1 Start the ZDT_DataServer console from the VMware vSphere Client or web client.
2 Shut down the zdt_dataserver server. Enter the following command.

zdtuser@zdtserver:~$ **sudo␣shutdown␣-h␣now**

3 Display the ZDT_DataServer properties in VMware vSphere Client or the web client.
4 From the “Hardware” tab, click “Hard disk 1” or “Hard disk 2”, and then enter the desired disk capacity into “Provisioned Size”.
If you are using the Web client, click the target ZDT_DataServer in the virtual machine list. When the details screen appears, click “Edit”, and then enter the desired disk capacity in “Hard disk 1” or “Hard disk 2”.



VMware vSphere Client Web client

Fig. A.4 (b) Entering the expanded disk capacity

Expanding Disk Capacity (VMware Workstation Pro)

Step

1 Start the ZDT_DataServer console from VMware Workstation Pro.
2 Shut down the zdt_dataserver server. Enter the following command.

```
zdtuser@zdtserver:~$ sudo␣shutdown␣-h␣now
```

3 Display the ZDT_DataServer settings in VMware Workstation Pro.
4 From the “Hardware” tab, click “Hard Disk (SCSI)” or “Hard Disk 2 (SCSI)”, and then click “Expand” under “Disk utilities”.

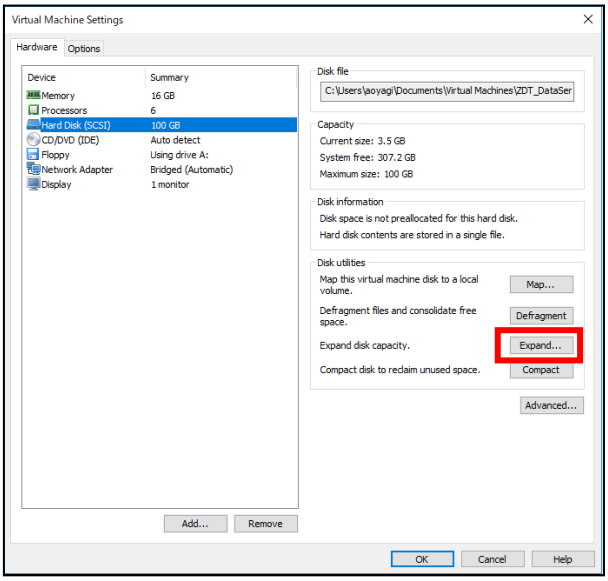


Fig. A.4 (c) Virtual machine settings

5 On the “Expand Disk Capacity” screen, change the maximum disk size and then click “Expand”.

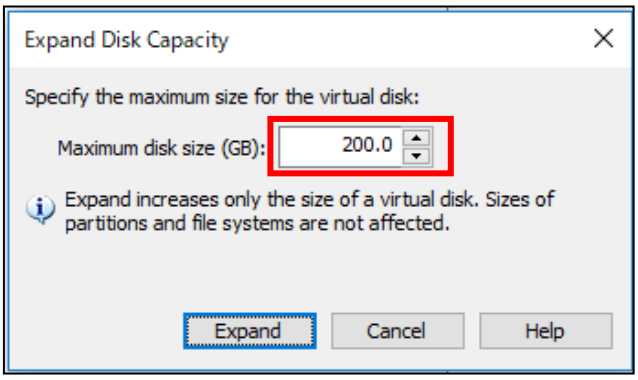


Fig. A.4 (d) Expand disk capacity

Expanding Disk Capacity (Console)

Step

1 Turn on the virtual machine and start a console.
2 When the Ubuntu login screen appears, input a user name and password to log in.
3 After logging in, change the directory. Input the following command.

zdtuser@zdtserver:~$ **cd␣zdt/bin**

4 Execute a shell script to expand the size of the partition and file system. Input the following command.
Refer to the table 2.5.6 (a) Hard disk configuration in "2.5.6 Expanding Disk Capacity" for paths that can be entered for [mount point].

zdtuser@zdtserver:~$ **sudo␣ZDTResizeDisk.sh␣[mount point]**

```
zdtuser@zdtserver:~/zdt/bin$ sudo ZDTResizeDisk.sh /home/zdtuser/zdt/data
1
```

Fig. A.4 (e) ZDTResizeDisk.sh execution results

5 If the shell script returns 1, then the expansion was successful. If it returns 0, then the size before and after execution did not change. Check that the disk size setting in the aforementioned VMware ESXi or VMware Workstation Pro was performed correctly.

Configuring Settings via the ZDT Server Management

Log into the ZDT Server Management and change settings as necessary. Refer to "5.2.9.1 Environment settings" for more information.

A.5 ZDT SERVER UPGRADE (When the old ZDT version is V2.0, V2.1, V2.2, and V2.3)

A.5.1 Return the Old ZDT Server License

Step

1 Locate the "return_license.sh" file that is included in the upgrade package installation DVD to the following old ZDT server environment using a file transfer tool such as WinSCP.

Directory: /home/zdtuser/zdt/bin/

File placement example: /home/zdtuser/zdt/bin/return_license.sh

The file protocol and the port number, the connection user and the password are as follows:
・File protocol: SFTP
・Port number: 22
・user: zdtuser
・password: zdtuser
*If you change the login password by “2.5.5 Changing Login Passwords”, use the changed password.

2 Enter the following command by the old ZDT server console to grant an execution authority.

zdtuser@zdtserver:~$ **chmod␣544␣/home/zdtuser/zdt/bin/return_license.sh**

3 Enter the following command by the old ZDT server console to return the license.

zdtuser@zdtserver:~$ **sudo␣/home/zdtuser/zdt/bin/return_license.sh**

4 After you returned the license, a license file to return is created on the following directory.

Directory: /home/zdtuser
File placement example: /home/zdtuser/returnlicense_[The date when the command is executed].tar.gz
File name example: returnlicense_20200801.tar.gz

Download the license file to return by using a file transfer tool such as WinSCP. The information necessary to connect is the same as Step 1. Save the file above to use it in “5.4.3 Request to issue a license”.

A.5.2 Create a DB Backup of the Old ZDT Server

Step

1 Database backup
Acquire the database backup. Refer to “5.3.2 Data backup”.

2 Backup the robotcontrollermanagement table in HistorianDB

Open in order from “HistorianDB” – “Schemas” – “Tables” in the “Browser” tree of pgAdmin4 and right-click “robotcontrollermanagement”. Then click “Backup” from the context menu.

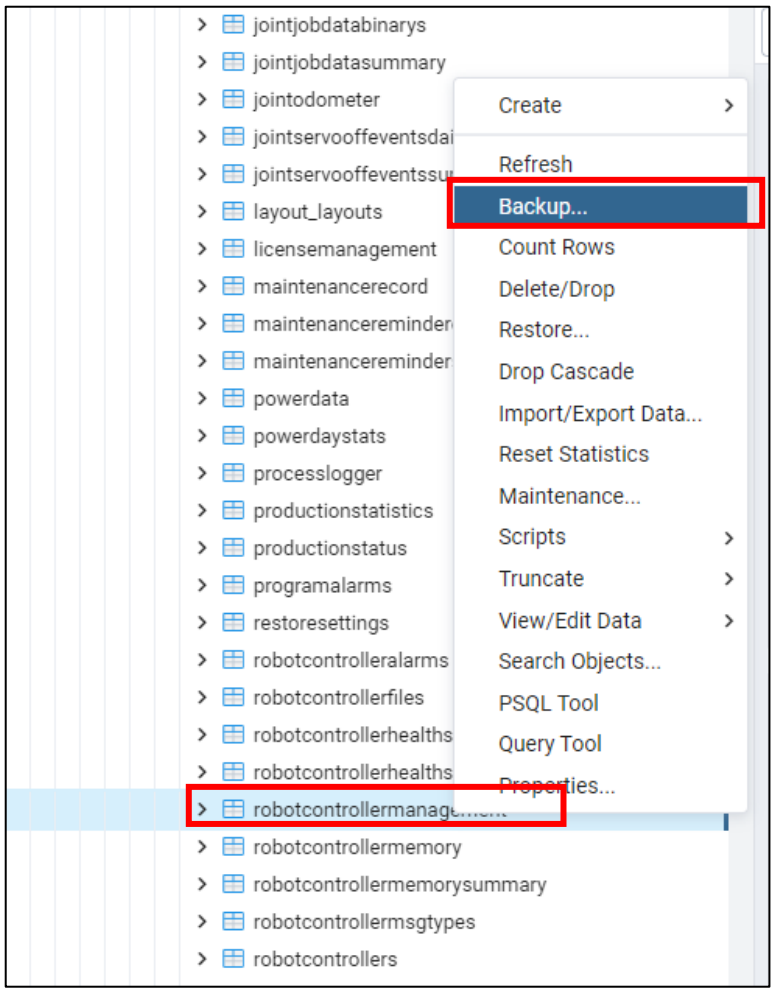


Fig. A.5.2 (a) Backing up

Name the file as “robotcontrollermanagement.backup” and specify the full path (directory path + file name”. Then click “Backup”.

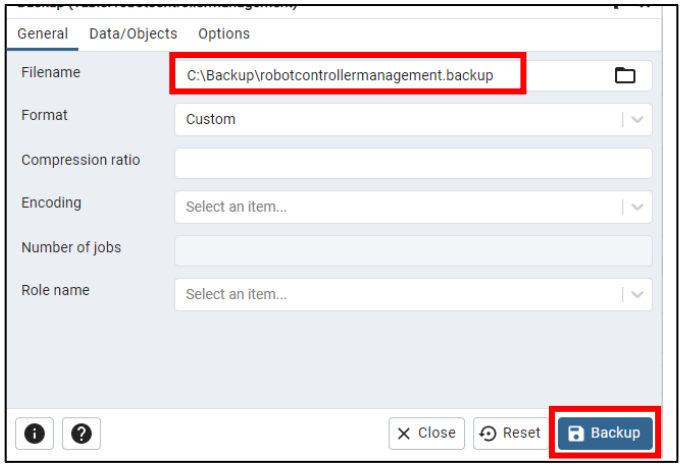


Fig. A.5.2 (b) Backing up

A.5.3 DB Data Transition to the New ZDT Server

Step

1 Stop the data collection service if you use it.
Click “Shut down” on the virtual machine of the data collection service.

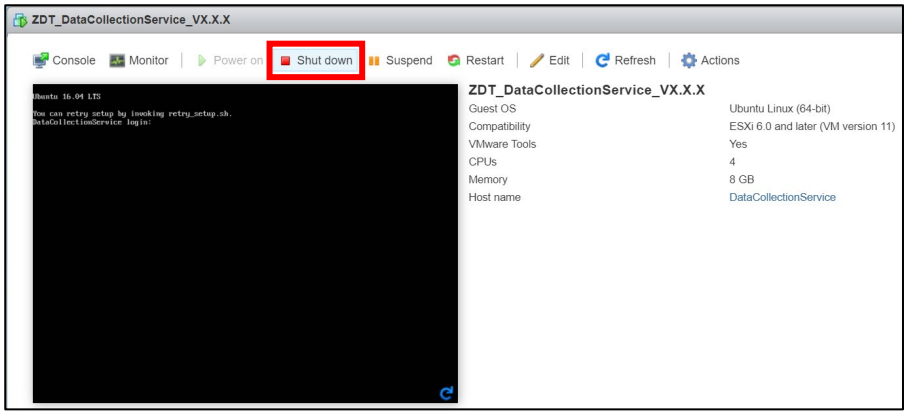


Fig. A.5.3 (a) Stop the data collection service

2 If the virtual machine of the new ZDT server that is the data transfer target is halted, start it.
Click “Power on” of the new ZDT server virtual machine.

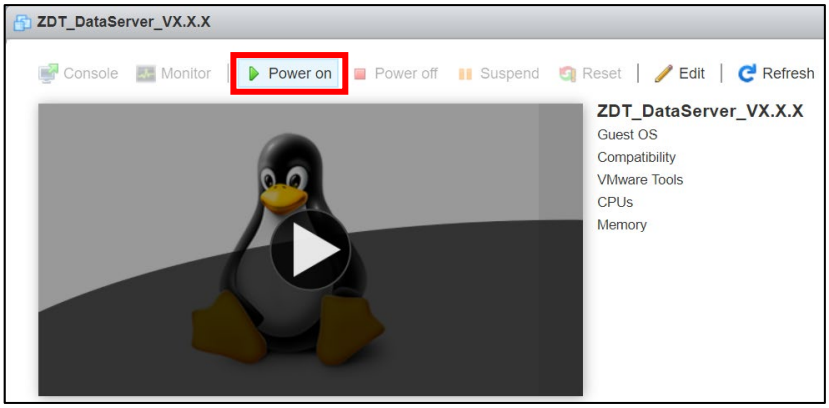


Fig. A.5.3 (b) Start the new ZDT server

3 Enter the following command on the new ZDT server console.

zdtuser@zdtserver:~$ **sudo␣zdt_stop_services.sh**

4 Restore the backup file that was created on Step 1 of “5.4.4 Create a DB backup of the old ZDT server” above to the ReportDB of the new ZDT server.

NOTE
Refer to Step 3 to 5 of “5.3.3 Data restore” for how to restore ReportDB. Restart of the ZDT server and start of the data collection service that is after Step 6 is unnecessary.

5 Restore the backup file “robotcontrollermanagement.backup” that was created on “5.4.4 Create a DB backup of the old ZDT server” Step 2 to the “robotcontrollermanagement” table on the new ZDT server.

Open in order from “ReportDB” – “Schemas” – “Tables” in the “Browser” tree of pgAdmin4. Then click “Restore” from the context menu.

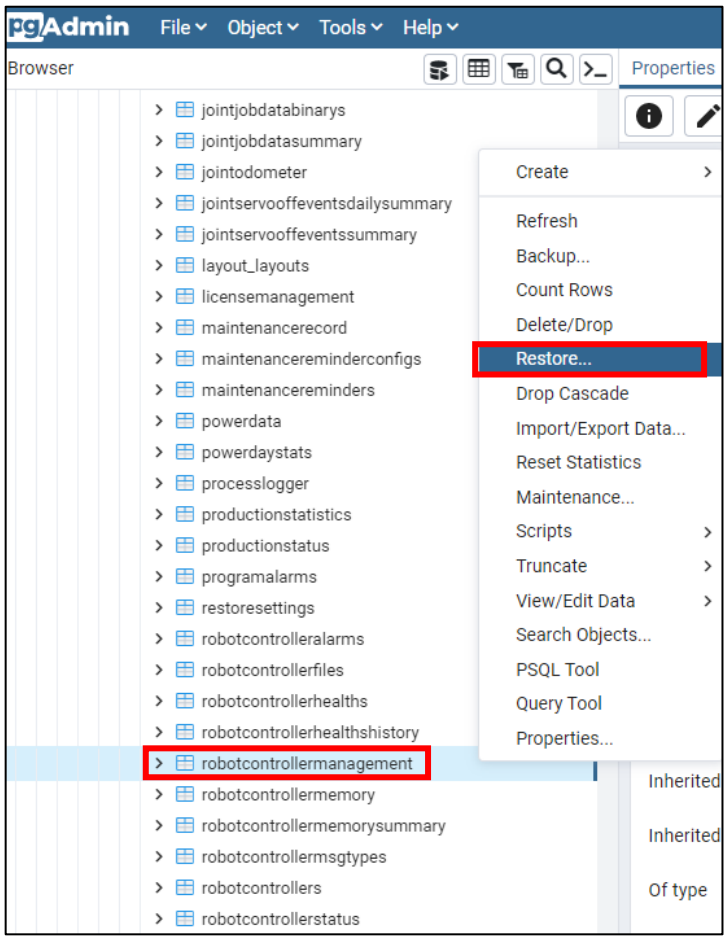


Fig. A.5.3 (c) Restoring

Specify the backup file (including the path name” to restore then click “Restore”.

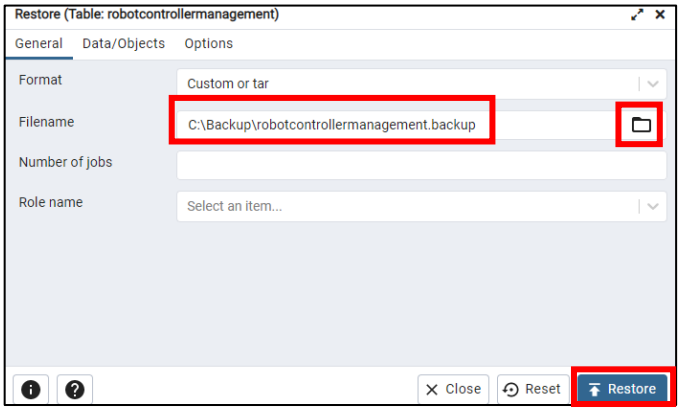


Fig. A.5.3 (d) Restoring

6 Restart the new ZDT server.
Click “Restart” of the new ZDT server virtual machine.

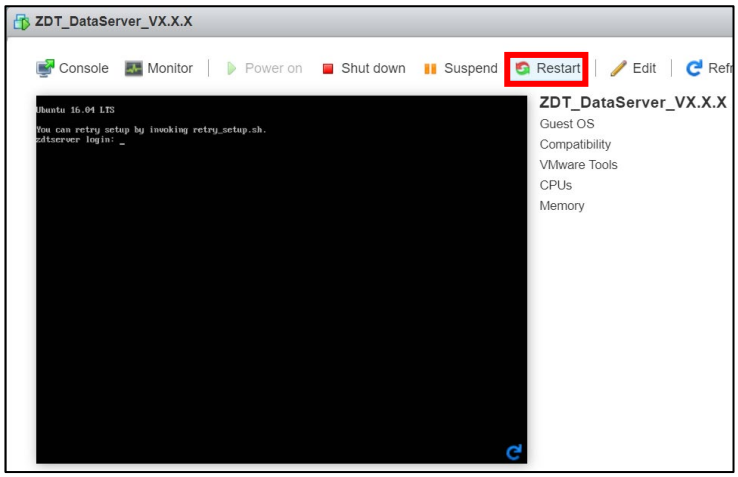


Fig. A.5.3 (e) Restart the new ZDT server

7 Start the data collection service if you use it.
Click “Power on” of the data collection service virtual machine.

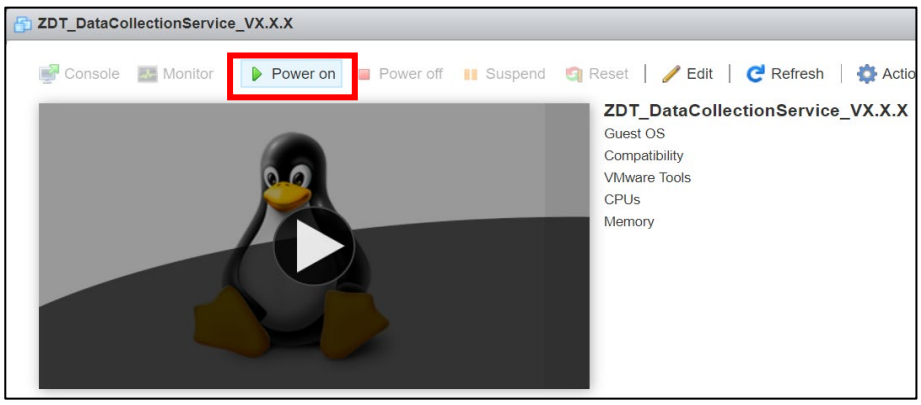


Fig. A.5.3 (f) Start the data collection service

INDEX

<T>

<U>

<V>

<W>

<Z>

REVISION RECORD

Edition	Date	Contents
07	Jan., 2023	Addition of specification change of version 2.10.0
06	Jun., 2022	Addition of specification change of version 2.8.0
05	Jul., 2021	Addition of specification change of version 2.7.0
04	Nov., 2020	Addition of specification change of version 2.6.0 Addition of specification change of version 2.5.0
03	Apr., 2020	Addition of specification change of version 2.4.0
02	Apr., 2019	Addition of specification change of version 2.3.0
01	Sep., 2018	

B-84064EN/07