SHOP MANUAL

SMEW4200MO

MAX avance

WA420-3

WHEEL LOADER

SERIAL NUMBERS WA420-15001 AND UP

CONTENTS

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, glasses, 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.

DISASSEMBLY AND ASSEMBLY

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advanced notice. Contact the distributor of Komatsu if the latest information is required.

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

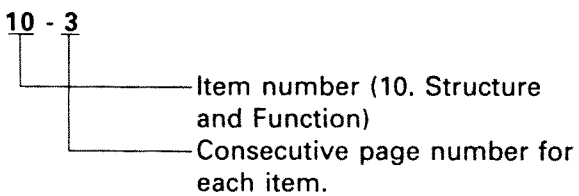
These various volumes are designed to avoid duplicating the same information. Therefore, to deal with all repairs for any model , it is necessary that chassis, engine, electrical and attachment volumes be available.

DISTRIBUTION AND UPDATING

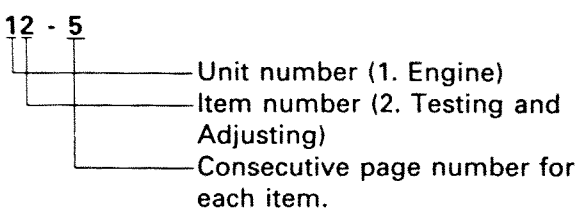
Any additions, amendments or other changes will be sent to KOMATSU distributors. Get the most up-to-date information before you start any work.

FILING METHOD

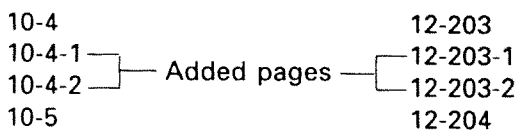
1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number.
   Example 1 (Chassis volume):



   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 (①②③....) 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.
kg	Weight	Weight of parts of systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
kgm	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:

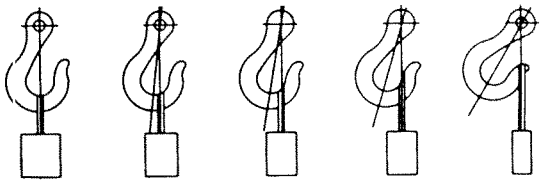
Wire ropes
(Standard "Z" or "S" twist ropes without galvanizing)

Rope diameter (mm)	Allowable load (tons)
10	1.0
11.2	1.4
12.5	1.6
14	2.2
16	2.8
18	3.6
20	4.4
22.4	5.6
30	10.0
40	18.0
50	28.0
60	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.



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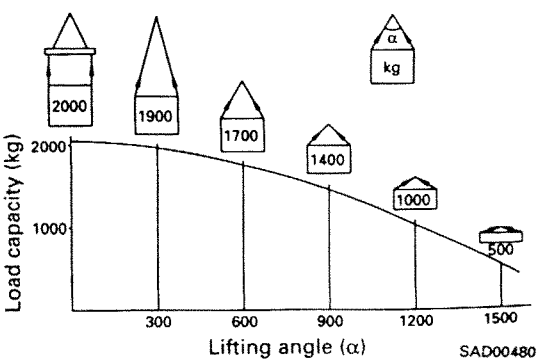
3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound onto the load.
⚠ Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result 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 (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, at various hanging angles.
When two ropes sling a load vertically, up to 2000 kg of total weight can be suspended. This weight becomes 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 4000 kg if they sling a 2000 kg load at a lifting angle of 150°.



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COATING MATERIALS

The recommended coating materials prescribed in Komatsu Shop Manuals are listed below.

Category	Komatsu code	Part No.	Q'ty	Container	Main applications, features
Adhesive	LT-1A	790-129-9030	150 g	Tube	• Used to prevent rubber gaskets, rubber cushions, and cork plugs from coming out
	LT-1B	790-129-9050	20 g (x2)	Plastic container	• Used as sealant for plastics , Rubber, metal, and non-metal.
	LT-2	09940-00030	50 g	Plastic container	• Features: Resistance to heat, chemicals • Used for anti-loosening and sealant purposes for bolts and plugs.
	LT-3	790-129-9060 (Set of adhesive and hardenging agent)	Adhesive :1 Kg Hardening agent: :500 g	Can	• Used as adhesive or sealant for metal, glass, plastic
	LT-4	790-129-9040	250 g	Plastic container	• Used as sealant for machined holes
	(Loctite 648-50)	79A-129-9110	50 cc	—	• Features: Resistance to heat, chemicals • Used at joint portions subject to high temperature
Gasket sealant	LG-1	790-129-9010	200 g	Tube	• Used as adhesive or sealant for gaskets and packings of power train case, etc.
	LG-3	790-129-9070	1 Kg	Can	• Features: Resistance to heat • Used as sealant for flange surfaces and bolts at high temperature locations, used to prevent seizure • Used as sealant for heat resistant gasket for high temperature locations such as engine precombustion chamber, exhaust pipe
	LG-4	790-129-9020	200 g	Tube	• Features: Resistance to water, oil • Used as sealant for flange surface, thread • Aiso possible to use as sealant for flanges with large clearance • Used as sealant for mating surfaces of final drive case, transmission case
	LG-5	790-129-9080	1 Kg	Plastic container	• Used as sealant for various threads, pipe joints, flanges • Used as sealant for tapered plugs, elbows, nipples of hydraulic piping
	LG-6	09940-00011	250 g	Tube	• Features: Silicon based, resistance to heat, cold • Used as sealant for flange surface, thread • Used as sealant for oil pan, final drive case, etc.
	LG-7	09920-00150	150 g	Tube	• Features: Silicon based, quick hardening type • Used as sealant for flywheel housing, intake manifold, oil pan, thermostat housing, etc.
Rust prevention lubricant	—	09940-00051	60 g	Can	• Used as lubricant for sliding parts (to prevent squeaking)
Molybdenum disulphide lubricant	—	09940-00040	200 g	Tube	• Used to prevent seizure or scuffing of the thread when press fitting or shrink fitting • Used as lubricant for linkage, bearings, etc.
Lithium grease	G2-LI	SYG-350LI SYG-400LI SYG-400LI-A SYG-160LI SYGA-160CNLI	Various	Various	• General purpose type
Calcium grease	G2-CA	SSG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYGA-16CNCA	Various	Various	• Used for normal temperature, light load bearing at places in contact with water or steam
Molybdenum disulphide grease	—	SYG2-400M	400 g (10 per case)	Bellows type	• Used for places with heavy load

STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUES OF BOLTS AND NUTS

The following charts give the standard tightening torques of bolts and nuts. Exceptions are given in section of **DISASSEMBLY AND ASSEMBLY**.

1 Kgm = 9.806 Nm

Thread diameter of bolt	Width across flats	 SAD00481	 SAD00482
mm	mm	kgm	Nm
6	10	1.35 ± 0.15	13.2 ± 1.4
8	13	3.2 ± 0.3	31.4 ± 2.9
10	17	6.7 ± 0.7	65.7 ± 6.8
12	19	11.5 ± 1.0	112 ± 9.8
14	22	18.0 ± 2.0	177 ± 19
16	24	28.5 ± 3	279 ± 29
18	27	39 ± 4	383 ± 39
20	30	56 ± 6	549 ± 58
22	32	76 ± 8	745 ± 78
24	36	94.5 ± 10	927 ± 98
27	41	135 ± 15	1320 ± 140
30	46	175 ± 20	1720 ± 190
33	50	225 ± 25	2210 ± 240
36	55	280 ± 30	2750 ± 290
39	60	335 ± 35	3280 ± 340

★ This torque table does not apply to the bolts with which nylon packings or other nonferrous metal washers are to be used, or which require tightening to otherwise specified torque.

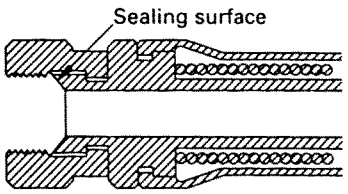
TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

Use these torques for split flange bolts.

Thread diameter of bolt	Width across flats	Tightening torque	
mm	mm	kgm	Nm
10	14	6.7 ± 0.7	65.7 ± 6.8
12	17	11.5 ± 1	112 ± 9.8
16	22	28.5 ± 3	279 ± 29

TIGHTENING TORQUE FOR FLARED NUTS

Use these torques for flared part of nut.



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

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

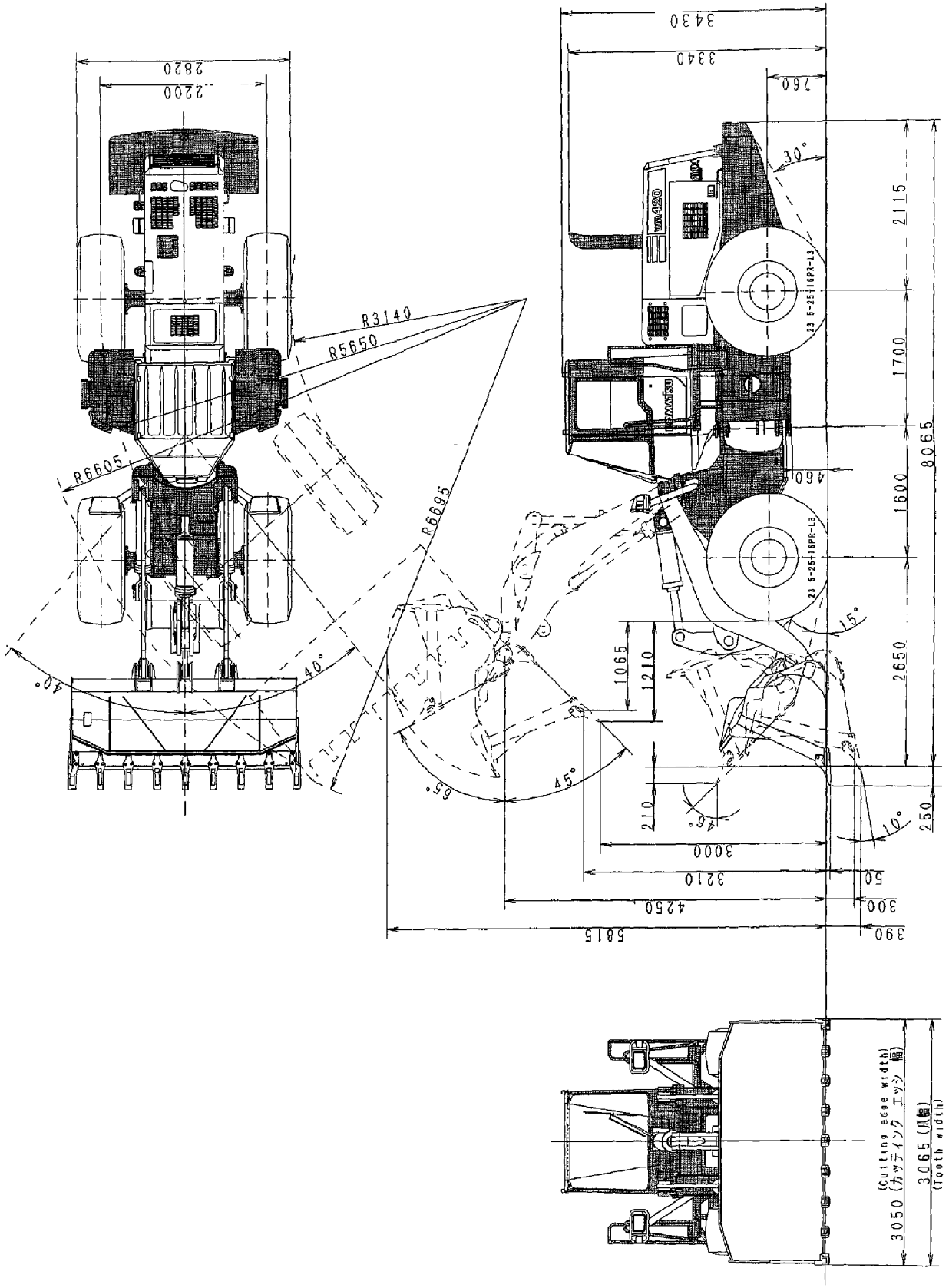
Nominal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number of strands	Dia. of strands (mm)	Cross section (mm^2)			
0.85	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
2	26	0.32	2.09	3.1	20	Lighting, signal etc.
5	65	0.32	5.23	4.6	37	Charging and signal
15	84	0.45	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	—	Black & White	Red & White	Yellow & 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 & Red
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	—

01 GENERAL

GENERAL ASSEMBLY DRAWING



SPECIFICATIONS

	Machine model			WA420-3
	Serial No.			15001 and up
Weight	Operating weight		(kg)	18, 280
	Distribution (front)		(kg)	9, 560
	Distribution (rear)		(kg)	8, 720
Performance	Bucket capacity (heaped)		(m^3)	3. 5
	Rated load		(kg)	6, 000
	Travel speed	FORWARD 1st	(km/h)	6. 3
		FORWARD 2nd	(km/h)	11. 7
		FORWARD 3rd	(km/h)	20. 5
		FORWARD 4th	(km/h)	32. 8
		REVERSE 1st	(km/h)	6. 6
		REVERSE 2nd	(km/h)	12. 2
		REVERSE 3rd	(km/h)	21. 2
		REVERSE 4th	(km/h)	33. 9
	Max. rimpull		(N (kg))	175, 420 (17, 900)
	Gradeability		(deg)	25. 0
	Min. turning radius	Center of outside wheel	(mm)	5, 650
		Outside portion of chassis	(mm)	6, 695
Dimensions	Overall length		(mm)	8, 315
	Overall width (chassis)		(mm)	2, 820
	Bucket width		(mm)	3, 065
	Overall height (top of cab)		(mm)	3, 430
	(Bucket raised)		(mm)	5, 815
	Wheelbase		(mm)	3, 300
	Min. ground clearance		(mm)	460
	Height of bucket hinge pin		(mm)	4, 250
	Dumping clearance		(mm)	3, 000
	Dumping reach (edge of bucket)		(mm)	1, 210
	Bucket dump angle		(deg)	45
	Bucket tilt angle (travel posture)		(deg)	46
	Digging depth (10° dump)		(mm)	390

Machine model			WA420-3
Serial No.			15001 and up
Engine	Model		Komatsu SA6D114
	Type		4-cycle, water-cooled, in-line, 6-cylinder, direct injection, with turbocharger
	No. of cylinders - bore x stroke	(mm)	6 -114 mm x135 mm
	Piston displacement	(cc)	8,270
	Flywheel horsepower	(kW (PS)/rpm)	167 (227)/2,200
	Maximum torque	(Nm (kgm)/rpm)	847 (86.4)/1,500
	Fuel consumption ratio	(g/kWh (g/PSh))	207(152)
	High idling speed	(rpm)	2,420
	Low idling speed	(rpm)	850
	Starting motor		24 V 7.5 kW
	Alternator		24 V 50 A
	Battery		12 V 170 Ah x 2
Power train	Torque converter		3-element, 1-stage, single-phase (Komatsu TCA37-2A)
	Transmission		Spur gear, constant-mesh multiple-disc, hydraulically actuated, modulation type
	Reduction gear		Spiral bevel gear, splash lubrication
	Differential		Straight bevel gear, torque proportioning
	Final drive		Planetary gear single stage, splash lubrication
Axle, wheel	Drive type		Front-, rear-wheel drive
	Front wheel		Fixed frame, full-floating type
	Rear wheel		Center pin support full-floating type
	Tire		23.5-25-16PR (L-3)
	Wheel rim		19.5/2.5×25(TT)
	Inflation pressure	Front tire (MPa (kg/cm²))	0.343 (3.5)
		Rear tire (MPa (kg/cm²))	0.304 (3.1)
Brakes	Service brake		Front-, rear-wheel independent system control, sealed multiple-disc wet-type disc brake With hydraulic booster
	Parking brake		Drive shaft, wet type disc brake Hydraulically released spring type

Machine model				WA420-3
Serial No.				15001 and up
Steering system	Type			Articulated steering
	Structure			Fully hydraulic power steering
Hydraulic system	Hydraulic pump type			Gear pump
	Delivery (ℓ /min.)		Hydraulic pump	172
			Switch pump	155
			Steering pump	98
			PPC pump	57
	Control valve	Set pressure for work equipment (MPa (kg/cm²))		Spool type 20.58 (210)
		Set pressure for steering (MPa (kg/cm²))		Spool type 20.58 (210)
	Cylinder	Boom cylinder No. – bore x stroke (mm)		Reciprocating piston 2 – 160 x 846
		Bucket cylinder No. – bore x stroke (mm)		Reciprocating piston 1 – 200 x 498
		Steering cylinder No. – bore x stroke (mm)		Reciprocating piston 2 – 90 x 442
Work equipment	Link type			Single link
	Bucket			Bucket teeth

WEIGHT TABLE

This weight table is a guide for use when transporting or handling components.

Unit: kg

Machine model	WA420-3		
Serial No.	15001 and up		
Engine	750		
Radiator	169		
Transmission (including torque converter)	1,000		
Center drive shaft	36		
Front drive shaft	31.2		
Rear drive shaft	19		
Front axle	1,388		
Rear axle	1,376		
Front differential	214		
Rear differential	224		
Planetary carrier (each)	506		
Axle pivot (rear axle)	120		
Wheel (each)	200		
Tire (each)	335		
Steering valve	23.5		
Steering cylinder (each)	27.7		
Brake valve (R.H.)	8.5		
Hydraulic tank	165		
Hydraulic, PPC pump (tandem pump)	20.5		
Steering, switch pump (tandem pump)	23.9		
Main control valve	97		
Lift cylinder (each)	153		
Bucket cylinder	203		
Engine hood	169		
Front frame	1,420		
Rear frame	1,170		
Bucket link	56		
Bellcrank	327		
Lift arm (including bushing)	1,170		
Bucket (with BOC)	1,670		
Counterweight	615		
Fuel tank	233		
Battery (each)	80		
Cab	300		
Air conditioner unit	140		
Operator's seat	20		
Floor board	454		

PROPER SELECTION OF FULE, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE	CAPACITY	
		-22 -4 14 32 50 68 86 104 122°F -30 -20 -10 -0 10 20 30 40 50°C	Speicified	Refill
Engine oil pan	Engine oil	API CF-4 及以上 SAE 30 SAE 10W-30 SAE 15W-40	22.4L	19L
Transsmi-ssion		SAE 10W	60L	40L
Hydarulic system		SAE 10W30 SAE 10W-30 SAE 15W-40 H046-HM(※)	210L	138L
Axle(with standard diffrential) (Front or rear)		AX080 or SAE30 API CD gread	60L	60L
Pins	Grease	NLGI No.2	—	—
Pins(with autogreasing system)		★ NLGI No.2	—	—
Fule tank	Diesel fule	ASTM D975 No.2 *	320L	—
Cooling system	Water/ Antifreeze (AF-NAC)	Add antifreeze by prorate	53L	—

※ For H046-HM, Please use the oil KOMATSU commended.

* **ASTM D975 No.1**

★ For normally use, Please consult KOMATSU or KOMATSU distributor.
In order to ensure the quality of lubricants, Please by KOMATSU Genuine lubricants from KOMATSU or KOMATSU distributor.

REMARK

- 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 engin oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

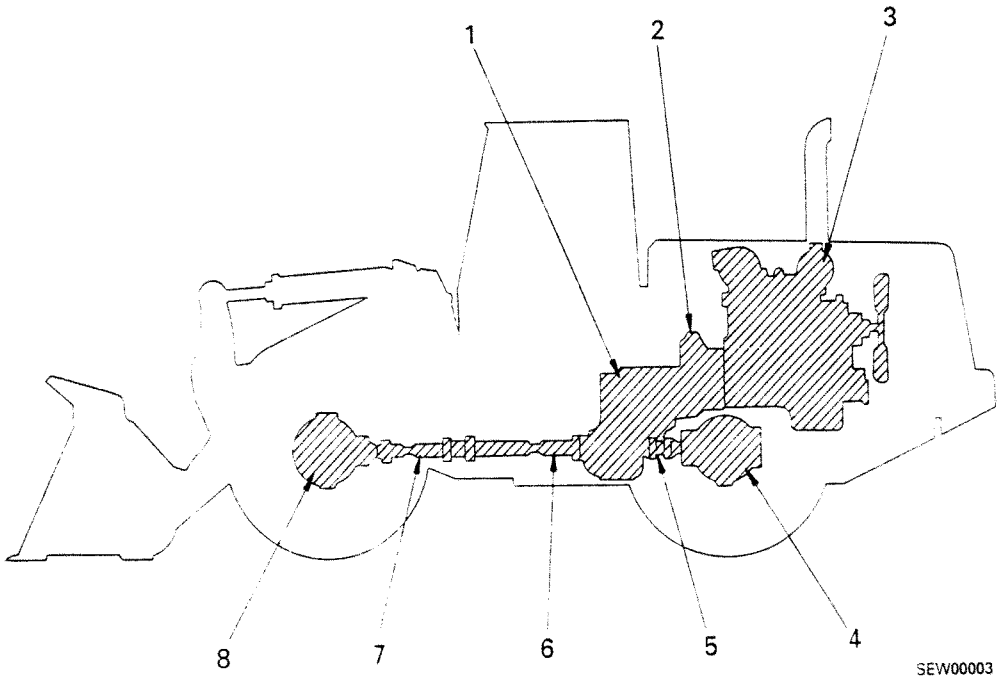
- When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.
- Use API classification CF4 as engine oil.
- There is no problem if single grade 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.
- 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.

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

10 STRUCTURE AND FUNCTION

POWER TRAIN



1. Transmission (multiple shaft type)
2. Torque converter
3. Engine (SA6D114)
4. Rear axle
5. Rear drive shaft
6. Center drive shaft
7. Front drive shaft
8. Front axle

Outline

- The motive force from engine (3) passes through the engine flywheel and is transmitted to torque converter (2), which is connected to the input shaft of transmission (1).
- The transmission has six hydraulically actuated clutches, and these provide four speed ranges for both FORWARD and REVERSE. The transmission speed ranges are selected manually.
- The motive force from the output shaft of the transmission passes through center drive shaft (6), front drive shaft (7) and rear drive shaft (5), and is then transmitted to front axle (8) and rear axle (4) to drive the wheels.

POWER TRAIN SYSTEM