PLUTON TURN ON THE FUTURE

MC200+
MODULAR CONTROLLER

CITY ELECTRIC TRANSPORT ■
RAILWAYS ■ METRO ■ INDUSTRY

MC200+ MODULAR CONTROLLER

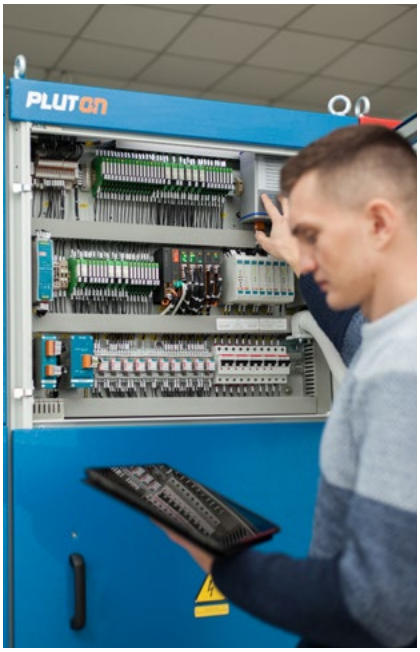
Products by leading domestic and foreign manufacturers are widely used in modern technological equipment automated control systems in power industry, in transport industry, including railway transport, as well as in various industry fields. Despite huge variety of PLC systems, their development is characterized with the following main trends:

- extension of functional capability;
- extended amount of supported interfaces and networks;
- application of open system concept;
- application of programming languages of IEC 61131-3 standard;
- reduction of overall dimensions;
- reduced costs.

MC200+ modular control system developed and produced by PLUTON is a hi-tech product that meets the most severe requirements to safety, applied in DC power distribution electrical networks.

MC200+ system has the following distinguishing features:

- optimal configuration selection depending on specific task;
- possibility of system scaling and modernization during the whole life cycle;
- providing high determinism of equipment control algorithms execution due to application of high-speed control busbar;
- system computing resources are distributed between master controller and intelligent extension modules, that carry out various types of primary data processing;
- ability of intelligent modules to exchange information independently of master controller additionally increases system response rate;
- various standard interfaces allow expanding required system functionality due to integration of devices and components produced by the third party manufacturers;
- the best price-quality ratio.



System modules are tested according to the requirements of IEC 61131-2:2007 international standard "Programmable controllers — Part 2: Equipment requirements and tests".

MC200+ modular controllers are successfully applied in switchgears of traction substations of:

- city electric transport of the Republic of Tajikistan (Dushanbe), the Republic of Poland (Lodz), Romania (Oradea), Ukraine (Mykolaiv, Vinnytsia, Dnipro);
- plant railways of the Republic of Kazakhstan (Kostanai Minerals JSC, Zhitikara).

MC200+ PROCESSING MODULE

MC200+ processing module carries out the following tasks:

- acquisition and processing of input data gained from discrete input modules according to the user's algorithm, control of input modules output lines state;
- transfer of data on actual equipment state and receipt of remote/local control commands via communication interfaces (RS-485, Ethernet, CAN);
- continuous monitoring of extension modules operation (available connection, power supply, overheating, load failure, emergency operation mode, etc.), as well as transfer of these data into the upper level system;
- receipt of real-time synchronization commands;
- implementation of industrial network protocols stack. Modbus TCP/IP, FTP (client/server), SNTP (time synchronization), HTTP (Web Server) are for Ethernet channel, Modbus RTU Master/Slave are for RS-485 channel;
- integration of various devices into the system and development of devices with HMI for prompt equipment control due to the standard communication interfaces;
- providing +5 V power supply for exension modules controller part;
- control of up to 15 I/O modules (360 digital signals) operation. Admissible number of modules can be extended up to 30 units (720 discrete signals) due to application of external power supply;
- prompt updating of application software without application of additional software and hardware. Software updating is carried out due to removable USB flash drive.

▲ Processing module MC200+

Controller has non-volatile memory for user's configuration data storage.

PLC-DI-24, PLC-DO-24 EXTENSION MODULES

Extension modules are functional devices, capable of performing various types of signals (discrete, analog etc.) primary processing, and therefore reducing computational load onto master processing module. Extension modules are installed onto DIN rail. Various versions allow using them both in direct proximity to the master controller, and remotely. Control interface can be either CAN, or RS-485 with a standard (open) protocol. Hot connection to the control busbar is also acceptable.

Modules have two operating modes: with default settings and with user settings. Parameters of user's configuration are set via control interface and are stored in the non-volatile memory.

All modules of discrete input/output signals have grouped galvanic isolation. LED indicators, that display actual lines state and modules operation modes, are installed on the front panel. Connection of wires to the modules doesn't require special-purpose tools and is implemented on the basis of connections pressure system. External slots for connection of discrete signals have control points for monitoring of voltage levels at the lines.

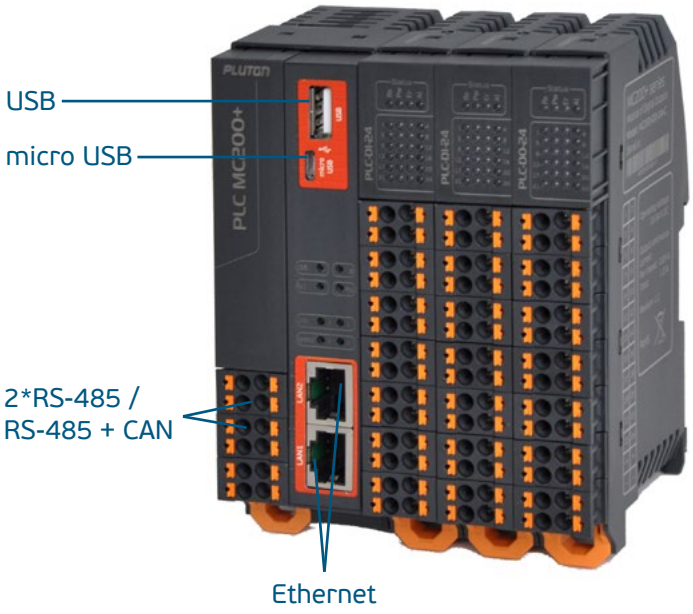
▲ PLC-DI-24, PLC-DO-24 extension modules

During operation modules carry out continuous monitoring of:

- connection with master controller;
- power supply voltage in +24 V circuit;
- correct operation of internal communication channels;
- reduction of power supply voltage to the level that is less than +18 V (PLC-DI-24);
- temperature conditions of input circuits operation (PLC-DI-24);
- load failure and overload at output lines PLC-DO-24.

The information is transferred to the upper level controller for processing and decision-making. Inputs module can carry out data transfer upon request, periodically or upon line state changes. Operational mode parameters are configured by user and are stored in the non-volatile memory. Outputs module is able to read out actual state of output lines for monitoring compliance with the specified state.

If there is no connection with external control device, outputs module can switch output lines to the specified state for safe emergency shutdown of devices.



▲ MC200+ interfaces

MAIN TECHNICAL CHARACTERISTICS OF MC200+ MODULAR CONTROLLER

Name of parameter	Unit of measurement	Value
Interfaces: 2 x Ethernet 10BASE-T/100BASE-TX 2/1 x RS-485 with galvanic isolation 0/1 x CAN with galvanic isolation 1 x CAN extension modules control	-	Modbus-TCP/IP, FTP, HTTP, SNTP protocols Modbus-RTU Master/Slave protocol PPM2, CAN-open protocol (is planned) self-designed open protocol
Real time clock	-	possibility of synchronization with the upper level system
Programming interface	-	USB-Host
Debugging and diagnostics interface	-	Ethernet, RS-485, USB-device
Power supply voltage, DC	V	10 – 34
Useful current, max.	mA	300
Electrical insulation resistance of galvanically isolated circuits (upon U_{test} = 1000 V DC), min.	MOhm	100
Ambient temperature: - during transportation and storage - during operation	°C	from -40 up to +60 from -20 up to +45
Operating mode	-	continuous
Cooling	-	natural
Installation method	-	DIN rail, 35 mm
Protection level EN 60529:2014	-	IP20

MAIN TECHNICAL CHARACTERISTICS OF PLC-DI-24 INPUT DISCRETE SIGNALS MODULE

Name of parameter	Unit of measurement	Value
Number of discrete inputs	-	24 (one galvanically isolated group)
Rated input voltage, DC	V	24
Input voltage range, "ON" state (log. 1), DC	V	10 – 34
Input current, "ON" state (log. 1) (upon input voltage 10 V < U < 30 V)	mA	2.8 - 3.6 per channel
Input voltage range, "OFF" state (log. 0), DC	V	0 – 4
Minimum input current, "OFF" state (log. 0), max.	mA	2.0 per channel
Data response delay at output upon signal switching at input	ms	0, 1 or 3 (hardware-based) + from 0 up to 5000 (software-based)
Electrical insulation resistance of galvanically isolated circuits (upon test voltage frequency 50 Hz and testing time 1 min.)	V	1000
Electrical insulation resistance of galvanically isolated circuits (upon U_{test} = 1000 V DC), min	MOhm	100
Module address setting from 0 up to 15	-	mechanical switching device
Interface for communication with control controller	-	RS-485 (Modbus-RTU Slave up to 115200 bps) or CAN (from 50 kHz up to 500 kHz)
Connection/disconnection of matching resistance of connection line 120 Ohm	-	configured with a parameter
Module power supply voltage in +24 V, DC circuit	V	12 – 34
Module power supply voltage in +5 V, DC circuit	V	4.7 – 5.5
Consumption power in +5 V circuit	W	0.35
Operation mode	-	continuous
Cooling		natural
Installation	mm	DIN rail, 35 mm
Protection level DIN EN 60529:2014	-	IP20
Environmental conditions		
Operational temperature	°C	from -20 up to +45
Storage temperature	°C	from -40 up to +60
Relative humidity	-	up to 80 % with no condensed water
Atmospheric pressure	kPa	from 86 up to 106 (645 – 795 mm Hg)

MAIN TECHNICAL CHARACTERISTICS OF PLC-DO-24 OUTPUT DISCRETE SIGNALS MODULE

Name of parameter	Unit of measurement	Value
Number of discrete outputs	-	24 (one galvanically isolated group)
Rated output voltage, DC	V	24
Output DC, max.: - upon all public keys - upon 12 public keys of 24 available	mA	 50 100
Output overload protection actuation current, DC	A	1.4 – 2.0
Output resistance of public key, max.	mΩ	165
Private key leakage current, max.	uA	20 per channel
Current of load failure monitoring generator	uA	80 per channel
Maximum output switching frequency	kHz	1
Electrical insulation resistance of galvanically isolated circuits (upon test voltage frequency 50 Hz and testing time 1 min)	V	1000
Electrical insulation resistance of galvanically isolated circuits (upon U_{test} = 1000 V DC), min.	MOhm	100
Module address setting from 0 up to 15	-	mechanical switching device
Interface of communication with master controller	-	RS-485 (Modbus-RTU Slave up to 115200 bps) or CAN (from 50 kHz up to 500 kHz)
Connection/disconnection of matching resistance of connection line 120 Ohm	-	configured with a parameter
Module power supply voltage in +24 V DC circuit	V	10 – 34
Module power supply voltage in +5 V DC circuit	V	4.7 – 5.5
Consumption power in +5 V circuit	W	0.5
Operation mode	-	continuous
Cooling		natural
Installation	mm	DIN rail, 35 mm
Protection level DIN EN 60529:2014	-	IP20
Environmental conditions		
Operational temperature	°C	from -20 up to +45
Storage temperature	°C	from -40 up to +60
Relative humidity	-	up to 80 % with no condensed water
Atmospheric pressure	kPa	from 86 up to 106 (645 – 795 mm Hg)

LLC Pluton IC

5 Novobudov St.
Zaporizhzhia 69076, Ukraine

Telephone/Fax:
+380 (61) 239-7900
+380 (61) 239-7901

E-mail: info@pluton.ua

www.pluton.ua

PLUTON Polska

44, Domaniewska str.
02-672 Warsaw, Poland

Telephone/Fax:
+48 22 111 50 31

E-mail: office@pluton-polska.pl

www.pluton-polska.pl

MC200+ 1.0-22-en