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OWNER'S MANUAL

RM8150
VHF/UHF MOBILE RADIO

RELM Wireless

7100 Technology Dr.
West Melbourne, FL 32904
Telephone: (321) 984-1414
FAX: (321) 984-0434
www.RELM.com

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Memo :

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7PIZ-1943-E03C

INSTRUCTION MANUAL
RM8150
VHF/UHF MOBILE RADIO

MANDATORY SAFETY INSTRUCTIONS TO INSTALLERS AND USERS

● Use Only manufacturer or dealer supplied antennas.

● Antenna minimum safe distance: 108 cm

● Antennas used for this transmitter must not exceed an antenna gain of 3 dBi.

The FCC (Federal Communications Commission) has adopted a safety standard for human exposure to RF energy which is below the OSHA (Occupational Safety and Health Act) limits.

● Antenna mounting: The antenna supplied by the manufac-

turer or radio dealer must not be mounted at a location such that during radio transmission, any person can come closer than the above indicated minimum safe distance to the antenna (i.e. 108cm).

● To comply with current FCC RF Exposure limitations, the antenna must be installed at or exceeding the minimum safe distance indicated above, and in accordance with the requirements to the antenna manufacturer or supplier.

● Vehicle installation: The antenna can be mounted at the center of a vehicle metal roof or trunk lid if the minimum safe distance is observed.

Antenna substitution: Don't substitute any antenna for the one supplied or recommended by the manufacturer or radio dealer. You may be exposing person(s) to excessive radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.

EU Regulatory Conformance

The equipment is in compliance with the essential requirements and other relevant provisions of the Directive 1999/5/EC.

Note: The above information is applicable to EU countries only.

⚠ warning

Maintain a separation distance from the antenna to person(s) at least 108cm.

● This transmitter is authorized to operate with a maximum duty factor of 50%, in a typical push-to-talk mode, for satisfying FCC RF exposure compliance requirements."

●The device is authorised for occupational use only. Qualified users must be provided with training information for meeting occupational exposure requirements.

●The device complies with SAR and/or RF field strength limits of RSS-102 requirement and contact information where the user can obtain Canadian information on RF exposure and compliance.

CONTENTS

1 Package-opened Inspection and Installing

Please check the host in the package and the supplied acce-ssories in the following table before using. Any articles are found lost or damaged, please contact the distributor without delay.

1.1 Supplied Accessories

Accessories	Quantity
Fixed bracket	1
Power Cable	1
Hand Microphone	1
Microphone Hanger	1
M4*10 Combination Screw	4
M4*16 Self-tapping Screw	2
M5*16 Self-tapping Screw	4
Instruction Manual	1
Fuse	2

Microphone Hanger

Fuse

M4*10 Combination Screw

M5*16 / M4*16 Self-tapping Screw

Power Cable

Hand Microphone

Fixed bracket
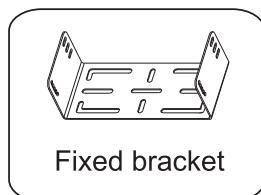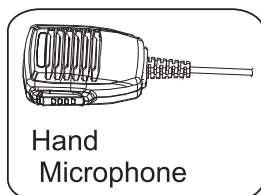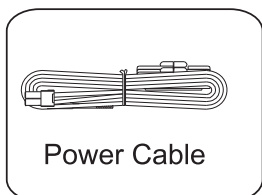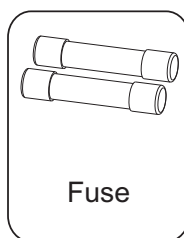
1.2 Preparation

1.2.1 Connection of Power Cable

＊ First of all, please check whether there is a hole for the power cable on the insulating board. If no, please bore the board with the suitable drill bit and fix a rubber grommet on it.

＊ Afterwards, please have the cable pass through the insulating board and lead from the car into the car engine. Connect the red conductor to the positive terminal of the accumulator and the black conductor to the negative terminal.

＊ At last, ring the remained conductor and fix it.

Note: Please maintain the sufficient relaxation of the power cable to make it convenient to dismantle the radio in the state of power connection.

1.2.2 Radio Installing

Warning: For passengers' safety, please fix the radio firmly on the fixed bracket so that the radio will not be loosened in case of collision.

＊ The fixed bracket is taken as an example. Draw the position and drill a hole on the instrument panel first, and then install the fixed bracket with 4 M5*16 self-tapping screws. (Note: please fix the radio at the position convenient for operation and control, and leave an enough space for fixation and connection of the cable.)

＊ Slide the radio into the fixed bracket and fix it with 4 M4*10 combination screws (plus plain washer and spring washer). (Different combinations of fixing holes are selectable to adjust the radio to the proper height and visual angle.)

＊ Connect the antenna and the power cable to the radio.

＊ Install the microphone hanger at the position easy to use, with

2 M4*16 self-tapping screws. (The microphone and its cable sho-

-uld be fixed at the position not affecting safe driving.)

＊Connect the microphone to the microphone jack on the front

panel of the radio and put it on the hanger.

Note: When replacing the fuse for the power cable, please use the one of the same specification without fail. It is not allowed to replace the fuse with one of a higher capacity.

2 Radio Overview

2.1 Description of External View
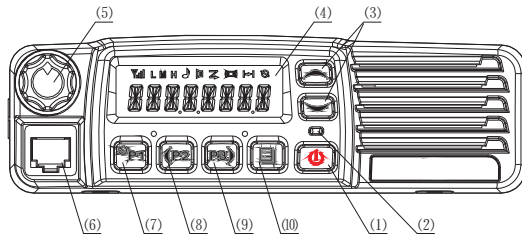
（1） ⏻ power button

Press this button for a long time (more than 1.5 seconds) to swith the radio on/off.

（2）LED indicator

The red indicator will light while transmitting; the green indicator will light when it receives the carrier.

The led flashes orange on received correct DTMF/ 2Tone signalling.

The red indicator flashes in the scanning process.
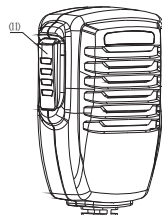
（3） ⌒ / ⌄ button (programmable button)

（4）LCD display screen

For details, see "LCD Display".

（5）Volume Control knob

To be used to adjust volume.

（6）Microphone/Programming Interface

（7） P1 button (programmable button)

（8） P2 button (programmable button)

（9） P3 button (programmable button)

（10） button (programmable button)

（11）PTT button (on the hand microphone)

Press the PTT button first, and then speak to the microphone to transmit the voice to the other. Release to receive.

2.2   Display Screen

P1   P2   P3
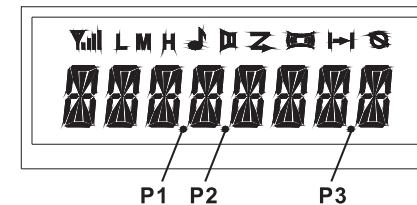
Display	Description
▾▫▪▪	It means the receiving signal strength. 4 lines means the strongest signal.
LMH	Transmission power level "L" means the transmission of signal for the radio at the lower power; "M" means the transmission of signal for the radio at the medium power;

Display	Description
LMH	"H" means the transmission of signal for the radio at the high power;
♪	Call Received indicator. The radio receives a selective call/call alert.
(speaker icon)	Monitor State Indicator.
Z	Scan Indicator.
(companding icon)	Companding Indicator.
I→I	Talkaround Indicator.
(scrambler icon)	Scrambler Indicator.
P2	OST Indicator.

2.3 Rear Panel
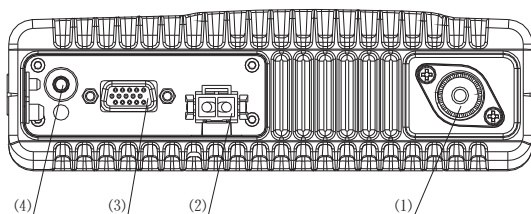
（1）Antenna Interface
（2）Power Interface
（3）15-Pin Connector for accessories.
（4）External Speaker Interface

3. Basic Operation

1.Startup:

Press the red POWER button for a long time (at least 1.5 seconds) to switch the radio on/off

2.Volume

Press the "MONITOR" or "Squelch" button to listen to the background noise first, and then adjust the volume by turning the volume control knob.

3.Channel

The radio can provide 128 conventional channels (There are totally 16 groups and each has at most 16 channels).

Press the "CHANNEL UP" or "CHANNEL DOWN" button to select the channel. Press the "ZONE UP" or "ZONE DOWN" button to select the group you require.

4.Transmission

To send a call, press the PTT button and speak to the microphone in the normal voice. Please keep the microphone about 3 or 4 cm far from your mouth. After speaking, please loosen the PTT button.

5. Receive

The radio will return to the receiving state after you release the PTT button.

The distributor may have set the CTCSS/DCS signalling in the programmed radio of your radio. On the channels with CTCSS/DCS are set, you can only hear the call from other radio with the same CTCSS/DCS.

4. Programmable Button Function

⌣ / ⌢ , ³P1 , (P2 , P3) , ▤ can be programmed as one of the following functions.

Buttons	Function Description
0. None	No function
1.Channel Up	Select the next channel
2.Channel Down	Select the previous channel
3.Zone Up	Select the next zone
4.Zone Down	Select the previous zone
5.Display Channel Frequency	Press this button and the LCD will show the frequency of the current channel.
6.Display Channel Name	Press this button and the LCD will show the name of the current channel.
7.Display Mode Switch	Press this button and the LCD will show "Channel Number", "Channel Name", "Zone Number, Zone Name" and "Channel Frequency" alternately.
8.OST	Change the setup of preset CTCSS/DCS for the current channel.
9.Power level Selection	Press this button to make selection among the high, medium and low transmission power, and "H", "M" and "L" will be shown on the LCD to represent the current transmission power.
10.Squelch Level Selection	Press this button to enter the "Squelch Level Adjustment Mode" first, and then press the ⌣ / ⌢ button to adjust the level. Press the ▤ button to save the selected squelch level and quit this mode.

Buttons	Function Description
11.Key lock	To toggle between locking/unlocking your radio keypad.
12.Scan	Start/end the scanning function of system.
13.Nuisance Delete	When one channel continually generated unwanted noise, this allow you temporary remove the channel from the current active scan.
14. Voice Companding	Start/end the voice compression/expansion function.
15. Public Address	Start/end the public address function. Press this button and the function will be actived. Press the PTT button and speak to the micro--phone so that you can hear your voice through the external speaker . Press this button once again and return to the normal user mode.
16.Scrambler	Enable or Disable voice scrambler function.
17. Home Channel	Changes to the home channels.
18.Talkaround	Switch the radio between talkaround and repeater mode.
19.VOX Selection	Enable or disable the VOX function.
20. Monitor momentary/ Call Cancel	Hold this button to close CTCSS, DCS, 2Tone /DTMF signalling according to the set data. Loosen this button to return to the normal operation. Press this button in the selective call

Buttons	Function Description
	state to quit such a state.
21.Monitor/ Call Cancel	Press this button to trigger this function and the CTCSS, DCS, 2Tone/DTMF signalling will be closed, so you can receive the signal that can't be heard in the normal operation. Press this button again to return to the normal operation. Press this button in the selective call state to quit such a state.
22.Squelch off monmentary/ Call Cancel	Hold this button to open the squelch. loosen this button to return to the normal operation. Press this button in the selective call state to quit such a state.
23.Squelch off /Call Cancel	Press this button to open squelch, press it again to return to normal operation.Press the button in the selective call state to quit such a state
24.Emergency Alarm	Enables the emergeney mode.
25.Radio Call	Press this button and to enter the fast menu mode of "Radio Call".For detailed operation, see "Menu Operation".
26.Call Button 1	Sends the DTMF/2Tone code assigned to call 1 key.
27.Call Button 2	Sends the DTMF/2Tone code assigned to call 2 key.
28.Call Button 3	Sends the DTMF/2Tone code assigned to call

Buttons	Function Description
	3 key.
29.Call Button 4	Sends the DTMF/2Tone code assigned to call 4 key.
30.Menu Select /Enter	To enter the menu mode or make menu selections.
31.Horn Alert	Enables the Horn Alert
32.Tenancy	Press this button to view tenancy remained time.
33.Lone worker	Enables Lone worker function
34.Scan List Edit	Press this button and the radio will enter the fast menu mode for scan list edit. For details, see "Menu Operation".
35.GPS Information View	Press this button and the radio will enter the menu mode of GPS Information Menu.
36.VOX Level Selection	Press this button to enter the " VOX Level Adju--stment Mode". Press ⌃/⌄ button to adjust VOX level. Press 🗏 button to save the selected VOX level and quit this mode.

5. Radio Call

5.1   Selective Call

5.1.1 Send a Selective Call

A.Press "Menu Select/Enter" button to enter the menu
mode.
B.Press ⌃ / ⌄ button until "RADIOCAL".
C.Press ▤ button to select "SEL CALL".
D.Press⌃ / ⌄ button until the required call list appears.
E.Press "PTT" button to send the selective call.
F.Press "PTT" button and speak to the microphone in normal
voice. Please keep the microphone about 3 to 4 cm far from
your mouth. After speaking, please loosen the "PTT".
G.Press ↻P1 button to return to the previous operation.
5.1.2 Receive a Selective Call
Receiving a selective call, you will hear the alert tone and the
LED indicator will blink orange. ♪ Icon flashes and the
caller's ID or name displays.
Press PPT button for callback.

5.2 Call Alert
After the radio receives the call alert, the alert tone will sound and
the orange indicator flicker. ♪icon flashes and the caller's ID
code or name shows until someone answers.
Press the "PTT" button for callback or other buttons for
cancellation.
A.Press "Menu Selection/Enter" button to enter the menu
mode.
B.Press⌃ / ⌄button until "RADIOCAL".
C.Press ▤ button to select "CALL ALT".
D.Press ⌃ / ⌄ button until the required call list is showed.

E.Press "PTT" button to send the call.
F.After calling, press↻P1 button to return the previous operation.

6. Select Zone
According to the setup of the communication network, the radio
can be distributed to different zones. Select the proper zone to
realize communicating with the radio from a different zone.
1.Select the zone through menu.
A.Press the "Menu Selection/Enter" button to enter the menu
mode.
B.Press ⌃ / ⌄ button until "ZONE".
C.Press ▤ button for selection.
D.Press ⌃ / ⌄ button until the zone name you require is
appeared.
E.Press ▤ button for selection.
2. Select the zone through "ZONE UP" or "ZONE
DOWN" button.

7. Talkaround
In the communication network, you can expand communication
range through the repeater, but when the mobile radio is out of the
communication range, you can connect with other radio in the
talkaround method. The talkaround function can be showed by⊢→⊣
1.Select the talk around by menu.
A.Press the "Menu Selection/Enter" button to enter the menu
mode.

B.Press ︿ / ﹀ button until "RPTRTALK".

C.Press 🗒 button for selection.

D.Press ︿ / ﹀ button until "REPEATE " or "TALKRND".

E.Press 🗒 button for confirmation.

2. Switch the talkaround or repeater mode through "talkaround" button.

8. Utilities

The item can help you customize some setups of the radio.

The operating steps go as follows:

A.Press the "Menu Selection/Enter" button to enter the menu mode.

B.Press ︿ / ﹀ button until "UTILITY".

C.Press 🗒 button for selection.

D.Press ︿ / ﹀ button until the items you require are showed.

E.Press 🗒 button for select. The radio will show the current setup.

F.Press ︿ / ﹀ button to show all items that can be set with this item.

G.Press 🗒 button to select this setup.

H.Press ⤺P1 button to return to the previous operation.

Change the setup items in the following table as per the previous steps.

Items	Selectable Setups	Functions
Squelch Level "SQL LEV "	SQL 0 ~ 9	Change the squelch level of the radio.
Transmission Power "PWR LEV"	"PWR LOW " "PWR MID " "PWR HI "	Select transmission power among high, medium and low levels.
VOX Level "VOX LEV "	VOX 0 ~ 9	Change the VOX level of the radio.
Backlight "BACK LED".	"BLED OFF" "BLED ON " "BL AUTO "	Select among such modes of backlight as "turnoff", "normal turn-on" or "auto"
MCU software version display "SOFT VER"	... Eg. "R01.00"	Show the software version.

9. Scan

In order to receive the calls from many channels, the radio can be programmed to scan these channels. At most there are 16 channels in each scan list. Each channel can use a scan list together with others or alone.

9.1 Start/End Scan Function

You can press "SCAN" button directly or enable the scan through the menu. When the scan function is started, ⚡ icon and your revert channel will display .

During sweep, the red indicator will flicker. When the scan is
landed on, the indicator will stop flickering.
1.Enter the scan state through menu mode.
　A.Press the "Menu Selection/Enter" button to enter the
　　menu mode.
　B.Press ⌃/⌄ button until "SYS SCAN".
　C.Press ▤ button for selection.
　D.Press ⌃/⌄ button until "SCAN ON?" or "SCAN OF?"
　E.Press ▤ button for select.
2.Use the scan button.
　A.Press "SCAN" button to activate the scan function.
　B.Press "SCAN" button again to disable the scan function.

9.2　Nuisance Delete
　　If a channel continuously generates noise or interference, press
　　the button to remove this channel from the scan list temporarily.
　　Note: the priority channel can't be removed and the last one in the
　　scan list, either.

9.3　　Edit Scan List

9.3.1 Add or Delete the Channels in the Scan List
　　A.Press the "Menu Selection/Enter" button to enter the menu
　　　mode.
　　B.Press ⌃/⌄ button until "PROG LST".
　　C.Press ▤ button to select "SCAN LIST".
　　D.Press ⌃/⌄ button until "ADD LST?" or "DEL LST?".
　　E.Press ▤ button for selection.
　　F.Press ⌃/⌄ button until the channel you want to add or

　delete.
　G.Press ▤ button to complete operation you will see "CHN
　　SAVE" (If you added a channel)or "CHN DEL".
　H.Press ⤵P1 button to return to the previous operation.

9.3.2 Set Priority Channel
　　1.Press the "Menu Selection/Enter" button to enter the menu
　　　mode.
　　2.Press ⌃/⌄ button until "PROG LST".
　　3.Press ▤ button to select "SCAN LIST".
　　4.Press ⌃/⌄ button until "ED PRIO?".
　　5.Press ▤ button for selection.
　　6.Press ⌃/⌄ button until "PRIO#1?" or "PRIO#2?".
　　7.Press ▤ button to select the type of the required priority channel.
　　　For example, in Step 7, the type of priority channel is "DES?".
　　　Press ⌃/⌄ button to select the required priority channel.
　　8.Press ▤ button to complete operation.
　　9.Press ⤵P1 button to return to the previous operation.

10.　OST
　　In a certain specific channel, you can revise the CTCSS/DCS
　　encode/decode setup of current channel.
　　The operating steps go as follows:
　　A.Press the "OST" button to enter the OST menu mode.
　　B.Press ⌃/⌄ button until the CTCSS/DCS encode/decode you
　　　want.
　　C.Press ▤ button to select .

Note:
- When the OST backup function is enabled, the radio retains the OST code of each channel even if the channel is changed or the radio is shut down.
- In the OST state, P2 " · " icon will display.
- Press "OST" button again to return to normal operation.

11. GPS Information View

If the radio starts the GPS function, you can view the current GPS information. The specific operating steps go as follows:

A.Press "GPS Information View" button to enter the GPS infor-
-mation display mode.

B.Press ⏷ / ⏷ button until the items you require displays.

C.Press ▤ button for selection.

D.Press ⏷ / ⏷ button for page up of the following content.

E.Press ꒫P1 button to return to the previous operation.

The specific content can be shown as follows:
1. Positioning star number: "STAR NUM"
2. Longitude "LONGITUD"
3. Latitude "LATITUDE"
4. Altitude "ALTITUDE"
5. Speed "SPEED"
6. Time "TIME"

12. Wired Clone Mode

If the wired clone function is enabled, the radio will not quit after entering the wired clone mode. To return to normal user mode, the user needs to restart the machine.

The operating steps go as follows:

1.Press [P1] and [P2] buttons for power-on until show "CLONE" (for two seconds) and enter the clone mode. If the function is disabled, it will enter the user mode.

2.Connect the slave radio with the wired clone cable first,and then turn on .

3.Press the master radio's [P4] for starting clone.During transm-
-itting the data,the master radio lightes red,and the slave radio lights green.

4.Press the [P4] button and the master will return to the clone mode. Continuous clone will start from Step 3.

Note: The master displays "success" and the slave auto matically restart upon successfally receipt of all data.

13. Trouble Shooting Guide

Number	Problem	Solution
1	Power on Failure	A.The power cable is not connected with the accumulator or the host reliably. Please connect the power cable reliably. B.The protective tube of power cable is burnt out. Please change it. C.The power button is of poor contact. Please change the silica gel button or PCB button.

No.	Problem	Solution
		D.The battery is out of power. Please charge or change it. E.CPU is broken, Please change the IC.
2	Phase lock loop unlocked (Beeping)	A.The crystal X1 of phase lock loop is broken. Please change it. B.The oscillator tube is broken. Please change it. C.The IC U101 of phase lock loop is broken.Please change IC.
3	No talkback	A.The frequency is not right. Please reselect the channel of the same frequency. B.The CTCSS/DCS code is not the same. Please reset it. C.Please check the TX/RX signalling system of both. D.It is out of the effective communication range.
4	No receiving signal	A.The antenna is not in good contact. Please fasten the antenna head. B.The high-frequency amplifying tube Q26 is broken. Please change it. C.The squelch level is set to high Please reset the squelch level. D.The mixed tube Q21 is broken. Please change it.

No.	Problem	Solution
		E.The FM IC U101 is broken. Please change IC.
5	The red transmission Indicator lights but no sound is heard.	A.The power-amplifier tube Q23/Q25 is broken, resulting in no power output. Please change it. B.The microphone is broken. Please change it. C.The power amplifier U201 is broken. Please change it.
6	The green receiving dicator lights but no sound is heard.	A.The speaker is broken. Please change it. B.The audio power amplifier U11 is broken. Please change IC.

14. Major Specifications

Frequency Range: 136MHz--174MHz   350MHz--400MHz
400MHz--470MHz   450MHz--520MHz

Channel Number: 128 (divided into 16 zones and at most 16 channels per zone)

Channel Spacing: 25 kHz (wide band)/ 20 kHz (medium band) /12.5 kHz (narrow band)

Operating Voltage: 13.6V DC±10%

Operating Temperature: -25℃-+55℃

External Dimension: machine only: 170mm*52mm*170mm;

　　　　　　　　　　plus fixed bracket: 185mm*62mm*170mm

Weight: machine only: 1450g; plus fixed bracket: 1690g

DECLARATION OF CONFORMITY

RELM WIRELESS

CE 0678 ⚠

Declare on our sole responsibility that this equipment complies with the essential requirements of the Radio and Telecommunication Terminal Equipment Directive,1999/5/EC,and that any applicable Essential Test Suits measurement has been performed.

Description of equipment: FM MOBILE Transceiver
Model No.: RM8150

This compliance is based on conformity with the following harmonised standards or documents:
(1). EN 60950
(2). EN 301 489-1/-5
(3). EN 300 086-1/-2