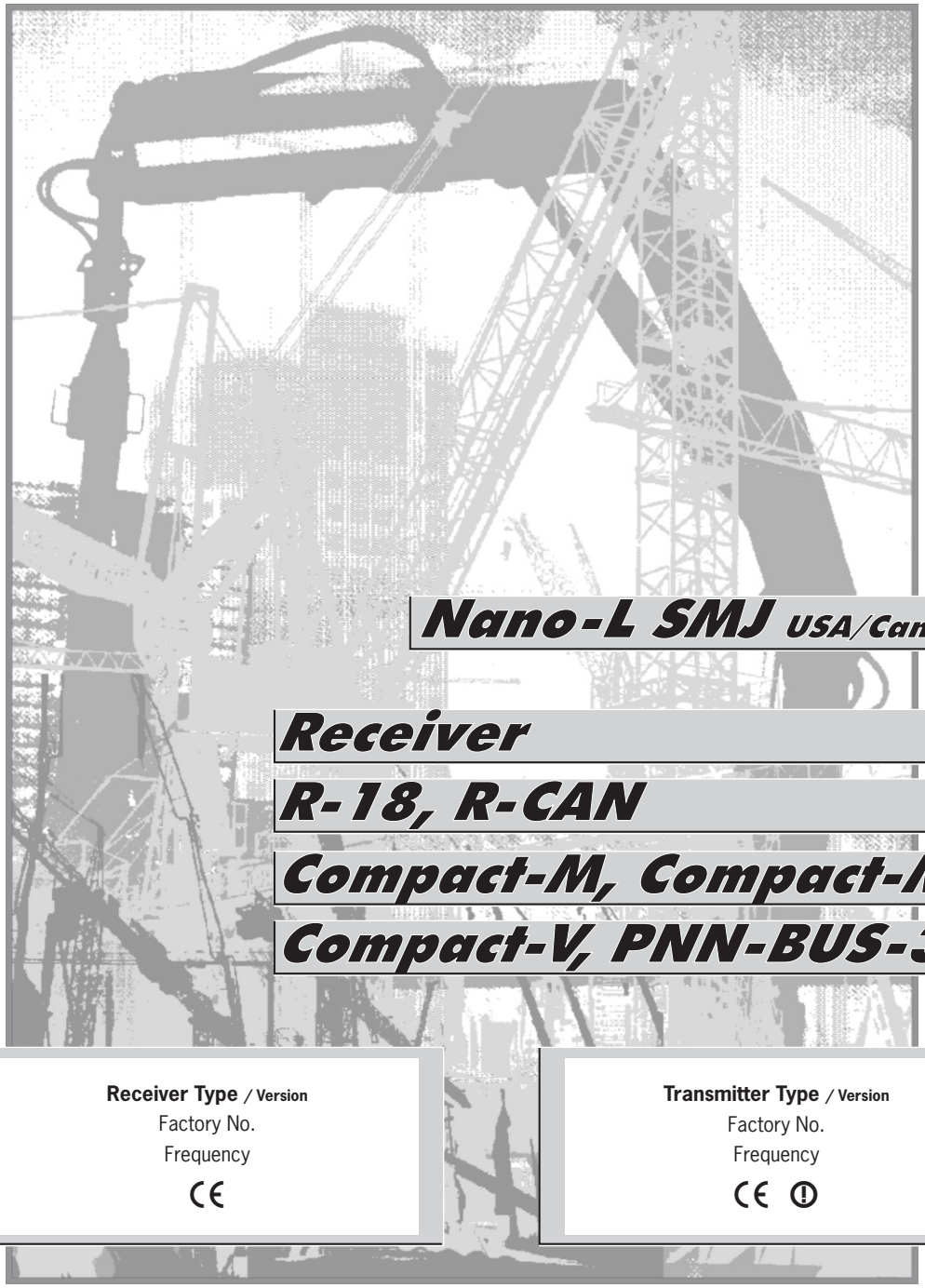
OPERATING INSTRUCTIONS



Nano-L SMJ USA/Canada

Receiver

R-18, R-CAN

Compact-M, Compact-M2

Compact-V, PNN-BUS-3

Receiver Type / Version
Factory No.
Frequency
CE

Transmitter Type / Version
Factory No.
Frequency
CE

1. STANDARD SPECIFICATION

- Portable transmitter.
- Receiver with integrated mounting holes.
- Multi-pin connecting cable for the receiver according to your specifications.

The actual delivery specification is as detailed on the confirmation of order or the delivery note accompanying the goods!

2. SAFETY PRECAUTIONS

Even if you are accustomed to working with radio control systems, read these operating instructions carefully before using this equipment. Only this document contains the latest information relating to your NBB radio control system.

For explanatory notes on obtaining an operating permit please refer to registration documents enclosed in the appendix of this operating instruction. Observe all applicable work-safety and accident prevention regulations carefully. Only fully trained, authorized personnel may use the NBB radio control equipment. Components, etc. built into the NBB equipment for safety purposes must be regularly inspected.

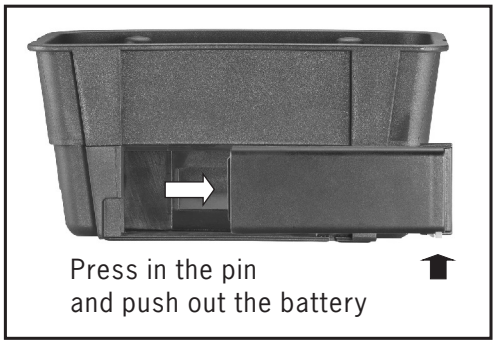
If the NBB radio control unit develops a fault, it must be shut down immediately. The transmitter should be switched off with the STOP key, resp. EMERGENCY STOP switch. The connecting cable must be disconnected at the receiver from the connecting socket (terminal) of the unit to be controlled . The repair of the equipment must not be carried out other than by NBB or an NBB authorized technician.

Failure to observe these recommendations will put both you yourself and others at risk. Under these circumstances, NBB rescinds the guarantee and any other form of liability. This radio control unit is designed exclusively for the control of construction machines and industrial plants. Only under these conditions are the safety systems (STOP, resp. EMERGENCY STOP, zero setting) fully effective. No other form of use is permitted. Any non-observance of this condition will relieve NBB of all liability.

3. TRANSMITTER

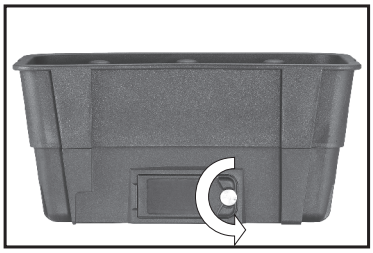
Switching on:

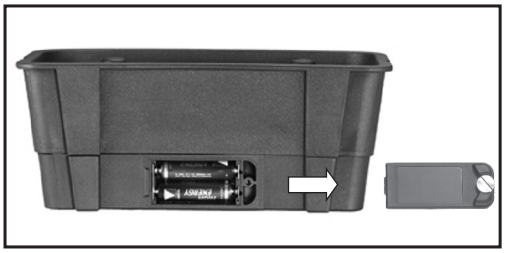
7,2V: To make the unit ready for use, insert the battery into the battery Compartment. To remove the battery, press in the pin and push out the battery.

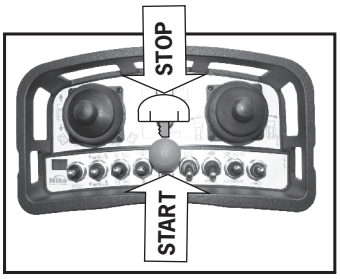


2,4V: To make the unit ready for use, unscrew the screw plug of the battery compartment on the back of the transmitter and remove the cover. Insert 2 charged AA Mignon batteries 1,2V NiMH (or batteries 1,5V - not rechargeable) into the battery compartment, close the cover and tighten the screw plug again.

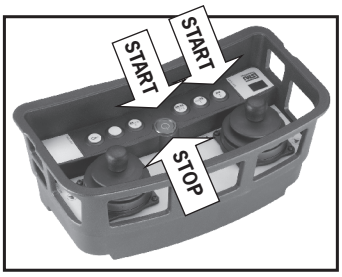
Rechargeable batteries (NiMH or NiCd) must be fully charged before first use!
Never attempt to charge standard non rechargeable 1,5V AA batteries!



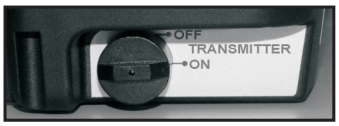




Transmitter with Emergency-Stop switch
The power supply to the transmitter is activated with the “STOP” key, resp. EMERGENCY STOP switch. (When pressed, the EMERGENCY STOP switch can also be secured by removing the key cap. EMERGENCY STOP key No. 19).
As a confirmation the **horn** will be activated briefly **two times** in a row.
A red dot flashes on the Planar- NL / Nano-L display during operation.
Commands can now be put in by means of the controls.
To turn off the transmitter push the “EMERGENCY STOP” switch.
As a confirmation the **horn** will be activated briefly **one time long continuous.**



Transmitter with Piezo button
The power supply to the transmitter is activated with the “STOP” key and the ON/HORN key. The order you push the keys doesn´t make any difference. After you push the first key, you have 5 seconds to push the second key.
As a confirmation the **horn** will be activated briefly **two times** in a row.
A red dot flashes on the Planar- NL / Nano-L display during operation.
Commands can now be put in by means of the controls.
To turn off the transmitter push the “STOP” key.
As a confirmation the **horn** will be activated briefly **one time long continuous.**



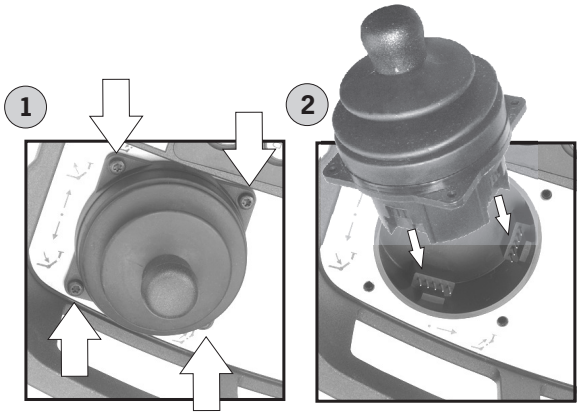
Option: Turn the switch on the side to position: ON

Operation:
The red dot flashes.

Quickly flashing:
Batteries are nearly empty. Transmitter can be operated for appr. 30 minutes more.

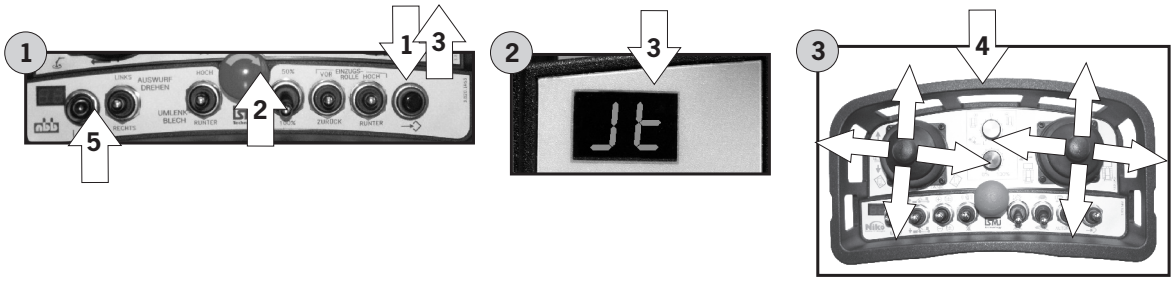
When the letter "L" flashes quickly on the Nano-L display, the battery are nearly empty. The transmitter can be operated for approximately 30 minutes more in this condition. During this time, bring the unit to a safe position, switch off the transmitter and install a charged battery.

Energy saving function: The transmitter switches off automatically, if the keys are not pressed within a specified time. The red dot goes out.
Optional: Transmitter for continuous operation possible.
**The duration of this stand-by can be specified when ordering.*

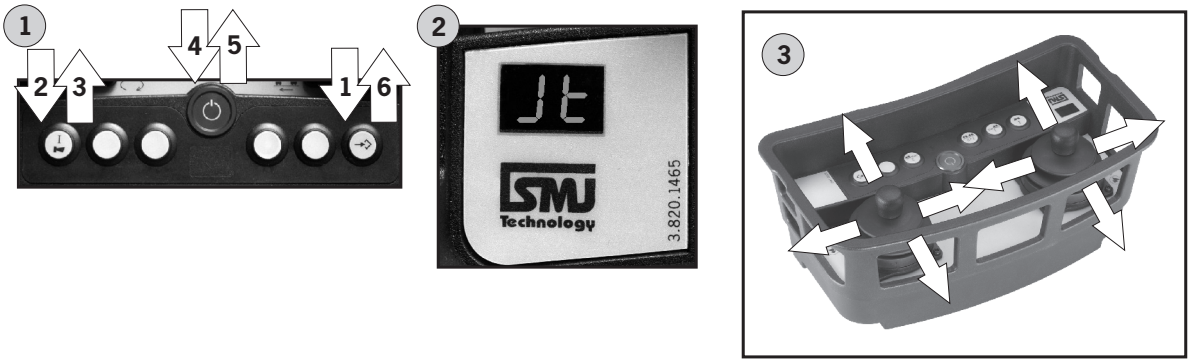


Changing the Joysticks: Unscrew and remove the 4 screws from the joystick
(witch a Torx T10 screwdriver) (1) and move out the joystick.
Insert the new joystick. Attend the orientation from the connectors (2).
Fix the joystick with the 4 screws.
After the changing, start the joystick teachmode.

Joystick teach mode activation EMERGENCY STOP switch:
• Before starting the joystick teach mode activation, please switch off
1. Push the “Frequency change” button and hold it.
2. Release the “Stop” button.
3. After a while “Jt” should be shown on the display. Now release the “Frequency change” button.
4. Please deflect all joysticks as much as possible in the same directions as shown.
5. Push the “On/Horn” button..
6. Release the “On/Horn” button.
• Troubleshooting:
If “Jt” couldn't be shown on the display please switch off the transmitter and repeat the teach mode activation procedure.



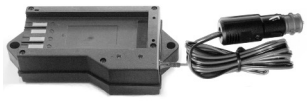
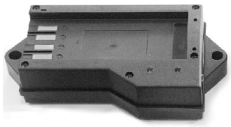
Joystick teach mode activation with Piezo:
• Before starting the joystick teach mode activation, please switch off the transmitter!!!
1. Push the **“Frequency change”** button and hold it.
2. Push the **PIEZO** and the **ON/HORN** buttons
3. After a while **“Jt”** should be shown on the display. Now release the button **“Frequency change”**.
4. Please deflect all joysticks as much as possible in the same directions as shown.
5. Press the **ON/HORN** button. Attention! Now the transmitter is on the working mode!
A red dot flashes on the display during operation.
• Troubleshooting:
If **“Jt”** couldn't be shown on the display please switch off the transmitter and repeat the teach mode activation procedure.



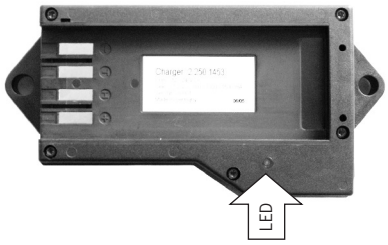
BATTERY CHARGER
L-AD72A2

For charging NiCd and NiMH batteries (7,2V).

Optional: Integrated battery charger if DC-supply: In the receivers R-16, R-CAN, Compact-M and Compact-V rapid charging in about 1 hour. In PNN-BUS-3 about 3 hours. Use this battery charger only in closed rooms.

	2.250.1449	Universal-charger (12V/24V DC), (without cable), black
	2.250.1450	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, pluggable with plug Europe (3.970.1449) and power supply (3.970.1448) (100/240V AC / 12V DC)
	2.251.1450	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, pluggable with plug USA/Japan (3.970.1451) and power supply (3.970.1448) (100/240V AC / 12V DC)
	2.252.1450	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, pluggable with plug GB (3.970.1452) and power supply (3.970.1448) (100/240V AC / 12V DC)
	2.253.1450	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, pluggable with plug Australia (3.970.1453) and power supply (3.970.1448) (100/240V AC / 12V DC)
	2.250.1451	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, pluggable at the charger, with car charger (cigarette lighter) (3.400.1451)
	2.250.1452	Universal-charger (2.250.1449) (12V/24V DC) set with 2m cable, black, not pluggable at the charger, only for car charger, with car charger (cigarette lighter) (3.400.1451)
	2.250.1453	Universal-charger (2.250.1449) (12V/24V DC) set, black, included: car charger (cigarette lighter) (3.400.1451), interchangeable ac plugs (GB, Australia, USA/Japan, Europe) (3.970.1456) and power supply (3.970.1455) (100/240V AC / 12V DC)
	2.250.1455	Universal-charger/EX black, pluggable, optional with plug Europe (3.970.1449) and power supply (3.970.1448) or car charger (cigarette lighter) (3.400.1451) (100/240V AC / 12V DC) **Only to be used outside the potentially explosive area!**

Operating instructions



Display of the charging process via a DUO-LED:

Green LED - Steady light:	STANDBY. The battery charger is ready for use. Place the battery in the charger.
Orange LED - Steady light:	CHARGING. The battery will now be charged.
Orange LED - Quickly flashing:	The charging process is finished.
Orange LED - Slowly flashing:	The battery is totally discharged or the ambient temperature is to low for quick charging. A regeneration respectively a warm-up stage occurs with a reduced charging current until it proceeds to the actual quick charging stage.

No harm will come to the battery if it is left in the charger beyond the required charging time. Use this battery charger only in closed and dry rooms!

7,2 V Battery

Before first use, fully charge batteries!
To prevent damage to the batteries never use discharged batteries!
Only charge fully discharged batteries!
Therefore please work with your control until the capacity of the battery is totally exhausted.
The battery reaches the maximum energy storage capacity only after at least 5 times charging and discharging completely!
Discharge the battery completely in the operating unit before charging once more. The charging time depends on the type of battery. It is normal that the battery warms up during charging or longer use. Charge the battery in an ambient temperature range of 10°C up to 35°C. To avoid deep discharging the battery should be charged frequently once a month. No legal liability for follow-up damages. Deep discharging and extreme temperature damages the battery. Especially heat reduces the efficiency. If the temperature of the battery is too high or too low the charging process will not start to prolong the durability of the battery.
Keep the battery in the charged state in a cool and dry place.

Safety precautions

Do not open, modify or burn the battery. Do not drop the battery and don't expose it to blows or knocks. Protect the battery against rain, wetness or extreme temperature. Keep the contacts clean and don't get the battery in touch with metal objects (aluminium foil etc.). Do not short-circuit the battery.

A charged battery is a concentrated energy source. Never store a charged battery in a toolbox or similar where it could be short-circuited by metal components (even a key in your trouser pocket can cause a short circuit).

Waste disposal

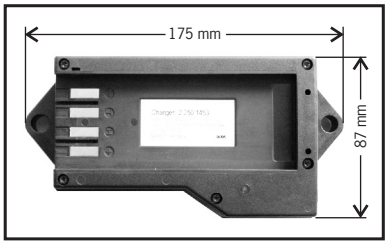
Do not drop used up batteries into the domestic waste. Hand over the batteries to collective point.

Warranty

By damages, defects or premature wear caused by non-observance of the above described operating and safety instructions all warranty claims expire.

Technical data

Power supply via 12V / 24V on board or external power supply.
Range of voltage: 9V - 32VDC (Note: Below 10V the charging process takes longer).
Power supply via hollow plug (Outside diameter = 5,5mm, inside diam. - = 2,1mm)
The parameters of specific accumulators can be adjusted (Delta Peak, dT/dt, charging current, timeout)
AD-changer: 10Bit resolution



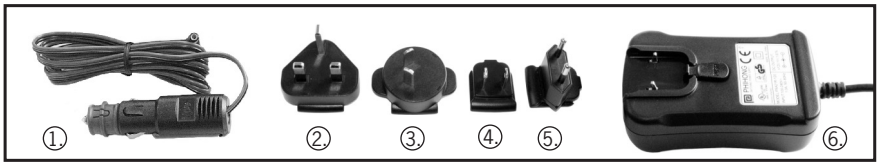
Dimensions: 175 x 87 x 43 mm

Identification of charging stop by:
Delta Peak (minus Delta U to maximum voltage)
dT/dt (Velocity of rise in temperature)
Timeout (shut down of time of charging)

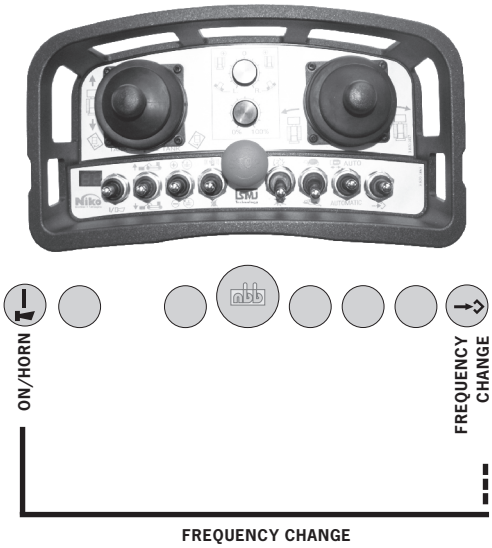
Identification and evaluation of the following starting states:
Undervoltage: Pre-charging with reduced charging current
Untertemperatur: Pre-charging with reduced charging current (warm-up)
Overvoltage: No starting of the charging prosess
Shut down after reaching the maximum of temperatur.
Error memory to collect data of abort of charging.

Components:

1. Car charger (cigarette lighter) (3.400.1451), interchangeable ac plugs
(2. GB (3.970.1452), 3. Australia (3.970.1453), 4. USA/Japan (3.970.1451),
5. Europe (3.970.1449)) and 6. Power pack (3.970.1448).



4. OPERATING THE UNIT



Safety equipment in the NBB-radio remote control:

In the transmitter, this comprises mainly:

- STOP, resp. EMERGENCY STOP with disconnection of the power supply.
- Automatic zero positioning.

In the receiver:

- Automatic zero setting when switching back on after radio interruption.
- Locking of the radio commands at relay level in the event of a defective STOP, resp. EMERGENCY STOP circuit.

To ensure fault-free operation, please follow precisely the following rules for operation: The unit to be controlled can only be switched on - it is assumed that the transmitter is ready to operate - when no command unit is actuated. The command necessary to do so is triggered by the key "ON/HORN". This triggers a horn signal in the unit to be controlled. After switch-on of the facility to be controlled, this key is used for repeated emission of the horn signal in accordance with working regulations.

If the NBB radio remote control is not used for a long period, it is urgently recommended - if you use rechargeable batteries - that they should be charged now and again (about every 4 weeks). This prevents deep discharges of the batteries and prolongs their useful life. If you shut down the NBB radio remote control for a long period, we recommend you take the batteries out of the transmitter.

Frequency change:

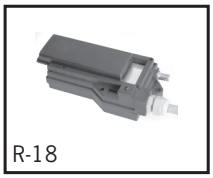
To change the frequency, keep the "ON/HORN" key pressed down. Then operate the “FREQUENCY CHANGE" key. If the receiver locks into the new frequency, a horn signal is given (if present) and the unit to be controlled is ready for operation.

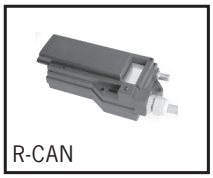
Please observe the particular postal approval regulations of the concerned country.

Channel number: When changing the frequency the channel number lights up shortly in the display. During operation the choosen channel can be shown by pressing the “FREQUENCY CHANGE” key.
(See example on the left)

5. RECEIVER

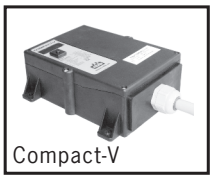
R-18,
R-CAN,
Compact-M,
Compact-M2,
Compact-V
PNN-BUS-3

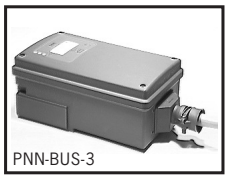

R-18


R-CAN

Compact-M

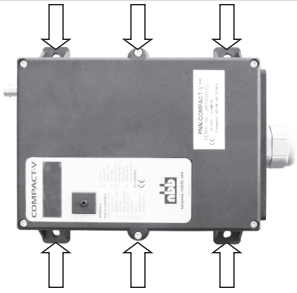
Compact-M2

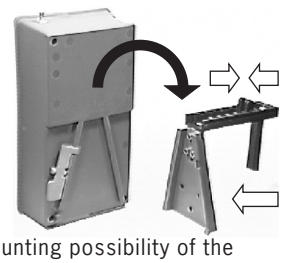

Compact-V


PNN-BUS-3

Mounting possibility of the receiver R-18, R-CAN,Compact-M.

Mounting possibility of the receiver Compact-M2.

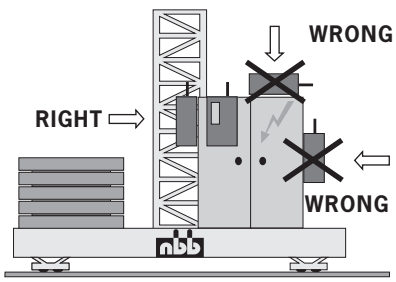

Mounting possibility of the receiver Compact-V.


Mounting possibility of the PNN-BUS-3.

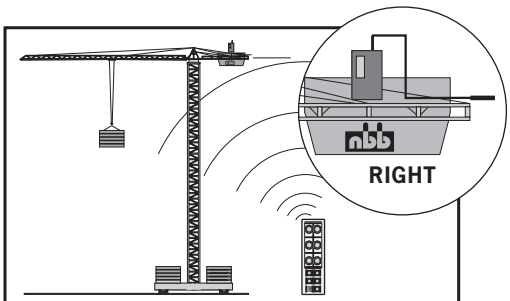
The receiver is connected to the unit to be controlled with the multi-pin connecting cable supplied. Please observe the instructions issued by the manufacturer of the unit to be controlled! **We recommend urgently to realize this connection via a central, well accessible, multi-pin plug connector (for example HTS-plug connector series HE/HB/HN/HA or comparable ones of other manufacturers) to make possible a quick and clear fault diagnosis in the service case and to take off the receiver without an expenditure of assembly.**

The power supply of the receiver is generally effected by the connecting cable.

- **In general, an earth lead is required in case the units to be controlled have not previously been operated by radio control. Failing this, the receiver electronic circuit will not receive any power supply. Ensure that the operating voltage of the receiver complies with the electrical specifications of the unit to be controlled. The applicable operating voltage is specified in the supplement.**
- **Never expose the receiver to a high pressure cleaning jet. This applies to the transmitter also.**
- **The receiver should always be fixed vertically at the outside panel of the switching cabinet. (The antenna should always reach over the top of the panel.)**
- **You have to make sure that the antenna is not shielded by metal parts totally or partly.**
- **Mounting the receiver in a cabine or in a switching cabinet the antenna should be layed with an extension cable to the outside and be attached with the fastening strapping as horizontally as possible with distance to the shielding metal parts.**
- **In general the antenna should always be mounted in such a way so that the antenna is still visible with each change of position of the transmitter.**



Mounting on a tower slewing crane.



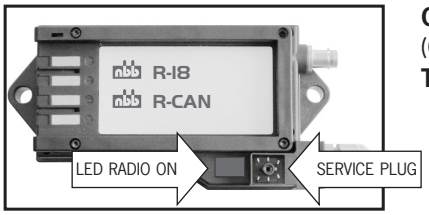
Top slewing crane: Mount the antenna with extension cable horizontally.

6. FUNCTION CHECK

To maintain operational safety, a regular function check of the NBB radio remote control is necessary. In single-shift day-to-day operation, we recommend performing this check at least once a week. Checking is possible using the display lights provided on the receiver. To do so, the transmitter must be set to the ready-to-operate state.

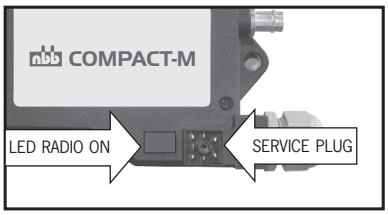
First connect just the receiver - the transmitter remains switched off.

- Activate the transmitter by pressing the "STOP" key, resp. the key "START/ ON/ HORN".
- Now check the commands (always start with the lowest stage) and check for correct function of the unit to be controlled.
- Ensure in particular that there is nobody in the danger area. **ACCIDENT RISK!**
- **STOP**, **check**. Press the STOP key at the transmitter until the switch engages. Then observe if the unit to be controlled is switched off (time to switch off according to the application).



Checking the LED display at the receiver R-18 and R-CAN:
(Optional with integrated charger)

The green LED flashes: RADIO PRESENT.
If the LED fails to come on:
1. Check that the transmitter is on.
2. Check the power supply of the receiver.
3. (Optional) Irregular flashing of the LED:
Check or change the current radio channel.



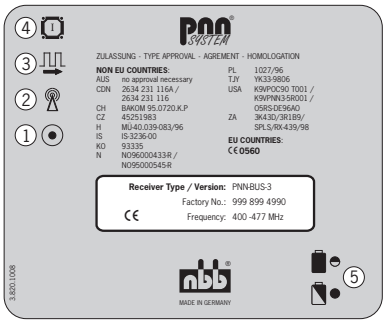
Checking the LED display at the receiver Compact-M:
(Without integrated charger)

The green LED flashes: RADIO PRESENT.
If the LED fails to come on:
1. Check that the transmitter is on.
2. Check the power supply of the receiver.
3. (Optional) Irregular flashing of the LED:
Check or change the current radio channel.

Checking the LED's at the receiver Compact-V:

- **LED 1 green:** POWER ON. If LED fails to come on, check the power supply. If the power lead is OK, call in the after-sales service.
- **LED 2 yellow:** HF PRESENT. Steady light when transmitter is switched on (insignificant for scanner operation).
- **LED 3 green:** Flashes evenly during fault-free operation. Irregular flashing means that the HF channel is probably at fault - please set another channel.
- **LED 4 red:** If this LED flashes, the HF channel is at fault (not in the scanner operation). Steady light notifies the operator that an output function is critical due to over current.

Service plug: **For NBB service only.**



Checking the LED's at the receiver PNN-BUS-3:

- **LED1:** POWER ON. If LED fails to come on, check the power supply. If the power lead is OK, call in the after-sales service.
- **LED2:** HF PRESENT. Steady light when transmitter is switched on (insignificant for scanner operation).
- **LED3:** Flashes evenly during fault-free operation. Irregular flashing means that the HF channel is probably at fault - please set another channel.
- **LED4:** If this LED comes on, the HF channel is at fault.
- **LED5:** Charge condition display of battery (only present when charger is integrated). Steady light when charging a battery. LED flashes: The battery is charged, the charging process is finished.

7. RATING PLATES

The rating plates state the type of transmitter or receiver, the factory number, the frequency range and the approval number for non EU countries.

Always state the factory number in all your queries.

Example:

Transmitter Type / Version:	**MS**
Factory No.:	999 899 4990
Frequency:	402 -470 MHz
	CE ⓘ

Receiver Type / Version:	**Compact-V**
Factory No.:	999 899 4990
Frequency:	402 -470 MHz
	CE

8. MAINTENANCE

Your NBB radio remote control is largely maintenance-free. Nevertheless, please bear in mind the following points:

- The STOP key, resp.the EMERGENCY STOP switch must be easy to move.
- Remove any leftover building materials!
- During electro-welding work on the unit to be controlled, disconnect the receiver from the current supply! Otherwise there is a risk of damage to the receiver's electronic system!
- Check wear and tear parts like dust shield tops regular!

9. WARRANTY

We grant a function warranty for 12 months after the sale date for all NBB radio remote controls (transmitter, receiver, charger). The warranty covers working time and material used. Shipping costs shall be charged to the customer. The warranty shall not cover: wear and tear parts, relays and batteries. The function warranty shall be invalidated in the case of damage, accident damage, negligence, incorrect use, non-compliance with operating conditions, non-compliance with operating, testing and maintenance instructions, and repairs or unit modifications not authorised by NBB.

NBB shall not be liable for indirect damage and reserves the right to decide on repair or replacement.

10. IN CASE OF DEFECTS

Do not attempt to continue working with a defective NBB radio remote control. Even initially minor defects might be the start of a more extensive defect.

Do not try to repair the NBB radio remote control yourself. If there is any fault please contact your dealer or our company.

11. US-FCC and CANADA IC

USA:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ATTENTION:

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment!

IC CANADA:

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hcsc.gc.ca/rpb

This device complies with Industry Canada license-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada exempt de licence Rss standard(s).
Son fonctionnement est soumis aux deux conditions suivantes :
(1) cet appareil ne peut causer d'interférences, et
(2) cet appareil doit accepter toute interférence, y compris des interférences qui peuvent provoquer un fonctionnement indésirable du périphérique.

TECHNICAL DATA

Operating ambient temperature	-20 bis +65 °C
Insulation class - Protection	IP 65

TRANSMITTER SMJ

Transmission frequency range	see rating plate

The use of synthesizer technology permits frequencies to be selected in accordance with the appropriate waveband for the country of use.

Low frequency modulation	FSK signal to CCITT V.23
Data repetition rate	60 ms
Baud rate	1200 - 9600 Baud (Bit / sec.)
Range	300 - 1000 m
Power input	60 - 100 mA
RF ouput	< 10 mW
Weight (without battery)	1,0 kg
Size (L x W x H)	Nano-L SMJ: 24,7 x 13,9 x 11,7 cm Planar NL SMJ: 24,8 x 13,7 x 9,6 cm
Power supply	2 x rechargeable batteries 1,2V AA NiMH (or 2 x batteries 1,5V - not rechargeable)
Operating duration	Planar NL SMJ: >30h (2000mA/h NiMH Akkus) Nano-L SMJ: 7,2V / 1000mAh

RECEIVER R-18, R-CAN, Compact-M, Compact-M2, Compact-V, PNN-BUS-3

Reception frequency range	see rating plate

Data security:
Generates a CRC code with a Hamming distance = 4. Generates a neutral position.
Addressing of each transmitter with its own, unique combination (max. 2^{16} possible combinations).

Security	EMERGENCY STOP with self test.
max. switching voltage	250V AC (12V / 24V DC - R-18, R-CAN, Compact-M, Compact-V)
max. switching current	4A AC (3A DC at 12V / 24V - R-18, R-CAN, Compact-M, Compact-V)
max. switching power	1000 VA

	Weight	Size (L x W x H)
R-18, R-CAN (potted)	640 g 800 g	18 x 9,7 x 4,4 cm
Compact-M (potted)	640 g 800 g	18 x 9 x 7 cm
Compact-M2 (potted)	640 g 800 g	15,1 x 11,3 x 6,1 cm
Compact-V (potted)	1,5 kg	21,5 x 16 x 6,5 cm
PNN-BUS-3	3,0 kg	30,6 x 18,1 x 13 cm

BATTERY 7,2V / 1000mAh

CHARGING UNIT

Operating voltage / external charging unit	12V/24V DC, AC-DC changer 100/240V AC / 12V DC
Operating voltage / PNN-BUS-3 / PNN-BUS-5	40V-230V AC, 8V-32V DC, 12V / 24V DC
Operating voltage / R-18, R-CAN / Compact	12V / 24V DC

APPROVALS AND CERTIFICATES

Approvals EU countries: CE

Enclosure:

EC Declaration of Conformity

Obtainable at demand:

M-Zert mbH
Certificate DIN EN ISO 9001:2000-12 No. 03022

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Technische und konstruktive Änderungen vorbehalten.

Bedienungsanleitung Nano-L SMJ, R-18, R-CAN, Compact-M, Compact-M2, Compact-V, PNN-BUS-3,
Englisch, Teile-Nr. 3.150.1281, Stand 11.11