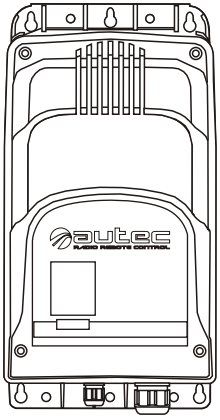
AC Receiver System

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.

1
INDEX & CONVENTIONS

INDEX

CONVENTIONS

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

abcd. . . : WARNINGS

abcd. . . : INSTRUCTIONS

abcd. . . : TECHNICAL DATA

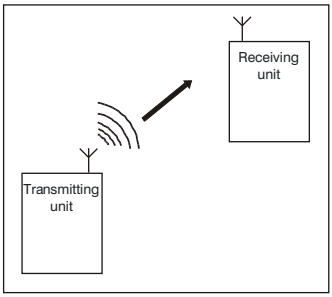
abcd. . . : IMPORTANT TEXTS

THIS MANUAL REFERS EXCLUSIVELY TO THE RECEIVING UNIT: THE GENERAL USAGE WARNINGS ARE GIVEN IN THE TRANSMITTING 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

Industrial radio remote controls 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 its own 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 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.

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

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.

Alll 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.

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 voided.

TECHNICAL DATA

Frequency band	**902 - 928 MHz**
Programmable radio channels	**32**
Hamming distance	**8**
Probability of non-recognition of error	**<10 exp-11**
Typical working range	**330 ft [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.

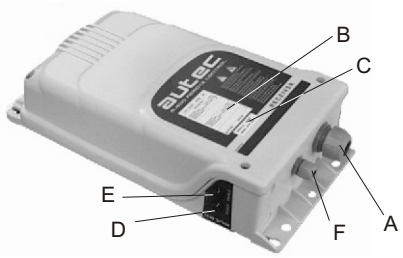
Following from the status of dip switch no.1 (see paragraph 7) or possibly due to a failure (of the dip switch itself), a delay up to max 1 second may occasionally occur between command release and actual deactivation of outputs. This is due to the characteristics of radio propagation (i.e.: EM interferences, near out-of-range condition). Care must be taken to ensure that this could never lead to a dangerous situation in the specific use.

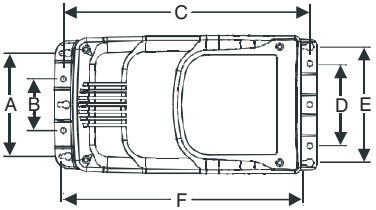
3
RECEIVING UNITS

The receiving unit Type R202 and Type R302 can be used with the following transmitting unit:
- SERIES LIGHT
- SERIES MODULAR

These receiving units are equipped with a safety function called SAFETY that protects the "radio remote control + machine" system, when it is in neutral (rest position), from involuntary movements caused by possible radio remote control faults.

RECEIVING UNIT TYPE R202



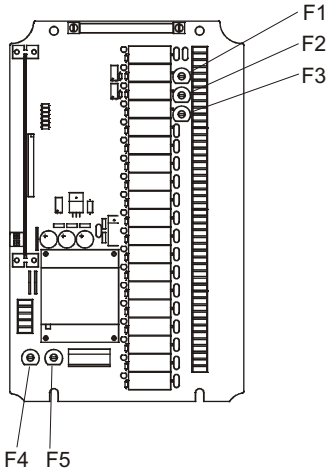


A	cable holder *(opt. plug)*
B	data technical plate
C	identification plate
D	POWER light
E	ENABLE light
F	coaxial cable exit for stylus antenna or for blinker *(when present))*

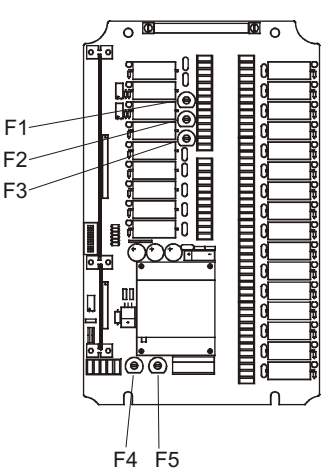
Drilling template
A = 5.9 inches [150 mm]
B = 3 inches [75 mm]
C = 14.1 inches [357.5 mm]
D = 4.7 inches [118.5 mm]
E = 6.6 inches [167 mm]
F = 13.8 inches [350.5 mm]

The master boards on this type of receiving unit may be:
- E16B16AC for configurations of up to 16 commands
- E16B22AC for configurations of up to 22 commands (plus extension interface card)

E16B16AC



E16B22AC



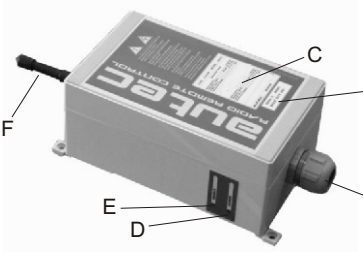
F1	STOP circuit protection fuse
F2 **F3**	SAFETY circuit protection fuse
F4 **F5**	POWER SUPPLY protection fuse

Receiving unit Type R202 TECHNICAL DATA

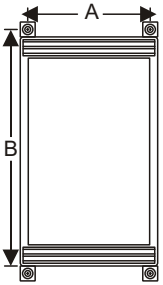
Power supply..... **24/48/55/110 Vac ±20% 60 Hz (15VA)**
Antenna..... **integrated or dedicated**
Max switching capacity of STOP contacts..... **4A (250Vac)**
Max switching capacity of SAFETY contacts..... **4A (250Vac)**
Max switching capacity of command contacts..... **10A (250Vac)***
Fuse F1 (STOP circuit)..... **4A T 250V (0.2"x0.8") inches [5x20 mm])**
Fuse F2 and F3 (SAFETY circuit)..... **4A T 250V (0.2"x0.8") inches [5x20 mm])**
Fuse F4 and F5 (POWER SUPPLY)..... **1A T 250V (0.2"x0.8") inches [5x20 mm])**
Working temperature..... **(-5°F) - (+160°F) [(-20°C) - (+70°C)]**
Housing..... **nylon (20% fg)**
Minimum protection grade..... **NEMA 4 [IP65][**
Dimensions..... **(8.0"x15"x3.6") inches [(202x381x91) mm]**
Weight..... **max 7.7 lbs [3.5 kg]**

*Capacity only valid if both terminals are used for each contact.
If the radio remote control output have been cabled by Autec, please see technical data sheet.

RECEIVING UNIT TYPE R302



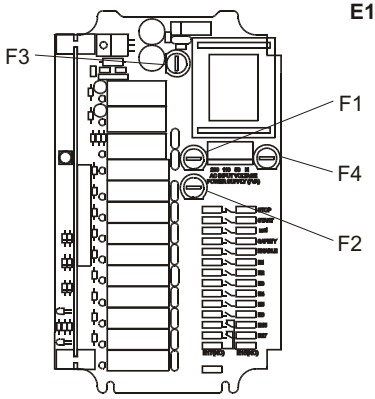
A	cable holder *(opt. plug)*	**D**	POWER light
B	identification plate	**E**	ENABLE light
C	data technical plate	**F**	antenna



Drilling template
A = 4.2 inches [106 mm]
B = 8.4 inches [213.5 mm]

The master board in this type of receiving unit is E16B10AC for configurations of up to 10 commands.

E16B10AC



F1	STOP circuit protection fuse
F2	SAFETY circuit protection fuse
F3 **F4**	POWER SUPPLY protection fuse

Receiving unit Type R302 TECHNICAL DATA

Power supply	**50/110 Vac ±20% 60 Hz (7VA)**
Antenna	**dedicated**
Max switching capacity of STOP contacts	**4A (250Vac)**
Max switching capacity of SAFETY contacts	**4A (250Vac)**
Max switching capacity of command contacts	**6A (250Vac)***
Fuse F1 (STOP circuit)	**4A T 250V (0.2"x0.8") inches [5x20 mm])**
Fuse F2 (SAFETY circuit)	**4A T 250V (0.2"x0.8") inches [5x20 mm])**
Fuse F3 and F4 (POWER SUPPLY)	**0.5A T 250V (0.2"x0.8") inches [5x20 mm])**
Working temperature	**(-5°F) - (+160°F) [(-20°C) - (+70°C)]**
Housing	**Polycarbonate**
Minimum protection grade	**NEMA 4 [IP65]**
Dimensions	**(4.7"x7.9"x3.5") inches [(120x200x90) mm]**
Weight	**max 4.4 lbs [2 kg]**

*if the radio remote control output have been cabled by Autec, please see technical data sheet

4
WARNINGS FOR INSTALLATION

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

THE INSTALLER MUST

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

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 the appropriate antivibration absorbers.

DO NOT MODIFY or TAMPER WITH the radio remote control, the machine or its electric panel. 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", and that the voltages and currents being used do not exceed the maximum permitted values.

DO NOT EXCLUDE the radio remote control safety mechanisms 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 SUPPLY the receiving unit directly from the mains. A main switch should always be present to permit power supply removal.

PLACE the receiving unit so that it is not completely screened by metal parts and that it must be easily reachable.

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

After installation and wiring, ALWAYS CHECK that the maneuvers 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: The stylus of dedicated antenna (always present in the receiving unit Type R302, optional for the receiving unit Type R202), must never come in contact with metal parts.

The installer must CHECK and/or COMPLETE the "Technical Data Sheet" indicating the date of activation of the system, putting his signature and stamp.

5
WARNINGS FOR MAINTENANCE

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

All the 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")

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 are structurally integral
3. verify the integrity and connection of the internal wiring to the receiving unit
4. make sue that the panel symbols can be easily seen. If necessary, replace the panel.
5. check identification plate readability and integrity

Electrical operation

It is recommended every **six months** to:
1. make sure that all the relay contacts of the receiving unit operate correctly, controlling contact closing when the corresponding manoeuvre is enabled and contact opening when the manoeuvre is disabled.
2. verify the correct correspondence between the commands that are sent and the manoeuvres that are carried out.
3. verify that the contact for the SAFETY relay is open when no movement command has been sent. This is a 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. verify and if necessary replace the strips or other fixing systems
4. make sure that the connecting cable has not deteriorated, above all near the cable holder

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

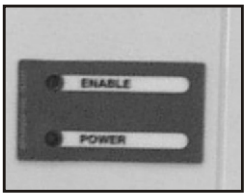
When scrapping, entrust the radio remote control to the separate scrap collecting services in the country of use.
Please pay particular attention when recycling the batteries, applying local rules. Do not throw them away with domestic trash.

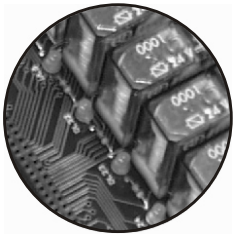
6
LIGHT SIGNALS

On each receiving unit
there are:

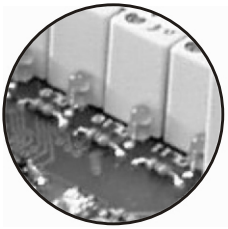
a **POWER** lamp
indicates the presence of power
supply in the receiving unit

an **ENABLE** lamp
which indicates radio link on
between the transmitting unit
and receiving unit

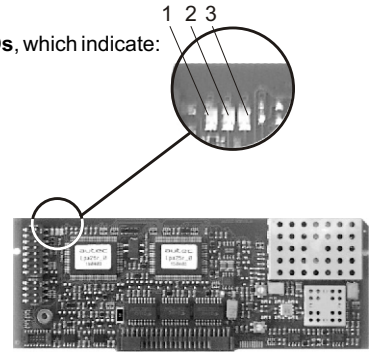




a **LED**
for each relay
on the master board,
which indicates
the activation of that relay



On the receiver module there are three **LEDs**, which indicate:
1. power supply
2. radio connection
3. frequency scanning search.



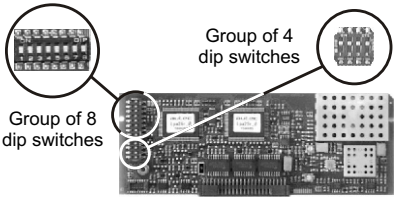
7
PROGRAMMING

The dip switches must be programmed when the receiving unit is not powered and can be done only by authorised personnel.

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

DIP SWITCHES ON E16SRXUS1 RADIO RECEIVING MODULE

The group of eight dip switches found in the module permits the programming of different operating mode and the setting of 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	Passive emergency at 0.35 second
	OFF	Passive emergency at 1 second
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 MK10, MK12, MJ transmitting unit the dip switch should be at ON.
(**) 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 transmitting unit (see manual).

DIP SWITCHES ON MASTER BOARDS

There are a number of dip switches on the E16B16AC and E16B22AC master boards for programming various functions of the radio remote control, as explained in the following tables:

DIP SWITCHES ON E16B16AC MASTER BOARD

DIP SWITCH	POS. SEL.	DESCRIPTION
1	ON	E8 activate also E7
1	OFF	function disabled *
2	ON	E10 activate also E9
2	OFF	function disabled **
3	ON	E3 held by E2 (or E1) and E4 by E3 ***
3	OFF	function disabled
4	ON	E7 held by E5 (or E6) and E8 by E7 ***
4	OFF	function disabled

* With the **LK**, **VEGA E** transmitting units the dip switch is not used and should be at OFF.
** With the **LK** transmitting units the dip switch is not used and should be at OFF.
*** E4 and E can be disconnected simply by activating them in the reverse order (after you have activated E2 (or E1) and, therefore, maintained by E2 (or E1)). The same is true for E8 and E7 with E5 (or E6).

DIP SWITCHES ON E16B22AC MASTER BOARD

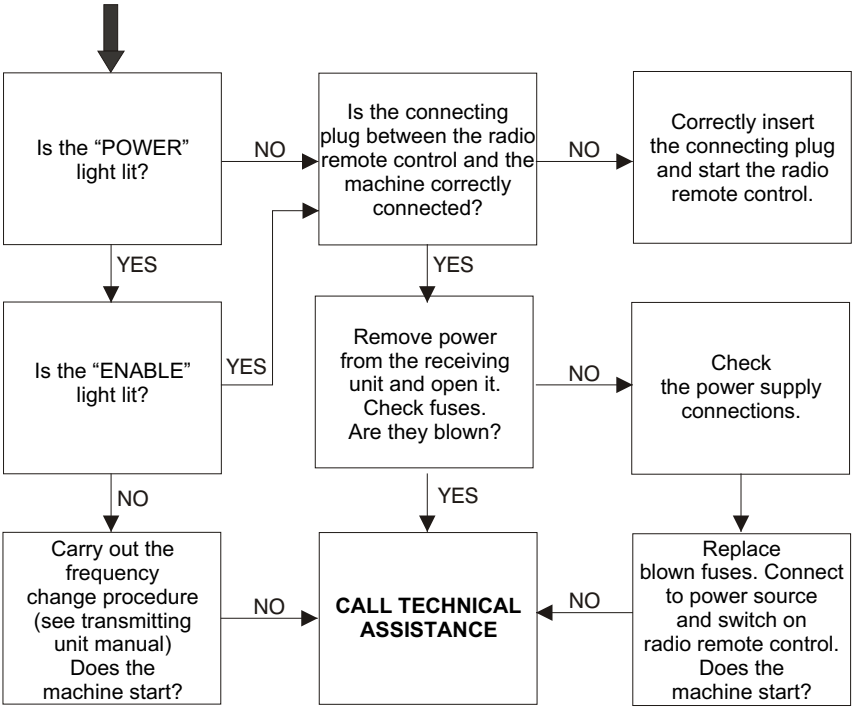
DIP SWITCH	POS. SEL.	DESCRIPTION
1	ON	E10 activate also E9
1	OFF	function disabled *
2	ON	E12 activate also E11
2	OFF	function disabled
3	ON	E14 activate also E13
3	OFF	function disabled
4	ON	E16 activate also E15
4	OFF	function disabled
5	ON	E18 activate also E17
5	OFF	function disabled
6	ON	E20 activate also E19
6	OFF	function disabled
7	ON	E3 held by E2 (or E1) and E4 by E3 ***
7	OFF	function disabled **
8	ON	E7 held by E5 (or E6) and E8 by E7 ***
8	OFF	function disabled **

* With the **LK** transmitting units the dip switch is not used and should be at OFF.
** With the **SIRIO E** transmitting units the dip switch is not used and should be at OFF.
*** E4 and E3 can be disconnected simply by activating them in the reverse order (after you have activated E2 (or E1) and, therefore, maintained by E2 (or E1)). The same is true for E8 and E7 with E5 (or E6).

With the **MK10** and **MK12** transmitting units the dip switches are not used and should all be at OFF.

8
RECEIVING UNIT DIAGNOSTIC

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, on the other hand, the machine can only be switched on using the cable control panel, the problem lies with the radio remote control. In this case, follow diagnostics procedure for the transmitter unit and then proceed as follows:



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

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