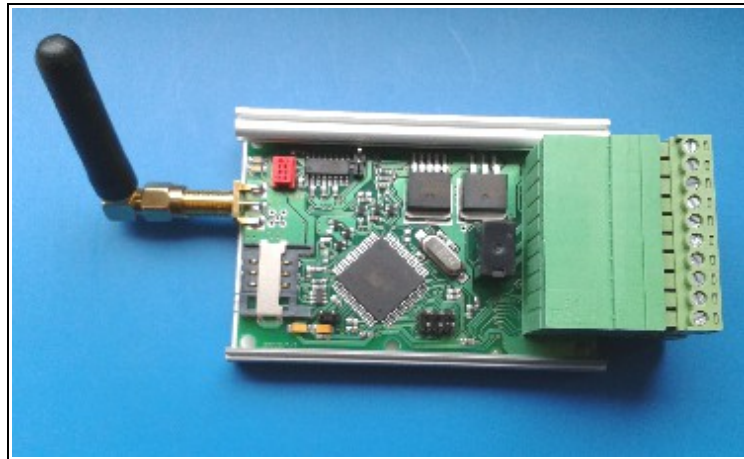
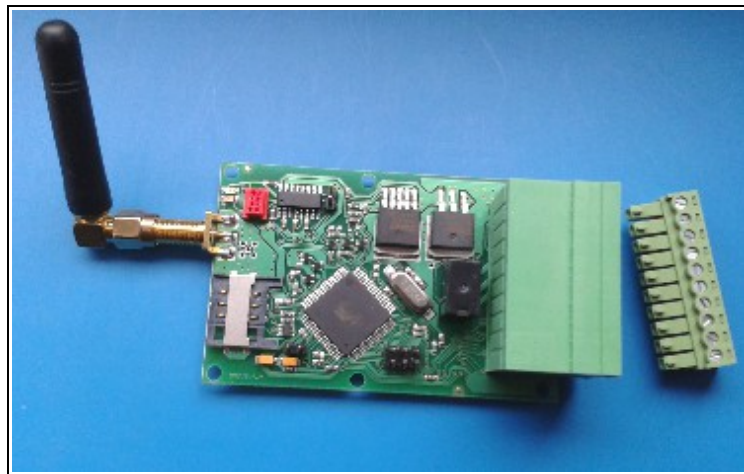


GSM Remote Control Data-logger Module

BR928-DL-2G
BR928-DL-3G

Preliminary data



Board Rev.: BR928
Document Rev.: 2.0
Revision Date: 22.05.2019

Features

- GSM module SIM5300 for 3G (Dual-Band UMTS/HSPA 900/2100MHz) and 2G (Dual-Band GSM/GPRS/EDGE 900/1800MHz) version
- GSM module SIM800 for 2G (Quad-Band GSM/GPRS 850/900/1800/1900MHz) version
- 6 digital inputs
- 3 analogue input (0-5V / 0-10V; 4-20mA optionally)
- 2 Open-Drain MOSFET outputs (20V/1A max)
- 1 Relay output (NO/COM/NC; 24VDC/24VAC/0.5A max))
- On-board power supply voltage monitoring
- User definable input alarming text descriptions
- Embedded Software
- Event notification via SMS
- Remote supervision via SMS
- Internal supervision without SMS
- Remote control via SMS (turn equipment on and off at any location via GSM)
- Data Logger
- Simple installation via PC serial port or via SMS.
- Pluggable screw terminal block for external signal connections
- External stabilised 12VDC (11VDC min...14.5VDC max)
- Board dimensions: 50.5x77.5mm
- Enclosure: FISCHER ELEKTRONIK AKG 55 32 80 ME (optional)

Applications

- Remote control
- Remote monitoring
- Remote telemetry
- Remote alarming

Technical Specification

BR928-DL Hardware Specification

	BR928-DL
Communication	3G Dual-Band UMTS/HSPA 900/2100MHz and 2G Dual-Band GSM/GPRS/EDGE 900/1800MHz 2G Quad-Band GSM/GPRS 850/900/1800/1900MHz
Command and data transmission	SMS / GPRS / FTP / HTTP
Internal GSM modem	Simcom SIM5300 / SIM800
SIM card reader	Yes
SIM card type	Phase 2 GSM11.14 - SIM 1.8V/3V
Digital inputs	
Quantity of digital inputs	6
- Transistor digital input	6 (4 inputs with 3k3 pull-up resistor to power)
- Events digital inputs	6
- Digital signal filter	25ms - 9sec
Pulse / counters inputs	
Quantity	2 (digital inputs 5 and 6)
- Pulse duration	30ms min
- Pulse period	60ms min
Temperature / humidity sensor inputs	
Temperature sensor	SMT172 Smartec
Quantity of temperature inputs	2
Temperature events inputs	2
Temperature range	-45...+135°C
Events Temperature range	-45...+135°C
Accuracy	See used Smartec temperature sensor
Humidity/temperature sensor (optional)	SHT11 (SHT15, SHT75) Sensirion
Number inputs	1
Humidity range	0...100 %RH
Temperature range	-40...+123°C
Humidity Accuracy	±3 %RH (SHT11) / ±2 %RH (SHT15)
Temperature Accuracy	±0.4 °C (SHT11) / ±0.3 °C (SHT15)
Analogue inputs	
Quantity of analogue inputs	3
- analogue inputs mode	0...5V/ 0...10V (impedance - 100kom)
- optional	0-20mA
Power supply voltage monitoring	On board (17.75V max)
- Analogue event inputs	4
ADC resolution	10 bits (0-10V), 9 bits (0-5V, 0-20mA)
Outputs	
Quantity of outputs	3
- MOSFET Open Drain outputs	2 (20V max)
- Relay outputs	1 (NO, NC, COM; 24V/0.5A max)
Data Logger Function	
Timing Interval	From 1 to 10 min (selectable)
Data transfer	RS232 port / GPRS (FTP or HTTP)
Logging data	Date/ Time, temperature, counters, analogue data, digital data
Line in logging data file	1,2,4,8,16,32,64,128,256 - selectable
Power Supply	
Required Power supply	External +12 VDC stabilised (11VDC min...14.5V max) / 1.2A min
Power requirement	50mA typ, 800mA(rms) max, 2A peak during transmission
Power protection	Reverse-polarity and over-voltage protection
Environmental Conditions	
Operational temperature range	-30...+85°C
Physical parameter	
Board dimension	77.5x50.5mm
Enclosure (optional) dimensions	Aluminium enclosure 80x55x32mm (optional)

BR928-DL Firmware Specification

	BR928-DL
Number of controlled outputs	3
Number of readable digital outputs	3 (6 text messages for '0' and for '1' state)
Text messages output state	6 (text up to 15 characters)
Number of digital event inputs	6
Number of readable digital inputs	6 (12 text messages for '0' and for '1' state)
Text messages input state	12 (text up to 15 characters)
Number of temperature event inputs	2
Number alarm SMS message for temperature inputs	10 (up to 32 characters) 10 (up to 15 characters)
Number of analogue event inputs	3 (+1 power supply voltage monitoring)
Number of readable analogue data	4
Number alarm SMS message for analogue inputs	20 (up to 32 characters) 20 (up to 15 characters)
Events cell phone numbers	7 = 4 (external cell phone)+3 (external BieneRemote module or cell phone)
SMS events format	Text message (up to 32 characters; up to 15 characters)
SMS digital data format	Binary and text
SMS message format for analogue data	In % from Reference level 00 - 99
SMS message format for temperature data	° C min level 2, min level 1, max level 1, max level 2 measurement -45° C - +135° C events level -45° C - +135° C

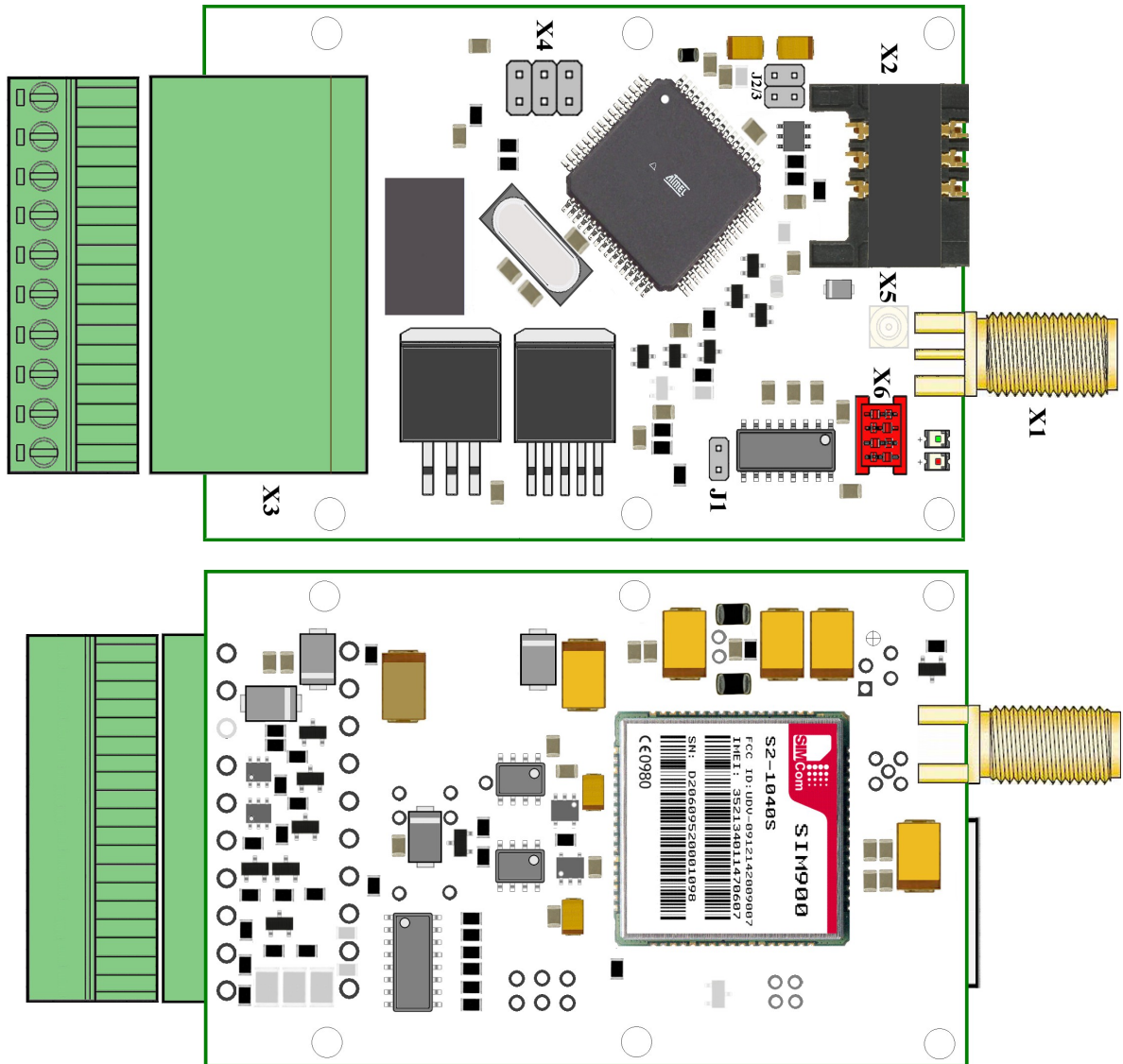
Remote programming by SMS

To remote module programming, you need

- send SMS message
- from PC via serial port

Hardware

The BR928-DL module consists of the microcontroller, voltage regulator, inputs and outputs drivers, relay, built-in GSM module, SIM-card holder, GSM antenna connector and connectors for external power supply and input / output signals for external monitored equipment connection.



Connectors

- X1 - SMA female connector for GSM antenna connection
- X2 - SIM card connector
- X3 - Dual row 2x10 pluggable terminal block for power supply and input and output connections
- X4 - Standard 2x3 pin ISP interface connector
- X5 - MMCX connector for GSM antenna connection with additional MMCX-SMA cable (optional)
- X6 - Serial Port RS232 connector

Jumpers

- J1 – connect this jumper J1 if use RS232 interface (default ON)
- J2 – not used
- J3 – not used

Power Supply

- On-board voltage regulation
- Reverse-polarity and over-voltage protection
- Required external stabilised Power supply +12VDC/1.2A min (11V min...+14.5V max)
- Connected in pluggable terminal block X3.

Antenna

- External GSM 2G/3G antenna with SMA male connector. Antenna connected to SMA connector X1.

SIM Card

- Small SIM-card with 1.8V/3V technology. SIM card inserted in SIM holder X2.

LED indicators

- Module status indication - RED LED (LED1)
- GSM Modem status indication - GREEN LED (LED2)

Module LED indication (Red LED)

LED status	Modem status
Permanently off	Device off
Short blinking after power on	SIM card read process
Short periodic blinking	Module in work
Permanently on	Module work with modem

GSM Modem LED indication (Green LED)

LED status	Modem status
Permanently off	Device off
Fast blinking (period 1s, ton 0,5s)	Net search / Not registered / Turning off
Slow blinking (period 3s, ton 0,3s)	Registered full service
Permanently on	A call is active

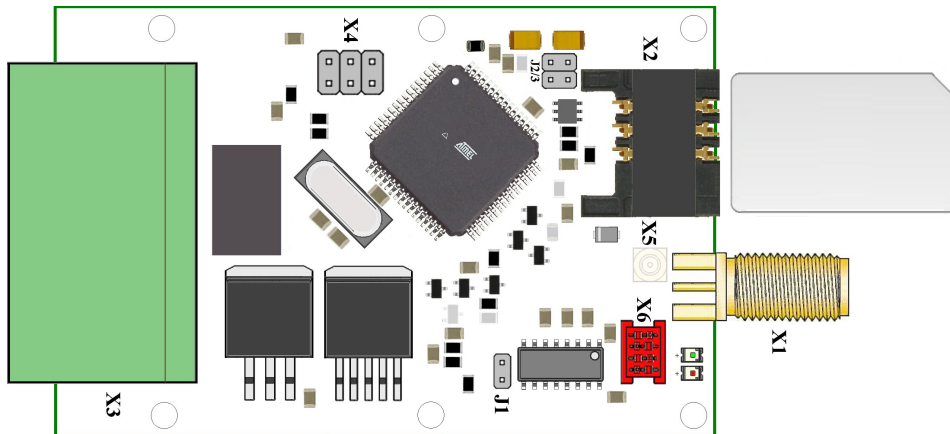
Installation

Preparation of SIM card

1. Delete any SMS messages from SIM.
2. Disable PIN code request so it will not prompt for a PIN code on turning on.
3. Write 7 authorised numbers to Phone Book (position 1,2,3...7)

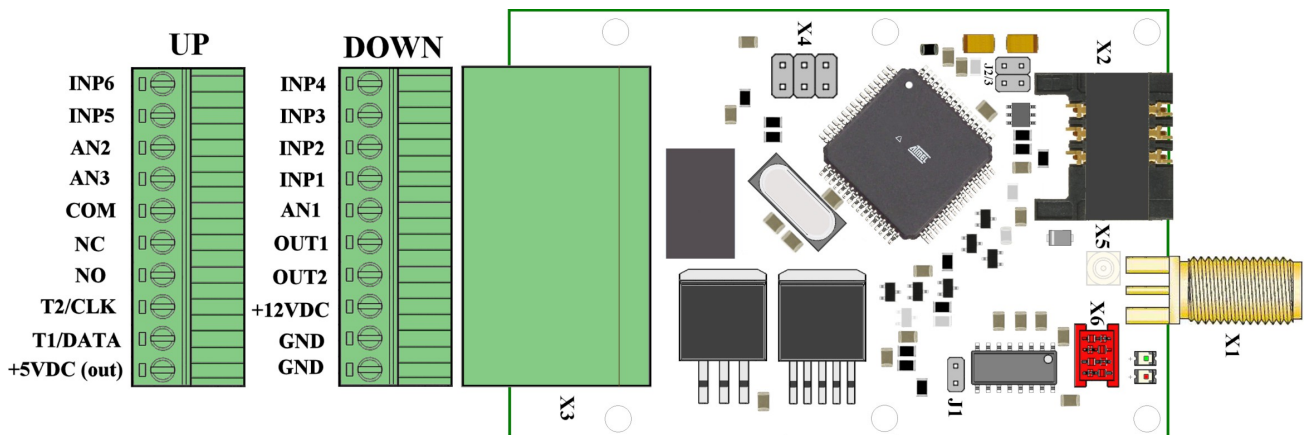
Note:

1. The BR928-DL can only be used with small SIM-cards with 1.8 or 3V technology.
2. For SIM card preparation you can use cell phone or external GSM modem.
3. SIM card change if power turn off.

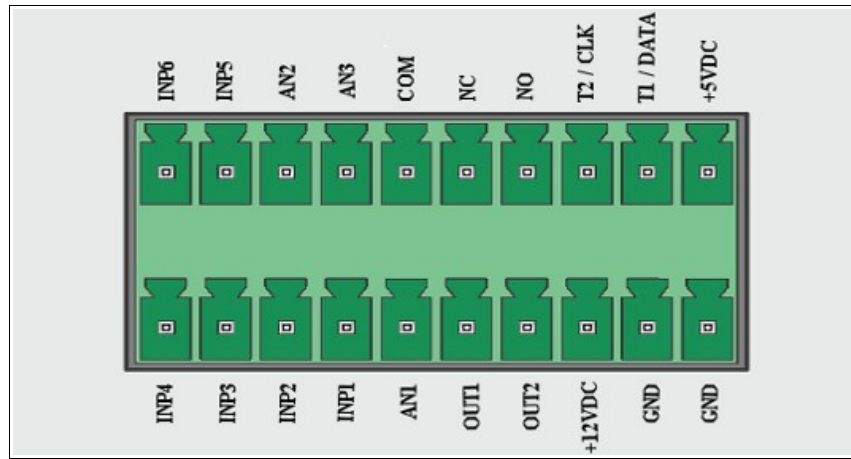


External devices connection

1. Pluggable screw terminal blocks (X3) - for inputs, outputs and power supply connection
2. SMA female connector (X1) - for GSM antenna connection
3. SIM card holder (X2) for SIM card

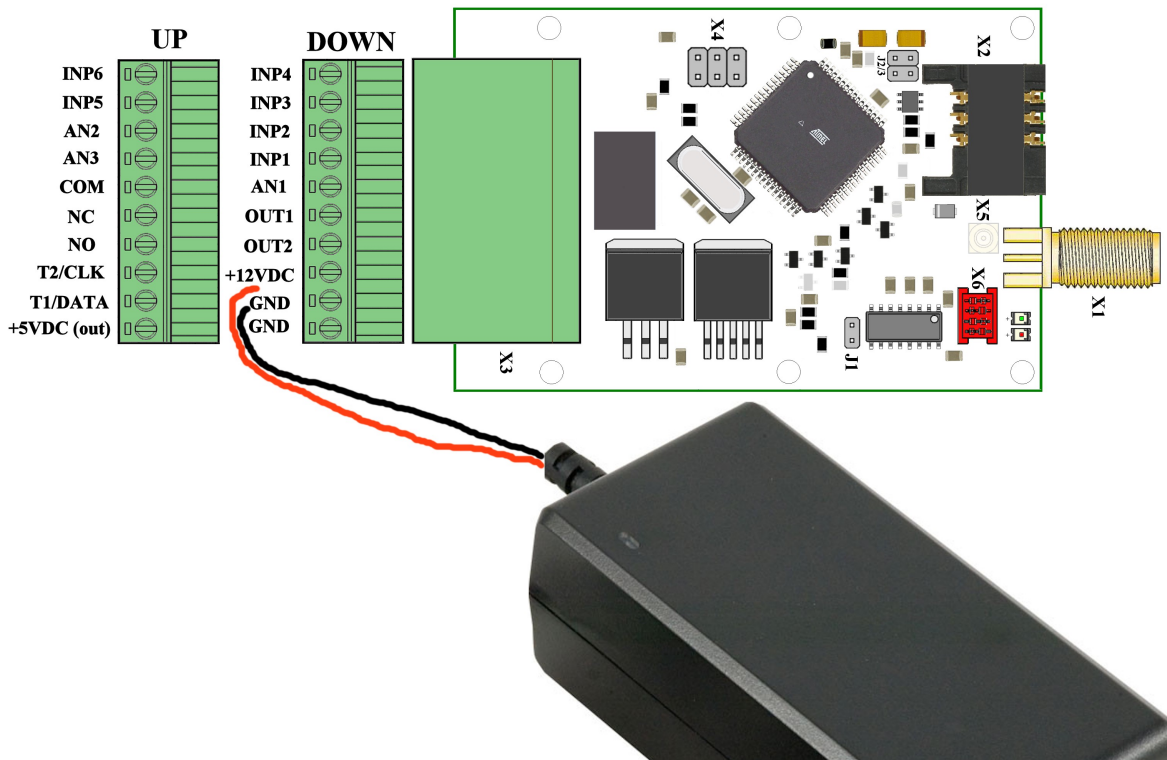


- INP1, INP2, ... INP6 - Digital Inputs 1,2,3,4,5,6
(Inputs 1,2,3 and 4 pull-uped to power supply 12V with 3k3 resistor,
Inputs 5 and 6 without pull-up resistor)
- AN1, AN2, AN3 - Analogue Inputs 1,2,3
- OUT1, OUT2 - Open-Drain Outputs 1,2
- COM, NC, NO - Relay Outputs
- T1/DATA, T2/CLK - Temperature sensors inputs, Humidity/temperature sensor inputs (optional)
- +12VDC - Power Supply Input
- GND - GND



Power Supply Connection

+12VDC stabilised Power Supply must be connected with screw terminal block.
 We recommend use stabilised +12VDC/1.2A(min) power supply.
 Power supply input has voltage polarity and over-voltage protection.



Antenna connection

External GSM antenna must be connected to SMA connector (X1).
 Use only the 50Om antenna of the necessary frequency range.

Note: It is very important that the antenna is installed on a location where the GSM-network coverage is sufficient. Please also check carefully that antennas are not installed nearby technical devices, cables etc. which could influence the GSM-radiation.

Inputs and Outputs connection

Digital inputs, analogue input, outputs and power supply must be connected with pluggable screw terminals block X3.

Digital inputs – 6 (Inputs 1,2,3,4 with pull-up resistors 3k3 to power; inputs 5 and 6 without pull-up resistors)

Analogue inputs – 3 (0-10V / 0- 5V mode; 0-20mA optional)

Temperature sensor inputs – 2 for Smartec SMT172 (optional – 1 Sensirion humidity/temperature sensor)

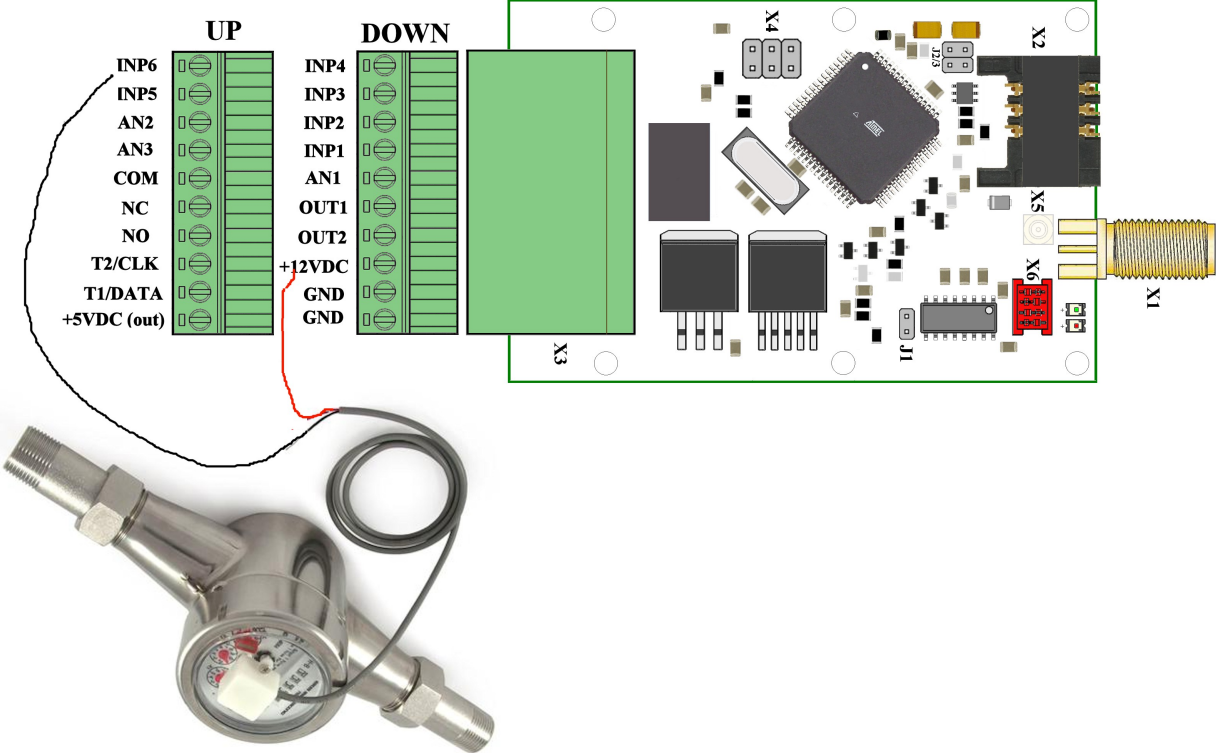
NO/COM/NC Relay output - 1 (24V/0.5A max)

MOSFET Open Drain outputs – 2 (20V max)

Note: See also "Inputs and Outputs schematic".

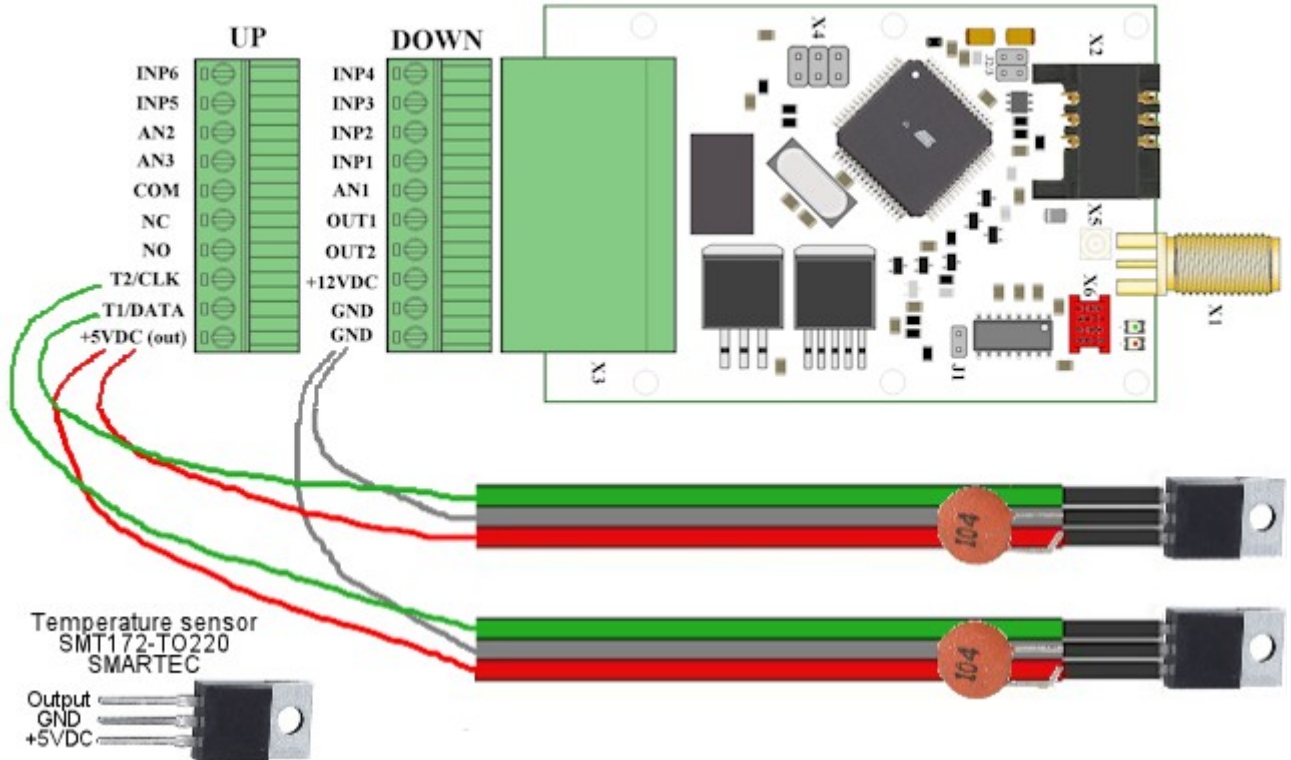
Counters connection

Counter can connect to digital input 5 and/or digital input 6



Note: For long distance recommended used shielded cable.

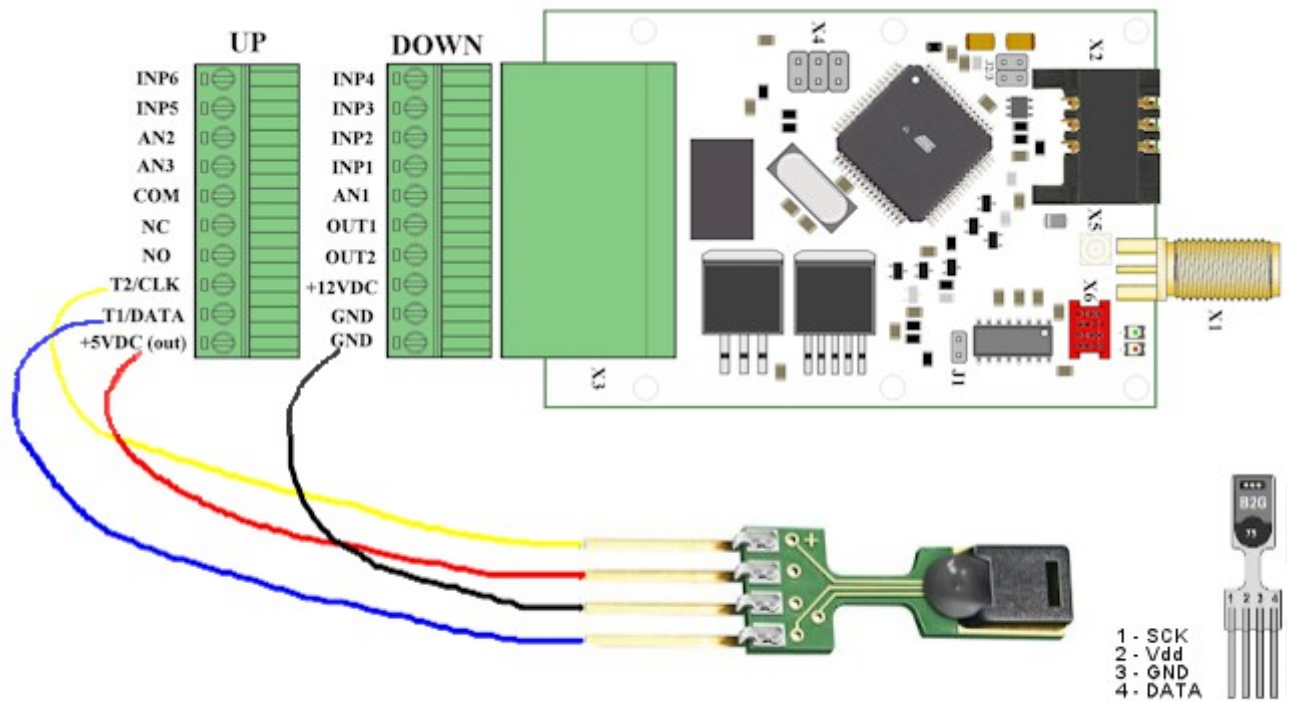
Temperature sensors Smartec SMT160-30 connection



Note: for cable need connect capacitor 100nF between GND and +5V sensor side. Also for long cable recommended used shielded cable.

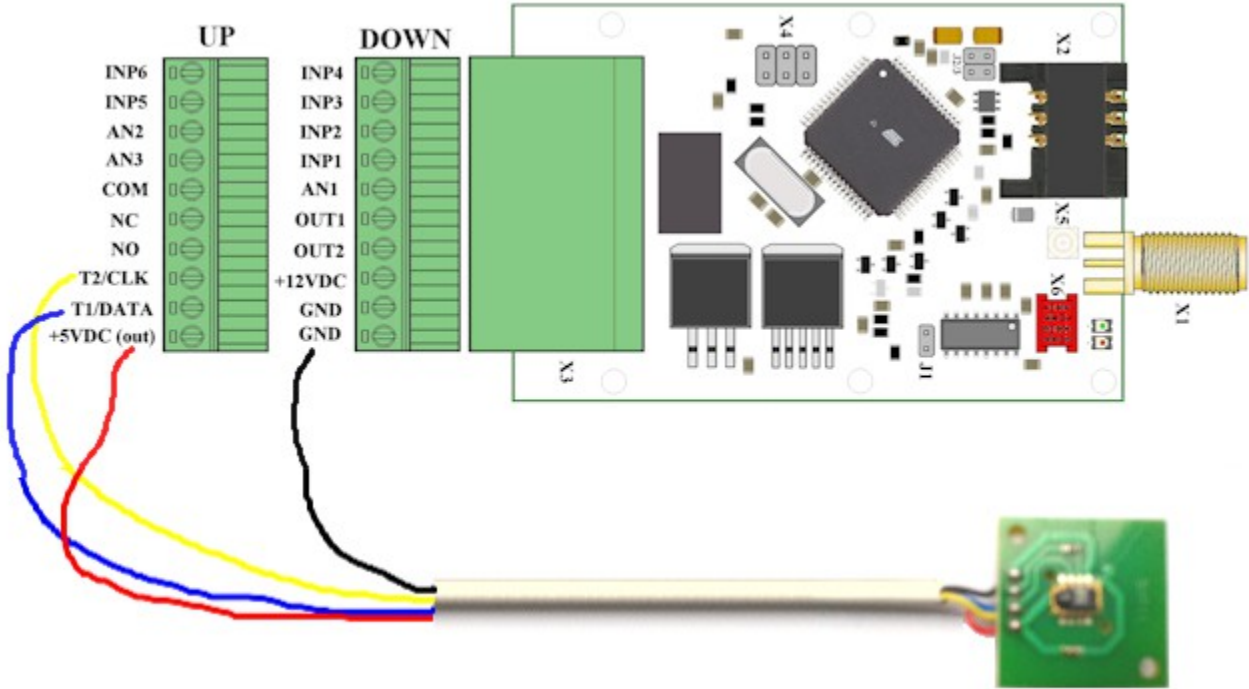
Humidity/Temperature sensors Sensirion connection (optional)

SHT75 (optional)



Note: For long distance recommended used shielded cable.

SHT11 / SHT15 (optional)



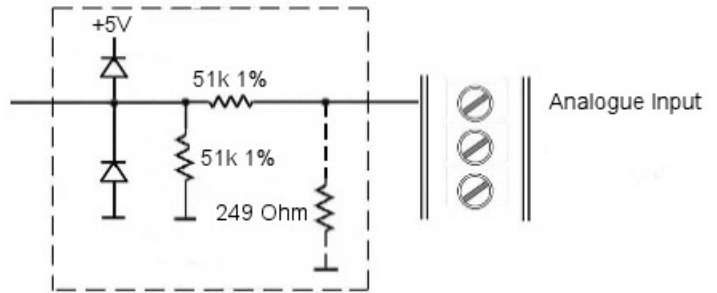
Note: For long distance recommended used shielded cable.

Input and Output Schematic

Inputs

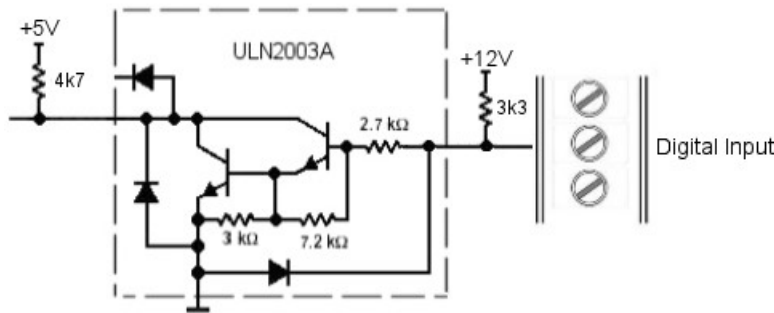
0-5V / 0-10V Analogue Inputs

Connector: Pluggable Screw terminal block
 Maximum Input Voltage: 10V
 Input resistance: 100 kOm.
 0-20mA mode: 249Om resistor optionally



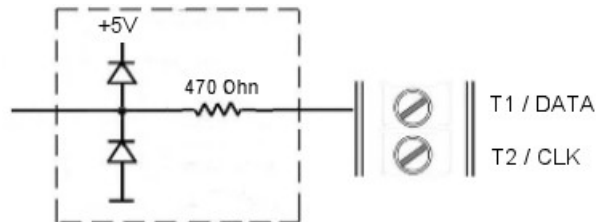
Digital Inputs

Connector: Pluggable Screw terminal block
 Max input voltage: +14.5V without external limited resistor.
 Pull-Up Resistor: 3.3kOhm to power supply – only for Inputs 1,2,3 and 4.



Temperature sensors and Humidity/temperature sensor Inputs

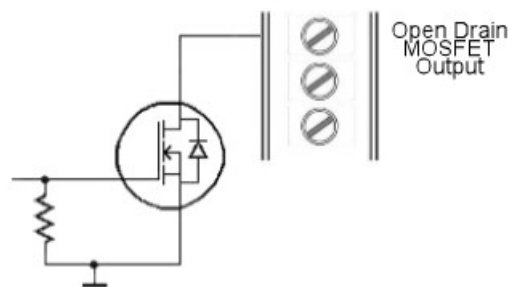
Connector: Pluggable Screw terminal block
 Max input voltage: +5.5V



Outputs

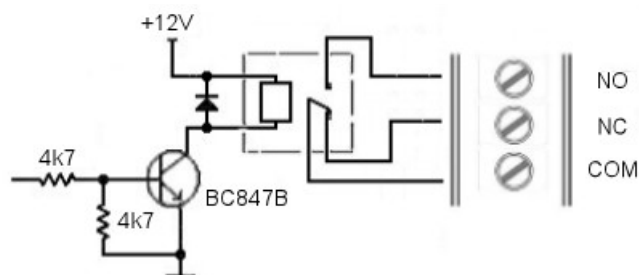
MOSFET Open Drain Outputs

Connector: Pluggable Screw terminal block
 MOSFET transistor: IRLMS2002
 Max. Voltage: 20V



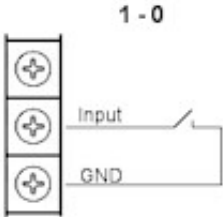
Relay Output

Connector: Pluggable Screw terminal block
 Outputs: NC, NO, COM
 Relay: Rayex Electronic RSY-12 or equivalent
 Max. Voltage: 24VDC/24VAC/0.5A



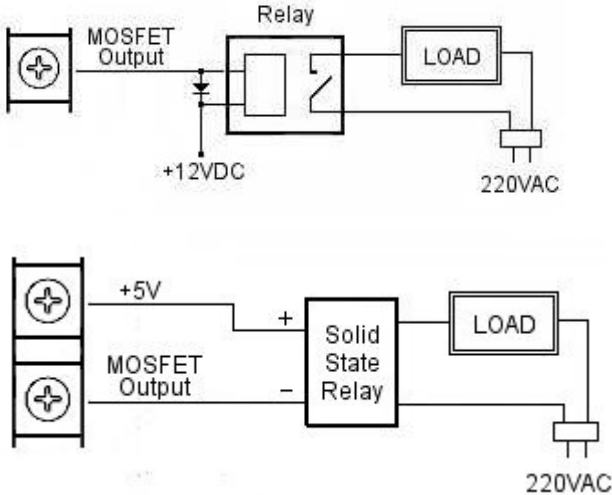
Connection Example

Connection example to Input Driver



Relay connection example to Output Driver (Output 1, 2 on terminal block)

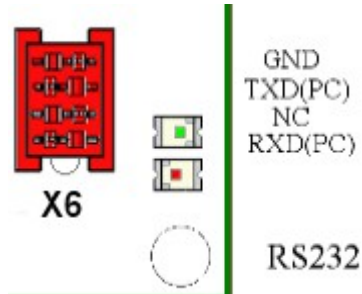
Electromechanical relay and Solid-state-relay (SSR) connection.



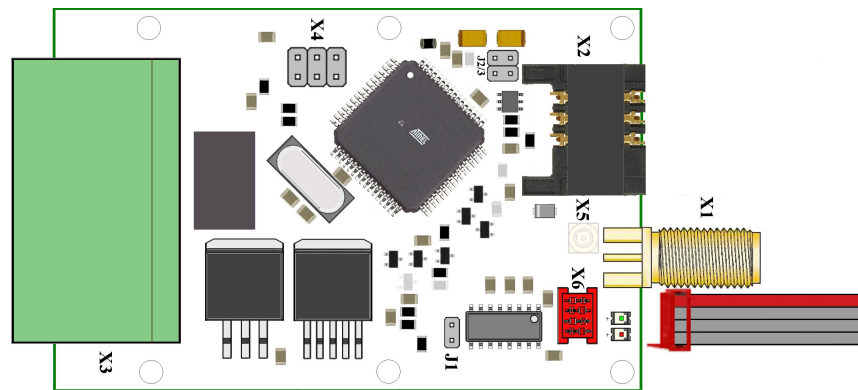
Serial interface RS232

RS232 Serial Port (X6)

RS232 serial port used for direct PC serial port connection for module programming or monitoring.
Connect jumper J1 if use RS232 interface (default ON)



RS232 cable connection



ISP programming

X4 connector used for in-system programming (not for user)

