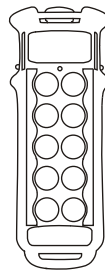




## **Transmitter System**

### **USER'S MANUAL**



### **Modular Series**

**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 AUTECH. Please specify the serial number of the relative radio remote control.**

**Contact AUTECH 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 AUTECH (including recording and photocopying).**

# 1 INDEX AND CONVENTIONS

## INDEX

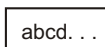
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## CONVENTIONS

In this manual, all important information is indicated using the following symbols and conventions:



abcd. . . : WARNINGS



abcd. . . : INSTRUCTIONS



abcd. . . : TECHNICAL DATA

abcd. . . : IMPORTANT TEXTS

**THIS MANUAL REFERS EXCLUSIVELY TO THE TRANSMITTING UNIT: THE INSTALLATION WARNINGS ARE GIVEN IN THE RECEIVING UNIT MANUAL.**

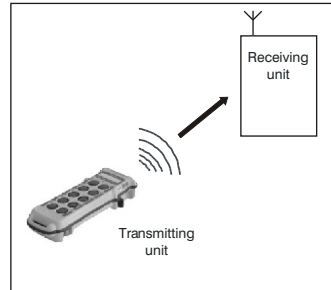
**BEFORE INSTALLING, STARTING AND USING THE RADIO REMOTE CONTROL, THIS MANUAL MUST BE READ AND UNDERSTOOD CAREFULLY BY ALL PEOPLE WHO INSTALL, USE AND CARRY OUT MAINTENANCE ON THE RADIO REMOTE CONTROL.**

## 2 INTRODUCTION TO MODULAR SERIES

Industrial radio remote controls of the **Modular series** are used to command 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 a transmitting unit with the same address.

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



**Each Modular series radio remote control complies with Part 15 of the FCC Rules.**

**Operation is subject to the following two conditions:**

- (1) this device may not cause harmful interference, and**
- (2) 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.**



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

#### **PERMITTED USES**

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

#### **FORBIDDEN USES**

**Machines installed in areas where equipment with explosion-proof characteristics are being used.**

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

All machines must undergo a risk analysis; therefore it is 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 current user country national laws 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 any cases of emergencies, faults or damaged parts, ALWAYS stop the “machine + radio remote control” system until the problem has been solved.**

Any damaged parts can ONLY be replaced by authorised Autec personnel or service representative, and only using original Autec spare parts.

## INSTRUCTIONS FOR DOCUMENT MANAGEMENT

The following minimum documentation is supplied with each radio remote control:

- transmitting unit manual
- receiving unit manual
- battery charger manual
- a guarantee certificate
- the radio remote control technical data sheet.

**Make sure that the following documents have been supplied:** if they are not, request them from Autec. Please specify the radio remote control serial number.

### CERTIFICATE OF GUARANTEE

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

### TECHNICAL DATA SHEET

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 all necessary checks have taken place the installer must sign the technical data sheet, which must be kept with the user's manual (always keep a copy of this data sheet in case it is needed 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.

**The plates MUST NOT be removed from where they are placed or damaged otherwise the warranty will be forfeited.**

## TECHNICAL DATA

Frequency band .....	902 - 928 MHz
Programmable radio channel .....	32
Hamming distance .....	8
Probability of non-recognition of error .....	<10 exp-11
Typical working range .....	100 m
Time of reply to commands .....	<100 ms
Time of reply to STOP .....	<100 ms
Passive emergency time .....	* 0,35 / 1 sec.

\* refer to paragraph "Programming" in the receiving unit manual, DIP nr. 1 settings.



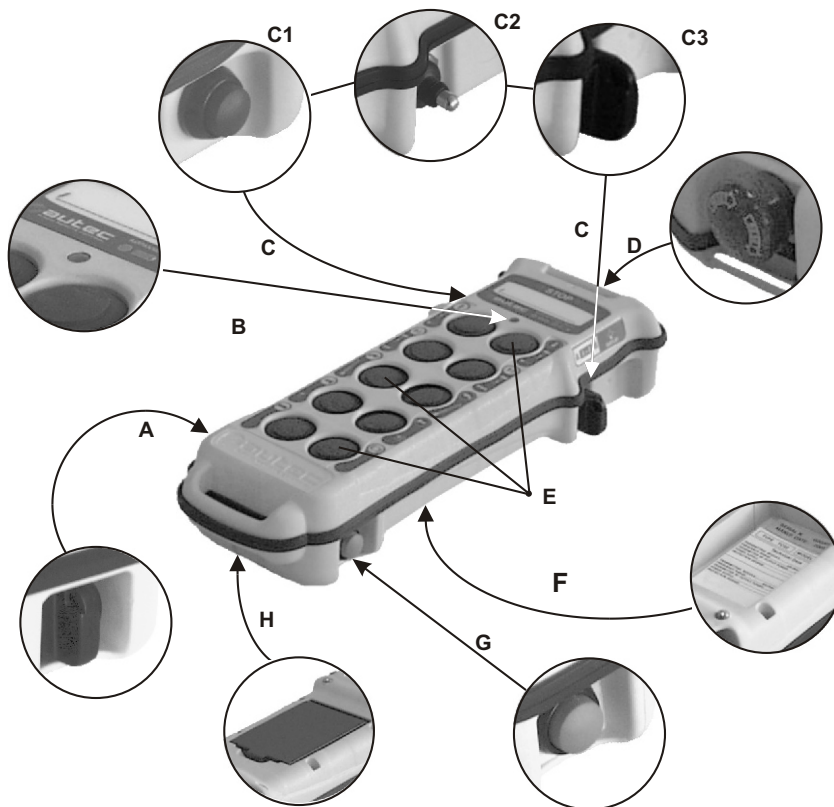
**Following from the status of dip switch no.1 or possibly due to a failure (of the dip switch itself), a delay up to max 1 second may occasionally occur between command release and actual deactivation of outputs. This is due to the characteristics of radio propagation (i.e.: EM interferences, near out-of-range condition). Care must be taken to ensure that this could never lead to.**

### 3

## MK10, MK12 TRANSMITTING UNIT

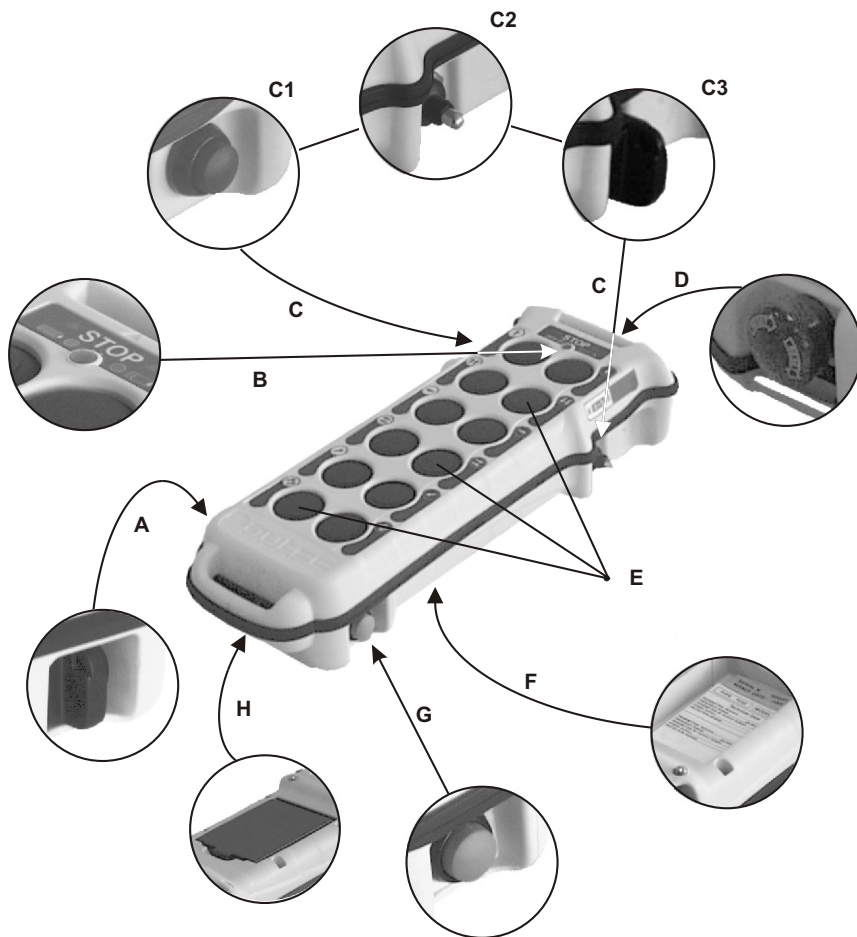
These transmitting units can be used with one of the following receiving units:  
 - Type R102  
 - Type R202

### MK10



<b>A</b>	starting keyswitch		<b>D</b>	STOP pushbutton	
<b>B</b>	signalling LED		<b>E</b>	actuators pushbutton	
<b>C</b>	actuator (if present)	<b>C1</b>	pushbutton	<b>F</b>	technical data plate, identification plate (in the battery housing)
		<b>C2</b>	toggle switch	<b>G</b>	START pushbutton
		<b>C3</b>	keyswitch selector	<b>H</b>	battery

## MK12



<b>A</b>	starting keyswitch		<b>D</b>	STOP pushbutton
<b>B</b>	signalling LED		<b>E</b>	actuators pushbutton
<b>C</b> <i>(if present)</i>	<b>C1</b>	pushbutton	<b>F</b>	technical data plate, identification plate <i>(in the battery housing)</i>
	<b>C2</b>	toggle switch	<b>G</b>	START pushbutton
	<b>C3</b>	keyswitch selector	<b>H</b>	battery



The Modular series radio remote controls are equipped with a redundant control that protects the “radio remote control + machine” system, when it is in neutral (neutral position), from involuntary movements caused by possible radio remote control faults. This occurs only if the wiring indications indicated in the technical data sheet have been respected as well as the indications for correct installation.

### **MK10, MK12 TRANSMITTING UNIT TECHNICAL DATA**

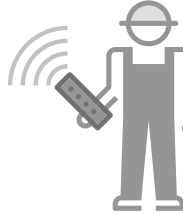
Power supply (battery pack MBM06MH) .....	* NiMH 7,2Vdc
Antenna .....	internal
Output power .....	meets FCC Part 15 for license-free operation
Housing .....	PA6 (20% fg)
Minimum protection grade .....	IP65
Working temperature .....	-4°F - +131°F
Dimensions .....	(85x260x56) mm
Weight .....	650 g
Autonomy with fully charged battery (at 68°F) .....	~ 15 hours
Warning of low battery charge .....	3,5 minutes

\* refer to battery technical data in the battery charger manual.

## 4 WARNINGS FOR USE



### THE OPERATOR MUST ALWAYS



**VISUALLY FOLLOW** all movements of the machine and its load remaining inside radio remote control typical working range.

**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.

Before using the radio remote control **ALWAYS MAKE SURE** that the STOP push-button can be pressed and released: if it does not work, do not use the radio remote control.

**SWITCH OFF** the transmitting unit when work is interrupted. Avoid leaving the load suspended in the air (even when changing the battery).

**NEVER LEAVE** the transmitting unit unguarded when the starting keyswitch is inserted.

**ONLY SWITCH ON OR USE** the transmitting unit when starting work: improper use could be hazardous.

**NEVER SWITCH ON OR USE** the transmitting unit in closed spaces, with the machine not in sight, or outside the typical working range.

**PRESS** immediately the STOP button in case of hazard.

**PAY ATTENTION** to the entire work area. Press the STOP button in case of hazard.

**PAY ATTENTION** not to let elements such as cement, sand, lime, etc. deposit on the transmitting unit because they can compromise transmitting unit use and safety.

In case of malfunctions and/or damaged and/or faulty parts, **PUT** the radio remote control out of use until the problem has been completely eliminated.

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

## 5 WARNINGS FOR MAINTENANCE



**ENSURE THAT THE BATTERY HAS BEEN REMOVED FROM THE TRANSMITTING UNIT BEFORE CARRYING OUT ANY MAINTENANCE WORK.**

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



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



**Before carrying out maintenance and/or diagnostics it is recommended to replace the battery with a charged one and ensure the efficiency of the START key.**

**Routine maintenance in accordance to the instructions given in this manual is fundamental for the safe use of the radio remote control.**

**Read and strictly respect the warnings given in the battery charger manual in order to lengthen the life of the battery itself.**

**After each maintenance intervention, always make sure that only the expected manoeuvres are carried out when the relative commands are sent by the transmitting unit.**

## ROUTINE MAINTENANCE

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

Special applications may need more specific routine maintenance interventions 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 started.**



**If irregularities are noted while carrying out routine maintenance, put the "machine+radio remote control" system out of order, following the indications given (see "Receiving unit diagnostic")**

### Transmitting unit

It is recommended **every day** to:

1. remove dust or accumulations of other material from the transmitting unit. Never use solvents or flammable/corrosive materials to clean, and do not use high pressure water cleaners or steam cleaners.
2. store the transmitting unit in clean and dry areas.
3. make sure that the transmitting unit gaskets, joystick bellows, selectors caps and pushbuttons are intact, soft and elastic
4. make sure that the battery seat and the battery contacts are always clean
5. make sure that the transmitting unit are structurally integral
6. make sure that the panel symbols can be easily recognised. If necessary, replace the panel.
7. check identification plate readability and integrity
8. verify the efficiency of the STOP pushbutton before using the radio remote control.

## SPECIAL MAINTENANCE



**Any fault should be repaired by authorised Autec 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:

- the serial number
- the purchase date (given on the guarantee)
- description of the problem found
- the address and telephone number of the place where the radio remote control is being used
- the name of the person to be contacted
- the name of the company that supplied the radio remote control.

**Before speaking with a service technician, it is advisable to make sure that the given instructions have been followed correctly.**

### DISPOSAL

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

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

## 6 MK10, MK12 OPERATION TRANSMITTING UNIT

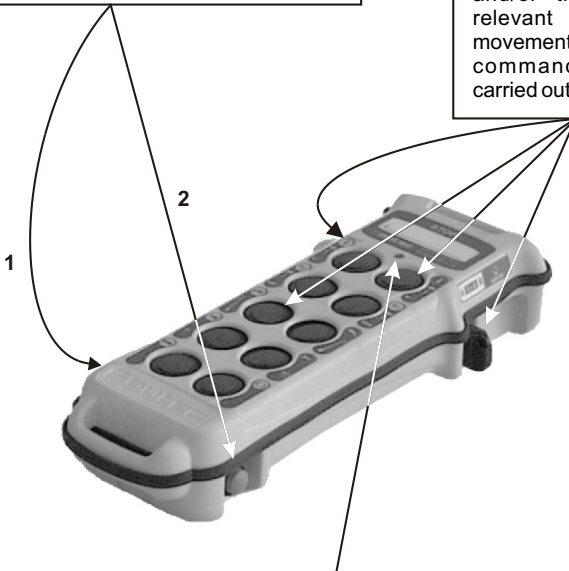
### POWER AND STARTING

- 1 To switch on the transmitting unit, insert the starting key and turn it to "I".
- 2 To start the radio remote control functions, press the "START" button for 1+2 seconds.

After starting, the green signalling LED always lights up.

### COMMAND ACTIVATION

Operate the actuators and/or the selectors relevant to whatever movement or selection command is to be carried out.



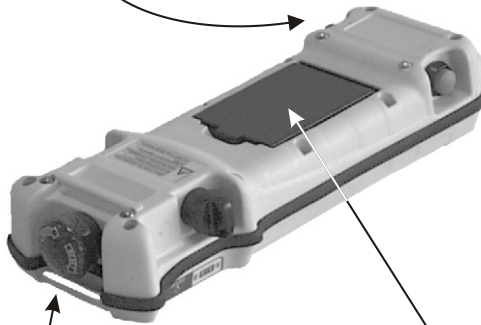
### SIGNALS

TYPE	MEANING	ACTION
blinking green LED	OPERATION NORMAL	///
blinking red LED, accompanied by intermittent sounds from the buzzer	LOW BATTERY The transmitting unit switches off 3,5 minutes after the LED starts flashing	Switch off the transmitting unit and replace the battery
steady red LED at starting, accompanied by the continuous sound from the buzzer	ONE OR MORE (movement) ACTUATORS and/or STOP PUSHBUTTON INSERTED	Release actuator(s) and/or the STOP pushbutton

## SWITCHING OFF

The transmitting unit should be switched off each time work is stopped by turning the ignition key to "O" and extracting it (always put the key in a safe place).

The unit may also switch off if the battery is not sufficiently charged and/or when the radio remote control is not used for more than 3,5 minutes (set DIP nr. 1: refer to paragraph 8 "Programming").



## STOP



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.

To **start working again**, after having made sure that the working conditions are safe, turn the STOP button in the direction indicated to deactivate it and repeat the starting procedure.

## BATTERY

To recharge a flat battery, proceed as follows:

1. Insert the battery into its proper battery charger, which should be positioned in an area having a temperature of between +5°C and +45°C. The battery now starts charging, a state signalled by the lighting up of the "CHARGE" pilot light.
2. After a maximum of 3 hours the "CHARGE" indicator switches off: the battery is fully charged. Remove the battery from the charger (if the battery is not removed, charging continues in maintenance mode).

## 7 FREQUENCIES

**The radio frequency of AUTEK radio remote controls is included in the group of frequencies permitted by regulations that are current at the moment of radio remote control entry onto the market.**

Each radio remote control is programmed by the producer in the **AUTOMATIC** scan mode (producer's standard programming) or **MANUAL** selection mode.

### MANUAL SELECTION MODE

When operating in the **MANUAL** selection mode it is possible to work at a specific frequency that must be set manually by programming the dip switches in the radio modules (see "Settings" on page 13).

**To set or modify this operation mode contact personnel that have been authorised by Autec.**

### AUTOMATIC SCAN MODE

When operating in the **AUTOMATIC** scan mode it is possible to operate at a specific frequency, which can be changed in case of interference or conflict with other radio equipment using the "Changing the operating frequency" procedure.

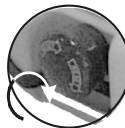
This mode avoids internal interventions on the transmitting unit and the receiving unit.

### Working frequency change process

- 1 With the transmitting unit started (blinking green LED):
  - press the START pushbutton (a) and keep it pressed,
  - press the STOP pushbutton (b),
  - release the START pushbutton.



- 2 Unlock the STOP pushbutton by turning it as shown in the photo and repeat the 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 pressed for about 8÷10 seconds.**



## 8 PROGRAMMING

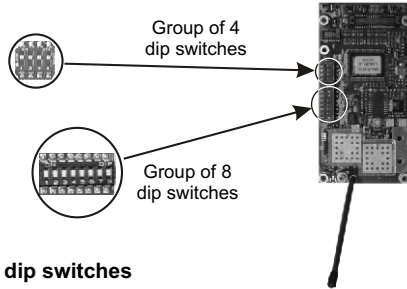


The dip switches must be programmed with the battery removed from the transmitting unit and can be done only by authorised personnel.

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

### DIP SWITCHES ON E16STXUS1 RADIO TRANSMITTING MODULE

The group of eight dip switches found in the module is necessary for programming some operations and setting the operating frequency. The programming set in the other group of four dip switches must never be modified.



Group of 8 dip switches

DIP	POS.	DESCRIPTION
1 (*)	ON	The transmitting unit never switches off automatically
	OFF	The transmitting unit switched on without movement commands entered switches off after approx. 3,5 minutes
2	ON	Deactivated of low battery warning from horn on machine
	OFF	Activation of low battery warning from horn on machine
3	ON	With DIP 8 OFF automatic scan mode of the frequencies in the 915 - 928 MHz
	OFF	With DIP 8 OFF automatic scan mode of the frequencies in the 902 - 915 MHz
3 - 7	ON/OFF	With DIP 8 ON see "Appendix: Frequency Table"
8	ON	Manual selection of frequencies with DIP 3 - DIP 7 (see "Appendix: Frequency Table")
	OFF	Automatic scan mode of frequencies in the band selected with DIP 3 (DIP 4 – DIP 7 not relevant)

(\*) With the MK12 transmitting unit the dip switch should be at ON.

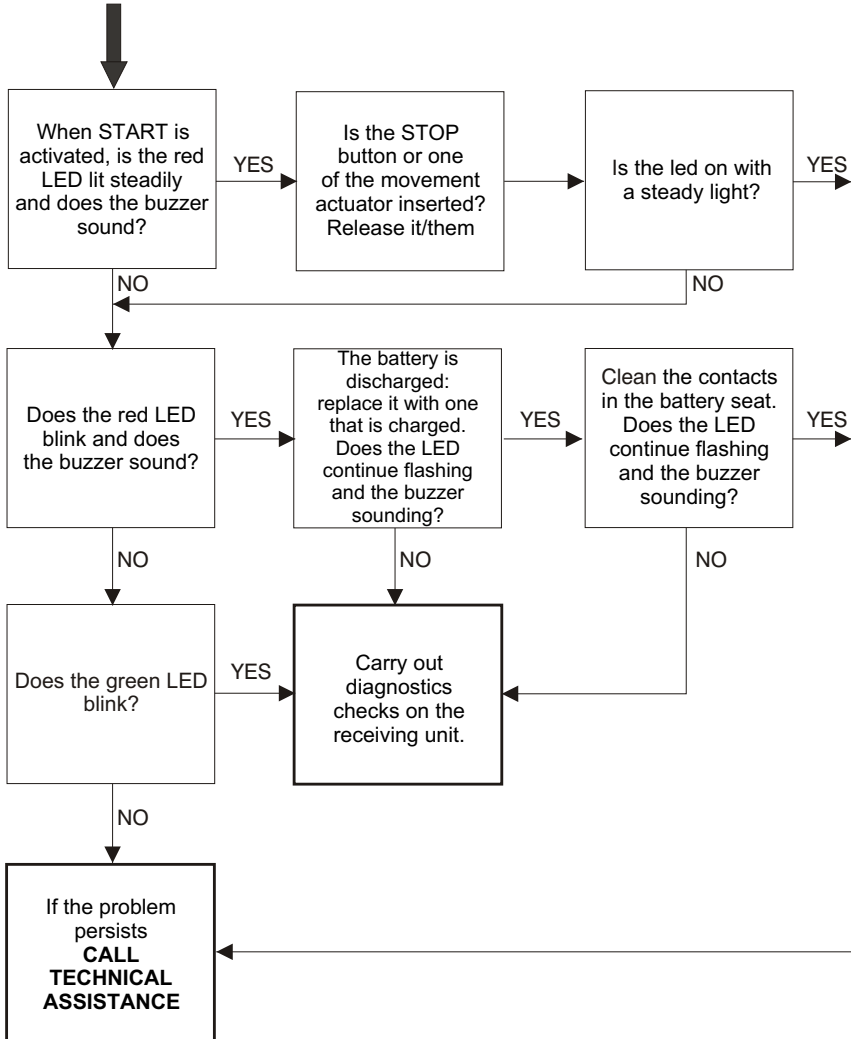


These eight dip switches must be programmed in the same manner as the group of 8 dip switches (excluding DIP 1) present in the radio module of the receiving unit (see manual).

## 9 MK10, MK12 TRANSMITTING UNIT DIAGNOSTICS

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 verifications, check the functioning of the machine with the cable control panel:

- if it does not switch on, the problem lies with the machine itself
- if it does switch on, the problem lies with the radio remote control. In this case, proceed as follows:



## Appendix: FREQUENCY TABLE

### E16STXUS1

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



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