

Small-to-middle Scale PLC [type1 light]

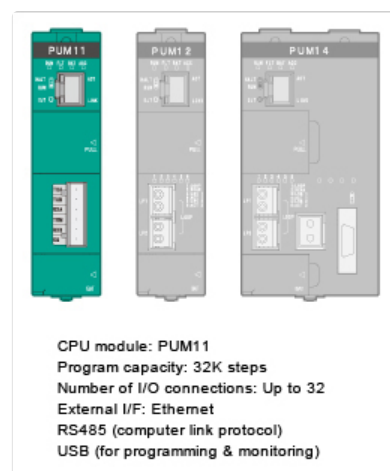
The Integrated Controller V series Model 2000 Sequence Control Module S2 (S2) has a proven track record in a wide range of fields as the core component of social infrastructures and industrial systems. As well as handing down existing assets such as S2 applications, I/O and wiring, type1 light offers enhanced control performance and supports transition to next-generation control systems.



Standard Sequence Control Module type1 light S

The type1 light S CPU mounts in a standard V2000 I/O rack (3 I/O, 5 I/O or 8 I/O racks are available). It can replace a S2E module.

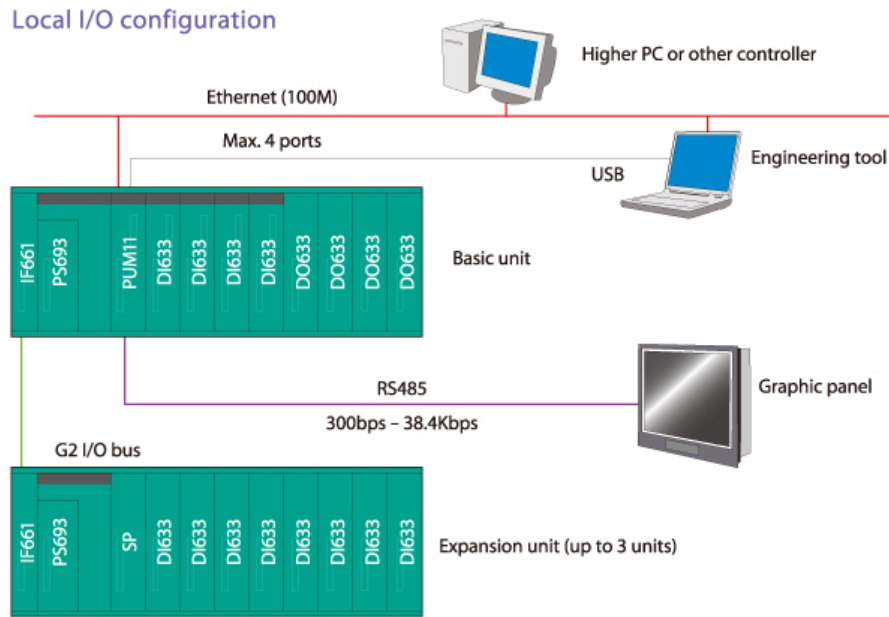
The type1 light S does not support racks with station bus, or I/O modules that require a station bus.



Compact CPU Module

The type1 light S CPU has both a RS485 port and an Ethernet port which supports Toshiba's ASCII computer link protocol.

Basic System Configuration



Local I/O unit

BU668 Basic base

PUM11 CPU module

IF661 G2 I/O interface

PS693 Power source unit

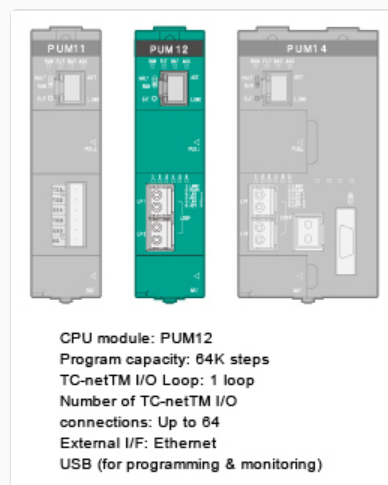
DI633 G2 I/O DI 16 points

DO633 G2 I/O DO 16 points

BU668 Expansion base

High-Performance Sequence Control Module type1 light H

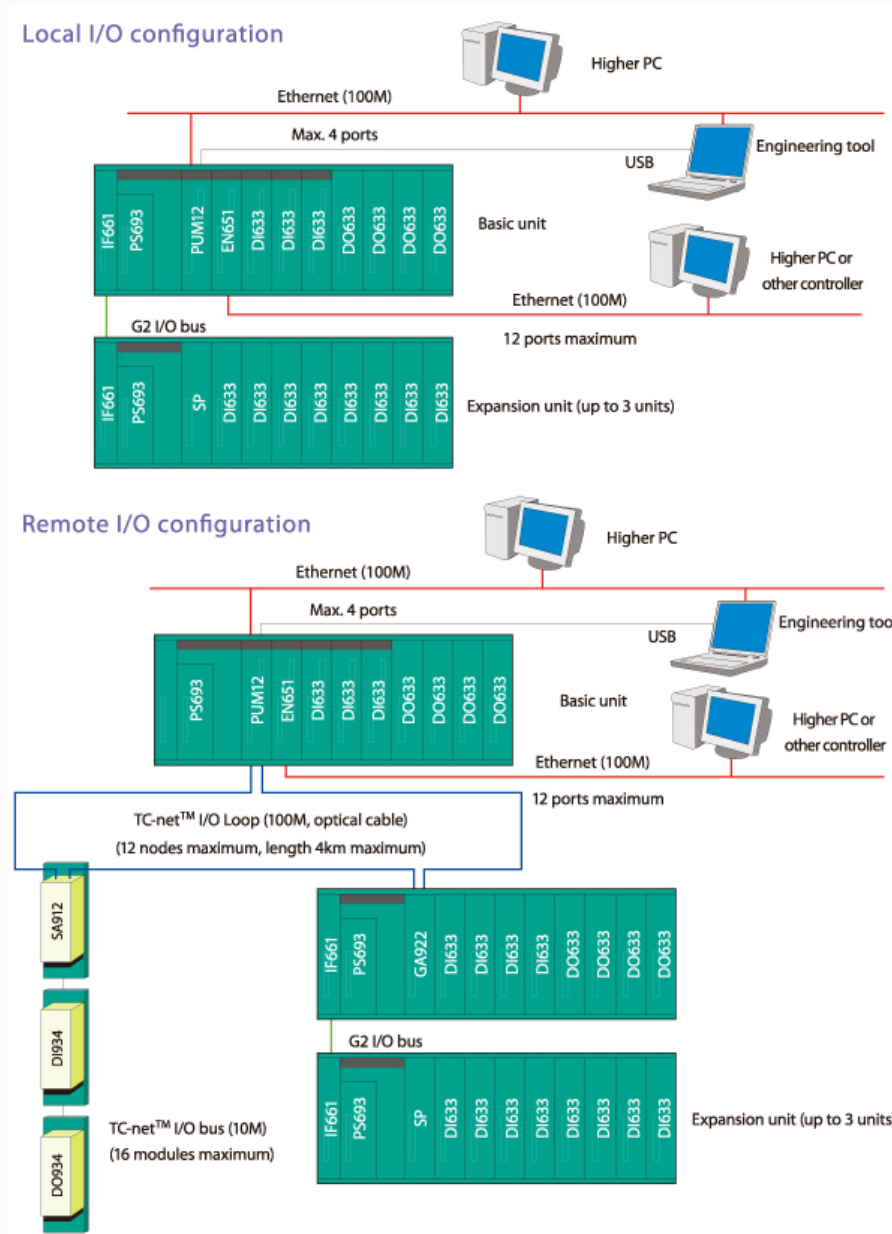
The Unified Controller nv series™ TC-net™ I/O is built-in to the type1 light H CPU. It can be applied to I/O systems to provide enhanced performance. The master station, built into the CPU module, enables direct connection of the TC-net™ I/O loop. A 4 km-long remote I/O system than can be installed at low cost. The connected I/O can be selected from Integrated Controller V2000 series I/O (G2 I/O) or Unified Controller nv series™ TC-net™ I/O.



Remote I/O System Configuration

TC-net™ I/O collects and controls remote field I/O in real time. The TC-net™ I/O is a high-speed, robust communications I/O system which uses a fiber optic cable which is highly resistance to electrical noise.

Basic System Configuration



Local I/O

- BU648E Basic base
- PUM12 CPU module
- IF661 Expansion interface
- PS693 Power source module
- EN651 Ethernet 100M
- DI633 G2 I/O DI 16 points
- DO633 G2 I/O DO 16 points

Local I/O unit

- BU648E Basic base
- PUM12 CPU module
- IF661 Expansion interface
- PS693 Power source module
- EN651 Ethernet 100M
- DI633 G2 I/O DI 16 points
- DO633 G2 I/O DO 16 points

BU668 Expansion base

BU901 TC-net™ I/O adapter base

SA912 TC-net™ I/O adapter

BU905 TC-net™ I/O base

DI934 TC-net™ I/O DI 32 points

DO934 TC-net™ I/O DO 32 points

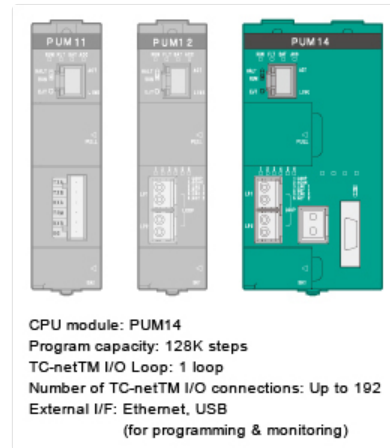
BU668 Expansion base

GA922 G2 I/O adapter

Redundant Sequence Control Module type1 light D

The type1 light D CPU supports redundancy. Redundancy enables greater productivity by providing the highest system availability. With a program capacity of 128K steps and the ability to connect up to 192 I/O modules, the type1 light D is ideal for critical medium and large-scale systems.

The module can also be used in a single module configuration.

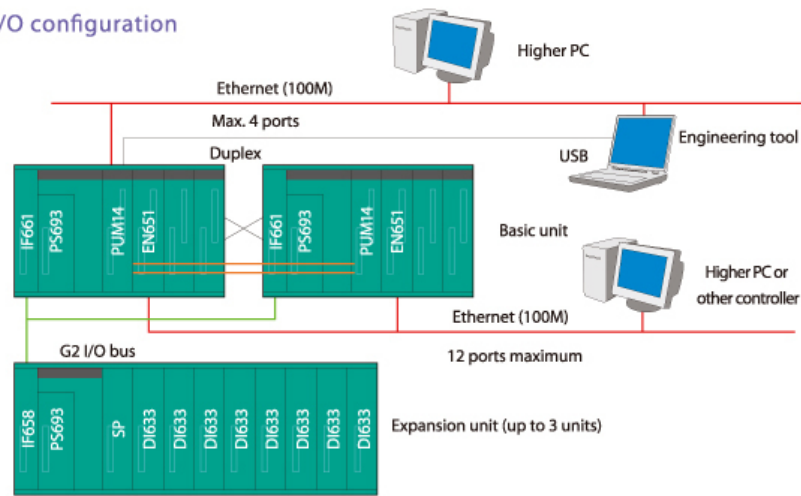


High Performance and Critical System Reliability

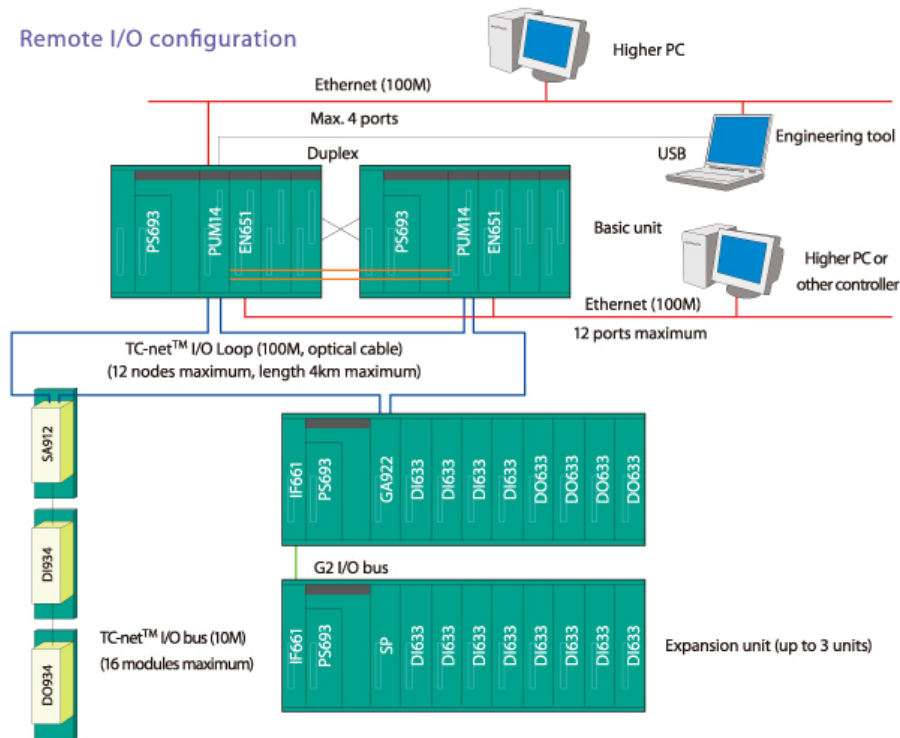
Automatic switching to the secondary CPU occurs if a problem is detected in the primary CPU.

Duplex System Configuration

Local I/O configuration



Remote I/O configuration



Local I/O

- BU643D** Basic base
- PUM14** CPU module
- IF661** Expansion interface
- IF658** Expansion interface (2 ports)
- PS693** Power source module
- EN651** Ethernet 100M
- BU668** Expansion base
- DI633** G2 I/O DI 16 points
- DO633** G2 I/O DO 16 points

Local I/O unit

- BU643D** Basic base
- PUM14** CPU module
- IF661** Expansion interface
- PS693** Power source module
- EN651** Ethernet 100M
- BU668** Expansion base
- GA922** G2 I/O adapter
- DI633** G2 I/O DI 16 points
- BU901** TC-net™ I/O adapter base
- DO633** G2 I/O DO 16 points
- SA912** TC-net™ I/O adapter
- BU905** TC-net™ I/O base
- DI934** TC-net™ I/O DI 32 points
- DO934** TC-net™ I/O DO 32 points

Environmental specifications

Item	Specifications
Operating ambient temperature	0 - 55°C (24-hour average temperature 40°C or less)
Storage temperature	-40~70°C*1
Relative humidity	5-95% RH (with no condensation)
Dust	0.3mg/m ³ (no conductive dust)
Pollution degree	2 or less IEC 61131-2/JIS B 3502
Corrosive gas	No corrosive gas shall be present*2
Vibration resistance	5<=f<8.4Hz: 3.5mm, 8.4<=f<150Hz: 9.8m/s2 (Compliant with IEC 60068-2-6 / JIS C 60068-2-6, test Fc)
Impact resistance	147m/s2 (Compliant with IEC 60068-2-27 /JIS C 60068-2-27, test Ea)
Noise resistance	5<=f<8.4Hz: 3.5mm, 8.4<=f<150Hz: 9.8m/s2 (Compliant with IEC 60068-2-6 / JIS C 60068-2-6, test Fc)
Insulation resistance	DC500V mega 10MΩ or more*3
Withstand voltage	AC2000V per minute*3
Grounding	100Ω or less (type D grounding)
Cooling system	Natural cooling

*1 For long-term storage, spare parts should be kept in a dark place away from high temperature and humidity. The temperature and humidity for storing products for long periods should be 0-40°C and 20-80% RH (with no condensation) and the rate of temperature change should be no higher than 10°C/h. The service life of batteries and power sources, in particular, may be affected by high ambient temperature. Store at room temperature (25°C) or below.

*2 No materials containing silicon; hydrogen sulfide, sulfurous acid gas, chlorine gas, nitrogen oxide (Nox), sulfur oxide (Sox), ammonia, silicon gas, etc.

*3 Power terminal - ground terminal

Function specifications

Item		Specifications		
		type1 light S	type1 light H	type1 light D
Control system		Stored program cyclic scan system		
Processor	Control processor		32 bit general purpose processor	
	Language processor		Exclusive language processor (LP)	
Execution method	Scan method	Ultrafast scan	1 - 500ms (1ms unit)	
		High-speed scan	1 - 500ms (1ms unit)	
	Main scan	Floating scan	Selectable	
		Scheduled scan	1 - 1000ms (1ms unit)	
	Input/output system		Batch input/output: Yes (only MS task synchronized), direct input/output: Yes	
Interruption	I/O	Number	8	
	Multiple interrupt function	I/O multiple interrupt	Not possible	
	Interrupt response		1ms or less	
Program type		EV/SS/IP/HS/MS		
Program capacity		32K steps	64K steps	128K steps
Number of tasks/programs		EV	8 tasks, 1 program/task	
		SS	1 task, 1 program/task	

Item		Specifications			
		type1 light S	type1 light H	type1 light D	
		IP	8 tasks, 1 program/task		
		HS	1 task, 128 programs/tasks		
		MS	1 task, 256 programs/tasks		
Data volume	Local/global variables		64KW	96KW	128KW
	Special register (S)		1KW		
	Data register (D)		8KW		
	Station global variables		-		
	I/O variables (IQ)		3KW	3KW	8KW
	Index register		8 types		
Number of timers		Arbitrary size setting function for user data domain			
I/O [G2 I/O]	Number of connections	System	1 system		
		Maximum number of units	4 units (1 basic + 3 expansion)		
		Maximum number of slots	32 slots	32 slots	31 slots (single) / 24 slots (dual)
	Batch input/output	I/O update time	22μs/W or less (at 64-point I/O, 4 consecutive accesses)		
		Transmission update time	22μs/W or less (at 64W consecutive accesses)		
	Direct input/output	Instruction time	10μs/W or less		

Item			Specifications		
			type1 light S	type1 light H	type1 light D
		Transmission update time	15μs/W or less		
TC-net I/O Loop			-	1 loop (up to 12 nodes)	1 loop (up to 12 nodes)
I/O [via TC-net I/O Loop]	Maximum number of G2 I/O points		-	12 nodes, 64 slots	12 nodes, 192 slots
	Maximum number of G3 I/O points		-	1 node, 77 slots	1 node, 77 slots
	Maximum number of TC-net I/O points		-	12 nodes, 64 slots	12 nodes, 192 slots
Program languages			LD (ladder diagram), FBD (function block diagram), SFC (sequential function chart), ST (structured text)		
Execution speed	Bit	Contact	0.08μs	0.04μs	0.04μs
		Coil	0.16μs	0.08μs	0.08μs
	Integer	Transmission	0.08μs	0.04μs	0.04μs
		Calculation	0.08μs	0.04μs	0.04μs
		Multiplication	0.24μs	0.12μs	0.12μs
	Floating	Calculation	0.4μs	0.2μs	0.2μs
		Multiplication	0.4μs	0.2μs	0.2μs
	System configuration			Single	Single
Ethernet	Channel		1ch built-in (100Mbps)	1ch built-in, via external EN module (100Mbps)	
	Tool connection		Possible (built-in)	Possible (built-in/EN651A)	
	Computer link		Possible (built-in)	Possible (built-in/EN651A)	

Item		Specifications		
		type1 light S	type1 light H	type1 light D
	Socket communication	Possible (built-in)	Possible (built-in/EN651A, EN911)	
	PC link	Possible (built-in)	Possible (built-in/EN651A)	
RS485	Channel	1ch built-in (300bps - 38.4Kbps)	-	-
	Tool connection	Impossible	-	-
	Computer link	Possible	-	-
	Free port	Impossible	-	-
USB	Channel	1ch built-in		
	Tool connection	Possible		
	Computer link	Impossible		
	Free port	Impossible		
Support network	Station bus	-	Ethernet, TOSLINE-S20, TOSLINE-S20LP	
	G2 I/O bus	TOSLINE-S20, TOSLINE-F10, TC-net 100LP, FL-net, Profibus, DeviceNet		
	TC-net I/O	-	TC-net 100LP, FL-net, Profibus, MODBUS RTU, Ethernet	
RAS function	Diagnosis	Battery check, I/O non-sync, I/O parity check, I/O package check, language processor function check, unauthorized order detection, WDT, peripheral LSI check, etc.		
	Surveillance	Logs (error log, event log, transmission event log), program execution time measurement, program congestion detection		
	Debugging & maintenance	Program monitor, data tracing, input/output force		

(Caution)

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