CRS
INDUSTRIAL POWER EQUIPMENT

REM - REMOTE CONTROL UNIT

The remote control unit (REM) is an electronic device that communicates with the QUASAR rectifier (single machines only), up to 100 meters away, via serial communications (through CRS-ASCII or Modbus-RTU protocol) or analogue control.

It is able to perform as the following:

A. Remote control of the QUASAR rectifier's keyboard and display functions.

B. Gateway between a PLC (with analogue inputs and outputs) and the QUASAR rectifier in automatic mode. See also our analogue control card option (Part Numbers: ANL001, ANL002).

C. Remote display without any manual or automatic control. See also our serial remote display option (Part Number: SED002).

D. Gateway between a PC/PLC running the QUASAR communication protocol and a traditional thyristor rectifier which works with 0-10V analogue inputs and outputs. In manual mode the thyristor rectifier is controlled by its own push-buttons, while in automatic mode it is controlled by the software commands received from the PC/PLC.

INCLUDED:

- A mounting frame or a plastic case. Mounting frame can be easily mounted on cabinet doors or on a waterproof plastic box.
- An operator control panel which includes:
  - 8 keys
  - 8 LED indicators
  - 1 line by 16 characters display

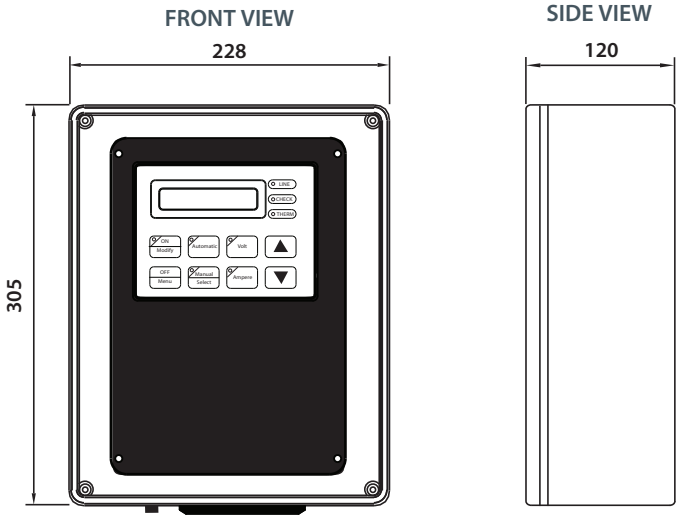
*OPTIONAL INPUTS (Only for **A** & **B** functions)* - External contacts:

- 1 or 2 multi-turn potentiometers (For either current or voltage adjustments)
- Start/Stop selection
- Current/Voltage regulation mode selection
- Manual/Automatic operation mode selection
- Direct/Reverse polarity selection (For DCR and PPR machines)
- Preset function
- Dosing pump function
- Emergency stop

Technical Specifications

Supply voltage	24Vdc
Power consumption	0.75A max
INPUT	
Number of digital/analogue input lines	4
Number of digital input lines	6
Analogue entry level	0 - 10V or 4 - 20mA
Steps	1024
Low logic entry level (digital mode)	5V
DIGITAL OUTPUTS	
Number of digital outputs	8
Contact's max current with resistive load	0.1A
Contact's max voltage rating	48Vac
ANALOGUE OUTPUTS	
Number of analogue outputs	2
Analogue outputs level	0 - 10V or 4 - 20mA
Steps	256
WAVEFORM PROGRAMMING	
Binary or keyboard selection	
COMMUNICATION PORTS	
Number	2
Type	N.01 RS232 + N.01 RS485

Mechanical Dimensions (mm)



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Standard Remote Controls

REM302
- Metal support frame
- Weight: 0.6kg
- Analogue In/Out signal: 0 - 10V

REM303
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

REM3A3
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

REM322
- Plastic case
- Weight: 3.0kg
- Analogue In/Out signal: 4 - 20mA
- 3 Isolating amplifiers[1]

REM310
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

» 1 Potentiometer on the right side

REM3A0
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

» 1 Potentiometer on the right side

REM314
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

» 1 Selector

REM3A4
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

» 1 Selector

REM3D4
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V
- 1 Isolating amplifiers[1]

» 1 Selector

REM307
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

» 1 Potentiometer
» 1 Selector

REM3A7
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

» 1 Potentiometer
» 1 Selector

REM308
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

» 2 Potentiometers
» 1 Selector

REM3A8
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

» 2 Potentiometers
» 1 Selector

REM309
- Plastic case
- Weight: 2.2kg
- Analogue In/Out signal: 0 - 10V

» 1 Potentiometer
» 2 Selectors

REM3A9
- Plastic case
- Weight: 2.4kg
- Analogue In/Out signal: 0 - 10V
- 3 Isolating amplifiers[1]

» 1 Potentiometer
» 2 Selectors

[1] The 3 isolating amplifiers are used as following: 1 for current reading output, 1 for voltage reading output and 1 for driving input (currrent or voltage selection). A fourth isolating amplifier for driving input can be included upon request. Please contact our technical center.

CRS offers the possibility to personalize your remote control by adding as many optional inputs as needed.

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REM Software Available

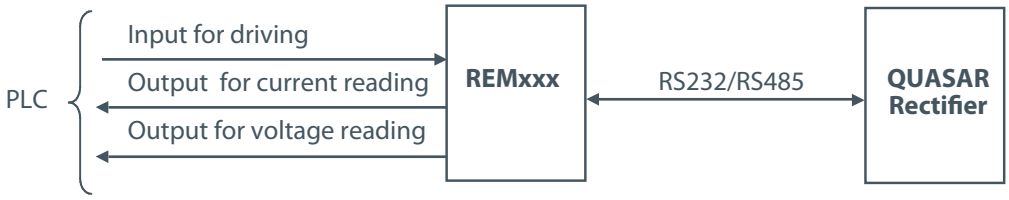
Software	Machine Types				Features		Description
	DC	DCR	PP	PPR	Pump dosing	Pre-set	
R30DCINV	●	●			●	●	Standard software for remote control of DC & DCR machines.
R30CHROM			●				Special software for remote control of PP machines and decorative chrome application. It allows to generate a complex waveform profile, composed of mixed DC current & pulsed current. Up to 16 different waveform programs can be defined.
R30PULSP			●	●			Standard software for remote control of PP & PPR machines. It gives the possibility to generate a pattern with fast pulses (pulse time as low as 1ms).
R30WAVES	●	●					Special software for remote control of DC & DCR machines. It gives the possibility to generate complex waveform profiles, which can be composed of maximum 6 phases; each one having its own value and duration time.
R30ANODA	●	●					Special software for remote control of DC & DCR machines and anodizing application.
R30ANOPP	●						Special software for remote control of DC machines and hard anodizing application. It gives the possibility to generate up to 8 different programs, each one composed of up to 6 steps with relatively 'slow' pulses (from 100ms up to 2.5s). Each step has 2 pulses (one high and one low), a ramp time and a duration time in hh:mm:ss.

Schematic Connection's Diagram

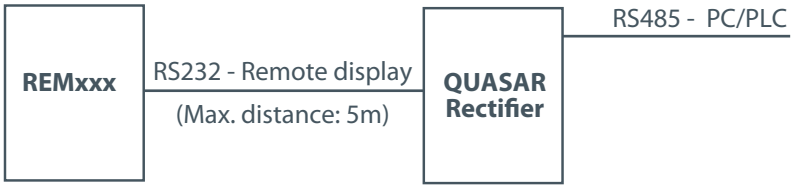
The following figures clarify the different functions, previously mentioned, that the remote control (REM) is able to perform:

A - Remote control

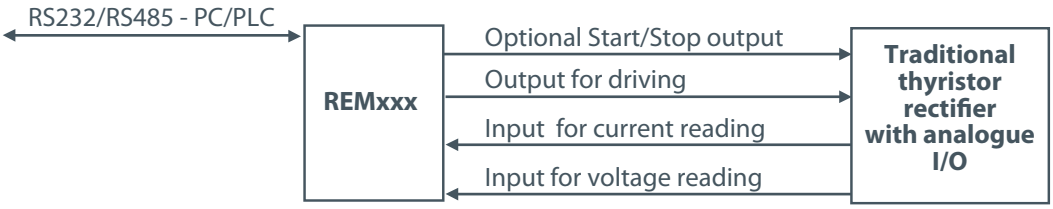
B - Remote control + *Automatic* remote control from analogue PLC



C - Remote display



D - *Automatic* remote control from PC/PLC for analogue thyristor rectifier



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Connection Tables

CN1 Internal connector - input

1 - 2	Power input: 24Vdc (0.75A max)

CN3 Internal connector - analogue inputs/outputs from/to PLC

1	(+) 0 - 10V or 4 - 20mA driving input signal from PLC
2	(-) 0 - 10V or 4 - 20mA driving input signal from PLC
3	(+) 0 - 10V or 4 - 20mA current reading output signal to PLC
4	(-) 0 - 10V or 4 - 20mA current reading output signal to PLC
5	(+) 0 - 10V or 4 - 20mA voltage reading output signal to PLC
6	(-) 0 - 10V or 4 - 20mA voltage reading output signal to PLC

CN4 Internal connector - digital inputs from PLC or external contacts

1 - 2	USED BY CRS
3	Power output for potentiometer (+10V)
4	ADC0 (+) 0 - 10V potentiometer cursor input
5 - 6 - 7	Analogue common (0V) - Power output for potentiometer
8 - 14	USED BY CRS
15	Digital input 0
16	Digital input 1
17	Digital input 2
18	Digital input 3
19	Digital input 4
20	Digital input 5
21	Digital common (+5V)

CN5 External connector - male 25 pin Sub-D

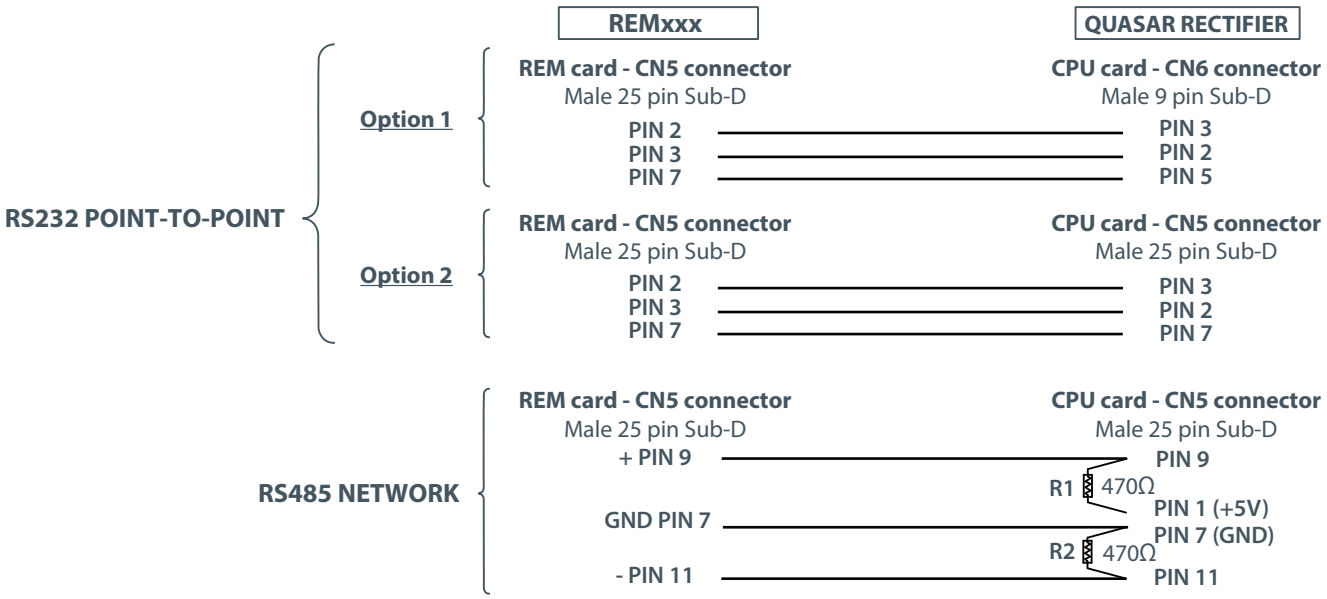
2	RS232 **RX**
3	RS232 **TX**
7	RS232 **GND**
9	RS485 **A(+)**
11	RS485 **B(-)**

CN6 Internal connector - digital outputs from relay contacts

1 - 2	Digital output 0
3 - 4	Digital output 1
5 - 6	Digital output 2
7 - 8	Digital output 3
9 - 10	Digital output 4
11 - 12	Digital output 5
13 - 14	Digital output 6
15 - 16	Digital output 7

NOTE: Contact max. rating 48Vac/0.1 with resistive load.

Electrical Connections



Specifications of communication cable between REMxxx and rectifier:

-Type for RS485: 2 Twisted + 1 Wire + Shield. Brand BELDEN 3106 or Brand ITC 15S7Y or Equivalent.

-Type for RS232: Data Cable shielded 3 x AWG 22.

- The shields must be connected together from REM Side. Do not connect Shields to the rectifier main power box P.E Point.

-Use a Seperate P.E. point (1) on the PC/PLC side (i.e. from the automation cabinet).

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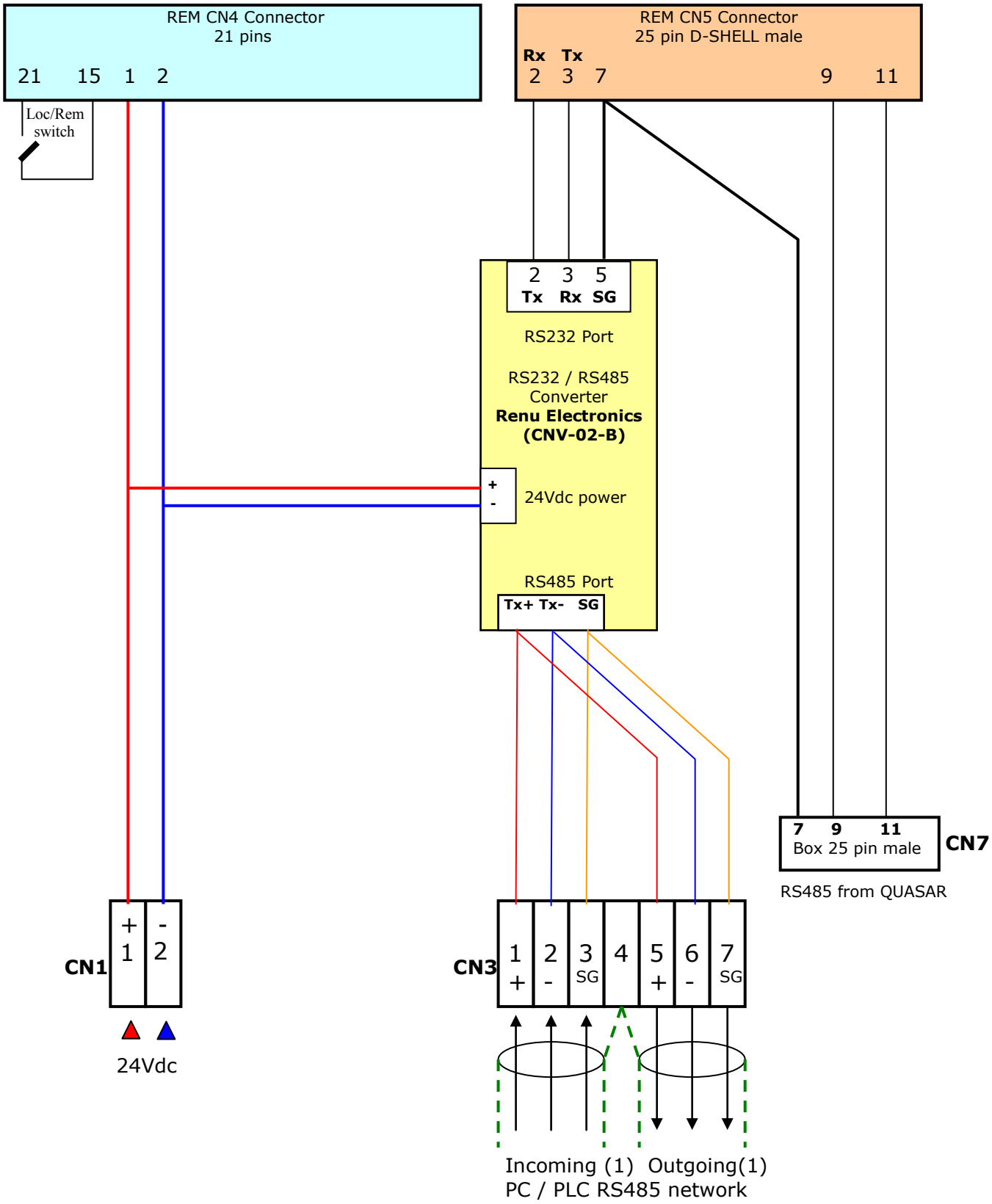
Internal Connections

— Remote Control REM3D4



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Configuration Parameters

The remote control unit (REM) configuration parameters are stored in a CONFIGURATION MENU, which is accessible by the following operations:

- Press OFF key to turn off the remote control and disconnect the RS485/RS232 serial cable.
- Press OFF key again to turn on the remote control and hold it down for a few seconds until message 'DEBUG!!!' appears on the display.
- Press the OFF key again and hold it down for a few seconds until 'CONFIGURATION' message appears on the display.
- Press MANUAL/SELECT key to access inside the configuration menu; the first parameter will be displayed with its actual value.
- Use ▼▲ keys to scroll up and down the parameter list.

Modification of a parameter value

- To modify a particular parameter value, choose the desired parameter and press MANUAL/SELECT key. At this point, the MODIFY modality will be activated and the parameter value will appear between the symbols <>.
- Press the ▼▲ keys to increase/decrease the value of the chosen parameter.
- Press ON/MODIFY key to accept the modification of the parameter value; symbols <> will disappear around the modified parameter value.
- Press OFF/MENU key to exit configuration menu and to save all parameter values on a static memory.

- After visualizing or modifying the configuration parameters, turn off and then turn on the remote control by pressing the OFF key in order to activate all parameter values and then connect back the RS485/RS232 serial cable.

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