CEAM030002

Operation & Maintenance Manual

930E-4

DUMP TRUCK

SERIAL NUMBERS **930E-4** **A31879 – A31880**
A31882 – A31883
A31892 – A31935

ENGINE **16V160**

It is our policy to improve our products whenever it is possible and practical to do so. We reserve the right to make changes or improvements at any time without incurring any obligation to install such changes on products sold previously.

Due to this continuous program of research and development, revisions may be made to this publication. It is recommended that customers contact their distributor for information on the latest revision.

Printed in U.S.A
Komatsu America Corp.

February 2017

INTRODUCTION

FOREWORD F.1-0000051238

This manual is written for use by the operator and/or the service technician and is designed to help these persons become fully knowledgeable of the truck and all its systems in order to keep it operating safely and efficiently.

All operators and maintenance personnel must read and understand the materials in this manual before operating the truck or performing maintenance and/or operational checks on the truck. All safety notices, warnings and cautions are to be understood and followed when operating or accomplishing repairs on the truck.

The illustrations used in this manual are typical of the component shown and may not be an exact reproduction of what is found on the truck.

A product identification plate is located on the frame in front of the right side front wheel and designates the truck model number, product identification number (vehicle serial number), and maximum GVW (Gross Vehicle Weight) rating.

The KOMATSU truck model designation consists of three numbers and one letter (i.e. 830E).

The three numbers represent the basic truck model.

The letter “M”, when present, designates a Mechanical drive system;

The letter “E”, when present, designates an Electrical wheel motor drive system.

The product identification number (vehicle serial number) contains information which will identify the original manufacturing bill of material for this unit. This complete number will be necessary for proper ordering of many service parts and/or warranty consideration.

The GVW is what determines the load on the drive train, frame, tires, and other components. The vehicle design and application guidelines are sensitive to the total maximum GVW. GVW is TOTAL WEIGHT: the Empty Vehicle Weight + the fuel & lubricants + the payload.

To determine allowable payload: Service all lubricants for proper level and fill fuel tank of empty truck (which includes all accessories, body liners, tailgates, etc.) and then weigh truck. Record this value and subtract from the GVW rating. The result is the allowable payload.

NOTE: *Accumulations of mud, frozen material, etc. become a part of the GVW and reduces allowable payload. To maximize payload and to keep from exceeding the GVW rating, these accumulations should be removed as often as practical.*

Exceeding the allowable payload will reduce expected life of truck components.

⚠ DANGER

- **Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read and understand this manual before operating or maintaining this machine.**
- **This manual should be kept in or near the machine for reference, and periodically reviewed by all personnel who will come into contact with it.**

ABOUT THIS MANUAL F.2-0000051237

This manual is written for use by the operator and/or the service technician. It is designed to help these persons learn how to operate the truck and its systems in order to keep it operating safely and efficiently. All operators and maintenance personnel must read and understand the materials in this manual before operating the truck or performing maintenance and/or operational checks on the truck. All safety notices, warnings, and cautions should be understood and followed when operating or performing repairs on the truck.

The front cover of this manual includes a form number. This form number should be referenced when ordering additional copies of this manual, or for any other correspondence regarding the coverage in this manual.

Direct all inquiries to:
Komatsu America Corp
Literature Services
100 Komatsu Dr.
Cartersville, GA 30121
United States of America
Phone: 678-721-3310
Email: KACTECHPUBS@KOMATSUNA.COM

If there is ever a question regarding the information in a particular section, refer to the manual form number, and use the address shown above to correspond.

The illustrations used in this manual are typical of the component shown and may not be an *exact* reproduction of what is found on the truck.

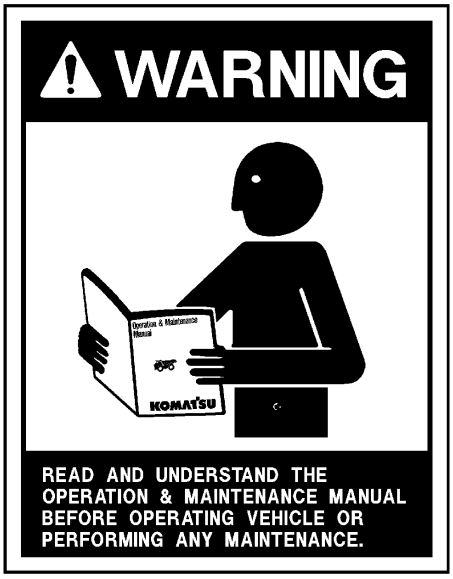
This manual shows dimensioning of U.S. standard and metric (SI) units throughout. All references to “right”, “left”, “front”, or “rear” are made with respect to the operator's normal seated position, unless specifically stated otherwise.

When assembly instructions are provided without references to torque values, standard torque values should be assumed. Standard torque requirements are shown in torque charts in the following section and in the General Information section of the truck service manual. Individual torques when provided in the text are in bold face type, such as **135 N·m (100 ft lb)**. All torque specifications have ±10% tolerance unless otherwise specified.

WARNINGS F.3-0000051687

It is the policy of the company to improve products whenever it is possible and practical to do so. The company reserves the right to make changes or add improvements at any time without incurring any obligation to install such changes on products sold previously.

Because of continuous research and development, periodic revisions may be made to this publication. Customers should contact their local Komatsu distributor for information on the latest revision.



DANGER

- **Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read and understand this manual before operating or maintaining this machine.**
- **This manual should be kept in or near the machine for reference, and periodically reviewed by all personnel who will come into contact with it.**

California Proposition 65 Warnings

WARNING

- **Diesel engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.**

WARNING

- **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Wash hands after handling.**

WARNING

- **Mercury and mercury compounds are known to the State of California to cause developmental problems. This machine may be equipped with optional HID lamps which contain mercury. There is no risk of exposure unless the lamps are broken. However, the lamps must be reused, recycled or properly disposed of in accordance with Local, State and Federal Laws at the end of their useful lives.**

ALERTS D.2-0000051268

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The ALERT symbol is used with the following signal words:

- DANGER
- WARNING
- CAUTION

This symbol is used to alert the reader of hazards that can arise from improper operating and maintenance practices.

⚠ DANGER

- **DANGER identifies a specific potential hazard WHICH WILL RESULT in either INJURY OR DEATH if proper precautions are not taken.**

⚠ WARNING

- **WARNING identifies a specific potential hazard WHICH COULD RESULT in either INJURY OR DEATH if proper precautions are not taken.**

⚠ CAUTION

- **CAUTION is used for general reminders of proper safety practices OR to direct the reader's attention to avoid unsafe or improper practices which may result in damage to the machine.**

TRUCK MODEL ILLUSTRATION A.2-0000072148

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NON-OEM PARTS IN CRITICAL SYSTEMS C.3-0000051235

For safety reasons, Komatsu America Corp. strongly recommends against the use of non-OEM replacement parts in critical systems of all Komatsu equipment. Critical systems include but are not limited to steering, braking and operator safety systems

Replacement parts manufactured and supplied by unauthorized sources may not be designed, manufactured or assembled to Komatsu's design specifications; accordingly, use of such parts may compromise the safe operation of Komatsu products and place the operator and others in danger should the part fail.

Komatsu is also aware of repair companies that will rework or modify an OEM part for reuse in critical systems. Komatsu does not generally authorize such repairs or modifications for the same reasons as noted above.

Use of non-OEM parts places full responsibility for the safe performance of the Komatsu product on the supplier and user. Komatsu will not in any case accept responsibility for the failure or performance of non-OEM parts in its products, including any damages or personal injury resulting from such use.

STANDARD CHARTS AND TABLES

⚠ WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

This safety section also contains precautions for optional equipment and attachments.

GENERAL INFORMATION E.2-0000051234

This manual provides dual dimensioning for many specifications. Metric units are specified first, with U.S. standard units in parentheses. When torque values are not specified in the assembly instructions contained in this manual, use the standard torque value for the hardware being used. Standard value torque tables are contained in this chapter for metric and SAE hardware.

This truck is assembled with both metric and SAE (U.S.) hardware. Reference the correct table when determining the proper torque value.

⚠ CAUTION

- **References throughout the manual to standard torques or other standard values will be to one of the following tables. Do not use standard values to replace specific torque values in assembly instructions.**

For values not shown in any of the charts or tables, standard conversion factors for most commonly used measurements are provided in the following tables.

Effect Of Special Lubricants

The Komatsu engineering department does not recommend the use of special friction-reducing lubricants, such as Copper Coat, Never-Seez®, and other similar products, on the threads of standard fasteners where standard torque values are applied. The use of special friction-reducing lubricants will significantly alter the clamping force being applied to fasteners during the tightening process.

If special friction-reducing lubricants are used with the standard torque values listed in this chapter, excessive stress and possible breakage of the fasteners may result.

Where the torque tables specify “Lubricated Threads” for the standard torque values listed, these standard torque values are to be used with simple lithium base chassis grease (multi-purpose EP NLGI) or a rust-preventive grease (see below) on the threads and seats unless specified otherwise.

NOTE: *Ensure the threads of fasteners and tapped holes are free of burrs and other imperfections before assembling.*

Suggested Sources For Rust Preventive Grease

NOTE: *This list represents the current engineering approved sources for use in Komatsu manufacture. It is not exclusive. Other products may meet the same specifications of this list.*

- American Anti-Rust Grease #3-X from Standard Oil Company (also American Oil Co.)
- Gulf NoRust #3 from Gulf Oil Company.
- Mobilarma 355, Product No. 66705 from Mobil Oil Corporation.
- Rust Ban 326 from Humble Oil Company.
- Rustolene B Grease from Sinclair Oil Co.
- Rust Preventive Grease - Code 312 from the Southwest Grease and Oil Company.

STANDARD TIGHTENING TORQUES F.6-0000051233

Class 10.9 Capscrews And Class 10 Nuts

The following specifications apply to required assembly torques for all metric class 10.9 finished hexagon head capscrews and class 10 nuts.

DO NOT lubricate capscrew threads and seats during assembly. These specifications are based on the following hardware:

- All capscrews
- All nuts
- All hardened washers being phosphate and oil coated

NOTE: *If zinc-plated hardware is used, each piece must be lubricated with simple lithium base chassis grease (multi-purpose EP NLGI) or a rust preventive grease (see list, this page) to achieve the same clamping forces provided below.*

NOTE: *Torques are calculated to give a clamping force of approximately 75% of proof load. The maximum torque tolerance shall be within ±10% of the torque value shown.*

In the following table under “Capscrew Size”, the first number represents the shank diameter (mm). The second number represents thread pitch in millimeters.

Example: M20 x 2.25
M20 = shank diameter (20 mm)
2.25 = thread pitch in millimeters

Table 2-1

Standard Tightening Torque for Metric Class 10.9 Capscrews & Class 10 Nuts

Capscrew Size	Torque N·m	Torque ft·lb	Torque kg·m
M6 x1	12	9	1.22
M8 x 1.25	30	22	3.06
M10 x 1.5	55	40	5.61
M12 x 1.75	95	70	9.69
M14 x 2	155	114	15.81
M16 x 2	240	177	24.48
M20 x 2.25	465	343	47.43
M24 x 3	800	590	81.6
M30 x 3.5	1600	1180	163.2
M36 x 4	2750	2028	280.5

SAE Grade 5 And Grade 8 Capscrews

The following specifications apply to required assembly torques for all grade 5 and grade 8 capscrews.

NOTE: *Capscrew threads and seats shall be lubricated when assembled. Unless instructions specifically recommend otherwise, these standard torque values are to be used with simple lithium base chassis grease (multi-purpose EP NLGI) or a rust-preventive grease (see list, previous page) on the threads.*

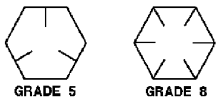
NOTE: *Torques are calculated to give a clamping force of approximately 75% of proof load. The maximum torque tolerance shall be within ±10% of the torque value shown.*

In the following table under Capscrew Size, the first number represents the shank diameter (in.). The second number represents threads per inch.

Example: 7/16 - 20
7/16 = shank diameter (7/16 inch (0.438 inch))
20 = threads per inch

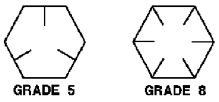
Table 2-2

Standard Tightening Torque for SAE Hex Head Capscrew And Nut Assembly



Cap-screw Size	Torque Grade 5			Torque Grade 8		
	N·m	ft·lb	kg·m	N·m	ft·lb	kg·m
1/4-20	9.5	7	0.97	13.6	10	1.38
1/4-28	10.8	8	1.11	14.9	11	1.52
5/16-18	20.3	15	2.07	28	21	2.90
5/16-24	22	16	2.21	30	22	3.04
3/8-16	34	25	3.46	47	35	4.84
3/8-24	41	30	4.15	54	40	5.5
7/16-14	54	40	5.5	79	58	8.0
7/16-20	61	45	6.2	84	62	8.57
1/2-13	88	65	9	122	90	12.4
1/2-20	95	70	9.7	129	95	13.1
9/16-12	122	90	12.4	169	125	17.3

Standard Tightening Torque for SAE Hex Head Capscrew And Nut Assembly



Cap-screw Size	Torque Grade 5			Torque Grade 8		
	N·m	ft·lb	kg·m	N·m	ft·lb	kg·m
9/16-18	129	95	13.1	183	135	18.7
5/8-11	169	125	17.3	237	175	24.2
5/8-18	183	135	18.7	258	190	26.2
3/4-10	298	220	30.4	420	310	42.8
3/4-16	319	235	32.5	454	335	46.3
7/8-9	475	350	48.4	678	500	69.2
7/8-14	508	375	51.9	719	530	73.3
1.0-8	712	525	72.6	1017	750	103.7
1.0-12	759	560	77.4	1071	790	109.3
1.0-14	773	570	78.8	1085	800	110.6
1 1/8-7	881	650	89.9	1424	1050	145
1 1/8-12	949	700	96.8	1546	1140	158
1 1/4-7	1234	910	125.9	2007	1480	205
1 1/4-12	1322	975	134.8	2142	1580	219
1 3/8-6	1627	1200	166	2630	1940	268
1 3/8-12	1776	1310	181	2874	2120	293
1 1/2-6	2142	1580	219	3471	2560	354
1 1/2-12	2305	1700	235	3756	2770	383

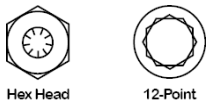
SAE Grade 9 Capscrews

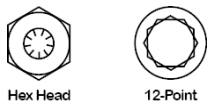
The following specifications apply to required assembly torques for SAE Hex Head and 12-point, grade 9 (170,000 psi minimum tensile), capscrews.

NOTE: *Capscrew threads and seats shall be lubricated when assembled. Unless instructions specifically recommend otherwise, these standard torque values are to be used with simple lithium base chassis grease (multi-purpose EP NLGI) or a rust-preventive grease (see list, this page) on the threads.*

NOTE: *Torques are calculated to give a clamping force of approximately 75% of proof load. The maximum torque tolerance shall be within ±10% of the torque value shown.*

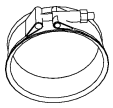
Table 2-3

Standard Tightening Torque for SAE Hex Head and 12-Point, Grade 9 Capscrews			
			
Capscrew Size [1]	**Torque N·m**	**Torque ft·lb**	**Torque kg·m**
0.250 - 20	16	12	1.7
0.312 - 18	33	24	3.3
0.375 - 16	57	42	5.8
0.438 -14	95	70	9.7
0.500 -13	142	105	14.5
0.562 - 12	203	150	20.7
0.625 - 11	278	205	28.3
0.750 - 10	488	360	49.7
0.875 - 9	780	575	79.4
1.000 - 8	1166	860	119
1.000 - 12	1240	915	126
1.125 - 7	1670	1230	170

Standard Tightening Torque for SAE Hex Head and 12-Point, Grade 9 Capscrews			
			
Capscrew Size [1]	**Torque N·m**	**Torque ft·lb**	**Torque kg·m**
1.125 - 12	1800	1330	184
1.250 - 7	2325	1715	237
1.250 - 12	2495	1840	254
1.375 - 6	3080	2270	313
1.375 - 12	3355	2475	342
1.500 - 6	4040	2980	411
1.500 - 12	4375	3225	445

T-Bolt Clamps

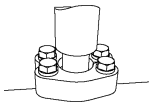
Table 2-4

Tightening Torque For T-Bolt Type Hose Clamp (SAE J1508 Type TB)			
			
Thread Size	**Band Width**	**Newton meters (N·m)**	**Inch Pounds (in·lb)**
0.25-28 UNF	19.05 mm (0.75 in.)	8.5 ± 0.6	75 ± 5

1. Shank Diameter (in) — Threads per inch

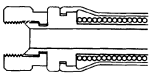
Split Flange Clamps

Table 2-5

Tightening Torque For Split Flange Clamp Bolts				
				
Capscrew Thread Diameter (mm)	**Width Across Flat (mm)**	**Newton meters (N·m) ± 10%**	**Foot Pounds (ft·lb) ± 10%**	**Kilogram meters (kg·m) ± 10%**
10	14	66	48	6.7
12	17	112	83	11.5
16	22	279	206	28.5

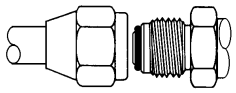
Flared Tube And Hose Fittings

Table 2-6

Tightening Torque For Flared Tube And Hose Fittings				
				
Thread Diameter of Nut (mm)	**Width Across Flat (mm)**	**Newton meters (N·m) ± 10%**	**Foot Pounds (ft·lb) ± 10%**	**Kilogram meters (kg·m) ± 10%**
14	19	25	18	2.5
18	24	50	36	5
22	27	80	58	8
24	32	140	101	14
30	36	175	130	18
33	41	195	145	20
36	46	245	180	25
42	55	295	215	30

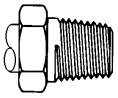
JIC 37° Swivel Nuts

Table 2-7

Torque Chart For JIC 37° Swivel Nuts With Or Without O-ring Seals				
				
Size Code	**Tube Size (OD)**	**Threads UNF-2B**	**Newton meters (N·m)**	**Foot Pounds (ft·lb)**
– 2	0.125	0.312 – 24	5 ± 1	4 ± 1
– 3	0.188	0.375 – 24	11 ± 4	8 ± 3
– 4	0.250	0.438 – 20	16 ± 4	12 ± 3
– 5	0.312	0.500 – 20	20 ± 4	15 ± 3
– 6	0.375	0.562 – 18	24 ± 7	18 ± 5
– 8	0.500	0.750 – 16	40 ± 7	30 ± 5
– 10	0.625	0.875 – 14	54 ± 7	40 ± 5
– 12	0.750	1.062 – 12	75 ± 7	55 ± 5
– 14	0.875	1.188 – 12	88 ± 7	65 ± 5
– 16	1.000	1.312 – 12	108 ± 7	80 ± 5
– 20	1.250	1.625 – 12	136 ± 14	100 ± 10
– 24	1.500	1.875 – 12	163 ± 14	120 ± 10
– 32	2.000	2.500 – 12	312 ± 27	230 ± 20

Pipe Thread Fittings

Table 2-8

Torque Chart For Pipe Thread Fittings					
					
Size Code	**Pipe Thread Size**	**With Sealant N·m**	**With Sealant ft·lb**	**Without Sealant N·m**	**Without Sealant ft·lb**
– 2	0.125 – 27	20 ± 4	15 ±3	27 ± 7	20 ± 5
– 4	0.250 – 18	27 ± 7	20 ±5	34 ± 7	25 ± 5
– 6	0.375 – 18	34 ± 7	25 ±5	48 ± 7	35 ± 5
– 8	0.500 – 14	48 ± 7	35 ±5	61 ± 7	45 ± 5
– 12	0.750 – 14	61 ± 7	45 ±5	75 ± 7	55 ± 5
– 16	1.000 – 11.50	75 ± 7	55 ±5	88 ± 7	65 ± 5
– 20	1.250 – 11.50	95 ± 7	70 ±5	108 ± 7	80 ± 5
– 24	1.500 – 11.50	108 ± 7	80 ±5	129 ± 14	95 ± 10
– 32	2.000 – 11.50	129 ± 14	95 ±10	163 ± 14	120 ± 10

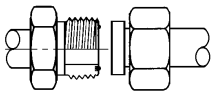
O-Ring Boss Fittings

Table 2-9

Torque Chart For O-ring Boss Fittings				
				
Size Code	**Tube Size (OD)**	**Threads UNF-2B**	**Newton meters (N·m)**	**Foot Pounds (ft·lb)**
– 2	0.125	0.312 – 24	4 ± 3	4 ± 2
– 3	0.188	0.375 – 24	7 ± 3	5 ± 2
– 4	0.250	0.438 – 20	11 ± 4	8 ± 3
– 5	0.312	0.500 – 20	14 ± 4	10 ± 3
– 6	0.375	0.562 – 18	18 ± 4	13 ± 3
– 8	0.500	0.750 – 16	33 ± 7	24 ± 5
– 10	0.625	0.875 – 14	43 ± 7	32 ± 5
– 12	0.750	1.062 – 12	65 ± 7	48 ± 5
– 14	0.875	1.188 – 12	73 ± 7	54 ± 5
– 16	1.000	1.312 – 12	98 ± 7	72 ± 5
– 20	1.250	1.625 – 12	109 ± 7	80 ± 5
– 24	1.500	1.875 – 12	109 ± 7	80 ± 5
– 32	2.000	2.500 – 12	130 ± 14	96 ± 10

O-Ring Face Seal Fittings

Table 2-10

Torque Chart For O-ring Face Seal Fittings				
				
Size Code	**Tube Size (O.D.)**	**Threads UNF-2B**	**Newton meters (N·m)**	**Foot Pounds (ft·lb)**
– 4	0.250	0.438 – 20	15 ± 1	11 ± 1
– 6	0.375	0.562 – 18	24 ± 3	18 ± 2
– 8	0.500	0.750 – 16	48 ± 5	35 ± 4
– 10	0.625	0.875 – 14	69 ± 7	51 ± 5
– 12	0.750	1.062 – 12	96 ± 10	71 ± 7
– 16	1.000	1.312 – 12	133 ± 8	98 ± 6
– 20	1.250	1.625 – 12	179 ± 10	132 ± 7
– 24	1.500	1.875 – 12	224 ± 20	165 ± 15