



**TEREX** | COMEDIL

# Radio Remote Control

## Series E16

### SIRIO ET22

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**All information inside are part of the original manual specific for the equipment and delivered separately from the crane's general operation manual.**

## Chapter 6

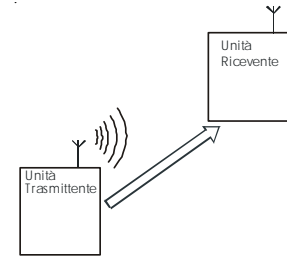
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## 1

## INTRODUCTION

An industrial radio remote control is used to control machines that are activated electrically or hydraulically from a distance. Each radio remote control is made up of a transmitting unit and a receiving unit. The transmitting unit is a portable device used by the operator which commands the machine from a distance. The receiving unit is normally installed on board the machine to be controlled.



### 1.1 CONVENTIONS

**abc** Any text written in **bold face** should be read very carefully.



This symbol denotes extremely important indications and informations which, if not observed, can cause **very dangerous situations** for people or things.



This symbol denotes very important indications and information which, if not observed, can provoke **potentially dangerous situations** for people or things.

### 1.2 INDICATIONS AND GENERAL WARNINGS

#### PERMITTED USES:

**Material lifting machines (construction cranes, industrial bridge cranes, concrete pumps, machines for moving material in general, . . . )**



#### FORBIDDEN USES:

**Machines used in environments with antideflagration characteristics and machines for moving, raising and transporting people:** COMEDIL cannot accept any responsibility for these uses and applications.

**Before installing and starting the system, this manual MUST be read and understood completely by all people who install, use and carry out maintenance on the radio remote control.**

If the indications given herein are not clear, contact COMEDIL before starting the radio remote control.



All current prescriptions on safety and accident prevention at work **MUST ALWAYS** be respected. All current user country national laws regarding the use of both the machine and the radio remote control **MUST ALWAYS** be respected.

Any damaged parts can **ONLY** be replaced by authorised COMEDIL personnel, and only using original COMEDIL spare parts.

**In any cases of emergencies, faults or damaged parts, ALWAYS stop the “machine + radio remote control” system until the problem has been solved.**



### 1.3 DOCUMENTS

#### THE GUARANTEE CERTIFICATE

The conditions of the radio remote control guarantee are given in the "Guarantee Certificate" contained in this manual.

#### THE TECHNICAL DATA SHEET

There are two copies.

The technical data sheet shows the wiring system between the receiving unit and the machine. It should be compiled and checked by the installer, who has the responsibility of correct wiring. Once these necessary checks have been carried out, the installer should sign both copies of the technical data sheet.

The first copy should be placed inside the receiving unit and left there. The second copy should always remain connected to the user manual (if necessary for administrative purposes, always keep a copy).

The radio remote control identification and approval data is given on plates that are on both the transmitting unit and the receiving unit.

**These plates SHOULD NOT be removed for any reason whatsoever.**

**Please also remember that as owners of a radio remote control you must follow any current laws in your country that deal with the use and/or possession of this apparatus.**

## 2

**IMPORTANT WARNINGS**

All of chapter 2 should be read and understood before installing the radio remote control.

2.1 **IMPORTANT WARNINGS FOR INSTALLATION**

**Installation should only be carried out by qualified people and in accordance with installation country rules. Installation is very important; the necessary safety level during subsequent radio remote control use can only be guaranteed if the device is installed correctly.**

Carefully follow the indications below:

**DO NOT EXCLUDE** the radio remote control safety mechanisms and/or those present inside the machine. Remember to carefully wire the SAFETY contacts (see § 3.1.2) in series with the movement commands inside the receiving unit.

**DO NOT MODIFY or TAMPER WITH** the radio remote control, the machine or its electric panel.



**NEVER SUPPLY** the receiving unit directly from the mains. A main switch should always be present to permit power supply removal during wiring and/or maintenance operations.

**CARRY OUT WIRING** in accordance with the EN 60204-32 standard (for hoisting machinery) and EN 60204-1 standard (for other machinery) .

After installation and wiring, **ALWAYS CHECK** that the manoeuvres carried out are exactly the same as the commands given (in particular check the STOP command, which should in any case block the machine and take it into a safety condition).

**PLACE IN A VERTICAL POSITION** the receiving unit in a way that favours radioelectric connection with the transmitting unit. Choose the position, keeping in mind that the receiving unit should be easily reached, to permit safe operation afterwards.



**DO NOT PERFORATE** the receiving unit for any reason whatsoever.

**CHECK** that the receiving unit power supply is inside the voltage range given in the "Technical Data" (§5.4).

After installation, **CHECK AND/OR COMPILE** the "Technical Data Sheet" in every part. Insert the system starting date (of the installation) together with installer stamp and a signature (see § 1.3).

**There is an "Installation Quick Reference" manual inside the receiving unit which gives practical information about installation and maintenance.**



## 2.2 IMPORTANT WARNINGS FOR USE

The “Important warnings for use” points should be carefully read and understood to prevent possible situations that can create danger for people or things when using the “machine + radio remote control” system. Follows the points given below:

**Use of the radio remote control when applied to machines is only permitted to operators who:**

- have read and understood this manual,
- have been correctly trained,
- know the structure and operation methods of the “machine + radio remote control” system well.

**To prevent danger from occurring and to promptly confront any emergency situation the operator should:**

- be positioned in a way that permits him to see the “machine + radio remote control” system, and above all the load, in the best possible way,
- follow all machine movements with his eyes,
- remain inside the radio control working range given in “Technical Data” §5.4.

**If a danger situation arises, the operator must intervene immediately by pressing the STOP button, which instantly interrupts machine movement.**

**The operator should only switch on or action the transmitting unit when starting work. Improper use can cause dangerous situations. Keep in mind that it is possible to create a radioelectric connection even when outside the radio control working range or directly from closed places, which would make the radio remote controlled machine carry out undesired actions.**

**The operator should:**

- switch off the transmitting unit each time work is stopped,
- NEVER leave the transmitting unit unguarded when the starting keyswitch is inserted,
- avoid switching off the transmitting unit with hung loads (above all when replacing a flat battery).

**As not all dangers are caused by the “machine + radio remote control” system, the operator should be careful even when emergency situations are present in the work area. The operator should, also in this case, intervene manually by activating the STOP command.**

## 2.3 IMPORTANT WARNINGS FOR MAINTENANCE

**During maintenance operations the people in charge should make sure that power supply is removed from the receiving unit and that the battery is removed from the transmitting unit.**

The radio remote control does not need any special maintenance, but some simple things are necessary to work with apparatus that is always reliable and safe:

- 1) always store the unit in a clean, dry area,
- 2) remove dust or accumulations of other material from the transmitting unit (never use solvents or flammable and corrosive products),
- 3) check that the symbols of the transmitting panel are clearly visible and
- 4) make sure that both the transmitting and the receiving units are in one piece and complete.

The correct operation of SAFETY command (§3.1.2) must be checked every six months. The check can be carried out by inspection of the correct operation of the SAFETY relay when a movement command is activated.

**Any faults should be repaired by authorised COMEDIL personnel using original COMEDIL spare parts only.**



## 3

**RADIO REMOTE CONTROL DESCRIPTION**3.1 **RADIO REMOTE CONTROL CHARACTERISTICS**3.1.1 **Conformity**

Each E16 series radio remote control is in conformity with the following standards (and their subsequent integration):

**73/23/CEE Low Voltage Directive**  
**89/336/CEE Electromagnetic Compatibility Directive**

It is also adapt to be installed on machinery that have to satisfy the **98/37/CEE Machinery Safety Directive**.

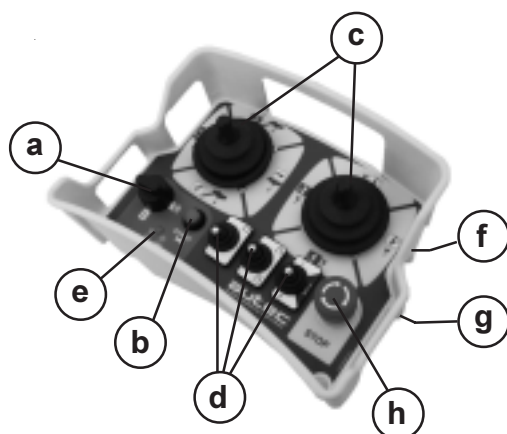
3.1.2 **Operational characteristics**

The radio remote control uses a radio frequency transmission, the signal of which is coded. A univocal address is present in this code, defined by a pair of hardware keys that COMEDIL guarantees to produce once only. This eliminates any possibility of disturbances activating a system function.

If the radio frequency transmission is disturbed, incorrect or interrupted, the receiving unit stops the whole system.

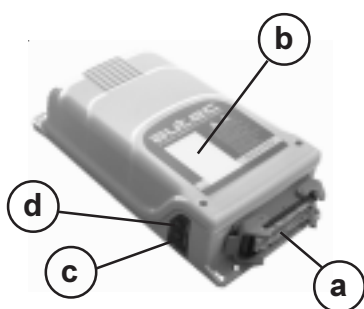
**To protect the system from involuntary movements in neutral position, the E16 series is equipped with a SAFETY command (FAIL SAFE even in case of system fault). This command constantly controls the rest position (neutral) of the movement actuators in the transmitting unit and is available on the SAFETY relay output of the receiving unit. By wiring the SAFETY relay contacts to the movement command common in series, the outputs are protected from involuntary movements caused by possible faults.**

### 3.2 TRANSMITTING *SIRIO E* WAIST-PORTABLE UNIT



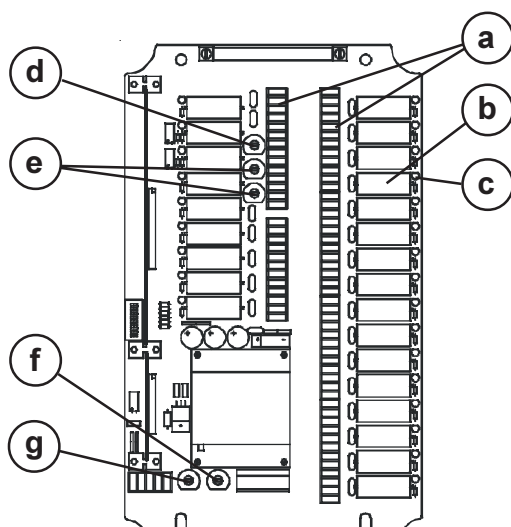
- a. Starting keyswitch selector
- b. START / alarm push button
- c. Joystick movement actuators
- d. Auxiliary selectors lever
- e. Green signalling LED
- f. Battery (*on bottom*)
- g. Identification plate (*on bottom*)
- h. STOP button

### 3.3 RECEIVING UNIT



- a. Cable exit (plug)
- b. Identification plate
- c. POWER pilot light
- d. ENABLE pilot light

#### 3.3.1 RECEIVING UNIT MAIN BOARD (E16B\_\_\_\_) CONFIGURATIONS



E16B22AC

- a. Connector (output relay)
- b. Relay
- c. Relay LED
- d. F1 STOP contact protection fuse
- e. F2-F3 SAFETY contact protection fuses
- f. F4 Secondary circuit voltage protection fuse
- g. F5 Primary circuit voltage protection fuse



## 4

## OPERATION

## 4.1 COMMAND FUNCTION

## 4.1.1 Power on and starting

After having inserted the starting keyswitch, check that no actuator (including the STOP button) has been activated.

To **switch on** the transmitting unit, turn the starting keyswitch to "I" (fig.4.1.1).

To **start** the radio remote control functions, press the "START" button or for 1÷2 seconds. (fig.4.1.2)



fig.4.1.1

After starting, the signalling LED always lights up (see § 4.2.1).

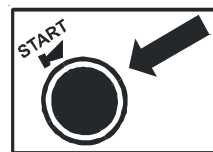


fig.4.1.2

## 4.1.2 Command activation

Operate the joystick or lever actuators (movement or selection) of any command that has to be carried out.

## 4.1.3 Stopping



**The STOP button should be used when it is necessary to stop the machine immediately in order to check any danger condition.**

To **stop** the machine **immediately**, press the STOP button. (fig.4.1.3).

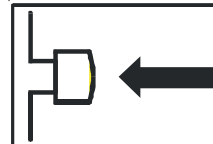


fig.4.1.3

To **start working again**:

- turn the STOP button in the direction indicated to deactivate it (fig.4.1.4) and
- repeat the power on and starting procedure.



fig.4.1.4

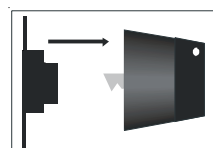
## 4.1.4 Switching off

**The transmitting unit should be switched off each time work is stopped.**

Turn the starting keyswitch to the "O" position.



Extract the starting keyswitch and put it in a safe place.




The transmitting unit can also be switched off automatically when:

- the battery is not sufficiently charged and/or
- the radio remote control is not used for 7.5 minutes.

## 4.2 LIGHTS

### 4.2.1 Transmitting unit leds

Some transmitting unit operating functions are highlighted by a green signalling LED

TYPE OF SIGNAL	MEANING	WHAT TO DO
During the operation		
Slow flash	NORMAL OPERATION	
Quick flash (accompanied by an acoustic signal)	Battery flat: the transmitting unit switches off after approx.7 minutes from when the LED starts flashing	Switch off the transmitting unit and replace the battery
During the starting		
Continuous light (accompanied by an acoustic signal)	One or more actuators (movement) inserted	Deactivate the actuator/s

### 4.2.2 Receiving unit light signals

**Externally**, the receiving unit has two light signals: POWER and ENABLE.

The POWER light signal indicates the presence of power supply in the receiving unit.

The ENABLE light signal indicates that there is radioelectric connection between the transmitting and the receiving units.

**Internally**, the receiving unit has a LED for each relay present on the basic card.

These LEDs only lights up to indicate that the corresponding relay has been activated.

## 4.3 RADIO FREQUENCIES

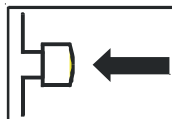
**Each working radio frequency to which a radio remote control can be programmed belongs to the set of frequencies permitted by national standards that are valid at the moment of entry into the market.**

Each radio remote control is programmed by the producer in the AUTOMATIC selection and scanning mode, and can therefore work in any of the available frequencies. In cases of interference or conflict with other systems, this mode makes it possible to move the working frequency (see the process explained below) without having to intervene inside either the transmitting or the receiving units.

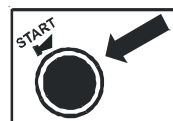
It is however possible to program the radio remote control in the MANUAL selection mode, which makes it possible to work at a specific frequency from among those available. **To activate this means of operation contact authorised COMEDIL personnel.**

#### 4.3.1 Working frequency change process

1. Start the transmitting unit.
2. Press the STOP button.



3. Within 4 seconds press the START button or selector and release immediately.



4. Turn the STOP button in the direction indicated and repeat the power on and starting procedure.



N.B.: During the work frequency changing process, the receiving unit loses radioelectric connection with the transmitting unit. After starting, some seconds may be necessary to reset connection, therefore keep the START button or selector pressed for about 8÷10 seconds.

#### 4.4 CHARGING THE BATTERY

To recharge a flat battery, proceed as follows:

1. Insert the battery into the relevant battery charger, which should be positioned in an area having a temperature of between +5°C and +35°C. The battery now starts charging, a state signalled by the lighting up of the "ON CHARGING" pilot light.
2. After 4÷5 hours the "END OF CHARGE" pilot lights up to indicate that recharging has been completed. At this point extract the battery from the charger (if the battery is not taken out, the charge continues through an holding current).

**As the charging process is only controlled by a timer, NEVER REMOVE THE BATTERY BEFORE THE RECHARGING IS COMPLETE (in cases of interrupted power supply, recharging starts again from the beginning).**

### 5 INFORMATION

#### 5.1 SERVICE

In all cases of special maintenance (excluding the operations described in paragraph 5.3), and when repairing the radio remote control or replacing damaged or faulty parts, contact the Assistance. Do not carry out these operations yourselves.

#### 5.2 SCRAPPING

When scrapping, entrust the radio remote control to the separate scrap collecting services in the user country.

#### 5.3 WHAT TO DO IN CASE OF FAULTS

**This manual should be read and understood in all its parts before requesting intervention from the service technicians. Make sure that all the instructions given within have been followed correctly.**

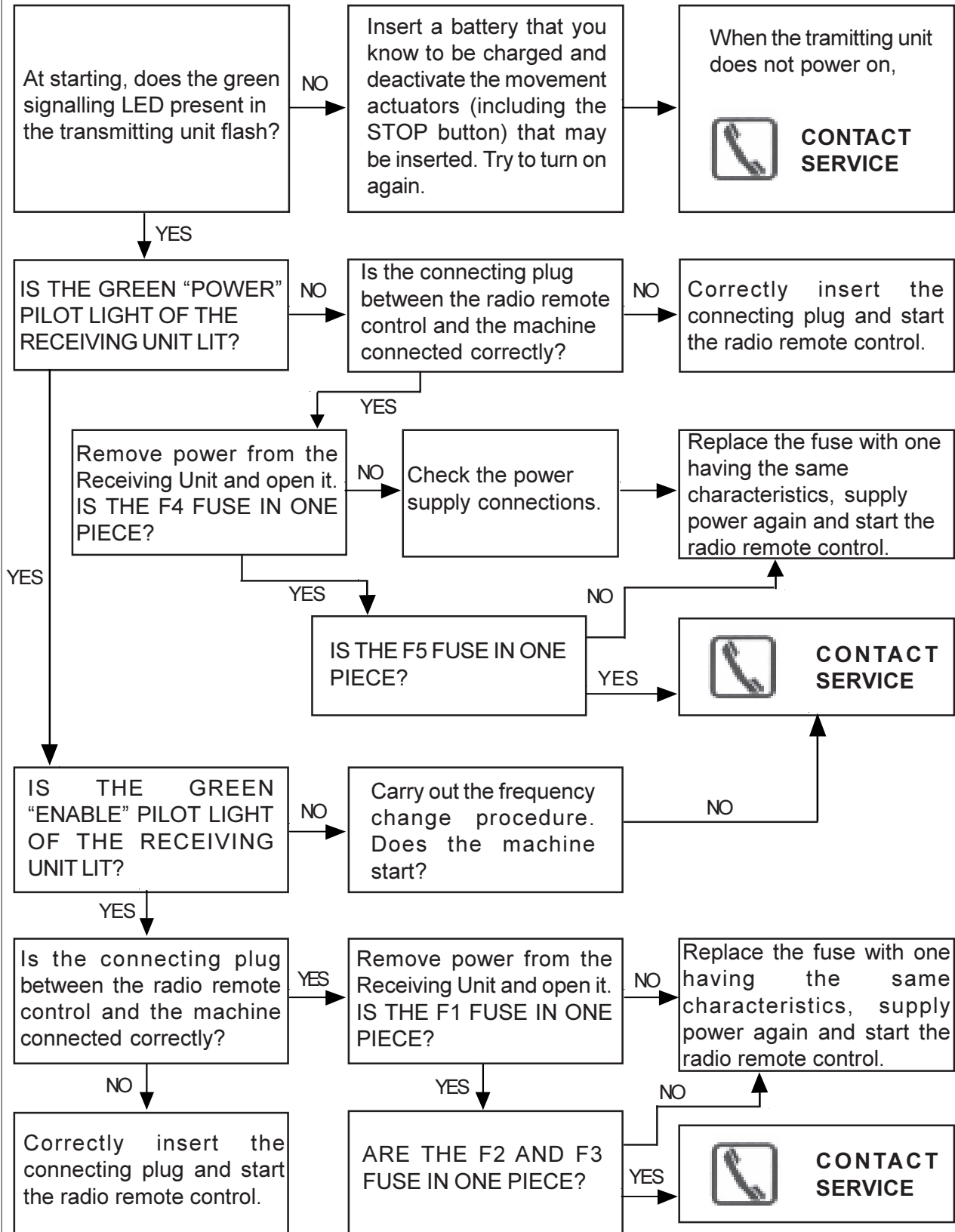


**The receiving unit can only be opened by competent people (as well as by authorised COMEDIL personnel).**



**Important: before opening the receiving unit, REMOVE POWER SUPPLY.**

If the "machine+radio remote control" system does not start, check if the problem is caused by the radio remote control or the machine. Before carrying out any test, therefore, connect the direct cable control: if the machine does not start, the problem is with the machine itself. If the machine only starts when activated from the direct cable control, the problem is with the radio remote control. In this case, proceed as follows:



## 5.4 IMPORTANT TECHNICAL DATA

### General

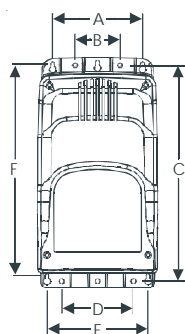
Frequency range (Europe)	UHF 433,075÷434,775 MHz
Programmable radio channel	32 out of 69
Channel spacing	25 kHz
Hamming distance	<sup>3</sup> 8
Probability of non-recognition of error	<10 <sup>-11</sup> (in worst S/N case)
No. of available addresses	>118000
Typical working range	100 m
Working temperature	-20°C ÷ 70 °C
Time of reply to commands	<100 ms
Time of reply to active STOP	<100 ms
Passive STOP time	1 sec. (opz. 0.5 sec.)
Number of available commands: SIRIO E + E16B22AC	20 (+ Start, +Stop)

### Transmitting unit

Power supply (battery pack)	NiCd 7,2V - 0,7 Ah
Antenna	internal
Transmitter power (standard CEPT-LPD)	< 10 mW ERP
Autonomy with fully charged battery (at 20°C)	about 15 hours
Warning of low battery charge	about 7 minuti
Housing	nylon (20% FG)
Minimum protection grade	IP65
Dimensions <i>SIRIO E</i>	(263x160x173) mm
Weight <i>SIRIO E</i>	1,4 kg

### Receiving unit

Power supply: AC	24/48/55/110/220 Vac ±20%
	50/60Hz (~15VA)
Antenna	stylus with coaxial cable
Capacity of STOP and SAFETY contacts	4A (models AC)
Capacity of command contacts	10A*
Housing	nylon (20% FG)
Minimum protection grade	IP65
Dimensions	(202x381x91) mm
Weight	2,5÷3,5 Kg
Drilling template	



A = 150 mm  
 B = 75 mm  
 C = 357,5 mm  
 D = 118,5 mm  
 E = 167 mm  
 F = 350,5 mm

\* When utilizing both output terminals in parallel for each contact.

If the radio remote control has been wired by COMEDIL, please see technical data sheet

## APPENDIX: BATTERIES AND BATTERY CHARGER

### I.1 BATTERIES

The Radio remote control is supplied with two batteries to ensure continuity of service (one battery in use and one recharging).



**Do not use different batteries from those supplied. The batteries must be recharged exclusively using the battery charger supplied with the Radio remote control.**

Incorrect use can significantly reduce battery life, for example:

- use outside the operating temperature range ( $-20 \div +70$ )°C;
- recharging performed outside the temperature range ( $+5 \div +35$ )°C;
- prolonged non-use;
- exposure to heat sources;
- storage in damp environments or at temperatures outside the following ranges (recommended ( $0 \div +45$ )°C; permitted ( $-45 \div +50$ )°C).



The number of charging cycles can also effect the service life of battery, we recommend that the battery is always used until fully discharged.

The battery charge status is shown by the green signalling LED on the trasmitting unit.



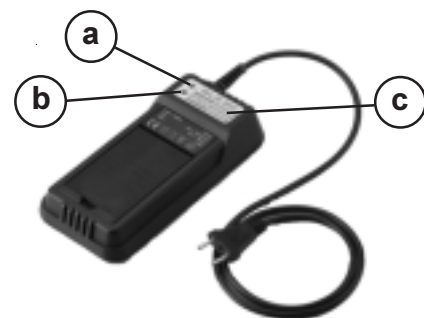
**Do not burn batteries or dispose of in ordinary urban waste bins. Always use the appropriate collection bins.**

### I.2 BATTERY CHARGER

The battery charger is a portable device and can be fixed onto vertical supports.

Warning:

- 1) always position the battery charger away from liquids (water or similar) and heat sources;
- 2) the supply socket should always be reachable and easy to extract;
- 3) do not insert non-rechargeable;
- 4) before carrying out any cleaning or maintenance, remove the mains socket;
- 5) in case of malfunction and/or incorrect operation, move from the mains, do not tamper with the device and only contact a service centre that has been authorised by the manufacturer;
- 6) extract the supply socket, if not used;
- 7) if the supply cable is damaged, it must be replaced by a service centre that has been authorised by the manufacturer.



Esempio caricabatterie FW26\_R

a	"ON CHARGING" signalling led
b	"END OF CHARGE" signalling led
c	Identification plate

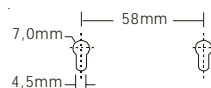
For charging battery with battery charger see paragraph 4.4.

## I.3

## TECHNICAL DATA

**Battery charger**

Recharging time	~ 4 ore
Minimum protection grade	IP30
Dimensions	(105x218x50)mm
Power supply	FW260R 230Vac 50/60Hz (6W)
	FW261R 24Vdc (6W)
	FW262R 12Vdc (6W)
	FW263R 115 Vac 50/60Hz (6W)
Output voltage	8,6 Vdc (260mA)
Drilling template	

**Batteries**

NC0707L	NiCd 7,2 - 0,7 Ah
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