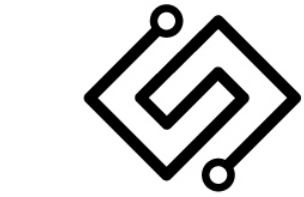
Document No. : MED6SP210002(R1)



Machine Tool Monitoring System

DIASCOPE Specification

For all models

NIDEC MACHINE TOOL CORPORATION

Development Department 6
Development Headquarters

■ Items added to the specification list

□ Monitoring system "DIASCOPE" : "Remote monitoring", "Operation monitoring"

□ Standard spec. :

Various information (signals and data) acquired from the machine is saved in the cloud server via the network module and wireless line (encrypted communication or closed network), and the operation status can be viewed on the Web screen.

▣ Non-communication spec. :

"Remote monitoring" and "Operation monitoring" are not available. Various information (signals and data) acquired from the machine are stored in the PC attached to the machine, but the web screen viewing function is not provided.

Outline of the monitoring system “DIASCOPE”

1. Remote monitoring system

1) Overview

This is a function to monitor the status of a customer’s machine and support the solution and recovery by remote access to the machine from our support center when a problem occurs. Based on the monitored information, the support center will provide accurate recovery instructions. In addition, service personnel can be dispatched after preparing the parts and equipment necessary for service work, making it possible to restore the machine in a short time.

2) Acquired information

- NC screen information of the machine tool
- Alarm information and alarm history
- PLC (sequence) information
- NC parameter information
- Other internal NC information required for service, etc.

2. Operation monitoring system

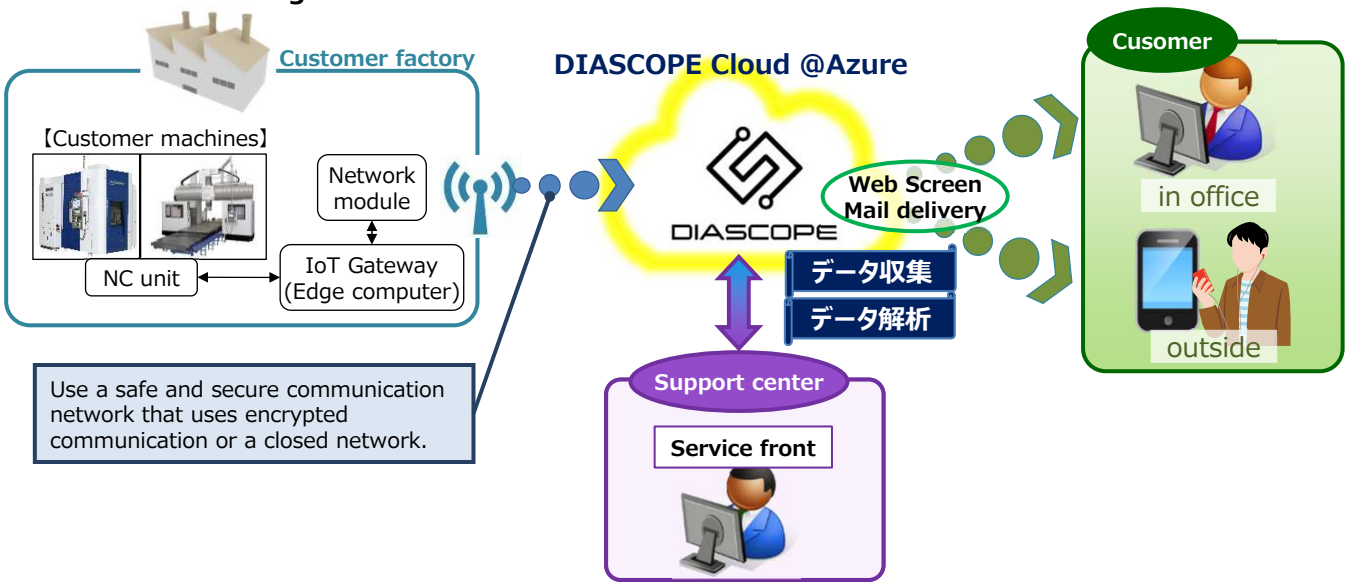
1) Overview

Various information (signals and data) related to machine tool operation information are constantly acquired from the NC unit.
The information acquired by the IoT Gateway (Edge computer) is stored in the cloud server via a network module and wireless line (encrypted communication or closed network). The data stored in the cloud server can be viewed on the web screen of the customer's computer.

2) Acquired information

- Operating information (power off, operation preparation off, stop, alarm stop, automatic operation)
- Alarm information (alarm signal, alarm contents)
- Coordinate information (machine coordinates, work coordinates)
- Program information (main program number, running program number)
- Main spindle information (spindle speed, spindle load)
- Servo information (feed rate, motor current, semi-full error)
- Operating results (daily results transition, monthly results transition)

3. Network configuration of DIASCOPE



1. Outline of the monitoring system “DIASCOPE”

1) Remote monitoring system *1)

This is a function to monitor the status of a customer’s machine and support the solution and recovery by remote access to the machine from our support center when a problem occurs.

Based on the monitored information, the support center will provide accurate recovery instructions. In addition, service personnel can be dispatched after preparing the parts and equipment necessary for service work, making it possible to restore the machine in a short time.

2) Operation monitoring system

The services of the operation monitoring system are as follows.

■ Web screen display

The system collects various information (signals and data) related to machine tool operation information and stores it on a cloud server, allowing the customer to view the current operation status of the machine on the customer's PC web screen.

■ Operating results

This function provides daily, monthly, and other operating results information on the Web screen.

■ E-mail delivery

This function sends various types of stop information, such as machine tool alarm stops and machining completions, by e-mail.

[Supplementary Information]

Various services by DIASCOPE can be used all over the world.

However, it may not be available depending on the country or region where the machine tool is installed, or on communication conditions such as poor radio wave conditions.

(Notes)

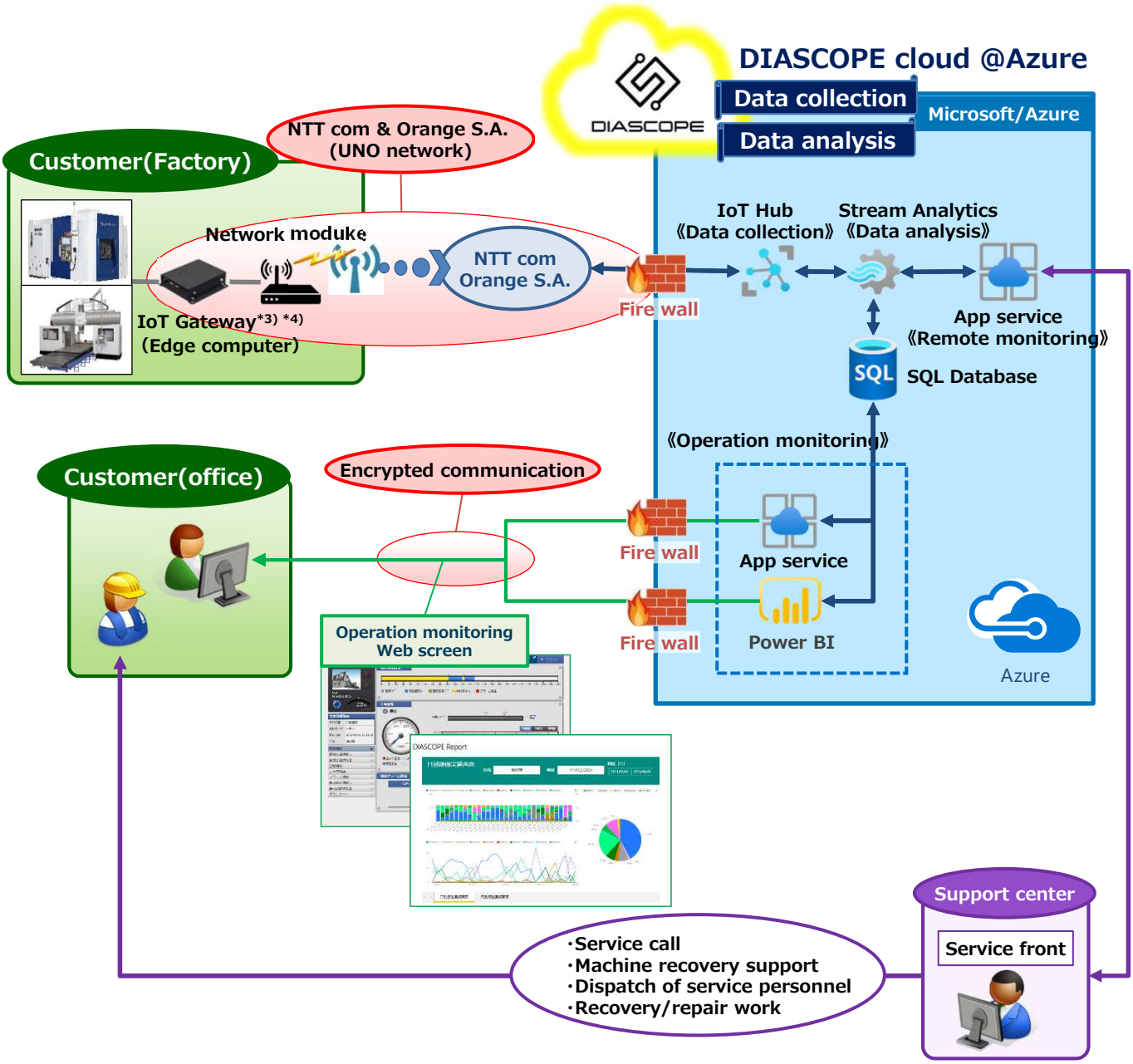
*1). This system is a function to support the confirmation of the problem and the identification of the cause that occurred in the customer's machine tool. It does not guarantee that the problem can be solved or recovered by remote operation.

2. Network configuration

1). Network configuration of "DIASCOPE"

The network configuration of "DIASCOPE" is as shown in the figure below.*2)

This service uses a secure communication line using encrypted communication and a closed network to provide a safe and secure service. The network configuration is subject to change as necessary to improve the service for customers.



■ Wireless line : NTT Com & Orange S.A. network (UNO network) is used.
■ Cloud server : Microsoft/Azure cloud environment is used.

(Notes)

*2). The network configuration is subject to change without the customer's consent.

*3). The operating systems of the Edge computers are Windows7 embedded and Windows10/IoT Core. When the OS support expires, the Edge computers may need to be replaced.

*4). In MVR-Ex and MVB, the IoT Gateway (Edge computer) is "PANEL-i".

3. Remote monitoring system

1) What is a remote monitoring system? *5)

This is a function to monitor the status of a customer's machine and support the solution and recovery by remote access to the machine from our support center when a problem occurs.

2) Configuration

The remote monitoring system provides the following services to support the solution and recovery of the customer's machine tool when a problem occurs.

- Remote access to the machine and monitor the machine status when the machine is stopped.
- Based on the monitored information, our support center will provide accurate recovery instructions to help reduce machine downtime.
- Based on the monitored information, we prepare the parts and equipment necessary for service work and dispatch service personnel. The machine will be restored in a short time.

3) Acquired information by the remote monitoring system

The information to be acquired by the remote monitoring system is as follows.

- NC screen information of the machine tool
- Alarm information and alarm history
- PLC (sequence) information
- NC parameter information
- Other internal NC information required for service, etc.

(Notes)

*5). This system is a function to support the confirmation of the problem and the identification of the cause that occurred in the customer's machine tool. It does not guarantee that the problem can be solved or recovered by remote operation.

4. Operation Monitoring System

1) What is the operation monitoring system? *6) *7)

Various information (signals and data) related to the operating information of the machine tool are constantly acquired from the NC unit.

The operating information acquisition system (MMS) in the IoT Gateway (Edge computer) acquires various information from the NC unit of the machine tool and stores it on the cloud server via a communication module and wireless line (encrypted communication or closed network). The data stored in the cloud server can be viewed on the web screen of the customer's computer.

2) Configuration

The service of the operation monitoring system includes the following functions.

Services	Functions and Screens		Description
1) Web screen display	"Top(list)" screen		View machine tool list and operation status on the web screen.
	"Operation information" screen	Main screen	View operating status of each machine on the web screen.
		Detailed I	View detailed information on operating status on the web screen.
		Detailed II	View detailed information on operating status on the web screen.
	"Spindle information" screen		View spindle information on the web screen.
	"Servo information" screen		View servo information on feed axes on the web screen.
	"Alarm information" screen		View current alarms and alarm history on the web screen.
2) Operating results	・Daily transition of operating results		View daily transition of operating results on the web screen.
	・Monthly transition of operating results		View monthly transition of operating results on the web screen.
	・Monthly transition of alarm		View monthly transition of alarm on the web screen.
3) E-mail delivery	・Alarm stop notification		Delivery e-mail of alarm stop information.
	・Processing completion notification *8)		Delivery e-mail of processing completion information.

(Notes)

*6). The machine tool operation information will be sent outside your factory (cloud server). The customer is requested to confirm in advance that there are no problems with the information management rules.

*7). This is a best-effort service in which the communication speed and quality may vary depending on the communication environment and usage conditions.

*8). Additional construction work for the sequence may be required.

3) Various NC information (signals and data) acquired by the operation monitoring system
The table below shows various NC information (signals and data) acquired by the operation monitoring system.

["○": can be obtained, "△": depends on machine specification]

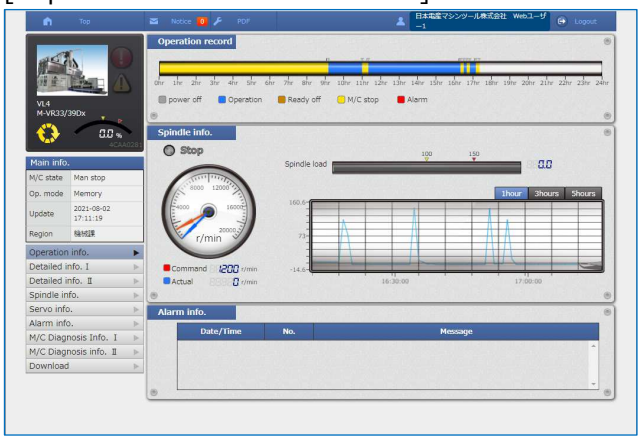
Signal/Data	Type/Kind	Input device	Signal acquisition	Acquisition cycle (sampling)
1) Operating information	・Power off ・Operation preparation off (power on) ・Stop (operation preparation on) ・Alarm stop ・Automatic operation	NC unit (Ethernet communication)	○	1min
2) Alarm information	・Alarm signal ・Alarm contents	↑	○	1min
3) Coordinate information	・Machine coordinates ・Work coordinates	↑	○	1min
4) Program information	・Main program number ・Running program number	↑	○	1min
5) Spindle information	・Spindle speed ・spindle load	↑	○	1min
6) Servo information	・Feed rate ・Motor current ・Semi-full error	↑	○	1min 1min
7) Operating results	・Daily results transition ・Monthly results transition	↑	(Web screen)	–

4) Basic service / Web screen display

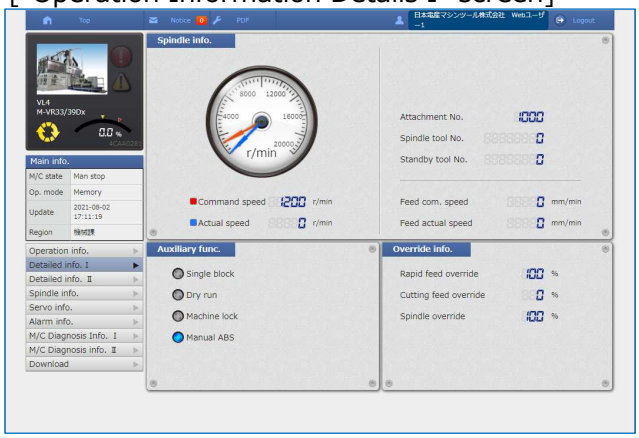
The following Web pages can be viewed in the basic service of the operation monitoring system.*9) *10) *11)

["Top(list)" screen]

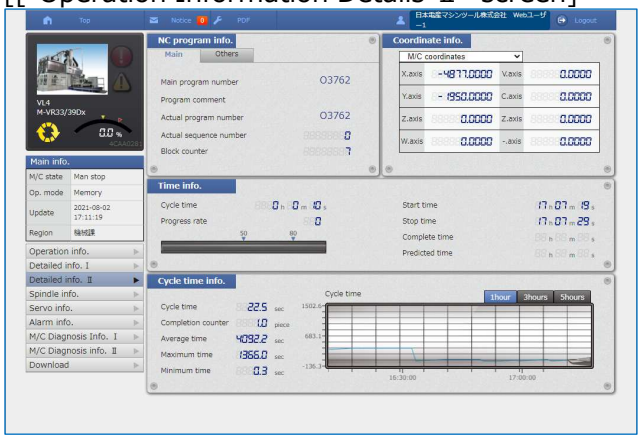
["Operation information" screen]



["Operation Information Details I" screen]



[["Operation Information Details Ⅱ" screen]



["Spindle information" screen]

["Servo information" screen]

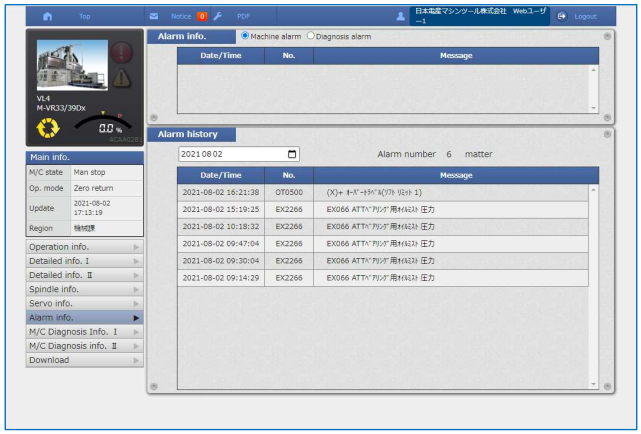
(Notes)

*9). The language of the web page is Japanese/English/Simplified Chinese. You can change the language setting of your Web browser.

*10). Use Microsoft Edge" or "Google Chrome" as your Web browser.

*11). The configuration of the web page is subject to change without prior notice. Please be aware of this.

["Alarm information" screen]

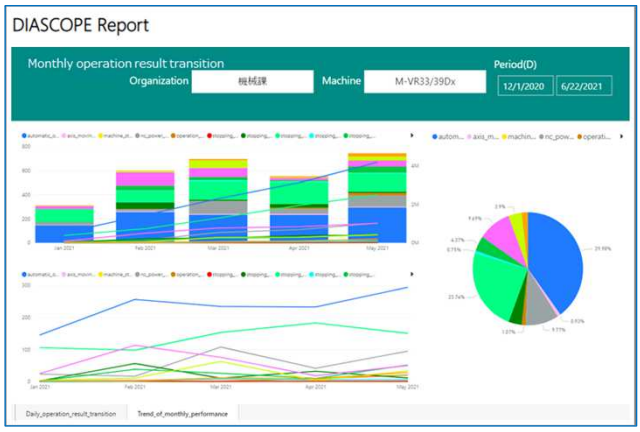


5) Basic service / Operating results

This is a function to provide daily and monthly machine operation results on the web.

[Operating results-Daily transition]

[Operating results-Monthly transition]



6) Basic service / E-mail delivery

This function sends various types of stop information such as machine alarm stop and machining completion by e-mail. The contents to be delivered by e-mail are as follows. The customer can select the contents to be delivered.

[Types of email delivery]

- Alarm stop
- Machining completion

Revision history			
Rev No	Revision details	Rev. data	Staff
0	・First edition create.	2021.12.05	Yamamoto
1	・Partial revision.	2021.12.08	Yamamoto
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