

IPLC100

Process station MicroPLC



Summary

The IPLC100 is a small free programmable DDC process station – a communicative controller with STM407 processor and FreeRTOS. It hosts one RS485 interface for connecting of I/O modules or 3rd party, and one Ethernet port for communication with a management station for remote management.

Application

- Free programmable control units for HVAC systems and other applications with local HMI
- Optional customized firmware – protocol converters with data presentation
- Data acquisition, processing, and presentation systems with advanced networking features

Functions

The controller contains an embedded operating system which boots up the runtime with the application. On the board there is a real time clock with battery backup, flash memory containing OS, runtime, application, and other data (time programs, set-points etc.), and a watchdog. The RS485 communication is indicated by two LEDs at the bus end switch.

The application is downloaded from the IDE, a Merbon development environment. IPLC100 contains a web server for remote access and control. The web pages are engineered in a Merbon HMI editor, a free application supplied as part of the engineering package.

The module mounts on a standard DIN rail, 2 standard 17.5 mm modules width.

Application examples: see *domat – Design and application guide*.

Technical data

Power	10 V ÷ 35 V DC, 14 V ÷ 24 V AC (terminals 1,2)
Consumption	max. 3 VA
Ambient temperature	0 ÷ 70°C, used components are working in the range of –20...80 °C
Processor	STM407 168MHz
Memory	192 kB RAM, 3 MB Flash, 4 kB NVRAM

	(Flash: 1 MB internal: 0.5 MB for OS, 0.5 MB for runtime image, 2 MB external: 0.5 MB for RT image and firmware upgrade, 256 kB for system files, 1.2 MB for user files (web))
Operating system	FreeRTOS
Ethernet	10/100BaseT, RJ45
LEDs	green: status red: Tx RS485 green: power OK
RS485	(K+, K-), 1200 ... 19200 bit/s, integrated bus-end (mini DIL switch)
Max. bus length	1200m
Dimensions	36 (l) x 90 (w) x 58 (d) mm

Terminals



RS485	serial line RS485, terminals K+, K-
1, 2	power terminals
TE	technical earth
RUN	green LED – system cycle
TxD	red LED – RS485 send data
PWR	green LED – power on
SW1	if ON at start, program execution is stopped
SW2	if ON at start, IP settings are brought to defaults
Ethernet	network interface
BusEnd	serial bus end microswitches, situated close to the RS485 connector

When powered by DC voltage the polarity is not relevant. All communication ports are optically separated (up to 1000 V) both from power part and from processor part.

Error codes

LED RUN indicates the runtime status using a sequence of short flashes. The error code persists the power off / on cycle, it is reset only after a project has been uploaded.

Normal state: LED flashes periodically 1 s ON, 1 s OFF – no errors

Error state: LED flashes in a pattern of

- M short flashes (300 ms ON / 300 ms OFF), where M is the upper code error order
- 1 s OFF
- N short flashes (300 ms ON / 300 ms OFF), where N is the lower code error order
- 2.5 s OFF

Meaning of the error codes:

11	memory low for OS
12	memory low for runtime
13	stack overflow *
21	corrupted / bad RT image
31	HardFault *
4X	watchdog of client X expired
5X	filesystem X error, where: X = 1 system filesystem (variables...) X = 2 filesystem for web pages

* At these errors the PLC stops and the LED starts to flash after power off and on.

DIP switch functions **STOP ON:** disable executing of the RT image after start (only the OS is started, this is the way how to establish communication with the PLC in case of a corrupted project)

INIT ON: default settings of network parameters etc. after start

Programming

Merbon IDE

The main programming tool is the **Merbon** package which contains I/O editor, graphical editor of the function block diagram (FBD) and / or structured text (ST), compiler (**Merbon IDE**), and web editor (**Merbon HMI Editor**).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). ST (structured text) programming is also possible.

Communication

Default network settings are:

IP address 192.168.1.10
subnet mask 255.255.255.0
default gateway 192.168.1.1

SSCP user / password: admin / rw.

Remember to note the new IP address after readdressing!

After these values have been changed, it is possible to bring the process station into default settings by DIP switch SW2: set SW2 to ON and restart the station. It will respond at the default address and it is possible to detect the device with Merbon IDE. The previously set IP address and other network properties will be lost.

The controllers can share variables over the Ethernet network (outside temperature, heat demands etc.) together with IPLC2../3../5.., IPCT, and other platforms.

The runtime provides drivers for communication with different subsystems, up to 12/2012 there is Modbus TCP / RTU, and M-Bus available. See the latest list of drivers in the Merbon IDE channel definition dialogue. New drivers may be developed on request, contact the Domat Control System support department for details.

Related products

MCIO2 Modbus I/O module, 30 I/O
MMIO Modbus I/O module, 17 I/O
M... Modbus I/O modules, see product overview
Merbon SCADA software

RoHS notice

The device contains a non-rechargeable battery which backups the real-time clock and part of the memory. After the device is not operable, please return it to the manufacturer or dispose of it in compliance with local regulations.