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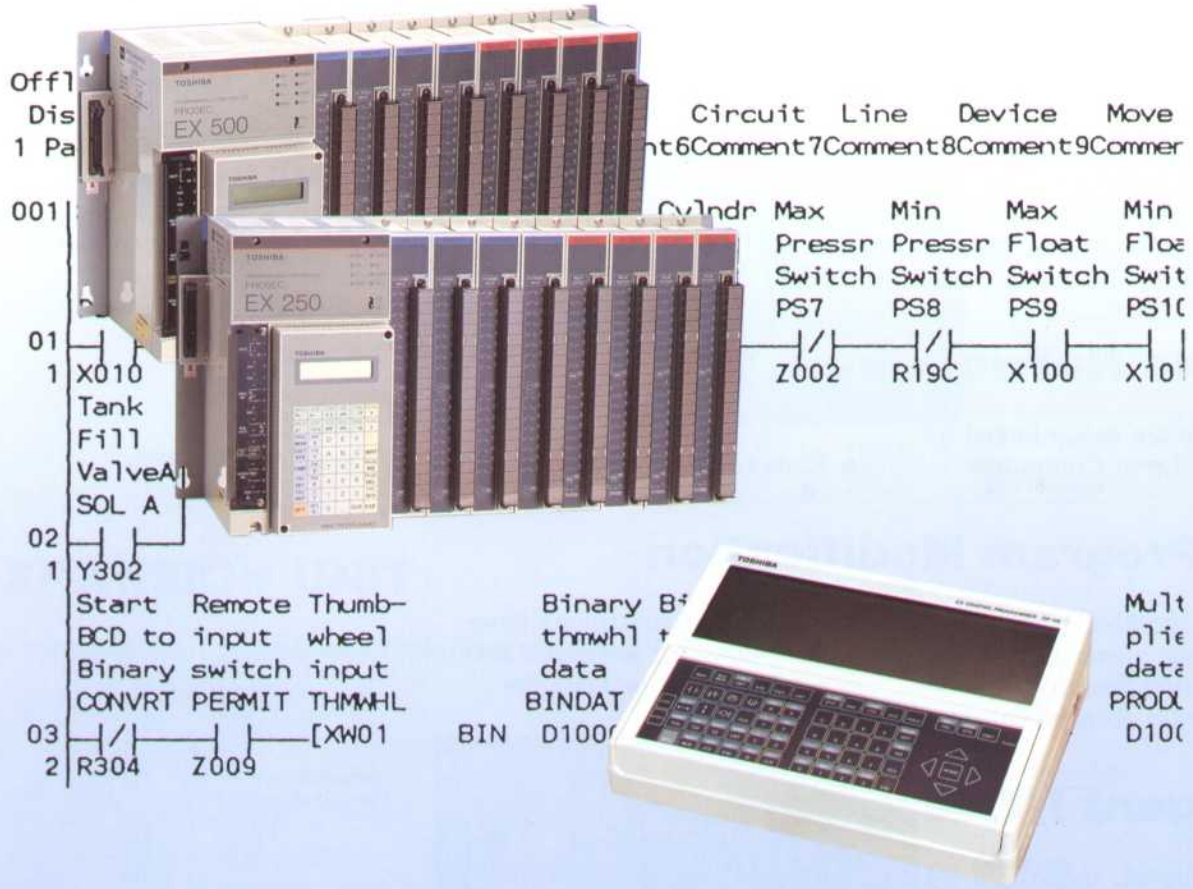
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TOSHIBA

EX250/500

PROGRAMMABLE CONTROLLERS



Enhanced Features

- High Speed Scanning
- On Line Programming
- On Line Program Saving
- Optional Clock-Calendar

FEATURES

Fast Scan Time

The EX250/500 uses a 16 bit microprocessor and custom Toshiba integrated circuits to significantly reduce program scan time.

TWO CPU TYPES

The only difference between the EX250 and the EX500 is the CPU card

	EX250	EX500
• Application Memory	4K steps	8K steps
• Execution Speed	1.1 μs/contact 65 μs/16 bit addition	0.75 μs/contact 65 μs/16 bit addition
• Max Local I/O	256 points	512 points

Advanced Instruction Set

There are 15 basic relay ladder instructions and 64 special function block instructions. The function blocks include instructions for performing:

- Arithmetic Operations
- Data Manipulation
- Trig. Functions
- Register Logic
- Comparisons
- Upper/Lower Limit
- Min/Max/Avg.
- Step Sequencer
- Shift Register
- Function Generator: Given x, solve for f(x) where f(x) is interpolated based on a pre-entered set of x, y points.

Flexible Networking

EX250/500's are easily linked to:

- Higher Level Computers
- Remote I/O Stations
- Other EX250/500's

Easy Program Modification

Testing and modifying logic programs is simple. All controllers have:

- Real time power follow monitor
- Instruction Search
- On-line (in Run mode) program edit
- Forced I/O
- Data Set

Intelligent I/O Modules

Several intelligent, specialized I/O modules are available:

- ASCII/Basic Module
- High Speed/Quadrature Input Module
- 4 Channel PID Control Module
- Motion/Stepper Control Module

Clock Calendar

The clock calendar function allows data gathering based on time, time scheduled operations, etc. Time is kept by:

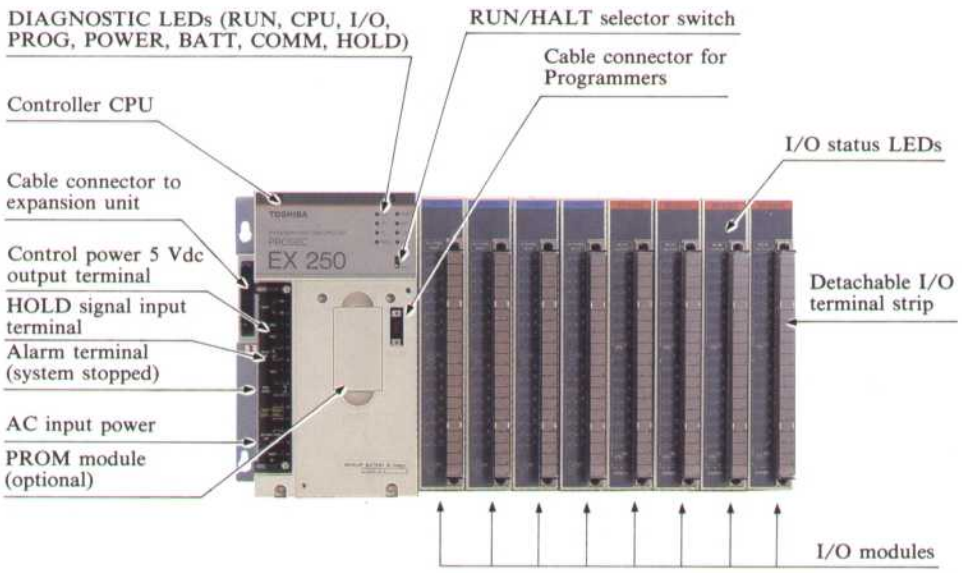
- Second
- Minute
- Hour
- Day
- Month
- Year

The compact modular structure of the EX250/500 is designed for easy installation. Diagnostic LEDs are immediately visible, and components can be readily removed and replaced.

CONTROLLER UNIT

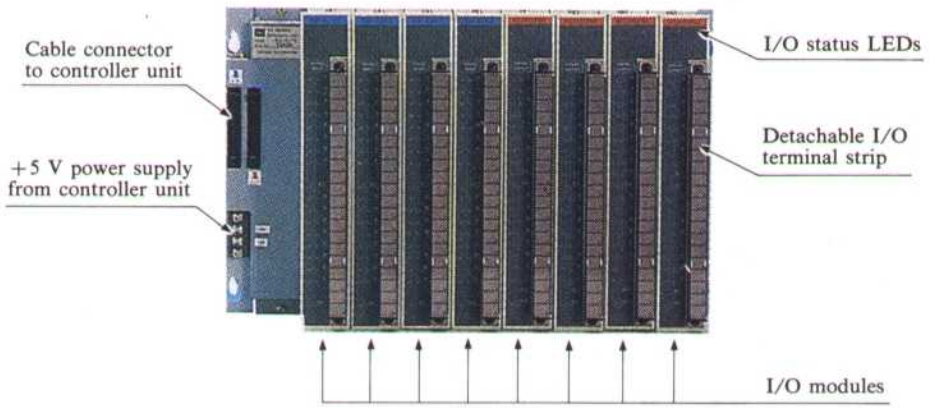
The only difference between the EX250 controller and the EX500 controller is the CPU card. The controller unit consists of:

- CPU which contains
  1. CPU Card.
  2. Power Supply Card.
  3. Space for Optional Computer Interface Card
- Backplane which contains space for 8 I/O Modules



EXPANSION UNIT

The expansion unit consists of a backplane and space for additional I/O modules.

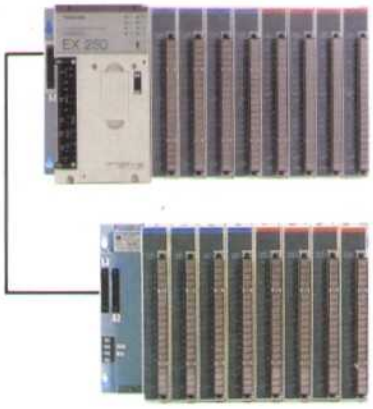


I/O EXPANSION CAPABILITY

EX250

One (1) expansion unit can be connected to each EX250 controller. A total of 16 I/O slots are available. If 32 point I/O modules are used, all the discrete I/O can be located on the controller leaving the expansion unit available for register type I/O (Analog, PID, BCD, etc.)

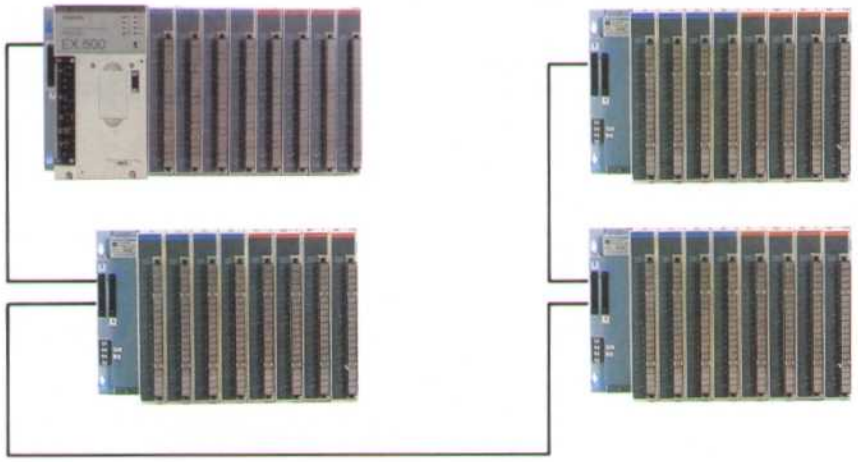
Local I/O
- 256 points or
- 32 registers



EX500

Three (3) expansion units can be connected to each EX500 controller. A total of 32 I/O slots are available. If 32 point I/O modules are used, all the discrete I/O can be located on the controller and the first expansion unit leaving the last two expansion units available for register type I/O (Analog, PID, BCD, etc.).

Local I/O
- 512 points or
- 64 registers



Notes: 1) A 0.5 m expansion cable is shipped with each expansion unit. Optional 1 m expansion cables are also available. Total cable length should be less than 2 m.

2) Four types of expansion units are available

EU-6257	480 mm width, 8 slots, with AC power supply
EU-6257D	480 mm width, 8 slots, with DC power supply
EU-6279	390 mm width, 8 slots, no power supply
EU-6278	240 mm width, 4 slots, no power supply, termination only

If total 5 Vdc current consumption will exceed 4.5 A, the expansion unit with power supply must be used.

NETWORKING

TOSLINE-30/30OP

TOSLINE-30 is an N-to-N data link system dedicated to the EX-series of programmable controllers. The TOSLINE-30 data communication modules allow EX250/500's to be set-up in a peer-to-peer configuration, master-to-slave configuration, or to use remote I/O.

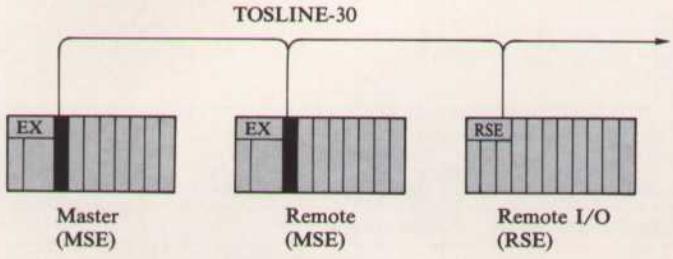
Controller Station (wire)
(MSE-5626)



Remote I/O Station (wire)
(RSE-5618)

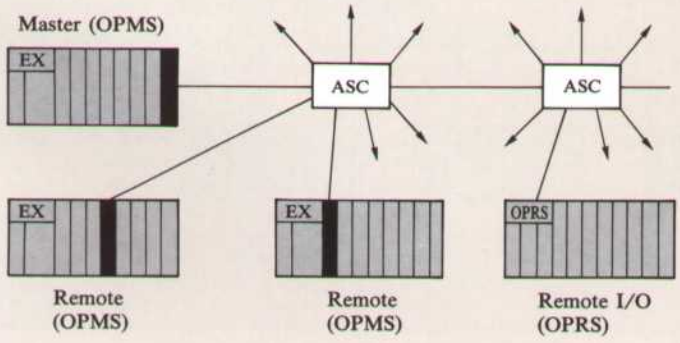


Wire System (TOSLINE-30)



Topology	Party line (multi-drop)
Transmission speed	187.5K bps
Transmission distance	1 km maximum (total)
No. of stations	17 maximum
Transmission capacity	8/16/32 registers (cyclic)
Response speed	25 ms/32 registers
Checking method	Inverted double transmission
Cable	Shielded twisted pair

Optical Fiber System (TOSLINE-30OP)



Topology	Star
Transmission speed	375K bps
Transmission distance	2 km maximum (stn-stn)
No. of stations	16 maximum
Transmission capacity	8/16/32 registers (cyclic)
Response speed	19.2 ms/32 registers
Checking method	Inverted double transmission
Cable	Optical fiber cable

ASC: Active Star Coupler

Computer Link

The optional computer link card allows up to 8 EX250/500's to be networked on one RS422 serial link back to a personal computer, cell controller, or other higher level computer. The computer can run Toshiba's EXPDD programming software, various graphics display and data acquisition software, or user designed custom software.

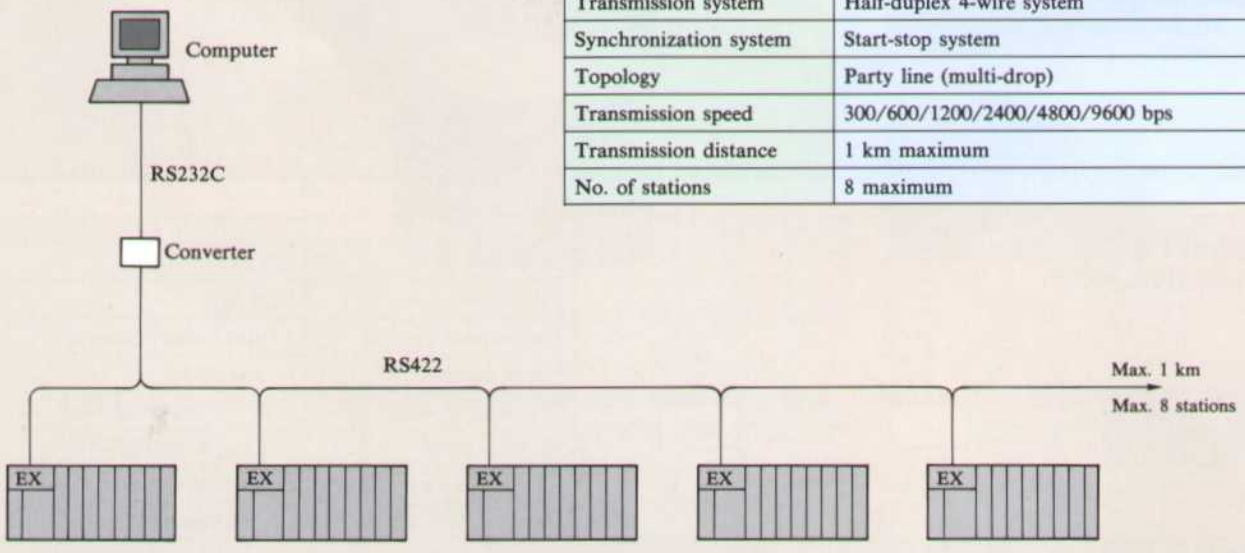
Computer Link Module
(CMP-6236)



EX250/500

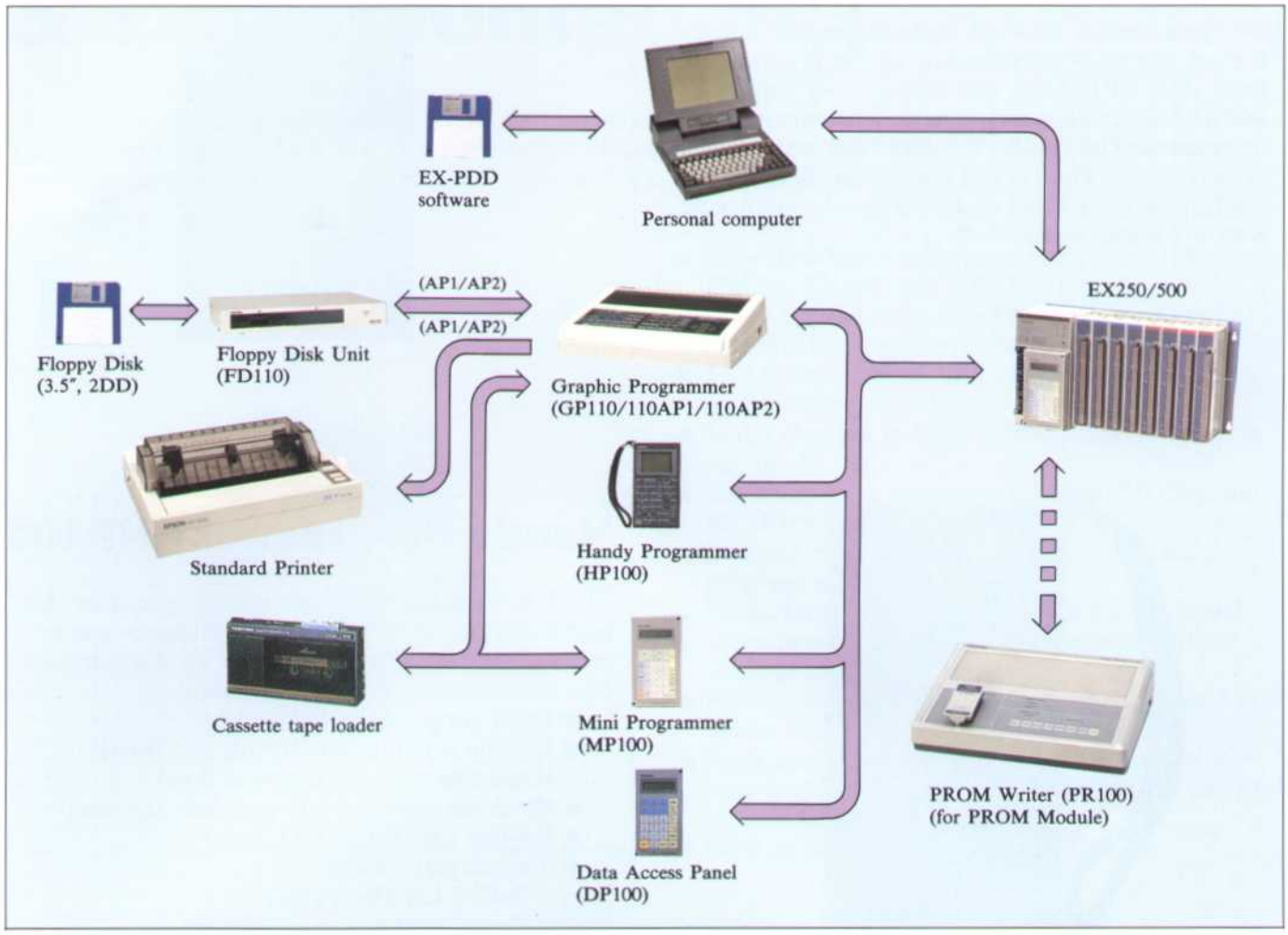


System Configuration



Interface	Conforms to RS-422
Transmission system	Half-duplex 4-wire system
Synchronization system	Start-stop system
Topology	Party line (multi-drop)
Transmission speed	300/600/1200/2400/4800/9600 bps
Transmission distance	1 km maximum
No. of stations	8 maximum

PERIPHERALS



PROM Module

There are two types of PROM Modules which can be used with the EX250 and EX500 controllers.

- PROM6258 UV erasable PROM. The PROM6258 requires the PR100 PROM writer for programming and a separate ultra violet PROM eraser for clearing.
- PROM6260 Electrically erasable PROM. The PROM6260 can be directly programmed and erased by all Ver. 2, or later, EX250 and EX500 controllers.



Data Access Panel DP100

The DP100 is used primarily for viewing and changing timers, counters and data register values. It does not allow modification of the program logic. The DP100 can also display user defined ASCII diagnostic messages and list their order of occurrence. The display is backlit for easy viewing in dark areas. The DP100 can mount directly on the face of the EX250 or EX500, or be connected with a 2 meter cable.





Handy Programmer HP100

The HP100 is hand-held graphic programmer. Its portability makes it ideal for maintenance use at remote locations. The HP100 has all the features of a full size programming terminal.

- Enter programs in ladder logic
- On-line program monitor & edit (logic intensifies to indicate power flow)
- Block monitor for I/O and data registers
- On-line data set & I/O force
- Two display modes
  - Full: 5 lines by 11 col.
  - Zoom: Full device description

Graphic Programmer GP110

The GP110 has a large dot matrix LCD screen that displays 7 lines by 11 columns. Logic lines intensify to indicate power flow. Device type, device address, current values in timers and counters, and data register values are shown during program execution. The GP110's advanced features include:

- Backlit screen
- On-line programming
- Stand alone programming (AP1 & AP2)
- Floppy disk drive interface (AP1 & AP2)

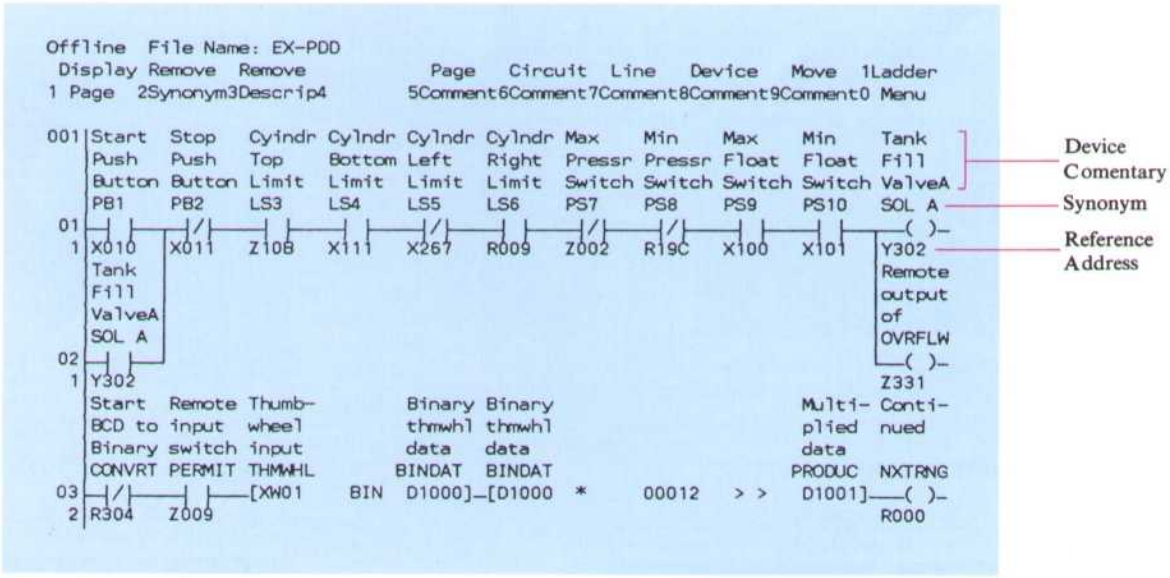


EX Program Development & Documentation (EX-PDD™)

Naturally it is possible to write and save EX250/500 programs on a personal computer. The EX Program Development and Documentation software (EX-PDD) runs on any IBM®-PC, XT, AT, PS/2 personal computer and most IBM-PC compatibles such as Toshiba's laptop computers.



- Same EX-PDD Software supports EX100, EX250, EX500 and EX200B PLC's.
- Write Ladder/Function Block programs off-line (PC disk) or on-line (EX250/500 memory).
- Full-feature ladder editor includes move, copy, insert, delete, search, etc.
- Make changes in EX250/500 program while in run mode.
- Load and Save programs between PC disk and EX250/500.
- Monitor power-flow status of on-line ladder program and register values.
- Force I/O and coils on or off from keyboard.
- Document programs with commentary while viewing ladder logic.
- Print ladder program with commentary and in-ladder coil cross reference.
- Print map options such as register values, instruction usage, device usage, forced devices, full cross reference, etc.
- Built-in Modem initialize and Dial-up.



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SPECIFICATIONS

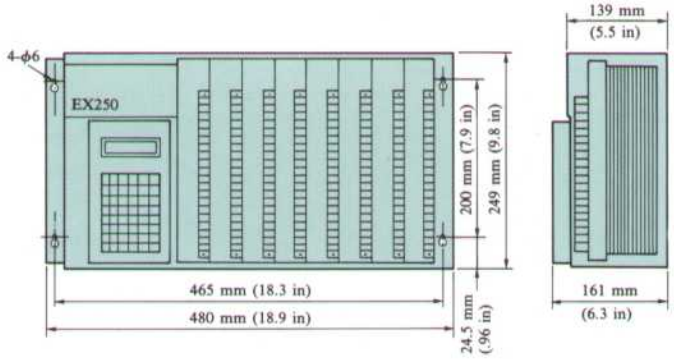
Toshiba's many years of experience in semiconductor technology and solid-state electronics have resulted in the production of versatile, highly efficient programmable controllers.

General Specifications

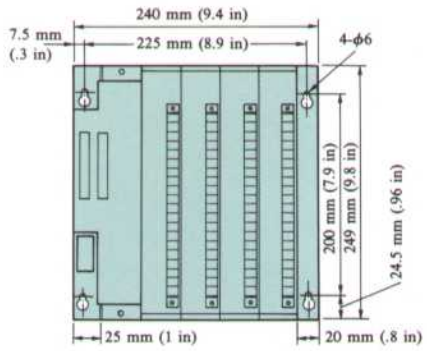
Item		EX250/500
Power supply voltage		100 – 120/200 – 240 Vac (+10/−15%) — 50/60 Hz, 24 Vdc (+20/−15%)
Power consumption		Less than 50 VA (per power supply module)
Allowable power interruption		Less than 10 ms for normal operation
Temperature	Operation	0 – 55°C (32° – 131°F)
	Storage	−20 – 75°C (−4° – 167°F)
Humidity		20 – 90% RH, no condensation
Vibration		16.7 Hz, 3 mmp-p
Shock		10 G in X, Y, Z directions, respectively 3 times
Noise immunity		1000 Vp-p 1 μs, NEMA ICS3-304
Grounding		Less than 100 Ω to ground
Atmosphere		No corrosive gases
Dust density		Less than 10 mg/m^3
Withstand voltage	Power supply	1500 Vac for 1 min.
	Input/output	1500 Vac for 1 min. (digital I/O)
Approx. weight		4 kg (8.8 lb) ..... Basic unit 8 – 10 kg (17.6 – 22 lb) ..... Basic unit w/ 8 I/O modules 2 kg (4.4 lb) ..... Expansion unit w/o power supply
Cooling		Natural air-cooling

External Dimensions

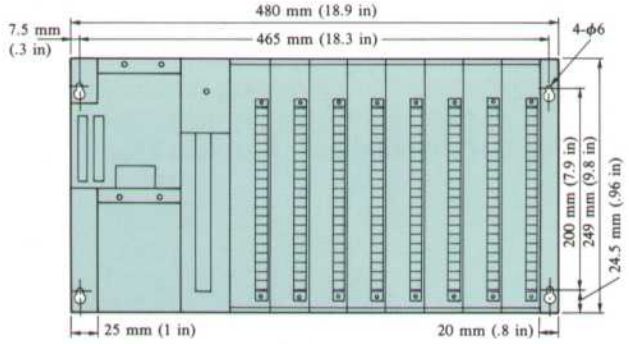
- Basic unit



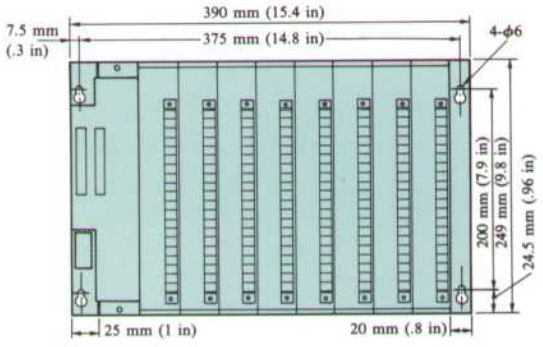
- 4-slot expansion unit



- Expansion unit w/ power supply



- Expansion unit w/o power supply



Functional Specifications

Item		EX250	EX500
Control method		Stored program cyclic scan	
Input/output control		Batch I/O (immediate I/O instruction is also available)	
Programming		Ladder network with relay symbols and function blocks	
Memory	Program capacity	4K steps	8K steps
	Memory type	CMOS RAM (with battery backup)/EPROM/EPROM (ROMs are option)	
	Battery life	Lithium battery 5 years (25°C)	
Processing speed		1.1 μs/relay contact 65 μs/16-bit addition	0.75 μs/relay contact 65 μs/16-bit addition
I/O registers		256 points contained in 16 registers	512 points contained in 32 registers
		32 registers total (1 register = 16 points)	64 registers total (1 register = 16 points)
Number of instructions		15 basic and 64 special functions	
Internal relays/registers	Auxiliary relays/registers	960 points contained in 60 registers (64 special relays contained 4 registers)	
	Link relays/registers	512 points contained in 32 registers	
	Timers	120 (0.1 – 3276.7 sec), 8 (0.01 – 327.67 sec)	
	Counters	96 (1 – 65535 counts)	
	Data registers	1536 registers	
	Special relays	Link status, Clock pulses, Alarm status, Self diagnostics, etc. (64 points total)	
	Retentive registers	Auxiliary relays/registers, timers, counters and data registers can be designated to maintain data upon power failure	
Clock-calendar (option)		Year, month, day, hour, minute, second	
Communications		Computer link (RS422) PC link & remote I/O (TOSLINE-30)	
Self diagnostics		CPU, RAM, ROM, I/O response, Watchdog timer, Power supply voltage, Battery voltage, Scan time, I/O setting and Illegal instruction	
CPU control input/output		RUN healty output: relay output (250 Vac/24 Vdc – 2 A) HOLD input: dry contact input (24 Vdc – 10 mA)	
CPU status indicators		RUN: lit when running CPU: lit when CPU is normal I/O: lit when I/O's are normal PROG: lit when program is normal	POWER: lit when power is normal BATT: lit when battery is normal COMM: flickers during communication HOLD: lit when HOLD input is ON
Peripherals	Programming	EX-PDD (software package for personal computer) Graphic Programmer (GP110/GP110 AP1/110AP2) Handy Programmer (HP100) Mini Programmer (MP100)	
	Maintenance tool	Data Access Panel (DP100)	
	Others	PROM Writer (PR100) — for use of UV-PROM module	

PROGRAMMING

Toshiba's experience in industrial controls (robotics, process computers, etc.) has resulted in a very wide range of programming instructions available on the EX250/500. There are 15 basic instructions, contacts, coils, timers, counters, etc. for standard relay ladder logic. There are also 64 special functions such as word logic functions, compare functions, trigonometric functions, math functions, etc.

	No.	Instruction	Symbol and Description		Steps of Memory
Basic instructions	1	NO CONTACT	—| |— Ⓐ	Normally open contact	1
	2	NC CONTACT	—|/|— Ⓐ	Normally closed contact	1
	3	COIL	—( )— Ⓐ	Relay coil	1
	4	FORCED COIL	—*( )— Ⓐ	Coil is forced ON or OFF	1
	5	TRANSITIONAL CONTACT	—|↑|— Ⓐ	Rising transitional contact	1
	6	TRANSITIONAL CONTACT	—|↓|— Ⓐ	Falling transitional contact	1
	7	MCS	—[MCS]—	Master control set	1
	8	MCR	—[MCS]—	Master control reset	1
	9	JCS	—[JCS]—	Jump control set	1
	10	JCR	—[JCR]—	Jump control reset	1
	11	TON	—[Ⓐ TON Ⓑ]—	ON delay timer	2/3
	12	TOF	—[Ⓐ TOF Ⓑ]—	OFF delay timer	2/3
	13	SS	—[Ⓐ SS Ⓑ]—	Single shot timer	2/3
	14	CNT	—[C CNT Q]— —[E Ⓐ Ⓑ]	Counter	2/3
	15	END	—[END]—	End of program	1
Data transfer instructions	16	W → W (FUN000)	—[Ⓐ W→W Ⓑ]—	Register-to-register transfer	3
	17	K → W (FUN001)	—[Ⓐ K→W Ⓑ]—	Constant-to-register transfer	3/4
	18	TINZ (FUN002)	—[Ⓐ TINZ [nn] Ⓑ]—	Table initialization	4
	19	T → W (FUN003)	—[Ⓐ T→W [nn] Ⓑ→Ⓒ]—	Multiplexer (table-to-register transfer)	5
	20	W → T (FUN004)	—[Ⓐ W→T [nn] Ⓑ→Ⓒ]—	Demultiplexer (register-to-table transfer)	5
	21	T → T (FUN005)	—[Ⓐ T→T [nn] Ⓑ]—	Table-to-table transfer	4

	No.	Instruction	Symbol and Description		Steps of Memory
Arithmetic calculation instructions	22	R + R (FUN010)	—[Ⓐ + Ⓑ→Ⓒ]—	Addition register + register	4
	23	R − K (FUN011)	—[Ⓐ − Ⓑ→Ⓒ]—	Subtraction register − register	4
	24	R × R (FUN012)	—[Ⓐ × Ⓑ→Ⓒ]—	Multiplication register × register	4
	25	R / K (FUN013)	—[Ⓐ / Ⓑ→Ⓒ]—	Division register ÷ register	4
Comparison instructions	26	R > R (FUN014)	—[Ⓐ > Ⓑ]—	Register comparison greater than	3
	27	R = R (FUN015)	—[Ⓐ = Ⓑ]—	Register comparison equal to	3
	28	R < R (FUN016)	—[Ⓐ < Ⓑ]—	Register comparison less than	3
Arithmetic calculation instructions	29	R ++ R (FUN017)	—[Ⓐ ++ Ⓑ→Ⓒ]—	Addition double length registers	4
	30	R −− R (FUN018)	—[Ⓐ −− Ⓑ→Ⓒ]—	Subtraction double length registers	1
	31	R + K (FUN020)	—[Ⓐ +. Ⓑ→Ⓒ]—	Addition register + constant	4/5
	32	R − K (FUN021)	—[Ⓐ −. Ⓑ→Ⓒ]—	Subtraction register − constant	4/5
	33	R × K (FUN022)	—[Ⓐ×. Ⓑ→Ⓒ]—	Multiplication register × constant	4/5
	34	R / K (FUN023)	—[Ⓐ /. Ⓑ→Ⓒ]—	Division register ÷ constant	4/5
Comparison instructions	35	R > K (FUN024)	—[Ⓐ >. Ⓑ]—	Comparison register greater than constant	3/4
	36	R = K (FUN025)	—[Ⓐ =. Ⓑ]—	Comparison register equal to constant	3/4
	37	R < K (FUN026)	—[Ⓐ <. Ⓑ]—	Comparison register less than constant	3/4
Logic operation instructions	38	AND (FUN030)	—[Ⓐ AND Ⓑ→Ⓒ]—	Logical AND register-to-register	4
	39	OR (FUN031)	—[Ⓐ OR Ⓑ→Ⓒ]—	Logical OR register-to-register	4
	40	EOR (FUN032)	—[Ⓐ EOR Ⓑ→Ⓒ]—	Logical EXCLUSIVE OR register-to-register	4
	41	NOT (FUN034)	—[Ⓐ NOT Ⓑ]—	Logical NOT	3
	42	RTR (FUN035)	—[Ⓐ RTR Ⓑ→Ⓒ]—	Rotate bits right	4

INSTRUCTIONS

	No.	Instruction	Symbol and Description		Steps of Memory
Instructions Logic operation	43	RTL (FUN036)	—[Ⓐ RTL Ⓑ→Ⓒ]—	Rotate bits left	4
	44	AND (FUN040)	—[Ⓐ AND. Ⓑ→Ⓒ]—	Logical AND register-to-constant	4/5
	45	OR (FUN041)	—[Ⓐ OR. Ⓑ→Ⓒ]—	Logical OR register-to-constant	4/5
	46	EOR (FUN042)	—[Ⓐ EOR. Ⓑ→Ⓒ]—	Exclusive OR register-to-register	4/5
	47	TEST (FUN043)	—[Ⓐ TEST Ⓑ]—	Bit test	3/1
	48	NEG (FUN046)	—[Ⓐ NEG Ⓑ]—	Two's complement	3
Data conversion instructions	49	BIN (FUN050)	—[Ⓐ BIN Ⓑ]—	Convert BDC data in Ⓐ to binary and store in Ⓑ	3
	50	BCD (FUN051)	—[Ⓐ BCD1 Ⓑ]—	Convert binary data in Ⓐ to BDC and store in Ⓑ	3
	51	BDC2 (FUN052)	—[Ⓐ BCD2 Ⓑ]—	Convert double length binary data starting in Ⓐ to BDC and store starting at Ⓑ	3
	52	ENC (FUN053)	—[Ⓐ ENC Ⓑ]—	Encode contents of register Ⓐ and store in register Ⓑ	3
	53	DEC (FUN054)	—[Ⓐ DEC Ⓑ]—	Decode contents of register Ⓐ and store in register Ⓑ	3
	54	BITC (FUN055)	—[Ⓐ BITC Ⓑ]—	All bits 1 in Ⓐ are counted and the total is stored in Ⓑ	3
Limit instructions	55	UL (FUN060)	—[Ⓐ UL Ⓑ→Ⓒ]—	Compare value in Ⓐ to UL in Ⓑ. Turn on output if Ⓐ=Ⓑ and store limit in Ⓒ.	4
	56	LL (FUN061)	—[Ⓐ LL Ⓑ→Ⓒ]—	Compare value in Ⓐ to LL in Ⓑ. Turn on output if Ⓐ < Ⓑ and store limit in Ⓒ.	4
Special functions	57	MAX (FUN062)	—[Ⓐ MAX [nn] Ⓑ]—	Take the maximum value in the nn table starting at Ⓐ and store in Ⓒ.	4
	58	MIN (FUN063)	—[Ⓐ MIN [nn] Ⓑ]—	Take the minimum value in the nn table starting at Ⓐ and store in Ⓑ.	4
	59	AVE (FUN064)	—[Ⓐ AVE [nn] Ⓑ]—	Take the AVE value value man Table size nn starting at Ⓐ and store in Ⓑ.	4

	No.	Instruction	Symbol and Description		Steps of Memory
Special functions	60	FG (FUN065)	—[Ⓐ FG [nn] Ⓑ→Ⓒ]—	Function Generator (given A, solve for f[A], where f[A] is interpolated based on a pre-entered set of x, y points). Store f[A] in Ⓒ	3
	61	RT (FUN070)	—[Ⓐ RT Ⓑ]—	Square root of 32-bit data starting in Ⓐ is stored in Ⓑ.	3
	62	SIN (FUN071)	—[Ⓐ SIN Ⓑ]—	Sine of data in Ⓐ is stored in Ⓑ.	3
	63	ASIN (FUN072)	—[Ⓐ ASIN Ⓑ]—	Arc sine of data Ⓐ store in Ⓑ.	3
	64	COS (FUN073)	—[Ⓐ COS Ⓑ]—	Cosine of data in Ⓐ is stored in Ⓑ.	3
	65	ACOS (FUN074)	—[Ⓐ ACOS Ⓑ]—	Arc cosine of data in Ⓐ is stored in Ⓑ.	2
Bit operation	66	SET (FUN080)	—[SET Ⓐ]—	Device Ⓐ is set continuously ON.	2
	67	RST (FUN081)	—[RST Ⓐ]—	Device Ⓐ is set continuously OFF.	2
Special functions	68	DDSP (FUN090)	—[DDSP Ⓐ]—	Diagnostic error code is assigned to Ⓐ.	2/3
	69	DDSM (FUN091)	—[DDSM Ⓐ Ⓑ]—	Diagnostic error message is assigned to Ⓑ.	3/4
	70	IN (FUN096)	—[IN [nn] Ⓐ]—	Immediate input	3
	71	OUT (FUN097)	—[OUT [nn] A]—	Immediate output	3
	72	READ (FUN098)	—[CH. Ⓐ READ [nnn] Ⓑ→Ⓒ]—	ASCII read	5
	73	WRITE (FUN099)	—[Ⓐ WRITE [nnn] Ⓑ→CH. Ⓒ]—	ASCII write	5
	74	STIZ (FUN100)	—[STIZ [nn] Ⓐ]—	Step initialize for step sequencer	3
	75	STIN (FUN101)	—[Ⓐ]—	Step input for step sequencer	2
	76	STOT (FUN102)	—[Ⓐ]—|	Step output for step sequencer	2
	77	F/F (FUN110)	—[SF/FQ]— —RⒶ	Filp-flop	2
	78	U/D (FUN111)	—[U C/D Q]— —C —E Ⓐ	Up/down counter	2
	79	SR (FUN112)	—[D SR Q]— —S (nn) —E Ⓐ	Shift register	3

I/O MODULES

Digital Input

Item	DI-6261	DI-6271	DI-6271H	DI-6249
Input voltage	10 – 30 Vdc			
Min. ON voltage	9.6 V			8.5 V
Max. OFF voltage	4.8 V			4.0 V
Input current	10 mA (24 Vdc)			
Input points	16 pts (8 pts common)	32 pts (16 pts common)		64 (dynamic scan)
ON delay	Less than 10 ms		Less than 1.0 ms	Less than 1.7 ms
OFF delay	Less than 15 ms		Less than 1.5 ms	Less than 1.7 ms
Consumed current	Less than 50 mA (5 V)	Less than 80 mA (5 V)		Less than 100 mA (5 V)
Weight	470 g	550 g		500 g

Item	INP-6262	INP-6272	INP-6266	INP-6276
Input voltage	85 – 132 Vac	170 – 250 Vac	85 – 132 Vac	170 – 250 Vac
Min. ON voltage	75 V	150 V	75 V	150 V
Max. OFF voltage	25 V	50 V	25 V	50 V
Input current	14 mA (100 Vac)	14 mA (200 Vac)	10 mA (100 Vac)	10 mA (200 Vac)
Input points	16 points		32 points	
ON delay	Less than 15 ms		Less than 25 ms	
OFF delay	Less than 15 ms		Less than 20 ms	
Consumed current	Less than 70 mA (5 V)		Less than 100 mA (5 V)	
Weight	510 g		550 g	

Digital Output

Item	DO-6263	DO-6273	RO-6265	RO-6275
Output voltage	10 – 30 Vdc		250 Vac/30 Vdc (max)	
Load current	2 A/pnt, 5 A/common	0.5 A/pnt, 5 A/common	2 A/pnt, 8 A/common	2 A/pnt, 16 A (total)
Output point	16 pts (8 pts common)	32 pts (16 pts common)	16 pts (8 pts common)	16 pts (independent)
ON delay	Less than 1 ms		Less than 10 ms	
OFF delay	Less than 1 ms		Less than 15 ms	
Leakage current	100 μA	10 μA	Non	
Consumed current	Less than 140 mA (5 V)	Less than 200 mA (5 V)	Less than 80 mA (5 V)	
Weight	550 g	700 g	650 g	

Item	ACO-6264	ACO-6274	ACO-6269
Output voltage	85 – 132 Vac	170 – 250 Vac	24 – 250 Vac (+10/−15%)
Load current	2 A/pnt, 5 A/common		0.5 A/pnt, 3.2 A/common, 5 A (total)
Output points	16 pts (8 pts common)		32 pts (16 pts common)
ON delay	Less than 2 ms		Less than 1 ms
OFF delay	Less than 12 ms		Less than 1/2 cycle
Leakage current	1 mA (100 V/50 Hz)	2 mA (200 V/50 Hz)	1 mA (100 V/50 Hz)
Consumed current	Less than 230 mA (5 V)	Less than 400 mA (5 V)	Less than 800 mA
Weight	550 g		800 g

Analog Input

Item	AI-6290B10	AI-6290B5	AI-6290B20	AI-6292V	AI-6292C
Input range	0 – ±10 V	0 – ±5 V	0 – ±20 mA	0 – ±10 V/1 – 5 V	4 – 20 mA
Input impedance	1 MΩ or more		250 Ω	1 MΩ or more	250 Ω
Input channels	2 channels (isolated)			8 channels	
Conversion speed	32 ms/2 channels			2 ms/8 channels	
Resolution	1/4000 (FS)				
Data format	±2000 (2's complement)			±2000 (±10 V), 0 – 4000 (1 – 5 V/4 – 20 mA)	
Accuracy	±0.2% (FS, 25°C)				
Consumed current	Less than 250 mA (5 V)				

Analog Output

Item	AO-6295B10	AO-6295B5	AO-6295B20	AO-6295U5	AO-6295U20
Output range	0 – ±10 V	0 – ±5 V	0 – ±20 mA	1 – 5 V	4 – 20 mA
Load impedance	More than 500 Ω	More than 250 Ω	Less than 300 Ω	More than 250 Ω	Less than 550 Ω
Output channels	2 channels				
Conversion speed	Less than 1 ms				
Resolution	1/4000 (FS)				
Data format	±2000 (2's complement)			0 – 4000	
Accuracy	±0.2% (FS, 25°C)				
Consumed current	Less than 100 mA				

RTD Input

Item	RTD-6240P	RTD-6240N
RTD type	Pt100	Ni500
Measuring method	Three-wire/two-wire system	
Temperature range	−180 — +200°C	−50 — +200°C
Resolution	0.1°C/count	
Resistance adjustment	Within 2 Ω	Within 3 Ω
Input channels	4 channels	
Load current	2 mA	0.3 mA
Data format	±2000 (2's complement)	
Accuracy	±0.5% (FS)	
Consumed current	Less than 340 mA	

Thermocouple Input

Item	TC-6294
Input range	±12.5/±25/±50/±100 mV
Input impedance	1 MΩ or more
Input channels	8 channels
Conversion speed	140 ms/8 channels
Resolution	1/4000 (FS)
Data format	±2000 (2's complement)
Accuracy	±0.4% (FS)
Consumed current	Less than 250 mA (5 V)

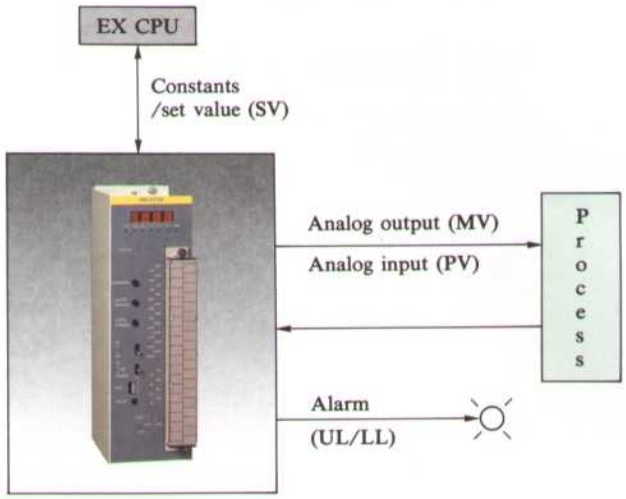
High-speed Pulse Counter

Item	PI-6246A	Item	PI-6246A
Counting speed	50 kpps (max)	Functions	1. Quadrature counter 2. Up/down counter 3. Speed counter
Input voltage	5/12 Vdc		
Input channels	1 channel (phase A, B, M)		
Count value range	0 – 65535	Consumed current	Less than 500 mA (5 V)
Comparison output	2 points (immediate output)	Others	Built-in 12 Vdc – 0.2 A (max)

INTELLIGENT I/O MODULES

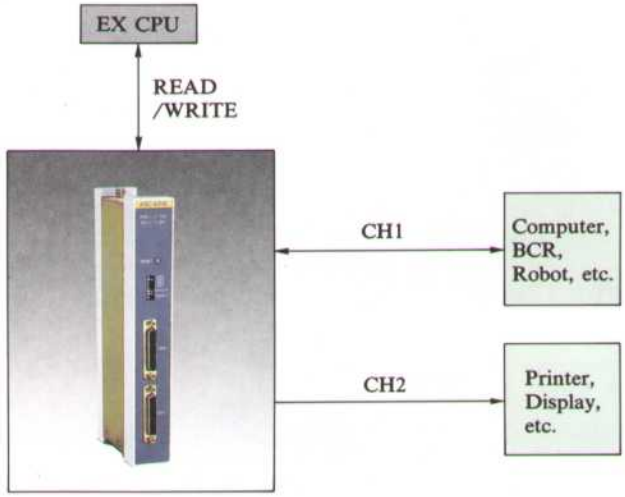
PID Control Module

Item		PID-6730V	PID-6730C
No. of loops		4 loops	
Sampling time		0.1 – 120.0 sec	
Input	Signal range	1 – 5 V	4 – 20 mA
	Resolution	1/8192	
Output	Signal range	1 – 5 V	4 – 20 mA
	Resolution	1/4096	
Constant	Proportional	0.1 – 1000.1%	
	Integral	0.1 – 6553.5 sec	
	Derivative	0 – 6553.5 sec	
Auto-tuning		Step Response Method	
Consumed current		Less than 800 mA (5 V)	



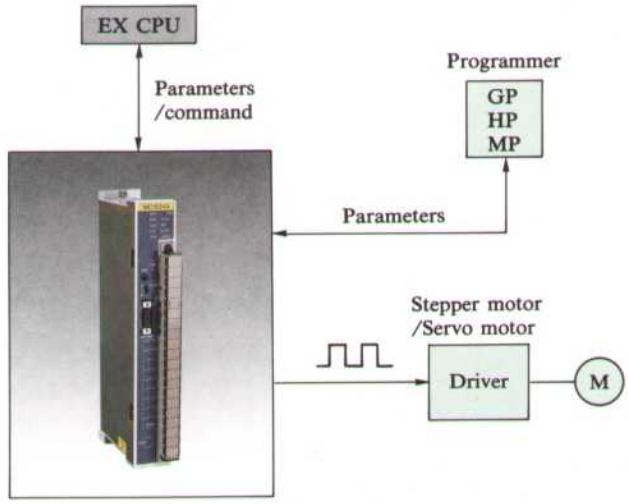
ASCII/BASIC Module

Item	ASC-6210	ASC-6210A
Language	BASIC-52 (interpreter)	
Program memory	32K bytes (EEPROM)	64K bytes (EEPROM)
Function	1. Communication with ASCII devices 2. BASIC co-processor	
External interface	RS232C (2 ports) CH 1: input/output CH 2: output only	
Baud rate	CH 1: 110/300/600/1200/2400/4800/9600 /19200 bps CH 2: Set by BAUD statement of BASIC	
Consumed current	800 mA (5 V)	



Motion Control Module

Item	MC-6243
No. of axis	1 axis
Speed (pulse rate)	Max. 200 kpps
Positionning range	±1000000 pulses
Positionning system	Absolute/increment
Point data capacity	511 points
Basic parameters	Acceleration/deceleration: 0 – 27 sec Backlash compensation: 0 – 1000 pulses Zero position compensation: ±10000 pulses Dwell time: 0.00 – 655.00 sec
Parameter setting	By EX CPU or programmer (GP, HP, MP)
Consumed current	600 mA (5 V) – w/o programmer



Specifications of Peripheral Devices

Item		GP110AP2	GP110AP1	GP110	HP100	MP100	DP100
Power supply voltage		100 – 240 Vac (+10/−15%) – 50/60 Hz			5 Vdc (supplied from PC)		
Power consumption		Less than 20 VA			0.2 A	0.3 A	0.4 A
Operating temperature		0 – 40°C (32 – 104°F)					
Storage temperature		−20 – 75°C (−48 – 167°F)					
Humidity		20 – 90% RH					
Approx. weight		3 kg (6.6 lb)			0.4 kg (.88 lb)		
Display	Device	LCD with back light			LCD	LCD with back light	
	Size	480 × 128 dot			120 × 64 dot	16 characters × 2 lines	
Keyboard	Type	Membrane keyboard with software beeper					
	No. of keys	63			42	48	24
Connection to PC	Method	Serial transmission (current loop)					
	Cable length	5 m (16.5 ft) (standard), max. 100 m (330 ft)			2 m (6.6 ft)		
Functions	Programming	Ladder network with relay symbols and function blocks					No
	Program display	11 columuns × 7 lines			11 columuns × 5 lines	1 element	No
	Program edit	Element add/delete/replace, Columun insert/delete, Line insert/delete, Page add/replace/insert/delete					No
	Stand-alone programming	Available		No	No	No	No
	On-line status monitor	Program real time power flow monitor, Data monitor (block monitor)				Element ON/OFF, Data monitor	Data monitor
	Data setting	Modification of register/device data (on-line/off-line)					
	Debugging	Input/output disable, Forced coil, Data setting, Search					No
	Documentation	Program, Cross-reference, Device/register usage map		No	No	No	No
	PC control	RUN/HALT/RUN-F					No
	PC status monitor	Operation status (RUN/HALT/ERROR), Error messages					
Supported PC types		EX100, EX200B, EX250, EX500, EX2000	EX100, EX200B, EX250, EX500				EX100, EX200B, EX250, EX500, EX2000
Supported devices		Floppy Disk Unit (FD110), Printer, Cassette tape loader		Cassette tape loader	No	Cassette tape loader	No

ORDERING INFORMATION

Item	Description		Part number
Controllers and Expansion Units			
EX250 Basic Unit	Contains CPU, Base, AC PS	Standard	EX25✳1A
		w/ clock-calendar	EX25✳2A
	Contains CPU, Base, DC PS	Standard	EX25✳1D
		w/ clock-calendar	EX25✳2D
EX500 Basic Unit	Contains CPU, Base, AC PS	Standard	EX50✳1A
		w/ clock-calendar	EX50✳2A
	Contains CPU, Base, DC PS	Standard	EX50✳1D
		w/ clock-calendar	EX50✳2D
Expansion Unit (0.5 m expansion cable attached)	480 mm width, 8 slots, AC PS (EU-6257)		EX25UEU✳6257
	480 mm width, 8 slots, DC PS (EU-6257D)		EX25UEU✳6257D
	390 mm width, 8 slots, w/o PS (EU-6279)		EX25UEU✳6279
	240 mm width, 4 slots, w/o PS (EU-6278)		EX25UEU✳6278
Controller Options			
PROM Module	EEPROM type		EX25PROM6260
	EPROM (UV-PROM) type		EX25PROM6258
Computer Link Module	RS422 multi-drop link		EX25PCMP6236
RS232C Adapter	RS422/RS232C converter for computer link		EX25PADP6237A
	RS485/RS232C converter for computer link		EX25PADP6237B
I/O Modules			
DC Input Module	16 points, 12 – 24 Vdc		EX25MDI✳6261
	32 points, 12 – 24 Vdc		EX25MDI✳6271
	32 points, 12 – 24 Vdc, quick response		EX25MDI✳6271H
	64 points (dynamic scan), 12 – 24 Vdc		EX25MDI✳6249
AC Input Module	16 points, 100 – 120 Vac		EX25MINP6262
	16 points, 200 – 240 Vac		EX25MINP6272
	32 points, 100 – 120 Vac		EX25MINP6266
	32 points, 200 – 240 Vac		EX25MINP6276
DC Output Module	16 points, 12 – 24 Vdc, 2 A/point (max)		EX25MDO✳6263
	32 points, 12 – 24 Vdc, 0.5 A/point (max)		EX25MDO✳6273
AC Output Module	16 points, 100 – 120 Vac, 2 A/point (max)		EX25MACO6264
	16 points, 200 – 240 Vac, 2 A/point (max)		EX25MACO6274
	32 points, 24 – 240 Vac, 0.5 A/point (max)		EX25MACO6269
Relay Output Module	16 points, 250 Vac/30 Vdc (max), 2 A (max)		EX25MRO✳6265
	16 points (independent), 250 Vac/30 Vdc, 2 A		EX25MRO✳6275

Item	Description		Part number

I/O Modules (cont'd)

Analog Input Module	2 channels	±10 V	EX25MAI✳6290B10
		±5 V	EX25MAI✳6290B5
		±20 mA	EX25MAI✳6290B20
	8 channels	±10 V/1 – 5 V	EX25MAI✳6292V
		4 – 20 mA	EX25MAI✳6292C
Analog Output Module	2 channels	±10 V	EX25MAO✳6295B10
		±5 V	EX25MAO✳6295B5
		±20 mA	EX25MAO✳6295B20
		1 – 5 V	EX25MAO✳6295U5
		4 – 20 mA	EX25MAO✳6295U20
RTD Input Module	4 channels	Pt100	EX25MRTD6240P
		Ni500	EX25MRTD6240N
Thermocouple Input	8 channels, ±12.5/±25/±50/±100 mV		EX25MTC✳6294
High-speed Pulse Counter	1 channel (phase A, B, M), 50 kpps (max)		EX25MPI✳6246A
PID Control Module	4 loops	1 – 5 V	EX25MPID6730V
		4 – 20 mA	EX25MPID6730C
ASCII/BASIC Module	2 parts of RS232C, BASIC-52	32K bytes	EX25MASC6210
		64K bytes	EX25MASC6210A
Motion Control Module	1 axis, 200 kpps (max)		EX25MMC✳6243

TOSLINE-30 Stations

TOSLINE-30 (wire)	Controller station		EX25MMSE5626
	Remote I/O station		EX25MRSE5618
TOSLINE-30OP (optional)	Controller station		EX25MOPM5611
	Remote I/O station		EX25MOPR5612
	Active Star Coupler	100 – 120 Vac PS	TL3CUASC5617A1
		200 – 240 Vac PS	TL3CUASC5617C1

Peripherals

Graphic Programmer (5 m cable attached)	Standard	GP110	EX25UGP✳110
	Stand-alone, Documentation	GP110AP1	EX25UGP✳110✳AP1
	For EX2000	GP110AP2	EX25UGP✳110✳AP2
Handy Programmer	2 m cable attached	HP100	EX25UHP✳100
Mini Programmer	2 m cable attached	MP100	EX25UMP✳100
Data Access Panel	2 m cable attached	DP100	EX25UDP✳100
Floppy Disk Unit	3.5 inch, 1 drive	FD110	EX25UFD✳110
PROM Writer	For ROM-6258	PR100	EX25UPR✳100

Note: UL listed types are also available.

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