INSTALLATION GUIDE

For PreSet Plus® SmartHub™, SmartTrack™ Asset Management, SmartAir™ TPMS, SmartAir™ Line Pressure, and SmartAir™ Axle Load

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1. Best Practices

Before and after performing an installation, it is important to do an inspection of the tractor(s) and/or trailer(s) to identify any warning lights or visible damage so that it can be reported immediately. This includes, but is not limited to, electrical components, warning lights, and interior or exterior damage. If you notice a problem during a pre- or post-installation inspection, immediately notify the driver or the onsite point of contact.

Always follow the safety procedures of the installation location and your company. This may include wearing personal protective equipment, or PPE, including but not limited to safety glasses, safety vest, foot protection and dust mask.

For your safety, when working on a trailer, it is a best practice to place a flag or high-visibility vest on the 7-way as a visual indicator that work is being performed. A gladhand lock could also be installed on an air line. It is also recommended to use knee protection when working under trailers.

Keep in mind that this installation guide applies to ConMet Digital products only and should not be used in installing or servicing any other equipment. The information supplied here is for instructional purposes. It is not intended as a replacement for hub service manuals and hub installation instructions, which must be reviewed before use and service. Also, the information supplied by ConMet is not a substitute for any technical certification that may be required to perform certain tasks associated with these products or the tractors and trailers on which they are installed, or for any technical or safety training that your organization may require.

The installation instructions in this guide may vary based on the tractor or trailer year, make, model and configuration.

2. SmartAir™ Tire Pressure Monitoring System (TPMS) Overview

SmartAir TPMS sensors can be installed in conjunction with a ConMet gateway or upfitted to an existing gateway. The gateway sends the captured data to the ConMet cloud database, where it can be viewed using the ConMet digital portal or accessed via the ConMet application program interface (API) suite to a customer's data portal or a preferred telematics provider.

2.1. TPMS Upfit Kit

Each TPMS installation kit comes equipped with everything needed to complete a valve stem sensor installation including the sensors, locknuts and wrench. There are no additional tools or supplies needed to install the sensors.

Item	Purpose
Bluetooth® valve stem sensor	Capturing and reporting tire pressure
Locknut	Prevent moment of the sensor on the valve stem
Wrench	To tighten locknut against a sensor on a valve stem

2.2. SmartAir TPMS Installation

TPMS sensors are installed on each tire air valve stem by first threading the locknut onto the stem then screwing on the sensor clockwise until finger tight. Overtightening could damage the sensor and or threads. Then, the locknut should be tightened counterclockwise to no more than 10 in-lbs. against the bottom of the sensor. This includes both internal facing and external facing tires (when there are dual tires). Depending on the valve stem location, there may be times when a crowfoot wrench would be beneficial when tightening the locknut against the sensor. TPMS sensors monitor pressure within the tire of the wheel they are attached to in order to provide information about proper operating pressure before trips, loss of pressure, slow leaks, or fast leaks (figure 1).

Each sensor is equipped with a unique ID which is recorded at the time of installation along with the tire position on the asset. Recording tire positions is a critical step in the installation process to ensure accurate reporting. If the tire positions of each TPMS sensor are not properly captured at time of installation, the installation is not complete (figure 2).

If installing the SmartAir TPMS as an upfit to an existing gateway, there are no additional steps beyond what is mentioned in this section. If you are installing the system in addition to a new gateway installation, please refer to Section 6.

Figure 1: TPMS Sensor and Locking Nut

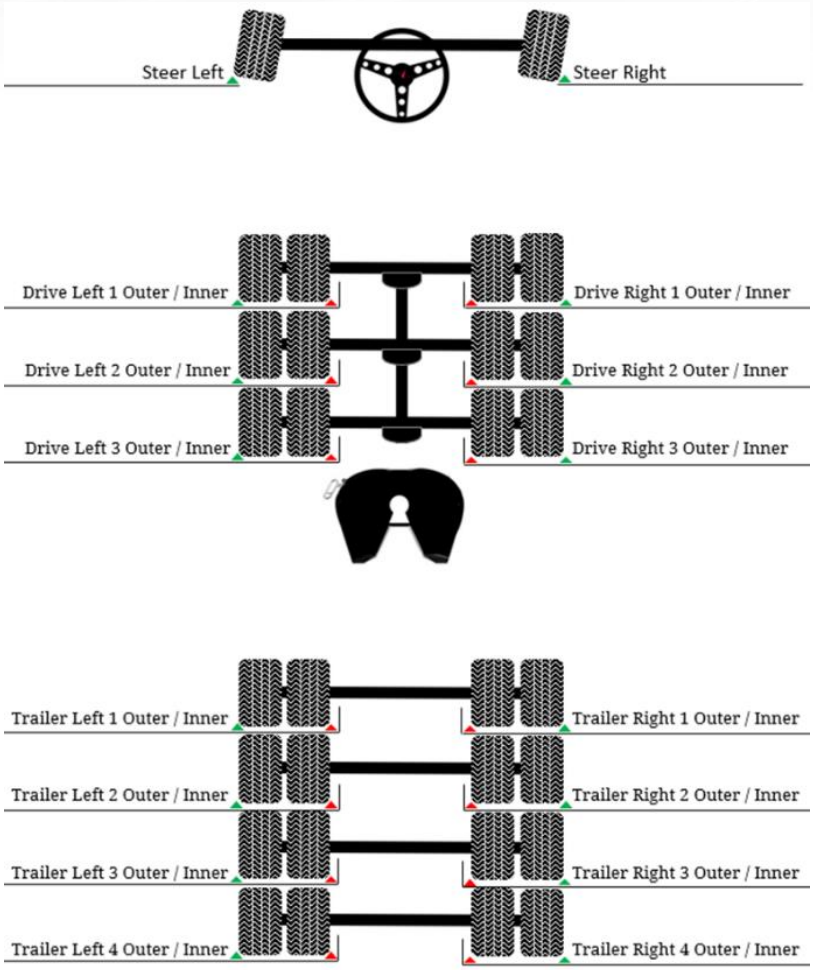

Figure 2: Tire Positions

2.3. TPMS with Automatic Tire Inflation System (ATIS) integration

If the trailer is equipped with an Automatic Tire Inflation System (ATIS), and the air hoses are not equipped with check ports, the hoses will need to be upfitted with integral check ports to accommodate the TPMS sensors. Depending on the system design, the hoses may be secured to a fitting at the center of the hub cap or there is a rotary union integrated into the sides of the hub cap. ATIS can be found on single or dual tire configurations. For dual tires, inside and outside tires will have hoses which will need to be upfitted if they don't include check ports. All air hose fittings should be hand tightened only. Tools should never be used as overtightening can potentially damage hose or valve stem threads, (figure 3).

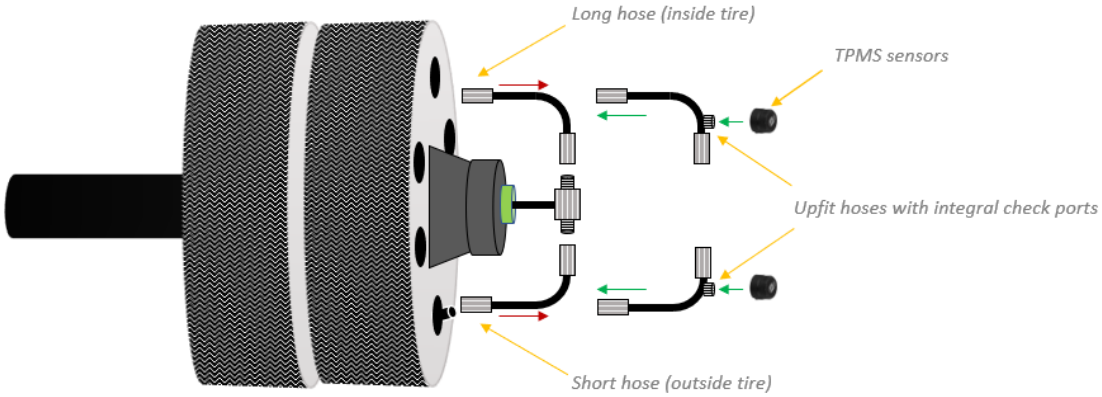

Figure 2: ATIS/TPMS Hose Integration

2.4. Alternate TPMS Sensor Installation Method

Depending on the ATIS configuration, it may be more suitable to install the TPMS sensors with interconnected Tee fittings at the valve stem. These should also be hand tightened only. Tools should never be used as overtightening can potentially damage hose or valve stem threads, (figure 3).

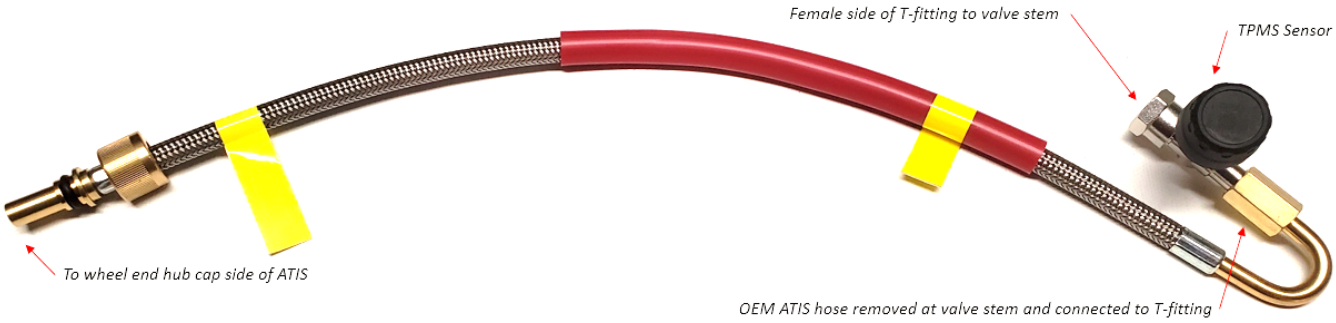

Figure 3: ATIS/TPMS T-Fitting Integration

2.5. SmartAir™ TPMS Checklist

Item	Description	Check
1.	All sensors have been securely tightened on the applicable valve stems	
2.	All locking nuts have been secured against the bottom of each TPMS sensor	
3.	All TPMS sensor serial numbers have been accurately recorded and submitted	
4.	All cold inflation pressures for all applicable tires have been recorded and submitted	

3. SmartTrack™ Asset Management

3.1. Gateway Overview

SmartTrack Asset Management is a service provided from data collected by the ConMet gateway, which can be upfit to a tractor or trailer and can pair with other ConMet Digital sensors. The gateway sends the captured data to the ConMet cloud database, where it can be viewed using the ConMet digital portal or accessed via the ConMet application program interface (API) suite to a customer's data portal or a preferred telematics provider.

3.2. Gateway Installation Upfit Kit

If you are installing a new gateway to integrate with SmartHub, SmartTrack or SmartAir sensors, all the necessary hardware and supplies are provided to complete the installation. Below is a list of items that you will receive in the upfit kit to complete a gateway installation (figure 4).

Figure 4: Gateway Upfit Kit

Item	Purpose
Gateway	Reports TPMS, SmartHub or Axle Load / Air Line Data
Power harness	Connectorized inputs for power and ground
(2) 10' extension cables	For trailer marker light input
ABS pass-through cable	Gateway power and ground connection method for trailer

Zip ties	Cable management
3/4” Self-tapping screws	Gateway mounting hardware
Circuit expander (fuse tap)	Tractor power connection method

3.3. Additional Tools and supplies not included

It is expected that the installer will have all the following common additional installation supplies and tools on-hand; they are not provided with the upfit kit but may be necessary to successfully install the gateway device. There may be scenarios that require specialized tools that are not listed here.

Tools	Purpose
Digital multimeter	Verifying circuits
Cordless drill	Driving self-tapping screws for gateway mounting
T10 Torx Bit with ¼ drill drive	For use with self-tapping screws

Supplies	Purpose
Extra cable ties / zip ties	Cable management
Adhesive lined butt connectors	Any exterior extended wire to wire connections
Solder and heat shrink	Alternate exterior wire connection method

3.4. Gateway Installation

Wiring the gateway requires a working knowledge of 12V mobile electronics and circuitry fundamentals, including, but not limited to, identifying circuits, current, wire to wire connection methods and basic wiring safety. Do not proceed unless properly trained. Prepare for gateway installation by having all components, tools, and supplies gathered (see Section 5).

3.4.1. Trailer - Gateway Sub Trailer Mounting

Before proceeding with an install in this location, locate access to your power connections and be cognizant of moving parts, especially if the trailer is equipped with a mechanical or air actuated tandem slide rail. Two pass-through connections need to be made to supply power and ground to the gateway. One is at the ABS circuit and the other is at one of the trailers marker lights. This connection provides a backup power source to the device.

The tandem slide assembly, or bogie, can be moved by the driver to accommodate load distribution and is typically where the ABS/AUX power source is located. Therefore, when mounting to an area that is stationary such as the floor or support beams, the power harness should follow the expansion harness to accommodate the movement in the slide assembly. A suitable location would be beyond the last position of the tandems. If this can't be accomplished, the gateway should be mounted directly to the framing of bogie with the provided self-tapping screws. This would allow the gateway and wiring to remain secure if the bogie is moved (figure 5). **As a precaution, you should always identify the drilling area and what's behind it to avoid potential damage and ensure there is adequate space to accommodate the hardware.**

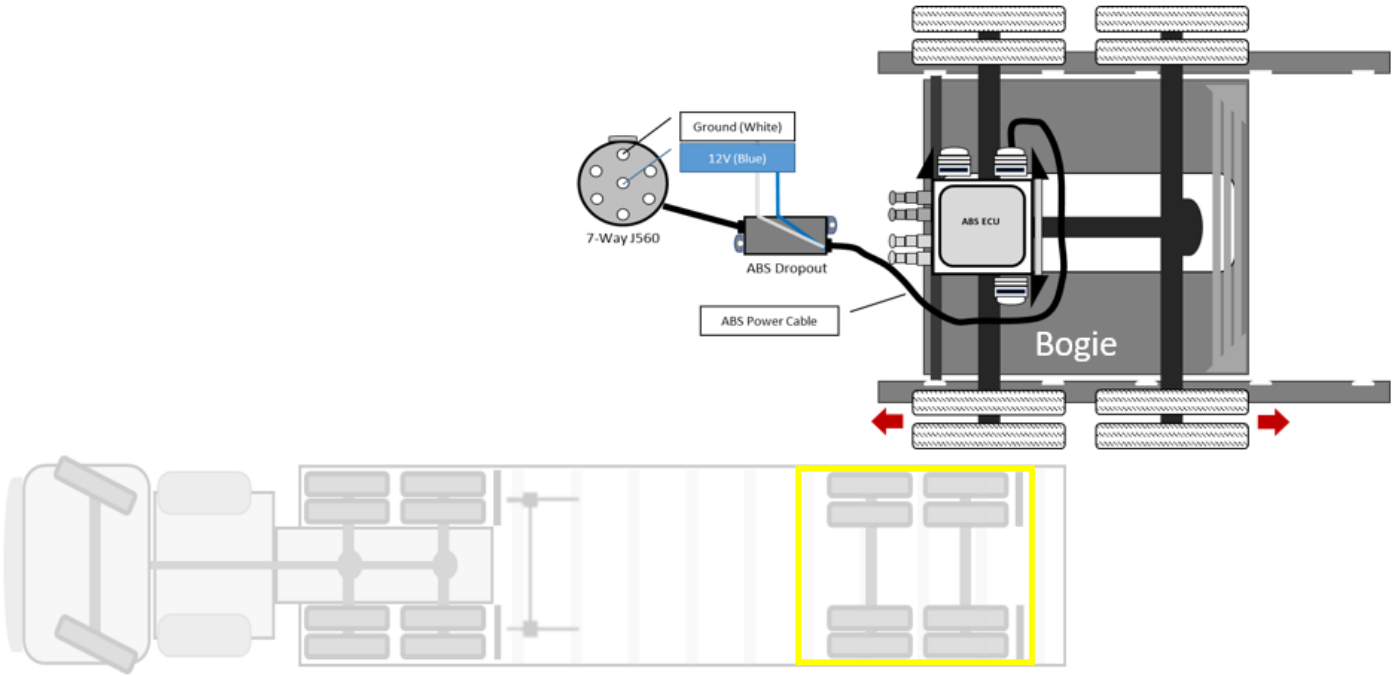

Figure 5: Tandem Slide (bogie)

The TTMA 5-PIN ABS breakout cable can also be found near the floor rail support beyond the last position in the slide rail. This would also be a suitable mounting location for the gateway (figure 6).

Note: Not all trailers come equipped with a tandem slide rail. In this scenario, the gateway can be mounted anywhere close enough to the ABS ECU power cable, provided all components are free of moving parts.

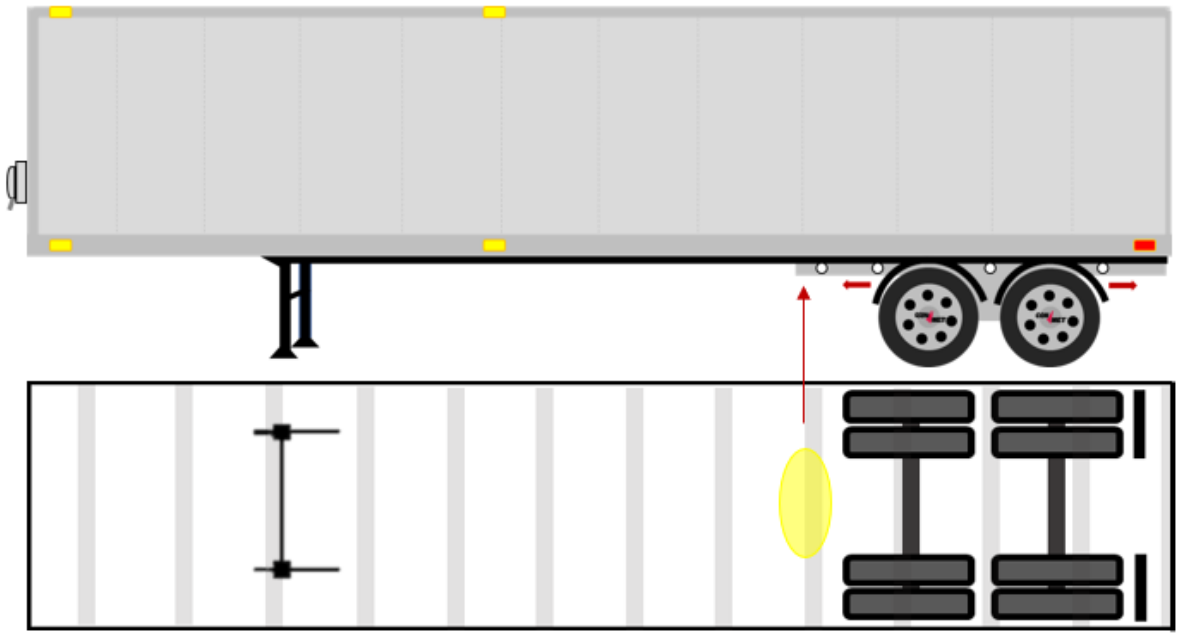

Figure 6: Beyond last position of bogie

3.4.2. Trailer - Gateway Sub Trailer Wiring

The wiring diagram below is applicable to trailer gateway installations. All the gateway harnesses have been connectorized for a seamless installation on a trailer. This configuration can be used for SmartAir TPMS as well as SmartHub integrations.

Once the Gateway has been securely mounted, make the following connections referenced in figure 7.

1. Secure the 6-PIN connector (1) from the Gateway to the 6-PIN Splitter (2).

2. Connect the 2-PIN harness (3) which is a backup power source that is a pass-through connection at the trailer's marker light circuit. The OEM trailer light circuit is disconnected at the light and is intercepted by this pass-through cable which supplies additional power and ground to the Gateway when the trailer is coupled.

3. Connect the 3-PIN (4) to the other connector of the (2) splitter which joins the 5-PIN ABS pass-through cable. This cable interconnects the trailers ABS circuit which provides power and ground to the Gateway when the trailer is coupled.

4. Locate the Trailers 5-PIN ABS power harness and insert the ABS pass-through cable. The power cable can be found at the ABS ECU and is positioned either front or rear axle. It can also be found beyond the last position of the tandem at the ABS breakout cabling where it splits off from the main auxiliary harness.

	Gateway Wiring Harness Key

1.	Gateway power harness
2.	2-way splitter to marker light and ABS pass-through cables
3.	Trailer maker light pass-through cable
4.	Jumper cable to 5-PIN ABS pass-through cable
5.	*(2) Additional 2-PIN 10’ extensions for trailer marker light input

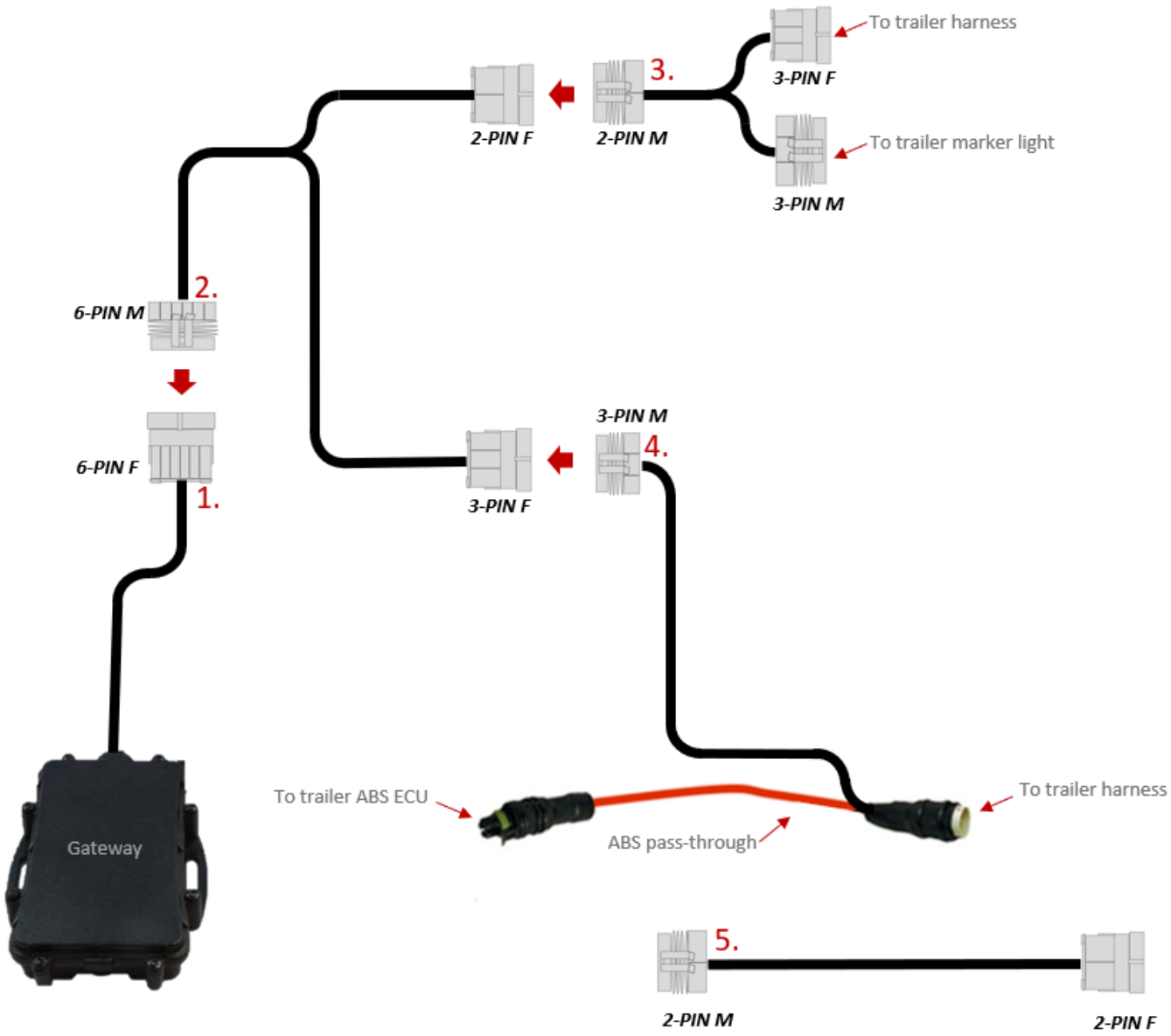

Figure 7: Connectorized Trailer Gateway Wiring

3.4.3. Gateway Status Lights

After the wiring connections have been completed you should then confirm that the gateway is online. To do this, observe the status lights that are located at the top left corner (figure 8). Please refer to the status light conditions in figure 9.

Figure 8: Gateway Status Lights

Amber LED (COM)	Condition
Off	Modem Off - 1hz-no network
Blinking slowly	COMM on and searching - 4hz-network found, not registered
Blinking fast	Network is available - solid-network found, registered
Alternates slow to fast	Registered but no inbound acknowledgement
Solid	Registered and received inbound acknowledgement

Green LED (GPS)	Condition
Off	GPS off - 1hz-looking for signal
Blinking slowly	GPS on - 4hz-signal found, acquiring fix
Blinking fast	GPS time sync
Solid	GPS fix

Figure 9: Gateway Status Light Conditions

3.4.4. Tractor - Gateway Mounting

Using the proper plastic panel pry tools, identify a mounting location for the gateway under the front dash area that provides enough space to fully reassemble the dash back to its OEM condition.

The preferred mounting location is typically near power and ignition circuits and away from any moving parts. It should never be secured to serviceable panels or in an area that is surrounded by metal as the gateway needs a clear path to the sky for optimal performance (figure 10). Areas such as crash bars, component bracketing and air ducts are suitable mounting locations for the device. The mounting location should also provide adequate space for cable routing and wire management.

Secure the gateway in any orientation with the cable ties to a surface that will have minimal movement (figure 11). You may use foam tape to position the gateway before applying cable ties for easier mounting, but always secure the gateway with cable ties or another mechanical method, as foam tape adhesive can be impacted by temperature and age.

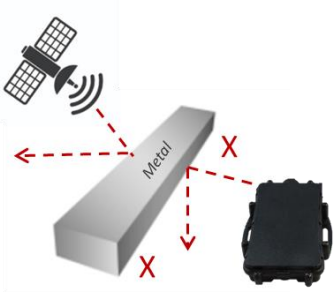

Figure 10: Clear View of Sky Method

Figure 11: Mechanical Mounting

There are several mounting locations that can be used in the cab area of a tractor (figure 12). Although a constant 12v supply can be found in most of these locations, you may be limited due to the availability of a switched power source or the availability of space for the device and/or wiring.

Figure 12: Recommended Mounting Locations

	Location	Potential Power Sources
1.	Driver front top dash	Behind instrument cluster
2.	Driver front under dash	Ignition switch, brake switch
3.	Center front console	Constant ACC plug, brake switch
4.	Center front radio	Radio or navigation
5.	Center front top dash	Fuse panel
6.	Passenger under dash	Passenger fuse panel

3.4.5. Tractor - Gateway Wiring Method

As the wiring connections will be interior, it's recommended that the power and ignition connections be made with circuit expanders (figure 13). These connections should never be made with wire piercing connectors as these can fail causing the device to work intermittently or become completely inoperable. All wiring should be routed free from sharp edges and secured with zip ties. Below are the recommended connection methods when using circuit expanders.

1. It's preferable to use an open fuse socket in the tractor but not all will be configured to supply power. If using an open fuse socket in the tractor, **DO NOT** install a fuse in the lower part of the circuit expander.

2. If using an open socket in the fuse panel, it's important to identify which side of the socket is providing power so that you can orient the circuit expander correctly.

3. If using a used socket, choose a circuit that is not critical to the operation of the vehicle; avoid ABS brakes, air bag systems, power train and engine control module circuits.

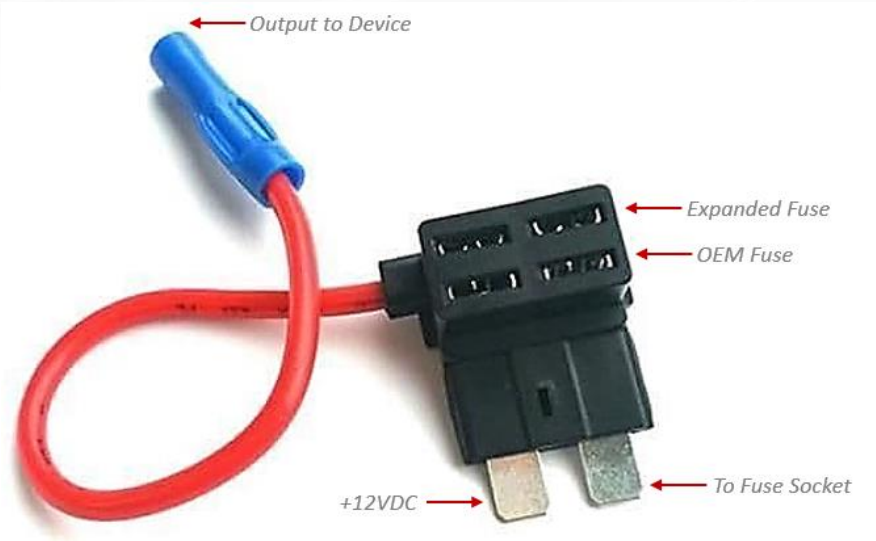

Figure 13: 12V Circuit Expander

If the power or the switched circuit needs to be extended, the wire should be of adequate gauge for the current requirements. Additionally, all wire connections, and/or removed wire insulation during circuit validation, should always be sealed prior to reassembling your access area.

The preferred ground connection method is one self-tapping screw through a ring terminal crimped onto the black ground wire from the gateway and screwed into chassis ground (figure 14). The use of an OEM ground source or grounding post can be used as an alternative so long as the aforementioned connection methods are followed.

Figure 14: Ring Terminal with ST screw

3.4.6. Tractor - Gateway Wiring Source

Using a digital multimeter, identify the 12 volt and ignition circuits to be used. The red wire (power input) must be connected to a constant +12V VDC circuit and should be fused with not more than 5 amps. The white wire (ignition input) must be connected to a switched circuit. This circuit must provide +12 VDC when the vehicle ignition is on. The black wire (ground) must be connected to chassis or battery direct, see figure 15.

After the wiring connections have been completed you should then confirm that the gateway is online. To do this, observe the status lights and conditions that are in section 6.3.

Figure 15: Wiring Harness

3.5. Gateway Installation Checklist

Item	Description	Check
1.	Adequate gateway cable lengths have been considered to allow movement of tandem axles on trailers	
2.	The gateway has been secured with a mechanical method to prevent movement and away from moving parts	
3.	All power and ground connection sources have been validated with a digital multimeter prior to connection	
4.	All wire to wire connections have been made with the provided connectorized solution	
5.	All wiring has been routed and secured away from moving parts as well as sharp edges	
6.	The gateway status lights have been validated	

4. SmartAir™ Line Pressure and SmartAir™ Axle Load

4.1. Overview

The SmartAir pneumatic sensor module is able to monitor compression of the air springs as well air line pressure in an air suspension system. This information can provide accurate continuous data on load sensing and air line pressure. The data is then communicated to a gateway installed on the trailer via Bluetooth®. The gateway sends the captured data to the ConMet cloud database where it can be viewed using the ConMet digital portal or accessed via the ConMet application program interface (API) suite to a customer's data portal or a preferred telematics provider.

4.2. SmartAir Pneumatic Sensor Module Upfit Kit

Here you will find a list of tools and supplies that are needed to perform the installation of the Pneumatic Sensor Module for axle load and supply air line monitoring. As the installer, you should confirm that you have the necessary tools and supplies prior to scheduling an installation.

Supplies	Purpose
Pneumatic Sensor Module	Captures and sends axle load and/or line pressure data to the gateway
Mounting bracket	Mounting option for sensor module
¼" air line – 20 ft.	Air supply and air spring inputs
Cable ties	Cable / air line management

3/8"-16 x 1/4" Hex cap bolt	Bracket mounting option
5/16"-18 x 3/4" Self-tapping hex screw	Bracket mounting option
3/8-16 Nylon locking nut	Bracket mounting option
(2) ¼" PTC tee fitting	Air line connection method

4.3. Additional tools and Supplies not included

Supplies	Purpose
Pneumatic thread sealer	If using the alternate 'street t' install method
Air line cutting tool	For an accurate clean 90° cut for proper seating in fittings
(2) ¼" Street tee fitting	For alternate 'street t' install method

4.4. SmartAir Pneumatic Sensor Module Installation

If you are installing the SmartAir Line Pressure & SmartAir Axle Load system as an upfit to an existing ConMet gateway, the pneumatic sensor module (PSM) will plug directly into it for its power source. The device mounting as well as the plumbing will still need to be completed. The installation may vary based on the tractor or trailer make, model and configuration.

4.4.1. Trailer - Pneumatic Sensor Module Mounting

Identify a mounting location for the Pneumatic Sensor Module (PSM) under the trailer. This location should be free of moving parts as well as providing accessibility to air spring and air supply lines. The mounting location should also be not more than 20 ft. away from the ConMet gateway as this is where the power connection will be made. If this is not an upfit to a pre-installed gateway and a new gateway is being installed, please refer to Section 4.

Due to moisture and debris, the orientation of the (PSM) should always be mounted vertically with the wiring connector facing to the side or horizontally with the molded top of the module facing up (figure 16). The PSM should never be mounted upside-down or with the wiring connector facing down or up as moisture could pool inside the pressure sensors and freeze causing the PSM to either report inaccurate data or become inoperable.

The PSM should be secured to the provided bracket assembly using three zinc plated 3/8" x 1" bolts and Nyloc nuts. The bracket can then be secured to the trailer framing with two 5/16"-18 x 3/4" Self-tapping hex screws (figure 17). The PSM can also be mounted without the bracket directly to a surface that has adequate space behind it and will not impede any moving parts using the self-tapping screws.

As a precaution, you should always identify the drilling area and what's behind it to avoid potential damage and ensure there is adequate space to accommodate the hardware.

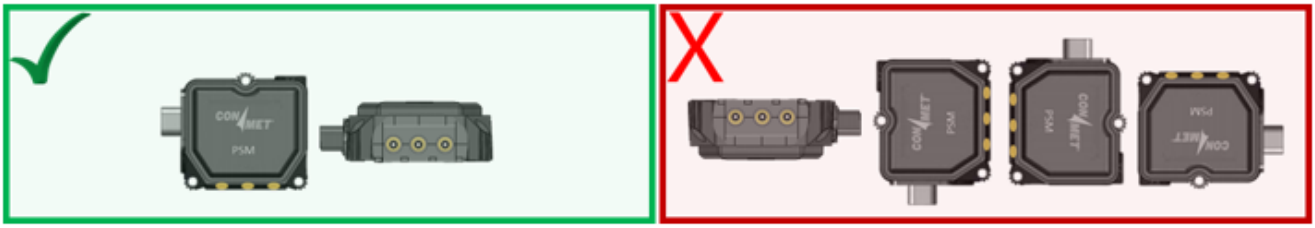

Figure 16: Proper PSM Orientation

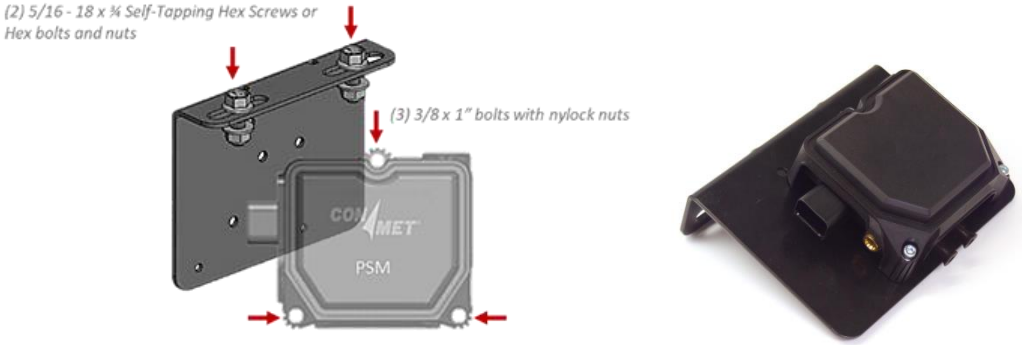

Figure 17: PSM Mounting Bracket

4.4.2. Trailer - Pneumatic Sensor Module Wiring Method

The wiring diagram below (figure 18), is applicable to Pneumatic Sensor Module trailer installations. All the harnesses have been connectorized for a seamless installation on a trailer. If this is not an upfit to a pre-installed gateway and a new gateway is being installed, please refer to Section 3.

Once the Gateway has been securely mounted, make the following connections listed below:

1. Secure the 6-PIN connector (1) from the Gateway to the 6-PIN Splitter (2).

2. Connect the 2-PIN harness (3) which is a backup power source that is a pass-through connection at the trailer's marker light circuit. The OEM trailer light circuit is disconnected at the light and is intercepted by this pass-through cable which supplies additional power and ground to the gateway when the trailer is coupled. If needed there are two additional 10' extensions (5) that can be utilized to reach the trailer marker light connection point. This may be needed depending on the gateway mounting location.

3. Connect the 3-PIN (4) splitter to the other side of the (2) splitter. Now connect one side to the PSM and the other to cable (5) which joins the 5-PIN ABS pass-through cable. This cable interconnects the trailers ABS circuit which provides power and ground to the Gateway when the trailer is coupled.

4. Locate the Trailers 5-PIN ABS cable and insert the ABS pass-through cable. This is typically done at the Tandem Slide Assembly or in front of it at the ABS breakout cabling.

	Pneumatic Sensor Module Wiring Harness Key
1.	Gateway power harness
2.	2-way splitter to marker light and ABS pass-through cables
3.	Trailer maker light pass-through cable
4.	2-way splitter to Pneumatic Sensor Module (PSM)
5.	Jumper to 5-PIN ABS pass-through cable
6.	(2) Available 2-PIN 10' extensions for marker light input
7.	(2) Available 3-PIN 10' extensions for PSM input

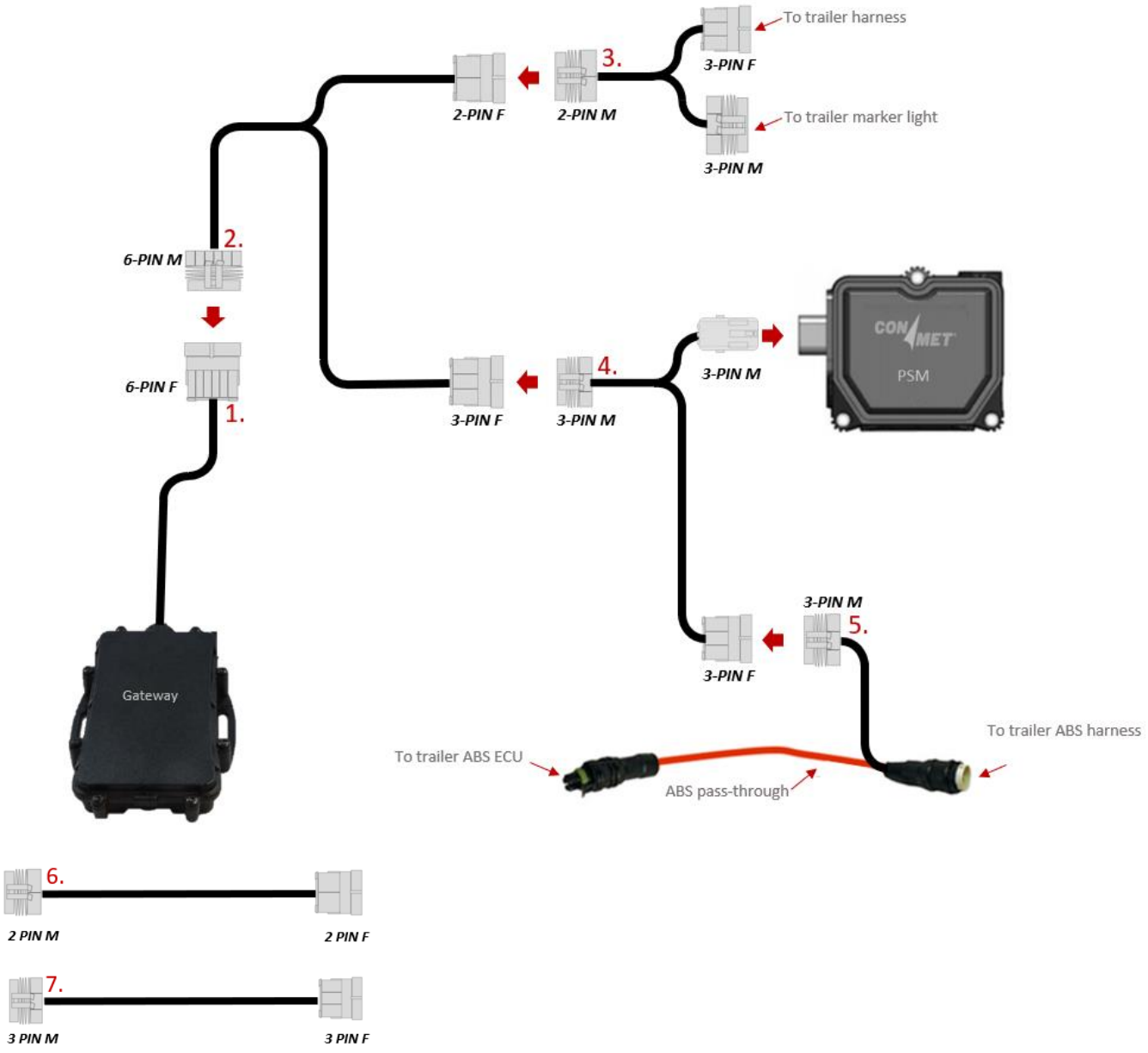

Figure 18: Pneumatic Sensor Module Wiring

4.4.3. Trailer - Pneumatic Sensor Module Plumbing

Before making any connections to the air system, the air should be purged as the system is under pressure and could cause harm or damage if this initial step is not taken.

Once the air has been purged from the system, locate your air line connection points both for an air spring as well as the supply air line. Next, cut your supplied air lines to the proper length that will reach the **air supply** input labeled "galley" which is on the same side as the connector and the primary **suspension input** port labeled "port 3" on the mounted PSM (figure 19). The supplied air lines should be cut with a proper pneumatic air line cutting tool at a 90° and should be free of debris and scarring on the outside of the line. Improper line seating could result if these precautions are not taken.

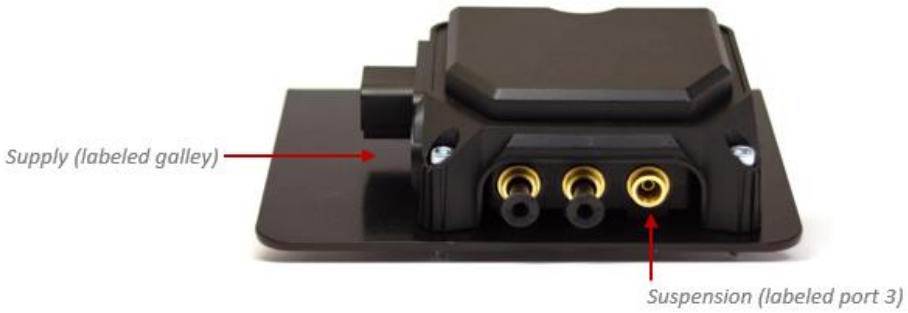

Figure 19: PSM Air Line Input Positions

Next, cut the OEM air lines where you will tap into the air supply line as well as an air spring line. Insert the OEM air lines as well as your (PSM) air lines into 'T' connectors by pushing firmly while lightly twisting the line. The line should be pushed into the connector until it stops. Next, lightly pull the air line to ensure it has been seated properly and is secure in the fitting. For further details, refer to the Pneumatic Sensor Module Plumbing Diagram in (figure 20).

You should be mindful of sharp edges as well as moving parts when routing and securing air lines. It's a best practice to route the lines along existing harnesses and secure them with zip ties. If the air line needs to be routed through an area with sharp edges, it's a best practice to add additional protection to the air line such as a sleeve or loom.

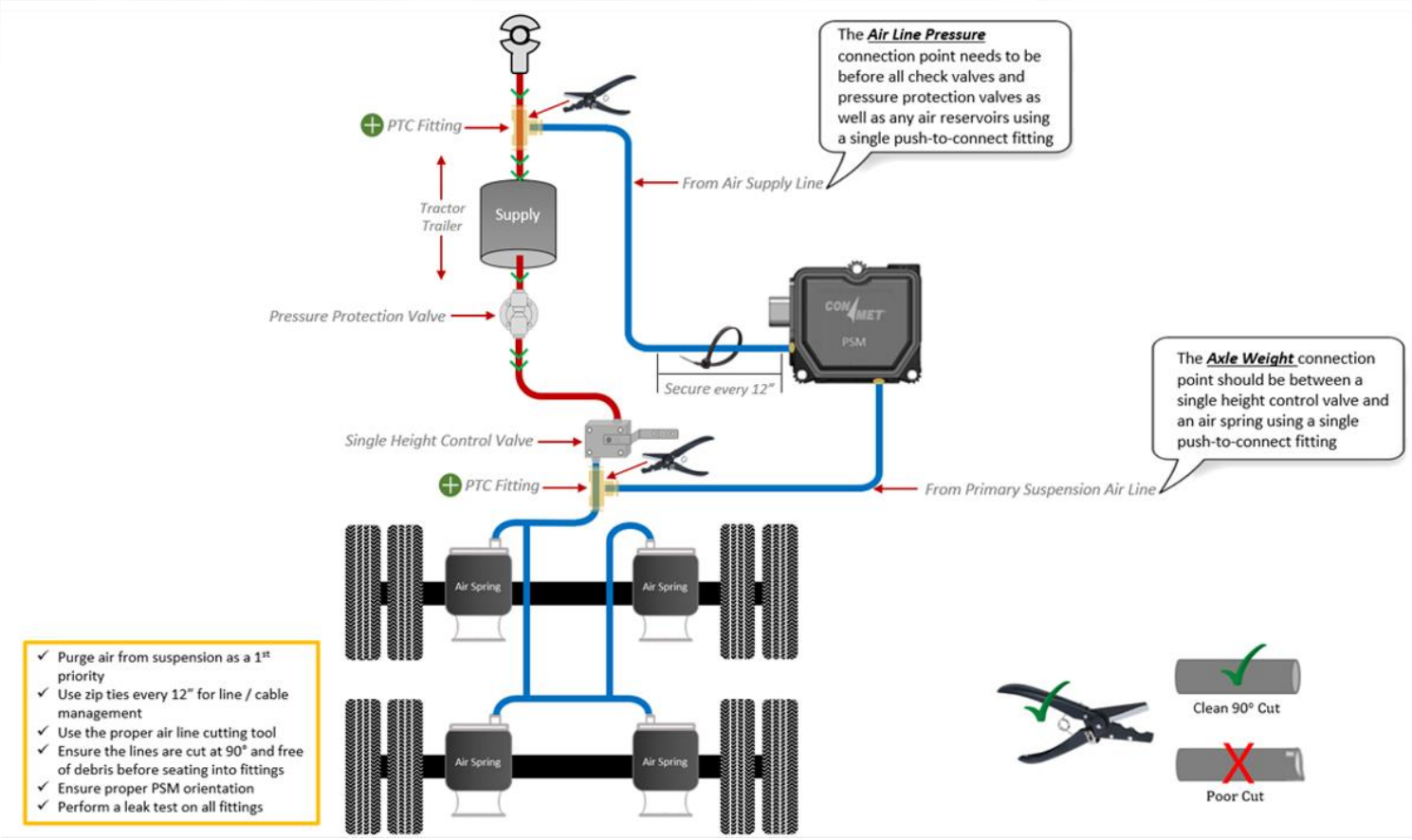

Figure 20: Recommended Trailer PSM Plumbing

Finally, check for leaks at all your connection points with soapy water. If bubbles are present at any of the connection points, the air line as well as fitting should be inspected and re-installed per guidelines.

4.4.4. Tractor - Pneumatic Sensor Module Mounting

Identify a mounting location for the Pneumatic Sensor Module (PSM) inside the cab of the tractor. This location should be free of moving parts as well as providing accessibility to an air spring air line through the firewall. If this is not an upfit to a pre-installed gateway and a new gateway is being installed, please refer to Section 3.

Secure the PSM in any orientation with the cable ties to a surface that will have minimal movement. You may use foam tape to position the PSM before applying cable ties for easier mounting, but always secure the PSM with cable ties or another mechanical method, as foam tape adhesive can be impacted by temperature and age. Surfaces such as air ducts, dash braces, or crash bars are suitable mounting locations.

There are several locations that can be used in the cab area of a truck (figure 21) where you will typically have access to a constant power source.

Figure 21: Potential PSM Mounting Locations

	Location	Potential Connection Points
1.	Driver front top dash	Behind instrument cluster
2.	Driver front under dash	Ignition switch, brake switch
3.	Center front console	Constant ACC plug, brake switch, media
4.	Center front radio	Radio or navigation
5.	Center front top dash	Fuse panel
6.	Passenger under dash	Passenger fuse panel

If the PSM is being mounted on the exterior of the tractor, the orientation of the PSM should always be mounted vertically with the wiring connector facing to the side or horizontally with the molded top of the module facing up to minimize exposure to moisture and debris (figure 22). The PSM should never be mounted upside-down or with the wiring connector facing down or up as moisture could pool inside the pressure sensors and freeze causing the PSM to either report inaccurate data or become inoperable.

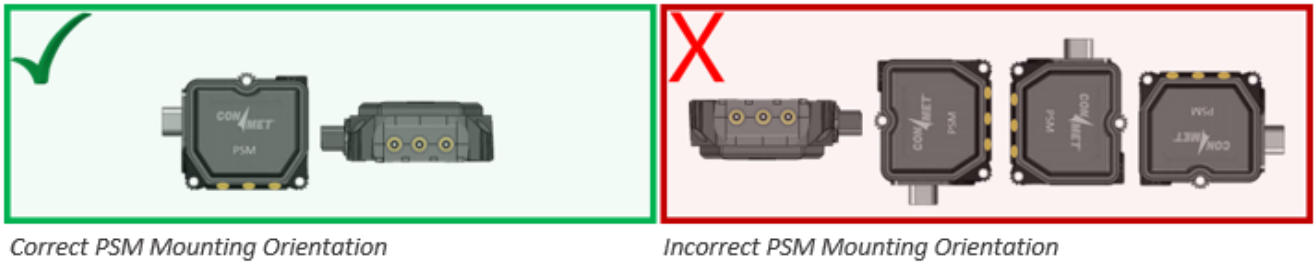

Figure 22: Proper External PSM Mounting Orientation

If mounting externally, the PSM should be secured to the provided bracket assembly using three zinc plated 3/8" x 1" bolts and nylock nuts. The bracket can then be secured to the trailer framing with two 5/16"-18 x 3/4" Self-tapping hex screws (figure 23). The PSM can also be mounted without the bracket directly to a surface that has adequate space behind it and will not impede any moving parts using the self-tapping screws.

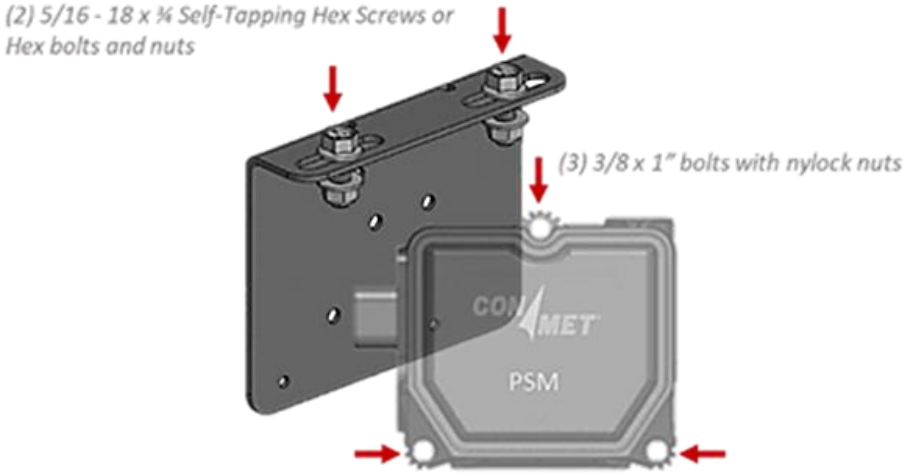

Figure 23: PSM Mounting Bracket

4.4.5. Tractor - Pneumatic Sensor Module Wiring Method

If the wiring connections are interior, it's recommended that the power connection be made with a circuit expander (figure 24). It's recommended that wire to wire connections should not be made with wire piercing connectors as these can fail causing the device to work intermittently or become completely inoperable. All wiring should be routed free from sharp edges and secured with cable ties. Below are the recommended connection methods when using circuit expanders.

1. It's preferable to use an open fuse socket but not all will be configured to supply power. If using an open fuse socket in the tractor, **DO NOT** install a fuse in the lower part of the circuit expander.

2. If using an open socket in the fuse panel, it's important to identify which side of the socket is providing power so that you can orient the circuit expander correctly.

3. If using a populated socket, choose a circuit that is not critical to the operation of the vehicle; avoid ABS brakes, Air bag systems, power train and engine control module circuits.

4. The power connection can share the same circuit as the gateway as both devices have a combined current draw of less than 1 AMP.

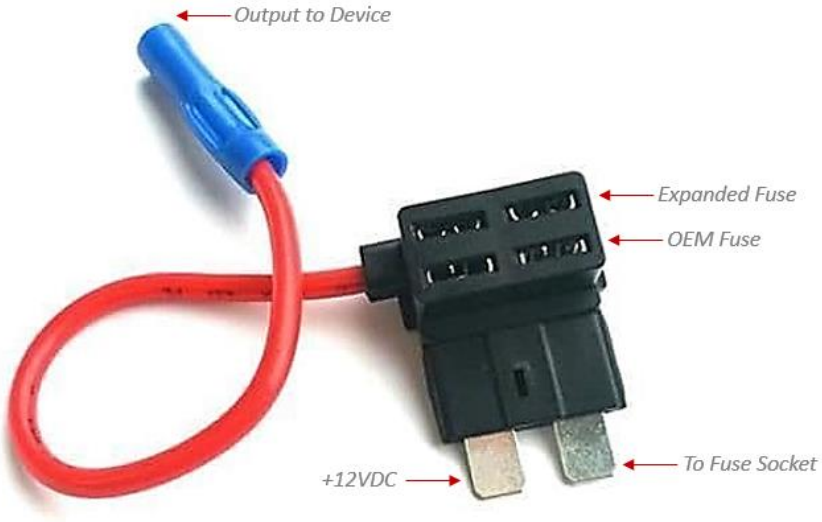

Figure 24: Circuit Expander (Fuse Tap)

If the tractor wiring connections are exterior, the proper weatherproof wiring connection methods such as ring terminals should be used for both power and ground connections. These types of connections can be made directly at a battery post or to the main battery studs that supply power and ground to a fuse panel in the engine compartment (figure 25). If a fuse panel can be accessed without modifications, a circuit expander can be used providing the fuse panel cover can be re-installed properly.

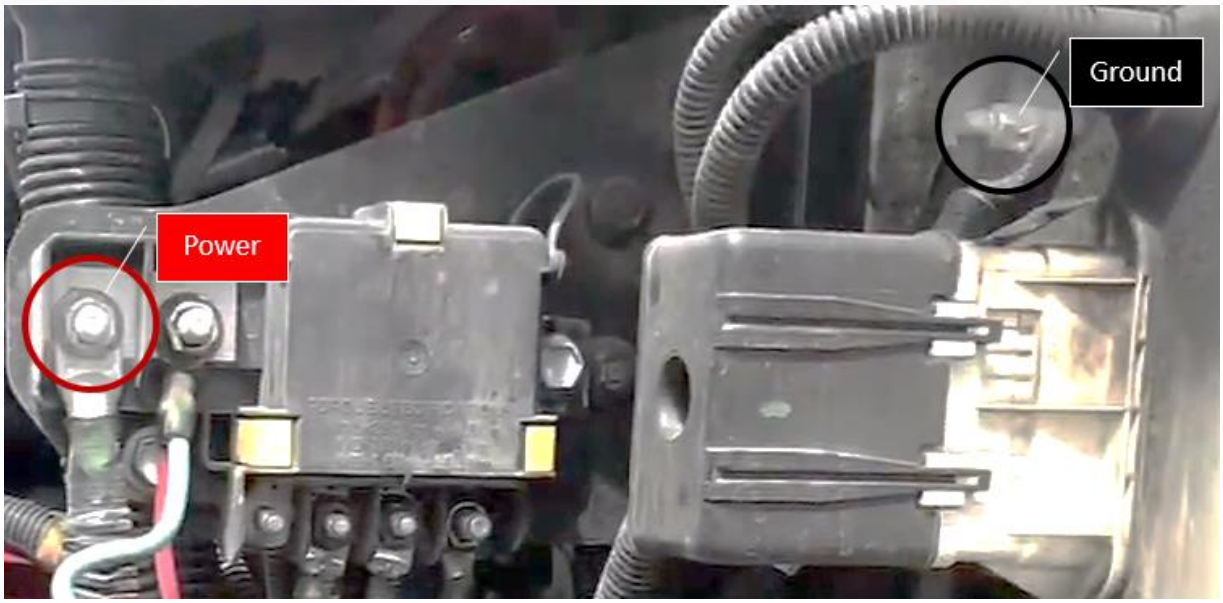

Figure 25: Exterior Tractor Wiring

If the 12V power circuit needs to be extended, the wire should be of adequate gauge for the current requirements. The extension should be made using the proper weatherproof adhesive lined butt connector.

An alternate ground connection method is one self-tapping screw through a ring terminal crimped onto the white ground wire from the (PSM) and screwed into chassis ground (figure 26). The use of an OEM ground source or grounding post can be used as an alternative so long as the aforementioned connection methods are followed.

Figure 26: Ring Terminal Ground Method

4.4.6. Tractor - Pneumatic Sensor Module Wiring Source

Using a digital multimeter, identify a switched 12-volt circuit to be used. The black wire (power input) must be connected to a switched +12V VDC or ignition circuit and should be fused with not more than 5 amps. The white wire (ground) must be connected to chassis or battery direct, see (figure 27).

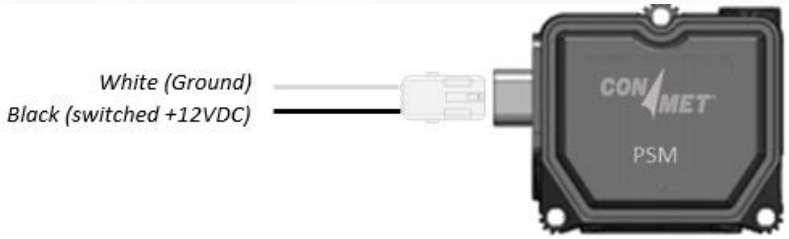

Figure 27: PSM Wire Harness

4.4.7. Tractor - Pneumatic Sensor Module Plumbing

Before making any connections to the air system, the air should be purged as the system is under pressure and could cause harm or damage if this initial step is not taken.

Once the air has been purged from the system, locate your air line connection point for the air springs. Next, cut your supplied air line to the proper length that will reach the primary suspension input port on the mounted PSM labeled port 3. The supplied air lines should be cut with a proper pneumatic air line cutting tool at a 90° and should be free of debris and scarring on the outside of the line. Improper line seating could result if these precautions are not taken. As tractors are equipped with in dash air line pressure indicators, there is no need to make this connection.

Next, cut the OEM air line where you will tap into the air suspension line. Insert the OEM air line as well as your PSM air line into a 3/8 push-to-connect 'T' fitting by pushing firmly while lightly twisting the line. The line should be pushed into the connector until it stops. Next, lightly pull the air line to ensure it has been seated properly and is secure in the fitting. For further details, refer to the Recommended Pneumatic Sensor Module Plumbing Diagram in figure 28.

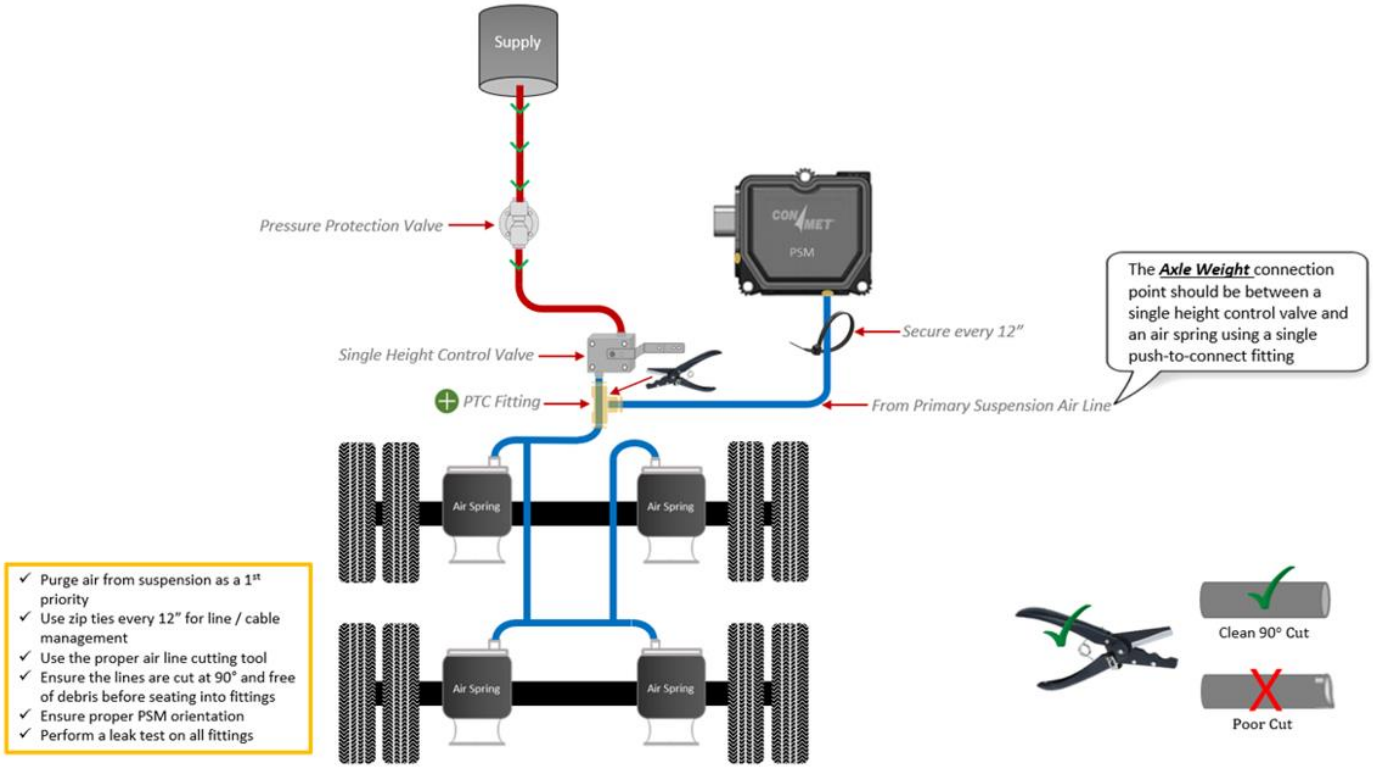

Figure 28: Trailer PSM Plumbing

You should be mindful of sharp edges as well as moving parts when routing and securing air lines. It's a best practice to route the lines along existing harnesses and secure them with zip ties.

If the PSM is mounted inside the cab of the tractor, it will be necessary to exit the tractor to gain access to your air line connection point. It is preferable to use an existing grommet or boot in the firewall providing there is enough space to accommodate the air line. If there aren't existing exit points that can be utilized, you may need to drill a small hole in the firewall to gain access to the exterior of the tractor which can accommodate the air line. If this method is used, a rubber grommet must be placed in the hole before routing the air line so that it is both protected from sharp metal edges as well as sealing the exit point (figure 29).

Figure 29: Air line Routed Through Firewall with Grommet

1.

4.5. SmartAir™ Line Pressure / Axle Load Checklist

Item	Description	Check
1.	Adequate PSM cable lengths have been considered to allow movement of tandem axles	
2.	The PSM has been secured in the correct orientation with a mechanical method to prevent movement and away from moving parts	
3.	All power and ground connection sources have been validated with a digital multimeter prior to connection	
4.	All wire to wire connections have been made with the provided connectorized solution	
5.	All wiring has been routed and secured away from moving parts as well as sharp edges	
6.	All air lines have been cut at a 90° with the proper cutting tool and free from debris	
7.	Adequate air line lengths have been considered to allow movement of tandem axles on trailers	
8.	The air supply line has been inserted into the PSM port labeled "galley" and the suspension line has been inserted into the PSM port labeled "port 3"	
9.	All air lines have been properly seated into the provided push-to-connect fittings	
10.	All air lines have been properly secured away from moving parts and any sharp edges	
11.	A leak test has been performed on all fittings	
12.	All modified conduits to accommodate an air line from the interior to the exterior have been properly sealed with a grommet	

5. PreSet Plus SmartHub

5.1. Overview

Now, let's take a moment to familiarize you with how the SmartHub works.

SmartHub sensors are installed on each hub assembly using aluminum shims that are contoured for every unique hub shape, including steer, drive, and trailer hubs. The SmartHub sensors monitor temperature and vibration that can be early indicators of bearing or seal wear, brake imbalance, brake seizure events, tire flat spots, tire imbalance, tire leaks, and more.

The SmartHub sensors communicate to a gateway installed on the tractor and/or trailer. The gateway sends the captured data to the ConMet cloud database, or via the ConMet application program interface (API) suite to a customer's data portal or a preferred telematics provider (figure 30).

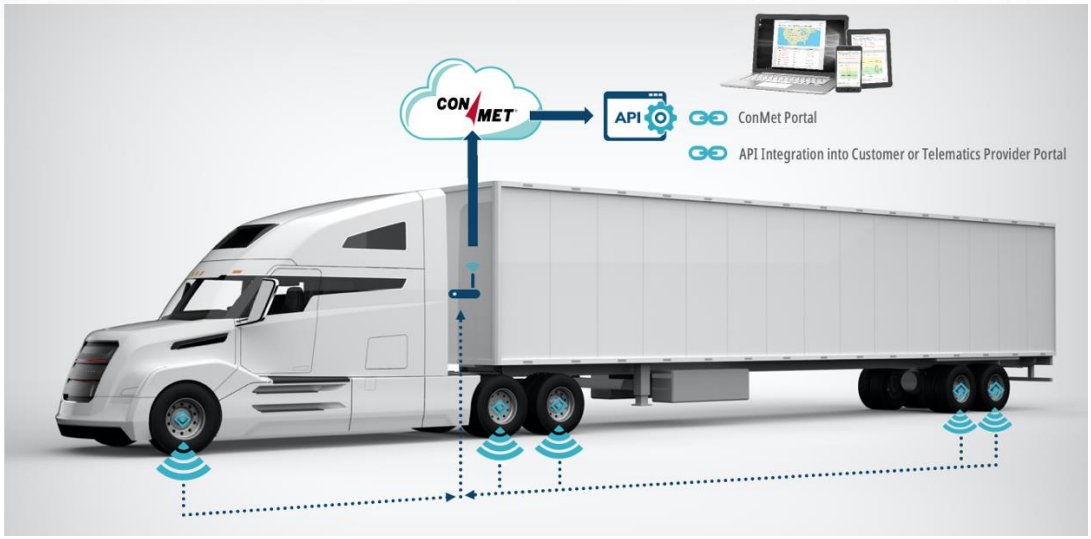

Figure 30: PreSet Plus® SmartHub technology depiction

5.2. Installation Supplies

Here you will find a list of tools and supplies that are needed to perform a complete SmartHub installation, including sensors and gateways. As the installer, you should confirm that you have the necessary tools and supplies prior to scheduling an installation.

5.3. Upfit Kit Contents

For SmartHub installation, you will be provided an installation upfit kit for each asset that includes the following items: sensors with pre-installed shims, gateway and cabling, a circuit expander, ABS pass-through cable, 2-part burst pack adhesive, zip ties and 5/16th x 1" self-tapping screws (figure 31).

Figure 32: SmartHub Upfit Kit

Item	Purpose
Gateway	Reports TPMS, SmartHub or Axle Load / Air Line Data
Power cable	Connectorized inputs for power and ground
(2) 10’ extension harnesses	For trailer marker light input
ABS pass-through cable	Gateway power and ground connection method for trailer
Zip ties	Cable management
1” Self–tapping screws	Gateway mounting hardware
Circuit expander (fuse tap)	Tractor power connection method

Note: The sensor nodes are specific to each hub type - steer, drive and trailer are mounted to shims that can accommodate the different types of hubs. The sensors will be labeled in the install kit for each specific wheel hub.

5.4. Additional Tools and Supplies Not Provided

It is expected that the installer will have all the following common additional installation supplies and tools on-hand; they are not provided with the upfit kit but may be necessary to successfully install the SmartHub product. There may be scenarios that require specialized tools that are not listed here.

Tools	Purpose

Digital multimeter	Verifying circuits
Wire brush or wire brush attachment for rotary tool	Preparing hub surfaces for application
Cordless drill	For use with self-tapping screws
T10 Torx bit with ¼" drill drive	For use with self-tapping screws
T25 Torx bit	Interior dash disassembly / reassembly
Socket set	Asset disassembly / reassembly
Wire strippers / cutters	Gateway wiring connections
Utility knife	Customizing harness
Plastic panel pry tools	Removing interior trim panels

Supplies	Purpose
Extra cable ties / zip ties	Wire management or securing SmartHub gateway
Electrical tape	Proper insulation of any exposed wiring
Clean shop towels / rags	Cleaning hub for sensor installation
Electrical Contact Cleaner (or equivalent solution)	Cleaning hub for sensor installation
Assortment of female spades	Additional wiring options
Assortment of ring terminals	Ground or power connection method
Solder, soldering gun, and 3mm heat shrink tubing or heat shrink butt connectors (2:1 shrink ratio)	External wire connections
Extra 5/16", 1" long self-tapping screws	For external trailer gateway installs

5.5. Sensor Node Installation

In order to validate SmartHub node functionality, the gateway must be powered and in range. Once the Gateway has been connected to a power source, you can begin the node validation process. This process should be done prior to adhering any of the nodes.

To activate a node, place the provided neodymium magnet centered over the narrow end of the node above the ConMet arrow. There is a 1 minute 15 second period in which the node will connect to the gateway for validation. SmartHub node communication must be validated before nodes are adhered to the hubs.

This process can be completed for each individual node or all the nodes in the kit at the same time, (figure 33). the bottom of the sensor shims should be inspected and cleaned, if necessary, to ensure optimal bonding to the hub.

Figure 33: SmartHub Sensor Activation

5.6. Steer Hubs

For installation of a SmartHub sensor on a steer hub, first locate the wheel pilot closest to the ground.

Sensor nodes should only be adhered directly to a metal surface. So, if this is a painted iron hub, prepare the sensor mounting surface by using a wire brush or wire brush attachment for a drill to remove paint from the surface of the wheel pilot.

Use a clean cloth to remove all residue (oil, road grime, rust, etc.) from this wheel pilot and do a final cleaning with electrical contact cleaner (or equivalent cleaning solution) to ensure surface is free of residue and debris. This step in the process is important for proper sensor adhesion to the wheel hub.

Before beginning the gluing process, it's important to note that the glue cures quickly and each burst pack should be used per sensor. . Next, roll up the burst pack 2-part adhesive from the bottom until the separator seal bursts and mix both parts together by rubbing the pack on a semi-sharp edge, such as the corner of a table(figure 34).

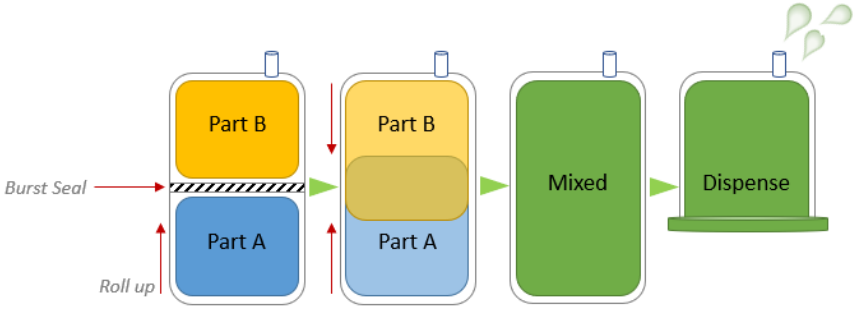

Figure 34: Adhesive Burst Pack

Apply the adhesive to the bottom of the shim and position the sensor node on the wheel pilot closest to the ground with the narrower side pointing left when facing the hub. Secure the sensor to the hub by firmly holding it in place for **no less than 40 seconds** on the wheel pilot against the flange. The sensor node should nest into the corner between the wheel pilot and flange (figure 35**). The vehicle should remain stationary for at least 1 hour.**

Figure 35: Steer Hub Sensor

5.7. Drive Hubs

For drive hub installations, find the sensor mounting position on the hub barrel. This should be centered between any two-hub barrel flutes but should not be in-line with a wheel stud, as this could impede wheel removal or tool access to the lugs.

Sensor nodes should only be adhered directly to a metal surface. So, if this is a painted iron hub, prepare the sensor mounting surface by using a wire brush or wire brush attachment for a drill to remove a dime-sized amount of paint from the surface of the hub barrel.

Use a clean cloth to remove all residue (oil, road grime, rust, etc.) from this area and do a final cleaning with electrical contact cleaner (or equivalent cleaning solution) to ensure surface is free of residue and debris. This step in the process is important for proper sensor adhesion to the wheel hub. Before beginning the gluing process, it's important to note that the glue cures quickly and each pack should be used once per axle.

Next, roll up the burst pack 2-part adhesive from one end until the separator seal bursts and mix both parts together. Apply the adhesive to the bottom of the shim and position the sensor on the wheel hub against the hub cap flange with the narrow end facing the wheel studs (figure 36). Firmly hold the sensor in place for **no less than 40 seconds. The vehicle should remain stationary for at least 1 hour.**

Figure 36: Drive Hub Sensor

5.8. Trailer Hubs

For trailer hub installations, first locate the sensor mounting position. It can be positioned anywhere on the hub barrel that is **not** in line with the fill port. It should also be centered and not in line with a wheel stud as this could impede wheel removal or tool access to the lugs.

Sensor nodes should only be adhered directly to a metal surface. So, if this is a painted iron hub, prepare the sensor mounting surface by using a wire brush or wire brush attachment on a drill to remove a dime-sized amount of paint from the surface of the hub barrel.

Use a clean cloth to remove all residue (oil, road grime, rust, etc.) from this area and do a final cleaning with electrical contact cleaner (or equivalent cleaning solution) to ensure surface is free of residue and debris. This step in the process is important for proper sensor adhesion to the wheel hub. Before beginning the gluing process, it's important to note that the glue cures quickly and each pack should be used per axle.

Next, roll up the burst pack 2-part adhesive from one end until the separator seal bursts and mix both parts together. Apply the adhesive to the bottom of the shim and position the sensor on the wheel hub against the hub cap flange with the narrow end facing the wheel studs (figure 37). Firmly hold the sensor in place for **no less than 40 seconds. The trailer should remain stationary for at least 1 hour.**

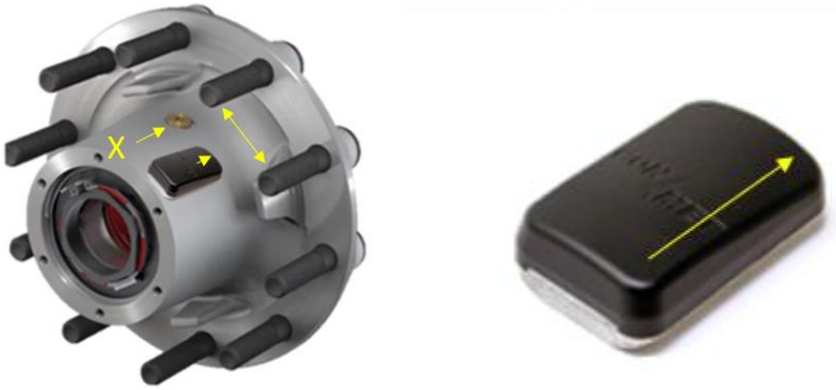

Figure 37: Trailer Hub Sensor

5.9. SmartHub Installation Checklist

Item	Description	Check
1.	The hub sensor mounting area has been adequately cleaned prior to adhering the sensor to the hub	
2.	The two-part burst pack has been adequately mixed together	
3.	All applicable smart hub sensors have been oriented correctly, not in line with a fill port and/or centered between wheel studs	
4.	All applicable smart hub sensors have been held in place for no less than 40 seconds once the adhesive has been applied	

6. FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and any part of your body

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

CAN ICES-3(A)/NMB-3(A)

This device complies with ISED Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and

2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISDE Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage;

2. l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

SmartHub™
FCC ID: 2AY6O-SHN01 IC:
27011-SHN01
Model: 10087522