

*Hitachi High-Tech*

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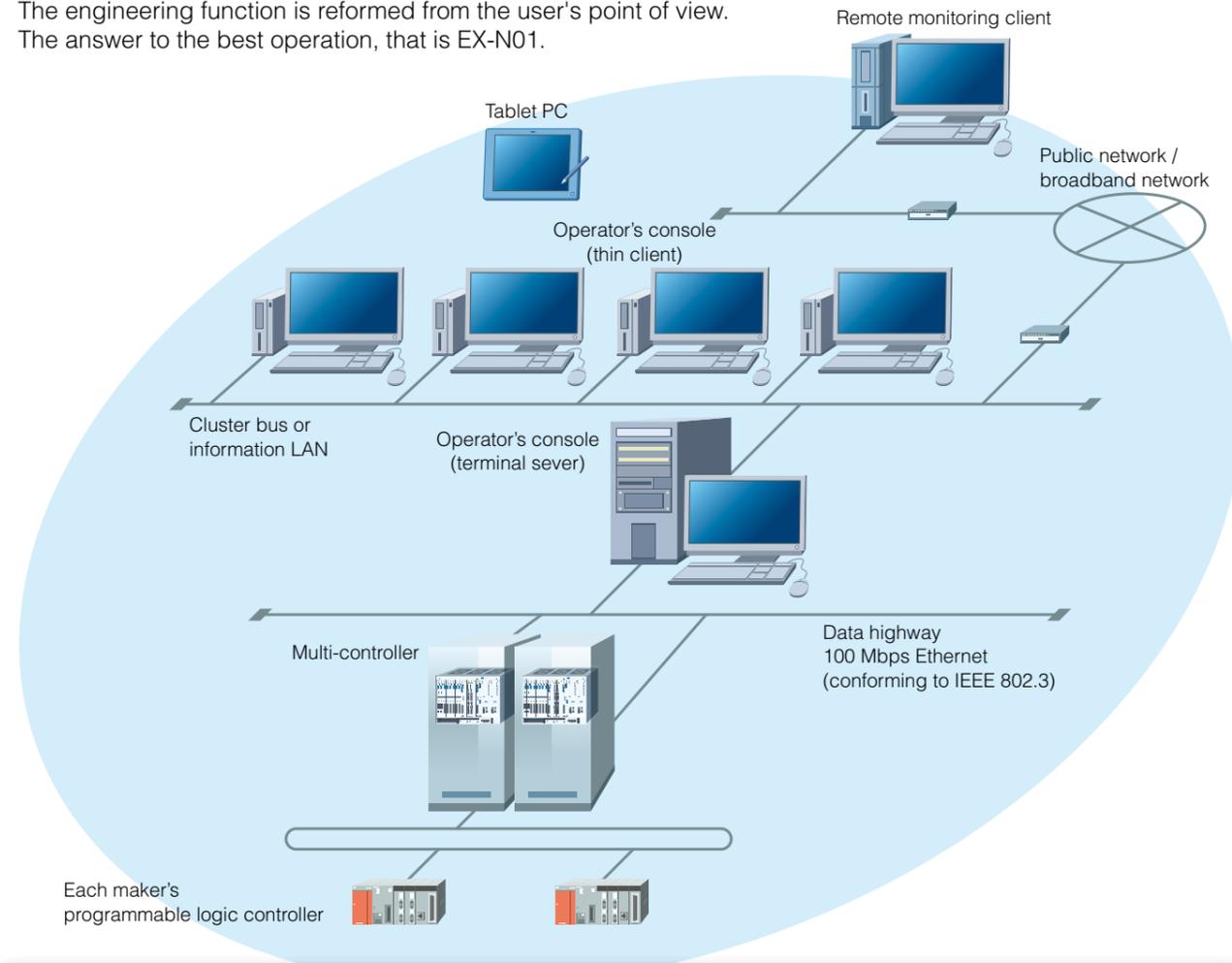
Hitachi Integrated Instrumentation System

EX-NO1



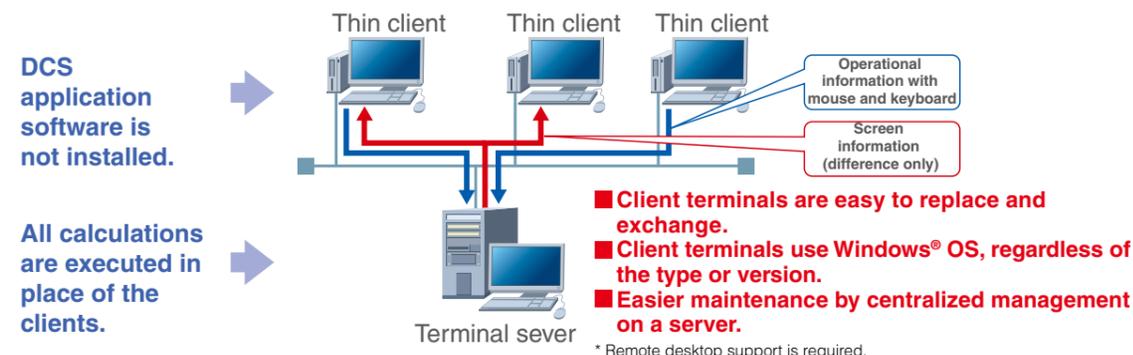
# For the best operation

Since its launch in 1975, Hitachi integrated instrumentation system EX series has been used as a supervisory control system in various fields like chemical processing, food, pharmaceuticals, energy, water treatment and environment. This time, to provide the best operation beyond the reliability Hitachi has established so far, we have fundamentally reviewed its functions. We have adopted Windows® 7 OS for EX-N01, whose operability is greatly improved. The engineering function is reformed from the user's point of view. The answer to the best operation, that is EX-N01.



## Thin client system

In a thin client system, DCS software is not installed in clients. The clients used only for input processing and display, and all application programs are executed on the terminal sever.



# EX-N01

## ■ Liberation from operational stress

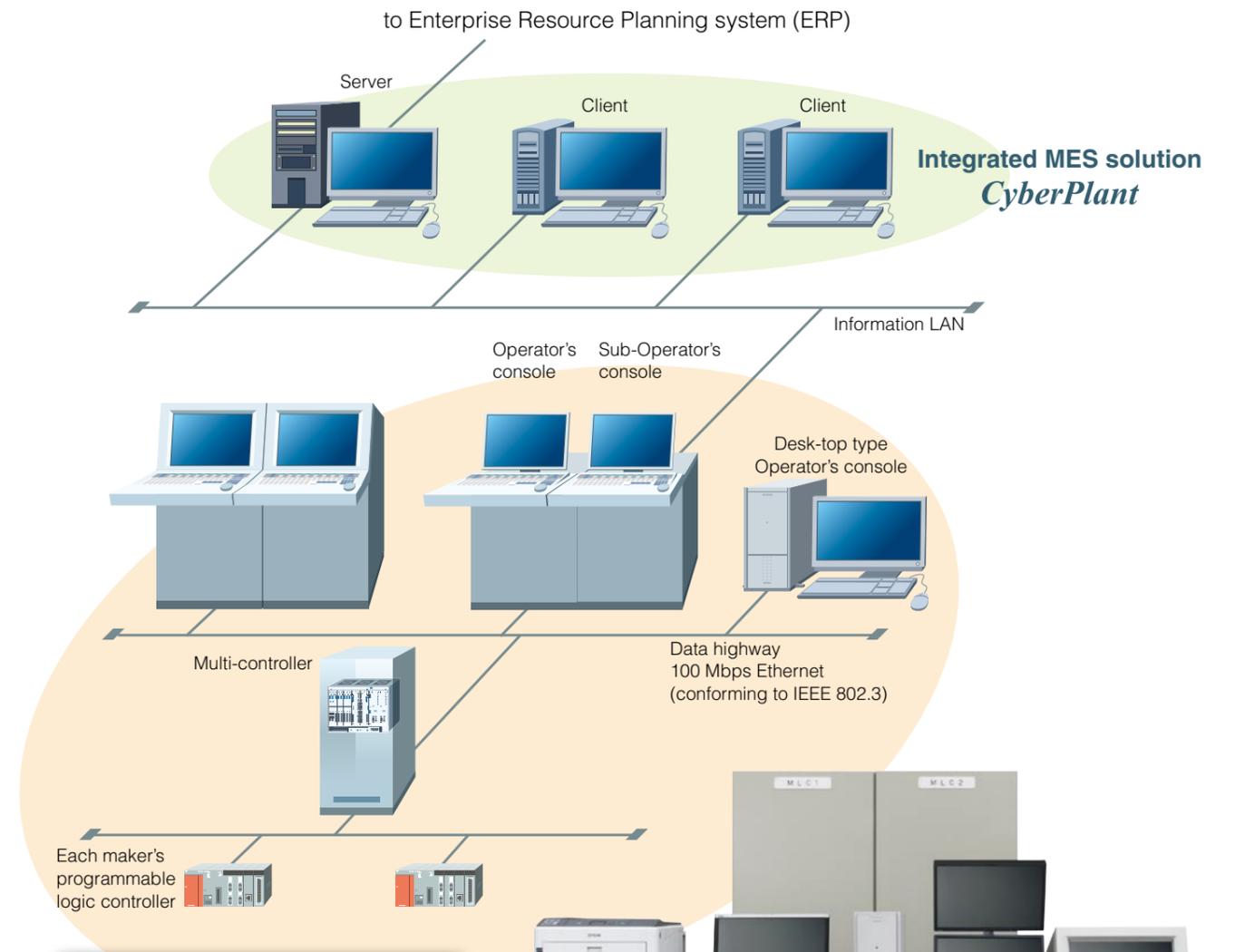
The human-machine interface is reviewed for comfortable operation. Operability and efficiency are improved to offer safe operating environment.

## ■ Liberation from hardware and location restriction

Thin client terminals do not depend on hardware and OS version. Various operating environments such as the operator's consoles of wireless tablet PC are available. \* Remote desktop support is required.

## ■ Liberation from programming skills

The description method of instrumentation oriented language SLC was reformed. The control software can be constructed by the specification description method, and the programming skills are not needed.



## Standard system

This is a client-server system in which an operator's console is used as a data server as the previous EX series. A sub-operator's console can be connected via a cluster bus.



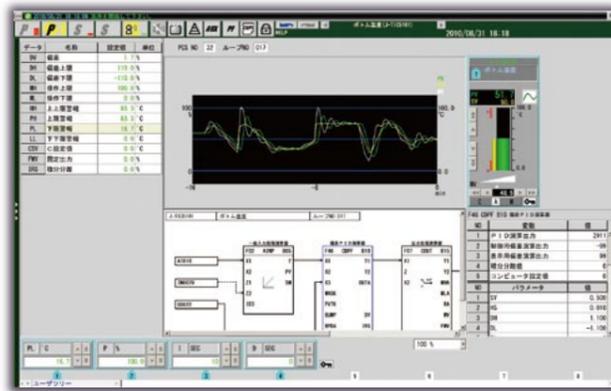
## ■ Operation frame

This is a window for instrument operation. Up to 16 instruments can be displayed and operated.



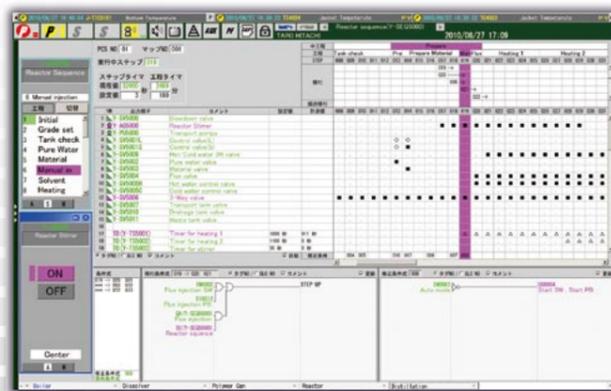
## ■ DDC tuning frame

Detailed parameters of a loop instrument and the trends of PV, SV and MV can be displayed for tuning, etc. In addition, loop trend display helpful for tuning and related instrument window display are available here. Also, you can confirm which blocks are used and how they are interconnected to construct the control software.



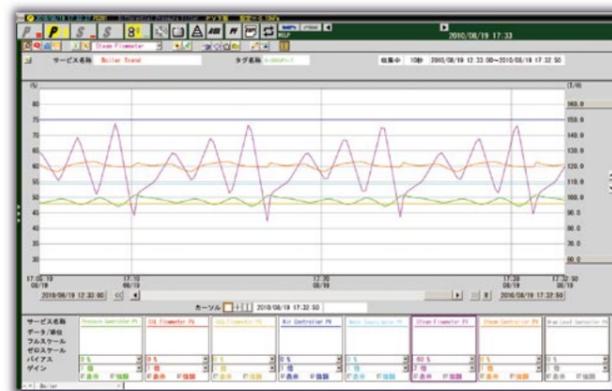
## ■ Sequence tuning frame

It is possible to display output status of valves/motors used in a time chart-based sequence and sequence pattern transition conditions, and manually operate a final control element.



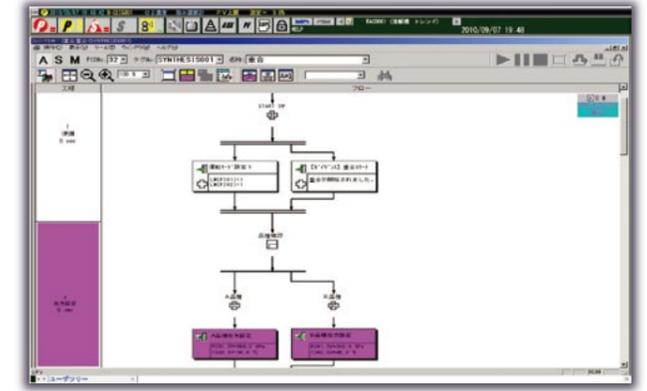
## ■ Trend frame

Following trends can be displayed on this window: real-time trend and batch trend (for batch process). Trend data will be stored on HD, and it can be saved into an external medium for secondary applications.



## ■ Flow tuning frame

This window is used to check the progress of a flowchart-based sequence. The current execution point on a flow is highlighted.



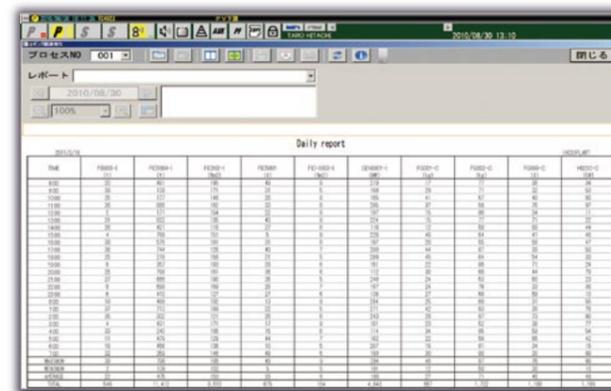
## ■ Alarm summary

Process alarms occurring at present are listed by each level or in chronological order. Also, functions for filtering overlapping alarms and displaying operator's guide are available.



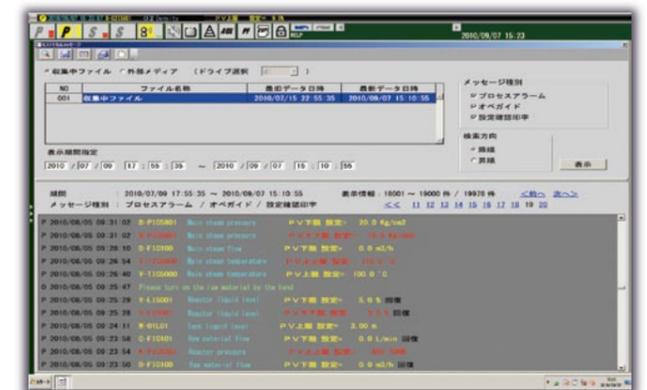
## ■ Log data

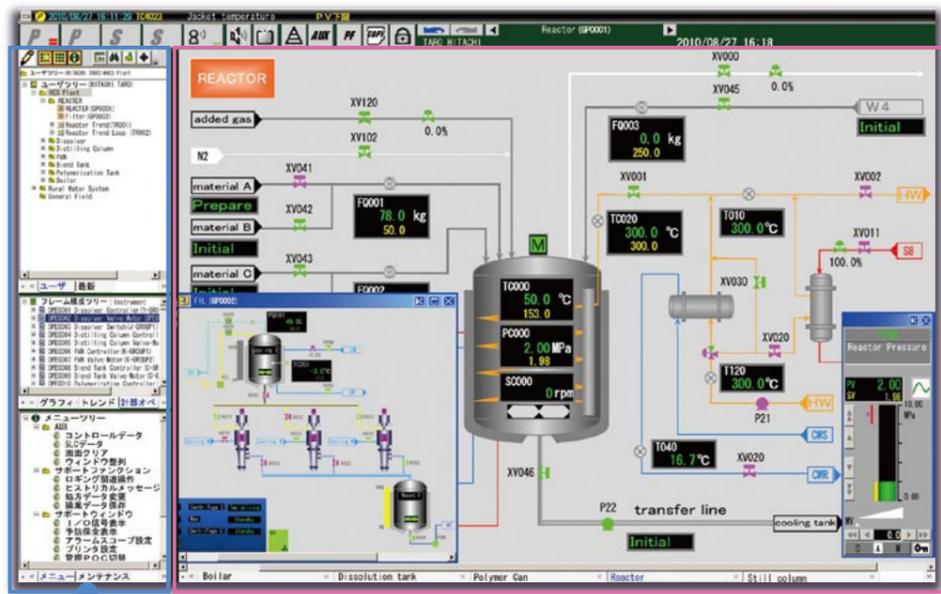
Current log data or already printed log data can be displayed and revised on this window. Although log data will be stored on HD, it can be saved into an external medium for secondary applications.



## ■ Historical messages

Alarm, operator's guide and operation record messages can be stored and displayed by specifying a time period or message type.





## Frame tree

You can open graphics, trends, instruments and other elements from the Frame tree. The Frame trees consists of three components (User tree, Frame composition tree, and Menu tree). User tree composition can be customized for each login user.

## Frame tree composition

### Tool bar

### User tree

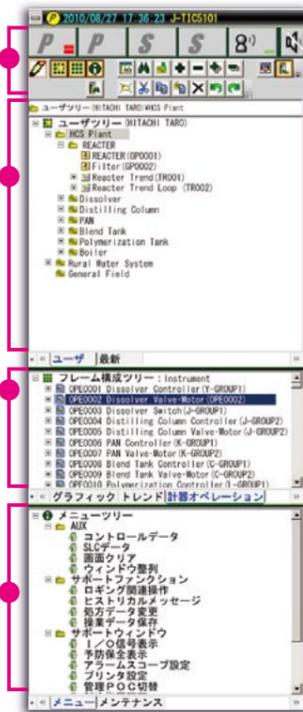
The login user can customize the composition.

### Frame composition tree

Displays all graphics, trends and instruments in a list.

### Menu tree

You can open assistance functions such as SLC data and report.



## Customizing User tree

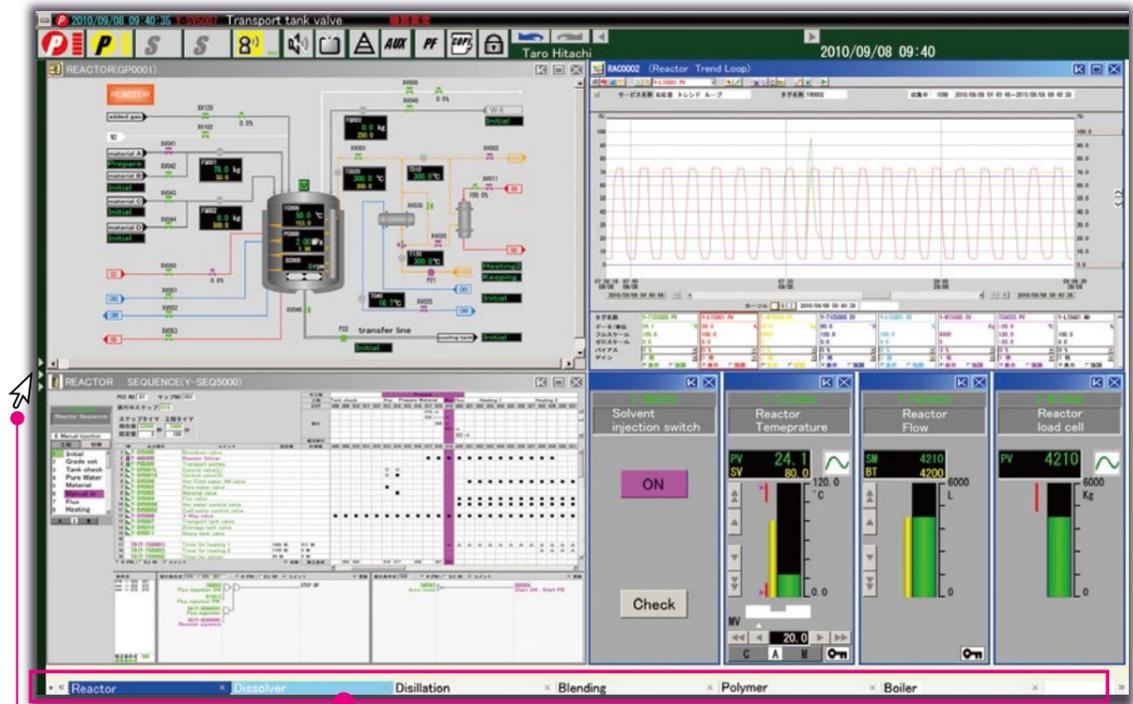
### User tree can be freely customized

- ★ The user menu can be freely customized for each section, piece of equipment, or other items.
- ★ It is possible to drag and drop menu components from Frame composition tree.
- ★ You can select which instruments to display and set their sequence from the user menu.



## Multi window operation

You can open up to five windows of graphics, trends and other elements at the same time in a canvas. The windows can be freely arranged, and scaled up or down.

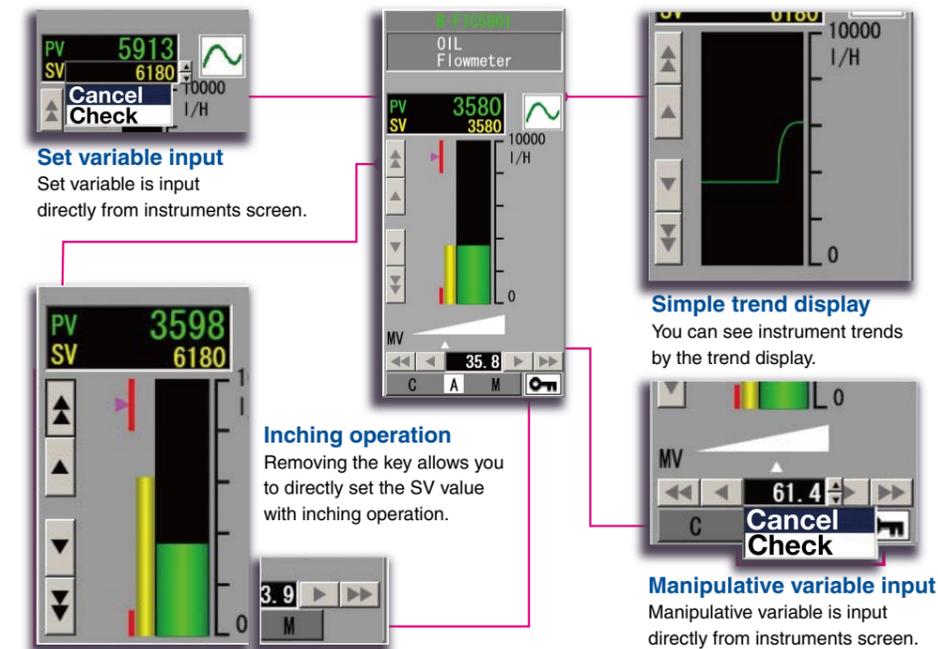


Frame tree can be concealed.

You can open up to 64 canvases, each of which can display multiple windows. Use tabs to open the desired canvas.

## Comfortable instrument operation

A comfortable environment for instrument operation is available.



**Set variable input**  
Set variable is input directly from instruments screen.

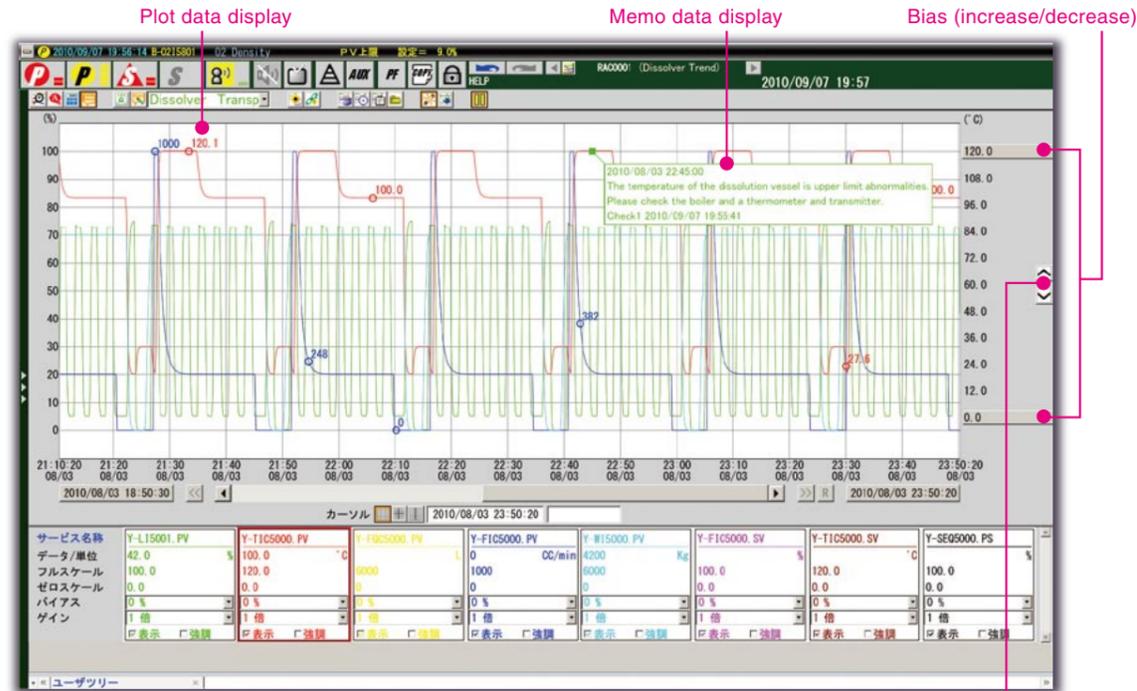
**Inching operation**  
Removing the key allows you to directly set the SV value with inching operation.

**Simple trend display**  
You can see instrument trends by the trend display.

**Manipulative variable input**  
Manipulative variable is input directly from instruments screen.

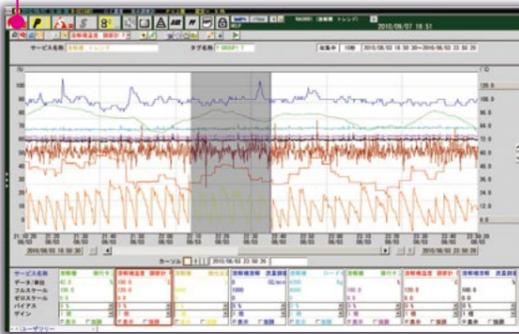
## ■Trend display

Two trends (Real-time trend/Batch trend) are available. In addition to recording the operation status, various functions such as data acquisition and display of alarms related to trends are prepared.

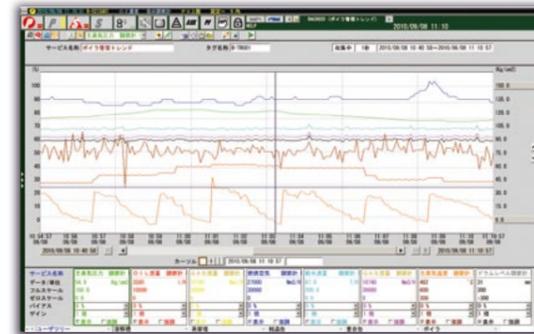


Memo data and numerical values (plot data) can be posted on the trend graph. Bias and gain can be changed with buttons.

### Trend expansion button



Drag with your mouse.



Selected part is expanded.

### Alarm display button



Displays a list of alarms occurred in the specified time frame.

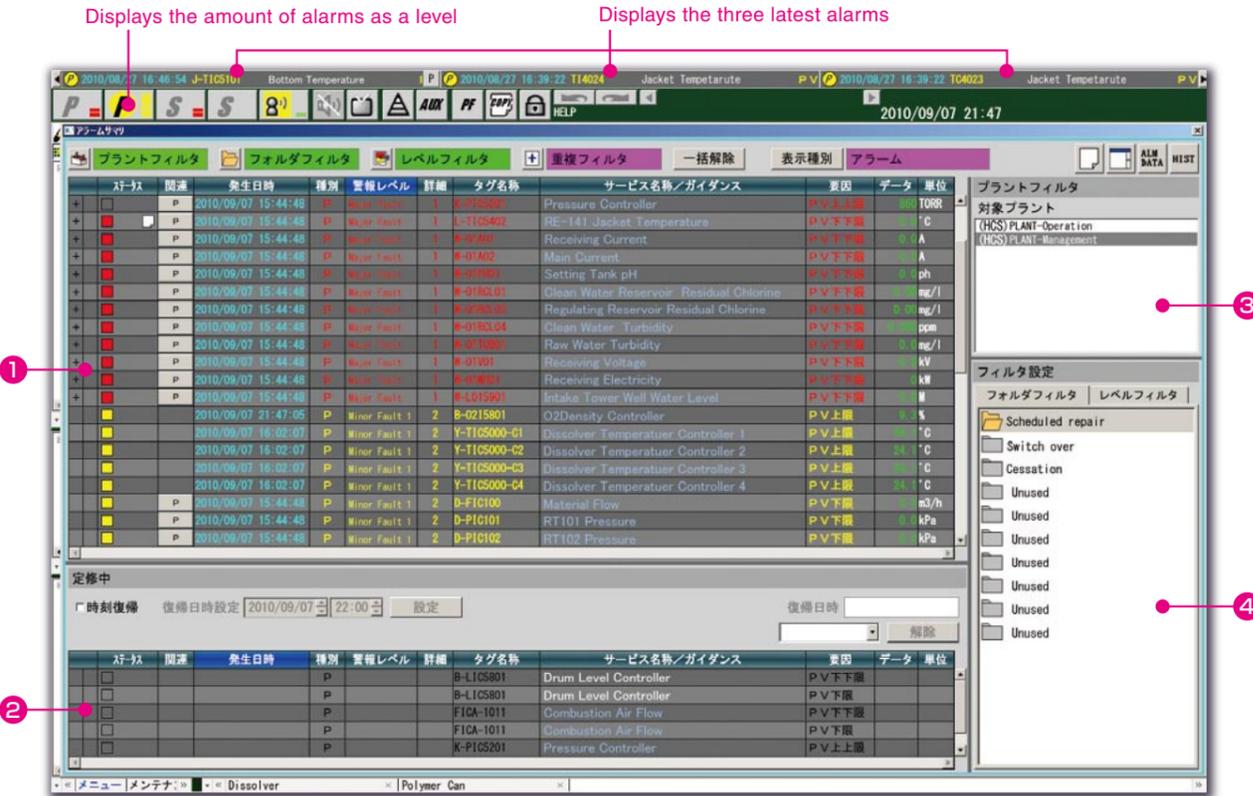


Displays maximum, minimum and average values, and raw data in the specified time frame.

## ■ Alarm display

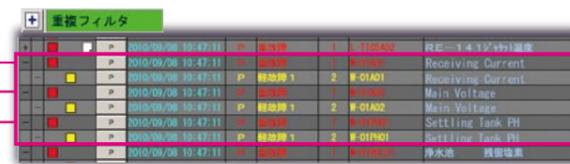
Various alarms occurred in processes or system are reported by on-screen display and alarm sound. Alarm management functions conforming to EEMUA 191\* such as alarm confirmation, coping method display, filtering, and record for improvement are prepared.

\* An alarm management guideline

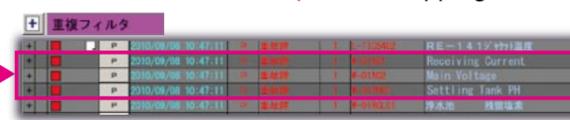


Various alarm filters such as a plant filter, level filter and overlap filter are available. Also, it is permuted by ten step alarm trigger.

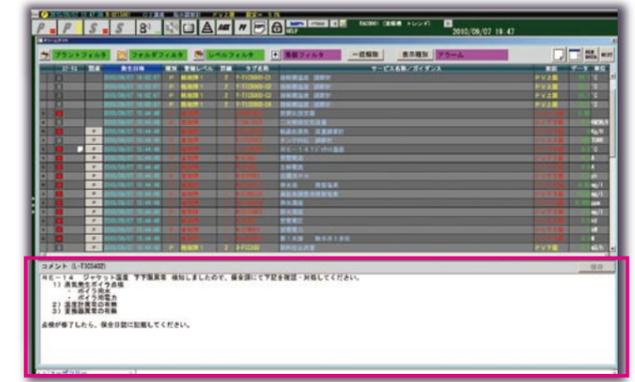
- ① Alarm display area  
Current process alarms and operator's guide are displayed.
- ② Folder detail information area  
Folder detail information in the filter setting is displayed.
- ③ Plant filter area  
Object plant is displayed.
- ④ Filter setting area  
Assignment folder and assignment alarm filtering are set.



Filtering of overlapping alarms



Overlapping alarms can be folded into one line to suppress the number of alarms displayed. An overly large number of alarms are suppressed.



The alarm display area is divided into two block, and coping method to the alarm can be filled and displayed in the lower block.

## Sequence control by a time chart optimized for comprehending mutual relationship of output devices

Complex movement of batch process is described with a time chart. The current and following processes can be understood by defining processes, output patterns, and conditional expressions. You can visually observe and operate the process by functions such as explanation of signals, on/off state display, timer/counter display, and automatic scrolling of the current step.

**Process name**

**Current step**

**Sequence name**

**Elapsed time in step and process**

**Explanation of output signal**

**Output ON is indicated in magenta.**

**On/off state of output**

**Set value and measurement value of timer/counter**

**Current step is indicated in magenta and automatically scrolls in response to the progress.**

**Jumping over shift of step**

**When the output terminal is clicked, instrument window of the output device is displayed.**

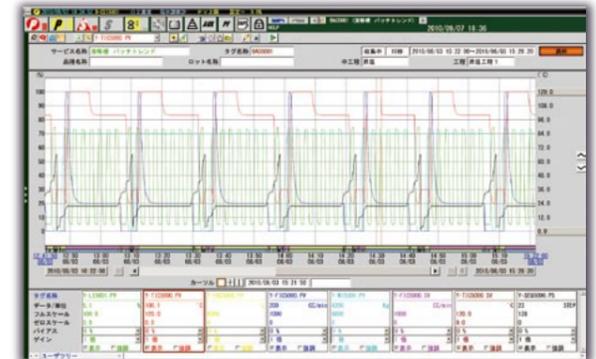
**List of conditional expressions used in sequence**

**Expression that defines the conditions to the next step**

**Expression that defines the conditions to modify the step output**

## Batch trend

Process names and other elements are displayed in synchronization with the sequence control. Moreover, it is possible to save data in each batch.



## Grade Management System\*

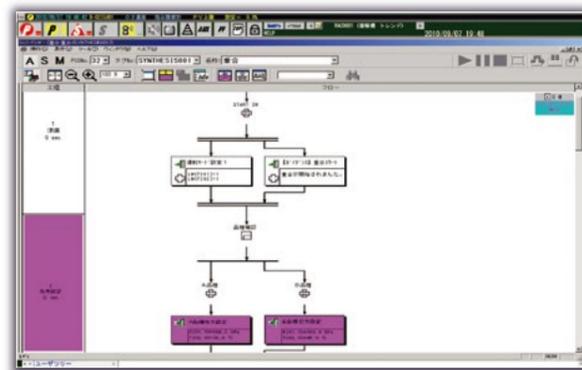
The parameter of each production item is managed. Moreover, parameters can be set in synchronization with the sequence control.

項目名	単位	設定値	現在値	状態
準備時間	分	10	0	OFF
タンクチェック	分	5	0	OFF
純水投入	分	10	0	OFF
材料投入	分	10	0	OFF
溶剤投入	分	10	0	OFF
加熱1	分	10	0	OFF
加熱2	分	10	0	OFF
分析	分	10	0	OFF

\* Option

## Sequence control with flowchart that conforms to SFC

The state transition of the entire sequence can be easily understood by a flowchart. The divergence and the confluence of the process can be done.



## Simple tuning screen

The sequence status is displayed on operation frame of the instrument, enabling monitoring and operation in conjunction with other instruments.

工程	状態	種別	状態
3 Tank check	OK	OFF	OK
4 Pure Water	OK	OFF	OK
5 Material 1	OK	OFF	OK
6 Standby	OK	OFF	OK
7 Solvent	OK	OFF	OK
8 Heating 1	OK	OFF	OK
9 Heating 2	OK	OFF	OK
10 Analysis	OK	OFF	OK

Click the button. → The simple tuning screen is displayed.

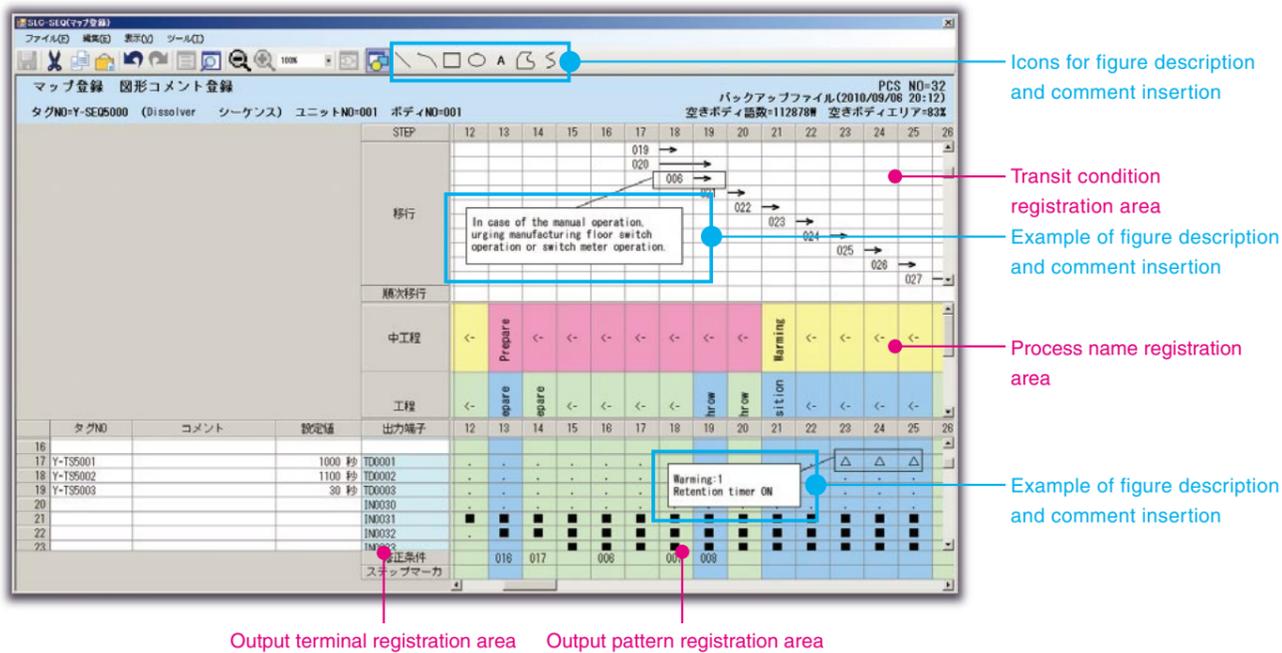
We have adopted specification description method for EX-N01 to enable directly expressing control functions without manuals. Engineering environment has improved by the multi-window display.

## ■ Specification description method

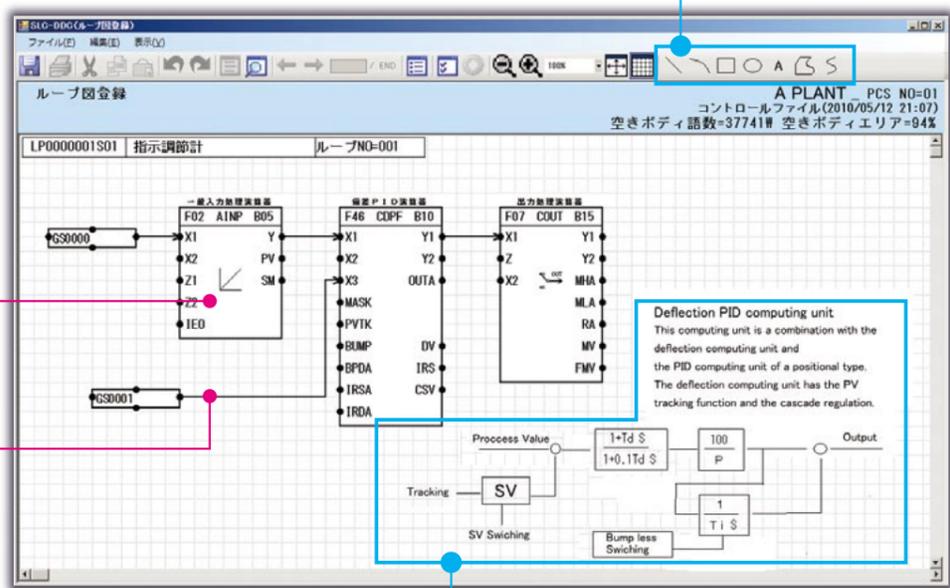
You can construct control software by describing the specification.

You can also reuse desired parts. Thus this product contributes to efficient engineering.

### Sequence Construction (time chart)

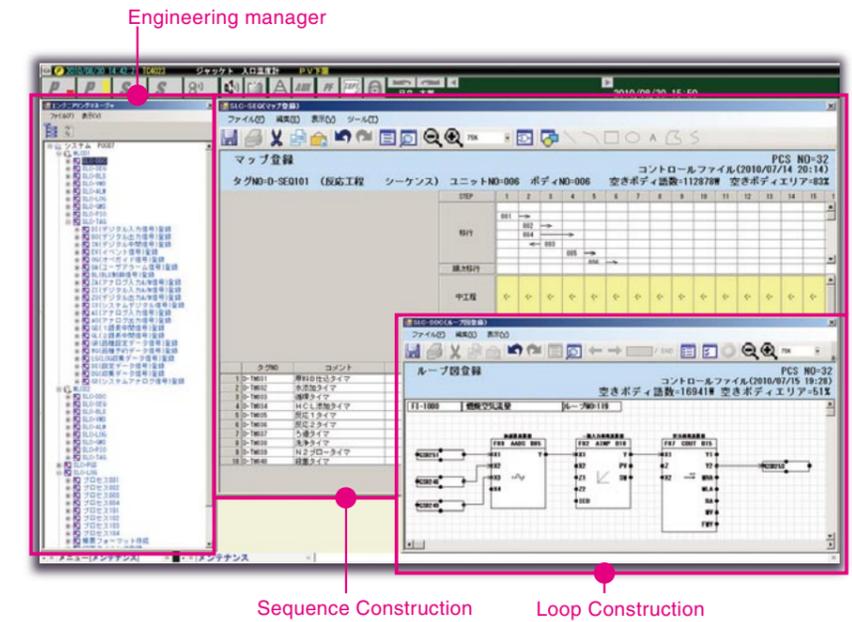


### Loop Construction



## ■ Multi engineering

Each software for constructing control functions can be launched from engineering manager. You can display multiple software at the same time and use them to construct control functions.



## ■ Software for constructing monitoring or control functions

Besides Loop Construction and Sequence Construction, the following software are inherited from the previous EX series to this product.

### Graphic Construction



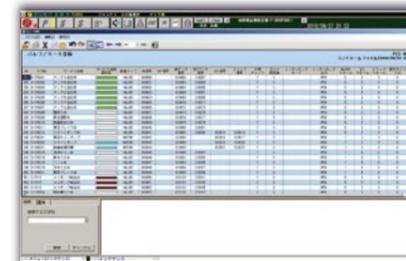
### Simplified Calculation



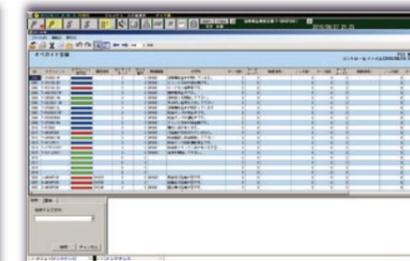
### Log Construction



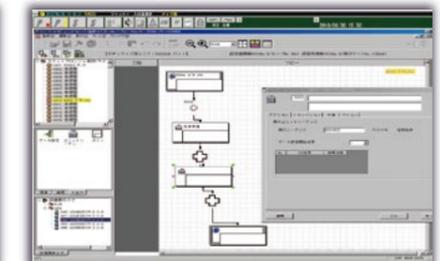
### Instrument Construction for Valves and Motors



### Alarm Construction

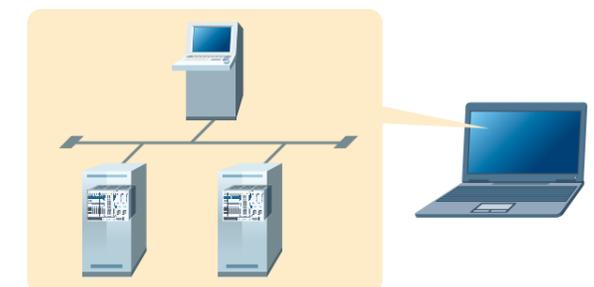


### Sequence Construction (flow chart)



## ■ Engineering tool (PC simulator)

Operator's console functions and multi-controller's functions are simulated on a PC. Therefore, you can check the operation of the monitoring and control software without a real system, and reflect the software after confirmation to the actual equipment.



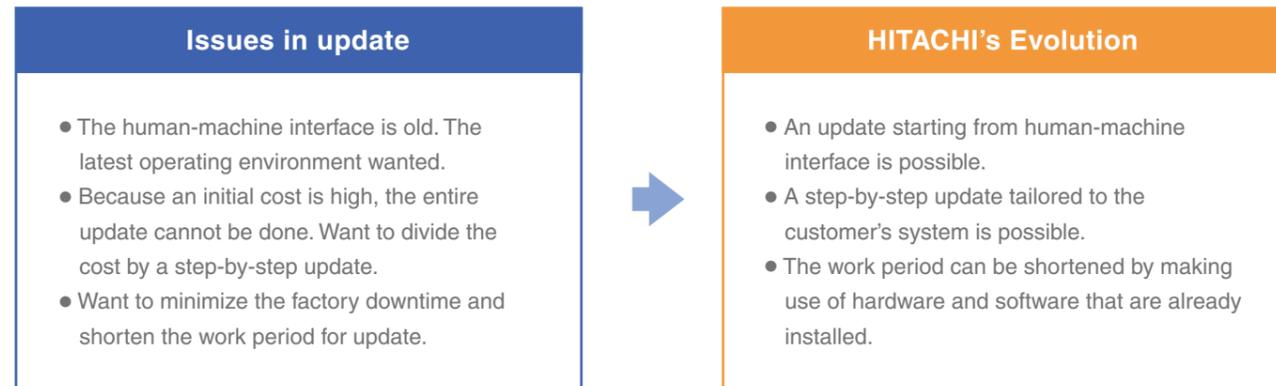
# Evolution

Offers a smooth update from existing systems

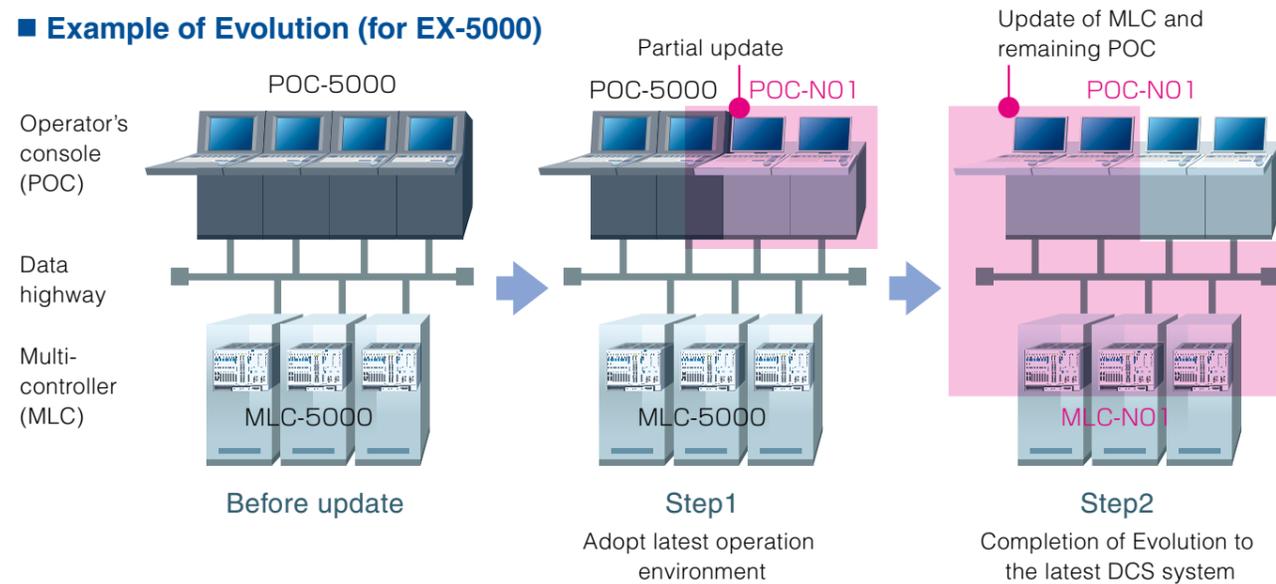
EX-N01 is highly compatible with the previous EX series.

It can be connected to the control LAN of the existing EX series, making possible a phased update.

We offer a system construction tailored to the customer's needs.



## ■ Example of Evolution (for EX-5000)



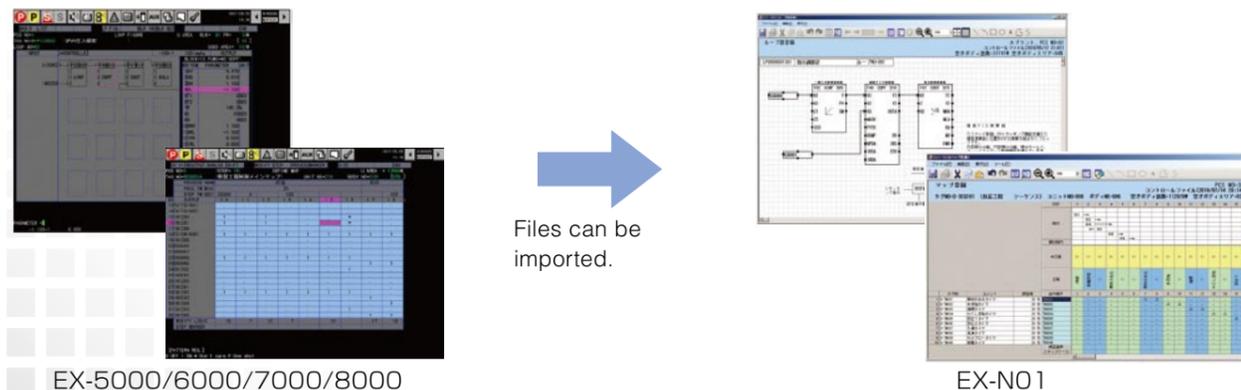
## ■ Inheritance of the existing software to new system

EX-N01 can inherit the software asset.

Almost all files of EX-5000 can be imported to EX-N01.

Files of EX-6000/7000/8000 can be reused by EX-N01.\*

\* Graphic files must be converted with a tool.



# Hardware

Concentrate technologies unique to the Hitachi group to ensure high reliability

## ■ Operator's console

In-house hardware is employed for operator's consoles.

We offer models with higher reliability by adopting ECC memory as the main storage and doubling the hard disk.

You can select from two types of chassis, console and half console, for the installation environment and intended use.



In addition to the above, PC server types are available.

## ■ Dedicated Operation Keyboard

Seventy six programmable function keys are provided for quick call-up of the desired screen.

Inching operation of multiple instruments is more easily accomplished compared to key input.



Operation Keyboard

## ■ Multi-controller

The RISC-processor SH4 microcomputer\* developed by Hitachi's original microcomputer technology is employed to realize superlative control performance and high-speed calculations. Having a field-proven reputation as a built-in RISC CPU in many applications, the SH4 microcomputer excels in operational stability.

\* Manufactured by Renesas Electronics Corporation.



Multi-controller

# Security

## ■ User authentication and operation authority

EX-N01 can identify the operator by using ID and password. In addition, the range and content that can be operated can be limited based on the authority that has been given beforehand. As a result, the entire system including the program and data can be protected and, furthermore, operational errors are expected to be prevented. The system takes operation records together with the login user name. So it is reliable enough to be used in manufacturing processes of medicinal products, where audit trails are required.

# Maintenance

## ■ Remote maintenance

Services such as virus check and operational support are remotely provided from the support center.

## ■ Online maintenance

It is possible to carry out necessary maintenance, such as online modification of the control software and online replacement of hard disks in each operator's console, at the proper time without stopping operation of the plant.



Support Center

## System scales

Items		Specifications	
		EX-N01	
Number of stations	Operator's console (POC)	16 units (total number of POCs and terminal servers)	
	Multi-controller (MLC)	32	
Operator's console	Sub-operator's console or client operation console	1 unit/POC or 8 units/terminal server	
	Printer	1 to 4 units/POC or terminal server	
Scale of monitoring and operation	Number of instrument tags	Loop	24,576
		Flow	4,096
		Sequence	10,240
		Valve/motor	31,744
	Number of trend indication points	Real-time	6,144
		Batch	2,048
	Number of graphic screens		2,000
	Recipe management	Number of recipes	2,000
		Number of data elements/recipes	2,000
		Number of categories	16
	Report (logging)	Number of processes (periodic reporting/batch reporting)	24 / 24
		Number of reports	256
		Number of data collection points	2,000/process
	Number of operator's guide points		64,000
Number of user alarm points		64,000	

## Specifications of multi-controller

Items	Specifications	
Model	MLC-N01	
Computational section	CPU: 32-bit microprocessor	
	Memory: With ECC (battery backup provided)	
	Detection of power failure at moment: Provided	
	Option: Duplication of computation unit	
Control scale per controller	Analog inputs	768
	Analog outputs	768
	Digital inputs	4,000
	Digital outputs	4,000
	Control loops	768
	Number of flows	128
	Sequence maps	320
	Timer-counters	1,000
Valves/motors	992	

\* The number of applicable signal points may be limited according to the hardware configuration.

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- Microsoft® Excel is a trademark of Microsoft Corporation, U.S.A.
- Ethernet is a trademark of Fuji Xerox Co., Ltd.

Notice: For proper operation, follow the instruction manual when using the instrument.

Specifications in this catalog are subject to change with or without notice, as Hitachi High-Tech Solutions Corporation continues to develop the latest technologies and products for our customers.

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