Velodyne® LiDAR

HDL-32E & VLP-16
Interface Box

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Using the HDL-32E & VLP-16 sensors with the Interface Box

Caution!

There is no internal polarity nor over voltage protection in the sensors; therefore it is imperative that the Interface Box and/or protective circuitry be incorporated into every installation.

The interface box contains circuitry to protect against:

1. Over Voltage:
   The Interface Box accepts 9-32 VDC input voltage. The over voltage protection is triggered at 34 V and blows the 3 A automotive blade fuse.
2. Reverse Voltage:
   The reverse voltage protection is triggered at 0.6 V until the 3 A fuse blows or the TVS diode burns out.

Important!

When reducing the length of the interface cable, take care to ensure the terminal block is correctly wired. Reversing the power and ground at the terminal block may result in irreparable damage to the sensors.

Avertissement!

Les capteurs n'ont pas de polarité interne ni de protection contre la surtension. Il est donc impératif que chaque installation soit munie d'un boîtier d'interface et/ou d'un circuit de protection.

Le boîtier d'interface contient une circuiterie de protection contre :

1. La surtension : Le boîtier d'interface fonctionne avec une plage de tension d'entrée de 9 à 32 V CC. La protection contre la surtension s'enclenchera à 34 V jusqu'à ce que le fusible 3 A saute.
2. Tension inverse : La protection contre la tension inverse s'enclenche à 0,6 V jusqu'à ce que le fusible 3 A saute ou jusqu'à ce que la diode du limiteur de surtension s'éteigne.

Important!

Assurez-vous que le bloc de jonction est bien raccordé lorsque vous raccourcissez le câble de l'interface. Vous pourriez causer des dommages irréparables aux capteurs si vous inversez les fils d'alimentation et de terre du bloc de jonction.

Using the HDL-32E & VLP-16 sensors in hardwired applications.

The sensors may be integrated into a custom system by removing the Interface Box and cutting the interface cable to the desired length. When integrated into a custom system, adequate circuit protection – similar to that provided by the interface box - must be included to safeguard against damaging the sensors.

Failing to provide adequate circuit protection may result in irreparable damage to the sensors.

The schematic of Velodyne's interface circuit is contained in the following pages.

Time Synchronization with an External GPS/INS System

The sensors can synchronize their data with precision, GPS-supplied time pulses. Synchronizing to the GPS pulse-per-second (PPS) signal provides users the ability to compute the exact firing time of each data point.

To utilize these features the user must configure their GPS/INS device to issue a once-per-second synchronization pulse in conjunction with a once-per-second NMEA $GPRMC sentence. No other NMEA message will be accepted by the sensors. Other NMEA sentences might be misinterpreted. The $GPRMC record may be confligured for HHMMSS, HHMMSS.s, HHMMSS.ss, and HHMMSS.sss formats.

For additional information, please refer to the tables and diagrams in the following section **"Interface Cable Signal Description."**

- The serial data output from the GPS receiver should be connected to the sensor Interface Box via the screw terminal labeled: "GPS RECEIVE."
- The PPS output from the GPS/INS should be connected to the sensor Interface Box via the screw terminal labeled: "GPS PULSE."
- The ground signal(s) from the GPS/INS should be connected to the sensor Interface Box via the screw terminal labeled: "GROUND."
- Serial configuration for the NMEA Message should be 9600 baud, 8N1.

The PPS synchronization pulse and $GPRMC message may be issued concurrently or sequentially. The PPS synchronization pulse length is not critical (typical lengths are between 20ms and 200ms), but reception the $GPRMC sentence must conclude less than 500ms after the rising edge of the synchronization pulse.

Electrical Characteristics

- Logical "1": Voltage must be greater than 3 V and Less than 15 V.
- Logical "0": Voltage must be less than 1.2 V
- The GPS/INS unit must be able to supply at least 2 mA of current in the logical 1 state.
- Polarity of the NMEA message is as shown in Figure 1.

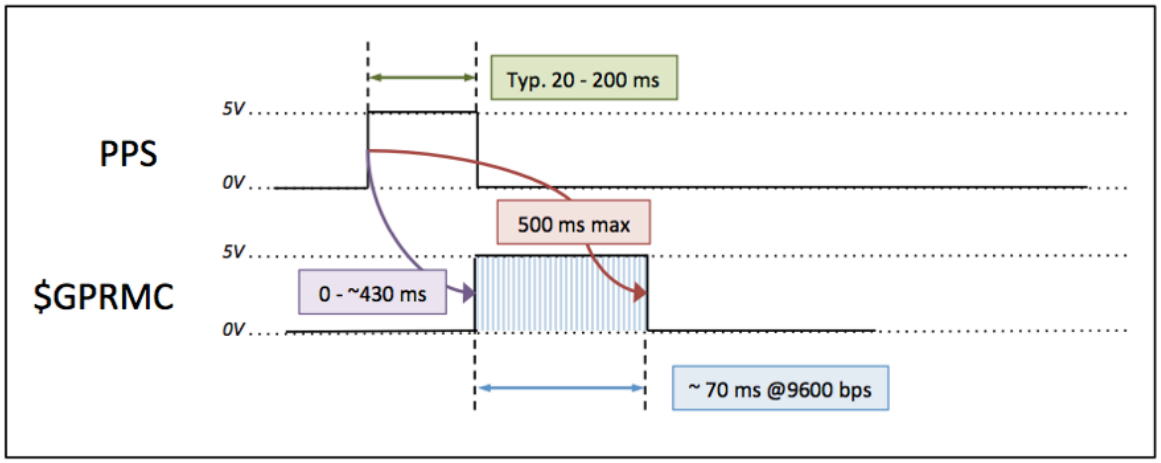


Figure 1

Interface Cable Signal Description

Wire	Signal	Input/Output	Specifications
● Black	Ground	Input	System Ground
● Red	Power	Input	9-15 VDC / 12 W
● Yellow	GPS Sync Pulse	Input	TTL
● White	GPS Serial Receive	Input	TTL
● Light Orange	Ethernet TX+	Output	Differential
● Orange	Ethernet TX-	Output	Differential
● Light Blue	Ethernet RX+	Input	Differential
● Blue	Ethernet RX-	Input	Differential

Figure 2

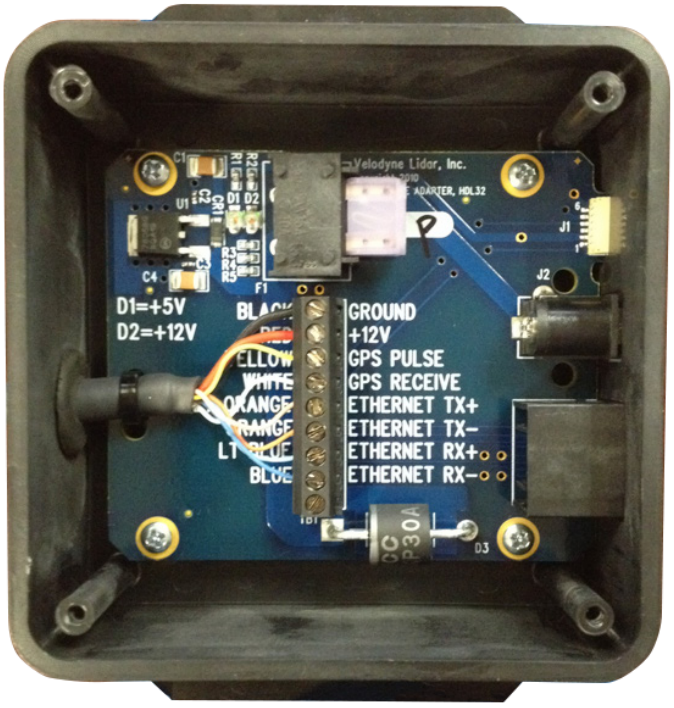
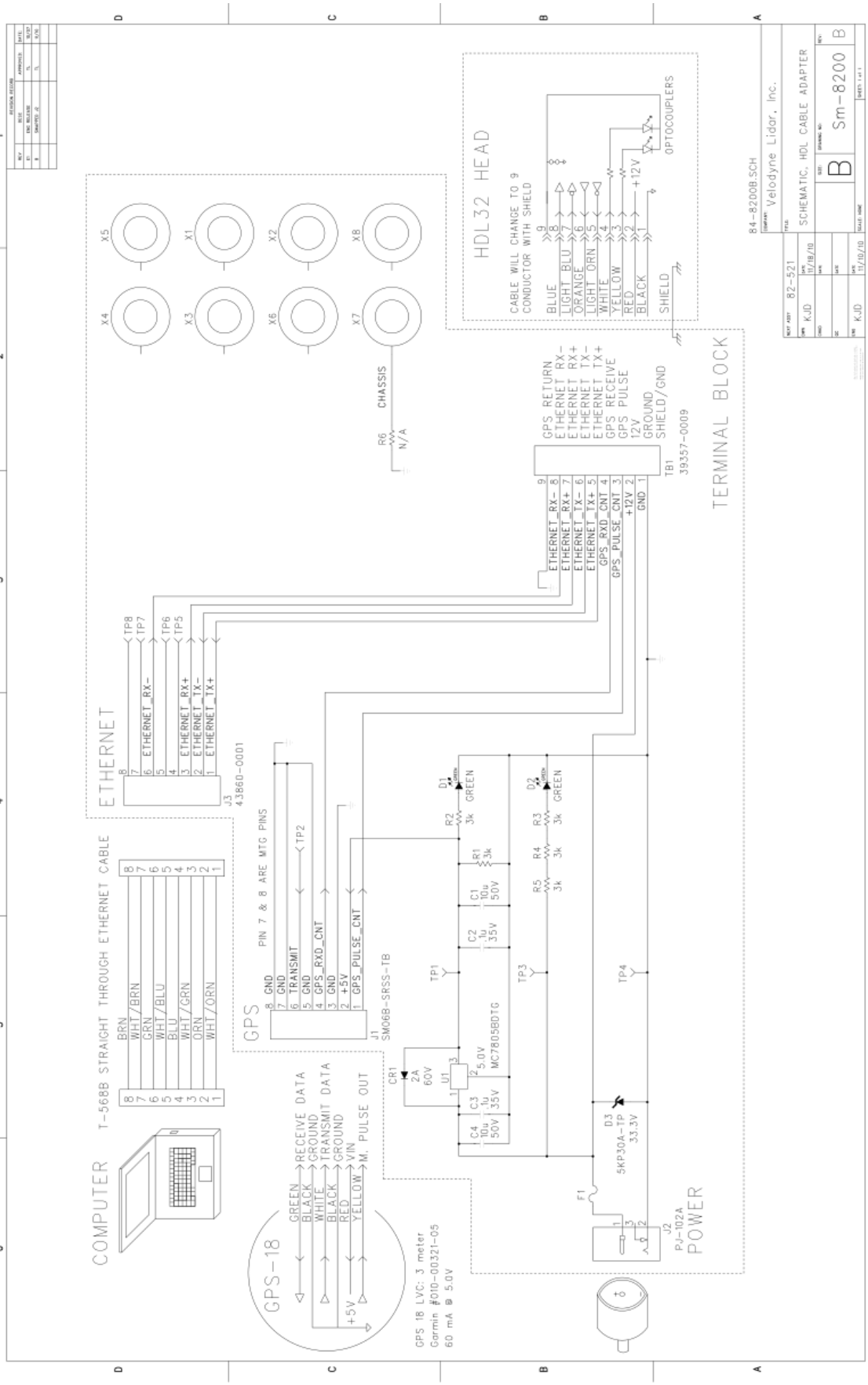
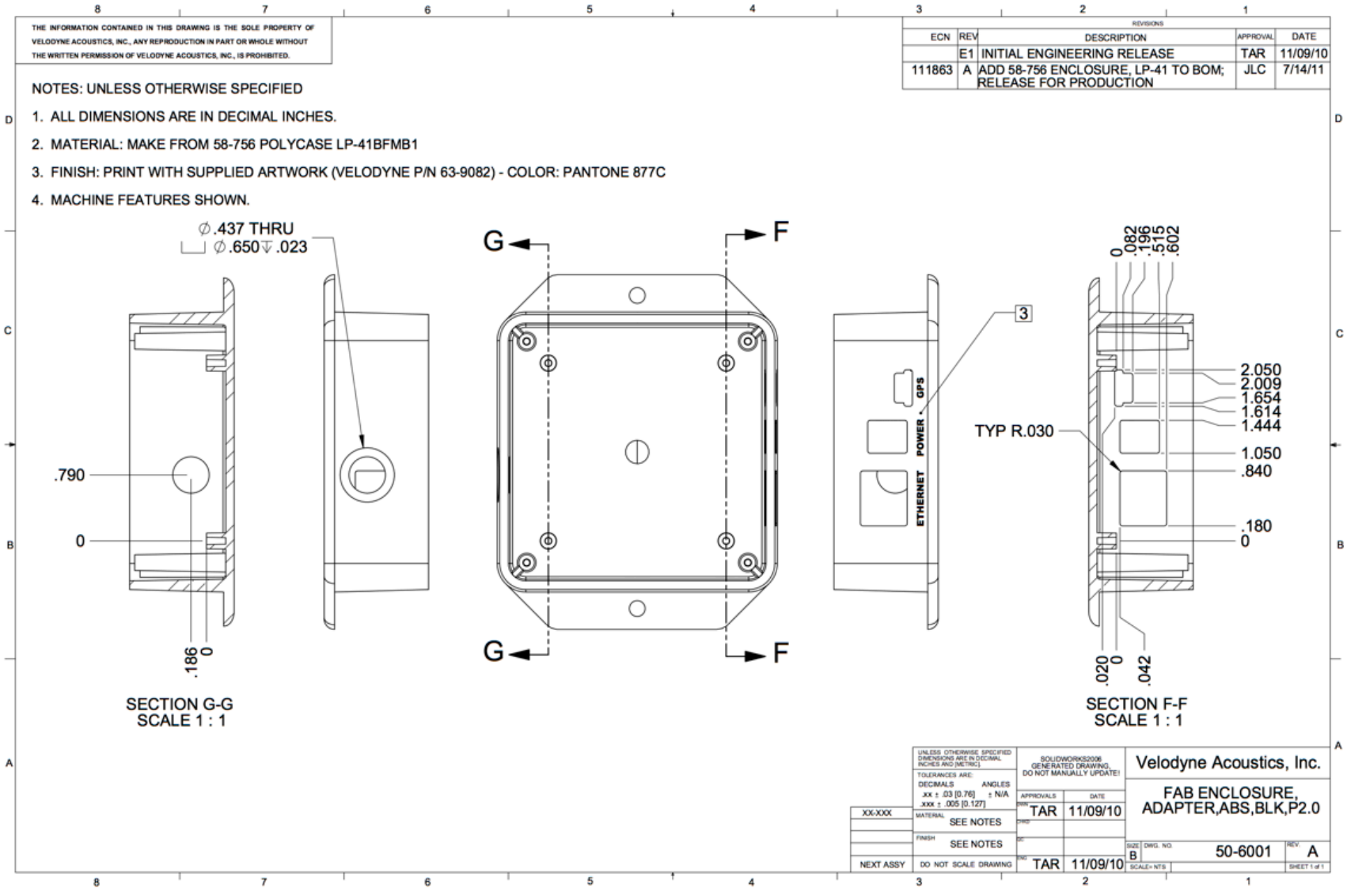


Figure 3

Schematic: HDL-32E and VLP-16 Interface Box



Mechanical Drawings: HDL-32E and VLP-16 Interface Box



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