

Alfa Radio Ltd.

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Alfa /HR Rotator Kit



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<http://www.alfaradio.ca>

This manual is for use with units sold by Alfa Radio Ltd. of Edmonton, Alberta, Canada, on or after July 12, 2023. Units sold by others may have different firmware and may operate using different voltages.

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1 Introduction

The Alfa Radio /HR rotator Kit is a conversion kit for any standard Alfa Radio Rotator to improve the resolution from 1.0 or 0.5 Degrees (depending upon the rotator) to 0.2 Degrees. The kit consists of two interconnection boxes and two Hall Effect sensors and associated parts.

2 Specifications

See Specification sheet in appropriate Alfa Radio Rotator Manual

All specifications except "Resolution" are the same.



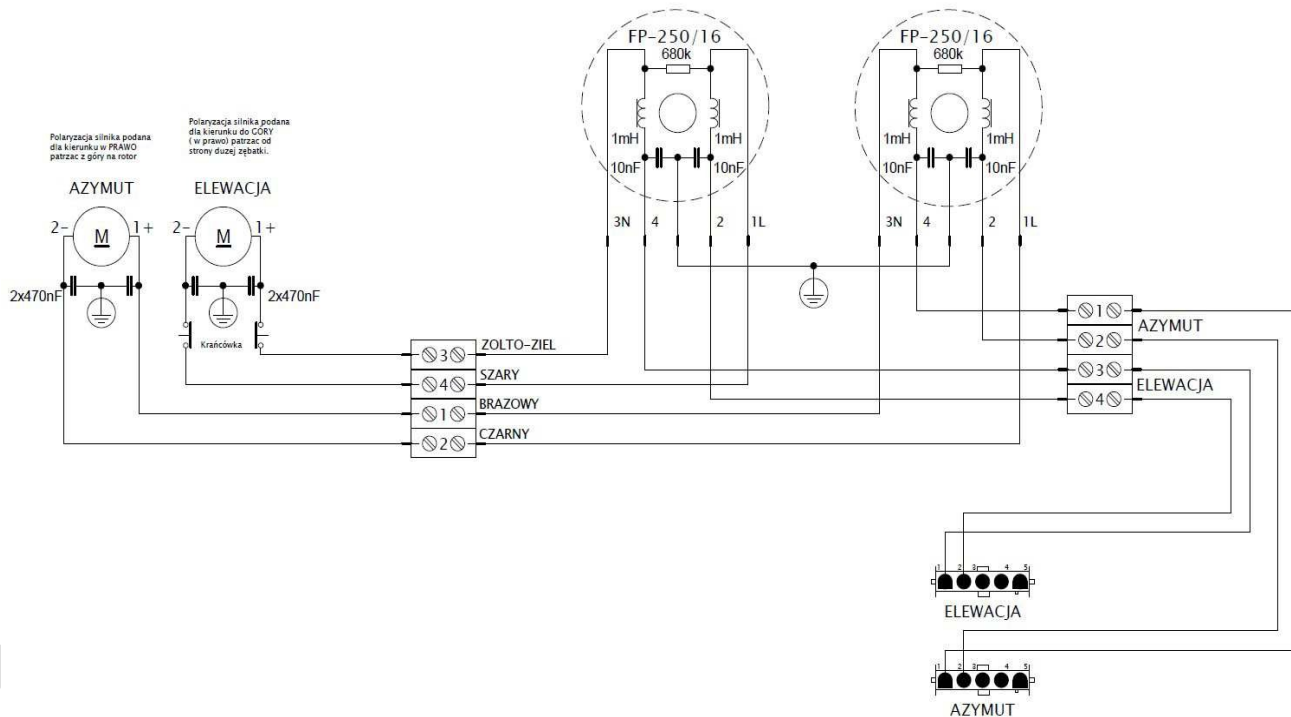
3 INSTALLATION Alfa /HR Rotator

3.1 Wiring

To connect the MD-01/02 controller to an Alfa /HR rotator, two cables are required. The first cable is used to supply power to the two DC motors. A 4-wire cable is required, with two wires for each motor. The gauge of the wire depends on the distance between the MD-01 and the rotator.

Length	Gauge
10 m (32')	#18 (1.19 mm)
30 m (100')	#16 (1.42 mm)
60 m (200')	#14 (1.75 mm)

The following diagram shows the Motor wiring.



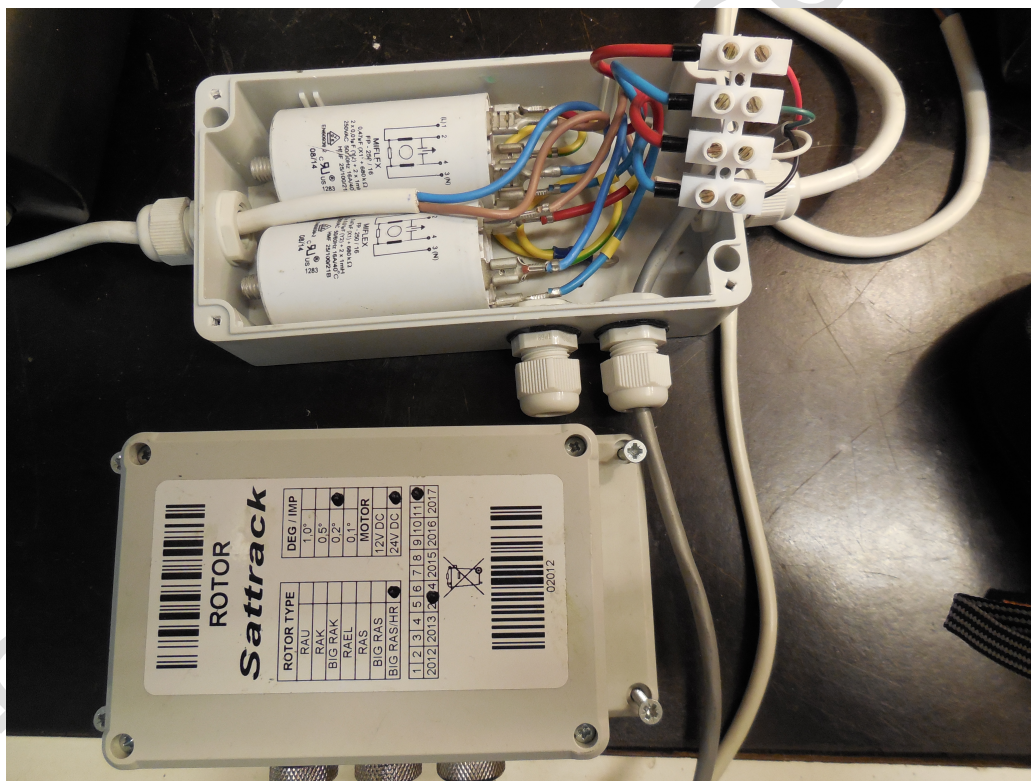
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On the controllers, the AZ and EL outputs, pins 1 and 2 are always used to power the motors. Remember to verify the correct polarity of the motor power supply. The pins in the rotor connection box for AZ are numbered 1 and 2, and for the EL pin in the rotor they are numbered 3 and 4.

This picture shows the connections for the motor cable. The terminal strip shown on the right is the one for the cable going to the controller. The terminal strip orientation is the same as in the schematic on the previous page.



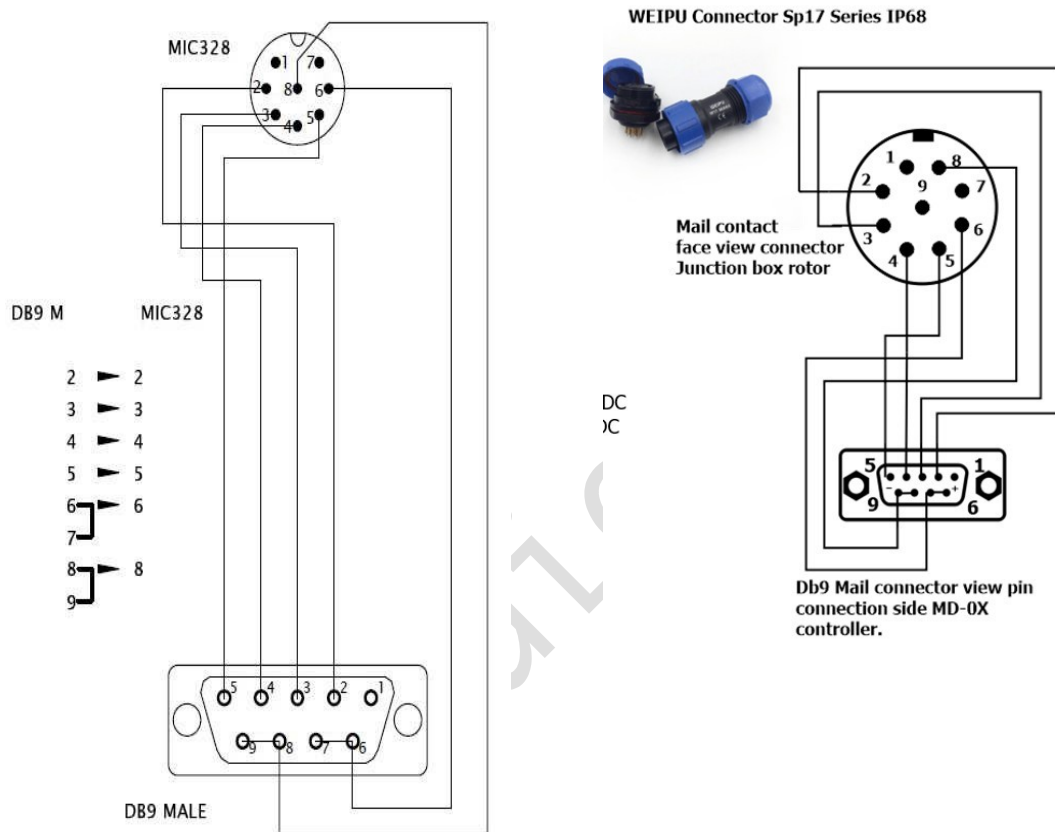
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The second cable provides power to and returns signals from the Hall Effect sensors in the Rotator to the MD-01/02 controller. For short distances, the wire can be #22 gauge wire. For distances in excess of 50 Meters (165ft.), this gauge should be increased. The following diagram shows the cable wiring

Connection diagram (left MIC328, right WEIPU Sp17):



Good shielding and its effective grounding is necessary to protect the rotor and controller from the influence of electromagnetic radiation of the transmitting antennas, otherwise the controller can count false pulses generated by a RF field inducing voltage in the connection cable. Errors in making these cables can result in permanent damage to the Hall Effect sensors on the /HR series Rotator.

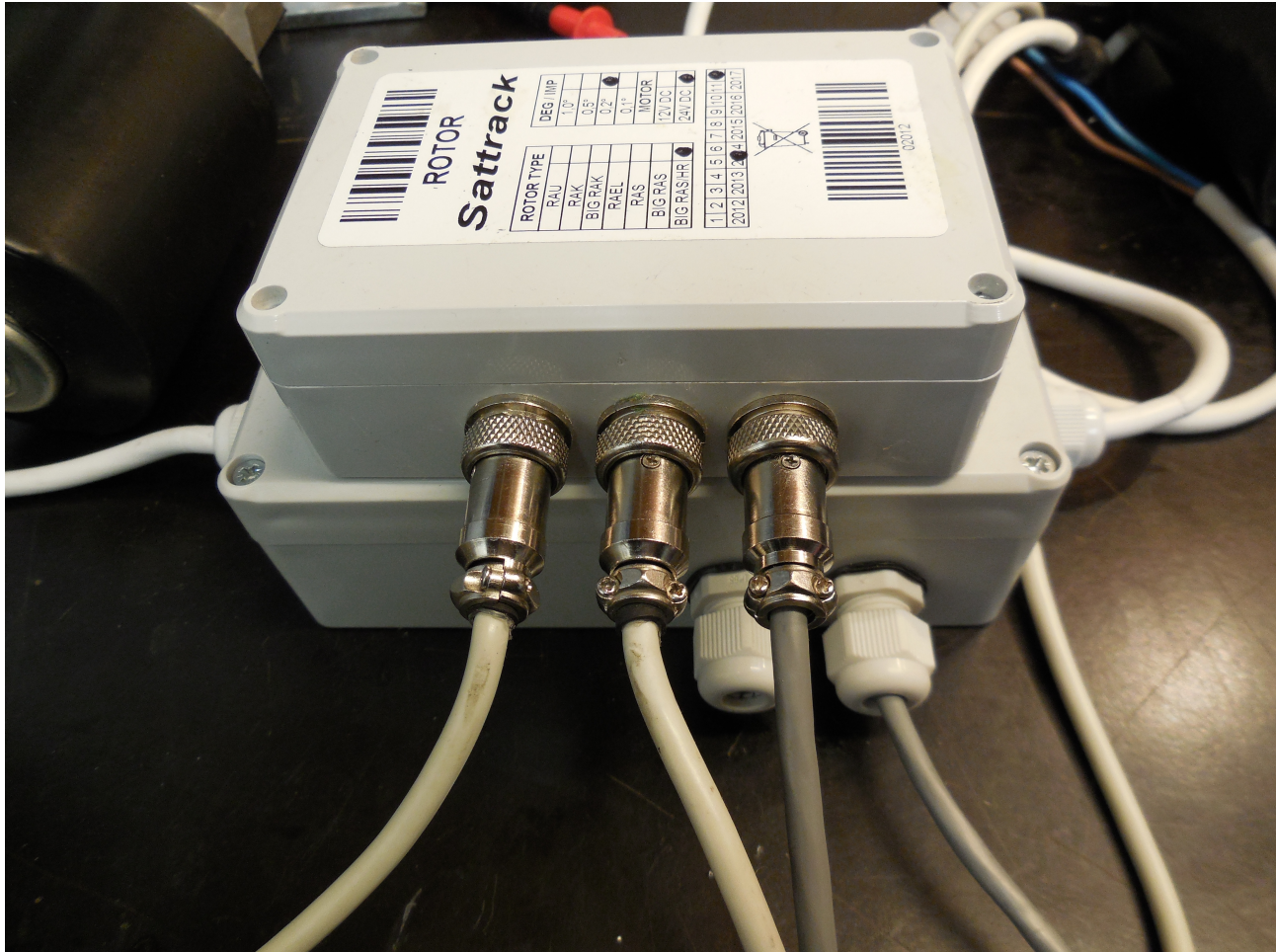
Note: For the RAK/HR and BIG-RAK/HR rotators, only two wires are required for the Motor and 4 wires are required for the sensor.

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This picture shows the connection for the sensor cables. The cable to the MD-01.02 controller is on the right.



When installing any rotator, care must be taken to ensure that the antenna and rotator cables are installed, so that it is not damaged while the antenna is rotated through it's normal azimuth operating angular travel. When installing an Alfa Rotator, that normal azimuth operating angular travel can be up to 720 degrees.

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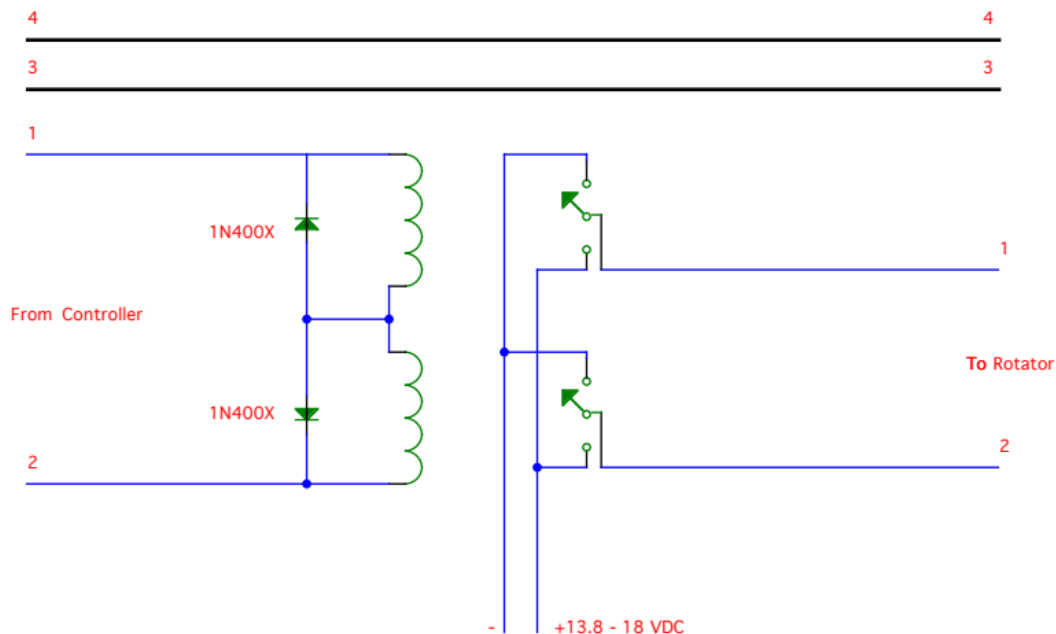
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3.2 Using the Alfa Rotator on long cable runs

Since the motor uses relatively low DC voltage, a combination of long cable runs and/or thinner than required cable may reduce the voltage at the motor to an unacceptably low value. It may turn in warm weather or light winds, but the power will not be available to rotate under severe conditions.

While it is easy to recommend installing heavier cable, this may be costly, impractical or both. Don Moman VE6JY, at his contest station, northeast of Edmonton, has a tower that is just over 1700 feet (500 meters) away from the shack. At this distance, the only cost effective alternative was to run 22 gauge underground telephone cable and use relays to switch power from a power supply at the base of the tower. The power supply needs to have enough voltage to supply 13.8 to 18 volts at the motor at 3 to 8 amps. Don uses a battery that is charged by the remaining unused conductors in the telephone cable.



Relays chosen should be suitable for the proper coil voltage, as well as appropriate current carrying capacity of the contacts. A relay capable of 5 to 10 amps DC is adequate. The diodes are general-purpose 1 amp style such as the 1N400X series.

This information is presented as a guide to help the user realize a solution to the long cable run situation.

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3.3 Rotator Mounting Bolts

All mounting bolts on the *Alfaspid Rotators* are Metric.

Rotator	Bolt Size	Thread Pitch	Length	Wrench or Socket
RAK/HR – RAS/HR	M10	1.5	25mm	17mm
BIG-RAK/HR or BIG-RAS/HR	M10 M12	1.5 1.75	25mm 25mm	17mm 19mm

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4 Rotator Testing:

It is highly recommended that the rotator controller and rotator be setup on the bench before installing on a tower. This will rule out any damage that may have been caused in transit, and will give the operator a chance to become familiar with the equipment.

Once setup, check the Azimuth:

Pressing should make the rotator move clockwise.

Pressing should make the rotator move counter-clockwise.

If rotation is reversed, switch lines 1 and 2 on the back of the controller.
Impulse sense lines (3 & 4) have no polarity concerns.

If the rotator under test is a RAS, check out the Elevation:

Pressing should make the rotator move up.

Pressing should make the rotator move down.

If rotation is reversed, switch lines 1 and 2 on the back of the controller.
Impulse sense lines (3 & 4) have no polarity concerns.

Part of the overload protection circuitry involves cutting power to the motor, if the controller does not receive a sense indication. If the motor turns for a few seconds and then stops, the motor has either stalled or there is a problem in the impulse sense wiring.

Azimuth

In order to set the limits for both the Azimuth and the Elevation sections of the rotator (on RAS rotators), always begin by setting up the azimuth section. Point the rotator to 0 degrees or true north. Now reset the controller as outlined in Section 4.0.2 of the MD-01-02 Manual.

The AlfaSpid rotator is now set at the counter-clockwise end of its normal rotation range. Normal rotation range is in a clockwise direction for 360 degrees.

From the reset position, you can rotate counter-clockwise an additional 180 degrees in over-travel, as well 360 degrees clockwise, plus an additional 180 degrees into clockwise over-travel.

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Elevation

The elevation motor has mechanical stops installed as well as the soft stops in the controller and must be set to zero. To do this, the controller and rotator must be positioned to zero degrees, both electronically and mechanically. Using the **[Down]** button (or the mouse) move the rotator to the full travel, which should be about -15.0. If the rotator stops and the display is not -15.0 then the mechanical stop in the rotator has been activated. If the display on the controller reads -15.0 (or its lowest value), reset the elevation indicator as described in section 4.0.2. Again, using the **[Down]** button (or the mouse), move the rotator to the full travel, which should be about -15.0; repeat this until there is no more travel.

Press the display **[Up]** until the 10.0 degree mark is met. Do a reset. Test for a full 180 degrees of travel. If the travel is 180 degrees or more, then setup is correct. If it does not, then repeat the process until it does. See section 4.0.2 of the MD-01-02 Manual for minor adjustments.

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5 Rotator Troubleshooting

Before contacting Alfa Radio Ltd. please make the following tests:

NOTE: ON THE ELEVATION ROTATOR THERE ARE MECHANICAL SWITCHES WHICH OPEN THE POWER WHEN THE END LIMIT IS REACHED. A DIODE IS PLACED IN SERIES WITH THE MOTOR. TO TEST FOR THIS, REVERSE THE POWER TO THE MOTOR.

The following are some trouble shooting tips, if for some reason your Alfa will not operate correctly.

It is important to confirm correct operation before installing the rotator on the tower. This will rule out any damage that may have been caused by the shipping company.

Check the Limits - PH and PL settings and rule out overlap.

Simple resistance tests can reveal incorrect or shorted wiring.

Pins 1 and 2 are the motor winding and will have a low resistance. Typically 2-3 ohms.

All lines should have **no** conductivity to ground.

**** Be careful not to overwind the coax with the next test, as there will be no protection from over turning.**

Find a small 12 volts supply which will deliver 3 to 4 amps. (A small 12 Volt battery will work just fine)

To confirm that the motor runs, you may connect 12 volts D.C. to the lines that go to the motor, pins 1 and 2. It should turn. Reversing the 12 Volts D.C. should cause the motor to turn in the reverse direction.

NOTE: ON THE ELEVATION ROTATOR, THERE ARE MECHANICAL SWITCHES WHICH REMOVE THE POWER TO THE MOTOR WHEN THE END LIMIT IS REACHED. A DIODE

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IS PLACED IN SERIES WITH THE MOTOR. TO TEST FOR THIS, REVERSE THE POWER TO THE MOTOR. THE UNIT SHOULD TURN.

Pin on Rotator not controller	Typical Reading	Your reading	
Pins 1 to 2	About 2 to 4 Ohms	-----	Depends on the length of wire to rotator
Pin 1 to Ground	Open	-----	
Pin 2 to Ground	Open	-----	
Voltage on controller		-----	
Pins 1 to 2	About 12 volts running		Depends on the supply voltage (14 volt applied)

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12 MONTH LIMITED WARRANTY

Alfa Rotators and controllers

Alfa Radio Ltd. warrants to original purchaser of the product, that the product will be free from defects in material and workmanship for the following periods after such date of purchase: Material - 12 months Workmanship - 12 months.

Alfa Radio Ltd. will, at its discretion, repair or replace free of charge such defective products subject to the following conditions:

1. Delivery of the product **prepaid** to **Alfa Radio Ltd.** or its authorized dealer.
2. Determination by **Alfa Radio Ltd.** that a defect exists and is covered by the limited warranty.
3. Defects due to alteration, repair by an unauthorized person, misuse, accidental damage, lightning strikes, use of the equipment for purposes other than those for which it was designed, and the like, are NOT COVERED by this limited warranty. Repairs in these cases will be subject to normal service charges.
4. Damage to an Alfa rotator or controller caused by using said rotator or controller with a rotator or controller manufactured by any other manufacturer will NOT BE COVERED by this limited warranty.
5. Repairs and replacement parts are covered under this limited warranty only for the remaining term of the original limited warranty.
6. Under no circumstances is **Alfa Radio Ltd.** liable for consequential damages to person(s) or property by the use of this product.
7. **Alfa Radio Ltd.** reserves the right to make changes or improvements in design or manufacture without incurring any obligations to install such changes in any of the products previously manufactured.
8. All claims of defect or shortage should be sent prepaid to:

Alfa Radio Ltd.

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and must be accompanied by a letter describing the problem in detail along with a copy of your proof-of-purchase.

Contact **Alfa Radio Ltd.** before sending.