

# Brake Lock

Electric Activated



## Installation and Service Instructions

BRAKE FLUID MODEL NUMBERS	MINERAL BASED HYDRAULIC OIL MODEL NUMBERS
407 128 000 0 407 128 002 0	407 128 001 0

NOTE: 407 128 000 0 replaces 02-620-009  
407 128 001 0 replaces 02-620-172  
407 128 002 0 replaces 02-620-173

READ GENERAL INSTALLATION GUIDELINES SHEET (81-600-001) BEFORE PROCEEDING

### **▲ WARNING**

1. All ZF brake locking devices are **supplemental** safety equipment which provide additional brake holding action **when used with existing vehicle parking brake.**
2. The Low Pressure Warning Switch must be used in combination with an audible and/or visual alarm to signal any loss of system pressure. The Low Pressure Warning Switch is explained in the Operating Instructions (Form No. 81-620-021). **Do not disconnect Low Pressure Warning Switch.**
3. All lines, fittings, and adjacent areas must be cleaned of dirt or road residue before any lines or fittings are disconnected. Special care must be taken so dirt and road residue are not allowed to enter hydraulic brake system. This can contaminate the system and interfere with proper operation of brakes and locking devices.
4. Follow procedures outlined in Vehicle Manufacturer Service Manual or SAE Standards when making new connections or adding to existing brake systems. Use only steel brake tubing conforming to SAE specifications.
5. For brake fluid models, use only brake fluid conforming to latest SAE or DOT Standards. Improper or contaminated brake fluid may cause gummy deposits and softening and swelling of other rubber seals in the entire brake system. Such a condition must be corrected immediately.
6. Do not use sealants, tapes, teflon, or cement compounds on any connections or fittings. These sealants or compounds can contaminate the hydraulic brake system and interfere with the operation of brake components or brake locking device.
7. All fittings and connections must be in good condition and tightened to proper torque values as specified in the Installation and Service Instructions.
8. Separate models of brake locking devices are available for brake fluid and for mineral based hydraulic oil. Select a model that conforms with the type of fluid in the brake system.
9. Brake hoses, brake lines, brake locking device, brake components, cylinders, and all fittings must be routinely inspected for leaks, damage, or wear. Adequate fluid levels must be maintained. In the event of any loss of fluid, the brake system must be carefully inspected for leaks.
10. After installation, bleed the system according to vehicle manufacture recommendations.
11. Follow INSPECTIONS and TESTS section as outlined in the Operating Instructions.
12. The self-adhesive warning label accompanying each brake locking device must be affixed in the vehicle cab in view of the operator.
13. The Operating Instructions must be placed in the cab of vehicle in a place available to operator.

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## ⚠ WARNING

The Electric Activated Brake Lock is not to be used if four wheel lock-up is desired or in 3 or 4-channel anti-lock brake systems. For these applications it is recommended to use the Dual Cable Lock (see form number 80-950-056). When this brake lock is used in a dual brake system it must be installed in the primary line from the tandem master cylinder.

## MOUNTING BRAKE LOCK

Tubing is not supplied because of the variation in each installation. Install tubing using shortest and most protected route. Use the same size tubing when replacing a line, unless otherwise specified. Thoroughly inspect the brake lock port threads for any foreign material after removing the vinyl shipping plugs.

### NOTE

The included low pressure warning switch must be installed. Fittings are provided for attaching the pressure switch directly to the brake on the end opposite the inlet port.

Mount the brake lock on the frame near the brake line using an existing hole in the frame if possible. Many times a brake line support bracket will be located in this area. This bracket may be removed and the brake lock mounted in its place. The brake lock will then support the brake lines.

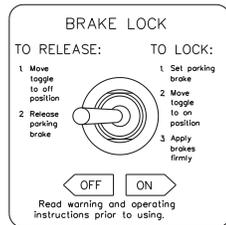
### NOTE

A good electrical contact is needed between the brake the lock mounting bracket and the machine frame chassis. If necessary, scrape the paint off of the frame where the brake lock mounting bracket will be fastened.

After installation, the brake lock may contain air. Air in the brake lock will cause an ineffective and perhaps inoperative brake system. Bleed the system of air.

## MOUNTING TOGGLE SWITCH AND DASH PLATE

The switch and dash plate are typically mounted to the dash. The toggle switch requires a 1/2 inch diameter hole.



**FIGURE 1**

## CONNECTING BRAKE LINES

(Refer to Figures 2, 3, and 4)

## ⚠ WARNING

The brake lock must be installed between the last hydraulic component in supply line and wheel brakes.

## ⚠ CAUTION

When installing and tightening adapter fittings and tube nuts on the brake lock, always grip the lock on the hex nut, fitting, or hex surface nearest the fitting being tightened. Never grip onto the opposite end of the brake lock. Failure to follow this procedure may result in damage to the brake lock housing.

The line from the pressure source side must be installed in the end of the brake lock stamped INLET and the line to the wheel brakes must be installed in the low pressure warning switch end of the brake lock.

## TORQUE SPECIFICATIONS

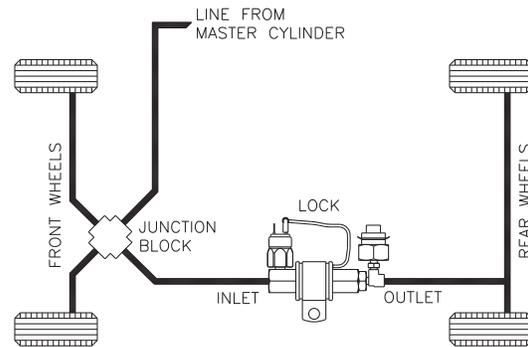
All hydraulic line connections must be torqued to specifications listed below and be free of leakage.

### Thread Size

3/8-24UNF  
7/16-24UNF  
1/2-20UNF  
9/16-18UNF

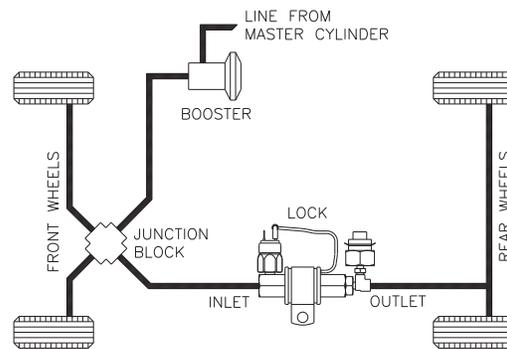
### Torque

10.8-20.3 N·m (8-15 lb·ft)  
16.3-23.0 N·m (12-17 lb·ft)  
16.3-23.0 N·m (12-17 lb·ft)  
20.3-33.9 N·m (15-25 lb·ft)



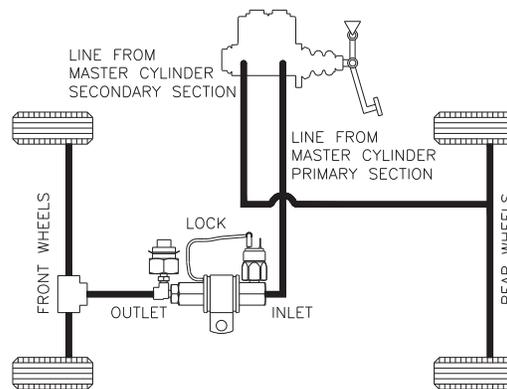
Single System with Firewall Mounted Booster

**FIGURE 2**



Single System with Remote Mounted Booster

**FIGURE 3**



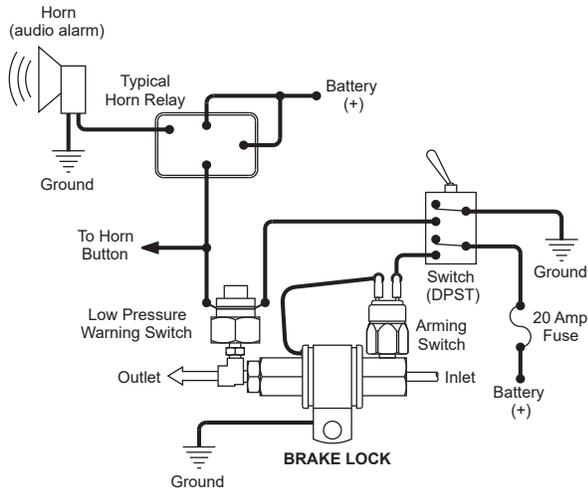
Dual System

**FIGURE 4**

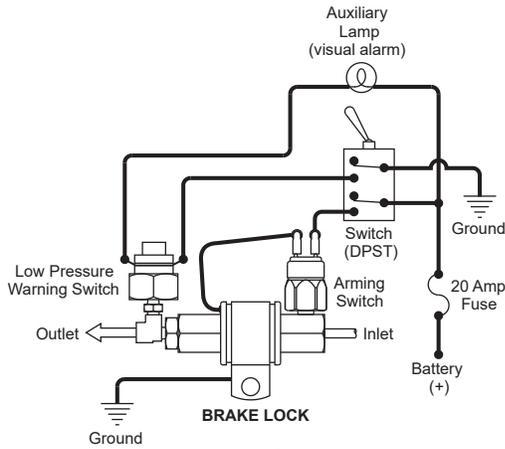
# WIRING BRAKE LOCK

(Refer to Figures 5, 6, or 7)

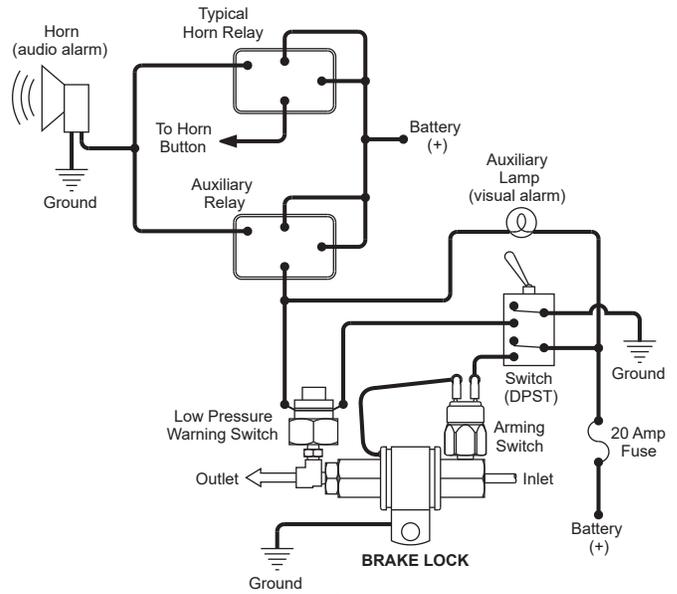
1. After the brake lock is installed, make wiring connections as shown in Figures 5, 6, or 7.
2. Bleed air from the brake system and test the audible and visual warning devices to be sure they are functioning properly.



**FIGURE 5**  
(vehicle horn as audio alarm)



**FIGURE 6**  
(auxillary lamp as visual alarm)



**FIGURE 7**  
(audio and visual alarm)

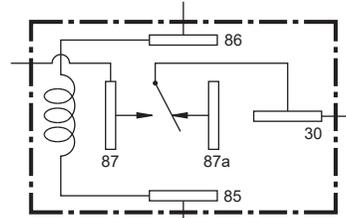
## NOTE

When wiring an auxillary lamp as a visual alarm, Figure 6, we recommend an incandescent lamp. Using LED for visual alarm may not draw sufficient electrical current to keep the low pressure warning switch contacts functioning properly.

## Replacement Low Pressure Warning Switch Kits

Model Numbers	Kit Number
02-620-009, 4071280000 (BF)	02-600-017
02-620-172, 4071280010 (HO)	02-600-030
02-620-173, 4071280020 (BF)	02-600-017

BF = DOT 3, 4, 5, or 5.1 brake fluid  
HO = mineral base hydraulic oil



Typical Horn Relay

## BLEEDING

See General Guidelines Sheet (Form No. 81-600-001) for bleeding guidelines.

The hydraulic brake system must be bled whenever any line has been disconnected. There are two methods of bleeding hydraulic systems, pressure bleeding and manual bleeding. Both methods are acceptable and adequate but pressure bleeding is recommended if the equipment is available. Follow bleeding procedure and instructions as specified by vehicle manufacturer.

## CAUTION

Use only Brake Fluid SAE J1703 or DOT Brake Fluid specified by vehicle manufacture. Never reuse brake fluid that has been drained from the machine.

## CAUTION

Before moving the machine, a firm brake pedal must be achieved when the brake pedal is in the full release position. If a firm pedal is not achieved, repeat bleeding procedures until a firm pedal is achieved. Make several brake applications with vehicle stationary and check fittings for leaks. Tighten fittings to correct any leaks that occur.

## TROUBLESHOOTING GUIDE

The brake lock is not field serviceable, do not disassemble. If the brake lock becomes inoperable return it to ZF Off-Highway Solutions Minnesota Inc. for service or replacement.

PROBLEM	POSSIBLE CAUSE	RECOMMENDED SERVICE
Brake lock will not apply	* Malfunctioning toggle switch	Move toggle switch to ON position and test incoming terminal on brake lock arming switch with a test lamp. If the lamp lights, toggle switch is working properly.
	* Malfunctioning arming switch	If toggle switch is working properly, move toggle switch to ON position and test other terminal on arming switch with a test lamp. If lamp does not light when the brake pedal is depressed, replace the arming switch.
	* Inadequate ground or inoperable brake lock	If toggle switch and arming lamp are working properly, move the toggle switch to ON position and short across the arming switch terminals. If there is no clicking sound, check for good ground to the brake lock body. If there is still no clicking, replace brake lock.
System locked up and brakes will not release	Excessive pressure locked up	Loosening a bleeder screw at the service brakes will correct this condition. If this condition repeats, installing a pressure gauge to determine locked up pressure is advised.
	Toggle switch internally shorted or sticking	Check the toggle switch to be sure that it is in the OFF position. If the switch appears to be OFF, disconnect the wire lead at the switch and reapply the brake pedal. If the brakes release, the toggle switch is internally shorted or sticking.
	Master cylinder or booster malfunction	Trouble may be somewhere other than the brake lock. After brake pedal has been applied firmly and the brake lock does not release, bleed off at the INLET. If the brakes release, the cause of the brakes not releasing is not in the brake lock but in the master cylinder and/or booster. If disconnecting the brake line at INLET side of the brake lock does not release the brakes, then disconnect at the OUTLET end of the brake lock. If the brakes release, replace the brake lock.
	Lock installed incorrectly between master cylinder and booster	Replumb the brake lock so it is installed between vehicle brakes and last hydraulic component in the supply line
Brake system will not hold pressure	Leaking conditions in tubing and/or fittings	Check all tubing and fittings in brake system. Tighten or replace where required.
	Leak in the bake system	Check for fluid leaks. Repair or replace components as necessary.
	Leak within the brake lock	Replace the brake lock.
Visual and/or audible alarm (low pressure warning switch) operates inadvertently or will not shut off	Locked up pressure leaking off	See problems and conditions under heading "Brake system will not hold pressure."
	Wiring improperly installed or a short in the wires	Check to be sure the installation conforms with installation diagrams 5, 6, and 7 on page 3. Check for shorted wiring.
	Insufficient brake system pressure for low pressure warning switch to open	Contact ZF Off-Highway Solutions Minnesota Inc..
Spongy or soft brake pedal	Air in the brake system	Follow good bleeding practices. Use pressure bleeder when available.
	Slow leak in the brake system	Check service brake system for leaks. Tighten or replace fittings and components as necessary.
<p><b>* None of these possible causes affect the release of the brake lock after application. The brake lock cannot be applied if any of these conditions exist.</b></p>		