# TL-60

## LUTHOR®
### TECHNOLOGIES

DUAL BAND VHF/UHF
TRANSCEIVER

VHF/UHF
144/430 MHz

USER'S MANUALS

CE 0700 ①

We want to appreciate the confidence shown by purchasing this dual band transceiver **LUTHOR TECHNOLOGIES model TL-60**. This transceiver offers an innovative design in terms of technology and multi-functionality. Its high quality and extensive features make it one of the best equipments in its field, we trust in your total satisfaction with your expectations and communication needs.

In the design of **TL-60** every effort, excitement and professionalism has been made to finally reach the obtained result, an **EASY HANDLING DUAL BAND** VHF/UHF transceiver with a **RELIABILITY** only reachable by the best worldwide manufacturers.

An important sector's professional team has taken part in its development, even though maybe the newest aspect has been joining forces with different user profiles to capture the needs of many groups. Besides the transceiver's **QUALITY** and **RELIABILITY** the main concern was to get an equipment than can be used both by experienced users in this kind of devices, and by beginners with any kind of experience, for that reason the **TL-60 EASY HANDLING** is brilliantly distinguished.

Please read carefully the following manual before using the transceiver in order to guarantee the equipment's maximum performances.

The use of the symbol shows that this equipment it's under use restrictions in certain countries.

Countries where the use of this equipment is permitted, without prejudice that in any of them their administration request a licence, an authorisation or indicates some restrictions. In case of doubt we recommend you to request the competent authority of the country where you intend to use this equipment.

| AT | BE | DK | FI | FR | DE | GR | IS | LT | MT | PL |
|----|----|----|----|----|----|----|----|----|----|----|
| IE | IT | LI | LU | NL | NO | PT | ES* | SK | SI |    |
| SE | CH | GB | CY | CZ | EE | HU | LV | BG | RO |    |

*ES: for using this transceiver, the user must have a **personal** amateur radio **licence**.

The use of amateur radio transceivers is allowed within the frequencies assigned for an amateur use: that is 144-146 MHz on VHF, 430-440 MHz on UHF and both on dual band transceivers.

# Contents

# LUTHOR
### TECHNOLOGIES

# Cautions and practical advices

⚠ Both the transceiver and the elements supplied with it are not toys, and as you can see later on this text of compulsory reading for the user, prior to unpacking the equipment and its accessories detailed below, you should consequently keep them out of: children's, persons with reduced cognitive capacity, and domestic or wild animals reach.

⚠ Any repair must be made only for qualified personal, in case of any problem in the equipment or any of its components you must contact your dealer or a professional and qualified technical service.

⚠ Under no circumstances disassemble, modify or manipulate the transceiver, the battery or the charging elements. Apart from the physical hazard that this implies for the user, the equipment and the accessories would lose their warranty.

⚠ The inappropriate handling of the transceiver or its accessories, could make change any of the technical features of them, in such a way that might affect their operation, the equipment's security, the user's physical integrity or the technical parameters, which may affect the features as designed, manufactured and marketed. In those cases the user shall be solely responsible for all the disadvantages and liquidated damages that might result of this action, both the manufacturer and the dealer shall be relieved of such liability.

⚠ Do not use the transceiver for any purpose other than it was designed for.

⚠ Do not use the transceiver if you see deterioration or breakage in any of its parts. Do not hit the equipment or the battery and by all means avoid the risk of falling that may damage it.

⚠ Do not expose the product to extremely high temperatures up to 45° or temperatures below 0°. That could significantly affect its operation and the battery could even ignite or explode (read carefully the cautions and practical advices for batteries described in detail below in this manual).

⚠ Do not place the transceiver or the battery above heating sources such as radiators, heaters, etc. that might seriously damage the equipment or the battery with the consequent risk of malfunctioning or overheating of them causing a burn down or an explode.

⚠ Do not use or charge both the transceiver and the battery if they are wet. Make sure that

they are completely dry before using it or charging the battery. Neither use the equipment with your hands wet.

⚠ Do not supply the equipment with a different tension than the one indicated by the manufacturer. Neither use a different battery than the one supplied by the manufacturer for this equipment. It might cause a burn down or an explode. Do not following this advice will carry an important risk for both the equipment and the user.

⚠ Do not use the transceiver during a thunderstorm (lightning storm), you would be expose yourself to a potential risk and danger of serious injuries or even the death.

⚠ For cleaning the transceiver and its accessories make sure is turned off, use a damp cloth (not wet). Do not use liquids, detergents nor any other chemical substance. Do not clean with a dry cloth in order to avoid the creation of static electricity.

⚠ Do not use the transmission button PTT if is not necessary.

⚠ An extended transmission could lead to transceiver's or battery's overheating, causing a transceiver's failure, burns or even the battery's explosion. Take care specially if you change the battery, it is not recommended until the temperature has significantly reduced.

⚠ Do not use the transceiver in any susceptible of flammable or potentially explosive environment. Do not use the device specially on petrol stations, chemical industries, explosives factories, ammunition warehouses, close to combustibles, chemical products, storage silos, tank lorries with dangerous goods, in presence of gas, nor in demolition areas. For most of those scenes are some specially designed and authorised transceivers that can be used without any risk, consult your dealer.

⚠ Do not use the transceiver in hospitals nor close to medical equipments that can suffer interferences caused by radio frequencies. If you use medical equipments, get in contact with the manufacturer to ensure that the equipments are protected from the radio frequencies.

⚠ Do not use the transceiver close to a pacemaker. Do not use the device in a distance less than 30 centimetres from a pacemaker, since the device can interfere with it and result in a serious accident. To minimise the possible interference with a pacemaker, use the device on the opposite side of the body from the pacemaker location.

⚠ Turn off the transceiver when you board an aeroplane. The use of electronic devices on

board of an aeroplane is restricted and subjected to the rules applied to those devices. It can interfere with the navigation electronic instruments of the aeroplane. In case of doubt ask the crew members about the possible restrictions of using the transceiver also in other kind of public transports like trains, ships, etc.

⚠ Do not use the transceiver if you are driving any kind of vehicle. Concentrate yourself exclusively on driving. In addition to infringe traffic laws, you could put passengers, street users and your security, at serious risk.

⚠ In case of leaving the transceiver, leave it on a stable location. Giving a special attention on vehicles so that the device do not slow down the driving. Never place the transceiver in the operating range or on the inflatable protection systems (Airbag), because in case of a protection system activation, the transceiver will be throw out with at high speed and strength and could hit the driver or passengers with serious or lethal results.

⚠ On vehicles, it is possible that the transceiver could interfere or be interfered due to radio frequencies. That could cause the wrong operation of vehicle's electronic equipments or otherwise, the transceiver could be the interfered one. In this case, keep in contact with your dealer, technical service or manufacturer to report this abnormality. Keep special attention in case of electric or hybrid vehicles and prior of using the transceiver ask the manufacturer of this kind of vehicles.

⚠ When walking or moving, use the transceiver with caution to avoid physical risks of yourself and other people around.

⚠ To guarantee a greater performance of the transceiver's microphone and that the sound clearly arrives to your interlocutor, when you talk, make it keeping the transceiver between 5 and 10 centimetres from your mouth.

⚠ For connecting accessories like earphones, speakers, programming cables, etc. always turn off the transceiver previously. Once installed the accessory turn it on again. Use the manufacturer recommended accessories.

⚠ Prior to using earphones or micro-earphones, check the transceiver's volume, a high volume level will damage the ear. A prolonged use of those accessories could cause audition's harm: auditive capacity degradation, vertigo, dizziness, etc. that's why it is recommended to use a suitable volume and not extending its use for a long time, taking breaks and alternating the ear.

⚠ Please pay special attention to the use of transceiver's external accessories like earphones or micro-earphones, etc. The cable used for those accessories could get caught up on machinery, vehicles, etc. causing the consequent transceiver's or accessory material risk or even pose a danger the user's physical integrity. This applies also to cases for protecting the transceiver or the transceiver itself when using the belt clip.

⚠ While using the transceiver avoid the contact of the antenna with your eyes, your face or other parts of your body. Keep the antenna in a vertical position and far from your body during transmission, so the transceiver will give its maximum performance in addition to your physical integrity.

⚠ Do not take nor grab your transceiver through the antenna, making that can cause damages both to the antenna and the transceiver. Besides the bad operation of the equipment can cause physical damages to the user or to others.

⚠ Do not use the transceiver if the covering from the antenna is damaged, immediately replace the antenna if is a removable one or contact your authorised technical service if is a fixed antenna. Do not taking this advice into account can cause burns for radio frequency to the user.

⚠ The cards and documents with a magnetic band, as credit, telephone or medical cards, savings books, etc. can be damaged due to the transceiver's radio frequency. Likewise, take care with information's storage or memory devices, those could be damaged by the transceiver's radio frequency.

⚠ When using the transceiver in public places try not to disturb the people around you.

# Cautions and practical advices for the battery and the charger

⚠ This transceiver is supplied with a Lithium-Ion (Li-Ion) battery.

⚠ The excessive battery's overheating can cause the battery to ignite or explode with the resulting risk of serious physical damages or even the death. Avoid exposing it to temperatures up to 45°.

⚠ Be careful with the equipment and specially with the battery. A hit could damage the equipment or the battery and if the worst comes to the worst the explosion or burn of the battery.

⚠ If you see a deterioration, a hit or a crack on the battery cover do not use it and replace it immediately. If you do not make it the battery could cause damages to the equipment or the user because of ignite or explode. Be particularly careful if from inside the battery leaks out any kind of liquid or another material, that could cause chemical burns on your skin or your eyes, in that case contact a doctor immediately for advice on how to proceed and go to the nearest emergency unit.

⚠ SERIOUS DANGER: under no circumstances short-circuit or short across the battery terminals, that could irreversibly damage the battery and if the worst comes to the worst the explosion or burn of the battery with the possible physical damages for the user, that could be extremely serious injuries or even the death. Consequently you must:

- Transport the equipment properly so that the terminals can not short-circuit accidentally.
- Do not carry it in your pocket with metallic objects like keys, coins, etc.
- Do not place the equipment with its terminals making contact on a metallic, wet or conductive surface, that will cause a short-circuit of the terminals.
- Avoid the contact of the equipment and the battery with water or conductive liquids.
- Do not lick, bite or touch with your wet hands the battery terminals.

⚠ Do not use the supplied battery by the manufacturer for another transceiver than the one

supplied. Do not following this advice implies an important risk of ignite or explode, and could seriously damage both the equipment and other people around.

⚠ Do not apply a soldering iron on the battery terminals, could cause the battery overheating with the consequent risk of suffering a serious accident.

⚠ Remember that inside a vehicle could reach extreme heat or cold temperatures, in one of those situations the battery could ignite or explode.

⚠ Never charge the battery with another charger than the one original supplied by the manufacturer. The charger is specific for the battery's technology. Using another charger will damage the battery and could cause the battery to ignite or explode with the consequent risk of suffering a serious accident.

⚠ Both the battery and charger contacts must be at all times clean. A bad maintenance of those elements and its deterioration could cause a bad operation, overheat, ignite or explode from the equipment.

⚠ Do not leave the transceiver or the battery close to magnetic fields. It is possible that this cause the bad operation of the transceiver or the battery. It is also possible the battery's discharge due to the action of this magnetic fields.

⚠ In case of not using the transceiver during a long period of time of weeks or months, it is strongly recommended to take off the Li-Ion battery and store it on a cool and dry place, without direct sun light and with a temperature between 5 and 25 degrees. Never store the battery completely discharged or with only a low load, that could cause an irreparable damage to the battery to the point of becoming unusable. It is also inadvisable to store the battery for a long period of time with 100% of the load, the ideal is store it with a 40% of the load, this will extend the battery's working life.

⚠ After a long period of time without being used, the Li-Ion batteries gradually lose its load. Whereby try to use it and charge it with a certain frequency in order to extend the battery's working life.

⚠ Do not use the charger/feeder if the cables or plugs are damaged. That could cause electrical shocks, ignites and explodes. Dispose the product and buy a new one from your dealer.

⚠ Do not use the charger/feeder if the socket outlet is damaged or loose. That could cause

electrical shocks, ignites and explodes. In that case, call a professional electrician to solve the problem.

⚠ During the charging process do not touch none of its components nor the battery. That could cause electrical shocks with serious security risk or even the death.

⚠ Do not touch the charger, any of its components nor the battery with wet hands nor your bare feet. That could cause electrical shocks with serious security risk or even the death.

⚠ Do not short-circuit the charger/feeder terminals. That could seriously damage the system and void it or even catch on fire with a serious risk for the security of the people and facilities where the equipment is located.

⚠ The Li-Ion batteries have a circuit available that cuts the energy supply once the charge is completed. Usually the charger shows this situation through a LED indicator. But facing the possibility of an error or an overheating both on the charger and on the battery, is appropriate not to let the charger permanently connected to the wall outlet and even less with the battery installed. Once the charge is completed it is strongly recommended to quit the battery from the charger and disconnect it from the electricity supplies.

⚠ During the charging process, if any of its components: transceiver, battery, cables, charger, wall feeder, etc. will give off smoke or a strange smell, with great caution disconnect the charger from the wall outlet and remove the transceiver or the battery in case is being charged alone. If the battery is installed on the transceiver remove it immediately and do not use the equipment. Get immediately in contact with your dealer or technical service.

⚠ Do not cover nor put any kind of objects over the transceiver, the battery, the charger, the feeder or the cables. That could cause an overheating or damages on the elements with the consequent risk of burn or explosion.

# Main features

Dual band, dual display, dual wait mode
2 x 128 memory channels
FM Radio reception with 25 channels
Selectable frequency steps
VOX hands free function
CTCSS / DCS coding and decoding
Low battery alarm
Emergency alarm
Repeater shift function
ANI function
DTMF function
Reverse frequency function
Selectable tricolour backlight
English voice guide
1750Hz tone

# Unpacking of the equipment and content

Unpack carefully the content of your transceiver's box. We recommend you to verify the elements listed in the following table before discarding the package. If some element is missing or it had been damaged due to the shipping, please contact your **LUTHOR TECHNOLOGIES** dealer as soon as possible.

## Supplied accessories

TL-60
Transceiver
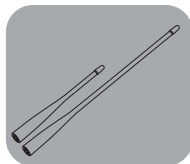
2 Antennas

Li-Ion Battery
TLB-460
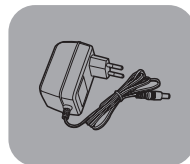
Charger adapter
TLC-360/1

Desktop charger
TLC-360

Hand strap
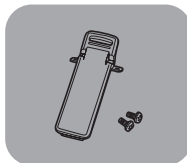
Belt-clip
TLP-160

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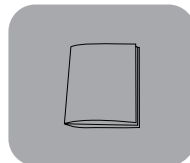
# Battery charge

This device is equipped with a Lithium-Ion battery (also known as Li-Ion or simply Lithium battery). The main features of these batteries are lightness, no memory effect and a high energetic capacity in a reduced size. It is necessary to take some cautions with the Lithium batteries, therefore we recommend you to carefully read the cautions and advices regarding the Lithium batteries and the charger in the section "Cautions and practical advices for the battery and the charger" located from pages 10 to 12.

To carry out the charge of the batteries, the equipment is supplied with an intelligent charger that identifies the battery charge to recharge it only during the necessary time to complete its full capacity. In the case where the battery is totally flat, the full capacity will be reached in less than 6 hours. The charging LED indicator will show you the charging status:

| LED indicator | Status |
|---------------|-----------|
| Red | Charging |
| Green | Completed |

**Advices:**

- The battery is not completely factory-charged, please, charge it before prior to first use.
- The battery will reach its maximum capacity, once it is two or three times charged and discharged. When the battery capacity is low, please, charge or change the battery.
- When the battery load duration is too low even though had been completely charged, the battery is exhausted, please, replace it for a new one.

⚠ **DANGER**: do not charge the battery with another charger than the original and do not try to charge another battery different from the one provided by the brand for this charger. Do not following this advice implies an important risk of ignite or explode, and could seriously damage both the equipment and other people around or even the death.

**Antenna:**
The short antenna is suitable for short distance communications, while the long antenna will offer you a better communication. Carrying the antenna on your waist will not make you uncomfortable. With bad weather or between trees conditions the communication range will be reduced, please, plan in advance in order to avoid any issue for your communication or your security.

# Accessories installation

## Battery installation

1. Line up the battery slots with the guide situated on the aluminium case, making sure that both are in contact and aligned, slide the battery towards the upper transceiver's part until the battery fastening button locks it. (Figure 1)
2. To remove the battery, please, make sure the radio is powered off, and making sure the battery and the radio are separated, press the battery fastening button, and slide the battery towards the lower transceiver's part. (Figure 2)

Figure 1                    Figure 2

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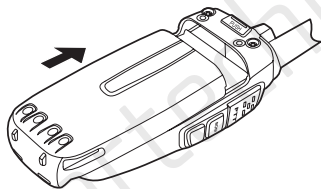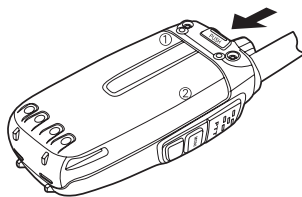
**Antenna installation**
To install the supplied antenna, line up the antenna threaded end with the thread situated on the upper side of the radio, hold it on the base and make it turn clockwise into the transceiver's top connector until it will be totally fixed. (Figure 3)
To uninstall the antenna, hold it on the base and make it turn counter-clockwise. (Figure 4)



Figure 3              Figure 4

**Belt clip installation**
Line up both holes on the the transceiver's back side with the clip ones, fix the clip to the transceiver with the two supplied screws (M2.5x5). (Figure 5)
Unscrew the screws to remove the clip. (Figure 6)
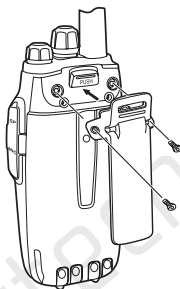


Figure 5
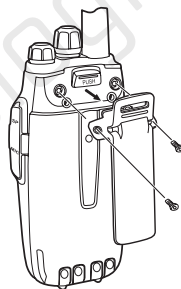
Figure 6

**External accessory installation**
Open (not remove) the connections cover placed on the right lateral side, and insert the accessory connection. (Figure 7)
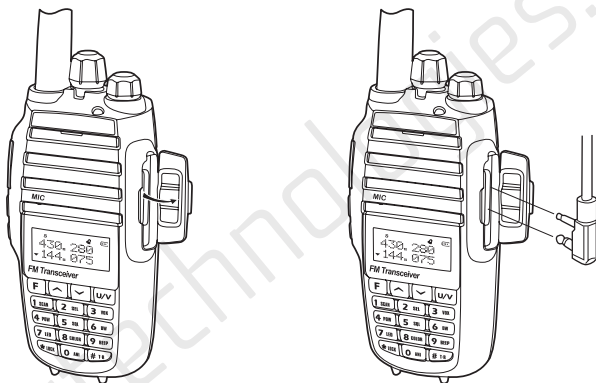


Figure 7

**Note:** the use of an external earphone will affect the water resistant features of the transceiver.

# Transceiver's description

**CHANNEL SELECTOR**
Use it to adjust the channel
and the frequency.

**ANTENNA**
Connect here the supplied
antenna.

**VOLUME KNOB**
Power on / off the radio,
and adjust the volume level.

**LED INDICATOR**
Lights red during
transmission and green
during reception.
Flickers red if the battery
is exhausted, and flickers
green during the search.

**SPEAKER**
Internal speaker.

**MICROPHONE**

**U/V KEY**
Toggles between A and B
bands and exits menu.

**#T-R KEY**
Quick press in standby mode
to toggle between VFO and
MR modes. Keep pressed
to exchange Rx and Tx
frequencies.

**LOCK KEY**
Keeping this key pressed
in standby mode, locks or
unlocks the keyboard.

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**PTT BUTTON**
Press To Transmit and
release to receive when
your transmission is done.

**MONI BUTTON**
Keep pressed to disable
squelch allowing to hear
very weak signals close to
background noise.

**BELT CLIP**
Allows hanging the radio on
your belt and it will be easy
to take.

**SP/MIC CONNECTOR**
Use it to connect
an earphone or the
programming cable (through
the PC programming
software).

**LI-ION BATTERY**
To power the radio.

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# Introduction to display's icons

You can see different icons on the display when the radio is power on. The following table will help you to identify the meaning of display's icons.
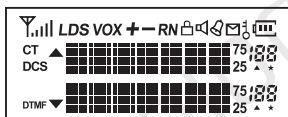
| $\mathbb{Y}_{\text{.}\text{I}\text{I}}$ | Signal's power level, power meter |
|---|---|
| **L** | Low power ON |
| **D** | Dual watch / standby ON |
| **S** | Battery save function ON |
| **VOX** | VOX function ON |
| **+−** | Frequency shift direction |
| **R** | Reverse frequency ON |
| **N** | Narrow band ON |
| 🔒 | Keyboard lock ON |

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| | |
|---|---|
| ⊲ | Squelch function ON |
| ⊲ | Beep function ON |
| ✉ | Call received |
| 🔋 | Battery level indicator |
| CT | CTCSS ON |
| DCS | DCS ON |
| DTMF | DTMF ON |
| ▲ | A band in use indicator |
| ▼ | B band in use indicator |
| 75 25 | Decimal frequency for frequency steps |
| 188 | Channel number / menu number indicator |
| ▲ | Busy channel indicator |
| ★ | Scan function available in channel mode |

# Working modes

**Frequency mode (VFO)**

Using this mode, you can use the 🔲 key to toggle between the A and B bands, and then use the 🔼 / 🔽 keys or the channel selector to change the frequency, or introduce the frequency number directly through the numeric keyboard, and store the channel.

**Frequency-channel mode (MR)**

When there is at least one memory channel memorized and being in frequency mode (VFO), press the 🔳 key to enter MR mode.

The frequency will be shown in the display and the channel number will be indicated on the right side.

When the channel name editing option is on and the channel name is edited, the name of the channel will be displayed.

**Channel mode (CH)**

When there is at least one memory memorized, you can operate in CH mode. The channel number will be shown in the display. Keeping the 🔳 key pressed power on the transceiver, and you will enter the CH mode.

Keeping the 🔳 key pressed and powering on again the transceiver, you will exit the CH mode.

# Menu function list
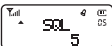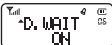
| Nº | Display and function | Selectable parameters | Function's description |
|----|----------------------|-----------------------|------------------------|
| 1 | SCAN | / | Frequencies / Channels search |
| 2 | TX.SEL | EDIT / BUSY | Selection of priority channel |
| 3 | VOX | 1 - 9 | VOX (hands free) sensitivity level |
| 4 | POW | LOW / HIGH | High or Low transmission power |
| 5 | SQL | 0 - 9 | Squelch sensitivity level |
| 6 | D.WAIT | ON / OFF | Dual watch / Standby |
| 7 | LED | ON / AUTO / OFF | Display light mode |
| 8 | COLOR | COLOR1 / COLOR2 / COLOR3 | Display colour setting |
| 9 | BEEP | ON / OFF | Keyboard's beep sound setting |
| 10 | ANI | ON /OFF | ANI code activation |
| 11 | TURN | ON / OFF | Repeater frequency activation |
| 12 | ID | 0 - 9 | ANI code introduction |
| 13 | PTT-ID | BOT / EOT / BOTH / OFF | ANI code transmission mode |
| 14 | TOT | OFF / 30 / 60 / ... / 270 / 360 | Time Out Timer setting |
| 15 | BCLO | ON / OFF | Busy channel lock setting |
| 16 | VOX.SW | ON / OFF | VOX setting |

| N° | Display and function | Selectable parameters | Function's description |
|----|----------------------|-----------------------|------------------------|
| 17 | ROGER | ON / OFF | Transmission's end notice setting |
| 18 | DW | ON / OFF | Dual watch / Monitor setting |
| 19 | RX.SAV | ON / OFF | Reception's energy save setting |
| 20 | SCAN.S | TO / CO / SE | Signals search mode setting |
| 21 | AUTOLK | ON / OFF | Automatic keyboard lock setting |
| 22 | VOICE | English / Chinese / OFF | English voice guide setting |
| 23 | TAIL | ON / OFF | End of transmission noise elimination |
| 24 | OPN.SET | OFF / DC / MSG | Display information when power on |
| 25 | VLT | / | Shows the battery voltage |
| 26 | MSG.SET | -1A @ | Display message when power on |
| 27 | DIS.NM | ON / OFF | Channel name displaying |
| 28 | CH.NAME | -1A @ | Edition of channel name |
| 29 | C-CDC | OFF / 67.0 / D023N | CTCSS/DCS tones in TX/RX |
| 30 | R-CDC | OFF / 67.0 / D023N | CTCSS/DCS tones in RX |
| 31 | T-CDC | OFF / 67.0 / D023N | CTCSS/DCS tones in TX |
| 32 | S-D | + / - / OFF | Frequency shift direction setting |
| 33 | OFFSET | 0.00 - 99.975 MHz | Frequency shift value |
| 34 | STEP | 0.5K / 2.5K / 5K / ... / 50K / 100K | Frequency steps setting |

| N° | Display and function | Selectable parameters | Function's description |
|----|----------------------|------------------------|------------------------|
| 35 | N/W | WIDE / NARROW | Bandwidth: Wide / Narrow setting |
| 36 | SEEK 67.0 | | CTCSS tones search |
| 37 | SEEK D023N | | DCS tones search |
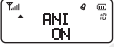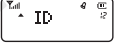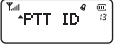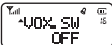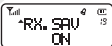
**Menu operation**
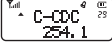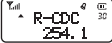
1. In standby mode, press the **F** key to enter into menu setting, "MENU" will be shown on the display.
2. Press the **∧** or **∨** keys to select the wished menu's item, the item's current setting will be shown on the display.
3. Press the **F** key to enter and then press the **∧** or **∨** keys to select the wished setting.
4. Press the **U/V** key to exit menu mode and return to standby mode.

| Item N° and name | How to enter | Display text | Parameter selection | Parameter settings | Confirm | Return to standby mode |
|---|---|---|---|---|---|---|
| 1.Frequency/ Channel search | **F** + **1 scan** | ↑ SCAN | Press ∧ or ∨ to change search direction | PTT / MONI / U / V | **F** | **U/V** |
| 2.Priority channel | **F** + **2 sel** | ↑TX. SEL EDIT | Press ∧ or ∨ to select available values | EDIT / BUSY | **F** | **U/V** |
| 3.VOX level setting | **F** + **3 vox** | ↑ VOX 4 | Press ∧ or ∨ to select available values | VOX level: 1 - 9 + | **F** | **U/V** |
| 4.Transmission power | **F** + **4 pow** | ↑ POW LOW | Press ∧ or ∨ to select available values | High / Low | **F** | **U/V** |
| 5.Squelch level | **F** + **5 sql** | ↑ SQL 5 | Press ∧ or ∨ to select available values | SQL level: 0 - 9 | **F** | **U/V** |
| 6.Dual watch / Standby | **F** + **6 dw** | ↑D. WAIT ON | Press ∧ or ∨ to select available values | ON / OFF | **F** | **U/V** |

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| Item Nº and name | How to enter | Display text | Parameter selection | Parameter settings | Confirm | Return to standby mode |
|---|---|---|---|---|---|---|
| 7. Display light | F + 7 LED | LED AUTO | Press ▲ or ▼ to select available values | ON / AUTO / OFF | F | U/V |
| 8. Display colour | F + 8 COLOR | COLOR COLOR1 | Press ▲ or ▼ to select available values | Color 1 / 2 / 3 | F | U/V |
| 9. Keyboard's beep sound | F + 9 BEEP | BEEP ON | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 10. ANI code activation | F + 1 SCAN + 0 ANI | ANI ON | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 11. Repeater frequency activation | F + 1 SCAN + 1 SCAN | TURN | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 12. ANI code introduction | F + 1 SCAN + 2 SEL | ID | Keyboard 0 - 9 | F to confirm *lock to delete | F | U/V |
| 13. ANI code transmission mode | F + 1 SCAN + 3 VOX | PTT ID | Press ▲ or ▼ to select available values | BOT / EOT / BOTH / OFF | F | U/V |

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| Item N° and name | How to enter | Display text | Parameter selection | Parameter settings | Confirm | Return to standby mode |
|---|---|---|---|---|---|---|
| 14.Time Out Timer | F + 1 SCAN / 4 POW | TOT OFF | Press ▲ or ▼ to select available values | OFF / 30... / 360s | F | U/V |
| 15.Busy channel lock | F + 1 SCAN / 5 SQL | BCLO OFF | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 16.VOX setting | F + 1 SCAN / 6 DW | VOX_SW OFF | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 17.Transmission's end notice | F + 1 SCAN / 7 LED | ROGER OFF | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 18.Dual watch / Monitor | F + 1 SCAN / 8 COLOR | DW | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 19.Reception's energy save | F + 1 SCAN / 9 BEEP | RX.SAV ON | Press ▲ or ▼ to select available values | ON / OFF | F | U/V |
| 20.Signals search mode | F + 2 SEL / 0 AM | SCAN.S CO | Press ▲ or ▼ to select available values | TO / CO /SE | F | U/V |

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☞ **F** + **2 SEL** / **1 SCAN** ➡ AUTOLK OFF (21) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ ON / OFF ➡ **F** ➡

☞ **F** + **2 SEL** / **2 SEL** ➡ VOICE ON (22) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ English / Chinese / OFF ➡ **F** ➡

☞ **F** + **2 SEL** / **3 VOX** ➡ TAIL (23) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ ON / OFF ➡ **F** ➡

☞ **F** + **2 SEL** / **4 POW** ➡ OPN.SET OFF (24) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ OFF / DC / MSG ➡ **F** ➡

☞ **F** + **2 SEL** / **5 SQL** ➡ VLT 7.6V (25) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ Shows the battery voltage ➡ **F** ➡

☞ **F** + **2 SEL** / **6 DW** ➡ MSG.SET (26) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ *Lock / #T-R / U/V ➡ **F** ➡

☞ **F** + **2 SEL** / **7 LED** ➡ DIS.NM (27) ➡ **F** ➡ Press ▲ or ▼ to select available values ➡ ON / OFF ➡ **F** ➡

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| Item N° and name | How to enter | Display text | Parameter selection | Parameter settings | Confirm | Return to standby mode |
|---|---|---|---|---|---|---|
| 28.Edition of channel name | F + 2 SEL / 8 COLOR | ↑CH.NAME 28 | Press ▲ or ▼ to select available values | *Lock / #T-R / U/V | F | U/V |
| 29.CTCSS/ DCS tones in TX/RX | F + 2 SEL / 9 BEEP | ▲ C-CDC 29 254.1 | Press ▲ or ▼ to select available values | OFF / QT / DCS | F | U/V |
| 30.CTCSS/DCS tones in RX | F + 3 VOX / 0 ANI | ▲ R-CDC 30 254.1 | Press ▲ or ▼ to select available values | OFF / QT / DCS | F | U/V |
| 31.CTCSS/DCS tones in TX | F + 3 VOX / 1 SCAN | ▲ T-CDC 31 254.1 | Press ▲ or ▼ to select available values | OFF / QT / DCS | F | U/V |
| 32.Frequency shift direction | F + 3 VOX / 2 SEL | ▲ S-D 32 OFF | Press ▲ or ▼ to select available values | OFF / + / - | F | U/V |
| 33.Frequency shift value | F + 3 VOX / 3 VOX | ↑OFFSET 33 2.000 | Press ▲ or ▼ to select available values | 0.0000 - 99.975MHz | F | U/V |
| 34.Frequency steps | F + 3 VOX / 4 POW | ▲ STEP 34 25K | Press ▲ or ▼ to select available values | 0.5K / 2.5K / 5k ...100K | F | U/V |

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| Item Nº and name | How to enter | Display text | Parameter selection | Parameter settings | Confirm | Return to standby mode |
|---|---|---|---|---|---|---|
| 35.Bandwidth: /Wide / Narrow | 👉 **F** + **3 vox** **5 sql** ➡️ | **N/W** **WIDE** | ➡️ **F** ➡️ | Press ▲ or ▼ to select available values | Wide / Narrow | ➡️ **F** ➡️ | **U/V** |
| 36.CTCSS tones search | 👉 **F** + **3 vox** **6 bw** ➡️ | **SEEK** **67.0** | ➡️ **F** ➡️ | Press ▲ or ▼ to change search direction | Press **F** to start search | ➡️ **F** ➡️ | **U/V** |
| 37.DCS tones search | 👉 **F** + **3 vox** **7 led** ➡️ | **SEEK** **D023N** | ➡️ **F** ➡️ | Press ▲ or ▼ to change search direction | Press **F** to start search | ➡️ **F** ➡️ | **U/V** |

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# Function's detailed descriptions

The current menu number appear in the upper left side of the display.

**Setting the search mode (SCAN and SCAN.S - MENU 1 and 20)**
**Function**: in VFO / MR / CH modes, the transceiver allows searching in the entire operative band and in the stored channels.
Enter into menu 1 and press the **F** key to start the search.
Once the searching has started, press th **∧** / **∨** keys to change search direction. The searching will stop when a signal has found, press the PTT button to stop the searching; press the MONI button to temporally stop the searching; press the **F** key to exit the searching mode.
The searching function is basically the same for every one of the different modes. Before starting, take a moment to select the mode you prefer the search to stop when founding a signal.
Enter into menu 20 to select the setting for the searching mode. The default value is TO.

In VFO mode there are three searching options available:

**TO**: in this mode, the searching will stop in the signal found, and will stay in this signal for a while. If you do not make any action to cancel the searching during this period of time, the searching will restart although the signal is still active.

**CO**: in this mode, the searching will stop in the signal found, and will stay in this signal until it ends. Once the signal ends, the searching will restart.

**SE**: in this mode, the searching will stop in the signal found, and will not restart automatically, you will have to restart manually the searching if you want it to continue.

**Selection of priority channel (TX.SEL - MENU 2)**
**Function**: allows transmitting in the sub-band although you are using the operating band.
Enter into menu 2 to select the priority transmission band. The default value is: EDIT.
**EDIT**: you will transmit on the operating band.
**BUSY**: you will transmit on the last band used for transmitting.

**VOX level setting and activation (VOX and VOX.SW - MENU 3 and 16)**
**Function**: the VOX function allows an automatic transmission / reception based on the voice reception through the built-in microphone. With the VOX on, you do not need to press the PTT button to transmit, and it is not necessary to use an external earphone with VOX to use this function.
Enter into menu 16 to activate the VOX function. The default value is: OFF.
When this function is on, the "VOX" icon will appear on the display.
Enter into menu 3 to set the VOX level.
There are 9 available levels.
The higher the level is, the greater sensitivity you will have.
The TL-60 has a setting via software for adjusting a VOX delay time (a delay time for transmitting-receiving after you stop speaking).
The default value is: 2 secondss.

**Setting the transmission power (POW - MENU 4)**
**Function**: allows selecting the High or Low transmission power depending on your environment and your needs. When you store memories, you can save the High or Low transmission power setting independent for each memory.
Enter into menu 4 to set the transmission power.
**High**: 10W
**Low**: 5W, when you select the Low power, the "L" icon will appear on the display.

**Setting the noise filter level (squelch) (SQL - MENU 5)**
**Function**: allows silencing the background noise when no signal is received. The squelch function not only makes the standby mode more pleasant but significantly reduces battery consumption.
Enter into menu 5 to set the Squelch level. The default value is: 5.

**Dual watch or dual standby activation (D.WAIT - MENU 6)**
**Function**: allows receiving signals in other channel while you are in the operating channel. Allows monitoring both channels signals at the same time.
Enter into menu 6 to activate the dual standby. The default value is: ON.

**Display light (LED - MENU 7)**
**Function**: allows adjusting the display light.
Enter into menu 7 to set the display light. The default value is: AUTO.
**ON**: the display light will be always on.
**AUTO**: the light turns on when pressing any key and 3 seconds later turns off automatically.
**OFF**: the display light will be always off.

**Display colour (COLOR - MENU 8)**
**Function**: allows selecting the display brightness.
Enter into menu 8 to set the display colour. The default value is: COLOR2.
**COLOR1**: orange.
**COLOR2**: blue.
**COLOR3**: purple.

**Keyboard's beep sound (BEEP - MENU 9)**
**Function**: activate/deactivate the keyboard's beep sound.
Enter into menu 9 to set the keyboard's beep sound. The default value is: ON.

**ANI code activation (ANI - MENU 10)**
**Function**: enable/disable the ANI code. When enabling the ANI code, always sending the ANI code when transmitting, the receiving radios can see it on the display in case of having also the ANI code function.
Enter into menu 10 to activate the ANI code. The default value is: OFF.

**Repeater frequency activation (TURN - MENU 11)**
**Function**: enable/disable the repeater frequency.
Enter into menu 11 to set the repeater frequency. The default value is: OFF.

**ANI code introduction (ID - MENU 12)**
Enter into menu 12 to introduce the ANI code through the numeric keyboard 0 – 9.

**ANI code transmission mode (PTT-ID - MENU 13)**
**Function**: sets the ANI code transmission mode.
**Options**: BOT / EOT / BOTH / OFF.
**BOT**: the ANI code is transmitted when pressing the PTT button.
**EOT**: the ANI code is transmitted when releasing the PTT button.
**BOTH**: the ANI code is transmitted when pressing and releasing the PTT button.
**OFF**: disabled.

**Transmission time timer (TOT - MENU 14)**
**Function**: gives a security lock, that limits the transmission to a maximum pre-programmed time. Allows preserving the battery not permitting too lengthy transmissions, and in case of a PTT button block it will prevent both interfering other users and exhausting the battery.
Enter into menu 14 to activate the TOT function. The default value is: OFF.

**Busy channel lock (BCLO - MENU 15)**
**Function**: prevents the user from transmitting if the radio is receiving a signal strong enough to brake the squelch. In frequencies where different transceivers using different CTCSS or DCS codes can be actives, this function prevents to accidentally interrupt their communications (because the transceiver can be silenced by its own tone decoder).
Enter into menu 15 to activate the BCLO function. The default value is: OFF.

**Transmission's end notice (ROGER - MENU 17)**
**Function**: the radio will emit a "beep" sound when the transmission ends.
Enter into menu 17 to activate the ROGER BEEP function. The default value is: OFF.

**FM radio option (DW - MENU 18)**
**Function**: allows monitoring a signal call while listening to FM Radio, so you will not lose any call.
Enter into menu 18 to activate the function. The default value is: OFF.

**Reception's energy save (RX.SAV - MENU 19)**
**Function**: this feature produces a considerable energy saving, but could not receive all entry data.
Enter into menu 19 to activate the RX.SAV function. The default value is: OFF.

**Searching mode (SCAN.S - MENU 20)**
Enter into menu 20 to set the searching mode.

**Automatic keyboard lock (AUTOLK - MENU 21)**
**Function**: to avoid accidentally changing the frequency or an involuntary transmission, the keyboard and other buttons will be automatically locked.
Enter into menu 21 to activate the AUTOLK function. The default value is: OFF.
If the equipment is locked, press the 🔒 key to unlock it. If you want to lock it manually press the 🔒 key again.

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**English voice guide (VOICE - MENU 22)**
**Function**: enable/disable English voice guide.
Enter into menu 22 to activate the VOICE function. The default value is: English.
**OFF**: disables the voice guide.
**English**: enables the English voice guide.
**Chinese**: enables the Chinese voice guide.

**End of transmission noise elimination (TAIL - MENU 23)**
Enter into menu 23 to set the TAIL function.

**Display information when turning on (OPN.SET and VLT and MSG.SET - MENU 24 and 25 and 26)**
**Function**: select the presentation mode when turning on and edit the welcome message.
Enter into menu 24 to activate the OPN.SET function. The default value is: OFF.
**OFF**: shows the frequency.
**DC**: shows the battery voltage.
**MSG**: shows the welcome message.
Enter into menu 25 to check the battery voltage.
Enter into menu 26 to edit the welcome message, you can also edit it through the programming software.

**Channel name show (DIS.NAME and CH.NAME - MENU 27 and 28)**
**Function**: show or hide the channel name and edit the channel name in CH and MR modes.

**Tones coding and searching (C-CDC, R-CDC, T-CDC, SEEK 67.0 and SEEK DO23N - MENU 29, 30, 31, 36 and 37)**
**Function 1**: use of the CTCSS / DCS tones.
Many repeaters require a very low frequency audio tone, to superimpose its signal for activating the repeater. That helps to prevent false repeater activations by radar or other transmitters spurious signals.

Enter into menu 29 / 30 / 31 to adjust the CTCSS / DCS tones in TX transmission and RX reception / in RX reception / in TX transmission.

Press the ✳🔒 key to select between CTCSS / DCS / OFF. After selecting CTCSS / DCS / OFF use the ⏶ / ⏷ keys to choose the particular group you need.

Press the #⬆ key to select the DCS tone direction. The TL-60 has 50 CTCSS groups and 104 DCS normal / inverted groups.

**Function 2**: tones search.

In situations where you not know the CTCSS / DCS tone used by another station or stations, you can command the transceiver to hear the incoming signal and scan searching the used tone. Enter into menu 36 / 37 to start the CTCSS / DCS tones search.

If any tone or code is not detected by the tone search, it will continue to search indefinitely. When this happens, could be why the other station is not sending any tone.

You can press the PTT button at any time to stop the search.

You can also press the MONI button during the search to hear the muted signal from the other station. When you release the MONI button, the tone search will resume.

The tone search works equally for VFO or MR modes.

**Frequency offset (OFFSET and S-D - MENU 32 and 33)**
**Function**: in frequency (VFO) mode, you can adjust the value and the direction for the frequency offset.

Enter into menu 32 to set the frequency offset direction.

The default value is: OFF.

Enter into menu 33 to select the frequency offset value.

Available values: 0.00 to 99.975 MHz.

**Frequency steps setting (STEP - MENU 34)**
**Function**: adjust the frequency steps. Enter into menu 34 to set it.

Available values: 0.5 / 2.5 / 5 / 6.25 / 10 / 12.5 / 25 / 37.5 / 50 / 100 KHz.

**Bandwidth setting  (N/W - MENU 35)**
**Function**: adjust the bandwidth.
Enter into menu 35 to set the bandwidth.
Available values: "WIDE" (25KHz) / "NARROW" (12.5KHz).

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# Basic operations

**Power the radio on / off**
Turn the volume knob clockwise to power on the transceiver after hearing a click sound. Turn the volume knob counter-clockwise to power off the transceiver.

**Adjusting the volume**
After powering on the transceiver, turn the volume knob clockwise to increase the volume, and turn it counter-clockwise to decrease the volume.

**Channel selector**
After powering on the transceiver, turn the channel selector clockwise or counter-clockwise to adjust the frequency.

**PTT button**
Press to transmit and release to receive when your transmission has been finished.

**Keyboard lock**
When you are not using the keyboard, you can lock the keyboard to prevent an accidental use of it.
Press the ✱🔒 key during about two seconds to lock or unlock the keyboard.

**Reverse frequency**
In standby mode, keep pressed the #1-8 key to enable or disable this function, the "R" icon will appear in the upper side of the display when activating this function. In this moment, the radio transmission frequency turns into reception frequency and reception frequency into transmission frequency. If you have set CTCSS/DCS tones, the codes will also be interchanged.

**MONI button**

Keeping this key pressed disables the squelch function, allowing you to hear very weak signals close to background noise.

**FM radio**

In standby mode, press the **F** key followed by MONI button to enter FM Radio mode. You can introduce the desired station frequency or carry out a search. For that purpose, press the **F** key and enter menu number 1, press the key to start the search, it will stop when founding a radio station, repeat the operation to search another radio station. You can exit the FM Radio mode by pressing the PTT button or the **F** key followed by MONI button.

**1750Hz tone**

To access to repeater, keep pressed the CALL button during the time established by the repeater. The transmitter will be automatically activated, a 1750Hz audio tone will be transmitted. Once the access to the repeater is obtained, you will be able to release the CALL button and use the PTT button to transmit.

**Emergency alarm**

In standby mode, press the **F** key followed by the CALL button to activate this function, when you press the PTT button the emergency alarm will be disabled.

**Storage of a channel**

In VFO mode, introduce the desired frequency directly through the numeric keyboard, next press the **F** + **#** keys, the channel digits will blink in the upper right side of the display, introduce the desired channel number through the numeric keyboard or pressing the **∧** / **∨** keys, next press the **F** key to store the channel.

Example: to store the 432.325MHz frequency on channel 05, follow the next steps:

In VFO mode, introduce 4 3 2 3 2 5.

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Press the ⭐ + #️⃣ keys, press the 🔼 / 🔽 keys to select the channel number 05.
Press the ⭐ key to confirm.

**Delete of a channel**

In MR or CH modes, press the 0️⃣ key and next power on the radio, "DEL ?" will appear on the display and the channel number blinks in the upper right side of the display.

Press the 🔼 / 🔽 keys or introduce the channel number you want to delete, next press the ⭐ key to confirm.

After deleting, it will move to the next occupied channel, if you want to delete it, repeat the instructions. To exit without deleting any channel press the U/V key.

**FM Radio function**

In standby mode, press the ⭐ key followed by MONI button to enter FM Radio mode, "88.00M" will appear on the display, press the ⭐ key followed by MONI button again to exit FM Radio mode.

**Storage of a FM radio station**

It is the same procedure used for memory channels.
Or you can store the channels through the programming software.

**Note**: after you have introduced the channel number, in case it is blinking means this channel is occupied, and you will have to choose another channel.
**Note**: in FM Radio mode, if you receive a signal, the transceiver deactivates the FM Radio mode to allow you hear the signal, after 5 seconds when the signal has disappeared, returns to FM Radio mode.

**Delete of FM radio channels**

In FM Radio mode, keep pressing the U/V key and next power on the transceiver, "DEL ?" will appear on the display and the channel number will blink in the upper right side of the display, press the 🔼 / 🔽 keys or introduce the channel number you want to delete, next press the ⭐

key to confirm. Repeating this operation, you will be able to delete all the radio stations, you can store a maximum of 25 radio stations.

**DTMF coding**
To manually send a DTMF code, keep pressed the PTT button, next introduce the DTMF code through the keyboard, release the PTT button to finish.

**DTMF signalling**
Press the **F** key followed by the **U/V** key, next introduce the DTMF code with a maximum of 16 digits, then press the PTT button to send the code.

**Reset**
Keep pressing the **F** key and next power on the transceiver, "RESET ?" will appear on the display. Press the **F** key to confirm. Press the ▲ or ▼ keys to select between VFO/ FULL /AGING.
1. **VFO:** reset all settings from frequency mode.
2. **FULL:** reset all settings from frequency and channel modes.
3. **AGING**: function not available in Europe.
Press the **F** key to confirm.

**Note**: when you introduce a code, press the MONI button to erase the last digit, if you press the CALL button you will return to standby mode.

# Table of CTCSS / DCS codes

CTCSS (analogical tones)

| 1 | 67.0 | 11 | 94.8 | 21 | 131.8 | 31 | 171.3 | 41 | 203.5 |
|---|------|----|------|----|-------|----|-------|----|-------|
| 2 | 69.3 | 12 | 97.4 | 22 | 136.5 | 32 | 173.8 | 42 | 206.5 |
| 3 | 71.9 | 13 | 100.0 | 23 | 141.3 | 33 | 177.3 | 43 | 210.7 |
| 4 | 74.4 | 14 | 103.5 | 24 | 146.2 | 34 | 179.9 | 44 | 218.1 |
| 5 | 77.0 | 15 | 107.2 | 25 | 151.4 | 35 | 183.5 | 45 | 225.7 |
| 6 | 79.7 | 16 | 110.9 | 26 | 156.7 | 36 | 186.2 | 46 | 229.1 |
| 7 | 82.5 | 17 | 114.8 | 27 | 159.8 | 37 | 189.9 | 47 | 233.6 |
| 8 | 85.4 | 18 | 118.8 | 28 | 162.2 | 38 | 192.8 | 48 | 241.8 |
| 9 | 88.5 | 19 | 123.0 | 29 | 165.5 | 39 | 196.6 | 49 | 250.3 |
| 10 | 91.5 | 20 | 127.3 | 30 | 167.9 | 40 | 199.5 | 50 | 254.1 |

DCS (digital tones)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 017 | 18 | 073 | 35 | 165 | 52 | 261 | 69 | 356 | 86 | 464 | 103 | 632 |
| 2 | 023 | 19 | 074 | 36 | 172 | 53 | 263 | 70 | 364 | 87 | 465 | 104 | 645 |
| 3 | 025 | 20 | 114 | 37 | 174 | 54 | 265 | 71 | 365 | 88 | 466 | 105 | 654 |
| 4 | 026 | 21 | 115 | 38 | 205 | 55 | 266 | 72 | 371 | 89 | 503 | 106 | 662 |
| 5 | 031 | 22 | 116 | 39 | 212 | 56 | 271 | 73 | 411 | 90 | 506 | 107 | 664 |
| 6 | 032 | 23 | 122 | 40 | 217 | 57 | 274 | 74 | 412 | 91 | 516 | 108 | 703 |
| 7 | 036 | 24 | 125 | 41 | 223 | 58 | 305 | 75 | 413 | 92 | 523 | 109 | 712 |
| 8 | 043 | 25 | 131 | 42 | 225 | 59 | 306 | 76 | 423 | 93 | 526 | 110 | 723 |
| 9 | 047 | 26 | 132 | 43 | 226 | 60 | 311 | 77 | 425 | 94 | 532 | 111 | 731 |
| 10 | 050 | 27 | 134 | 44 | 243 | 61 | 315 | 78 | 431 | 95 | 534 | 112 | 732 |
| 11 | 051 | 28 | 135 | 45 | 244 | 62 | 325 | 79 | 432 | 96 | 546 | 113 | 734 |
| 12 | 053 | 29 | 143 | 46 | 245 | 63 | 331 | 80 | 445 | 97 | 565 | 114 | 743 |
| 13 | 054 | 30 | 145 | 47 | 246 | 64 | 332 | 81 | 446 | 98 | 606 | 115 | 754 |
| 14 | 055 | 31 | 152 | 48 | 251 | 65 | 343 | 82 | 452 | 99 | 612 | 116 | 765 |
| 15 | 065 | 32 | 155 | 49 | 252 | 66 | 345 | 83 | 454 | 100 | 624 | | |
| 16 | 071 | 33 | 156 | 50 | 254 | 67 | 346 | 84 | 455 | 101 | 627 | | |
| 17 | 072 | 34 | 162 | 51 | 255 | 68 | 351 | 85 | 462 | 102 | 631 | | |

# Troubleshooting guide

| Problem | Possible cause and possible solution |
|---|---|
| No reaction when power on. | The battery pack is exhausted. Please, charge it again or replace it for a new one.<br>The battery pack could not be properly installed. Please, check it and install it again. |
| The operation time is very brief, even though the battery is charged. | Replace the battery pack for a new one. |
| You can not communicate with the members of your group. | Please, check if you are using the same CTCSS or DCS tones.<br>The distance between you is out of range. |
| You receive calls from other persons out of your group. | Change the CTCSS tones of your group. |
| Other radios can not receive the transmission signals or receive the signals at low volume. | Turn the volume knob at maximum level. The microphone could be damaged, send it to your local dealer for checking. |
| You always hear noise. | The distance is out of range.<br>Reduce the range or try it again. |

# General technical specifications

| | |
|---|---|
| Frequency range | 144 - 146 MHz / 430 - 440 MHz |
| Frequency stability | ± 2.5 ppm |
| Operating voltage | 7.2 Vcc (rechargeable Li-Ion battery) |
| Memory channels | 2 x 128 |
| Antenna | High gain |
| Antenna impedance | 50Ω |
| Operation mode | Simplex or semi-duplex |
| Battery capacity | 3600 mA |

**Transmitter**

| | |
|---|---|
| Power output | ≤ 10W VHF / ≤ 9W UHF / 5W (low power) |
| Modulation mode | 16K*F3E / 11K*F3E |
| Maximum deviation | ≤ 5 KHZ, ≤ 2.5KHz |
| Spurious radiation emitted | ≤ 7.5μW |
| Adjacent channel power | ≤ -65dB / ≤ -60dB |
| Pre-emphasis characteristics | 6 dB |
| Current | ≤ 2.8 A (10W) ≤ 1.8 A (5W) |
| Intermediation sensitivity | 8 - 12 mV |
| Audio distortion | < 5 % |

**ATTENTION:** Some of these specifications can be subject to modification without previous notice.

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**Receptor**

| Sensitivity (12dB SINAD) | -122 dBm (12dB SINAD) |
|---|---|
| Audio power | > 0.5 W |
| Audio distortion | < 10 % |
| Intermediation | ≥ 60dB ≥55dB |
| Selectivity | ≥ 65dB ≥60dB |
| Spurious reject | ≥ 65dB |
| Block | ≥ 85dB |

**ATTENTION:** Some of these specifications can be subject to modification without previous notice.

# Warranty information

**Period:**
2 years from transceiver's date of purchase.
**Note: keep your equipment's sales receipt. Is essential to give it for any complaint related to the equipment and for applying your warranty claim of it.**

**Warranty exclusions:**
The equipment will lose its warranty in the next cases:
- Do not give the sales receipt.
- The product has not the serial number or is totally or partially illegible.
- The serial number does not match with the one in sales receipt.
- The product has been manipulated by non authorised personal.
- If the product damage has been caused by using non official accessories.
- If the has been used for any other purpose different from communicating between users of the frequencies assigned for amateur use that are: 144-146 MHz in VHF, 430-440 MHz in UHF and both of them on dual band transceivers.
- Misuse, abuse, abnormal use or inadequate care by the user, both deliberately or accidentally.
- If any of the Cautions and practical advices (from pages 6 to 9) or the Cautions and practical advices for the battery and the charger (from pages 10 to 12) were reneged on.

# Note on environmental protection

This symbol on the equipment or its packaging indicates that at the end of the useful life of this product the user is legally obligated to fulfil the European Directive 2012/19/EU, on 4 July 2012 (in the legislative Spanish system RD 110/2015 on 20 February 2015), on Waste Electrical and Electronic Equipment, which applies the following: the electrical and electronic equipment, as well as batteries and rechargeable batteries, can not be treated as normal household waste, but must be delivered to the corresponding collection point. By ensuring that this product is rejected correctly, you help with this action to prevent negative consequences for the environment and human health which could be caused by its inappropriate management. The recycling of materials helps to preserve natural resources.

To receive detailed information about the recycling of this product, please contact the city office, the most nearby waste disposal service or the establishment where you purchased the product.

# LUTHOR
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# Declaration of conformity

$C\,\epsilon$ 0700 ①

**The undersigned, in representation of:**

| | |
|---|---|
| Company: | GENEREUS S.L. |
| Address: | Industria, 5 nave 8, 08160 Montmeló – Barcelona (Spain) |
| Telephone number: | (+34) 93 599 17 65 |
| VAT number: | B66339029 |
| e-mail address: | gestiontecnica@genereus.com |

**We declare under our sole responsibility the conformity of the following product:**

| | |
|---|---|
| Type of equipment: | Dual band VHF/UHF in FM movile transceiver for amateur |
| Brand name: | LUTHOR TECHNOLOGIES |
| Model number: | TL-60 |
| Manufacturer: | GENEREUS S.L. |
| Manufacturing site: | China |

**Which it refers this declaration, with the following rules or other policy documents:**

| | |
|---|---|
| EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 | Safety regarding information technology equipments. General requirements. |
| EN 301 489-1 V1.9.2 / EN 301 489-15 V 1.2.1 | Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech). |
| EN 300 086-1 V 1.4.1 / EN 300 086-2 V 1.3.1 | Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Technical features and testing conditions for Radio equipment with an internal or external RF connector intended primarily for analogue speech; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive. |
| Directive RoHS: 2011/65/UE | About restrictions of the use of certain hazardous substances in electrical and electronic equipment (EEE). |

**In accordance with the requirements of Directive 2014/53/UE, of the European Parliament and the 16th April 2014 Council, transposed into Spanish law by Royal Decree 188/2016 of 6th May 2016.**

More additional information related with the equipment, accessories, images, updated management software, etc. are available on the official website: www.luthortechnologies.com

Josefa Paredes Martínez

Manager

Montmeló, 15th November 2016

Notes

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2002/95/EC