8500 Series

OPERATING MANUAL

FM Portable Radio

Multi-Net®
Intrinsically-Safe
Viking CK

EFJohnson®

FM
Approved

SAFETY INFORMATION

The FCC has adopted a safety standard for human exposure to RF energy. Proper operation of this radio under normal conditions results in user exposure to RF energy below the Occupational Safety and Health Act and Federal Communication Commission limits.

WARNING

- DO NOT allow the antenna to touch or come in very close proximity with the eyes, face, or any exposed body parts while the radio is transmitting.
- DO NOT operate the radio in explosive or flammable atmospheres. The transmitted radio energy could trigger blasting caps or cause an explosion.
- DO NOT operate the radio without the proper antenna installed.
- DO NOT allow children to operate or play with this radio.
- DO NOT operate this transceiver in flammable or explosive atmospheres that are not listed on the label on the back of the transceiver.
- DO NOT use battery packs other than Intrinsically Safe Battery Packs, Part No. 587-8565-162 (1400 mAH) or 587-8560-160 (1000 mAH).
- DO NOT remove, install, or recharge the battery pack while in a hazardous location.
- DO NOT dispose of the battery pack in fire because it may explode.
- DO NOT open this transceiver or permit it to be serviced by anyone that is not authorized by the Factory Mutual Research Corporation to repair EFJohnson intrinsically safe radios.
- DO NOT use unapproved accessories with this transceiver.

NOTE: The above warning list is not intended to include all hazards that may be encountered when using this radio.

This device complies with Part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference. In addition, changes or modifications to this equipment not expressly approved by the E.F. Johnson Company could void the user's authority to operate this equipment (FCC rules, 47CFR Part 15.19).

LAND MOBILE PRODUCT WARRANTY - The manufacturer's warranty statement for this product is available from your product supplier or from the E.F. Johnson Company, 299 Johnson Avenue, Box 1249, Waseca, MN 56093-0514. Phone (507) 835-6222.

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BATTERY RECYCLING INFORMATION

If a Nickel-Cadmium (Ni-Cd) battery is used by this radio, it must be recycled or disposed of properly when it reaches the end of its life. It may be illegal to dispose of this battery in the municipal waste stream. For information on how to dispose of this battery properly, call toll free 1-800-8-BATTERY (1-800-822-8837).

NOTES

QUICK REFERENCE GUIDE

Change system number: S (System)

Change group number: G (Group)

Turn system scanning on or off: SCN

Temporarily suspend system and group scanning in Multi-Net or LTR mode: Press Auxiliary switch on side.

Lock out of scanning last-selected system or group: LCK

Unlock all systems: LCK for 2 seconds

Turn on backlight: Press upper switch on side.

Return to home or last active system/group: RTN

Disable or enable keypad: Turn power on with LCK pressed.

Disable or enable key press tone: Turn power on with SCN pressed.

Switch between high and low power: Turn power on with RTN pressed (high power models only).

Switch between loud and soft clear-to-talk tone: Turn power on with the "S" key pressed.

Monitor in the conventional mode: Press Auxiliary switch on side.

Telephone Calling Using Optional Keypad

NOTE: In the phone mode, SCN=STO, LCK = CLR, and RTN = RCL.

Select phone mode: PHON or SND

Store a number in memory: STO (1-8)

Recall a number from memory: RCL (1-8)

Erase the last number in display: CLR

Erase entire number in display: RCL CLR

Display overflow digits: RCL 0

Step through numbers stored in memory: RCL

Transmit number in display: Briefly press PTT switch to acquire dial tone, then SND.

FEATURES

- Up to 14 systems selectable
- Up to 11 groups selectable per system (Multi-Net)
- Up to 10 channels selectable per system (conventional)
- System scan
- Group scan (Multi-Net Only)
- System and group lockout when scanning
- LCD display with backlight to indicate system and group numbers, 7-character system or 5-character group identifier, and other information
- Both Multi-Net (trunked) and conventional (non-trunked) operation
- Repeater talk-around in conventional mode
- Optional keypad for making telephone calls
- When equipped with the optional keypad, up to 8 telephone numbers can be stored in memory and later recalled. Each number can contain up to 14 digits
- Call indicator
- Clear-to-talk beep to signal when speaking can begin (Multi-Net Only)
- Compatible with optional Vehicle Adapter and Remote Control Unit to allow mobile (vehicle) as well as handheld use

NOTE: Programming by your system operator determines the specific operation of some of the preceding features. Refer to separate descriptions in this manual for more information.

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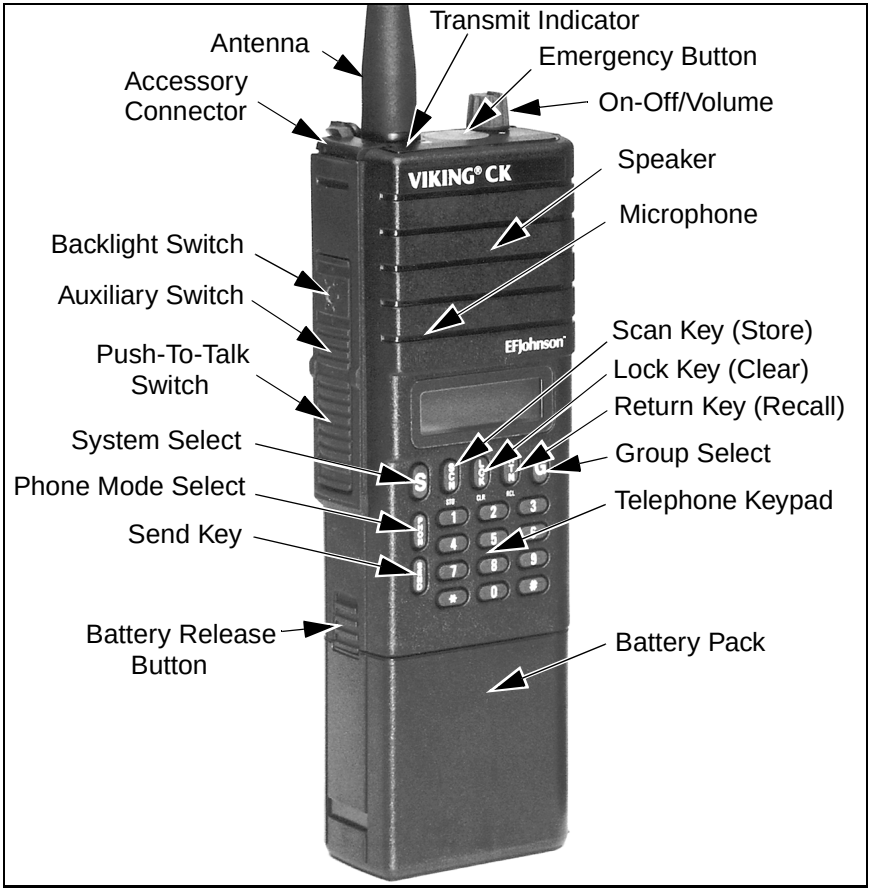
CONTROLS



FRONT PANEL CONTROLS

On-Off/Volume -Turning this knob clockwise turns power on and sets the volume. Turning it counterclockwise to the detent turns power off. Power is on when information appears in the display. Refer to “Setting Volume Level” on page 38 for more information.

Emergency Button - This switch is used to manually or automatically place a high priority call. Refer to “Emergency Button” on page 26 for more information.

S (System) - Pressing this key increases the selected system. Holding it down causes the function to repeat. Only programmed systems can be selected. Turning power on with this switch pressed changes the loudness of the clear-to-talk tone.

G (Group) - Pressing this key increases the selected group. Holding it down causes the function to repeat. Only programmed groups can be selected.

SCN (Scan) - Turns the scan feature on and off. Scan is enabled when "SCN" is indicated in the lower part of the display. Scanning is actually occurring when "IN SCAN" is indicated in the upper part of the display. Turning power on with this key pressed enables/disables the key press tone.

LCK (Lock) - Used to lock systems out of the scan list so that they are not scanned. Also adds locked out systems or groups back into the scan list. Pressing this key changes the status of whatever system or group was selected last. The system or group is locked out and not scanned if ▼ is indicated next to "SYS" or "GRP". Turning power on with this switch pressed enables/disables the keypad.

RTN (Return) - Is programmed to select either the home or last active system/group.

Push-To-Talk (PTT) Switch - Pressing this switch turns the transmitter on as indicated by TX in the display and a lighted transmit indicator on the top panel. This switch is the lower half of the rubber switchpad on the side.

Auxiliary Switch - Pressing this switch with a Multi-Net system selected temporarily suspends system or group scanning. Pressing it twice halts scanning until it is again pressed twice or scanning is re-enabled by the SCN key. Pressing it with a conventional system selected enables the monitor mode. This switch is the lower part of the upper half of the rubber switchpad on the side.

Backlight Switch - Pressing this switch illuminates the display so that it can be viewed in low-light conditions. This switch is the upper part of the upper half of the rubber switchpad on the side.

Speaker and Microphone - The internal speaker and microphone are located behind the grille in the locations shown.

Battery Pack - Rechargeable nickel-cadmium (Ni-Cd) battery pack.

OPTIONAL KEYS FOR TELEPHONE CALLS

NOTE: Refer to "SPECIAL CALLS" on page 15 for more information on the following keys.

Telephone Keypad - 0-9, *, and # keys for dialing the telephone number.

PHON (Phone) - Turns the phone mode on and off.

SND (Send) - This switch can be used instead of the PHON key to select the phone mode. The system and group preprogrammed for telephone calls are then automatically selected. Pressing this switch after the phone mode is selected transmits the telephone number in the display.

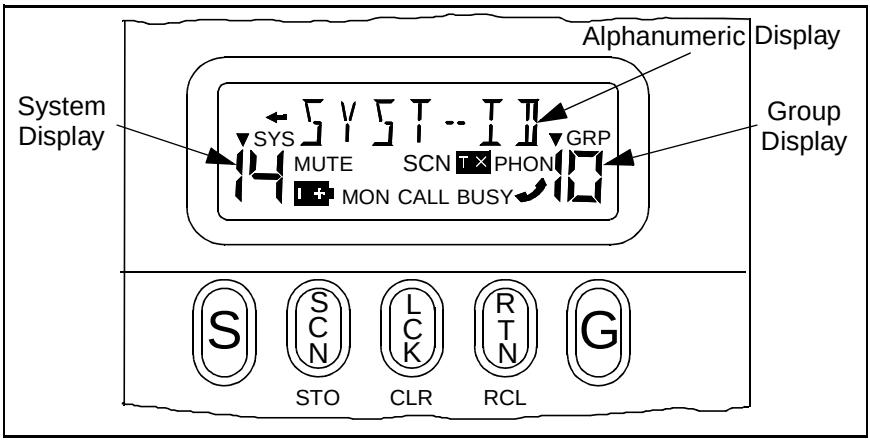
NOTE: The next three keys are dual-function keys which operate as follows when the phone mode is selected and as described in the preceding information when the standard mode is selected.

STO (SCN) - Pressing this key and then a number key from 1-8 stores the number in the display in that memory location.

CLR (LCK) - Pressing this key erases the last digit in the display. Holding this key down causes function to repeat. Pressing RCL and then CLR erases the entire number.

RCL (RTN) - Pressing this key steps through the numbers stored in memory. Pressing this key and then the number of a memory location from 1-8 recalls the telephone number stored in that location.

DISPLAY INFORMATION



FRONT PANEL DISPLAY

System Display - Indicates the selected system number.

Group Display - Indicates the selected group number.

SYS (System) - Always displayed above the system number.

GRP (Group) - Always displayed above the group number.

SCN (Scan) - Indicates that the scan mode has been selected by the SCN key.

CALL - Indicates that a call has been received and not answered. To turn this indicator off, press any key except backlight.

▼ (SYS) - This indication next to "SYS" indicates that the displayed system has been locked out of scanning by the LCK key. This indication appears while scanning if any system has been locked out of the scan list.

▼ (GRP) - This indication next to "GRP" indicates that the displayed group has been locked out of the scan list by the LCK key. This indica-

tion appears when system or group scanning if any group has been locked out of the scan list.

MUTE - Indicates that the key press tone has been muted by turning power on with the SCN key pressed. To re-enable this tone, turn power on again with the SCN key pressed.

TX - Indicates that the transmitter is on. This indication appears in conjunction with the red transmit indicator next to the antenna.

BUSY - Indicates that the channel is busy when a conventional system is selected.

MON - When a conventional system is selected, indicates that the monitor mode has been enabled by pressing the Auxiliary switch on the side. This disables Call Guard® squelch so that all messages are heard. Press the Auxiliary switch again to disable monitoring.

PHON - Indicates that the phone mode has been selected by pressing the PHON or SND key (telephone keypad models only).

- Indicates that the displayed group is programmed for telephone calls.

- Indicates that the battery needs recharging.

- Indicates that there are overflow digits because the telephone number is longer than 7 digits. To momentarily display the overflow digits, press RCL 0.

Alphanumeric Display - In the standard (non-phone) mode, this display indicates either the 7-character system identification or the 5-character group identification. Programming determines which is displayed, and the group identification is available on Multi-Net systems only. In the phone mode, this display indicates the telephone number. Operating modes and error conditions may also be indicated by this display as described in “Display Messages” on page 38.

STANDARD CALLS

Introduction

Most calls that you make to others in your radio system are standard calls. When these calls are placed, all that is required is to select the desired system and group. No number needs to be entered on the telephone keypad as with special calls. Calls in the conventional mode are always standard calls.

Placing a Standard Call

1. Turn power on and set the volume as required.

2. Select the desired system and group if applicable.

3. If a conventional system is selected, the channel must be monitored before transmitting. Refer to page 30 for more information.

4. Press the push-to-talk switch on the side of the transceiver and begin talking. If a Multi-Net system is selected, a clear-to-talk tone sounds to indicate when the system has been successfully accessed and speaking can begin. Refer to “Clear-To-Talk Tone” on page 20 for more information.

5. Release the push-to-talk switch as soon as the message is complete and listen for a response. The push-to-talk switch must be pressed to talk and released to listen.

Receiving a Standard Call

1. Turn power on and set the volume level as required.

2. Select the desired system and group if applicable.

3. After the message is received, press the push-to-talk switch on the side of the transceiver and respond. This switch must be pressed to talk and released to listen. If scanning, you should respond before scanning

resumes which is programmable for 1-7 seconds after the message ends. If you do not, another call may be received and you may have to change the system and group. Refer to “Transmitting In Scan” on page 22 for more information.

SPECIAL CALLS

Introduction

Special calls include telephone calls, calls to specific mobiles or a dispatcher, calls to other Multi-Net sites, and others. These calls differ from standard calls in that a special number must be dialed after the system is accessed. This number is dialed using the optional DTMF keypad on the front panel of the transceiver.

NOTE: Special calls can be placed and received only if your transceiver has been programmed for that service by your system operator.

Placing a Special Call

1. Turn power on and set the volume level as required.

2. Select the system and group programmed for the special call you are making. When a group programmed for telephone calls is selected, the handset symbol appears in the display.

3. Select the phone mode by pressing the PHON or SND keys. The phone mode is indicated by “PHONE” in the display.

4. If you are making a telephone call, dial the telephone number. If you are making other calls, a number containing 4-8 digits is dialed. Your system operator will tell you what number you are to dial for each special call you can make. You may also be able to recall the number from memory as described in the following information.

5. Momentarily press the push-to-talk switch to acquire a dial tone. Then press the SND key to transmit the number in the display. Release the

push-to-talk switch (if it is pressed) and a short tone should sound to indicate that the call was accepted by the system. After this tone sounds, a ringing or second short tone sounds as follows:

A ringing tone indicates that the other party is being rung. If it is a telephone call and the line is busy, a busy tone may also sound. In this case, terminate the call by pressing the # key. When the party answers, continue the call as described in step 6.

A second short tone indicates that the path is complete and you should transmit your message. No ringing of the other party occurs. Proceed as follows:

6. Press the push-to-talk switch to talk and release it to listen as with standard calls. Since the path is one way, you will not hear the other party while the push-to-talk switch is pressed.

7. When the conversation is finished, the call should be terminated by sending the # character. This character is sent automatically when you exit the phone mode by pressing the PHON key. It can also be sent by pressing the # key. Three beeps indicate that the call has been terminated.

Receiving a Special Call

1. Turn power on and set the volume level as required.

2. Special calls are usually received regardless of the group selected if a system programmed for Multi-Net operation is selected or scanned. However, some calls may require that a certain system and group be selected. If so, your system operator will tell you which to select.

3. When “ringing” is heard, answer the call in the normal manner (press the push-to-talk switch to talk and release it to listen). It is not necessary to select the phone mode to receive a special call.

4. When the call is finished, it is usually terminated by the originating party. If you do not hear the three rapid beeps which indicate termination, press the # key to terminate the call.

Landside-Originated Calls

Mobiles can also be called from a landside telephone. If the system is designed so that mobiles can be called directly, simply dial the telephone number of the mobile being called. If mobiles cannot be called directly, dial the number of the system. Then when the system answers, dial the special number which specifies the mobile being called. This number is supplied by your system operator, and it must be dialed using a tone-type telephone. Depending on the type of call, a ringing tone then sounds or a second tone sounds which indicates speaking can begin. Operation is similar to that described in “Placing a Special Call” on page 15.

Additional Phone Mode Information

Phone Mode

When the phone mode is selected by pressing the PHON or SND keys, “PHONE” appears in the lower part of the display and the group or system identification is cleared so that the phone number can be displayed. In addition, the SCN, LCK, and RTN keys become STO, CLR, and RCL keys. Group scan is also disabled if it is programmed, causing calls to be received on the displayed group only. To exit the phone mode, press the PHON key (the SND key cannot be used).

When the phone mode is not selected, the number keys dial a number only when the push-to-talk switch is pressed. In addition, the dialed number does not appear in the display, so it cannot be stored or recalled. When the phone mode is exited, any phone number in the display is erased and cannot be redisplayed unless it was stored in memory. The transceiver always goes into the standard mode when power is turned on.

Entering the phone mode using the PHON or SND key results in slightly different operation. When the PHON key is used, the displayed system and group do not change when entering as well as exiting the phone mode. When the SND key is used, the system and group preprogrammed for telephone calls are automatically selected when the phone

mode is entered. Then when the phone mode is exited by pressing the PHON key, the system and group that were displayed when the phone mode was entered are again displayed. The system and group may be changed in either mode by pressing the SYS or GRP keys.

Dialing The Number

The phone mode allows you to enter the telephone or mobile number at any convenient rate, correct any dialing errors, and then transmit the number when desired by pressing the SND (Send) key. To erase the last digit entered, press CLR. Holding the key down erases the number one digit at a time. To erase the entire number, press RCL CLR.

Numbers up to 14 digits in length can be entered in this mode. However, only the last 7 digits are displayed. When there are overflow digits, an arrow appears on the left side of the telephone number. To momentarily display the overflow digits, press RCL 0. The RCL key can also be used to step through the programmed telephone numbers, including overflow digits.

Numbers can be dialed in the phone mode without changing the number in the display. Simply dial the number while the push-to-talk switch is pressed. This also allows access to special services which require numbers to be dialed after the connection is made. Telephone calls can also be placed without selecting the phone mode by dialing the number with the push-to-talk switch pressed.

Storing and Recalling Telephone Numbers From Memory

Up to 8 telephone or other numbers can be stored in memory and then later recalled. This eliminates the need to re-enter frequently called numbers. Each of these numbers can be up to 14 digits in length. To store a number, select the phone mode and enter the telephone number as described in the preceding section. Then press STO and a number key from 1-8 to select the memory location where the telephone number is stored. The * symbol can be stored, but is sent normally without a pause. If the # symbol is stored, it will terminate the call when it is sent. To recall a telephone number, press RCL and then the memory location from

1-8. The number can then be changed if necessary and then transmitted by pressing SND.

Telephone numbers can also be programmed by your system operator. A unique identification can then be stored in the unused positions of each 14-character location. For example, if the number has seven digits, the seven-character identification "RICHARD" can be stored with the number. Then when the number is recalled, "RICHARD" is flashed in the display followed by his telephone number. Each number programmed by your system operator can also be programmed so that you cannot change it. If you do change a number with a unique identification, the identification is erased and cannot be reprogrammed from the keypad. You must take the transceiver back to your system operator to have the identification reprogrammed.

Terminating a Call

When a conversation is finished, it is good practice for one of the parties to terminate the call by transmitting the # character. When the phone mode is exited by pressing the PHON key, this character is sent automatically. The # key can also be pressed to send this character. Three beeps sound to indicate that the system has detected the end of the call. Terminating the call in this manner prevents additional billing that may occur for the time it takes the system to automatically detect the end of a call.

SUPERVISORY TONES

NOTE: The following tones are heard at various times when operating this transceiver. The tones are heard only when a Multi-Net system is selected unless noted otherwise.

Intercept Tone

This is a siren-like tone (alternating high and low tones) which indicates the following error conditions:

- If this tone sounds after the transmit indicator flashes several times and "NO SITE" appears in the display, an out-of-radio-range condition is indicated. To complete a call, you may need to get closer to your radio system. Once this tone sounds, no more access attempts are made until the push-to-talk switch is released and then pressed again.

- If this tone sounds after the transmitter has been on for an extended period and "TX TIME" also appears in the display, the transmitter has been disabled by the time-out timer feature. Refer to page 25 for more information.

- If this tone sounds as soon as the push-to-talk switch is pressed and "TX DSBL" appears in the display, a channel is selected in the conventional mode that is programmed as receive-only. Refer to page 31 for more information.

Clear-To-Talk Tone

This is a short tone which sounds when the push-to-talk switch is pressed. It indicates that the system has been successfully accessed and speaking can begin. This tone does not sound if the radio system is busy or if the selected system is programmed for conventional operation. Refer to "Clear-To-Talk" on page 24 for more information.

Key Press Tone

This is a short tone that sounds when a key is pressed. This tone can be enabled and disabled by turning power on with the SCN key pressed.

NOTE: The following tones are heard only when making telephone calls.

Confirmation Tone

This is a short tone that sounds when the number just dialed is accepted by the system.

Call Proceed Tone

With certain non-telephone calls, ringing does not occur after the number is dialed. Instead, another short tone sounds after the confirmation tone to indicate that the audio path is complete and speaking can begin.

End Call Tone

This tone consists of three beeps, and it indicates that the end of the call has been detected by the system.

Proceed Dialing Tone

When placing a landside-originate call to a mobile (see “Landside-Originated Calls” on page 17), the landside caller may dial the system and then enter a special number which specifies the mobile being called. If placing this type of call, this tone sounds when the system answers to indicate that the special number should be dialed.

SYSTEM SCAN

General

NOTE: In some cases, such as if your transceiver is programmed with only one system or if calls are received on only one system, you may decide not to use the system scan feature.

System scanning is turned on by pressing the SCN key. The scan mode is indicated by “SCAN” in the lower part of the display. When scanning is actually occurring, “IN SCAN” appears in the upper part of the display in place of the unique system identification. In addition, the system and group numbers are replaced by dashes.

Scanning is sequential through the programmed systems unless they are locked out as described in “System and Group Lockout”. When an incoming call is detected, scanning stops and the call is received. The

display always changes to the system of the call and usually changes to the group of the call. The selected system or group can be changed while scanning by simply pressing the system or group select switch. Scanning then halts and the selected system or group changes. Scanning resumes 1 second after a switch is released.

Some transceivers may be programmed so that the conventional and some Multi-Net systems may not be scanned. If this is the case with your transceiver, your system operator will tell you which systems are not scanned.

Scan Resume Delay

After a message is received or transmitted in the scan mode, there is a delay period of 1-7 seconds before scanning resumes. The exact length of this delay is programmed by your system operator. When a message is received, this delay prevents another message from being received before a response can be made. If a response is not made during this delay period, the selected system and group may have to be changed (refer to next section). When a message is transmitted, this delay ensures that a response to your message is heard instead of some other message occurring on another system or group.

Transmitting In Scan

When you transmit while scanning (dashes in both the system and group displays), the transmission always occurs on the revert system/group. This is the system and group that were displayed when scanning was turned on. To display the revert system and group while scanning, temporarily halt scanning by pressing the SCN key, Auxiliary switch, or PTT switch. If a message is received while scanning, scanning stops and the system and group of the call are displayed. If the transmitter is keyed to respond to this call, Floating/Fixed Revert programming determines the system and group on which the transmission occurs:

Floating - When Floating Revert is programmed, you can always respond to the call without having to change the selected system/group as long as you do so before the scan resume delay expires (see

preceding section). For example, if System 1/Group 2 were displayed when scanning was turned on and a call is received on System 3/ Group 4, System 3/Group 4 are displayed and the call is received. If a response is then made to that call, the transmission occurs on System 3/Group 4. However, if the response is not made until after scanning resumes, the transmission occurs on the revert system/group (System 1/Group 2 in this case). This configuration may be programmed if while scanning, responses must be made to messages occurring on different systems and groups.

Fixed - When Fixed Revert is programmed, the transceiver always transmits on the revert system/group, even when responding to a call. Therefore, if Fixed Revert was programmed for the preceding example, the transmission would occur on System l/Group 2, not System 3/Group 4. To respond to the call, the selected system/group would have to be changed manually using the System and Group keys. The system/group of a call can also be made the revert system/group by turning off scanning before scanning resumes. This configuration may be programmed if you normally only monitor other calls while scanning and most transmissions occur on the revert system/group.

System and Group Lockout

Systems and groups can be locked out of system and group scanning by the LCK key. Pressing this key changes the lockout status of the system or group that was changed last. For example, if System 2 is selected by pressing the “S” switch and then LCK is pressed, System 2 is locked out of scanning (if it was unlocked). Then if LCK is pressed again, System 2 is unlocked and so on.

A locked out system is indicated by ▼ next to “SYS” in the display, and a locked out group is indicated by the same symbol next to “GRP”. When system scanning (“IN SCAN” displayed), the system lockout indication is displayed if any system is locked out. Likewise, the group lockout indication is displayed if any group in a scanned system is locked out. To check which system or groups are locked out, halt scanning by pressing the SCN or Auxiliary switches. Then step through the programmed systems and groups while watching the lockout indicators.

System lockout is not available if you have only one selectable system, and group lockout is available only if the selected system is programmed for group scan (see page 25). The lockout status of all systems and groups is maintained when power is turned off.

Scanning Multi-Net Systems

NOTE: For information on Multi-Net and conventional systems, refer to page 29.

When Multi-Net systems are scanned, calls are received on all selectable groups if Group Scan is programmed, and on only the last-selected group if it is not programmed. Your transceiver may also be programmed with fixed groups. Calls on these groups are normally received regardless of system and group scanning.

Scanning Conventional Systems

Group scan is not available with conventional systems. Therefore, calls are received on only the last-selected group of conventional systems. For example, if Groups 1-4 are programmed in a conventional system and Group 2 is the last selected or displayed group in that system, Group 2 is the only group on which calls are received in that system.

If a group is programmed with Call Guard squelch, only messages intended for you will be detected on that group while scanning. However, if Call Guard squelch is not programmed or is disabled by the monitor mode selected by the Auxiliary switch, any message occurring on that group will be heard. Refer to “CONVENTIONAL MODE OPERATION” on page 30 for more information.

OTHER FEATURES

Clear-To-Talk

When a system programmed for Multi-Net operation is selected, a short beep sounds when the push-to-talk switch is pressed. This tone indi-

cates that the radio system has been successfully accessed and speaking can begin. If no tone sounds and “BUSY” is indicated in the display, the system is busy. If you continue to hold down the push-to-talk switch, the system will be accessed and the clear-to-talk tone will sound when the system is available. If the selected system is programmed for conventional operation, the clear-to-talk tone does not sound. Therefore, you can begin speaking as soon as the push-to-talk switch is pressed (after monitoring the channel). A standard or loud clear-to-talk tone can be selected. To change the tone, turn power on with the “S” key pressed.

Group Scan

With the Group Scan feature, calls are received on all the selectable groups of a Multi-Net system regardless of which is selected. The display also changes to the group on which a call is received. Without Group Scan, calls are received on only the selected group. Group Scan is enabled or disabled by your system operator on each Multi-Net system. If programmed, it is active whenever the system is selected or scanned (system scan does not need to be on). Group Scan is not available on conventional systems, and it is disabled when the phone mode is selected.

When system scan is turned off, group scan is indicated by a dash in the Group display (the System display continues to indicate the selected system). When system scan is occurring, dashes appear in both the System and Group displays even if group scan is not programmed. Groups can be locked out of scanning using the LCK key (refer to “System and Group Lockout” on page 23).

Time-Out Timer

There is a Time-Out Timer feature which automatically disables the transmitter if it is continuously on for longer than the programmed time. If this timer times out, the transmitter is disabled, the intercept tone sounds, and “TX TIME” is displayed. It is programmed by your system operator for a time from 0.5-5.0 minutes. The timer and tone are reset by releasing the push-to-talk switch. This timer prevents a blocked channel caused by an accidentally keyed transmitter and also possible transmitter damage caused by transmitting for extended periods.

Call Indicator

The call indicator is the word “CALL” in the lower part of the display. This feature indicates that a call was received while you were away from the transceiver. It is programmed by your system operator to turn on when calls are received on certain groups (Multi-Net systems) or channels (conventional systems). It may also be disabled entirely. This indication is turned off by pressing any key except backlight. Transceiver power must be on for this indicator to operate.

RTN (Return) Key

The RTN key is used to quickly display either the “home” or last active system/group. Programming by your system operator determines which is selected and also the length of time it is displayed. The system/group may be displayed briefly (1-7 seconds) or indefinitely so that it is the new selected system/group. If scanning when the RTN key is pressed, scanning halts and either the home or last active system/group is displayed. In addition, when this key is programmed to display the home system/group, the revert (selected) system/group is also displayed. If the system/group is displayed indefinitely, scanning automatically turns off. When the system and group are displayed temporarily, the system and group that are displayed can be made the selected system and group by pressing any function key. Pressing the RTN key twice also has this effect.

Emergency Button

When equipped with this optional switch, high-priority calls can be placed. This switch can be programmed by your system operator for manual or automatic operation. When manual operation is programmed, no call is placed automatically. However, a specific system/group is selected and the transceiver goes into a high-priority mode that minimizes, as much as possible, the chance that the system will be busy when a call is placed. When automatic operation is programmed, the transceiver automatically transmits an emergency message on a specific system and group at a high priority until an acknowledgment is received

from the dispatcher. A short tone sounds when this key is pressed. Contact your system operator for more information on the operation of this switch.

Transmit Inhibit

The Transmit Inhibit feature prevents the transmitter from turning on if the party you are calling is busy with another call. When the transmitter is disabled by this feature, the intercept tone also sounds and "TX INHIB" appears in the display. This feature is programmed by your system operator on Multi-Net systems only.

To make another call attempt when the transmitter has been disabled by this feature, the push-to-talk switch must be released and then pressed again. However, since a 5-second time period must expire, you may want to wait a few seconds before making another call attempt. One use of this feature is to provide an audible indication that the party you are calling is busy.

Priority Calls

Your transceiver can be programmed so that certain incoming calls have priority over other calls you may be receiving. Therefore, if a higher priority call is detected while you are listening to another call, the current call is immediately dropped and the priority call is received.

If a first priority call is received, "RX PRI1" is displayed, and if a second priority call is received, "RX PRI2" is displayed. A priority 1 message can interrupt a priority 2 message. To turn off the priority indication, press any key except backlight. Priority calls occur only on Multi-Net and LTR systems, and they are received regardless of the group that is selected (as long as the system programmed for those calls is selected or scanned).

Keypad Disable

If you are having problems with front-panel keys being accidentally pressed, such as when the transceiver is carried on a belt, the keypad can

be disabled. To disable all keys except push-to-talk and backlight, turn power on with the LCK key pressed. If a key is then pressed, all that happens is that “KEYLOCK” is displayed. To re-enable the keypad, simply turn power on again with the LCK key pressed.

Key Press Tone Disable

If the tone that sounds when a key is pressed is distracting or annoying, it can be disabled. To enable or disable this tone, turn power on with the SCN key pressed. When the key press tone is disabled, “MUTE” is displayed.

High/Low Power Select

Some transceivers have selectable high and low power output (your system operator will tell you if yours does). If your transceiver has this feature, power output is changed by turning power on with the RTN key pressed. Either HI PWR or LOW PWR is then flashed in the display to indicate which power setting is currently selected. The low power setting may increase battery life but decrease range. The opposite may occur with the high power setting. If your transceiver does not have selectable power output, this information is still indicated even though no power change occurs.

MULTI-NET AND CONVENTIONAL MODES

General

This transceiver can operate in both the Multi-Net and conventional modes. Each selectable system can be programmed for either type of operation. The type of operation that is programmed is determined by the type of radio equipment in use in the radio system you are accessing. You can probably assume that Multi-Net operation has been programmed unless you are told otherwise. The differences in operation are described in the information which follows and also noted elsewhere in this manual as required.

Channel Monitoring

In the Multi-Net mode, channel monitoring is performed automatically by the transceiver. In the conventional mode, it must be performed manually as described in the “Monitoring Before Transmitting” description which follows.

Supervisory Tones

In the Multi-Net mode, supervisory tones indicate clear-to-talk and out-of-range conditions. In the conventional mode, a busy condition is detected by manually monitoring the channel, and an out-of-range condition probably exists if you are unable to get a response from the party you are calling.

Group Select

In the Multi-Net mode, the group key selects ID codes; in the conventional mode it selects radio channels.

CONVENTIONAL MODE OPERATION

Monitoring Before Transmitting

Before transmitting in the conventional mode, regulations require that you monitor the channel to make sure that it is not being used by someone else. If you were to transmit while someone else was talking on the channel, you would probably disrupt their conversation.

The simplest way to monitor the channel is to note if "BUSY" is indicated in the lower part of the display. If it is not, the channel is not being used and you can transmit your message. There may be periods when this indication is displayed and no one is using the channel. Therefore, other methods to monitor the channel are as follows:

If Call Guard squelch is not used on the channel (refer to description page 31), monitoring can be performed by simply listening for someone talking before pressing the push-to-talk switch.

If Call Guard squelch is programmed, it must be disabled so that all calls can be heard. To disable Call Guard squelch, press the Auxiliary switch on the side of the transceiver. This turns on the monitor mode which is indicated by "MON" in the lower part of the display. To re-enable Call Guard squelch, press the Auxiliary switch again so that "MON" is not displayed.

Transmit Disable When Busy

The transceiver can be programmed so that the Transmit Disable When Busy feature automatically disables the transmitter if the channel is busy ("BUSY" indicated in the lower part of the display). If the channel is busy with this feature programmed and the push-to-talk switch is pressed, the transmitter does not turn on and the channel can be monitored for as long as the push-to-talk switch is pressed.

In some systems, "BUSY" may be indicated and the transmitter disabled even though no one is talking. In this case, the transmitter can be

turned on by quickly releasing and then pressing the push-to-talk switch. If “MON” is indicated in the display as described in the preceding section, the transmitter will turn on even if the channel is busy. When this feature is disabled, the transmitter always keys, even if the channel is busy.

Receive-Only and Talk-Around Channels

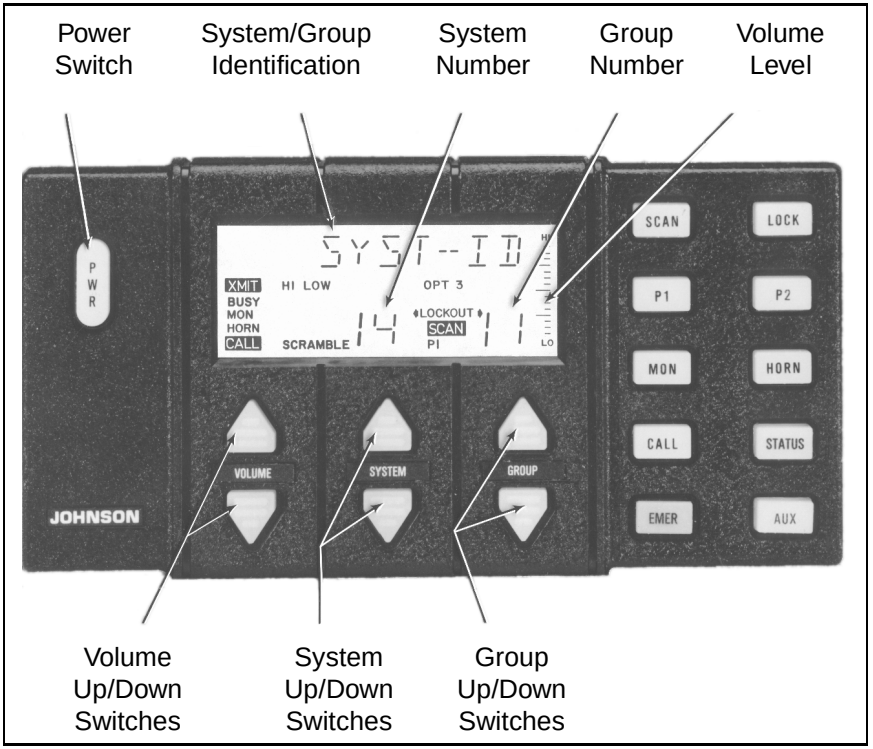
Receive-only channels can be programmed in the conventional mode by your system operator to allow monitoring but not transmitting on certain channels. If the push-to-talk switch is pressed with a receive-only channel selected, the intercept tone sounds and “TX DSBL” is displayed.

Talk-around channels (groups) can be programmed by your system operator to allow you to talk directly to another mobile without going through a repeater (both Multi-Net and conventional calls normally go through a repeater). This may permit communication when it would otherwise not be possible such as when you are out of range of the repeaters. This feature is available on conventional systems only.

Call Guard Squelch

The Call Guard Squelch feature eliminates distracting calls intended for others using the channel. This is done by using a subaudible tone or digital code to control the squelch. This tone or code is unique to you or your group on that channel. Call Guard squelch is a programmable feature available in the conventional mode only. (The Multi-Net mode uses ID codes to eliminate calls intended for others.)

OPERATION WITH OPTIONAL REMOTE CONTROL UNIT



Introduction

This transceiver can be converted to a mobile transceiver by plugging it into the optional vehicle adapter if it has been installed in the vehicle. This adapter also provides rapid recharging of the transceiver battery.

The optional Remote Control Unit shown above can be used with the adapter to operate the transceiver. Most controls on the control unit and transceiver operate in parallel, so both can be used if desired. Two

additional features available with a control unit are a power turn-off delay and horn alert. The operation of the Remote Control Unit with this transceiver is described in the following information.

Control Unit Controls

PWR - Turns both control unit and transceiver power on and off. Power is also controlled by the vehicle's ignition switch. Therefore, that switch must also be on to turn power on. The transceiver on-off switch and volume control are nonfunctional when the control unit is used.

VOLUME - Pressing the upper VOLUME switch increases the volume level by one step, and pressing the lower switch decreases the volume level by one step. Holding either switch down causes the function to repeat. The volume level is indicated by a bar graph on the right side of the display.

NOTE: The equivalent transceiver key is shown in parentheses in the following descriptions.

SYSTEM (S) - Pressing the upper SYSTEM switch increases the selected system number by one, and pressing the lower switch decreases the selected system number by one. Holding either switch down causes the function to repeat. The selected system is indicated in the display above the switch.

GROUP (G) - Functions like the SYSTEM switch to select the desired system.

SCAN (SCN) - Turns scanning on and off. Scanning is on when “SCN” is indicated in the display.

LOCK (LCK) - Locks systems and groups out of the scan sequence. The lockout indicator is the word “LOCKOUT” in the display. Small arrows on either side of this word indicate if the system and/or group is locked out.

P1 (PHON) - Turns the phone mode on and off.

P2 (RTN) - Selects either a home system/group or the last active system/group, depending on programming by your system operator. In the phone mode, this key is used to sequentially recall telephone numbers from memory.

MON (Auxiliary) - Turns the monitor mode on and off when a conventional system is selected. This key and the AUX key perform the same function

HORN - Turns the horn alert on and off if it has been installed.

CALL (SEND) - Selects the phone mode or if already in the phone mode, transmits the telephone number in the display.

STATUS - Selects the status message to be sent. Refer to “Sending Status Information” on page 36 for more information.

EMER (Emergency Button) - Used to manually or automatically place a high-priority call. Refer to “Emergency Button” on page 26 for more information.

AUX (Auxiliary) - Turns the monitor mode on and off when a conventional system is selected. This key and the MON key perform the same function.

Miscellaneous Operating Information

Microphone Hanger - The microphone hanger controls the monitor mode similar to the Monitor key (off-hook = monitor). In addition, taking the microphone off-hook disables system and group scanning if it is enabled.

Telephone Calls - The phone mode can be selected by the P1 key and numbers can be sequentially recalled from memory by pressing the P2 key. This can be done even if the transceiver is not equipped with the optional telephone keypad. However, that keypad is required to enter numbers into the display or store numbers in memory (a microphone

keypad cannot be used). If the number is dialed using the microphone keypad, the phone mode probably does not need to be selected.

Turning Power On and Off - Power to both the transceiver and control unit is controlled by the control unit PWR switch. However, the vehicle's ignition switch also normally controls power. Therefore, it must be in the ON or ACCESSORY position for power to turn on. When the ignition switch is turned off and power has not been turned off by the PWR switch, power remains on for the programmed delay period (see next description). The control unit can also be installed so that the ignition switch does not control power. Power is then controlled by only the PWR switch and the turn-off delay is not available.

Turn-Off Delay - When the ignition switch controls power as described in the preceding paragraph, there is a turn-off delay that can be programmed by your system operator. This delay can be 0, 10, 20, or 30 minutes, 1, 2, or 4 hours, or an infinite time (no turn-off occurs). The delay period begins when the ignition switch is turned off with the control unit power on. It can be canceled by turning power off using the PWR switch or turning the ignition switch back on. This delay can be used to keep functions such as the Call indicator, horn alert, and battery charger functional for a limited time after the vehicle is turned off. It can also be used to prevent accidental discharge of the vehicle battery.

Horn Alert - The vehicle's horn or some other type of alert can be used to signal an incoming call. It can be programmed to activate when calls are received on specific groups or channels. When a call is received that activates the horn alert, the horn sounds once per second for 3 seconds and then deactivates. The horn alert is turned on and off by the HORN button on the control unit. It is enabled when "HORN" is displayed. Other requirements for the horn to sound are that the vehicle's ignition switch must be turned off and the control unit must be in the delay period described in the preceding section.

Control Unit Display - The control unit displays the same unique 7-character system or 5-character group identification as the transceiver display. Other information displayed in that area of the transceiver display is also indicated by the control unit display. The control unit display and keys

are continuously lighted (when power is on) for use in low-light conditions.

Sending Status Information

When the remote control unit is used, status information can be transmitted to your dispatcher when a Multi-Net system is selected. If this feature has been programmed by your system operator, one of up to eight status conditions can be selected using the STATUS key. The currently selected status condition is transmitted whenever the transmitter is keyed. To momentarily display the currently selected status, press the STATUS key once. To change the status, press this key again while this information is displayed. This cycles through the available choices. For example, status conditions such as AT SITE, LVG SITE, or UNLOADING can be displayed. This information is not displayed by the transceiver display.

MISCELLANEOUS INFORMATION

Auto-Registration

In some radio systems, several sites may be linked together to provide wide area coverage. The auto-registration feature may then be used so that special calls can be automatically routed to the correct site (standard calls are not routed to other sites). To have this feature, it must have been programmed by your system operator and system scanning must be enabled by the SCN key. Auto-registration is available with Multi-Net systems only.

Auto-registration operates as follows: When you move out of range of the current site, the transceiver automatically begins searching for another site. While it is searching, “SCN” flashes in the display. When a new site is located, “SCN” is again displayed continuously and the selected system/group changes to the new site. The new system is typically the first system that is programmed for the new site, and the new group is the group that was displayed when that system was last selected.

Busy Queuing

The busy queuing feature places the call in a queue if the repeater system is busy when the call is placed. Then when the system becomes available, a tone sounds and the call can be placed if desired. Busy queuing is either enabled or disabled on all Multi-Net systems by system operator programming. It functions with both standard and special calls. It is not available on LTR or conventional systems.

The Busy Queuing feature operates as follows: If the radio system is busy, the busy tone sounds. (Without queuing, no tone sounds because the clear-to-talk tone sounds only when a successful access is made.) The queue mode is then entered automatically when the PTT switch is released. The queue mode is indicated when “QUEUED” is displayed and the busy tone turns off. Then when the system becomes available, either a beeping tone or dial tone sounds. The beeping tone is heard if a standard call is being made, and the dial tone is heard if a special call is being made. The call can then be placed in the normal manner.

If no call is placed soon after the tone sounds, the queue mode is automatically exited and normal operation resumes. The queue mode is also exited if a call is received on the selected group, the system/group is changed, the push-to-talk switch is pressed, or any other keys directly under the display are pressed (while no call is being received).

Calls are received normally while in the queue mode. Group scanning continues if it is programmed on the selected system. However, system scanning is temporarily disabled, so calls are not received on other systems. If a call is received on some other group while in queue, you can respond to the call without affecting the queued call. Normal queuing of a call resumes shortly after the call on the other group is finished.

System Operator Programming

As noted in the descriptions of many of the features of this transceiver, programming by your system operator may determine availability and how they operate. If you require more information on how a partic-

ular feature operates, contact your system operator. The only user-programmable feature of this transceiver is the seven telephone numbers (if your transceiver is equipped with the optional telephone keypad). However, even that may not be user programmable if the location has been locked by your system operator (see “Storing and Recalling Numbers From Memory” on page 18).

Setting Volume Level

This transceiver does not have a squelch control that can be turned to enable background noise for use in setting the volume level. However, if the key press tone is enabled, any key can be pressed and a beep will sound that is representative of the current volume level. The index on the volume knob can also be used to determine the current volume setting.

Display Messages

Messages may appear in the display which indicate operating modes and error conditions. The messages that may be displayed are as follows. Refer to the related descriptions in this manual for more information.

NO SITE - Indicates an out-of-range condition. The intercept tone also sounds when this message is displayed. To correct this condition so that calls can again be placed, you must get closer to your repeater site. This message is not displayed in the conventional mode.

BUSY - Indicates that the system being accessed is busy. Calls cannot be placed until the system becomes available. Refer to “Clear-To-Talk” on page 24 for more information. This message is not displayed in the conventional mode.

TX TIME - Indicates that the transmitter has been disabled by the time-out timer.

TX DSBL - Indicates that transmitting is not allowed on the selected group because it has been programmed as receive-only. This message is displayed in the conventional mode only.

TX INHIB - Indicates that the selected group is temporarily busy. This message is not displayed in the conventional mode.

SYN ERR - Indicates a frequency synthesizer error. Refer to "Transceiver Service" on page 42.

PRG ERR - Indicates that no transmit frequency has been programmed for the selected system. Refer to "Transceiver Service" on page 42.

RX PRI1 - Indicates that a call has been received on the first priority group (see "Priority Calls" on page 27). Press any key except backlight to turn it off. This message is not displayed in the conventional mode.

RX PRI2 - Indicates that a call has been received on the second priority group (see preceding description).

IN SCAN - Indicates that system scanning is occurring.

KEYLOCK - Indicates that the keypad has been disabled by turning power on with the LCK key pressed. Turn power on again with this key pressed to re-enable the keypad.

Rechargeable Battery Pack

WARNING

Dispose of the nickel-cadmium battery pack in accordance with local regulations. Do not dispose in fire because it may explode.

Battery Pack

NOTE: Before removing a battery pack, make sure that transceiver power is turned off.

With proper care, a battery pack should provide many months of service. Since the battery pack is a sealed unit, it cannot be serviced and must be replaced whenever it fails to hold a charge or is defective for some other reason. To remove the pack, press the spring-loaded button on

the side upward and rotate the pack counterclockwise (when viewed from the bottom). To install a pack, insert it in the socket and rotate it clockwise until it locks in place. A new pack must be charged before use.

Battery Operating Time

Typical operating time before recharging is required depends on what model of transceiver you have and also how you use it. The 8560/70 models have fixed power output and the 8565 model has user-selectable high and low power outputs. With the following times, it is also assumed that 90% of the time is spent in the standby mode (receiving, audio muted), 5% in the receive mode (audio enabled), and 5% in the transmit mode. If more time is spent in the receive or transmit modes, the time varies accordingly. Recharging is required when appears in the display and a beep sounds when the push-to-talk switch is released. Do not regularly use a pack until the transceiver becomes totally inoperative because this can shorten battery life.

Transceiver	**1400 mAH Battery (P.N. 587-8565-162)**
8560/70 (fixed output)	14 hrs
8565 (low power selected)	10.5 hrs
8565 (high power selected)	8.5 hrs

Recharging

The battery pack can be recharged while it is attached to the transceiver or it can be removed and recharged. Charging time is somewhat longer if the transceiver is left on while recharging, especially when using the trickle charger. Approximate charge times with the various chargers are shown below. It is assumed that the battery is discharged to the point where the low-battery indication appears. When the rapid and vehicular chargers are used, a steady or red indicator indicates charging in the rapid mode and a flashing or green indicator indicates charging in the trickle rate and an almost fully charged battery.

Charger	Part Number	Approximate Charge Time
Trickle	563-0001-003	16 hours
Rapid	239-5800-400/-476	2 hours
Vehicular Adapter Rapid	239-5810-500	2 hours

It is good practice to remove the battery from the charger after it is fully charged. Regularly leaving a fully charged battery in the charger for an extended period (such as longer than overnight or over a weekend), may shorten battery life. In addition, the ambient temperature should be +50° to +95° F (+10° to +35° C) when recharging a battery.

NOTE: It is recommended that one of the rapid chargers be used whenever possible (especially the new technology DT/Dt chargers listed on the preceding page). Using those chargers normally results in longer battery life, longer operating time, and faster recharging.

Speaking Into Microphone

For best results, hold the speaker grille about l-2 inches away from your mouth and speak slowly and distinctly at a normal conversational level. Do not shout since it distorts your voice and does not increase range. Make sure the push-to-talk switch is pressed before you begin to speak and released as soon as the message is complete.

Operation At Extended Range

When approaching the limits of radio range, the other party may not always hear your transmissions and there may be an increase in background noise when messages are received. Communication may be improved by moving to higher ground or away from shielding structures such as tall buildings and hills.

FCC Licensing

To operate this transceiver on the air, it is usually necessary to file the proper license application. Your system operator will provide you with the necessary information regarding licensing requirements.

Transceiver Service

If the transceiver is not operating properly, “SYN ERR” or “PROG ERR” may be displayed. It is also possible that all segments of the display are indicated when power is turned on. To attempt to clear this condition, turn the power off and then on again to reset the control logic. Also make sure that the battery is charged, the controls are properly set, and the antenna is tight. If the transceiver still does not operate properly, contact your system operator for service.

NOTE: There are no user-serviceable components in this transceiver. Altering internal adjustments can void the warranty and cause illegal emissions, and result in improper operation that can seriously damage the transceiver.

INTRINSICALLY SAFE CLASSIFICATION

Introduction

“Intrinsically Safe” is a fire safety rating given to this transceiver by the Factory Mutual Research Corporation. When equipment is given this rating, it is considered safe to use in certain flammable or combustible atmospheres. Flammable atmospheres have been categorized by Class, Division, and Group as described in the next two sections. The specific hazardous atmospheres in which this transceiver has been approved to operate are as follows. This information is also listed on the label on the back of the transceiver.

Intrinsically Safe - Class I and II, Division 1, Groups C, D, E, F, and G.
Non-Incendive - Class I, Division 2, Groups A, B, C, and D.
Temperature Code - T3C (Battery Pack P.N. 587-8565-162).

Classification of Areas (Division)

Areas are classified as Division 1or 2 as shown below. Since a Division 1 area is considered most hazardous, a transceiver approved for a specific Division 1 atmosphere can also be used in the same Division 2 atmosphere. The intrinsically safe rating applies to Division 1 areas and the nonincendive rating applies to Division 2 areas.

Division	Area
1	An area where there is or could be an explosive atmosphere most of the time in normal operations.
2	An area where an explosive atmosphere exists only as a result of a fault (something going wrong).

Classification of Atmospheres (Class/ Group)

For the purposes of testing and approval, various atmospheric mixtures have been grouped on the basis of their hazardous characteristics. Equipment is approved for a class of material and also for the specific group of gas, vapor, or dust in that class. Class I materials include gases and vapors, and Class II materials include combustible dusts. The typical hazardous materials in each group and class are shown in the following table.

ATMOSPHERE CLASSIFICATION

Typical Hazard	Group	Class
Acetylene	A	1
Hydrogen	B	1
Ethylene, ethyl ether, cyclopropane	C	1
Gasoline, naphtha, butane, propane, alcohol acetone, benzol, natural gas	D	1
Metal dust including aluminum, magnesium, and their alloys	E	2
Carbon black, coal or coke dust	F	2
Flour, starch, or grain dusts	G	2
Ignitable fibers/flyings such as rayon and cotton	–	3

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