

# INSTALLATION MANUAL

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**SUBJECT:** INSTALLATION PROCEDURE OF DIFFERENTIAL LOCK DEVICE ON HD465/605-5

**PURPOSE:** To introduce installation procedures of the differential lock for optional use on HD465-5 and HD605-5 dump trucks

**APPLICATION:** HD465-5 Dump Trucks, Serial Nos. 4407 and up  
HD605-5 Dump Trucks, Serial Nos. 1001 and up

**FAILURE CODE:** 2B6099

## DESCRIPTION:

### 1. Introduction

This Service News will introduce procedures for installing the optional differential lock onto the HD465-5 and HD605-5 dump trucks.

This differential lock has been developed for use on snow-covered or muddy surfaces where the tires are likely to slip.

When the differential lock is activated, the left-hand and right-hand rear wheels are locked together to suppress slipping and to provide a powerful drive force. It also helps prolong the service life of the tires.

### 2. List of parts

No.	Part No.	Part Name	Q'ty	Remarks
	X23-109-8820	Diff. ass'y	1	Equipped with the differential lock device
1	04020-01842	Pin	1	
2	01010-62055	Bolt	20	
3	01643-32060	Washer	20	
4	568-83-11440	O-ring	1	
5	195-21-11350	O-ring	2	Consumable parts (for the final drive cover)
6	04020-01024	Pin	4	
7	07002-03634	O-ring	4	} Consumable parts (for the drain plug)
8	07002-02434	O-ring	2	
9	561-88-64121	Board	1	
10	283-17-18710	Pedal	1	
11	283-17-18720	Spring	1	
12	283-17-18730	Pin	1	
13	01641-20812	Washer	1	

No.	Part No.	Part Name	Q'ty	Remarks
14	04050-12015	Pin, cotter	1	
15	01010-81035	Bolt	1	
16	01580-11008	Nut	1	
17	561-88-64140	Bracket	1	
18	01010-81020	Bolt	2	
19	01643-31032	Washer	2	
20	566-06-41413	Switch	1	
21	01010-80616	Bolt	4	
22	01643-30623	Washer	4	
23	561-88-64160	Wiring harness	1	
24	569-88-64180	Bracket	1	
25	01010-81030	Bolt	2	
26	01643-31032	Washer	2	
27	283-95-14500	Valve	1	
28	01023-10516	Screw	2	
29	561-88-64171	Wiring harness	1	
30	08020-10000	Diode	1	
31	08052-11911	Clip	1	
32	08036-10614	Clip	1	
33	01010-80812	Bolt	2	
34	01643-30823	Washer	2	
35	411-44-11470	Tee	1	
36	07822-00802	Tube	1	
37	281-35-19540	Elbow	1	
38	567-35-12160	Elbow	1	
39	07102-20211	Hose	2	
40	07238-60211	Connector	3	
41	581-35-23540	Insulator	2	
42	08036-02514	Clip	2	
43	01010-81020	Bolt	1	
44	01580-11008	Nut	1	
45	01643-31032	Washer	2	
46	08034-00414	Band	20	
47	01571-00814	Seat	2	
48	566-88-6A210	Bracket	1	
49	561-07-48120	Cable	1	
50	562-06-22611	Lamp	1	
51	01640-22032	Washer	1	

3. Installation procedures

Circled code numbers given behind part names in descriptive sentences and code numbers affixed to part numbers in drawings of this literature correspond to the item numbers indicated in the lists of necessary parts.

(Nonetheless, as for Section 3-1, the numbers given in the schematic diagrams indicated on the right-hand side of respective pages are referred to for explanation.)

3-1 Installation of the new differential assembly equipped with the differential lock device

Replace the differential assembly with the new differential assembly equipped with the differential lock device in assembly state.

3-1-1 Removal of differential assembly

1. Drain oil.



Final drive gear case : **31.5 l (each)**



Differential case : **95 l**

2. Slack adjuster assembly

Remove slack adjuster assembly.

For details, see REMOVAL OF SLACK ADJUSTER.

3. Remove cover (1).

4. Pull out shaft (2).

★ Fit an eyebolt and pull out with a bar.

5. Disconnect hose (3).

6. Remove guard (4).

7. Remove cover (5).

8. Disconnect drive shaft (6).

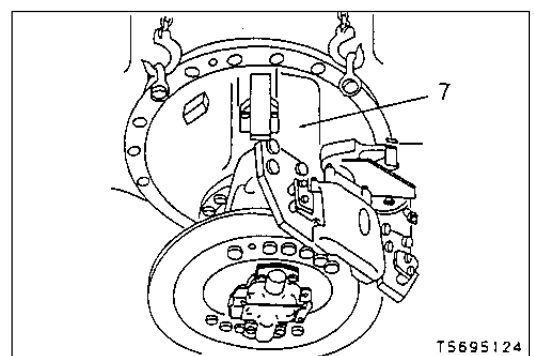
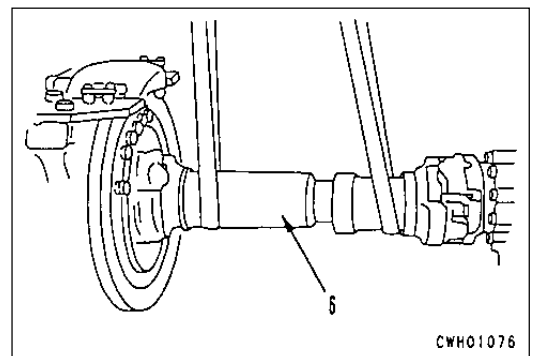
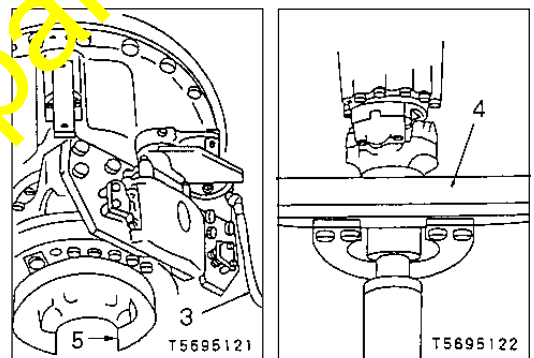
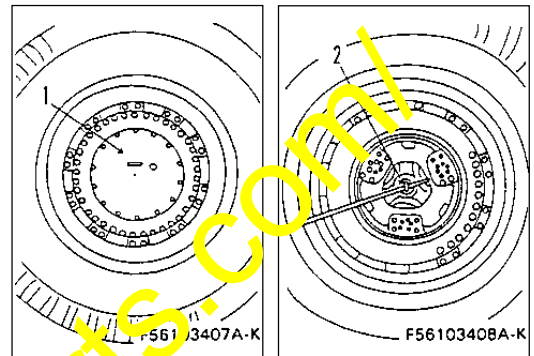


Drive shaft assembly : **60 kg**

9. Remove differential assembly (7).



Differential assembly : **700 kg**



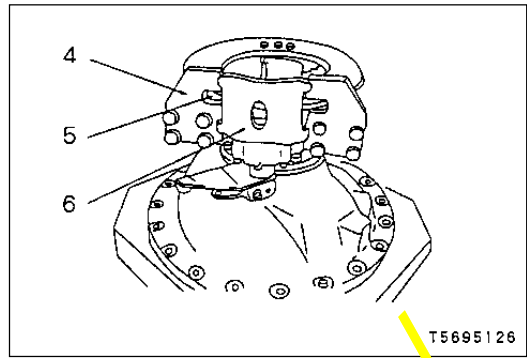
### 3-1-2 Removing the parking brake chamber and caliper assembly

1. Set differential assembly in tool **H1**.

#### 2. Parking brake chamber assembly

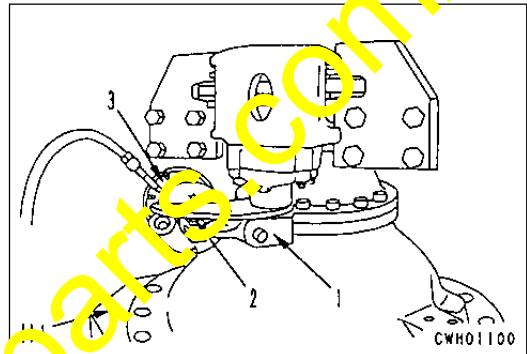
Pump air into parking brake chamber to retract rod, then pull out connecting pin (2) of slack adjuster (1) lever, and remove parking brake chamber (3).

**⚠** If the air in the parking brake chamber is released, the rod will suddenly extend, so be careful not to get caught.

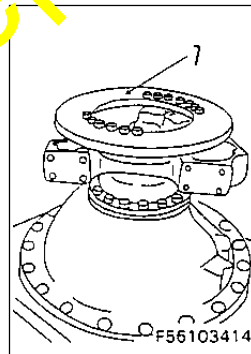


#### 3. Caliper assembly

- 1) Remove plate (4) on one side, then remove caliper (6) together with pad (5).
- 2) Remove plate on other side.




- 3) Remove disc plate (7).




## 3-1-3 Reinstalling the parking brake chamber and caliper assembly

**1. Caliper assembly**

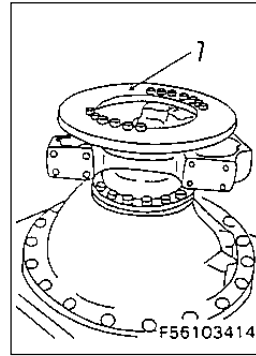
- 1) Install disc plate (7).

 Mounting bolt:

**Thread tightener (LT-2)**

 Mounting bolt:

**549.2 ± 58.8 Nm {56 ± 6 kgm}**



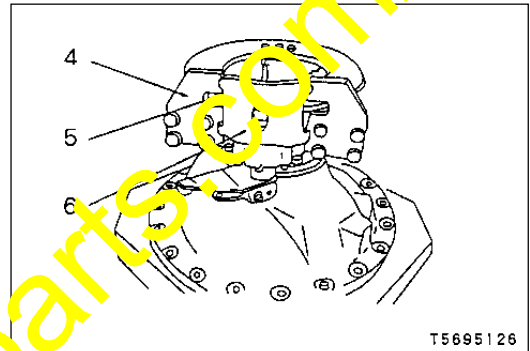
- 2) Fit plate (4) on one side temporarily.
- 3) Fit pad (5) and install caliper (6).
- 4) Fit plate on other side and tighten fully.
  - ★ Make a clearance of 0.1 mm between the plate and the caliper.

 Mounting bolt:

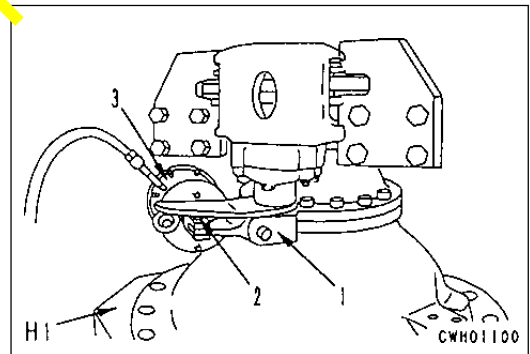
**Thread tightener (LT-2)**

 Mounting bolt:

**926.8 ± 98.1 Nm {94.5 ± 10 kgm}**

**2. Parking brake chamber assembly**

- 1) Install spring cylinder (3), and connect forked portion of rod and lever of slack adjuster (1) with pin (2).
  - ★ Pump air into the spring cylinder and retract the rod.



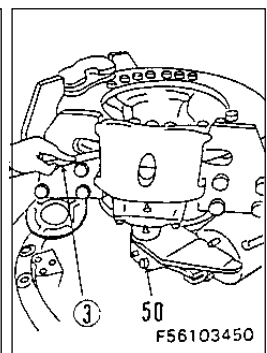
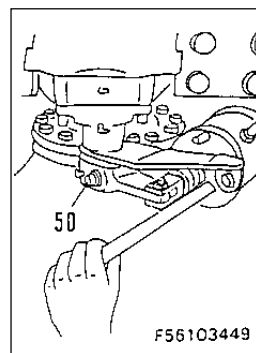
- 2) Adjusting clearance of caliper pad  
Rotate adjustment screw (50) of slack adjuster and measure clearance of caliper pad with gauge ③.

★ Spring cylinder stroke: 50 mm

★ Clearance of pad:

Both ends: 0.8 mm each

When moved to one end: 1.6 mm



### 3-1-4 Installing the new differential assembly (equipped with the differential lock device)

- Carry out installation in the reverse order to removal.

※ 1



Drive shaft mounting bolt:

**Thread tightener (LT-2)**



Drive shaft mounting bolt:

**176.5 ± 19.6 Nm {18 ± 2 kgm}**

※ 2



Differential mounting bolt:

**Thread tightener (LT-2)**



Differential mounting bolt:

**549.2 ± 58.8 Nm {56 ± 6 kgm}**

- **Refilling with oil**

Refill with oil to the specified level, and check the oil level again.



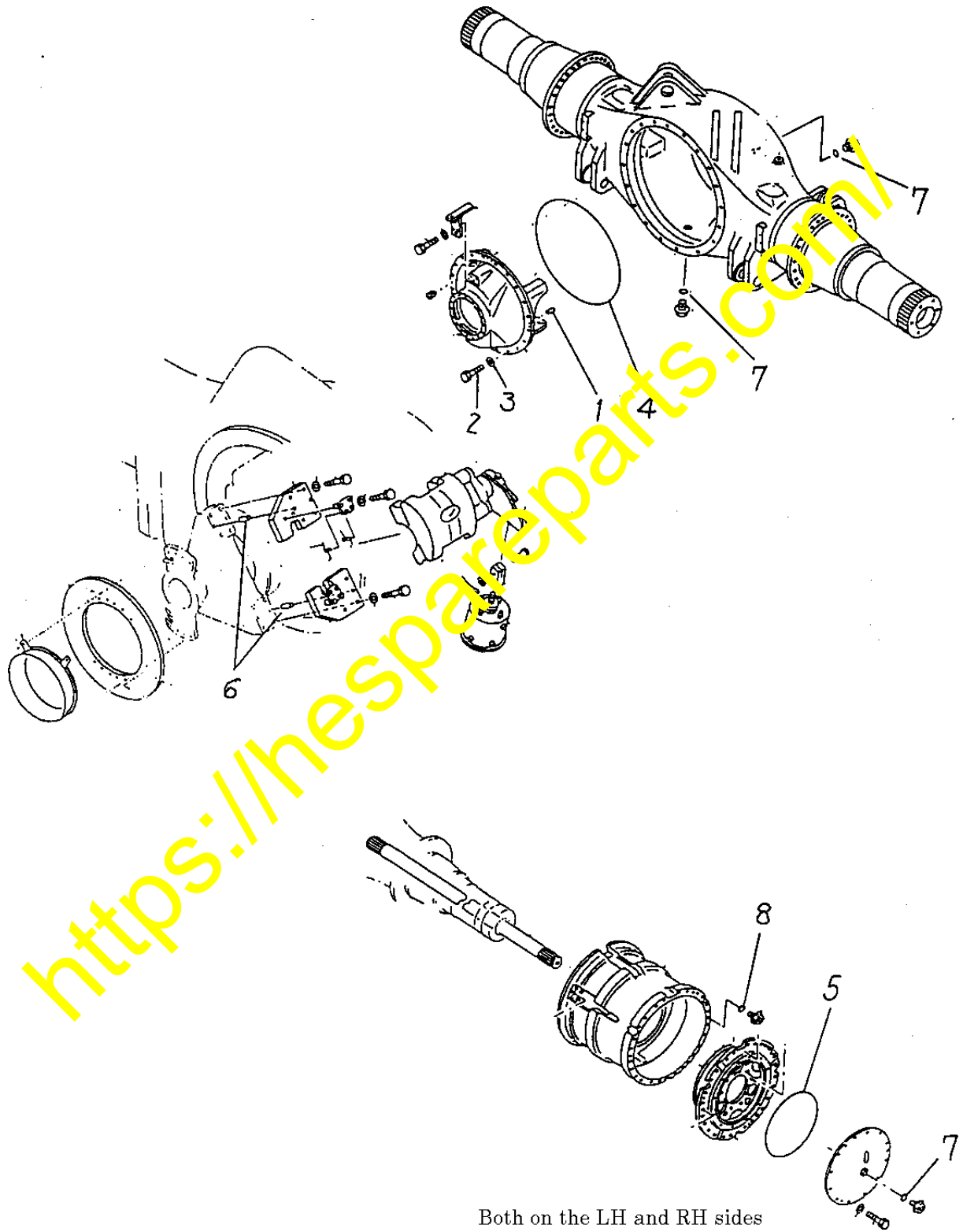
Final drive case: **31.5 l (each)**



Differential case: **95 l**

<https://hespareparts.com/>

Replace the drain plugs, O-ring for the final drive case and any other consumable parts removed while changing the differential assembly with new counterparts.



Both on the LH and RH sides

### 3-2. Installation of the controlling parts

#### 3-2-1 Inside the operator's cab

- 1) Preparations (Refer to Fig. 1.)
  - (1) Remove the floor mat ①. (This part is reused after reworking.)
  - (2) Remove the cover ② from the floor frame. (This part is reused.)
  - (3) Remove the board ③ from the floor frame. (This part is replaced with a newly prepared part.)
  - ★ On vehicles with the serial numbers of #4524 – #4625 of the HD465-5 and with the serial numbers of #1007 – #1012 of the HD605-5, make the following removal also.
  - (4) Remove the dashboard cover ④ from the dashboard. (This part is reused.)
- 2) Reworking with the floor mat ① (Refer to Fig. 2.)
  - (1) Cut to remove the hatched section in the diagram from the floor mat.
- 3) Installing the differential lock pedal and differential lock switch (Refer to Fig. 3.)
  - (1) Install the pedal ⑩ (283-17-18710), spring ⑪ (283-17-15720), bracket ⑫ (561-88-64141), switch ⑬ (566-06-41413), etc. to the board ⑨ (566-88-64121).
  - (2) Install the board sub-assembled in above (1) to the floor frame <to the position where the current board was removed in Paragraph (3) of the Section 1) Preparations>.
- 4) Installing the differential lock pilot lamp (Refer to Fig. 4.)

(This installation is only for vehicles with the serial numbers of #4524 – #4625 of the HD465-5 and with the serial numbers of #1007 – #1012 of the HD605-5.)

  - (1) Install the lamp ⑮ (562-06-22611) by inserting it through the hole opened in the bracket ⑯ (566-88-6A210) .
  - (2) Install the bracket ⑯ (566-88-6A210) to the designated position between the dashboard and the dashboard cover and fasten altogether using the same screws.
  - (3) Connect the grounding lead.



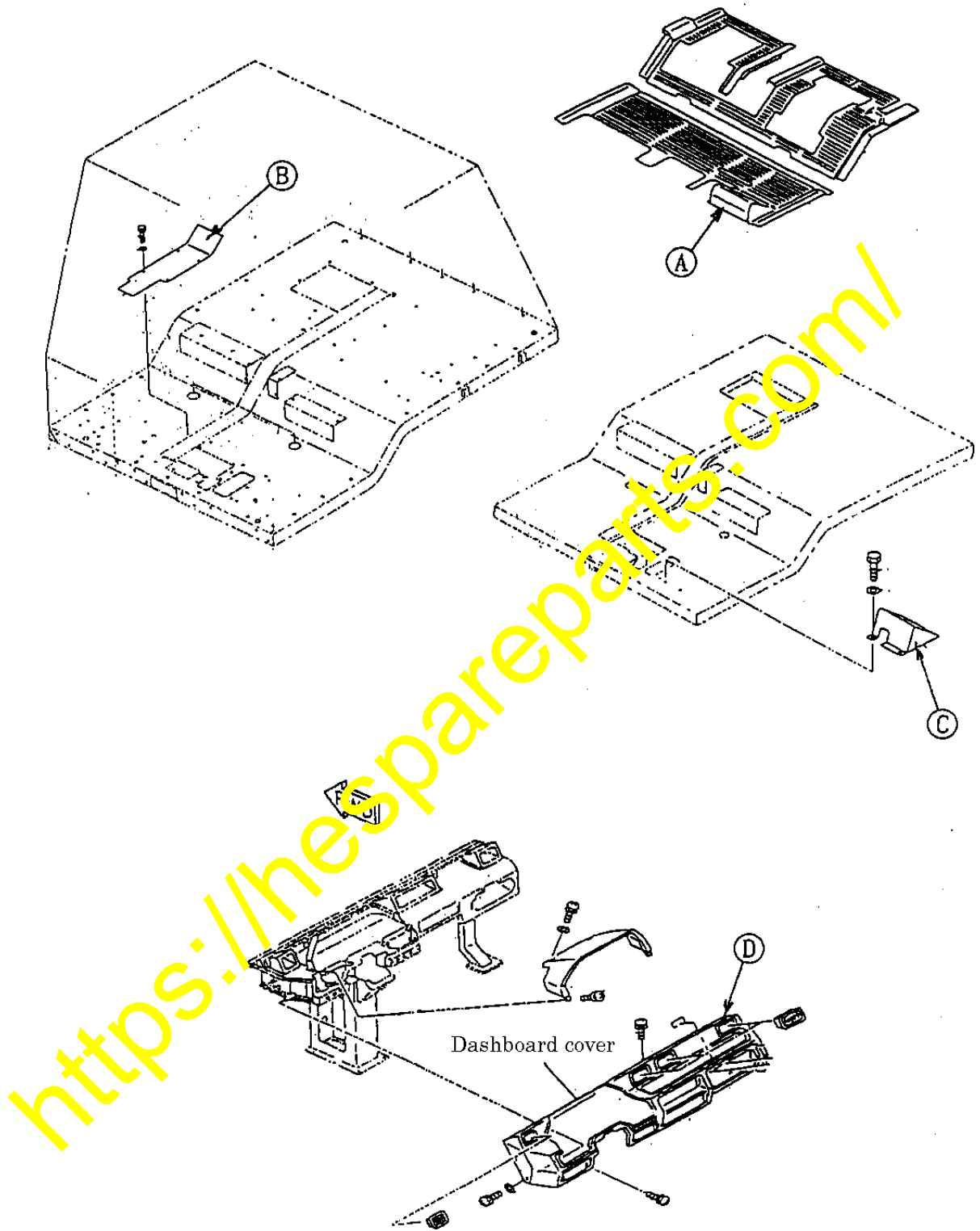
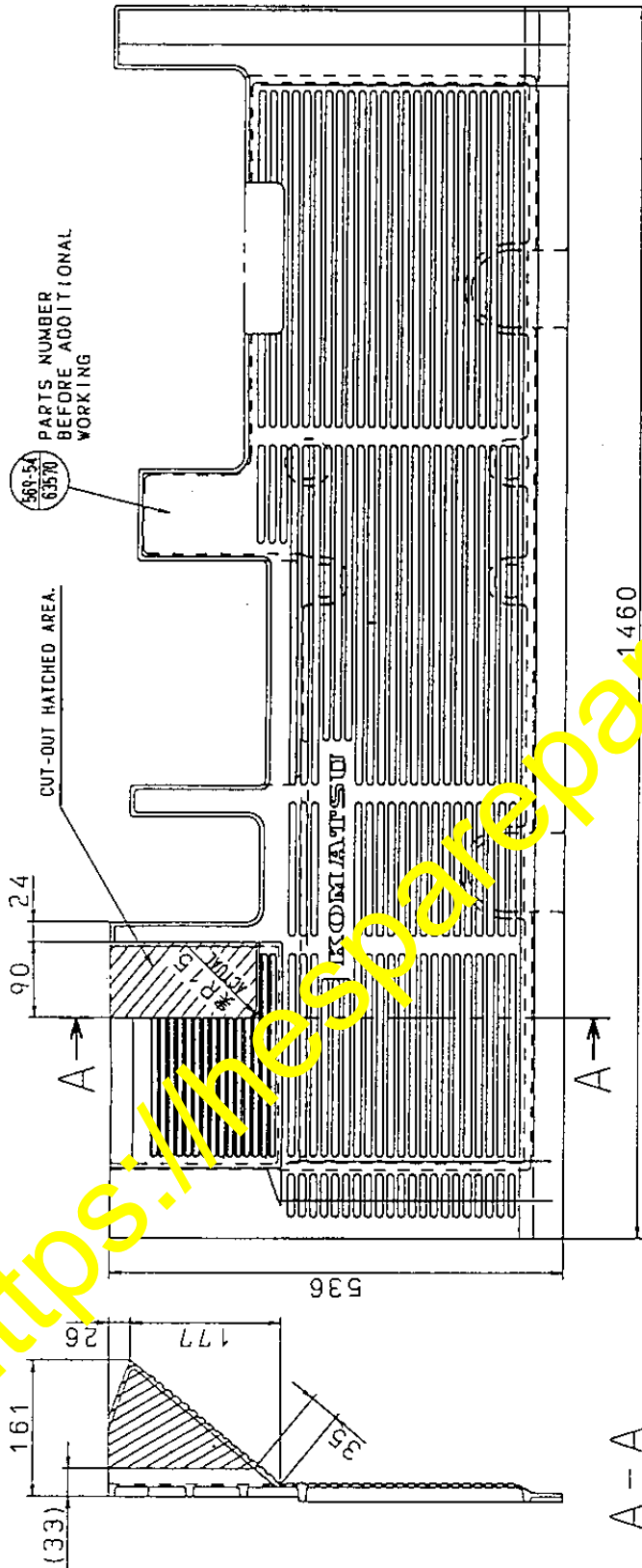


Fig. 1



To be same as 569-54-63570  
Except those specified above.

Fig. 2 Reworking drawing for the floor mat

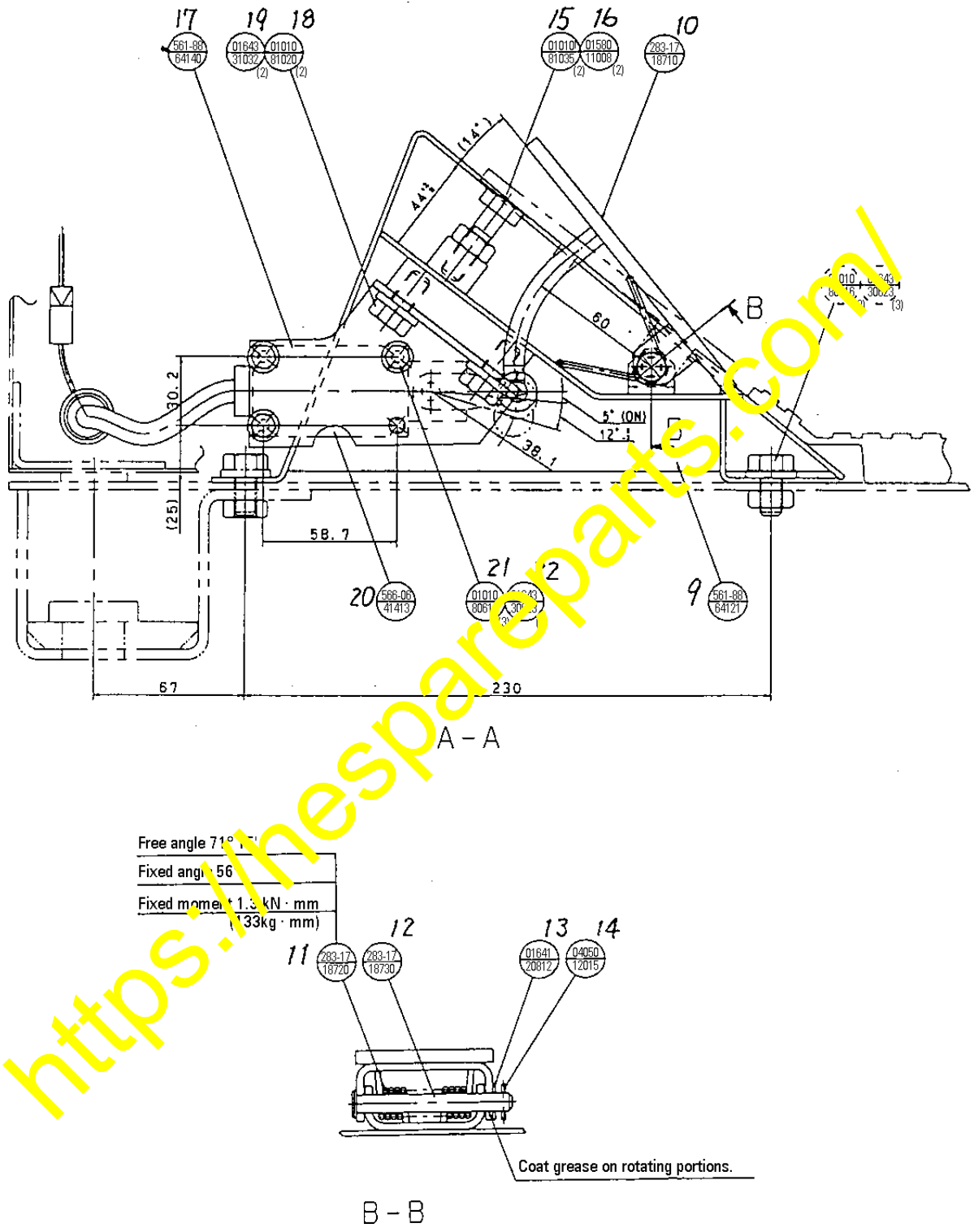


Fig. 3 Installing the differential lock pedal and differential lock switch

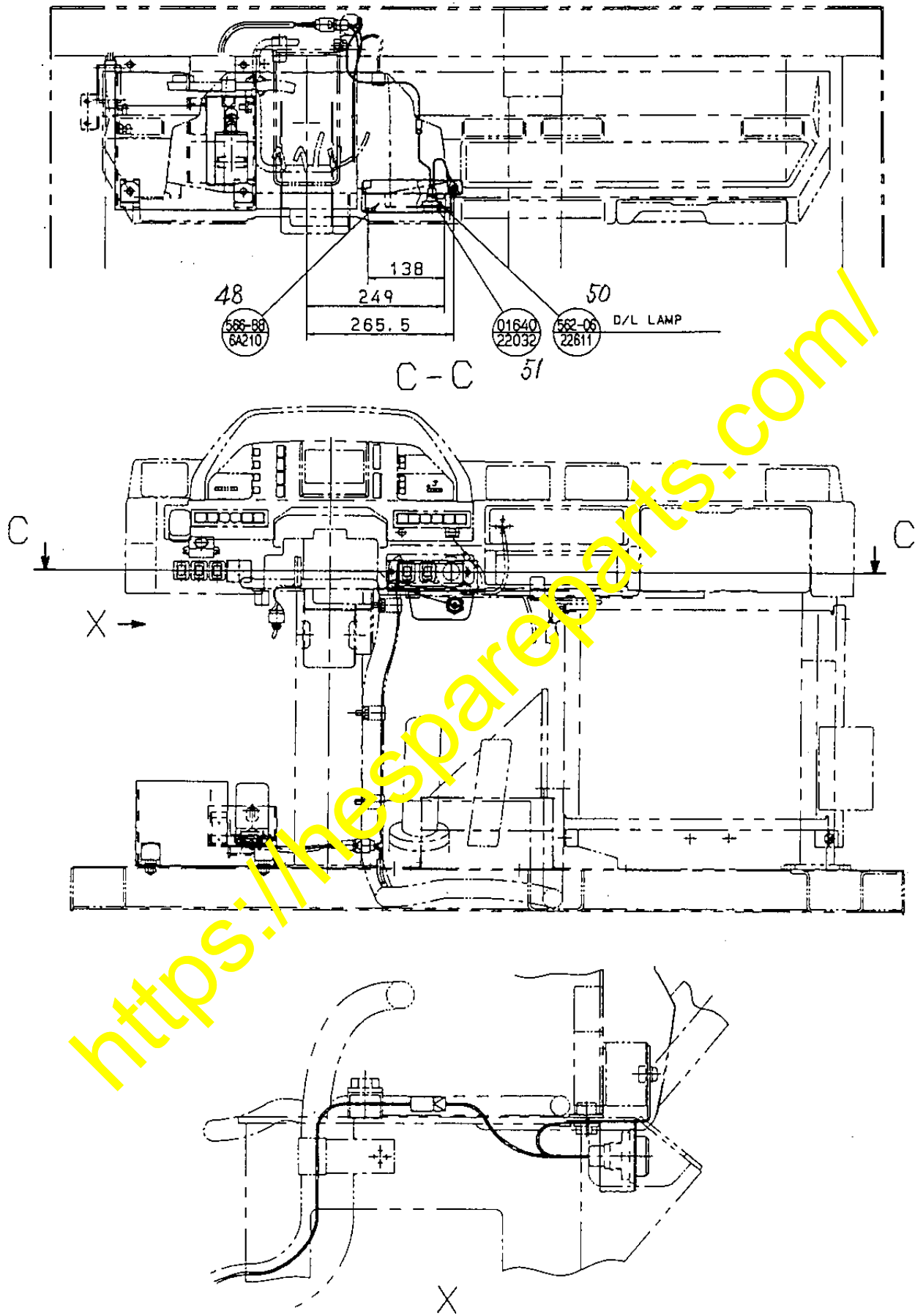


Fig. 4 Installing the differential lock pilot lamp

## 5) Arranging the electric wiring harnesses

(Refer to Fig. 5, Fig. 6, Fig. 7 and Fig. 14 (Electric Circuit Diagram). )

- (1) Connect the connectors of the harness ⑳ (561-88-64160) to the switch ㉑ (566-06-41413) which has been installed according to the preceding Section and to the connector (CN DL) of the existing harness.

With vehicles with the serial numbers of #4524 – #4625 of the HD465-5 and with the serial numbers of #1007 – #1012 of the HD605-5, connect the harness to the pilot lamp ㉒ (562-06-22611) also.

- (2) Bundle the harness ⑳ (561-88-64160) together with the existing harness using bands ㉓ (08034-00414) before clamping them accordingly.

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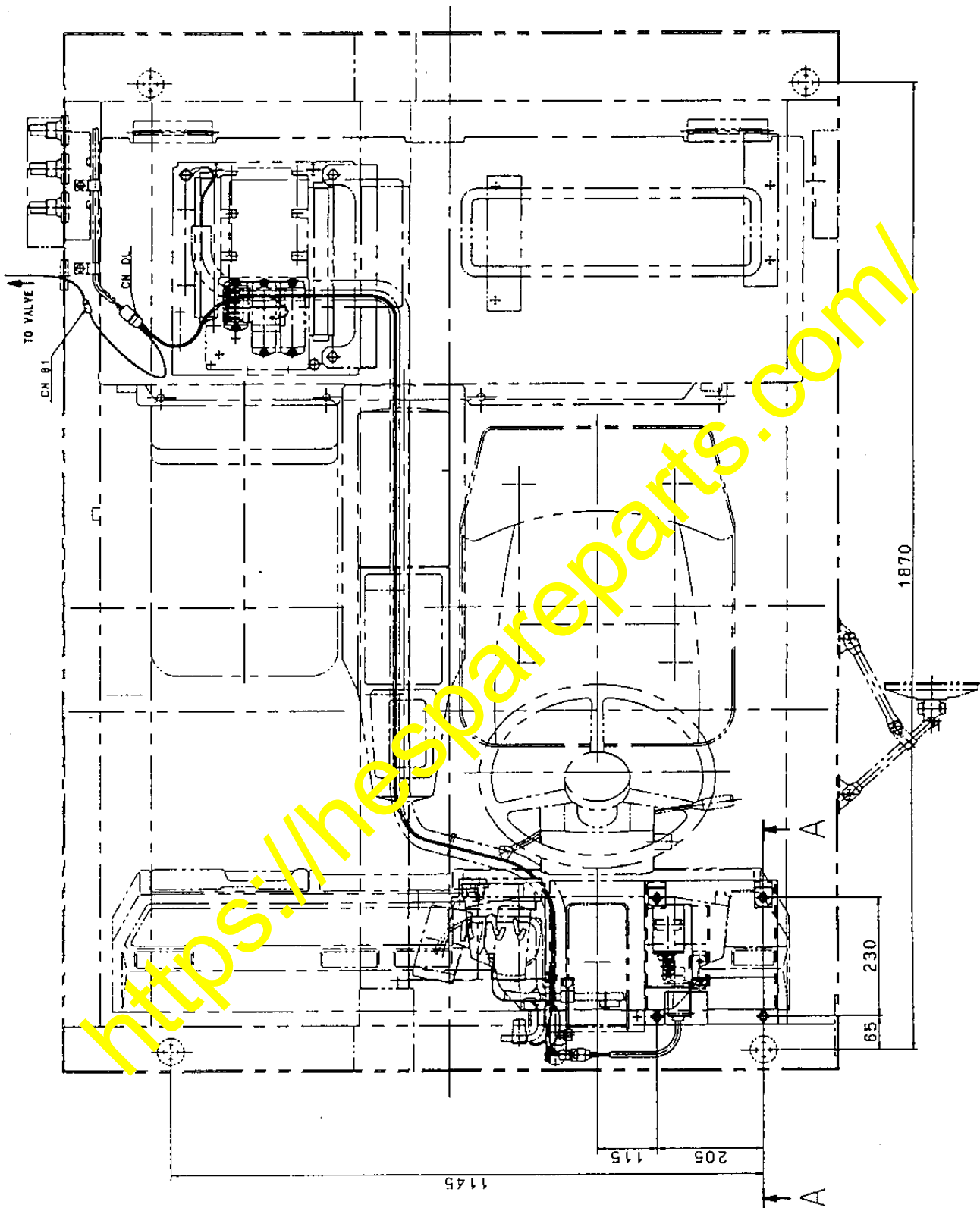


Fig. 5 Plan view of the inside structure of the operator's cab

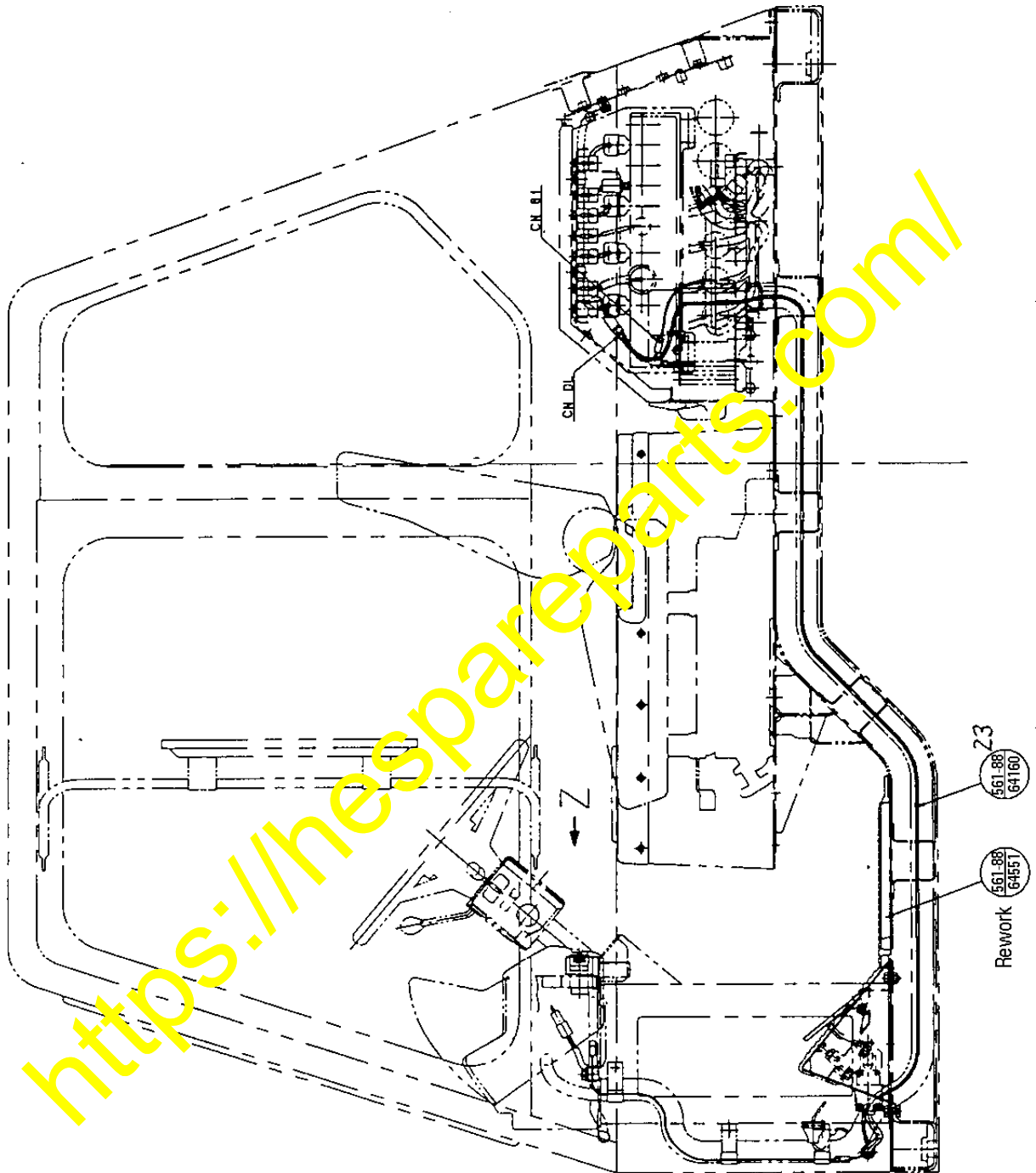


Fig. 6 Side view of the inside structure of the operator's cab

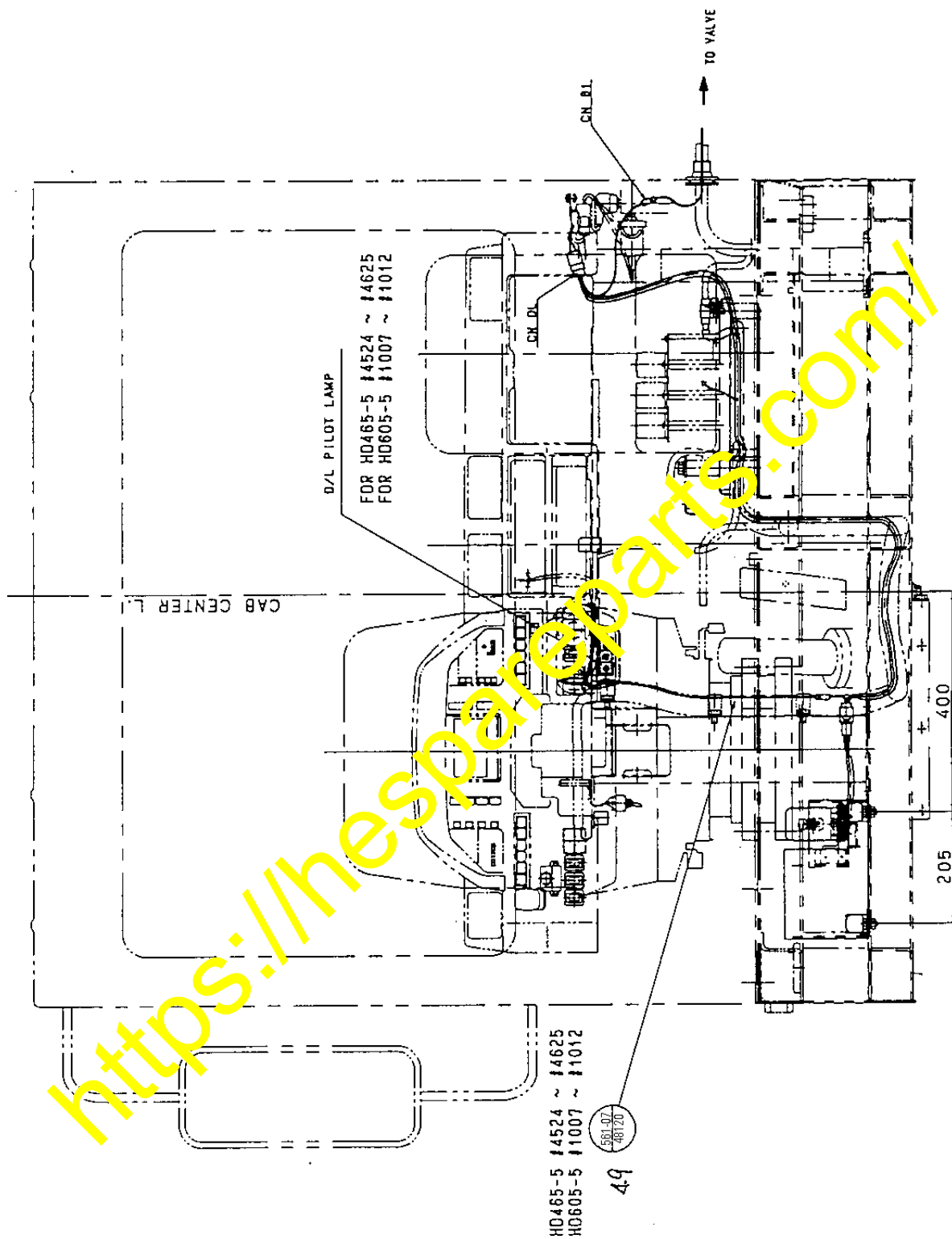


Fig. 7 Rear view of the inside structure of the operator's cab



### 3-2-2 Outside of the operator's cab

- 1) Reworking with the rear brake chamber bracket (Refer to Fig. 8.)
  - ★ Modification according to this reworking may already be made with some vehicles.
  - (1) Drill  $\phi 12.5$  holes (at 2 places) in the bracket and weld the seat ④⑦ (01571-00814) to the bracket.
- 2) Installing the valve (Refer to Fig. 12.)

Sub-assemble the valve ②⑦ (283-95-14500) and the bracket ②④ (569-88-64180) before installing the sub-assembly to the bracket referred to in the preceding Section using the holes reworked therein.
- 3) Installing the pneumatic pipings  
(Refer to Fig. 9 thru Fig. 12 and Fig. 13 (Pneumatic Circuit Diagram). )
  - (1) Install the tube ③⑥ (07822-00802) to connect between the air tank and the valve.
  - (2) Connect the hose ③⑨ (07102-20211) between the valve and the differential assembly.
- 4) Arranging the electric wiring harnesses  
(Refer to Fig. 9, Fig. 10, Fig. 11 and Fig. 14 (Electric Circuit Diagram). )
  - (1) Arrange the harness ②⑨ (561-88-64171) to connect between the operator's cab and the valve and make necessary connections of the connectors.
  - (2) Bundle the harness ②⑨ (561-88-64171) together with the existing harness using bands ④⑥ (08034-00414) before clamping them according to the instructions.

### 4. Operation checks

Stepping on the differential lock pedal and traveling at a low speed, operate the steering wheel to turn the vehicle to check that the differential lock is working.

- ▲ Since this operation check corresponds to the prohibitions of "making turns while the differential lock is being activated", be careful not to harm the tires nor damage the ground surface.

Also, as the differential lock disk and the final drive unit are loaded while the differential lock is being activated, promptly step out of the pedal to release the differential lock when the operation check has been finished.

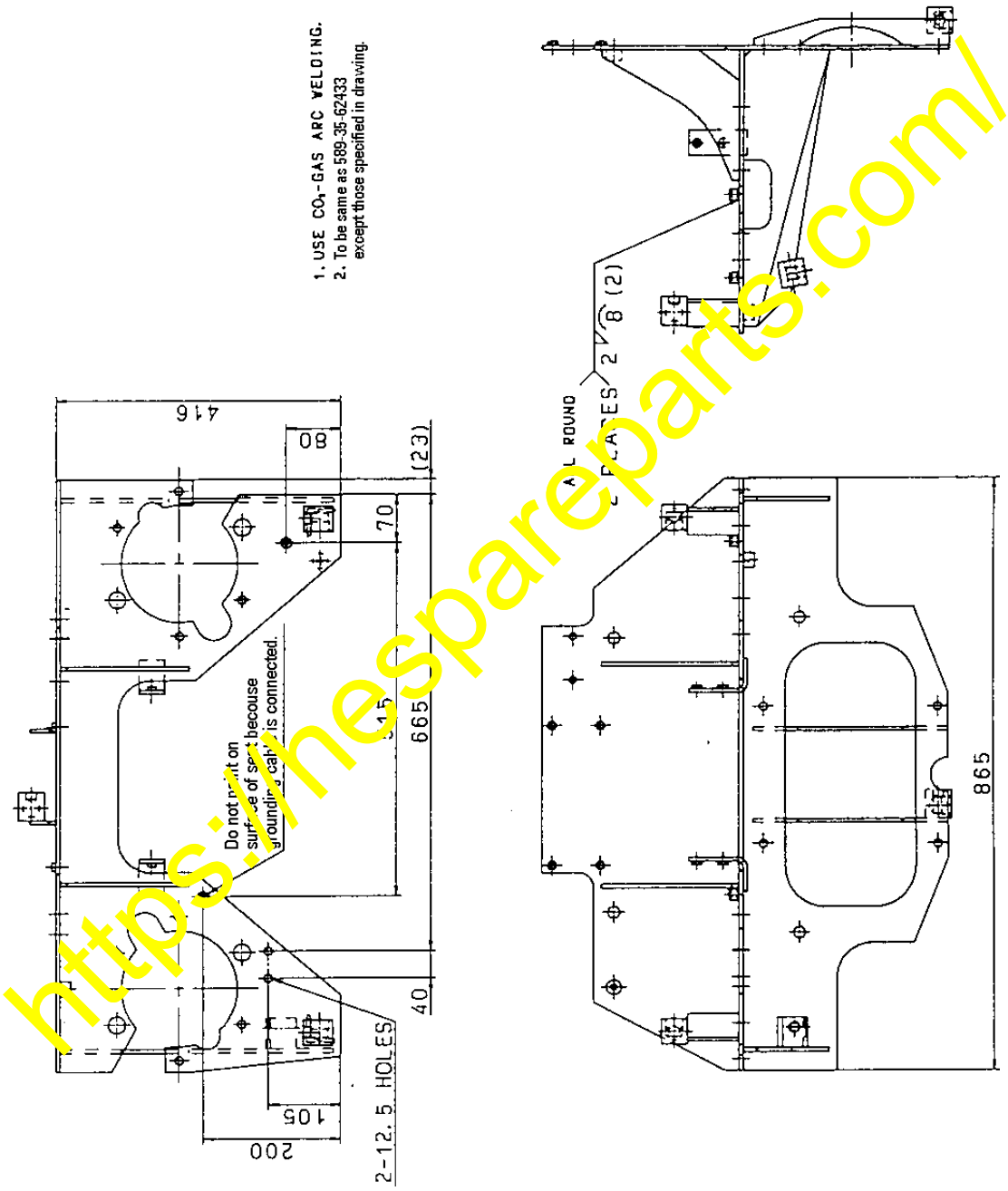


Fig. 8 Reworking drawings for the bracket

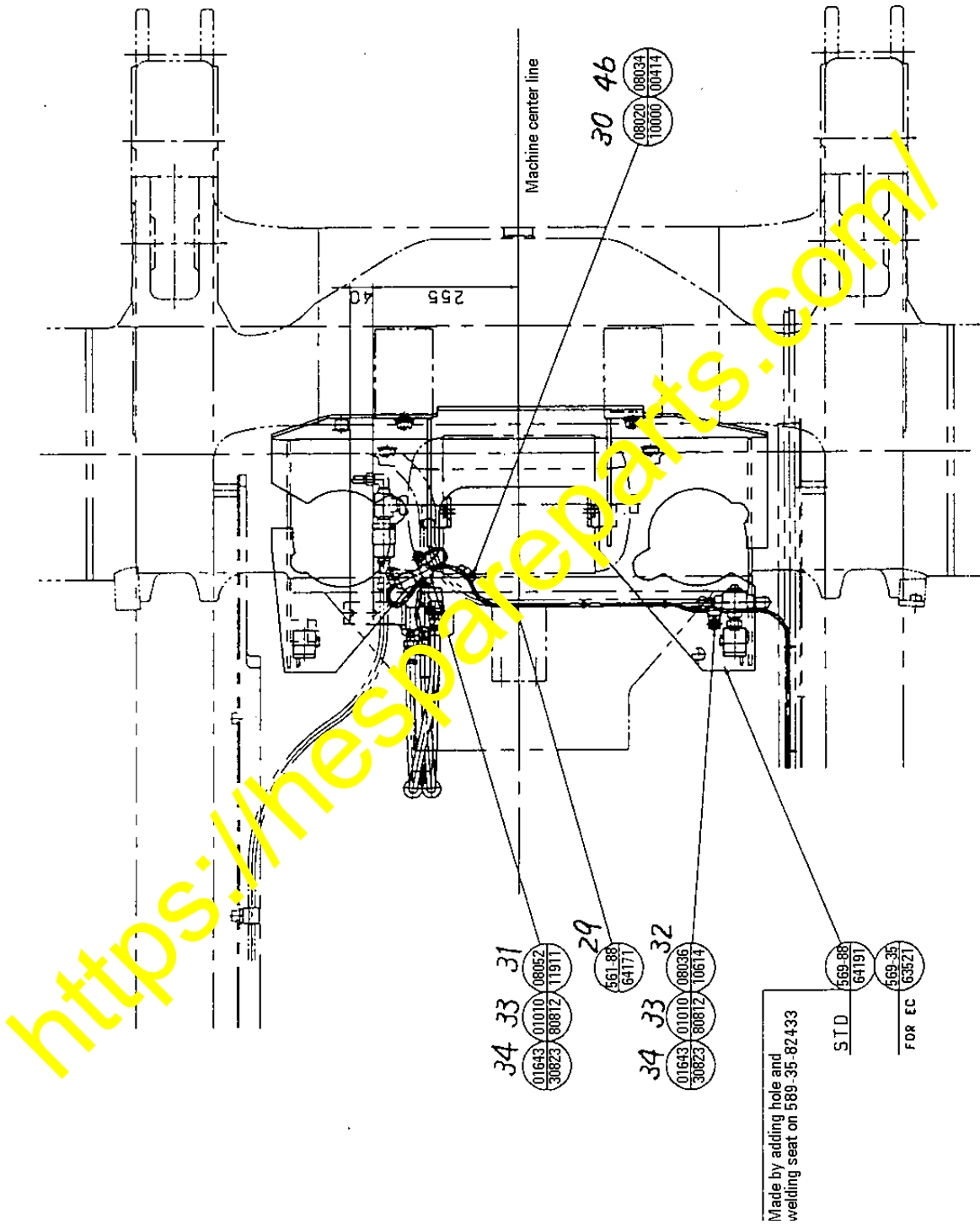


Fig. 9 Plan view of the outside structure of the operator's cab

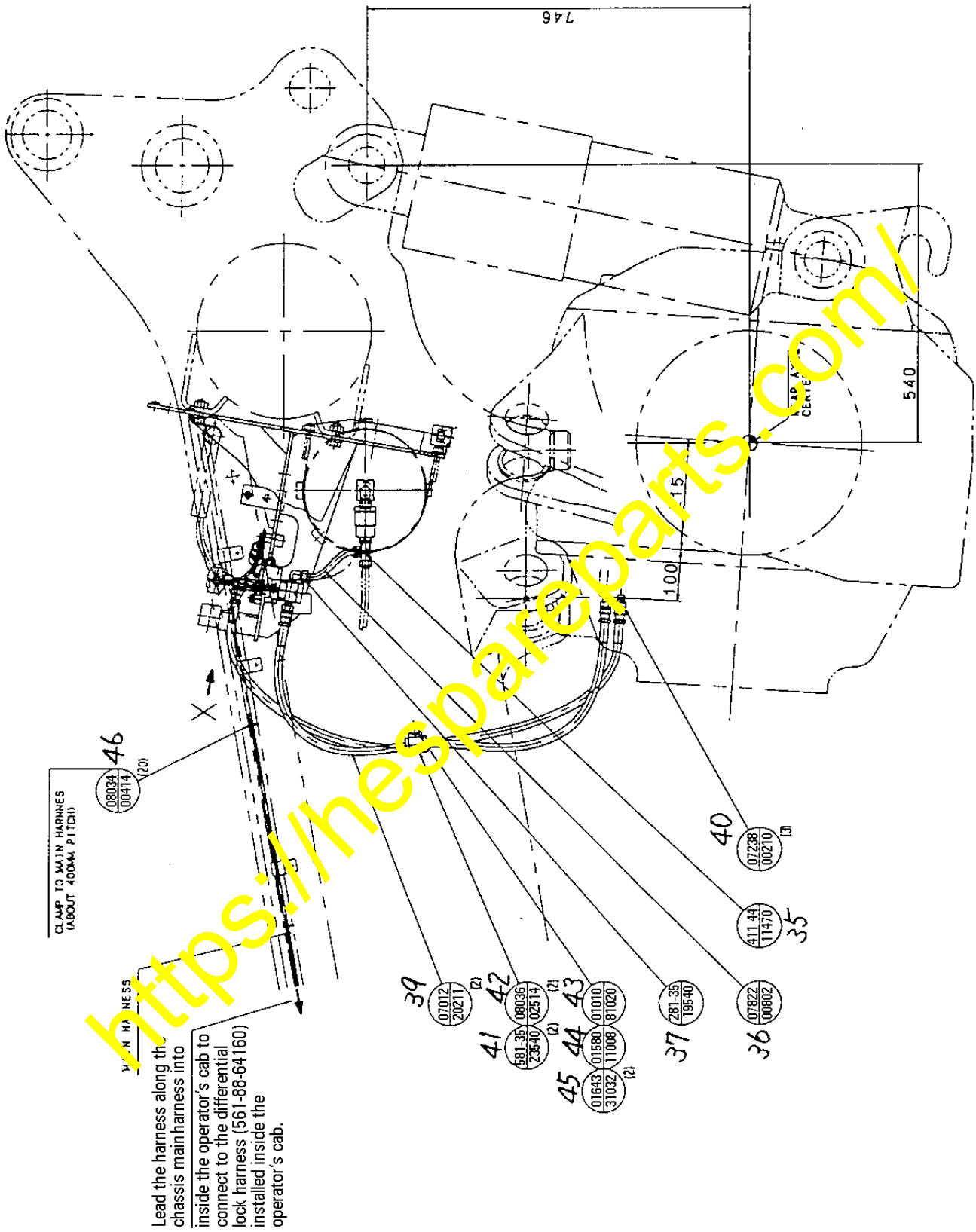


Fig. 10 Side view of the outside structure of the operator's cab

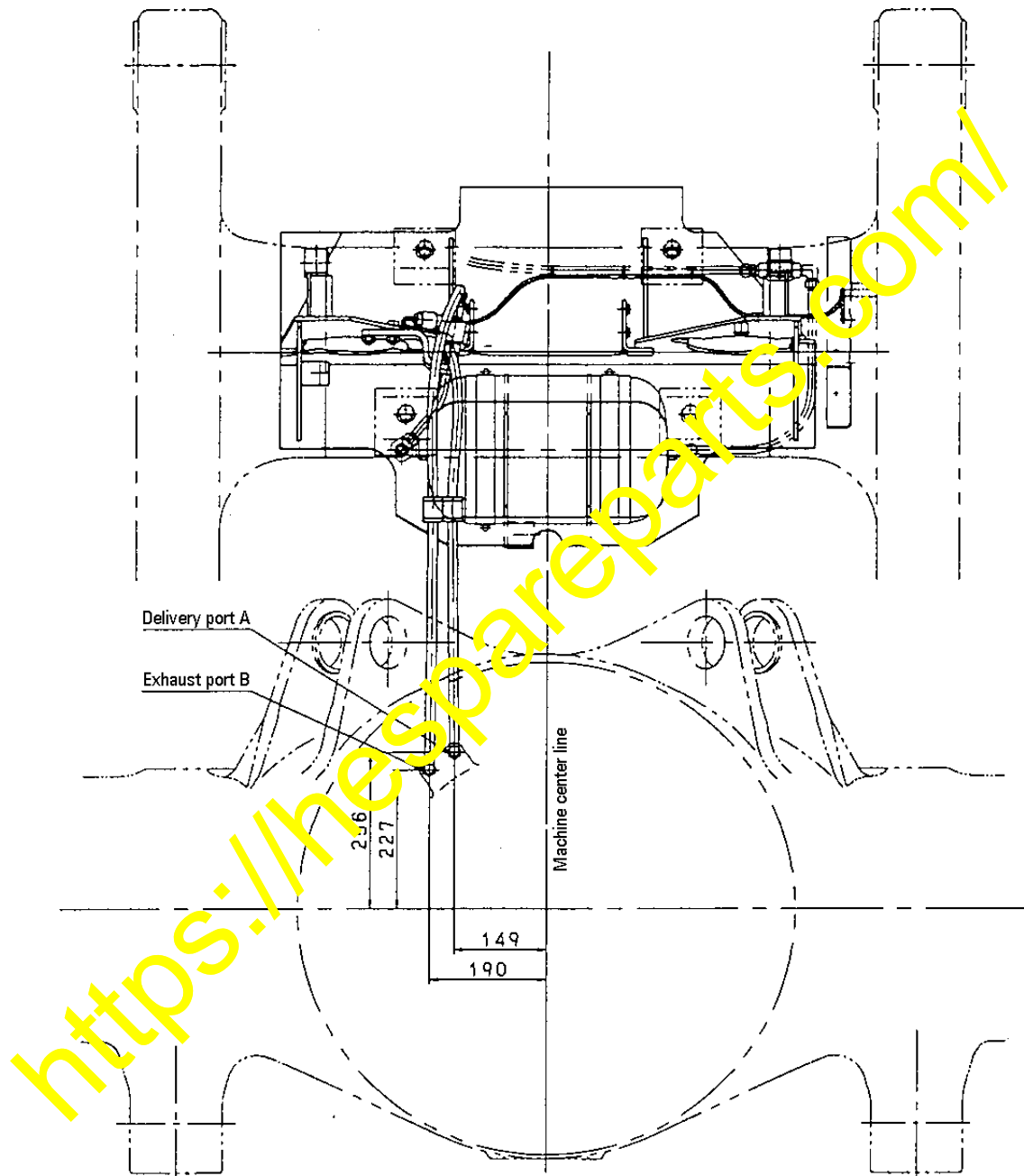


Fig. 11 Front view of the outside structure of the operator's cab

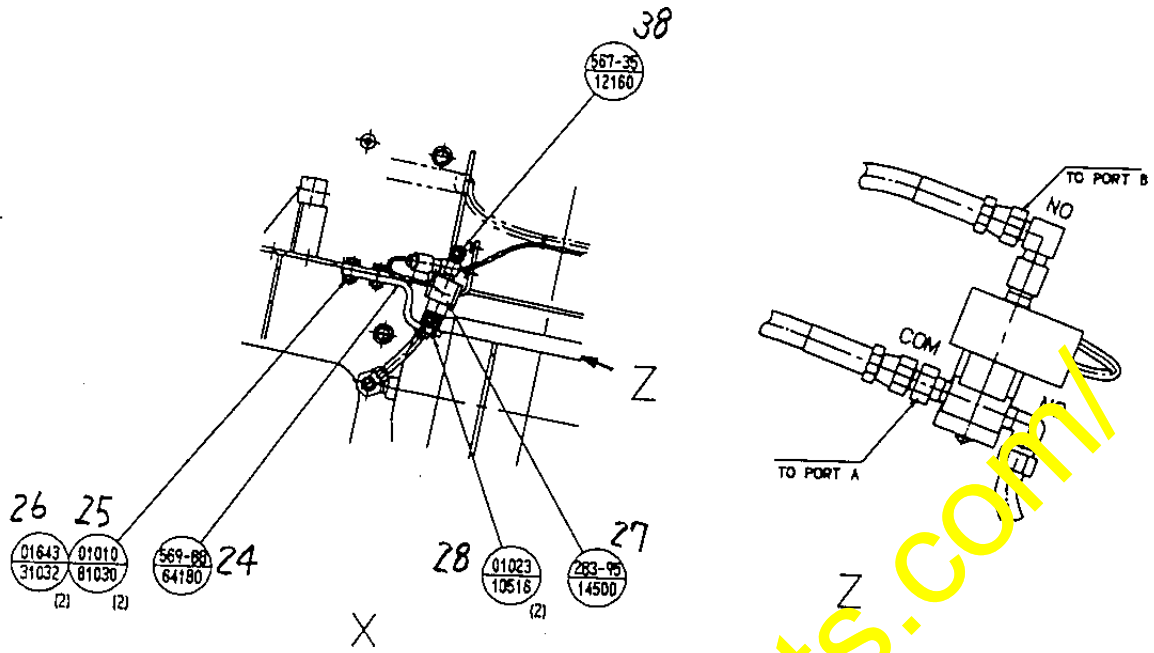


Fig. 12 Detail drawing of the valve section.

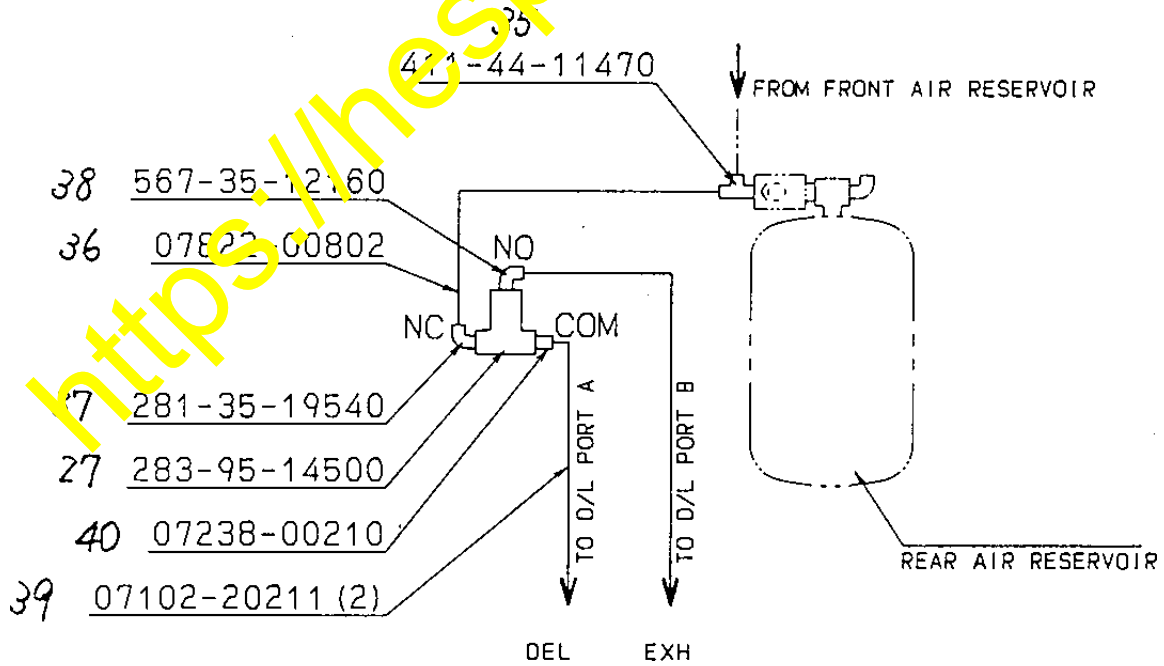


Fig. 13 Pneumatic circuit diagram

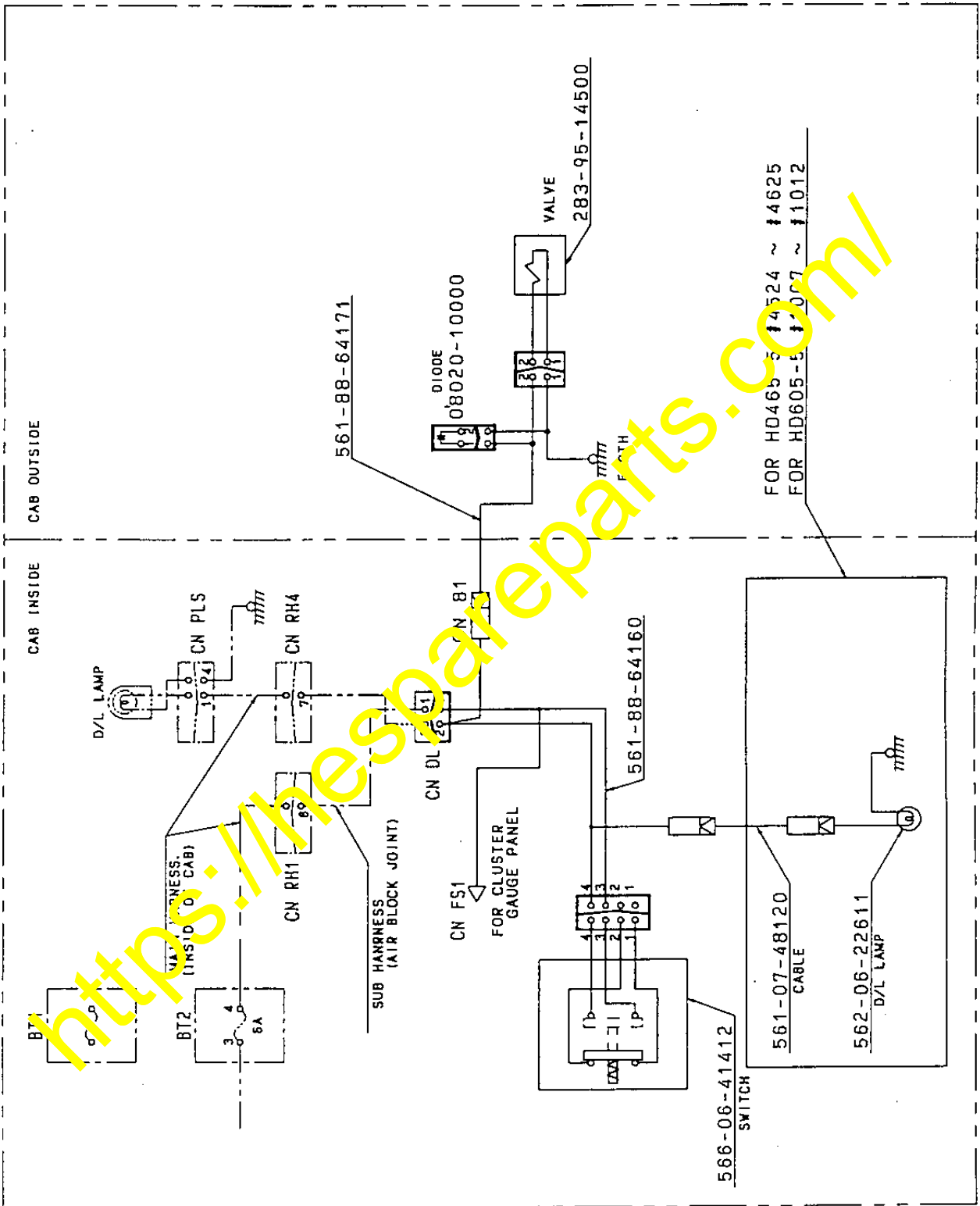
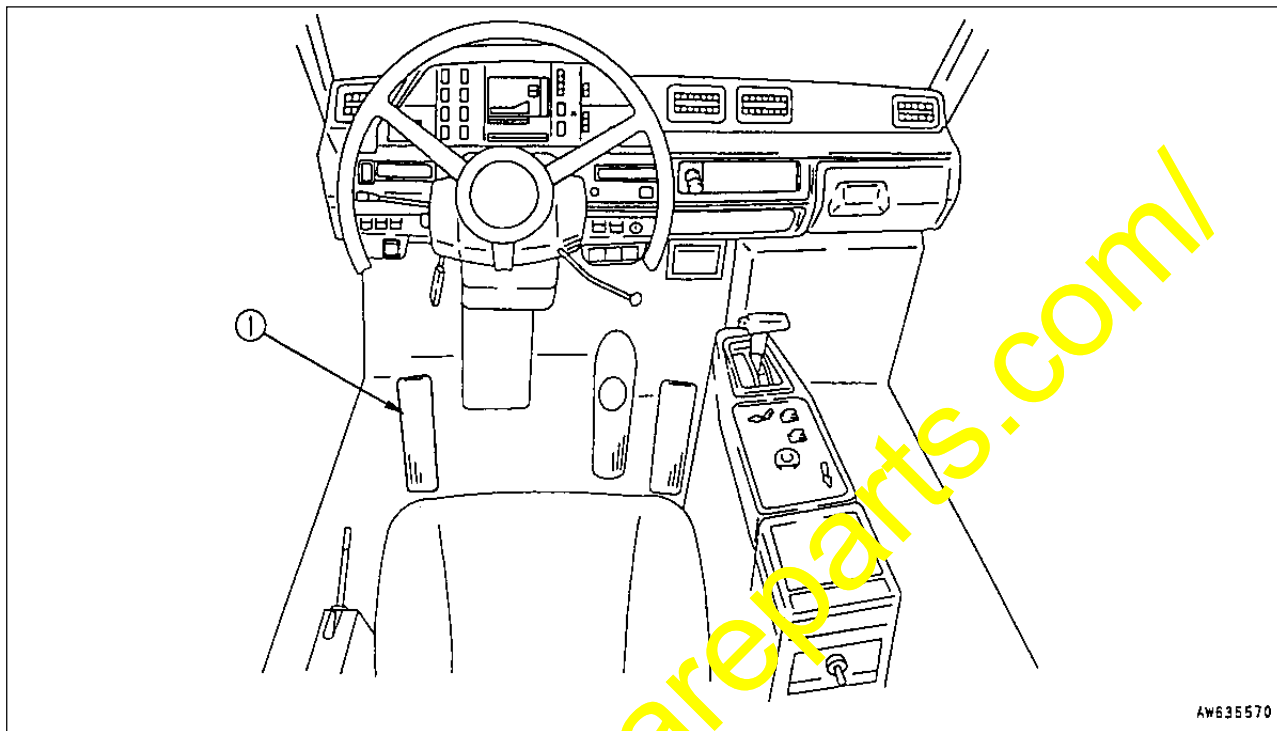


Fig. 14 Electric circuit diagram

## 5. Using differential lock

### 5-1 Differential lock pedal

The differential lock is used on snow-covered or muddy areas where the tires are likely to slip. The left and right wheels on the rear axle are locked together to prevent slipping and to provide a powerful drive force. This also helps to improve the service of the tires.



#### ▲ WARNING

- Do not use the differential lock pedal when traveling at high speed (4th gear, 20 km/ h (12.4 MPH) and above).
- Do not use the differential lock pedal when turning.

#### NOTICE

**Do not use the differential lock pedal when the wheels are already slipping. This may reduce the durability.**

**First, stop the machine, then depress the differential lock pedal, and start the machine again.**

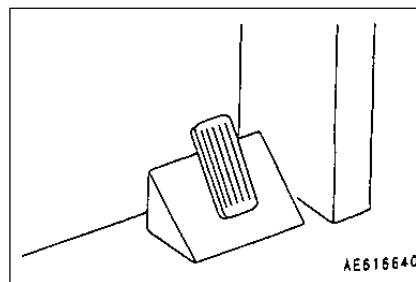
#### Differential lock pedal

The pedal ① above actuates the differential lock control.

When the pedal is depressed, the differential lock is actuated; when the pedal is released, the differential lock is cancelled.

#### REMARK

When traveling on soft ground where the wheel on one side slips, or when traveling on road surfaces where the tires are likely to slip, depress the differential lock pedal. This actuates the differential lock and makes both the left and right wheels rotate at the same speed to prevent slipping.





## 5-2 Precautions and method of use

- Depress the differential lock pedal to actuate the differential lock 5 – 10 m before entering the area where the tires may slip.

### REMARK

Using the differential lock before the tires slip makes it possible to obtain the full capacity of the differential lock, and also extends the tire life.

- If the differential lock is applied when the tires are already slipping, the durability may be reduced. Do not actuate the differential lock when the tires are slipping.
- If the tires should slip and it becomes impossible to escape, stop the machine, then depress the differential lock pedal and start the machine again.
- When traveling on road surfaces where the tires may slip, be particularly careful to avoid sudden changes in travel speed (decelerating or accelerating).
- Do not use the differential lock pedal when traveling at high speed (4th gear, 20 km/ h (12.4 MPH) and above).
- Do not use the differential lock pedal when turning.

If the differential lock is used when turning, it will cause the following problems.

1. It will be more difficult to turn than when the differential lock is not used, so the truck may be unable to turn on curves where it could normally turn easily.
2. The inside wheels and outside wheels will turn at the same speed when turning, so one side will spin and reduce the tire life, and it may also damage the road surface.
3. In order to absorb the difference in rotation of the left and right tires which is caused when the machine turns, the differential lock disc will slip, and this will reduce the durability of the differential lock.
4. An excessive load will be brought to bear on the final drive, and this may reduce the life of the final drive.

### NOTICE

**If the tires are likely to slip on the road surface on curves, carry out maintenance of the road surface to reduce this problem.**