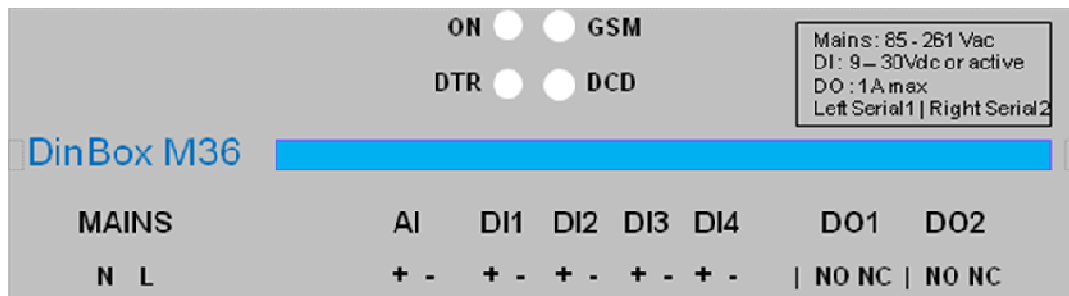
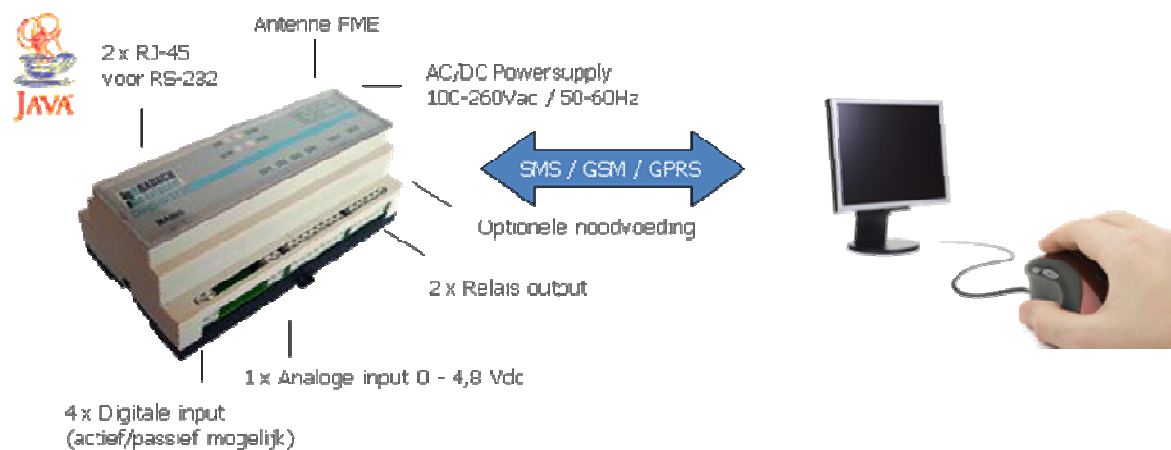


# DinBox M36 Hardware Description Guide



This manual covers the different hardware settings when using the DinBox M36 equipment. Next to this you will find all the relevant technical information needed when using the DinBox M36 hardware.

Please refer to the DinBox M36 Software Reference Guide if you are using the embedded SMS software.

If you like to develop your own Java application please refer to the Cinterion TC65i\_ATC, TC65i\_HW reference manual & the Cinterion Java ME developers suite.

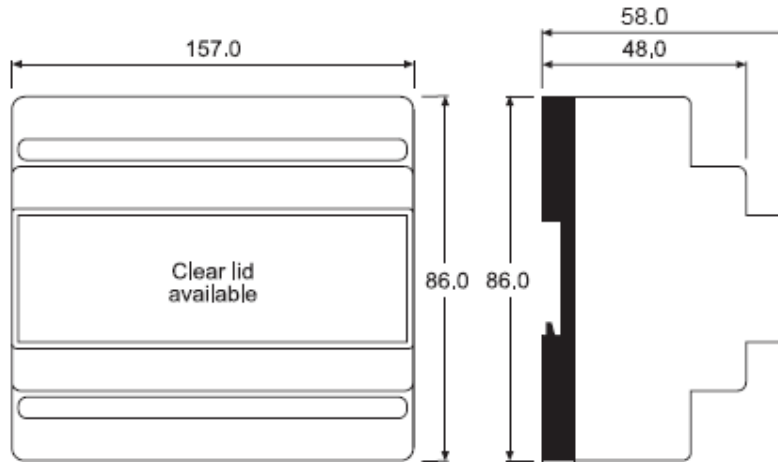
## **Table of contents:**

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7. Watch Dog
8. Serial ports
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10. Digital Inputs Configuration
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13. Internal Battery operation (optional)

Bausch Datacom Contact information

## 1. Housing

Dimensions:



Technical Data:

### TOP PART:

Material:	Lexan 940
Colour:	Grey (RAL 7035)
Max. temperature:	100°C
Width:	157 mm (9 modules)
Label measurement:	41.0 x 152.0 mm
Self-extinguishing:	Acc. to UL94-V0

### BASE PART:

Material:	Noryl VO 1550
Colour:	Black (RAL 7021)
Max. temperature:	100°C
Max. wire dia.:	2 x 2.5 mm <sup>2</sup>
Max. load:	10A (for higher load please enquire)
Terminals:	52 fixed or plugable
Mounting:	DIN-rail (EN50022)
Self-extinguishing:	Acc. to UL94-V0

Opening the housing can be done by gently pushing one of the clips on the left and/or right hand side of the lower base of the housing & removing the upper part of the enclosure.

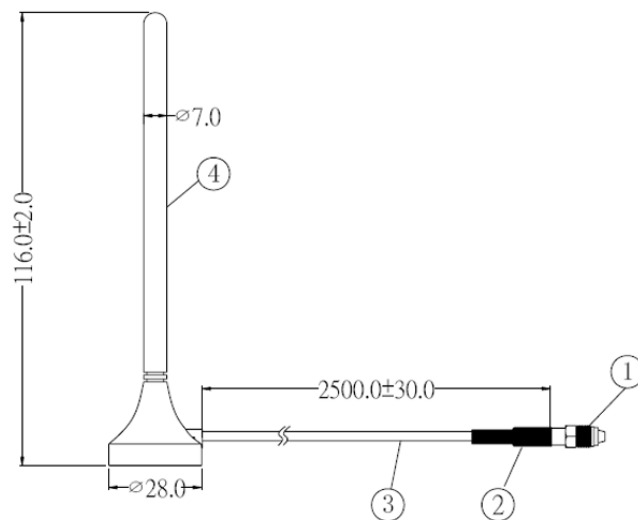
**ATTENTION:** The antenna cable is connected between the upper part of the enclosure & the base part. Do not stress this cable when opening the device.

## 2. Antenna & Antenna Connector

The GSM antenna should be connected via the FME connector located on the upper part of the housing.

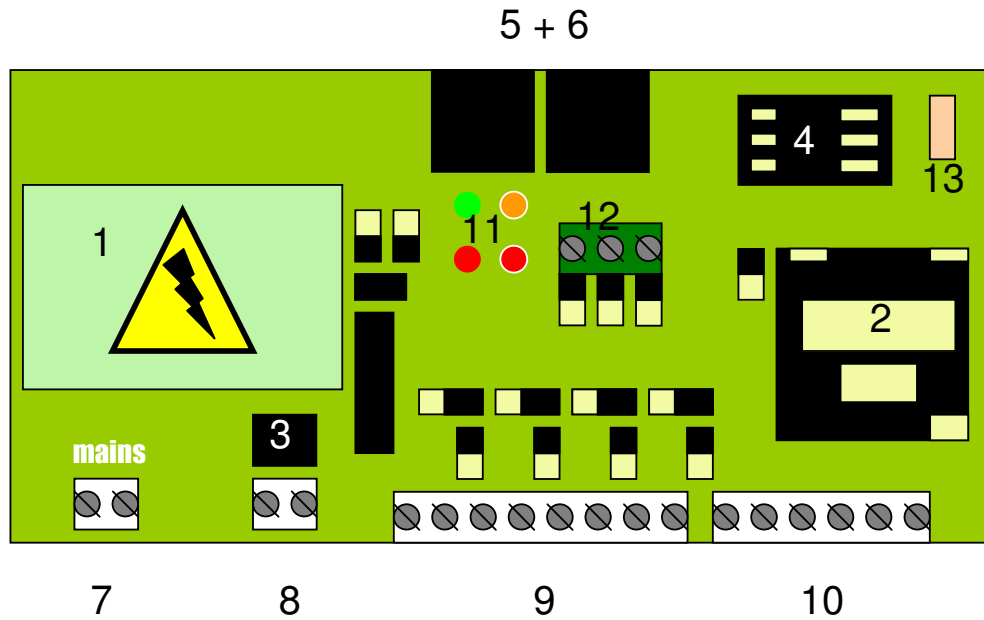
Internally a UFL connector is used to connect the antenna signal to the TC65i. Never use the DinBox M36 without a proper antenna connected.

### Standard Magnetic Dual Band Antenna:



- Magnetic Dual Band antenna : 900-1800 MHz
- Impedance: 50 Ohm
- Coaxial cable: RG-174-2500 mm
- Connector: FME female (to fit on Indubox GSM modems)
- Antenna gain:  $2.0 \pm 0.5$  dBi @ 920 MHz  
 $1.5 \pm 0.5$  dBi @ 1800 MHz

### 3. Main components



The bottom part of the enclosure fits the main PCB. On this PCB you will find the following components:

1. Wide range ac/dc power supply
2. GSM/GPRS Module Cinterion TC65i
3. Hardware watchdog (little AVR processor)
4. SIM card holder/reader
5. Main serial port
6. Second serial port
7. Screw contacts MAINS
8. Screw contacts Analogue INPUT
9. Screw contacts Digital INPUTS
10. Screw contacts RELAIS OUTPUTS
11. Information / Status LEDS
12. BackLi-ion battery pack connector (with NTC)
13. 0,1F supercap for real time clock

**WARNING:** When opening or closing the enclosure be sure that the mains is disconnected.

## 4. LED's

The DinBox M36 has 4 status LED's.

Meaning of the LED's:

**ON**   **GSM**

**DTR**   **DCD**

The **GREEN ON Led** is directly connected to the internal watch dog circuitry. This LED supervises the good functioning of the internal watchdog. This LED should always be blinking with a period of 1 sec.

The **ORANGE GSM Led** gives more information on the status of the GSM/GPRS module. Please refer to the TC65i hardware & software reference guide for full documentation. (document tc65i\_hd\_v01100b.pdf & tc65i\_atc\_v01100.pdf)

LED behavior	ME operating status if <code>AT^SSYNC=1</code>	ME operating status if <code>AT^SSYNC=2</code>
Permanently off	ME is in one of the following modes: - POWER DOWN mode - AIRPLANE mode - CHARGE ONLY mode - NON-CYCLIC SLEEP mode - CYCLIC SLEEP mode with no temporary wake-up event in progress <sup>1)</sup>	ME is in one of the following modes: - POWER DOWN mode - AIRPLANE mode - CHARGE ONLY mode
600 ms on / 600ms off	Limited Network Service: No SIM card inserted or no PIN entered, or network search in progress, or ongoing user authentication, or network login in progress.	Same as for <code>AT^SSYNC=1</code>
75 ms on / 3 s off	IDLE mode: The mobile is registered to the GSM network (monitoring control channels and user interactions). No call is in progress.	Same as for <code>AT^SSYNC=1</code>
75 ms on / 75 ms off / 75 ms on / 3 s off	One or more GPRS PDP contexts activated.	Same as for <code>AT^SSYNC=1</code>
500 ms on / 50 ms off	Packet switched data transfer is in progress.	Same as for <code>AT^SSYNC=1</code>
Permanently on	Depending on type of call: Voice call: Connected to remote party. Data call: Connected to remote party or exchange of parameters while setting up or disconnecting a call.	Same as for <code>AT^SSYNC=1</code>
<n> ms on / <n> ms off <sup>2)</sup>	Not possible: With <code>AT^SSYNC=1</code> , LED signalization is disabled in SLEEP mode.	SLEEP mode is activated ( <code>AT+CFUN</code> parameter <code>&lt;fun&gt; ≠ 1</code> ), but the ME is not registered to the GSM network (e.g. SIM not inserted or PIN not entered, and therefore, either no network service or only Limited Network Service is available).

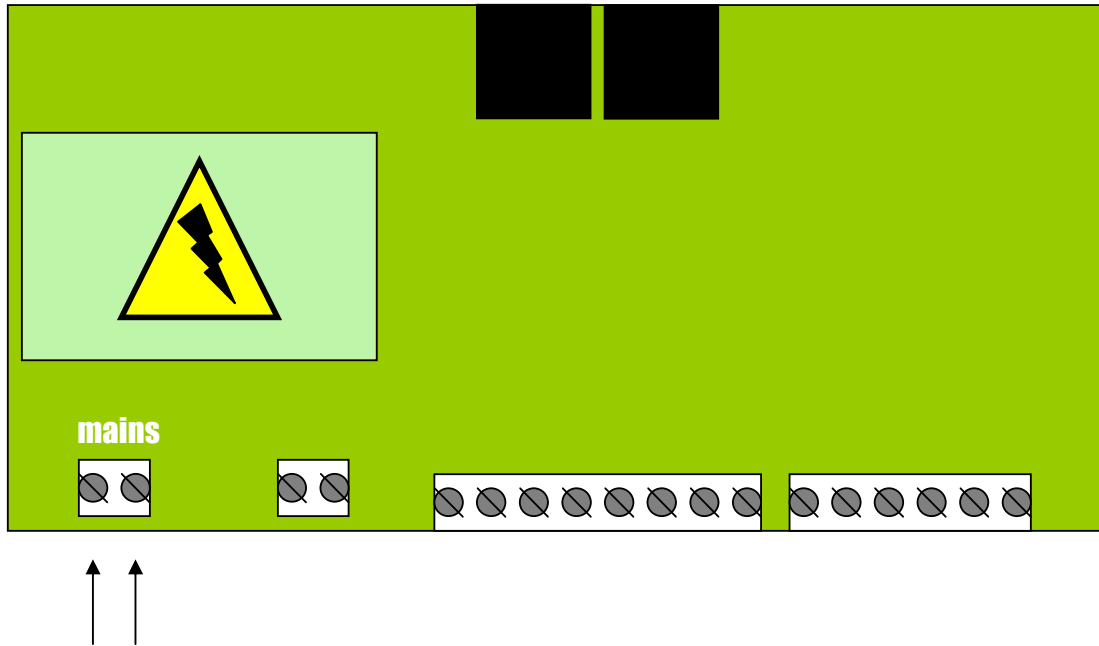
The **RED DTR led** gives you information when DTR is active (from DTE) on the first serial port.

The **RED DCD led** gives you information when an active GSM connection is established. (CSD data call). This led can be controlled also by issuing the following AT Command: AT&C. Please refer to the TC65i software reference guide for full documentation. (document tc65i\_atc\_v01100.pdf)



## 5. Power Supply / Mains

The DinBox M36 can be connected directly to the mains by using the screw contacts 7.



Power supply parameters:

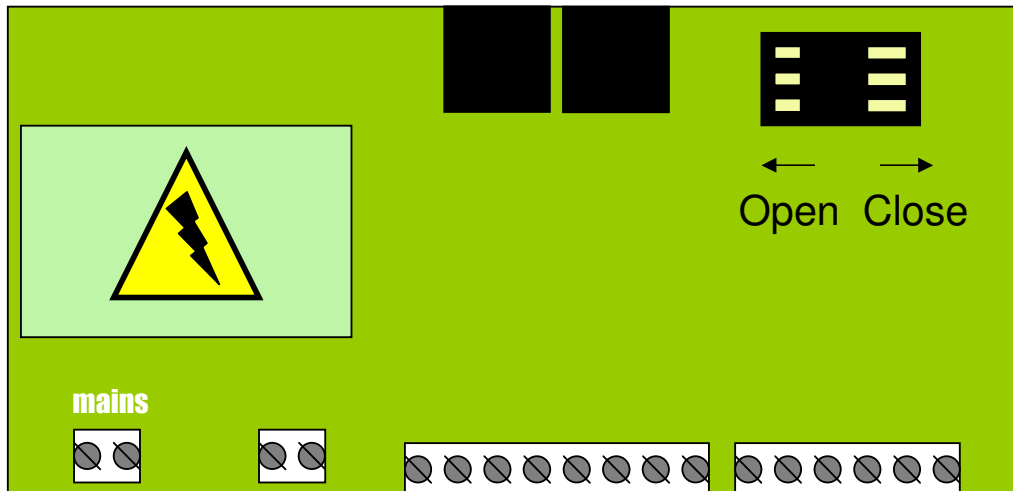
Input: AC (Alternated Current) between 85 Vac – 261 Vac.

Optionally we can provide an internal wide range DC (Direct Current) power supply (8-30 Vdc). Contact us for more information.

**WARNING:** Disconnect mains connection when connecting the mains wires onto the DinBox M36.

## 6. SIM card / SIM card reader

The SIM card reader is located on the top right on the main PCB. By shifting to the left you can open the card reader. Insert the SIM card and closed the tray by shifting to the right.



Both 1.8V & 3.0V SIM cards are supported.

This SIM interface is conform ISO 7816 IC card standard.

Please refer to the Cinterion TC65i hardware description guide for more information.

**WARNING:** When inserting or removing the SIM card be sure that the mains is disconnected.

## 7. Watchdog

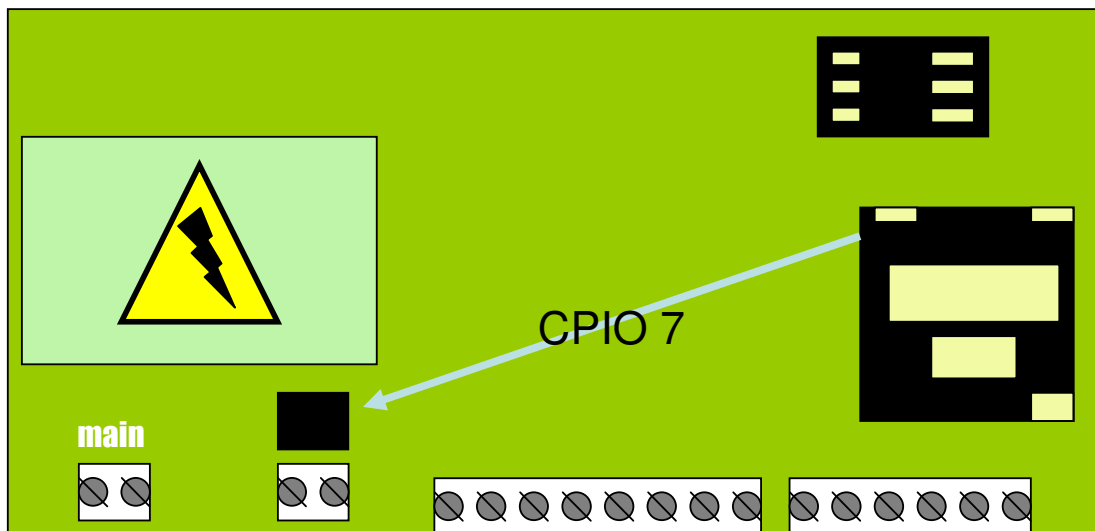
The build-in TC65i GSM/GPRS module is toggling GPIO7 each second (controlled by Java pgrm). When the watchdog processor doesn't detect this toggle during 2 minutes, the TC65i will be reseted via the EMERG\_RTS.

### Watchdog LED functionality :

500 ms ON / 500 ms OFF → idle

ON → during EMERG\_RST procedure

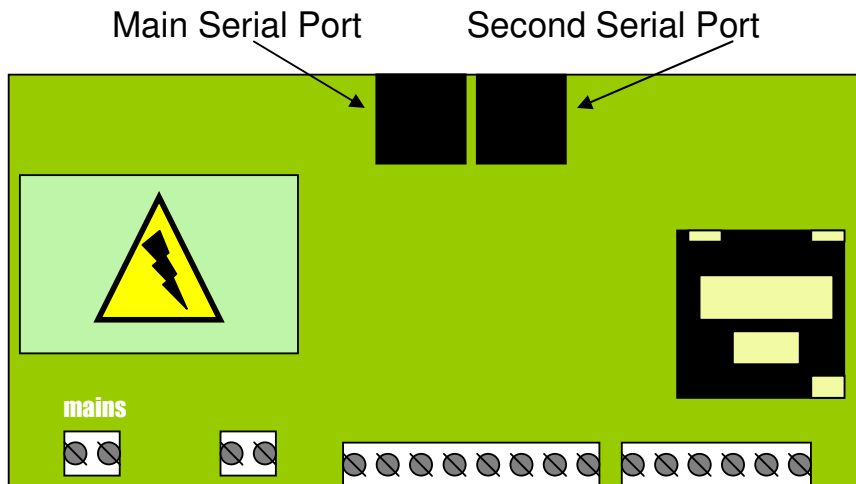
Note: On request other watch dog functionality is possible (non Java driven watchdog).



## 8. Serial Ports

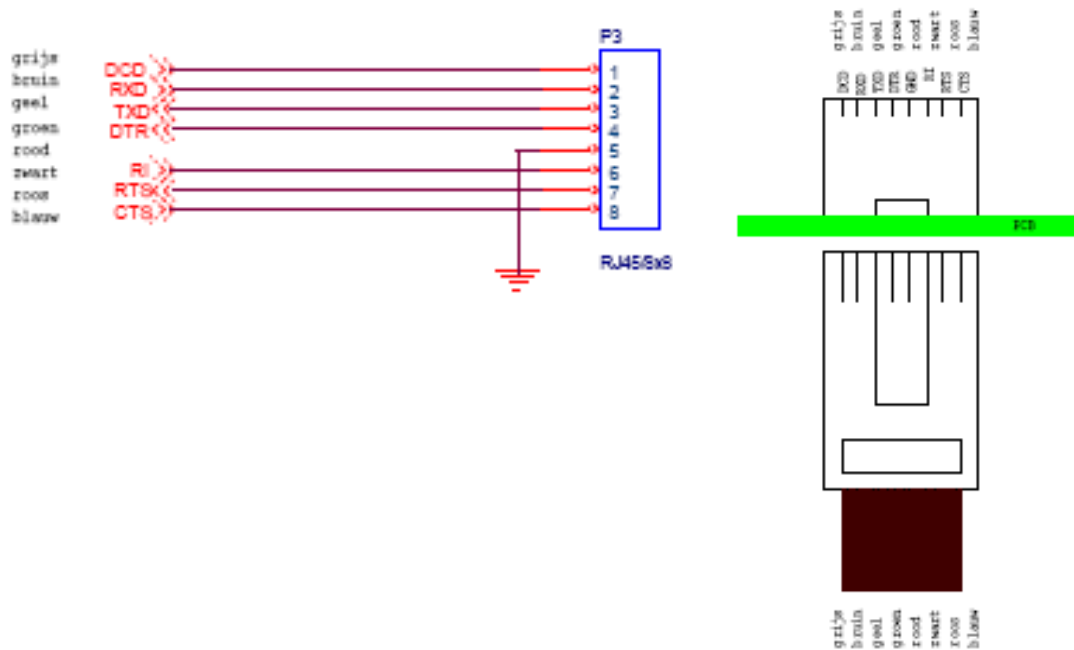
The DinBox M36 has 2 serial ports available. The first serial port (located on the left side) has all V.24 lined available (except DSR). The second serial port (on the right) is equipped with TxD, RxD, GND, 5Vdc

The status of the DTR signal of the first serial port is visible by LED.



The used connectors are RJ-45.

Schematics first serial port:





Schematics second serial port:

Same layout as above but only TxD, RxD & GND is present on the RJ45 connector. Additionally PIN 8 is connected to the +5VDC.

This port can be used for instance to power an external active GPS device.

Standard RJ45 – RS232 DB-9 cables can be ordered.

## **9. Real Time clock**

The real time clock (RTC) is embedded in the Cinterion TC65i GSM module.

Please refer to the TC65i Hardware & ATC reference manual for more information.

The realtime clock has an externally backup (0.1 F / 5V Aluminium Electrolytic Capacitor, C20)

## 10. Digital Input configuration

The digital inputs can be configured as a “dry” contact or as an “active” contact.

The inputs are galvanic separated with an opto-coupler from the TC65i GSM module

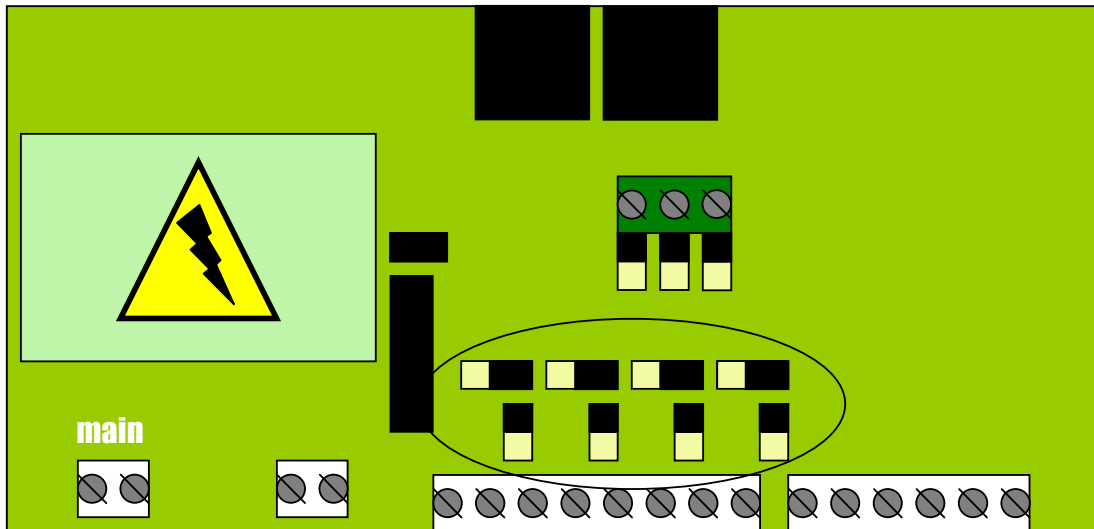
Dry Contact minimum & maximum ratings:

- minimum input voltage : 9 Vdc (@ 1 mA)
- maximum input voltage : 30 Vdc (@ 7 mA)
- this input is polarity dependent (protected with a diode)

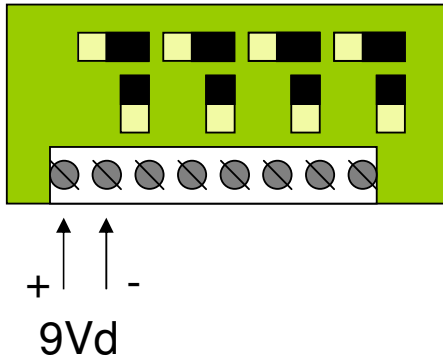
The galvanic separated dry contact or active digital input are switchable via jumpers.

You can set the desired operation mode by the following jumpers.

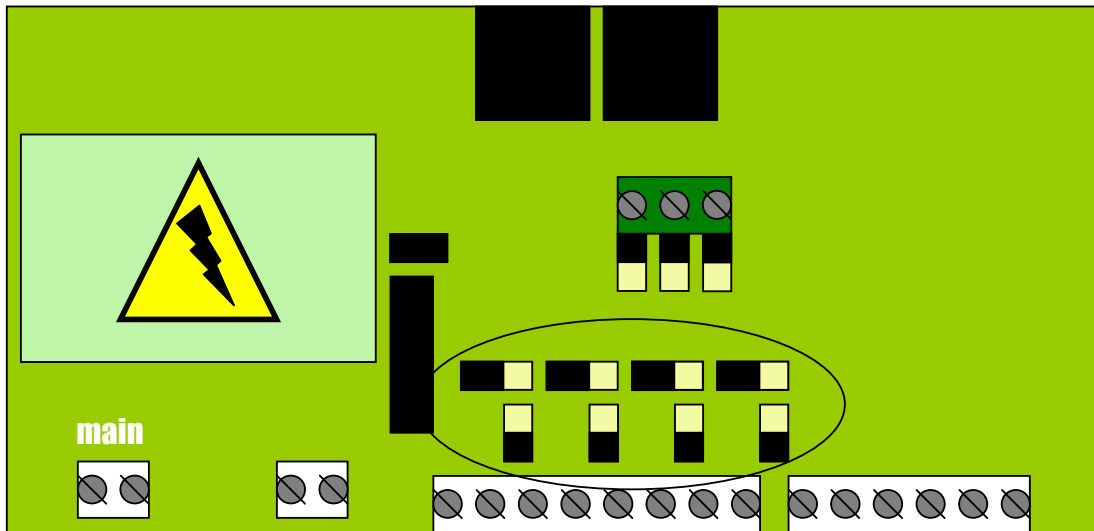
Dry Contact jumper settings:



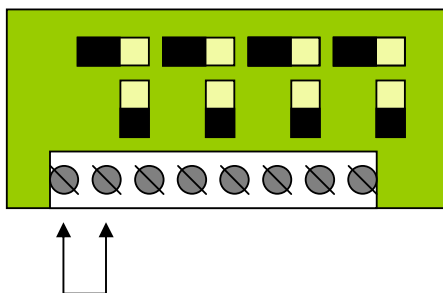
Each input has 2 jumpers. When both jumpers are located to each other the power based Input configuration is active. (INPUT Need DC power to activate)



When the jumpers are located away from each other the INPUT configuration is Active. (open or short circuit operation)



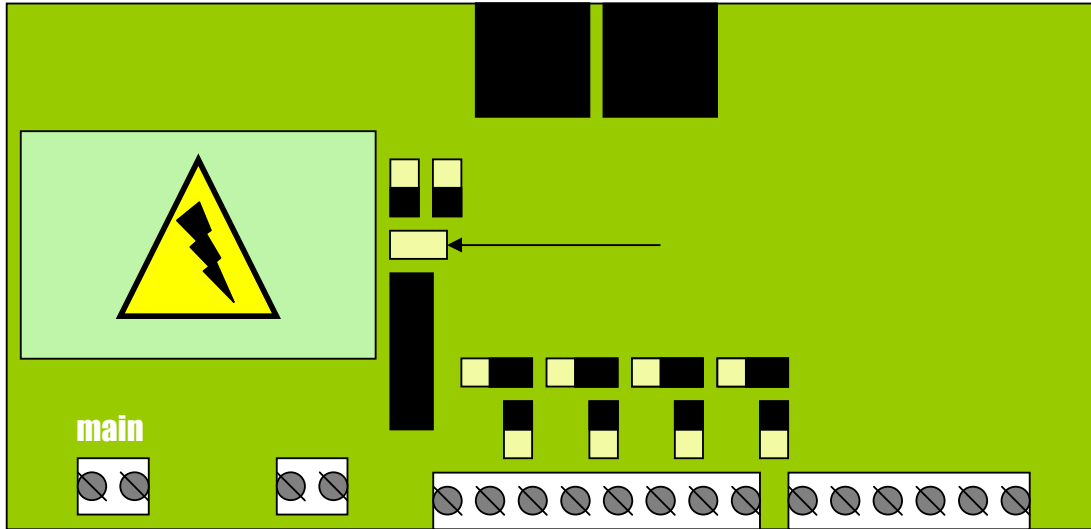
This means that that the input is active when the input is short circuited.



Note: The on-board DC/DC converter (30V) will then supply the necessary isolated voltage to make the DI active.



Note: When using the inputs in dry contact configuration you can deactivate the **on-board** DC/DC converter (specially in battery operated mode or applications). This can be done by removing the jumper located on top of the DC/DC converter.



The mix of Dry Contact & Active Inputs are possible.

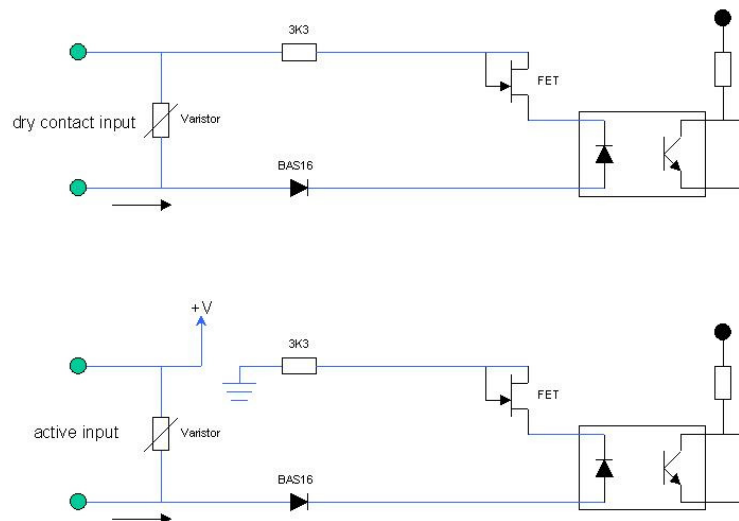
The first DI in connected to GPIO10 pin of the TC65i module (this pin can also be configured as a pulse counter. Please refer to the tc65i\_atc\_v01100.pdf manual for more information).

The second DI is connected to GPIO2.

The third DI is connected to GPIO3.

The fourth DI in connected to GPIO4.

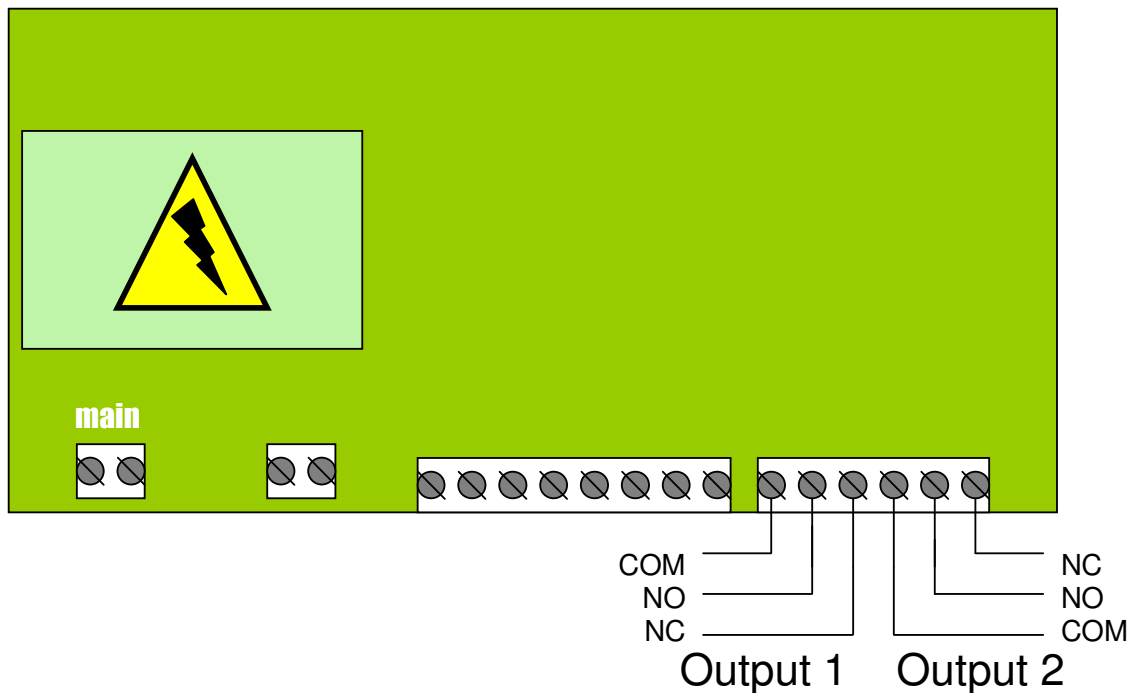
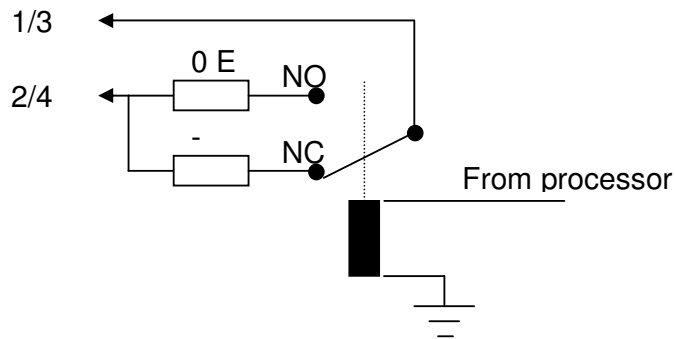
Note: Due to the internal electronics the logical inputs on the internal TC65i GSM module are inverted. If you like to write you're proper Java application keep in mind that all the inputs are inverted.



## 11. Outputs

The 2 outputs on the DinBox M36 are relays with NO and NC connections.

Load	Resistive load (p.f. = 1) Inductive load (p.f. = 0.4, L/R = 7 ms)
Rated load	0.5 A at 125 Vac, 1 A at 24 Vdc
Max. operation voltage	125 Vac, 60 Vdc
Max. operation current	1 A



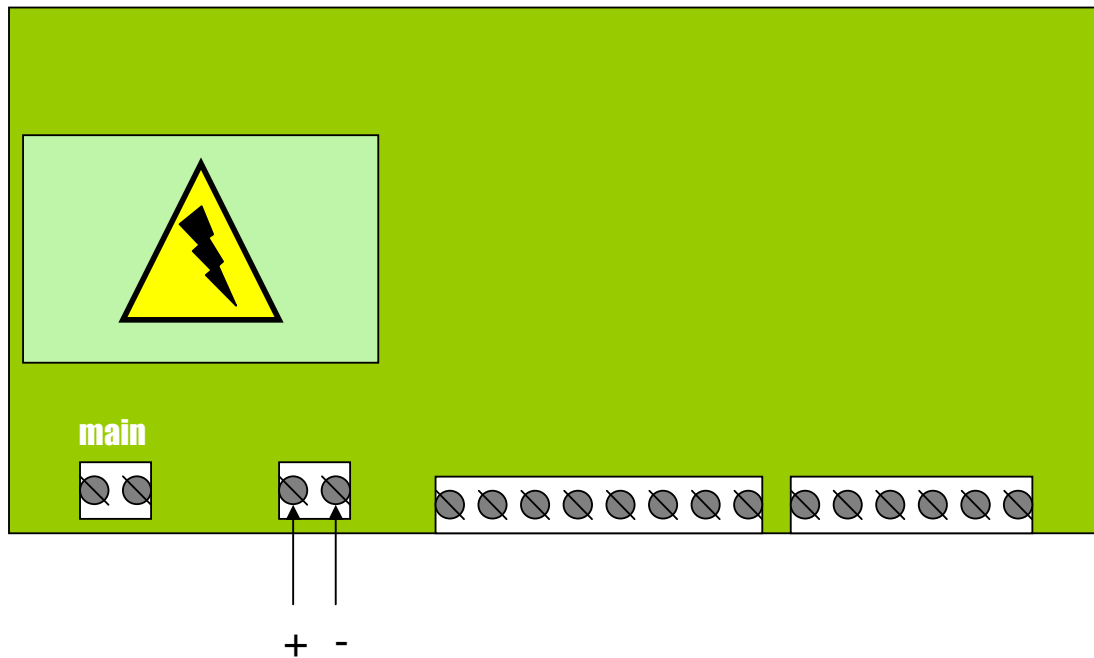
The first output is connected to the GPIO5 line of the TC65i module.

The second output is connected to the GPIO8 line of the TC65i module.

## 11. Analogue input

This input is connected to the ADC1 input on the TC65i module. The input has a resistive divider of 220K Ohm / 220K Ohm.

Please refer to the TC65i hardware & software manual for using this input.



The maximum input voltage may not exceed 4.8 VDC.

**Warning: this input is not protected nor isolated. When misused damage to the GSM module is possible**

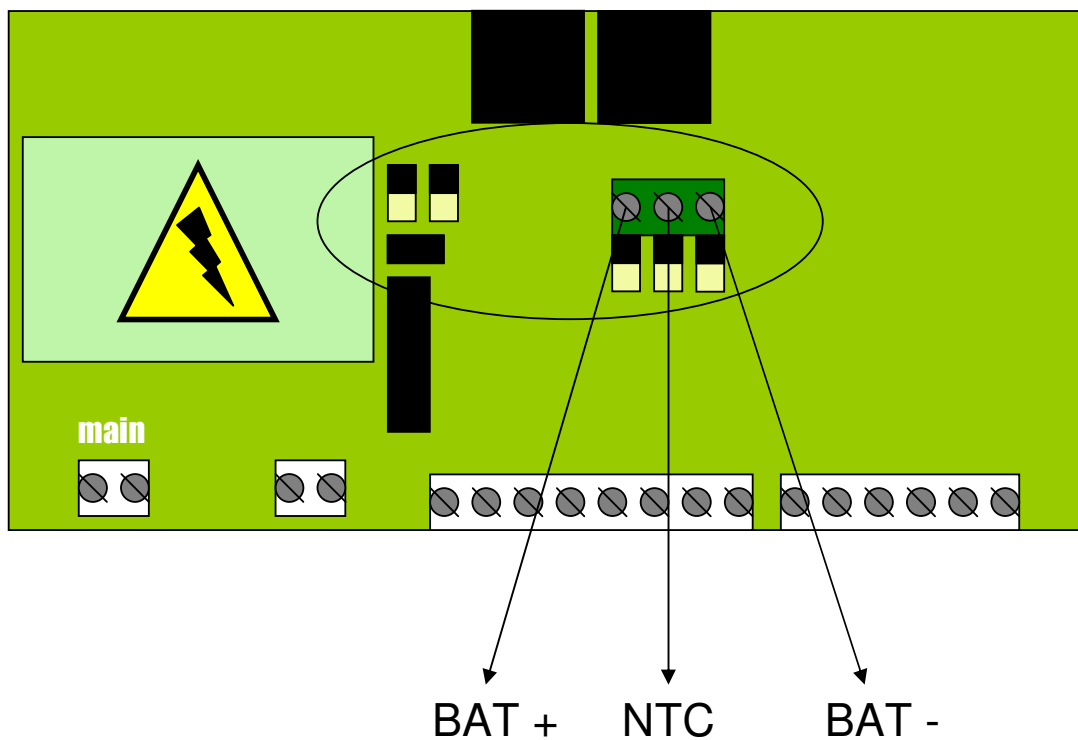
## 12. Battery operation

Optionally you can order a Li-ion back-up battery (P109123). When using this battery you should change 5 jumpers. 2 next to the power supply & 3 under the battery connector. All jumpers should be placed **without** mains or power connected.

The figure below give you the correct jumper settings for battery operation applications.

The load processor is included in the TC65i module. Please refer the the TC65 hardware en software reference manual for more information.

Jumper placement for battery operation:



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