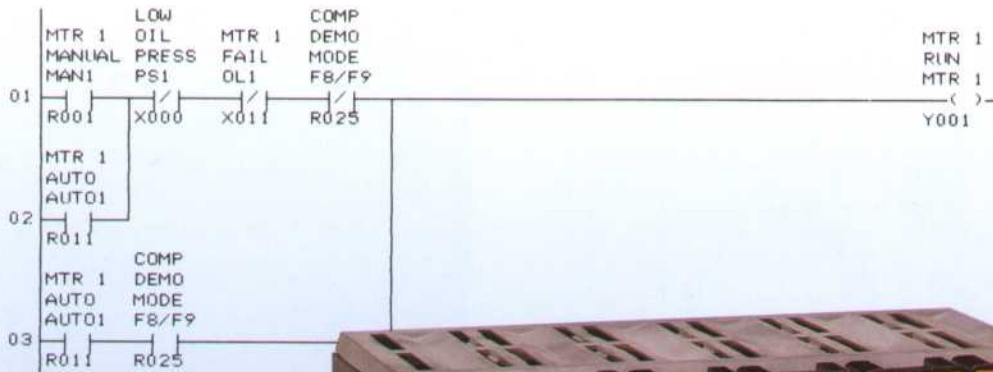


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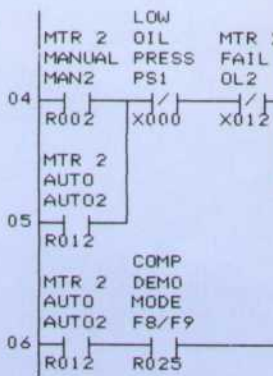
TOSHIBA

EX100 Programmable Controller

This circuit controls motor 1. R001 is the contact from the manual logic and R011 is the contact from the auto logic.



This circuit controls motor 2 and R012 is the contact from the auto logic.



Advanced features

- Advanced instruction set
- Real time clock-calendar
- On-line programming
- Compact modular style
- IBM® compatible programming
- Easy networking

GENERAL PURPOSE PROGRAMMABLE CONTROLLER

Toshiba's EX100 is a small, modular type programmable controller suitable for both relay replacement and complex control applications. It provides an economical, compact solution to a wide range of OEM and user applications in automotive, machine control and process control systems. The EX100's high performance, high reliability and compact size are a result of Toshiba's long history of leadership in the semiconductor and microelectronics industry.



I/O Module Features

- ON/OFF status LED's
- Removable keyed terminal blocks
- Secure DIN connectors for positive mounting and backplane
- Assign any module to any I/O slot on main or expansion backplane

I/O Module Type

- 12, 16 or 32 points discrete I/O
- Analog input (4 channels)/
Analog output (2 channels)
- Pulse input (100 kpps)
- Motion control (1 axis, 200 kpps)

Configuration

Racks

Non-expandable
6 modules
9 modules

Expandable
6 modules
9 modules



I/O Expansion Capability

9 main + 9 expansion



9 main + 6 expansion



6 main + 6 expansion



6 main + 9 expansion



CPU Module

- Standard
 - 4k program memory
 - Write password protection
 - On-line programming
 - Built-in EEPROM & capacitor (battery is optional)
- Enhanced
 - Same as standard
 - Built-in RS485 computer link
 - Built-in real time clock/calendar

Power Supply Modules

- Types
 - 100/120 Vac
 - 200/240 Vac
 - 24 Vdc
- Features
 - Provides power to CPU
 - External 24 Vdc-0.5A power
 - Run status contact

High Performance Software

- Easy to use ladder diagram programming
- Function blocks can be inserted into ladder diagrams
 - Math (double-length registers)
 - Data move (register-table, etc.)
 - Logic (AND, OR, etc.)
 - Comparison (<, =, >)
 - Trig. (Sin, Cos, etc.)
 - Limit
 - Special (FF, SR, sequencer, Function Generator, min., max., avg., etc.)
 - Immediate I/O update
 - EEPROM access (V2.1 or after)
- High Scan Speed
 - 0.9µs/contact
 - 110µs/16 bit addition

Status and Control

- Run
- CPU
- I/O
- Com Link
- Key Switch Access
- Station Selector

Peripherals

Handy Programmer HP-100

The HP-100 is a hand-held graphic programmer used with Toshiba's medium size controllers (EX100, 200B, 250&500). Its portability makes the HP-100 ideal for maintenance use at remote installations. The HP-100 has all the features of a full size programming terminal.

- Enter programs in ladder logic
- On-line program edit and monitor (logic intensifies to indicate power flow)
- Block monitor for I/O and internal registers
- On-line data set & I/O force
- Double-length data monitoring/setting
- Two display modes
 - Full (normal): 5 lines by 11 columns
 - Zoom: 2 lines by 2 columns with full device description



Graphic Programmer GP110 & GP110AP1

The GP110 is an enhanced version of Toshiba's GP-100 graphic programmer.

It has the same large-dot matrix LCD screen that displays 7 lines by 11 columns.

Logic lines intensify to indicate power flow, device type, address, current values of timers, counters, and data registers are shown during program execution.

The GP100's enhanced features include:

- Backlit screen for sharper contrast in dark areas
- On-line programming and block read/write instructions
- Double-length data monitoring/setting
- Stand-alone programming (AP1)
- Built-in floppy disk drive interface (AP1)
 - Formats and saves logic programs on 3.5 inch floppy disks
 - Loads and compares logic programs saved on disk

Floppy Disk Drive Unit

The floppy disk drive is used with the GP110AP1 for storing and comparing programs.

- 3.5 inch floppy disk, 1 drive (standard)
- Record: GP → FD
- Load: FD → GP
- Compare: FD → GP
- Disk format



EX Program Development & Documentation (EX-PDD™)

Naturally it is possible to write and save EX100 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.

- Built-in Modem initialize and Dial-up.
- Same EX-PDD Software supports EX100, EX250, EX500 and EX200B PLC's.
- Write Ladder/Function Block programs off-line (PC disk) or on-line (EX100 memory).
- Full-feature ladder editor includes move, copy, insert, delete, search, etc.
- Make changes in EX100 program while in run mode.
- Load and Save programs between PC disk and EX100.
- 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.
- 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.

```

Offline File Name: EX-PDD
Display Remove Remove
1 Page 2Synonym3Descrip4
Page Circuit Line Device Move Ladder
5Comment6Comment7Comment8Com9Comment0 Menu

001 Start Stop Cyln dr Cyln dr Cyln dr Cyln dr Max Min Max Min Tank
Push Push Top Bottom Left Right Pressr Pressr Float Float ValveA
Button Button Limit Limit Limit Limit Switch Switch Switch Switch
PB1 PB2 LS3 LS4 LS5 LS6 PS7 PS8 PS9 PS10 SOL A
01 1 X010 X011 Z10B X111 X267 R009 Z002 R19C X100 X101 ( )
Tank Remote
Fill output
ValveA of
SOL A Z331
02 1 Y302 ( )
Start Remote Thumb- Binary Binary Multi- Conti-
BCD to input wheel thmwhl thmwhl plied nued
Binary switch input data data data
CONVRT PERMIT THMWHL BINDAT BINDAT PRODUC NXTRNG
03 2 R304 Z009 [XW01 BIN D1000]—[D1000 * . 00012 > > D1001]—( )
R000
  
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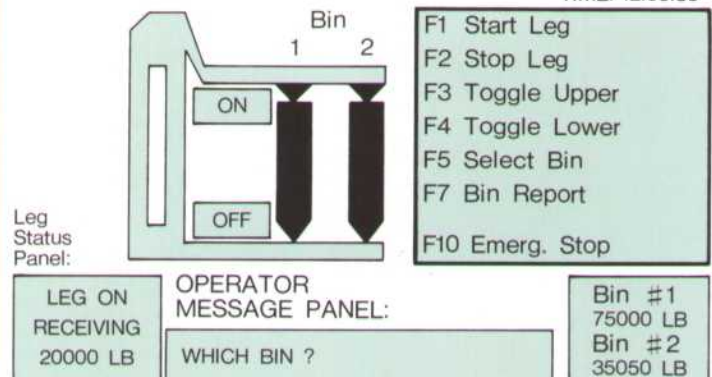


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EX-PAL™

PAL (Process Automation Language) is a proven high-level programming language for integrating personal computers with programmable controllers. PAL incorporates data processing, operator input and graphic displays of computers into automated systems using programmable controllers. PAL allows the operator of an automated control system to communicate directly with the programmable controllers in the system through the personal computer.

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General Specifications

Item	Specifications
Power supply voltage	100-120 Vac (+10/-15%), 50/60 Hz ($\pm 5\%$)
	200-240 Vac (+10/-15%), 50/60 Hz ($\pm 5\%$)
	24 Vdc (+20/-15%)
Power consumption	Less than 50 VA (ac power supply)
	Less than 22 W (dc power supply)
Retentive power fault	Less than 10 ms
Ambient temperature	0°-55°C operation (32° to 131°F)
	-20°-75°C storage (-4 to 167°F)
Humidity	20-90% RH (no condensation)
Noise immunity	1000 V-1 μ s, NEMA ICS3-304
Withstand voltage	1500 Vac for 1 minute
Approx. weight	6-slot rack with full modules less than 2.8 kg
	9-slot rack with full modules less than 4 kg

Functional Specifications

Item	Specification	
Control method	Stored program, cyclic scan system	
Program language	Ladder diagrams with function blocks	
Memory	Capacity	4k program or 3k program & 1k retentive data registers
	Type	EEPROM and RAM with capacitor back-up
Execution time	0.9 μ s/contact, 110 μ s/16-bit addition	
I/O capacity	Discrete: 480 points/32-point modules	
	Register: 60 words/4 register modules (16-bit word)	
Registers	Data	1536 registers (16-bit registers)
	Timer	120 (0.0 to 3276.7 sec), 8 (0.00 to 327.67 sec)
	Counter	96 (0 to 65535)
	Auxiliary	960 points/60 registers (16-bit registers)
	Link	512 points/32 registers (16-bit registers)
	Special	Link status, timing clock, self-diagnosis, etc.
Retained	Data, timer, counter and auxiliary registers can be user specified as retentive	
Clock-calendar	Built-in (Equipped in an enhanced type CPU) Year, month, day, week*, hour, minute, second	
Communication networks	Built-in computer link (Equipped in an enhanced type CPU) TOSLINE-30 (PC link, remote I/O)	
RAM memory backup	Built-in capacitor (7 days/25°C)	
	Optional battery (2 years/25°C)	

* marked item requires CPU V2.1 or after

I/O Modules

Type	Part number	Circuit	Specifications
DC/AC input	EX10*MDI31	16 (16/common)	12-24 Vdc/ac, 8 mA
DC input	EX10*MDI32	32 (8/common)	24 Vdc, 5 mA
AC input	EX10*MIN51	16 (16/common)	100-120 Vac, 7 mA
	EX10*MIN61	16 (16/common)	200-240 Vac, 6 mA
Relay output	EX10*MRO61	12 (4/common)	240 Vac/24 Vdc, 2 A/point
	EX10*MRO62	8 (isolated)	240 Vac/24 Vdc, 2 A/point
Transistor output	EX10*MDO31	16 (16/common)	5-24 Vdc, 1 A/point
	EX10*MDO32	32 (8/common)	5-24 Vdc, 0.1 A/point
Triac output	EX10*MAC61	12 (4/common)	100-240 Vac, 0.5 A/point
Analog input	EX10*MAI21	4 channels	4-20 mA/1-5 V (8-bit)
	EX10*MAI31	4 channels	0-10 V (8-bit)
	EX10*MAI22	4 channels	4-20 mA/1-5 V (12-bit)
	EX10*MAI32	4 channels	-10+10 V (12-bit)
Analog output	EX10*MAO31	2 channels	4-20 mA/1-5 V/0-10 V (8-bit)
	EX10*MAO22	2 channels	4-20 mA/1-5 V (12-bit)
	EX10*MAO32	2 channels	-10+10 V (12-bit)
Pulse input	EX10*MPI21	1 channel	5/12 V, 100 kpps
Motion control	EX10*MMC11	1 axis	200 kpps, 64 points data
ASCII/BASIC	T.B.A.		
EEPROM	T.B.A.		

Instructions

Type	Function
Ladder	NO-contact, NC-contact, coil, transitional contact, master control, jump control, timers (on-delay/off-delay, single-shot), counter
Data manipulation	Data move, data table block move, register to table, table to register
Arithmetic	Addition, subtraction, multiplication, division (register/constant, single/double-length)
Compare	>, =, < (register/constant)
Logical operation	AND, OR, exclusive OR, NOT, two's complement, rotate
Data conversion	Binary/BCD, bit count, encode/decode
Special functions	Upper/lower limit, maximum, minimum, mean value, function generator, square root, sine, arc sine, cosine, arc cosine, bit set/reset, diagnostic message, immediate IN/OUT, step sequencer, flip-flop, up/down counter, shift register, data read/write for special module*, EEPROM read/write*, clock-calendar data setting*

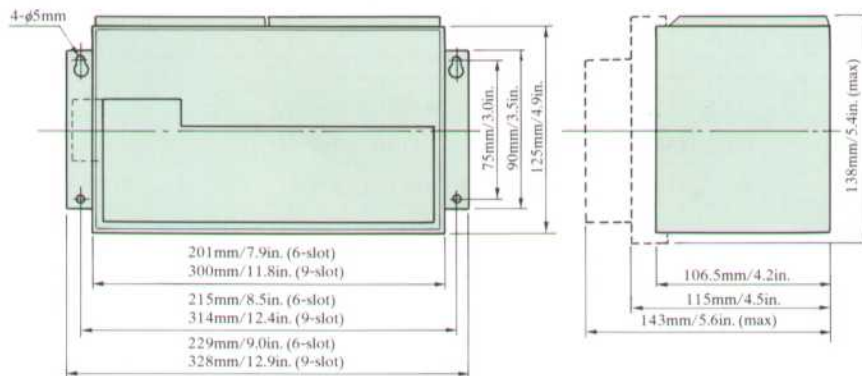
* marked items require CPU V2.1 or after

Part Numbers

	Description	Part number
Rack	6-slot, unexpandable	EX10*UBA1
	9-slot, unexpandable	EX10*UBA2
	6-slot, expandable	EX10*UBB1
	9-slot, expandable	EX10*UBB2
Power supply	100-120 Vac	EX10*MPS51
	200-240 Vac	EX10*MPS61
	24 Vdc	EX10*MPS31
CPU	Standard	EX10*MPU11A
	Enhanced (calendar com, link)	EX10*MPU12A
Peripheral	Graphic programmer	EX25UGP*110
		EX25UGP*110*API
	Handy programmer	EX25UHP*100
	Data access panel	EX25UDP*100
	FDD unit	EX25UFD*110
Optional	Battery	EX10*ACR2
	Vacant slot cover	EX10*ABP1
Expansion cable	0.3 m	EX10*CAR3
	0.5 m	EX10*CAR5
	0.7 m	EX10*CAR7

	Description	Part number	
I/O	DC/AC input	EX10*MDI31	
	DC input	EX10*MDI32	
	AC input (100-120 Vac)	EX10*MIN51	
	AC input (200-240 Vac)	EX10*MIN61	
	Relay output		EX10*MRO61
			EX10*MRO62
	Transistor output		EX10*MDO31
			EX10*MDO32
	Triac output	EX10*MAC61	
	Analog input		EX10*MAI21
			EX10*MAI31
			EX10*MAI22
			EX10*MAI32
	Analog output		EX10*MAO31
		EX10*MAO22	
		EX10*MAO32	
Pulse input	EX10*MPI21		
Motion control	EX10*MMC11		
TOSLINE -30	Wire	EX10*MLK11	
	Optical	EX10*MLK12	

External Dimensions



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TOSHIBA INTERNATIONAL (EUROPE) LTD.

1 Roundwood Avenue
Stockley Park, Uxbridge
Middlesex UB11 1AR, UNITED KINGDOM
Tel: 081 848 4466 Fax: 081 848 4969
E_mail nigels@toshibai.co.uk

TOSHIBA INTERNATIONAL CORPORATION

Industrial Equipment Division
13131 West Little York Road
Houston, TX. 77041 U.S.A.
Tel: 713-466-0277 Fax: 713-466-8773
E_mail: plc@tic.toshiba.com

TOSHIBA do BRASIL, S.A.

Estrade dos Alvarengas 5500
Sao Bernardo do Campo
Sao Paulo 0985-5500, Brazil
Tel: 55-11-7689-7199
Fax: 55-11-7689-7189
antoneli@tbb.toshiba.com.br

TOSHIBA INTERNATIONAL CORPORATION PTY. LTD.

Unit 1, 9 Orion Road Lane Cove
N.S.W. 2066, AUSTRALIA
Tel: 02-428-2077 Telex: AA25192
E_mail: preston@toshiba.co.au

TOSHIBA CORPORATION

Industrial Equipment Department
1-1, Shibaura 1-chome, Minato-ku
Tokyo 105, JAPAN
Tel: 03-3457-4900 Cable: Toshiba Tokyo
E_mail: osamu.seki@toshiba.co.jp

Toshiba Asia Pacific PTE. LTD

200 Cantonment Rd. #12-01
Southpoint, 089763 Singapore
Ph: 65-324-1048
Fax: 65-324-5286