

Instant Green

User Manual

IGR - Instant Green Remote

IGB - Instant Green Base

IGT - Instant Green Tester

PASE

FORTEL

1. Instructions to the User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

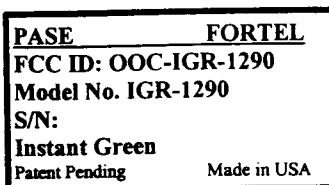
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC ID Label:



7. Limited Warranty

Pase (Manufacturer) warrants each Instant Green unit (Product) purchased by a person or entity (Buyer) in the United States against defects in materials and workmanship for a period of one (1) year from date of original purchase of the Product by Buyer

This warranty does not apply if the damage was caused by accident, abuse, misuse or misapplication of the Product or by service or alteration of the Product by anyone (including but not limited to the Buyer) other than the Manufacturer; if the Product has been modified, serviced or altered by anyone without written permission of Manufacturer; or if Buyer cannot provide proof of original purchase.

Manufacturer's liability is limited (at Manufacturer's sole discretion) to (1) repair of the Product or (2) replacement of the Product, provided, however, that for any such repair or replacement the Buyer must first contact Fortel (Distributor) for a return material authorization number (RMA). The Product must be returned to the Distributor during the warranty period, properly packaged, with shipping and insurance charges prepaid, with it's RMA, acceptable documentation of purchase, and a complete description of the defect.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, AND MANUFACTURER MAKES NO OTHER WARRANTIES OR REPRESENTATIONS, EXPRESSED OR IMPLIED, AND WITHOUT LIMITING THE FOREGOING, MANUFACTURER SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No distributor, agent or employee (or any other person or entity) is authorized to make any modification, extension or addition to this warranty.

MANUFACTURER SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION LOSS OF PROFIT, PROMOTIONAL OR MANUFACTURING EXPENSES, OVERHEAD, BUSINESS INTERRUPTION OR LOSS OF GOODWILL, RESULTING FROM ANY BREACH OF WARRANTY OR UNDER ANY OTHER LEGAL THEORY.

Some states do not allow the exclusion or limitation of warranties. Some of these limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

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Channel Selection

S1-1	S1-2	S1-3	Channel	Frequency
0	0	0	0	903.37mhz
0	0	1	1	906.37mhz
0	1	0	2	907.87mhz
0	1	1	3	909.37mhz
1	0	0	4	912.37mhz
1	0	1	5	915.37mhz
1	1	0	6	919.87mhz
1	1	1	7	921.37mhz

IGB Offset Selection

S2-1	S2-2	S2-3	S2-4	S2-5	S2-6	S2-7	S2-8	Degrees
+/-	N/U	32°	16°	8°	4°	2°	1°	
0	-	0	0	0	0	0	0	0°
0	-	0	0	0	0	0	1	+1°
1	-	0	0	0	0	0	1	-1°
0	-	0	0	0	0	1	0	+2°
1	-	0	0	0	0	1	0	-2°
0	-	0	0	0	0	1	1	+3°
1	-	0	0	0	0	1	1	-3°
0	-	0	0	0	1	0	0	+4°
1	-	0	0	0	1	0	0	-4°
0	-	0	0	0	1	0	1	+5°
1	-	0	0	0	1	0	1	-5°
0	-	0	0	0	1	1	0	+6°
1	-	0	0	0	1	1	0	-6°
0	-	0	0	0	1	1	1	+7°
1	-	0	0	0	1	1	1	-7°
0	-	0	0	1	0	0	0	+8°
1	-	0	0	1	0	0	0	-8°
0	-	0	0	1	0	0	1	+9°
1	-	0	0	1	0	0	1	-9°
0	-	0	0	1	0	1	0	+10°
1	-	0	0	1	0	1	0	-10°
0	-	0	0	1	0	1	1	+11°
1	-	0	0	1	0	1	1	-11°

The above shown as example, extend as necessary

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2. Product Overview.

This system is designed for preempting the signal lights of an intersection. The magnetic heading of an emergency or other vehicle is measured using an Instant Green Remote unit (IGR) calibrated to account for the magnetic interference of the vehicle. The magnetic heading is transmitted to an Instant Green Base unit (IGB) installed at the intersection. Upon receiving a verified magnetic heading from an IGR, the IGB unit preempts the normal operation of the signal lights to present a green light or other preferred display to the vehicle. The vehicle's IGR has a transmitter operating at a high frequency, which limits the range of the transmission. Thus, only the intersection to be preempted receives the transmission from the IGR unit. An Instant Green Tester (IGT) is also available to evaluate the function of the IGR unit without interfering with the normal operation of the traffic signal. The location, type and direction of vehicles can be tracked even if the signal lights are not preempted.

A typical system might consist of:
 1 base unit (IGB), if only one intersection is to be controlled.
 At least 1 remote unit (IGR), if there is only 1 emergency vehicle to be equipped.
 1 test unit (IGT), to aid in installation.

3. Functional Description

Instant Green Remote - IGR

Continuous operation is initiated by pushing the "ON" button. After 5 minutes the unit will return to standby mode.

Note: Holding the "ON" button for 2 seconds will also return the unit to the standby mode.

When the operator pushes the "On" button it initiates the micro controller and starts the following sequence of events. First the magnetic field is measured, corrected by the calibration numbers, and converted to a magnetic heading. Then the transmitter is powered up and the data is transmitted. The whole process is repeated until the preset time expires and shuts the micro controller off. Each cycle takes on the order of 200 ms to 250 ms, so 4 to 5 transmissions per second take place.

Instant Green Base - IGB

When the base unit receives the data stream from the IGR unit it checks the data received for message length and checksum, before proceeding to evaluate the data. The heading is corrected by a correction factor based on the physical configuration of the intersection, i.e. the deviation from north/south orientation. Then the heading is split into quadrants, e.g. 315 degrees to 45 degrees representing north or prl, etc. Also the high priority bit is decoded and the outputs modified to use standard encoding (solid output for high priority and flashing output for low priority). If the controller is not equipped to interpret the flashing output a separate receiver and transmission channel can be used. The outputs are fully isolated via opto isolators. Two extra outputs are provided to aid in classification or grouping of functions. A disable and test switch is provided for each channel. Also a power LED, receive LED, and one LED per channel help in the operation of the receiver.

Instant Green Tester - IGT

The tester is very similar in operation to the IGB unit, but is a self contained unit similar to the remote unit. The outputs have been omitted and there are only LEDs for the four main outputs labeled "N", "E", "S", and "W". The tester allows evaluating the installed IGR unit without interrupting the normal operation of an intersection.

4. Installation

The IGB unit (receiver) is normally installed in the traffic signal controller cabinet. It is designed to plug into a standard detector rack slot. If a standard rack is not available one can easily be added. The outputs of the IGB unit are connected to the appropriate controller inputs to affect the desired operation upon reception of a preempt signal.

The IGR unit (transmitter) is normally installed in the emergency vehicle (fire truck, rescue vehicle, ambulance, police car, etc.). The installation requires a clear view through the windshield to maximize transmission of the radio frequency signal. Level installation is necessary due to the level sensitive characteristic of the electronic compass. To aid level installation the remote unit has 2 liquid level tubes. A universal mounting bracket allows adjusting the unit level and in line with the direction of travel. When looking in the direction of travel the unit should be oriented with the antenna on the left and the indicators and switches on the right. The unit is powered by the vehicle's DC power via a cigarette lighter or auxiliary plug. To cancel the magnetic distortion created by the metal parts of the vehicle a calibration procedure is performed. Testing with the help of the IGT unit will verify operation and conclude the installation.

5. Calibration

Calibration allows the compass in the IGR unit to separate the earth's magnetic field from local magnetic fields, thereby providing accurate heading information. The calibration procedure allows compensation for "hard" iron magnetic fields. It is recommended to install the unit away from magnetic materials, this will enhance accuracy. The unit must be calibrated when:

- ◆ It is installed for the first time.
- ◆ It is moved from the original installation (even by a small amount).
- ◆ Other electrical or magnetic equipment is installed or moved in the vicinity.

Select an open, level area, like a large parking lot, with as little magnetic interference in the area as possible. No bridges, large concrete reinforced structures, etc. Turn the unit on by pushing the red button. Observe that the unit is transmitting and the green light is blinking. Push the recessed "Data" button with a pen or other small pointed object. Observe that the red indicator is blinking. Now drive the vehicle two (2) full turns (720°) at a very slow speed. During this time the unit will be sampling the heading at a rate of about 4 to 5 samples per second and you want to get at least one sample for every degree. A two minute duration is recommended. Now push the "Data" button again and Calibration is complete. Use an Instant Green Tester (IGT) to verify proper operation.

6. Technical Data

Communication Protocol: Asynchronous Serial 2400,N,8,1.

Power for the Remote unit is normally supplied via the cigarette or aux. jack of the vehicle.

The maximum IGR and IGT input voltage is 16V.

The maximum IGB input voltage is 28V.