SHOP MANUAL

KOMATSU

D475A-5

MACHINE MODEL	SERIAL No.
D475A-5	**20001 and up**

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require. Materials and specifications are subject to change without notice.
- D475A-5 mount the SDA12V140E-1 engine.
  For details of the engine, see the 12V140-1 Series Engine Shop Manual.

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Pages having no marks are those previously revised or made additions.

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	20-613	(1)		20-653	(6)		20-717	(6)		20-757	(1)		20-921	(6)
	20-614	(6)		20-654	(1)		20-718	(1)		20-758	(1)		20-922	(1)

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				30-33	(6)		30-73	(2)		30-109	(2)		30-149	(6)
				30-34	(6)		30-74	(2)		30-110	(2)		30-150	(6)
	30-1	(6)		30-35	(2)	●	30-75	(10)		30-111	(2)		30-150-1	(6)
	30-2	(6)		30-36	(5)		30-76	(8)		30-112	(6)		30-151	(6)
	30-3	(2)		30-37	(6)		30-77	(8)		30-113	(2)		30-152	(6)
	30-4	(2)		30-38	(2)		30-78	(8)		30-114	(2)		30-153	(6)
	30-5	(2)		30-39	(2)		30-79	(8)		30-115	(2)		30-154	(5)
	30-6	(2)		30-40	(6)		30-80	(8)		30-116	(2)		30-155	(2)
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	30-9	(2)		30-43	(6)		30-80-3	(8)		30-119	(6)		30-158	(2)
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	30-26	(2)		30-67	(6)		30-103	(6)		30-143	(2)		30-182	(2)
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	30-192	(2)		90-21										
	30-193	(2)		90-23										
	30-194	(2)		90-25										
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SAFETY

SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for safe machine operation. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe. Some of these techniques require the use of tools specially designed by Komatsu for the specific purpose.

To prevent injury to workers, the symbol ⚠ is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, hand shield, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making any repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
    Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
    Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
13. Before starting work, remove the leads from the battery. Always remove the lead from the negative (–) terminal first.
14. When raising heavy components, use a hoist or crane.
    Check that the wire rope, chains and hooks are free from damage.
    Always use lifting equipment which has ample capacity.
    Install the lifting equipment at the correct places.
    Use a hoist or crane and operate slowly to prevent the component from hitting any other part.
    Do not work with any part still raised by the hoist or crane.
15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
16. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.
17. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.
18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.
19. Be sure to assemble all parts again in their original places.
    Replace any damaged parts with new parts.
    - When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly installed.
21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
24. Take care when removing or installing the tracks of track-type machines.
    When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

FOREWORD
GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following chapters; these chapters are further divided into the each main group of components.

STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.
In addition, this section may contain hydraulic circuit diagrams, electric circuit diagrams, and maintenance standards.

TESTING AND ADJUSTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs.
Troubleshooting charts correlating "Problems" with "Causes" are also included in this section.

DISASSEMBLY AND ASSEMBLY

This section explains the procedures for removing, installing, disassembling and assembling each component, as well as precautions for them.

MAINTENANCE STANDARD

This section gives the judgment standards for inspection of disassembled parts.
The contents of this section may be described in STRUCTURE AND FUNCTION.

OTHERS

This section mainly gives hydraulic circuit diagrams and electric circuit diagrams.
In addition, this section may give the specifications of attachments and options together.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Use the specifications given in the book with the latest date.

HOW TO READ THE SHOP MANUAL

VOLUMES

Shop manuals are issued as a guide to carrying out repairs. They are divided as follows:

Chassis volume: Issued for every machine model
Engine volume: Issued for each engine series
Electrical volume:
Attachments volume: } Each issued as one volume to cover all models

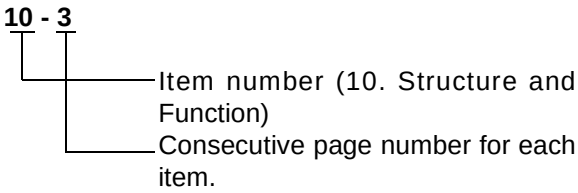
These various volumes are designed to avoid duplicating the same information. Therefore, to deal with all repairs for any model , it is necessary that chassis, engine, electrical and attachment volumes be available.

DISTRIBUTION AND UPDATING

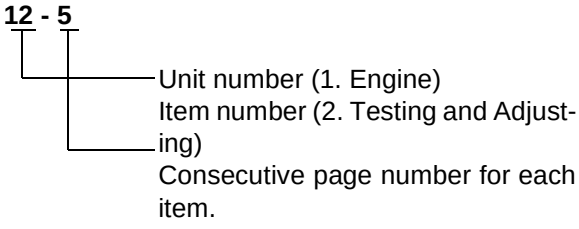
Any additions, amendments or other changes will be sent to KOMATSU distributors. Get the most up-to-date information before you start any work.

FILING METHOD

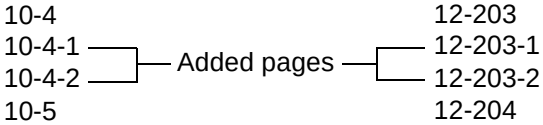
1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number.
   Example 1 (Chassis volume):



   Example 2 (Engine volume):



3. Additional pages: Additional pages are indicated by a hyphen (-) and number after the page number. File as in the example.
   Example:



REVISED EDITION MARK

When a manual is revised, an edition mark ((1)(2)(3)....) is recorded on the bottom of the pages.

REVISIONS

Revised pages are shown in the LIST OF REVISED PAGES next to the CONTENTS page.

SYMBOLS

So that the shop manual can be of ample practical use, important safety and quality portions are marked with the following symbols.

Symbol	Item	Remarks
⚠	Safety	Special safety precautions are necessary when performing the work.
★	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts of systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
	Tightening torque	Places that require special attention for the tightening torque during assembly.
	Coat	Places to be coated with adhesives and lubricants, etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

HOISTING INSTRUCTIONS

HOISTING

⚠ Heavy parts (25 kg or more) must be lifted with a hoist, etc. In the **DISASSEMBLY AND ASSEMBLY** section, every part weighing 25 kg or more is indicated clearly with the symbol

- If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:
  1) Check for removal of all bolts fastening the part to the relative parts.
  2) Check for existence of another part causing interference with the part to be removed.

WIRE ROPES

1) Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

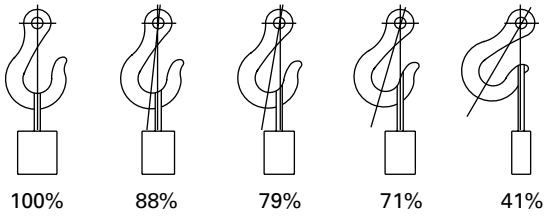
Wire ropes
(Standard "Z" or "S" twist ropes
without galvanizing)

Rope diameter	Allowable load	
mm	kN	tons
10	9.8	1.0
11.5	13.7	1.4
12.5	15.7	1.6
14	21.6	2.2
16	27.5	2.8
18	35.3	3.6
20	43.1	4.4
22.4	54.9	5.6
30	98.1	10.0
40	176.5	18.0
50	274.6	28.0
60	392.2	40.0

★ The allowable load value is estimated to be one-sixth or one-seventh of the breaking strength of the rope used.

2) Sling wire ropes from the middle portion of the hook.

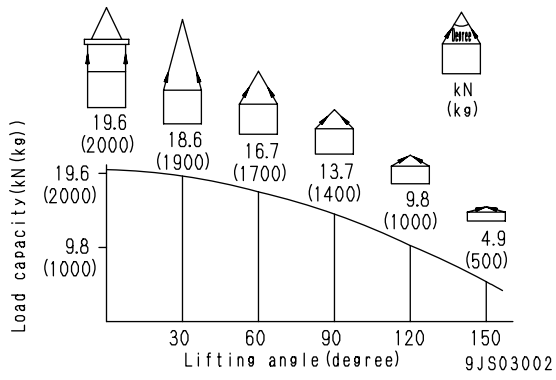
Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound onto the load.

⚠ Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.

4) Do not sling a heavy load with ropes forming a wide hanging angle from the hook.
When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles. The table below shows the variation of allowable load kN {kg} when hoisting is made with two ropes, each of which is allowed to sling up to 9.8 kN {1000 kg} vertically, at various hanging angles.
When two ropes sling a load vertically, up to 19.6 kN {2000 kg} of total weight can be suspended. This weight becomes 9.8 kN {1000 kg} when two ropes make a 120° hanging angle. On the other hand, two ropes are subjected to an excessive force as large as 39.2 kN {4000 kg} if they sling a 19.6 kN {2000 kg} load at a lifting angle of 150°.



METHOD OF DISASSEMBLING, CONNECTING PUSH-PULL TYPE COUPLER

⚠ Before carrying out the following work, release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

⚠ Even if the residual pressure is released from the hydraulic tank, some hydraulic oil flows out when the hose is disconnected. Accordingly, prepare an oil receiving container.

Disconnection

1) Release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

2) Hold adapter (1) and push hose joint (2) into mating adapter (3). (See Fig. 1)
   - ★ The adapter can be pushed in about 3.5 mm.
   - ★ Do not hold rubber cap portion (4).

3) After hose joint (2) is pushed into adapter (3), press rubber cap portion (4) against (3) until it clicks. (See Fig. 2)

4) Hold hose adapter (1) or hose (5) and pull it out. (See Fig. 3)
   - ★ Since some hydraulic oil flows out, prepare an oil receiving container.

Connection

1) Hold hose adapter (1) or hose (5) and insert it in mating adapter (3), aligning them with each other. (See Fig. 4)
   - ★ Do not hold rubber cap portion (4).

2) After inserting the hose in the mating adapter perfectly, pull it back to check its connecting condition. (See Fig. 5)
   - ★ When the hose is pulled back, the rubber cap portion moves toward the hose about 3.5 mm. This does not indicate abnormality, however.

Type 1

Fig. 1

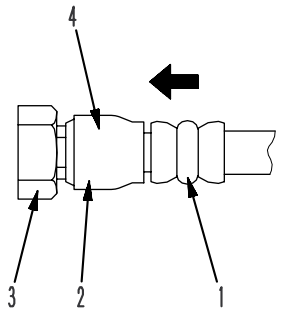


Fig. 2

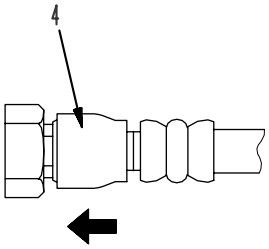


Fig. 3

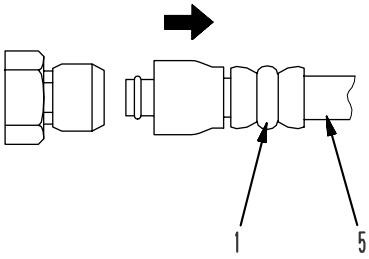


Fig. 4

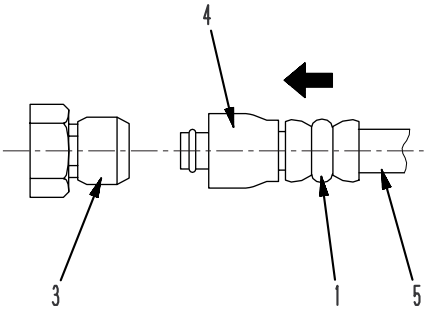
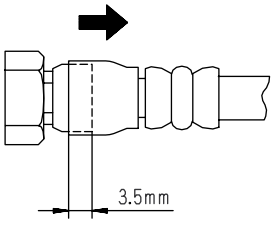


Fig. 5



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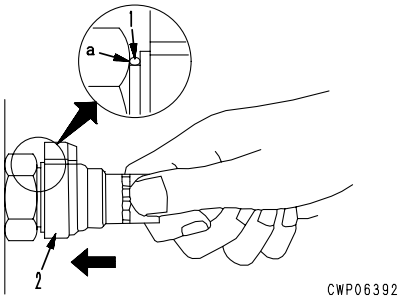
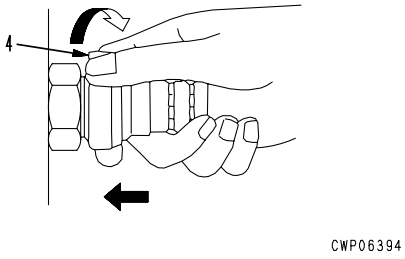
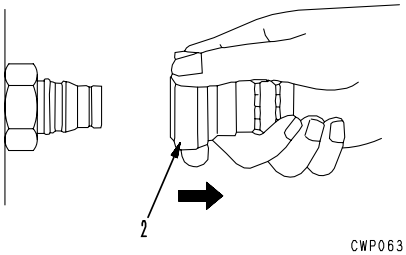
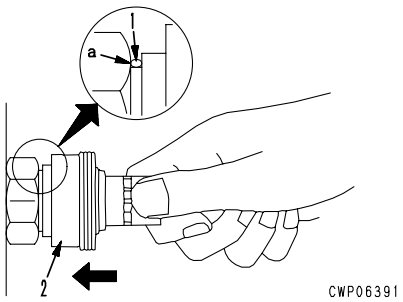
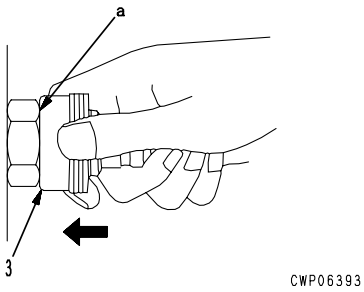
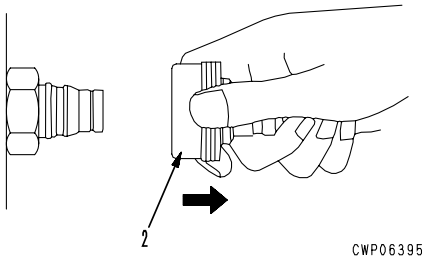
<table>
<tr><th></th><th>Type 2</th><th>Type 3</th></tr>
<tr><td>Disassembly</td><td>
1) Hold the mouthpiece of the tightening portion and push body (2) in straight until sliding prevention ring (1) contacts contact surface a of the hexagonal portion at the male end.


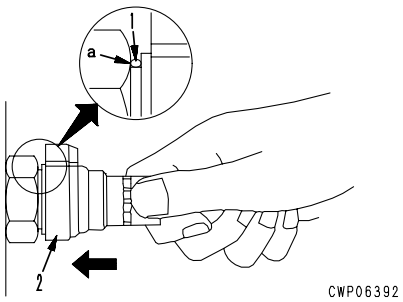
2) Hold in the condition in Step 1), and turn lever (4) to the right (clockwise).


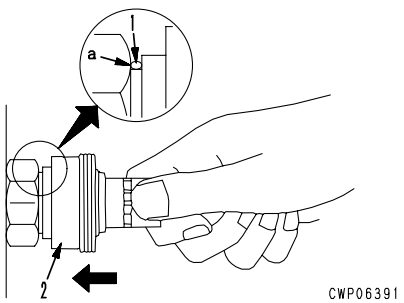
3) Hold in the condition in Steps 1) and 2), and pull out whole body (2) to disconnect it.


</td><td>
1) Hold the mouthpiece of the tightening portion and push body (2) in straight until sliding prevention ring (1) contacts contact surface a of the hexagonal portion at the male end.


2) Hold in the condition in Step 1), and push until cover (3) contacts contact surface a of the hexagonal portion at the male end.


3) Hold in the condition in Steps 1) and 2), and pull out whole body (2) to disconnect it.


</td></tr>
<tr><td>Connection</td><td>
• Hold the mouthpiece of the tightening portion and push body (2) in straight until sliding prevention ring (1) contacts contact surface a of the hexagonal portion at the male end to connect it.


</td><td>
• Hold the mouthpiece of the tightening portion and push body (2) in straight until sliding prevention ring (1) contacts contact surface a of the hexagonal portion at the male end to connect it.


</td></tr>
</table>

COATING MATERIALS

★ The recommended coating materials such as adhesives, gasket sealants and greases used for disassembly and assembly are listed below.
★ For coating materials not listed below, use the equivalent of products shown in this list.

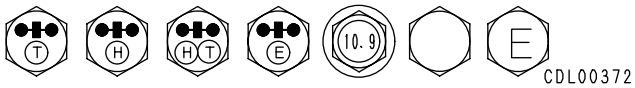
Category	Komatsu code	Part No.	Q'ty	Container	Main applications, features
Adhesives	LT-1A	790-129-9030	150 g	Tube	• Used to prevent rubber gaskets, rubber cushions, and cock plug from coming out.
	LT-1B	790-129-9050	20 g (2 pcs.)	Polyethylene container	• Used in places requiring an immediately effective, strong adhesive. Used for plastics (except polyethylene, polyprophylene, tetrafluoroethlene and vinyl chloride), rubber, metal and non-metal.
	LT-2	09940-00030	50 g	Polyethylene container	• Features: Resistance to heat and chemicals • Used for anti-loosening and sealant purpose for bolts and plugs.
	LT-3	790-129-9060 (Set of adhesive and hardening agent)	Adhesive: 1 kg Hardening agent: 500 g	Can	• Used as adhesive or sealant for metal, glass and plastic.
	LT-4	790-129-9040	250 g	Polyethylene container	• Used as sealant for machined holes.
	Holtz MH 705	790-126-9120	75 g	Tube	• Used as heat-resisting sealant for repairing engine.
	Three bond 1735	790-129-9140	50 g	Polyethylene container	• Quick hardening type adhesive • Cure time: within 5 sec. to 3 min. • Used mainly for adhesion of metals, rubbers, plastics and woods.
	Aron-alpha 201	790-129-9130	2 g	Polyethylene container	• Quick hardening type adhesive • Quick cure type (max. strength after 30 minutes) • Used mainly for adhesion of rubbers, plastics and metals.
	Loctite 648-50	79A-129-9110	50 cc	Polyethylene container	• Resistance to heat, chemicals • Used at joint portions subject to high temperatures.
Gasket sealant	LG-1	790-129-9010	200 g	Tube	• Used as adhesive or sealant for gaskets and packing of power train case, etc.
	LG-5	790-129-9080	1 kg	Can	• Used as sealant for various threads, pipe joints, flanges. • Used as sealant for tapered plugs, elbows, nipples of hydraulic piping.
	LG-6	790-129-9020	200 g	Tube	• Features: Silicon based, resistance to heat, cold • Used as sealant for flange surface, tread. • Used as sealant for oil pan, final drive case, etc.
	LG-7	790-129-9070	1 kg	Tube	• Features: Silicon based, quick hardening type • Used as sealant for flywheel housing, intake manifold, oil pan, thermostat housing, etc.
	Three bond 1211	790-129-9090	100 g	Tube	• Used as heat-resisting sealant for repairing engine.
	Three bond 1207B	419-15-18131	100 g	Tube	• Features: Silicone type, heat resistant, vibration resistant, and impact resistant sealing material • Used as sealing material for transfer case

Category	Komatsu code	Part No.	Q'ty	Container	Main applications, features
Molybdenum disulphide lubricant	LM-G	09940-00051	60 g	Can	• Used as lubricant for sliding portion (to prevent from squeaking).
	LM-P	09940-00040	200 g	Tube	• Used to prevent seizure or scuffling of the thread when press fitting or shrink fitting. • Used as lubricant for linkage, bearings, etc.
Grease	G2-LI	SYG2-400LI SYG2-350LI SYG2-400LI-A SYG2-160LI SYGA-160CNLI	Various	Various	• General purpose type
	G2-CA	SYG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYGA-160CNCA	Various	Various	• Used for normal temperature, light load bearing at places in contact with water or steam.
	Molybdenum disulphide grease LM-G (G2-M)	SYG2-400M SYG2-400M-A SYGA-16CNM	400 g × 10 400 g × 20 16 kg	Bellows type Bellows type Can	• Used for heavy load portion
	Hyper White Grease G2-T G0-T (*) *: For use in cold district	SYG2-400T-A SYG2-16CNT SYG0-400T-A (*) SYG0-16CNT (*)	400 g 16 kg	Bellows type Can	• Seizure resistance and heat resistance higher than molybdenum disulfide grease • Since this grease is white, it does not stand out against machine body.
	Biogrease G2B G2-BT (*) *: For high temperature and large load	SYG2-400B SYGA-16CNB SYG2-400BT (*) SYGA-16CNBT (*)	400 g 16 kg	Bellows type Can	• Since this grease is decomposed by bacteria in short period, it has less effects on microorganisms, animals, and plants.
Primer	SUNSTAR PAINT PRIMER 580 SUPER	417-926-3910	20 ml	Glass container	Adhesive for cab glass • Used as primer for cab side (Using limit: 4 months)
	SUNSTAR GLASS PRIMER 580 SUPER		20 ml	Glass container	Adhesive for cab glass • Used as primer for glass side (Using limit: 4 months)
	SUNSTAR PAINT PRIMER 435-95	22M-54-27230	20 ml	Glass container	Adhesive for cab glass • Used as primer for painted surface on cab side (Using limit: 4 months)
	SUNSTAR GLASS PRIMER 435-41	22M-54-27240	150 ml	Can	Adhesive for cab glass • Used as primer for black ceramic-coated surface on glass side and for hard polycarbonate-coated surface (Using limit: 4 months)
	SUNSTAR SASH PRIMER GP-402	22M-54-27250	20 ml	Glass container	Adhesive for cab glass • Used as primer for sash (Alumite). (Using limit: 4 months)
Adhesive	SUNSTAR PENGUINE SUPER 560	22M-54-27210	320 ml	Ecocart (Special container)	Adhesive for cab glass • Used as adhesive for glass. (Using limit: 6 months)
	SUNSTAR PENGUINE SEAL 580 SUPER "S" or "W"	417-926-3910	320 ml	Polyethylene container	Adhesive for cab glass • "S" is used for high-temperature season (April - October) and "W" for low-temperature season (November - April) as adhesive for glass. (Using limit: 4 months)
	Sika Japan, Sikaflex 256HV	20Y-54-39850	310 ml	Polyethylene container	Adhesive for cab glass • Used as adhesive for glass. (Using limit: 6 months)
Caulking material	SUNSTAR PENGUINE SEAL No. 2505	417-926-3920	320 ml	Polyethylene container	Adhesive for cab glass • Used to seal joints of glass parts. (Using limit: 4 months)
	SEKISUI SILICONE SEALANT	20Y-54-55130	333 ml	Polyethylene container	Adhesive for cab glass • Used to seal front window. (Using limit: 6 months)
	GE TOSHIBA SILICONES TOSSEAL 381	22M-54-27220	333 ml	Cartridge	Adhesive for cab glass • Used to seal joint of glasses. Translucent white seal. (Using limit: 12 months)

STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE TABLE (WHEN USING TORQUE WRENCH)

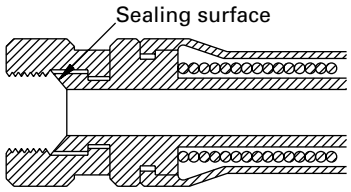
★ In the case of metric nuts and bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter of bolt	Width across flats	Tightening torque	
		 CDL00372	
mm	mm	Nm	kgm
6	10	11.8 – 14.7	1.2 – 1.5
8	13	27 – 34	2.8 – 3.5
10	17	59 – 74	6 – 7.5
12	19	98 – 123	10 – 12.5
14	22	153 – 190	15.5 – 19.5
16	24	235 – 285	23.5 – 29.5
18	27	320 – 400	33 – 41
20	30	455 – 565	46.5 – 58
22	32	610 – 765	62.5 – 78
24	36	785 – 980	80 – 100
27	41	1150 – 1440	118 – 147
30	46	1520 – 1910	155 – 195
33	50	1960 – 2450	200 – 250
36	55	2450 – 3040	250 – 310
39	60	2890 – 3630	295 – 370

Thread diameter of bolt	Width across flats	Tightening torque	
		 CDL00373	
mm	mm	Nm	kgm
6	10	5.9 – 9.8	0.6 – 1.0
8	13	13.7 – 23.5	1.4 – 2.4
10	14	34.3 – 46.1	3.5 – 4.7
12	27	74.5 – 90.2	7.6 – 9.2

TABLE OF TIGHTENING TORQUES FOR FLARED NUTS

★ In the case of flared nuts for which there is no special instruction, tighten to the torque given in the table below.



SAD00483

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
14	19	24.5 ± 4.9	2.5 ± 0.5
18	24	49 ± 19.6	5 ± 2
22	27	78.5 ± 19.6	8 ± 2
24	32	137.3 ± 29.4	14 ± 3
30	36	176.5 ± 29.4	18 ± 3
33	41	196.1 ± 49	20 ± 5
36	46	245.2 ± 49	25 ± 5
42	55	294.2 ± 49	30 ± 5

TABLE OF TIGHTENING TORQUES FOR SPLIT FLANGE BOLTS

★ In the case of split flange bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
10	14	59 – 74	6 – 7.5
12	17	98 – 123	10 – 12.5
16	22	235 – 285	23.5 – 29.5

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PIPING JOINTS

★ Unless there are special instructions, tighten the O-ring boss piping joints to the torque below.

Norminal No.	Thread diameter	Width across flat	Tightening torque (Nm {kgm})	
	mm	mm	Range	Target
02	14	Varies depending on type of connector.	35 – 63 {3.5 – 6.5}	44 {4.5}
03, 04	20		84 – 132 {8.5 – 13.5}	103 {10.5}
05, 06	24		128 – 186 {13.0 – 19.0}	157 {16.0}
10, 12	33		363 – 480 {37.0 – 49.0}	422 {43.0}
14	42		746 – 1010 {76.0 – 103}	883 {90.0}

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PLUGS

★ Unless there are special instructions, tighten the O-ring boss plugs to the torque below.

Norminal No.	Thread diameter	Width across flat	Tightening torque (Nm {kgm})	
	mm	mm	Range	Target
08	08	14	5.88 – 8.82 {0.6 – 0.9}	7.35 {0.75}
10	10	17	9.8 – 12.74 {1.0 – 1.3}	11.27 {1.15}
12	12	19	14.7 – 19.6 {1.5 – 2.0}	17.64 {1.8}
14	14	22	19.6 – 24.5 {2.0 – 2.5}	22.54 {2.3}
16	16	24	24.5 – 34.3 {2.5 – 3.5}	29.4 {3.0}
18	18	27	34.3 – 44.1 {3.5 – 4.5}	39.2 {4.0}
20	20	30	44.1 – 53.9 {4.5 – 5.5}	49.0 {5.0}
24	24	32	58.8 – 78.4 {6.0 – 8.0}	68.6 {7.0}
30	30	32	93.1 – 122.5 {9.5 – 12.5}	107.8 {11.0}
33	33	—	107.8 – 147.0 {11.0 – 15.0}	124.4 {13.0}
36	36	36	127.4 – 176.4 {13.0 – 18.0}	151.9 {15.5}
42	42	—	181.3 – 240.1 {18.5 – 24.5}	210.7 {21.5}
52	52	—	274.4 – 367.5 {28.0 – 37.5}	323.4 {33.0}

TIGHTENING TORQUE FOR 102 AND 114 ENGINE SERIES

1) BOLT AND NUTS

Use these torques for bolts and nuts (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	10 ± 2	1.02 ± 0.20
8	24 ± 4	2.45 ± 0.41
10	43 ± 6	4.38 ± 0.61
12	77 ± 12	7.85 ± 1.22

2) EYE JOINTS

Use these torques for eye joints (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	8 ± 2	0.81 ± 0.20
8	10 ± 2	1.02 ± 0.20
10	12 ± 2	1.22 ± 0.20
12	24 ± 4	2.45 ± 0.41
14	36 ± 5	3.67 ± 0.51

3) TAPERED SCREWS

Use these torques for tapered screws (unit: inch) of Cummins Engine.

Thread diameter	Tightening torque	
inch	Nm	kgm
1 / 16	3 ± 1	0.31 ± 0.10
1 / 8	8 ± 2	0.81 ± 0.20
1 / 4	12 ± 2	1.22 ± 0.20
3 / 8	15 ± 2	1.53 ± 0.20
1 / 2	24 ± 4	2.45 ± 0.41
3 / 4	36 ± 5	3.67 ± 0.51
1	60 ± 9	6.12 ± 0.92

TIGHTENING TORQUE TABLE FOR HOSES (TAPER SEAL TYPE AND FACE SEAL TYPE)

★ Tighten the hoses (taper seal type and face seal type) to the following torque, unless otherwise specified.

★ Apply the following torque when the threads are coated (wet) with engine oil.

Nominal size of hose	Width across flats	Tightening torque (Nm {kgm})		Taper seal type	Face seal type	
		Range	Target	Thread size (mm)	Nominal thread size - Threads per inch, Thread series	Root diameter (mm) (Reference)
02	19	34 – 54 {3.5 – 5.5}	44 {4.5}	–	$\frac{9}{16}$ – 18UN	14.3
		34 – 63 {3.5 – 6.5}	44 {4.5}	14	–	–
03	22	54 – 93 {5.5 – 9.5}	74 {7.5}	–	$\frac{11}{16}$ – 16UN	17.5
	24	59 – 98 {6.0 – 10.0}	78 {8.0}	18	–	–
04	27	84 – 132 {8.5 – 13.5}	103 {10.5}	22	$\frac{13}{16}$ – 16UN	20.6
05	32	128 – 186 {13.0 – 19.0}	157 {16.0}	24	1 – 14UNS	25.4
06	36	177 – 245 {18.0 – 25.0}	216 {22.0}	30	$1\frac{3}{16}$ – 12UN	30.2
(10)	41	177 – 245 {18.0 – 25.0}	216 {22.0}	33	–	–
(12)	46	197 – 294 {20.0 – 30.0}	245 {25.0}	36	–	–
(14)	55	246 – 343 {25.0 – 35.0}	294 {30.0}	42	–	–

ELECTRIC WIRE CODE

In the wiring diagrams, various colors and symbols are employed to indicate the thickness of wires.
This wire code table will help you understand WIRING DIAGRAMS.
Example: 5WB indicates a cable having a nominal number 5 and white coating with black stripe.

CLASSIFICATION BY THICKNESS

Norminal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number of strands	Dia. of strands (mm^2)	Cross section (mm^2)			
0.85	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
2	26	0.32	2.09	3.1	20	Lighting, signal etc.
5	65	0.32	5.23	4.6	37	Charging and signal
15	84	0.45	13.36	7.0	59	Starting (Glow plug)
40	85	0.80	42.73	11.4	135	Starting
60	127	0.80	63.84	13.6	178	Starting
100	217	0.80	109.1	17.6	230	Starting

CLASSIFICATION BY COLOR AND CODE

Priority	Classification \ Circuits		Charging	Ground	Starting	Lighting	Instrument	Signal	Other
1	Primary	Code	W	B	B	R	Y	G	L
		Color	White	Black	Black	Red	Yellow	Green	Blue
2	Auxiliary	Code	WR	—	BW	RW	YR	GW	LW
		Color	White & Red	—	White & Black	Red & White	Rellow & Red	Green & White	Blue & White
3		Code	WB	—	BY	RB	YB	GR	LR
		Color	White & Black	—	Black & Yellow	Red & Black	Yellow & Black	Green & Red	Blue & Yellow
4		Code	WL	—	BR	RY	YG	GY	LY
		Color	White & Blue	—	Black & Red	Red & Yellow	Yellow & Green	Green & Yellow	Blue & Yellow
5		Code	WG	—	—	RG	YL	GB	LB
		Color	White & Green	—	—	Red & Green	Yellow & Blue	Green & Black	Blue & Black
6		Code	—	—	—	RL	YW	GL	—
		Color	—	—	—	Red & Blue	Yellow & White	Green & Blue	—

CONVERSION TABLE

METHOD OF USING THE CONVERSION TABLE

The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

EXAMPLE

- Method of using the Conversion Table to convert from millimeters to inches

1. Convert 55 mm into inches.
   (1) Locate the number 50 in the vertical column at the left side, take this as (A), then draw a horizontal line from (A).
   (2) Locate the number 5 in the row across the top, take this as (B), then draw a perpendicular line down from (B).
   (3) Take the point where the two lines cross as (C). This point (C) gives the value when converting from millimeters to inches. Therefore, 55 mm = 2.165 inches.
2. Convert 550 mm into inches.
   (1) The number 550 does not appear in the table, so divide by 10 (move the decimal point one place to the left) to convert it to 55 mm.
   (2) Carry out the same procedure as above to convert 55 mm to 2.165 inches.
   (3) The original value (550 mm) was divided by 10, so multiply 2.165 inches by 10 (move the decimal point one place to the right) to return to the original value. This gives 550 mm = 21.65 inches.

Millimeters to inches

(B)

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
(A) 50	1.969	2.008	2.047	2.087	2.126	(C) 2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Millimeters to Inches

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

1 kg = 2.2046 lb

	0	1	2	3	4	5	6	7	8	9
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.53	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

Liter to U.S. Gallon

1ℓ = 0.2642 U.S. Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153

Liter to U.K. Gallon

1ℓ = 0.21997 U.K. Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.969	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

kgm to ft. lb

1 kgm = 7.233 ft. lb

	0	1	2	3	4	5	6	7	8	9
0	0	7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	296.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	1005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.6	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

kg/cm² to lb/in²

1kg/cm² = 14.2233 lb/in²

	0	1	2	3	4	5	6	7	8	9
0	0	14.2	28.4	42.7	56.9	71.1	85.3	99.6	113.8	128.0
10	142.2	156.5	170.7	184.9	199.1	213.4	227.6	241.8	256.0	270.2
20	284.5	298.7	312.9	327.1	341.4	355.6	369.8	384.0	398.3	412.5
30	426.7	440.9	455.1	469.4	483.6	497.8	512.0	526.3	540.5	554.7
40	568.9	583.2	597.4	611.6	625.8	640.1	654.3	668.5	682.7	696.9
50	711.2	725.4	739.6	753.8	768.1	782.3	796.5	810.7	825.0	839.2
60	853.4	867.6	881.8	896.1	910.3	924.5	938.7	953.0	967.2	981.4
70	995.6	1010	1024	1038	1053	1067	1081	1095	1109	1124
80	1138	1152	1166	1181	1195	1209	1223	1237	1252	1266
90	1280	1294	1309	1323	1337	1351	1365	1380	1394	1408
100	1422	1437	1451	1465	1479	1493	1508	1522	1536	1550
110	1565	1579	1593	1607	1621	1636	1650	1664	1678	1693
120	1707	1721	1735	1749	1764	1778	1792	1806	1821	1835
130	1849	1863	1877	1892	1906	1920	1934	1949	1963	1977
140	1991	2005	2020	2034	2048	2062	2077	2091	2105	2119
150	2134	2148	2162	2176	2190	2205	2219	2233	2247	2262
160	2276	2290	2304	2318	2333	2347	2361	2375	2389	2404
170	2418	2432	2446	2460	2475	2489	2503	2518	2532	2546
180	2560	2574	2589	2603	2617	2631	2646	2660	2674	2688
190	2702	2717	2731	2745	2759	2773	2788	2802	2816	2830
200	2845	2859	2873	2887	2901	2916	2930	2944	2958	2973
210	2987	3001	3015	3030	3044	3058	3072	3086	3101	3115
220	3129	3143	3158	3172	3186	3200	3214	3229	3243	3257
230	3271	3286	3300	3314	3328	3343	3357	3371	3385	3399
240	3414	3428	3442	3456	3470	3485	3499	3513	3527	3542

Temperature

Fahrenheit-Centigrade Conversion ; a simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vice versa is to enter the accompanying table in the center or boldface column of figures.

These figures refer to the temperature in either Fahrenheit or Centigrade degrees.

If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.

If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

1°C = 33.8°F

°C		°F	°C		°F	°C		°F	°C		°F
–40.4	**–40**	–40.0	–11.7	**11**	51.8	7.8	**46**	114.8	27.2	**81**	117.8
–37.2	**–35**	–31.0	–11.1	**12**	53.6	8.3	**47**	116.6	27.8	**82**	179.6
–34.4	**–30**	–22.0	–10.6	**13**	55.4	8.9	**48**	118.4	28.3	**83**	181.4
–31.7	**–25**	–13.0	–10.0	**14**	57.2	9.4	**49**	120.2	28.9	**84**	183.2
–28.9	**–20**	–4.0	–9.4	**15**	59.0	10.0	**50**	122.0	29.4	**85**	185.0
–28.3	**–19**	–2.2	–8.9	**16**	60.8	10.6	**51**	123.8	30.0	**86**	186.8
–27.8	**–18**	–0.4	–8.3	**17**	62.6	11.1	**52**	125.6	30.6	**87**	188.6
–27.2	**–17**	1.4	–7.8	**18**	64.4	11.7	**53**	127.4	31.1	**88**	190.4
–26.7	**–16**	3.2	–7.2	**19**	66.2	12.2	**54**	129.2	31.7	**89**	192.2
–26.1	**–15**	5.0	–6.7	**20**	68.0	12.8	**55**	131.0	32.2	**90**	194.0
–25.6	**–14**	6.8	–6.1	**21**	69.8	13.3	**56**	132.8	32.8	**91**	195.8
–25.0	**–13**	8.6	–5.6	**22**	71.6	13.9	**57**	134.6	33.3	**92**	197.6
–24.4	**–12**	10.4	–5.0	**23**	73.4	14.4	**58**	136.4	33.9	**93**	199.4
–23.9	**–11**	12.2	–4.4	**24**	75.2	15.0	**59**	138.2	34.4	**94**	201.2
–23.3	**–10**	14.0	–3.9	**25**	77.0	15.6	**0**	140.0	35.0	**95**	203.0
–22.8	**–9**	15.8	–3.3	**26**	78.8	16.1	**61**	141.8	35.6	**96**	204.8
–22.2	**–8**	17.6	–2.8	**27**	80.6	16.7	**62**	143.6	36.1	**97**	206.6
–21.7	**–7**	19.4	–2.2	**28**	82.4	17.2	**63**	145.4	36.7	**98**	208.4
–21.1	**–6**	21.2	–1.7	**29**	84.2	17.8	**64**	147.2	37.2	**99**	210.2
–20.6	**–5**	23.0	–1.1	**30**	86.0	18.3	**65**	149.0	37.8	**100**	212.0
–20.0	**–4**	24.8	–0.6	**31**	87.8	18.9	**66**	150.8	40.6	**105**	221.0
–19.4	**–3**	26.6	0	**32**	89.6	19.4	**67**	152.6	43.3	**110**	230.0
–18.9	**–2**	28.4	0.6	**33**	91.4	20.0	**68**	154.4	46.1	**115**	239.0
–18.3	**–1**	30.2	1.1	**34**	93.2	20.6	**69**	156.2	48.9	**120**	248.0
–17.8	**0**	32.0	1.7	**35**	95.0	21.1	**70**	158.0	51.7	**125**	257.0
–17.2	**1**	33.8	2.2	**36**	96.8	21.7	**71**	159.8	54.4	**130**	266.0
–16.7	**2**	35.6	2.8	**37**	98.6	22.2	**72**	161.6	57.2	**135**	275.0
–16.1	**3**	37.4	3.3	**38**	100.4	22.8	**73**	163.4	60.0	**140**	284.0
–15.6	**4**	39.2	3.9	**39**	102.2	23.3	**74**	165.2	62.7	**145**	293.0
–15.0	**5**	41.0	4.4	**40**	104.0	23.9	**75**	167.0	65.6	**150**	302.0
–14.4	**6**	42.8	5.0	**41**	105.8	24.4	**76**	168.8	68.3	**155**	311.0
–13.9	**7**	44.6	5.6	**42**	107.6	25.0	**77**	170.6	71.1	**160**	320.0
–13.3	**8**	46.4	6.1	**43**	109.4	25.6	**78**	172.4	73.9	**165**	329.0
–12.8	**9**	48.2	6.7	**44**	111.2	26.1	**79**	174.2	76.7	**170**	338.0
–12.2	**10**	50.0	7.2	**45**	113.0	26.7	**80**	176.0	79.4	**175**	347.0

UNITS

In this manual, the measuring units are indicated with Internatinal System of units (SI).
As for reference, conventionally used Gravitational System of units are indicated in parentheses { }.

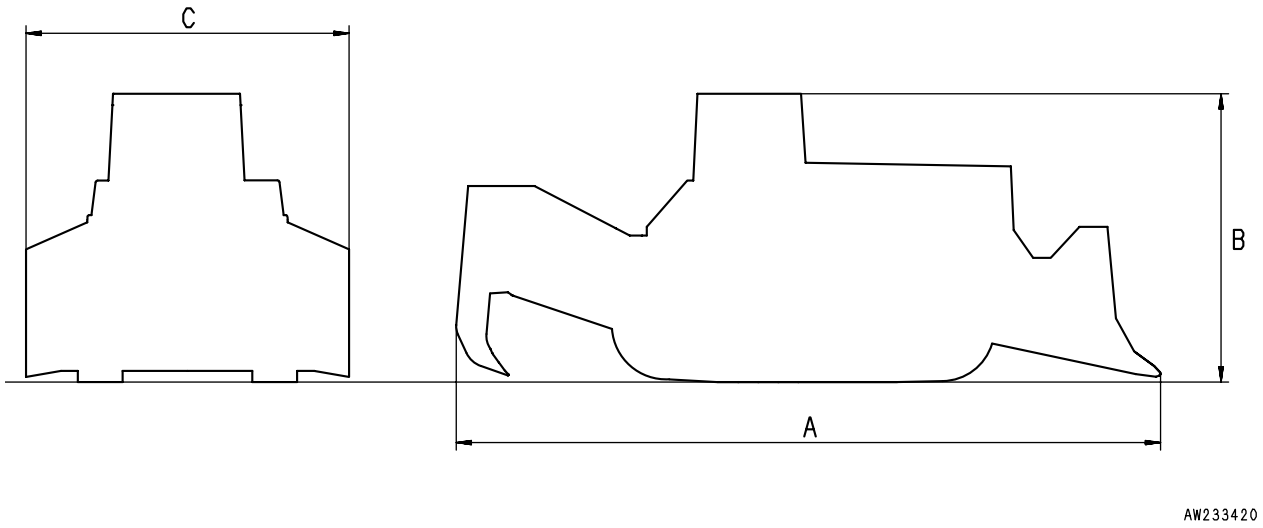
Example:

N {kg}
Nm {kgm}
MPa {kg/cm^2}
kPa {mmH_2O}
kPa {mmHg}
kW/rpm {HP/rpm}
g/kWh {g/HPh}

01 GENERAL

SPECIFICATION DRAWINGS

DIMENSIONS



Symbol	Item	Unit	Semi-U tiltdozer + giant ripper	Full-U tiltdozer + giant ripper	Superdozer + counterweight
A	Overall length	mm	11,565	12,065	10,525
B	Overall height (including ROPS)	mm	4,590	4,590	4,590
C	Overall width	mm	5,265	6,205	6,465

SPECIFICATIONS

Semi-U tiltdozer and full-U tiltdozer specifications

Machine model				D475A-5
Serial Number				20001 and up
Weight	Machine weight			
	• Tractor		kg	77,310
	• Above + Semi-U tiltdozer			93,810
	• Above + Variable giant ripper			101,110
	• Above + ROPS cab + Air conditioner			102,500
Performance	Min. turning radius		m	4.6
	Gradeability		deg.	30
	Stability (Front, Rear, Left, Right)		deg.	35
	Gear speeds	Forward 1st	km/h	0 – 3.5
		Forward 2nd		0 – 6.3
		Forward 3rd		0 – 10.9
		Reverse 1st	km/h	0 – 4.7
		Reverse 2nd		0 – 8.4
		Reverse 3rd		0 – 14.3
	Ground pressure	Tractor	kPa {kg/cm^2}	122.6 {1.25}
		Semi-U dozer		148.1 {1.51}
		Semi-U dozer + Variable giant ripper		159.8 {1.63}
		Above + ROPS cab + Air conditioner + Perforated side cover		122.6 {1.65}
Dimensions	Overall length	Tractor	mm	6,680
		Semi-U dozer		8,705
		Semi-U dozer + Variable giant ripper		11,565
		Full-U dozer + Variable giant ripper		12,065
	Overall width	Tractor	mm	3,610
		Semi-U dozer		5,265
		Full-U dozer		6,205
	Overall height	Up to ROPS top	mm	4,590
		Up to exhaust pipe end		4,240
		Up to exhaust duct top		3,805
	Track gauge		mm	2,770
	Length of track on ground			4,365
	Track shoe width			710
	Minimum ground clearance			655

Machine model				D475A-5
Serial Number				20001 and up
Engine	Model name			Komatsu SDA12V140E-1
	Type			4-cycle, water-cooled, V-type, direct-injection engine with turbocharger and aftercooler
	Number of cylinder–Bore x Stroke		mm	12–140 x 165
	Total displacement		ℓ {cc}	30.48 {30,480}
	Performance	Rated output	kW/rpm {HP/rpm}	641/2,000 {860/2,000}
		Max. torque	Nm/rpm {kgm/rpm}	3,825/1,400 {390/1,400}
		High idle	rpm	2,150
		Low idle	rpm	660
		Min. fuel consumption ratio (at rated output)	g/kW•h {g/HP•h}	240 {153}
	Starting motor Alternator Battery			24 V, 7.5 kW x 2 24 V, 100 A 12V, 170 Ah x 4
	Type of radiator core			D-type
Power train	Torque converter			3-element, 1-stage, 1-phase type (With lock-up clutch)
	Transmission			Planetary gear, multiple disc clutch, hydraulic, pump-forced lubrication, 3 forward/reverse gear speeds type
	Bevel gear shaft			Spiral bevel gear, splash lubrication type
	Steering clutch			Wet, multiple disc clutch, spring-actuated, hydraulic (hand-operated) type interlocked with brake
	Steering brake			Wet, multiple disc clutch, spring-actuated, hydraulic (foot/hand-operated) type interlocked with brake
	Final drive			1-stage spur gear and 1-stage planetary gear, splash lubrication type
Undercarriage	Type of suspension			Hard, equalizing beam type
	Carrier roller			2 pieces on each side
	Track roller			7 [8] pieces on each side
	Track shoe			Assembly type single grouser shoe, 40 pieces on each side, Pitch: 317.5 mm, Width: 710 mm
Power train + Lubricating oil pump (Tandem)				Gear type (BAL 160 + 160 + 112)
Scavenging pump (Tandem)				Gear (BAR 63 + 320)

★ Values in [ ] are for 8-track roller specifications.

Machine model				D475A-5
Serial Number				20001 and up
Work equipment hydraulic system	Max. pressure		MPa {kg/cm^2}	27.5 {280}
	Work equipment pump	Type	ℓ/min	Variable swash plate type: 2 pcs. (HPV 125 + 125)
		Capacity (at engine speed of 2,000 rpm)		542
	Fan pump		MPa {kg/cm^2} ℓ/min/rpm	Variable swash plate type: 2 pcs. (LPV 90 + 30) Max. discharge pressure: 17.5 {178} Theoretical discharge pressure: 178/1,934
	Fan motor		MPa {kg/cm^2}	Fixed swash plate type (LMF 180) Max. using pressure: 17.5 {178}
	Work equipment valve	Type • For blade lift • For blade tilt • For ripper lift • For ripper tilt		6-spool type: 1 pc. Hydraulic
	Hydraulic cylinders	Type		Double acting piston
		Dimensions of blade lift cylinder: Bore of cylinder	mm	180
		Dimensions of blade lift cylinder: Outside diameter of piston rod	mm	110
		Dimensions of blade lift cylinder: Stroke of piston	mm	1,925
		Dimensions of blade lift cylinder: Max. distance between pins	mm	3,155
		Dimensions of blade lift cylinder: Min. distance between pins	mm	1,230
		Dimensions of blade tilt cylinder: Bore of cylinder	mm	250
		Dimensions of blade tilt cylinder: Outside diameter of piston rod	mm	140
		Dimensions of blade tilt cylinder: Stroke of piston	mm	293
		Dimensions of blade tilt cylinder: Max. distance between pins	mm	1,988
		Dimensions of blade tilt cylinder: Min. distance between pins	mm	1,695

Machine model					D475A-5
Serial Number					20001 and up
Work equipment hydraulic system	Hydraulic cylinders	Dimensions of blade dual tilt cylinder	Bore of cylinder (Both of right and left)	mm	250
			Outside diameter of piston rod (Both of right and left)		140
			Stroke of piston (Both of right and left)		293
			Max. distance between pins (Both of right and left)		1,988
			Min. distance between pins (Both of right and left)		1,965
		Dimensions of ripper lift cylinder	Bore of cylinder	mm	225
			Outside diameter of piston rod		120
			Stroke of piston		645
			Max. distance between pins		2,175
			Min. distance between pins		1,530
		Dimensions of ripper tilt cylinder	Bore of cylinder	mm	225
			Outside diameter of piston rod		140
			Stroke of piston		540
			Max. distance between pins		2,020
			Min. distance between pins		1,480
	Hydraulic tank				Box type (External control valve type)

Machine model					D475A-5
Serial Number					20001 and up
Work equipment	Type				Hydraulic semi-U tiltdozer Hydraulic full-U tiltdozer
	Blade supporting method				Brace type (Right tilt cylinder)
	Semi-U dozer	Performance	Max. lift above ground	mm	1,620
			Max. drop below ground	mm	1,010
			Max. tilting distance	mm	770
			Changing range of blade cutting edge angle	deg.	±6
			Capacity of blade	m^3	38.1 <SAE 27.2>
		Dimensions	Width of blade	mm	5,265
			Height of blade	mm	2,690
			Angle of blade cutting edge	deg.	52
	Full-U dozer	Performance	Max. lift above ground	mm	1,620
			Max. drop below ground	mm	1,010
			Max. tilting distance	mm	905
			Changing range of blade cutting edge angle	deg.	±6
			Capacity of blade	m^3	42.3 <SAE 34.4>
		Dimensions	Width of blade	mm	3,640
			Height of blade	mm	1,580
			Angle of blade cutting edge	deg.	52
	Semi-U dozer + Pitch	Performance	Max. tilting distance	mm	1,145
			Max. pitch angle	deg.	6
			Max. pitch back angle	deg.	6
	Full-U dozer + Pitch	Performance	Max. tilting distance	mm	1,350
			Max. pitch angle	deg.	6
			Max. pitch back angle	deg.	6
	Multi-ripper	Performance	Max. digging depth	mm	1,180
			Max. lift	mm	1,140
			Digging angle (Standard)	deg.	45 (Adjustable steplessly to 32.5 – 54)
		Dimensions	Length of beam	mm	3,085
			Number of shanks	pcs.	3
	Giant ripper	Performance	Max. digging depth	mm	1,800
			Max. lift	mm	1,140
			Digging angle (Standard)	deg.	45 (Adjustable steplessly to 34 – 56)
		Dimensions	Length of beam	mm	1,477
			Number of shanks	pcs.	1

Superdozer specification

Machine model				D475A-5
Serial Number				20001 and up
Weight	Machine weight • Tractor • Superdozer + ROPS cab + Air conditioner + Counterweight		kg	 78,510 108,000
Performance	Min. turning radius		m	4.6
	Gradeability		deg.	30
	Stability (Front, Rear, Left, Right)		deg.	35
	Gear speeds	Forward 1st	km/h	0 – 3.5
		Forward 2nd		0 – 6.3
		Forward 3rd		0 – 10.9
		Reverse 1st	km/h	0 – 4.7
		Reverse 2nd		0 – 8.4
		Reverse 3rd		0 – 14.3
	Ground pressure	Tractor	kPa {kg/cm^2}	97.09 {0.99}
		Superdozer + ROPS cab + Air conditioner + Counterweight		133.37 {1.36}
Dimensions	Overall length	Tractor	mm	6,680
		Superdozer + Counterweight		10,525
	Overall width	Tractor	mm	3,610
		Superdozer		6,465
	Overall height	Up to ROPS top	mm	4,590
		Up to exhaust pipe end		4,240
		Up to exhaust duct top		3,805
	Track gauge		mm	2,770
	Length of track on ground			4,365
	Track shoe width			810
	Minimum ground clearance			655

Machine model				D475A-5
Serial Number				20001 and up
Engine	Model name			Komatsu SDA12V140E-1
	Type			4-stroke, water-cooled, V-type, direct-injection engine with turbocharger and aftercooler
	Number of cylinder–Bore x Stroke		mm	12–140 x 165
	Total displacement		ℓ {cc}	30.48 {30,480}
	Performance	Rated output	kW/rpm {HP/rpm}	632/2,000 {848/2,000}
		Max. torque	Nm/rpm {kgm/rpm}	3,825/1,400 {390/1,400}
		High idle	rpm	2,150
		Low idle	rpm	660
		Min. fuel consumption ratio (at rated output)	g/kW•h {g/HP•h}	240 {148}
	Starting motor			24 V, 7.5 kW x 2
	Alternator			24 V, 100 A
	Battery			12 V, 220 Ah x 4
	Type of radiator core			D-type
Power train	Torque converter			3-element, 1-stage, 1-phase type (With lock-up clutch)
	Transmission			Planetary gear, multiple disc clutch, hydraulic, pump-forced lubrication, 3 forward/reverse gear speeds type
	Bevel gear shaft			Spiral bevel gear, splash lubrication type
	Steering clutch			Wet, multiple disc clutch, spring-actuated, hydraulic (hand-operated) type interlocked with brake
	Steering brake			Wet, multiple disc clutch, spring-actuated, hydraulic (foot/hand-operated) type interlocked with brake
	Final drive			1-stage spur gear and 1-stage planetary gear, splash lubrication type
Undercarriage	Type of suspension			Hard, equalizing beam type
	Carrier roller			2 pieces on each side
	Track roller			7 pieces on each side
	Track shoe			Assembly type single grouser shoe, 40 pieces on each side, Pitch: 317.5 mm, Width: 810 mm
Power train + Lubrication pump (Tandem)				Gear type (BAL 160 + 160 + 112)
Scavenging pump (Tandem)				Gear (BAR 63 + 320)

Machine model				D475A-5
Serial Number				20001 and up
Work equipment hydraulic system	Max. pressure		MPa {kg/cm²}	27.5 {280}
	Work equipment pump	Type		Variable swash plate type: 2 pcs. (HPV 125 + 125)
		Capacity (at engine speed of 2,000 rpm)	ℓ/min	542
	Fan pump		MPa {kg/cm²} ℓ/min/rpm	Variable swash plate type: 2 pcs. (LPV 90 + 30) Max. discharge pressure: 17.5 {178} Theoretical discharge pressure: 178/1,934
	Fan motor		MPa {kg/cm²}	Fixed swash plate type (LMF 180) Max. using pressure: 17.5 {178}
	Work equipment valve	Type • For blade lift • For blade tilt • For ripper lift • For ripper tilt		6-spool type: 1 pc. Hydraulic
	Hydraulic cylinders	Type		Double acting piston
		Dimensions of blade lift cylinder	Bore of cylinder Outside diameter of piston rod Stroke of piston Max. distance between pins Min. distance between pins	mm	180 110 1,925 3,155 1,230
		Dimensions of blade pitch cylinder	Bore of cylinder Outside diameter of piston rod Stroke of piston Max. distance between pins Min. distance between pins	mm	250 140 660 2,154 1,494
	Hydraulic tank				Box type (External control valve type)

Machine model					D475A-5
Serial Number					20001 and up
Work equipment	Type				Hydraulic superdozer (Pitchdozer)
	Blade supporting method				Cylinder type
	Superdozer	Performance	Max. lift above ground	mm	1,960
			Max. drop below ground	mm	860
			Max. tilting distance	mm	900 (at cutting edge angle of 52 deg.)
			Max. pitch dump angle	deg.	15
			Max. pitch back angle	deg.	15
			Capacity of blade	m^3	45.0 <SAE 36.6>
		Dimensions	Width of blade	mm	6,465
			Height of blade	mm	2,690
			Angle of blade cutting edge	deg.	42 – 67

WEIGHT TABLE

⚠ This weight table is a reference for handling and transportation of components.

Semi-U tiltdozer and full-U tiltdozer specifications Unit: kg

Machine model	D475A-5
Serial Number	20001 and up
Engine and damper assembly	4,250
• Engine assembly	4,035
• Damper assembly	215
Main radiator assembly	485
Sub radiator assembly	144
Oil cooler assembly	129
Fuel tank assembly [When full]	863 [2,335]
Power train unit (Including work equipment pump and fan pump)	5,350
• Torque converter and PTO assembly	830
• Transmission assembly	1,335
• Transmission valve assembly	40
• Steering clutch and brake assembly	2,290
• Steering valve assembly	75
• Work equipment pump	180
• Fan pump	72
• Power train and lubricating oil pump	64
• Scavenging pump	25
• Power train filter assembly (3 pcs.)	100
Final drive assembly (Each side)	3,575
Main frame assembly	9,120
Track group assembly (Each side)	11,180
• Track frame	2,996
• Idler assembly (Each side)	708
• Track roller assembly (1 single flange)	222
• Track roller assembly (1 double flange)	237
• Carrier roller assembly (1 pc.)	106
Track shoe assembly (710 mm)	13,200
Pivot shaft assembly (each side)	370
Equalizer bar	598
Hydraulic tank assembly	290
Main control valve	195
Blade lift cylinder assembly (Each side)	509
Blade tilt cylinder assembly	504
Tiltdozer assembly	16,500 (18,500)
• Blade	8,550 (9,760)
• Straight frame (Left)	1,770 (1,770)
• Straight frame (Right)	1,770 (1,770)
• Tilt cylinder assembly	504 (504)
Variable giant ripper assembly	7,300
• Shank assembly	1,040
• Ripper lift cylinder assembly	389
• Ripper tilt cylinder assembly	394

★ Values in ( ) are for full-U blade.

Unit: kg

Machine model	D475A-5
Serial Number	20001 and up
Radiator guard assembly	4,640
• Radiator guard	2,530
• Blade lift cylinder assembly (Each side)	509
• Fan motor	65
Radiator mask (Including grille) (Each side)	100
Engine underguard (Front)	267
Engine underguard (Rear)	324
Power train underguard (Front)	340
Power train underguard (Rear)	448
Hood	197
Fender (Left)	474
Fender (Right)	570
ROPS mount assembly (Left)	527
ROPS mount assembly (Right)	520
ROPS assembly	934
Floor frame assembly	600
Cab assembly	455
Operator's seat assembly	64

Superdozer specification Unit: kg

Machine model	D475A-5
Serial Number	20001 and up
Engine and damper assembly • Engine assembly • Damper assembly	4,250 4,035 215
Main radiator assembly Sub radiator assembly Oil cooler assembly Fuel tank assembly [When full]	485 144 129 863 [2,335]
Power train unit (Including work equipment pump and fan pump) • Torque converter and PTO assembly • Transmission assembly • Transmission valve assembly • Steering clutch and brake assembly • Steering valve assembly • Work equipment pump • Fan pump • Power train and lubricating oil pump • Scavenging pump • Power train filter assembly (3 pcs.)	5,350 830 1,335 40 2,290 75 180 72 64 25 100
Final drive assembly (Each side) Main frame assembly	3,575 9,120
Track group assembly (Each side) • Track frame • Idler assembly (Each side) • Track roller assembly (1 single flange) • Track roller assembly (1 double flange) • Carrier roller assembly (1 pc.)	11,180 2,996 708 222 237 106
Track shoe assembly (810 mm) Pivot shaft assembly (each side) Equalizer bar	14,100 370 598
Hydraulic tank assembly Main control valve	290 195
Blade lift cylinder assembly (Each side) Blade pitch cylinder assembly (Each side)	509 508
Superdozer assembly • Blade • Straight frame (Left) • Straight frame (Right) • Pitch cylinder assembly (Each side)	21,200 11,950 1,770 1,770 508
Counterweight	6,400
Radiator guard assembly • Radiator guard • Blade lift cylinder assembly (Each side) • Fan motor	4,640 2,530 509 65

Unit: kg

Machine model	D475A-5
Serial Number	20001 and up
Radiator mask (Including grille) (Each side)	100
Engine underguard (Front)	267
Engine underguard (Rear)	324
Power train underguard (Front)	340
Power train underguard (Rear)	448
Hood	197
Fender (Left)	474
Fender (Right)	570
ROPS mount assembly (Left)	527
ROPS mount assembly (Right)	520
ROPS assembly	934
Floor frame assembly	600
Cab assembly	455
Operator's seat assembly	64

FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE −22 −4 14 32 50 68 86 104°F −30 −20 −10 0 10 20 30 40°C	CAPACITY (ℓ)	
			Specified	Refill
Engine oil pan	Engine oil	SAE 30 SAE 10W SAE 10W-30 SAE 15W-40	126	121
Power train oil pan (incl. torque converter, transmission and bevel gear cases)		SAE 30 SAE 10W	410	210
Damper case			2.4	2.4
Recoil spring		SAE 30	145	145
Pivot shaft (each)			26	26
Hydraulic system		SAE 10W SAE 10W-30 SAE 15W-40	420	170
Final drive case (each)	Gear oil	SAE 140 SAE 85W-140 SAE 80W-90	75	75
Idler (each)			1.4 – 1.5	1.4 – 1.5
Track roller (each)		GO 140B	1.4 – 1.5	1.4 – 1.5
Carrier roller (each)			1.25 – 1.35	1.25 – 1.35
Fuel tank	Diesel fuel	ASTM D975 No.2 ASTM D975A No.1	1,670	—
Cooling system	Coolant	Add antifreeze	Main circuit: 210 Sub circuit: 35	— —

NOTE:

(1) When fuel sulphur content is less than 0.5 %, change oil in the oil pan every periodic maintenance hours described in this manual. Change oil according to the following table if fuel sulphur content is above 0.5 %.

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0 %	1/2 of regular interval
Above 1.0 %	1/4 of regular interval

ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers
API: American Petroleum Institute

(2) When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.

(3) Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

(4) There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table on the left.

(5) We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

10 STRUCTURE, FUNCTION AND MAINTENANCE STANDARD