TOSHIBA

Unified Controller nv series™
Multi-Loop Controller LC531/LC532

Overview

The LC531/LC532 multi-loop controller is an instrumentation panel device which supports various applications and user programs. Compatibility with the previous models of controls has been maintained with panel cut and depth. Toshiba has enriched the features ensuring the highest levels of reliability and user friendliness.

Features

● **High speed operation and power saving**

• Processing speed is twice that of conventional models *1*2

• Power conservation of about 60%   *1

   *1 Compared to conventional model LC521
   *2 In case the maximum registration composition is 8 PID tags

● **Network**

Ethernet
Connection of the multi-loop controller to the OIS-DS/SMART and OIS-DS supervisory systems is achieved via use of the PLC Server.

RS485
Supports EC Bus communications with the EC300 series controllers.

● **PID control**
• All Toshiba controllers utilise the advanced PID algorithm 'hyper PID'.
• Advanced control strategies are easily developed and applied.
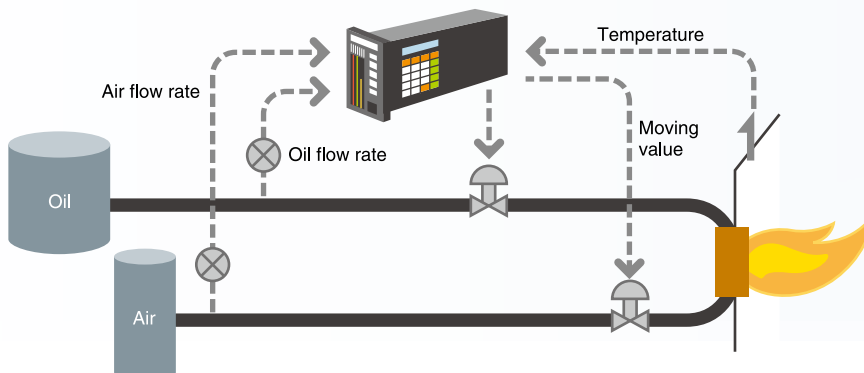
● **Engineering**
• The programming tools comply with the IEC 61131-3 standard and contain many new and advanced function blocks.
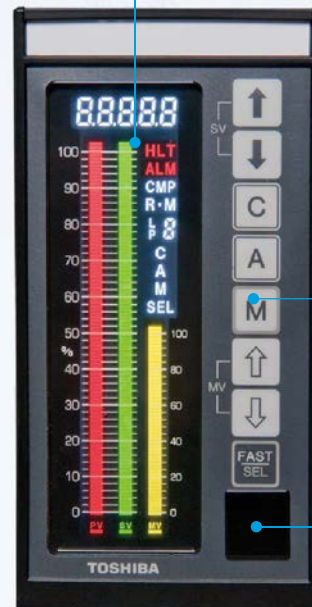• The engineering tool environment is efficient and contributes to reduction in program development costs.

● **Size line up**
There are 2 sizes available;
Size 450 mm: easy replacement.
Size 250 mm: new compact type.

Easy-to-see color LCD indication

You can operate up to 8 loops.

Easy to connect online to the tool from front usb port.

Application example **Boiler combustion control**

Temperature

Air flow rate

Oil flow rate

Moving value

Oil

Air

product line while maintaining upwards compatibility.
ingle product.

System configuration example

Instrumentation Panel

Ethernet

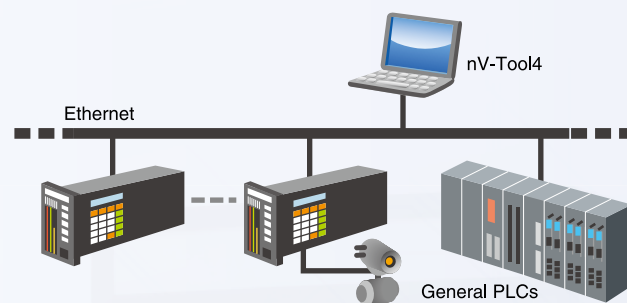nV-Tool4

The number of connection Up to 32 units
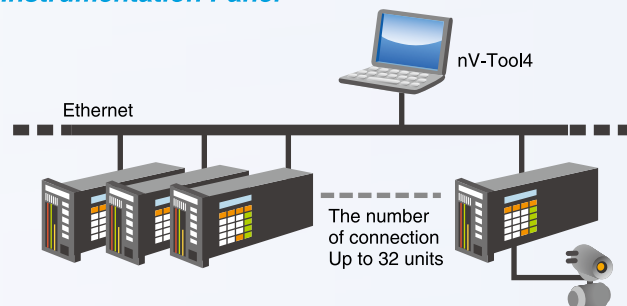
- Clear bar graph, display value and variety of advanced control functions.
- Operation value setting and data output is carried out using the front panel.

I/O extention

Ethernet

nV-Tool4

The number of connection Up to 32 unit

MODBUS Extension I/O module
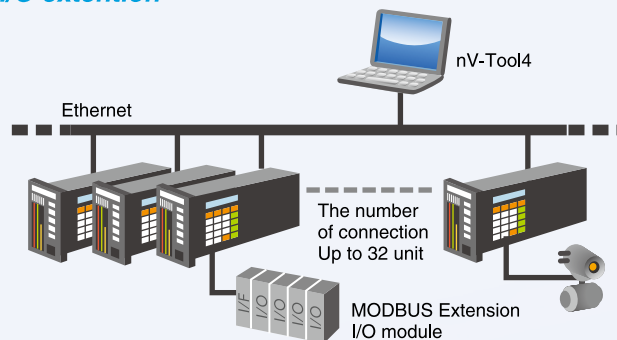
- MODBUS-RTU support I/O extension, which carry out the loop-control and sequences-control.

High speed processing with general PLC

Ethernet

nV-Tool4

General PLCs

- High speed sequence control.
- Data communication between Toshiba PLC and controllers through Ethernet.
- Integrated engineering achieved by combination of Toshiba PLC through nV Tool.

Connection of HMI for DCS

OIS-DS/SMART   OIS-DS/SMART   nV-Tool4

Ethernet

The number of connection Up to 32 units
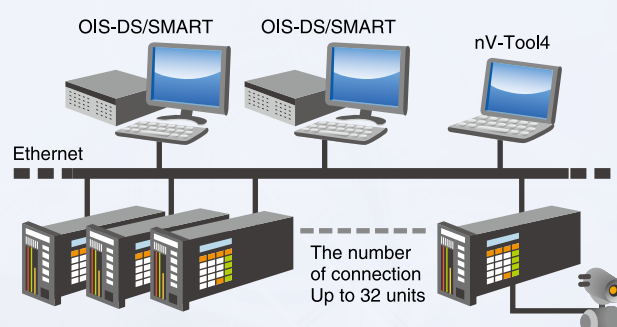
- Toshiba TOSDIC-CIE DS system is a universal supervision and control system, which combine up to 32 units of controllers or up to 8 units of OIS-DS/SMARTs.

Application for medium-scale or large-scale systems

OIS-DS

Redundant Ethernet

Communication module

PLC Server

RS485

Ethernet

Unified controller nv series™

USB connection

nV-Tool4

The number of connection Up to 64 units
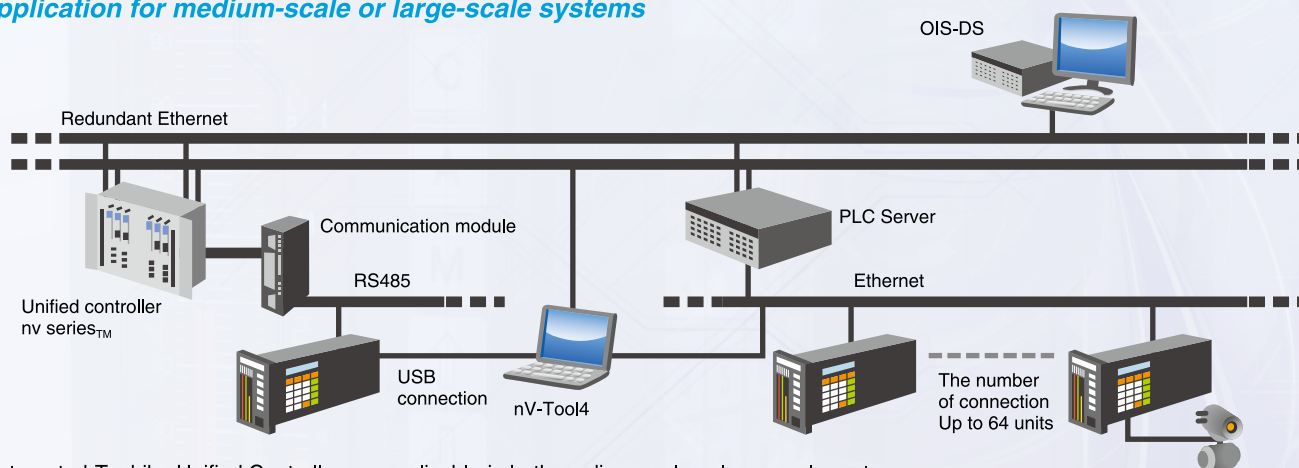
- Integrated Toshiba Unified Controller are applicable in both medium-scale or large-scale systems.
- Provide an integrated engineering environment.

Software Specifications

Control mode		RUN/HALT/ERROR
Programming language		IEC 61131-3 compliant
Program capacity		64POU
Program type		Task type 1
Program processing capacity	Control loop	8 loop
	Program capacity	6k steps
	Performance[3]	1 loop/100ms 8 loops/500ms
Main scan cycle		50 ~ 5000ms (at 50-ms increments)
Engineering Tool		Ethernet connection (modular connector)
Power failure decision		None(only long interruption)
Network service		Ethernet, EC BUS (MODBUS-RTU base)
Inter-controller transmission		Ethernet : 64W×32 station/1sec cycle EC BUS : V parameter 32 (16 station or less/ within 4 seconds) (31 statsion or less/within 8 seconds)
Self-diagnosis function		Watchdog timer(WDT)monitor, memory diagnosis(RAM/ROM), peripheral LSI diagnosis, board revision management, analog input diagnosis, MV read-back diagnosis
Monitor function		Program congestion monitor, battery monitor
Alarm function		System alarm, process alarm
Maintenance function		Online monitor system logs (error log, event log, intervention event logs, transmission event log)

Engineering tool, Option software

Engineering tool	nV-Tool4(LC53x[4])(model : HET8LE4SS)
Engineering tool Add in software	New Function Block Library(MCS type)(model : GET9NEMSS)
nv-ADCOP	Process control optimizer (model : HET8CB1SS)

General Specification

Electrical conditions	Power supply		24Vdc +10%-15% (ripple of 1% or less)
	Consumption power		Main unit power supply: 24VDC-Approx.0.2A DI/O power supply: 24VDC-50mA or less
	Allowable instantaneous interruption time		1ms or less
	Memory backup		Data retention : 1year(Lithium battery)temperature 25°C
	Online installation and removal		Online installation and removal of the LC53[4] main unit can be done. Installation/removal from the housing
Casing	External dimensions	LC53x[4]E*S	72W×144H×250D(mm)
		LC53x[4]S*S	72W×144H×450D(mm)
	Weight	LC53x[4]E*S	Approx. 2kg
		LC53x[4]S*S	Approx. 3.5kg
	Panel cutout dimensions		68W×138H(mm) square hole, plate thickness 8mm or less
	Panel material		Panel: ABS resin (UL94-V0)-Black Case: Iron plate-Black paint
	External line terminal block		Power supply, signal, RS485 transmission: M3.5 screw terminals Ethernet□RJ45 connector
	Draw-out operation of LC53x[4] main unit		Fixed/draw-out operation is possible with 2-stage stopper mechanism

I/O Specifications

Analog input (AI1 to 6)	Number of input points	6 points
	Input range	1 to 5Vdc (Signal common terminalSC, terminal No.6)
	Insulation unit	No insulation between channels
	Input impedance	During energization: 1MΩ or more During power down: 1MΩ or more
	Resolution	16bit
	Conversion data	12800 to 64000 counts/1-5Vdc
Operation output (MV1,2) (LC531 only)	Number of output points	2 points
	Output range	4 to 20mA (Powersupply common 0V, Terminal No.3, 26)
	Insulation unit	No insulation between channels
	Resolution	16bit
	Conversion data	12800 to 64000 count/4 to 20mAdc
	Load resistance range	0 to 600Ω
Analog output (AO1,2)	Number of output points	2 points
	Output range	1 to 5Vdc (Signal common terminal SC, terminal No. 6)
	Insulation unit	No insulation between channels
	Resolution	16bit
	Conversion data	12800 to 64000 count/1 to 5Vdc
Digital input (DI1 to 3)	Number of output points	3 points
	External signal	No voltage contact (external 24V 5mA±20% at contact ON)
Digital output (DO1 to 5)	Number of output points	5 points
	Output type	FET open-drain output
	Maximum rating	30V-0.1A
WDT output	Number of output points	1 point
	Output type	FET open-collector output
	Output signal	Normally "ON", In case of an error "OFF"
	Maximum rating	30V-0.1A
Pulse output(PO) (LC532 only)	Number of output points	1 point (open, close)
	Output form	Pulse width output
	Output type	FET open-drain output
	Output signal	Low speed: 0.072×n-sec/control-period High speed: 0.009×n-sec/control-period
	Maximum rating	30V-0.1A

- The specifications and design in this catalog are subject to change without notice due to their design change or other reason.
- The content of this catalog shows the information as of July 2013.
- Inlaid composite images are used for this catalog.
- The names of products listed in this catalog may be used by each company as their trademark.

Environment Specification

Environment conditions	Operating ambient temperature	0 to 55°C
	Storage temperature	-40~70°C
	Relative humidity	10% to 95% Level RH2 (with no condensation)
	Dust	0.3mg/m3 (no conductive dust)
	Corrosive gas	No corrosive gas shall be present.
	Vibration resistance	$5 \leq f < 9Hz$: Half amplitude of 3.5mm $9 \leq f < 150Hz$: Constant acceleration of 9.8m/s²
	Impact resistance	147m/s²
	Altitude	2000m or less
	Grounding	Type-D grounding
	Installation location	Inside an indoor control panel
	Cooling	Natural cooling

Tag specifications

Tag meter variable	No. of points	Explanation
Display(PV)	48	Variables for analog input (instantaneous value, integrated value).
Control(LP)	8	Variables for analog output. LP is used with PV.
Push button (PB)	32	Tags for digital input/output.

Ethernet Transmission Specifications

Transmission Path specifications	Function	Connection between PLC server, OIS-DS/SMART, LC53x[4], and nV Engineer Tool4
	Standard	10Base-T,100Base-TX
	Topology	Star type
	Protocol	PCMP
	Transmission speed	10Mbps/100Mbps
	Length of transmission path	10Mbps : Max.100m 100Mbps : Max.40m
	Connection connector	RJ45 modular connector
	No. of units connected to LC531	OIS-DS/SMART : 32 PLC server : 64
	Insulation	Insulation between power supply and internal circuit
Transmission cable		UTP cable (Cat5e or more)

USB specification

Transmission path specifications	Standard	USB2.0
	Function	Connection to nV Engineer Tool 4
	Topology	1:1
	Transmission speed	12Mbps
	Length of cable	2m
	Insulation	Insulation between power supply and internal circuit

USB Cable Specifications

Standard	USB2.0 (full speed)
PC side connector	USB, Terminal A (male)
LC531 side connector	USB, Terminal B (male)
Length of cable	2m or less (Extension cable cannot use)

RS485 Communication Specifications

Transmission path specifications	Specifications	ECBUS/H
	Function	Connection between LC53x[4] and EC329
	Standard	RS485
	Topology	Bus type
	Protocol	ECBUS (MODBUS base)
	Transmission speed	300/1200/2400/4800/9600/19.2K/38.4K/208K (bps)
	Length of transmission path	300 ~ 19.2K(bps):1Km 208K(bps):200m
	Connection type	M3.5 screw terminal block
	Number of Station	32(including host devices)
	insulation	insulation between power supply and internal circuit
Communication method		2-line method
Transmission method		Asynchronous
Transmission cable		Twisted pair cables with shield

*3:Depend on applications.
*4:LC53x represents LC531 and LC532.

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  [Example]
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Contact Information

TOSHIBA
TOSHIBA CORPORATION
Social Infrastructure Systems Company
Automation Products & Facility Solution Division
TEL. +81-3-3457-4894 FAX. +81-3-5444-9409
1-1, Shibaura 1-chome, Minato-ku, Tokyo 105-8001, Japan (Toshiba Building)

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