

MAGNUM
DELTA FORCE
OPERATING MANUAL

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LIMITED WARRANTY

Magnum International warrants this product to be free of defects for a period of one (1) year from the original date of purchase. This warranty is non-transferable. This limited warranty is subject to repair or replacement of defective components only. This warranty is void if the radio has been tampered with or misused.

IMPORTANT: RETAIN YOUR SALES RECEIPT

The enclosed warranty registration must be filled out and mailed along with a photocopy of your sales receipt within 15 days from the purchase date. If the warranty registration and copy of your sales receipt are not received the radio is not covered under warranty. Please fill out the enclosed warranty registration and send it along with a copy of your sales receipt to:

Magnum International
PO Box 445
Issaquah, WA 98027

Registering your DeltaForce with Magnum International provides several benefits:

- 1) Validates your warranty
- 2) Entitles you to free updates and information regarding your radio and new accessories for your radio
- 3) Provides possible recovery of lost or stolen radios through our serial number tracking database
- 4) Receive your free "Magnum Power" baseball cap within 30 days after registering

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INTRODUCTION

Congratulations on your purchase of a MAGNUM DELTAFORCE 10 meter FM/AM/SSB/PA transceiver. Your MAGNUM is designed to provide years of enjoyment and trouble-free service. There are many features and functions designed into this transceiver. To ensure that your investment is enjoyed to its fullest extent please take a few moments and thoroughly read this manual.

Your MAGNUM DELTAFORCE is a microprocessor controlled, user programmable radio combining both high RF performance with a user-friendly environment. The DELTAFORCE is built rugged to withstand years of use in harsh mobile environments. Although engineered with mobile use in mind the DELTAFORCE, with the addition of a high quality 10 amp regulated power supply, may be easily adapted to fixed station operation.

Some of the features of the DELTAFORCE are; an advanced design liquid crystal display that provides the operator with a full visual account of the transceivers operating status, automatic frequency scanning from either the front panel or microphone, memory storage of your favorite frequencies, programmable frequency resolution of either 1 kHz, 10 kHz or 100 kHz, and split (offset) frequency operation for repeater use. These are just a few of the features that make the DELTAFORCE a pleasure to own and operate.

IMPORTANT: The MAGNUM DELTAFORCE is designed for entry level amateur use. If the transmitter is operated in the United States or within its territories a licensed amateur radio operator must be present at the station. The minimum license class to operate 10 meter phone is Novice/Technician. If you are studying for your license and want to familiarize yourself with the operation of the radio, the receiver may be operated with or without a licensed operator present. For more information regarding FCC licensing, contact your nearest amateur radio dealer, or for complete details contact the American Radio Relay League.

American Radio Relay League (ARRL)
225 Main Street
Newington, CT 06111

Telephone 860-594-0200
Facsimile 860-594-0259
<http://www.arrl.org>

INSTALLATION

1. Contents

Unpack and inspect your Magnum DELTAFORCE for missing or damaged components. Your DELTAFORCE includes the following items:

Quantity	Description
1	DELTAFORCE Transceiver
1	Scanning Microphone
1	Mounting Bracket and Hardware
1	Power Cord
1	Operating Manual with Schematic

2. Install the DELTAFORCE

Choose a location where there is easy access to all front panel controls and air circulation available to the rear panel and aluminum heatsink. Do not install the transceiver in any compartment that restricts airflow. Attach the mounting bracket to the vehicle first then mount the transceiver to the bracket. If the rear panel is not easily accessible you may want to attach the power cord and antenna feed line prior to mounting.

3. Make Electrical Connections

The transceiver is designed to work on any 13.8 VDC power source with a negative ground. The condition of a vehicle's electrical system can affect operation. A low battery, worn generator/alternator, or poor voltage regulator will seriously impair the performance of the transceiver. Any of the above conditions could result in a high level of receiver noise generation or a substantial loss of the transmitter's RF output. Make sure that all of these components of your vehicle's electrical system are in good condition prior to installing the transceiver.

Before making any electrical connections make sure the AF gain (volume) control on the transceiver is in the "OFF" position. Connect the positive (+) red wire and negative (-) black wire from the transceiver directly to the battery. Connecting directly to the battery has several benefits, the first of which is to maximize RF output. Secondly, the battery is a very large capacitor and will help eliminate certain types of ambient and vehicle noise. Depending on your mounting location, additional power cable may be required. On additional runs of 6 feet or less use 14-gauge stranded wire. Use 12-gauge wire on longer runs.

CAUTION!
VOLTAGE EXCEEDING 15 VDC WILL DAMAGE THE RADIO. MEASURE VOLTAGE AT BATTERY TERMINALS, WITH VEHICLE RUNNING, PRIOR TO INSTALLATION!

4. Connect the Antenna

The transceiver will operate using any standard 50-ohm ground-plane, vertical, mobile whip, long wire or similar antenna. The antenna should be rated at 50 watts PEP minimum. A standard SO-239 type connector is provided on the rear panel of the transceiver. Connection is made using a PL-259 and high grade coaxial cable (RG213, RG58A/U or Mini RG-8 is recommended).

A ground-plane antenna provides greater coverage and is recommended for fixed station-to-mobile operation. For point-to-point fixed station operation, a directional beam antenna operates at greater distances even under adverse conditions. A non-directional antenna should be used in a mobile installation; a vertical whip is best suited for this purpose. The base loaded whip antenna normally provides effective communications. For greater range and more reliable operation, a full quarter wave whip may be used. Either of these antennas use the metal vehicle body as a ground plane.

The Penetrator™ and Super Penetrator™ mobile antennas, available from RF Limited, are the perfect antennas for use with the Magnum DeltaForce. The Penetrator™ and Super Penetrator™ feature power ratings of up to 3,500 watts PEP and bandpass ratings of 1.5 MHz, the widest bandpass of any mobile antenna of its kind.

5. VSWR

After you have determined that the installation is correct and the radio is operational, it is important to determine the antenna system's VSWR (voltage standing wave ratio). Prior to taking any measurements make sure the SWR bridge (meter) is in good working order and is calibrated. To ensure your radio is performing properly the VSWR should never exceed 1.5 to 1. This is critical due to the high level of gain developed in the RF deck. Never transmit on any antenna system where the VSWR exceeds 1.8 to 1. This will stress the output stage and could destroy the RF transistors; this type of misuse and failure is not covered under warranty.

FRONT PANEL CONTROLS AND FUNCTIONS

Reference Front Panel Diagram on Page 5.

(1) POWER ON/OFF and VOLUME CONTROL

Turns the transceiver on and off, and adjusts the AF gain, or volume.

(2) SQUELCH CONTROL

Used to eliminate background or "white" noise when monitoring strong signals. Also used to activate SCAN feature (see 14). To properly adjust squelch circuit, slowly rotate the control clockwise until the received audio disappears. Now turn the control slightly counterclockwise - this will keep the threshold right on the edge so you will not miss any incoming signals.

(3) MICROPHONE GAIN CONTROL

Increases or decreases the energy developed in the microphone amplifier circuit. The gain increases as the control is rotated clockwise. For optimum setting, press the push-to-talk switch on the microphone (see 23) and speak in a constant tone into the microphone. A good test tone is to say the word "four" in a long, drawn out

tone. While speaking, rotate the mic gain control clockwise until the modulation LCD display reads +30(see 22). Next, rotate the control counterclockwise until the +30 segment of the display starts to flicker.

(4) RF GAIN CONTROL

Adjusts the receiver sensitivity to both signals and background noise. This affects the distance at which a signal can be detected. Turning the control counterclockwise reduces the receiver sensitivity. This is particularly useful in areas where large volumes of traffic (signals) are present.

(5) ROGER BEEP CONTROL

RB position activates the end of transmission, or roger beep, tone. When activated a 1 kHz tone will automatically transmit upon release of PTT switch (see 23). This notifies contacts that your transmission has ended and you are ready to receive their signal. To turn off the roger beep, put the switch in the S/RF position. NOTE: In the RB position, the meter (see 13) measures S/RF.

SIGNAL STRENGTH / RF METER CONTROL

S/RF position activates the meter (see 13) to measure receive signal strength and transmitter RF output power.

CALIBRATE CONTROL

CAL position activates the meter to calibrate for SWR measuring. To calibrate for SWR, set the switch to the CAL position, press the PTT switch (see 23) and rotate the calibrate control (see 6) until the meter (see 13) needle lines up with the CAL mark on the far right side of the meter. Once lined up, release the PTT. The transceiver is now ready to measure SWR. NOTE: When first attempting to calibrate make sure the transceiver is in the AM mode (see 19). If it is not possible to calibrate in AM, then switch to FM mode.

STANDING WAVE RATIO CONTROL

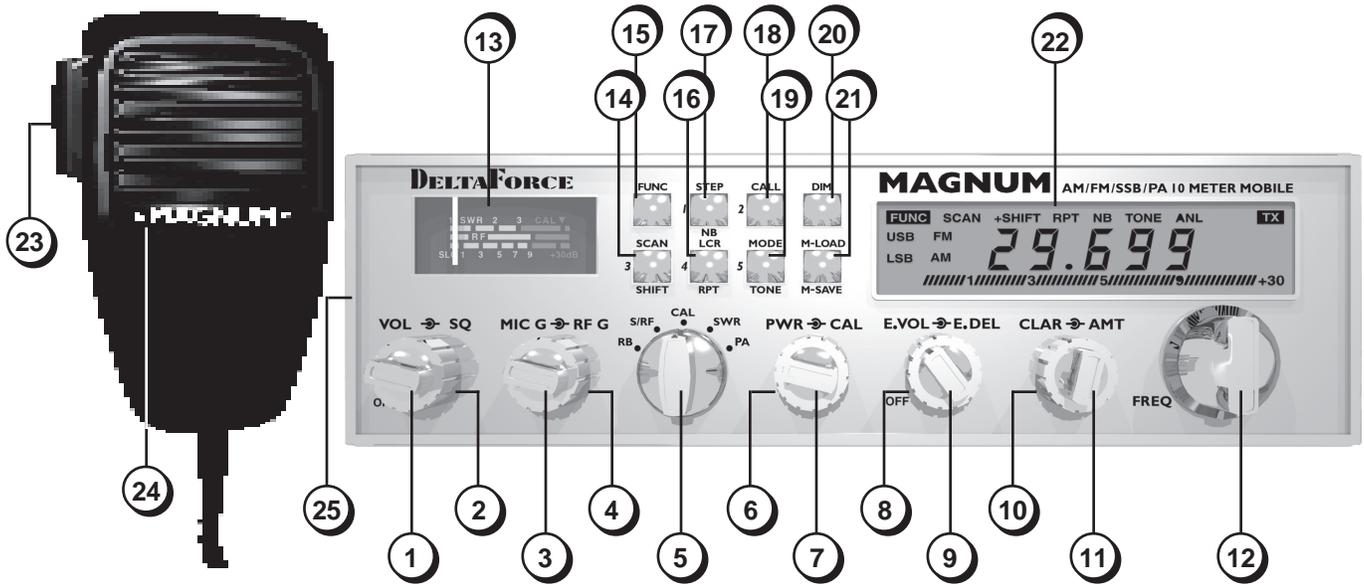
SWR position activates the meter to measure the standing wave ratio of the transceiver and antenna system. After the meter is calibrated, set the switch to the SWR position and press the PTT switch (see 23). The meter (see 13) will measure the SWR. For optimum performance the SWR should be below 1.5 - the first green segment on the SWR portion of the meter indicates an acceptable standing wave ratio.

PUBLIC ADDRESS

PA position activates the public address amplifier. To operate PA, select the PA position and insert a public address speaker or horn into the PA jack on the rear panel of the transceiver.

(6) CALIBRATE CONTROL

Rotate to calibrate the meter (see 13) for SWR measurements. See instruction 5 for more information.



(7) RF OUTPUT POWER CONTROL

Continuously variable control for adjusting the RF output power of the transmitter in all modes for QRP operation. To reduce the RF output power rotate the control counterclockwise. To increase rotate the control clockwise. The power output is a linear control, therefore the peak to average output power ratios remain constant regardless of power level.

(8) ECHO DELAY CONTROL

Varies the amount of delay, or duration of the echo repetition. Rotate clockwise to increase the amount of delay and counterclockwise to decrease.

(9) ECHO ON/OFF and VOLUME CONTROL

Turns on and off the echo feature, and varies the volume or number of echo repetitions. To turn on the echo feature and increase the echo volume, rotate the control clockwise. To turn off the echo feature rotate the control completely counterclockwise to the OFF position.

(10) ALL MODE TALK BACK CONTROL

All Mode Talk Back, a Magnum exclusive, is an independent talk back monitor. The AMT functions in all modes and allows the operator to monitor the transmitted audio of the DELTAFORCE. To increase the volume of the talk back rotate the control clockwise. To decrease rotate counterclockwise. To turn off the talk back rotate the control completely counterclockwise.

(11) CLARIFIER

Allows variation of the receiver operating frequency above and below the indicated frequency in all modes. The receive clarifier is primarily used in tuning to an SSB signal. The receive clarifier has a range of +/-1 kHz above and below the indicated frequency.

(12) FREQUENCY

Rotate clockwise to increase the operating frequency and counterclockwise to decrease the operating frequency.

(13) METER

The meter indicates receive signal strength, RF output power, SWR calibrate and SWR. The top horizontal bar graph indicates calibration and measuring of the standing wave ratio. The center bar graph indicates RF output power. The bottom bar graph indicates receive signal strength.

IMPORTANT!

Operating some of the features in 14 through 21 require the use of the function control. To activate the function control, momentarily push the FUNC (15) control, the FUNC prompt will be displayed in upper left-hand corner of LCD. Push the control again to deactivate the function control.

(14) SCAN

Scans frequencies in increments of 10 kHz. There are two ways to scan using front panel entry.

(1) Receive Audio On Scanning: Press the SCAN button. Scan rate is one step every 5 seconds. To stop scanning press the SCAN button again, or momentarily press the PTT button on the microphone (scanning will stop without transmitting).

(2) Receive Audio Mute Scanning: Carefully rotate squelch control to the threshold (see 2). The receiver scan rate will now be five steps per second. When a signal is detected the squelch is automatically disengaged and the scanning is paused. The squelch circuit will automatically reengage and the receiver will continue to scan the moment the received signal is no

longer detected. To stop scanning, press the SCAN button, or momentarily press the PTT button on the microphone (scanning will stop without transmitting).

SHIFT

Used for programming offsets to operate repeater networks. The DELTAFORCE can transmit and receive on different frequencies.

To program the offset, press the FUNC button and hold down the SHIFT button for 3 or more seconds. Three digits will appear on the LCD. This is the offset frequency in kHz. Rotate the FREQUENCY control until the desired offset frequency is displayed. To return to the main display press the FUNC button and hold down the SHIFT button for 3 or more seconds, or momentarily press the PTT button on the microphone (the transmitter will not be engaged).

To activate the programmed offset frequency, press the FUNC button, and then press the SHIFT button once. +SHIFT is displayed on the LCD. The DELTAFORCE will now transmit on the frequency that is XXX kHz greater than the displayed, or receive, frequency (XXX represents the programmed offset frequency in kHz).

To transmit on the frequency that is XXX kHz lower than the displayed, or receive, frequency press FUNC, then the SHIFT button. Repeat this until -SHIFT is displayed on the LCD.

To disengage the programmed offset frequency, press the FUNC button and then press the SHIFT button. Repeat this until the SHIFT indicator is no longer displayed on the LCD.

MEMORY CHANNEL 3

After programming this button is memory channel 3. See M.LOAD \ M.SAVE control for programming instructions.

(15)FUNCTION

This control is used to operate the functions that are printed below the control buttons. Press and release, FUNC will be displayed on the LCD indicating that the function command is activated. After you have pressed one of the buttons the FUNC will disappear from the screen.

(16)LAST CHANNEL RECALL

Press the LCR button to return to the last frequency that was transmitted on for more than 3 seconds.

REPEATER

Repeater access tone on and off control. Most repeaters require an 88.5 Hz tone burst to access. To activate the 88.5 Hz tone burst, press the FUNC control

and then press the RPT button. RPT will appear on the LCD indicating that the tone burst will now automatically be transmitted whenever the PTT is pressed. To deactivate, repeat the same process.

MEMORY CHANNEL 4

After programming, this button is memory channel 4. See M.LOAD \ M.SAVE control for programming instructions.

(17)STEP

The STEP button selects frequency resolution in either 1 kHz, 10 kHz or 100 kHz steps. Press the STEP button, one of the digits will flash on and off. Press the STEP button again to change stepping resolution.

To tune frequencies in either 10 kHz or 100 kHz increments, press the STEP button until the desired digit is flashing. Rotate the FREQUENCY control in either direction. The entire frequency range of the Magnum DELTAFORCE can be stepped through in 10 or 100 kHz increments.

To tune in 1 kHz increments, press the STEP button until the 1 kHz digit flashes on and off. Rotate the FREQUENCY control. NOTE: When stepping in 1 kHz increments, you are limited to tuning within a 10 kHz frequency range.

NOISE BLANKER and AUTOMATIC NOISE LIMITER

Noise blanker on and off control. This circuit eliminates pulse type interference usually associated with automotive ignition systems. To activate the noise blanker, press the FUNC control and then press the NB button. NB will appear on the LCD indicating the noise blanker is turned on. To turn off the noise blanker, repeat the same process.

MEMORY CHANNEL 1

After programming, this button is memory channel 1. See M.LOAD \ M.SAVE control for programming instructions.

(18)CALL

The USA national call frequency for SSB is 28.400 MHz. The radio's operating frequency is automatically reset to this frequency when the CALL button is pressed.

MEMORY CHANNEL 2

After programming this button is memory channel 2. See M.LOAD \ M.SAVE control for programming instructions.

(19)MODE

Each time the button is pressed the operating mode is changed. The operating mode is indicated on the liquid crystal display: AM, FM, USB, or LSB.

TONE LOW

To activate the tone low feature, press the FUNC button, and then press the T. Low button to turn on the receive audio tone control. LOW will appear on the LCD when the low tone is activated. This feature will roll-off high frequency noise (i.e. "white" noise). Under many operating conditions this will improve the clarity and understanding of received signals.

MEMORY CHANNEL 5

After programming this button is memory channel 5. See M.LOAD \ M.SAVE control for programming instructions.

(20) DIMMER

Press the DIM, or dimmer control to decrease the amount of back-lighting on the front panel and LCD screen.

(21) MEMORY SAVE

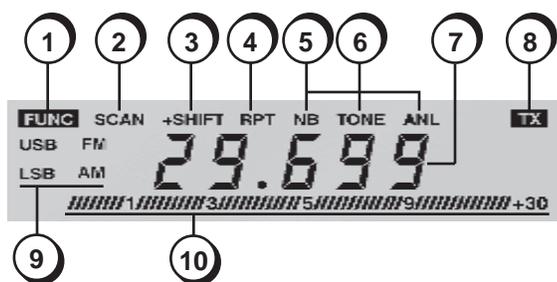
To save in memory a specific frequency and operating mode, select the desired mode and rotate the FREQUENCY control to the desired frequency. Press the FUNC button, and then press the M.SAVE button. S will appear on the LCD next to the frequency. While S is displayed, immediately press any of the memory channel buttons (1 - 5). The mode and frequency is now saved into memory. If the S indicator disappears before you press the memory channel button, the information will not be saved and the process must be repeated.

MEMORY LOAD

To load, or recall, any of the saved memory channels press the M.LOAD button. L will appear on the LCD for several seconds. While the letter is displayed press the desired memory channel button (1 - 5). The programmed mode and frequency will be displayed.

(22) LIQUID CRYSTAL DISPLAY

The LCD screen is the status display for the majority of the transceiver's functions.



(1) FUNCTION

Indicates the function button has been activated and that the function dependent controls may be accessed.

(2) SCAN

Indicates that the transceiver is in scan mode.

(3) +SHIFT \ -SHIFT

Indicates that the split or offset frequency function is activated.

(4) RPT

Indicates that the repeater access tone burst function is active.

(5) NB and ANL

Indicates that both the noise blanker and the automatic noise limiter are active.

(6) TONE

Indicates that the receive audio tone low feature is active.

(7) 5 DIGIT FREQUENCY DISPLAY

Indicates transmit and receive operating frequencies.

(8) TX

Indicates that the transmitter is on.

(9) USB \ LSB \ FM \ AM

Indicates the selected operating mode.

(10) PEAK READING RF POWER METER

Indicates relative peak RF output power.

(23) PUSH-TO-TALK (PTT) CONTROL

Activates the transmitter and/or receiver. Push and hold the PTT control to transmit. Release the PTT control to receive.

(24) UP and DOWN FREQUENCY CONTROLS

Allows remote control of frequency control. Press the up arrow to increase in frequency and press the down arrow to decrease in frequency.

(25) MICROPHONE INPUT JACK (not shown)

6-pin, lock ring type, microphone connector located on side chassis of transceiver. Mic wiring is as follows:

Pin 1 : Microphone Audio

Pin 2 : Receive

Pin 3 : Transmit

Pin 4 : Down (Up w/ 22K Ohm Resistor)

Pin 5 : Ground

Pin 6 : +13.8 VDC

(26) EXTERNAL SPEAKER JACK (not shown)

External speaker jack, marked EXP SP, is located on the rear panel of transceiver. For use with 8 ohm external speaker.

(27) PA HORN JACK (not shown)

Located on the rear panel. For inserting a PA speaker or horn.

OTHER FEATURES

PROGRAMMING TONE

This tone sounds each time the CPU is being programmed. It is helpful, in the beginning so you can be sure the command has been entered. You may eliminate the tone by simply pressing the PTT switch while turning on the ON/OFF POWER switch.

SPECIFICATIONS

TRANSMITTER

Frequency Range:

28.000 - 29.699 MHz

Tuning Steps:

1 kHz, 10 kHz, 100 kHz

Emission Types:

LSB, USB (J3E), AM (A3E), FM (F3E)

Carrier Suppression:

Better than 40 dB below peak output

Unwanted Sideband Suppression:

Better than 50 dB below peak output (1 kHz tone)

Spurious Radiation:

Better than 50 dB below peak output

Frequency Accuracy:

Better than +10 ppm from 0 - 40°C after
15 minute warm up

Modulation Type:

J3E: Balanced Modulator
A3E: Voltage Modulator
F3E: Frequency Modulator

Maximum FM Deviation:

+/-2 kHz

Output Impedance:

50 ohms (nominal), unbalanced

Microphone Impedance:

Dynamic, 600 ohms

Power Consumption:

6 amps maximum

Power Output:

FM: 30 Watts (Max.)
AM: 8 Watts Average (Max.)
30 Watts Peak (Max.)
SSB: 30 Watts Peak (Max.)

RECEIVER

Frequency Range:

28.000 - 29.699 MHz

Circuit Type:

Superheterodyne, Dual Conversion

Clarifier Range:

+/-1.0 kHz

Sensitivity:

SSB and AM 0.25uV
(SSB and AM figures measured for 10 dB S+N/N)
FM better than 0.3uV for 12 dB SINAD
Minimum discernable signal -135 dBm

Intermediate Frequencies:

1st IF: 10.695 MHz
2nd IF: 455 kHz
SSB IF: 10.695 MHz

Image Rejection:

Better than 70 dB

IF Rejection:

Better than 80 dB for all frequencies

Selectivity:

	-6 dB	-60 dB
SSB:	4.2 kHz	8.5 kHz
AM, FM:	6.0 kHz	18 kHz

Noise Blanker:

All mode, seven stage high gain type

Dynamic Range:

Better than 100 dB

Audio Output Power:

2 watts minimum (into 8 ohms, with less than 7%
THD)

Audio Output Impedance:

8 - 16 ohms

Power Consumption:

500 milliamps

Dimensions:

7.75(L) x 10.75(W) x 2.5(H) Inches

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