Delivery Defender Lite™ (DDL-#)

The **Delivery Defender Lite™ (DDL)** is a universal remote overfill alarm in a compact NEMA 4X enclosure. This unit can connect to our PROTEUS® and OEL8000II series ATG's as well as most industry standard Tank Gauging systems. The **DDL** provides delivery and alarm indication outside, where your fuel provider can observe current tank conditions. Equipped with high intensity sunlight visible LED indicators, high decibel horn, general alarm light, and API color coded symbols for product identification, the **DDL** provides critical information to the filling operator.

The **Delivery Defender Lite™** connects using a RS-232 or RS-485 connection. There is an optional RS-485 to RS-232 converter that is used to extend the range with the ATG if it does not support RS-485.

** Note: "#" indicates the number of tanks. **

Specifications subject to change

Dimensions

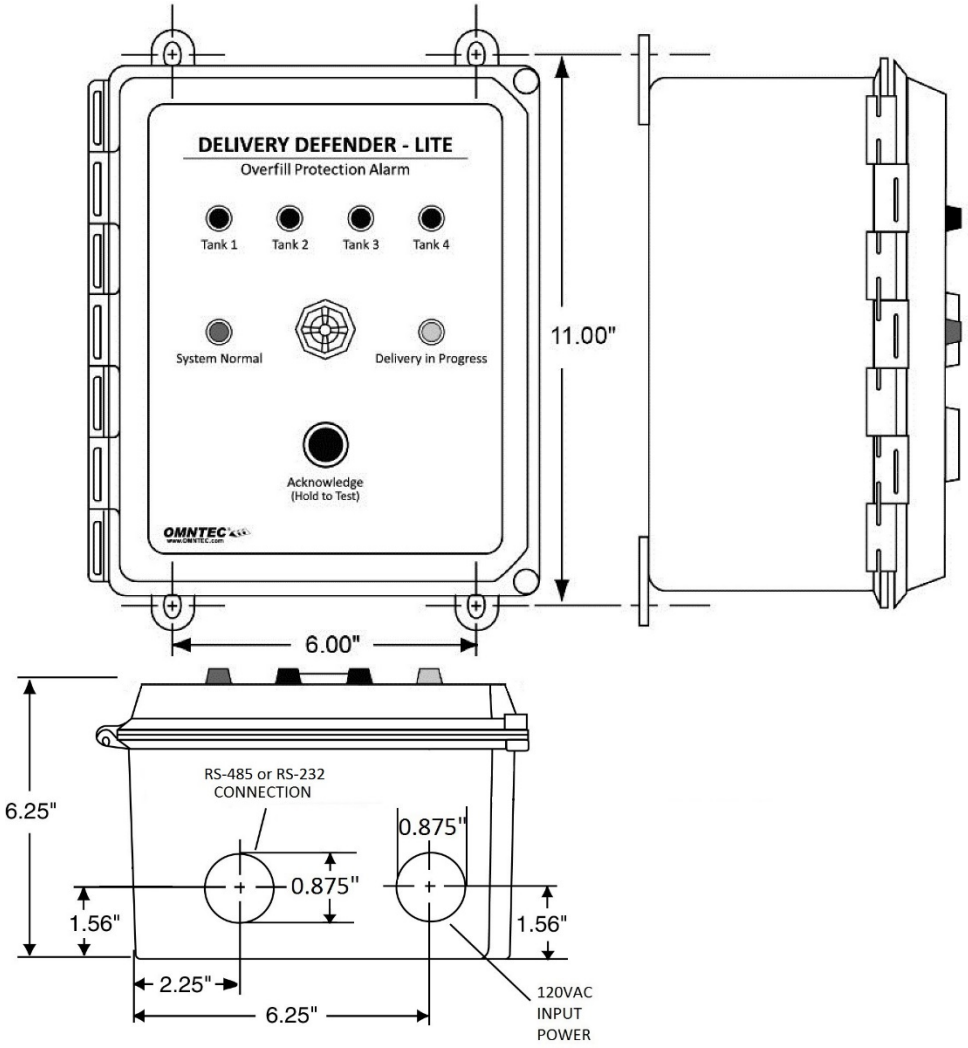
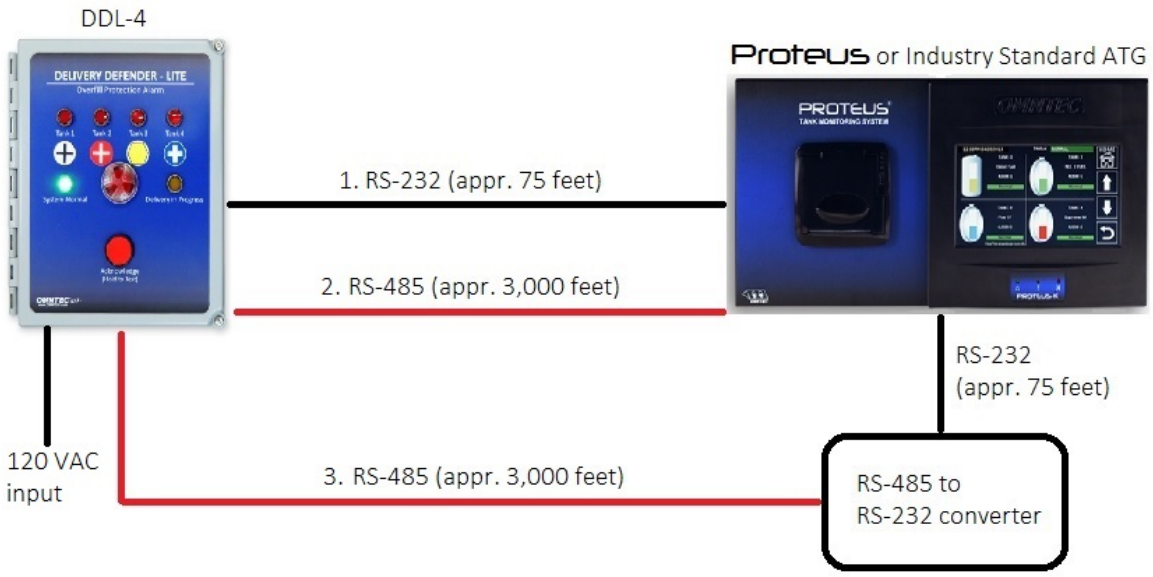


Figure 1.0

The **Delivery Defender Lite™** has two knockouts. One is used for 120VAC power cable, the other knockout is for RS-485 or RS-232 communication cables depending on site's layout.

Block Diagram



The Delivery Defender Lite can be wired one of three ways:

1. RS-232 (appr. 75 feet)
2. RS-485 (appr. 3,000 feet)
3. RS-485 with RS-232 converter if ATG does not support RS-485

May also use one conduit for AC power and RS-485

if communication cable is rated for 600V (EC4-600V)*

Connecting Power

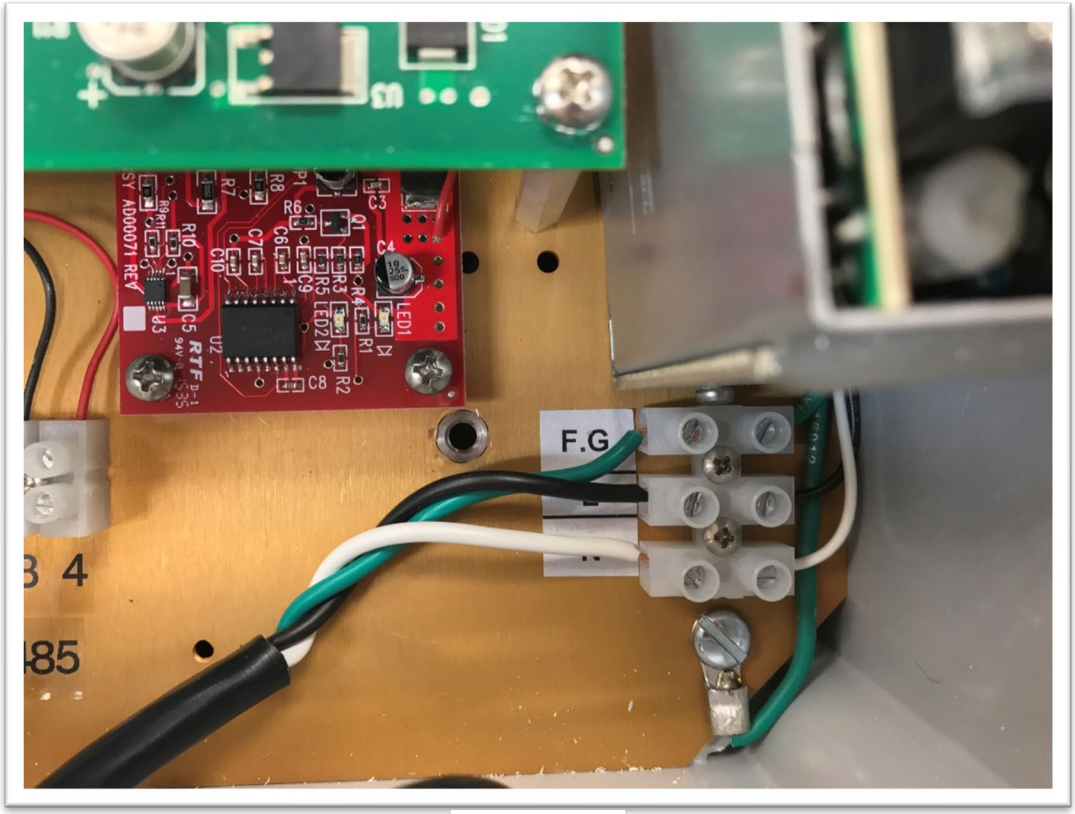


Figure 2.0

External 120 VAC power is required. Use the knockout for AC power on the bottom-right of the enclosure. Connections are to be made as follows:

Green Wire	Field Ground (F.G.)
Black Wire	Line Voltage (L)
White Wire	Neutral (N)

** Note: Install per NEC and local code in your area. **

RS-485 Connection

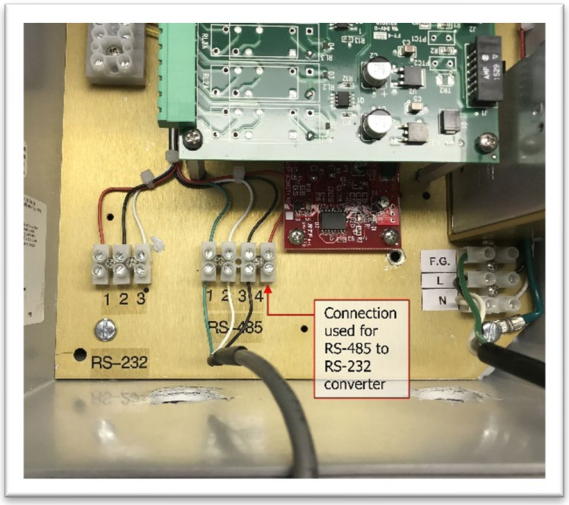


Figure 3.1

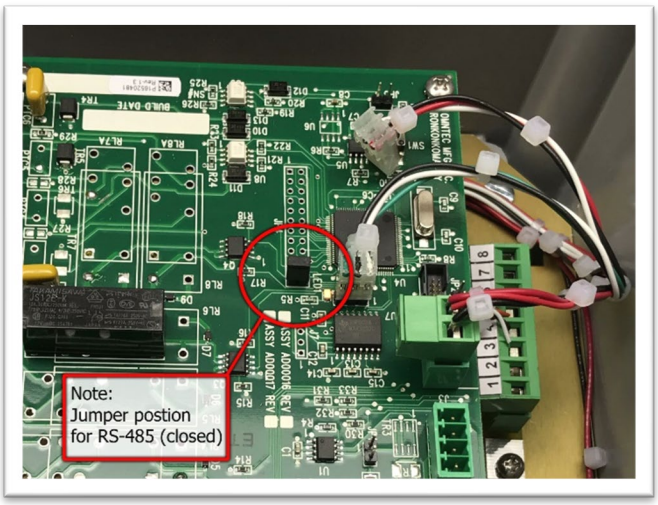


Figure 3.2

For Use Without Converter:

- Connect pins 1-3 only as shown in Figure 3.1
- Change RS-485 port settings in Proteus to RD7CTS

For Use With Converter (RS-485 to RS-232):

- RS-485 cable should be a 4-conductor twisted pair shielded cable that is at least 22 AWG (we recommend EC-4 or Quabbin 04448).
- If only one conduit is available, use the same knockout as AC power, cable must have an insulation rating for 600 VAC (we recommend EC-4-600V or Belden 1048A).
- Use the appropriate knockouts and cable for your site's layout. Make your connections as follows:

Pin 1	Tx+
Pin 2	Tx-
Pin 3	Ground
Pin 4	5 VDC (output); if using converter

The default communication settings for the **Delivery Defender Lite™** are: 9600 baud, 8 data bits, no parity, 1 stop bit for both RS-485 and RS-232. **Check jumper settings on J4** (see Fig. 3.2).

RS-485 Connection (cont.)

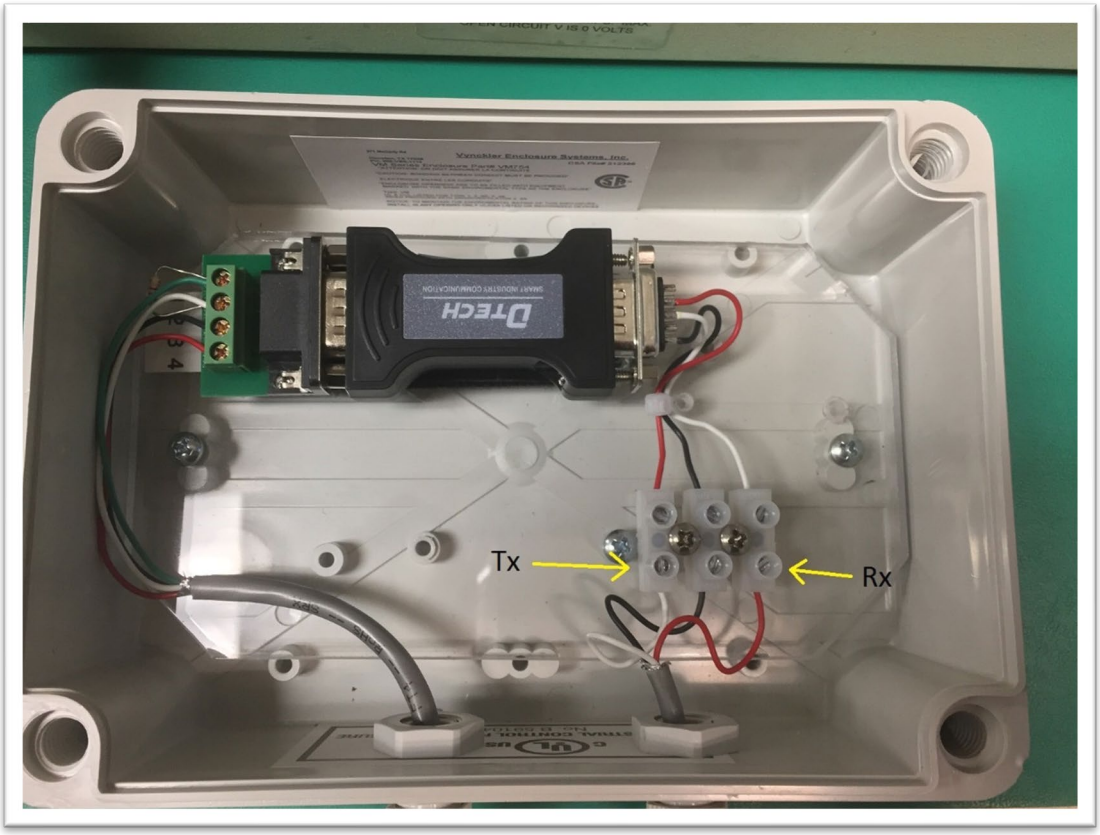


Figure 4.0

The RS-485 to RS-232 converter has the following pinout:

Pin 1	Tx+
Pin 2	Tx-
Pin 3	Ground
Pin 4	5 VDC (input)

You must also use the supplied 120-ohm termination resistor to terminate the COMM line between Tx+ and Tx-. The RS-232 wiring (supplied 10ft DB-9 cable) can be reconfigured for any ATG by swapping the Tx and Rx wires (shown in Figure 4.0). If you do not need to use the converter, connect only Pins 1-3 from the **DDL**.

**** Converter sold separately ****

Swapping Communication Type to RS-232

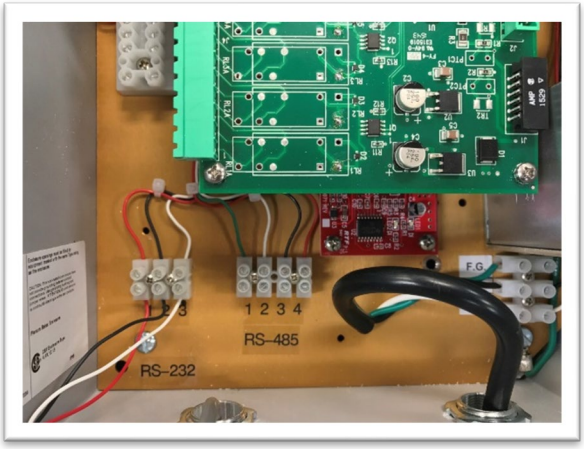


Figure 5.1

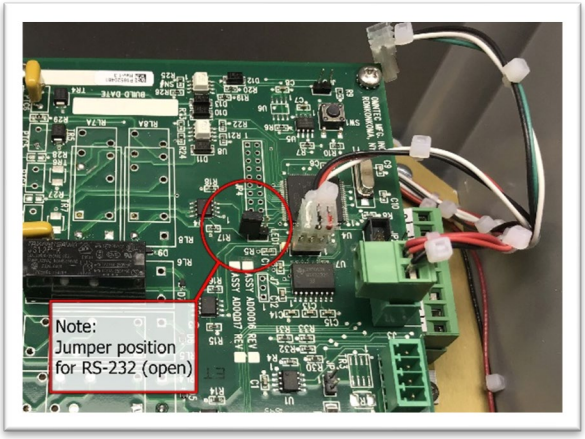


Figure 5.2

The RS-485 wire (green, black, white) is connected to J6 of the main board of the DDL. Swapping this cable for the RS-232 cable (white, black, red) will change the configuration to RS-232. Change the jumper setting on J4 (see Figure 5.2). The RS-232 pinout on the bottom left of the enclosure is as follows (see Figure 5.1):

Pin 1	RS-232 Tx
Pin 2	RS-232 Ground
Pin 3	RS-232 Rx

** Note: Swapping the Tx and Rx wires will create a null modem connection. **

** RS-232 has a limited distance of approximately 75 feet. **

** Check jumper setting on J4 (see Fig. 5.2). **

ATG Settings

Communication Settings:

Set the ATG for 9600 baud, 8 data bits, no parity, 1 stop bit.

Recommended Settings**:

NOTE: Each site should be assessed and programmed accordingly.

- Set each tank Overfill Alarm to 90%.
- Set each tank High Product Alarm to 90%.
- Set Drop Threshold value to a reasonable level corresponding to each tank's capacity. Recommended value is 50 gallons.
- Set Drop Dwell time as short as possible. Some ATG systems already have a built-in delay.

**** Note: To be taken as recommendation only. Program each tank to site's specifications.**

Features

	Tank 1	Tank 2	Tank 3	Tank 4	Horn	System Normal	Delivery in Progress
Normal Condition							
Pushbutton (Hold for 5 seconds to test)							
Receiving Delivery (flashes)							
High Level Alarm							
Overfill Alarm							
Comm Loss / Time Out							

Figure 7.0

The above table will explain the functions of the **Delivery Defender Lite™** (See Figure 7.0).

Notes:

Green Light - Indicates power available and there are proper communications with the ATG.

Amber Light - Flashes during delivery in progress.

Red Tank Lights - Indicates which tank has reached a high level and remains illuminated until condition is satisfied; flashes when tank is in delivery.

General Horn/Light - Activates upon high product, overfill, max height, probe timeout or ATG communication failure. IMPORTANT!!!! High level and overfill alarm thresholds are received and programmed at the main ATG.

Acknowledge Button - Acknowledges alarm conditions by deactivating general horn/alarm light. Pressing and holding for 5 seconds will test all lights and horn. Lights will blink on/off three times