

INSTALLATION MANUAL

REF NO.	BA01009
DATE	May 3, 2001

SUBJECT: INTRODUCTION OF NEW ELECTRONIC CONTROLLED SUSPENSION SYSTEM (E.C.S.S.)

PURPOSE: To introduce the new E.C. S.S.

APPLICATION: WA500-3 Wheel Loaders, S/N 50001 thru 50897
WA500-3A Wheel Loaders, S/N 50001 thru 50887
WA500-3D Wheel Loaders, S/N 50001 thru 50889
WA500-3L Wheel Loaders, S/N A70001 thru A70832

FAILURE CODE: DW50NG

DESCRIPTION:

This **INSTALLATION MANUAL** will introduce a new ECSS, which is highly effective to suppress vibration and shocks being applied to the chassis when the machine is traveling on bumpy roads.

When the current ECSS is already installed and yet further improvement of the damping performance is required, install the new ECSS following the modification procedures outlined in this **Installation Manual**.

LISTS OF PARTS

PART NO.	PART NAME	QTY	REMARKS
0101081060	Bolt	8	
0101081265	Bolt	1	
0101081275	Bolt	6	
0101181200	Bolt	2	
0101181220	Bolt	2	
0125241225	Bolt	6	
0143501016	Bolt	4	
0143501020	Bolt	4	
0143501230	Bolt	1	
0143501230	Bolt	1	
0143501270	Bolt		
0143501280	Bolt	4	
0157101016	Seat	1	For reworking
0157320205	Seat	2	
0158011210	Nut	3	
0164331032	Washer	8	
0164331232	Washer	9	
0164351032	Washer	24	
0443452712	Clip	2	

PART NO.	PART NAME	QTY	REMARKS
07000F3024	O-ring	1	
07000F3032	O-ring	2	
07000F3035	O-ring	4	
07000F3038	O-ring	6	
07000F3045	O-ring	3	
07000F3048	O-ring	3	
0700212034	O-ring	1	
0700212434	O-ring	9	
0704012412	Plug	1	
0709410518	Clamp	2	
0709500524	Cushion	1	
07088010A6	Hose	1	
0723020522	Union	1	
0723020628	Union	1	
0723510518	Elbow	1	
0723510522	Elbow	2	
0723510628	Elbow	1	
0723510630	Elbow	1	
0737131049	Flange	8	
0737131255	Flange	4	
0737221035	Bolt	24	
0762700504	Hose	1	3-pool control valve assembly
0762700509	Hose	1	
0762900614	Hose	1	
07629006A3	Hose	1	
0803420519	Band	10	
1755486270	Seat	1	for reworking
1959797610	Seat	3	for reworking
22W6213110	Union	1	
363137550	Bracket	1	
4185413151	Cushion	6	
4185413161	Cushion	3	
4185413220	Washer	6	
4216213740	Adapter	1	
425S992530	Valve	1	
421S992390	Valve Assembly	1	
425S992592	Wiring Harness	1	
425S992641	Tube	1	
425S992660	Tube	1	

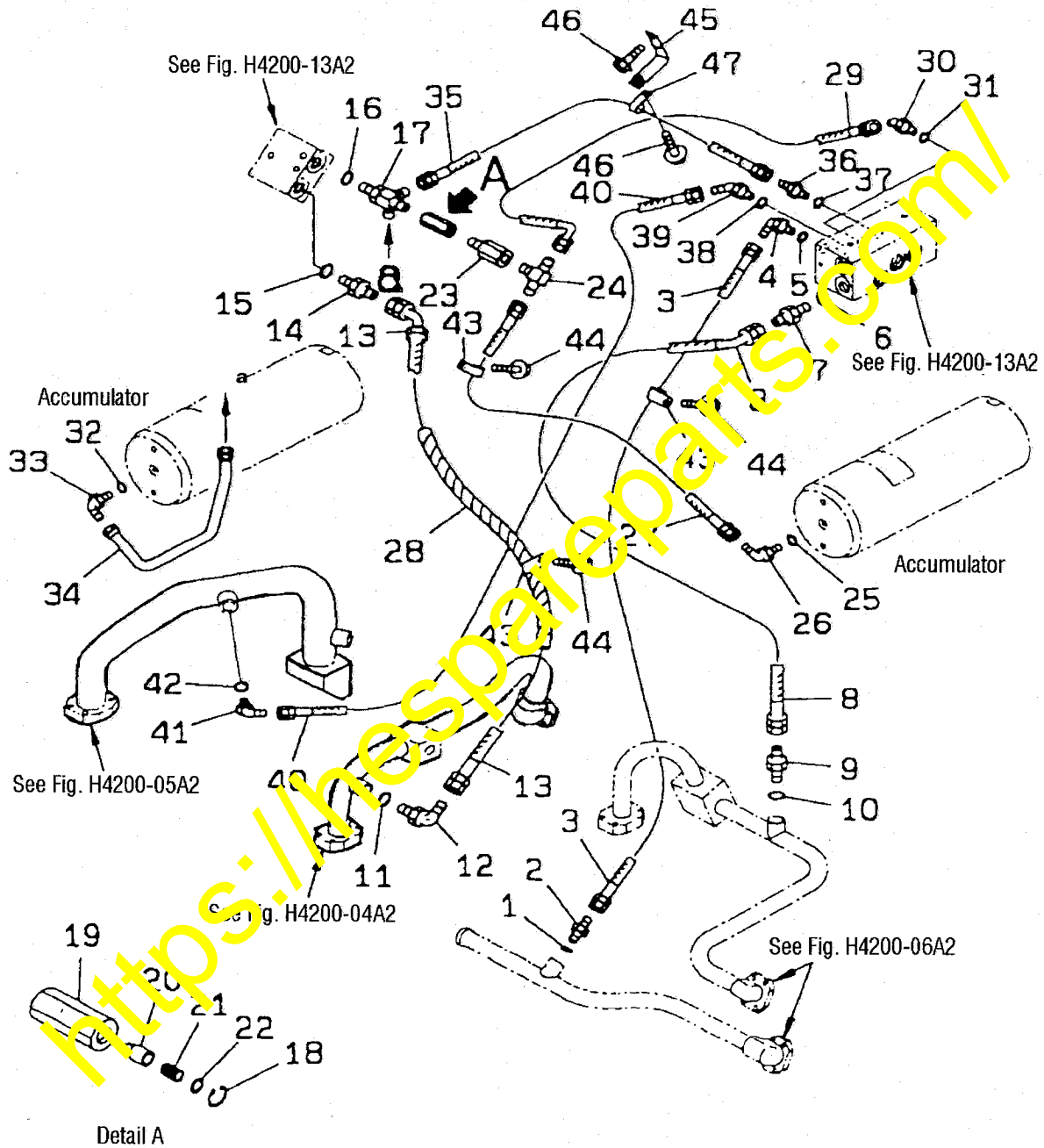
PART NO.	PART NAME	QTY	REMARKS
425S992681	Tube	1	Load Meter
425S992670	Adapter	1	
0158001008	Nut	1	for reworking
1545418510	Seat	1	for reworking
0101081230	Bolt	4	
0143501025	Bolt	2	
0709500628	Cushion	2	
0805301512	Clip	1	
0726020913	Hose	1	Necessary part when using 3-spool control valve assembly
0728100197	Clamp	2	
2080619170	Clip	2	
4258772310	Tube	1	Necessary part when using 3-spool control valve assembly
425772320	Elbow	1	
4210311620	Nipple	1	
425S992690	Tube	1	
425S992710	Tube	1	
425S992790	Elbow	1	
425S992771	Hose	1	
425S992810	Tube	1	Refer to precautions indicated below when installing the 3-spool control valve assembly or the in line filter
425S992820	Tube	1	
425S992830	Plate	1	
45S992840	Bracket	1	
425S992890	Hose	1	
425S992910	Bracket L.H.	1	for reworking
425S992920	Bracket R.H.	1	for reworking
426S992690	Cap	1	
428641110	Collar	3	

PRECAUTIONS:

- 1) When installing the 3-spool control valve assembly, order 07627-00503 instead of 07627-00504 and order 425-S99-2941 instead of 425-S99-2810.
- 2) When installing the high pressure line filter, order 425-S99-2690 instead of 425-S99-2810.
- 3) When installing the load meter, order 425-U94-2320 instead of 425-S99-2681.

REMOVAL PROCEDURES:

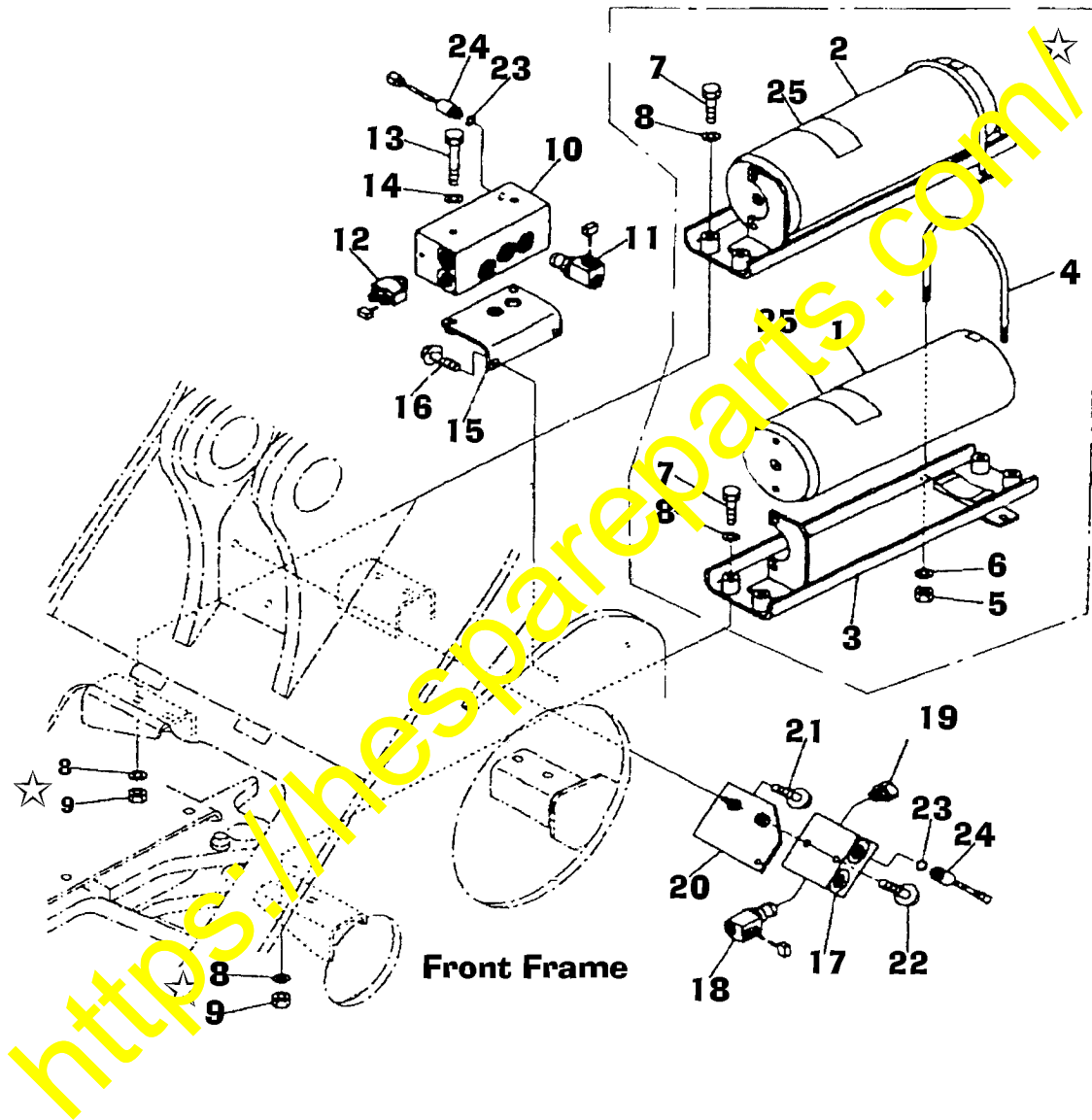
- 1) Remove those parts which are illustrated by solid lines in the schematic diagram indicated below.
H4200-14A2
Hydraulic Piping with E.C.S.S. Line



2) Remove those parts which are illustrated by solid lines in the schematic diagram indicated below:

Parts marked with a *star* are being reused. After removal, wash and keep them in a place where there is no fear of adhesion of dust.

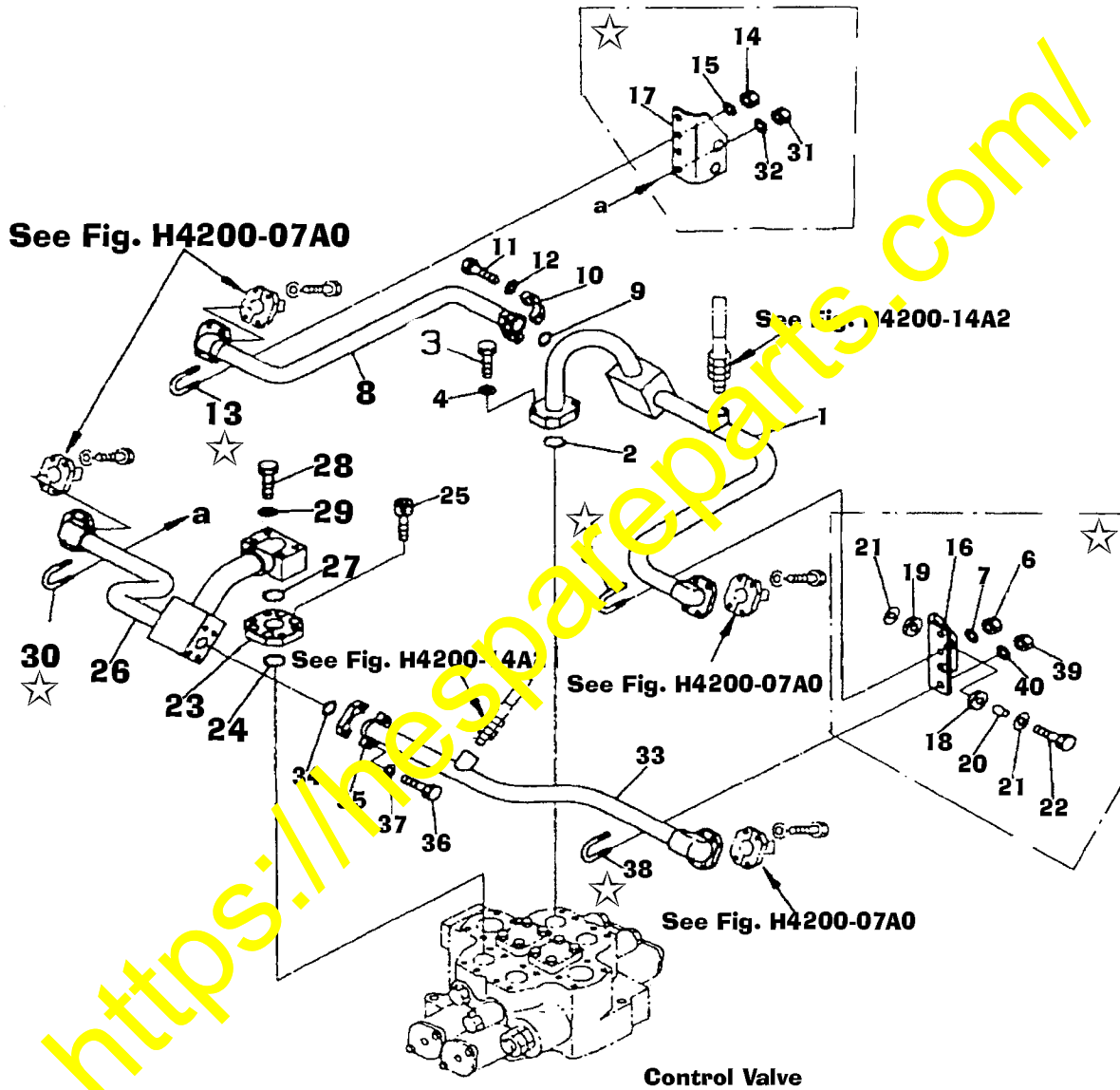
H4200-13A2
Hydraulic Piping
Accumulator solenoid valve and mounting with E.C.S.S.



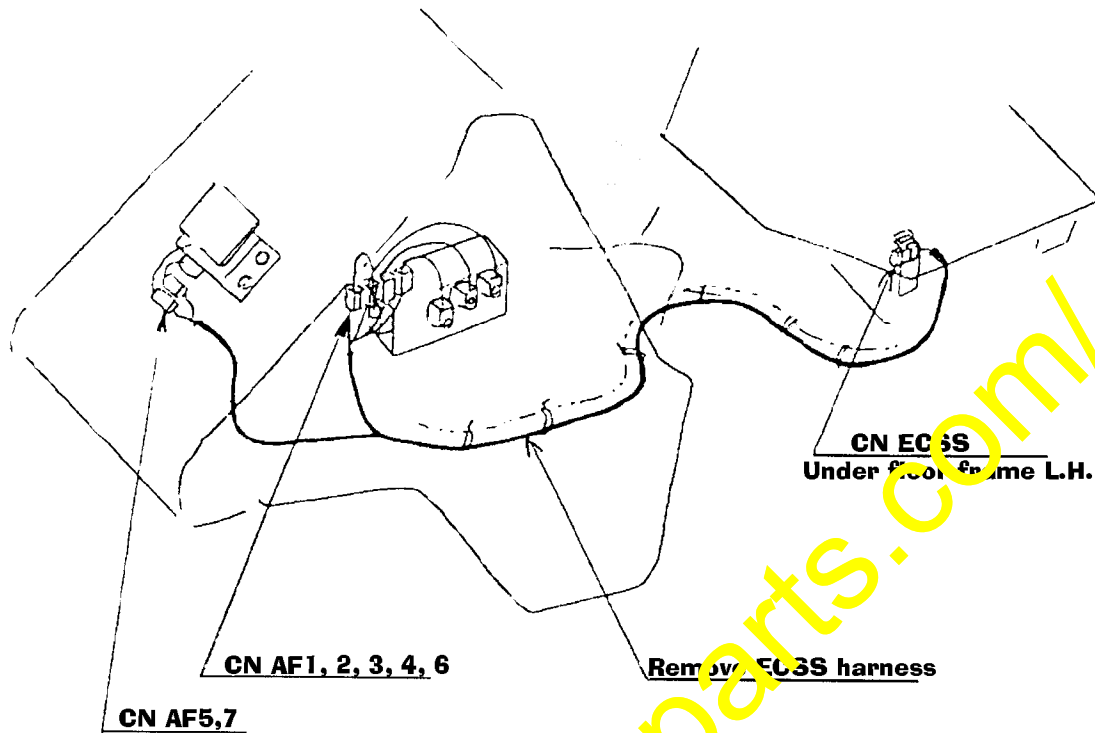
3) Remove those parts which are illustrated by solid lines in the schematic diagram indicated below.

Parts marked with a *star* are being reused. After removal, wash and keep them in a place where there is no fear of adhesion of dust.

H4200-06A2
HYDRAULIC PIPING E.C.S.S. LIFT CYLINDER LINE



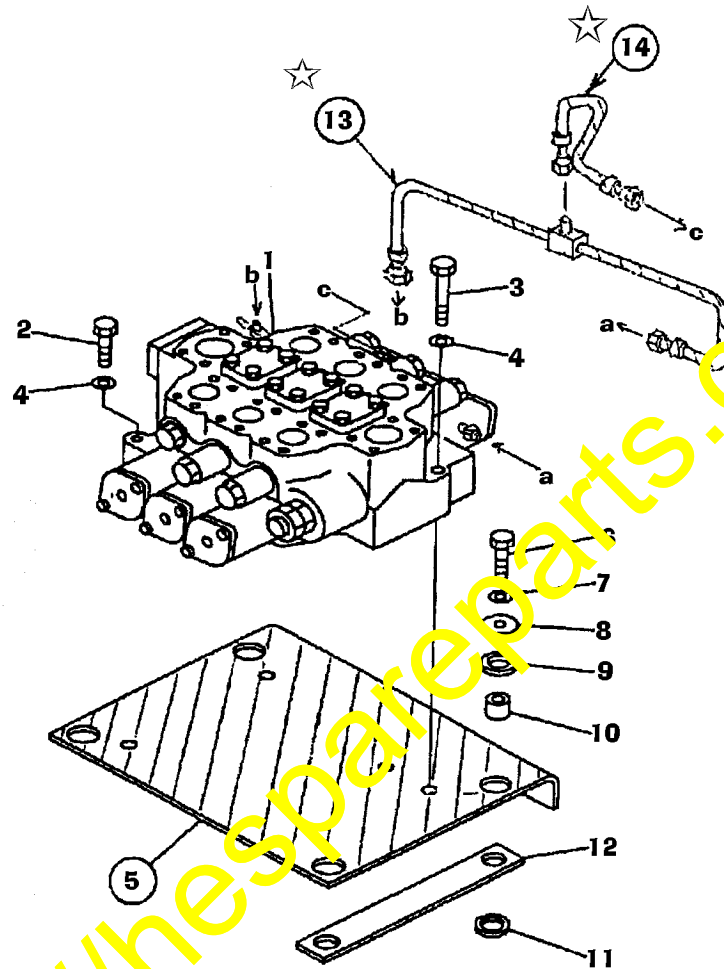
4) Disconnect and remove the ECSS harness from the chassis.



4) Remove the hatched parts shown in the schematic diagram indicated below.

NOTE: Remove the parts marked with a *star* beside their code numbers only on the machines equipped with the 3-spool control valve assembly.

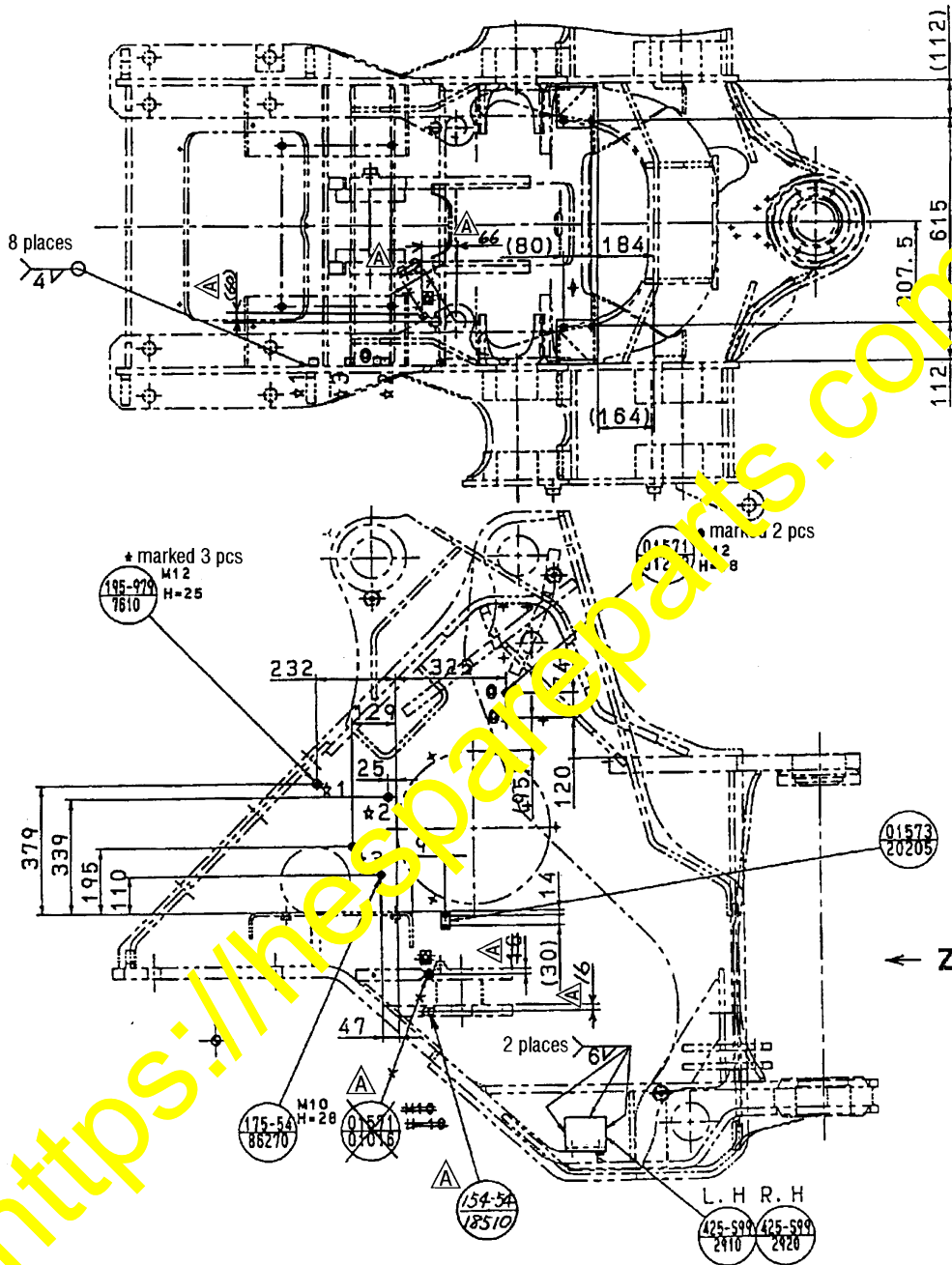
H4200-04A0
HYDRAULIC PIPING TO 2-SPOOL CONTROL VALVE

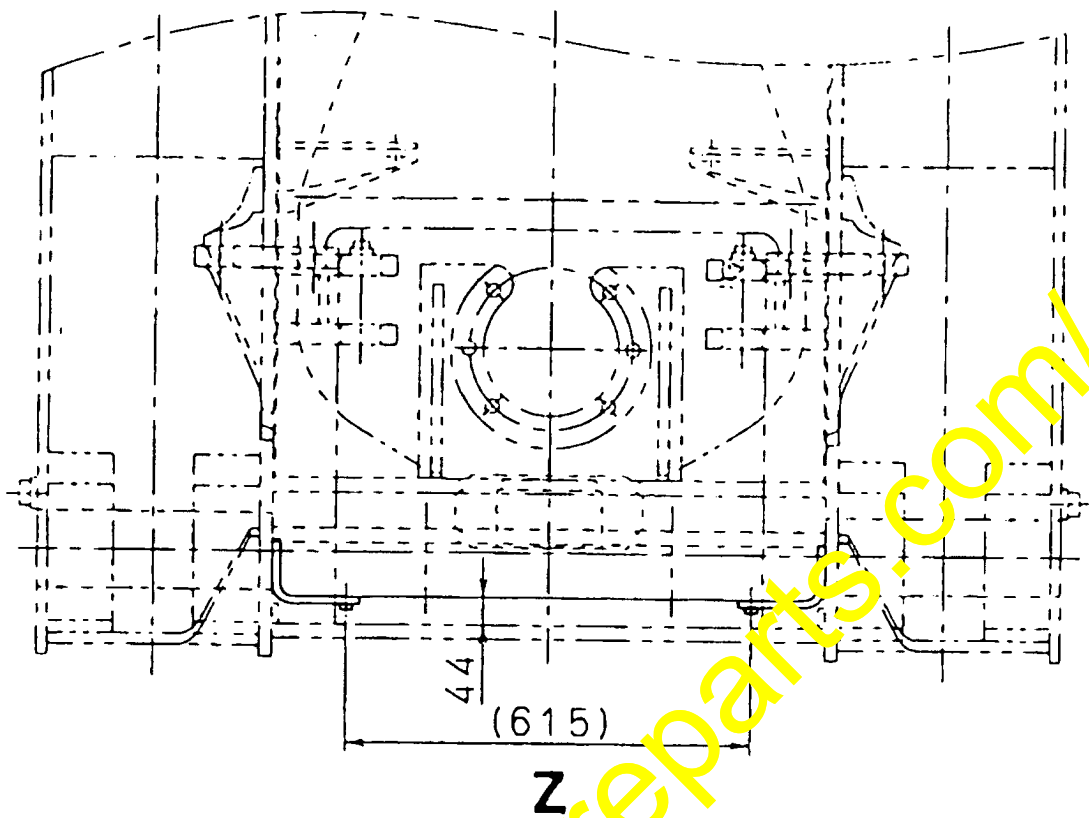


1	(709-13-11900)	Valve Assembly	1
2	01010-81580	Bolt	2
3	01011-81505	Bolt	1
4	01643-31645	Washer	3
5	425-64-23110	Bracket	1
6	01010-81670	Bolt	4
7	01643-31645	Washer	4
8	421-70-11280	Washer	4
9	421-64-23120	Cushion	4
10	421-64-23140	Spacer	4
11	421-6423130	Cushion	4
12	421-64-23150	Cushion	2
13	709-13-11260	Tube	1
14	709-13-11270	Tube	1

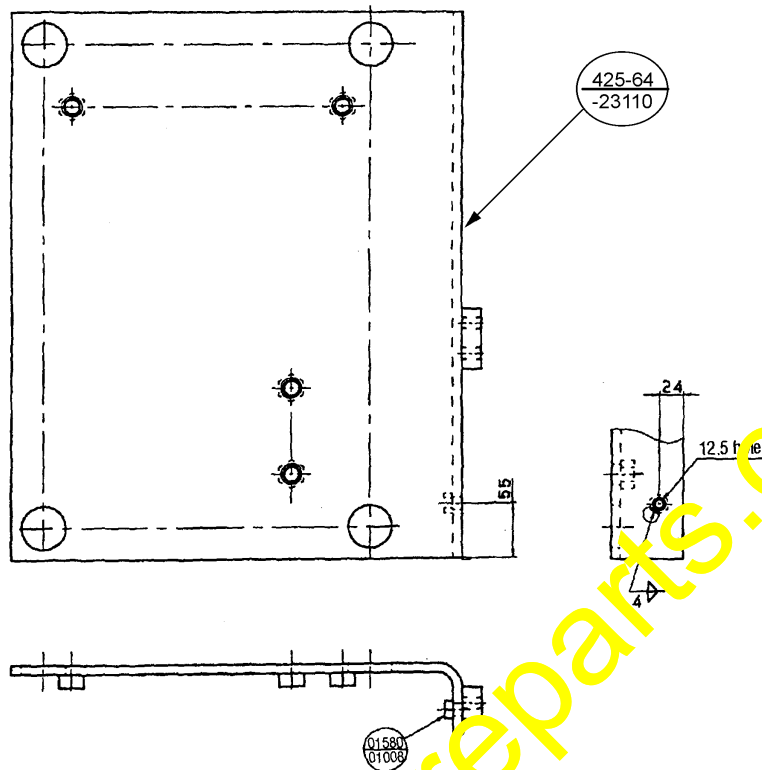
3. Reworking procedures

- 1) Weld the designated seats and plates to the front frame.
- 2) Paint the surfaces of the reworked sections.





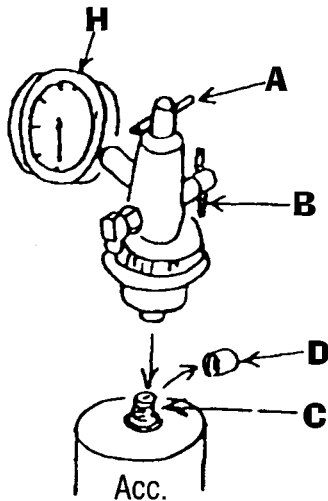
Reworking with the control valve mounting bracket, 425-64-23110:



<https://hespareparts.com/>

Nitrogen gas charging - PRECAUTIONS: Always handle the accumulator carefully. Specific qualifications may be necessary to charge nitrogen gas and gas charge should always be performed by a person carrying such qualifications.

Gas charging procedures: Introduction of gas charging valve (P/N 792-610-1700)



Part names	Part numbers
1 Charge valve assembly	792-610-1700
2 Charge valve body	
3 Handle (adjust screw)	
4 Handle (gas vent plug)	
5 Gas valve	
6 Union nut	
7 Joint	
8 Pressure gauge	
9 Hose assembly	
10 Reducing joint	

Refer to the list indicated below.

The types of the joint to the nitrogen gas tanks are different by countries and areas. Part numbers of proper reducing joint types for respective countries and areas are as follows:

Part Number	Countries and types
1 792-610-1260	Japan (Type "B")
2 792-610-1310	Russia
3 792-610-1320	U.S.A. ("CGA" tank)
4 792-610-1330	U.S.A. ("ASA" tank)
5 792-610-1340	France
6 792-610-1350	Germany
7 792-610-1360	U.K.
8 -----	It is not necessary to order part - Japan (Type "A")

Gas charging procedures: Use the charge valve assembly (792-610-1700). Check and make sure that the oil inside the accumulator has been totally drained. (Refer to Releasing the hydraulic pressure from the accumulator further on in this Parts & Service News). Charge nitrogen gas under an outside air temperature of 15° to 25 °C.

- a) Before installing the charge valve to the accumulator, perform the following: turn the handles "A" and "B" in the counter-clockwise direction as far as they will go.
- b) Remove the cap "D" plugging the valve "C".
- c) Install the charge valve assembly to the accumulator.
- d) Connect the charge valve assembly to the nitrogen gas cylinder by the hose "E". The reducing joint being installed to the hose assembly "E" is of the JIS Type "A". Select and use the appropriate joint conforming to the nitrogen gas cylinder from the list indicated in above table.

e) After connecting the hose, open the valve "G" gradually. **DO NOT OPEN IT ABRUPTLY.** Nitrogen gas will then start flowing through the handle "B" within the pressure range of 0.12 - 0.3 MPa.

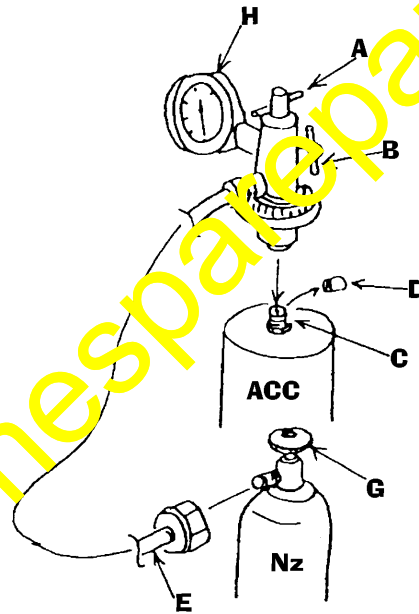
In the case of gas leaking (if occurring), turn the handle "B" in the clockwise direction.

f) Turn the handle "A" to push down the piston of the valve "C". Nitrogen gas will then start flowing through the handle "B" within the pressure range of 0.2 - 0.3 MPa. **In the case of gas leaking (if occurring), turn the handle "B" in the clockwise direction.**

g) By turning handle "A" very slowly in the clockwise direction, the piston of the valve "C" can be pushed down. Meanwhile, since the piston shaft of the valve "C" is very fragile, be careful not to turn the handle "A" excessively to bend the piston shaft.

h. Open the valve "G" gradually to charge nitrogen gas into the accumulator. Midway while doing the above, close the valve "G" once in a while and check the gas pressure on the pressure gauge "H".

i. When the gas pressure has reached 2.5 ± 0.1 MPa, close the valve "G". If gas pressure exceeds 2.7 MPa, close the valve "G" before turning the handle "B" in the clockwise direction to release the nitrogen gas.



j. Turn the handle "A" in the counter-clockwise direction to move back the piston of the valve "C".

k. Turn the handle "B" in the counter-clockwise direction to release gas from inside the hose.

l. Disconnect the charge valve assembly from the accumulator.

m. Pour soapy water around the valve "C" to check and make sure gas is not leaking.

n. Install the cap "D" to the valve "C".

Periodical inspections of nitrogen gas pressure. Use the charge valve assembly P/N 792-610-1700 for this purpose.

Use the charge valve assembly (792-610-1700) for this purpose.

Before installing the charge valve to the accumulator, check the following items:

Check and make sure that the handle "A" has been turned in the counter-clockwise direction as far as it can go.

Check and make sure that the handle "B" has been turned in the clockwise direction as far as it can go.

a) Drain oil from inside the accumulator.

b) Remove the cap "D" plugging the accumulator valve "C".

c) Install the charge valve assembly to the accumulator valve "C".

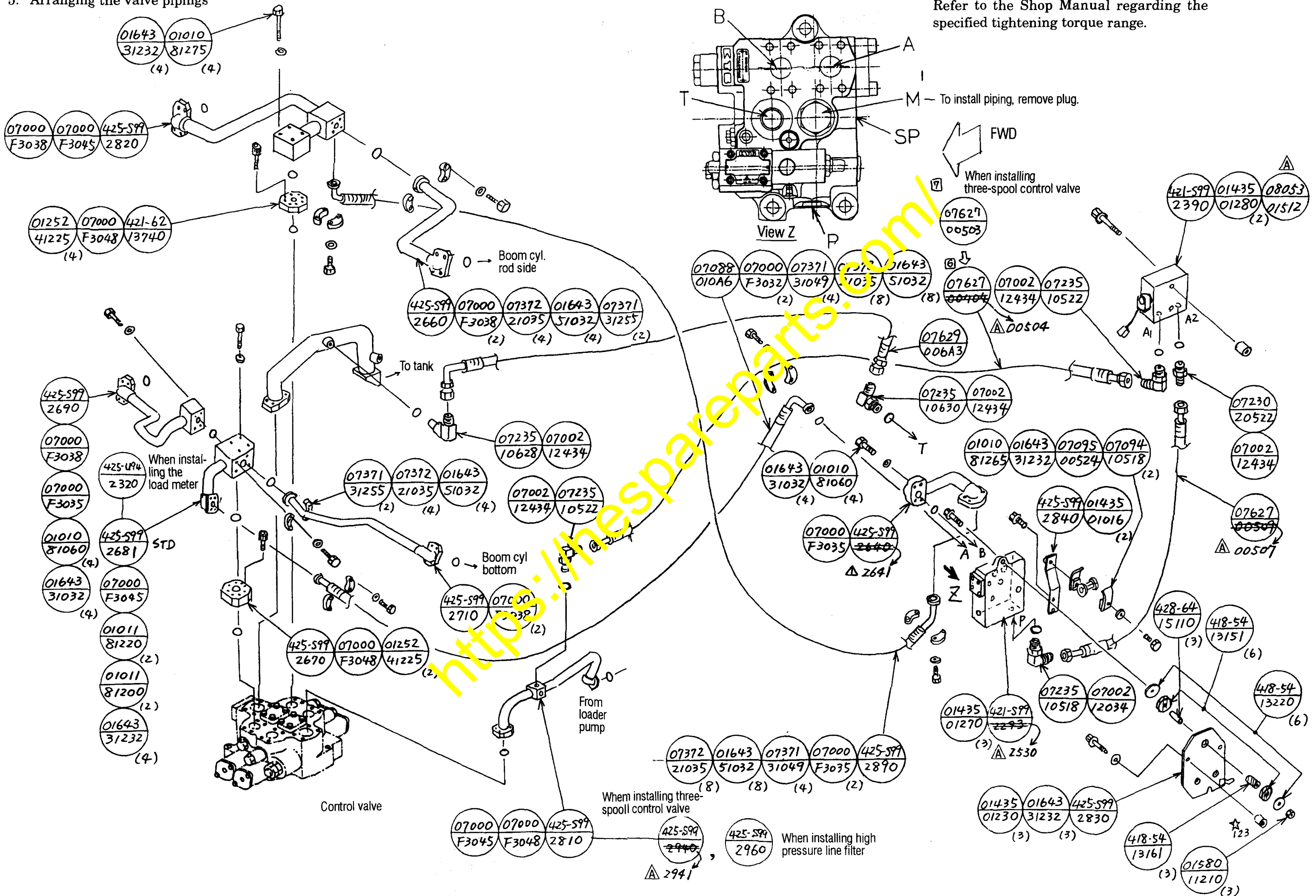
d) Turn the handle "Z" very slowly in the clockwise direction to push down the piston of the valve "C" until the pointer of the pressure gauge "H" moves to indicate the flowing gas pressure. Since the piston shaft of the valve "C" is very fragile, be careful not to turn the handle "A" excessively to bend the piston shaft. The aforementioned gas charging is not necessary if the gas pressure remains within the range of 2.5 ± 0.1 MPa.

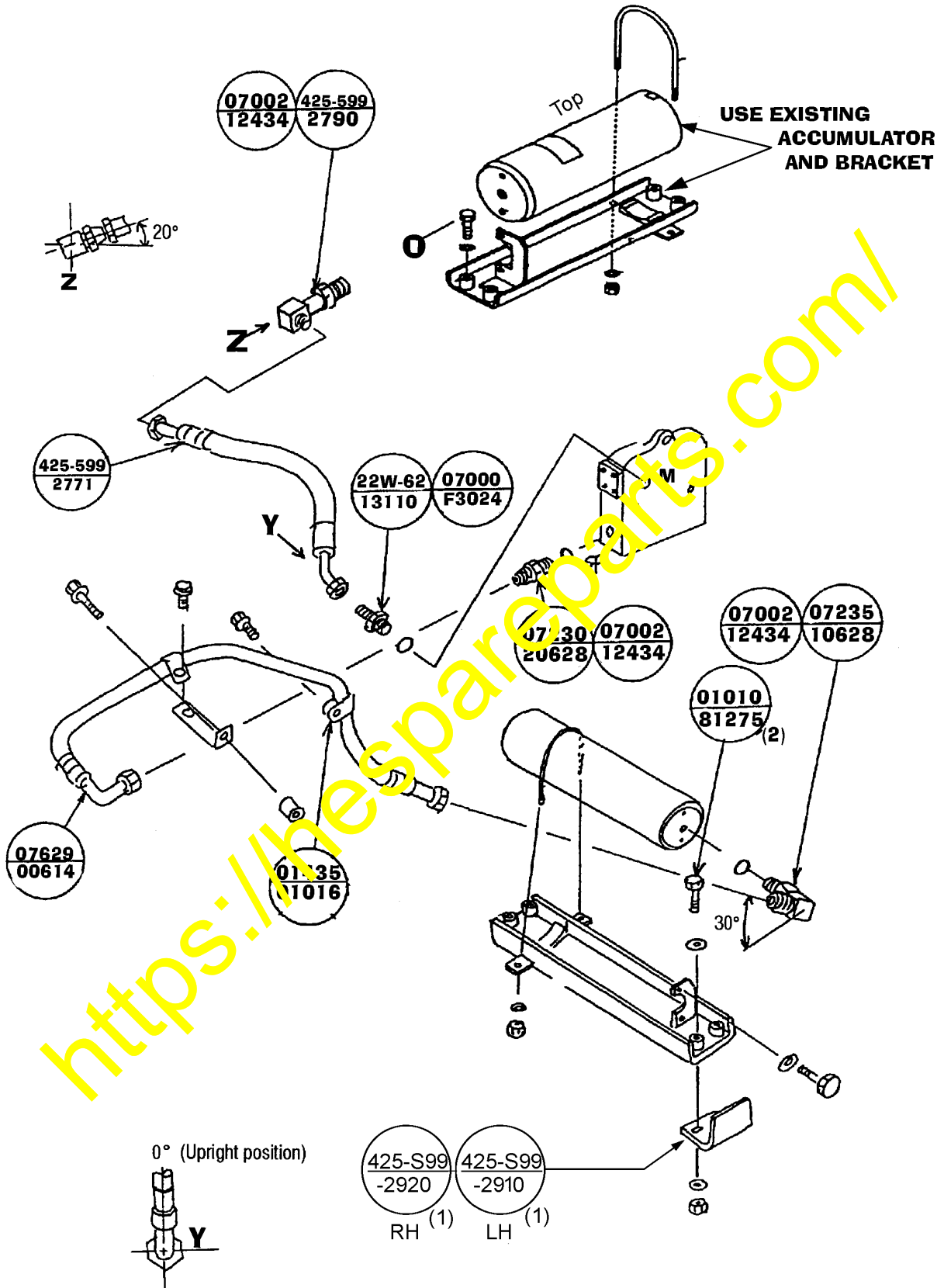
If the gas pressure is found to have gone out of the above range, charge nitrogen gas following the procedures outlined above.

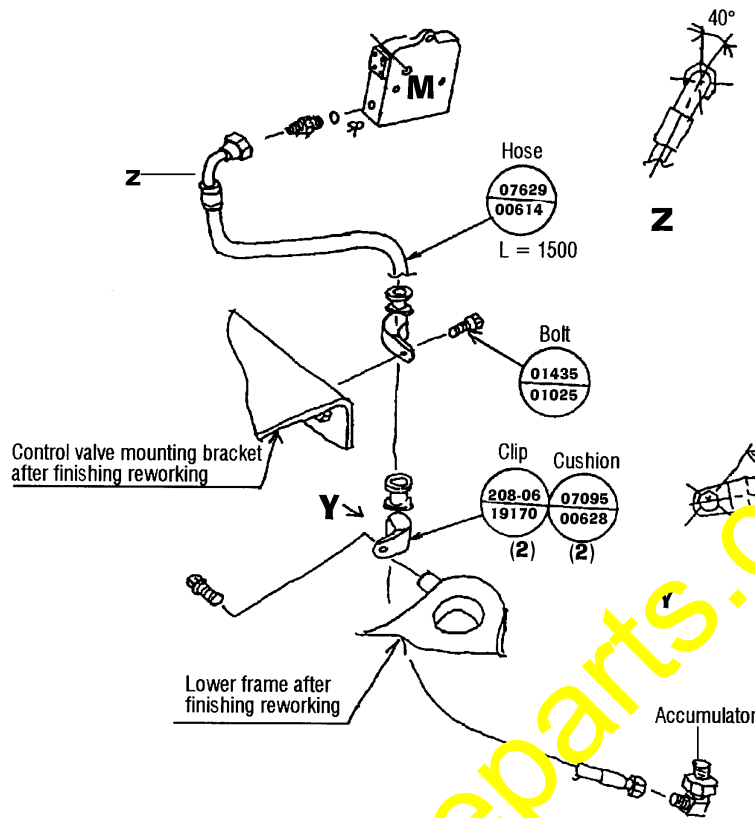
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5. Arranging the valve pipings

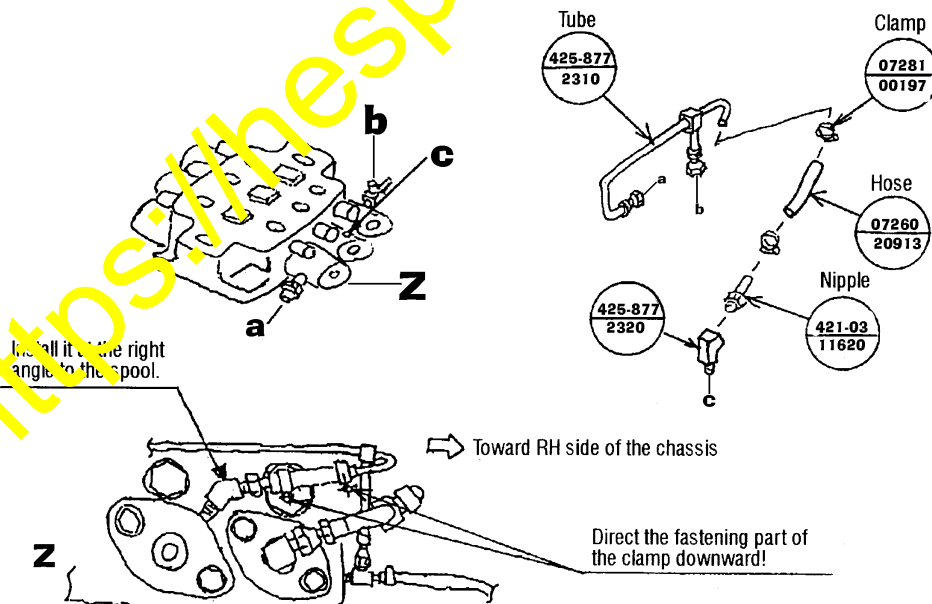
Refer to the Shop Manual regarding the specified tightening torque range.







When the machine is carrying the three fold control valve assembly.



Connecting the ECSS harness connectors.

1. Connect the connectors CN SOL1 and CN SOL2 of the harness 425-S99-2592 to the ECSS main control valve and the E.C.S.S. charge valve.

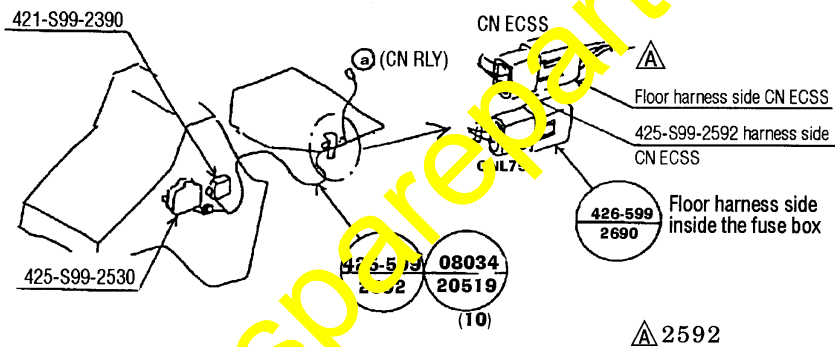
SOL1 - - - ECSS MAIN CONTROL VALVE (425-S99-2530)

SOL2 - - - ECSS CHARGE CONTROL VALVE (425-S99-2390)

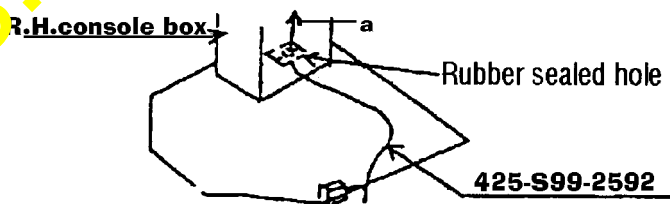
2. Lead the new harness (425-S99-2592) along the existing front frame harness and bundle them together using straps (08034-20519)

3. Connect the connector CN ECSS of the new harness (425-S99-2592) to the connector of the same number located underneath the cab floor.

4. Install the cap (426-S99-2690) to the CNL75 of the floor harness located inside the fuse box.

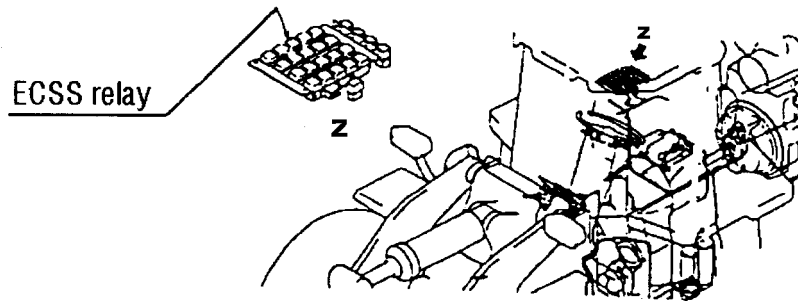


5. Lead the single wire (colored yellow and red) of the harness (425-S99-2592) into inside the R.H. console box.

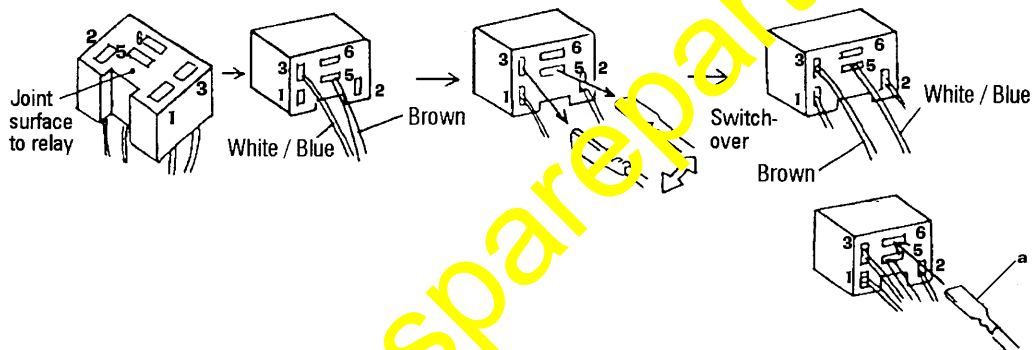


Remove vinyl tape and the connector body from the connector (a). Use a miniature screwdriver when releasing the terminal lock.

6. Remove the ECSS relay from inside the R.H. console box. (This relay is being reused) To find out the location of the ECSS relay, refer to the decal applied on the rear surface of the R.H. console box cover.



7. Switch over the locatoins of the No. 3 terminal pin and No. 5 terminal pin of the ECSS relay connector. (Use miniture (Jewelers) screwdrivers to release the terminal lock.)



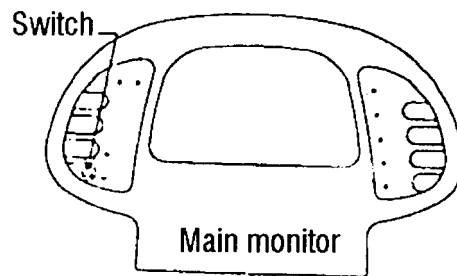
8. Connect the single wire of the harness 425-S99-2592 as was led into the R.H. console box according to the above paragraph.

9. Reinstall the relay back to its original place and install the R.H. console box cover.

OPERATION AND ADJUSTMENT METHODS

1. The ECSS switch is located at the lower left position of the main monitor.

When the back light of the ECS switch is not lit, the ECSS will not operate. When this lamp is lit, the ECSS will operate when the travel speed is at 5km/h or more and when the speed shift is being set to the 2nd speed or up.

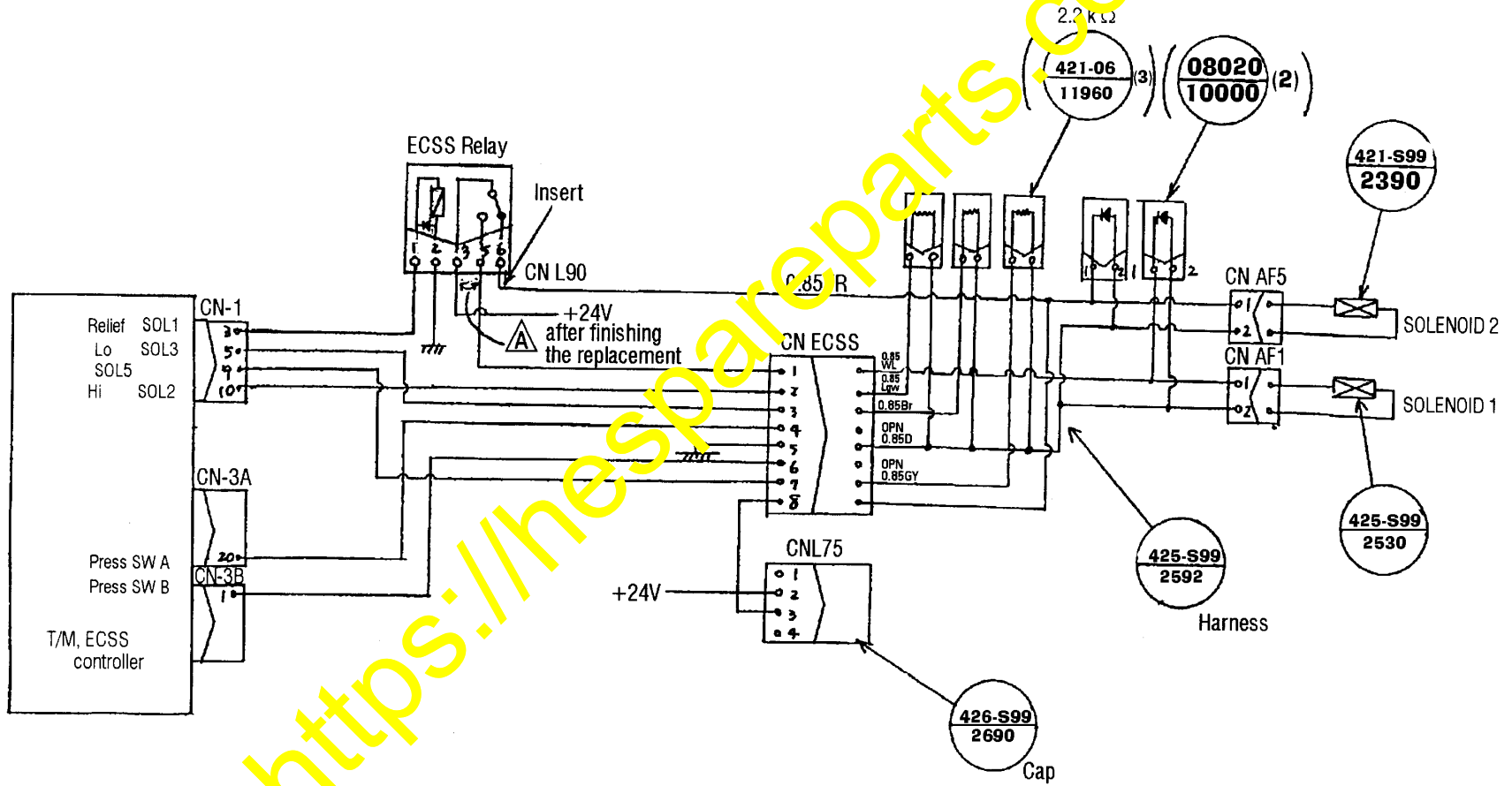


CAUTIONS

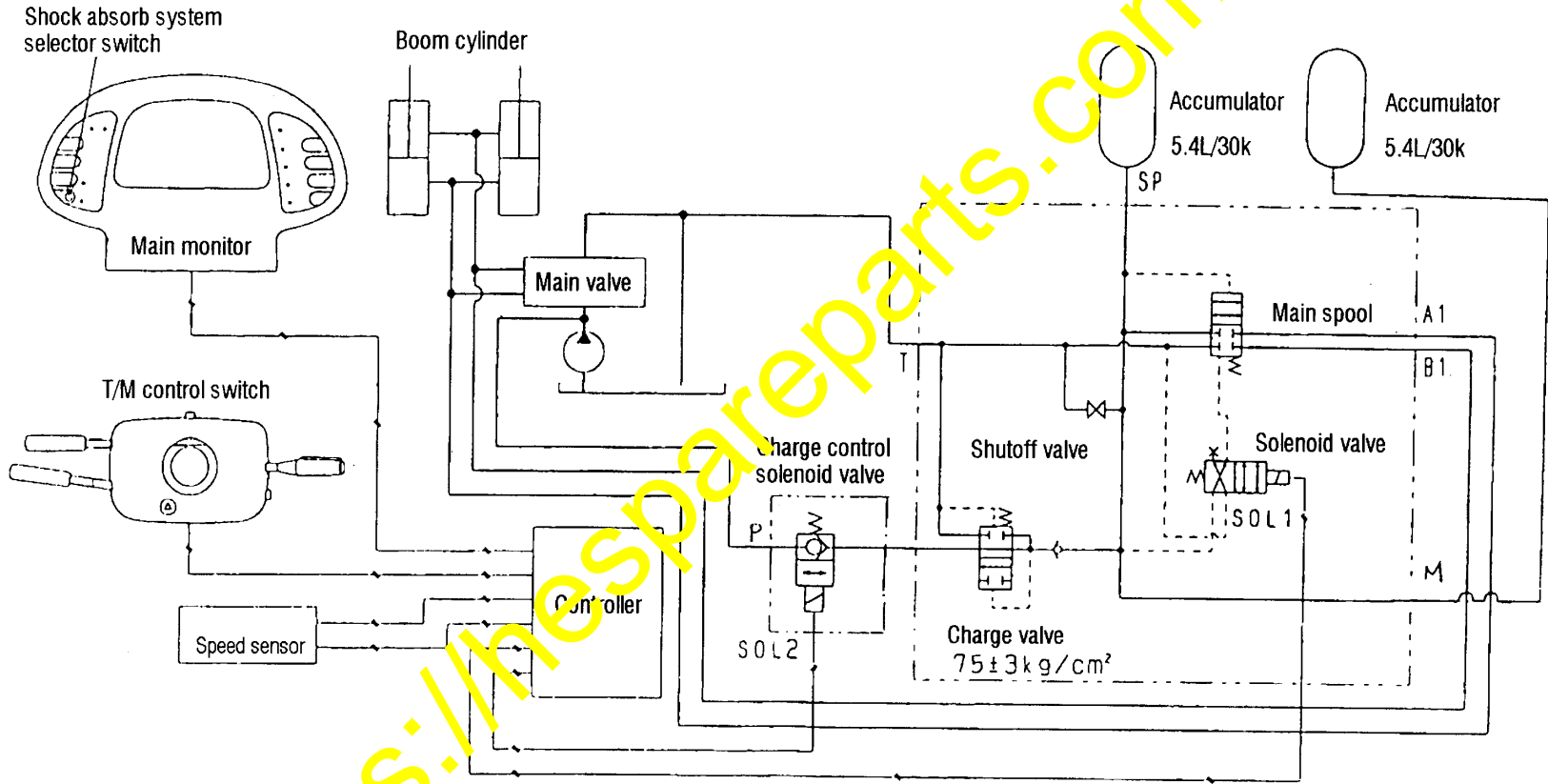
The ECSS valve will be activated by the hydraulic pressure accumulated in the accumulator. If the machine is left unused for a long time and when the remaining pressure in the accumulator is 0 MPa, the ECSS will not operate since hydraulic pressure cannot be fed into the ECSS valve. Under these circumstances, operate the work equipment for about 5 seconds keeping the machine in standstill, before starting traveling of the machine.

- When disconnecting pipings connecting between the ECSS valve with a drain cock.
- When checking the nitrogen gas pressure inside the accumulator.
- When charging nitrogen gas into the accumulator.
 - a) Remove the L.H. front fender and R.H. front frame side cover.
 - b) Loosen the locknut of the red paint marked plug of the ECSS valve.
 - c) Loosen the hexagon socket head plug (Size 4). When hydraulic pressure is being accumulated inside the accumulator, you will hear sounds of flowing oil.
 - d) Tighten the hexagon socket head plug when the flowing oil sound has disappeared.
 - e) Tighten the locknut at a tightening torque of $13 \pm 0.06\text{Nm}$.
 - f) Install the frame cover and fender back to their original state.

8. Electric circuit diagram



9. Hydraulic circuit diagram



Spec gear	Travel Speed (km/h)	SOL1	SOL2	Remark
1	0 - max.	OFF	ON	Not function
2 - 4	0 - 5	OFF	ON	Not function
	5 - max.	ON	OFF	ACC function