WORKSHOP MANUAL

TB219

Serial No.121900003~

Book No. CD6E002

WETB219_C-XC



MINI EXCAVATOR

TAKEUCHI

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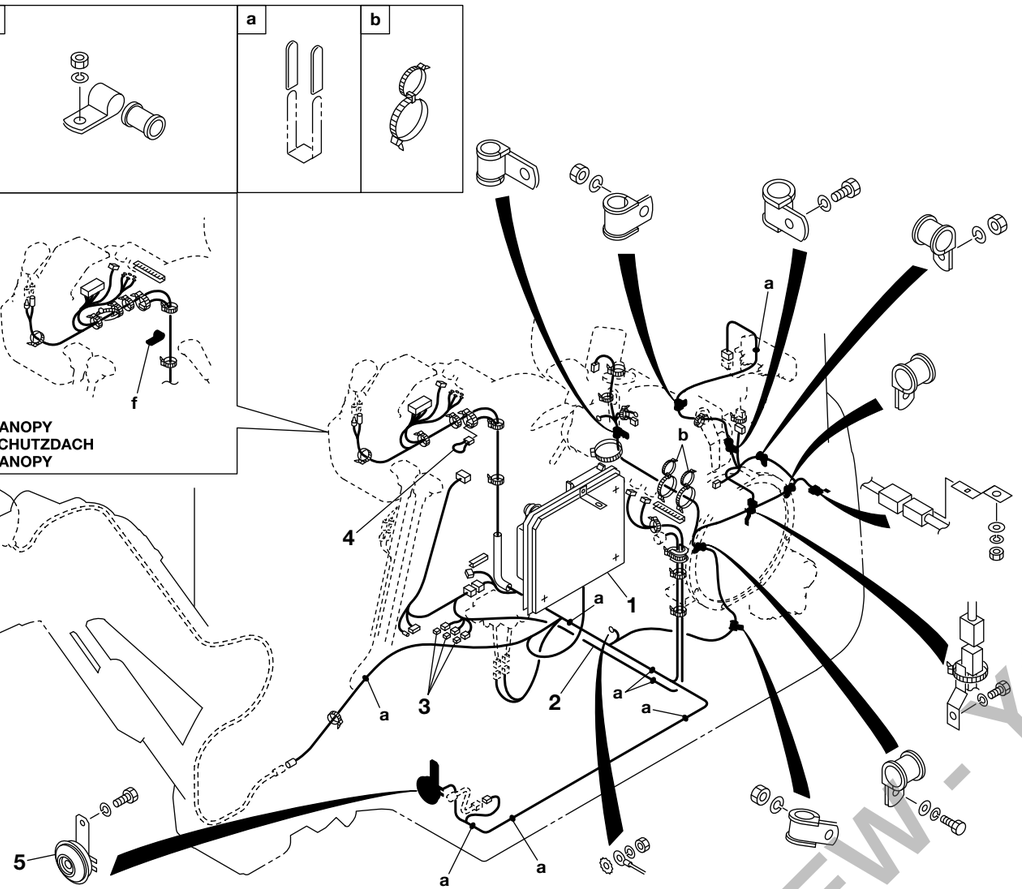
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Overall machine 5-3
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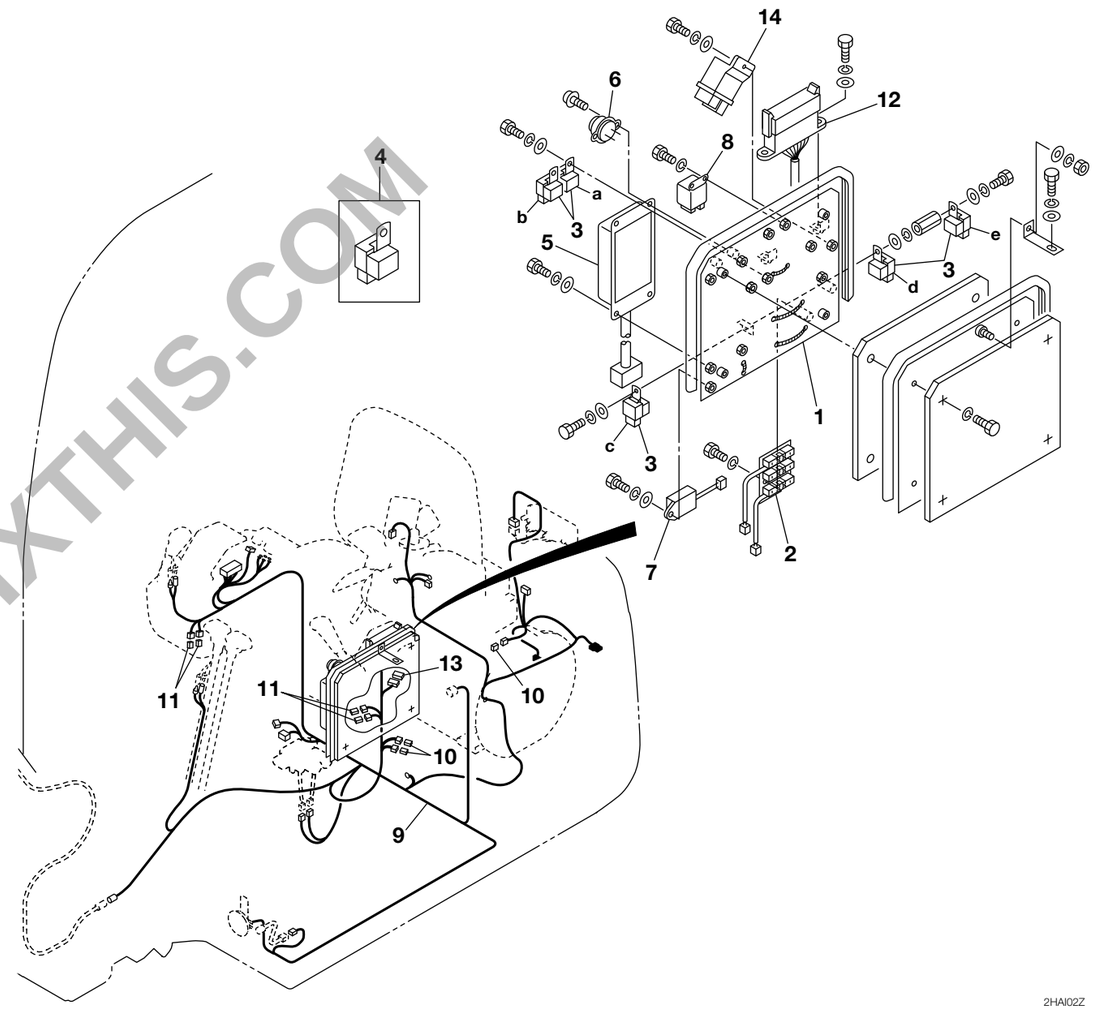
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WIRE HARNESS WIRING DIAGRAM



2HAI01Z

1. Control unit
2. Wire harness (03342-42200)
3. Diode
4. Short connector
5. Horn



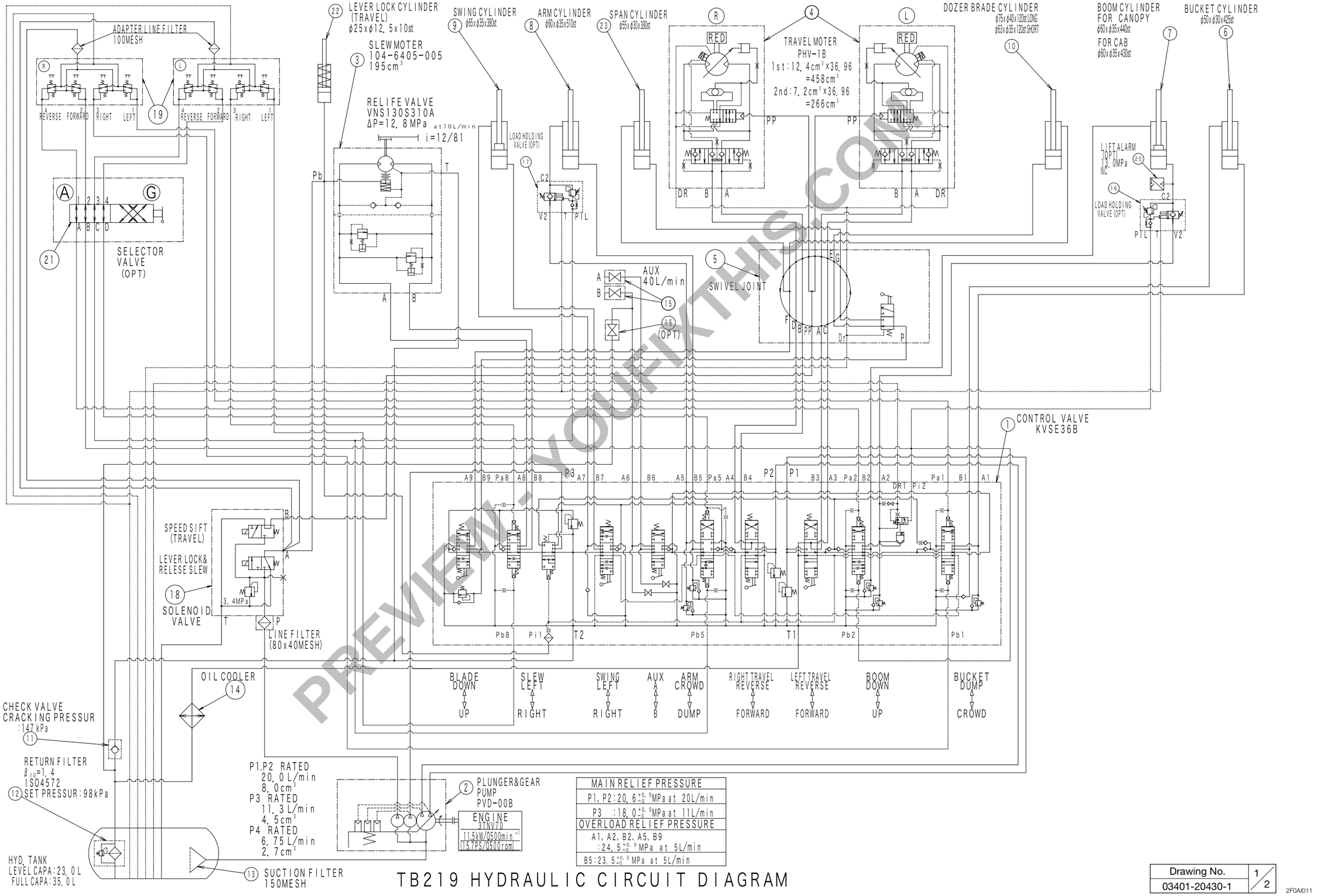
2HAI02Z

1. Control unit
2. Resistor assembly
3. Relay assembly
4. Relay
5. Controller
6. Buzzer
7. Timer
8. Glow resistor
9. Wire harness assembly (03442-09130)
10. Diode (3A)
11. Diode (1A)
12. Fuse box
13. Short connector
14. Safety relay

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HYDRAULIC CIRCUIT DIAGRAM



MAIN RELIEF PRESSURE
P1, P2:20.6 $^{+0.5}_{0}$ MPa at 20L/min
P3 :18.0 $^{+0.5}_{0}$ MPa at 11L/min
OVERLOAD RELIEF PRESSURE
A1, A2, B2, A5, B9 :24.5 $^{+0.5}_{0}$ MPa at 5L/min
B5:23.5 $^{+0.5}_{0}$ MPa at 5L/min

TB219 HYDRAULIC CIRCUIT DIAGRAM

Drawing No.	1/2
03401-20430-1	

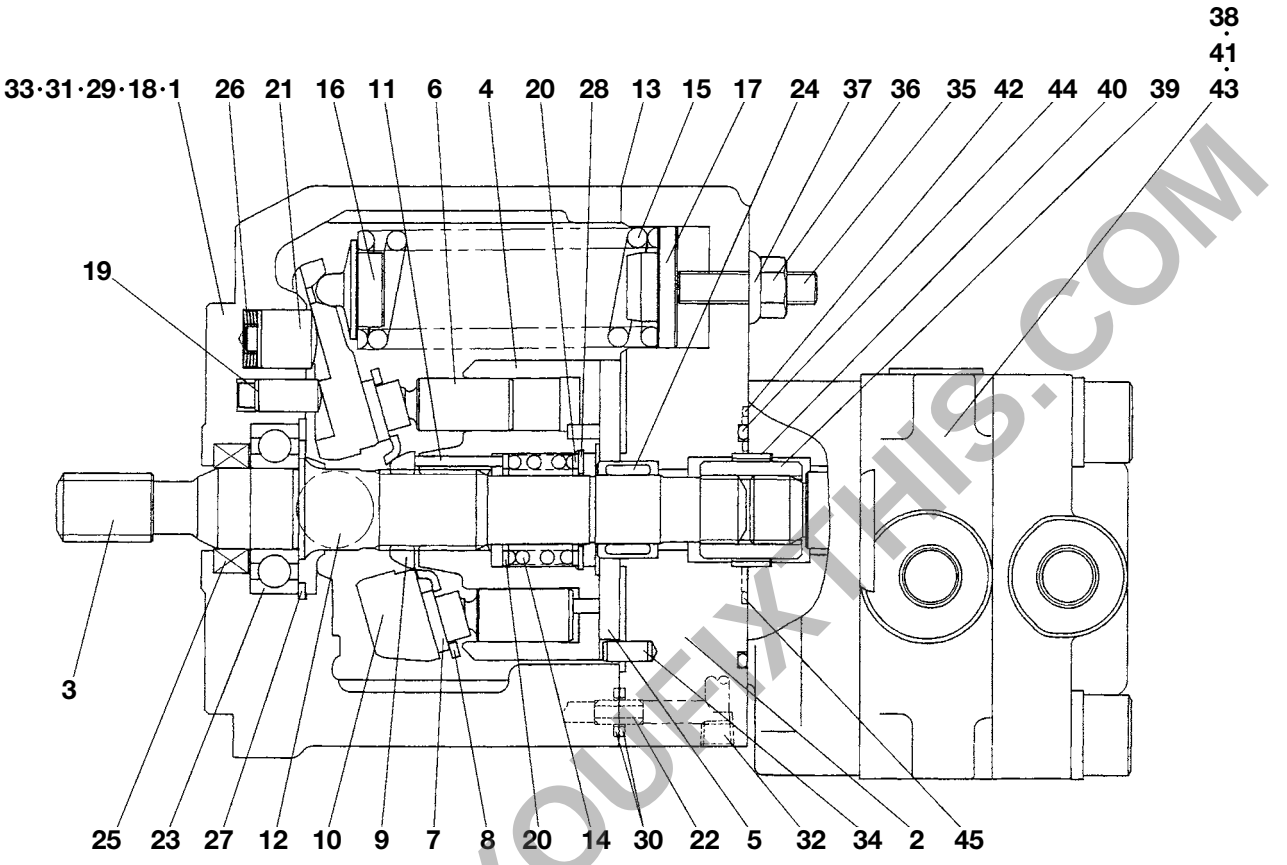
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HYDRAULIC PUMP

Construction



4I0AI01Z

1. Body S
2. Body H
3. Shaft
4. Cylinder block
5. Valve plate
6. Piston
7. Shoe
8. Shoe holder
9. Guide
10. Swash plate
11. Pin
12. Pin
13. Packing
14. Spring C
15. Spring T1
16. Spring holder
17. Spring guide
18. Pin
19. Piston
20. Retainer
21. Stopper pin A
22. Pin
23. Ball bearing
24. Needle bearing
25. Oil seal
26. Belleville spring
27. Snap ring
28. Snap ring
29. O-ring
30. O-ring
31. Cap screw
32. Plug
33. Plug
34. Spring pin
35. Setscrew
36. Nut
37. Seal washer
38. Gear pump
39. Coupling
40. Collar
41. Bolt
42. O-ring
43. Washer
44. O-ring
45. O-ring

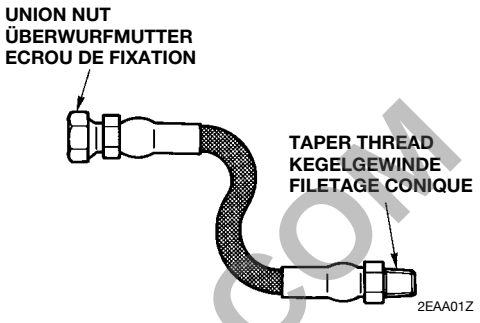
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TIGHTENING TORQUE

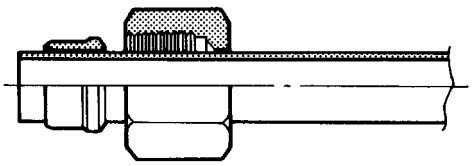
Hydraulic hose

Hose fitting size	Tightening torque	
	Union nut (G)	Taper thread (R)
	N·m	N·m
1/8	$9.8^{+4.9}_{0}$	11.8 ±1.2
1/4	$24.5^{+4.9}_{0}$	29.4 ±2.9
3/8	$49.0^{+4.9}_{0}$	53.9 ±5.4
1/2	$58.8^{+4.9}_{0}$	88.3 ±8.8
3/4	$117.7^{+4.9}_{0}$	147.1 ±14.7
1	$137.3^{+4.9}_{0}$	196.1 ±19.6



Bite-type pipe fitting for steel pipe

Pipe outer diameter (mm)	Tightening torque
	N·m
8	34.3 ±4.9
10	41.7 ±2.5
12	58.8 ±4.9
15	88.3 ±4.9
16	93.2 ±4.9
18	132.4 ±4.9
22	205.9 ±9.8
27.2	245.2 ±9.8
28	313.8 ±19.6
32	313.8 ±19.6
35	411.9 ±19.6



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SPECIFICATIONS TABLES

Operating mass	Cab	kg	2070
	Canopy	kg	1945
Rated output	Gross (SAE J1995)	kW/min^{-1}	12/2500
	Net (ISO 9249/SAEJ1349)	kW/min^{-1}	11.5/2500
Bucket capacity	Heaped capacity	m^3	0.046
	Struck capacity	m^3	0.033

Performance

Standard loading mass		kg	59	
Slew speed		min^{-1}	8.7	
Travel speed	1st	km/h	2.4	
	2nd	km/h	4.0	
Maximum tractive force		kN	20.7	
Gradeability		%	58	
		Degree	30	
Ground Pressure			Rubber crawlers	Steel crawler with double grousers
	Cab	kPa	33.1	34.1
	Canopy	kPa	31.1	32.1
Noise Level	Sound-power level	dB(A)	LWA 93	
	Sound-pressure level	dB(A)	LPA 78	

Machine dimensions

Overall length in transport condition			mm	4010
Overall width			mm	1370
Overall width	Crawler	Cab	mm	1030
		Canopy	mm	980
Overall working equipment height in transept position	Cab		mm	2360
	Canopy		mm	2290

Dimensions of base machine

Overall length of base machine			mm	1980
Overall width of base machine			mm	1370
Overall width of base machine	Track retracted		mm	—
Upper structure overall width		Cab	mm	1030
		Canopy	mm	980
Upper structure overall width	Left	Cab	mm	535
		Canopy	mm	490
	Right	Cab	mm	495
		Canopy	mm	490
Cab overall length			mm	980
Overall height of base machine			mm	—
Slew radius			mm	1140
Upper structure rearmost distance from axis of rotation			mm	1140
Clearance height under upper structure			mm	470
Crawler base			mm	1205
Crawler overall length			mm	1570
Undercarriage overall width			mm	1370
Undercarriage overall width	Track retracted		mm	980
Track gauge			mm	1140
Track gauge	Track retracted		mm	750
Track shoe width			mm	230
Ground clearance of undercarriage			mm	205

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LUBRICANT AND FUEL CHART

Select the appropriate fuel, lubricant and grease according to the temperature by referring to the table below.

- Regardless of the specified time, change the oil if it becomes too dirty or degraded.
- When refilling, never mix oils of different brands. If a brand is to be changed, replace the whole fuel/oil.

Part	Type	Type by air temperature -20 -10 0 10 20 30 40°C	When to change/ replenish	Capacity
Engine oil pan	Diesel engine oil API: CD class ACEA-E3, E-4 or E-5	SAE 10W-30 SAE 15W-40	Every 250 hrs after the first 50 hrs	Upper limit 2.8 L Lower limit 1.6 L
Hydraulic oil tank	Takeuchi genuine hydraulic oil 46	ISO VG46	Every 4000 hrs***	Total amount of oil: 35 L Tank capacity: 23 L
	Anti-wear hydraulic oil	ISO VG32 ISO VG46 ISO VG68	Every 2000 hrs	
Engine cooling system	Cooling water (water + coolant)** SAE-J814C, J1941, J1034 or J2036 ASTM-D6210 or D4985 (USA)	Mixture of 50% coolant Mixture of 30% coolant	Every 1000 hrs	3.7 L
Travel reduction gear	Gear oil API: GL-4	SAE 90	Every 1000 hrs after the first 250 hrs*	0.33 L
Track roller	Gear oil API: GL-4	SAE 90	—	0.06 L
Idler	Gear oil API: GL-4	SAE 90	—	0.045 L
Slew bearing	Lithium grease EP-2 NLGI No.2	—	Every 50 hrs	As required
Working equipment			Daily or every 10 hrs	
Levers			When required	

* If the ratio of traveling time to total operating time is high, replace the gear oil earlier than the specified time.

** For water, use tap water (soft). Do not use well or river water.
When the ambient temperature drops below 0°C, add coolant (antifreeze). Follow the coolant manufacturer's instructions to determine the mixture ratio.

*** The replacement interval for hydraulic oil depends on the oil type being used. New machines are shipped from the factory with the Takeuchi genuine hydraulic oil 46. This manual describes when to replace the hydraulic oil assuming that this Takeuchi oil 46 is used. When a conventional antiwear hydraulic oil is used, replace it every 2000 hours.

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Removing the engine

1. Disconnect the battery ground cable (7) from the battery terminal.

2. Remove the canopy or the cab.
   ☞ "Removing the cab"

3. Remove the floor frame.
   ☞ "Removing the floor frame"

4. Disconnect the electrical wiring of the air cleaner (13).

5. Remove the air cleaner (13).

6. Remove the radiator.
   ☞ "Removing the radiator"

7. Remove the drain hose.
   ☞ "Removing the radiator"

8. Remove the hydraulic pump.
   ☞ "Removing the hydraulic pump"

9. Disconnect the fuel hoses.
   ☞ "Removing the fuel tank"

10. Disconnect the battery cable and the electrical wirings from the engine side.
    • Attach an identification label to each wiring.

11. Disconnect the engine ground cable (7).

12. Disconnect the accelerator wire from the engine, and remove it together with the bracket.
    ☞ "Adjusting the engine throttle lever"

13. Take out the bolts and remove the cushion rubbers (11) and (17).
    Bolt: Three bond 1324
    Bolt: 102 N·m

14. Suspend the engine.
    : 103 kg

Installing the engine

For installation of the engine, follow the same procedure as for removal in the reverse order.

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SAFETY ALERT SYMBOL



This symbol represents the safety alert. The message that follows the symbol contains important information regarding human safety.
Read and understand the message to avoid personal injury or death.

Safety label

Safety labels are used to alert operators or other people exposed to the risks of injury or damage. There are the following three types of labels.
Read the labels carefully as they are important for your safety.

⚠ DANGER

The word "DANGER" indicates an imminently hazardous situation which, if not avoided, is likely to result in serious injury or death.

⚠ WARNING

The word "WARNING" indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

⚠ CAUTION

The word "CAUTION" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word "IMPORTANT" is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. It is also impossible to cover all hazards and risks which may be associated with the maintenance of the machine in every environment. For maintenance work, each person must take adequate safety precautions against possible hazards in the respective working environment.

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Unit: mm

Code	Item	Criteria					Action
		Standard dimension	Tolerance		Standard clearance	Allowable clearance	
			Axis	Hole			
A	Bucket and arm	30	-0.02 -0.05	+0.029 +0.114	0.049~0.164	1.0	
B	Bucket and link	30	-0.02 -0.05	+0.029 +0.114	0.049~0.164	1.0	
C	Arm and link	30	-0.02 -0.05	+0.029 +0.114	0.049~0.164	1.0	
D	Bucket cylinder and link	30	-0.02 -0.05	Link side +0.029 +0.114	0.047~0.163	1.0	
				Cylinder side +0.15 +0.05	0.07~0.20	1.0	
E	Bucket cylinder and arm	30	-0.02 -0.05	+0.15 +0.10	0.07~0.20	1.0	
F	Arm and boom	35	-0.02 -0.05	+0.027 +0.113	0.047~0.163	1.0	
G	Arm cylinder and arm	35	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	
H	Arm cylinder and boom	35	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	Replace
I	Boom and swing bracket	40	-0.02 -0.05	+0.024 +0.112	0.044~0.162	1.0	
J	Boom and swing bracket	35	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	
K	Boom cylinder and swing bracket	35	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	
L	Swing bracket and turntable	70	-0.02 -0.05	+0.034 +0.113	0.054~0.183	1.0	
M	Swing cylinder and swing bracket	40	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	
N	Swing cylinder and turntable	40	-0.02 -0.05	+0.16 +0.05	0.07~0.21	1.0	
O	Blade cylinder and blade	30	-0.02 -0.05	±0.05	0.03~0.10	1.0	
P	Blade cylinder and lower frame	30	-0.02 -0.05	±0.05	0.03~0.10	1.0	
Q	Blade and lower frame	40	-0.02 -0.05	+0.029 +0.114	0.049~0.164	1.0	
R	Swing bracket and turntable	70	-0.02 -0.05	+0.034 +0.113	0.054~0.183	1.0	

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PERFORMANCE CRITERIA

Standard values table

Serial No. 121900003 to 121900149

Item					Standard values	Allowable value
Engine speed	Idling			min^{-1}		—
	Maximum R. P. M			min^{-1}		—
Hydraulic oil pressure	Boom			MPa	$20.6\ ^{+1.4}_{-0.2}$	—
	Arm			MPa	$20.6\ ^{+1.4}_{-0.2}$	—
	Dozer blade			MPa	$18.0\ ^{+1.5}_{0}$	—
	Slew			MPa	$14.0\ ^{+2.0}_{0}$	—
	Pilot pressure			MPa	3.4 ±0.3	—
Cylinder speed	Boom	Canopy	Retraction	s	2.3 ±0.5	3.0
			Extension	s	2.2 ±0.5	2.9
		Cab	Retraction	s	2.2 ±0.5	2.9
			Extension	s	2.1 ±0.5	2.8
	Arm		Retraction	s	3.0 ±0.5	3.8
			Extension	s	3.3 ±0.5	4.1
	Bucket		Retraction	s	1.8 ±0.4	2.4
			Extension	s	2.6 ±0.4	3.3
	Swing	Canopy	Retraction	s	5.3 ±0.7	6.5
			Extension	s	5.3 ±0.7	6.5
		Cab	Retraction	s	5.1 ±0.7	6.3
			Extension	s	5.1 ±0.7	6.3
	Dozer blade	Standard	Retraction	s	3.1 ±0.4	3.8
			Extension	s	3.3 ±0.4	4.0
		Short	Retraction	s	2.2 ±0.4	2.8
			Extension	s	2.3 ±0.4	2.9
	Spanner		Retraction	s	5.5 ±0.7	6.8
			Extension	s	5.9 ±0.7	7.2
Slew time			Normal speed	s	14.0 ±0.8	16.2
			Slow speed	s		
Overrun when slewing stops				mm	40 ±20	77
Spontaneous travel drop				mm	0	
Spontaneous drop	Slew bearing			mm	0	
	Swing cylinder			mm	$5\ ^{0}_{-5}$	
Travel speed (10m)	Low speed		Rubber	s	15.5 ±1.2	18.3
			Steel	s	17.3 ±1.5	20.5
	High speed		Rubber	s	9.8 ±1.2	12.4
			Steel	s	10.3 ±1.5	13.2
Travel speed (5 rev.)	Low speed		Rubber	s	25.5 ±1.5	29.6
			Steel	s	26.5 ±1.8	31.0
	High speed		Rubber	s	15.5 ±1.2	18.9
			Steel	s	16.0 ±1.5	19.7
Straight travel				mm	$125\ ^{0}_{-125}$	500
Straight travel function check	Bucket				Straightness should be remained when operated at the same time	
	Arm					
	Boom					
	Blade					
Bucket cylinder speed*			Retraction	s	3.2 ±0.6	4.1

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