Section-5 Hydraulic Unit

Section-13 Electrical System

Section-14 Tightening Torque Table

Section-5 Hydraulic Unit

Section-13 Electrical System

Section-14 Tightening Torque Table

HC−228H Series − Master Keysheet (Carrier, Third Drum, & Boom)
(C4L Prefix On Crane Serial Number)

AREA 00 GENERAL INFORMATION

AREA 01 RUBBER TIRE LOWER

SM01–027–103.00 Dual Air Brake Chamber, R & I
SM01–027–104.00 Lift Axle Brake Chamber, R & I
SM01–027–105.00 Front Axle Brake Chamber, R & I
SM01–028–002.00 Rear Wheel Hub & Brake Drum, R & I
SM01–028–003.00 Rear Wheel Hub & Brake Drum, R & I (Lift Axle)
SM01–029–013.00 Rear Axles & Suspension, R & I
SM01–029–014.00 Lift Axle, R & I
SM01–036–001.00 Selector Valve, Recondition
SM01–039–003.00 Hydraulic System Cleaning Procedure
SM01–043–020.00 Outrigger Beams Directional Valve, R & I
SM01–043–023.00 Outrigger Jacks Directional Valve, R & I
SM01–043–025.00 Outrigger Beams Directional Valve, Recondition
SM01–043–026.00 Outrigger Jacks Directional Valve, Recondition
SM01–043–027.00 Two Way Solenoid Valve, Recondition (Outrigger Removal)
SM01–043–028.00 Outrigger Removal Control Valve, R & I
SM01–044–003.00 Lock Valve, Recondition
SM01–044–007.00 Lock Valve, Recondition (Fifth Outrigger)
SM01–044–013.00 Lock Valve, R & I
SM01–044–015.00 Fifth Outrigger Lock Valve, R & I
SM01–045–036.00 Front & Rear Outrigger Beam Assembly, R & I
SM01–045–037.00 Outrigger Beam Cylinder, R & I
SM01–045–038.00 Outrigger Beam Cylinder, Recondition
SM01–046–012.00 Jack Cylinder, Recondition
SM01–046–016.00 Jack Cylinder, Recondition (Fifth Outrigger)
SM01–046–029.00 Jack Cylinder, R & I
SM01–046–031.00 Fifth Outrigger Jack Cylinder, R & I
SM01–047–013.00 Flow Control Valve, Recondition
SM01–063–092.00 Radiator Fan Clutch, Recondition
SM01–063–094.00 Radiator Fan Clutch, R & I
SM01–063–095.00 Radiator, R & I (Series 92)
SM01–063–096.00 Starter, R & I
SM01–063–097.00 Alternator, R & I
SM01–066–000.00 Electrical System Wire Identification Code
SM01–066–020.00 Carrier Electrical Schematic Diagram
SM01–069–011.00 Front Tire & Rim, R & I
SM01–069–012.00 Dual Rear Tires & Rims, R & I
SM01–071–001.00 Throttle Treadle Assembly, R & I
SM01–071–002.00 Throttle Treadle Assembly, Recondition
SM01–073–001.00 Electronic Gauges, Troubleshooting
SM01–079–005.00 Lower Hydraulic Components, R & I
SM01–079–007.00 Lower Hydraulic System Schematic Diagram
SM01–082–009.00 Front & Rear Pin Removal Cylinder, R & I
SM01–082–010.00 Pin Removal Cylinder, Recondition

AREA 03 UPPER REVOLVING FRAME

****

SM03–001–060.00 Upper Frame & Turntable Bearing, R & I

AREA 05 HORIZONTAL SHAFTS

****

SM05–005–013.00 Winch, Recondition (Third Drum – Generation 1)
SM05–005–016.00 Winch, Recondition (Third Drum – Generation 2)
SM05–005–017.00 Third Drum Winch, R & I

AREA 07 HYDRAULIC POWER SUPPLY

****

SM07–006–066.00 Hydraulic Motor, Recondition (Third Drum)
SM07–006–090.00 Third Drum Winch Motor, R & I
SM07–018–001.00 Hydraulic System Tube Fittings

AREA 09 TUBULAR BOOM, FLY, & JIB

****

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

AREA 18 SPECIAL ATTACHMENTS

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SM18–000–001.00 Capscrew Torques
SM18–000–002.00 Bearing, Gear, Shaft, & Housing Inspection

Notes:

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: ES01–01–0032.0R for HSC/SCM items or SM01–005–034.00 for LBCE items) 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 - HSC/SCM Items

ES00– Section – 0 General
ES01– Section – 1 Upper Mechanism
ES02– Section – 2 Lower Mechanism
ES03– Section – 3 Control System
ES04– Section – 4 Hydraulic System
ES05– Section – 5 Hydraulic Unit
ES06– Section – 6 Gantry
ES07– Section – 7 Crane Attachment
ES13– Section – 13 Electrical System
ES14– Section – 14 Tightening Torque Table

General Area Descriptions - LBCE Items

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 & Scrapper 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 lower, 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:

Figure 1
Keep hands and tools clear of moving parts.

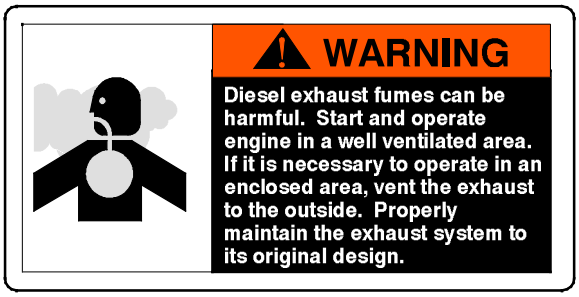


Figure 2
Diesel Exhaust Fumes.

DANGER

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

WARNING

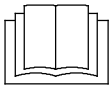
An operating procedure, practice, etc. which, if not correctly followed, may result in personal injury.

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.

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.

DANGER

Do not operate the crane unless you are qualified. Unauthorized operation by untrained personnel could result in an accident. Crane operation is to be performed by a certified operator only.

2. Wear protective gear to prevent injury; hard hat, safety glasses, mask, gloves, steel toed shoes, etc.
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.

Figure 3
Pinch Point Label

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 unexpecting 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 exists 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, always 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!

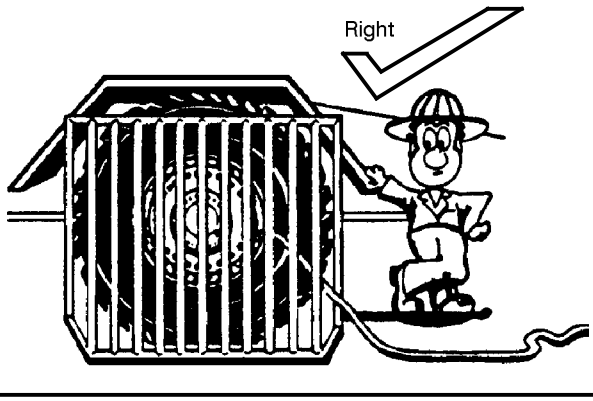


Figure 4
Use a guard when inflating tires.

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 better safety and 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.