

# FuelCAN FLC300

## Fuel sender to J1939 CANbus interface

00-02-0663  
revision A, 26<sup>th</sup> February 2010  
section 78



### Installation Instructions

**Please read the following information before installing.** A visual inspection of this product for damage during shipping is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product. If in doubt, please contact your local Murphy representative.

### General Information

WARNING

**BEFORE BEGINNING INSTALLATION OF THIS PRODUCT**

- ✓ Disconnect all electrical power to the machine
- ✓ Make sure the machine cannot operate during installation
- ✓ Follow all safety warnings of the machine manufacturer
- ✓ Read and follow all installation instructions



FuelCAN is a compact interface for translating an analogue fuel level sender signal into digital SAE J1939 CANbus data. The device allows integration of standard fuel level senders into modern ECU-based engine instrument and control systems.

FuelCAN modules have three inputs (only one of which is connected at any one time): input 1 is configured for use with Murphy ES series resistive fuel level senders; inputs 2 and 3 can be used with fuel level senders having compatible resistance ranges.

	fuel level / approx. resistance, Ohms				
	empty	1/4	1/2	3/4	full
<b>Input 1 (Murphy)</b>	240	147	96	60	33.5
<b>Input 2</b>	240	158	100	58	30
<b>Input 3</b>	10	56	95	138	180

FuelCAN inputs can also be factory-configured for use with non-standard fuel level or resistive senders. Please note that minimum order quantities apply for custom solutions.

A rear facing LED indicates input and CANbus status. FuelCAN is compact and light enough to be incorporated into wiring harnesses, but can also be surface mounted via four case holes. The polycarbonate case is fully sealed in epoxy resin for high impact and environmental resistance.

These instructions relate to Murphy part number 79.70.0006. FuelCAN modules with other stock codes may include modified input scaling or CANbus/J1939 data parameters.

### Specifications

#### Power supply

**Operating voltage, steady state:** 7 to 35 VDC  
**Current consumption:** 25mA (typ.)

#### Inputs

**Maximum operating range:** -2 to +35 VDC  
**Input 1 sender range, Ohms:** 240 (empty) to 33.5 (full)  
**Input 2 sender range, Ohms:** 240 (empty) to 30 (full)  
**Input 3 sender range, Ohms:** 10 (empty) to 180 (full)

#### Output

**CANbus:**  
SAE J1939 protocol, PGN65276 (00FEFC<sub>16</sub>), 2 sec update rate.  
120 Ohm terminating resistor fitted.

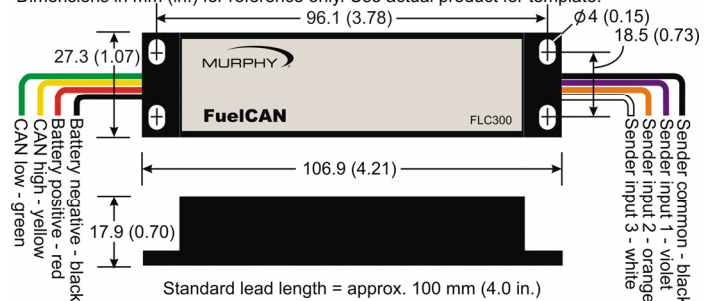
#### Physical

**Case material:** high impact ABS, epoxy filled  
**Dimensions:** see diagram below  
**Weight:** approx 60g / 0.13 lb  
**Operating temperature:** -20 to +85 °C / -4 to +185 °F  
**Environmental sealing:** IP65, exposed lead ends  
**Electromagnetic compatibility:** 2004/108/EC

### Connection and Dimensions

(standard FLC300 shown)

Dimensions in mm (in.) for reference only. Use actual product for template.



# Electrical Connection & Mounting

## Electrical Connection

FuelCAN connection is via 8 colour-coded flying leads (see diagram on page 1).

**RED: Power supply positive DC**

**BLACK: Power supply negative DC**

Connect these wires to a smooth DC power supply in the range 7 to 35 VDC. A 1 Amp anti-surge fuse is recommended in the positive DC line.

FuelCAN operates with negative earth/ground or fully insulated DC systems. **DO NOT** use FuelCAN with positive earth/ground systems.

**YELLOW: CANbus high**

**GREEN: CANbus low**

Connect these wires to the engine's CANbus, using the appropriate twisted-pair cable to J1939 specification. FuelCAN includes a non-removable 120 Ohm terminating resistor.

**BLACK: Sender common (negative DC)**

**VIOLET: Sender input 1 (Murphy)**

**ORANGE: Sender input 2**

**WHITE: Sender input 3**

For best measurement accuracy, use an insulated return (2-wire) resistive fuel level sender, e.g. (for input 1) Murphy ES2F series. Connect one sender terminal to the appropriate FuelCAN input lead (1, 2 or 3); connect the other sender terminal to FuelCAN's Sender Common (black) wire.

Where a 1-wire (negative DC/ground return) sender is used, connect the black (sender common) wire to battery negative.

## Mounting

FuelCAN uses an epoxy-resin filled, polycarbonate case for high impact and environmental resistance. The case is compact and light enough for inclusion in (or tie-wrapping to) an engine wiring harness; or, using the actual product as a template, FuelCAN can be surface mounted via four M4 (0.15 in) holes (see diagram on page 1 for approximate dimensions). The case is sealed to IP65; the exposed flying leads must use connectors appropriate for the environmental sealing required.

# Operation and Maintenance

## Operation

At each power up, FuelCAN checks all three inputs for an in-range sender resistance. If more than one sender is connected at power-up, FuelCAN prioritises input selection in the order 1 (Murphy), 2 then 3.

Once FuelCAN has selected a valid input, it continues to use that input until the DC power supply is cycled. FuelCAN transmits fuel level data every 2 seconds. Data specification is otherwise as SAE J1939-71:

PGN	65276 (00FEFC <sub>16</sub> )
Message data length	8 bytes
Relevant byte	#2 (fuel level)
Data page	0
PDU format	254
PDU specific	252
Resolution	0.4%/bit gain, 0% offset
Data range	0 to 100%

If a sender failure (short or open circuit) occurs during operation, FuelCAN transmits fuel level data of value 0xFE<sub>16</sub> (indicating 'measurement error').

If no valid sender is detected at power-up, FuelCAN transmits a value 0xFF<sub>16</sub> (indicating 'measurement not available') and flashes its LED in a 'heartbeat' pattern (two short pulses, followed by a longer pause). J1939 message PGN65275 also includes bytes for other parameters, including washer fluid level (byte #1), fuel filter differential pressure (byte #3),

engine oil filter differential pressure (byte #4) and cargo ambient temperature (bytes #5/6). For each of these parameters, FuelCAN transmits a value 0xFF<sub>16</sub> (indicating 'measurement not available').

LED operation is as follows:-

LED pattern	Status
Off	Power off
Flashing ('heartbeat' pulse on)	Power on, but all inputs open circuit (valid sender not detected).
Flashing (50/50% on/off)	Power on, valid sender input, but no CAN activity.
On	Power on, valid sender input and CAN activity

## Maintenance and Warranty

FuelCAN contains no user-serviceable parts. Maintenance is therefore limited to the following preventative checks:

- Check that FuelCAN electrical connections are secure.
- Check that the case is mounted securely, with vibration and environmental exposure minimised where possible. The case may be wiped with a clean, damp cloth. Do not use cleaning solvents.

FuelCAN is supplied with a two year warranty on parts and workmanship. In the event of a fault or technical query, and before returning equipment, please contact your Murphy representative for technical support.

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time. MURPHY, the Murphy logo, are registered and/or common law trademarks of Murphy Industries, LLC. This document, including textual matter and illustrations, is copyright protected by Frank W Murphy Ltd., with all rights reserved. © 2010 Frank W Murphy Ltd.

**RJ Mann & Associates Inc.**  
*Engine Controls & Panels/Compressor Parts*

860 North 9th Avenue, Brighton, CO 80603  
Ph: (303) 659-5139 Fax: (303) 659-5309  
www.rjmann.com