RTU870 Utility Outstation

Installation and Connection Guide

03.06

Regulations for the installation and operation of electrical systems

The RTU870 devices are produced under the attention of the relevant regulations and appointments, especially to IEC 1010-1.

The RTU870 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 RTU870 module. Additional information have to be taken from the data sheet and RTU870 operators guide.

Qualified personnel
The RTU870 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 RTU870 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 RTU870 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

RTU870 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 device, 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 capacitive earthing)

⚠️ **Connecting of the supply voltage**
A terminal block feeding dangerous contact voltages (supply, input/output channels 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.
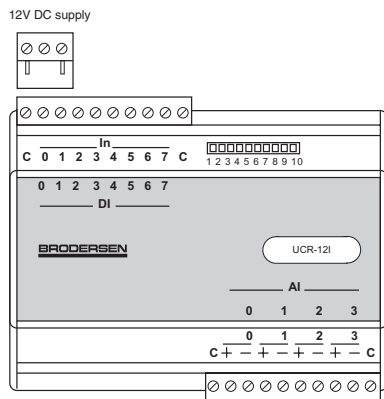
• **Lead signal - and power- lines separately**
Capacitive and inductive interferences of the power lines to signal lines should be prevented by appropriate cable laying (distance, crossing).

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.
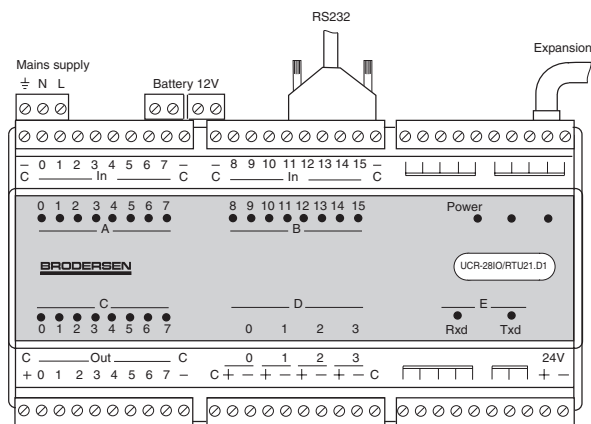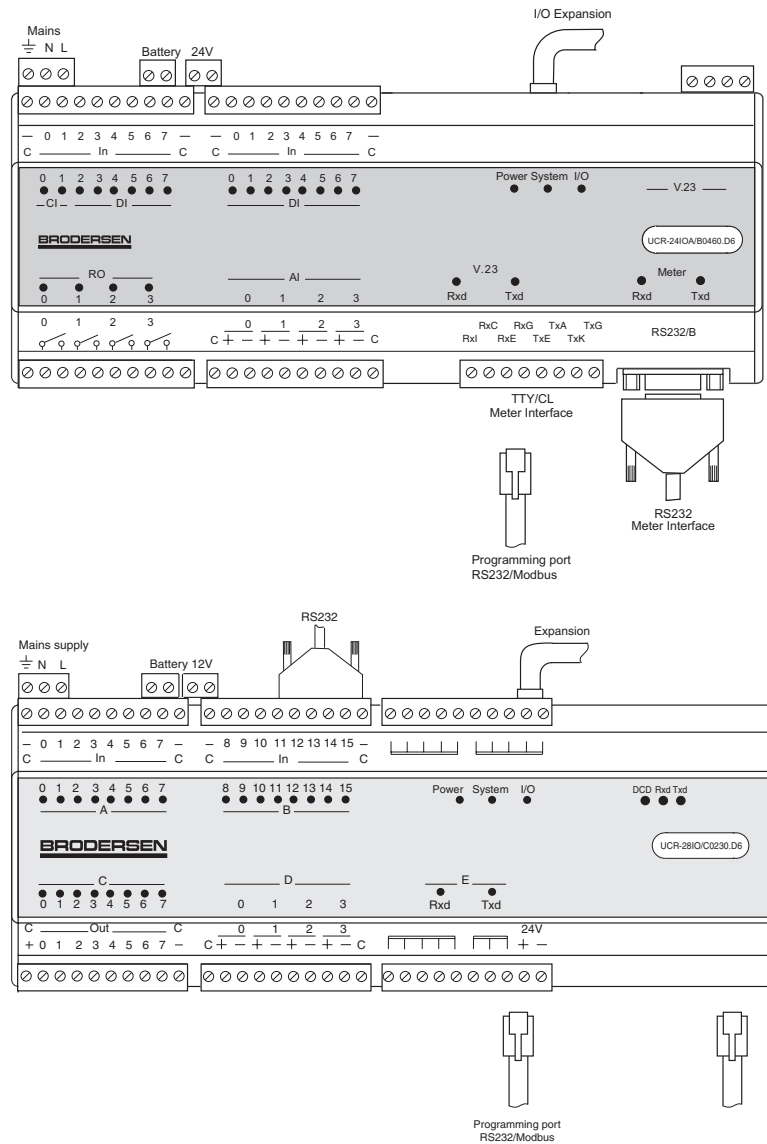
BRODERSEN

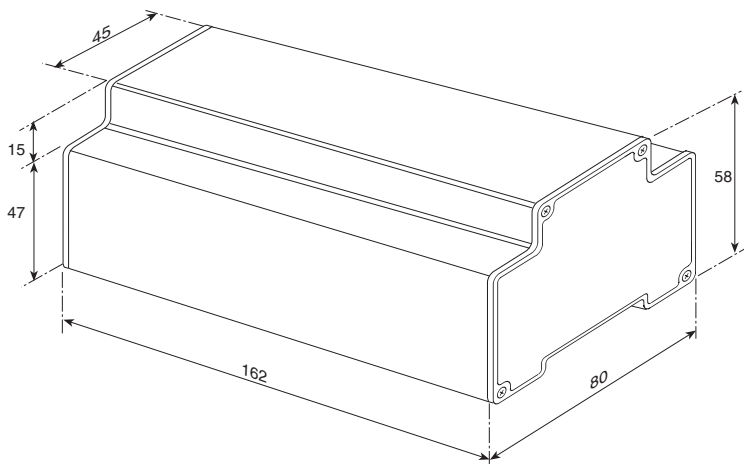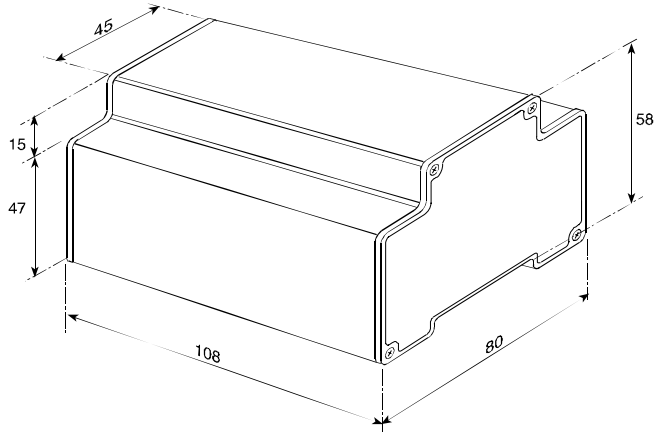## Layout and dimension drawings

Small sized RTU870

12V DC supply

In
C 0 1 2 3 4 5 6 7 C   1 2 3 4 5 6 7 8 9 10

0 1 2 3 4 5 6 7
——— DI ———

BRODERSEN   UCR-12I

——— AI ———
0   1   2   3

0   1   2   3
C + − + − + − + − C

Normal sized RTU870

RS232

Mains supply   Expansion
⊥ N L   Battery 12V

− 0 1 2 3 4 5 6 7 −   − 8 9 10 11 12 13 14 15 −
C ——— In ——— C   C ——— In ——— C

0 1 2 3 4 5 6 7   8 9 10 11 12 13 14 15   Power
——— A ———   ——— B ———

BRODERSEN   UCR-28IO/RTU21.D1

——— C ———   ——— D ———   ——— E ———
0 1 2 3 4 5 6 7   0   1   2   3   Rxd   Txd

C ———Out——— C   0   1   2   3   24V
+ 0 1 2 3 4 5 6 7 −   C + − + − + − + − C   + −

Extended sized RTU870

BRODERSEN

45

58

15

47

108

80

45

15

47

58

162

80

40183 42.03

BRODERSEN

45

15

47

216

58

80

45

15

47

225

58

80

40183 42.03

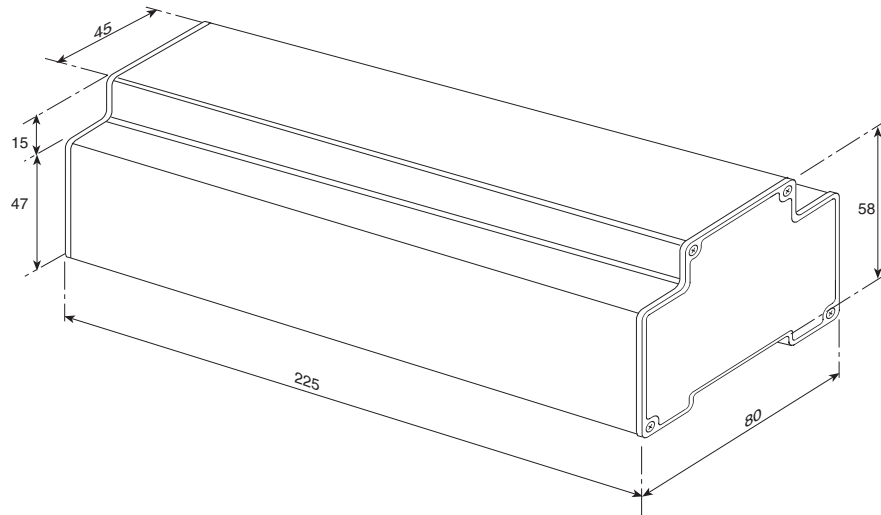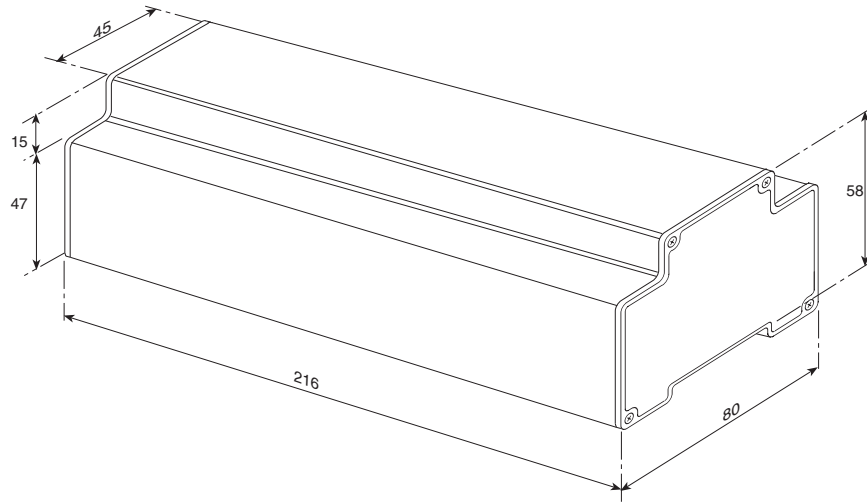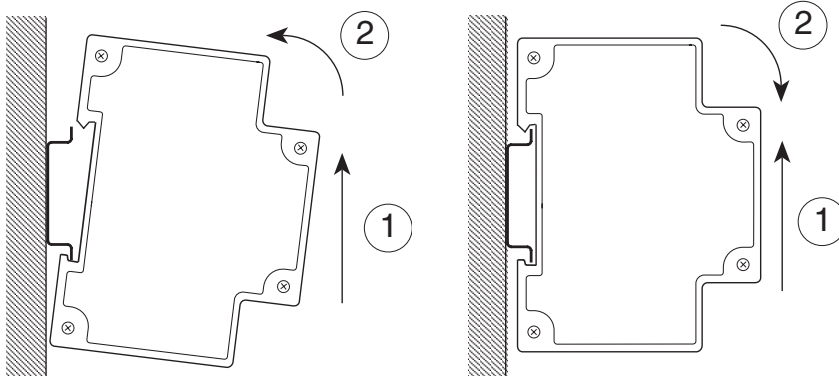### Mounting instruction

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

CODE SWITCH/ADDRESS SELECTOR

The code switch of the RTU870 selects the common ASDU address according to IEC870-5-101 as a 8-bit binary (0-255). Additional two switches are free and can be used by the application program. All switches are readable from the application program.

The logical common ASDU address is defined as the sum of the binary value selected using switch 1-8 and the binary value of the logical address configured in the FLASH (default = 0).

ASDU/Slave
address
1-255

ON Active dial back enabled RTU870 call CS if new data in class 1 queue.

OFF Active dial back disabled.

ON Modem mode

OFF Null modem mode

Wiring Diagram - general
Terminal blocks for I/O power supply V23 modem and TTY interface are plug-in connectors with screw terminals. It is recommended to use ferrules on wires.

RS232 is connected via 9-pole sub-D female. Programmer port is RJ11 modular jack and programming cable type UCC-301 is required.
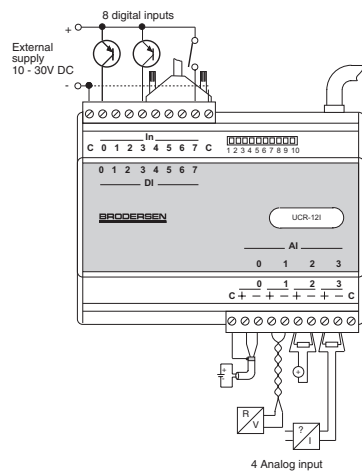
Wire size
Earth and power supply: max. 2,5mm^2 (earth wiring must be 2,5mm^2 and kept as short as possible)

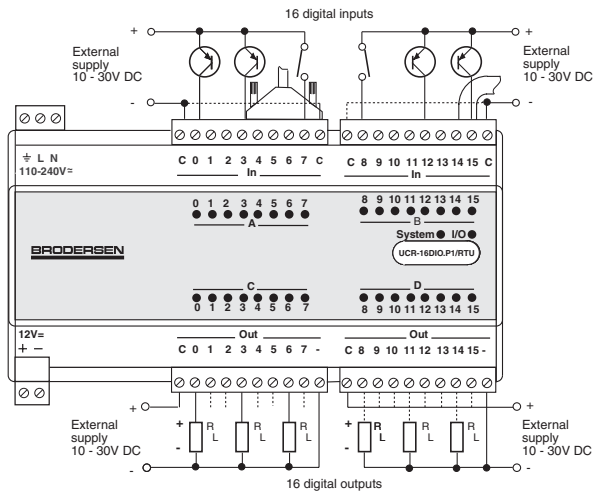Other connectors: Max. 1,5mm^2 with ferrules.
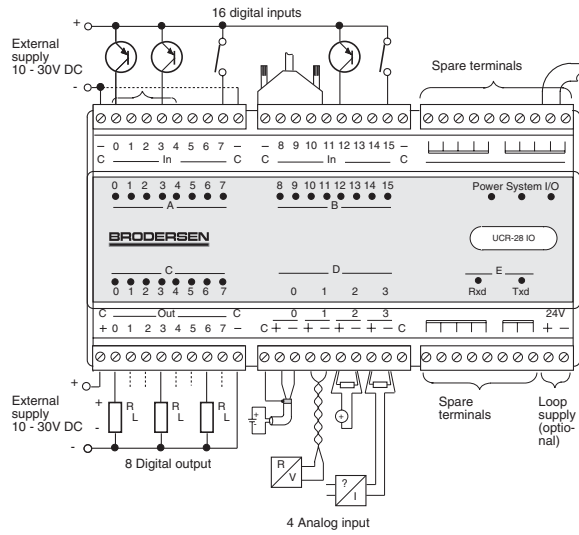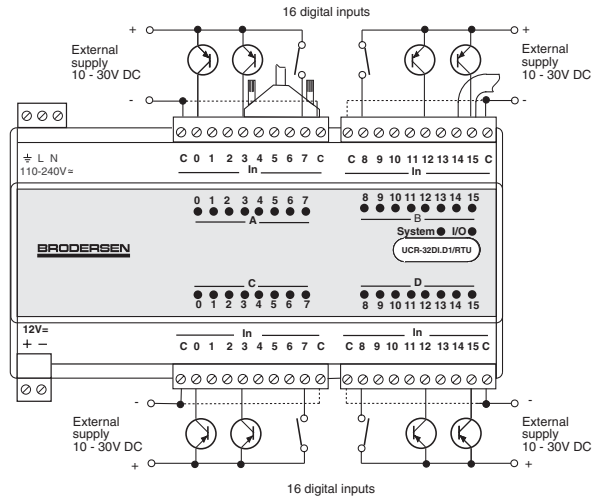
Wiring diagram
UCR-8DIO

UCR-12I

4 Analog input

BRODERSEN
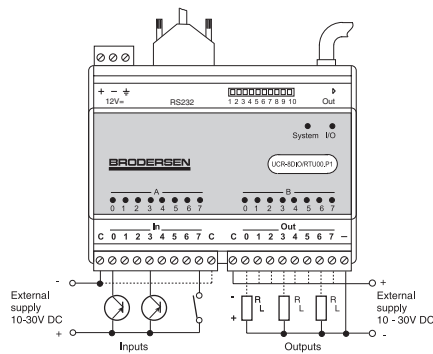
UCR-16DIO

UCR-28IO

UCR-32DI

UCR-24IO..

BRODERSEN

UCR-36IO
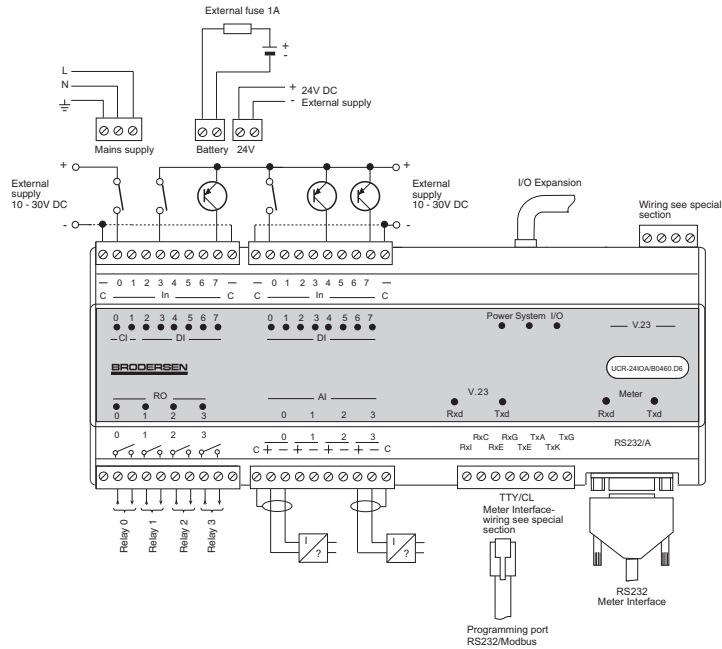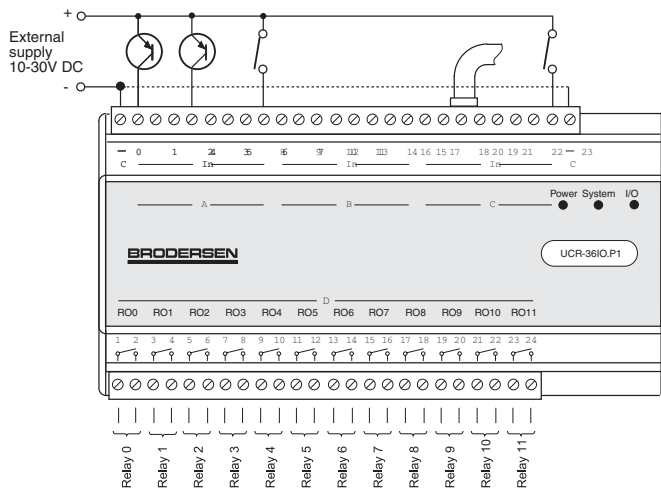
Power Supply
Version 1x and 2x   Version 00, 30 and 50

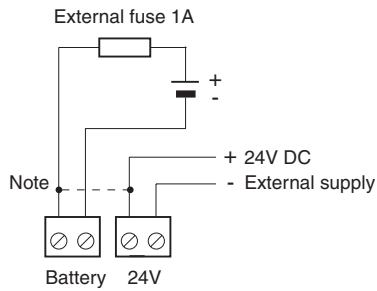Mains supply   VDC supply
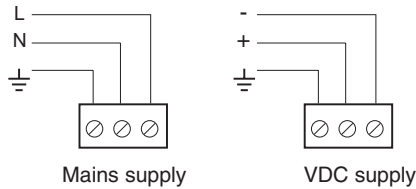
Earthing: Connect to PE conductor - wire as short as possible.

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

40183 42.03

BRODERSEN

Battery
Only type 6x.

External fuse 1A

+
-

+ 24V DC
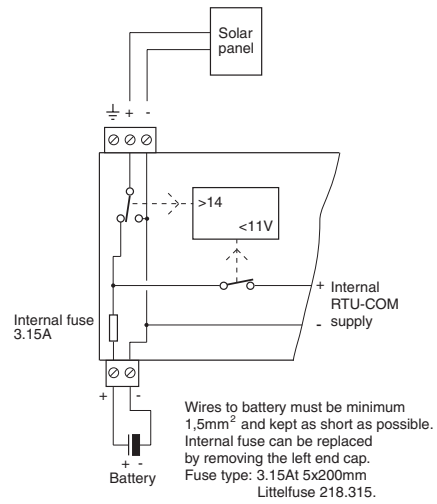Note   - External supply

Battery   24V

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 con-
            nected.

Battery/Solar panel
Only type 40.

Solar
panel

+ -

>14
<11V

+ Internal
   RTU-COM
- supply

Internal fuse
3.15A

+

+ -
Battery

Wires to battery must be minimum
1,5mm^2 and kept as short as possible.
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.

C ___ Out ___ C
+ 0 1 2 3 —   + — + —

+   -
Supply for I/O etc.
12V max. 4.8W
24V max. 7.0W

BRODERSEN
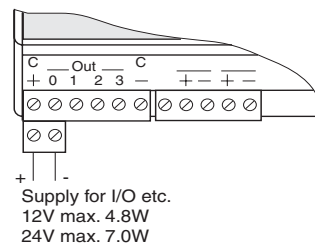
Digital Input / S0 counter Wiring

To activate the inputs an external voltage is required, use e.g. the 12V supply from the RTU.
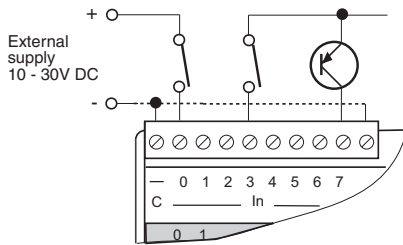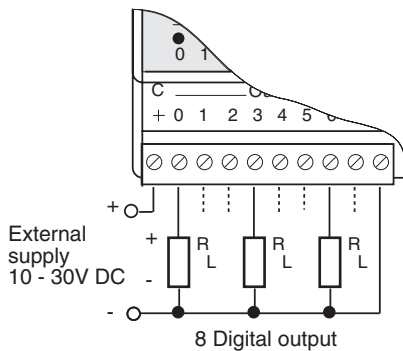
Input 0 and 1 is additional used for S0 counter inputs. Must be connected via potential free contacts.
(only on 12I, 24IO and 28IO)

External supply
10 - 30V DC

— 0 1 2 3 4 5 6 7
C ——— In ———
0 1

Output Wiring (PNP)

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

0 1
C
+ 0 1 2 3 4 5
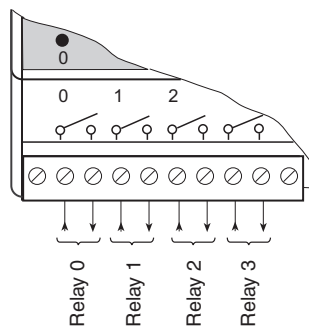
External supply
10 - 30V DC

+
R L   R L   R L

8 Digital output

Relay Output Wiring

4 potential free normally open (NO) relay outputs.
Max. load: 250VAC 5A (resistive)
Max. load: 0,1mA 100mV DC

0
0 1 2

Relay 0
Relay 1
Relay 2
Relay 3

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

0   1   2   3
C + — + — + — + — C

I
?

- Current
+

Loop powered device
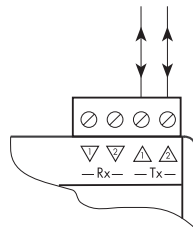
- External
+ Loop power supply
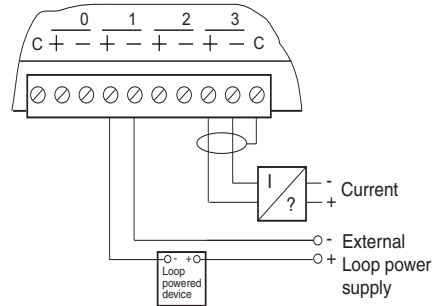
Modem V.23 wiring

The built-in V.23 1200 Baud modem module can be used on a 2-or 4-wire connection. Multi-drop or Point-to-Point connection are possible.
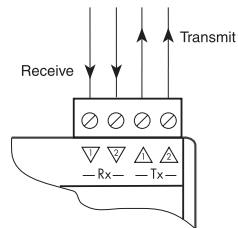
Modem wiring details:

2-wire:

2-Wire Communication Line

4-wire:

4-Wire Communication Line

Modem DIL Switch Settings

4 W termination	2 Wire/4 Wire
= No termination	= 2 wire
= 600 ohm termination	= 4 wire

2W/4W termination	Half Duplex/Full Duplex
= No termination	= Half duplex
= 600 ohm termination	= Full duplex

Not used	Transmit level
	= -15dBm
Minimum Receive Detection Level	= -13dBm
= -43dBm	= -10dBm
= -33dBm	= -6dBm
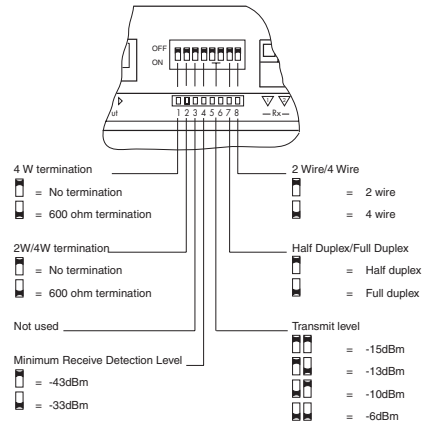
Modem parameters are adjusted via the DIL switch as shown above.
The last modem in the system must be terminated.
Transmit and receive levels can be adjusted, but it is recommended to start with the default settings.

BRODERSEN

Serial Main Interface IEC870-5-101
RS232 wiring
RS232 meter port connector (9 pole sub-D male)

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 Send Ready (in)
7	RTS	Request to send (out)
8	CTS	Clear to send (in)
9	RI	Ring Indicator (in)

Hardware handshake signal use is setup via software configuration.

Serial RS232 wiring (Parallel to TTY)
RS232 meter port connector (9 pole sub-D)

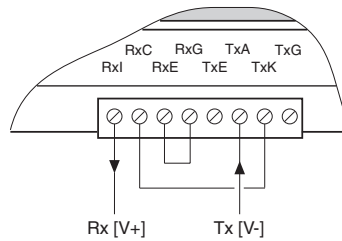| Pin no	Signal	Description/Remarks
1	DCD	Data carrier detect (in)
2	RX	Receive data (in)
3	TX	Transmit data (out)
4	DTR	Data terminal ready (out)
5	SG	Signal ground
6	DSR	Data set ready (in)
7	RTS	Request to send (out)
8	CTS	Clear to send (in)
9	RI	Ringing indicator (in)

Current Loop (TTY) port
CL interface is a serial TTY interface for meters.

It is possible by selection of terminal to chose between 2 or 4 wire, and passive and active connection.
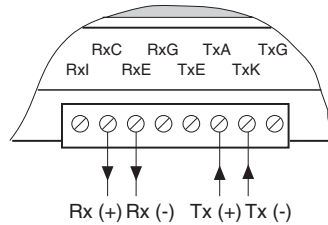
CL meter port (8 pole screw connector)

Pin no	Signal	Description/Remarks
1	RxI	24V RX+ (out)
2	RxC	RX+ (out)
3	RxE	RX- (out)
4	RxG	Signal ground (GND power)
5	TxE	24V TX+ (out)
6	TxA	TX+ (in)
7	TxK	TX- (in)
8	TxG	Signal ground (GND power)

CL/2Wire Passive

RxC RxG TxA TxG
RxI RxE TxE TxK

Rx [V+]   Tx [V-]

CL/4 Wire Passive

RxC RxG TxA TxG
RxI RxE TxE TxK

Rx (+) Rx (-) Tx (+) Tx (-)

40183 42.03

BRODERSEN

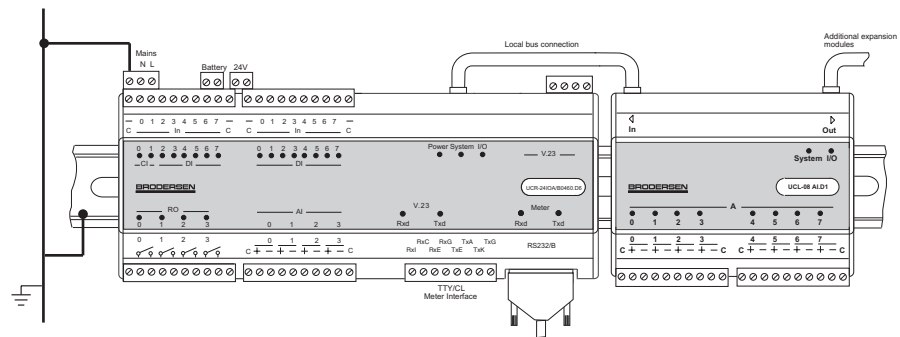### IO Expansion Modules and wiring
IO expansion modules is mounted next to the RTU and connected via a Local bus cable (cable UCC-505).

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 IOTOOL870 Pro. Connect a PC with a serial cable to the RTU serial port (cable UCC-301).

17
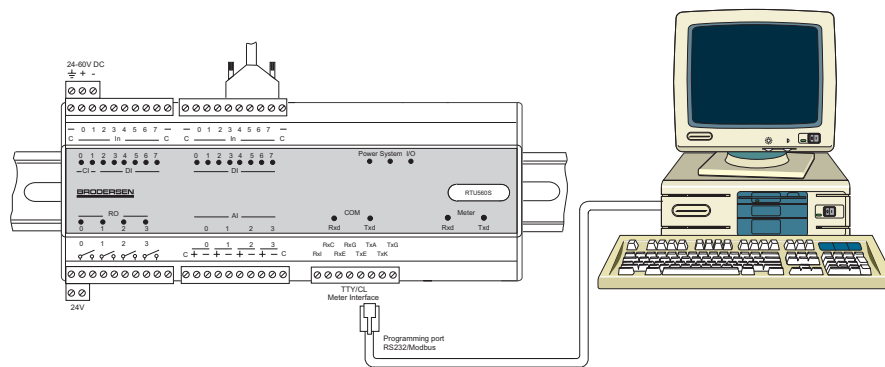
ACCESSORIES

Programming cable
2,5m: UCC-301/2,5

Configuration software
package for
WinNT/2000/XP: IOTOOL32Pro or
                        IOTOOL870

Special features
The RTU870 can optionally be delivered with Modbus and Siemens RK512 protocol on the RS232 COM interface. 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 RTU870 types. The family covers also the below listed subfamily products:

RTU8
Compact RTU supporting Modbus RTU and with RTC and datalogging facilities.

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

RTU870 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.

RTU870E
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.