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[Title] Performances of MES interface function   **[Date of Issue]** December, '06
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Thank you for your continued support of Mitsubishi Graphic Operation Terminal (GOT) products.
There are some points to easily use MES interface functions for GOT1000 series.
This bulletin explains applications, setting, and usage of related script functions for MES interface function.

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1. Applications of MES interface function

MES interface is a function that can easily link databases, by directly transmitting data of FA equipments connected to GOT, such as programmable controllers and temperature controllers, using SQL text.

The following are the representative applicable systems and target information:
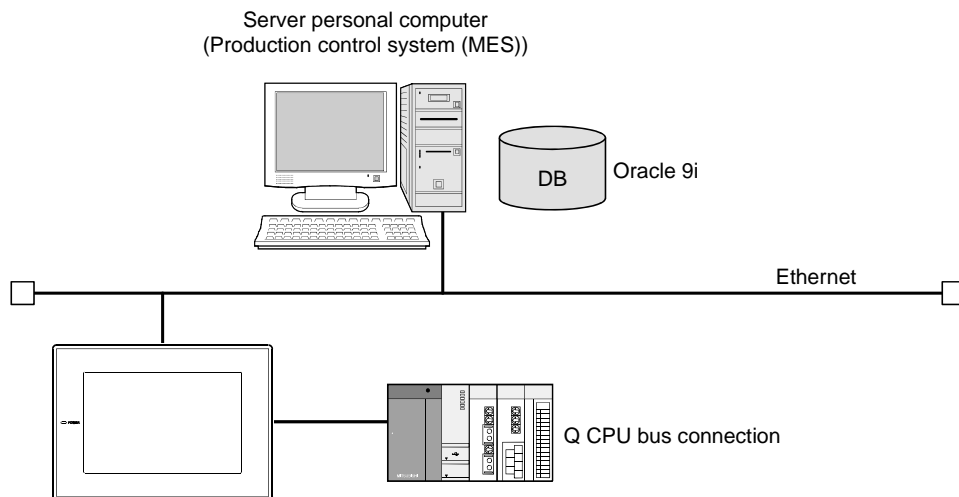
Applicable system	Main information
Stock control system	Storing and delivery information
Production control system	Production direction information, production progress information
Performance control system	Task performance, production performance
Quality control system	Quality information
Equipment operation control system	Equipment operation information
Cost control system	Machine operation cost information
Equipment maintenance control system	Equipment maintenance information

2. Reference values of performances for MES interface function

The following shows the measurement results of screen updating time and screen switching time when using MES interface function with GOT1000.

In the actual system, execution time may vary depending on the conditions such as FA equipments monitored by GOT1000 and server personal computer, therefore use these values as reference.

2.1 System configuration

Server personal computer
(Production control system (MES))

DB   Oracle 9i

Ethernet

Q CPU bus connection

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2.2 Screen for measurement

(1) Screen updating performance
Place numerical displays (10 / 100 / 300 / 500 / 800 / 1000 points) on each test screen.
Increment the values in 100 ms with sequence program and measure the update intervals of numerical displays.

(2) Screen switching performance
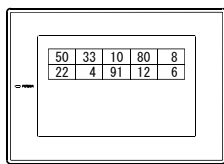Measure the time from pressing a screen switching button to switching to the next screen.

Screen before switching   Screen after switching

Figure 1-1 Screen image for measuring screen updating performance
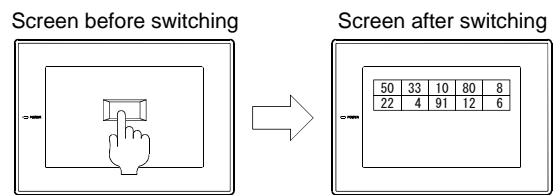
Figure 1-2 Screen image for measuring screen switching performance

2.3 Measuring conditions

(1) Settings
Conditions for measurement are as follows:

		Item		Setting value
GOT side	MES interface setting items	Device tag setting	Sampling setting	1 second cycle
			Device tag points	*1
		Job setting	Trigger conditions	2 seconds cycle
			No. of communication actions	*2
			Types of communication actions	INSERT
			No. of operation actions	20 device points
		Server service setting	No. of services	1 service
	Script function		Trigger type	1 second cycle
			Transfer methods	Transfer from device D to device GD (using bmov)
			Device points	*2
	Logging function		Trigger type	0.5 seconds cycle clock
			Device points	250 points
	Alarm history		Watching timer	2 seconds
			No. of alarms	10 points
QCPU side	Scan time			20 ms

*1: Measures the performance by each changed settings between 0 to 2000 points.
*2: Always set the same points as the device tag points.

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The overview and setting items of MES interface function are shown in Figure 2:
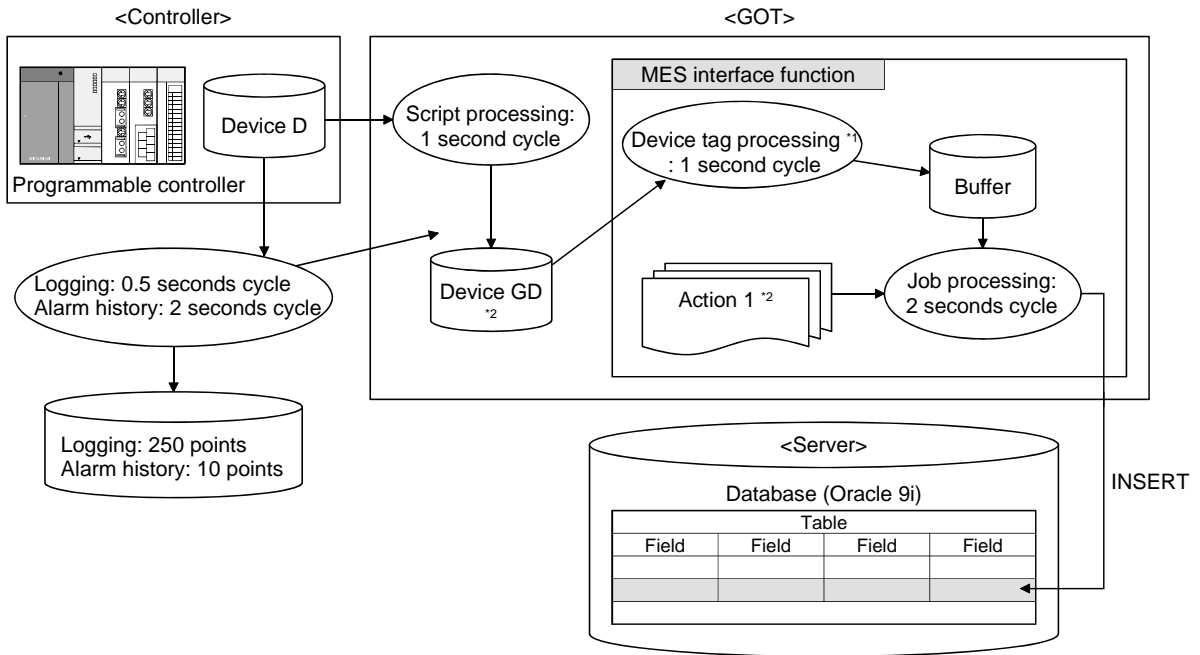

Figure 2 Overview and setting items of MES interface function

(2) Measurement items
    The following items are measured as the performance of screen updating and screen switching.
      1) Performance depending on the changes in "Device tag points, No. of scripts processed, or No. of communication actions"
      2) Performance depending on the changes in "job trigger condition (cycle)".

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2.4 Reference values of performance

(1) Screen updating performance
   1) Performance depending on the changes in "Device tag points, No. of scripts processed, or No. of communication actions"
      • The screen updating performance when "device points set to logging" are 250 and 500 points, is as follows:
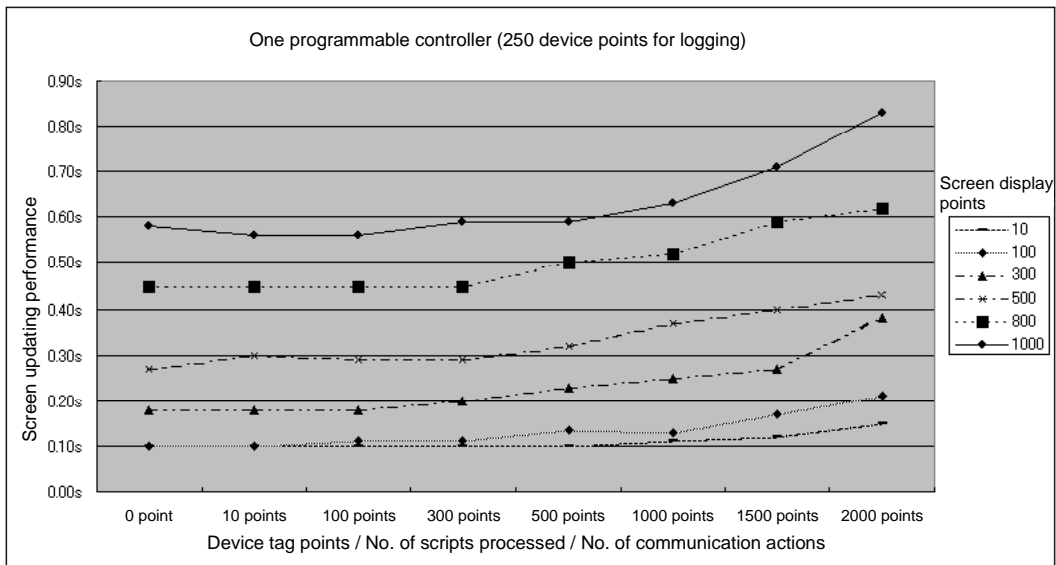

Figure 3 Screen updating performance for one programmable controller
         (250 device points for logging, job execution in 2 seconds cycle)

   • The screen updating performance gradually degrades as "device tag points" of MES interface setting increases.
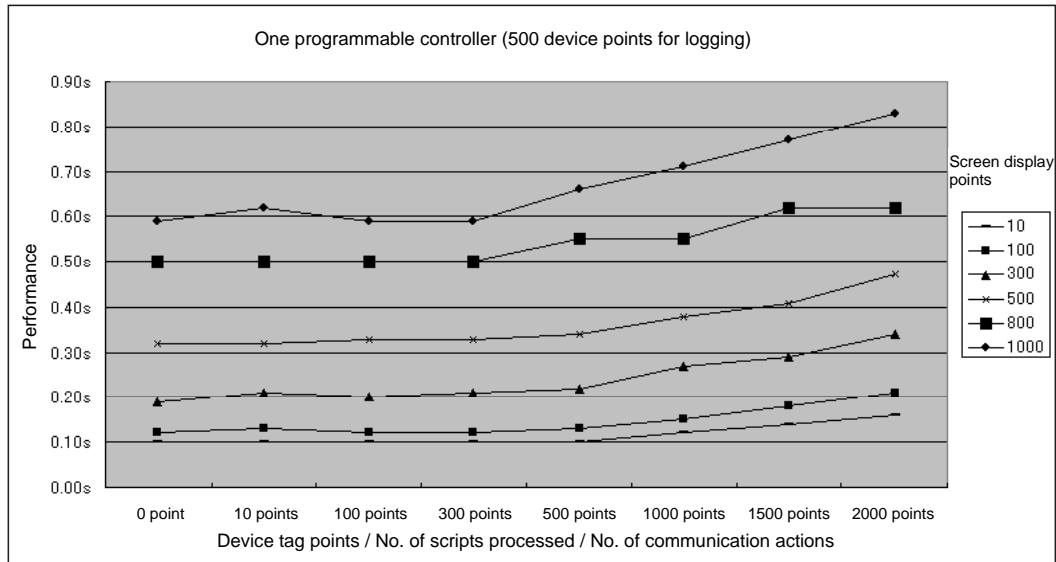
Figure 4 Screen updating performance for one programmable controller
(500 device points for logging, job execution in 2 seconds cycle)

- The screen updating performances of MES interface functions are approximately the same when "device points set to logging" are 250 and 500 points.

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2) Screen updating performance depending on the changes in "job trigger condition (cycle)"
　　• The screen updating performance when "job trigger conditions (cycle)" are 1 second, 2 seconds, and 5 seconds is as follows:
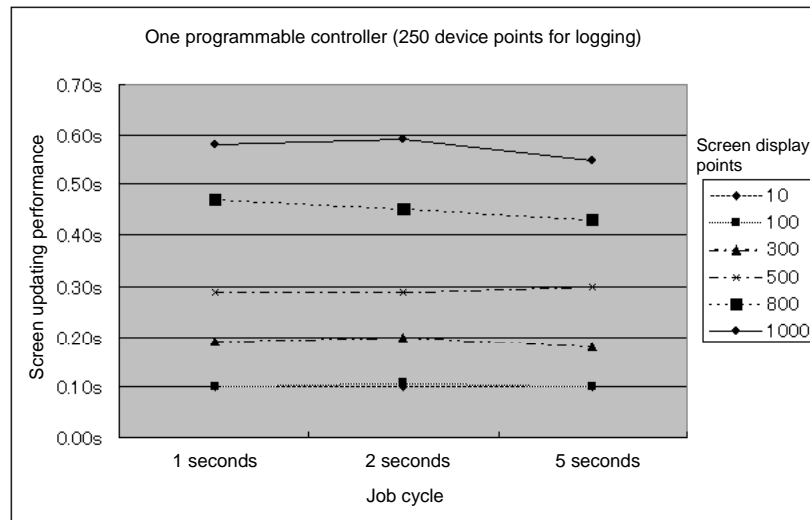

Figure 5 Screen updating performance for one programmable controller (250 device points for logging)

　　• As shown in Figure 5, the screen updating performance is approximately the same regardless of the "job trigger conditions (cycle)" interval, and is not affected by the job cycle value.

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(2) Screen switching performance
    1) Performance depending on the changes in "Device tag points, No. of scripts processed, or No. of communication actions"
       • The screen switching performance when "device points set to logging" are 250 and 500 points is as follows:

One programmable controller (250 device points for logging)

Screen display points: 10, 100, 300, 500, 800, 1000

Device tag points / No. of scripts processed / No. of communication actions
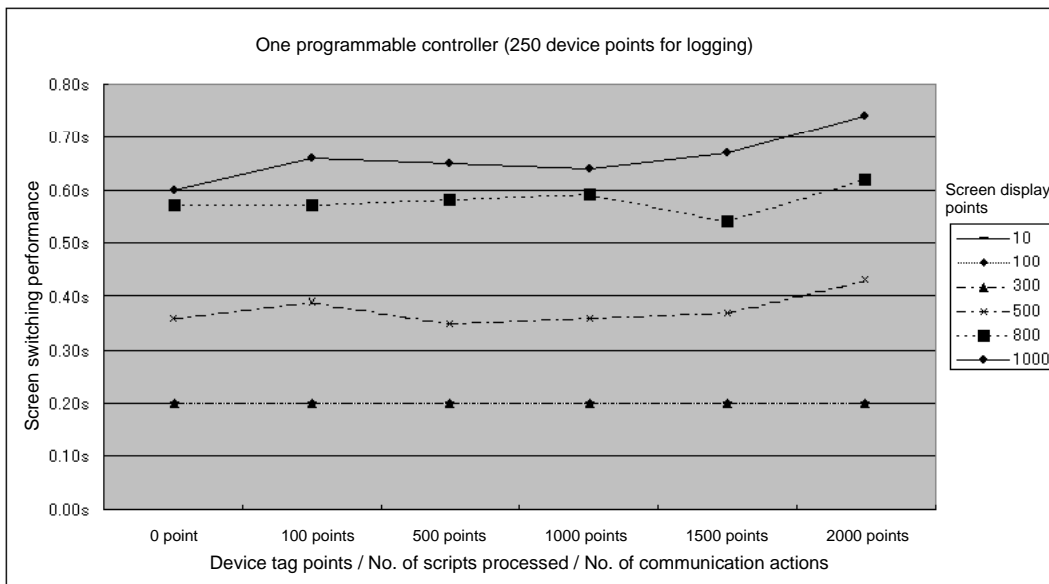
Figure 6 Screen switching performance for one programmable controller
(250 device points for logging, job execution in 2 seconds cycle)

   • The screen switching performance of MES interface function does not change when the screen display points are 300 or less.
Although the degradation is not so much as the screen updating performance, the screen switching performance gradually degrades as "device tag points" of MES interface setting increases.

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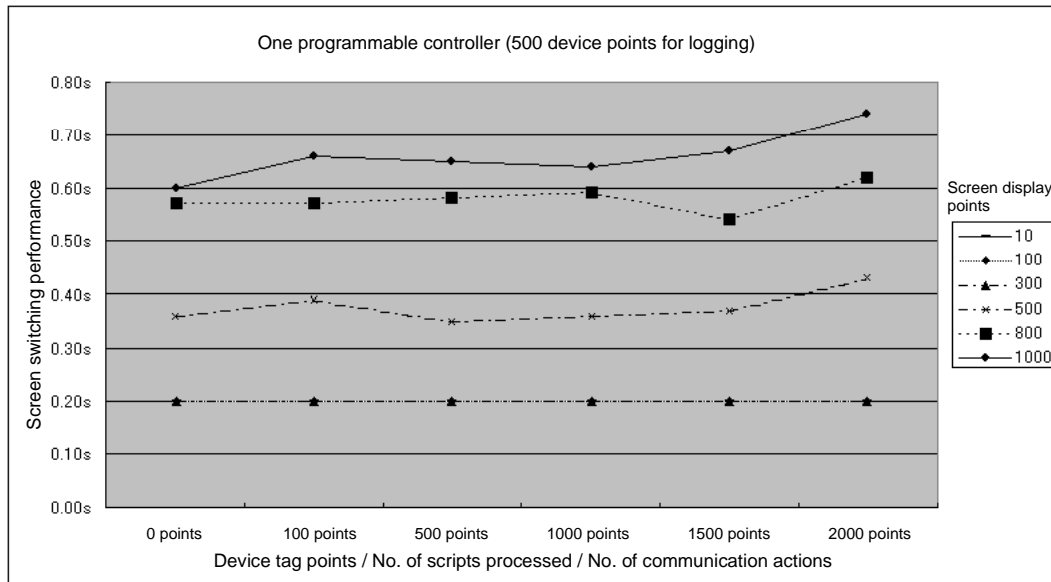**[Relevant Models]** GOT1000 series

Figure 7 Screen switching performance for one programmable controller
(500 device points for logging, job execution in 2 seconds cycle)

- The screen switching performances of MES interface functions are approximately the same between "device points set to logging" 250 and 500 points.

2) Screen switching performance depending on the changes in "job trigger condition (cycle)"
   - Just as in the screen updating performance, the screen switching performance is approximately the same regardless of the "job trigger conditions (cycle)" interval, and is not affected by the job cycle value.

2.5 Correlation between No. of communication channels and performance

Processing performance is not effected by the number of communication channels, but by the sum of points (device points set to logging, No. of scripts processed, device tag points, the number of action jobs, screen display points and others) processed in GOT1000.

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3. Points for configuring system using MES interface function

When using MES interface function, it is necessary to pay attention to the performance of monitoring and MES interface processing.

For example, it is important to keep the balance between the settings of MES interface function and background processing such as logging and script function.

Six points for configuring system are as follows:

(1) Deletion of unnecessary tags and element (device) settings.

Even if the tags and the elements are not to be registered to the database, they will be included as points to be counted in the collected data. Therefore, when there are excessive settings of tags and elements (devices), the screen updating performance will degrade. If there are unnecessary tags and elements, it is recommended to delete them.

(2) Device tag sampling interval and job execution

Collect device tags more than twice for each job execution (upper main system / "job trigger condition (cycle)"). This prevents omission of device tag collection.

For example, set the sampling setting of the device tag to 2 seconds when job execution cycle is 4 seconds.

(3) Minimum setting of job

Minimize the number of jobs in consideration of processing efficiency.

Setting a large number of jobs increases the load of GOT1000 background processing, which degrades the performance of screen updating and screen switching.

(4) Minimum setting of action

Minimize the number of settings for "operation action" and "communication action" for each job.

Even if only one job is used, setting more "operation actions" and "communication actions" increases the load of operation processing and communication with database, which degrades the screen updating performance.

As a technique for reducing actions, instead of two tables updated by two actions, design one table to be updated by one action.

(5) Distributed process by expanding server service

Processing efficiency will be raised by setting multiple server services (GOT1000 specifications: maximum of eight server services). When there are many numbers of jobs and processing is slow, increasing the number of services to distribute process has potential to improve the performance.

(6) Using programmable controller devices with consecutive address

When collecting the data with random device numbers from the programmable controller, the scripts execute the data transfer for each device separately. In this case, the data processing take much time compared with handling the devices with consecutive addresses. To improve the performance, it is recommended to use consecutive device numbers to use bmov (device batch transfer instruction) in scripts, which could considerably improve the script processing time.

4. Precautions

- Access performance vary depending on the database server environment and settings.
  Contact the database administrator if the database access is slow.
- When registering large data to the database, contact the database administrator for available capacity.
  The database can not register the data if the database is full.
- "MX MES Interface" can also be used for implementation of MES interface function.
  It is recommended to use "MX MES Interface" if the screen updating time and screen switching time by GOT1000 MES interface function is insufficient.