



Acu-Trac® J1708 Mode Messaging

Product Overview

SSI's Acu-Trac® ultrasonic fuel level transmitters broadcast and receive commands over the SAE J1708 serial data link enabling the level transmitters to communicate and share data with other modules located on the bus.

The level transmitter messages can be loosely organized to three categories as follows:

- 1) Standard PID's
- 2) Transport Protocol Messages
- 3) Data Link Escape Messages

The Standard PID's are used to pull data from the link such as odometer reading, road speed, percent engine load and the like as well as to provide data to other modules located on the link.

The transport protocol messages are used to report and route fuel data through off vehicle communications equipment such as Qualcomm.

The Data Link Escape Messages are used to program parameters into the level transmitter and to provide a simple alternative means to acquire fuel data over the J1708 data link.

Setup & Programming Commands

PID 84 Road Speed	Request	None
	Response	Automated PID 84 J1587 Standard Broadcast
	Purpose	Data used by the level transmitter to determine if the vehicle has stopped.
PID 89 Power Take Off Status	Request	None
	Response	Automated PID 89 J1587 Standard Broadcast
	Purpose	Data used by the level transmitter to determine if the PTO option is engaged.
PID 92 Percent Engine Load	Request	None
	Response	Automated PID 89 J1587 Standard Broadcast
	Purpose	Data is used by the level transmitter to determine if fuel is being used for PTO purposes or if the additional fuel is being used while idling.
PID 96 Fuel Level	Request	Automated PID 96 J1587 Standard Broadcast
	Response	143 96 D1 chk
	Where	D1 Fuel level as a percent of total capacity at 0.5% / bit

Standard PID's Continued

PID 96 Fuel Level	Request	PID 194 J1587 Standard Request/Broadcast					
	Response	143	194	0	chk		
	Response	143	194	2	96	D1	chk
	Response	143	194	2	96	D2	chk
	Where	D1 Diagnostic data byte, 44 active fault, 98 inactive fault D2 Low Fuel diagnostic data byte 33					
PID 234 Software PN & Revision Level	Request	PID 234 J1587 Standard Request					
	Response	143	234	14	143	D1-D13	chk
	Where	D1 D6 Measurement Processor Software PN & Rev level D7 Delimiter ascii "***" Communications Processor D8 D13 Software PN & Rev level					
	Request	PID 243 J1587 Standard Request					
	Response	143	243	17	143	D1-D16	chk
PID 243 Make, Model, and Serial Number	Where	D1 D5 Make ascii "FLS12" D6 Delimiter ascii "***" D7 Revision ascii "0" D8 Delimiter ascii "***" D9 D16 Ascii Serial Number					
PID 245 Total Vehicle Distance	Request	PID 245 J1587 Standard Request directed to MID 128					
	Response	PID 245 J1587 Standard Response					
	Purpose	Data used by the level transmitter to calculate average MPG & distance to empty.					
PID 250 Total Fuel Used	Request	PID 250 J1587 Standard Request directed to MID 128					
	Response	PID 250 J1587 Standard Response					
	Purpose	Data used by the level transmitter to calculate how much fuel was burned through the engine for cumulative Idle/PTO, fuel loss, and fill measurements.					

Transport Protocol Messages

Setup and programming command messages are defined below.

PID 197 Connection Management	Request	J1587 Standard Transport Protocol transfer mechanism
	Response	J1587 Standard RTS, CTS, EOM, Abort as req'd
	Purpose	To facilitate off vehicle messaging

Analog Gauge Drive	Read Command	MID	198	7	143	1	D1	---	D3	crch	crcl	chk
	Write Command	MID	198	15	143	1	D1	---	D11	crch	crcl	chk
	Response	143	198	15	MID	1	D1	---	D11	crch	crcl	chk
	Where	<p>D1 Reserved Always 0</p> <p>D2 Level transmitter MID Always 143</p> <p>D3 Message Header Always 130</p> <p>16 bit DAC Output Voltage at Capacity Maximum Limit at 10.04 mv D4, D5 per bit, (msb first lsb last)</p> <p>16 bit DAC Output Voltage at Capacity Minimum Limit at 10.04 mv D6, D7 per bit, (msb first lsb last)</p> <p>D8, D9 16 bit Capacity Maximum Limit 0.125% per bit, (msb first lsb last)</p> <p>D10, D11 16 bit Capacity Minimum Limit 0.125% per bit, (msb first lsb last)</p> <p>crch High byte of the 16 bit crc performed on message bytes D1 - D11</p> <p>crcl Low byte of the 16 bit crc performed on message bytes D1 - D11</p>										
Tank Capacity	Read Command	MID	198	7	143	1	D1	---	D3	crch	crcl	chk
	Write Command	MID	198	11	143	1	D1	---	D5	crch	crcl	chk
	Response	143	198	11	MID	1	D1	---	D5	crch	crcl	chk
	Where	<p>D1 Reserved Always 0</p> <p>D2 Level transmitter MID Always 143</p> <p>D3 Message Header Always 123</p> <p>D4, D5 16 bit Tank volume in gallons, (msb first lsb last)</p> <p>crch High byte of the 16 bit crc performed on message bytes D1 – D5</p> <p>crcl Low byte of the 16 bit crc performed on message bytes D1 – D5</p>										

Tank Size, Shape, and Measurement Operation	Read Command	MID	198	7	143	1	D1	---	D3	crch	crcl	chk
	Write Command Segment 1	MID	198	13	143	1	D1	---	D11	chk		
	Write Command Segment 2	MID	198	9	143	2	D12	---	D16	crch	crcl	chk
	Response Segment 1	143	198	13	MID	1	D1	---	D11	chk		
	Response Segment 2	143	198	9	MID	2	D12	---	D16	crch	crcl	chk
	Where	D1 Reserved Always 0										

D2 Level transmitter MID Always 143

D3 Message Header Always 123

D4-D7 Tank Diameter/Depth 4 byte floating point value in inches, (msb first lsb last)

D8-D11 Tank full level 4 byte floating point value in inches, (msb first lsb last)

D12-D15 Tank width 4 byte floating point value in inches, (msb first lsb last)

D16 Measurement operation mode selection where,

Analog output selection 1 = Voltage, 2 = Current loop, 4 High Nibble
Low Nibble = Linear Output & 8 = Non Linear Output Measurement mode,
0 = Linear distance, 1 = Cylindrical level & 2 = Rectilinear level

crch High byte of the 16 bit crc performed on message bytes D1 - D16

crcl Low byte of the 16 bit crc performed on message bytes D1 - D16

Configure Idle/Satellite Communications Parameter	Read Command	MID	198	7	143	1	D1	---	D3	crch	crcl	chk
	Write Command	MID	198	11	143	1	D1	---	D7	crch	crcl	chk
	Response	143	198	11	MID	1	D1	---	D7	crch	crcl	chk
	Where	<p>D1 Reserved Always 0</p> <p>D2 Level transmitter MID Always 143</p> <p>D3 Message Header Always 125</p> <p>D4 8 bit Communication option parameter where, b0 Reset accumulations to 0 after sending fuel data. b1 Generate a minimized Fuel Data message upon selected events. Generate an automated fuel message when idle fuel consumed is in excess of the idle fuel b2 notification parameter. Generate an automated fuel message when PTO fuel consumed is in excess of the PTO b3 fuel notification parameter. Generate an automated fuel message fuel was removed from the tank is in excess of the b4 loss notification quantity. Generate an automated fuel message fuel was added in excess of the fill notification b5 quantity. Generate an automatic Fuel Data message when the level transmitter/data link is disabled and the b6 fuel consumed is in excess of the sensor disabled fuel change notification quantity or if the level transmitter and/or ecm have been exchanged. Generate an automated fuel message when the fuel quantity is less than the low fuel level b7 notification quantity.</p> <p>D5 8 bit Fill Loss Notification Parameter High Nibble Tank Fill notification quantity at 10 gallons per bit Low Nibble Fuel Loss notification quantity at 10 gallons per bit</p> <p>D6 8 bit Idle/PTO Notification Parameter High Nibble Idle fuel consumed notification quantity at 1 gallon per bit Low Nibble PTO fuel consumed notification quantity at 1 gallon per bit</p> <p>D7 8 bit Disabled/Low Fuel Notification Parameter High Nibble Level transmitter disabled fuel change notification quantity at 1 gallon per bit Low Nibble Low fuel level notification quantity at 1 gallon per bit</p> <p>crch High byte of the 16 bit crc performed on message bytes D1 - D7</p> <p>crcl Low byte of the 16 bit crc performed on message bytes D1 - D7</p>										

Fuel Data**Request
Segment 1**

MID 198 7 143 1 0 205 207 209 chk

**Response
Segment 2**

143 198 17 MID 1 D1 --- D15 chk

Response

143 198 17 MID 2 D16 --- D28 crch crcl chk

Where

D1 Reserved Always 0

D2, D3 16 bit Fuel Quantity @ 1/8 gallon/bit, (msb first lsb last)

D4, D5 16 bit Tank volume @ 1 gallon/bit, (msb first lsb last)

D6, D7 16 bit MPG @ 1/256 mpg/bit, (msb first lsb last)

D8, D9 16 bit Cumm Idle Fuel Consumed @ 1/8 gallon/bit, (msb first lsb last)

D10, D11 16 bit Cumm PTO Fuel Consumed @ 1/8 gallon/bit, (msb first lsb last)

16 bit Cumm Tamper Fuel Consumed w No Data Link @ 1/8 gallon/bit, (msb first lsb D12, D13 last)

D14, D15 16 bit Cumm Fuel Lost from the Tank @ 1/8 gallon/bit, (msb first lsb last)

16 bit Cumm Fuel Added to the Tank @ 1/8 gallon/bit, (msb first lsb D16, D17 last)

D18 8 bit Transmit Reason

Where

b0 Cumulative idle fuel consumed exceeded automated transmit parameter

b1 Cumulative PTO fuel consumed exceeded automated transmit parameter

Cumulative tamper fuel consumed while sensor communications b2 was disabled exceeded automated transmit parameter

b3 Cumulative fuel lost from the tank exceeded automated transmit parameter

b4 Cumulative fuel added to the tank exceeded automated transmit parameter

b5 Fuel level fell below preset

b6 Level transmitter and/or the ECM were exchanged during the stop

b7 Host system request

D19 8 bit Fuel Temperature (msb, first lsb last) D20,

D23 32 bit Life to Date Total Fuel (msb, first lsb last)

D24, D27 32 bit Life to Date Total Distance (msb, first lsb last)

D28 unused always 0

D29 crch High byte of the 16 bit crc performed on message bytes D1 - D28

crcl Low byte of the 16 bit crc performed on message bytes D1 - D28

Data Link Escape Messages

Analog Gauge Drive Transfer Function Parameters	Read Command	MID	254	143	3	192	1	130	chk				
	Write Command	MID	254	143	11	192	9	130	D1	D2	---	D8	chk
	Response	143	254	MID	11	192	9	130	D1	D2	---	D8	chk
	Where	D1-D2 16 bit DAC Output Voltage @ Capacity Maximum Limit @ 10.04 mv per bit, (msb first lsb last)											
		D3-D4 16 bit DAC Output Voltage @ Capacity Minimum Limit @ 10.04 mv per bit, (msb first lsb last)											
D5-D6 16 bit Capacity Maximum Limit 0.125% per bit, (msb first lsb last)													
D7-D8 16 bit Capacity Minimum Limit 0.125% per bit, (msb first lsb last)													
Distance to Empty Data	Request	MID	254	143	3	192	1	207	chk				
	Response	143	254	MID	8	207	6	D1	D2	---	D6	chk	
	Where	D1-D2 16 bit Distance to empty @ 1 mile/bit, (msb first lsb last)											
		D3-D4 16 bit Fuel Quantity @ 1/8 gallon/bit, (msb first lsb last)											
		D5-D6 16 bit MPG @ 1/256 mpg/bit, (msb first lsb last)											
Fuel Optimization Data	Request	MID	254	143	3	192	1	205	chk				
	Response	143	254	MID	8	205	6	D1	D2	---	D6	chk	
	Where	D1-D2 16 bit Tank volume @ 1 gallon/bit, (msb first lsb last)											
		D3-D4 16 bit Fuel Quantity @ 1/8 gallon/bit, (msb first lsb last)											
		D5-D6 16 bit MPG @ 1/256 mpg/bit, (msb first lsb last)											
Fuel Tank Capacity	Read Command	MID	254	143	3	192	1	123	chk	chk			
	Write Command	MID	254	143	7	192	7	123	D1	D2	chk		
	Response	143	254	MID	6	193	6	D1	D2	chk			
	Where	D1-D2 16 bit Tank volume in gallons, (msb first lsb last)											
		D3-D4 Unused											

Idle/PTO/Fill/Loss Data	Request	MID	254	143	3	192	1	206	chk			
	Response	143	254	MID	14	206	12	D1	D2	---	D12	chk
	Where	D1-D2 16 bit Cumm Idle Fuel Consumed @ 1/8 gallon/bit, (msb first lsb last) D3-D4 16 bit Cumm PTO Fuel Consumed @ 1/8 gallon/bit, (msb first lsb last) D5-D6 16 bit Cumm Fuel Consumed w No Data Link @ 1/8 gallon/bit, (msb first lsb last) D7-D8 16 bit Cumm Fuel Removed from the Tank @ 1/8 gallon/bit, (msb first lsb last) D9-D10 16 bit Cumm Fuel Added to the Tank @ 1/8 gallon/bit, (msb first lsb last) D11-D12 16 bit spare always 0, (msb first lsb last)										

Idle/PTO Parameters Programming	Read Command	MID	254	143	3	192	192	1	125	chk				
	Write Command	MID	254	143	6	192	192	4	125	D1	D2	D3	D4	chk
	Response	143	254	143	6	192	192	4	125	D1	D2	D3	D4	chk
	Where	D1 8 bit Communication option parameter where, b0 Reset accumulations to 0 after sending fuel data. b1 Generate an automatic Fuel Data message upon selected events. Generate an automated fuel message when idle fuel consumed is in excess of the idle fuel b2 notification parameter. Generate an automated fuel message when PTO fuel consumed is in excess of the PTO b3 fuel notification parameter. Generate an automated fuel message fuel was removed from the tank is in excess of the b4 loss notification quantity. Generate an automated fuel message fuel was added in excess of the fill notification b5 quantity. Generate an automatic Fuel Data message when the sensor/data link is disabled and the b6 fuel consumed is in excess of the sensor disabled fuel change notification quantity or if the sensor and/or ecm have been exchanged. Generate an automated fuel message when the fuel quantity is less than the low fuel level b7 notification quantity. D2 8 bit Fill Loss Notification Parameter High Nibble Tank Fill notification quantity @ 10 gallons per bit Low Nibble Fuel Loss notification quantity @ 10 gallons per bit D3 8 bit Idle/PTO Notification Parameter High Nibble Idle fuel consumed notification quantity @ 1 gallon per bit Low Nibble PTO fuel consumed notification quantity @ 1 gallon per bit D4 8 bit Disabled/Low Fuel Notification Parameter High Nibble Level transmitter disabled fuel change notification quantity @ 1 gallon per bit Low Nibble Low fuel level notification quantity @ 1 gallon per bit												

Measurement Filter Timer Constant	Read Command	MID	254	143	3	192	1	131	chk					
	Write Command	MID	254	143	11	192	9	131	D1	chk				
	Response	143	254	MID	11	192	9	131	D1	chk				
	Where	D1 Measurement Filter Time Constant at 0.8 seconds/bit												
Fuel Tank Size, Shape, and Measurement Operation Parameters	Read Command	MID	254	143	3	192	1	129	chk					
	Write Command	MID	254	143	16	192	14	129	D1	D2	---	D13	chk	
	Response	143	254	MID	16	192	14	129	D1	D2	---	D13	chk	
	Where	D1-D4 Tank Diameter/Depth 4 byte floating point value in inches, (msb first lsb last)												
		D5-D8 Tank Air Gap 4 byte floating point value in inches, (msb first lsb last)												
		D9-D12 Tank width 4 byte floating point value in inches, (msb first lsb last)												
		D13 Measurement operation mode selection where,												
		High Nibble Analog output selection 1 = Voltage, 2 = Current loop, 4 = Linear Output & 8 = Non Linear Output												
	Low Nibble Measurement mode, 0 = Linear distance, 1 = Cylindrical level & 2 = Rectilinear level													

Contact

SSI Technologies, LLC

3200 Palmer Drive, Janesville, WI 53546

ssi-sensors.com

1 (608) 757-2000



Made In USA



SSI Technologies, LLC is an Amphenol Advanced Sensors company.



SSI Technologies, LLC
— an Amphenol Company —

Warranty

LIMITED WARRANTY: All SSI products are warranted against defective materials and workmanship for a period of one (1) year from the date of delivery to the original purchaser. Any product that is found to be defective within the one year period will be replaced at the discretion of SSI. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, PERFORMANCE, OR OTHERWISE.** SSI is not an expert in the customer's technical field and therefore does not warrant the suitability of its products for the applications selected by the customer. SSI accepts no responsibility for misuse, misapplication or unauthorized modification of its products.

LIMITATION OF LIABILITY: SSI's obligation under this limited warranty is strictly and exclusively limited to the repair or replacement free of charge of such articles as are found to be defective in material or workmanship on the condition that the purchaser gives prompt written notice to SSI of any claim to breach of warranty within the warranty period, and, if requested, returns the defective articles to SSI. SSI will not assume any expenses or liability for repairs made to its articles outside of its plant, without its prior written consent. SSI reserves the right to satisfy its warranty obligation in full, with respect to defective articles, by the payment to the purchaser of all sums paid by the purchaser to SSI for such articles. **IN NO EVENT SHALL SSI BE LIABLE FOR CLAIMS (BASED UPON BREACH OF EXPRESS OR IMPLIED WARRANTY, NEGLIGENCE OR OTHERWISE) FOR ANY DAMAGES, WHETHER DIRECT, IMMEDIATE, INCIDENTAL, FORESEEABLE, CONSEQUENTIAL, OR SPECIAL.**

Terms & Conditions

Please visit [<https://www.ssi-sensors.com/contact/supplier-portal>] for information regarding the SSI Technologies, LLC Terms & Conditions.

Note: Specs are subject to change without notice.