RTU8 Compact Outstation

Installation and Connection Guide

43.03

Regulations for the installation and operation of electrical systems

The RTU8 devices are produced under the attention of the relevant regulations and appointments, especially to IEC 1010-1.

The RTU8 is classified according to DIN VDE (IEC664-1) 0110: Insulation coordination for equipment within low-voltage systems
Part 1: Principles, requirements and tests.

- Pollution degree 2.
  Only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be expected.

- Over voltage category II
  is in accordance with the appointment in IEC 1010-1, table J1.

The user has to ensure that the devices and the components belonging to them are mounted under the attention of such safety regulations and standards as may from time to time be in force.

DIN VDE 0100
Erection of power installations with rated voltages below 1000V.

DIN VDE0 106
Protections against electrical shock part 100: Actuating members positioned close to parts liable to shock.

Installation and application hints

Documentation
This documentation includes hints for the installation and wiring of the RTU8 module. Additional information have to be taken from the data sheet and RTU8 operators guide.

Qualified personnel
The RTU8 modules conduct partly dangerous contact voltages at their connectors.

DIN VDE 0113
Electrical equipment of machines part 1: General requirements

DIN VDE 0160
Electronic equipment for use in electrical power installations and their assembly into electrical power installations.

IEC 1131
Programmable controllers
Part 2: Equipment requirements and tests.

If the pollution degree 2 (VDE 0110) can not be guaranteed or an ongoing protection against direct contact is required the devices should be mounted into appropriate cubicles.

If RTU8 module devices are coupled with or fed by power-frequency voltage networks of overvoltage category III qualified protective provisions have to be taken to guarantee overvoltage category II according to VDE 0110 at the terminal connectors (e.g. surge voltage protectors).

Touching parts which are alive can force heavy injuries of health.

Installation, commissioning and maintenance of such systems is therefore only allowed by technical instructed personnel. It should have relevant knowledge:
- in dealing with dangerous voltages.
- in the use of specifications and standards.

In particular VDE- and accident preventation regulations.

Use according to the rules
The RTU8 module was developed, manufactured, tested and documented while observing the relevant standards. When observing the valid regulations for installation, commissioning and maintenance, the product poses no danger to health and objects in normal case.

Use according to the rules means that the RTU8 module is operating and maintained exclusively in the form as described in the functional- and module description documents. Especially the technical data for the process-circuits and the supply should be regarded.

Any liability for the consequences of incorrect use or after unauthorized repairs is rejected.

WARNING CAUTIONS

⚠ **Earth the devices**
Before connecting any power to the de vice, make sure that the earth terminal is wired to protective earth. The earth ing may be removed only if it is certain that no more power is being supplied to the device.
Regard the earthing principles for the serial peripheral bus (direct or capaci-tive earthing)

⚠ **Connecting of the supply voltage**
A terminal block feeding dangerous con-tact voltages (supply, input/output chan-nels should only be plugged or with drawn in off load state.

- **Protect the device from dampness, dirt and damage during transport, storage and operation.**

- **Do not operate device outside of the specified technical data.**

- **Operate device according to the protection degree IP20 (DIN 40050)**

  Mount into a closed cubicle or rack if the environmental conditions that requires.

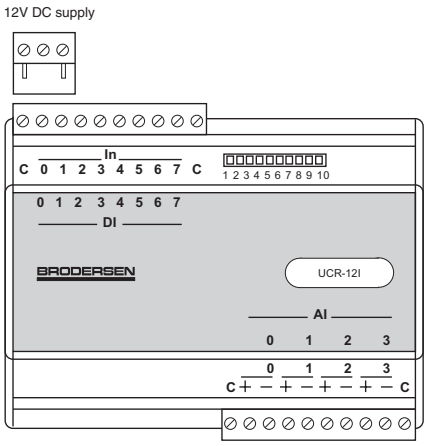
- **Do not obstruct the ventilation for cooling**
  Do not cover the ventilation slots by cables or wires.

- **Lead signal - and power- lines separately**
  Capacitive and inductive interferences of the power lines to signal lines should be prevented by appropriate cable lay-ing (distance, crossing).

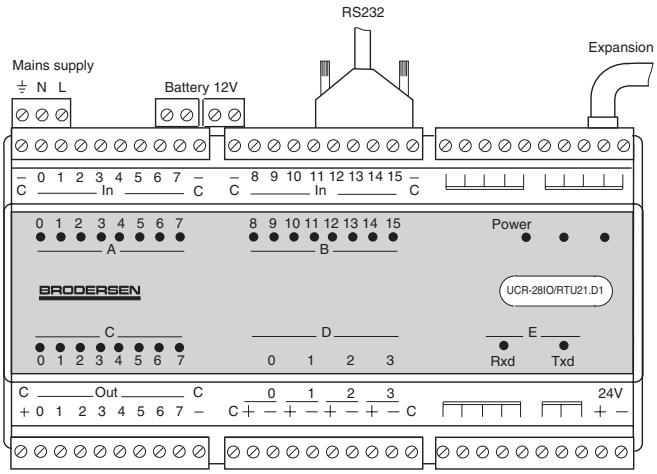
Technical data/user guide, data sheet, getting started guide etc. are available for down load on the Brodersen Controls homepage www.brodersencontols.com or by contacting your local distributor.

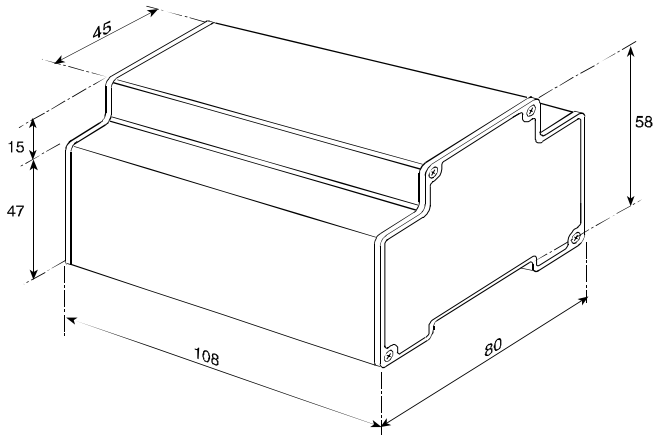
Layout and dimension drawings

Small sized RTU8



Normal sized RTU8




45
15
47
58
108
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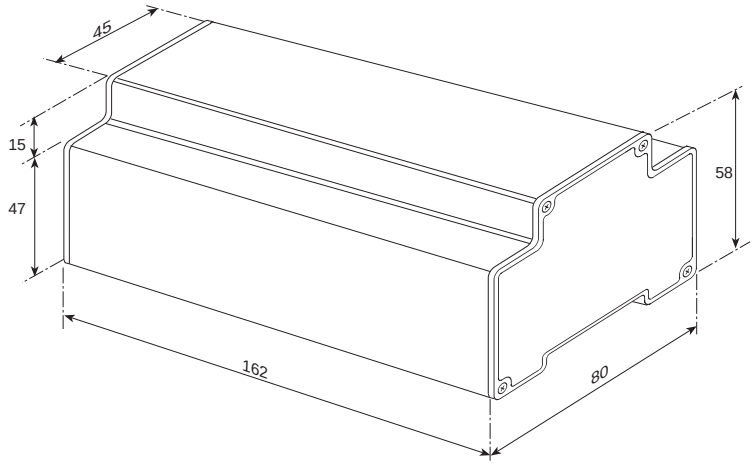
45
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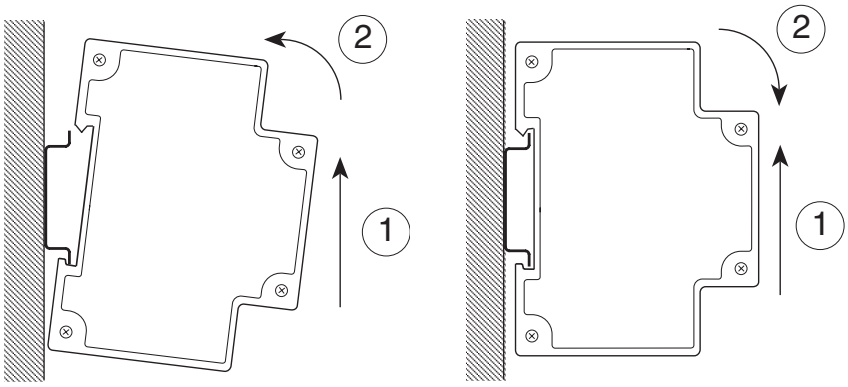
162
80

Mounting instruction
The RTU is mounted on a 35mm DIN-rail (EN50022). For de-mounting and mounting - see the drawings below.



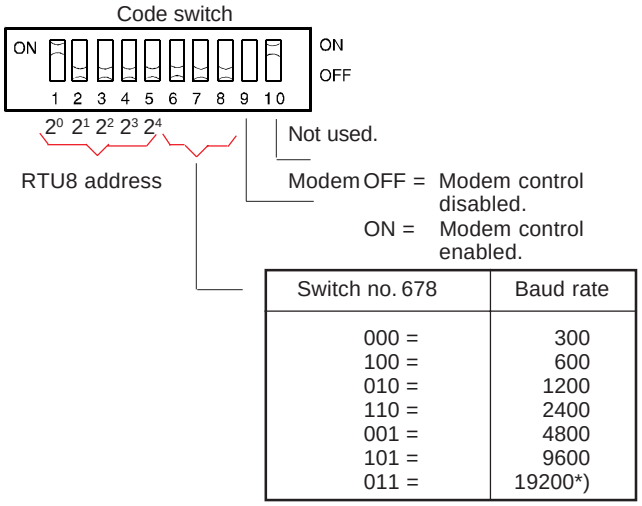
CODE SWITCH/ADDRESS SELECTOR
The code switch of the RTU8 is defining RTU8 address and communication speeds etc.

Switches 1-5 define the address of the RTU8. Addressing is different in the two modes NullModem and modem. See the next sections for details.

If you are direct connected to the RTU8 and have selected **NullModem mode**, the address set on the switches is direct the Modbus node address. The standard RTU8 can be set to Modbus addresses from 1-31.

The station address is in other words defined as the sum of the binary value selected using switch 1-5 and the binary value of the logical addresss set in the Config table via IOExplorer (defalut set to 0)

When **modem dial-up mode** is selected (via switch 9), address is the station address (In IOExplorer define as Net). If you have more than 31 stations, you can enter a value in the logical address field, which will be added to the address set on the switches.



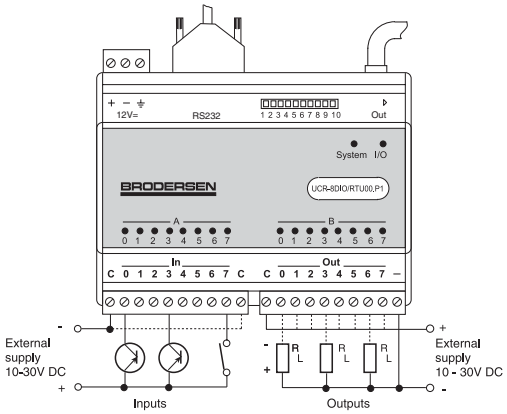
Switch no. 678	Baud rate
000 =	300
100 =	600
010 =	1200
110 =	2400
001 =	4800
101 =	9600
011 =	19200*)

*) Only null modem mode.

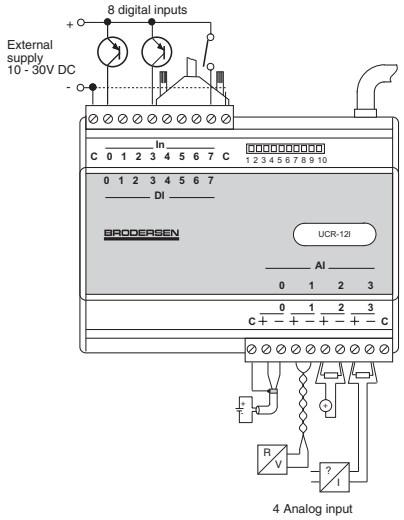
Wiring Diagram - general
Terminal blocks for I/O and power supply are plug-in connectors with screw terminals. It is recommended to use ferrules on wires.
RS232 is connected via 9-pole sub-D female.

Wire size
Earth and power supply: max. 2,5mm^2 (earth wiring must be 2,5mm^2 and kept as short as possible)
Other connectors: Max. 1,5mm^2 with ferrules.

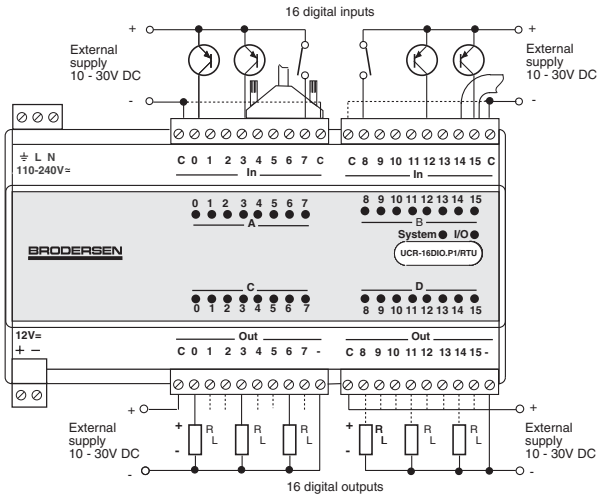
Wiring diagram
UCR-8DIO/RTU00.P1



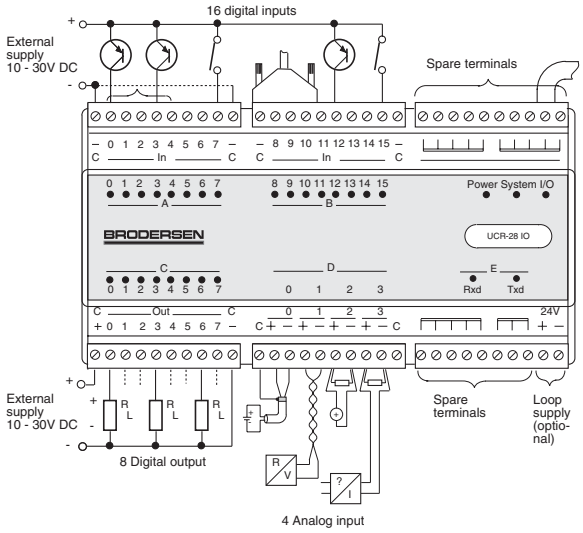
UCR-12I/RTU00.Dx



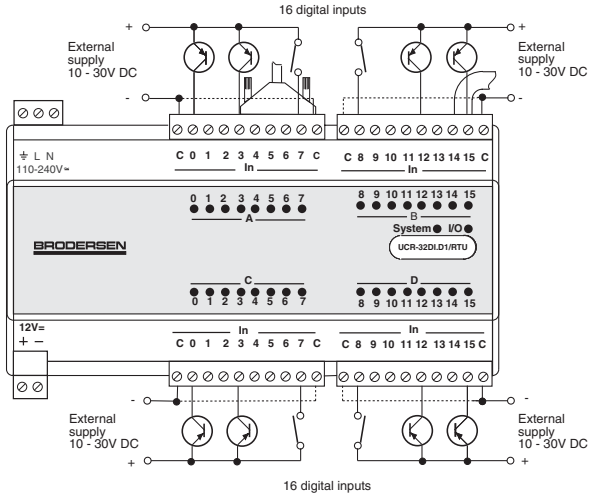
UCR-16DIO



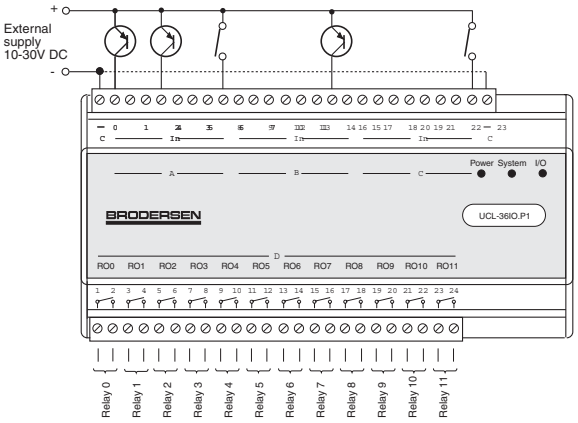
UCR-28IO



UCR-32DI

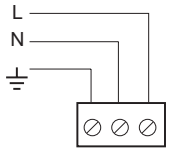


UCR-36IO

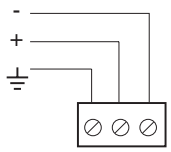


Power Supply

Version 1x and 2x



Version 00, 30 and 50



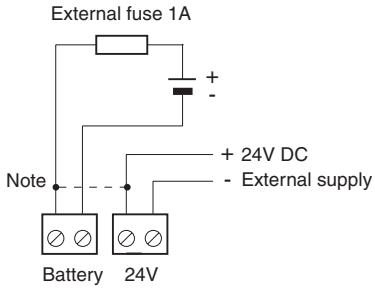
Earthing: Connect to PE conductor - wire as short as possible.

Version 1x, 2x and 6x:
L: 115-230VAC Mains supply
N: 0V Mains supply (neutral).

Version 3x and 5x:
+: +24-48V DC positive
-: 0V negative

Battery

Only type 6x.

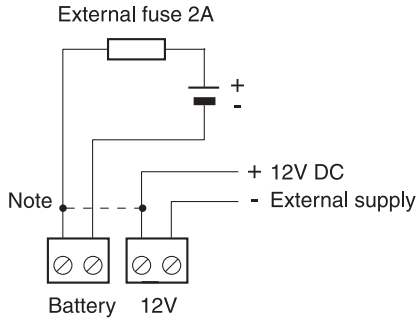


Battery: An external fuse 1A must be mounted on the live wire to the battery.
24VDC: Supply required for e.g. binary inputs.

Note: Strap required if no battery is connected.

Battery

Only type 2x.

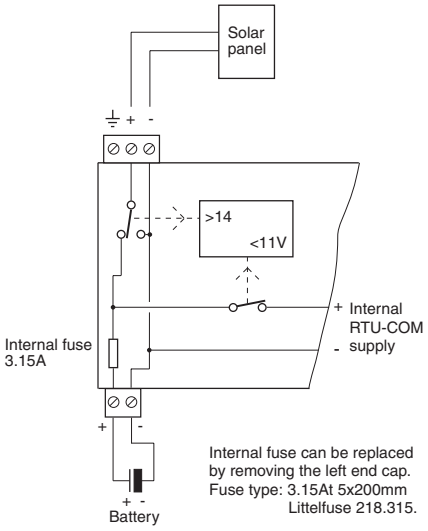


Battery: An external fuse 2A must be mounted on the live wire to the battery.
12VDC: Supply required for e.g. binary inputs.

Note: Strap required if no battery is connected.

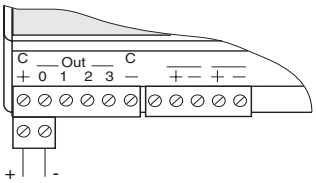
Battery/Solar panel

Only type 40.



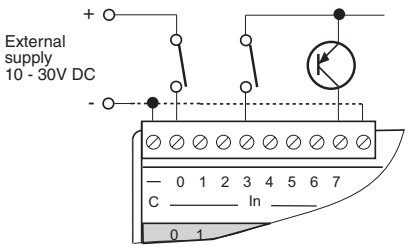
Internal fuse can be replaced by removing the left end cap.
Fuse type: 3.15At 5x200mm Littelfuse 218.315.

Supply output
Version 00, 10, 30 and 50.

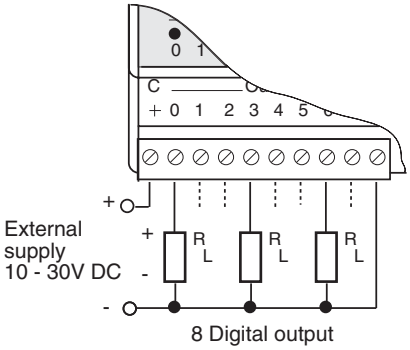


Digital Input / S0 counter Wiring
To activate the inputs an external voltage is required, use e.g. the 12V supply from the RTU.

Input 0 and 1 is additional used for S0 counter inputs. Must be connected via potential free contacts.
(only on 28IO/12I)

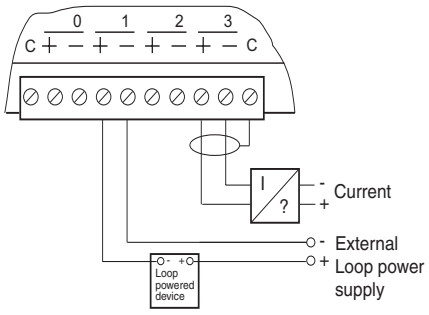


Output Wiring
8 PNP collector outputs - all equipped with opto couples.
Max. 0,5A pr. input and max. 2A in total for 8 outputs.



Analog Input (voltage or current)
4 analogue inputs. Are configured from the factory according to the last digit in the type no:
D1=0-10V, D2=4-20mA, D3=0-5V, D6=0-20mA, D7=0-2V, D8=0-10mA.
The shield must be connected to the common terminal (C). The connector for analogue inputs have gold plated contacts and is special marked.

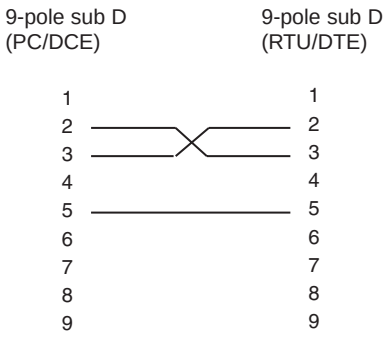
Wiring: current input



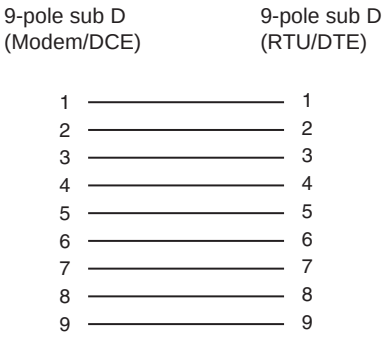
Interface RS232 wiring
RS232 meter port connector (9 pole sub-D)

Pin no	Signal	Description/Remarks
1	DCD	Data carrier detect (in)
2	RX	Receive data (in)
3	TX	Transmit data (out)
4	DTR	Data terminal ready (out)
5	SG	Signal ground
6	DSR	Data set ready (in)
7	RTS	Request to send (out)
8	CTS	Clear to send (in)
9	RI	Ringing indicator (in)

Null modem cable wiring
(without handshake signals)



Modem cable wiring



When using modem, you must use **Modem cable** (RX-RX and TX-TX) and when you are connecting direct to PC you must use **Null Modem cable** (RX-TX and TX-RX). See the wiring above.

Note that the switch no. 9 on the address selector is used to select between direct connection (cable/radio) or dial-up connection (modem/GSM).

If switch no. 9 is “ON” at start-up, an initialization string stored inside the RTU8 is downloaded into the modem/GSM module.

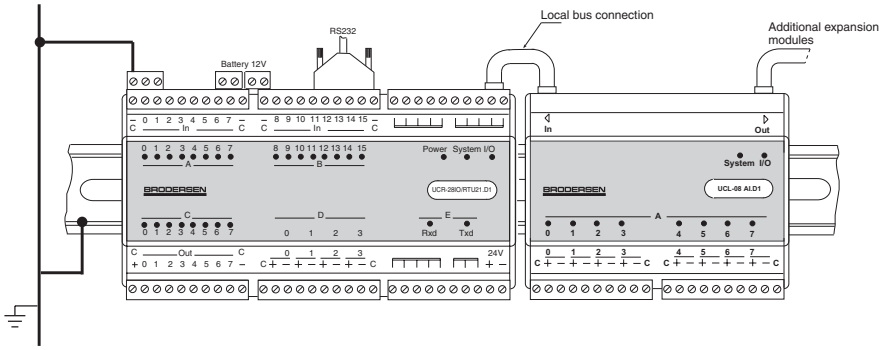
It is however highly recommended to store the following settings direct in the modem flash:

ATS0=	Auto answer after 1 ring.
ATE0	Echo off.
ATV0	Enable terse result codes.
AT&C1	DCD follows state of carrier.

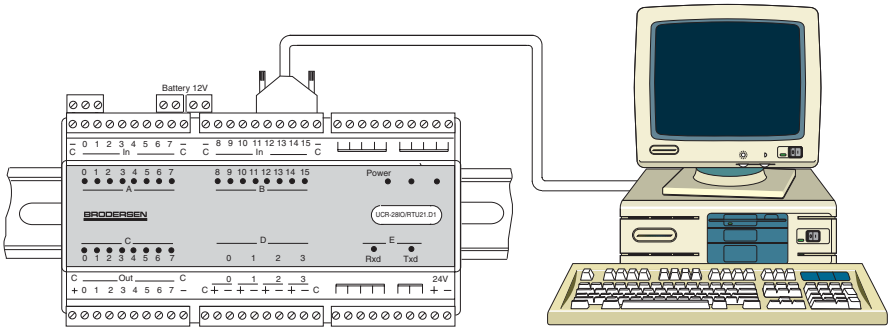
Store the settings in the modem with AT&W (most commently used command for save to flash - please check how you store in your modem).

IO Expansion Modules and wiring
IO expansion modules is mounted next to the RTU and connected via a Local bus cable (cable UCC-505).

Connection to IO on the expansion module according to the module data sheet.



Configuration of the RTU
The RTU is configured with a PC running the configuration program IOTOOL32 Pro. Connect a PC with a serial cable to the RTU serial port (cable UCC-561).



Special features
The RTU8 can optionally be delivered with a second serial RS232 port supporting different communication protocols. On request additional protocols can be implemented.

Other RTUs in the Brodersen Controls A/S RTU family

The range of small RTUs covers more than just the RTU8 types. The family covers also the below listed subfamily products:

RTU870
Compact RTU supporting EN/IEC60870-5-101 utility protocol.

RTU-COM
Compact microRTU with built-in modem of your choice. Alarm facilities.

RTU8 Gateway
Special transport gateway RTU, supporting a general simple read/write protocol handling into the IEC1131 programming environment. Can for instance be used with barcode reader, small automatic read-out panels etc.

RTU8E
RTU with Ethernet communication interface provide Modbus over TCP/IP communication. Built-in webserver for configuration.

For more info please use our document download facilities on our homepage www.brodersencontrols.com or contact your local distributor.