ILISC805
2010-2015 Ford F 650/750 (diesel only)
2010-2018 Freightliner M2
2018 Durastar 3200 (6.7L Cummins Only)
2010-2016 International/Navistar 3200
Contact InterMotive for additional vehicle applications

Introduction

The ILISC805 is a wheel chair Lift Interlock for Medium Duty J1939 vehicles. It is intended to prevent driving the vehicle when the wheel chair lift is deployed. It can optionally also lock the vehicle down when the passenger door is open. ILISC805 provides system status via a dash mounted LED panel and may be used on either hydraulic or air brake chassis. It also has the ability to program and control most Allison transmission's Range Inhibit function.

> The ILISC805 **must** secure the vehicle in one of three ways: 1) Activate a Shift Lock Solenoid that will physically prevent shifting out of Park, 2) use the Range Inhibit output to prevent the transmission from engaging in a drive gear, or 3) activate a Park Brake Lock Solenoid that will prevent the air Park Brake from being released once applied. The ILISC805 **must not** use an air dump solenoid that could apply the vehicle's air brakes when activated.

ILISC805 Add-On Options

- **ILISC805-D** Door Ajar Display Panel
- **ILISC805-P2 or P2G** Plug and Play J1939 data link harness

Installation Instructions

Disconnect vehicle battery before proceeding with installation.

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

> 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.
> It is important to avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Also avoid radio frequency energy from antenna's or inverters next to the module. Finally, avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

ILISC805 Module

Remove the lower dash panel below the steering column and find a suitable location to mount the ILISC805 module. Do not mount the module where it will be exposed to external heat sources (engine heat, heater ducts, etc.). Do not mount the module until all wire harnesses are routed and secure. The last step of the installation is to mount the module. When installing the harnesses, leave several inches of take-out in order to remove the module if necessary.

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**J1939 Data Link Harness (Blunt Cut non-Plug and Play option)**

Note: If using the optional P2 or P2G Data Link harness, skip to next section

Important: On the following wires use solder and electrical tape to make all of the connections.

Back of the connector

1. Locate the vehicle's J1939 Connector. It will be mounted below the lower left dash panel. Remove the J1939 Connector from the mounting bracket.

2. Locate Pin A of the J1939 connector. **Do not cut the wire**. Strip the insulation 1" from the J1939 connector and attach the Black wire from the ILISC805 Data Link Harness.

3. Locate Pin B of the J1939 connector. **Do not cut the wire.** Strip the insulation 1" from the J1939 connector and attach the Red wire from the ILISC805 Data Link Harness.

4. Locate Pin C of the J1939 connector. **Do not cut the wire**. Strip the insulation 1" from the J1939 connector and attach the Yellow wire from the ILISC805 Data Link Harness.

5. Locate Pin D of the J1939 connector. **Do not cut the wire**. Strip the insulation 1" from the J1939 connector and attach the Green wire from the ILISC805 Data Link Harness.

6. Plug the free end of the Data Link harness into the mating 6-pin connector on the ILISC805 module.

7. Secure the ILISC805 Data Link harness to prevent hanging below the lower dash panel.
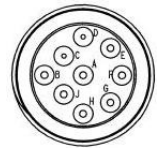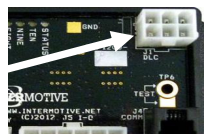
J1939 Data Link Harness (Optional P2 or P2G Data Link Harness)

1. Locate the vehicle's J1939 Connector. It will be mounted below the lower left dash panel.

2. Remove the J1939 Connector from the mounting bracket.

3. Connect the ILISC805 Data Link harness J1939 female connector to the vehicle's J1939 connector.

4. Mount the ILISC805 Data Link harness J1939 male connector to the vehicle's J1939 connector mounting bracket.

5. Plug the free end of the Data Link harness into the mating 6-pin connector on the ILISC805 module.

6. Secure the ILISC805 Data Link harness to prevent hanging below the lower dash panel.

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LED Display Panel

1. Locate a suitable position on the dashboard within view of the driver for mounting the LED Display Panel. The length of the display harness is 40". This is the maximum distance the display can be mounted from the ILISC module.

2. Drill a 5/8" hole in the dashboard where the center of the display will be located, being careful not to damage anything behind the dashboard.

3. Attach the 4 Pin LED display harness to the ILISC module's 4-pin connector.

4. Run the free end of the display harness under the dash and out through the 5/8" hole.

5. Attach the end of the display harness to the LED Display Panel.

6. Ensure panel is level, and secure using the supplied screws.

Door Ajar Display Panel (optional)

If a Door Ajar Display Panel is used, a pre-crimped green wire is included with the panel which can be inserted into the ILISC805 12 pin connector Pin #5. When connected to the passenger door ajar switch, the Door Ajar LED's will flash when the passenger door is open. The crimped pin on the green wire MUST be oriented correctly as it is plugged into the Molex connector housing. Observe the orientation on the existing pins in the connector, and match this orientation.

1. Install Door Ajar Panel per instructions above

2. Attach the free end of the green wire to the passenger door switch that provides a ground when the door is open.

3. To shift/brake lock the vehicle when the passenger door is open, also connect this passenger door wire to the module's pin #11 Vehicle Lock Request input.

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Control Outputs, Input, and Lift Inhibit Connections - 12-pin I/O Connector

The ILISC805 provides three ground side configurable outputs and one configurable input/output. The outputs can provide vehicle information and are configured per customer requirements at InterMotive prior to shipping. These outputs can be used to control upfitter circuits and can sink up to 1/2 amp. The input pin can be connected to a ground side switch to activate Shift Lock.

A 12 pin mating connector and seven terminals are provided. To use any of these outputs, properly crimp a provided connector terminal to the installer supplied wire using the correct crimping tool (Molex Part# 11-01-0197), and insert into the correct connector pin housing. The pin MUST be properly oriented for it to fully seat and click into place. The largest wire that can be used with these terminals is 16 AWG. Snap this connector into the ILISC805 module's 12-pin connector.

12-pin connector pin out definition

- Pin #1 - Orange - Warning Beeper 12V Output
- Pin #2 - Yellow - Shift Lock/Range Inhibit 1/2A Output (Active High/Low Configurable)
- Pin #3 - I/O Port Pin #2 - Configured Low True 1/2A Output (Default: RPM>400)
- Pin #4 - I/O Port Pin #3 - Configured Low True 1/2A Output (Default: Park Brake Input)
- Pin #5 - Green - Door Ajar Input (Use with Door Ajar Panel) locks shifter or park brake
- Pin #6 - Not Used
- Pin #7 - Red - From Pin #12
- Pin #8 - Blue - Vehicle Lock 12V 1/2A Output
- Pin #9 - I/O Port Pin #1 - Configured Low True 1/2A Output (Default: VSS>70)
- Pin #10 - I/O Port Pin #4 (Undefined)
- Pin #11 - Vehicle Lock Request Input. Active Low (gnd) locks shifter or Park Brake (Optional)
- Pin #12 - Red - To Pin #7
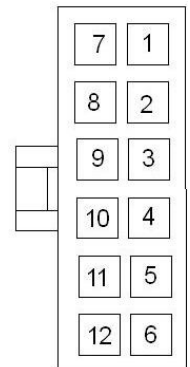
Back of the Connector

Note: When using the I/O port outputs to drive installer supplied low current devices, such as LEDs or Piezo buzzers, a small amount of leakage current when the pin is inactive may cause the external low current device to activate. This is indicated by the LED turning on dimly or the Piezo buzzer sounding faintly when the output is inactive (Conditions not met).

To correct this, install a 470 Ohm 1W resistor across the low current device.
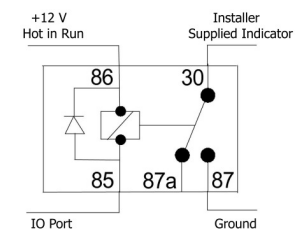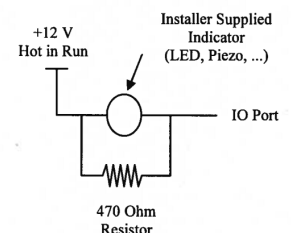
Digikey Part # 470WCT-ND

Or, drive a relay with the I/O output to switch ground to the low current device.

Digikey Part # PB682-ND

Warning Indicator Beeper
1. Choose a location accessible to the driver to mount the warning indicator beeper.
2. Drill a 1 1/8 inch hole to mount the beeper, being careful not to damage anything behind the dashboard.
3. Attach the beeper Black wire eyelet to a ground source.
4. Secure the beeper into the hole with the supplied nut and rubber washer.
The beeper bezel can be rotated to control the volume.

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Securing the Vehicle

The ILISC805 requires a installer or OEM supplied vehicle locking mechanism (i.e. a Park Brake Lock solenoid or Shift Lock solenoid). This device must allow ILISC805 to prevent the vehicle from moving when the wheel chair lift door is open. This can be done by locking the Park Brake so it cannot be released, locking the shifter so it cannot be shifted out of Park, or enabling Range Inhibit on the TCM so it cannot be shifted into gear. **The ILISC805 must not use an air dump solenoid that would apply the park brake when activated.**

CAUTION: vehicle may roll in neutral if the Range Inhibit method is used.

There are two outputs ILISC805 can use to secure a vehicle. The 12 pin connector Pin #2 Yellow wire is a configurable low/high true 1/2A output intended for Shift Lock/Range Inhibit. For this output to be asserted the vehicle must be stationary in Park and a vehicle lock trigger must be active. The output will also be asserted if the park brake is set. The 12 pin connector Pin #8 blue wire is a 12V 1/2A output intended for park brake locking mechanisms. For this output to be asserted, the vehicle must be stationary in Park with park brake set and a vehicle lock trigger must be active. Vehicle lock triggers include the lift door input on the 4 pin connector Pin #3 Gray wire, the door ajar input on the 12 pin connector Pin #5 Green wire, the vehicle lock request input on the 12 pin connector Pin #11, and the configurable shift lock request input on the 12 pin connector Pin #10.
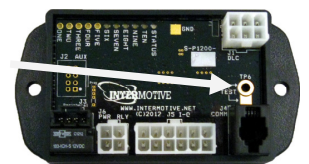
Park Brake Lock

Attach the ILISC805 12 pin connector Pin #8 Blue wire to an installer supplied wire that runs to the park brake locking mechanism. The 12 pin connector Pin #8 Blue wire is a 12V 1/2A output.

The ILISC805 will flash the Vehicle Lock icon on the LED panel if it detects this output is not connected to a load. This is a safety feature to alert the driver that the vehicle may not be properly "locked."

DO NOT connect this output to a air dump solenoid or equivalent that would allow ILISC805 to apply the brake. This output should be used only to lock the park brake on once applied by the operator.

Shift Lock

1. Attach the ILISC805 12 pin connector Pin #2 Yellow wire to an installer supplied wire that runs to the shift locking mechanism. A 12V 1/2A output is the default setting for the ILISC805 module.
2. If an active low signal is desired, perform the following procedure:

   - With the Park Brake set, turn the Key On with the Engine Off.
   - Put the module in Test mode by applying a ground wire to the "TEST" pad of the module. When in Test mode, several of the LEDs on the module will start to flash.
   - Press and release the Service Brake 3 times.
   - Press and release the Accelerator Pedal (must be pressed to the floor) 2 times.
   - Press and release the Service Brake 3 times.

When successful, the Park Brake and vehicle lock LED's will flash. They will flash three times if the output is active low and five times if the output is active high.

Note: If no LED's flash, the sequence was not recognized. Wait 10 seconds and perform the sequence procedure again.

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Range Inhibit

The ILISC805 can operate in conjunction with the Allison transmission Range Inhibit feature. This feature allows the ILISC805 to inhibit the transmission's ability to shift into gear during wheel chair lift operation. The ILISC805 12 pin connector Pin #2 Yellow wire configured as a **high true** output must be connected to the Allison Transmission Control Module for the function to operate, and the Allison transmission must have this feature enabled (pages 7 and 8). Some examples of these connections follow.

CAUTION: The Range Inhibit Feature does not lock the transmission in Park, it will only prevent shifting into gear. If the transmission is in Neutral the vehicle may roll even when Range Inhibit is active.

2010 F650/750

1. Locate the C314 Transmission Body Builder connector on the left side of the engine.
2. Attach the ILISC805 12 pin connector Pin #2 Yellow wire to an installer supplied wire, that runs through the firewall, that is connected to the C314 Transmission Body Builder connector Pin E Gray/Yellow wire.

Front of the C314 Transmission
Body Builder Connector
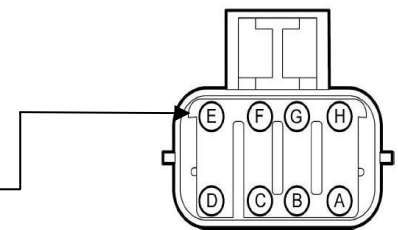
2011-2015 F650/750

1. Locate the C3618 Transmission Body Builder connector on the left side of the engine.
2. Attach the ILISC805 12 pin connector Pin #2 Yellow wire to an installer supplied wire, that runs through the firewall, that is connected to the C3618 Transmission Body Builder connector Pin A Gray/Yellow wire.

Front of the C3618 Transmission
Body Builder Connector
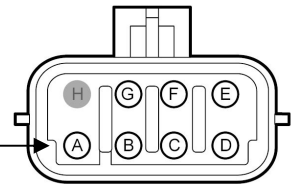
Freightliner M2 Series

1. Locate the Allison Transmission Control Module connector.
2. Attach the ILISC805 12 pin connector Pin #2 Yellow wire to an installer supplied wire that runs to the Transmission Control Module. Attach the wire to the Allison Transmission Control Module connector Pin #1 Gray/Yellow wire.

Front of the Allison Transmission
Control Module Connector

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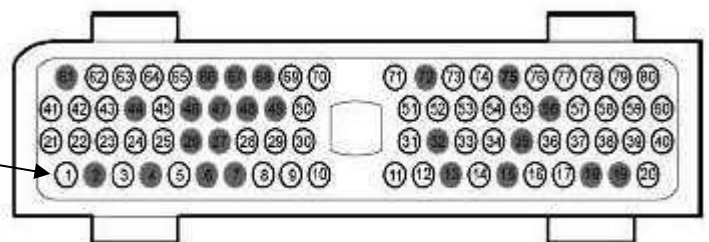
Allison Range Inhibit Programming Sequence

A functional change was made to the ILISC805 starting with firmware v1.10. The module no longer auto-matically configures the Allison transmission to support the Range Inhibit input and Park output features. These functions can still be enabled by the ILISC805 by performing the following procedure:

1. With the module installed, engine Off, turn the key to "RUN", and wait for the panel to prove out.
2. Set the Park Brake.
3. Put the module in Test mode by applying a ground wire to the "TEST" pad of the module. When in Test mode, several of the LEDs on the module will start to flash.
4. Press and fully release the Service Brake 5 times within 10 seconds.
5. Immediately tap the accelerator pedal once.

Once the above sequence is executed, the green Lift Power LED will flash on the panel. This indicates that the range inhibit is now enabled. If the red Park LED, Lift Door Open, and the PB LED flash, then the transmission was not successfully programmed. If the LED's don't flash, the sequence was not recognized. Wait 10 seconds and perform the sequence procedure again.

Once the procedure is successfully completed on a vehicle, the Allison programming portion of the ILISC805 will only work on that particular VIN.

Note: To disable the Allison transmission inhibit feature, repeat the steps above. When the sequence is correctly executed, the Green Lift Power LED <u>and</u> the Red Lift Door Open LED will flash. If the LED's don't flash, the sequence was not recognized. Wait 10 seconds and perform the sequence procedure again.

Vehicle Lock LED Programming Sequence

By default, the Vehicle Lock LED will track the Pin #8 Park Brake Lock output. If this output is not used and instead the Pin #2 Shift Lock or Range Inhibit output is used, the LED will not accurately indicate when the vehicle is locked. This programming sequence will toggle the Vehicle Lock LED tracking between Pin #2 Shift Lock/Range Inhibit output and Pin #8 Park Brake Lock output.

1. With the module installed, engine Off, turn the key to "RUN", and wait for the panel to prove out.
2. Set the Park Brake.
3. Put the module in Test mode by applying a ground wire to the "TEST" pad of the module. When in Test mode, several of the LEDs on the module will start to flash.

4. Press and hold the Service Brake.
5. Press and release the Accelerator Pedal (must be pressed to the floor) 2 times.
6. Release the Service Brake.
7. Press and release the Service Brake 3 times.
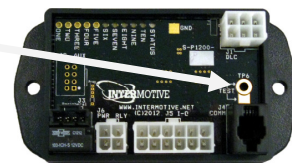
When successful, two LEDs will flash on the LIN Panel. The Park Brake and Park LEDs will flash five times if the Vehicle Lock LED is tracking the Pin #2 Shift Lock/Range Inhibit output. The Park Brake and Vehicle Secure LEDs will flash five times to indicate that the Vehicle Lock LED is tracking the Pin #8 Park Brake Lock output.

Note: If the LED's don't flash, the sequence was not recognized. Wait 10 seconds and perform the sequence procedure again.

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Eaton Transmission Discrete Park/Neutral Input

A functional change was made to the ILISC805 in firmware v2.12. This change allowed the ILISC805 to read the Park/Neutral input discretely instead of over the vehicle CAN network.

Firmware 3.01 and higher

The Eaton transmission data will be determined from the network. No programming sequence is necessary. The Discrete Park/Neutral input not used.

Lift Connector 4-pin

This 12" harness contains the circuits listed below. One end plugs into the ILISC805 module and the other end provides a Molex MLX connector which is intended to plug into the wheel chair lift harness. A mating harness can be fabricated by the installer. The mating connector is Molex Part # 0050841040. The mating terminals are Molex Part # 0002081003. We recommended using Molex terminal extractor tool Part # 0011010168 and Molex hand crimp tool # 0638116800.

Vehicle Secure/Lift Power Circuit (output) - Connect the Vehicle Secure Orange wire from pin #2 of the white 4-pin Lift connector to the Vehicle Secure input on the lift. The Vehicle Secure circuit must only activate the Vehicle Secure input on the lift and must not draw more than 8A (see lift manufacturers installation instructions). **Note:** Do not power any other loads (i.e. lights, motors, etc.) off this circuit that increase the current draw to greater than 8A.

Ignition Circuit (input) – Connect the Yellow wire from pin #4 of the white 4-pin Lift connector to an appropriately fused ignition power source (Hot only with ignition on). The fuse will support a current draw of 8A.

Lift Inhibit (input) - Since this circuit generally does not connect to the wheel chair lift, no wire is provided in the lift harness. A lift inhibit (or lift enable) switch can be connected to this connector location by crimping one of the provided Molex terminals to a wire and inserting it into the empty pin #1 cavity of this connector. Connecting this wire to a grounding switch will prevent ILISC805 from supplying power to the Vehicle Secure Output, thus disabling the lift.

Lift Door Circuit – Locate the vehicle's lift door switch circuit. Connect the Gray wire from pin #3 of the white 4-pin Lift connector to this circuit. **Note:** the door switch must provide a ground with the door open. A switch that provides power with the door open will not operate correctly.

Plug the White 4-pin connector from the Lift Harness into the ILISC805 module.

ILISC805 Module Mounting

Ensure all harnesses are properly connected and routed and are not hanging below the dash area. Mount the modules as described on Page One and secure using supplies screws or double sided tape.

Reconnect vehicle battery

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Post Installation Testing Check List

Lift Interlock

1. With the transmission in Park, start the engine, noting the ILISC805 LED panel.
   Note: for vehicles without Park use Neutral.

2. When the ignition key is turned on, all LED's will turn on for approximately 2 seconds then back off. The Park LED (P) will illuminate when the transmission is in Park/Neutral, and the Park Brake LED (PB) will illuminate when Park Brake is set. Verify these LEDs are tracking properly.

3. Verify the Lift Door LED illuminates when the Wheel Chair Lift Door is opened. The optional Door Ajar Display panel will illuminate in Red when the lift door is open, and flash Red when the passenger door alone is open.

4. With the vehicle in Park, Park Brake set, Lift Door open, Lift Inhibit not grounded, verify that the Vehicle Secure/Lift Power LED (lightening icon) is on, and that the Lift operates. If the Lift does not operate, check the ILISC805 LIFT connector J6. Pin 4 Yellow wire should have 12V (Lift power input), and pin 2 Orange wire should have 12V (Vehicle Secure/Lift Power output).

5. With the vehicle in Park, Park Brake set, Lift Door open, Lift Inhibit not grounded, confirm that the vehicle can not be moved. Either the transmission can not be shifted from Park, or the Park Brake can not be released. Do not rely solely on the Range Inhibit function of the transmission, as this can allow the vehicle to be shifted into neutral, allowing the vehicle to roll with the lift deployed.

Note: as a safety feature, closing the lift door does NOT release Vehicle Lock. The Park Brake must be released and the Service Brake must be applied to release Vehicle Lock.

Do not place vehicle in service without the Shift Interlock working properly!

If the ILISC805 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.

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Keep in vehicle
System Operating Instructions ILISC805
2010-2015 Ford F 650/750 (diesel only)
2018 Durastar 3200 (6.7L Cummins Only)
2010-2018 Freightliner M2
2010-2016 International/Navistar 3200

ILISC805 Operation:

The ILISC805 is a wheelchair lift interlock system which prevents driving the vehicle when the wheel chair lift is deployed. An LED display panel, usually mounted on the dashboard, provides system status.

ILISC805 initializes when the vehicle ignition is on. During initialization, the LED display panel performs a prove-out for 2 seconds. After the initialization, the system collects vehicle data by monitoring the J1939 data port. It uses this information to perform all of its control logic. When the ILISC805 module has been running and the vehicle ignition is turned to the off or accessory positions, the module goes into a low current consumption "sleep" mode. This may take anywhere from several seconds to a minute.

Lift Operation

Wheel chair lift operation is only allowed when all of the following conditions are met:

- Vehicle transmission range in Park (or Neutral if the vehicle lacks a Park position).
- The Park Brake is applied.
- The vehicle ignition is on.
- The Lift Door is open.
- Lift inhibit is not activated. (Optional control input).

Once the wheel chair lift door is open, ILISC805 will not allow the vehicle to be driven. If the vehicle is not in a secure state, ILISC805 will not allow the lift to be operated.

LED Panel

The LED panel provides the following vehicle status (left to right) when the key is on:

Vehicle Secure (Lightening Icon) - illuminates green when lift is enabled. All conditions for lift operation have been met.

Door Open - (not available on "Door Ajar" panels) - Illuminates Red when lift door open.

Park Brake - Solid Red when Park Brake set. Flashes when not set and lift door open.

Park - Solid Red when in Park (neutral w/o a park position). Flashes when not set and lift door open.

Vehicle Lock - Illuminates in Red when the Park Brake and/or transmission shifter is locked. If other systems in the vehicle are tied into this input, the LED will also illuminate. If the Vehicle Lock LED is illuminated, the driver will not be able to drive or move the vehicle. Flashes when output is not properly connected. Vehicle must be serviced as soon as possible.

Door Ajar (Door Ajar Panel only) - Solid Red when the lift door is open, flashes when the passenger door alone is open.

The lower backlit icons on the Panel will remain illuminated whenever ILISC805 is awake. There are no lower backlit icons on the Door Ajar Panel. The module will stay awake for several minutes after the ignition is turned off.

Beeper

The warning beeper will sound when attempting to operate the wheel chair lift when one of the safety conditions is not met, such as opening the lift door while not in Park (neutral if no Park), not having the Park Brake set, or if vehicle motion is detected (rolling). Beeper volume can be adjusted by rotating the bezel on the beeper. Beeper location is determined by bus manufacturer.

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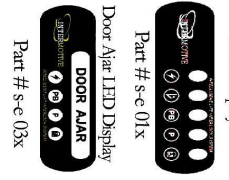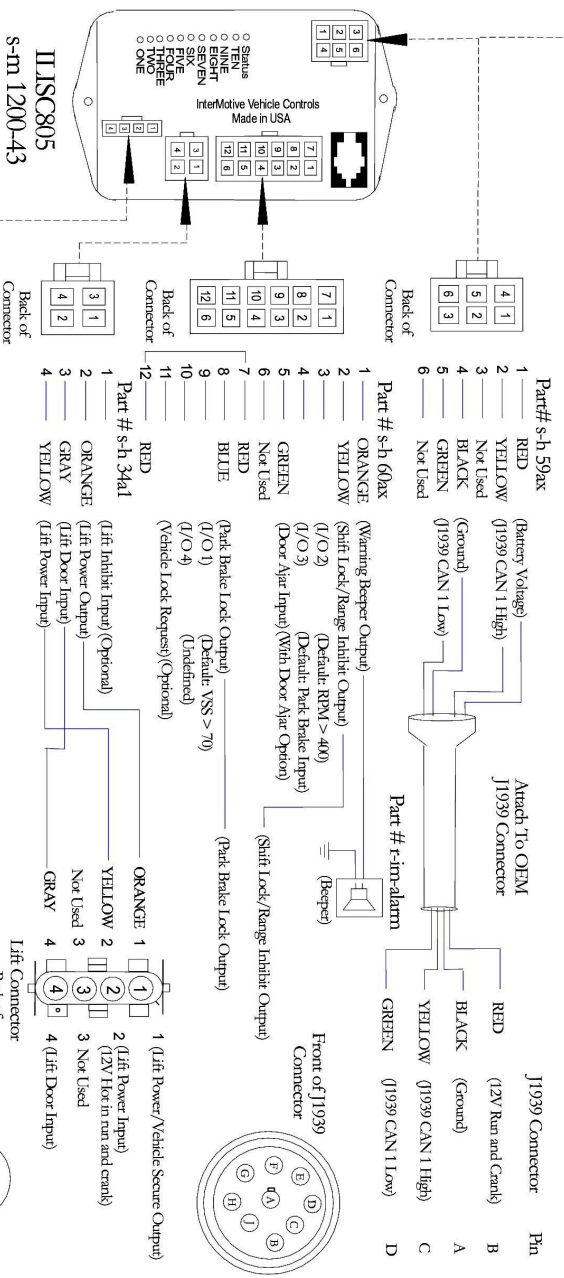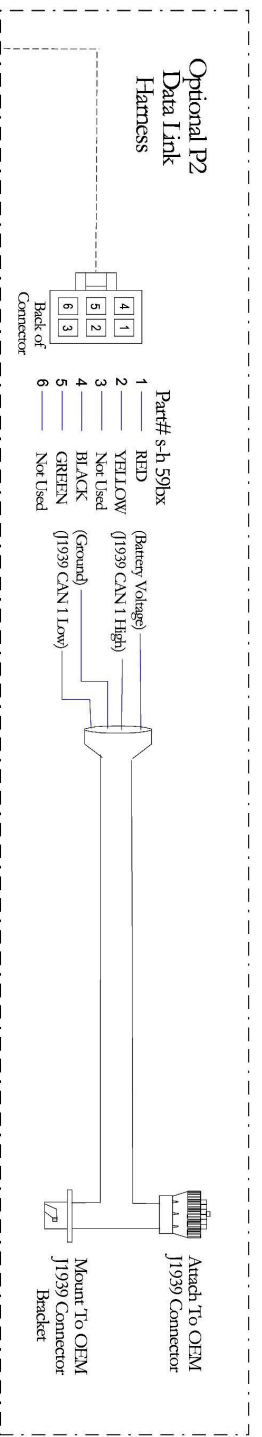
Submit product registration at www.intermotive.net

If the ILISC805 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.

Optional P2
Data Link
Harness

ILISC805
s-m 1200-43

InterMotive Vehicle Controls
Made in USA

Status
TEN
NINE
EIGHT
SEVEN
SIX
FIVE
FOUR
THREE
TWO
ONE

Back of
Connector

Part# s-h 59px
1 —— RED (Battery Voltage)
2 —— YELLOW (J1939 CAN 1 High)
3 —— Not Used
4 —— BLACK (Ground)
5 —— GREEN (J1939 CAN 1 Low)
6 —— Not Used

Part# s-h 59ax
1 —— RED (Battery Voltage)
2 —— YELLOW (J1939 CAN 1 High)
3 —— Not Used
4 —— BLACK (Ground)
5 —— GREEN (J1939 CAN 1 Low)
6 —— Not Used

Part # s-h 60ax
1 —— ORANGE (Warning Beeper Output)
2 —— YELLOW (Shift Lock/Range Inhibit Output)
3 —— (I/O 2) (Default: RPM > 400)
4 —— (I/O 3) (Default: Park Brake Input)
5 —— GREEN (Door Ajar Input) (With Door Ajar Option)
6 —— Not Used
7 —— RED (Park Brake Lock Output)
8 —— BLUE (I/O 1) (Default: VSS > 70)
9 —— (I/O 4) (Undefined)
10 ——
11 —— RED (Vehicle Lock Request) (Optional)
12 ——

Part # s-h 34a1
1 —— (Lift Inhibit Input) (Optional)
2 —— ORANGE (Lift Power Output)
3 —— GRAY (Lift Door Input)
4 —— YELLOW (Lift Power Input)

Part # s-h 32d1
1 —— BLUE (Ground)
2 —— YELLOW (5V)
3 —— WHITE (LIN)
4 —— RED (12V)

Part # s-h 32d1
1 —— BLUE (Ground)
2 —— YELLOW (5V)
3 —— WHITE (LIN)
4 —— RED (12V)

Part # r-in-alarm

(Beeper)

(Shift Lock/Range Inhibit Output)

(Park Brake Lock Output)

Attach To OEM
J1939 Connector

RED (12V Run and Crank)
BLACK (Ground)
YELLOW (J1939 CAN 1 High)
GREEN (J1939 CAN 1 Low)

J1939 Connector   Pin
B   (12V Run and Crank)
A   (Ground)
C   (J1939 CAN 1 High)
D   (J1939 CAN 1 Low)

Attach To OEM
J1939 Connector

Mount To OEM
J1939 Connector
Bracket

J1939 Connector
Pin   Wire Color
A
B   Green
C   Yellow

Front of J1939
Connector

Lift Connector
Back of
Connector
1 (Lift Power/Vehicle Secure Output)
2 (Lift Power Input) (12V Hot in run and crank)
3 Not Used
4 (Lift Door Input)

ORANGE 1
YELLOW 2
Not Used 3
GRAY 4

LED Display
Door Ajar LED Display
Part # s-e 01x
Part # s-e 03x

DOOR AJAR

Back of LED
Display