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TOUGH-Link.com

Remote Intelligence Gateway
TL-3600
User Manual

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1 Introduction

The TOUGH-Link Remote Intelligence Gateway unit TL-3600 is a mobile device that resides in private, commercial or government industrial engine equipment. The TL-3600 is a single box enclosure incorporating a processor, a GPS receiver, a wireless data modem, and a vehicle-rated power supply. The TL-3600 also supports inputs and outputs to monitor and react to the equipment environment and/or operator actions.

The TL-3600 collects, stores and transmits equipment and location data over a designated wireless network including LTE and HSPA. Equipment and location data are transmitted to a customized software application that has been designed to receive, acknowledge, process, store, and respond to this data. Unit location and equipment information is sent at pre-determined intervals, on demand, or when pre-programmed equipment conditions are met. Transmission of data are sent immediately when in wireless network coverage and stored for later transmission when out of the wireless coverage area. SMS messaging can be used as an alternative or redundant communication backup.

The TL-3600 is designed to support a variety of custom applications starting with basic automatic equipment monitoring, third party security monitoring, dynamic reporting routines, and an array of exception alerts.

Typical installations include hook-up to power, ignition, and ground. TL-3600s and the corresponding wiring are almost always hidden from view and general access. Placement of the units is usually within enclosures or on top of equipment canopies.

2 Pin Diagram and Description

2.1 Pin Numbering

Fig. Connector receptacle on the TL-3600

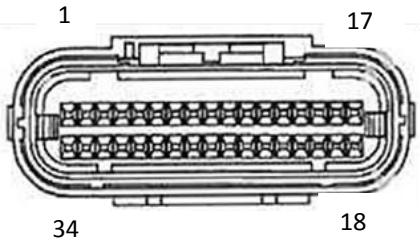
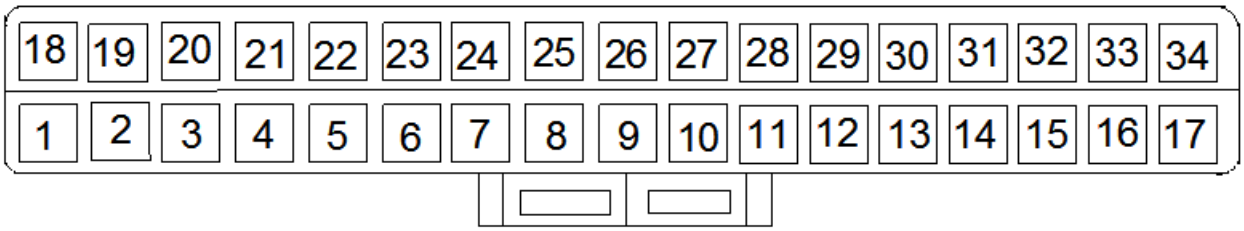


Fig. Mating Plug on the wire harness



2.1.1 Pin Description and Colors (When supplied with Harness Part Number TBD)

Pin	Signal Name	Wire Color
1	Input_0 Ignition	Red
2	AUX1 Switched 3.3V	Black
3	AUX2 Switched 3.3V	White
4	1BB	Pink
5	CAN2_L_8	Brown/ Red
6	ISO_KLINe_7	Brown/ Orange
7	CAN1_H	Black
8	AUX2_RX	Brown/ Green
9	AUX2_TX	Brown/ Blue
10	CAN2_H	Yellow/ Red
11	J1850+	Yellow/ Orange
12	SWCAN	Yellow/ Green
13	Output_0	Yellow/ Blue
14	Output_1	Blue
15	GND	Orange
16	Vin Primary	Violet
17	Vin2	Gray
18	Input_1	Green/ White
19	Input_2	Blue/ White
20	Input_3	Black/ White
21	Input_4	Green/ Black
22	ADC_1	Black
23	K/L Line_15	Orange/ Black
24	CAN1_L	Green
25	AUX1_TX	Brown

26	AUX1_RX	Yellow
27	CAN2_L_11	Blue/ Orange
28	J1850	White/ Yellow
29	KLINE_12_HDn	Red/ Green
30	J1708L	Orange/ Green
31	J1708H	Black/ Red
32	Output_2	White/ Red
33	VIN_VBUS	Orange/ Red
34	Switched_12V_OUT	Blue/ Red

2.1.2 Status of LEDs

LED	Status	Color
1	AUX	Blue
2	COM	Orange
3	GPS	Green
4	VEH	Red

2.1.2.1 COM LED- Orange Identification

Condition	LED
Modem Off	Off
COM On - Searching	Slow Blinking
Network Available, Not yet registered	Fast Blinking
Registered but no Acknowledgement From TOUGH-Link.com	Alternates from Solid to Fast blinking every 1 sec
Registered and received Acknowledgement from TOUGH-Link.com	Solid

2.1.2.2 GPS LED- Green Identification

Condition	LED
GPS Off	Off
GPS On	Slow blinking
GPS Time Sync	Fast blinking
GPS Fix	Solid

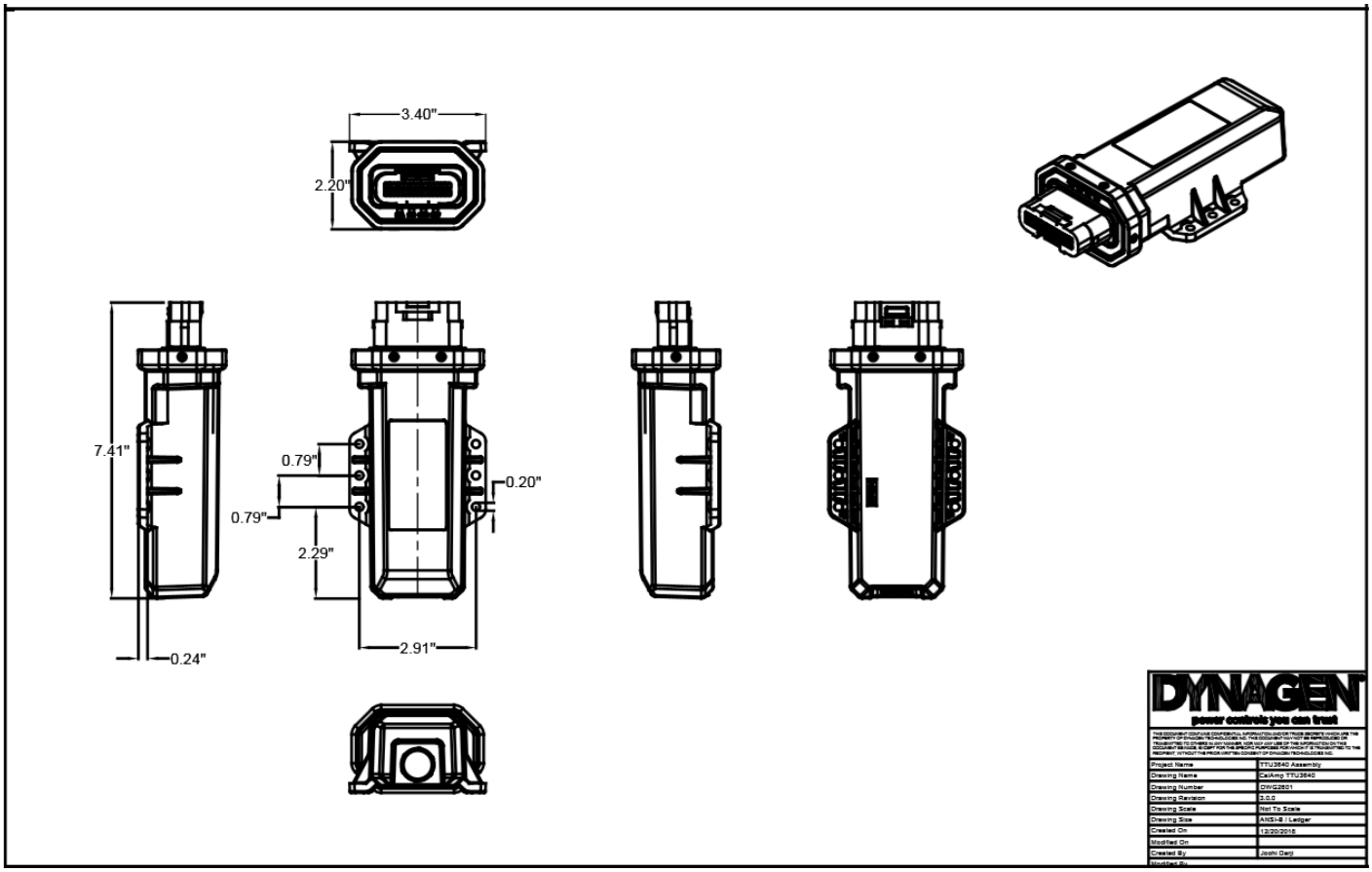
2.2 General Wiring Instructions

Following are the important wiring guidelines to be followed:

- TL-3600 contains a TVS to protect I/Os and internals from a transient on a main battery (the battery the TL-3600 is powered from). If you have I/O connected to other batteries or power supplies, those I/Os must contain their own voltage transient protection. Otherwise the I/O and/or TL-3600 can be damaged if the transient exceeds the maximum rated voltage of the I/O. A device that provides this kind of protection is known as a TVS or a varistor.

- Fusing: A fuse should be placed in line with the battery +ve wire going to the TL-3600 unit power. A 10 A fuse is suggested.

3 Installation



3.1 Preparation

TL-3600 Components needed:

- TL-3600 to be installed
- Power Harness
- 34-pin I/O connector
- Optional components:
  - Input and Output cables
  - Relays

3.2 Protection from heat

It is best not to place the TL-3600 unit in an unusually warm location such as directly near heater vents, near hot engine components or in direct sunlight.

3.3 Size and placement of TL-3600 Unit

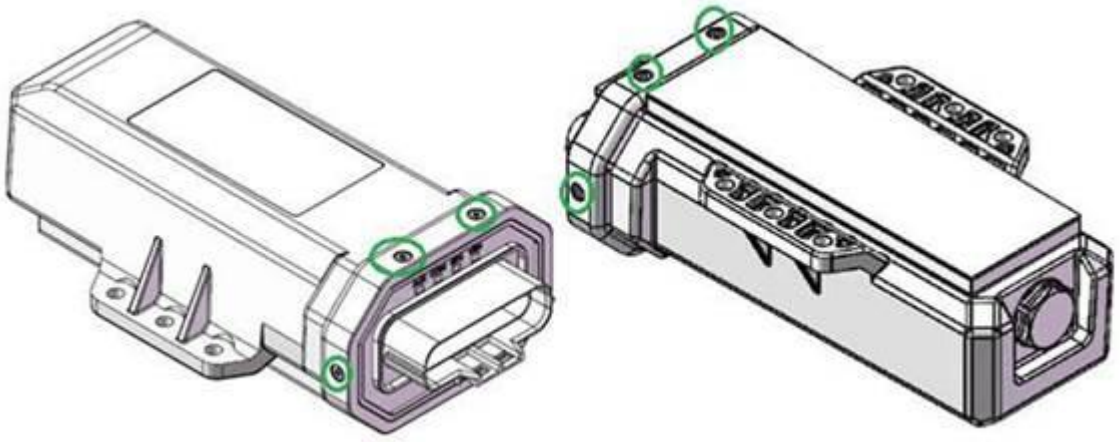
The dimensions of the TL-3600 should be taken into account, particularly when installing:

- When you intend to place the TL-3600, be sure that it will fit before drilling any holes or running cable
- Be certain that the cables running to the TL-3600 will not be bent or constricted. Damage to the cables may impede the TL-3600's performance.
- Be certain that the installation point will not violate any of the TL-3600's environmental specification (Temperature, moisture, etc…) as improper installation of the TL-3600 may void the warranty.

3.4 Replacement of SIM (Subscriber Identity Module) Card

When used in a LTE or HSPA, each TL-3600 uses a Subscriber Identity Module (SIM) card, which is already installed in TL-3600. The SIM card is attached to the main-board inside the housing of the TL unit.

At some future time, you might need or want to replace the SIM card with a different one, so try to install the TL-3600 in such a way that the cover can be removed to make the SIM card accessible.



There are 6 Torx screws that attach the cover to the case. The cover houses the connector. The whole PCB board slides out and the SIM holder is on the PCB board.
The cover can be removed without unmounting the device from the asset. It is sealed with a gasket that is reusable. Screw driver required is TORX T8.

3.5 Placement of Combination and Internal Access

When dealing with combination antennas such as the internal antennas in the TL-3600, it is more important to consider GPS performance over cellular communications performance. GPS signal strengths are much lower than those typically seen by cellular networks supported by the TL3600. In order to maximize the performance, the TL-3600 should have as a clear view of the sky as possible. When installing the GPS antenna in a system, make sure that there are as few obstructions as possible close to the TL-3600 that might block the view 360° to the horizon. As with stand-alone GPS antennas, nothing should not block the combination antenna beyond 5° above the horizon with the best location being near the center of the canopy.

Normally the TL-3600 label should be oriented with the label facing upwards toward the sky. It is not recommended to mount the TL-3600 perpendicular to the horizon but it may be acceptable depending on the unit has a good view of the sky. It is recommended to run few tests on the actual engine equipment based on the LED lights (GREEN) and see how long it takes to go SOLID in different orientations or by measuring the signal strength using the serial port on the TL-3600.

3.6 Backup Battery

The TTU-3640™ supports a Lithium-Ion 1000 mAh backup battery input to be used when primary power is lost; the supported voltage range is 9 to 16 VDC.

3.7 Warranty

12 months

4 Activation Procedure

4.1 Adding a new device to your subscription service

Electronic Serial number is in the format of
467########

1. Your TL-3600 intelligent gateway uses a cellular data connection to communicate with the TOUGH-Link.com cloud. The cellular service is activated and tested prior to shipping.

To receive a login to the TOUGH-Link.com cloud service or to add new devices to your existing account, please email support@tough-link.com or call our sales contact at 1-888-396-2436.

You will need to provide the device Electronic Serial Number (ESN) found on the top of the TL-3600 and the email address to associate with your account. Your device will then be added to your account.

For new TOUGH-Link.com accounts, users will receive login invitations at the email addresses provided. Email invitations will include instructions for your account.

2. Once your device has been added to your account, login to the cloud at https://tough-link.com to view it.