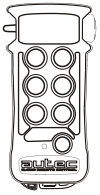
Transmitter System

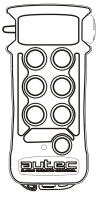
USER'S MANUAL



Light Series

Transmitter System

USER'S MANUAL



Light Series

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

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

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

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

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

1 INDEX AND CONVENTIONS

1.1 INDEX

1.2 CONVENTIONS

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


abcd… : WARNINGS

abcd… : TECHNICAL DATA

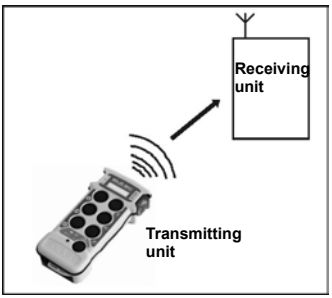
abcd… : IMPORTANT TEXTS

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

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

2 INTRODUCTION

Industrial radio remote controls of the Light series are used to control machines from a distance. Each industrial radio remote control is made up of a portable transmitting unit, from which the user can remotely control the machine, and a receiving unit installed on board the machine itself.
The transmitting unit uses radio frequencies to transmit a coded message which contains a value called address. Each receiving unit can only decode the messages coming from its own transmitting unit with the same address.
This excludes the possibility of an interference activating any system function. If the radio transmission is disturbed, incorrect or interrupted, the receiving unit autonomously stops the whole system.



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

Operation is subject to the following conditions:
- this device may not cause a harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

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

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

PERMITTED USES

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

FORBIDDEN USES

Machines installed in areas where equipment with explosion-proof characteristics is required.
Machines for moving, raising and transporting people.

All machines must undergo a **risk analysis**: it is therefore necessary to evaluate, within the limits of this analysis, if the machine can be radio remote controlled.
The machine producer and/or the person who decides upon radio remote control use and installation is responsible for this analysis.
Autec cannot be held responsible if the risk analysis is not carried out correctly.

To guarantee correct radio remote control operation, all current regulations regarding safety at work and accident prevention should be respected. All applicable standards and regulations valid in the user country regarding the use of both the machine and the radio remote control must always be respected.
Autec cannot be held responsible if the radio remote control is used in unlawful working conditions.

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

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

Any damaged part can ONLY be replaced by authorised Autec personnel, and ONLY using original Autec spare parts.

2.1 DOCUMENTATION

Documentation enclosed with each radio remote control includes at least the following:
- transmitting unit manual
- receiving unit manual
- battery charger manual
- certificate of guarantee
- technical data sheet.

Make sure that such documents have been supplied: if they are not, please ask them to Autec specifying the product serial number.

Technical data sheet

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

Identification plates

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

These plates MUST NOT be:

- removed from their position

- altered or damaged (contact Autec for replacement)

2.2 GENERAL TECHNICAL DATA

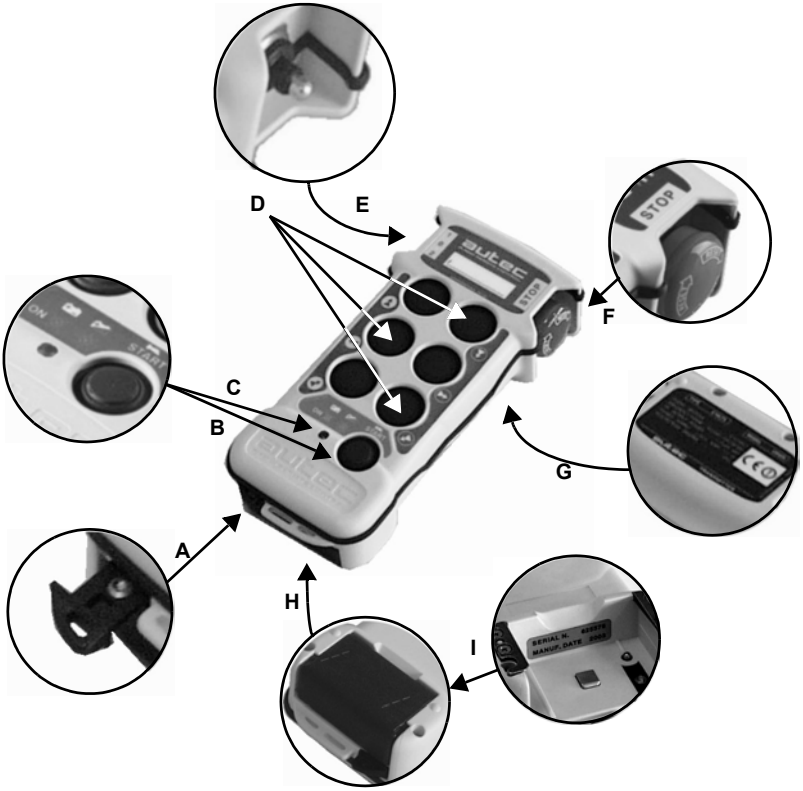
Frequency band	902 - 928 MHz
Available radio channels	32
Hamming distance	≥ 8
Probability of undetected error	<10 exp-11
Typical working range	330 ft (100 m)
Command response time	~ 100 ms
STOP command response time	~ 100 ms
Passive emergency time (or passive stop) *	0.35/1 sec.

* refer to paragraph “Programming” in the receiving unit manual, DIP No. 1 settings.

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

3 LK TRANSMITTING UNIT

These transmitting units can be used with one of the following receiving units:
- Type R102
- Type R202
- Type R302
- Type R402.



A	starting keyswitch	**F**	STOP pushbutton
B	START pushbutton	**G**	technical data plate
C	signalling LED	**H**	battery
D	pushbuttons	**I**	identification plate *(in the battery housing)*
E	selector *(optional)*		

The number of pushbuttons in the LK transmitting unit varies depending on its configuration.

The receiving units of the Light series are equipped with a safety function called SAFETY that protects the system "machine+radio remote control", when it is in neutral (rest) position, from unintended movements caused by possible radio remote control faults. For this to happen, both the wiring instructions in the technical data sheet and the prescriptions for correct installation.

3.1 TECHNICAL DATA OF THE LK TRANSMITTING UNIT

Climatic conditions

	TEMPERATURE	RELATIVE HUMIDITY	AIR PRESSURE
WORKING	Class 4K4H -5°F to +130°F (-20°C to +55°C)	Class 4K4H 4% to 100%	Class 4K4H 86 kPa to 106 kPa
STORAGE	Class 1K5 -40°F to +160°F (-40°C to +70°C)	Class 1K3 5% to 95%	Class 1K4 86 kPa to 106 kPa
TRANSPORTATION	Class 2K3 -13°F to + 160°F (-25°C to +70°C)	Class 2K3 95%	Class 2K3 70 kPa to 106 kPa

Power supply (battery pack LBM02MH)* ..... NiMH 2.4 Vdc
Antenna ..... internal
Output power ..... meets FCC Part 15 for license-free operation
Housing ..... PA 66 (50% fg)
Protection degree ..... NEMA 4 [IP65]
Dimensions ..... (3.1'' x 7.3'' x 1.7'') [(80 x 185 x 43)mm]
Weight ..... 14.8 oz (420 g)
Battery capacity with fully charged battery [at 68°F (20°C)] ..... ~ 12 hours
"Low battery" warning ..... 3.5 min

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

4 WARNINGS FOR USE

The user MUST ALWAYS respect the following warnings:

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

BE POSITIONED in a way that permits him to see the system “machine+radio remote control”, and above all the load, in the best possible way.

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

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

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

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

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

PRESS immediately the STOP pushbutton in case of hazard.

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

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

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

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

5 WARNINGS FOR MAINTENANCE

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

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

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

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

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

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

5.1 ROUTINE MAINTENANCE

The following instructions allow to maintain the radio remote control in perfect conditions, guaranteeing it to function safely and correctly for a long period.
Special applications may need more specific routine maintenance actions to be carried out at different periods.
These instructions do not in any case substitute the norms and laws that regulate work safety, nor do they limit the responsibility of the purchaser and user of the radio remote control.
All given instructions must be followed correctly each time the machine and the radio remote control are put into service.

If irregularities are noted while carrying out routine maintenance, put the “machine+radio remote control” system out of order, following the indications given (see paragraph 9 "LK transmitting unit diagnostics").

Daily maintenance

1. remove dust or accumulations of other material from the transmitting unit: never use solvents or flammable/corrosive materials to clean, and do not use high pressure water cleaners or steam cleaners
2. store the transmitting unit in clean and dry areas
3. make sure that the gaskets, bellows and caps of the actuators (selectors and pushbuttons) are intact, soft and elastic
4. make sure that the battery housing and the battery contacts are always clean
5. check structural integrity of the transmitting unit
6. make sure that the panel symbols can be easily recognised and replace the panel if necessary
7. check that the identification plate is readable and not damaged
8. make sure that the STOP pushbutton works properly before using the radio remote control.

Half yearly maintenance

Make sure that all the relay contacts of the receiving unit operate correctly, and check that the contact closes when the corresponding manoeuvre is enabled and opens when the manoeuvre is disabled.

5.2 SPECIAL MAINTENANCE (SERVICE CENTER)

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

Authorized Service Center

When it is necessary to carry out special maintenance (radio remote control repair and replacement of damaged or faulty parts), do not contact anyone other than our Authorized Service Center. In order to make the intervention faster and more reliable, please help us identify the radio remote control correctly and completely by giving:
- serial number
- purchase date
- description of the problem found
- address and telephone number of the place where the device is being used (with the name of the person to contact)
- local supplier.

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

5.3 DISPOSAL

When disposing of a radio remote control, give it to the waste separate collecting services in the user's country.
Please pay particular attention when recycling the batteries, applying local rules. Do not throw them away with domestic trash.

6 WORKING MODE OF THE LK TRANSMITTING UNIT

POWER ON AND START UP

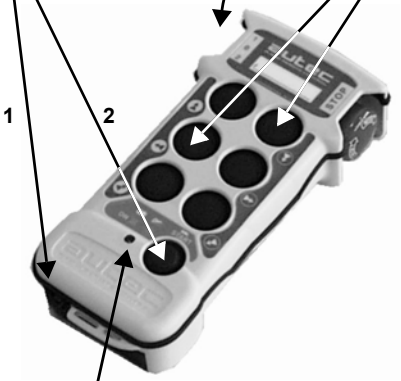
1. To switch on the transmitting unit, insert the starting keyswitch in the appropriate slot.

2. To start the radio remote control functions, press the START pushbutton for 1-2 seconds.

After starting, the green signalling LED always lights up.

COMMAND ACTIVATION

Activate the pushbuttons and/or selectors related to any of the movement or selection commands to be carried out.



SIGNALS		
TYPE	**MEANING**	**ACTION**
slow blinking	NORMAL WORKING	///
fast blinking*	LOW BATTERY the transmitting unit switches off 3.5 minutes after the LED starts blinking	switch off the transmitting unit and replace the battery
steady light on starting*	ONE OR MORE (movement) ACTUATORS and/or STOP PUSHBUTTON are ACTIVATED	release all actuators and/or the STOP pushbutton

* Red LED if present.

STOP

The STOP pushbutton should be pressed when it is necessary to stop the machine immediately when a dangerous condition should occur.

To stop the machine **immediately**, press the STOP pushbutton.
To **start working again**, after checking that the working conditions are safe, turn the STOP pushbutton in the direction indicated to deactivate it and repeat the starting procedure.

BATTERY

To recharge a low battery, proceed as follows:

1. Insert the battery into its proper battery charger, which should be positioned in an area with a temperature between +41°F and 113°F (+5°C and +45°C): the battery now starts charging, a state signalled by the lighting up of the “CHARGE” pilot light.

2. After a maximum of 4 hours the “CHARGE” light switches off: the battery is fully charged. Remove the battery from the charger (if the battery is not removed, the charger switches to trickle charging).

SWITCHING OFF

The transmitting unit should be switched off each time work is stopped by extracting the starting keyswitch (always put the key in a safe place).

The transmitter unit may also switch off automatically if the battery is not sufficiently charged and/or when the radio remote control is not used for more than 3.5 minutes (refer to paragraph 8 "Programming", DIP No. 1 setting).

7 FREQUENCIES

Radio frequency transmission of AUTEC radio remote controls operates in the band of frequencies permitted by regulations that are valid when the radio remote control is placed on the market.

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

7.1 MANUAL SELECTION MODE

When operating in the MANUAL selection mode it is possible to work at a specific frequency that must be set manually by programming the dip switches in the radio modules (refer to paragraph 8 "Programming").
To set or modify this operation mode contact authorised Autec personnel.

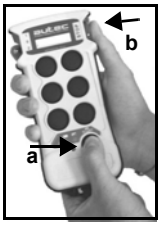
7.2 AUTOMATIC SCAN MODE

When operating in the AUTOMATIC scan mode it is possible to operate at a specific frequency, which can be changed in case of interference or conflict with other radio systems, using the “Changing the working frequency” procedure.
This mode allows to change the working frequency without internal interventions on the transmitting unit or the receiving unit.

Changing the working frequency

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

2. Unlock the STOP pushbutton by turning it as shown in the photo and repeat the starting procedure.



N.B.: During the working frequency changing process, the receiving unit loses radio link with the transmitting unit. After starting, some seconds may be necessary to reset connection, **therefore keep the START pushbutton pressed for about 8-10 seconds**.

8 PROGRAMMING

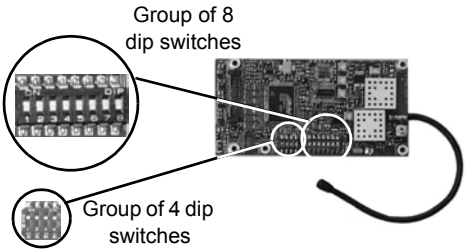
The dip switches must be programmed when the battery is removed from the transmitting unit. Programming must only be carried out by authorised personnel.

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

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

8.1 PROGRAMMING THE E16STXUS1 TRANSMITTING MODULE

The group of eight dip switches located on the radio module are used to program some functions and set the working frequency.
The programming set in the other group of four dip switches must never be modified.

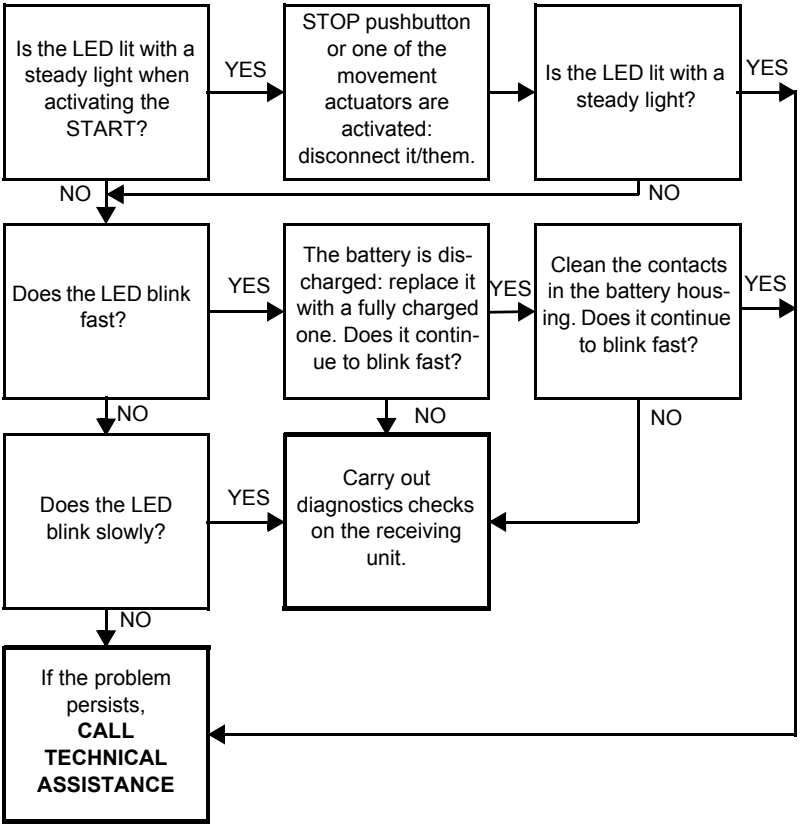


Group of 8 dip switches

DIP	STATE	FUNCTION
1	ON	The transmitting unit never switches off automatically
	OFF	If the transmitting unit stays switched on without any movement commands entered, it switches off after approx. 3.5 minutes
2	ON	Deactivation of low battery warning from horn on machine
	OFF	Activation of low battery warning from horn on machine
3	ON	If DIP 8 is OFF automatic scan of the frequencies in the band 915 -928 MHz
	OFF	If DIP 8 is OFF automatic scan of the frequencies in the band 902 - 915 MHz
3-7	ON/OFF	If DIP 8 is ON see “Appendix: Frequency Table”
8	ON	Manual selection mode of the frequencies using DIP 3 - DIP 7 (refer to “Appendix: Frequency Table”)
	OFF	Automatic scan mode of the frequencies in the band selected by DIP 3 (DIP 4 - DIP 7 indifferent)

9 LK TRANSMITTING UNIT DIAGNOSTICS

If the system “machine+radio remote control” does not start, check if the problem is caused by the radio remote control or the machine. Therefore, before carrying out any verification connect the cable control unit: if the machine does not start, the problem lies with the machine itself.
If, on the other hand, the machine only starts using the cable control panel, the problem lies with the radio remote control. In this case, follow the diagnostics procedure of the transmitting unit and then proceed as follows:



Appendix: FREQUENCY TABLE

E16STXUS1

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