

SERVICE MANUAL

TRUCKS

L 385

Export Service Department

AKTIEBOLAGET

VOLVO

GÖTEBORG, SWEDEN

PART 9

FRAME AND SPRINGS

FRAME

DESCRIPTION

The L 385 has a frame consisting of two U-profile sidemembers and five cross-members which are riveted into their respective positions.

The cross-members are specially formed to give the frame great resistance against torsional stresses.

The frame is fitted with spring shackle brackets which are riveted into position.

REPAIR INSTRUCTIONS

MEASURING THE FRAME

If the vehicle has been in a collision, or if one has any other reason to suspect that the frame is faulty, it must be carefully measured. This operation can be carried out without dismantling the vehicle, by the simple method of marking the positions of certain points of the frame on a clean level floor, and then measuring the distances between these marks.

When measuring it is wise to use the centers of the spring shackle bolts as measuring points. See Fig. 9-1. The positions of the points in question are transferred to the floor in the following way:

Hang a plumb line over the center of one of the spring shackle bolt centers, as shown in Fig. 9-2. Whilst carrying out this operation the vehicle must be held still by means of the handbrake or chocks placed under the wheels. Make a thick chalk mark on the floor. Draw a cross on this mark, with a pencil, exactly under the point of the plumb bob. Do this to all the spring shackle bolt centers in turn, and then remove the vehicle. Chalk a string and stretch it tightly between two of the marks, lift the center of the string slightly and then drop it so that it strikes against the floor. A chalk line will then be left on the floor between two of the points. This should be done to all the points in turn so that they are joined diagonally as shown in Fig. 9-1. Draw a center line. The meeting points of all the diagonal lines should be on the center line. Should this not be the case

it means that the frame is twisted or deformed. When the frame is measured, all pairs of diagonal crossing lines should be measured. These should be of the same length, with a permitted variation of 5 mm (1/5"). If the variation exceeds this value, the frame is bent and must be straightened.

When measuring the frame of a vehicle that has been dismantled, first check measurement "A" with the value given in Fig. 9-1 and then measure the "diagonals".

To determine if the frame is deformed or bent, it should be laid up on a pair of trestles with the straight upper edges of the sidemembers parallel with the floor and with both sides at the same height over floor level. Measure the distance between the straight upper edge of the frame and the floor. Use this measurement as a starting point when measuring the frame. See Fig. 9-1. The measuring of the frame requires a perfectly level floor so that the measuring is absolutely accurate. Carry out all measuring and marking work extremely accurately.

STRAIGHTENING AND REPAIRING THE FRAME

If possible straighten the frame without heating it. Should it be necessary to heat the frame, do not do so excessively. It is not permissible to heat the frame more than to cherry red heat.

Before attempting to carry out any straightening on the frame it must be carefully examined for cracks. Should any large cracks be discovered on the members, the members concerned must be replaced. Stop holes should be drilled at the ends of any small cracks that are located. When the frame has been straightened, all cracks must be welded.

There are special supports for straightening, which are attached to the frame by means of clamps and chains. Straighten the minor buckles with a hammer and a straight edged plate at the same time as the support is pressed up.

All welding must be carried out by an experienced welder, who must exercise great care. No cracks must be overlooked. Carefully examine all welds when they have cooled off.

When riveting any part of the frame, make certain that the rivets and rivet holes are of the correct size. Ream any rivet holes, that have worn to an oval shape, to their correct shape and use a thicker rivet.

SPRINGS

DESCRIPTION

The L 385 is fitted, both front and rear, with semi-elliptical leaf springs. The front springing consists of single leaf springs, whereas the rear springing consists of main and helper springs.

The springs are attached to the frame by means of shackle bolts and shackles. The springs and shackles are fitted with pressed-in bronze bushings.

REPAIR INSTRUCTIONS

REPLACING THE SHACKLE BOLTS AND BUSHINGS

1. Raise the vehicle so that the wheels are 10-15 cm (4"-6") above the floor and block up the frame. Lower the jack sufficiently for the springs to be unloaded. Disconnect the retainer bolts for the shackle bolts and drive out the shackle bolts.

NOTE. Should the vehicle be fitted with dual rear wheels, make certain that the balance arms do not fly over when the shackle bolts are removed.

2. Lower the jack. Drive out the old bushings and drive in new bushings with a suitable driver.
3. Ream the new bushings until the shackle bolts fit in easily without being loosed.

REMOVING THE SPRINGS

1. Raise the vehicle so that the wheels are between 10 and 15 cm (4" and 6") above floor level. Block up the frame and lower the jack until the springs are unloaded.
2. Disconnect the spring U-bolts and lower the axle. Loosen the retainer bolts for the shackle bolts and drive them out with a suitable driver.

TESTING THE SPRINGS

The springs can be tested in a hydraulic press. The press must be fitted with an accurate pressure gauge.

Set the spring in the press in an inverted position with supports under the ends. Bring the press to bear on the center bolt.

Main and helper springs must be tested together, with supports under the ends of both of

the springs. When testing these springs, one must check that the main spring is straight, whereas the helper spring should be slightly above the straightline position (A Fig 9-3).

Regarding the pressure load and measurement "A", see the Specifications.

The press must be fitted with stop devices so that the spring does not slip out at the sides.

When testing, press the spring slightly further down than the testing position, and then release the spring to the correct position. Read off the pressure gauge. If the pressure gauge shows an insufficient value, the spring must be corrected or replaced.

DISASSEMBLING THE SPRINGS

One must exercise great care when disassembling any of the springs, as the leaves have a powerful combined tension. It is wise to use a special spring press when disassembling and assembling the springs. Should there not be a spring press available, it is possible to use a pair of strong screw clamps.

INSPECTING THE SPRINGS

Examine the spring leaves for cracks and wear. Any faulty leaves must be replaced.

Check that the clips, that guide the leaves laterally, are riveted properly into place.

ASSEMBLING THE SPRINGS

Place a round bar, that has the same diameter as the center bolt, into a vise. Invert the main blade and fit it onto the round bar. (Start with the helper spring, if there is one). Lubricate the blade with spring grease. Fit on and lubricate the other blades in the same way. Compress the spring and replace the round bar with the center bolt. Mount the bolts and spacer sleeves for the clips on the spring leaves.

FITTING THE SPRINGS

Fit the springs onto the frame in the opposite order to that used when they were removed. Tighten the spring U-bolts well. Tighten the U-bolts once again when the vehicle is loaded. Grease the shackle bolts.

N.B. The center bolt, on vehicles with dual rear wheels, is not exactly central. The short end of the spring should face forward when these springs are fitted.

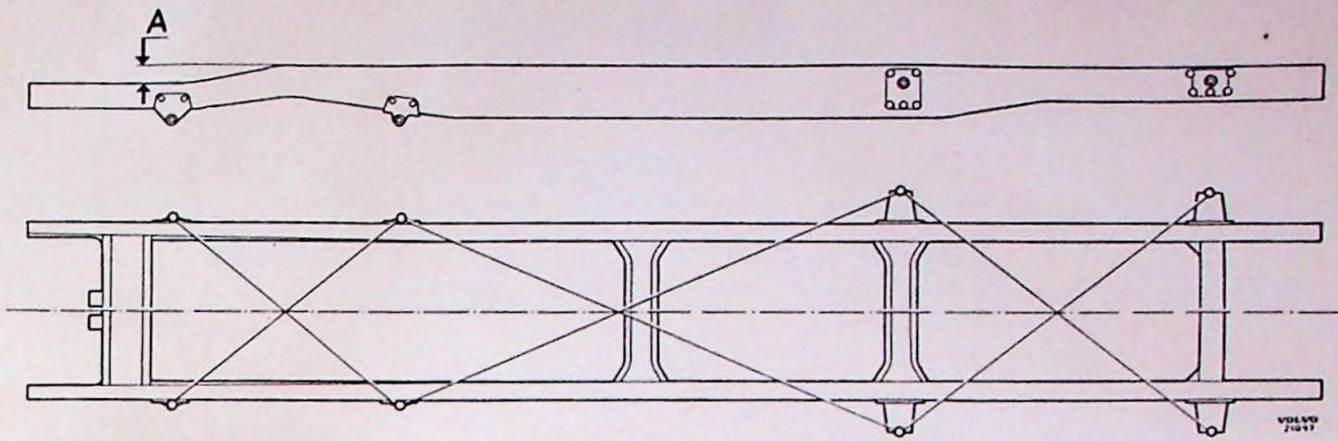


Fig. 9—1.

A = 110 mm (4⁵/₁₆")

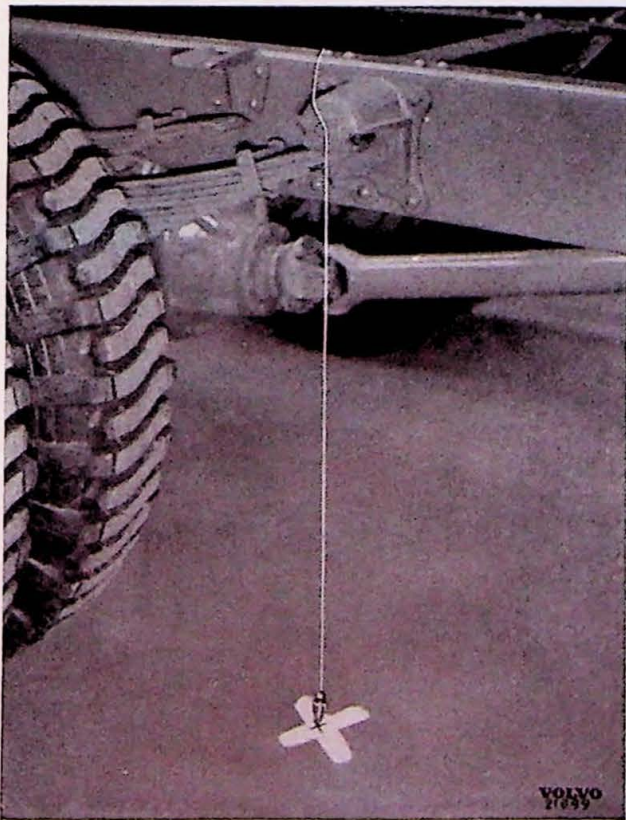


Fig. 9—2.

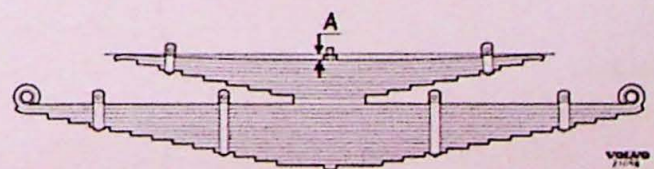


Fig. 9—3.

FAULT TRACING

FAULT	
REASON	REMEDY
SQUEAKING	
Insufficient lubrication.	Lubricate the springs and shackle bolts.
Loose spring hangers.	Drive out the old rivets. Ream the rivet holes and rivet the hanger into place with thicker rivets.
SPRINGS SHOW TENDENCY TO "BOTTOM"	
The springs are "tired".	Align or replace the springs concerned.
Broken leaf.	Replace the leaf.
Worn leaves.	Replace the worn leaves.
HARD SPRINGING	
Insufficient lubrication between the leaves.	Grease the springs.

SPECIFICATIONS

FRAME

Frame width	800 mm (31.1/2")
Sidemembers, height	231 mm (9.3/32")
" , width of flanges	82 mm (3.7/32")
" , material thickness	6.35 mm (1/4")

SPRINGS

Type	Semi-elliptical
------------	-----------------

Front Springs

Front Springs L 38503

Length	1140 mm (44.57/64")
Width	76 mm (3")
Number of leaves	11
Leaf thicknesses:	
Leaves 1 and 2	9 mm (23/64")
" 3-11	8 mm (5/16")
Test values:	
Load required to depress the spring 1 cm (25/64")	192 [±] 12 kg (424 [±] 26.1/2 lb.)
Spring leaves should be depressed to 20 mm (25/32") below the straight-line position with a load on the center bolt of	1500 [±] 90 kg (3308 [±] 198 lb.)

Front Springs L 38505, -06, L 3851

Length	1140 mm (44.57/64")
Width	76 mm (3")
Number of leaves	13
Leaf thicknesses:	
Leaves 1-3	9 mm (23/64")
" 4-13	8 mm (5/16")
Test values:	
Load required to depress the spring 1 cm (25/64")	231 [±] 14 kg (509 [±] 31 lb.)

Spring leaves should be depressed to 20 mm
(25/32") below the straight-line position with
a load on the center bolt of 1800 mm[±]110 kg (3969[±]242 lb.)

Front Springs L 38507, -09
.....

Length 1140 mm (44.57/64")

Width 76 mm (3")

Number of leaves 14

Leaf thicknesses:

Leaf 1 10 mm (25/64")

Leaves 2-4 9 mm (23/64")

" 5-14 8 mm (5/16")

Test values:

Load required to depress the spring 1 cm
(25/64") 263[±]16 kg (580[±]35 lb.)

Spring leaves should be depressed to 20 mm
(25/32") below the straight-line position with
a load on the center bolt of 2000 kg_±120 kg (4410_±264.1/2 lb.)

Front Springs L 38525
.....

Length 1140 mm (44.57/64")

Width 76 mm (3")

Number of leaves 14

Leaf thicknesses:

Leaf 1 10 mm (25/64")

Leaves 2-4 9 mm (23/64")

" 5-14 8 mm (5/16")

One extra plate (bottom) 10 mm (25/64")

Test values:

Load required to depress the spring 1 cm
(25/64") 263_±16 kg (580_±35 lb.)

Spring leaves should be depressed to 20 mm
(25/32") below the straight-line position
with a load on the center bolt of 2000_±120 kg (4410_±264.1/2 lb.)

Front Springs L 38527
.....

Length 1140 mm (44.57/64")

Width 76 mm (3")

Number of leaves 15

Leaf thicknesses:

Leaf 1	10 mm (25/64")
Leaves 2-8	9 mm (23/64")
" 9-15	8 mm (5/16")

Test values:

Load required to depress the spring 1 cm (25/64")	326±19 kg (719±42 lb.)
Spring leaves should be depressed to 20 mm (25/32") below straight-line position with a load on the center bolt of	2300±140 kg (5072±309 lb.)

Rear Springs

Rear Springs L 3850-3851
.....

Length	1380 mm (54.21/64")
Width	76 mm (3")
Number of leaves, main springs	14
" " " , helper springs	9

Leaf thicknesses, main springs:

Leaves 1-3	11 mm (7/16")
" 4-14	10 mm (25/64")

Leaf thicknesses, helper springs:

All leaves	8 mm (5/16")
------------------	--------------

Test values, main springs:

Load required to depress the springs 1 cm (25/64")	289±15 kg (637±33 lb.)
Spring leaves should be depressed to the straight-line position with a load on the center bolt of	3200±190 kg (7056±419 lb.)

Test values, helper springs:

Load required to depress the spring 1 cm (25/64")	266±15 kg (586±33 lb.)
Spring leaves should be depressed to a point 15 mm (19/32") over straight-line position with a load on the center bolt of	900±55 kg (1984±121 lb.)

Test values, both springs:

Load required to depress the spring 1 cm (25/64")	555±30 kg (1224±66 lb.)
Spring leaves should be depressed to the straight-line position on the main spring and to a point 15 mm (19/32") over straight-line position on the helper spring with a load on the center bolt of	4100±245 kg (9041±540 lb.)

Rear Springs L 3852
.....

Length	1440 mm (44.57/64")
Width	76 mm (3")
Number of leaves, main spring	15
Leaf thicknesses, main spring:	
Leaves 1-2	11 mm
" 3-12	10 mm (25/64")
" 13-15	9 mm (23/64")

Test values:

Load required to depress the spring 1 cm (25/64")	240±15 kg (486±33 lb.)
Spring leaves should be depressed to the straight-line position with a load on the center bolt of	3200±190 kg (7056±419 lb.)