

# Emergency Traffic Systems, Inc.

## TRANSMITTER MODEL TR1

### Installation and Operation Instructions

*NOTICE: This device is intended to be installed by qualified installers and operated by emergency personnel exclusively for emergency or test situations. Always complete the installation—including antenna connection—before powering-up the transmitter system. There are no user-serviceable parts inside—please return to the manufacturer for service.*

The TR1 transmitter system is installed in emergency vehicles and is intended for operation in-conjunction-with fixed ETS Priority 1 Phase Selector receivers. For reference purposes a picture of the transmitter TR-1 and Control Head User Interface Display is shown below:



Figure 1 - Control Head-Display



Figure 2 - Transmitter

### TR1 Transmitter Installation

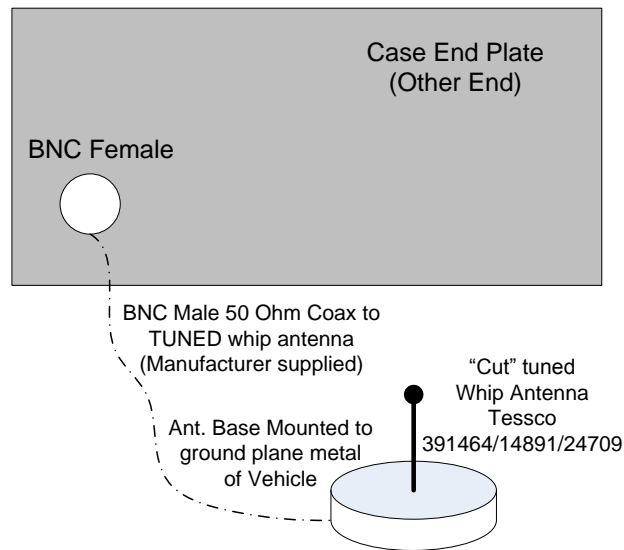
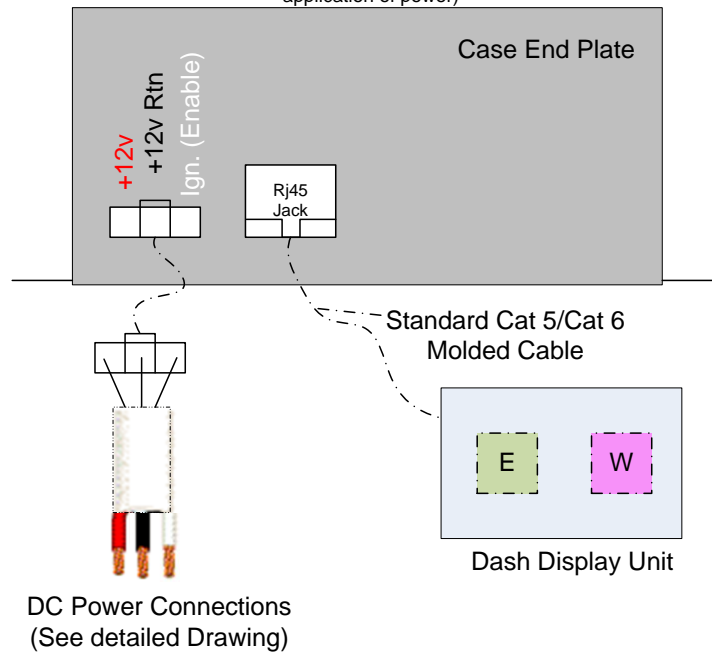
The TR-1 transmitter system is comprised of a User interface display control head (figure 1), the TR-1 TRANSMITTER (figure 2) and a vehicle-mount whip ANTENNA, a standard CAT 5/6 male-to-male cable, and a POWER CONNECTION pigtail.

Start installation with the DC POWER CONNECTOR disconnected from the TRANSMITTER. The last step after connection of all other pieces will be to re-connect the power connector.

(To insure no transmission prior to antenna connection)

### Overview—Transmitter Connections

(Note: Insure Transmitter has antenna connected before application of power)



Install the Control Head at a convenient visible location for the occupants of the emergency vehicle. Nearly any reasonable length of Cat 5 or Cat 6 cable can be used to connect the DISPLAY UNIT to the TRANSMITTER. Our recommendation is to either use the cable provided or use the various pre-molded cables available from multiple sources.

Mount the TRANSMITTER case using the 4 mounting holes. As discussed below, there is no need to remove the paint from the case surrounding the mounting holes as the ground return for the unit is provided over the black wire and not the case. Do not mount the TRANSMITTER enclosure on or adjacent to a source of high heat. Connect the Cat 5/6 cable from the display unit to the transmitter.

Fasten the Whip antenna to a location with a good metal vehicle ground plane. Route the RG-58 coax line and securely fasten the BNC connector to the TRANSMITTER.

The TRANSMITTER power connection is a 3 pin connector with 2 pins for DC power, +12.6vdc (red +), 12.6 vdc RETURN (black -) and a 3<sup>rd</sup> pin that functions as an IGNITION/ENABLE purpose (white wire). The power connector has a convenient 3 wire pigtail—Red, Black and White—corresponding to these signals. The RED and BLACK wires should be routed respectively to vehicle +12.6v battery and a good ground of the vehicle. As the device consumes less than 1 amp in operation, nearly any vehicle terminal-block connection can be used. This device has an internal automatically resettable “fuse” in the form of a PTC device (commonly referred to as “hiccup” protection), however if you desire, an external 1 amp slow-blow in-line fuse can be added.

*NOTE: The case of the TRANSMITTER is indeed connected to the BLACK (return) wire internally in the transmitter. However do NOT rely upon this connection and thus neglect to connect the black wire return to a good source of vehicle ground. Always insure the black-wire connection a low-resistance path to a common return point on the vehicle.*

The IGNITION/ENABLE (white) wire will DISABLE the unit UNLESS it is connected to a source of DC voltage around 9.5vdc or higher. When disabled, note that the transmitter is in a very low current-consumption state—with NO display indication. The internal circuitry associated with this wire is about 100K ohms to ground, so it is a high impedance input that will not draw excessive current from a driving source. Thus it is compatible with “open collector”, relay or switch contact closures. Typical examples include:

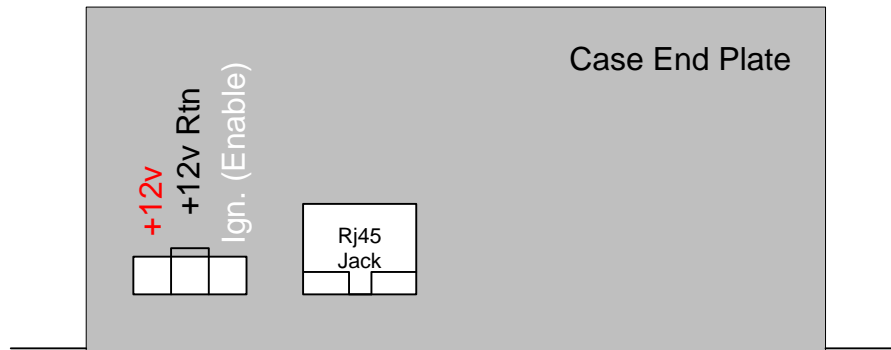
- White Wire Connected to Vehicle “Ignition”: Unit is on only when Ignition Circuitry is On; disabled otherwise.
- White Wire connected to Red Wire: Unit always on.
- White wire disconnected or connected to black wire: Transmitter disabled. (Mentioned just to show logic)
- White Wire connected to a contact closure to +12vdc (relay or switch): Unit on when contact is closed, disabled otherwise.
- Between Red and White wire a 1/4w, 1K resistor. Contact closure to ground on white wire: Unit is on with no contact closure, and disabled with contact closure.
- Same resistor as above, white wire to collector of “Open Collector Output”, Black wire as common: When collector is on, transmitter is disabled.

Suggested usage for the white wire:

- Ignition Kill
- Seat Occupancy Switch
- With a motion detector

The last step is to plug-in the DC power connector to the TRANSMITTER.

### *Transmitter DC Power Connections*



Mating Connector=Molex 39-01-4031  
plus Q=3 pins, 39-00-0038  
(View back of connector, tab up)

Wire= 18awg (3 conductor)  
Belden 6301UE877500

RED=+12v (under 750ma max\*\*)  
Black=+12v return (\*tied to case internally)  
White=Ignition/Enable

Ignition/Enable Wire: Useful for a seat-presence or motion-detect "kill switch". Connecting this wire to >9vdc enables unit, (<9vdc or ground/return disables unit) resistance=100Kohms. In normal operation (no "kill-switch" feature) tie the white ignition/enable wire to +12v red)

**\*Note: Do not rely-upon case ground to supply +12v return (negative) to the transmitter. Always wire the connector black +12v return (negative) to a good return ground for the vehicle.**

\*\*Transmitter + Display, current dependent on display graphics/activity

## **OPERATION**

When correctly wired to 12 VDC power to the unit and that the white-wire is connected to >12vdc, the complete unit will be on (including display illuminated), awaiting a command from the user. A simple generic description of operation will be given.

*Note: Different Graphical User Interfaces (GUI) can be “loaded” on the display dependent on requirements of the customer. These merely are “GUI button preferences” and do not change the fundamental functioning of the transmitter. Please refer to specific operation instructions from the government authorities for which this product is installed for details specific to its application.*

Fundamentally, pressing an ON button on the display (for example East/West or North/South) will cause that specific tone channel to be transmitted continuously until turned-off by the user. Turning off the channel/tone, could be accomplished by depressing the same button and/or perhaps a display OFF button—dependent upon particular GUI employed. Removing +12vdc power to the unit or removing DC voltage to the white ignition/enable wire will turn off the unit and thus stop the transmission. (Upon return of DC voltage the unit will default to the OFF channel state. *Note: Always be cognizant that the transmitter will be signaling close-by traffic-lights to their pre-emption state, so either turn-off the complete unit (via white wire or DC power) or use the display to turn-off the channel/tone, when not needed.*

## **SPECIFICATIONS**

- SUPPLY VOLTAGE: Nominal 12.6VDC from a clean well regulated source [current consumption of Display unit plus Transmitter typically 650ma. Note: The transmitter plus display current consumption is dependent upon display graphics/activity. Without the Display, current consumption is typically under 500ma.
- INTERNAL CIRCUIT PROTECTION: Automatically Reset-able device—PTC 2 amp trip.
- FREQUENCY: 39.06 MHz. (Other frequencies upon request and certification)
- FREQUENCY STABILITY--- FINAL FREQUENCY AND ALL MODULATION FREQUENCIES:  $\pm 20$  ppm -30 ~ +50°C if over 2 watts;  $\pm 50$  ppm -30 ~ +50°C, 2 watts or less (per FCC)
- EMISSION: 20K0A9W
- RF OUTPUT POWER into 50 ohm load: +30dBm (+-1.5db) (1 watt) carrier plus total sideband power <0.25watts (typically <0.2watts with +30dBm carrier).

- SPURIOUS EMISSIONS: Meets FCC Part 90 requirements; but typically better than -40dBc.  
(Measured via Spectrum Analyzer with either very low RBW/VBW or employing 50 kHz RBW and 50x video averaging.

FCC ID: 2AK93TR1

TRADE NAME: ETS TR1 TRANSMITTER

MODEL NUMBER: TR-1

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference. This is a Part 90 certified transmitter and must be operated in accordance with licensed restrictions and manufacturer recommendations. No user serviceable parts inside.