TOSHIBA

Leading Innovation

nv Series Controller

Fast • Powerful • Universal

nv Controller - nV Tool 4

- A Single System for Electrical & Instrument Controls.
- A Single Fast Solution for Remote and Local I/O.
- Very High Availabilities through Reliability & Redundancy.
- Open Architectures through Industry Standard Communications.
- Economy and Performance through Dedicated Language Processing.
- Lower Engineering Cost through Powerful IEC61131-3 Compliant Tool

Faster Communications – TCnet I/O loop

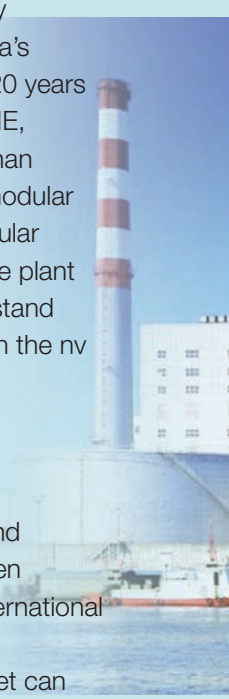
The I/O network is an ultra fast (100Mbps) serial connection called TC (Time Critical)-net I/O loop. This industry leading technology can scan I/O data at a cycle time of 200 microseconds, and operates over duplex wire or fiber optic topology. With a total length of up to 8km and a 3 tier connection hub the system caters for the largest geographically distributed plants. The high noise rejection of fiber optical transmission and the highway redundancy ensure secure, reliable operations in the hostile plant environments. TC- net I/O loop is Ethernet based, providing both scan and message transmission using TCP/IP and UDP/IP and conforms to IEC 62406. Whatever the application the nv controller offers performance with reliability.

Faster Processing - Built in IEC Language Direct Executing Processor

Today's complex control strategies demand high performance from controllers. The nv controller achieves a breakthrough in fast control execution by directly processing the IEC61131-3 compliant language that the control instructions are written in within their own dedicated processor. With processing cycles down to 20 nano seconds economic, reliable, high speed control is achieved without fear of processor overload. Whatever the application the nv controller offers performance with reliability.

High Systems Availability through Reliability & Redundancy

Toshiba products are synonymous with quality and have legendary reliability. In Oceania, as well as around the Globe, many of Toshiba's TOSDIC Control Systems continue to perform reliably more than 20 years after their original installation. The latest generations of TOSDIC-CIE, featuring the nv controller, achieve very high availabilities, (better than 99.99%), through excellence of design, low component counts, modular redundancy and error correcting circuitry in the memory. The modular redundancy enables the user to identify the optimal strategy for the plant from a reliability and economic standpoint. I/O highways can withstand multiple failures without loss of operation. Whatever the application the nv controller offers performance with reliability.



Integrated Operations - Open Architecture & Connectivity

Today's plant has many systems from multiple vendors covering applications from the Enterprise system down to smart sensors and instrumentation. Integration of function and data exchange between systems have become essential and the nv controller provides international standard connectivity. Common industry serial protocols such as MODBUS, PROFIBUS, Device net, Foundation Fieldbus and FL-net can

be accommodated via the SIO controller. TC-net 100 provides the basis for connectivity to supervisory systems and HMI's as an Information and Control LAN. A TC-net 100 OPC server is created by simply installing a TC net PCI bus card in a PC. The nv controller also features a 1 Gbps Ethernet Information Network for DCS and SCADA applications. Whatever the application the nv controller offers performance with reliability.

High Speed Machine Control and Tag Based Instrumentation Control.
Traditionally the requirement for high speed sequential control demanded in machine control has been accommodated by PLCs while the requirements for multivariable instrument tag based controls have been the province of Loop Controllers and DCS. The nv controller is a truly unified controller capable of implementing either form of control with equal efficiency and effectiveness. This common approach simplifies plant wide application whatever the process, reduces spares holdings and training and simplifies maintenance. This performance breakthrough is achieved by fast control execution within the nv controller by directly processing the IEC61131-3 compliant language in its own dedicated processor. Plant data is exchanged at ultra high speed by the nv controller's serial I/O system TC-net I/O loop. Whatever the application the nv controller offers performance with reliability.

Powerful and Simple Engineering - Standard Engineering Tool
The nv controller and systems are engineered through the Toshiba nV-Tool 4. This IEC61131-3 compliant tool simplifies the translation of process into control instructions by providing the freedom to use Ladder, Function Block, Sequential Function Chart and Structured Text languages within the same worksheet. These functions are complemented by the nV-Tool's full Graphic Editor and Its Custom Symbol Editor providing a more open engineering environment in which library, custom and XML imported functions can be used. Building the instrumentation data base is simple with the spread sheet format nV-Tool Tag Editor, which automatically generates the system faceplates and data tables. The nV-Tool also provides system diagnostics and simulation. Internet connection is possible for remote engineering and trouble shooting. Whatever the application the nv controller offers performance with reliability.

1 I Pulp & Paper - Dissolution process of pulp, Papermaking, Winding up

2 I Power Generation - Temperature/ Pressure control for the boiler

3 I Rail Transportation - Signal control, Information service in the station

4 I Water & Waste Water - Pump control, Chemical dosing control

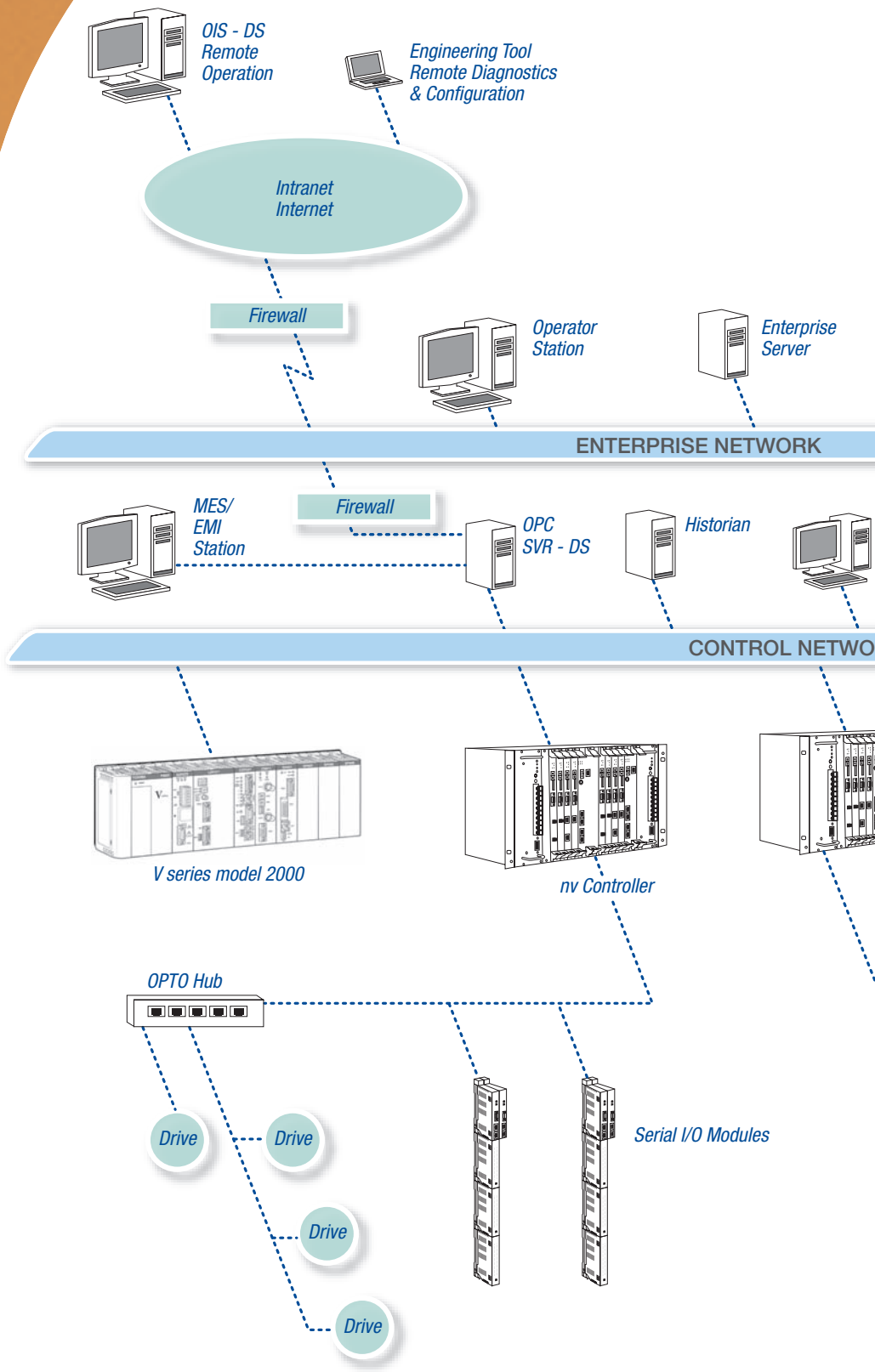
5 I Road Transportation - Signal control, Information service in the station

6 I Chemical - Temperature/Pressure control for the reactor

7 I Steel - Dissolution process of raw material, Mill process

8 I Food & Beverage - Mix process of materials, Packaging process

System Architecture



Toshiba Leading Innovation in control

1975 | TOSDIC introduced the world's first digital control system

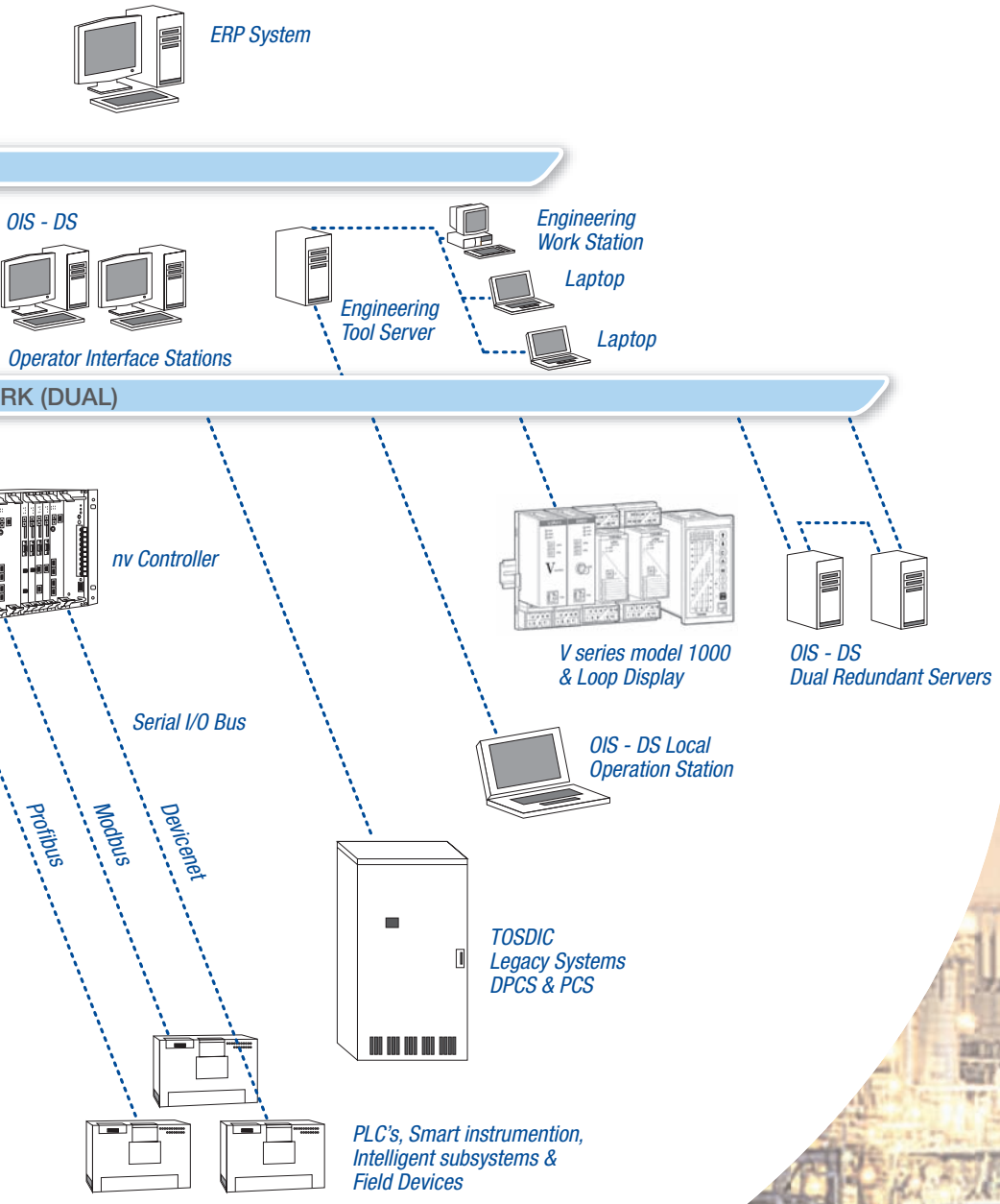
1980 | TOSDIC-246 introduced world's first pixel graphic H.M.I.

1989 | TOSDIC-CIE introduced combining instrument & electrical control.

1997 | OIS-DS Introduced first true open client server architecture.

1999 | V series introduced first generation universal controller.

2007 | nv series introduced second generation universal controller.



Fast

Control execution processing I/O gathering control network

Powerful

Programming tools

Universal

Electrical & instrument controls

Reliable

High availability full redundancy

nV-Tool

Engineering tool "nV-tool4"
Building or modifying a control system is an important part of the system's lifecycle. Tools need to be flexible to cope with the diverse applications presented, powerful to satisfy the complexity of modern controls yet simple to use to facilitate engineering and modification by non specialist engineering staff. Toshiba's nV-tool4 provides this in a single unified application.
The nV-tool4's engineering interface utilizes the International standard IEC 61131-3 programming languages. First implemented by Toshiba with the introduction of the V series it has evolved to Engineering Tool nV4 and it brings with it a wealth of applications for the nV controller.

Simplified Programming
With nV-tool4 you are completely free to mix and match different programme languages to suit each application into a single programme. Using the object oriented design environment of the IEC61131-3 standard, it allows Ladder Diagrams (LD), Function Block Diagrams (FDB), Sequential Function Charts, (SFC), and Structured Text (ST) programming, to be combined in the same worksheet.

Eliminates the gap between PLCs and DCS
Whether the applications are for PLC, fast logic operations, DCS, Tag based systems or both the nv controller and its nV-tool4 provides a single programming & debugging interface suited to Electrical, Instrument and Process Engineers alike.

Simplified Network Design
nV-tool4 goes beyond the controller and supports the network design and registration of the network cards forming the complete system such as Ethernet & TC-net 100.

Powerful Maintenance Support
nV-tool4 is a powerful maintenance tool providing information such as RAS and operation information for on-line fault identification and module exchange. High level diagnostics enable speedy problem location and facilitates drill-down to the dynamic information from the process input.

On-line Engineering
When the process cannot be interrupted, on- line editing can be effected using Program Monitor, Data Monitor, Online Data Change, and Online Program Change.

Faster start up
nV-tool4's client / server construction, allows many engineers to work in parallel on the same application reducing engineering lead times.

Easy System Integration
The controller exists in an 'Open Environment' and allows the exchange of data with other plant support systems and integrates with other plant and enterprise systems.

Extended Operations

Copy and Paste System Build
Transferring Tag based data directly from the engineering data is made simple with the New Tag Editor. Comprising a spreadsheet style editor it makes system build a copy and paste exercise which automatically generates faceplates and data tables.

Instrumentation Function Block Library
For use with Tag based systems, the Instrumentation Function Block Library adds a wider range of function blocks for use in creating the specific control schemes.

Synchronized trend
For use in fast logic applications such as machine control this software collect states and operation signals in a synchronised scan. The data is stored and recalled to a trend display. The tool simplifies the cause and effect analysis of faults and has pan and zoom controls.

Interlock (permissive) Diagnosis
In machine control under fault conditions this support function automatically informs the operator, why the machine stopped or cannot start, directly from the interlock circuit logic. Confirmation can be initiated from the logic diagram.

Full Graphic Editor
Complex graphics with pop ups, faceplates and imported pictures can be easily created using the CAD style full graphic editor. This software self documents and allows the use of prebuilt components and user generated macros, giving a high level of freedom in graphic screen presentation.

Remote Engineering & Diagnostics
This software allows nV-Tool 4 to operate via the Internet to provide remote diagnostics and engineering from any location.

nV simulator
This software enables programs created by nV tool to be simulated without a controller enabling the user to fully check and debug the operation without risk to operations.

Migration

Toshiba products and systems are world renowned for their reliability and longevity but in this era of fast moving electronic and microprocessor technology obsolescence must eventually overtake them. Many of our products are supported well beyond their 20 year minimum guaranteed lifecycle and today many plants around the world are still operating efficiently and economically with Toshiba Control Systems installed in the 1970's and 80's.

Control systems represent a significant proportion of the total plant cost and Toshiba recognize that this investment by the user must be protected and can demonstrate a continuous migration philosophy in its systems. The philosophy has twin strands, one is the ability of older products and current product to cohabit within a single system and secondly to allow the change out of older products without change to the plant through retention of field terminations, module exchange and software transportability.

In the case of complete DCS Systems there are basically four elements in the migration strategy.

1 Network Architecture

Toshiba adopted an "Open System" philosophy with the introduction of a 1 Gbit/sec Ethernet information LAN as it core communication structure. All of the current nV and V series control products plus all the older TOSDIC, DPCS & PCS controllers can interface and co-exist on this network.

2 Control Hardware

Toshiba nv controller and its I/O subsystems can be used as direct replacements for older hardware by plug and socket change only from the system's I/O terminations, minimizing cost, downtime and risk.

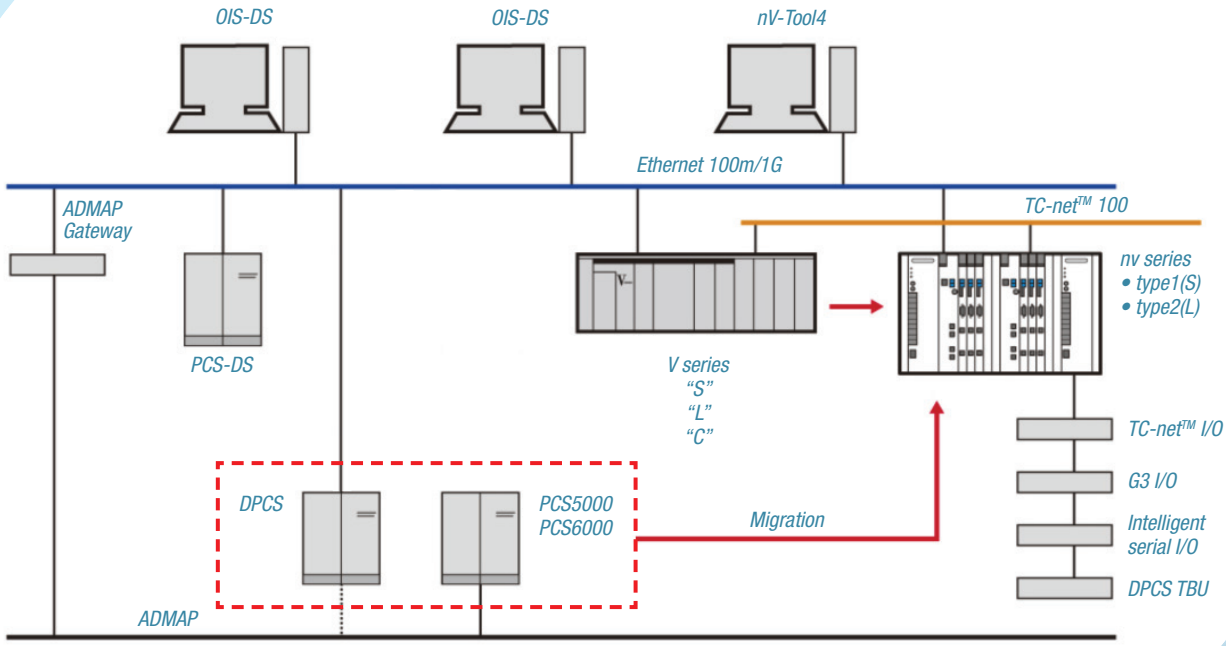
3 Operator Consoles and HMI's

Toshibas OIS–DS is Microsoft Windows® based but presents the plant data in a format that replicates earlier generations of TOSDIC Control Systems allowing for faster operator familiarization and lower risk to operations.

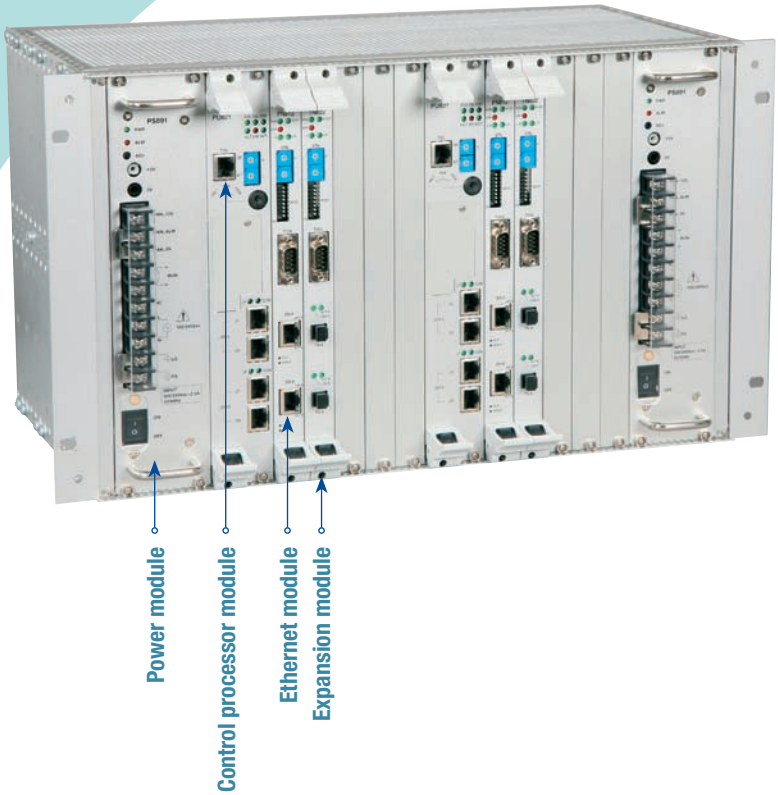
4 Software Migration nv tool

Provides software translation tools for legacy modules such as DPCS and PCS controllers to simplify transition.

Leading Innovation in Control System Migration



nv Controller in Dual Redundant Configuration



Item		For electric control (type1)	For instrumentation (type2)
Program capacity		256 K step	512 K step
Local variable/Global variable		256 K word	256 K word
I/O variable		16 K word	16 K word
Tag			Standard input/output (Process alarm management) OIS-DS interface
Task	Periodical task	• Ultra high speed: 0.5 – 500 ms • High speed: 0.5 – 500 ms • RIO: 0.5 – 500 ms • Main: 0.5 – 1,000 ms	• High speed: 10 – 500 ms • Main: 100 – 10,000 ms
	Event task	Selectable • Event: 8 entry • I/O interruption: 16 entry	• Event: 8 entry • I/O interruption: 16 entry
Task switching time		Less than 60 µs	
Calculation performance		Contact instruction: 20 ns Integer add instruction: 20 ns Floating point add instruction: 120 ns	
Programming language		Four languages conformed to IEC 61131-3 • LD (Ladder) • FBD (Function Block Diagram) • SFC (Sequential Function Chart) • ST (Structured Text)	

- TOSDIC is a registered trademark of Toshiba Corporation.
- OIS-DS, SVR-DS, V series, nv series are model names of components or series names of Toshiba's TOSDIC Integrated Control System.
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Reliable Systems From Reliable People!

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