

Operation Manual

MODEL - 4185

HIGH PRESSURE HAND PUMP



MANUAL PART NO. : 18991 - 0007

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MODEL – 4185
HIGH PRESSRUE HAND PUMP

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1 GENERAL INFORMATION

1.1 Introduction

The High pressure hand pump (Model - 4185) is the device to effect pressurization inside the sondes for the High pressure borehole lateral load testers (the Elastmeter - 100, the Elastmeter - 200, and the Geologger - 3030 Elastmeter 2) by means of water or oil.

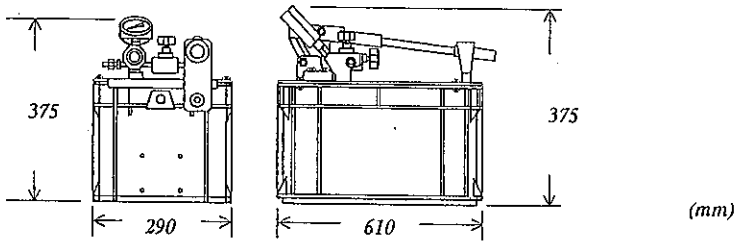
1.2 Features

The principal components for this device are made of stainless steel and plastic in consideration of the durability and the corrosion resistance required.

1.3 Specifications

Table 1 - 1 indicates the specifications for this device.

Table 1 - 1 Specifications

Model	T300NDX (The type of single - pressure and of manual operation)
Pressure	Max. 20 MPa
Plunger diameter	12 mm
Stroke	45 mm
Unit exhaust quantity	5.0 cc
Tank capacity	18 liters
Liquid used	Water or oil (Explanation in this Operation manual is based on the assumption that water is the liquid used.)
Pressure gage	20 MPa
Outer dimensions	290 × 610 × 375 (mm)
	
Weight (Dry weight)	8.0 kg

1.4 Typical accessories

Table 1 - 2 indicates the typical accessories.

Table 1 - 2 Typical accessories

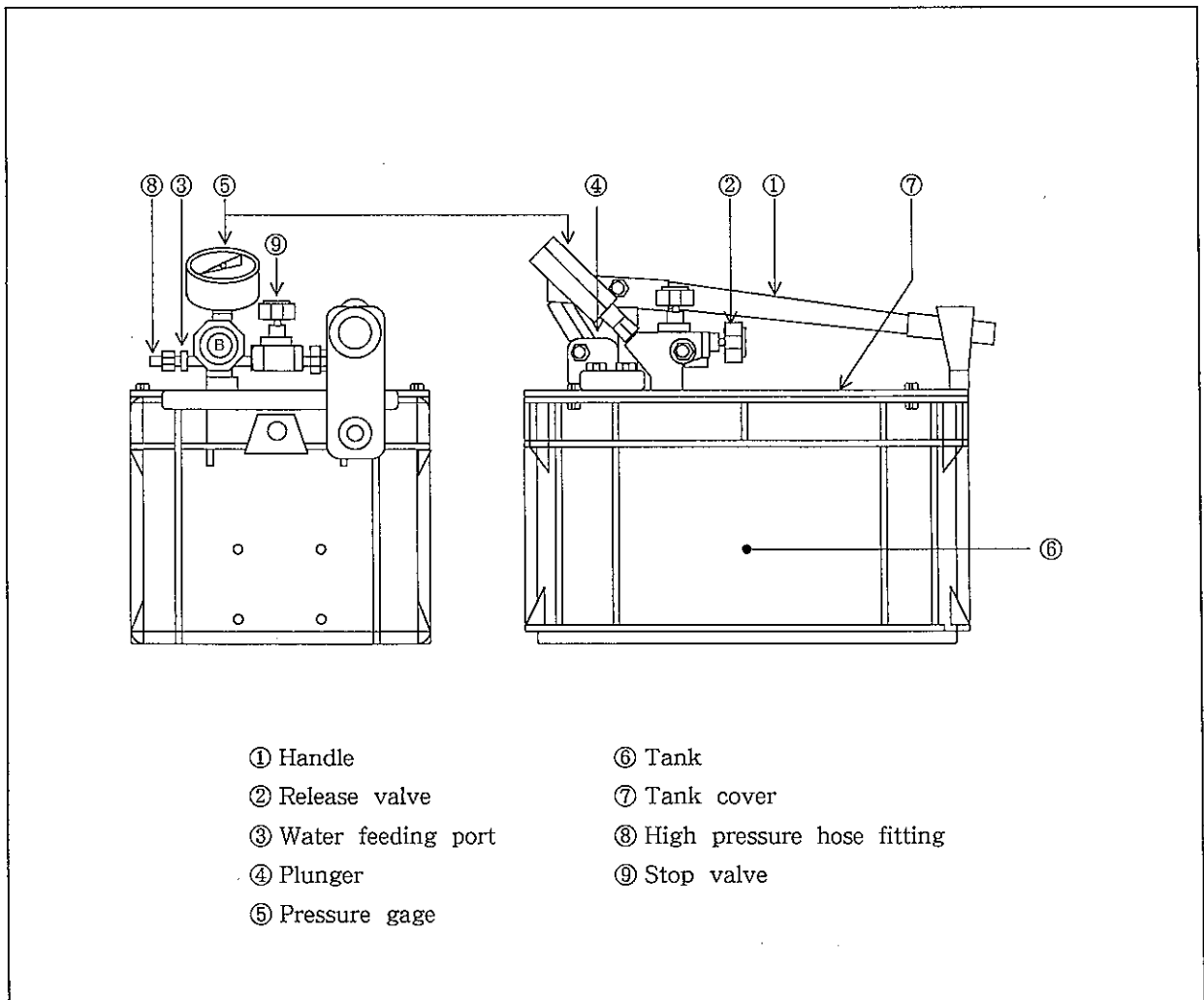
Item	Part number	Quantity	Remark
Shoulder band	-	1	
Operation manual	18991 - 0007	1	Applicable for the Operation manual issued after Sept., 1993 (inclusive)

2 OPERATION

2.1 Nomenclature with each constituting component

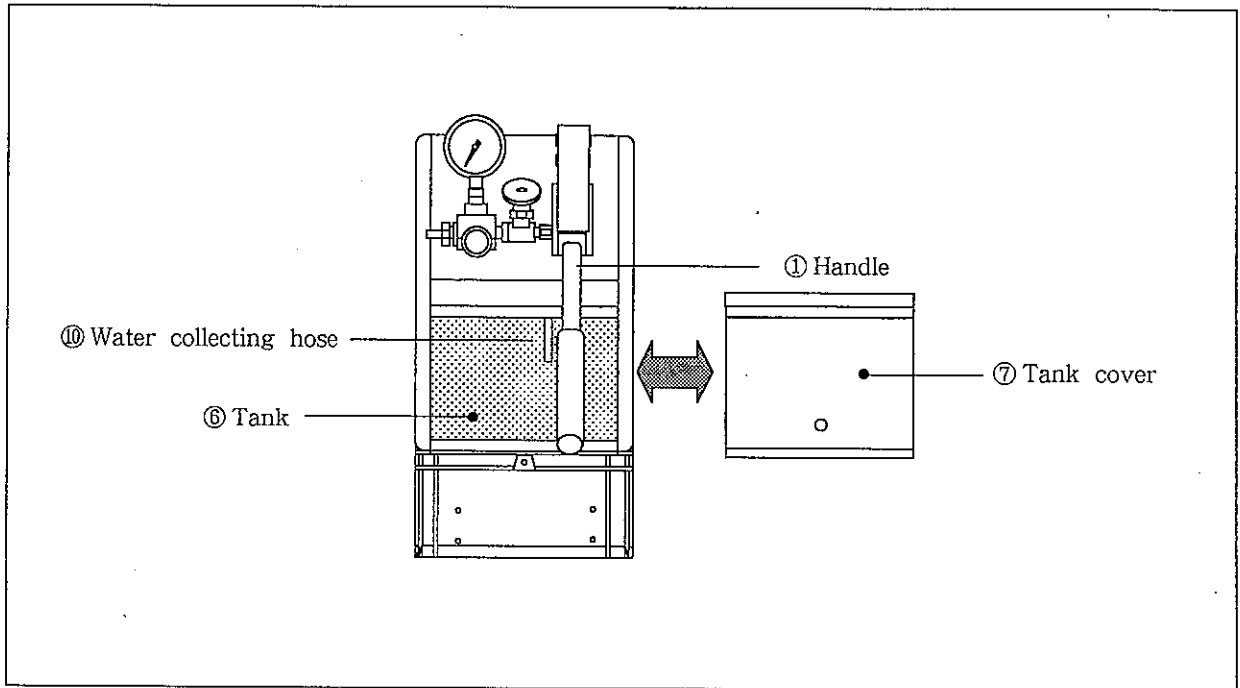
Nomenclature with each constituting component is specified partly in Fig. 2 - 1 and partly in Fig. 2 - 2.

Fig. 2 - 1 Nomenclature with each component constituting the High pressure hand pump (Part 1)



- ① Handle
Moved vertically, upward and downward, this Handle works to feed the pressurized water.
- ② Release valve
This Release valve is used for returning the pressurized water once fed to the sonde.
To effect pressurization, tighten this valve turning clockwise. To return the pressurized water, turn this valve counterclockwise.
- ③ Water feeding port
This is the feeding port for highly pressurized water.
- ④ Plunger
Being the device to transfer the vertical movement of the handle to the piston, this plunger works to move the piston always to the vertical direction.
- ⑤ Pressure gage
Max. pressure of this Pressure gage is 20 MPa
- ⑥ Tank
This Tank is made of plastic in view of the required corrosion resistance.
- ⑦ Tank cover
For storing water or oil in the Tank, lift this Tank cover to pour either one of them into the Tank.
- ⑧ High pressure hose fitting
This is the fitting to connect the High pressure hose.
- ⑨ Stop valve
Opening or closing of this Stop valve works to control the water feeding from the cylinder.
For feeding the pressurized water, turn this Stop valve counterclockwise to let the valve left open.
If the maintenance of the pressure is desired, turn this Stop valve clockwise to fasten it.

Fig. 2-2 Nomenclature with each component constituting the High pressure hand pump (Part 2)



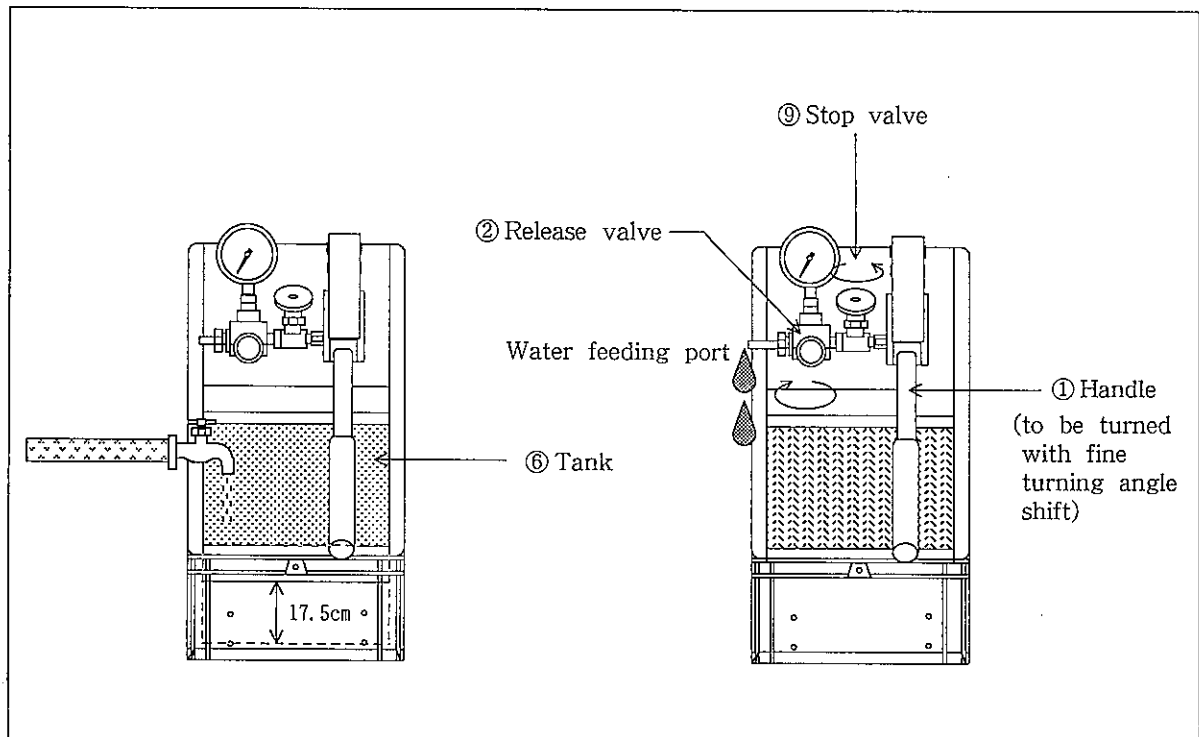
⑩ Water collecting hose

This is the hose equipped with filter and is good for collecting water in the tank.

2.2 Standing – by the Operation

When the High pressure hand pump is put to use for the first time or when its use is resumed after long hours of no application, water feeding may sometimes be unexpected due to the cylinder for the pump not filled with water. In such a case, take the following steps, verify water feeding extendable, and then put the High pressure hand pump into use.

Fig. 2 – 3 Standing – by the Operation with High pressure hand pump



1. Lift ⑦ Tank cover and draw out ⑩ Water collecting hose from inside the Tank. Then, turn ① Handle counterclockwise to detach it. (Refer to Fig. 2 – 2.)
2. Supply water into ⑥ Tank. For the volume of water to be supplied, water should reach 17.5cm high from the bottom of Tank. (This height corresponds to the border between the mainframe of Tank and the frame painted yellow.)
3. Turn ② Release valve clockwise and close it. Then, turn ⑨ Stop valve counterclockwise and open it. As the subsequent step, extend fine vertical move with the root part of ① Handle for the Hand pump continuously till water is recognized to come from Water feeding port. Continuation of extending such fine vertical move may span approximately two minutes as criterion. Refer to the right figure in Fig. 2 – 3.
4. After confirming the feasibility of water feeding, fix ⑩ Water collecting hose (equipped with filtering function) to its original position. Refer to Fig. 2 – 2.

2.3 Pressurizing operation

Effect the pressurizing operation in the order as specified below.

- (1) Lift ⑦ Tank cover to pour water or oil into ⑥ Tank.
- (2) Fix ⑧ High pressure hose fitting to ③ Water feeding port, and link the High pressure hose. Connect another end of the High pressure hose to the Sonde.
- (3) Turn the cock for ② Release valve clockwise to fasten the valve. (At this time, turn ⑨ Stop valve counterclockwise to open it.)
- (4) Move ① Handle upward and downward to effect the pressurization with the feeding water. (In case the pressure maintenance is desired, turn ⑨ Stop valve clockwise to fasten it.)
- (5) After the pressure has been raised to the slated level and after the measurement is over, turn the cock for ② Release valve counterclockwise to fasten it.
Eventually, the pressure will be lowered.

【Note 1】 Always use clean water or oil whichever you may use. If dirty water or oil is used, it may result in the valve choked up with dust, which might make the cause for the trouble.

【Note 2】 From time to time, lubricate each driving section with oil. Lubrication may facilitate to make the job easier and may serve to make the life span of the pump longer.

【Note 3】 Periodically clean the inside of the Tank eliminating the fur – like matter and other dirt settled there.

【Note 4】 In case the Device is not used for a long period, exhaust the water in the Tank and apply the grease to the plunger section prior to its storage.

2.4 Causes for Troubles and Troubleshooting

Table 2-1 indicates the causes for the troubles with the High pressure hand pump along with the troubleshooting. If incidentally any phenomenon listed in the Table has happened, take the appropriate procedures while referring to Table 2-1.

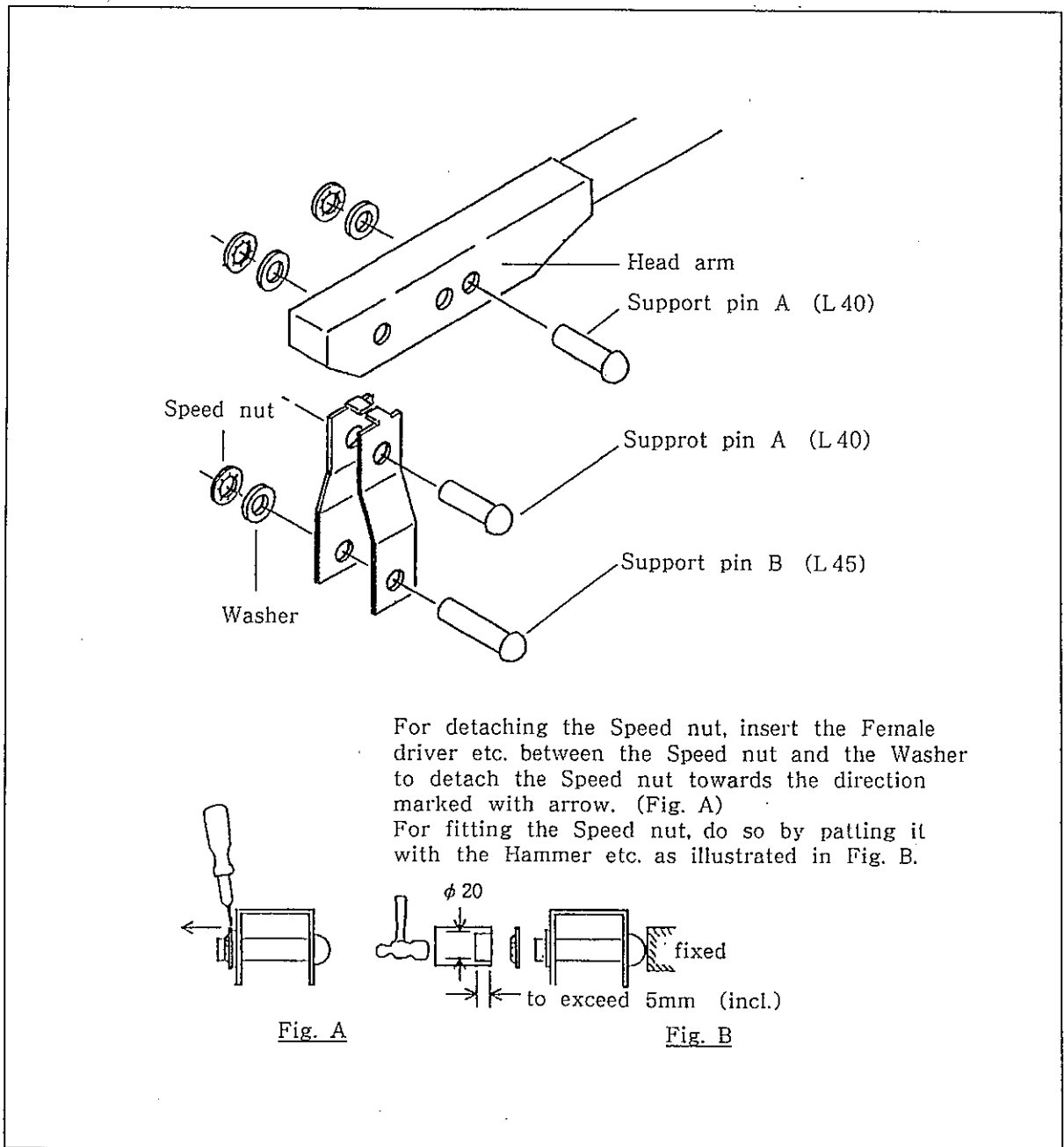
Table 2-1 Causes for Troubles and Troubleshooting

In case water feeding cannot be attained despite the pump driven		In case the pressure cannot be raised to the slated level or in case the pressure is lowered soon after its raise once attained	
Cause	Troubleshooting	Cause	Troubleshooting
1	In case of water or oil in the Tank being insufficient Replenish the Tank fully with water or oil.	1	In case of the Release valve being not tightly fastened or in case of the dust being adhering to the Release valve Manually re-fasten tight the Release valve if loose. Eliminate the dust after detaching the Release valve.
2	In case of the dust adhering to suction valve or exhaust valve Detach the Pressure gage stand from the Cylinder section, and clean the valve and the valve seat.	2	In case of the leakage happend from the joint section of the fitting Lower the pressure once, and then re-fasten the connecting section completely.
3	In case of air entered into the Plunger chamber causing the idle drive Detach the Pressure gage stand from the Cylinder section, manually move the Exhaust valve to activate the pump, and exhaust air.	3	In case of the leakage happened from the section between the pump and the fitting or from the section where the Pressure gage is connected Replace the packing with the new one, or fasten it further tight.

2.5 Steps for disassembling the Handle section of the High pressure hand pump of new type

Detaching the Handle section of the High pressure hand pump of new type is not feasible. In case the replacement of the packing inside the cylinder or the inspection of the cylinder with its inside is intended, disassembling the Handle section is required. Take the following steps for disassembly and subsequent assembly.

Fig. 2 - 4 Dissassembling the Handle section



2.6 Explanation on the steps for purchasing the Parts for replacing with those in trouble

Explanation in this Operation manual is concerned with the High pressure hand pump of new type. In case of the trouble with the Instrument or the replacement of the part intended, proceed to the relevant purchase and the replacement while referring to Fig. 2-5 and Table 2-2 (Constituting parts list).

Fig. 2-5 Parts structure diagram

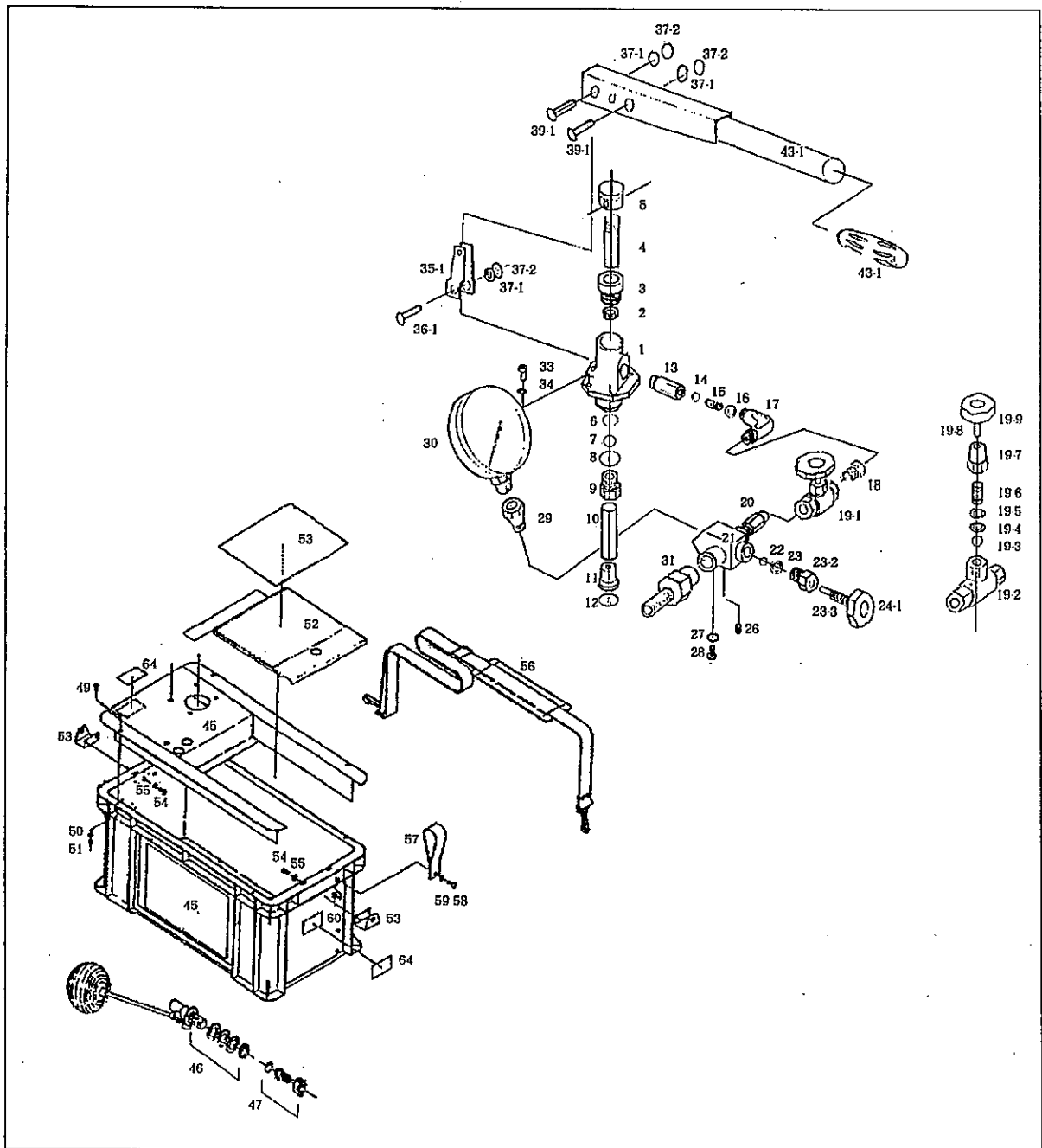


Table 2 - 2 Constituting parts list

No. in List	Part nomenclature	Q'tity	No. in List	Part nomenclature	Q'tity
1	Cylinder	1	28	Bolt	1
2	U - packing	1	29	Pressure gage joint 3/8	1
3	Packing gland	1	30	Pressure gage	1
4	Plunger	1	31	Nipple PT 3/8 - PF1/8	1
5	Fitting	1	33	Bolts	4
6	Snap ring	1	34	Plain washers	4
7	Suction valve ball 3/8	1	35-1	Supports	2
8	O - ring P - 18	1	36-1	Support pin ϕ 12 \times 45	1
9	Suction nipple	1	37-1	Plain washers	3
10	Suction pipe	1	37-2	Speed nuts	3
11	Strainer fitting	1	39	Support pins ϕ 12 \times 40	2
12	Strainer	1	43-1	Handle	1
13	Exhaust valve chamber	1	44	Grip	1
14	Exhaust valve ball 3/8	1	45	Tank (Water tank)	1
15	Exhaust valve spring	1	48	Pump stand	1
16	O - ring P - 11	1	49	Machine screws	4
17	Exhaust port elbow 1/4	1	50	Plain washers	4
18	Valve joint 1/4	1	51	Nuts	4
19-1	Valve ass'y (19 - 2~9)	1	52	Tank cover	1
19-2	Stop valve mainframe	1	53	Suspension fittings	2
19-3	Valve ball 3/8	1	54	Machine screws	4
19-4	O - ring P - 7	1	55	Plain washers	4
19-5	Backup ring	1	56	Suspension belt	1
19-6	Valve ball cap	1	57	Handle belt	1
19-7	Cap	1	58	Machine screw	1
19-8	Stop valve shaft	1	59	Plain washer	1
19-9	Valve handle A	1	60	Nut	1
20	Nipple 1/4	1	64	Model plate	1
21	Gage stock	1			
22	Pressure exhaust valve ball 3/16	1			
23-1	Push nut	1			
23-2	Pressure exhaust valve shaft fitting	1			
23-3	Pressure exhaust valve shaft	1			
24-1	Valve handle B	1			
26	Plug	1			
27	Plain washer	1			