



SmartPlat

Bluetooth System with Voice Communication Device for Vertical Platform Technical Description

Rev. 27/09/2023

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1 - Introduction

The SmartPlat is a system used for the cable-free control of "Vertical Platform" according to the definition of the UNI EN 81.41 and UNI EN 81.40.

The PlatForm system implements the functions of "Cableless Controls", (in compliance with the UNI EN 81.41 norm, Paragraph 5.5.17), which constitutes a system that allows you to send to the Vertical Platform remotely, without connection cables, the commands that move it.

The SmartPlat system can also be configured to be used as a "Bi-directional voice communication device" (in compliance with UNI EN 81.41 , Paragraph 5.5.16.1).

The SmartPlat system, in its various configurations, is created according to the architecture illustrated in Fig. 1.

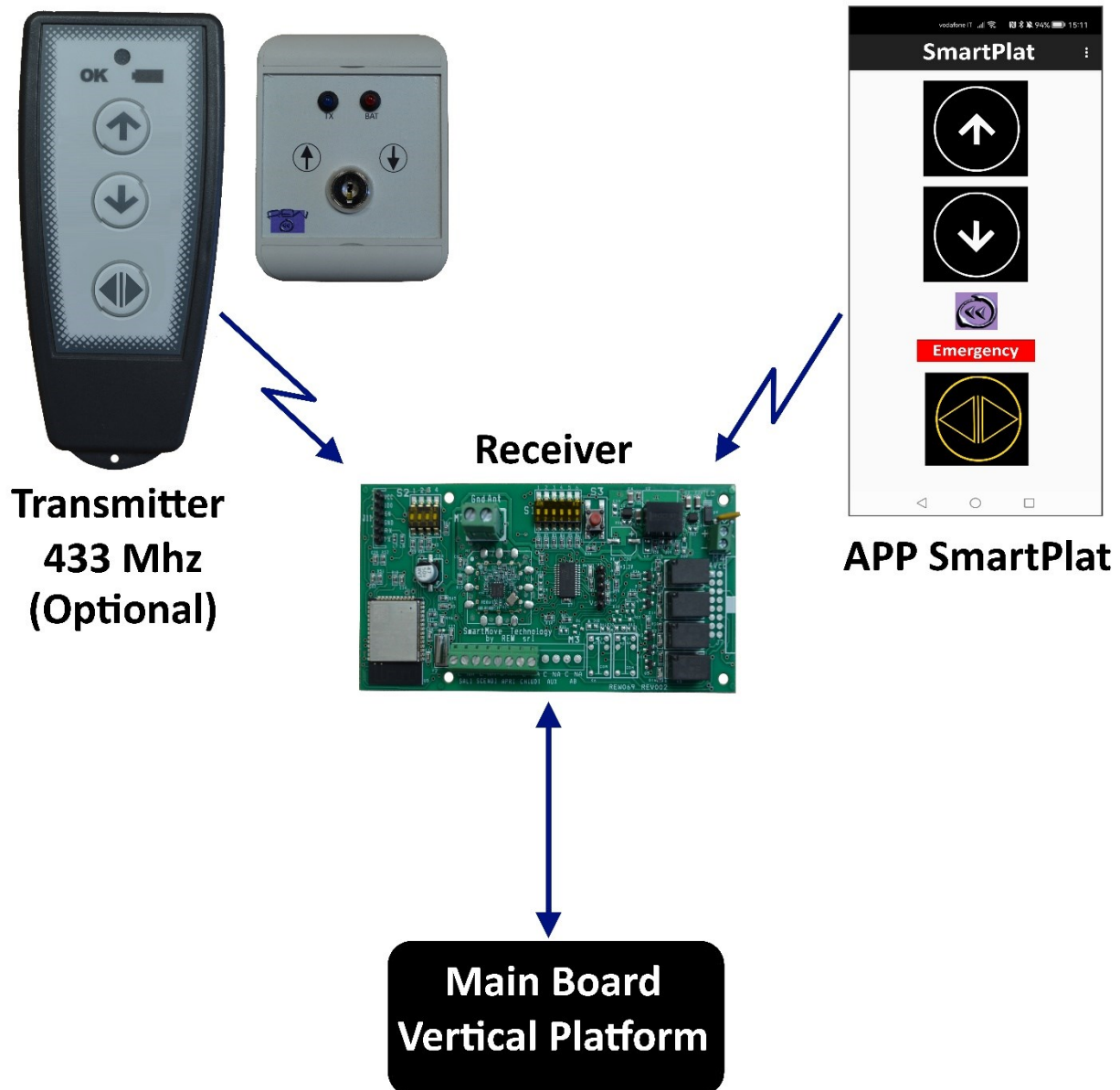


Fig. 1



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It is composed of the following devices:

- **SMARTPHONE (WITH IOS or ANDROID OPERATING SYSTEM) EQUIPPED WITH “SmartPlatUser APP”.**

Using a smartphone, with the above-mentioned APP installed, the user can send the commands via the BLUETOOTH connection. Once the APP has been launched, the smartphone connects with the Receiver via Bluetooth and allows commands to be sent (Up, Down, Opening), as highlighted in fig. 4:

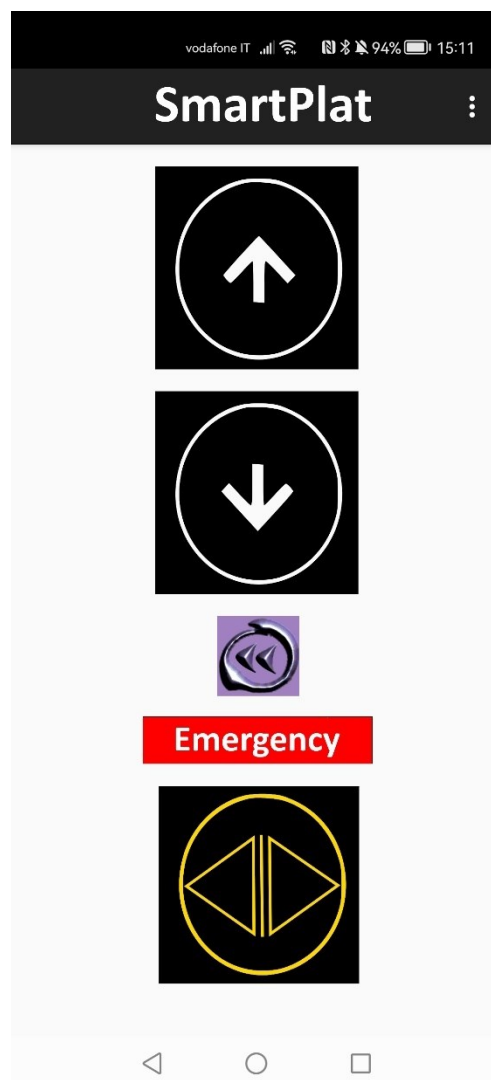


Fig.4



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• **RADIO 433Mhz and BLUETOOTH RECEIVER.** The radio receiver is an electronic board that receives commands from the smartphone, via Bluetooth, and sends them to the electronic control board of the Vertical Platform.

The interface between the receiver and the electronic control board depends on how the latter is designed. The radio receiver adapts to the interface with which the electronic control board is equipped. The Radio Receiver consists of a "PFREW-RXSRV-yxxx" RECEIVER board. The electronics of the board that manages the functions of the Radio Receiver is always the same, only the shape of the board and the type of connection with the control board of the vertical platform are changed to adapt them to the needs of the vertical platform manufacturer.

An example is presented in Fig. 5:

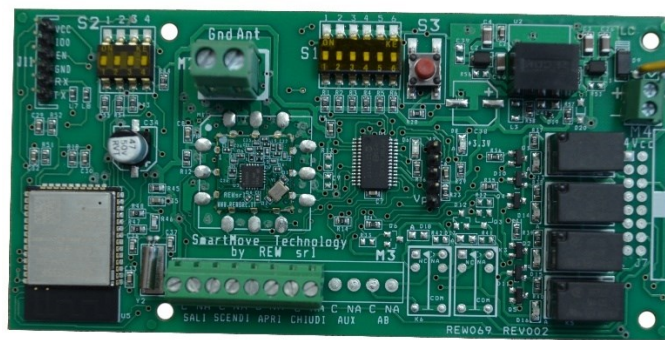


Fig.5

REW srl designs receivers with different interfaces to adapt to the Vertical Platform control board:

- "PFREW-RXSRV-Axxx" Receiver with relay interface
- "PFREW-RXSRV-Bxxx" Receiver with serial RS232 interface
- "PFREW-RXSRV-Cxxx" Receiver with NPN/PNP transistor interface
- "PFREW-RXSRV-Dxxx" Receiver with I2C interface
- "PFREW-RXSRV-Exxx" Receiver with SPI interface

If required, the receiving board can be equipped, in addition to the Bluetooth system, also with a 433 MHz reception system so as to allow the use of handheld or fixed radio controls (Optional) operating at 433 MHz described below. In this configuration the vertical platform can be controlled both through the APP and with the 433 MHz transmitters.

In compliance with 81.41, the execution of the commands received can only be carried out in safe conditions as established by the norm. This control is delegated to the vertical platform control board, which manages all aspects related to the safety of the system. The 81.41 establishes that "Cableless commands", the category to which SmartPlat system belongs, must not be part of the safety systems of the vertical platform..

SmartPlat implements the following functions defined in the UNI EN 81.41 norm in a single system:

- Paragraph 5.5.17 – Cableless Commands
- Paragraph 5.5.16.1 - Bi-directional voice communication device

The SmartPlat system, for the uses listed above, is NOT to be considered a "safety device" in compliance with the UNI EN 81.41 norm.



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• **RADIO Transmitter at the FLOOR.** The SmartPlat system can also be equipped with fixed floor or portable transmitters operating at 433 MHz. This configuration is optional and allows the use of the vertical platform both with the APP and with 433 MHz radio transmitters. Some examples are presented in Fig. 2:



Fig. 2

All types of transmitters, both handheld and at the floor, whatever the external appearance, they consist of a "PFREW-TXSRV-Axxx" TRANSMITTER board which changes from one to the other only in terms of shape. The electronics of the board are always the same but the shape of the board is changed to adapt it to the cases and the customer's needs.



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2 - SmartPlatUser System Description

The SmartMoveUser system allows you to use a SmartPhone to operate and move the vertical platform.
The system includes two APPs:

1. APP SmartPlatUser (for the users)
2. APP REWInstallatore (for installers to install the system)

The system provides for the configuration of the receiving device through the REWInstaller APP. During this configuration the installer will have to choose and enter his own installer code (which he can also use for other systems) and a user password common to all users which will allow the use of the SmartPlatUser APP on the configured vertical platform.

Every new user who needs to use the vertical platform will have to download and install the SmartMoveUser APP on their Smartphone and enter, upon first access, the password provided by the system administrator or installer. This allows immediate use of the vertical platform without the installer having to go to the system.

2.1 – MINIMUM SYSTEM CHARACTERISTICS

The minimum characteristics of the smartphones on which the APP is installed are the following:

- Android 4.4 or higher
 - ios 16 or higher (from Iphone 8 to higher)
- Attention!!!! Make sure your Smartphone has enabled:
- Bluetooth
 - Gps (location or position)

N.B. The GPS must be turned on to use Bluetooth BLE. If during installation the Smartphone asks for authorization regarding the "position" select "always" or "when using the APP"

2.2 – EXAMPLE OF USE

To make the concept of using the SmartPlatUser system clearer, let's make an example of use:

Installer use

1. The installer downloads and installs the "APP REWInstaller" version on his Smartphone"
2. After clicking and starting the APP, through the present procedure, the installer selects the receiving device present on board the vertical platform.
3. Through the menu in the APP, the installer chooses his installer code which will be stored in the receiving device on the machine (operation to be carried out only once).
4. Through the menu in the APP, the installer chooses a user code which will be stored in the receiving device on the machine (operation to be carried out only once). This user code will then be communicated to all users who will use the machine or to the system administrator.



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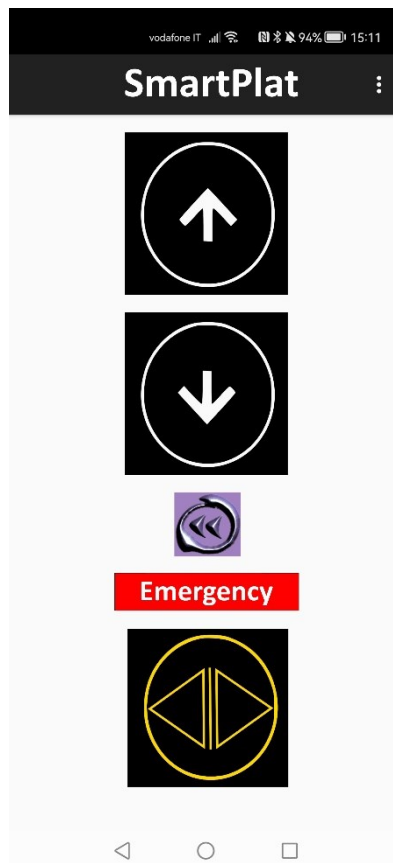
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User use

1. The user downloads and installs the "APP SmartPlatUser"
2. After clicking and starting the APP, through the automatic procedure, the user associates the receiving device on the machine with his Smartphone (an operation to be carried out only once, the subsequent times the recognition will be carried out automatically).
3. The user enters the user code provided by the installer or system administrator (operation to be carried out only once).
4. Now the Smartphone is ready for use. Every time the user wants to use it, he will have to open the APP and use the buttons on the screen to control the machine. Each new user will be able to enable their Smartphone using the user code provided at the time of installation.

5. Once the APP has been launched, the smartphone connects with the Receiver via Bluetooth and transmits a "connection present" Bluetooth command with a frequency of 0.5Hz". This command allows the Receiver to know that there is a smartphone capable of sending Bluetooth commands and to have information on the distance of the smartphone. When the user presses a command on the "SmartPlatUSER" APP (Up, Down, Opening), the relevant Bluetooth command is sent to the Receiver and the transmission of the "connection present" command is interrupted.

Every time the APP is launched, your device will show the main screen. By clicking on this, the screen will display the "UP-DOWN-OPEN" buttons.





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By clicking on one of these buttons, the button image will be enlarged to allow the command by touching a larger area.



When the APP sends a command it transmits a data packet to the receiver which contains the following information:

- Command to execute: UP, DOWN, OPENING PLATFORM.
- vertical platform Code: This is an identification code set at the time of installation. The receiver considers valid only messages that have the correct vertical platform code.
- Password: This is a password set at installation that can be changed by the user at any time. The receiver only considers messages that have the correct password to be valid.

The features listed above make the Bluetooth system compliant with UNI EN 81.41 regarding requirement 5.5.17.1

BLUETOOTH system is “hold-to-run command”: as long as the APP button is pressed the relevant Bluetooth command is sent; as soon as the button is released the command is no longer transmitted.

The APP can be customized by adding functions and buttons.



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3 – Bi-directional Voice Communication Device

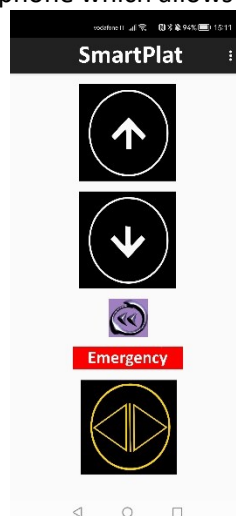
The “PFREW-RXSRV-Axxx” receiver can be configured to implement the “Bi-directional Voice Communication Device” functionality, according to the indications of the UNI EN 81-40:2021 norm paragraph 5.5.16.1. The operating logic is described below.

1 – The “PFREW-RXSRV-Axxx” receiver is equipped with a relay (ENABLE relay which provides a normally open contact to be used within the aforementioned functionality). The ENABLE relay must be connected to the vertical platform in series with the safety chain, upstream of the connection of the on-board controls. In this way the vertical platform can not be used from on board if this relay is not activated by the radio/bluetooth receiver.



2 – The radio/Bluetooth receiver is equipped with an opto-isolated digital input, dedicated to maintaining the ENABLE relay ON. This input must be connected to the vertical platform signal which indicates that it is moving.

3 – The enabling of the vertical platform is activated according to the following methods:
The user activates the APP on the smartphone which allows to control the vertical platform.



The activating of the APP, if the smartphone on which it runs is sufficiently close to the vertical platform, determines the activation of the ENABLE relay on the receiver. This relay remains active until the smartphone communicates to the receiver his presence near the vertical platform. When this communication ends, the ENABLE relay remains activated for 30 seconds, after which it deactivates.



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Once activated as described above, the ENABLE relay still remains active in the following circumstances:

- There is any UP, DOWN, OPENING command coming from the radio transmitters or from the smartphone via the APP.

- The receiver input signal is active, indicating that the vertical platform is moving.

The enabling remains active as long as the presence of one of the two aforementioned conditions persists. When both conditions ends, the ENABLE relay remains active for 30 seconds, after which it deactivates.

4 - The operating mode described above guarantees that the user of the vertical platform has the smartphone with him while using it and therefore, in case of need, if it breaks, he is able to call the necessary assistance. For this reason, the system described is to be considered compliant with UNI EN 81.41 paragraph 5.5.16.1.

5 – The use of the "Bi-directional Voice Connection" system described above is facilitated by the presence on the APP of an emergency button that allows you to call one or more preset telephone numbers.

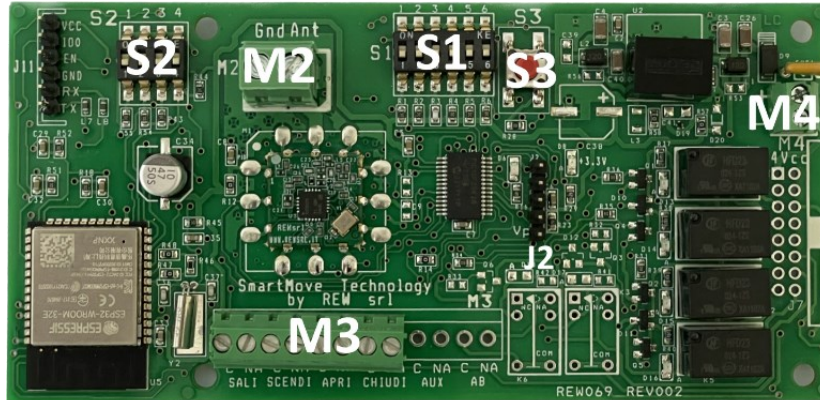


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4 - Radio/Bluetooth Receiver “PFREW-RXSRV-xxxx”



- The radio/bluetooth receiver is a device with two distinct sections:
- 433 Mhz radio section (Optional)
- Bluetooth Section

The 433 Mhz radio section is able to work with all “PFREW-TXSRV-Axxx” transmitters.

The Bluetooth section works via APP on Smartphones with Android or IOS operating systems

4.1 - CONNECTIONS

Terminal Block M4 (24Vcc)

PIN	Description
+	Alimentazione + 24VDC
-	Alimentazione GROUND VDC

Terminal Block M2 (Antenna 433 Mhz)

PIN	Description
Ant	Antenna + 433 Mhz
Gnd	Antenna – 433 Mhz

N.B.: The antenna of the receiving device consists of a rigid single-pole wire.
For optimal operation of the receiver, the antenna must be orthogonal to the ground.



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Terminal Block M3 (OUT)

The TERMINAL BLOCK M3 for command output to the vertical platform control board is customized based on the characteristics of the control board to which the receiver must be connected.

An example of a PFREW-RXSRV-Axxx receiver (Receiver with Relay Interface) is the following:

PIN		Description
UP	C	UP command output - COMMON
	NA	UP command output - NO
DOWN	C	DOWN command output - COMMON
	NA	DOWN command output - NO
OPEN	C	OPENING command output - COMMON
	NA	OPENING command output - NO
CLOSE	C	RESERVE Command output - COMMON
	NA	RESERVE Command output - NO
AUX	C	RESERVE Command output - COMMON
	NA	RESERVE Command output - NO
AB	C	RESERVE Command output - COMMON
	NA	RESERVE Command output - NO

Relais MAX Current: 1 Amper - 24 Vdc

4.2 – TECHNICAL CHARACTERISTICS

- Power Supply: 24 Vcc +- 10%
- Max. supply voltage: 28Vcc
- Absorption: about 200 mA
- Number of band channels 433 Mhz: 16 (from 433,150 Mhz to 434,650 Mhz)
- Band channeling 433 Mhz :100 KHz
- Section deviation 433 Mhz: +- 25 KHz
- 433 MHz section modulation type: GFSK
- Maximum transmission power in the 433 MHz section: 0 dbm
- 433 MHz section sensitivity: about -110 dbm
- Bluetooth section: V4.2 BR/EDR and LE
- Bluetooth section power: 0 dbm (typical)
- Bluetooth section power range: from -12 dbm to + 9 dbm
- Bluetooth section sensibility: -89 dbm



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4.3 – DIP SWITCH S1 CONFIGURATION

The 433 MHz section can be configured via dip switch S1.

Like the transmitter, the radio channel used can be selected on the receiver.

The receiver is delivered from the factory with channel 1 selected.

The dip switches from 1 to 4 allow you to select the reception FREQUENCY up to a maximum of 16 channels (from 433.150 MHz to 434.650 MHz), according to the indications in the following table:

S1-1	S1-2	S1-3	S1-4	Reception frequency
OFF	OFF	OFF	OFF	1 (433,150 Mhz)
ON	OFF	OFF	OFF	2 (433,250 MHz)
OFF	ON	OFF	OFF	3 (433,350 Mhz)
ON	ON	OFF	OFF	4 (433,450 Mhz)
OFF	OFF	ON	OFF	5 (433,550 Mhz)
ON	OFF	ON	OFF	6 (433,650 Mhz)
OFF	ON	ON	OFF	7 (433,750 Mhz)
ON	ON	ON	OFF	8 (433,850 Mhz)
OFF	OFF	OFF	ON	9 (433,950 Mhz)
ON	OFF	OFF	ON	10 (434,050 Mhz)
OFF	ON	OFF	ON	11 (434,150 Mhz)
ON	ON	OFF	ON	12 (434,250 Mhz)
ON	OFF	ON	ON	13 (434,350 Mhz)
ON	OFF	ON	ON	14 (434,450 Mhz)
OFF	ON	ON	ON	15 (434,550 Mhz)
ON	ON	ON	ON	16 (434,650 Mhz)

N.B.: Be careful to set all the transmitters and receivers relating to the same installation on the same radio channel.

4.4 – UP/DOWN COMMAND REVERSE

In the receiving device, the UP and DOWN outputs can be inverted via dip switch 5.

When S1-5 is OFF the UP output is activated in correspondence with the UP command of the transmitter and the DOWN output is activated in correspondence with the DOWN command of the transmitter.

When S1-5 is ON the UP output is activated in correspondence with the DOWN command of the transmitter and the DOWN output is activated in correspondence with the UP command of the transmitter.

4.5 – SETTING SELF-HOLDING TIME AND COMMAND

When the receiver "loses" a 433 MHz radio command, the command that had been received up to that moment is maintained for a SELF-HOLD time which can be configured via dip switch S1-6, according to the following table:

S1-6	SELF-HOLDING time (seconds)
OFF	1,5 (sec)
ON	3 (sec)

During operation, the transmitter provides the stop command when one of the commands is released. This allows the relays to de-energize immediately.



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The self-holding time intervenes only and exclusively if the radio signal is momentarily lost for a few moments.

4.6 – FUNCTIONING

The “PFREW-RXSRV-Axxx” receivers with relay interface and “PFREW-RXSRV-Cxxx” with NPN/PNP transistor interface are equipped with 6 digital outputs listed below.

- Digital output UP: The relay or transistor is closed when the receiver receives a radio UP or DOWN command based on the configuration of the dip switch S1-5.
- Digital output DOWN: The relay or transistor is closed when the receiver receives a DOWN or UP radio command based on the configuration of dip switch S1-5.
- OPEN digital output: The relay or transistor is closed when the receiver receives a PLATFORM OPENING radio command.
- AUX, AB and CLOSED digital outputs are NOT active, but can be used for specific functions on request. The Bluetooth section operates the digital outputs in the same ways.

The boards are equipped with some LEDs:

- RED Led (D8): When it is on it indicates that the board is powered
- GREEN Led: Flashes when the device is receiving a 433 MHz radio command
- RED Leds (UP, DOWN, OPEN, CLOSED, AUX and AB): They light up when the corresponding digital outputs are active.

The “PFREW-RXSRV-Bxxx” receivers with RS232 serial interface, “PFREW-RXSRV-Dxxx” with I2C interface and “PFREW-RXSRV-Dxxx” with SPI interface, send commands to the vertical platform control board according to a protocol that is customized based on the needs of the vertical platform control board.

The boards are equipped with some LEDs:

- RED Led (D8): When it is on it indicates that the board is powered
- GREEN Led: Flashes when the device is receiving a 433 MHz radio command

4.7 – NEAR/FAR OPERATION WITH 433MHz RADIO CONTROL

The commands are transmitted with a reduced range to prevent the user from moving the platform without seeing it. This flow rate has a factory setting, but can be modified by the installer as described below.

- Maximum Range. If you want the commands to be transmitted with the same range as the other commands (MAXIMUM range), simply insert a jumper on connector J2.
- ADJUSTED Range. If you want to set the range of the commands, you must follow the following procedure:
 - 1 – Remove the power supply to the receiver board.
 - 2 – Power the receiver board again by holding down the S3 button on the receiver board until the GREEN LED lights up.
 - 3 – Release S3 and position yourself with a 433 MHz transmitter at the distance beyond which you do not want the commands works.
 - 4 – send any command via the transmitter until the GREEN LED turns off.

N.B.: The operating distance setting can't be precise. This is because radio waves are influenced by objects, walls and the position of the transmitter (orientation relative to the receiver). During the calibration procedure described above, take this detail into consideration in order to find the optimal calibration distance.



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4.8 – NEAR/FAR OPERATION WITH CONTROL VIA APP (Bluetooth)

The commands transmitted by the APP via the smartphone can be transmitted with a reduced range compared to the other commands to prevent the user from moving the platform without seeing it. This flow rate can be modified by the installer by acting on the Dip Switch S2, according to the table below:

Dip S2-1	Dip S2-2	Operating distance
Off	Off	100 % (MAX RANGE)
On	Off	75 % of the max range
Off	ON	50 % of the max range
ON	ON	25 % of the max range

Attention: To change the dip setting, remove the power, move the dip switches to the desired configuration and reconnect the power.

N.B.: The operating distance setting can't be precise. This is because radio waves are influenced by objects, walls and the position of the transmitter (orientation relative to the receiver). During the calibration procedure described above, take this detail into consideration in order to find the optimal calibration distance.

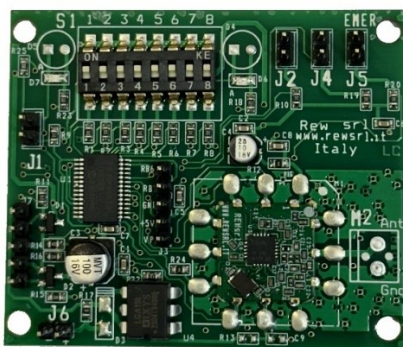


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5 – Radio Transmitter “PFREW-TXSRV-Axxx”(OPTIONAL)



Radio Transmitter “PFREW-TXSRV-Axxx” It is an electronic board with the following characteristics:

5.1 - CONNECTIONS

Terminal block J6 (3Vdc)

PIN	Description
+	Power Supply + 3VDC
-	Power Supply GROUND VDC

Terminal block M2 (Antenna)

PIN	Description
Ant	Antenna +
Gnd	Antenna -

Terminal block J7 (IN)

PIN	Wire Colour	Description
1	YELLOW	COMMON
2	WHITE	UP COMMAND
3	BLUE	DOWN COMMAND
4	GREEN	OPENING COMMAND
5	VIOLET	SPARE

5.2 – TECHNICAL CHARACTERISTICS

- Power Supply: 3Vdc (2x1,5V AAA TYPE BATTERY)
- Absorption: about 25-30 mA (Max Power +10 dbm)
- Two signaling LEDs
- Number of band channels 433 Mhz: 16 (from 433,150 Mhz to 434,650 Mhz)
- Channeling 100 Khz
- Deviation +- 25 Khz
- Modulation Type GFSK
- Maximum power selectable + 10 dbm
- Sensibility about -110 dbm
- Low battery indication with voltage of 2.4V



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5.3 - TRANSMITTER CONFIGURATION

The transmitter board can be configured via dip switch S1, according to the methods described below.

- Selection of the RADIO CHANNEL

Since the broadcast frequencies are public, there may be other devices using the same frequency generating interference. therefore if interference occurs at the time of installation, the radio transmission channel can be changed according to the methods described below.

If multiple systems are installed close to each other, to avoid mutual interference, each system must use a different radio channel.

The dip switches from 1 to 4 allow you to select the transmission FREQUENCY up to a maximum of 16 channels (from 433.150 MHz to 434.650 MHz), according to the indications in the following table:

S1-1	S1-2	S1-3	S1-4	Frequency Of Transmission
OFF	OFF	OFF	OFF	1 (433,150 Mhz)
ON	OFF	OFF	OFF	2 (433,250 MHz)
OFF	ON	OFF	OFF	3 (433,350 Mhz)
ON	ON	OFF	OFF	4 (433,450 Mhz)
OFF	OFF	ON	OFF	5 (433,550 Mhz)
ON	OFF	ON	OFF	6 (433,650 Mhz)
OFF	ON	ON	OFF	7 (433,750 Mhz)
ON	ON	ON	OFF	8 (433,850 Mhz)
OFF	OFF	OFF	ON	9 (433,950 Mhz)
ON	OFF	OFF	ON	10 (434,050 Mhz)
OFF	ON	OFF	ON	11 (434,150 Mhz)
ON	ON	OFF	ON	12 (434,250 Mhz)
ON	OFF	ON	ON	13 (434,350 Mhz)
ON	OFF	ON	ON	14 (434,450 Mhz)
OFF	ON	ON	ON	15 (434,550 Mhz)
ON	ON	ON	ON	16 (434,650 Mhz)

- Selection of RADIO POWER

Dip switches 6 and 7 allow you to select the transmission POWER according to the indications in the following table:

S1-6	S1-7	POWER Of Transmission
OFF	OFF	-20 dbm
ON	OFF	-10 dbm
OFF	ON	0 dbm
ON	ON	+10 dbm

To obtain maximum performance from the system, in terms of operating distance, it is necessary to select the Max power (+10 dbm).

To ensure that the commands of the portable transmitters are effective only in proximity to the vertical platform, the minimum power must be selected (-20dbm).

The range of the radio system can be increased by installing an external antenna on the transmitter.



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5.4 – FUNCTIONING

The transmitter is equipped with 3 digital inputs, which can be connected to a buttons, with which it is possible to send UP, DOWN and OPENING commands.

While activating a command, the transmitter provides the user with some functional information via two signaling LEDs:

- GREEN LED: Flashes when the device is transmitting
- RED LED: Lights up when the battery is low

If the RED LED lights up, you need to replace the transmitter batteries.

If the GREEN LED does not light up it means that the transmitter is faulty.

The Transmitter is normally OFF and is powered only by activating one of the 3 digital inputs. This feature allows the board's absorption to be reduced to a minimum.

When a command is activated, the transmitter sends the receiver a data packet containing the following information:

- Code of the command to execute: UP, DOWN, OPENING. These codes have different values depending on whether they come from wall-mounted control devices or handheld transmitters.

- Vertical platform Manufacturer Code: Each manufacturer using the radio system has a separate manufacturer code

- Identification Code: This is a numeric code over 3 bytes that uniquely identifies each transmitter. The procedure for installing a transmitter, either in a new installation or in the case of replacing a faulty transmitter, involves a learning phase that allows the receiver to identify, by this Code, the new transmitter as one of those that are part of the vertical platform on which the receiver is mounted. The Identification Code is stored in the receiver, which will recognize the transmitter each time it sends a command. This feature makes the radio system compliant with EN 81.41 regarding requirement 5.5.17.



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