

**HTC—1055/1060 Series — Master Keysheet**  
**(63 Prefix On Crane Serial Number)****AREA 00 GENERAL INFORMATION**

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SM00—000—000.00 Service Manual General Usage &amp; Instructions

**AREA 01 RUBBER TIRE LOWER**

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SM01—002—013.00 Front Wheel & Brake Drum, R & I  
SM01—002—014.00 Front Axle, Recondition (Eaton EFA Series)  
SM01—003—013.00 Brakes, Recondition (Rockwell "Q" Series)  
SM01—003—014.00 Adjusting The Brakes (Eaton & Rockwell "P,Q,T" Series)  
SM01—003—015.00 Brakes, Recondition (Rockwell RDA Series)  
SM01—003—017.00 Adjust The Brakes (Rockwell RDA)  
SM01—005—003.00 Steering Gear, Recondition (Master)  
SM01—005—004.00 Steering Gear, Recondition (Slave)  
SM01—005—006.00 Miter Box, Recondition  
SM01—005—015.00 Steering Column, Recondition  
SM01—006—008.00 Steering Gears, R & I  
SM01—006—009.00 Front Wheel Alignment & Steer Linkage Adjustment  
Axle Stop Adjustment  
SM01—010—007.00 Steer Pump, Recondition  
SM01—018—026.00 Transmission, Recondition  
SM01—019—010.00 Transmission Master Control, R & I  
SM01—019—011.00 Transmission Slave Control, R & I  
SM01—019—012.00 Transmission Shift Cable Adjustment — Manual  
SM01—019—014.00 Transmission Air Shift Control, Recondition  
SM01—022—004.00 U—Joint Installation — Half Round Yokes  
SM01—024—003.00 Rear Axles, Recondition (Rockwell)  
SM01—027—009.00 Air Dryer, Recondition  
SM01—027—010.00 Air Throttle Control Cylinder, Recondition  
SM01—027—018.00 Front Air Brake Chamber, Recondition (Wedge Type Brakes)  
SM01—027—026.00 Caging Dual Air Brake Chambers  
SM01—027—027.00 Air Brake Chamber, R & I  
SM01—027—029.00 Rear Dual Air Brake Chamber, Recondition  
SM01—027—033.00 Throttle Pedal, Recondition  
SM01—027—061.00 Spring Brake Valve, Recondition  
SM01—028—001.00 Rear Wheel & Brake Drum, R & I  
SM01—039—002.00 Vacuum Pressure Relief Valve, Recondition  
SM01—039—003.00 Hydraulic System Cleaning Procedure  
SM01—043—001.00 Solenoid Valves, General Recondition  
SM01—043—003.00 Outrigger Solenoid Valve Stack, Recondition (Function)  
SM01—043—004.00 Four Way Solenoid Valve, Recondition (Outrigger Directional)  
SM01—044—008.00 Jack Cylinder Lock Valve, R & I  
SM01—044—009.00 Jack Cylinder Lock Valve, Recondition  
SM01—045—006.00 Outrigger Beam Cylinder, Recondition (Link—Belt)  
SM01—045—007.00 Outrigger Beam Cylinder, Recondition (Iowa Industrial Hydraulics)  
SM01—046—012.00 Jack Cylinder, Recondition (Main & Fifth Outrigger)  
SM01—046—015.00 Jack Cylinder, R & I  
SM01—047—006.00 Relief Valve, Recondition  
SM01—048—009.00 Rotating Joint, Recondition  
SM01—069—003.00 Rims & Tires, R & I — Dual Rear  
SM01—069—004.00 Rim & Tire, R & I — Front  
SM01—075—009.00 Power Steering Pump, R & I  
SM01—076—007.00 Collector Ring, Recondition (Generation 1)  
SM01—076—013.00 Collector Ring, Recondition (Generation 2)

|                 |                                          |
|-----------------|------------------------------------------|
| SM01-079-001.00 | Unloader Valve, R & I                    |
| SM01-080-009.00 | Main Hydraulic Pump, R & I               |
| SM01-080-014.00 | Pump Disconnect, R & I                   |
|                 | Jaw Clutch Clearance Adjustment          |
| SM01-080-015.00 | Pump Disconnect, Recondition             |
| SM01-081-012.00 | Main Hydraulic Pump, Recondition         |
| SM01-083-003.00 | Free-Fall Pump, Recondition              |
| SM01-083-007.00 | Free-Fall Pump, R & I (Cummins NTCC-230) |
| SM01-085-002.00 | Engine Preheater, R & I                  |
| SM01-085-004.00 | Engine Preheater, Recondition            |

## AREA 03 UPPER REVOLVING FRAME

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|                 |                                        |
|-----------------|----------------------------------------|
| SM03-001-047.00 | Upper Frame & Turntable Bearing, R & I |
| SM03-003-005.00 | Counterweight, R & I                   |

## AREA 04 VERTICAL SHAFTS

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|                 |                                  |
|-----------------|----------------------------------|
| SM04-005-017.00 | Brake Caliper, Recondition       |
| SM04-010-010.00 | Swing Speed Reducer, Recondition |
| SM04-010-011.00 | Swing Speed Reducer, R & I       |
|                 | 360 Degree Swing Lock Adjustment |
|                 | Swing Brake Adjustment           |

## AREA 05 HORIZONTAL SHAFTS

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|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| SM05-004-007.00 | Hoist Motor, Brake & Planetary, R & I (w/Separate Hyd Shift Two-Speed Valve) |
| SM05-004-008.00 | Hoist Drum & Shaft Without Free-Fall, R & I                                  |
| SM05-004-011.00 | Hoist Motor, Brake & Planetary, R & I (w/Air Shift Two-Speed Valve)          |
| SM05-004-012.00 | Hoist Drum & Shaft With Free-Fall, R & I                                     |
| SM05-004-014.00 | New Style Hoist Brake Retrofit                                               |
| SM05-006-008.00 | Hoist Motor, Brake & Planetary, R & I (w/Integral Hyd Shift Two-Speed Valve) |
| SM05-006-009.00 | Winch Drum & Shaft Without Free-Fall, R & I                                  |
| SM05-006-010.00 | Winch Drum & Shaft With Free-Fall, R & I                                     |
| SM05-009-016.00 | Free-Fall Hoist Rotating Joint, R & I                                        |
|                 | Free-Fall Hoist Rotating Joint, Recondition                                  |
| SM05-009-017.00 | Free-Fall Hoist Clutch Cylinder, Recondition                                 |
| SM05-009-018.00 | Free-Fall Hoist Clutch Cylinder, R & I                                       |
| SM05-009-019.00 | Free-Fall Hoist Clutch Shoes, R & I                                          |
|                 | Clutch Lining "Burn In" Procedure                                            |
| SM05-009-020.00 | Free-Fall Hoist Clutch Shoe Adjustment                                       |
| SM05-009-021.00 | Free-Fall Hoist Clutch Shoes, Recondition                                    |
| SM05-009-022.00 | Free-Fall System Test Procedure                                              |
| SM05-012-033.00 | Automatic Hoist Brake, Recondition                                           |
| SM05-012-035.00 | Free-Fall Hoist Brake Cylinder, Recondition                                  |
| SM05-012-036.00 | Free-Fall Hoist Band Brake, R & I                                            |
|                 | Brake Lining "Burn In" Procedure                                             |
| SM05-012-037.00 | Free-Fall Hoist Band Brake Adjustment                                        |
| SM05-012-038.00 | Free-Fall Hoist Brake Cylinder, R & I                                        |
|                 | Brake Actuator Spring, R & I                                                 |
| SM05-012-039.00 | Free-Fall Hoist Brake Bands, Recondition                                     |

**AREA 06                    UPPER ENGINE**

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SM06-008-004.00    Treadle Valve, Recondition  
SM06-024-023.00    Audio/Visual Warning System Calibration  
SM06-025-002.00    Diesel Cab Heater, Recondition  
SM06-025-003.00    Propane Heater, Recondition  
SM06-025-007.00    Hydraulic Cab Heater, R & I  
SM06-025-008.00    Hydraulic Cab Heater, Recondition  
SM06-025-009.00    Hydraulic Heater – Troubleshooting  
SM06-047-000.00    Electrical System Wire Identification Code  
SM06-047-044.00    Electrical Schematic  
SM06-047-045.00    Electrical Free-Fall Schematic

**AREA 07                    HYDRAULIC POWER SUPPLY**

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SM07-000-086.00    Hydraulic System Schematic Diagram  
SM07-001-019.00    Free-Fall Accumulator, R & I  
                                Charging The Accumulator  
SM07-002-027.00    Unloader Valve, Recondition  
SM07-002-028.00    Relief Valve, Recondition (Hydraulic Heater)  
SM07-003-006.00    Solenoid Valves, General Recondition  
SM07-005-051.00    Hydraulic Heater Gear Pump, R & I  
SM07-005-052.00    Hydraulic Gear Pump Assembly, Recondition (Hydraulic Heater)  
SM07-006-010.00    Two-Speed Hoist Valve, R & I (Air Shift)  
SM07-006-011.00    Winch Motor, Recondition (w/Separate Two-Speed Valve)  
SM07-006-012.00    Two-Speed Hoist Valve, R & I (Hydraulic Shift)  
SM07-006-013.00    Hoist Counterbalance Valve, R & I (w/Hydraulic Shift Two-Speed)  
SM07-006-014.00    Hoist Counterbalance Valve, R & I (w/Air Shift Two-Speed)  
SM07-006-034.00    Swing Motor, Recondition  
SM07-006-040.00    Winch Motor, Recondition (w/Integral Two-Speed Valve)  
SM07-008-012.00    Control Valves, Recondition (Gresen V42)  
SM07-008-014.00    Winch Counterbalance Valve, Recondition (w/Hydraulic Shift Two-Speed)  
SM07-008-022.00    Free-Fall Press Sequence Valve, Recondition  
SM07-008-023.00    Control Valves, Recondition (Gresen V70)  
SM07-008-024.00    Hoist Counterbalance Valve, Recondition (w/Air Shift Two-Speed)  
SM07-008-025.00    Two-Speed Hoist Valve, Recondition (Hydraulic Shift)  
SM07-008-026.00    Two-Speed Hoist Valve, Recondition (Air Shift)  
SM07-008-030.00    Free-Fall Pressure Sequence Valve, R & I  
SM07-008-080.00    Hoist Counterbalance Valve, R & I (w/Hydraulic Shift Two-Speed)  
SM07-018-001.00    Hydraulic System Tube Fittings

**AREA 09                    TUBULAR BOOM, FLY, & JIB**

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SM09-001-002.00    Repairing Damaged Tubular Booms, Flys, & Jibs

**AREA 17                    HYDRAULIC CRANE ATTACHMENT**

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SM17-001-014.00    Boom, R & I  
SM17-001-015.00    Four Section Boom, Recondition  
                                Manual Section Only, R & I  
                                Manual Section & Bottom Cylinder, R & I  
                                Retrieval Bracket Adjustment  
                                Hose Wheel Hose Replacement  
                                Hose Wheel Cable Replacement  
SM17-001-036.00    Hydraulic Boom Inspection  
SM17-002-009.00    Telescope Counterbalance Valve, Recondition  
SM17-002-014.00    Boom Telescope Cylinder, Recondition  
SM17-003-010.00    Boom Hoist Cylinders, R & I

SM17-003-013.00 Boom Hoist Cylinder, Recondition  
SM17-003-015.00 Boom Hoist Counterbalance Valve, Recondition  
SM17-003-016.00 Boom Hoist Counterbalance Valve, R & I

**AREA 18                      SPECIAL ATTACHMENTS**

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SM18-000-001.00 Capscrew Torques  
SM18-000-002.00 Bearing, Gear, Shaft, & Housing Inspection  
SM18-001-009.00 Boom Length/Angle Indicator Adjustment (Generation 1)  
SM18-001-011.00 Boom Angle Indicator Adjustment  
SM18-001-012.00 Boom Length/Angle Indicator Adjustment (Generation 2)  
SM18-007-001.00 Reeling Drum, R & I  
SM18-007-002.00 Reeling Drum, Recondition  
SM18-018-001.00 Air Conditioning Service Instructions

## How To Use This Manual, General Service Instructions, And Safety Procedures

The following information is provided to help guide the user of this manual. An explanation of how this manual is organized, as well as general information and safety considerations which should be understood when performing any service or maintenance procedure, is given. This information is general in nature and should supplement any of the specific procedures in this manual along with a constant awareness of safety and common sense.

### How To Use This Manual

This Service Manual is a collection of written procedures which are used to service and maintain a specific crane model. The index, which is called a "Keysheet", is used to organize the procedures within this manual and serve as a Table Of Contents as well. Each procedure, in this manual, is written so that it can stand alone and typically covers only one procedure. Procedures are given a numerical designation, or "SM Code" Number, (Example: SM01—005—034.00) which is unique to that procedure and that procedure only. The following is a listing of the general area definitions which are designated by the first digits in the SM Code Number sequence:

### General Area Descriptions

- SM01 — Rubber Tire Lower
- SM02 — Crawler Lower
- SM03 — Upper Revolving Frame & Machinery
- SM04 — Vertical Shafts
- SM05 — Horizontal Shafts
- SM06 — Upper Engine
- SM07 — Hydraulic Power Supply
- SM08 — Angle Boom
- SM09 — Tubular Boom
- SM10 — Tagline Winder
- SM11 — Fairleader
- SM12 — Shovel Attachment
- SM13 — Trench Hoe, Logger & Scraper Attachment & Prop Handler
- SM14 — Cab & House Assembly
- SM15 — Rotascope Attachment (Discontinued)
- SM16 — Wire Rope Requirements
- SM17 — Hydraulic Boom And Attachments
- SM18 — Special Attachments
- SM19 — Diesel Pile Hammer (Discontinued)
- SM20 — Tower, Climbing Assembly, Traveling Base & Gantry (Discontinued)
- SM21 — Log Skidder (Discontinued)
- SM22 — Hydraulic Hammer (Discontinued)

The procedures in this manual are collated by SM Code Number sequence. Use the Keysheet in the front of this manual, the general area descriptions shown previously, and the SM Code title shown on the

Keysheet to find the specific procedure required to service the crane.

Throughout this manual, reference is made to the left, right, front, and rear, pertaining to directions and locations. These reference directions are relative to the operator, sitting in the operator's seat, with the upper directly over the front of the carrier, unless otherwise stated. (Crawler mounted cranes: upper over the front of the crane with travel motors to the rear.)

Danger, warning, and caution captions as well as special notes are used throughout this manual and on the crane to emphasize important and critical instructions. **If any instruction, caution, warning, or danger labels, decals, or plates become lost, damaged, or unreadable, they must be replaced.** Information contained on such labels, decals, and plates is important and failure to follow the information they contain could result in an accident. Replacement labels, decals, and plates can be ordered through a Link-Belt Distributor. For the purpose of this manual, danger, warning, and caution captions and notes are defined as follows:



### DANGER

An operating procedure, practice, etc. which, if not correctly followed, may result in severe personal injury, dismemberment, or loss of life.



### WARNING

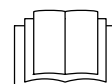
An operating procedure, practice, etc. which, if not correctly followed, may result in personal injury.

### CAUTION

An operating procedure, practice, etc. which, if not correctly followed, may result in damage to, or destruction of, equipment or property.

### NOTES

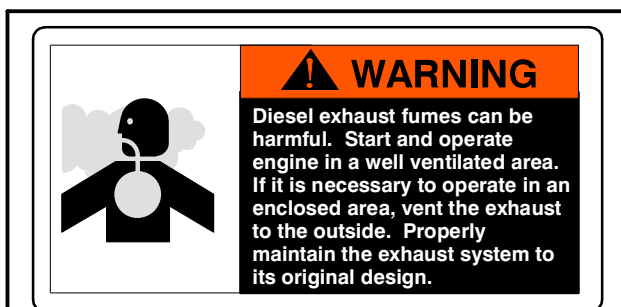
**Note:** An operating procedure step, condition, etc. which is essential in order for the process to be completed properly.



This symbol may appear in manuals or on a label on the crane to alert personnel that additional instructions are included in the crane Operator's Manual.



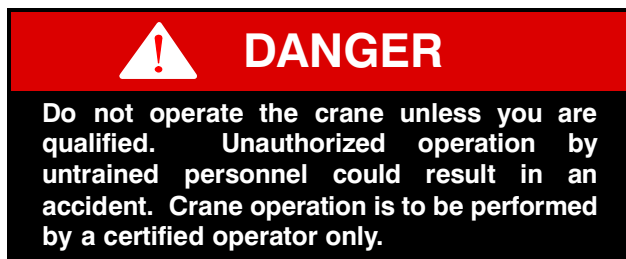
**Figure 1**  
Keep hands and tools clear of moving parts.



**Figure 2**  
Diesel Exhaust Fumes.

## Service Safety And Set Up Guidelines

The following is a list of safety and set up considerations which may apply to any service or maintenance procedure. Review the entire list and understand the type of things you must consider to perform a safe service procedure and then apply these guidelines to each specific service or maintenance procedure.



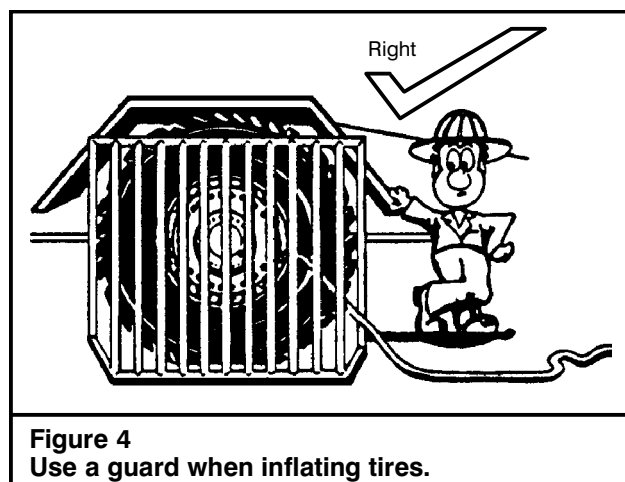
### Service Safety

1. Read and understand the service or maintenance procedure to be performed before beginning work. By reading the procedure ahead of time, you can be sure to have the replacement parts and tools on hand that are required to complete the job.
2. Wear protective gear to prevent injury; hard hat, safety glasses, gloves, steel toed shoes, etc.



**Figure 3**  
Pinch Point Label

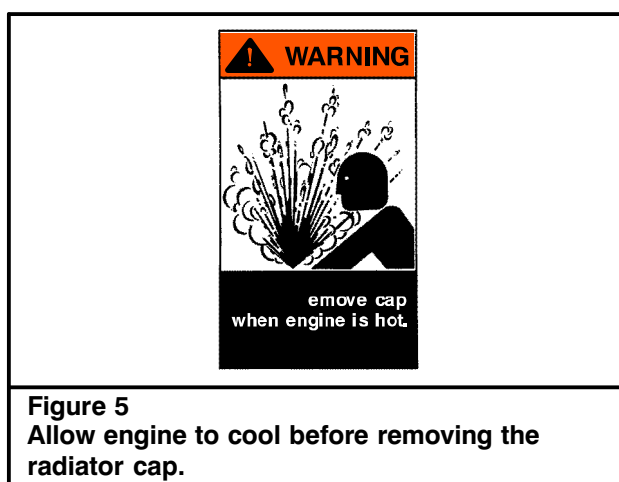
3. First aid supplies and a fire extinguisher should be on the job site to assist in an unexpected situation. The location of these items should be known to all as well as access to a telephone for emergencies.
4. Work in a clean, dry, firm, level area whenever possible. Choosing the correct work site can make a big difference on how well the job goes.
5. Use caution around flammable materials. Be aware of all the materials in the work area which are a threat. Also make others aware of volatile materials; post signs if necessary.
6. Release all trapped pressure in air and hydraulic circuits before disconnecting any line or component. Shutdown the crane, exhaust all pressure from the crane's air reservoir(s) and work the hydraulic control levers back and forth before servicing the crane.
7. Do not disconnect any hydraulic line from a crane which has its attachment in the air. Trapped pressure may be all that is suspending it. Disconnecting a line could release the trapped pressure, causing the attachment to fall. Lower the attachment to the ground or on to its rest before servicing the crane.
8. Do not work on a crane which is in motion. Fans, belts, gear trains, etc. can catch an unexpected person and quickly dismember them.
9. Do not climb on the attachment or other hard to reach areas. If the steps and/or ladders which are installed on the crane do not provide adequate access to the area of the crane which needs servicing, use a step ladder or other approved device.
10. Pinch points exist between the upper and lower frames. Death or dismemberment may result from personnel caught in these points. Learn where these pinch points are and stay clear of the rotating upper frame.



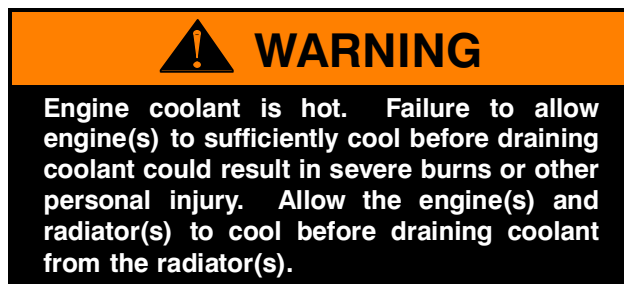
11. If working in a confined area, be sure to provide adequate ventilation when running the engine(s), using toxic solvents, welding, or any other operation which contaminates the fresh air supply.
12. Post a sign in the operator's cab to alert others that the crane is under service. Starting the crane while it is being serviced could severely injure someone. Crane damage could also occur if systems are operated prematurely. Imagine starting the engine(s) before the oil is replaced.
13. Secure access panels, doors, and machinery hoods when in the open position to ensure they do not fall or slam shut due to wind or accidental disruption.
14. Crane parts may be heavy. Always use an appropriate lifting device to support work. Do not attempt to lift an object without knowing its weight. Get help if necessary.
15. Always use a safety rim cage when inflating or deflating tires. Worn or misassembled parts can "explode" from the assembly causing serious injury. Use a safety rim cage, clip on air chuck, and stand aside when inflating or deflating tires.

## Crane Set Up And Disassembly

1. Properly park the crane as described in the Operator's Manual. Park the crane in an area which provides the most comfortable working conditions. However, do not park the crane where it will be an obstruction or an intrusion to traffic, coworkers, or to the public. Keep in mind that a major service procedure, or a repair part which requires a long lead time, could have the crane disabled for an extended period of time.
2. Keep in mind the mess which is sometimes caused by a crane under repair. Oil or other fluid leaks should be contained or prevented. Consider your responsibility of maintaining a safe clean work area and a healthy environment for all.

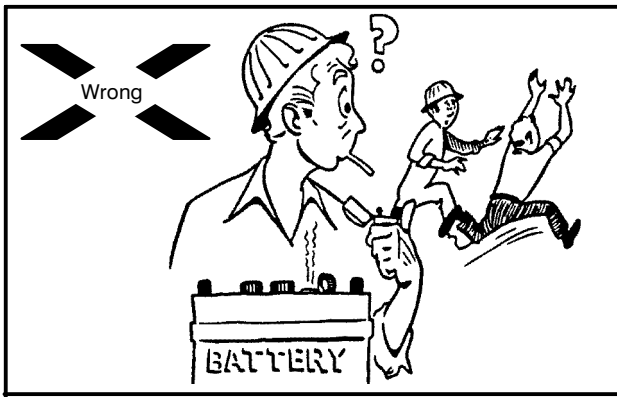


3. If the crane is equipped with outriggers, it may be safer as well as an advantage to raise and level the crane on outriggers to provide easier access to areas underneath. Do not work under a crane that is improperly supported.
4. Shutdown the engine(s) per the instructions given in the Operator's Manual.
5. Post a sign in the operator's cab to alert others that the crane is being serviced.
6. Engines, transmissions, hydraulic systems, etc. generate extreme heat during operation. Temperatures can reach levels which may cause serious burns. Allow the crane to cool before attempting to service it.



7. Pressure is generated inside the engine's cooling system due to the heat transfer process from the engine(s) to the radiator(s). Do not attempt to open or drain the radiator(s) until it/they has/have had sufficient time to cool. Disconnecting hoses before the engine(s) and radiator(s) has/have cooled is even more dangerous. Wait until the engine(s) and radiator(s) have cooled and then drain the radiator(s) before disconnecting any hoses. Properly store or dispose of used coolant.





**Figure 6**  
**Do not use an open flame near the battery.**

### **WARNING**

Solvents and cleaning solutions can be hazardous. Serious personal injury may result from misuse of these products. Read and follow all the manufacturer's recommendations concerning solvents and cleaning solutions.

8. Thoroughly clean the area of the crane which is to be serviced. Dirt or other contamination could enter the hydraulic, air, lubricating system, etc. and cause immediate and/or long term problems. Cleaning the service area not only prevents contamination problems but it also makes working on the crane easier and sometimes problems are more recognizable.
9. Before beginning any removal or disassembly procedure, take a moment to observe critical features of the assembly which may greatly simplify the installation or assembly process. Label electrical, hydraulic, air, or other connections. Index mark pump, motor, and valve sections. Lightly spray paint or count the threads of adjustment screws. Simple steps such as these can minimize the effort needed to put the crane back in service.

### **WARNING**

Hydraulic oil is under pressure and may be hot. A sudden release of hot oil could cause severe burns and/or other serious injury. Shutdown the engine(s) and exhaust all trapped hydraulic pressure from the system before removing any line or component.

10. Hydraulic systems, while operating, are under high pressure. Even after the crane is shutdown these pressures can remain trapped in the hydraulic lines and system components. Some hydraulic systems utilize an air pressurized reservoir which maintains pressure on the system after the crane is shutdown. It is critical that all residual pressure, which is trapped in the system, be neutralized before disconnecting any line or hydraulic component. Use the following techniques to exhaust trapped hydraulic pressure from the system:

- a. Lower the attachment to the boom rest, onto blocking, or onto the ground and shutdown the engine(s).
- b. Open the drain valves on the air system reservoir(s), if equipped, to bleed the air system pressure.
- c. Relieve any residual or precharge pressure by pushing the button on the pressure relief valve, on the hydraulic reservoir, if equipped. Otherwise, loosen the filler cap 1/4 turn.
- d. Turn the ignition switch to the **ON POSITION**, but **DO NOT START THE ENGINE**.
- e. Operate the steering control(s) back and forth repeatedly until steering becomes hard. (On cranes equipped with emergency steering system, it will take several rotations of steering wheel before steering becomes hard.)
- f. Work the crane control levers and outrigger switches, if equipped, back and forth several times.
- g. Turn ignition switch to the **OFF POSITION**.
- h. When pressure is fully relieved, close the drain valves on the air system reservoir(s), if equipped.

### **WARNING**

Air lines may contain high pressure. Opening lines and fittings before relieving air pressure may result in serious injury. Shutdown the engine(s) and drain the air system reservoir(s) before opening any line or fitting.

11. Air system circuits, like hydraulic circuits, contain high pressures also. Although the threat of a hot working fluid does not exist, highly pressurized lines and components can possibly "fly off" if lines are disconnected before the system pressure is relieved. Open the drain valve on the air system reservoir(s) to exhaust system pressure before working on the crane.





## WARNING

Use care not to cause sparks at the battery terminals while disconnecting or connecting the battery. Battery gasses are volatile and could be ignited by a spark or flame causing the battery to explode. Keep the area around the battery well ventilated and disconnect the negative side of the battery first, with the ignition switch “OFF”, to minimize hazard.

Battery posts, terminals, and related accessories contain lead and lead compounds. Eating or smoking with lead residue on hands may cause lead poisoning. Wash hands after handling lead products.

12. When working on electrical circuits, disconnect the battery to minimize shock, burn, spark, or other hazard. When disconnecting the battery, confirm that the ignition switch is in the “OFF” position. Disconnect the negative side of the battery first to minimize the potential for sparks at the battery. Battery gases which are exposed to such sparks, could cause an explosion. Likewise when connecting the battery, confirm that the ignition switch is in the “OFF” position and install the positive cable(s), first and the negative connection(s) last.
13. It is a good practice when disassembling hydraulic components to lay the parts out in the order that they were disassembled. Keeping the parts in this order during disassembly, cleaning, and inspection will aid in the assembly process.

## Welding

1. When making repairs which require welding, disconnect any electronic equipment (such as rated capacity limiters and engine computers) to prevent damage to them. Use the battery disconnect switch(es), if equipped.
2. Be aware of systems adjacent to areas being welded. Residual heat from the welding process could cause damage to other components. Heat may also vaporize materials which may become toxic or volatile.
3. Remove paint from areas to be welded to prevent toxic fumes.
4. The grounding connection should be within 3 feet (1 m) of the welded parts.
5. Connect the ground to the lower, if welding on the lower, or to the upper if welding on the upper. Electrical current through the turntable bearing could cause an arc which could damage it.

6. Do not position the ground connection where seals or bearing, as in transmissions or valves, will be between it and the welded parts.
7. Remove any flammable materials from the area.
8. Use the appropriate setting on the welder for the size of the welding operation. Do not use more than 200 Volts continuously.

## Cleaning And Inspection



## WARNING

Solvents and cleaning solutions can be hazardous. Serious personal injury may result from misuse of these products. Read and follow all the manufacturer's recommendations concerning solvents and cleaning solutions.

1. All components should be thoroughly cleaned with an approved cleaning solvent, air dried and carefully inspected for damage, wear and corrosion.
2. All Loctite® or other sealant residue should be removed from threads of hardware and parts that are going to be reused.
3. All “soft parts”, such as seals, gaskets, back up rings, and o-rings, should be replaced.
4. Replacement of bearings and bushings is generally a good preventive maintenance measure. Even though a bearing or bushing seems to be intact and is functioning properly, its life span is limited. Replacing a simple bearing or bushing while the opportunity is at hand could save a complete component failure later.
5. In the event of severe defects, contact factory personnel for directions whether to repair or replace any major component.

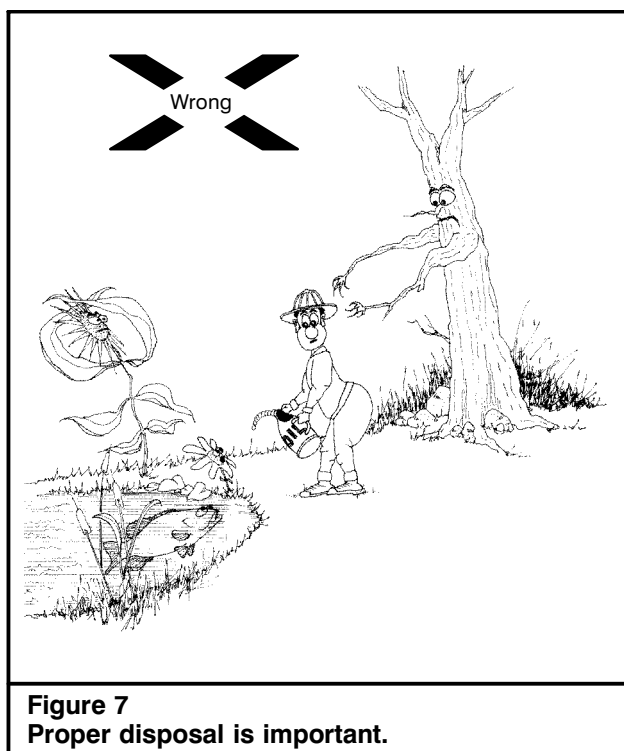
## Crane Assembly

1. Loosely assemble parts to ensure all parts are in place and fasteners started before beginning torquing procedure. Always use a cross torquing sequence to ensure even and uniform installation.



## WARNING

Lubricants, sealants, joint and thread locking compounds, etc. can be hazardous. Serious personal injury may result from misuse of these products. Read and follow all manufacturer's recommendations concerning these products.



2. Unless otherwise stated, torque all fasteners per the instructions given in SM Code Area 18—000.
3. When installing hydraulic hoses, lines, and fittings, use two wrenches to ensure the hoses and lines are not twisted. One wrench must be on the male fitting, the other wrench on the female fitting.
4. Unless otherwise stated, torque all hydraulic fittings per the instructions given in SM Code Area 07—018.
5. Check all fluid levels before returning the crane to service; hydraulic reservoir oil level, transmission fluid level, engine(s) oil level, etc. Add oil as required. See Operator's Manual and/or engine(s) manufacturer's manual(s) for correct type of fluids and procedures.
6. Always replace guards, grilles, and other types of protective shields. Also, be sure that any systems which were disconnected such as load indicating systems, anti-two block devices, control cables, etc. are functioning properly before returning the crane to service.
7. Start the appropriate engine and let it idle for five minutes. Inspect the connections on the hydraulic, air, transmission, etc. lines for leaks. Repair if needed.
8. Check that all hydraulic, air, and electrical functions are operating normally before returning the crane to service.
9. After crane is assembled, refer to the Operator's Manual for any periodic type of adjustments which may have been affected by the service procedure.
10. Properly dispose of any used oils, solvents, cleaners, etc.

### FRONT WHEEL AND BRAKE DRUM, R & I

#### WARNING

Brake Linings Contain Asbestos Fibers Which May Be Hazardous To Your Health. Caution Should Be Exercised In Handling And Maintenance As Described In OSHA Regulations.

#### Removal

1. Properly park the crane, level it on outriggers, and shutdown the engine.
2. If desired, remove the rim and tire assembly from the wheel. See SM Keysheet Area 1-69 for the correct procedure.

NOTE: The tire, rim, wheel, and brake drum may be removed as a unit, provided an adequate means of handling the assembly is available. This assembly weighs approximately 550 lbs (250 kg).

If wedge type brakes are used (Rockwell RDA Series) ignore Step 3.

Refer to Figure 1.

3. Depress the locking sleeve (2) on the slack adjuster (1) and back off the adjuster screw (3) to provide maximum clearance between the brake lining and drum.

Refer to Figure 2.

4. Remove the capscrews (19) and washers (18) which hold the hub cap (17) to the wheel (11). Remove the hub cap and clean off the old gasket (16).
5. Remove the cotter pin (7) from the spindle (8) and remove the adjusting nut (15).
6. Adequately support the wheel (11) and brake drum (1) assembly with an appropriate lifting device. The wheel and brake drum assembly weighs approximately 200 lbs (91 kg). If the tire, rim, wheel, and brake drum are being removed as a unit, this assembly weighs approximately 550 lbs (250 kg).
7. Pull the wheel (11) outward and remove the outer bearing cone (13) and thrust washer (14) from the spindle (8).
8. Carefully remove the wheel (11) and brake drum (1) assembly from the spindle (8). Use care not to damage the machined surfaces of the wheel and spindle.
9. Clean the old gasket (16) off the wheel (11) and remove the seal (6) and inner bearing cone (5).
10. If desired, remove the capscrews (3), washers (2,10) and nuts (9) to separate the wheel (11) from the brake drum (1).

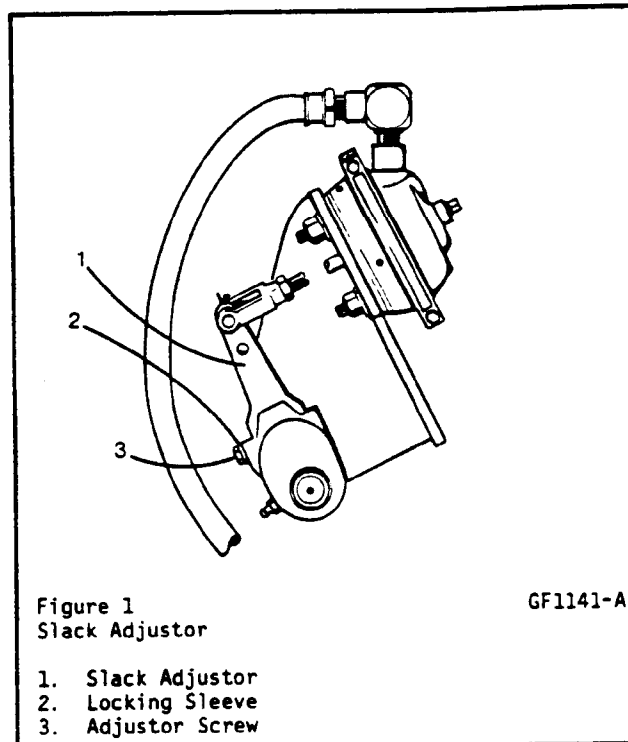


Figure 1  
Slack Adjuster

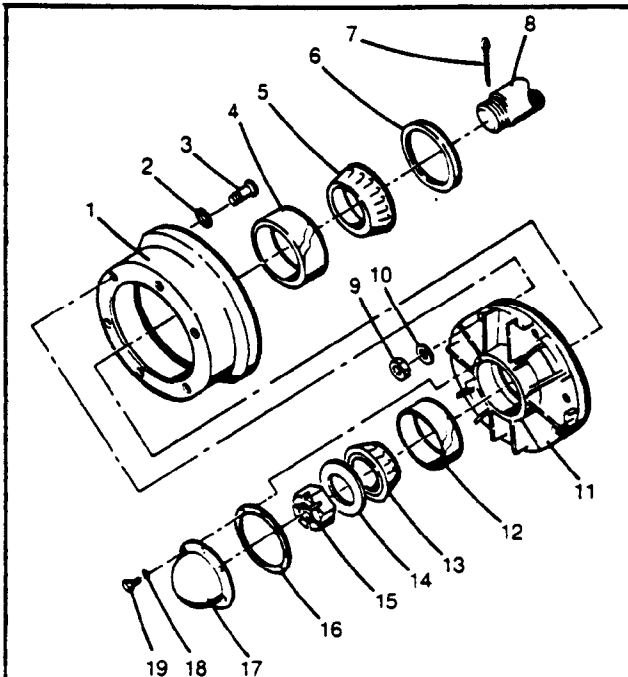
1. Slack Adjuster
2. Locking Sleeve
3. Adjuster Screw

11. If the inner and outer bearing cones (5,13) are being replaced, replace the inner and outer bearing cups (4,12) also. Use a shop press to remove the bearing cups.

#### Installation

Refer to Figure 2.

1. Thoroughly clean all parts in kerosene to remove dirt, oil, grease, and old gasket material. Inspect all parts for damage, wear, and corrosion and replace as required. Pack the inner and outer bearing cones (5,13) with grease. Refer to the Lubrication Chart for the correct type of grease.
2. If the inner and outer bearing cones (5,13) are being replaced, install new inner and outer bearing cups (4,12) in the wheel (11) using a shop press.
3. Install the brake drum (1) on the wheel (11) using the capscrews (3), washers (2,10) and nuts (9).
4. Install the inner bearing cone (5) and new seal (6) in the wheel (11).
5. Attach the wheel (11) and brake drum (1) assembly to an appropriate lifting device. The wheel and brake drum assembly weighs approximately 200 lbs (91 kg). If the tire, rim, wheel, and brake drum are being installed as a unit, this assembly weighs approximately 550 lbs (250 kg).
6. Carefully install the wheel (11) and brake drum (1) assembly on the spindle (8). Use care not to damage the seal (6) or machined surfaces of the wheel and spindle.



7. Install the outer bearing cone (13) and thrust washer (14) on the spindle (8).
8. Install the adjusting nut (15) on the spindle (8) and tighten it to 50 ft-lbs (68 Nm) while rotating the wheel (11) back and forth.
9. Back off the adjusting nut (15) 1/6 to 1/4 turn, to allow the wheel (11) to turn freely, and install the cotter pin (7).
10. Install the new gasket (16) and hub cap (17) on the wheel (11) using the capscrews (19) and washers (18).
11. If the rim and tire assembly was removed, see SM Keysheet Area 1-69 for the correct installation procedure.
12. Properly adjust the brakes. See SM Keysheet Area 1-3 for the correct procedure.

Figure 2  
Front Wheel Assembly

GD0841-A

1. Brake Drum
2. Washer
3. Capscrew
4. Inner Bearing Cup
5. Inner Bearing Cone
6. Seal
7. Cotter Pin
8. Spindle
9. Nut
10. Washer
11. Wheel\*
12. Outer Bearing Cup
13. Outer Bearing Cone
14. Thrust Washer
15. Adjusting Nut
16. Gasket
17. Hub Cap
18. Washer
19. Capscrew

\*Style Of Wheel May Vary.

FRONT AXLE, RECONDITION (ROCKWELL)

This SM Code covers front non-driving axles manufactured by Rockwell International Corporation. Cranes with serial numbers beginning with 57 or 63 use Rockwell Axle Model FL-951. Cranes with serial numbers beginning with 64 use Rockwell Axle Model FL-931. For complete disassembly and assembly instructions for these axles, use Rockwell's Field Maintenance Manual No. 2. A copy of this manual can be obtained by contacting FMC Corporation's Technical Publications Department in Lexington, Kentucky, or through Rockwell International Corporation.

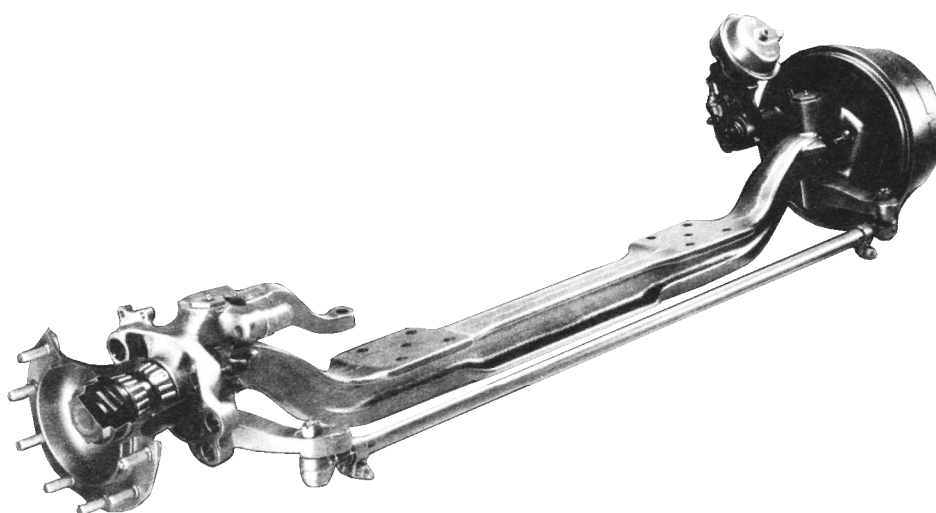




# Front Non-Drive Steering Axles

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## Maintenance Manual MM-99120



Supersedes Maintenance  
Manuals 2 and 2A:  
*Front Non-Drive Steering* and  
*Easy Steer Plus™ Front Axle*  
Includes Procedures for Tie  
Rod and Cross Tube Assembly  
and Maintenance

Models:  
Conventional Front  
Easy Steer Plus™ Front  
MFS Modular Front