

### Channel Selector

Rotate to select a channel. Turn clockwise to increase the channel and counterclockwise to decrease the channel.

Press to select a group if the group is set.

Press and hold over 2 seconds to enter into the menu.

### Microphone Jack

Insert the microphone plug into this jack.

### S Key

Press the key to activate its programmable function. The default setting is RF power/Selcall.

### A Key

Press the key to activate its programmable function. The default setting is Key tone/Menu.

### B Key

Press the key to activate its programmable function. The default setting is TX inhibit/Scan.

### △Key

Press the key to activate its programmable function. The default setting is Monitor. When in the Menu, a key press will step back one step. Also used as an exit key.

### TX/Busy LED

TX LED lights red while transmitting.

### PTT Switch

To send a voice transmission, press and hold the switch, and then speak into the microphone. Release PTT to receive.

## 4.1 Programmable Key Functions

Keys can be programmed with the functions listed below. Each key has the ability for two functions to be programmed, and are activated with a short press or long press. Please contact your dealer for further details on these functions.

Channel Up	Talk Around ON/OFF	DTMF Buffer Clear
Channel Down	Fast Channel Mode	Scan Add/Remove
Monitor ON/OFF	TOT ON/OFF	Status Send
Key lock ON/OFF	BCL ON/OFF	Status Receive Check
Scan Mode	Scramble ON/OFF	DTMF One Time Send
Selcall Mode	Compander ON/OFF	Voting Mode
TX Power Change	TX Inhibit ON/OFF	Squelch Change
Emergency	Key Tone ON/OFF	Group Charge
DTMF ON/OFF	TX Alert ON/OFF	
Horn Alert ON/OFF	*GPS ON/OFF	
Public Address ON/OFF	Menu	

\*The function can be selected only when GPS is installed.

## 4.2 Operations

### Power ON /OFF

Press and hold the volume knob to turn the radio on.

If the radio is protected with a password, "PASSWORD INPUT" will appear on the display when power is on. To unlock the radio, enter the correct password.

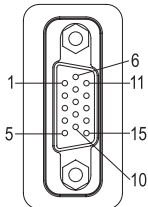
1. Choose a number by rotating the channel selector.
2. Press the selector to input the number.
3. Repeat steps 1 and 2 to enter the whole password.  
If no key is pressed within 10 seconds, the radio will return to the password protect state.
4. Press the selector for more than 1 second to complete the entry.  
Press and hold the volume for approximately 2 seconds to turn the radio off. further details on these functions.

### Volume Adjustment

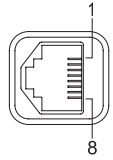
Rotate the volume knob clockwise to increase the volume and counterclockwise to decrease the volume. Maximum increment is 16 levels.

**6. Terminal Description**


**D-SUB 15 Pin Connector**

Pin No	Pin Name	Description	Specification	I/O	Remark
1	RX Signal Strength	DC Power Output	0.6~1.4V	O	After PCB Version XM1-R5 XM2-R3 XM4-R7 
2	IGN	Ignition Signal Input	Power ON : ↑ 8V Power OFF : ↓ 8V R79 is selection	I	
	LSP	Low Speed Data	R12 is selection		
3	EXT_SPK	Loudspeaker Output	4 Ω, 4Watt	O	
4	AF_OUT	Audio Output	500mV	O	
5	EXT_MIC	Audio Input	5k Ω	I	
6	TXD/FCN1	TX Serial Data	3.3V TTL	O	
7	RXD/FCN2	RX Serial Data	3.3V TTL	I	
8	EXT_PTT	External PTT	3.3V(H) : PTT OFF 0V(L) : PTT ON	I/O	
9	F_AUDIO	IF IC Output	100mV	O	
10	COR/COS	Squelch Output	S.Q ON : 3.3V S.Q OFF : 0V	O	
11	EXT/INPUT	Programmable	High Impedance	I/O	
12	DC+5V	DC Power Supply	DC+5V Max 100mA	O	
13	HR1	Horn Alert Signal Output	Max 3A	O	
14	HR2	Horn Alert Signal Output	Max 3A	O	
15	GND	Ground	Ground	-	


**Microphone Jack**

Pin No	Pin Name	Description	Specification	I/O	Remark
1	MBL	Backlight of Microphone	-	O	
2	DC+13.6V	DC Power Output	13.6±5%	O	
3	GND	Ground	Ground	-	
4	PTT/TXD0	PTT/PC Serial Data	3.3V TTL	I	
5	ME	MIC Ground	MIC Ground	-	
6	MIC	MIC Signal Input	600 Ω	I	
7	HOOK/RXD0	HOOK/PC Serial Data	3.3V TTL	I	
8	DM	MIC Data Detection	High Impedance	I/O	


**Speaker Jack (3.5mm Phone Jack) 4Watt/4 Ω**

Pin No	Pin Name	Description	Specification	I/O	Remark
1	SPO	External Speaker Output	4Watt/4 Ω	O	
2	GND	Ground	Ground	O	

**DC Input Power Connector**

Pin No	Pin Name	Description	Specification	I/O	Remark
Red	DC+13.6V	DC Power Output	13.6±5%	I	
Black	GND	Ground	Ground	I	

**Antenna Connector**

Pin No	Pin Name	Description	Specification	I/O	Remark
		PL-259			
		Impedance is 50			

## 7. Specifications

### 7. EM-100/ EM-400

#### General

Frequency Range	EM-100 VHF : 100 ~ 174 MHz EM-400 UHF : 400 ~ 470 MHz
Frequency Stability	± 1.5PPM (-30 to +60°C)
Programmable Channels	512 Channel/32 Group
Channel Spacing	Dual Channel Spacing 12.5/25 kHz (12.5kHz USA)
Dimensions	103mm (H) x 52mm (W) x 32mm (D)
Weight	1.1 Kg
Power Source	DC +13.6
Current Drain (Maximum)	Receive Mode, Rated Audio Out - 1A(Audio Max) Transmit Mode - 11A Standby Mode - 300mA

#### Receiver

Sensitivity	0.25uV 12 dB SINAD
Squelch Sensitivity	0.22uV 10dB SINAD
Selectivity	65dB (12.5kHz), 70dB (25kHz)
Spurious and Harmonic Rejection	75dB
FM Hum and Noise	40dB (12.5kHz), 45dB (25kHz)
Audio Output Power	4 Watt Across an 4-ohm Load
Audio Distortion	Less than 5% at Rated Output
Audio Response	+1, -3 dB from 6dB per Octave De-Emphasis Characteristic from 300 ~ 3000Hz
IF Frequencies	EM-100 VHF : 21.4MHz and 455kHz EM-400 UHF : 45.3MHz and 455kHz
Input Impedance	50 ohms

#### Transmitter

RF Power Output	EM-100 VHF : 50/25/10/5Watt EM-400 UHF : 40/25/10/5Watt
Spurious and Harmonic	70dB
FM Hum and Noise	40dB (12.5kHz), 45dB (25kHz)
Audio Distortion	3% Maximum with 1kHz Modulation
Audio Frequency Response	+1, -3dB from 6dB per Octave Pre-Emphasis Characteristic from 300 ~ 3000Hz
Output Impedance	50ohms

## 8. Warranty Statement

***E-TECH CO., LTD offers to the original end user a:***

***One (1) Year Limited Warranty on EM series.***

E-TECH warrants each new radio product manufactured or supplied by it to be free from defects in material and workmanship under normal use and service for the time period stated, provided that the user has complied with the requirements stated herein. The warranty period begins on the date of purchase from an Authorized E-TECH Dealer. This warranty is not assignable or transferable. This warranty is void if the product serial number is altered, defaced or removed. E-TECH is not responsible for any equipment that is attached to or used in conjunction with the products.

During the warranty period, if the product fails to function under normal use, because of manufacturing defects or workmanship, it should be returned to the Authorized E-TECH from which it was purchased.

The Authorized E-TECH will repair the product or return the product for repair to E-TECH or its Authorized Repair Depot. The user is responsible for the removal of the product from a vehicle or any equipment attached to it, or other site of its use, transportation of the product to the Authorized E-TECH, for the return of the repaired or replacement product to the site of its use and for the reinstallation of the product.

E-TECH shall have no obligation to make repairs or replacement of product which results from normal wear and tear, or is necessitated by catastrophe, fault, or negligence of the user, improper or unauthorized alterations or repairs to the product, incorrect wiring, use for which it was not designed or by causes external to the product. E-TECH's sole obligation shall be to replace or repair the product covered by warranty.

Replacement is done at E-TECH's discretion and may consist of a similar or higher featured product. Repair may include the replacement of parts with functionally equivalent new or reconditioned parts. All replaced parts and accessories are warranted for the balance of the original time period. All parts and accessories that are replaced become the property of E-TECH.

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