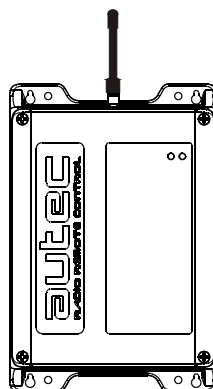




## AC Receiver System

### USER'S MANUAL

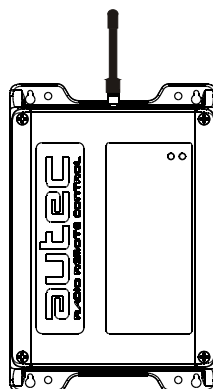






## AC Receiver System

### USER'S MANUAL



**Follow the indications and warnings given by the machine producer regarding the machine controlled by the radio remote control.**

**The information contained in this manual considers a representative configuration of the radio remote control: please find radio remote control real configuration in the technical data sheet (attached to the manual).**

**If this manual is lost or damaged, ask for a copy from AUTEC. Please specify the serial number of the relative radio remote control.**

**Contact AUTEC if any of the instructions and/or warnings given in this manual are not clear.**

**The information contained in this manual is subject to modification without notice and is not binding.**

**No parts of this manual may be reproduced by any means without the written permission of AUTEC (including recording and photocopying).**

# 1 INDEX AND CONVENTIONS

## 1.1 INDEX

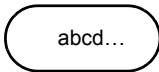
<b>1</b>	<b>Index and conventions .....</b>	<b>1</b>
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## 1.2 CONVENTIONS

In this manual, all important information is highlighted in the following symbols and conventions:



abcd... : WARNINGS



: TECHNICAL DATA

abcd... : IMPORTANT TEXTS

**THIS MANUAL REFERS EXCLUSIVELY TO THE RECEIVING UNIT: THE GENERAL USAGE WARNINGS ARE INCLUDED IN THE TRANSMITTING UNIT MANUAL.**

**BEFORE INSTALLING, STARTING AND USING THE RADIO REMOTE CONTROL, THIS MANUAL MUST BE READ AND UNDERSTOOD BY ALL PEOPLE WHO INSTALL, USE AND CARRY OUT MAINTENANCE ON THE RADIO REMOTE CONTROL.**

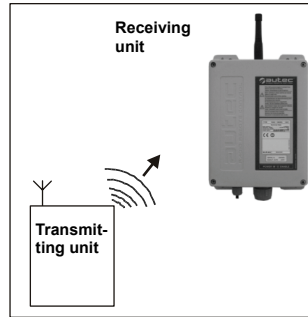
## 2 INTRODUCTION

### 2.1 GENERAL DESCRIPTION

Industrial radio remote controls are used to control machines from a distance. Each industrial radio remote control is made up of a portable transmitting unit, from which the user can remotely control the machine, and a receiving unit installed on board the machine itself.

The transmitting unit uses radio frequencies to transmit a coded message which contains a value called address. Each receiving unit can only decode the messages coming from its own transmitting unit with the same address.

This excludes the possibility of an interference activating any system function. If the radio transmission is disturbed, incorrect or interrupted, the receiving unit autonomously stops the whole system.



**Each radio remote control complies with Part 15 of the FCC rules.**

Operation is subject to the following conditions:

- this device may not cause a harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.



**Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**



**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Autec cannot be held responsible if the radio remote control is installed on applications that are different from those permitted:**

#### PERMITTED USES



**Hoisting machines (construction cranes, bridge cranes, machines for material handling in general,...).**

#### FORBIDDEN USES



**Machines installed in areas where equipment with explosion-proof characteristics is required.**

**Machines for moving, raising and transporting people.**

All machines must undergo a **risk analysis**: it is therefore necessary to evaluate, within the limits of this analysis, if the machine can be radio remote controlled.

The machine producer and/or the person who decides upon radio remote control use and installation is responsible for this analysis.

**Autec cannot be held responsible if the risk analysis is not carried out correctly.**

To guarantee correct radio remote control operation, all current regulations regarding safety at work and accident prevention should be respected. All applicable standards and regulations valid in the user country regarding the use of both the machine and the radio remote control **MUST ALWAYS** be respected.

**Autec cannot be held responsible if the radio remote control is used in unlawful working conditions.**

**System must be installed by a licensed technician and in accordance with all relevant local, state/provincial and federal regulations, including but not limited to NEC, OSHA, CE etc.**



**In case of malfunction and/or emergency, disable the system “machine radio remote control” until the problem has been completely solved.**



Any damaged part can **ONLY** be replaced by authorized Autec personnel or service representative, and **ONLY** using original Autec spare parts.

## 2.2 DOCUMENTATION

Documentation enclosed with each radio remote control includes at least the following:

- transmitting unit manual
- receiving unit manual
- battery charger manual
- certificate of guarantee
- technical data sheet.

**Make sure that such documents have been supplied: if they are not, please request them from Autec or an authorized representative, specifying the product serial number.**

## Technical data sheet

The technical data sheet shows the wiring diagram between the receiving unit and the machine. The technical data sheet must be filled in and checked by the installer, who is responsible for a correct wiring. Once all necessary checks have been carried out, the installer must undersign the technical data sheet, which must be kept with the user's manual (always keep a copy of this data sheet for administrative purposes).

## Identification plates

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 MUST NOT be:**

- removed from their position
- altered or damaged (contact Autec or an authorized representative for replacement)

## 2.3 GENERAL TECHNICAL DATA

Frequency band .....	902 -928 MHz
Available radio channels .....	32
Hamming distance .....	≥ 8
Probability of undetected error.....	<10 exp-11
Typical working range.....	330 ft (100 m)
Command response time.....	~ 100 ms
STOP command response time.....	~ 100 ms
Passive emergency time (or passive stop) *	0.35/1 sec.

\*refer to paragraph 7.1 "Programming the E16SRXUS1 radio receiving module" DIP nr. 1 settings.



**Due to the characteristics of radio propagation (i.e.: EM interferences, near out-of-range condition), a delay up to one second may occasionally occur between command release and actual deactivation of the corresponding output. Care must be taken to ensure that this could never lead to a dangerous situation in the specific uses.**

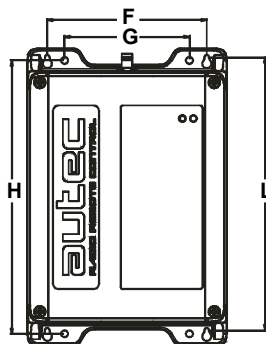
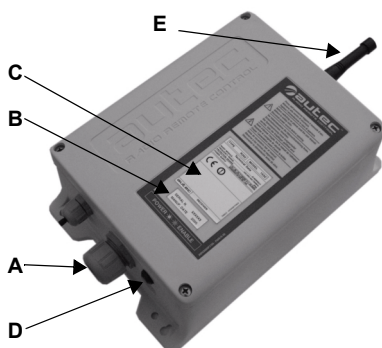


### 3 RECEIVING UNIT TYPE R402

The receiving units Type R402 can be used with the transmitting units of the following series:

- LIGHT SERIES
- MODULAR SERIES

These receiving units are equipped with a safety function called **SAFETY** that protects the system “machine+radio remote control”, when it is in neutral (rest) position, from unintended movements caused by possible radio remote control faults. For this to happen, both the wiring instructions in the technical data sheet and the recommendations for correct installation included in the following manual have to be respected.

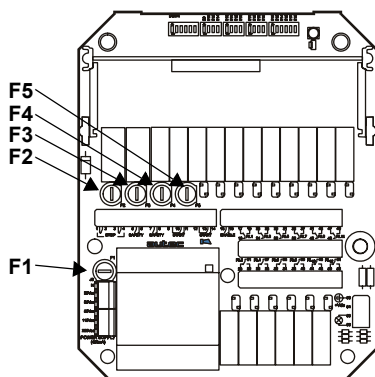


#### DRILLING TEMPLATE

<b>A</b>	cable gland ( <i>opt. plug</i> )	<b>D</b>	POWER/ENABLE light
<b>B</b>	identification plate	<b>E</b>	antenna
<b>C</b>	technical data plate		

F = 5.8" (148 mm)  
G = 4.6" (116 mm)  
H = 10" (253 mm)  
L = 10" (253 mm)

The mother board of this receiving unit is the E16B14AC board for configurations up to 14 commands. This number can be modified using the bus E16RI02\_ board.



<b>F1</b>	POWER SUPPLY protection fuse
<b>F2</b> <b>F3</b>	STOP circuit protection fuses
<b>F4</b> <b>F5</b>	SAFETY circuit protection fuses

### 3.1 RECEIVING UNIT TYPE R402 TECHNICAL DATA

#### Power supply

	MIN.	NOM.	MAX.
<b>Voltage (Vac)</b>	18	<b>25</b>	30
	25	<b>35</b>	42
	36	<b>50</b>	62
	70	<b>110</b>	132
<b>Frequency (Hz)</b>	50		60
<b>Absorbed power (VA)</b>		<b>11</b>	

#### Climatic conditions

	TEMPERATURE	RELATIVE HUMIDITY	AIR PRESSURE
<b>WORKING</b>	Class 4K4H -5°F to +160°F (-20°C to +70°C)	Class 4K4H 4% to 100%	Class 4K4H 86 kPa to 106 kPa
<b>STORAGE</b>	Class 1K5 -40°F to + 160°F (-40°C to +70°C)	Class 1K3 5% to 95%	Class 1K4 86 kPa to 106 kPa
<b>TRANSPOR- TATION</b>	Class 2K3 -13°F to + 160°F (-25°C to +70°C)	Class 2K3 95%	Class 2K3 70 kPa to 106 kPa

Antenna ..... dedicated  
 STOP contact rated current..... 4A (250Vac)  
 SAFETY contact rated current..... 4A (250Vac)  
 Command contact rated current..... 6A (250Vac)\*  
 Fuse F1 (POWER SUPPLY)..... 1.25A T 250V [0.2"x0.8" (5x20 mm)]  
 Fuse F2 and F3 (STOP circuit)..... 4A T 250V [0.2"x0.8" (5x20 mm)]  
 Fuse F4 and F5 (SAFETY circuit) ..... 4A T 250V [0.2"x0.8" (5x20 mm)]  
 Housing ..... PA 6 (20% fg)  
 Protection degree ..... NEMA 4 (IP65)  
 Dimensions..... (7.1"x9.1"x3.7") [(180 x 230 x 95) mm]  
 Weight ..... 5.7 lbs (2.6 kg)

\*The maximum command contact rated current for the optional modules that may be present is given in the technical data sheet.

## 4 WARNINGS FOR INSTALLATION



**Installation must only be carried out by qualified people and in accordance with installation country rules.**

The installer **MUST ALWAYS** respect the following warnings:



**PLACE** the receiving unit vertically, with the cable gland (or plug) facing down.



**PLACE** the receiving unit so that it is not completely shielded by metal parts and that it is easily reachable.



**FIX** the receiving unit at least in four points, using the specific holes located in the housing.



If installing on machines that vibrate, **FIX** the receiving unit to the machine with its appropriate vibration dampers.



**DO NOT MODIFY** or **TAMPER WITH** the radio remote control, the machine or its electrical panel. **DO NOT PERFORATE** the receiving unit in any case.



**CHECK** that the receiving unit power supply is within the voltage range given in the “Technical Data”, and that the voltages and currents being used do not exceed the maximum permitted values.



**DO NOT BYPASS** the radio remote control safety devices and/or those present inside the machine.



**RESPECT** all the requirements for machines and for hoisting machines (see corresponding IEC60204-1 and IEC60204-32 prescriptions).



**NEVER POWER** the receiving unit directly from the mains. A main switch should always be present to allow power supply removal.



**REMEMBER** to carefully wire the **SAFETY** contact in series with the movement commands inside the receiving unit.



**GROUP** the wiring away from the radio module, in order to avoid interferences and hazards related to electrical safety.



**NEVER REMOVE** the jumper between the contacts 2 and 3 of the **STOP** command, unless a circuit with 2 separate contacts (4 wires) is required. If it is removed, the **STOP** circuit could lose its safety function.



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).



**FAILURE TO COMPLY WITH THE ABOVE WARNINGS MAY RESULT IN SERIOUS INJURY OR DEATH TO PERSONNEL AND DAMAGE TO EQUIPMENT.**

**WARNING:** If the receiving unit is covered by metal structures or installed inside metal electrical panels, use the appropriate extension kit for the antenna. The dedicated antenna stylus should never come into contact with metallic parts.

The installer must **CHECK** and/or **FILL IN** the “Technical Data Sheet”, indicating the date the system has been put into service, signing and stamping it.

## 5 WARNINGS FOR MAINTENANCE



**ALWAYS ENSURE THAT THE RECEIVING UNIT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE CARRYING OUT ANY MAINTENANCE WORK.**

All control and maintenance actions carried out on the radio remote control must be verified and recorded by the person in charge of carrying out maintenance on the machine.



**Routine maintenance carried out as described in this manual is fundamental for using the radio remote control safely.**



**After each maintenance action, always make sure that commands sent by the transmitting unit only activate the corresponding expected operations.**

### 5.1 ROUTINE MAINTENANCE

The following instructions allow to maintain the radio remote control in perfect conditions, guaranteeing it to function safely and correctly for a long period.

Special applications may need more specific routine maintenance actions to be carried out at different periods.

These instructions do not in any case substitute the norms and laws that regulate work safety, nor do they limit the responsibility of the purchaser and user of the radio remote control.

**All given instructions must be followed correctly each time the machine and the radio remote control are put into service.**



**If irregularities are noted while carrying out routine maintenance, put the “machine+radio remote control” system out of order, following the indications given (see paragraph 8 “Receiving unit diagnostics”).**

#### Receiving unit

It is recommended every three months to:

1. remove dust or accumulations of other material from the receiving unit. Never use solvents or flammable/corrosive materials to clean, and do not use high pressure water cleaners or steam cleaners
2. make sure that the receiving unit is intact in its structure
3. verify the integrity and connection of the internal wiring to the receiving unit
4. make sure that the panel symbols can be easily recognized and replace the panel if necessary
5. check that the identification plate is readable and not damaged.

#### Electrical operation

It is recommended every six months to:

1. make sure that all the relay contacts of the receiving unit operate correctly, and check that the contact closes when the corresponding manoeuvre is enabled and opens when the manoeuvre is disabled
2. check the correct correspondence between the commands that are sent and the manoeuvres that are carried out
3. check that the contact for the SAFETY relay is open when no movement command has been sent. This is safety critical maintenance: it's necessary to keep a record (date, signature, comments) showing that this check has been performed regularly, together with other installation documents.

### **External electric conductors**

It is recommended every twelve months to:

1. verify integrity along the full length of the cable which connects the receiving unit to the machine
2. verify the integrity and the electrical connection of the plugs and the connection socket
3. check the strips or other fixing systems and replace them if necessary
4. make sure that the connecting cable is not deteriorated, especially the part near the cable holder.

## **5.2 SPECIAL MAINTENANCE (SERVICE CENTER)**



**Any fault should be repaired by authorized personnel (contact Service), using original Autec spare parts only.**

### **Authorized Service Center**

When it is necessary to carry out special maintenance (radio remote control repair and replacement of damaged or faulty parts), do not contact anyone other than our Authorized Service Center. In order to make the intervention faster and more reliable, please help us identify the radio remote control correctly and completely by giving:

- serial number
- purchase date
- description of the problem found
- address and telephone number of the place where the device is being used (with the name of the person to contact)
- local supplier.

**It is recommended to read and understand all parts of this manual, and make sure that all the instructions it contains have been followed correctly before contacting the Service technicians.**

## **5.3 DISPOSAL**

When disposing of a radio remote control, give it to the waste separate collecting services in the user's country.

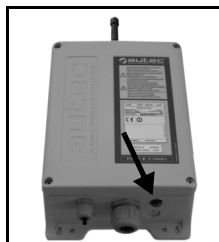
Please pay particular attention when recycling the batteries, applying local rules. Do not throw them away with domestic trash.

## 6 LIGHT SIGNALS

### 6.1 EXTERNAL SIGNALS

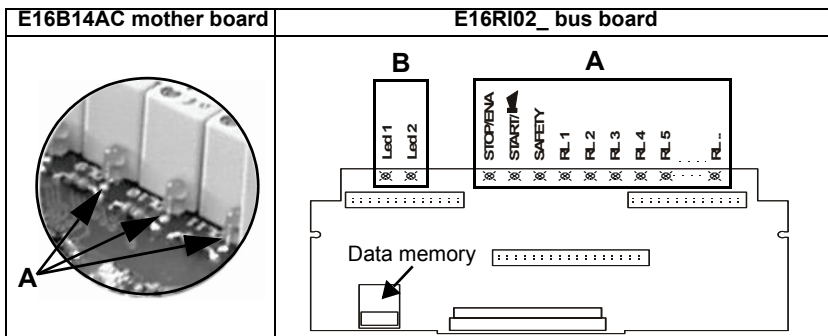
Each receiving unit is equipped with a status indicating light:

SIGNAL TYPE	MEANING
<b>LIGHT SWITCHED OFF</b>	Receiving unit not powered
<b>STEADY LIGHT</b>	Receiving unit powered (POWER ON)
<b>BLINKING LIGHT</b>	Radio link between the transmitting and receiving unit is present (ENABLE ON)



### 6.2 INTERNAL SIGNALS

The activation of each relay on the E16B14AC mother board is signalled by a LED (A) near the relay. The same indication is repeated on the bus board (E16RI02\_) if present.

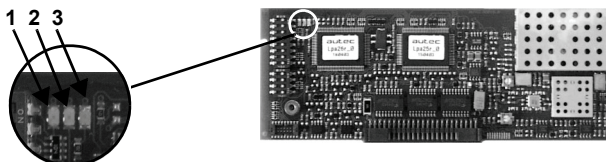


Two diagnostic LEDs (B) are present on the E16RI02B bus board that indicate:

<b>LED 1 (GREEN)</b>	diagnostic LED
<b>LED 2 (RED)</b>	code alarm in the data memory (see paragraph 7.3 "Programming the E16RI02B bus board")

Three LEDs are present on the E16SRXUS1 radio receiving module that indicate:

1. power supply on
2. radio link on
3. frequency scanning search



## 7 PROGRAMMING



The dip switches must be programmed when the receiving unit is not powered. Programming must only be carried out by authorized personnel.



For the correct functioning, the group of 8 dip switches (excluding DIP 1) for the radio modules E16STXUS1 (transmitting unit) and E16SRXUS1 (receiving unit) must be set in the same way.

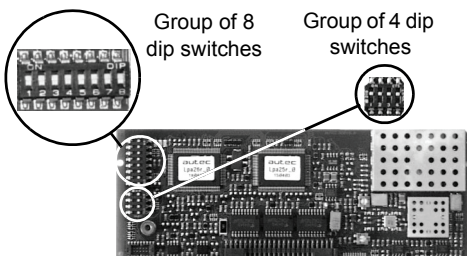


The incorrect closure of the receiving unit can compromise the seal between the casings and thereby the protection degree from dust and water.

### 7.1 PROGRAMMING THE E16SRXUS1 RADIO RECEIVING MODULE

The group of eight dip switches located on the radio module are used to program some functions and set the working frequency.

The programming set in the other group of four dip switches must never be modified.



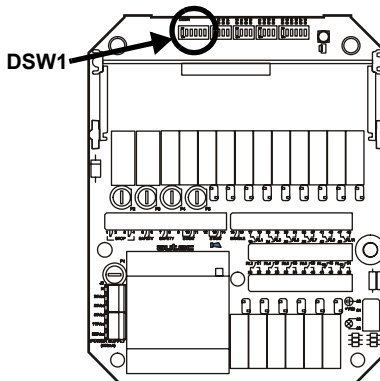
Group of 8 dip switches

DIP	STATE	FUNCTION
1	ON	Stop after 0.35 sec with invalid radio signal
	OFF	Stop after 1 sec with invalid radio signal
2	ON	Deactivation of low battery warning from horn on machine
	OFF	Activation of low battery warning from horn on machine
3	ON	If DIP 8 is OFF automatic scan of the frequencies in the band 915 - 928 MHz
	OFF	If DIP 8 is OFF automatic scan of the frequencies in the band 902 - 915 MHz
3-7	ON/OFF	If DIP 8 is ON see "Appendix: Frequency Table"
8	ON	Manual selection mode of the frequencies using DIP 3 - DIP 7 (refer to "Appendix: Frequency Table")
	OFF	Automatic scan mode of the frequencies in the band selected by DIP 3 (DIP 4 - DIP 7 indifferent)

## 7.2 PROGRAMMING THE E16B14AC MOTHER BOARD

Dip switch programming shall correspond to that given on the technical data sheet.

Dip switches 4-5-6 of the DSW1 group are used to program some of the radio remote control functions as illustrated in the following table:

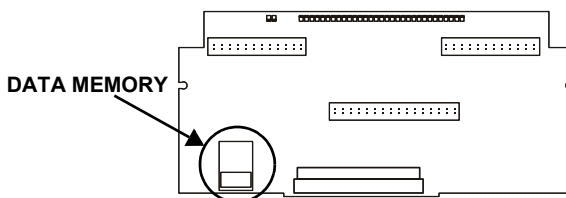


DSW1			
PROG.	DIP SWITCH	SEL. POS.	FUNCTION
P1	4	ON	RL3 held by RL2 (or RL1) and RL4 by RL3*
	4	OFF	disabled function
P2	5	ON	RL7 held by RL5 (or RL6) and RL8 by RL7*
	5	OFF	disabled function
P3	6	ON	If RL1 (or RL3) is active then RL2 and RL4 are disabled If RL2 (or RL4) is active then RL1 and RL3 are disabled
	6	OFF	disabled function

\*Once RL4 and RL3 have been activated after RL2 or RL1 (and therefore held by RL2 (or RL1)) they can be easily disabled by activating them in the reverse order. The same applies for RL8 and RL7 with RL5 (or RL6).

## 7.3 PROGRAMMING THE E16RI02B BUS BOARD

Autec programs this bus board and programming is recorded in the data memory.

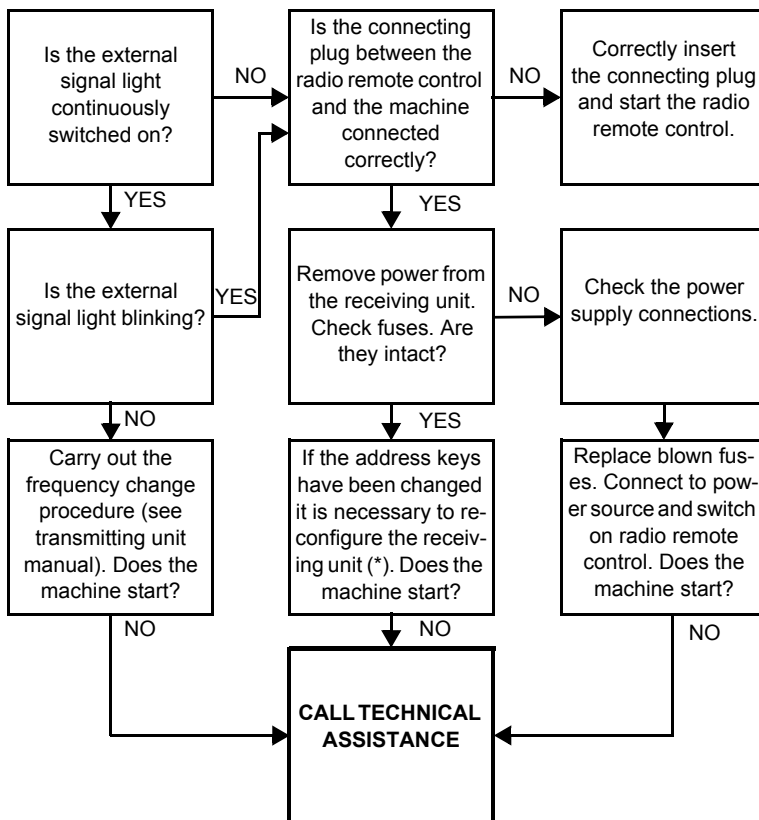




## 8 RECEIVING UNIT DIAGNOSTICS

If the system “machine+radio remote control” does not start, check if the problem is caused by the radio remote control or the machine. Therefore, before carrying out any verification connect the cable control unit: if the machine does not start, the problem lies with the machine itself.

If, on the other hand, the machine only starts using the cable control panel, the problem lies with the radio remote control. In this case, follow the diagnostics procedure of the transmitting unit and then proceed as follows:



(\*) If the address keys (*E16SCHUS1*) have been replaced, do the following:

1. check that the transmitting unit is off and the receiving unit is powered
2. switch on the transmitting unit
3. press the START pushbutton without releasing it for at least 5 sec.



## Appendix: FREQUENCY TABLE

### E16SRXUS1

MHz	DIP SWITCH						MHz	DIP SWITCH					
	3	4	5	6	7	8		3	4	5	6	7	8
902.150	OFF	OFF	OFF	OFF	OFF	ON	915.350	ON	OFF	OFF	OFF	OFF	ON
903.050	OFF	OFF	OFF	ON	OFF	ON	916.250	ON	OFF	OFF	ON	OFF	ON
903.850	OFF	OFF	OFF	OFF	ON	ON	917.050	ON	OFF	OFF	OFF	ON	ON
904.650	OFF	OFF	OFF	ON	ON	ON	917.850	ON	OFF	OFF	ON	ON	ON
905.525	OFF	ON	OFF	OFF	OFF	ON	918.675	ON	ON	OFF	OFF	OFF	ON
906.325	OFF	ON	OFF	ON	OFF	ON	919.525	ON	ON	OFF	ON	OFF	ON
907.175	OFF	ON	OFF	OFF	ON	ON	920.375	ON	ON	OFF	OFF	ON	ON
907.975	OFF	ON	OFF	ON	ON	ON	921.175	ON	ON	OFF	ON	ON	ON
908.850	OFF	OFF	ON	OFF	OFF	ON	922.050	ON	OFF	ON	OFF	OFF	ON
909.650	OFF	OFF	ON	ON	OFF	ON	922.850	ON	OFF	ON	ON	OFF	ON
910.450	OFF	OFF	ON	OFF	ON	ON	923.650	ON	OFF	ON	OFF	ON	ON
911.250	OFF	OFF	ON	ON	ON	ON	924.450	ON	OFF	ON	ON	ON	ON
912.125	OFF	ON	ON	OFF	OFF	ON	925.325	ON	ON	ON	OFF	OFF	ON
912.925	OFF	ON	ON	ON	OFF	ON	926.175	ON	ON	ON	ON	OFF	ON
913.775	OFF	ON	ON	OFF	ON	ON	926.925	ON	ON	ON	OFF	ON	ON
914.525	OFF	ON	ON	ON	ON	ON	927.725	ON	ON	ON	ON	ON	ON

