SERVICE MANUAL

E160C Blade Runner

Crawler Excavator

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Part number 47497833A
English
October 2012

NEW HOLLAND CONSTRUCTION

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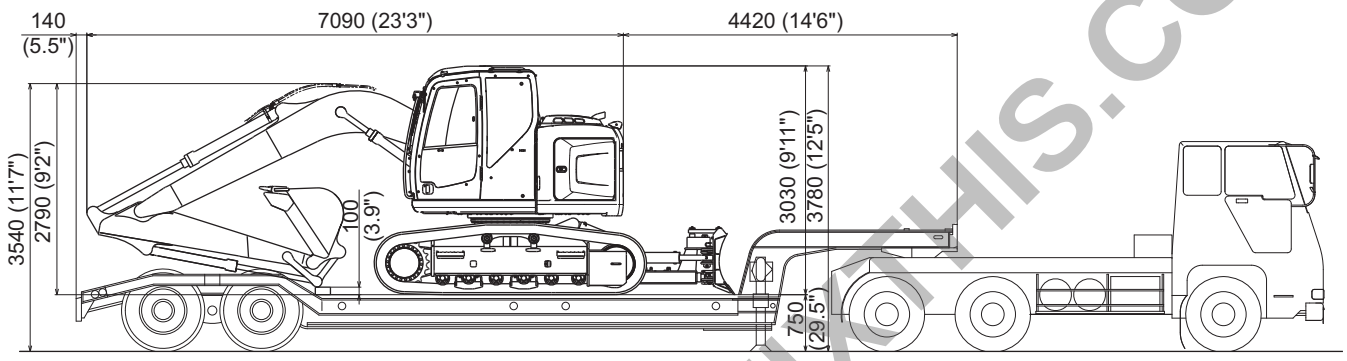
2.4 TRANSPORTATION

2.4.1 OVERALL DIMENSIONS OF MACHINE ON A TRAILER

(1) 4.68m (15ft-4in) Boom+2.38m (7ft-10in) Arm+0.5m3 (0.65cu-yd) Bucket

Item/Shoe type	500mm (19.7in)
Width : mm (ft-in)	2,490 (8'2")
Weight: kg (lbs)	15,600kg (34,400 lbs)

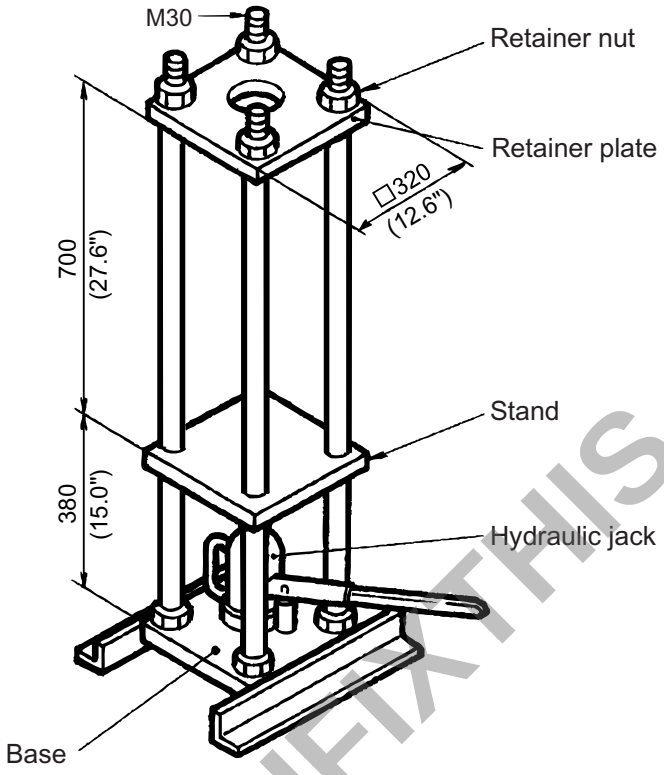
Unut: mm(ft-in)



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11.14 TRACK SPRING SET JIG



Track spring set jig

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21. MECHATRO CONTROL SYSTEM

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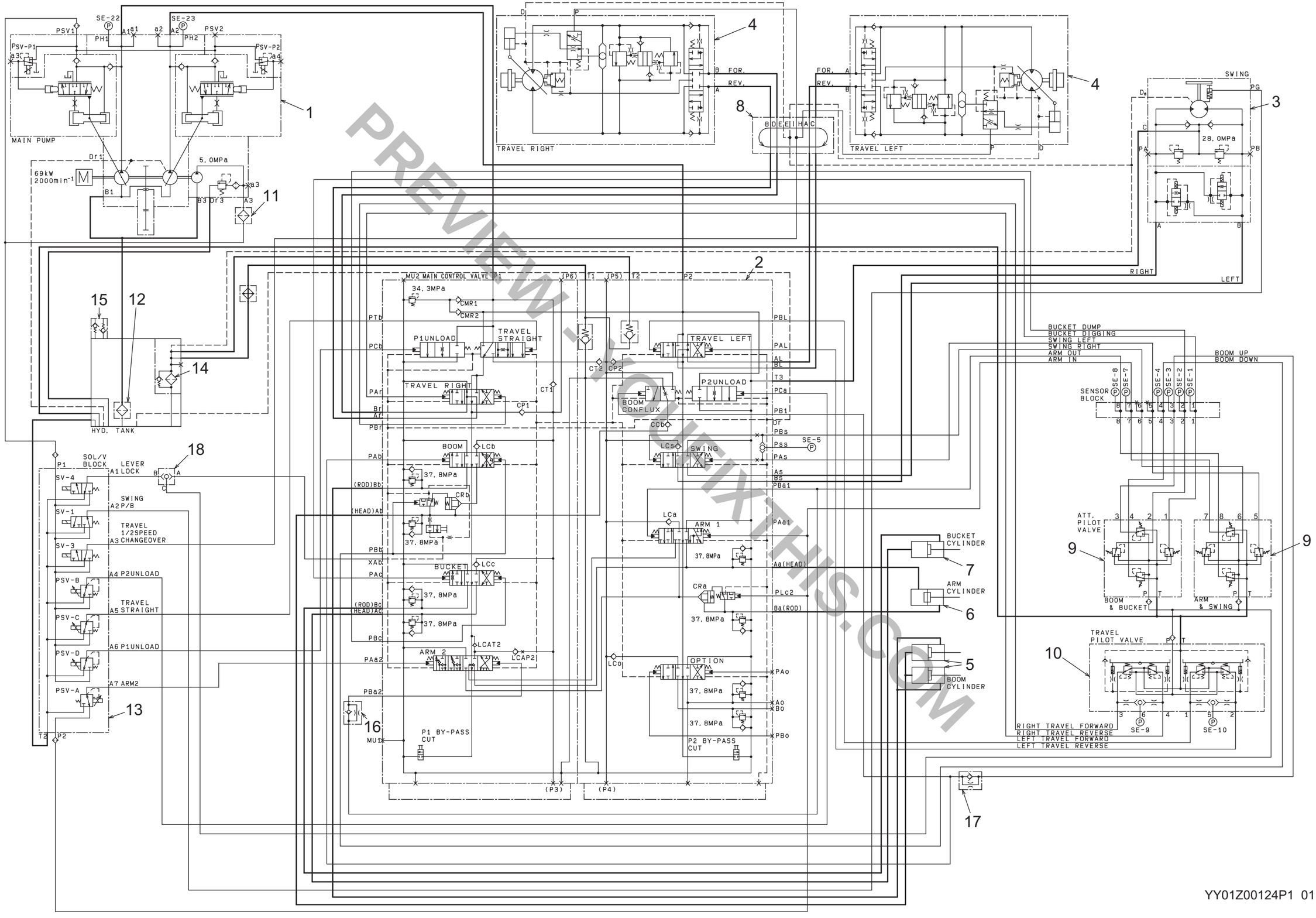
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22.2.1 STANDARD

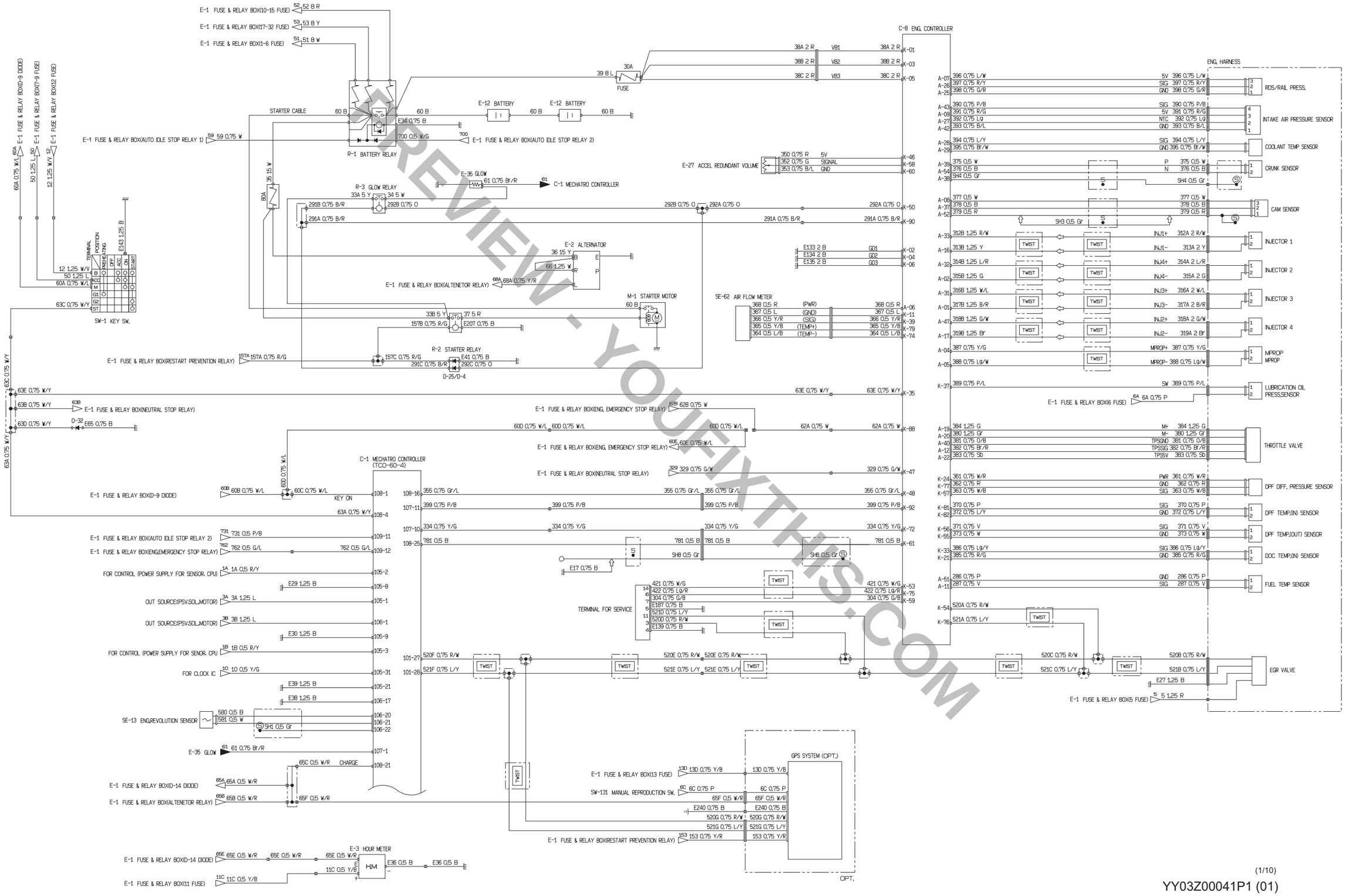


YY01Z00124P1 01

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23.1 ELECTRIC CIRCUIT DIAGRAM



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(1/10)

YY03Z00041P1 (01)

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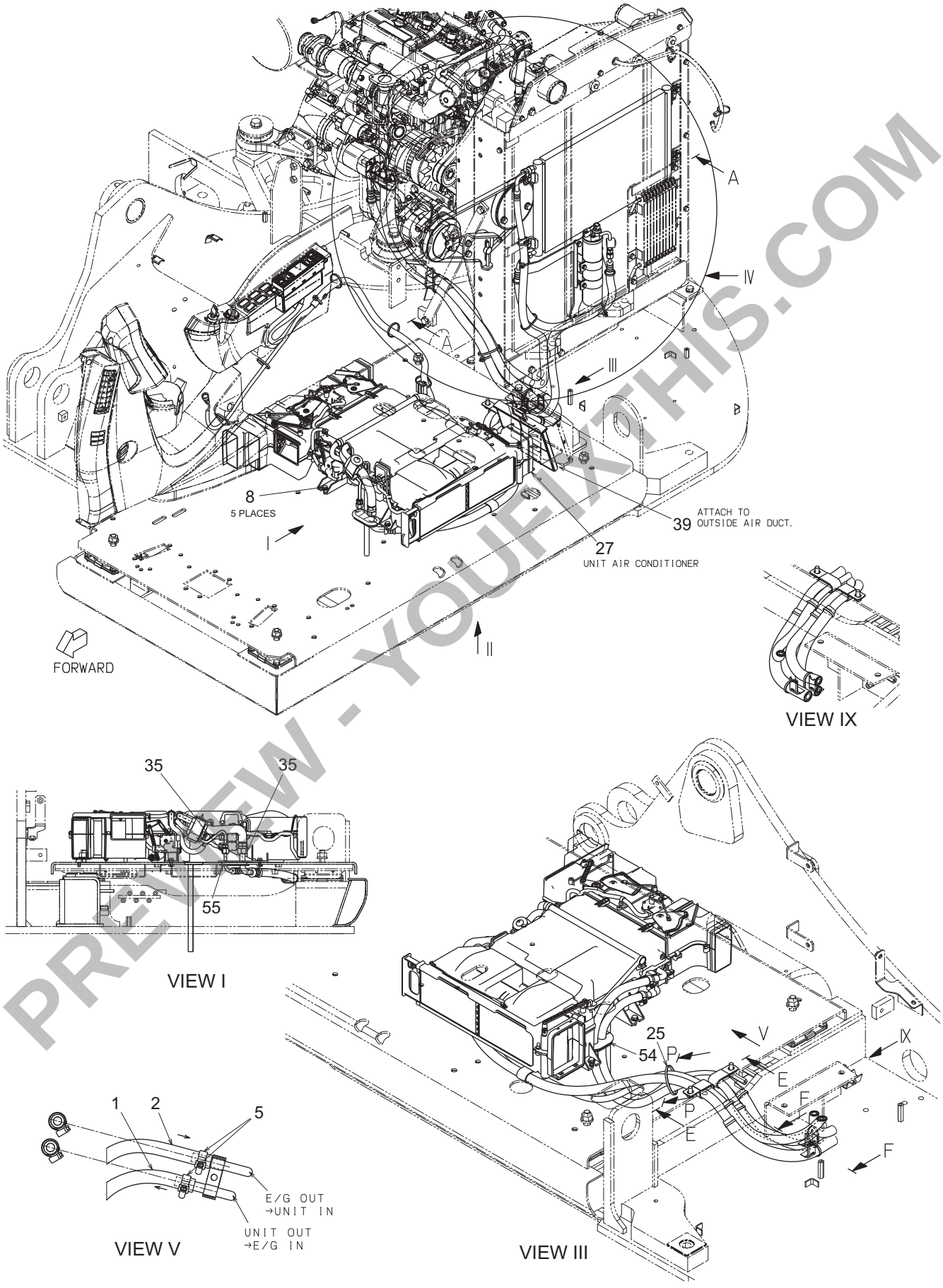
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25.3 PIPING

25.3.1 AIR CONDITIONER



Air conditioner piping (1/4)

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Issue	Date of Issue	Applicable Machines	Remarks
First Edition	December, 2008	SK200-8 : YN12-56001~ SK210LC-8 : YQ12-08001~	S5YN0129E01 (SE Asia & Oceania)
↑	December, 2010	SK210LC-8 : YQ12-B0101~	↑ KCEI
↑	↑	SK250-8 : LQ13-07375~ SK260LC-8 : LL13-06387~	↑ (ANZ)
↑	↑	SK225SR : YB06-03580~ SK225SRLC : LA06-02501~	↑ (ANZ)
↑	January, 2011	SK330-8 : LC11-09068~ SK350LC-8 : YC11-04950~	↑ (ANZ)
↑	September, 2011	SK225SR : YB06-03501~	↑ (SE Asia)
↑	November, 2011	SK200-8 : YN12-H4463~H4612	↑ Indonesia (HS Engine)
↑	December, 2011	E140CSR : YH07-09001~	↑ (NHK-EUR)
↑	↑	SK140SRLC-3 : YH07-09001~	↑ (NA)
↑	February, 2012	E260CSR(N)LC : YU07-04001~	↑ (NHK-EUR)
↑	↑	260SR : YU07-04001~	↑ (NA)
↑	↑	E230CSR : YB07- E230CSRLC : LA07-03001~	↑ (NHK-EUR)
↑	↑	230SR : LA07-03001~	↑ (NA)
↑	May, 2012	SK850LC-2 : LY03-001~	↑ (NA)
↑	September, 2012	E75CSR : YT08-30001~	↑ (NHK-EUR)
↑	↑	75SR-3 : YT08-30001~	↑ (NA)
↑	↑	SK75SR-3 : YT07-25001~	↑ (SE Asia & Oceania)
↑	↑	SK85MSR-3 : LF07-05001~	↑ (OCE)
↑	October, 2012	E85CMSR : LF08-05501~	↑ (NHK-EUR)
↑	↑	85CS-3 : LF08-05501~	↑ (NA)
↑	November, 2012	SK75-8 : LG01-H5001~	↑ (SE Asia)
↑	↑	E160CBR : LH02-01501~	↑ (NHK-EUR)
↑	↑	ED160BR : LH02-01501~	↑ (NA)

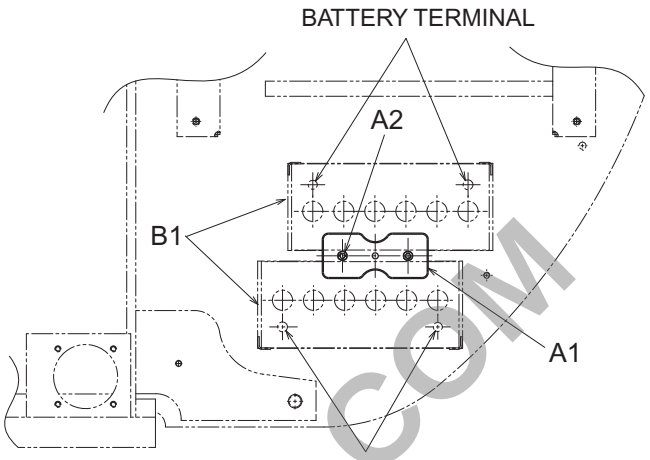
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33.1.3.2 INSTALL

(1) Install the battery in the reverse order of removing.
Hold down plate (A1) against battery (B1), and tighten capscrew (A2).
Tools: Socket: 17mm,
Tightening torque : 10.8 N-m (8.0 lbf-ft)

(2) Installing grounding cable
Install grounding cable (A4) last. Especially care must be taken that the grounding face is free from painting, rust, etc.
Tools: Socket: 13mm

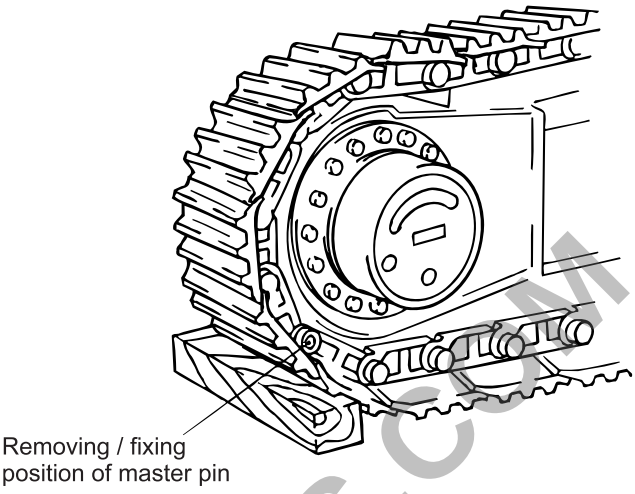


Removing battery

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3. Pushing out master pin
   Apply jig on master pin and strike it out with a mallet.
   (Refer to Fig. "Press fitting of master pin")

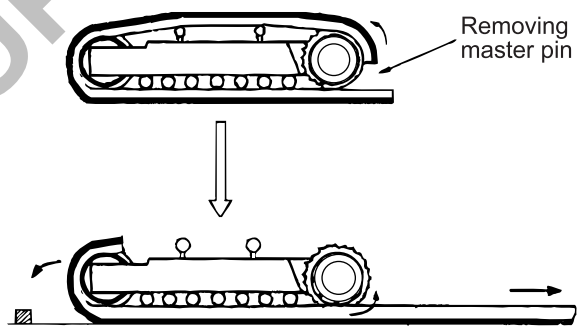


Removing/fixing position of master pin

CAUTION

When using a big hammer, wear protective goggles and a long-sleeved uniform so you do not injure yourself by flying objects.

(4) Removing crawler
   Put attachment on ground so that weight is not loaded to the lower frame, and remove track link assy rotating sprocket.



Removing crawler

CAUTION

Crawler end section may fall on the ground just before extending it on the ground incurring danger of injury. Please keep well away from the equipment.

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Issue	Date of Issue	Applicable Machines	Remarks
First Edition	November, 2012	E160CBR : LH02-01501~	S5LH4601E01 (NHK-EUR)
↑	↑	ED160BR : LH02-01501~	↑ (NA)

Preface

Troubleshooting provides process locating for the cause of trouble in the order that trouble occurred. This manual describes how to solve the specific phenomenon systematically as early as possible. For troubleshooting concerning the inside of equipment, refer to troubleshooting for each manual of equipment.



Attending the field to verify actual thing.

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47. TROUBLESHOOTING (BY TROUBLE)

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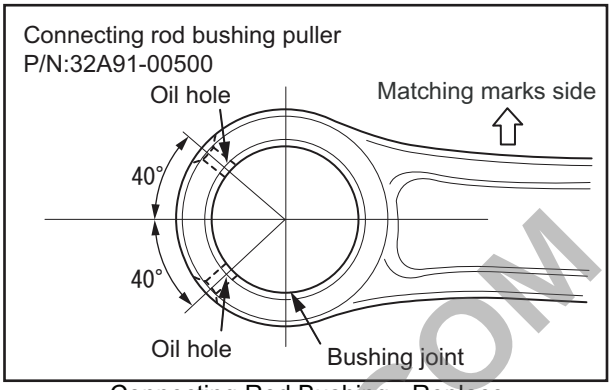
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4.9 Connecting Rod Bushing - Replace

(1) Use the connecting rod bushing puller to replace the connecting rod bushings.

(2) With the bushing joints oriented as shown in the illustration, align the oil hole of bushing with the oil hole of connecting rod, and press-fit the connecting rod bushing into the connecting rod.

(3) After press-fitting, insert the piston pin, and make sure the smooth movement of the connecting rod and piston without looseness.



Connecting Rod Bushing - Replace

4.10 Connecting Rod Bushing - Remove

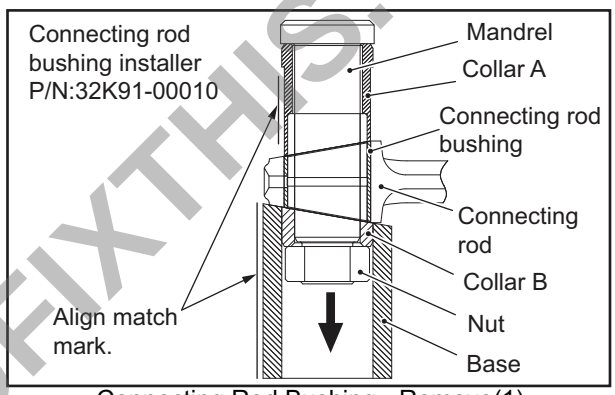
4.10.1 Connecting Rod Bushing - Remove

(1) Apply engine oil to the inner surface of connecting rod bushing.

(2) Install the collar A to the connecting rod bushing.

(3) Install the collar A and B to mandrel and fix them with a nut.

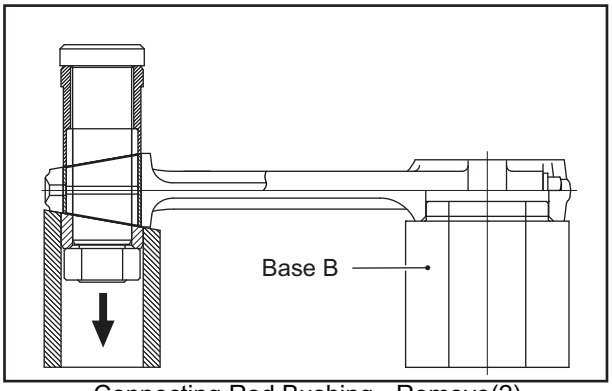
(4) Align the matching mark (red scribed line) on the collar A with that on the adapter.



Connecting Rod Bushing - Remove(1)
(with connecting rod bush installer)

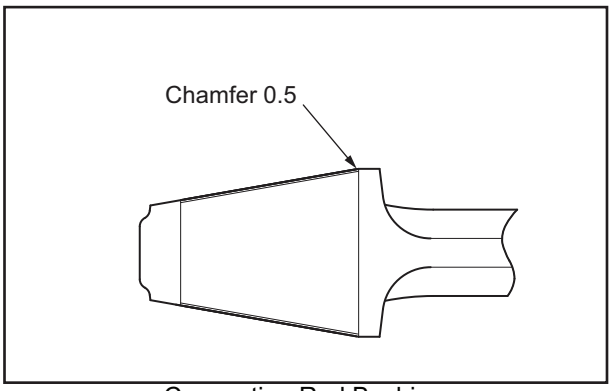
(5) Install the connecting rod big end to the base B.

(6) With a pressing machine, apply pressure slowly on the mandrel head to push-out the connecting rod bushing.



Connecting Rod Bushing - Remove(2)

(7) Chamfer (C 0.5) the bore edge of connecting rod small end.



Connecting Rod Bushing,
Chamfer the Small End Bore

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WARNING

The proper and safe lubrication and maintenance for this machine, recommended by Manufacturer, are outlined in the OPERATOR'S MANUAL for the machine.
Improper performance of lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table is shown in the section; SPECIFICATIONS.

The following is a list of basic precautions that must always be observed.

(1) Read and understand all Warning plates and decal on the machine before Operating, Maintaining or Repairing this machine.

(2) Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.

(3) Disconnect the battery and hang a "Do Not Operate" tag in the Operators Compartment. Remove ignition keys.

(4) If possible, make all repairs with the machine parked on a firm level surface. Block the machine so it does not roll while working on or under the machine. Hang a "Do Not Operate" tag in the Operators Compartment.

(5) Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.

WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATOR'S MANUAL. Improper machine operation is dangerous and could result in injury or death.

(6) Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.

(7) Lower the bucket, dozer, or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, dozer, ripper or other attachment is blocked correctly to prevent it from dropping unexpectedly.

(8) Use steps and grab handles when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. Always face to the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.

(9) To avoid back injury, use a hoist when lifting components which weigh 20kg (45lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.

(10) To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and compartments.

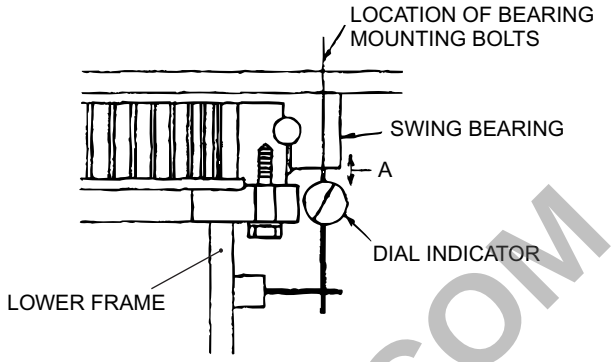
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13.8 MEASURING PERFORMANCES OF SWING BEARING

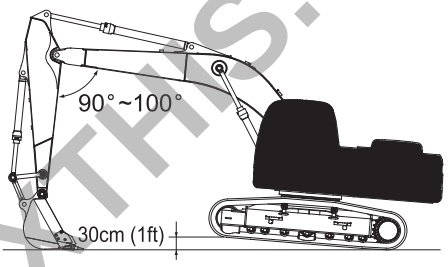
(1) Purpose
Measure the gap between the lower frame and the bottom face of the swing bearing and estimate the degree of wear of the swing bearing.

(2) Condition
Firm, level ground
The swing bearing mounting bolts are not loosened.
The swing bearing is lubricated well, not making abnormal sound during turning.



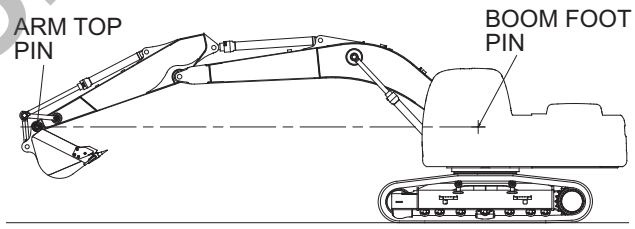
How to measure the axial play of swing bearing

(3) Preparation
1.
Install a dial indicator to the magnetic base and fix it to the lower frame.
2.
Direct the upper swing body and the lower frame toward the travel direction, bring the probe of the dial indicator in contact with the bottom surface of the outer race on the swing body side and set the reading at zero.



Measuring position 1

(4) Measurement 1 (Measuring position 1 and 2)
1.
Measure the displacement of the outer race in the axial direction in position 1 [The arm at 90 degrees to 110 degrees and the crawler front is lifted by attachment about 30cm (1ft)] and in position 2, using a dial indicator.

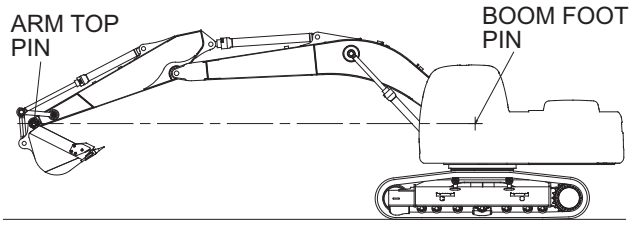


Measuring position 2

Axial play of swing bearing — Unit : mm (in)

Measuring position	Standard value	Reference value for remedy	Service limit
A	0.5~1.5 (0.02~0.06)	1.9~2.9 (0.08~0.11)	3.0~ (0.12~)

(5) Measurement 2 (Measuring position 3)
1.
Retract the arm cylinder fully and extend the bucket cylinder fully. And move the boom so that the arm top pin is positioned at same height with boom foot pin. Then swing the bucket right and left by man power. But in this case, the gap of the attachment is included.



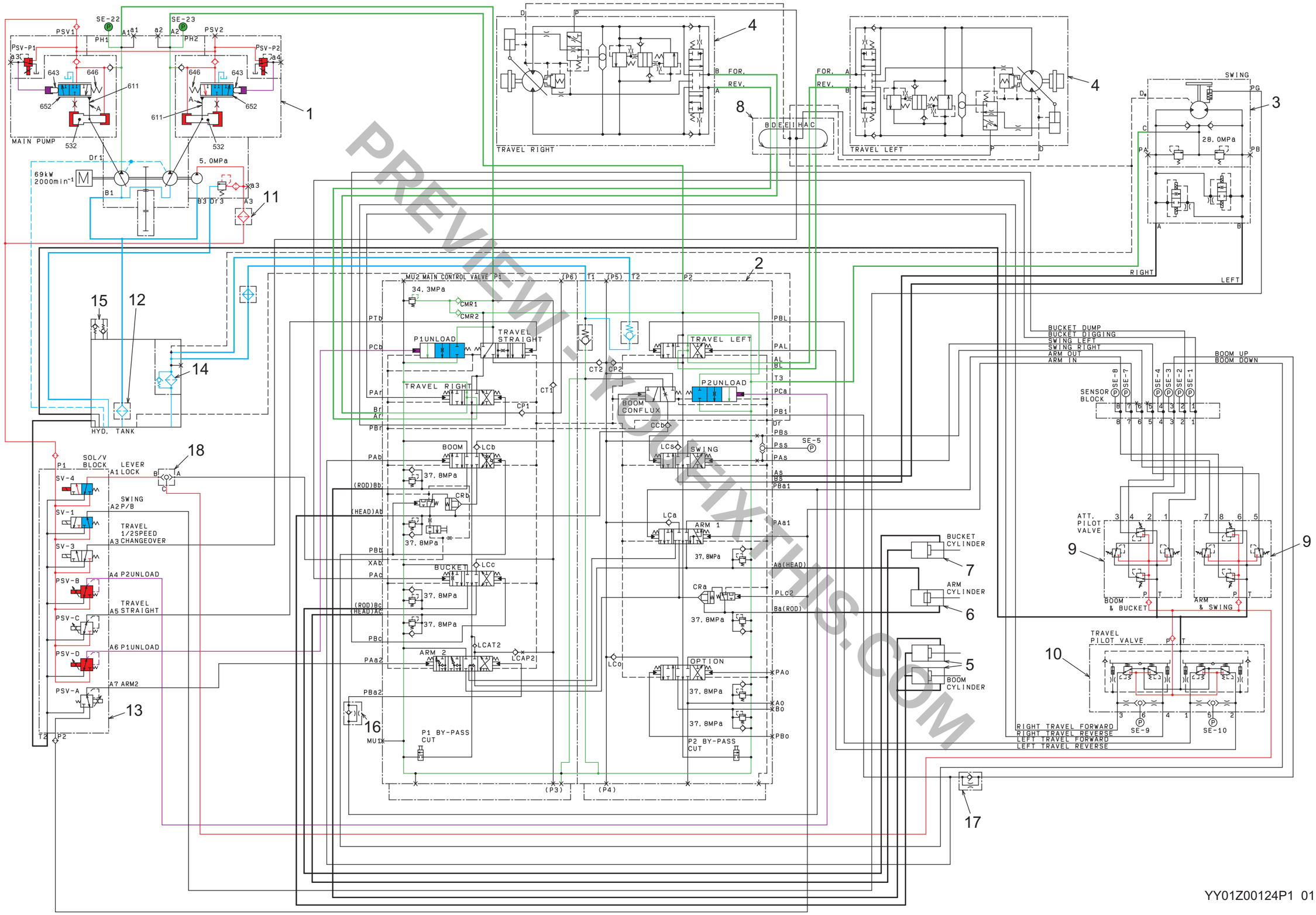
Measuring position 3

Right and left movement of the tip of bucket — Unit : mm (in)

Measuring position	Standard value	Reference value for remedy	Service limit
Bucket	30~50 (1.18~1.97)	80 (3.15)	120 (4.72)

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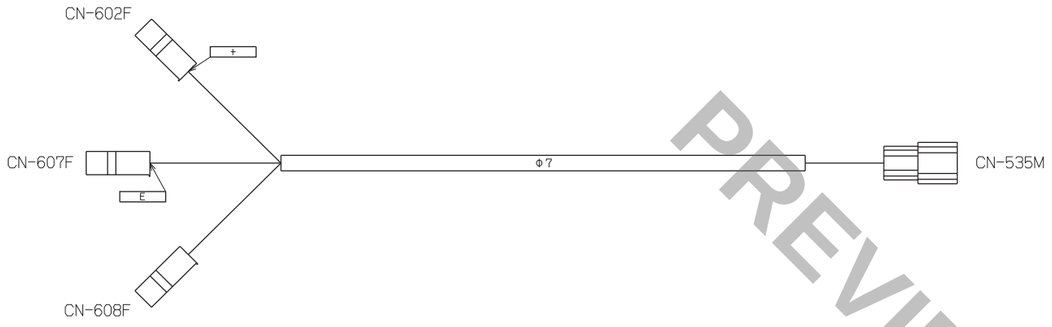
NEUTRAL CIRCUIT : Positive control function at safety lock lever down (unlocked position)

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23.3.16.6 HOUR METER HARNESS : YN11E01205P1
23.3.16.7 12V HARNESS : LF14E01033P1

HOUR METER HARNESS : YN11E01205P1



CONNECTORS SELECTION TABLE

CONNECTER NAME (PIN NUM.)	MANUFAC.	PART NUMBER	
		HOUSING	TERMINAL
3MA-CNA	AMP	172131-1	170340-1
1FA-POL	AMP	171809-2	170233-1

WIRE NO	WIRE COLOR	WIRE SIZE (mm2)	FROM	CONNECTION	TO
11C	Y/B	AVSS0.5f	CN-602F	———	CN-535M
65E	W/R	AVSS0.5f	CN-607F	———	CN-535M
E36	B	AVSS0.5f	CN-608F	———	CN-535M

CN-535M



3MA-CNA
CN-535M
TO CAB HARNESS

CN-602F



1FA-POL
CN-602F
E-3
HOUR METER

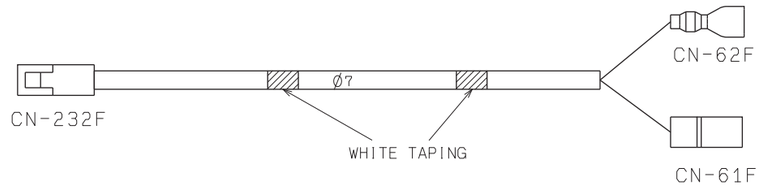
CN-607F

1FA-POL
CN-607F
E-3
HOUR METER

CN-608F

1FA-POL
CN-608F
E-3
HOUR METER

12V SOCKET HARNESS : LF14E01033P1



CONNECTORS SELECTION TABLE

CONNECTER NAME (PIN NUM.)	MANUFAC.	PART NUMBER	
		HOUSING	TERMINAL
1FA-205	AMP	4-170823-1 236540 DR-205-3.2	170179-1
2FA-CNA	AMP	172130-1	170032-2
1FA-HSG	AMP	1-480416-0	170213-3

WIRE NO	WIRE COLOR	WIRE SIZE	FROM	CONNECTION	TO
96B	W/G	AVSS0.75f	CN-62F	———	CN-232F
E116	B	AVSS0.75f	CN-61F	———	CN-232F

CN-61F



1FA-HSG
CN-61F
E-23
12V SOCKET

CN-62F



1FA-205
CN-62F
E-23
12V SOCKET

CN-232F



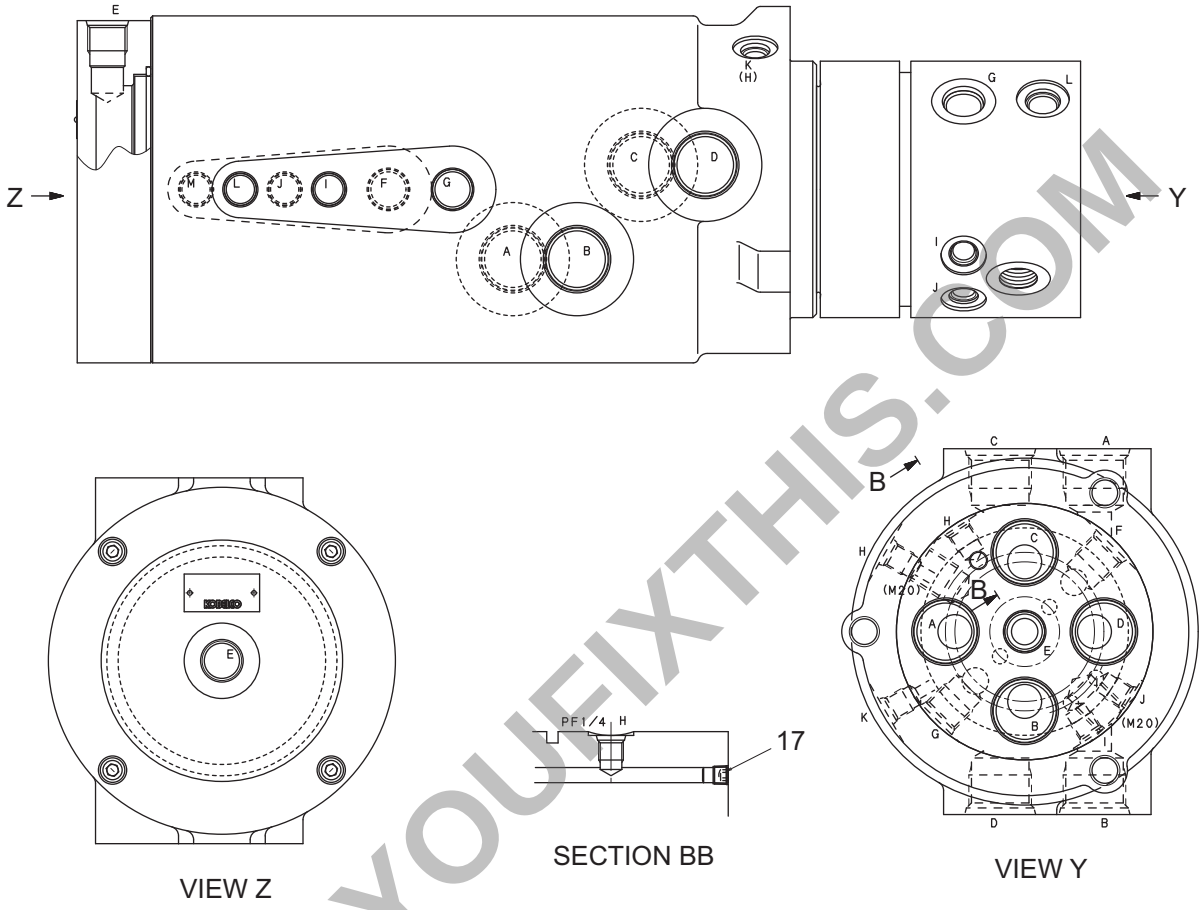
2FA-CNA
CN-232F
TO FLOOR HARNESS

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24.1.8 SWIVEL JOINT

24.1.8.1 GENERAL VIEW



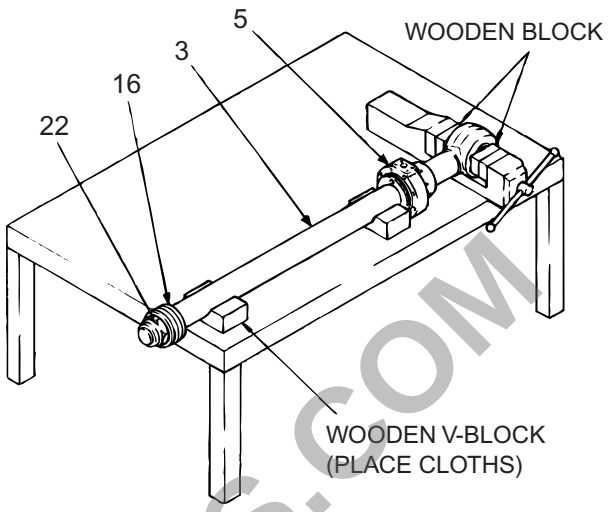
General view of swivel joint

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32.2.1.3.2 REMOVING PISTON ASSY

(1) Fix piston rod (3) by holding its clevis section in a vise. Fix the piston rod (3) securely as piston nut (22) is tightened to a high torque.

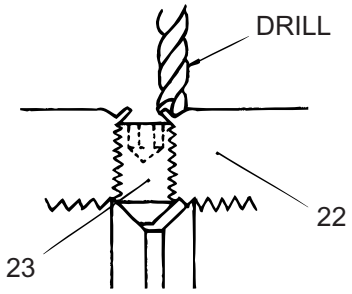


How to loosen piston nut (22)

⚠CAUTION

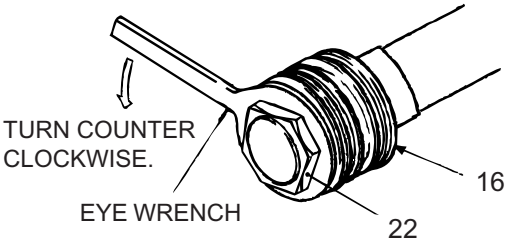
-Note that the tightening torque differs with the type, the working pressure and the mounting method of the piston (16), though the rod diameter remains the same.
-It is also necessary to place a suitable supporting block near the piston (16). In case a V-block is used, put cloths or something over the rod to prevent it from damage.

(2) Scrape off the caulked part of setscrew (23) of piston nut (22) by means of a hand drill and loosen setscrew (23).



Removing setscrew (23)

(3) Loosen and remove piston nut (22).



How to loosen piston nut (22)

⚠CAUTION

Since piston nut (22) is tightened to a high torque, use a hook wrench suitable for the outside diameter of piston nut (22). Use care so the hook of the wrench is positively fixed in the groove of the piston nut perimeter.

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33.2.1.2.2 Disassembly and assembly

(1) Tools

The right list shows the tools required for remove and install.

(2) Disassembling procedure

1.
Selecting a place for disassembly.

-Choose a clean place.
-Spread rubber sheet or cloth on work bench to protect parts from damaging.

2.
Cleaning
Remove dust and rust, etc. on regulator surface with wash oil.

3.
Remove regulator (See Fig."Regulator exploded view")
Remove socket bolts (415) and separate the regulator from the pump body.
Tools: Allen wrench: 6mm

TOOLS	SIZE (mm)	PARTS	
		SIZE	ITEM No.
ALLEN WRENCH	4	M5	418, 496
	5	M6	402,407
	6	M8	415,466
	8	M10	801
	12	M14	614
ADJUSTABLE WRENCH	MIDDLE SIZE		1 pc.
SCREW DRIVER	FLAT BLADE MIDDLE SIZE		1 pc.
TORQUE WRENCH			
STEEL BAR	ϕ4X100		
SOCKET BOLT	M4X50		ADJUSTING STEM

CAUTION

Take care so as not to lose O-rings and check valve sub (541), (543), and (545).

4.
Remove ROH-plug
Remove ROH-plug (466) for a port of valve casing (601). And remove ROH-plug (466) for psv port too.
(In case of KR76-0E13PV)



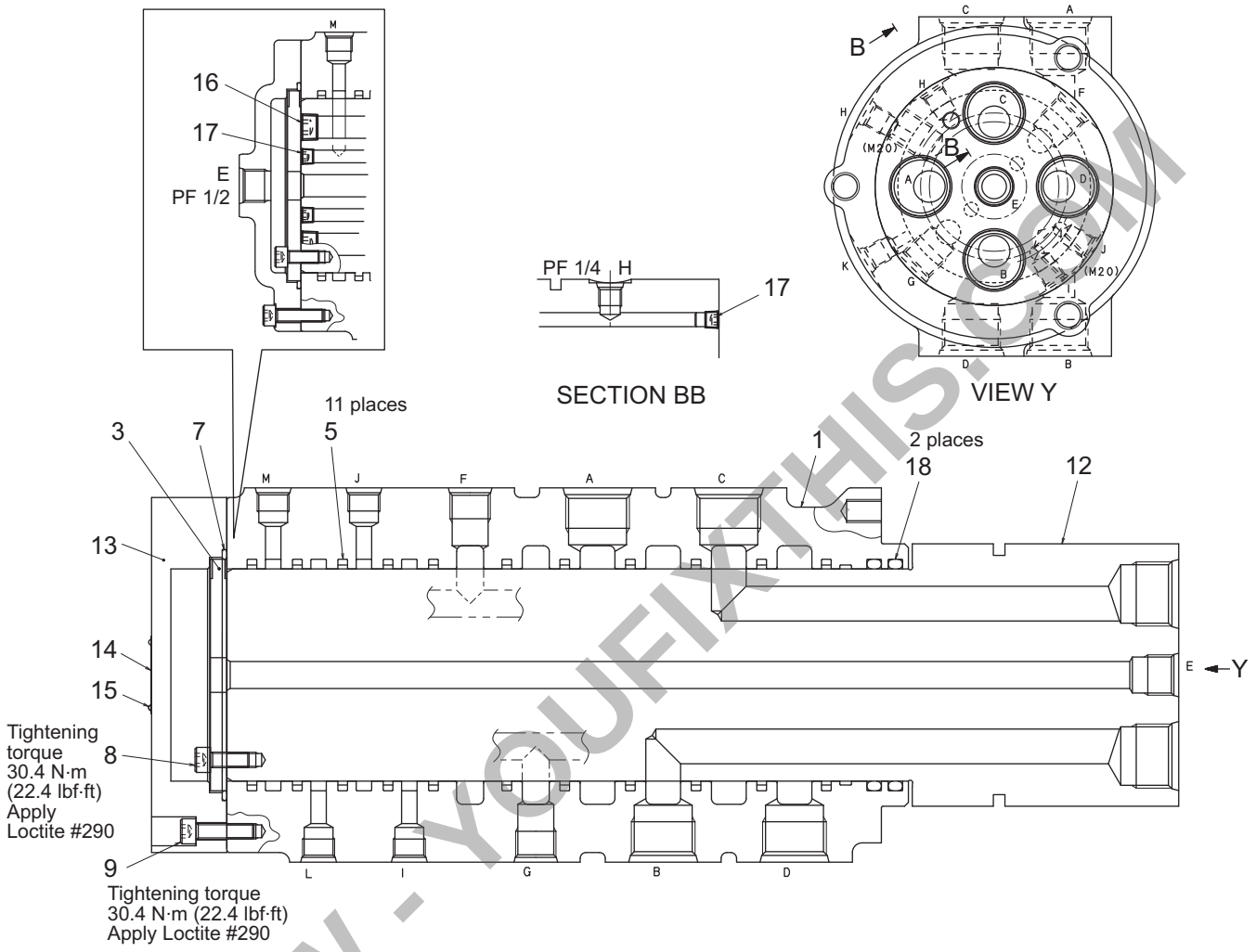
Removing ROH-plug (466)

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33.2.6 SWIVEL JOINT

33.2.6.1 CONSTRUCTION VIEW



Construction

No.	NAME	Q'TY	No.	NAME	Q'TY
1	BODY	1	13	COVER	1
3	THRUST PLATE	1	14	NAME PLATE	1
5	SEAL ASSY	11	15	CLEVIS	2
7	O-RING	1	16	PLUG	2
8	CAPSCREW (M8X20)	2	17	PLUG	5
9	CAPSCREW (M8X30)	4	18	O-RING	2
12	STEM	1			

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Error code		B044		
Trouble		Arm-in pressure sensor's power source is shortcut.		
Judging condition		The input voltage from arm-in pressure sensor is 4.7V or more.		
Symptom		Cavitation occurs at independent work of arm-in. Arm horizontal arm pulling can be barely done but if attachment is pulled in the air, arm falls first. Bucket can drag under the condition that the bucket bottom put on the ground.		
Control in the event of failure		Set proportional valve output rate of P1 and P2 pumps to constant current. (Current when all operation is in neutral.) Only on independent operation of boom-up, set output of P1, P2 unload proportional valves to 750mA. Set output of arm 2 arm-in proportional valve to 200mA.		
Returned in normal condition		It returns automatically in normal condition.		
Service diagnosis checking screen		Screen No.	5	B-4 ARM IN
		Screen No.		
		Screen No.		
Checking object				Checking contents and remedy
1	-Arm-in pressure sensor SE-7			When B044 is cancelled and other error occurs by turning starter switch on after exchanging the connector with other sensor. Check sensor unit for possible failure. If failure found, replace it.
2	-Wiring between arm-in pressure sensor and controller CN-130F CN-101F			When B044 is displayed after turning the starter switch on after the connector is exchanged with other sensor. Check wiring for possible failure according to the wiring checking procedure and repair it if necessary.
3	-Mechatro controller			Check that the error is corrected after replacement of controller.

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Trouble \ Factors		Engine body										
		Damage of engine oil cooler core and O-ring	Strainer clogged, damage of oil pipe	Damage of cylinder head and head gasket	Failure of injection holder sleeve	Wear and failure of valve and valve guide	Damage and seizing of piston and connecting rod	Wear of piston ring and liner, ring stick	Hole due to cavitation	Wear and damage of rear oil seal and seal surface	Damage of dumper	Damage of flywheel gear
Faulty starting	Poor start ability (Take a long time)					○		○				
	Faulty engine starting/engine does not rotate.											○
	Faulty engine starting/engine rotates but no exhaust gas (No fuel injection)											
	Faulty engine starting/exhaust gas is emitted but engine does not start (With fuel injection)					○		○				
Insufficient rotation	Engine poor run-up (Low follow-up ability)					○		○				
	Rotation in bad condition (hunting)											
Poor output	Engine stalled during operation.						○					
	Output is lowered.					○		○				
	Overheating			○					○			
Other failures	Exhaust smoke is black					○		○				
	Exhaust smoke is white			○	○	○		○				
	Larger oil consumption (or blue exhaust gas)	○		○		○		○		○		
	Early contamination of oil	○						○				
	Larger fuel consumption							○				
	Intruding of oil in coolant, back flow, reduction of coolant quantity	○		○	○				○			
	Hydraulic pressure down (Monitor lights up)		○									
	Oil quantity increased. (Intruding of water and fuel)	○		○	○				○			
	Vibration						○				○	

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1.7 Main Bearing Cap - Install

CAUTION

Be sure to tighten the bolts in the specified sequence when installing the main bearing cap bolts.

(1) Make sure that the main bearings and the thrust plates installed on the main bearing caps are evenly coated with clean engine oil.

(2) Install the main bearing cap from the front side to the rear side of the engine with the arrow on the bottom of the main bearing cap facing the front side of the engine. All of the lug grooves on the main bearing cap should be in the same position.

(3) Coat the main bearing cap bolt and washer with engine oil, and install the bolts and washer temporarily.

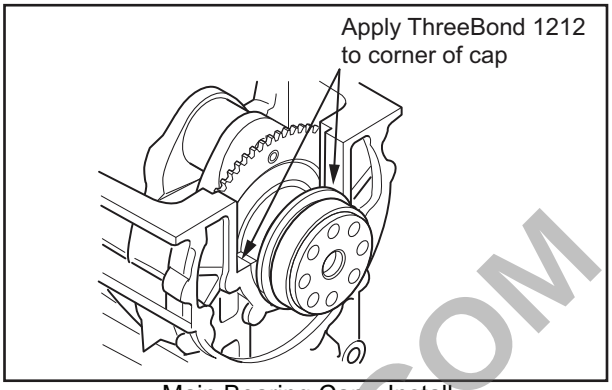
(4) Tap the main bearing caps with a soft-head hammer evenly to install them in position.

Note: The foremost and rearmost main bearing caps should be flat with the end face of the crankcase.

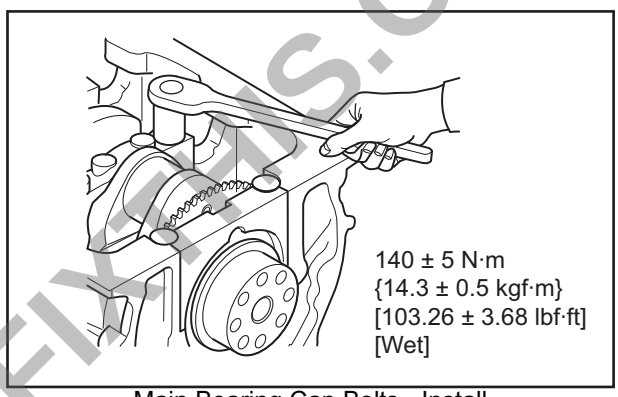
(5) Apply engine oil to the threads and bolt seat surface.

(6) Tighten the main bearing cap bolts alternately and progressively to the specified torque.

(7) Tighten the rearmost main bearing cap bolt until its seat surface contacts lightly with the main bearing cap. Measure the crankshaft end play in this condition.



Main Bearing Cap - Install



Main Bearing Cap Bolts - Install

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