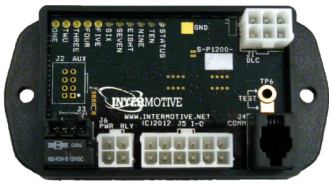
INTERMOTIVE VEHICLE CONTROLS

An ISO 9001:2008 Registered Company

1939CM405-A J1939 Translator

(for use with GTWY505/506/605, and HL510/550/610)
2005-2017 Ford E-Series & F250-F550
2014-2017 Ford Transit
2006-2017 Chevy Express, GM Savana



Select 2018 vehicles — Contact InterMotive for additional details

Introduction

The 1939CM405 translator plugs into a vehicle's OBDII connector and acquires proprietary vehicle data which it translates and transmits over a separate J1939 protocol network. This allows 3rd party J1939 devices to be installed on light duty vehicles which do not support J1939 protocol. By moving 3rd party devices off of the OEM OBDII network and onto a separate J1939 network, OEM network bandwidth traffic problems are eliminated as well as conflicts between multiple 3rd party devices.
The 1939CM405 harness also provides a compatible connector for applications which include an Intermotive GTWY505/605 or HL510/550/610 wheelchair lift interlock module. See 1939CM401 for applications with GTWY401 or GTWY201, and 1939XR501 for standalone non-Gateway applications.

Installation Instructions

Disconnect vehicle battery before proceeding with installation.

WARNING
Disconnect the battery to prevent setting a check engine light.

IMPORTANT—READ BEFORE INSTALLATION

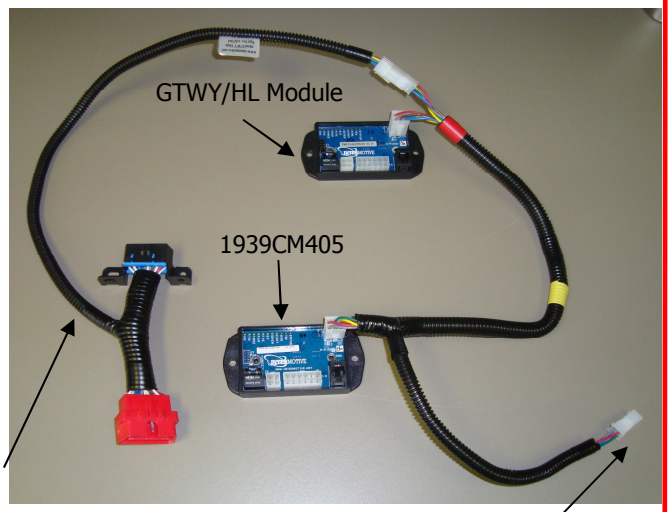
It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers. Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

J1939CM405 Module

Remove the lower dash panel below the steering column area and find a suitable location to mount the 1939CM405 module. Locate the module in an area away from any external heat sources (engine heat, heater ducts, etc.). Do not actually mount the module until all wire harnesses are routed and secure (last step of the installation is to mount the module). If installing GTWY or HL for the first time, refer to their appropriate instructions.

Harness Installation

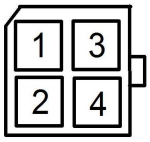
1. Install the 4 connector 1939CM405 harness as shown.
2. Red tape end connectors must plug into the GTWY or HL module & OBDII harness.
3. Non-red tape 6 pin connector plugs into the 1939CM405.
4. Non-red tape 4 pin connector plugs into 3rd party J1939 device. See pinout below.



1939CM405-A Translator Connection Output

The 1939CM405 harness provides a 4 pin connector for interfacing to 3rd party J1939 devices. There is also an optional stub harness which provides the more common J1939 type of barrel connector if desired.

Pin#1 Green - J1939 CAN High Pin#2 Red—Battery Voltage (2A max)
Pin#3 Blue - J1939 CAN Low Pin#4 Gray - Ground



Reconnect vehicle battery

Initial Installation: Temporarily disconnect the GTWY or HL modules 6 pin connector before performing the following procedures.

1. With vehicle in PARK, Park Brake ON, Ignition ON, Engine OFF, and 1939CM405 module **unplugged** from the OBDII connector, hold a ground source to the 1939CM405 modules Test Pad.
2. Plug in the 6-pin 1939CM405 connector while keeping the Test Pad grounded for at least a second, then the ground connection may be removed.
3. The module recognizes this as a special power up sequence and requests the vehicle VIN as well as checks to see what Optional PGNs are available on the vehicle. The module stores this information internally and uses it on subsequent boot-up sequences.
4. To verify a successful initial power-up sequence, observe the module LEDs; there should be no LEDs ON. If "scrolling" LEDs (1-4) are seen, another LED will also be ON solid – this indicates a problem occurred while powering up (see Error Mode below). In this case, try repeating the special power up grounding sequence again. If errors persist, contact Intermotive Technical Support.

Operation

Optional PGN Enable: Some vehicles support additional network data (PGN/SPN's) which may be required by the 3rd party device that will be connected to the 1939CM405. See page 4. The module comes from the factory with this optional data disabled. If the 3rd party device requires this data, perform the following sequence to enable this additional data:

1. With vehicle in PARK, Park Brake ON, and Ignition ON, Engine OFF, put the module into the "TestDiag" mode by grounding the test pad on the module (does NOT require disconnecting 6 pin connector—see below) .
2. Observe the module LEDs as you engage and disengage the Service Brake 4 times within 5 sec. The module recognizes this sequence and enables acquisition of the optional data. As a visual feedback that this occurred, the module will scroll the LEDs twice. NOTE: the optional PGN/SPN's can be disabled again by executing the same sequence of events (i.e. it's a toggle operation).
3. Once the optional data has been enabled, put the module into the PGN check diag mode and observe which PGNs are active (see below).

Normal Operation: Once power is applied to the module or it wakes up on CAN traffic, there is a period of 2 seconds before the module starts transmitting data on the J1939 port. If there is no connection on the J1939 port, the module will sense this and stop transmitting until proper equipment (terminated with 120 ohms) is attached.

Inactive Operation: When the key is turned off, and the vehicle CAN traffic stops, the module ceases operation after 20 sec. and goes into a low-power state. It will remain in this state until it detects CAN traffic again at which point it will wake up and begin transmitting data.

Diagnostic Mode: The 1939CM405 module has 2 diagnostic modes that enable it's LEDs. This can be helpful in troubleshooting or determining what vehicle data is available. Touching a ground source to the Test Pad on the module will cause it to enter the "TestDiag" mode. A second touch enables "PGNcheck" mode. A third touch will exit these diagnostic modes and shut off the LEDs. The module continues to operate normally in all modes. The LED's are defined as follows:

TestDiag Mode (first grounding of test pad)

LED1 – toggles at a 1 sec. rate to indicate TestDiag Mode
LED2 – toggles when vehicle HSCAN data is being received
LED3 – toggles when data is being *received* on the J1939 port (rare)
LED4 – toggles when data is being received over laptop connection
LED8 – toggles when data is being transmitted out the J1939 port (normal)

PGNcheck Mode – Each LED (by turning ON) will indicate that particular Optional PGN data has been acquired. All LED's are turned OFF together every 2 sec. in this mode. Note that not all PGN data is available on all vehicles.

LED1 – MAF Mass Air Flow
LED2 – AAT Ambient Air Temperature
LED3 – EOT Engine Oil Temperature
LED4 – BP Barometric Pressure
LED5 – IMP Intake Manifold Pressure
LED6 – IAT Intake Air Temperature
LED7 – ELD Engine Load
LED8 – EFR Engine Fuel Rate
LED9 – TP Throttle Position
LED10 – DTC Diagnostic Trouble Codes are present (Emissions Related DTC's)

Operation (continued)

Error Mode – certain events can lead to a condition which halts translator operation. This can be observed by LEDs 1 – 4 scrolling and one of three (6, 7, or 8) LEDs being constantly ON. While there can be several causes for the three errors listed below, the most common fault is poor or no connection to the OBDII connector. Error Modes are defined as follows:

LED6 – Module failed to receive all information about which optional PGNs are available.
LED7 – Invalid VIN received. Module may be installed in currently unsupported vehicle.
LED8 – Module timed out (about 8 sec) waiting for a VIN to be received during installation.

The following page defines the J1939 PGN/SPN's that are available. The PGNs labeled "Default" are automatically enabled and available, whereas the Optional PGNs need to be "Turned ON" if required by the 3rd party device connected to the J1939 connector.

Module mounting

Ensure all harness are properly connected and routed, and are not hanging below the dash are. Mount the module as described on page one and secure using supplied screws or double sided tape.

Function	SPN	PGN	Dflt / Opt	Applications*
VSS - Vehicle Speed	SPN84	PGN65265	Default	1,2,3
RPM - Engine Revs per Minute	SPN190	PGN61444	Default	1,2,3
ECT - Engine Coolant Temp	SPN110	PGN65262	Default	1,2,3
TFT - Trans Fluid Temp	SPN177	PGN65272	Default	1,2,3
FL - Fuel Tank Level	SPN96	PGN65276	Default	1,2,3
APP - Accelerator Pedal Position	SPN91	PGN61443	Default	1,2,3
PB - Park Brake	SPN619	PGN65274	Default	1,2,3
SB - Service Brake	SPN597	PGN65265	Default	1,2,3
ABS - Anti Lock Brake System Event	SPN563	PGN61441	Default	1,2,3
TR - Transmission Range	SPN163	PGN61445	Default	1,2,3
ODO - Odometer	SPN917	PGN65217	Default	1,2,3
EOP On/Off - Engine Oil Pressure		PGN61452	Default	2
ENG RUN - RPM > 400		PGN61452	Default	1,2,3
MIL - Malfunction Indicator Lamp		PGN61452	Default	1,2,3
AC Clutch - Air Conditioner clutch on		PGN61452	Default	1,2,3
Key Position		PGN61452	Default	1,2,3
DFDR - Driver side Front Door		PGN61452	Default	1,2
DRDR - Driver side Rear Door		PGN61452	Default	1,2
PFDR - Passenger side Front Door		PGN61452	Default	1,2
PRDR - Passenger Side Rear Door		PGN61452	Default	1,2
RDR - Rear Door		PGN61452	Default	1,2
Park Lamp		PGN61452	Default	2
Low Beam		PGN61452	Default	2
High Beam		PGN61452	Default	2
DRL - Daytime Running Lights		PGN61452	Default	2
Turn Signal		PGN61452	Default	2
DRLKS - Door Locks		PGN61452	Default	2
DTC Count - Diag Trbl Codes (Emissions)		PGN61452	Optional	1,2,3
EFR - Eng Fuel Rate	SPN183	PGN65266	Optional	2
TP - Throttle Position	SPN51	PGN65266	Optional	1,3
BP - Barometric Pressure	SPN108	PGN65269	Optional	1,2,3
EOT - Engine Oil Temp	SPN175	PGN65262	Optional	2
MAF - Mass Air Flow	SPN132	PGN61450	Optional	1,3
IMP - Intake Manifold Pressure	SPN106	PGN65270	Optional	3
IAT - Intake Air Temperature	SPN105	PGN65270	Optional	1,3
ELD - Engine Load	SPN92	PGN61443	Optional	1,2,3
AAT - Ambient Air Temperature	SPN171	PGN65269	Optional	1,2,3
VIN - Vehicle Identification Number		PGN59904	Requested	1,2,3

* Applications
1 = Ford 2009-2017 E-Series and 2009-2010 F-Series
2 = 2011-2017 Ford F-Series Superduty
3 = 2008-2017 Chevy, GM Express, and Savana

All PGNs having an SPN designation will be formatted and transmitted as stated in the SAE J1939-71 (Rev. AUG2002) standards document. Some of the PGNs on the previous chart do not have SPN's specified. These are custom-defined and have chassis data in the locations described below. NOTE: For any of the 2-bit definitions below, a value of "01" indicates a TRUE condition (as defined), a "00" indicates a FALSE condition, and if both bits are HIGH, data is to be considered invalid.

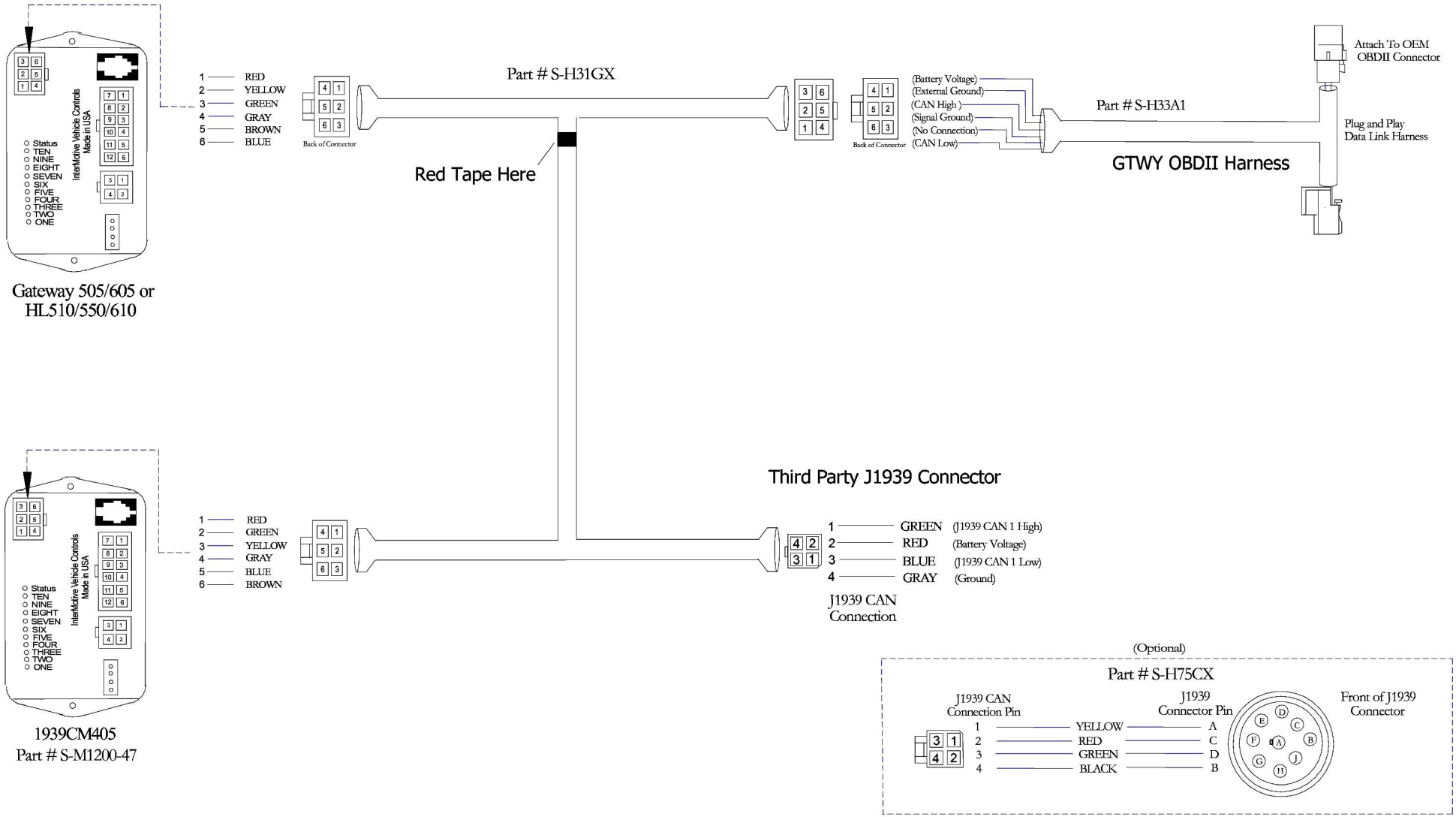
PGN 61452 Format:

Key Position (4 bits)	Byte 0 bits 0-3
	1 = OFF (0001)
	2 = ACC (0010)
	4 = Run (0100)
	8 = Crank (1000)
	F = Data invalid (1111)
Doors Open/Closed (2 bits)	Driver Front – Byte 0, bits 6&7
	Passenger Front – Byte 1, bits 0&1
	Driver Rear – Byte 1, bits 2&3
	Passenger Rear – Byte 1, bits 4&5
	Rear – Byte 1, bits 6&7
Engine Run (2 bits)	Byte 2, bits 0&1
MIL (2 bits)	Byte 2, bits 2&3
DRL (2 bits)	Byte 2, bits 4&5
AC clutch (2 bits)	Byte 2, bits 6&7
Park Lamp (2 bits)	Byte 3, bits 0&1
Low Beam (2 bits)	Byte 3, bits 2&3
Hi Beam (2 bits)	Byte 3, bits 4&5
Door Locks (3 bits)	Byte 4 bits 0-2
	001 – All doors locked
	010 – All doors unlocked
	011 – Driver door unlocked
	111 – Data invalid
EOP On (2 bits)	Byte 4, bits 4&5
DTC count (7 bits)	Byte 5, bits 0-6
UNDEFINED	Bytes 6 & 7

PGN 61450 Format:

MAF (2 bytes)	Bytes 0&1
Turn Signals (3 bits)	Byte 4 bits 0-2
	001 – Right
	010 – Left
	011 – Hazard (both)
	111 – Data invalid

NOTES on certain PGN data:
DTC count is defined to be only for Emissions-related DTCs at present.
ODO is read in meters (as defined) but the resolution is 10m for the Ford vehicles and 100m for Chevy.
VIN must be requested - J1939 REQ PGN 59904 using destination address 65260. VIN will then be transmitted in a multi-frame packet to this address (65260).



Submit product registration at www.intermotive.net

If the 1939CM405-A fails any step in the Post Installation Test, review the installation instructions and check all connections.
If necessary, call InterMotive Technical Support at (530) 823-1048.