



Parts Manual



ECT20009 ***TRIPLE TURRET***

MGS Incorporated , 178 Muddy Creek Church Road, Denver, PA 17517
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MGS Inc. was established in 1962 by owner and president Roland Gehman. The company's corporate culture is a direct reflection of Roland's desires, capabilities, and attitudes. These attitudes have developed from his experiences and relationships with his family, education, church, volunteer groups, business associates and MGS employees. We are staffed with an extraordinary group of talented people. The members of MGS consist of : salesmen, welders, sales support personnel, press and shear operators, engineers, tow motor operators, shipping and receiving personnel, purchasing agents, production controllers, administrative personnel, supervisors, painters, mechanics, cad operators, maintenance men, truck drivers, carpenters, and managers. All of which, have an impact on who we are:

INNOVATORS AND MANUFACTURERS OF TRANSPORTATION EQUIPMENT

The MGS Mission :

It is our mission to provide *the best total solution* for our customers, clients and alliance partners. These solutions are built like our products, with TEAMWORK. The combined expertise and efforts of the MGS team is what keeps us **one of a kind - not one of a group!**

About Your Trailer

MGS Model No.	ECT20009
Description	Triple Turret Trailer
GAWR	12,000#
GVWR	26,400#
Empty Weight	10,150#
Unladen Hitch Weight	1,045#
Tire Size	235/85R16 Dual 3,000# Cap/Tire, 110# PSI.
Coupler	Eye 3" - 4 bolt
Electrical Connection	7 way plug

This hazard alert sign appears in this manual. When you see this sign, carefully read what it says.
YOUR SAFETY IS AT STAKE.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates an potentially hazardous situation which, if not avoided, could result in death or serious injury.

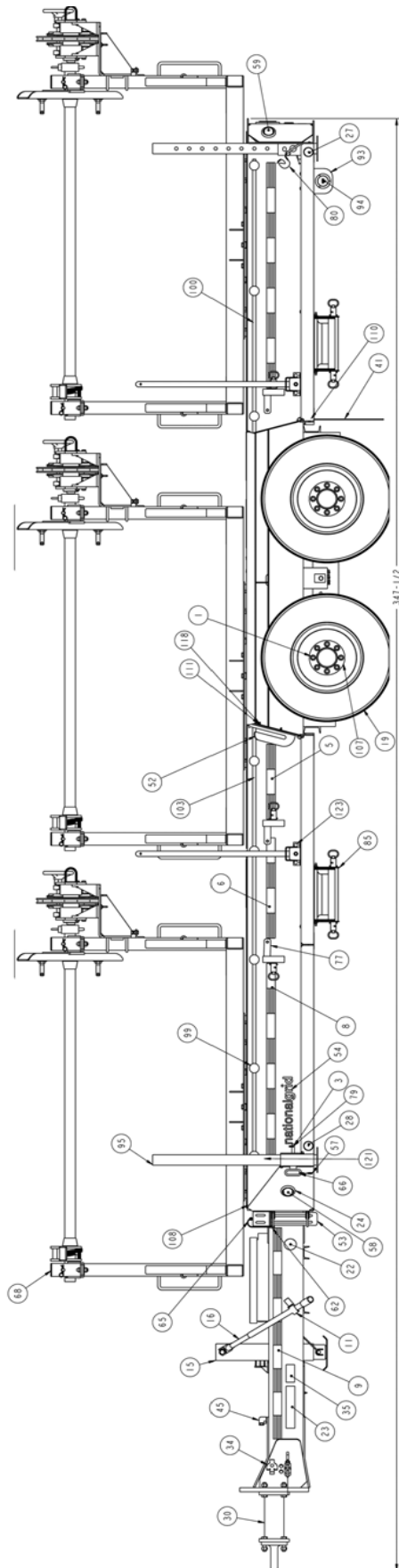


Indicates a hazardous situation which if not avoided, may result in minor or moderate injury

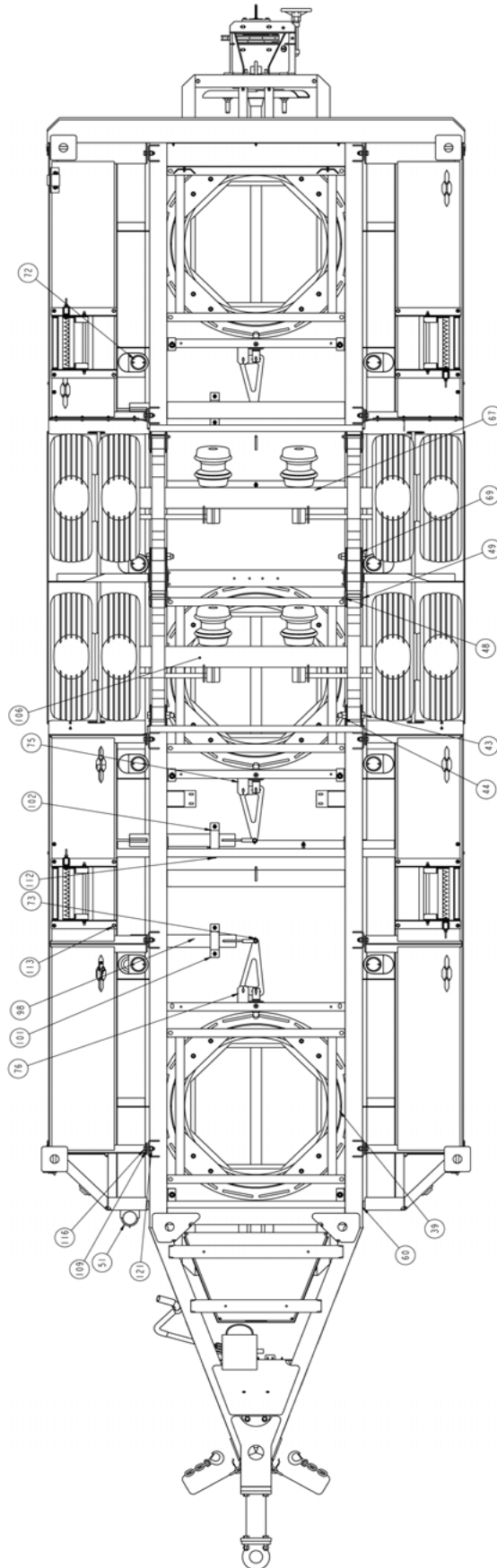
Read and Understand

Do not operate this equipment until you have carefully read, and understand the “Safety” and “Operation” sections of this manual, and of all other equipment manuals that will be used with it. Your safety and the safety of others depends upon care and judgement in the operation of this equipment. Follow all applicable federal, state, local, and industry specific regulations. MGS Inc. cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual and on the machine are therefore not all inclusive. You must satisfy yourself that a procedure, tool, work method, or operating technique is safe for you and others. You should also ensure that the machine will not be damaged or made unsafe by the method of operation or maintenance you choose.

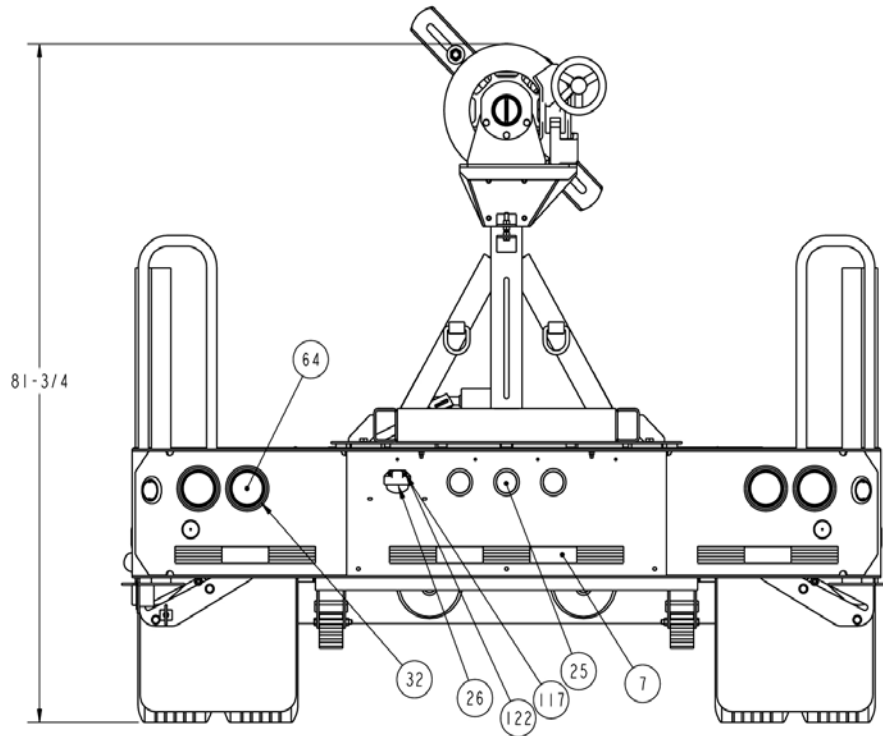
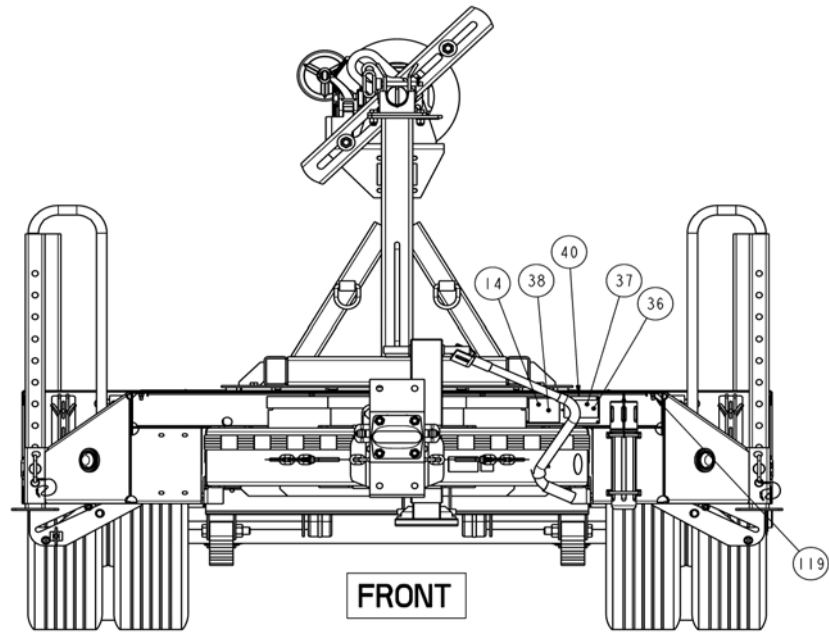
Component Identification



Component Identification



Component Identification



Component Identification

ITEM	QTY.	PART NO.	DESCRIPTION
1	32	15222	LUG NUT 5/8-18 90°
2	1	16001	DOCUMENT HOLDER SMOKE COVER
3	4	18804	HEAVY DUTY HITCH PIN--5/8 x 4-1/2
4	1	18823-102-R	CONSPICUITY TAPE, RED/WHITE
5	3	18823-18-R	CONSPICUITY TAPE, RED/WHITE
6	1	18823-24	CONSPICUITY TAPE, RED/WHITE
7	1	18823-30-R	CONSPICUITY TAPE, RED/WHITE
8	1	18823-48	CONSPICUITY TAPE, RED/WHITE
9	3	18823-54-R	CONSPICUITY TAPE, RED/WHITE
10	1	18823-60	CONSPICUITY TAPE, RED/WHITE
11	1	24634	CLIP, JACK HANDLE
12	1	30072	JUNCTION BOX #50400
13	2	30073	COMPRESSION FITTING, 3/4" I.D
14	1	32591	VIN LABEL UV OVERLAY
15	1	37732	DUAL PIN, DROP LEG JACK
16	1	38067	MODIFIED 10" EXT, JACK HANDLE W.A
17	2	39223	COMPRESSION FITTING #50840
18	2	39730	ANCHOR
19	8	40575	T&W ASSY. LT235/85R16LRG DUEL
20	3	42458	U-BOLT (JACK 1/2-13 SQ 4 1/16)
21	1	45881	CONNECTOR CORD
22	1	46948	DECAL, NATM COMPLIANCE
23	1	46953	DECAL, TRAILER WARNING COMBO
24	7	48761	GROMMET FOR LED CLEARANCE/MARKER LAMP
25	3	48762	LED RED CLEARANCE/MARKER LAMP
26	1	48765	LED LICENSE PLATE LAMP, TRUCK-LITE
27	4	48844	RED REFLECTOR, ROUND
28	2	48845	YELLOW REFLECTOR, ROUND
29	2	50976	SAFETY CHAIN 3/8 GR 70 w/1/2 CLEVIS HOOK
30	1	51947	HITCH EXTENSION
31	1	56134	STOR-AWAY PLUG HOLDER
32	4	58828	GROMMET, STOP, TURN / TAIL LIGHT LED
33	1	60323	SLOAN AIR HOSE PAIR, RED / BLUE
34	2	60326	DUMMY GLADHAND BRACKET
35	1	61191	DECAL, OVERLOAD HAZARD

Component Identification

36	1	61353	TIRE & LOADING INFORMATION LABEL
37	1	61354	TIRE LABEL UV OVERLAY
38	1	61357	VIN LABEL
39	3	64120	TURNTABLE BEARING
40	1	64294	PLATE, VIN & TIRE
41	2	65554	MUD FLAP, 20 X 18
42	2	67853	3/8 TUBE TO 1/4 NPT ELL PUSH IN FITTING
43	4	68487	SPRING EYE BOLT 1-8 X 5.5 007-169-00
44	4	68488	EYE BOLT LOCK NUT 006-112-00
45	2	68532	1/2"NPT ELL
46	2	68932	EQUALIZER BOLT, 007-170-00
47	2	68933	EQUALIZER BOLT LOCK NUT 1 X 1/8 -7 006-072-00
48	4	68934	KEEPER NUT SLIPPER 1/2-20 006-046-00
49	4	68935	KEEPER BOLT SLIPPER 1/2-20 X 4.5 007-095-00
50	1	69611	TA8221B AIR BRAKE KIT
51	2	71541	3" CLAMP
52	2	71867	CHOCK HOLDER W.A.
53	1	71947	CANISTER, OPERATOR'S MANUAL
54	2	71959	LOGO DECAL
55	3	71960	UNIT NUMBER DECAL
56	1	71967	HARNESS, 4-PLUG LED LICENSE/I.D.
57	4	72278	304 SS SASH CHAIN LANYARD, 12"
58	2	72378	MODEL 10 MARKER/CLEARANCE LAMP, AMBER, LED
59	2	72380	MODEL 10 CLEARANCE/MARKER LAMP, RED, LED
60	4	72410	GROMMET
61	1	72713	EYE 3", 4 BOLT, 60000 GROSS TRL WT
62	2	73048	SS SPLIT RING .680 O.D.
63	2	73116	HARNESS, 84" SINGLE PLUG LED
64	4	73573	SUPER 44 S/T/T LED 4" SEALED 6 DIODE
65	1	73574	TYPE 302 SS BEAD CHAIN LANYARD
66	4	73575	SPLIT RING, 316 SS
67	1	73622	AXLE 12000 LB AIR BRAKE
68	3	73643	TURRET ASSEMBLY
69	2	73883	EQUALIZER 10-15K 38" (013-107-07)
70	8	73896	HINGE PIN
71	8	73897	TIEDOWN CLEVIS

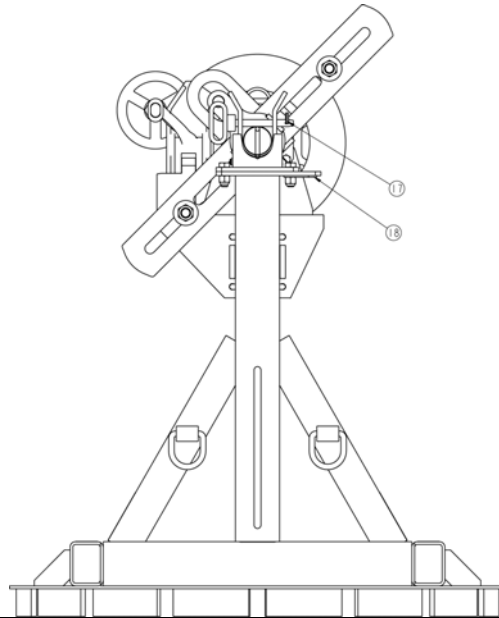
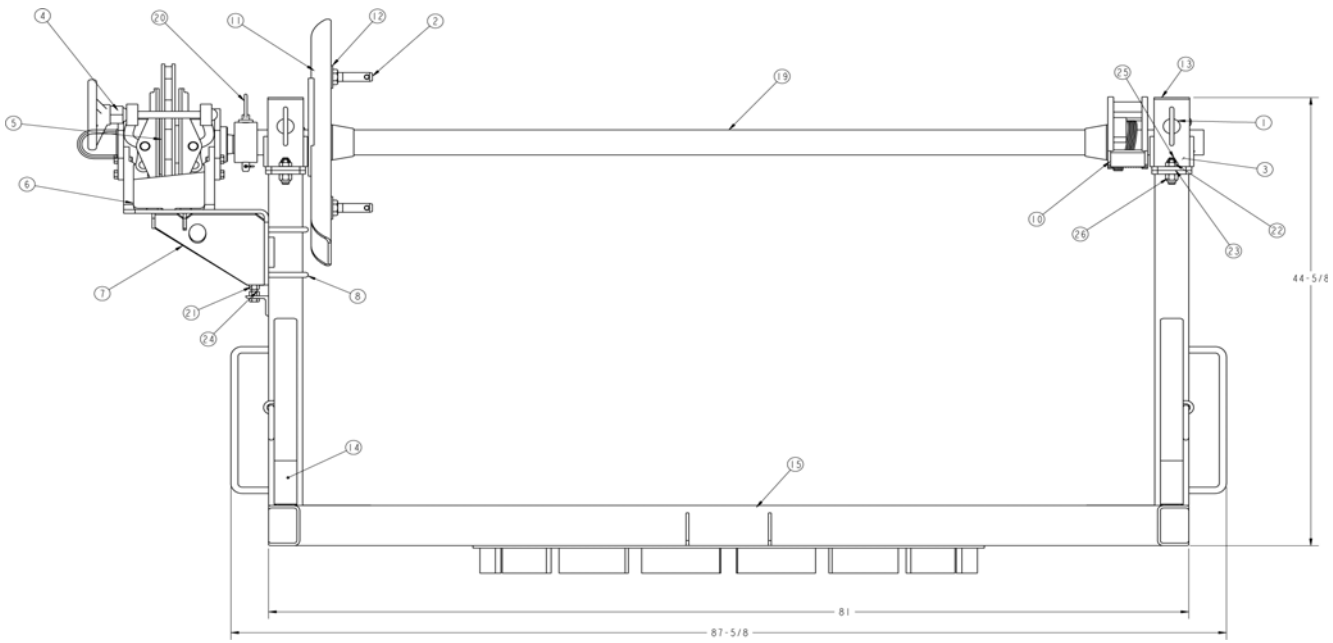
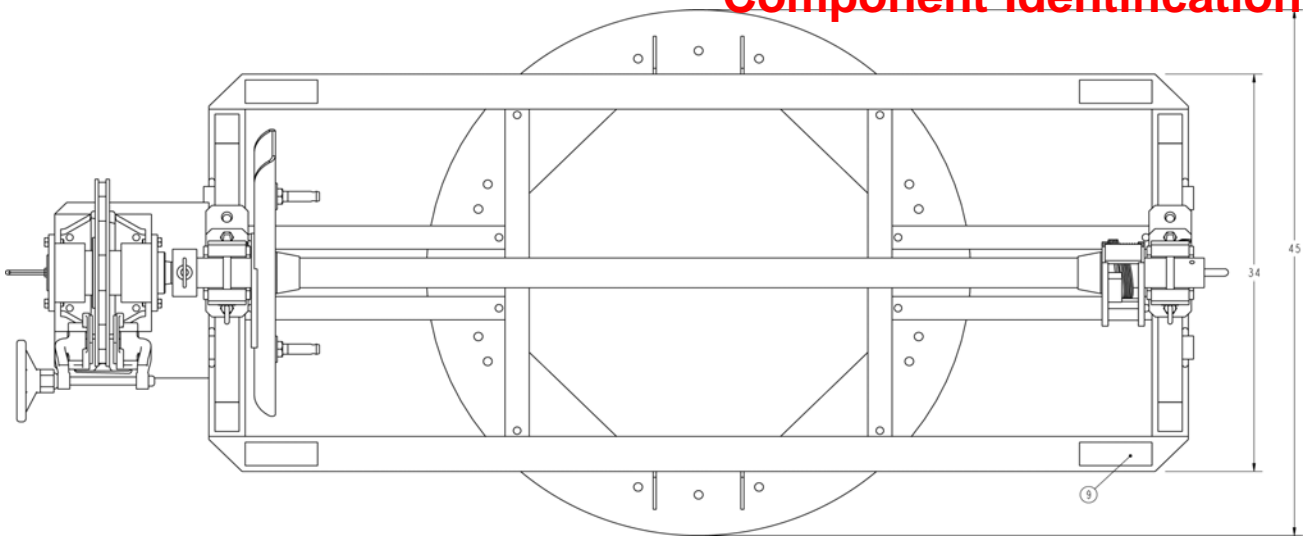
Component Identification

72	8	73898	SWIVEL RETAINER
73	8	73899	COTTER PIN SS
74	1	73900	TOOL BOX (TAPERED)
75	2	73904	LATCH ASSEMBLY FRONT
76	1	73905	LATCH ASSEMBLY REAR
77	3	73911	TURRET LOCK HANDLE W.A
78	1	73923	RUBBER LINER
79	4	74260	DOUBLE LOOP HITCH PIN CLIP
80	1	74323	REAR COVER PLATE W.A.
81	1	75175	DECK PLATE, FRONT
82	1	75176	DECK PLATE, MID
83	1	75177	DECK PLATE, REAR
84	1	75178	DECK BODY W.A.
85	4	75179	STEP LADDER ASSEMBLY
86	4	75189	HANDRAIL ASSEMBLY
87	1	75195	ECT20009 FRAME W.A.
88	1	75201	7 COND. ABS MAIN CABLE, 360"
89	1	75205	ABS LED FAULT LAMP JUMPER HARNESS, 180"
90	1	75207	ABS POWER HARNESS, 216"
91	1	75208	LED REAR SILL HARNESS W/ AUX DROPOUTS
92	2	75209	LED SINGLE PLUG MARKER/CLEARANCE HARNESS, 12"
93	1	75210	ABS LIGHT BRACKET
94	1	75211	2-1/2" YELLOW ABS LIGHT, 12V
95	4	75213	STABILIZER W.A.
96	53	75215	3/8-16 X 1-1/4 FLAT HEAD SLOTTED MACH SCREW, ZP
97	1	75216	ECT20009 WIRING SCHEMATIC
98	3	75302	OFFSET PULL BAR W.A.
99	16	75305	GROUNDING LUG
100	2	75306	BUS BAR LONG
101	2	75307	TURRET LOCK LEVER RETAINER
102	1	75308	TURRET LOCK LEVER RETAINER, OFFSET
103	2	75309	BUS BAR SHORT
104	3	75311	DEVCON PLASTIC STEEL PUTTY, 1 LB. PACKAGE
105	3	75312	POLY-LINED GROUT/MORTAR BAG
106	1	75562	AXLE 12000 LB AIR BRAKE, ABS
107	4	CLAMP-RING	CLAMP RING

Component Identification

107	4	CLAMP-RING	CLAMP RING
108	92	FW03	3/8 FLAT WASHER
109	32	FW07	5/8 FLAT WASHER
110	8	FWW01	1/4 FLAT WASHER, WIDE
111	15	HCS01-02	1/4-20 X 1 HEX HEAD CAP SCREW
112	1	HCS03-03	3/8-16 X 1-1/4 HEX HEAD CAP SCREW
113	8	HCS03-06	3/8-16 X 2 HEX HEAD CAP SCREW
114	4	HCS05-03	1/2-13 X 1-3/4 HEX HEAD CAP SCREW
115	66	HCS07-01	5/8-11 X 1-3/4 HEX HEAD CAP SCREW
116	16	HCS07-02	5/8-11 X 2 HEX HEAD CAP SCREW
117	6	MSPH02-56	#10-32 X 1 PHIL PAN HEAD MACH SCREW
118	15	NLN01	1/4-20 NYLOC NUT
119	84	NLN03	3/8-16 NYLOC NUT
120	10	NLN05	1/2-13 NYLOC NUT
121	82	NLN07	5/8-11 NYLOC NUT
122	6	NLN61	10-32 NYLOC NUT
123	8	RHB03-02	3/8-16 X 1-1/4 SQUARE NECK CARRIAGE BOLT
124	14	RHB03-05	3/8-16 X 2 SQUARE NECK CARRIAGE BOLT

Component Identification



Component Identification

ITEM	QTY.	PART NO.	DESCRIPTION
1	2	18804	HEAVY DUTY HITCH PIN--5/8 x 4-1/2
2	2	61769	LIFT ARM PIN
3	2	65778	SADDLE BUSHING
4	1	65779	MOUNTING PACKAGE
5	1	65780	VENTILATED DISK, 16"
6	1	65782	BRAKE CALIPER
7	1	65787	BRAKE SHELF W.A
8	2	65792	U-BOLT
9	4	70719	CRUSH HAZARD WARNING LABEL
10	1	71945	REEL LOCK ASSEMBLY
11	2	71962	LOCKNUT, 7/8-14 THIN
12	4	71963	FLAT WASHER, USS HARDENED
13	2	72384	SADDLE W.A.
14	4	72415	WARNING LABEL
15	1	73632	REEL FRAME W.A.
16	1	73643	TURRET ASSEMBLY
17	2	74260	DOUBLE LOOP HITCH PIN CLIP
18	2	74263	PLATE
19	1	74313	SPINDLE BAR W.A.
20	1	77192	HITCH PIN ASSEMBLY
21	1	HCS05-08	1/2-13 X 3 HEX HEAD CAP SCREW
22	2	HCS05-13	1/2-13 X 4-1/4 HEX HEAD CAP SCREW
23	4	HCS07-01	5/8-11 X 1-3/4 HEX HEAD CAP SCREW
24	3	HN05	1/2-13 NUT
25	2	NLN05	1/2-13 NYLOC NUT
26	4	NLN07	5/8-11 NYLOC NUT

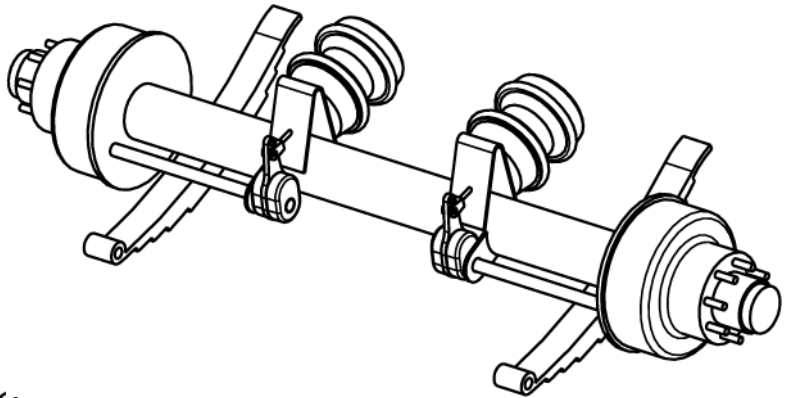
Axle Information

RATED CAPACITY (LBS)	12000 LBS
BRAKE STYLE	AIR BRAKES
BRAKE #	K71-152-00 19.5 CAM LENGTH TYPE 24/30 CHAMBER AUTO SLACKS
SPINDLE TYPE	STRAIGHT
HUB GROUP DESIGNATION	008-214-09, GREASE LUBRICATION
STUDED HUB	8 ON 6.5, 5/8 STUDS
SPRING #	072-044-01
SPRING TYPE	SLIPPER
SPRING CENTER (INCHES)	45
SPRING LOCATION	UNDERSLUNG
HUB FACE (INCHES)	73-3/8
TRACK WIDTH	74-3/8
COMPLETE ABS PACKAGE	

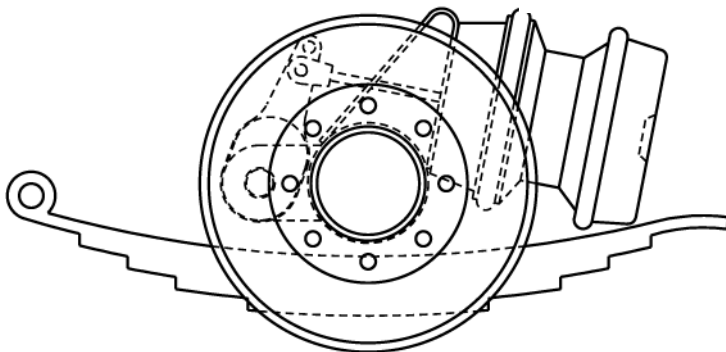
* INSTALL AIR CHAMBERS IN B-B HOLES
AND 5" SLACK ADJUSTER HOLES (POSITION
CLOSEST TO AXLE)

Axle Part Numbers

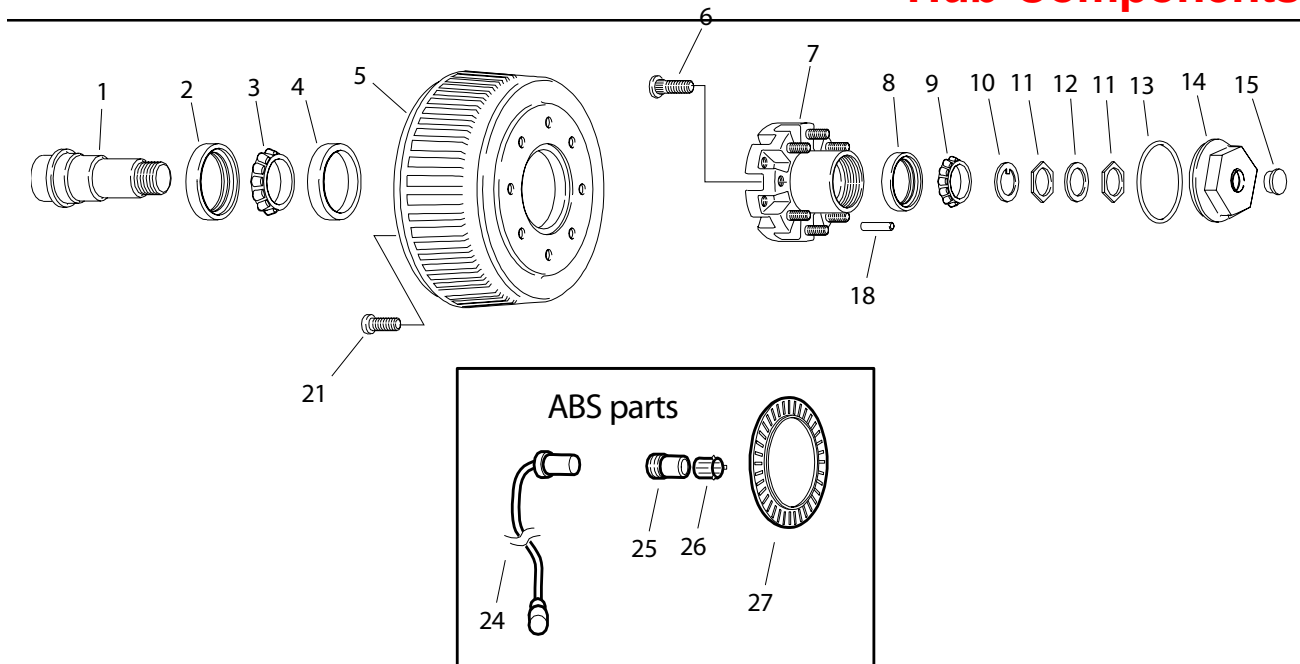
73622 - non ABS (rear)
75562 - full ABS (front)



<----FORWARD

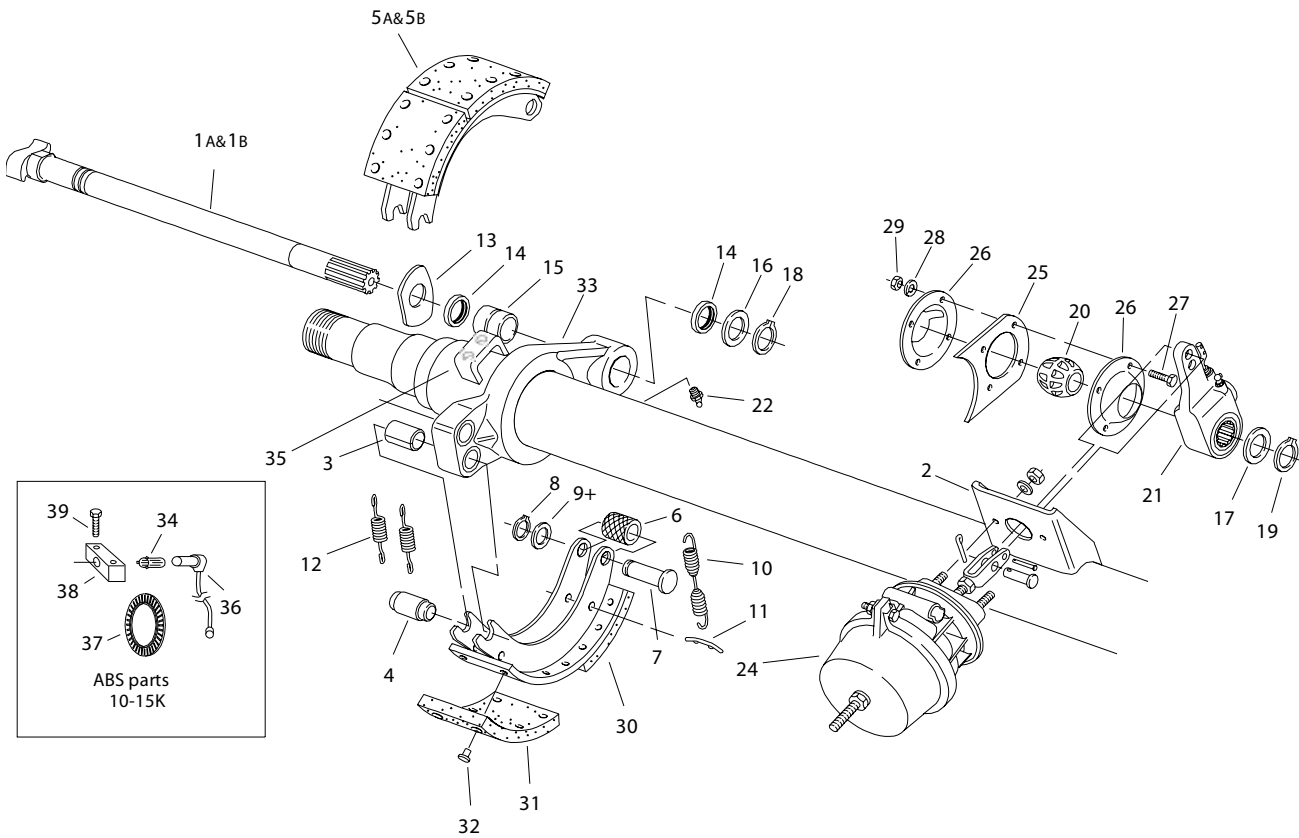


Hub Components



Item	Description	Item	Description	
2	Unitized Oil Seal	010-056-00	22	Rotor Mounting Stud
3	Inner Bearing Cone	031-020-02	23	Rotor Mounting Nut
	(3984)		24	ABS Sensor, straight
4	Inner Bearing Cup	031-020-01	25	ABS Sensor Block
	(3920)		26	ABS Sensor Clip
5	Brake Drum	009-028-01	27	ABS Tone Ring
5	Brake Drum-ABS	009-028-05	NS - not shown	
6	Wheel Mtg. Stud RH	007-115-00		
7	Hubs w/Cups & StudsRH	008-214-08		
8	Outer Bearing Cup	031-021-01		
	(28622)			
9	Outer Bearing Cone	031-021-02		
	(28682)			
10	Spindle Washer	005-060-00		
11	Spindle Nut	006-084-00		
12	Tang Washer	005-059-00		
13		Not Used		
14	Grease Cap	021-036-01		
15		Not Used		
16	Wheel Clamp Ring	033-052-01		
17	Wheel Nut RH	006-109-00		
18	Locating Pin	056-008-00		
21	Drum Mounting Screw	007-244-00		

Brake Components



Item	Description	Qty. Per Brake	12 1/4 x 4 10K Part No.
1A	Camshaft LH	1	034-188-00
1B	Camshaft RH	1	034-189-00
2	Air Chamber Bracket	1	034-061-00
5	Shoe & Lining Assembly	2	040-321-01
5A	Shoe & Roller Assembly RH	1	040-321-03
5B	Shoe & Roller Assembly LH	1	040-321-02
13	"D" Washer, Camshaft	1	005-074-00
14	Grease Seal	2	010-052-00
15	Camshaft Bushing	1	014-056-00
16	Washer-Camshaft Spider End	1	005-075-00
17	Camshaft Washer-28 Spline	1	005-134-00
18	Retainer-Camshaft	1	069-020-00
19	Retainer-Camshaft End	1	069-078-00
20	Camshaft Support Bushing	1	014-058-00
21	Automatic Slack Adjuster -28 Spline	1	055-040-xx
21	Manual Slack Adjuster - 28 Spline	1	055-039-xx
22	Grease Fitting	1	061-006-00
23	Air Chamber w/Hardware	1	034-260-00
24	Spring Brake	1	034-261-00
25	Plate - Camshaft Support Brkt	1	034-031-00
26	Plate, Bushing Retainer	2	034-032-00
27	Bolt, Retainer Plate	4	007-139-00
28	Lock Washer	4	005-079-00
29	Nut	4	006-099-00
33	Brake Spider	1	036-113-02

Item	Description	Qty. Per Brake	12 1/4 x 4 10K Part No.
Brake Shoe Repair Kit containing:		1	K71-460-00
3	Bushing-Spider Anchor Pin	2	014-068-00
4	Anchor Pin	2	056-017-00
6	Roller	1	014-057-00
7	Roller Pin	2	056-010-00
8	Roller Pin Retainer	2	069-018-00
9	Roller Pin Spacer	2	005-076-00
10	Retractor Spring	1	046-092-00
11	Retainer Pin	2	056-018-00
12	Shoe Keeper Spring	2	046-097-00
Brake Block Kit containing:		1	K71-102-00
31	Brake Block Anchor	2	041-052-01
30	Brake Block Cam	2	041-052-02
32	Rivet	24	022-018-00
ABS Components:			
34	ABS Sensor Retaining Clip	1	097-002-00
35	ABS Lower Sensor Mtg Block	1	024-101-00
36	ABS Sensor 90°	1	097-003-00
37	ABS Tone Ring	1	024-203-00
38	ABS Upper Sensor Mtg Block	1	024-101-01
39	Mounting Screw Upper Block	2	007-237-00



L30030HBS
Rev. 6/02

*PLC, PLC Plus &
PLC Select Trailer ABS
Installation &
Service Manual*



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PLC4Trucks

\$7.00

Technical Service and Engineering Support

**In the U.S., please call:
Brake Systems Division
World Headquarters
1-800-643-2374 (Press 2)**

**In Canada, please call
Brake Systems Division
Haldex, Limited
1-800-267-9247**

PLC Select

General Operation

Note:

Federal regulations require that new trailers, starting 3/1/2001, have the capability to provide an ABS fault signal from the trailer ABS into the tractor. Haldex provides two (2) options for this, one is through Industry standard "PLC 4 Trucks" multiplexing (the signal is carried on Pin 7), and the other is a hard wire (through Pin C of the power connector via the ISO 3731 connector). The requirement for the trailer mounted ABS lamp remains in effect until March of 2009.

ABS Basics:

The PLC family of Trailer ABS, is the latest in a full line of Haldex trailer ABS systems that provide stability and control during braking by preventing wheel lock up. As with other ABS systems, PLC uses a combination of valves, sensors, exciter rings, and the Electronic Control Unit (ECU) working in union to maximize the control of a braking trailer.

When the ECU detects the rapid decrease in speed of a wheel about to lock up, it releases the air pressure from the brake chambers of the affected wheel via one or two modulator valves. The release of air from the chambers prevents the wheels from locking up and ensures vehicle stability. As soon as the wheels begin to rotate again, the ECU signals the modulator valve(s) to reapply the pressure in the affected brake chambers to maximize brake effort. If the condition that caused the lock up remains, the cycle is repeated until either the vehicle is stopped, or the brake has been released. This function is totally automatic and can occur up to six times per second.

Configurations:

A 2S/1M system is the most popular configuration. This system is the least complex and simplest to install. There are 2 sensors and 1 ABS Modulator Relay Valve. The system meets the minimum FMVSS-121 ABS requirements for semi-trailers and dollies, and is designed to work on 1, 2, or 3 axle trailers, or dollies.

A 2S/2M system is the least popular configuration. In most cases, there is no significant benefit of a 2S/2M system over the 2S/1M SLH product. Consult Haldex Engineering for assistance in this area.

A 4S/2M system offers the best performance overall on multiple axle trailers and is required by FMVSS 121 for full trailers. The control is provided through 4 sensors and 2 Modulator valves. The system has the flexibility to be installed as 4S/2M Side-By-Side control, with lift axle compatibility, or 4S/2M Axle-By-Axle control. All configurations meet the requirements of FMVSS-121. The 4S/2M system can be installed on a variety of trailers. Full trailers, spread axle trailers, and multiple axle trailers are particularly well suited to this system.

Sensor Block Installation:

The clearance between block and exciter ring should be $0.156 \pm .031$ ".

Any deviation from this clearance as a result of hub exciter ring position must be approved by the sensor manufacturer. The radial clocking position should be between 9 and 3 O'clock. While the ABS performance is not affected with the sensor located in the lower half of the axle, the structural integrity of the axle could be compromised. The sensor block should not interfere with any wheel end hardware. In general, the position of the wheel speed sensor center axis to the exciter ring surface should be as close as possible to a 90° angle in both directions. Deviation will result in a reduction of the wheel speed sensor signal output. The sensor block must be mounted to provide adequate sensor to exciter ring contact. When the sensor is pushed against the exciter ring, the centerline of the sensor should be no more than .080" above or .080" below the centerline of the exciter teeth

Note: The sensor block is generally welded to the axle. Refer to axle manufacturer's manual to insure that welding won't affect structural integrity.

PLC Select

Testing - PLC Select

End of Line ABS Check:

Test Equipment:

12 VDC power source (do not use a battery charger) and shop air.

Procedure:

1. Charge the supply and service air system.
2. Apply power source to 7-way receptacle.
3. The ABS Valve should “blow down” first. You will hear a brief shot of air from the valve.
4. The ABS light should illuminate for about 3 seconds and then turn off.
5. If desired, information such as the name of the Inspector, the date inspected, or the Trailer

VIN can be stored in the ABS ECU using a PC, in conjunction with Haldex’s PC Diagnostics software.

Note:

If ABS light never illuminates, or stays illuminated during the ABS check, refer to the Troubleshooting Section of this Manual.

Road Test - PLC Select:

To check the operation of the entire ABS system, connect a tractor to the trailer and charge the trailer’s air tanks. Turn on the ignition key and ensure that the warning light comes on briefly, then goes out. Pull the trailer at a speed above 6 mph and make a brake application until the tractor-trailer has come to a complete stop. Verify that the ABS light has remained OFF.

If the light remains OFF, the system is functioning properly.

If the ABS system detected an error during the stop, the warning light will be ON.

If the light never comes ON when the ignition is turned **ON**, then refer to the “Troubleshooting - No ABS Warning Light Illumination” section of this Manual.

If the light stays ON with the ignition key on, refer to the “Troubleshooting - ABS Warning Light Illuminates; Stays On Permanently” section of this Manual .

Notes:

1. **Disconnect power from the ABS system before testing or making any repairs.**
2. Most ABS problems are related to: A) Cut, corroded, or abraded wires. B) Corroded connectors and terminals. C) Connector terminals not latched or seated correctly to mating assemblies. D) Excessive sensor air gap, sensor clip retention, or wheel bearing end play.
3. After making any repairs go to the “Diagnostic Tools” section of this Manual to confirm that the Fault is corrected. If a Fault # 11, 12, 21, 22, 41 or 42 has occurred, and has been corrected, the code will read an “07”. The trailer must then be driven above 6 mph for the ABS warning light to turn OFF.

PLC Select

Testing - PLC Select

Road Test - PLC Select:

Notes:

To check the operation of the entire ABS system, connect a tractor to the trailer and charge the trailer's air tanks. Turn on the ignition key and ensure that the warning light comes on briefly, then goes out. Pull the trailer at a speed above 6 mph and make a brake application until the tractor-trailer has come to a complete stop. Verify that the ABS light has remained OFF. **If the light remains OFF, the system is functioning properly.** If the ABS system detected an error during the stop, the warning light will be ON. **If the light never comes ON** when the ignition is turned **ON**, then refer to the "Troubleshooting - No ABS Warning Light Illumination" section of this Manual. **If the light stays ON with the ignition key on**, refer to the "Troubleshooting - ABS Warning Light Illuminates; Stays On Permanently" section of this Manual.

Diagnostic Tools - PLC Select:

Blink Codes:

ABS fault codes can be accessed using the ABS Light without the use of any other tools. The Blink code "Simple Fault Mode" diagnostics can be activated by pressing on the brake pedal to activate the trailer brakes and switching ignition power on, off, then back on in 1 second intervals. See Blink Code information.

PLC Select

Troubleshooting - PLC Select

Code 00, 07, A7, or C0:

This indicates that the system is working OK.

1. "00" with the trailer moving or "07" with the trailer not moving indicates there are no active faults.
2. "A4", "A7", and "A8" are configuration codes and may or may not be present.
3. "C0" indicates that the ABS is a 2S/1M system.

Code 01, or 02:

This Indicates that a wheel speed sensor or its wiring has a short or open circuit.

1. Disconnect the relevant sensor connector from the sensor and measure the resistance between the two pins in the sensor connector housing. The ohmmeter reading for the sensor should be between 980 and 2350 ohms. The sensor should be replaced if the reading is outside of these limits.
2. The connections and sensor cable can be disconnected at the ECU to check for open or shorts. If there is a sensor extension cable attached to the sensor, test this separately for continuity. Replace any defective hardware and retest.

PLC Select

Troubleshooting - PLC Select

Code 11, or 12 (Occurs when the trailer is moving):

Indicates that the output of a wheel speed sensor of a moving trailer is insufficient.

1. The most likely reason for this is the gap between one sensor and the exciter is too great. Measure the AC voltage at the sensor in question while rotating the wheel at a rate of about 1 revolution every two seconds. The output should be at least 200 millivolts. If the output is less than 200 millivolts, try pushing in the sensor until it touches the exciter. If this doesn't correct the problem, then replace the sensor.

2. If the gap on both sensors is too great, you may not get a fault. If the ECU isn't getting voltage from any sensor it will assume that the trailer is not moving, even when it is. If you suspect this is the case, check each wheel separately for sensor output.

Code 21, or 22 (Occurs when the trailer is moving):

Indicates that there is an intermittent loss of a sensor signal when the trailer is traveling down the road. This type of fault is often difficult to diagnose.

1. The most likely causes include: a broken sensor retaining clip, a damaged or misaligned exciter, or excessive wheel bearing end play*. Check components at the affected wheel.

2. Other possible causes are: a loose, damaged, or corroded sensor electrical connection or a break in the cable. Check the connectors for these items. If the connections look good, then look for visual external damage to the cable. Replace any suspect components and retest.

* Ensure that the wheel bearings are torqued per the manufacture's specification.

Code 41 (Occurs when the trailer is moving):

Indicates that a wheel is slow to come back up to speed when ABS releases the brake during an ABS event.

1. The most likely causes include: a dragging brake, a pinched or kinked delivery hose, or defective modulator valve, or an unequal number of exciter teeth between wheels. Check the brakes to ensure that they release completely. Look for visual external damage to the delivery hoses or delivery tubing. Replace any defective hardware and retest.

Code 61, or 67:

Indicates that a solenoid or its cable has an open circuit internally.

1. The most likely causes include: a bad solenoid or a loose solenoid connection. Disconnect the solenoid and check the resistance at the solenoid pins. Readings across the two bottom pins should be between 7 and 9 ohms. Check the female terminals on the connector for excessive pin spread or corrosion. Replace defective hardware as required and retest.

2. Additional possible causes are: a bad solenoid cable or loose connection. Remove the Valve Cable from the ECU and check for continuity. Repair or replace.

between pins and trailer ground. If the resistance is less than 10M ohms in any case, replace suspect hardware and retest. If the code still exists, than the ECU is likely defective.

PLC Select

Troubleshooting - PLC Select

Code 71, or 77:

Indicates that a solenoid or its cable has a short circuit to ground (negative).

1. The most likely causes include: a damaged cable or solenoid. An example of this is a worn or chafed cable that has exposed wires contacting the trailer. Disconnect the solenoid connector and check for continuity between each solenoid terminal and trailer ground. Next remove the valve cable from the ECU and check for continuity

Code 81, or 87:

Indicates that the solenoid or its cable has a short circuit to B+ (positive 12 volts).

1. The most likely cause is a damaged cable or solenoid. Remove the valve cable from the ECU and test for continuity and trailer B+, with power disconnected. If the resistance is less than 10M ohms in any case, replace suspect hardware and retest. If the code still exists, then the ECU is likely defective.

Code 90:

Indicates that ABS voltage is below about 8.5 volts. This fault will disappear when the voltage exceeds 8.5 volts, without the ignition being recycled.

1. The most likely causes include: a damaged or corroded wire, terminal, or splice in the ABS power supply circuit. Check the voltage drop between the SAE J560 7-way and the ABS ECU. The voltage drop should not exceed 2 volts. Remove the power cable from the ECU and test for continuity with power disconnected.

2. If power is coming from somewhere other than the tractor; make sure the tester battery is fully charged or the voltage converter has adequate DC voltage and current capacity. **Do NOT use a battery charger.**

3. Another possible cause is undersized wiring. Recommended vehicle harness wire sizes are 10 gauge for power (permanent and stoplight) and 8 gauge for ground.

Code 92:

Indicates that the ABS voltage is above 16.5 volts.

1. The most likely cause is a malfunctioning voltage regulator or tester power supply set too high. If this occurs while troubleshooting the trailer without a tractor connected, verify that the tester power supply is below 16 volts before proceeding.

Code 80, 93, 99, E0-E9, or EA-EF:

Indicates that the ECU is likely defective.

1. Replace the ECU and retest to confirm problem is resolved.

PLC Select

Troubleshooting - PLC Select

Code CA, CC:

1. A “CA” code is an invitation to “clear all” stored faults stored in memory. Note that if dynamic faults are stored in memory, the ABS Warning Lamp may remain ON until the trailer is driven above 6 mph. If the Lamp remains ON, the fault still exist. Correct the problem and retest, then clear stored faults from memory.

2. A “CC” code will be displayed during the third consecutive time that a “Clear All” is attempted. This is an invitation to “Clear Configuration” and should be avoided. This is only used to reconfigure the ABS to a 2S/1M after it has been configured to a 2S/2M or 4S/2M. If a “CC” is displayed, power the system down and power back up.

ABS Warning Light Stays On Permanently:

Upon power up of the ABS system, the ABS warning light should come ON for about 3 seconds, then go OFF. If the light stays ON, it may be caused by improper light wiring, or by a fault in the ABS system.

1. Check for diagnostic fault codes. If anything other than an “07” is displayed, review the “Troubleshooting” section of this Manual for possible solutions. After the problem is repaired, clear all stored faults.

2. If an “07” is displayed but there was an, 11, 12, 21, 22, or 41 stored in memory, then correct the problem and drive. The trailer needs to be driven above 6 mph to get the ABS light to turn OFF.

3. If there are no stored faults and an “07” is displayed, and the ABS light is still ON, then the ABS light is miswired. Remove the main wire harness 5 pin connector at the ECU and verify continuity between pin “D” and the trailer light. The remaining light wire must be grounded to the trailer chassis or connected to the SAE J560 7-way connector ground wire. Check for continuity between the ABS light wire and ground. Repair as necessary and retest.

No ABS Warning Light Illumination:

1. Check the bulb to verify that it is functional. If not functional, replace it.

2. Verify that there is power to the ECU. Disconnect the main wire harness 5 pin connector and check for B+ (positive power) between either pin A or pin B and ground, (pin A requires a brake application, as it is stoplight power). The voltage drop between the SAE J560 7-way and the ECU should not exceed 2 volts. If no power exists at either pin, then check continuity from these pins to the SAE J560 7-way connector red and blue circuits. Make necessary repairs and retest.

3. If the problem is still present, remove the main wire harness 5 pin connector at the ECU and verify continuity between pin “D” and the light. The remaining light wire must be grounded to the trailer chassis or connected to the SAE J560 7-way connector ground wire. Check for continuity between the ABS light wire and ground. Repair as necessary and retest.

PLC Select

Diagnostics - PLC Select

Blink Code Diagnostics - PLC Select:

There are 4 Blink Code modes:

Mode:	Description	Ignition Cycles (1 second ON/ 1 second OFF)
1	Simple / Wheel Speed Mode	ON, off, ON
2	Active Faults Mode	ON, off, ON, off, ON
3	Stored Faults / Clear Mode	ON, off, ON, off, ON, off, ON
4	Configuration Mode	ON, off, ON, off, ON, off, ON, off, ON

Procedure For Activating Blink Code Diagnostics:

1. The trailer must be stationary.
2. The trailer must be connected to a DC-power supply (8-14 volts). **Do not use a battery charger.**
3. Constant power (8-14 volts) must be provided to the stoplight circuit (apply trailer brakes).
4. Ignition power must be cycled on and off (trailer auxiliary circuit) to reach the desired mode (shown above).

Procedure Notes:

1. Once entered, a mode can only be terminated by completely disconnecting all trailer power.
2. All modes repeat endlessly. Each repeat is separated by 10 seconds of continuous lamp energization.
3. All codes are separated by 2 seconds of lamp OFF.
4. All fault codes are followed by an occurrence count which is displayed at a much faster rate than the fault code.

Note: Stoplight and ignition power must be independent for blink code troubleshooting. If ignition power is required to be on for your brake light to operate, then the **blink code** diagnostics will not function.

Simple Mode Diagnostics:

This mode has a shortened list of fault codes that will display. Faults are grouped to simplify the diagnostics. Up to 3 active codes will display at one time. These faults need to be repaired before other active faults can be displayed. See Simple Mode Faults Code Table on next page.

PLC Select

Diagnostics - PLC Select

Blink Code Diagnostics - PLC Select:

Mode 1 - Simple Mode Diagnostics Faults Table (ON, OFF, ON):

ITEM	FLASH COUNT	ACTUAL FAULT
System OK	Lamp Stays On	07
Sensor 1A	1 Flash	01
Sensor 1B	2 Flashes	02
Sensor 2A	3 Flashes	03
Sensor 2B	4 Flashes	04
Sensor 3A	5 Flashes	05
Sensor 3B	6 Flashes	06
Red Valve	7 Flashes	61, 67, 71, 77, 81, 87
Blue Valve	8 Flashes	62, 68, 72, 78, 82, 88
Yellow Valve	9 Flashes	63, 69, 73, 79, 83, 89
Low Voltage	10 Flashes	90
ECU Failure	11 Flashes	93, 99, E-Codes

Note: If the simple mode does not show a fault code, but the ABS lamp remains “ON” after powering the ABS, there maybe dynamic faults stored in the memory. In this case, proceed to the stored fault mode of diagnostics.

Wheel Speed Mode:

Wheel Speed Mode is accessible **only** when in Simple Mode. This Mode is not activated until the ECU has received a signal from the wheel speed sensor of a spinning wheel. The hold solenoid of the modulator associated with the particular sensed spinning wheel will be cycled. The blink codes for the sensed wheels are as follows:

S1A: 1 Flash **S1B:** 2 Flashes **S2A:** 3 Flashes
S2B: 4 Flashes **S3A:** 5 Flashes **S3B:** 6 Flashes

Note 1: Spin only one wheel at a time.

Note 2: Once a wheel is rotated, the ABS lamp will remain on after the wheel is stopped, until the next wheel is rotated.

PLC Select

Diagnostics - PLC Select

Blink Code Diagnostics - PLC Select:

Mode 2 - Active Fault Mode (ON, OFF, ON, OFF, ON):

When the Active Fault Mode is enabled (see page 63), the ABS lamp displays a numerical fault code sequence for each existing fault, up to nine fault codes at a time. The nine faults must be repaired before additional active faults can be displayed. The blink codes used in the Active Fault Mode are related to the Haldex standard fault codes.

Mode 3 - Stored (Passive) Faults Mode (ON, OFF, ON, OFF, ON, OFF, ON):

In this mode (see page 63) the ABS lamp displays a numerical fault code sequence for each stored fault. All stored faults (not currently active) are displayed in this mode. The lamp will display up to nine passive stored faults at a time. The most recent stored fault is displayed last. The blink codes used in the Passive Stored Fault Mode are related to the Haldex standard fault codes.

Clearing Stored Codes:

The passive stored fault codes may be cleared by switching ignition power off and on twice during the 10 seconds of lamp energization that occurs prior to each repeat of the fault code blink sequence. The lamp will flash rapidly for 10 seconds to show that the faults are being erased.

Active / Stored Mode Fault Occurrences:

The fault code blink sequence is followed by the occurrence count for that fault in either the Active or Passive Mode. The occurrence count is displayed at a much faster rate in order to differentiate between the code and its occurrence count.

Active / Stored Fault Mode Notes:

1. A "zero" for codes such as "01" is indicated by a two second lamp "ON" condition. All other digits are indicated by a half second lamp "ON" condition.

Example: Fault code "23" is indicated by the lamp flashing ON twice for one half second each time - followed by two seconds of lamp unlit - followed by three 1/2 second flashes. The third flash is the occurrence count and as 1/4 second flashes.

2. There is a two second lamp "OFF" delay between the digits in each code.

3. Code 07 (system OK, vehicle at rest) is displayed as a continuous Lamp "ON" condition.

PLC Select

Diagnostics - PLC Select

Blink Code Diagnostics - PLC Select:

Mode 4 - Configuration Mode (ON, OFF, ON, OFF, ON, OFF, ON, OFF, ON):

This Mode displays Configuration and Auxiliary Codes. The Configuration Code is displayed prior to Auxiliary Codes. The tables below show a list of Configuration Codes and a list of Auxiliary Codes which are supported by Blink Codes. Auxiliary Codes are displayed low to high. Each blink code digit will refer to a digit in the Haldex configuration codes.

Clear Configuration Mode:

The configuration codes may be cleared by switching ignition power off and on twice during the 10 seconds of lamp energization that occurs prior to each repeat of the fault code blink sequence. The lamp will flash rapidly for 10 seconds to indicate that the configuration has been erased from the ECU's memory. The ECU will then store its full configuration on the next power up.

Config Code	Blinks	Function	Axle Lifted	Sensor Used	Modulators Used
C0	1	2S/1M		S1A S1B	RED
C1	2	2S/2M		S2A S2B	BLUE, YELLOW
C2	3	4S/2M		S3A S2A S2B S3B	BLUE, YELLOW
C3	4	4S/2M	2 or 3	(S3A) S2A S2B (S3B)	BLUE, YELLOW

Aux Code	Blinks	Description
A0	1	Not Applicable
A1	2	Not Applicable
A2	3	Not Applicable
A3	4	Not Applicable
A4	5	No load sense valve - momentarily displayed when power is applied.
A5	6	Not Applicable
A6	7	Not Applicable
A7	8	SLH programming for yellow valve channel (red valve is 2S/1M)
A8	9	MSLH programming for yellow valve channel (red valve is 2S/1M)

PLC Select

Diagnostics - PLC Select

Diagnostic Code - PLC Select:

CODE	EXPLANATION	SOLUTION
00	NO FAULT FOUND-WHEEL SPEED IS OVER 6 MPH	ABS IS OPERATIONAL
01	RED CHANNEL WHEEL SPEED SENSOR WIRING S1A HAS AN OPEN OR SHORT CIRCUIT	CHECK CABLE CONNECTIONS THEN REPLACE CABLE OR SENSOR AS NECESSARY
02	BLUE CHANNEL WHEEL SPEED SENSOR WIRING S2A HAS AN OPEN OR SHORT CIRCUIT	CHECK CABLE CONNECTIONS THEN REPLACE CABLE OR SENSOR AS NECESSARY
07	NO FAULT FOUND	ABS ECU IS FULLY OPERATIONAL. DISPLAYS: "07<6MPH
11	RED CHANNEL S1A GAP TOO LARGE. GAP SHOULD BE KEPT TO A MINIMUM	CHECK GAP & ALIGNMENT BETWEEN SENSOR AND EXCITER RING. SENSOR MAY BE DEFECTIVE
12	RED CHANNEL S1B GAP TOO LARGE. GAP SHOULD BE KEPT TO A MINIMUM	CHECK GAP & ALIGNMENT BETWEEN SENSOR AND EXCITER RING. SENSOR MAY BE DEFECTIVE
20	INCORRECT EXCITER (TONE) RING USED	CHECK NUMBER OF TEETH ON EXCITER RING. NUMBER OF TEETH SHOULD BE UNIFORM FOR ALL WHEEL ENDS
21	RED CHANNEL WHEEL SPEED SENSOR S1A HAS AN ERRATIC OUTPUT VOLTAGE.	CHECK CABLE CONNECTIONS: SENSOR/EXCITER RING MISALIGNED, DAMAGED SENSOR CABLE, SENSOR OR WHEEL BEARING
22	RED CHANNEL WHEEL SPEED SENSOR S1B HAS AN ERRATIC OUTPUT VOLTAGE.	CHECK CABLE CONNECTIONS: SENSOR/EXCITER RING MISALIGNED, DAMAGED SENSOR CABLE, SENSOR OR WHEEL BEARING
37	LAMP SIGNALLED BY INTERNAL DEVICE	
40	SENSOR WIRING CROSSED ACROSS AN AXLE	CHECK SENSOR CABLE CONNECTIONS

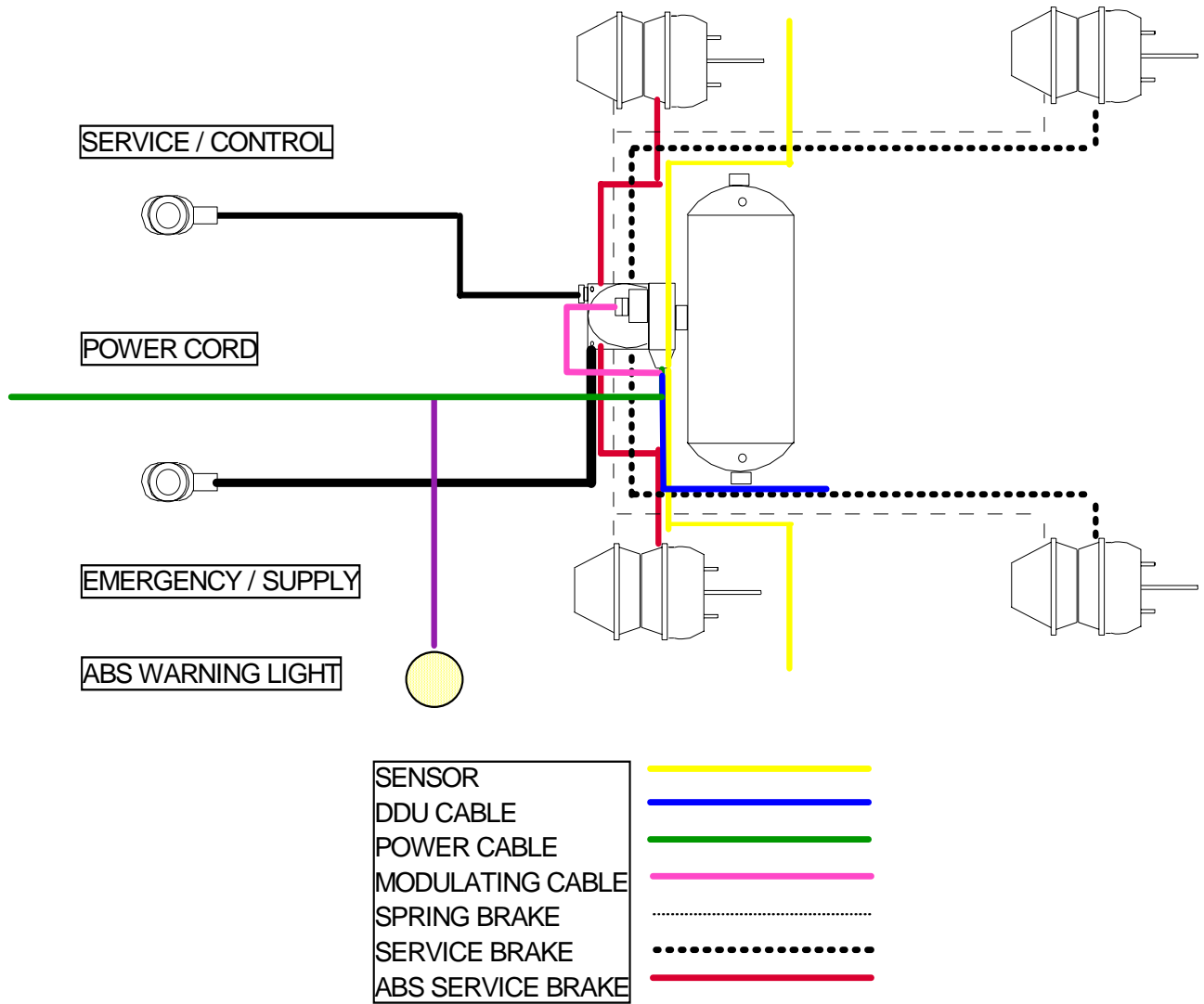
PLC Select

Diagnostics - PLC Select

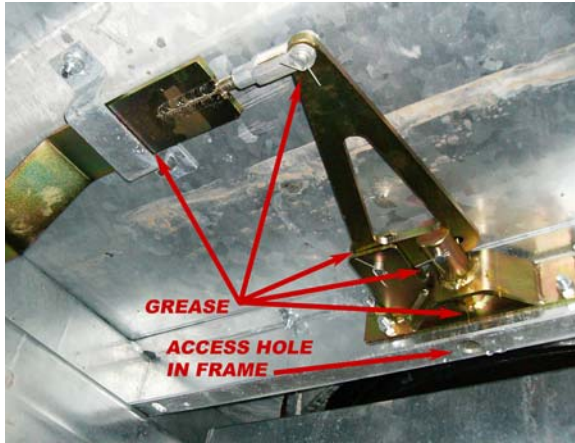
Diagnostic Code - PLC Select:

CODE	EXPLANATION	SOLUTION
41	SLOW WHEEL RECOVERY ON RED VALVE CHANNEL	CHECK FOR MECHANICAL FAULTS I.E. DRAGGING BRAKE, RESTRICTED PIPING OR DEFECTIVE VALVE
61	HOLD SOLENOID VALVE OPEN CIRCUIT ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
67	DUMP SOLENOID OPEN CIRCUIT ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
71	HOLD SOLENOID SHORT CIRCUIT TO GROUND ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
77	DUMP SOLENOID SHORT CIRCUIT TO GROUND ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
80	OUTPUT LEAKAGE OR POOR INSULATION ON ANY OF THE VALVE CHANNELS	CHECK ALL VALVES AND ECU. ANY ONE OF THESE COULD BE DEFECTIVE
81	HOLD SOLENOID SHORTED TO B+ ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
87	DUMP SOLENOID SHORTED TO B+ ON RED VALVE CHANNEL	CHECK CABLE CONNECTIONS. SOLENOID ON RED VALVE CHANNEL MAY BE DEFECTIVE
90	LOW SUPPLY VOLTAGE FAULT. DOES NOT LATCH. IS NOT STORED IN MEMORY	POWER SUPPLY VOLTAGE LEVEL AT ECU IS LESS THAN REQUIRED. DO NOT USE A BATTERY CHARGER AS POWER SUPPLY
91	NO INTERNAL ABS ECU SOLENOID VOLTAGE AVAILABLE	FAULTY POWER SUPPLY OR FUSE BLOWN. NO SOLENOID VALVE POWER SOURCE
92	POWER INPUT OVER VOLTAGE FAULT	POWER SUPPLY IS OVER 16 VOLT LIMIT; VOLTAGE REGULATOR MALFUNCTION
93	SHORT CIRCUIT ON ABS ECU INTERNAL RELAY	DEFECTIVE ABS ECU, VALVE CABLE OR SOLENOID
99	ABS CORRUPT MEMORY	DEFECTIVE ABS ECU
9A	ABS CORRUPT MEMORY	DEFECTIVE ABS ECU

Air Brake Schematic



Lubrication of Body Components



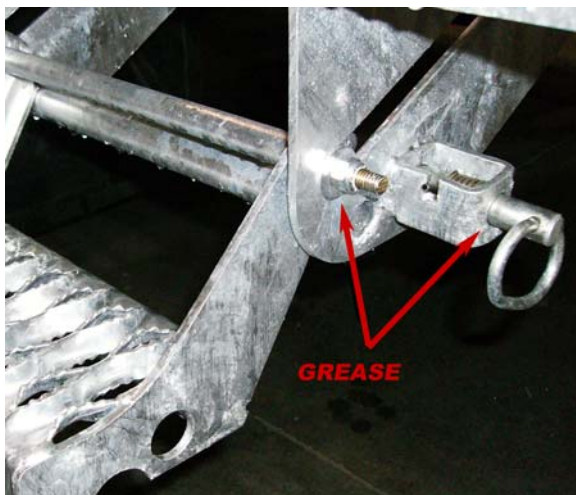
MGS recommends using a lithium base, high pressure grease

Lubricate all pivot points in the latch assembly and lubricate the grease zerk fitting accessed through the hole in the longitudinal crossmember shown in photo (on all three turrets)



Turntable is to be lubricated via multiple grease zerks on the diameter of the bearing. minimum interval is 3 months. Do not use calcium or sodium based lubricants.

If welding is performed on trailer, never attach ground in a manner that current can flow through the turntable. Damage to the bearing will result

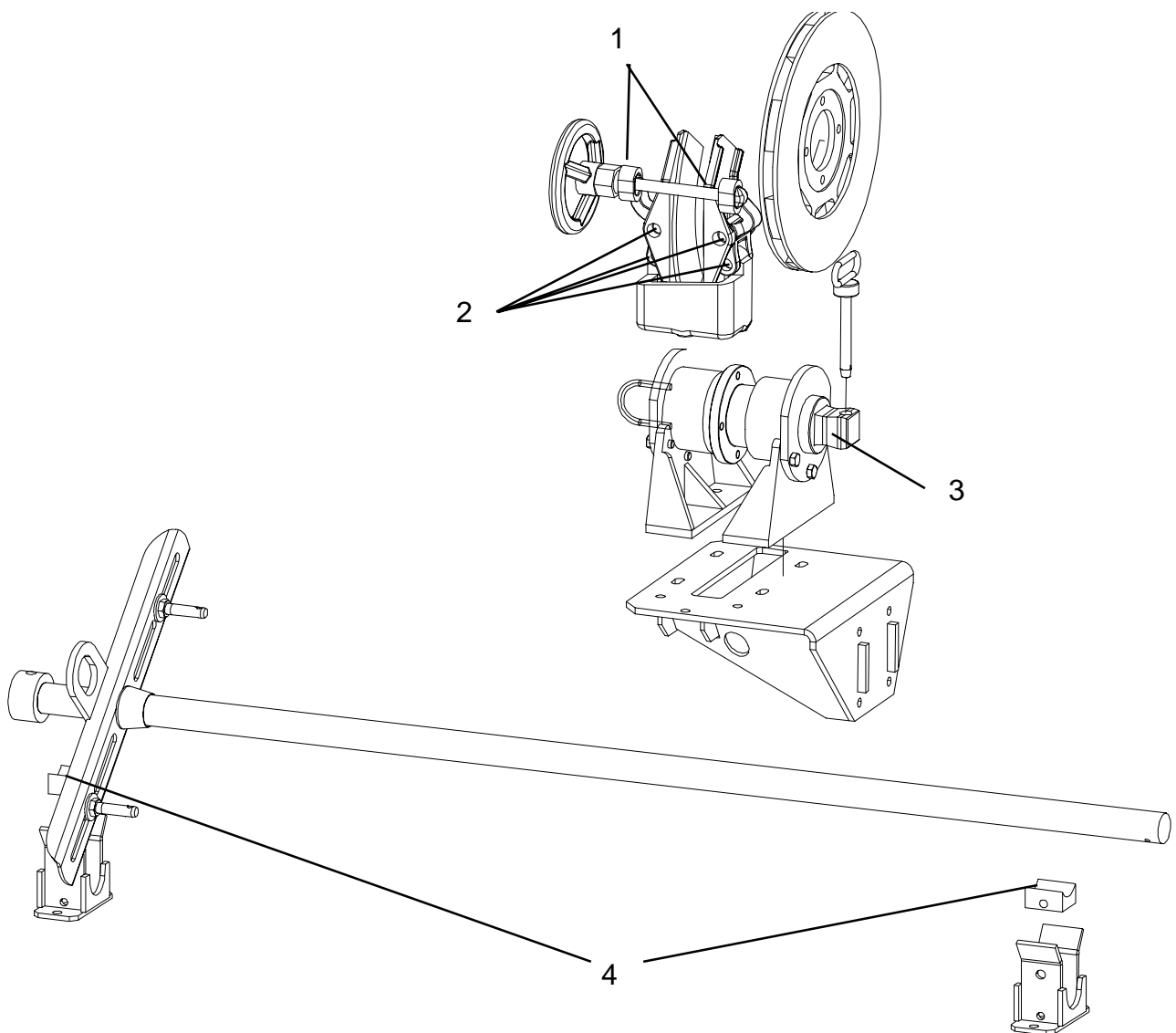


Grease step glidepin and latch

Lubrication of Body Components

The following components should be lubricated during your normal preventative maintenance schedule:

1. Tensioning wheel assy- Small amount of wheelbearing grease to threaded area
2. Caliper Pivots - Light coating of penetrating oil (four pins, lube both sides)
3. Drive Pin - Coat entire surface of square pin with wheel bearing grease
4. Spindle Bushings- Coat mating surfaces with wheel bearing grease



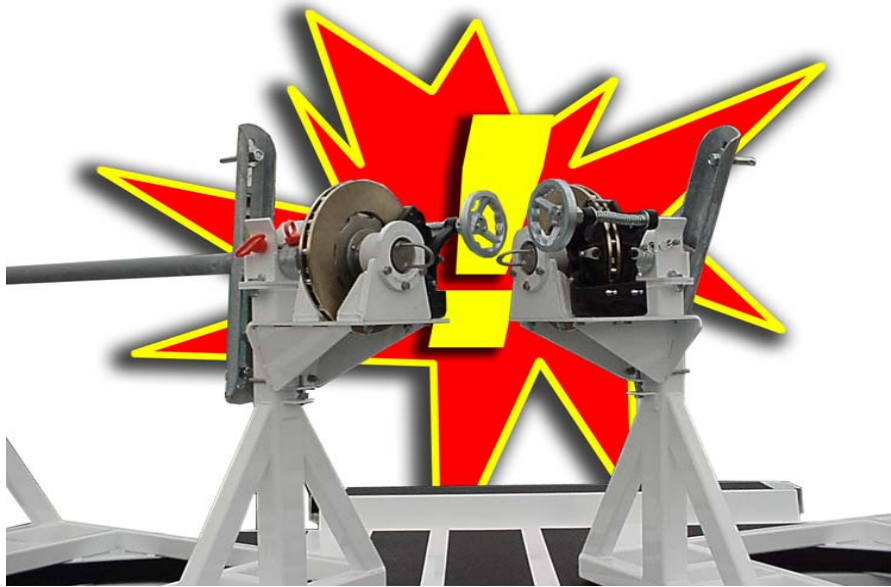
ROTATING THE TURRET

On units equipped with tensioning brake, never attempt to rotate turret when one of the brake assemblies is located toward the center of the trailer. Brake assemblies can come into contact with each other as shown in the photo below. Always use extreme caution when rotating turrets.



CAUTION

Brake assemblies can come into contact with each other during rotation. It is possible to be pinched between brake assemblies or turrets causing damage to equipment or injury.



Engagement pin can be lined up with locking slot by sighting through the deck as shown





MGS 1-Year Limited Warranty

MGS Incorporated (Seller) hereby warrants, for a period of **ONE** years from the date of purchase, to the first buyer- purchaser (Purchaser) of a **MGS Trailer** manufactured by Seller (Product) that the Product shall be free from defects in material or workmanship, provided timely notice of any claim on this warranty is given to Seller by Purchaser. *Notice of any warranty claim shall be untimely if written notice of such claim is not given to Seller in writing within fifteen (15) days from the date Buyer has discovered or, with the exercise of reasonable diligence, would have discovered any such defect in material or workmanship giving rise to such warranty claim. Any claim for breach of warranty which is not timely made shall be deemed waived by purchaser.*

Provided that a timely notice of a warranty claim is made for a defect in material or workmanship rising during the warranty period. Seller shall repair or replace any defective Product or portion thereof, or, at its option, may refund the purchase price for the Product. All decisions concerning whether a Product or any portion thereof is defective and whether said defects should be repaired or the Product replaced, and the manner, method and extent of such repairs, shall be within the sole discretion of Seller. Any alteration or repair to a Product or any portion thereof made by Purchaser without the prior written approval of Seller shall be done at Buyer's own risk and expense and shall invalidate this warranty.

Seller makes no warranty in connection with any components provided with the Product subject to a separate manufacturer's warranty and any claim relating to such goods shall lie exclusively against the manufacturer of such goods.

This warranty is made in lieu of all other warranties, express, implied or statutory. **Seller expressly disclaims any warranty or merchantability or warranty of fitness for a particular purpose or use.**

The express warranty provided herein shall be Purchaser's sole and exclusive remedy for any defects in material or workmanship relating to Product. Under no circumstance shall Seller be liable to Purchaser or any other person for lost profits, additional expenses incurred in repairing or replacing the Product or any other special, incidental, indirect or consequential losses of damages of any kind. Purchaser shall have no claim under this warranty for ordinary wear and tear or for abuse, misuse, improper installation or maintenance or alteration of or repairs to the Product unless such repairs have been authorized in writing by Seller prior to said repair.

Notice of any claim under this warranty must be made in writing and sent to Seller by certified mail, return receipt requested addressed to: MGS Incorporated, Sales Department, 178 Muddy Creek Church Road, Denver, PA 17517.



If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying MGS Inc.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or MGS Inc.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 202-366-0123) or write to: NHTSA, U.S. Department of Transportation, 400 7th street, SW, NSA-11, Washington, DC 20590. You can also obtain other information about motor vehicle safety from the Hotline.