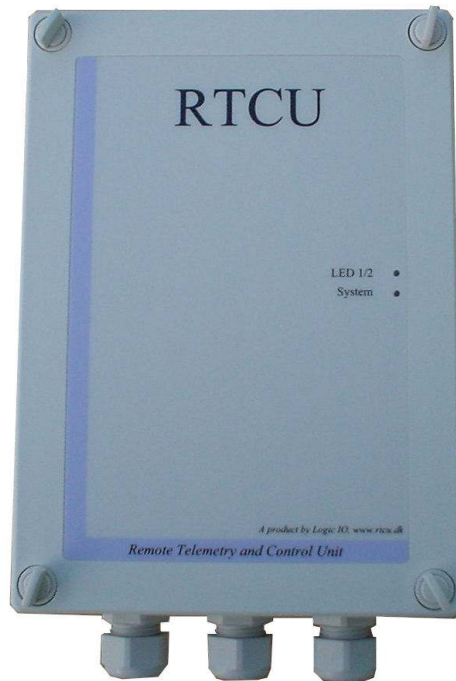




Technical Manual for RTCU-A5 / A5i

Version 1.15





Introduction

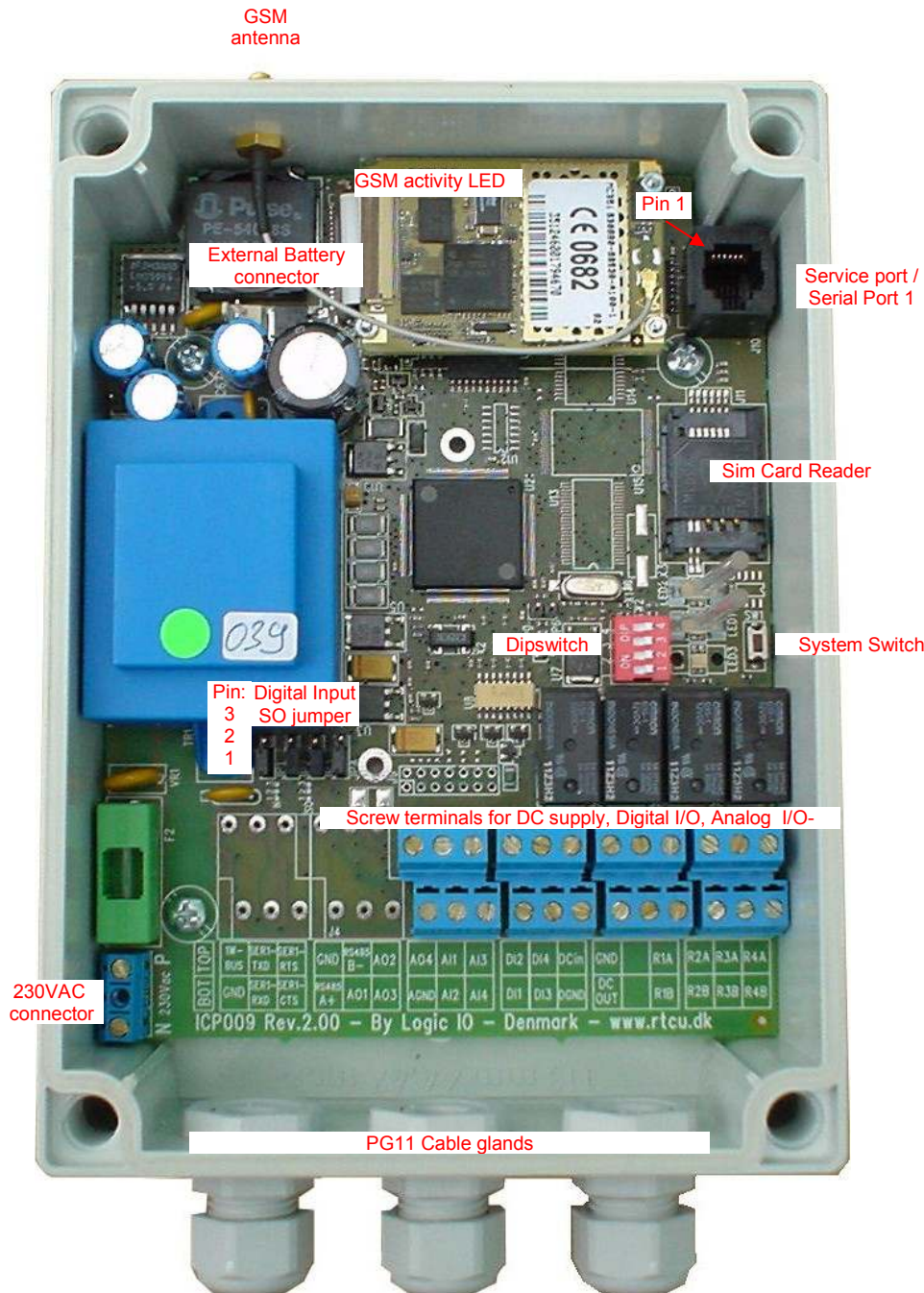
The RTCU-A5/A5i offers an impressive list of features and possibilities. The product is a unique combination of a powerful Programmable Logic Controller (PLC) and a GSM phone tightly connected in a single easy programmable unit. The RTCU-A5/A5i product provides the user-friendly answer to your remote monitoring, remote control, surveillance and datalogging needs.

This manual contains technical documentation allowing easy installation and use of the unit. For programming information please consult the RTCU Programming Documentation and/or the RTCU IDE Online help.

Table of Content

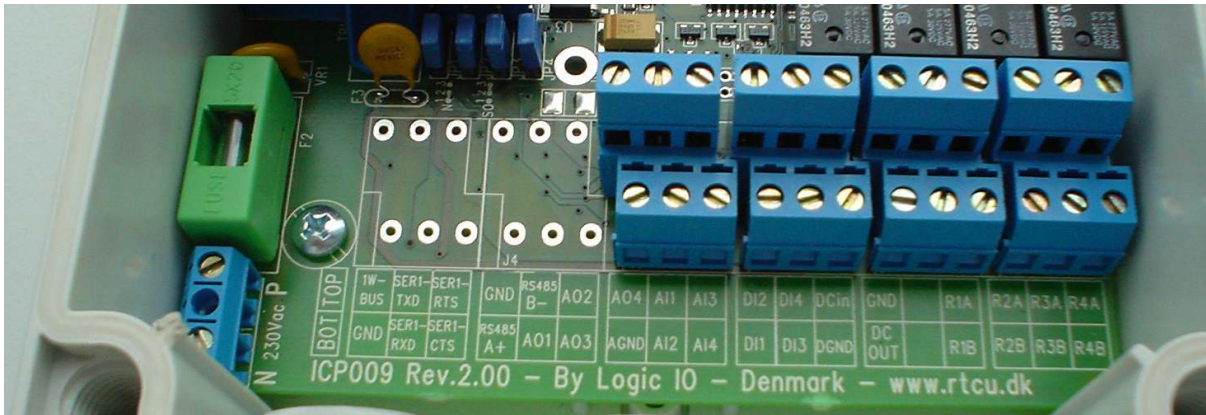
Introduction	2
Table of Content.....	2
Graphical view.....	3
External connections	4
Power supply	4
Analog Inputs.....	5
Digital Inputs.....	6
Digital outputs.....	6
Serial port 1 / Service port.....	7
GSM Activity LED.....	7
Installing SIM card / connecting the GSM antenna	8
SIM Card	8
GSM Antenna	8
Switches / Indicators	8
Specifications	10

Graphical view



External connections

All connections to external equipment (except the GSM antenna) is done using screw terminals, located at the bottom of the unit, see picture below:



Power supply

The RTCU-A5/A5i unit can be supplied either by 230VAC 50Hz or via 18..26 VDC. Depending on the power source used, the connections are as follows:

230 VAC Supply:

The 230VAC supply is connected to the P and N terminals on the unit (These are found to the left on the unit, in a separate block, with the "230 VAC" listed in front of them).

Terminal	Description
N	Neutral connection for 230 VAC
P	Phase connection for 230 VAC

18..26 VDC Supply:

The 18..26 VDC supply is connected to the DCin and GND terminals on the unit (These are found approximately in the middle of the right block of terminals, upper row).

Optionally the RTCU-A5 can be operated at 12V DC but IEC 62053-31-A, battery charger (RTCU-A5i only) and the 12V DC output is not supported at this voltage.

A 12 V output from built-in power supply is available on the screw terminals. The maximum output current is 100 mA. Note the 12V output is not guaranteed when the RTCU-A5/A5i unit is operated below 18V supply voltage.



Terminal	Description
Dcin	Positive (+) connection from DC power supply
GND	Negative (-) connection from DC power supply
DCOut	12V DC for external equipment, maximum current draw is 100 mA !

Please notice:

It is not recommended to have the two power sources connected to the RTCU-A5/A5i unit at the same time. This will lead to possible damage to the electrical circuit of the RTCU-A5/A5i unit and/or the connected power sources. If it is necessary to have two power sources connected at the same time, a Logic IO dual power sources connector must be used.

Battery operation / Battery charger: (RTCU-A5i only)

It is possible to connect a rechargeable battery at connector J2 (see graphical view) for battery operation.

The RTCU-A5i unit contains a battery charger and a battery voltage measurement circuit, which is controlled from the VPL program. Please consult the RTCU-IDE documentation for details on the battery charger- and battery voltage measurement functions.

The battery charger charges with a constant current of 47mA. There must be a minimum voltage difference of approximately 4V between the battery voltage and supply voltage in order to charge the battery. Be aware that all operations are controlled manually from the VPL program and there is NOT implemented any overcharge protection. For more information on battery charging techniques contact your rechargeable battery dealer.

Terminal	Description
1	Positive (+) connection from battery
2	Negative (-) connection from battery

Analog Inputs

The analog inputs are all voltage inputs, with a range from 0V to 5V DC

The input signal is connected between AI_n and AGND. AGND must be connected to the reference of the connected equipment.

Terminal	Description
AI1	Analog input number 1
AI2	Analog input number 2
AI3	Analog input number 3
AI4	Analog input number 4
AGND	Analog ground



Digital Inputs

The digital inputs are isolated from the RTCU with optocouplers and they are also low-pass filtered and transient protected. Using the jumpers located at each input, it is possible to configure each input as a normal input, or as a S0-A (jumper installed at position 2+3) compatible input (S0 configurations supply a current to the input connector, so that a simple switch between GND and the input will activate it). If configured as normal inputs (jumper installed at position 1+2), connect a positive voltage between the input and DGND connector.

Terminal	Description
DI1	Digital input number 1
DI2	Digital input number 2
DI3	Digital input number 3
DI4	Digital input number 4
DGND	Digital ground

Digital outputs

The digital output interfaces to the outside world via relay contacts. All outputs have a Normally Open contact set.

Terminal	Description
R1A	Contact set for relay output number 1
R1B	
R2A	Contact set for relay output number 2
R2B	
R3A	Contact set for relay output number 3
R3B	
R4A	Contact set for relay output number 4
R4B	



Serial port 1 / Service port

The connection to the service port/RS232 port, is done using the RJ11 connector in the upper right corner on the RTCU Unit (see graphical view)

This connector can be used as a general-purpose serial port, and as a programming connector. In order to use the connector as a programming connector, the RSDDET pin (pin 6) must be connected to GND. When using this connector as a general-purpose serial port, the RSDDET pin (pin number 6) must be left unconnected, or it can be tied to the VCC pin (recommended).

Serial port 1/service port, RJ11 6 pin connector:

Pin	Name	Description
1	VCC	+5V from RTCU. Normally unconnected.
2	TxD	RS232 Transmit data FROM RTCU
3	GND	Ground
4	RxD	RS232 Receive data TO RTCU
5	NC	Leave unconnected
6	RSDDET	Programming cable detect, normally unconnected (if used as programming cable, connect to GND)

GSM Activity LED

The GSM Activity LED is placed to the right of the GSM Antenna connector on the PCB (see graphical view) and shows the current activity of the GSM module as follows:

LED mode	Operating Status
Off	The GSM module is turned off
600 ms On / 600 ms Off	No SIM card inserted or no PIN code entered, or network search in progress, or ongoing user authentication, or network logon in progress.
75 ms On / 3 s Off	Logged to the network. No call in progress.
75 ms On / 75 ms Off / 75 ms On / 3 s OFF	A GPRS session is active (not possible)
Flashing	Indicates GPRS data transfer. When a GPRS transfer is in progress the LED goes on 1 second after data packets were exchanged. Flash duration is approx. 500 ms. (not possible)
On	Depending on type of call: <i>Voice call:</i> Connected to remote party. <i>Data call:</i> Connected to remote party or exchange of parameters while setting up

or disconnecting a call.

Installing SIM card / connecting the GSM antenna

SIM Card

The RTCU unit contains a standard SIM card reader. It is located to the right on the printed circuit board, just below the programming connector. The SIM card reader is opened by carefully pressing down on the lid of the reader, and at the same time, pressing the lid towards the screw terminals. It is then possible to open the SIM card reader, and insert your SIM card into it. Close the lid by pressing it down, while at the same time, pressing it towards the programming connector.

GSM Antenna

The RTCU unit contains an SMA Female connector for connection of a suitable GSM Dual band antenna (900/1800 MHz). When installing the antenna, please make sure that the antenna is not in close proximity of metallic parts or anything else that can influence the efficiency of the GSM antenna. Please consult the installation guide that follows the GSM antenna.

Switches / Indicators

A status indicator is present on the front of the unit (see the graphical view). Different colors/blinking patterns are used to signal different types of errors/status change in the RTCU unit:

Fastest blinking, green
Fast blinking, green (or yellow)

The unit is initializing, preparing to start the VPL program
 The VPL program is not executing, stopped by the reset/diagnostic switch.

Slow blinking, green (or yellow)
Fast blinking, red (or yellow)
Alternating Fast/Slow, red (or yellow)

The unit is executing the VPL program
 A runtime error has been detected in the program
 The unit has lost its Firmware ! This can only happen if, during a firmware upgrade, the RTCU Unit loses power, or the communication is lost completely. In this case, simply upload the firmware to the unit again.

If the color of the status indicator is yellow, the unit is actively communicating with for example, the RTCU-IDE program (or another program, supporting the RTCU protocol, RACP).

The RTCU unit contains a combined reset/diagnostic switch. This switch is located just to the right of the two light pipes. When this switch is activated during reset of the unit (or poweron), the VPL program/project uploaded to the unit will not be started. The status indicator indicates this. If the switch is activated for more than 3 seconds, the unit will reset (same as poweron).




A two-colored (red/green) indicator is visible above the status indicator. This indicator can be controlled from within the VPL program in the unit. The green part is accessed as LED1 and the red part as LED2.

The RTCU unit contains a dipswitch. The dipswitch is located just to the left of the LED indicators (see the graphical view). To use the dipswitch in the RTCU-IDE declare a Boolean input variable, and define it as a dipswitch in the RTCU-IDE Job variable configuration dialog.



Specifications

Analog inputs		Min		Max		Resolution is 10 bits. All inputs are protected against transients and lowpass filtered.
		0	-	+5	VDC	
Digital inputs		Min	Typ	Max		All inputs are protected against transients and lowpass filtered. All inputs are optically isolated
	Logic "High"	8	10	40	VDC	
	Logic "Low"	-5	-	5	VDC	
Digital outputs (Relay SPST)		Min		Max		
		-	-	5	Amp @ 250 VAC	
		0.0	-	5	Amp @ 30 VDC	
Operating Voltage DC (*Can be operated at 12V but deviations from SO standard will occur)		18 (12*)	-	26	VDC	Protected against wrong polarity. Self-healing fuse.
Mains voltage (instead of DC)			230		VAC	Fused
U* Act. + GSM off + DO*not set. U* Act. + GSM on + DO* not set. U* Act. + GSM on + DO* set U* DS* + GSM off + DO* not set			80 85 210 50	350	mA mA mA mA	@ 24 VDC supply voltage *U = Unit *DO = Digital Outputs *DS = Deep Sleep
Storage temperature		-40	-	+90	°C	External connections: • 3 PG11 cable glands for cable entry • SMA-Female for GSM antenna.
Operating temperature (According to GSM 11.10 specification)		-20	-	+55	°C	
Restricted operation (deviations from the GSM specification may occur)		-29	-	+70	°C	
Humidity (non condensing)		5	-	90	%	
Weight		0.88			Kg	
External dimensions		W 130 x H 180 x D 60 mm				
Ingress Protection (IP)		IP67				
Approvals		EN-50081-1 Emission EN-61000-6-2 Immunity			Unit is CE Approved 	

Technical data subject to change