

INSTALLASJONSVEILEDNING

REPEATER

Nikrans NS-Smart-Boats



Frek.: 900, 1800, 2100, 2600, 800 MHz
Dekning: 2000 m²

PREFACE

This user's manual describes the installation and maintenance of wide band consumer boosters. Please do read user manual carefully before installing and maintaining repeaters. The information in this manual is subject to change without prior notice.

1. SAFETY WARNINGS

Users must follow the principles below◇



Repeater should follow system requirements; assure good grounding and lightning protection.



The power supply voltage of repeater should meet security requirements; any operation shall be carried out only after turning off power in advance. Only the professional is authorized for the operation.



Do not dismantle machine, maintain or replace its components by yourself, because this way the equipment may be damaged and you may even get an electric shock.



Do not open the repeater, touch the module of the repeater, or open the cover of the module to touch electronic component. The components will be damaged due to electrostatic.



Please keep away from heating equipment, because the repeater dissipates heat during working. And do not cover a booster with anything that influences heat dissipation.

2. INTRODUCTION AND REASONS FOR WEAK CELLULAR SIGNALS

Mobile Signal Booster is a perfect solution for providing improvement of cellular signal reception inside a house, office, restaurant, VIP Room, apartment, building or shopping mall.

Generally cell phones cannot pick up or maintain a strong cellular signal due to one of the two following reasons:

1. **Location of the Nearest Base Station** – Base stations are used to provide broad coverage. However there are many areas in which signal strength gets reduced due to topographic peculiarities or local Governmental restrictions regarding the height or location of base stations. Rural areas generally have fewer base stations than urban regions.

2. **Natural and Man-Made Obstructions** – Signal strength can also be negatively affected by trees, hills, buildings, weather and other obstructions. You may be relatively close to a base station but still unable to make a call. This often occurs inside houses, offices and other buildings with stucco, concrete or metal walls that may block the signal.

The Signal Booster works with two antennas. An Indoor antenna communicates with your cell phone and an Outdoor antenna communicates with the base station (BS). The Outdoor antenna receives a signal from the BS and sends it through the cable to the Signal Booster, where it gets amplified and re-transmitted by the Indoor antenna throughout a building. When the Indoor antenna picks up a signal from your cellular device, the Signal Booster amplifies that signal and transmits it through the cable to the Outdoor antenna and back to the BS.

(Note: The Signal Booster will only operate if there is an adequate signal to amplify.)

3. MODEL DESCRIPTION

Med vår beste marine forsterker NS-Smart- Boat vil du forbedre ALLE SIGNALTYPER AV ALLE LEVERANDØRER i store båter og yachter på opptil 2000 m².

Nikrans NS-Smart-Boats er et avansert forsterkningssystem som **forbedrer taleanrop og 3G og 4G Internett** på samme tid. Forsterkeren fungerer på **GSM 900MHz** for telefonsamtaler og 2G, **DCS 1800MHz** for telefonsamtaler og 4G LTE Internett, **WCDMA 2100MHz** for 3G, **LTE 800MHz og 2600MHz** for 4G LTE Internett-tilkobling. Alle frekvensene er typiske for **alle europeiske, afrikanske og asiatiske land**.

Forsterkerpakken inneholder en innvendig antenne som er egnet for store båter og yachter **opp til 20000 ft² (2000 m²)**. Du kan imidlertid bruke opptil 4 innvendige antenner, hvis du ønsker å diffundere signalet på båten din mer effektivt. Den marine repeateren har også en allestedsnær utvendig antenne som betyr at den vil **fange signal rundt båten** fra alle leverandørers antenner som ligger på opptil 40 km avstand. **Antall brukere på båten er ubegrenset**.

Blant kjennetegnene til Nikrans NS-Smart-Boats marine forsterker er det:

- **12V strømforsyning** sammen med standard 220V strømforsyning er inkludert i settet.
- **Avstengingsfunksjon** for sikker forsterkerdrift, vanligvis i tilfeller av det skulle oppstå en feil eller i tilfeller med dårlige nettverksforhold.
- **Manuell forsterkningskontroll** for regulering av inngangssignalforsterkning avhengig av signalnivå og andre eksterne forhold.
- **Automatisk forsterkningskontroll** for å justere signalnivået uten manuell kontroll.
- **Automatisk nivåkontroll** for å opprettholde utgangssignalet på sikkert nivå og forhindre at enheten bryter sammen.

Denne penta-bånd-mobilforsterkeren lar brukerne surfe på internett, ringe og til og med se på mobil-TV uten avbrudd uansett hvor du er.

Bestill båtforsterkeren akkurat nå og vær alltid online uansett leverandør, verken nettverkstype!

Denne båtforsterkeren kommer i **en full pakke** som er nødvendig for installasjon. Alle antenner og kabler er inkludert i settet, slik at du enkelt kan installere enheten på egen hand. Installasjonen tar omtrent 20 minutter, så du trenger ikke å ansette en tekniker for det.

Nikrans NS-Smart-båtforsterker er ikke helsefarlig og **reduserer til og med nivået for stråleutslipp** i dekningsområdet.

Produktet leveres med **3 års garanti**, hvor det tredje års garanti kan kjøpes i tillegg.

4. SPECIFICATION

Dekningsområde:	2000 m ²
Opplinkfrekvens:	832-862, 880-915, 1710-1785, 1920-1980, 2500-2570MHz MHz
Inngangsfrekvens:	791-821, 925-960, 1805-1880, 2110-2170, 2620-2690MHz MHz
Opplinkvinning:	65 dB
Nedlinkvinning:	70 dB
Strømforsyning:	Input AC90~264V,output DC5V/2A
Energiforbruk:	0.012 kW/h
Fungerer i temperaturer på °C:	-25/+55
Fuktighet:	5 - 95%
Størrelse (mm):	150×210×36
Forsterkerens vekt:	2.5 kg
dBm:	20 dBm

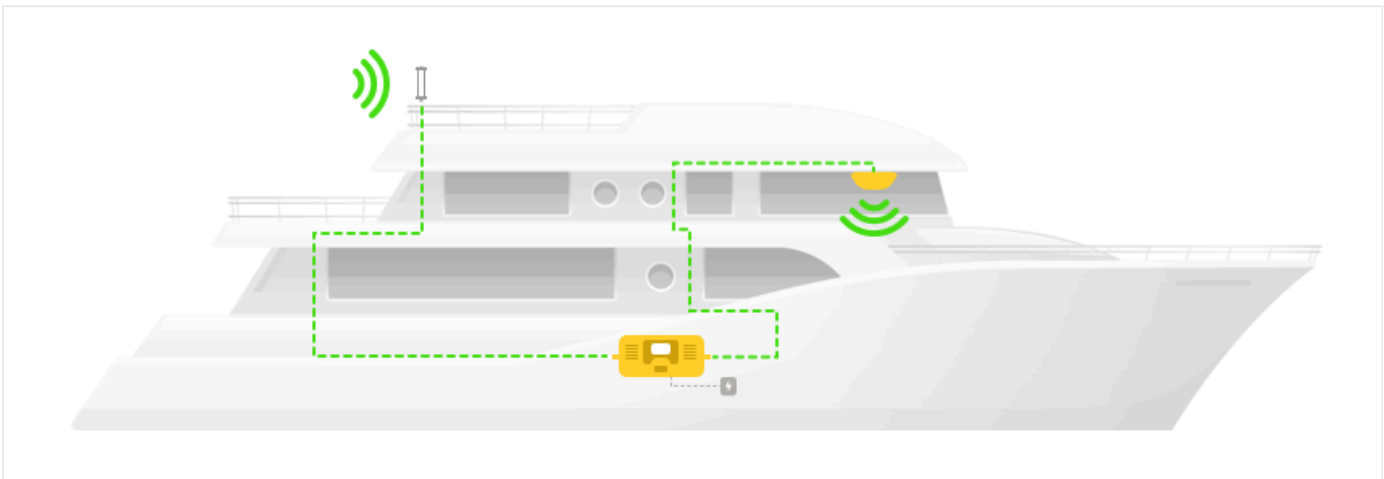
5. REPEATER SYSTEM OVERVIEW

The picture below shows how simple and fast booster installation is and how effectively it works.

Out-of-car antenna should be fixed in a proper place (for example, on a car trunk) and connected with the booster by cable. Then fasten the in-car antenna to the booster and plug the power supply into the cigar lighter. Just in a few seconds the signal will become boosted in your car.

A repeater kit includes:

- **Out-of-car Antenna**◊
Function: To pick up outside signals from the base station and send them by cable to the repeater; out-of-car antenna also transmits the uplink signals from the repeater back to the base station.
- **In-car Antenna:**
It is mounted inside the vehicle with the purpose to transmit the improved signals throughout the coverage area.
- **Cables:** cables for connecting indoor and outdoor antennas.
- **Mountings:** Special mountings for antennas and the booster (depends on a booster model)
- **Power Supply** (12V for a cigar lighter)



6. ANTENNAS AND CABLES SETTING UP

6.1. Outdoor antenna installation

Mount out-of-car antenna onto the car trunk fixing it on a magnetic antenna's surface.

Cable layout and connector assembly

1. Keep the type, specifications, routing direction, location and curvature radius of cables in compliance with the model requirements. Place cables in correct order, bend them smoothly, and protect the surface from any damage.
2. Place RF cables separately from power cables. Take proper isolation measures if they have to be placed on the same cable racks owing to the site condition restrictions.
3. Fasten all connection parts of the whole system in correct order, from the antenna to repeater interfaces, and make sure that the electrical interfaces are well contacted. Give waterproof treatment to outdoor connection parts.
4. Take lightning protection measures for the antenna and feeder system in accordance with the system requirements. Avoid deforming the antenna feeder where grounding clips are placed, and give waterproof treatment to the feeder.

Indoor antenna installation

1. Find a suitable position for an in-car antenna (e.g. under the seat of a driver).
2. Clear and dry the place where you're going to fix the in-car antenna. Put up the nylon strap tightly on the chosen position and stick the antenna firmly.
3. Plug in the in-car antenna into the booster interface and fasten it tightly.

7. REPEATER INSTALLATION

7.1 Installation requirements

7.1.1 Installation Location Requirements

No specific installation requirements shall be followed.

7.1.2 Power requirement

DC 12V. Connect the Power adapter to the cigar lighter.

7.2. Installation Steps

INSTALLATION STEPS

1. Find a suitable position for an in-car antenna (e.g. under the seat of a driver).
2. Clear and dry the place where you're going to fix the in-car antenna. Put up the nylon strap tightly on the chosen position and stick the antenna firmly.
3. Plug in the in-car antenna into the indoor booster interface and fasten it tightly.
4. Mount out-of-car antenna onto the car trunk fixing it on the antenna's magnetic surface.
5. Plug in the out-of-car antenna into the outdoor booster interface and fasten it tightly.
6. Connect the Power adaptor to the cigar lighter. If the indicator on the booster lights up the installation has been made correctly.

NOTE: Switch on the signal booster only after installing out-of-car and in-car antennas correctly!

7. Test the signal of your mobile telephone. After installation, mobile signal should get maximally strong within all the car area. In case the mobile connection is still instable try to change the position of the antennas for a better result.

7.2.2 Repeater's ports description

1. Outdoor port: connected with the outdoor antenna by cable
2. Indoor port: connected with indoor antenna directly or by cable (depending on a booster model)
3. Connect the Power supply into the cigar lighter.

7.2.3 Accessories selection

No need. Use standard accessories.

7.3. Repeater Settings

7.3.1. Indicator Light Instructions



Repeater Features & Settings

The Three Band repeater is a newly designed device with intelligent functions.

The repeater possesses all the features of a consumer electronic device helping to operate it via LCD touch screen on the front panel. Also it has many intelligent functions such as antenna isolation detection, input/output signal strength indication and a “smart” function.

See the detailed description below.

Five Band repeater display and operation interface



The booster is a 5 band device that supports 5 different kinds of signal:
LTE 800, GSM 900, DCS 1800, WCDMA 2100, LTE 2600.




1. **The 1st line** shows the output signal strength. 5 bars appearing next to the signal strength indicator signify the maximum output power of the repeater. **One signal bar is 5 dB.**
2. The input signal strength measured in **dBm**.
3. Indicates the frequency band of the mobile system; All signal readings correspond to the current frequency band. Since the booster amplifies several bands simultaneously, the frequency band and its readings will change every few seconds.
4. **Antenna Isolation Detection.** After switching on the repeater for the first time, it will automatically detect the oscillation between the outdoor and indoor antennas.
5. **Uplink Sleep Mode.** The uplink of the repeater is in standby mode when there is no call or data transmission. It will be activated immediately when a call or a data exchange session are initiated.
6. **UL maximum gain.**
7. **DL maximum gain.**



8. Press **“Enter”** to select or confirm the settings.



9. **Back** to the previous page or to cancel the settings.

10.  **Increase** the gain.
11.  **Decrease** the gain.
12.  **Smart** The repeater can set the gain automatically to prevent the alarm.

LED indicator status and definition

In order to maintain required output signal levels, this repeater has in-built signal oscillation detection circuit to adjust the gain automatically so as to avoid interference to the operators' cellular network.

When the **“Smart”** function is enabled, the repeater sets up the suitable gain automatically thus not causing any interference to the mobile network.

The repeater also has **Manual Gain Control (MGC)** feature that enables users/ engineers to reduce the gain of the repeater manually with the help of a touch screen, if any oscillation is detected.

In this case, the **“Smart”** function must be disabled. The repeater LED indicators will change their color in case of a too strong input signal or oscillation detected. Thus, the **Alarm LED** located on the front panel will turn from green to orange or red (depending on the strength of the input signal).



After switching on the repeater, check first the POWER and ALARM LEDs.

Status and definition of the **POWER** indicator:

Status	Definition
Green	Normal
Off	DC power problem

Status and definition of the **ALARM** indicator (**LTE800, EGSM, DCS, WCDMA, LTE2600**):

Status	ALARM
Green	It is working in linearity
	<i>Note: Input signals may be not enough, please pay attention to the readings displayed by the device. Do not do anything if it is good; otherwise please adjust the repeater system to get better source signal.</i>
Green Flickering	It is working with slight oscillation.
	AGC is activated at 1~10dB.
Orange Flickering	It is working with medium oscillation.
	AGC is activated at 11~20dB.
Red Flickering	It is working with high oscillation.
	AGC is activated at 21~30dB, and the repeater will shut off after 5 seconds of the LED flickering red.



The repeater also has a Network Safe / MUTE feature that automatically shuts off the repeater in order not to interfere with the operators' cellular network. Users shall make sure that the LED indicators remain green at all times for optimum system performance.

Manual Gain Control (MGC)



Press “” icon until you get to the uplink gain settings (the uplink gain value is flickering), then



press “” to decrease the gain as required or press “” to increase the gain, if the setting



is not proper. Please press “” again to confirm the set value.



Please proceed with the same steps for setting the downlink gain.

Smart function



The Smart function means that the repeater could set the gain automatically. Users should press to turn ON or turn OFF this function.

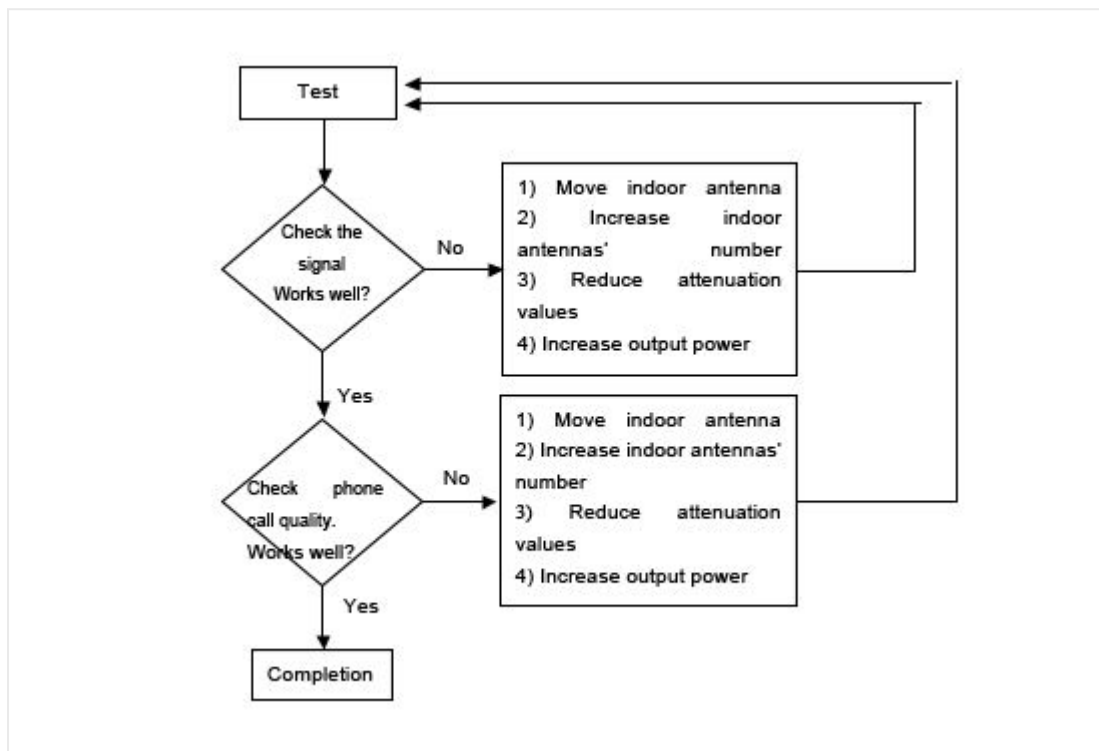
Remark: When the “Smart” function is ON, the users will not able to set the gain manually. If you need to

set the gain manually, please turn OFF the **“Smart”** function, and then follow the instructions for MGC setting.

7.4. System Test

7.4.1. Check whether the coverage is good

1. If the signals in small parts of the area have not been improved, please check the following:
 - Check whether the indoor antenna is installed correctly or not; you may try to change the antenna location to improve coverage.
 - Check if it is necessary to adjust the direction of the indoor antenna.



For maximum precision in signal level testing, switch your cell phone into Field Test Mode and see dB parameter. The closer dB signal level to 0, the better cell phone reception you'll get.

- -105 to -100 = Bad/drop call
- -99 to -90 = Getting bad/signal may break up
- -89 to -80 = OK/shouldn't have problems, but maybe
- -79 to -65 = Good
- Over -65 = Excellent

Your task is to get at least -79dB signal to ensure reliable communication and strong signal inside the building.

Remark:

- **Reduce attenuation values** * — by ensuring the isolation level
- **Increase output power** * — recommended ways: to adjust outdoor antenna direction/location, or replace it to an antenna with higher gain to increase input signal strength.

7.4.2 Repeater can not communicate in Power-ON status

The repeater's power is on but the phone cannot get connected to the network and still can not communicate.

Reason: There are loose or wrong connections in the repeater system.

Solution: Please try to fasten the connections between different parts of the system.

8. FAQ

1. Will booster increase the RF radiation?

No, it will decrease instead.

Every cell phone irradiates heavily being in zones with poor mobile signal as a cell phone is constantly in searching mode. The danger is your cell phone is about 2cm to your body, which makes its usage rather harmful. And when a booster is installed, it improves the mobile signals in the coverage, and your cell phone stops irradiating strongly, thus it will reduce the RF radiation of the mobile phone tremendously.

The maximum power level of booster is 0.01W, and it decreases to be maximum 0.001W when reaching indoor antenna. And since the indoor antenna is installed over the ceiling or onto the wall, there is usually more than 3 meter away from the human body, 3meter away means at least 40dB propagation loss, or 10000 times less, 0.0000001W, and therefore it is too weak to influence human bodies though it is still a very good signal for mobile phones.

2. If the power indicator is off after installing the repeater, what should I do?

Check if the repeater's power supply works normally or not.

3. If repeater's power supply is normal, ALM light is on or flashing all the time, what should I do?

Firstly, check whether all connectors are connected well or not. If it is all right, please, adjust the direction of the outdoor and indoor antenna. Make sure the horizontal distance is 75 feet or more, the vertical distance is 20 feet or more.

4. If the repeater and power supply are installed correctly, why the signal is still bad?

1. According to the steps above, verify if all the cables and connectors are connected correctly or not and correct the connections if necessary.
2. If connections are correct, please, adjust the direction of the outdoor antenna, point it towards BTS antenna, and make sure it can accept the strongest signal.

5. After installing the repeater, the signal is good, but the connection is slow or intermittent, or I cannot hear clearly the other side?

1. Please, check the indoor antenna position, and whether the cables and connectors are connected correctly or not.
2. Adjust the indoor antenna direction and make sure it can easily receive a cell phone signal.

9. ABOUT NIKRANS BRAND

Nikrans boosters is the result of a 7-year experience in selling cell phone signal amplifiers throughout EMEA, APAC, NAR and other regions. For all these years we've been following the market carefully listening to customers and industry leading experts with the aim of working up our own vision and quality standards in signal amplification.

Nikrans product line includes about 40 models: from basic single-band devices with 100 m² coverage to high-end all-in-one solutions covering up to 5000 m². Depending on the model, boosters operate in GSM, DCS, CDMA, LTE or combination of these standards at 850-2100 MHz frequencies. The product line is extended with a series of antennas, splitters and other accessories for completing exclusive custom projects of any difficulty level.

Nikrans product development process is rigorously assessed to comply with ISO 9001:2008 standard and implicates internal tests, which greatly ensures the quality of our goods. High product quality is also confirmed by Phoenix Testlab, Germany and is proved with CE and RoHS certificates. That's why a 3-year warranty applies to any of Nikrans boosters.

Certificates





Hereby, Nirkans declares that this signal booster is in compliance with the essential requirements and other relevant provisions of Radio Equipment Directive (RED) 2014/53/UE (CE marking).

In Norway, it is necessary to obtain the appropriate permissions from the respective service providers. The installation of Personal Repeaters must be conducted in accordance with regulations set by the Norwegian Communications Authority (Nkom).

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