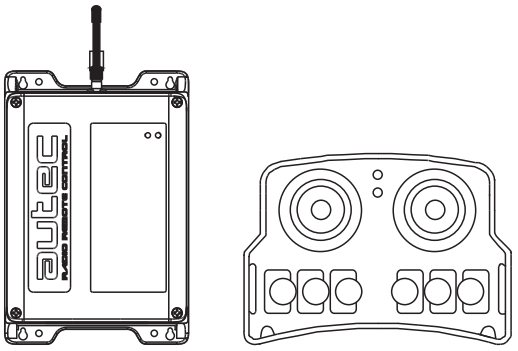
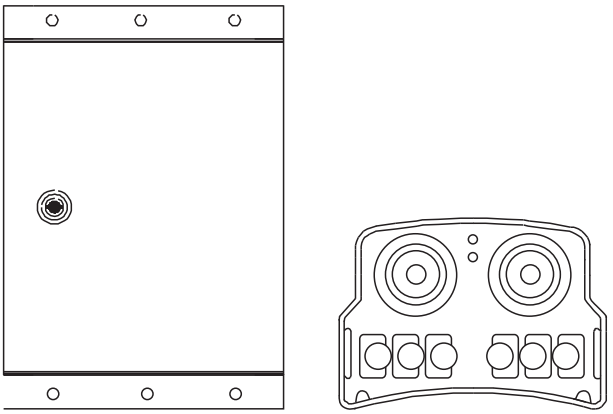
C26PRO SERIES

SERVICE MANUAL

PRO-M



MA



Index of "INTRODUCTION"

1 Introduction

This technical assistance manual contains all information regarding the radio remote control replacement, programming and diagnostic procedures.
For this reason it is **COMPLEMENTARY TO and does not replace the user manual**, where warnings and indications regarding radio remote control installation, usage and maintenance can be found.

To operate correctly and safely, those who use this manual must:
- become familiar with and respect all the warnings and indications given in the user manual
- use the radio remote control technical data sheet (a copy of this sheet can be found inside the receiving unit and another copy can be found in the documentation included with the user manual).

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

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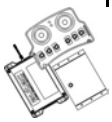


1.1 How to use the assistance manual

Using the manual

Follow the indications given below according to the situation:

THE RADIO REMOTE CONTROL DOES NOT WORK: FINDING AND CORRECTING THE FAULT

If the "machine + radio remote control" system does not work correctly, begin from the diagnostic paragraph (see General diagnostic of the radio remote control on page 1-6) which sends you to the diagnostic sections in the other parts of the manual. Follow the indications given in the flow chart step by step.

SPARE PARTS: SEARCHING FOR INDIVIDUAL CODES

If spare parts have to be ordered, refer to section 2 "Exploded view and spare parts" of each chapter, which contains a list showing all the part codes of the unit described in that chapter.

SPARE PARTS: REPLACEMENT

If parts of the radio remote control have to be replaced, use the list given in the "Replacement index". This list can be found at the beginning of the relative unit chapter.

RADIO REMOTE CONTROL FUNCTIONS: MODIFYING THE PROGRAMMING

If the radio remote control function programs are to be modified, use the list given in the "Glossary" (§ 1.4). Once the relative function has been found, follow step by step the cross-references to the different chapters of the manual.

Structure of the manual

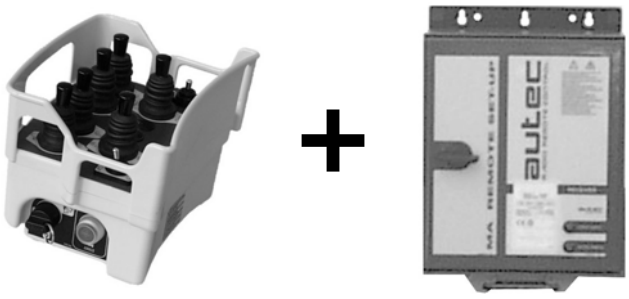
This manual is structured as follows:

- CHAPTER 1 An introduction to and explanation of the manual
- CHAPTER 2 Batteries and battery charger
- CHAPTER 3 Transmitting unit
- CHAPTER 4 and 5* Receiving unit

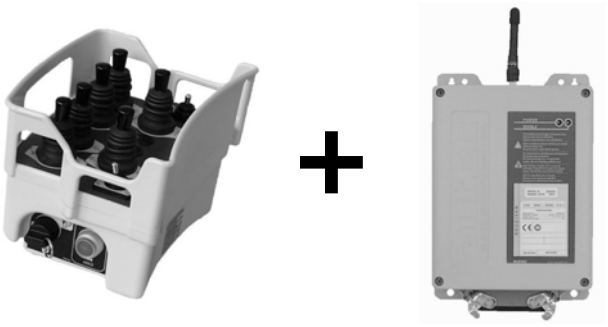
* chapter 5 may not be included

1.2 Radio remote control identification

Model

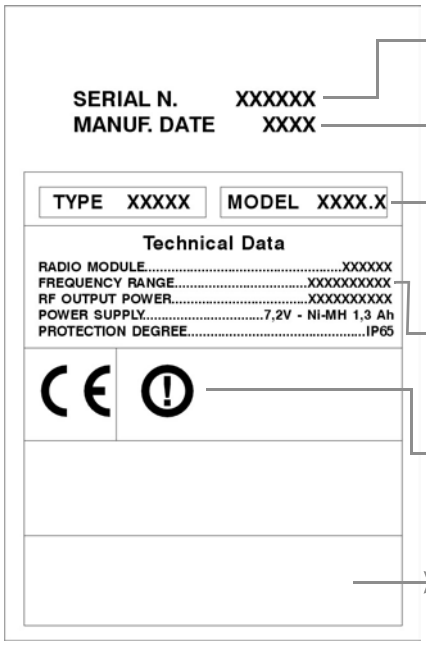


MA
(REMOTE SET-UP)



PRO-M

Plate



Identification of the serial number
(to unequivocally identify the radio remote control)

Identification of the year of production
(to verify the guarantee validity)

Identification of the "Type" and "Model"
(to identify the radio remote control from a homologation point of view)

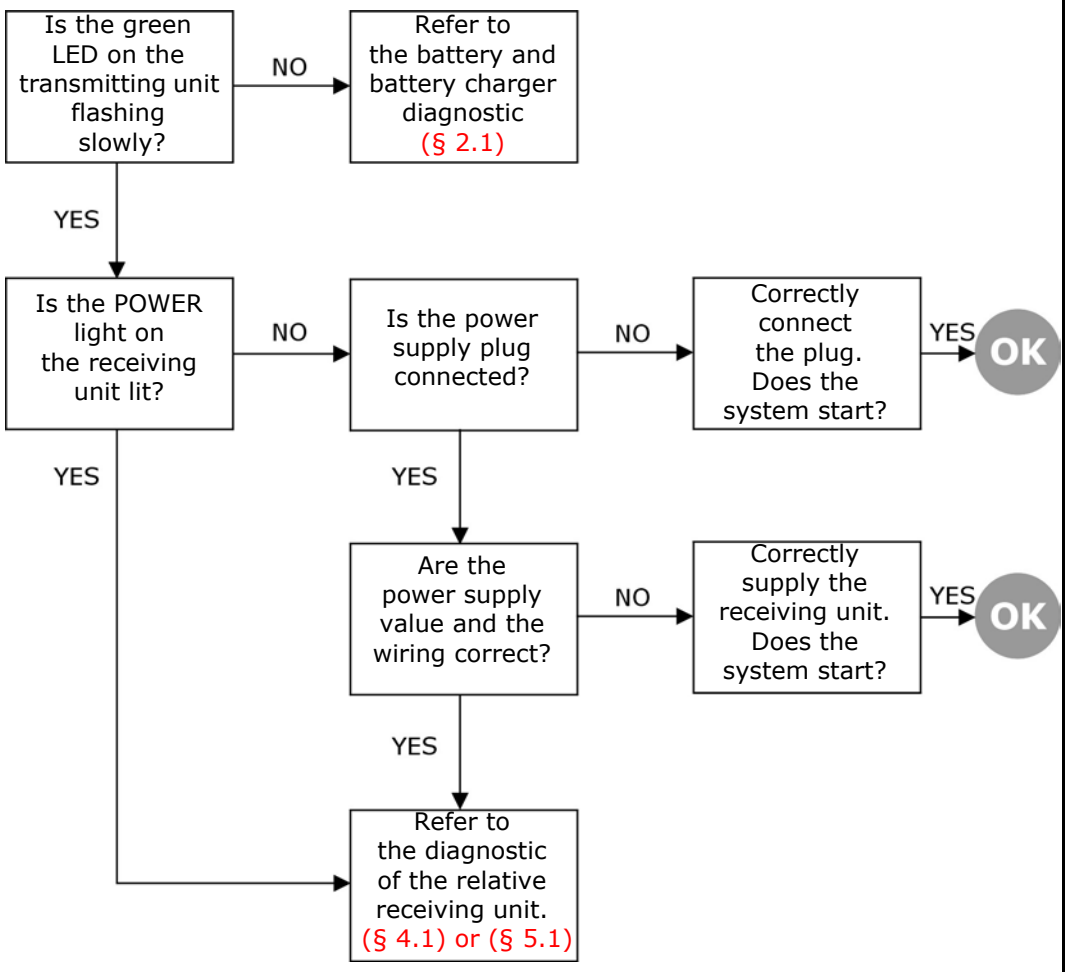
Identification of the technical data
(to identify some of the characteristics of the radio remote control: the most useful characteristic is the frequency)

Identification of the technical data
(conformity with the 99/05 R&TTE Directive)

Identification of brands and certification

1.3 General diagnostic of the radio remote control

If the "radio remote control + machine" system does not operate correctly, first check if the problem has to do with the radio remote control or the machine. Before carrying out any verification, therefore, connect the wired control station. If the machine does not start, the problem has to do with the machine itself.
Alternatively, if the machine starts normally and operates correctly but only when activated from the wired control station the problem involves the radio remote control.
In this case, after having carried out the power on and starting procedure, follow the indications given below.
1. **If the machine works intermittently** because the radio remote control continually switches off, change the radio frequency being used (with the transmitting unit powered and started, keep the START pushbutton pressed for 5-6 seconds. A prolonged beep accompanied by the powering of both the signalling LEDs indicates that the frequency has changed. During this operation the receiving unit switches off. To start operating again press the START pushbutton, as for the normal starting procedure).
2. **If the machine works partially**, i.e. some commands are not activated while others are, replace:
- the actuators of the faulty commands in the transmitting unit and
- if necessary, the corresponding relay cards in the receiving unit.
This information can be found in the technical data sheet of the radio remote control.
3. **If the machine does not start at all**, follow the flow chart given below.



1.4 Glossary

Actuator

An actuator is a device present in the transmitting unit. The operator uses actuators to activate fixed commands which are sent to, received by and also actuated by the receiving unit.
The joysticks, selectors and pushbuttons are all actuators.

Address

The address is a number (value) used by the receiving unit to differentiate the telegrams sent to the respective transmitting unit. The address is contained in the address keys and renders the radio remote control unique.
(see Address key on page 3-25) or (see Address key on page 4-30) or (see Address keys on page 5-42)

Address keys

There are two address keys: a yellow one which should be inserted into the transmitter encoder module, and a grey one which should be inserted into the receiver decoder module.
These keys are necessary for correct radio remote control operation because they contain the unequivocal address of the system.

Analogue receiving module

The analogue receiving module is a module that is present in the receiving unit and is necessary not only for activating commands but also the intensity at which to activate them. The outputs of these commands can be controlled either by voltage or by current (PWM).

Antenna

The antenna is the device that permits the transmission and reception of the telegram that contains the commands activated in the machine by the receiving unit. The antenna can be internal, integrated or external.

Automatic scan

Automatic scan is an operation mode of the radio remote control that makes it possible to work at any one of the frequencies available inside the permitted band. When set in this mode the receiving unit continues to scan all the frequencies until it recognises a telegram that it can decode. From then on, the operating frequency does not change.
A radio remote control is normally pre-set by Autec in this mode, which makes it possible to move the operating frequency in case of interference (see "Frequency change") without having to intervene inside the transmitting unit or the receiving unit.
(see Automatic scan mode on page 3-9) or (see Automatic scan mode on page 4-11) or (see Automatic scan mode on page 5-11)

Automatic switching off

Automatic switching off (or power off) occurs when the transmitting unit switches off automatically by itself. This happens when the battery is not sufficiently charged and/or the radio remote control is not used for approximately 3 and a half minutes.
This function can be deactivated.
(see Connectors on page 3-15)

Battery

The battery supplies power to the transmitting unit and guarantees operation for at least one working day (8 hours). The battery charge state is indicated by two LEDs present on the transmitting unit. When the battery is flat, it should be recharged using the supplied battery charger. Only Autec batteries can be used.

Command

Activating a command means activating an actuator of the transmitting unit. The actuation of a movement or a selection in the machine commanded by the receiving unit corresponds to this action.

Command common

The command common is the wiring cable of the receiving unit that supplies the relay contacts relative to the command. All the commons must be in series with the STOP contact.

Dip switch

The dip switch is a device used for programming some functions. It can assume two statuses (ON and OFF), which correspond to the activation and deactivation of a specific operation.
(see Dip switches on page 3-7) or (see Dip switches on page 4-8) or (see Dip switches on page 4-24) or (see Dip switches on page 5-8) or (see Welding points and dip switches on page 5-33) or (see Welding points and dip switches on page 5-39)

ENABLE

ENABLE is a signal present in the receiving unit when the unit is in radio link with the transmitting unit. Only if this signal is present (and therefore the relative relay is active) can the commands that are sent be actuated.

FLOW

If programmed, FLOW activates a movement command. This function commands the solenoid valve which pressurises the oil in the primary hydraulic circuit of the distributor.
(see Welding points on page 4-25)

Function

A function is a well-defined task carried out by the radio remote control. A function can be activated or deactivated.

Horn

The machine horn/alarm (when connected) can be activated by pressing the START pushbutton with the transmitting unit started.

Interference

Radio interference is a disturbance in the radio link between the transmitting unit and the receiving unit. It can be caused by any radio equipment (radio remote controls included) operating in the same area. In case of interference the passive emergency intervenes automatically to guarantee safety.

Joystick

A joystick is an actuator present on the transmitting unit. To activate this actuator, move it from its rest position.

Joystick axis

An axis is a spatial direction along which a joystick can be moved. Normally, a joystick can have one single axis or two right-angled axes. Each axis corresponds to a fixed movement command.

Manual selection

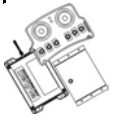
Manual selection is an operating mode of the radio remote control that makes it possible to work at a single fixed frequency inside the permitted band. To set this mode it is necessary to set the dip switches in the radio transmitting and receiving module.
(see Manual frequency mode on page 3-11) or (see Manual frequency mode on page 3-11) or (see Manual frequency mode on page 5-13)

Movement command

A movement command is a command that causes the machine or part of it to move physically. As regards the receiving unit, the common of the movement commands must be obtained from the series of the STOP contact and the SAFETY contact. Given that the SAFETY contact only closes when a movement command is transmitted, the radio remote control is protected from involuntary movements when the actuators are in the rest position.

Operating frequency change

When the automatic scan mode is set in a radio remote control, changing the operating frequency makes it possible to move the operating frequency without having to intervene inside either the transmitting unit or the receiving



	unit. The frequency can only be changed if the radio remote control is operating in the automatic scan mode, and is very useful in cases of interference. The operating frequency change procedure is as follows: - power and start the transmitting unit - keep the START pushbutton pressed for 5-6 seconds (an extended beep accompanied by the powering of both the LEDs present on the transmitting unit indicate that the frequency has changed) - start the transmitting unit again.
Operating range	The typical operating range of a radio remote control is the distance within which a transmitting unit can create a stable radio link with the receiving unit and therefore command the machine.
Passive emergency	The passive emergency is a function of the radio remote control that intervenes following an irregular situation that occurs during operation. When radio remote control linkage is disturbed, incorrect or interrupted, the receiving unit independently decides to stop the radio remote control. This function can be set at 0.5 or 1.5 seconds. (see Welding points on page 4-25) or (see Welding points and dip switches on page 5-33) or (see Welding points and dip switches on page 5-39)
Operating frequency	The operating frequency is the frequency of the radio link between the transmitting unit and the receiving unit. This frequency can be fixed (see "Manual selection") or variable (see "Automatic scan").
Power on	Power on consists of supplying voltage to the units that make up the radio remote control. In the transmitting unit this operation consists of inserting the starting key and turning it to position "I".
Power supply	The power supply is the supply that allows the radio remote control to operate. The power supply of the transmitting unit is supplied by the internal battery while the power supply of the receiving unit is external (in DC or AC).
Programming	Programming means selecting whether to activate a radio remote control function or not, setting values or in any case modifying radio remote control operation within a set of permitted values.
Pushbutton	A pushbutton is an actuator present in the transmitting unit. It activates when pressed and deactivates when released.
PWM	PWM (Pulse Width Modulation) is the modulation that regulates the output current of the analogue receiving module and therefore of the receiving unit. This current commands the solenoid valves of the radio remote controlled machine.
Radio link	The radio link of a radio remote control is the radio-frequency transmission that is created between the transmitting unit and the receiving unit. This link occurs at the operating frequency at which the telegram is modulated.
Radio receiving module	The radio receiving module is a module present in the receiving unit which transforms the radio signal into a low frequency signal that is decoded by the radio transmitter encoder module. The radio receiving module can search for the radio signal that is sent by the transmitting unit at a set frequency (see "Manual selection") or at a variable frequency (see "Automatic scan").

Radio remote control	A radio remote control is the radio equipment which is used to command machines from a distance. It is made up of a portable transmitting unit, from which the user can command the machine from a distance, and a receiving unit installed on-board the machine itself.
Radio transmitter encoder module	The radio transmitter decoder module is the module in the transmitting unit that: - creates the telegram to be sent by coding the activated commands by way of an address. - transforms this low frequency signal into a high frequency radio signal, the value of which can be set (see "Manual selection") or variable (see "Automatic scan").
Receiver decoder module	The receiver decoder module is a module present in the receiving unit that decodes the telegram, transforming it into commands to be carried out by the machine. The receiver decoder module contains the address key that permits recognition of the unequivocal address of the radio remote control.
Receiving unit	The receiving unit is a radio apparatus installed on-board the radio remote controlled machine which receives the commands sent by the transmitting unit and makes the machine carry them out.
REMOTE SET-UP	The REMOTE SET-UP function makes it possible to set the proportional outputs from a distance using a selector that is present on the transmitting unit. (see Preparation for setting on page 4-19) or (see Preparation for setting on page 5-19)
Reply time	The reply time is the time that passes from activation of the command that is to be actuated until true actuation of this command by the radio remote controlled machine. The STOP command reply time must never exceed 550 ms.
RPM	The RPM function is necessary for increasing or decreasing the motor turns of the machine. A precise selector, which is also used to set the outputs (see "REMOTE SET UP"), exists for this operation.
Rest position	The rest position, also called neutral or zero, of an actuator is the position at which the actuator is not active, therefore the transmitting unit does not send commands to the receiving unit. This position is constantly controlled by the SAFETY function to protect the system from involuntary movements in case of failure.
SAFETY	The SAFETY is a safety function that protects the system from involuntary movements caused by possible failures. This function constantly controls the rest position of the movement actuators of the transmitting unit and is available at the SAFETY relay of the receiving unit. (see Welding points on page 4-17) or (see Welding points and dip switches on page 5-33) or (see Welding points and dip switches on page 5-39)
Selection command	A selection command is a command that does not cause a physical movement of the machine or part of it. In the receiving unit, the common of the selection commands may not be in series with the SAFETY contact, while it must be in series with the STOP contact (excluding the TIMED STOP).
Selector	A selector is a type of actuator present in the transmitting unit that can be either a lever or round.

Among those present on the transmitting unit, there is a speed selector that is necessary for making the machine work at different speeds, according to operative needs.

Serial number

The serial number is a group of figures that unequivocally identify the radio remote control. This number is given on the identification plate present on the transmitting unit and the receiving unit.
(see Radio remote control identification on page 1-5)

Setting

Setting is an operation that activates or deactivates a radio remote control function. This function is normally carried out when a dip switch or welding point are to be modified.

Setting

Setting is an operation that consists of fixing set values of radio remote control operation. It is normally carried out following a precise procedure.

Signal

A signal is an electric impulse or an electromagnetic radiation that corresponds to an elementary piece of information. Each command that is sent is transformed into a signal.

Start

Start means starting and powering the radio remote control.

Starting

Starting consists of activating the START pushbutton on the transmitting unit until the green LED starts flashing. This operation finishes when the ENABLE light present on the receiving unit illuminates.. From that moment onwards until subsequent switching off, the commands sent by the transmitting unit are received and actuated by the receiving unit.

STOP

The STOP command should be used each time it is necessary to immediately stop the machine in order to verify any dangerous condition.
It can be actuated by pressing the relative mushroom pushbutton. To start working when this command has been activated, rotate the STOP pushbutton in the indicated direction and repeat the power on and starting procedure.

Switching off (power off)

Switching off consists of disconnecting the power from the transmitting unit, interrupting in this manner the radio link.
To do this insert the starting key and turn it to "O".
Switching off can also be automatic (see "Automatic switching off").

Telegram

A telegram is a set of bits that the transmitting unit sends to the receiving unit. It is modulated at a determinate frequency and contains, as a minimum, the unequivocal address of the radio remote control and the commands that the machine must carry out. A telegram is created by the transmitter encoder module and is recognised by the receiving decoder module.

Technical data sheet

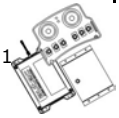
The technical data sheet contains the layout of the transmitting unit commands, the wiring diagram between the receiving unit and the machine, and the setting values that have been set. The installer must fill in and verify the two copies of the technical data sheet (one copy is attached to the user manual, the other is inside the receiving unit).

Transmitting unit

The transmitting unit is a portable radio apparatus supplied by a battery. It sends the commands that are to be carried out by the radio remote controlled machine to the receiving unit.

Trimmer

A trimmer is a variable resistor on some relay cards and is necessary for adjusting the values of some characteristics of the card (for example: minimum and maximum value of the outputs).



TS (Timed STOP)	TS is the command that switches off the diesel motor of the machine. It remains active for 10 seconds after the STOP pushbutton has been activated.
Welding point	These are points that can be present on the radio remote control electronic card and which are necessary for programming activation or deactivation of some functions. They can be programmed by closing the relative pads with a drop of solder.
Wiring	The wiring is the set of electric cables that connects the various parts of a radio remote control unit.

"BATTERIES E BATTERY CHARGERS" index

2 Batteries e battery chargers

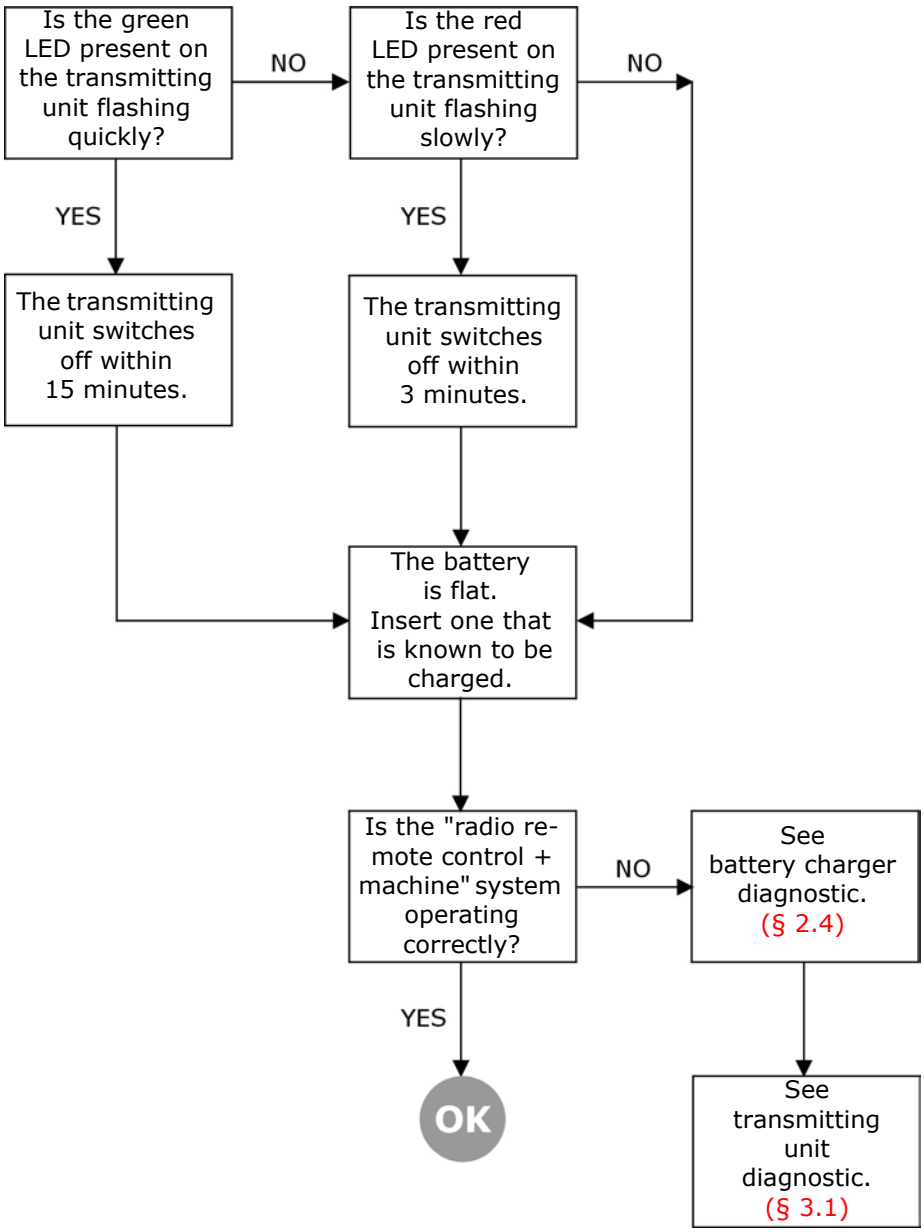
In order to operate, each transmitting unit must be power supplied by a battery that supplies voltage. This battery must be exclusively of the MH0707L type.

Once flat, the MH0707L batteries can only be recharged by CH26_R type battery chargers.

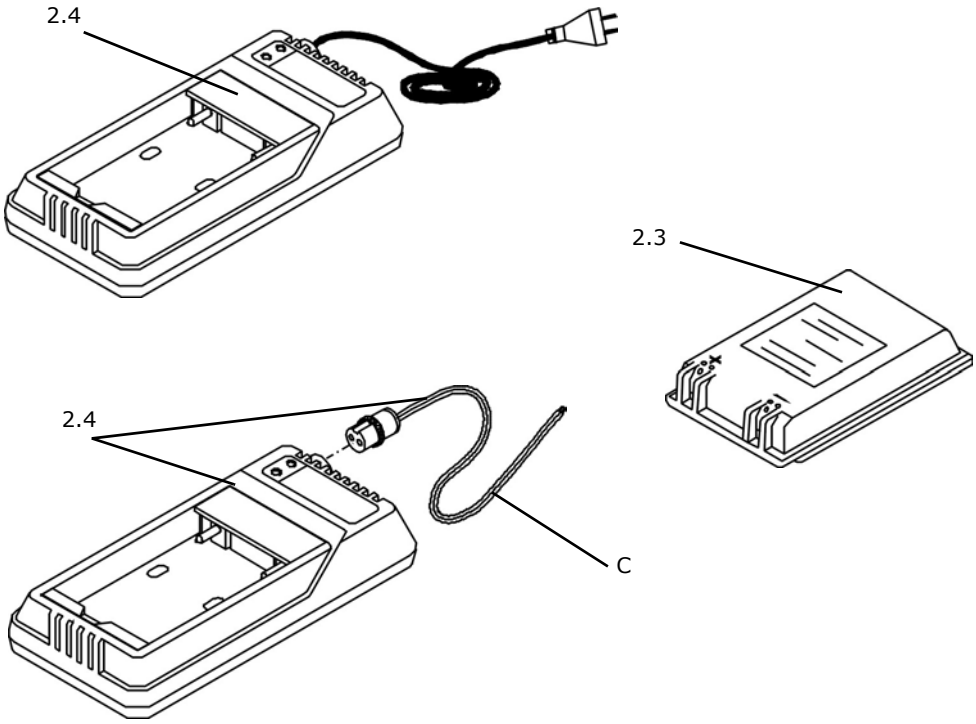
Not using this type of battery and battery charger prejudices correct radio remote control operation. Autec cannot be held responsible for the consequences of this action.

2.1 Battery diagnostic

Diagnostic



2.2 Spare parts



N°	Code	Description
2.3	F0BATT00E07A0	MH0707L battery to Nichel Metal Idrato
2.4	F0CABA01E02N0	CH260R battery charger for MH0707L (230 Vac) *
2.4	F0CABA01E03N0	CH261R battery charger for MH0707L (24 Vdc)
2.4	F0CABA01E04N0	CH262R battery charger for MH0707L (12 Vdc)
2.4	F0CABA01E05N0	CH263R battery charger for MH0707L (115 Vac)
C	F0CAVI00E20A0	24 Vdc and 12Vdc extendable cable for battery chargers

* together with the code, indicate also the type of battery charger (given on the technical data plate)

The "N°" is the paragraph number that deals with the spare parts (except for the extension cable).

2.3 MH0707L regargeable battery

Characteristics

number of NiMH elements	6
nominal voltage of 1 element (V)	1,2
total nominal voltage of the battery (V)	7,2
battery voltage after discharge (V)	8,4
voltage of the charged battery (V)	6
capacity (Ah)	1,3
number of cycles in average life	400
autonomy (hours)	up to 15
recharge time	(approx) 4

Recharge conditions

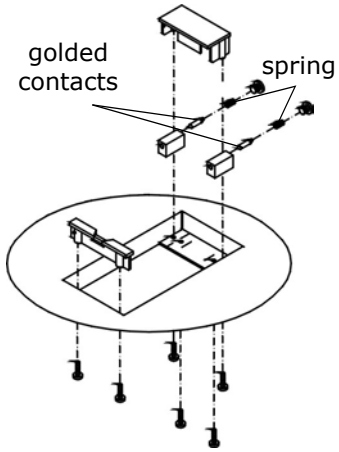
MH0707L batteries must only be recharged using CH26_R battery chargers (see CH26_R battery charger on page 2-8).

Use the battery until it is totally flat.

As the battery recharges in relation to time, it should never be removed before recharging finishes (for example if the power supply to the battery charger is interrupted, the charge starts from the beginning again).

Housing

The battery should be inserted into its housing, which can be found in the lower part of the transmitting unit.
When there is no voltage in the transmitting unit even with a charged battery, check contacts are clean and the efficiency of the battery seat.



Temperature intervals

The battery should be recharged, used and stored within the recommended temperature limits, which are indicated in the following table.

	Recommended interval	**Permitted interval**
Recharge	(+5÷+35)°C	(0÷+50)°C
Usage	(-10÷+45)°C	(-20÷+50)°C
Storage	(0÷+45)°C	(-20÷+50)°C

As the temperature has a notable effect on battery capacity, not respecting the indicated temperature limits, voltage and duration, can permanently damage the battery elements (in this case the battery terminals have voltages of less than 6V).

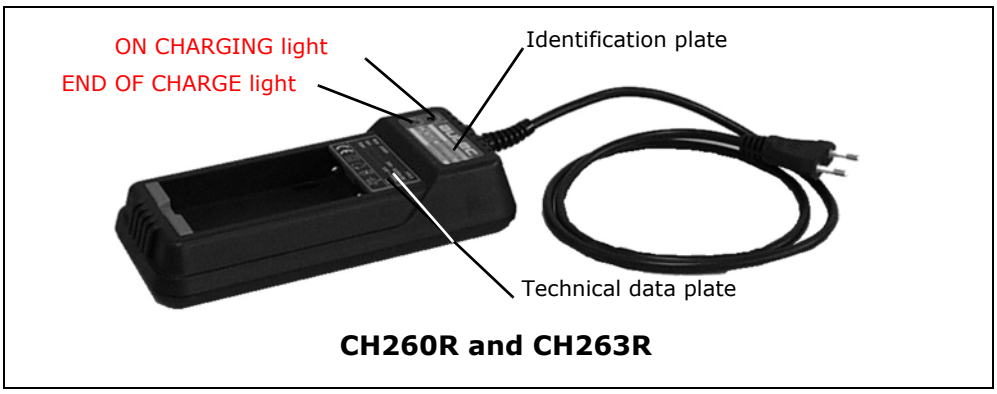
2.4 CH26_R battery charger

Codes

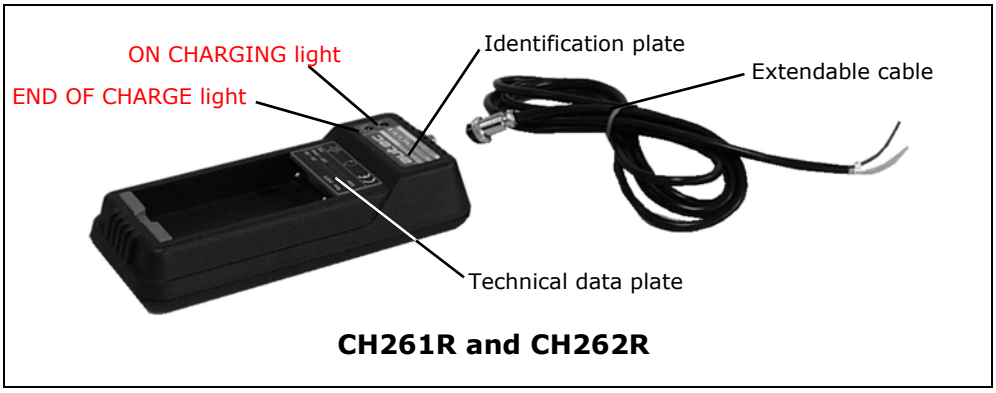
F0CABA01E02N0	CH260R battery charger supplied to 230 Vac *
F0CABA01E03N0	CH261R battery charger supplied to 24 Vdc **
F0CABA01E04N0	CH262R battery charger supplied to 12 Vdc **
F0CABA01E05N0	CH263R battery charger supplied to115 Vac *

* together with the code indicate also the type of battery charger (given on the technical data plate)
** the cable is extendable (F0CAVI00E20A0) and is included in the battery charger code

Description



CH260R and CH263R

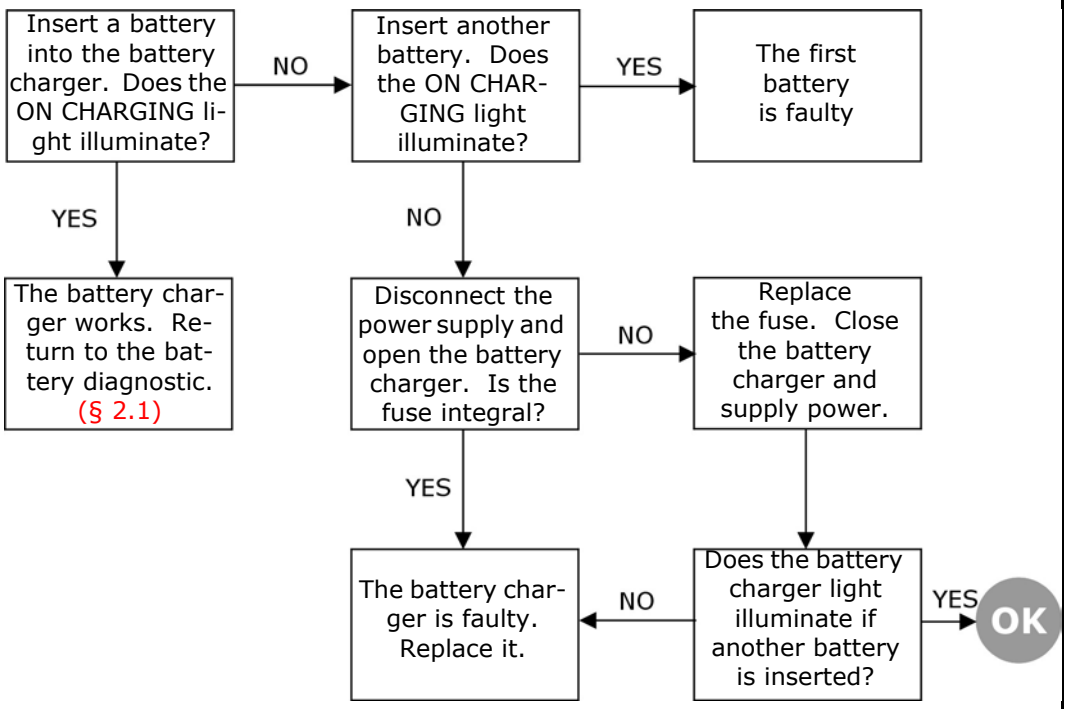


CH261R and CH262R

Signal light

The "ON CHARGING" signalling light is red and lights up when the MH0707L battery inserted in the battery charger is being recharged.
The "END OF CHARGE" signalling light is green and indicates that the charge phase has ended and the battery can be used.

Diagnostic



Internal fuse

In order to check that the battery charger is operating correctly, verify the integrity of the internal fuse. Fuse technical characteristics: F0.5A, 250 V, (5x20) mm.

Recharge conditions

A CH26_R battery charger can only be used with MH0707L batteries (see MH0707L regargeable battery on page 2-6).

The recharge of a CH26_R battery charger lasts approx. 4 hours, after which the battery has a voltage of approx. 8.4V.
As the battery recharges in relation to time, it should never be removed before the end of the recharge (for example if the power supply to the battery charger is interrupted, the charge starts from the beginning again).

We recommend using the battery charger within the recommended temperature interval (+5÷+35)°C or at least within the permitted temperature interval (10÷+50)°C.

"TRANSMITTING UNIT" index

"TRANSMITTING UNIT" replacements index

"TRANSMITTING UNIT" programmings index

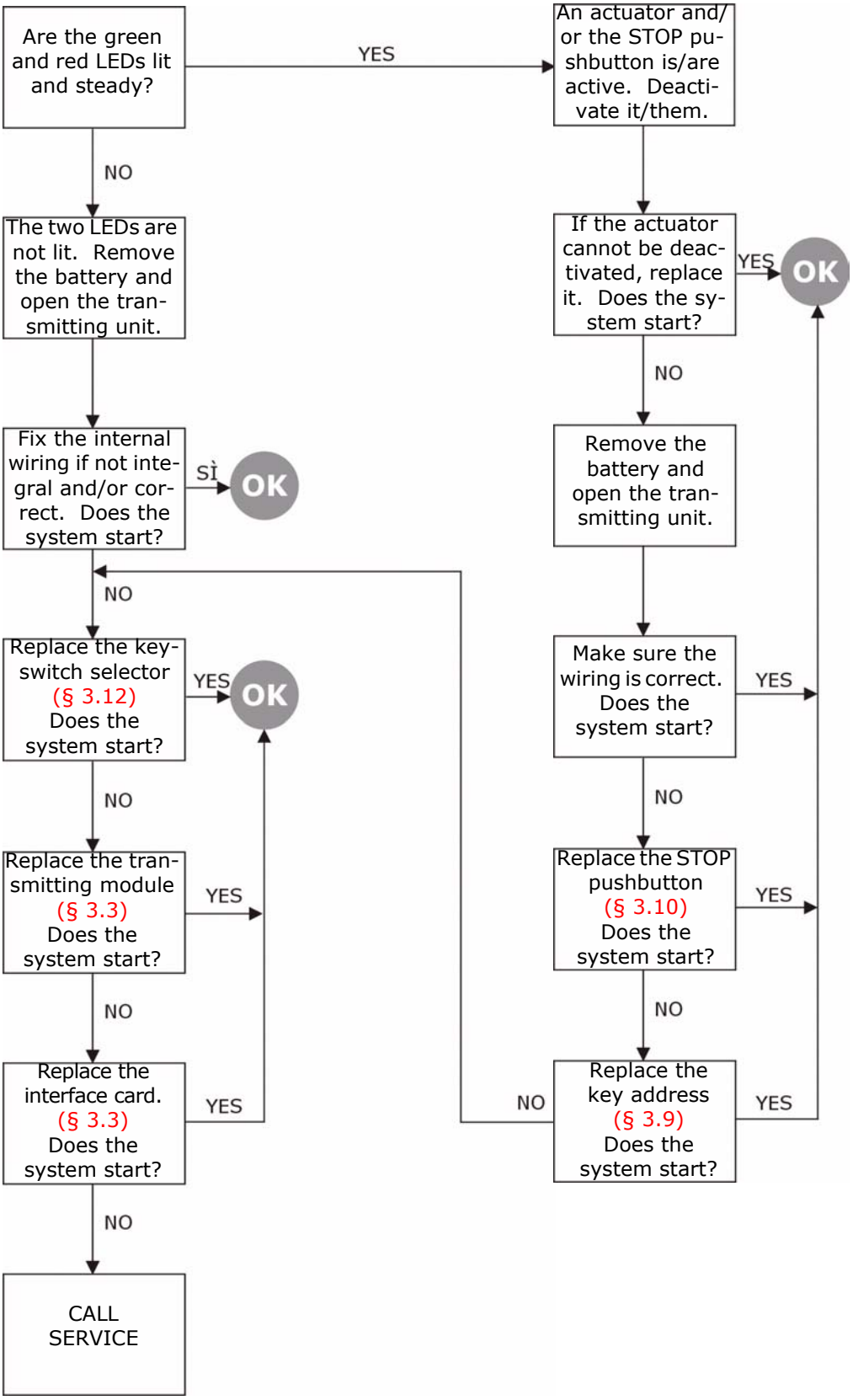
3 Transmitting unit

The model MA transmitting unit of the C26 PRO series can command machines with electric or electrohydraulic proportional drives from a distance.

The distinctiveness of this unit are the proportional outputs of the machine, which can be set directly from the transmitting unit using the REMOTE SET UP function.

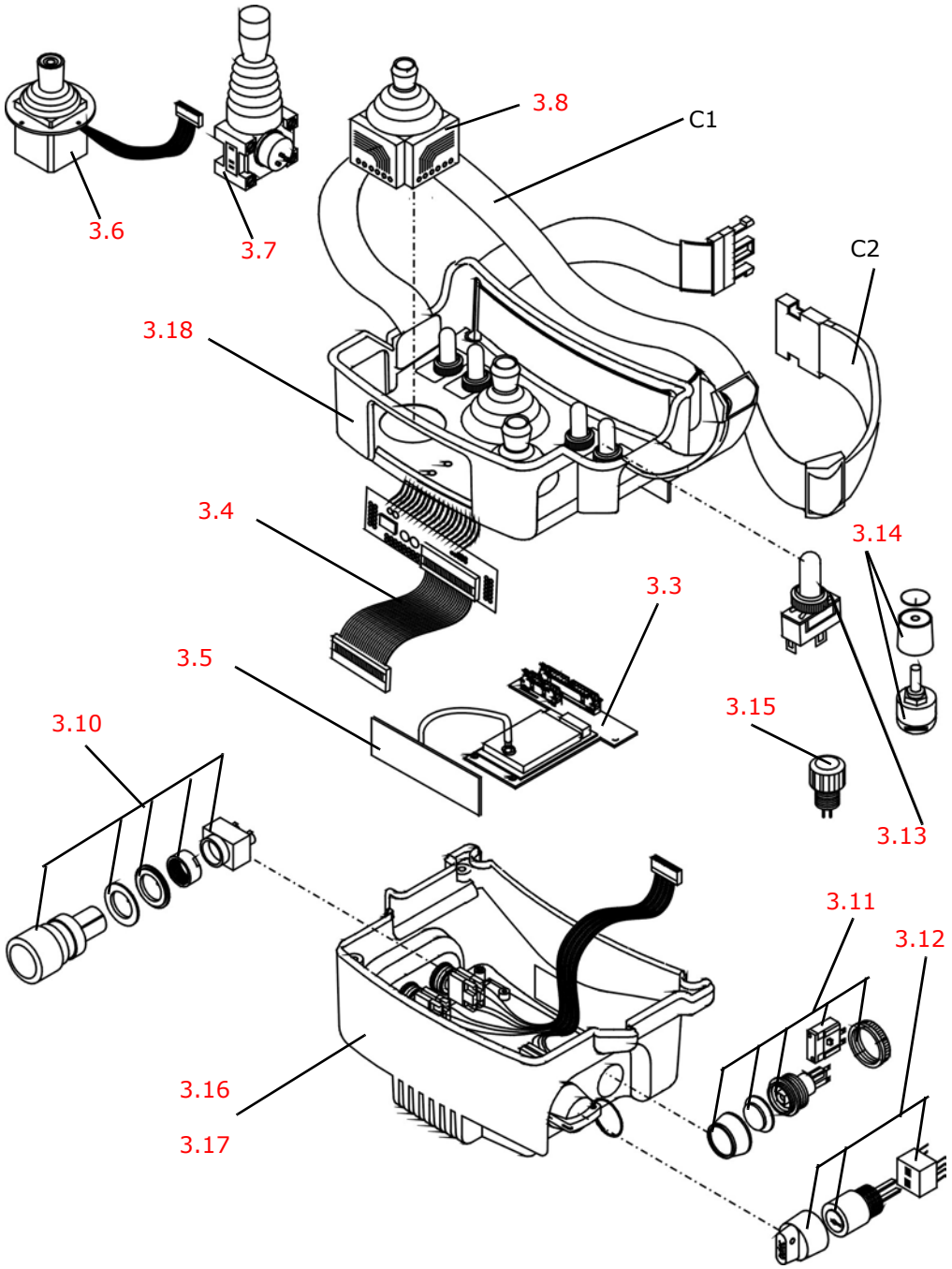
3.1 Transmitting unit diagnostic

Diagnostic



3.2 Exploded view and spare parts

Exploded view



Spare parts

N°	Code	Description
C1	A0CING00P0002	Collar strap
C2	A0CING00P0003	Waist strap
3.6	A0MANI00E84A0	Double axis joystick, Penny Giles type
3.6	A0MANI00E85A0	Double axis joystick with coulisse, Penny Giles type
3.15	A0RESI04E0038	Single turn potentiometer
3.5	F0ANTE00E02A0	Transmitting antenna (frequency 433 MHz)
3.5	F0ANTE00E02B0	Transmitting antenna (frequency 472 MHz)
3.5	F0ANTE00E02C0	Transmitting antenna (frequency 458 MHz)
3.5	F0ANTE00E31A0	Transmitting antenna (frequency 870 MHz)
3.7	F0MANI00E05A0	Single axis joystick, Tecnord type
3.4	F0SCIN00E57A0	SIC97GP05A interface card
3.3	F0TXCO04E02A0	Radio transmitter encoder module (frequency 433 MHz)
3.3	F0TXCO04E02B0	Radio transmitter encoder module (frequency 472 MHz)
3.3	F0TXCO04E02D0	Radio transmitter encoder module (frequency 458 MHz)
3.3	F0TXCO04E02E0	Radio transmitter encoder module (frequency 870 MHz)
3.8	R0MANI00E03A0	Double axis joystick, Gessmann type
3.8	R0MANI00E03B0	Double axis joystick mit coulisse, Gessmann type
3.16	R0POCO12E06A0	Bottom casing -wired control casing for IR START UP
3.17	R0POCO12P06A0	Bottom casing for IR START UP
3.16	R0POCO16E03A0	Bottom wired control casing
3.16	R0POCO16E04A0	Bottom wired control casing for cable control
3.18	R0POCO16P03A0	Upper casing with 2 holes for Gessman joystick
3.18	R0POCO16P06A0	Upper casing with 3 holes for Gessman joystick
3.18	R0POCO16P07A0	Upper casing with 2 holes for Penny Giles joystick
3.18	R0POCO16P08A0	Upper casing with 3 holes for Penny Giles joystick
3.18	R0POCO16P09A0	Upper casing with 4 holes for Tecnord joystick
3.18	R0POCO16P10A0	Upper casing with 6 holes for Tecnord joystick
3.17	R0POCO16P12A0	Bottom casing
3.17	R0POCO16P13A0	Bottom casing for cable control
3.13	R0PULS00E0004	3-position toggle switch (2 with return)
3.13	R0PULS00E0005	3-position toggle switch
3.13	R0PULS00E0006	2-position toggle switch (1 with return)
3.13	R0PULS00E0007	3-position toggle switch (1 with return)
3.13	R0PULS00E0010	2-position toggle switch
3.10	R0PULS00E0012	STOP pushbutton
3.11	R0PULS00E0013	Pushbutton kit, TH type
3.13	R0PULS00E0014	3-position toggle switch (2 with return), 2 poles
3.13	R0PULS00E0032	2-position toggle switch, 2 poles
3.13	R0PULS00E0039	2-position toggle switch (1 with return), 2 poles
3.13	R0PULS00E0040	3-position toggle switch, 2 poles
3.13	R0PULS00E0042	3-position toggle switch (1 with return), 2 poles
3.15	R0RESI04E0041	Single turn potentiometer
3.12	R0SELE00E0035	0-1-2 keyswitch selector
3.14	R0SELE00E07A0	11-position rotative switch

"N°" is the paragraph number which refers to the spare part.

Warning

No voltage should be present when carrying out any internal operations (replacement or programming) on transmitting unit. Before proceeding, remove the battery from the transmitting unit.

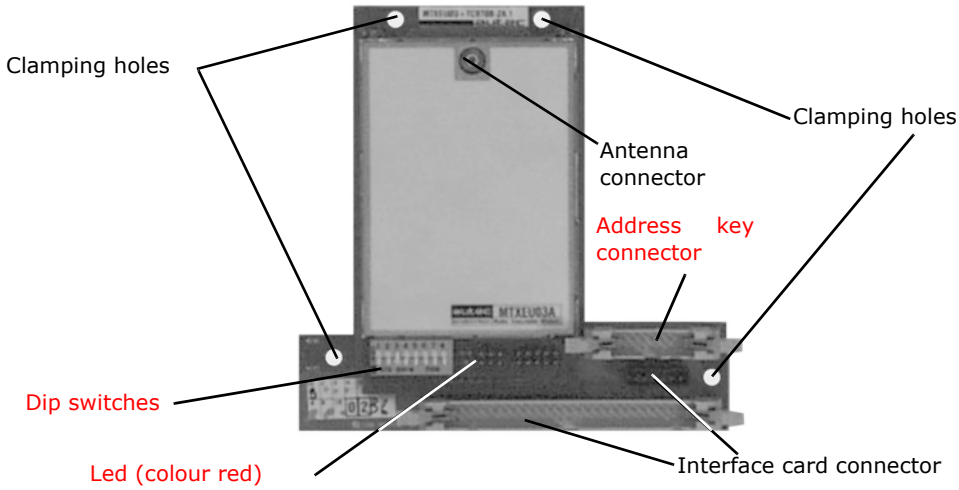
3.3 Radio transmitter encoder module (MTX____+TC9708)

Codes

MTXEU03A+TC9708	Radio transmitter encoder module frequency 433 MHz
MTXUK03A+TC9708	Radio transmitter encoder module frequency 458 MHz (module for UK)
MTXEU06B+TC9708	Radio transmitter encoder module frequency 870 MHz
MTXAU03A+TC9708	Radio transmitter encoder module frequency 472 MHz(module for Australia)

Always make sure that the frequencies at which the radio transmitter encoder module operates are permitted in the country where the radio remote control is to be used.

Module components



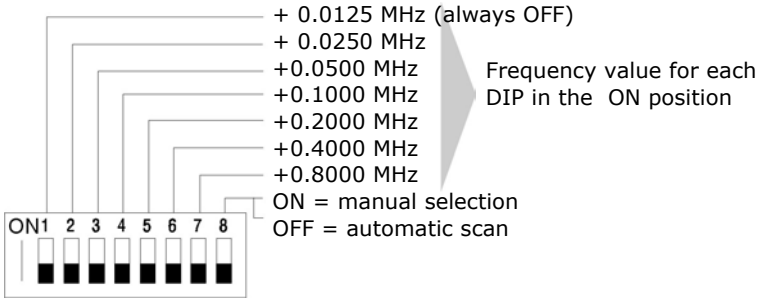
Led

The red LED should only light up during starting (approx. 1 second).

If it remains lit or does not light up during starting, there could be a failure in the transmitting unit.

Dip switches

The eight dip switches present on the radio transmitter encoder module define the operation mode of the frequency (automatic scan or manual selection) and also the operating frequency:

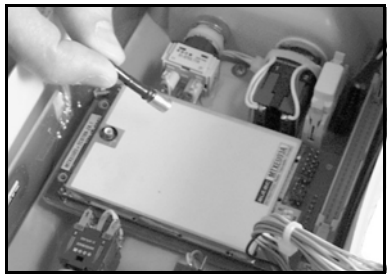


The radio transmitter encoder module dip switches must always be set similarly to the dip switches of the radio receiving module.

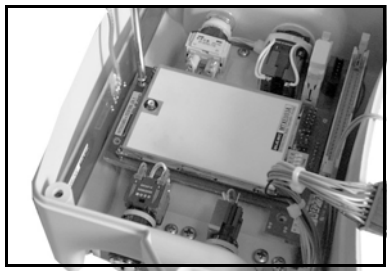
Replacement

Disassembly

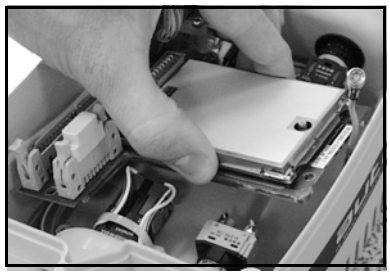
1.
Open the transmitting unit. (§ 3.16). Disconnect the antenna cable from the connector on the module.



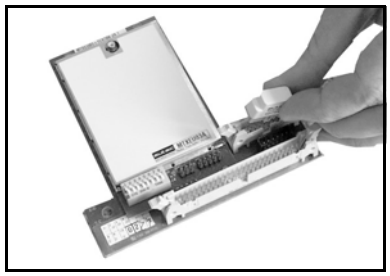
2.
Unscrew the four screws that hold to the module to the bottom control casing.



3.
Extract the module from the bottom control casing.



4.
Extract the address key from the module.



Assembly

8.
Connect the antenna cable to the module connector. Close the transmitting unit. (§ 3.16).

7.
Tighten the four screws that hold the module to the bottom control casing.

6.
Insert the new module into the bottom control casing.

5.
Insert the address key in the new module and control the setting of the dip-switch.

Automatic scan mode

For this type of mode it is necessary to:
1) set DIP8 at OFF
2) select the requested frequency group by setting the eight dip switches for each module as explained in the following tables:

MTXEU03A

	Group 1	Group 2	Group 3	Group 4
Position DIP 2, 3 e 4	OFF, OFF, OFF	ON, OFF, OFF	OFF, ON, OFF	ON, ON, OFF
Freq. 1	433.100 MHz	433.125 MHz	433.150 MHz	433.175 MHz
Freq. 2	433.300 MHz	433.325 MHz	433.350 MHz	433.375 MHz
Freq. 3	433.500 MHz	433.525 MHz	433.550 MHz	433.575 MHz
Freq. 4	433.700 MHz	433.725 MHz	433.750 MHz	433.775 MHz
Freq. 5	433.900 MHz	433.925 MHz	433.950 MHz	433.975 MHz
Freq. 6	434.100 MHz	434.125 MHz	434.150 MHz	434.175 MHz
Freq. 7	434.300 MHz	434.325 MHz	434.350 MHz	434.375 MHz
Freq. 8	434.500 MHz	434.525 MHz	434.550 MHz	434.575 MHz

	Group 5	Group 6	Group 7	Group 8
Position DIP 2, 3 e 4	OFF, OFF, ON	ON, OFF, ON	OFF, ON, ON	ON, ON, ON
Freq. 1	433.200 MHz	433.225 MHz	433.250 MHz	433.275 MHz
Freq. 2	433.400 MHz	433.425MHz	433.450 MHz	433.475 MHz
Freq. 3	433.600 MHz	433.625MHz	433.650 MHz	433.675 MHz
Freq. 4	433.800 MHz	433.825 MHz	433.850 MHz	433.875 MHz
Freq. 5	434.000 MHz	434.025 MHz	434.050 MHz	434.075 MHz
Freq. 6	434.200 MHz	434.225 MHz	434.250 MHz	434.275 MHz
Freq. 7	434.400 MHz	434.425 MHz	434.450 MHz	434.475 MHz
Freq. 8	434.600 MHz	434.625 MHz	434.650 MHz	434.675 MHz

In this module, DIPs 5, 6 and 7 do not effect the setting of the frequency group while DIP 1 must be set to OFF.

The available frequencies are those belonging to the set group.

MTXUK03A

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at OFF.

MTXEU06B

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at ON.

MTXAU03A

In this module the DIPs from 2 to 7 must be set in order to operate within the permitted frequencies:.

DIP 1	OFF
DIP 2	ON
DIP 3	OFF
DIP 4	OFF
DIP 5	ON
DIP 6	OFF
DIP 7	ON
DIP 8	OFF

Manual frequency mode

For this type of mode it is necessary to:
1) set DIP8 at ON
2) select the frequency by setting the DIPs from 2 to 7 as explained below as a function of the radio transmitter encoder module:

MTXEU03A

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.100	OFF	OFF	OFF	OFF	OFF	OFF	OFF	433.500	OFF	OFF	OFF	OFF	OFF	ON	OFF
433.125	OFF	ON	OFF	OFF	OFF	OFF	OFF	433.525	OFF	ON	OFF	OFF	OFF	ON	OFF
433.150	OFF	OFF	ON	OFF	OFF	OFF	OFF	433.550	OFF	OFF	ON	OFF	OFF	ON	OFF
433.175	OFF	ON	ON	OFF	OFF	OFF	OFF	433.575	OFF	ON	ON	OFF	OFF	ON	OFF
433.200	OFF	OFF	OFF	ON	OFF	OFF	OFF	433.600	OFF	OFF	OFF	ON	OFF	ON	OFF
433.225	OFF	ON	OFF	ON	OFF	OFF	OFF	433.625	OFF	ON	OFF	ON	OFF	ON	OFF
433.250	OFF	OFF	ON	ON	OFF	OFF	OFF	433.650	OFF	OFF	ON	ON	OFF	ON	OFF
433.275	OFF	ON	ON	ON	OFF	OFF	OFF	433.675	OFF	ON	ON	ON	OFF	ON	OFF
433.300	OFF	OFF	OFF	OFF	ON	OFF	OFF	433.700	OFF	OFF	OFF	OFF	ON	ON	OFF
433.325	OFF	ON	OFF	OFF	ON	OFF	OFF	433.725	OFF	ON	OFF	OFF	ON	ON	OFF
433.350	OFF	OFF	ON	OFF	ON	OFF	OFF	433.750	OFF	OFF	ON	OFF	ON	ON	OFF
433.375	OFF	ON	ON	OFF	ON	OFF	OFF	433.775	OFF	ON	ON	OFF	ON	ON	OFF
433.400	OFF	OFF	OFF	ON	ON	OFF	OFF	433.800	OFF	OFF	OFF	ON	ON	ON	OFF
433.425	OFF	ON	OFF	ON	ON	OFF	OFF	433.825	OFF	ON	OFF	ON	ON	ON	OFF
433.450	OFF	OFF	ON	ON	ON	OFF	OFF	433.850	OFF	OFF	ON	ON	ON	ON	OFF
433.475	OFF	ON	ON	ON	ON	OFF	OFF	433.875	OFF	ON	ON	ON	ON	ON	OFF

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.900	OFF	OFF	OFF	OFF	OFF	OFF	ON	434.300	OFF	OFF	OFF	OFF	OFF	ON	ON
433.925	OFF	ON	OFF	OFF	OFF	OFF	ON	434.325	OFF	ON	OFF	OFF	OFF	ON	ON
433.950	OFF	OFF	ON	OFF	OFF	OFF	ON	434.350	OFF	OFF	ON	OFF	OFF	ON	ON
433.975	OFF	ON	ON	OFF	OFF	OFF	ON	434.375	OFF	ON	ON	OFF	OFF	ON	ON
434.000	OFF	OFF	OFF	ON	OFF	OFF	ON	434.200	OFF	OFF	OFF	ON	OFF	ON	ON
434.025	OFF	ON	OFF	ON	OFF	OFF	ON	434.425	OFF	ON	OFF	ON	OFF	ON	ON
434.050	OFF	OFF	ON	ON	OFF	OFF	ON	434.450	OFF	OFF	ON	ON	OFF	ON	ON
434.075	OFF	ON	ON	ON	OFF	OFF	ON	434.475	OFF	ON	ON	ON	OFF	ON	ON
434.100	OFF	OFF	OFF	OFF	ON	OFF	ON	434.500	OFF	OFF	OFF	OFF	ON	ON	ON
434.125	OFF	ON	OFF	OFF	ON	OFF	ON	434.525	OFF	ON	OFF	OFF	ON	ON	ON
434.150	OFF	OFF	ON	OFF	ON	OFF	ON	434.550	OFF	OFF	ON	OFF	ON	ON	ON
434.175	OFF	ON	ON	OFF	ON	OFF	ON	434.575	OFF	ON	ON	OFF	ON	ON	ON
434.200	OFF	OFF	OFF	ON	ON	OFF	ON	434.600	OFF	OFF	OFF	ON	ON	ON	ON
434.225	OFF	ON	OFF	ON	ON	OFF	ON	434.625	OFF	ON	OFF	ON	ON	ON	ON
434.250	OFF	OFF	ON	ON	ON	OFF	ON	434.650	OFF	OFF	ON	ON	ON	ON	ON
434.275	OFF	ON	ON	ON	ON	OFF	ON	434.675	OFF	ON	ON	ON	ON	ON	ON

MTXUK03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
458.525	OFF	ON	OFF	OFF	OFF	OFF	ON
458.550	OFF	OFF	ON	OFF	OFF	OFF	ON
458.575	OFF	ON	ON	OFF	OFF	OFF	ON
458.600	OFF	OFF	OFF	ON	OFF	OFF	ON
458.625	OFF	ON	OFF	ON	OFF	OFF	ON
458.650	OFF	OFF	ON	ON	OFF	OFF	ON
458.675	OFF	ON	ON	ON	OFF	OFF	ON
458.700	OFF	OFF	OFF	OFF	ON	OFF	ON
458.725	OFF	ON	OFF	OFF	ON	OFF	ON
458.750	OFF	OFF	ON	OFF	ON	OFF	ON
458.775	OFF	ON	ON	OFF	ON	OFF	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 7) which are not, however, permitted.

MTXEU06B

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
869.7125	ON	OFF	OFF	ON	OFF	ON	ON
869.7375	ON	ON	OFF	ON	OFF	ON	ON
869.7625	ON	OFF	ON	ON	OFF	ON	ON
869.7875	ON	ON	ON	ON	OFF	ON	ON
869.8125	ON	OFF	OFF	OFF	ON	ON	ON
869.8375	ON	ON	OFF	OFF	ON	ON	ON
869.8625	ON	OFF	ON	OFF	ON	ON	ON
869.8875	ON	ON	ON	OFF	ON	ON	ON
869.9125	ON	OFF	OFF	ON	ON	ON	ON
869.9375	ON	ON	OFF	ON	ON	ON	ON
869.9625	ON	OFF	ON	ON	ON	ON	ON
869.9875	ON	ON	ON	ON	ON	ON	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 7) which are not, however, permitted.

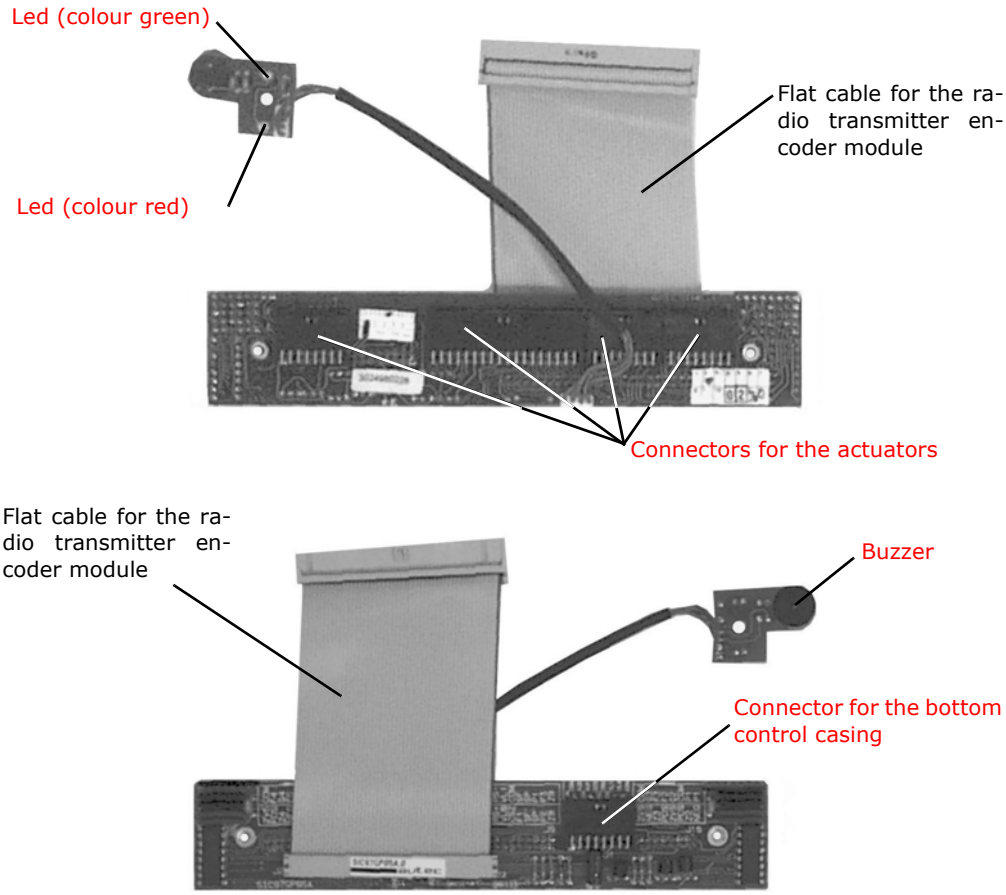
MTXAU03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
472.025	OFF	ON	OFF	OFF	ON	OFF	ON
472.050	OFF	OFF	ON	OFF	ON	OFF	ON
472.075	OFF	ON	ON	OFF	ON	OFF	ON
472.100	OFF	OFF	OFF	ON	ON	OFF	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 7) which are not, however, permitted.

3.4 Interface card (SIC97GP05A)

Electronic card components



Led e buzzer

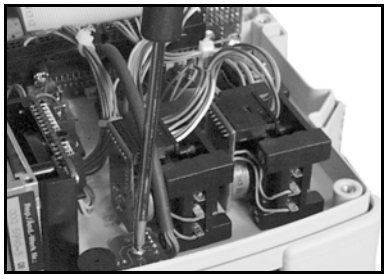
Of the two LEDs on the interface card one is green, the other is red.
The green LED blinks slowly during correct operation. If it blinks quickly, this means that the battery is running down and will be completely flat within 15 minutes.
The red LED blinks quickly to signal that the battery will be completely flat within 3 minutes.
The buzzer is an acoustic signal that activates in particular situations.

Operation	Green led	Red led	Buzzer
Slow blink	normal operation	/	not operational
Fast blink	1st signal of a flat battery	2nd signal of a flat battery	not operational
(at starting) fixed light	/	Command inserted during power on	operational
fixed light for both LEDs	frequency has changed		operational

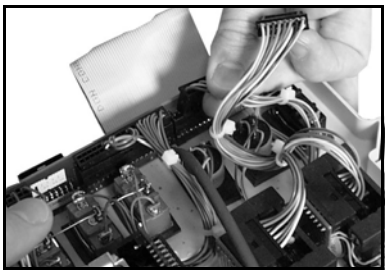
Replacement

Disassembly

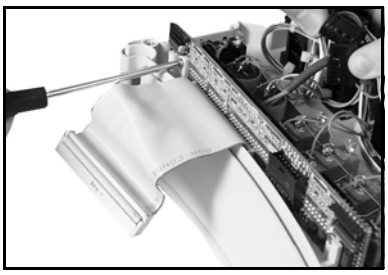
1.
Open the transmitting unit (§ 3.16). Unscrew the screw that fix the buzzer and the two LEDs to the top control casing.



2.
Extract all the connectors from the interface card.



3.
Unscrew the two screws that clamp the interface card to the upper control casing.



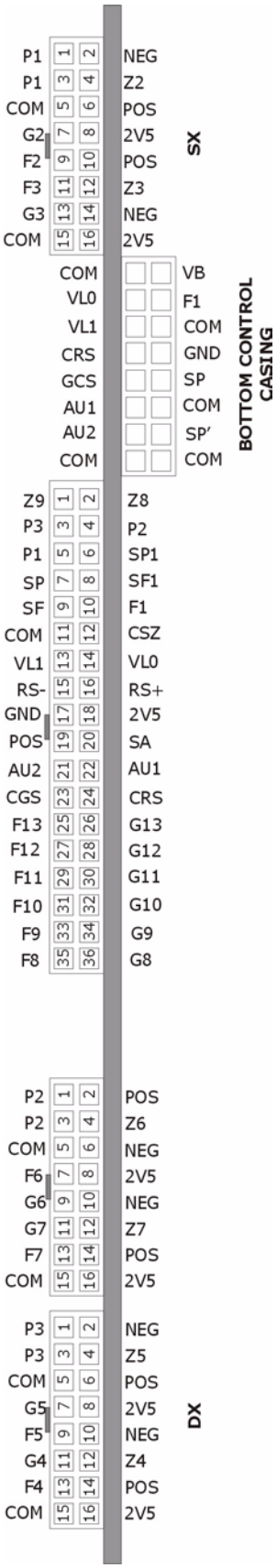
Assembly

6.
Tighten the screw that clamps the buzzer and the two LEDs to the upper control station casing. Close the transmitting unit (§ 3.16).

5.
Connect all the connectors to the interface card.

4.
Tighten the two screws that clamp the interface card to the upper control casing.

Connectors



Symbol	Signal
2V5	2.5 Vdc
AU1	Auxiliary
AU2	Auxiliary (motor start)
BUZZ	Buzzer
CGS	GAS+/GAS- common
COM	On/off command common
CRS	Remote Set Up common
CSZ	Sectioned common
F1	START (start command)
F2-F10	On/off commands
G2-G10	On/off commands
GND	Ground (battery negative)
LEDR	Red LED
LEDV	Green LED
P1	Joystick 1 enable (if present)
P2	Joystick 2 enable (if present)
P3	Joystick 3 enable (if present)
POS	5 Vdc
RS+	Remote Set Up increase
RS-	Remote Set Up decrease
SA	Automatic switching off*
SF	SAFETY
SF'	SAFETY I
SP	STOP
SP'	STOP I
VBATT	Battery voltage (7.2 Vdc)
VL0	Speed selection
VL1	Speed selection
Z2-Z7	Proportional commands
Z8,Z9	Auxiliary proportional commands

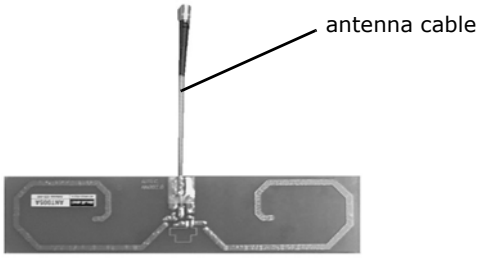
* if automatic switching off is to be deactivated, connect "SA" to "GND".

3.5 Transmitting antenna (ANT0___)

Codes

ANT005A	Transmitting antenna (frequency 433 MHz)
ANT005B	Transmitting antenna (frequency 458 MHz)
ANT005C	Transmitting antenna (frequency 472 MHz)
ANT012B	Transmitting antenna (frequency 870 MHz)

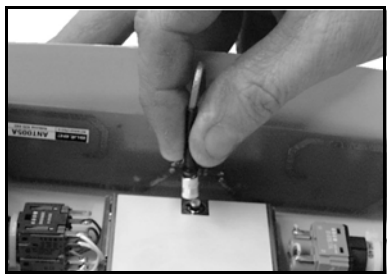
Antenna parts



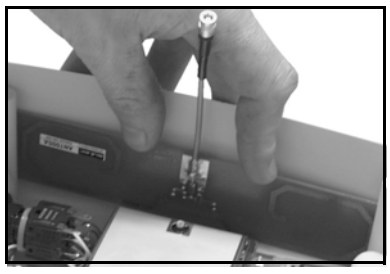
Replacement

Disassembly

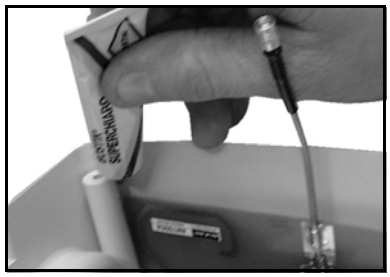
1.
Open transmitting unit (§ 3.16).
Separate the antenna cable from the connector on the radio transmitter encoder module.



2.
Extract the antenna from the bottom control casing.



3.
Insert the antenna into its seat in the bottom control casing.



4.
Fix the antenna to the control station casing, placing a drop of Bostick on each side.

Assembly

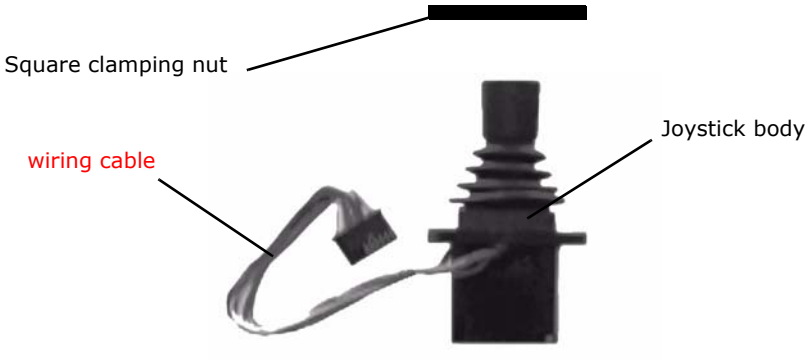
5.
Insert the antenna cable into the connector of the radio transmitter encoder module.
Close the transmitting unit (§ 3.16).

3.6 Double axis Joystick, Penny Giles type

Codes

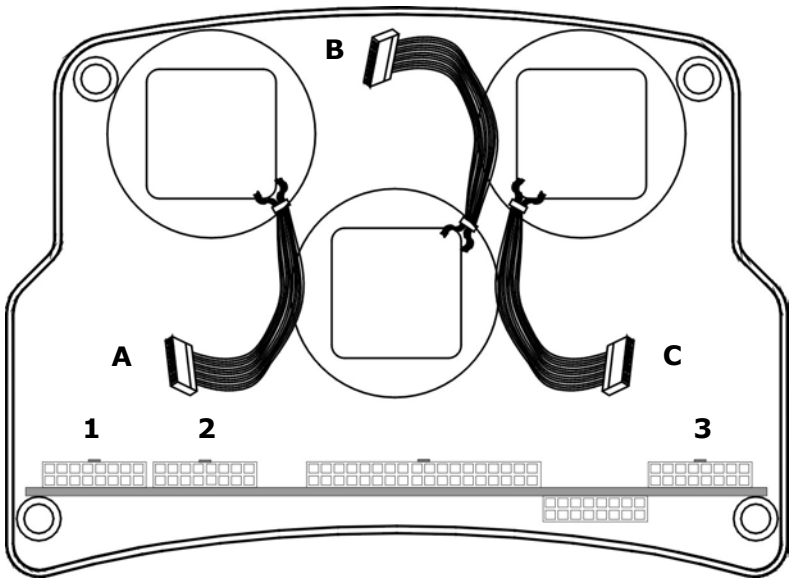
A0MANI00E0084	Double axis joystick proportional, Penny Giles type
A0MANI00E0085	Double axis joystick proportional with coulisse, Penny Giles type

Joystick parts



Wiring

The joystick cables must always be directed as shown in the figure to permit their wiring with the interface card.



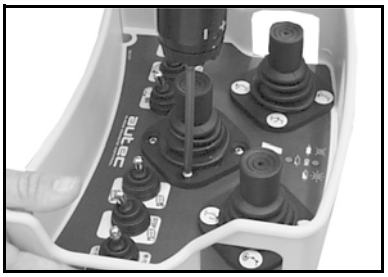
Connect the joysticks and the interface card as follows:

"A"	with "1"
"B" (if present)	with "2"
"C"	with "3"

Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16).
After having removed the four symbol plates, unscrew the four screws that are present.



2.
Extract the square clamping nut.

3.
Extract the joystick body from inside the upper control casing.

Assembly

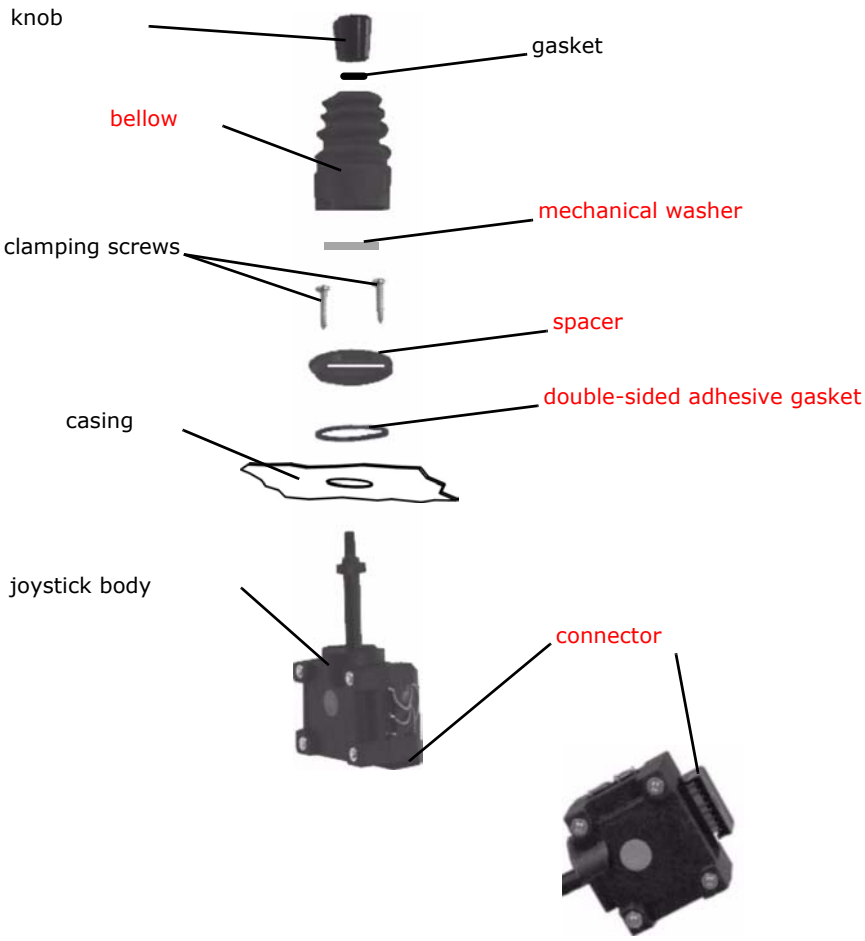
4.
Insert the joystick body from the inside of the top case of the control station casing: make sure that the bellow does not catch.

5.
Insert the square clamping nut to block.

6.
Tighten the four screws and cover them with the relative symbol plates. Close the transmitting unit (§ 3.16).

3.7 Single axis joystick, Tecnord type

Joystick parts



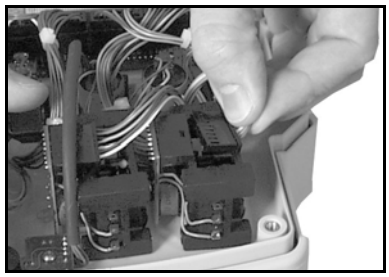
Additional information

1) The double-sided adhesive gasket should be positioned under the spacer between the spacer itself and the transmitting unit casing.
2) The spacer should be assembled with the projection upwards, the holes should coinciding perfectly with those of the casing and the joystick body.
3) The metal washer should be inserted into the bellow, pushing it inwards and upwards (it should be near the knob).
4) The bellow must cover the spacer completely: the lower part of the bellow blocks against the projection of the spacer.

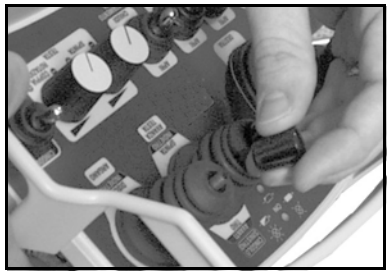
Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16). Extract the wiring connector from the one present on the bottom of the joystick body.



2.
Unscrew the knob then remove the gasket and the bellow from the joystick.



3.
Unscrew the two screws that are present, then extract the spacer, the gasket and the metal disc from one side and the joystick body from the other.

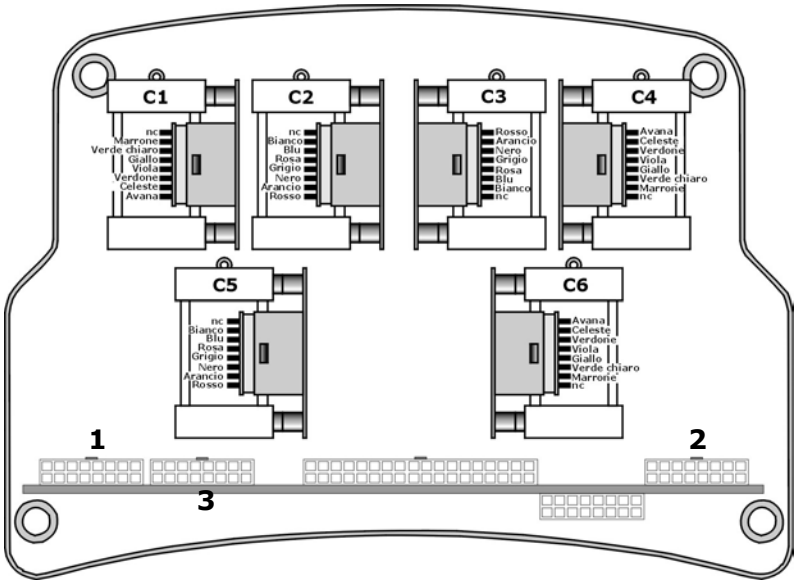
Assembly

6.
Insert the wiring connector into the connector present on the bottom of the joystick body. Close the transmitting unit (§ 3.16).

5.
Assemble the gasket and the bellow (into which the washer has been inserted) making sure that the latter covers the spacer. Tighten the knob.

4.
From inside the upper control station casing insert the joystick body. Return the metal disc, the gasket and the spacer to their places, then tighten the two screws that are present.

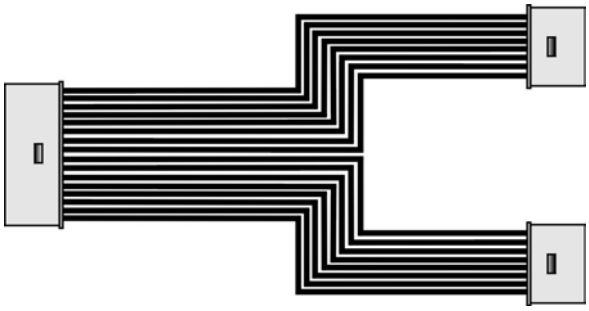
Wiring



Connect the joysticks and the interface card as follows:

"C1"	with "1"
"C2"	with "1"
"C3"	with "2"
"C4"	with "2"
"C5" (if present)	with "3"
"C6" (if present)	with "3"

Each cable kit that exits from an interface card connector divides into two sections.



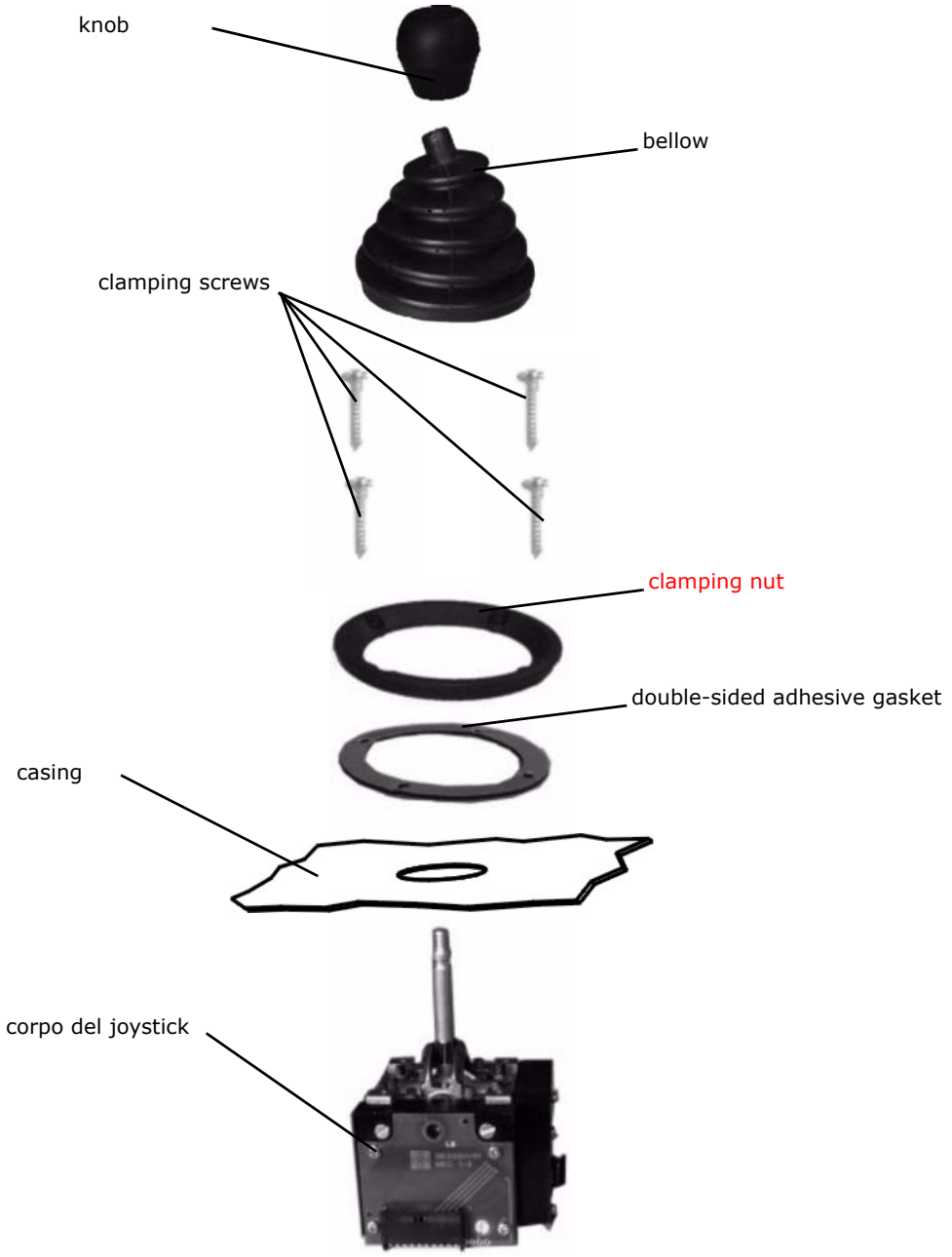
Check the colour of the cables to understand which section should be wired to which joystick.

3.8 Double axis joystick, Gessmann type

Codes

R0MANI00E03A0	double axis proportionale joystick, Gessmann type
R0MANI00E03B0	double axis proportionale joystick, Gessmann type with coulisse

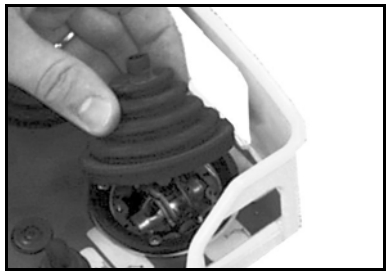
Joystick parts



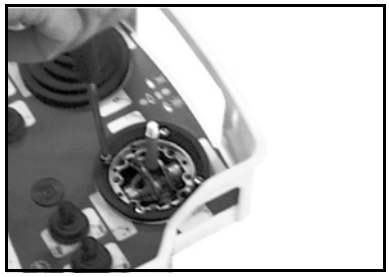
Replacement

Disassembly

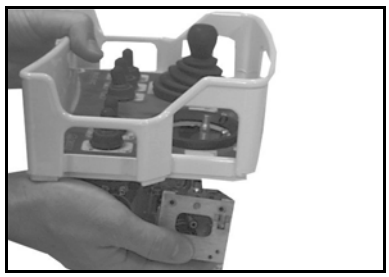
1.
Open the transmitting unit(§ 3.16). Separate the joystick wiring from that of the interface card. Unscrew the knob and remove the bellow.



2.
Unscrew the four screws that are present.



3.
Extract the joystick body.



Assembly

6.
Insert the bellow, making sure that it is connected to the clamping nut. Tighten the knob. Insert the wiring into the interface card.
Close the transmitting unit (§ 3.16).

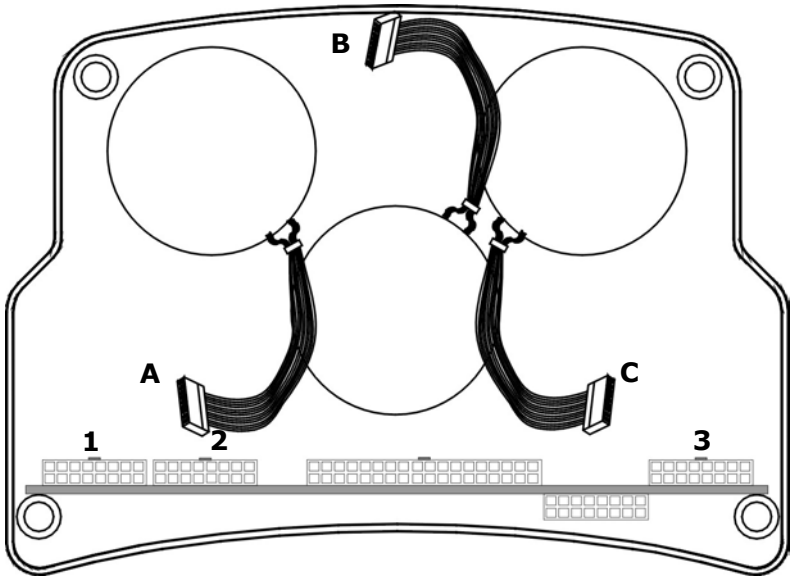
5.
Tighten the four screws to fix the joystick to the transmitting unit casing.

4.
Insert the joystick body.

INFORMATION FOR THE REPLACEMENT
Usually it's not necessary replace the clamping nut.
When this replacement is necessary, the double-sided adhesive gasket should be positioned under the clamping nut between the clamping nut itself and the transmitting unit casing. The holes should coincide perfectly with those of the casing, the clamping nut and the joystick body.

Wiring

The joystick cables must always be directed as shown in the figure to permit their wiring with the interface card.



Connect the joysticks and the interface card as follows:

"A"	with "1"
"B" (if present)	with "2"
"C"	with "3"

3.9 Address key

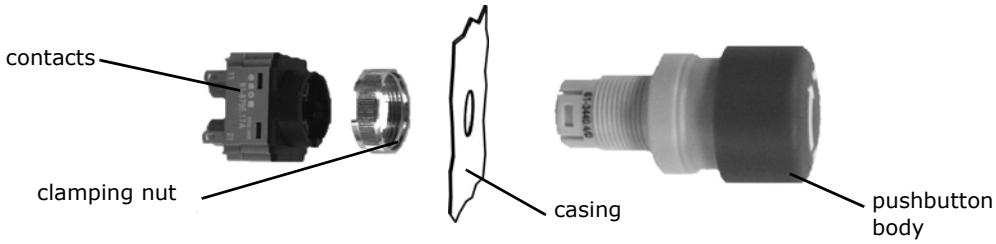
Description

The radio transmitter encoder module is equipped with an address key that contains the address of the radio remote control.
This key is:
- coloured yellow (grey)
- removable
- necessary for radio remote control operation
- unique, like the serial number given on the label.

WARNING!
The radio receiving module contains the corresponding address key, which has the same address (and serial number given on the label).
This key is, however, coloured grey. DO NOT INTERCHANGE THE TWO ADDRESS KEYS (the radio remote control would not operate).

3.10 STOP pushbutton

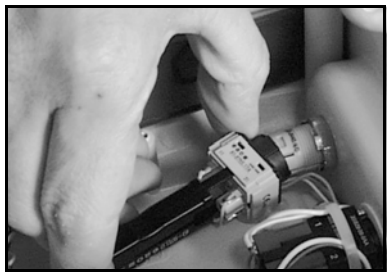
Pushbutton parts



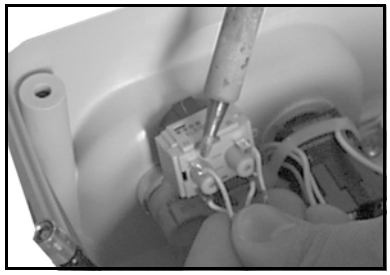
Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16). Remove the module (§ 3.3). Cut the strip that holds the wiring in position and insert the relative tool into the contact holes. Push heavily and extract the contacts.

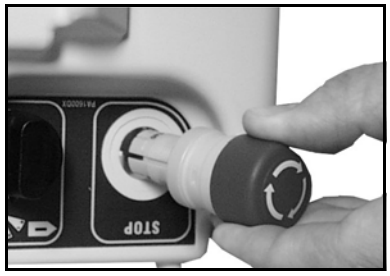


2.
Separate the wiring wires from the contacts.



3.
Unscrew completely the clamping nut using the relative tool.

4.
Extract the pushbutton body and the gasket.



Assembly

8.
Insert the contacts. Fix the wiring with a strip. Assemble the module (§ 3.3).
Close the transmitting unit (§ 3.16).

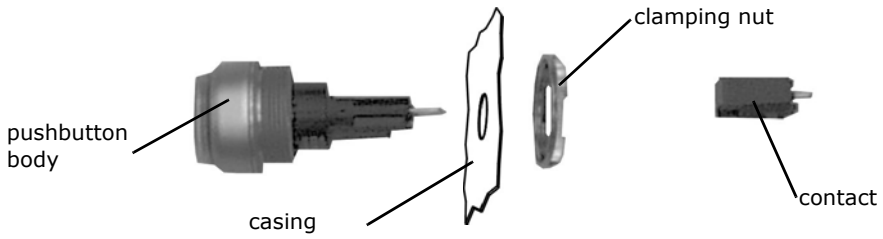
7.
Carry out wiring of the contacts (see Bottom wired control casing page 36)

6.
Fully tighten the clamping nut.

5.
Extract the pushbutton body and the gasket (which should stay between the pushbutton and the casing)

3.11 Pushbutton kit, TH type

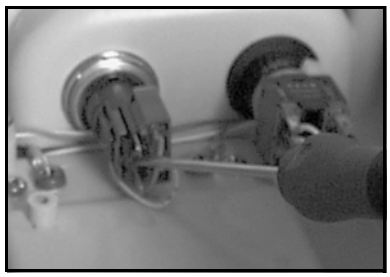
Pushbutton parts



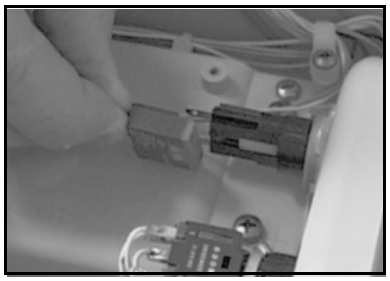
Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16). Remove the module (§ 3.3). Cut the strip that holds the wiring in position.
Turn the red screw by 90° in a counterclockwise direction.



2.
Extract the contacts. Separate the wiring wire from the contacts.



3.
Unscrew completely the clamping nut.

4.
Extract the pushbutton body.

Assembly

8.
Turn the red screw by 90° in a clockwise direction. Fix the wiring with a strip. Assemble the module (§ 3.3). Close the transmitting unit. (§ 3.16).

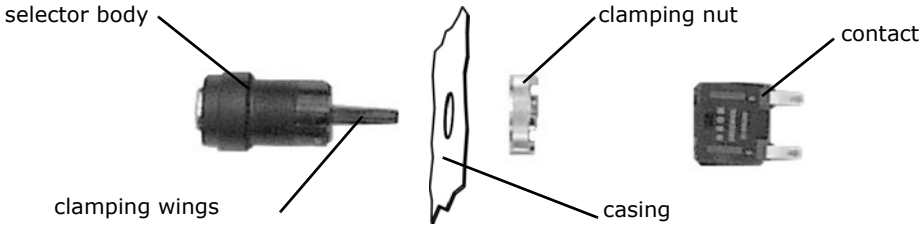
7.
Carry out wiring. (see Bottom wired control casing page 36).
Insert the contacts.

6.
Fully tighten the clamping nut.

5.
Insert the pushbutton body.

3.12 Keyswitch selector

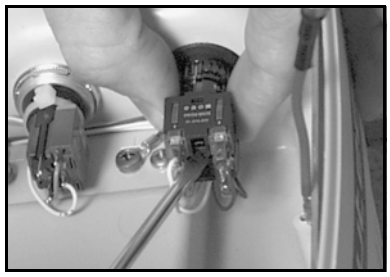
Selector parts



Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16). Remove the module (§ 3.3). Cut the strip that holds the wiring in place. Insert a screwdriver to separate the clamping wings and extract the contacts.



2.
Separate the wiring wires from the contacts. Unscrew the clamping nut using the relative pliers.

3.
Extract the selector body.

Assembly

4.
Insert the selector body.

5.
Tighten the clamping nut using the relative tools. carry out the wiring (see Bottom wired control casing page 36)

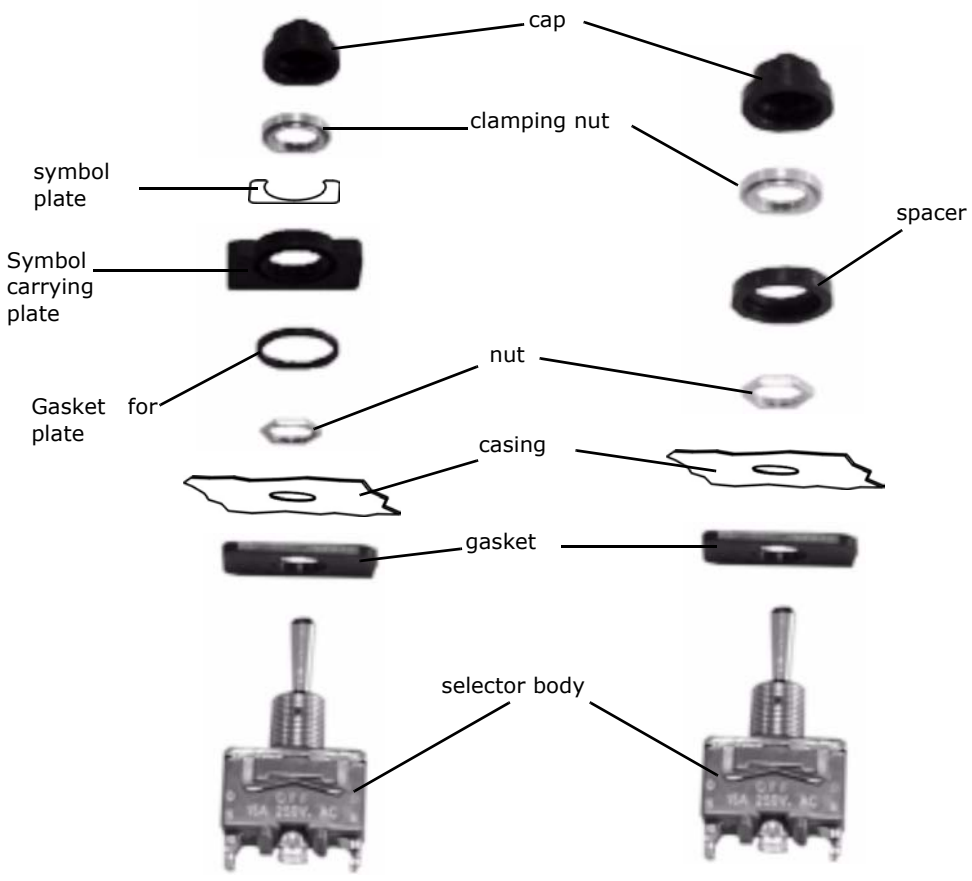
6.
Insert the contacts. Fix the wiring with a strip. Assemble the module (§ 3.3). Close the transmitting unit (§ 3.16).

3.13 Toggle switch

Codes

R0PULS00E0004 R0PULS00E0014	3-position toggle switch (2 with return) 3-position toggle switch (2 with return), 2 poles	
R0PULS00E0005 R0PULS00E0040	3-position toggle switch 3-position toggle switch, 2 poles	
R0PULS00E0006 R0PULS00E0039	2-position toggle switch (1 with return) 2-position toggle switch (1 with return), 2 poles	
R0PULS00E0007 R0PULS00E0042	3-position toggle switch (1 with return) 3-position toggle switch (1 with return), 2 poles	
R0PULS00E0010 R0PULS00E0032	2-position toggle switch 2-position toggle switch, 2 poles	

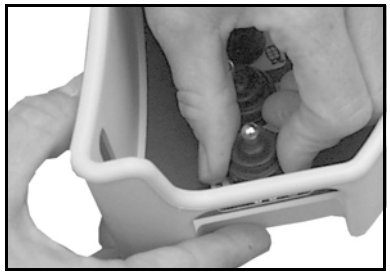
Selector parts



Replacement

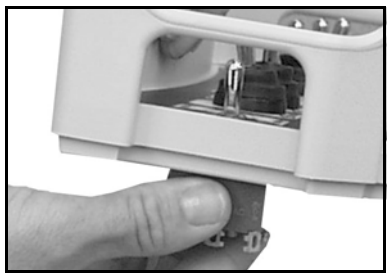
Disassembly

1.
Open the transmitting unit (§ 3.16).
After having unsoldered the wiring from the selector contacts, unscrew the cap that contains the clamping nut.



2.
Remove the spacer (or the symbol carrying plate).
Unscrew the fixing nut.

3.
Extract the gasket and the selector body.



Assembly

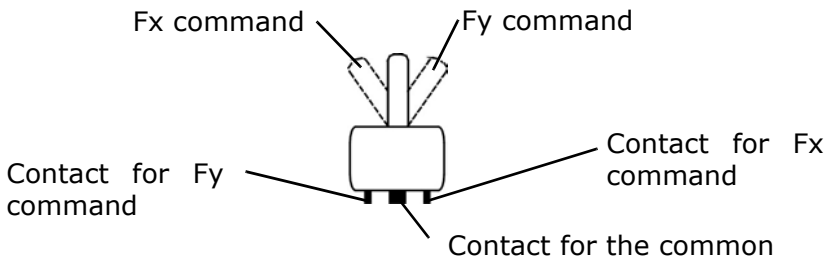
4.
Insert the gasket and the selector body.

5.
Tighten the clamping nut. Insert the spacer (or the symbol carrying plate).

6.
Insert the clamping nut into the cap and screw onto the selector. Wire. Close the transmitting unit (§ 3.16).

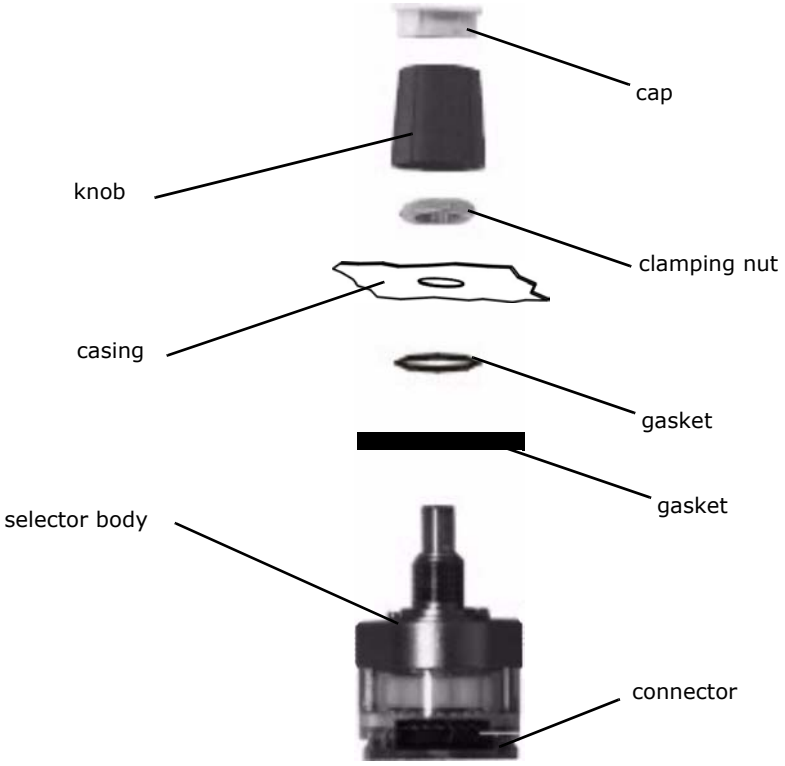
Wiring

For wiring, weld the cable of the command to the contact which is opposite to the selection and the common cable to the central contact.



3.14 11-position rotative switch

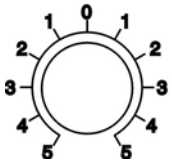
Selector parts



Resistor setting

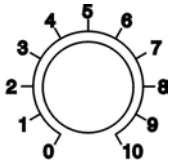
The selector must be set by removing the resistors, according to whether the configuration requires a central or lateral 0 position.

Central 0 position

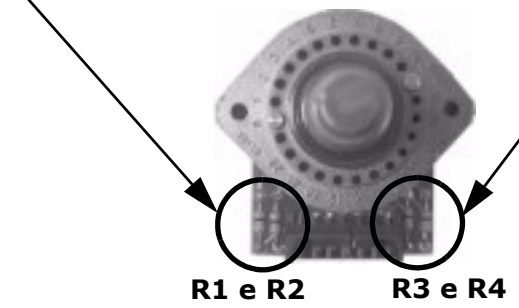


Remove resistors R1 and R2.

Lateral 0 position



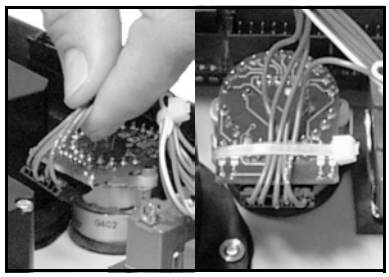
Remove resistors R2 and R4.



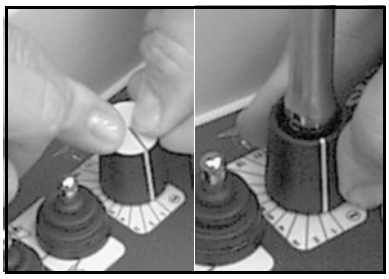
Replacement

Disassembly

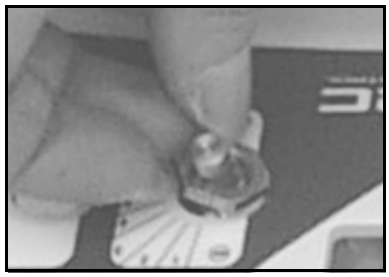
1.
Open the transmitting unit (§ 3.16). Cut the strap. Unsolder the wiring from the connector.



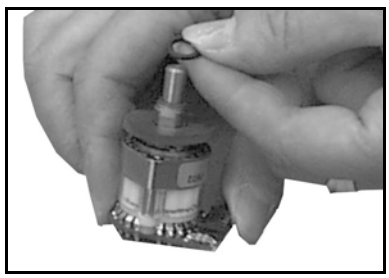
2.
Remove the cap. Loosen the knob locking nut using the relative pliers. Extract the knob.



3.
Remove the nut that blocks the selector body and extract the latter.



4.
Insert the two gaskets into the selector body.



Assembly

5.
Insert the selector body with the two gaskets. Fix by tightening the nut.

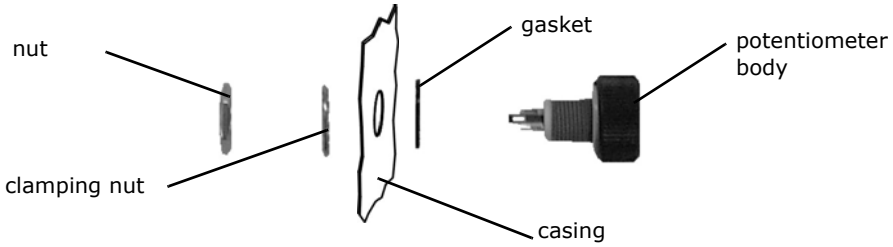
6.
Tighten the knob using the relative pliers (the white line must be positioned at 0). Insert the cap (the black line must coincide with the white line).

7.
Insert the wiring into the connector. Fix the wiring using a strap. Close the transmitting unit (§ 3.16).

3.15 Potentiometers

A0RESI04E0038

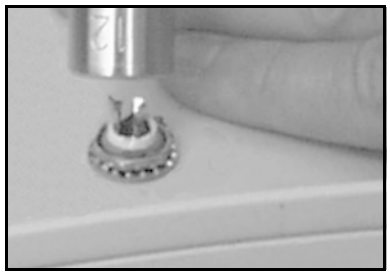
Potentiometer parts



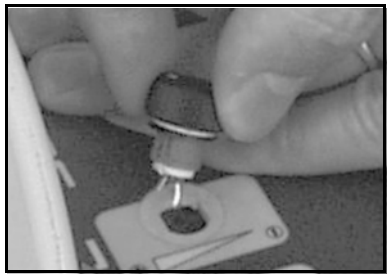
Replacement

Disassembly

1.
Open the transmitting unit (§ 3.16). Unsolder the wiring. Unscrew the nut and extract the clamping nut.



2.
Extract the potentiometer body and the gasket.

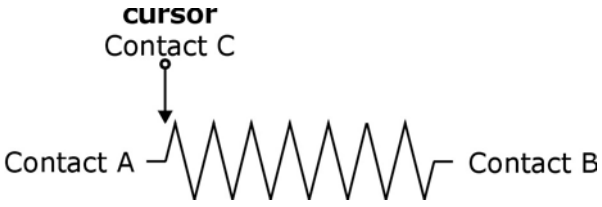


Assembly

3.
Insert the gasket into the potentiometer body and then the potentiometer body into the hole of the transmitting unit casing.

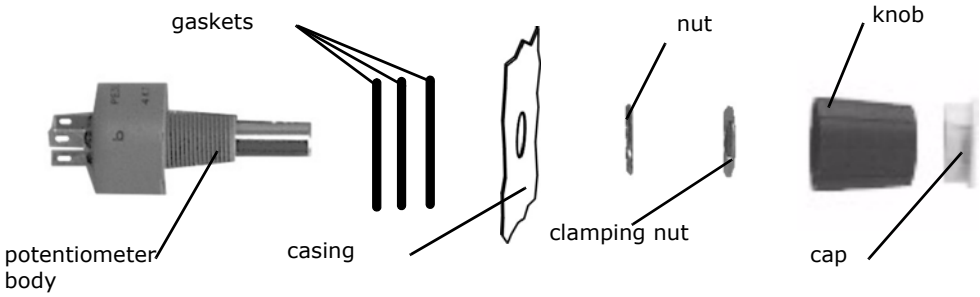
4.
Insert the clamping nut and tighten the nut. Weld the wiring. Close the transmitting unit. (§ 3.16).

Wiring



R0RESI04E0041

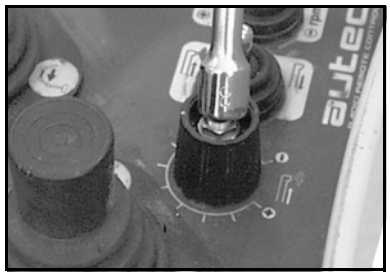
Potentiometer parts



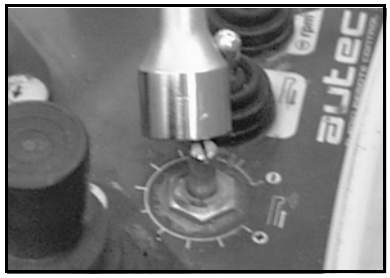
Replacement

Disassembly

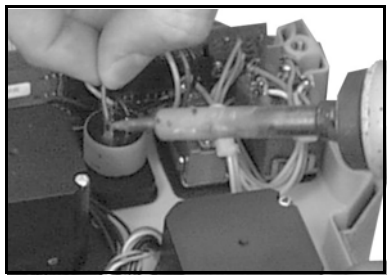
1.
Open the transmitting unit (§ 3.16). Remove the cap. Loosen the knob locking nut using the relative pliers. Extract the knob.



2.
Unscrew the nut and extract the clamping nut.



3.
Unsolder the wiring and extract the potentiometer body with the three gaskets.



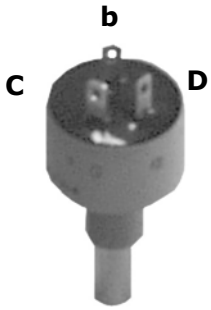
Assembly

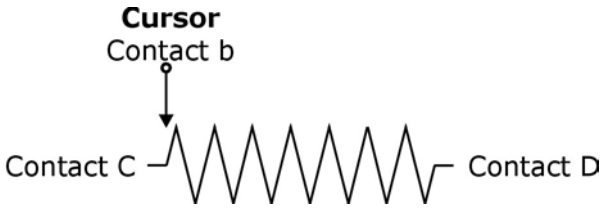
4.
Weld the wiring. Insert the three gaskets into the potentiometer body, and the potentiometer body into the hole in the transmitting unit casing.

5.
Insert the clamping nut and tighten the nut.

6.
Using the relative pliers tighten the knob and insert the cap (the black line must coincide with the white line). Close the transmitting unit (§ 3.16).

Wiring





3.16 Bottom wired control casing

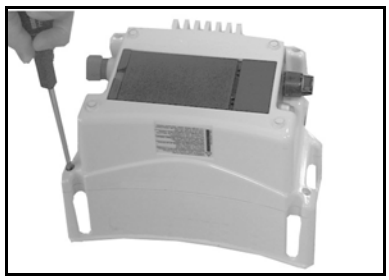
Codici

R0POCO16E03A0	Bottom wired control casing
R0POCO16E04A0	Bottom wired control casing for cable control
R0POCO12E06A0	Bottom wired control casing for IR START UP

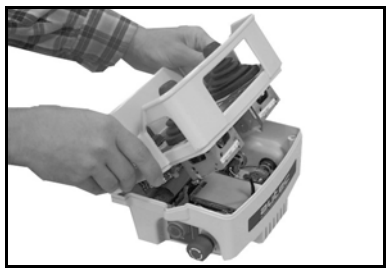
Opening and closing

Disassembly

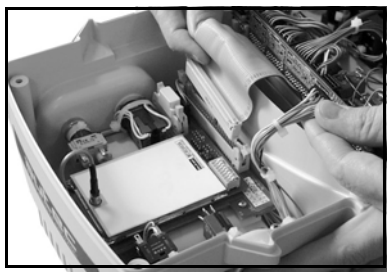
Unscrew the four screws that keep the transmitting unit closed. Remove the battery.



2.
Open the transmitting unit as a book (bottom casing of the control casing on the right).



3.
Extract the flat cable from the radio transmitter encoder module and the connector from the interface card.



Assembly

4.
Insert the flat cable into the radio transmitter encoder module and the connector into the interface card.

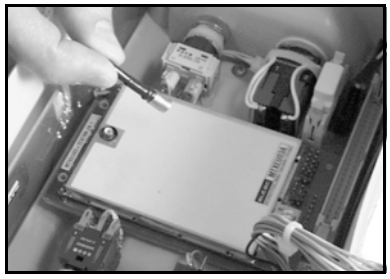
5.
Close the transmitting unit.

6.
Tighten the four screws.
Insert the battery.

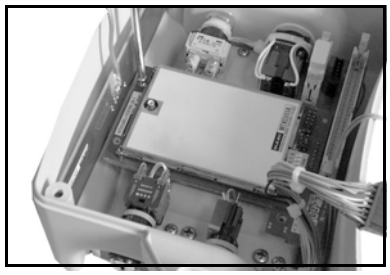
Replacement

Disassembly

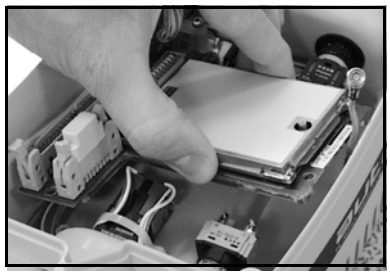
1.
Open the transmitting unit.
Disconnect the antenna cable from the connector present in the module.



2.
Unscrew the four screws that fix the radio transmitter encoder module to the bottom control station casing.



3.
Extract the radio transmitter encoder module.



Assembly

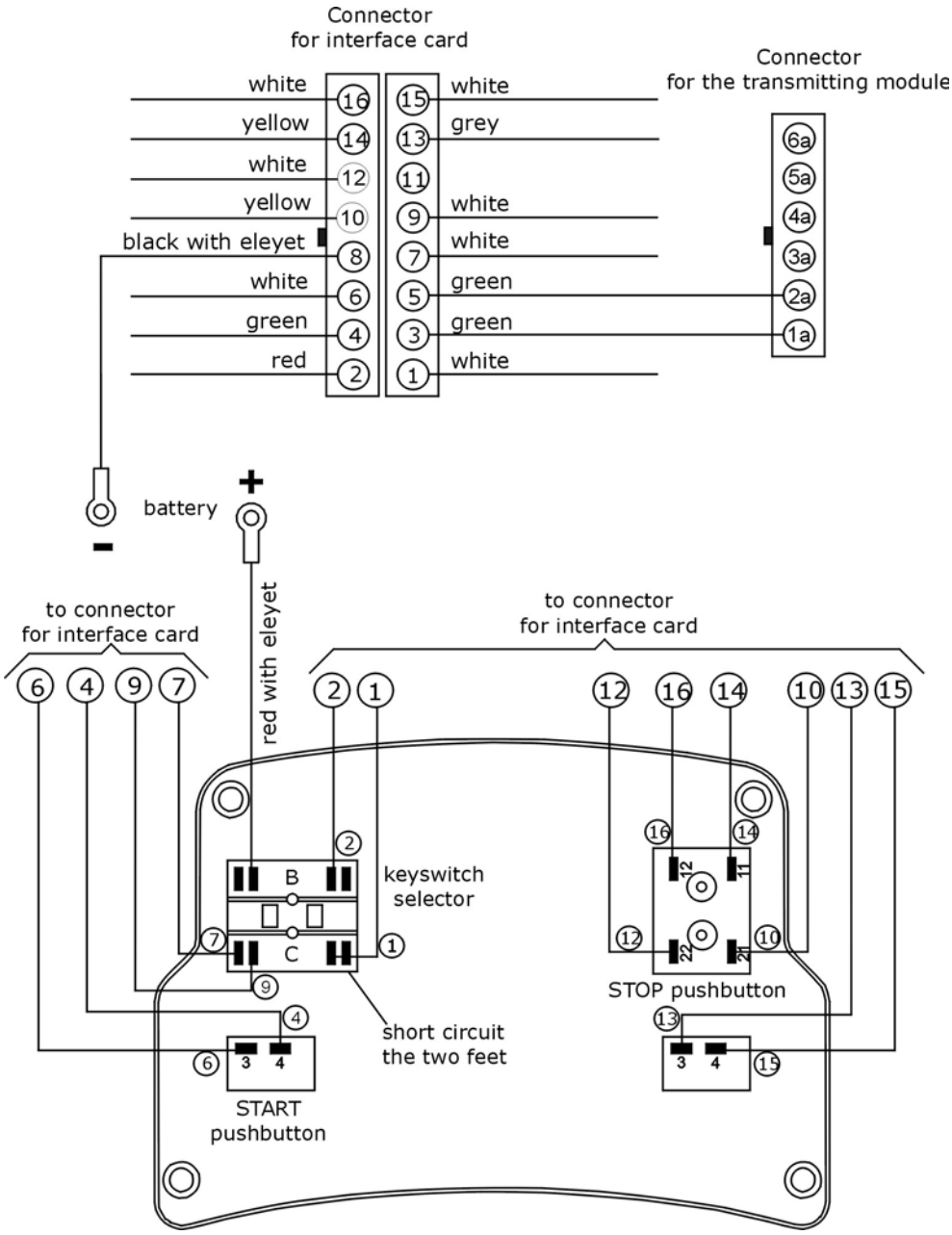
4.
Insert the radio transmitter encoder module into the new bottom control station casing.

5.
Tighten the four screws to fix the radio transmitter encoder module to the bottom control station casing.

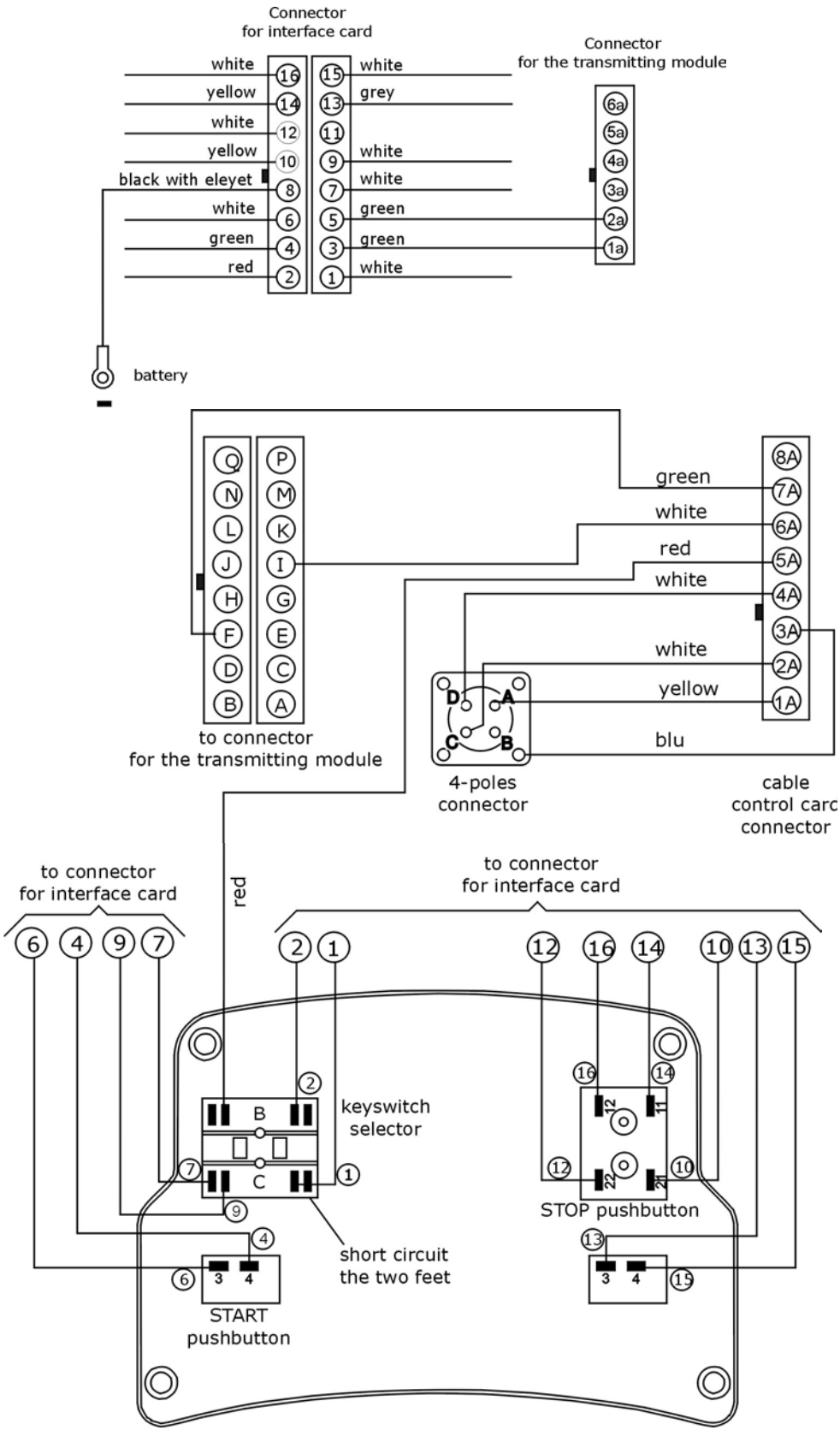
6.
Insert the antenna cable into the connector of the radio transmitter encoder module. Close the transmitting unit.

Wiring

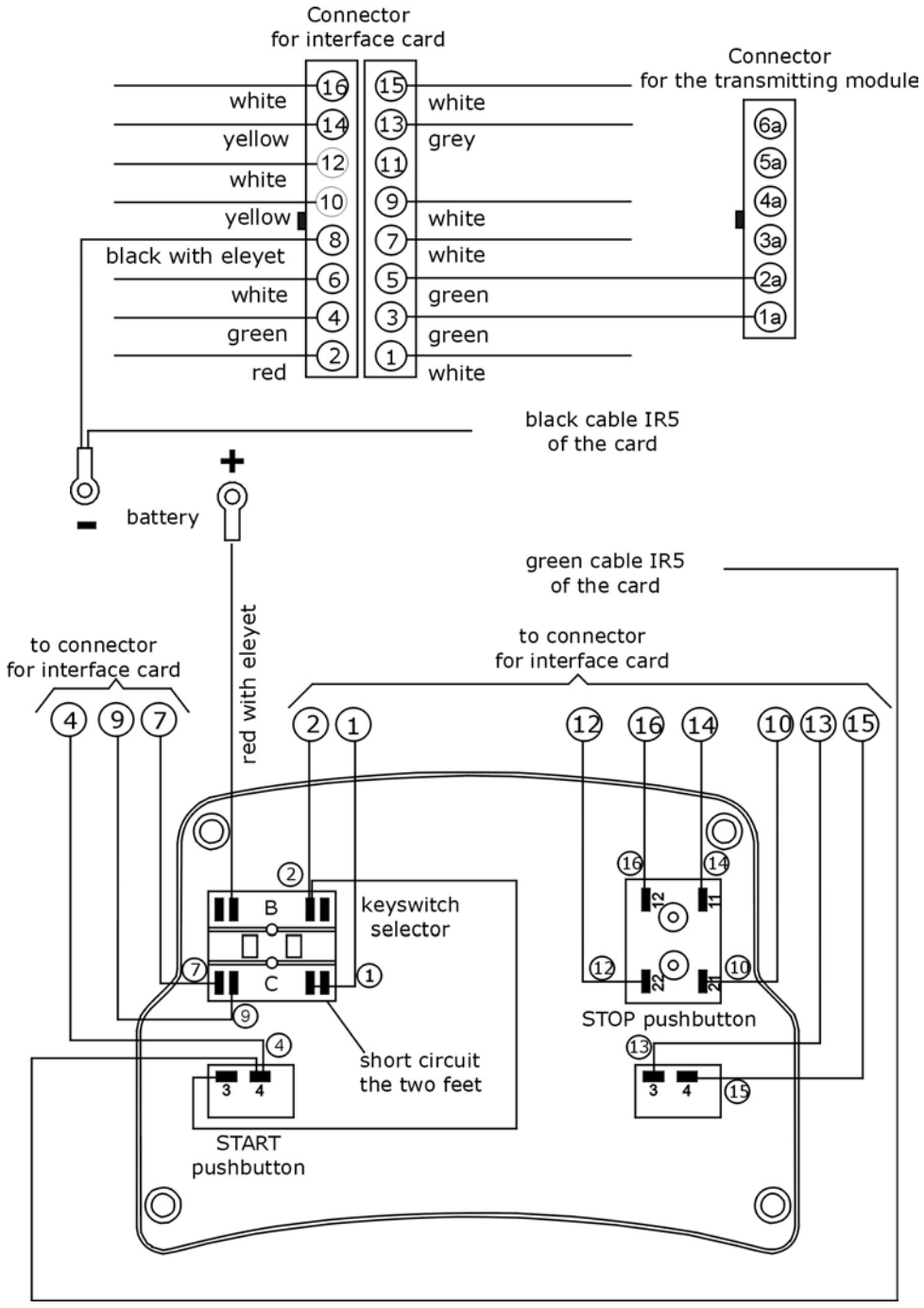
R0POCO16E03A0



R0POCO16E04A0
(bottom wired control station for cable control)



R0POCO12E06A0
(bottom wired control casing for IR START UP)



3.17 Bottom casing

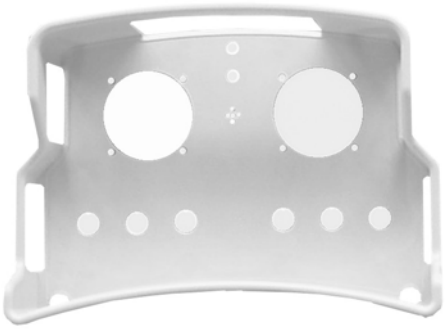
Codes

R0POCO16P12A0	Bottom casing
R0POCO16P13A0	Bottom casing for cable control
R0POCO12P06A0	Bottom casing for IR START UP

3.18 Upper casing

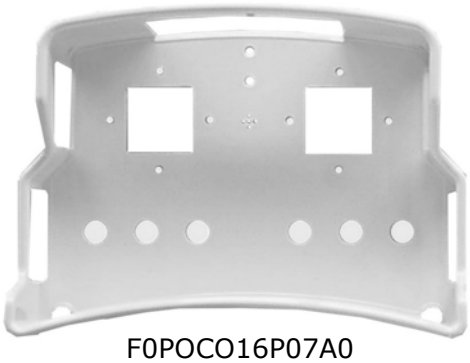
Codes

R0POCO16P03A0	Upper casing with 2 holes for Gessmann joystick
R0POCO16P06A0	Upper casing with 3 holes for Gessmann joystick
R0POCO16P07A0	Upper casing with 2 holes for Penny Giles joystick
R0POCO16P08A0	Upper casing with 3 holes for Penny Giles joystick
R0POCO16P09A0	Upper casing with 4 holes for Tecnord joystick
R0POCO16P10A0	Upper casing with 6 holes for Tecnord joystick

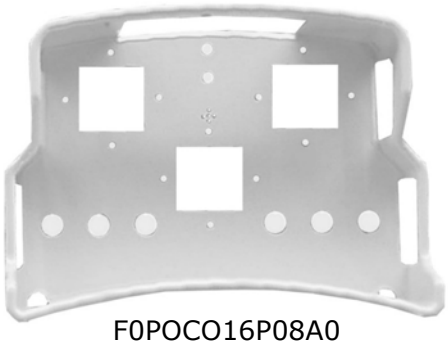


F0POCO16P03A0

F0POCO16P06A0

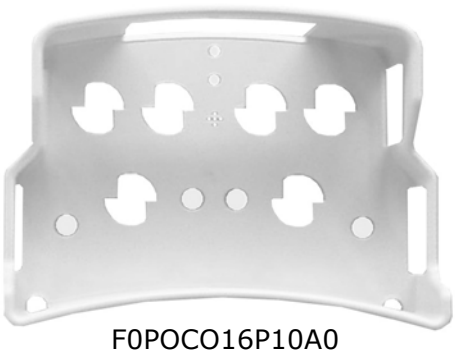


F0POCO16P07A0



F0POCO16P08A0

F0POCO16P09A0



F0POCO16P10A0

To order the command panel relative to the casing, supply the serial number of the radio remote control.

3.19 Technical data and findings

Technical data

Number of available commands .....
for MA ..... 6 analog + 12 on/off + start + stop
for PRO-M ..... 6+2 analog + 12 on/off + start + stop
Antenna..... integrated
Type of modulation ..... GFSK
Power..... < 10mW (433 MHz)
.....< 5 mW (870 MHz)

Power supply.....battery pack NiMH 7,2 V - 1.3 Ah
Turn off voltage ..... 6 V
Autonomy with fully charged battery (at 20°C) .....about 10 ore
Time of 1° prewarning time..... about 15 minutes
Time of 2° prewarning time .....about 3 minutes
Housing ..... PA6 fv 20%
Protection grade ..... (173x160x236) mm
Weight.....≤ 2.5 kg

Findings

Fixing of the . . .	to . . .	No. screws	Paragraph
Bottom control casing (or casing)	Upper control casing (or casing)	4 (M 4x8)	3.16
radio transmitter encoder module	Bottom control casing	4 (M 2.9x6.5)	3.3
interface card	Upper control casing (or casing)	2 (M 3x6)	3.4
interface card	Upper control casing (or casing)	1 (M 2.9x9.5)	3.4

"PRO-M receiving unit" index

"PRO-M receiving unit" replacements index

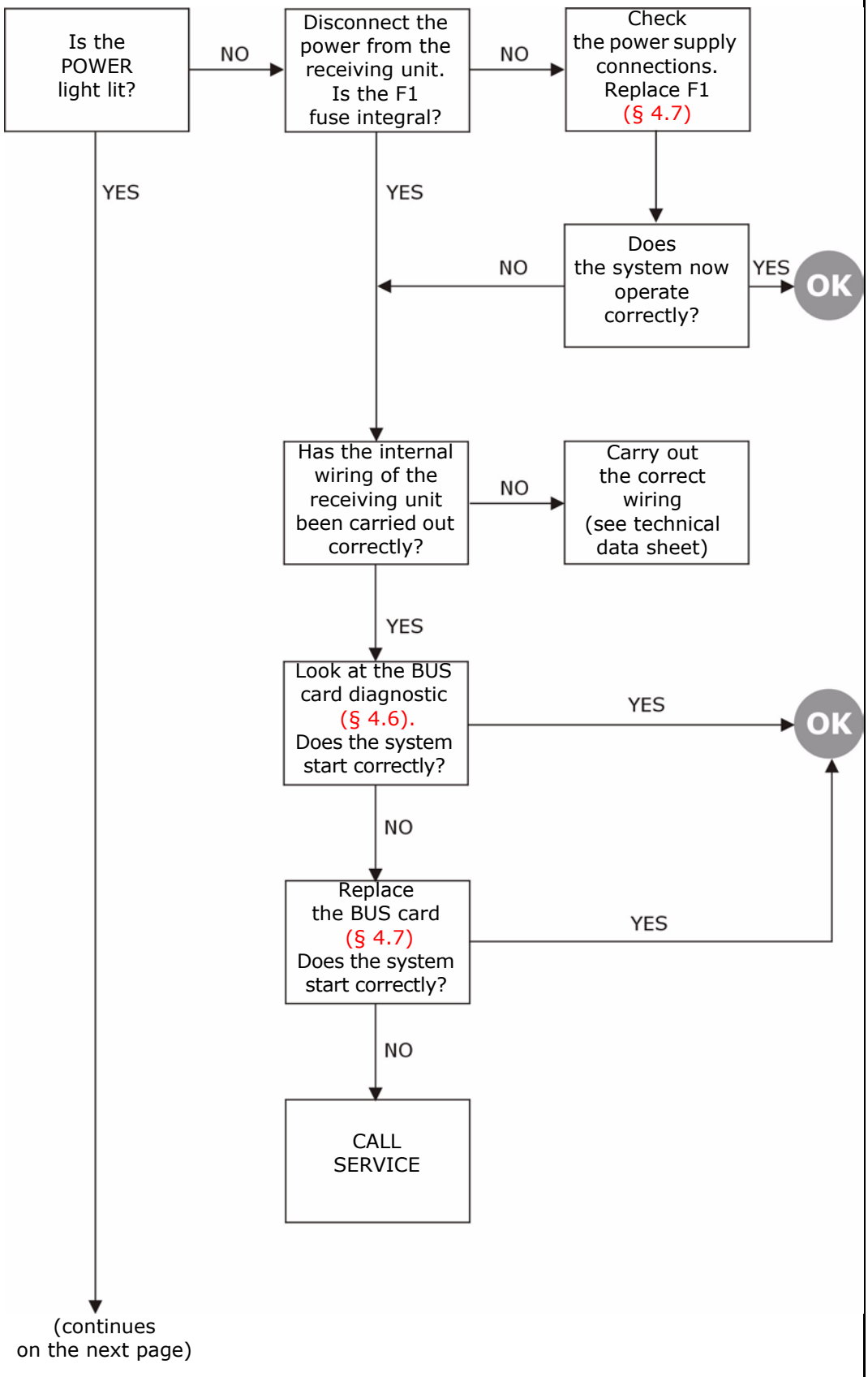
"PRO-M receiving unit" programmings index

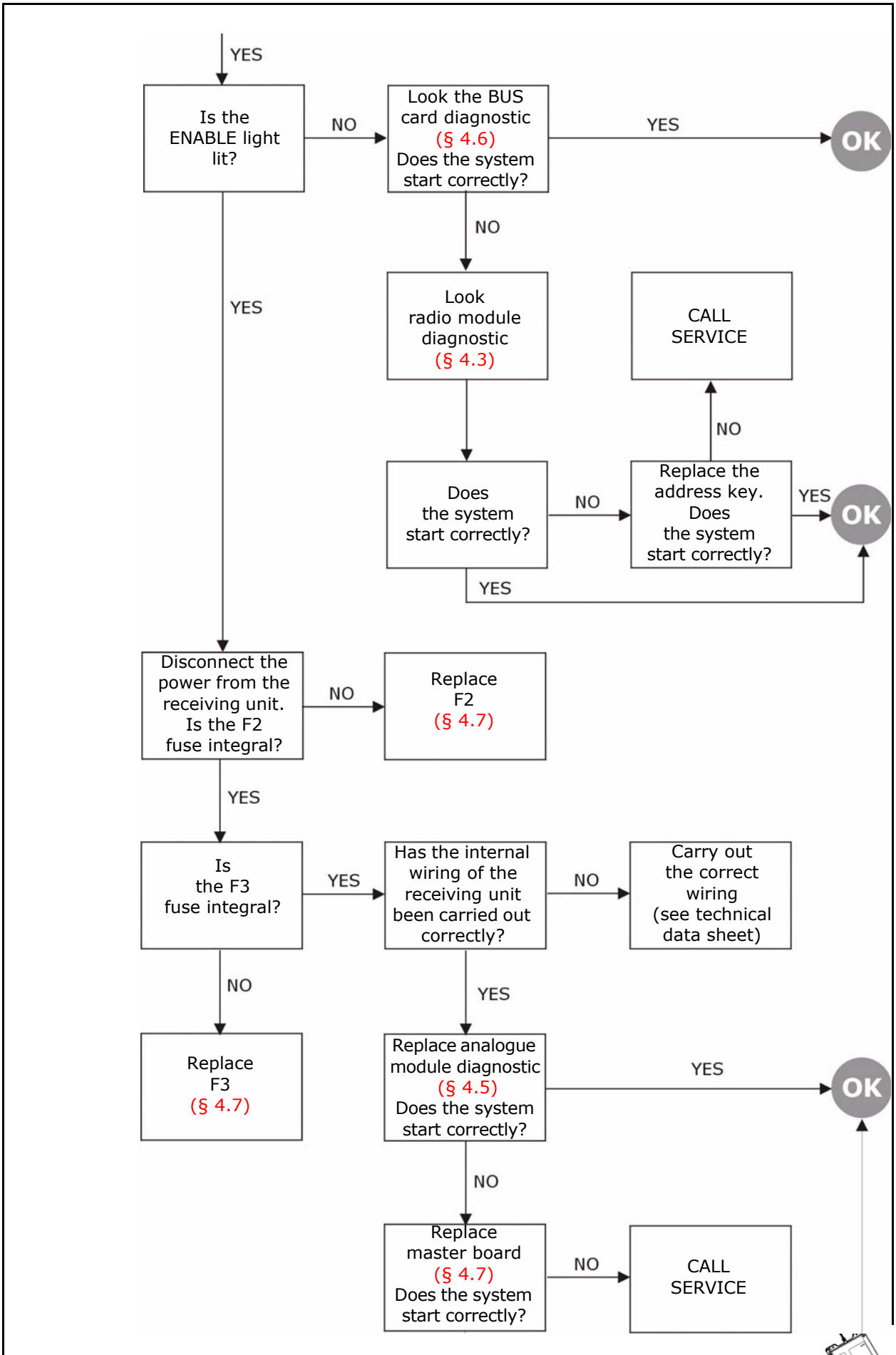
4 PRO-M receiving unit

The PRO-M receiving unit can only be installed on hoisting and moving equipment installed on vehicles where there is a battery power supply.
The following applications are therefore not permitted:
- machines supplied by AC
- machines where the DC supply does not come from a battery.

In addition, the receiving unit cannot be installed on:
- machines installed in environments where apparatus with flameproof characteristics are needed.
- machines for moving, lifting and transporting people.

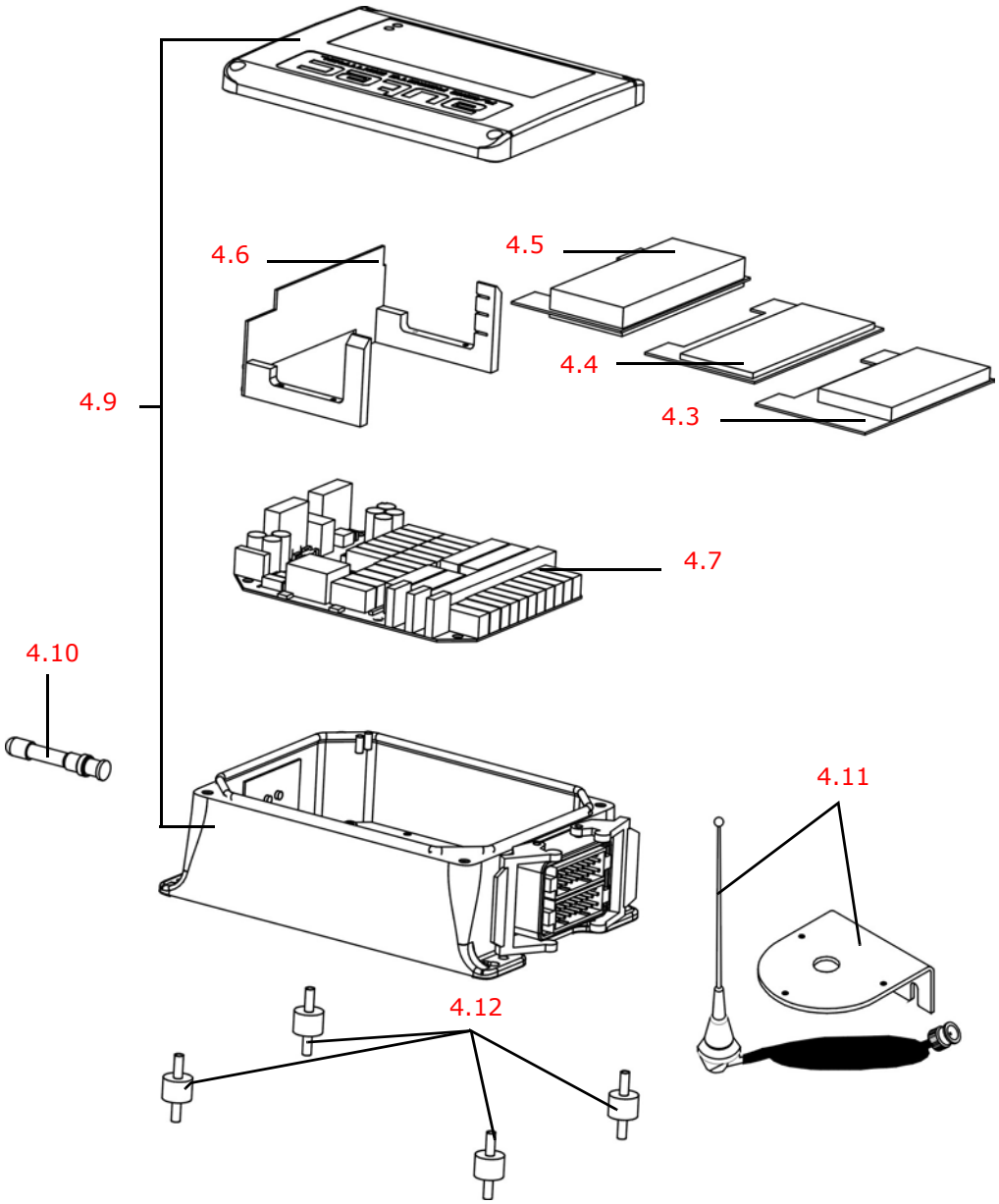
4.1 Receiving unit diagnostic




YES
Is the ENABLE light lit?
NO
Look the BUS card diagnostic (§ 4.6) Does the system start correctly?
YES
OK
NO
YES
Look radio module diagnostic (§ 4.3)
CALL SERVICE
NO
Does the system start correctly?
NO
Replace the address key. Does the system start correctly?
YES
OK
YES
Disconnect the power from the receiving unit. Is the F2 fuse integral?
NO
Replace F2 (§ 4.7)
YES
Is the F3 fuse integral?
YES
Has the internal wiring of the receiving unit been carried out correctly?
NO
Carry out the correct wiring (see technical data sheet)
NO
YES
Replace F3 (§ 4.7)
Replace analogue module diagnostic (§ 4.5) Does the system start correctly?
YES
OK
NO
Replace master board (§ 4.7) Does the system start correctly?
NO
CALL SERVICE

4.2 Exploded view and spare parts

Exploded view



Spare parts

N°	Codice	Descrizione
4.10	F0ANTE00E24A0	Receiving unit antenna (frequency 433 MHz)
4.10	F0ANTE00E32A0	Receiving unit antenna (frequency 870 MHz)
4.7	F0BASE00E55A0	SBR97DC08 master board
4.9	F0CASS00P22A0	Receiving case
4.5	F0INRI00E45A0	RI97-08V0ZA analogue receiver module with voltage outputs
4.5	F0INRI00E46A0	RI97-08P0ZA analogue receiver module with PWM outputs
4.6	F0INRI00E47A0	RI97BUS01ZA BUS card
4.4	F0RIDE00E10A0	RD97-00A receiver decoder module
4.3	F0RIRA00E11A0	MRXEU03A radio receiver module (frequency 433 MHz)
4.3	F0RIRA00E11D0	MRXUK03A radio receiver module (frequency 458 MHz)
4.3	F0RIRA00E14A0	MRXEU06B radio receiver module (frequency 870 MHz)
4.11	G0ANTE00E10A0	Antenna with cable, length 5 m.
4.12	G0ANVI00M0002	Antivibration support kit

"N°" is the paragraph number which refers to the spare part.

Warning

No voltage should be present when carrying out any internal operations (replacement or programming) on the receiving unit, therefore make sure that the power is disconnected from the receiving unit before proceeding.

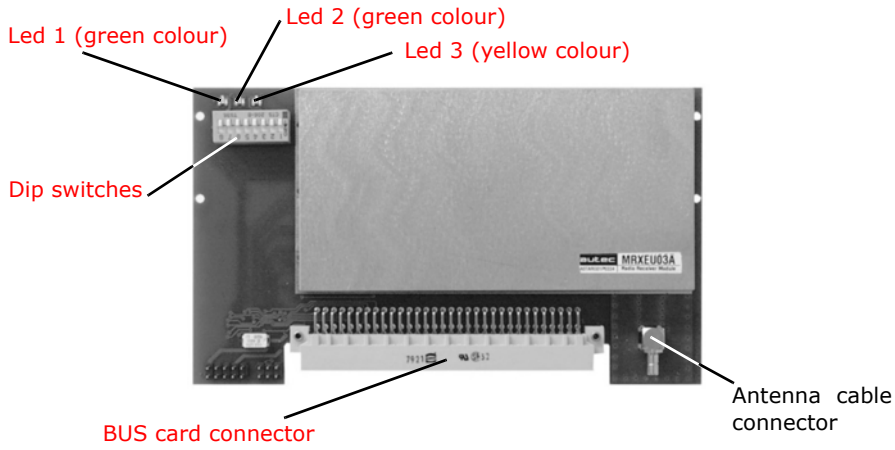
4.3 Radio receiver module (MRX__0__)

Codes

MRXEU03A	Radio receiver module frequency 433 MHz
MRXUK03A	Radio receiver module frequency 458 MHz (module for England)
MRXEU06B	Radio receiver module frequency 870 MHz
MRXAU03A	Radio receiver module frequency 472 MHz (module for Australia)

Always make sure that the frequencies at which the radio receiving module operates are permitted in the country where the radio remote control is to be used.

Module components

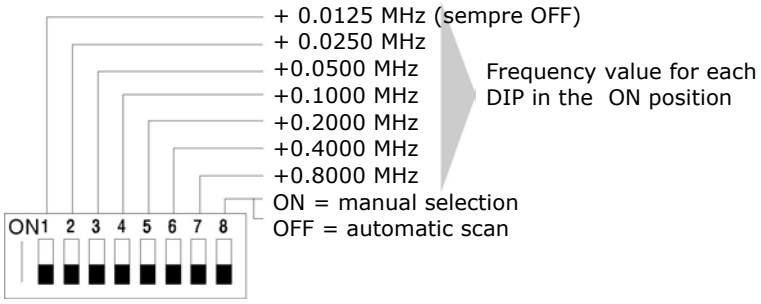


Leds

The three LEDs that are present indicate if the radio receiving module:
- is being supplied correctly (LED 1)
- is receiving a radio signal at the operating frequency (LED 2)
- is scanning the frequencies (when LED 3 blinks)

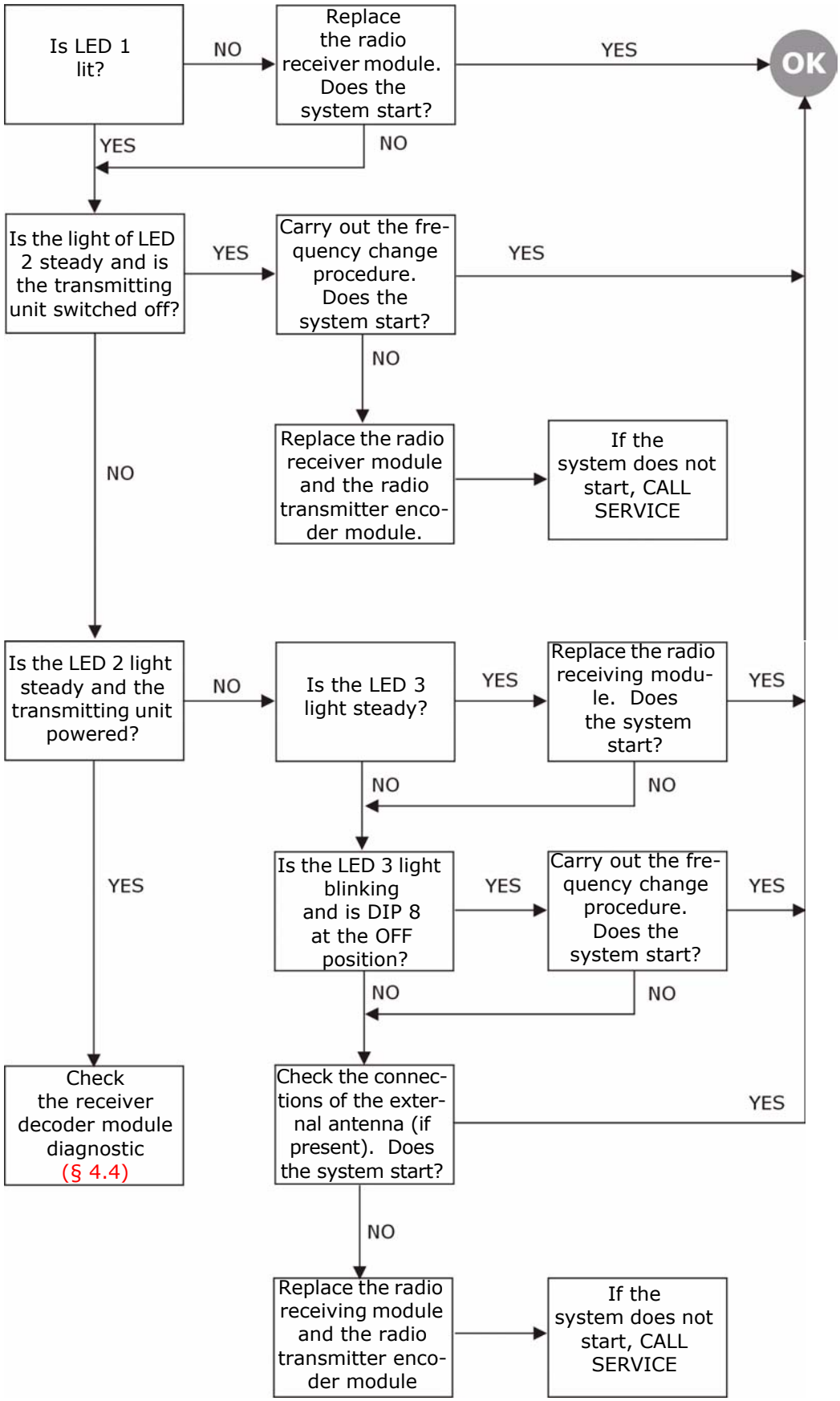
Dip switches

The eight dip switches present in the radio receiving module define the frequency operation mode (automatic scan or manual selection) and the operating frequency itself: :



The radio receiving module dip switches must always be set in the same manner as the dip switches of the radio transmitter encoder module.

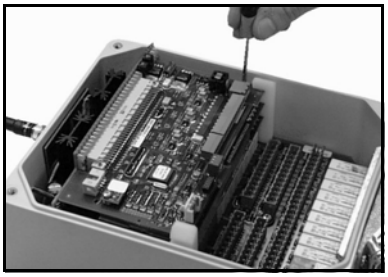
Diagnostic


Is LED 1 lit?
NO
Replace the radio receiver module. Does the system start?
YES
OK
NO
YES
Is the light of LED 2 steady and is the transmitting unit switched off?
YES
Carry out the frequency change procedure. Does the system start?
YES
NO
Replace the radio receiver module and the radio transmitter encoder module.
If the system does not start, CALL SERVICE
NO
Is the LED 2 light steady and the transmitting unit powered?
NO
Is the LED 3 light steady?
YES
Replace the radio receiving module. Does the system start?
YES
NO
NO
YES
Is the LED 3 light blinking and is DIP 8 at the OFF position?
YES
Carry out the frequency change procedure. Does the system start?
YES
NO
NO
Check the receiver decoder module diagnostic (§ 4.4)
Check the connections of the external antenna (if present). Does the system start?
YES
NO
Replace the radio receiving module and the radio transmitter encoder module
If the system does not start, CALL SERVICE

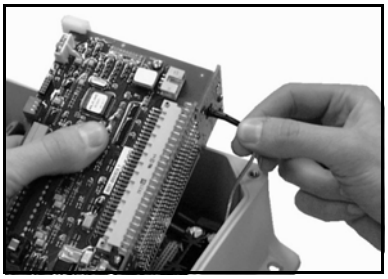
Replacement

Disassembly

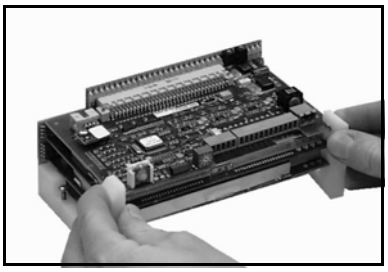
1.
Unscrew the four screws that fix the BUS card to the master board.



2.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiving module.



3.
Widen the two guides and extract the radio receiving module (third from the top)



Assembly

4.
After having set the dip switches, insert the new radio receiving module into its connector and into the seats of the BUS card guides.

5.
Insert the antenna cable that is present into the radio receiving module connector.

6.
Tighten the four screws to fix the BUS card to the master board.

Automatic scan mode

For this type of mode it is necessary to:
1) set DIP8 at OFF
2) select the requested frequency group by setting the eight dip switches for each module as explained in the following tables:

MTXEU03A

	Group 1	Group 2	Group 3	Group 4
Position DIP 2, 3 e 4	OFF, OFF, OFF	ON, OFF, OFF	OFF, ON, OFF	ON, ON, OFF
Freq. 1	433.100 MHz	433.125 MHz	433.150 MHz	433.175 MHz
Freq. 2	433.300 MHz	433.325 MHz	433.350 MHz	433.375 MHz
Freq. 3	433.500 MHz	433.525 MHz	433.550 MHz	433.575 MHz
Freq. 4	433.700 MHz	433.725 MHz	433.750 MHz	433.775 MHz
Freq. 5	433.900 MHz	433.925 MHz	433.950 MHz	433.975 MHz
Freq. 6	434.100 MHz	434.125 MHz	434.150 MHz	434.175 MHz
Freq. 7	434.300 MHz	434.325 MHz	434.350 MHz	434.375 MHz
Freq. 8	434.500 MHz	434.525 MHz	434.550 MHz	434.575 MHz

	Group 5	Group 6	Group 7	Group 8
Position DIP 2, 3 e 4	OFF, OFF, ON	ON, OFF, ON	OFF, ON, ON	ON, ON, ON
Freq. 1	433.200 MHz	433.225 MHz	433.250 MHz	433.275 MHz
Freq. 2	433.400 MHz	433.425MHz	433.450 MHz	433.475 MHz
Freq. 3	433.600 MHz	433.625MHz	433.650 MHz	433.675 MHz
Freq. 4	433.800 MHz	433.825 MHz	433.850 MHz	433.875 MHz
Freq. 5	434.000 MHz	434.025 MHz	434.050 MHz	434.075 MHz
Freq. 6	434.200 MHz	434.225 MHz	434.250 MHz	434.275 MHz
Freq. 7	434.400 MHz	434.425 MHz	434.450 MHz	434.475 MHz
Freq. 8	434.600 MHz	434.625 MHz	434.650 MHz	434.675 MHz

In this module, DIPs 5, 6 and 7 do not effect the setting of the frequency group while DIP 1 must be set to OFF.

The available frequencies are those belonging to the set group

MTXUK03A

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at OFF.

MTXEU06B

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at ON.

MTXAU03A

In this module the DIPs from 2 to 7 must be set in order to operate within the permitted frequencies:.

DIP 1	OFF
DIP 2	ON
DIP 3	OFF
DIP 4	OFF
DIP 5	ON
DIP 6	OFF
DIP 7	ON
DIP 8	OFF

Manual frequency mode

For this type of mode it is necessary to:
1) set DIP8 at ON
2) select the frequency by setting the DIPs from 2 to 7 as explained below as a function of the radio transmitter encoder module:

MRXEU03A

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.100	OFF	OFF	OFF	OFF	OFF	OFF	OFF	433.500	OFF	OFF	OFF	OFF	OFF	ON	OFF
433.125	OFF	ON	OFF	OFF	OFF	OFF	OFF	433.525	OFF	ON	OFF	OFF	OFF	ON	OFF
433.150	OFF	OFF	ON	OFF	OFF	OFF	OFF	433.550	OFF	OFF	ON	OFF	OFF	ON	OFF
433.175	OFF	ON	ON	OFF	OFF	OFF	OFF	433.575	OFF	ON	ON	OFF	OFF	ON	OFF
433.200	OFF	OFF	OFF	ON	OFF	OFF	OFF	433.600	OFF	OFF	OFF	ON	OFF	ON	OFF
433.225	OFF	ON	OFF	ON	OFF	OFF	OFF	433.625	OFF	ON	OFF	ON	OFF	ON	OFF
433.250	OFF	OFF	ON	ON	OFF	OFF	OFF	433.650	OFF	OFF	ON	ON	OFF	ON	OFF
433.275	OFF	ON	ON	ON	OFF	OFF	OFF	433.675	OFF	ON	ON	ON	OFF	ON	OFF
433.300	OFF	OFF	OFF	OFF	ON	OFF	OFF	433.700	OFF	OFF	OFF	OFF	ON	ON	OFF
433.325	OFF	ON	OFF	OFF	ON	OFF	OFF	433.725	OFF	ON	OFF	OFF	ON	ON	OFF
433.350	OFF	OFF	ON	OFF	ON	OFF	OFF	433.750	OFF	OFF	ON	OFF	ON	ON	OFF
433.375	OFF	ON	ON	OFF	ON	OFF	OFF	433.775	OFF	ON	ON	OFF	ON	ON	OFF
433.400	OFF	OFF	OFF	ON	ON	OFF	OFF	433.800	OFF	OFF	OFF	ON	ON	ON	OFF
433.425	OFF	ON	OFF	ON	ON	OFF	OFF	433.825	OFF	ON	OFF	ON	ON	ON	OFF
433.450	OFF	OFF	ON	ON	ON	OFF	OFF	433.850	OFF	OFF	ON	ON	ON	ON	OFF
433.475	OFF	ON	ON	ON	ON	OFF	OFF	433.875	OFF	ON	ON	ON	ON	ON	OFF

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.900	OFF	OFF	OFF	OFF	OFF	OFF	ON	434.300	OFF	OFF	OFF	OFF	OFF	ON	ON
433.925	OFF	ON	OFF	OFF	OFF	OFF	ON	434.325	OFF	ON	OFF	OFF	OFF	ON	ON
433.950	OFF	OFF	ON	OFF	OFF	OFF	ON	434.350	OFF	OFF	ON	OFF	OFF	ON	ON
433.975	OFF	ON	ON	OFF	OFF	OFF	ON	434.375	OFF	ON	ON	OFF	OFF	ON	ON
434.000	OFF	OFF	OFF	ON	OFF	OFF	ON	434.200	OFF	OFF	OFF	ON	OFF	ON	ON
434.025	OFF	ON	OFF	ON	OFF	OFF	ON	434.425	OFF	ON	OFF	ON	OFF	ON	ON
434.050	OFF	OFF	ON	ON	OFF	OFF	ON	434.450	OFF	OFF	ON	ON	OFF	ON	ON
434.075	OFF	ON	ON	ON	OFF	OFF	ON	434.475	OFF	ON	ON	ON	OFF	ON	ON
434.100	OFF	OFF	OFF	OFF	ON	OFF	ON	434.500	OFF	OFF	OFF	OFF	ON	ON	ON
434.125	OFF	ON	OFF	OFF	ON	OFF	ON	434.525	OFF	ON	OFF	OFF	ON	ON	ON
434.150	OFF	OFF	ON	OFF	ON	OFF	ON	434.550	OFF	OFF	ON	OFF	ON	ON	ON
434.175	OFF	ON	ON	OFF	ON	OFF	ON	434.575	OFF	ON	ON	OFF	ON	ON	ON
434.200	OFF	OFF	OFF	ON	ON	OFF	ON	434.600	OFF	OFF	OFF	ON	ON	ON	ON
434.225	OFF	ON	OFF	ON	ON	OFF	ON	434.625	OFF	ON	OFF	ON	ON	ON	ON
434.250	OFF	OFF	ON	ON	ON	OFF	ON	434.650	OFF	OFF	ON	ON	ON	ON	ON
434.275	OFF	ON	ON	ON	ON	OFF	ON	434.675	OFF	ON	ON	ON	ON	ON	ON

MRXUK03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
458.525	OFF	ON	OFF	OFF	OFF	OFF	ON
458.550	OFF	OFF	ON	OFF	OFF	OFF	ON
458.575	OFF	ON	ON	OFF	OFF	OFF	ON
458.600	OFF	OFF	OFF	ON	OFF	OFF	ON
458.625	OFF	ON	OFF	ON	OFF	OFF	ON
458.650	OFF	OFF	ON	ON	OFF	OFF	ON
458.675	OFF	ON	ON	ON	OFF	OFF	ON
458.700	OFF	OFF	OFF	OFF	ON	OFF	ON
458.725	OFF	ON	OFF	OFF	ON	OFF	ON
458.750	OFF	OFF	ON	OFF	ON	OFF	ON
458.775	OFF	ON	ON	OFF	ON	OFF	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

MRXEU06B

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
869.7125	ON	OFF	OFF	ON	OFF	ON	ON
869.7375	ON	ON	OFF	ON	OFF	ON	ON
869.7625	ON	OFF	ON	ON	OFF	ON	ON
869.7875	ON	ON	ON	ON	OFF	ON	ON
869.8125	ON	OFF	OFF	OFF	ON	ON	ON
869.8375	ON	ON	OFF	OFF	ON	ON	ON
869.8625	ON	OFF	ON	OFF	ON	ON	ON
869.8875	ON	ON	ON	OFF	ON	ON	ON
869.9125	ON	OFF	OFF	ON	ON	ON	ON
869.9375	ON	ON	OFF	ON	ON	ON	ON
869.9625	ON	OFF	ON	ON	ON	ON	ON
869.9875	ON	ON	ON	ON	ON	ON	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

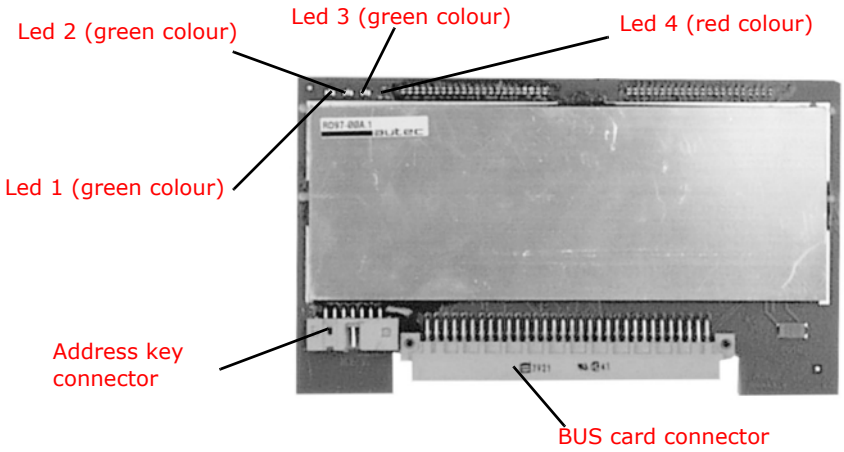
MRXAU03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
472.025	OFF	ON	OFF	OFF	ON	OFF	ON
472.050	OFF	OFF	ON	OFF	ON	OFF	ON
472.075	OFF	ON	ON	OFF	ON	OFF	ON
472.100	OFF	OFF	OFF	ON	ON	OFF	ON

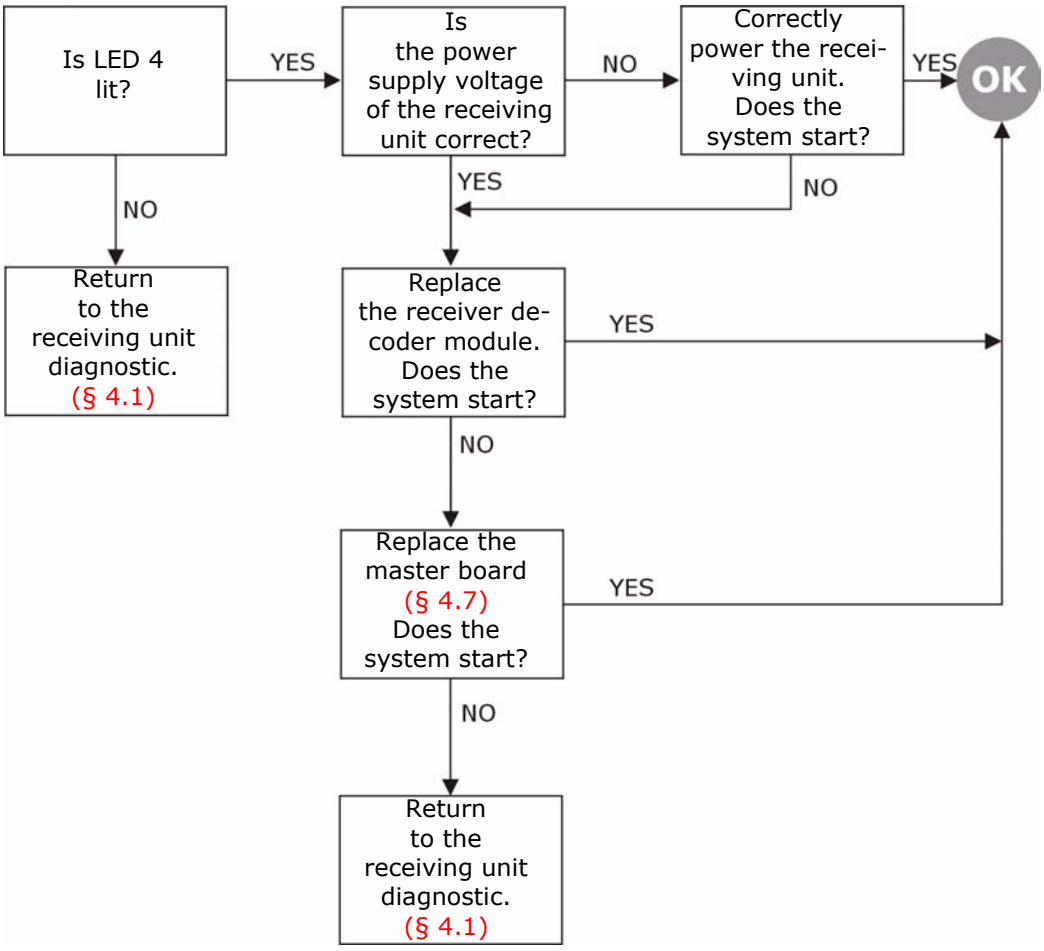
The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

4.4 Receiver decoder module (RD97-00A)

Module components



Diagnostic



Leds

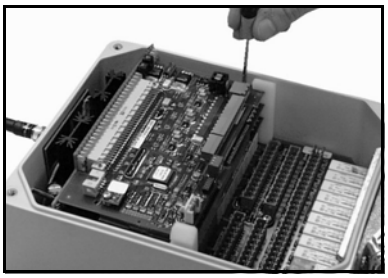
The four LEDs present on the receiver decoder module indicate:
LED 1 (green)
ON : module being powered correctly with a steady voltage of between 9 and 15 Vdc
OFF: module being powered incorrectly
LEDs 2 and 3 (green)
ON: module operating correctly

OFF: module not operating correctly
These two LEDs must blink during the test phase after power on and before true operation.
LED 4 (red)
ON: the module is signalling the presence of a fault in the system
OFF: the module is operating correctly

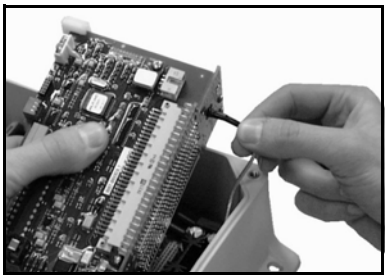
Replacement

Disassembly

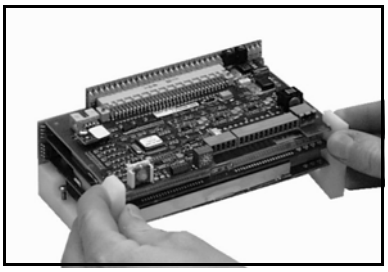
1.
Unscrew the four screws that fix the BUS card to the master board.



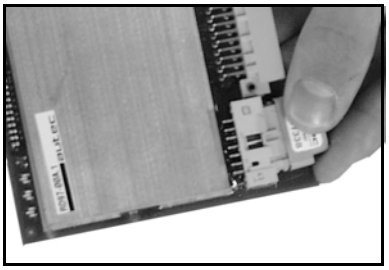
2.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiver module.



3.
Widen the two guides and extract the receiver decoder module (second from the top)



4.
Extract the address key from the receiver decoder module that is to be replaced.



Assembly

8.
Tighten the four screws to fix the BUS card to the master board.

7.
Insert the antenna cable that is present into the radio receiver module connector.

6.
Insert the new receiver decoder module into its respective connector and into the seats of the BUS card guides.

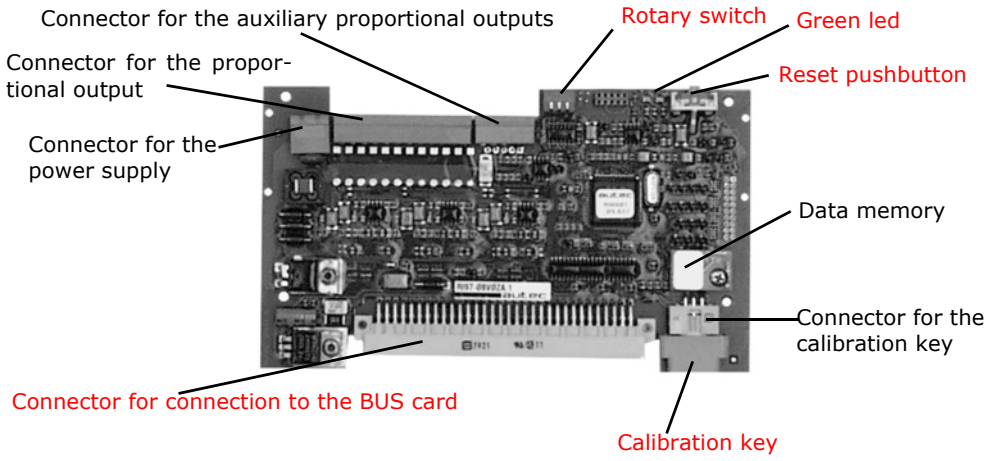
5.
Insert the address key into the new receiver decoder module.

4.5 Analogue receiver module (RI97-08_0ZA)

Codes

RI97-08V0ZA	Analogue receiver module with voltage outputs
RI97-08P0ZA	Analogue receiver module with PWM outputs

Module components



Information about module

1) Never leave the K1 calibration key inserted during radio remote control use. The key is only needed during the calibration phase and, when inserted, only one proportional command can be activated at a time.

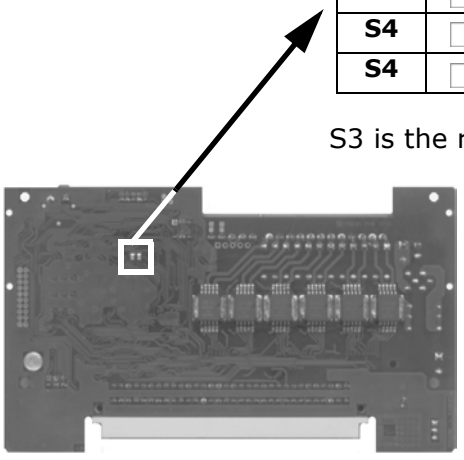
2) The proportional outputs of RI97-08____ module are programmed at the values given on the relevant technical data sheet.

3) To keep the same settings in case of module replacement, move the K2 memory from the old module to the new one.

Welding points

Some welding points are present on the analogue receiver module:

PAD	STATE	DESCRIPTION
S3	▬	stabilised voltage
S3		in step voltage
S4	▬	RI97-08P0ZA configuration
S4		RI97-08V0ZA configuration



S3 is the right-hand welding point, S4 the left one

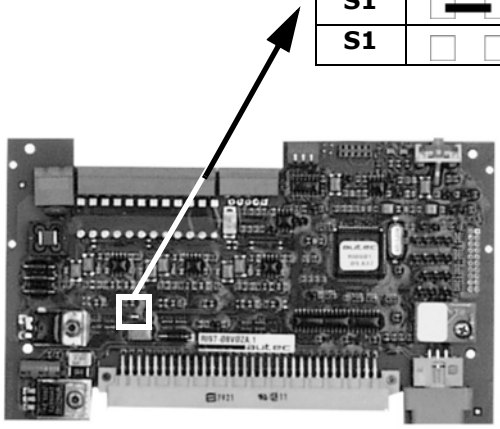
The S4 welding point must be closed in RI97-08P0ZA modules, while it must be open in the RI97-08V0ZA module.

To set S3 please keep in mind the following:

Stabilised voltage: the voltage of the module outputs are always related to an absolute voltage value.

In step voltage: the module output voltages are related to the true power supply values.

PAD	STATE	DESCRIPTION
S1		RI97-08V0ZA configuration
S1		RI97-08P0ZA configuration

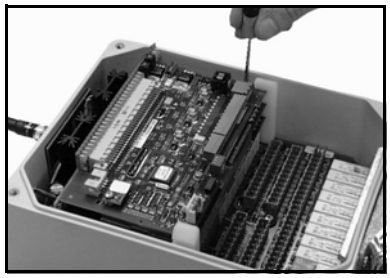


The S1 setting can at times be different from what is indicated above. Check the current setting given in the technical data sheet, and during replacement verify that the new module is set in the same manner as the one to be replaced.

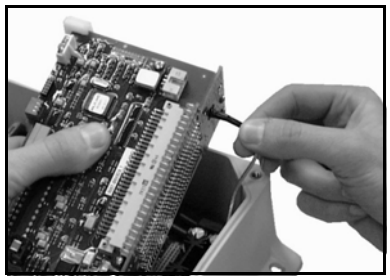
Replacement

Disassembly

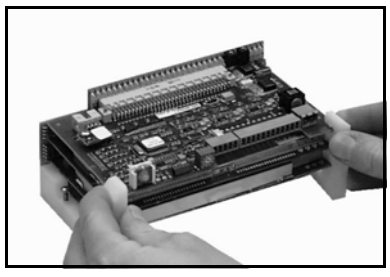
1.
Unscrew the four screws that fix the BUS card to the master board.



2.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiver module.



3.
Widen the two guides and extract the analogue receiver module (first from the top)



Assembly

6.
Tighten the four screws to fix the BUS card to the master board.

5.
Insert the antenna cable into the radio receiver module connector.

4.
Insert the new analogue receiver module into the respective connector and into the BUS card guide seats.

Preparation for setting

1. Make sure that the transmitting unit is switched off.
2. Disconnect the power from the receiving unit.
3. Open the receiving unit and insert the K1 settings key into the C4 connector.
4. Power the receiving unit. ATTENTION: From this moment onwards do not touch the receiving unit until setting up has been completed (otherwise you risk losing the settings that have already been set)
5. Turn the transmitting unit ignition key to "I" and press the START pushbutton.
6. Turn the starting key to the " " position (REMOTE SET UP).

Rotary switch setting

7. Select the parameters to be set using the rotary switch S, which can be found on the RI97-08 module, and the RPM+/- selector, which is present on the transmitting unit (+ increases the value being set, - decreases it).

In modules with voltaged outputs it is possible to set positions 1, 2, 3, 4 and 5. In modules with current outputs (PWM) it is possible to set positions 0, 1, 3 and 4.

Setting modules with voltage outputs

When the rotary switch S is at **1 POSITION**, it is possible to regulate the **maximum and minimum voltage values of the two semiaxes of a joystick**. Proceed as follows:
1. To set the maximum value, take the joystick to the maximum range of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.
2. To set the minimum value, take the joystick just out of the rest position of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **2 POSITION**, it is possible to regulate the **voltage value which corresponds to the mechanical rest position of the joystick**. Normally, this value shouldn't be modified. Proceed as follows:
- take any joystick out of the rest position
- use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **3 and 4 POSITION**, it is possible to regulate **the maximum and minimum voltage values of auxiliary outputs Z8 and Z9** respectively. Proceed as follows:
1. To set the maximum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully clockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.
2. To set the minimum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully counterclockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.

Semiaxis direction is inverted when the rotary switch S is at **5 POSITION**. Proceed as follows:
- take the joystick of the axis to be inverted out of the rest position
- while maintaining this situation, use the toggle switch RPM +/- on the transmitting unit. Move it to + in order to invert the semiaxis direction or to - in order to reset the semiaxis direction.

Setting modules with PWM outputs

When the rotary switch S is at **0 POSITION**, the **PWM (current) signal frequency** can be adjusted. Normally this value shouldn't be modified. If necessary, proceed as follows:
- take one joystick out of the rest position

- use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **1 POSITION**, it is possible to regulate **the maximum and minimum voltage (or current) values of the two semiaxes of a joystick**. Proceed as follows:
1. To set the maximum value, take the joystick to the maximum range of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.
2. To set the minimum value, take the joystick just out of the rest position of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **3 and 4 POSITION**, it is possible to regulate **the maximum and minimum voltage values of auxiliary outputs Z8 and Z9** respectively. Proceed as follows:
1. To set the maximum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully clockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.
2. To set the minimum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully counterclockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.

Saving the settings

8. Switch off the transmitting unit to save the settings.
9. Disconnect power from the receiving unit.
10. Extract the K1 settings key.
11. Close the receiving unit and power it.

Important notes about setting

If the joystick is moved out of its rest position during setting, the horn/alarm sounds for 0.5 seconds, indicating that you are in the minimum setting area.

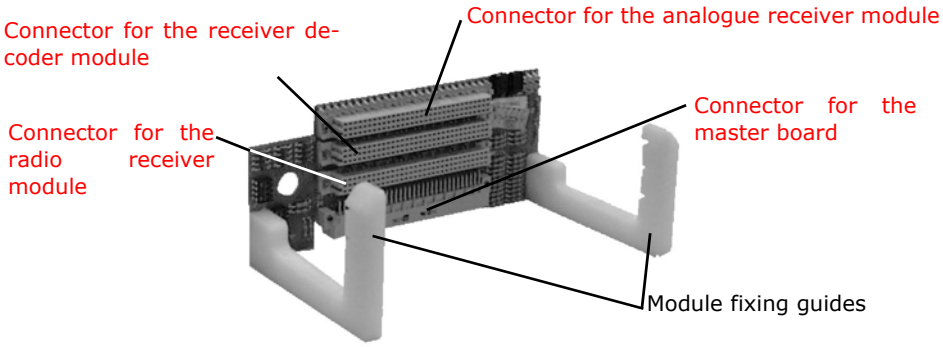
Each single position of the speed selector present on the transmitting unit must be set.

Output values reset

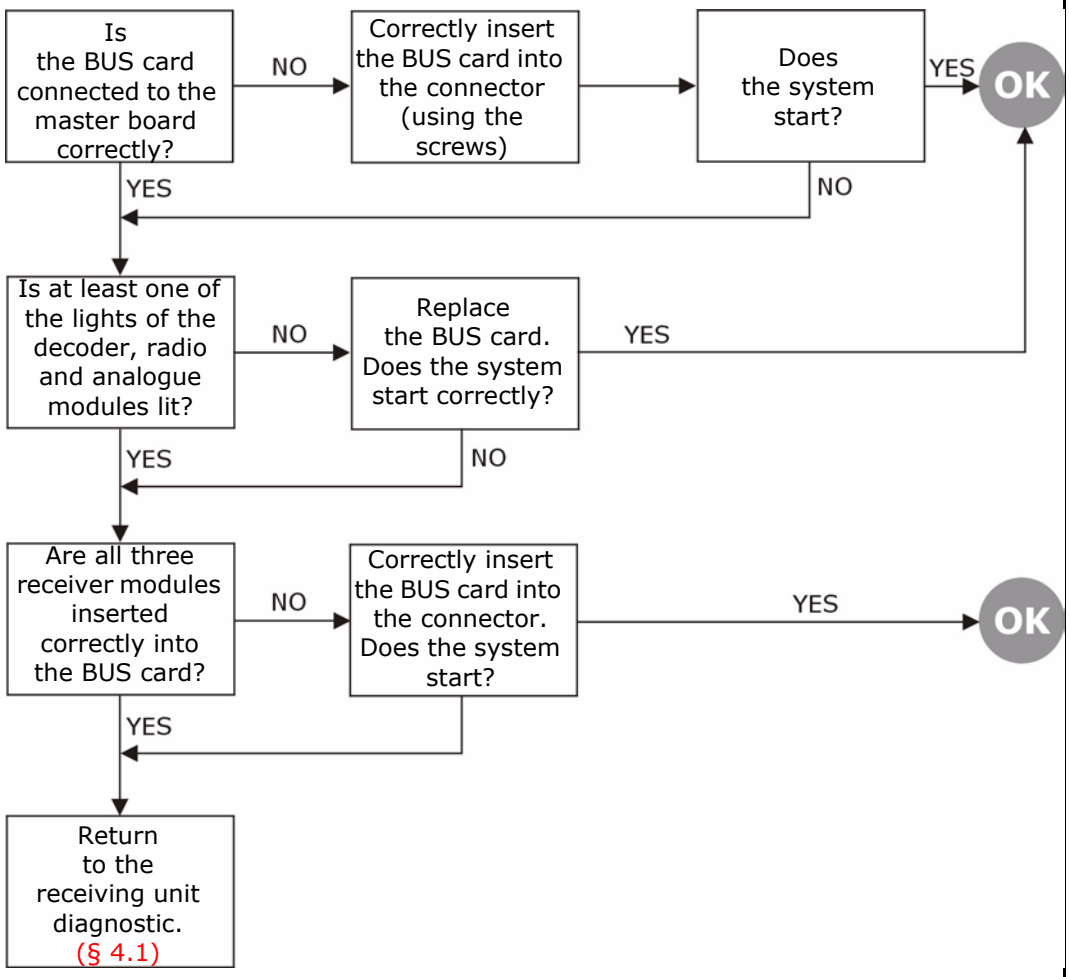
To reset the initial proportional output values (i.e. those given in the technical data sheet), with calibration key K1 inserted, just keep reset button P pressed until the green led L stops flashing and remains lit.

4.6 Bus card (RI97BUS01ZA)

Card components



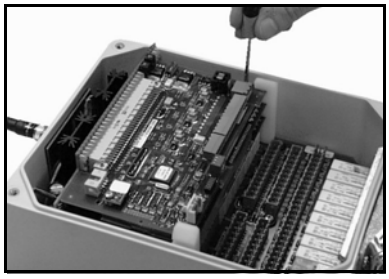
Diagnostic



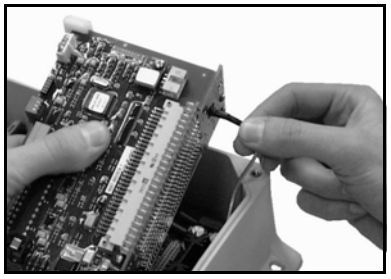
Replacement

Disassembly

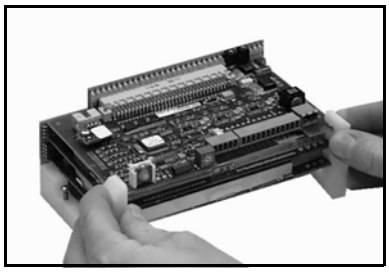
1.
Unscrew the four screws that fix the BUS card to the master board.



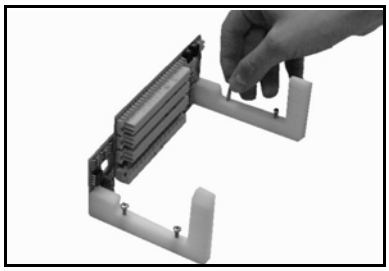
2.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiver module.



3.
Widen the two guides and extract the three receiver modules, separating them from the BUS card.



4.
Extract the four screws that are present in the guides of the BUS card that is to be replaced.



Assembly

5.
Insert the four screws into the holes present in the guides of the new BUS card (check the settings).

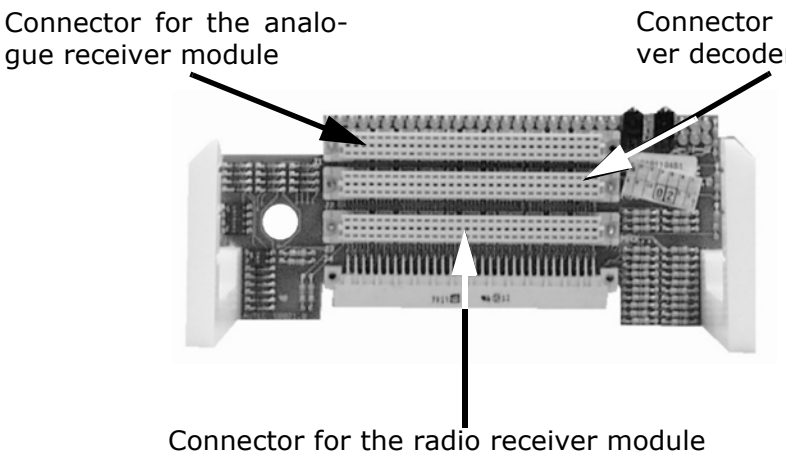
6.
Insert the three receiver modules into their respective connectors and into the slots (present on the two guides) of the BUS card.

7.
Insert the antenna cable into the radio receiver module connector.

8.
Tighten the four screws to fix the BUS card to the master board.

Connectors

The three receiver modules should be inserted into the connectors in the following manner:



The layout of the connector pin signals that are present is as follows:
(RESERVED: pin for a control signal).

Out relè F2	33	64	G2
Out relè F3	31	63	G3
Out relè F4	30	62	G4
Out relè F5	29	61	G5
Out relè F6	28	60	G6
Out relè F7	27	59	G7
Out relè F8	26	58	G8
Out relè F9	25	57	G9
Out relè F10	24	56	G10
Out relè F11	23	55	G11
Out relè F12	22	54	G12
Out relè F13	21	53	G13
Out relè F1 START	20	52	TS
RESERVED	19	51	RESERVED
RESERVED	18	50	RESERVED
RESERVED	17	49	RESERVED
RESERVED	16	48	RESERVED
RESERVED	15	47	RESERVED
RESERVED	19	46	RESERVED
RESERVED	13	45	RESERVED
RESERVED	12	44	RESERVED
Out relè ENABLE	11	43	RESERVED
+24 Vdc	10	42	+24 Vdc
+12 Vdc	9	41	+12 Vdc
RESERVED	8	40	RESERVED
RESERVED	7	39	RESERVED
RESERVED	6	38	RESERVED
RESERVED	5	37	RESERVED
RESERVED	4	36	RESERVED
RESERVED	3	35	RESERVED
RESERVED	2	34	RESERVED
GND	1	33	GND

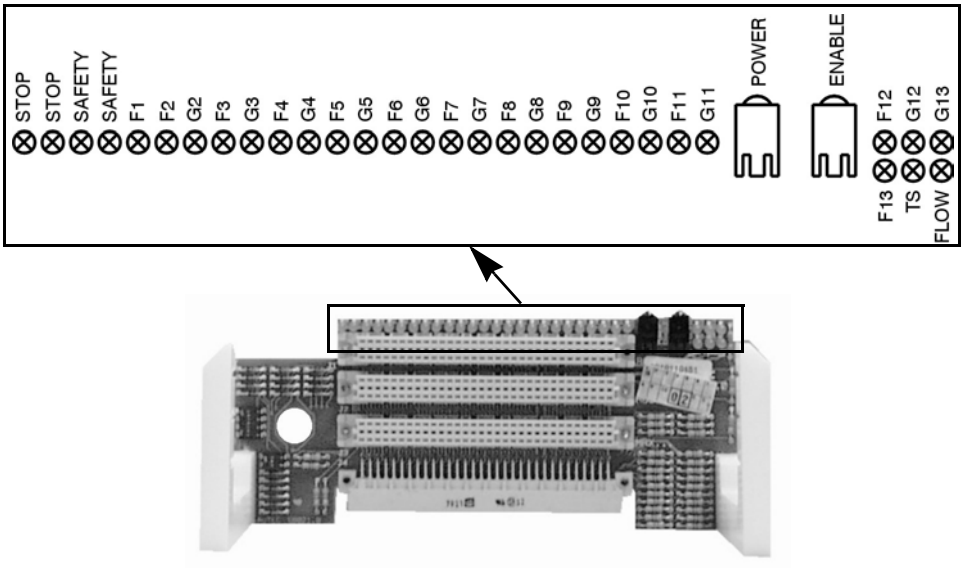
Connector for electrical connection to the master board

Out relè F2	1	33	G2
Out relè F3	2	34	G3
Out relè F4	3	35	G4
Out relè F5	4	36	G5
Out relè F6	5	37	G6
Out relè F7	6	38	G7
Out relè F8	7	39	G8
Out relè F9	8	40	G9
Out relè F10	9	41	G10
Out relè F11	10	42	G11
Out relè F12	11	43	G12
Out relè F13	12	44	G13
Out relè F1 START	13	45	TS
RESERVED	14	46	RESERVED
RESERVED	15	47	RESERVED
RESERVED	16	48	RESERVED
RESERVED	17	49	RESERVED
RESERVED	18	50	RESERVED
RESERVED	19	51	RESERVED
RESERVED	20	52	RESERVED
RESERVED	21	53	RESERVED
Out relè ENABLE	22	54	RESERVED
+24 Vdc	23	55	+24 Vdc
+12 Vdc	24	56	+12 Vdc
RESERVED	25	57	RESERVED
RESERVED	26	58	RESERVED
RESERVED	27	59	RESERVED
RESERVED	28	60	RESERVED
RESERVED	29	61	RESERVED
RESERVED	30	62	RESERVED
RESERVED	31	63	RESERVED
GND	32	64	GND

Connector for electrical connection to the receiver modules.

Signalling LEDs

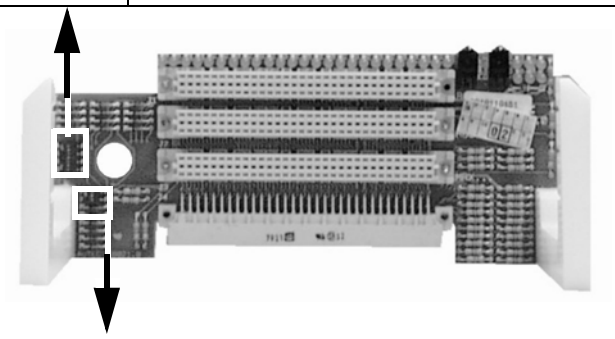
When relays relative to sent commands are activated on the master board, the corresponding LED illuminates.



The POWER and ENABLE LEDs are also visible externally on the receiving unit. They signal:
POWER: the presence of power in the receiving unit
ENABLE: radio link between the transmitting and the receiving units.

Dip switches

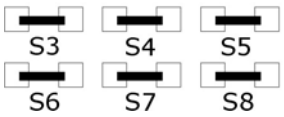
DIP	POSITION	DESCRIPTION
1	ON	F2 activated by G2 and G2 activated by F2
1	OFF	F2 and G2 indipendent from each other
2	ON	F3 activated by G3 and G3 activated by F3
2	OFF	F3 and G3 indipendent from each other
3	ON	F4 activated byG4 and G4 activated by F4
3	OFF	F4 and G4 indipendent from each other
4	ON	F5 activated by G5 and G5 activated by F5
4	OFF	F5 and G5 indipendent from each other



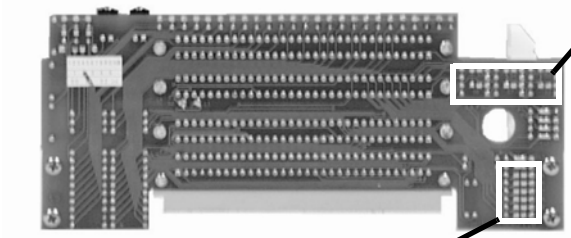
DIP	POSITION	DESCRIPTION
1	ON	F6 activated by G6 and G6 activated by F6
1	OFF	F6 and G6 indipendent from each other
2	ON	F7 activated by G7 and G7 activated by F7
2	OFF	F7 and G7 indipendent from each other

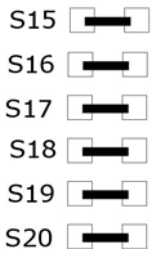
Welding points

PAD	STATE	DESCRIPTION
S3		FLOW activated by F2-G2
S3		F2 and G2 do not activated FLOW
S4		FLOW activated by F3-G3
S4		F3 and G3 do not activated FLOW
S5		FLOW activated by F4-G4
S5		F4 and G4 do not activated FLOW
S6		FLOW activated by F5-G5
S6		F5 and G5 do not activated FLOW
S7		FLOW activated by F6-G6
S7		F6 and G6 do not activated FLOW
S8		FLOW activated by F7-G7
S8		F7 and G7 do not activated FLOW



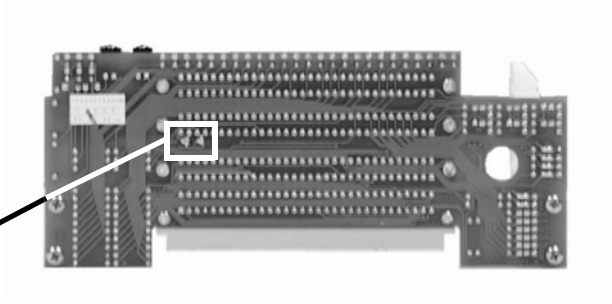
The following standard programme is pre-set by Autec: S3÷S8 CLOSED





PAD	STATE	DESCRIPTION
S15		F8 activated by G8
S15		F8 indipendent from G8
S16		F9 activated by G9
S16		F9 indipendent from G9
S17		F10 activated by G10
S17		F10 indipendent from G10
S18		F11 activated by G11
S18		F11 indipendent from G11
S19		F12 activated by G12
S19		F12 indipendent from G12
S20		F13 activated by G13
S20		F13 indipendent from G13

The following standard programme is pre-set by Autec: S15÷S20 OPEN

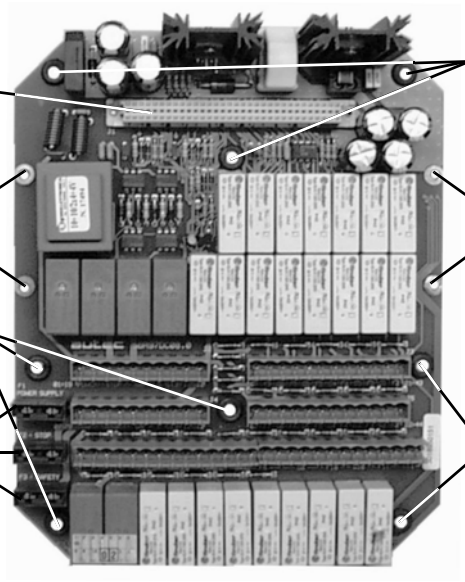


PAD	STATE	DESCRIPTION
S1		SAFETY activated by F2÷G7
S1		SAFETY activated by F1÷G13
S2		Passive emercency time = 1.5 s
S2		Passive emercency time = 0.5 s

The following standard programme is pre-set by Autec: S1 CLOSED and S2 OPEN

4.7 Master board (SBR97DC08)

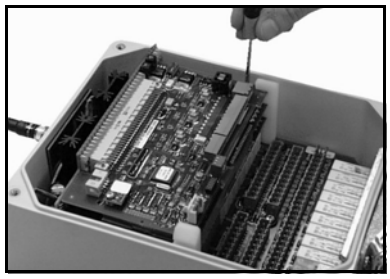
Board components



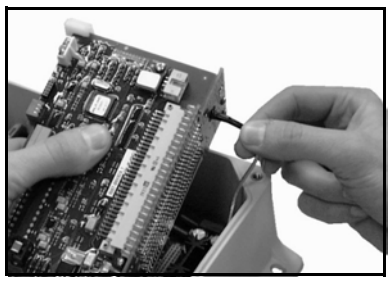
Replacement

Diassembly

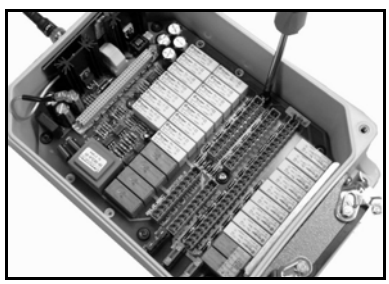
1.
Unscrew the four screws that fix the BUS card to the master board.



2.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiver module.



3.
Unscrew the eight screws and extract the master board from the receiving case.



Assembly

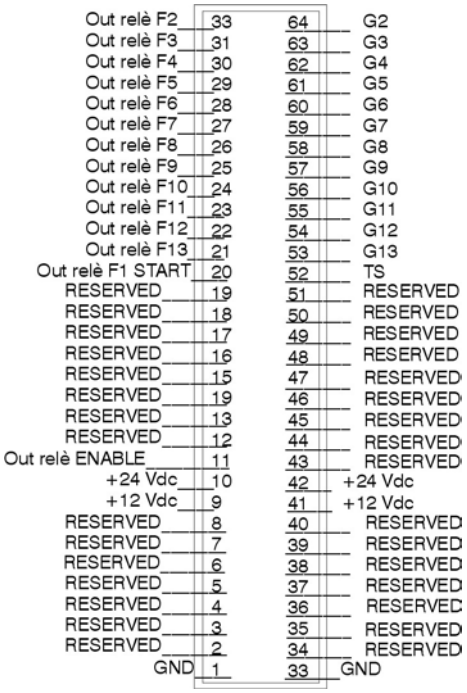
4.
Insert the new master board and tighten the eight screws.

5.
Insert the antenna cable into the radio receiver module connector.

6.
Tighten the four screws to fix the BUS card to the master board.

Connector

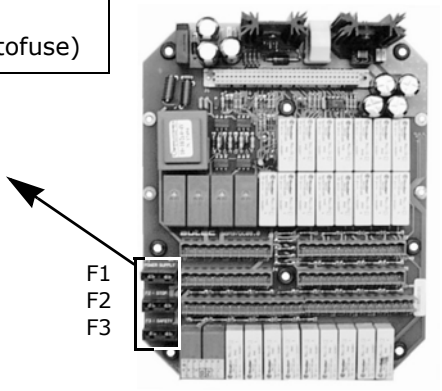
The layout of the signals on the connector pins is as follows:
(RESERVED: pin for a control signal).



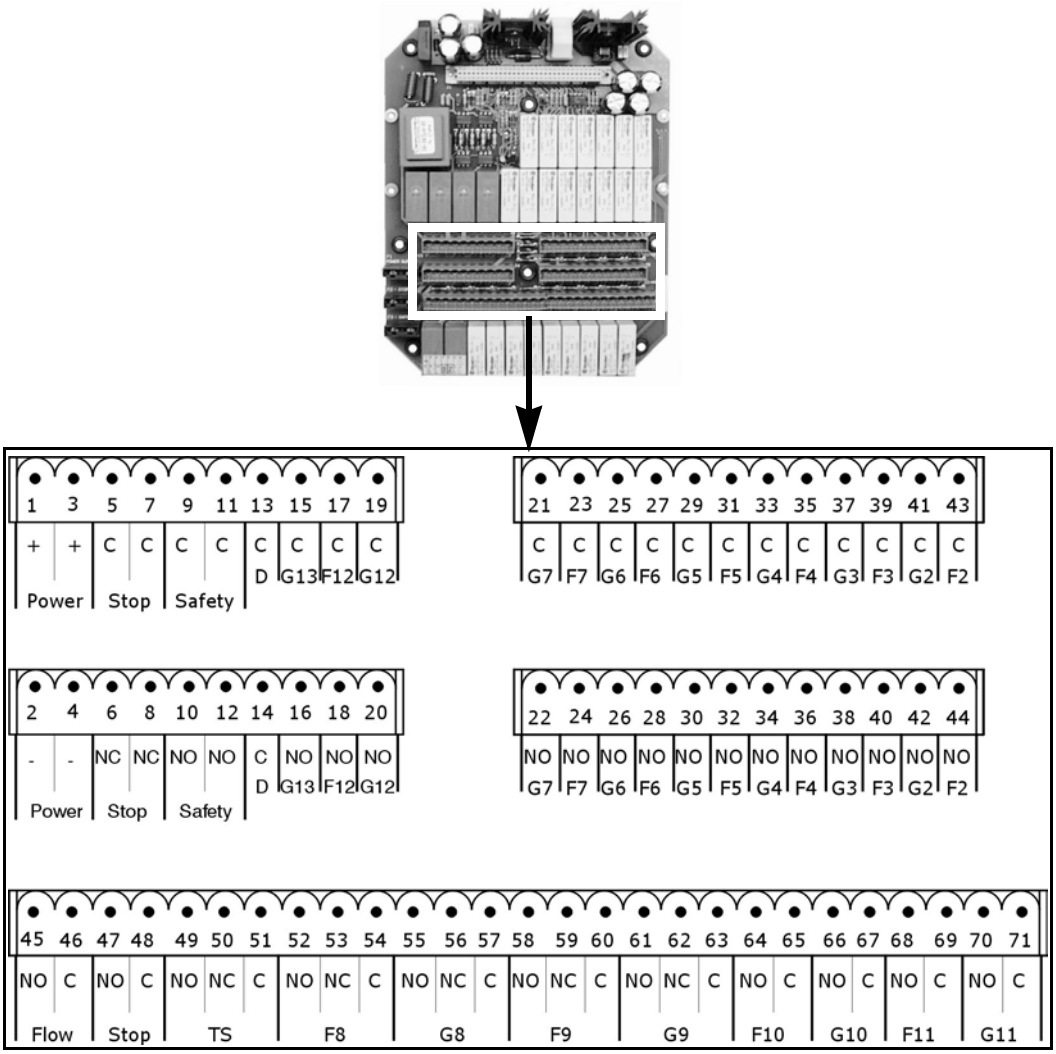
Fuses

Name	Function	Characteristics
F1	POWER SUPPLY circuit protection	4A (32 Vdc, autofuse)
F2	STOP circuit protection	10A (32 Vdc, autofuse)
F3	SAFETY Protezione del circuito	10A (32 Vdc, autofuse)

AUTOFUSE: fuses for automotives



Connectors for wiring

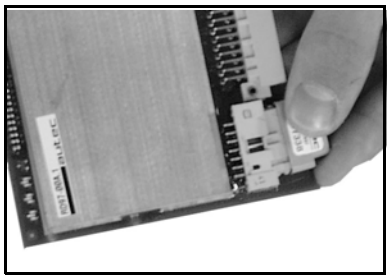


+:	positive
-:	negative
NC:	normally closed
NO:	normally open
C:	common
Power:	power supply (8÷30 Vdc)
Stop:	command which blocks the receiver unit and, as a result, the machine
Safety:	safety function which protects the system from involuntary movements caused by possible radio remote control failure. This function constantly controls the zero position (rest) of the movement command actuators.
Flow:	function which commands the solenoid valve that lets pressurised oil into the hydraulic circuit of the main distributor. The movement commands normally activate this function.
TS:	(TIMED STOP) command used for switching off the auxiliary or diesel motor of the machine. The motor remains active for 10 seconds after the STOP command has been activated.
CD:	common recovery diodes
F__ e G__:	movement and selection commands

4.8 Address key

Description

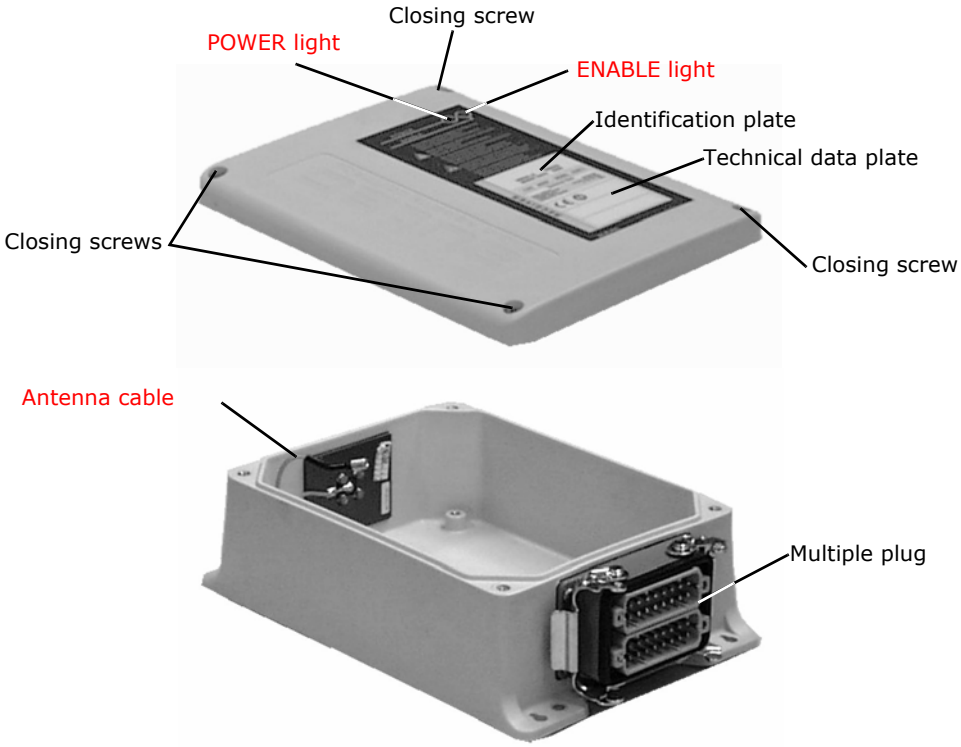
The receiver decoder module is equipped with an address key that contains the address of the radio remote control.
This key is:
- coloured grey
- removable
- necessary for radio remote control operation
- unique, like the serial number given on the label.



WARNING!
The radio encoder trasmitter module contains the corresponding address key, which has the same address (and serial number given on the label).
This key is, however, coloured yellow. DO NOT INTERCHANGE THE TWO ADDRESS KEYS (the radio remote control would not operate).

4.9 Receiving case

Case components



Lights

The POWER and ENABLE lights signal:
POWER: the presence of power supply in the receiving unit
ENABLE: radio link between the transmitting and receiving units
When the receiving unit is powered, operation is correct if:
- POWER and ENABLE are lit when the transmitting unit is started
- POWER is lit and ENABLE switched off when the transmitting unit is switched off.

Antenna cable

The receiving case holds a cable for the antenna which connects the radio receiver module to the antenna outside the case.
This cable should be connected to the radio receiver module connector by way of the hole present on the BUS card.

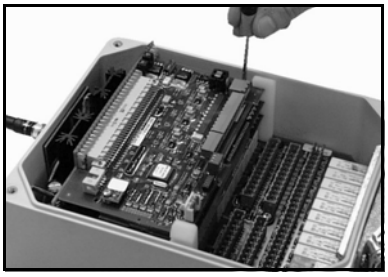
Replacement

If the receiving case is to be replaced:
- quote the serial number when ordering a new one
- make sure that the plates on the new receiving case are the same as those on the replaced receiving case.

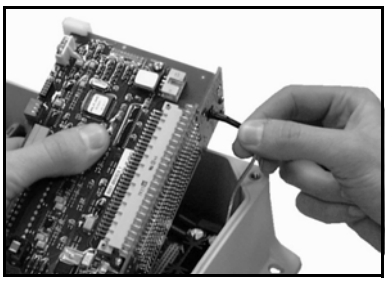
Disassembly

1.
Loosen the four screws that keep the receiving case closed.

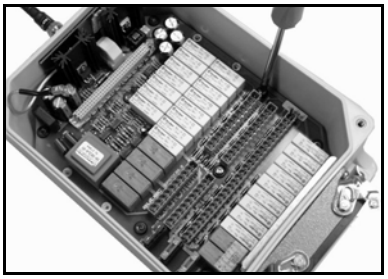
2.
Unscrew the four screws that fix the BUS card to the master board.



3.
Extract the BUS card from the receiving case and separate the antenna cable from the connector that is present in the radio receiver module.



4.
Loosen the eight screws that are present and extract the master board from the receiving case that is to be replaced.



Assembly

8.
Tighten the four screws to close the receiving case (first the two upper screws, then the two lower ones).

7.
Tighten the four screws to fix the BUS card to the master board.

6.
Insert the antenna cable into the radio receiver module connector.

5.
Insert the master board into the new receiving case and fix it using the eight screws.

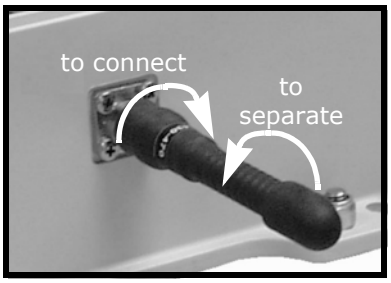
4.10 Antenna

Codes

F0ANTE00E24A0	antenna (frequency 433 MHz)
F0ANTE00E32A0	antenna (frequency 870 MHz)

Replacement

To separate the antenna from the receiving unit, rotate it in an anti-clockwise direction.
To connect the antenna to the receiving unit, rotate it in a clockwise direction.



The antenna must never come into contact with metallic parts.
The antenna must always be vertical.

Connection

If the antenna is to create a radio link between the transmitting unit and the receiving unit, the cable inside the receiving case must be connected to the radio receiver module (see Antenna cable page 31).

4.11 Antenna with cable, length 5 m.

Indications for installation

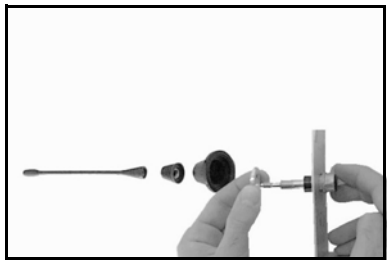
If the receiving unit is covered or shielded by metal structures or installed inside electric panels, use the antenna with the 5 metre cable. Install it in a position that favours reception of the signals emitted by the transmitting unit.

The antenna must always be assembled on a metal support surface, but the antenna stylus must never come into contact with metallic parts.

Replacement

Disassembly

1.
With the receiving unit disconnected from the power supply, assemble the different parts of the antenna, fixing them to a metal support surface.



2.
Insert one end of the cable into the antenna connector and the other into the relative receiving case connector.

Assembly

4.
Disassemble the antenna, separating the different parts from the support surface.

3.
Disconnect the power from the receiving unit. Extract the ends of the cable from the antenna connector and the relative receiving case connector.

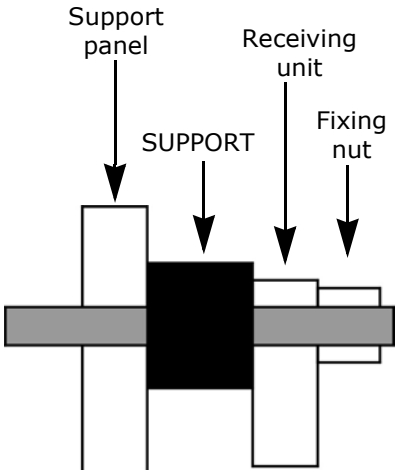
4.12 Antivibration supplort kit

Assembly

To reduce the effect of vibrations on the receiving unit, always use antivibration supports.

These supports can be assembled in two different ways:

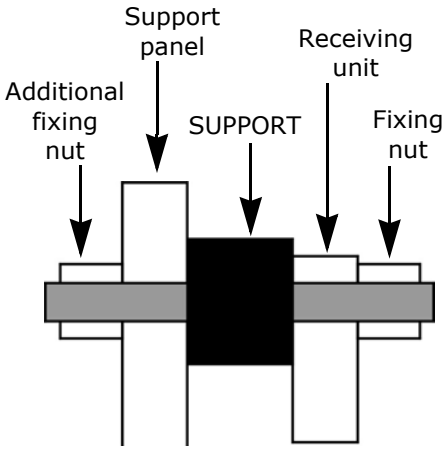
1) DRILLING AND THREADING THE SUPPORT PANEL



Drilling particulars

HOLE:	thread
DIAMETER:	5 mm
TAPPING:	M6
DATA NUMBER:	1

2) CONTROL PANEL DRILL HOLE (PASS THROUGH) WITH THE USE OF AN ADDITIONAL NUT



Drilling particulars

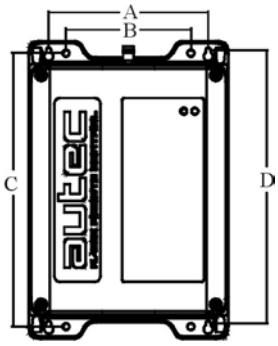
HOLE:	drilling
DIAMETER:	6.5 mm
TAPPING:	/
DATA NUMBER:	2

4.13 Technical data and findings

Technical Data

Power .....8÷30 Vdc (40 W)
Antenna .....external (dedicated)
Max switching capacity of STOP and SAFETY contacts ..... 10 A (30 Vdc)
Max switching capacity of movement commands contacts ..... 4 A (30 Vdc)
Max switching capacity of selection commands contacts ..... 6 A (30 Vdc)
Sensitivity receiver .....0,5 µV per 20 dB SINAD
Housing..... PA6 fg 20%
Minimum protection grade IP65
Dimensions .....(180x230x95) mm
Weight .....2.8 kg

Drilling template .....



A = 148 mm
B = 116 mm
C = 253 mm
D = 253 mm

Findings

Clamp of . . .	to . . .	n° screws	Paragraph
lower part of the receiving case	receiving case cover	4 (M5x15)	4.9
master board	lower part of the receiving case	8 (M4x10)	4.7
BUS card	master board	4 (M3x20)	4.6

"C26 PRO MA receiving unit" index

"C26 PRO MA receiving unit" replacements index

"C26 PRO MA receiving unit" programmings index

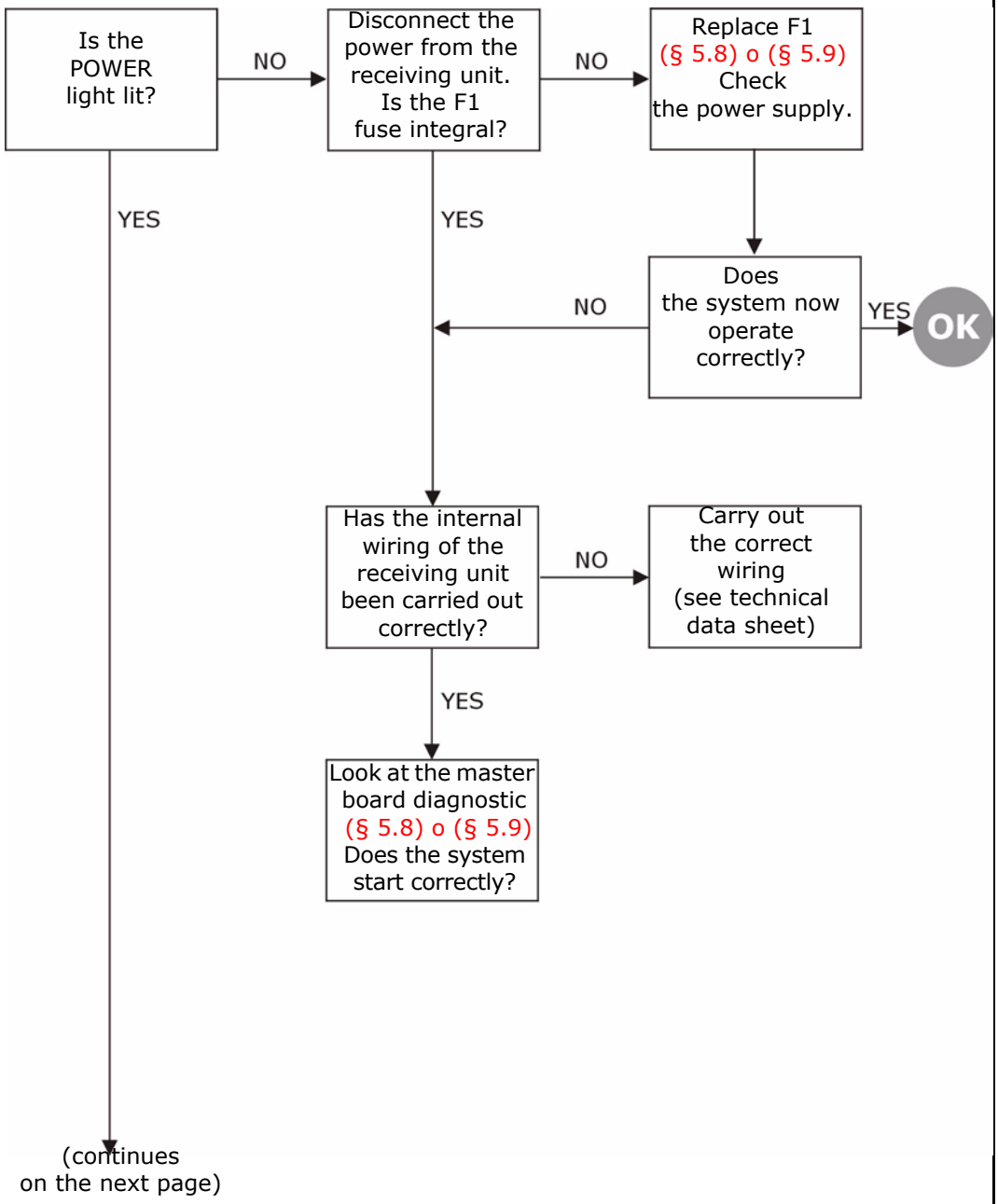
5 C26 PRO MA receiving unit

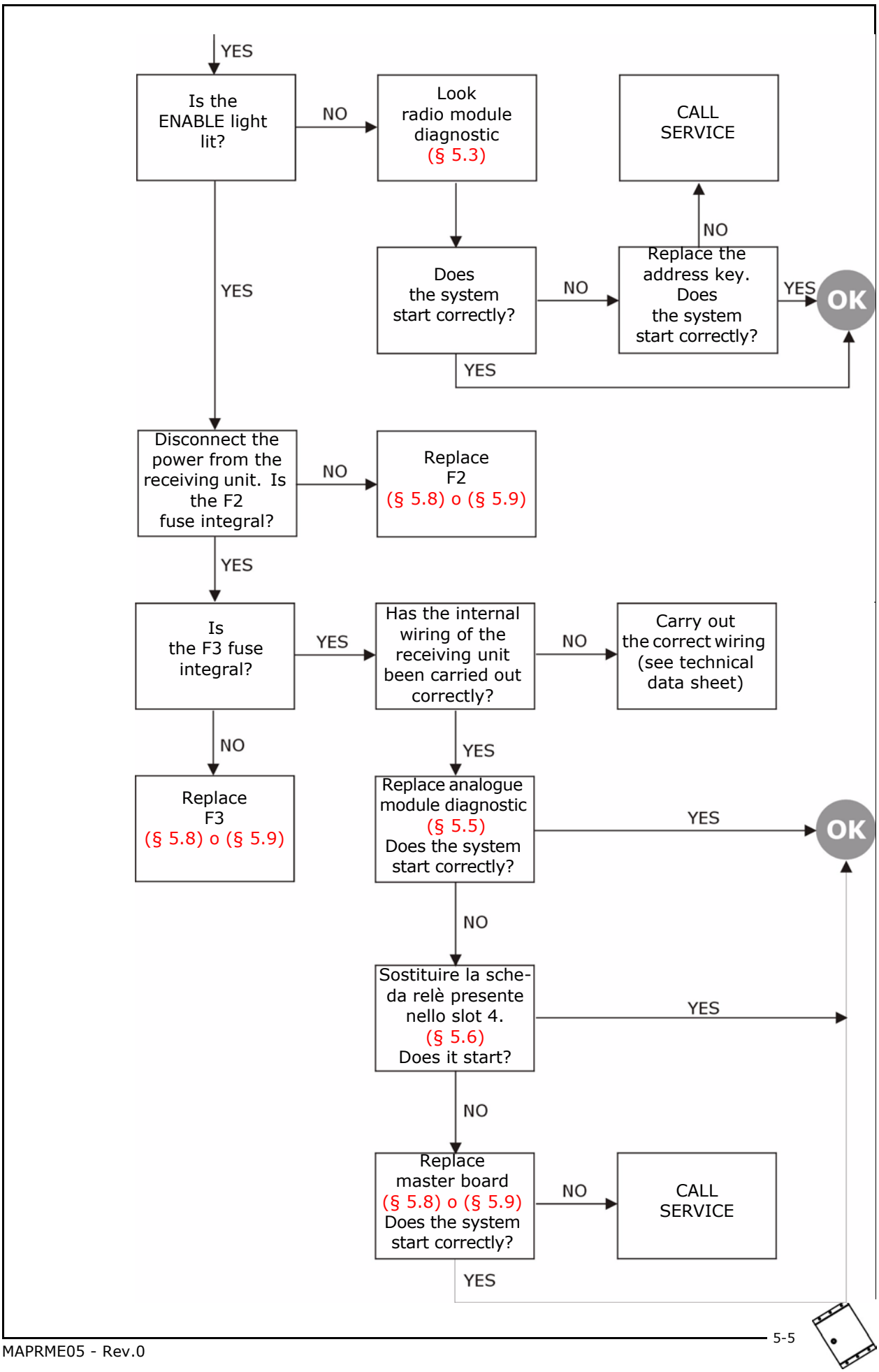
The C26 PRO MA receiving unit can only be installed on hoisting and moving equipment with an AC or DC power supply.

This receiving unit cannot be installed in areas where apparatus with flame-proof characteristics is necessary.

Other applications (such as manoeuvring locomotives, or machines that lift people, crates and aerial platforms. . .) can be considered but the additional risks must be analysed to evaluate if the machine can be radio remote controlled.
This risk analysis is the responsibility of whoever puts the radio remote controlled machine onto the market or whoever decides upon radio remote control installation and use.

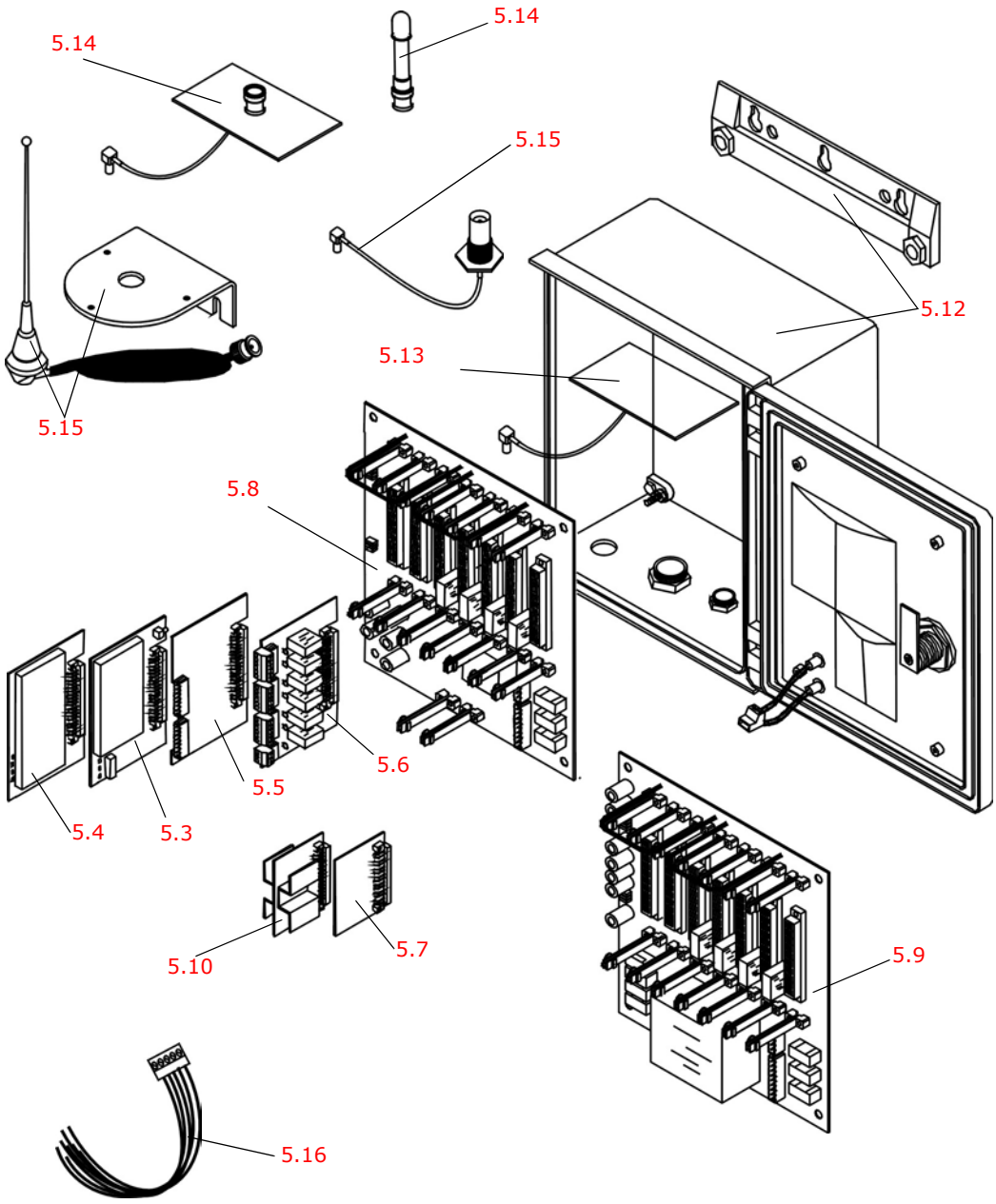
5.1 Receiving unit diagnostic




YES
Is the ENABLE light lit?
NO
Look radio module diagnostic (§ 5.3)
CALL SERVICE
NO
YES
Does the system start correctly?
NO
Replace the address key. Does the system start correctly?
YES
OK
YES
Disconnect the power from the receiving unit. Is the F2 fuse integral?
NO
Replace F2 (§ 5.8) o (§ 5.9)
YES
Is the F3 fuse integral?
YES
Has the internal wiring of the receiving unit been carried out correctly?
NO
Carry out the correct wiring (see technical data sheet)
NO
YES
Replace F3 (§ 5.8) o (§ 5.9)
Replace analogue module diagnostic (§ 5.5) Does the system start correctly?
YES
OK
NO
Sostituire la sche-da relè presente nello slot 4. (§ 5.6) Does it start?
YES
NO
Replace master board (§ 5.8) o (§ 5.9) Does the system start correctly?
NO
CALL SERVICE
YES

5.2 Exploded view and spare parts

Exploded view



Spare parts

N°	Code	Description
5.14	F0ANTE00E17A0	External antenna at 433 MHz
5.13	F0ANTE00E30A0	Internal antenna at 870 MHz
5.8	F0BASE00E39A0	24 Vdc master board (SBR97DC01)
5.8	F0BASE00E39B0	24 Vdc master board for external antenna (SBR97DC03)
5.8	F0BASE00E39C0	24 Vdc master board for cable control (SBR97DC05)
5.9	F0BASE00E40A0	ac master board (SBR97AC01)
5.9	F0BASE00E40C0	ac master board for external antenna (SBR97AC02)
5.8	F0BASE00E46A0	12 Vdc master board (SBR97DC01)
5.8	F0BASE00E46B0	12 Vdc master board for external antenna (SBR97DC03)
5.8	F0BASE00E46C0	12 Vdc master board for cable control (SBR97DC05)
5.15	F0CAVI00E89A0	Internal extension cable for antenna (40 cm)

5.16	F0CAVI01E18A0	Cable for wiring with recovery diodes
5.10	F0ESBA01E02A0	24V power supply card (SBA97V24D02A)
5.10	F0ESBA01E06A0	24V power supply card (SBA97V12-24L)
5.10	F0ESBA01E06B0	12V power supply card (SBA97V12-24K)
5.4	F0RIDE00E10A0	RD97-00A receiver decoder module
5.4	F0RIDE00E10B0	RD97-00B receiver decoder module with SAFETY progr.
5.3	F0RIRA00E11A0	MRXEU03A radio receiver module (frequency 433 MHz)
5.3	F0RIRA00E11B0	MRXAU03A radio receiver module (frequency 472 MHz)
5.3	F0RIRA00E11D0	MRXUK03A radio receiver module (frequency 458 MHz)
5.3	F0RIRA00E14A0	MRXEU06B radio receiver module (frequency 870 MHz)
5.14	F0SCIN00E50A0	Support for external antenna
5.6	F0ESBA00E03A0	24V 7 relay card (SR97R07S1LA)
5.6	F0ESBA00E05A0	24V 7 relay card with double contact SR97R07S2LA
5.6	F0ESBA00E07A0	12V 7 relay card (SR97R07S1KA)
5.6	F0ESBA00E08A0	12V 7 relay card with double contact (SR97R07S2KA)
5.6	F0ESBA00E11A0	24V 7 relay card (SR97IR7S1LA) for IR system
5.6	F0ESBA00E13A0	24V 9 relay card with 2 relays for SAFETY (SR97R09S1LA)
5.6	F0ESBA00E14A0	24V 7 relay card for up/down analogue commands (SR97R07V1LA)
5.6	F0ESBA00E15A0	24V 7 relay card for BCD analogue commands (SR97R07V4LA)
5.6	F0ESBA00E16A0	24V 7 relay card with double contact with FLOW (SR97R07S2LB)
5.6	F0ESBA00E17A0	24V 8 relay card with a configurable relay (SR97R08S1LA)
5.6	F0ESBA00E18A0	24V 8 relay card with a configurable relay (SR97R08S1KA)
5.6	F0ESBA00E19A0	24V 5 relay configurable card (SR97R05S1LA)
5.6	F0ESBA00E20A0	14V 5 relay configurable card (SR97R05S1KA)
5.6	F0ESBA00E29A0	24V 7 relay card for BCD/PWM analogue comm. (SR97R07P4LA)
5.15	G0ANTE00E10A0	433 MHz external antenna with 5 metre cable
5.15	G0ANTE00E27A0	433 MHz external antenna with 10 metre cable
5.15	G0ANTE00E28A0	433 MHz external antenna with 1 metre cable
5.15	G0ANTE00E31A0	870 MHz external antenna with 5 metre cable
5.7	G0INRI00E39A0	24V 3 relay TS, ENA, F1 (RI97R03S1LA)
5.7	G0INRI00E39B0	24V 3 relay ENA, ENA, F1 (RI97R03S1LB)
5.7	G0INRI00E40A0	12V 3 relay TS, ENA, F1 (RI97R03S1KA)
5.7	G0INRI00E40B0	12V 3 relay ENA, ENA, F1 (RI97R03S1KB)
5.5	G0INRI00E45A0	RI97-08V0ZA analogue receiver module with voltage outputs
5.5	G0INRI00E46A0	RI97-08P0ZA analogue receiver module with PWM outputs
5.12	R0CASS00P03A0	Receiving case with 24/64 pole plug
5.12	R0CASS00P04A0	Receiving case with cable entry
5.12	R0CASS00P05A0	Receiving case with 32 pole (reduced) plug
5.12	R0CASS00P06A0	Receiving case with 40 pole plug
5.12	R0CASS00P18A0	Receiving case with 32 pole pug with cover

"N°" is the paragraph number which refers to the spare part.

Warning

No voltage should be present when carrying out any internal operations (replacement or programming) on the receiving unit, therefore make sure that the power is disconnected from the receiving unit before proceeding.

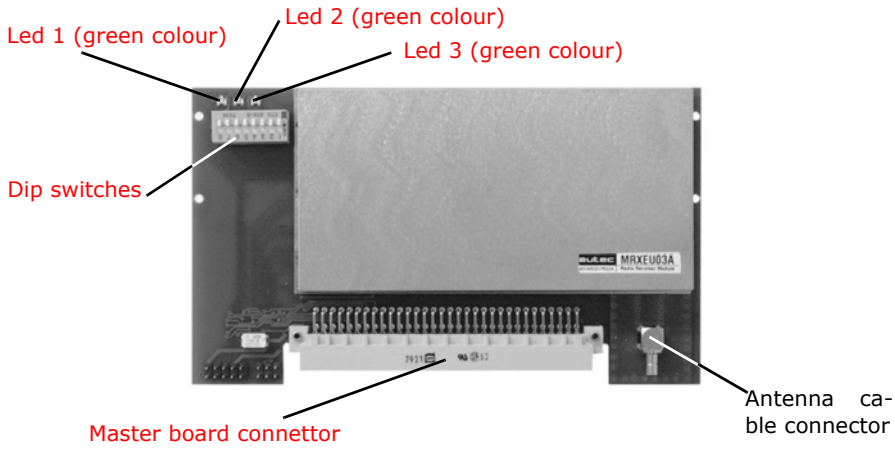
5.3 Radio receiver module (MRX__0__)

Codici

MRXEU03A	Radio receiver module frequency 433 MHz
MRXUK03A	Radio receiver module frequency 458 MHz (module for England)
MRXEU06B	Radio receiver module frequency 870 MHz
MRXAU03A	Radio receiver module frequency 472 MHz (module for Australia)

Always make sure that the frequencies at which the radio receiving module operates are permitted in the country where the radio remote control is to be used.

Module components

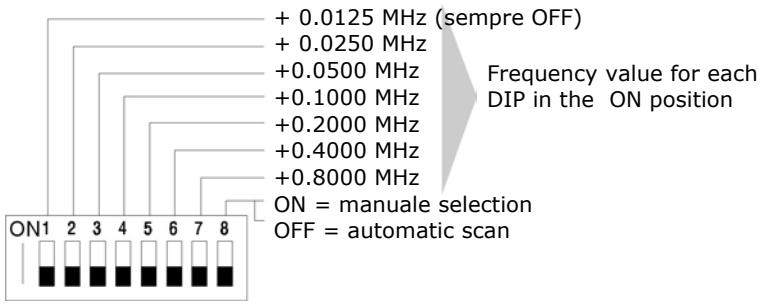


Leds

The three LEDs that are present indicate if the radio receiving module:
- is being supplied correctly (LED 1)
- is receiving a radio signal at the operating frequency (LED 2)
- is scanning the frequencies (when LED 3 blinks)

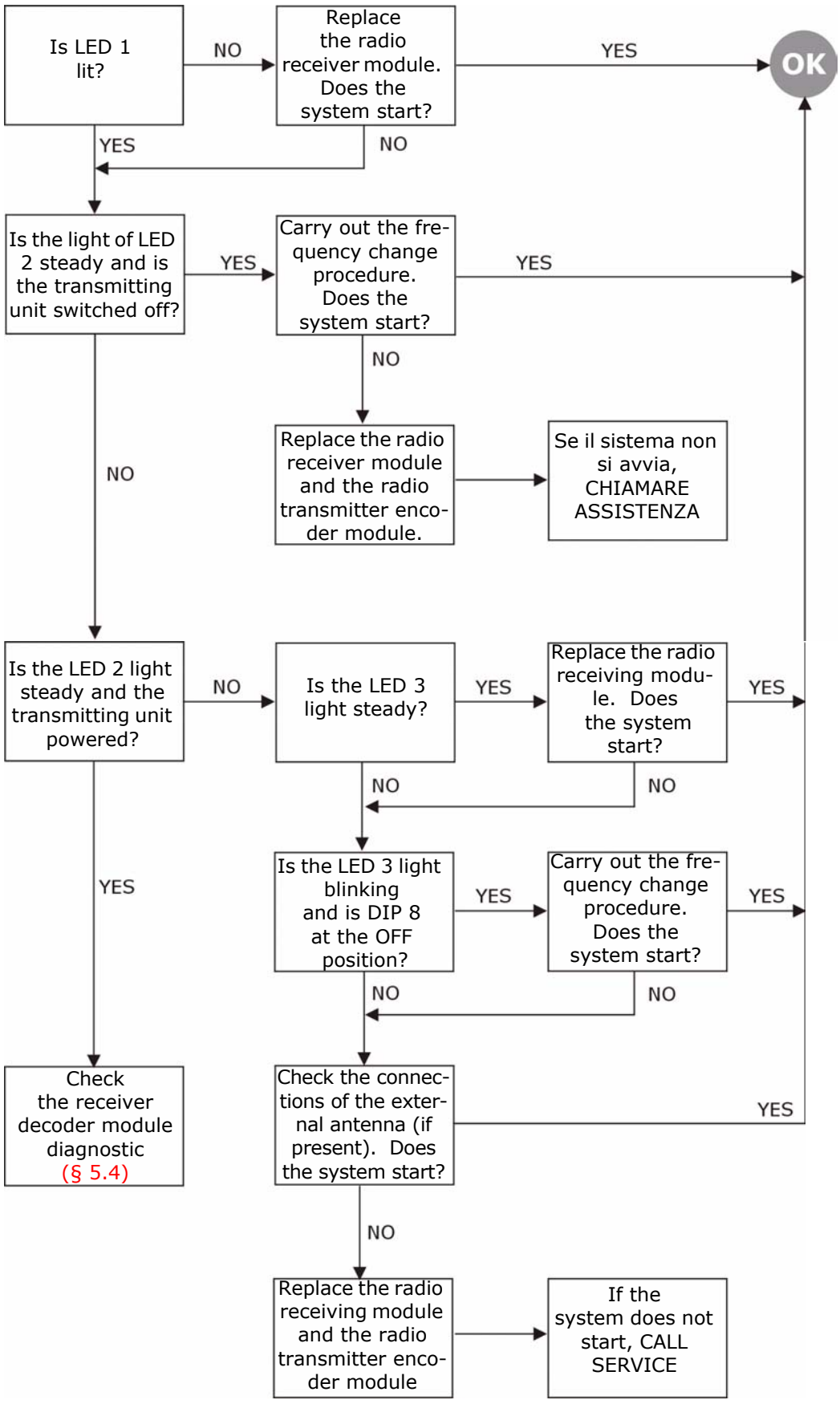
Dip switches

The eight dip switches present in the radio receiving module define the frequency operation mode (automatic scan or manual selection) and the operating frequency itself: :



The radio receiving module dip switches must always be set in the same manner as the dip switches of the radio transmitter encoder module.

Diagnostic

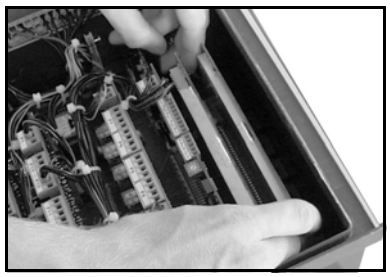

Is LED 1 lit?
NO
Replace the radio receiver module. Does the system start?
YES
OK
YES
NO
Is the light of LED 2 steady and is the transmitting unit switched off?
YES
Carry out the frequency change procedure. Does the system start?
YES
NO
Replace the radio receiver module and the radio transmitter encoder module.
Se il sistema non si avvia, CHIAMARE ASSISTENZA
NO
Is the LED 2 light steady and the transmitting unit powered?
NO
Is the LED 3 light steady?
YES
Replace the radio receiving module. Does the system start?
YES
NO
NO
YES
Is the LED 3 light blinking and is DIP 8 at the OFF position?
YES
Carry out the frequency change procedure. Does the system start?
YES
NO
NO
Check the receiver decoder module diagnostic (§ 5.4)
Check the connections of the external antenna (if present). Does the system start?
YES
NO
Replace the radio receiving module and the radio transmitter encoder module
If the system does not start, CALL SERVICE

Replacement

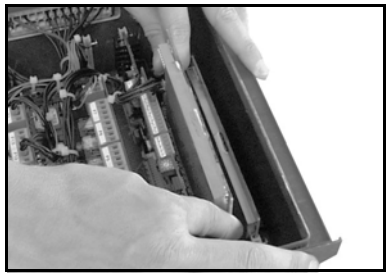
Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

2.
Release the module, pressing the metal discs on the two electronic card guides on the second slot from the left.



3.
Extract the radio receiver module.



Assembly

4.
After having set the dip switches, insert the new radio receiver module into the two card guides.

5.
Lock the module by pressing the two black pins on the card guides.

6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

Automatic scan mode

For this type of mode it is necessary to:
1) set DIP8 at OFF
2) select the requested frequency group by setting the eight dip switches for each module as explained in the following tables:

MTXEU03A

	Group 1	Group 2	Group 3	Group 4
Position DIP 2, 3 e 4	OFF, OFF, OFF	ON, OFF, OFF	OFF, ON, OFF	ON, ON, OFF
Freq. 1	433.100 MHz	433.125 MHz	433.150 MHz	433.175 MHz
Freq. 2	433.300 MHz	433.325 MHz	433.350 MHz	433.375 MHz
Freq. 3	433.500 MHz	433.525 MHz	433.550 MHz	433.575 MHz
Freq. 4	433.700 MHz	433.725 MHz	433.750 MHz	433.775 MHz
Freq. 5	433.900 MHz	433.925 MHz	433.950 MHz	433.975 MHz
Freq. 6	434.100 MHz	434.125 MHz	434.150 MHz	434.175 MHz
Freq. 7	434.300 MHz	434.325 MHz	434.350 MHz	434.375 MHz
Freq. 8	434.500 MHz	434.525 MHz	434.550 MHz	434.575 MHz

	Group 5	Group 6	Group 7	Group 8
Position DIP 2, 3 e 4	OFF, OFF, ON	ON, OFF, ON	OFF, ON, ON	ON, ON, ON
Freq. 1	433.200 MHz	433.225 MHz	433.250 MHz	433.275 MHz
Freq. 2	433.400 MHz	433.425MHz	433.450 MHz	433.475 MHz
Freq. 3	433.600 MHz	433.625MHz	433.650 MHz	433.675 MHz
Freq. 4	433.800 MHz	433.825 MHz	433.850 MHz	433.875 MHz
Freq. 5	434.000 MHz	434.025 MHz	434.050 MHz	434.075 MHz
Freq. 6	434.200 MHz	434.225 MHz	434.250 MHz	434.275 MHz
Freq. 7	434.400 MHz	434.425 MHz	434.450 MHz	434.475 MHz
Freq. 8	434.600 MHz	434.625 MHz	434.650 MHz	434.675 MHz

In this module, DIPs 5, 6 and 7 do not effect the setting of the frequency group while DIP 1 must be set to OFF.

The available frequencies are those belonging to the set group

MTXUK03A

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at OFF.

MTXEU06B

In this module, the DIPs from 2 to 7 are inactive and do not influence in the choice of the frequency group, while DIP 1 must be set at ON.

MTXAU03A

In this module the DIPs from 2 to 7 must be set in order to operate within the permitted frequencies:.

DIP 1	OFF
DIP 2	ON
DIP 3	OFF
DIP 4	OFF
DIP 5	ON
DIP 6	OFF
DIP 7	ON
DIP 8	OFF

Manual frequency mode

For this type of mode it is necessary to:
1) set DIP8 at ON
2) select the frequency by setting the DIPs from 2 to 7 as explained below as a function of the radio transmitter encoder module:

MRXEU03A

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.100	OFF	OFF	OFF	OFF	OFF	OFF	OFF	433.500	OFF	OFF	OFF	OFF	OFF	ON	OFF
433.125	OFF	ON	OFF	OFF	OFF	OFF	OFF	433.525	OFF	ON	OFF	OFF	OFF	ON	OFF
433.150	OFF	OFF	ON	OFF	OFF	OFF	OFF	433.550	OFF	OFF	ON	OFF	OFF	ON	OFF
433.175	OFF	ON	ON	OFF	OFF	OFF	OFF	433.575	OFF	ON	ON	OFF	OFF	ON	OFF
433.200	OFF	OFF	OFF	ON	OFF	OFF	OFF	433.600	OFF	OFF	OFF	ON	OFF	ON	OFF
433.225	OFF	ON	OFF	ON	OFF	OFF	OFF	433.625	OFF	ON	OFF	ON	OFF	ON	OFF
433.250	OFF	OFF	ON	ON	OFF	OFF	OFF	433.650	OFF	OFF	ON	ON	OFF	ON	OFF
433.275	OFF	ON	ON	ON	OFF	OFF	OFF	433.675	OFF	ON	ON	ON	OFF	ON	OFF
433.300	OFF	OFF	OFF	OFF	ON	OFF	OFF	433.700	OFF	OFF	OFF	OFF	ON	ON	OFF
433.325	OFF	ON	OFF	OFF	ON	OFF	OFF	433.725	OFF	ON	OFF	OFF	ON	ON	OFF
433.350	OFF	OFF	ON	OFF	ON	OFF	OFF	433.750	OFF	OFF	ON	OFF	ON	ON	OFF
433.375	OFF	ON	ON	OFF	ON	OFF	OFF	433.775	OFF	ON	ON	OFF	ON	ON	OFF
433.400	OFF	OFF	OFF	ON	ON	OFF	OFF	433.800	OFF	OFF	OFF	ON	ON	ON	OFF
433.425	OFF	ON	OFF	ON	ON	OFF	OFF	433.825	OFF	ON	OFF	ON	ON	ON	OFF
433.450	OFF	OFF	ON	ON	ON	OFF	OFF	433.850	OFF	OFF	ON	ON	ON	ON	OFF
433.475	OFF	ON	ON	ON	ON	OFF	OFF	433.875	OFF	ON	ON	ON	ON	ON	OFF

Frequenza (MHz)	Dip switch							Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
433.900	OFF	OFF	OFF	OFF	OFF	OFF	ON	434.300	OFF	OFF	OFF	OFF	OFF	ON	ON
433.925	OFF	ON	OFF	OFF	OFF	OFF	ON	434.325	OFF	ON	OFF	OFF	OFF	ON	ON
433.950	OFF	OFF	ON	OFF	OFF	OFF	ON	434.350	OFF	OFF	ON	OFF	OFF	ON	ON
433.975	OFF	ON	ON	OFF	OFF	OFF	ON	434.375	OFF	ON	ON	OFF	OFF	ON	ON
434.000	OFF	OFF	OFF	ON	OFF	OFF	ON	434.200	OFF	OFF	OFF	ON	OFF	ON	ON
434.025	OFF	ON	OFF	ON	OFF	OFF	ON	434.425	OFF	ON	OFF	ON	OFF	ON	ON
434.050	OFF	OFF	ON	ON	OFF	OFF	ON	434.450	OFF	OFF	ON	ON	OFF	ON	ON
434.075	OFF	ON	ON	ON	OFF	OFF	ON	434.475	OFF	ON	ON	ON	OFF	ON	ON
434.100	OFF	OFF	OFF	OFF	ON	OFF	ON	434.500	OFF	OFF	OFF	OFF	ON	ON	ON
434.125	OFF	ON	OFF	OFF	ON	OFF	ON	434.525	OFF	ON	OFF	OFF	ON	ON	ON
434.150	OFF	OFF	ON	OFF	ON	OFF	ON	434.550	OFF	OFF	ON	OFF	ON	ON	ON
434.175	OFF	ON	ON	OFF	ON	OFF	ON	434.575	OFF	ON	ON	OFF	ON	ON	ON
434.200	OFF	OFF	OFF	ON	ON	OFF	ON	434.600	OFF	OFF	OFF	ON	ON	ON	ON
434.225	OFF	ON	OFF	ON	ON	OFF	ON	434.625	OFF	ON	OFF	ON	ON	ON	ON
434.250	OFF	OFF	ON	ON	ON	OFF	ON	434.650	OFF	OFF	ON	ON	ON	ON	ON
434.275	OFF	ON	ON	ON	ON	OFF	ON	434.675	OFF	ON	ON	ON	ON	ON	ON

MRXUK03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
458.525	OFF	ON	OFF	OFF	OFF	OFF	ON
458.550	OFF	OFF	ON	OFF	OFF	OFF	ON
458.575	OFF	ON	ON	OFF	OFF	OFF	ON
458.600	OFF	OFF	OFF	ON	OFF	OFF	ON
458.625	OFF	ON	OFF	ON	OFF	OFF	ON
458.650	OFF	OFF	ON	ON	OFF	OFF	ON
458.675	OFF	ON	ON	ON	OFF	OFF	ON
458.700	OFF	OFF	OFF	OFF	ON	OFF	ON
458.725	OFF	ON	OFF	OFF	ON	OFF	ON
458.750	OFF	OFF	ON	OFF	ON	OFF	ON
458.775	OFF	ON	ON	OFF	ON	OFF	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

MRXEU06B

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
869.7125	ON	OFF	OFF	ON	OFF	ON	ON
869.7375	ON	ON	OFF	ON	OFF	ON	ON
869.7625	ON	OFF	ON	ON	OFF	ON	ON
869.7875	ON	ON	ON	ON	OFF	ON	ON
869.8125	ON	OFF	OFF	OFF	ON	ON	ON
869.8375	ON	ON	OFF	OFF	ON	ON	ON
869.8625	ON	OFF	ON	OFF	ON	ON	ON
869.8875	ON	ON	ON	OFF	ON	ON	ON
869.9125	ON	OFF	OFF	ON	ON	ON	ON
869.9375	ON	ON	OFF	ON	ON	ON	ON
869.9625	ON	OFF	ON	ON	ON	ON	ON
869.9875	ON	ON	ON	ON	ON	ON	ON

The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

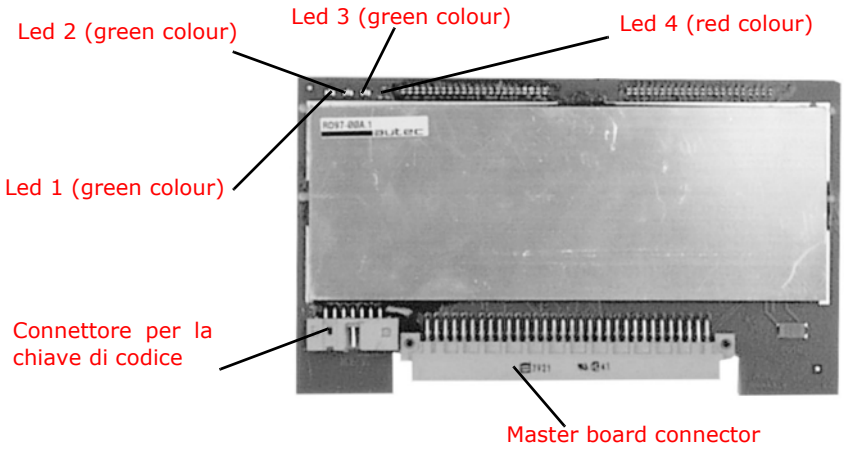
MRXAU03A

Frequenza (MHz)	Dip switch						
	1	2	3	4	5	6	7
472.025	OFF	ON	OFF	OFF	ON	OFF	ON
472.050	OFF	OFF	ON	OFF	ON	OFF	ON
472.075	OFF	ON	ON	OFF	ON	OFF	ON
472.100	OFF	OFF	OFF	ON	ON	OFF	ON

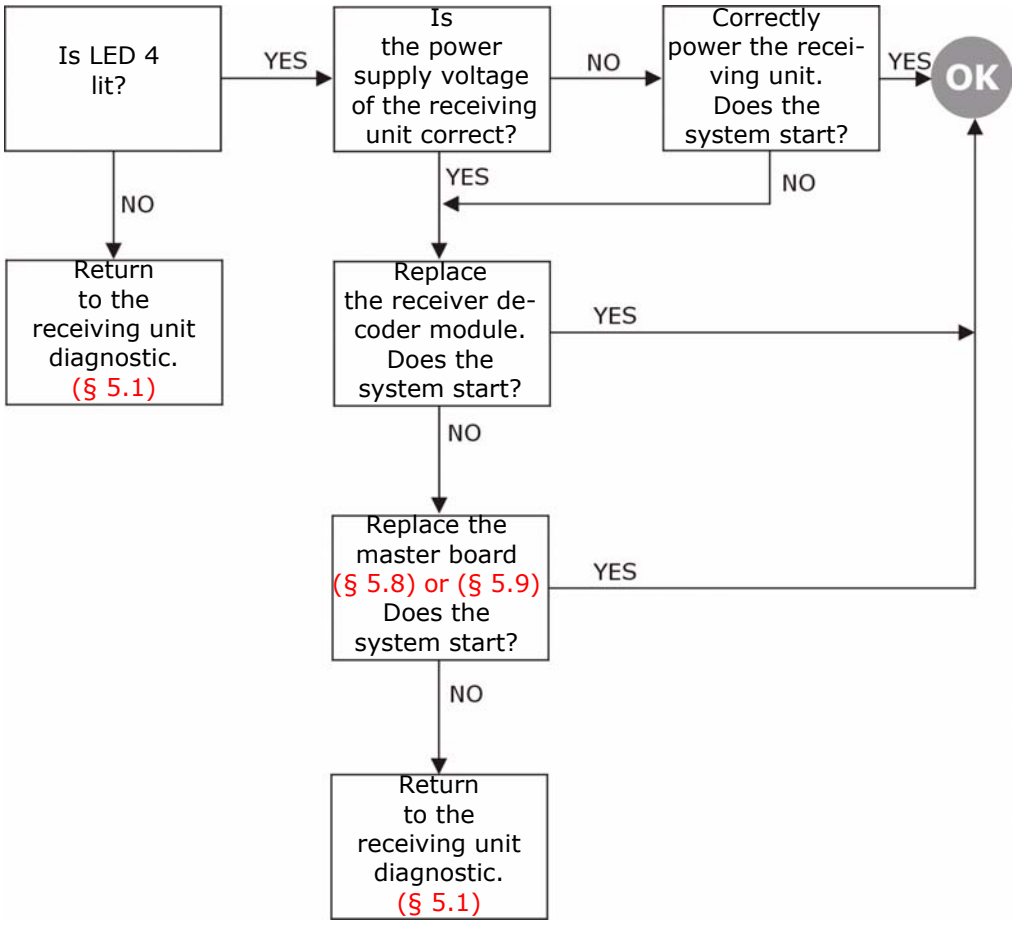
The DIPs that are present make it possible to set other frequencies (see Dip switches page 8) which are not, however, permitted.

5.4 Receiver decoder module (RD97-00A)

Module components



Diagnostic



Leds

The four LEDs present on the receiver decoder module indicate:
LED 1 (green)
ON : module being powered correctly with a steady voltage of between 9 and 15 Vdc
OFF: module being powered incorrectly
LEDs 2 and 3 (green)
ON: module operating correctly

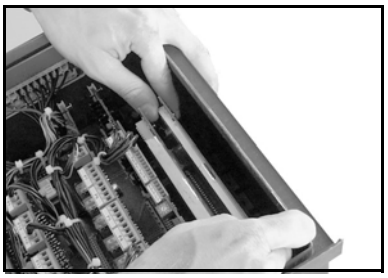
OFF: module not operating correctly
These two LEDs must blink during the test phase after power on and before true operation.
LED 4 (red)
ON: the module is signalling the presence of a fault in the system
OFF: the module is operating correctly

Replacement

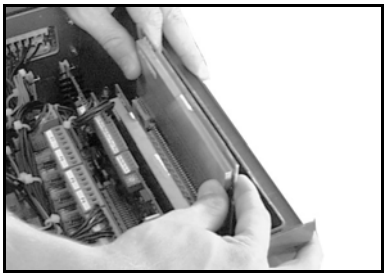
Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

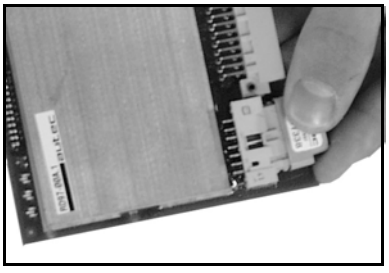
2.
Release the module, pressing the metal discs on the two electronic card guides on the first slot from the left.



3.
Extract the receiver decoder module.



4.
Extract the address key from the receiver decoder module.



Assembly

8.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

7.
Lock the module by pressing the two black pins on the card guides.

6.
Insert the new receiver decoder module into the two card guides.

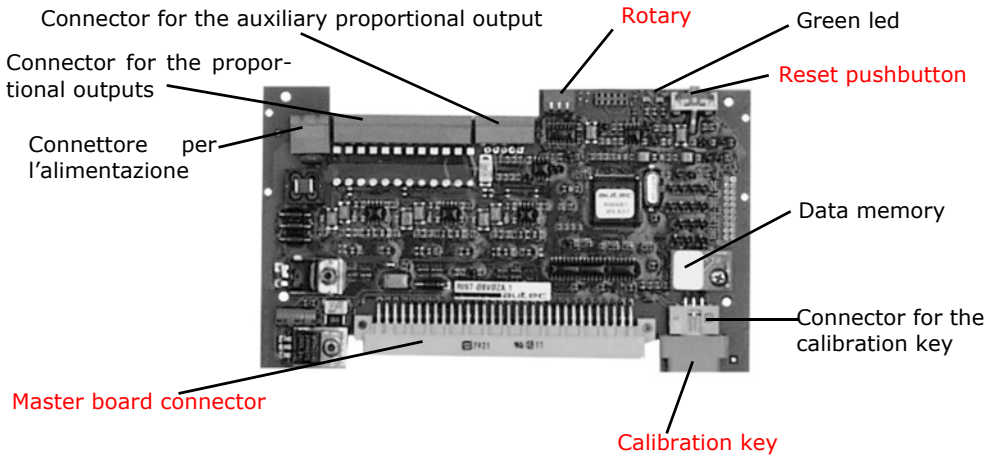
5.
Insert the address key in the new receiver decoder module.

5.5 Analogue receiver module (RI97-08_0ZA)

Codes

RI97-08V0ZA	Analogue receiver module with voltage outputs
RI97-08P0ZA	Analogue receiver module with PWM outputs

Module components



Information about module

1) Never leave the K1 calibration key inserted during radio remote control use. The key is only needed during the calibration phase and, when inserted, only one proportional command can be activated at a time.

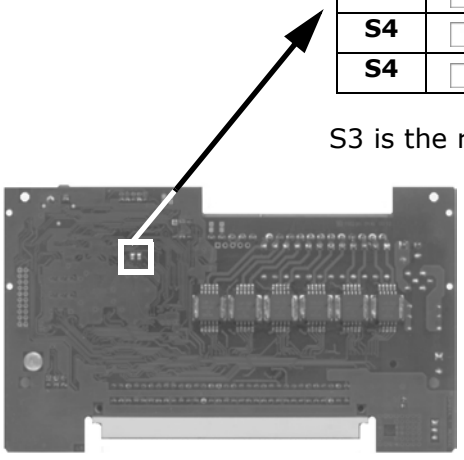
2) The proportional outputs of RI97-08____ module are programmed at the values given on the relevant technical data sheet.

3) To keep the same settings in case of module replacement, move the K2 memory from the old module to the new one.

Welding points

Some welding points are present on the analogue receiver module:

PAD	STATE	DESCRIPTION
S3	▬	stabilised voltage
S3	□ □	in step voltage
S4	▬	RI97-08P0ZA configuration
S4	□ □	RI97-08V0ZA configuration



S3 is the right-hand welding point, S4 the left one

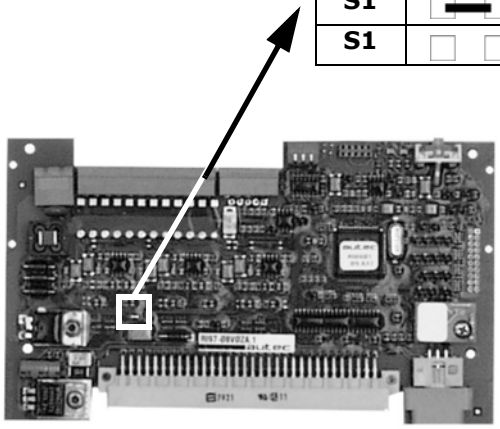
The S4 welding point must be closed in RI97-08P0ZA modules, while it must be open in the RI97-08V0ZA module.

To set S3 please keep in mind the following:

Stabilised voltage: the voltage of the module outputs are always related to an absolute voltage value.

In step voltage: the module output voltages are related to the true power supply values.

PAD	STATE	DESCRIPTION
S1		RI97-08V0ZA configuration
S1		RI97-08P0ZA configuration

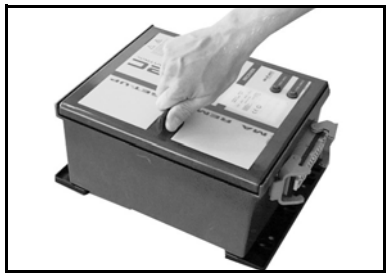


The S1 setting can at times be different from what is indicated above. Check the current setting given in the technical data sheet, and during replacement verify that the new module is set in the same manner as the one to be replaced.

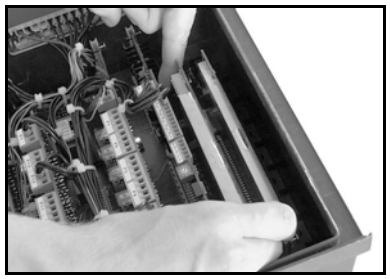
Replacement

Disassembly

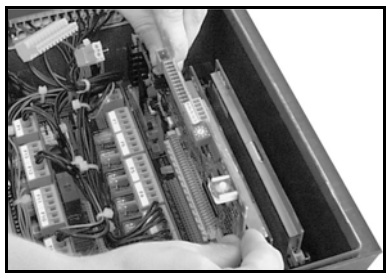
1.
Open the receiving unit by rotating the plastic key in a clockwise direction.



2.
Release the module, pressing the metal discs on the two electronic card guides on the third slot from the left.



3.
Remove the wiring connectors from the analogue receiver module. Extract the module.



Assembly

4.
Insert the new analogue receiver module into the two card guides. Insert the wiring into the respective connectors.

5.
Lock the module by pressing the two black pins on the card guides.

6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

Preparation for setting

1. Make sure that the transmitting unit is switched off.
2. Disconnect the power from the receiving unit.
3. Open the receiving unit and insert the K1 settings key into the C4 connector.
4. Power the receiving unit. ATTENTION: From this moment onwards do not touch the receiving unit until setting up has been completed (otherwise you risk losing the settings that have already been set)
5. Turn the transmitting unit ignition key to "I" and press the START pushbutton.
6. Turn the starting key to the " " position (REMOTE SET UP).

Rotary switch setting

7. Select the parameters to be set using the rotary switch S, which can be found on the RI97-08 module, and the RPM+/- selector, which is present on the transmitting unit (+ increases the value being set, - decreases it).

In modules with voltaged outputs it is possible to set positions 1, 2, 3, 4 and 5. In modules with current outputs (PWM) it is possible to set positions 0, 1, 3 and 4.

Setting modules with voltage outputs

When the rotary switch S is at **1 POSITION**, it is possible to regulate the **maximum and minimum voltage values of the two semiaxes of a joystick**. Proceed as follows:
1. To set the maximum value, take the joystick to the maximum range of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.
2. To set the minimum value, take the joystick just out of the rest position of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **2 POSITION**, it is possible to regulate the **voltage value which corresponds to the mechanical rest position of the joystick**. Normally, this value shouldn't be modified. Proceed as follows:
- take any joystick out of the rest position
- use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **3 and 4 POSITION**, it is possible to regulate **the maximum and minimum voltage values of auxiliary outputs Z8 and Z9** respectively. Proceed as follows:
1. To set the maximum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully clockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.
2. To set the minimum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully counterclockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.

Semiaxis direction is inverted when the rotary switch S is at **5 POSITION**. Proceed as follows:
- take the joystick of the axis to be inverted out of the rest position
- while maintaining this situation, use the toggle switch RPM +/- on the transmitting unit. Move it to + in order to invert the semiaxis direction or to - in order to reset the semiaxis direction.

Setting modules with PWM outputs

When the rotary switch S is at **0 POSITION**, the **PWM (current) signal frequency** can be adjusted. Normally this value shouldn't be modified. If necessary, proceed as follows:
- take one joystick out of the rest position
- use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **1 POSITION**, it is possible to regulate **the maximum and minimum voltage (or current) values of the two semiaxes of a joystick**. Proceed as follows:
1. To set the maximum value, take the joystick to the maximum range of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.
2. To set the minimum value, take the joystick just out of the rest position of the semiaxis to be calibrated. Use the toggle switch RPM +/- to modify the value while maintaining same joystick position.

When the rotary switch S is at **3 and 4 POSITION**, it is possible to regulate **the maximum and minimum voltage values of auxiliary outputs Z8 and Z9** respectively. Proceed as follows:
1. To set the maximum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully clockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.
2. To set the minimum value, turn the Z8 (or Z9) command knob (present in the transmitting unit) fully counterclockwise. Use the toggle switch RPM +/- to modify the value while maintaining same knob position.

Saving the settings

8. Switch off the transmitting unit to save the settings.
9. Disconnect power from the receiving unit.
10. Extract the K1 settings key.
11. Close the receiving unit and power it.

Important notes about setting

If the joystick is moved out of its rest position during setting, the horn/alarm sounds for 0.5 seconds, indicating that you are in the minimum setting area.

Each single position of the speed selector present on the transmitting unit must be set.

Output values reset

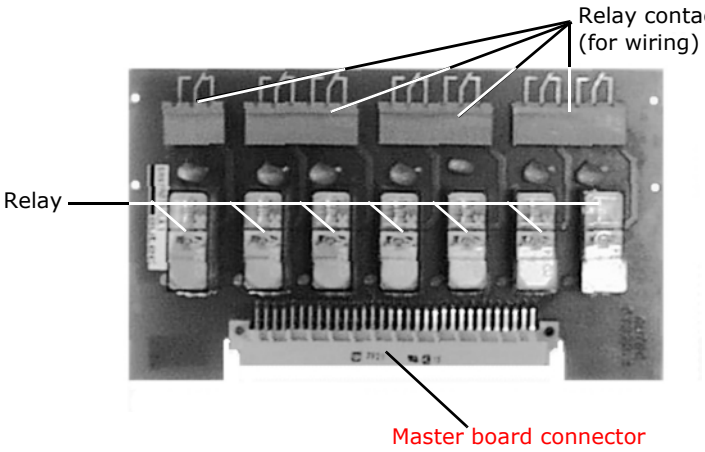
To reset the initial proportional output values (i.e. those given in the technical data sheet), with calibration key K1 inserted, just keep reset button P pressed until the green led L stops flashing and remains lit.

5.6 Relay card (SR97R0_____)

Codes

SR97R07S1LA	24V 7 relay card
SR97R07S2LA	24V 7 relay card with double contact for each relay
SR97R07S1KA	12V 7 relay card
SR97R07S2LA	12V 7 relay card with double contact for each relay
SR97R07S2LB	24V 7 relay card with double contact for each relay and with FLOW
SR97IR7S1LA	24V 7 relay card for IR system
SR97R09S1LA	24V 9 relay card with 2 relays for SAFETY
SR97R07V1LA	24V 7 relay card for up/down analogue commands
SR97R07V4LA	24V 7 relay card for BCD analogue commands
SR97R07P4LA	24V 7 relay card for BCD/PWM analogue commands
SR97R08S1LA	24V 8 relay card with a configurable relay
SR97R08S1KA	12V 8 relay card with a configurable relay
SR97R05S1LA	24V 5 relay configurable card
SR97R05S1KA	12V 5 relay configurable card

Card components



The capacity of the relay contacts is: 10 A, 250 V.

Replacement

Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

2.
Release the card by pressing the metal discs on the two card guides of the slot that hold the relay card that is to be replaced.

3.
Remove the wiring connectors from the relay card. Extract the card.

Assembly

4.
Insert the new relay card into the two card guides. Insert the wiring into the respective connectors.

5.
Lock the card by pressing the two black pins on the card guides.

6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

Additional information

SR97R07S__A

The relay cards with double contact make it possible for a single command to act on two electrically separate parts.

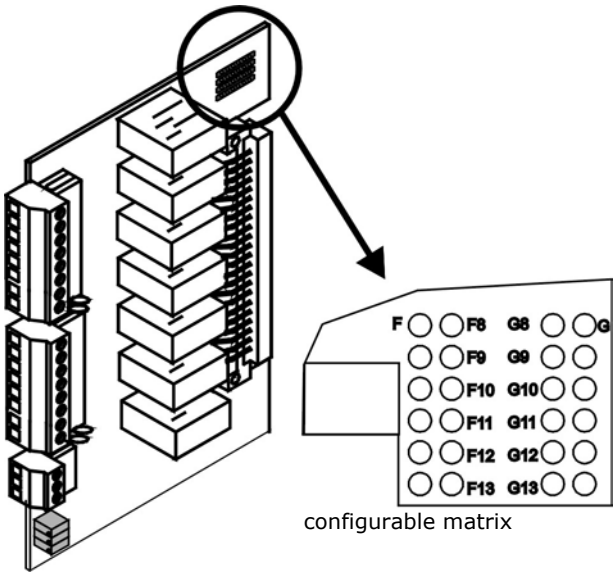
SR97R07S2LB

This relay card can only be inserted into slot 4 of DC master boards.
This differs from the SR97R07S2LA because the FLOW command is not delayed at deactivation.

SR97R07V1LA

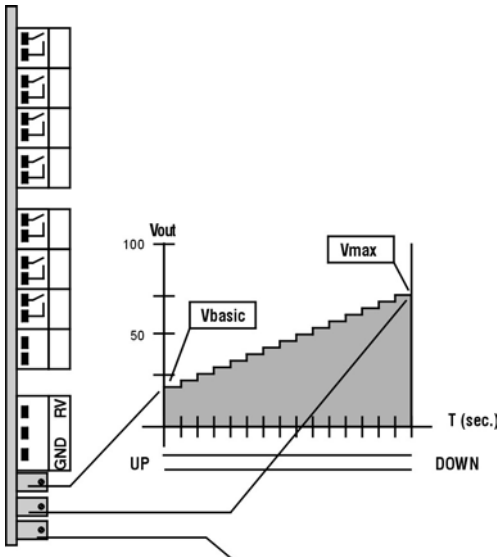
This card generates a voltaged analogue output, the value of which is increased (UP) or decreased (DOWN) by a selector on the transmitting unit.
The commands that carry out the UP and DOWN function are configured by programming the matrix of pads using wire bridges.

It is also possible to set using trimmers:
- the initial and final value of the analogue output to be varied,
- the increment/decrement time of the output voltage.



configurable matrix

Connect the "G" pad with the "G_" pad to carry out the UP function, and the "F" pad with the "F_" pad to carry out the DOWN function.



increment/decrement time of the output voltage: adjustable from between 5 and 15 seconds

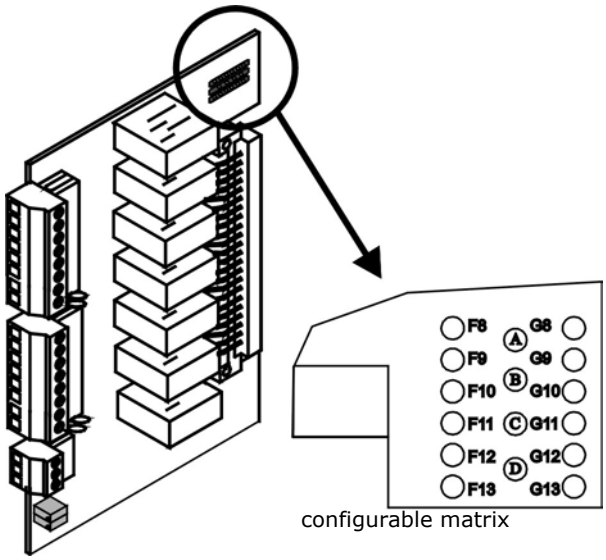
Output voltage
Vout < 0,9 POWER SUPPLY
Minimum adjustable voltage
Vbasic = 0÷0,9 POWER SUPPLY
Maximum adjustable voltage
Vmax = 0÷0,9 POWER SUPPLY

GND: 0V of the analogue signal
RV: analogue signal output

SR97R07_4LA

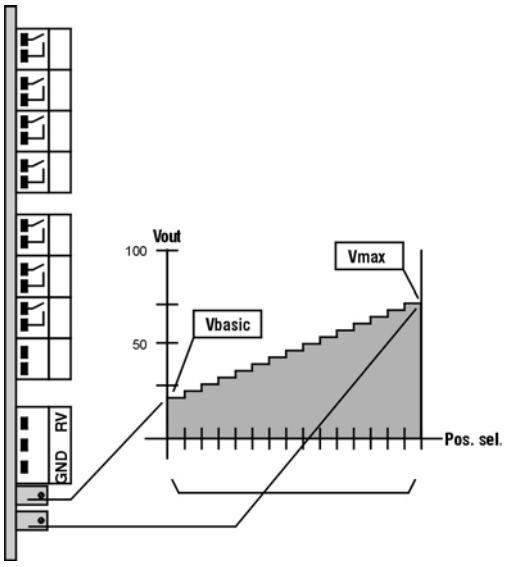
This card generates a voltage analogue output, the value of which depends on the position of a BCD selector placed inside the transmitting unit.
The commands that set the level of this analogue output are configured by programming the matrix of pads by way of wire bridges.

It is also possible to set the initial and final value of the analogue output to be varied using trimmers.



configurable matrix

Configure the matrix pads in the same manner as the relay card that is to be replaced.

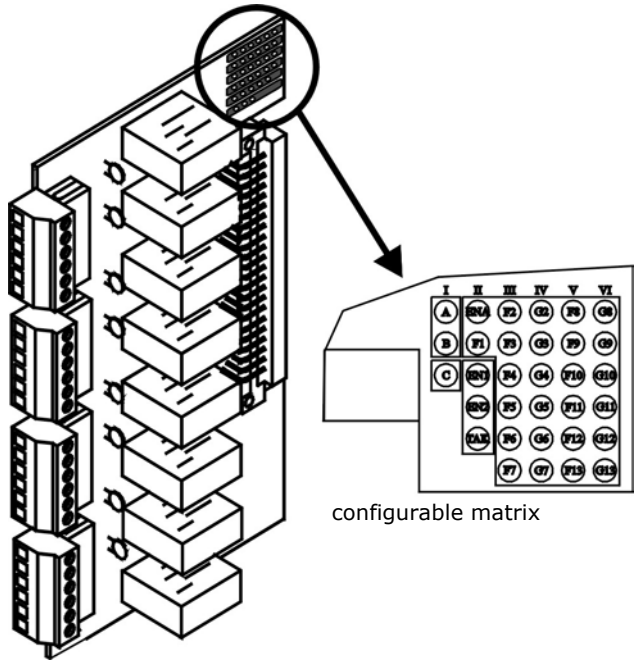


Output voltage
Vout < 0,9 POWER SUPPLY
Minimum adjustable voltage
Vbasic = 0÷0,9 POWER SUPPLY
Maximum adjustable voltage
Vmax = 0÷0,9 POWER SUPPLY

GND: 0V of the analogue signal
RV: analogue signal output

SR97R08S1_A

The eighth relay present on the card is used to have a same command available at two different outputs of the receiving unit.
This relay can be configured programming the matrix of pads by way of wire bridges.

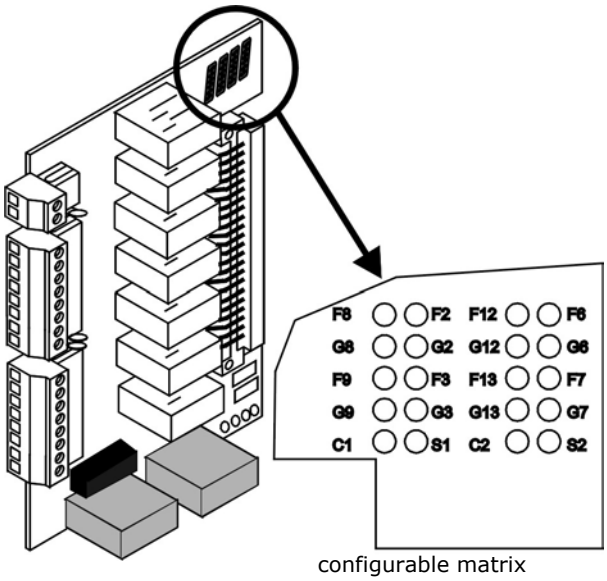


configurable matrix

Connect pad "C" with pad "F_" or "G_" according to which signal is to be doubled.

SR97R09S1LA

The two additional relays (the characteristics of which are 5A, 250V) can be configured by programming the matrix of pads by way of wire bridges. They are used to obtain 2 additional SAFETYs.



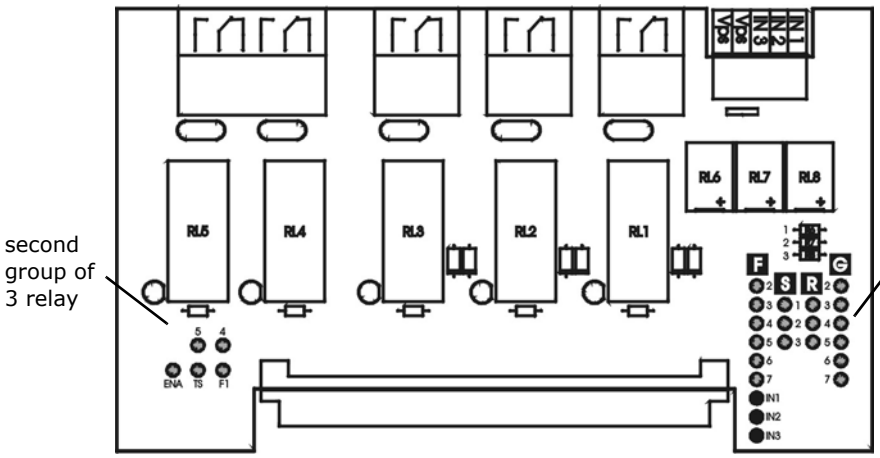
configurable matrix

Connect pads "C1" and "C2" to pads "S1" and "S2" to activate 2 additional SAFETYs.
The fuse present on the card has the following characteristics: (5x20) mm, 5A, 250 V.

SR97R05S1_A

The SR97R05S1_A card holds 5 programmable relays:
- three relays can either save a Set/Reset command of F/G pair commands or carry out the function of auxiliary relays (therefore directly controlled by an external power supply source at 24 and 12 Vdc)
- two relays can be programmed with the START/F1, TIMED STOP or ENABLE functions.

NOTE: The Set/Reset command is forgotten if stops or passive emergencies occur.



FIRST GROUP OF 3 RELAYS (RL1÷RL3)

To programme the SET function, connect one of the F2÷F7 pads to S1÷3 (activation of the command programmed at pad S1÷3 causes closure of the relative RL1÷RL3 relay)
To programme the RESET function, connect one of the G2÷G7 pads to R1÷3 (activation of the command programmed at pad R1÷3 causes opening of the relative RL1÷RL3)
N.B.: if Fn is programmed with S1÷3 connect Gn to R1÷3

To programme the relays as auxiliary relays, connect one or more IN1÷3 terminals to S1÷3 and contemporaneously cut the corresponding resistor (R6 if S1 is programmed, R7 if S2 is programmed and R8 if S3 is programmed).

SECOND GROUP OF 2 RELAYS (RL4 and RL5)

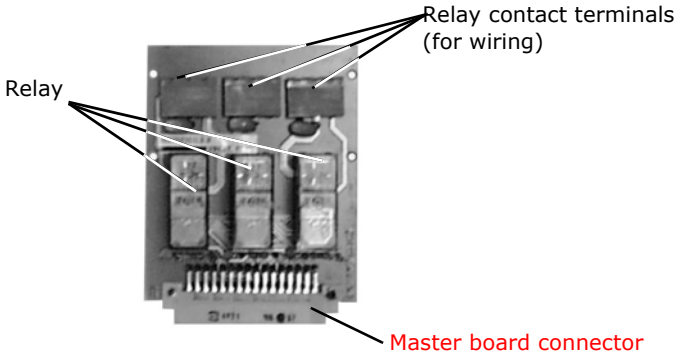
Connect pads 4 and 5 (respectively for RL4 and RL5) with the ENA pad (to programme the ENABLE signal). Connect pads 4 and 5 (respectively for RL4 and RL5) to the ENA pad (to programme the ENABLE signal), TS (to programme the TIMES STOP signal) and F1 (to programme the F1/ALARM signal).

5.7 3 relay card (RI97R03S1__)

Codes

RI97R03S1LA	24V 3 relay card for TIMED STOP, ENABLE e F1
RI97R03S1LB	24V 3 relay card for ENABLE, ENABLE e F1
RI97R03S1KA	12V 3 relay card for TIMED STOP, ENABLE e F1
RI97R03S1KB	12V 3 relay card for ENABLE, ENABLE e F1

Card components

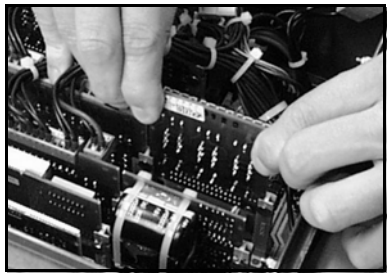


Replacement

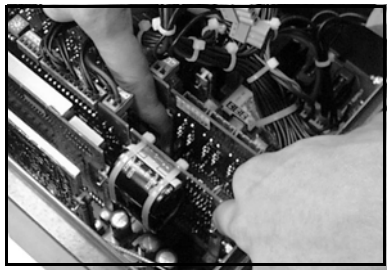
Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

2.
Release the card by pressing the metal discs on the card guides in the slot on the bottom right (number 9).



3.
Separate the wiring connectors from the relay card. Extract the card.



Assembly

6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

5.
Lock the relay card by pressing the two black pins on the card guides.

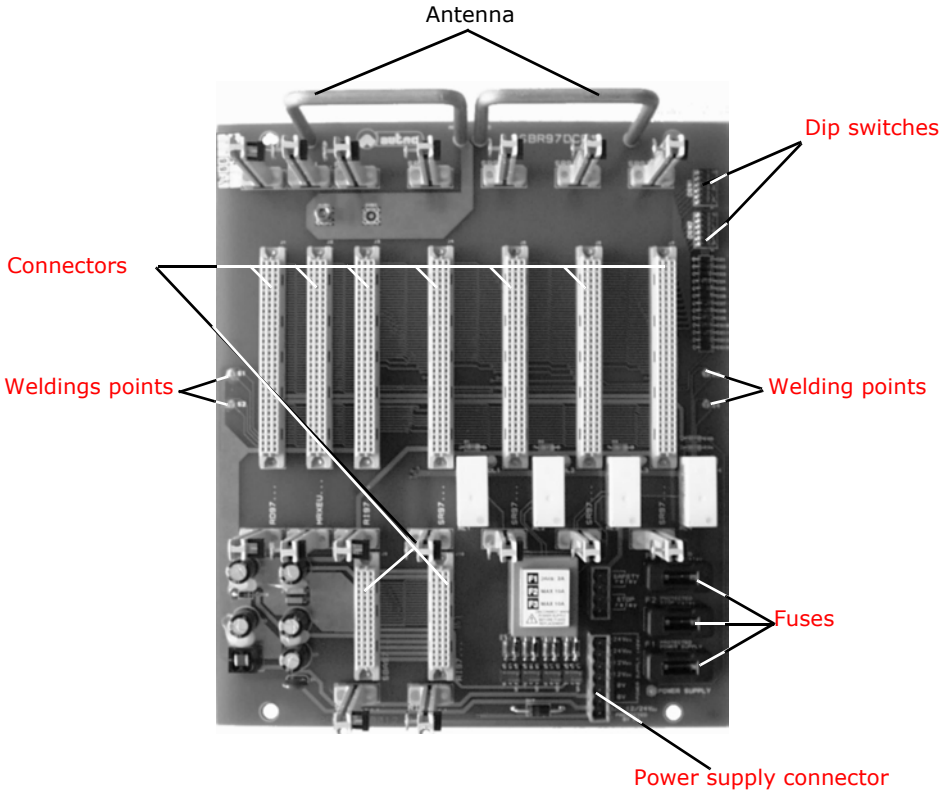
4.
Insert the new relay card into the two card guides. Insert the wiring into the respective connectors.

5.8 DC master board (SBR97DC___)

Codes

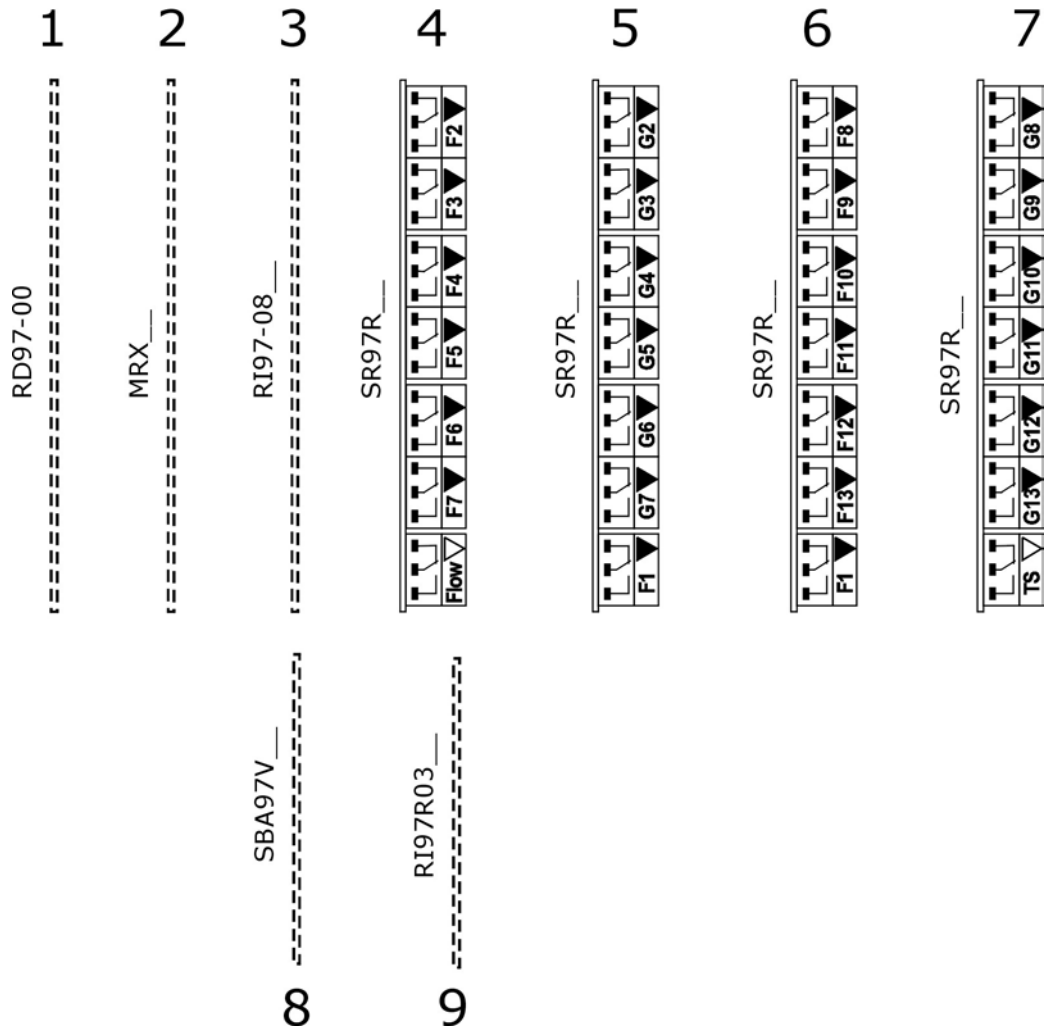
SBR97DC01	24 Vdc master board
SBR97DC02	12 Vdc master board
SBR97DC03	24 Vdc master board for external antenna 24 Vdc master board operating 870 MHz Master board for radio remote control operating at 870 MHz
SBR97DC04	12 Vdc master board for external antenna Master board for radio remote control operating at 870 MHz
SBR97DC05	24 Vdc master board for cable control
SBR97DC06	12 Vdc master board for cable control

Board components

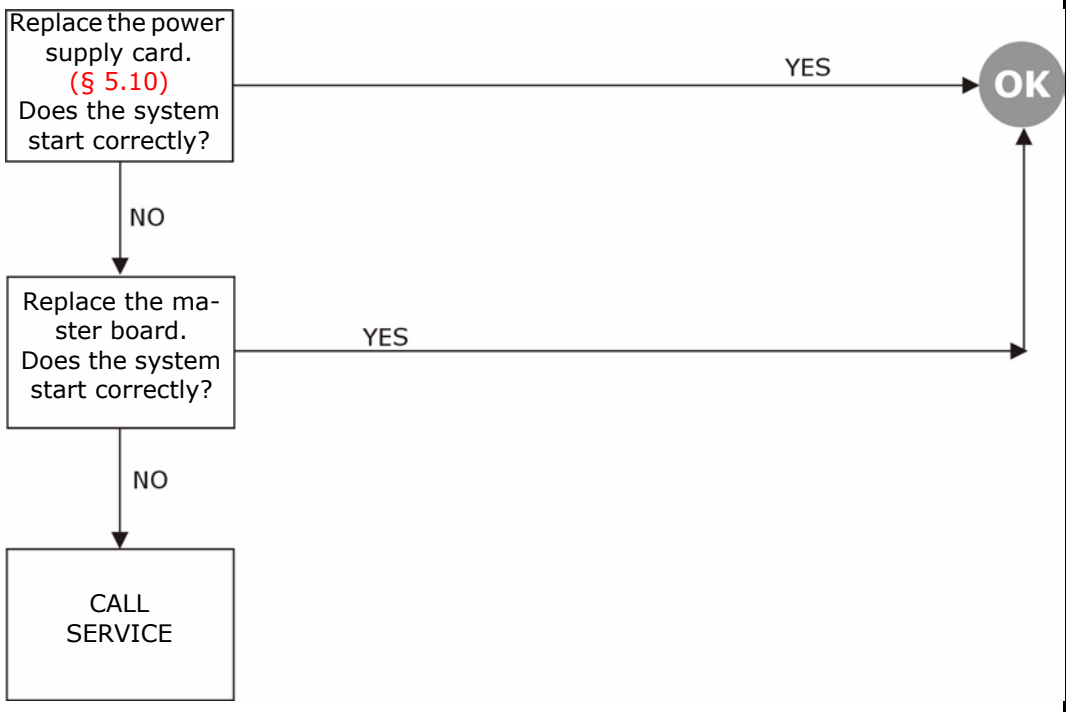


Module and card layout

As shown in the example, it is always necessary to insert:
- the RD97 receiver decoder module into slot 1;
- the MRX radio receiver module into slot 2;
- the RI 97 analogue receiver module into slot 3;
- an SR97 relay card into slots 4, 5, 6, 7;
- the 24Vdc or 12Vdc power supply card into slot 8;
- a possible optional module into slot 9.


1
2
3
4
5
6
7
RD97-00
MRX__
RI97-08__
SR97R__
SR97R__
SR97R__
SR97R__
Flow
F7
F6
F5
F4
F3
F2
F1
G7
G6
G5
G4
G3
G2
F1
F13
F12
F11
F10
F9
F8
TS
G13
G12
G11
G10
G9
G8
SBA97V__
RI97R03__
8
9

Diagnostic

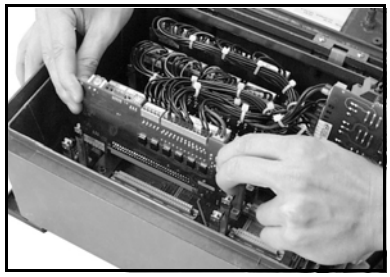

Replace the power supply card. (§ 5.10) Does the system start correctly?
YES
OK
NO
Replace the master board. Does the system start correctly?
YES
NO
CALL SERVICE

Replacement

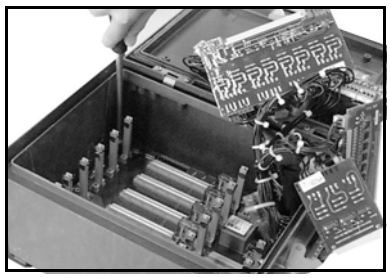
Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

2.
Extract all the modules and the cards (with respective wiring) that are present inside the receiving unit.



3.
Extract the master board by unscrewing the four nuts that are present (disconnect the external antenna if present).



Assembly

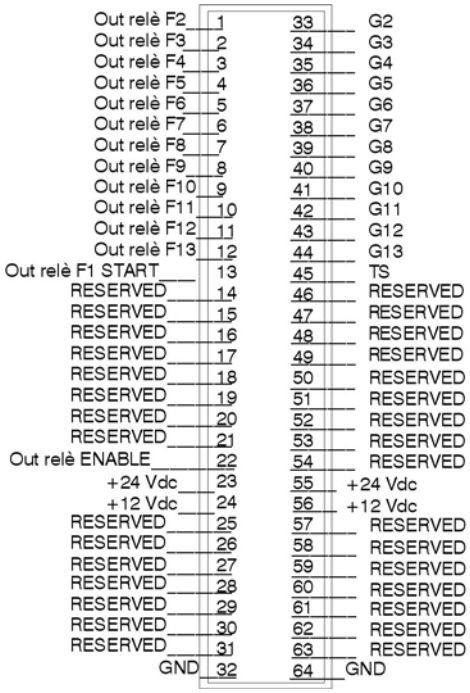
4.
(Connect the external antenna if present) Insert the new master board and tighten the four nuts.

5.
Insert the modules and the cards (with their respective wiring) into the relative slots.

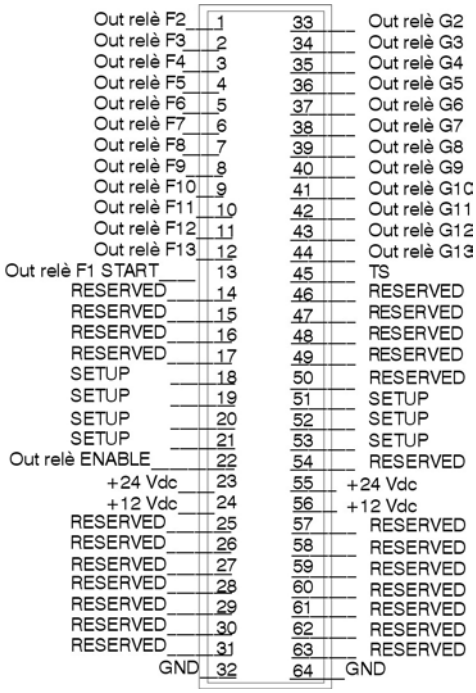
6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

Connectors

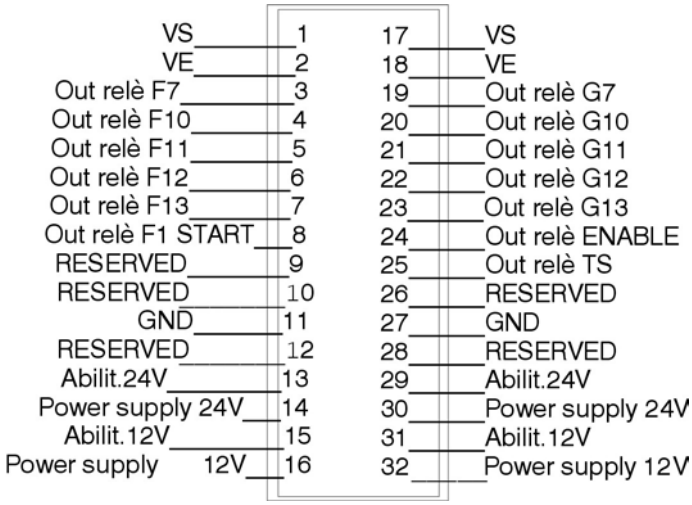
The signals in the pins of the connectors present in the master board are laid out as follows: (RESERVED: pin for a control signal)



Connector for electrical connection
with the receiver modules (slots 1, 2 and 3)



Connectors for electrical connection
with the relay cards (slot 4, 5, 6 and 7)

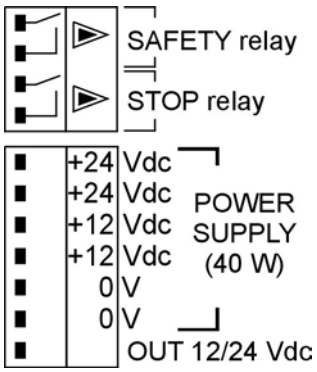


Connectors for electrical connection
with the 3-relay cards (slot 9)

The pins indicated by SETUP relative to slots 4, 5, 6 and 7 have different signals, according to the slot:

PIN	SLOT 4	SLOT 5	SLOT 6	SLOT 7
18	F2	G2	F8	G8
19	F3	G3	F9	G9
20	F4	G4	F10	G10
21	F5	G5	F11	G11
51	FLOW	F1	F1	TS
52	F6	G6	F12	G12
53	F7	G7	F13	G13

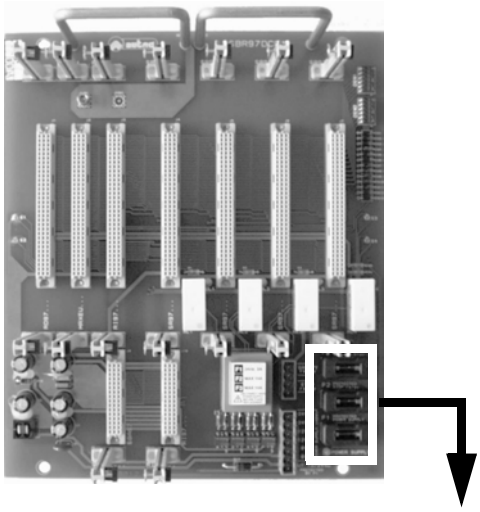
Power supply



Carry out power supply wiring in the following manner:
- connect the power supply neutral to the 0V terminal;
- connect the positive to the +12 or +24 Vdc terminal, in accordance with the voltage value.
The "OUT 12/24 Vdc" terminal supplies the POWER and ENABLE signalling lights.

Wire the STOP and SAFETY relays as indicated in the technical data sheet of the radio remote control.

Fuses



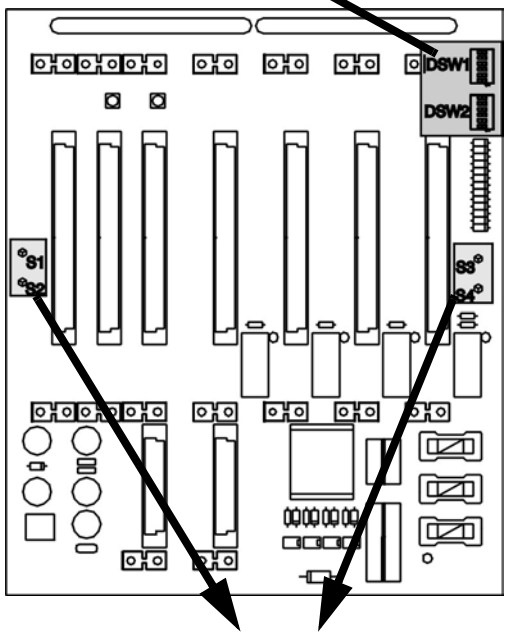
Name	Function	Caracteristics
F1	POWER SUPPLY circuit protection	2A (for 24Vdc) and 4A (for 12 Vdc) (5x20mm; 250V)
F2	STOP circuit protection	10A (5x20mm; 250V)
F3	SAFETY circuit protection	10A (5x20mm; 250V)

Welding points and dip switches

DSW1	POSITION	DESCRIPTION
1	ON	F7 activated by G7
2	ON	F6 activated by G6
3	ON	F5 activated by G5
4	ON	F4 activated by G4
5	ON	F3 activated by G3
6	ON	F2 activated by G2

DSW2	POSITION	DESCRIPTION
1	ON	F13 activated by G13
2	ON	F12 activated by G12
3	ON	F11 activated by G11
4	ON	F10 activated by G10
5	ON	F9 activated by G9
6	ON	F8 activated by G8

When the dip switches are OFF, the different settings are deactivated ((F_ not activated by G_)



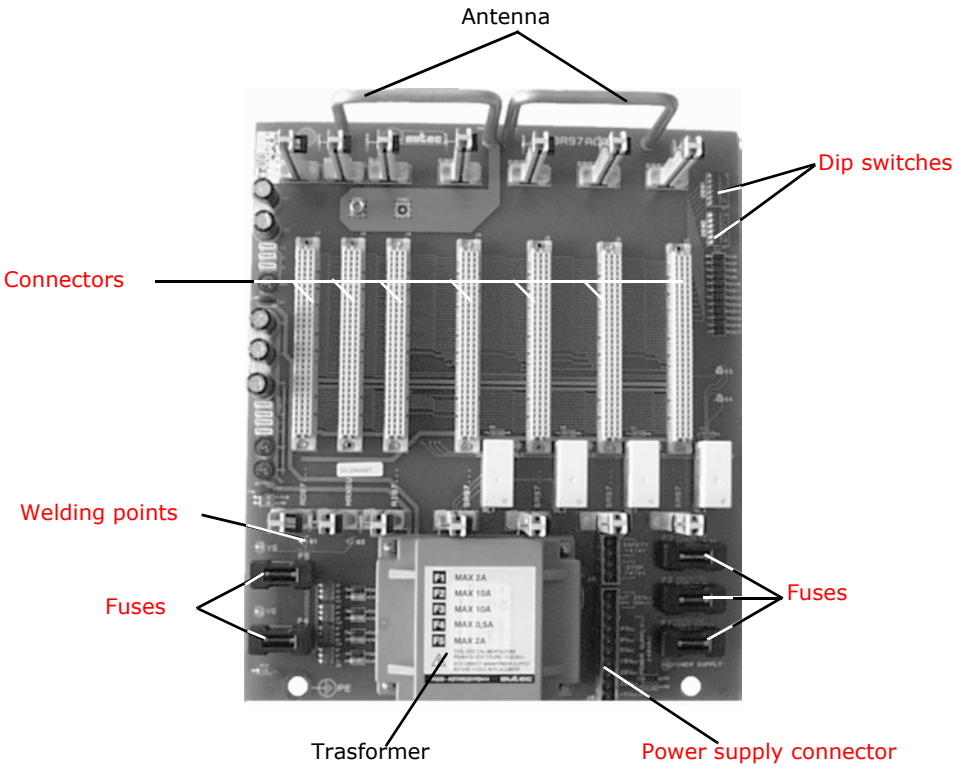
PAD	STATE	DESCRIPTION
S1		SAFETY activated by F2÷G7
S1		SAFETY activated by F1÷G13
S2		Passive emercency time = 1.5 s
S2		Passive emercency time = 0.5 s
S3		F2 (or F3) held by G2 (or G3)
S3		disabled function
S4		F4 (or F5) held by G4 (or G5)
S4		disabled function

5.9 AC master board (SBR97AC___)

Codes

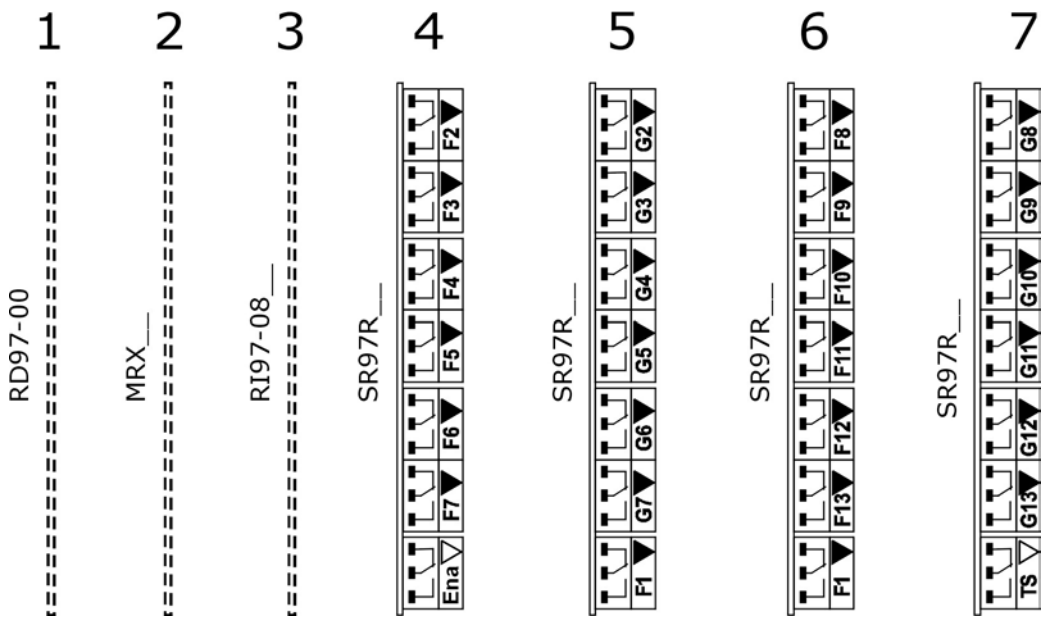
SBR97AC01	ac master board
SBR97AC02	ac master board for external antenna
	Master board for radio remote control operating at 870 MHz

Board components

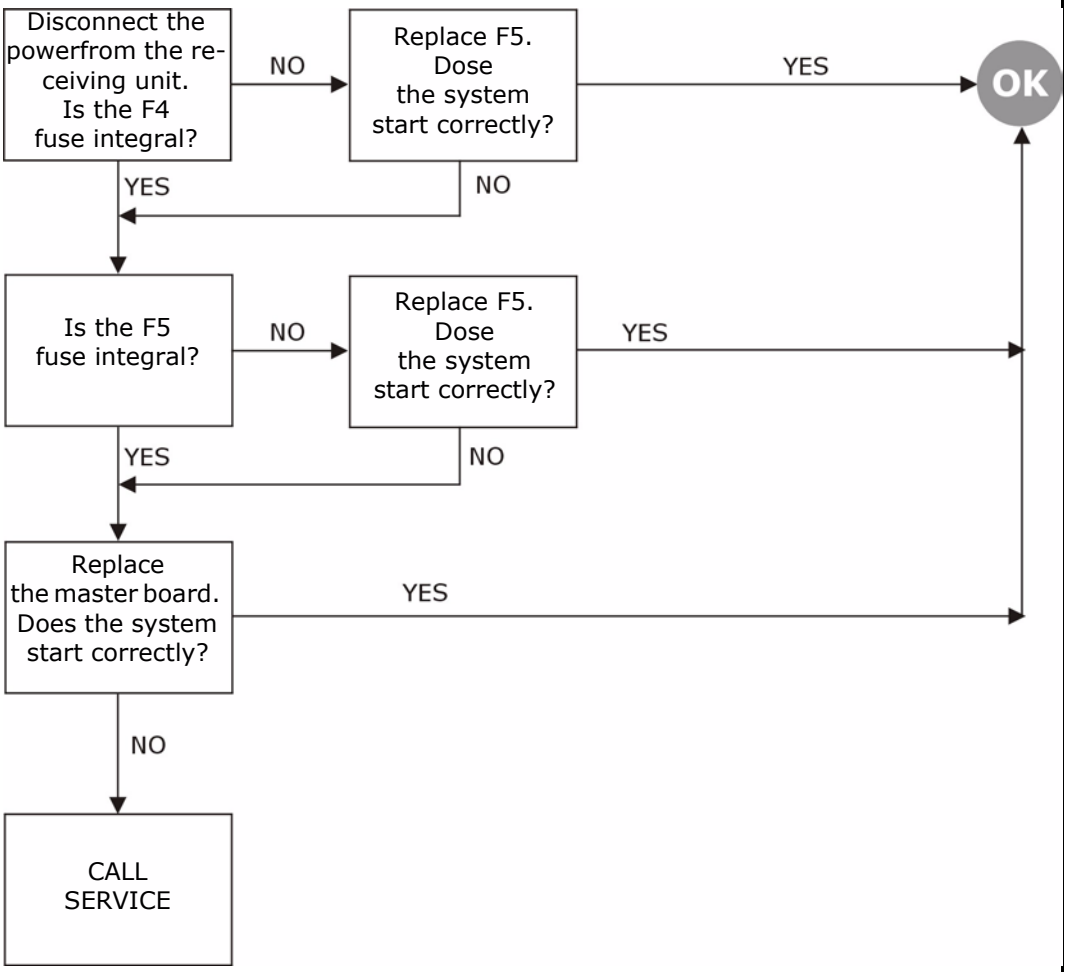


Module and card layout

As shown in the example, it is always necessary to insert:
- the RD97 receiver decoder module into slot 1;
- the MRX radio receiver module into slot 2;
- the RI 97 analogue receiver module into slot 3;
- an SR97 relay card into slots 4, 5, 6, 7.


1
2
3
4
5
6
7
RD97-00
MRX__
RI97-08__
SR97R__
SR97R__
SR97R__
SR97R__
Ena
F7
F6
F5
F4
F3
F2
F1
G7
G6
G5
G4
G3
G2
F13
F12
F11
F10
F9
F8
TS
G13
G12
G11
G10
G9
G8

Diagnostic

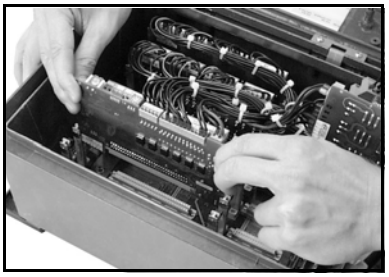

Disconnect the powerfrom the re-ceiving unit. Is the F4 fuse integral?
NO
Replace F5. Dose the system start correctly?
YES
OK
NO
YES
Is the F5 fuse integral?
NO
Replace F5. Dose the system start correctly?
YES
NO
YES
Replace the master board. Does the system start correctly?
YES
NO
CALL SERVICE

Replacement

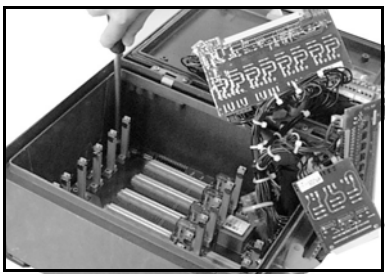
Disassembly

1.
Open the receiving unit by rotating the plastic key in a clockwise direction.

2.
Extract all the modules and the cards (with respective wiring) that are present inside the receiving unit.



3.
Extract the master board by unscrewing the four nuts that are present (disconnect the external antenna if present).



Assembly

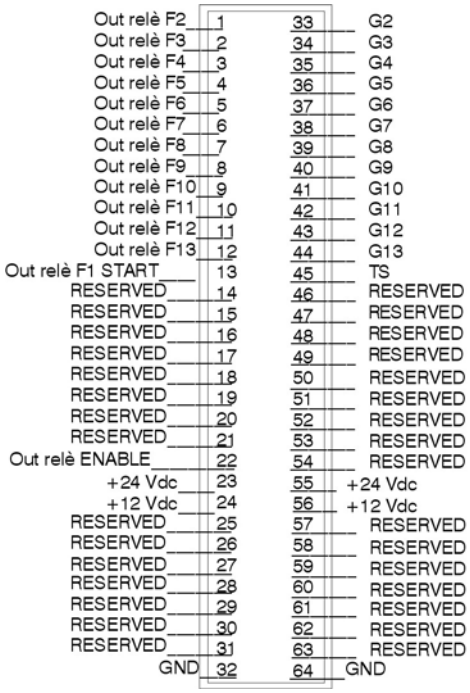
6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

5.
Insert the modules and the cards (with their respective wiring) into the relative slots.

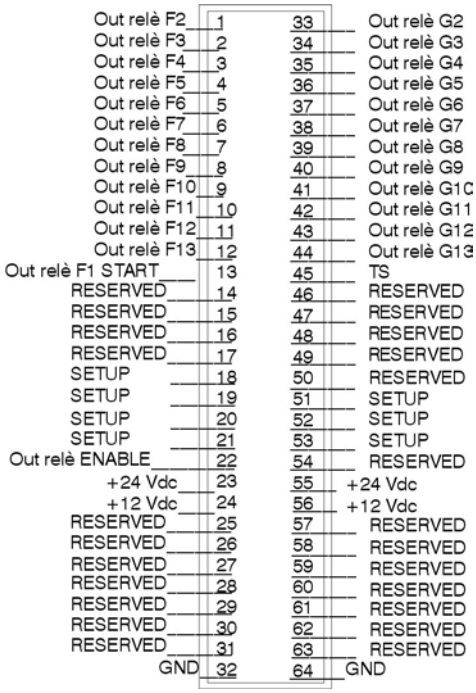
4.
(Connect the external antenna if present) Insert the new master board and tighten the four nuts.

Connectors

The signals in the pins of the connectors present in the master board are laid out as follows: (RESERVED: pin for a control signal)



Connector for electrical connection
with the receiver modules (slots 1, 2 and 3)

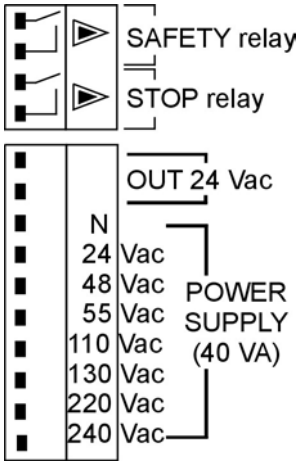


Connectors for electrical connection
with the relay cards (slot 4, 5, 6 and 7)

The pins indicated by SETUP relative to slots 4, 5, 6 and 7 have different signals, according to the slot:

PIN	SLOT 4	SLOT 5	SLOT 6	SLOT 7
18	F2	G2	F8	G8
19	F3	G3	F9	G9
20	F4	G4	F10	G10
21	F5	G5	F11	G11
51	ENABLE	F1	F1	TS
52	F6	G6	F12	G12
53	F7	G7	F13	G13

Power supply



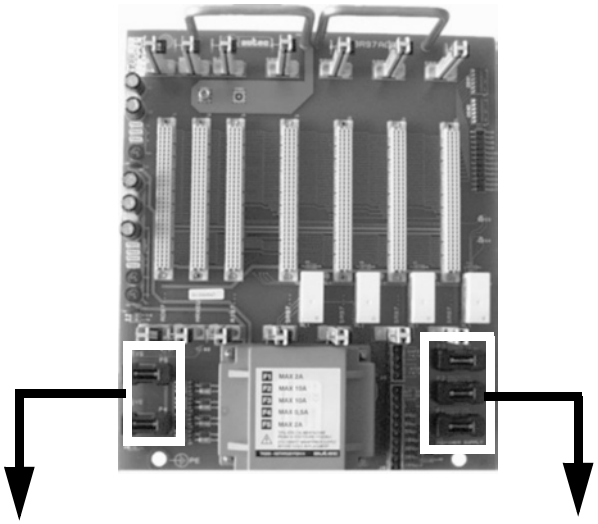
Carry out power supply wiring as follows:
- connect the neutral to terminal N;
- connect the phase to the 24÷240 Vac terminal in accordance with the voltage value.

The "OUT 12/24 Vdc" terminal supplies the POWER and ENABLE signalling lights.

ATTENTION: all "POWER SUPPLY" terminals have voltage. Don't touch them if the receiving unit is powered.

Wire the STOP and SAFETY relays as indicated in the technical data sheet of the radio remote control.

Fuses



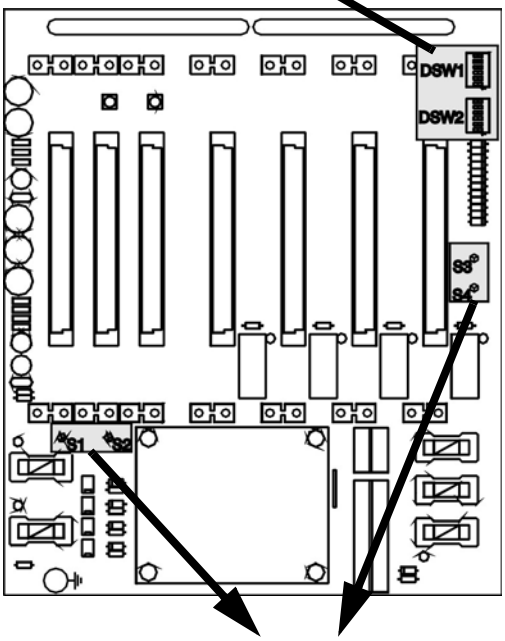
Name	Function	Caracteristics
F1	POWER SUPPLY circuit protection	2A (5x20mm; 250V)
F2	STOP circuit protection	10A (5x20mm; 250V)
F3	SAFETY circuit protection	10A (5x20mm; 250V)
F4	transformer secondary circuit protection	0.5A (5x20mm; 250V)
F5	transformer primary circuit protection	2A (5x20mm; 250V)

Welding points and dip switches

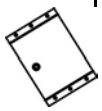
DSW1	POSITION	DESCRIPTION
1	ON	F7 activated by G7
2	ON	F6 activated by G6
3	ON	F5 activated by G5
4	ON	F4 activated by G4
5	ON	F3 activated by G3
6	ON	F2 activated by G2

DSW2	POSITION	DESCRIPTION
1	ON	F13 activated by G13
2	ON	F12 activated by G12
3	ON	F11 activated by G11
4	ON	F10 activated by G10
5	ON	F9 activated by G9
6	ON	F8 activated by G8

When the dip switches are OFF, the different settings are deactivated ((F_ not activated by G_)



PAD	STATE	DESCRIPTION
S1		SAFETY activated by F2÷G7
S1		SAFETY activated by F1÷G13
S2		Passive emercency time = 1.5 s
S2		Passive emercency time = 0.5 s
S3		F2 (or F3) held by G2 (or G3)
S3		disabled function
S4		F4 (or F5) held by G4 (or G5)
S4		disabled function

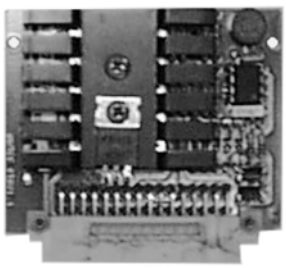


5.10 Power supply card (SBA97V_____)

Codes

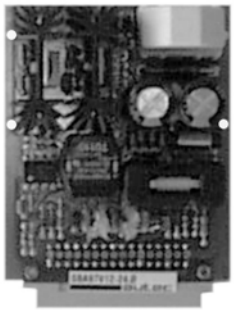
SBA97V24D02A	24V power supply card
SBA97V12-24L	24V power supply card
SBA97V12-24K	12V power supply card

Card component



SBA97V24D02A

The SBA97V24D02A power supply card must only be inserted into slot 8 of the 24Vdc master boards.



SBA97V12-24L
SBA97V12-24K

The SBA97V12-24L power supply card must only be inserted into slot 8 of the 24Vdc master boards.

The SBA97V12-24k power supply card must only be inserted into slot 8 of the 12Vdc master boards.

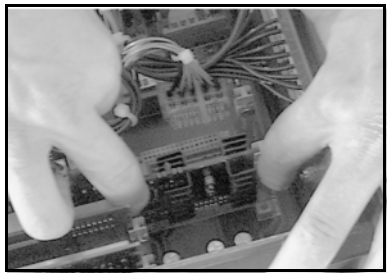
The SBA97V12-24L e SBA97V12-24K power supply contain a fuse having the following characteristics: 5x20 mm; 5A; 250V.

Replacement

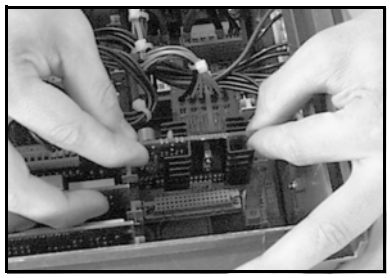
Disassembly

1.
Aprire l'unità ricevente ruotando in senso orario la chiave di plastica.

2.
Release the card by pressing the metal discs positioned on the two card guides of the slot in the lower centre (number 8).



3.
Extract the power supply card.



Assembly

6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

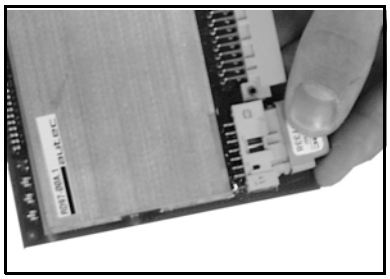
5.
Lock the card by pressing the two black pins on the card guides.

4.
Insert the new power supply card into the two card guides.

5.11 Address keys

Description

The receiver decoder module is equipped with an address key that contains the address of the radio remote control.
This key is:
- coloured grey
- removable
- necessary for radio remote control operation
- unique, like the serial number given on the label.



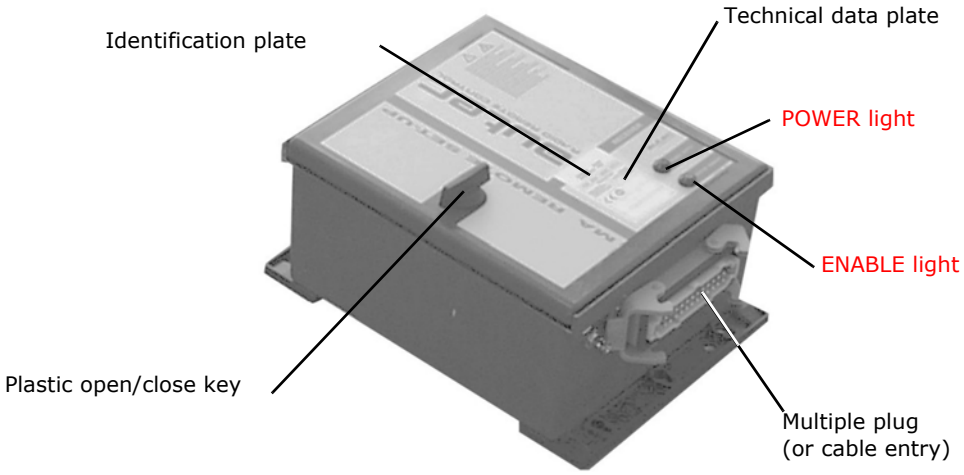
WARNING!
The radio encoder trasmitter module contains the corresponding address key, which has the same address (and serial number given on the label).
This key is, however, coloured yellow. DO NOT INTERCHANGE THE TWO ADDRESS KEYS (the radio remote control would not operate).

5.12 Receiving case

Codes

R0CASS00P03A0	Receiving case with 24/64 poles plug
R0CASS00P04A0	Receiving case with pressacavo
R0CASS00P05A0	Receiving case with spina 32 poles (reduced) plug
R0CASS00P06A0	Receiving case with spina 40 poles plug
R0CASS00P18A0	Receiving case with 32 poles plug with cover

Case components



Internal wiring for the POWER and ENABLE lights

Lights

The POWER and ENABLE lights signal:
POWER: the presence of power supply in the receiving unit
ENABLE: radio link between the transmitting and receiving units
When the receiving unit is powered, operation is correct if:
- POWER and ENABLE are lit when the transmitting unit is started
- POWER is lit and ENABLE switched off when the transmitting unit is switched off.

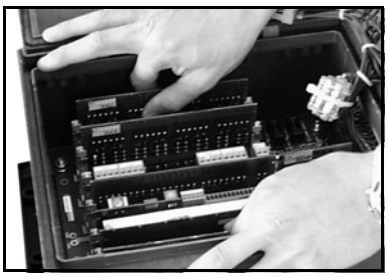
Replacement

Disassembly

1.
Aprire l'unità ricevente ruotando in senso orario la chiave di plastica.

2.
Separate the wiring connectors from all the electronic cards present inside the receiving unit.

3.
Extract the master board (with the modules and the electronic cards in their seats) by unscrewing the four nuts that are present.



Assembly

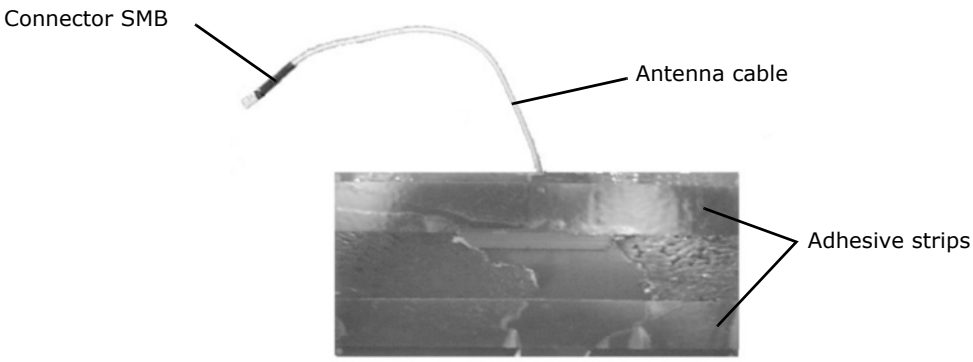
6.
Close the receiving unit by turning the plastic key in an anti-clockwise direction.

5.
Carry out wiring of the receiving unit (see radio remote control technical data sheet).

4.
Insert the master board (with the modules and the electronic cards in their seats) and tighten the four relative nuts.

5.13 Internal antenna at 870 MHz

Antenna components

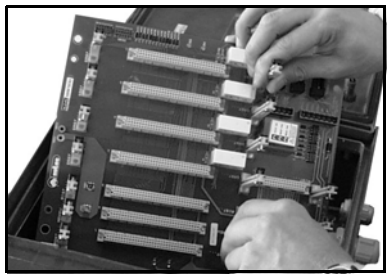


This antenna must use the F0BASE00E__B0 master boards.

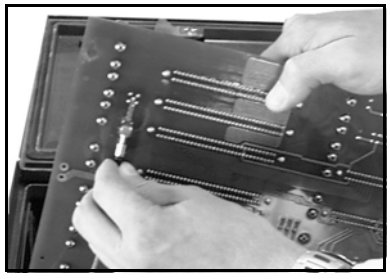
Replacement

Disassembly

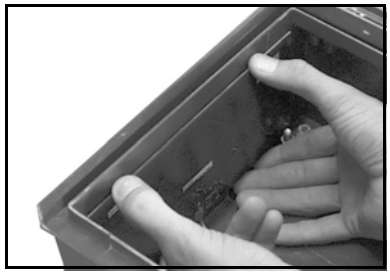
1.
Extract the master board (see (§ 5.8) or (§ 5.9))



2.
Separate the SMB connector of the antenna from the SMB2 connector, printed on the soldering side of the master board.



3.
Extract the antenna from the upper part of the receiving case.



Assembly

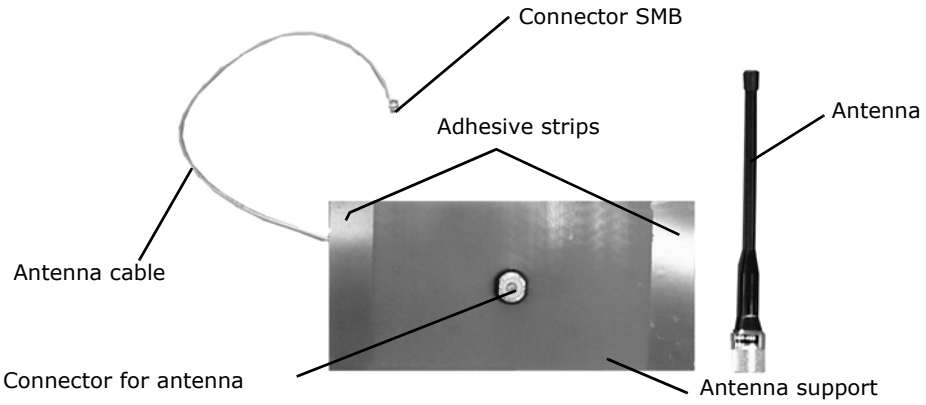
6.
Insert the master board (see (§ 5.8) or (§ 5.9))

5.
Insert the SMB connector of the antenna into the SMB2 connector, printed on the soldering side of the master board.

4.
Remove the adhesive straps from the antenna and attach it to the upper part of the receiving case.

5.14 External antenna with support

Antenna components

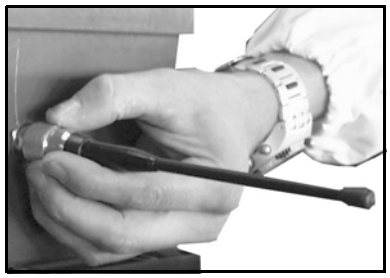


This antenna must use the F0BASE00E__B0 master boards.

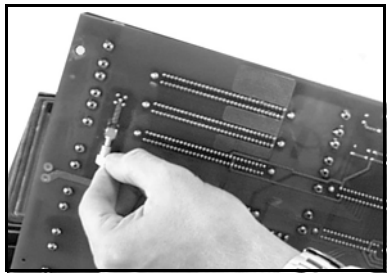
Replacement

Disassembly

1.
Extraxt master board (see (§ 5.8) or (§ 5.9)) and unscrew the antenna.



2.
Separate the SMB connector of the antenna from the SMB2 connector, printed on the soldering side of the master board.



3.
Unscrew the fixing nut present externally on the receiving case (on the antenna connector). Extract the antenna support from the receiving case.

Assembly

6.
Insert master board (see (§ 5.8) or (§ 5.9)) and screw in the antenna.

5.
Insert the SMB connector of the antenna into the SMB2 connector, printed on the soldering side of the master board.

4.
Remove the adhesive straps from the support and attach it inside the receiving case. Tighten the nut on the antenna connector.

5.15 External antenna with cable

Codes

G0ANTE00E10A0	433 MHz external antenna with 5 metres cable
G0ANTE00E27A0	433 MHz external antenna with 10 metres cable
G0ANTE00E28A0	433 MHz external antenna with 1 metre cable
G0ANTE00E31A0	870 MHz external antenna with 5 metres cable

Indications

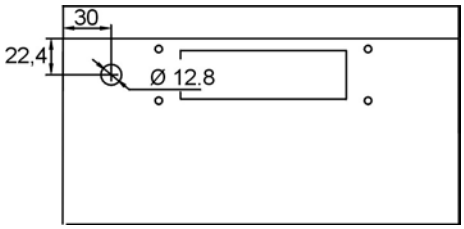
If the receiving unit is covered by metallic structures or installed inside electric panels, use the external antenna option with a cable of 1, 5 or 10 metres according to need. Install it in a position that favours reception of the signals emitted by the transmitting unit.

The antenna must always be assembled on the supplied bracket or on a metallic support plate, but the antenna stylus must never come into contact with metallic parts.

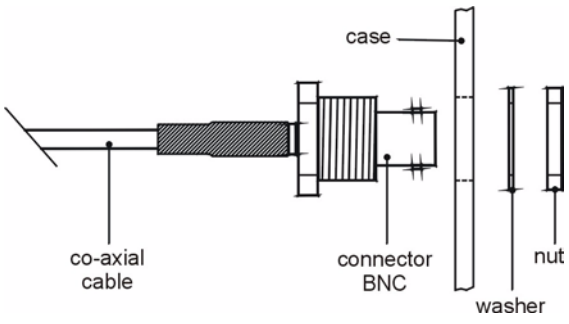
These antennas must use F0BASE00E__B0 master boards.

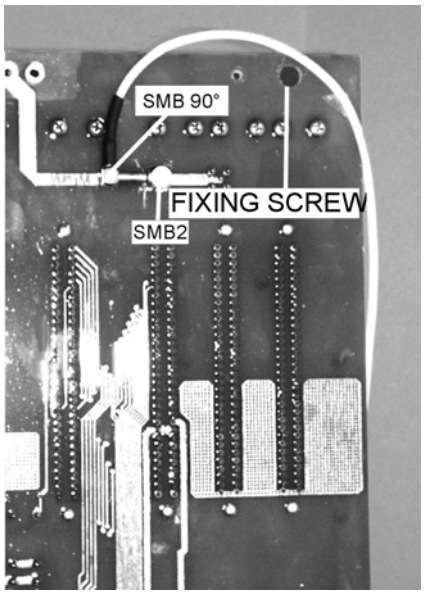
Preparing the receiving case

Before assembling an external antenna it is necessary to do the following:
1) drill the bottom of the receiving case (the part with the plug or the cable entry). The position of the hole must be identical to that indicated in the figure (measurements in mm):

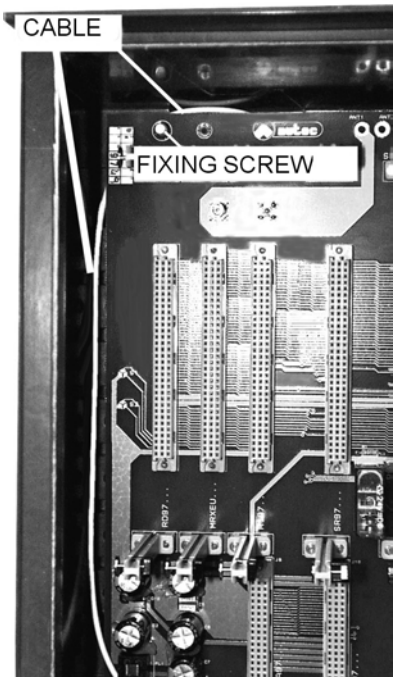


2) use the F0CAVI00E89A0 cable for internal connection. The end with the BNC connector should be positioned into the hole that has been made (see figure) while the other extremity with the SMB connector at 90° should be connected to the SMB2 connector, printed on the soldering side of the master board. (see photo).





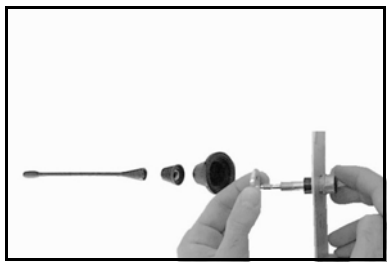
The cable should be made to pass above the master board close to the wall of the receiving case (beside the receiver decoder module). At the height of the SMB connectors of the base, the cable must run under it and turn externally around the fixing screws until it reaches the SMB2 connector.



Replacement

Disassembly

1.
With the receiving unit disconnected from the power supply, fit together the different pieces of the antenna, fixing them to a metallic support plate.



2.
Insert one end of the cable into the antenna connector and one into the relative connector of the receiving case.

Assembly

4.
Disassemble the antenna, separating the different parts from the support surface.

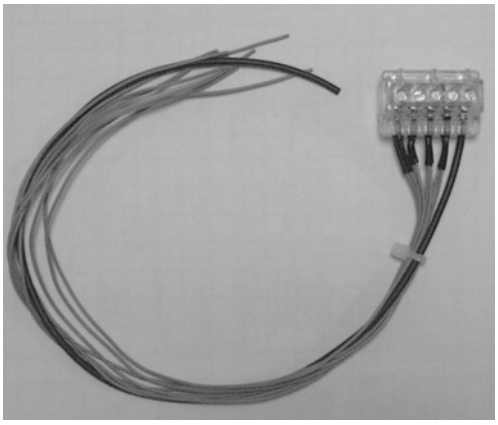
3.
Disconnect the receiving unit. Extract the ends of the cable from the antenna connector and from the relative connector of the receiving case.

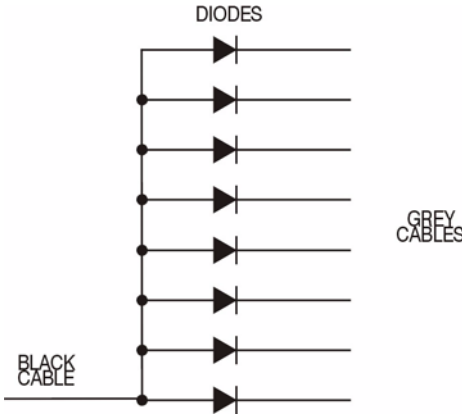
5.16 Cable for wiring with recovery diodes

Indications

This cable is used for wiring recovery diodes in the command contacts of the electromagnetic devices (solenoid valves). Their function is to suppress the overvoltage generated by the opening of the contacts.
It should therefore only be used with DC master boards. It is particularly useful for the contacts of the inductive load on/off commands.

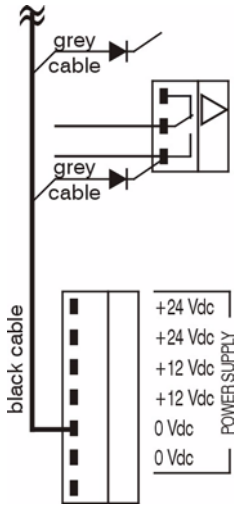
WARNING: only carry out wiring of this cable if the controlled machine does not already have devices for suppressing the overvoltages.





Wiring

When used, this cable with recovery diodes should only be wired to the relay contacts that command solenoid valves (as indicated in the electric diagram below).

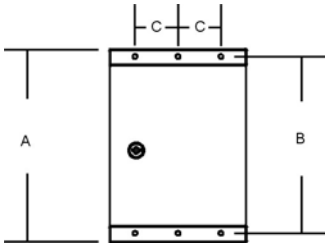


5.17 Technical data and findings

Technical data

Power supply
DC ..... 12 or 24 Vdc; ±25% (40 VA)
AC .....24/48/55/110/130/220/240 Vac; ±20%; 50 Hz (40 VA)
Antenna ..... internal or external (dedicated)
Max switching capacity of STOP and SAFETY relay contacts .....10 A (30 Vdc)
Max switching capacity of movements command relay contacts.... 4 A (30 Vdc)
Max switching capacity of selection command relay contacts ..... 6 A (30 Vdc)
Sensitivity receiver .....0,5 µV for 20 dB SINAD
Housing ..... fiber glass reinforced polyester
Minimum proctection grade IP65
Dimansions ..... (250x150x300) mm
Weight ..... 5÷6.5 kg

Drilling template .....



A = 338 mm
B = 322 mm
C = 80 mm

Findings

Clamp of . . .	to . . .	n°	Paragraph
master board	lower part of the receiving case	4 nuts (6 MA)	5.8 o 5.9
master board	lower part of the receiving case	4 washer (6)	5.8 o 5.9

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