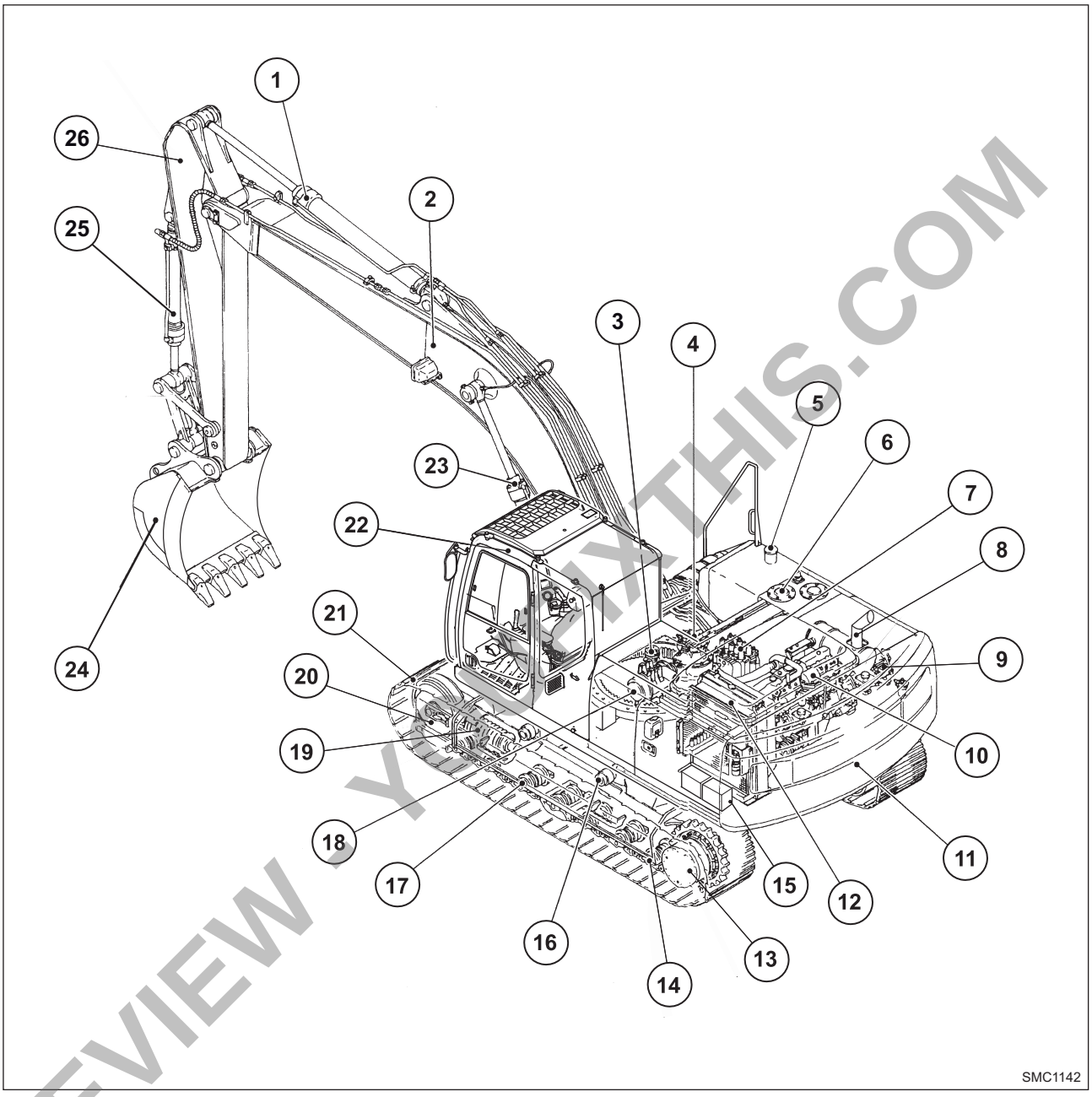
MACHINE MAIN COMPONENTS

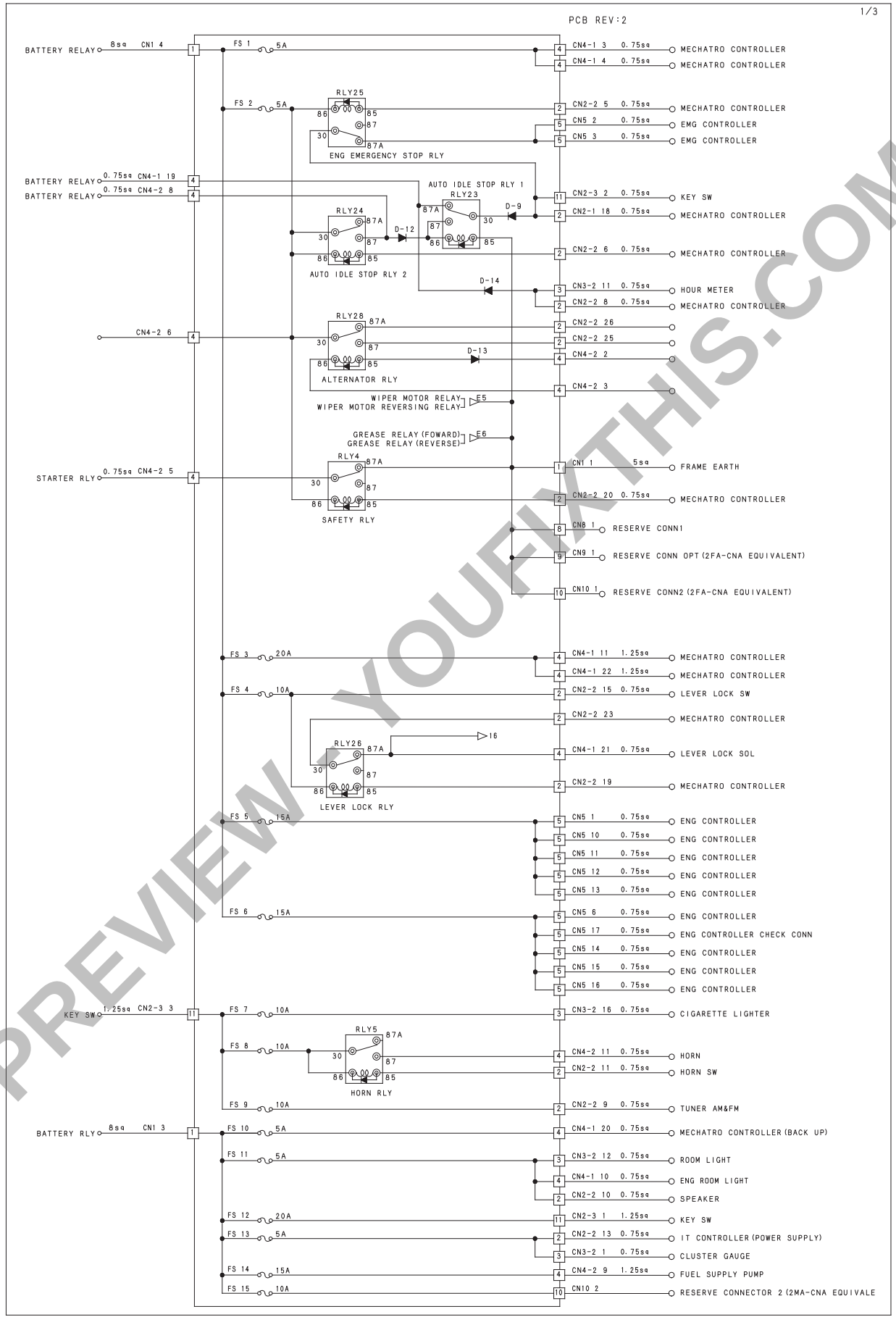


1 - Arm cylinder
2 - Boom
3 - Swivel joint
4 - Swing motor
5 - Fuel tank
6 - Hydraulic oil tank
7 - Control valve
8 - Muffler
9 - Hydraulic pumps
10 - Diesel engine
11 - Counterweight
12 - Radiators
13 - Travel motor
14 - Tracks
15 - Batteries
16 - Upper roller
17 - Lower roller
18 - Air cleaner
19 - Track adjuster
20 - Track adjust wheel
21 - Track shoe
22 - Cab
23 - Boom cylinder
24 - Bucket
25 - Bucket cylinder
26 - Arm

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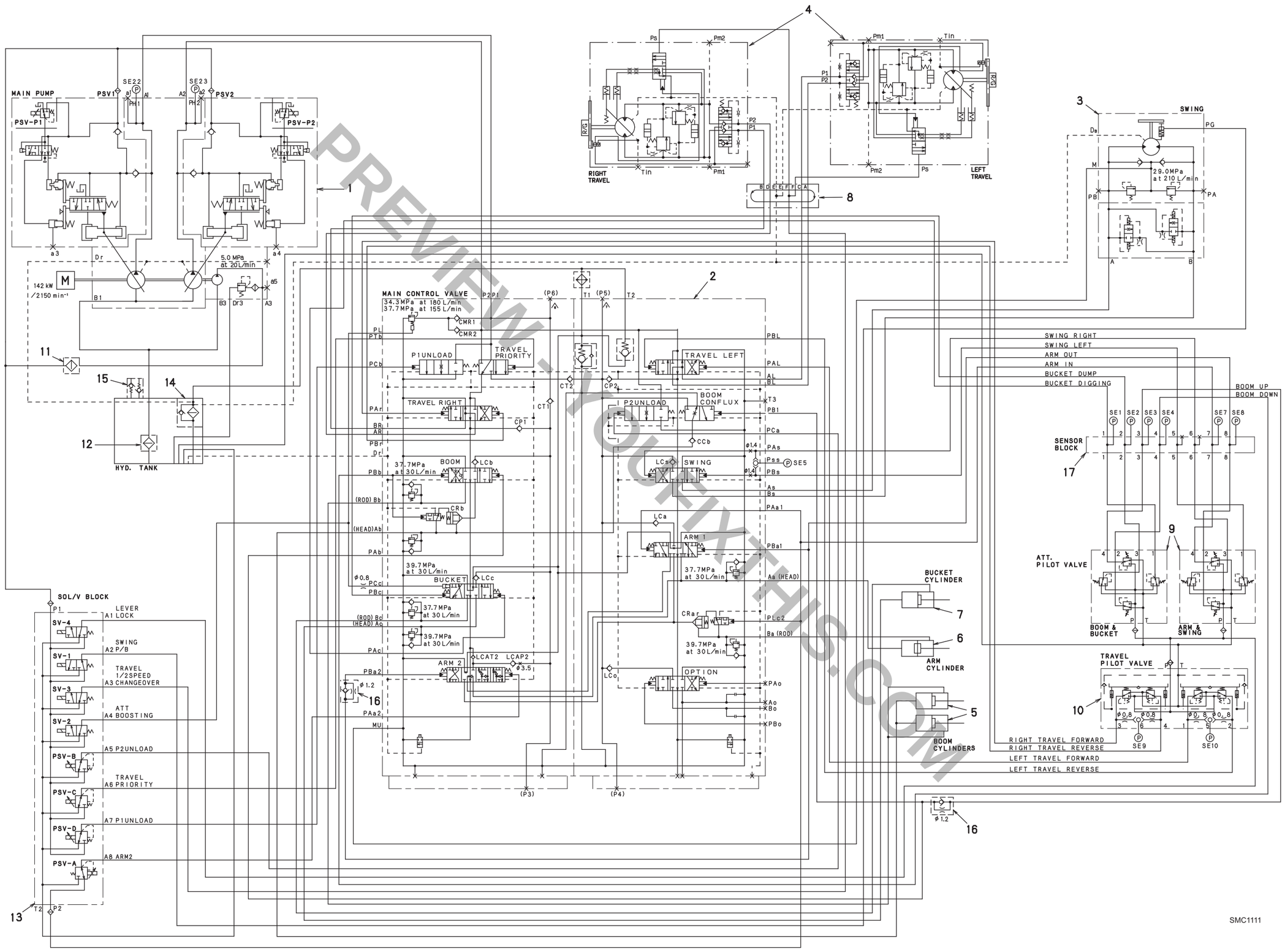
2) Circuit diagram



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HYDRAULIC CIRCUIT - E265C



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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.

1. JUDGMENT OF ACTUAL THING AT SITE

GET TO THE SITE AS QUICKLY AS POSSIBLE

Verify model, serial number, situation of trouble and field, and notify person of arrival time.

VERIFY BACKGROUND
OF TROUBLE OCCURRED

1. Model name and serial number
2. Kind of attachment
   Check that the combination of attachment is proper or that the operating method is not unreasonable.
3. Operating time by hour-meter
4. History of trouble occurred and additional works.
5. Recurrence of past trouble, or problems on the additional works.

HOW TO DIAGNOSE TROUBLE

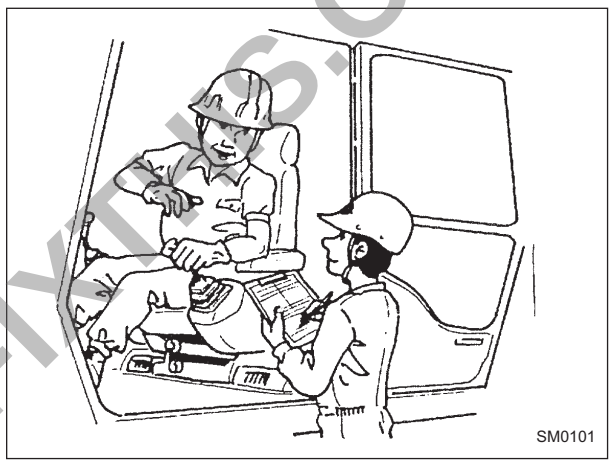
1. Verify defective part
2. Make the condition of trouble again
3. Where defective parts can not be verified, surmise causes systematically.
4. Verify reasons for surmise
5. Report methods, procedure, and period for repairing to user.

EXPLANATION OF THE CAUSE OF TROUBLE

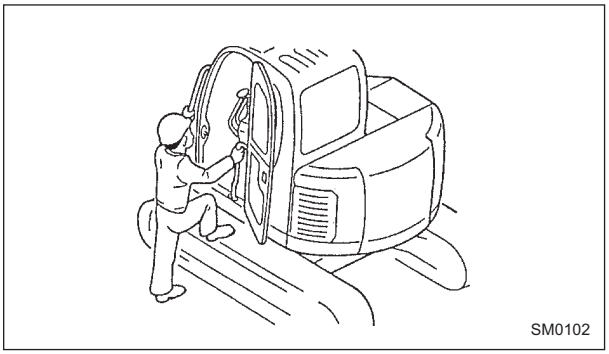
1. Explain the cause of trouble to clients. For example, oil leak through piston is caused by flaws on the piston rod. And the method of using the machines should be explained so that the same kind of trouble does not reoccur.
2. Treatment of damaged parts
   The damaged parts to be claimed and returned are evidence so they should be handled with care. Protect them from entry of water, soils, etc. into port of hydraulic unit, etc. and return them. And also use care not to flaw and damage those surfaces.



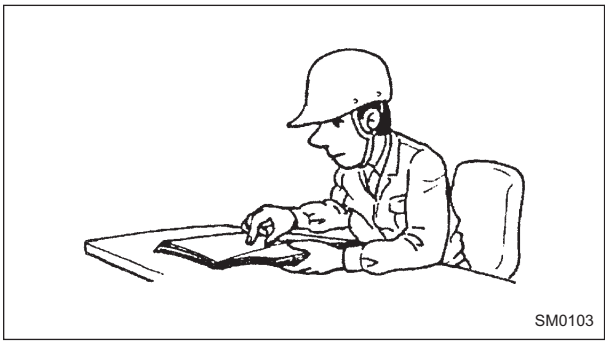
Attending the field to verify actual thing



Verifying background of trouble occurred



Confirm the symptoms of the trouble



Diagnosing fail by means troubleshooting

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REMOVAL AND INSTALLATION OF UPPERSTRUCTURE

WARNING

Hydraulic oil, at the end of a work shift, can be very hot and can cause, when spilling, potentially serious burns. Prior to beginning any intervention, make sure that the oil and components are cooled-off.
The hydraulic oil tank cap can be ejected, if the pressure is not released from the tank. Press the valve located on the hydraulic oil tank to release any residual pressure present in the tank itself.
Check that the lifting devices (hooks, chains, etc.) are in perfect conditions without any sign of excessive wear and appropriate to hold the weight of load.

Preparation

1. Park the machine on a firm, level surface.
2. To drain the hydraulic pressure from the Hydraulic System, refer to procedure “Releasing the hydraulic pressure” at page T2-1-60.
3. Cut-off the engine. Press the valve located on the hydraulic oil cap to release any residual pressure present in the tank itself.

Removal of upperstructure

1. Remove the front equipment and the boom cylinders, performing the operations described in the procedure at pages W4-1-1 (Refer to: Section 4 - “Front Attachment”).
2. Remove the operator seat, performing the operations described in the procedure at page W2-1-2.
3. Remove the cab, performing the operations described in the procedure at page W2-1-3.
4. Remove the battery, performing the operations described in the procedure at page W2-1-6.
5. Remove the guard, performing the operations described in the procedure at page W2-1-7.
6. Remove the under cover, performing the operations described in the procedure at page W2-1-12.
7. Remove the fuel tank, performing the operations described in the procedure at page W2-1-13.
8. Remove the hydraulic oil tank, performing the operations described in the procedure at page W2-1-14.
9. Remove the air cleaner, performing the operations described in the procedure at page W2-1-18.
10. Remove the muffler, performing the operations described in the procedure at page W2-1-19.
11. Remove the counterweight, performing the operations described in the procedure at page W2-1-21.
12. Remove the radiator, performing the operations described in the procedure at page W2-1-23.
13. Remove the engine, performing the operations described in the procedure at page W2-1-27.
14. Disconnect the hoses of swivel joint lower side, performing the operations described in the procedure at page W2-1-30.
15. Remove the upper frame performing the operations described in the procedure at page W2-1-32.

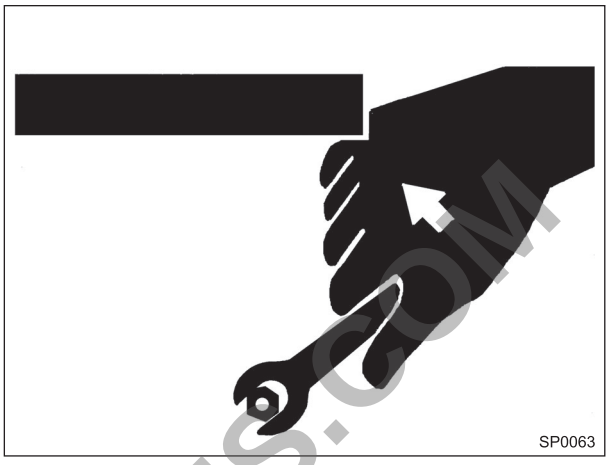
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TORQUE CHART

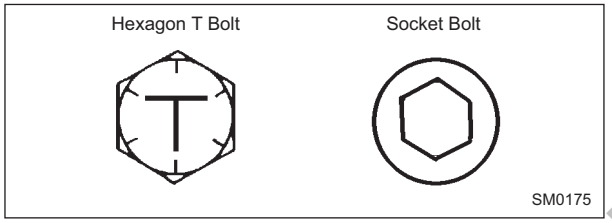
WARNING

Use tools appropriate for the work to be done. Makeshift tools and procedures can create safety hazards. For loosening and tightening nuts and bolts, use the correct tools. Avoid bodily injury caused by slipping wrenches.



Bolt Types

Tighten nuts or bolts correctly to torque specifications. Two kinds of bolts, hexagon bolts T and socket bolt, each made of different material, are used. Make sure to employ the correct bolts and tighten them to specification when assembling the machine or components.



Specified Tightening Torque Chart

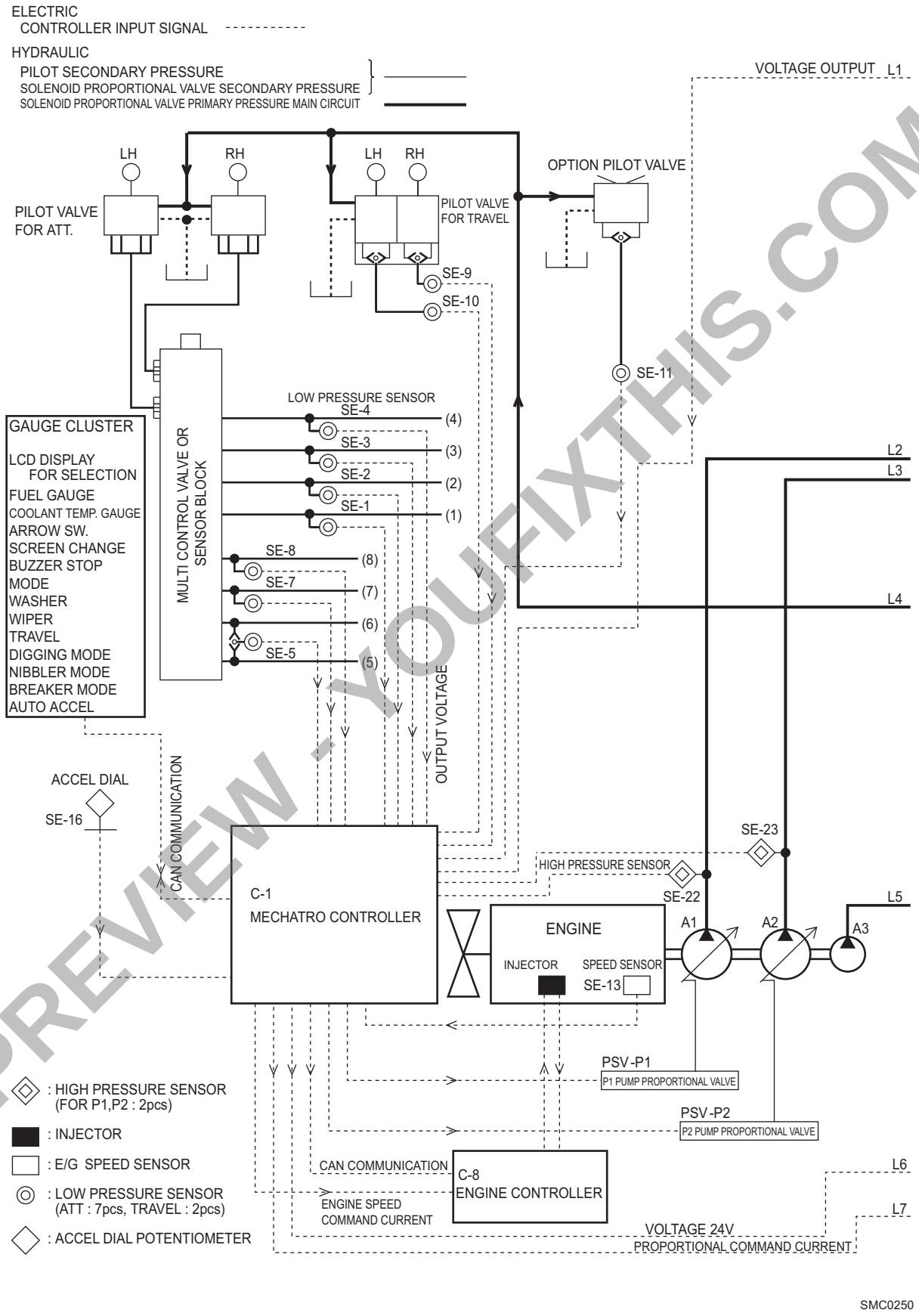
Bolt Dia.	Wrench Size	Hexagon Wrench Size	T Bolt, Socket bolt (Nm)
M8	13	6	29.5
M10	17	8	64
M12	19	10	108
M14	22	12	175
M16	24	14	265
M18	27	14	390
M20	30	17	540
M22	32	17	740
M24	36	19	930
M27	41	19	1370
M30	46	22	1910
M33	50	24	2550
M36	55	27	3140

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2 SUMMARY OF MECHATRO CONTROL SYSTEM

2.1 MECHATRO CONTROL SYSTEM IN GENERAL



SMC0250

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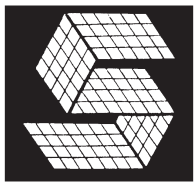
MANUAL INDEX



GENERAL SAFETY INFORMATION

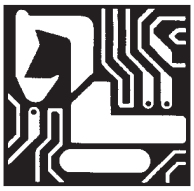
Page

Section 1 SAFETY INFORMATION S1
Section 2 SAFETY PRECAUTIONS S2
Section 3 SAFETY DECALS..... S3

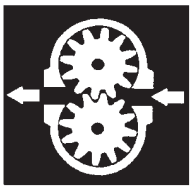


OPERATIONAL PRINCIPLE

Section 1 GENERAL INFORMATION
Group 1 Specifications..... T1-1



Section 2 SYSTEM
Group 1 Mechatro Control System T2-1
Group 2 Hydraulic System..... T2-2
Group 3 Electrical System T2-3



Section 3 COMPONENT OPERATION
Group 1 Hydraulic Pump Assy..... T3-1
Group 2 Pilot Valve T3-2
Group 3 Control Valve T3-3
Group 4 Swing Device T3-4
Group 5 Travel Device T3-5
Group 6 Swivel Joint..... T3-6
Group 7 Cylinders..... T3-7
Group 8 Air Conditioner system..... T3-8
Group 9 Electrical Equipment T3-9



OPERATIONAL PERFORMANCE TEST

Section 4 OPERATIONAL PERFORMANCE TEST
Group 1 Introduction T4-1
Group 2 Standard Performances T4-2
Group 3 Test Procedures T4-3
Group 4 Mechatro Controller T4-4



TROUBLESHOOTING

Section 5 TROUBLESHOOTING
Group 1 Troubleshooting (by error codes)..... T5-1
Group 2 Troubleshooting (by trouble)..... T5-2

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WARNING

Read this manual before operating the machine

Most accidents occurring during work are due to non-observance of simple safety norms and elementary precautions.

Many accidents can be avoided if the causes are known and opportune cautions taken beforehand.

There is no device or protection, no matter how advanced, that may prove so effective at avoiding accidents as a careful and attentive behaviour.

WARNING

Ensure that the attachment is safely resting onto the ground before repairing, adjusting or servicing machines fitted with hydraulically, mechanically or cable controlled attachments (such as, excavators, loaders, dozers, scrapers, etc.). Should it be necessary to partially or fully raise the hydraulically, mechanically or cable controlled attachment to gain access to certain items, make sure the attachment is adequately retained in the raised position by means other than the hydraulic lift cylinders, cables and/or mechanical devices used for controlling it.

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Product Support

Strada di Settimo, 323 - S. MAURO T.SE (TO) ITALY

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TO THE READER

- This manual is written for an experienced technician to provide technical information needed to maintain and repair this machine.

  - Be sure to thoroughly read this manual for correct information concerning the service procedures.

  - If you have any questions or comments, or if you found any errors regarding the contents of this manual, please contact:

NEW HOLLAND KOBELCO
CONSTRUCTION MACHINERY S.p.A.
Strada Settimo, 323
San Mauro Torinese (TO)
10099 ITALIA
PRODUCT SUPPORT
Fax. ++39 011 0077357

ADDITIONAL REFERENCES

- Please refer to the materials listed below in addition to this service manual:

  - **Operator's Manual**
  - **Service Parts Catalogue**

COMPLETE SERVICE MANUAL

- The complete Service Manual consists of two distinct volumes:
  - **Service Manual "Crawler Excavators"**
  - **Service Manual "Engine"**

The two distinct volumes of the complete Service Manual can be identified through their print number as stated below:

VOLUME	PRINT NUMBER
Service Manual "Crawler Excavators"	47357333A
Service Manual "Engine"	84250493

- The Service Manual "Crawler Excavators" consists of five parts:
  - **"General Safety Information"**
  - **"Operational Principle"**
  - **"Operational Performance Test"**
  - **"Troubleshouting"**
  - **"Repair Instructions"**

  - The "General Safety Information" part includes the recommended procedures that, if followed, can avoid the risk of accident for operator and for staff related to the work and maintenance machine operations.

  - The "Operational Principle" part includes the technical information concerning the operation of main devices and systems.

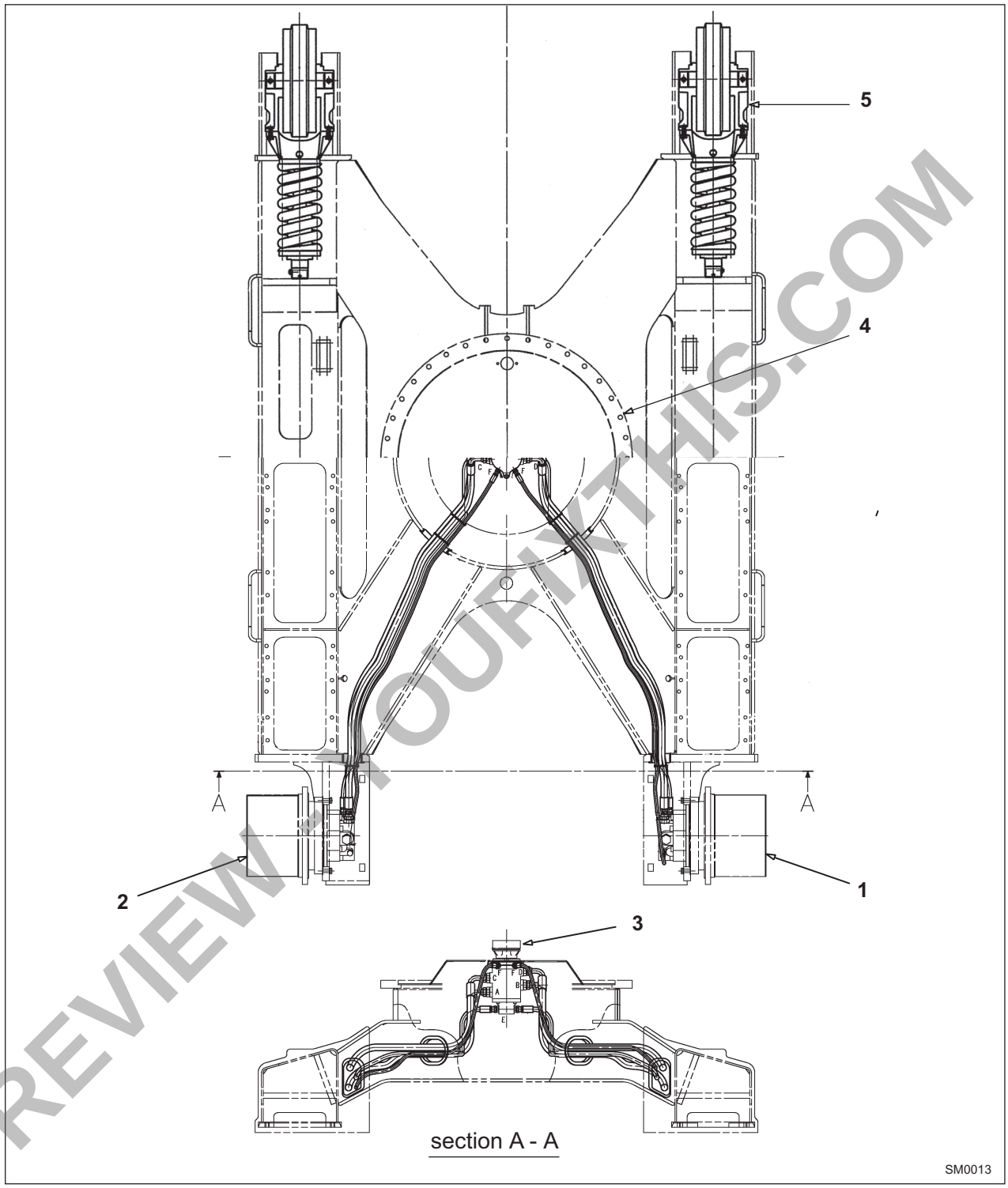
  - The "Operational Performance Test" part includes the information needed to carry out the machine operational performance test.

  - The "Troubleshooting" part includes the technical information needed for troubleshooting and malfunction detection.

  - The "Repair Instructions" part includes information needed for maintenance and repair of the machine, tools and devices needed for maintenance and repair, maintenance standards, removal/installation and assembly/disassembly procedures.

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Main Components – Under Carriage



1 - Right Travel Motor Unit
2 - Left Travel Motor Unit
3 - Center joint
4 - Swing Gear
5 - Front Idler Assy

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3.3 SERVICE DIAGNOSIS DISPLAY FUNCTION

The current service diagnosis is displayed on multi display based on the data received from mechatro controller. This section explains the operating procedure and examples of each screen. The values in display changes according to the conditions like engine speed, attachment position, etc.

1. Service diagnosis display screen operating procedure
   1)  Turn starter switch ON keeping buzzer stop switch pressed.
   2) After logo mark is displayed, the screen changes in service diagnosis mode.
      The service diagnosis screen "**Mode No.1**", "Screen No.1" is displayed first.
      The service diagnosis is classified into three modes, 1, 2, and 3, and the present mode is displayed in "Screen No.1".
      The screen number each mode can display differs. The screen number displayed by each mode is as follows.
      - **Mode No.1**: Screen No.1 to No.22
      - **Mode No.2**: Screen No.1, Screen No.23 to No.27
      - **Mode No.3**: Screen No.1, Screen No.28 to No.32
   3) The screen changes each time each switch is pressed from now on.

       Up arrow switch: Screen gains by 1 in order. (No.2→No.3→No.4→...)

       Down arrow switch: Screen loses by 1 in order. (No.24→No.23→No.22→...)

       Next arrow switch: Service diagnosis number advances from No.1 to No.3, and then returns to No.1. (No.1→No.2→No.3→No.1→...)

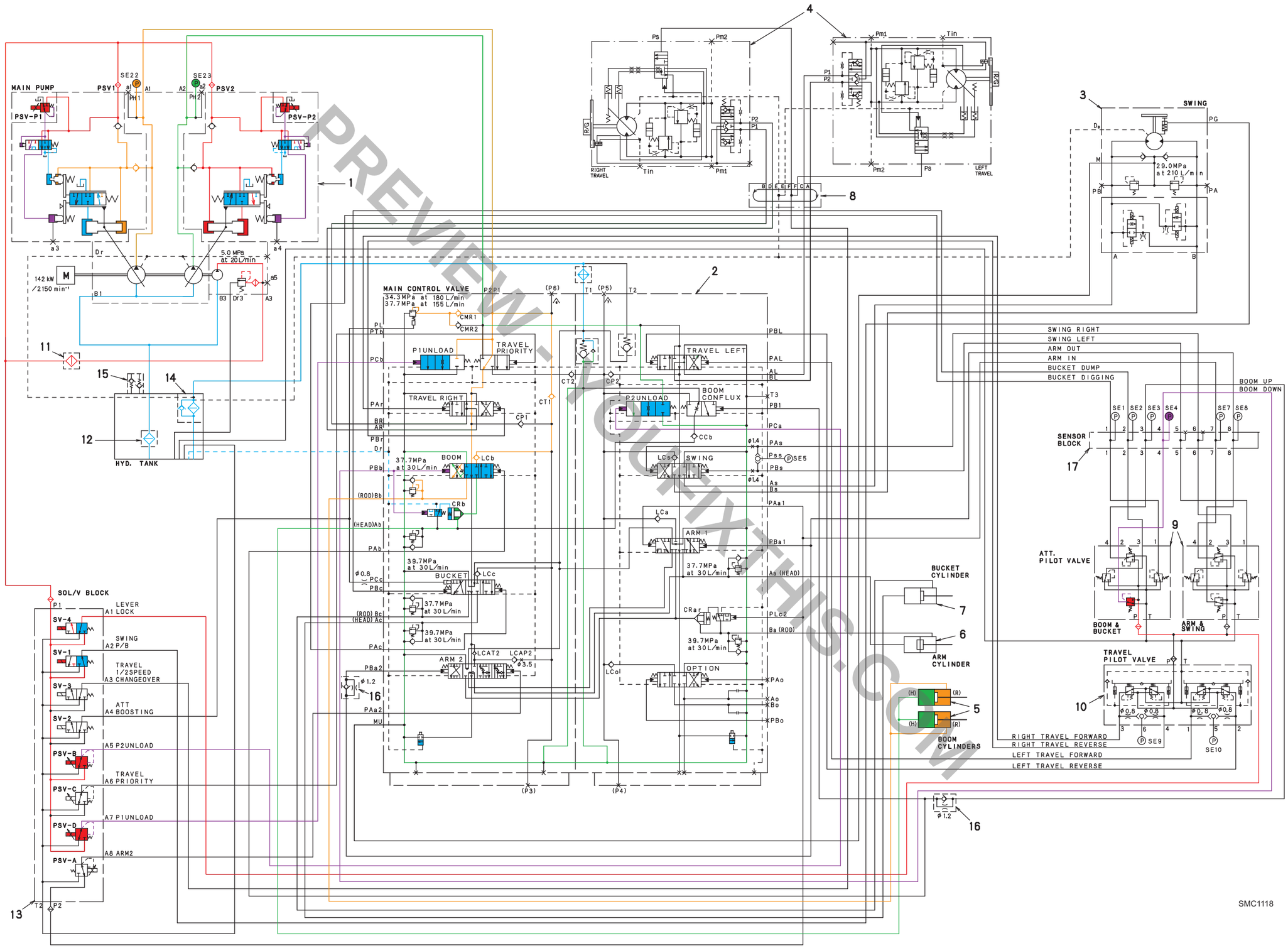
       Back arrow switch: Service diagnosis number advances from No.3 to No.1, and then returns to No.3. (No.3→No.2→No.1→No.3→...)

   4) Turn key switch OFF and the display of service diagnosis mode is closed.

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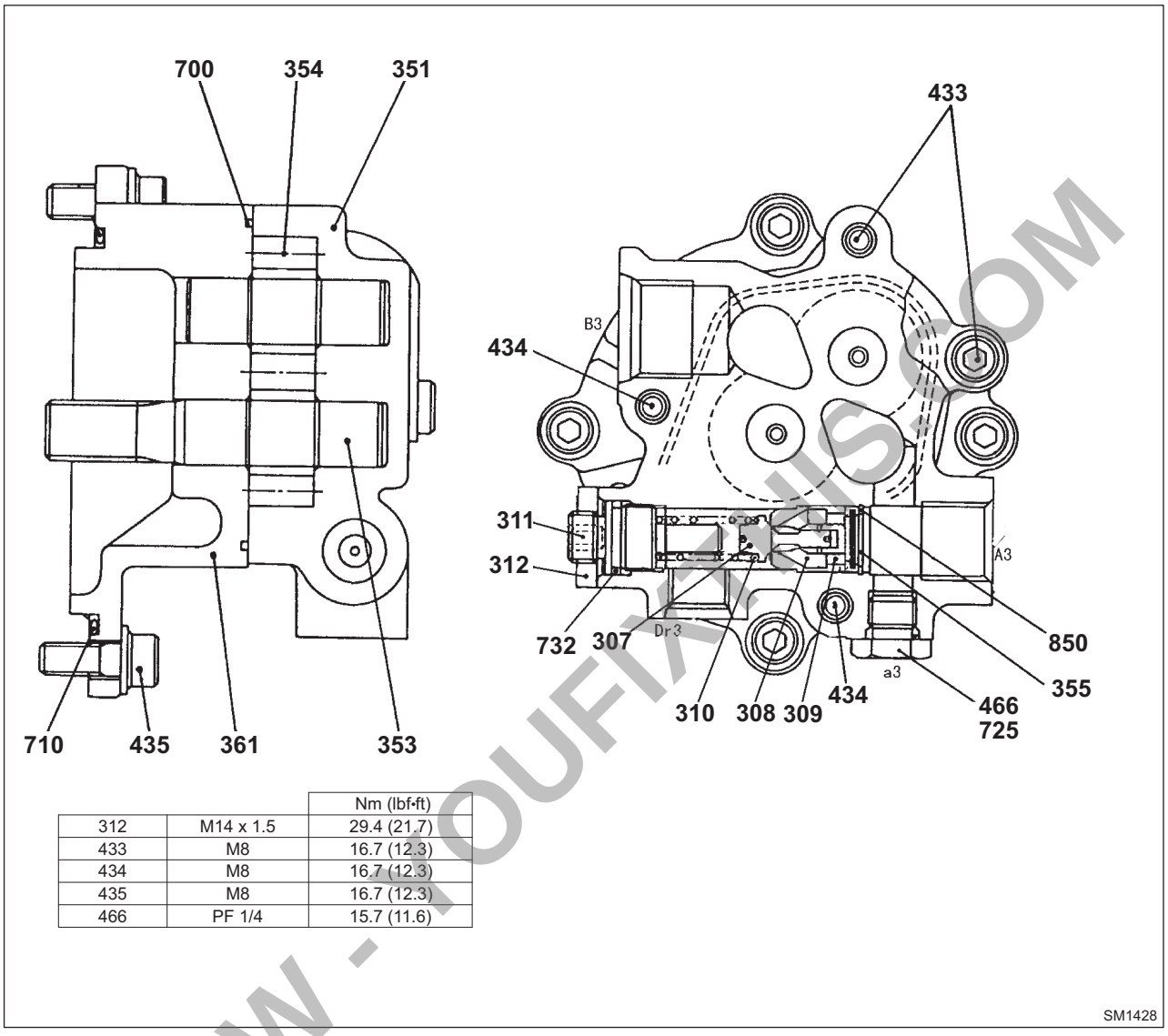
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BOOM CIRCUIT: Boom down operation & Prevention of natural boom falling.



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GEAR PUMP (FOR PILOT)



		Nm (lbf·ft)
312	M14 x 1.5	29.4 (21.7)
433	M8	16.7 (12.3)
434	M8	16.7 (12.3)
435	M8	16.7 (12.3)
466	PF 1/4	15.7 (11.6)

307 - Poppet
308 - Seat
309 - Ring
310 - Spring
311 - Adjust screw
312 - Lock nut; M14×1.5
351 - Gear case
353 - Drive gear
354 - Driven gear
355 - Filter
361 - Front case
433 - Flange socket; M8×40 (Q.ty 2)
434 - Flange socket; M8×55 (Q.ty 2)
435 - Flange socket; M10×35 (Q.ty 2)
466 - Vp plug; PF1/4
700 - Ring
710 - O-Ring
725 - O-Ring
728 - O-Ring
732 - O-Ring
850 - Locking ring
a3 - Gauge port; PF1/4 16 Nm (11.8 lbf·ft)
A3 - Delivery port; PF 1/2 53 Nm (39.1 lbf·ft)
B3 - Suction port; PF 3/4 73.5 Nm (54.2 lbf·ft)
Dr3 - Drain port; PF 3/8 34.3 Nm (25.3 lbf·ft)

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10. **Boost check valve, By-pass check valve**

a) Boost check valve

The boost check valve is located between low pressure passage (**D**) and tank port T1 and generates boost pressure necessary for the low pressure passage.

a. In normal operation

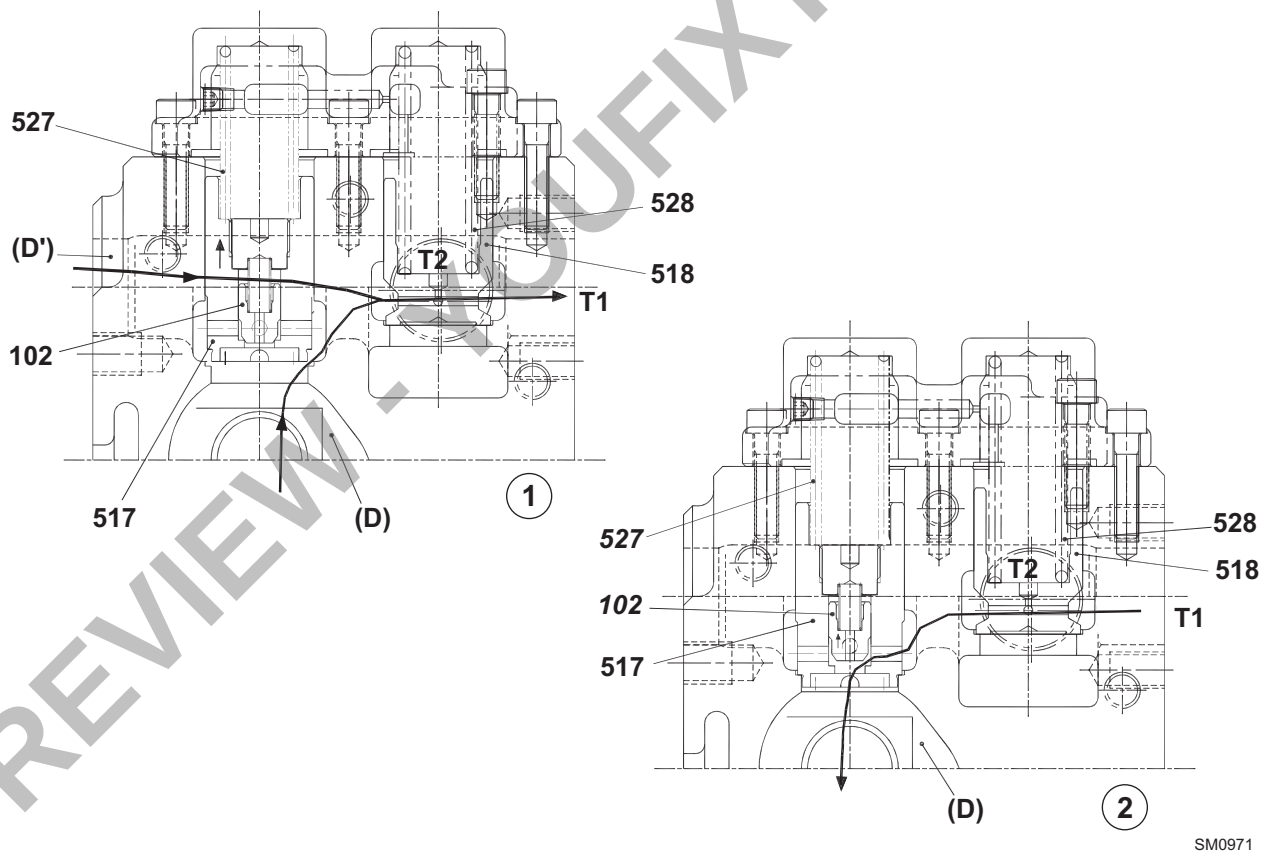
The hydraulic oil from low pressure passage (**D**) moves the boost check valve (**517**) upward against the force of spring (**527**), and returns to the hydraulic tank through tank port T1. At this time, the pressure generated by spring (**527**) is used as the boost pressure for the low pressure passage.

But the return oil used for the arm out and bucket dumping operation does not pass through boost check valve (**517**), but returns from low pressure passage (**D'**) to hydraulic tank through tank port T1.

b. In make up operation

When supplying to make up the flow rate through low pressure passage (**D**) after the swing operation is suspended, if the hydraulic oil quantity in low pressure passage (**D**) is not enough, the deficient hydraulic oil is made up from hydraulic tank into low pressure passage (**D**).

When the deficient hydraulic oil in low pressure passage (**D**) is not sufficient, the pressure of low pressure passage (**D**) is lowered. If the pressure of low pressure passage (**D**) is lowered to the pressure at tank port T1, poppet (**102**) housed in boost check valve (**517**) receives the pressure at tank port T1 on the receiving section in ring type which is made up of guide diameter and seat diameter of poppet (**102**), and is pushed upward and opens, and the hydraulic oil flows from the hydraulic tank to low pressure passage (**D**) to make up the deficient flow rate.

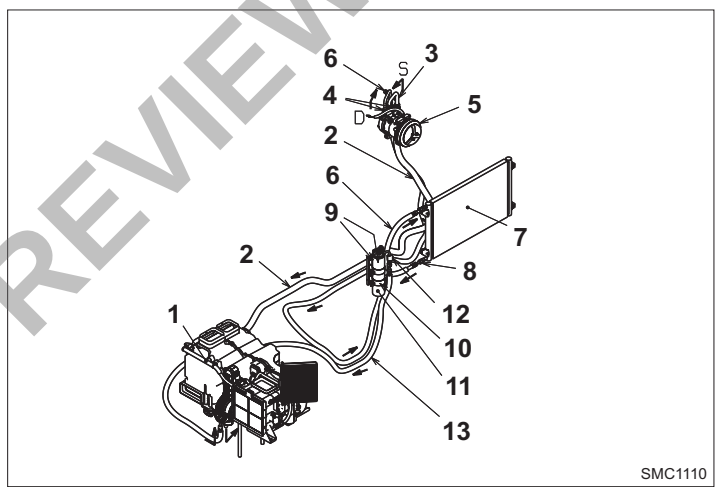


1. In normal operation
2. In make up operation
Boost check valve operation

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Air conditioner							
Tightening torque Nm (lbf·ft)	No.	Parts	Q'ty	Tightening torque Nm (lbf·ft)	No.	Parts	Q'ty
	1	Hose: L = 2300	1		34	Condenser	1
	2	Hose: L = 2100	1		35	Air dryer assy	1
	3	Bracket	2		37	Capscrew: M10x25	1
	4	V-belt	1		38	Clip	1
3.92 ~ 4.9	5	Clip	6		39	Filter	1
	6	Hose	1		40	Solar radiation sensor	1
3.9~5.9	7	Sems bolt: M6x20	2	10~12	41	Capscrew: M8x30	4
20.7~25.3	8	Sems bolt: M8x20	5		42	Washer	4
20.7~25.3	9	Capscrew: M8x100	4		50	Connector	1
	10	Washer	8		53	Washer	10
	12	Tube	2		54	Grommet	1
	13	Tube	1		63	Safety washer	2
	14	Tube	2		64	Safety washer	7
	16	Tube	1	16.7~18.4	65	Safety washer	2
	17	Tube	1	20.7~25.3	66	Capscrew: M10x30	7
	18	Clamp	1		68	Capscrew: M10x20	2
	19	Filter	1		69	Capscrew: M12x40	1
	20	Tube	1		70	Washer	1
	21	Bracket	1		71	Clip	5
41.9~51.1	22	Sems bolt: M10x70	2		72	Clip	1
20.7~25.3	23	Sems bolt: M8x25	2		73	Clip	1
	24	Clip	4		74	Capscrew: M10x60	1
	25	Clip	24				
	27	Conditioner assy	1				
	30	Panel	1				
	32	Compressor assy	1				
41.9~51.1	33	Pulley assy	1				



1 - Air conditioner assy
2 - S Hose
3 - S Tube
4 - Compressor connection bolt
5 - Compressor assy
6 - D Hose
7 - Condenser
8 - L Hose
9 - Receiver connection bolt
10 - Receiver dryer mounting bracket
11 - Receiver dryer
12 - L Tube
13 - L Hose

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PERFORMANCE INSPECTION STANDARD TABLE (E265C)

NOTE: ***unless otherwise specified, measure it on "H" mode.***

Inspection Item					Measuring Position			Standard Value	Unit	Adjusting Point	Measuring Condition
					Position	Size	Port				
Std. Measuring condition	Cleanliness of hydraulic oil				Hydraulic oil in tank			NAS 9 or less	Class	-	Sampling
	Hydraulic oil temperature				Tank surface			50 ± 5	°C	-	Atmospheric temp 50 °C ~ -10 °C
	Water temperature				Radiator surface			75 ± 15		-	
	Engine speed	H mode Lo idle			Measure the engine speed at multi display on the gauge cluster, or measure with diesel speed meter			1000 ± 30	min^{-1}	Adjustment not required	Low throttle
		H mode Hi idle						2150 ± 30			Full throttle (Hi Idle)
		Auto-Idle						1050 ± 30			Perform all measurement with the air-conditioner “OFF”
		S mode Hi idle						2100 ± 30			
		E mode Hi idle						2100 ± 30			
Pilot primary pressure circuit					G pump		a5	$5.0^{+0,5}_{-0}$	MPa	PR1	HI idle
High pressure circuit	Main relief valve pressure	ATT Travel		P1	Main pump	PF 1/4	a1	$34.3^{+0.7}_{-0,5}$		MR1	Boom up
				P2			a2				
		Power boost		P1			a1	$37.8^{+1.0}_{-0.5}$		MR1	
				P2			a2				
	Over load relief valve pressure	Boom		H			a1	$39.7^{+0}_{-5.9}$		OR3	Boom up
				R				$37.8^{+0}_{-4.0}$		OR4	Boom down
		Bucket		H			a1	$39.7^{+0}_{-5.9}$		OR1	Bucket digging
				R				$37.8^{+0}_{-4.5}$		OR2	Bucket dump
		Arm		H			a2	$37.8^{+0}_{-4.0}$		OR7	Arm in
				R				$39.7^{+0}_{-5.9}$		OR8	Arm out
		Swing		LH			a2	$29.0^{+4.0}_{+1.0}$		OR5	Swing LH
				RH						OR6	Swing RH
		Travel	RH	Forward			a1	$34.3^{+1,7}_{-0,5}$			Simultaneous Operation of travel RH and LH
				Reverse							
			LH	Forward			a2	$34.3^{+1,7}_{-0,5}$			
				Reverse							

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Table 36

Error code	**B113**		
Trouble	Option selector position detect pressure sensor's wiring is disconnected.		
Judging condition	The input voltage from option selector position detect pressure sensor is 0.1 V or less.		
Symptom	When Breaker mode is selected, option selector valve error is indicated.		
Control in the event of failure	Normal control.		
Returned in normal condition	It returns automatically in normal condition.		
Service diagnosis checking screen	Screen No.	9	F-4
	Screen No.		
	Screen No.		
Checking object			Checking contents and remedy
1	• Option selector position detect pressure sensor SE-29		When B113 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 option selector position detect pressure sensor and controller CN-162F CN-104F		When B113 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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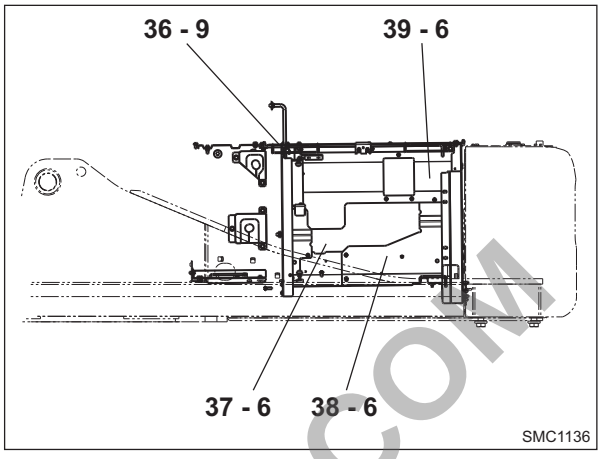
No.	Sections	Contents/normal value		Corrective action, others
11	Secondary pressure of travel straight proportional valve	Measure directly the proportional valve secondary pressure at the ports A6 (travel straight) of 8 sections solenoid block	0.8 MPa or less in high idling operation regardless of neutral/operation	Replace proportional valve
12	Remote control valve	Check targeted remote control valve	Check that spool is free from abnormal damage and spring is free from breakage	Replace
13	Main relief valve <Trouble> Relief pressure is low.	Check set pressure	• See Service Diagnosis Data List Operation No.3 boom up full lever and relief	Reset or replace
14	Over load relief valve <Trouble> P1, P2 pressure is low.	Visual check (Head side)	Pressure is 32 MPa or more in arm in and relief. Free from dust entered in over load relief valve. Seat is free from abnormality	When only relief pressure of arm in is low, replace valve
15	Over load relief valve <Trouble> P1, P2 pressure is low.	Visual check (Rod side)	Pressure is 32 MPa or more in arm out and relief. Free from dust entered in over load relief valve. Seat is free from abnormality.	When only relief pressure of arm out is low, replace valve
16	Arm 1 spool <Trouble> P1, P2 pressure is high.	Visual check	When removing, free from abnormal resistance against sliding Free from abnormal damage, etc on outside surface Spring is free from breakage.	Replace (Check on the casing side for damage)
17	Arm 2 spool <Trouble> P1, P2 pressure is high or low.	Visual check	When removing, free from abnormal resistance against sliding Free from abnormal damage, etc on outside surface Spring is free from breakage.	Replace (Check on the casing side for damage)
18	Check arm 2 spool and recirculation <Trouble> Arm in power is poor.	Disassembly and investigation	Free from abnormal resistance against sliding Spring is free from breakage.	Replace spool assembly
19	Check lock valve poppet <Trouble> Both P1, P2 pressures are high.	Visual check	Free from abnormal resistance against sliding Free from abnormal damage, etc on outside surface	Replace (Check on the casing side for damage)

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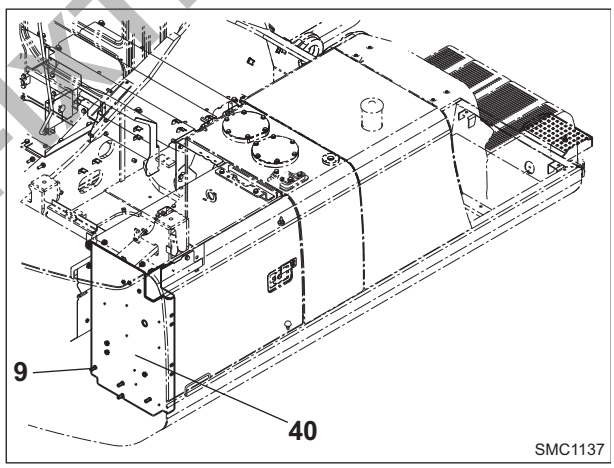
12) Remove guard assy (**36**), (**37**), (**38**), (**39**).

1. Loosen 2 sems bolts (**9**) M12x40 and remove guard assy (**36**).
   : 19 mm
   Weight: 12 kg (26.5 lbs)
2. Loosen 7 sems bolts (**6**) M12x25 and remove guard assy (**37**), (**38**), (**39**) in order.
   : 19 mm
   Weight: guard (37) 1 kg (2.2 lbs)
   guard (38) 3.5 kg (7.7 lbs)
   guard (39) 9.2 kg (20.3 lbs)



13) Remove pillar (**40**).

1. Loosen 4 sems bolts (**9**) M12x40 and remove pillar (**40**).
   : 19 mm
   Weight: 16.5 kg (36.4 lbs)



14) Remove other brackets, as required.

Installation of the guard

1. Installing is done in the reverse order of removing.
2. Tightening torque:

Unit: Nm (lbf.ft)

SIZE	NUT	SEMS BOLTS
M8	-	23 ± 2.3 (17 ± 1.7)
M10	46.5 (34.3)	65 ± 6.5 (48 ± 4.8)
M12		80 ± 8 (59 ± 5.9)

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Tightening torque N•m (lbf•ft)	No.	Parts Name	Q.ty
	101	Casing A	1
	102	Casing B	1
220~250 (162~184)	154	Plug PF3/4	3
20~24 (15~18)	159	Plug PT1/4 MEC (Pre-coat bolt)	1
7.8~9.8 (5.8 ± 7.2)	160	Plug PT1/16 NPTF1/16 MEC (Pre-coat bolt)	5
	161	O-ring	7
	162	O-ring	15
	163	O-ring	11
	164	O-ring	19
	201	Cover	3
	202	Cover	6
	203	Cover	1
	204	Cover	1
	205	Cover	5
	206	Cover	1
	207	Back pressure check valve cover	1
	209	Cover	1
	210	Cover	2
9.8~14 (7.2~10.3)	211	Lock valve selector sub	2
	212	Plate	1
	213	Plate	1
	215	Boom lowering valve (Optional)	1
	216	Piston	1
	261	O-ring	12
	264	O-ring	10
	266	O-ring	4
25~34 (18~25)	273	Socket bolt	40
98~120 (72~89)	274	Socket bolt	4
98~120 (72~89	275	Socket bolt	4
25~34 (18~25)	278	Socket bolt	5
9.8~14 (7.2~10.3)	279	Socket bolt (Optional)	3
	301	Boom spool sub	1
	302	Arm 1 spool	1
	303	Swing spool	1
	304	Bucket spool	1
	305	Boom conflux spool	1
	306	Travel spool	2
	307	Travel priority spool	1
	308	Arm 2 spool sub	1
	309	P1 unload spool	1
	310	P2 unload spool	1
	311	Option spool	1

Tightening torque N•m (lbf•ft)	No.	Parts Name	Q.ty
	321	Spring	5
	322	Spring	4
	323	Spring	3
	324	Spring	3
	325	Spring	1
	326	Spring	1
	327	Spring	3
	328	Spring	1
	329	Spring	3
	331	Spring seat	24
16~18 (11 ~ 13) Loctite #262	333	Spacer bolt	12
	336	Stopper	10
	339	Stopper	1
	340	Stopper	1
	511	Poppet	11
	512	Poppet	2
	514	Poppet	2
	515	Poppet	1
	517	Boost check valve	1
	518	Poppet	1
	521	Spring	11
	522	Spring	2
	523	Spring	1
	524	Spring	2
	527	Spring	1
	528	Spring	1
230~260 (170~192)	551	Plug	13
130~150 (96~111)	552	Plug	2
230~260 (170~192)	556	Plug	3
	562	O-ring	2
13~17 (9.6~12.5)	563	Plug	2
	564	O-ring	2
69~78 (51~58)	601	Main relief valve	1
69~78 (51~58)	602	Over load relief valve	3
69~78 (51~58)	603	Over load relief valve	3
69~78 (51~58)	604	Plug assy for relief valve hole	2
98~120 (72~89)	606	By-pass cut valve	2
140~180 (103~133)	973	Socket bolt	8
140~180 (103~133)	974	Socket bolt	2
	977	Name plate	1
	978	Rivet	2

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Preliminary operations

1. Before disassembly, clean thoroughly the swing reduction unit outer, checking for no damage or scratches.

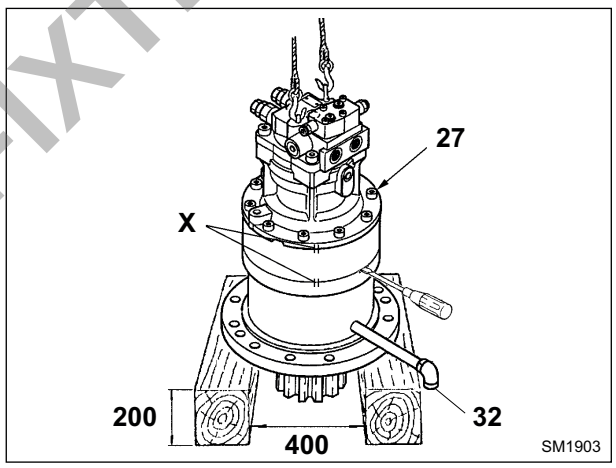
2. Drain out the gear oil from reduction unit.

3. Remove the draining pipe.

4. In order to case the re-assembly, before disassembly put a matching mark on the parts to be connected on the reduction casing.

Disassembly

1. Place the reduction unit assy on a stable work bench as shown in figure, remove plug (**32**), drain out oil put a matching mark on the matching surface of the figure on the right side.



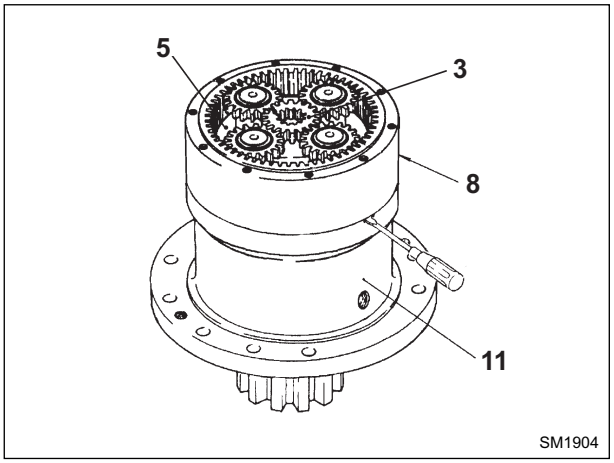
2. Loosen all socket bolt (**27**) (M20). Attach eye bolts (M12) in the lifting bolt holes in the top surface of the swing motor and lift the assy by crane. If it is hard to remove the swing motor assy from the reduction unit, float it by inserting a flat-blade screwdriver in the groove of the flange.


: 17 mm

3. Remove retaining ring (**24**).

4. Remove #1 sun gear (**3**).

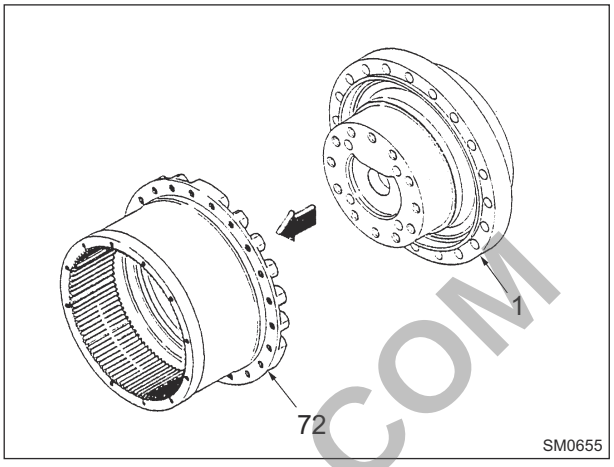
5. The spider assy (**5**) [consisting of thrust washer (**22**), #1 pinion (**4**), needle bearing (**11**) and snap ring (**25**)] can be removed from the spline easily if it is lifted up in that condition.



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Assembling housing into flange

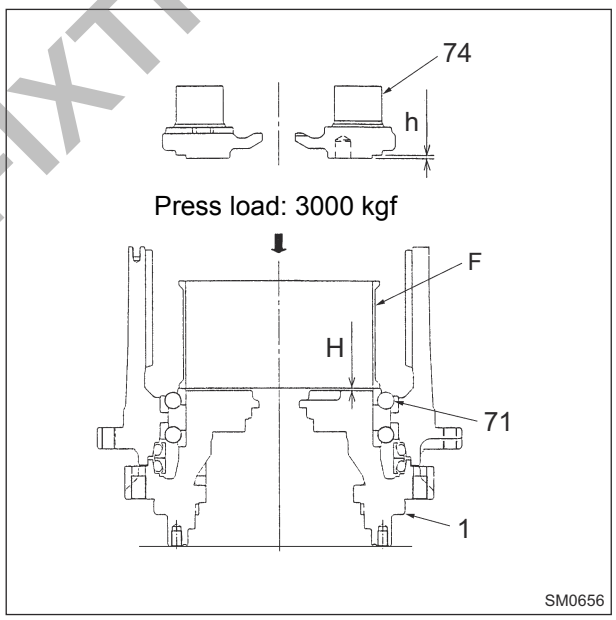
1. Make sure of the below items and assemble housing (**72**) into flange (**1**), using a crane, so floating seal (**70**) of flange (**1**) matches floating seal (**70**) of housing (**72**).



ATTENTION: *make certain that there is no foreign matter on the moving surface of the seal ring located in floating seal (**70**).*
- *Apply lubricating oil for the reduction unit or hydraulic oil to all sliding surface of seal ring located in floating seal (**70**).*
- *When assembling housing (**72**) into flange (**1**), make sure that the shaft centers are aligned with each other.*

Selecting the thickness of shim

1. Press the end face of the inner race of angular bearing (**71**) at a load of 3000 kgf (6600 lbf), using the shim thickness (**F**) adjusting jig.
2. In that case, measure the step H between the end face of the inner race of angular bearing (**71**) and the end face of flange (**1**).
3. Measure the step h at holder (**74**).
4. Select and combine the repair kit (t=0.05, 0.1, 0.3, 0.5, 1.0) of shims (**73**) so as to attain shim thickness that matches (**H-h**).

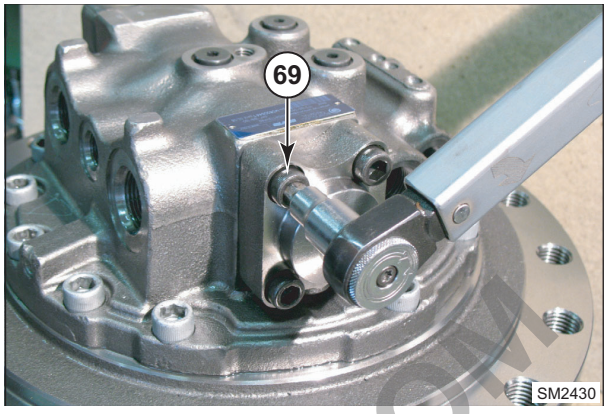


ATTENTION: *do not reuse shims (**73**) that were once used.*
- *Do this work without fail. If pre-load adjustment is not done well, the reduction unit may be broken during operation.*
- *Clean the measuring surface thoroughly.*

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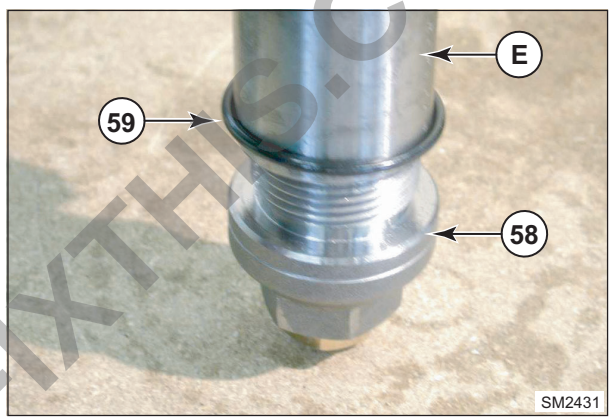
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45. Tighten the nos. 4 socket head screws M12x40 (**69**), grade 12.9, of the second flanged plug assy (**68**) by a male hex head torque wrench at 108 ± 10 Nm (79.6 ± 7.4 lbf.ft) torque.

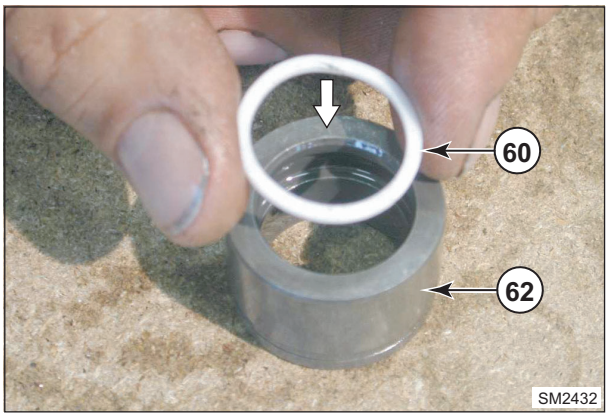


Reassembly of the relief valve assy

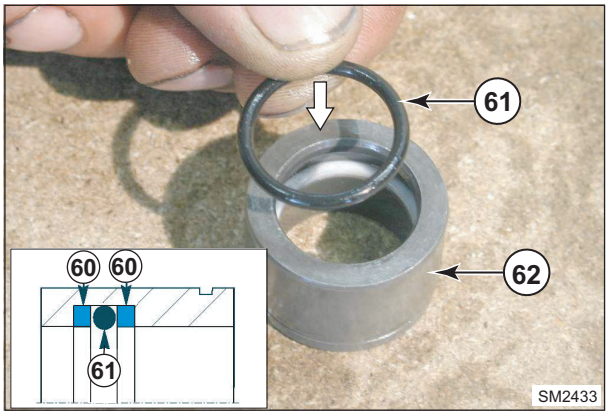
46. By using the stopper (**E**) (**6689960830**) assemble the O-ring seal (**59**) in its seat in the relief valve (**58**).



47. Assemble the first backup-ring (**60**) into its seat in the free piston (**62**).



48. Assemble the O-ring seal (**61**) into its seat in the free piston (**62**). After this step assembly the second backup ring (**60**) as shown on the sketch.

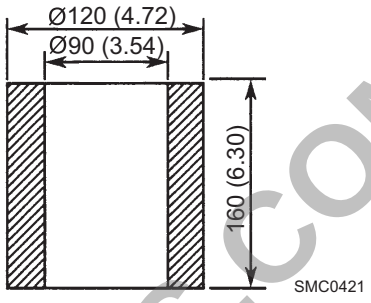
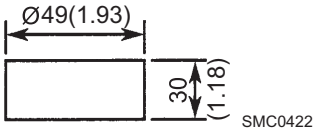
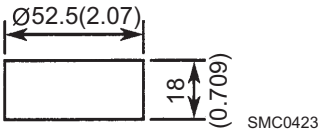
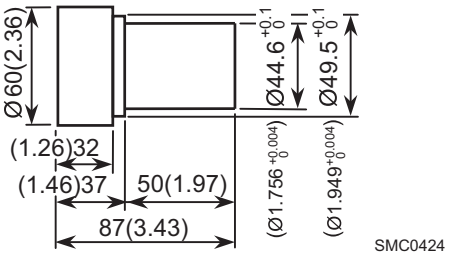


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TOOL TABLE FOR UPPER ROLLER

Unit: mm (in)

Ref.	Name	Drawing
A	Support jig	
B	Shaft extruding jig	
C	Bushing extruding jig	
D	Bushing fixing jig	

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