BeiDou GPS Signal Repeater Kit

Installation Instructions And User Guide

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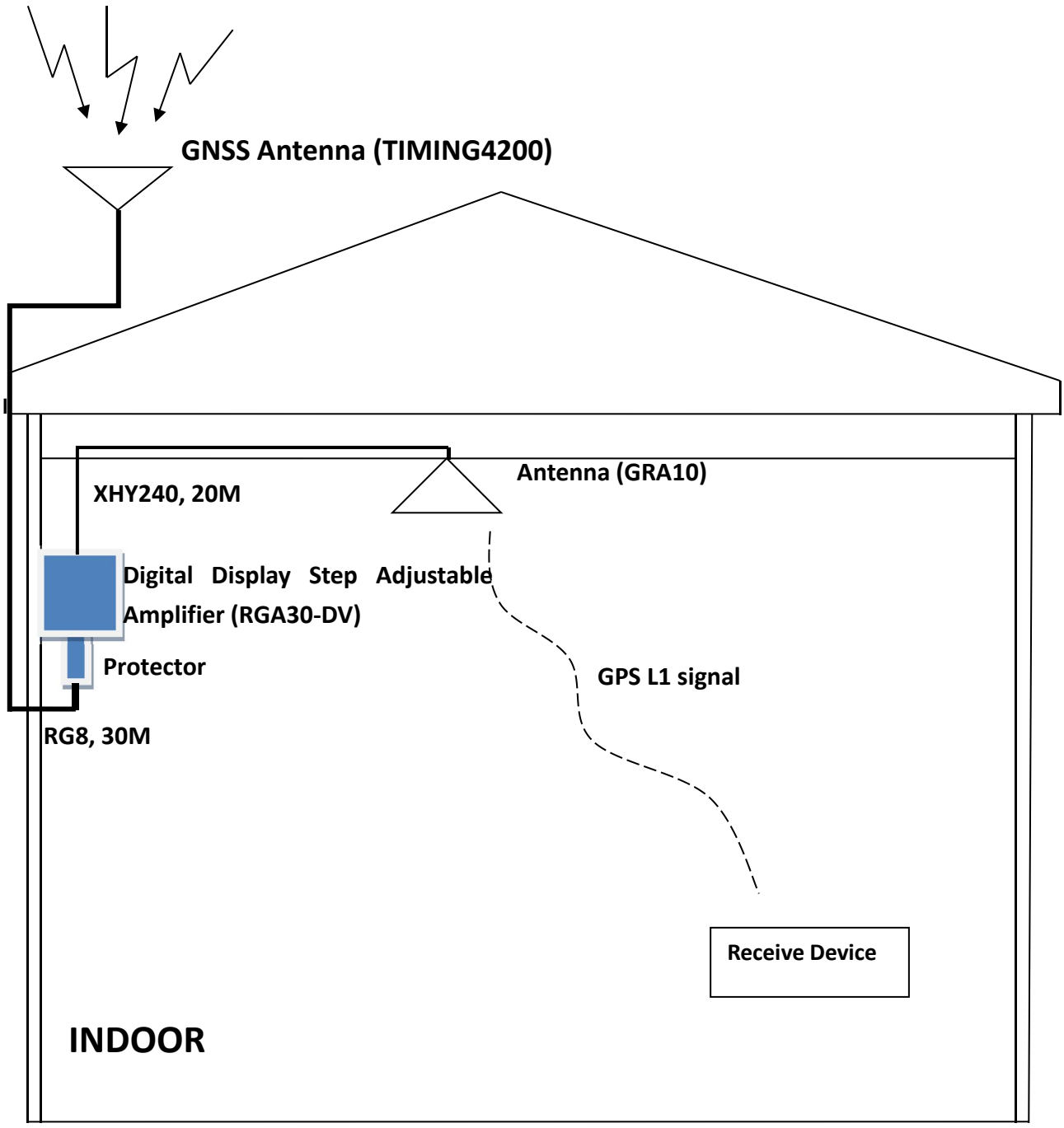
GNSSRK-D-RDV

- ✧ **System signal:**
  - ➢ **GPS L1(1575MHz);**
  - ➢ **Beidou2 B1(1561MHz);**
- ✧ **System gain: 0-30dB, digital display step adjustable;**
- ✧ **Digital gain: LED digital display, clearly shows the current amplifier gain;**
- ✧ **Serial command control;**
- ✧ **Input and output port DC power through or block setting;**
- ✧ **Covers up to 20 meters**

Contents

GPS L1、Beidou 2 B1



1. GNSS antenna TIMING 4200 mounted on the roof of the building;
2. Cable assembly RG8 fixed along the out wall, one terminator connects TIMING4200,the another to protector at the appropriate place. In some special environment, select PE or PVC material plastic pipe to protect the cable assembly is quite sensible;
3. Lightning arrester and digital stepper adjustable amplifier fixed in the ceiling of the room or in the cabinet;
4. Cable assembly XHY240 is fixed along the ceiling of the operating place;
5. The transmitting antenna GRA10 is fixed to the ceiling by means of a fastening nut. . According to the actual environment, you can adjust positions of some parts, which can make you the adjust, change and overhaul more easily.

Quality Commitment

All products have been strictly inspected, all are qualified products.

We promise one-year guaranty and 5-year available.

Under warranty, products gone wrong which be identified not be human factor, can be replaced free or repaired. Freight be charged by GEMS.

Return Policy

Our product and its packaging have LOGO and Serial-number, you should not tear up them, as we will depend on them to deal with the return product.

We haven't recruit agencies, sales and after service be took charged by GEMS. Please pay attention.

Service phone: 86-755-29644311 or email to: sales@gemsnav.com, We will response in 24 hours.

1. Functional Description

GNSSRK-D-RDV is a repeater operates by receiving GPS/Beidou2 satellite signals with an antenna located outside the building and re-radiating the signals into the indoor area or covered space where satellite signal cannot reach.

GNSSRK-D-RDV is a single point GPS/Beidou2 repeater, one transmitting antenna transmit GPS/Beidou2 signal. This solution offer adjustable test signal to receiver.

If need extend the system, you can add assemblies and sending antennas, so as to cover satellite signal indoor large area and more rooms or buildings.

Other documents, log in website: www.gemsnav.com , or contact:sales@gemsnav.com, or call the technical service: 86-755-29644311。

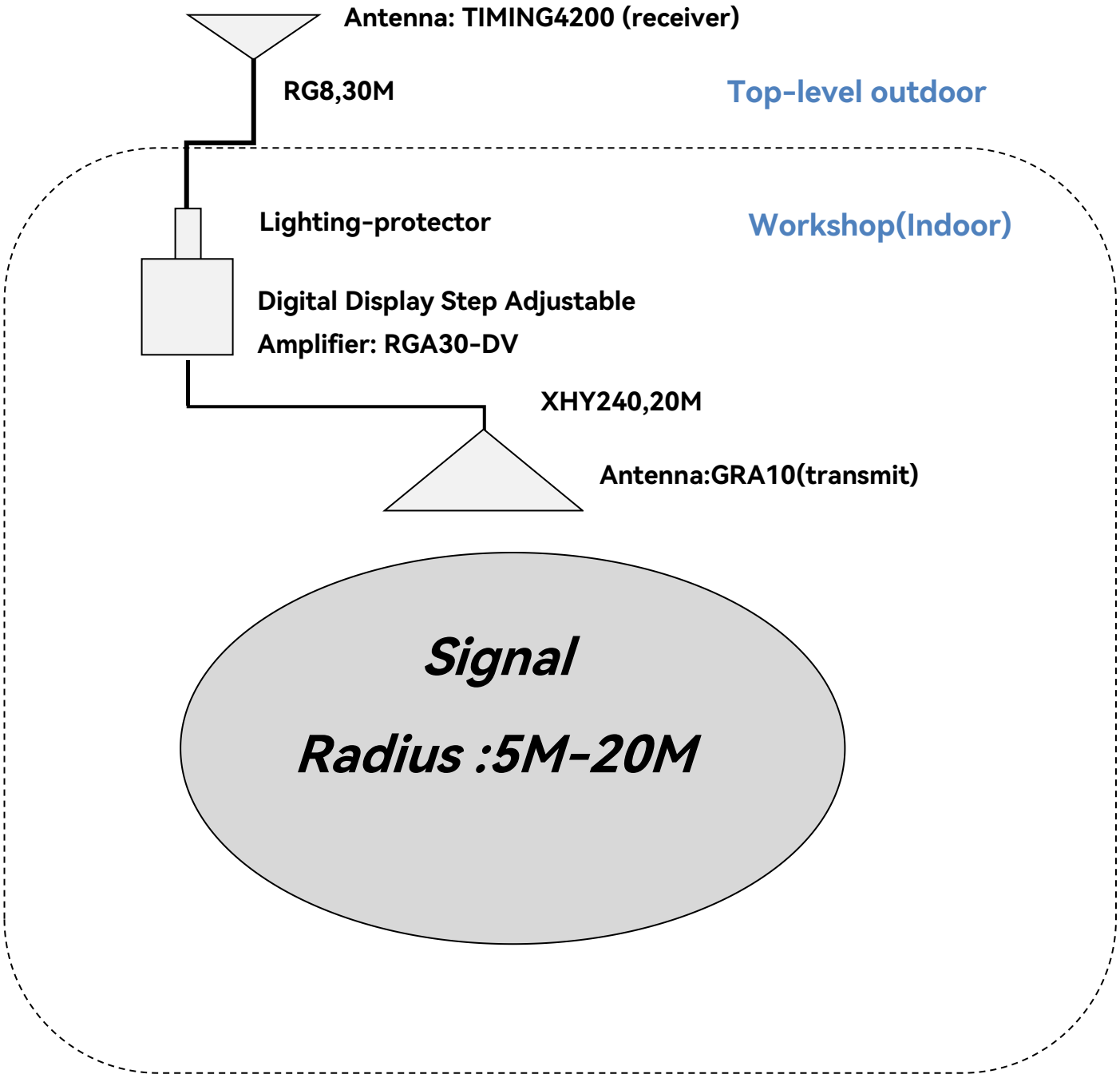
2. Typical Application

- **For GPS/Beidou2 products testing**
  For testing the cell- phone with GPS/Beidou2 , PND, car navigators, tracker, survey products, etc.
- **For the purpose of GPS/ Beidou2 signal covering**
  Car parks, lab, aviation manufacturing hangar, trade shows, Emergency-, safety vehicles, public transportation etc.

3. Standard Configurations

- **Digital Display Step Adjustable Amplifier:RGA30-DV ,1 ea;**
- **Receiving Antenna: TIMING4200,1 ea;**
- **Cable Assembly:RG8,30M, 1ea;**
- **Cable Assembly:XHY240,20M,1 ea;**
- **Sending Antenna: GRA10,1 ea;**
- **Ligting-protector:1 ea;**
  The cable components can be selected according to the customers' environment and can communicate with our technicians.

4. Topological (Under standard configuration)



5. Kits include

5.1 Digital Display Step Adjustable Amplifier RGA30-DV

5.1.1 Function:

Used to adjust system gain, 0-30 dB adjustable, you can control when needed. The input and output can be set to energize 5V DC or not energized.

The system power supply voltage is 220V.

①and②are RGA30-DV input and output.

③For power control switch. System power-on when allocated to upward, opposite, system stops working.

④ For the gain adjustment button, you can adjust the gain size, you can adjust the controller gain increase or decrease. (Through the GAIN button to adjust. UP to the big, down to small.)

⑤For the input and output power state setting, IN for the input, Out for the output, PDC that power, BDC that does not power.

⑥For the digital display, showing the current gain value of the amplifier, and the voltage of the input and output ports.

5.1.2 Specification

Electrical Specifications, Operating Temperature -40 to 85°c

Parameter	Conditions	Min	Typ	Max	Units
Freq. Range	In- Output ports, 50Ω	1164		1616	MHz
In &Out Imped	In, all output ports		50		Ω
Gain 1207MHz 1227MHz 1561MHz 1575MHz 1609MHz	In- Output ports -45dBm Input Level		0~30		dB
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1.5	0~30	(0~30)+1.5	
		(0~30)-1	0~30	(0~30)+1	
		(0~30)-1.5	0~30	(0~30)+1.5	
Input SWR				2.5:1	-
Output SWR				2.5:1	-
Noise Figure				3	dB
Gain Flatness				3	dB
Current balance				0.5	dB
Phase Balance				1.0	deg
Group Delay Flatness				1	ns
Current	Pass DC, No Powered configuration, DC input on Out Port			250	mA
Max RF Input	Max RF input without damage			0	dBm

5.2 Antenna

5.2.1 Roof Antenna TIMING4200

Receive satellite signal GPS L1 & Beidou3 B1;

Electrical parameter:

Frequency [MHz]	1575.42±5, 1561±5
Gain [dBi]	39±2(LNA included)
Polarization	Circular polarization
Axial ratio [dB]	< 5
3dB beam width (°)	110±10
Front to Back Rario [dB]	> 10
DC Voltage [V]	4~6
DC Current [mA]	≤45
Connector	N (Female)

LNA Specifications:

Frequency Range(MHz)	1568.42±5
Gain (dB)	34±2
Flatness in bandwidth (dB)	< 1 (1575.42±1.023MHz) < 2 (1575.42±5MHz) < 2 (1561±5MHz)
Noise Figure (dB)	≤2.7
Out-of-Band Rejection (dBc)	12 (1568±50MHz) 35 (1575±50MHz) 70 (1568±50MHz)
VSWR	S11≤2.5dB(Input); S22≤2.5dB(Output)
DC Voltage (V)	4~6
DC Current (mA)	≤45
1dB the dot of the output (dBm)	≥0
Anti-Surge Performance	According GB/T17626.5-1999; idt IEC 61000-4-5:1995 standard

Mechanical characteristic:

Radome material	ABS
Size [mm]	Ø112×205
Weight [Kg]	1.42 (including GPS clamp)
Operation Temperature [℃]	-40~+70
Reposition Temperature [℃]	-40~+85
Operating Humidity [%]	5-95

5.2.2 Timing 4200 installation

Installation of the GNSS antenna Timing4200

GNSS antennas can be installed on the edge of guardrail where no building more than 3m higher than antennas is visible outside 10m around the antenna.

1、Lightening protection measures for antennas

Outdoor antennas are generally installed within the lightning protection zone of the building. Arrester should be set up additionally if the antennas are higher or beyond the lightening protection zone. The arrester is as shown in the figure below. Installation precautions are:

(1) The arrester height is determined based on the installation position of antenna and should be much higher than antennas (0.5m to 1m higher);

(2) The arrester must be fully welded with lightening protection circuit of the building and earthing resistance should be kept lower than 10ohm;

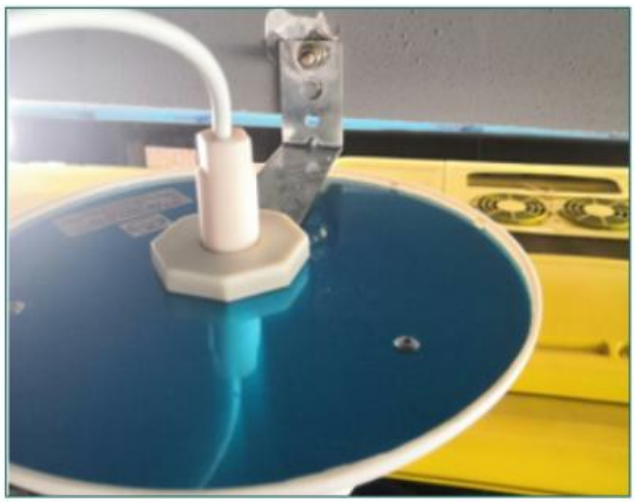
(3) The arrester (iron pillar) can be directly welded onto the lightening protection zone (as shown above in the figure) of the building with thick iron sheet.

Note: Lightening protection is an important and prudent discipline. We only provide you with suggestions and you need to employ professional enterprises with certified qualification to design and implement lightening protection measures.

5.3 Transmitting antenna GRA10

Fixing the antenna GRA10

Fix the antenna to the ceiling, or to a concrete beam; usually in the center of the area where GPS signal coverage is required;



This product factory with fixed bracket, you can refer to the diagram to fix

Electrical parameters:

Frequency [GHz]	**1.15-1.7**
Input impedance	**50Ω**
Polarization method	**Vertical polarization**
Horizontal coverage angle	**360^0**
Output standing wave (VSWR)	**≤1.45**
Maximum power	**50W**

Mechanical parameters:

Lightning protection	**DC Grounding**
Input Interface	**NK/SMAK**
Size	**Φ186X85mm**
Antenna cover material	**ABS, UV protection**
Antenna Color	**white**
Operating temperature	**-40~+60℃**
Ultimate temperature	**-55~+70℃**

Function: Transmit full-band GNSS satellite signal

Gain(dB):3dBic,passive

Connector:N/SMA(Female)

5.4 Cable Assembly

5.4.1 RG8

RG8,30M is usually used for connecting Receiver antenna TIMING4200 and lighting-protector. You can calculate the length according to your actual environment, also 60m or 90 be selected.

Connector N Male-N Male.

The attenuation value is 0.18dB/m.

Thus, you can assess the system, or contact with our sales to select proper configuration.

5.4.2 XHY 240

The cable assembly, XHY240 20M, is the cable that connects the digital stepper amplifier RGA30-DV to the antenna GRA10.

The attenuation of this cable assembly is about 0.32dB/M.

5.4.3 Select Connector

Connectors are industrial standard component, below are selectable:

SMA Connectors (Male - Female)

BNC Connectors
(Male & Female)

N Connectors (Male - Female)

TNC Connectors (Male & Female)

6 Frequency Reference Table

Glloba/Compass Navigation Satellite Systems(GNSS/CNSS)	5						2						6/3				6				1									
Frequency (MHz)	1164	1176	1188	1192	1207	1215	1219	1227	1239	1245	1252	1259	1266	1268	1278	1290	1535	1540	1545	1550	1558	1558	1561	1563	1575	1587	1592	1602	1609	1616	2491
GPS(USA) L1,L2,L2C,L5	L5+/-12						L2/L2C+/-12												L6+/-5					L1+/-12						
Glonass(Russia) G1,G2										G2+/-7																			G1+/-7		
Galileo(Europian) L1,E1,E2,E5(E5a,E5b),E6	E5+/-15 E5a+/-12 E5b+/-12												E6+/-12						L6+/-5			E2		L1+/-17			E1			
Compass (Beidou 2,China)				B2+/-10									B3+/-10									B1+/-2								
Beidou 1 (China,Tx(LHCP)/Rx(RHCP)																														L	S
IRNSS (India)			L5+/-15																					L1+/-12						S+/-15
OmniStar																	O+/-14---->														

7.Typical faults and solutions

GNSS repeater GNSSRK-D-RDV8 fault location and remove:

First: To determine whether the RGA30-DV power supply connected, through the RGA30-DV digital display can be observed to lose whether there is voltage output, such as digital display shows a voltage of about 5V, indicating normal power supply, RGA30-DV work properly. Otherwise, check the power outlet for good contact.

Second: If the digital stepper is adjustable, the input port of the amplifier has a voltage of 5V, you need to check whether the fixing is steady between GRA10 and the cable.

Third: If the below two step were ok, please check the outdoor antenna TIMING4200 .You can, check the voltage between axis of the cable connector and the outer shielding layer to make sure it's 5V.If no voltage, the circuit has fault, please contact our technical support. If 5V,the antenna TIMING4200 can be suspected.(In fact, this case hasn't appear in our engineering projects.

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