DMR-200 Satellite Terminal – Hardware Guide

V.2

Edition date: sept 05

1. Configurations

The DMR-200 is available in two configurations: with bottom-mount connector and side-mount connector. (Figure 1 and Figure 2).

DMR 200D (SM200216-BXX-XXX) with bottom mount connector

DMR 200D (SM200216-SXX-XXX) with side mount connector

2. Technical Specifications

Physical DMR 200D

Overall Size	160 mm (dimeter) x 51 mm (height)
Weight	580g
Enclosure material	GE Xenoy
Gasket Material	Santoprene ®

Physical DMR 200L

Overall Size	160 mm (dimeter) x 97.5 mm (height)
Weight	720 g
Enclosure material	GE Xenoy
Gasket Material	Santoprene ®

Environmental

Operating Temperatura Range	-40°C to 70° C
Storage temperatura Range	-40°C to 85° C
Humidity	95% relative humidity at 30°C non-condensing.
Shock (survival)	Half sine 6 ms, 300m/s2
Vibration	5-20 Hz: 1.912 m2/s3 random noise. 50-500 Hz: -3dB octave random noise.

NOTE: WATER-PROOF. NON SUBMERGIBLE.

Electrical DMR-200D,L

Power Supply Voltage	9 VDC to 30 VDC
I/O_1	Digital In (0 to Power Supply voltage) Digital Out (open collector, 0 or HiZ, max 50mA sink current)Analog In (0-3.3V, 8-bit resolution)
I/O_2	Digital In (0 to Power Supply voltage) Digital Out (open collector, 0 or HiZ, max 50mA sink current)Analog In (0-3.3V, 8-bit resolution)
I/O_3	Digital In (0 to Power Supply voltage) Digital Out (open collector, 0 or HiZ, max 50mA sink current)Analog In (0-3.3V, 8-bit resolution)
I/O_4	Digital In (0 to Power Supply voltage) Digital Out (open collector, 0 or HiZ, max 50mA sink current)Analog In (0-3.3V, 8-bit resolution) Current Loop Input (4-20mA)
RS-232 Tx, Rx	9600 bit/s, 8 data, 1 stop, no parity

NOTE: The terminal must be protected with protection fuses of 2A at 12V or 1A at 24V

CAUTION:Power must be applied only after the ground connection is made.

CAUTION:Voltage levels applied to I/O pins should not exceed the Power Supply voltage at any time.

Power Consumption (typically @ 12VDC):	D+ Receive: 0.75W
	D+ Receive with GPS Active: 1.25W
	Idle: 0.25W
	Transmit: 10W
	Sleep: 500µA
	Heater active: +1.4W

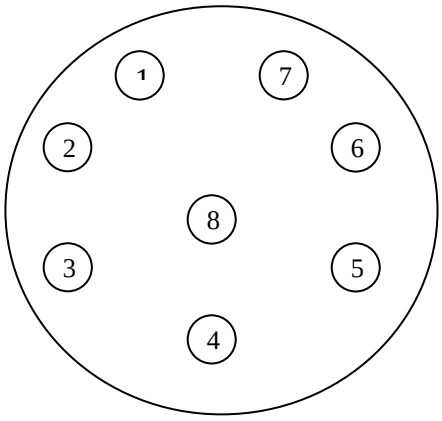
GPS Receiver

Receiver Type	16 channel, parallel
	L1 frequency, C/A code
Maximum Update Rate	0.5 Hz (2s)
Position Accuracy	3 m CEP, 5 m SEP
Start-up Times	Hot start 3.5 s
	Warm start 33 s
	Cold start 41.5 s

Connector Pin-out DMR-200 D/L

All DMR 200 electrical connections go through our water-proof cable/connector (brown cable is positive and blue one is negative).
The electrical connection has to be done with the right polarity and protected by a fuse responding to our technical specifications (see below). If you need a mobile installation, you can use a lighter conector. The warranty does not cover a wrong polarity connection.
Scheme of the cable to pin connector:

PIN	FUNCTIONALITY
1	I/O_1
2	RS-232 Tx User Data (Output)
3	RS-232 RxUser Data (Input)
4	Ground
5	Power supply
6	I/O_2
7	I/O_3
8	I/O_4



3. Installation information

Caution

Ensure that you install the terminal in a safe and secure manner in order to avoid hazards to person and property. It is the responsibility of the installer to ensure that the installation is safe and secure.

Inmarsat D+ DMR200 is designed to be easily installed, offering an ininterrupted service for years if the following instructions are followed:

Shipping Box Contents

The DMR-200 is shipped in and individual packaging box with the following parts:

- D+ Transceiver.
- Mating connector (if built cable is not provided).
- Installation instructions and product warranty.
- Tube of dielectric grease (if built cable is not provided).

Tools Required

The following tools are required to install the DMR-200.

- Drill.
- 5.5 mm drill bit.
- 25 mm hole punch or drill bit for Bottom Mount Connector version only.
- Screwdriver.
- Socket wrench set.

Marterials Required

The following materials are required to install a DMR-200. These materials are not included with the DMR-200, as they need to be selected for each installation type. (you can consult the accessories in the Emmi Network price list).

- Qty 4-M5 screws (length depends on mounting surface thickness)
- Qty 4-nuts with locking hardware.
- Water-proof sealing tape.

- Water-proof sealing compound such as silicone RTV (bottom connector version only).
- Dielectric grease.
- Qty 1-DMR-200 cable.

Recording Serial Number

The DMR-200's serial number is the DCC004 number and the following six hexadecimal digits. It is located in three places:

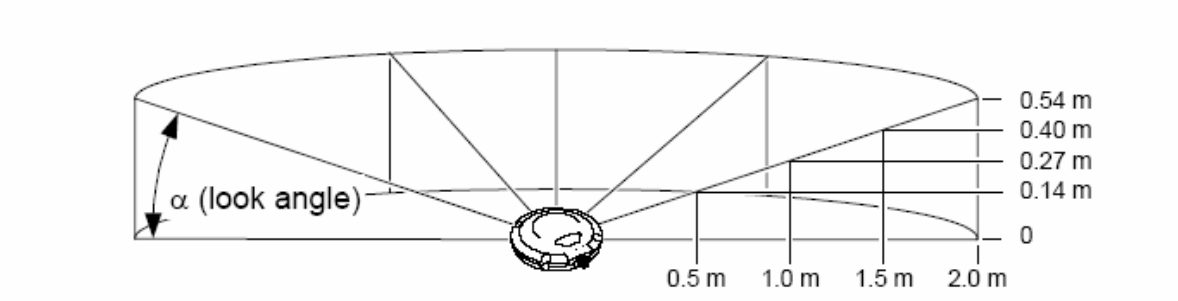
- a label on the bottom of the terminal
- a label on the original Skywave packaging box.
- Electronically inside the terminal.

This number is a unique identifier for the terminal. Record this number before the terminal is mounted. You will need it later for commissioning the terminal on the satellite network.

Selection of Mounting Location

The most important part of any installation is making sure to fasten the DMR-200 securely, and in a location where it will have a clear view of the satellite. For a mobile installation, this generally means an installation location at the highest point on the vehicle or vessel where there is no obstruction in any direction.

Mount the terminal so that it has an unobstructed view to within α degrees of the mounting surface, where α=15deg for DMR-200 D, and α=0deg for DMR-200L.



Ensuring Clear View of Satellite.

Selection of Mounting Surface

The installation must be on a flat surface. Do not mount the DMR-200 in an area where standing water may occur. Do not block the drain holes in the slots on the bottom of the terminal.

The terminal DMR-200's mounting surface must be capable of mechanically supporting the terminal. If not, use a backing plate (not supplied) or other suitable reinforcement.
In some cases, the surface temperature of the mounting platform may exceed the DMR-200's maximum operating temperature (70°C). If this is the case, mount the DMR-200 with a thermal barrier between it and the mounting surface.

Before drilling any holes, verify that there is enough space to accommodate the bend radius of the DMR-200's cable. The bend radius needs to be measured on the cable supplied with the DMR-200.

Electromagnetic Interference Precautions

Take care when mounting the DMR-200 in close proximity to other electrical equipment to ensure minimal interaction due to radiated and conducted emissions. Avoid locating the DMR-200 in close proximity with radar or other communications antennas.

Mounting

The terminal guarantees a correct communication when installation is done outside the boat avoiding any obstacle that may interfere above it.
The installation inside the boat is not recommended. Emmi Network will not be responsible for any communication failures that may occur.

We highly recommed you to check if there is not any misfunction, lost of signal and data reports are received and displayed on the system before it is fixed definitely.
Some typical obstacles to be found on boats are large structural metallic elements such as decks or cabin divisions, proximity to rigging, places where people sit/lie down, etc.. In general, internal installations will affect the communication between terminal and satellite but it doesn't mean that the communication is impossible. The GPS position is not affected by internal installation. If the terminal receives GPS position, this will be the correct position within the limits of the system itself.

Situations that may difficult transmission of the terminal DMR200:

- the unit has to transmit through metal
- the unit has to transmit through more than one thick layer of fibre glass or other material
- the unit has to transmit through people or animals
- the unit is situated below the deck and something is put on the deck above the unit.
- the unit is situated below the deck and a person is sitting/lying on the deck above the unit.
- the unit is in a cupboard next to a metal box.
- the vessel is moored next to a wall or building that is obscuring its view of the sky.
- the vessel it is moored between two larger vessels.
- if the power connection to the unit is not constant.
- if the unit is located next to radar equipment.

Note:

If the unit does not appear to be reporting correctly (please revise the Signal Lights Codes) it may help to reset the unit by disconnecting it from power for 1 minute then reconnecting it. The unit will search for a satellite and report as soon as it has been able to make a connection.

The normal places for antenna installations onboard also the most appropiated for the installation of the DMR-200 terminal. As example:

Rail Mounting Mast Top Over deck

Bottom connector terminal

Side connector terminal

A mounting template is included to be used to perforate the installation surface. It is highly recommended to install the terminal with blocking nuts in order to avoid vibrations due to looseness of those nuts.

NOTE: Emmi Network can provide different mounting brackets to make the installation easier.

Applying Power

Before connecting the DMR-200 to an external voltage source, ensure that the polarity is correct and the voltage source is between 9 and 30 VDC. Refer to Section Connector Pin-Out descriptions.

Always ensure that the connectors are properly mated before power is applied, and that the ground connection is connected at the same time or before power is applied. This is specially applicable to cases when the RS-232 lines are used along with power an ground.

Verification

After powering on the terminal, the ERR LED comes on for 5 seconds and the STAT LED flashes. This indicates that the DMR-200 is correctly executing its startup self-test sequence. After about 5 seconds, the ERR LED will turn off and STAT LED continues flashing at different rates. If the ERR LED remains on, the DMR-200 is not functioning correctly. The Figure shows the LED locations.

DMR-200 LEDs

When the terminal enters in the adequate satellite traffic channel, it sends light signals codes indicating its current status. The most important are:

Signal Lights Codes	Status
STAT turned on permanently	Defect terminal. Contact with Emmi Network, S.L.
STAT 1 signal light each 8 seconds	Operative terminal in stand-by
STAT 5 signal lights each 8 seconds	Waiting for transmission
TX turned on permanently	Defect terminal. Contact with Emmi Network, S.L.
TX turned on with short turned off each 4 segonds	Transmisión blocked. Contact with Emmi Network, S.L.
ERR 1 signal light, short pause, 3 fast signal lights	Very high Voltage. Check voltage alimentation
ERR 1 signal light, short pause, 4 fast signal lights	Very low voltage. Check battery.
ERR 1 signal light, short pause, 5 fast signal lights	Very high internal temperature.
ERR 1 signal light, short pause, 6 fast signal lights	Very low internal temperature.
ERR turned on permamently	Defective terminal. Contact with Emmi Network, S.L.

4. DMR-200 Cable Assembly Instructions

The following section provides the information necessary to assemble DMR-200 power/interface cables. Pay attention to the assembly and installation steps to protect the connector pins operation of the terminal.

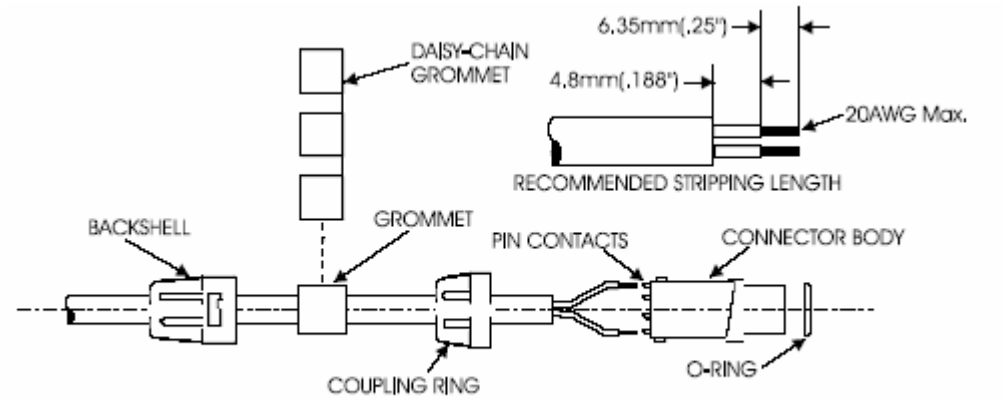


Figure 14: Conxal Mini-con-x Series Cable connector Assembly

Mating Connector Part Number

DMR-200 C/F	6282-6PG-3xx
DMR-200 D/L	6282-8SG-3DC

Cable Selection

All cables should be less than 30m long and built with the following guidelines:

- Cable used for power and data connections to the terminal must be shielded for reliable operation.
- Maximum Jacket outside Diameter (in order to fit in the connector shell): 6.35 mm (0.25”). For example, for a 6 wire cable, this will result in a 20 AWG wire gage.
- Protect the DMR-200 with an external fast-acting 2-amp fuse connected in series with the terminal. If the voltage is greater than 18VDC, then a 1-AMP fuse can be used.
- The minimum recommended wire gage is 22 AWG. If the power cable length exceeds 4.6m (15ft), the input voltage range should be de-rated by 1 volt for every 4.6m (15ft) increase in length.

Tools

- Knife
- Wire Stripper
- Fine-tip Soldering Iron
- Solder

Cable Assembly Steps

1 Select a cable made of a material suitable for the operational environment and cut to the required length.
2 Install back shell on the cable.
3 Select proper size grommet and install on the cable. The connector is supplied three grommets with three different size holes. Select the grommet, which provides a snug fit on the selected cable. Make sure that the end of the grommet that has the larger inner diameter is facing toward the connector body. Discard the remaining two grommets.
4 Install coupling ring.
5 Cut and remove the outer jacket of the cable 11.15 mm (0.438") from the end. Be careful not to nick the insulation on the wires.
6 Remove the foil shield if present..
7 With a wire stripper, remove 6.35 mm (0.25") of insulation from the wires.
8 With the soldering iron and solder, tin wires and solder into the connector pins. The connector pin out is found in Table 2.
9 Move coupling ring on to the connector body
10 Slide grommet to cover wires.
11 Slide the back shell over connector body and twist lock in place.
12 Install O-Ring on front of connector body.

Molded Cable

We encourage to adopt a molded cable to ensure continued reliable operation. Please consult the Customer Support if you need assistance in procuring or specifying a molded cable.

5. Compliance

Inmarsat Compliance
The DMR-200 complies with Inmarsat Type Approval DCC004.
CE Mark
The DMR-200 product is also compliant with the following CE Mark standards:

Safety (art 3.1.a)	EN 60950:2000 (3rd Edition) Safety of Information Technology Equipment
EMC (art3.1.b)	EN301 489-20 V1.2.1 (2002-11)
	Electromagnetic compatibility and Radio spectrum Matters (ERM)
	Electromagnetic Compatibility (EMC) standard for radio equipment and services
	Part 20: Specific conditions for Mobile Earth Stations (MES) used in the Mobile Satellite Services (MSS)
Spectrum (art 3.2)	EN301 426 V1.2.1 (2001-10)
	Satellite Earth Stations and Systems (SES). Harmonized EN for Low data rate Land Mobile satellite Earth Stations (LMES) and Maritime Mobile satellite Earth Stations (MMES), not intended for distress and safety communications, operating in the 1.5/1.6 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE Directive.

E Mark
E Mark Approval in accordance with Regulation ECE 10. Approval NumberE24 10R-020019 Aug. 2002.

NEMA 4, 4x and IP56

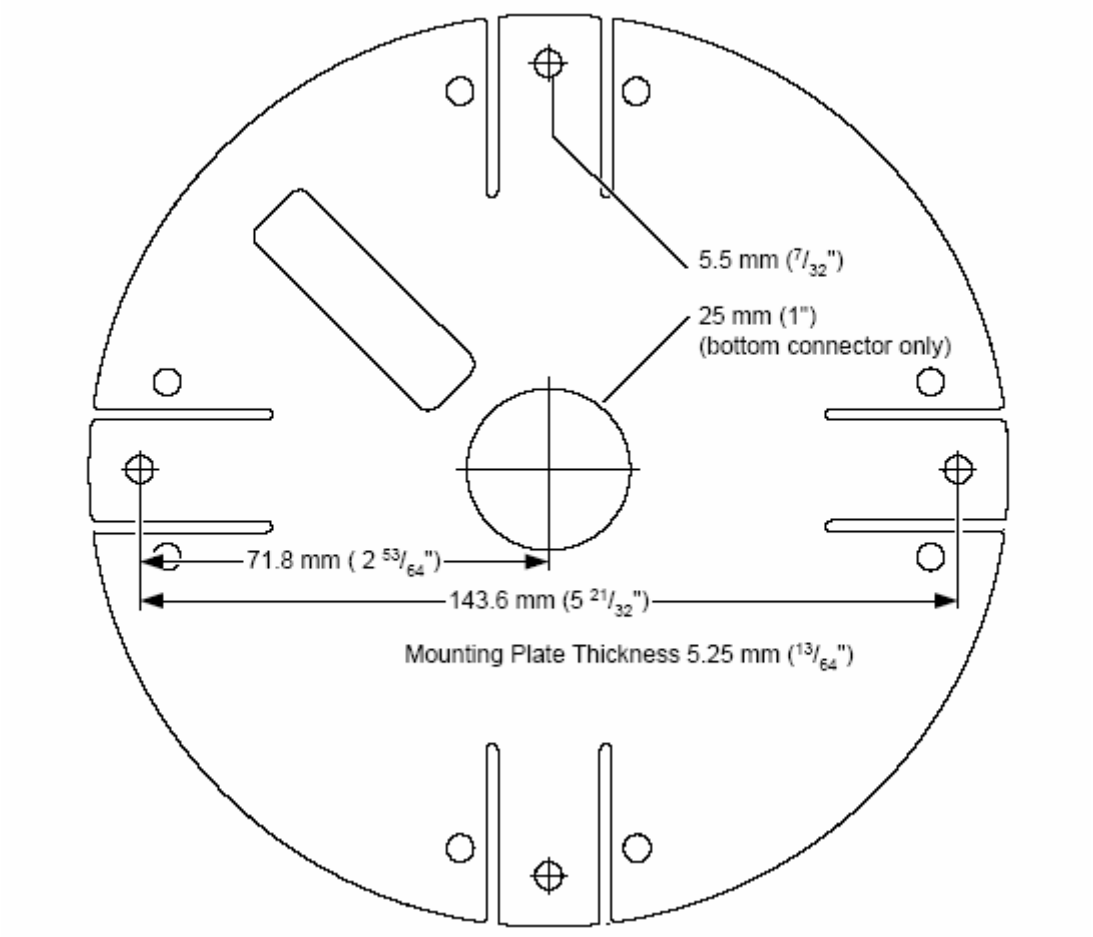
The DMR-200 has passed the following NEMA/IP56 conformance tests.

- CSA C22.2 94-M91 Clause 6.8.2 Hose-down Test (NEMA 4 & 4X)
- UL-50 Section 35.2 Hose-down Test (NEMA 4 & 4X)
- IEC/EN 60529 Water Jet Test IP X6, Clause 14.2.6
- ICE/EN 60529 Dust Test IP 5X (Category 2), Clause 13.4-13.5

FCC Authorization

The DMR-200 FCC Licence Number is SES-LIC-20030311-0353.

Appendix A Drilling Diagram



DMR-200 Standard Plastic Bracket Mounting Plate (Imperial units are approximate)

Caution

This diagram is not the same size as the mounting plate. Measure holes before drilling.