Code: CT109108 Revision: B

Product Description

PO3x47 CLP CPU's were designed for process control and supervision. Due to its hardware oriented architecture they can deliver very low scan timing comparing to predecessors PO3x42 CPUs family. With these new CPU it can be obtained up to 10 times more performance in CLP's program Ladder instruction execution.

Additionally, these Ponto series CPU are characterized by a high integration of functions, programming on-line, high capacity of memory and several integrated serial channels.

These CPU can be connected directly to the bus GBL, creating very compact systems of control and supervision. With the use of field net interfaces, the CPUs become powerful controllers with capacity up to 4.096 I/O points.

Features:

- Direct access to 30 modules through Series Point's bus.
- Capacity up to 4.096 I/O points.
- High-speed processing required by big systems.
- Hardware arithmetic coprocessor
- Connectivity to PROFIBUS bus through PROFIBUS-DP Master interface
- 1 USB serial channel for programming
- 1 RS-232 serial channel, with configurable and programmable protocols, including MODBUS master or slave.
- 1 RS-485 serial isolated channel, with configurable and programmable protocols, including MODBUS master or slave.
- Large Flash memory capacity up to 1 Mbyte for program application.
- Ethernet connectivity.
- WebServer characteristics.
- CPU redundancy on local bus.
- Diagnosis and status of local operation through alphanumeric display in the panel.
- Momentary key for diagnostic selection.
- Diagnostics through operands.
- Supporting to redundant PROFIBUS architecture.
- Float point operands (% F).
- Integer signed 32 bits operands (% I).
- Internal power supply of + 24 Vdc with 700mA capacity of for I/O modules

Warning: The characteristics above refer to the PO3247 complete model. The other models have subsets of these characteristics, as explained in the appropriate section of this CT.

Ordering Information

Included Items

The product packing contains:

- CPU PO3047 or PO3147 or PO3247.
- Installation Guide

Product Code

The following codes are used when ordering the product:

Code	Description
PO3047	UCP 256K Flash, 16 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, Ethernet
PO3147	UCP 512K Flash, 30 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, PROFIBUS, Ethernet
PO3247	UCP 1M Flash, 30 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, PROFIBUS, Ethernet, WebServer, Redundancy

Related Products

Depending on your system requirements, the following products may be ordered with the CPU:

Code	Description
PO6307	UCP PO3x47 Base
AL-1338	RS-485 Cable
AL-1715	RJ45-CFDB9 Cable
AL-1718	RJ45-CMDB9 RS232C Cable
AL-1719	RJ45-CMDB9 RS232 Cable
AL-1720	RJ45-CMDB9 RS232 / RS485 Cable
AL-1731	RJ45-CMDB9 RS485 Cable
AL-1746	USB CP/Microcomputer Cable
AL-2301	RS485 Network Cable (up to 1000 meters)
AL-2305	UCP/ Derivator Cable
AL-2306	RS485 Network Cable (up to 500 meters)
AL-2600	Derivator and Terminator
AL-2601	DB9 Connector to RS485 Network
AL-2700	Mathematical Functions
AL-2703	Communication Functions (F Module)
MT4100	MasterTool Programming MT4100
MT6000	MasterTool ProPonto w/ Manuals
MT8000	MasterTool Programming Extended Edition
PO4053	PROFIBUS DP Interface
PO7091	Industrial Ethernet Interface
PO8530	Battery (spare part)
PO8524	Bus Terminator (spare part)
PO8525	Derivator and Terminator to RS485 Network

PO6307: Base for PO3047, PO3147 and PO3247 CPUs.

AL-1715: Cable assembled with one RJ45 connector and one RS232 9-pin male sub-D connector IBM/PC standard. It is used on COM1 and COM3 to connect the following equipment:

- HMI, which uses IBM/PC standard connector, for local supervision
- IBM/PC standard microcomputer with supervision software.
- IBM/PC standard microcomputer to UCP programming through MasterTool Software

AL-1718: Cable assembled with one RJ45 connector and one RS232 9-pin male sub-D connector Altus standard. It is used on COM1 and COM3 to connect the following equipment:

- AL-1413 module, RS232 / RS485 Converter

AL-1719: Cable assembled with one RJ45 connector and one RS232 9-pin male sub-D connector Altus standard. It is used on COM1 and COM3 to connect the following equipment:

- Foton 5 or Foton 10 (MMI)

AL-1720: Cable assembled with one RJ45 connector and one RS232/RS485 9-pin male sub-D connector Altus standard. It is used on COM1 and COM3 to connect the following equipment:

- Foton 1 or Foton 3 (MMI)

AL-1731: Cable assembled with one RJ45 connector and one RS485 9-pin male sub-D connector Altus standard. It is used on COM2 to connect the PO8525 module.

AL-1746: standard USB cable for communication between microcomputer and serial channel COM1 of PO3x47 CPU.

AL-2301: Shielded cable with two pairs, no connectors. It is used on RS485 network:

- Connection between AL-2600 module or PO8525 module, maximum length of 1000 meters.

AL-2306: Shielded cable with two pairs, no connectors. It is used on RS485 network:

- Connection between AL-2600 module or PO8525 module, maximum length of 500 meters..

AL-2600: This module helps to connect a RS485 network (AL-2301 cable) to the AL-2305 cable.

PO8525: This module can be use to connect the CPU to a RS485 network. It has two terminals to network derivation, termination resistors, and one RJ45 connector. The serial port COM2 is connected to this module through the AL-1731 cable.

Characteristics

The 3 PONTO series CPUs are similar except for the following characteristics:

	PO3047	PO3147	PO3247
Description	UCP 256K Flash, 16 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, Ethernet	UCP 512K Flash, 30 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, PROFIBUS, Ethernet	UCP 1M Flash, 30 Modules E/S, 1 USB, 1 RS-485, 1 RS-232, MODBUS, Display, PROFIBUS, Ethernet, WebServer, Redundancy
Application program memory – Flash type	256K	512K	1M
Application program memory – RAM type	256K	512K	1M
Maximum Modules	16	30	30
Maximum number of Segments	4	4	4
Maximum local I/O points	256 w/ 16 point modules 512 w/ 32 point modules	480 w/ 16 point modules 960 w/ 32 point modules	480 w/ 16 point modules 960 w/ 32 point modules
Maximum local analog I/O points	128 w/ 8 point modules	240 w/ 8 point modules	240 w/ 8 points modules
Maximum I/O points through networks	-	4096	4096
Network interface support (PO4053 module)	No	Yes	Yes
Ethernet TCP/IP interface support (PO7091 or PO7092 module)	Yes	Yes	Yes
Ethernet TCP/IP interface with WebServer support (PO7091 or PO7092 module)	No	No	Yes
Serial interfaces (see Serial Ports item)	1 x USB 1 x RS485 1 x RS232 COM 1 , COM2 e COM3	1 x USB 1 x RS485 1 x RS232 COM 1 , COM2 e COM3	1 x USB 1 x RS485 1 x RS232 COM 1 , COM2 e COM3
Serial port USB (COM1)	Yes	Yes	Yes
Serial port RS-485 (COM2)	Isolated	Isolated	Isolated
Serial port RS-232 (COM3)	RTS, CTS, DTR, DSR.	RTS, CTS, DTR, DSR.	RTS, CTS, DTR, DSR.
Floating point operand (%F)	Yes	Yes	Yes
Arithmetic coprocessor	Yes	Yes	Yes
MODBUS Protocol (master / slave)	Yes	Yes	Yes
Power supply	Embedded inside module (max. 700mA in first bus)	Embedded inside module (max. 700mA in first bus)	Embedded inside module (max. 700mA in first bus)
Redundancy	No	No	Yes

Serial Interfaces: The RS232 ports uses RJ45 connector with grounded shielding. The RS485 port uses DB 9 connector. Base contains a bus terminator with switch.

Power supply: The CPUs PO3x47 include a internal power supply, which is feed with +24 Vdc. This power supply can feed up to 700 mA to modules on first segment. If more I/O modules is necessary a PO8085 power supply must be installed in the beginning of the next segment. MasterTool ProPonto – MT6000 helps for bus configuration, showing the necessities of additional power supply (see specific manual). The power consumption of each module on bus can be seen in its technical characteristics – CT.

Common General Characteristics

	PO3047, PO3147, PO3247
Module type	CPU
Hot Swap	Yes, for all I/O modules
Maximum analog I/O points	The limit is provide by the network bus. A system with 1000 analog points, demands 11 PROFIBUS analog remotes
Typical bus scan time	0,5 ms with 480 digital I/O points
Local bus rate	12 Mbaud
Network connecting support	Yes, through network interfaces
Retentive memory	48 Kbytes
On-line programming	Yes
Middle time processing of 1025 boolean instructions	0,6 ms
Middle time processing of 1025 floating point instructions	4,1 ms
Real Time Clock	Yes
Watchdog	Yes
Battery for retentive operands	Inside the base, hot swap
Connector configuration **PO6302 Base**	1 USB connector, COM 1 1 DB9 connector DB9, COM 2 1 RJ45 connector RJ45, COM 3
Status and diagnostic indication	Alphanumeric display of 4 digits
Diagnostic selection key	Yes
Isolation **RS485 Serial port RS485**	1500 Vac / 1 minute
External power supply	19 a 30 Vdc including ripple; maximum power consumption: 620 mA @ 24 Vdc
Power dissipation	4,5 W
Bus power supply protection	The power supply is protected against over current or bus short circuits.
Operating temperature	0 to 60 ^{o}C
Dimensions (W x H x D) mm	99 x 49 x 81 mm
Compatible bases	PO6307
Software Compatibility	MasterTool Extended Edition – MT8000 v5.10 ProPonto - MT6000 v1.54

Serial Ports

The PO3x47 Ponto Series CPUs have an excellent communication capability, providing a wide range of communication features. They have up to 3 serial ports with the following communication rates:

	Communication Rate (bps)
COM1	115200
COM2	115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300.
COM3	115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300.

The next table shows the communication protocols allowed for each port. It is important to note that some protocols can be used simultaneously.

	COM 1 RS232	**COM 2 RS485**	**COM 3 RS232**
Alnet I slave **Included on all CPUs** complete	Yes	Yes	Yes
MODBUS master	--	Yes	Yes
MODBUS slave	--	Yes	Yes

For further details see User's Manual and Technical Characteristics (CTs) of the listed protocols.

The following table present some protocol combination examples:

	COM1	**COM 2**	**COM 3**
Example 01	Alnet I slave	MODBUS master	MODBUS master
Example 02	Alnet I slave	MODBUS master	MODBUS slave
Example 03	Alnet I slave	MODBUS slave	MODBUS master
Example 04	Alnet I slave	MODBUS slave	Alnet I slave
Example 05	Alnet I slave	Alnet I slave	MODBUS slave

Software Characteristics

	PO3047 , PO3147, PO3247
Programming language	Relay diagram and logic blocks, structured in modules with functions and sub-routines
On line programming	COM 1, COM 2, COM 3
Input (E) and output (S) operands	4096
Auxiliary operands (bits)	4096
Memory operands (M) (word 16bits)	Up to 9984
Decimal operands (D) (32 bits, BCD form + signal)	Up to 9984
Floating point operand (F) (32 bits, IEEE 754)	Up to 9984
Integer operands (I): **32 bits value, 2 complement format 2**	Up to 9984
Memory table operand (TM) (word 16bits)	Up to 255 tables with 255 positions each
Floating point table operand (TF) (32 bits, IEEE 754)	Up to 255 tables with 255 positions each
Decimal table operand (TD) (32 bits, BCD format + signal)	Up to 255 tables with 255 positions each
Integer table operands (TI): **Same as (I) operand**	Up to 255 tables with 255 positions each
Memory constant (KM) (16 bits)	Stored in the application program
Decimal constant (KD) (32 bits, BCD form + signal)	Stored in the application program
Floating point constant (32 bits, IEEE 754)	Stored in the application program
Integer constant (KI): **Same as (I) operand**	Stored in the application program
Typical memory occupation by contact instruction	7 bytes
Memory retention	Configurable for operands S, A, M, D, F Always active for TM, TD e TF
File instruction	Permits the storage of great amounts of data in blocks with up to 32 Kbytes
External interrupt for module E020	Permits related a input digital point to na interrupt application module (E020)
Latency external interrupt E020	1,0 ms
Programmable time for module E018	2,5ms 3,125ms 5ms 10ms 25ms 50ms

- The total number of 4096 digital I/O points include inputs and outputs from local and remote buses. The sum of E with S operands must be less or equal than the limit.
- All numeric operands (KM, KD, KF, , KI, M, D, F, I, TM, TD, TF and TI) allow arithmetic signal in the representation values. The number of simple operands and tables (M, D, F, TM, TD, TF) is configured by each program, and is limited by the available memory capacity of operands (48 Kbytes).
- The feature of memory retention can be attributed to the operands S, A, M, D, F e I through the programmer. The retentive operands have their values preserved during power outage, whereas the non-retentive operands have their values zeroed. The table operands are always retentive.

Execution Times

The table below shows the execution time of main instructions in case of Ladder programming language, comparing to PO3x42 series CPUs.

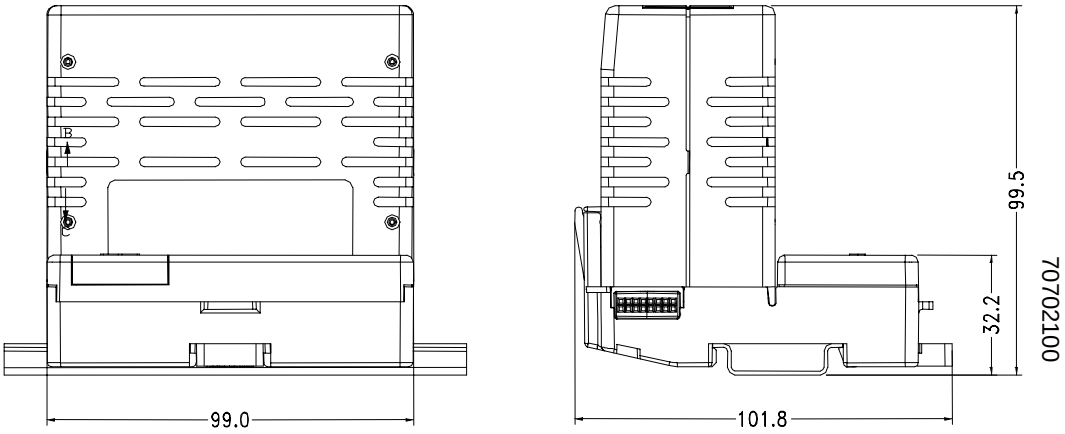
	PO3x47 (µs) *	PO3x42 (µs)
MOV M,M	4,3	59,8
MOV I,I	5,8	83,6
MOV F,I	6,7	70,2
RNA	0,6	1,6
BOB	0,6	2,7
MOB 100 oper M	158,0	280,6
MOB 100 oper I	308,0	708,6
SOM M+M=M	6,5	35,4
SOM I+I=I	8,8	74,3
SUB F-F=F	9,1	114,4
MUL I=I*I	9,6	95,8
MUL F=F*F	9,8	135,9
DIV I=I*I	12,1	273,1
DIV F=F*F	10,6	285,4

WARNNIG:

* The times showed are concerned to PO3147 and PO3247. The PO3047 has different times. For further details see User's Manual.

Physical Dimensions

Dimensions in mm.



The Installation Manual should be consulted for general measurement of installation panel.

Manuals

For correct application and utilization the **User's Manual – CPU Ponto Series** must be consulted

For further technical details, configuration, installation and programming of Ponto series the table below should be consulted.

Document Code	Description
CT109000	Technical Characteristics and configuration of Ponto series
MU209000	Utilization Manual of Ponto series IP20
MU209108	Utilization Manual PO3x47 – UCP of Ponto series
MU299604	Utilization Manual MasterTool XE
MU399003	Programming Manual ST
MU399102	Programming Manual Ladder
MU299040	Utilization Manual MT6000 - MasterTool ProPonto
	CEs of Modules of Ponto series