



TOWABLE

MASTER MANUAL

LIPPERT
COMPONENTS™

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LIPPERT IN-WALL™ SLIDEOUT
OWNER'S MANUAL

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System and Safety Information

Safety Information



The “WARNING” symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause death or serious injury if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required is too advanced or the procedure too difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in death, serious injury or voiding the warranty.



Failure to act in accordance with the following may result in death, serious injury, coach or property damage.

The Lippert In-Wall™ Slideout System is intended for the sole purpose of extending and retracting the slideout room. Its function should not be used for any purpose or reason other than to actuate the slideout room. To use the system for any reason other than what it is designed for may result in damage to the coach and/or cause serious injury or even death.

Before actuating the system, please keep these things in mind:

1. Parking locations should be clear of obstructions that may cause damage when the slideout room is actuated.
2. Be sure all persons are clear of the coach prior to the slideout room actuation.
3. Keep hands and other body parts away from slideout mechanisms during actuation. Severe injury or death may result.
4. To optimize slideout actuation, park coach on solid and level ground.

Operation

Prior to Operation

1. Prior to operating the Lippert In-Wall™ Slideout System, follow these guidelines:
2. Coach should be parked on the most level surface available.
3. Leveling or stabilizing system should be actuated to ensure coach will not move during operation of slideout system.
4. Be sure battery is fully charged.
5. Be sure to keep all persons and pets clear of slideout system during operation.



Always make sure that the slideout room path is clear of people and objects before and during operation of the slideout room. Always keep away from the slide rails when the room is being operated.

NOTE: Install transit bars (if so equipped) on the slideout room during storage and transportation.

Extending Slideout Room

1. Level the unit.
2. Verify the battery is fully charged and hooked up to the electrical system.
3. Remove the transit bars (if so equipped).
4. Press and hold the IN/OUT switch (Fig. 1B) in the OUT position until the room is fully extended and stops moving.
5. Release the switch, which will lock the room into position.

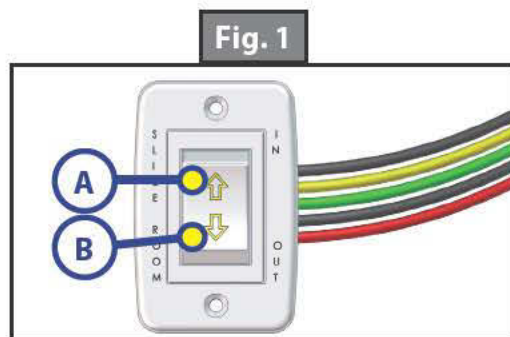
NOTE: If the slideout switch is held after the room is fully extended, the control will sense that the room has stopped and will shut off the motor after a few seconds.

Retracting Slideout Room

1. Verify the battery is fully charged and hooked-up to the electrical system.
2. Press and hold the IN/OUT switch (Fig. 1A) in the IN position until the room is fully retracted and stops moving.
3. Release the switch, which will lock the room into position.

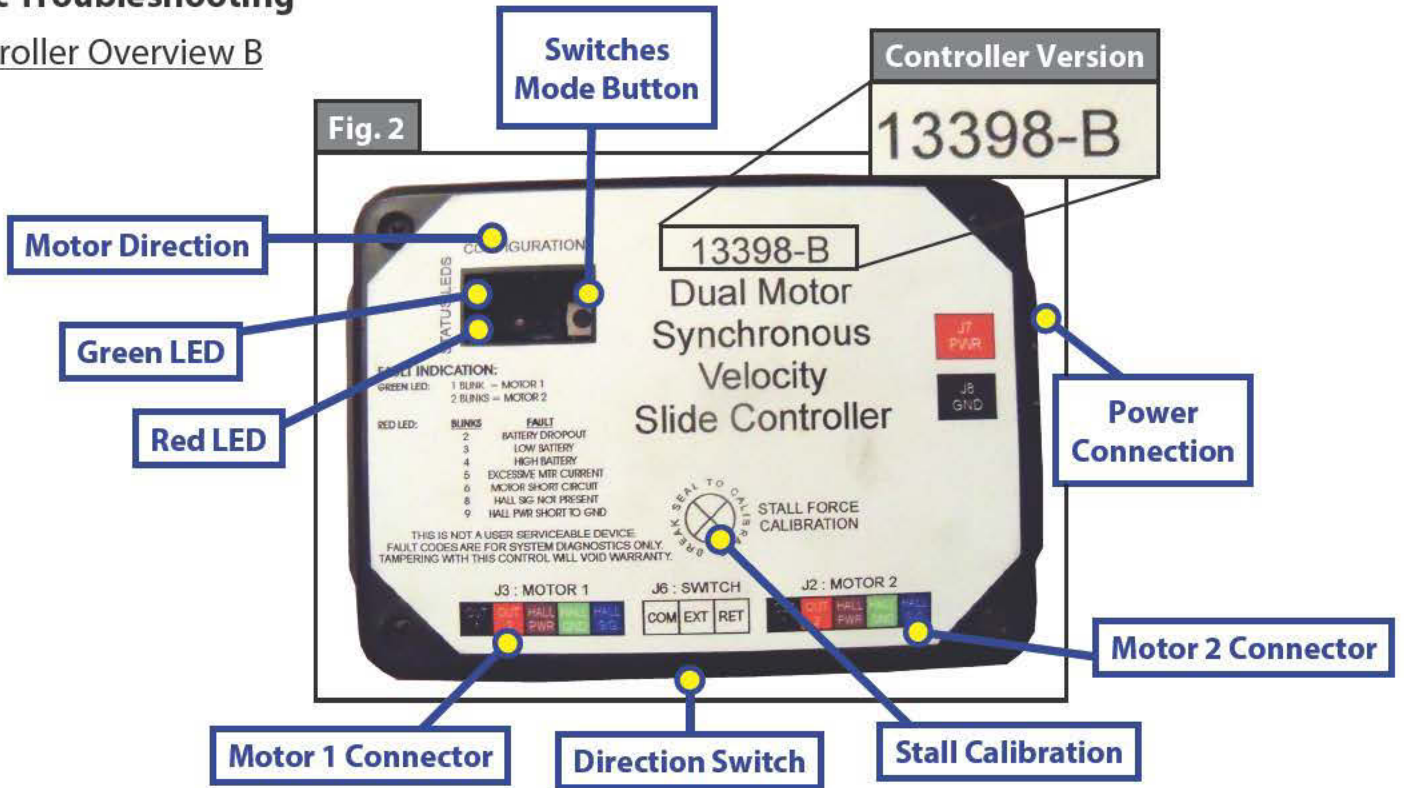
NOTE: If the slideout switch is held after the room is fully retracted, the control will sense that the room has stopped and will shut off the motor after a few seconds.

4. Install the transit bars (if so equipped).



Basic Troubleshooting

Controller Overview B



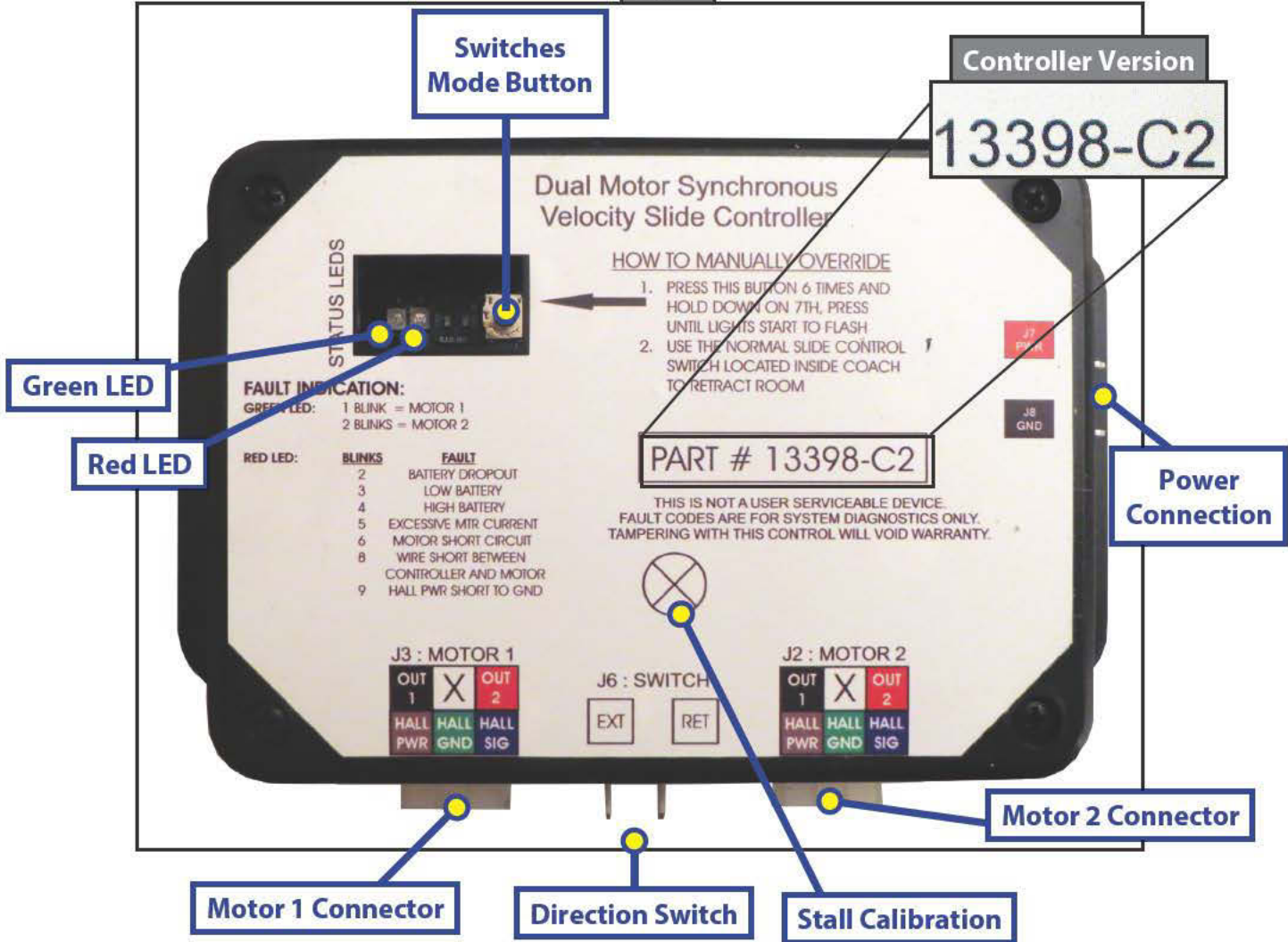
System Inoperative

1. Locate Controller (Fig. 2 and Fig. 3).
2. Activate switch.
3. Look for the status LEDs on the controller to light while switch is activated.
4. If status LEDs do not light, and no error codes are present, check the following:
 - A. Check for 12VDC in to controller (red and black terminals).
 - B. Check for 12VDC at switch connection on both extend and retract.
 - C. Check the battery for 12VDC.
5. If error codes are present, refer to the error codes as follows:

Error Code	Name	Description
2	Battery Drop Out	Battery capacity low enough to drop below 6 volts while running
3	Low Battery	Voltage below 8 volts at start of cycle
4	High Battery	Voltage greater than 18 volts
5	Excessive Motor Current	High amperage, also indicated by 1 side of slide continually stalling
6	Motor Short Circuit	Motor or wiring to motor has shorted out
8	Hall Signal Not Present (Rev. B, Fig. 2) Wire Short Between Controller and Motor (Rev. C2, Fig. 3)	Encoder is not providing a signal and is usually a wiring problem
9	Hall Power Short To Ground	Power to encoder has been shorted to ground, which is usually a wiring problem

When an error code is present, the board needs to be reset. Energizing the extend/retract switch resets the board. Energize the extend/retract switch again for normal operation.

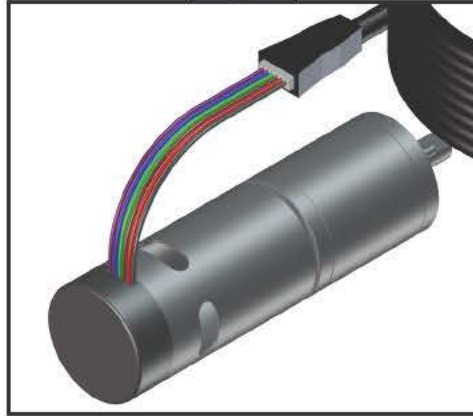
Fig. 3



Motors and Harnesses

1. Check for proper connections between the motors and harnesses.
2. Visually inspect the exposed harnesses to ensure they are not pinched or damaged.
3. If test harness is available, connect the test harness from the controller to the motor and try to operate the slideout using the normal switch.
4. If test harness is not available, ohm test the harness.

Fig. 4



To Resynchronize the Slide Motors

1. Fully extend the slide room using the switch. Keep the switch engaged until the motors shut down on their own.
2. Retract the room 8-10 inches.
3. Repeat steps 1 and 2. In many cases, two or three repetitions are necessary to re-sync the system.
4. Fully extend and then retract the room. Again, always let the motors shut down on their own before releasing the switch.

For further reference on the following subjects, please refer to indicated page:

["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)

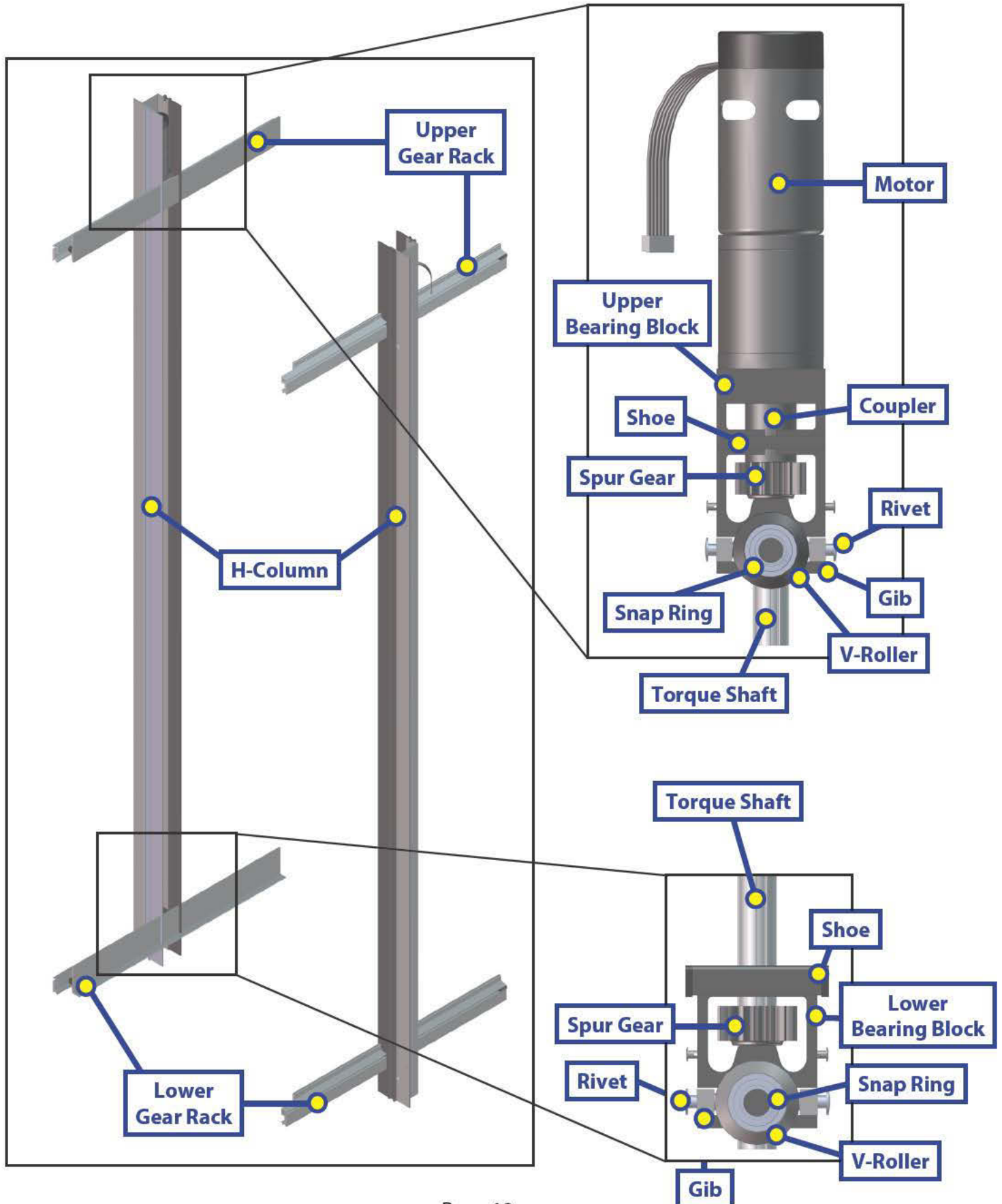
["Gear Pack Replacement Instructions" on page 43](#)

["Corrective Action for Squeaking Gear Packs" on page 44](#)

["Room Bar Measurement Chart" on page 45](#)



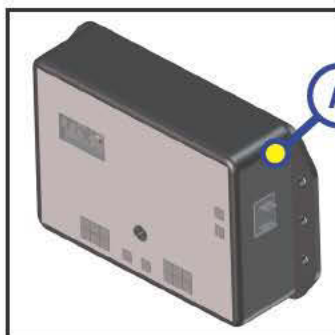
SLIDEOUTS





LIPPERT IN-WALL™ SLIDEOUT COMPONENTS WEBPAGE

SLIDEOUTS



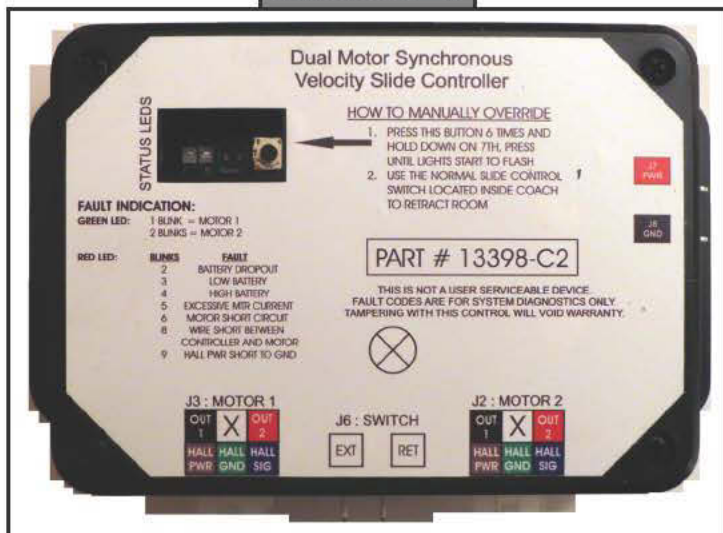
Revision B

Revision C - 1

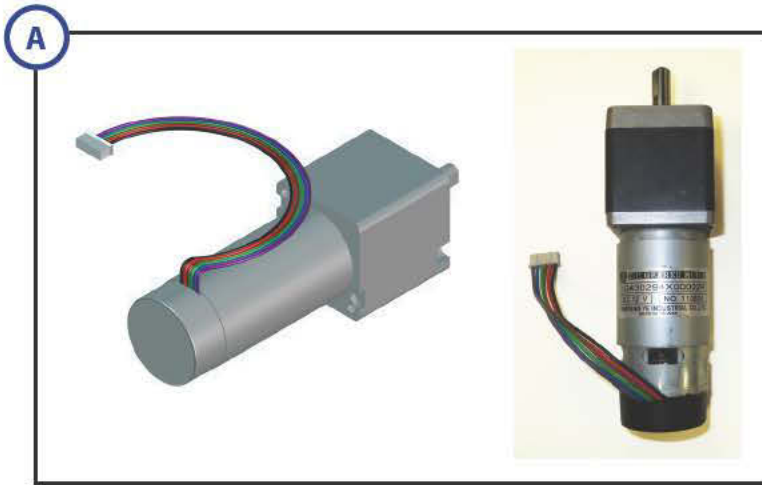


Revision C - 2

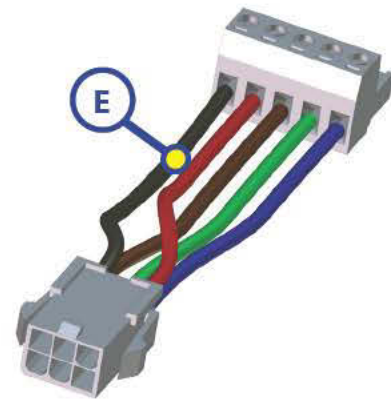
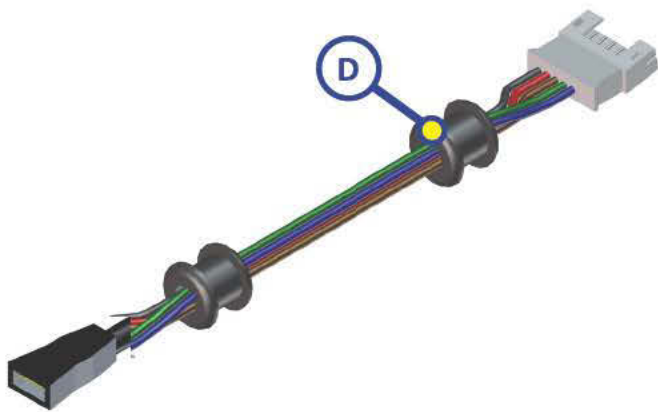
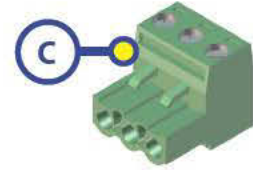
Revision 8 Amp



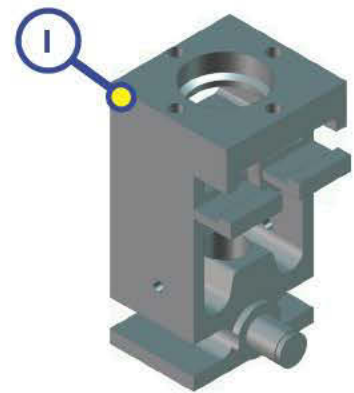
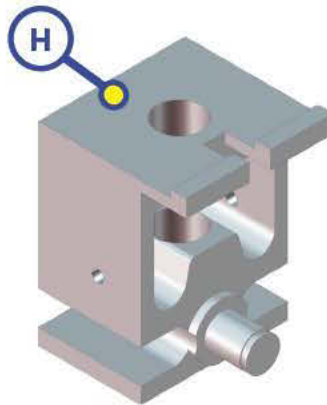
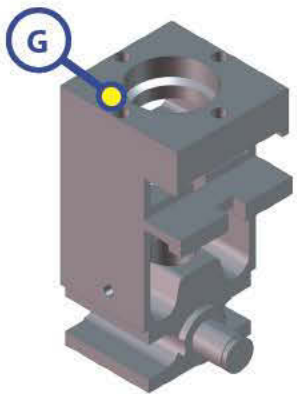
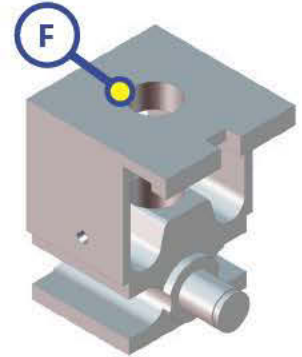
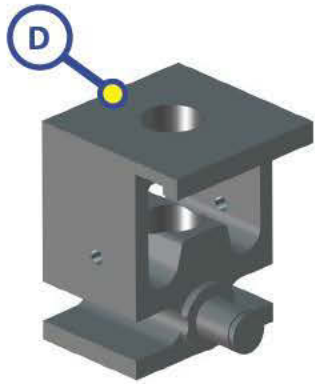
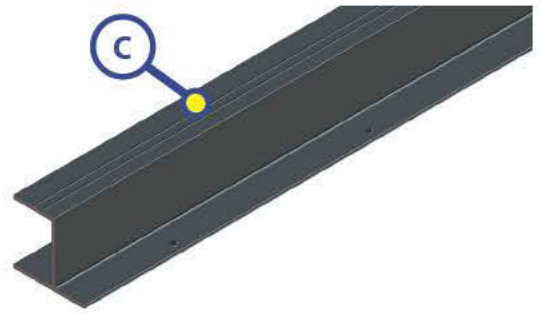
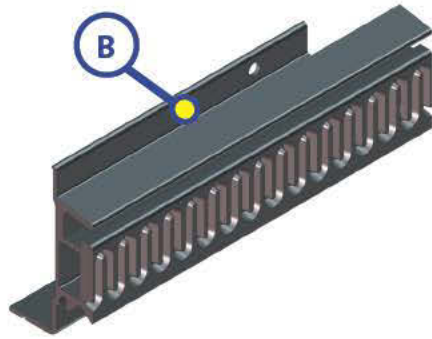
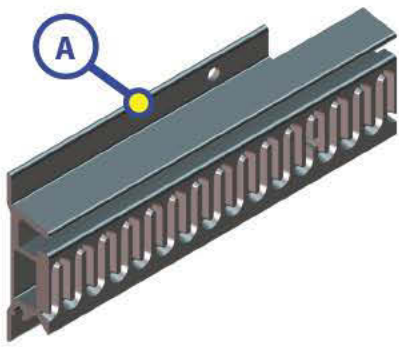
Callout	Part #	Description	Revision
A	211852	Dual Motor Synchronous Velocity Slide Controller	B
			C-1
			C-2
	326876	Dual Motor Synchronous Velocity Slide Controller NOTE: This controller will not replace other controller versions	8 Amp



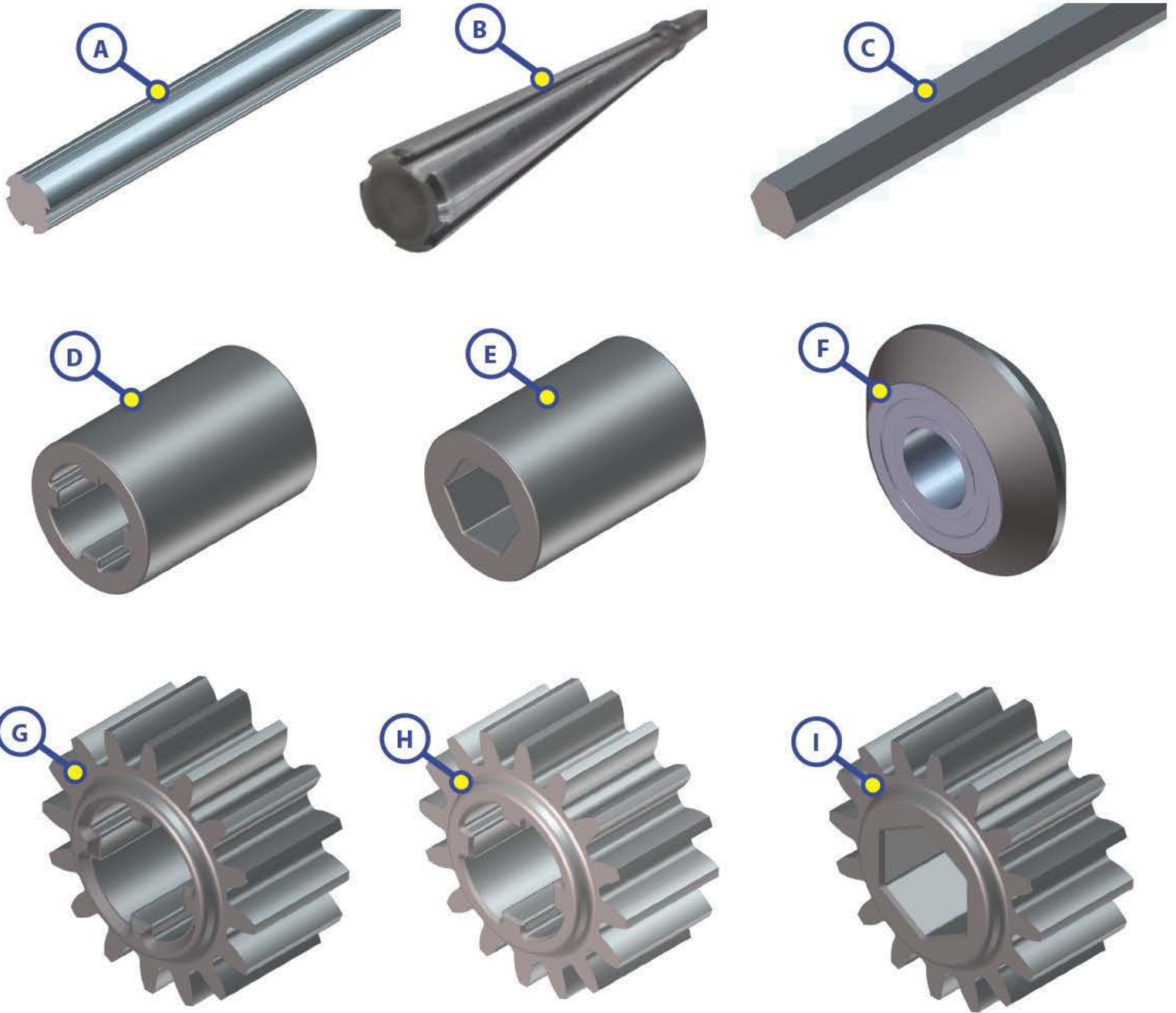
Callout	Part #	Description
A	229466	Motor
B	287298	Motor, High Torque 500:1
C	236575	Motor, 300:1
D	-	Obsolete (Replace with 229466 or 236575)



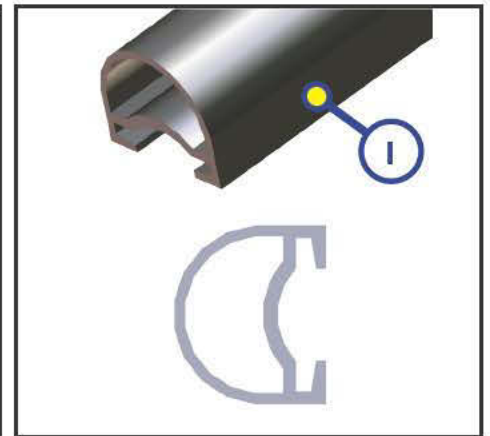
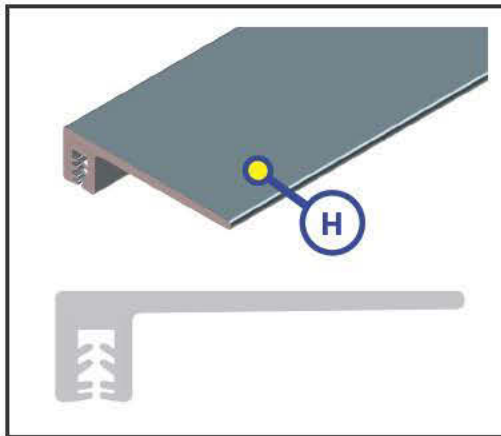
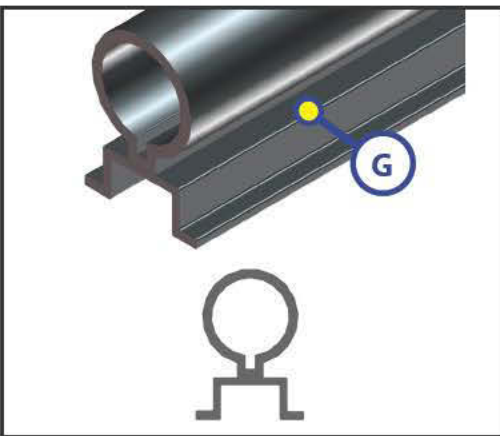
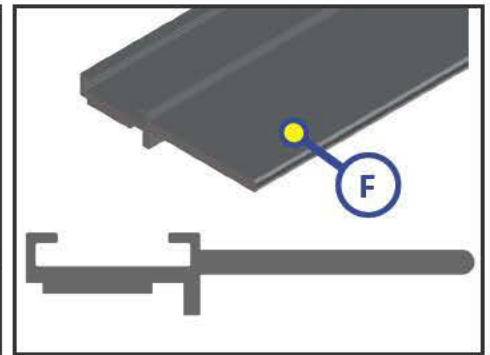
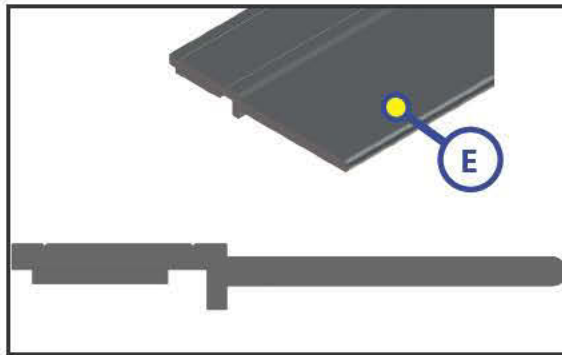
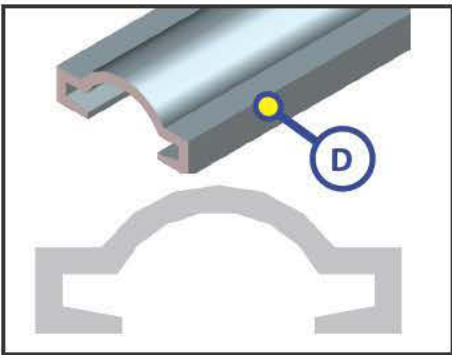
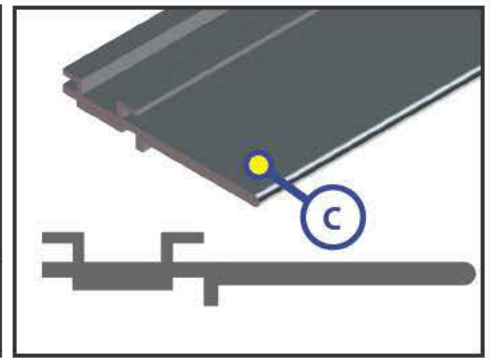
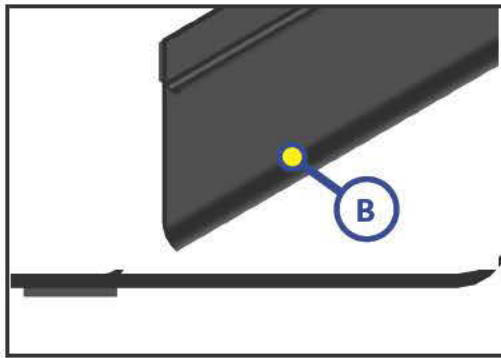
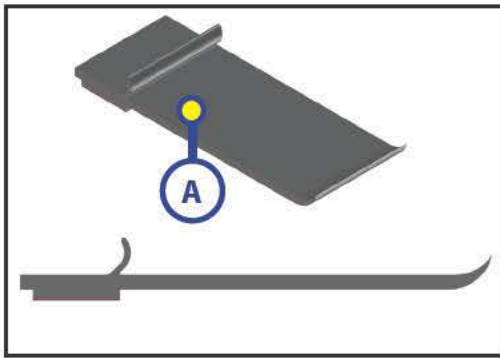
Callout	Part #	Description
A	238744	5 ft. Controller to Motor Harness
	238990	10 ft. Controller to Motor Harness
	247768	15 ft. Controller to Motor Harness
	229755	20 ft. Controller to Motor Harness
	238991	25 ft. Controller to Motor Harness
	229756	30 ft. Controller to Motor Harness
	238992	35 ft. Controller to Motor Harness
B	229758	Harness Connectors 5 Wires
C	229759	Harness Connectors 3 Wires
D	241834	5 ft. Interconnect Harness
	241835	6 ft. Interconnect Harness
	241836	8 ft. Interconnect Harness
E	258760	Slide Controller 6" Pigtail Harness (Use on Revision B and Revision C-1 Controllers)



Callout	Part #	Description
A	268774	Upper Gear Rack
B	268775	Lower Gear Rack
C	240411	H-Column, Black
	238457	H-Column, White
D	239365	Lower Bearing Block
E	239366	Upper Bearing Block
F	335632	Lower Bearing Block (Hex Shaft)
G	335633	Upper Bearing Block (Hex Shaft)
H	338237	Lower Bearing Block (Steel Shaft)
I	338241	Upper Bearing Block (Steel Shaft)



Callout	Part #	Description
A	238462	Aluminum Torque Shaft
B	295065	Steel Torque Shaft
C	295873	Hex Torque Shaft
D	238461	Motor Coupler: Old Style for Use with "B" Motor see (A) on Page 17; New Style for Use with "C" Motors and Torque Shafts (A) and (B) on this Page
E	285083	Hex Coupler
F	292801	V-Roller Assembly
G	238893	Spur Gear
H	292435	Copper Infused Spur Gear
I	285085	Hex Spur Gear



Callout	Part #	Description	Measurements
A	156603	Seal	1" x 2 2 ¹ / ₃₂ " x 5 ⁵ / ₆₄ "
B	132733	Sweep Seal	2 4 ³ / ₆₄ " x 1 ¹ / ₁₆ "
C	239667	EK Design Flap	1 1 ¹ / ₄ "
D	239668	Screw Cover	1 3 ³ / ₆₄ " x 1 ¹⁵ / ₆₄ " TPE
E	240410	Flat Side Wiper	1 1 ¹ / ₂ "
F	240448	KE Black Single Wiper with Leg	1 3 ³ / ₄ "
G	240449	KE Black Slide on D-Seal	-
H	300614	Slideout Seal	144"
I	260406	EK Black Slide on D-Seal	-



ABOVE FLOOR SOFA SLIDEOUT
OWNER'S MANUAL

LIPPERT
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Warning, Safety, and System Requirement Information



Failure to act in accordance with the following may result in death, serious injury, coach or property damage.

The Lippert Above Floor Sofa Slideout System is intended for the sole purpose of extending and retracting the slideout room. Its function should not be used for any other purpose or reason than to actuate the slideout room. To use the system for any reason other than what it is designed for may result in damage to the coach and/or cause serious injury or even death.

Before actuating the system, please keep these things in mind:

1. Parking locations should be clear of obstructions that may cause damage when the slideout room is actuated.
2. Be sure all persons are clear of the coach prior to the slideout room actuation.
3. Keep hands and other body parts away from slideout mechanisms during actuation. Severe injury or death may result.
4. To optimize slideout actuation, park coach on solid and level ground.

Product Information

The Lippert Above Floor Sofa Slideout System is a rack and pinion style slide system. Utilizing a bi-directional electric motor to actuate the drive shaft, the slideout room is extended and retracted from the same source. The actuator has a built-in automatic braking feature. The Lippert Above Floor Sofa Slideout is designed as a negative or positive ground system.

There are no serviceable parts within the electric motor. If the motor fails, it must be replaced.

Disassembly of the motor voids the warranty.

Mechanical portions of the slideout system are replaceable. Contact Lippert Components, Inc. to obtain replacement parts.

Prior to Operation

Prior to operating the Lippert Above Floor Sofa Slideout, follow these four (4) guidelines:

1. Coach should be parked on the most level surface available.
2. The PARKING BRAKE must be engaged.
3. The coach's transmission must be in PARK.
4. The coach's ignition must be in the ON or RUN position or the coach's engine must be running. (Class A and C only; Gas and Diesel)

Operation



Failure to act in accordance with the following may result in death, serious injury, coach or property damage.

Always make sure that the slideout room path is clear of people and objects before and during operation of the slideout room.

Always keep away from the slide rails when the room is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

Keep stored items in compartment clear of slideout motor mechanisms and wiring to prevent interference of slideout operation.

Install transit bars (if so equipped) on the slideout room during storage and transportation.

The family of Lippert Above Floor Sofa Slide is controlled by a switch mounted on the coach wall, normally located close to the entry door.

Extending Slideout Room

1. Level Unit
2. Verify the battery is fully charged and hooked up to the electrical system.
3. Remove transit bars (if so equipped).
4. Press and hold the IN/OUT switch in the OUT position until room is fully extended and stops moving.
5. Release switch, which will lock the room into position.

NOTE: Only hold OUT switch until room stops.

Retracting Slideout Room

1. Verify the battery is fully charged and hooked up to the electrical system.
2. Press and hold the IN/OUT switch in the IN position until the room is fully retracted and stops moving.
3. Release the switch. This will lock the room into position.

NOTE: Only hold IN switch until room stops.

4. Install the transit bars (if so equipped).

Maintenance

Preventative

The Lippert Above Floor Sofa Slideout has been designed to require very little maintenance and has been static tested to over 2,500 continuous cycles with out any noticeable wear to rotating or sliding parts. No grease or lubrication is necessary and in some situations may be detrimental to the environment and long term dependability of the system. To ensure the long life of your slideout system, read and follow these few simple procedures.

Electric

For optimum performance, slide-out system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch, and the electric motor for corrosion, and loose or damaged terminals. Check motor leads under the motor-home chassis. Since these connections are subject to damage from road debris, be sure they are in good condition.

NOTE: The Lippert Above Floor Sofa Slideout is designed to operate as a negative ground system. A 12VDC system must maintain good wire connections. It is important that the electrical components have good ground connection. Over 90% of unit electrical problems are due to bad ground connections.

Mechanical Maintenance

Although the system is designed to be almost maintenance free, inspect the slideout for any visible signs of external damage after and before movement of the room. Remember to inspect inside the coach as well as the slideout outside the coach.

NOTE: For long-term storage: It is recommended that the room be closed (retracted).

NOTE: Visually inspect the Slide Floor and Drive Box Assemblies. Refer to Fig. 1 for location of rail assemblies. Check for excess build-up of dirt or other foreign material; remove any debris that may be present.

NOTE: • If the system squeaks or makes any noises it is permissible to apply a coat of lightweight oil to the drive shaft and roller areas but remove any excess oil so dirt and debris do not build-up. DO NOT use grease.

Troubleshooting

Troubleshooting Introduction

The Lippert Above Floor Sofa Slideout System is only one of four inter-related slideout room system components. These four components are as follows: Chassis, Slideout room, Coach and Lippert Above Floor Sofa Slideout System. Each one needs to function correctly with the others or misalignment problems will occur.

Every coach has its own personality and what may work to fix one coach may not work on another, even if the symptoms appear to be the same.

When something restricts room travel, system performances will be unpredictable. It is very important that slide rails, rack and pinion be free of contamination and allowed to travel freely the full distance or "STROKE." Debris build-up during travel is an example of the type of contamination that may occur.

When beginning to troubleshoot the system, make sure the battery is fully charged, there are no visible signs of external damage to the actuator, motor or rails and that the motor is wired properly and all connections are secure.

You can adjust room extension by modifying the position of the rack gear on the slide floor rail to the pinion gear on the gear assembly.

During troubleshooting, remember, by changing, altering or adjusting one thing, it may affect something else. Be sure any changes do not create a new problem.

Switch related problems:

- If room moves opposite from what the switch plate indicates, reverse the motor wires on the back of the switch. Wire size must be 10ga. min.
- If a gear is stripped, the entire gearbox must be replaced.

Motor Unit

Before attempting to troubleshoot the Power Unit, make sure an adequate power source is available. The unit batteries should be fully charged or the unit should be plugged into A/C service with batteries installed. Do not attempt to troubleshoot the Power Unit without assuring a full 12V DC charge.

The following tests require only a DC voltmeter (or DC test light) and a jumper lead.

Step 1 - Attach voltmeter (or test light) leads to the negative and positive switch terminals on back of wall switch. Does the meter indicate 12VDC?

If **YES**, see **Step 2**; if **NO** see **Step 3**.

Step 2 - If **YES**, at the motor, check the incoming leads to 12VDC (if necessary, disconnect leads at wire splices). Does meter indicate 12VDC? If **YES**, Power Unit needs to be replaced. The motor is not field serviceable. DO NOT ATTEMPT TO REPAIR. If **NO**, Inspect all wires and connections between the wall switch and the motor. Repair connections as necessary. Recheck as in **Step 1**.

Step 3 - If **NO**, Inspect all connections between battery and switch. Inspect any and all breakers, relays and fuses. Recheck as above in **Step 1**.

Since there are no field serviceable parts in the motor of the 12VDC motor, electrical troubleshooting and service is limited to replacing only those components as previously outlined.

NOTE: Thorough inspection of wiring and connections is the only other electrical service that can be performed.

Problem	Probable Cause	Corrective Action
Room doesn't move when switch is pressed	Restriction or obstruction inside or outside of unit	Check for and clear obstruction
	Low battery voltage, blown fuse, defective wiring	Check battery voltage and charge if needed. Find and check fuse, replace if blown. Check battery terminals and wiring. Look for loose, disconnected or corroded connectors.
	Excessive room drag	Check that transit bars are removed
Power unit runs but room does not move	Motor turns, room does not move	Gear key is broken or lost. Replace gear drive assembly
	Broken gear on drive shaft	Replace gear drive assembly
	Broken gear in gearbox	Replace motor/gearbox assembly
	Bad motor or gearbox	Replace motor/gearbox assembly
Power unit runs but room moves slowly	Low battery, poor ground, extremely low outdoor temperature	Charge battery and check ground wire
	Room is in a bind	Adjust to proper room setting
	Incorrect height adjustment	Check for proper room height
Room starts to move and stops	Low battery voltage, blown fuse, defective wiring	Check battery voltage and charge if needed. Find and check fuse, replace if blown. Check battery terminals and wiring. Look for loose, disconnected or corroded connectors.
	Obstruction of room inside or outside	Check for and clear obstruction
Room chatters during operation	Teeth on gear drive broken or worn	Replace gear drive assembly
	Teeth on inner rail broken and worn	Replace inner rail assembly

⚠ CAUTION

Always disconnect battery from system prior to manually operating system. Failure to disconnect battery can cause electricity to back feed through the motor and cause serious damage to the system as well as void the warranty.

1. Accessing Out-Stop Assembly (Fig. 1).

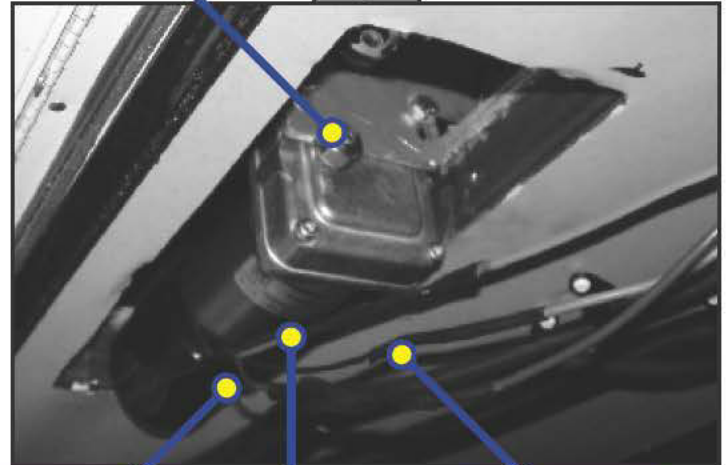
NOTE: The slideout out-stop assembly will be accessible from the inside of the unit. The slideout motor and mechanism is accessible from the outside.

Fig. 1



Manual Override

Fig. 2



Motor Brake Wire (Brown)

Positive Wire (Red)

Ground Wire (Black)

Fig. 3

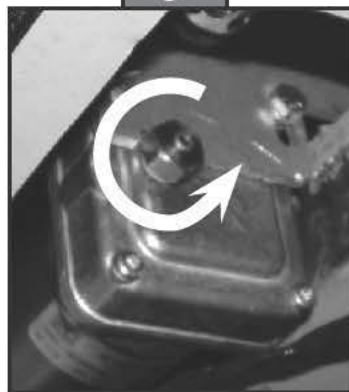


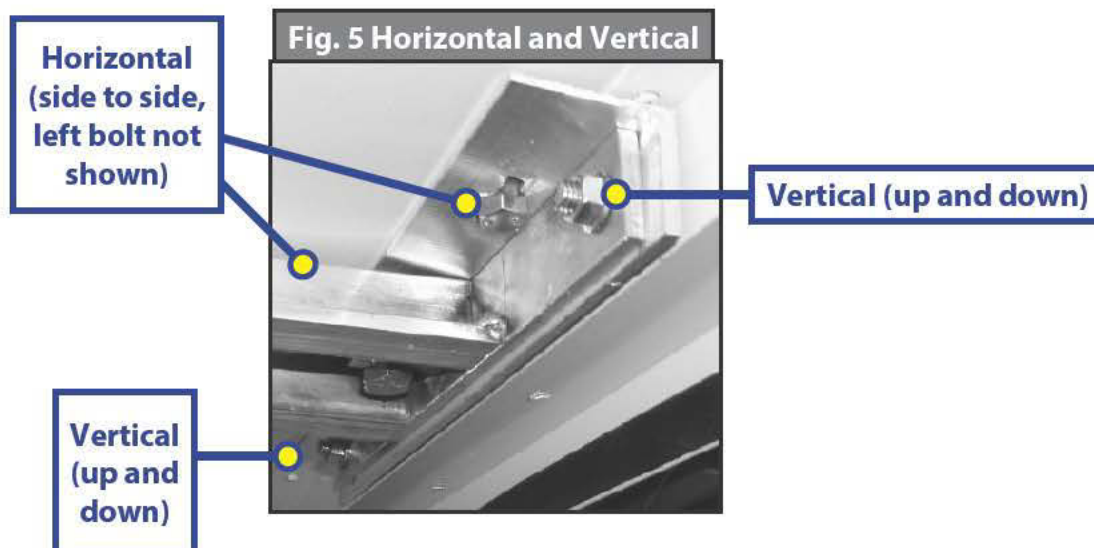
Fig. 4



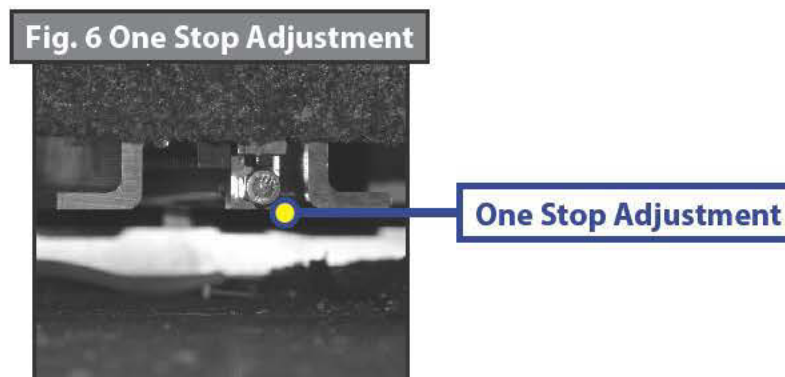
NOTE: The gears can be stripped out if the room is manually retracted/extended to its fullest extent and the operator continues to rotate manual override. Any damage due to misuse of the Manual Override feature will disqualify any and all claims to the limited warranty.

2. With a second person assisting, one person must push and hold the manual override switch while the other person, using a $\frac{5}{8}$ " wrench or socket/ratchet combination, rotates the hex head manual override (Figs. 3 and 4) to manually move the slideout.

Room Adjustment



1. For Horizontal Adjustment, back both lag bolts out just enough to release tension. In a Dual System, lag bolts must be loosened on both head stocks to adjust the room horizontally.
2. Adjust room to desired location.
3. Tighten lag bolts before operating room.



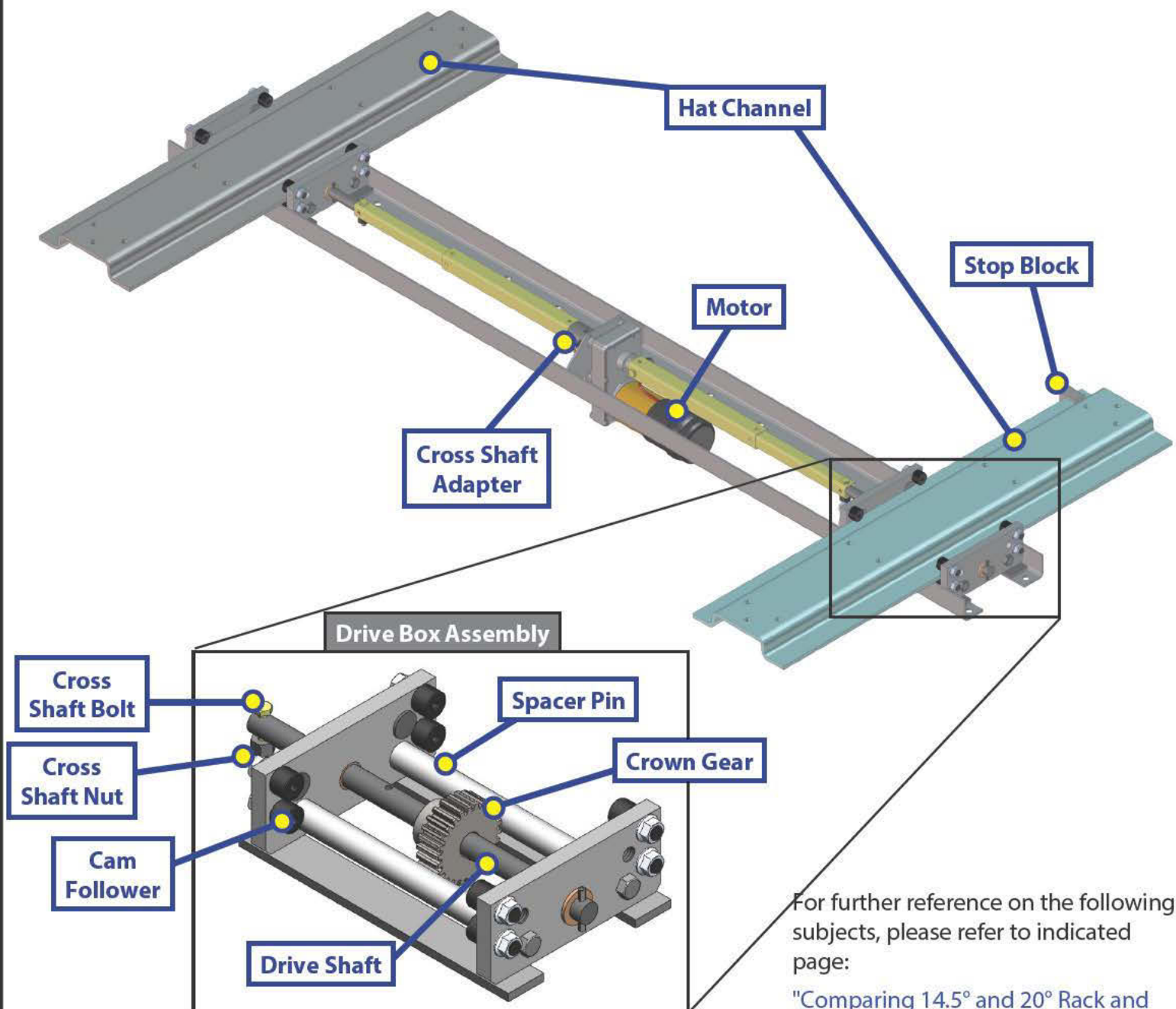
1. Loosen jam nut (shown) on the outside of the Out Stop Bracket.
2. Adjust Stop Bolt to desired location.
3. Tighten jam nut.



LIPPERT
COMPONENTS

ABOVE FLOOR SOFA SLIDEOUT ASSEMBLY WEBPAGE

SLIDEOUTS



For further reference on the following subjects, please refer to indicated page:

["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)

["Gear Pack Replacement Instructions" on page 43](#)

["Corrective Action for Squeaking Gear Packs" on page 44](#)

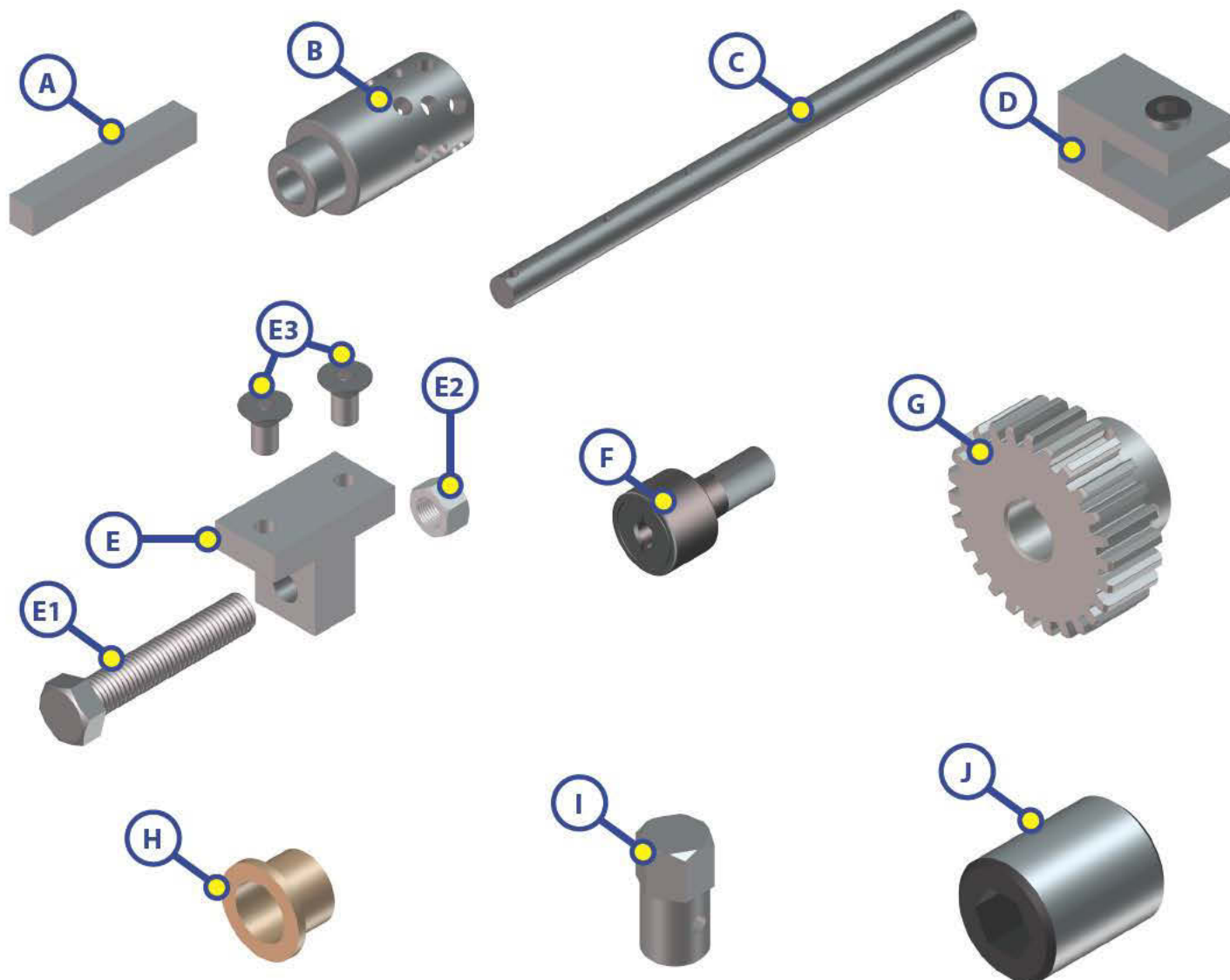
["Room Bar Measurement Chart" on page 45](#)



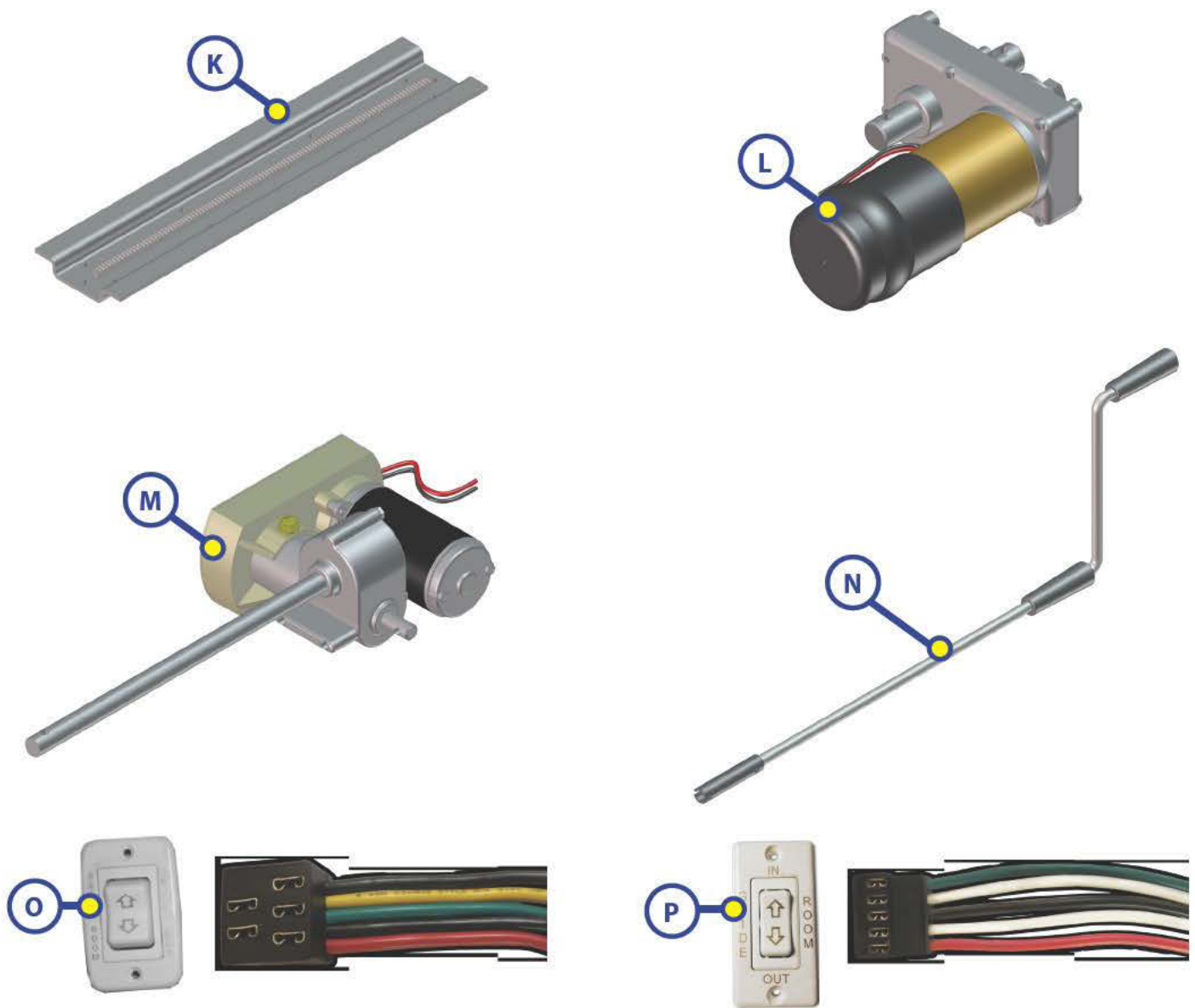
LIPPERT
COMPONENTS

ABOVE FLOOR SOFA SLIDEOUT COMPONENTS WEBPAGE

SLIDEOUTS



Callout	Part #	Description
A	124366	Key
B	101232	Cross Shaft Adapter
C	116656	Drive Shaft
D	124188	Stop Block with Set Screw
E	126158	Stop Block
E1	182137	Fasten Screw
E2	118647	Fasten Bolt
E3	119125	Fasten Nut
F	118353	Cam Follower
G	116658	Crown Gear (26 Teeth)
H	116551	Bronze Bushing
I	116597	Manual Override Nut
J	125554	Crown Gear Set Screw (2X)



Callout	Part #	Description
K	Many	Hat Channel MF Style NOTE: To order the correct hat channel for your system, contact the LCI Parts department.
L	141425	Klauber M500 Motor
M	117292	Venture 18:1 Dual Motor/Drive Shaft
	117293	Venture 28:1 Dual Motor/Drive Shaft
N	119226	Crank Handle
O	173628	Old Slideout Switch Kit
	119134	Switch Plate
	119132	Switch
	119130	Switch Wire Harness
P	117460	New Slideout Switch Kit (Black)
	117461	New Slideout Switch Kit (White)
	117420	Switch Plate (White)
	129003	Switch (White)
	117421	Switch Plate (Black)
	117426	Switch (Black)
	178436	Switch Wire Harness



**ELECTRIC THROUGH FRAME SLIDEOUT
OWNER'S MANUAL**

**LIPPERT
COMPONENTS™**

Warning, Safety, and System Requirement Information

Description

The Lippert Electric Through Frame Slideout System is a rack and pinion guide system, utilizing an electric ball screw actuator to move the room assembly. The motor drives the ball screw in a forward and backward motion to move the slide room in and out. The actuator comes equipped with an automatic clutching system. The Lippert Electric Slideout System is designed to operate as a negative ground system.

Safety Information



The “WARNING” symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause serious injury or death if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required or the procedure too difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in death, injury or voiding the warranty. The owner’s manual for your unit may have more procedures for service and maintenance.



Failure to act in accordance with the following may result in death or serious personal injury.

The Lippert Through Frame Slideout System is intended for the sole purpose of extending and retracting the slideout room. Its function should not be used for any other purpose or reason than to actuate the slideout room. To use the system for any reason other than what it is designed for may result in death, serious injury or damage to the coach.

Before actuating the system, please keep these things in mind:

1. Parking locations should be clear of obstructions that may cause damage when the slideout room is actuated.
2. Be sure all persons are clear of the coach prior to the slideout room actuation.
3. Keep hands and other body parts away from slideout mechanisms during actuation. Severe injury or death may result.
4. To optimize slideout actuation, park coach on solid and level ground.

Prior to Operation

Prior to operating the Lippert Through Frame Slideout System, follow these guidelines:

1. Coach should be parked on the most level surface available.
2. Leveling or stabilizing system should be actuated to ensure coach will not move during operation of slideout system.
3. Be sure battery is fully charged.
4. Be sure to keep all persons and pets clear of slideout system during operation.



Always make sure that the slideout room path is clear of people and objects before and during operation of the slideout room. Always keep away from the slide rails when the room is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

NOTE: Install transit bars (if so equipped) on the slideout room during storage and transportation.

Operation

Extending Slideout Room

5. Level Unit
6. Verify the battery is fully charged and hooked up to the electrical system.
7. Remove transit bars (if so equipped).
8. Press and hold the IN/OUT switch in the OUT position until room is fully extended and stops moving.
9. Release switch, which will lock the room into position.

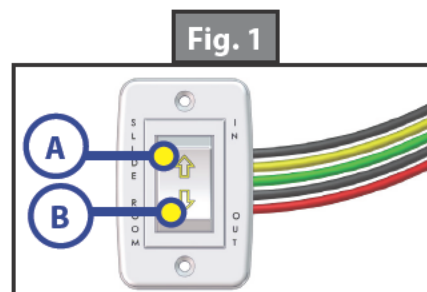
NOTE: Only hold OUT switch until room stops.

Retracting Slideout Room

1. Verify the battery is fully charged and hooked up to the electrical system.
2. Press and hold the IN/OUT switch in the IN position until the room is fully retracted and stops moving.
3. Release the switch. This will lock the room into position.

NOTE: Only hold IN switch until room stops.

4. Install the transit bars (if so equipped).



Maintenance

Inspection

After servicing the slideout system in any way, be sure to check the following:

1. Slideout stops are installed and adjusted properly.
2. Head assemblies are installed and adjusted properly.
3. System is mounted properly.
4. Cross shafts are mounted properly and clear all other components.
5. Gear packs function properly.
6. Manual override is accessible.
7. Outside seals compress when slideout is retracted.
8. Inside seals compress when slideout is extended.
9. Slideout extends and retracts smoothly.
10. Both sides of slideout are synchronized.
11. Any dirt or debris is cleaned from the interior or exterior of the coach.

The Lippert Slideout System has been static tested to over 4,000 continuous cycles without any noticeable wear to rotating or sliding parts. It is recommended that when operating in harsh environments (road salt, ice build up, etc) the moving parts be kept clean. They can be washed with mild soap and water. No grease or lubrication is necessary and in some situations may be detrimental to the environment and long term dependability of the system.

Electrical System Maintenance

For optimum performance, the slideout system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch, and the system for corrosion, and loose or damaged terminals. Check motor leads under the trailer chassis. Since these connections are subject to damage from road debris, be sure they are in good condition.

NOTE: The Lippert Slideout System is designed to operate as a negative ground system. A negative ground system utilizes the chassis frame as a ground and an independent ground wire back to battery is necessary. It is important that the electrical components have good wire to chassis contact. To ensure the best possible ground, a star washer should be used. Over 90% of unit electrical problems are due to bad ground connections.

Mechanical Maintenance

Although the system is designed to be almost maintenance free, actuate the room once or twice a month to keep the seals and internal moving parts lubricated. Check for any visible signs of external damage after and before movement of the travel trailer.

NOTE: For long-term storage: It is recommended that the room be closed (retracted).

Troubleshooting

Troubleshooting Introduction

This troubleshooting chart outlines some common problems, their causes and possible corrective actions. If any part or serial number information is available, provide it to the service technician when asking for assistance.

The Lippert Slideout System is only one of four interrelated slideout room system components. These four components are: chassis, room, coach, and Lippert Slideout System. Each one needs to function correctly with the others or misalignment problems will occur.

Every travel trailer has its own personality and what may work to fix one trailer may not work on another even if the symptoms appear to be the same.

When something restricts room travel, system performance will be unpredictable. It is very important that slide tubes be free of contamination and allowed to travel full distance (Stroke). Ice or mud buildup during travel is an example of some types of contamination that can occur.

When you begin to troubleshoot the system, make sure the battery is fully charged, there are no visible signs of external damage to the system and that all connections are secure.

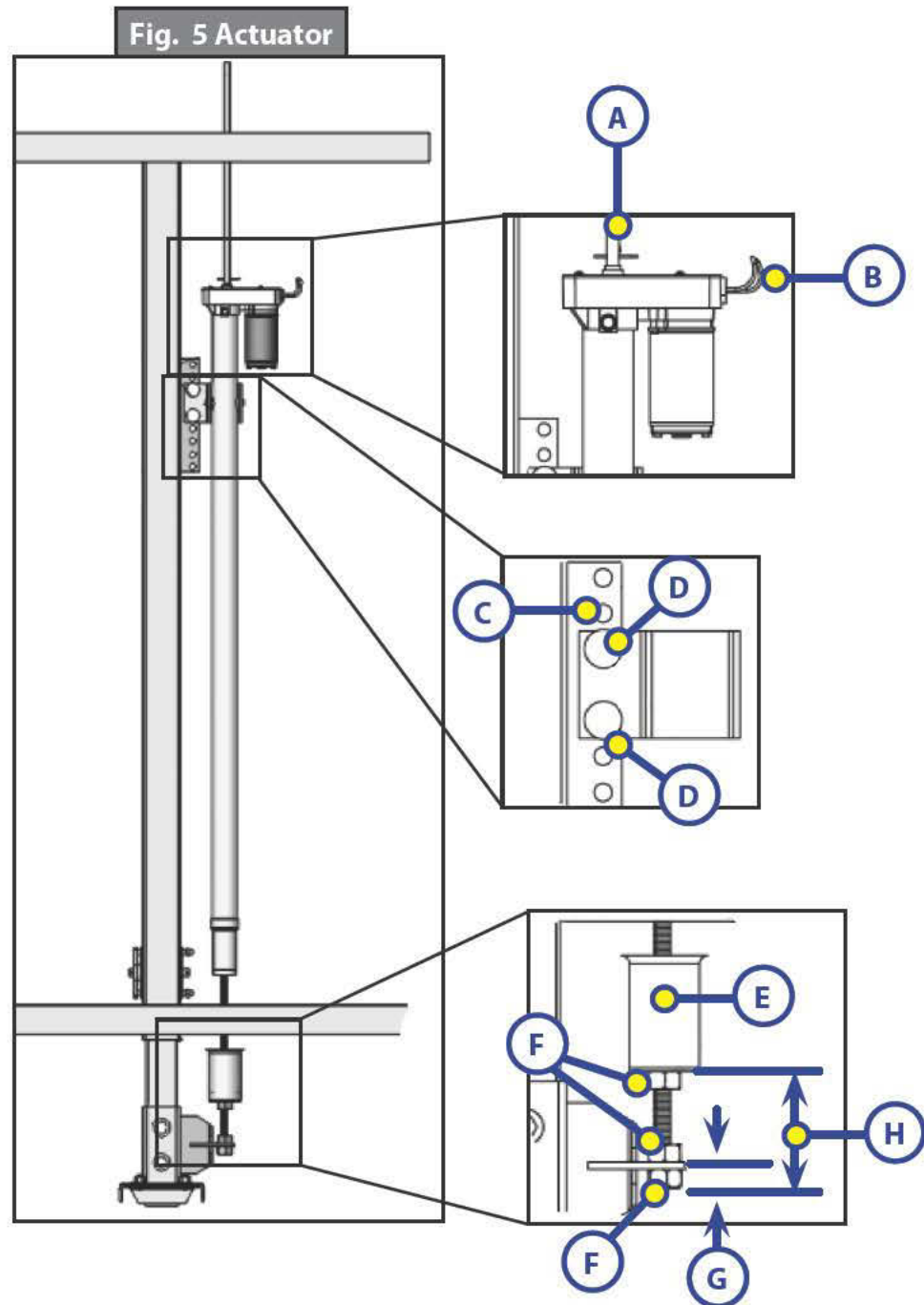
During troubleshooting, remember that if you change something, that change may affect something else. Be sure any changes you make will not create a new problem.

You can obtain additional information on the Lippert Slideout System by visiting www.lci1.com/customerservice or by calling 574-537-8900.

Problem	Probable Cause	Corrective Action
Room doesn't move when switch is pressed	Restriction or obstruction inside or outside of unit	Check for and clear obstruction.
	Low battery voltage, blown fuse, defective wiring	Check battery voltage and charge if needed. Find and check fuse, replace if blown. Check battery terminals and wiring. Look for loose, disconnected or corroded connectors.
Actuator motor runs but room does not move	Actuator not attached to front mounting drive bracket	Check jam nuts/nylock nuts. Be sure that they are properly tightened and adjusted.
	Bad motor or gear housing	Replace motor.
Motor runs but room moves slowly	Low battery voltage, poor ground, extremely low outdoor temperature	Charge battery and check ground wire.
	Room is in a bind	Check to see that room is properly adjusted.
Room stalls in mid travel	Actuator in a bind	Crank manual override and move room short distance then retry electric switch to move room.
	Bad actuator	Replace actuator if above instructions do not work.

Removing and replacing actuator

1. Disconnect manual crank shaft (A) from end of motor assembly.
2. Disconnect motor wires from source (B).
3. Take measurements (G) and (H).
4. Remove all jam nuts (F) and stop can (E) from threaded shaft on actuator.
5. Take note of mounting bolt locations and remove mounting bolts (D).
6. After everything is disconnected, slide actuator out of frame. To replace with new actuator, follow previous directions in reverse.



Motor troubleshooting

Before attempting to troubleshoot the motor, make sure an adequate power source is available. The unit batteries should be fully charged or the unit should be plugged into A/C service with batteries installed. Do not attempt to troubleshoot the motor without assuring a full 12V DC charge.

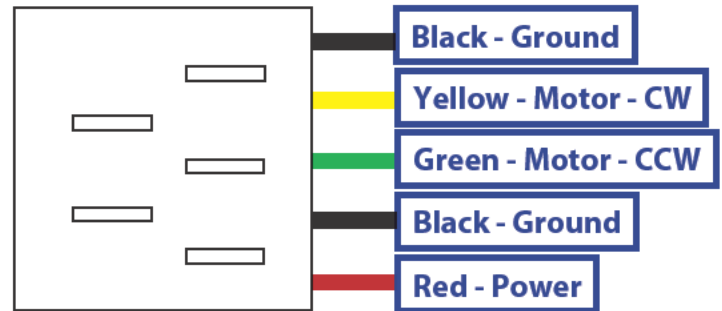
The following tests require only a DC voltmeter (or DC test light) and a jumper lead.

1. Attach voltmeter (or test light) leads to the negative and positive switch terminals on back of wall switch. Does the meter indicate 12V DC? If **YES**, see **Step 2**; if **NO** see **Step 3**.
2. If **YES**, at the motor, check the incoming leads to 12V DC (if necessary, disconnect leads at wire splices). Does meter indicate 12V DC? If **YES**, motor needs to be replaced. The motor is not field serviceable. **DO NOT ATTEMPT TO REPAIR**. If **NO**, inspect all wires and connections between the wall switch and the motor. Repair connections as necessary. Recheck as in **Step 1**.
3. If **NO**, inspect all connections between battery and switch. Inspect 30A Auto-reset Circuit Breaker (See Next Page). Recheck as above in **Step 1**.
4. Since there are no field serviceable parts in the motor, electrical troubleshooting and service is limited to replacing only those components as previously outlined.
5. Thorough inspection of wiring and connections is the only other electrical service that can be performed.

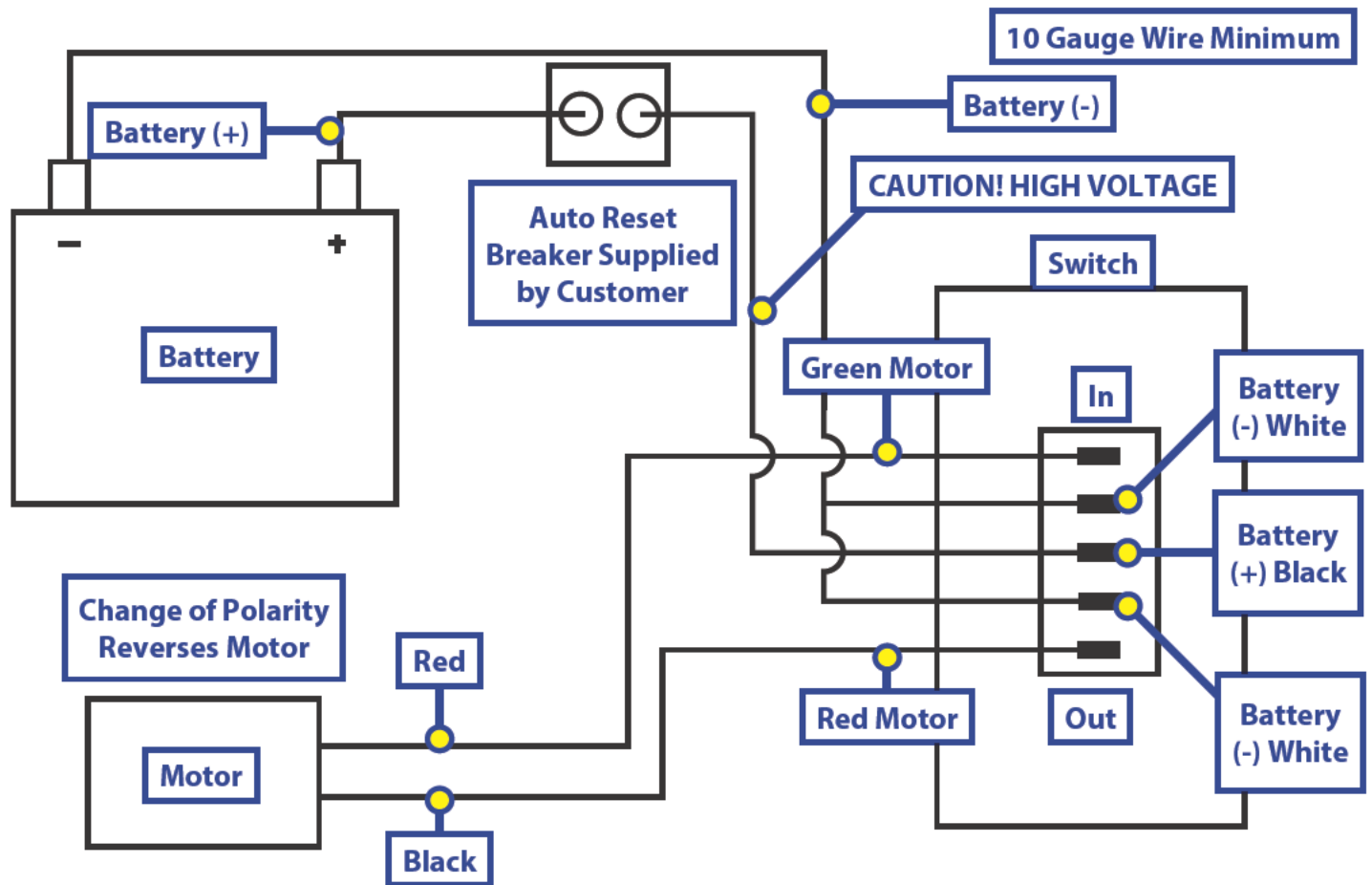
Fig. 1 Old Slideout Switch Color Codes



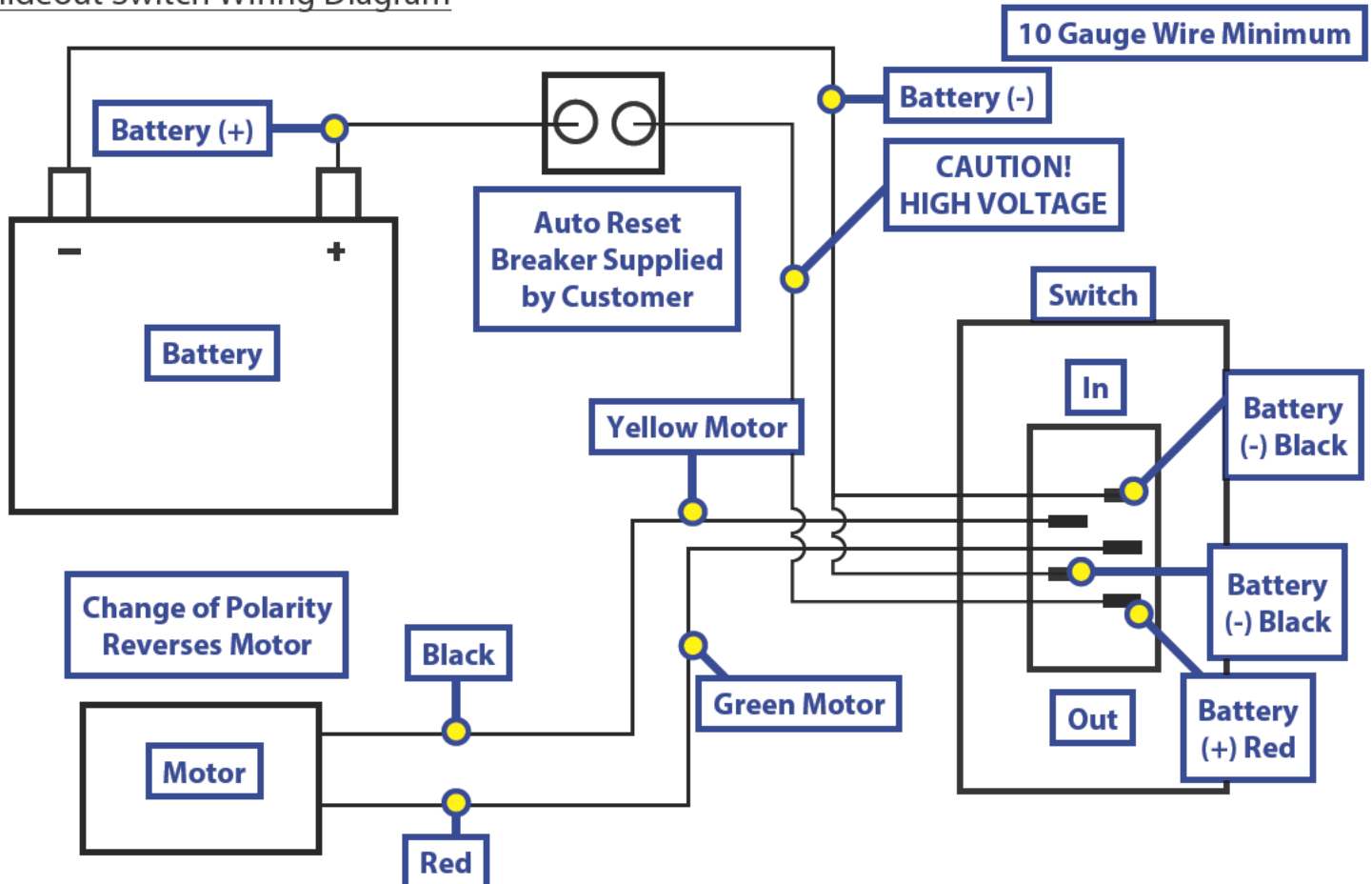
Fig. 2 New Slideout Switch Color Codes



Old Slideout Switch Wiring Diagram



New Slideout Switch Wiring Diagram



Mechanical Room Adjustment

NOTE: All slideout room adjustments must be performed by certified service technicians. Adjustments made by non-certified persons may void any and all warranty claims.

Horizontal adjustment

1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Room is ready to be positioned horizontally by pushing on the outside, sidewall or by using a prying device inserted into the opening between the room and coach.

NOTE: Use caution when using prying device so seals do not become damaged.

Vertical adjustment

1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Loosen jam nut.
3. For vertical adjustment turn vertical adjustment bolt "B" up or down to locate room height.
4. Once room is located, tighten "A" and Jam Nut bolts.

Fig. 1

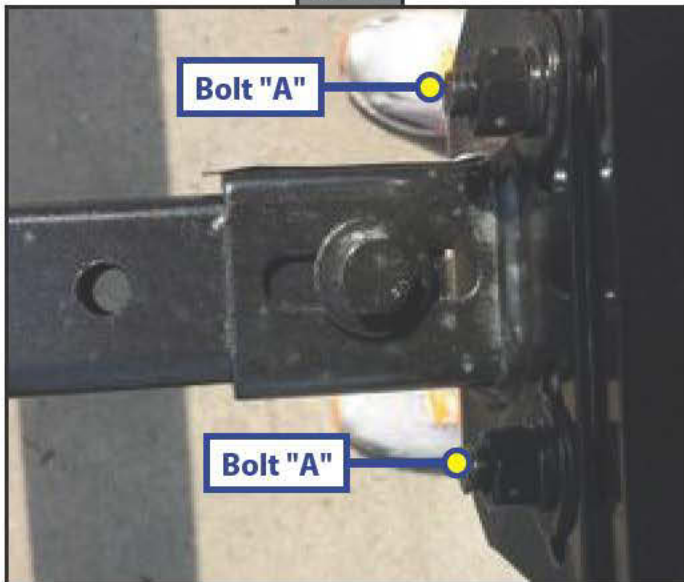


Fig. 2

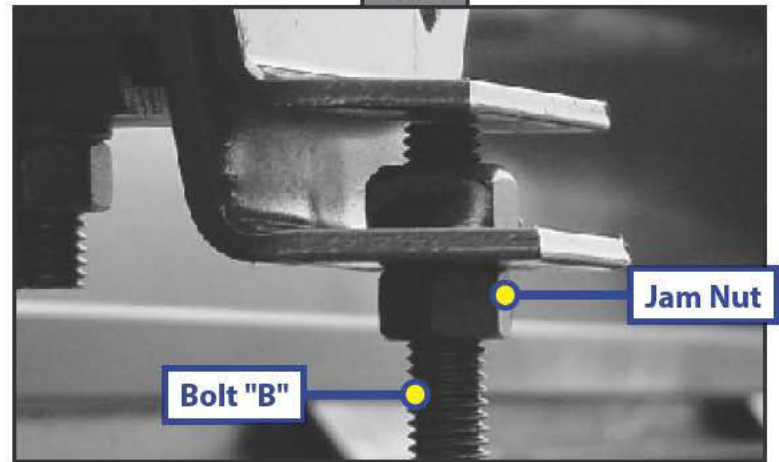
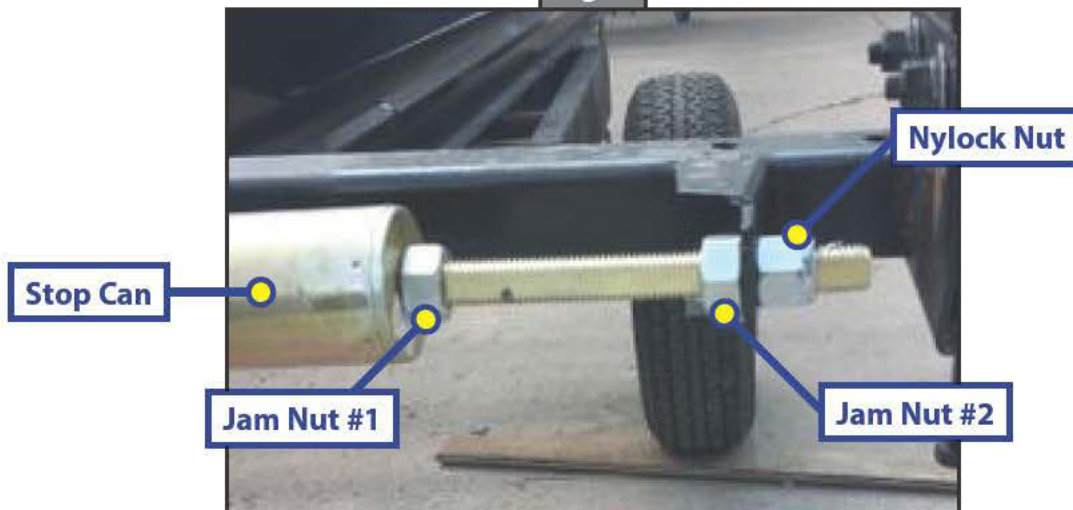


Fig. 3



Adjusting room so it seals in the IN position

1. Locate actuator coming through the frame.
2. On the end of the actuator there is a threaded shaft mounted to the drive bracket with 3 nuts and a stop can.
3. Loosen the $\frac{3}{4}$ " nut (Jam Nut #1) on the outside of the stop can.
4. Screw the can out or in, and then tighten down the nut – this will change the location of your seal going to the "in position".

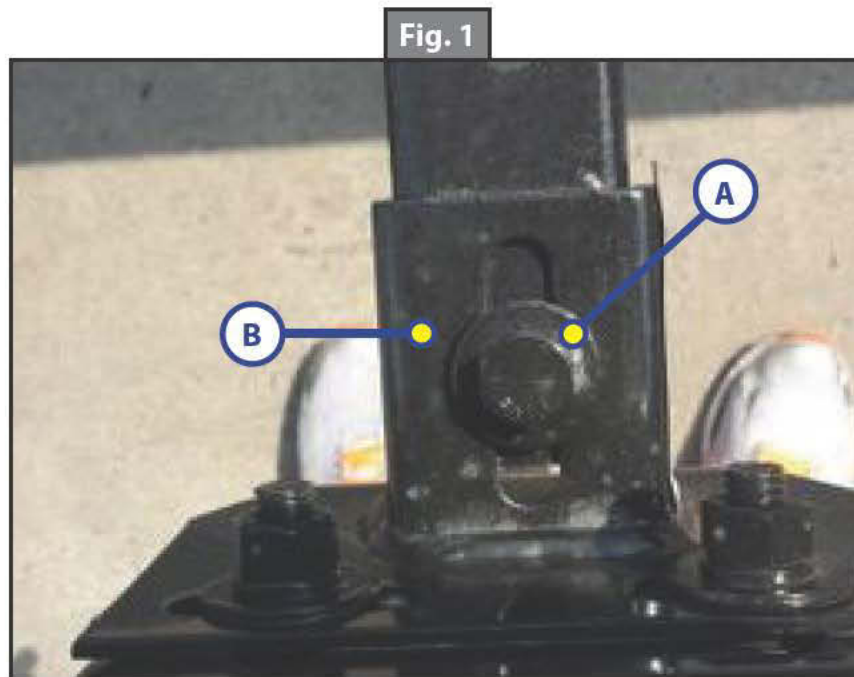
Adjusting room so it seals in the OUT position

1. Locate actuator coming through the frame.
2. On the end of the actuator there is a threaded shaft mounted to the bracket with 3 nuts and a stop can.
3. Move one of the 1" nuts (Jam Nut #2 or Nylock Nut) one way or the other– this will change the location of your seal going to the "out position".
4. Make sure all nuts are tight.

Synchronizing Room Travel

The Lippert Electric Slideout System room travel (both sides of the room traveling the same distance) can be adjusted with specially designed synchronizing bracket mounted on the passive slide tube. The passive slide tube is the one that is not powered. The active slide tube is the one that has the cylinder attached. If one side of the room fails to seal adjust as follows:

1. Loosen bolts (Fig. 1A) on top of the passive slide tube (Fig. 1B).
2. Push or pull room (on the passive side) to align with the active side.



Manual Override

NOTE: Always disconnect battery from system prior to manually operating system. Failure to disconnect battery can cause electricity to back feed through the motor and cause serious damage to the system as well as void the warranty.

The Lippert Electric Through Frame Slideout comes with a Manual Override system. Locate the crank extension with pin outside of the chassis main rail as (Fig. 1) shows underneath the unit on the end of the motor. This is where the crank handle (standard fifth wheel landing gear crank handle or 3/4" socket and ratchet) fits on to allow the manual extension/retraction of the room (Fig. 3-4). Simply take the crank handle (through-frame models) or wrench, ratchet or drill with a nut driver (in-frame models) and rotate it clockwise to retract and counterclockwise to extend slide-out. It is important to note that you DO NOT need to attempt to disengage the motor as the actuator is "manual ready." Just hook up and crank.

NOTE: Use EXTREME CAUTION when extending and/or retracting room using the manual override feature. It is possible to operate the slideout beyond the maximum extension and/or retraction and damage the slide components, slide room structure or trim components.

NOTE: The gears can be stripped out if the room is manually retracted/extended to its fullest extent and the operator continues to rotate manual override. Any damage due to misuse of the Manual Override feature will disqualify any and all claims to the Limited Warranty.

Fig. 1

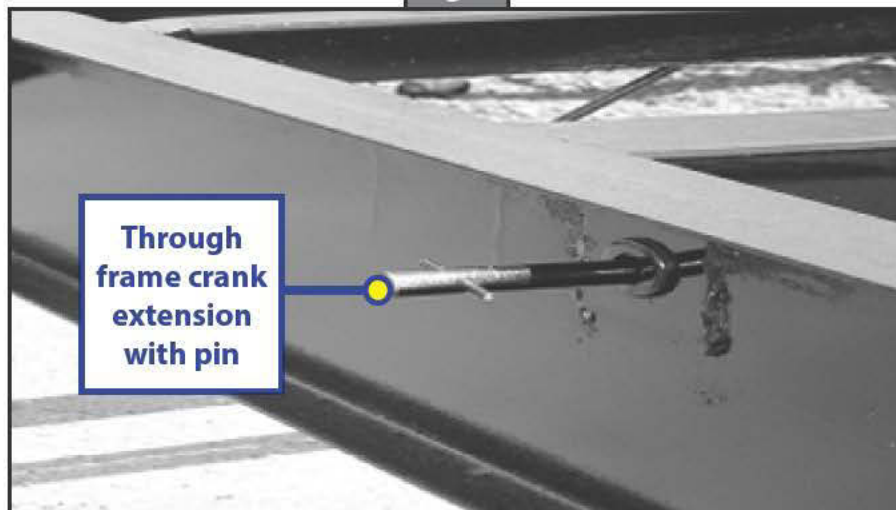


Fig. 2

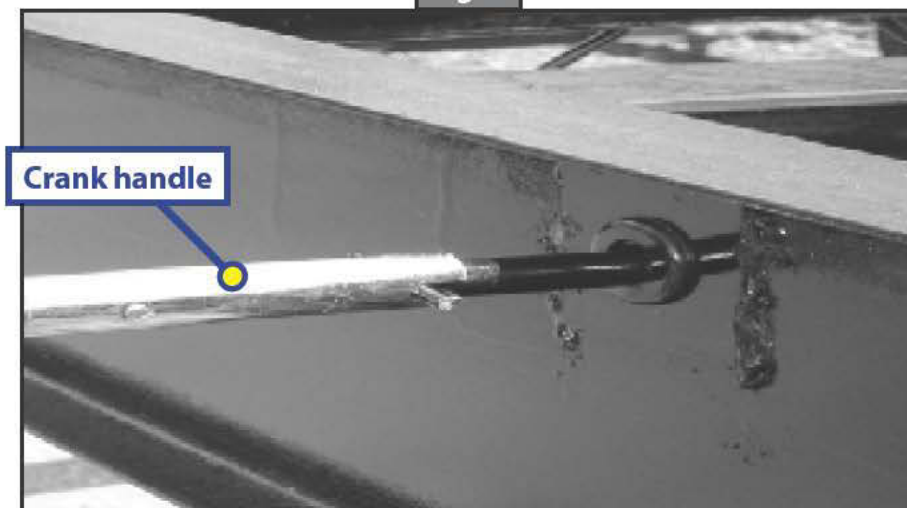


Fig. 3

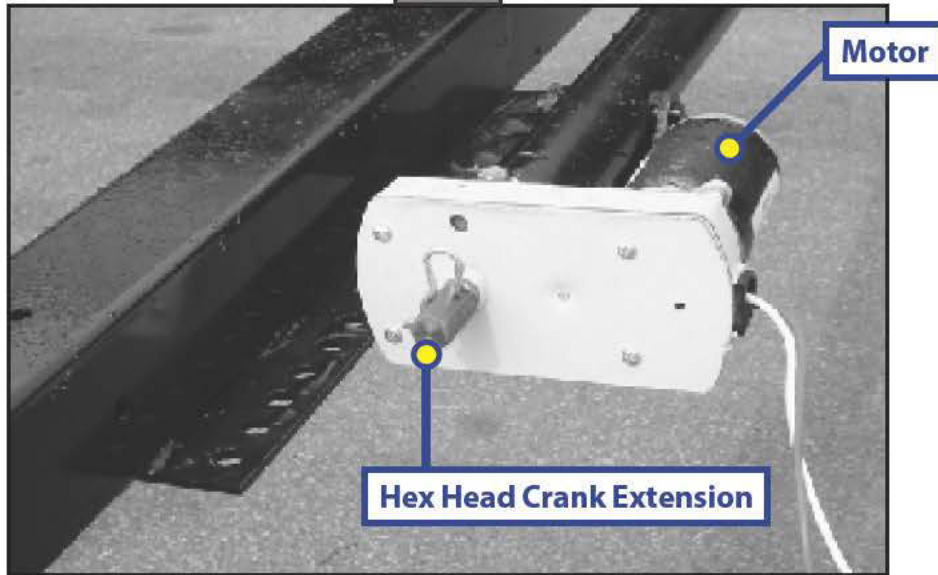
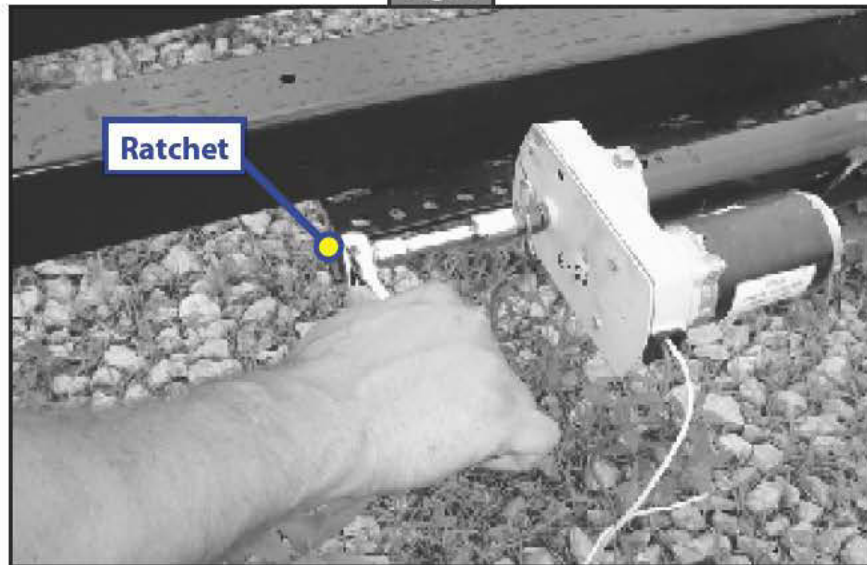


Fig. 4



SLIDEOUTS

1. Start by measuring the distance between two individual adjacent teeth.
2. Using calipers or a steel rule, measure from the inside edge of one tooth (A), and then measure over to the inside edge of the next tooth (B) shown in (Fig. 1).
3. The 14.5° rack will measure approximately 0.170 inches (Fig. 2.1). The 20° rack will measure approximately 0.231 inches (Fig. 3.1).
4. The 14.5° rack will have 4 teeth per inch (Fig. 2.2). The 20° rack will have 3 teeth per inch (Fig. 3.2).

Fig. 1 Side View

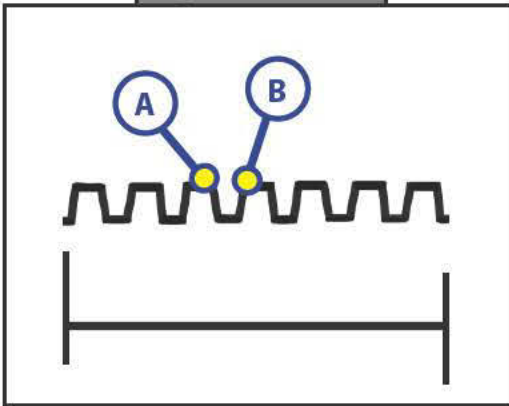


Fig. 2.1 - 14.5° Rack

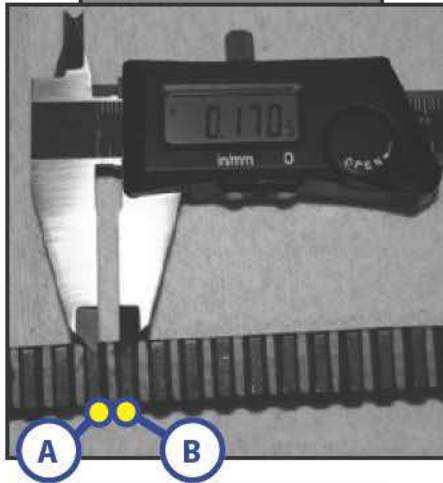


Fig. 3.1 - 20° Rack

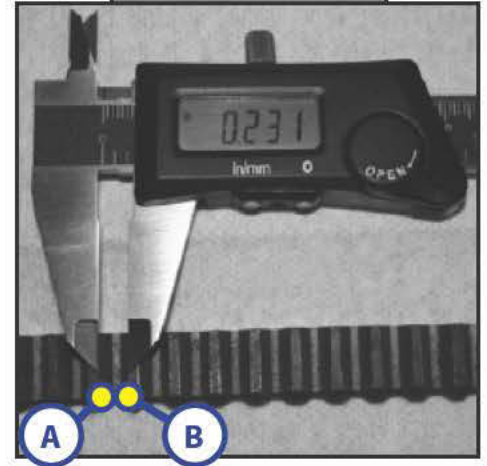


Fig. 2.2 - 14.5° Rack

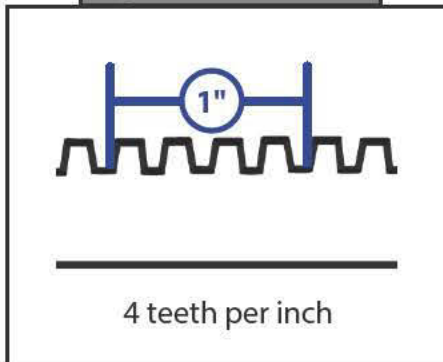
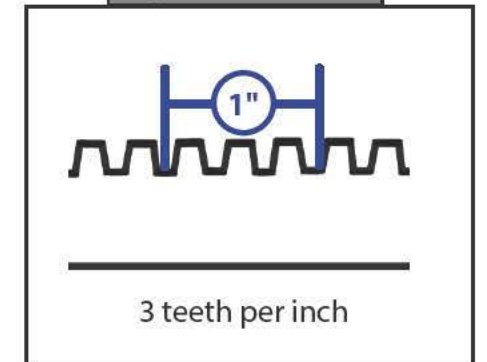


Fig. 3.2 - 20° Rack

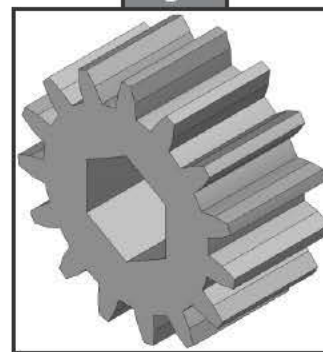


The simplest way to differentiate between the 14.5° spur gear and the 20° spur gear is the number of teeth on the gear. Spur gear 122739 (Fig. 4) has 18 teeth. Spur gear 101941 (Fig. 5) has 15 teeth.

Fig. 4



Fig. 5

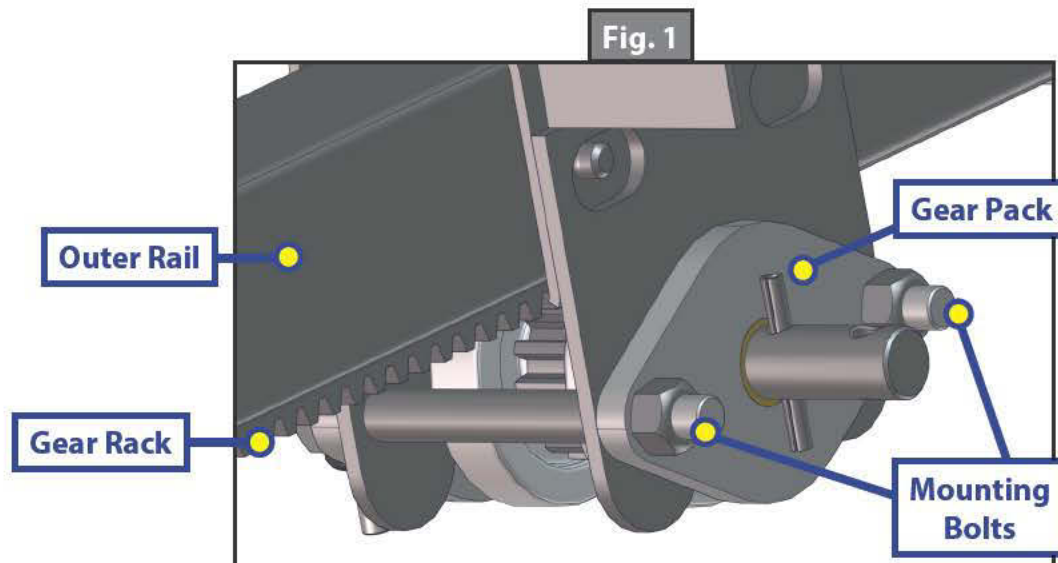


SLIDEOUTS

In the event a gear pack needs to be replaced, follow these steps:

1. Run slideout room half way out.
2. Place a jack under the inner arm of the slideout.
3. Jack room up just enough to remove pressure off the gear pack.
4. Remove drive bolt from the cross shaft.
5. Remove bolts which hold the gear pack assembly in place on the outer rail.
6. Drop out the damaged gear pack.
7. Install the new gear pack.
8. Install bolts to hold gear pack assembly in place on the outer rail.
9. Install cross shaft and bolt.
10. Gear pack assembly does not need to be torqued down, only adequately and securely tightened.

Gear Packs	
281331	2 x 2
140409	2 x 3, 3 x 3
122837	Standard 2.5 x 2.5
123356	Heavy Duty 2.5 x 2.5
140418	Embedded Rack



SLIDEOUTS

Fig. 1



A

B

Fig. 2



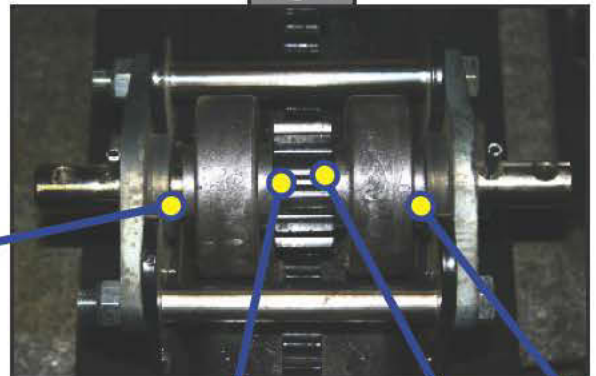
A

Fig. 3



A

Fig. 4



A

B

C

D

1. Loosen both gear packs bolts (Fig. 1A and Fig. 1B) until tension is off of the gear pack.
2. Using a manual pump oil can, pump 2-3 squirts of synthetic motor oil onto gear pack drive shaft in lubrication points (Fig. 2A), (Fig. 3A), (Fig. 4 A through D).

NOTE: Do not lubricate rack or pinion gear teeth, lubricate drive shaft only.

NOTE: LCI recommends Mobile One Fully Synthetic 10W-30 Motor Oil to lubricate gear pack.

3. Extend and retract slideout arms several times to work lubricant through gear pack.

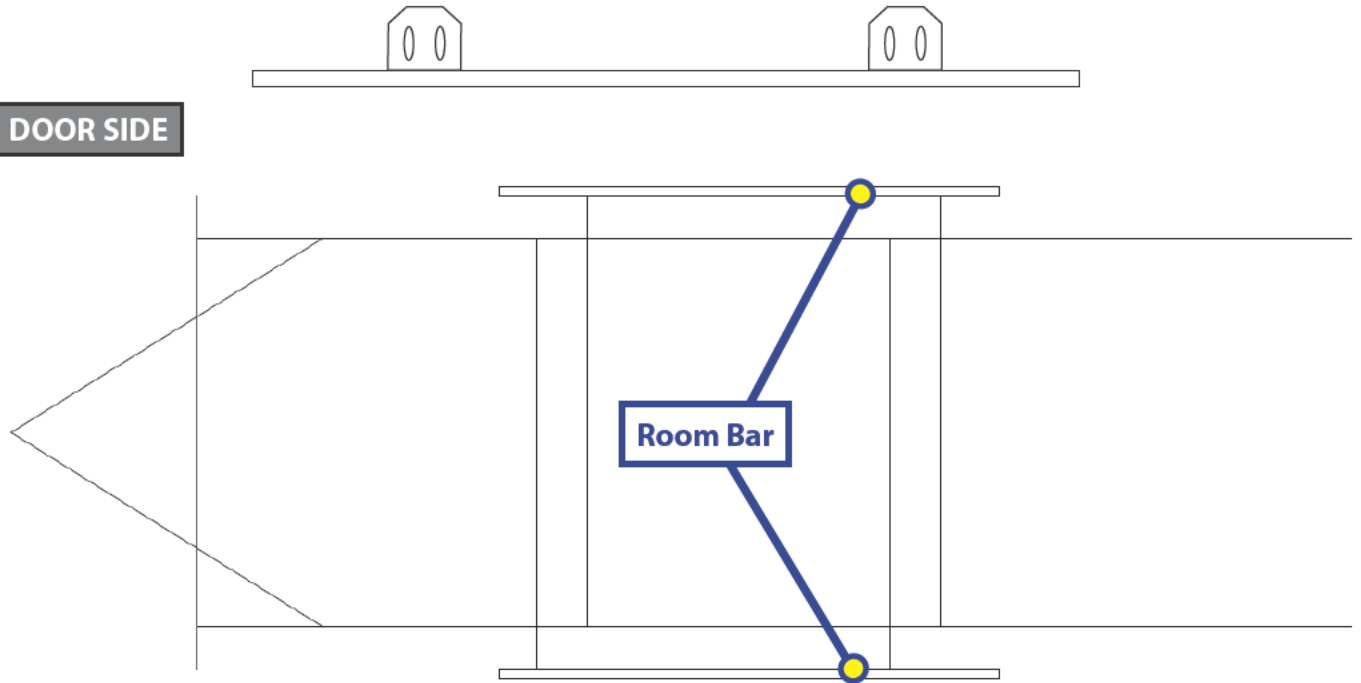
ROOM BAR MEASUREMENT CHART

SLIDEOUTS

1. Circle which side of your coach this room bar is for (Door Side or Off Door Side).
2. Enter the measurements for A, B, C, and D on the lines at the bottom.

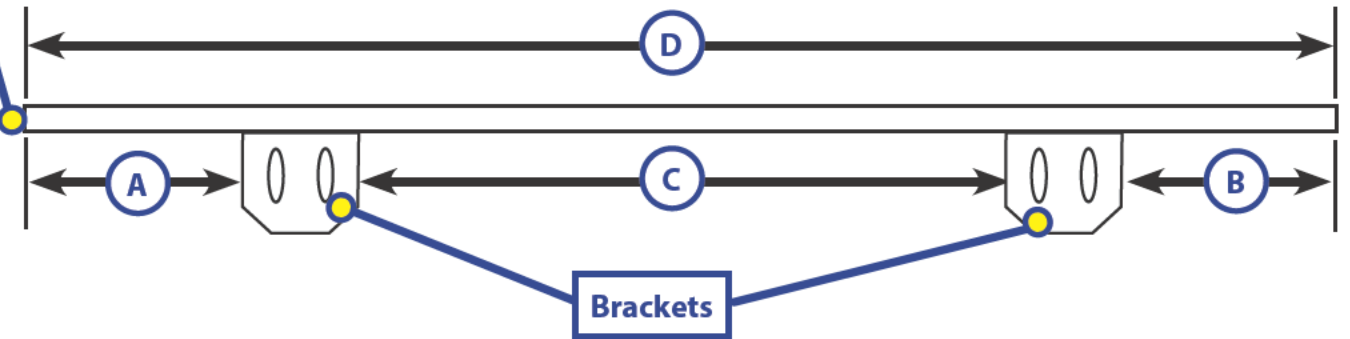
DOOR SIDE

FRONT OF COACH



OFF DOOR SIDE

Room Bar



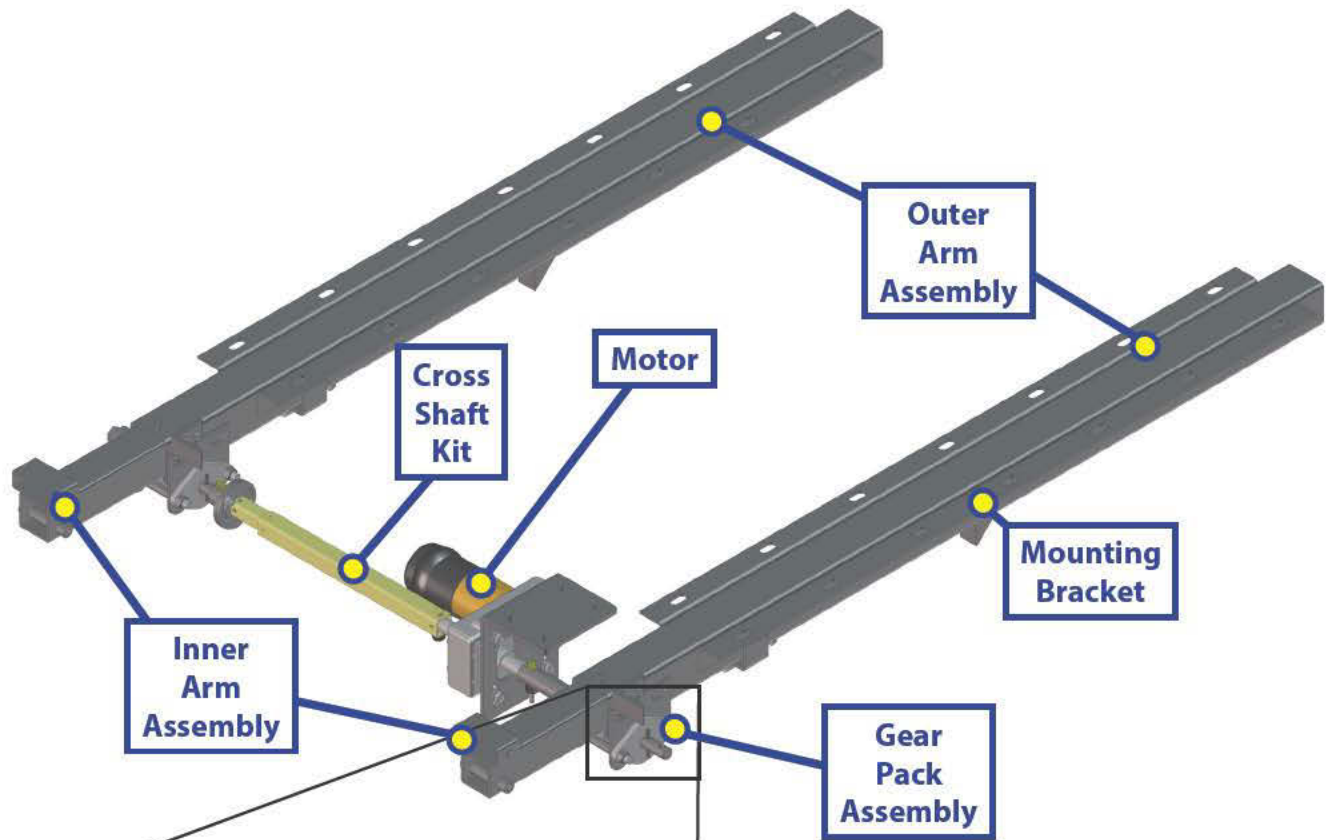
A _____ B _____ C _____ D _____



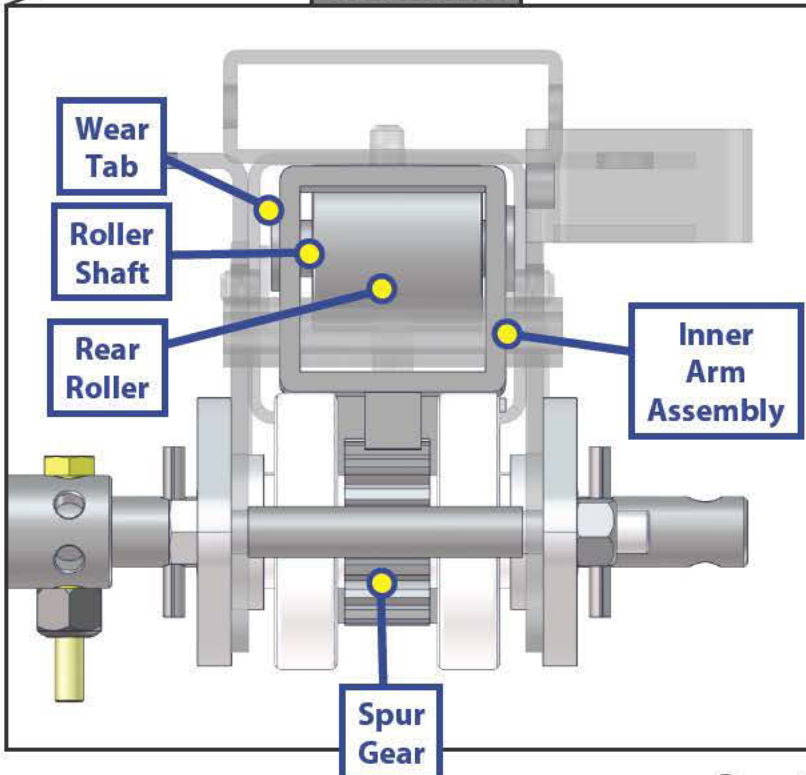
2X2 ELECTRIC THROUGH FRAME SLIDEOUT ASSEMBLY WEBPAGE

SLIDEOUTS

Bolt-on Electric Through Frame Slideout



Section View



For further reference on the following subjects, please refer to indicated page:

["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)

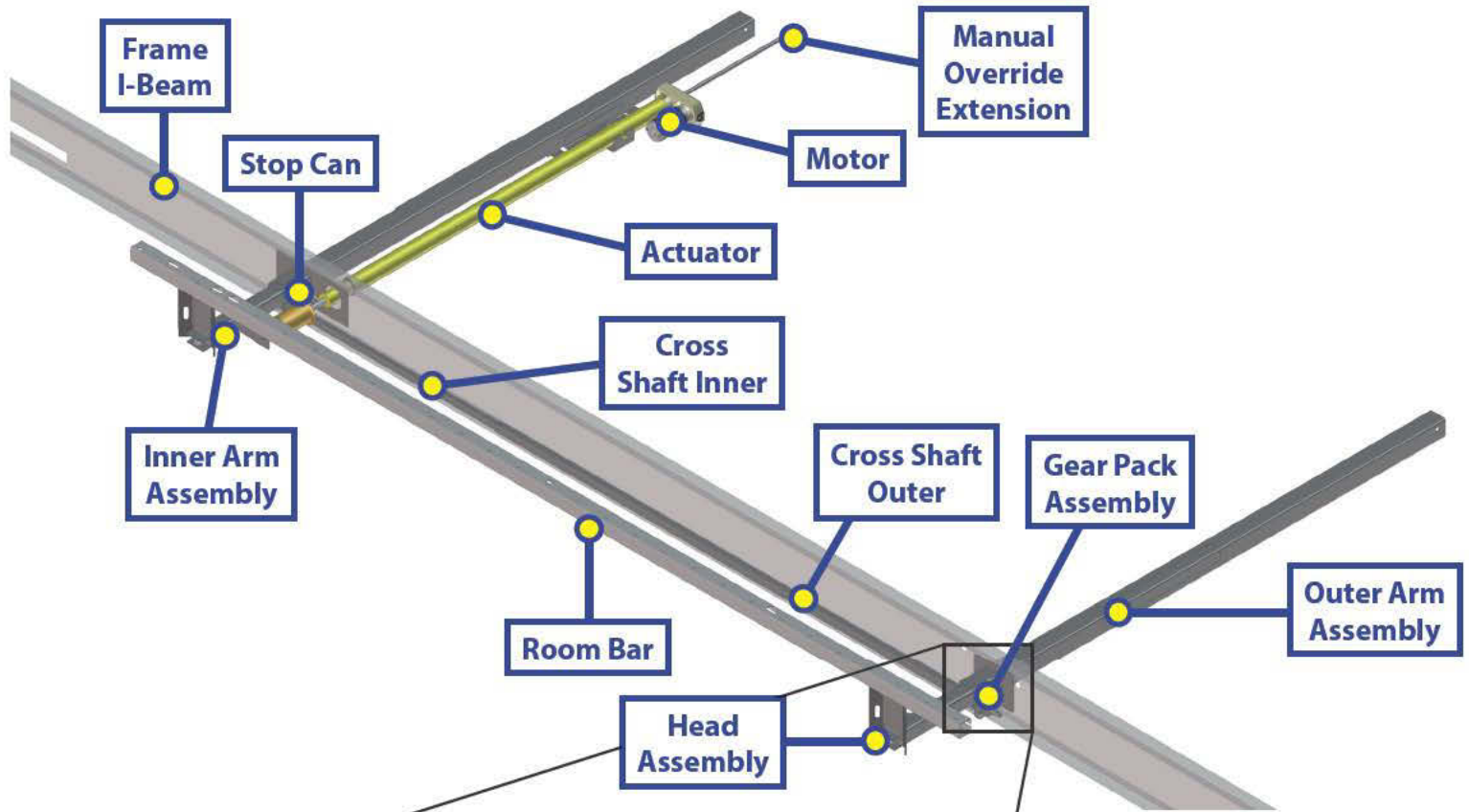
["Gear Pack Replacement Instructions" on page 43](#)

["Corrective Action for Squeaking Gear Packs" on page 44](#)

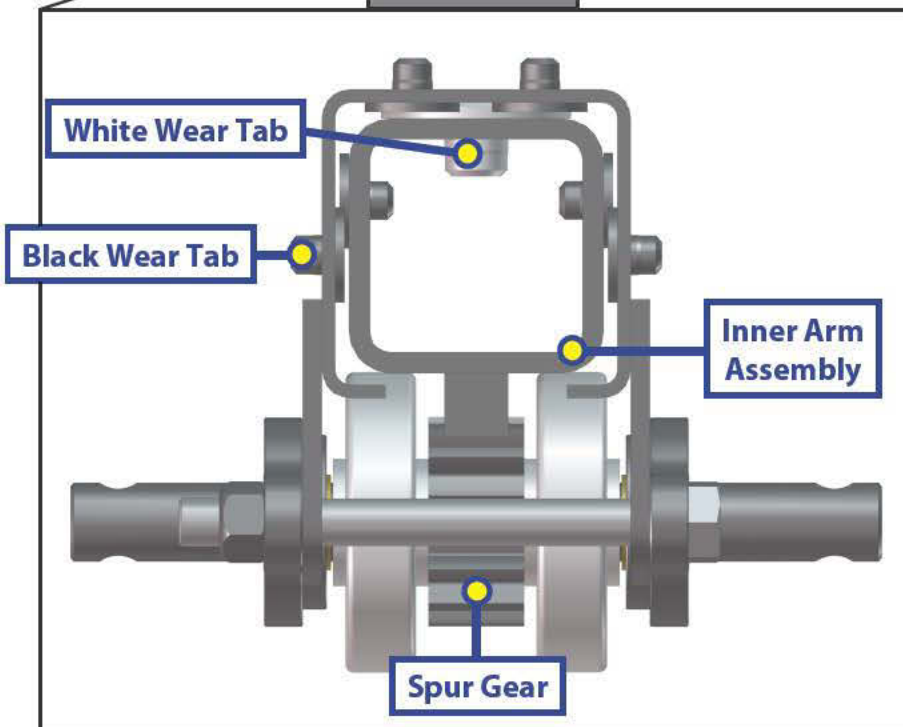
["Room Bar Measurement Chart" on page 45](#)

SLIDEOUTS

Electric Through Frame Slideout with Wear Tabs



Section View



For further reference on the following subjects, please refer to indicated page:

["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)

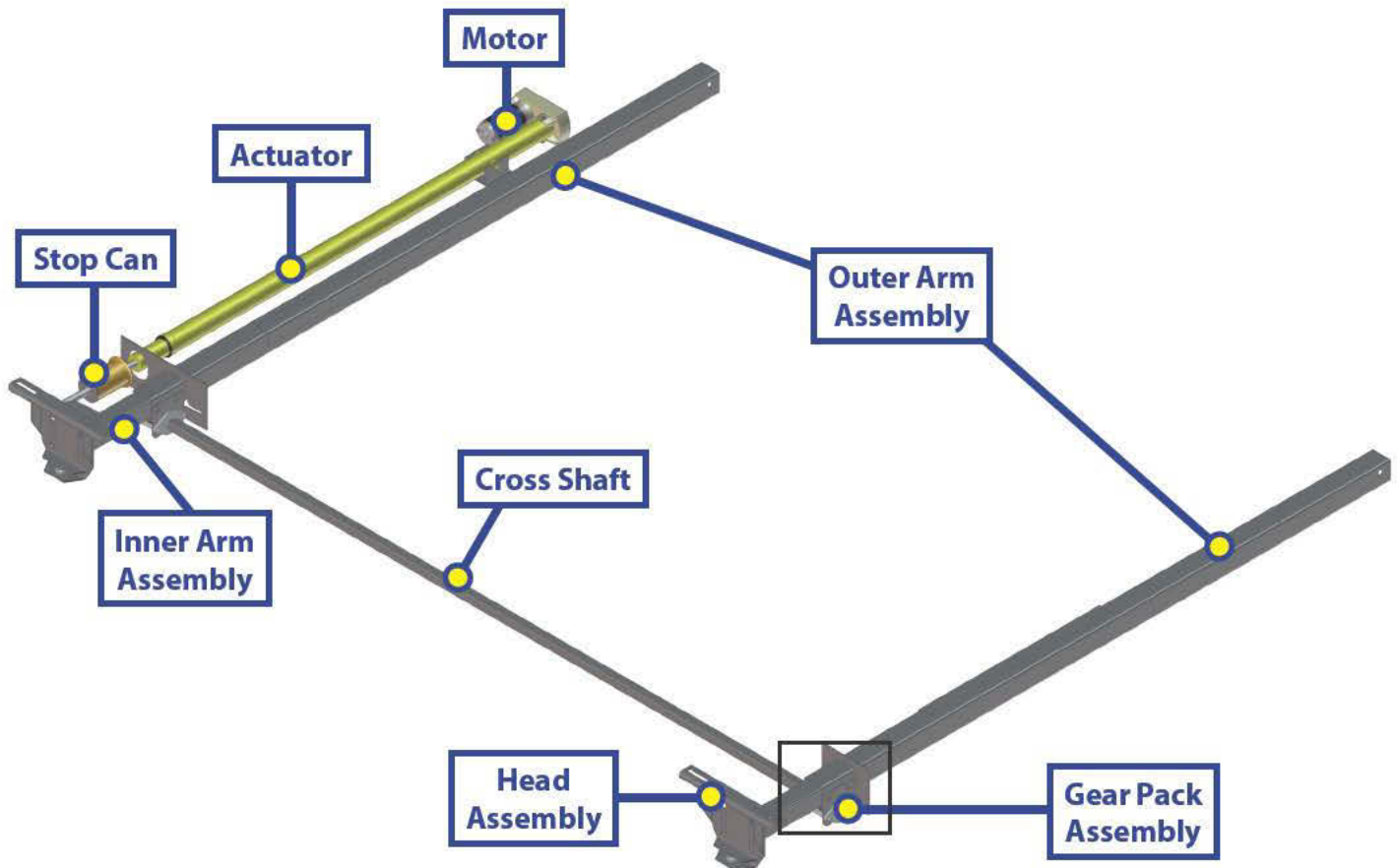
["Gear Pack Replacement Instructions" on page 43](#)

["Corrective Action for Squeaking Gear Packs" on page 44](#)

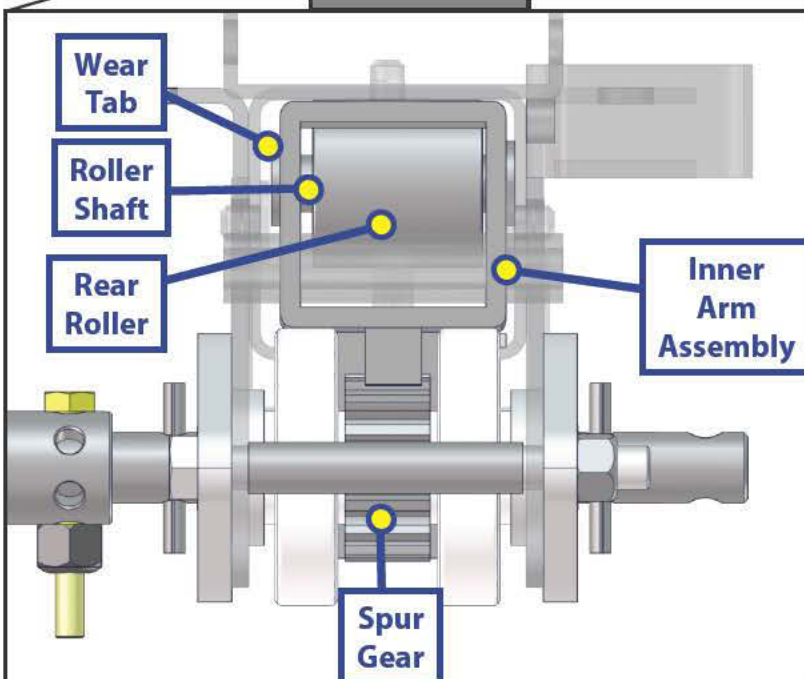
["Room Bar Measurement Chart" on page 45](#)

SLIDEOUTS

Electric Through Frame Slideout with Rear Roller



Section View



For further reference on the following subjects, please refer to indicated page:

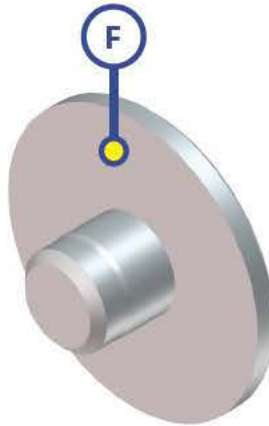
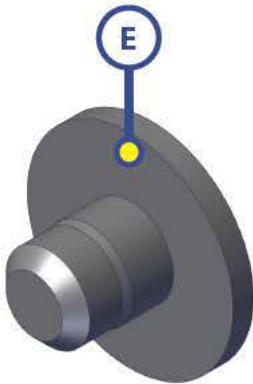
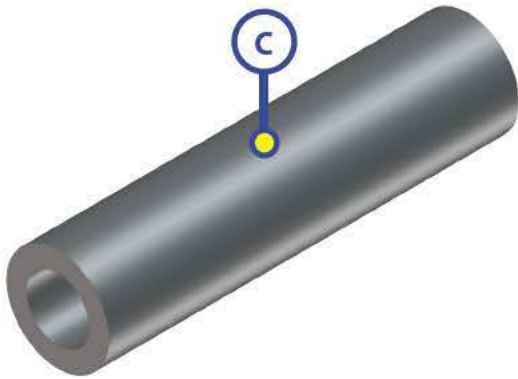
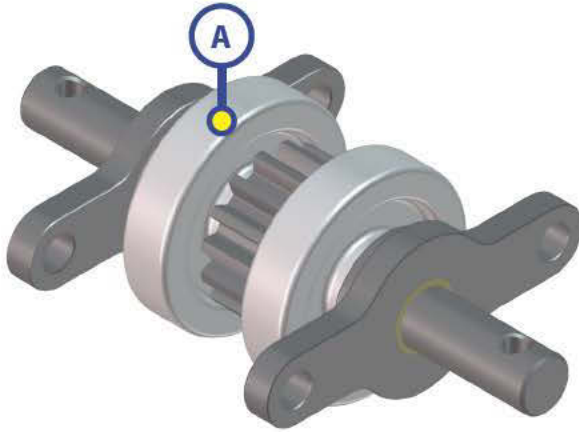
["Comparing 14.5° and 20° Rack and Pinion Gears"](#) on page 42

["Gear Pack Replacement Instructions"](#) on page 43

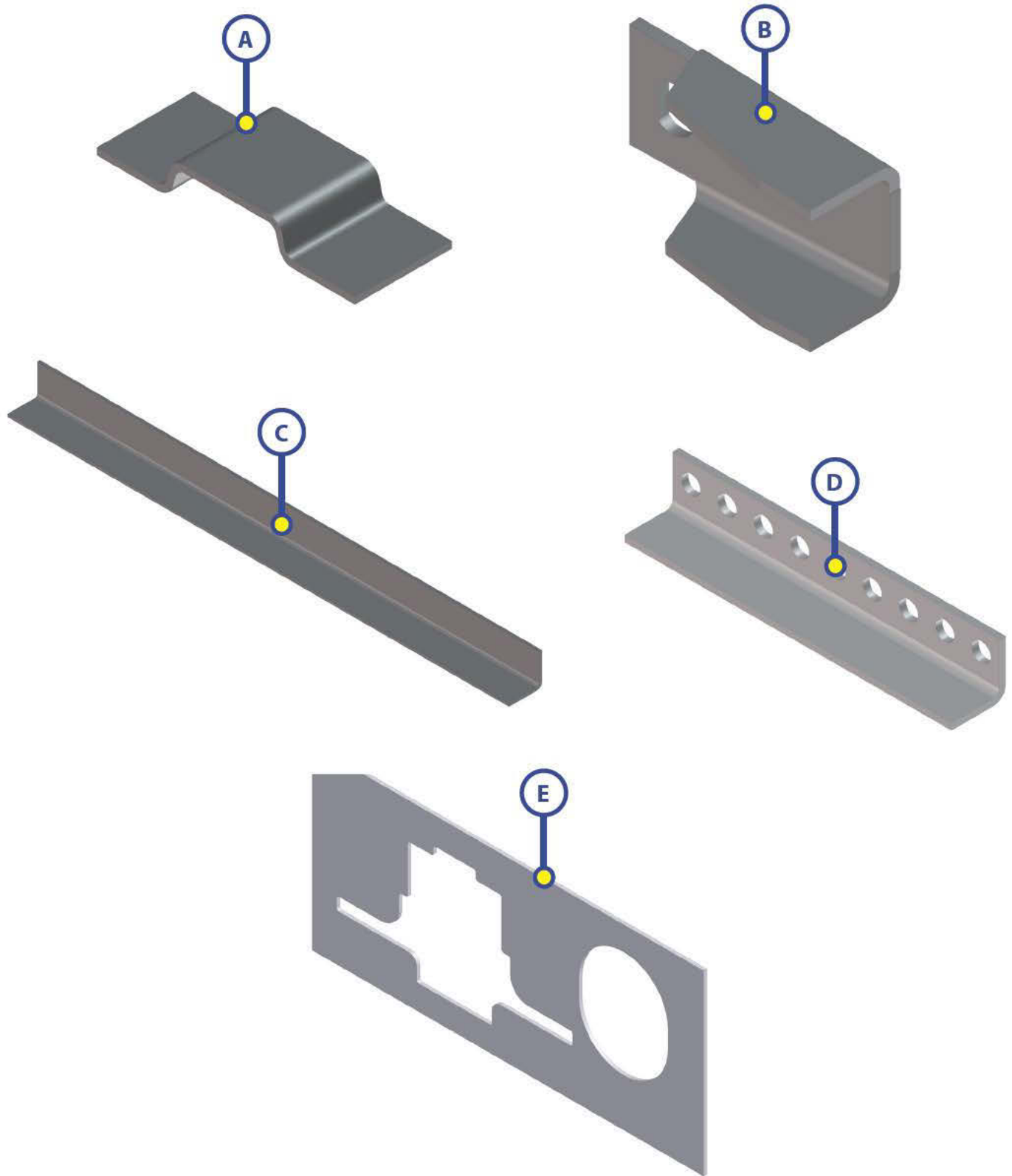
["Corrective Action for Squeaking Gear Packs"](#) on page 44

["Room Bar Measurement Chart"](#) on page 45

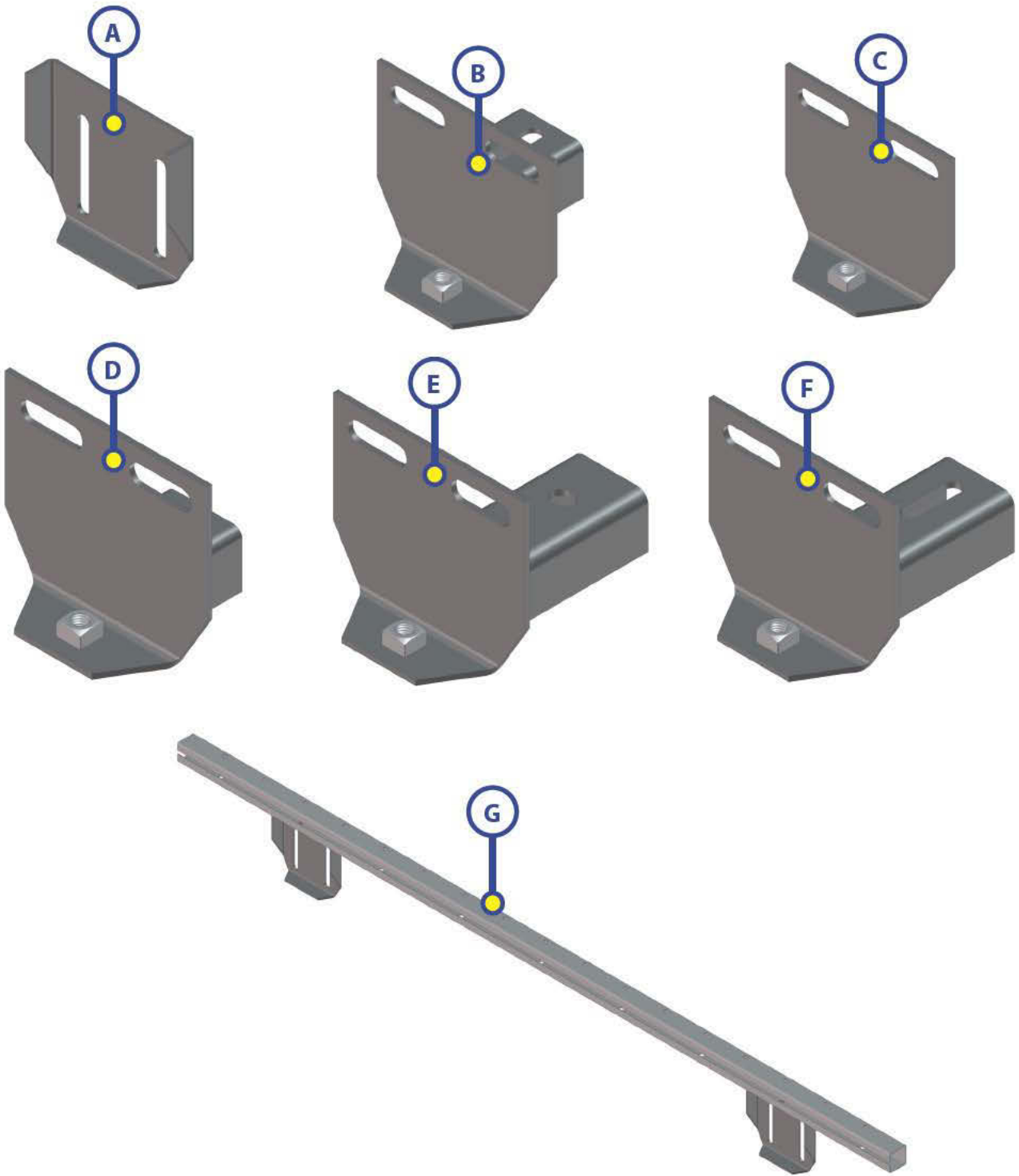
SLIDEOUTS



Callout	Part #	Description
A	281331	Gear Pack
B	116658	Spur Gear
C	105893	Roller Shaft
D	122840	Stop Can
E	103480	Black Wear Tab
F	277882	White Wear Tab
G	104475	Rear Roller

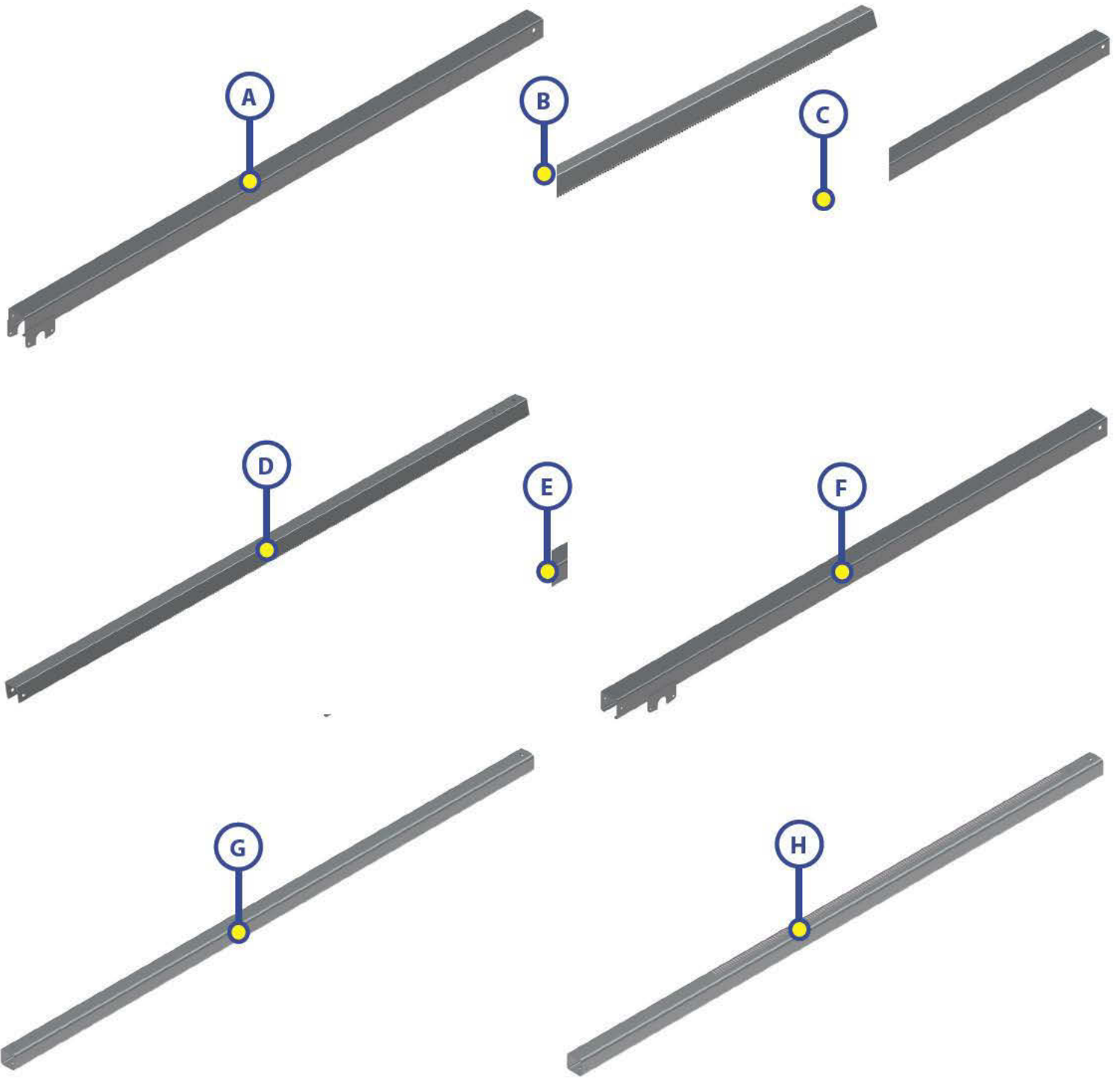


Callout	Part #	Description
A	106059	Hat
B	134707	Front Actuator Mounting Bracket
C	102357	Stiffener
D	158814	Mounting Bracket
E	131317	Trim Plate



Callout	Part #	Description
A	104851	Slideout Mounting Bracket
B	141792	1 3/8" Adjustable Head Assembly
C	159624	Standard Weld-On Head Assembly
D	163049	Flush Adjustable Head Assembly
E	173593	Standard Flush Fixed Head Assembly
F	173594	Standard Flush Adjustable Head Assembly
G	183949	Room bar (Use for up to 80")
	183950	Room bar (Use for 81" to 154")

NOTE: Brackets can be shipped loose.

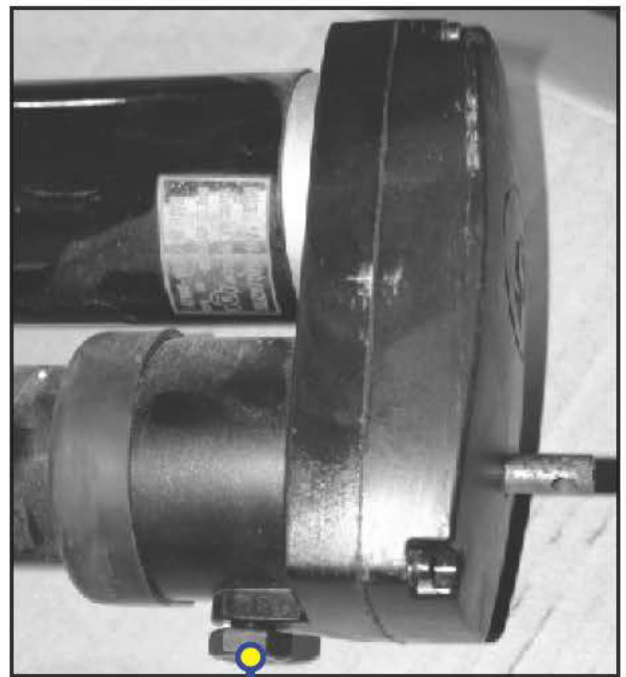


Callout	Part #	Description
A	145735	Outboard Outer Arm (Idler)
	145734	Outboard Outer Arm (Drive)
B	145736	Outboard Inner Arm
C	173204	Inboard Outer Arm 76" (Idler and Drive)
D	163778	Inboard Inner Arm
E	161014	Inboard Outer Arm 69" (Idler and Drive)
F	159389	Inboard Outer Arm 70" (Idler and Drive)
G	301393	Inboard Inner Arm (18 Teeth)
H	296090	Outboard Inner Arm (18 Teeth)

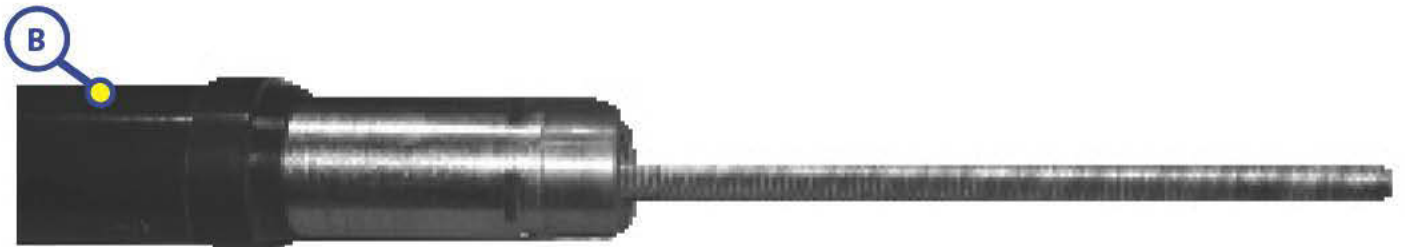
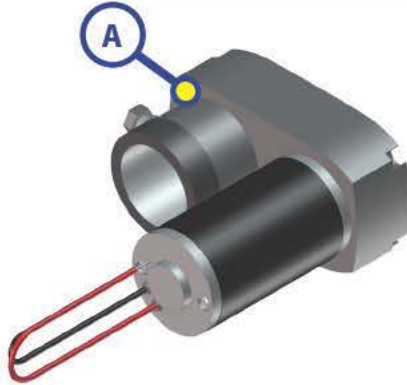
NOTE: Standard slideout arms have 15 teeth.



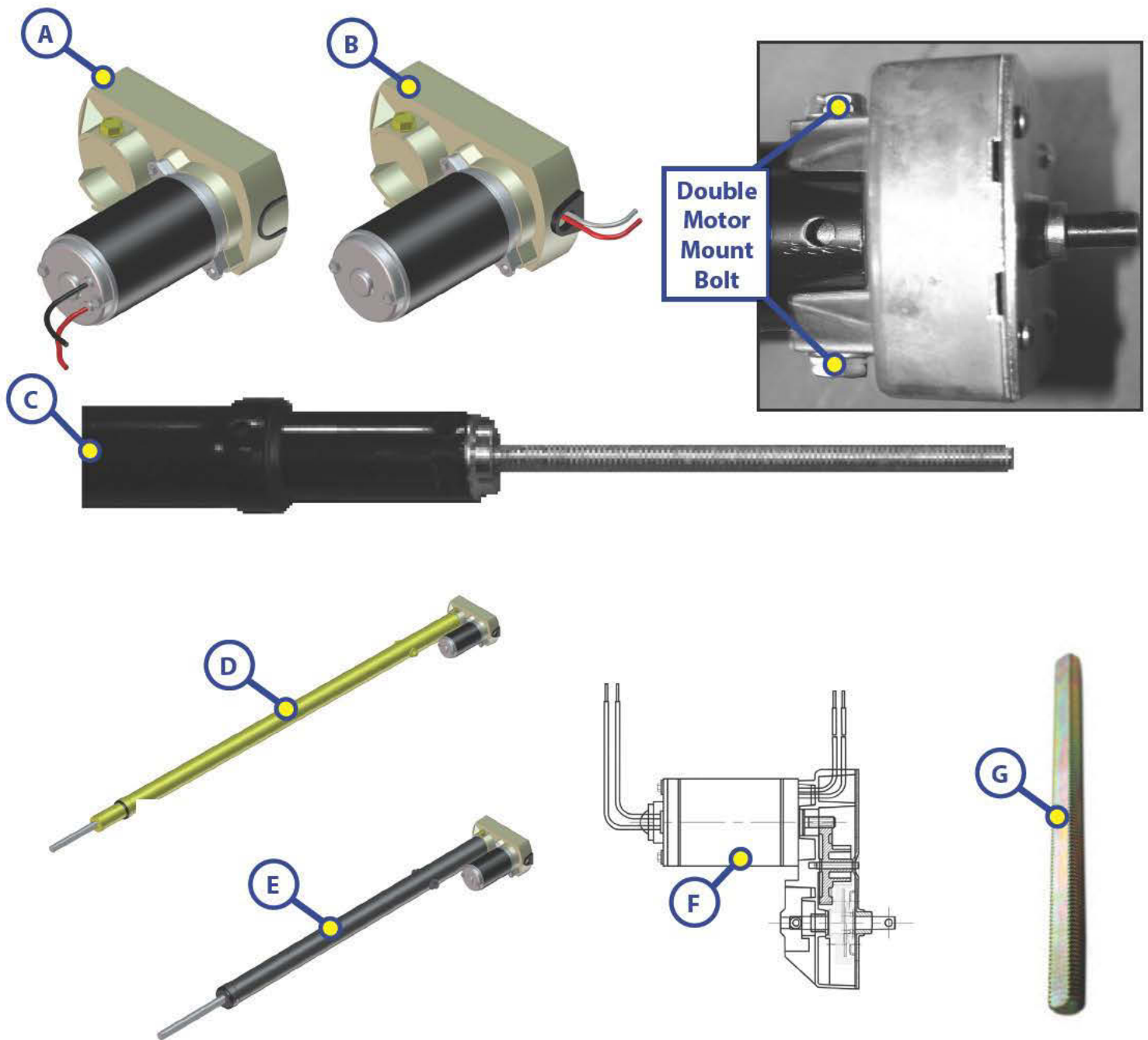
**LCI Logo on
bottom of Gearbox**



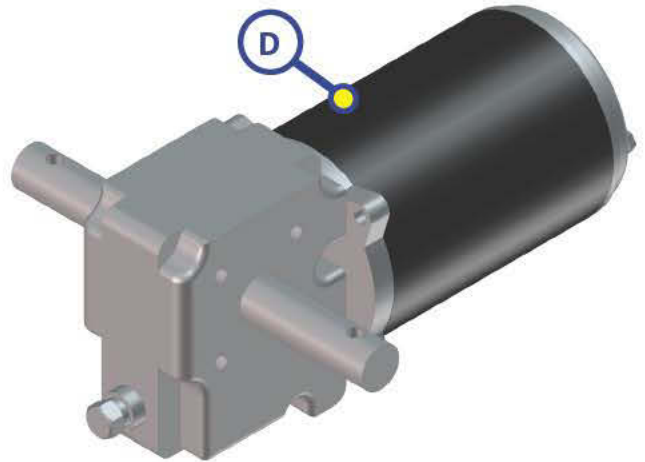
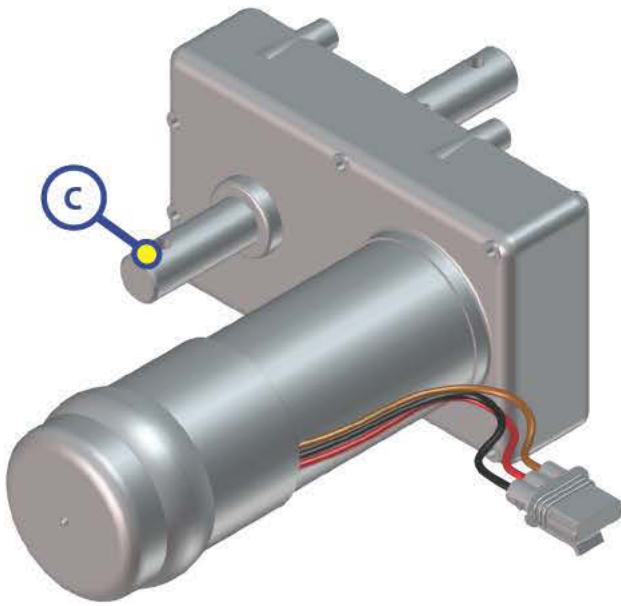
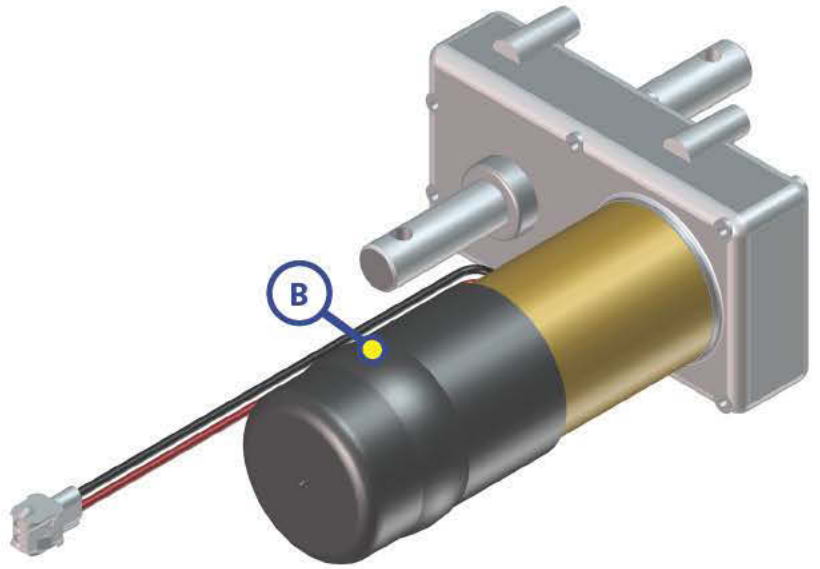
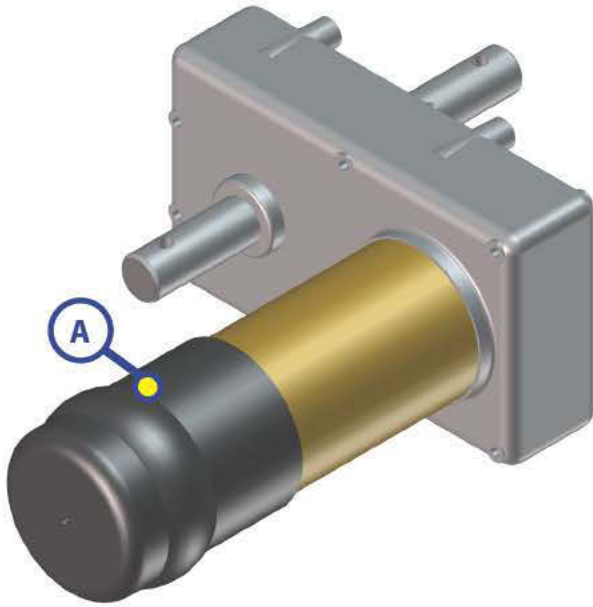
**Single Motor
Mounting Bolt**



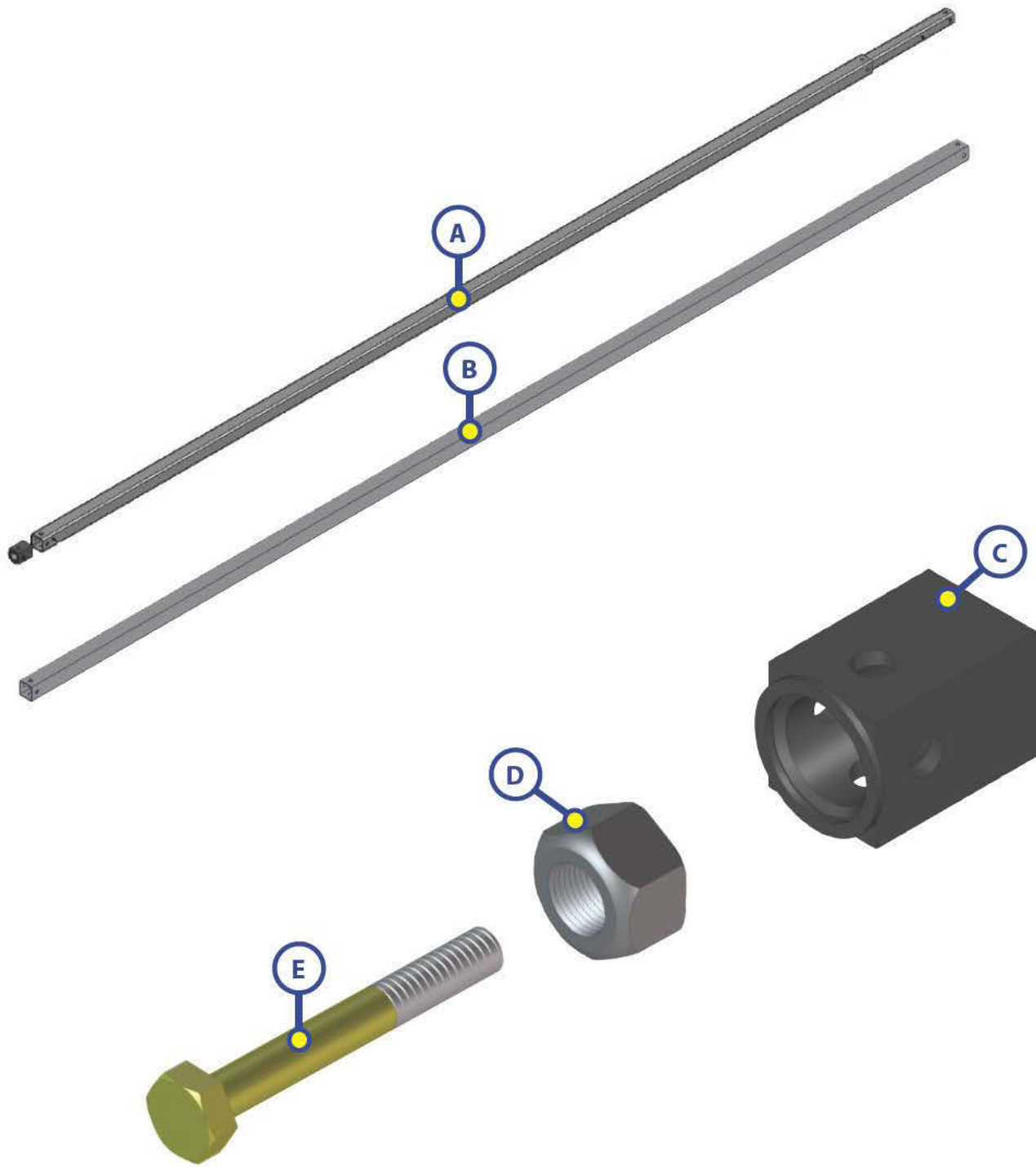
Callout	Part #	Description
A	125802	Tuson 18:1 Motor Only
B	145596	Tuson 18:1 Actuator Only (40")
C	145185	Tuson 18:1 Actuator and Motor (24")
	131903	Tuson 18:1 Actuator and Motor (40")



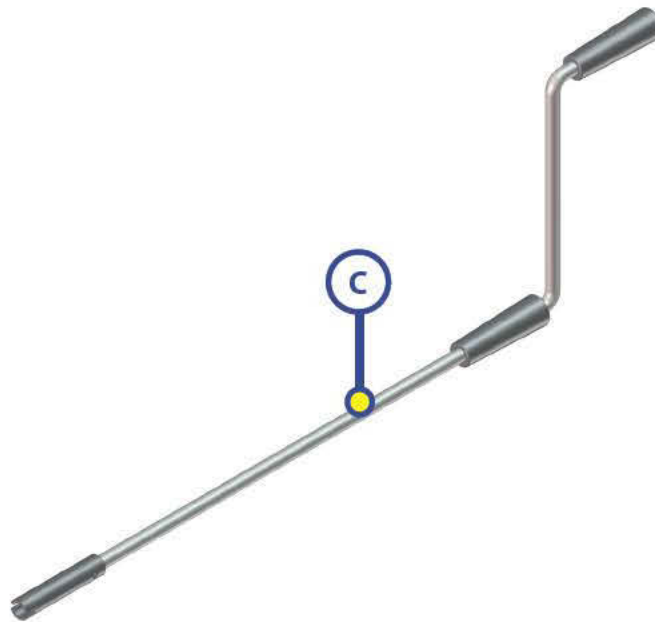
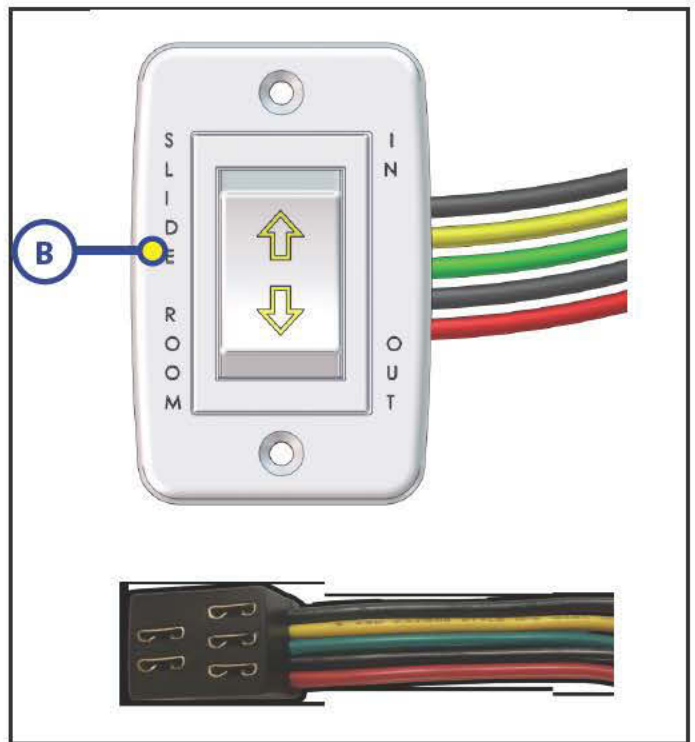
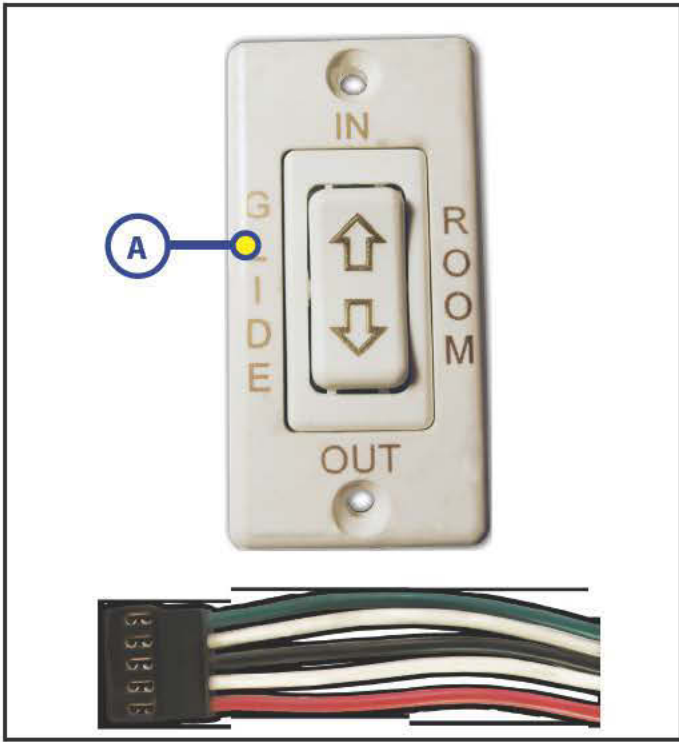
Callout	Part #	Description
A	132682	Venture 18:1 Motor Only
B	136373	Venture 28:1 Motor Only
C	145595	Venture 18:1 Actuator Only (40")
D	158457	Venture Actuator and 28:1 Motor (43")
	255676	Venture Actuator and 18:1 Motor (43")
	336937	Venture Actuator and 58:1 Motor (43")
E	119128	Venture Actuator and 18:1 Motor (24")
	122747	Venture Actuator and 18:1 Motor (32")
	119129	Venture Actuator and 18:1 Motor (40")
F	191072	Venture Replacement Gear Set 18:1
	191073	Venture Replacement Gear Set 28:1
G	157488	Actuator Replacement Rod
NOTE: Toula actuators and motors can be replaced by Venture.		



Callout	Part #	Description
A	138449	Klauber D-300 Motor
	140201	Klauber E-300 Motor
	143701	F-350 Motor
B	321395	Klauber F-300
C	325502	H-350 Motor
D	138448	M-150N Motor



Callout	Part #	Description
A	157523	Cross Shaft Kit
B	117630	Outer Cross Shaft
	117606	Inner Cross Shaft
C	123365	Cross Shaft Insert
D	118092	Nut 1/4" - 20
E	119066	Bolt

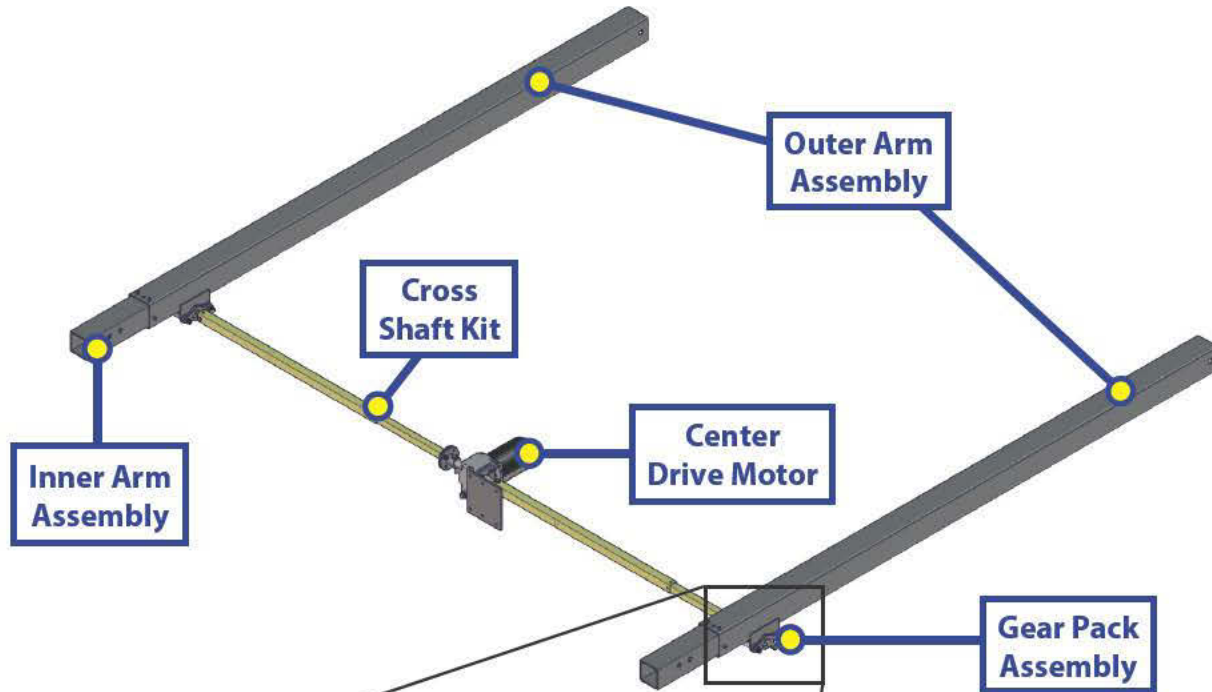


Callout	Part #	Description
A	173628	Old Slideout Switch Kit
	119134	Switch Plate
	119132	Switch
	119130	Switch Wire Harness
B	117460	New Slideout Switch Kit (Black)
	117461	New Slideout Switch Kit (White)
	117420	Switch Plate (White)
	129003	Switch (White)
	117421	Switch Plate (Black)
	117426	Switch (Black)
	178436	Switch Wire Harness
C	119226	Manual Slideout and Landing Gear Crank Handle

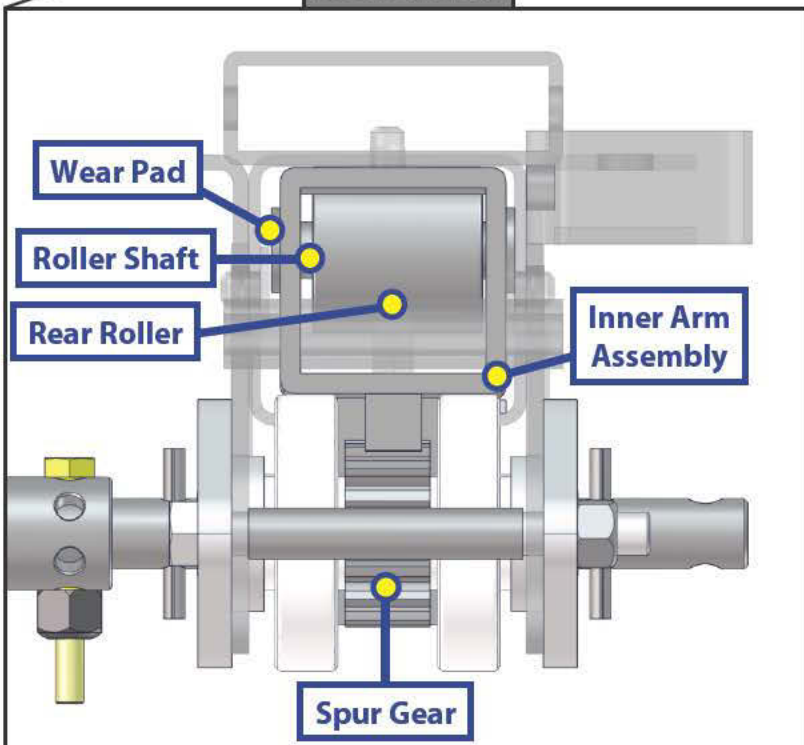
2.5X2.5 ELECTRIC THROUGH FRAME SLIDEOUT ASSEMBLY WITH CENTER DRIVE WEBPAGE

SLIDEOUTS

Electric Through Frame Slideout with Center Drive



Section View

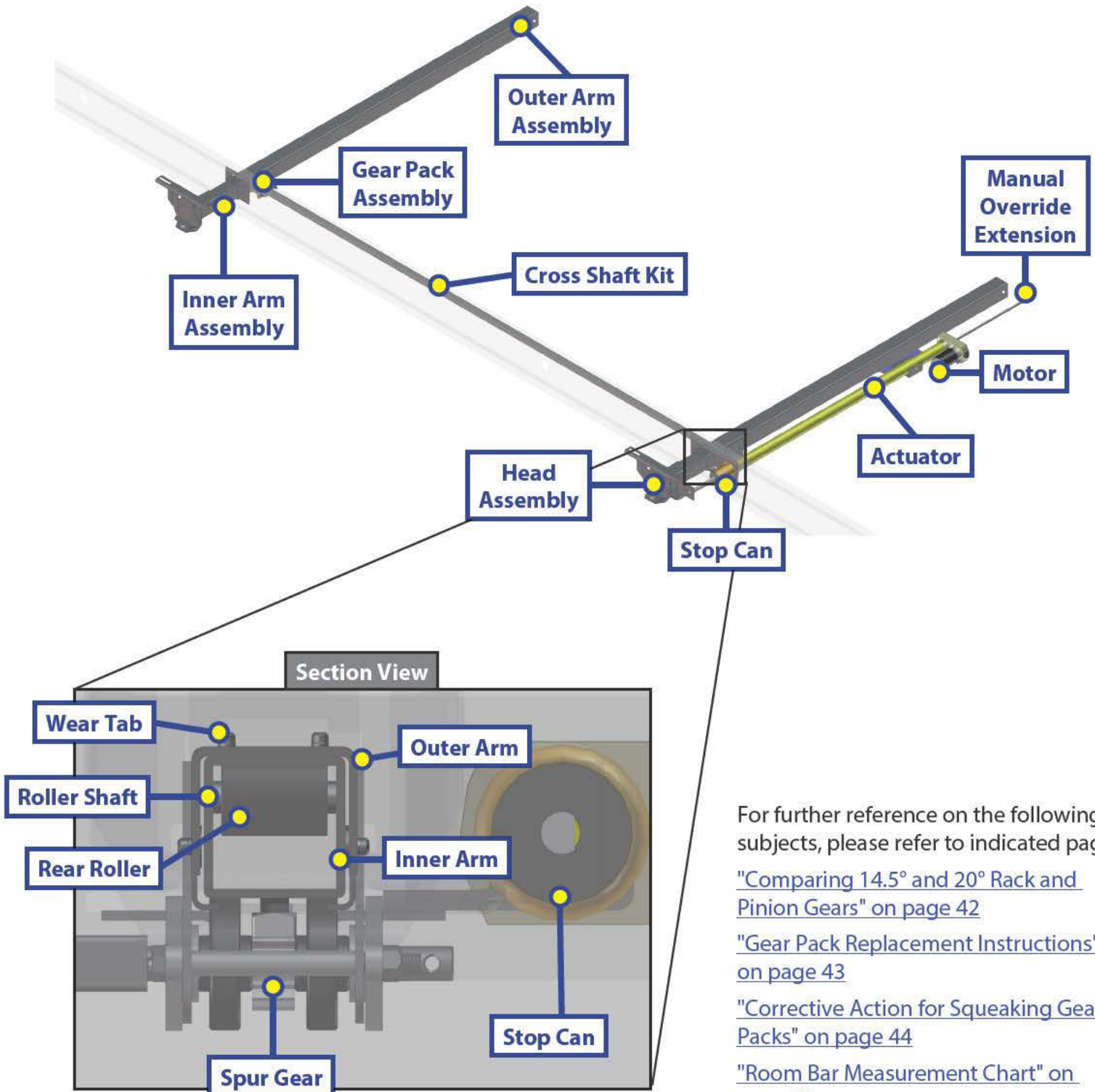


For further reference on the following subjects, please refer to indicated page:

- ["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)
- ["Gear Pack Replacement Instructions" on page 43](#)
- ["Corrective Action for Squeaking Gear Packs" on page 44](#)
- ["Room Bar Measurement Chart" on page 45](#)

SLIDEOUTS

Electric Through Frame Slideout with Actuator



For further reference on the following subjects, please refer to indicated page:

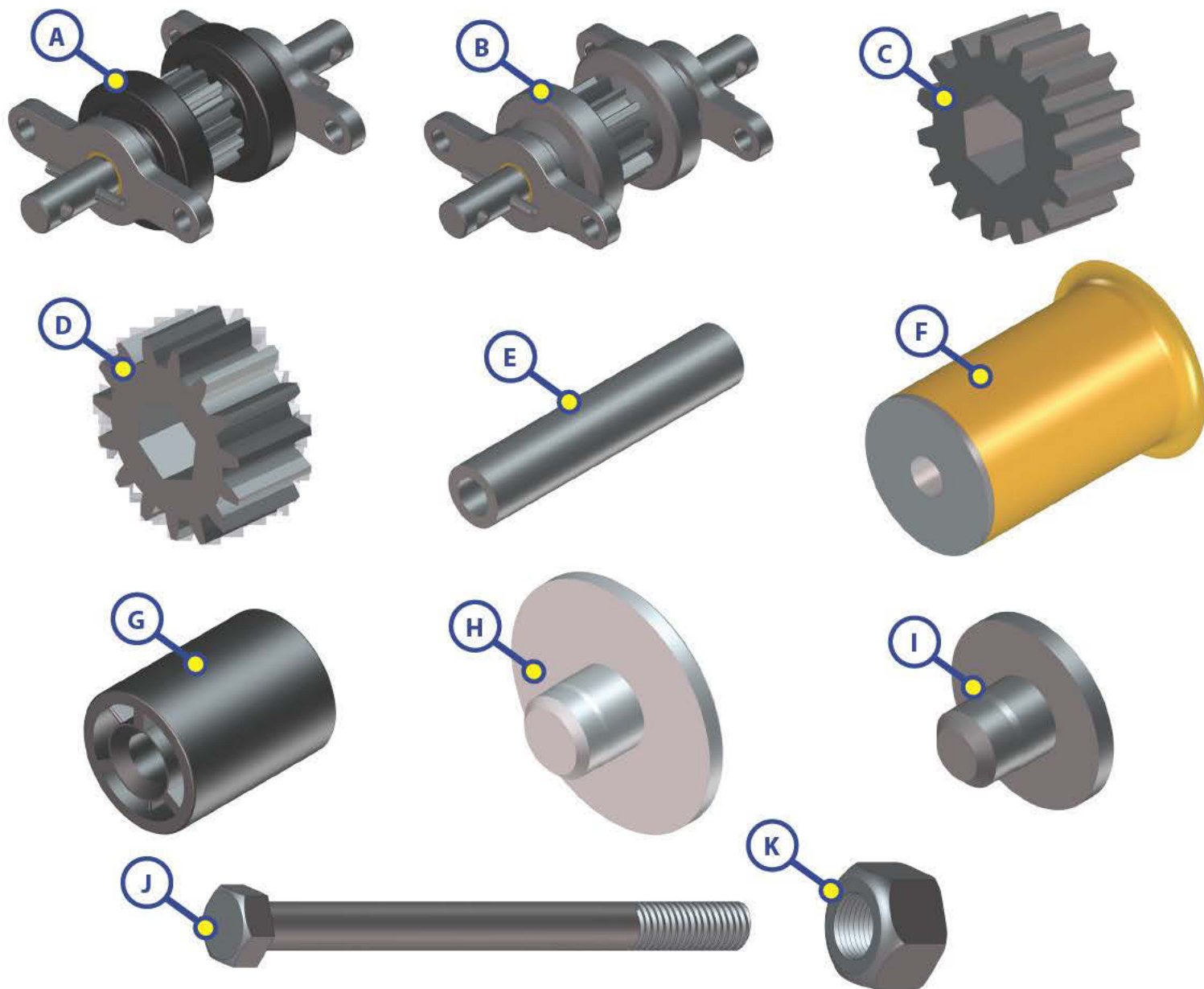
["Comparing 14.5° and 20° Rack and Pinion Gears"](#) on page 42

["Gear Pack Replacement Instructions"](#) on page 43

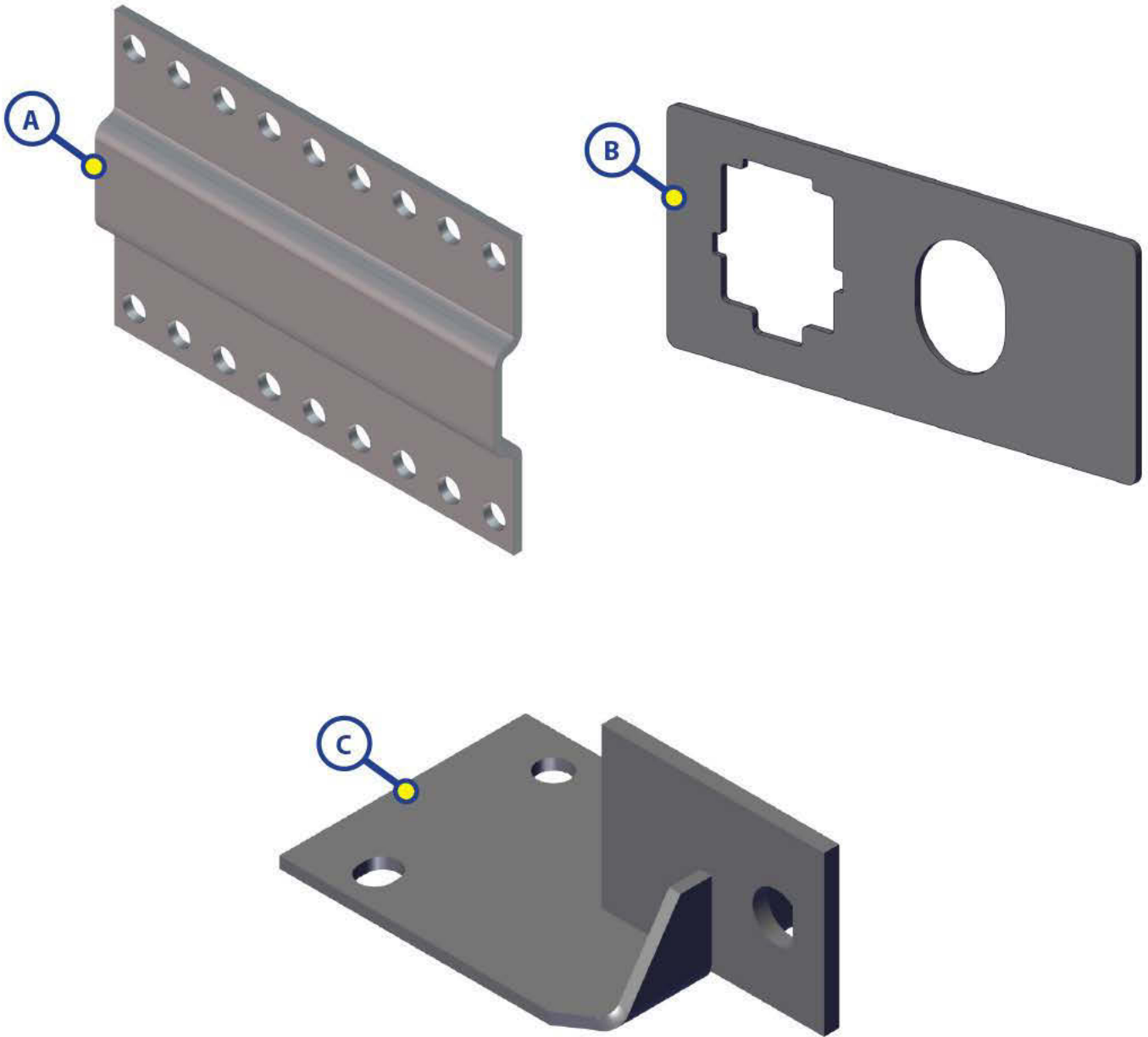
["Corrective Action for Squeaking Gear Packs"](#) on page 44

["Room Bar Measurement Chart"](#) on page 45

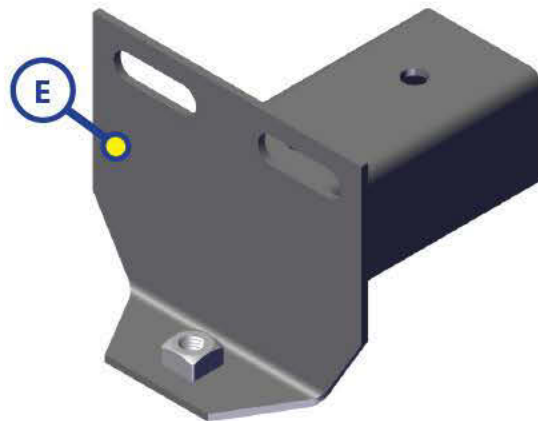
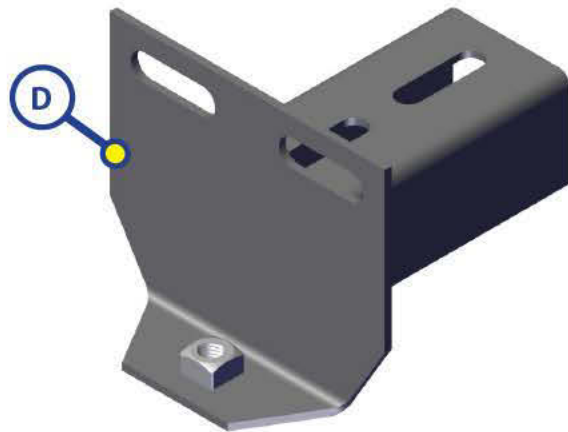
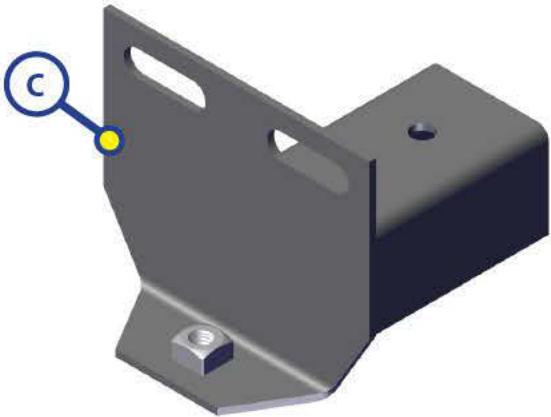
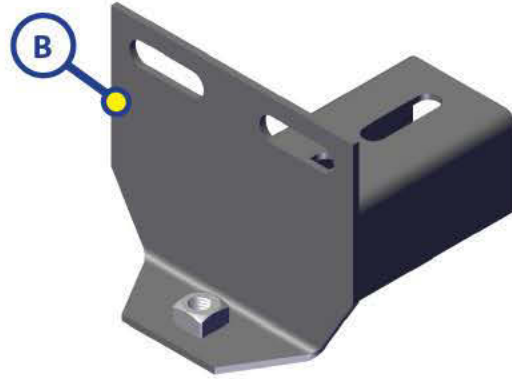
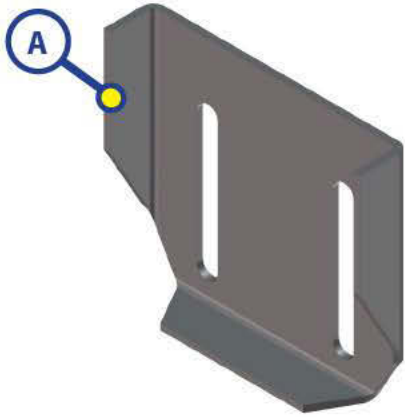
SLIDEOUTS



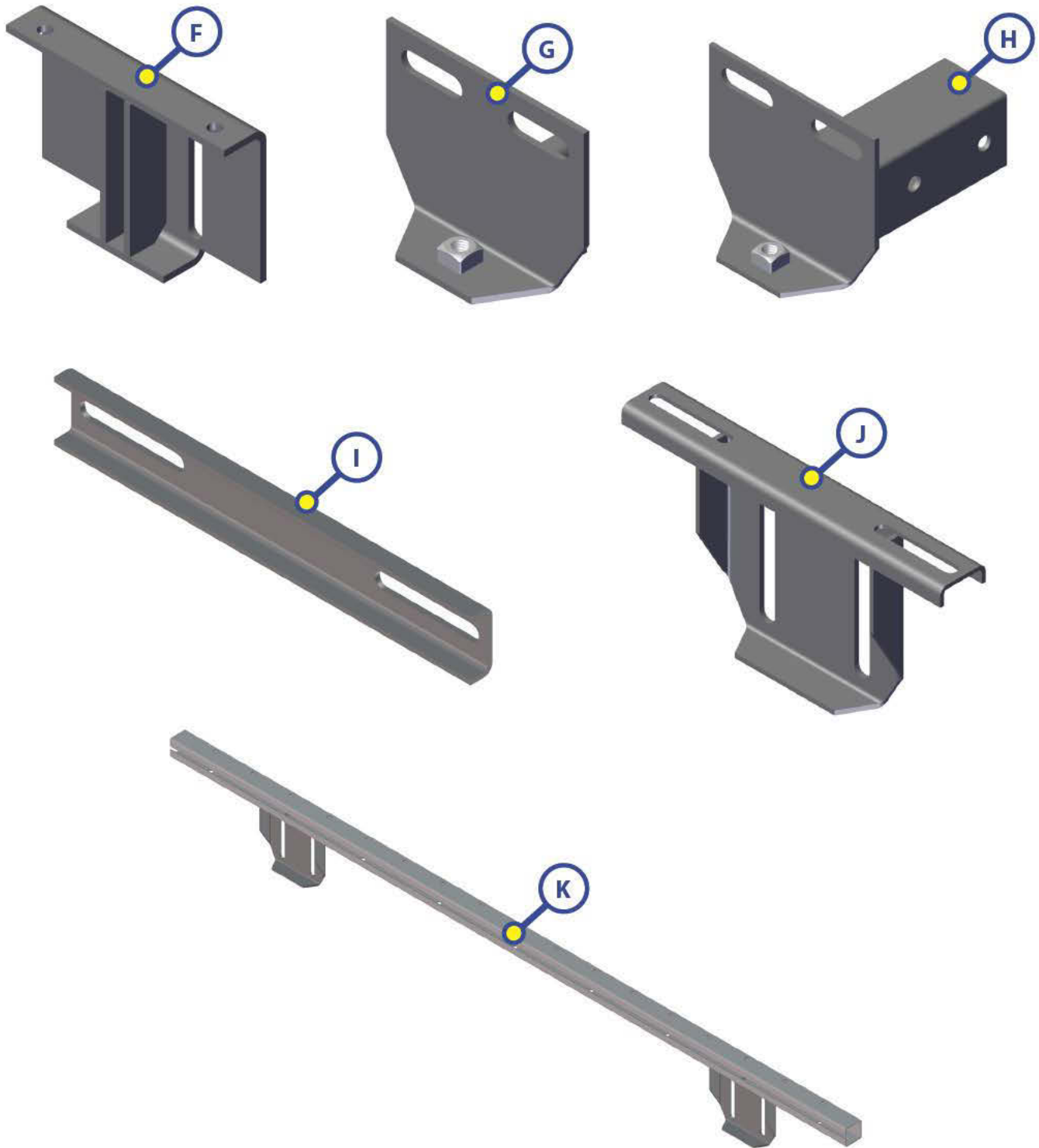
Callout	Part #	Description
A	122837	Gear Pack (Standard)
B	123356	Gear Pack (Heavy Duty)
C	101941	Spur Gear
D	328044	Spur Gear HD
E	105892	Roller Shaft
F	122840	Stop Can
G	104474	Rear Roller
H	277882	Wear Tab for 317322
I	103480	Wear Pad
J	132695	Mounting Bolt $\frac{3}{8}$ " - 16
K	119073	Mounting Nut $\frac{3}{8}$ " - 16



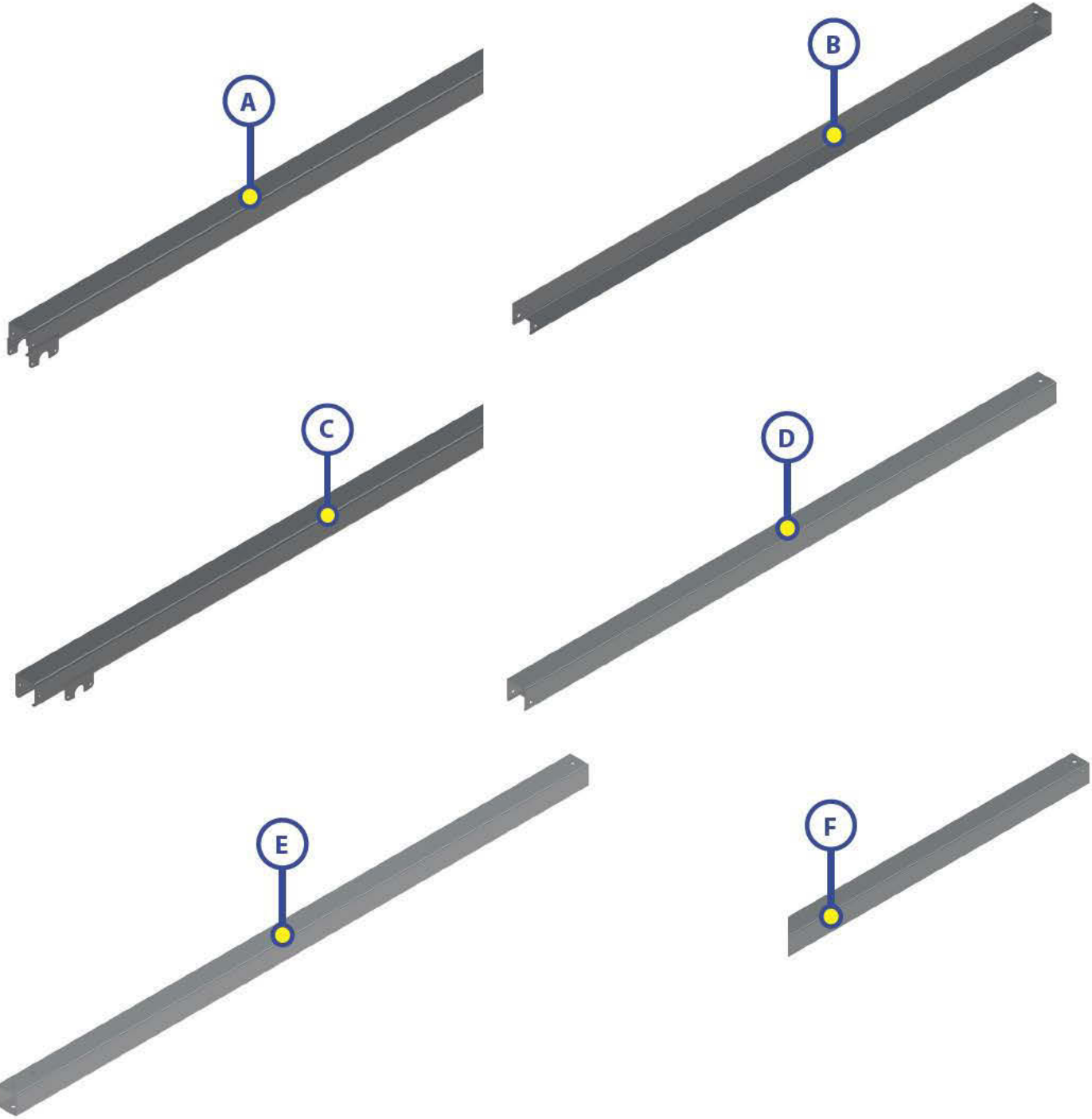
Callout	Part #	Description
A	105965	Hat
B	116401	Trim Plate
C	122852	Front Actuator Mounting Bracket



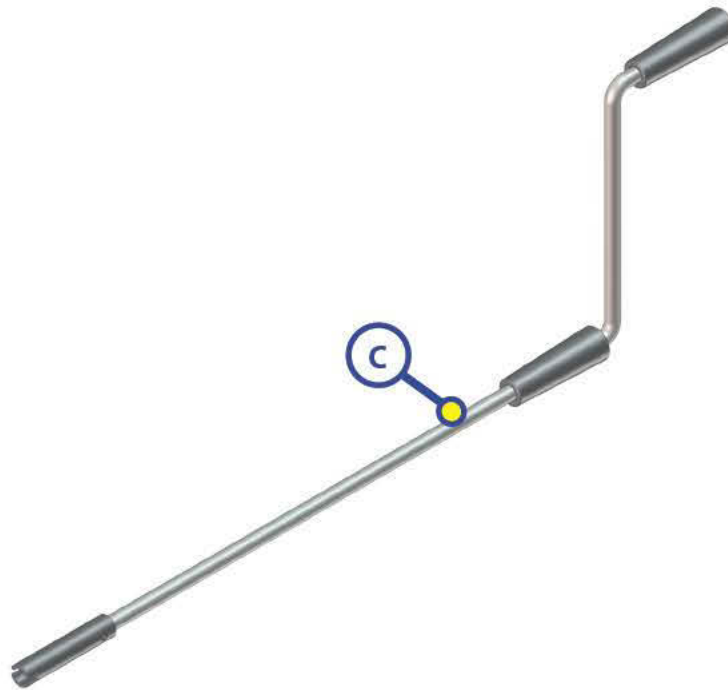
Callout	Part #	Description
A	104851	Slideout Mounting Bracket
B	119047	Flush Adjustable Head Assembly
C	119048	Flush Fixed Head Assembly
D	122854	Adjustable Head Assembly (1 3/4")
E	122855	Fixed Head Assembly (1 3/4")



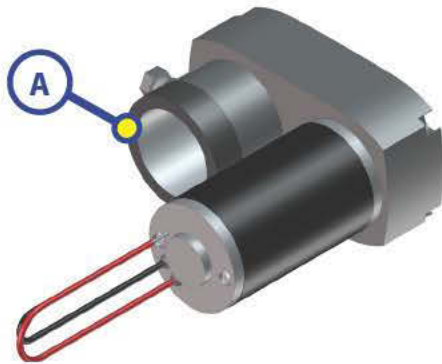
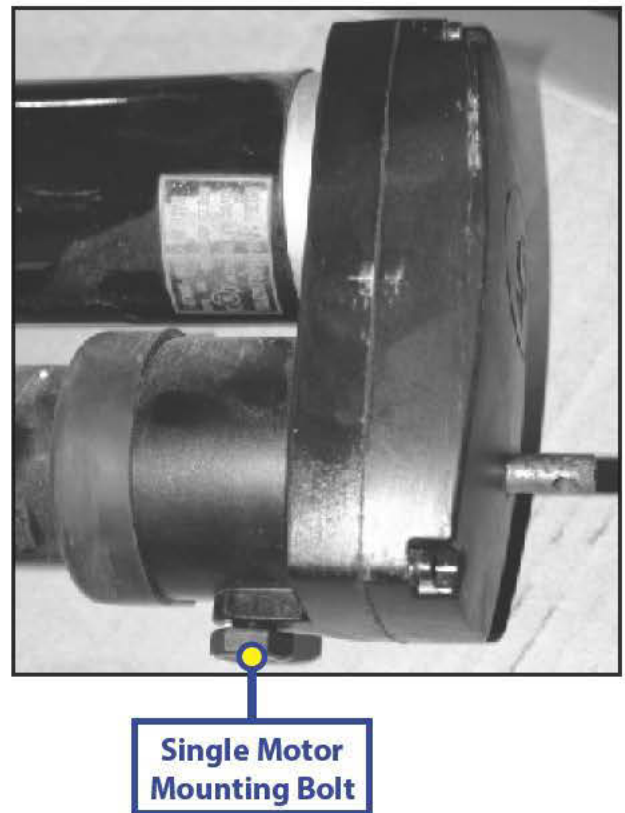
Callout	Part #	Description
F	166536	Flush Floor End Condition
G	158744	Flush Floor Head Assembly
H	169315	Flush Fixed Head Assembly
I	105966	Room Bar Bracket
J	226347	Room Bar Slide Head Assembly (12")
K	183949	Room Bar (Use for up to 80")
	183950	Room Bar (Use for 81" to 154")



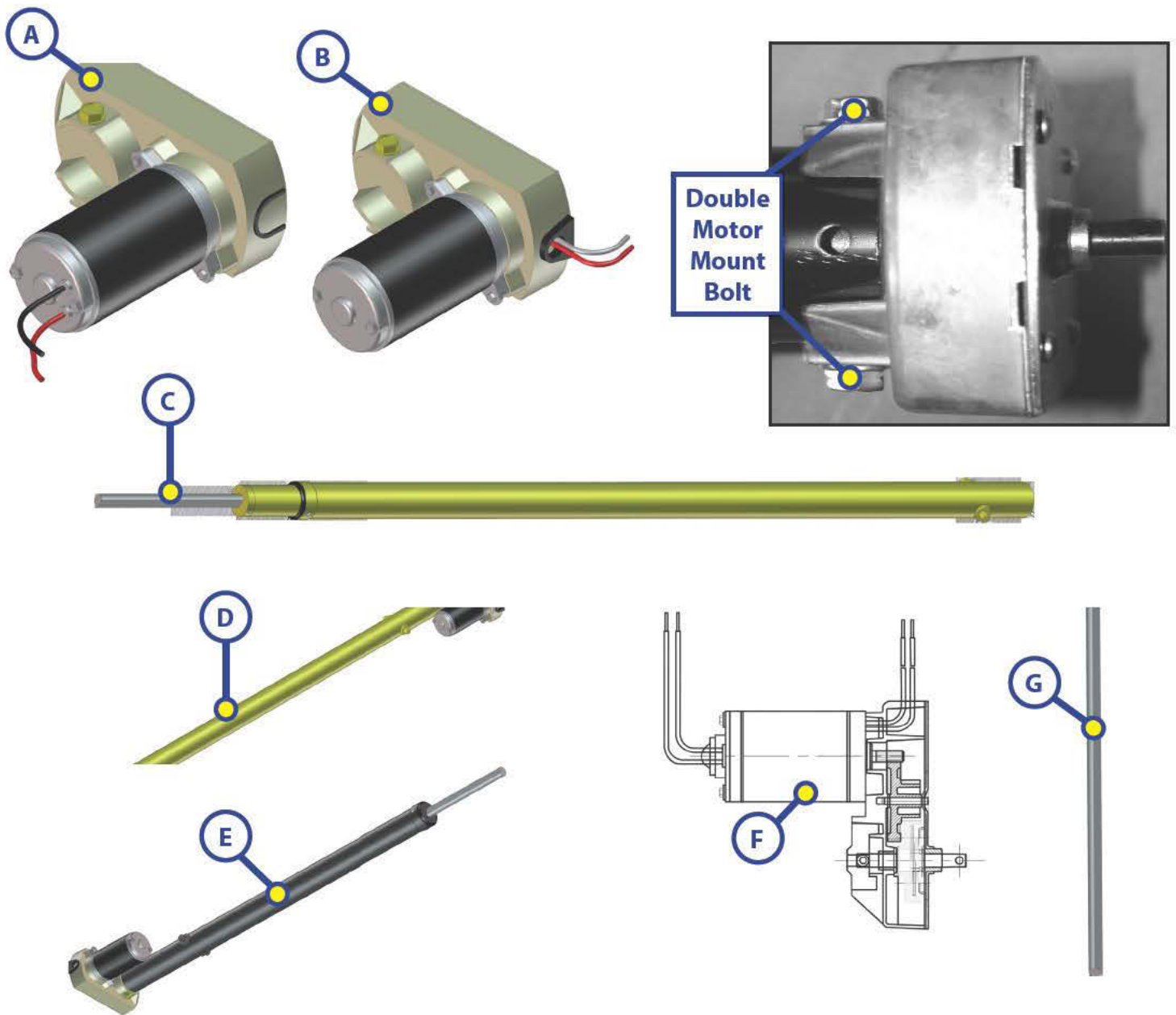
Callout	Part #	Description
A	143674	Outboard Outer Arm(Idler)
	143675	Outboard Outer Arm (Drive)
B	143707	Outboard Inner Arm
C	143676	Inboard Inner Arm (Idler)
	143677	Inboard Outer Arm (Drive)
D	143710	Inboard Inner Arm
E	296121	Inboard Inner Arm (18 Teeth)
F	317322	Outboard Inner Arm (18 Teeth)
NOTE: Standard slideout arms have 15 teeth.		



Callout	Part #	Description
A	173628	Old Slideout Switch Kit
	119134	Switch Plate
	119132	Switch
	119130	Switch Wire Harness
B	117460	New Slideout Switch Kit (Black)
	117461	New Slideout Switch Kit (White)
	117420	Switch Plate (White)
	129003	Switch (White)
	117421	Switch Plate (Black)
	117426	Switch (Black)
	178436	Switch Wire Harness
C	119226	Manual Slideout and Landing Gear Crank Handle

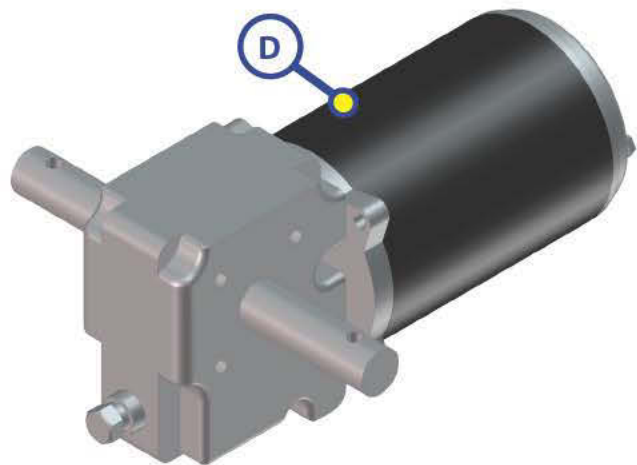
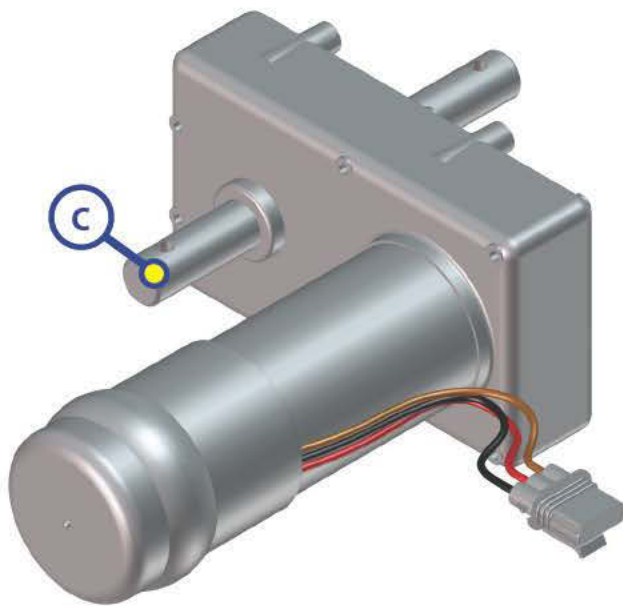
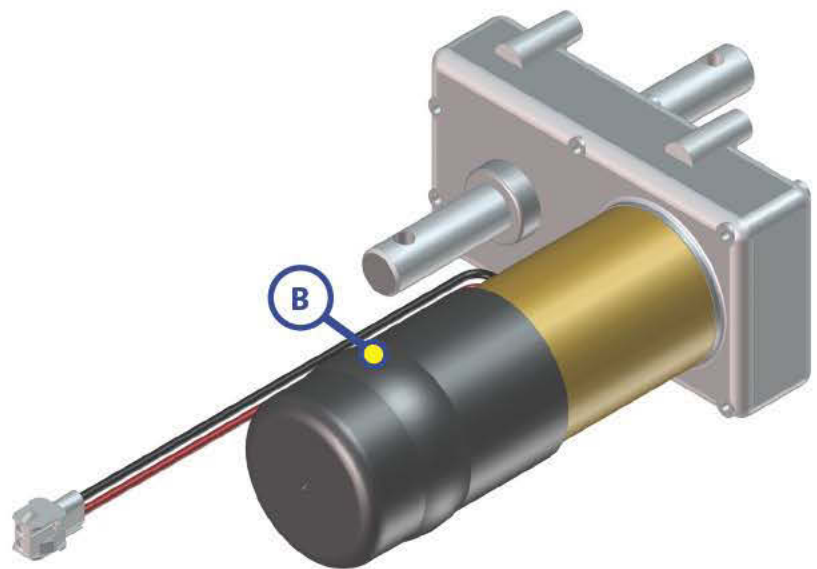
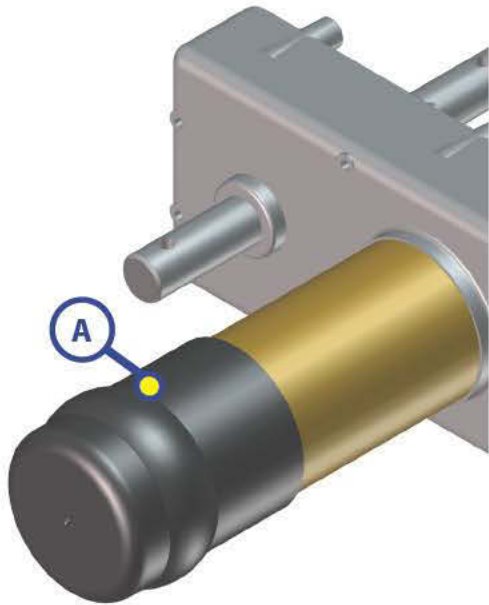


Callout	Part #	Description
A	125802	Tuson 18:1 Motor Only
B	145596	Tuson 18:1 Actuator Only (40")
C	145185	Tuson 18:1 Actuator and Motor (24")
	131903	Tuson 18:1 Actuator and Motor (40")

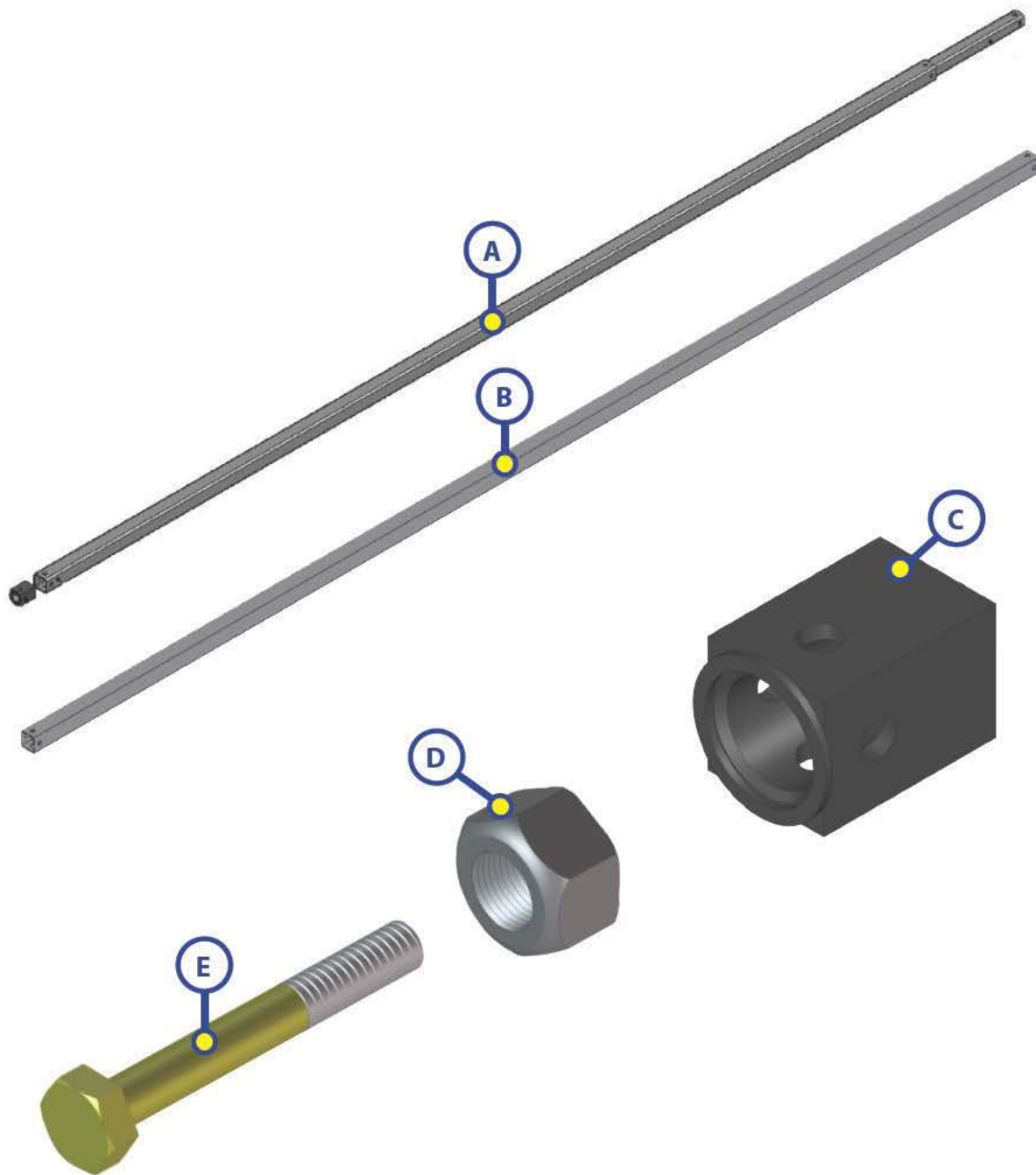


Callout	Part #	Description
A	132682	Venture 18:1 Motor Only
B	136373	Venture 28:1 Motor Only
C	145595	Venture 18:1 Actuator Only (40")
D	158457	Venture Actuator and 28:1 Motor (43")
	255676	Venture Actuator and 18:1 Motor (43")
	336937	Venture Actuator and 58:1 Motor (43")
E	119128	Venture Actuator and 18:1 Motor (24")
	122747	Venture Actuator and 18:1 Motor (32")
	119129	Venture Actuator and 18:1 Motor (40")
F	191072	Venture Replacement Gear Set 18:1
	191073	Venture Replacement Gear Set 28:1
G	157488	Actuator Replacement Rod

NOTE: Toula actuators and motors can be replaced by Venture.



Callout	Part #	Description
A	138449	Klauber D-300 Motor
	140201	Klauber E-300 Motor
	143701	F-350 Motor
B	321395	Klauber F-300
C	325502	H-350 Motor
D	138448	M-150N Motor



Callout	Part #	Description
A	157523	Cross Shaft Kit
B	117621	Outer Cross Shaft
	117502	Inner Cross Shaft
C	123365	Cross Shaft Insert
D	118092	Nut 1/4" - 20
E	119066	Bolt



**HYDRAULIC THROUGH FRAME SLIDEOUT
OWNER'S MANUAL**

**L I P P E R T
C O M P O N E N T S™**

Warning, Safety, and System Requirement Information

Description

The Lippert Hydraulic Through Frame Slideout System is a rack and pinion guide system, utilizing a hydraulic cylinder to move the room assembly. The power unit drives the cylinder rod in a forward and backward motion to move the slide room in and out. The Lippert Hydraulic Slideout System is designed to operate as a negative ground system.

Safety Information



The “WARNING” symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause serious injury or death if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required is too high or the procedure is too difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in death, serious injury or voiding the warranty. The owner’s manual for the unit may have more procedures for service and maintenance.



Failure to act in accordance with the following may result in death, serious injury, coach or property damage.

The Lippert Hydraulic Through Frame Slideout System is intended for the sole purpose of extending and retracting the slideout room. Its function should not be used for any other purpose or reason than to actuate the slideout room. To use the system for any reason other than what it is designed for may result in damage to the coach and/or cause serious injury or even death.

Before actuating the system, please keep these things in mind:

1. Parking locations should be clear of obstructions that may cause damage when the slideout room is actuated.
2. Be sure all persons are clear of the coach prior to the slideout room actuation.
3. Keep hands and other body parts away from slideout mechanisms during actuation. Severe injury or death may result.
4. To optimize slideout actuation, park coach on solid and level ground.

Prior to Operation

Prior to operating the Lippert Hydraulic Through Frame Slideout System, follow these guidelines:

1. Coach should be parked on the most level surface available.
2. Leveling or stabilizing system should be actuated to ensure coach will not move during operation of slideout system.
3. Be sure battery is fully charged.
4. Be sure to keep all persons and pets clear of slideout system during operation.



Always make sure that the slideout room path is clear of people and objects before and during operation of the slideout room. Always keep away from the slide rails when the room is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

NOTE: Install transit bars (if so equipped) on the slideout room during storage and transportation.

Operation

Extending Slideout Room

5. Level the Unit.
6. Verify the battery is fully charged and hooked up to the electrical system.
7. Remove transit bars (if so equipped).
8. Press and hold the IN/OUT switch in the OUT position until room is fully extended and stops moving.
9. Release switch, which will lock the room into position.

NOTE: Only hold OUT switch until room stops.

Retracting Slideout Room

1. Verify the battery is fully charged and hooked up to the electrical system.
2. Press and hold the IN/OUT switch in the IN position until the room is fully retracted and stops moving.
3. Release the switch. This will lock the room into position.

NOTE: Only hold IN switch until room stops.

4. Install the transit bars (if so equipped).

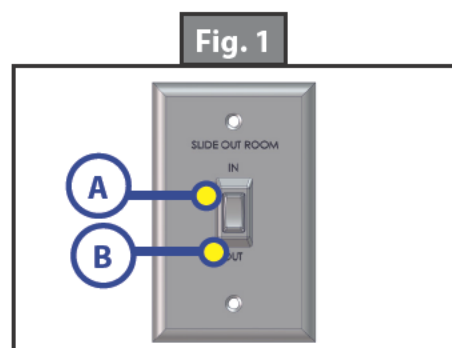


Fig. 1

Maintenance

Inspection

After servicing the slideout system in any way, be sure to check the following:

1. Slideout stops are installed and adjusted properly.
2. Head assemblies are installed and adjusted properly.
3. System is mounted properly.
4. Cross shafts are mounted properly and clear all other components.
5. Gear packs function properly.
6. Manual override is accessible.
7. Outside seals compress when slideout is retracted.
8. Inside seals compress when slideout is extended.
9. Slideout extends and retracts smoothly.
10. Both sides of slideout are synchronized.
11. Any dirt or debris is cleaned from the interior or exterior of the coach.

The Lippert Through Frame Slideout System has been static tested to over 4,000 continuous cycles without any noticeable wear to rotating or sliding parts. It is recommended that when operating in harsh environments (road salt, ice build up, etc.) the moving parts be kept clean. They can be washed with mild soap and water. No grease or lubrication is necessary and in some situations may be detrimental to the environment and long term dependability of the system.

Electrical System Maintenance

For optimum performance, the slideout system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch, and the system for corrosion, and loose or damaged terminals. Check motor leads under the trailer chassis. Since these connections are subject to damage from road debris, be sure they are in good condition.

NOTE: The Lippert Through Frame Slideout System is designed to operate as a negative ground system. A negative ground system utilizes the chassis frame as a ground and an independent ground wire back to battery is necessary. It is important that the electrical components have good wire to chassis contact. To ensure the best possible ground, a star washer should be used. Over 90% of unit electrical problems are due to bad ground connections.

Mechanical Maintenance

Although the system is designed to be almost maintenance free, actuate the room once or twice a month to keep the seals and internal moving parts lubricated. Check for any visible signs of external damage after and before movement of the travel trailer.

NOTE: For long-term storage: It is recommended that the room be closed (retracted).

Troubleshooting

Troubleshooting Introduction

This troubleshooting chart outlines some common problems, their causes and possible corrective actions. If any part or serial number information is available, provide it to the service technician when asking for assistance.

The Lippert Slideout System is only one of four interrelated slideout room system components. These four components are: chassis, room, coach, and Lippert Slideout System. Each one needs to function correctly with the others or misalignment problems will occur.

Every travel trailer has its own personality and what may work to fix one trailer may not work on another even if the symptoms appear to be the same.

When something restricts room travel, system performance will be unpredictable. It is very important that slide tubes be free of contamination and allowed to travel full distance (Stroke). Ice or mud buildup during travel is an example of some types of contamination that can occur.

When you begin to troubleshoot the system, make sure the battery is fully charged, there are no visible signs of external damage to the system and that all connections are secure.

During troubleshooting, remember that if you change something, that change may affect something else. Be sure any changes you make will not create a new problem.

You can obtain additional information on the Lippert Slideout System by visiting www.lci1.com/customerservice or by calling 574-537-8900.

Problem	Probable Cause	Corrective Action
Room doesn't move when switch is pressed	Restriction or obstruction inside or outside of unit	Check for and clear obstruction
	Low battery voltage, blown fuse, defective wiring	Check battery voltage and charge if needed. Find and check fuse, replace if blown. Check battery terminals and wiring. Look for loose, disconnected or corroded connectors.
Power unit runs but room does not move	Restrictions both inside and outside of unit	Check for and clear restriction
Power unit runs, room moves slowly	Low battery, poor ground, extremely low outdoor temperature	Charge battery and check ground wire
Room drifts in both the in and out positions	Check for leaks in the hydraulic system	Tighten fittings
	Air in system	After checking all connections, cycle pump several times in and out
In the closed position, room drifts out	Leaking cylinder seal	See cylinder test next page
	Fluid bypassing cylinder piston	See cylinder test next page
	Hose from pump is leaking	Tighten fitting or replace hose
	Air in system	After checking all connections, cycle pump several times in and out.
In the open position, room drifts in	Loose mounting bolts	Tighten mounting bolts.
	Hose from pump is leaking	Tighten fitting or replace hose
	Leaking cylinder seal	See cylinder test on next page
	Fluid bypassing cylinder piston	See cylinder test on next page

Hydraulic slideout cylinder retract test

1. Retract (close) all slideouts (rooms) completely.
2. Disconnect all rooms from system (if coach is equipped with IRC, close all but one room).
3. Loosen hose from "E" (extend) port on the manifold of the power unit.
4. Plug opening on manifold to prevent drawing air into the system.



Do not attempt to run room out with the "E" port hose loose. The system will experience rapid fluid loss.

5. Energize the pump unit to retract (close) room.
6. When room is fully retracted, continue to run the room in and watch for fluid flow from hose/port "E". Fluid flow greater than a few drops will indicate internal cylinder leaking (bypassing of piston seal). If greater than a few drops leak from hose fitting, piston seal is bad and will need to be replaced. If there is no fluid flow, reconnect hose to "E" port and tighten.
7. Repeat steps 2 through 6 for each slideout until all slideouts have been tested. Energize the pump unit to retract (close) room.



Be sure to reconnect and tighten hose at the "E" port before attempting to extend (open) the room or the system will experience rapid fluid loss.

Hydraulic slideout cylinder extend test

1. Extend (open) all slideouts (rooms) completely.
2. Disconnect all rooms from system (if coach is equipped with IRC, open all but one room).
3. Loosen hose from "R" (retract) port on the manifold of the power unit. Individual slideouts can be tested if the unit is equipped with an IRC block. Close all valves in IRC except the one to be tested.
4. Plug opening on manifold to prevent drawing air into the system.



Do not attempt to run room in (retract) with the "R" port hose loose. The system will experience rapid fluid loss.

5. Energize the pump unit to extend (open) room.
6. Continue to run the room out and watch for fluid flow from hose/port "R" (or IRC block if coach is equipped with IRC). Fluid flow greater than a few drops will indicate internal leaking (bypassing of piston seal). If greater than a few drops leak from hose fitting, piston seal is bad and will need to be replaced. If there is no fluid flow, reconnect hose to "R" port and tighten.
7. Repeat steps 2 through 6 for each slideout until all slideouts have been tested.



Be sure to reconnect and tighten hose at the "R" port before attempting to retract (close) the room or the system will experience rapid fluid loss.

Fluid Filling Procedure

The Lippert Hydraulic Slideout System uses automatic transmission fluid (ATF). Any ATF can be used. A full synthetic or synthetic blend works best such as Dexron III or Mercon 5. For best operation, fill system to within ½" of the top when all slideouts are completely retracted. The see-through reservoir makes it easy to check oil level. It is recommended that the oil level be checked prior to operating the system. Make sure the breather cap is free of contamination before removing, replacing or installing.

1. Remove Breather/Fill Cap.
2. Pour ATF into Breather/Fill opening.

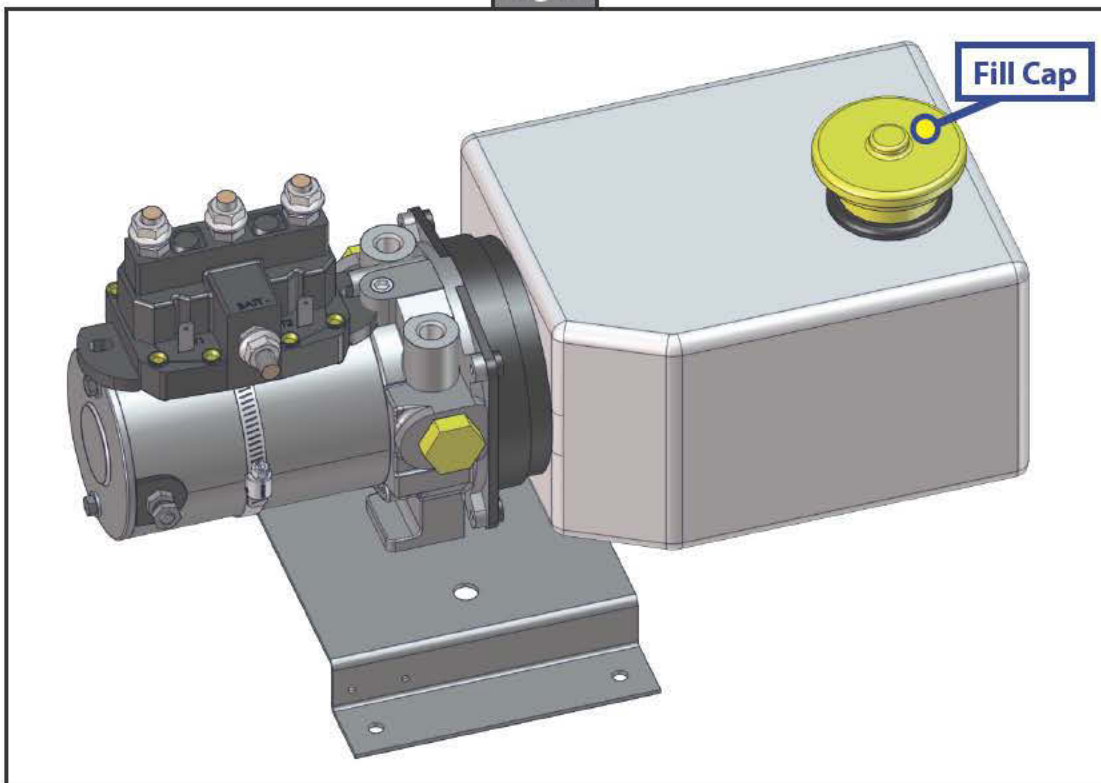
NOTE: Do not allow any contamination into reservoir during fill process.

NOTE: Standard reservoir holds approximately 2 quarts (1.89 liters) of ATF.

3. Fill to within ½" of top.
4. Replace Breather/Fill cap when finished.

NOTE: System is self-purging. By simply cycling the system 2-3 times, any air in the system will be forced back to the reservoir and out of the Breather/Fill cap.

Fig. 1



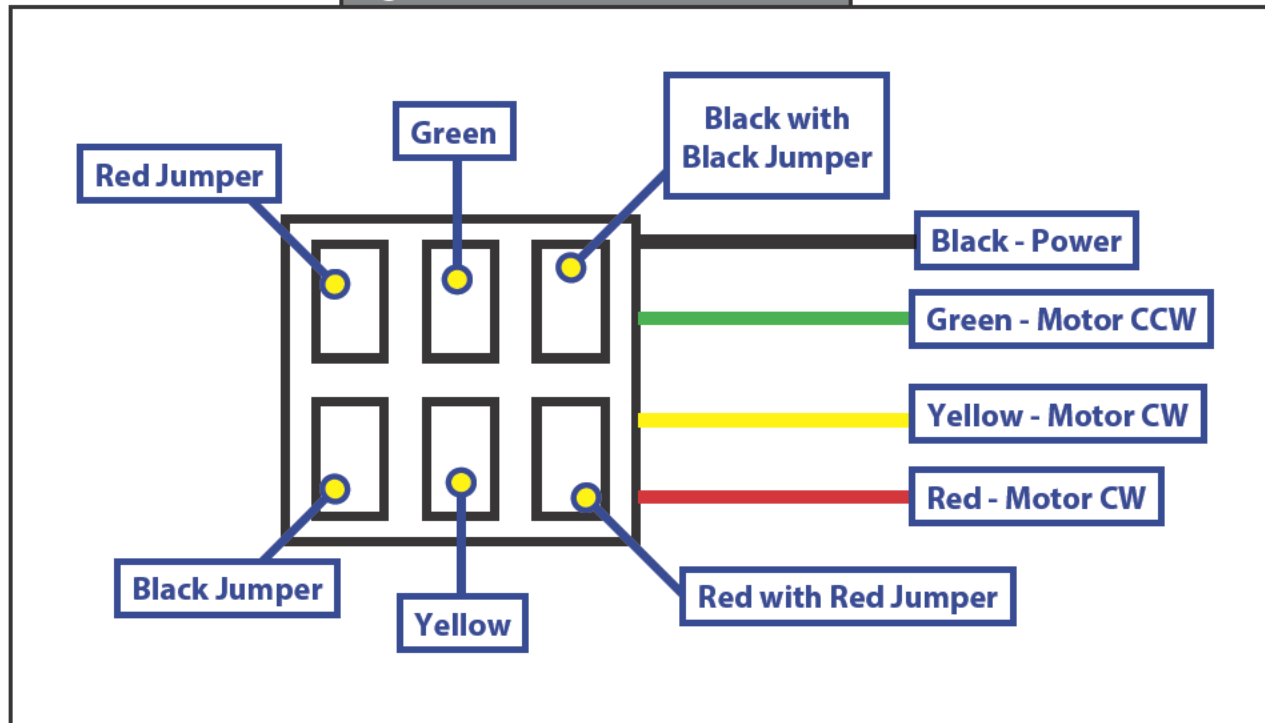
Motor troubleshooting

Before attempting to troubleshoot the motor, make sure an adequate power source is available. The unit batteries should be fully charged or the unit should be plugged into A/C service with batteries installed. Do not attempt to troubleshoot the motor without assuring a full 12V DC charge.

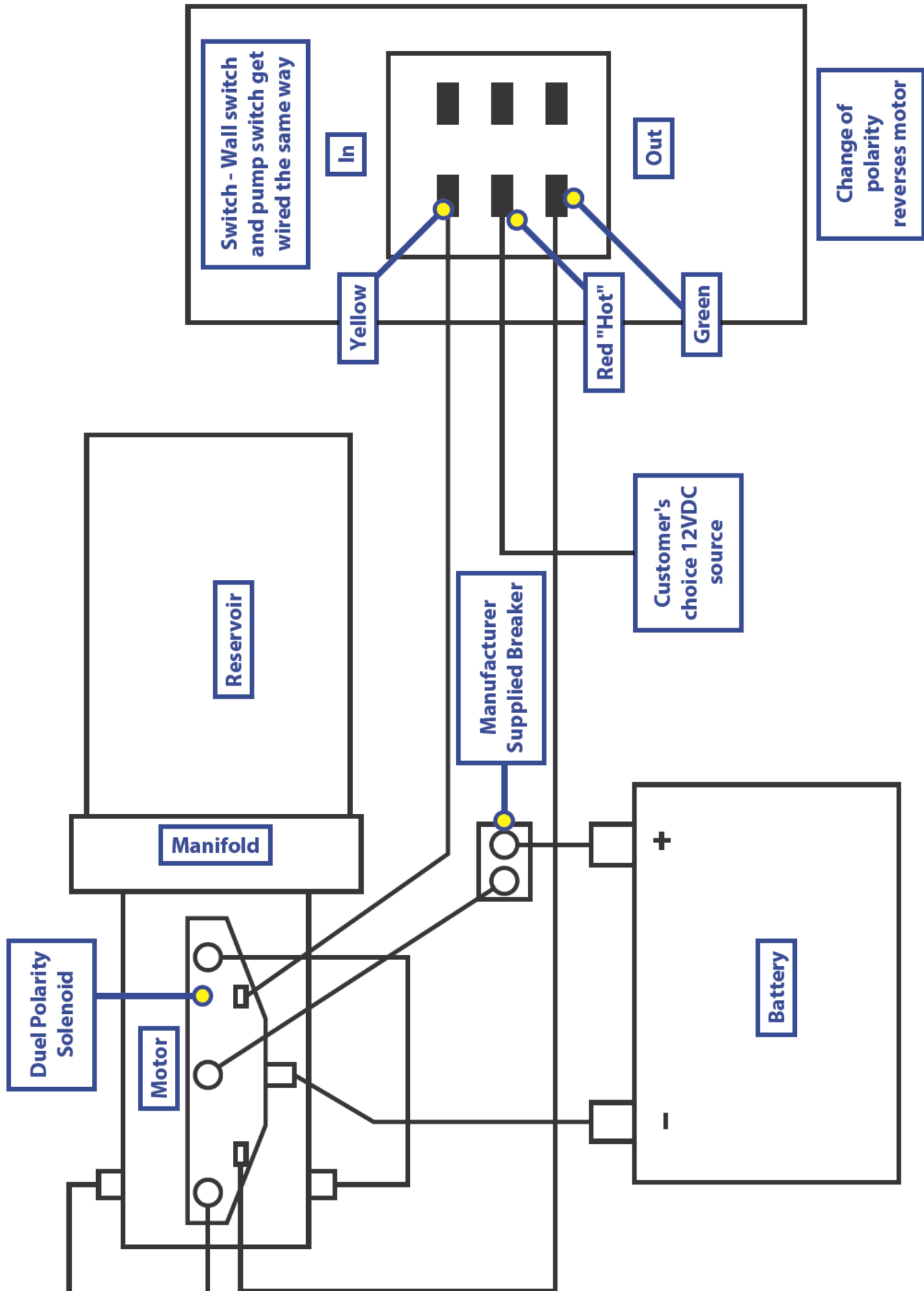
The following tests require only a DC voltmeter (or DC test light) and a jumper lead.

1. Attach voltmeter (or test light) leads to the negative and positive switch terminals on back of wall switch. Does the meter indicate 12V DC? If **YES**, see **Step 2**; if **NO** see **Step 3**.
2. If **YES**, at the motor, check the incoming leads to 12V DC (if necessary, disconnect leads at wire splices). Does meter indicate 12V DC? If **YES**, motor needs to be replaced. The motor is not field serviceable. **DO NOT ATTEMPT TO REPAIR**. If **NO**, inspect all wires and connections between the wall switch and the motor. Repair connections as necessary. Recheck as in **Step 1**.
3. If **NO**, inspect all connections between battery and switch. Inspect 30A Auto-reset Circuit Breaker (See Next Page). Recheck as above in **Step 1**.
4. Since there are no field serviceable parts in the motor, electrical troubleshooting and service is limited to replacing only those components as previously outlined.
5. Thorough inspection of wiring and connections is the only other electrical service that can be performed.

Fig. 1 Slideout Switch Color Codes



Wiring Diagram



Mechanical Room Adjustment

NOTE: All slideout room adjustments must be performed by certified service technicians. Adjustments made by non-certified persons may void any and all warranty claims.

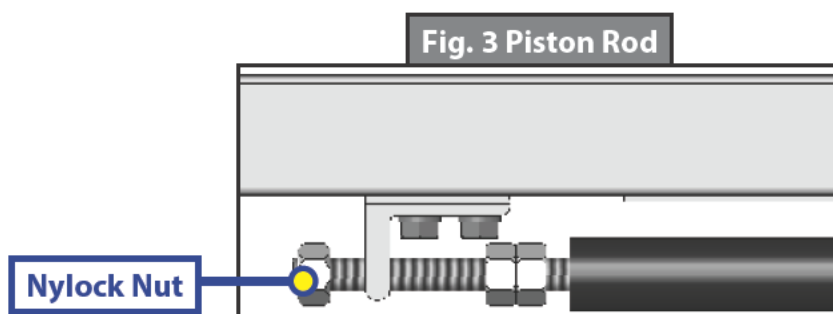
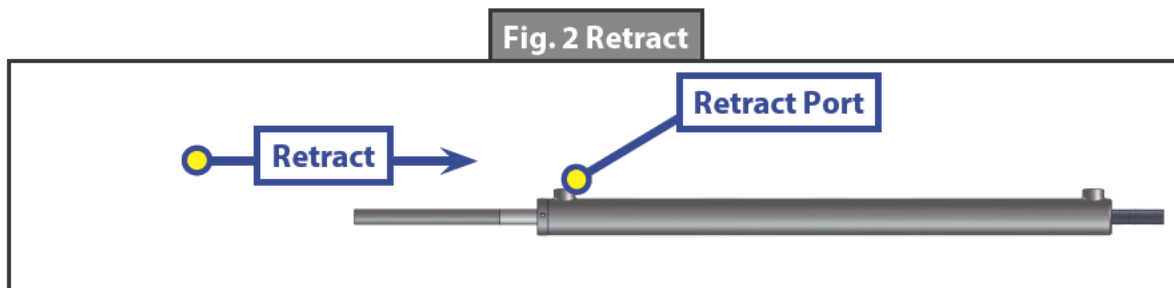
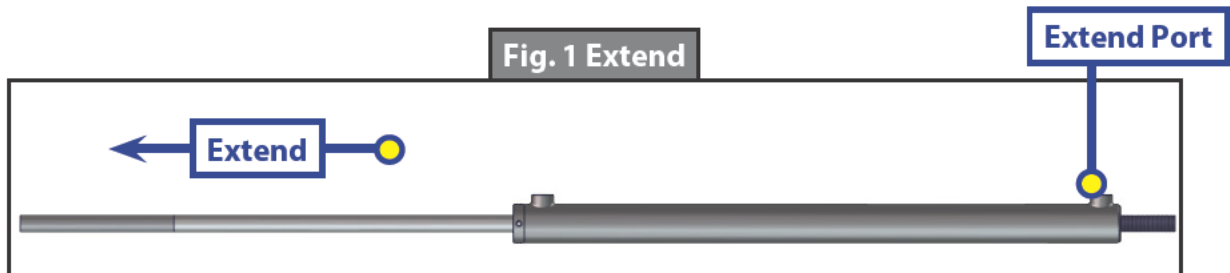
Horizontal adjustment

1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Room is ready to be positioned horizontally by pushing on the outside, sidewall or by using a prying device inserted into the opening between the room and coach.

NOTE: Use caution when using prying device so seals do not become damaged.

Vertical adjustment

1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Loosen jam nut.
3. For vertical adjustment turn vertical adjustment bolt "B" up or down to locate room height.
4. Once room is located, tighten "A" and Jam Nut bolts.



Mechanical Room Adjustment

NOTE: All slideout room adjustments must be performed by certified service technicians. Adjustments made by non-certified persons may void any and all warranty claims.

Horizontal adjustment

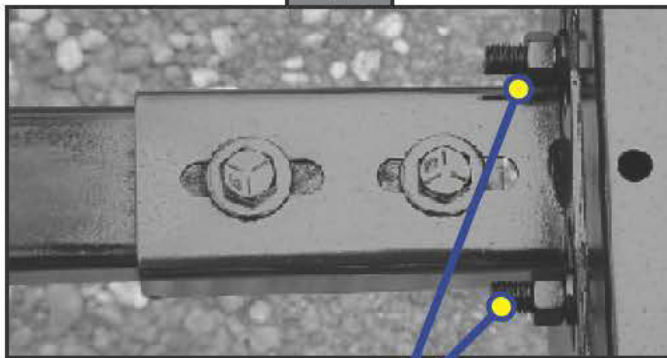
1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Room is ready to be positioned horizontally by pushing on the outside, sidewall or by using a prying device inserted into the opening between the room and coach.

NOTE: Use caution when using prying device so seals do not become damaged.

Vertical adjustment

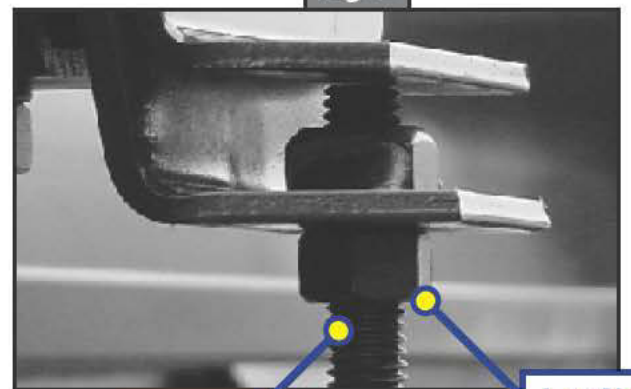
1. Loosen 2 carriage bolts "A" on each bracket located at the end of each guide tube.
2. Loosen jam nut.
3. For vertical adjustment turn vertical adjustment bolt "B" up or down to locate room height.
4. Once room is located, tighten "A" and Jam Nut bolts.

Fig. 1



Bolt "A"

Fig. 2



Bolt "B"

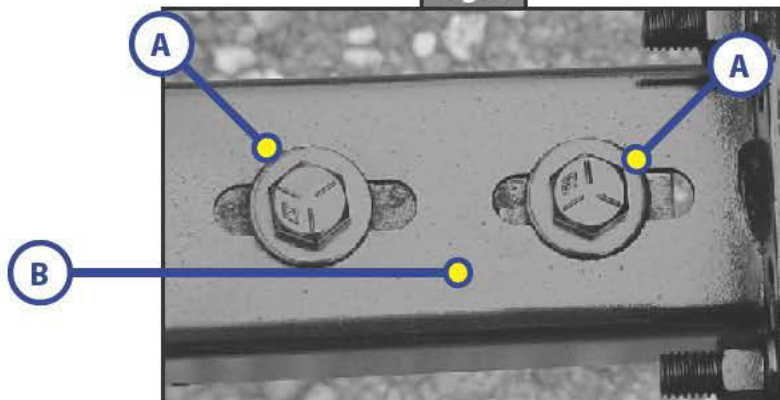
Jam Nut

Synchronizing Room Travel

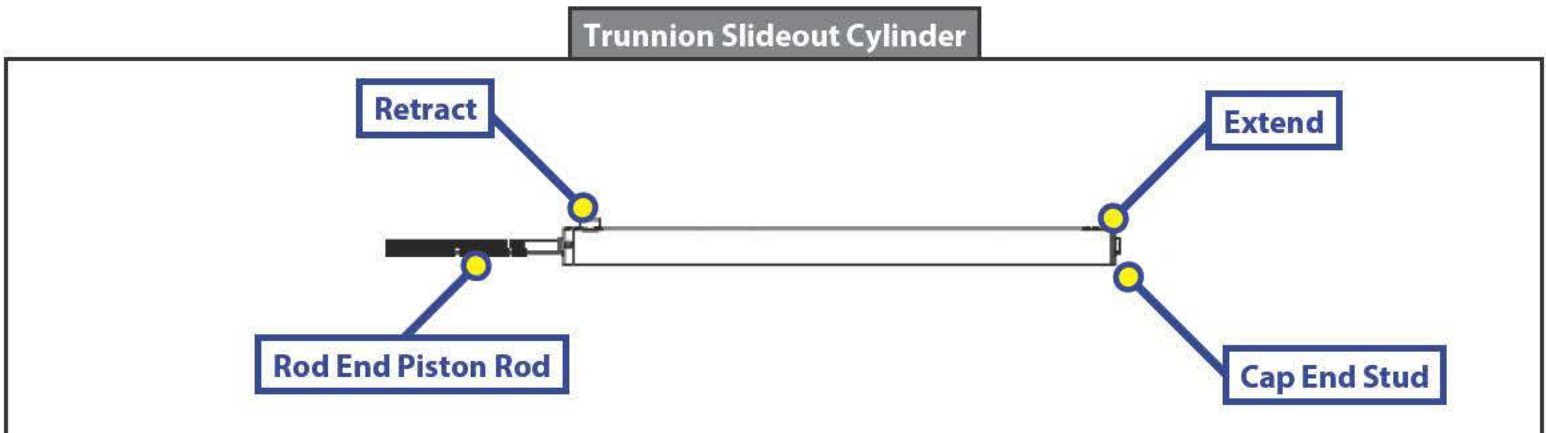
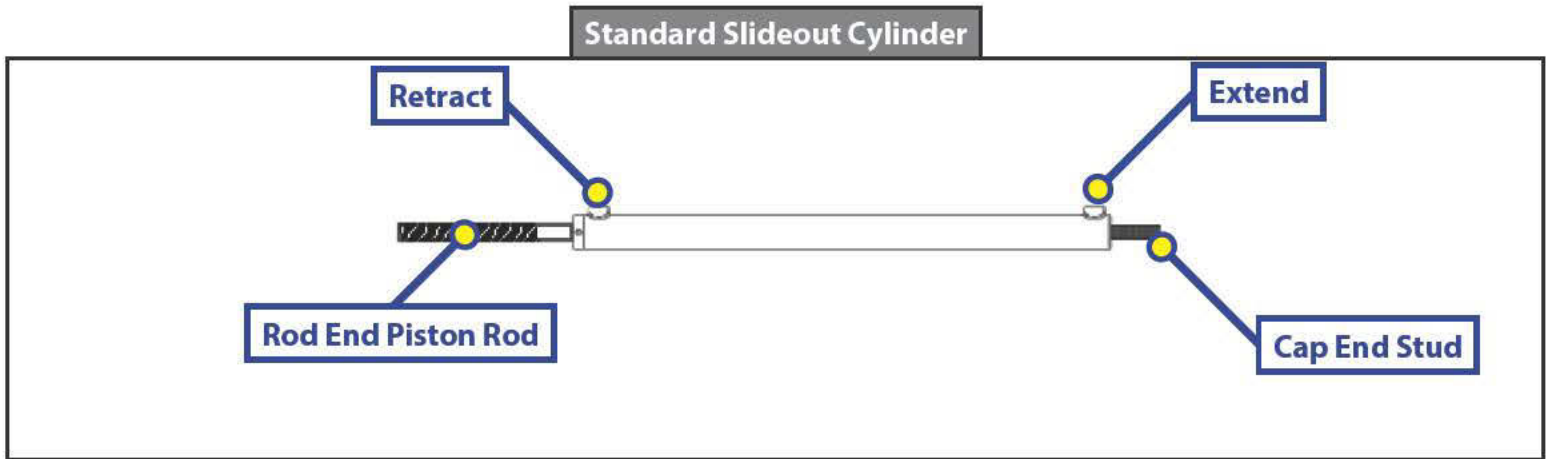
The Lippert Hydraulic Slideout System room travel (both sides of the room traveling the same distance) can be adjusted with specially designed synchronizing bracket mounted on the passive slide tube. The passive slide tube is the one that is not powered. The active slide tube is the one that has the cylinder attached. If one side of the room fails to seal adjust as follows:

1. Loosen bolts (Fig. 3A) on top of the passive slide tube (Fig. 3B).
2. Push or pull room (on the passive side) to align with the active side.

Fig. 3



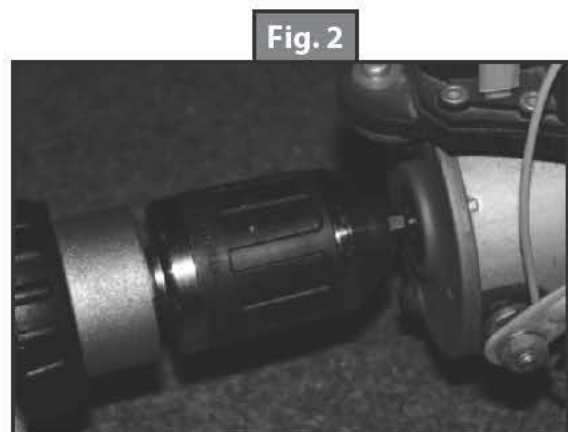
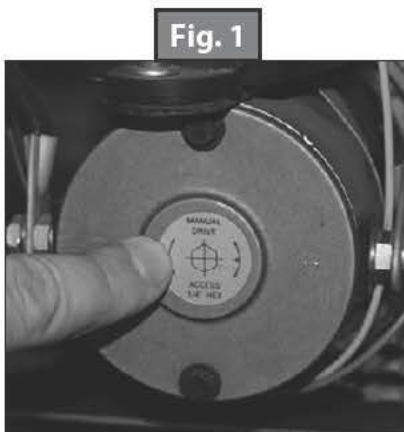
Extend and retract cylinder port locations



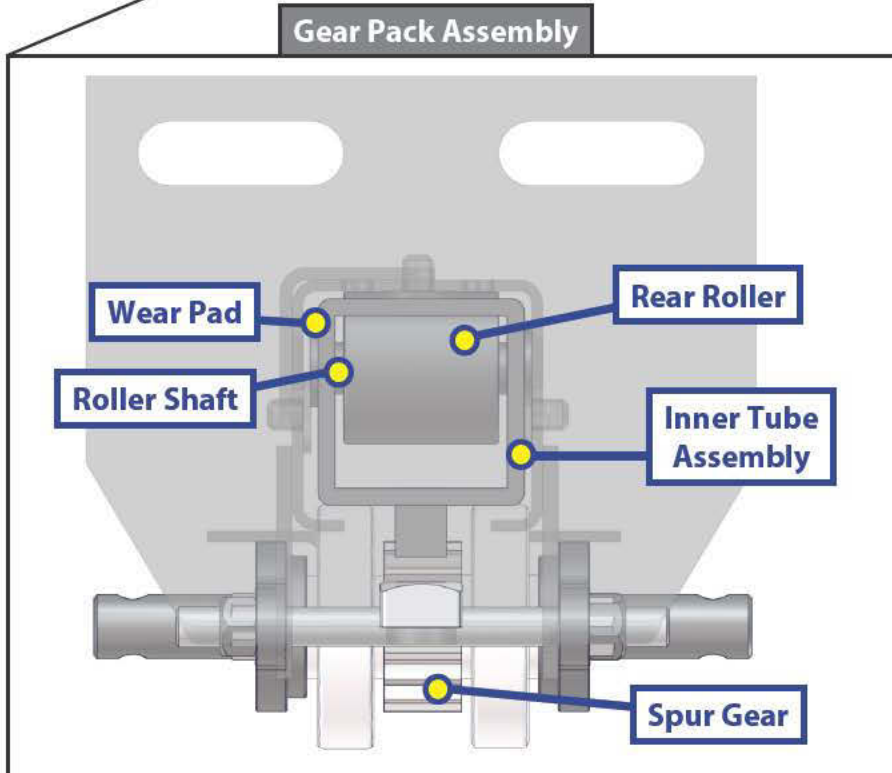
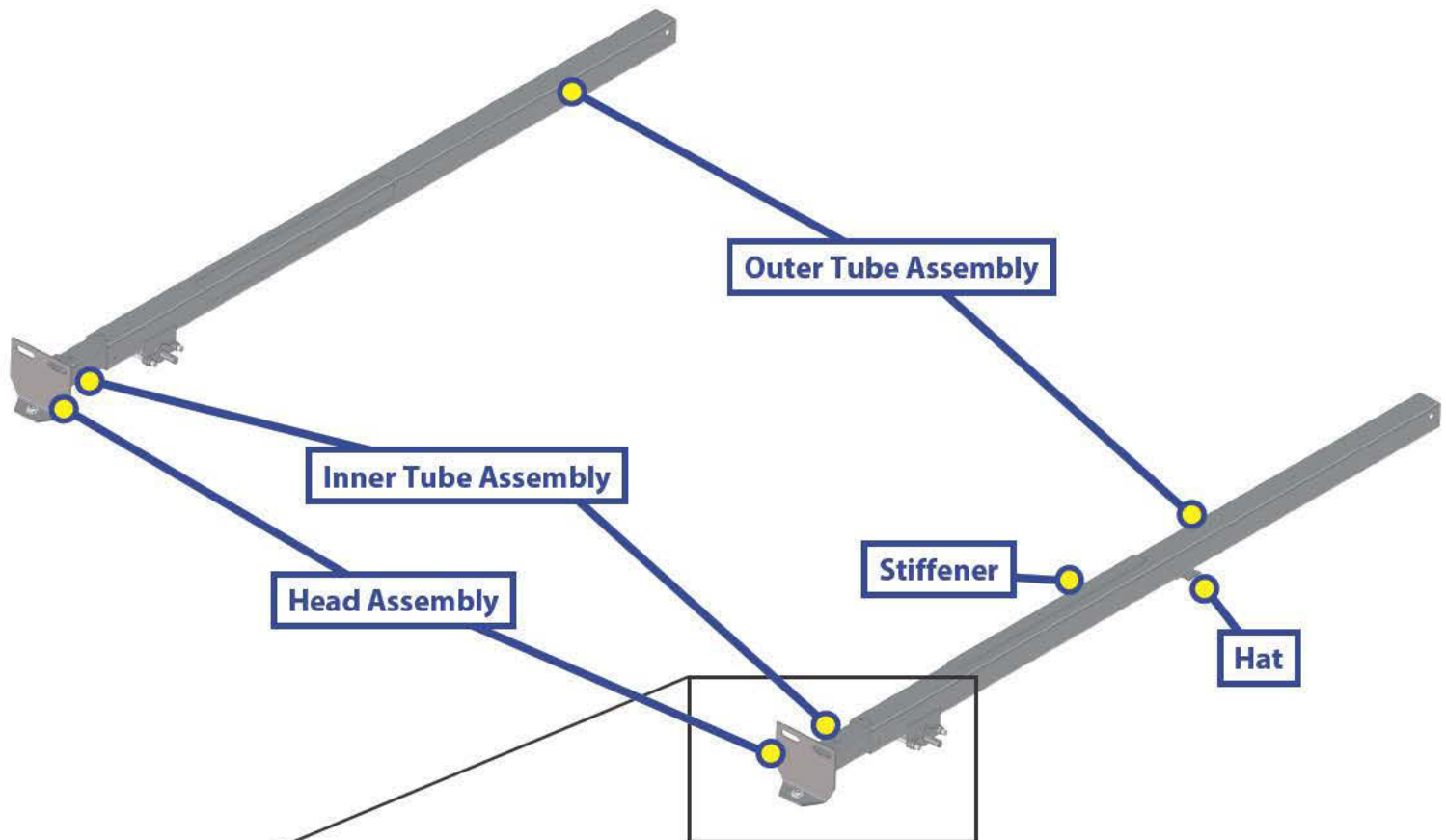
Manual Override

The Lippert Hydraulic Slideout System can be run with auxiliary power devices like electric drills, ratchet wrenches or cordless screwdrivers. In the event of electrical or system failure, this manual method of extending and retracting the slideout room can be used. A standard hand-held drill is all that is required. A standard 38" room will take approximately 45 seconds to retract. See the instructions below.

1. Remove protective label (Fig. 1).
2. Using a standard hex bit, insert into auxiliary drive device (cordless drill, screwdriver, or ratchet wrench).
3. Insert hex bit into coupler found under protective label (Fig. 2).
4. Run drill forward or clockwise to extend slideout room and in reverse or counterclockwise to retract slideout room.



SLIDEOUTS



For further reference on the following subjects, please refer to indicated page:

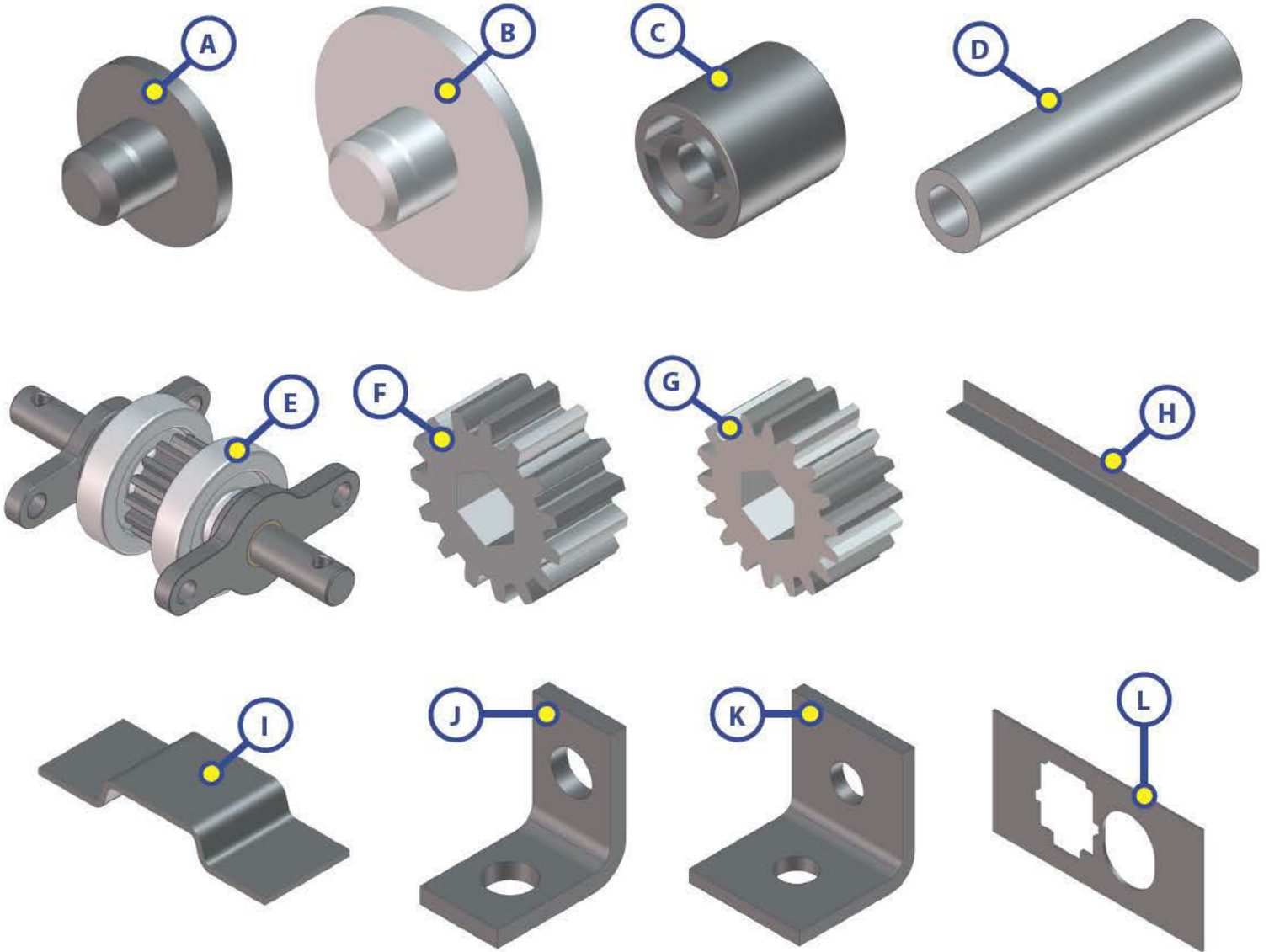
["Comparing 14.5° and 20° Rack and Pinion Gears"](#) on page 42

["Gear Pack Replacement Instructions"](#) on page 43

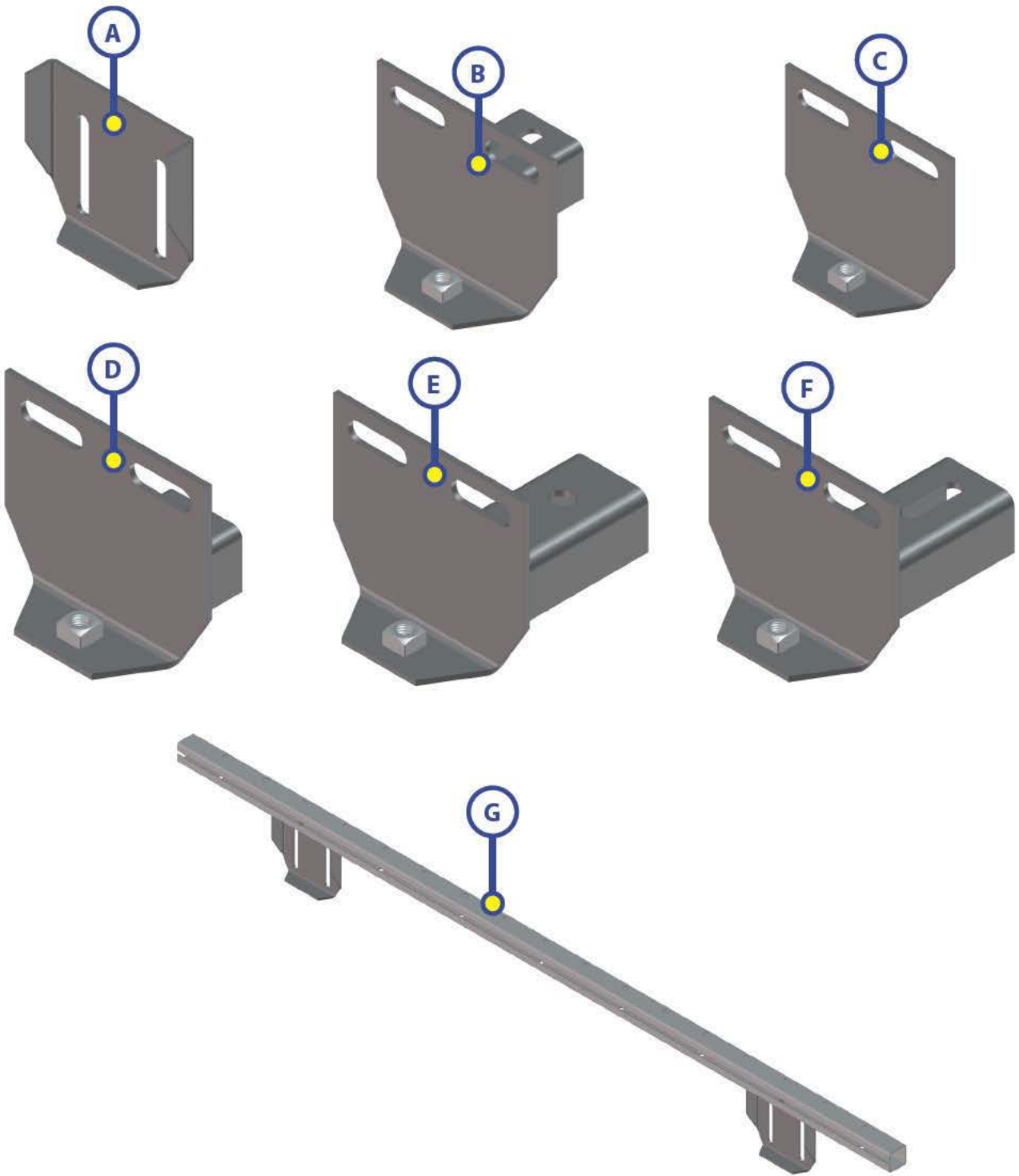
["Corrective Action for Squeaking Gear Packs"](#) on page 44

["Room Bar Measurement Chart"](#) on page 45

SLIDEOUTS

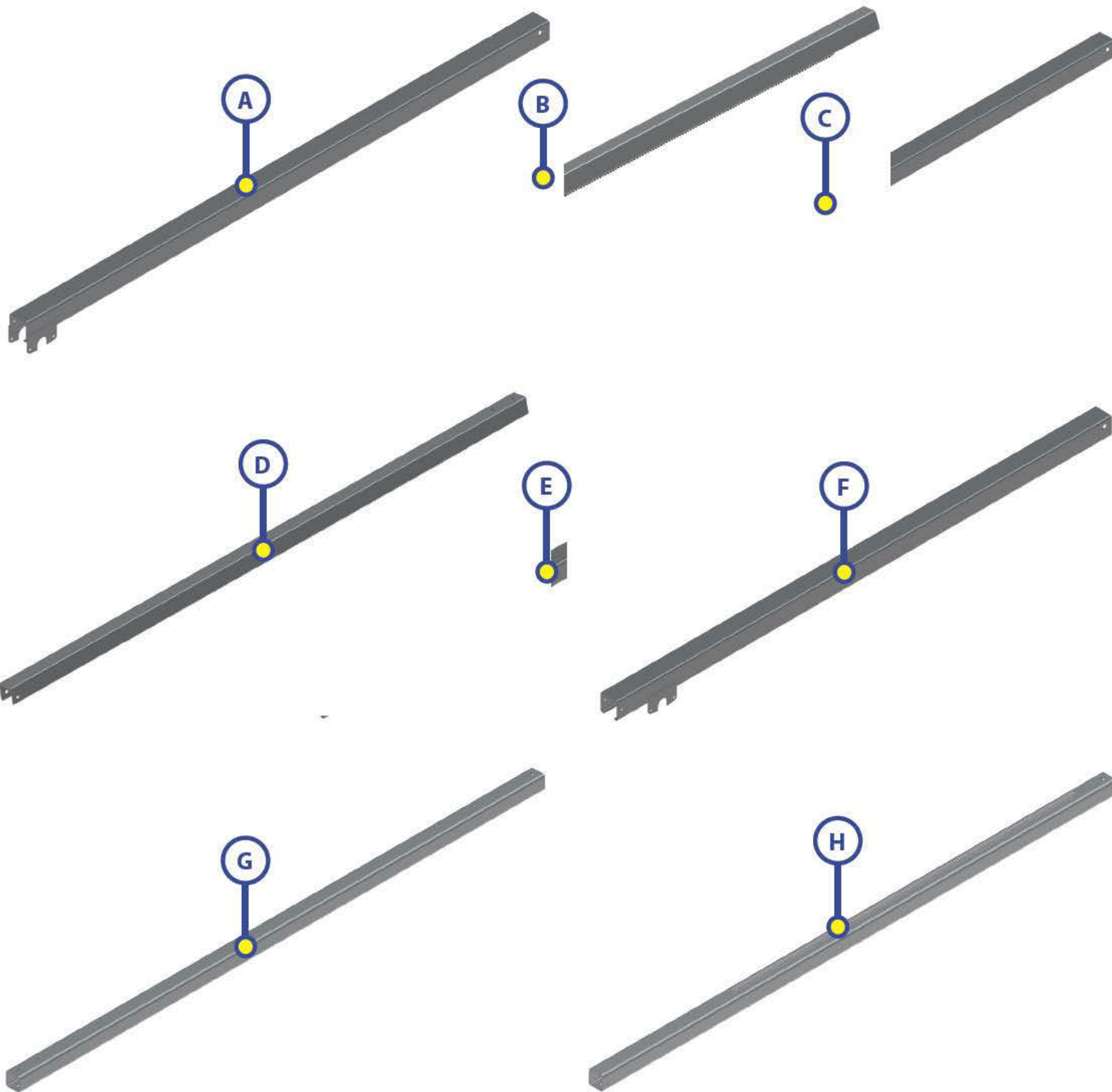


Callout	Part #	Description
A	103480	Wear Pad (x8)
B	277882	Wear Tab for 317322
C	104475	Rear Roller
D	105893	Roller Shaft
E	281331	Gear Pack
F	101941	Spur Gear (Current)
G	122739	Spur Gear (Obsolete)
H	102357	Stiffener
I	106059	Hat (x2)
J	113535	Front Trunion Bracket
K	106040	Rear Trunion Bracket
L	159279	Trim Plate

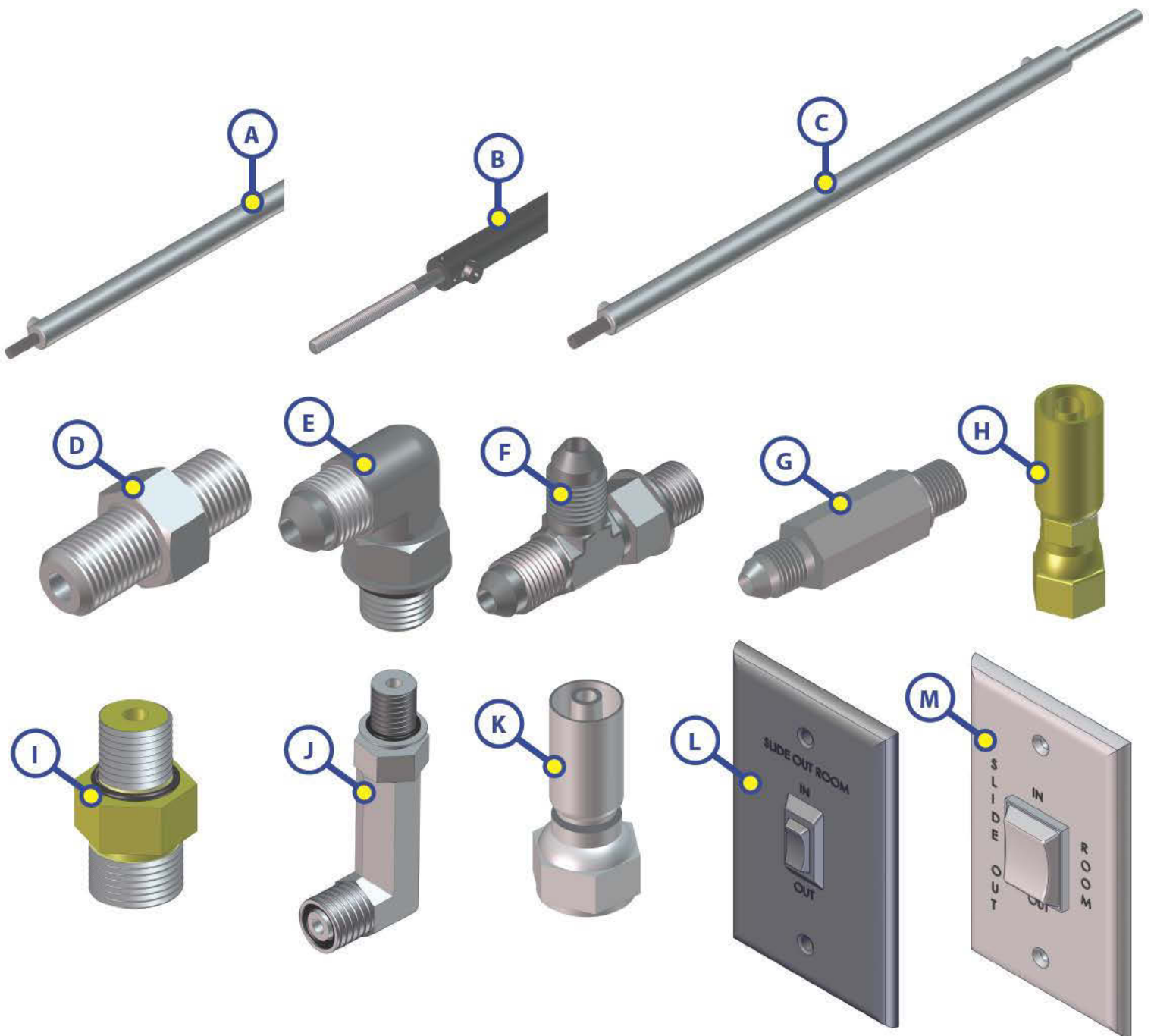


Callout	Part #	Description
A	104851	Slideout Mounting Bracket
B	141792	1 3/8" Adjustable Head Assembly
C	159624	Standard Weld-On Head Assembly
D	163049	Flush Adjustable Head Assembly
E	173593	Standard Flush Fixed Head Assembly
F	173594	Standard Flush Adjustable Head Assembly
G	183949	Room bar (Use for up to 80")
	183950	Room bar (Use for 81" to 154")

NOTE: Brackets can be shipped loose.

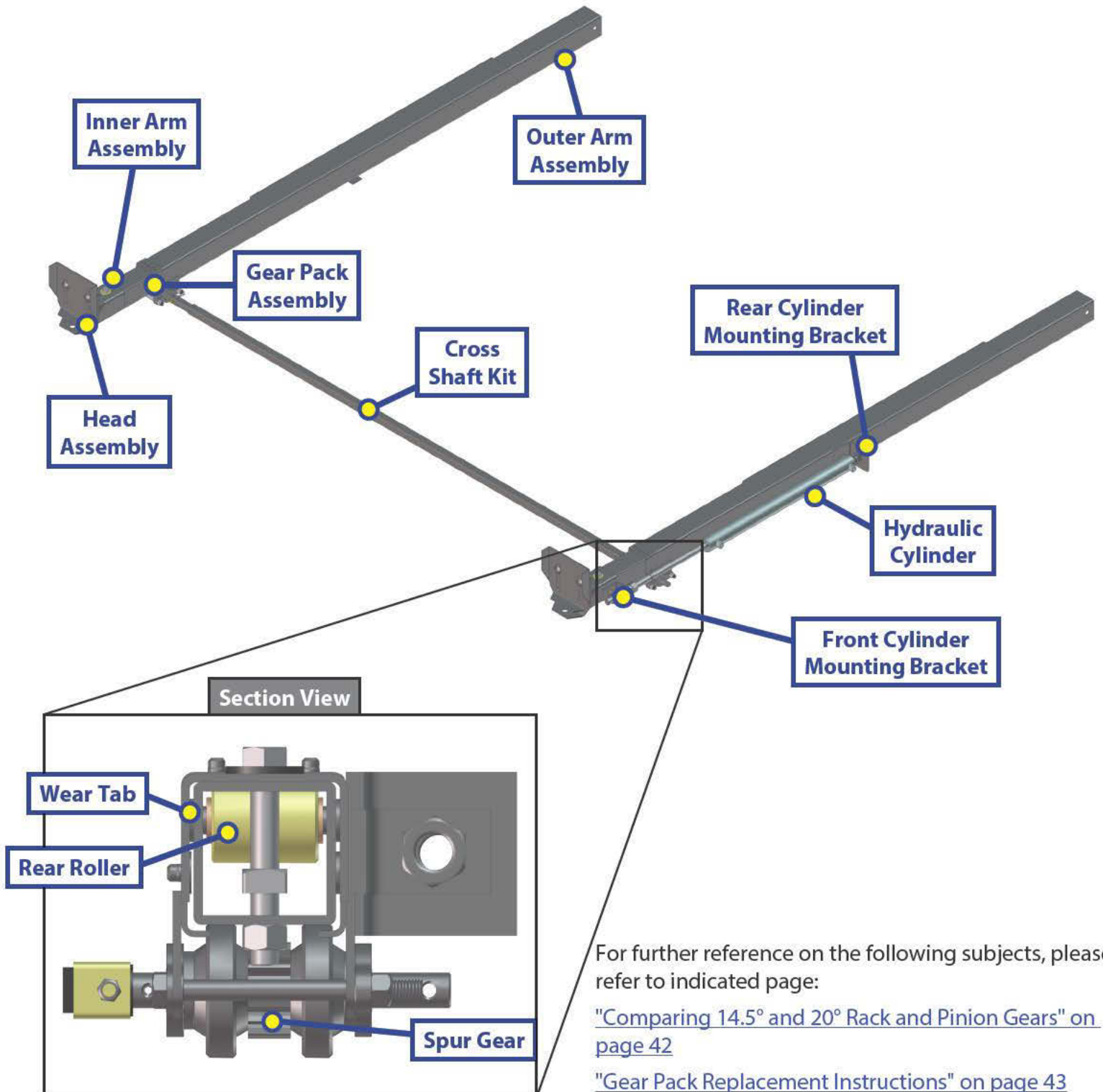


Callout	Part #	Description
A	145735	Outboard Outer Arm (Idler)
	145734	Outboard Outer Arm (Drive)
B	145736	Outboard Inner Arm
C	173204	Inboard Outer Arm 76" (Idler and Drive)
D	163778	Inboard Inner Arm
E	161014	Inboard Outer Arm 69" (Idler and Drive)
F	159389	Inboard Outer Arm 70" (Idler and Drive)
G	301393	Inboard Inner Arm (18 Teeth)
H	296090	Outboard Inner Arm (18 Teeth)
NOTE: Standard slideout arms have 15 teeth.		



Callout	Part #	Description
A	123603	Hydraulic Trunion 38"
B	125653	Hydraulic Trunion 24"
C	133874	Hydraulic Trunion 30"
D	113131	Straight Fitting
E	113128	JIC to O-Ring 90 Degree Elbow Fitting
F	113130	T-Fitting with O-Ring on Run
G	139417	Long Straight Fitting
H	138416	Hose Coupling
I	141109	O-Ring Face Seal Straight Fitting
J	173738	O-Ring Face Seal Elbow Fitting
K	249363	O-Ring Hose End Fitting
L	120639	Hydraulic Interior Slideout Switch
M	140530	6 Prong Interior Switch with Wall Plate

SLIDEOUTS



For further reference on the following subjects, please refer to indicated page:

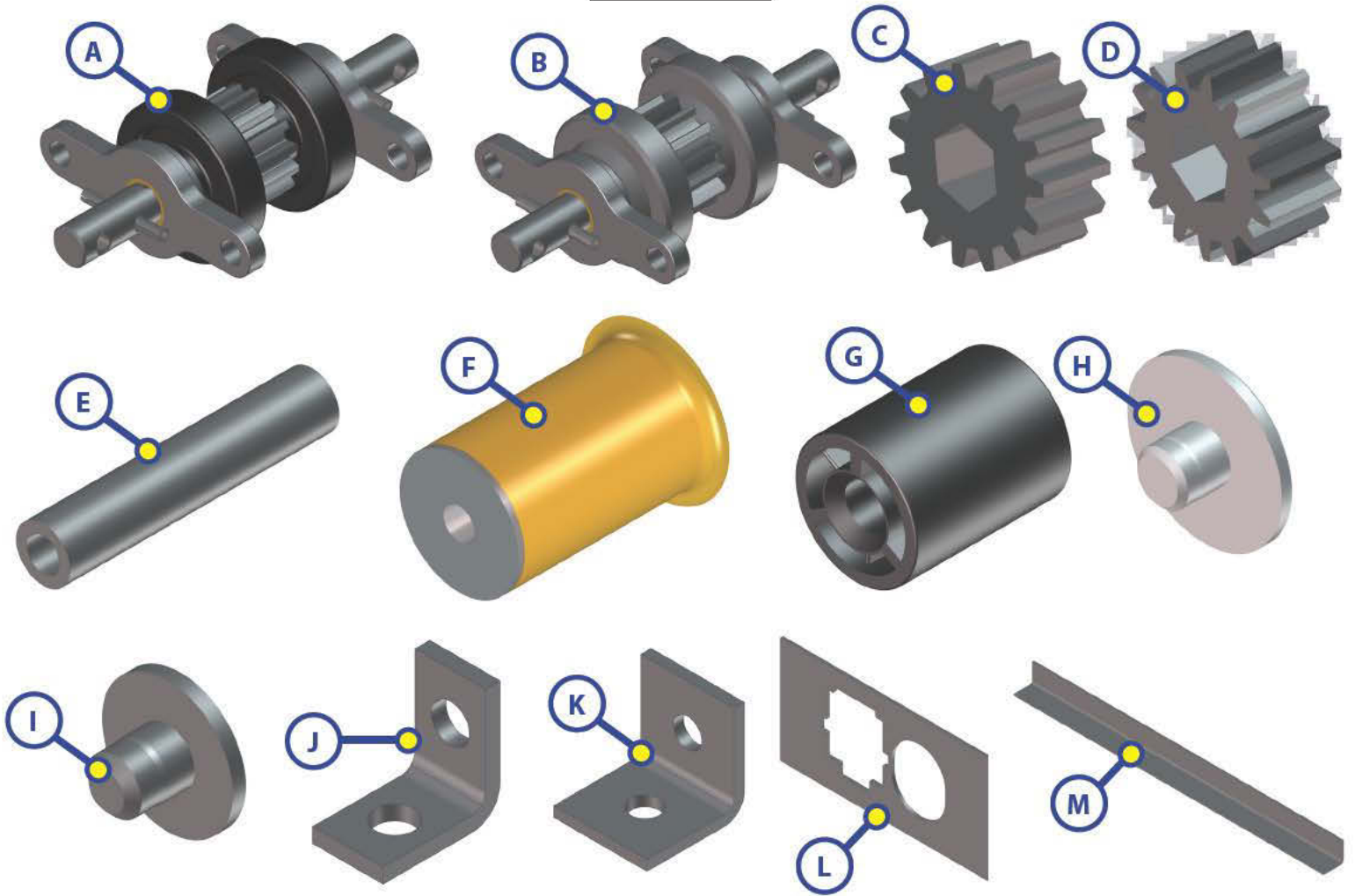
["Comparing 14.5° and 20° Rack and Pinion Gears" on page 42](#)

["Gear Pack Replacement Instructions" on page 43](#)

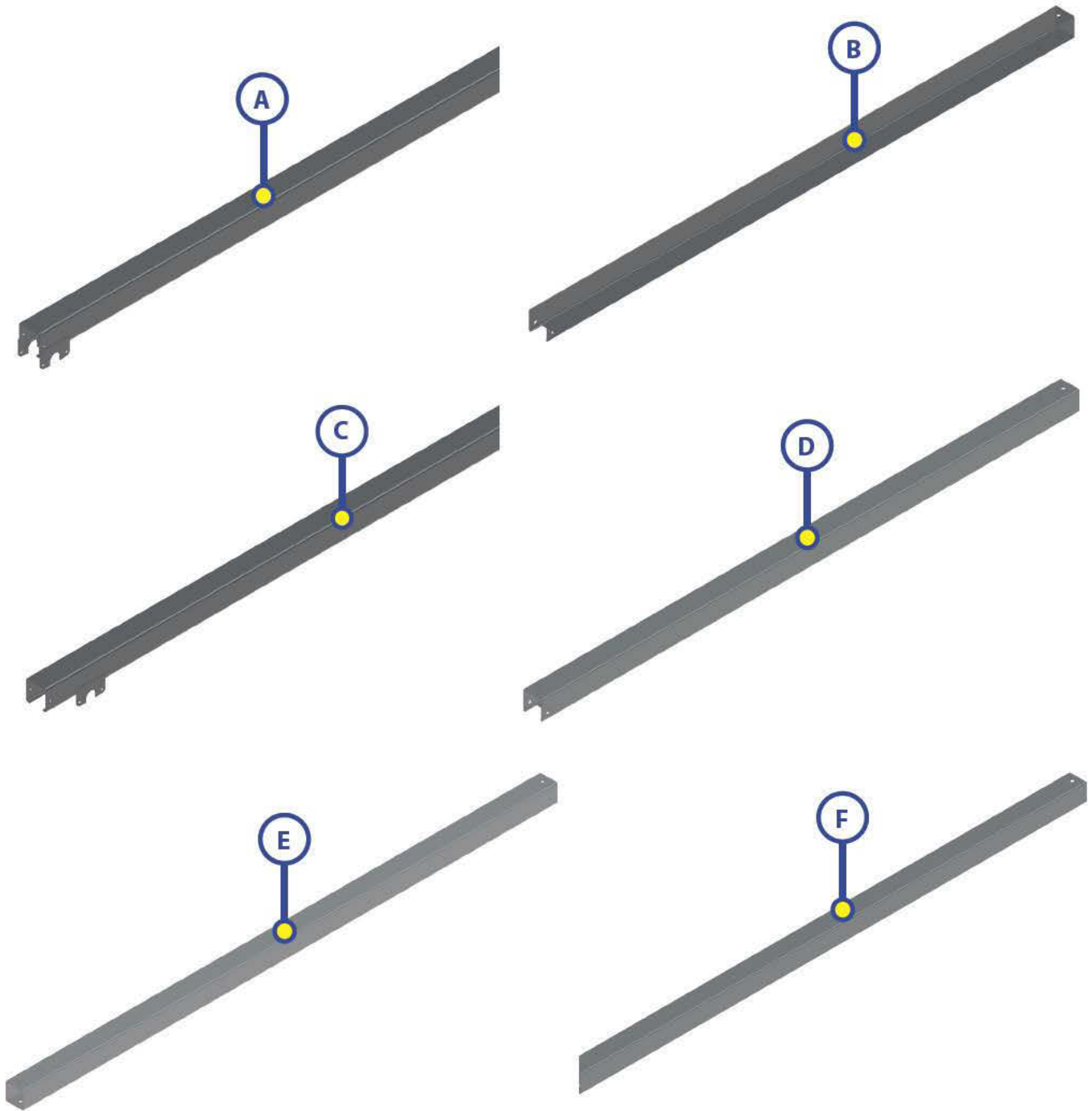
["Corrective Action for Squeaking Gear Packs" on page 44](#)

["Room Bar Measurement Chart" on page 45](#)

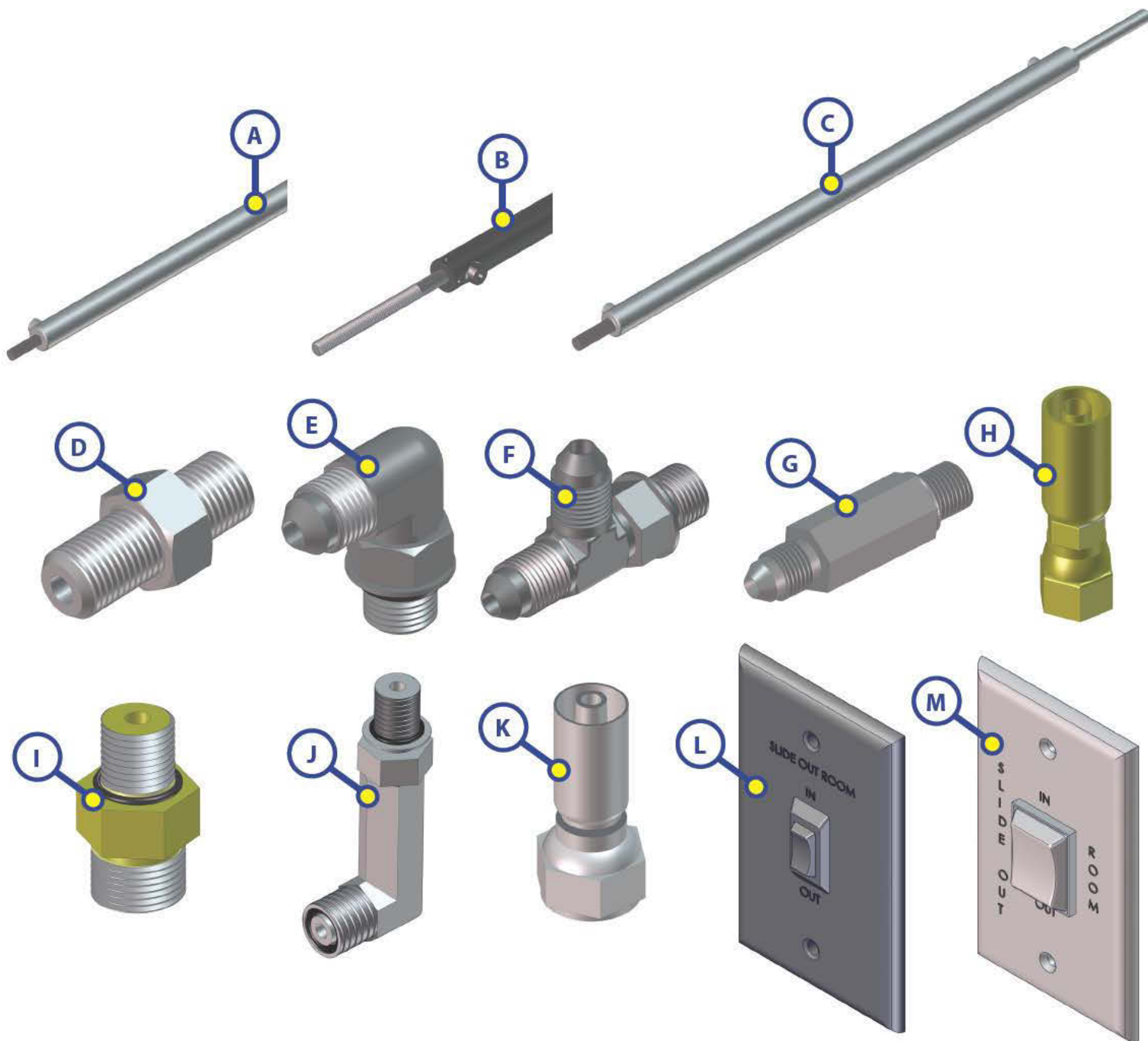
SLIDEOUTS



Callout	Part #	Description
A	122837	Gear Pack (Standard)
B	123356	Gear Pack (Heavy Duty)
C	101941	Spur Gear (Standard)
D	328044	Spur Gear (Heavy Duty)
E	105892	Roller Shaft
F	122840	Stop Can
G	104474	Rear Roller
H	277882	Wear Tab for 317322
I	103480	Wear Tab
J	113535	Front Cylinder Bracket
K	106040	Rear Cylinder Bracket
L	106030	Trim Plate
M	102357	Stiffener



Callout	Part #	Description
A	143674	Outboard Outer Arm (Idler)
	143675	Outboard Outer Arm (Drive)
B	143707	Outboard Inner Arm
C	143676	Inboard Outer Arm (Idler)
	143677	Inboard Outer Arm (Drive)
D	143710	Inboard Inner Arm
E	296121	Inboard Inner Arm (18 Teeth)
F	317322	Outboard Inner Arm (18 Teeth)
NOTE: Standard slideout arms have 15 teeth.		

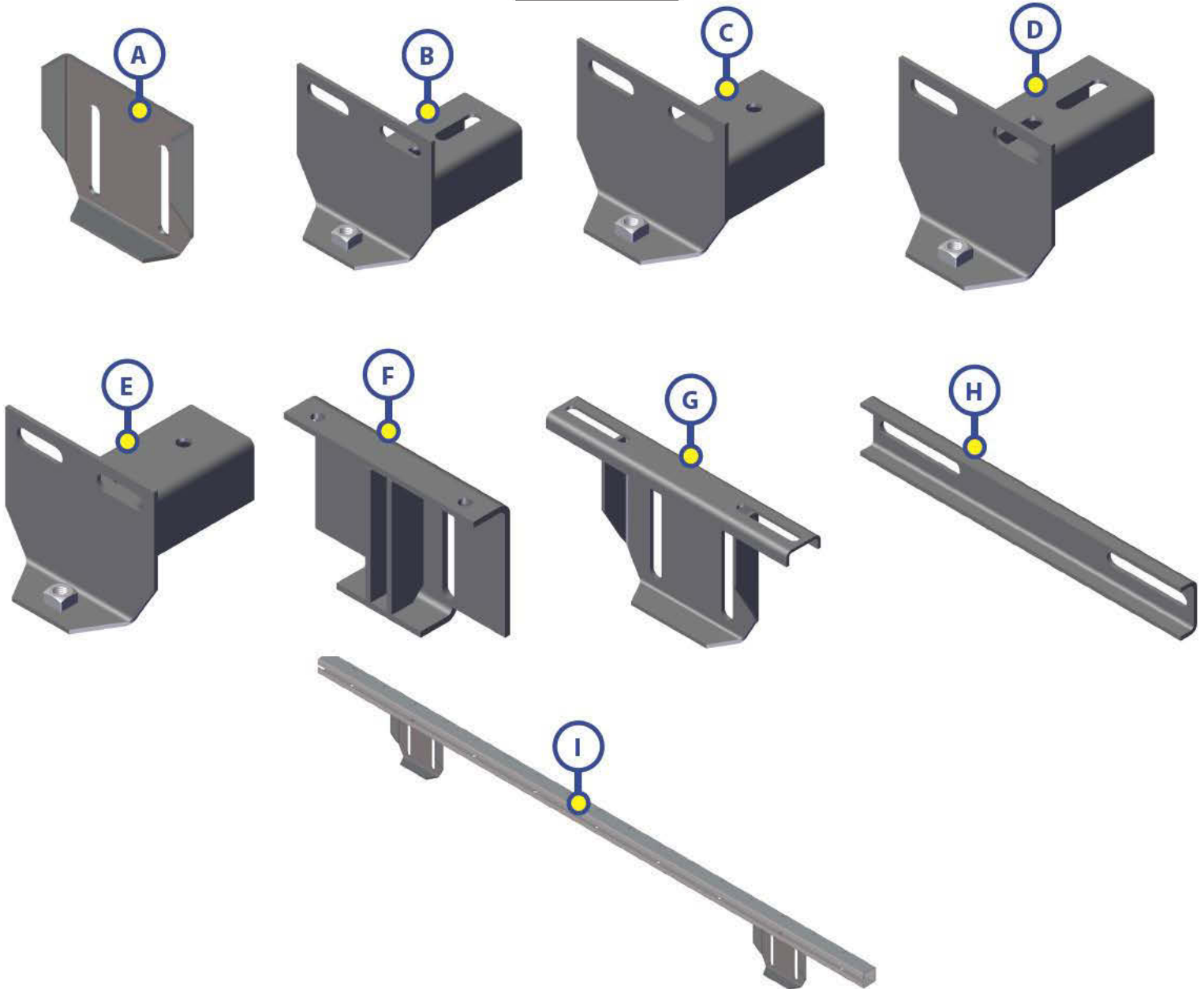


Callout	Part #	Description
A	123603	Hydraulic Trunion 38"
B	125653	Hydraulic Trunion 24"
C	133874	Hydraulic Trunion 30"
D	113131	Straight Fitting
E	113128	JIC to O-Ring 90 Degree Elbow Fitting
F	113130	T-Fitting with O-Ring on Run
G	139417	Long Straight Fitting
H	138416	Hose Coupling
I	141109	O-Ring Face Seal Straight Fitting
J	173738	O-Ring Face Seal Elbow Fitting
K	249363	O-Ring Hose End Fitting
L	120639	Hydraulic Interior Slideout Switch
M	140530	6 Prong Interior Switch with Wall Plate



2.5X2.5 HYDRAULIC THROUGH FRAME SLIDEOUT STANDARD HEAD COMPONENTS WEBPAGE

SLIDEOUTS

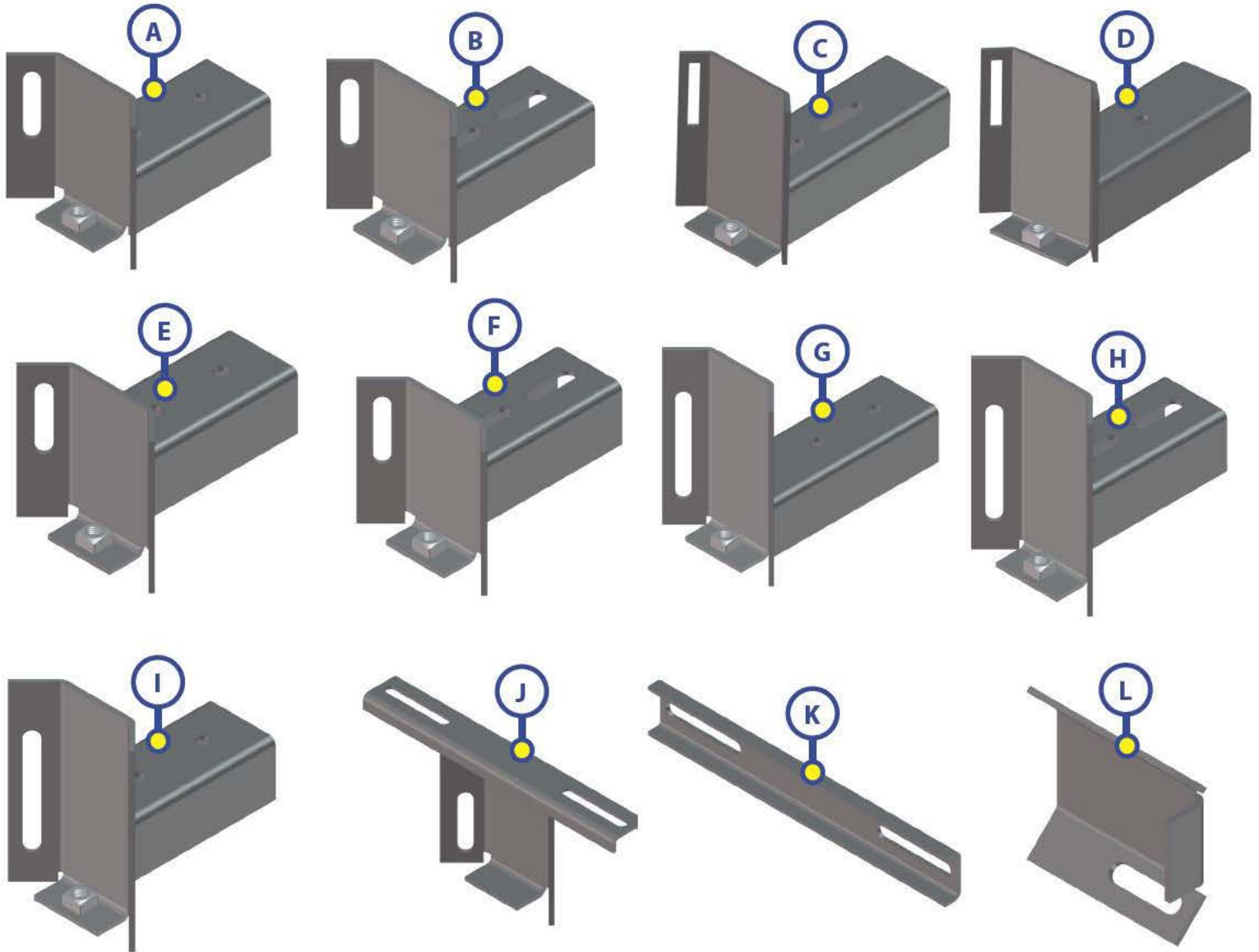


Callout	Part #	Description
A	104851	Slideout Mounting Bracket
B	119047	Flush Adjustable Head Assembly
C	119048	Flush Fixed Head Assembly
D	122854	Adjustable Head Assembly (1 3/4")
E	122855	Fixed Head Assembly (1 3/4")
F	166536	Flush Floor End Condition
G	226347	Room Bar Slide Head Assembly (12")
H	105966	Room Bar Bracket
I	183949	Room Bar (Use for up to 80")
	183950	Room Bar (Use for 81" to 154")



2.5X2.5 HYDRAULIC THROUGH FRAME SLIDEOUT V-TECH HEAD COMPONENTS WEBPAGE

SLIDEOUTS



Callout	Part #	Description
A	118127	Flush Fixed Head Assembly
B	119157	Flush Adjustable Head Assembly
C	123999	Flush Adjustable, Tall & Extended Head Assembly
D	124000	Flush Fixed, Tall & Extended Head Assembly
E	145388	1 3/8" Fixed Head Assembly
F	145389	1 3/8" Adjustable Head Assembly
G	146612	Flush Fixed, Tall & Extended Head Assembly
H	151474	1 3/8" Adjustable Head Assembly
I	151475	1 3/8" Fixed Head Assembly
J	180461	Room Bar Assembly
K	105966	Room Bar Bracket
L	103139	Mounting Bracket



**LEVEL UP™ AUTOMATIC LEVELING
OWNER'S MANUAL**

**LIPPERT
COMPONENTS™**

System and Safety Information

Safety Information



Failure to act in accordance with the following may result in death, serious injury, coach or property damage.

The use of the LCI Level-Up™ with Automatic Leveling System to support the unit for any reason other than which it is intended is prohibited by Lippert's limited warranty. The Lippert Leveling System is designed as a "leveling" system only and should not be used to provide service for any reason under the coach such as changing tires or servicing the leveling system.



Lippert Components Inc. Recommends that a trained professional be employed to change the tire on the unit. Any attempts to change the tires or perform other service while unit is supported by the LCI Level-Up with Automatic Leveling System could result in damage to the 5th wheel and/or cause death, serious injury, coach or property damage.

NOTES:

- Be sure to park the unit on solid, level ground.
- Clear all jack landing locations of debris and obstructions. Locations should also be free of depressions.
- When parking the unit on extremely soft surfaces, utilize load distribution pads under each jack.
- People and pets should be clear of unit while operating leveling system.
- Be sure to keep hands and other body parts clear of fluid leaks. Oil leaks in the Lippert Leveling System may be under high pressure and can cause serious skin penetrating injuries.
- Never lift the unit completely off the ground. Lifting the unit so the wheels are not touching ground will create an unstable and unsafe condition.

Prior to Operation

The leveling system shall only be operated under the following conditions:

1. The unit is parked on a reasonably level surface.
2. Be sure all persons, pets and property are clear of the coach while LCI Level-Up Automatic System is in operation.

Basic Jack Operation

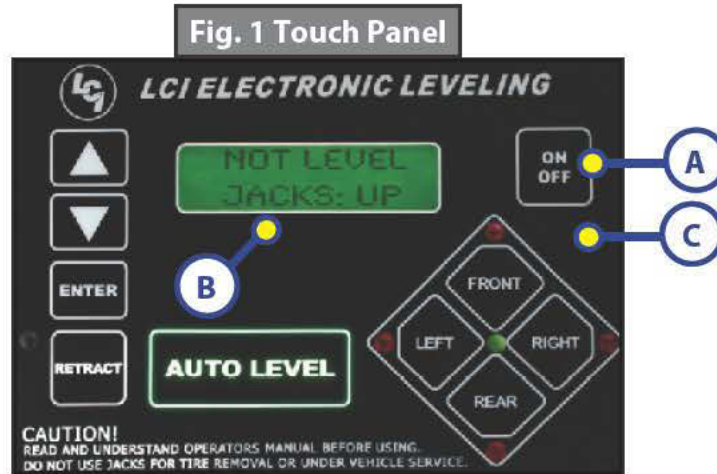
1. Front jacks or Landing Gear jacks.
2. Level-Up jacks.

Landing gear jacks can be operated any time the system is "ON" but NOT in the "AUTO MODE." By pushing the "FRONT" button, both front or landing gear jacks can be extended. If the touch panel is put in the "RETRACT" mode, indicated by the orange illuminated LED next to the "RETRACT" button, the front jacks can be retracted together by pushing the "FRONT" button.

The Level-Up jacks operate when the "AUTO MODE" is activated or the touch panel is in the "MANUAL MODE." Once system is in "MANUAL MODE," pressing the "REAR" button will extend all Level-Up jacks at the same time. Press the "LEFT" or "RIGHT" buttons to operate Level-Up jacks to move on the left or right side of the coach, respectively.

Dropping Off Unit

1. Push touch panel "ON/OFF," (Fig. 1A) to turn system on. LCD Screen lights up, (Fig. 1B).



2. LCD will display status ... "NOT READY JACKS: UP"

NOTE: Orange arrow lights (Fig. 1C) may come on, indicating the current disposition of the unit, in this case the FRONT and RIGHT sides of the unit are low.

3. Push "FRONT BUTTON" to extend landing gear jacks and lift front of vehicle to take the weight of the 5th wheel off of the hitch.
4. Uncouple the fifth wheel connection on the tow vehicle.
5. Pull tow vehicle away and park at a safe distance.
6. Push "AUTO LEVEL." The unit will commence to auto level by setting the landing gear jacks close to level. The driver side rear jack will then extend and touch the ground, followed by the passenger side rear jack. There may be several level checks from the system at this time.
7. When auto level is complete, LCD indicates "READY - Jacks: Down" and the green light in the middle of the jack buttons will light (Fig. 2D).
8. Push "ON/OFF" button to turn system off or system will time out and shut off automatically.



Reconnecting the Unit to a Tow Vehicle

1. Be sure main power switch "ON."
2. LCD display will indicate "READY: JACKS DOWN."
3. Push "LEFT" and "RIGHT" buttons at the same time.
4. Unit will raise up to the point where the AUTO LEVEL was started, (normal starting point from where it was disconnected from the tow vehicle.)
5. Connect tow vehicle and make sure 5th wheel and pin are connected and locked.
6. Push "UP" arrow until "AUTO RETRACT" appears in LCD screen.
7. Push "ENTER." System will immediately retract all jacks.

Manual Operation - Hydraulic

1. Front jacks

NOTE: The front jacks will operate manually any time system is "ON" except "AUTO MODE."

Fig. 3



Fig. 4

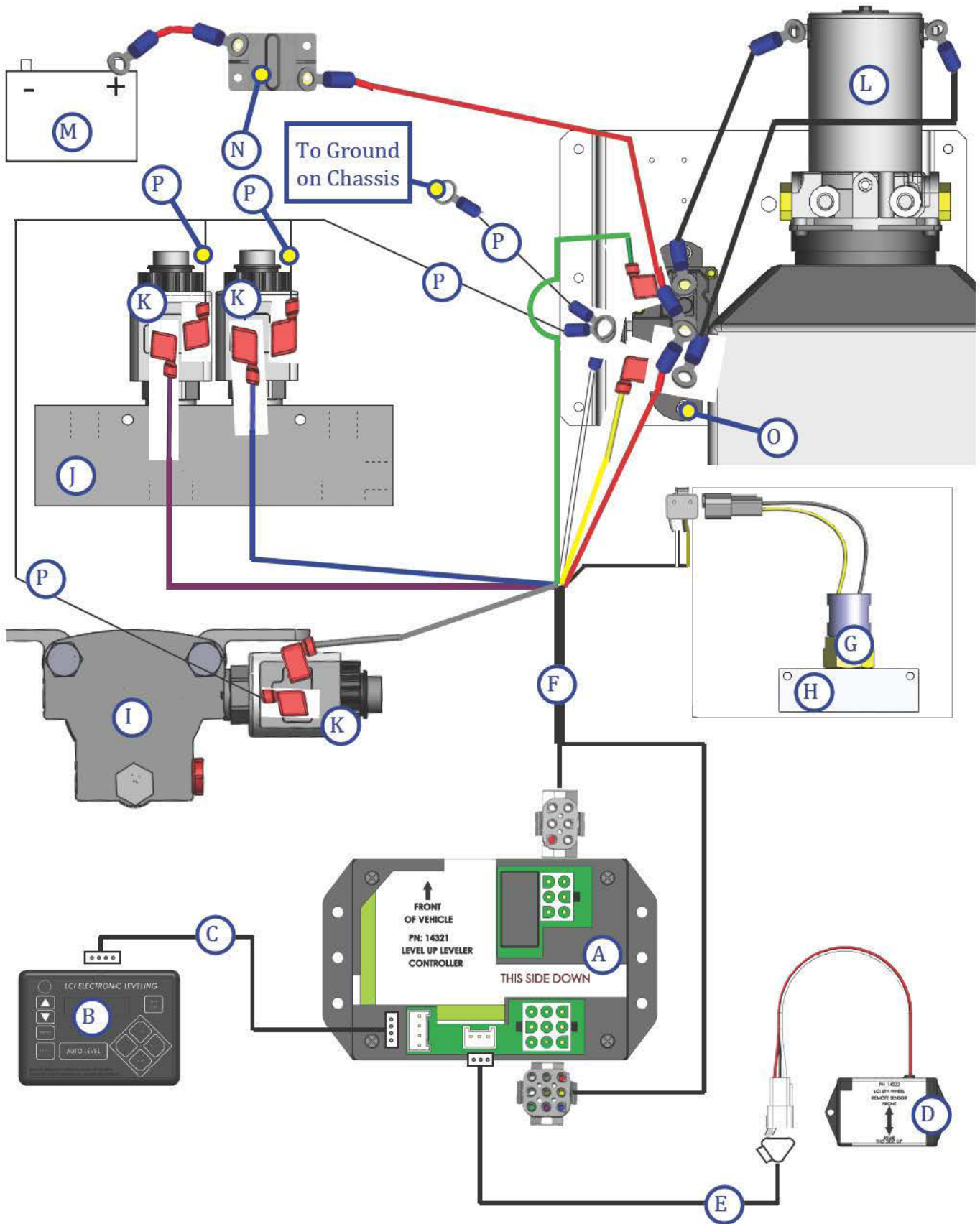


- A. Push "ON/OFF" to turn system on.
 - B. Push "UP" ARROW once or until screen reads "MANUAL MODE" (Fig. 4).
 - C. Push "ENTER" once while screen reads "MANUAL MODE."
 - D. Push "FRONT" to extend front landing gear legs.
 - E. Push "RETRACT" and orange LED, Fig. 6, comes on.
 - F. Push "FRONT" to retract front landing gear legs:
- NOTE:** If orange LED is on legs will retract. If orange LED is off legs will extend.
- G. Push "ON/OFF" to turn system off.
 - H. After 3 minutes system will turn off by itself.
2. Level-Up jacks - EXTEND
 - A. Turn "ON/OFF" button "ON."
 - B. Push scroll arrow to display "MANUAL MODE," (Fig. 3).
 - C. Push "ENTER." "MANUAL MODE" displayed (Fig. 4).
 3. Level-Up jacks - RETRACT
 - A. To retract, push "RETRACT" (orange LED lights up), (Fig. 5).
 - B. Push "REAR" to retract all Level-Up jacks.
 - C. To extend, the "RETRACT" light should be "OFF."

NOTE: By pushing "RIGHT," both passenger side Level-Up jacks operate; pushing "LEFT," both driver's side Level-Up jacks operate, and so on.

NOTE: The side to side movement in manual mode is limited to 5° of tilt.

Wiring Diagram



Wiring Diagram Legend

- A.** Controller
- B.** Interface (Touchpad)
- C.** Interface Harness
- D.** Rear Sensor
- E.** Rear Sensor Harness
- F.** Main Harness
 - I.** Green - Extend Spade on Trombetta
 - II.** Yellow - Retract Spade on Trombetta
 - III.** Red - Power (Center Post on Trombetta)
 - IV.** Blue - Curb Side Level Up Jacks (Connects to Valve Coil on extend manifold)
 - V.** Purple - Road Side Level Up Jacks (Connects to Valve Coil on extend manifold)
 - VI.** Gray - Lead Landing Gear Leg (Connects to Valve Coil on Lead Landing Gear Leg)
 - VII.** Yellow/White - Pressure Switch
 - VIII.** White - Connects to Grounding post on Trombetta
 - IX.** 6 Pin - Connects to 6 Pin port on Controller
 - X.** 9 Pin - Connects to 9 Pin port on Controller
- G.** Pressure Switch
- H.** Retract Manifold
- I.** Lead Hydraulic Landing Gear
- J.** Extend Manifold
- K.** Cartridge Valve w/ Spade Coil
- L.** Power Unit Motor
- M.** Battery (Customer Supplied)
- N.** 80 Amp Breaker
- O.** Trombetta
- P.** Grounding Wires (Connect to each Valve Coil, then grounding post of Trombetta, then grounding bolt on chassis) (All Installer supplied)

Zero setting the control

1. Turn "ON/OFF" button "OFF".
2. Push "FRONT" button 10 times.
3. Push "REAR" button 10 times.
4. Control will flash and beep, LCD says "ZERO POINT CALIBRATE".
5. To memorize this level condition , press "ENTER".
6. LCD says "ZERO POINT STABILITY SUCCESSFULLY SET".
7. The control will then turn off.
8. Turn "ON/OFF" on to commence operation.

Manual Override

The LCI Level-Up Automatic Leveling System can be manually operated with an electric drill. In the event of electrical or system failure, this manual method of extending and retracting the jacks can be used. See the instructions below.

1. Locate the blocking valves on the jacks to be operated. See (Fig. 5 and 6) for location of leveling, slideout and landing gear jacks.
2. Using a 5/32" Allen wrench, manually open the valve by turning the manual override set screw in the end of the valve clockwise (Fig. 6).
3. Remove protective label shown on wiring diagram.
4. Using a standard hex bit, insert into auxiliary drive device, i.e. cordless drill or power drill.

Fig. 5

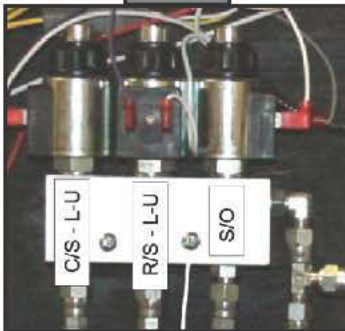


Fig. 6

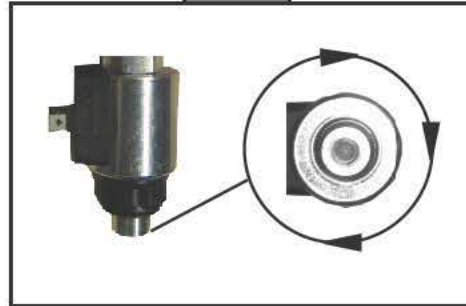
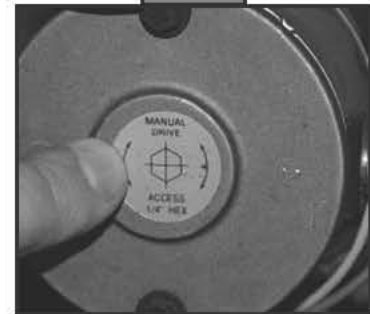


Fig. 7

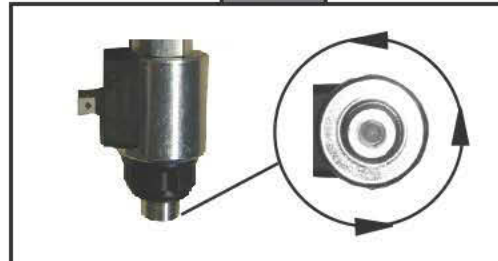


5. Insert hex bit into coupler found under protective label shown in the wiring diagram (Fig. 7).
6. Run drill forward or clockwise to extend jacks and in reverse or counterclockwise to retract jacks (Fig. 8 and 9).
7. Be sure to turn manual override set screw back to the counterclockwise position after extending or retracting landing gear.

Fig. 8



Fig. 9



Error display in LCD

1. If an error occurs before or during operation, the error will be displayed in the LCD and a “buzzer “ will sound.
2. The errors that will be displayed are:
 - a. “excess angle” > relocate the unit.
 - b. “bad calibration” > bad zero point.
 - c. “feature disable”
 - d. “low voltage”
 - e. “out of stroke” > relocate the unit.
 - f. “external sensor” > bad connection to rear remote sensor.
 - g. “jack time out” > system could not level in expected time, check for obstructions, leaks, fluid level and voltage to pump motor under load.
 - h. “auto level failure” > retry.
 - i. “stabilizer time”> rear stabilizers ran too long ... bad motor or connections.
 - j. “Not configured” > unit was not zeroed properly.
 - k. To clear error, push “ENTER” > if error remains, it will appear again.

Fluid Recommendation

The Lippert Level-Up Leveling System is pre-filled, primed and ready to operate direct from the manufacturer. Please consult with the manufacturer of your unit for the fluid type in your hydraulic unit.

Preventative Maintenance Procedures

1. Change fluid in RESERVOIR ONLY every 36 months.
 - A. Check fluid only when jacks are fully retracted.
 - B. Always fill the reservoir with the jacks in the fully retracted position. Filling reservoir when jacks are extended will cause reservoir to overflow into its compartment when jacks are retracted.
 - C. When checking fluid level, fluid should be within ¼” of fill spout lip.
2. Check the fluid level every month.
3. Inspect and clean all Pump Unit electrical connections every 12 months. If corrosion is evident, spray unit with WD-40 or equivalent.
4. Remove dirt and road debris from jacks as needed.
5. If jacks are down for extended periods, it is recommended to spray exposed leveling jack rods with a silicone lubricant every seven days for protection. If your coach is located in a salty environment, it is recommended to spray the rods every 2 to 3 days.



Your coach should be supported at both front and rear axles with jack stands before working underneath. Failure to do so may result in death, serious injury, coach or property damage.

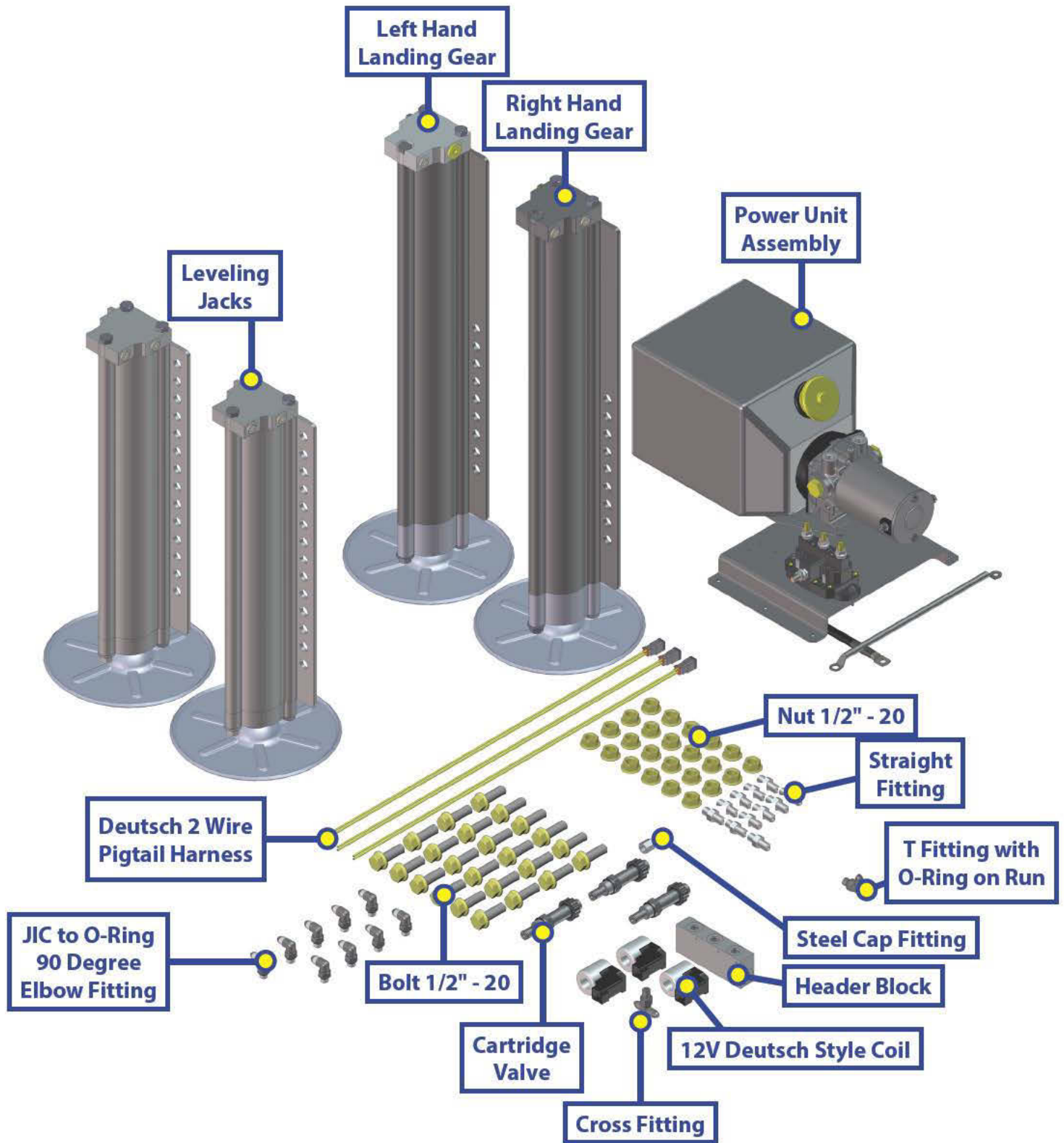
6. If jacks are down for extended periods, it is recommended to spray exposed leveling jack rods with a silicone lubricant every seven days for protection. If your coach is located in a salty environment, it is recommended to spray the rods every 2 to 3 days.



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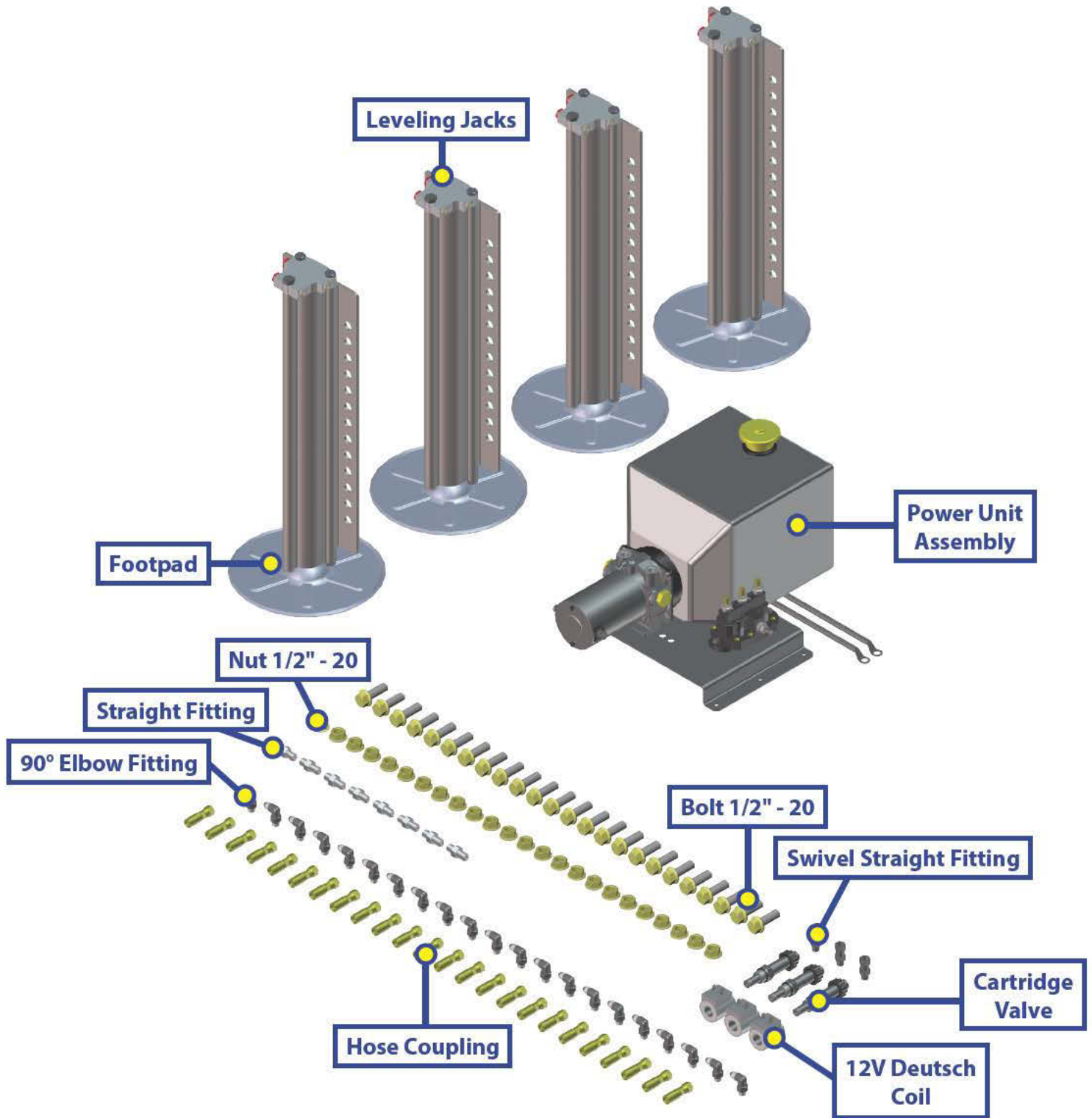
FIFTH WHEEL LEVEL UP 4 POINT ASSEMBLY WEBPAGE

LEVELING AND STABILIZATION





LEVELING AND STABILIZATION

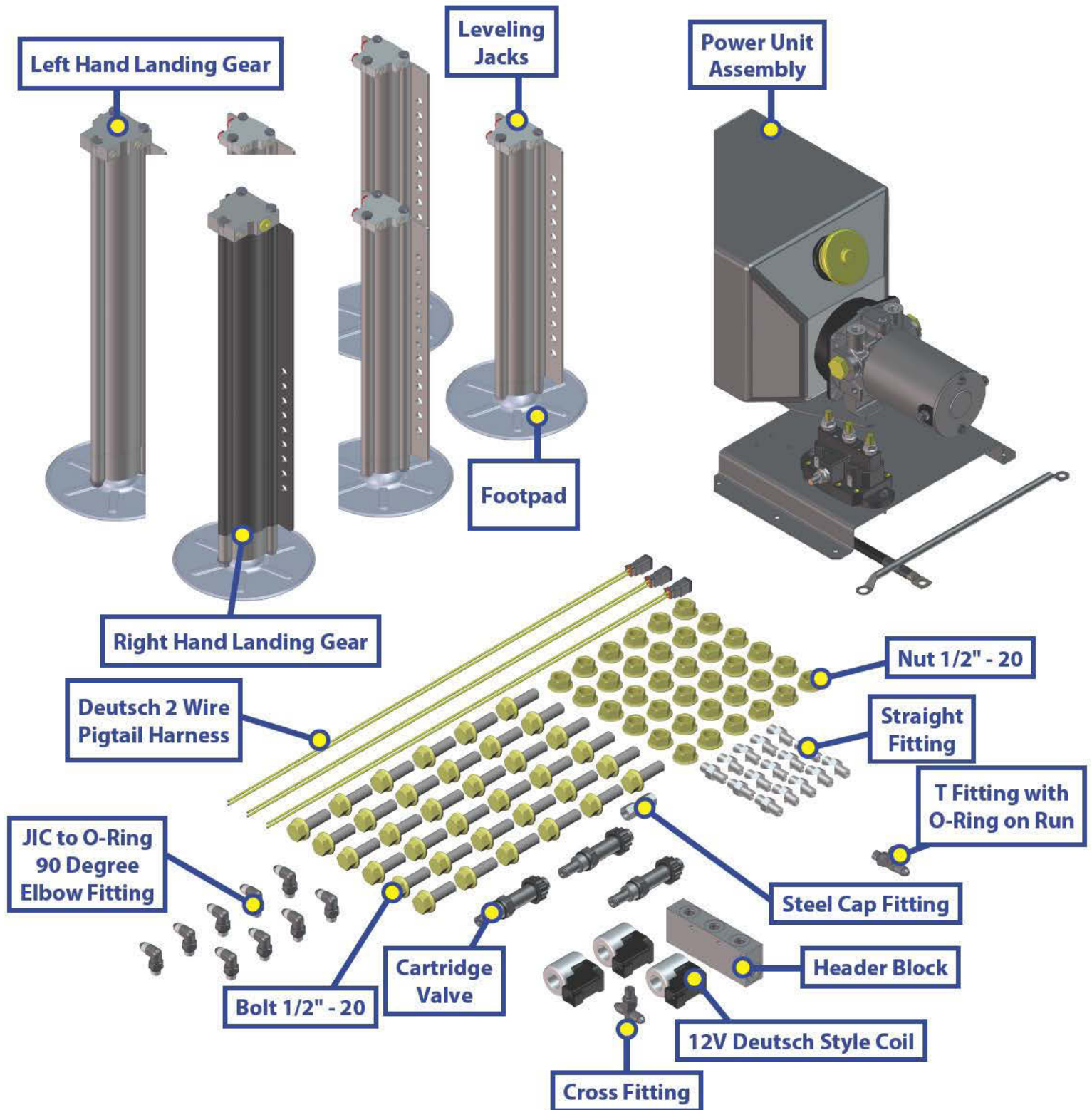




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FIFTH WHEEL LEVEL UP 6 POINT ASSEMBLY WEBPAGE

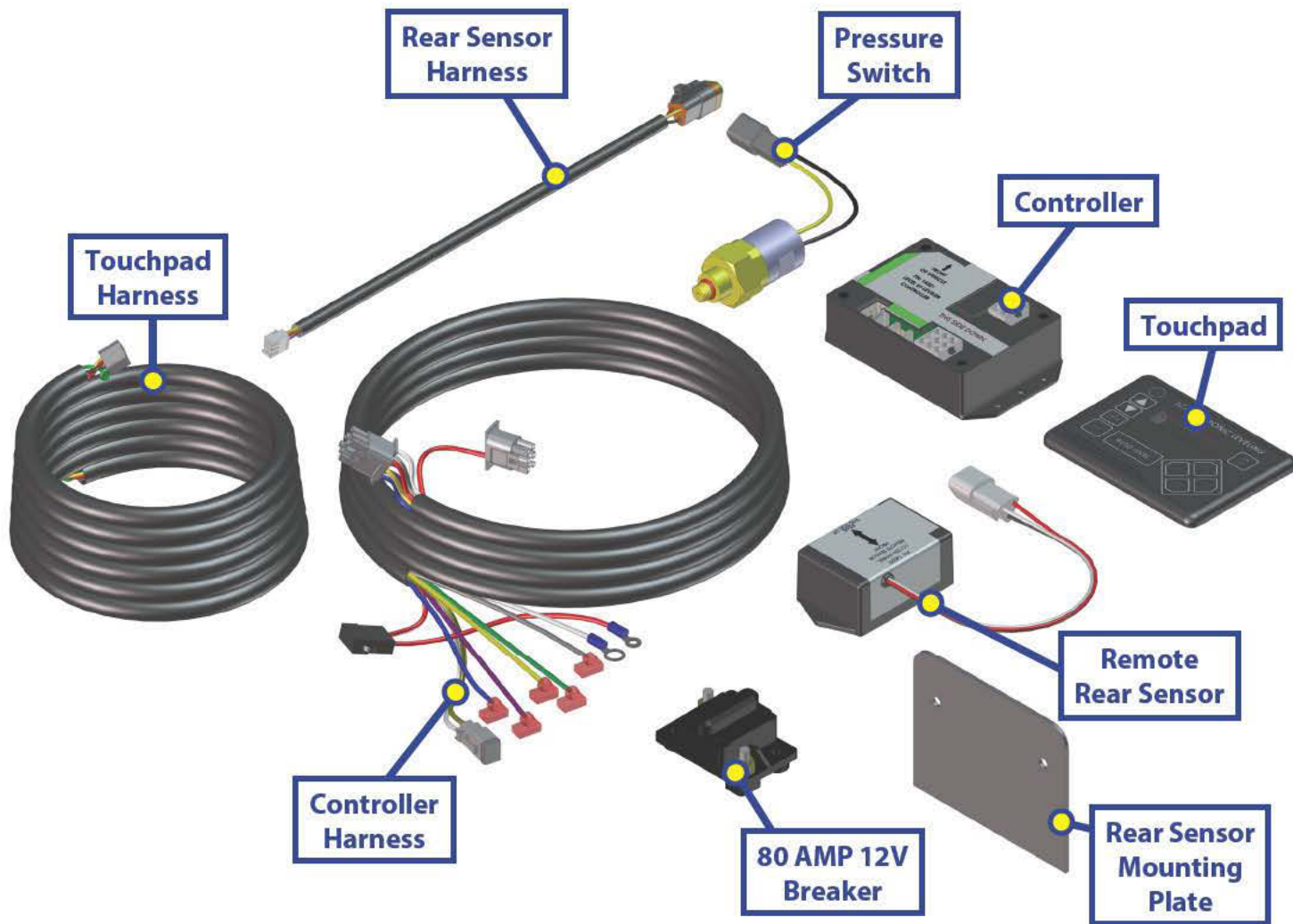
LEVELING AND STABILIZATION

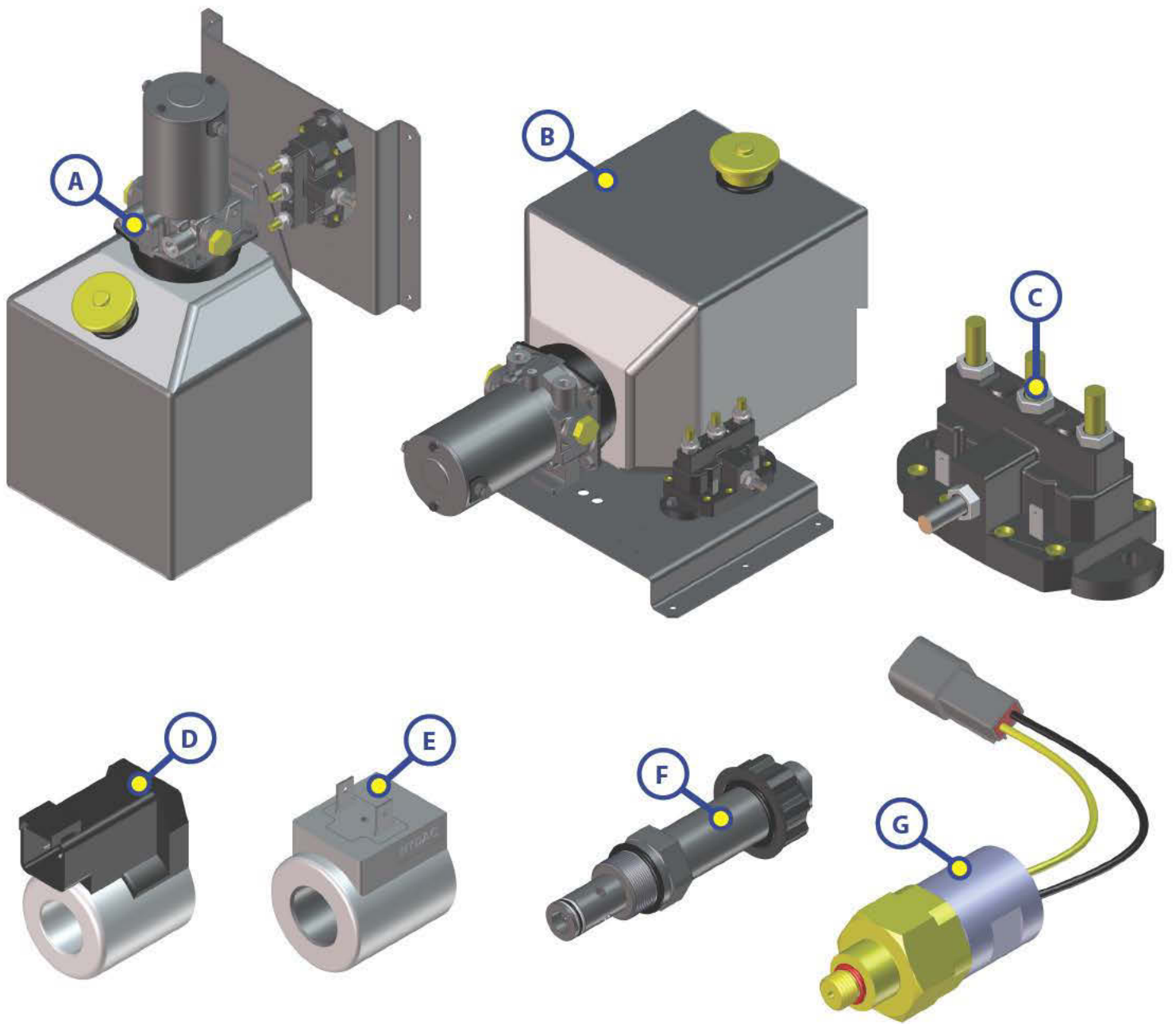




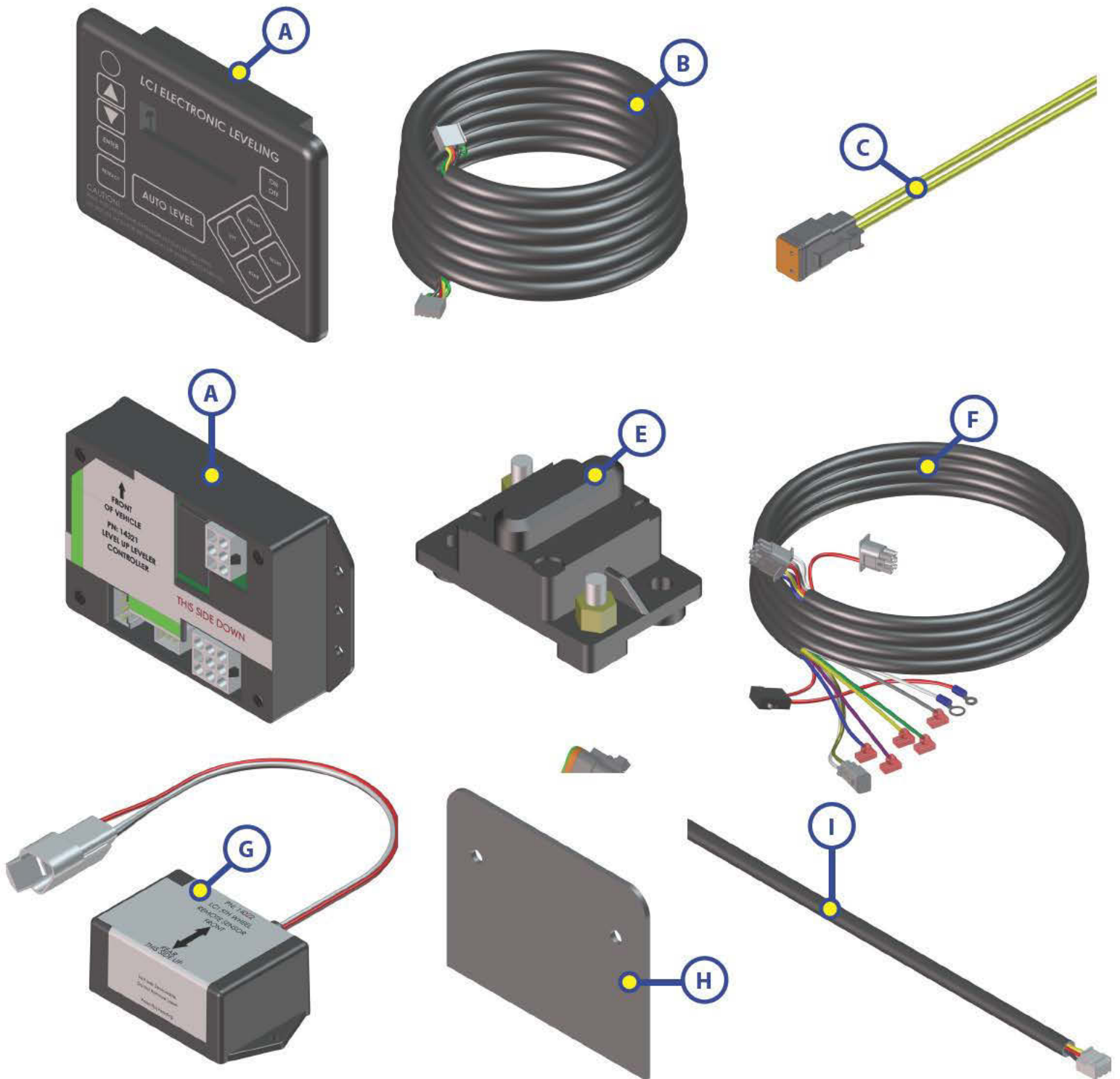
LEVEL UP COMPONENTS WEBPAGE

LEVELING AND STABILIZATION

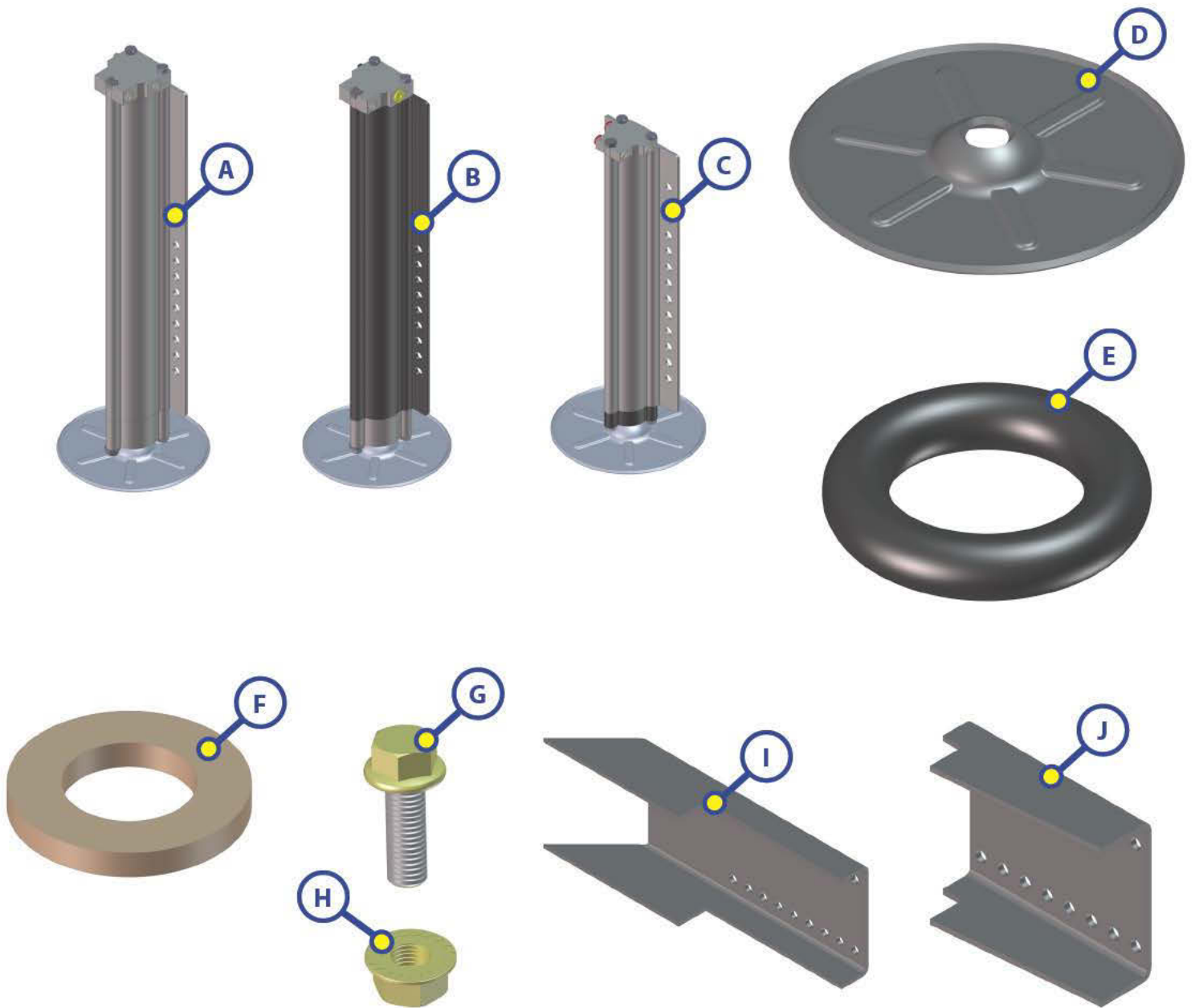




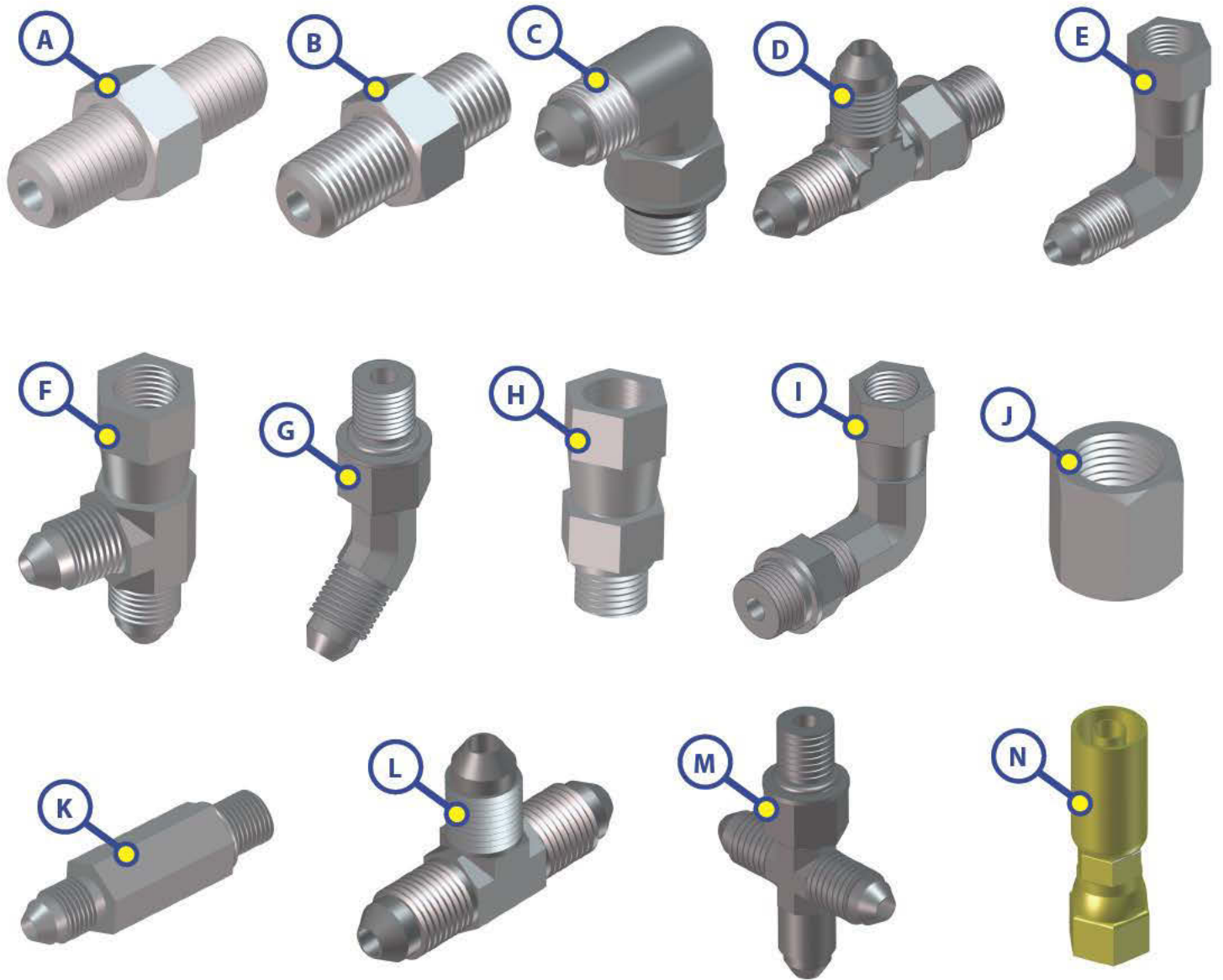
Callout	Part #	Description
A	251910	Vertical Power Unit
B	251909	Horizontal Power Unit
C	118246	Dual Polarity Solenoid
D	174184	Deutsch Coil
E	176954	Spade Coil
F	177094	Cartridge Valve
G	142927	Pressure Switch



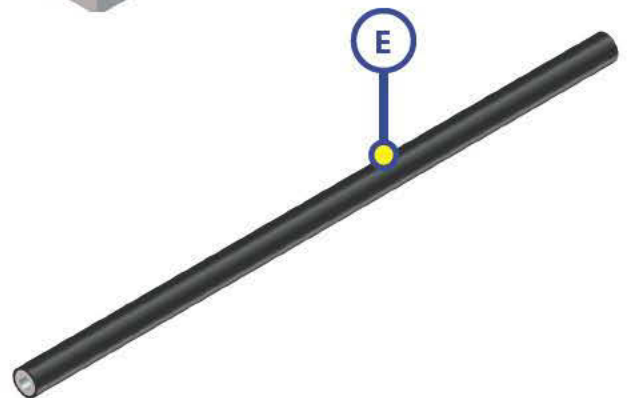
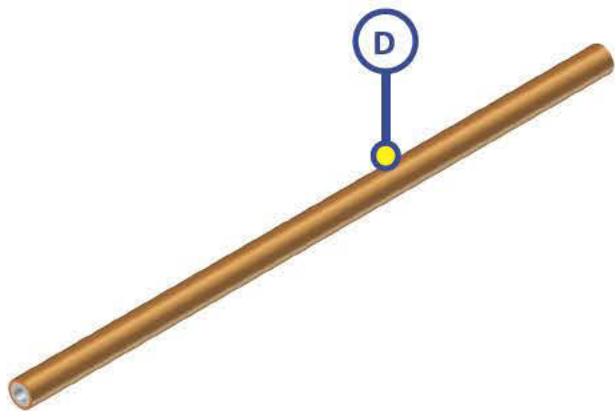
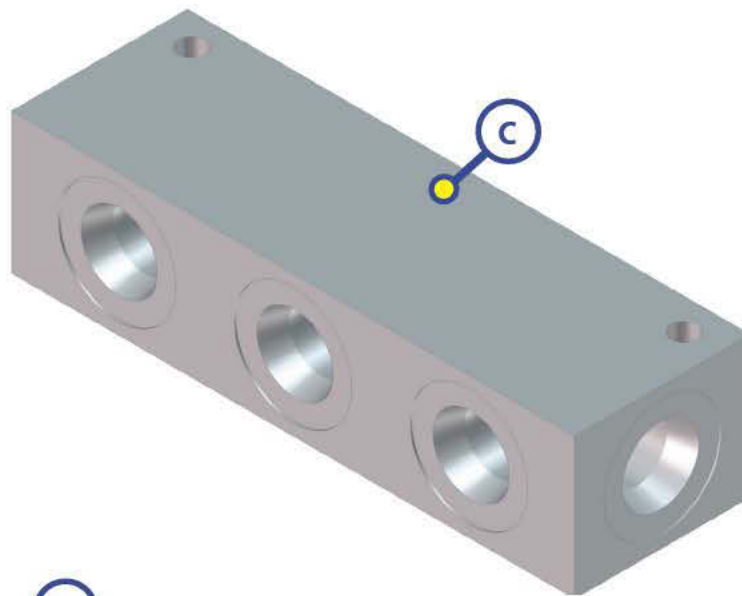
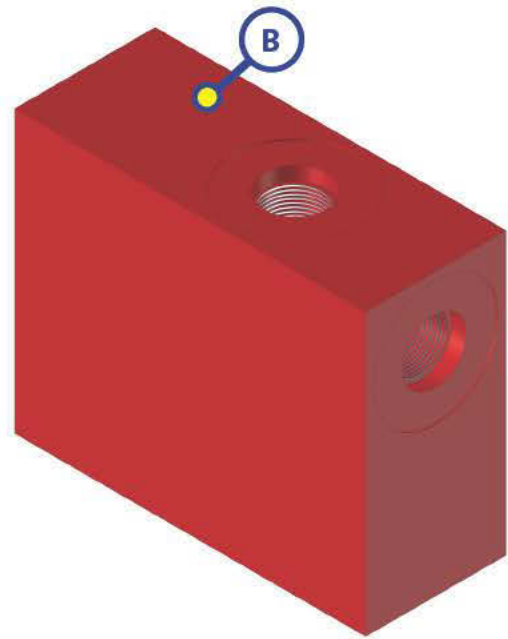
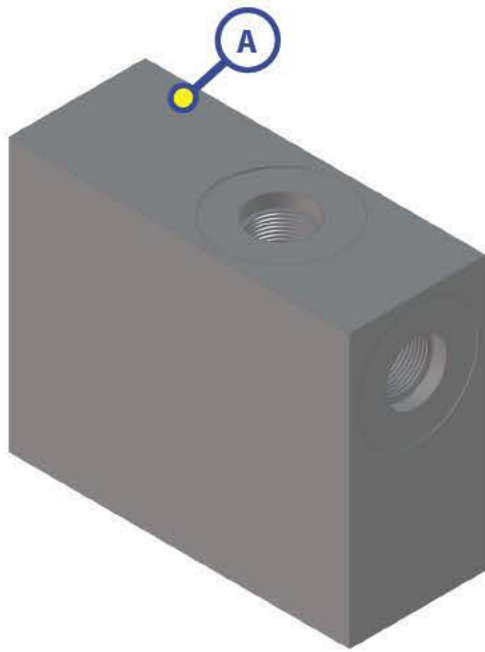
Callout	Part #	Description
A	234802	Touchpad
B	241316	Touchpad Harness
C	237855	Deutsch 2 Wire Pigtail Harness
D	241129	Controller
E	135461	80 AMP 12V Breaker
F	241318	Controller Harness
G	232201	Rear Sensor
H	231775	Rear Sensor Mounting Plate
I	241314	Rear Sensor Harness



Callout	Part #	Description
A	257125	Left 14,000 Landing Gear
B	257126	Right 14,000 Landing Gear
C	195860	8,000 Leveling Jack
D	113309	Foot Pad
E	123932	Foot Pad O-Ring
F	178208	Foot Pad Washer
G	118076	Bolt; ½" - 20
H	178210	Nut; ½" - 20
I	134989	Mount Bracket
J	218210	Mount Bracket



Callout	Part #	Description
A	113042	Hose Union Fitting
B	113131	Straight Fitting
C	113128	JIC to O-Ring 90 Degree Elbow Fitting
D	113130	T-Fitting with O-Ring on Run
E	113134	Swivel Elbow Fitting
F	113135	Swivel T-Fitting
G	113129	45 Degree Elbow Fitting
H	113133	Swivel Straight Fitting
I	141020	Swivel Elbow Fitting
J	113136	Steel Cap Fitting
K	139417	Long Straight Fitting
L	138423	Union T-Fitting
M	136225	Cross Fitting
N	138416	Hose Coupling



Callout	Part #	Description
A	138420	Manifold
B	138421	Restricted Manifold
C	166078	8 Port Header Block
D	248654	Orange Hose
E	248653	Black Hose



GROUND CONTROL 2.0
OWNER'S MANUAL

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Failure to act in accordance with the following may result in death or serious injury.

The use of the Ground Control - Gen II to support the unit for any reason other than which it is intended is prohibited by Lippert's limited warranty. The Lippert Leveling System is designed as a "leveling" system only and should not be used to provide service for any reason under the coach such as changing tires or servicing the leveling system.

Lippert Components Inc. recommends that a trained professional be employed to change the tire on the unit. Any attempts to change tires or perform other service while unit is supported by the Ground Control - Gen II could result in death, serious injury or damage to the 5th Wheel.

NOTES:

- Be sure to park the unit on solid, level ground.
- Clear all jack landing locations of debris and obstructions. Locations should also be free of depressions.
- When parking the unit on extremely soft surfaces, utilize load distribution pads under each jack.
- People and pets should be clear of unit while operating leveling system.
- Never lift the unit completely off the ground. Lifting the unit so the wheels are not touching ground will create an unstable and unsafe condition.

Basic Jack Operation

1. Front Landing gear jacks.
2. Rear leveling jacks.

Landing gear jacks can be operated any time the system is "ON" but NOT in the "AUTO MODE." By pushing the "FRONT" button, both front or landing gear jacks can be extended. By pushing either the "LEFT" or "RIGHT" button, the individual front jacks can be extended. If the touch panel is put in the "RETRACT" mode, indicated by the orange illuminated LED next to the "RETRACT" button, the front jacks can be retracted together by pushing the "FRONT" button or individually by pressing either the "LEFT" or "RIGHT" button.

The rear jacks can only be operated when the touch panel is in the "MANUAL MODE." Once system is in "MANUAL MODE," pressing the "REAR" button will extend both rear jacks at the same time. To operate individual rear jacks, press the "LEFT" or "RIGHT" button first, depending on what is needed at the time, then press the "REAR" button and hold both at the same time.

Prior to Operation

The leveling system shall only be operated under the following conditions:

1. The unit is parked on a reasonably level surface.
2. Be sure all persons, pets and property are clear of the coach while Lippert Ground Control Leveling System is in operation.
3. Make sure battery(ies) are fully charged and load test at 12+VDC.
4. Drop inner leg of both landing gear jacks 4-5 inches.

Dropping off unit

1. Loosen J.T. Strong Arm Stabilizer "T" handles. (If applicable.)
2. Disconnect 5th Wheel latch.
3. Turn battery power "ON."

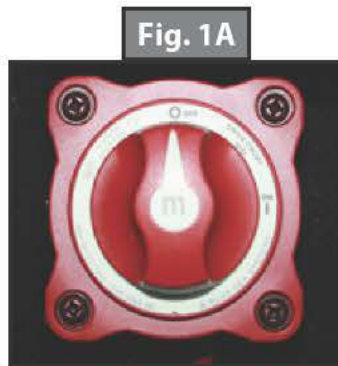


Fig. 1A



Fig. 1B

4. Release the inner legs of both landing gear jacks by pulling on the quick release pins and extending the inner leg 4-5 inches.
5. Push touch panel "ON/OFF" (Fig. 2A) to turn system on. LCD Screen lights up (Fig.2B).

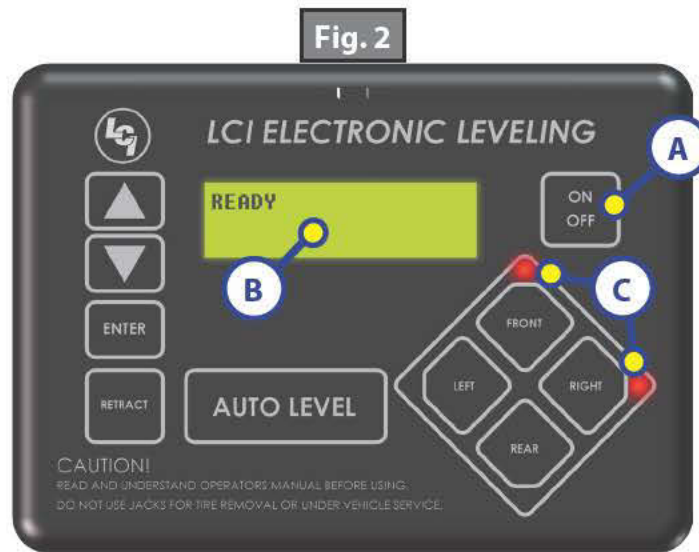


Fig. 2

6. Push the DOWN ARROW to scroll to "DROP FRONT JACKS" option on LCD screen.

NOTE: Orange arrow lights (Fig. 2C) may come on, indicating the current disposition of the unit. In this case the FRONT and RIGHT sides of the unit are low.

7. Push "ENTER." Both front landing gear jacks will go to ground and stop.
8. Push "FRONT" button to extend front landing gear jacks manually and lift front of vehicle to clear the 5th wheel hitch plate.
9. Pull tow vehicle away and park at a safe distance.
10. Release the inner legs of both rear leveling jacks by pulling on the quick release pins and extending the inner leg 3-4 inches.
11. Push "AUTO LEVEL." The unit will commence to auto level by setting the landing gear jacks close to level. Rear-most jacks will extend to ground, followed by a second ground verification leveling jacks.
12. When auto level is complete, LCD indicates LEVEL SUCCESSFUL, **Jacks: Down** and the green light in the middle of the jack buttons will light (Fig. 3A).
13. Tighten the J.T Strong Arm stabilizer "T" handles if applicable.

Taking Up Strut Pin Slop (If J.T Strong Arm Stabilizers are installed ONLY)

1. After leveling is complete, LCD screen will read "LEVEL SUCCESSFUL/CHECK STABILIZERS."
2. Push "FRONT" button momentarily until front stabilizer pins are tight.
3. Push "REAR" button momentarily until rear stabilizer pins are tight.
4. Push "ON/OFF" button to turn system off.

Fig. 3



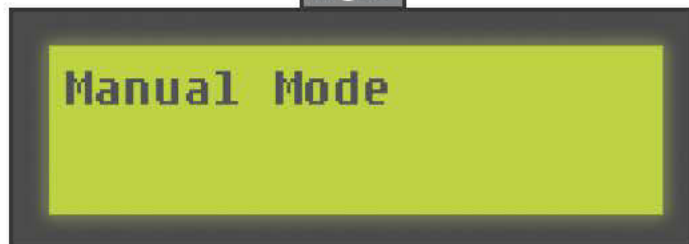
Reconnecting the unit to a tow vehicle

1. Be sure main power switch "ON."
2. Loosen J.T. Strong Arm Stabilizer "T" handles. (If applicable.)
3. Push Touch Pad "ON/OFF" button to turn system on.
4. Push "DOWN ARROW" to scroll to AUTO RETRACT REAR JACKS and push "ENTER." Rear jacks will fully retract and stop.
5. Push "LEFT" & "RIGHT" button together. Front will raise to previous drop off height. Push "FRONT" button if more height is needed.
6. Back tow vehicle to align 5th wheel hitch.
7. Push "RETRACT" button. Orange LED will illuminate (Fig. 4).
8. Push the scroll arrow to display "AUTO RETRACT ALL."
9. Push "ENTER." Landing Gear jacks will automatically retract and then stop.
10. Raise inner drop legs on all jacks (4) and secure with quick release pull pin.
11. Turn "ON/OFF" button off.

Fig. 4



Fig. 5



Truck Hauler Operation (Manual ONLY)

1. Loosen J.T. Strong Arm Stabilizer "T" handles. (If applicable.)
2. Turn the Touch Panel "ON." LED lights up green.
3. Push "FRONT" button to extend FRONT jacks to gain height.
4. To retract jacks:
 - A. Push "RETRACT" button; Orange LED lights up.
 - B. Push the "FRONT" button to retract jacks and hook up vehicle. Once 5th wheel is coupled, push "FRONT" button and hold until jacks are fully retracted.
 - C. Let off "FRONT" button and push "ON/OFF" button to turn system off. Green light goes out.
 - D. Double check 5th wheel latch is secure and that all jacks are retracted.
 - E. Ready to tow.

Zero setting the control

1. Turn "ON/OFF" button "OFF".
2. Push "FRONT" button 10 times.
3. Push "REAR" button 10 times.
4. Control will flash and beep, LCD says "ZERO POINT CALIBRATE".
5. Manually operate the jacks to attain unit level condition (use carpenter's level).
6. To memorize this level condition , press "ENTER".
7. LCD says "ZERO POINT STABILITY SUCCESSFULLY SET".
8. The control will then turn off.
9. Turn "ON/OFF" on to commence operation.

Error display in LCD

1. If an error occurs before or during operation, the error will be displayed in the LCD and a “buzzer “ will sound.
2. The errors that will be displayed are:
 - A. “EXCESS ANGLE” - Relocate the unit.
 - B. “BAD CALIBRATION” - Bad zero point.
 - C. “FEATURE DISABLE” - Cycle Main Power or system not Zero Calibrated.
 - D. “LOW VOLTAGE”
 - E. “OUT OF STROKE” - Relocate the unit.
 - F. “EXTERNAL SENSOR” - Bad connection to rear remote sensor.
 - G. “JACK TIME OUT”
 - H. “AUTO LEVEL FAILURE” - Retry.
 - I. “STABILIZER TIME” - Rear stabilizers ran too long ... bad motor or connections.
 - J. “NOT CONFIGURED” - Unit was not zeroed properly.
 - K. To clear error, push “ENTER” - If error remains, it will appear again.
3. Special JACK codes
 - LF JACK
 - RF JACK
 - LR JACK
 - RR JACK
 - A. If any of these error codes appear, the system does have manual control over the jacks to prevent being stuck..
 - B. It is important that once the error code has been resolved, the user of the unit must manually retract all jacks completely before exiting the error code. If this step is not completed, the LCD will prompt the user to complete this step as follows:
4. Sample Error Codes
 - “ERROR”
 - “LR JACK”
 - “MANUALLY RETRACT”
 - “ALL JACKS”
 - “PRESS ENTER”

Preventative Maintenance Procedures

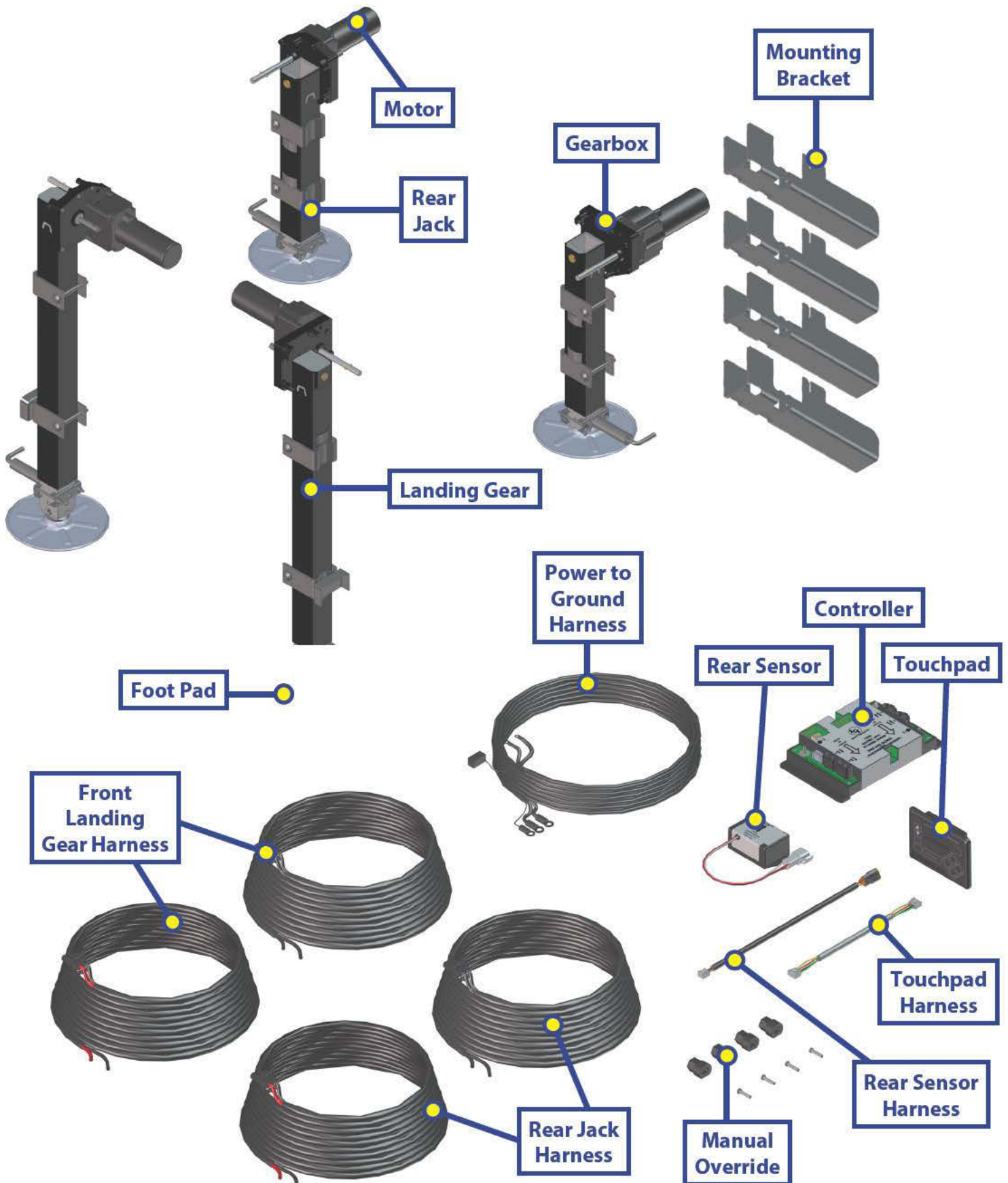
1. Remove dirt and road debris from jacks (and stabilizer struts if equipped) as needed.
2. If jacks are down for extended periods, it is recommended to spray exposed leveling jack tubes with a spray lubricant every 3 months for protection. If your coach is located in a salty environment, it is recommended to spray the rods every month.



Your coach should be supported at both front and rear axles with jack stands before working underneath. Failure to do so may result in death or serious injury.



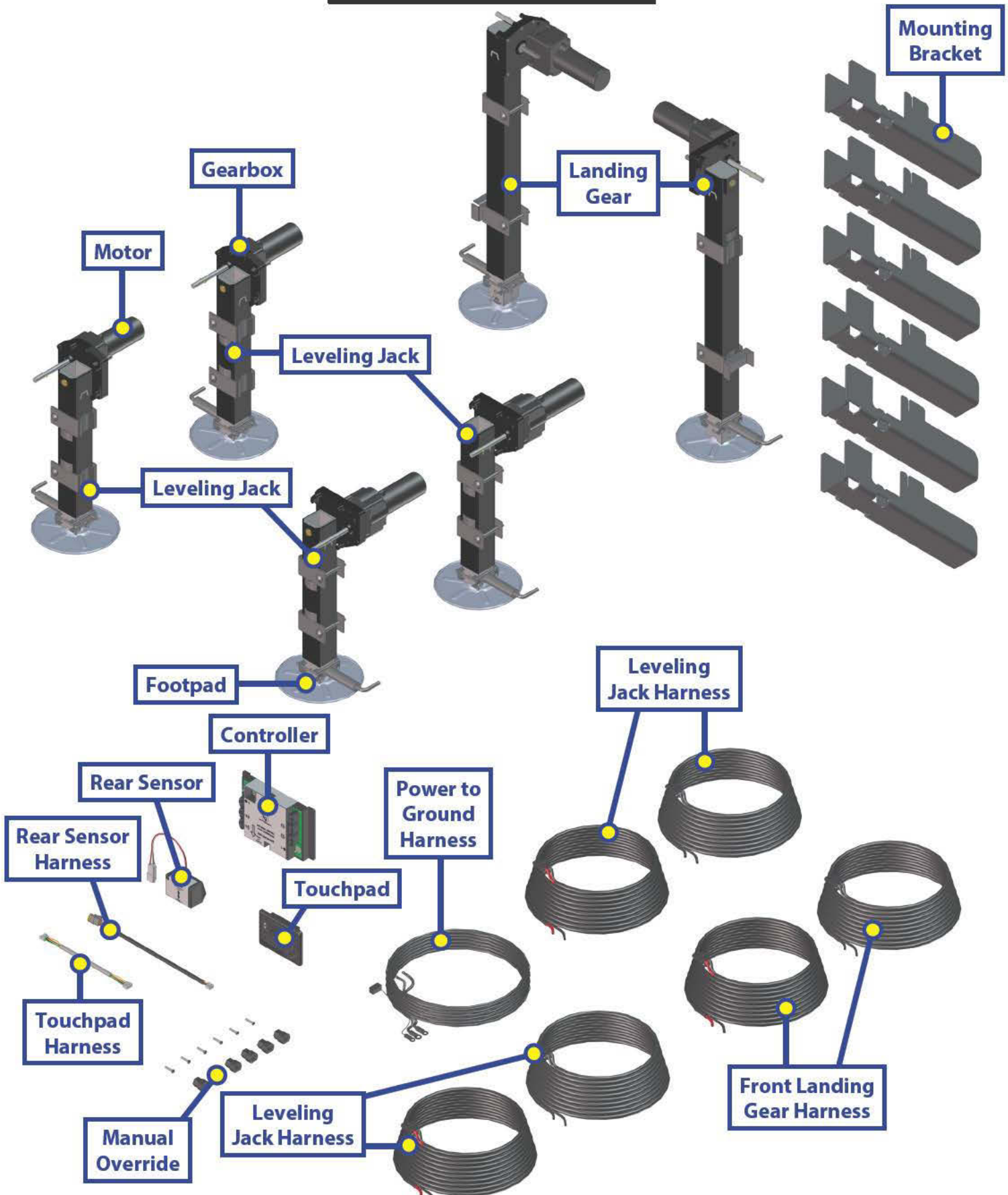
LEVELING AND STABILIZATION



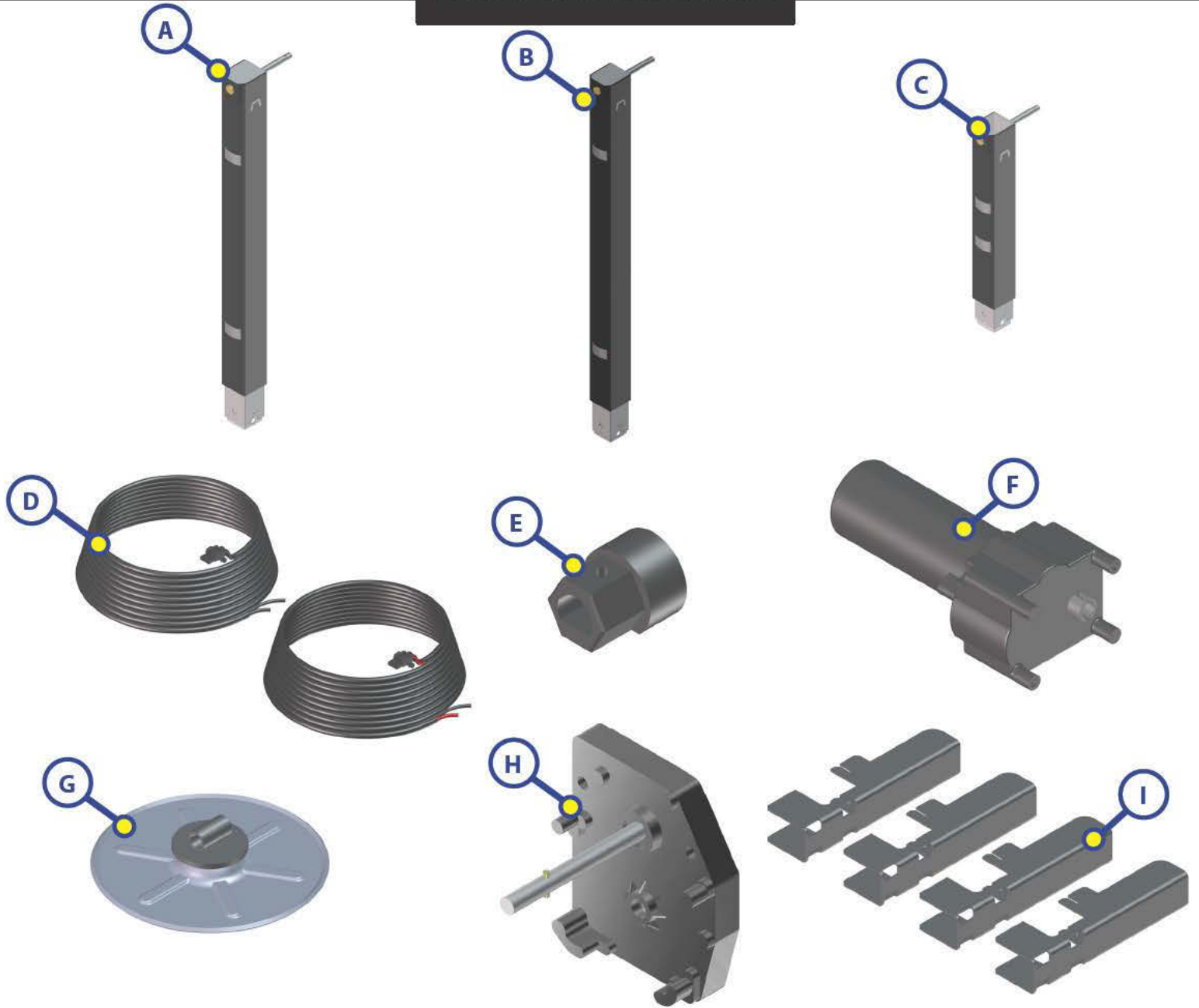


GROUND CONTROL 2.0 SIX POINT ASSEMBLY WEBPAGE

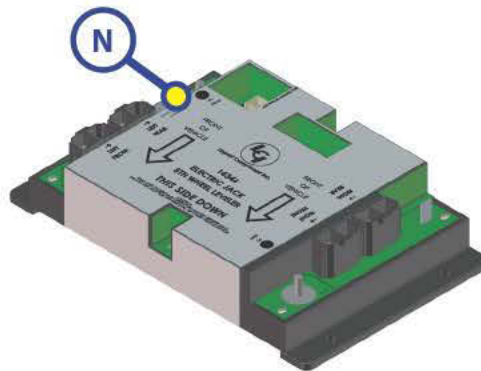
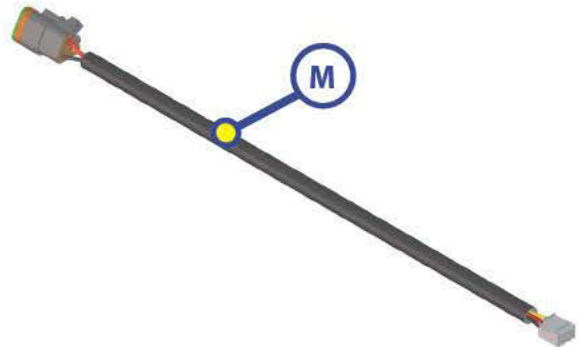
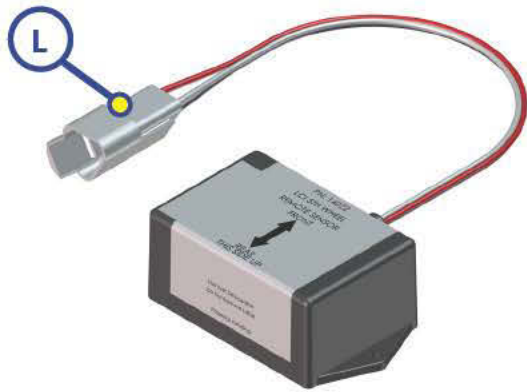
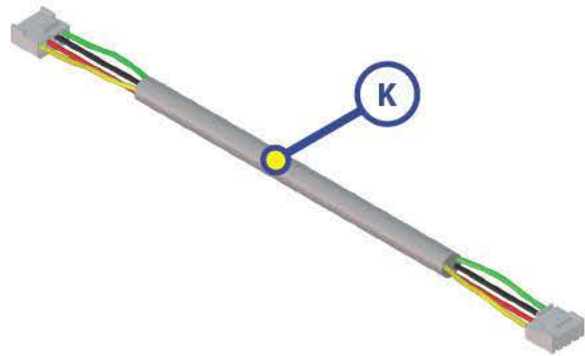
LEVELING AND STABILIZATION



LEVELING AND STABILIZATION



Callout	Part #	Description
A	241846	Standard Landing Gear
B	241845	Extended Landing Gear
C	241844	Rear Jack
D	245794	Leveling Jack Harness
	245795	Leveling Jack Harness
E	228031	Manual Override
F	241795	Tuson Motor
G	297788	Foot Pad
H	179015	Gear Box
I	275403	Mounting Brackets



Callout	Part #	Description
J	234802	Touchpad
K	232937	Touchpad Harness
L	232201	Rear Sensor
M	243688	Rear Sensor Harness
N	242623	Controller (Gen II 4 Point)



GROUND CONTROL 3.0
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COMPONENTS™

WARNING

Failure to act in accordance with the following may result in serious personal injury or death. The use of the Ground Control 3.0 leveling system to support the unit for any reason other than which it is intended is prohibited by Lippert's limited warranty. The Lippert leveling system is designed as a "leveling" system only and should not be used to provide service for any reason under the coach such as changing tires or servicing the leveling system. Any attempts to change tires or perform other service while unit is supported by the Ground Control 3.0 leveling system could result in damage to the 5th wheel and/or cause serious injury or death.

WARNING

Be sure to park the unit on solid, level ground. Clear all jack landing locations of debris and obstructions. Locations should also be free of depressions. When parking the unit on extremely soft surfaces, utilize load distribution pads under each jack. People and pets should be clear of coach while operating leveling system. Never lift the unit completely off the ground. Lifting the unit so the wheels are not touching the ground will create an unstable and unsafe condition.

Operation

Prior To Operation

The leveling system shall only be operated under the following conditions:

1. The unit is parked on a reasonably level surface.
2. Be sure all persons, pets and property are clear of the coach while Lippert Ground Control 3.0 Leveling System is in operation.
3. Make sure battery(ies) are fully charged and load test at 12+VDC.
4. Drop inner leg of both landing gear jacks 4-5 inches.

Basic Jack Operation

1. Front landing gear jacks.
2. Rear leveling jacks.

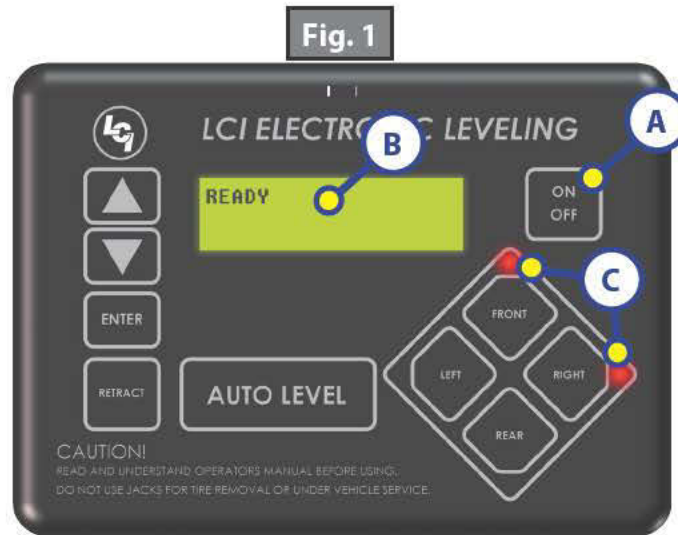
Landing gear jacks can be operated any time the system is "ON". By pushing the "FRONT" button, both front or landing gear jacks can be extended. By pushing either the "LEFT" or "RIGHT" button, while simultaneously pressing the "FRONT" button, the individual front jacks can be extended. If the touch panel is put in the "RETRACT" mode, indicated by the orange illuminated LED next to the "RETRACT" button, the front jacks can be retracted together by pushing the "FRONT" button or individually by pressing either the "LEFT" or "RIGHT" button, while simultaneously pressing the "FRONT" button.

The rear jacks can only be operated when the touch panel is in the "MANUAL MODE." Once system is in "MANUAL MODE," pressing the "REAR" button will extend both rear jacks at the same time. To operate individual rear jacks, press the "LEFT" or "RIGHT" button while simultaneously pressing the rear button depending on which jack needs to be operated.

NOTE: If the rear jacks will not operate individually using the method described above, but they operate properly when Auto Level is performed, the Twist Prevention Protection system has locked out the operation to prevent damage to the frame of the unit.

Dropping Off the Unit

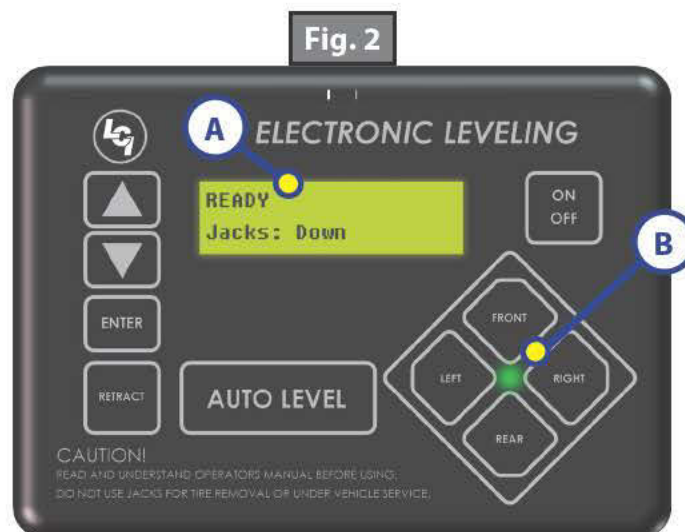
1. Release the inner legs of both landing gear jacks by pulling on the quick release pins and extending the inner leg 4-5 inches.
2. Push touch panel ON/OFF (Fig. 1A) to turn system on. LCD Screen will light up and displays "READY" (Fig. 1B).



3. Push the DOWN ARROW to scroll to "DROP FRONT JACKS" option on LCD screen.

NOTE: Red arrow lights (Fig. 1C) may come on, indicating the current disposition of the unit. In this case the FRONT and RIGHT sides of the unit are low.

4. Push ENTER. Both front landing gear jacks will go to ground and stop.
5. Push the FRONT button extending the front landing gear to a sufficient height, which raises the front of the unit off of the tow vehicle's 5th wheel hitch plate.
6. Pull tow vehicle away and park at a safe distance.
7. Push AUTO LEVEL. The unit will commence to auto level by setting the landing gear jacks close to level. Rear-most jacks will extend to ground, followed by a second ground verification.
8. When auto level is complete, LCD indicates "READY, Jacks: Down" (Fig. 2A) and the green light in the middle of the jack buttons will light (Fig. 2B).



Connecting To A Tow Vehicle

1. Press the ON/OFF button to activate the system.
2. Press the LEFT and RIGHT buttons at the same time.
3. The rear leveling jacks will fully retract and then the front landing gears will extend to raise the unit back to the memorized hitch height.

NOTE: The hitch recognition feature will only work if the auto level process was started with the unit in an above level condition.

4. Ensure that the landing gears are fully retracted.

NOTE: Each time the landing gears are completely retracted, the memorized hitch height will be reset.

Zero Point Calibration

1. Manually run the jacks to level the unit. This is best achieved by placing a level in the center of the unit and leveling it both side to side and front to back.
2. Once the unit is level, turn off the touch pad.
3. With the touch pad off, press and release the FRONT button ten (10) times and then press and release the REAR button ten (10) times. This will put the system in a zero calibrated state.
4. Press the ENTER button.
5. The system will set this point as its level state.

Troubleshooting

Error Display In LCD

1. If an error occurs before or during operation, the error will be displayed in the LCD and a buzzer will sound.
2. The errors that will be displayed are:
 - A. "Excess angle" - Relocate the unit.
 - B. "Bad calibration" - Bad zero point.
 - C. "Feature disabled" - This will happen only during Hitch Recognition. This indicates that the landing gears were not fully retracted prior to starting the unhitch process.
 - D. "Low voltage"
 - E. "Out of stroke" - Relocate the unit.
 - F. "External sensor" - Bad connection to rear remote sensor.
 - G. "Jack time out"
 - H. "Auto level failure" - Retry.
 - I. "Not configured" - Unit was not zeroed properly.
3. To clear an error, make sure that the jacks have all extended at least six (6) inches, then press and hold the RETRACT button; all jacks will retract and clear error.
4. Special JACK codes
 - A. LF JACK
 - B. RF JACK
 - C. LR JACK
 - D. RR JACK
 - I. If any of these error codes appear, the system does have manual control over the jacks to prevent being stuck.
 - II. It is important that once the error code has been resolved, the user of the unit must manually retract all jacks completely before exiting the error code. If this step is not completed, the LCD will prompt the user to complete this step as follows:
 - a. "ERROR"
 - b. "LR JACK"
 - c. "MANUALLY RETRACT"
 - d. "ALL JACKS"
 - e. "PRESS ENTER"

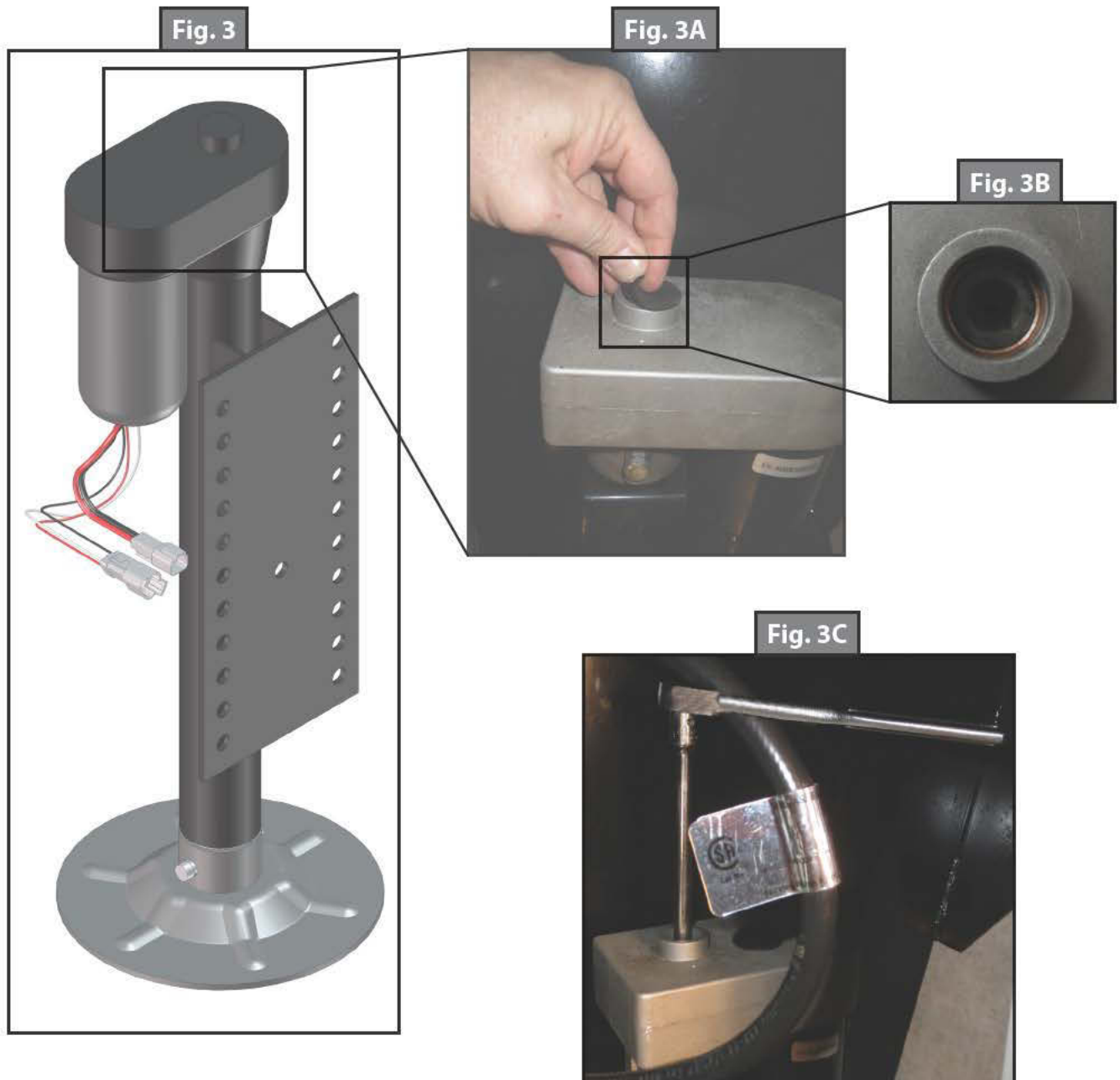
Manual Override Procedure - Top of Jack Motor

NOTE: Use of a 12V-18V cordless screw gun or pneumatic screw gun is acceptable to manually override the jacks. Do not use an impact screw gun to perform the override procedure, as this may damage the motor.

If manual override is necessary on any jack in the system, there are two options. The following process will describe how to use the top override. See Page 8 for the bottom override.

Tools needed: 3/8" drive ratchet and extension (no socket)

1. Find the port on the top of the jack motor (Fig. 3).
2. Remove the rubber plug (Fig. 3A).
3. Insert the 3/8" drive into the port (Fig. 3B).
4. Turn override until the jack extends or retracts to desired position (Fig. 3C).



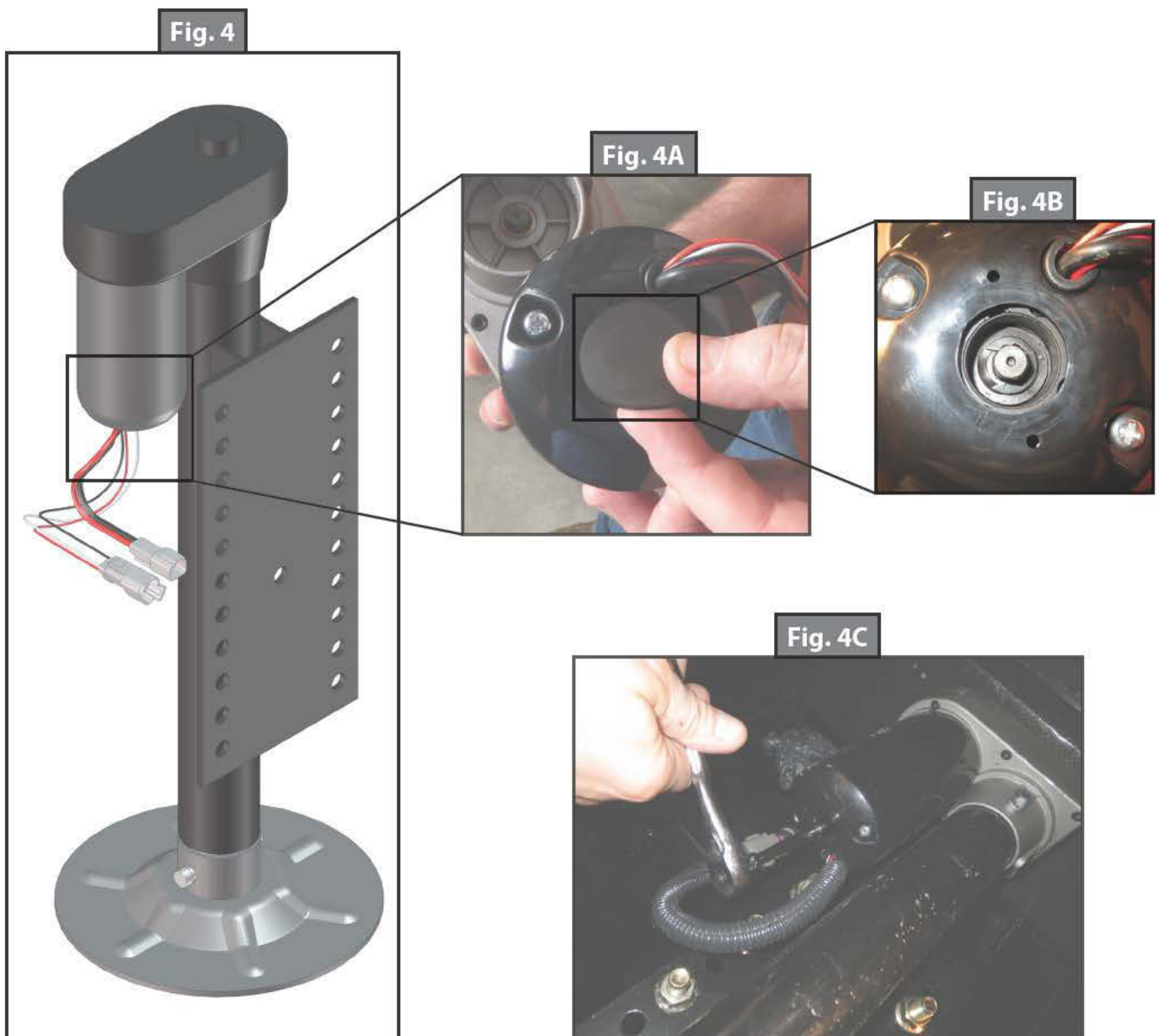
Manual Override Procedure - Bottom of Jack Motor

NOTE: Use of a 12V-18V cordless screw gun or pneumatic screw gun is acceptable to manually override the jacks. Do not use an impact screw gun to perform the override procedure, as this may damage the motor.

If manual override is necessary on any jack in the system, there are two options. The following process will describe how to use the bottom override. See Page 7 for the top override.

Tools needed: 3/8" drive ratchet and extension, 5/16" socket

1. Find the port on the bottom of the leveling jack motor (Fig. 4).
2. Remove the rubber plug (Fig. 4A).
3. Place the 5/16" socket onto the override (Fig. 4B).
4. Turn override until the leg extends or retracts to desired position (Fig. 4C).



Preventive Maintenance Procedures

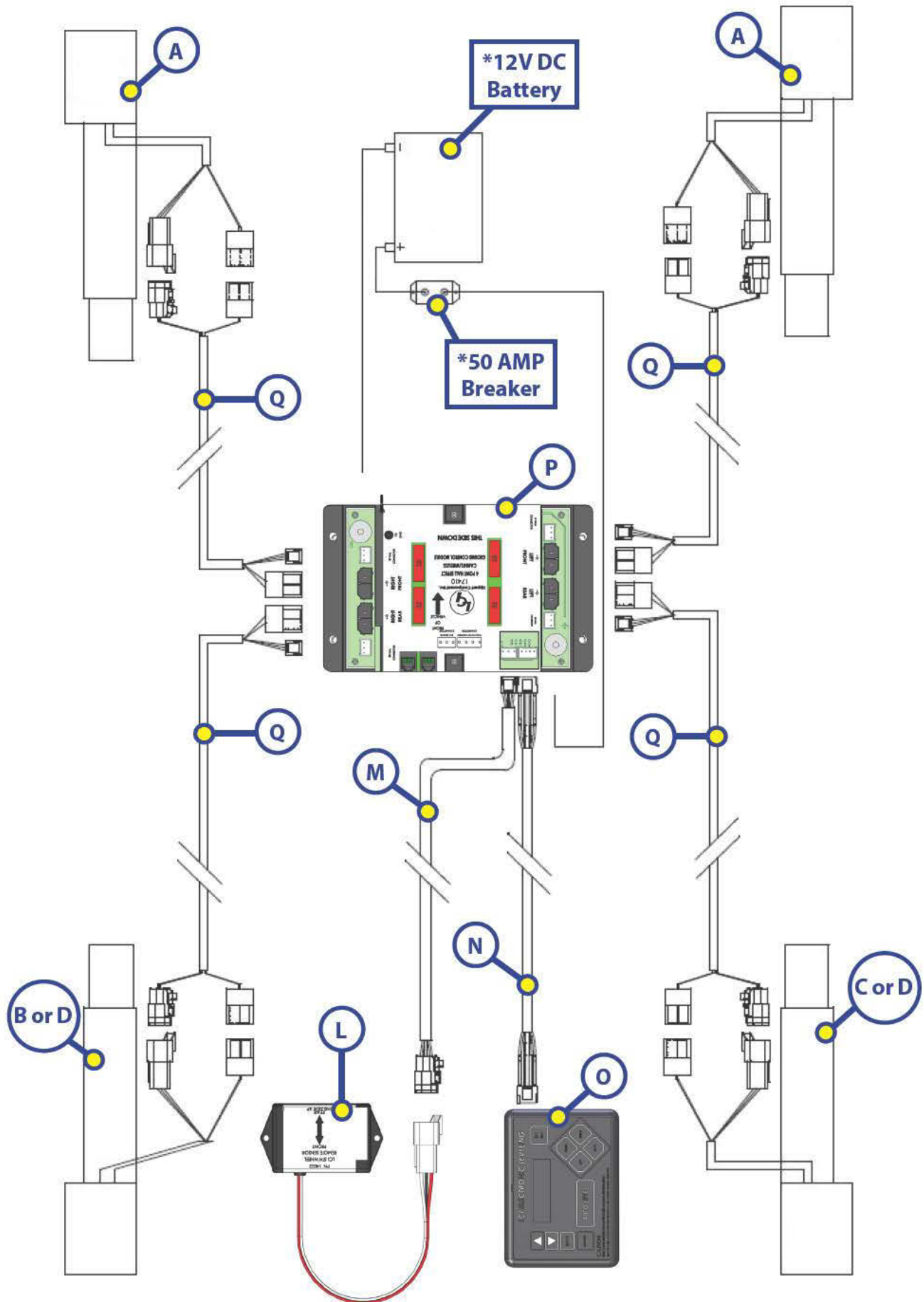
1. Remove dirt and road debris from jacks and stabilizer struts (if equipped) as needed.
2. If jacks are down for extended periods, it is recommended to spray exposed leveling jack tubes with a spray lubricant every 3 months for protection. If the coach is located in a salty environment, it is recommended to spray the rods every month.



**Make sure the coach is supported at both the front and rear with jack stands before working underneath.
Failure to do so may result in death or personal injury.**

Wiring Diagram

NOTE: For callouts refer to the components list beginning on Page 12.

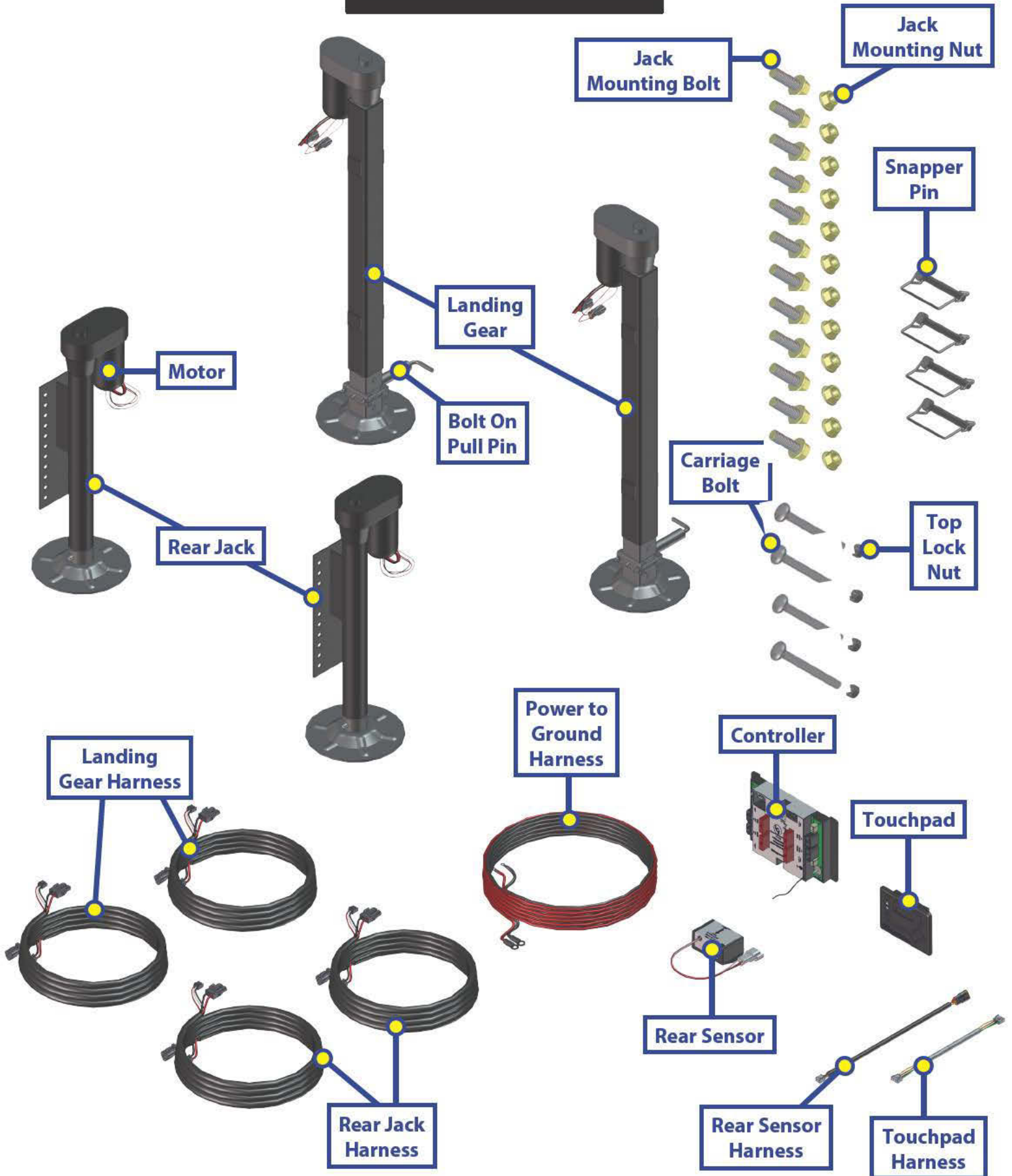




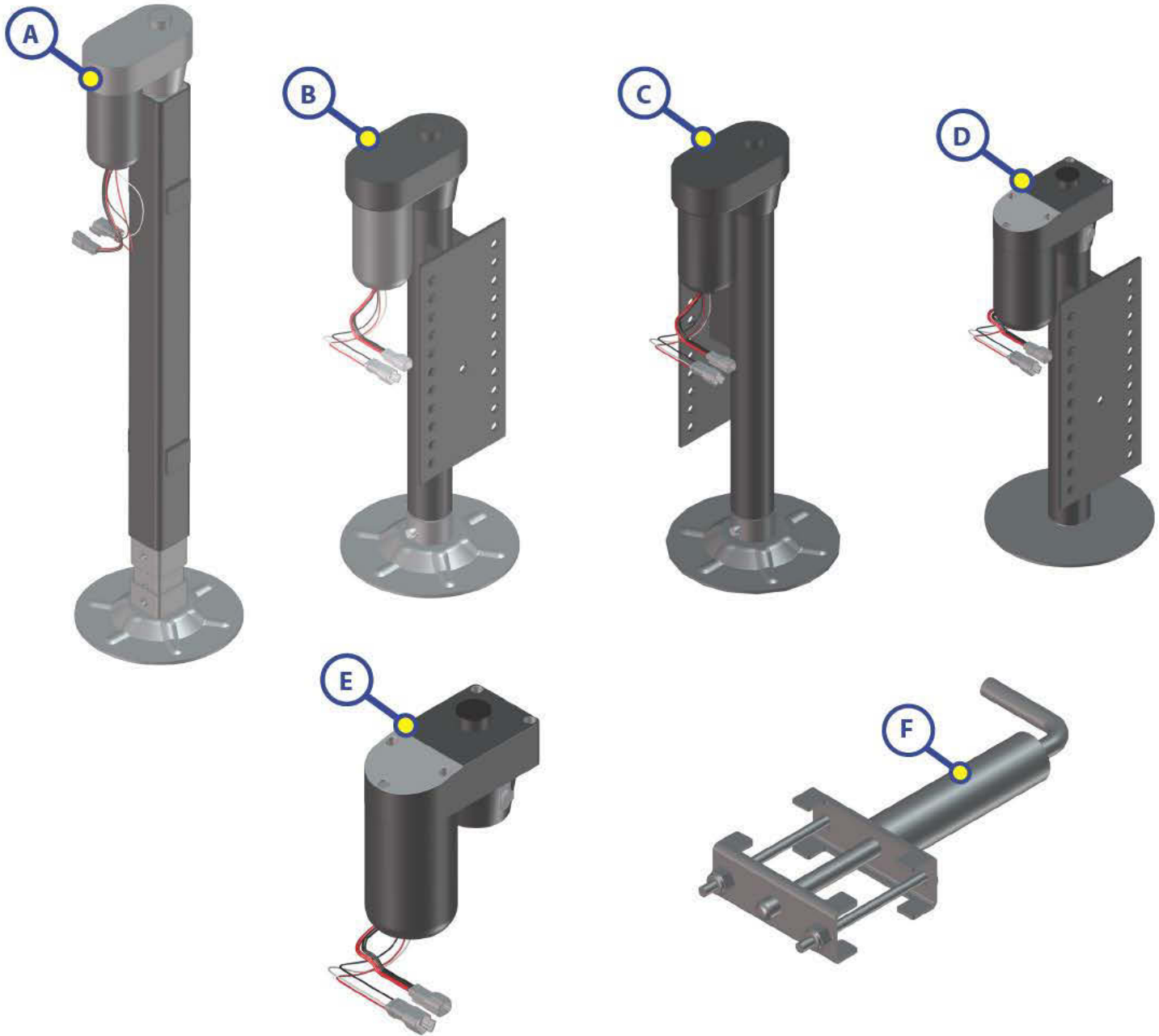
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GROUND CONTROL 3.0 ASSEMBLY WEBPAGE

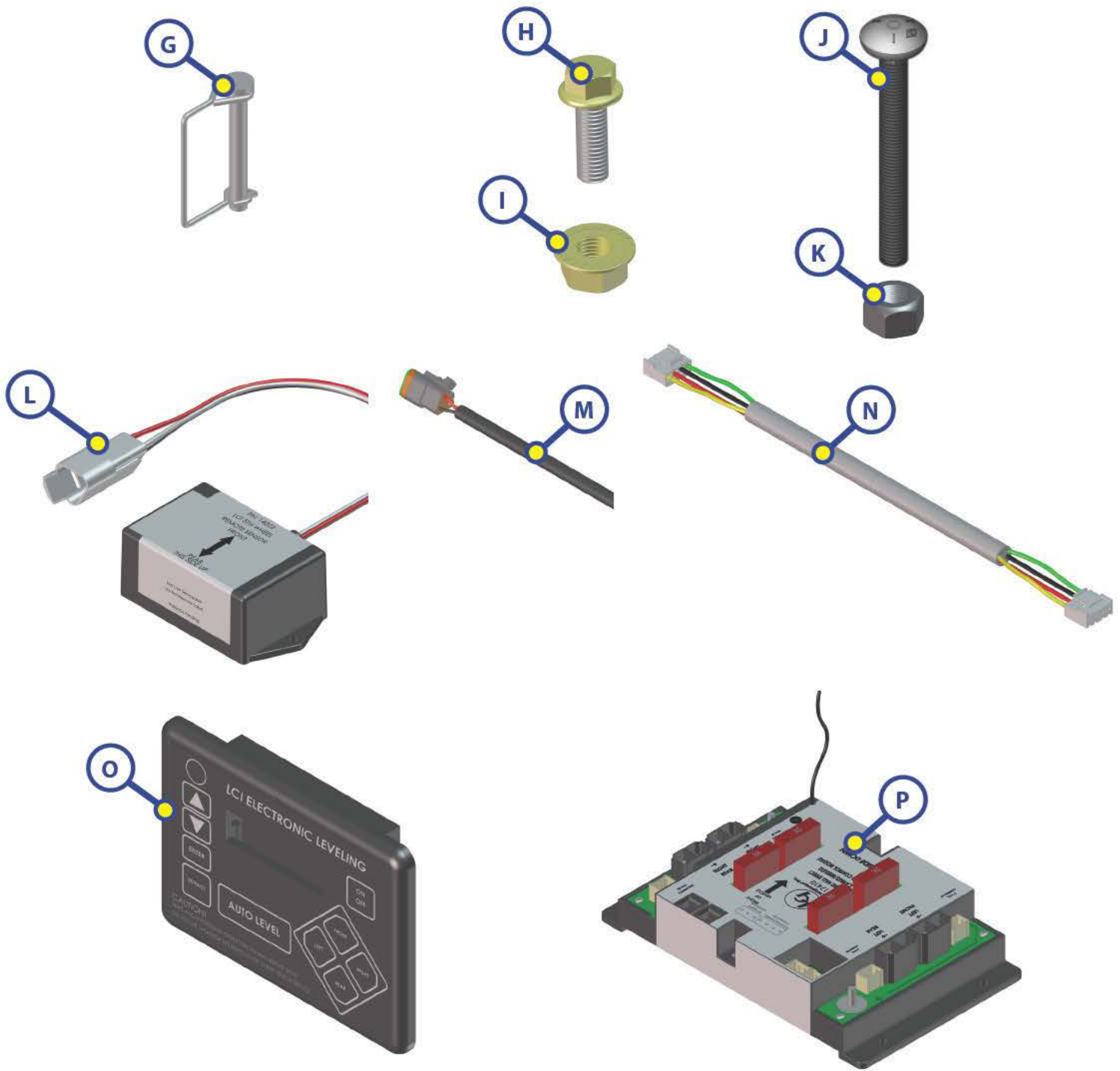
LEVELING AND STABILIZATION



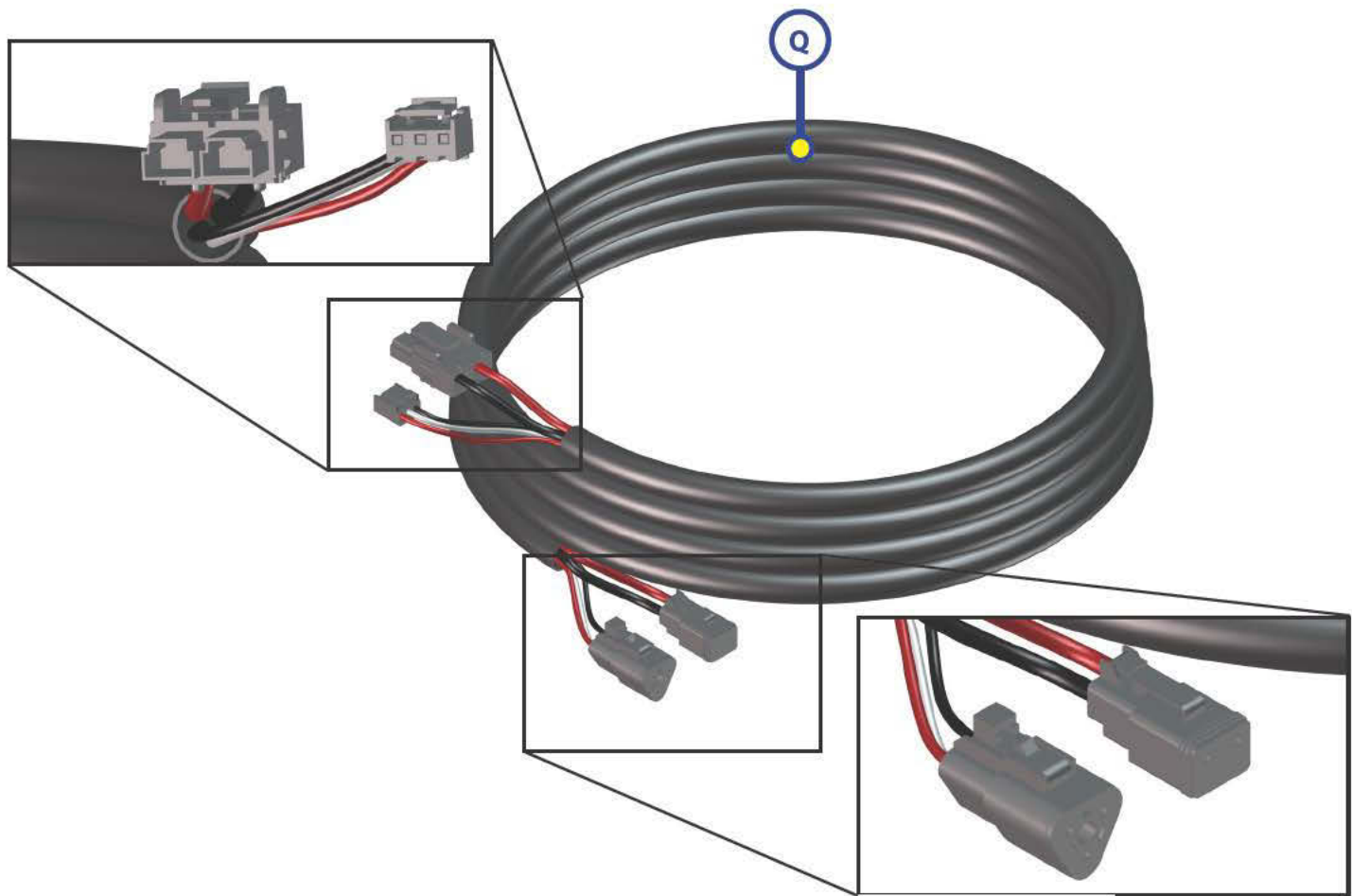
LEVELING AND STABILIZATION



Callout	Part #	Description
A	305340	Hall Effect Landing Gear; Front Stroke 19.8125"
B	305339	Hall Effect Jack; Rear Left 12.5" Stroke
C	344792	Hall Effect Jack; Rear Right 12.5" Stroke
D	342610	Hall Effect Jack; Rear Short 10.5" Stroke
E	343758	Hall Effect Jack Motor
F	119113	Bolt On Pull Pin



Callout	Part #	Description
G	225598	Snapper Pin; 3/8 x 3"
H	118076	Jack Mounting Bolt; 1/2" - 20 x 1 1/2" Flange
I	178210	Jack Mounting Nut; 1/2" - 20 UNF Serrated Flange
J	125878	Carriage Bolt
K	119073	Top Lock Nut
L	232201	Rear Sensor
M	243688	Rear Sensor Harness
N	232937	Touchpad Harness
O	234802	Touchpad
P	304136	4 Point Hall Effect Canbus Wireless Ground Control Module (17410)



Callout	Part #	Description
Q	305115	Hall Effect Right Rear Sensor Harness
	306298	Hall Effect Left Rear Sensor Harness
	307489	Hall Effect Right Front Sensor Harness
	307490	Hall Effect Left Front Sensor Harness
R	306176	Power and Ground Supply Harness



HYDRAULIC LANDING GEAR
OWNER'S MANUAL

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Failure to act in accordance with the following may result in death or serious injury.

The use of the Lippert Hydraulic Landing Gear to support the coach for any reason other than which it is intended is prohibited by Lippert's limited warranty. The Lippert Hydraulic Landing Gear system is designed as a system to drop the unit off of a truck, level the unit from front to back and stabilize the front of the unit only and should not be used to provide service for any reason under the coach such as changing tires or servicing the landing gear.

Lippert Components, Inc. recommends that a trained professional be employed to change the tire of the coach. Any attempts to change tires or perform other service while coach is supported by the hydraulic landing gear could result in death, serious personal injury and/or damage to the coach.

- Be sure to park the coach on solid, level ground.
- Clear all jack landing locations of debris and obstructions. Location should also be free of depressions.
- When parking the coach on extremely soft surfaces, utilize load distribution pads under each jack.
- People and pets should be clear of coach while operating Lippert hydraulic landing gear system.
- Be sure to keep hands and other body parts clear of fluid leaks. Oil leaks in the Lippert hydraulic landing gear may be under high pressure and can cause serious skin penetrating issues.
- Never lift the coach completely off the ground. Lifting the coach so the wheels are not touching ground will create an unstable and unsafe condition.

Prior to Operation

The Lippert Hydraulic Landing Gear shall only be operated under the following conditions:

1. The unit is parked on a reasonably level surface.
2. The towing vehicle is disengaged from the unit.
3. Be sure all persons, pets and property are clear of the coach while Lippert Hydraulic Landing Gear is in operation.

System Description

Please read and study the operating manual before you operate the Lippert Hydraulic Landing Gear.

- The Lippert Hydraulic Landing Gear is an electric/hydraulic system. A 12V DC electric motor drives a hydraulic pump that moves fluid through a system of hoses, fittings and jacks to level and stabilize the coach.
- There are no serviceable parts within the electric motor. If the motor fails, it must be replaced.
- Disassembly of the motor voids the warranty.
- Mechanical portions of the Lippert Hydraulic Landing Gear are replaceable. Contact Lippert Components, Inc. to obtain replacement parts.

Component Description

The Lippert Hydraulic Landing Gear consists of the following major components:

- Lippert Hydraulic Landing Gear are rated at a lifting capacity appropriate for your coach.
- Lippert Hydraulic Landing Gear is powered from a central 12VDC motor/pump assembly, which also includes the hydraulic oil reservoir tank, control valve manifold, and solenoid valves.
- The Lippert Hydraulic Landing Gear is controlled electronically from the switch near the pump.

Preventative Maintenance Procedures

The Lippert Hydraulic Landing Gear has been designed to require very little maintenance. To ensure the long life of your slideout system, read and follow these few simple procedures.

1. Check the fluid level every month.
 - A. Check fluid only when jacks are fully retracted.
 - B. Always fill the reservoir with the jacks in the fully retracted position. Filling reservoir when jacks are extended will cause reservoir to overflow into its compartment when jacks are retracted.
 - C. When checking fluid level, fluid should be within ¼" of fill spout lip.
2. Inspect and clean all Pump Unit electrical connections every 12 months.
3. Remove dirt and road debris from Landing Gear as needed.



The coach should be supported at both front and rear axles with jack stands before working underneath. Failure to do so may result in death or serious injury.

The Lippert Hydraulic Landing Gear has been static tested to over 6,000 continuous cycles without any noticeable wear to rotating or sliding parts. It is recommended that when operating in harsh environments and conditions (road salt, ice build-up, etc.) the moving parts be kept clean. They can be washed with mild soap and water. No grease or lubrication is necessary and in some situations may be detrimental to the environment and long-term dependability of the system.

Mechanical Components

Although the system is designed to be almost maintenance-free, actuate the landing gear once or twice a week to keep the seals and internal moving parts lubricated.

Check for any visible signs of "leaking" before and after movement of the system and the coach.

When the landing gear is down, visually inspect the inner and outer assemblies. Refer to components list for location of inner assemblies. Check for excess build-up of dirt or other foreign material; remove any debris that may be present.

If the system squeaks or makes any noises it is permissible to apply a coat of lightweight oil or silicone lubricant spray to the hydraulic rod but remove any excess oil so dirt and debris do not build-up. DO NOT use grease.

Electrical Components

For optimum performance, the landing gear system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch and the pump motor for corrosion and loose or damaged terminals. Check motor leads under the coach chassis. Since these connections may be subject to damage from road debris, be sure they are in good condition.

NOTE: The Lippert Hydraulic Landing Gear is designed to operate as a negative ground system. A negative ground system utilizes the chassis frame as the ground source. An independent ground wire back to the battery is not needed. It is important the electrical components have good wire to chassis contact. Over 90% of unit electrical problems can be attributed to bad ground connections.

NOTE: For long-term storage: It is recommended that the room be closed (retracted) and if your unit is equipped with the IRC room control, it is recommended all of the control knobs be kept in the closed position.

Auxiliary Operation

The Lippert Hydraulic Landing Gear can be run with power devices like electric drills or cordless screwdrivers. In the event of electrical or system failure, this manual method of extending and retracting the jacks can be used. A standard hand-held cordless or power drill is all that is required.

1. Locate the blocking valve (Fig. 1) on the top cap of either of the landing gear jacks.
2. Using a 5/32" Allen wrench, manually open the valve by turning the manual override set screw in the end of the valve clockwise (Fig. 1).
3. Remove protective label from the motor (Fig. 2).
4. Using a standard 1/4" hex bit, insert into auxiliary drive device, i.e. cordless drill or power drill. Insert hex bit into coupler found under protective label (Fig. 2).
5. Run drill forward or clockwise to retract jacks and in reverse or counterclockwise to extend jacks.
6. Be sure to turn manual override set screw back to the counterclockwise position after extending or retracting landing gear (Fig. 3).

Fig. 1

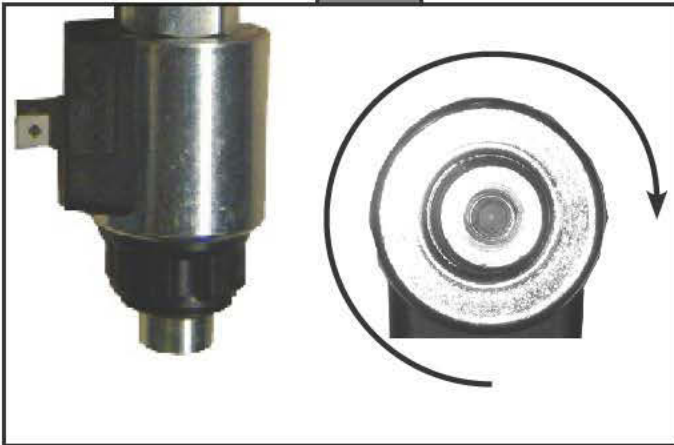
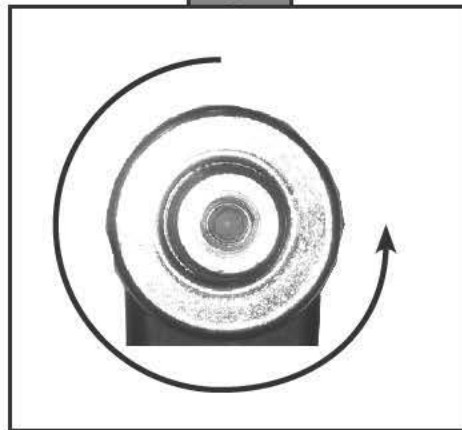


Fig. 2



Fig. 3



Fluid Filling Procedure

The Lippert Hydraulic Landing Gear uses automatic transmission fluid (ATF). Any ATF can be used. A full synthetic or synthetic blend works best such as Dexron III or Mercon 5. For best operation, fill system within ½" of the top when all hydraulic components are completely retracted. The see through reservoir makes it easy to check oil level. It is recommended that the oil level be checked prior to operating the system. Make sure the breather cap is free of contamination before removing, replacing or installing. In colder temperatures (less than 10° F) the jacks may extend and retract slowly due to the fluid's molecular nature. For cold weather operation, fluid specially formulated for low temperatures may be desirable. Please consult factory before using any other fluids.

Filling Directions

NOTE: Be sure landing gear are fully retracted prior to filling reservoir to prevent over-filling.

1. Remove Breather/Fill Cap
2. Pour ATF into Breather/Fill opening.

NOTE: Do not allow any contamination into reservoir during fill process.

NOTE: Standard reservoir holds approximately 2 quarts (1.89 liters) of ATF.

3. Fill to within ½" of top.
4. Replace Breather/Fill cap when finished.

System is self-purging. By simply cycling the system 2-3 times, any air in the system will be forced back to the reservoir and out of the Breather/Fill cap.

Troubleshooting

Power Unit

Before attempting to troubleshoot the Power Unit, make sure an adequate power source is available. The unit batteries should be fully charged or the unit should be plugged into to A/C service with batteries installed. Do not attempt to troubleshoot the Power Unit without assuring a full 12V DC charge.

The following tests require only a DC voltmeter (or DC test light) and a jumper lead.

1. Attach voltmeter (or test light) leads to the negative and positive terminals on motor solenoid. Does the meter indicate 12V DC? If YES, see Step 2; if NO see Step 3.
2. If YES, at the motor, check the incoming leads to 12V DC (if necessary, disconnect leads at wire splices). Does meter indicate 12V DC? If YES, Power Unit needs to be replaced. The motor is not field serviceable. Do not attempt to repair. If NO, Inspect all wires and connections between the wall switch and the motor. Repair connections as necessary. Recheck as in Step 1.
3. If NO, Inspect all connections between battery and solenoid. Inspect 30A Auto-reset Circuit Breaker. Recheck as above in Step 1.

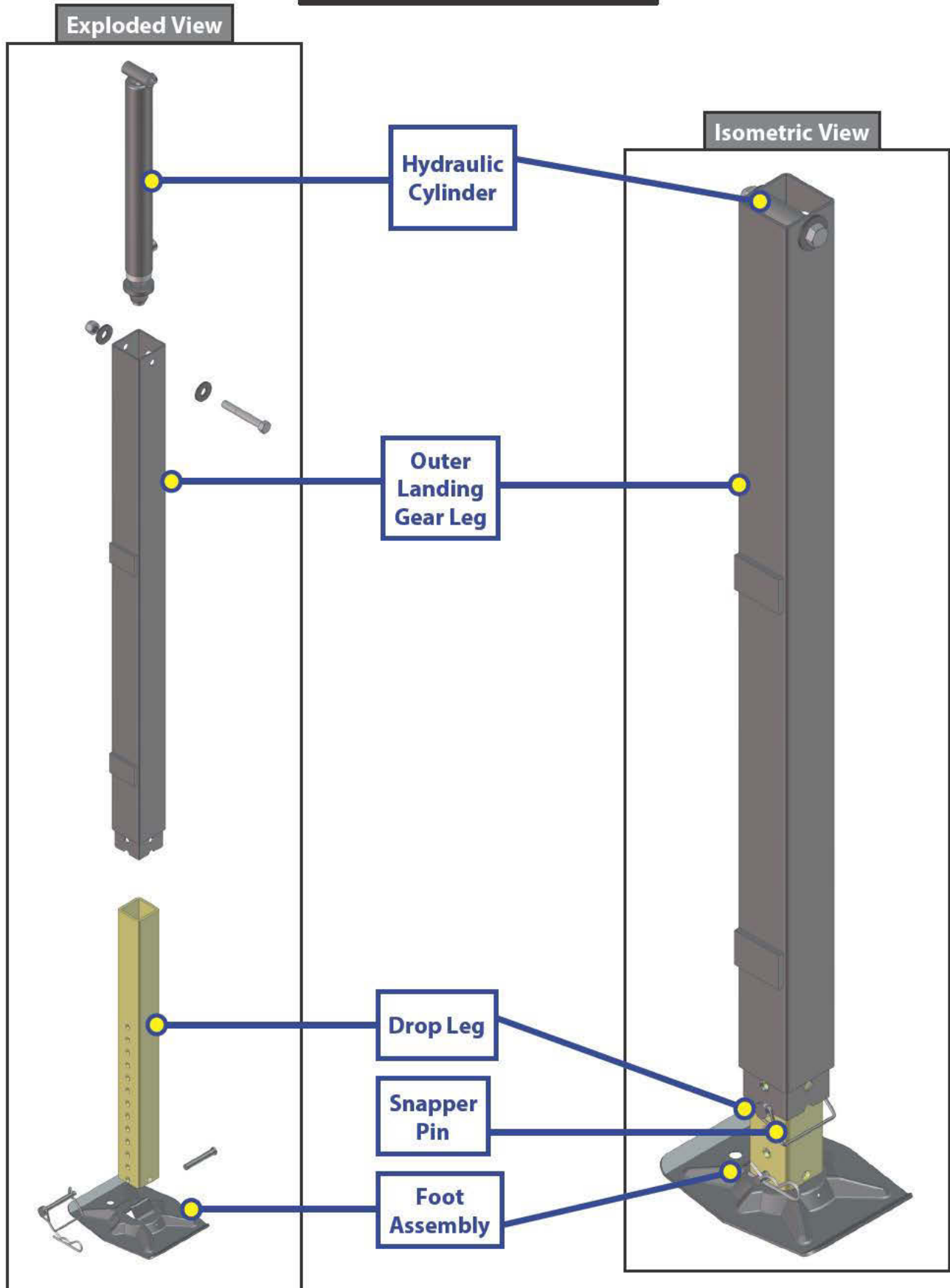
NOTE: Since there are no field serviceable parts in the motor of the Power Unit, electrical troubleshooting and service is limited to replacing only those components as previously outlined.

NOTE: Thorough inspection of wiring and connections is the only other electrical service that can be performed.

Problem	Probable Cause	Corrective Action
Jacks will not extend to ground, pump is running.	Little or no fluid in reservoir.	Fill reservoir with Dexron III ATF.
	Leg valve is inoperative.	Clean, repair or replace.
	Electronic signal is lost between switch and leg valves.	Trace wires for voltage drop or loss of signal. Repair or replace necessary wires or replace switch.
Any one or two jacks will not retract.	Hose damaged or not connected.	Replace with new hose or reconnect.
	Return valve is inoperative.	Replace inoperative return valve.
	Electronic signal is lost between switch and solenoid.	Attempt to retract jacks in manual mode, if successful replace control pad; if not, test voltage drop.
	Electronic signal is lost between switch and leg valve.	Repair bad wiring or replace defective board or valve.



LEVELING AND STABILIZATION

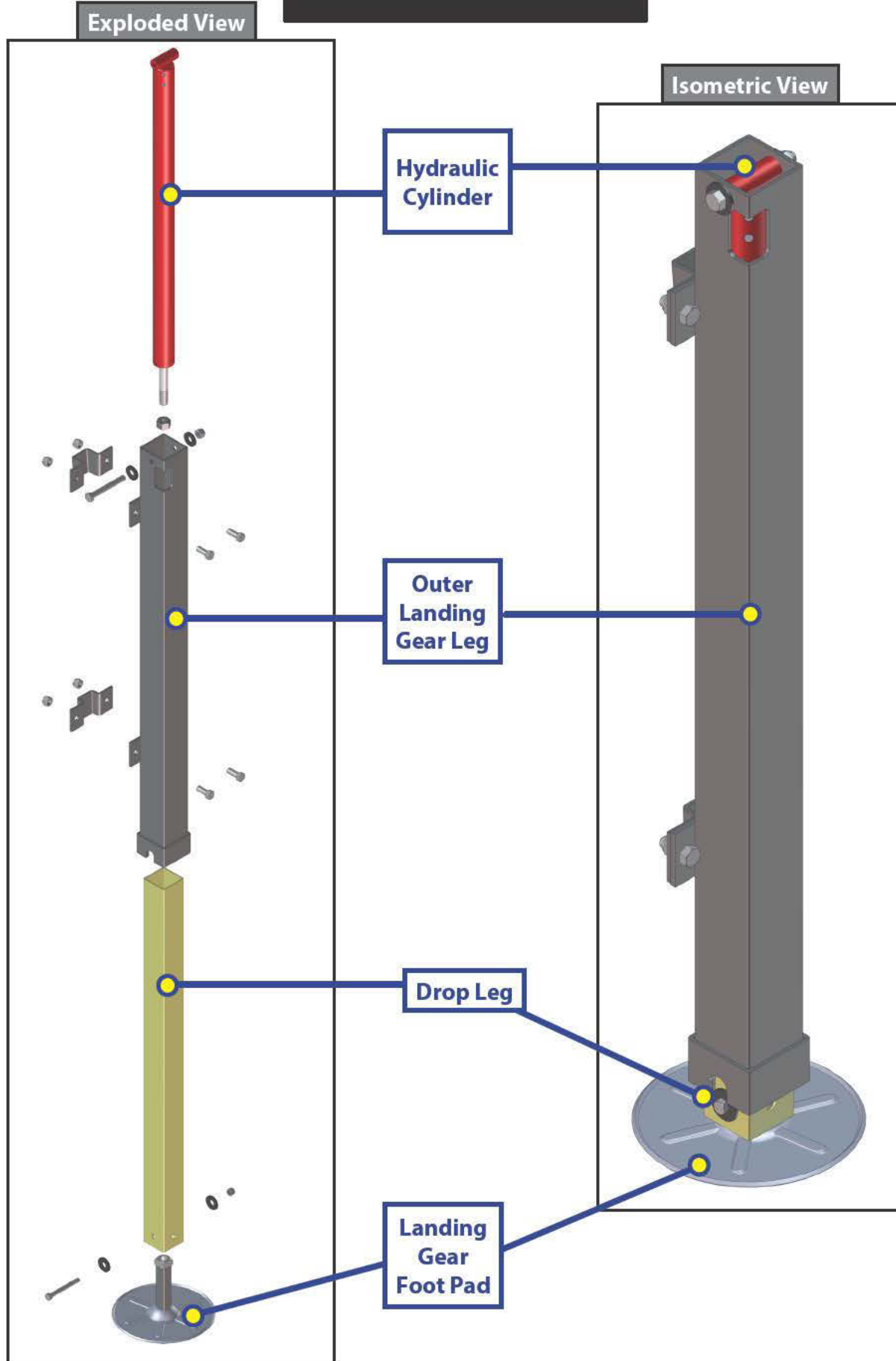




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PINLESS HYDRAULIC LANDING GEAR ASSEMBLY WEBPAGE

LEVELING AND STABILIZATION



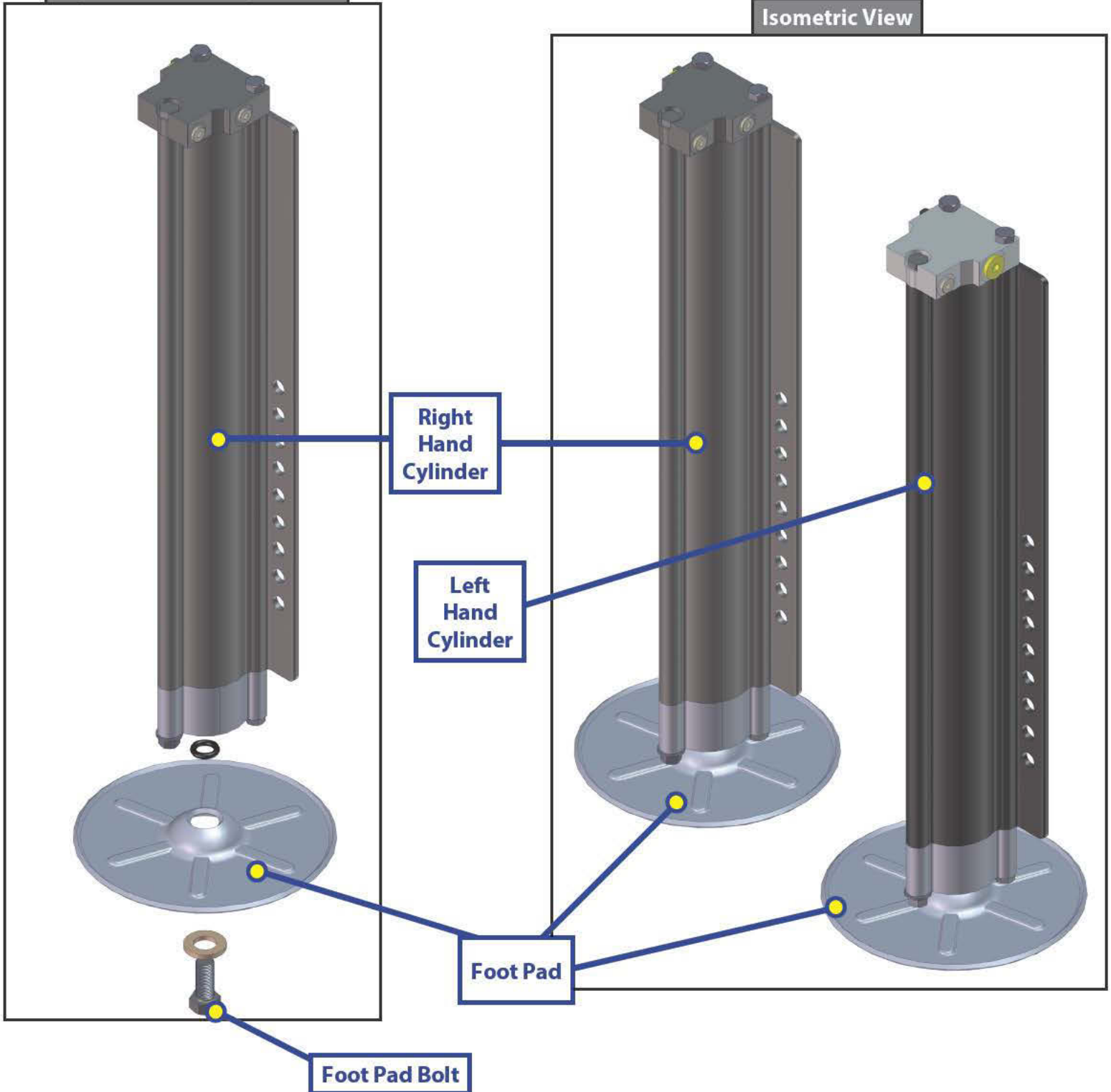


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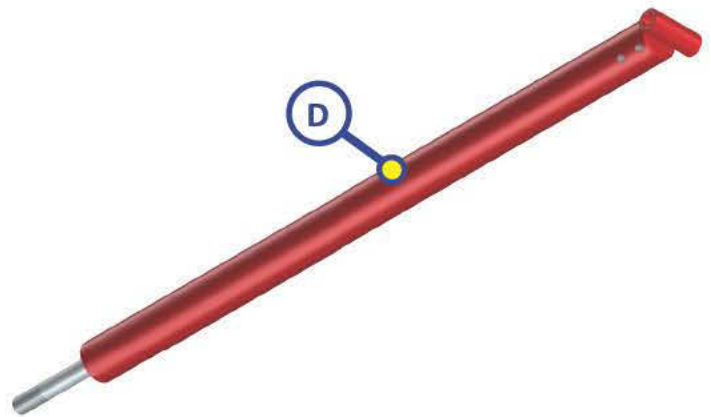
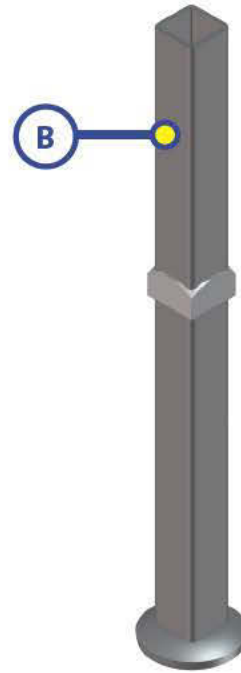
LEVELING AND STABILIZATION

Exploded View - Right Hand

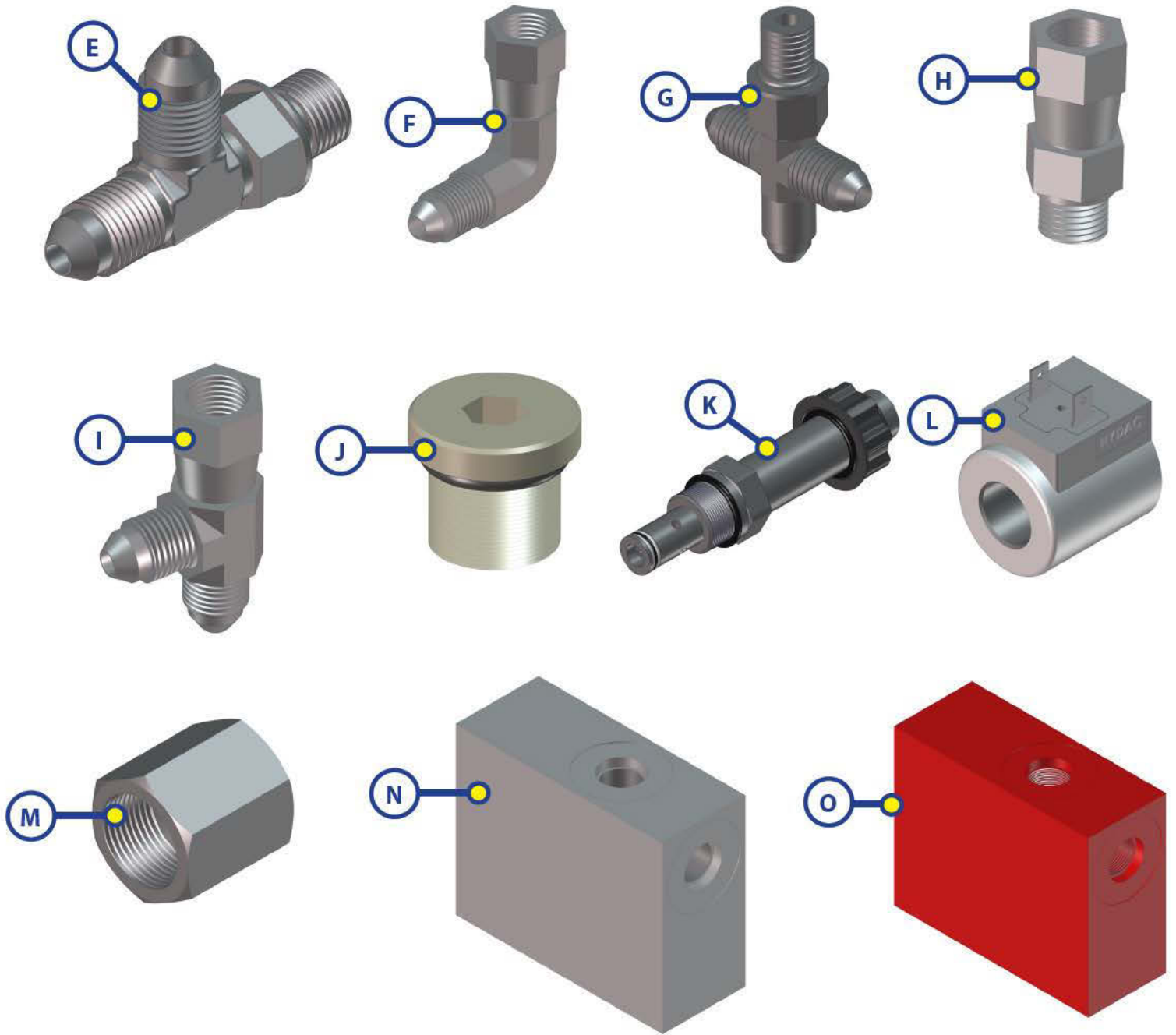
Isometric View



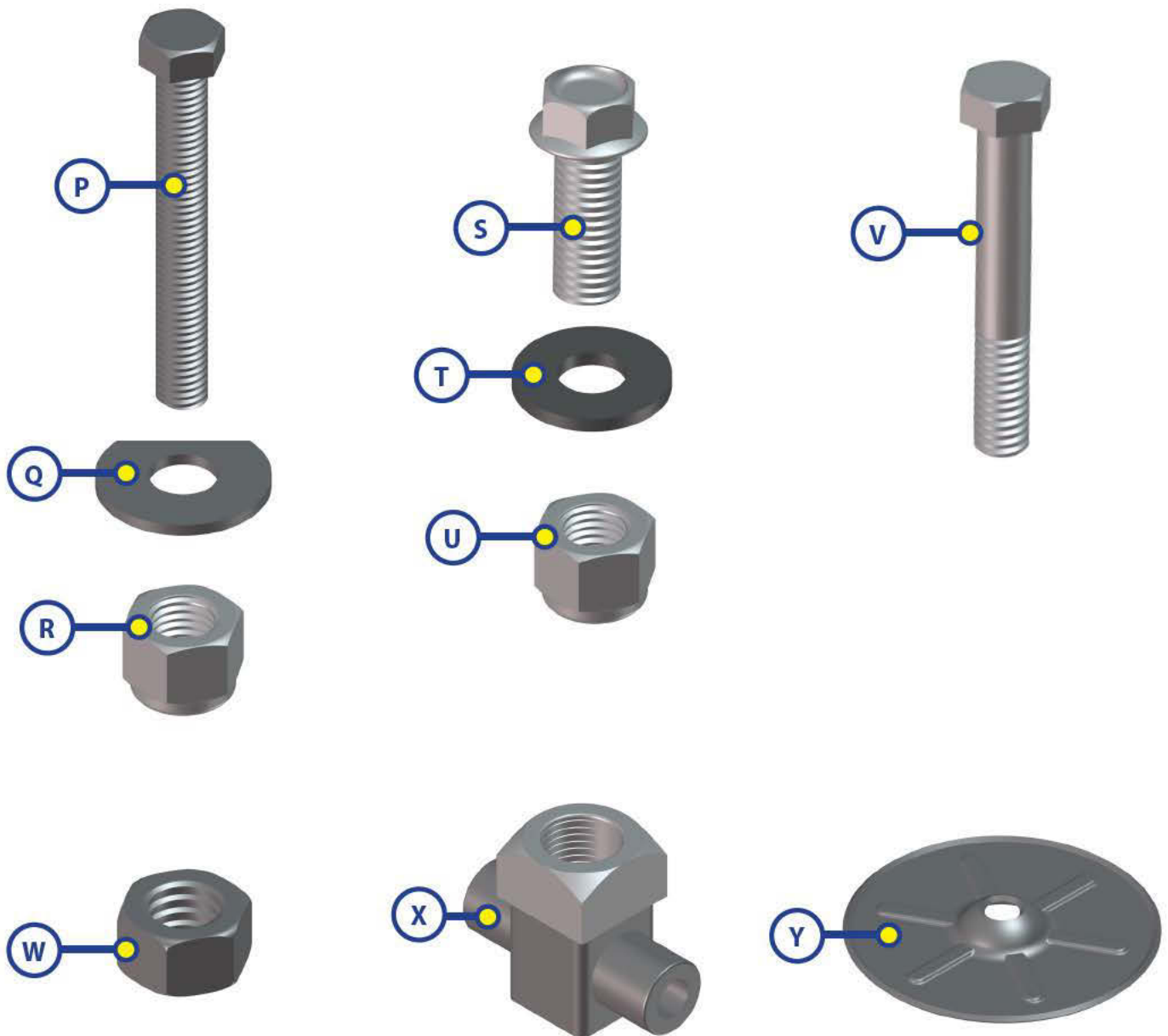
LEVELING AND STABILIZATION



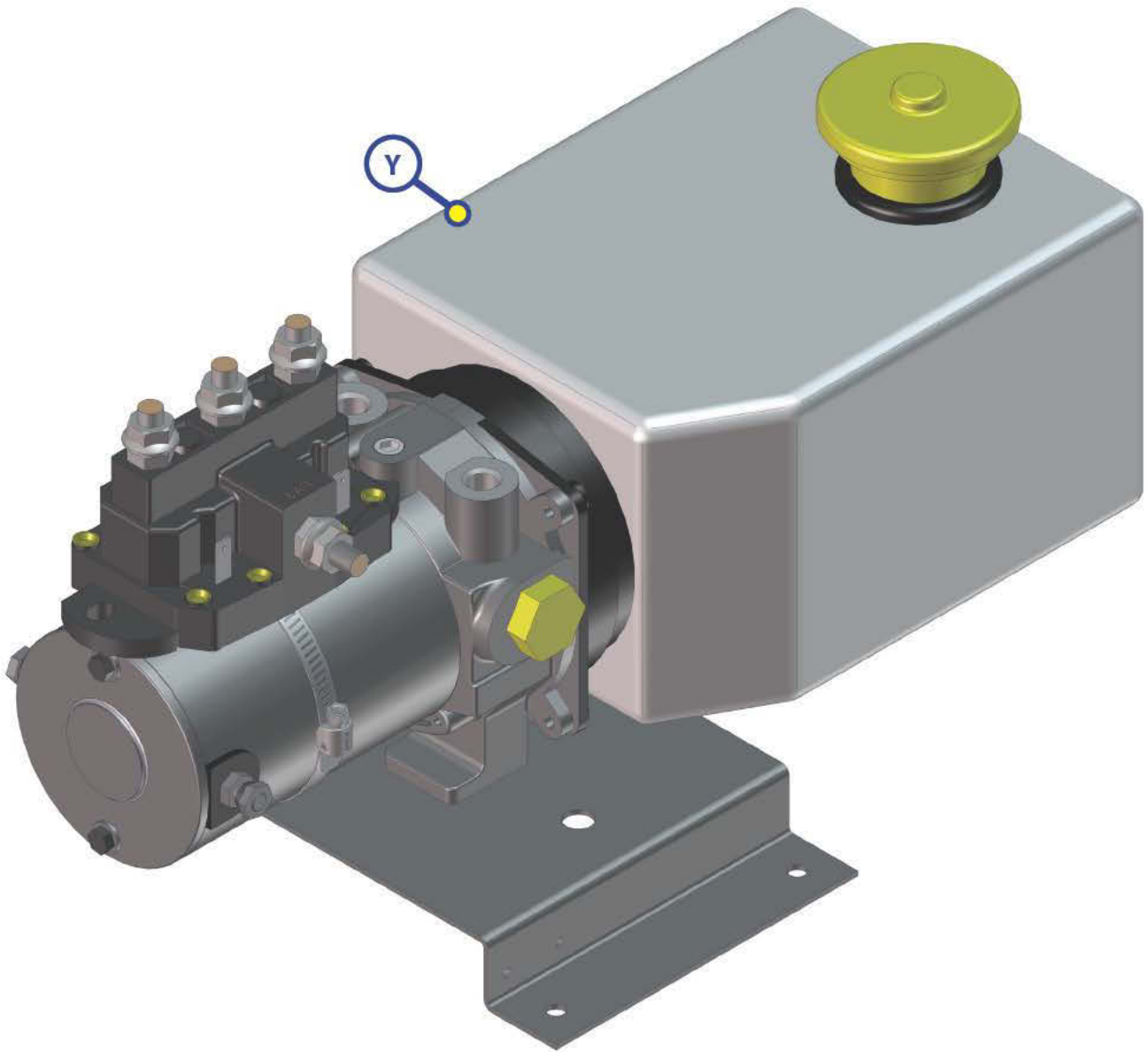
Callout	Part #	Description
A	248026	Hydraulic Exterior Landing Gear Switch with Plate
B	115903	Stabilizer Jack Adapter
C	137612	12" Stroke Bore Hydraulic Cylinder
D	118830	26" Stroke Bore Hydraulic Cylinder



Callout	Part #	Description
E	113130	T-Fitting without Ring
F	113134	Swivel Elbow Fitting
G	136225	Cross Fitting
H	113133	Swivel Straight Fitting
I	113135	Swivel Tee Fitting
J	140998	Ring Hollow Hex Plug
K	177094	Cartridge Valve with Set Screw Turn and Lock Manual Override
L	176954	Hydac Spade Coil
M	216288	#4 JIC Cap
N	138420	Valve Body Non-Restricted
O	138421	Red Block Restricted Valve Body



Callout	Part #	Description
P	118609	Bolt; ½ - 13 x 3 ½ HHCS GR5 ZN PTHD ST
Q	118138	1/2; USS Flat Washer
R	118045	1/2-13; Nylon Insert Lock Nut
S	117919	Bolt; ¾ - 16 x 1 Serrated Flange GR5 Zinc
T	118138	Washer; ¾ USS Flat Washer
U	118044	Nut; ¾ - 16 Nylon Insert Lock Nut Zinc
V	118609	Bolt; ½ - 13 x 3 ½ HHCS GR5 ZN PTHD ST
W	118606	Nut; ¾ - 10 HEX GR5 Zinc
X	162893	Hydraulic Leg Gear Foot Adapter
Y	113309	Foot Plate



Callout	Part #	Description
Y	141111	Hydraulic Power Unit

NOTE: This is the most common power unit for hydraulic landing gears; however please call our parts department to correctly identify the power unit required.



**ELECTRIC STABILIZER JACK
OWNER'S MANUAL**

**LIPPERT
COMPONENTS™**

WARNING

Failure to act in accordance with the following may result in death or serious injury.

The Lippert Electric Stabilizer Jack is intended for the purpose of stabilizing the rear end of the unit. The use of this system for any reason other than which it is intended is prohibited by Lippert's Limited Warranty and may result in serious personal injury or death.

The Lippert Electric Stabilizer Jack is designed as a stabilizing component system and should not be used to provide service for any reason under the coach such as changing tires or servicing anything beneath the unit.

WARNING

Lippert Components Inc. recommends that a trained professional be employed to change the tire on the coach. Any attempts to change tires or perform other service while coach is supported by the Lippert Electric Stabilizer Jack could result in death, serious injury and/or damage to the coach.

NOTES:

- Be sure to park the unit on solid, level ground.
- Clear all stabilizer jack landing locations of debris and obstructions. Locations should also be free of depressions.
- When parking the unit on extremely soft surfaces, utilize load distribution pads under each jack.
- People and pets should be clear of coach while operating Electric Stabilizer Jack.
- Never lift the coach completely off the ground. Lifting the coach so the wheels are not touching ground will create an unstable and unsafe condition.

System Description

Please read and study the operating manual before you operate the Electric Stabilizer Jack. The Lippert Electric Stabilizer Jack is a 12VDC electric motor driven system. The electric motor drives an acme threaded screw to extend and retract the stabilizer legs to stabilize the unit's rear end. The Lippert Electric Stabilizer Jack is designed to operate as a negative ground system.

There are no serviceable parts within the electric motor. If the motor fails, it must be replaced.

Disassembly of the motor voids the warranty.

Mechanical portions of the Lippert Electric Stabilizer Jack are replaceable. Contact Lippert Components, Inc. to obtain replacement parts.

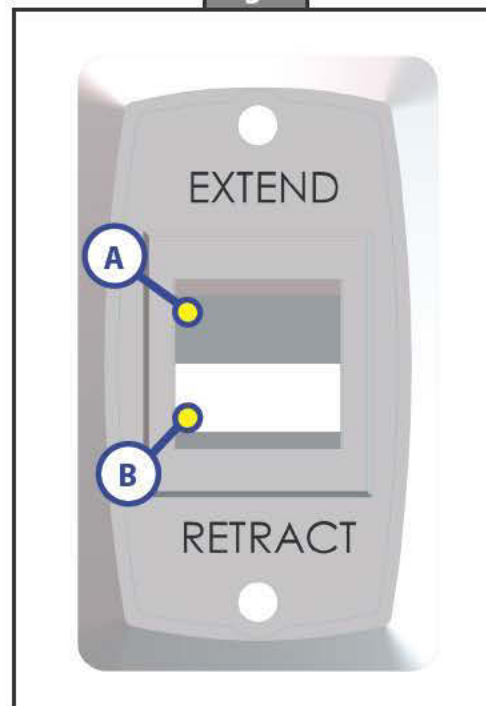
WARNING

Your coach should be supported at both front and rear axles with jack stands before working underneath. Failure to do so may result in death or serious injury.

⚠ CAUTION

Failure to act in accordance with the following may result in serious personal injury or death. Always make sure that the Lippert Electric Stabilizer Jack path is clear of people and objects before and during operation of the stabilizer jack. Always keep away from the stabilizer jack when it is being operated. There are areas that may pinch or catch on loose clothing causing personal injury.

Fig. 1



Extending Stabilizer Jack

1. Level the unit.
2. Verify the battery is fully charged and hooked-up to the electrical system.
3. Press and hold EXTEND (Fig. 1A) until the stabilizer jack foot pads contact the ground and the unit is stabilized.
4. Release the switch.

Retracting Stabilizer Jack

1. Verify the battery is fully charged and hooked-up to the electrical system.
2. Press and hold RETRACT (Fig. 1B) until the stabilizer jack is fully retracted.
3. Release the switch.

System Maintenance

Mechanical Maintenance

It is recommended that when operating in harsh environments (road salt, ice build up, etc.) the moving parts be kept clean. They can be washed with mild soap and water. No grease or lubrication is necessary and in some situations may be detrimental to the environment and long term dependability of the system.



Do not work on your stabilizer jack unless the battery is disconnected. Failure to act in accordance with the following may result in death or serious injury.

Electrical Maintenance

For optimum performance, the system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch, and the electric motor for corrosion, and loose or damaged terminals. Check motor leads under the trailer chassis. Since these connections are subject to damage from road debris, be sure they are in good condition.

NOTE: The Lippert Electric Stabilizer Jack is designed to operate as a negative ground system. A negative ground system utilizes the chassis frame as a ground and an independent ground wire back to battery is necessary. It is important that the electrical components have good wire to chassis contact. Over 90% of unit electrical problems are due to bad ground connections.

Troubleshooting

Manual Override

⚠ CAUTION

Always disconnect battery from system prior to manually operating system. Failure to disconnect battery can cause electricity to back-feed through the motor and cause serious damage to the system as well as void the Limited Warranty.

The Lippert Electric Stabilizer Jack comes with a manual override system located on the end opposite of the electric motor in the form of a crank handle (Fig. 3) that fits over a coupler and pin (Fig. 2A).

To manually operate the stabilizer jack:

1. Disconnect one of the wire leads from the motor to prevent back-feeding the motor.
2. Next, insert the 1/2" dia. crank handle over the coupler and pin. The slot in the end of the crank handle (Fig. 3A) accommodates the pin on the coupler (Fig. 2A) to allow the manual extension/retraction of the stabilizer jack.
3. Rotate the crank handle clockwise to retract or counterclockwise to extend the stabilizer jack.

NOTE: The gears can be stripped out if the stabilizer jack is manually retracted/extended to its fullest extent and the operator continues to rotate manual override.

⚠ CAUTION

Any damage due to misuse of the Manual Override feature will void the Limited Warranty.

Fig. 2

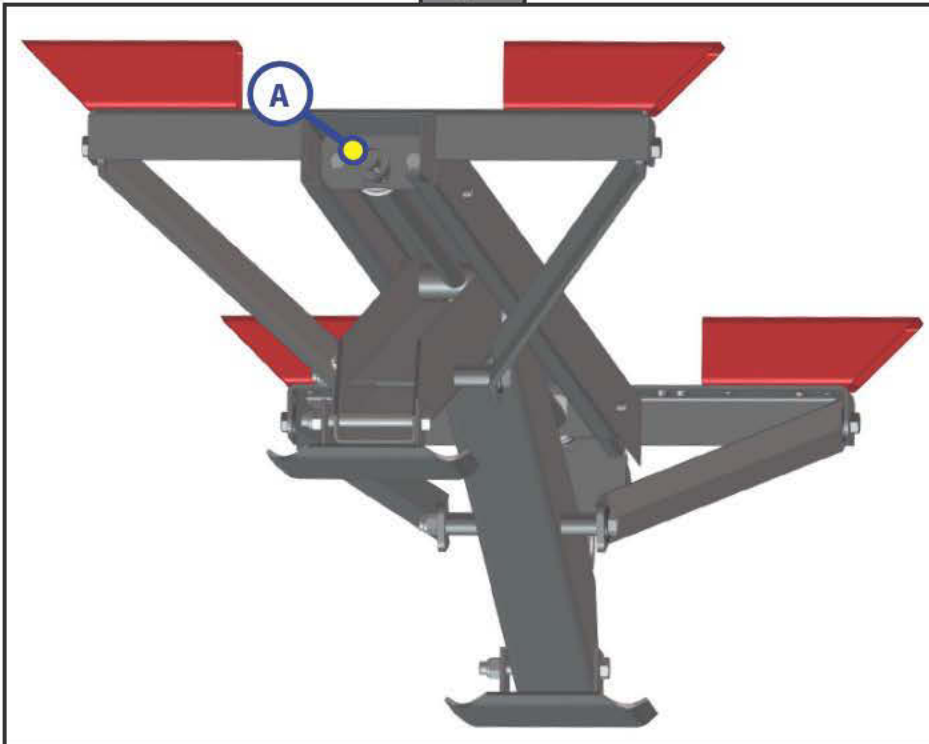


Fig. 3

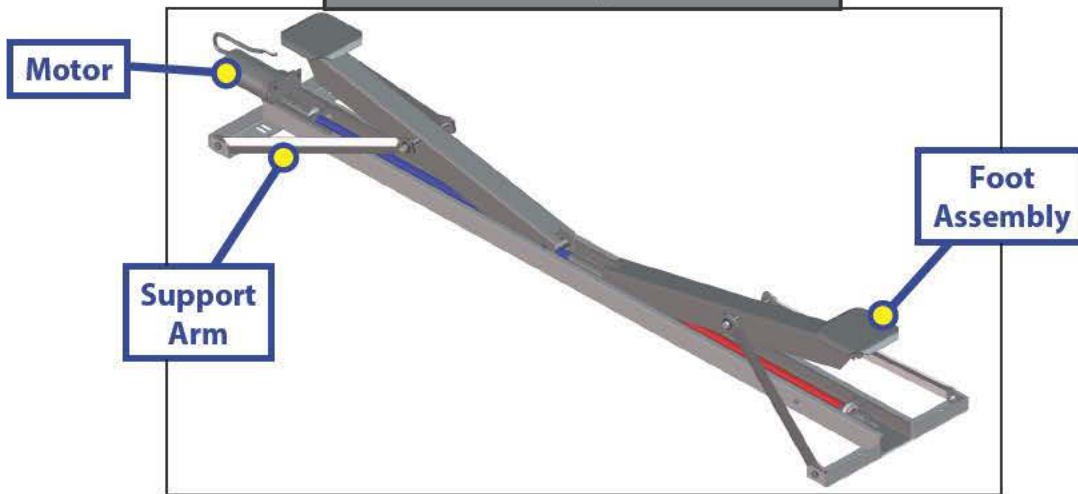




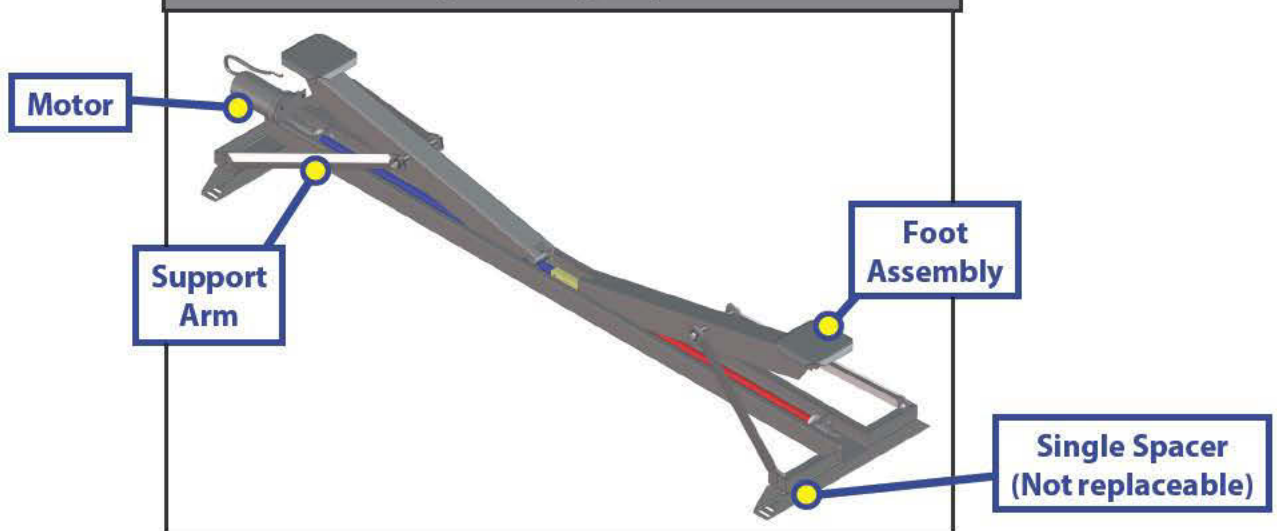
ELECTRIC STABILIZER JACK ASSEMBLIES WEBPAGE

LEVELING AND STABILIZATION

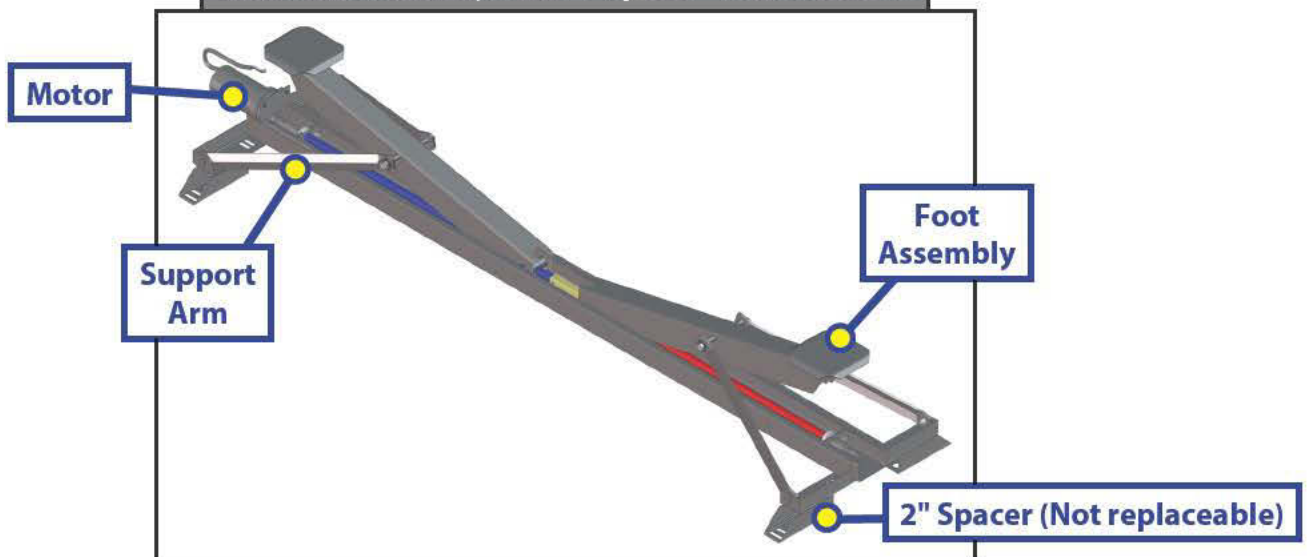
Standard Assembly - Part #113407



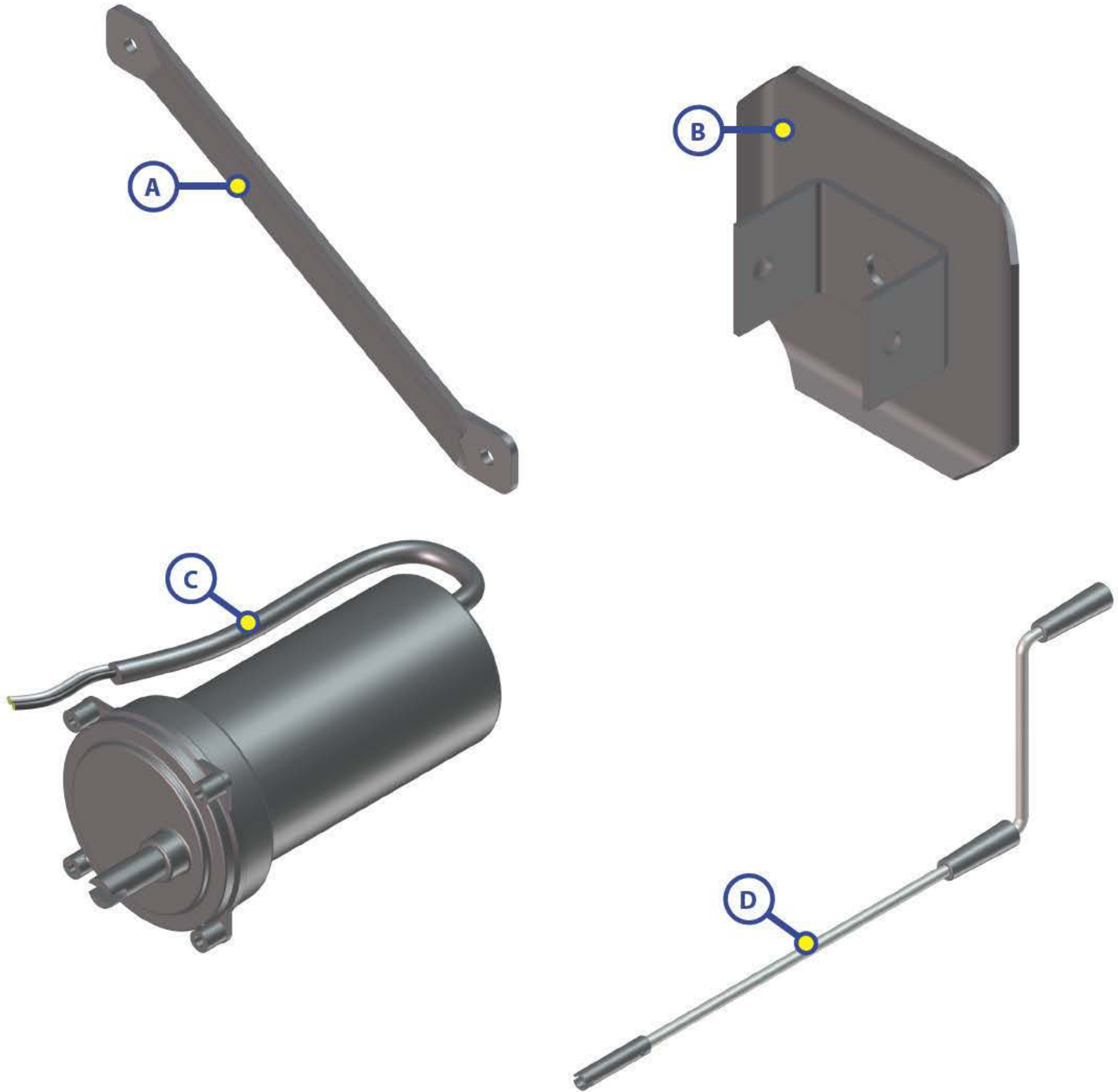
Ultra Lite Assembly with Single Spacer - Part #300625



Ultra Lite Assembly with 2" Spacer - Part #300626



LEVELING AND STABILIZATION



Callout	Part #	Description
A	113412	Support Arm
B	157584	Foot Assembly
C	138445	Klauber C800 Motor
D	119226	Jack Crank Handle



TM

ELECTRIC TONGUE JACK
OWNER'S MANUAL

LIPPERT
COMPONENTS™

System

Safety Information



The “WARNING” symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause death or serious injury if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required or the procedure too difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in death, serious injury or property damage.

The owner’s manual for the unit may have more procedures for service and maintenance.

- NEVER allow anyone unfamiliar with this product to install, operate or service this product.
- NEVER lift or level this the trailer without a properly installed footpad.
- NEVER crank jack or couple trailer without preventing the trailer from rolling.
- NEVER exert excessive side forces to the jack unit.
- NEVER allow anyone, including operator to put any body parts under the jack or the supported load during jack operation.
- NEVER drop the trailer off the hitch ball.
- NEVER exceed load capacity.
- NEVER use jack to lift trailer for service or tire change.
- NEVER move trailer before jack is fully retracted.
- NEVER use jack unless footpad retaining pin is fully inserted through both sides of the jack’s inner tube.

Operation

To Extend:

1. Chock trailer tires.
2. Be sure footpad is pinned securely in place with clevis & hair pins (Fig. 2A).
3. Push ON to turn the Power Tongue Jack on (Fig. 1A).
4. Make sure ground surface under jack is firm and level.
5. Push EXT side of switch to EXTEND jack until coupler clears hitch ball (Fig. 1D).
6. Move tow vehicle away from trailer.
7. Push OFF to turn the Power Tongue Jack off to conserve battery power (Fig. 1B).

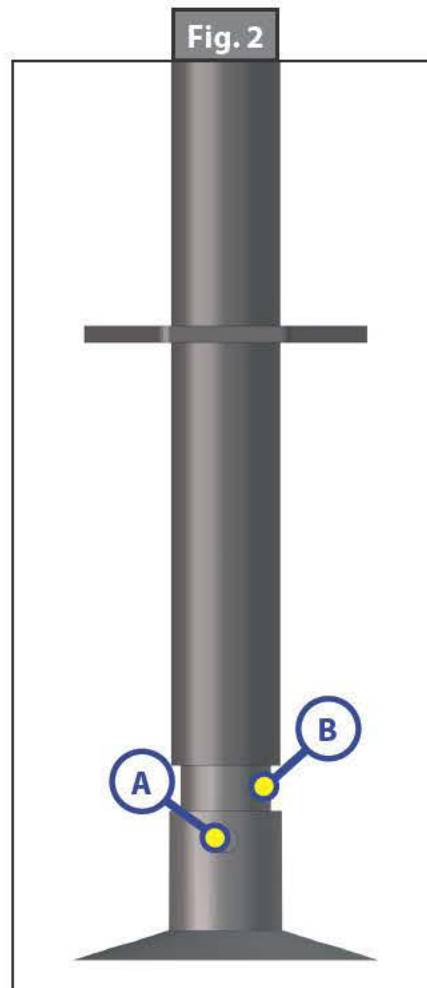
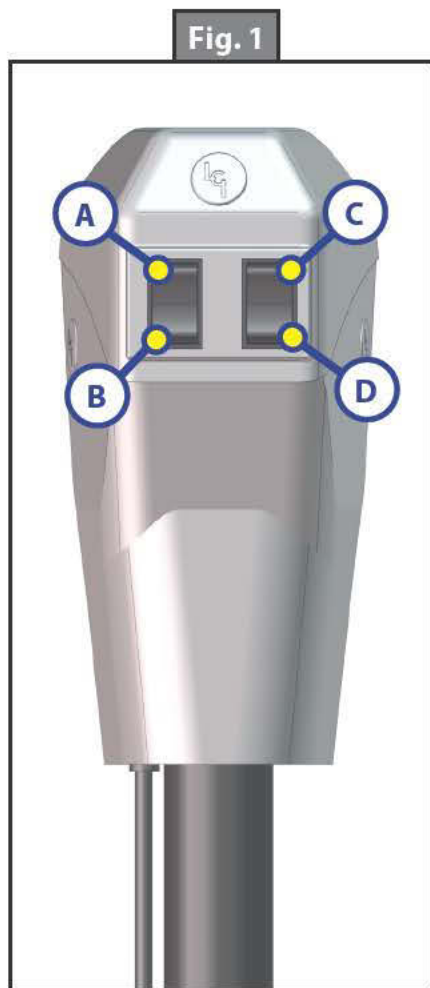
NOTE: If left on for extended periods of time, the courtesy light will drain the battery.

To Retract:

1. Chock trailer tires.
2. Push ON to turn the Power Tongue Jack on (Fig.1A).
3. Push RET side of switch to RETRACT jack until coupler properly mounts hitch ball (Fig. 1C).
4. Push OFF to turn the Power Tongue Jack off to conserve battery power (Fig. 1B).

NOTE: If left on for extended periods of time, the courtesy light will drain the battery.

NOTE: Be sure inner tube of jack is fully retracted prior to moving vehicle (Fig. 2B).



Troubleshooting

Manual Operation

If 12VDC power is unavailable to operate the Power Tongue Jack, use the following directions to manually operate the jack.

To Extend:

1. Chock trailer tires.
2. Be sure footpad is pinned securely in place with clevis & hair pins (Fig. 4A).
3. Make sure ground surface under jack is firm and level.
4. Open rubber plug on top of jack's gearbox to expose manual drive shaft (Fig. 5A).
5. Insert manual crank handle (Fig. 6).
6. Turn handle clockwise until trailer is supported and coupler clears hitch ball.
7. Move tow vehicle away from trailer.
8. Lower trailer until it is level by turning crank handle counterclockwise.
9. Remove crank handle (Fig. 6).
10. Replace rubber plug (Fig. 5A).

To Retract:

1. Chock trailer tires.
2. Be sure footpad is pinned securely in place with clevis and hair pins (Fig. 4A).
3. Open rubber plug on top of jack's gearbox to expose manual drive shaft (Fig. 5A).
4. Insert manual crank handle (Fig. 6).
5. Turn crank handle counterclockwise until coupler properly mounts hitch ball.
6. Remove crank handle (Fig. 6).
7. Replace rubber plug (Fig. 5A).

NOTE: Be sure inner tube of jack is fully retracted prior to moving vehicle (Fig. 4B).

Fig. 3

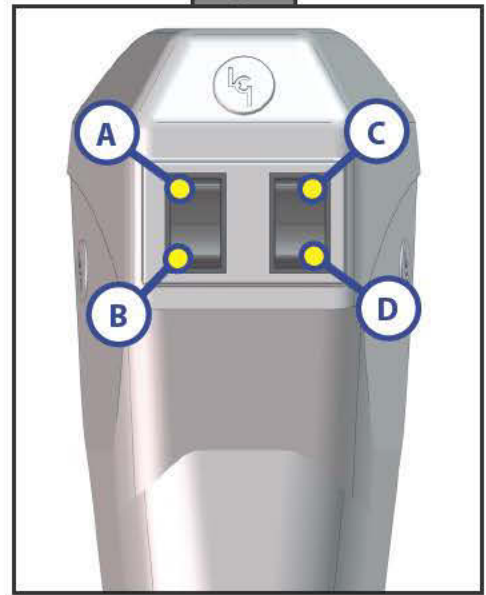


Fig. 4

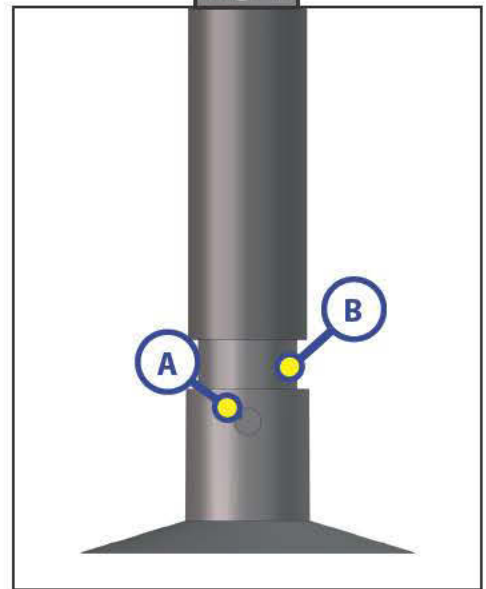


Fig. 5

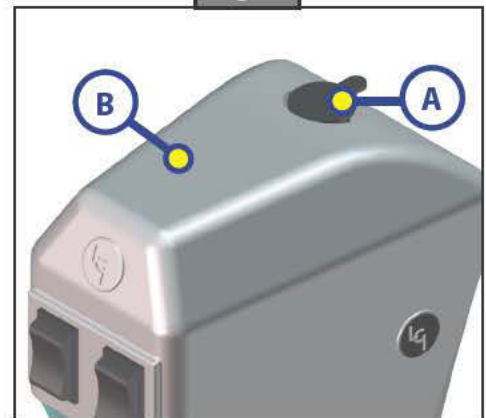
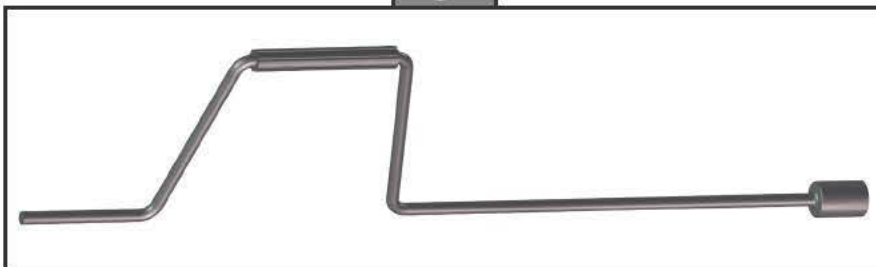


Fig. 6



Power Tongue Jack Clutch

The Power Tongue Jack is provided with a motor, clutch and a 30A fuse. Fuse is located underneath the lid (Fig. 5B) of the jack and will need to be replaced if it blows. It must be replaced with a 30A ATO-type fuse. Battery must be fully charged, free of defects, and full of water prior to operating the jack. Low voltage from the battery will cause the fuse to blow prematurely.

The clutch will slip under two conditions:

1. The jack may have reached it's extend or retract limit.
2. That the tongue weight of the trailer has exceeded the capacity limits of the jack. Items stored in the trailer can vastly influence the weight distribution of the jack. Reorganize stored items if Power Tongue Jack motor clutch continues to slip.

NOTE: Release switch immediately when clutch noise occurs. The clutch is the overload protection for the motor. The clutch should not slip during normal operation. This will cause excessive wear on the clutch and the motor.

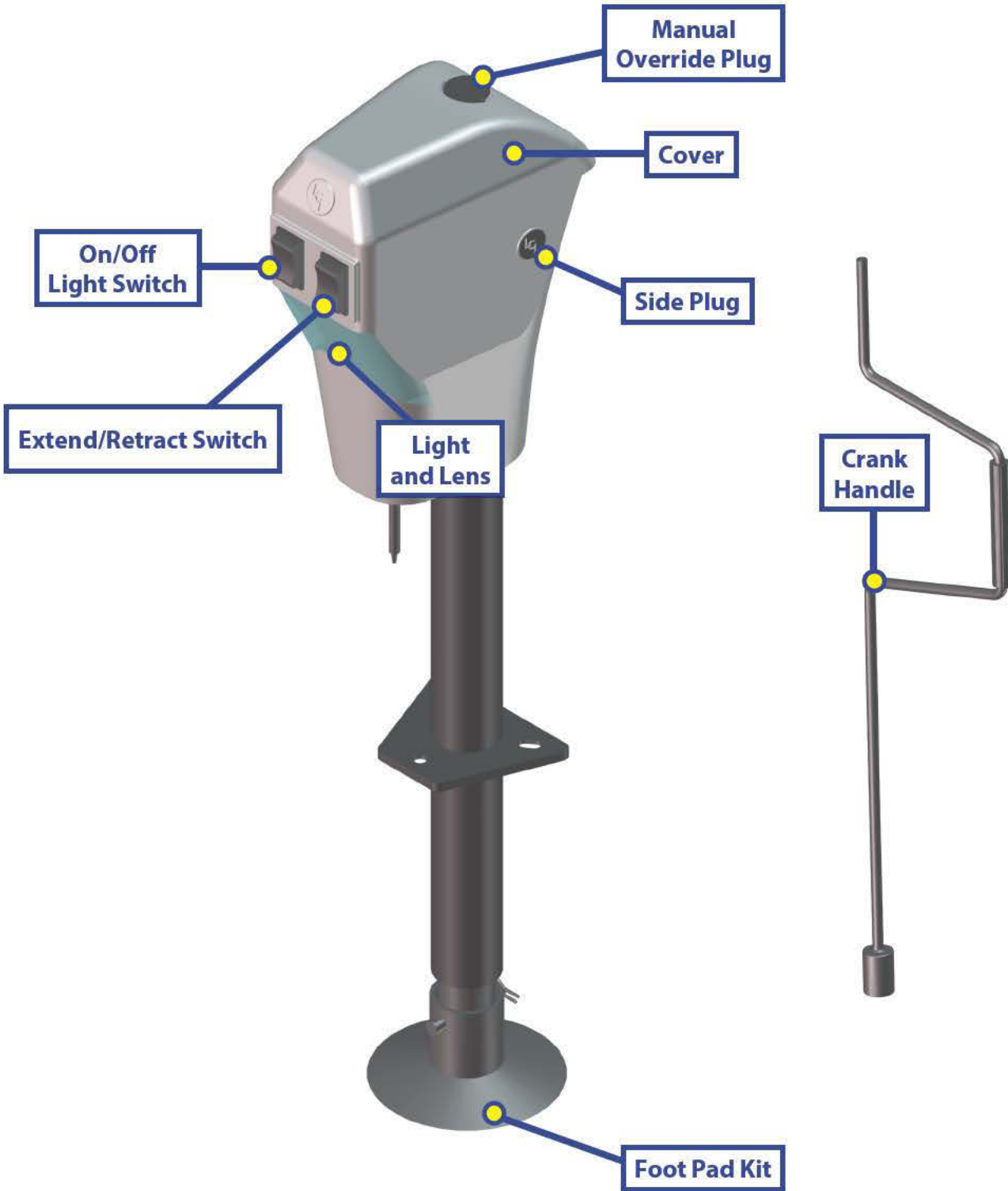
NOTE: If left on for extended periods of time, the courtesy light will drain the battery.

NOTE: The Power Tongue jack is designed for jacking the trailer in a vertical disposition only.

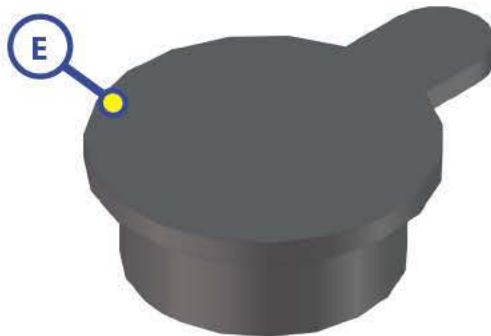
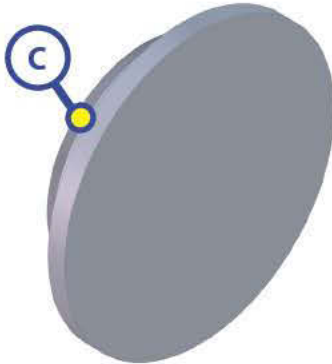
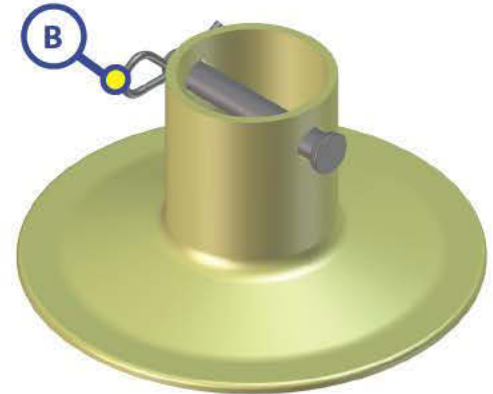


ELECTRIC TONGUE JACK ASSEMBLY WEBPAGE

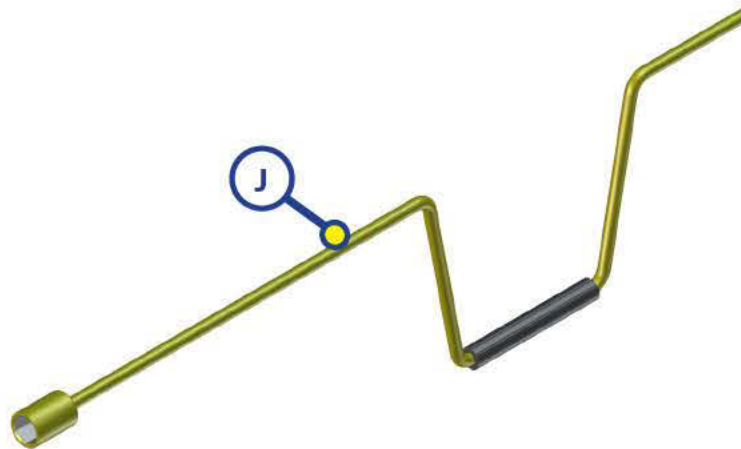
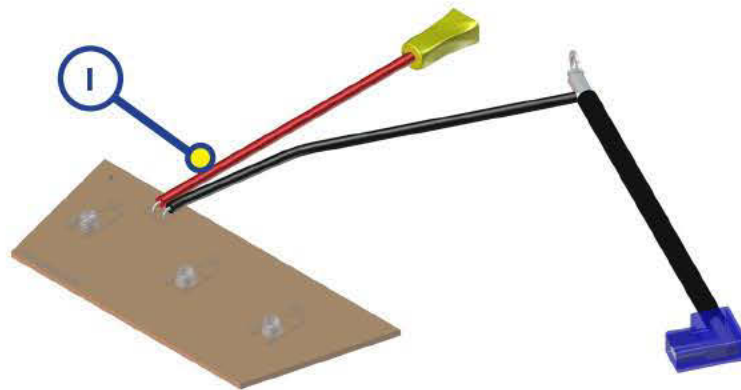
LEVELING AND STABILIZATION



LEVELING AND STABILIZATION



Callout	Part #	Description
A	225868	Cover (White)
	285160	Cover (Black)
B	165253	Footpad Kit
C	225875	Side Plug
D	225876	Original Manual Override Plug
E	321807	Current Manual Override Plug
F	225885	Lens



Callout	Part #	Description
G	226018	On/Off Light
H	226023	Extend/Retract Switch
I	226027	Light
J	116112	Crank Handle



TRAILER AXLE
OWNER'S MANUAL

L I P P E R T
C O M P O N E N T S™

Introduction

Combining years of experience in the trailer frame and recreational vehicle industry with the newest and most innovative technology, Lippert Components, Inc. introduces it's newest addition, The Axle and Running Gear Division.

The following publication is designed to give the customer an easy-to-understand operation and service manual to provide useful and important information. The quality of the Lippert name and the finest materials utilized in the production of the Axles and Running Gear provide you with hubs, brakes, drums and spindles that make trailering and braking the finest in the industry.

Quality comes threefold in Lippert Components, Inc.

1. The finest quality materials.
2. The latest technology and design.
3. The quality standards maintained from materials to final assembly.

All three points provide the customer with the best product they can possibly buy and the satisfaction of knowing they can trust the equipment on which they have spent their hard-earned money.

Lippert Components, Inc. thanks you for purchasing our Axles and Running Gear. When you speak of Lippert Components, Inc., our quality stands beside you.

Safety Information



The "WARNING" symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause serious injury or death if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required or the procedure to difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in voiding the warranty, inflicting injury or even death.

The owner's manual for your unit may have more procedures for service and maintenance.

Break-in Period for Electric Drum Brakes

The break-in period is a typical phenomenon with drum brakes and especially electric drum brakes. Electric drum brakes will require a break-in period to achieve full performance. This break-in period applies for new axles and any time new brake shoes and/or magnets are installed as part of regular maintenance.

Lippert Components has found through extensive brake testing that the break-in period for our drum brakes can range from 20 to 50 brake applications.

Brakes can be seated in by applying approximately 8-10 volts to the trailer brakes at an initial speed of 40 mph and allowing the truck/trailer combination to slow down to 20 or 25 mph. For best results do not use truck brakes during this procedure. The trailer brakes will seat in faster by using them to stop both the truck and trailer. The easiest method is to apply the trailer brakes using the manual activation lever located on the in-cab brake controller. Care must be taken to not overheat the lining material, therefore brake applications conducted at one mile intervals will suffice. The driver should feel a noticeable difference in the brake performance during this period, sometimes in as few as 10 applications. After 50 applications, the brake lining material will be fully cured from the heat and develop close to 100% contact with the brake drum surface.

This break in period not only seats the shoe lining material but also seats in the brake electromagnets. During the break-in period, the linings will wear at a faster rate than they do after they are seated in.

NOTE: Brakes should be manually adjusted after the first 200 miles of operation and periodically thereafter, approx. 3,000 mile intervals.

Hubs/Drums/Bearings

Hub Removal

To remove the hub assembly for inspection, maintenance or service, follow the six (6) steps below:



Lift unit by the frame and never the axle or suspension. Do not go under unit unless it is properly supported by jack stands. Unsupported units can fall causing death or serious injury.

1. Lift trailer and support it per manufacturer's requirements.
2. Remove the wheel.
3. Remove the grease cap by prying the edge out of the hub. If equipped with oil lubrication, unscrew oil cap using a 2½" socket. Let oil drain into pan.
4. Pull the cotter pin from the castle nut and remove the outer spindle nut.
5. Remove the spindle washer.
6. Pull the hub off the spindle. Do not let the outer bearing cone fall free of the assembly. The inner bearing cone will be contained by the seal and will not fall out.

NOTE: Brakes may need to be adjusted or backed off to remove drum from spindle.

NOTE: A gear puller may be necessary to remove hub from spindle.

Brake Drum Inspection

The brake shoes contact the drum surface and the magnet contacts the armature. These surfaces are subject to wear and should be inspected periodically.

The drum surface should be re-machined if wear is more than .030" or out of round by more than .015". The drum should be replaced if scoring or wear is greater than .090".

The inner surface of the brake drum that contacts the brake magnet is the armature surface. If the armature surface is scored or worn unevenly, it should not be machined more than .030". The magnets should be replaced whenever the armature surface is refaced and vice versa.

NOTE: Ensure that the wheel bearing cavities are clean and free of contamination before reinstalling bearing and seals. Resurfacing procedures can produce metal chips and dust that can contaminate the wheel bearings and cause failure.

Drum	Maximum Re-bore Diameter
7"	7.09"
10"	10.09"
12"	12.09"

Bearing Inspection

Wash all grease and oil from the bearing cone using a suitable solvent. Dry the bearing with a clean, lint-free cloth and inspect each roller completely. If any pitting, spalling, or corrosion is present, then the bearing must be replaced. The bearing cup inside the hub must be inspected.

NOTE: Bearings must always be replaced in sets of one cone and one cup.



Always wear eye protection when servicing the axle, brakes, hubs, springs and wheels. Failure to wear eye protection may result in serious injury.

Follow the procedure below to replace the bearing cup:

1. Place hub on a flat surface with bearing cup on the bottom.
2. With brass drift punch, lightly tap around the small end of the cup to push it out.
3. Clean the hub bore. Replace the cup by tapping it back in with the brass drift punch. Cup should be seated against the retaining shoulder in the hub.

Consult Bearing Replacement Chart for proper replacement bearings.

NOTE: Replacing the bearing cup is a very precise process. The cup must be perfectly seated when replaced. If the cup is not seated correctly, damage to the assembly may not be covered by the warranty. Consult Lippert Components, Inc. prior to replacing bearing and bearing cup. The trailer should be taken to a certified service center for this work to be done.



Do not mix Lithium, calcium, sodium or barium complex greases. Chemical compatibility problems may occur. If you are changing from one chemical grease to another, be sure all old grease is removed prior to applying new grease. If the old grease is not removed completely, chemical compatibility may result in component failure or damage.

Bearing Lubrication - Oil

If your axles are equipped with oil lubricated hubs, then your lubrication procedure is to periodically fill the hub with a high quality hypoid gear oil to the level indicated on the clear plastic oil cap. The oil can be filled through the rubber plug hole in the cap.

Bearing Lubrication - Grease

Bearing grease should be replaced every 12,000 miles or 12 months, whichever comes first. Remove all old grease from wheel hub and bearings first. Bearings should be packed by machine if possible. Packing bearings by machine is preferable; however, packing by hand is a viable alternative.

Follow these procedures to repack bearings by hand:

1. Place grease into the palm of your hand (Fig. 1).
2. Press widest end of bearing into the outer edge of the grease pile, forcing grease into the inner area of the bearing between two adjacent rollers (Fig. 2).
3. Repeat this process while turning bearing from roller to roller until all rollers are coated.
4. Apply a light coat of grease into the bearing cup surface.
5. Reassemble bearing into cup.



Recommended Wheel Bearing Grease Specifications	
Thickener Type	Lithium Complex
Dropping Point	230°C (446°F) Minimum
Consistency	NLGI No. 2
Additives	EP, Corrosion, & Oxidation Inhibitors
Base Oil	Solvent Refined Petroleum Oil
Base Oil Viscosity	@40°C (104°F) 150cSt (695 SUS) Minimum
Viscosity Index	80 Minimum
Pour Point	-10°C (14°F) Minimum

Approved Sources	
Mobil Oil	Mobilgrease HP
Exxon/Standard	Ronex MP
Kendal Refining Co.	Kendall L-427
Ashland Oil Co.	Valvoline Val-plex EP Grease
Pennzoil Prod. Co.	Premium Wheel Bearing Grease 707L

Seal Inspection and Replacement

Always check the seal to make sure that it is not damaged, nicked, cracked or torn and is in good working order. If there is any question of condition, replace the seal.

Procedure to replace seal:

1. Pull seal from the hub with a seal puller. Never push the seal out with the bearing. The bearing may get damaged.
2. Apply a PERMATEX sealant to the outside of the new seal.

NOTE: Do not use PERMATEX on rubber encased seals.

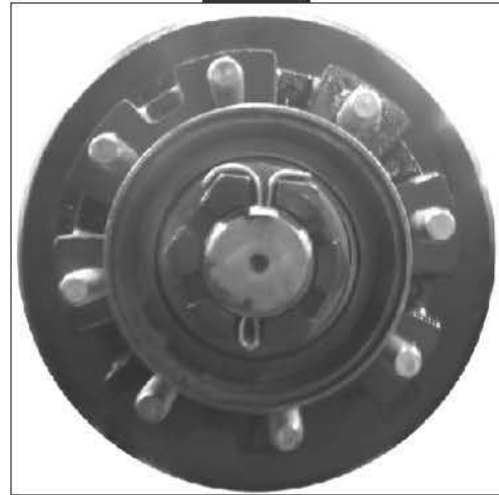
3. Tap the new seal into place using a clean, hardwood block (Fig. 3).

NOTE: When installing a new oil seal, be sure side marked "AIR SIDE" is away from bearing cone.

Fig. 3



Fig. 4



Bearing Adjustment/Hub Replacement

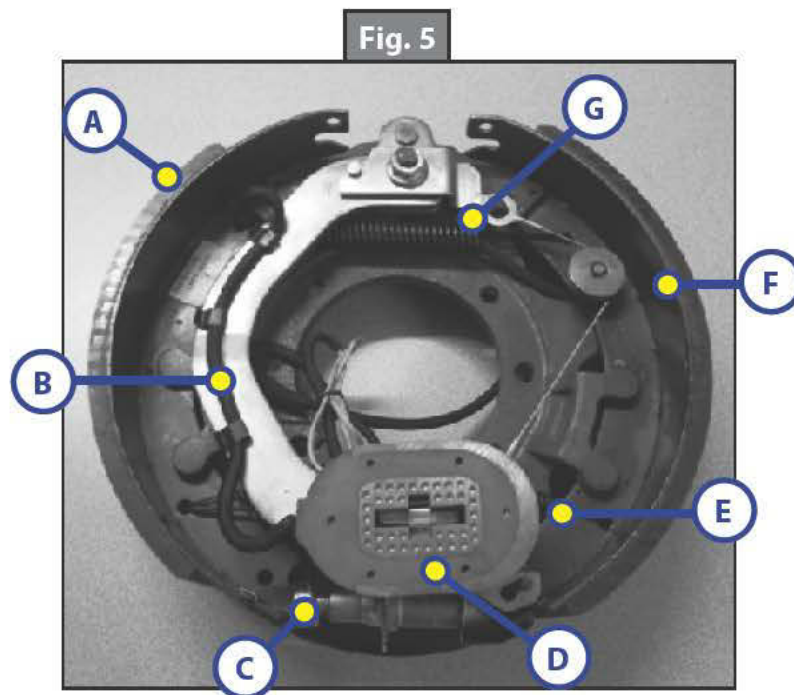
To adjust bearings or replace removed hub, follow procedures below:

1. Place hub, bearing, washers and castle nut back on axle spindle in the reverse order from which they were removed. Castle nut should be torqued to 50 ft.-lb. Hub will rotate during this process.
2. Loosen castle nut to back off the torque.
3. Tighten castle nut finger tight until snug.
4. Insert cotter pin. If cotter pin does not line up with hole, back castle nut up slightly until pin can be inserted (Fig. 4).
5. Bend cotter pin over to lock nut in place. Nut should be free to move with only the cotter pin keeping it in place.

Electric Brakes

The basic structure of the Electric Brakes on your trailer will resemble the brakes on your car or tow vehicle, with one major difference; your trailer implements an Electric Actuation system and your tow vehicle utilizes a hydraulic system. The Electric Braking System operates in the following order of steps: (Refer to the Electric Braking System Diagram and the brake diagram below to follow along.)

6. Electric current is supplied to the trailer's braking system when the tow vehicle's brakes are applied.
7. From the tow vehicle's battery, the electricity flows to the brake's electromagnet.
8. When energized the magnets are attracted to the rotating surface of the drums.
9. This moves the actuating levers in the direction the drums are turning.
10. The actuating cam at the end of the shoe forces the primary shoe out to the drum surface.
11. The force of the primary shoe actuates the secondary shoe to contact the drum.
12. The force applied to the brake drum can be increased by elevating the current flow to the magnet.



Callout	Description
A	Primary Shoe
B	Actuating Lever
C	Adjuster
D	Magnet
E	Adjusting Spring
F	Secondary Shoe
G	Retracting Spring

How to Use Lippert Electric Brakes Properly

The Lippert Components, Inc. Electric Braking System is synchronized with the tow vehicle brakes. Never attempt to stop the combined load of the tow vehicle and the trailer by using either the tow vehicle brakes or the trailer brakes only. They are designed to work together.

Small manual adjustments may occasionally be necessary to accommodate changing loads and driving conditions. Synchronization of tow vehicle to trailer braking can only be accomplished by road testing. Locking up, excessive grab, or delayed application is quite often due to the lack of synchronization between the tow vehicle and the trailer being towed. High voltage (2V+), Low voltage (2V-) or improperly adjusted brakes are the most common causes of these problems and can be easily remedied.

Prior to any adjustments, your trailer brakes should be burnished-in by applying the brakes 20-30 times with a 20 m.p.h. decrease in speed, e.g. 40 m.p.h. to 20 m.p.h. Allow ample time for brakes to cool between application. This allows the brake shoes and magnets to begin seating to the brake drum.

Trailer Wire Gauge Chart		
Wire Gauge and Type	Number of Axles	Length of Run
16 Ga Stranded Copper	1	N/A
14 Ga Stranded Copper	2	Under 30ft. (9.1m) from hitch to center of axles
12 Ga Stranded Copper	2 or 3	Over 30ft. (9.1m) from hitch to center of axles

General Maintenance - Electric Brakes

Brake Adjustment



Prior to testing or adjusting brakes, be sure area is clear of any persons and vehicles. Failure to perform test in a clear area may result in death or serious injury.

Lippert Components, Inc. Electric Brakes are automatic adjust only. If manual adjusting is needed, the following 6-step procedure can be utilized. The brakes should be adjusted in the following manner:

1. Jack up trailer and secure on adequate capacity jack stands. Follow trailer manufacturer's recommendations for lifting and supporting the unit. Make sure the wheel and drum rotates freely.



Lift unit by frame and never the axle or suspension. Do not go under unit unless it is properly supported by jack stands. Unsupported units can fall causing death or serious injury.

2. Remove the adjusting hole cover from the adjusting slot on the bottom of the brake backing plate.
3. With a screwdriver or standard adjusting tool, rotate the starwheel of the adjuster assembly to expand the brake shoes. Adjust the brake shoes out until the pressure of the linings against the drum makes the wheel very difficult to turn.
4. Then rotate the starwheel in the opposite direction until the wheel turns freely with a slight lining drag.

NOTE: A second screwdriver will be needed to push the auto adjusting lever away from the adjuster starwheel so that the starwheel can be rotated backwards.

5. Replace the adjusting hole cover and lower the wheel to the ground.
6. Repeat the above procedure on all brakes. For best results, the brakes should all be set at the same clearance.

Lubricate Brakes

Prior to reassembling the brake drum assembly, remember to apply a light film of white grease or an anti-seize compound on the brake anchor pin, the actuating arm bushing and pin, and the areas on the backing plate that are in contact with the brake shoes and magnet lever arm. In addition apply a light film of grease on the actuating block mounted on the actuating arm.

Clean and Inspect Brakes

In the event the braking system encounters symptoms of improper application or failure, immediate inspection and service must be implemented. During normal use, servicing the braking system once a year is considered normal. Increased usage will require service on a regulated schedule based on 3000-6000 mile increments. As magnets and shoes become worn, they need to be changed to maintain maximum braking capability.

Be sure, when disassembling brakes for cleaning, to clean the backing plate, magnet arm, magnet and shoes. Also, make sure that any and all parts removed for cleaning are placed back into the same brake drum assembly. This is also an excellent time to check for parts that have become loose or worn.



Potential Asbestos Dust Hazard.

Older brake linings have the potential to contain asbestos dust, which has been linked to serious or fatal illnesses. Certain precautions must be taken when servicing brakes:

1. Avoid creating and/or breathing any brake dust.
2. Do not machine, file, or grind the brake linings.
3. Remove with a damp brush or cloth. Dry brushing or compressed air will cause the dust particles to become airborne.

Magnets

This electric braking system utilizes an electromagnet to actuate the brake shoes. These high-quality magnets provide superior force and friction to safely and effectively stop the trailer. These magnets should be inspected and serviced on the same schedule as the rest of the axle system, at least once a year for normal use and more often if the trailer is used extensively. Abnormal or uneven wear is a sign that the magnet needs to be replaced. Check the surface of the magnet with a straight edge to check for uneven wear. The surface of the magnet should be completely flat.

If the magnet's coil is exposed in any way, even if normal wear is evident, the magnets should be replaced immediately. If the electromagnets are replaced, the drum armature surface should also be refaced. If a magnet is replaced on one side of an axle, it is recommended that the magnet on the opposite brake assembly also be replaced to ensure even braking capacity.

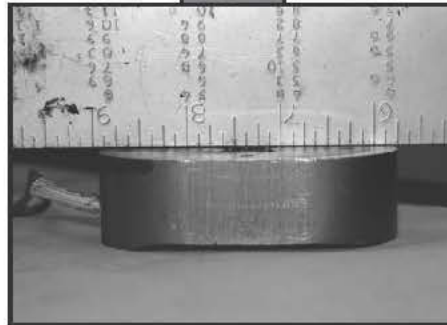
Figure 6 (Page 11) shows an Electro-Magnet with little or no wear. If there are any pronounced gaps on the surface of the Electro-Magnet, the magnet should be replaced.

Shoes and Linings

Linings should be replaced if the material is worn to $\frac{1}{16}$ " or less. Shoes should also be replaced if they become contaminated with grease or oil or have become scored, pitted or gouged. Heat cracks are normal and rarely require attention. When replacing shoes, both shoes on the same brake and the brakes on the same axle should all be replaced at the same time, once again ensuring even braking capacity.

After replacing shoes and linings, your trailer brakes should be burnished-in by applying the brakes 20-30 times with a 20 m.p.h. decrease in speed, e.g. 40 m.p.h. to 20 m.p.h. Allow ample time for brakes to cool between application. This allows the brake shoes and magnets to begin seating to the brake drum.

Fig. 6



Axle and Suspension Installation

The single most important portion of axle installation is parallel alignment of the trailer axle(s) to the tow vehicle or drive axle(s). Parallel installation allows for correct and safe control, prolonged tread life and will all but eliminate dog-tracking. Proper alignment is most readily achieved by measuring from the center of the trailer king pin to the center of each end of the axles.

Lippert Components, Inc. tubular axles are made of high strength steel to prevent metal fatigue and provide the best possible welding conditions. The round tubular axles allow for even and uniform structure.



Always wear eye protection when servicing the axle, brakes, hubs, springs and wheels. Failure to wear eye protection may result in serious injury.

Suspension Systems

The suspension systems incorporated into Lippert Component, Inc. axles are designed to provide the following benefits:

1. Attach the axle to the trailer.
2. Dampen the effects of road shock.
3. Provide stability to the trailer.

All Lippert suspension systems are available in single and multiple axle configurations. For specific or custom applications, please contact Lippert Components, Inc. Axle Division.

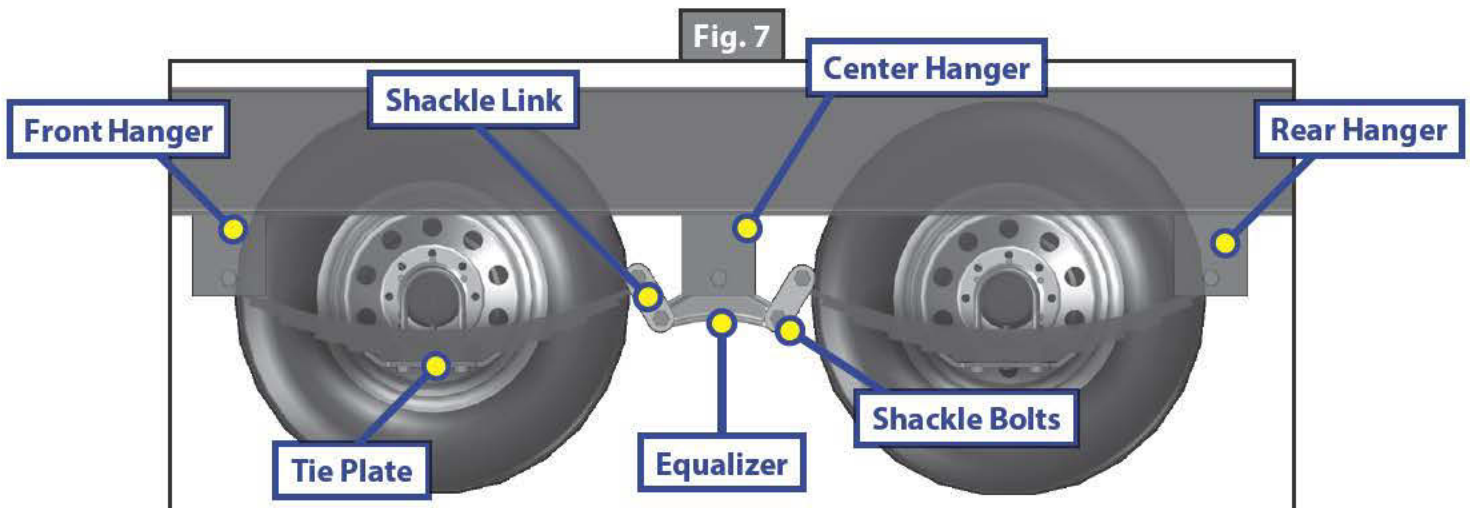
Double-Eye Leaf Springs

Double-eye leaf springs have eyes at either end of the spring assembly with nylon bushings to assist in preventing wear. U-bolts hold the springs to the axle with a plate.

The articulation of this suspension occurs when the eyes rotate on the wear surfaces provided in eyes of the springs and on the equalizers. This suspension is also available in single and multiple axle configurations.

In trailers with 2 or more axles, the additional movement is maintained by an equalizer. This feature allows for even load handling from axle to axle.

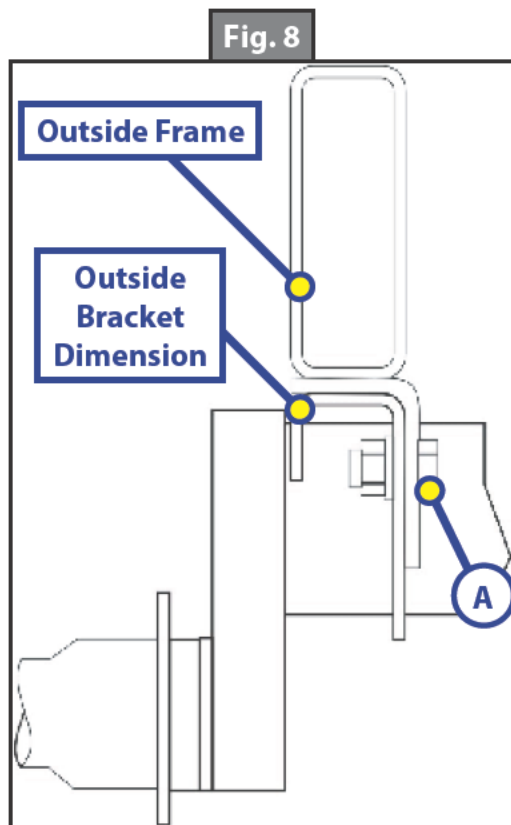
Double-eye suspension systems are available on 8,000 lb. axles. Tandem and triple axle mounting kits are available for both 33" and 35" axle spacing.



Spring Axle Torque Specifications		
Bolt Type	Axle Capacity	Maximum Torque
U-Bolts	2K	25 ft-lb
	3.5K with ½"	50 ft-lb
	5.2K	65 ft-lb
	6-8K	90 ft-lb
	Minimum Torque	Maximum Torque
Shackle Bolts	30 ft-lb	50 ft-lb

Torsion Suspension System

1. The Lippert Components, Inc. Torsion Suspension system is designed to offer superior qualities over leaf spring technology. The Lippert Components, Inc. Torsion Suspension system is bracketed to the trailer's frame and housed inside the trailer axle's tube.
2. The spindle is connected to a swing arm, the swing arm is connected to a square inner bar that is sheathed in rubber and as the swing arm rotates and experiences the torque and resistance of driving conditions, the characteristics of the rubber absorb and distribute the load providing benefit over leaf spring suspensions.
3. The Lippert Components, Inc. Torsion Suspension system requires very little attention in regards to maintenance. Normal inspection of the entire Lippert Components, Inc. Trailer Axle system can be applied to the Torsion Suspension system. See inspection procedures for system components in this manual.



NOTE: For Torsion installation, mount axle bracket to frame bracket (Fig. 8) and torque fasteners as specified in the chart below.

NOTE: Washer(s) must be placed against the slotted hole in the axle bracket (Fig. 8A).

NOTE: Low profile brackets have plain round holes.

Torsion Axle Torque Specifications		
Axle Size	Bolt Size	Torque Range
#8 - #9	1/2"	70-90 ft-lb
#10 - #13	5/8"	120-150 ft-lb

Inspection

All the components of your suspension system should be visually inspected for signs of wear, damage or loose fasteners at least every 6,000 miles. When replacing or tightening loose fasteners, consult the torque specs on page 13 for correct torque values.

Worn spring eye bushings or sagging or broken springs should be replaced using the following method:

1. Support the trailer with the wheels just off the ground. Follow the trailer manufacturer's recommendations for lifting and supporting the unit.
2. After the unit is properly supported place a suitable block under the axle tube near the end to be repaired. This block is to support the weight of the axle only so that suspension components can be serviced or replaced.
3. Disassemble the U-bolts, nuts, and tie plates.
4. Remove the spring eye bolts and the spring.
5. If the spring eye bushings are to be replaced, press out the old bushing by hand or tapping out with a punch.
6. Free-floating nylon bushing needs no lubrication. Press the new bushing into the spring eye by hand or gently tapping it in with a bounce less rubber or plastic mallet.
7. Reinstall repaired or replaced components in reverse order.

NOTE: For multiple axle units, the weight of each axle must be supported as outlined in Step 2 before disassembly of any component of the suspension system.



Lift unit by the frame and never the axle or suspension. Do not go under unit unless it is properly supported by jack stands. Unsupported units can fall causing death or serious injury.



Always wear eye protection when servicing the axle, brakes, hubs, springs and wheels. Failure to wear eye protection may result in serious injury.

If the equalizer or equalizer bushings must be replaced, follow the instructions above for lifting and supporting the trailer unit and then proceed as follows:

1. With both axles blocked up, remove the spring eyebolt, keeper bolt, and equalizer bolt from the equalizer to be repaired or replaced.
2. Press the old nylon bushing out of the equalizer.
3. Reassemble in reverse order.

Suspension Replacement

1. Make sure springs are on straight. Align spring eyes to front hanger. Insert spring eye bolts but do not torque at this point.
2. Assemble springs into equalizer.
3. After leveling equalizer to frame, torque equalizer nuts and spring eye nuts to a minimum of 30 ft.-lb. and a maximum of 50 ft.-lb.

Wheels

Wheel Selection

When specifying or replacing your trailer wheels it is important that the wheels, tires, and axle are properly matched. The following characteristics are extremely important and should be thoroughly checked when replacement wheels are considered:

1. Bolt Circle. Wheels have many bolt circle variations and some are so close that it could be possible to attach an inappropriate wheel that does not match the axle hub.
2. Capacity. Wheel load capacity should match tire and trailer max. load ratings.
3. Offset. The relationship of the center line of the tire to the hub face of the axle should match any replacement. Failure to match offset may result in reducing the carrying capacity of your axle.
4. Rim Contour. Replacement wheels should be direct replacements to match the rim contour.



Use only rim contours suggested by manufacturer. Failure to use correct rim contour may cause dramatic separation of tire and wheel and could cause death or serious injury.



Attempting to modify or repair a wheel can cause unsafe conditions that may result in an explosion. Air pressure on a weakened or cracked rim can cause death or serious injury.

Torque Requirements

It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque wrenches assure the proper amount of torque is being applied to a fastener. Use no other method to torque fasteners.

⚠️ WARNING

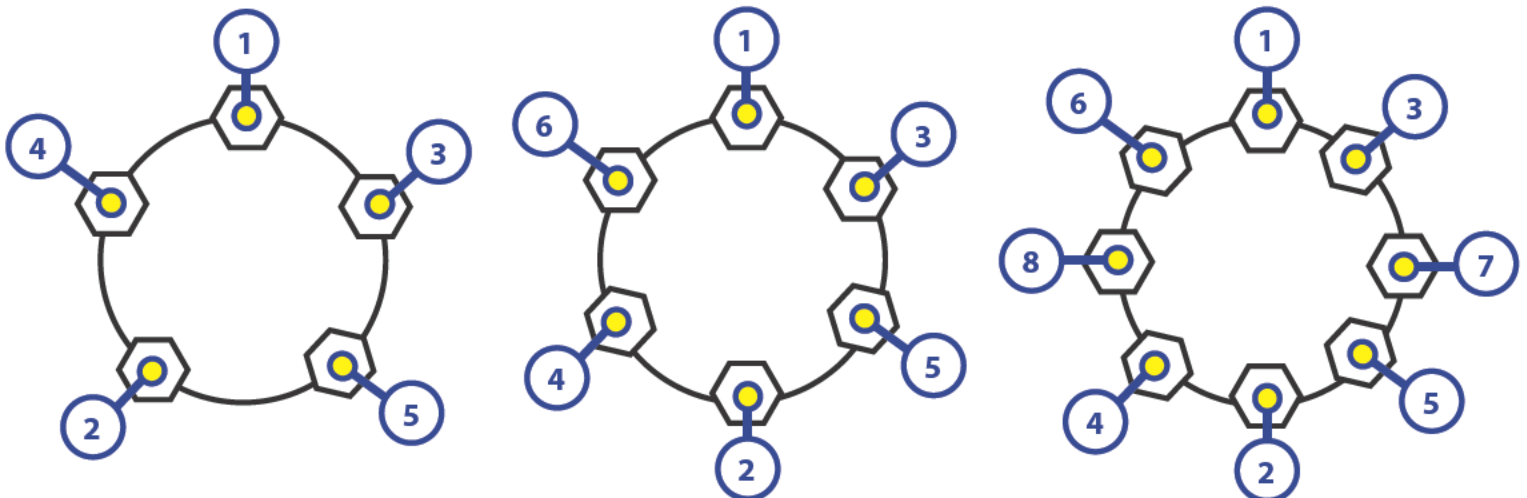
Proper and accurate torque must be maintained to prevent wheels from loosening, studs from cracking and/or breaking or other possible hazardous breakage resulting in death or serious injury.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60° or 90°). The proper procedure for attaching your wheels is as follows:

1. Start all bolts or nuts by hand to prevent cross threading.
2. Tighten bolts or nuts in the following sequence (see Wheel Torque Requirement Chart below).
3. Tightening fasteners should be done in stages. Follow the recommended sequence (Fig. 9), tighten fasteners per wheel torque requirements chart below.
4. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the 10 and 25 miles and again at 50 miles. A periodic check during regular service is recommended.

Wheel Torque Requirement Chart				
Wheel Size	Stud Size	Torque Sequence		
		1st Stage	2nd Stage	3rd Stage
14"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
15"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16.5" x 6.75"	1/2"	20-25 ft-lbs	50-60 ft-lbs	90-120 ft-lbs
16"	9/16"	20-25 ft-lbs	60-70 ft-lbs	120-130 ft-lbs
16.5" x 6.75"	9/16"	20-25 ft-lbs	60-70 ft-lbs	120-130 ft-lbs
16" Dual and 17.5" Cone Nut	5/8"	50-60 ft-lbs	100-120 ft-lbs	190-210 ft-lbs
16" Dual and 17.5" Flange Nut	5/8"	50-60 ft-lbs	150-200 ft-lbs	275-325 ft-lbs
14.5" Demount	5/8"	Tighten sequentially to 85-95 ft-lbs		

Fig. 9



Tires







Prior to mounting tires onto wheels, be sure the rim size and contour are approved by the Tire and Rim Association Yearbook or the tire manufacturers catalog. In addition, confirm that the tire will carry the rated load. If the load is not evenly distributed on all tires, use the tire rated for the heaviest wheel position.

The Rubber Manufacturers Association or the tire manufacturers guidelines should be consulted for mounting procedures.

Tire inflation pressure is the most important factor in tire life. Tire pressure should always be what is recommended by the manufacturer for the load. Always check pressure cold before operation. DO NOT bleed air from tires when they are hot. Check inflation pressure weekly during use to insure maximum tire and tread life.

The following tire wear diagnostic chart will help you pinpoint the causes and solutions of tire wear problems.

NOTE: Tire wear should be checked frequently because once a wear pattern becomes firmly established in a tire it is difficult to stop, even if the underlying cause is corrected.

Problem	Probable Cause	Corrective Action
Center Wear 	Over-inflation	Adjust pressure to particular load per tire catalog.
Edge Wear 	Under-inflation	Adjust pressure to particular load per tire catalog.
Side Wear 	Loss of camber or overloading	Make sure load does not exceed axle rating. Call Lippert Service & Warranty to advise.
Toe Wear 	Incorrect Toe-in	Call Lippert Service & Warranty to advise.
Cupping 	Out-of-balance	Check bearing adjustment and balance tires.
Flat Spots 	Wheel lockup and tire skidding	Avoid sudden stop if possible and adjust brakes.

Introduction to Troubleshooting

The following section is a guideline for ensuring operation of your braking system. The safety of you, those traveling with you and those sharing the road paramount and it starts with the ability to safely stop the tow vehicle and the towed vehicle.

Troubleshooting

Most brake malfunctions can be corrected by utilizing the Troubleshooting Chart on the next page. Mechanical failure is the most common form of malfunction, however, if the brake system fails and it's not mechanical, it is usually electrical. A Voltmeter and Ammeter are essential tools to diagnose these problems.

Mechanical problems are mostly self-evident; something is bent or broken. Consult the troubleshooting chart on Page 19 to determine the probable cause and corrective actions for a variety of issues with the braking system.

Remember to use only Lippert Components, Inc. replacement parts on these systems. Consult the Limited Warranty or call our Service Department for any other related issues.

Measuring Voltage

The Braking System voltage is measured at the two lead wires of the magnet on any brake. Use the pin probes inserted through the insulation of the lead wires. To ensure that the battery is indicating a full charge, the towing vehicle engine should be running with the trailer coupler connected when checking the voltage.

Voltage in the system should begin at 0 volts and, as the brake pedal of the tow vehicle is applied, voltage will gradually increase to about 12 volts. If the system does not indicate at least 12 volts, problems may occur in the wiring of the system, the battery or alternator of the tow vehicle.

When the brakes are applied, a gradual increase in voltage is preferable to a quick increase to 12 volts. A gradual increase in voltage ensures smooth and firm trailer braking. A quick increase in voltage will cause the braking system to feel like the trailer is grabbing too quickly.

Taking a Voltage reading is usually done with probes inserted into the wire connector (Fig. 10).

Fig. 10



Troubleshooting Chart

Problem	Probable Cause	Corrective Action
No brakes	Open circuits	Find and correct
	Short circuits	Test and correct
	Severe under-adjustment	Adjust brakes
Weak brakes	Grease or oil on magnets or linings	Clean or replace
	Corroded connections	Clean and correct cause of corrosion
	Worn linings or magnets	Replace
	Scored or grooved brake drums	Machine or replace
	Improper synchronization	Correct
	Under-adjustment	Adjust brakes
	Glazed Linings	Re-burnish or replace
Locking brakes	Under-adjustment	Adjust
	Improper synchronization	Correct
	Loose, bent or broken brake components	Test and correct
	Out-of-round brake drums	Machine or replace
	Insufficient wheel load	Adjust system resistor and synchronize
Intermittent brakes	Broken wires	Test and correct
	Loose connections	Repair or replace
	Faulty ground	Find and repair
Brakes pull to one side	Wrong magnet lead wire color	Adjust
	Incorrect adjustment	Correct
	Grease or oil on linings or magnets	Clean or replace
	Broken wires	Find and repair
	Bad connections	Find and repair
Harsh brakes	Under-adjustment	Adjust
	Improper synchronization	Correct
Noisy brakes	Under-adjustment	Adjust
	Lack of lubrication	Lubricate
	Broken	Replace component
	Incorrect brake components	Correct
Surging brakes	Grease or oil on linings or magnets	Clean or replace
	Out-of-round or cracked brake drums	Machine or replace
Dragging brakes	Over-adjustment	Readjust
	Out-of-round brake drums	Machine or replace
	Incorrect brake components	Replace
	Loose, bent or broken brake components	Replace
	Faulty breakaway switch	Repair or replace
	Loose wheel bearing adjustment	Adjust
	Bent spindle	Replace Axle

NOTE: If all trailer lights and brakes do not work, check your wiring plug connection and make sure the ball is making solid contact with the coupler (that is how a trailer is grounded). Too much grease or not using dielectric grease on the ball and coupler can cause this to happen.

Measuring Amperage

The Braking System amperage is the amount of current flowing through the system when all magnets have been energized. The amperage will change proportionately with the voltage. To ensure that the battery is indicating a full charge, the towing vehicle engine should be running with the trailer coupler connected when checking the voltage.

If a resistor is used in the brake system, it must be set at zero or bypassed completely to obtain the maximum amperage reading. Individual amperage draw can be measured by inserting the ammeter in the line at the magnet you want to check. Disconnect one of the magnet lead wire connectors and attach the ammeter between the two wires. Consult Amperage Chart on the next page for normal amp readings.

Make sure that the wires are properly reconnected and sealed after testing is completed.

Testing for Amperage can be done with probes (Fig. 11) or alligator clips on the leads or an amp clamp (Fig. 12).

Fig. 11



Fig. 12



Amperage Chart

Amps/Magnet	Two Brakes	Four Brakes	Six Brakes
3.0	6.0	12.0	18.0

Low or no voltage are the most common problem with the Braking System. Amperage at the brakes is also a relatively common issue. Common causes of these conditions are:

1. Low quality electrical connections
2. Open circuits
3. Insufficient wire gauge
4. Broken wires
5. Blown fuses (fusing of brakes is not recommended)
6. Short circuits (indicated by high amperage)

Possible causes of shorts are:

1. Shorted magnet coils
2. Bare wires contacting a grounded object

Finding the cause of a short circuit in the system is done by isolating one section at a time. If the high amperage reading drops to zero by unplugging the trailer, then the short is in the trailer. If the amperage reading remains high with all the brake magnets disconnected, the short is in the trailer wiring.

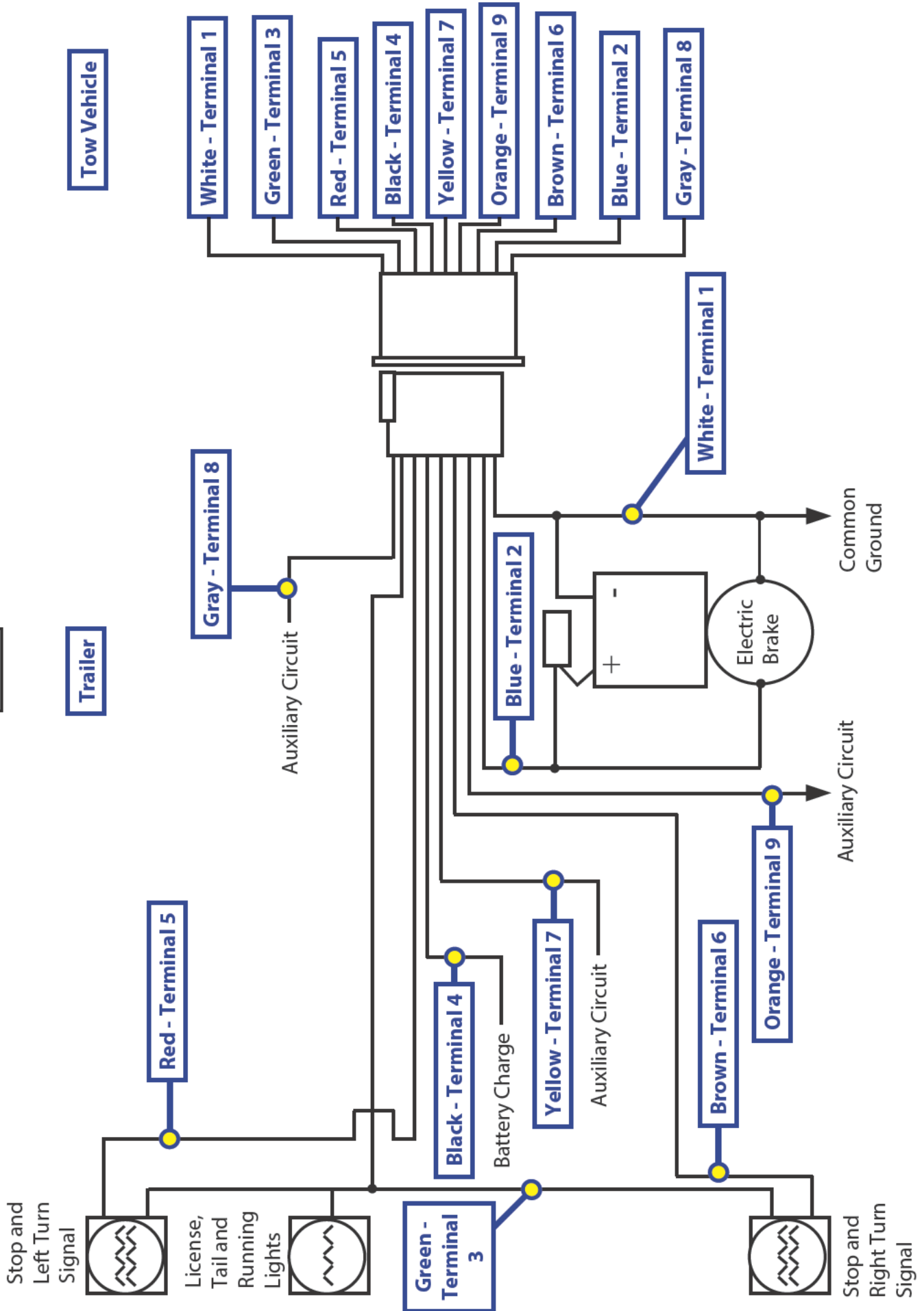
All electrical troubleshooting procedures should start at the controller. Most complaints regarding brake harshness or malfunction are traceable to improperly adjusted or nonfunctional controllers. See your controller manufacturer's data for proper adjustment and testing procedures. For best results, all the connection points in the brake wiring should be sealed to prevent corrosion. Loose or corroded connectors will cause an increase in resistance which reduces the voltage available for the brake magnets.

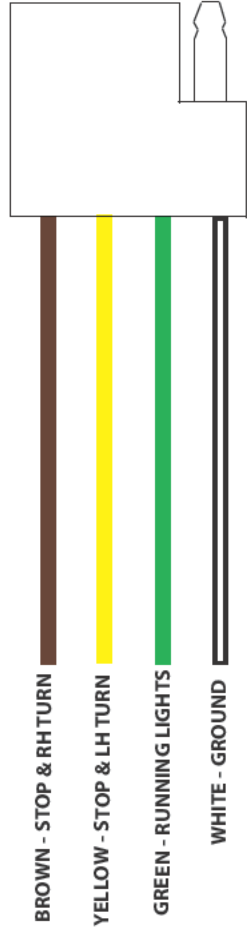
Maintenance Schedule

Item	Function Required	Weekly	3 Months / 3,000 Miles	6 Months / 6,000 Miles	12 Months / 12,000 Miles
Brakes	Test that they're operational.	At Every Use			
Breakaway System	Check battery charge and switch operation.	At Every Use			
Brake Adjustment	Adjust to proper operating clearance.		◆		
Brake Magnets	Inspect for wear and current draw.			◆	
Brake Linings	Inspect for wear or contamination.				◆
Brake Controller	Check for correct amperage and modulation.			◆	
Trailer Brake Wiring	Inspect wiring for bare spots, fray, etc.				◆
Hub/Drum	inspect for abnormal wear or scoring.				◆
Wheel Bearing	Inspect for corrosion or wear. Clean and repack.				◆
Seals	Inspect for leakage. Replace if removed.				◆
Springs	Inspect for wear, loss of arch.				◆
Suspension Parts	Inspect for bending, loose fasteners, wear.			◆	
Hangers	Inspect welds.				◆
Wheel Nuts and Bolts	Tighten to specified torque values.		◆		
Wheels	Inspect for cracks, dents, or distortion.			◆	
Tire Inflation Pressure	Inflated tires to mfg's specifications.	◆			
Tire Condition	Inspect for cuts, wear, bulging, etc.		◆		

Wiring Diagram

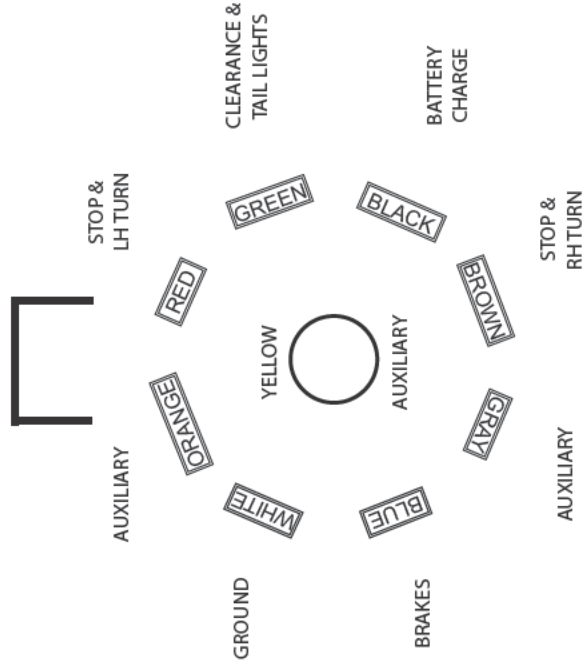
Fig. 13



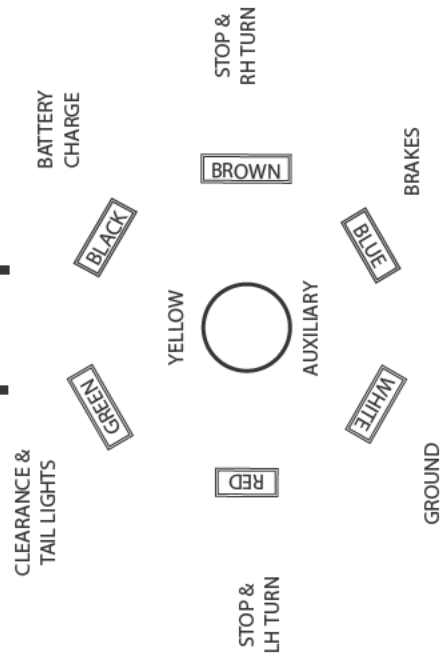


TRAILER LIGHTS PIGTAIL - DOES NOT OPERATE BRAKES

9-PIN COUPLER

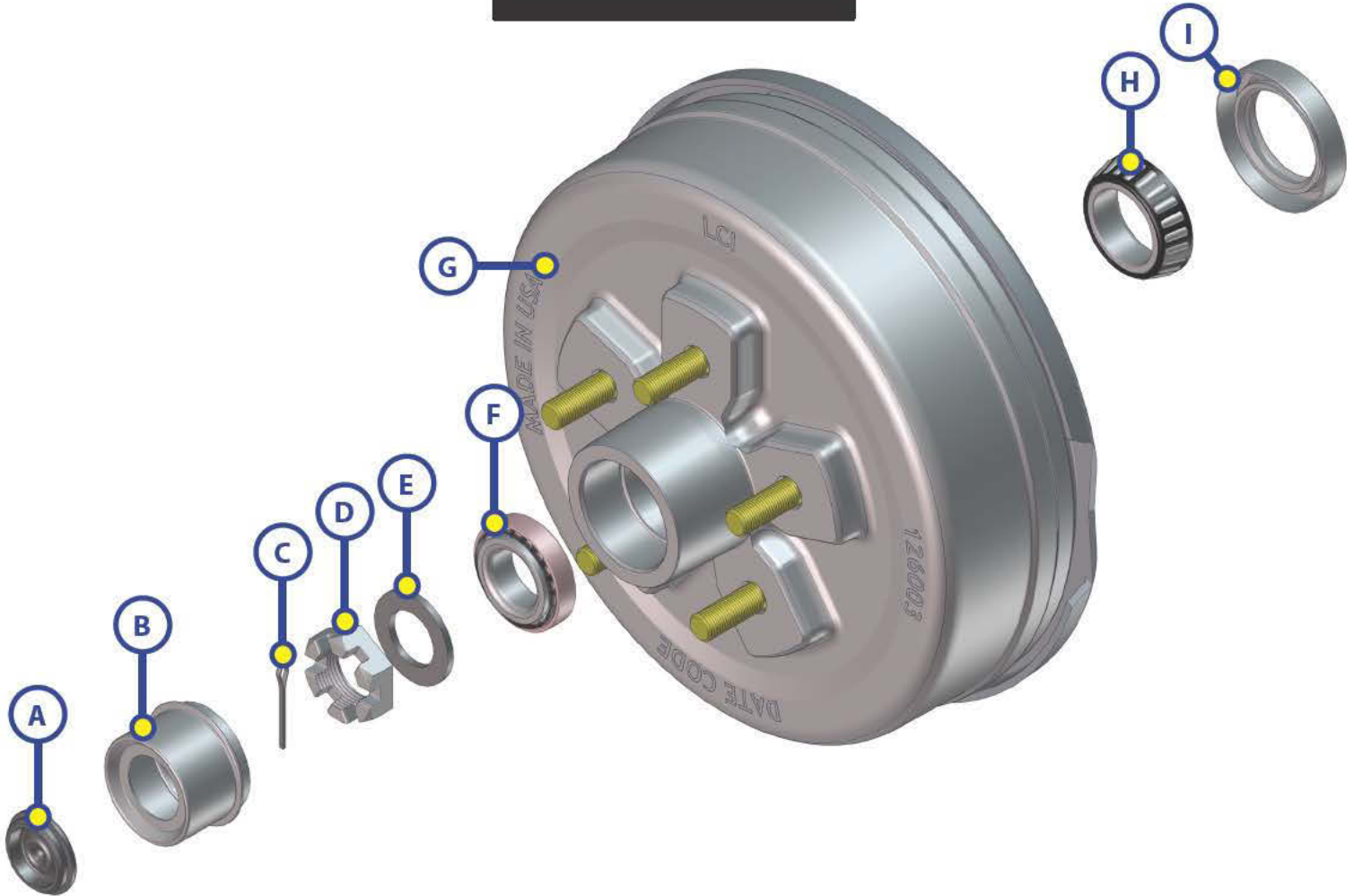


7-PIN COUPLER



TRAILER BRAKE AND LIGHT COUPLER - OPERATES BRAKES

AXLES AND SUSPENSION

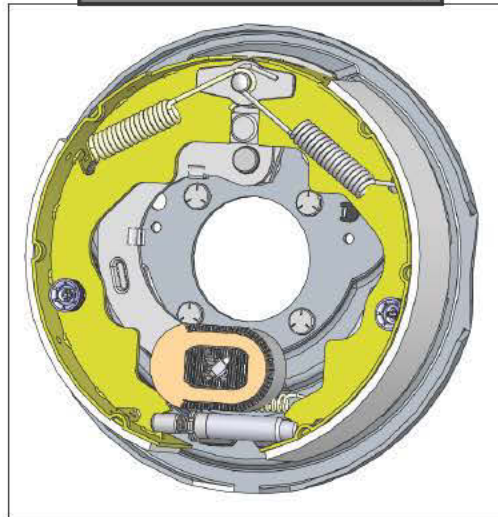


Callout	Part #	Description
A	122065	Rubber plug for lubed grease caps
B	122067	Dust cap, for 2" bore, super lube
	122099	Dust cap, for 2" bore, non-lube
C	122075	Cotter pin
D	122081	Spindle nut, 6 slot
E	119214	Spindle washer, round ID
E1	119215	Spindle washer, for spindle with D-flat
E2	119216	Spindle locking tang washer
Use E1 and E2 in place of C and E if spindle has no hole for cotter pin and has D-flat on all axles built prior to 2009.		
F	122089	Outer bearing cone, L44649
	125102	Outer bearing cup, L44610
G	126003	Brake hub; 545-1/2"
H	122092	Inner bearing cone, L68149
	124296	Inner bearing cup, L68111
I	122087	Grease seal, double lip, 1.72" ID x 2.565" OD



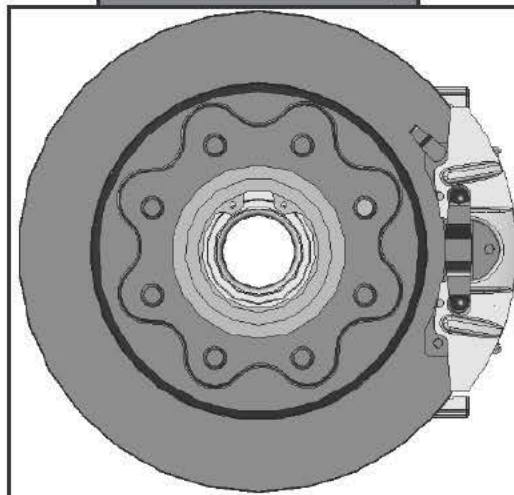
AXLES AND SUSPENSION

Electric Brake Assembly



Part #	Description
122258	Electric Brake - 10" x 2.25" (Left Hand)
1222581	Electric Brake - 10" x 2.25" APG (Left Hand)
1222582	Electric Brake - 10" x 2.25" Long Lead (Left Hand)
1222583	Electric Brake - 10" x 2.25" Self-Adjusting (Left Hand)
139380	Electric Brake - 10" x 2.25" with Park (Left Hand)
122450	Electric Brake - 10" x 2.25" (Right Hand)
1224501	Electric Brake - 10" x 2.25" APG (Right Hand)
1224502	Electric Brake - 10" x 2.25" Long Lead (Right Hand)
12244503	Electric Brake - 10" x 2.25" Self-Adjusting (Right Hand)
139381	Electric Brake - 10" x 2.25" with Park (Right Hand)

Disc Brake Assembly

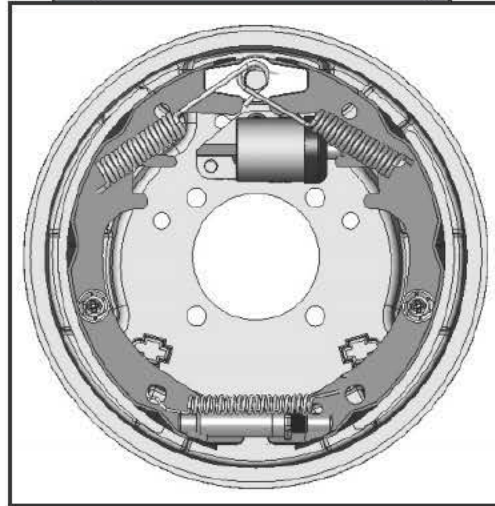


Part #	Description
130033	Disc Brake; 545 - 1/2" Studs



AXLES AND SUSPENSION

Hydraulic Brake Assembly



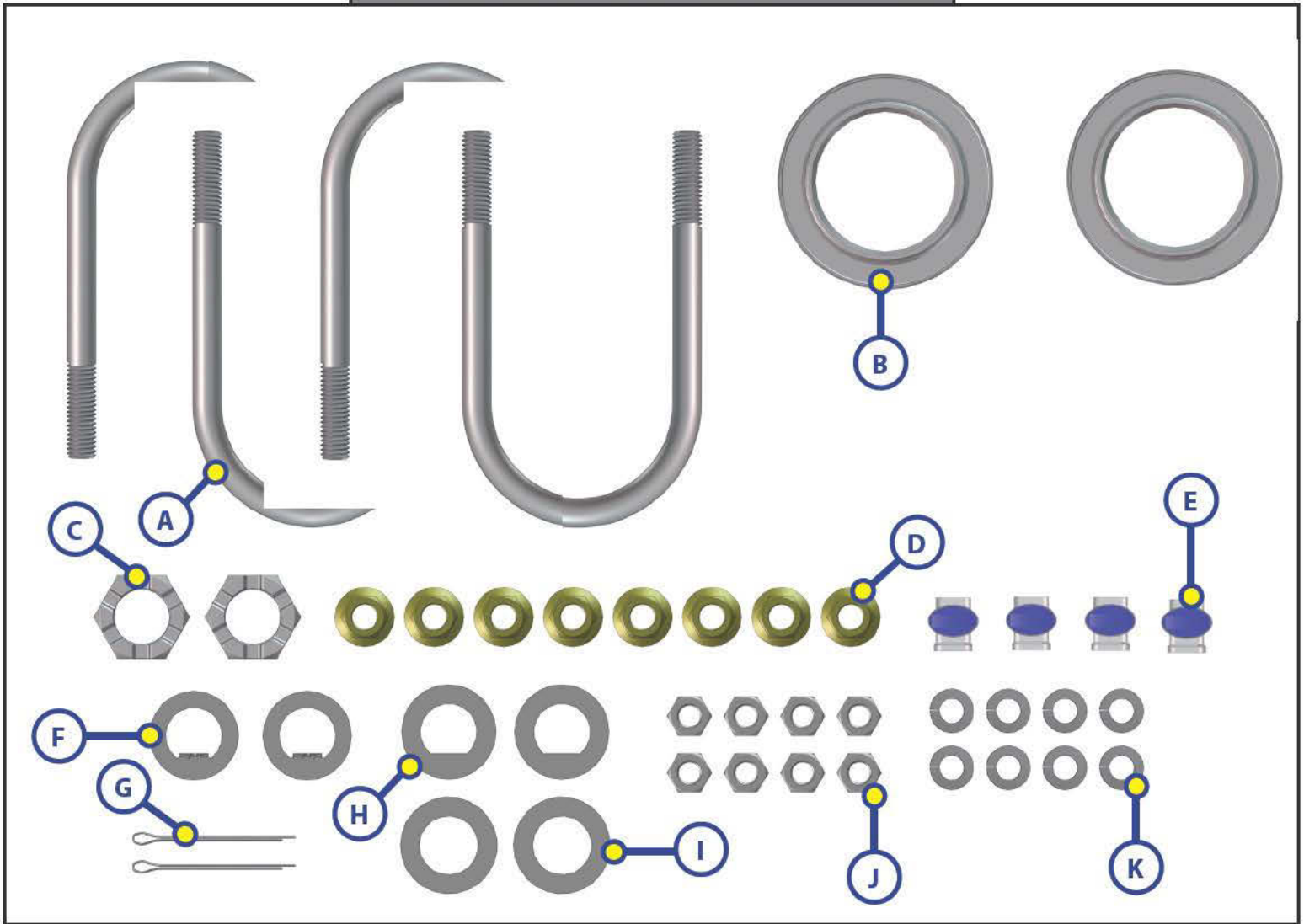
Part #	Description
132047	Hydraulic Brake - 10" x 2.25" (Right Hand)
132048	Hydraulic Brake - 10" x 2.25" (Left Hand)
179868	Hydraulic Brake - 10" x 2.25" Free Backing (Right Hand)
179869	Hydraulic Brake - 10" x 2.25" Free Backing (Left Hand)



LIPPERT
COMPONENTS

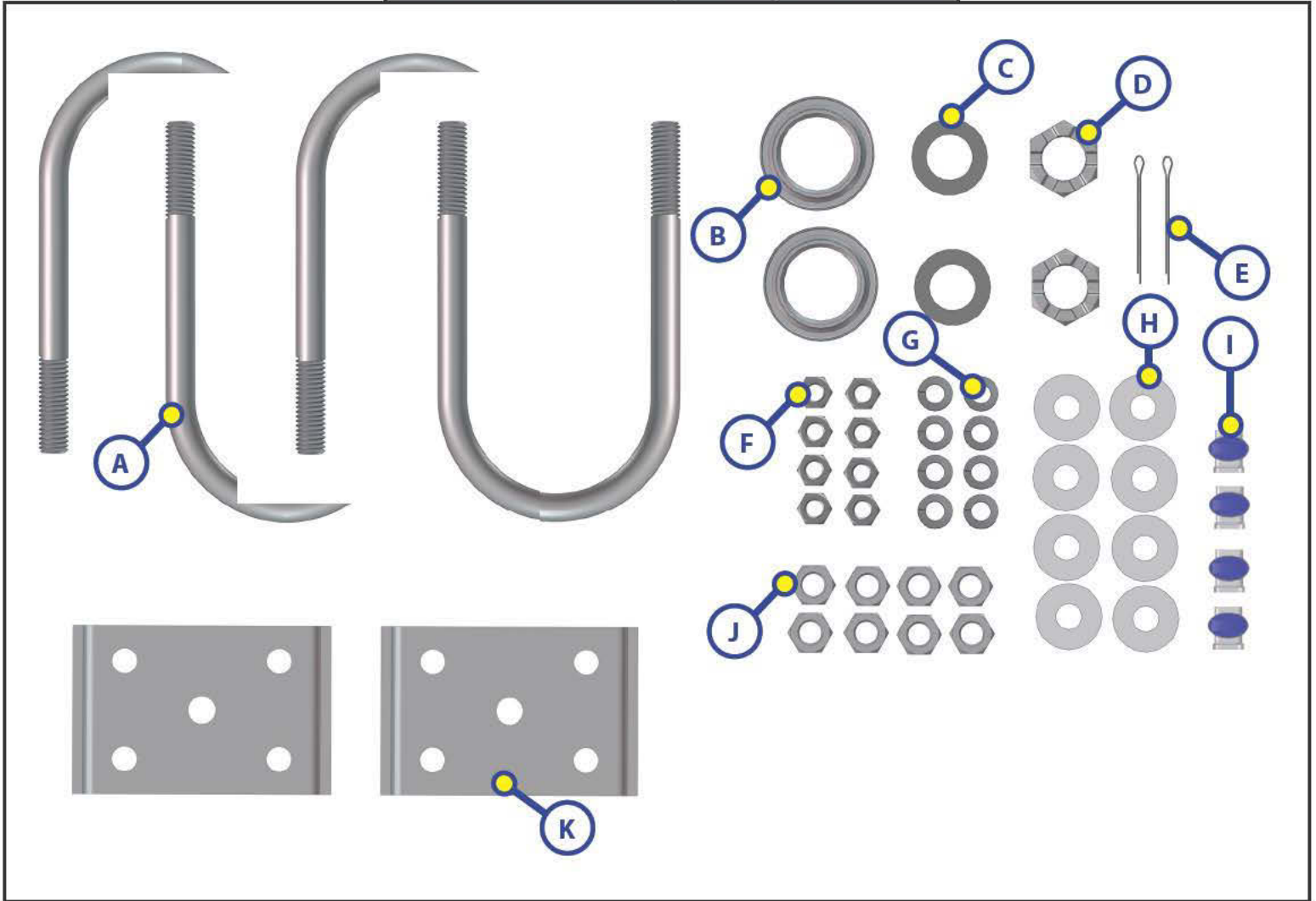
AXLES AND SUSPENSION

Axle U-Bolt Service Kit (2 3/8" Beam) Part #173229



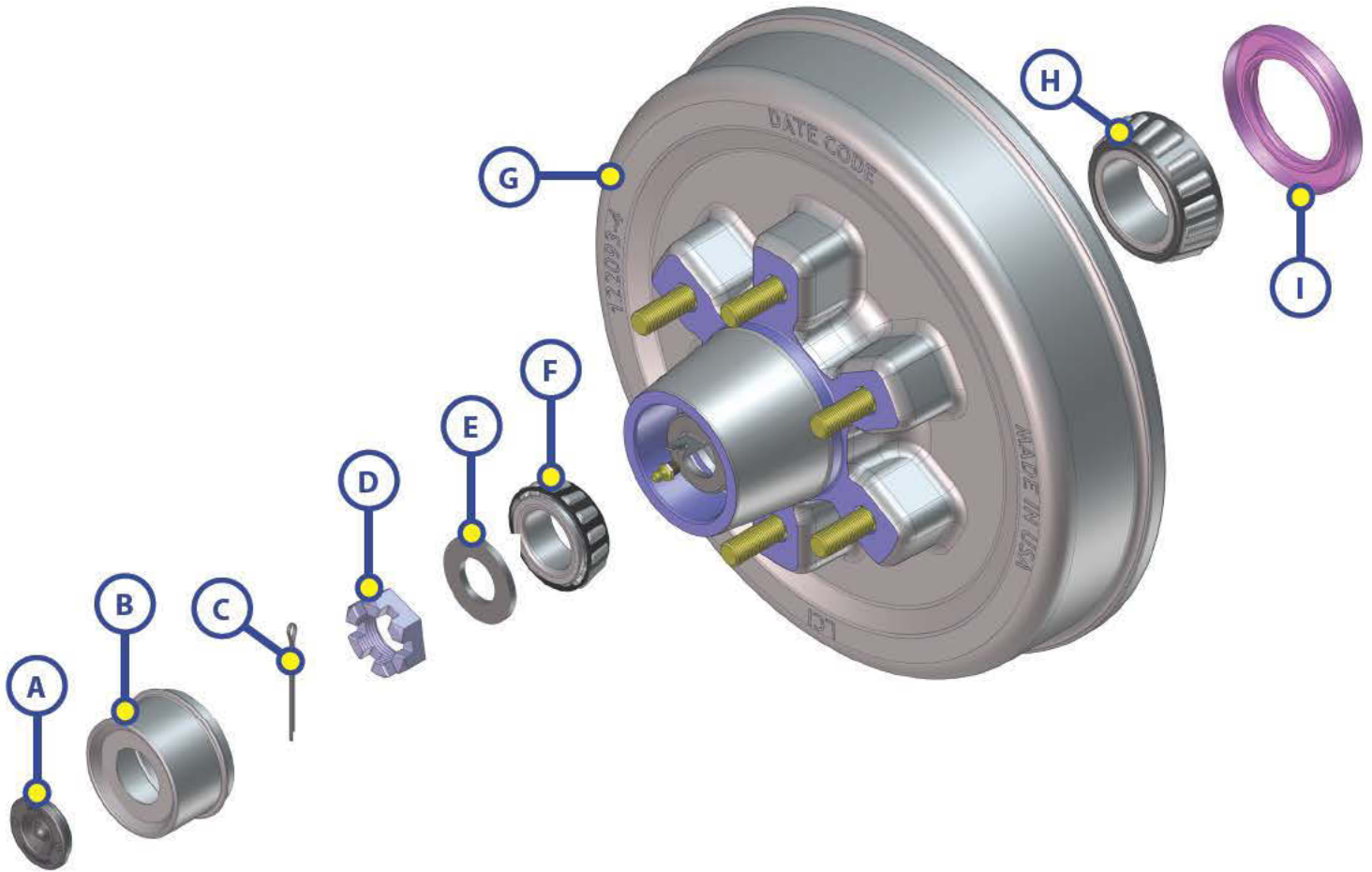
Callout	Part #	Description	Quantity
A	122073	U-Bolt; 1/2 - 20 x 5.1, 2.375 Tube Diameter Yellow Dich	4
B	122087	Seal; 1.666 x 2.565 x 5 (2,800 - 3,500)	2
C	122081	Castle Nut; 1 - 14	2
D	122079	Yellow Zinc Nut; .5 - 20	8
E	122084	Sealed Wire Connector	4
F	119216	Tang Washer; 1.58 x .033	2
G	122075	Cotter Pin; .120 x 1.75	2
H	119215	D-Flat Spindle Washer; 1 x 1.68	2
I	119214	Rounded Spindle Washer; 1 ID x 1.68 OD	2
J	122085	Washer; 7/16 - 20 Hex YZ or SZ	8
K	122086	Washer; 7/16 x 3/4 x 11 GA Helical Lock Zinc	8

Axle U-Bolt Service Kit (3" Tube) Part #260525



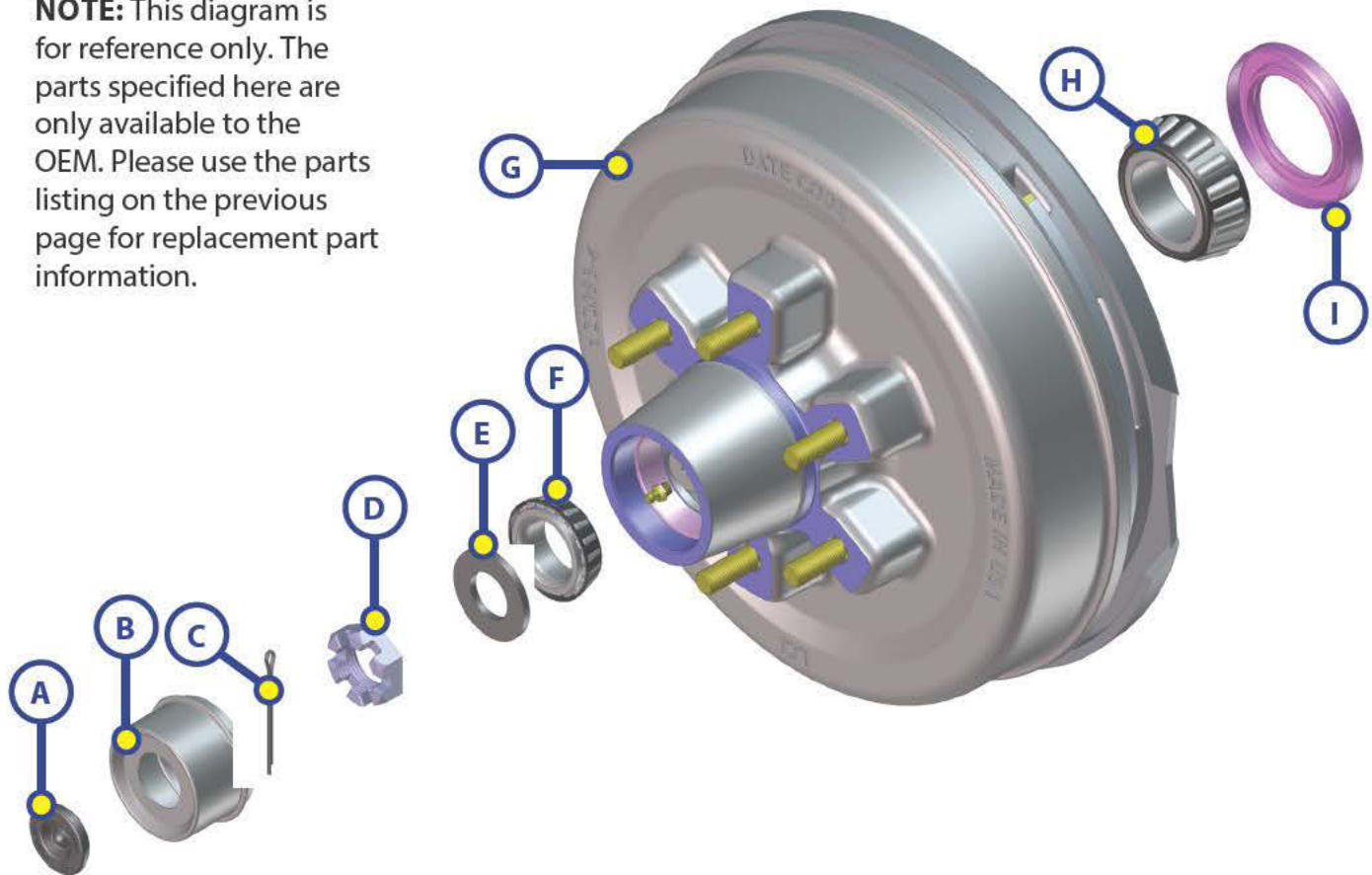
Callout	Part #	Description	Quantity
A	2139541	U-Bolt; 5/16 - 18 x 6.625, 3" Tube YZ	4
B	122087	Seal; 1.666 x 2.565 x 5 (2,800 - 3,500)	2
C	119214	Round Spindle Washer; 1 ID x 1.68 OD	2
D	122081	Castle Nut; 1 - 14	2
E	122075	Cotter Pin; .120 x 1.75	2
F	122085	Nut; 7/16 - 20 Hex YZ or SZ	8
G	122086	Helical Lock Zinc Washer; 7/16 x 3/4 x 11 GA	8
H	170997	Flat USS Hardened Washer; 5/16	8
I	122084	Sealed Wire Connector	4
J	182274	Nut; 5/16 - 18 Hex GR8	8
K	2139521	4 x 6.15 x .8 x .8	2

AXLES AND SUSPENSION



Callout	Part #	Description
A	122065	Rubber plug for lubed grease caps
B	122064	Dust cap, for 2.5" bore, super lube
	122071	Dust cap, for 2.5" bore, non-lube
C	122075	Cotter pin
D	122081	Spindle nut, 6 slot
E	179660	Spindle washer, round ID
E1	172888	Spindle washer, for spindle with D-flat
E2	119216	Spindle locking tang washer
Use E1 and E2 in place of C and E if spindle has no hole for cotter pin and has D-flat on all axles built prior to 2009		
F	122091	Outer bearing cone, 15123
	122996	Outer bearing cup, 15245
G	122094	Brake Hub; 655; ½" studs
	122095	Brake Hub; 865; ½" studs
	122096	Brake Hub; 865; ⅝" studs
H	122066	Inner bearing cone, 25580
	124287	Inner bearing cup, 25520
I	122088	Grease seal, double lip, 2.25" ID x 3.376" OD

NOTE: This diagram is for reference only. The parts specified here are only available to the OEM. Please use the parts listing on the previous page for replacement part information.



Callout	Part #	Description
A	122065	Rubber plug for lubed grease caps
B	122064	Dust cap, for 2.5" bore, super lube
	122071	Dust cap, for 2.5" bore, non-lube
C	122075	Cotter pin
D	122081	Spindle nut, 6 slot
E	119214	Spindle washer, round ID
E1	119215	Spindle washer, for spindle with D-flat
E2	119216	Spindle locking tang washer
Use E1 and E2 in place of C and E if spindle has no hole for cotter pin and has D-flat on all axles built prior to 2009		
F	122090	Outer bearing cone, L44649
	124292	Outer bearing cup, L44610
G	122093	Brake Hub-drum, with cups and studs, 6 on 5.50" BC
H	122066	Inner bearing cone, 25580
	124287	Inner bearing cup, 25520
I	122088	Grease seal, double lip, 2.25" ID x 3.376" OD



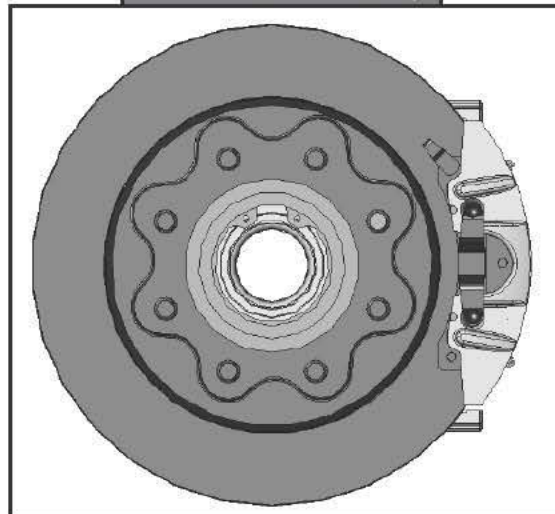
AXLES AND SUSPENSION

Electric Brake Assembly



Part #	Description
122259	Electric Brake - 12" x 2" (Left Hand)
1222592	Electric Brake - 12" x 2" Long Lead (Left Hand)
1222593	Electric Brake - 12" x 2" Self-Adjusting (Left Hand)
122451	Electric Brake - 12" x 2" (Right Hand)
1224512	Electric Brake - 12" x 2" Long Lead (Right Hand)
1224513	Electric Brake - 12" x 2" Self-Adjusting (Left Hand)

Disc Brake Assembly



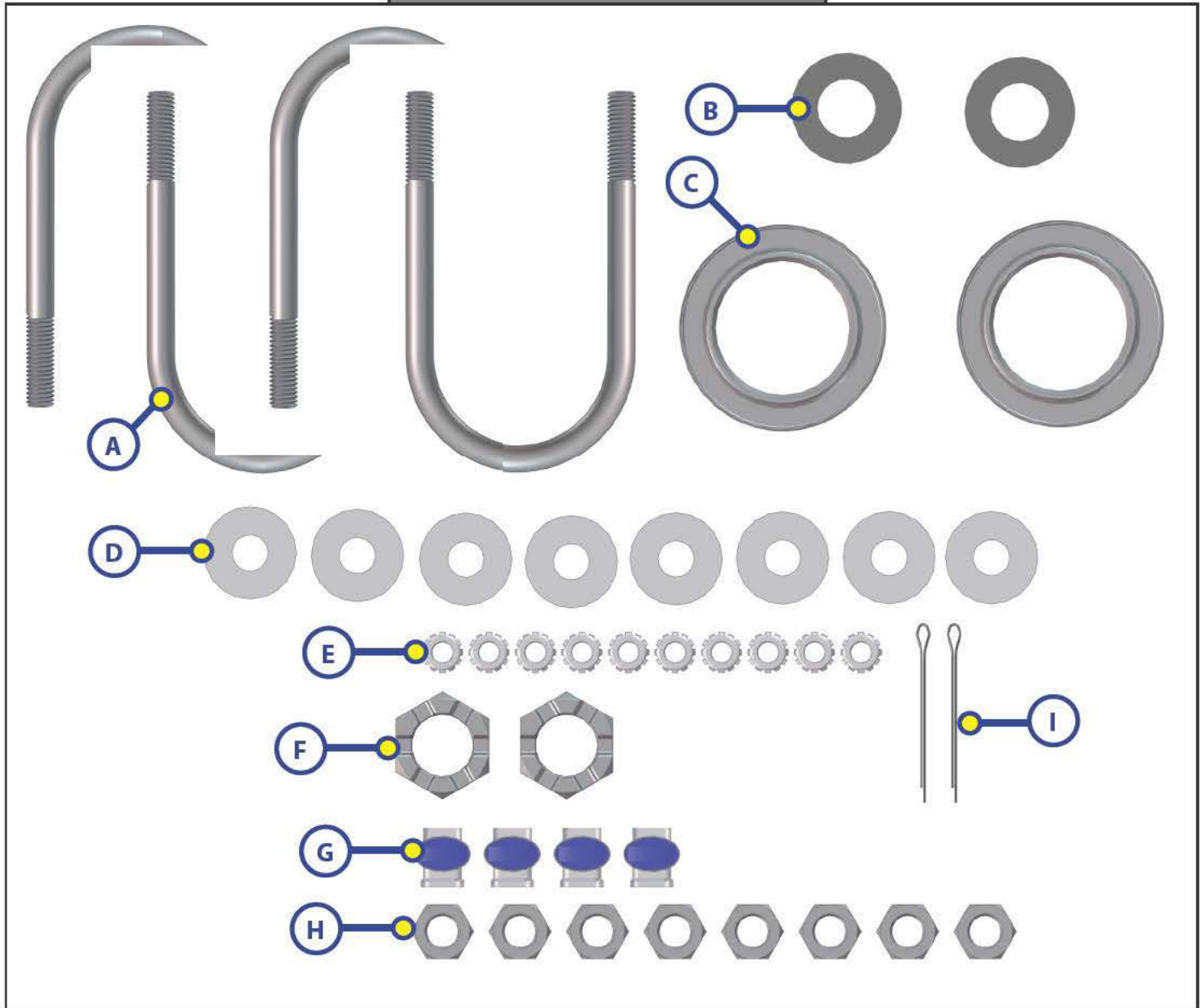
Part #	Description
130111	Disc Brake; 655 - 1/2" Studs (5,200 - 6,000)



5,200-LB AXLE WHEEL END U-BOLT ASSEMBLIES WEBPAGE

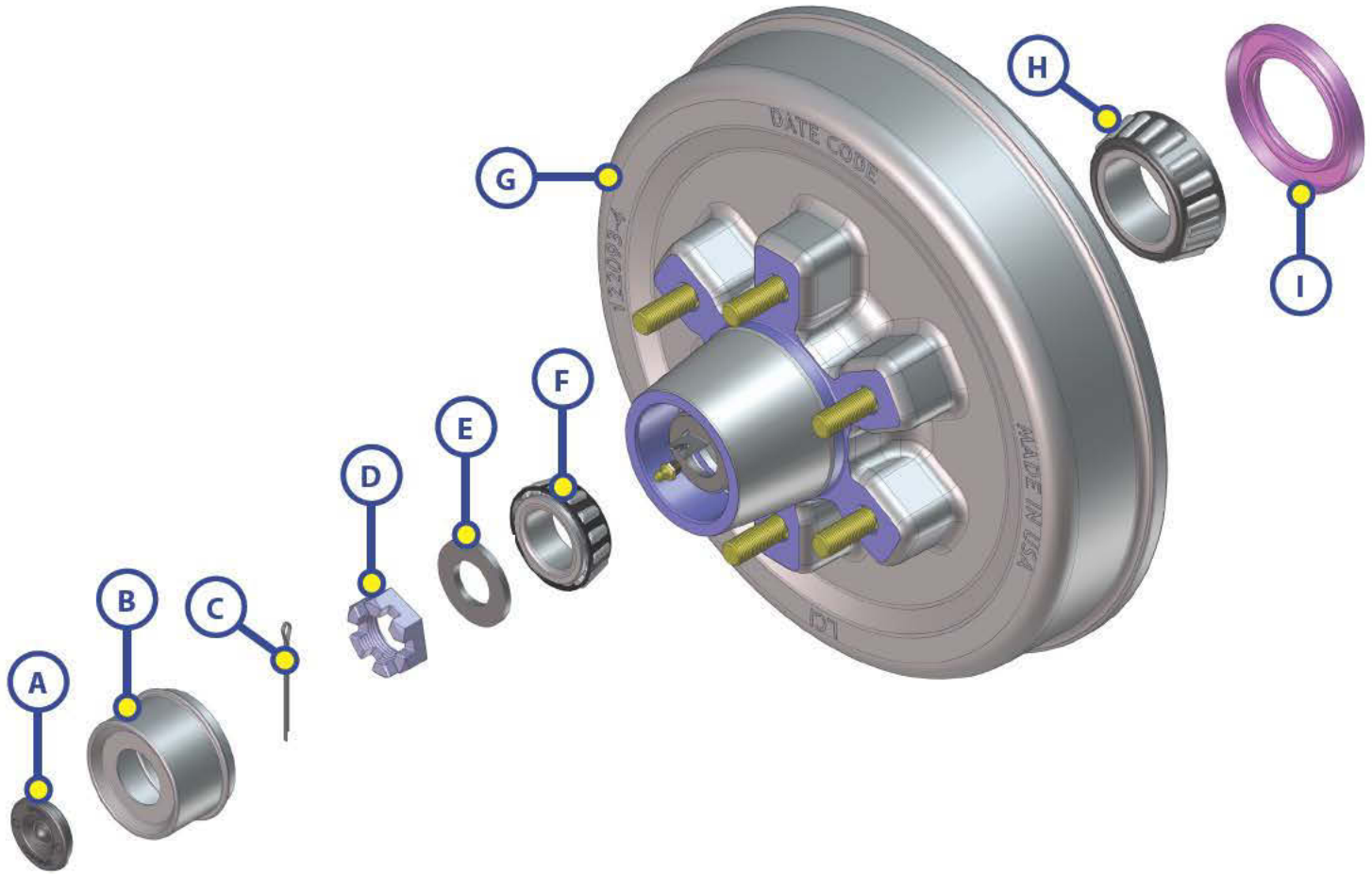
AXLES AND SUSPENSION

Axle U-Bolt Service Kit Part #232996



Callout	Part #	Description	Quantity
A	2139541	U-Bolt; $\frac{1}{16}$ - 18 x 6.625" for 3" Tube	4
B	119214	Round Spindle Washer - 1 ID x 1.68 OD	2
C	122088	Double Lip Grease Seal (5,200-7,000)	2
D	170997	Flat USS Hardened Washer - $\frac{1}{16}$ "	8
E	122077	Brake Nut Locking Keys Clear Dich	10
F	122081	Castle Nut - 1 - 14	2
G	122084	Sealed Wire Connector	4
H	182274	Hex Nut; $\frac{1}{16}$ " - 18 GR8	8
I	122075	Cotter Pin; .120" x 1.75"	2

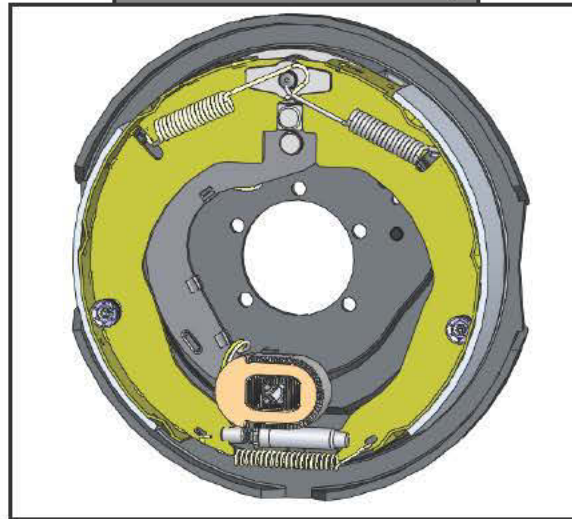
AXLES AND SUSPENSION



Callout	Part #	Description
A	122065	Rubber plug for lubed grease caps
B	122064	Dust cap, for 2.5" bore, super lube
	122071	Dust cap, for 2.5" bore, non-lube
C	122075	Cotter pin
D	122081	Spindle nut, 6 slot
E	179660	Spindle washer, round ID
E1	172888	Spindle washer, for spindle with D-flat
E2	119216	Spindle locking tang washer
Use E1 and E2 in place of C and E if spindle has no hole for cotter pin and has D-flat on all axles built prior to 2009		
F	122091	Outer bearing cone, 15123
	122996	Outer bearing cup, 15245
G	122094	Brake Hub; 655; ½" studs
	122095	Brake Hub; 865; ½" studs
	122096	Brake Hub; 865; ⅝" studs
H	122066	Inner bearing cone, 25580
	124287	Inner bearing cup, 25520
I	122088	Grease seal, double lip, 2.25" ID x 3.376" OD

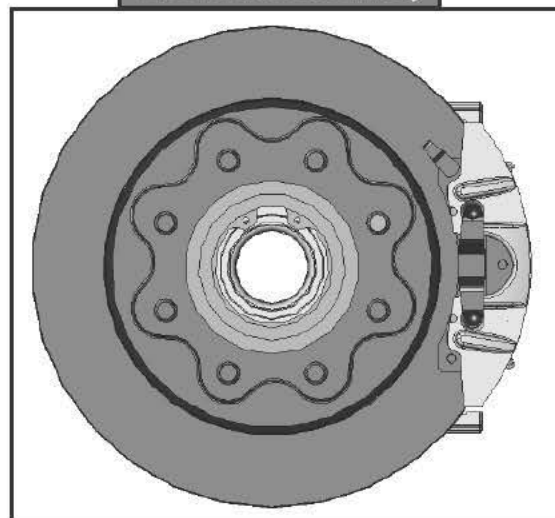
AXLES AND SUSPENSION

Electric Brake Assembly



Part #	Description
122259	Electric Brake; 12" x 2" (Left Hand)
1222592	Electric Brake; 12" x 2" Long Lead (Left Hand)
1222593	Electric Brake; 12" x 2" Self-Adjusting (Left Hand)
122451	Electric Brake; 12" x 2" (Right Hand)
1224512	Electric Brake; 12" x 2" Long Lead (Right Hand)
1224513	Electric Brake; 12" x 2" Self-Adjusting (Left Hand)

Disc Brake Assembly

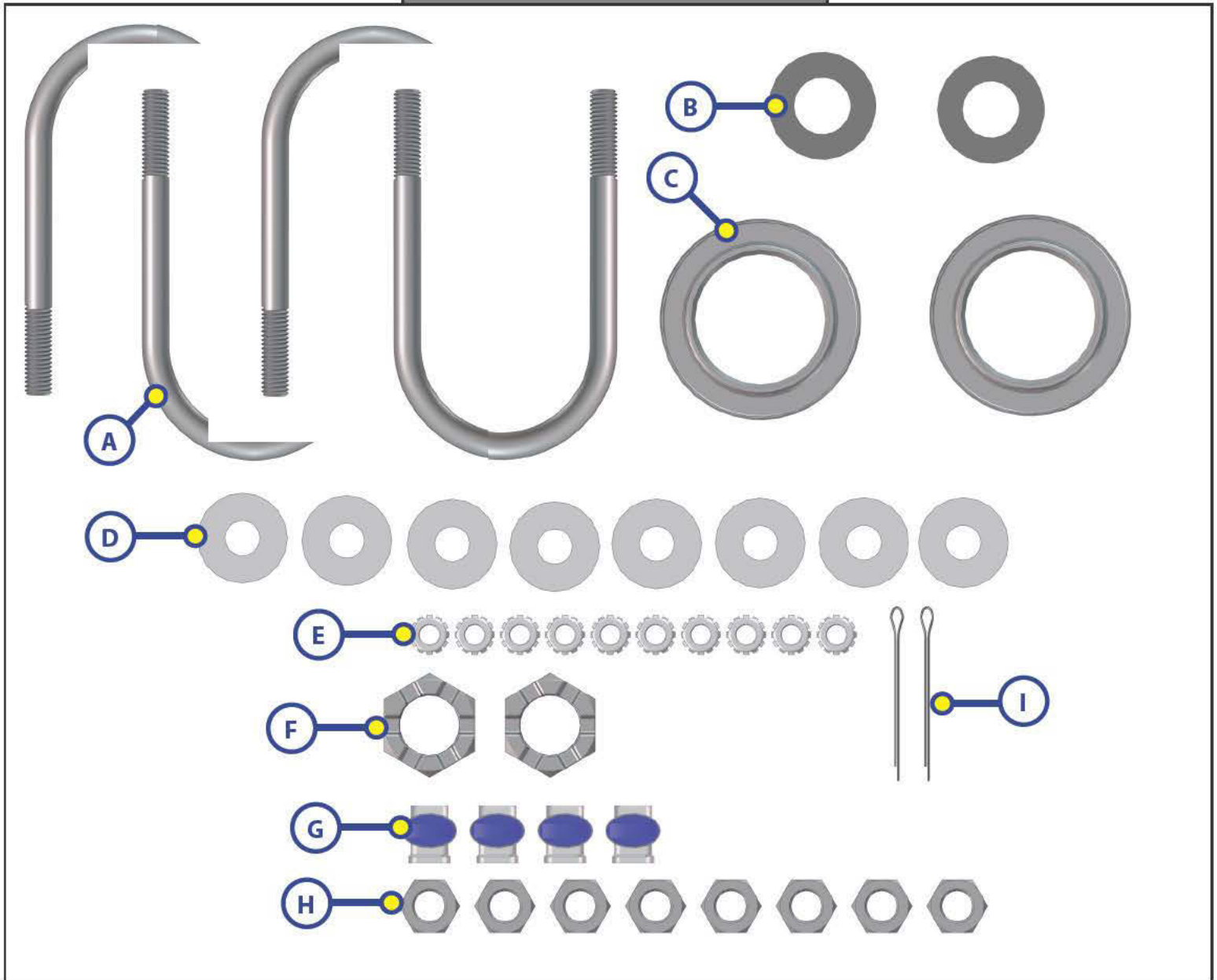


Part #	Description
130111	Disc Brake; 655; 1/2" Studs (5,200 - 6,000)



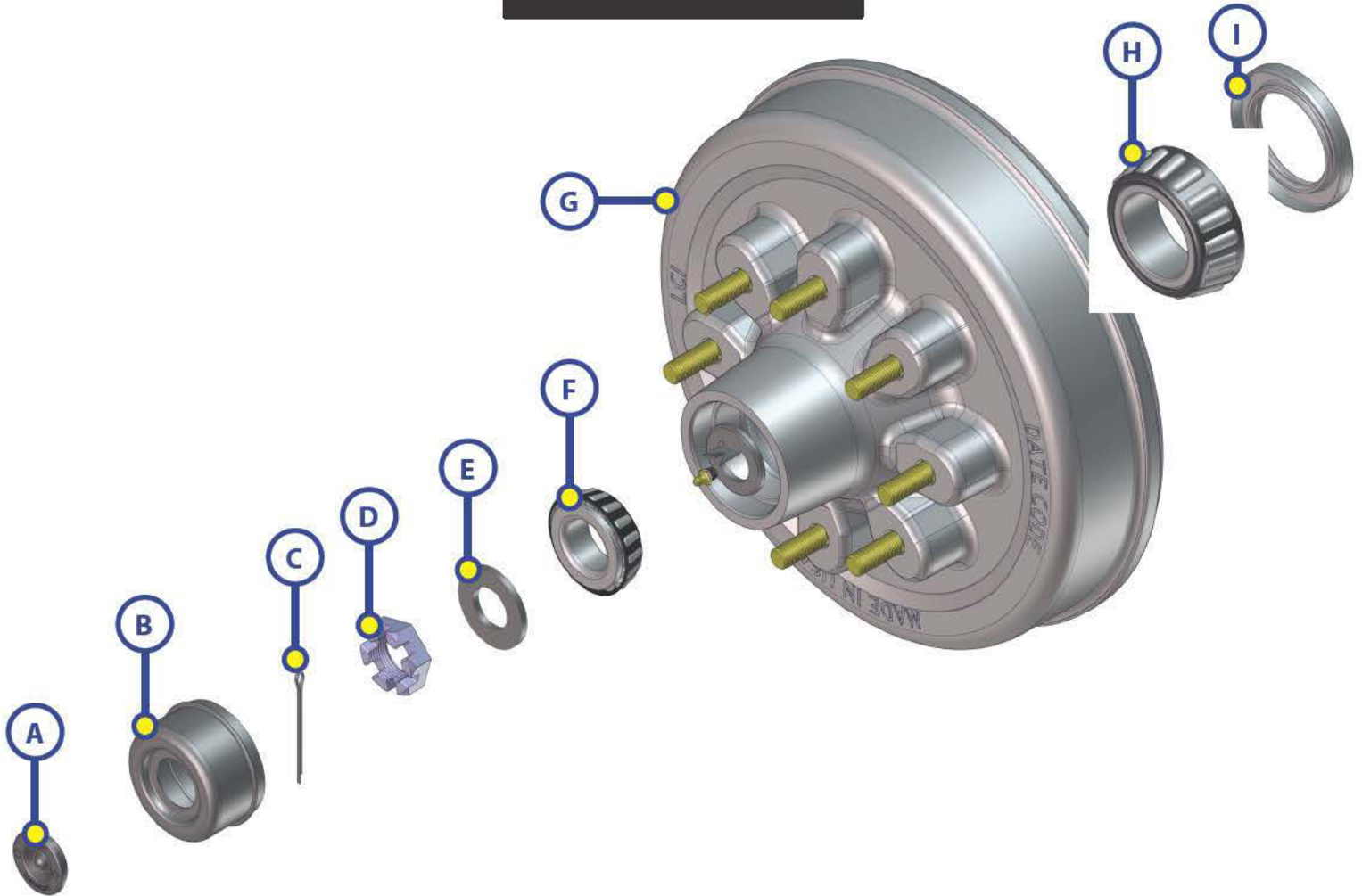
AXLES AND SUSPENSION

Axle U-Bolt Service Kit Part #232996



Callout	Part #	Description	Quantity
A	2139541	U-Bolt; 5/16" - 18 x 6.625" for 3" Tube	4
B	119214	Round Spindle Washer; 1 ID x 1.68 OD	2
C	122088	Double Lip Grease Seal (5,200-7,000)	2
D	170997	Flat USS Hardened Washer; 5/16"	8
E	122077	Brake Nut Locking Keps Clear Dich	10
F	122081	Castle Nut; 1 - 14	2
G	122084	Sealed Wire Connector	4
H	182274	Hex Nut; 5/16" - 18 GR8	8
I	122075	Cotter Pin; .120" x 1.75"	2

AXLES AND SUSPENSION



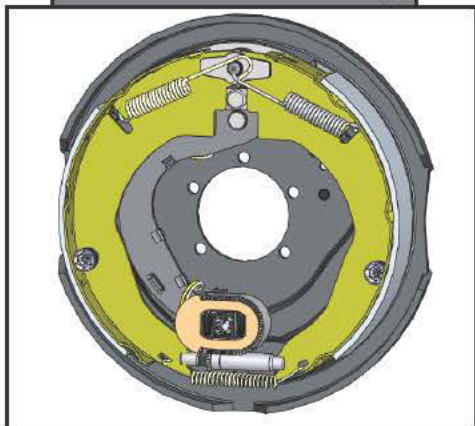
Callout	Part #	Description
A	122065	Rubber plug for lubed grease caps
B	127300	Dust Cap, for 2.75" Bore, Super lube
	127206	Dust Cap, for 2.75" Bore, Non-lube
C	122075	Cotter Pin
D	122081	Spindle Nut, 6 Slot
E	179660	Spindle washer, round ID
E1	172888	Spindle washer, for spindle with D-flat
E2	119216	Spindle locking tang washer
Use E1 and E2 in place of C and E if spindle has no hole for cotter pin and has D-flat		
F	127009	Outer Bearing Cone, 14125A
	127012	Outer Bearing Cup, 14276
G	122096	Brake Hub; 865 - 1/2"
	134543	Brake Hub; 865 - 5/16"
H	122066	Inner Bearing Cone, 25580
	124287	Inner Bearing Cup, 25520
I	122088	Grease Seal, Double Lip, 2.25" ID x 3.376" OD



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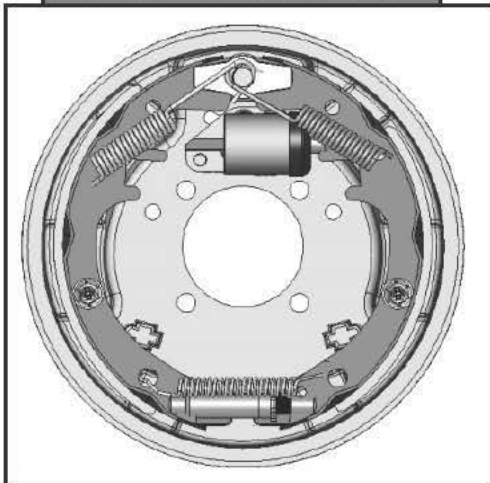
AXLES AND SUSPENSION

Electric Brake Assembly



Part #	Description
122259	Electric Brake; 12" x 2" (Left Hand)
1222592	Electric Brake; 12" x 2" Long Lead (Left Hand)
1222593	Electric Brake; 12" x 2" Self Adjusting (Left Hand)
122451	Electric Brake; 12" x 2" (Right Hand)
1224512	Electric Brake; 12" x 2" Long Lead (Right Hand)
1224513	Electric Brake; 12" x 2" Self Adjusting (Right Hand)
139383	Electric Brake; 12" x 2" (Left Hand)
139384	Electric Brake; 12" x 2" (Right Hand)

Hydraulic Brake Assembly

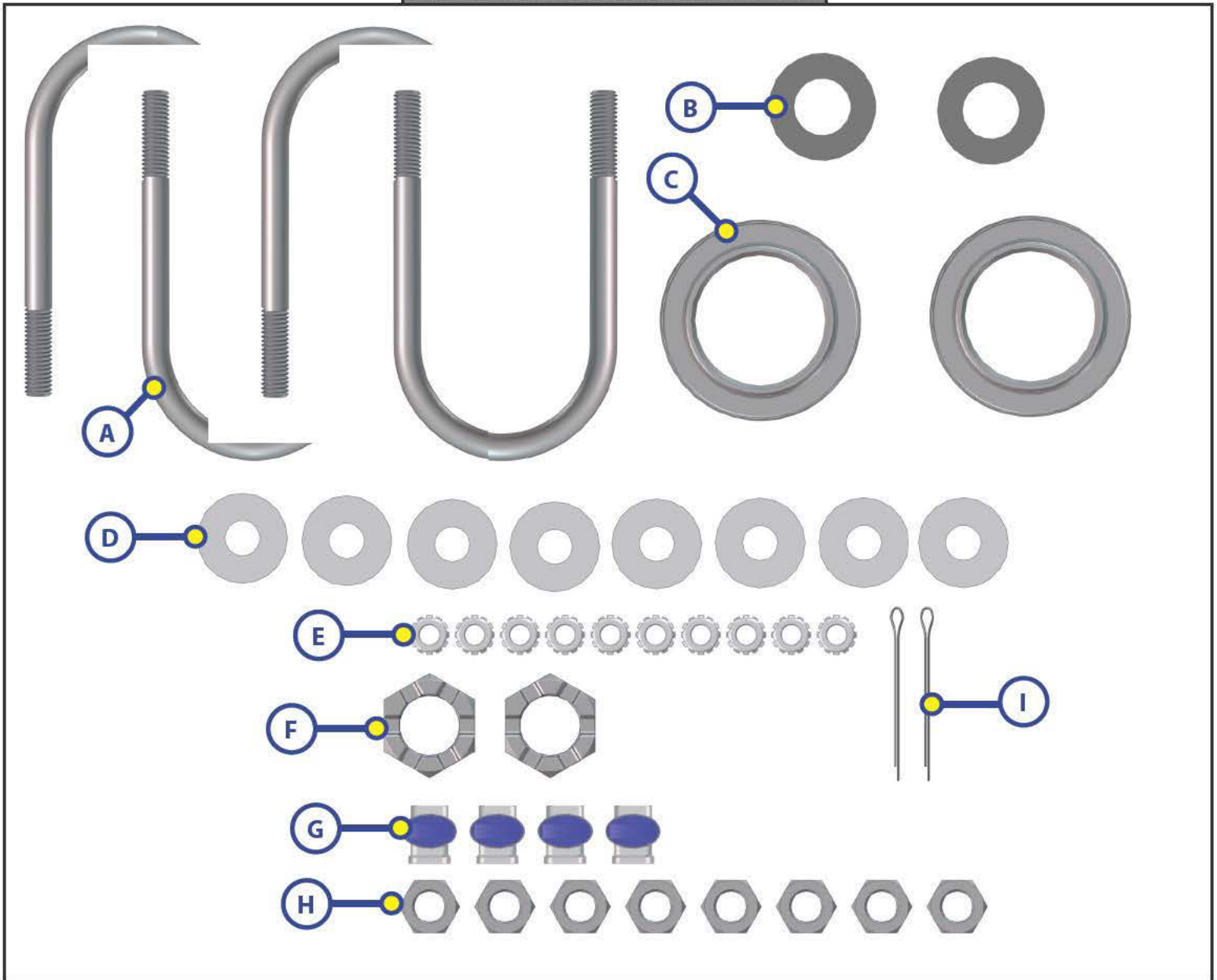


Part #	Description
138754	Hydraulic Brake; 12" x 2" (Left Hand)
138755	Hydraulic Brake; 12" x 2" (Right Hand)
139419	Hydraulic Brake; 12" x 2" Free Backing (Left Hand)
139420	Hydraulic Brake; 12" x 2" Free Backing (Right Hand)
139429	Hydraulic Brake; 12" x 2" With Park (Left Hand)
139430	Hydraulic Brake; 12" x 2" With Park (Right Hand)
139516	Hydraulic Brake; 12" x 2" Free Backing With Park (Left Hand)
139517	Hydraulic Brake; 12" x 2" Free Backing With Park (Right Hand)



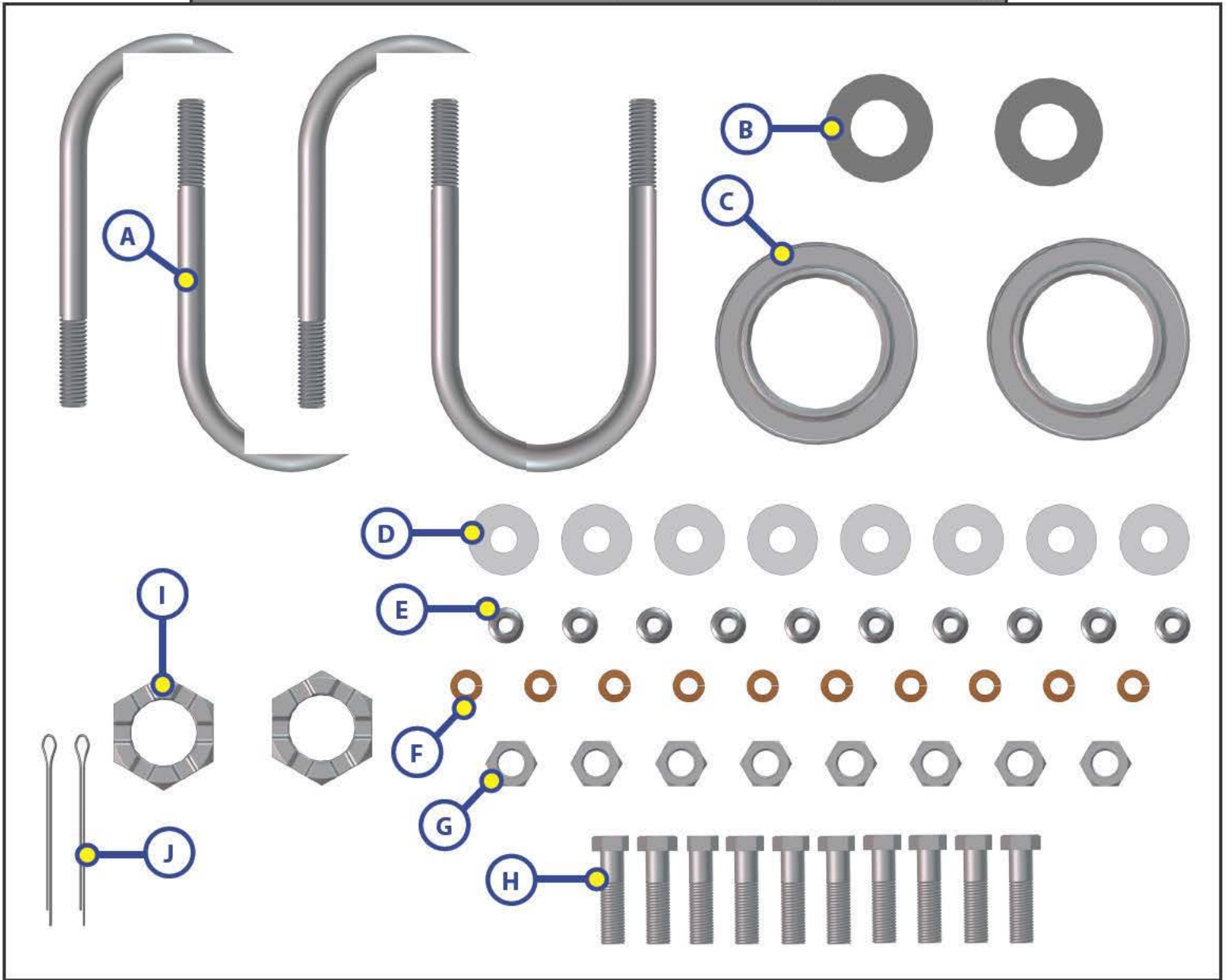
AXLES AND SUSPENSION

Axle U-Bolt Service Kit Part #232997



Callout	Part #	Description	Quantity
A	1963511	U-Bolt; $\frac{5}{16}$ - 18 x 7.25 for 3" Tube YZ	4
B	179660	Flat Hardened SAE Washer; 1.06 ID x 2.00 OD	2
C	122088	Double Lip Grease Seal (5,200-7,000)	2
D	170997	Flat USS Hardened Washer; $\frac{5}{16}$ "	8
E	122077	Brake Nut Locking Keys Clear Dich	10
F	122081	Castle Nut; 1 - 14	2
G	122084	Sealed Wire Connector	4
H	182274	Hex Nut; $\frac{5}{16}$ " - 18 GR8	8
I	122075	Cotter Pin; .120" x 1.75"	2

Axle U-Bolt Service Kit Part #309893 (Disc Brake Axle Application Only)



Callout	Part #	Description	Quantity
A	1963511	U-Bolt - $\frac{1}{16}$ " - 18 Hex GR8	4
B	179660	Flat Hardened SAE Washer - 1.06 ID x 2.00 OD	2
C	122088	Double Lip Grease Seal (5,200-7,000)	2
D	170997	Flat USS Hardened Washer - $\frac{1}{16}$ "	8
E	119072	Flange Nut - $\frac{3}{8}$ " - 16 GR5	10
F	126030	Washer - .385" x .68" x .094"	10
G	182274	Hex Nut - $\frac{1}{16}$ " - 18 GR8	8
H	135835	Tap Bolt - $\frac{3}{8}$ " - 16 x 1 $\frac{1}{2}$ GR5 ZN FT HD ST	10
I	122081	Castle Nut 1 - 14	2
J	122075	Cotter Pin - .120 x 1.75	2



TM

GENERAL TOWABLE CHASSIS
OWNER'S MANUAL

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LCI Chassis Information

Lippert Chassis Maintenance

The Lippert Chassis needs relatively little maintenance. The chassis and its components are powder coated to resist rust and corrosive materials that cause rust.

A few simple guidelines should be kept in mind to maintain the integrity of the chassis structure.

1. Never overload the trailer. The chassis is built to the specifications for GVWR (Gross Vehicle Weight Rating) set forth by the manufacturer of the trailer. Overloading the trailer may cause damage to the structure of the chassis causing residual damage to the trailer.
2. In the event the trailer is pulled through winter conditions where salt on the road can be splashed up and onto the chassis or the trailer is pulled or located near coastal areas of the country, periodically rinsing down the chassis will wash away the corrosive salt and keep the powder coat clean.
3. Pinbox mounting bolts should be torqued 90 - 110 ft. lb. and checked annually.
4. Inspect welds of cross-members, outriggers bumpers and draw bars (A-frame with coupler on the front of a travel trailer).

Issues Resulting from Improper Maintenance

1. Cracks or "spider-webbing" in the powder coated surfaces.
2. Paint or powder coat flaking in large sheets.
3. Surface rust coming through powder coating.
4. Large areas of bubbling rust.

Main Rail Camber

1. Camber is manufactured into the unit to offset the weight of the coach rear of the axles.
2. Loss of camber in the main rails, due to overload, i.e. excessive rear end weight, pulling a trailer behind the unit, may manifest in slideouts, entry doors or interior cabinets not operating or functioning properly on one or both sides of the trailer.
3. Outriggers bent downward. Outriggers extend perpendicular off the main rails of the chassis to provide an area to fasten the house portion of the trailer to the chassis. Bending outriggers will cause slideouts, entry doors or interior cabinets to malfunction in specific areas.

Axle Hangers

1. Axle hangers are welded to the underside of the main rails and are brackets used to mount the axle suspension. Axle hangers should be perpendicular to the ground and parallel to the length of the main rails. Bent or damaged hangers may cause tire wear or spring issues.

Recommendations for Jacking the Frame to Change a Tire

1. Carrying a jack rated for the weight of the coach is essential. The jack must be rated between 8 and 12 tons.
2. To prevent damage to the coach, carry wood blocks to place between the jack and the main rail (I-beam or tube) of the coach and to go under the jack.
3. DO NOT jack the coach on the axle tube or black pipe gas lines that can sometimes be mounted to the bottom of the main rail.
4. Chock the wheels, both front and rear, on the opposite side of the coach.
5. If hitched to tow vehicle, stay hitched and set the parking brake.



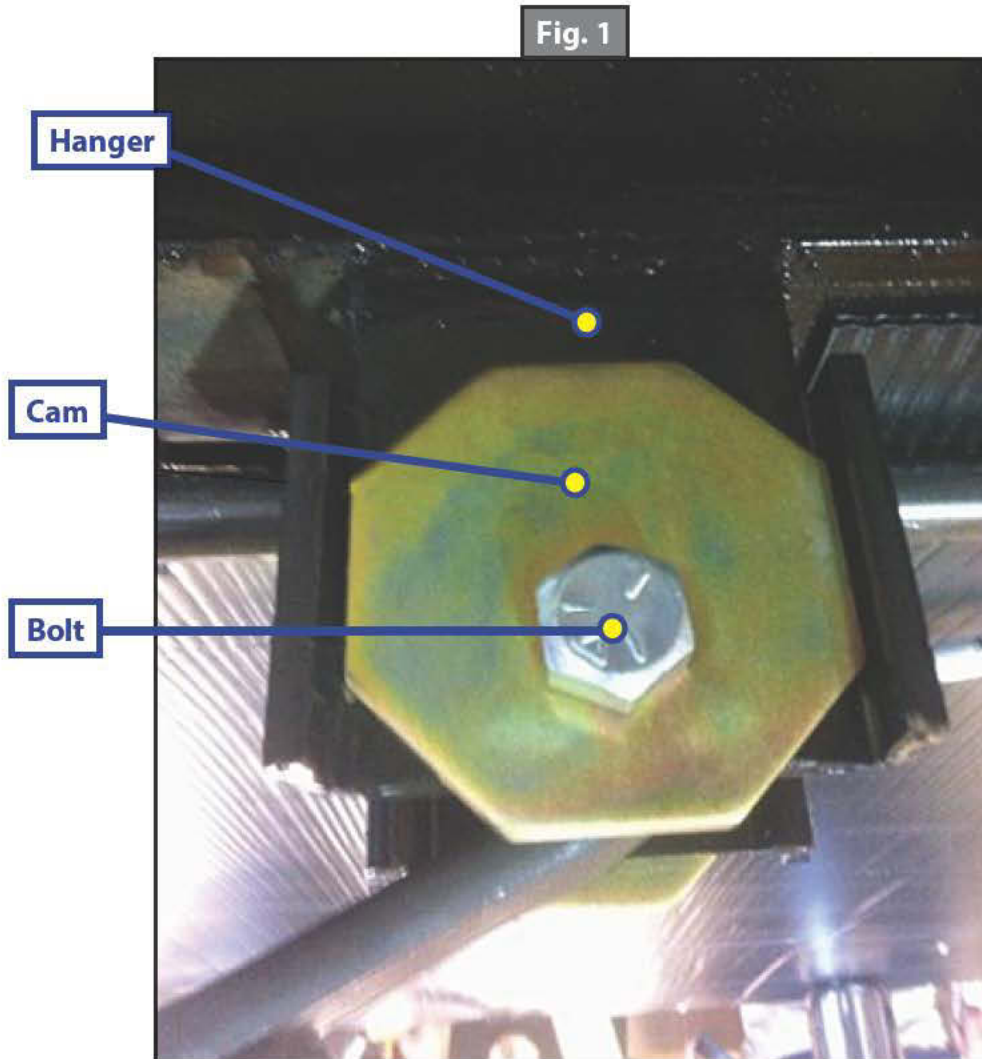
DO NOT use the front landing gear, leveling system (if equipped), or rear stabilizer jacks to pick the coach up to change a tire. This is dangerous and may result in death or serious bodily injury.



**CORRECT TRACK
OWNER'S MANUAL**

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Installation Instructions



1. Cam/Bolt assembly should be installed into the hanger in the middle/neutral position. All cam assemblies should be installed in the same manner. Orient the cam so that the least amount of cam material showing is oriented to the bottom side of the hanger as shown above. The loose cam plate should be installed on opposite side of hanger in the same orientation.
2. Finger start the flanged locknut onto the threaded end of bolt. Tighten nut until the flange bottoms out on the shoulder of the bolt. Approx 30-50 ft-lbs.
3. Install is complete when bolt is centered on the hanger, both cam plates are oriented the same and the nut is tight against bolt shoulder.

Correct Track Installation Kits

Tandem Axle

Fig. 2 - Tandem Axle Install Kit ES-1182

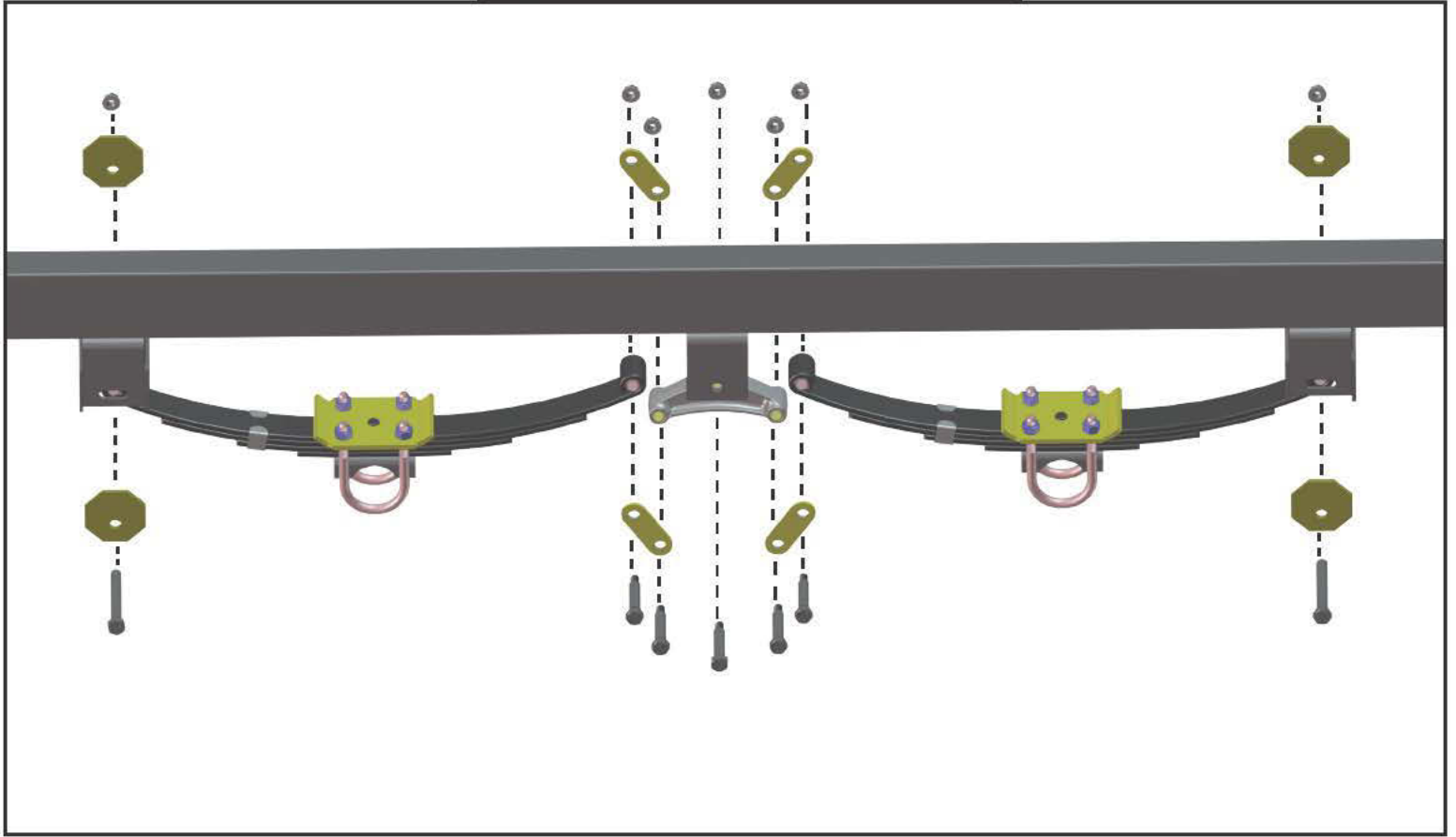


Fig. 2.1 - Tandem Axle Installed

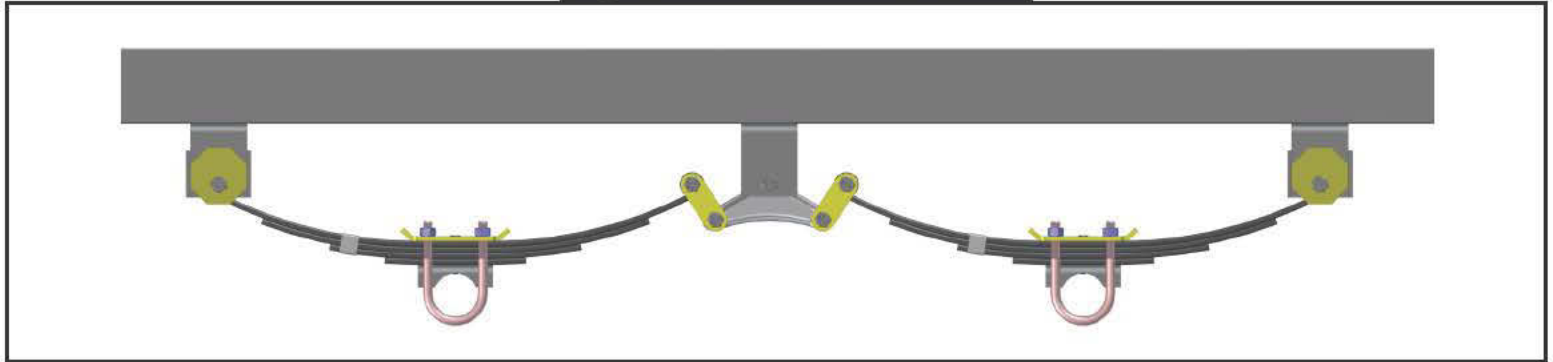


Fig. 3 - Triple Axle Install Kit ES-1180

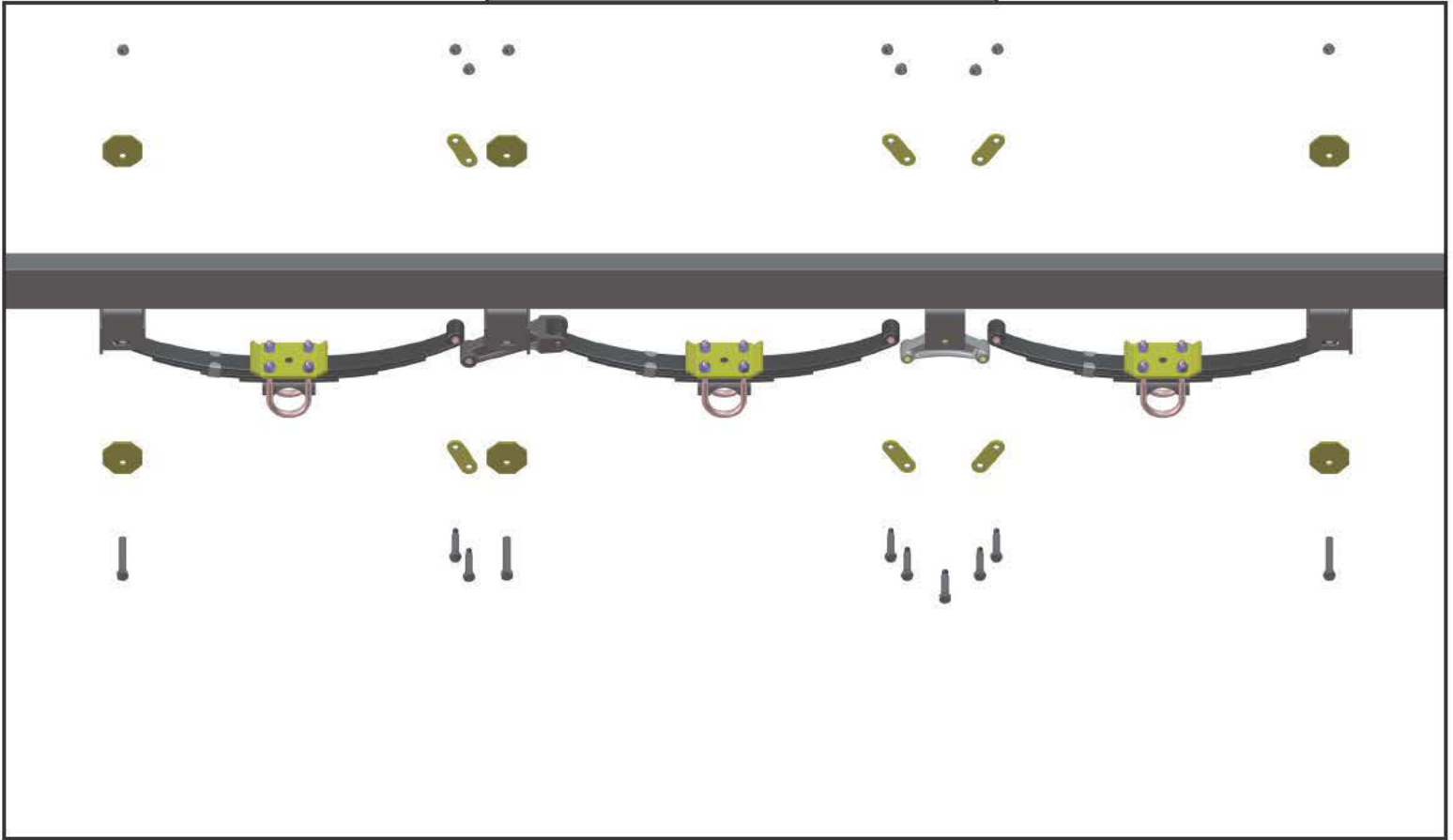


Fig. 3.1 - Triple Axle Installed

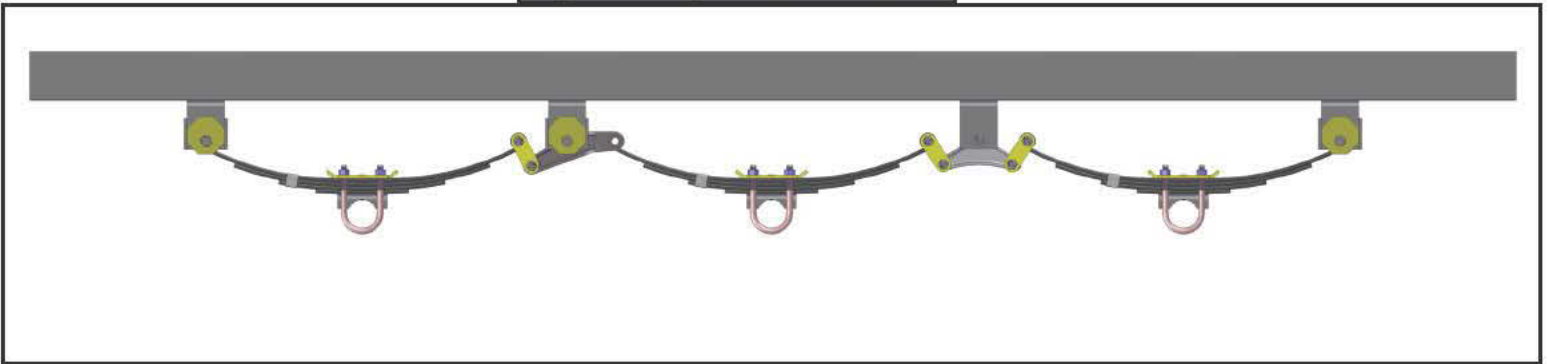


Fig. 4 - Tandem Axle With Equaflex Kit ES-1185

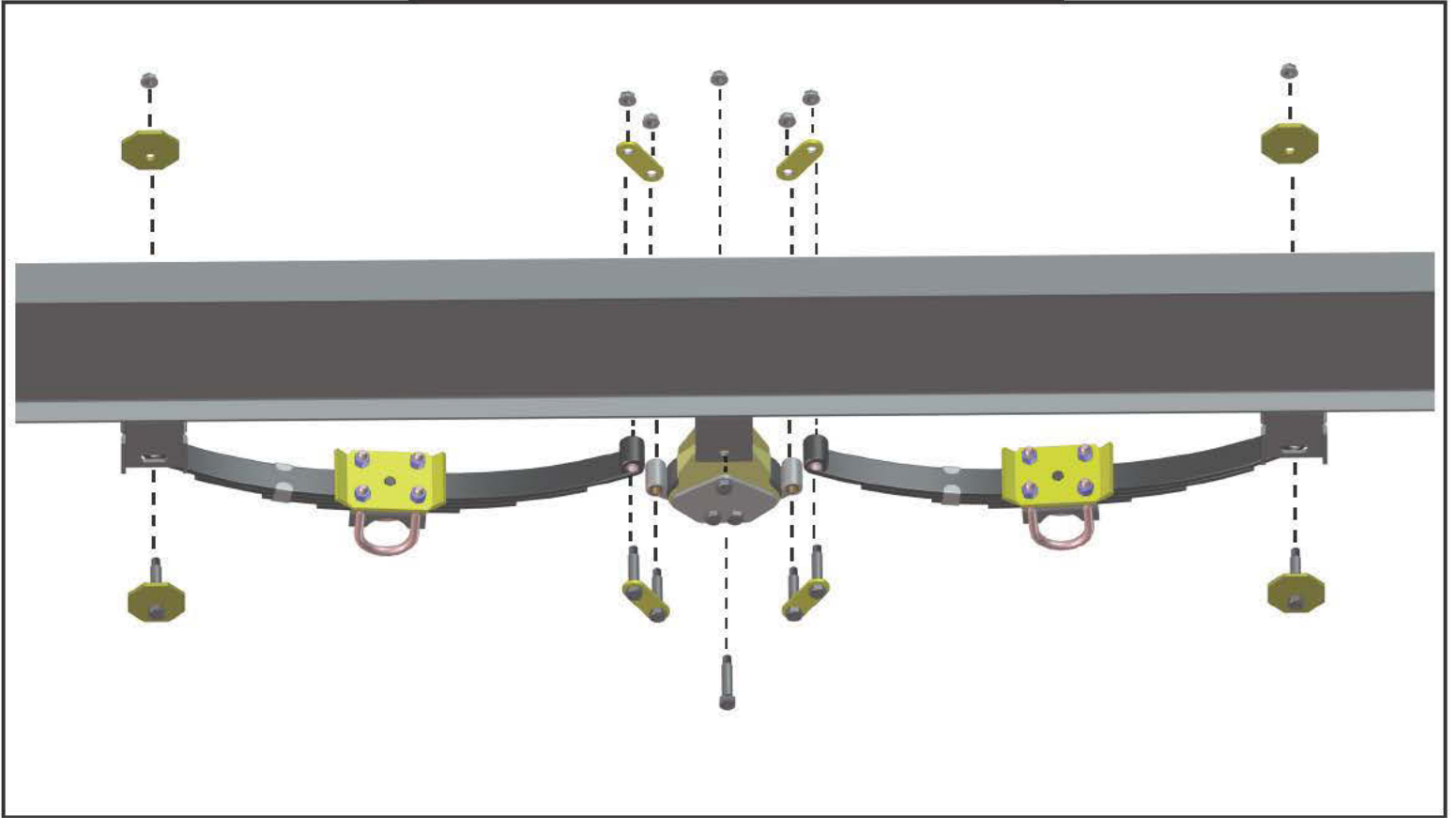


Fig. 4.1 - Tandem Axle With Equaflex Installed

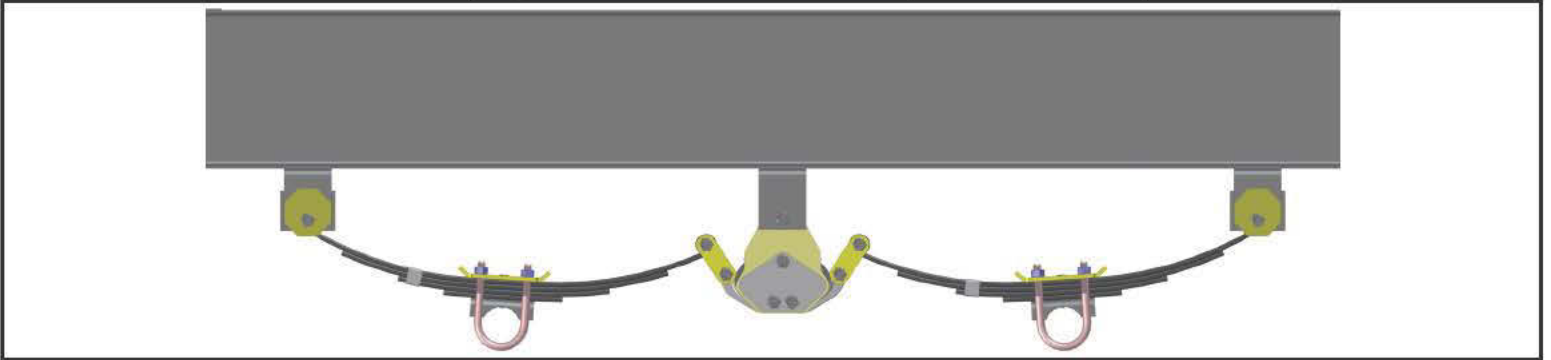


Fig. 5 - Triple Axle With Equaflex ES-1186

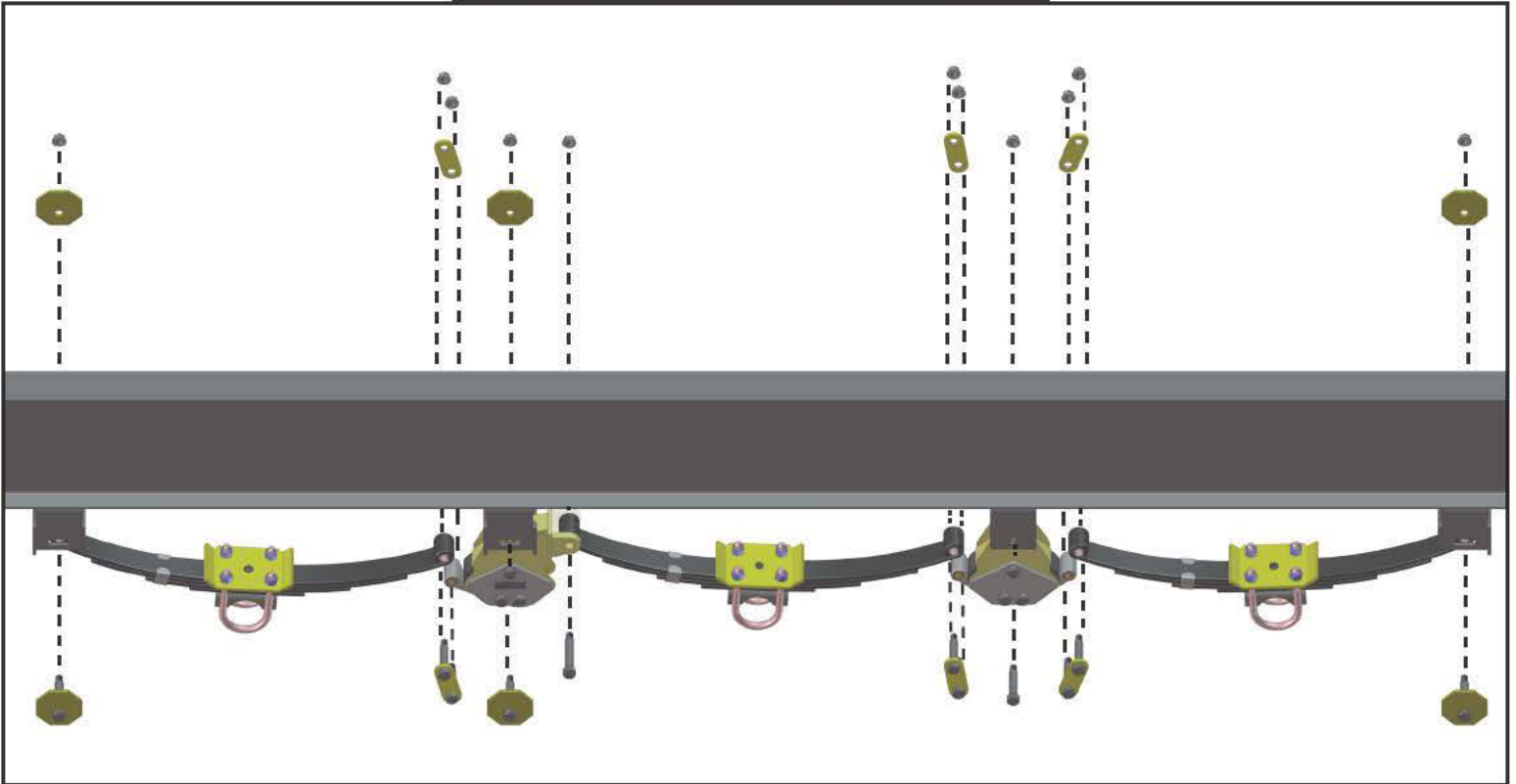


Fig. 5.1 - Triple Axle With Equaflex Installed



Alignment

Travel Trailer

NOTE: These procedures can only be performed by a certified facility.

Travel Trailer Components



1. Install tube on base.



2. Install laser alignment tool.



3. Install bracket to allow you to extend up and down.



4. Install Upper Tube.



5. Install Kingpin adapter (Fits 2" - 2 1/2" Couplers).

Fifth Wheel

NOTE: These procedures can only be performed by a certified facility.

Fifth Wheel Components



1. Install tube on base (longer tube than travel trailer tube).



2. Install laser alignment tool.



3. Install bracket to allow you to extend up and down.



4. Install Upper Tube.



5. Install Kingpin adapter (Fits 2" - 2 1/2" Couplers).

Install the Alignment Tool to Kingpin



1. Loosen bracket and raise it up to meet the Kingpin.



2. Make sure the bubble is on the center. Tap it back and forth until the bubble is in the center.



3. Place the target in the center tread of the tire.



4. Repeat, placing the target on the other passenger side.

Fill Out Customer Form on Both Sides



1. Align the laser with each target and record the measurements on the customer form.



2. Measure the distance between the center of each hub on both sides of the trailer.
3. Fill out customer form with the measurements.

Adjustment

1. Release pressure on cam bolt by jacking up the frame making sure to stop just before the tire is lifted off the ground.

⚠️ WARNING

Lift unit by the frame and never the axle or suspension. Do not go under unit unless it is properly supported by jack stands. Unsupported units can fall causing death or serious injury.

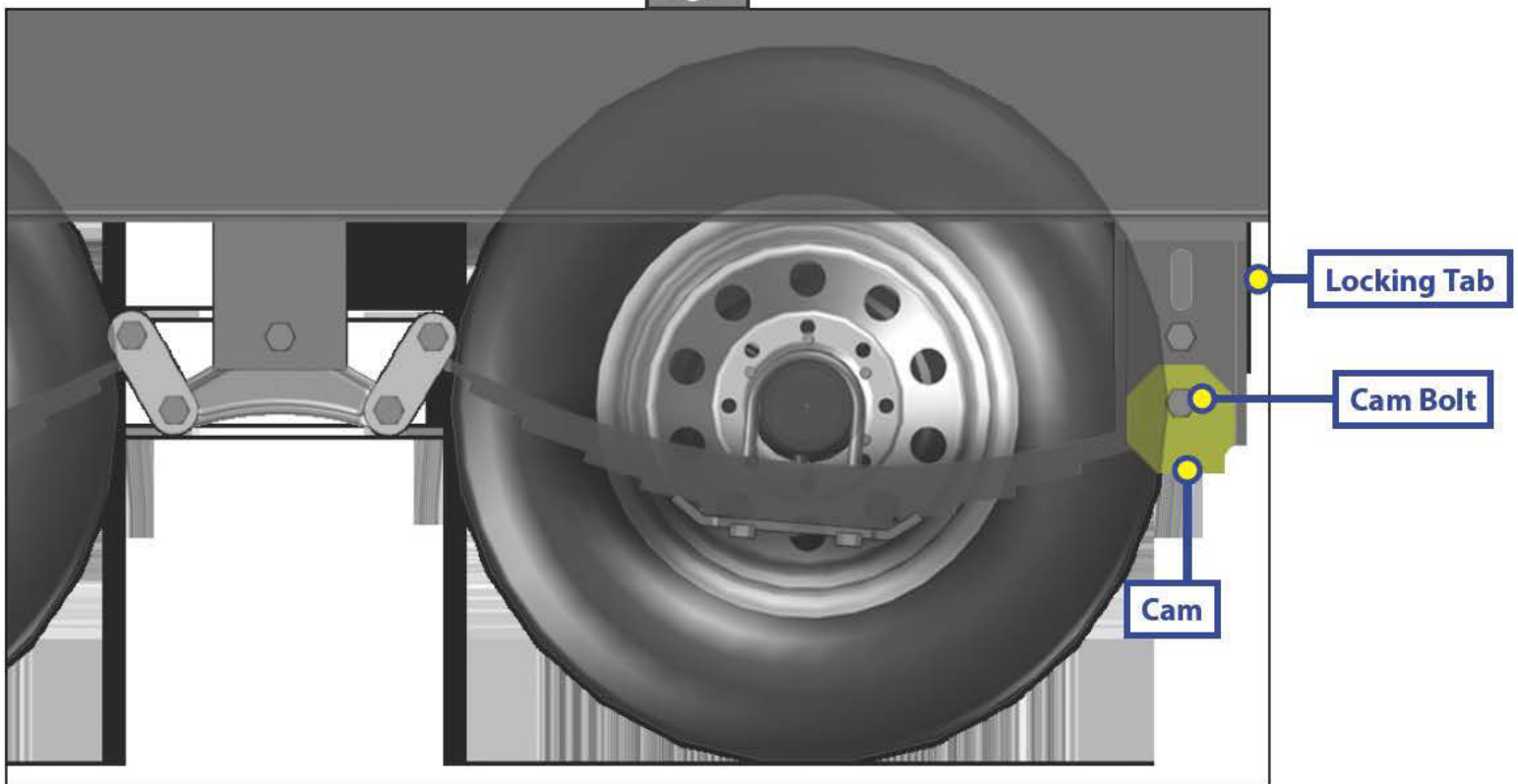
2. Loosen nut from backside of cam bolt (Fig. 1).
3. Tap end of bolt until the cam clears the locking tabs.
4. Rotate cam to get desired movement of axle. Each notch of the octagon when turned equals 1/4 in. of adjustment.
 - a. Moving the cam COUNTERCLOCKWISE one notch moves the axle forward 1/4 in. Two notches will move the axle 1/2 in.
 - b. Moving the cam CLOCKWISE one notch will move the axle back 1/4 in. Two notches will move the axle 1/2 in.

NOTE: Do not move the cam more than two notches either clockwise or counterclockwise.

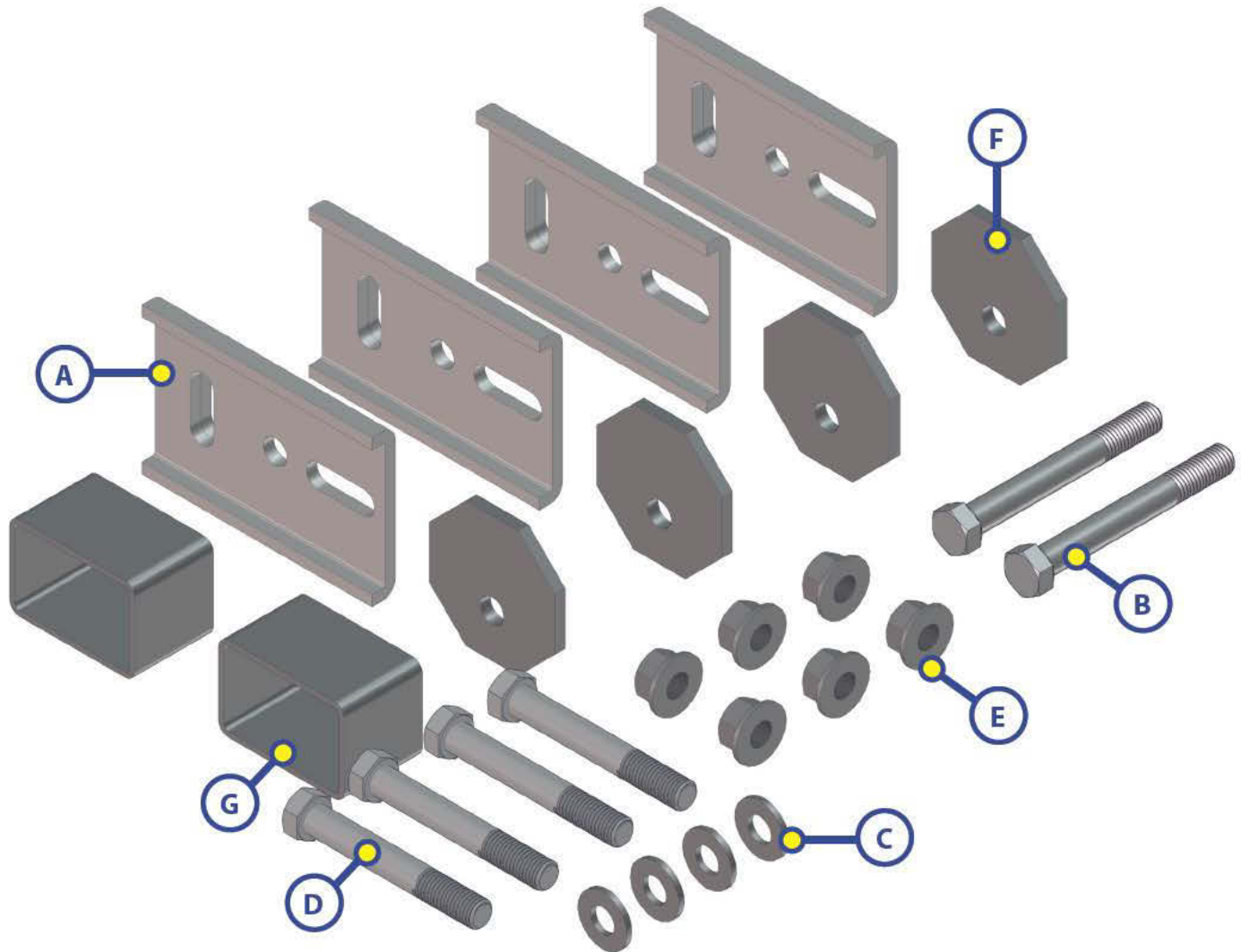
NOTE: The jack may have to be adjusted up or down in order to get the cam aligned with the locking tabs on the hanger.

5. Take the coach out for a short drive or move the coach at least one tire revolution to stabilize the system.

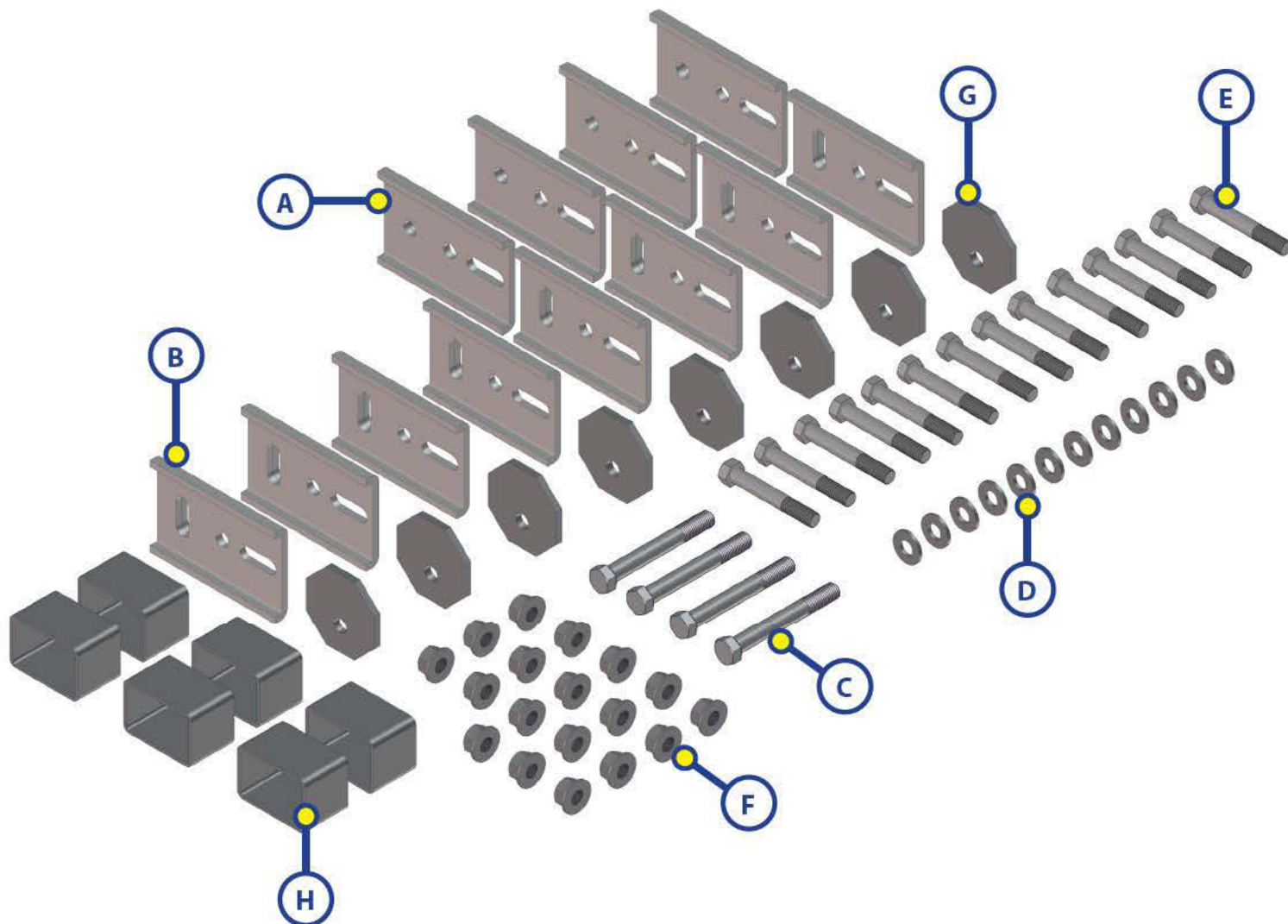
Fig. 1



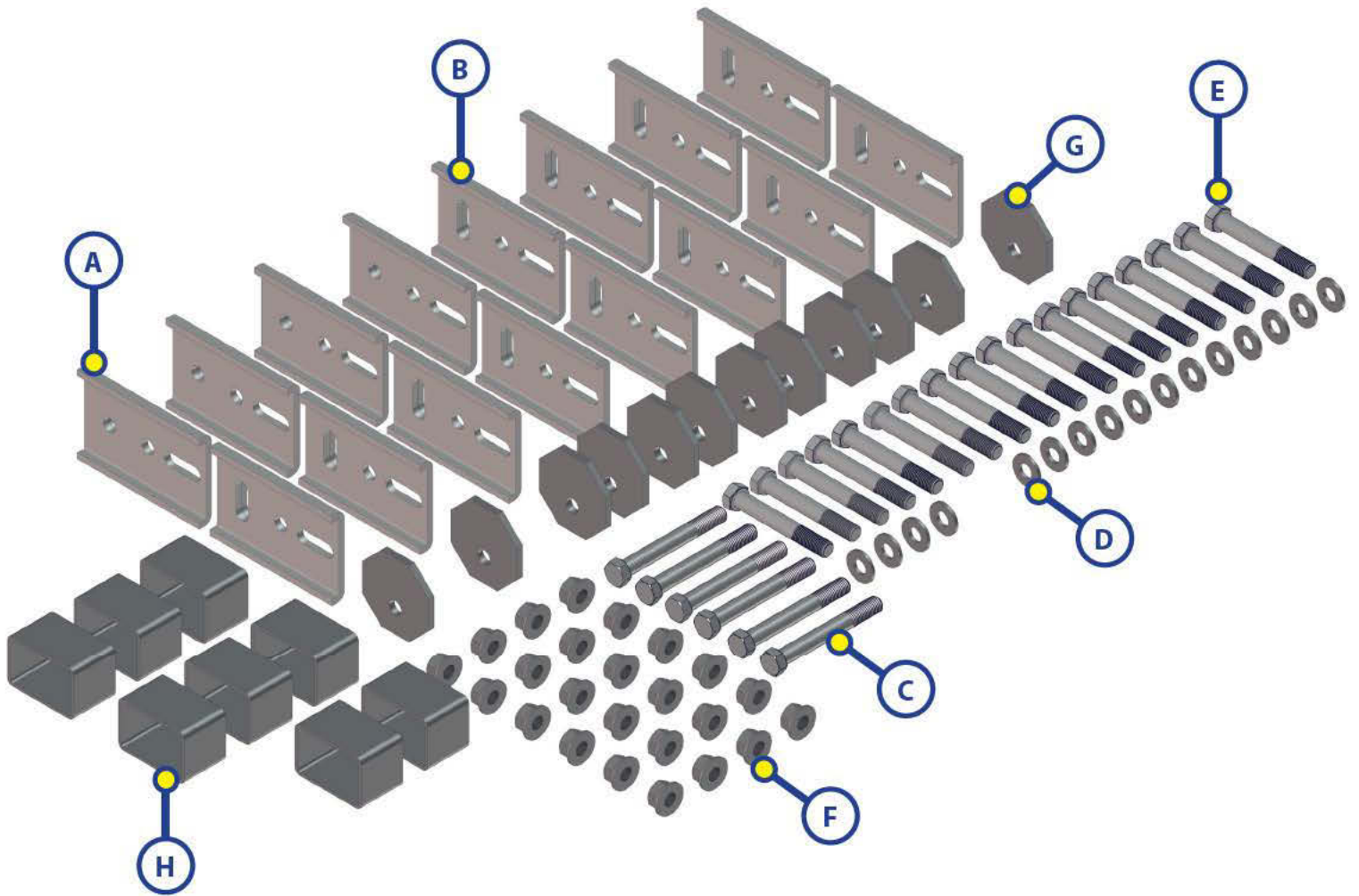
AXLES AND SUSPENSION



Single Axle Kit - Part # 322575			
Callout	Part #	Description	Quantity
A	290960	Spring Plate	4
B	247991	Bolt 9/16 - 18 x 4.5 Hex	2
C	140776	.56 x 1.18 x .12 SAE Washer	4
D	163535	Bolt 9/16 - 18 x 4	4
E	131378	Nut 9/16 - 18 Hex Flange	6
F	290731	Adjustment Cam	4
G	290967	Spacer Block	2



Tandem Axle Kit - Part # 322590			
Callout	Part #	Description	Quantity
A	290959	Equalizer Plate	4
B	290960	Spring Plate	8
C	247991	Bolt 9/16 - 18 x 4.5 Hex	4
D	140776	.56 x 1.18 x .12 SAE Washer	12
E	163535	Bolt 9/16 - 18 x 4	14
F	131378	Nut 9/16 - 18 Hex Flange	18
G	290731	Adjustment Cam	8
H	290967	Spacer Block	6



Triple Axle Kit - Part # 322609			
Callout	Part #	Description	Quantity
A	290959	Equalizer Plate	4
B	290960	Spring Plate	12
C	247991	Bolt 9/16 - 18 x 4.5 Hex	6
D	140776	.56 x 1.18 x .12 SAE Washer	16
E	163535	Bolt 9/16 - 18 x 4	18
F	131378	Nut 9/16 - 18 Hex Flange	24
G	290731	Adjustment Cam	12
H	290967	Spacer Block	8



SOLERA MANUAL AND ELECTRIC AWNING
OWNER'S MANUAL

L I P P E R T
C O M P O N E N T S™



Safety Information

The “WARNING” symbol above is a sign that a service or maintenance procedure has a safety risk involved and may cause serious injury or death if not performed safely and within the parameters set forth in this manual.

Always wear eye protection when performing service or maintenance to the vehicle. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

This manual provides general service and maintenance procedures. Many variables can change the circumstances of the service procedure, i.e., the degree of difficulty involved in the service operation and the ability level of the individual performing the operation. This manual cannot begin to plot out procedures for every possibility, but will provide the general instructions for effectively servicing the vehicle. In the event the skill level required is too advanced or the procedure too difficult, a certified technician should be consulted before performing the necessary service. Failure to correctly service the vehicle may result in voiding the warranty, inflicting injury or even death.

The owner’s manual for your unit may have more procedures for service and maintenance.

Operation

Extending the Awning

1. Locate the locking latch (Fig. 1A) (if equipped) on the drive side awning arm. Unlock the latch (Fig. 1B).

NOTE: This latch is optional and may not be installed. If not installed, skip to step 2.

2. Using the pull rod, place the "L" end of the rod on top of the cam lock (Fig. 2A) and pull down on the lock to release it (Fig. 2B).
3. Insert the pull rod into the pull strap (Fig. 3).
4. Pull strap to chest height using the pull rod. Using hands to grasp strap, walk the awning outward, keeping in front of the roll bar at all times (Fig. 4).

NOTE: Full extension is considered complete when the awning valance seam reaches the leading edge of the awning tube (Fig. 5). Also check to make sure cam lock is on top of the roller tube.

Fig. 1A



Fig. 1B



Fig. 2A



Fig. 2B



Fig. 3



Fig. 4

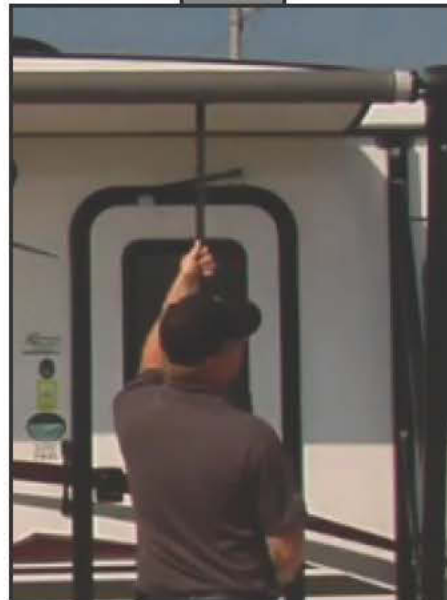
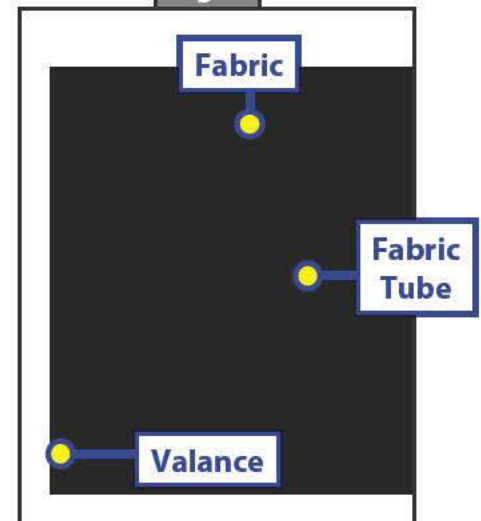


Fig. 5



Retracting the Awning

1. Grasping strap, pull slightly toward you to release pressure on the cam lock (Fig. 6) and disengage the cam lock (Fig. 7).
2. While holding strap in hand, walk awning toward coach until the strap is about chest height (Fig. 8).
3. Insert pull rod into the pull strap.
4. Walk awning all the way in until it stops (Figs. 9 and 10). Remove pull rod from strap.
5. Locate the locking latch (Fig. 11B) (if equipped) on the drive side awning arm. Lock the latch to secure the awning in place (Fig. 11A).

NOTE: This latch is optional and may not be installed. If not installed, awning is secured and ready for transportation.

Fig. 6



Fig. 7

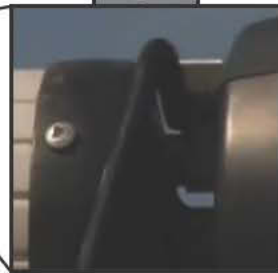


Fig. 8



Fig. 9



Fig. 10



Fig. 11A



Fig. 11B



Conversion from Pull-Style Manual to Power Awning

Tools/Equipment Needed	Quantity
Cordless Screw Gun	1
#3 Phillips Bit	1
Square Head Bit	1
Zip Ties	
Cotter Pins (.09" x 2 5/16" OAL Zinc Plated Hairpin or equivalent)	2

Part Description	White Part #	Black Part #	Quantity
Conversion Kit	323948	323949	
Motor Side Head	266146	273478	1
Idler Side Head	266147	273479	1
#8 Wax Screws	299630		2
Power Cord	273007		1
End Caps	2661301	2661302	2
Plastic Wire Covers	266138481		2
	266139337		2
	266139429		2
	275070157		2
	275070353		2
Mini Breaker	134181		1
Wire Harness	280570		1
Switch	280564	280566	1
Plate	280565	280567	1
Bezel Spacer	285079	285077	1

1. Run the awning out from the unit approximately one foot. Insert hairpins through end cap into shaft on motor head. Repeat this at other end of awning (Fig. 1).
2. Take zip ties and go around the outer arm and then around the top pin on the mount arm. Repeat this at other end of awning (Fig. 2).
3. While one person holds the roll bar remove the bolt that holds the drive side head to the arm with a #3 Phillips bit (Fig. 3). Areas around the head/mount must be kept clear of people and objects at all times to prevent personal injury and/or property damage.
4. While one person is securely holding the roll bar, have the second person remove the hairpin. Make sure that you have a secure hold on the awning head and tube prior to removing the hairpin or the head could spin freely. Now release the tension by rotating the drive side head assembly in a clockwise motion (with awning lock in the "Roll In" position).

Fig. 1



Fig. 2



5. Once all tension has been released from the head/spring assembly, remove the three square head screws that secure the end cap to the roll bar and remove the head/spring assembly from the roll bar (Figs. 4, 5).
6. Install new end cap to the roll bar using the three square head screws that were removed in Step 5 above. Confirm cap is fully seated on the end of the roll bar. If the screws/screw holes have been stripped consider using #10 screws to ensure a secure fit.
7. Plug the power cord into the motor by matching the black wire from power cord to black wire at the motor. Next take the white wire from the power cord and plug it into the red wire on the motor. Make sure to then tuck the wires down into the mount assembly to assure wires won't be pinched during install (Figs 6, 7).
8. Insert the shaft from the motor head into the end cap and secure with the provided #8 wax screw (Fig. 8).
9. Install the head mount into the arm and secure with the bolt removed in Step 3 above.

Fig. 3



Fig. 4



Fig. 5



10. Repeat Steps 3 through 6 and 8-9 for the idler head side of the awning. Cut zip ties from top of arm. Using the cordless screw gun battery (or other low voltage battery source) run the awning out by putting the black wire from power cord to the positive side of battery and the white wire on negative.
11. Starting at the motor, run the wire approximately halfway down the outer arm, then up the inner arm to the wall mount (holes for 'top wire' and 'bottom wire' options are provided in the wall mount extrusion) (Fig 9). Install plastic wire covers into the outer arm (1 section), inner arm (2 sections), and wall mount (2 sections) extrusions to secure/protect the power supply wire (Figs 10-12). Make sure wire is placed on the outside of the pin that joins the steel tension arm to the wall mount (Fig. 12) to prevent damage to the wire.
12. Hook power cord to the coach supplied power. Make sure to install the supplied 6 amp mini breaker on the power wire between the power source and the awning switch (Fig. 13).

Fig. 6



Fig. 7



Fig. 8



Fig. 9



Top Wire Stop

Fig. 10



Fig. 11



Fig. 12



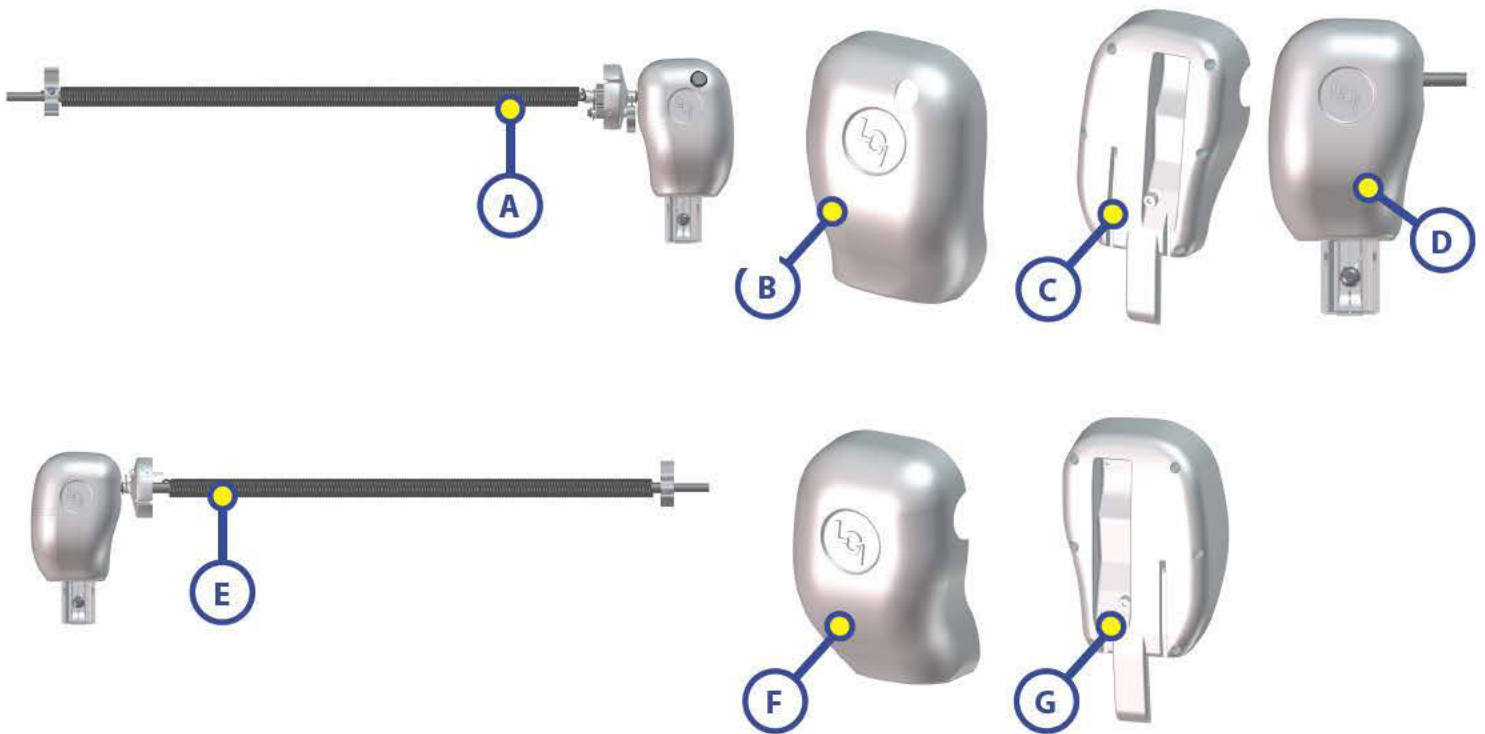
Fig. 13



Bottom Wire Stop

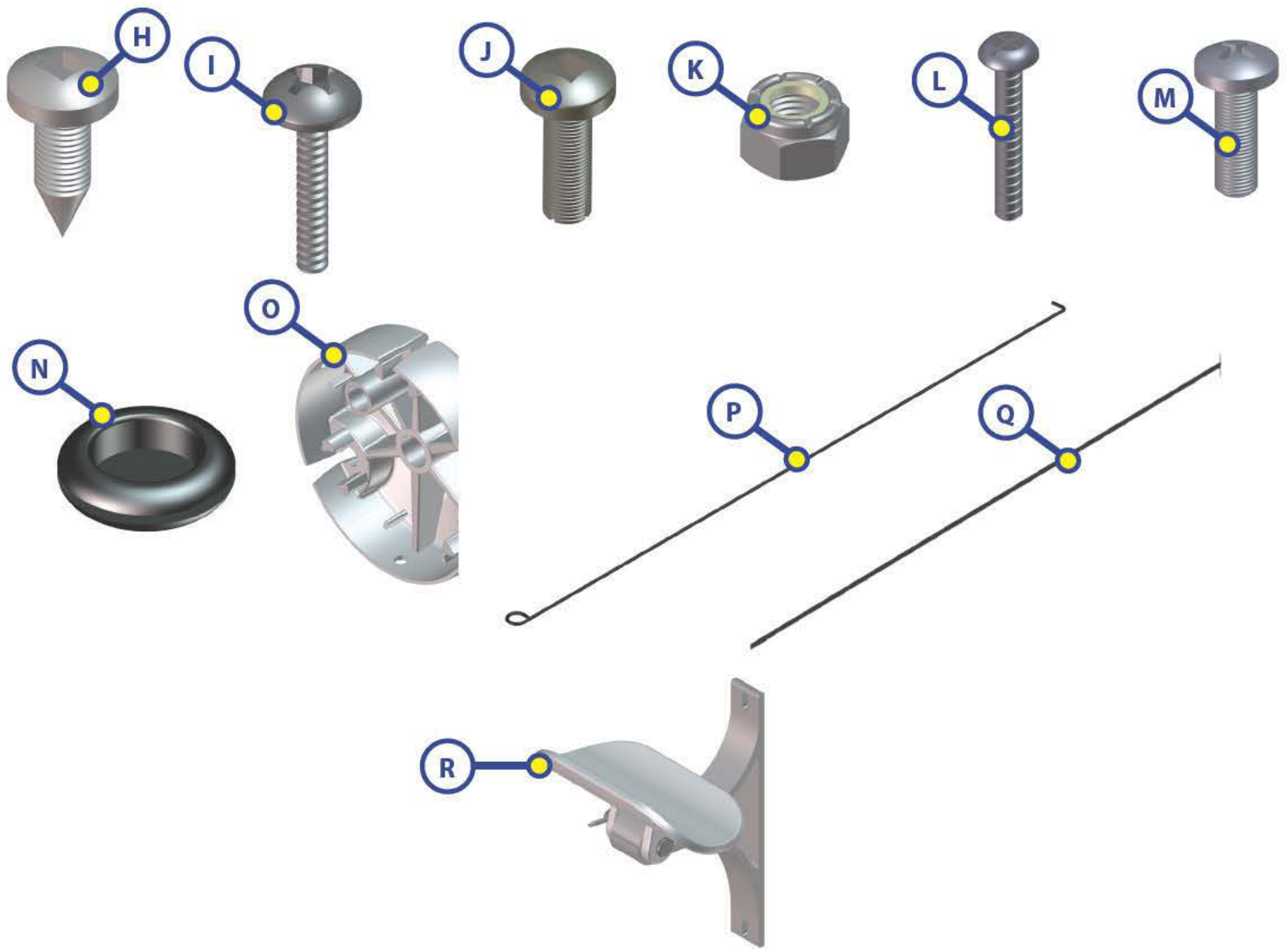
Variant Code Information

The variant code on Lippert products can assist LCI customers in obtaining additional information about the product and its components. For replacement part information, locate the variant code as outlined below and call LCI customer service at 574-537-8900.

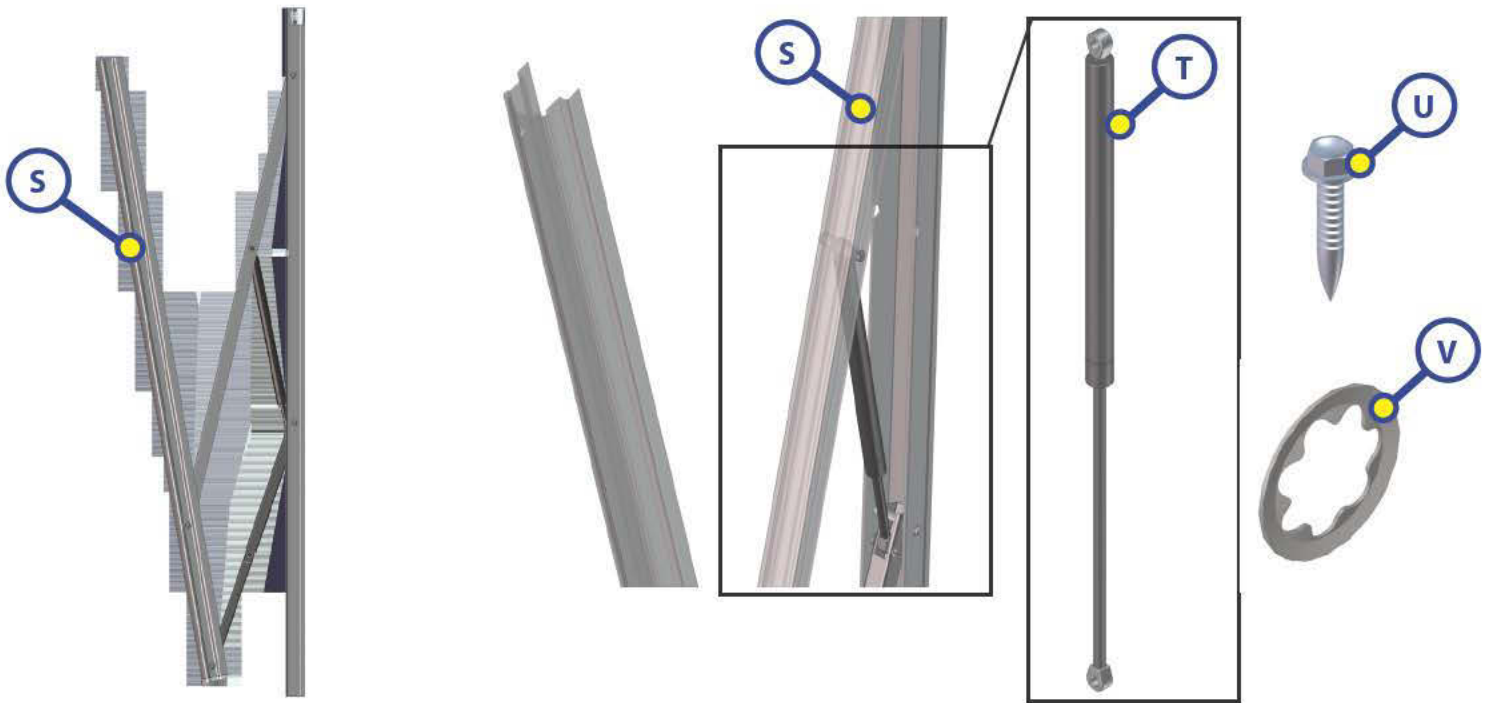


Callout	White Part #	Black Part #	Description
A	271181	272067	Drive Head Assembly
B	266151	266161	Drive Head Front Cover
	289557	289560	Drive Head Front Cover (NEW)
C	266152	266162	Drive Head Rear Cover
	289558	289561	Drive Head Rear Cover (NEW)
D	266147*	273479*	Idler Side Head
E	272397	285147	Idler Head Assembly
F	266153	266163	Idler Head Front Cover
	289563	289566	Idler Head Front Cover (NEW)
G	266154	266164	Idler Head Rear Cover
	289564	289567	Idler Head Rear Cover (NEW)

NOTE: * Only used on 6' awning assemblies.



Callout	White Part #	Black Part #	Description
H	299419		Screw - # 8 - 15 X ½ PNH ZN SQ A ST
I	266156		#6 X ½ ZN Screw (fastener for head covers, 6 per cover)
J	299630*		#8 Wax Screw
K	118043		Nut ⅝-18 Nylock ZN ST (head to arm)
L	266148		Screw ⅝-18 X 2-1/4 (head to arm)
M	266155		Screw #8-32 x ½ PH PNH MACHG ZN FT HD (back cover to mount)
N	275071		Rubber Grommet
O	3334291	3334292	End Cap for Manual Drive Head
	3334301	3334302	End Cap for Manual Idler Head
P	281080		Pull Rod
Q	292794		Manual Pull Strap Replacement NOTE: Only use on 6' awning idler head assemblies
R	289373	289374	Awning Center Support Assembly NOTE: Only required for Solera Awnings greater than 21' in length



Callout	White Part #	Black Part #	Description
S	295742	395743	Support Arm Assembly (Short, 61")
	260294	266169	Support Arm Assembly (Pitched, 66 1/8")
	281152	2881154	Support Arm Assembly (Flat, 69")
T	280343		Gas Strut; 26"; 124 LBS (for Short and Flat Arm assemblies)
	260282		Gas Strut; 124 - 144 LBS (for Pitched Arm assemblies)
U	286576		Screw - #14 - 10 x 1 1/2 (arms to coach)
V	282484		Star Washer (for Gas Strut)

Awning Fabric and Roll Bar Replacement

To order replacement awning fabric and roll bar for your awning, locate the awning label on the roll bar. Locate the variant code at the bottom of the label. Call LCI Customer Service at 574-537-8900 and provide the variant code.



Operation

Extending the Awning

1. Locate the locking latch (Fig. 1A) (if equipped) on the drive side awning arm. Unlock the latch (Fig. 1B).

NOTE: This latch is optional and may not be installed. If not installed, skip to step 2.

2. Locate the manual crank handle for the awning.
3. Insert the hook end of the crank handle into the eye bolt on the drive head (Fig. 2A).
4. Turn the crank in a counter-clockwise direction and fully extend the awning (Fig. 3).

NOTE: Full extension is considered complete when the awning valance seam reaches the leading edge of the awning tube (Fig. 4).

Fig. 1A



Fig. 1B



Fig. 2



Fig. 3

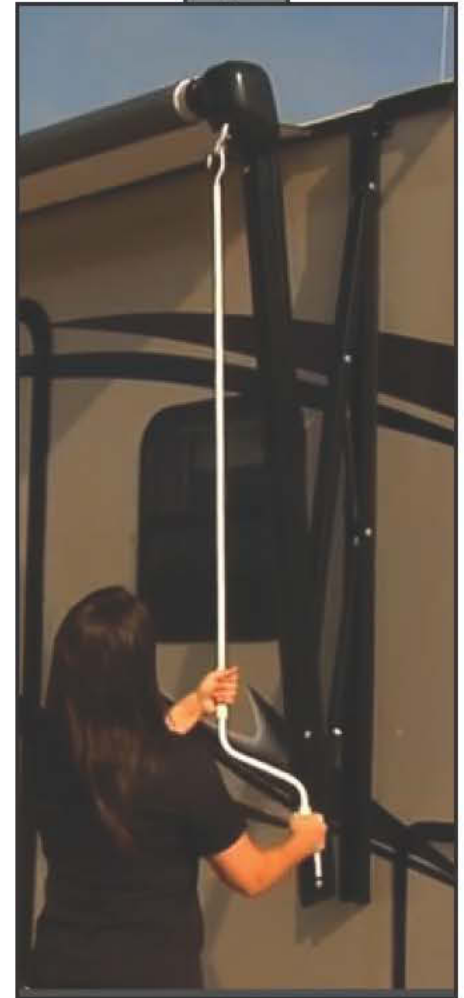
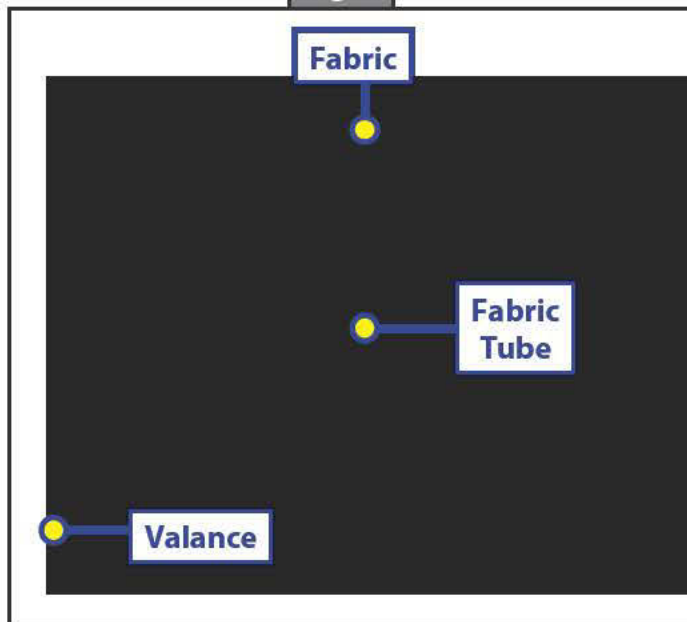


Fig. 4



Retracting the Awning

1. Insert the hook end of the crank handle into the eye bolt on the drive head (Fig. 5).
2. Turn the crank handle in a clockwise direction until the awning is fully retracted (Figs. 6 and 7).

NOTE: Keeping handle even with the roller tube makes it easier to turn.

3. Locate the locking latch (Fig. 8A) (if equipped) on the drive side awning arm. Lock the latch to secure the awning in place (Fig. 8B).

NOTE: This latch is optional and may not be installed. If not installed, awning is secured and ready for transportation.

Fig. 5



Fig. 6



Fig. 7

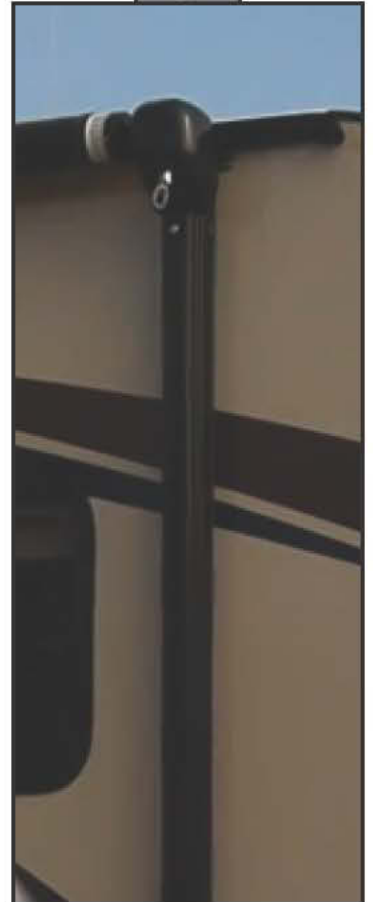


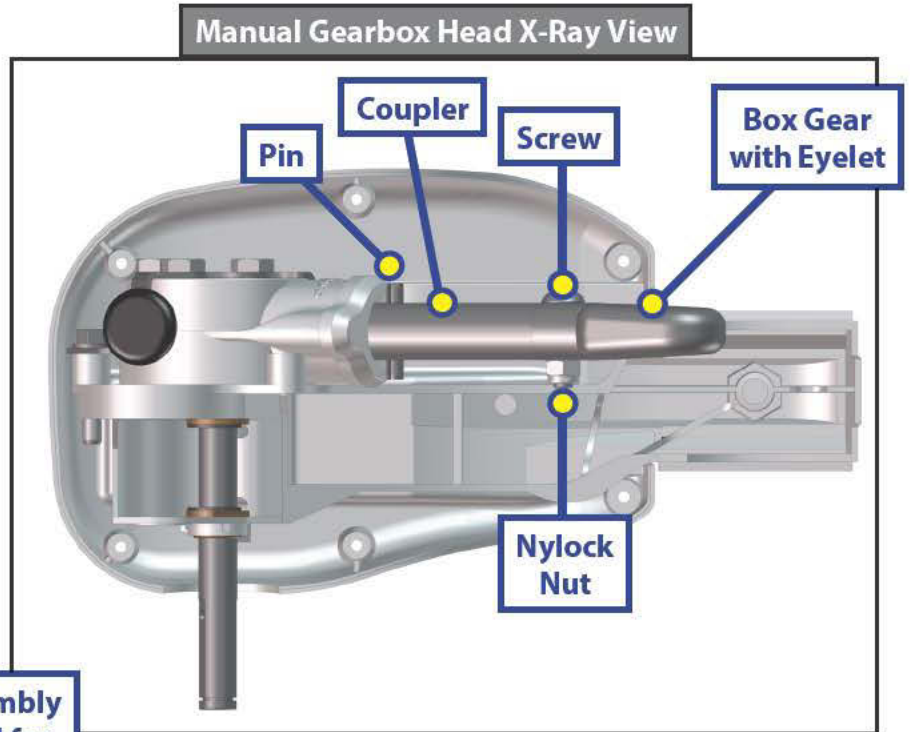
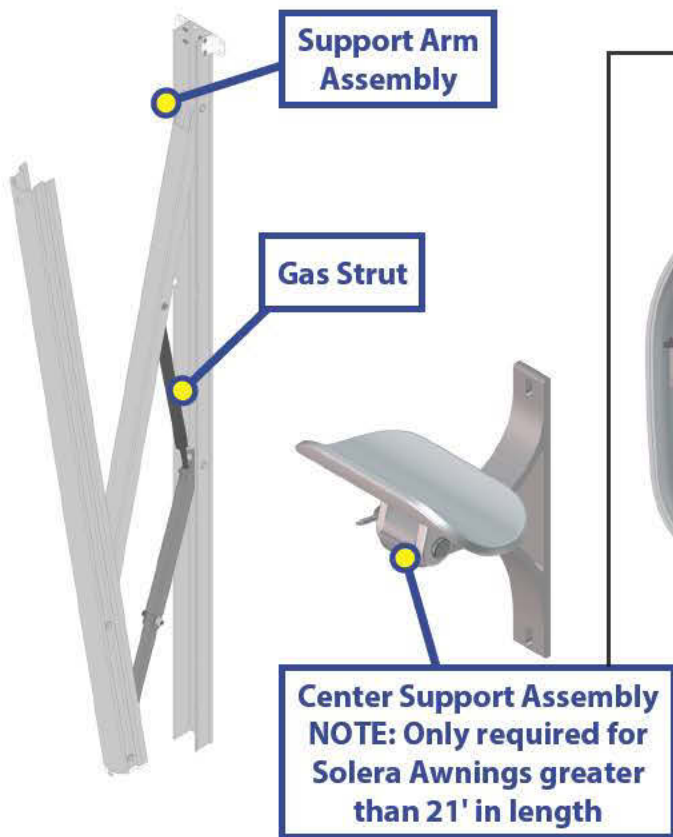
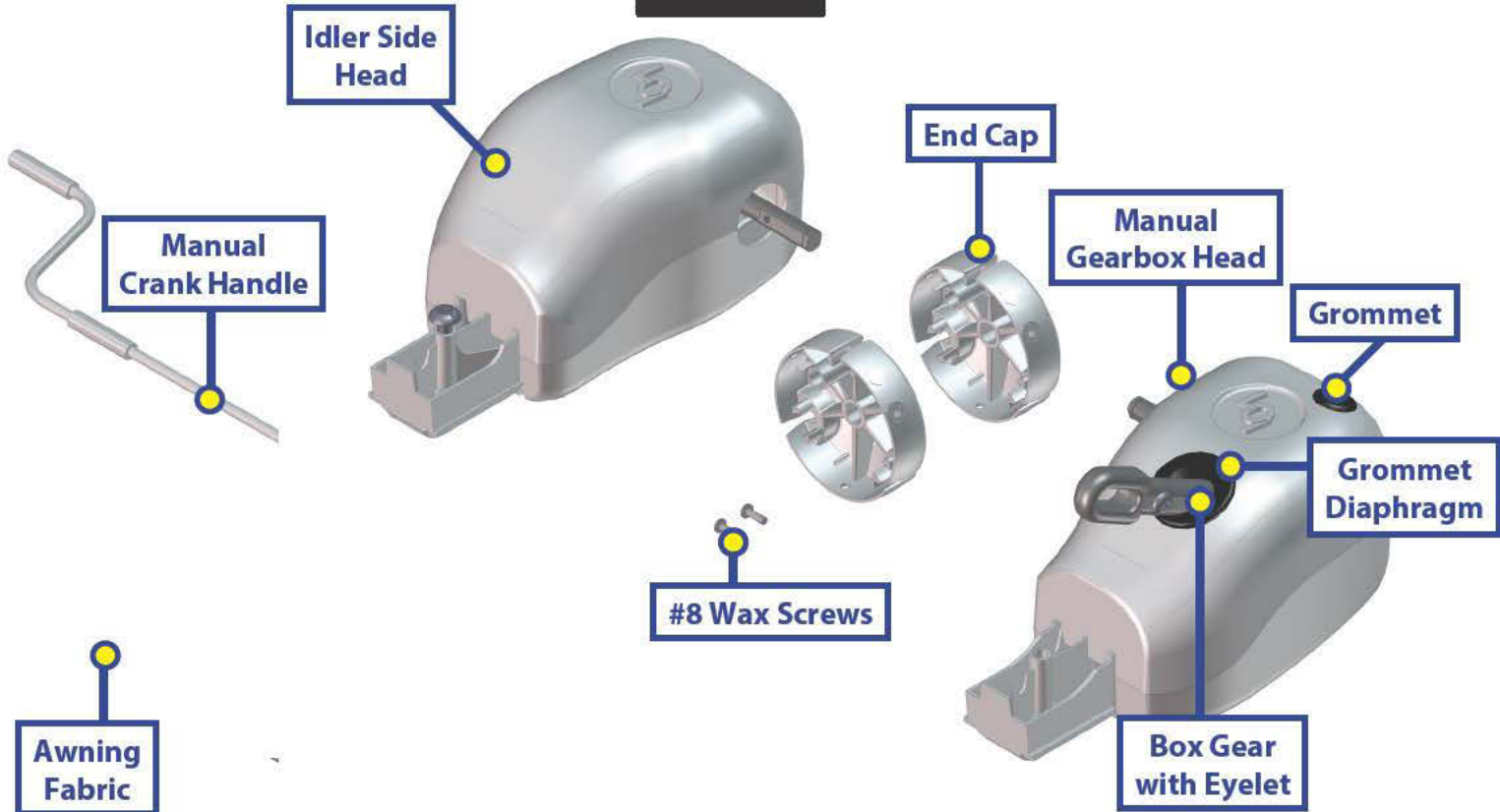
Fig. 8A



Fig. 8B



AWNINGS

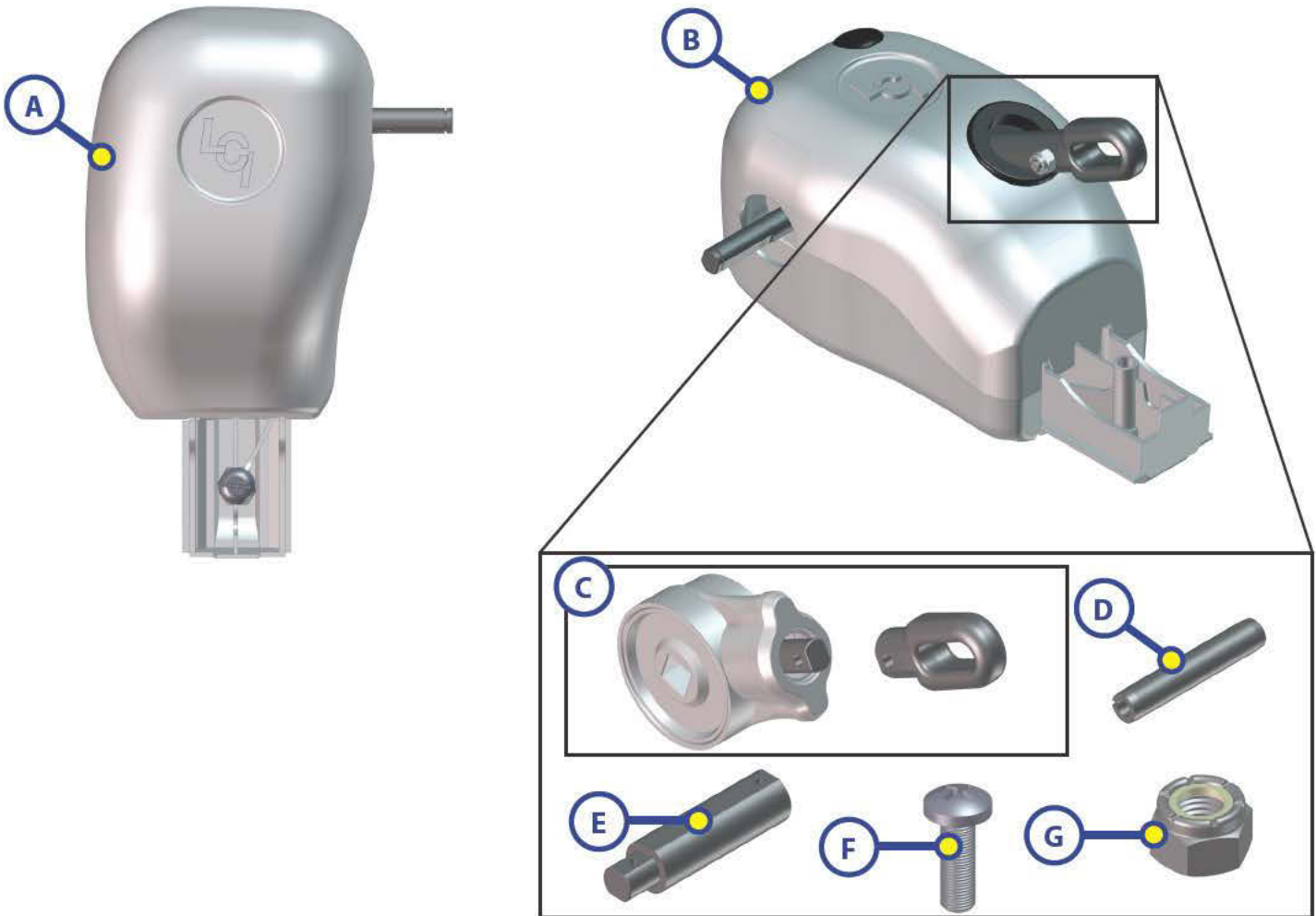




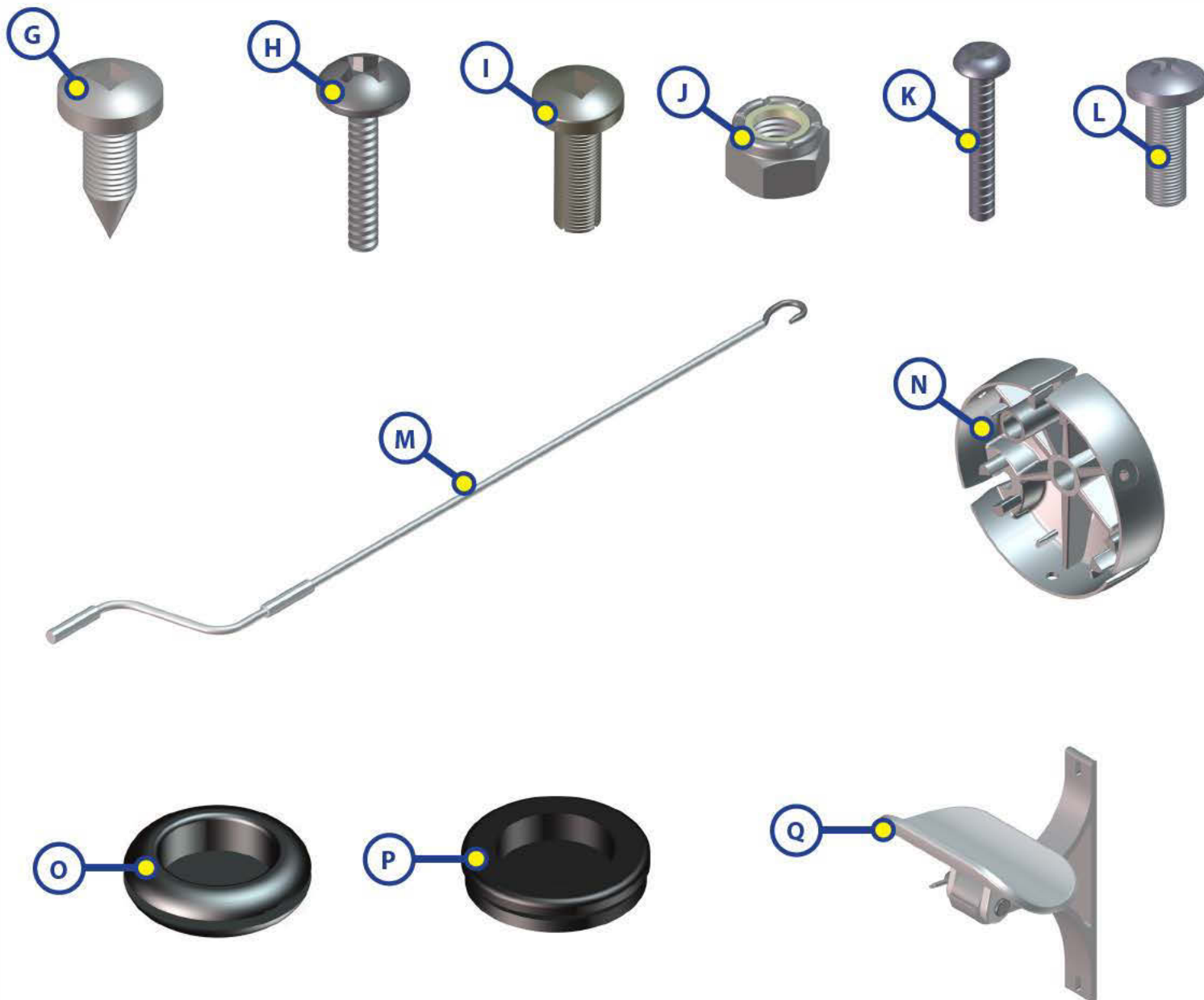
AWNINGS

Variant Code Information

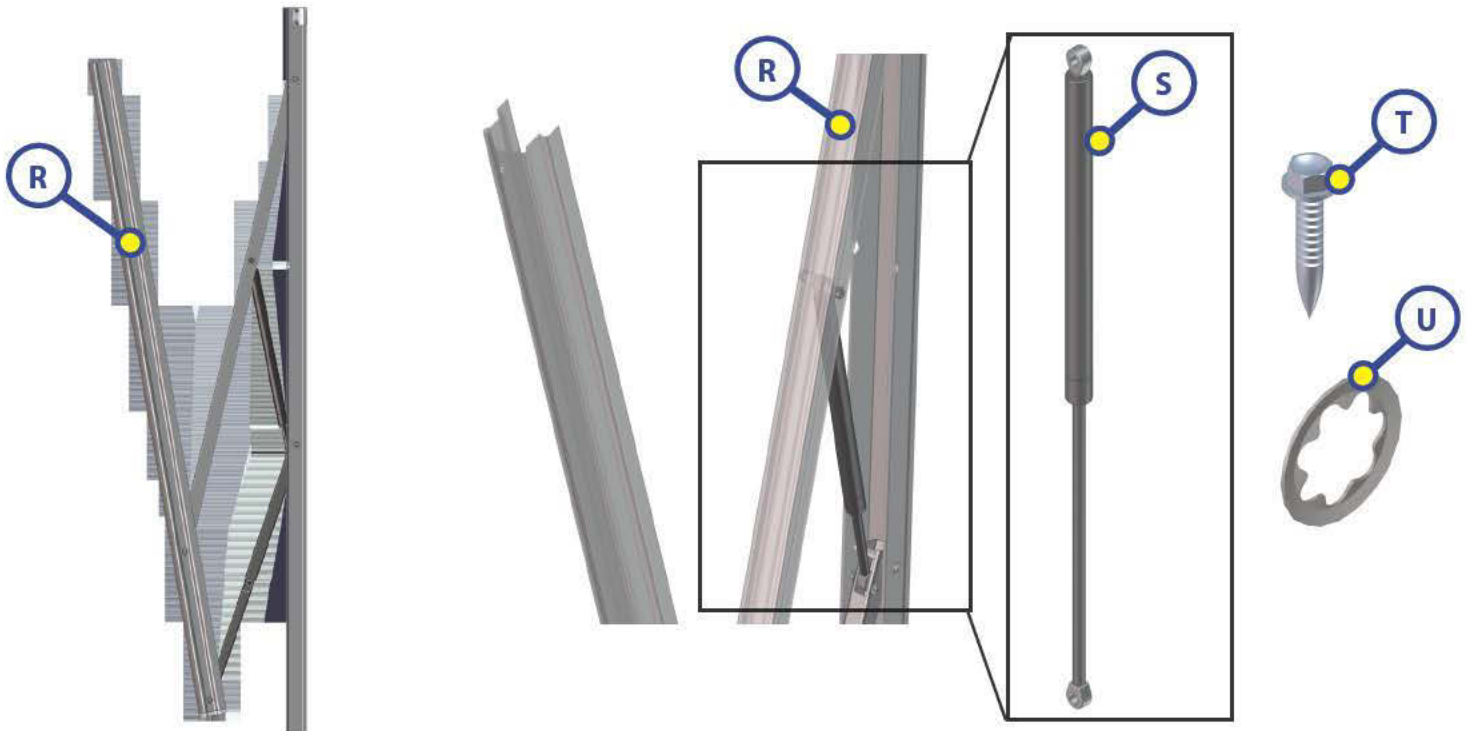
The variant code on Lippert products can assist LCI customers in obtaining additional information about the product and its components. For replacement part information, locate the variant code as outlined below and call LCI customer service at 574-537-8900.



Callout	White Part #	Black Part #	Description
A	266147	273479	Idler Side Head (White)
B	300029	300031	Manual Gearbox (White)
C	300029		Box Gear, Manual, with Eyelet (gear will come disassembled)
D	300026		Pin, Spring Slotted (for Box Gear)
E	299889		Coupler (for Box Gear)
F	300027		Screw 1/4 - 20 x 1 1/8 (for Box Gear)
G	322401		Nut 1/4 - 20 Nylock (for Box Gear)



Callout	White Part #	Black Part #	Description
G	299419		Screw - # 8 - 15 X ½ PNH ZN SQ A ST
H	266156		#6 X ½ ZN Screw (fastener for head covers, 6 per cover)
I	299630		#8 End Cap Wax Screw (head to roll bar)
J	118043		Nut ⅝-18 Nylock ZN ST (head to arm)
K	266148		Screw ⅝-18 X 2-1/4 (head to arm)
L	266155		Screw #8-32 x ½ PH PNH MACHG ZN FT HD (back cover to mount)
M	300030		Manual Crank Handle
N	266130		End Cap
O	275071		Rubber Grommet
P	299993		Grommet Diaphragm
Q	289373	289374	Awning Center Support Assembly - White NOTE: Only required for Solera Awnings greater than 21' in length



Callout	White Part #	Black Part #	Description
R	295742	395743	Support Arm Assembly (Short, 61")
	260294	266169	Support Arm Assembly (Pitched, 66 1/8")
	281152	2881154	Support Arm Assembly (Flat, 69")
S	280343		Gas Strut; 26"; 124 LBS (for Short and Flat Arm assemblies)
	260282		Gas Strut; 124 - 144 LBS (for Pitched Arm assemblies)
T	286576		Screw - #14 - 10 x 1 1/2 (arms to coach)
U	282484		Star Washer (for Gas Strut)

Awning Fabric and Roll Bar Replacement

To order replacement awning fabric and roll bar for your awning, locate the awning label on the roll bar. Locate the variant code at the bottom of the label. Call LCI Customer Service at 574-537-8900 and provide the variant code.



Operation

Extending the Awning

1. Verify the battery is fully charged and hooked up to the electrical system.
2. Locate the locking latch (Fig. 1A), if equipped, on the drive side awning arm and unlock the latch (Fig. 1B).

NOTE: This latch is optional and may not be installed. If not installed, skip to step 3.

3. Press and hold EXTEND (Fig. 2A) until the awning is extended completely.

NOTE: Extension is considered complete when the awning valance seam reaches the leading edge of the awning tube (Fig. 3).



Over extending the awning will roll the awning back up the wrong way and could damage the system and will void the Limited Warranty.

Retracting the Awning

1. Verify the battery is fully charged and hooked up to the electrical system.
2. Press and hold RETRACT (Fig. 2B) until the awning is retracted completely.
3. Locate the locking latch (Fig. 1B), if equipped, on the drive side awning arm and lock the latch to secure the awning in place (Fig. 1A).

NOTE: This latch is optional and may not be installed. If not installed, awning is secured and ready for transportation.

Fig. 1A



Fig. 1B



Fig. 2

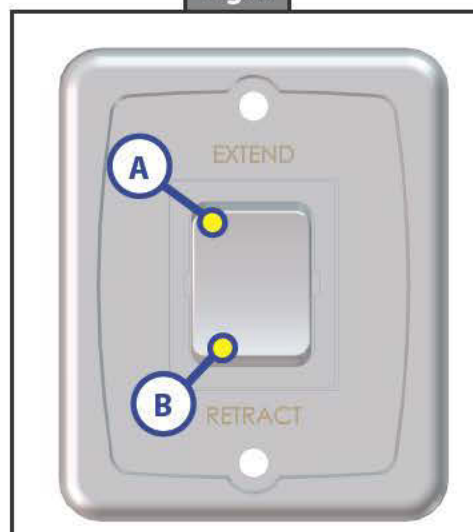
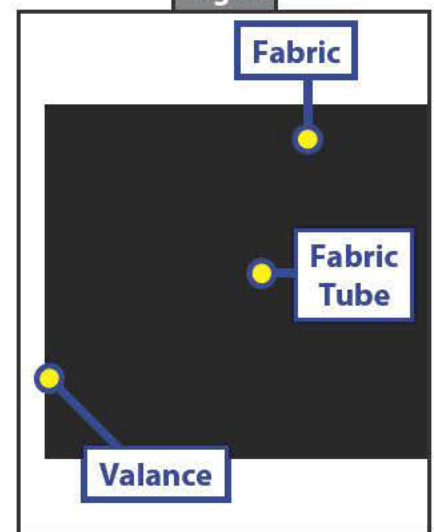


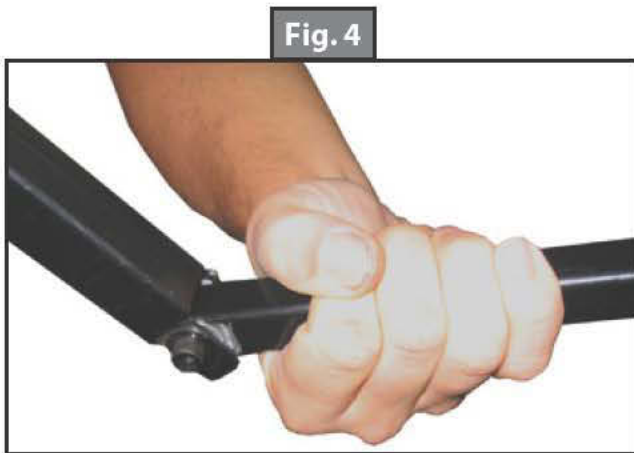
Fig. 3



Adjusting Pitch - All Solera Awnings

NOTE: Without manually setting pitch to the awning, the awning will pitch itself to purge excessive water pooling in one location and may dump a significant amount of water to either end of the awning without notice.

1. Pitch can be set manually by adjusting the articulating arm to tip one side of the awning to allow water runoff. Extend awning to desired location.
2. Choose the side of the awning for optimum or convenient water runoff. Pull downward on the joint of the articulating arm until pitch is set (Fig. 4) to allow for water runoff. Do not push up on the articulating arm. This will put tension on the gas strut and can break it. Belleville washers and bolt allow for the joint to remain in the position set by the operator (Fig. 5).



Maintenance - All Solera Awnings

Fabric Care

If the awning is rolled up while wet, roll it out and let it dry as soon as conditions allow before rolling it up again. This will help prevent the formation of mildew and add greatly to the life of the awning. Mildew does not form on the fabric itself, but on the accumulated dust, dirt and grime. Periodically clean vinyl or woven acrylic fabric using a mixture of 1/4 cup of dish soap mixed with 5 gallons of warm water. Liberally slosh the mixture on the top of the fabric and roll the awning up for 5 minutes. This will apply the mixture to the bottom as well. Roll it back out and hose off with fresh water. Repeat if necessary. Allow to dry before rolling up.

Troubleshooting

Manual Override

In the event of power loss or motor failure, the awning can be extended and retracted manually. Perform the following procedure to manually retract the awning.

1. Remove rubber plug from the power head assembly exposing the manual override nut on the motor (Fig. 6A).

NOTE: The power head is always located on the right side of the awning as it is viewed from outside of the coach.

2. Using a $\frac{7}{16}$ " socket and ratchet, or nut driver and power drill, spin the manual override nut counterclockwise to retract the awning (Fig. 7).

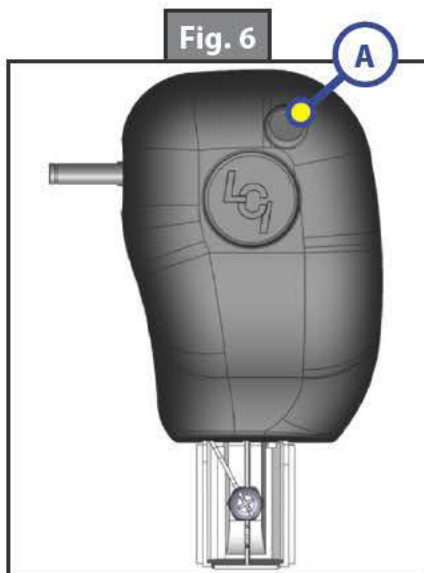
NOTE: Use caution when retracting manually as the use of a step stool or ladder may be required to completely retract the awning.

3. When awning is completely retracted, remove socket or drive device and replace rubber plug in power head assembly.

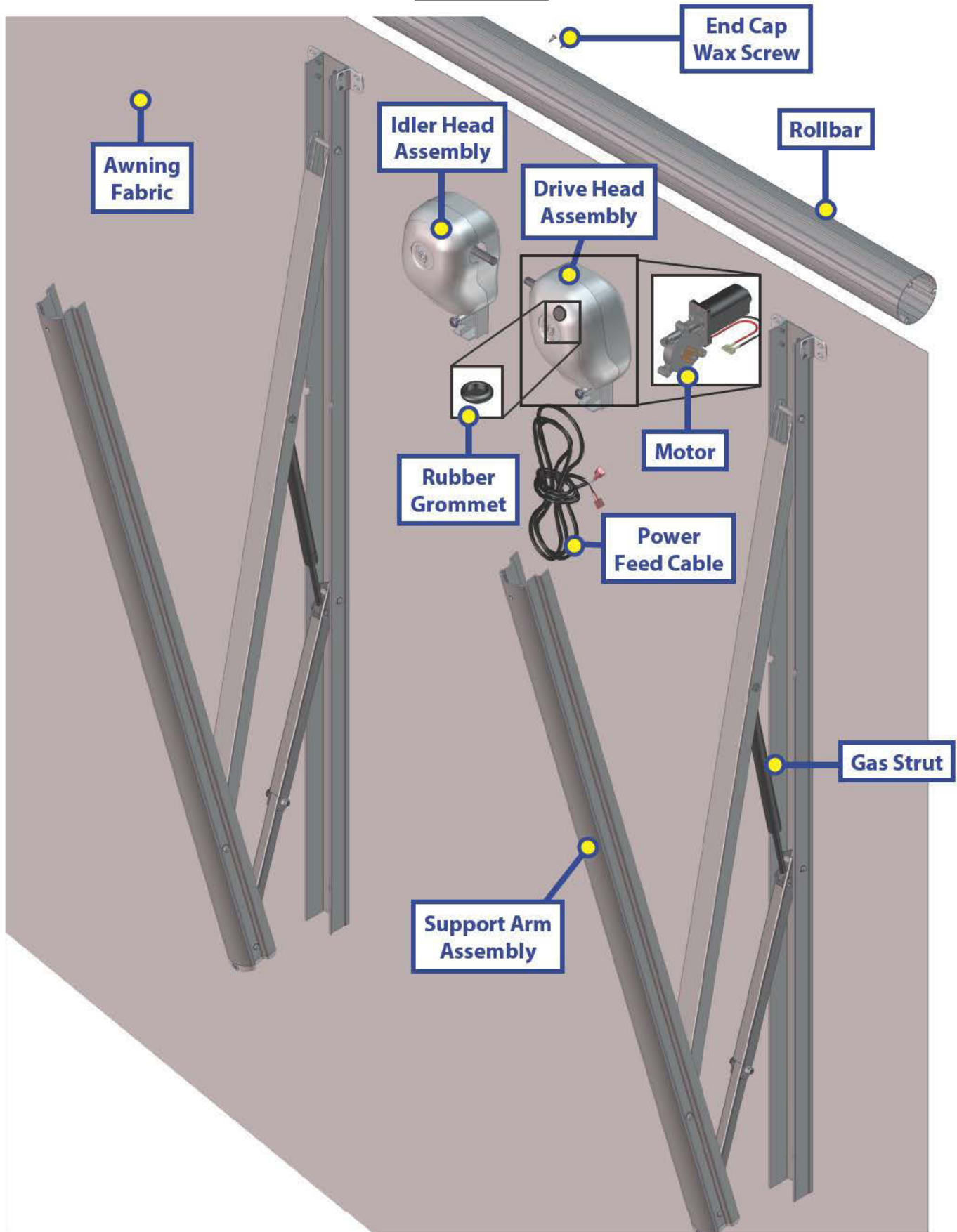
NOTE: The motor's internal drive system prevents the awning from moving (extend or retract) on its own. If the motor is damaged or disabled, be sure to secure the awning in the retracted position with straps before the override nut is released.



During incidents of high wind, heavy rain or extended time away from the unit, it is advisable to retract the awning completely to prevent damage to the awning and the RV.



AWNINGS

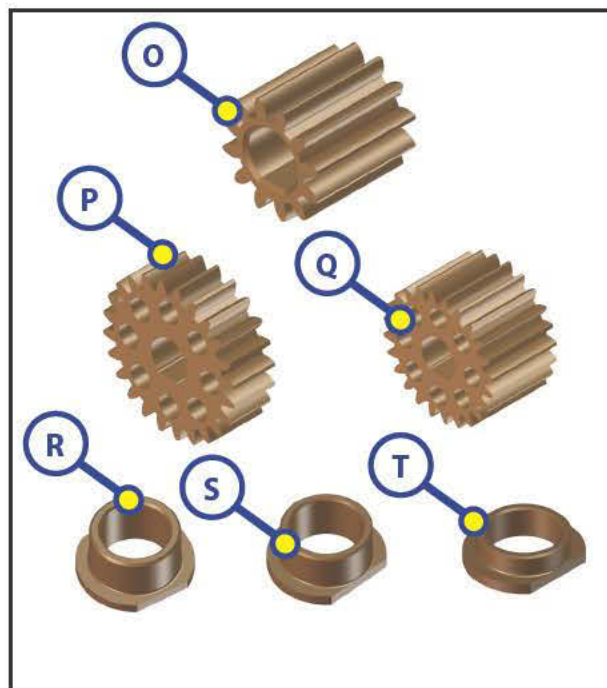
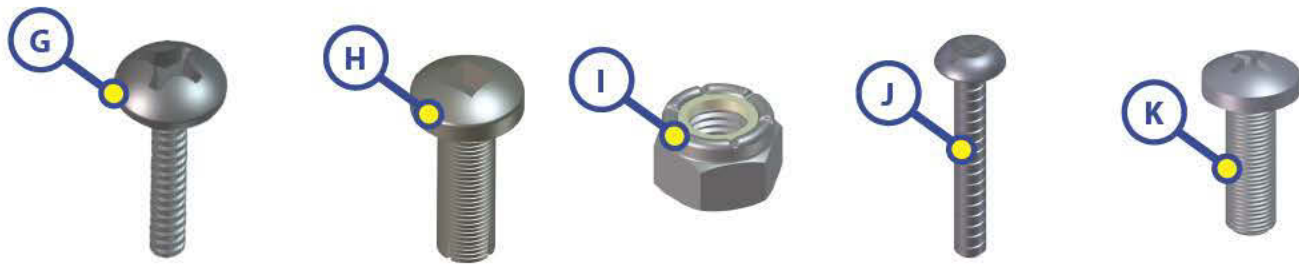


Variant Code Information

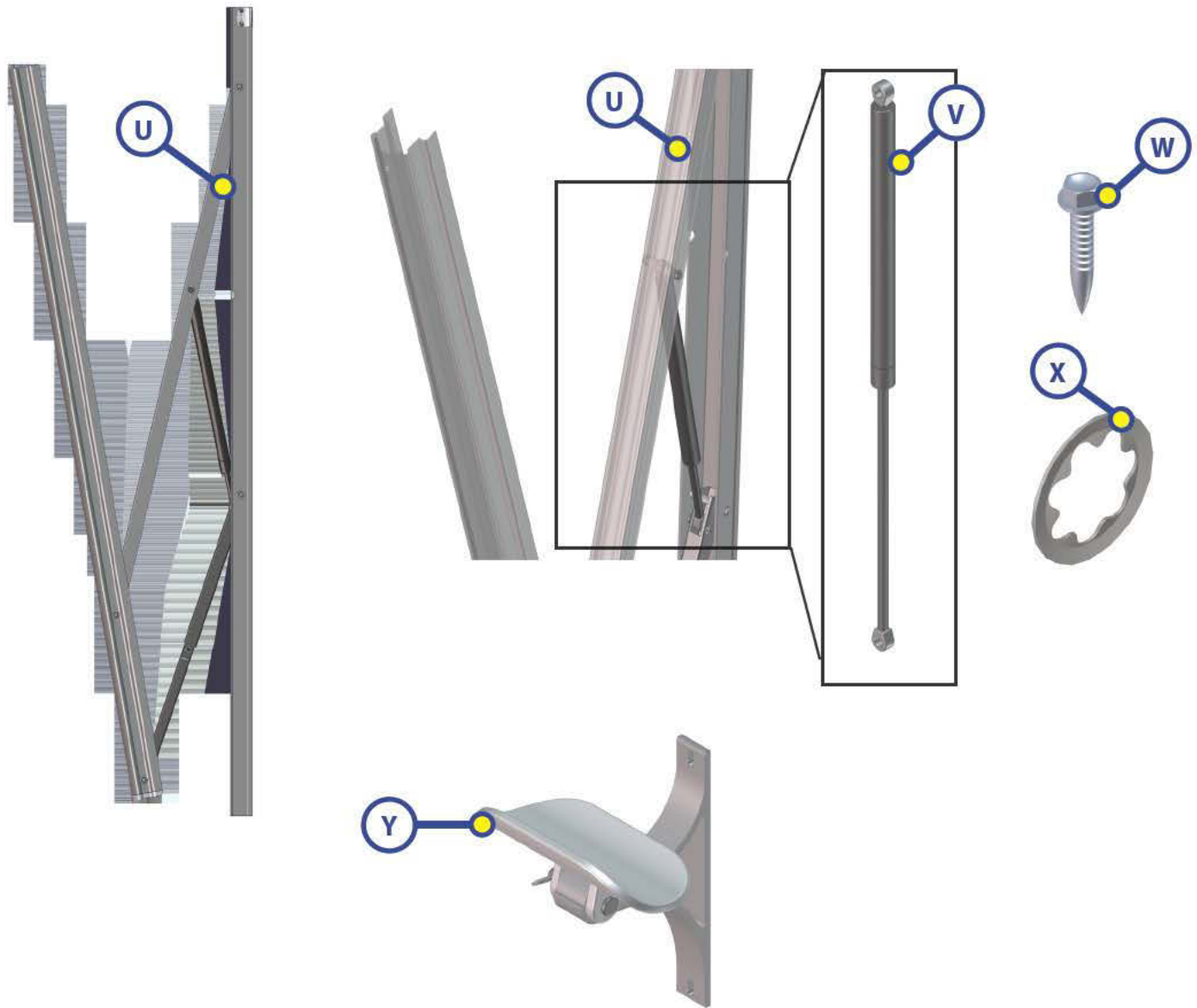
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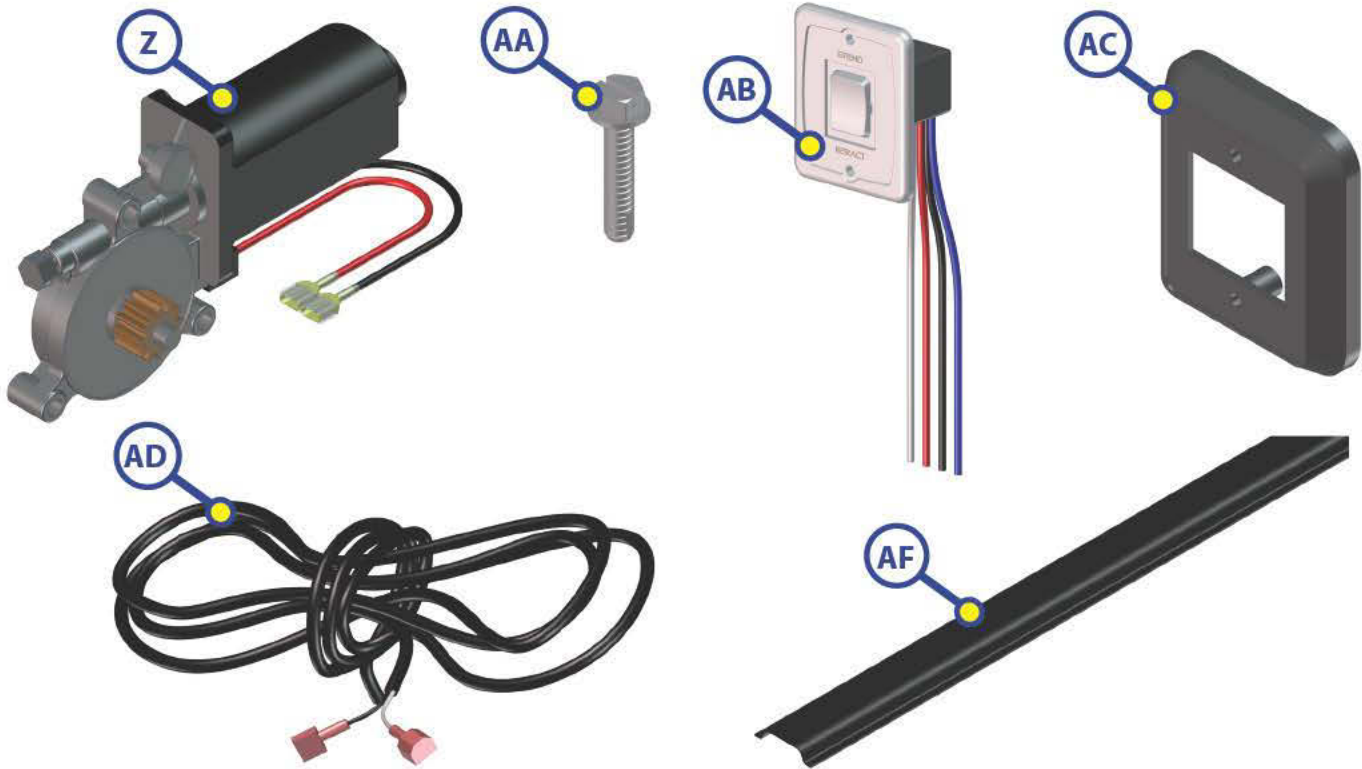
Callout	White Part #	Black Part #	Description
A	266147	266147	Idler Head Assembly
B	266153	266163	Idler Head Front Cover
	289563	289566	Idler Head Front Cover (NEW)
C	266154	266164	Idler Head Rear Cover
	289564	289567	Idler Head Rear Cover (NEW)
D	266146	273478	Drive Head Assembly
E	266151	266161	Drive Head Front Cover
	289557	289560	Drive Head Front Cover (NEW)
F	266152	266162	Drive Head Rear Cover
	289558	289561	Drive Head Rear Cover (NEW)



Callout	White Part #	Black Part #	Description
G	266156		#6 X 1/2 ZN Screw (fastener for head covers, 6 per cover)
H	299630		#8 End Cap Wax Screw (head to rollbar)
I	118043		Nut 5/16-18 Nylock ZN ST (head to arm)
J	266148		Screw 5/16- 18 X 2 - 1/4 (head to arm)
K	266155		Screw #8-32 x 1/2 PH PNH MACHG ZN FTHD (back cover to mount)
L	275071		Rubber Grommet (around manual override on drive head)
M	2661301	2661302	End Cap for power heads
N	299419		Screw - # 8 - 15 X 1/2 PNH ZN SQ A ST
O	266133		.873" 20 PA 16 DP, D SLOT GEAR
P	266134		.442" 20 PA 16 DP, CLR ZN GEAR
Q	266136		.500" 20 PA 16 DP, CLR ZN GEAR
R	266142		Bushing
S	266143		Bushing
T	281828		Bushing



Callout	White Part #	Black Part #	Description
U	295742	395743	Support Arm Assembly (Short, 61")
	260294	266169	Support Arm Assembly (Pitched, 66 1/8")
	281152	2881154	Support Arm Assembly (Flat, 69")
V	280343		Gas Strut; 26"; 124 LBS (for Short and Flat Arm assemblies)
	260282		Gas Strut; 124 - 144 LBS (for Pitched Arm assemblies)
W	286576		Screw - #14 - 10 x 1 1/2 (arms to coach)
X	282484		Star Washer (for Gas Strut)
Y	289373	289374	Awning Center Support Assembly NOTE: Only required for Solera Awnings greater than 21' in length



Callout	White Part #	Black Part #	Description
Z	266149		Motor
AA	266132		Screw ¼ - 20 x ¼ IHWH 2N SLF ST (motor to mount)
AB	285499	285500	Switch Kit
	280570		Wire Harness
	280565	280567	Switch Plate
	280564	280566	Switch
AC	285077	285079	Bezel Spacer
AD	273007		Power Feed Wires
AF	27507015	2750701692	Wire Cover; 9.75"; Narrow
	275070353	2750701888	Wire Cover; 22"; Narrow
	266138481	2661382017	Wire Cover; 30"; Narrow
	266139337	2661391872	Wire Cover; 21"; Wide
	266139429	2661391964	Wire Cover; 26.75"; Wide

Awning Fabric and Roll Bar Replacement

To order replacement awning fabric and roll bar for your awning, locate the awning label on the roll bar. Locate the variant code at the bottom of the label. Call LCI Customer Service at 574-537-8900 and provide the variant code.



AWNINGS

Ordering Replacement Fabric

1. Locate the awning label on the roll bar.
2. Locate the variant code at the bottom of the label.
3. Call LCI Customer Service at 574-537-8900 and provide the variant code.

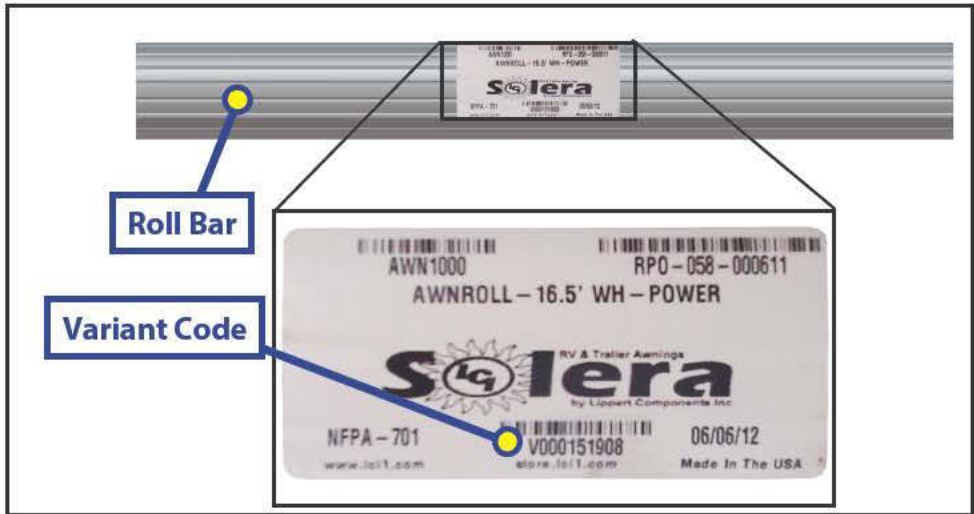


Fig. 1

Installing Awning Fabric to Roll Bar

1. With printed side of fabric down, slide end of fabric with two gray cords into two channels on roll bar tube (Fig. 1). Ensure that the ends of the fabric are spaced evenly from the ends of the tube (1" from each end).

NOTE: Manual awnings have an additional pull strap (292794 - 86" for flat/pitched awnings; 68" for short arm awnings) and must be installed into the empty channel of the roll bar tube.

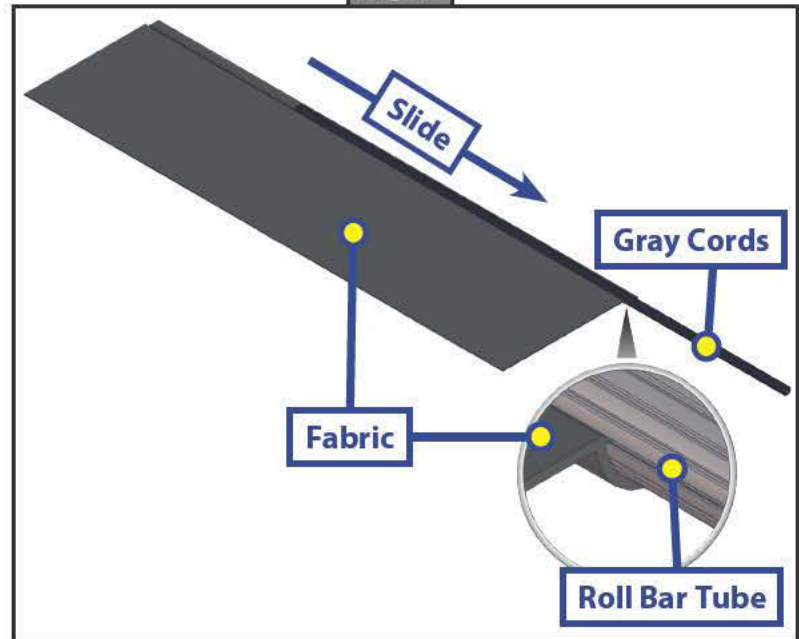
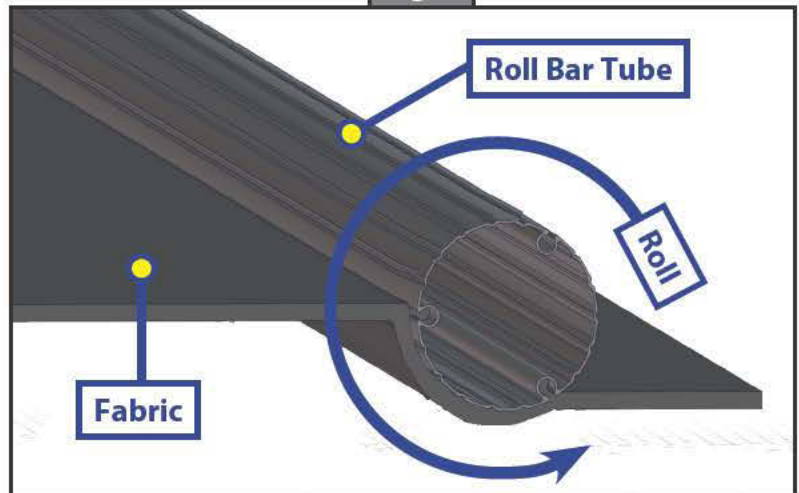


Fig. 2

2. Roll fabric onto roll bar tube. Make sure that the fabric stays snug and flat while rolling onto the tube. The printed side of the fabric should face the outside of the tube (Fig. 2).

NOTE: Electric awnings use the end caps (266130) will need to be attached with six (299419) screws, three on each end cap. Otherwise, the assembly will need to have the manual head assemblies installed and the tube wound.



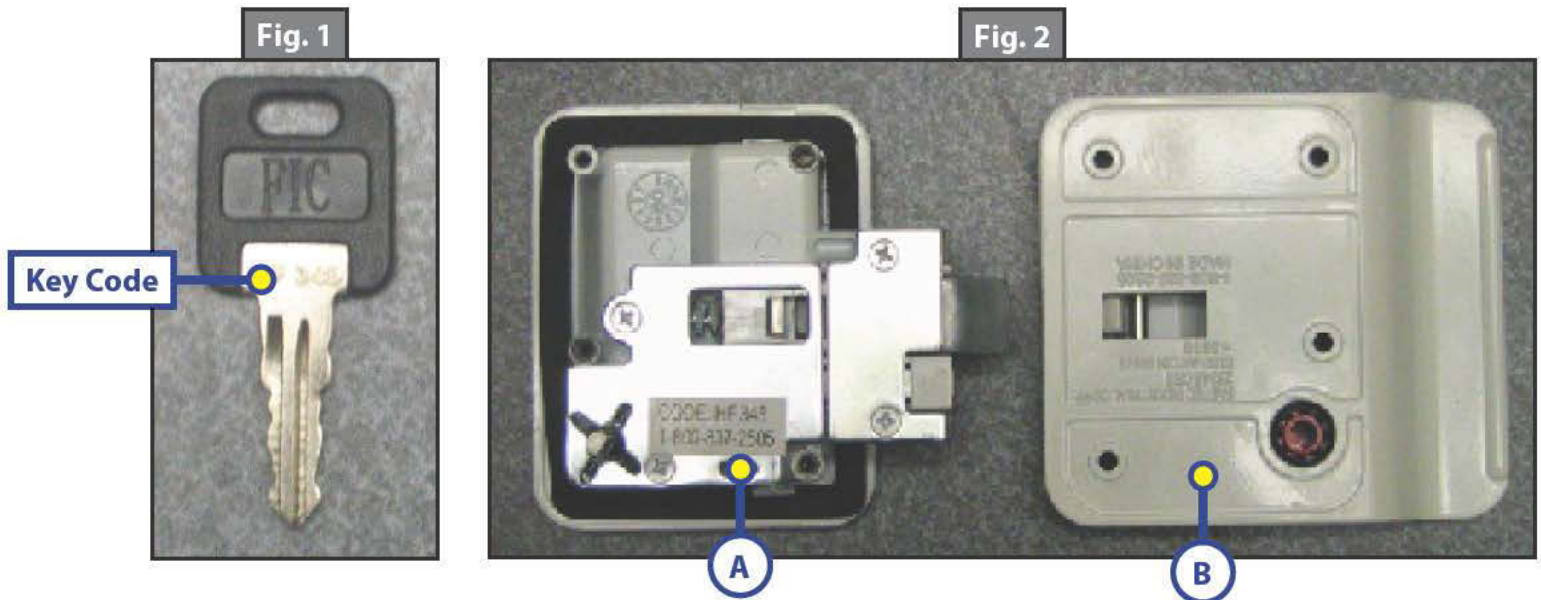


RV ENTRY DOOR LATCHES
OWNER'S MANUAL

LIPPERT
COMPONENTS™

FASTEC ENTRY DOOR LATCH

1. Fastec door latches are installed on about 98% of all entry doors in the RV industry. They are the only manual latch used by Lippert Components, Inc.
2. LCI Fastec door latch comes in 3 colors; Black-50% usage; White - 40% usage; Chrome - 10%.
3. There are 25 different keys used for the manual door latches.
4. The Fastec Key code is stamped into the key as a 5 character code, e.g. HF 345 (Fig. 1).



5. Standard key will have a square, black plastic coating on the key handle and will have "FIC" molded on the face.
6. In the event of a lost key, the key code can be found on a sticker affixed to the back plate of the latch (Fig. 2A).
7. Fastec's toll free number will also be listed - (800)837-2505.
8. Remove the four mounting screws found on the inside door latch. Remove inside latch to reveal key code sticker (Fig. 2B).
9. A Master Key will have the same characteristics only in red plastic. The Master Key will only open the door lock and not the deadbolt.

SOUTHCO KEYLESS ENTRY DOOR LATCH

1. Southco, Inc. door latches are used in Lippert's Keyless Entry Door systems.
2. All Southco units are black and the door handle is slightly curved, as opposed to the straight door handle on the Fastec.
3. Keypad (Fig. 1)
4. Keyfob (Fig. 2)

Fig. 1



Fig. 2



5. The Southco key code is a 3-digit code stamped onto the key, see Fig. 3. The key handle has black molded plastic on the key handle and is rounded at the end. The Master Key bears no key code.
6. If the key or key fob is lost, the key code can be found on the latch plate, see Fig. 4, by removing the 4 screws on the inside latch handle.
7. Southco can be contacted directly for key - 610-459-4000.

Fig. 3

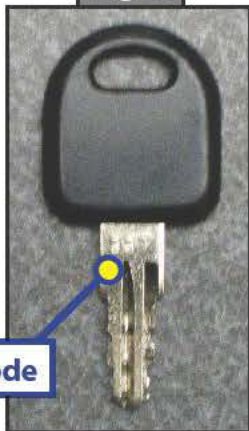


Fig. 4



Fig. 5



Fig. 6



Fig. 7



1. The receiver is mounted just below the entry door window.
2. The keypad and the keyfob are all matched directly to the receiver. A small black sticker with the code number is affixed directly to each component. On the keypad, the sticker is located under the 9 - 0 button (Fig. 5). On the keyfob, the sticker is in the middle of the backside of the fob (Fig. 6). The matching code will be located on the receiver next to the antenna (Fig. 7).
3. The default entry code is 1-2-3-4.



LIPPERT
COMPONENTS

RVLOCK KEYLESS ENTRY DOOR LATCH

Installation

Removal of Existing Handle

1. Securely latch the door in the open position to make it easy to work on. This will keep it from moving while you are working.
2. Remove the four screws from the back of the existing handle; the back of the handle will fall away from the door.
3. Remove the two screws and the strike plate from the side of the door; you will now be able to remove the front portion of the handle.
4. Store all of the parts you just removed for possible future needs. New installation parts as well as screws are provided with your new RVLock Handle. NOTE: At this point you are ready to install and program your new RVLock handle with your remote(s) and/or keypad.

Installing the RVLock

1. After carefully removing your new RVLock from its packaging, place all the parts on a soft towel to avoid scratches and dings.
2. Pull red tab to energize battery compartment. To change or verify batteries in handle, remove the two screws holding the plastic battery cover and install four AA alkaline batteries.

NOTE: Batteries last around 5-6 months. Remove batteries at end of season and/or during large gaps between trips to avoid draining batteries and possible acid damage.

3. Replace the battery cover making sure not to over tighten screws.
4. Slide the front of your new RVLock handle into the opening on the front of the door. While sliding it in, gently pull the wires ahead of the lock and through the opening making sure that they are not getting pinched. While holding the front handle in the door so that it does not fall, attach the new strike plate with the 2 shorter screws on the doors jamb side.
5. While holding the back portion of your RVLock handle, connect the battery wires to the front portion of the handle that is already in the door. Make sure you hear the confirmation beep that the power has been connected.
6. Carefully align and attach the back handle while gently tucking excess wires into the void area. Holding the paddle of the back handle closed while inserting the paddle tooth into the front handle will make sure of a proper and aligned fit.

NOTE: Make sure not to pinch or cut wires during installation and make sure all wires are tucked out of the way of each screw opening and the mechanical parts of the handle. We are not responsible for wires damaged during installation.

7. Next install the four longer installation screws, but be patient and read ahead as this is the most technical part of the installation – a long, skinny #2 Phillips screwdriver will make this much easier. Make sure not to cross-thread the screws and do not scratch the side of the paddle portion of the handle while fastening the screws. Only tighten the screws tight enough to keep the lock securely against the door and do not tighten the screws at this point.
8. With the four semi-tightened screws in place, adjust the front handle in place so it is straight in the opening and hold it there while tightening the screws in the back of the handle. Securely tighten the four screws.

Programming the RVLock

1. Press the lock and unlock buttons on the RVLock remote(s) or, if you have a keypad, type in the numeric code (default code is 1234) and press the lock button on the keypad to make sure the lock functions. If they function, go to step 2.
2. Press the learning button with a paper clip and then release after you hear a short beep. (This button is located through a pin hole under the interior handle. Lift the interior handle to see the pin hole.)
3. After you hear the "programming mode" beep, repeat pressing the lock button on your RVLock remote, or if you have the RVLock keypad, repeat typing in your numeric code and then pressing the lock button on the keypad until your RVLock handle confirms the programming with a series of fast beeps. You have approximately 10 seconds. (Example: 1-2-3-4 lock, 1-2-3-4 lock, 1-2-3-4 lock) Default code for all new keypads is 1234. If programming did not work or if you have additional remotes/keypads to program, repeat steps 2 and 3.
4. You have successfully finished the installation! Please always keep keys on the outside of the coach to avoid accidental lock out.

NOTE: Make sure to place your keys and these instructions in the glove box of your truck or somewhere on the outside of the trailer, so they are available when and if you need them. Do not place your keys or these instructions in the trailer.

Programming a new code into your RVLock Keypad

1. Write your desired "new" code down and then read through all instructions before you start the programming process as this will make the programming much easier.
2. While holding down the "0" button, press and release the "lock" button, then release the "0" button as well. (You will hear a long confirmation beep – this signifies that you have entered the programming mode).
3. Type in the keypad's existing code, for example 1234, then press lock. (1234 is the default code from the factory and only works until it has been changed).
4. Now type in the new code written down (up to 8 digits), then press lock.
5. Again type in the same new code as written and again press lock. (Repeat this until a long confirmation beep from the keypad confirms and completes programming).
6. Test to ensure your new code works by typing in your new code and press the lock/unlock button. The keypad should confirm the accepted code by a long beep. If not, start again at step #1.
7. Peel the double stick tape off the back of the Keypad and press firmly on a clean surface. Keypad will function best when within a closer proximity of the RVLock handle (Within 15-20').

NOTE: Keypad will reset to former operation after 10 seconds of being idle during programming mode. If you make a mistake simply wait 10 seconds and start over.

8. Long beep – Confirmation/Functioning
9. Five short beeps – Error/Wrong code
10. You must always have the current code to change to a new one. There is no reset button or override code. If the code has been forgotten, the keypad must be replaced.
11. Always keep your keys outside of your coach in case of electronics/battery failure.
12. The CR2032 battery can be accessed by removing the two screws that hold the battery door in place on the bottom of the keypad.
13. After installing a new battery, make sure to press battery door in firmly while tightening screws. This will allow the gaskets to seal up tight. Not pressing the battery door securely while tightening may result in water being able to access the interior of the keypad.

Syncing the RVLock handle with your Keypad or Remotes

1. Lightly press the learning button with a paper clip through the pin hole located under the interior handle. A beep will confirm that you have entered the programming mode.
2. Now repeat pressing the lock button on your remote until the handle confirms with a series of rapid beeps (usually takes one or two times). If you have a keypad, repeat typing in your numeric code and pressing the lock button until the handle confirms with a series of rapid beeps (usually takes one or two times).
 - A. Default code for all new keypads is 1234. If you would like to change your keypad code see "Programming a new code into your RVLock Keypad" after completing this "syncing" process.
 - B. If programming did not work or if you have additional remotes to program, repeat steps 1 and 2.
 - C. You can have both a keypad and multiple remotes operating the same or multiple RVLock handles.

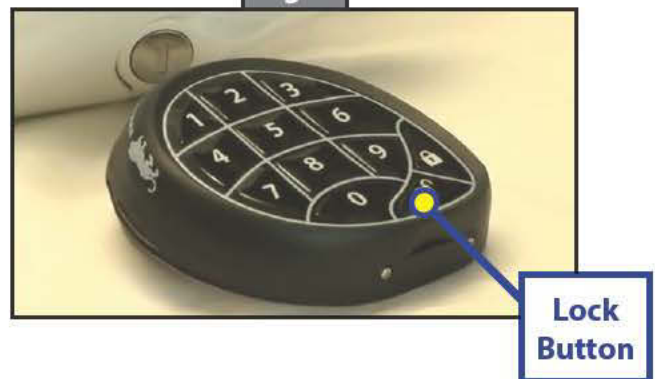
Keypad Programming Instructions

3. While holding the "0" button, press and release the "lock" button (Fig. 1). You will hear a long confirmation beep – entering programming mode.
4. Type in the existing code, in this case, the default code, "1234", then press lock (Fig. 2).
5. Now type in your new code (up to 8 digits), press lock.
6. Again type in your new code and press "lock". (A long confirmation beep confirms and completes programming.)
 - A. The keypad comes from the factory with the default code of "1234".
 - B. Remember, we removed the "backup" reset code/button. You must have the current code to change to a new code. There is no reset button or override code.

Fig. 1



Fig. 2



RVLock Handle Programming Instructions

1. Power up the RVLock handle.
2. Using a paperclip, lightly press the learn button located through the pin hole on the rear of the handle next to battery cover (Fig. 3). You will hear a short confirmation beep.
3. Press the lock button on the Key Fob (Fig. 4). Repeat this process until long set of beeps confirms and completes programming, usually 2 times.

Fig. 3

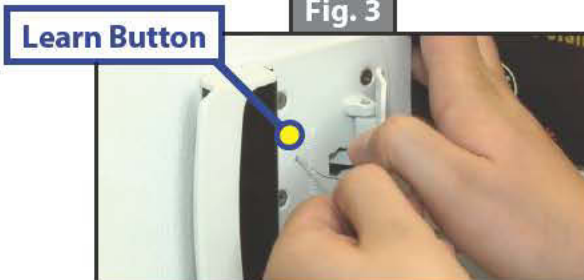


Fig. 4

Lock Button



Troubleshooting

- A.** When someone has tried to open the door after the handle is locked, the dead bolt may be on a bind making it difficult for the handle to retract the dead bolt. Push the door closed tightly and retry the remote or use your key.
- B.** If the door is hard to shut or does not shut tight: Adjust the strike plate on the jamb side of your door.
- C.** Fast beeps before the lock actuates means the batteries are getting low. Batteries should last around 5-6 months in between changes.
- D.** To see a video of installation and programming, go to www.rvlock.com.

FAQs

- Q.** Can I replace my SouthCo Keyless entry lock with the RVLock
 - A.** The RVLock is a direct replacement/ interchangeable with Southco Keyless Locks.
- Q.** What do I do if I lose my key?
 - A.** Email support@RVlock.com to request keys. Customers, OEMs and dealers can email requests for keys to the address. RVLock charges \$15 for a set of keys and the key # will need to be provided. Dealers or WDs who need master keys for RV Lock sets can also address through email address listed above.
- Q.** What if I lose my key fob?
 - A.** Go to RVLock.com and one may be purchased direct.
- Q.** Is my wireless keypad waterproof?
 - A.** Yes your wireless keypad is waterproof, however, power washing your coach or direct high impact water can breach the seal on your keypad and fill with water creating operating issues.
- Q.** What is my RVLock warranty period?
 - A.** RVLock supplies a one year from date of purchase (DOP) as warranty term to LCI.
- Q.** If my keypad isn't functioning, do I need to return the entire lock mechanism?
 - A.** No.
- Q.** Is the battery replaceable in my keypad?
 - A.** Yes. Std 2032 watch battery.



TM

MANUAL STEP
OWNER'S MANUAL

LIPPERT
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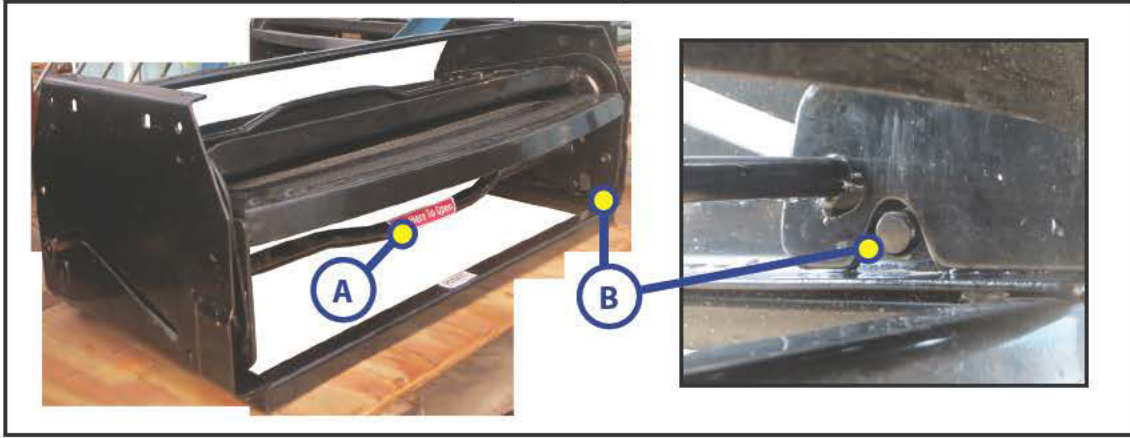
Operation

Unfolding Steps

1. Grasp step handle (Fig. 1A) firmly. Lift up slightly to disengage lock mechanism (Fig. 1B) from channel and pull entire step assembly forward. (Fig. 1 shows the steps fully retracted.)

NOTE: Top step slides forward, it does not fold.

Fig. 1



2. Bottom step rests on top step, then folds down (Fig. 2).
3. Fold down bottom step (Fig. 3).

Fig. 2



Fig. 3



4. LCI Double Step fully extended (Fig. 4).

Fig. 4



Folding Steps

1. LCI Double Step fully extended.

Fig. 1



2. Fold bottom step onto top step to store (Fig. 2).
3. Bottom step rests on top step to be stored (Fig. 3).

Fig. 2



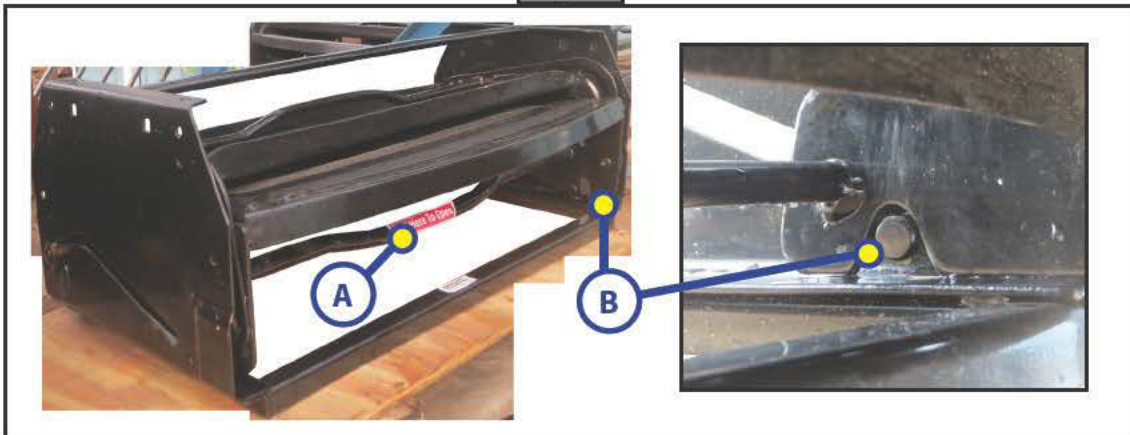
Fig. 3



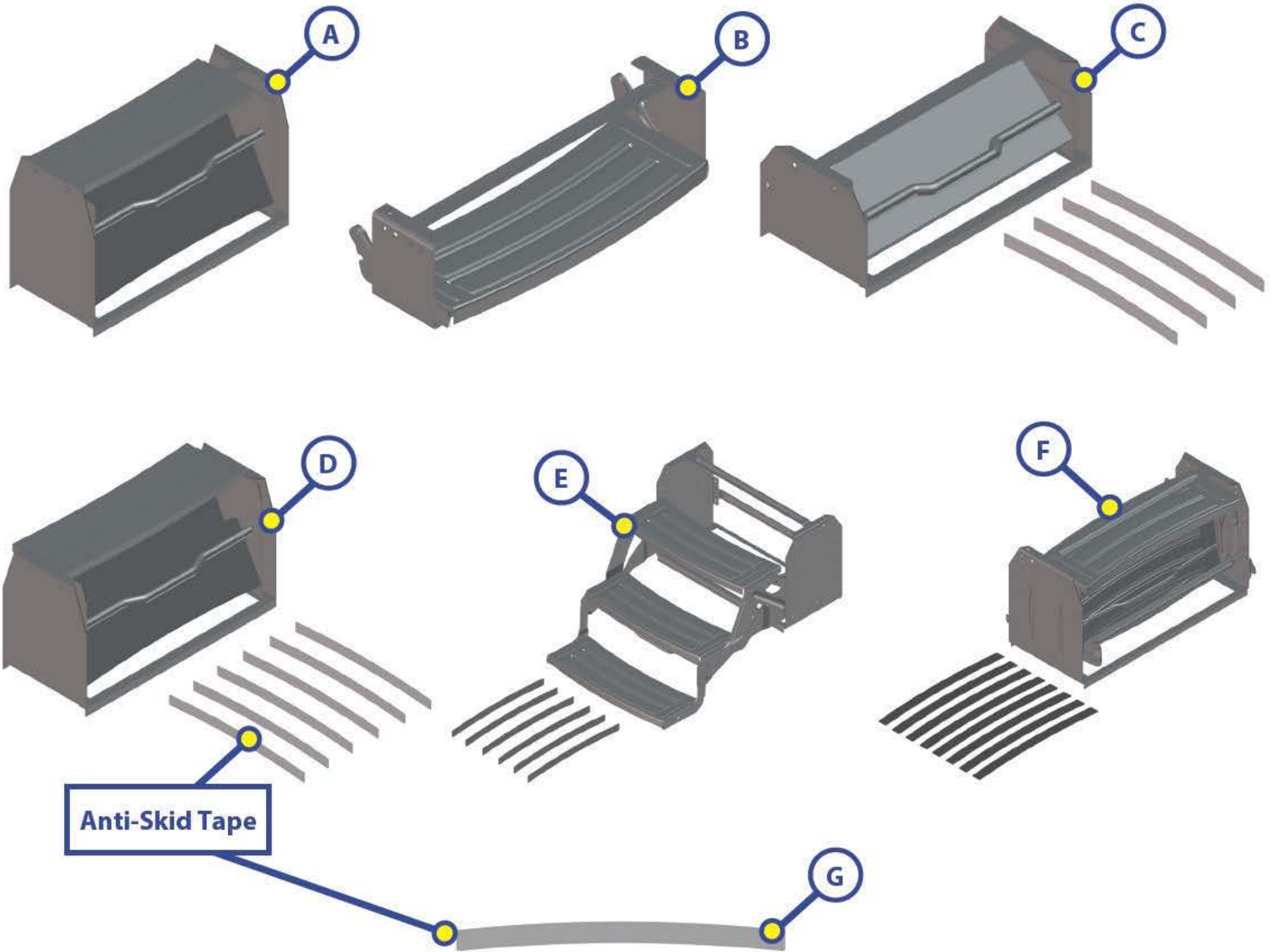
4. Grasp step handle (Fig. 4A) firmly. Lift up slightly to disengage lock mechanism (Fig. 4B) from channel and push entire step assembly back. (Fig. 4 shows the step assembly fully retracted.)

NOTE: Top step slides back, it does not fold.

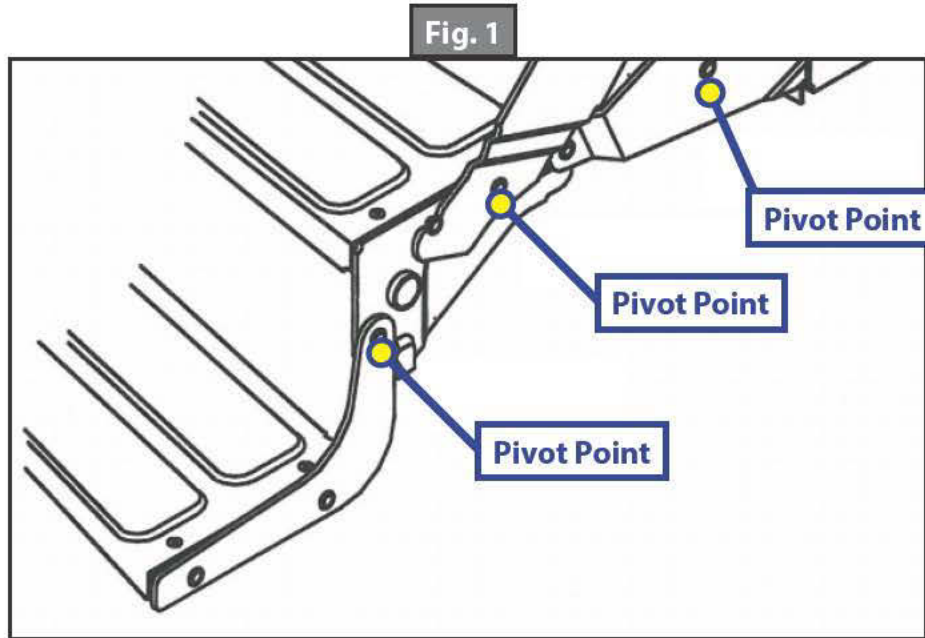
Fig. 4



STEPS



Callout	Part #	Description
A	183175	Triple Step 9" Radius with Tread Tape
B	257716	Single Step 24" Radius with Skid Tape
C	257717	Double Step 24" Radius with Skid Tape
D	257718	Triple Step 7" Radius with Skid Tape
E	257719	Triple Step Wide Body with Skid Tape
F	270038	Quad Step 8" Radius with Skid Tape
G	161638	Anti-Skid Tape (19.5" x 1.25")
	226893	Anti-Skid Tape (22.25" x .5")
	237520	Anti-Skid Tape (21" x 3")



Covering Nicks and Scratches

Seal any nicks or scratches with an automotive grade primer to prevent rust. Once the nick or scratch has been sealed, cover the damaged area with an automotive grade, high-gloss paint.

Lubricating the Mechanism

NOTE: It is recommended that you lubricate the mechanism every 30 to 60 days.

Carefully clean the area around the pivot points (the rivets involved in the motion of the mechanism (Fig. 1)). After cleaning, lubricate the pivot points between the parts (to pinpoint this area, locate the washer between the parts). An automotive grade, non-staining lubricant is recommended.



To prevent the possibility of a person slipping on the RV step, avoid letting any excess lubricant come in contact with the surface of the RV step itself. Carefully clean the entire RV step after lubricating the mechanism.



GENERAL MAINTENANCE INFORMATION

Couplers - Travel Trailer - Grease should be applied to inside of coupler or on hitch ball to prevent scratching and scarring and for smooth operation in travel.

Pinboxes - 5th Wheel - ALL - Rinse after winter, coastal or salt air travel. Grease on King Pin & Hitch. 110 ft./lb. torque on mounting bolts. Tri-Glide - See above pinbox maintenance. Also, grease 9 points, 3 per side, 3 on underside. See LIP Sheet 0170.

Chassis - Trailer Frame and all attaching components including Front and Rear Electric Stabilizer Jacks, Scissor Jacks, Under Chassis Storage Units, Tire Winches, Sliding and Bumper Mount Bike Racks. Wash down after winter travel on salted or otherwise treated roads or during extended period of time near coastal or salt air destinations. See LIP Sheet 0166.

Axles

Bearings - Service and Repack every 12 months or 12,000 miles. See Lippert Trailer Axle Manual for procedure and grease specs. See also LIP Sheet 0132.

Brakes - Brake Inspection & Maintenance - see LIP Sheet 0133. Any new brake assembly must go through the Break-In Period (Burnishing) to set initial contact. See LIP Sheet 0139.

Suspension Components

Equa-Flex - Grease every 5,000 - 8,000 miles.

Center Point - Check for proper inflation indicated by arms positioned vertically.

Wet Bolts - Grease every 5,000 - 8,000 miles.

Kinro

Windows - Inspect glazing around window to be free of damage, cracks or holes and that glazing goes completely around the window. Replace if damaged.

Cargo Doors - Inspect seals for damage, cracks or holes. Replace if damaged.

Ramp Doors - Inspect seals for damage, cracking or holes.

Slides - Inspect for dirt.

Inner Arms - Extend and wipe down and apply dry lube only.

Hydraulic Cylinder - Extend and wipe down piston rod and apply dry lube. Inspect hoses and hose fittings at cylinder for leaks.

Electric Actuator - Extend and wipe down inner actuator and apply dry lube. Do not leave extended for long periods of time. If unit is near coastal areas or exposed to salt air, maintain above components at least once a month.

Electric Landing Gear - Extend jacks and wipe down inner and outer jacks and apply dry lube to inner. Inspect bevel gears in top of jack to be free of dirt and contamination.

Hydraulic Landing Gear - Level-Up Jacks - Rear Hydraulic Stab Jacks - Wipe down inner and outer. Rinse outer after winter travel or coastal or salt air travel. Extend and apply dry lube to inner and piston rod where applicable. Inspect hoses and hose fittings for leaks.

Hydraulic Pump Units - Inspect for leaks around ports, hoses and fittings. Be sure fluid in reservoir is full to within 1/4" of the top.

The following products require no routine maintenance:

Touch Audio - TV Lift - Door Alarm - Wireless Remote Systems - Keyless Entry - Door and Slam Latches - Entry Doors - Manual Steps

Notes



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