

# INSTALLATION MANUAL

## Module for controlling of inverter outdoor units AOYG and WOYx

### USE

The UTI-INV-485 module (hereinafter „module“) is used for control of FUJITSU GENERAL LTD. outdoor inverter units connected to heat exchangers of different producer or of different construction.

### PACKAGE CONTENTS



UTI-INV-485 module



Temperature sensor



This manual



Description of the communication protocol

### INSTALLATION

- The module with IP20 protection is designed to be attached to the DIN rail situated inside the electrical switchboard or the installation box. In the outdoor environment, it must be used only in facilities with adequate protection. It's also possible to install the module inside the outdoor unit (only if there is enough space for installation).
- By installing the module properly, ensure that the air is perfectly circulating so that the maximum allowed working temperature of the module is not exceeded in the case of continuous operation and higher ambient temperatures.

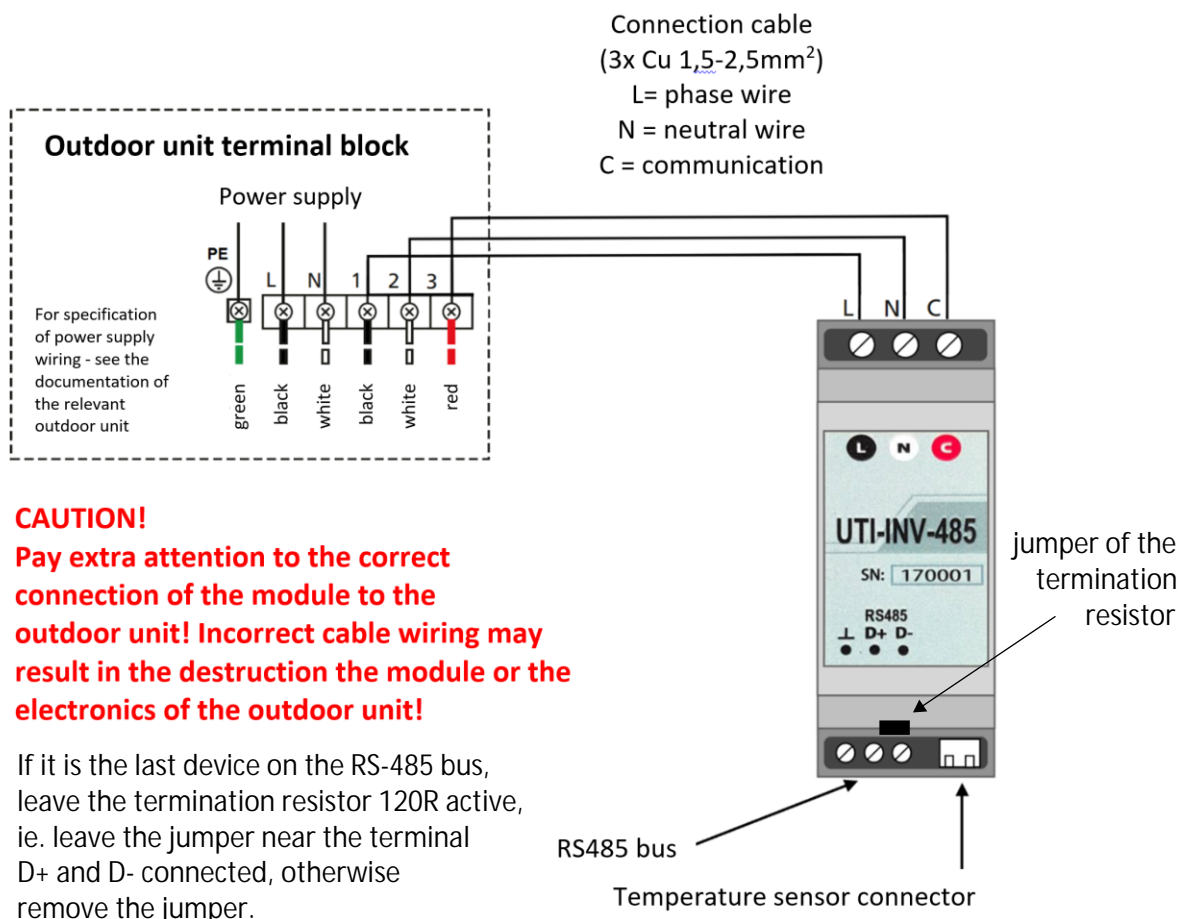
### WARNING

- If you find any signs of damage, deformation or malfunction, do not install this module and return it to your dealer.
- Pay extra attention to the wire connection between the module and the outdoor unit! There's a risk of possible destruction of the module and electronics of the outdoor unit, if incorrectly connected!
- The power and communication terminal of the module must not be used as a power supply of the outdoor unit!
- The module may be powered only from the outdoor unit to which it is connected. Power supply from another source is unacceptable.
- Use of the module in any other way than described in this manual may reduce the level of protection.

## ELECTRICAL CONNECTION

- General wiring of the supplied module can be found in the enclosed scheme.
- Before starting installation, make sure that the module is not energized and the main switch is in the "OFF" position.
- The module is designed for connection to single-phase alternating voltage supply network (AC) 230 V and must be installed in accordance with regulations and norms applicable in the particular country.
- Installation, connection, adjustment and operation may only be carried out by a person with adequate electrical engineering skills allowing them to work with equipment up to 1000V, who is fully familiar with this manual and functionality of this device.
- The module is a permanently connectable device and does not have its own power disconnection device. A switch or circuit breaker must be included as a part of the installation. It must be easily accessible by the operator and must be marked as the disconnect device. The device is protected as a set with the air conditioning unit. The circuit breaker values are determined by the unit type and are listed in the installation manual for the air conditioning unit. The switches or circuit breakers used as the disconnect device must comply with the relevant requirements of IEC 60947-1 and IEC 60947-3.
- **WARNING:** The installation manual for the air conditioning unit also requires an installation of residual-current device (RCD), in addition to the circuit breaker.
- The device includes protection against overvoltage peaks and disturbing impulses in the power supply. However, for the proper functioning of these protections, appropriate higher level of protection (A, B, C) must be provided in the installation and the interference of the switching devices (contactors, motors, inductive loads, etc.) must be ensured according to the standard.
- Do not install the module near the sources of excessive electromagnetic interference.

## CONNECTION OF THE UTI-INV-485 MODULE



## UTI-INV 485 MODULE TERMINALS DESCRIPTION

Description of the RS-485 bus terminals:

- D+** positive communication terminal of the RS-485 bus
- D-** negative communication terminal of the RS-485 bus
- L** ground of the internal power supply RS-485 (5V)

**DO NOT connect to the PE protective wire!**

Description of the terminals for connection to the air-conditioning unit:

- L** phase wire terminal
- N** negative wire terminal
- C** communication wire terminal

## INSTALLATION OF THE RS-485 COMMUNICATION CABLE

- Always use shielded cable.
- Connect the cable shield to the frame of the device or the switchboard panel.
- We recommend using the same type of cable for the entire RS-485 bus (to prevent reflections due to different impedances).
- When placing a cable in an environment with electromagnetic interference, we recommend using the Anti-EMI ferrite elements with minimum impedance of min. 200 Ohm/100Mhz (e.g. type FLF-65B).

<b>Communication cable RS-485:</b>	
Cross-section of connecting wires (mm <sup>2</sup> )	min. 2x0,35 max. 2x1
Cable type	twisted pair + shield
Impedance	approx. 120 Ohm
Capacity	< 65pF/m
Temperature range	-30°C to +60°C
Suitable types:	J-Y(St)Y, Belden 9842, LAM DATAPAR 2x0.8

## INSTALLATION OF THE CABLE BETWEEN MODULE AND AIR CONDITIONING UNIT

- Use a cable as specified in the installation manual for air conditioning unit.
- Do not use a damaged cable
- When placing a cable in an environment with electromagnetic interference, we recommend to use the Anti-EMI ferrite elements with minimum impedance of min. 200 Ohm/100Mhz (eg. type FLF-65B).

<b>Connection cable between the device and the air-conditioning unit:</b>	
Cross-section of connecting wires (mm <sup>2</sup> )	min 3x 1.5 max. 3x 2.5
Temperature range	-30°C to +60°C
Code number	IEC: 60245 IEC 57 / CENELEC: H05RN-F

## **INSTALLATION OF TEMPERATURE SENSOR UTI-ETS**

- The location and method of sensor installation must ensure its perfect thermal contact with the sensed surface - e.g. location in the housing, fixed with sleeve or thermally conductive sealant.
- The sensor must be isolated from the influence of the surrounding air temperature (e.g. by suitable temperature insulation).
- The sensor must always be electrically connected to the module. The module doesn't work without the connected sensor.
- The maximum cable length of the sensor is 3m. If you need to extend the length of the original cable, please follow no current grounding principles to avoid current loops.
- If sensor is located in an environment with electromagnetic interference, we recommend to use the Anti-EMI ferrite elements with minimum impedance of min. 200 Ohm/100Mhz (e.g. type FLF-65B).

### **Sensor location:**

- Sensors in systems that are used only for cooling should be placed on the coldest part of the evaporator or on the refrigerant return pipe (gas pipe).
- For air exchangers with cooling and heating functions, the best sensor location is approximately in the middle of the tube exchanger length.

The sensor location in **air-to-water heat pumps** depends on the structural design:

- When using the plate heat exchanger, it is suitable to place the sensor to its lower part. Right in the middle between the water inlet and the liquid refrigerant outlet.
- When using the coil heat exchanger which is integrated into a storage tank, place the sensor inside the housing in order to reach the bottom of the spiral heat exchanger.

## **TEST RUN**

Before first turning the power on, please check if the module and the outdoor unit are correctly connected.

If the outdoor unit is equipped with an error indication with LED lamps or alphanumeric display, check if the error status is not indicated. To decode the errors, use the Fujitsu-General service documentation (Installation manual, Service manual, Service Instructions).

### **Starting the outdoor unit:**

Using the UTI-INV-485 module RS-485 bus, send the command to operate the outdoor unit from the master control system. This command must include a performance and a mode request. For a list of supported protocols and their exact description, please refer a document attached to this manual.

## CAUTION!

If the heat offtake from the indoor unit is not provided (for example, if the indoor heat exchanger is not connected, the indoor fan or circulation pump is not running), the compressor may operate for maximum of 1 minute!

## SAFETY PRECAUTIONS, MAINTENANCE AND CLEANING

For security reasons, do not interfere with the module. For any possible repairs, please return to the manufacturer. Do not expose this device to excessive humidity, do not immerse it in the water and do not expose it to the vibrations, shocks or direct sunlight. The device requires no maintenance. Use only soft, slightly moistened cloth to clean the case of the module. Do not use any scouring or chemical solvents.

## RECYCLING

Electronic and electrical products must not be disposed as a household waste. Dispose the waste at the end of its lifetime in accordance with the applicable legal provisions.

## TECHNICAL SPECIFICATIONS

Supply voltage	AC 230 V / 50 Hz
Power consumption	max. 1,5W
Operating temperature	-20°C to +40°C
Storage temperature	-30°C ... +60°C
Operation position	any
Mounting	DIN rail EN 60715
Protection	IP20
Overvoltage category	II.
Pollution degree:	2
Dimensions:	88 x 34 x 62 mm

## MANUFACTURER

**IMPROMAT KLIMA spol. s r. o.**  
Tř. T. Bati 5267, 760 01 Zlín, Czech Republic  
tel.: + 420 577 004 141 (148)  
e-mail: [info@impromat-klima.cz](mailto:info@impromat-klima.cz)  
[www.impromat-klima.cz](http://www.impromat-klima.cz)

This device is in conformity with the following EC directives:

- EC Council Directive 2014/35/EU (Government Regulation No. 118/2016 Coll.) Safety requirements for electrical equipment
- EC Council Directive 2014/30/EU (Government regulation No. 117/2016 Coll.) Electromagnetic compatibility (EMC)