

IC-290A/E

144MHz ALL MODE TRANSCEIVER

INSTRUCTION MANUAL

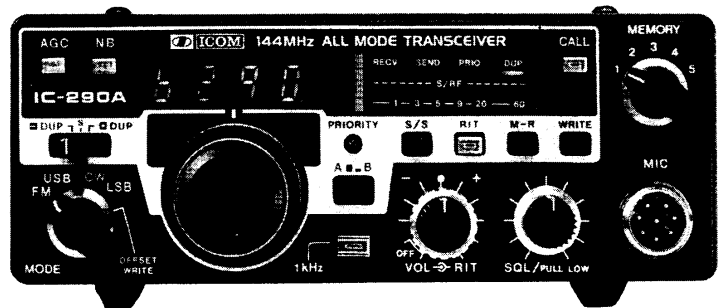


TABLE OF CONTENTS

I. SPECIFICATIONS	1
II. DESCRIPTION	3
III. INSTALLATION	4
IV. CONTROL FUNCTIONS.....	7
V. OPERATION	12
VI. INSIDE VIEW	25
VII. CIRCUIT DESCRIPTION	27
VIII. TROUBLE-SHOOTING	40
IX. BLOCK DIAGRAM	43
X. OPTIONS	44
XI. P.C. BOARD LAYOUT.....	SEPARATE
XII. SCHEMATIC DIAGRAM.....	SEPARATE

SECTION I SPECIFICATIONS

GENERAL

Numbers of semi-conductors	:	Transistor	61
		FET	6
		IC	28
		Diode	134 (IC-290A : 135)
Frequency coverage	:	144.000 ~ 145.9999MHz	
		(IC-290A : 143.8000 ~ 148.1999MHz)	
Frequency resolution	:	SSB 100Hz steps FM 5KHz steps	
		1KHz steps with 1KHz STEPS button depressed	
Frequency control	:	Microcomputer based 100Hz step Digital PLL synthesizer	
		Independent Dual VFO Capability	
Frequency readout	:	5 digit LED 100Hz readout	
Frequency stability	:	Within ± 1.5 KHz	
Memory channels	:	5 channels with any inband frequency programmable	
Usable conditions	:	Temperature: $-10^{\circ}\text{C} \sim 60^{\circ}\text{C}$ ($14^{\circ}\text{F} \sim 140^{\circ}\text{F}$)	
		Operational time: Continuous	
Antenna impedance	:	50 ohms unbalanced	
Power supply requirement	:	13.8V DC $\pm 15\%$ (negative ground) 3.5A Max.	
Current drain (at 13.8V DC)	:	Transmitting	
		SSB (PEP 10W)	Approx. 2.2A
		CW, FM (10W)	Approx. 3.1A
		FM (1W)	Approx. 1.6A
		Receiving	
		At max audio output	Approx. 0.9A
		Squelched	Approx. 0.7A
Dimensions	:	64mm (H) x 170mm (W) x 218mm (D)	
Weight	:	Approx. 2.5Kgs	

TRANSMITTER

Output power	:	SSB High 10W (PEP) Low 1W (PEP)	
		CW High 10W Low 1W	
		FM High 10W Low 1W	
Emission mode	:	SSB (A3J, USB/LSB), CW (A1), FM (F3)	
Modulation system	:	SSB Balanced modulation	
		FM Variable reactance frequency modulation	
Max. frequency deviation	:	± 5 KHz	
Spurious emission	:	More than 60dB below peak power output	
Carrier Suppression	:	More than 40dB below peak power output	
Unwanted Sideband	:	More than 40dB down at 1000Hz AF input	
Microphone	:	1.3K ohm dynamic microphone with built-in preamplifier and push-to-talk switch.	
Operating mode	:	Simplex, Duplex	
		(Any inband frequency separation programmable)	
Tone Burst	:	1750Hz ± 0.1 Hz (IC-290A : Not installed)	

RECEIVER

Receiving system	: SSB, CW	Single conversion superheterodyne
		FM Double conversion superheterodyne
Receiving mode	: SSB	(A3J, USB/LSB), CW (A1), FM (F3)
Intermediate frequency	: SSB, CW	10.75MHz
		FM 10.75MHz, 455KHz
Sensitivity	: SSB, CW	Less than 0.5 microvolts for 10dB S+N/N
		FM More than 30dB S+N+D/N+D at 1 microvolt
		Less than 0.6 microvolts for 20dB Noise quieting
Squelch sensitivity	: Less than 0.4 microvolts	
Spurious response rejection ratio	: More than 60dB	
Selectivity	: SSB, CW	More than ± 1.2 KHz at -6 dB point
		Less than ± 2.4 KHz at -60 dB point
		FM More than ± 7.5 KHz at -6 dB point
		Less than ± 15 KHz at -60 dB point
Audio output power	: More than 2W	
Audio output impedance	: 4 ~ 8 ohms	



SECTION II DESCRIPTION

144MHz ALL-MODE TRANSCEIVER INCORPORATING A MICROCOMPUTER

CPU control with ICOM's original programs provide various operating capabilities. No-backlash dial controlled by ICOM's unique rotary encoder circuit. The band-edge detector and Endless System provides out-of-band protection. There are no variable capacitors or dial gear, ensuring problem-free use. The IC-290A/E can accommodate FM, USB, LSB, CW coverage in the 144 ~ 146 MHz (IC-290A: 143.8 ~ 148.2MHz) frequency range, and thus the IC-290A/E can be used for mobile, DX, local calls, and satellite work.

MULTI-PURPOSE SCANNING

The Memory Scan allows you to monitor five different memory channels and two VFO frequencies, and the Program Scan provides scanning between two programmed frequencies. The scanning speed is adjustable, and the auto-stop terminates scanning when a signal is received or a channel is empty, for all modes.

DUAL VFO'S

Two separate VFO's can be used independently either for simplex operation or for duplex operation, and any desired frequency can be split in duplex operation.

CONTINUOUS TUNING SYSTEM

ICOM's new continuous tuning system features an LED display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 5 LED digits representing 100Hz digits.

Automatic recycling restarts tuning at the top of the band, i.e., at 145.999.9MHz when the dial goes below 144.000.0MHz. Recycling changes 145.999.9MHz to 144.000.0MHz as well. Quick tuning in 1KHz steps is available, and fine tuning in 100Hz steps in the SSB and CW modes, and 5KHz steps and 1KHz steps in the FM mode, is also provided for trouble free QSO.
(IC-290A: 145.999.9MHz and 144.000.0MHz should be read 148.199.9MHz and 143.800.0MHz.)

OUTSTANDING PERFORMANCE

The RF amplifier and first mixer circuits using MOS FETs, and other circuits provide excellent Cross Modulation and Two-Signal Selectivity characteristics. The IC-290A/E has excellent sensitivity demanded especially for mobile operation, high stability, and with Crystal Filters having high shape factors, exceptional selectivity as well.

The transmitter uses a balanced mixer in a single conversion system, a band-pass filter and a high-performance low-pass filter. This system provides distortion-free signals with a minimum spurious radiation level.

ADDITIONAL CIRCUITS

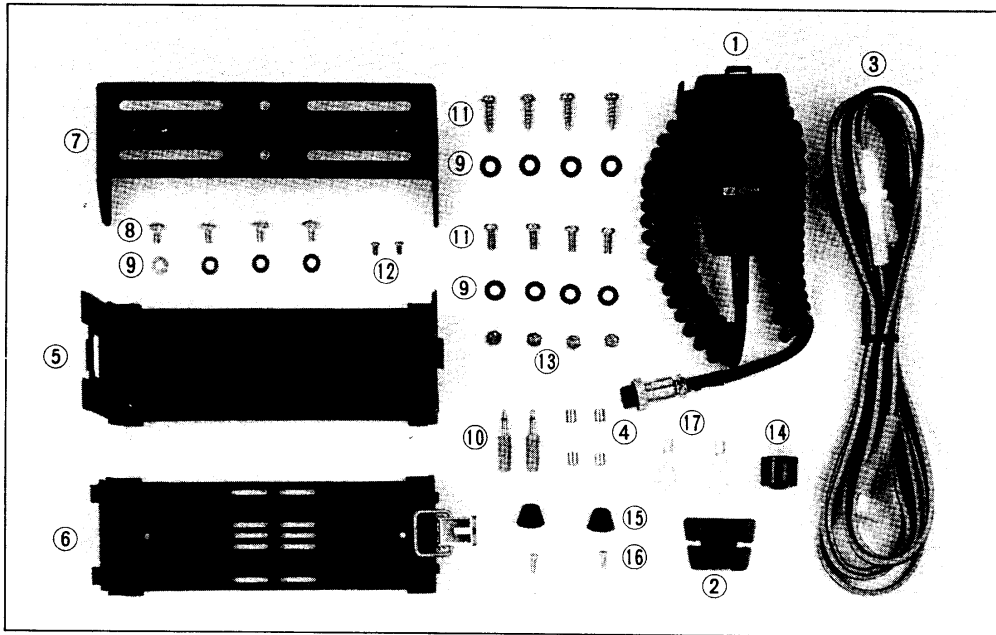
The IC-290A/E has a built-in Noise Blanker, CW Break-in, CW Monitor, APC, and many other circuit features for your convenience.

The IC-290A/E has everything you need to truly enjoy VHF operation, in an extremely compact, rugged transceiver, designed to ensure high quality, long term use.

SECTION III INSTALLATION

UNPACKING

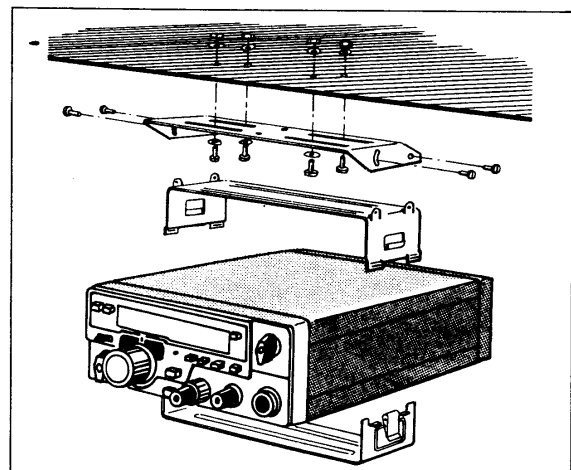
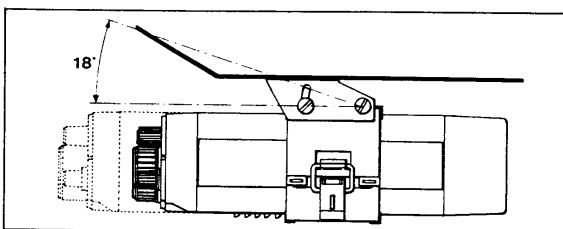
Carefully remove your transceiver from the packing carton and examine it for signs of shipping damage. Should there be any damage, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended you keep the shipping cartons. In the event storage, moving, or reshipment become necessary, they can come in handy. Accessory hardware, cables, etc., are packed with the transceiver. Be sure you have not overlooked anything.



1. Microphone (dynamic type)	1	10. Plugs for speaker and key	2
2. Microphone hook	1	11. Mounting screws	8
3. Power cord.	1	12. Screws for additional bracket.	2
4. Spare fuses (5A)	2	13. Mounting screw nuts	4
5. Installing holder A.	1	14. 9-Pin MT plug.	1
6. Installing holder B.	1	15. Rubber feet	2
7. Installing angle joint.	1	16. Fixing screws	2
8. Gimp screws.	4	17. Battery Terminal Lugs	2
9. Flat washers	12		

LOCATION

The placement of the transceiver in your automobile is not critical and should be determined by convenience and accessibility. Since the unit is so compact, various mobile possibilities present themselves. In general,



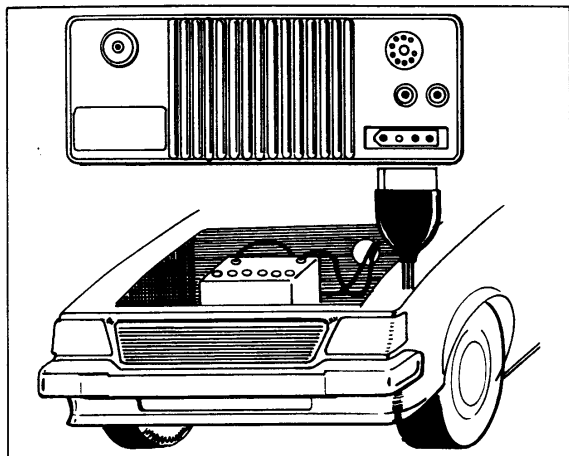
the mobile mounting bracket will provide you with some guidance as to placement. Any place where it can be mounted with metal screws, bolts, or pop-rivets will work. For fixed station use, a power supply should be designed to produce 3.5 amps for the transceiver.

POWER REQUIREMENTS

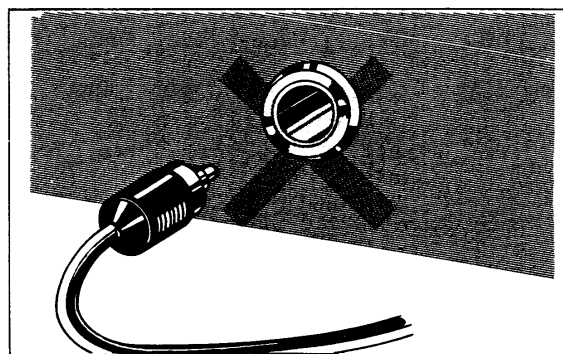
The transceiver is supplied ready to operate from any regulated 13.8V DC, 3.5 ampere negative ground source. An automobile 12 volt, negative ground system is usually more than adequate for operation. Some note must be taken, however, of the condition of the vehicle's electrical system. Items such as a low battery, worn generator/alternator, poor voltage regulator, etc., will impair operation of your transceiver as well as the vehicle. High noise generation or low voltage delivery can be traced back to these deficiencies. If an AC power supply is used with your transceiver, make certain it is adequately regulated for both voltage and current. Low voltage while under load will not produce satisfactory results from your transceiver. Receiver gain and transmitter output will be greatly impaired. Caution against catastrophic failure of the power supply should be observed, and steps should be taken to ensure continual maintenance of the power supply.

CAUTION: Excessive Voltage (above 15VDC) will cause damage to your transceiver. Be sure to check source voltage before plugging in the power cord.

Included with your transceiver is a DC power cable with plug attached. The Red Wire is positive (+), the Black, negative (-). If your mobile installation permits, it is best to connect these directly to the battery terminals. This arrangement eliminates random noise and transient spikes sometimes found springing from automotive accessory wiring. If such an arrangement is not possible, then any convenient B+ lead in the interior of the vehicle and the negative frame can be utilized. Remember, the unit operates on a negative ground system only; it cannot be used in a positive ground automobile. After making your connections, simply insert the plug into your transceiver.



Do not use a cigarette lighter socket.



ANTENNA

The single most important item that will influence the performance of any communication system is the antenna. For that reason, a good, high-quality, gain antenna of 50 ohms impedance is recommended, fixed or mobile. In VHF as well as the low bands, every watt of ERP makes some difference. Therefore, 10 watts average output plus 3dB of gain antenna equals 20 watts ERP, presuming low VSWR of course. The few extra dollars invested in a gain type antenna is well worth it. When adjusting your antenna, whether mobile or fixed, by all means follow the manufacturer's instructions. There are however some pitfalls to be aware of. For example, do not



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