Major Specifications of the TOSDIC VS

ltem	Web-Based HMI Spec.
Number of stations	Controllers: Up to 32, OI-VS10: Up to 14 (22 with a future enhancement), OI-S20: Up to 2
Number of management tags	8,000 per system (20,000 per system with a future enhancement)
DB: Number of history data items	320,000 per system
DB: Data management	General-purpose database (PostgreSQL)
Recommended computer	Toshiba's industrial computer (Contact us for the models supported.)

Item	typeL Controller Specification
Computer core	Linux or Windows 10 IoT Enterprise (64-bit)
Program capacity	512 k steps
Number of tasks per program	Events (EV): 8, interrupts (IP): 16, high-speed scans (HS): 128, main scans (MS): 512
Program execution cycle settings	High-speed scans (HS): 10 to 500 ms (Setup interval: 1 ms) Main scans (MS): 100 to 5,000 ms (Setup interval: 10 ms)
Programming languages	Four languages of IEC 61131-3 LD (Ladder Diagram), FBD (Function Block Diagram), SFC (Sequential Function Chart), ST (Structured Text)
Local and user global variables	512 k words
Types of instrumentation tags	Process value (#PV), loop control (#LP), push bottom switch (#PB), timer/counter (#TC), sequence (#SQ), database (#DB), batch & blend (#BL), PLN table (#P), timer (#T), counter (#C), whole number (#W), real number (#R), real-time trend (#RTT), tag data scan (#TS)
Tag capacity	#PV: 2048, #LP: 640, #PB: 4095, #TC: 1024, #SQ: 256, #DB: 512, #BL: 128, #P: 512, #T: 1024, #C: 256, #W: 5120, #R: 8192, #RTT: 512, #TS: 2048
I/O system supported	TC-net™ I/O (up to 32 nodes, 512 slots (remote I/O, 32 nodes × 16 slots))
Processor	Intel Atom [®] x5-E3940 (1.6 GHz), quad-core
Main memory	8 GB DDR3L (1600 MT/s)
Internal storage	eMMC: 8 GB, SSD: 128 GB
Interfaces	 Graphics: One DisplayPort channel USB: Two USB 5 Gbps (Type-A) ports, two Hi-Speed USB (Type-A) ports LAN: 10BASE-T/100BASE-TX/1000BASE-T, two RJ45 connector ports

A Precautions

• Toshiba will bear no responsibility whatsoever for any damages arising from the use of or inability to use this product (including, but not limited to, loss of business profit, interruption of

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For inquiries about our products, call:

Product information

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Inheriting the quality and stability that Toshiba has pursued for many years, the TOSDIC VS integrated control system provides superior compatibility with IT solutions.

The DCS controller is the cornerstone of a computerized control system. Toshiba's DCS controller has now evolved into a software-defined architecture to realize smart manufacturing.

Redesigned to allow more intuitive system operations, the human-machine interface (HMI) of the TOSDIC VS offers a new style of plant operation and helps our customers enhance their quality and productivity.

In addition, the TOSDIC VS allows the reuse of existing instrumentation and control assets, making it possible to transfer process control assets and know-how to the next generation.

Meister nV-Tools Cloud, a solution that **Meister nV-Tools Cloud** provides an engineering environment OI-VS10/OI-VS20 : HMI for user-friendly integrated monitoring anywhere Gateway PC The HMI where interactions between humans and machines occur has been redesigned Since Meister nV-Tools Cloud provides all the functions to further enhance the usability of the TOSDIC VS. available with the previous nV-Tool tool, it is capable of Redundant database for enhanced reliability running existing applications without modification. In addition, the TOSDIC VS allows you to perform programming and simulation anywhere-even in an environment Tablet-based without computers. operation • Allows online development, operation, and nV-Tool maintenance in the cloud • Pre-verification via simulation (future enhancement) • Online engineering of on-site controllers Software-defined DCS: typeL **OI-VS20** Fieldbus **Database with** TC-net[™] I/O Loop redundancy Inter-controller transmission Sharing of plant equipment Web client data among controllers and HMI TC-net[™]I/O OI-VS20 TC-net[™] I/O, an I/O module for network high-speed control Despite remote I/O, TC-net[™] I/O is fast and OI-VS10 (web server) Software-defined DCS typeL deterministic as it incorporates the concept of Toshiba's unique TC-net[™] network. typeL, a highly reliable high-performance With multivendor networking capabilities, **DCS controller** TC-net[™] I/O makes it possible to build a flexible system regardless of system constraints. Transcending the concept of conventional DCS controllers, the typeL provides a platform that makes the most use of • Fully remote system capable of collecting process control data to improve productivity safely. process control data within 1 ms • The typeL incorporates both control and computing **Control network** functions, so they can share control data at high speed. • The computing function allows process control data to be analyzed at the edge of the network to optimize a plant's control parameters. nv series type2 system configuration

Cloud

Cloud

Internet

In-house LAN

Realizing smart manufacturing

The TOSDIC VS works in tandem with the Meister series to make the most use of data and realize an integrated monitoring and control system for operational technology (OT) and information technology (IT) applications. The TOSDIC VS can be employed to use process control data as a basis for production management and business decision-making.

> Meister series of manufacturing IoT solutions



Role as an edge computer to accelerate fusion with DCS controllers and IT solutions **Computing function of the typeL**

Edge computing

The typeL is a DCS controller that integrates both control and computing functions.

While conventional DCS controllers require a separate PC to analyze important process data, the typeL is capable of storing and analyzing such data and thus makes it possible to improve production processes in a timely manner.

Therefore, the typeL is the ideal choice for edge computing applications that utilize the data collected at manufacturing sites for IT solutions.

High-speed data transfer

The typeL shares tag information with the internal computing function at high speed.

Since the computing function runs under both Linux and Windows, IT solutions on other computers can be ported to the typeL without modification.

Secure environment with s hared memory

The typeL transfers data between the computing and control functions via shared memory, eliminating the need for a communication program to transmit data to the computing function.

The typeL allows secure data sharing since data is not transmitted through any external network.



Architecture to realize the edge computing capability of the typeL

Highly reliable high-performance DCS controller **Unified Controller Vm series typeL**

High performance and reliability

The typeL provides high-speed control scans and tracking to make it possible to collect process data from widely dispersed devices in a system and shut down equipment in the event of an emergency. The typeL provides excellent reliability as it supports redundant state monitoring between active and standby controllers, which is pivotal for achieving redundancy.

High-capacity tag storage

A single unit of the typeL supports approximately double the number of tags of the previous model. Therefore, the typeL helps reduce the number of stations in a process control system.

Since the typeL can communicate with the existing DSC controllers, a process control system can be composed of different generations of DCS controllers.



Technology to realize the high reliability of the typeL Japanese patent number: P7326239

Mutual mode monitoring via five communication paths-tracking LAN, control LANs (A and B), TC-net[™] I/O Loop (A and B)— in addition to the monitoring of the counterpart power supply via hardware signals

Inheritability

The typeL supports the nv-Tool, an engineering tool that has been used with Toshiba's conventional industrial controllers. Therefore, the typeL allows the reuse of existing program assets and the inheritance of design know-how.

Intuitive and easy-to-use HMI Human-machine interface (HMI): OI-VS10/OI-VS20

Design compliant with the ISA-101 standard from the International Society of Automation (ISA)

The human-machine interface (HMI) of the TOSDIC VS is designed in accordance with the ISA-101 standard from the International Society of Automation (ISA). Therefore, the TOSDIC VS can be used intuitively both by novice and experienced operators. It is suitable even for operators who have no experience with instrumentation engineering. The TOSDIC VS also supports operation consoles that have been conventionally utilized for plant operation.

Highly user-customizable architecture

The TOSDIC VS provides various highly user-customizable options.

High capacity

With an increased database capacity, the TOSDIC VS is capable of storing trend data for a long period. Therefore, the TOSDIC VS is suitable for analyzing long-term trends in equipment and system conditions. The TOSDIC VS supports the monitoring of up to 8,000 tags per system (up to 20,000 tags with a future enhancement), and its HMI allows up to 14 stations (up to 22 stations with a future enhancement) to be connected.

Operation from anywhere, anytime Web architecture of the human-machine interface (HMI)

Accessible 24/7

The HMI incorporates web technologies to make it possible to monitor a plant's operating conditions and perform troubleshooting via a web server from anywhere, be it the headquarters, your office, or your home. In addition, since maintenance personnel can use tablets for on-site plant operations, their mobile task efficiency can be improved.

High-reliability web server

The TOSDIC VS stores a plant's operating data in databases on a web server. Since the web server is the cornerstone of a process control system, it is designed with dual redundancy to achieve high reliability.

Client terminals hardly dependent on their performance or the

operating system used

Since client terminals use a web browser, remote monitoring and operation are hardly affected by their performance or the operating system used. Therefore, tablets can be used as client terminals.





Designed in accordance with the ISA-101 standard from the International Society of Automation (ISA), the TOSDIC VS allows intuitive plant operation.

Web-based monitoring and remote operation system

Environment suitable for ICE

ICE considerations

In the field of instrumentation and control engineering (ICE), instrumentation loop diagrams have been conventionally created as a basis for required specifications. On the other hand, most modern DCS controllers are compliant with the IEC 61131-3 standard that deals with the programming languages of DCS control programs. However, since descriptions of these control programs are very different from loop diagrams, it has been a burden for DCS engineers to maintain both control programs and loop diagrams. The nV-Tool allows you to customize the symbols of IEC 61131-3 functional blocks. The nv-Tool supports custom-made symbols for field devices and instrument balloons, which can be attached to any IEC 61131-3 functional blocks. You can download and monitor instrumentation loop diagrams via these symbols.

PLCs for sub-stations

A process control system uses not only DCS controllers but also programmable logic controllers (PLCs) for sub-stations.

The nV-Tool supports a ladder language for programming PLCs, allowing a single environment to support the development and maintenance of control programs for both DCS controllers and PLCs.

Compliant with the IEC 61131-3 standard

IEC 61131-3 is an international standard that deals with control programming languages and basic software architecture. It supports four programming languages: Ladder diagram (LD)

Functional block diagram (FBD) Sequential function chart (SFC) Structured text (ST)



ICE-oriented nV-Tool

Cloud-based engineering environment management

Anytime-anywhere engineering

Implemented in the cloud, the engineering environment using Meister nV-Tools Cloud supports the monitoring of the typeL as well as program reference and downloading.

Pre-verification via simulation

You can create an application on a PC using a simulator instead of real-world hardware and verify its functionality and operation before running it at a plant. (Future enhancement)

Remote operation and maintenance

The TOSDIC VS supports remote operation and maintenance as well as swift remote troubleshooting.



TC-net[™] I/O realizing a high-availability process control system

Dual redundancy and online replacement

The TOSDIC VS provides I/O modules for each type of process signal. Highly reliable process I/O modules that have been well-proven in the field can be configured for dual redundancy. Pressure clamp terminals, terminal boards, and other connectors can be combined for field signal connection according to your applications. In addition, the TOSDIC VS allows online replacement of I/O modules, enabling online maintenance required for instrumentation and control.

Multivendor networking

The TC-net[™] I/O provides various options for multivendor networking, which can be combined according to your applications.

High-reliability, high-speed control

To achieve high-speed and deterministic performance regardless of a remote I/O module, the TC-net[™] I/O incorporates the concept of the TC-net[™] networking standardized as an international standard. The TC-net[™] I/O is capable of collecting process control data in as fast as 1 ms.

Examples of utilizing controller and computer functions

Utilization of controller function: **Model-Driven PID**

Model-Driven PID is a type of IMC (Internal Model Control) algorism developed by TOSHIBA. Compared with PI-D, the merits of MD-PID are to provide optimal control for

- ·long dead time process.
- disturbance as well as set point changes.
- •various process dynamics.

Utilization of computer functions

It is possible to reduce the number of industrial computers by integrating the OPC server into typeL, and reduce the overall system implementation cost. (Future enhancement)

OPC Server





OPC Server integrated into typeL