Appendix I: Manual

Please see the following pages.

70 - MINI

ENGLISH

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70 MINI USER'S MANUAL

1.- SYSTEM DESCRIPTION: CHARACTERISTICS

The systems are based on several handheld transmitter models (with the possibility of single step keypads by function, known as generic transmitter, or double step keypads by function, known as hoisting transmitter) and several receiver models, available with relays or static outputs –PWM outputs-.

The radio, integrated in the PCB of the transmitter and the receiver, is ready to work in different ISM bands, according to different models.
The transmitter can be powered by alkaline batteries, type AA or rechargeable NiMH AA type batteries.

Applications are many and varied, depending on the emitter-receiver combination; basically the applications' areas are as follows:

- Mobile applications (on board systems)
- Industrial hoisting applications (no EC)
- Other industrial hoisting applications (Chain hoists / Cat. 3 ;EN-954-1: EC)
- Other applications

SYSTEM CHARACTERISTICS

Transmitters: T70MG10-T70MH3-T70MG10D-T70MH3D	Specifications
Available frequencies (ISM bands)	915MHz 870MHz/433MHz 419MHz
RF Power (ERP)	< 1mW 915MHz < 5mW 870 MHz; <10 mW 433MHz < 10mW 419MHz
Modulation type	FSK 4800 bps and 7.200 bps
Protection	IP65
Channel bandwidth	25KHz
Number of IDs	64K per band
Response time	< 150ms
Working channel selection	Automatic at transmitters' start-up
Display option (for Remote Tele-Alignment)	2 lines x 12 characters / line + icons
Antenna	Printed circuit board integrated (standard)
Weight	250gr
Dimensions	Length = 160mm / Wide = 75mm / Height = 45mm
Rechargeable batteries	Alkaline type AA 1,5V 2600mAh (-10ºC / +50ºC) Commercial Range NiMH type AA 1,2V 1200mAh (-20ºC / +70ºC) Industrial Range
Battery life	>12h (100% duty cycle) Alkalines 2500mAh >6h (100% duty cycle) NiMH 1200mAh
EEPROM	Internal
Hoisting Safety Standards	EN 954-1 Cat. 3 (hoisting models)
Active STOP (time)	< 500ms (Cat.3 CE)
Passive STOP (time)	< 2s (Cat.3 CE)
Operating temperature range	-20ºC / +70ºC
Storage temperature range (24h)	-25ºC / +75ºC
Storage temperature range –long periods-	-25ºC / +55ºC
Signaling (transmitters without display)	1 bicoloured LED (RUN labeled)
Acoustic signaling	Internal buzzer
T70MG10: Generic keypad transmitter (without display)	10 functions max. (1 step) + ON/OFF function
T70MH3: Hoisting keypad transmitter (without display)	6 functions max. (2 steps) + 2 AUX (1 step) + START + ON/STOP functions
T70MG10D: Generic keypad transmitter (with display)	10 functions max. (1 step) + ON/OFF function
T70MH3D: Hoisting keypad transmitter (with display)	6 functions max. (2 step) + START + ON/STOP function

R70MP10: Receiver with PWM outputs (10 outputs)	Specifications
Available frequencies (ISM bands)	915MHz 870MHz/433MHz 419MHz
Power supply	9-35V DC
Number of outputs	10 MOSFET (PWM)
Protection	IP65
Antenna	Printed circuit board integrated (standard)
Working channel selection	Automatic at transmitters' start-up
Weight	430 gr.
Dimensions	Length = 151mm / Wide = 129mm (160mm with PG) / Height = 61mm
EEPROM	Internal
Status signaling	MultiLED: 7 LED visible externally
Conexions	Plug-In terminals: inputs/outputs with PG cable glands 1) PG11 model power supply cable gland 2) PG16 model outputs cable gland
Maximum current per output	5A
Maximum current output (total)	15A
PWM outputs frequency range	30 – 300Hz (5%+-95%)
Output accuracy	16 bits (power supply range)
Electrical input protection	Fuse protected
Electrical output protections	Polarity inversion / Shortcircuit
Operating temperature	-20ºC / +70ºC
Storage temperature (24h)	-25ºC / +75ºC
Storage temperature –long periods-	-25ºC / +55ºC
Disconnecting security	A MOSFET transistor connected with the positive value of the power supply provides security functions.

R70MR11: Receiver with relays outputs (11 outputs)	Specifications
Available frequencies (ISM bands)	915MHz 870MHz/433MHz 419MHz
Power supply (depending on the model)	24/48V AC 50/60Hz (+20% / -30% Vin) 115/230V AC 50/60Hz (+20% / -30% Vin)
Number of outputs	11 RELAYS MODEL (No valid for CE hoisting applications) 11 relays outputs.
Protection	IP65
Antenna	Printed circuit board integrated (standard).
Working channel selection	Automatic at transmitters' start-up
Weight	980 grs.
Dimensions	Length = 205mm / Wide = 156mm / Height = 62mm
EEPROM	Internal
Status signaling	MultiLED: 7 LED visible externally
Conexions	Plug-In terminals. Inputs/outputs with PG 21 (25 poles maximum) cable gland.
Maximum current over resistive load	8A
Operating temperature range	-20ºC / +70ºC
Storage temperature (24h)	-25ºC / +75ºC
Storage temperature –long periods-	-25ºC / +55ºC

R70MR06: Receiver with output relays (6 outputs)	Specifications
Available frequencies (ISM bands)	915MHz 870MHz/433MHz 419MHz
Power supply (depending on the model)	24V AC 50/60Hz (+20% / -30% Vin) 48V AC 50/60Hz (+20% / -30% Vin) 115V AC 50/60Hz (+20% / -30% Vin) 230V AC 50/60Hz (+20% / -30% Vin)
Number of outputs	06 RELAYS MODEL (CE hoisting applications / Cat.3 EN-954-1) 06 relays outputs (3 Hoist / 3 Travel)
Protection	IP65
Antenna	Printed circuit board integrated (standard).
Working channel selection	Automatic at transmitters' start-up
Weight	640 grs.
Dimensions	Length = 151 mm / Wide = 129mm / Height = 61mm
EEPROM	Internal
Status signaling	MultiLED: 7 LED visible externally
Conexions	Plug-In terminals: inputs/outputs with PG16 model output cable gland.
Maximum current over resistive load	6A
Operating temperature range	-20ºC / +70ºC
Storage temperature (24h)	-25ºC / +75ºC
Storage temperature –long periods-	-25ºC / +55ºC

2.- SAFETY INSTRUCTIONS

2.1.- GENERALS

These instructions must be read carefully. This will allow you to install, use and maintain this device in a proper state, reducing the risk of incorrect use.

Do not install the equipment in machines for the elevation of people or in explosive atmospheres.

Any failure to comply with that set out in this manual will create a hazard, for which reason the following must be respected:

- Ensure that the installation is carried out by trained, competent staff.
- The safety rules of the work area and of all competent authorities must be respected every time.
- Ensure that this manual is permanently available to the operator and to the person in charge of maintenance.
- Keep the transmitter out of the reach of unauthorised people.
- At the start of each day, check the correct working of the STOP button and the other safety devices of the machine.
- In the event of any anomaly, use the STOP button.
- If there are several radio remote systems working in the same area, ensure that the used transmitter corresponds to the machine that is being controlled. Identify the machine which the transmitter corresponds to.
- Carry out regular checks and preventive maintenance.
- In the case of repairs, only use original spare parts.

- Never modify the device without prior study and approval of the manufacturer.
- Never use the device with a power supply other than the indicated.
- Never allow the device to be used by unqualified people.
- After being used, do not leave the transmitter in service without having pressed the STOP button in order to prevent accidental operations.
- Do not use the device without visibility.
- Avoid knocking or dropping the set.
- Do not use the set if failure is detected.

2.2.- HOISTING MACHINES

- Ensure that the machine is fully halted throughout the estimated assembly time; clear the work area and use safety clothing.
- In the case of overhead cranes, park the crane and position stop-ends (if these are not available use appropriate signs) at a suitable distance in order to prevent collision with other cranes in the same area.
- Verify the power supply and turn off the main contactor.
- Remember that the receiver has at least, more than one circuit under voltage.
- Even if the power supply is disconnected, there is still a risk of electrical discharges.
- Never forget to connect the ground cable.
- Use fireproof cables for the electrical connections.
- Check that the input power supply corresponds to the right voltage of the receiver.
- Be cautious: it may occur that the equipment has not been connected properly, which can result in unforeseen movements during the start-up.

2.3.- FCC RECOMMENDATIONS (only valid for equipment that works in 915MHz ISM band)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and

2. this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

To comply with FCC RF exposure compliance requirements, this device and its antenna must not be co-located with, or operating in conjunction with, any other antenna or transmitter.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rul.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

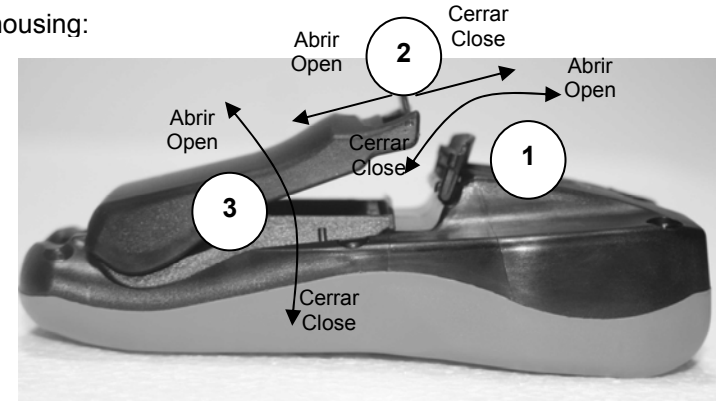
3.- INSTALATION / SYSTEM ASSEMBLY

3.1.-TRANSMITTER

Proceed to open the transmitter's battery compartment and introduce the supplied batteries into the battery housing (2 AA type 1,5V alkaline batteries) respecting the +/- polarity, indicated inside the battery housing.

Procedure for opening the mechanism of the battery housing:

1. "Open" the safety lock: rotate in the direction indicated by the arrow.
2. "Open" lock tab: press in the direction indicated by the arrow.
3. "Open" battery housing cover: rotate in the direction indicated by the arrow.



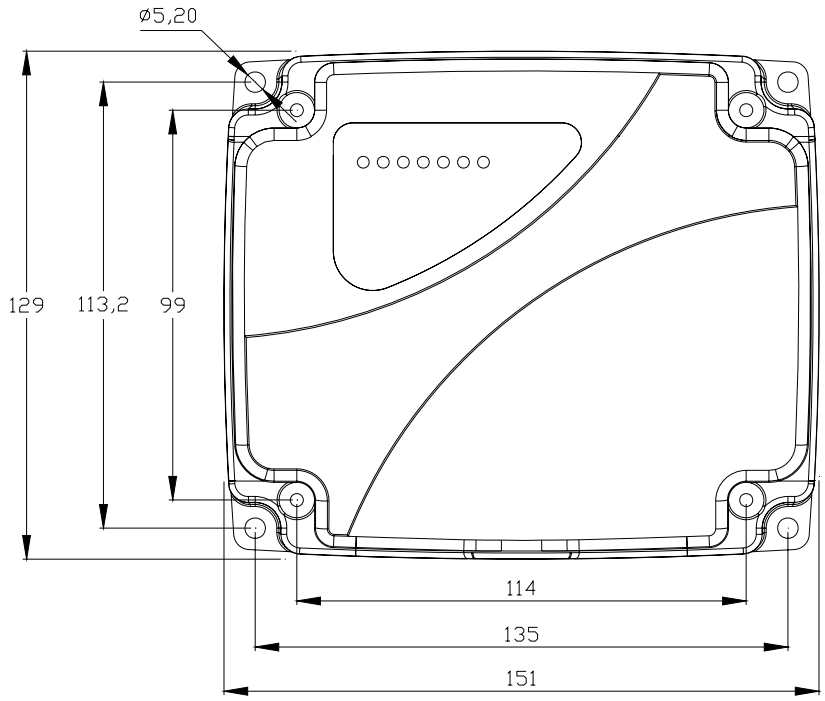
Procedure for closing the mechanism of the battery housing:

3. "Close" battery housing cover: rotate in the direction indicated by the arrow.
2. "Close lock tab": press in the direction indicated by the arrow.
1. "Close the safety lock": rotate in the direction indicated by the arrow.

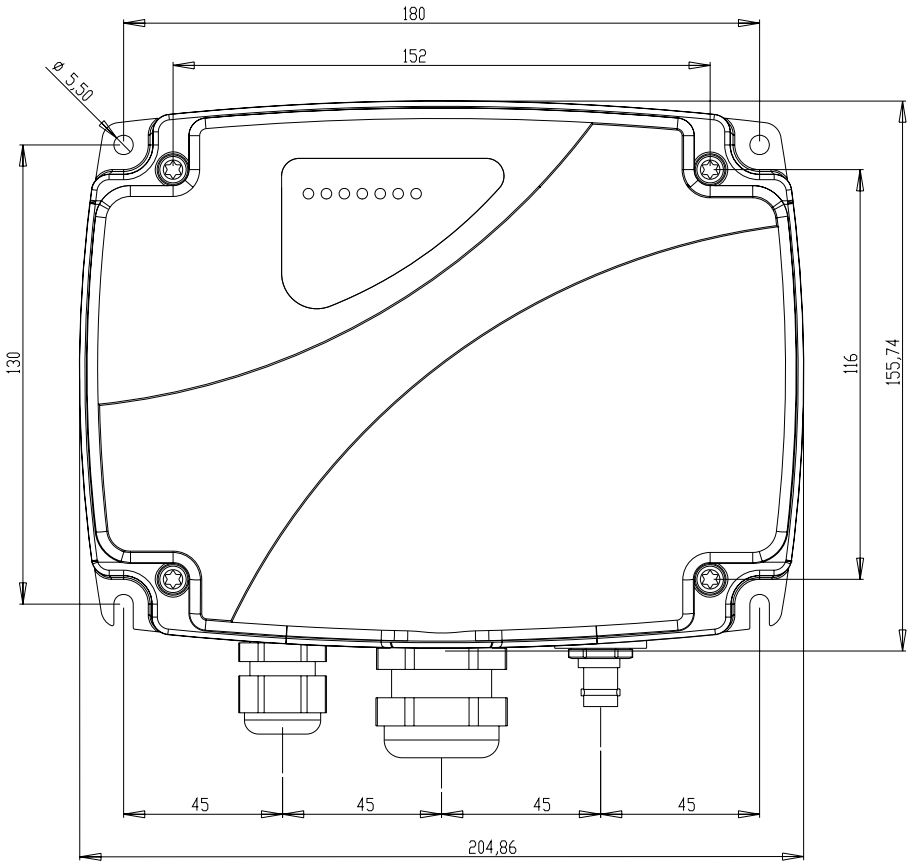
3.2.-RECEIVER

Find an easy access location for the receiver, free from obstacles, in order to facilitate the reception of the transmitter's radio signal, and far away from elements which can produce intense electric disturbance.

R70MP10 and R70MR06 models receiver dimensions:



R70MR11 model receiver dimensions:



3.3.- STARTING UP.

TRANSMITTERS:

Turning on the T70MG10 transmitter model:

1- Insert the transmitter's batteries (2 AA type batteries).
2- Press ON/OFF function. The transmitter remains powered.
3- Enter the key code: press simultaneously "7" + "8" functions.
4- Press "10" function. Equivalent to the START function.
5- Transmitter in ON state (solid green LED).

Turning on the T70MH3 / T70MH2 transmitter model:

1- Insert the transmitter's batteries (2 AA type batteries).
2- Press ON/STOP function. The transmitter remains powered.
3- Enter the key code: press simultaneously ◄ ► functions.
4- Press START.
5- Transmitter in ON state (solid green LED).

Turning on the T70MH3D transmitter model:

1- Insert the transmitter's batteries (2 AA type batteries).
2- Press ON/STOP function. LCD display message: "PLEASE WAIT"
3- Enter the key code: press simultaneously ◄ ► functions.
   LCD display message: "PRESS START"
4- Press START.
5- Transmitter in ON state. LCD display message: "WORKING OK"

T70MG10

T70MH3D

T70MH2

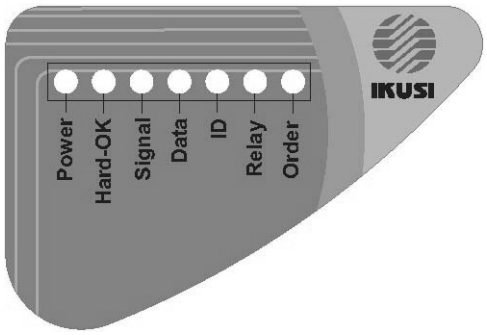
T70MH3

Transmitters without display: RUN signalling LED in solid green colour. In transmitters with LCD display: "WORKING OK"; if the transmitter is the owner of the receiver.

RECEIVERS

Proceed to connect the power supply and the output connections. Use the plug-in terminals and the connection block diagram provide in this manual (page 11).

LED's signaling in correct operating mode:

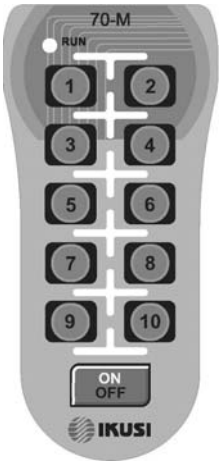


1) No radio link with the transmitter:
   "Power": solid green.
   "Hard-OK": solid green.
   "Signal": Blinking if there are transmitters near and in the same band.
2) There is a radio link with the transmitter:
   "Power": solid green.
   "Hard-OK": solid green.
   "Signal": green blinking fast.
   "Data": green blinking fast.
   "ID": green blinking fast.
3) With STOP relay activated and active outputs:
   "Power": solid green.
   "Hard-OK": solid green.
   "Signal": green blinking fast.
   "Data": green blinking fast.
   "ID": green blinking fast.
   "Relay": solid green if the STOP relay is activated.
   "Order": green (variable intensity), if one or more PWM outputs are activated.
   "Order": green (fixed intensity), if at least one or more relay outputs are activated.

4. – TRANSMITTERS

4.1. – Transmitters' MODELS

T70MG10



Generic: máx. 10 functions (1 step) + ON/OFF (without display)

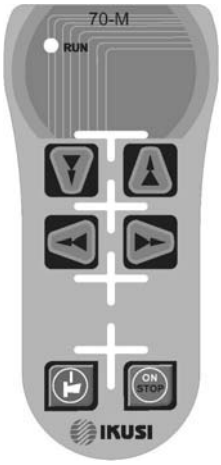
T70MH3

Hoisting: máx. 6 functions (2 steps) + 2 AUX: A1 and A2 (1 step) + START + ON/STOP

T70MH3D

Hoisting: máx. 6 functions (2 steps) + START + ON/STOP (with display)

T70MH2



Hoisting (Cat. 3 EN-954-1): máx. 4 functions (2 steps) + START + ON/STOP (without display)

The models with LCD display are always required for Tele-Alignment purposes.

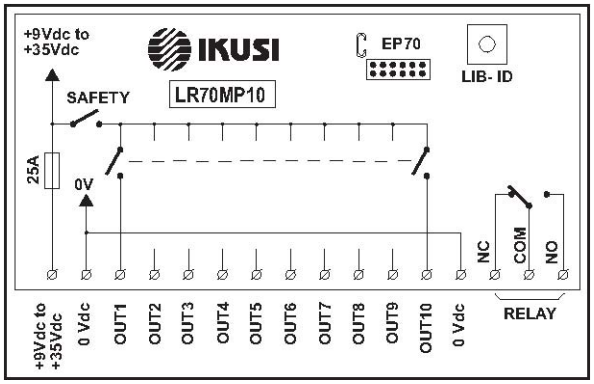
4.2.- MAINTENANCE / TROUBLE SHOOTING GUIDELINE

TRANSMITTER'S LED SIGNALLING					
Status	**Correct operating mode**	**Activated function**	**Low battery**	**Lost transmitter frame found**	**ERROR**
LATENCY	Green flashing LED	Without signal	Switches to SWITCHED OFF mode	Without signal	Red LED and buzzer continuously activated.
SWITCHED ON: TRANSMISSION MODE (max. 1 min., it only signalizes during START action)	Without signal	Red LED + buzzer	Red LED + buzzer.	Without signal	Red LED and buzzer continuously activated. It maintains after releasing START
TRANSMISSION	Green solid LED	Without signal	Red LED + buzzer: switches to SWITCHED OFF mode after 4 minutes	Without signal	Red LED and buzzer continuously activated
LOST	Without signal	Without signal	Switches to SWITCHED OFF mode	Buzzer bips during 1 minute	Red LED and buzzer continuously activated
PASSWORD	Orange solid LED	Without signal	Switches to SWITCHED OFF mode	Without signal	Red LED and buzzer continuously activated.
AUTOID	Orange LED	Without signal	Switches to SWITCHED OFF mode	Without signal	Red LED and buzzer continuously activated.
LIBID	Orange LED	Without signal	Switches to SWITCHED OFF mode	Without signal	Red LED and buzzer continuously activated.
PROGRAMMING	Orange solid LED	Without signal	Red LED + buzzer	Without signal	Red LED and buzzer continuously activated.
PARAM	Orange flashing LED	Without signal	Red LED + buzzer	Without signal	Red LED and buzzer continuously activated.
TELE-ALIGNMENT	Without signal	Without signal	Without signal	Without signal	Buzzer continuously activated
SEARCHING MODE	Orange LED	Without signal	Red LED + buzzer	Without signal	Red LED and buzzer continuously activated.

5.- RECEIVERS

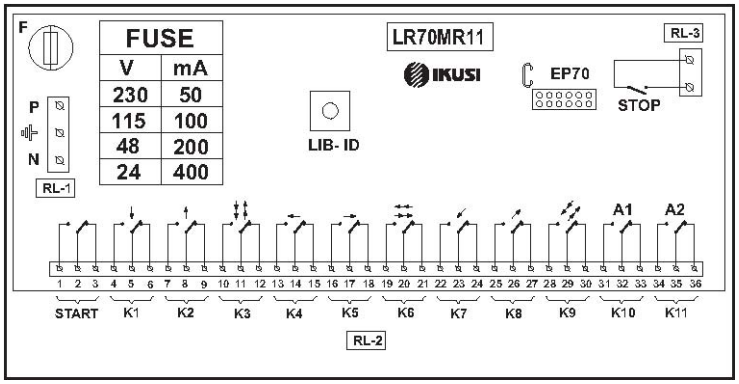
5.1.- TYPE OF RECEIVERS: CONNECTIONS BLOCK DIAGRAMS

R70MP10: PWM OUTPUT RECEIVER (10 OUTPUTS).



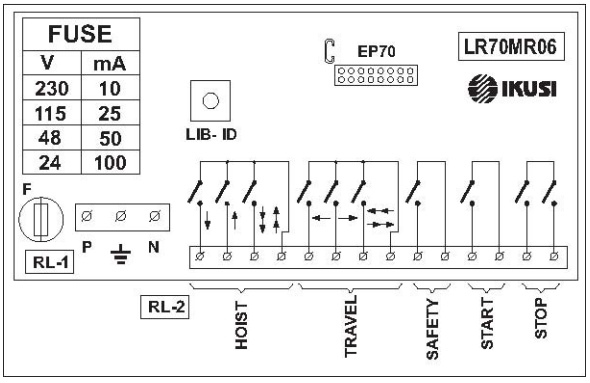
The voltage DC of the power supply (from 9v to 35v DC, is conducted to the common wiring of the 10 output switches (OUT1 until OUT10), through a SAFETY switch which guarantees the output disconnection in case of breakdown of some of the outputs. The "RELAY" (STOP) switches between 2 fixed positions NO (normally opened) and NC (normally closed). An "LIB ID" function, with ID release pushbutton is available on the electronic board, and it can be used in case of transmitter's breakdown. The ID release can be also performed from the transmitter with a special function.

R70MR11: RECEIVER WITH OUTPUT RELAYS (11 OUTPUTS).



RL-1: Power supply plug in terminals (24,48,115 and 230 V AC). Please note –see table- the right fuse values depending on the input voltage.
RL-2: Plug in identified connection terminals, 1st and 2nd speed (K1….K11) and START relay.
RL-3: Plug in terminal for connecting the STOP relay **(NO Cat.3 EN-954-1)**
LIB-ID: pushbutton to release the ID from the receiver.
EP70: On board plug in connector to connect an external EP70 (External EEPROM).

R70MR06: RECEIVER WITH OUTPUT RELAYS (6 OUTPUTS).



RL-1: Power supply plug in terminals (24,48,115 and 230 V AC). Please note –see table- the right fuse values depending on the input voltage.
RL-2: Plug in identified connection terminals, 1st and 2nd speed, HOISTING; TROLLEY TRAVELLING; SAFETY; START: STOP (Cat.3 EN-954)
LIB-ID: pushbutton to release the ID from the receiver.
EP70: On board plug in connector to connect an external EP70 (External EEPROM).

- Remember to connect the ground cable.

- Only use fireproof cables for connections.

- Select the appropriate voltage on the receiver, (230, 115 or 48 Vac). R70MR11 and R70MR06 models.

5.2.- MAINTENANCE / TROUBLE SHOOTING GUIDELINES

RECEIVER'S LED SIGNALING				
LED	*COLOUR*	STATUS	REMARKS	PROPOSED ACTION
POWER	GREEN	Switch On if powered	Power supply OK	Check the power supply
HARDOK	GREEN	Solid green LED if no error detected Blinking during start up process	Receiver hardware OK	OK Please wait to finish the start up process
HARDOK	RED	Solid red LED if one of these errors appears: - Watchdog activated / Oscillator breakdown / wrong ROM checksum - Reset activated - Blinking fast : wrong EEPROM checksum / Data corrupted.	Electronic board hardware breakdown	Replace the electronic board Reprogramme EEPROM
SIGNAL	GREEN	LED Off if no radio signal detected (Squelch)	- LED On and the transmitter switched Off indicates occupied radio channel - LED On and DATA switched Off indicates radio channel occupied by a non IKUSI system	Verify transmitter's radio and battery
DATA	GREEN	LED Off if a wrong frame is received Blinking if receiving good frames	LED Off and SIGNAL LED On: Radio breakdown	Replace radios
ID	GREEN	Blinking if a correct ID is received	Switched Off and DATA LED switched On: no valid ID	If the radio channel is not busy: verify transmitter's selected ID or reset receiver ID
			SIGNAL; DATA and ID LED On, indicates valid frames from the transmitter. Correct link.	OK
RELAY	GREEN	STOP relay activated		
ORDER	GREEN	Proportional lightning intensity depending on the number of activated outputs (PWM outputs); or indicates that at least one output is activated (RELAY outputs)		

6.- RADIO REMOTE SYSTEM FUNCTIONALITIES

6.1.- GENERALS

The transmitter models without LCD display have restrictions with the access to the programation parameters, due to the impossibility to show the Software Menu in Programation Mode.

The remote system receiver remembers the last ID used by the last current working transmitter. This transmitter can be considered as the receiver's owner. It means that if the receiver is going to be used with another transmitter with a different ID, the receiver must released the current transmitter's ownership releasing the current ID code (LIB ID).This operation can be performed from the current transmitter (performing LIB ID special function) or by pressing the LIB ID button inside the receiver.

6.2.- BATTERY LEVEL INDICATION

TRANSMITTER'S MODEL T70MH3D

Full battery: 3 black LED's + frame. [▓▓▓]
Medium battery: 2 black LED's + frame. [__▓▓]
Low battery: 1 black LED + frame. [___▓]
Empty battery: Blinking frame. [_____]

TRANSMITTER'S MODEL T70MH3 / T70MG10

Low battery state will be indicated with red LED blinking and intermittent buzzer's sound (pulses of 0.1 sec. every 0.9 sec.: __/_____/_____).

6.3.- BASE CHANNEL CHANGHING (TRANSMITTER MODELS:T70MG10;T70MH3D;T70MH3;T70MH2)

T70MG10 TRANSMITTER MODEL

1) With the transmitter switched off, press "ON/OFF". Transmitter in stand-by or LOW CONSUMPTION mode.

2) Entering base channel changing mode:

5 + 10 BASE CHANNEL CHANGING MODE (Press "5" and "10" functions simultaneously) -> Wait until the orange LED lights continuously.

3) The current base channel information is displayed: Number of red pulses = Number of units of the channel; Number of green pulses = Number in units of ten of the channel.

4) Once the orange LED lights continuously, proceed to change the base channel

1 Press function "1", as many times as the number of units of ten of the new base channel.
Note: To programme channels from 1 to 9, do not press this function –equivalent to 0 value--

2 Press function "2", as many times as the number of units of the new base channel.

Note: Press "4" function to leave the process without updating the new base channel. 4
The transmitter switches to stand-by or LOW CONSUMPTION mode.

5) To validate the new base channel, press "10" function. 10
The new updated base channel value will show with red and green LED pulses:
Number of red pulses = Number of units of the channel.
Number of green pulses = Number in units of ten of the channel.

6) Updating and sending the new base channel data to the receiver (orange LED blinking).

7) Once the new base channel is recorded in the receiver the transmitter switches to OFF mode (Orange LED stops blinking).

T70MH3D / T70MH3/ T70MH2 TRANSMITTER MODELS

1) With the transmitter switched off, press "ON/OFF". Transmitter in stand-by or LOW CONSUMPTION mode.

2) Entering in the base channel changing mode:

BASE CHANNEL CHANGING MODE (Press "RIGHT" and "START" functions simultaneously) -> Message in the LCD display: "FREQ CHANGE"

3) The current base channel information is displayed:

"Freq Change"
"Channel NN" -> (01,02,03…….MAXCAN) NN = 01,02,03,……, MAXCAN
MAXCAN = 11 in 870 MHz
MAXCAN = 69 in 433MHz and 915MHz

4) Use "UP"and "DOWN" functions to change the base channel:

With "DOWN" function, choose the units of the new channel.
Nota: 0 to programme channels from 1 to 9.

With "UP", function choose the number of units of ten of the new channel.

5) To validate the new channel press "START" 

The new channel information will be displayed in the LCD:

"Freq Change"
"Channel __" -> (01,02,03……MAXCAN) NN = 01,02,03,……, MAXCAN
MAXCAN = 11 in 870 MHz
MAXCAN = 69 in 433MHz and 915MHz

Note1: To leave without updating the change, press "ESC" in T70MH3 and T70MH3D models 

Note2: To leave without updating the change, press "RIGHT" in T70MH2 model. 

6) Updating and sending the new base channel data to the receiver.(the message blinks in the LCD display).

7) Once the new base channel is recorded in the receiver the transmitter switches to OFF mode. (LCD switched off).

Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

6.4 ID RELEASING (LIB ID) (TRANSMITTER MODELS:T70MG10;T70MH3D;T70MH3;T70MH2)

T70MG10 TRANSMITTER MODEL

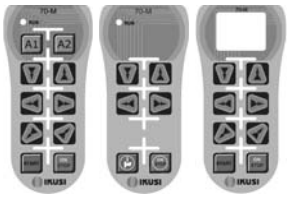
It allows releasing the receiver's ownership of the working transmitter.

1) With the transmitter switched off, press "ON/OFF". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in LIB ID mode, press simultaneously "4" and "10" functions.

DURING THE ID RELEASING PROCESS THE ORANGE LED BLINKS AND THE BUZZER IS ACTIVE. ID RELEASED PROCESS FINISHED: LED OFF and BUZZER OFF.

T70MH3D / T70MH3 / T70MH2



It allows releasing the receiver's ownership of the current working transmitter.

1) With the transmitter switched off, press "ON/STOP".
Transmitter in stand-by mode or LOW CONSUMPTION mode

2) To enter in LIB ID mode, press simultaneously "UP" and "START" functions.

DURING THE ID RELEASING PROCESS THE ORANGE LED BLINKS AND THE BUZZER IS ACTIVE. ID RELEASED PROCESS FINISHED: LED OFF and BUZZER OFF.

Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

6.5 AUTO TEACHING MODE (AUTO ID) (TRANSMITTER MODELS:T70MG10;T70MH3D;T70MH3;T70MH2)

T70MG10 TRANSMITTER MODEL

It allows to register in the receiver's database a new transmitter's ID (maximum = 32 ID)

1) With the transmitter switched off, press "ON/OFF". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in AUTO ID mode, press "9" and "10" buttons simultaneously

Keep pressed until the orange LED lights continuously.

3) Introduce the "default password" : "8-8-8-8-8" -> "10" to validate.

PASSWORD (DEFAULT) 

VALIDATE

The orange LED switches on-off when every password value is pressed.
At the validation process the orange LED blinks, indicating that the new values are being recorded into the receiver.
Once the operation has finished the orange LED switches off and the transmitter switches to stand-by or LOW CONSUMPTION mode.


T70MH3 / T70MH2 TRANSMITTER MODEL

It allows to register in the receiver's database a new transmitter's ID (maximum = 32 ID)

1) With the transmitter switched off, press "ON/STOP".
Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in AUTO ID mode, press "DOWN" and "START" buttons simultaneously

Keep pressed until the orange LED lights continuously.

3) Introduce the "default password" : "ENTER-ENTER-ENTER-ENTER" -> "START" to validate.

PASSWORD (DEFAULT) 

VALIDATE

The orange LED switches on-off when every password value is pressed.
At the validation process the orange LED blinks, indicating that the new values are being recorded into the receiver.
Once the operation has finished the orange LED switches off and the transmitter switches to stand-by or LOW CONSUMPTION mode.

Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

T70MH3D TRANSMITTER MODEL

It allows to register in the receiver's database a new transmitter's ID (maximum = 32 ID)

1) With the transmitter switched off, press "ON/STOP". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in AUTO ID mode, press "DOWN" and "START" buttons simultaneously; keep pressed this buttons until the message **** is shown in the LCD display.

****

3) Introduce the "default password" : "ENTER-ENTER-ENTER-ENTER" -> "START" to validate.

PASSWORD (DEFAULT) 

VALIDATE

Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

6.6 LOST TRANSMITTER SEARCHING MODE (TRANSMITTER MODELS: T70MG10;T70MH3;T70MH2)

T70MG10 TRANSMITTER MODEL

It allows finding one or more lost transmitters in the same working area.

1) With the transmitter switched off, press "ON/OFF". Transmitter is stand-by or LOW CONSUMPTION mode.

2) To enter in SEARCH mode, press simultaneously "7" and "10" functions.

7 + 10 Keep pressed until the orange LED lights continuously.

3) Entering "3"-"1"-"3" function's sequence, the SEARCH function will execute.

3 ▶ 1 ▶ 3 SEARCH FUNCTION EXECUTING
ORANGE LED BLINKS PERMANENTLY

4) Pressing "10" function the transmitter switches to stand-by or LOW CONSUMPTION mode.

10 STAND BY or LOW CONSUMPTION MODE

T70MH3 TRANSMITTER MODEL

It allows finding one or more lost transmitters in the same working area.

1) With the transmitter switched off, press ON/STOP to switch on (stand-by state).

2) To enter in SEARCH mode, press simultaneously "ENTER" and "START" functions.

+ START Keep pressed until the orange LED lights continuously.

3) Entering "ENTER-DOWN-ENTER" function's sequence, the SEARCH function will execute.

▶ ▶ EXECUTE SEARCH

4) Pressing "START" the transmitter switches to stand-by or LOW CONSUMPTION mode.

START STAND-BY or LOW CONSUMPTION MODE

Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

T70MH2 TRANSMITTER MODEL

It allows finding one or more lost transmitters in the same working area.

1) With the transmitter switched off, press "ON/STOP". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in SEARCH mode, press simultaneously "ENTER" and "START" functions.

+ START Keep pressed until, the orange LED will light

3) Entering "ENTER-DOWN-ENTER" function's sequence, the SEARCH function will execute.

▶ ▶ EXECUTE SEARCH

4) Pressing "START" the transmitter switches to stand-by or LOW CONSUMPTION mode.

START SWITCHED OFF or LOW CONSUMPTION MODE

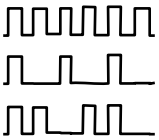
Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

6.7 PROGRAMMING PARAMETERS (PARAM) (TRANSMITTER MODELS: T70MG10;T70MH3;T70MH2)

1) When executing DOWNLOAD/UPLOAD LOCAL, if the EEPROM is wrong or not connected, the red LED will indicate "EEPROM Error" (red LED blinking during 5 secs. aprox.) and the transmitter switches to PARAM mode, ready to select a new sequence (DOWNLOAD LOCAL or UPLOAD LOCAL or DOWNLOAD REM).

2) In case of "Grave Error", the red LED and the buzzer becomes active continuously.

3) The beginning of the EEPROM updating process is signalized with orange LED, blinking in different ways.



DOWNLOAD LOCAL

UPLOAD LOCAL

DOWNLOAD REMOTE

4) The right ending of the EEPROM updating process is signalized with green LED continuously lightning on during 5 secs. aprox. and the transmitter switches to stand-by or LOW CONSUMPTION mode.

It allows making EEPROM backup copies between: internal EEPROM and external EP70 EEPROM; between EP70 external EEPROM and internal EEPROM; and to recover the content of the receiver's internal EEPROM into the transmitter's internal EEPROM**.**

1) DOWNLOAD LOCAL: It allows discharging the content of an internal EEPROM into an external EP70 extractable EEPROM.
2) UPLOAD LOCAL: It allows discharging the content of an extractable EP70 EEPROM into the internal EEPROM.
3) DOWNLOAD REM: It allows discharging the content of a receiver's internal EEPROM into the transmitter's internal EEPROM.
4) SWITCHED OFF: With this option the transmitter switches to a low consumption mode.

Transmitters:

If during transmitter's start up, an external EP70 is connected, the content of this EP70 is automatically stored into the internal EEPROM. **Remark: This operation disables the internal EEPROM check between the transmitter and the receiver contents.**

Receivers:

If an external EP70 is connected to the receiver's logic board and the LIB ID pushbutton is pressed during at least 2 seconds, the content of the EP70 is stored into the internal EEPROM.

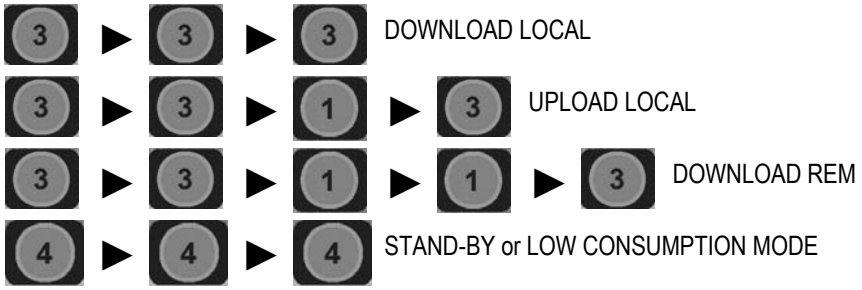
T70MG10 TRANSMITTER MODEL

1) With the transmitter switched off, press "ON/OFF". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in PARAM mode, press simultaneously "4" and "10" functions.

Keep pressed until, the orange LED lights continuously.

3) Entering modes:



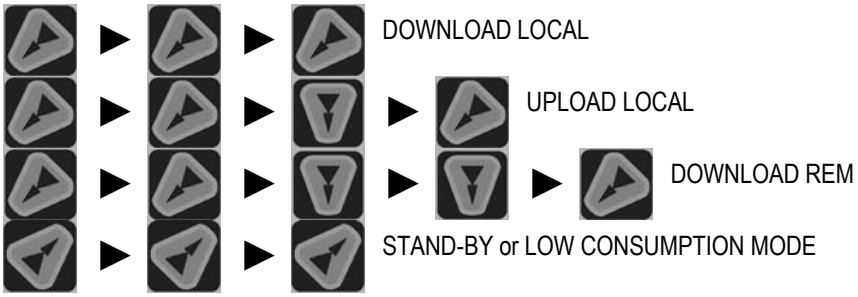
T70MH3 TRANSMITTER MODEL

1) With the transmitter switched off, press "ON/STOP". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in PARAM mode, press simultaneously "ENTER" and "START" functions.

Keep pressed until the orange LED lights continuously.

3) Entering modes:



Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

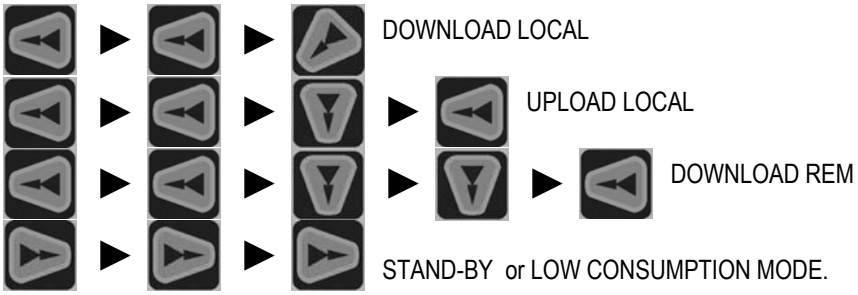
T70MH2 TRANSMITTER MODEL

1) With the transmitter switched off, press "ON/STOP". Transmitter in stand-by or LOW CONSUMPTION mode.

2) To enter in PARAM mode, press simultaneously "ENTER" and "START" functions.

Keep pressed until the orange LED lights continuously.

3) Entering modes:



Note: In two steps pushbutton keypads the special functions are activated pressing the first step.

6.8 PROGRAMATION (TRANSMITTER MODEL T70MH3D)

The availability to enter in programation mode is restricted to transmitter's models with LCD (model T70MH3D). The software architecture presents this following message's levels:

1											
M	E	S	S	A	G	E					

1	.	X1									
M	E	S	S	A	G	E					

1	.	X1	.	X2							
M	E	S	S	A	G	E					

1	.	X1	.	X2	.	X3					
M	E	S	S	A	G	E					

TRANSMITTER'S SWITCH ON PROCESS

With the transmitter switched off, press "ON/STOP" during 2 secs. and the following message is displayed in the LCD:

I	N	I	T	I	A	L	I	Z	I	N	G
P	L	E	A	S	E		W	A	I	T	

This message will remain in the LCD display when reading the internal EEPROM. Finally the transmitter will switch off remaining in switched off mode, (no message will be displayed); only the battery level icon will be displayed:
[▓▓▓] / [_▓▓] / [__▓] / [____] (different battery level indications: full, medium, low and empty).

SEQUENCE TO ACCESS TO PROGRAMATION MODE
With the transmitter switched off, press "ENTER" and "SART" simultaneously, during 3 secs. The message "PROGRAMATION" will be displayed in the LCD.

 + 

Programation mode sequence activation from switched off mode.

P	R	O	G	R	A	M	A	T	I	O	N

Pressing ESC, the transmitters turns to switched off mode.
Pressing ENTER, the software menu is available (use "UP" / "DOWN" arrows to navigate in the software):

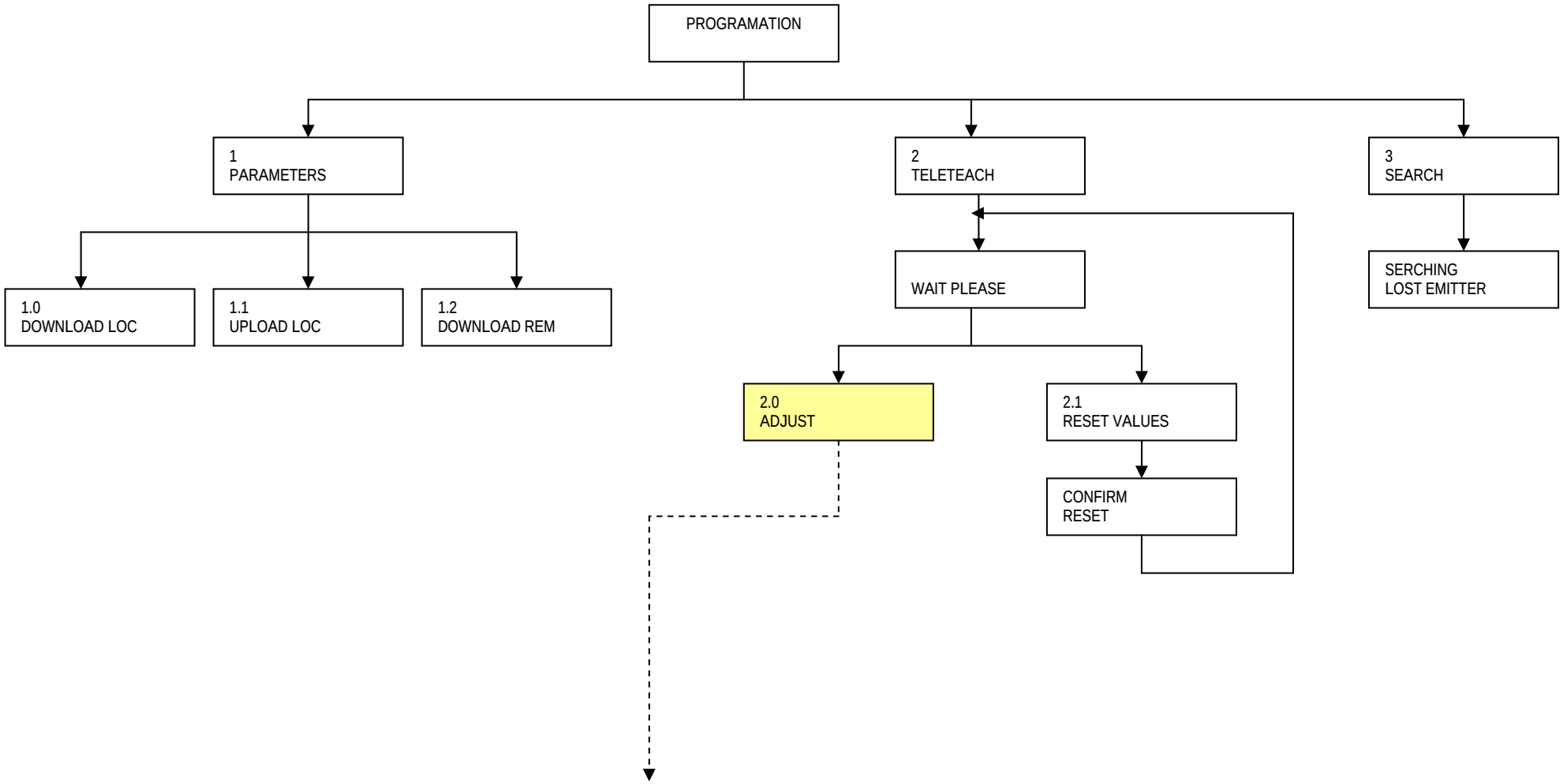
 UP

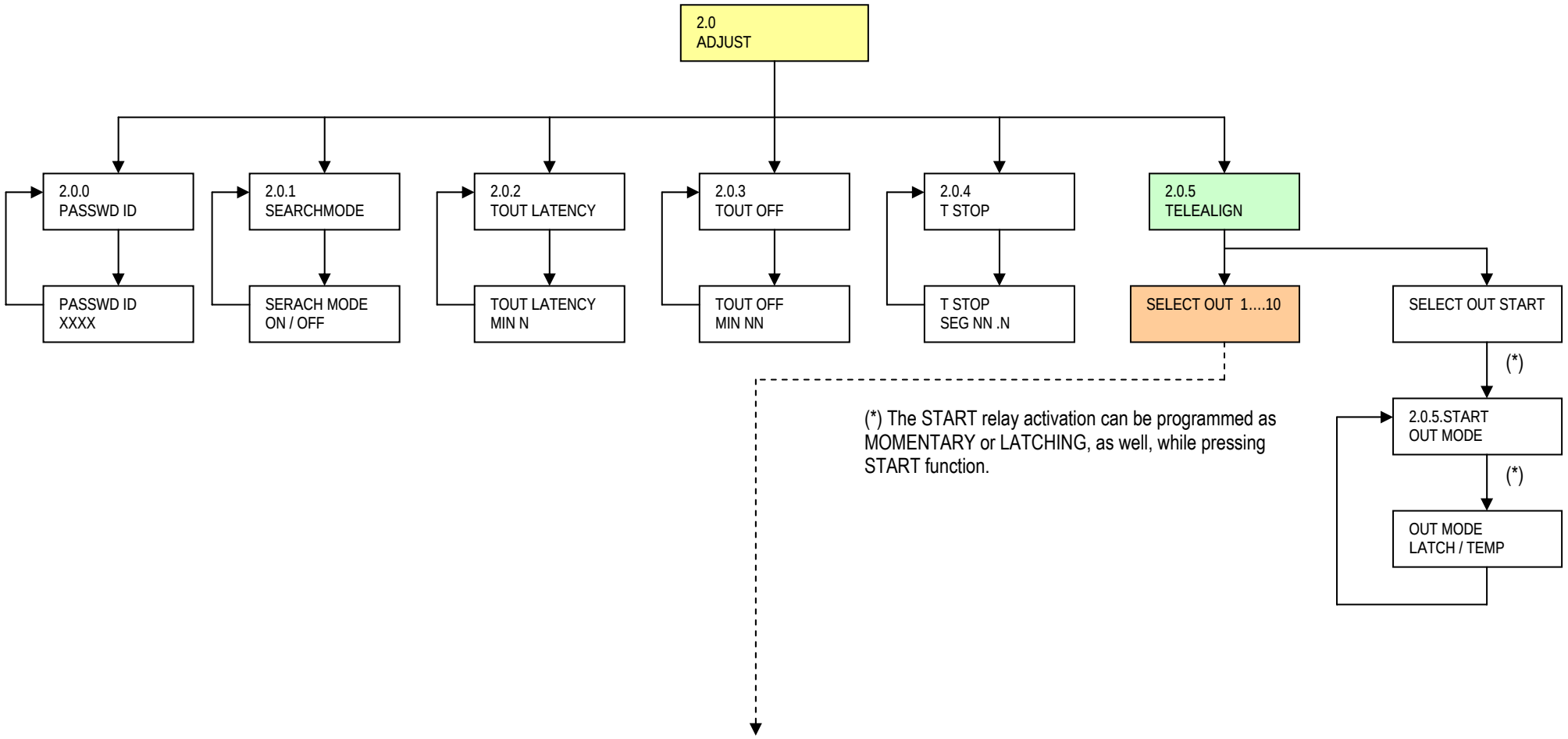
 DOWN

 VALIDATE (ENTER) and ACCESS TO A LOWER LEVEL OF THE MENU

 LEAVE / ACCESS TO AN UPPER LEVEL OF THE MENU

6.8.1- PROGRAMMING MODE: BLOCK DIAGRAM




2.0
ADJUST
2.0.0
PASSWD ID
PASSWD ID
XXXX
2.0.1
SEARCHMODE
SERACH MODE
ON / OFF
2.0.2
TOUT LATENCY
TOUT LATENCY
MIN N
2.0.3
TOUT OFF
TOUT OFF
MIN NN
2.0.4
T STOP
T STOP
SEG NN .N
2.0.5
TELEALIGN
SELECT OUT 1....10
SELECT OUT START
(*)
2.0.5.START
OUT MODE
(*)
OUT MODE
LATCH / TEMP
(*) The START relay activation can be programmed as MOMENTARY or LATCHING, as well, while pressing START function.

6.8.2.- PROGRAMMABLE PARAMETERS (TELE-ALIGNED):

PROGRAMMABLE VALUES (TELE-ALIGNED)

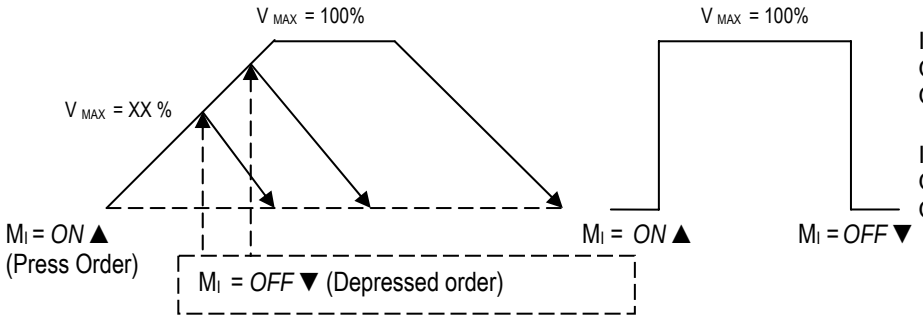
Parameter	Default value	Range (programmable values)
PASSWD ID	xxxx	Any combination of 4 functions, excluding 2nd speed, STOP and START (Coded)
START (Coded)		Described in the Service Manual
SEARCH MODE	OFF	ON, OFF. (SEARCH MODE)
TOUT LATENCY	4min	1 to 6min; steps of 1 min, and infinite ("INF" value) minutes. (Time to LATENCY state).
TOUT OFF	15min	10 to 20min step of 1 min, and infinite ("INF" value). (Time from LATENCY state to SWITCH OFF state).
TSTOP	2sec	1 to 10sec.: steps of 0,1sec. (Passive STOP time)
OUTMODE	MOMENTARY	MOMENTARY or LATCHING (OUTPUTS: OPERATING MODES)
SOFTSTART	ON	ON or OFF (Enable or Disable soft start)
SOFTSTOP	ON	ON or OFF (Enable or Disable soft stop)
ACCELRAMP	0,1sec	0,0sec, 0,1sec, 0,2sec, 0,3sec, 0,4sec, 0,5sec, 0,6sec, 0,8sec, 1,0sec, 1,2sec, 1,5sec, 1,7sec, 2.0sec, 2,5sec 3,5sec, 5.0sec (Ramp acceleration adjustment for each output)
DECELRAMP	0,1sec	0,0sec, 0,1sec, 0,2sec, 0,3sec, 0,4sec, 0,5sec, 0,6sec, 0,8sec, 1,0sec, 1,2sec, 1,5sec, 1,7sec, 2.0sec, 2,5sec 3,5sec, 5.0sec (Ramp deceleration adjustment for each output)
ASSIGN TABLE	Xxx	Described in the Service Manual
PWM FREQ	300Hz	30Hz to 300Hz ; Step = 10Hz. (R70MP10: PWM output frequency adjustment. Independent for each output).

6.8.3.- OUTPUT PROGRAMMING MODES (TELE-ALIGNED)

In Menu 2.0.5.x.0 OUTMODE: select "MOMENTARY" for MOMENTARY OUTPUT and "LATCHING" FOR LATCHED (LOCKED) OUTPUT.

OUTPUT PROGRAMMING WITH ONE STEP KEYPAD: "MOMENTARY" OUTPUT MODE or "LATCHING" OUTPUT MODE.

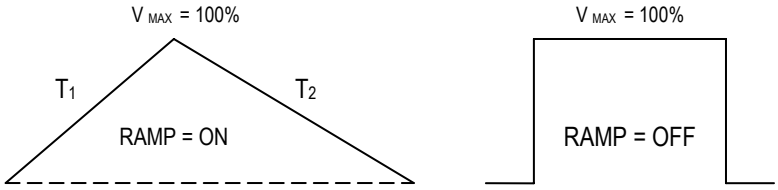
1) RAMP-UP PROGRAMMING (RAMP= ON) 2) ON/OFF PROGRAMMING (RAMP= OFF)



In 2.0.5.x.1 software menu SOFT START, select:
ON to enable ACCELERATION RAMP
OFF to disable ACCELERATION RAMP

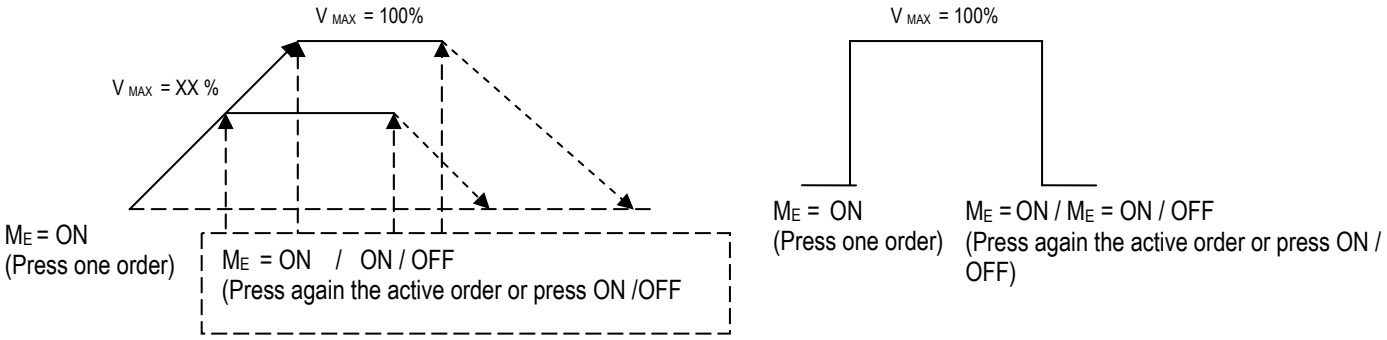
In 2.0.5.x.2 software menu SOFT STOP, select:
ON to enable DEACCELERATION RAMP
OFF to disable DEACCELERATION RAMP

In MOMENTARY mode, the outputs remain actives while the orders are pressed. They can be programmed in ramp mode (soft start and soft stop programmable independently) or ON/OFF mode.
M_I = Whatever 10 functions or generic keypad orders (1, 2, 3…….8, 9 10)

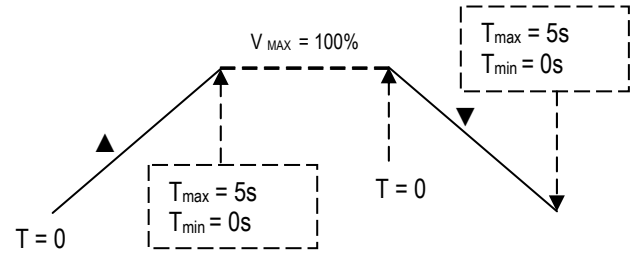


OUTPUT PROGRAMMING WITH ONE STEP KEYPAD: "LATCHING" OUTPUT MODE.

1) RAMP-UP PROGRAMMING (RAMP= ON) 2) ON/OFF PROGRAMMING (RAMP= OFF)



In LATCHING output mode the outputs remain active, once the order has been pressed until: a) the same order is pressed again; b) the ON/OFF function is pressed. They can be programmed in ramp mode (soft start and soft stop programmable independently) or ON/OFF mode.
M_I = Whatever 10 functions or generic keypad orders (1, 2, 3…….8, 9 10)



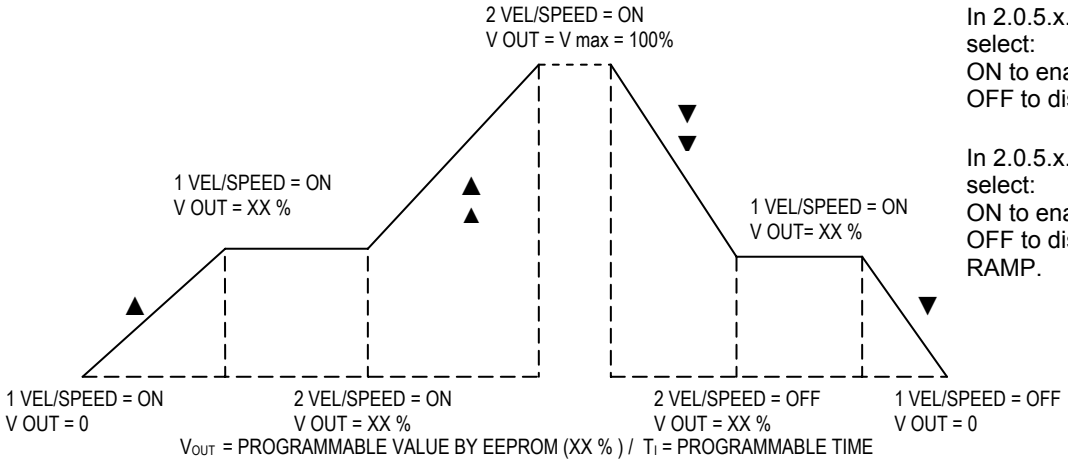
In 2.0.5.x.3.0 software menu ACCEL RAMP, select:
ACCEL TIME
SEG NN

In 2.0.5.x.3.1 software menu DECEL RAMP, select:
DECEL TIME
SEG NN

The ramp up time (up or down) is fully programmable (Tele-Aligned). The programmed time is the time to achieve Vmax. from 0v of the PWM output signal.

TWO STEP KEYPAD PROGRAMMING

1) RAMP-UP PROGRAMMING (RAMP= ON)

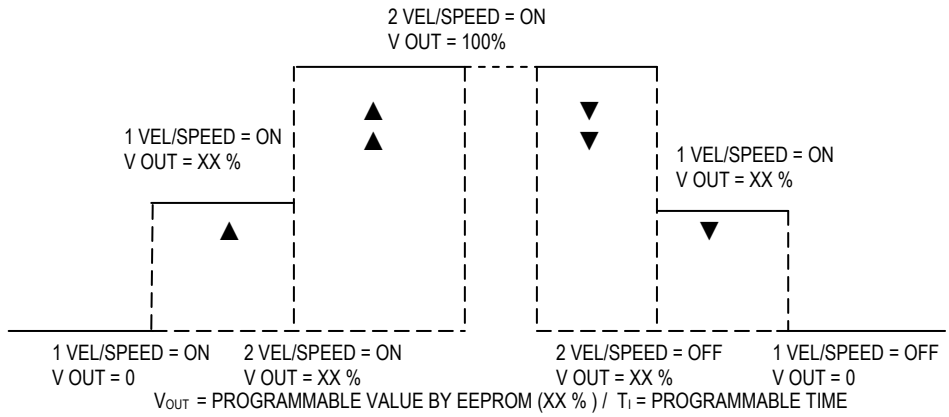


In 2.0.5.x.1 software menu SOFT START, select:
ON to enable ACCELERATION RAMP.
OFF to disable ACCELERATION RAMP.

In 2.0.5.x.2 software menu SOFT STOP, select:
ON to enable DEACCELERATION RAMP.
OFF to disable DEACCELERATION RAMP.

For two steps keypads, the 2nd speed value is V max (100%).
The 1st speed value is Vout, and is programmable (Tele-aligned = XX %).

2) ON/OFF PROGRAMMING (RAMP= OFF)



For two steps keypads, the 2nd speed value is V max (100%).
The 1st speed value is Vout, and is programmable (Tele-aligned = XX %).

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IKUSI

AENOR Asociación Española de Normalización y Certificación

Copia

ER-0149/1996

CERTIFICADO DE REGISTRO DE EMPRESA

REGISTERED FIRM CERTIFICATE

ER-0149/1996

La Asociación Española de Normalización y Certificación (AENOR) certifica que el Sistema de Gestión de la Calidad adoptado por: *The Spanish Association for Standardization and Certification (AENOR) certifies that Quality Management System adopted by:*

ANGEL IGLESIAS, S.A. (IKUSI)

para: *for:*

LAS ACTIVIDADES DETALLADAS EN EL ANEXO AL CERTIFICADO

THE ACTIVITIES SPECIFIED IN ANNEX TO THE CERTIFICATE

que se realiza/n en o desde el establecimiento: *which is/are carried out in or from the establishment:*

PO MIRAMON, 170
20009 - SAN SEBASTIAN
(GUIPUZCOA)

es conforme a las exigencias de la Norma Española **UNE-EN ISO 9001:2000** Sistemas de Gestión de la Calidad. Requisitos. *Complies with the requirements of the Standard **UNE-EN ISO 9001:2000** Quality Management Systems. Requirements.*

El presente Certificado es válido salvo suspensión, expiración o retirada notificada en tiempo por AENOR. *The Certificate is valid unless it is suspended, cancelled or withdrawn upon AENOR'S written notification.*

Cualquier aclaracion adicional relativa tanto al alcance de este certificado como a la aplicabilidad de los requisitos de la norma ISO 9001:2000 puede obtenerse consultando a la organización. *Further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2000 requirements may be obtained by consulting the organization.*

Fecha de emisión: **1996-04-12**	Fecha de renovación: **2005-09-30**	Fecha de expiración: **2008-09-30**
Issued on	*Renewed on*	*Expires on*

AENOR

El Director General de AENOR
General Manager of AENOR

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Entidad de certificación acreditada por ENAC con acreditación nº 01/C-SC003

AENOR Asociación Española de Normalización y Certificación

ANEXO AL CERTIFICADO DE REGISTRO DE EMPRESA

ANNEX TO THE REGISTERED FIRM CERTIFICATE

ER-0149/1996

El alcance del Certificado de Registro de Empresa de ANGEL IGLESIAS, S.A. (IKUSI) con nº **ER-0149/1996** incluye las siguientes actividades: *The scope of Registered Firm Certificate of ANGEL IGLESIAS, S.A. (IKUSI) nº ER-0149/1996 includes the following activities:*

EL DISEÑO, EL DESARROLLO, LA PRODUCCIÓN, LA INSTALACIÓN Y EL SERVICIO POSVENTA DE: SISTEMAS DE INFORMACIÓN AL PÚBLICO: PANELES TELEINDICADORES, MONITORES GRÁFICOS Y ALFANUMÉRICOS, MEGAFONÍA AUTOMÁTICA, SOFTWARE GENERAL DEL SISTEMA. GESTIÓN Y CONTROL DE INSTALACIONES DE TRÁFICO Y SEÑALIZACIÓN FERROVIARIA Y VIARIA. COMUNICACIONES DE VOZ Y DATOS, ADQUISICIÓN DE DATOS Y MONITORIZACIÓN DE PROCESOS, SOFTWARE GENERAL DEL SISTEMA. SISTEMAS ELECTRÓNICOS A BORDO PARA FERROCARRIL Y VEHÍCULOS DE TRACCIÓN.

EL DISEÑO, EL DESARROLLO, LA PRODUCCIÓN Y EL SERVICIO POSVENTA DE:
EQUIPO ELÉCTRONICO Y ACCESORIOS PARA EL SUBSISTEMA RADIANTE, CABECERA, RED EXTERIOR, Y ABONADO, EN REDES DE BANDA ANCHA DESTINADAS A LA TRANSMISIÓN Y DIFUSIÓN AUDIOVISUAL Y MULTIMEDIA. EL EQUIPO DE ANTENA, CABECERA, DISTRIBUCIÓN Y USUARIO PARA INSTALACIONES O COLECTIVIDADES DESTINADAS A LA CAPTACIÓN DE SEÑALES DE RADIOFRECUENCIA TRANSMITIDAS POR VÍA TERRENA O POR SATÉLITE (SMATV, MATV). EL EQUIPO DE RADIOFRECUENCIA Y EQUIPO DE FIBRA ÓPTICA PARA TRANSMISIÓN, PROCESAMIENTO Y RECEPCIÓN DE SEÑALES ANALÓGICAS Y DIGITALES POR CABLE O RADIADAS. TELECONTROL: CONTROL REMOTO POR RADIO, TELEMANDO POR INFRARROJOS.

THE DESIGN, THE DEVELOPMENT, THE PRODUCTION, THE INSTALLATION AND AFTER SALES SERVICE OF: PUBLIC INFORMATION SYSTEMS: INFORMATION PANELS, GRAPHIC AND ALPHANUMERICAL SCREENS, AUTOMATIC MEGAPHONE SYSTEMS, GENERAL SYSTEM SOFTWARE. MANAGEMENT AND CONTROL OF TRAFFIC INSTALLATIONS AND ROAD AND RAIL SIGNALLING. VOICE AND DATA COMMUNICATION, DATA ADQUISITION AND PROCESS MONITORING, GENERAL SYSTEM SOFTWARE. ELECTRONIC ONBOARD SYSTEMS FOR TRAINS.

THE DESIGN, THE DEVELOPMENT, THE PRODUCTION AND AFTER SALES SERVICE OF: ELECTRONIC EQUIPMENT AND ACCESSORIES FOR RADIATING SUBSYSTEM, HEADEND, OUTSIDE NETWORK AND SUBSCRIBER IN BROADBAND NETWORKS INTENDED FOR TRANSMISSION AND AUDIOVISUAL BROADCASTING AND MULTIMEDIA. AERIAL, HEADEND, DISTRIBUTION AND USER EQUIPMENT FOR INDIVIDUAL AND COMMUNITY INSTALLATIONS FOR THE CAPTURING OF RADIO FREQUENCY SIGNALS COMING FROM SATELLITE OR TERRESTRIAL TRANSMITTERS (SMATV, MATV) RADIO FREQUENCY AND FIBRE OPTIC EQUIPMENT FOR TRANSMISSION, PROCESSING AND THE RECEPTION OF ANALOGUE AND DIGITAL SIGNALS BY CABLE OR RADIATED. REMOTE CONTROL. RADIO REMOTE CONTROL: REMOTE CONTROL BY INFRARED.

Fecha de emisión: **1996-04-12** *Issued on*
Fecha de renovación: **2005-09-30** *Renewed on*
Fecha de expiración: **2008-09-30** *Expires on*

AENOR Asociación Española de Normalización y Certificación

Por AENOR. El Director General
On behalf of AENOR. The General Manager

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IKUSI

[redacted] ®

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and **AENOR**
hereby certify that the organization

ANGEL IGLESIAS, S.A. (IKUSI)

PO MIRAMON, 170
20009 - SAN SEBASTIAN
(GUIPUZCOA)

for the following field of activities

THE ACTIVITIES SPECIFIED IN ANNEX TO THE CERTIFICATE

has implemented and maintains a

Quality Management System

which fulfills the requirements of the following standard

ISO 9001:2000

Issued on: **1999-08-01** Renewed on: **2005-09-30** Validity date: **2008-09-30**

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Annex to IQNet Certificate Number ES-0149/1996

ANGEL IGLESIAS, S.A. (IKUSI)

Activities within the scope of IQNet Certificate ANGEL IGLESIAS, S.A. (IKUSI) Number ES-0149/1996 include the following:

THE DESIGN, THE DEVELOPMENT, THE PRODUCTION, THE INSTALLATION AND AFTER SALES SERVICE OF: PUBLIC INFORMATION SYSTEMS: INFORMATION PANELS, GRAPHIC AND ALPHANUMERICAL SCREENS, AUTOMATIC MEGAPHONE SYSTEMS, GENERAL SYSTEM SOFTWARE. MANAGEMENT AND CONTROL OF TRAFFIC INSTALLATIONS AND ROAD AND RAIL SIGNALLING, VOICE AND DATA COMMUNICATION, DATA ADQUISITION AND PROCESS MONITORING, GENERAL SYSTEM SOFTWARE. ELECTRONIC ONBOARD SYSTEMS FOR TRAINS.

THE DESIGN, THE DEVELOPMENT, THE PRODUCTION AND AFTER SALES SERVICE OF: ELECTRONIC EQUIPMENT AND ACCESSORIES FOR RADIATING SUBSYSTEM, HEADEND, OUTSIDE NETWORK AND SUBSCRIBER IN BROADBAND NETWORKS INTENDED FOR TRANSMISSION AND AUDIOVISUAL BROADCASTING AND MULTIMEDIA. AERIAL, HEADEND, DISTRIBUTION AND USER EQUIPMENT FOR INDIVIDUAL AND COMMUNITY INSTALLATIONS FOR THE CAPTURING OF RADIO FREQUENCY SIGNALS COMING FROM SATELLITE OR TERRESTRIAL TRANSMITTERS (SMATV, MATV) RADIO FREQUENCY AND FIBRE OPTIC EQUIPMENT FOR TRANSMISSION, PROCESSING AND THE RECEPTION OF ANALOGUE AND DIGITAL SIGNALS BY CABLE OR RADIATED. REMOTE CONTROL. RADIO REMOTE CONTROL: REMOTE CONTROL BY INFRARED.

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This annex is only valid in connection with the above-mentioned certificate.

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AENOR Asociación Española de Normalización y Certificación

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