

Icom America Systems

INSTRUCTION MANUAL

VHF FM REPEATER
CY 5000

UHF FM REPEATER
CY 6000



IMPORTANT

READ THIS INSTRUCTION MANUAL CAREFULLY before attempting to operate the repeater.

SAVE THIS INSTRUCTION MANUAL—This manual contains important safety and operating instructions for the CY FR series.

PRECAUTION

⚠WARNING HIGH VOLTAGE! NEVER attach an antenna or internal antenna connector during transmission. This may result in an electrical shock or burn.

⚠WARNING HIGH VOLTAGE! NEVER install the antenna at any place that person touch the antenna easily during transmission. This may result in an electrical shock or burn.

⚠NEVER apply AC to the [BATTERY] terminals on the repeater rear panel. This could cause a fire or damage the repeater.

⚠NEVER apply more than 16 V DC, such as a 24 V battery, to the [BATTERY] terminals on the repeater rear panel. This could cause a fire or damage the repeater.

⚠NEVER let metal, wire or other objects touch any internal part or connectors on the rear panel of the repeater. This may result in an electric shock.

⚠NEVER expose the repeater to rain, snow or any liquids.

AVOID using or placing the repeater in areas with temperatures below -30°C (-22°F) or above $+60^{\circ}\text{C}$ ($+140^{\circ}\text{F}$). Be aware that temperatures on a vehicle's dashboard can exceed 80°C ($+176^{\circ}\text{F}$), resulting in permanent damage to the repeater if left there for extended periods.

AVOID placing the repeater in excessively dusty environments or in direct sunlight.

EXPLICIT DEFINITIONS

WORD	DEFINITION
WARNING	Personal injury, fire hazard or electric shock may occur.
CAUTION	Equipment damage may occur.
NOTE	If disregarded, inconvenience only. No risk of personal injury, fire or electric shock.

AVOID putting anything on top of the repeater. This will obstruct airflow. Place the repeater in a secure place to avoid inadvertent use by children.

BE CAREFUL! The heatsink will become hot when operating the repeater continuously for long periods.

BE CAREFUL! If a linear amplifier is connected, set the repeater's RF output power to less than the linear amplifier's maximum input level, otherwise, the linear amplifier will be damaged.

Use Icom microphones only. Other manufacturer's microphones have different pin assignments, and connection to the CY FR series may damage the repeater.

For U.S.A. only

CAUTION: This repeater is intended for use as a fixed repeater with the antenna located outdoors on the rooftop or on antenna tower.

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FORWARD

Thank you for purchasing this Icom America Systems CY FR VHF/UHF repeater. With proper care, this product should provide you years of trouble-free operation.

☐ **FEATURES**

○ *Automatic battery backup and charging system*

A built-in backup system supports automatic switching to an external battery (13.6 V DC) if the AC power supply fails.

○ *Other features*

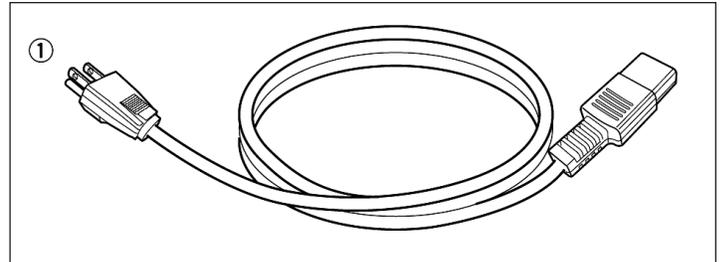
- PC programmable
- 19 inch rack mount or desktop.

SUPPLIED ACCESSORIES

The following accessory is supplied with CY FR series

[AC120V version]

- ① AC power cable (OPC-510) 1

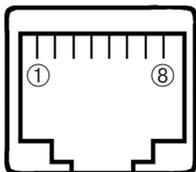


■ Front Panel



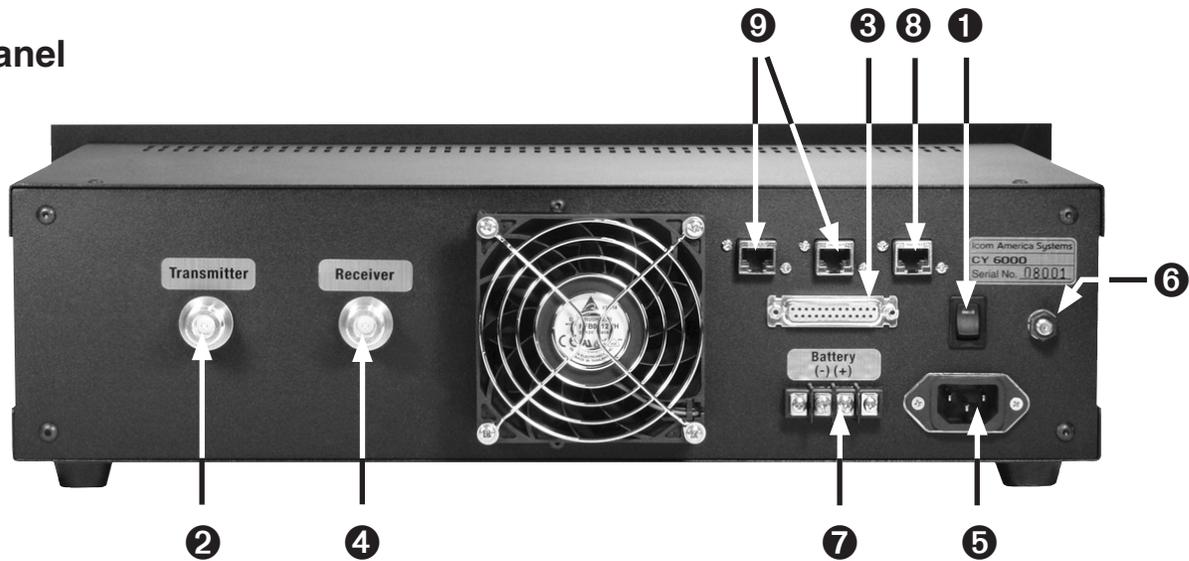
① MICROPHONE/SPEAKER CONNECTOR [MIC/SP]

This 8-pin modular jack accepts the optional Field Service Aid.



- ① +8 V DC output (Max. 15 mA)
- ② Output port for PC programming
- ③ AFO
- ④ M PTT (Input port for TX control)
- ⑤ Microphone ground
- ⑥ Microphone input
- ⑦ Ground
- ⑧ Input port for PC programming

■ Rear Panel



① LIGHTED POWER SWITCH [POWER]

Toggles to turn the repeater AC power ON or OFF. Located on the back panel of the repeater.

NOTE: Does not effect DC power input.

② TRANSMIT ANTENNA CONNECTOR [TX/TX•RX]

- ➔ Connects a transmit antenna (impedance: 50 Ω) and outputs transmit signals.
- ➔ When an optional internal duplexer is installed, this connects the Transmit and Receive Radios to an antenna.
- ➔ N Female Connector.

③ ACCESSORY CONNECTOR [ACC]

Connects to the remote controller.

- See pg. 3 for accessory connector information.

④ RECEIVE ANTENNA CONNECTOR [RX]

- ➔ Connects a receive antenna (impedance: 50 Ω) and inputs receiving signals.
- ➔ When an optional internal duplexer is installed, do not use this connector.
- ➔ N Female Connector.

⑤ AC POWER SOCKET [AC]

Connects the supplied AC power cable to a 120V or 220V AC outlet.
120V or 220V internal jumper selectable.

⑥ GROUND TERMINAL [GND]

Ground the repeater through this terminal to prevent electric shocks, TVI, BCI and other problems.

⑦ DC POWER INPUT TERMINALS [BATTERY]

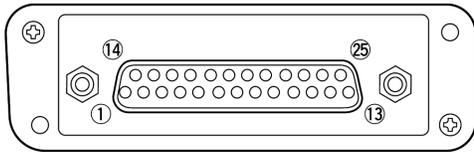
Connects the 12 V storage battery for the repeater backup when the AC power is interrupted. These terminals are also used for DC power operation. Battery is automatically recharged when AC power is restored.

CAUTION: NEVER short the (+) line of the DC power cable to repeater's chassis, when connecting DC power cable to the [BATTERY] terminals. Otherwise, there is danger of electric shock and/or equipment damage.

⑧ **LAN CONNECTOR** for ethernet connection when optional UC-FR5000 controller installed.

⑨ **BUS CONNECTORS** for data communication among optional UC-FR5000 controllers.

■ Accessory connector



DB25 Pin Outs Configuration

Pin No.	Pin Name	Description	Specification
1	CFS	Chassis fan sensor	—
2	TXD	Output terminal for serial communication data.	—
3	RXD	Input terminal for serial communication data.	—
4	RTS	Output terminal for request-to-send data.	—
5	CTS	Input terminal for clear-to-send data.	—
6	NC	No connection	—
7	GND	Serial/digital signal ground	—
8	MOD IN	Modulator input from an external terminal unit.	Input level: 300 mV rms
9	DISC OUT	Output terminal for AF signals from the AF detector circuit. Output level is fixed, regardless of [AF] control.	Output level: 300 mV rms
10	EXT. D/A	The desired function can be assigned.* (Default: Null)	—
11	VCC	13.6 V DC output	Output current: Less than 1 A
12	EXT. A/D	Customize A/D input (Not used)	—
13	CFS	Chassis fan sensor	—
14	GND	Ground	—
15	EXT./O 15	The desired function can be assigned.* (Default: Null)	+5 V pull up, Active=L
16	EXT./O 16	The desired function can be assigned.* (Default: P0 Monitor Output)	+5 V pull up, Active=L
17	EXT./O 17	The desired function can be assigned.* (Default: Busy Output)	+5 V pull up, Active=L
18	EXT./O 18	The desired function can be assigned.* (Default: Null)	+5 V pull up, Active=L
19	EXT./O 19	The desired function can be assigned.* (Default: EPTT Input)	+5 V pull up, Active=L
20	DATA IN	Input terminal for data.	—
21	EXT./O 21	The desired function can be assigned.* (Default: Analog Audible Output)	+5 V pull up, Active=L
22	AF OUT	The AF detector Output.	—
23	EXT./O 23	The desired function can be assigned.* (Default: Mic Mute Output)	+5 V pull up, Active=L
24	EXT./O 24	The desired function can be assigned.* (Default: Null)	+5 V pull up, Active=L
25	EXT./O 25	The desired function can be assigned.* (Default: Mic Hanger Output)	+5 V pull up, Active=L

* The desired function can be assigned using the optional CS-FR5000 CLONING SOFTWARE. Ask your dealer for details.

■ Unpacking

After unpacking, immediately report any damage to the delivering carrier or dealer. Keep the shipping cartons.

For a description and a diagram of accessory equipment included with the CY FR series, see 'Supplied accessories' of this manual.

■ Selecting a location

Select a location for the repeater that allows adequate air circulation, free from extreme heat, cold, or vibrations, and away from TV sets, TV antenna elements, radios and other electromagnetic sources.

■ Antenna connection

For radio communications, the antenna is of critical importance, along with output power and sensitivity. Select antenna(s), such as a well-matched 50 Ω antenna, and feedline. 1.5:1 or better of Voltage Standing Wave Ratio (VSWR) is recommended for desired band. Of course, the transmission line should be a coaxial cable.

/// CAUTION: Protect repeater from lightning by using a lightning arrestor.

/// NOTE: There are many publications covering proper antennas and their installation. Check with your local dealer for more information and recommendations.

■ Duplexer

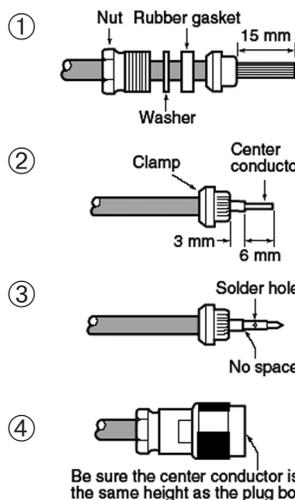
A duplexer is separately required when only one antenna is used for both transmitting and receiving. Select a duplexer according to the transmitting and receiving frequencies. Ask your Dealer for details.

■ Grounding

To prevent electrical shock, television interference (TVI), broadcast interference (BCI) and other problems, ground the transceiver through the [GND] terminal on the rear panel.

For best results, connect a 2-gauge wire to an 8-foot long earth-sunk copper rod. Make the distance between the [GND] terminal and ground as short as possible.

/// **⚠ WARNING: NEVER** connect the [GND] terminal to a gas or electric pipe, since the connection could cause an explosion or electric shock.



TYPE-N CONNECTOR INSTALLATION EXAMPLE

Slide the nut, flat washer, rubber gasket and clamp over the coaxial cable, then cut the end of the cable evenly.

Strip the cable and fold the braid back over the clamp.

Soft solder the center conductor. Install the center conductor pin and solder it.

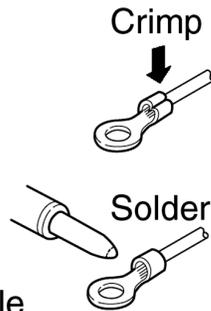
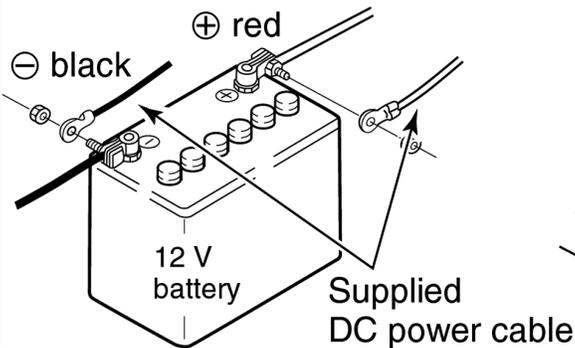
Carefully slide the plug body into place aligning the center conductor pin on the cable. Tighten the nut onto the plug body.

30 mm \approx 9/8 in 10 mm \approx 3/8 in 1–2 mm \approx 1/16 in

■ Required Connections

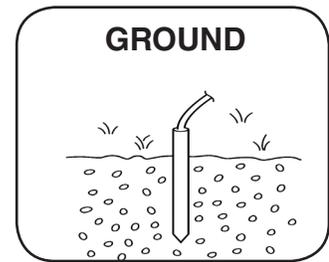
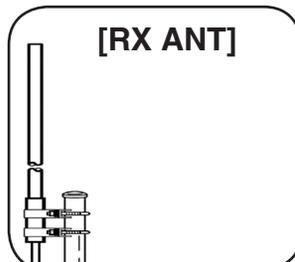
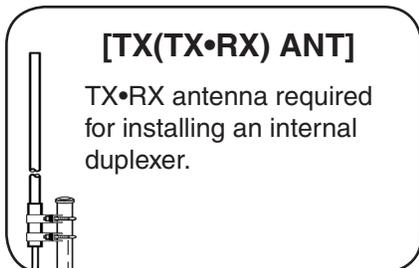


[DC POWER INPUT TERMINAL]



Make sure the back up battery is correctly connected. Use a cable with following current capacity. Solder or clamp the cable plug when connecting the power cable to the backup battery to prevent voltage drops.

Power cable current capacity: 25 A or more



NOTE: Must have minimum 20' vertical separation when using separate antennas.

■ Power

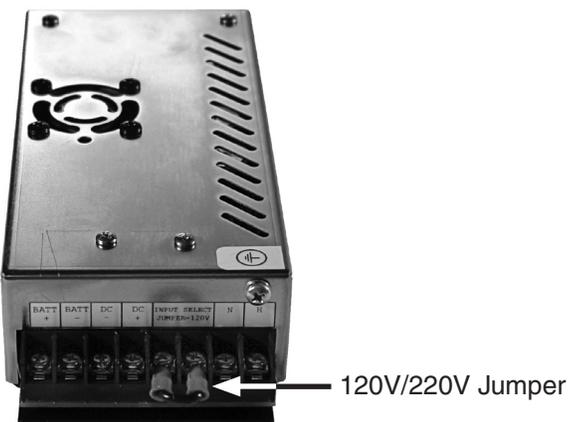
Make sure the AC [POWER] switch is turned OFF when connecting an AC power cable or a backup battery (emergency power supply).

The CY FR series can operate with either an AC or DC input. If AC power is interrupted and there is an external DC source (emergency power supply), the Repeater will continue to operate until the DC source is exhausted.

NOTE: IF turning the Repeater OFF using the rear panel switch, wait a few seconds before turning it back ON. Otherwise, Logic circuits may not sense the transition. The AC Power switch does not effect the DC supply. If Repeater is operating on DC, you must use the power switch(s) on the Radio.

□ In AC operation

- Use the supplied AC power cable for connection to a domestic AC outlet.
- Extension cords should not be used unless absolutely necessary. Using improper extension cords could result in fire risk.
- An International AC power cable is available. The internal AC power supply is jumper selectable between 120V_{ac} and 220V_{ac}.



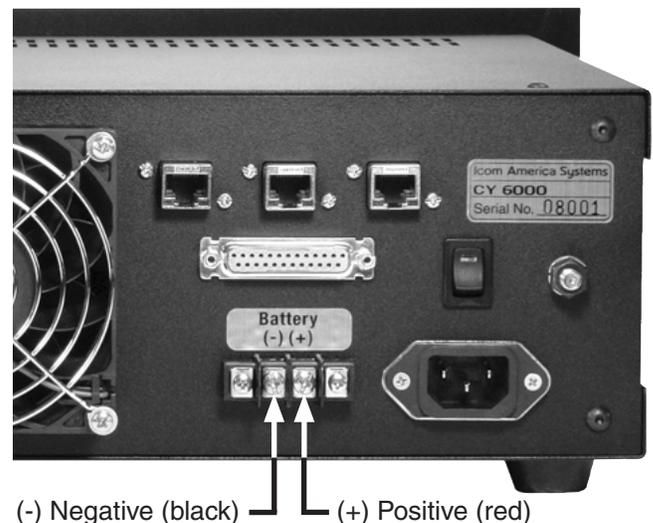
- Remove jumper for 220V operation.
- Install jumper for 120V operation.

⚠ WARNING: DANGER OF ELECTRIC SHOCK. Disconnect AC power before changing voltage select jumper.

□ In DC operation

CAUTION: Voltages greater than 16 VDC will damage the repeater. Check the source voltage before connecting the power cable.

- DO NOT place the backup battery on or near the repeater. Lead-acid batteries should be placed at least 5 m (16.4 ft.) away from the repeater. Use a heavy duty cable to make the connection and be sure both the positive (red) and negative (black) terminals are correctly connected.
- When connecting to the battery, connect the DC power cable to the repeater first, then the positive (red) terminal and negative (black) terminal to the battery. This is to prevent an electric shock or circuit damage.



3

OPTIONAL UNIT INSTALLATION

■ Opening the repeater's case

Follow the case and cover opening procedures shown here when an optional unit is installed or adjust the internal units, etc.

CAUTION: Disconnect the AC power cable and/or DC power cable from the repeater. Otherwise, there is danger of electric shock and/or equipment damage.

- ① Remove 3 screws from the top of the repeater and 4 screws from the sides, then lift up the top cover.



OPTIONAL DUPLEXER



OPTIONAL PRESELECTOR

■ Turning power ON

- ① On rear panel, toggle AC Power Switch up to turn AC power ON.

■ Receiving and transmitting

□ Receiving

- ① Connect optional Field service Aid Microphone/Speaker.
 - When receiving a signal, RX indicator turns ON and audio is emitted from the speaker.

□ Transmitting for Local Control

- ① Take the microphone off hook.
- ② Wait for the channel to become clear.
- ③ Push and hold [PTT] to transmit, then speak into the microphone at your normal voice level.
- ④ Release [PTT] to receive.

IMPORTANT:

To maximize the readability of the transmitted signal:

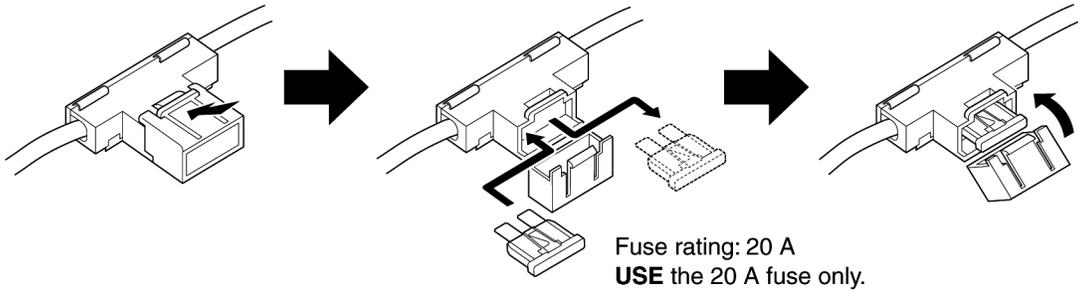
- (1) Pause briefly after pushing [PTT].
- (2) Hold the microphone 1 to 2 inch (2.5 to 5 cm) from your mouth, then speak into the microphone at a normal voice level.

■ Fuse replacement

If a fuse blows or the repeater stops functioning, try to find the source of the problem, and replace the damaged fuse with a new, rated fuse.

CAUTION: DISCONNECT the DC power cable from the repeater. Otherwise, there is a danger of electric shock and/or equipment damage.

◇ Line fuse replacement



■ Specifications (See UR Service Manual for module specifications)**◆ UR-FR5000****GENERAL**

Power supply requirement (nominal)	105-130 VAC 50/60 hz 5A Max 185-250 VAC 50/60 hz 13.6 VDC (nominal) 16.2 Amp Max
Dimensions (Projections not included)	480 (W) x 133 (H) x 364 (D) mm; 18.90 (W) x 524 (H) x 14.33 (D) in.
Weight:	8.6 kg; 18 lb

*Optional Duplexer and Preselector specifications not listed.

*All specifications are subject to change without notice.

■ Options

- Field Service Aid MICROPHONE SPEAKER
- HM-152 HAND MICROPHONE
- HM-152T DTMF MICROPHONE
 - Hand microphone with a DTMF keypad
- SM-25 DESKTOP MICROPHONE
- SP-22 SPEAKER
- IAS VHF DUP KIT
 - VHF duplexer kit with RF jumpers
- IAS UHF DUP KIT
 - UHF duplexer kit with RF jumpers
- 220V AC Power Cord
- Preselectors
 - VHF - FIP - PR - 16 - 4H - PE
 - UHF - FIP - PR - 46 - 4C - PE

Count on us!