1270927-02

GSM Base Remote Terminal Unit

RTU 3.1

Hardware Manual

Before using the RTU-3.1, please be sure to thoroughly read this software manual.

Manual ID : 1270927-02
Revision : 2 (10th of September 2007)

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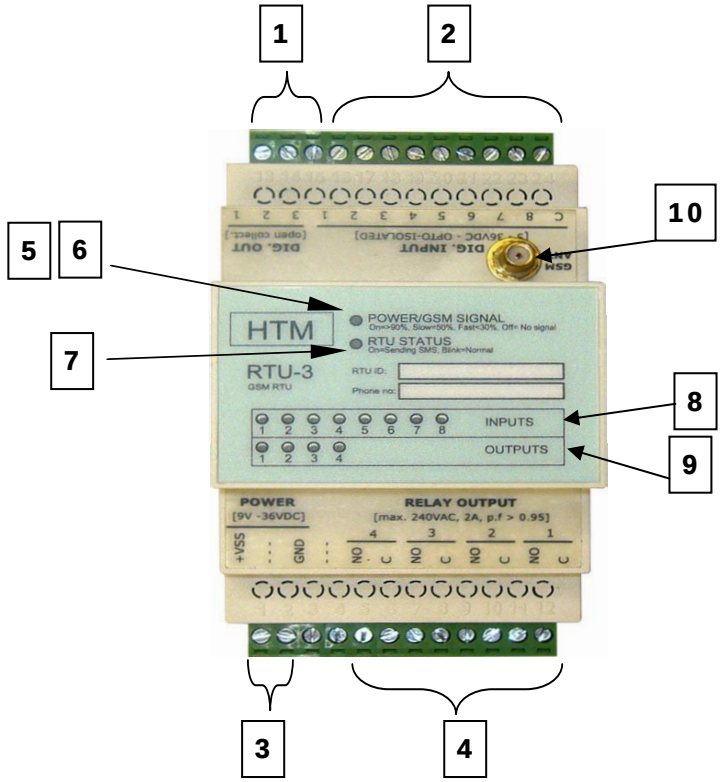
VERY IMPORTANT NOTICE [MUST READ THIS]

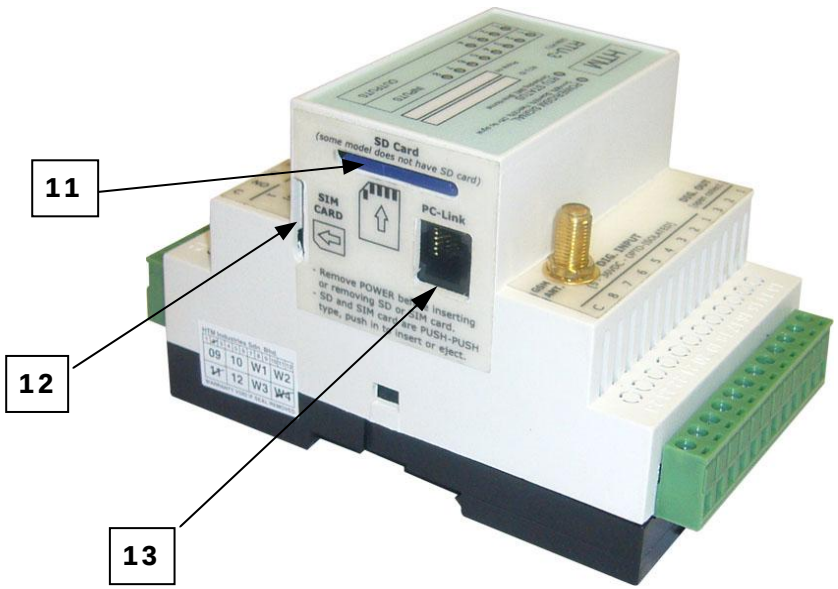
Whilst Hydro - Trent (M) Sdn. Bhd. has taken all the effort in ensuring the RTU perform/respond according to the command description describe in this manual, please ensure that you compose the command exactly as indicated in this manual. Our R.T.U does not have “human intelligent” thus we expect you to use yours, sending invalid or un-executable command, parameter or value might damage the firmware, the RTU OR the connected device.

HYDRO-TRENT CAN NOT BE HELD LIABLE FOR HUMAN ERROR.

Names and Function’s of Part’s



No	Function
1	Front Panel Power, GSM, RTU Light (open-collector)
2	8 nos of Optical-Isolated Digital Input
3	12VDC @ 2A Power Supply Terminal
4	Relay Output Terminal (Normally Open Contact)
5	Power Light (Red)
6	GSM Signal Strength Light (Green)
7	RTU Status Light (Blue)
8	8 nos Input Status Light
9	4 nos Relay Output Light
10	GSM Antenna (SMA Male)



No	Function
11	128MB SD Card
12	GSM Sim Card
13	PC-Link Connection – RJ11

General Specification

GSM

1.	Operating Frequency	900MHz / 1800MHz
2.	Operating Class	900MHz – Class 3 1800MHz – Class 1
3.	Transmitting Power	900MHz – 2W (peak) 1800MHz – 1W (peak)
4.	Receiver Sensitivity	900MHz – (-107dBm) 1800MHz – (-106dBm)
5.	Power Consumption	17mA *(70% signal strength and standby)* 250mA *(worst signal strength and sending SMS)* 150mA *(70% signal strength and sending SMS)*

Digital Input

1.	Number of Input	8 nos
2.	Type	Optical Isolated (bi-directional)
3.	Input Voltage Type	Direct Current (DC) only
4.	Input Voltage Range	9VDC to 36VDC
5.	Isolation Voltage	2500VAC for 10 sec

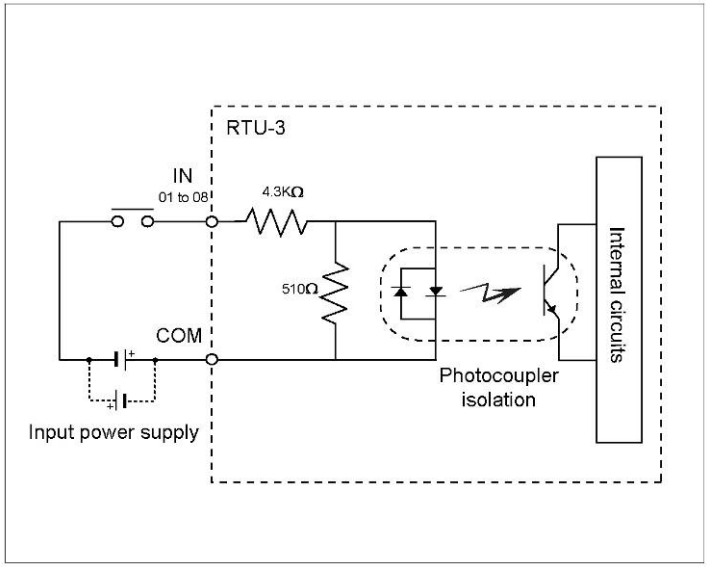
Digital Output

1.	Number of Input	4 nos
2.	Type	Relay
3.	Contact Rating	240VAC @ 3A, Resistive Load

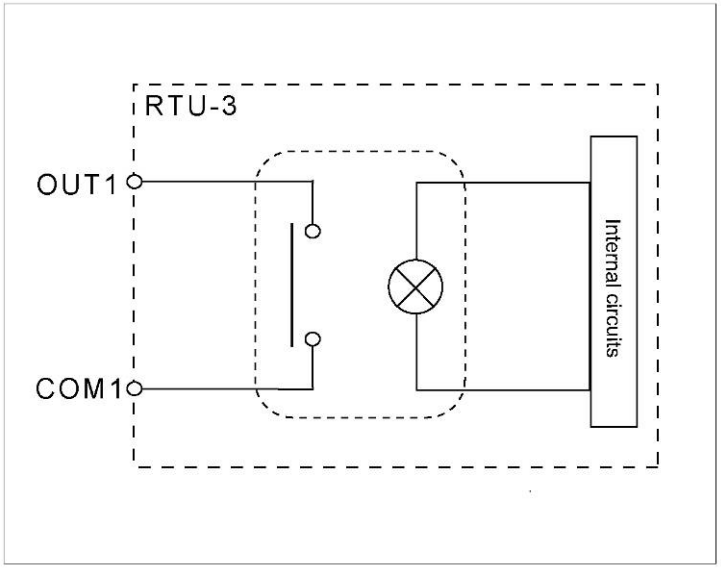
System

1.	Supply Voltage	12VDC
2.	Supply Current	Ideal – 150 mA Sending SMS – 2A (peak for 100mS)
3.	Operating Temperature	10^{o}C to 60^{o}C
4.	Operating Humidity	20% to 95% (non-condense)

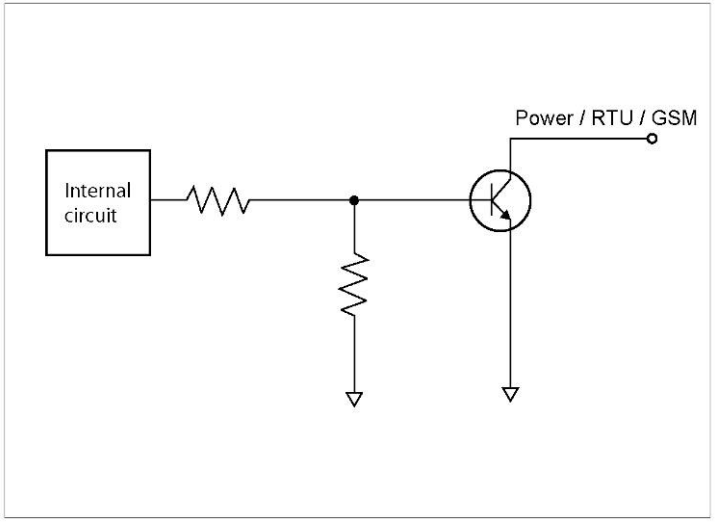
Input Circuits



Output Circuits



Transistor Output Circuit



The above transistor output circuit is show for reference only, no other load should be connected to it expect the from panel 22mm LED type 12VDC light.

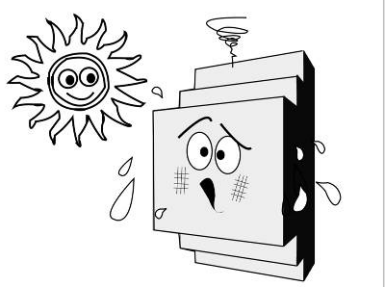
Please note that this output is non-isolated type, thus do not extend the wiring beyond the metal enclosure (control panel), doing so, might create (pickup) more EMC interference and might cause the RTU to fail.

Failure to observe this might damage the open collector port and the RTU.

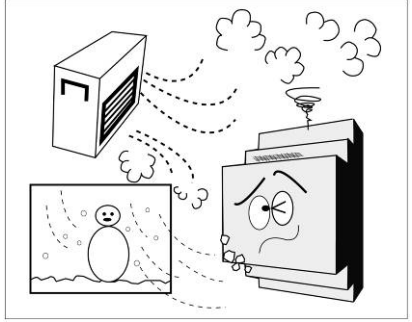
Installation Precaution

Do not install the RTU in the following place.

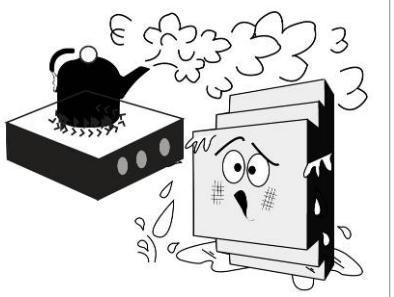
Locations subject to direct sun- light



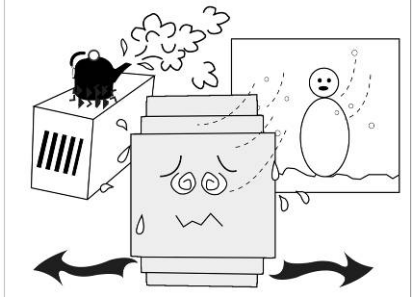
Locations subject to ambient temperature out of 0 - 50°C range



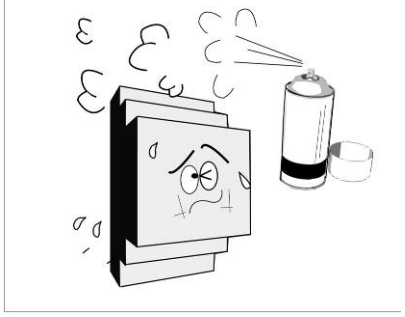
Locations subject to ambient humidity out of 35 to 85% RH range



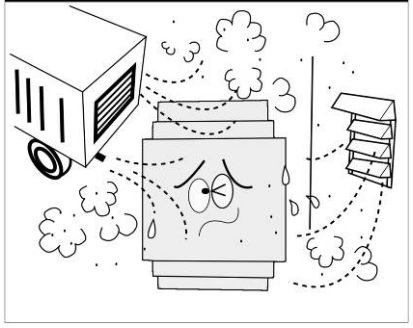
Locations subject to condensation caused by sudden temperature change



Locations subject to corrosive and flammable gasses

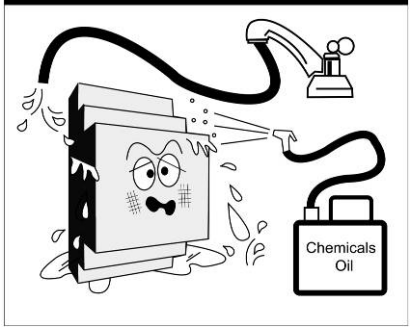


Locations subject to large ammount of dirt and dust, salt, iron and oil smoke.

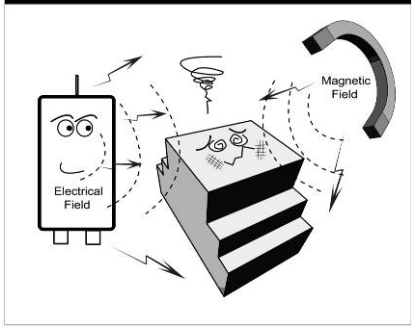


Installation Precaution (2)

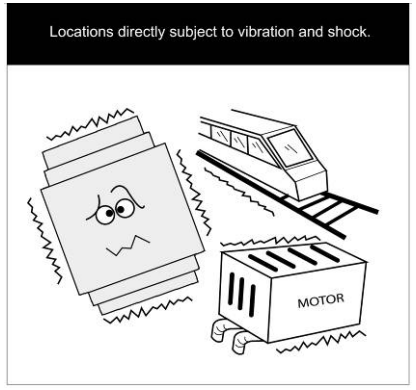
Locations that may be splashed with water, oil, or chemical mist



Locations where strong magnetic and electrical fields are generated.



Locations directly subject to vibration and shock.

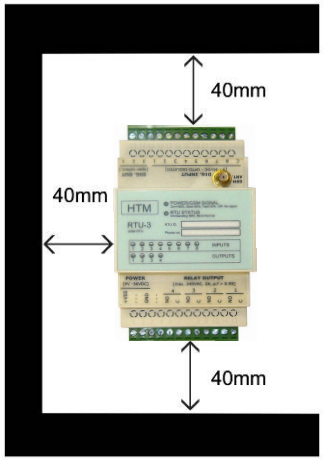


Failure to observe the above precaution WILL void the warranty.

Please note that the RTU performance is not stable under the above indication environments.

Clearance Space

Be sure to leave at least 40mm of space between the side's top and bottom of the RTU and surrounding areas.



If the temperature inside the panel (temperature below 40mm the RTU unit) exceeds the operating ambient temperature, lower the temperature by installing some form of cooling method, for example, by force air cooling OR provide more space between mounted unit and the surrounding area to improve the ventilation.

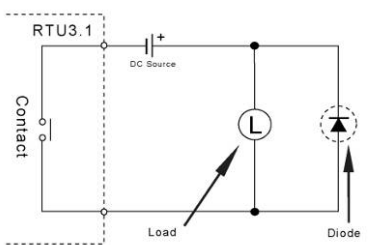
Important Note:

Our RTU is an RF transmitter device, as such installation near to any device which is sensitive to RF power, may cause that device some issue, in this case, please make sure the antenna and the unit is placed as far as possible from this type of device.

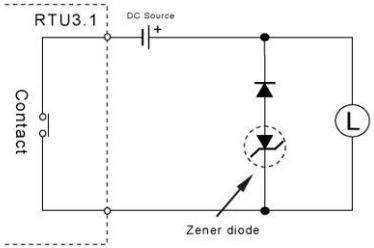
Output Contact Protection

When using clutches, motors, solenoids or other inductive loads, rush current flows when the load power is turned ON or counter electromotive force may occur when the lower power is cut. Rush current or counter electromotive force is a major cause of of shorter contact life. To suppress these phenomena, provide a contact protection circuits.

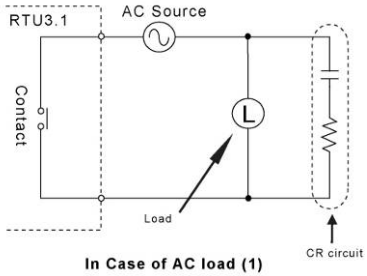
Example of contact protection circuits



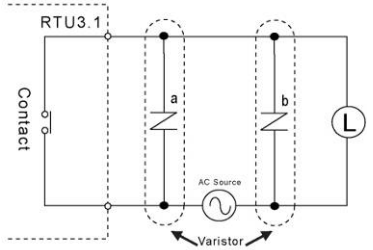
In Case of DC load (1)



In Case of DC load (2)



In Case of AC load (1)



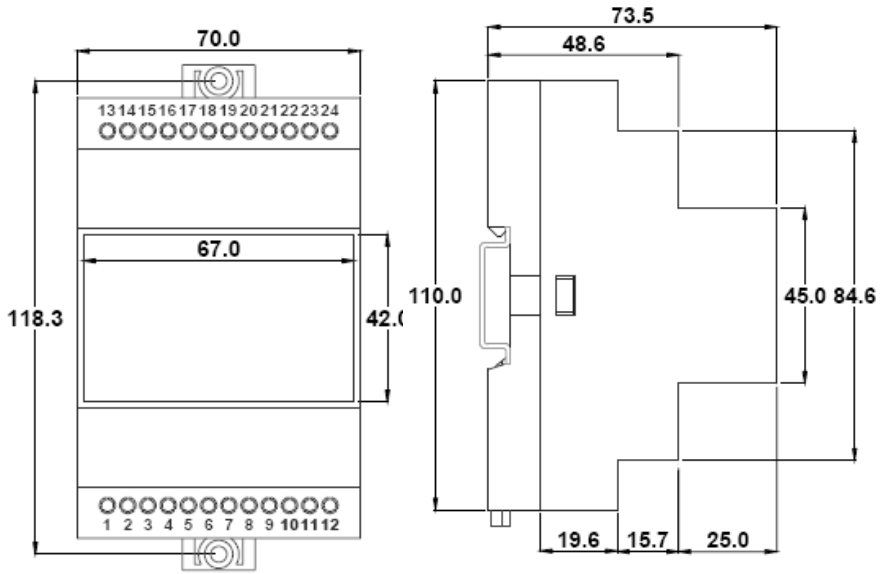
In Case of AC load (2)

When the power voltage is between 24 to 48 V, install the circuit protection at position b, and when the power voltage is between 100 to 240 V, install the circuit protection at position a.

Important Note:

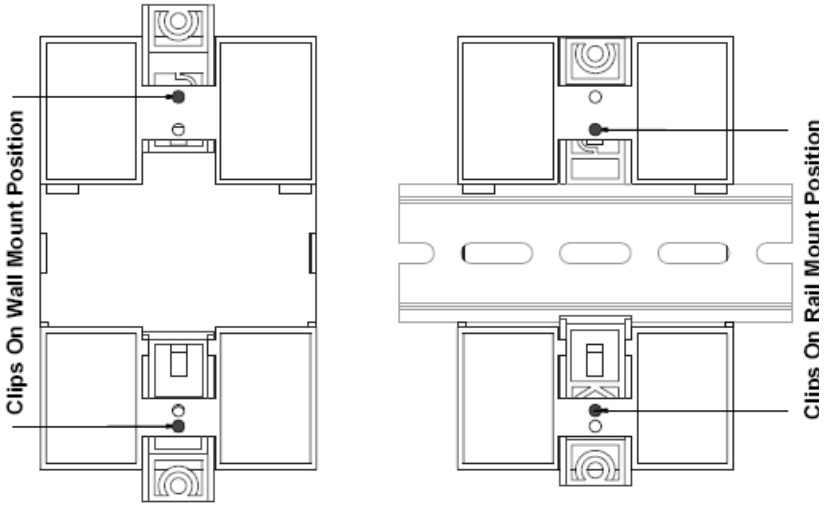
1. Use a load coil rated at the contact capacity or lower.
2. Use a diode whose peak inverse voltage is 10x or more then the circuit voltage and whose forward current is the current of the load or higher.
3. Install diode, varistor and CR circuit directly at the relay coil terminal (as close as possible)

External Dimension



Unit in MM

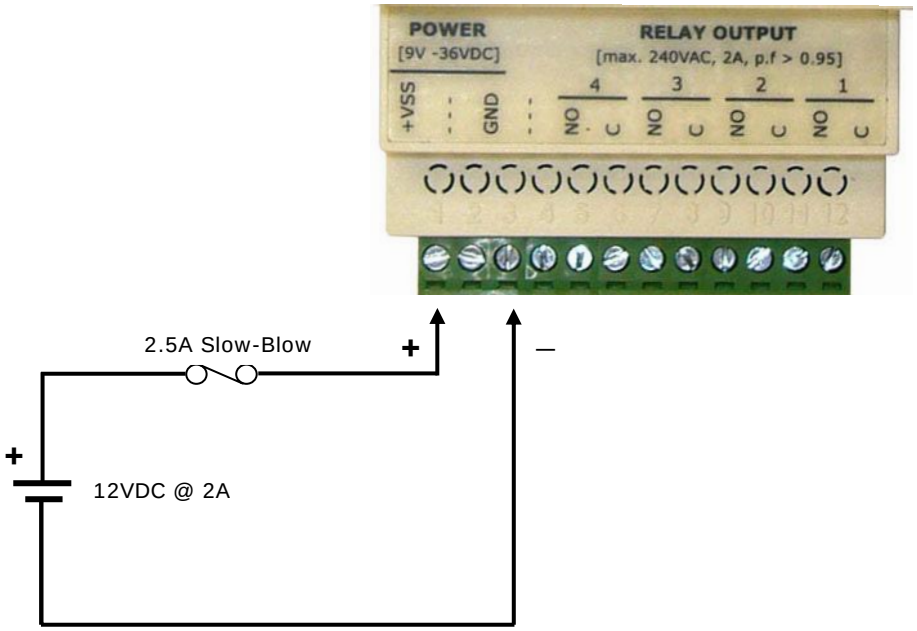
RTU-3 is design for DIN Rail or Panel Mounting; adjust the bottom clip as shown below,



Bottom view

Applying Power to RTU

1. Before applying power to the RTU, please ensure the Power is OFF
2. Avoid a location subject to the direct sunlight as installation site
3. Select a location having an ambient temperature of 0 to 50°C and ambient humidity of 35 to 85% RH. Also, avoid site subject to sudden temperature change.
4. Ensure the power source is DC with minimum 2A supplying capability at 12VDC
5. Ensure that you install 2.5A, slow-blow fuse on the supply line to the RTU.
6. Connect the DC power as shown in he figure below:



Power on Sequence

When applying power to the RTU, the following sequence of event will happened and the RTU-3 will indicate the stages by increasing the INPUT LED.

1. Immediately after applying the power to the RTU-3, the Power LED will Flash Fast. This indicates the internal processor is powered up.

2. After 2 sec, the INPUT 1 Led will ON; indicating SD-CARD is OK.

3. Then the RTU-3 will wait for PC-LINK connection for 25 sec, this will be indicated by the top to bottom Power, GSM, Status LED sequence.

4. If no PC-LINK connection is establish then INPUT 3 led will ON indicating the 3.8VDC is switched ON. At this stage the Power LED will flash fast. This will be for 5 sec.

5. The INPUT 4 LED will on indicated that the system is switch ON the GSM engine. And the system will wait 20 sec to the GSM engine to boot-up

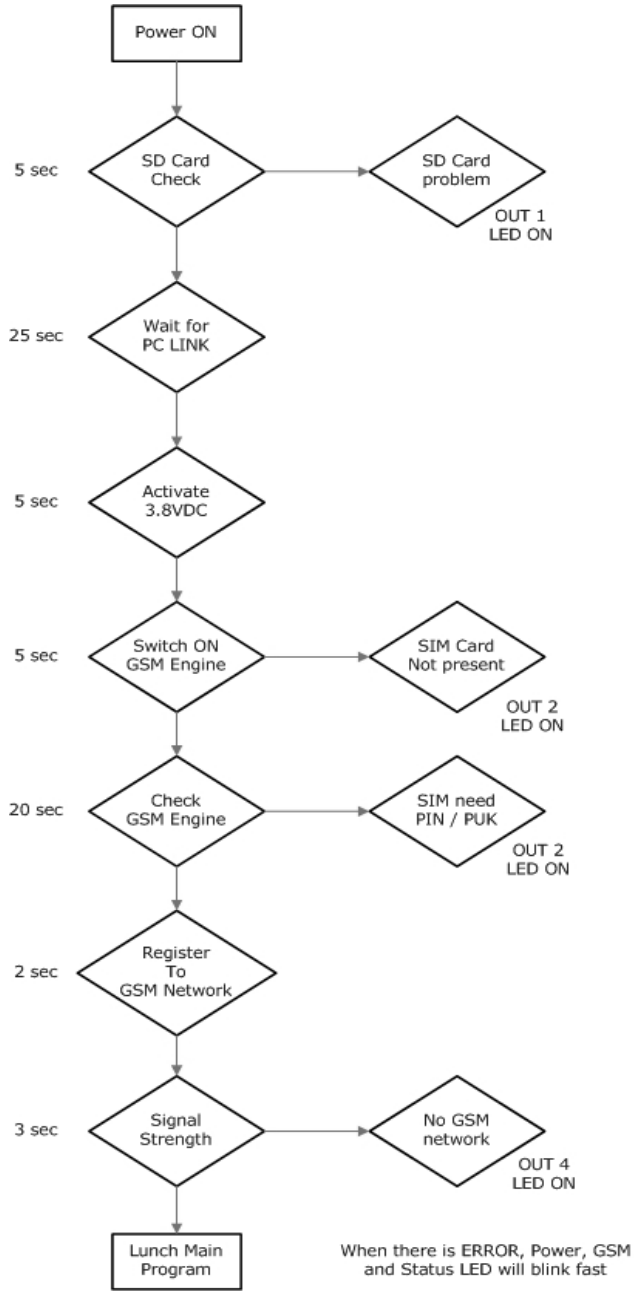
6. The INPUT 5 led will ON, when there is valid communication between CPU and GSM engine.

7. The INPUT 6 led will ON when the GSM engine configuration is completed

8. The INPUT 7 LED will ON when the GSM engine register to valid telco.

9. The INPUT 8 LED will ON when the GSM Network signal is more then 1 bar.

See the flow chart below:-



Basic Setup and Test

Once the RTU is successfully powered up, the following should be the LED status.

Power LED - Constantly ON

GSM LED - Blink according to GSM Signal Strength

RTU Status - Blink when in standby and ON when sending SMS

You have successfully power up the RTU, and the RTU now ready to send SMS (if there is valid recipient), upon change's of input or received valid SMS command.

You can verify the RTU3.1 by sending **#IST#** SMS to the RTU SIM card number, you should within few sec, get the respond of the DIGITAL INPUT STATUS.

Please refer to OVER THE AIR PROGRAMMING MANUAL or PC-LINK MANUAL for detail on how to configure the RTU.

Troubleshooting Guide

The RTU can report 4 type of problem, during this reporting the Power, GSM and Status LED will flash fast.

No	Error No.	Indication	Description
1	Error – 1	OUT 1 LED	SD Card Problem, could be, 1. SD Card not inserted in properly 2. SD Card not formatted in FAT16 3. Some files missing from SD card, default files 4. SD Card MBR is missing (need format and all the files)
2	Error – 2	OUT 2 LED	SIM Card Problem 1, could be, 1. SIM Card Not Inserted 2. SIM card damaged
3	Error – 3	OUT 3 LED	SIM Card Problem 2, could be, 3. SIM card asking for PIN number 4. SIM card asking for PUK code. 5. SIM Card is not registered to any valid network.
4	Error – 4	OUT 4 LED	Network Problem, could be, 1. Network signal too low OR not found.

RTU3 is design in such that when Error-1,Error-2 and Error-3 happened the power need to cycled after the error is rectified. For Error – 4 the RTU can self re-boot the system.

Solution for each error,

1. **ERROR-1**, please ensure the SD-Card is supplied by Hydro-Trent, if you have card SD Card reader please view the format and files, you can get the copy of all the file by sending email to Hydro - Trent.
2. **ERROR–2** and **ERROR–3**, please insert the SIM card in normal mobile phone and disable the PIN request. Also try sending SMS to the same number; you should get the SMS in few sec.
3. **ERROR-4**, ensure the antenna is connected. And that the place has GSM coverage. Verify this will standard mobile phone.

Warranty

Warranty Period

The warranty period for this product shall be one year from the date of purchase at the specified location.

Scope of Warranty

2.1 If a malfunction due to the liability on the part of Hydro - Trent (M) Sdn. Bhd. arises during the above warranty period, this product shall be repaired or exchanged with a new one FREE-OF-CHARGE. However, instances that fall under the following categories shall be excluded from the scope of warranty:

2.1.1 Malfunction due to inappropriate conditions, environment, handling and method of use other then described in the operation manual, user's manual, instruction manual and other separately exchanged specifications, etc

2.1.2 Malfunction due to a cause other then A Hydro-Trent product such as a customer's device or software design.

2.1.3. Malfunction due to remodeling, modification and repair other then done by Hydro-Trent.

2.1.4 Malfunction due to unforeseen causes in scientific and technical standards before shipment.

2.1.5 Malfunction due to fire, earthquake water damage and other disasters and external factor such as abnormal power voltage that are not the liability of Hydro-Trent.

2.1.6 Malfunction recognized as being preventable if the precaution and limitation listed in the operation, user's or instruction manual is acknowledged.

2.2 Above shall be sent as the restriction for the scope of the warranty and secondary damages (damage to the device, mechanical loss, profited loss due to defects, etc.) on the part of the customer due to malfunction of a HYDRO-TRENT product and any other damages whatsoever shall be outside the scope of this warranty.

Limitation of Use in Life Support, Space & Certain other Applications

Hydro - Trent products are not designed, intended or authorized for use in life support, life sustaining, nuclear, or other applications, including, but not limited to, transportation operating systems, in which the failure of such goods could reasonably be expected to result in personal injury, loss of life or severe property or environmental damage. Buyer acknowledges that use of Hydro - Trent products in such product applications is understood to be fully at the risk of Buyer and that Buyer is responsible for verification and validation of the suitability of Hydro-Trent products in such application.

Buyer agrees that Hydro-Trent is not liable, in whole or in part, for any claim or damage arising from use in such applications. Buyer agrees to indemnify, defend and hold Hydro - Trent harmless from and against any and all claims, damages losses, costs, expenses and liabilities arising out of or in connection with such use.