

# **SERVICE REPAIR**

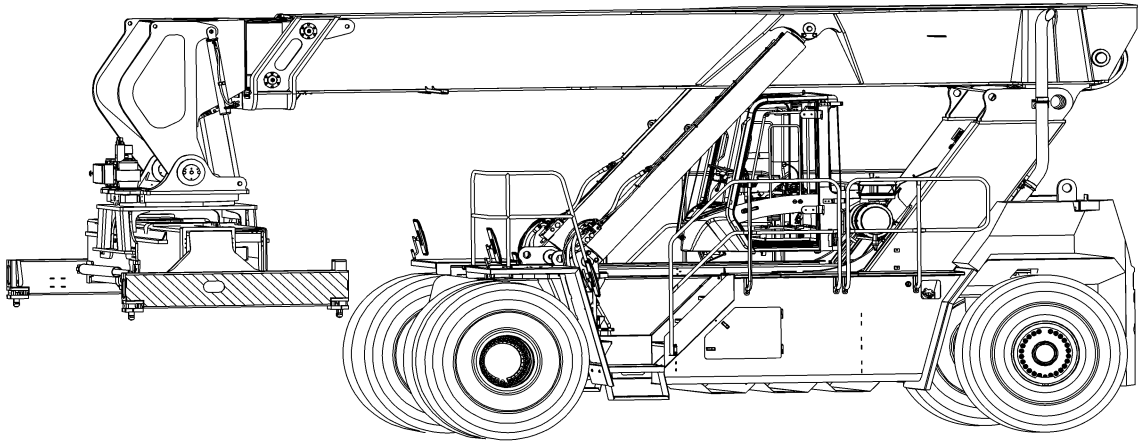
# **MANUAL**

Hyster B222 (HR45-27, HR45-31, HR45-36,  
HR45-40, HR45-41S, HR45-41L, HR45-41LS) Diesel  
Counter Balanced Truck Service Repair Manual

# ***HYSTER***

# PERIODIC MAINTENANCE

RS45-27CH, RS45-31CH, RS46-36CH, RS46-40CH,  
RS46-41S CH, RS46-41L CH, RS46-41LS CH,  
RS45-24IH, RS45-28IH, RS46-33IH, RS46-37IH,  
RS46-38S IH, RS46-38L IH, RS46-38LS IH  
(HR45-27, HR45-31, HR45-36, HR45-40, HR45-41S,  
HR45-41L, HR45-41LS) [B222]



# **HYSTER**

# SAFETY PRECAUTIONS

## MAINTENANCE AND REPAIR

- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **HYSTER APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

**NOTE:** The following symbols and words indicate safety information in this manual:



### **WARNING**

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



### **CAUTION**

**Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.**

**On the lift truck, the WARNING symbol and word are on orange background. The CAUTION symbol and word are on yellow background.**

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**Thanks very much for your reading,  
Want to get more information,  
Please click here, Then get the complete  
manual**

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CH, RS46-41LS CH, RS45-24IH, RS45-28IH, RS46-33IH, RS46-37IH,  
RS46-38S IH, RS46-38L IH, RS46-38LS IH (HR45-27, HR45-31, HR45-36,  
HR45-40, HR45-41S, HR45-41L, HR45-41LS) [B222]



## General

This section contains a Maintenance Schedule and the instructions for maintenance and inspection.

The Maintenance Schedule has time intervals for inspection, lubrication, and maintenance for your lift truck.

The recommendation for the time intervals are for 8 hours of operation per day. The time intervals must be decreased from the recommendations in the Maintenance Schedule for the following conditions:

- If the lift truck is used more than 8 hours per day.
- If the lift truck must work in dirty operating conditions.

Your dealer for Hyster lift trucks has the equipment and trained personnel to do a complete program of inspection, lubrication, and maintenance. A regular program of inspection, lubrication, and maintenance will help your lift truck give more efficient performance and operate for a longer period of time.



### WARNING

**Do not make repairs or adjustments unless you have both authorization and training. Repairs and adjustments made on a lift truck by people without authorization and training can make a dangerous operating condition.**

**Do not operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a DO NOT OPERATE tag in the operators area. Remove the key from the key switch.**

Some users have service personnel and equipment to do the inspection, lubrication and maintenance shown in the Maintenance Schedule. Service Manuals are available from your dealer for Hyster lift trucks to help users who do their own maintenance.

### SERIAL NUMBER DATA

The serial number for the lift truck is on the nameplate and also on the right hand frame rail, near the

counterweight. The serial number indicates the design series, manufacturing plant, and the year manufactured.

Example:	B222	E	4369	D
	(1)	(2)	(3)	(4)

(1) The first letter and number of the serial number indicates the design series and the model number of the lift truck.

(2) The second letter identifies the manufacturing plant.

Examples:

E = Nijmegen, The Netherlands

(3) The number series indicates the sequence of manufacture where the lift truck was made.

(4) The letter indicates the year of manufacture starting with A=2003. The letter B=2004 and so on.

### HOW TO MOVE DISABLED LIFT TRUCK



### WARNING

**Manual release of the parking brake caliper will result in loss of brakes.**

The service brake system requires hydraulic pressure to operate. The park brake will automatically apply when hydraulic pressure drops. If there is no hydraulic pressure to release the parking brake, the parking brake caliper must be manually released. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck. The parking brake caliper is installed at the back of the differential housing. To manually release the parking brake, remove cotter pin from bolt in caliper. Tighten nut to compress spring that applies brake.

## How to Tow Lift Truck



### WARNING

Do not tow the lift truck if a load is attached.

Use extra caution when moving a lift truck if any of the following conditions exist:

- Brakes do not operate correctly.
- Steering does not operate correctly.
- Tires are damaged.
- Traction conditions are bad.
- The lift truck must be towed on a slope.

If the engine cannot run, there is no power assist available for the steering and service brakes. This can make the control of the lift truck difficult. Poor traction can cause the disabled lift truck or towing vehicle to slide. Steep grades will increase the required brake effort.

**Manual release of the parking brake caliper will result in loss of brakes.**

1. The towed lift truck must have an operator.
2. Tow the lift truck slowly.
3. Tow the lift truck from lifting points of counterweight attached to frame.
4. If another lift truck is used to tow the disabled lift truck, that lift truck must have an equal or larger capacity than the disabled lift truck.
5. Use a towing link made of steel that attaches to the tow pins in the counterweights of both lift trucks.

## HOW TO PUT LIFT TRUCK ON BLOCKS

### How to Raise Drive Tires



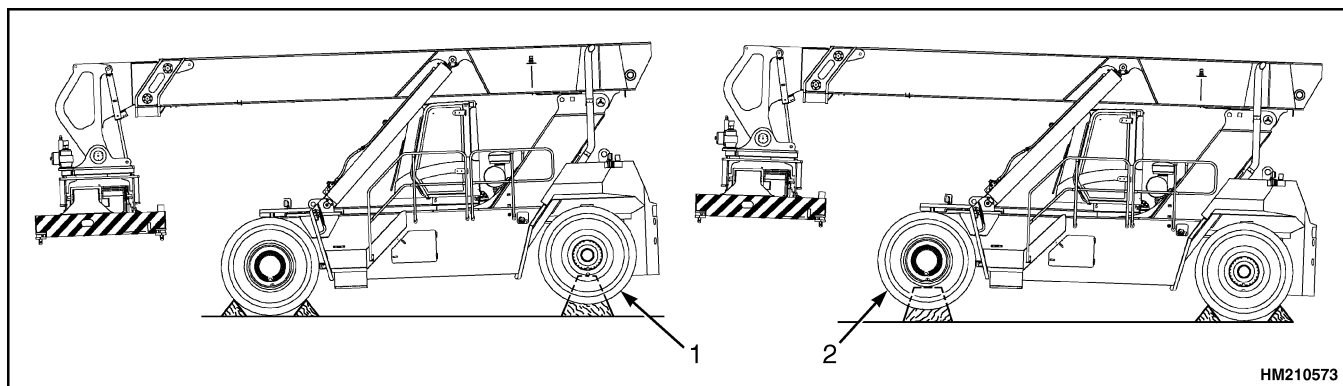
### WARNING

The lift truck must be put on blocks for some types of maintenance and repair. The surface must be solid, even, and level when the lift truck is put on blocks. Make sure that any blocks used to support the lift truck are solid, one-piece units. Do not use component lifting points on boom or frame to lift the lift truck.

1. Apply parking brake. Put blocks on both sides (front and back) of steering tires to prevent movement of the lift truck. See Figure 1.
2. Fully lower and retract boom.
3. Use a hydraulic jack under the side of frame near front. Make sure that the jack has a capacity of at least 41,000 kg (90,390 lb) equal to at least half the weight of the lift truck. See capacity plate.
4. Put additional blocks under frame behind drive tires. Make sure blocks are under frame channels and not tanks or compartments.

### How to Raise Steering Tires

1. Apply parking brake. Put blocks on both sides (front and back) of drive tires to prevent movement of the lift truck. See Figure 1.
2. Fully lower and retract boom.
3. Use a hydraulic jack to raise steering tires. Make sure that the jack has a capacity of at least 54,000 kg (119,050 lb) equal to 2/3 of the total weight of the lift truck. See capacity plate.
4. Put the jack under steering axle or frame to raise lift truck. Put blocks under frame as supports for the lift truck.



1. STEER AXLE/STEER TIRES

2. DRIVE AXLE/DRIVE TIRES

*Figure 1. Put Lift Truck on Blocks*

## HOW TO CLEAN A LIFT TRUCK



### WARNING

Engine, exhaust system components, and other components are hot to the touch. Be sure lift truck components are cool before starting inspection and cleaning, or personal injury may occur.



### WARNING

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.



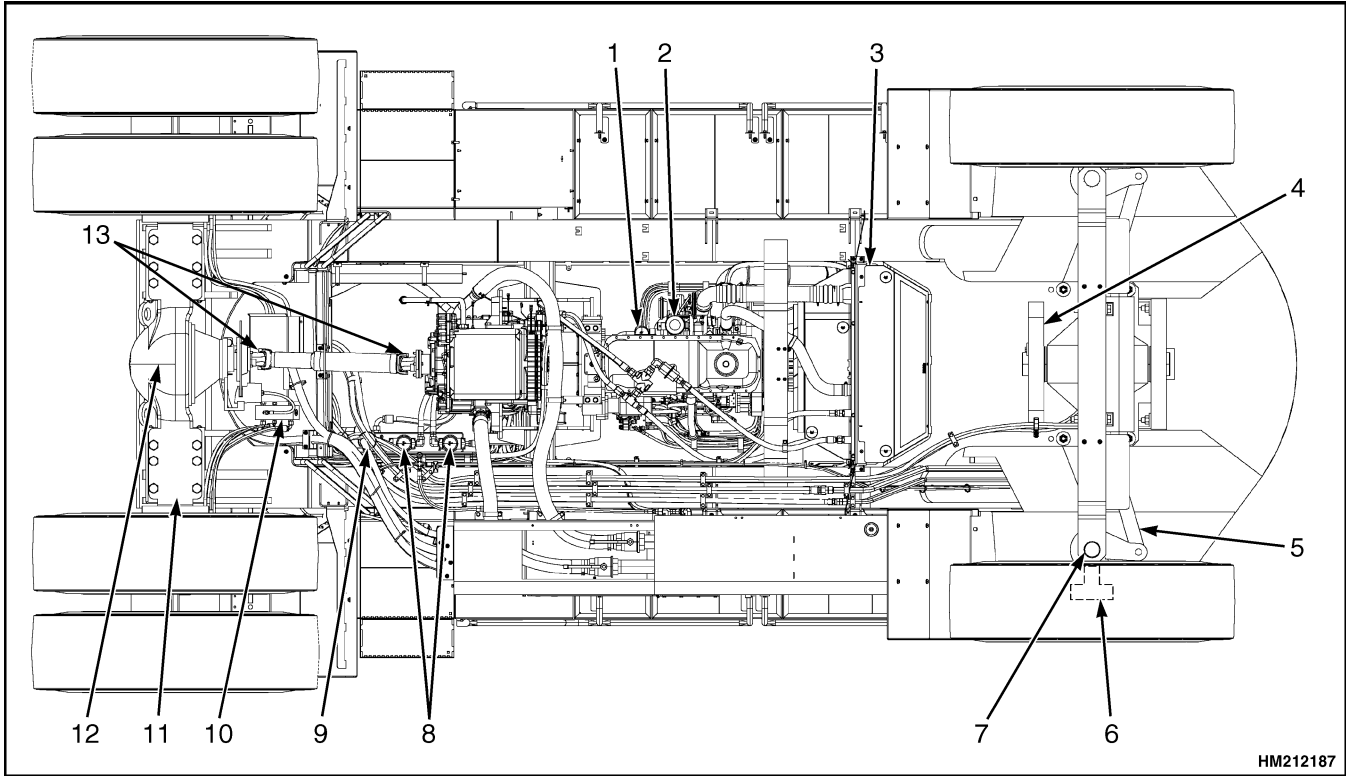
### CAUTION

Units may be washed with a non-heated pressure washer. Steam cleaning is not recommended in most instances, as condensation may form in electrical components causing damage or erratic behavior.

If it becomes necessary to clean the for lift, follow these guidelines.

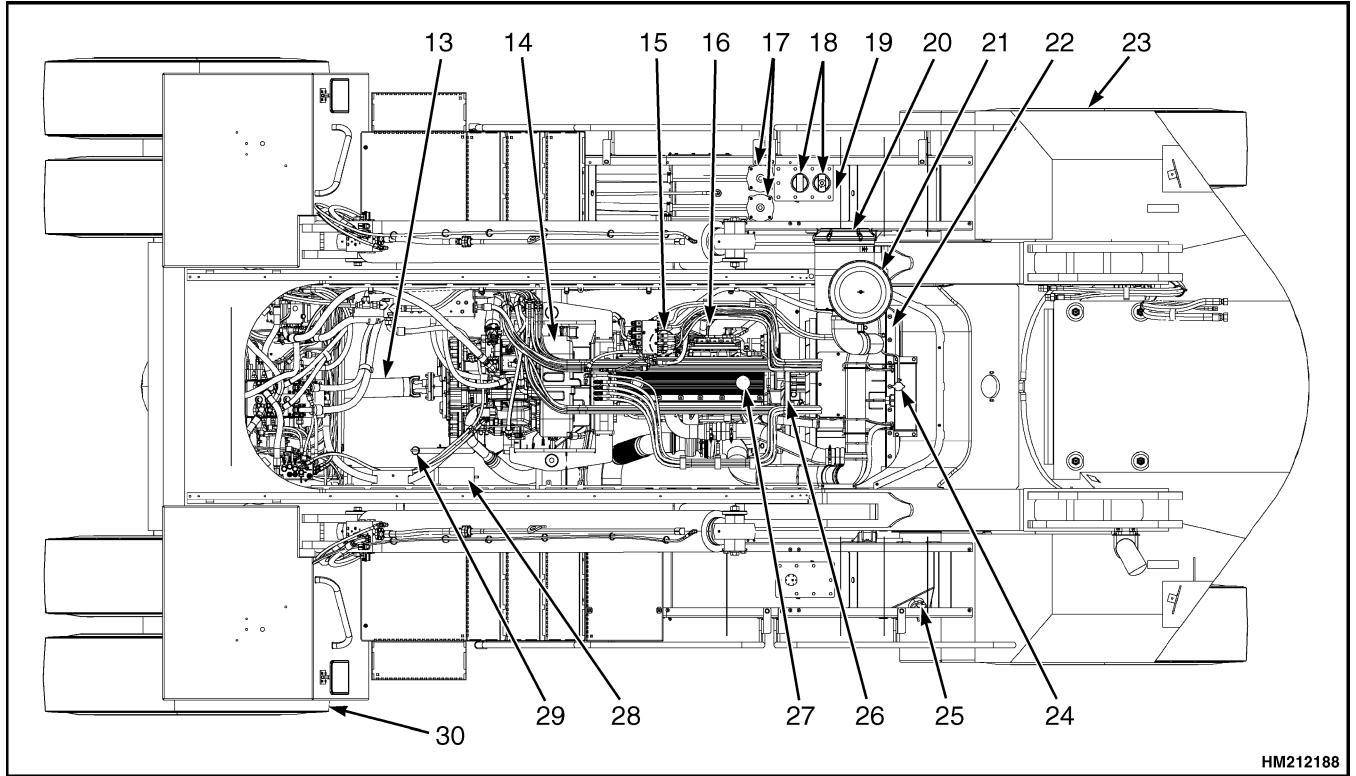
1. Assure truck components are cool before starting the cleaning procedure.
2. Disconnect the battery.
3. Remove accumulated debris using a compressed air line and nozzle.

4. Lightly spray a noncorrosive cleaning agent onto the areas to be cleaned. This will help loosen grime, so close contact direct spraying will not be necessary.
5. Be sure to avoid directing the spray into electrical panel compartment. Ensure overspray does not come in contact with electrical components; DO NOT spray water directly at electrical components, wiring connectors, or electrical enclosures. Even sealed connectors may allow water egress under pressure or if connector is damaged.
6. Avoid spraying in areas containing electrical components such as:
  - Floor Plates
  - Battery Compartment
  - Dash/cowl assembly
  - Armrests with electrical components
7. Clean the battery compartment by using a clean cloth to wash the battery with water. Dry with compressed air.
8. DO NOT pressure wash the battery. DO NOT use hot water.
9. DO NOT pressure wash lift chains, sheaves, or load rollers in the mast assembly.
10. After cleaning, immediately start and run the lift truck to dry out components.

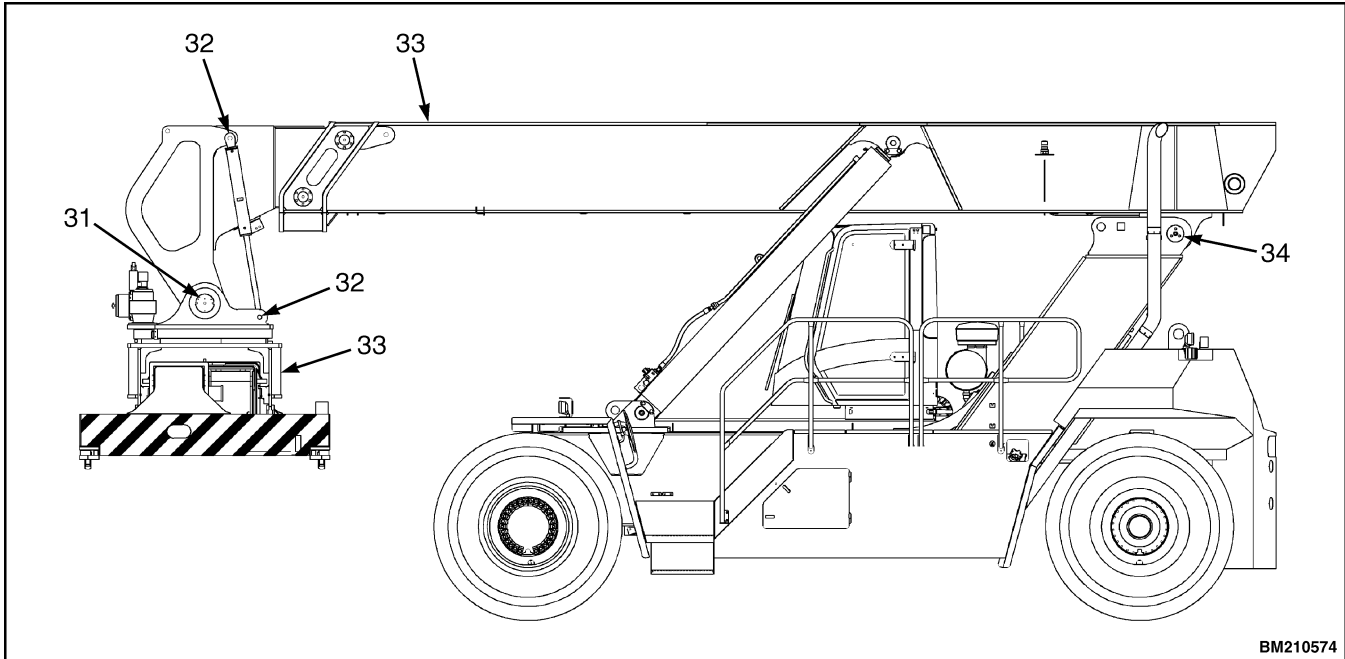


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*Figure 2. Maintenance Points (Sheet 1 of 3)*



*Figure 2. Maintenance Points (Sheet 2 of 3)*



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Figure 2. Maintenance Points (Sheet 3 of 3)

## Maintenance Schedule

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Table 1. Daily Inspections – Condition Check

Item No.	Item	Procedure
	Seat Belt, Seat Rails and Steering Column	Check condition and operation. Repair as required.
	Warning and Safety Labels	Check for presence and readability. Replace as required. See <b>Parts Manual</b> .
	Windows and Mirrors	Clean and adjust as required.
	Wheels, Tires and Tire Pressure	Check condition and pressure. See Nameplate.
	Wheel Nuts	Retorque nuts 8 hours after replacement of a wheel, or 8 hours after a nut could be turned at retorquing.
33	Boom, Rotator, and Spreader	Check condition. Repair as required.
21	Air Precleaner Dust Bowl	Remove dust from bowl as required.
	Hydraulic Tank Breathers	Inspect restriction indicator. Replace element as required. See <b>Parts Manual</b> .
	Fuel, Oil, and Coolant Leaks	Check for leaks. Repair as required.
	Engine Air Intake and Charge Air Piping	Check proper fitting. Look for leaks. Repair as required.
See Figure 2 for Item Nos.		


*Table 1. Daily Inspections – Condition Check (Continued)*

Item No.	Item	Procedure
26	Drive Belts	Check tension, absence of grease and damage. Repair as required.
	Engine Compartment	Remove combustible materials. Remove all foreign materials.
22, 3	Radiator Sections for Engine Coolant, Charge Air Cooler, Transmission and Hydraulic Oil	Check and clean when needed. Check hoses and tube connections for leaks.
See Figure 2 for Item Nos.		

*Table 2. Daily Inspections – Fluid Level Check*

Item No.	Item	Specification	Procedure
	Windshield Washer Fluid		Check level in reservoir. Add when needed.
19	Hydraulic System Oil	John Deere JDM-J20C	 <b>CAUTION</b> <b>Additives in the hydraulic system oil may damage the hydraulic system. Before using additives, contact your local HYSTER dealer.</b>  Check level indicator with boom fully lowered and retracted. Add oil if needed. Top off hydraulic oil through hydraulic return filter.
16, 27	Engine Oil Level	SAE 15W-40, –18°C (0°F) and up. API CH-4/SJ	Maintain level at Full mark on dipstick when cold.
See Figure 2 for Item Nos.			

**Table 3. Daily Inspections – Checks With the Engine Running**

<b>Item No.</b>	<b>Item</b>	<b>Procedure or Specification</b>
	Horn, Gauges, Lights, Alarms and Control System	Visual or audible verification. Repair as required.
	Signals from the LMI System	Check operation. Repair as necessary.
	Engine and Transmission Fault Codes	Check fault code warning lights. The display should be free of fault codes. Report any fault code.
20	Engine Air Filter	Replace main element when warning light is <b>ON</b> . Replace safety element every third time main element is replaced.
24	Coolant Level	 <b>WARNING</b> <b>Add engine coolant when engine is cold or personal injury may occur.</b>
		Add coolant when warning light is <b>ON</b> . Report loss of coolant. Shell HD Premium Coolant
	Hydraulic Return Oil Filter	Replace filters when the warning light is <b>ON</b> and when required filter replacement is established.
	Brake Return Filter	Replace filter when the warning light is <b>ON</b> and when required filter replacement is established.
25	Fuel Level	Avoid low fuel level and running out of fuel. Diesel No. 2. 670 liter (177 gal).
	Control Levers, Switches, and Pedals	Check operation as described in the <b>Operating Manual</b> . Repair as required.
	Parking and Service Brakes	Check operation. Repair as required.
	Steering System	Check operation. Repair as necessary.
33	Boom, Rotator, and Spreader	Check operation. Repair as necessary.
	Signals from the Spreader Control System	Check operation. Repair as necessary.
14	Transmission	Check operation. Repair as necessary.
	Operator Presence System	Check operation. Repair as necessary.
29	Transmission Oil Level	Add if needed. Dexron® III
See Figure 2 for Item Nos.		



**Table 4. First Inspection After First 100 Hours of Operation**

Item No.	Item	Procedure	Quantity	Specification
6	Bearing Pretorque in Steer Wheel Hubs	Check Torque		See <b>Steering Axle 1600 SRM 1114</b> .for procedure.
6	Oil in Steer Wheel Hubs	Change	4 liter (1.06 gal) each	MIL-L-2105D API-GL-5 SAE 90.
8	Transmission Oil Filter	Change	2	See <b>Parts Manual</b> .
9	Brake Return Filter	Change	1	See <b>Parts Manual</b> .
–	Hydraulic High Pressure Oil Filter	Change	1	See <b>Parts Manual</b> .
See Figure 2 for Item Nos.				

**Table 5. Periodic Maintenance Schedule – Inspect and Adjust**

Item No.	Item	Interval	Procedure
	Warning and Safety Labels	250 hr/3 mo	Check for presence and readability. Replace as required. See <b>Parts Manual</b> .
	Wheels, Tires, and Tire Pressure	250 hr/3 mo	Check condition and pressure. See nameplate.
	Wheel Nuts, Drive Wheels	250 hr/3 mo	Check torque. 405 to 440 N•m (300 to 325 lbf ft).
	Wheel Nuts, Steer Wheels	250 hr/3 mo	Check torque. 335 to 365 N•m (247 to 269 lbf ft).
18	Hydraulic Tank Breathers	250 hr/3 mo	Inspect restriction indicator. Replace elements when needed. See <b>Parts Manual</b> .
21	Air Precleaner	250 hr/3 mo	Remove dust from dust bowl as required.
	Fuel, Oil, and Coolant Leaks	250 hr/3 mo	Check for leaks. Repair as required.
	Engine Air Intake and Charge Air Piping	250 hr/3 mo	Check for wear points, damage, leaks, loose clamps or loose connections. Repair as required.
	Coolant Hoses	250 hr/3 mo	Inspect for cracks, cuts and collapsing. Replace as required. See <b>Parts Manual</b> .
26	Drive Belts	250 hr/3 mo	Check tension and condition. Replace as required. See <b>Parts Manual</b> .
	Engine Compartment	250 hr/3 mo	Remove combustible materials. Remove all foreign materials.
3	Radiator sections for Engine Coolant, Charge Air Cooler, Transmission and Hydraulic Oil	250 hr/3 mo	Check and clean when necessary. Check hoses and tube connections for leaks.
See Figure 2 for Item Nos.			

*Table 5. Periodic Maintenance Schedule – Inspect and Adjust (Continued)*

Item No.	Item	Interval	Procedure
11, 12	Drive Axle and Differential	250 hr/3 mo	Check oil levels. Add oil if needed. Clean magnetic plugs. API-GL-5, MIL-PRF-2104F, SAE 80W-90, –26°C (–14.8°F) and up. SAE 85W-140, –12°C (10.4°F) and up.
6	Oil in Steer Wheel Hubs	250 hr/1 mo	Check oil levels. Add oil if necessary. Clean magnetic plugs. MIL-L-2105D API-GL-5 SAE 90.
	Windshield Washer Fluid	250 hr/3 mo	Check level in reservoir. Add when needed.
17	Hydraulic System Oil	250 hr/3 mo	Check level indicator. Add hydraulic oil if needed through the hydraulic return filter. JDM-J20C
24	Coolant Level	250 hr/3 mo	Inspect level in the expansion tank. If level is below "MIN" mark, inspect for leaks, repair as required, and add coolant to the "MAX" mark. Shell HD Premium Coolant
16	Engine Oil Level	250 hr/3 mo	Maintain level halfway full range on dipstick when cold. API CH-4/SJ SAE15W-40 –18°C (0°F) and up.
15	Fuel Filter/Water Separator	250 hr/3 mo	Drain water until clean fuel flows from the filter.
29	Transmission Oil Level	250 hr/3 mo	Add oil if needed. DEXRON III.
	Seat Belt, Seat Rails and Steering Column	250 hr/3 mo	Check condition and operation. Repair as required.
	Operator Presence System	250 hr/3 mo	Check operation. Repair as required.
33	Boom Wear Pads	500 hr/6 mo	Replace wear pads if thickness is 18 mm (0.71 in.) or less. Make sure that retaining hardware is tightened to 165 N•m (121.7 lbf ft).
33	Boom Side Wear Pads	500 hr/6 mo	Check Adjustment. Replace pads when worn.
	Cab Air Filter	500 hr/6 mo	Check element. Replace element when needed. See <b>Parts Manual</b> .
	Cooling Fan	500 hr/6 mo	Check for cracks and damage. Replace if necessary. See <b>Parts Manual</b> .
10	Parking Brake and Service Brakes	1000 hr/6 mo	Check condition and operation. Repair as required.
24	Coolant Quality	1000 hr/6 mo	40 liter; Check acidity and freezing point. Replace factory filled coolant if pH level is lower than 8.0. 26 liter
6	Steer Wheel Hub Bearings	2000 hr/12 mo	Check pre-torque. See the section <b>Steering Axle</b> 1600 SRM 1114 or 1600 SRM 1362.
28	Brake System Accumulator	2000 hr/12 mo	Make sure pre-charge pressure at gauge is 10.35 ±0.5 MPa (1501 ±72.5 psi).
See Figure 2 for Item Nos.			

**Table 5. Periodic Maintenance Schedule – Inspect and Adjust (Continued)**

Item No.	Item	Interval	Procedure
	Engine Cleaning	2000 hr/12 mo	Clean engine if needed.
	Engine and Transmission Mounts	2000 hr/12 mo	Check for aging and deterioration. Replace if necessary. See <b>Parts Manual</b> .
27	Engine Valve Adjustment	2000 hr/12 mo	Check valve clearance. See engine identification plate for adjustment values.
	Turbo Charger	2000 hr/12 mo	Tighten clamps and hardware. Establish correct sealing.
	Transmission Clutch Calibration	2000 hr/12 mo	Perform clutch calibration.
	Inching Pedal Sensor Calibration	2000 hr/12 mo	Check calibration and adjust as required.
26	Fan Belt and Tensioner	6000 hr/24 mo	Check tension and belt condition. Replace as required. See <b>Parts Manual</b> .
26	Fan hub, Belt Hubs, Idler Pulley	6000 hr/24 mo	Inspect condition and proper rotation. Replace as required. See <b>Parts Manual</b> .
26	Vibration Damper	6000 hr/24 mo	Check for fluid loss and deformation. Replace if needed. See <b>Parts Manual</b> .
See Figure 2 for Item Nos.			


**Table 6. Periodic Maintenance Schedule – Lubricate**

Item No.	Item	Interval	Quantity	Specification
	Tracks for Boom Wear Pads	250 hr/3 mo	8 tracks	Multipurpose grease. EP2, EP3. Without MoS2.
13	Drive Shaft	250 hr/3 mo	3 fittings	Multipurpose grease. EP2, EP3. Without MoS2.
31	Boom Pivot to Attachment	500 hr/3 mo	2 fittings	Multipurpose grease. EP2, EP3. Without MoS2.
32	Dampening Cylinder Pivot Points	500 hr/3 mo	4 fittings	Multipurpose grease. EP2, EP3. Without MoS2.
34	Boom Pivot to Frame	500 hr/3 mo	2 fittings	Multipurpose grease. EP2, EP3. Without MoS2.
5	Steering Axle Tie Rod Pins	500 hr/3 mo	4 fittings	MoS2 grease.
7	King Pins	500 hr/3 mo	4 fittings	MoS2 grease.
4	Steering Axle Pivot	500 hr/3 mo	2 fittings	Multipurpose grease. EP2, EP3. Without MoS2.
See Figure 2 for Item Nos.				

**Table 6. Periodic Maintenance Schedule – Lubricate (Continued)**

Item No.	Item	Interval	Quantity	Specification
–	Stabilizer Cylinder Rod End	500 hr/3 mo	2 fittings	MoS2 grease.
–	Cab Door Hinges	1000 hr/6 mo	8 fittings	Multipurpose grease.
See Figure 2 for Item Nos.				

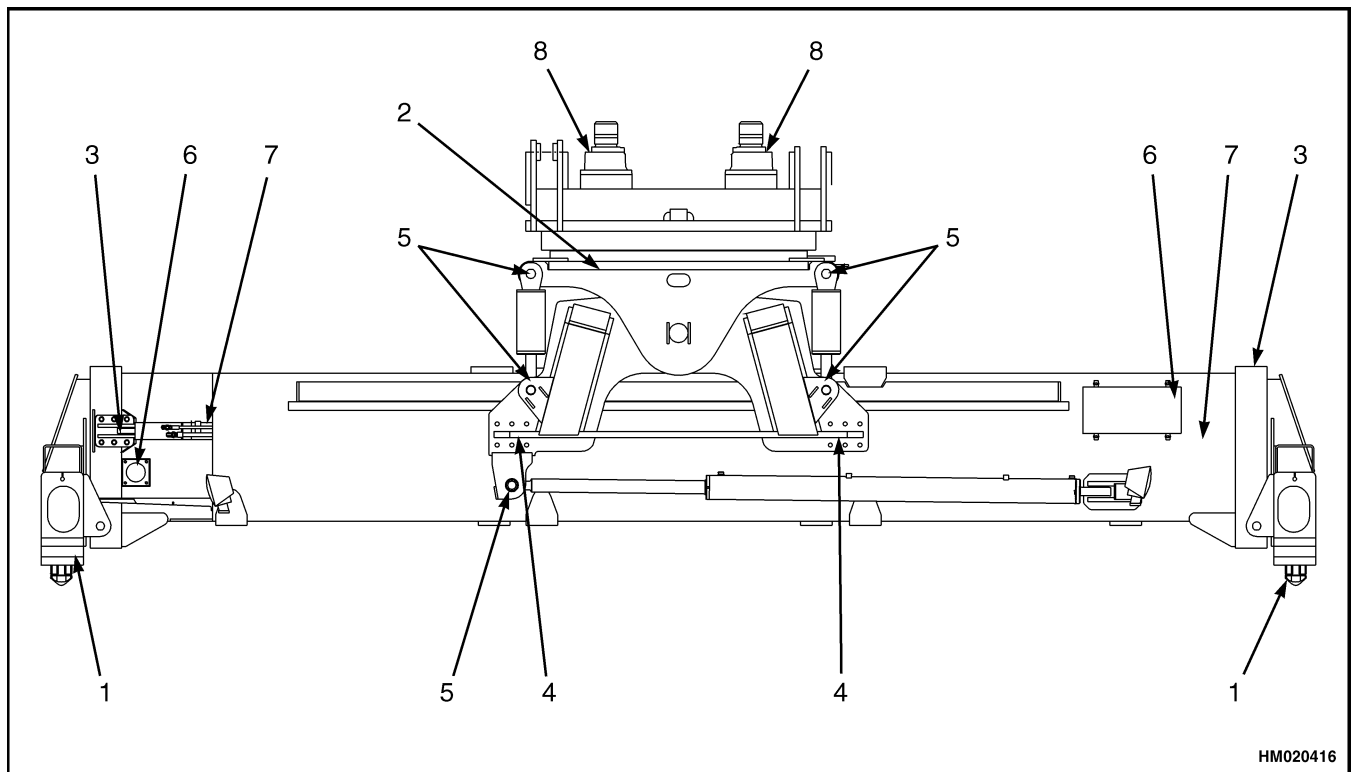
**Table 7. Periodic Maintenance Schedule – Change**

Item No.	Item	Interval	Quantity	Specification
16	Engine Oil	500 hr/6 mo	34 liter (9 gal)	SAE 15W-40, –18°C (0°F) and up. API CI-4/CJ-4 MIL-PRF-2104F
2	Engine Oil Filter	500 hr/6 mo	1	See <b>Parts Manual</b> .
15	Fuel Filter/Water Separator	500 hr/6 mo	1	See <b>Parts Manual</b> .
8	Transmission Oil Filter	1000 hr/6 mo	2	See <b>Parts Manual</b> .
29	Transmission Oil	1000 hr/6 mo	62 liter (16 gal)	Dexron® III
6	Oil in Steer Wheel Hubs	1000 hr/6 mo	4 liter (1 gal) each side.	MIL-L-2105D API-GL-5 SAE 80W-90.
12	Drive Axle and Differential Oil	1500 hr/6 mo	65 liter (17.2 gal)	API-GL-5, MIL-PRF-2104F, SAE 80W-90, –26°C (–14.8°F) and up. SAE 85W-140, –12°C (10.4°F) and up. Also clean magnetic plugs.
1	Engine Coolant Filter	2000 hr/12 mo	1	See <b>Parts Manual</b> .
9	Brake Return Line Filter	2000 hr/12 mo	1	See <b>Parts Manual</b> . Also replace when restriction indicator light is <b>ON</b> .
19	Hydraulic System Oil	3000 hr/36 mo	605 liter (160 gal)	 <b>CAUTION</b> Additives in the hydraulic system oil may damage the hydraulic system. Before using additives, contact your local Hyster dealer. John Deere JDM-J20C
19	Hydraulic System Suction Filter	3000 hr/36 mo	1	See <b>Parts Manual</b> .
See Figure 2 for Item Nos.				

*Table 7. Periodic Maintenance Schedule – Change (Continued)*

Item No.	Item	Interval	Quantity	Specification
17	Hydraulic Return Oil Filter	3000 hr/36 mo	2	See <b>Parts Manual</b> . Replace when Restriction Indicator Light is <b>ON</b> .
–	Air Conditioning System	5000 hr/36 mo		Contact certified AC specialist for replacing dryer, lubricant and refrigerant. R134A 1300 ±50 grams (45.86 ±1.76 oz)
–	High Pressure Hydraulic Oil Filter	10,000 hr/60 mo	1	Replace after major hydraulic system repair. See <b>Parts Manual</b> .
See Figure 2 for Item Nos.				

**CONTAINER ATTACHMENT MAINTENANCE**



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*Figure 3. Extendable Container Attachment Maintenance Points*