MIDAM H/WLx7002xx

Free programmable room controller

Free programmable room controller based on i.MX RT processor (FreeRTOS) and capacitive touch screen. It contains temperature, relative humidity and light intensity sensors. As an option it can feature CO_2 sensor, various communication interfaces (Ethernet, RS485, KFP wireless) as well as multiple inputs/outputs.

PLC / HMI

Application

- HMI for various HVAC applications

- Control of fan-coils and convectors, floor and radiator heating, AHUs, air-conditioning units

- Control of boilers, DHW, heating circuits,

- General BMS interfacing, monitoring of room temperature, relative humidity or CO_2

- SCADA system integration

Function

The free programmable room controller H/WLx7002xx contains i.MX RT processor type with FreeRTOS operating system. It is based on a high performance process platform for user application/ graphic development. The system is open and it is possible to create customised user interfaces, control programs, data collection applications, or to manage other processes. The controller has its own real-time clock, backed up with internal battery. As a default the H/WLx7002xx has no user application available. The application is created and uploaded in the integrated development environment (IDE) provided by the device manufacturer. The H/WLx7002xx is delivered with temperature and relative humidity sensor as a standard or equipped with CO_2 sensor as an optionand it features a built-in light intensity sensor too. The optional equipment is specified by a special device code (-xx). The combination options are listed at the end of the document and correspond to the Midam price list.

KFP Wireless communication option

Wireless communication is based on an unlicensed 868 MHz band and uses higher radio frequency transmitter power up to +20 dBm. WLx7002xx embeds AES 128-bit, the most secure encryption standard for wireless connections to date and is compatible with the entire range of Midam KFP wireless system devices.

SCADA system integration

Direct integration into various SCADA systems through wired Modbus RT, OPC UA, Modbus TCP 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, dew-point 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 LCD menu editor as well as web editor (HMI).

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Technical data

Power supply	24 V AC/DC ± 20% Power supply is not included; it is recommended to use dedicated power supply for this device only.
Consumption	3 W/7 W typical average/maximum.
Communication	**RS485, (K+, K-) Modbus RTU (option)** baud rates 300 ... 115 200 bit/s, parity and bits are set over Modbus RTU, default 9600/8/ N/1. **1x Ethernet 10/100 BaseT RJ45 (option)** RJ45, 2x LED (link, data) integrated in the connector. **Wireless (optional)** 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
Protocol	Modbus RTU master/slave; 256 nodes (RS485), Modbus TCP client/server; 128 nodes, OPC UA.
Temperature measurement range	0 to +55 °C, ± 0,3 °C.
Humidity measuring range	20 to 80 % rH, ± max. 4.5% rH, typical 3% rH.
Temperature setpoint	Configurable, ± 10 to ± 1 K.
CO$_2$ measuring range (option)	400 ... 5000 ppm (secondary output 0-100%).
CO$_2$ measuring method	PASens® (Photoacoustic Sensor Technology), response time 60s.
CO$_2$ measuring accuracy	± 40ppm, ± 5% of measured value defined under the condition of at least 1 completed Automatic Self Calibration (ASC) per week in an atmospheric concentration of 400 ppm CO$_2$. Accuracy drift per year with ASC algorithm enabled ± 5ppm, ± 0.5% of measured value.
Display	Projected capacitive, touch screen LCD display 4.3", Resolution 480x270 px. LED backlight, Contrast ratio 500:1, Backlight lifetime approx. 40.000 hrs. Viewing angle 160° (H)/160° (V). Color max. 16M.
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).

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Mechanical and dimensions	88x129x21mm (l x w x h) - body unit without flush mounted part (PCB with terminals). Mounting relates to 60mm diameter multifix flush wall installation box (67x40mm). Fanless version.
Terminals	M3 spring terminal block (power, RS485, IOs), wire diameter 0,35 - 1,0 mm^2.
Ambient conditions	0 to +50 °C, 5 % to 95 % rH (EN 60721-3-3 class 3K5).
RoHS notice	The device contains a lithium rechargeable battery (MS920SE). 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.

Terminals and connection

G	Power
G	Power
G0	Power
G0	Power
N.U.	Not used
TE	Technical ground (optional for shielding)
K+	Serial line RS485 +
K+	Serial line RS485 +
K-	Serial line RS485 -
K-	Serial line RS485 -
RJ45	Ethernet interface
OEM	Terminals/interfaces can be customized upon request and feasibilty.
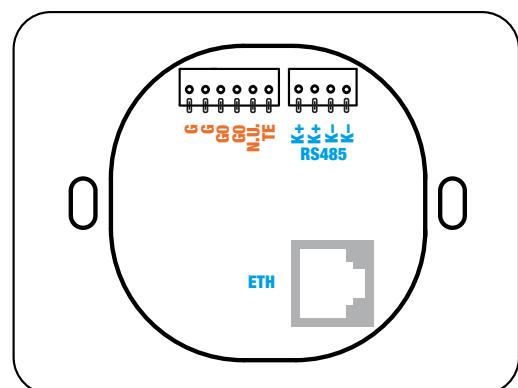
Switches between power supply and HMI unit (from left)

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, ...).
RUN	Optional.
PRG	Optional for wireless communication.
USR	Optional for wireless communication.

Device installation/dismantle (wall mount)

Once the terminal part (back plate) has been wired and mounted onto the multifix flush box, slide the HMI part from the left to fit in the connecting terminals. The controller is secured in its position lock located in the bottom part of the device. To detach the HMI part from the terminal part, use thin tool in order to disengage the locks situated at the bottom of the HMI part. Then, push the inclined plastic cover to slide the HMI part to the right carefully.
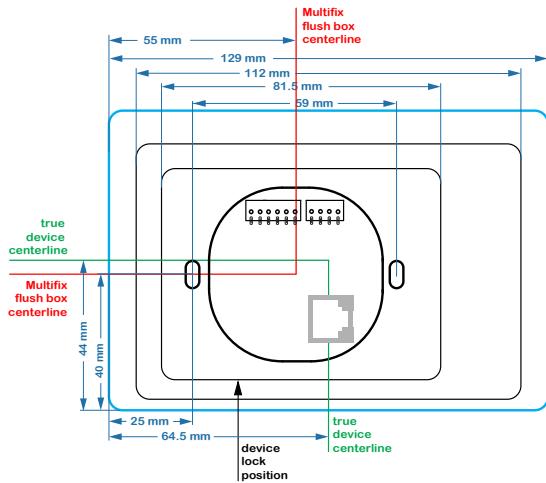
Communication settings

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.

Midam KFP Pairing

Two devices are required for mutual communication. Both must be powered and located in close proximity to each other. Usually, wireless gateway or configuration dongle is used to set up remote wireless devices. Use look-up function in software tool to display a list of all available devices in range and assign or adjust parameters based on wireless ID code for each single device. There is a comprehensive help section integrated in the software tool to provide support during the wireless device set up procedure.

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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Table of equipment types

H-L070-02-01	HMI, i.MX RT, Ethernet
H-L070-02-02	HMI, i.MX RT, Ethernet, RS485
H-L970-02-01	HMI, i.MX RT, CO_2, Ethernet
H-L970-02-02	HMI, i.MX RT, CO_2, Ethernet, RS485
W-L070-02-01	HMI, i.MX RT, Midam KFP wireless gateway, Ethernet
W-L070-02-02	HMI, i.MX RT, Midam KFP wireless gateway, Ethernet, RS485
W-L970-02-01	HMI, i.MX RT, CO_2, Midam KFP wireless gateway, Ethernet
W-L970-02-02	HMI, i.MX RT, CO_2, Midam KFP wireless gateway, Ethernet, RS485

Table of communication/installation types*

B-LPWR-01	HMI, i.MX RT, Ethernet
B-LPWR-02	HMI, i.MX RT, Ethernet, RS485

* Will be automatically paired based on the equipment type selected above

PLC / HMI

Changes in versions

06/2023	New datasheet version (v23/06).
07/2024	I/O options deleted. (v24/07).
07/2025	The wording of the section "Midam KFP Password change" has been modified (v25/07).
08/2025	Power supply information updated (v25/08).