MIDAM

C O N T R O L   S Y S T E M

MIDAM W00192

Wireless FreeRTOS programmable controller

Free programmable process station equipped with i.MX RT processor and FreeRTOS/Cloudbow operating system. It is suitable for control of small installations or data acquisition. It features one Ethernet, one RS485 port, AES 128 encrypted Midam KFP protocol as well as integrated web interface.

Application

- Free programmable control of common HVAC systems
- Web access and visualisation of HVAC systems
- Data acquisition, processing, and presentation
- Protocol converters with web data presentation
- Common application with advanced networking features
- Modbus RTU to wireless Midam KFP protocol
- Integration of up to 75 Midam KFP devices
- Integration of up to 75 WMbus devices
- Wired or wireless integration into SCADA systems

Function

The W00192 controller possesses an embedded FreeRTOS operating system which may boot up the runtime with the application. There is a RTC backed up with battery, flash memory containing OS, runtime, application, and othernecessary data like time programs, setpoints etc., and a watchdog as well. It is also possible to use NVRAM as a backup for key parameters in case of unexpected system shutdown or connectivity drop. The application is created and uploaded in the integrated development environment (IDE). The complexity of application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), level of code optimisation, and number of connections the controller is supposed to maintain. It contains one RS485 and one Ethernet (RJ45) port for seamless communication with other control devices. The PLC features an integrated web server for remote connection and direct user intervention. The web pages are created in HMI editor, which is included in the package of development programs supplied by the manufacturer. The exported web definition components are uploaded to the PLC through IDE (refer to Web definition in PLC properties). The W00192 embeds AES 128-bit, the most secure encryption standard for wireless connections. It can work in two modes, direct communication or cached mode. Each device is mapped to Modbus RTU register area. Up to 75 devices can be mapped with configurable offset and length. Communication status is available through timestamp, comm error and status.

SCADA system integration

Direct integration into various SCADA systems through wired Modbus TCP, OPC UA, or BACnet/IP (RJ45) protocols is possible.

Programming

The main programming tool is the IDE package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor (according to IEC 61131-3) and compiler. 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.). The program can be set up also as structured text (ST) or with combination of both types of programming languages. The IDE package contains also LCD menu editor as well as web editor (HMI).

Midam KFP Password change

Prior to the first use, the encryption password (default "MIKROKLIMA1234AB") must be changed using the WUSB01 configuration dongle and the relevant software tool.

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Technical data

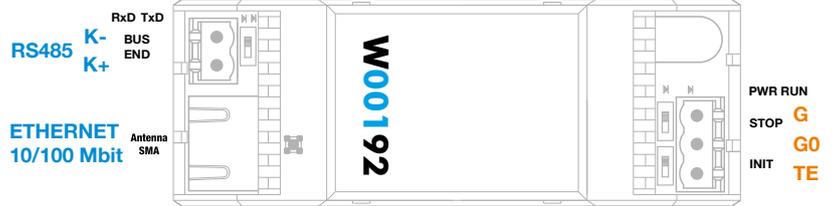|	
Power supply	24 V AC/DC ± 20 %
Consumption	5 VA
Communication	**Ethernet** Ethernet 10/100BaseT; galvanically insulated, insulating voltage 1 kV, RJ45, 2x LED (link, data) in the connector **RS485, Modbus RTU (K+, K-)** baud rates 300 ... 115 200 bit/s, parity and bits are set over Modbus RTU, default 9600/8/N/1 maximum bus length 1200 m, maximum number of modules depends on requested response time, galvanic isolation 1 kV **Wireless** 868,950 MHz, 100 kbps, WMBUS T1, KFP (default factory setting) 868,300 MHz, 32 kbps, WMBUS S1, KFP 868,100 MHz, 100 kbps, KFP 869,525 MHz, 100 kbps, WMBUS C, KFP 868,300 MHz, 38 kbps, KFP wMBUS (EN 13757-4), KFP (dual stack), AES 128 PCBC, EN 13757-4, RF power +20 to - 20 dBm Communication range 500 m in free space, 150 m in buildings
Protocol	Modbus RTU master/slave; 256 nodes (RS485), Modbus TCP client/server; 128 nodes, OPC UA, BACnet/IP
Indication	PWR (green, power supply), RUN (green, device active), Tx/Rx (red, RS485 communication), LINK/DATA (Ethernet)
HW	CPU i.MX RT (1x Cortex M7, 600 MHz), RAM 32MB, Flash 48MB, Power fail detection (50 ms ISO16750-2)
SW	IDE 2.5+ (IEC61131-3, FUPLA, ST language)
Mechanical and dimensions	98.7 x 36.2 x 64 mm (l x w x h), Polycarbonate enclosure (UL94V0) IP20, 3x DIP switch blocks - STOP (runtime, program execution), INIT (default configuration), BUS END
Terminals	5 x M3 screw terminals (Power, K+, K–), Recommended wire diameter 0.35 to 1.5 mm²
Antenna	SMA female connector for external antenna. Efficiency > 30% External antenna requirements: Max. input power 0.5 W Connector SMA male Input impedance 50 Ohm Frequency range 868 - 870 MHz Cable insertion loss < 1dB VSWR < 2.0
Ambient conditions	+5 to +40 °C, 5 % to 85 % rH non-condensation (EN 60721-3-3. Class 3K3).
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.
Safety note	The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

WIRELESS SOLUTIONS

MIDAM W00192

Wireless FreeRTOS programmable controller

Terminals and connection

TE	Technical ground
G0	Power
G	Power
Ethernet	Network interface (RJ45)
SMA	External antenna connector
K+	Serial line RS485+
K–	Serial line RS485–

RS485 K-
K+
RxD TxD
BUS END

ETHERNET 10/100 Mbit
Antenna SMA

W00192

PWR RUN
STOP **G**
G0
INIT **TE**

LED indication and DIP switches

PWR	Power supply indicator (ON: power OK; OFF: no power applied, weak or damaged power supply).
RUN	System cycle (OK: LED flashes periodically 1 s ON, 1 s OFF; ERROR: LED flashes in other pattern, LED is still ON or OFF).
STOP	In ON position - runtime is running, program execution has been stopped.
INIT	In ON position at power-up - configuration parameters are brought to defaults (refer to Configuration parameters in IDE; for example IP address, user and password, database settings, proxy, ...).
STOP + INIT	Both switched in ON position - factory default RT (i.e. the upgraded RT is not loaded).
RxD	RS485 receiving data from the field bus at COM1 (flashing: transmitting data; OFF: no data traffic).
TxD	RS485 transmitting data to the field bus at COM1 (flashing: transmitting data; OFF: no data traffic).
BUS END	Bus end RS485, the first and last devices on the bus should have bus end in ON position. This DIP switch is accesible upon removal of RS485 terminal.

Communication settings

Default network settings
IP address 192.168.1.10
Subnet mask 255.255.255.0
Default gateway 192.168.1.1
SSCP user: admin
Password: rw

Note the changed network settings for future reference!

As soon as these values have been changed, it is possible to bring the PLC into default settings by the INIT DIP switch.Set INIT to ON and restart the PLC. All values in the PLC configuration are set to defaults. The PLC will respond at the default IP address and it is possible to change the old address through IDE. The PLC controllers can share variables over the Ethernet network (outside temperature, heat demands etc.) together with other PLC platforms. The runtime provides drivers for communication with subsystems.

Runtime contains e.g. Modbus TCP / RTU (server/client), M-Bus, IEC62056-21, SSCP. The complete list of drivers can be found in the Channel configuration dialog in the most recent IDE release available. Please consult the required protocol features and functions with the list of implemented features in the IDE help. It is also possible to program own communication drivers using the I/O library functions in ST language.

Number of communication channels (on the serial lines and Ethernet) to I/O modules and subsystems is not directly restricted and relates to available RAM PLC memory. Maximum five SSCP client connections are available. Number of connections from Modbus TCP clients on Modbus TCP server is also limited to five. Other client channels (web interface, etc.) are not directly restricted.

Changes in versions

01/2025	New datasheet version (v23/01).
07/2025	The wording of the section "Midam KFP Password change" has been modified (v25/07).

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