

QUICK START GUIDE

SABRE™ RANGER 5000

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1. INTRODUCTION

The SABRE™ RANGER 5000 is a broadband global area network (BGAN) Class 2 machine-to-machine (M2M) satellite terminal. It has a ruggedised mechanical enclosure designed for long-term outdoor installation in all types of weather conditions.

The terminal operates on either the Inmarsat standard BGAN or the M2M service. It offers global coverage and is fit for SCADA applications to gather real-time data from remote unmanned locations. The firmware is specially designed to provide reliable and stable BGAN connectivity continuously for long period of time without user intervention.

It is fully compatible with the Remote Terminal Manager (RTM) or Inmarsat M2M platform, which allows the user to graphically view the location of the terminal and monitor the terminal status.

The terminal can also be configured remotely using SMS commands. The PDP context of the SABRE™ RANGER 5000 can be activated or deactivated via SMS. The rebooting process can also be initiated via SMS. In addition, the terminal logs can be retrieved remotely for debugging purpose.

You can use either the rugged mounting bracket (optional accessory) of the Sabre™ Ranger 5000 (See figure 1 below.) or a VESA MIS-D bracket to mount the SABRE™ RANGER 5000 terminal.



Figure 1

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2. QUICK REFERENCE

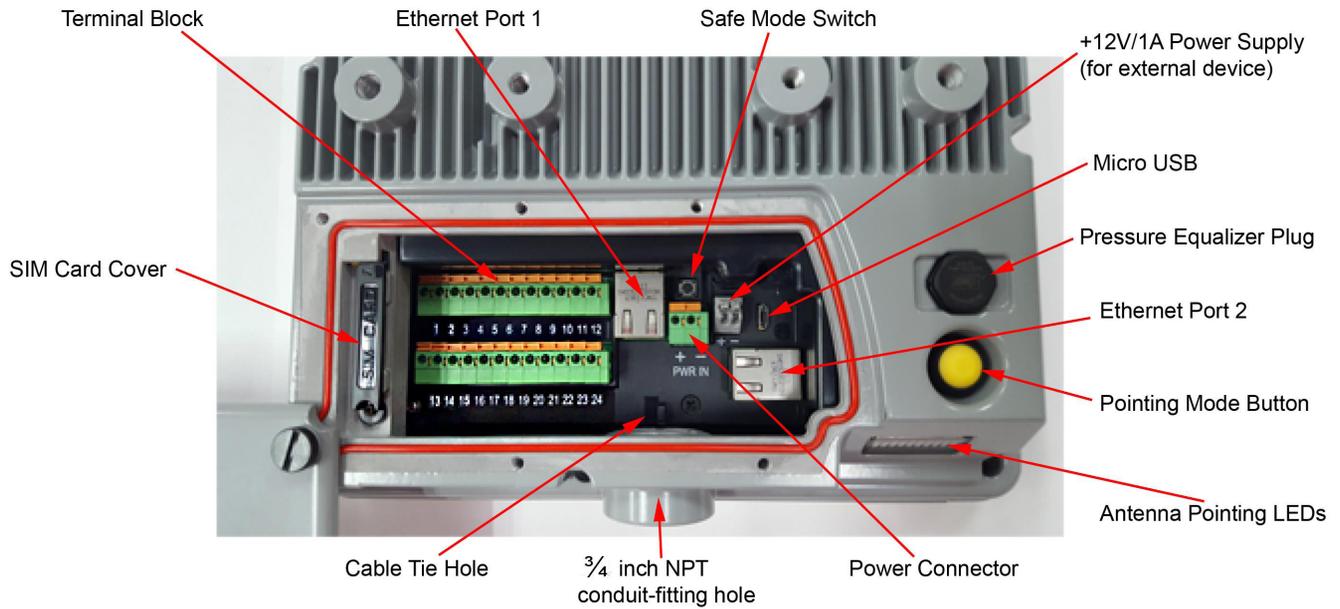


Figure 2

The SABRE™ RANGER 5000 has a NPT $\frac{3}{4}$ inch hole for installing a conduit-fitting or a cable gland at the bottom part of the casing to route all the wires.

NOTE: The mounting bracket is an optional accessory.

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3. INSTALL THE SIM CARD

1. Release the five black screws from the protective cover and loosen the “Rotation Point” screw. See figure 3.



Figure 3

2. Rotate the protective cover in a clockwise direction.

3. Open the SIM card cover and rotate in a clockwise direction. See figure 4.



Figure 4

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4. Slot the SIM card into the SIM card holder in the orientation as shown on figure 5.



Figure 5

5. Insert the SIM card until it 'clicks' into place.
6. Rotate and move the SIM card cover back in place.

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4. CONNECT THE CABLES AND WIRES

The SABRE™ RANGER 5000 has a NPT 3/4 inch hole for installing a conduit-fitting or a cable gland at the bottom part of the casing connect all the wires. See appendix B for information about the conduit and its accessories.



Figure 6



1	2	3	4	5	6	7	8	9	10	11	12
GND	OP	OP	GND	IP	IP	GND	RS232/TX	RS232/CTS	GND	RS232/RX	RS232/RTS
	3	4		3	4		RS485/Z(B)	RS485/B		RS485/A	RS485/Y(A)
13	14	15	16	17	18	19	20	21	22	23	24
TDR	OP	OP	GND	IP	IP	GND	Analog	Local	GND	RS232/	RS232/
	1	2		1	2		Input	Wakeup		RX	TX

Figure 7
CON801 and CON802 Terminal Block Assignment

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Ethernet Connection

- Use a CAT5 cable with the RJ45 plug for the Ethernet cable. Thread the Ethernet cable through the conduit-fitting/Cable gland hole carefully.
- Insert the RJ45 Plug into the Ethernet Port 1 (as indicated below in red rectangle).

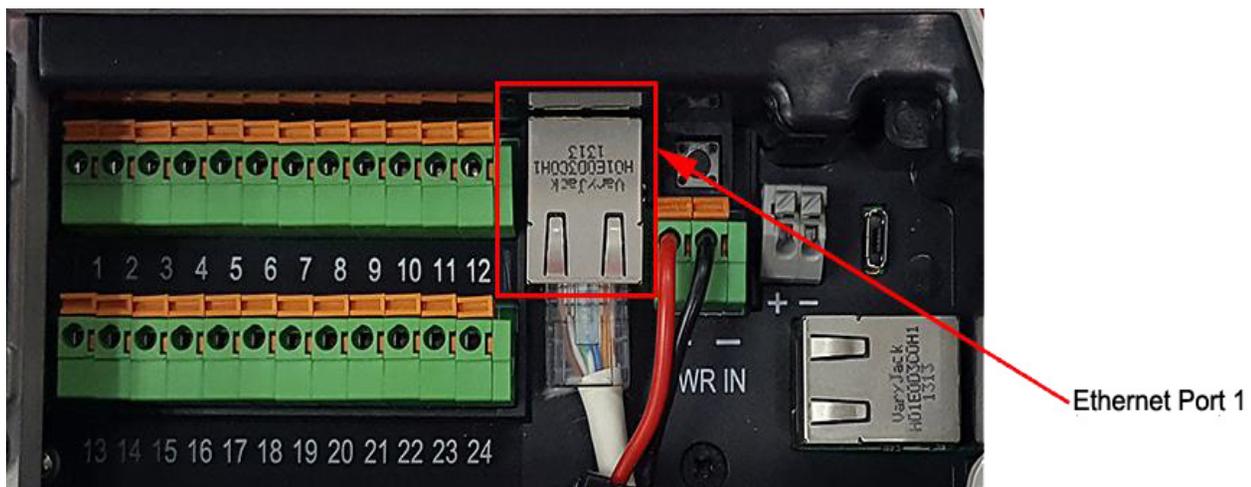


Figure 8

Power Supply input

- Connect a 12VDC or a 24VDC power supply which can source at least 30W - to the Power connector, CON501. This Power supply input supports voltages from 10.8 to 32Volts.
- Use two AWG16 wires for power connection if the cable length is not more than 10m. Otherwise, use AWG14 wires for a cable that can be lengthened up to 100m.
- Insert the red wire into the terminal block with (+) marking, the black wire into the terminal block with (-) marking. Press and hold the orange tab on the terminal block while inserting the wire into the hole.

NOTE: The sample wires below are used for reference. You may use different colour wires that met the electrical specifications.

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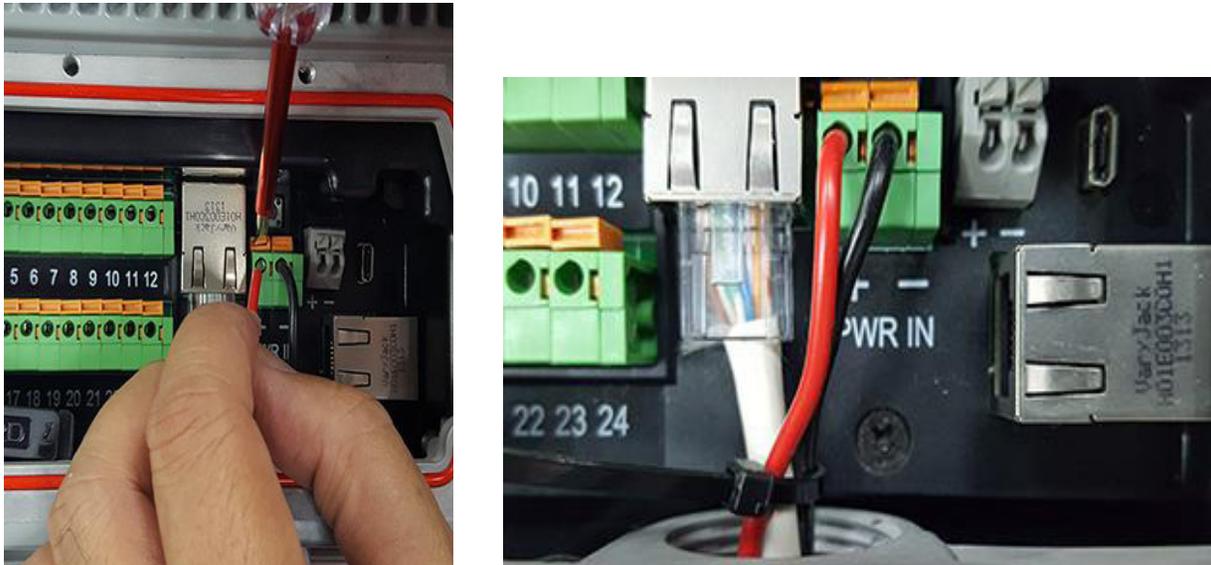


Figure 9

RS232 port – debug port

This port is intended for capturing the debug log. The cable length is limited to 10 metres. Use Belden cable no. 9533 or equivalent.

- Connect the wires as shown below.

NOTE: The sample wires below are used for reference. You may use different colour wires that met the electrical specifications.

Black wire - terminal block 22 (GND)
 Red wire - terminal block 24 (RS232-TX)
 White wire - terminal block 23 (RS232-RX).



Figure 10

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RS232/RS485 – user port

This is a user configurable port. The user can configure this port to be any of the following:

- RS232
- RS485 – full duplex
- RS485 – half duplex

RS232

Use Belden cable no. 9533 or equivalent for 3-wire RS232 (RX, TX, GND) or Belden cable no. 9535 or equivalent for 5-wire RS232 (RX, TX, RTS, CTS, GND). Cable length is limited to 10 metres.

- Connect the wires as shown below.

NOTE: The sample wires below are used for reference. You may use different colour wires that met the electrical specifications.

Black wire - terminal block 10 (GND)
 Red wire - terminal block 8 (RS232-TX)
 White wire - terminal block 11 (RS232-RX)

NOTE: If you use the Belden cable no. 9535 for 5-wire RS232 (RX, TX, RTS, CTS, GND), refer to figure 7 for the wire connections to the terminal block.

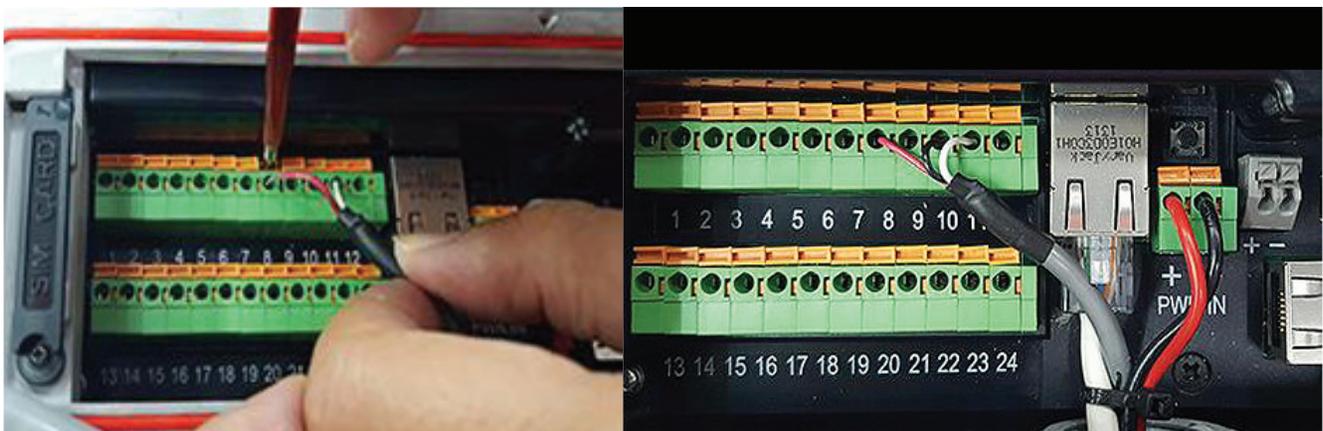


Figure 11

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Digital Input and Output; Terminal Data Ready (TDR) Output; Local Wake up Input

Use Belden cable no. 9535 or similar non-paired shielded cable for these connections. The number of wires in the cable can vary depending on the user requirements.

Digital output

There are 4 digital outputs configured as Low side drivers. These outputs are connected to pin 14(OP1) and pin 15(OP2) of CON801 and pin 2(OP3) and pin 3(OP4) of CON802. A low side driver will pull the signal to ground when active. An output can sink up to 400mA of current.

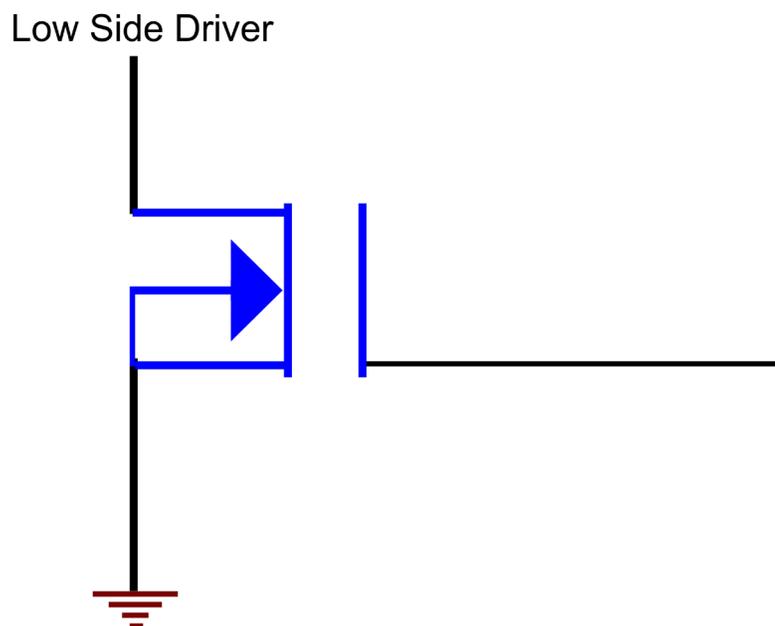


Figure 12

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Digital input

There are 4 digital inputs. They are connected to pin 17 (IP1) and pin 18 (IP2) of CON801 and pin 5 (IP3) and pin 6 (IP4) of CON802. These inputs accept a signal of 0V to +32VDC. These inputs have a weak pull-down of approximately 300K ohms. A pull-up to +5VDC may be used to drive these inputs. The input buffer inverts the input logic level. The input voltages higher than 2.6V will be declared as “High” and the input voltages lower than 1.0V will be declared as “Low”. The digital input ground is connected to pin 4 (GND), pin 7 (GND) or pin 16 (GND).

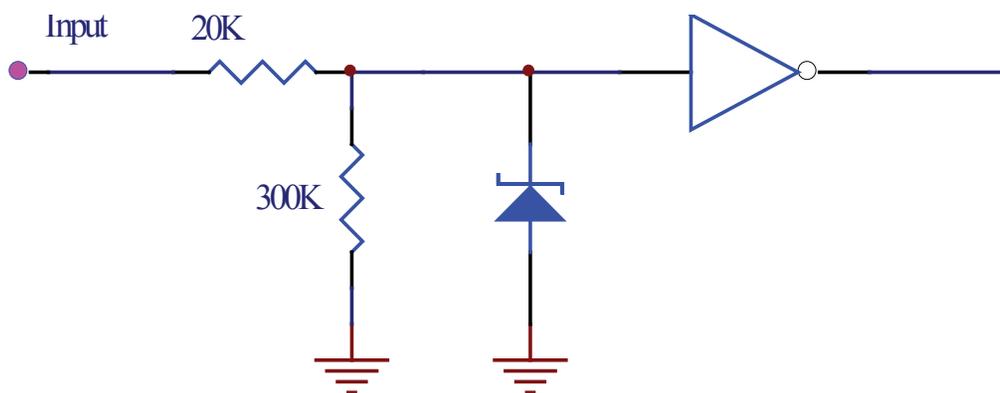


Figure 13

Local Wake up input

This is a digital input. The local wakeup input is connected to pin 21 (Wake-up) of CON801. The signal ground is connected to pin 22 (GND) of CON801. The electrical specifications of this input are the same as the specifications of the Digital input.

Terminal Data Ready (TDR) output

This is a digital output. The TDR output is connected to pin 13 (TDR) of CON801. The signal ground is connected to pin 1 (GND) of CON802. The electrical specifications of this port are the same as the specifications of the Digital output.

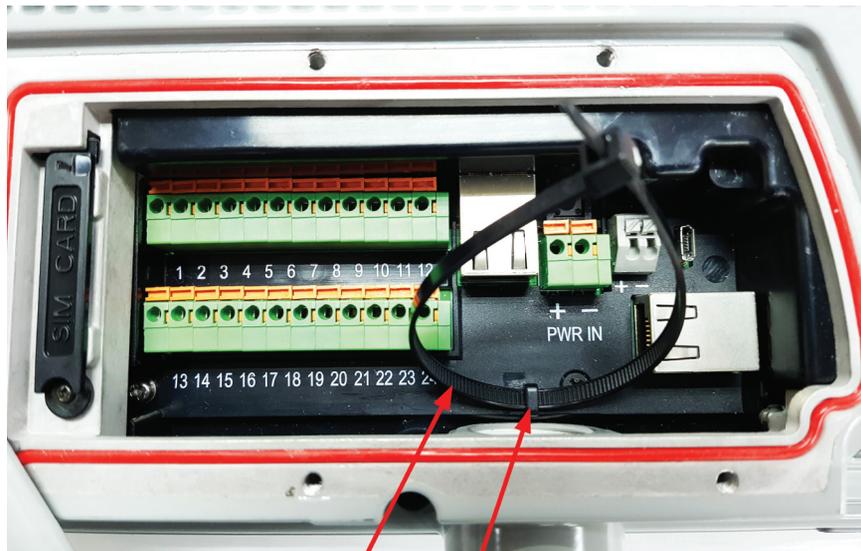
Analogue voltage input

Use Belden cable no. 9841 or equivalent. The analogue input is connected to pin 20 (Analog-input) of CON801. This input will accept a signal of 0V to 32VDC. The analogue signal ground is connected to pin 19 (GND) of CON801.

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Secure the cables and wires with a cable tie

1. Gather all the connected cables and wires.
2. Loop the cable tie into the cable tie hole in the terminal before fastening to secure the wires in place so that they will not slip off its connectors. See figure 14 – * wires are not displayed to show the cable tie hole.



Cable Tie
Cable Tie Hole

Figure 14

3. Secure the wires together with a cable tie.



Cable Tie

Figure 15

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- Secure the conduit tightly to the adaptor to prevent water from getting into the conduit and the terminal.

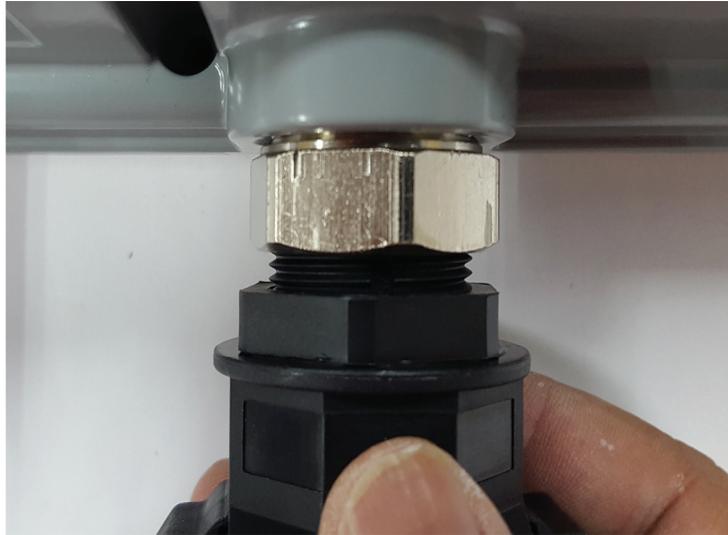


Figure 16

Secure the protective cover

- Rotate the protective cover anti-clockwise to the closed position.
- Tighten the six black screws including the “rotation point” screw with a flat blade screw driver.

NOTE: For ingress protection, it is important to ensure the screws are tightened to a torque value of 0.57 Nm (5.0 in-lbs), approximately 2 ½ to 3 turns for each screw.



Figure 17

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5. OPTIONAL ACCESSORIES

Mounting Bracket

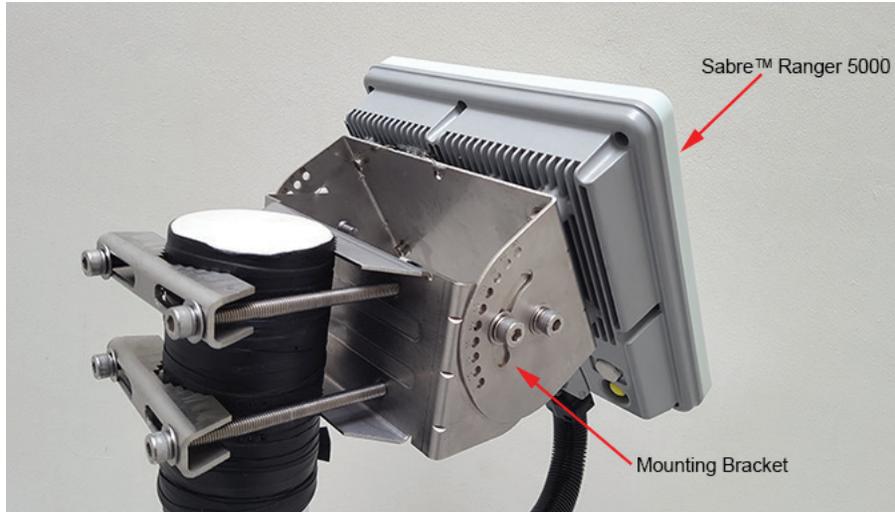


Figure 18

Parts List

ITEM	DESCRIPTION	QTY
01	Socket Head Cap Screws, M8 x 120mm, Full thread	4
02	Flat Washers, M8	12
03	Saddle Clamps	2
04	Bracket Wall (185 x 90 x 100)mm	1
05	Split Washers, M8	4
06	Socket Head Cap Screws, M8 x 14mm	8
07	Bracket Body (189 x 110 x 90)mm	1
08	Wing Screw, M5 x 12mm	1
09	Spare kit (6 x2, 8 x1, 2 x2, 5 x2)	1

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6. FIX OPTIONAL MOUNTING BRACKET TO SABRE™ RANGER 5000

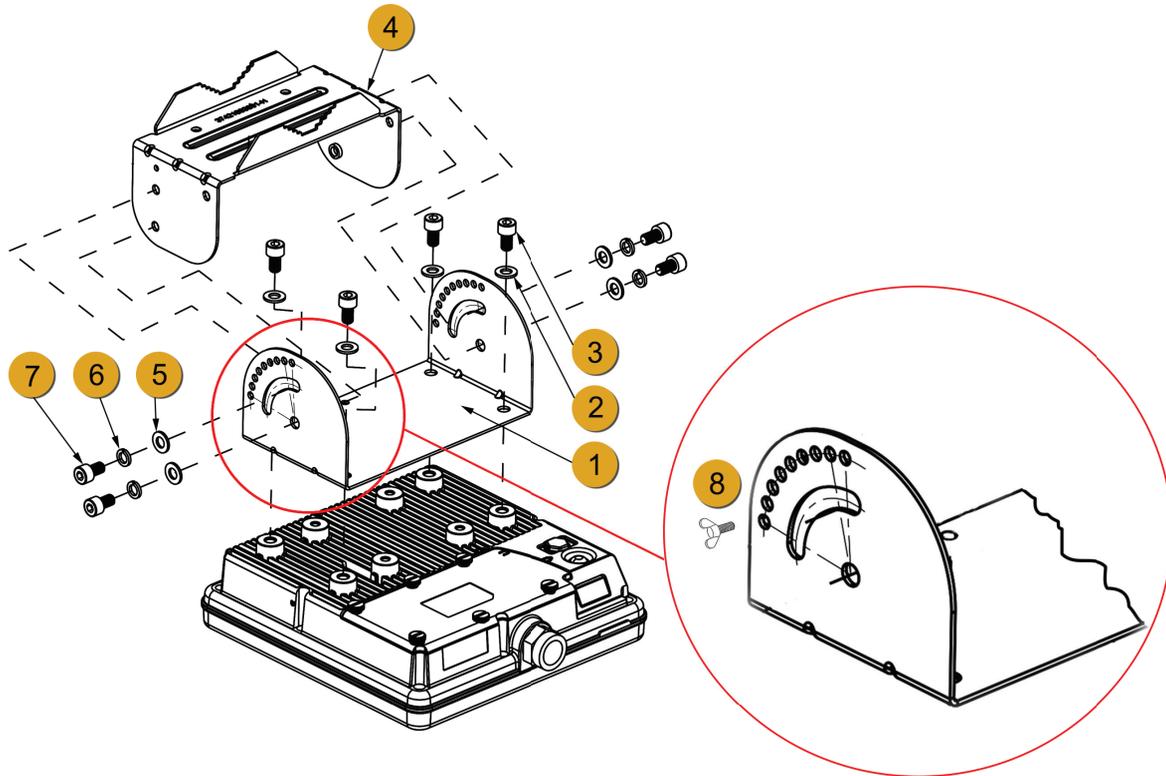


Figure 19

1. See figure 19 above. Place Sabre™ Ranger 5000 terminal with its front face on a flat surface.

2. Attach ① the bracket body on the rear of Sabre™ Ranger 5000 terminal.

NOTE: There are five holes at the base of the bracket body. The wire loop-hole as shown on the enlarged view should be placed along the upper edge of the terminal. See figure 19 and its enlarged view.

3. Align the four holes, and fasten ① to Sabre™ Ranger 5000 terminal using the washers (4x) ② and the socket head cap screws (M8 x 14mm - 4x) ③ with a hex L-key.

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4. Align the bracket wall **4** to the bracket body **1**. See figure 19. Notice the upper holes on the bracket wall align to the slots on the bracket wall and the lower holes align to the holes below the slots of the bracket body.

5. Use the washers (4x) **5**, the split washers (4x) **6** and the socket head screws (M8 x 14mm - 4x) **7** to assemble **4** to **1**.

NOTE: Do not fully tighten the screws to assemble **4** to **1** with a hex L-key, fasten the screws finger tight only as you need to adjust its actual position according to the satellite location later.



Figure 20

7. MOUNT THE TERMINAL ON A POLE

Before mounting the terminal, ensure that the azimuth is correct by using a compass. For example: North has an azimuth of 0°, East 90°, South 180° and West 270°.

1. Locate a vertical pole or column to mount the SABRE™ RANGER 5000 terminal.

NOTE: The mounting bracket is designed to be mounted on a 1 to 3 inch diameter pole.

2. Use the supplied washers, socket head cap screws (M8 x 120mm), and the saddle clamps to mount the pre-assembled terminal on the pole.

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3. Secure the saddle clamps on the pole by first turning in the screws and washers at the position ① and ②, and then turn in the screws and washers at the position ③ and ④ for easy installation. See figure 21.



Figure 21

4. Tighten the screws to secure the SABRE™ RANGER 5000 terminal to the pole.
5. Secure the conduit to the pole by using several cable ties.



Figure 22

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8. TERMINAL GROUNDING

Protective Earth Grounding

The chassis of the SABRE™ RANGER 5000 terminal must be firmly connected to the earth ground by using a short and low impedance wire.



Figure 23

1. Unscrew one of the four mounting screws at the back of the terminal.
2. Insert the earth grounding wire lug in between the mounting bracket and the washer, and then tighten the screw.

NOTE: Please seek professional local advice for earth grounding.

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9. POINT THE ANTENNA

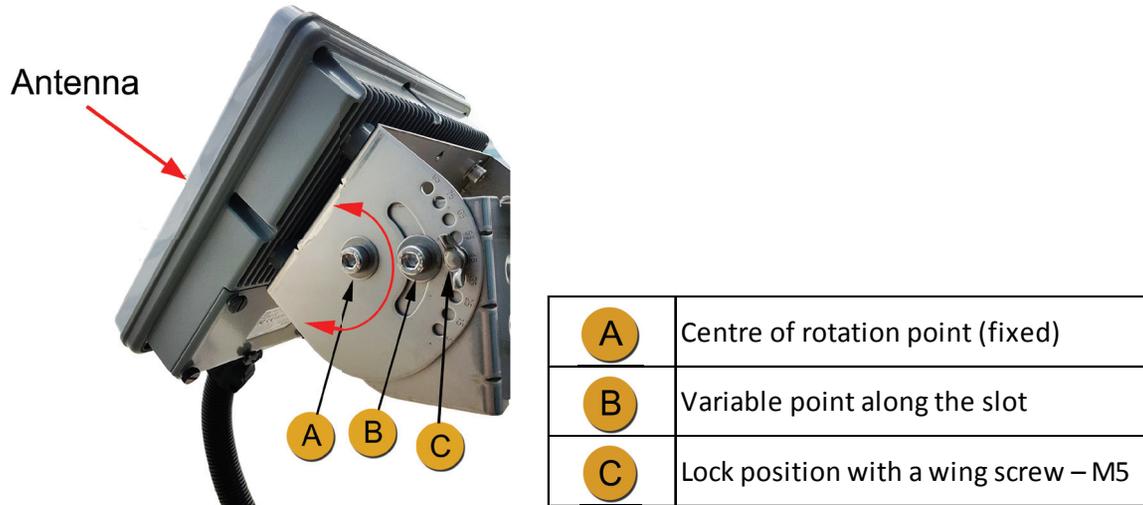


Figure 24

1. Place the terminal outdoor with no obstruction from trees, buildings, hills or any external objects and power up the terminal.
2. Check the elevation and azimuth on the terminal firmware. The terminal firmware displays the pre-calculated elevation and azimuth once the GPS location is acquired.

NOTE: The information can be found in the Web Console on the Home page. Refer to the section on Navigate to the Web Console for more details. Azimuth and Elevation are angles used to define the apparent position of an object in the sky, relative to a specific observation point. In this case, we are the observers on earth.

3. Adjust the required elevation angle by tilting the bracket body attached to the terminal along the slot. Notice that you can adjust the angle of elevation in steps of 5°. The angle markings at both sides of the bracket body have an offset of 5°. See figure 25 below. The terminal is at a vertical position at the angle of 0° and at a horizontal position at the angle of 90°.

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Figure 25

4. Insert the M5 wing screw to lock the required position and tighten it to secure the angle of elevation. See figure 26.



Figure 26

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10. NAVIGATE TO THE WEB CONSOLE

1. The SABRE™ RANGER 5000 terminal should be installed at an outdoor location with the correct **Azimuth**. The terminal needs to be pointed towards the satellite to ensure its connection to the satellite network. Turn ON the power supply to the terminal and connect the Ethernet cable to your laptop/PC.

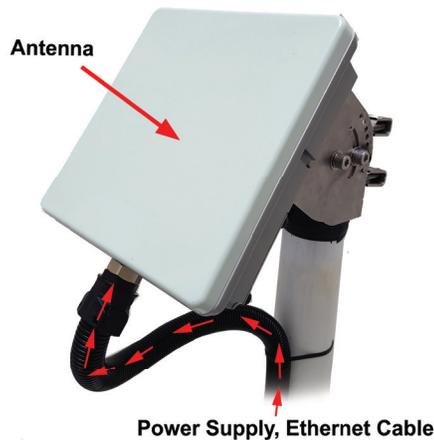


Figure 27

2. When the terminal is powered up, all the Antenna Pointing LEDs will flash briefly and goes off. This indicates the terminal is ON.

3. After a short while, the terminal will go into Auto network registration mode. This is indicated by synchronous flashing of all the LEDs. Press and hold Pointing Mode button for more than 3 seconds to disable the Auto network registration mode and go to the manual network registration mode



Figure 28

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Manual Network Registration

1. The Antenna Pointing LEDs indicate the received Global Beam signal strength. Slowly adjust the **Elevation** of the terminal until the maximum number of LEDs illuminate. See the table below for the number of LEDs lighting up vs the Global beam signal strength.

2. Another way to do the antenna pointing is to use the audio assisted pointing mode. In this mode, a buzzer will emit an audio tone with its pitch changing according to the strength of the global beam signal. The buzzer is disabled by default. To enable the buzzer, navigate to **Settings > Terminal Settings > Antenna Pointing buzzer**. Click **Apply** for the new setting to take effect.

3. After the antenna is correctly pointed to the satellite, press the Pointing Mode button once to exit the pointing mode and start the network registration process.

NOTE:  indicates flashing green LED and  indicates steady green LED.

LEDs Signal	Global Beam Signal Strength (dB)
 	0 – 40
 	41 – 47
  	48
 	49
  	50
  	51
  	52
 	53
 	54
  	55 and above

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NOTE:

When the Antenna is pointing away from the satellite, the received signal strength is weaker. This is indicated by, lighting up a fewer number of LEDs and a low pitch audio tone. When the Antenna moves towards the satellite, the signal strength will gradually increase. This is indicated by lighting up more LEDs and gradually increasing pitch of the audio tone.

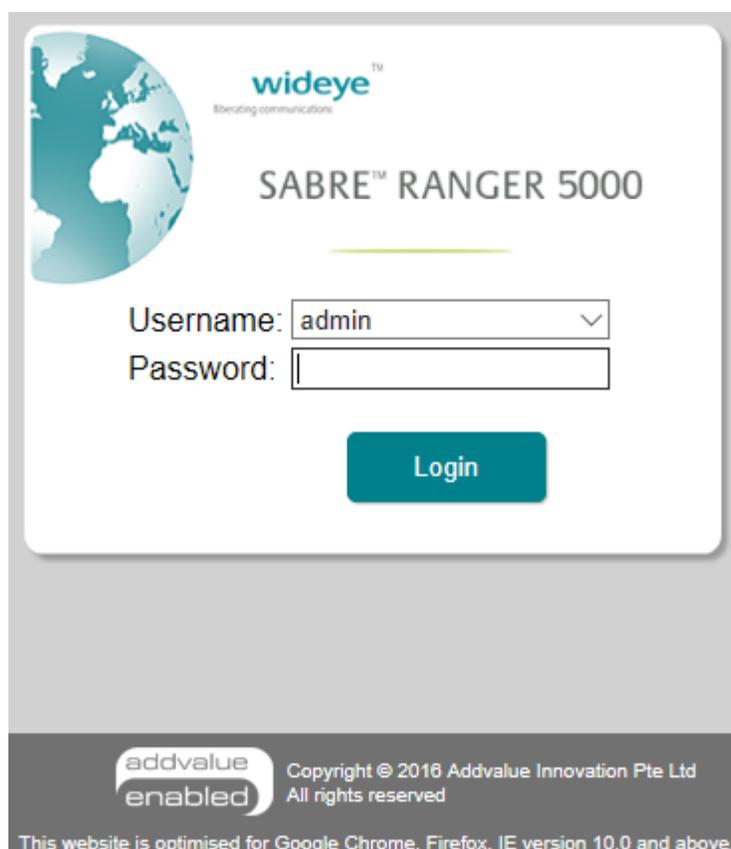
1. You may also verify the signal strength through the Web Console.

i) Open any web browser and type **http://RANGER5000** or **http://192.168.1.35** on the address bar.

ii) The default credentials are:

Username: **admin**

Password: **1234**



wideye™
liberating communications

SABRE™ RANGER 5000

Username:

Password:

Login

addvalue enabled

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This website is optimised for Google Chrome, Firefox, IE version 10.0 and above.

Figure 29

NOTE:

Web Console will remind the user to change the password for the first time login for security purposes. A minimum of 6 characters are required for the new password.

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iii) You can see the following details:

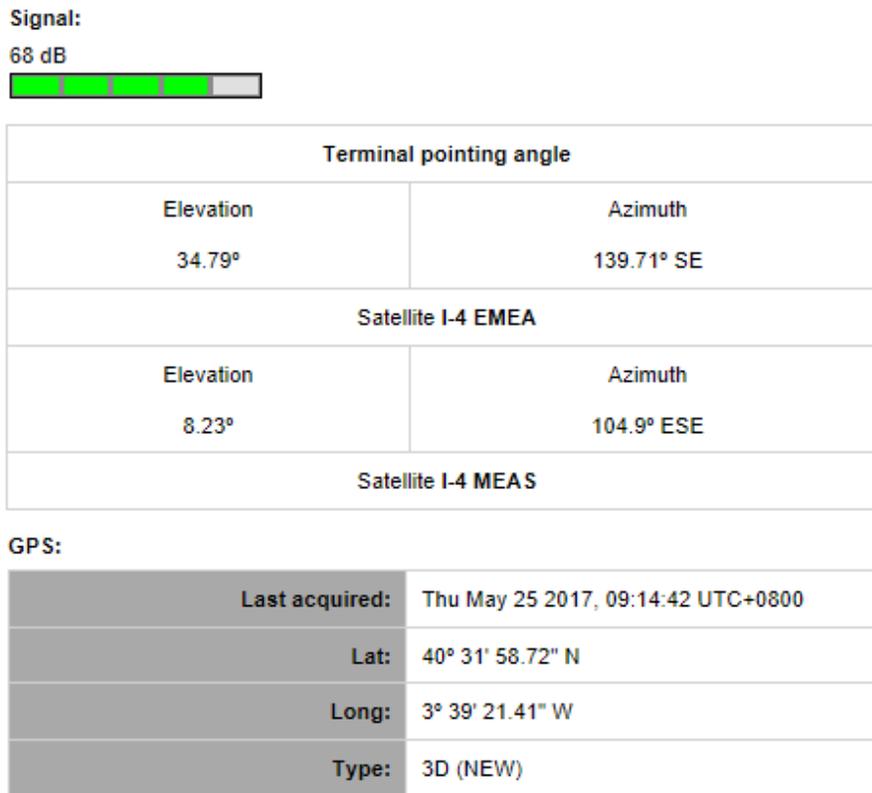


Figure 30

2. After the terminal is properly pointed, press and hold the Pointing Mode Button once to trigger the network registration.

3. The Antenna Pointing LEDs flash in sequence during the network registration.

NOTE:

The SABRE™ RANGER 5000 terminal activates a data connection automatically by default.

Auto Network Registration

When the terminal is powered up while it is already pointed to the satellite, it will register to the network automatically.

The LEDs will flash from right to left. When the network registration is successfully completed, all the LEDs will flash twice and turn off.

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11. APPENDIX A: TERMINAL BLOCK PIN ASSIGNMENT



1	2	3	4	5	6	7	8	9	10	11	12
GND	OP 3	OP 4	GND	IP 3	IP 4	GND	RS232/TX RS485/Z(B)	RS232/CTS RS485/B	GND	RS232/RX RS485/A	RS232/RTS RS485/Y(A)
13	14	15	16	17	18	19	20	21	22	23	24
TDR	OP 1	OP 2	GND	IP 1	IP 2	GND	Analog Input	Local Wakeup	GND	RS232/RX	RS232/TX

Figure 31

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Terminal block pin assignment Table:

Pin #	Name	Description	Remark
1	GND	GROUND	
2	OP 3	DIGITAL OUTPUT 3	Max +40V
3	OP 4	DIGITAL OUTPUT 4	Max +40V
4	GND	GROUND	
5	IP 3	DIGITAL INPUT 3	Max +32V
6	IP 4	DIGITAL INPUT 4	Max +32V
7	GND	GROUND	
8	RS232/TX RS485/Z(B)		Software Configurable RS232/RS485 Factory default to: RS232
9	RS232/CTS RS485/B		Software Configurable RS232/RS485 Factory default to: RS232
10	GND	GROUND	
11	RS232/RX RS485/A		Software Configurable RS232/RS485 Factory default to: RS232
12	RS232/RTS RS485/Y(A)		Software Configurable RS232/RS485 Factory default to: RS232
13	TDR	TERMINAL DATA READY	Open Drain Output Pin Max +40V
14	OP 1	DIGITAL OUTPUT 1	Max +40V
15	OP 2	DIGITAL OUTPUT 2	Max +40V
16	GND	GROUND	
17	IP 1	DIGITAL INPUT 1	Max +32V
18	IP 2	DIGITAL INPUT 2	Max +32V
19	GND	GROUND	
20	Analog Input		Max +32V
21	Local Wakeup		Max +32V
22	GND	GROUND	
23	RS232/RX		Debug Log Output only
24	RS232/TX		Debug Log Output only

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12. APPENDIX B: CONDUIT & ACCESSORIES

You may use the conduits and accessories listed below in your installation. These are provided for your reference only. Depending on your installation requirements, some or all of these parts may not be suitable for your application.

www.Schlemmer.com

1. 1200232 NW23 Black PA6 corrugated pipe ID23.2 X OD28.9 mm
2. 3805013 M25 male straight connector, black PA6 c/w gasket IP65
3. 7211977 Black PA6 M25 locknut
4. 6402212 Nickel Plated Brass Adaptor male NPT 3/4" female M25

To SABRE™ RANGER 5000
NPT 3/4" Conduit hole
NOTE: It is recommended to wrap it by using a pipe thread seal tape when assembling to SABRE™ RANGER 5000.



Assembly View

Figure 32

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13. APPENDIX C: TECHNICAL SUMMARY

Frequency Band

Receive: 1518MHz - 1559MHz
 Transmit: 1626.5MHz - 1660.5MHz and 1668 – 1675MHz

Antenna

Type: Built-in patch antenna

GNSS Air Interface

Integrated GPS receiver and antenna
 Support: GPS / Beidou / Glonass

Bearer Data Rate

M2M SIM

Standard IP: Up to 448/464kbps (send /receive)

BGAN SIM

Standard IP: up to 448/464kbps (send /receive)
 Symmetric Streaming IP: Up to 32, 64, 128kbps

Services

Standard IP, Streaming IP (BGAN SIM Only), SMS

Interfaces

2 x RJ45 Ethernet Ports (RJ45)
 2 x 12 PIN Terminal Block
 1 x RS232 / RS485 with Modbus
 1 x RS232 (debug)
 4 x GPIO – Output
 4 x GPIO – Input
 1 x Analog Input Port
 1 x Local wakeup - Input

1 x Power Supply Input (2 wires) Terminal Block
 1 x DC Output (2 wires) Terminal Block
 1 x Antenna Pointing Switch
 5 x Antenna Pointing LED
 1 x Antenna Pointing Buzzer
 1 x Safe mode button
 1 x SIM card holder
 1 x Micro USB (Reserved)

Firmware Upgrades

Over-the-air or via Ethernet Port

Supports 3GPP AT Commands

OS Agnostic (supports access via Web-MMI)

Environmental

Operating Temp: -40°C to +75°C
 Operating Humidity: 95% (Condensing at 40°C)
 Storage Temp: -40°C to +80°C
 Storage Humidity: 5% to 95% (RH)
 Water & Dust: IP66 compliant

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Electrical

DC input range: +10.8V to +32V
 Power Source (min): 30W (excluding*)
 *DC output: +12V Max 1A

Power Consumption

Receive: <6 W
 Transmit: 20 W (typical)
 Standby mode: <1 W
 Low power standby Mode: < 50mW

Weight

~2.5Kg

Dimensions

241(L) x 239(W) x 71(H) mm

Wind loading

Up to 125 mph (200kph) with mounting bracket supplied by Addvalue

Regulatory Approvals

CE
 FCC
 IC (Industry Canada)
 NEMA Type 4X
 RoHS
 IP66
 Designed for Intrinsic Safety
 Inmarsat Type Approval

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