# TU-RS485-ETH IO DL

Intelligent Unit with Ethernet Interface + Digital I/O & Data Logger

## FEATURES

- N.1 serial interface RS-485 Modbus RTU Master

- N.1 serial interface RS-485 Modbus RTU Slave

- Interface Ethernet 10Base-T, Modbus TCP

- N.1 USB Port + USB Memory Key 4 GB Data Logger

- N.4 Digital Inputs

- N.2 SPDT Relay Outputs

- Functional Block programming software

- Remotely programmable

- Connection by removable screw-terminals

- LED signalling for Link/Act Ethernet, serial RX-TX, power supply

- LED signalling for digital inputs and digital outputs state

- Galvanic Isolation on all the ways

- EMC compliance - CE mark

- Suitable for DIN rail mounting in compliance with EN-50022 standard

## GENERAL DESCRIPTION

The device TU-RS485-ETH IO DL is an Intelligent unit able to control a network of slave Modbus RTU devices connected on serial line RS-485 Master executing the reading and writing of the field values and performing the logical and mathematical functions necessary for the system working.

Moreover, the device is equipped with 4 digital inputs channels and 2 relay outputs .

By means of the Ethernet interface or the RS-485 "SLAVE"  ports it is possible to read and write, in real time, the internal registers value. Moreover, by means of the Ethernet interface, or by the RS-485 "SLAVE" ports it is possible to:

- Programming of the Control Logic
- Monitor, request of data, programming in real time the Intelligent Unit.
- Direct programming and request of data from the Slave devices connected on the RS-485 Master.

The device TU-RS485-ETH  IO DL is configurable by the software DEVTU, an easy and intuitive free IDE and running under Windows.

The device TU-RS485-ETH IO DL realizes a full electrical isolation between the lines, introducing a valid protection against the effects of all ground loops eventually existing in industrial applications.

LED signalling of Ethernet activity and data rx-tx flow on the serial line allows a direct monitoring of the system functionality. The connection is made by removable screw-terminals (supply and RS-485) and RJ45 plug (Ethernet ).

The unit is in compliance with the Directive 2004/108/EC on the electromagnetic compatibility.

The device is housed in a rough self-extinguishing plastic enclosure which, thanks to its thin profile of 22.5 mm only, allows a high density mounting on EN-50022 standard DIN rail.

## LIST OF SUPPORTED FUNCTION

Communication:
- Read data from "slave" devices (Modbus function 04)
- Write data to "slave" devices ( Modbus function 16)

Logical:
- Boolean(And, Or, ….)
- Compare (>, <, =, ……)
- Arithmetical (Sum, Subtraction, Multiplication, Division ……)
- Calculation (Scaling, Exponential functions, Square root extraction, Arithmetic mean, …..)

Process:
- Conditional statements (IF)
- Flow control (Goto, Call, ……)

For the complete list of functions and their operation, refer to the Programming software User Guide.

## TECHNICAL SPECIFICATION (Typical at 25°C in nominal conditions)

In compliance with Ethernet IEEE 802.3 EIA RS485

| | |
|---|---|
| Network interface | Ethernet 10Base-T |
| Protocol | Modbus TCP |

**RS485 Interface**

| | |
|---|---|
| Baud-rate | up to 38.4 Kbps |
| Max. distance | 1.2 Km @ 38.4 Kbps (recommended) (1) |
| Number of modules in multipoint | up to 32 |
| Internal termination resistance (optional) | 120 Ohm |

**Digital Inputs**

| | |
|---|---|
| Channels 4 | |
| Input voltage | (bipolar) |
| OFF state | 0 ÷ 3 V |
| ON state | 10 ÷ 30 V |
| Impedance | 4.7 KW |

**Digital Outputs**

| | |
|---|---|
| Channels | 2 |
| Type | SPDT Relays |
| Switching Power (max.) | 2 A @ 250 Vac ( resistive load ) per contact <br> 2A@30 Vdc ( resistive load ) per contact |
| Minimum load 5Vdc , 10mA | Max. voltage 250Vac (50 / 60 Hz) , 30Vdc |
| Dielectric strength between contacts | 1000 Vac, 50 Hz, 1 min. |
| Dielectric strength between coil and contacts | 4000 Vac, 50 Hz, 1 min. |

**Power supply**

| | |
|---|---|
| Power supply | 18 ÷ 30 Vdc |
| Current consumption | 45 mA typ. @ 24Vdc(standby) |

**Isolations**

| | |
|---|---|
| Power supply / Ethernet | 1500 Vac, 50 Hz, 1 min. |
| Power supply / RS485 | 1500 Vac, 50 Hz, 1 min. |
| Ethernet / RS485 | 1500 Vac, 50 Hz, 1 min. |
| Inputs / RS485 | 2000 Vac, 50 Hz, 1 min. |
| Inputs / Power supply | 2000 Vac, 50 Hz, 1 min. |

**EMC ( for industrial environments )**

| | |
|---|---|
| Immunity | EN  61000-6-2 |
| Emission | EN 61000-6-4 |

**Temperature & Humidity**

| | |
|---|---|
| Operative  temperature | -20 ÷ +60 °C |
| Storage temperature | -40 ÷ +85 °C |
| Relative humidity (not cond.) | 0 ÷ 90 % |

**Connections**

| | |
|---|---|
| Ethernet | RJ-45  (on  terminals  side) |
| RS-232D | RJ-45 (on front side) |
| RS-485 / Supply | Removable screw terminals |

**Housing**

| | |
|---|---|
| Material | Self-extinguishing    plastic |
| Mounting | DIN rail EN-50022 |
| Dimensions   in   mm.(WxHxT) | 100  x  120  x  22.5 |
| Weight | about 160 gr. |

(1) - The maximum distance depends of: number of devices connected, type of cabling, noises, etc...

## INSTALLATION INSTRUCTIONS

The Intelligent Unit TU-RS485-ETH IO DL is suitable for fitting to DIN rails in the vertical position. For
optimum operation and long life follow these instructions:

When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following case:
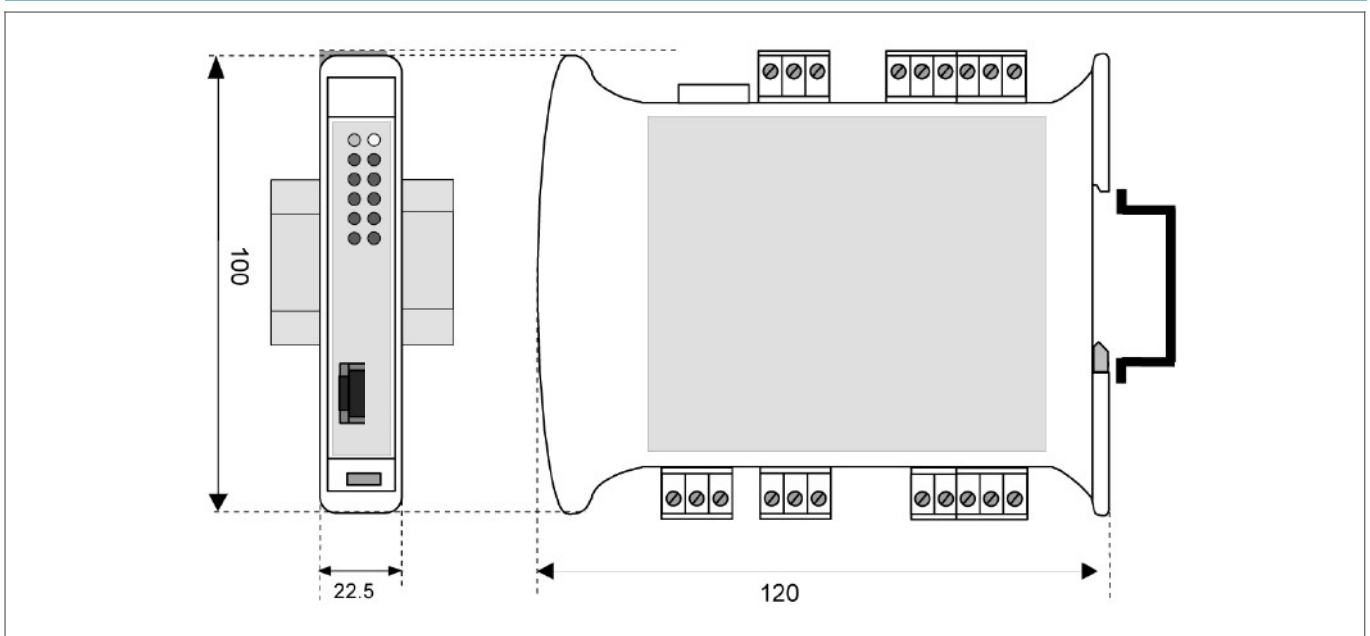   - If panel temperature exceeds 45°C and high power supply value( > 27Vdc).
Make sure that sufficient air flow is provided for the device avoiding to place raceways or other objects which could obstruct the ventilation slits.
Moreover it is suggested to avoid that devices are mounted above appliances generating heat; their ideal place should be in the lower part of the panel.
Install the device in a place without vibrations.
Moreover it is suggested to avoid routing conductors near power signalcables (motors, induction ovens, inverters, etc...) and to use shielded cable for connecting signals.
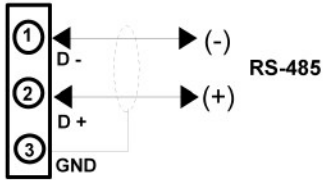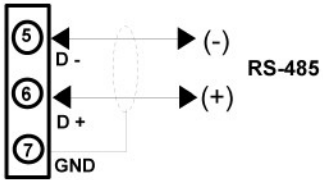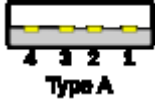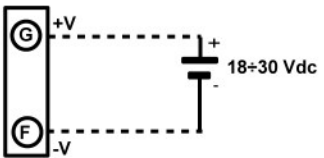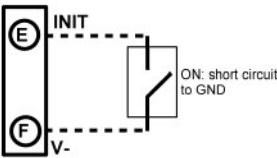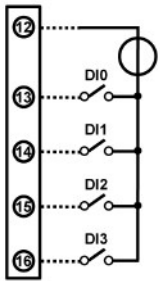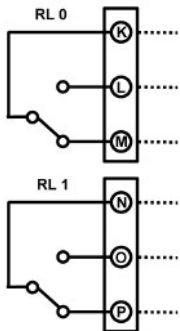
## MODBUS REGISTERS MAPPING

| Register | Description | Access |
|---|---|---|
| **%S0** | --Reserved-- | R/W |
| %S1 | Firmware [0] | R |
| %S2 | Firmware [1] | R |
| %S3 | Name [0] | R/W |
| %S4 | Name [1] | R/W |
| %S5 | Port 1 [BaudRate] | R/W |
| %S6 | Node ID | R/W |
| %S7 | Port 1 [Timeout RX] | R/W |
| %S8 | Digital Inputs | R/W |
| %S9 | Digital Outputs | R/W |
| %S10 | System Flags | R/W |
| %S11 | --Reserved-- | - |
| %S12 | --Reserved-- | - |
| %S13 | PC | R |
| %S14 | Status [0] | R |
| %S15 | Status [1] | R |
| %S16 | COM Errors | R/W |
| %S17 | Gateway Mask [L-H] | R/W |
| %S18 | Port 0 [Settings] | R/W |
| %S19 | Port 0 [Settings] | R/W |
| %S20 | Timers Enable | R/W |
| %S21 | --Reserved-- | - |
| %R22 | --Reserved-- | - |
| %R23 | --Reserved-- | - |
| %R24 | --Reserved-- | - |
| %R25 | --Reserved-- | - |
| %R25 %R959 | General Purpose Registers | R/W |
| %R960 %R1023 | Memory Registers | R/W |

## MECHANICAL DIMENSIONS (mm)

## WIRING SERIAL PORTS

| RS-485 Slave (Port 0) | RS-485 Master (Port 1) | USB PORT |
|---|---|---|



| POWER SUPPLY | INIT | DIGITAL INPUTS |
|---|---|---|



NOTE: the input channels are not isolated between them

| RELAY OUTPUTS |
|---|



## LIGHT SIGNALLING

| LED | COLOR | STATE | DESCRIPTION |
|---|---|---|---|
| PWR | GREEN | ON | Device powered |
| | | OFF | Device not powered / Wrong RS-485 connection |
| STS | YELLOW | BLINK | DEBUG modality |
| | | OFF | RUN modality |
| RX n | RED | BLINK | PORT n - Data received ( the blink frequency depends RX n RED on Baud-rate) |
| | | OFF | No reception in progress |
| TX n | RED | BLINK | PORT n - Data transmitted ( the blink frequency depends on Baud-rate) |
| | | OFF | No reception in progress. |
| In | RED | ON | State 1Digital Inputs |
| | | OFF | State 0 Digital Inputs |
| On | RED | ON | State 1Digital Inputs |
| | | OFF | State 0 Digital Inputs |

# 1 ETHERNET PORT TO CONNECT THYRISTOR UNIT & TOUCH PANEL

- Power Set Point
    - Power Feed-back
- ON/OFF
    - Local/Remote
    - General alarm
    - Current 1,2,3
- Power (Kw)

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MODBUS

MODBUS

MODBUS

MODBUS

DCS/PLC

ETHERNET MODBUS/TCP

Reading parameters + Diagnostics
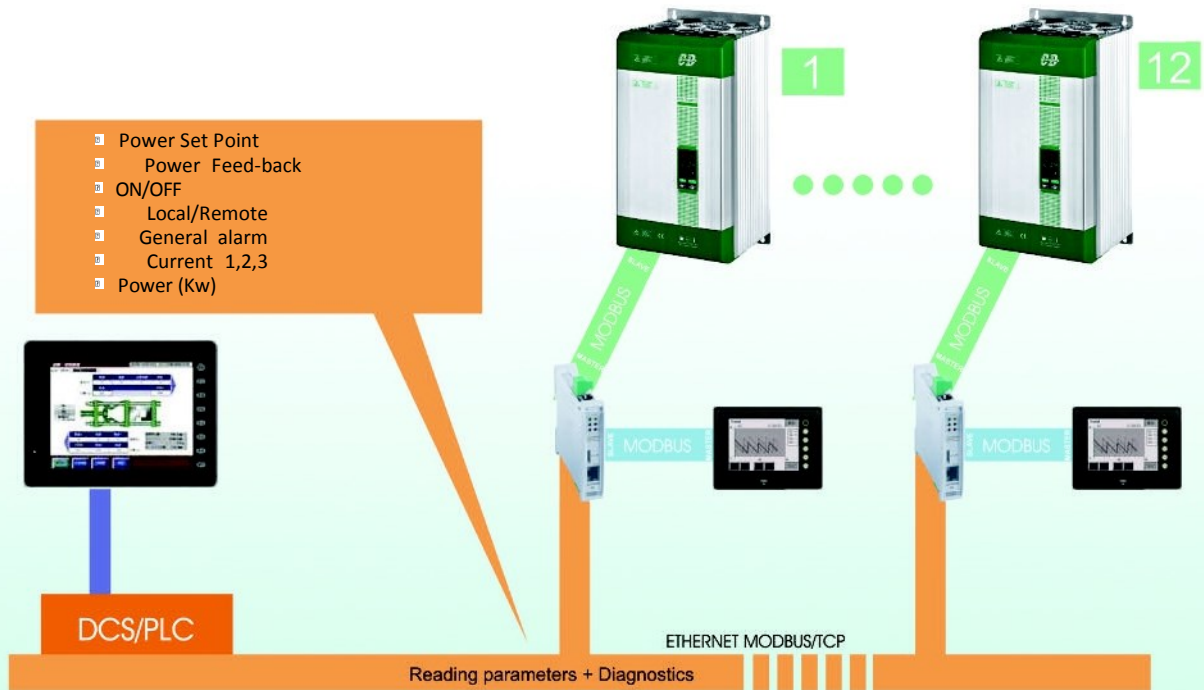
# 1 ETHERNET NODE FOR 12 THYRISTOR UNITS

- Power Set Point
    - Power Feed-back
- ON/OFF
- Local/Remote
- General alarm
- Current 1,2,3
- Power (Kw)

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MODBUS

DCS/PLC

ETHERNET MODBUS/TCP

Reading parameters + Diagnostics
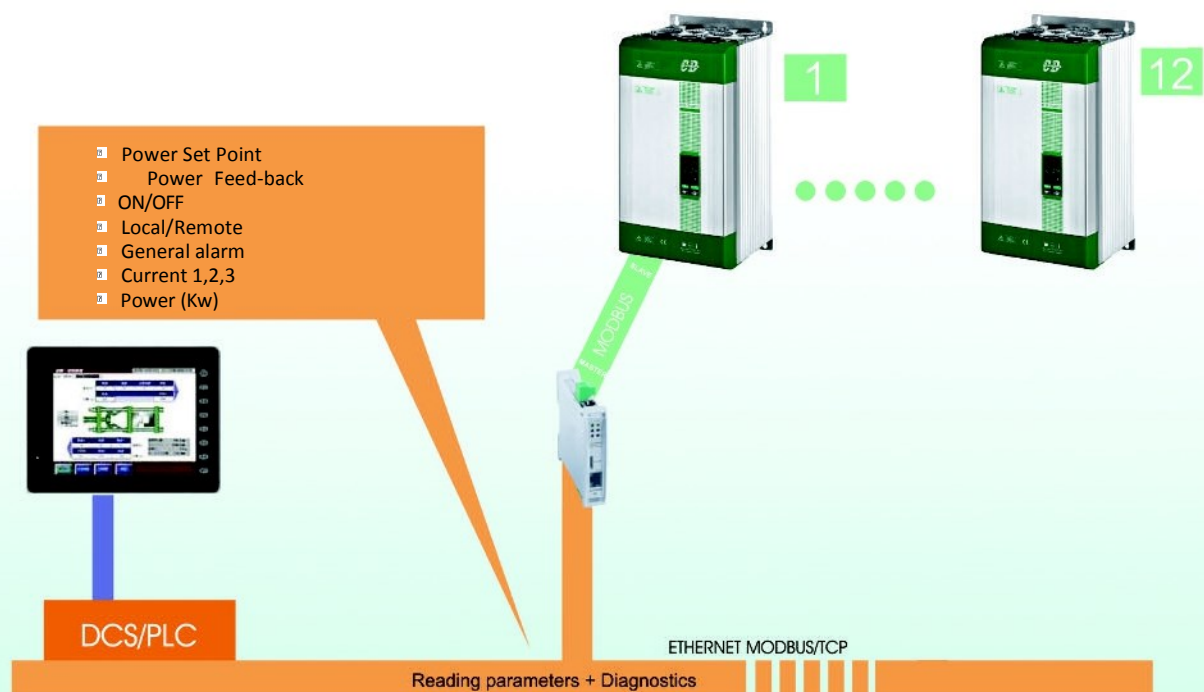
# EXTRUDER SYSTEM WITH FLAT CABLE & CONNECTOR

ETHERNET

TU-RS485-ETH IO

MODBUS

REVO-TC

REVO-TC

REVO-TC

EXPANDING MODULES GDAT3000 IO

| INPUT: | OUTPUT: |
|---|---|
| ■ Alarms from other panels | ■ Cold start |
| ■ Clixon engine | ■ Command System |
| ■ Heat fans | ■ Command flashing |
| ■ Alarm thickness measurement | |
| ■ Emergency inserted | |

Legend:  S = Slave  M = Master

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# ELECTRIC OVEN

I/O

MODBUS

REVO-PC

REVO-S 2PH

REVO-S 2PH (max8)

REVO-S 2PH

TU-RS485-ETH IO

PROFILER

REVO-TCM

**TU-RS485-ETH IO FUNCTIONS**

- Door open alarm
- Open Control Watch Dog
- Logical end of cycle

Legend:  S  Slave  M = Master