



## INSTRUCTION MANUAL

UHF TRANSCEIVER  
**ID-31A**  
UHF TRANSCEIVER  
**ID-31E**

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.

**WARNING:** MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.

**Icom Inc.**

The photo shows the ID-31E version.



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## FOREWORD

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Thank you for purchasing this fine Icom product. The ID-31A or ID-31E UHF TRANSCEIVER is designed and built with Icom's superior technology and craftsmanship combining traditional analog technologies with the new digital technology, Digital Smart Technologies for Amateur Radio (D-STAR), for a balanced package. With proper care, this product should provide you with years of trouble-free operation.

We thank you for making your ID-31A or ID-31E your radio of choice, and hope you agree with Icom's philosophy of "technology first." Many hours of research and development went into the design of your ID-31A or ID-31E.

### **For Canada:**

This device complies with RSS-310 of Industry Canada. Operation is subject to the condition that this device does not cause harmful interference.

Cet appareil est conforme au CNR-310 d'Industrie Canada. Son exploitation est autorisée sous réserve que l'appareil ne cause pas de brouillage préjudiciable.

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## FEATURES

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- *DV mode (Digital voice + Low-speed data communication) operation-ready*
  - *Text message and call sign exchange*
  - *Transmit position data*
- *DR (D-STAR Repeater) mode and repeater list allow you to easily operate using a D-STAR repeater*
- *GPS receiver installed*
- *GPS Logger function allows you to check your route as you move*
- *Waterproof construction (IPX7\*)*
  - \*Only when the supplied battery pack, antenna and jack cover are attached.
- *microSD card slot*

Spurious signals may be received in the DV mode near the following frequencies. These are made in the internal circuit and does not indicate a transceiver malfunction.  
430.080 MHz, 442.370 MHz

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## EXPLICIT DEFINITIONS

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WORD	DEFINITION
⚠ <b>DANGER!</b>	Personal death, serious injury or an explosion may occur.
⚠ <b>WARNING!</b>	Personal injury, fire hazard or electric shock may occur.
<b>CAUTION</b>	Equipment damage may occur.
<b>NOTE</b>	Recommended for optimum use. No risk of personal injury, fire or electric shock.

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## IMPORTANT

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**READ ALL INSTRUCTIONS** carefully and completely before using the transceiver.

**SAVE THIS INSTRUCTION MANUAL—** This instruction manual contains important operating instructions for the ID-31A/ID-31E.

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## FCC INFORMATION

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### • FOR CLASS B UNINTENTIONAL RADIATORS:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**CAUTION:** Changes or modifications to this device, not expressly approved by Icom Inc., could void your authority to operate this device under FCC regulations.

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## PRECAUTIONS

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⚠ **DANGER! NEVER** short the terminals of the battery pack.

⚠ **DANGER! NEVER** Use and charge only specified Icom battery packs with Icom radios or Icom chargers. Only Icom battery packs are tested and approved for use with Icom radios or charged with Icom chargers. Using third-party or counterfeit battery packs or chargers may cause smoke, fire, or cause the battery to burst.

⚠ **WARNING RF EXPOSURE!** This device emits Radio Frequency (RF) energy. Caution should be observed when operating this device. If you have any questions regarding RF exposure and safety standards please refer to the Federal Communications Commission Office of Engineering and Technology's report on Evaluating Compliance with FCC Guidelines for Human Radio Frequency Electromagnetic Fields (OET Bulletin 65)

⚠ **WARNING! NEVER** hold the transceiver so that the antenna is very close to, or touching exposed parts of the body, especially the face or eyes, while transmitting. The transceiver will perform best if the microphone is 5 to 10 cm (2 to 4 inches) away from the lips and the transceiver is vertical.

⚠ **WARNING! NEVER** operate the transceiver with an earphone, headphones or other audio accessories at high volume levels. Hearing experts advise against continuous high volume operation. If you experience a ringing in your ears, reduce the volume level or discontinue use.

⚠ **WARNING! NEVER** operate the transceiver while driving a vehicle. Safe driving requires your full attention—anything less may result in an accident.

⚠ **WARNING! NEVER** connect the transceiver to a power source of more than 16 V DC or use reverse polarity. This could cause a fire or damage the transceiver.

⚠ **WARNING! NEVER** operate or touch the transceiver with wet hands. This may result in an electric shock or may damage the transceiver.

**CAUTION: MAKE SURE** the flexible antenna and battery pack are securely attached to the transceiver, and that the antenna and battery pack are dry before attachment. Exposing the inside of the transceiver to water will result in serious damage to the transceiver. After exposure to water, clean the battery contacts thoroughly with fresh water and dry them completely to remove any water or salt residue.

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## PRECAUTIONS

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**CAUTION: DO NOT** use harsh solvents such as benzene or alcohol to clean the transceiver, because they can damage the transceiver's surfaces.

**DO NOT** operate the transceiver near unshielded electrical blasting caps or in an explosive atmosphere.

**DO NOT** push the PTT unless you actually intend to transmit.

**BE CAREFUL!** The transceiver will become hot when operating it continuously for long periods of time.

**DO NOT** use or place the transceiver in direct sunlight or in areas with temperatures below  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) or above  $+60^{\circ}\text{C}$  ( $+140^{\circ}\text{F}$ ).

Place the unit in a secure place to avoid inadvertent use by children.

**BE CAREFUL!** The transceiver meets IPX7\* requirements for waterproof protection. However, once the transceiver has been dropped, waterproof protection cannot be guaranteed because of possible damage to the transceiver's case or waterproof seal.

\* Only when the BP-271 or BP-272 (option), flexible antenna, [MIC/SP] cap and [DATA/DC IN] cap are attached.

The BP-273 meets IPX4 requirements for splash resistance. When it is connected, the transceiver corresponds to IPX4.

Even when the transceiver power is OFF, a slight current still flows in the circuits. Remove the battery pack or batteries from the transceiver when not using it for a long time. Otherwise, the installed battery pack or batteries will become exhausted, and will need to be recharged or replaced.

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## PRECAUTIONS

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### ◇ Important notes when using the GPS receiver

- The GPS signal cannot pass through metal objects. When using the ID-31A or ID-31E inside a vehicle, you may not receive GPS signals. We recommend you use it near a window. Please avoid the areas shown in the following:
  1. DO NOT use where it will block the driver's view.
  2. DO NOT use where the air bags could deploy.
  3. DO NOT use where it becomes a driving obstacle.
- The Global Positioning System (GPS) is built and operated by the U.S. Department of Defence. The Department is responsible for accuracy and maintenance of the system. Any changes by the Department may affect the accuracy and function of the GPS system.
- When the GPS receiver is activated, please do not cover the ID-31A or ID-31E with any object.
- The GPS receiver may not work if used in the following locations:
  1. Tunnels or high-rise buildings
  2. Underground parking lot
  3. Under a bridge or viaduct
  4. In remote forested areas
  5. Under bad weather conditions (rainy or cloudy day)
- The GPS receiver may not work if the transceiver operates near the 440.205 MHz. These are made in the internal circuit and does not indicate a transceiver malfunction.

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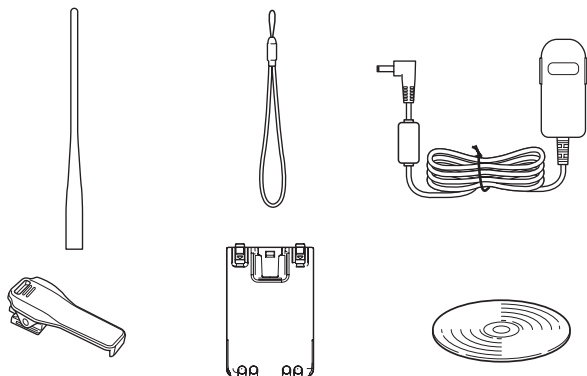
## SUPPLIED ACCESSORIES

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The following accessories are supplied with the transceiver.

- ① Antenna ..... 1
- ② Hand strap ..... 1
- ③ Battery charger (BC-167SA/SD/SV)\* ..... 1
- ④ Belt clip ..... 1
- ⑤ Battery pack (BP-271) ..... 1

\* Not supplied, or the shape is different, depending on the transceiver version.



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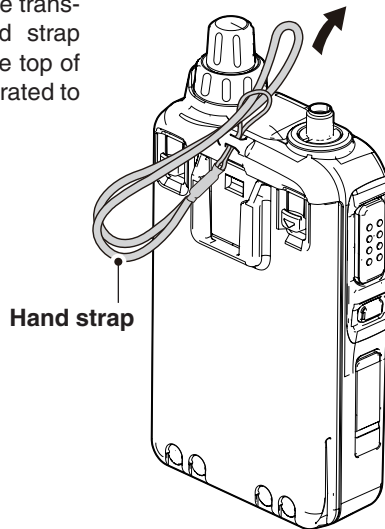
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# 1

## ACCESSORY ATTACHMENT

### ■ Hand strap

To facilitate carrying the transceiver, slide the hand strap through the loop on the top of the rear panel, as illustrated to the right.

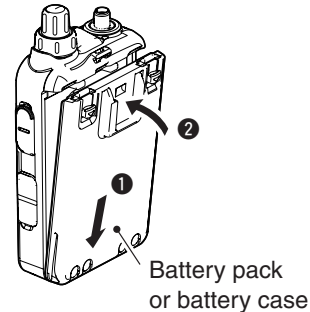


### ■ Battery pack

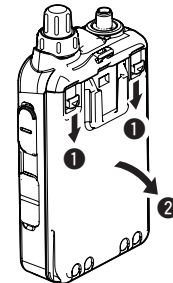
#### *To attach or detach the battery pack:*

To attach or detach the battery pack or battery case, follow the illustrations below.

#### To attach



#### To Detach



Even when the transceiver power is OFF, a small current still flows in the radio. Remove the battery pack or case from the transceiver when not using it for a long time. Otherwise, the battery pack or installed batteries will become exhausted.

The battery protection function automatically sets transceiver to Low power (0.5 W) when the temperature is 0°C (+32°F) or below. In this case, transmit power selections (High and Mid) are also disabled.



## ■ Belt clip

### **To attach the belt clip:**

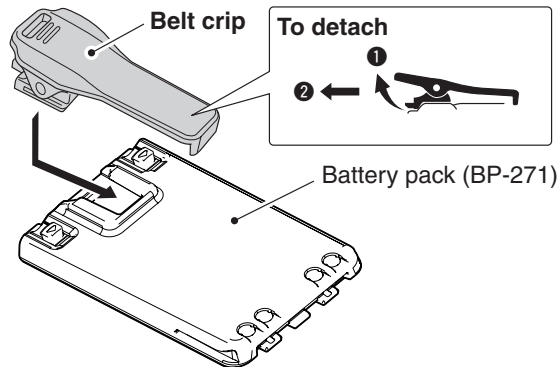
Slide the belt clip in the direction of the arrow until the belt clip locks in place, and makes a 'click' sound.

- ① Remove the battery pack from the transceiver, if it is attached. (p. 2)
- ② Slide the belt clip in the direction of the arrow until the belt clip locks in place, and makes a 'click' sound..

### **To detach the belt clip:**

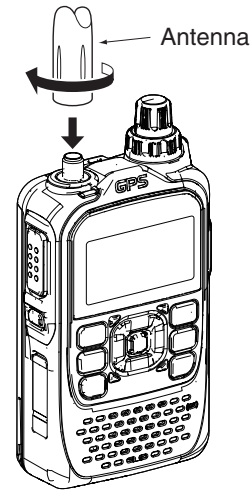
- ① Remove the battery pack from the transceiver, if it is attached. (p. 2)
- ② Lift the tab up (①), and slide the belt clip in the direction of the arrow (②).

#### **To attach**



## ■ Antenna

Insert the antenna connector into the antenna base and tighten the antenna base.



/// **NEVER** carry the transceiver by holding only the antenna.

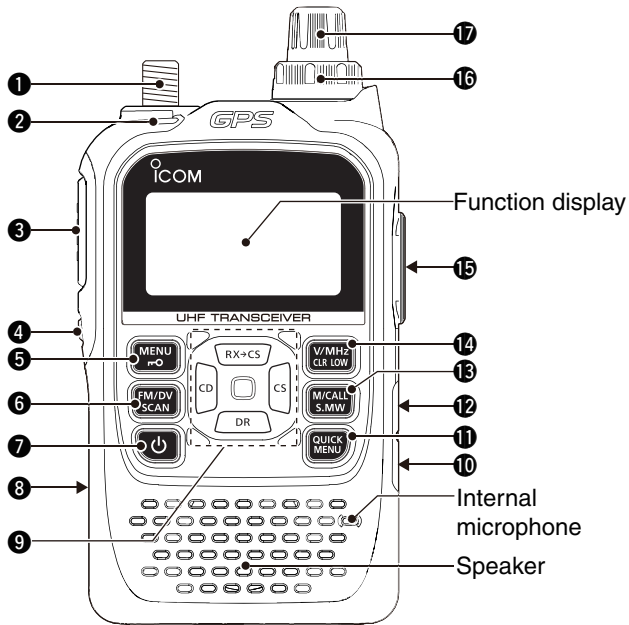
#### /// **✓ For your information**

Third-party antennas may increase transceiver performance. An optional AD-92SMA ANTENNA CONNECTOR ADAPTER is available to connect an antenna that has a BNC connector.

# 2

## PANEL DESCRIPTION

### ■ Front, top and side panels



#### 1 ANTENNA CONNECTOR (p. 1)

Connect the antenna here.

- An optional AD-92SMA adapter (p. 163) is available for connecting an antenna with a BNC connector.

#### 2 TX/RX INDICATOR [TX/RX] (pp. 24, 26)

Lights green while receiving a signal or when the squelch is open; lights red while transmitting.

#### 3 PTT SWITCH [PTT] (p. 26)

Hold down to transmit, release to receive.

#### 4 SQUELCH KEY [SQL] (p. 17)

- ➔ Hold down to temporarily open the squelch and monitor the operating frequency.
- ➔ While holding down this key, rotate [DIAL] to adjust the squelch level.

#### 5 MENU • LOCK KEY [MENU ⇄] (p. 115)

- ➔ Push to enter or exit the Menu screen. (p. 115)
- ➔ Hold down for 1 second to toggle the Lock function ON or OFF. (p. 24)

#### 6 FM/DV • SCAN KEY [FM/DV•SCAN] (p. 25)

- ➔ Push to select the operating mode. (p. 25)
  - Selectable operating modes are FM, FM N and DV.
- ➔ Hold down for 1 second to enter the scan type selection mode. (pp. 42, 44, 45)
  - Push again to start the scan.
  - Push  $\frac{V}{MHz}$  CLR LOW to stop the scan.

**7 POWER KEY** [⏻]



Hold down for 1 second to turn the transceiver power ON or OFF. (p. 16)

**8 microSD CARD SLOT** [micro SD] (p. 26)

Insert a microSD card of up to 32 GB SDHC.

**9 CROSS KEYS**

**CD (RX CALL RECORD)/LEFT KEY** [CD] (p. 26)



- ➔ Hold down for 1 second to set the received call sign (station and repeaters) to current call signs. (p. 50)
- ➔ While in the DR mode, or with the Menu screen or Quick Menu screen open, push to select an upper tier menu. (p. 115)

**CS (CALL SIGN)/RIGHT KEY** [CS] (p. 26)



- ➔ Hold down for 1 second to enter the operating call sign select mode. (pp. 48, 59)
- ➔ While in the DR mode, or with the Menu screen or Quick Menu screen open, push to select a lower tier menu. (p. 115)

**DR (D-STAR REPEATER)/DOWN KEY** [DR]



- ➔ Hold down 1 second to enter the DR mode. (p. 25)
- ➔ While in the DR mode, or with the Menu screen or Quick Menu screen open, push to move the value or option selector bar down. (p. 115)

**RX→CS (D-STAR REPEATER)/DOWN KEY** [DR]



- ➔ Hold down for 1 second to set the received call signs (station and repeaters) to current call sign. (p. 50)
  - While holding down this key, rotate [DIAL] select a Received call sign record.
- ➔ While in the DR mode, or with the Menu screen or Quick Menu screen open, push to move the value or option selector bar up. (p. 115)

**ENTER KEY**

While in the DR mode, or with the Menu screen or Quick Menu screen operation, push to open the selected set item or option. (p. 115)

**10 QUICK MENU KEY** [QUICK MENU]



Push to enter or exit the Quick Menu screen. (p. 25)

- The Quick Menu is used for changing the VFO setting or a memory channel.

**11 EXTERNAL DC IN JACK** [DC IN]

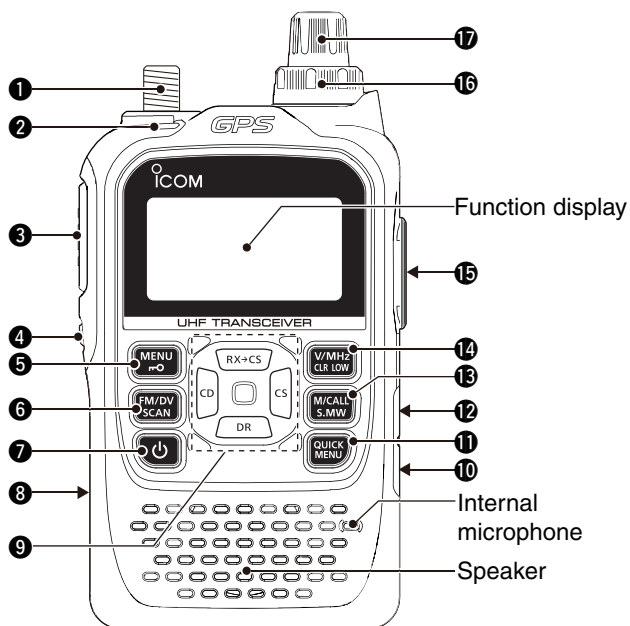
- ➔ Connects to the supplied wall charger, BC-167SA/SC/SV, to charge the attached battery pack. (p. 12)
- ➔ Connect an external DC power supply through the optional CP-12L or CP-19R cigarette lighter cable or OPC-254L DC power cable for external DC operation. (p. 15)

**12 DATA JACK** [DATA] (pp. 74, 77, 158)

Connects to a PC through the optional OPC-2218LU data communication cable, for low-speed data communication in the DV mode or for cloning. The jack and cable are also

## 2 PANEL DESCRIPTION

### ■ Front, top and side panels (Continued)



### 13 MEMORY/CALL • SELECT MEMORY WRITE KEY [M/CALL•S.MW]

**M/CALL  
S.MW**

- ➔ In the VFO mode, push once to enter the Memory selection mode, push again to enter the Call memory selection mode. (pp. 18, 29, 30, 72)
- ➔ Hold down for 1 second to enter the Select Memory Write mode. (p. 31)

### 14 VFO/MHz • CLEAR • OUTPUT POWER KEY [VFO/MHz•CLR•LOW]


**V/MHz  
CLR LOW**

- ➔ Push to select the VFO mode. (p. 25)
- ➔ While in the VFO mode, push to select 1 MHz tuning steps. (p. 22)
- ➔ With the Menu screen or Quick Menu screen open, push to return to the operating mode before entering the menu screen. (pp. 94, 115)
- ➔ While in the Memory Name or Call Sign Programming mode, push to select an upper tier menu. (p. 115)
- ➔ While scanning, push to cancel a scan. (pp. 104, 106, 107)
- ➔ Hold down for 1 second to select the output power. (pp. 42, 44, 45)
  - Select the transmit output power of High, Mid, Low or S-low.
  - While holding down this key, rotate **[DIAL]** to select the desired output power.

**15 EXTERNAL SPEAKER/MICROPHONE JACK [SP/MIC]**

Connect a cloning cable, optional speaker microphone or headset, if desired.

See page 163 for a list of available options.

 Be sure to turn power OFF before connecting or disconnecting optional equipment to or from the [SP/MIC] jack.

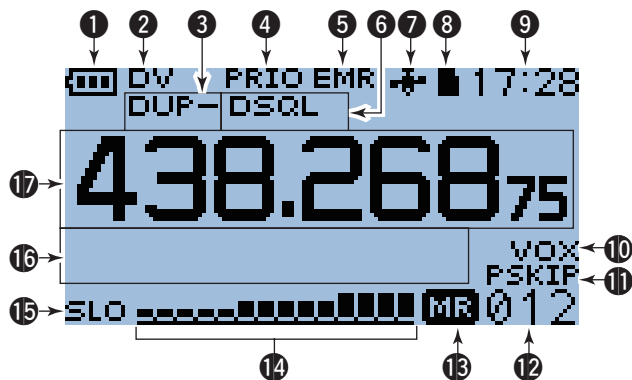
**16 VOLUME CONTROL [VOL]**

Rotate to adjust audio volume level. (p. 16)







**17 CONTROL DIAL [DIAL]**

- Rotate to tune the operating frequency. (p. 22)
- While in the Memory mode, rotate to select a memory channel. (pp. 18, 92)
- While scanning, rotate to change the scanning direction. (pp. 53, 104, 106, 107)
- Hold down [SQL], and rotate to select the squelch level. (p. 17)
- While in the DR mode, or with the Menu screen or Quick Menu screen open, rotate to select a desired option or value. (p. 115)

### ■ Function display



#### ① BATTERY ICON (pp. 12, 14)

- “” (battery icon) appears when the battery pack is attached.
- “” appears when the battery pack must be charged.
- While charging the attached battery pack, the icon sequentially shows “”, “”, “” or “.

#### ② OPERATING MODE ICONS (p. 25)

Shows the selected operating mode.

- DV, FM and FM N are selectable.
- “DV-G” or “DV-A” appears when GPS or GPS-A transmission is selected in the DV mode. (p. 138)

#### ③ DUPLEX ICON (p. 31)

“DUP” appears when plus duplex is selected, and “DUP-” appears when minus duplex is selected.

#### ④ PRIORITY WATCH ICON (pp. 112–114)

Appears when Priority Watch is in use.

#### ⑤ EMR ICON (pp. 112–114)

Appears when Enhanced Monitor Request (EMR) mode is selected.

#### ⑥ TONE ICONS

• *While operating in FM/FM N mode;*

- “TONE” appears while the Repeater Tone Encoder is ON. (p. 29)
- “TSQL” appears while the Tone squelch function is ON. (p. 150)
- “TSQL-R” appears while the Reverse Tone squelch function is ON. (p. 150)
- “DTCS” appears while the DTCS squelch function is ON. (p. 150)
- “DTCS-R” appears while the reverse DTCS squelch function is ON. (p. 150)
- “((·))” appears with the “TSQL” or “DTCS” icon while the Pocket Beep function (with CTCSS or DTCS) is ON. (p. 151)

- **While operating in DV mode;**

- “DSQL” appears while the Digital Call Sign squelch function is ON. (p. 151)
- “CSQL” appears while the Digital Code squelch function is ON. (p. 151)
- “(•)” appears with the “DSQL” or “CSQL” icon while the Pocket Beep function (with Digital Call Sign or Digital Code squelch) is ON. (p. 151)

### 7 GPS ICON

- Appears while GPS function is in use.
- GPS icons can be turned OFF in the GPS Set menu. (p. 137)
  - Stays ON when the internal GPS receiver is activated and a valid position data is received.
  - Blinks when an invalid position data is being received.

### 8 microSD ICON (pp. 112–114)

Appears while a microSD card is inserted.

### 9 CLOCK DISPLAY (pp. 112–114)

Displays the current time.

### 10 VOX ICON (pp. 112–114)

Appears when the VOX function is ON.

### 11 SKIP ICON

- “SKIP” appears when the selected memory channel is set as a skip channel. (pp. 108, 109)
- “PSKIP” appears when the displayed frequency is set as a skip frequency in the Memory mode. (pp. 108, 109)
- “PSKIP” appears while the Frequency Skip Scan function is ON in the VFO mode. (p. 102)

### 12 MEMORY CHANNEL NUMBER

- Displays the selected memory channel number. (pp. 18, 92)
- “C0” or “C1” appears when the Call channel is selected. (pp. 19, 93)

### 13 MEMORY ICON (pp. 18, 92)

Appears when the Memory mode is selected.

### 14 S/R F METER

- Shows the relative signal strength of the receive signal. (p. 24)
- Shows the output power level of the transmit signal. (pp. 26, 27)

### 15 POWER ICONS (p. 27)

- “SLO” appears when S-low power is selected.
- “LOW” appears when low power is selected.
- “MID” appears when mid power is selected.
- No icon appears when high power is selected.

### 16 MEMORY NAME DISPLAY (p. 24)

While in the Memory mode, the programmed memory or memory bank name is displayed.

### 17 FREQUENCY READOUT

Displays a variety of information, such as the operating frequency, menu contents and so on.

- The decimal point blinks during a scan.

## ■ Caution

Misuse of Lithium-Ion batteries may result in the following hazards: smoke, fire, or the battery may rupture. Misuse can also cause damage to the battery or degradation of battery performance.

- ⚠ **DANGER! NEVER** short the terminals (or charging terminals) of the battery pack. Also, current may flow into nearby metal objects such as a key, so be careful when placing battery packs (or the transceiver) in bags, etc. Simply carrying with or placing near metal objects such as a necklace, etc. may cause shorting. This may damage not only the battery pack, but also the transceiver.
- ⚠ **DANGER!** Use and charge only specified Icom battery packs with Icom radios or Icom charger. Only Icom battery packs are tested and approved for use with Icom radios or charged with Icom chargers. Using third-party or counterfeit battery packs may cause smoke, fire, or cause the battery to burst.

## ◇ Battery caution

- ⚠ **DANGER! DO NOT** hammer or otherwise impact the battery. Do not use the battery if it has been severely impacted or dropped, or if the battery has been subjected to heavy pressure. Battery damage may not be visible on the outside of the case. Even if the surface of the battery does not show cracks or any other damage, the cells inside the battery may rupture or catch fire.

- ⚠ **DANGER! NEVER** use or leave battery pack in areas with temperatures above **+60°C (+140°F)**. High temperature buildup in the battery, such as could occur near fires or stoves, inside a sun heated car, or in direct sunlight may cause the battery to rupture or catch fire. Excessive temperatures may also degrade battery performance or shorten battery life.
- ⚠ **DANGER! DO NOT** expose the battery to rain, snow, seawater, or any other liquids. Do not charge or use a wet battery. If the battery gets wet, be sure to wipe it dry before using.
- ⚠ **DANGER! NEVER** incinerate a used battery pack since internal battery gas may cause it to rupture, or may cause an explosion.
- ⚠ **DANGER! NEVER** solder the battery terminals, or **NEVER** modify the battery pack. This may cause heat generation, and the battery may burst, emit smoke or catch fire.
- ⚠ **DANGER!** Use the battery only with the transceiver for which it is specified. Never use a battery with any other equipment, or for any purpose that is not specified in this instruction manual.
- ⚠ **DANGER!** If fluid from inside the battery gets in your eyes, blindness can result. Rinse your eyes with clean water, without rubbing them, and see a doctor immediately.



- **WARNING!** Immediately stop using the battery if it emits an abnormal odor, heats up, or is discolored or deformed. If any of these conditions occur, contact your Icom dealer or distributor.
- **WARNING!** Immediately wash, using clean water, any part of the body that comes into contact with fluid from inside the battery.
- **WARNING! NEVER** put the battery in a microwave oven, high-pressure container, or in an induction heating cooker. This could cause a fire, overheating, or cause the battery to rupture.
- **CAUTION:** Always use the battery within the specified temperature range,  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ ). Using the battery out of its specified temperature range will reduce the battery's performance and battery life.
- **CAUTION:** Shorter battery life could occur if the battery is left fully charged, completely discharged, or in an excessive temperature environment (**above  $+50^{\circ}\text{C}$ ;  $+122^{\circ}\text{F}$** ) for an extended period of time. If the battery must be left unused for a long time, it must be detached from the radio after discharging. You may use the battery until the battery indicator shows half-capacity, then keep it safely in a cool dry place at the following temperature range:
  - $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) to  $+50^{\circ}\text{C}$  ( $+122^{\circ}\text{F}$ ) (within a month).
  - $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) to  $+35^{\circ}\text{C}$  ( $+95^{\circ}\text{F}$ ) (within three months).
  - $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) to  $+20^{\circ}\text{C}$  ( $+68^{\circ}\text{F}$ ) (within a year).

### ◇ Charging caution

- **⚠ DANGER! NEVER** charge the battery pack in areas with extremely high temperatures, such as near fires or stoves, inside a sun-heated vehicle, or in direct sunlight. In such environments, the safety/protection circuit in the battery will activate, causing the battery to stop charging.
- **WARNING! DO NOT** charge or leave the battery in the battery charger beyond the specified time for charging. If the battery is not completely charged by the specified time, stop charging and remove the battery from the battery charger. Continuing to charge the battery beyond the specified time limit may cause a fire, overheating, or the battery may rupture.
- **WARNING! NEVER** insert the transceiver (battery attached to the transceiver) into the charger if it is wet or soiled. This could corrode the battery charger terminals or damage the charger. The charger is not waterproof.
- **CAUTION: DO NOT** charge the battery outside of the specified temperature range:  $0^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$  ( $+32^{\circ}\text{F}$  to  $+95^{\circ}\text{F}$ ). Icom recommends charging the battery at  $+25^{\circ}\text{C}$  ( $+77^{\circ}\text{F}$ ). The battery may heat up or rupture if charged out of the specified temperature range. Additionally, battery performance or battery life may be reduced.

### 3 BATTERY CHARGING

## ■ Regular charging

Prior to using the transceiver for the first time, the battery pack must be fully charged for optimum life and operation.

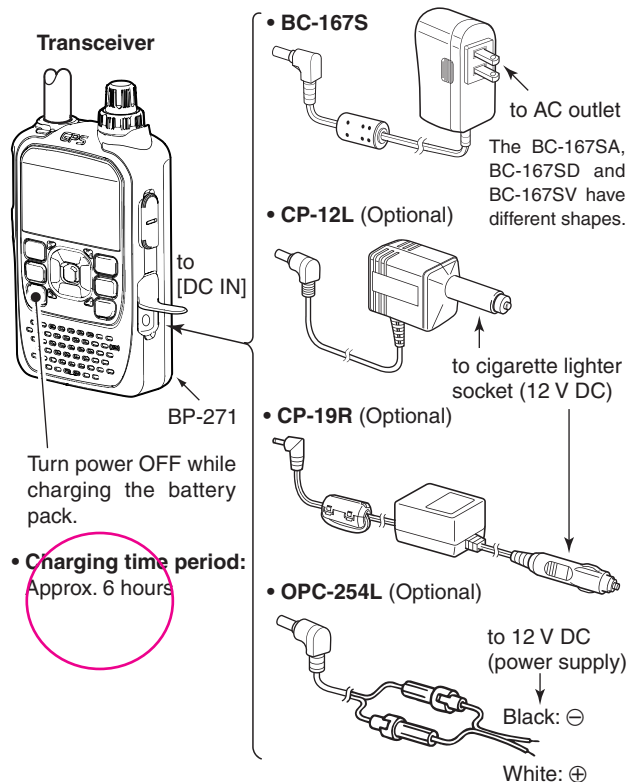
### ◇ Battery icon

When the transceiver's power is OFF, the charging icon sequentially shows “,” “” and “” along with “Charging...” while charging. The icon disappears when the battery pack is completely charged.

When the transceiver power is ON, the battery icon sequentially shows “,” “,” “” and “” while charging, and the icon disappears when the battery pack is completely charged.

### ◇ Charging note

- Be sure to turn the transceiver power OFF. Otherwise the battery pack will not be charged completely or will take much longer to charge.
- External DC power is possible when using an optional CP-12L, CP-19R or OPC-254L. The attached battery pack is also charged simultaneously, except during transmit (see p. 16 for more details).
- The external DC power supply voltage must be between 10–16 V to charge the battery pack and when operating using an OPC-254L.



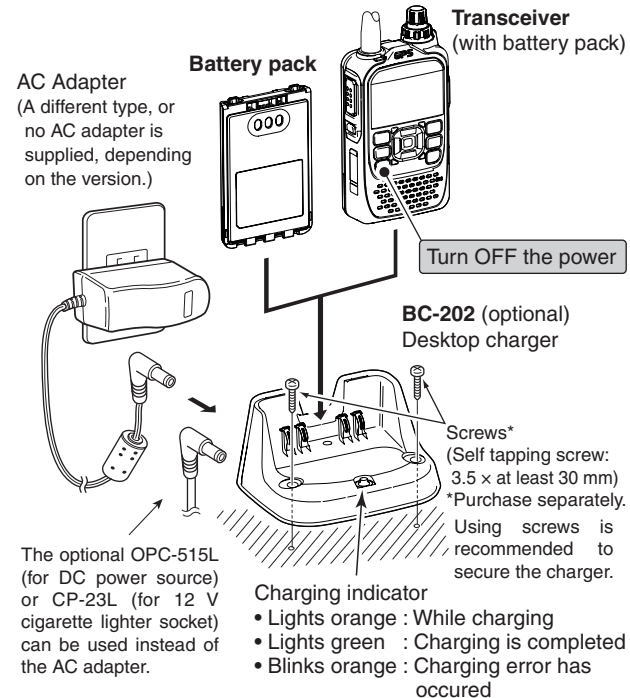
## ■ Rapid charging

The optional BC-202 rapidly charges of the BP-271 or BP-272 Li-ion battery packs.

### ◇ Charging note

- Be sure to turn OFF the transceiver power.  
When the transceiver power cannot be turned OFF, detach the battery pack from the transceiver then charge the battery pack by itself, or charge the battery using regular charging. Otherwise the battery pack will not be charged (the charging indicator on the BC-202 blinks orange about 10 second after the battery pack is installed in BC-202).
- The BC-202 desktop charger can only charge BP-271 or BP-272 Li-ion battery packs. Other types of rechargeable battery, Ni-Cd or Ni-MH cannot be charged.
- If the charging indicator blinks orange, there may be a problem with the battery pack or charger. If this occurs, try charging the battery pack alone, without the transceiver, or try using the standard (non-rapid) charger. Contact your dealer if you have problems charging a new battery pack.
- **NEVER** place the transceiver with the battery pack to the desktop charger when the transceiver is connected to the DC power supply. This may cause the charger's malfunction and the charging indicator of the charger lights red. In that case, disconnect the AC adapter from the charger, and then reconnect the AC adapter to the charger.
- The optional CP-23L and OPC-515L can be used instead of the supplied AC adapter. Connect one of these to the [DC 12-16V] jack.

- **Charging period:** BP-271 approximately 2.0 hours  
BP-272 approximately 3.5 hours

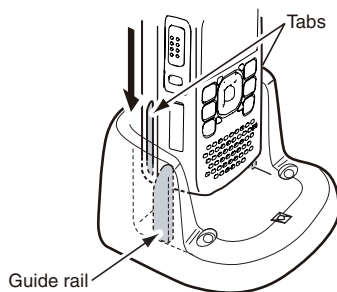


### 3 BATTERY CHARGING

#### ■ Rapid charging (Continued)

##### /// **IMPORTANT: Battery charging caution**

/// Ensure the tabs on the battery pack are correctly aligned with the guide rails inside the charger.



##### /// **CAUTION: When using the OPC-515L DC power cable**

/// **NEVER** connect the OPC-515L to a power source using reverse polarity. This will ruin the battery charger.

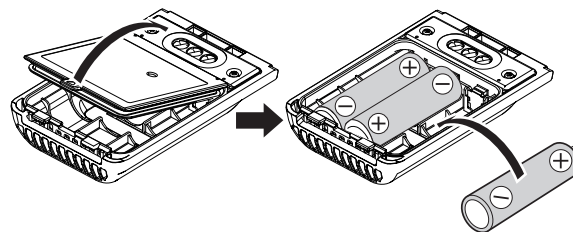
/// White line: ⊕    Black line: ⊖

**NOTE:** If the charging indicator blinks orange for 10 seconds or more with the battery pack installed in the transceiver, try charging the BP-271 alone. You can also try charging the BP-271 alone using the standard (non-rapid) battery charger.

#### ■ **Optional battery case**

When using the BP-273 BATTERY CASE, install 3 × AA (LR6) size alkaline batteries, as described below.

- ① Remove the battery case if it is attached. (p. 2)
- ② Install 3 × AA (LR6) size alkaline batteries.
  - Install only alkaline batteries.
  - Be sure to observe the correct polarity.
- ③ Attach the battery case. (p. 2)
  - Be sure to observe the correct polarity.



/// A built-in step-up converter in the BP-273 increases the voltage to 5.5 V DC.

/// Approximately 100 mW of output power is possible with the BP-273 operation. Also, the transmit output power selection is disabled.

/// The batteries may seem to have low capacity when used in low temperatures, such as  $-10^{\circ}\text{C}$  ( $+14^{\circ}\text{F}$ ) or below. Keep the batteries warm in this case.

**CAUTION:**

- When installing batteries, make sure they are all the same brand, type and capacity. Also, do not mix new and old batteries together.
- Keep the battery terminals clean. It's a good idea to periodically clean the battery terminals.
- Never incinerate used battery cells since the internal battery gas may cause them to rupture.
- Never expose a detached battery case to water. If the battery case gets wet, be sure to wipe it dry before using it.
- Never use batteries whose insulated covering is damaged.

### 3 BATTERY CHARGING

## ■ Battery information

### ◇ Battery life

The transceiver operates with the BP-271 or BP-272 Li-ion battery packs, as follows.

When operating in the DV mode, the operating time may be shortened by one-half hour.


Battery pack	Voltage	Capacity	Battery life*1
BP-271	7.4 V	1150 mAh (min.) 1200 mAh (typ.)	?? hrs.
BP-272	7.4 V	1880 mAh (min.) 2000 mAh (typ.)	?? hrs.


\*1 When the power save function is set to "Auto1," and the operating time is calculated under the following conditions;





TX : RX : standby = 1 : 1 : 8

\*2 The average operating life depends on the alkaline cells used.

### ◇ Battery icon

The " " battery icon appears when the BP-271 or BP-272 Li-ion battery pack is attached to the transceiver.

- When the BP-273 battery case is attached to the transceiver, the battery icon cannot display the battery capacity of the alkaline batteries. The battery icon stays "" , and it does not reflect with the true battery capacity.
- The battery icon does not appear when turning power ON after charging is completed without disconnecting the battery charger or external DC power.

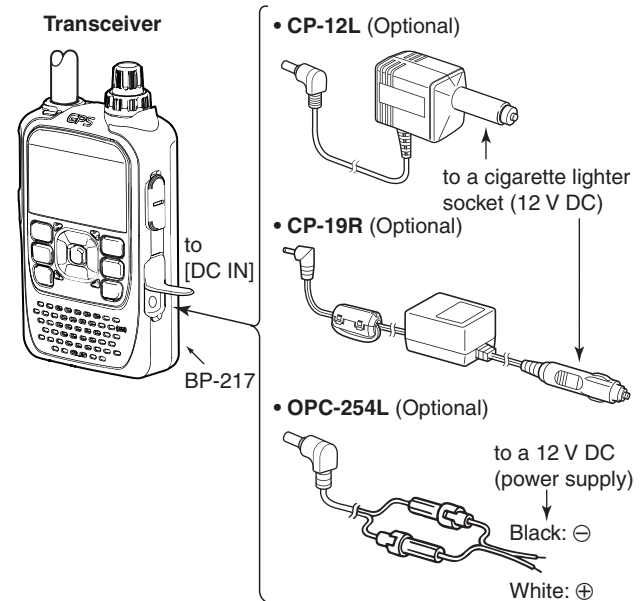
Icon	Battery condition
	The battery has sufficient capacity.
	The battery is exhausted a little.
	The battery is nearing exhaustion. Charging is necessary. (The transceiver can be operated for a short time.)
	The battery is almost exhaustion. Charging is necessary. (The transceiver quickly becomes impossible to operate.)

## External DC power operation

An optional CP-12L or CP-19R cigarette lighter cable, for a 12 V cigarette lighter socket, or an OPC-254L external DC power cable can be used for external power.



### Operating note

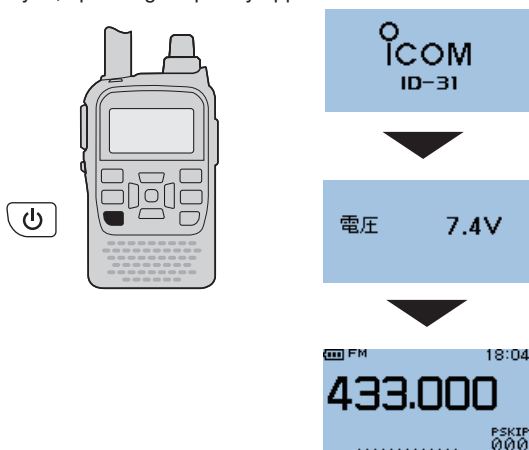
- The power supply voltage must be between **10.0–16.0 V DC**.  
**NEVER CONNECT OVER 16 V DC** directly into the [DC IN] jack of the transceiver.
- **BE SURE** to use a **CP-12L**, **CP-19R** or **OPC-254L** when connecting a regulated 12 V DC power supply. Use an external DC-DC converter to connect the transceiver through an optional CP-12L, CP-19R or OPC-254L to a 24 V DC power source.
- The voltage of the external power supply must be between 10–16 V DC when using either CP-12L, CP-19R or OPC-254L, otherwise, use the battery pack.
- Disconnect the power cables from the transceiver when not using it. Otherwise, the vehicle battery will become exhausted.
- The power save function is automatically deactivated when using an external DC power source.



**NOTE:** Up to 5 W (approximately) of maximum output power is available when using external DC power. However, when the supply voltage exceeds 14 V, the built-in protection circuit activates to reduce the transmit output power to approximately 2.5 W.

## ■ Power ON

- Hold down  for 1 second to turn ON power.
  - Hold down  for 1 second to turn OFF power.
  - After the opening message and power source voltage are displayed, operating frequency appears.



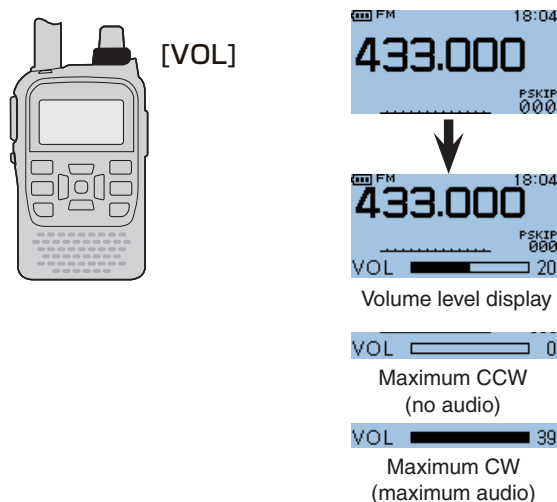
The opening message and power source voltage display options are selectable in the DISPLAY menu.

MENU ⇨ DISPLAY ⇨ **Opening Message** (p. 130)

MENU ⇨ DISPLAY ⇨ **Voltage Indication** (p. 130)

## ■ Setting audio volume

- Rotate [VOL] to adjust the audio level.
  - If the squelch is closed, hold down [SQL] while setting the audio level.
  - The display shows the volume level while setting.



The beep level is adjusted in the SOUNDS menu.

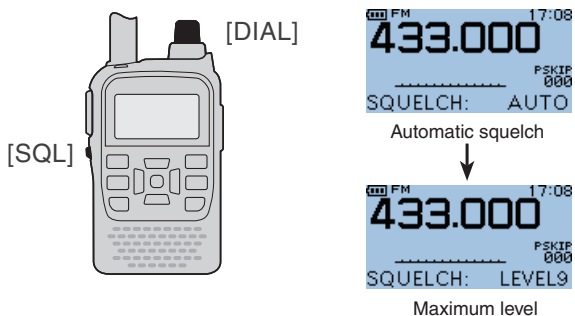
MENU ⇨ SOUNDS ⇨ **Beep Level** (p. 130)



## ■ Setting squelch level

The squelch circuit mutes the received audio signal, depending on the signal strength. The transceiver has 9 squelch levels, a continuously open setting and an automatic squelch setting.

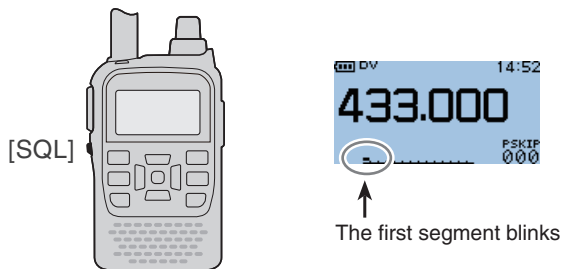
- ➔ While holding down [SQL], rotate [DIAL] to select the squelch level.
  - While holding down [SQL], rotate [DIAL] one click to display the squelch level.
  - “LEVEL1” is loose squelch (for weak signals) and “LEVEL9” is tight squelch (for strong signals).
  - “AUTO” indicates automatic level adjustment by a noise pulse counting system.
  - “OPEN” indicates a continuously open setting. (This option is not selectable in the DV mode.)



## ■ Monitor function

This function is used to listen to weak signals without disturbing the squelch setting, or having to open the squelch manually even when mute functions such as the tone squelch are in use.

- ➔ Hold down [SQL] to monitor the operating frequency.
  - The 1st segment of the S-meter blinks.



▨ The [SQL] key can be set to ‘sticky’ operation in FUNCTION menu. See page 125 for details.


MENU ⇄ FUNCTION ⇄ **Monitor** (p. 125)

## 4 BASIC OPERATION

### ■ Mode selection

#### ◇ VFO mode

VFO mode is used to set the desired frequency.

➔ Push  (V/MHz) to select VFO mode.



#### • VFO mode display





#### **What is VFO?**

VFO is an abbreviation of Variable Frequency Oscillator. Frequencies for both transmitting and receiving are generated and controlled by the VFO.

#### ◇ Memory mode

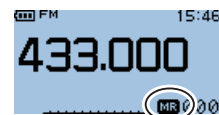
Memory mode is used for operation on memory channels which store programmed frequencies.

① Push  once or twice to select memory mode.

- “” appears when memory mode is selected.
- Push  again to select Call channels. Memory mode or Call channels are alternately selected.



#### • Memory mode display



Appears

② Rotate [DIAL] to select a desired memory channel.

- Only programmed memory channels can be selected.
- [See p. 94 for memory programming details.](#)

### ◇ Call channels

Call channels are used for quick recall of most-often used frequencies.

- 1 Push **M/CALL** once or twice to select call channels.
  - Push **M/CALL** again to select Memory mode. Memory mode or Call channels are alternately selected.



#### • Call channel display



- 2 Rotate [DIAL] to select a desired Call channel.

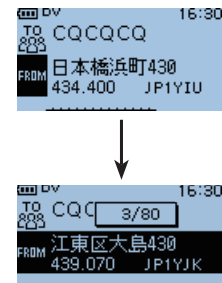
### ◇ DR (D-STAR Repeater) mode

DR (D-STAR Repeater) mode is used for D-STAR repeater operation. In this mode, you can select the pre-programmed repeaters and UR call sign easily by using [DIAL]. D-STAR is an abbreviation for Digital Smart Technologies for Amateur Radio.

- 1 Hold down **DR** for 1 seconds to select DR mode.



#### • DR mode display



- 2 Rotate [DIAL] to select a desired access repeater.

## 4 BASIC OPERATION

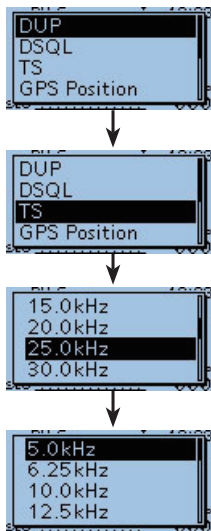
### ■ Setting a tuning step

The following tuning steps are selectable for the ID-31A or ID-31E.

- 5.0 kHz
- 6.25 kHz
- 10.0 kHz
- 12.5 kHz
- 15.0 kHz
- 20.0 kHz
- 25.0 kHz
- 30.0 kHz
- 50.0 kHz
- 100.0 kHz
- 125.0 kHz
- 200.0 kHz

#### ◇ Tuning step selection

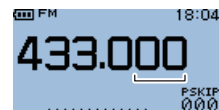
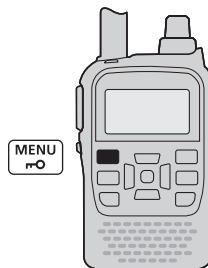
- ① Push  $\left[ \frac{V}{MHz} \right]$  to select VFO mode, if necessary.
- ② Push  $\left[ \text{QUICK MENU} \right]$  to enter the Quick Menu screen.
- ③ Push the Up or Down key to select the “TS” item.
- ④ Rotate  $\left[ \text{DIAL} \right]$  to select the desired tuning step.
- ⑤ Push  $\left[ \text{QUICK MENU} \right]$  (or  $\left[ \frac{V}{MHz} \right]$ ) to return to VFO mode.



5 kHz tuning step

### ■ Setting a frequency

- ① Push  $\left[ \frac{V}{MHz} \right]$  to select VFO mode, if necessary.
- ② Rotate  $\left[ \text{DIAL} \right]$  to select the desired frequency.
  - The frequency changes according to the preset tuning steps. See the previous content to set the tuning step.
  - When VFO mode is selected, push  $\left[ \frac{V}{MHz} \right]$  then rotate  $\left[ \text{DIAL} \right]$  to change the frequency in 1 MHz steps.  
Push  $\left[ \frac{V}{MHz} \right]$  again to cancel it.



$\left[ \text{DIAL} \right]$  changes the frequency according to the selected tuning step.

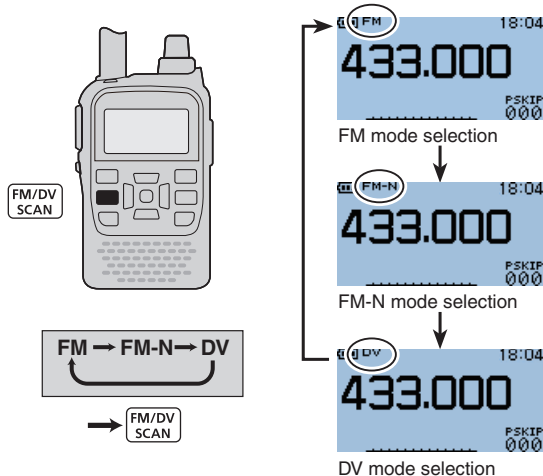


After pushing  $\left[ \frac{V}{MHz} \right]$  on VFO mode,  $\left[ \text{DIAL} \right]$  changes the frequency in 1 MHz steps.

## ■ Operating mode selection

Operating modes are determined by the modulation of the radio signals. The transceiver has total three operating modes, FM, FM-N and DV modes.

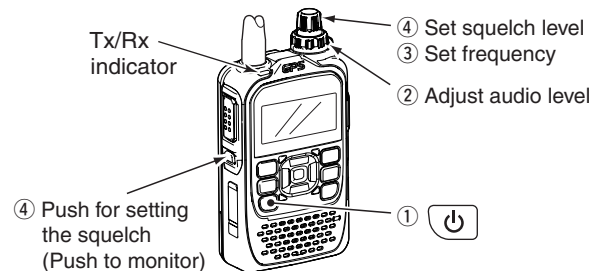
➔ Push **FM/DV SCAN** (FM/DV) one or more times to select a desired operating mode.



## ■ Receiving

Make sure a charged battery pack (BP-271) or brand new alkaline batteries (BP-273) are installed (pp. 2, 14).

- ① Hold down **POWER** for 1 second to turn ON the power.
- ② Rotate [VOL] to adjust a desired audio level. (p. 16)
  - The frequency display shows the volume level while setting.
- ③ Set the receiving frequency. (p. 23)
- ④ Set the squelch level. (p. 17)
  - While holding down [SQL], rotate [DIAL] one click to display the squelch level.
  - "LEVEL1" is loose squelch (for weak signals) and "LEVEL9" is tight squelch (for strong signals).
  - "AUTO" indicates automatic level adjustment by a noise pulse counting system.
  - Hold down [SQL] to manually open the squelch.
- ⑤ When a signal is received:
  - Squelch opens and audio is output.
  - Tx/Rx indicator lights white.
  - The S/RF-meter shows the relative signal strength level.



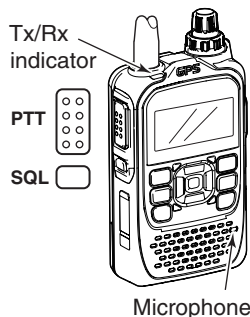
## 4 BASIC OPERATION

### ■ Transmitting

**CAUTION:** Transmitting without an antenna will damage the transceiver.

**NOTE:** To prevent interference, hold down [SQL] to listen on the channel before transmitting.

- ① Set the operating frequency.  
(p. 23)
  - Transmission is available only on the 440 MHz amateur band.
  - Select output power if desired. See next page for details.
- ② Hold down [PTT] to transmit.
  - Tx/Rx indicator lights red.
  - S/RF meter shows the output power level.
- ③ Speak into the microphone using your normal voice level.
  - DO NOT hold the transceiver too close to your mouth or speak too loudly. This may distort your speech.
- ④ Release [PTT] to return to receive.



**⚠ WARNING! NEVER** transmit for long periods of time. When the transceiver is used for prolonged transmissions at high power or middle power, the transceiver radiates heat to protect itself from overheating. The transceiver's chassis will become hot and may cause a burn.

- To prevent the transceiver's overheating, the default setting of the time-out timer function is set to 5 minutes (p. 62). Be careful when the time-out timer function is turned OFF or set to a long time period, and transmission is made for long periods.

**DO NOT** operate the transceiver in a situation that will obstruct heat dissipation, especially if the transceiver is operated with an external power supply. Heat dissipation may be affected, and it may cause a burn, warp the casing or damage the transceiver.

**NOTE:** When the transceiver becomes hot from continuous transmission, etc., the transceiver's heat protection function gradually reduces the output power to approximately 2.5 W, then it stops transmission after that. This is done to protect the transceiver itself until it has cooled down.

**CONNECT** the rated voltage range when using external power supply.

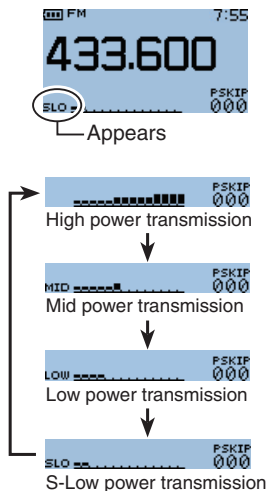
## ■ Transmit power selection

The transceiver has four output power levels to suit your operating requirements. S-Low output power during short-range communications may reduce the possibility of interference to other stations and will conserve battery power.

- ➔ Hold down  $\left[ \begin{smallmatrix} \text{V/MHz} \\ \text{CLR LOW} \end{smallmatrix} \right]$  (LOW) for 1 second to toggle the transmit output power between High (5W\*), Mid (2.5 W\*), Low (0.5 W\*) and S-Low (0.1 W\*). \*approximately
- While holding down  $\left[ \begin{smallmatrix} \text{V/MHz} \\ \text{CLR LOW} \end{smallmatrix} \right]$  (LOW), rotate [DIAL] to select the transmit power.



**ONLY** approximately 0.1 W transmission is available while attaching BP-273.

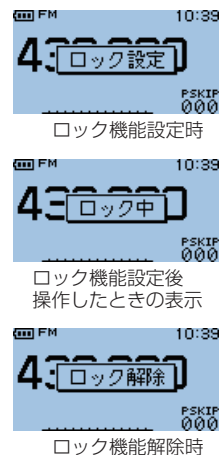
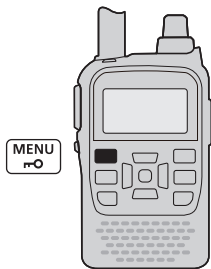


## ■ Lock function

To prevent accidental frequency changes and unnecessary function access, use the lock function.

- ➔ Hold down  $\left[ \begin{smallmatrix} \text{MENU} \\ \text{r-o} \end{smallmatrix} \right]$  (LOCK) for 1 second to turn the lock function ON or OFF.
  - While the lock function is activated and the locked key or dial is pushed or rotated, "LOCKED" will be displayed.
  - $\left[ \begin{smallmatrix} \text{Power} \\ \text{On/Off} \end{smallmatrix} \right]$ , [VOL], [SQL], [PTT] and  $\left[ \begin{smallmatrix} \text{MENU} \\ \text{r-o} \end{smallmatrix} \right]$  (LOCK) are operable while the lock function is activated.
  - Either or both the squelch control and volume control can also be locked in the Function menu.

MENU ⇨ SET ⇨ FUNC ⇨ **LOCK** (p. 127)



## ◇ General

- Frequency coverage : (unit: MHz)

Version	TX	RX
U.S.A.	420–450*1	400–479*1
AUS	420–450*2	400–479*2
EUR KOR	430–440	430–440
UK	430–440*2	400–479*2
ITR	430–434, 435–438	430–434, 435–438
EXP	400–479*2	400–479*2
EXP-1	430–440*2	400–479*2

\*1Guaranteed 440–450 MHz only, \*2Guaranteed 430–440 MHz only

- Mode : FM, FN-N, DV
- No. of memory channels : 552  
(incl. 50 scan edges and 2 call channels)
- Usable temp. range : –20°C to +60°C; –4°F to +140°F
- Tuning steps : 5, 6.25, 10, 12.5, 15, 20, 25, 30, 50, 100, 125 and 200 kHz
- Frequency stability : ±2.5 ppm  
(–20°C to +60°C; –4°F to +140°F)
- Power supply : 10.0–16.0 V DC for external DC power, or specified Icom's battery pack
- Digital transmission speed: 4.8 kbps
- Voice coding speed : 2.4 kbps
- Current drain (at 7.4 V DC) :
  - TX Less than 2.5 A
  - RX Max. output FM Less than 350 mA (Internal speaker)  
Less than 200 mA (External speaker)
  - DV Less than 450 mA (Internal speaker)  
Less than 300 mA (External speaker)

- Antenna connector : SMA (50 Ω)
- Dimensions : 58(W)×95(H)×25.4(D) mm;  
(projections not included) 2<sup>9</sup>/<sub>32</sub>(W)×3<sup>9</sup>/<sub>4</sub>(H)×1(D) in
- Weight (approximately) : 140 g; 4.94 oz  
(without battery pack/case and ant.)

## ◇ Transmitter

- Modulation system :
  - FM Variable reactance freq. modulation
  - DV GMSK reactance freq. modulation
- Output power (at 7.4 V DC)  
(Typical) : High 5.0 W, Mid. 2.5 W, Low 0.5 W,  
S-Low 0.1 W
- Max. frequency deviation : ±5.0 kHz (FM wide: approx.)  
±2.5 kHz (FM narrow: approx.)
- Spurious emissions : Less than –60 dBc at High/Mid.  
Less than –13 dBm at Low/S-Low
- Ext. mic. impedance : 2.2 kΩ

All stated specifications are subject to change without notice or obligation.



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# 15 SPECIFICATIONS

## ◇ Receiver

- Receive system : Double-conversion superheterodyne
- Intermediate frequencies : 46.35 MHz(1st IF)  
450 kHz(2nd IF)
- Sensitivity (except spurious points):
  - FM (1 kHz/3.5 kHz Dev.; 12 dB SINAD) Less than  $-15$  dB $\mu$
  - DV (PN9/GMSK 4.8kps; BER 1%) Less than  $-11$  dB $\mu$
- Audio output power (at 10% distortion)
  - Internal speaker : More than 0.4 W with a 16  $\Omega$  load
  - External speaker : More than 0.2 W with a 8  $\Omega$  load
- Selectivity :
  - FM (Wide) More than 55 dB
  - FM (Narrow), DV More than 50 dB
- Ext. speaker connector : 3-conductor 3.5(d) mm; ( $1/8$ "/)8  $\Omega$
- Spurious and image rejection ratio :  
More than 60 dB
- Squelch Sensitivity (threshold, 1 kHz/3.5 kHz Dev.):  
Less than  $-15$  dB $\mu$