



NMEA 2000 Product Certification Test Criteria & Methods
A List
February 2014



- DURABILITY AND RESISTANCE TO ENVIRONMENTAL CONDITIONS
- EXTENDED STORAGE (NON-OPERATING) TEMPERATURE
- UNWANTED ELECTROMAGNETIC EMISSIONS
- IMMUNITY TO ELECTROMAGNETIC ENVIRONMENT
- *CONTROLLER AREA NETWORK (CAN)*
- NETWORK SIGNALING RATE
- SHIELD CONNECTIONS
- SHIELD ISOLATION
- DC ISOLATION
- AC ISOLATION
- NET-H AND NET-L SIGNAL LINES
- TIMING LIMIT
- INPUT TIMING DELAYS
- OUTPUT TIMING DELAYS
- VOLTAGE LEVEL PROTECTION
- WIRING PROTECTION
- VOLTAGE RANGE
- MAXIMUM NODE CURRENT
- DEDICATED NODE POWER CABLE ISOLATION
- DEDICATED NODE POWER CABLE LABELING
- NODE POWER AND COMMON ISOLATION
- NODE POWER AND COMMON CURRENTS
- LOAD EQUIVALENCY NUMBER
- NODE NOISE, RIPPLE, AND TRANSIENTS
- CONDUCTED EMISSIONS
- POWER DISTURBANCES
- DC GROUND ISOLATION
- OUTPUT VOLTAGE RANGE
- AC INPUT LINE VARIATION
- DC INPUT LINE VARIATION
- CURRENT CAPACITY SHALL BE SPECIFIED
- OUTPUT CURRENT SURGE CAPACITY
- OUTPUT RIPPLE VOLTAGE
- OUTPUT OVER VOLTAGE PROTECTION
- OUTPUT OVER CURRENT PROTECTION
- POWER SUPPLY SINK CURRENT
- POWER SUPPLY SHIELD CONNECTION
- SELECTABLE ISOLATED SUPPLY
- EXCESSIVE NOISE, RIPPLE, OR TRANSIENTS
- MAXIMUM CONDUCTED EMISSIONS
- TERMINATION RESISTORS
- NUMBER OF NMEA 2000 CONNECTIONS
- FIELD PROGRAMMABILITY OF THE THREE INSTANCE FIELDS
- MESSAGE CONCURRENCY
- FAST PACKET SEQUENCE COUNTER
- UNIQUE FAST PACKET SEQUENCE COUNTER
- SUCCESSIVE FAST PACKET MESSAGE DELAY
- FAST PACKET MESSAGE TIME OUT
- COMPLEX REQUEST MESSAGE SUPPORT
- ACKNOWLEDGEMENT OF COMPLEX REQUEST MESSAGE
- REQUEST PARAMETER FIELD SUPPORT
- REQUEST FOR ADDRESS CLAIM PGN 60928
- EXPANDED ACKNOWLEDGMENT GROUP FUNCTION COMMAND RESPONSE
- EXPANDED ACKNOWLEDGMENT GROUP FUNCTION
- GLOBAL USE OF EXPANDED ACKNOWLEDGMENT MESSAGE
- EXPANDED ACKNOWLEDGMENT MESSAGE TIMING
- ISO 11783-3 3.2.2 RESERVED BIT ®
- ISO 11783-3 DATA FIELD RESERVED BYTES
- ISO 11783-3 ANNEX C, NACK
- NAME SUPPORT
- PRODUCT INFORMATION
- TRANSMITTED PGN LIST
- RECEIVED PGN LIST
- ADDRESS CLAIM TEST
- MINIMUM MESSAGE IMPLEMENTATION
- ADDRESS BUMPING
- DEFAULT REPORTING INTERVALS
- DEFAULT PRIORITY

NMEA 2000 Certification Test

Sample Only

February 2014

C.3.1 Message Concurrency [3.1.2] – Mandatory

This section certifies the requirement that *"The minimum NMEA 2000 requirement is to support the concurrent reception of the following messages:*

One single frame message

One fast-packet message

One multi-packet Broadcast message

One multi-packet RTS/CTS session"

This requires four messages to be sent to the DUT concurrently, meaning that the individual message frames from each message will be interleaved in some manner with those of the other three messages. The DUT will need to handle (receive, process, and respond if required) all four messages properly. The four methods that follow must all be synchronized so that the four messages actually transit on the NMEA 2000 network at the same time.

C.3.1.1 Method of measurement (multi-packet RTS/CTS session):

This method involves the first concurrent message to be sent to the DUT. This message should be the longest message with respect to time, and should be complete after the other three concurrent messages. This message is sent using the ISO 11783 multi-packet RTS/CTS session. In order for this message to take the longest time, and to require many frames, the Request Group Function, requesting the NAME (PGN 60928), is chosen as the first message.

Send an ISO Request PGN 059904 requesting the ISO Address Claim PGN 060928. Record the values of the fields returned in PGN 060928 that, according to the PGN 060928 definition, can be requested. Next, generate a Request Group Function PGN 126208, with the data fields set as follows.

Field 1 - Complex Request Group Function Code = 0 (Request group function)

Field 2 - Requested PGN = 60928

Field 3 - Transmission Interval = 4294967295 (FFFFFFFF₁₆)

Field 4 - Transmission interval offset = 65535 (FFFF₁₆)

Field 5 - Number of Pairs of Request Parameters to follow = 7

Field 6 - Field number of first parameter = 2 (field 2 from 060928)

Field 7 - Value of first parameter = value of field 2, Manufacturer code

Field 8 - Field number of second parameter = 3 (field 3 from 060928)

Field 9 - Value of second parameter = value of field 3, ECU Instance

Field 10 - Field number of third parameter = 4 (field 4 from 060928)

Field 11 - Value of third parameter = value of field 4, Function Instance

Field 12 - Field number of fourth parameter = 5 (field 5 from 060928)

Field 13 - Value of fourth parameter = value of field 5, Function

Field 14 - Field number of fifth parameter = 7 (field 7 from 060928)

Field 15 - Value of fifth parameter = value of field 7, Device Class

Field 16 - Field number of sixth parameter = 8 (field 8 from 060928)

Field 17 - Value of sixth parameter = value of field 8, Device Class Instance

Field 18 - Field number of seventh parameter = 9 (field 9 from 060928)

Field 19 - Value of seventh parameter = value of field 9, Industry Group

Initiate a connection mode transfer session with the DUT with the Request Group Function PGN created above. Begin transferring this PGN data, and proceed to 3.1.2, Method of Measurement (multi-packet Broadcast Message).

C.3.1.1.1 Required results:

A data transfer connection should be established with the DUT. Data should be transferred in accordance with the multi-packet RTS/CTS session protocol. The DUT should receive and accept this message. This transfer session should begin before the other three concurrent messages are started as defined in Methods 3.1.2, 3.1.3, and 3.1.4. This transfer session should finish after the other three concurrent messages have been completed. The DUT should receive and accept this message. The DUT should respond with the ISO Address Claim PGN 060928.

NMEA Property for Viewing Only



C.3.1 Message Concurrency - MANDATORY

NMEA 2000 devices (excluding Listen-only devices) shall at a minimum support the concurrent reception of the following messages:

- One single frame message
- Two fast-packet messages
- One multi-packet Broadcast message
- One multi-packet RTS/CTS session

The purpose of this test is to verify the unit can handle the concurrent reception of single frame, fast packet, Transport Protocol broadcast, and Transport Protocol connection managed messages.

- 1) Connect the channel 1 DRVcan cable to the terminated bus on which your unit resides.
- 2) Make sure your unit is powered on and network power is supplied to the bus.

Test Status

Pass Fail Requires NMEA Verification Not Run Running

Test Method C.3.1 Message Concurrency - MANDATORY:

Test Started At: 07/23/2013 20:44

PGN 059904 sent requesting PGN 060928 Globally

PGN 060928 received.

Connection Management PGN 060416 received from NAD 86 to NAD 85.

Group Function = 16 Request To Send

Total Message Size (bytes) = 26

Total Number of Packets = 4

Reserved = FF hex

Parameter Group Number of Packeted Message = 126208

Connection Management PGN 060416 received from NAD 85 to NAD 86.

Group Function = 17 Clear To Send

Number of Packets That Can Be Sent = 4