

232.2 87IN

MANUAL PUMP

TROPIC II

UNIVERSITY OF CALIFORNIA, BERKELEY  
RESEARCH CENTER FOR THE  
DESIGN OF WATER SUPPLY AND

232.2-87IN-13550



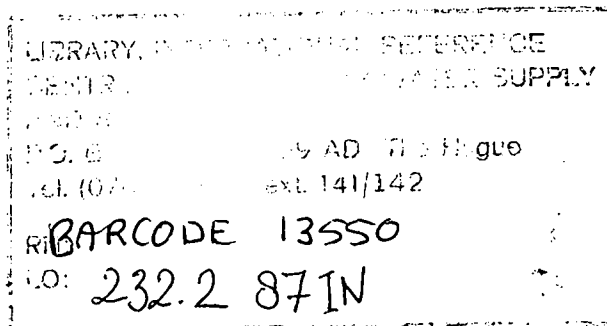
### WARNING

If the following instructions and informations are strictly adhered to, the installation of your TROPIC II pump will be easy and correct, even if the job is done by non-qualified personnel.

The designation of items and their numbering can be found on the drawings EA0796 and 797/1

### C O N T E N T S

- I Foundation
- II Putting the frame
- III Assembly of the rising main pipe
- IV Assembly of the piston unit
  - case 1 : wooden connecting rod
  - case 2 : stainless steel connecting rod
- V Assembly of the pump mechanism
- VI Maintenance of the pumping unit
- VII What could go wrong, why, how to fix it
- VIII Drawings EA0796, EA0797/1 BA0204 and FA 1428
- IX Installation tool kit





I. FOUNDATION (Fig. 1)

1. Make a concrete foundation around the casing pipe of the bore hole, dimensions are given in figure 1.  
Thickness 25 cm at least, eventually more, according to the quality of the surrounding soil.  
Caution : This horizontal foundation should be at right angle to the casing of the bore hole.
2. 5 Holes must be left open in this foundation as indicated on drawing fig. 1, in order to receive the foundation bolts. The holes will be square or round and  $\pm 10$  cm. diameter.
3. Let foundation dry.

II. PUTTING THE BASE N° 44 (fig. 2)

4. Remove delivery head (n° 49) and the flange for rising pipe (N° 50) from the base.  
Place the base on the dry foundation. The opening of the base must be lined up with the casing of the borehole (fig. 2).
5. Put the foundation bolts in the 5 holes and fill them up with a fluid cement.

III. ASSEMBLY OF THE RISING MAIN PIPE

6. Check if the suction (foot valve) is in place in the pumping cylinder and take the piston (plunger) out of the cylinder. Take one element of the rising main pipe. Assemble the cylinder on the element of the rising pipe equipped with a sleeve on the other side.

Warning :

Never place a spanner or a clamp on the cylinder N° 59 but only on the coupling sleeve of the rising pipe N° 58 and/or the housing of the suction valve N° 66.

Caution :

It is not absolutely necessary to use a sealing product on the screwthreads. Although we strongly advice to use a coating with an antirust paint; this will help a lot, in future disassembling and will protect the screw threads against oxydation.

NOTE : By adding a suction pipe of maximum 8 metres underneath the pumping cylinder, water can be pumped from this lower level. Therefore the housing of the suction valve N° 66 has a female thread according to the cylinder diameter given in following table.

<u>Ø Cylinder</u>	<u>Ø Suction pipe</u>
50 mm	1" G
60 mm	1 1/2" G
70-75 mm	2" G
90-100 mm	2 1/2" G



7. The cylinder, with or without suction pipe, assembled with the first element of the rising pipe should be brought in the well. (Fig. 3) A lifting device (e.g. tripod) with cable or chain centered on the well can be used. Also at least two clamps (Fig. 4) adapted to the diameter of the pipes are needed.
  - Depending on the possible maximum height of the lifting device, the first clamp is attached to the pipe and the whole cylinder-pipe is dropped in the well up to the point where this first clamp settles down on the frame.
  - Fix a second clamp to the pipe at a convenient height. Attach the cable of the tripod to the second clamp and secure it.  
Caution : Only after this is done the first clamp shall be removed.
  - Continue (see fig. 5) to bring in this way the pipe into the well, up to the point where the clamp is just underneath the sleeve of the pipe, while resting on the frame.
8. Fix a sleeve on the next pipe. Put the pipe vertically with the threaded end on the sleeve of the first pipe and screw the pipes together. Use two spanners to do this job. Again we advice to use an antirust paint in the screwthreads. Drop all pipes in the same way as the first until the correct depth is obtained and the cylinder is at the wanted level.
9. Instead of a sleeve the last pipe receives the flange for rising pipe N° 50 delivered with the pump.
  - To hang this last pipe equipped with the flange on the tripod (fig. 6), use the bolts needed later on for fixing the mecanism on the frame.
  - Screw this bolts temporarily in the two threaded holes (M 12) of the flange together with the chain.  
Caution : While descending the pipes pay attention that the holes (diameter 18) of the flange are lined-up with the holes of the frame.
10. This completes the assembly of the rising main pipe (see fig. A of drawing BA0204 .

#### IV. ASSEMBLY OF THE PISTON UNIT

According to the case there are two possibilities :

##### 11. Wooden connecting rods

- a) See fig. 7. Assemble the whole piston (this means : the valve housing with valve N° 60 and leather cups) together with the coupling rod N° 57, the fork N° 55, the guide N° 53 and the first wooden rod at the side with the 2 holes.

Warning : All connections shall be tightened very well especially the counter lock nuts.

- b) Bring the first wooden rod with the piston into the rising pipe.
- c) See fig. 8. Finally the rod is resting on the flange retained by an iron pin put in the first hole of the rod. (The key of the stuffing box can be used for this purpose).
- d) See fig. 9. Fasten two metal extension pieces to the next rod at the edges with two holes.  
Caution : Only one end of the wooden rods has three holes (two for the bolts, one for the iron pin).
- e) Put this rod vertical and assemble to the rod resting on the frame.
- f) Take away the iron pin and lower the rods up to the position as in fig. 8.
- g) Prepare the third rod (fig. 10), two metal extension pieces at the side with two holes, two metal extension pieces and two half guides at the side with three holes.
- h) Assemble with the rod resting on the frame, guide upside. Lower again in the rising pipe.
- i) The next rod will be assembled as indicated in fig. 11.
- j) Continue the same way. One guide is to be installed between forks every three rods.
- k) The moment that the piston is lowered up to the entrance of the pumping cylinder, a first resistance will be felt. (see drawing BA 0204, fig. B). Overcome this and push the rods so that the piston enters the cylinder. Continue ( see fig. C, drawing BA0204) up to the point that the piston touches the footvalve.
- l) At this moment put a marking on the rod, just level with the flange N°50.  
- Draw the rods out of the rising pipe for + 1 metre.  
Drill a hole diameter 10 mm in the rod at that point.  
Put in the iron pin and let the rod rest on the flange.  
- Cut the rod at exactly 40 cm. below the marking.  
Put the pump rod N° 45 with his fork on top of it.  
Drill two holes  $\varnothing$  10 mm. in the rod and fasten the fork to the rod with two bolts ( fig. D of BA 0204) and two half guides.  
- Now you can lower the rods. The piston will rest on the suction valve.
- Warning : Do not turn the rods clockwise. Otherwise the piston would be screwed on the footvalve.
- m) At this stage the rods are at the correct length. Follow now the instructions of the section V : "Assembly of the pump mechanism" (point 13).

## 12. Stainless steel connecting rods

- a) See fig. 12. Assemble the piston with his connecting rod and guide to the first connecting rod. On the other side there is a sleeve and locking nut.  
Warning : Don't forget to tighten the locking nuts.
- b) Lower the piston and the rod in the rising pipe.
- c) Fig. 13. Screw the next rod in the sleeve of the first rod and block it with the locking nut tightly. Continue to do so with the other rods taking care to install a guide every two rods (1 guide every 6 m.)
- d) NOTE : If the weight of the rods becomes too heavy, you can use a clamp (fig. 4) adapted for the diameter of the rod.
- e) See drawing BA0204 fig. B.  
 The moment that the piston is lowered up to the entrance of the pumping cylinder, a first resistance will be felt. Overcome this and push the rods so that the piston enters the cylinder. Continue (see fig. C drawing BA0204) up to the point that the piston touches the footvalve (suction valve).
- f) At this moment put a marking on the rod, just level with the flange N° 50.  
 - Draw the rod out of the rising pipe for  $\pm 1$  m. and cut the rod exactly 38 cm. below the marking.  
 Make a thread with screw-plate M 12, 30 to 35 mm. long.  
 - See fig. 14. Assemble the pump- rod N° 45 with his guide, the locking nuts and the end housing of piston rod N° 9 etc..  
 - Now you can lower the rods. The piston will rest on the suction valve (footvalve).  
Warning : Do not turn the rods clockwise, otherwise the piston would be screwed on the footvalve.
- g) At this stage the rods are at the correct length. Follow now the instructions of the section V : "Assembly of the pump mecanism".

## V. ASSEMBLY OF THE PUMP MECANISM

13. Loose and dismount the end housing of pump-rod N° 9 and the locknut (fig. 14). Put the gasket on the flange. Place the delivery head N° 49 with piece N° 46 and the stuffing box N° 47 over the rod and assemble this unit to the frame with two bolts M 16 x 70.
14. Assemble now the end housing of the pump- rod N° 9 and the locknut(fig. 14) back on the rod.



15. Place the mechanism on the frame. Dismount the front cover N° 6 and the cover of the drive mechanism N° 4. (See fig. 16) Dismount the two half bearings of the main lever N° 8 so that the spindle of the end housing N° 28 is centered.  
Reassemble the two half bearings on the main lever.  
Warning : Don't forget to relock the hollow nuts (see fig. 18) after the assembly.
16. The mechanism can be fastened to the frame by means of 5 bolts M12x60.  
Caution : Check if the connecting piston rod is centered in the stuffing box N° 46.
17. Put 2,5 liters of oil SAE40 in the mechanism. The oil level can be checked with the screw labelled "N. H." (fig. 19).
18. Reassemble covers N° 4 and 6. Don't forget the gaskets.
19. Assemble the flywheels. (see fig. 20)
  - Put a wedge in the groove of the flywheel. Place the flywheel on the shaft of the mechanism without knocking. Remove the wedge and fasten the flywheels very tight with 4 bolts. Put the handles on the flywheels.
20. If the stuffing is not put in the stuffingbox, just descrew piece N° 46 and put 3 rings of stuffing in the stuffingbox N° 47. (fig. 21 and 22). Screw piece N° 46 gently on the stuffing.  
Check that the connecting rod goes up and down while turning the flywheels without hitch. A small adjustment of the mechanism on the frame and/or the delivery head might be necessary.  
Caution : Be sure all nuts and bolts are fastened and tight this final adjustment.
21. Congratulations. By following this instructions you installed the TROPIC II pump in the correct way.

## VI. MAINTENANCE OF THE PUMP MECHANISM

NOTE : The maintenance of this pump is very limited and consists only in the replacement of the leather cups of the piston when they are worn out and the renewal of the oil in the driving mechanism.

### 22. Oil and grease

Renewal of the oil in the driving mechanism depends on the working conditions. Although it is difficult to state a certain period; we recommend to renew the oil (SAE40) every year, and at the same time to take the opportunity to grease the ball bearings ( $\pm$  10 strokes with the grease pump delivered with the pump).

Use quality grease for this job.

### 23. Replacement of the leather cups

After a certain extended working period, or if the unit is pumping water contaminated with sand, there could be a decrease of the capacity of the pump. This will indicate the wearing of the leather cups of the piston. Proceed with the following steps :

- Remove covers N° 4 and N° 6. Caution ! Pay attention to the gaskets.
- Disassemble the two half bearings N° 8' (fig. 16).  
Caution : Pay attention the rods can fall down all at once. To prevent this, use a tube of 1/2" cut in two along the longitudinal axis, and put it around the connecting rod. The rod will rest on this tube placed between the counter nut of the end housing of pump- rod and the stuffingbox. It is also possible to use a spanner to do this job (vise-grip).  
Caution : If using a spanner don't damage the rod at the place it passes through the stuffingbox.
- Unscrew the 5 bolts joining the mecanism on the frame and move the mecanism  $\pm$  10 cm. backwards.
- Unscrew the two bolts fixing the delivery head and bring the rods up (if necessary use a clamp around the rod) and put the iron pin in the hole of the wooden rod (fig. 8). Disassemble the two bolts of the fork and take away the endhousing, the piston rod, the delivery head etc. .
- Bring up all other rods up to the piston.
- Unscrew the piston and replace the leather cups (N° 69 : seal cups) check the valves and only if necessary change the rubber of the valve N° 63 and/or the valve spring N° 62.
- Assemble the rods back in the opposite way.

### 24. Repair of the suction valve (footvalve)

- Let down the rods completely. The piston is resting on the suction valve (fig. C drawing BA0204)
  - Turn the rods clockwise (5 to 6 rounds) to allow the piston to be screwed on the suction valve.
  - Knock one blow upwards. This will allow the suction valve to come loose from its seat.
  - Bring up the rods with piston and suction valve.
  - Clean and if necessary replace the rubber and or the spring of the suction valve etc. . Assemble in the opposite way.
  - The suction valve is put back in place with one blow downwards.
- Warning : Don't forget to separate the piston from the suction valve by turning the rods anticlockwise, otherwise the pump can not operate.

### 25. Changing the cylinder

It is possible that after a long period of working the pump-cylinder is worn. If the cylinder itself is out of working order (hole or crack due to extreme wear) it has to be changed. In this case the connecting rods have to be taken out and also the rising main pipe by unscrewing the tubes one after another (see par. III 6).

Once the cylinder is out of the well, unscrew the suction valve housing N° 66 and the worn out cylinder N° 59. Adapt the new cylinder N° 59 and screw the suction valve and the housing to it, after having checked the valve itself. Start lowering the rising main pipe as described in par III and the piston with connecting rods as described in par IV.



VII. WHAT COULD GO WRONG ? WHY ? HOW TO FIX IT

26. The capacity of the pump is much lower than initially

Possible causes in order of priority.

1) Impurities in the valves

Action : - Try to dislock the valves by turning the flywheels as fast as possible.

- If this is unsuccessful, the suction valve should be brought up with the piston and thoroughly cleaned, how to do see par. 24.

2) The leather cups of the piston are worn out.

Action : Change the leather cups (par. 23)

3) Valves or valve springs are broken.

Action : Bring up suction valve with piston and repair if necessary. (par. 23 and 24)

27. The pump delivers no water at all

Possible causes :

1) The connecting rods are broken.

Action : Disassemble the connecting rods and the rising pipe up to the point of trouble. During reassembling check especially the locking nuts.

2) After first installment or repair

The footvalve (suction valve) is not in his seat and/or still attached to the piston.

Action : Put suction valve in place (see par. 24)

3) The valves are completely blocked or obstructed by mud or cloth.

Action : Disassemble and repair (see par. 23 and 24)

4) Leather piston cups completely worn out.

Action : Replace leathercups (see par. 23)

5) Pumping cylinder or rising pipe perforated.

Action : Replace broken element.

28. The flywheels cannot be moved

Possible causes :

1) The rods get stuck in the rising pipe due to sand etc...

Action : Disassemble rods and rising pipe. Clean the well. Check carefully all items before reinstallation.



2) The mechanism on the frame is jammed. This is an extremely rare case.

Action : Verify oil and grease. Try to put in working order if without success contact the dealer.

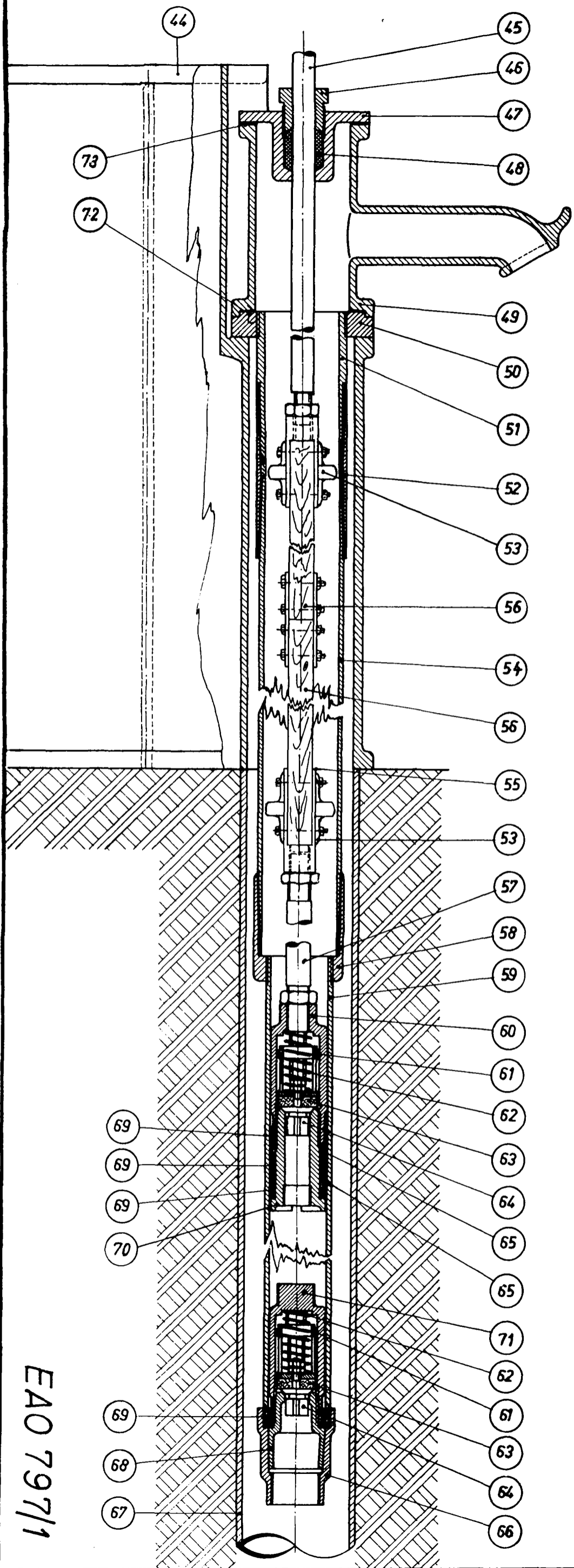
29. Water leaks at the stuffingbox

The stuffingbox should be tightened or the stuffing should be replaced.

NOTE : Some leakage of water is needed to protect the stuffing.




**ASSEMBLY DRAWING  
TROPIC II PUMP**



1. Housing
2. Bottom spindle of lever
3. Back lever
4. Cover of drive mechanism
5. Side lever
6. Cover of drive mechanism
7. Ball bearings
8. Control lever      8'. Control lever cover
9. Control head
10. Piston rod
11. Housing for control spindle bearings
12. Pinions
13. Felt ring
14. Ball bearing of control spindle
15. Closed cover back lever
16. Ball bearing back lever
17. Open cover back lever
18. Felt ring
19. Top spindle of back lever
20. Cover closed
21. Ball bearings
22. Felt ring
23. Cover open
24. Circlips
25. Felt ring
26. Cover piston rod head
27. Cover control head
28. Spindle control head
29. Tenon of side lever
30. Spindle head of piston rod
31. Spindle of side levers
32. Seal ring
33. Cover of housing
34. Tenon for big cog wheels
35. Cog wheel
36. Crankpin bearing
37. Piston rod pivot
38. Control spindle
39. Key
40. Flywheel
41. Handle      41'. Handle tube      41.1. Massive handle
42. Gasket for cover
43. Gasket for cover
44. Base plate
45. Pump rod
46. Gland
47. Packing box
48. Packing
49. Delivery head
50. Flange for riser pipe
51. Nipple
52. Sleeve
53. Guide
54. Riser pipe
55. Fork
56. Connecting rod
57. Coupling rod
58. Coupling sleeve riser pipe
59. Pump barrel
60. Shell of delivery valve
61. Delivery suction valve
62. Valve spring
63. Rubber valve
64. Valve guide
65. Insert
66. Housing seat of suction valve
67. Well casing
68. Seat of suction valve
69. Seal cup
70. Seat of delivery valve
71. Shell of suction valve
72. Riser pipe flange joint
73. Packing box joint
88. Key

EA0 79711

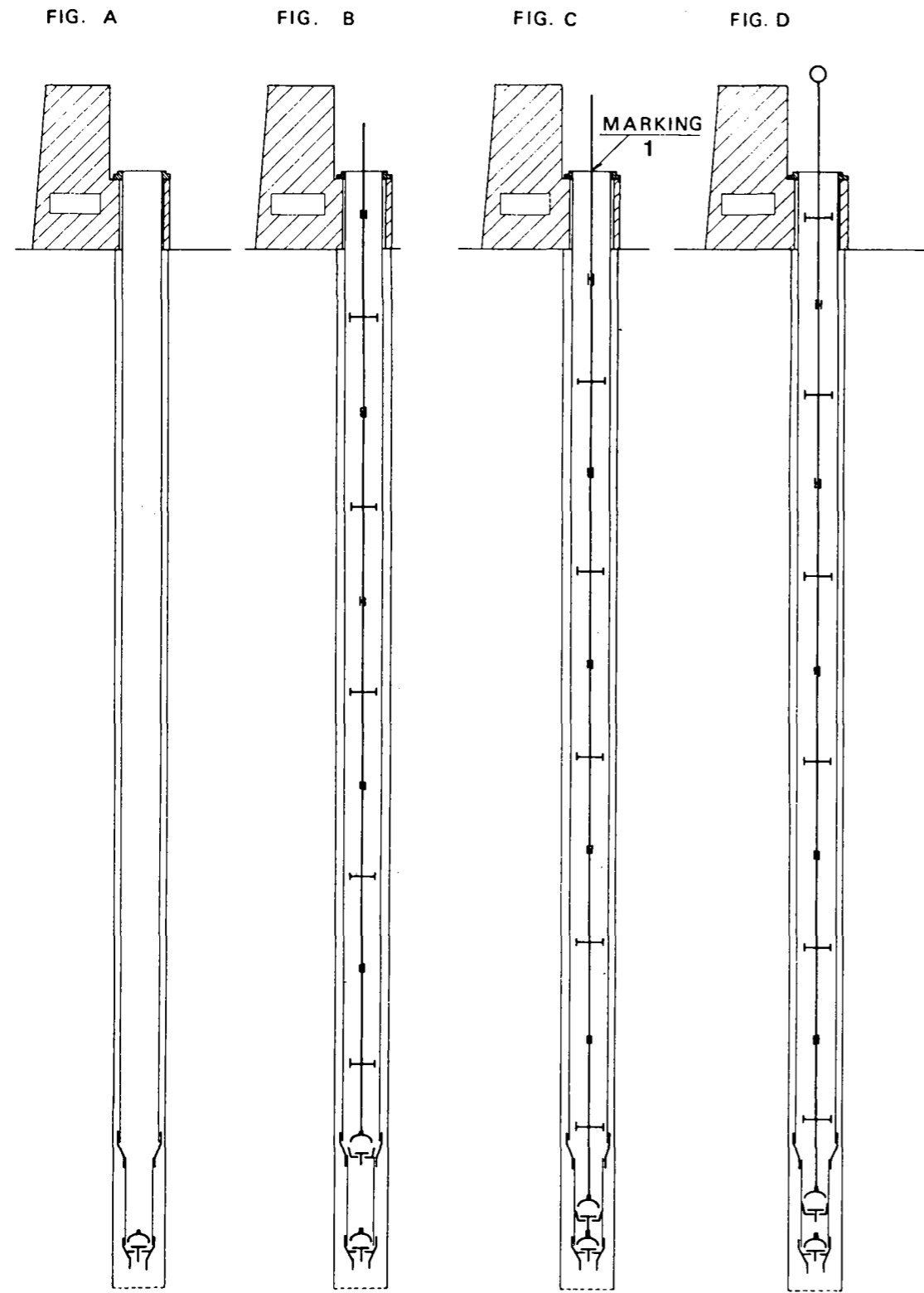
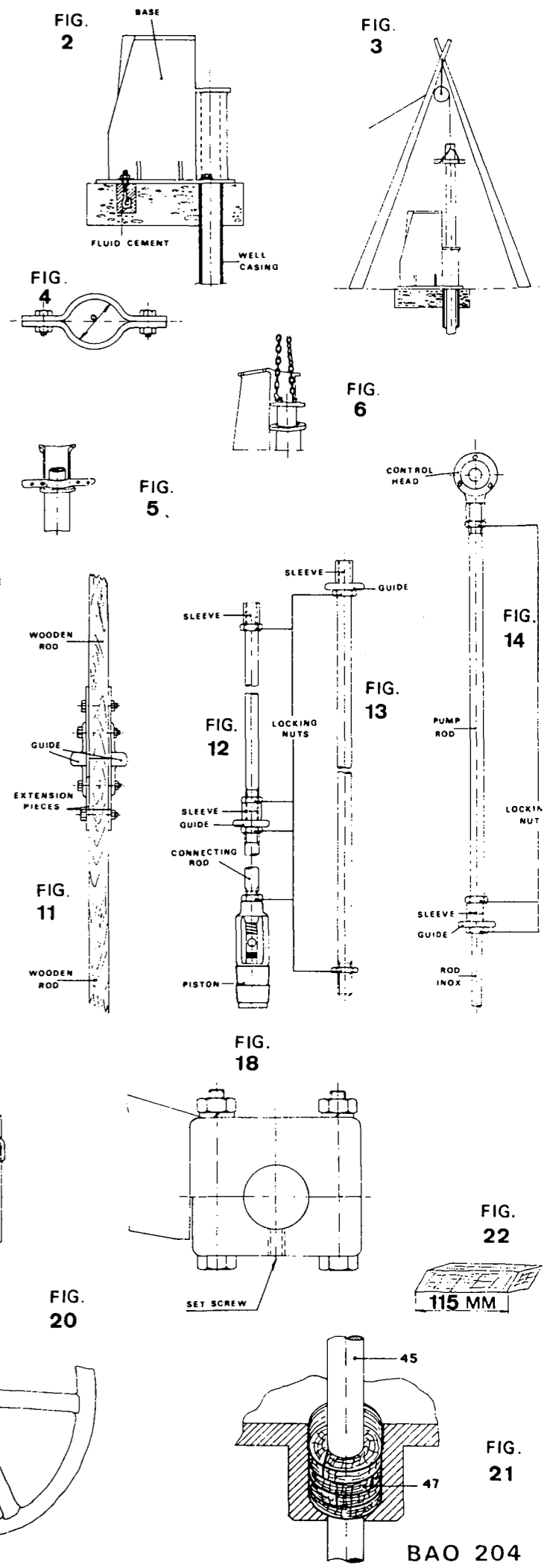
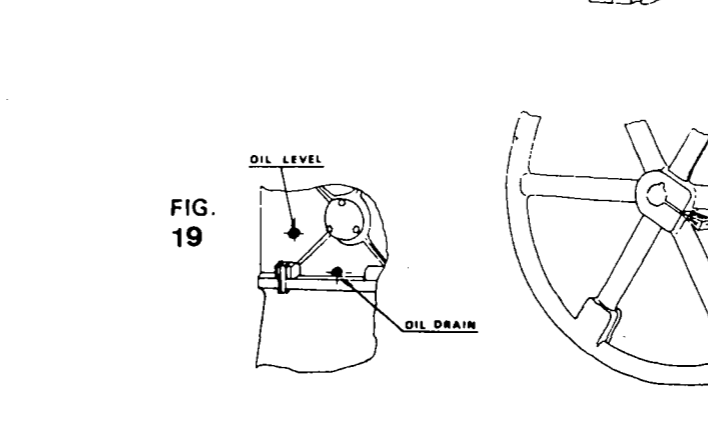
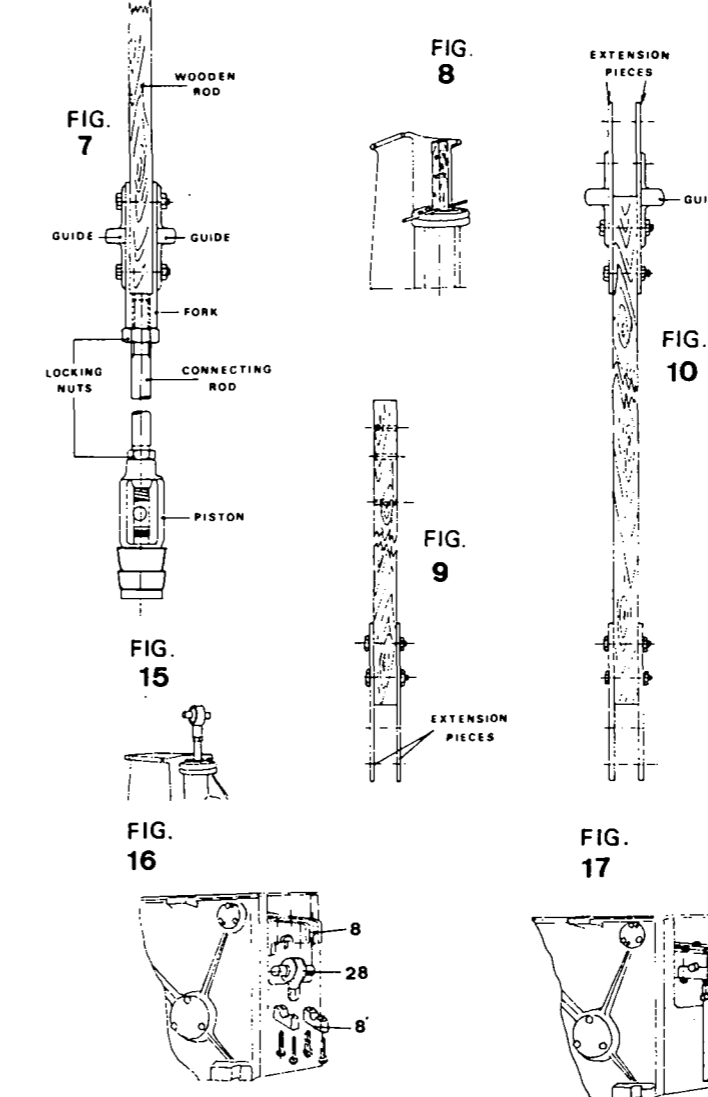
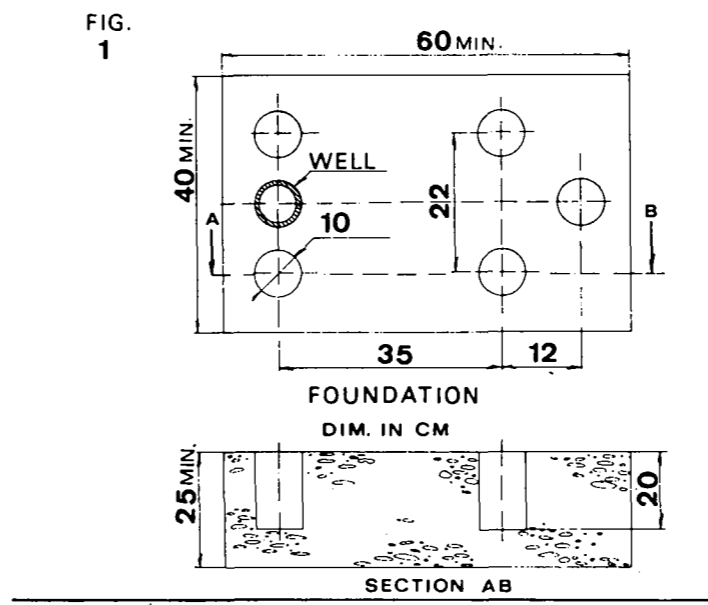
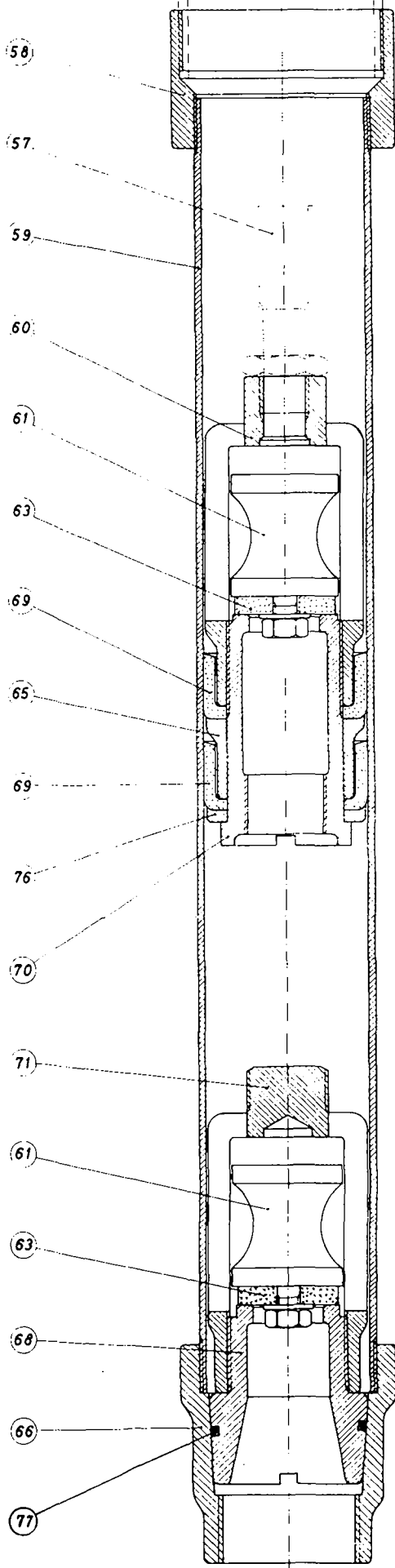


FIG. A                      FIG. B                      FIG. C                      FIG. D





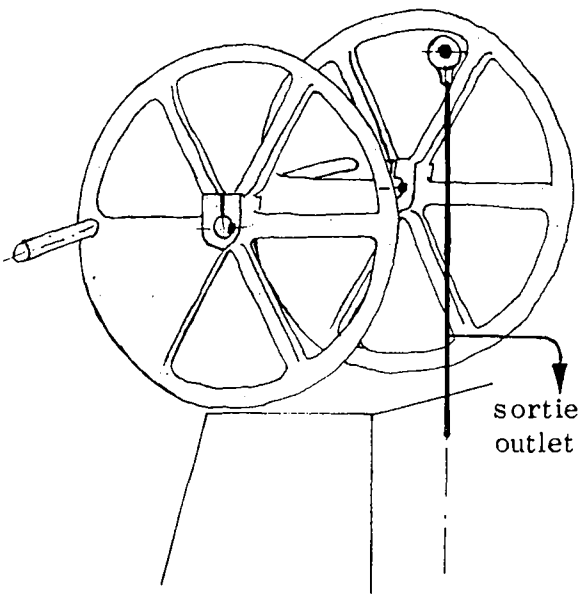
- 57. Tige d'accouplement
- 58. Manchon d'accouplement
- 59. Cylindre
- 60. Corps de soupape refoulement
- 61. Clapet aspiration/refoulement
- 63. Soupape
- 65. Intercalaire supérieur
- 66. Emboîtement siège de soupape aspiration
- 68. Siège de soupape aspiration
- 69. Godets d'étanchéité
- 70. Siège de soupape refoulement
- 71. Corps de soupape aspiration
- 76. Intercalaire inférieur
- 77. O ring

- 57. Coupling rod
- 58. Coupling sleeve rising pipe
- 59. Pump barrel
- 60. Pump shell
- 61. Delivery suction valve
- 63. Rubber valve
- 65. Upper inset
- 66. Housing seat of suction valve
- 68. Seat of suction valve
- 69. Seal cup
- 70. Seat of delivery valve
- 71. Shell of suction valve
- 76. Lower inset
- 77. O ring

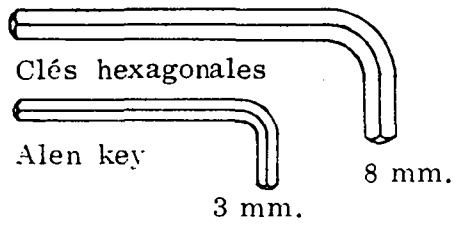
- 57. Kupplungsstange
- 58. Kupplungsmuffe
- 59. Zylinder
- 60. Gehäuse des Druckventils
- 61. Druck- / Ansaugventil
- 63. Ventil
- 65. Oberes Zwischenstück
- 66. Saugventilhalterung
- 68. Sitz des Saugventils
- 69. Kolbenringe
- 70. Sitz des Druckventils
- 71. Gehäuse des Saugventils
- 76. Unteres Zwischenstück
- 77. O ring

Position des roues avec contre-poids,  
la tringlerie en position "haute"

Position of wheels with counter-weight,  
connecting rods in "upper" position



Outillage d'entretien fourni avec la pompe  
Tools for maintenance delivered with each pump

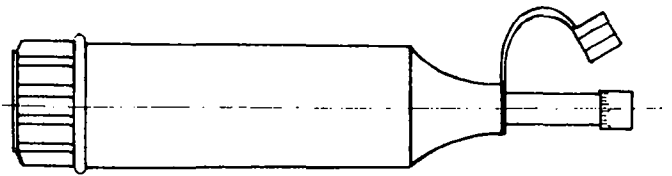


Clés hexagonales

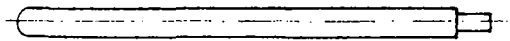
Alen key

3 mm.

8 mm.

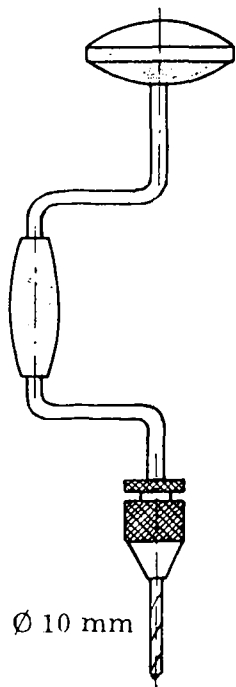
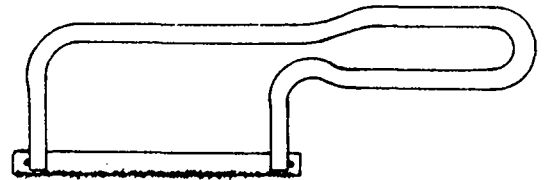
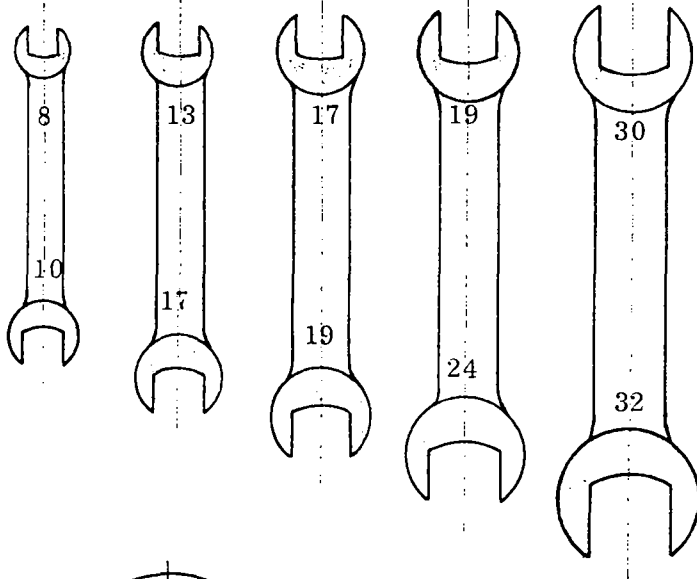


Pompe à graisse  
Grease pump

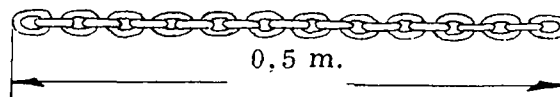


Clé à bourrage  
Stuffing key

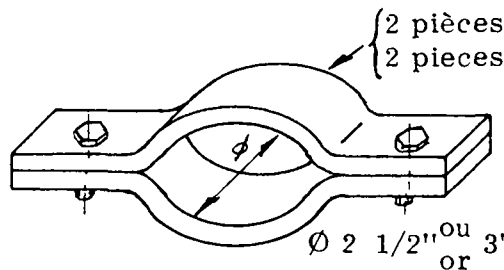
Outillage d'installation - Tools for instalment



Ø 10 mm

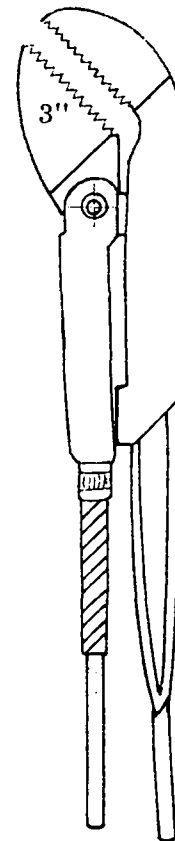
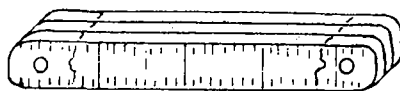


0,5 m.



2 pièces  
2 pieces

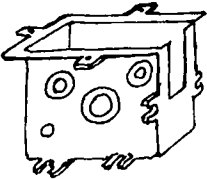
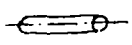
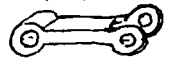


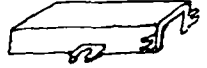

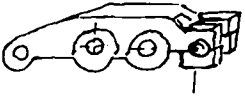

Ø 2 1/2'' ou 3''  
or



2 pièces  
2 pieces

D U B A	SPARE PARTS LIST	PAGE -1-	MANUAL PUMP	
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE	

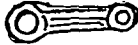



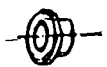

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C
1	Housing Carter 330 mm X 210 mm X 320 mm		1	112001480	22,000
2	Bottom shaft of lever Axe inférieur du levier length : 135 mm long : 135 mm		1	212403070 ø 20 mm	
3	Back lever Levier arr. length : 247 mm long : 247 mm		1	112201570	1,840
4	Cover of drive mechan. Couvercle du mécan. (sup) 460 mm X 210 mm X 150 mm		1	112001471	9,000
5	Side lever Levier latéral length : 156 mm long : 156 mm		2	112303470	0,395
6	Frontcover of drive mechanism Couvercle du mécan. (front) 140 mm X 100 mm X 320 mm		1	112001472	5,800
7	Ball bearings Roul. à billes		2	805012050 N° 1205	0,148
8	Main lever Levier de cde. length : 361 mm long : 361 mm		1	112201580	3,800
8'	Cover main lever Couvercle levier de cde. 80 mm X 25 mm X 25 mm		2	112201582 incl in 8	0,250
9	End housing of piston rod Tête de commande length : 111 mm long : 111 mm		1	112303500 ø int 52 ø ext 72	0,470








D U B A	SPARE PARTS LIST	PAGE -2-	MANUAL PUMP
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C
10	Connecting rod Bielle length : 250 mm long : 250 mm		1	112201601	1,360
11	Housing for main shaft bearings Logement roul. axe de cde.		2	112303460 ø ext 125	1,265
12	Pinions Pignons		2	212303480 ø int 42	1,100
13	Felt ring Anneau en feutre		2	ø 50/40X3	
14	Ball bearing of main shaft Roul. à billes de l'axe de cde.		2	805062080 N° 6208	0,365
15	Cover closed Couvercle fermé ident N° 20		2	112403100 ø ext 55	0,075
16	Ball bearing back lever Roul. à billes levier arrière		4	805062020 N° 6202	0,040
17	Cover open Couvercle ouvert ident N° 23		2	112403090 ø ext 55	0,070
18	Felt ring Anneau en feutre		2	ø 28/20X3	
19	Top shaft of back lever Axe sup. du levier arr. length : 98 mm long : 98 mm		1	222403030 ø 20 mm	0,215











D U B A	SPARE PARTS LIST	PAGE -3-	MANUAL PUMP
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C
20	Cover closed Couvercle fermé ident N° 15		4	112403100 ø ext 55	0,075
21	Ball bearings Roul. à billes		2	805012020 N° 1202	0,060
22	Felt ring Anneau en feutre		2	ø 28/20X3	
23	Cover open Couvercle ouvert ident N° 17		4	112403090 ø ext 55	0,070
24	Circlips Circlips		2	Din 471 15E	
25	Felt ring Anneau en feutre		4	ø 35/25X3	
26	Cover connecting rod Couvercle tête de bielle ident N° 27		2	112403060 ø ext 72	0,155
27	Cover connecting rod Couvercle tête de cde. ident N° 26		2	112403060 ø ext 72	0,155
28	Spindle end housing Axe tête de cde. length : 100 mm long : 100 mm		1	212403110 ø 25 mm	0,380
29	Pin of side lever Tenon du levier latéral ø ext max : 48 mm length : 55 mm long : 55 mm		2	212403080	0,195




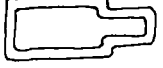
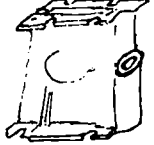
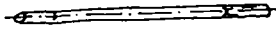



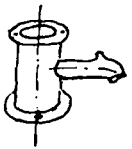
<b>D U B A</b>	SPARE PARTS LIST	PAGE -4-	MANUAL PUMP
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C
30	Spindle connecting rod Axe tête de bielle length : 81 mm long : 81 mm		1	212403050 ø 25 mm	0,310
31	Spindle of side levers Axe des leviers latéraux length : 135 mm long : 135 mm		1	212403070 ø 20 mm	0,305
32	Seal ring Bague d'étanchéité thickness : 12 mm épaisseur : 12 mm		2	425406212 ø int 40 ø ext 62	0,030
33	Cover of housing main bearings Couvercle de log.de roul.pincip.		2	112303560 ø ext 125	0,650
34	Pin for large gears Tenon pour grandes roues dent. length : 85 mm long : 85 mm		2	212303490 ø ext 80	1,030
35	Large gears Roue dentée		2	112201610 ø ext 186	5,000
36	Bearing connecting rod Coussinet pied de bielle length : 55 mm long : 55 mm		1	282201602 ø ext 38	0,210
37	Pivot connecting rod Pivot de bielle length : 147 mm long : 147 mm		1	222403120	0,490
38	Main shaft Axe de cde. length : 410 mm long : 410 mm		1	212201590	3,800
39	Key Clavette		2	10X8X70 Din6885	0,040




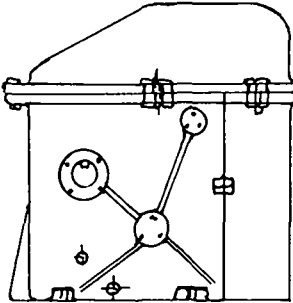
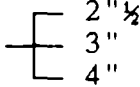
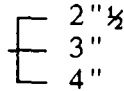
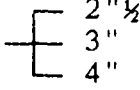
D U B A	SPARE PARTS LIST	PAGE -5-	MANUAL PUMP
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C
40	Flywheel $\phi$ 700 mm Volant $\phi$ 700 mm		2	112201460	38,000
41	Handle Poignée length : 275 mm long : 275 mm		2	222308430 $\phi$ 40 mm	2,200
42	Gasket for frontal cover N° 6 Joint du couvercle frontal N° 6 2 pièces 320 mm X 20 mm		2	BAO 147B	0,015
43	Gasket for cover N° 4 Joint du couvercle sup. N° 4 450 mm X 210 mm		1	BAO 147A	0,065
44	Frame Soubassement height : 700 mm hauteur : 700 mm		1	112110850	76,000
45	Piston rod Tige de piston length : 700 mm long : 700 mm		1	262303521 $\phi$ 22 mm	1,975
46	Gland Presse - Etoupe		1	272200122 $\phi$ ext 48	0,370
47	Stuffing box Boîte de bourrage		1	112200121 $\phi$ ext 130	1,650
48	Stuffing Bourrage  section 8 mm X 8 mm 6 rings 100 mm long	8 mm  8 mm	1	8X8X600 mm	0,045
49	Delivery head Tête de refoulement height : 205 mm hauteur : 205 mm		1	111110870	8,000

D U B A	SPARE PARTS LIST	PAGE -6-	MANUAL PUMP
	LISTE DE PIECES DE RECHANGE		TROPIC II POMPE MANUELLE

A Position number ----- Numéro de position  
 B Quantity in 1 unit ----- Quantité par unité  
 C Weight (Kg) ----- Poids (Kg)

A	DESCRIPTION	DENOMINATION	B	CODE-INFO	C	
50	Flange for rising pipe Bride de colonne montante		1	112201631 or / ou 112201632	3,000	
	112201631 : $\phi$ int 2½"					
	112201632 : $\phi$ int 3"					
72	Gasket for flange N° 50 Joint pour bride N° 50		1	DA 163	0,015	
						
73	Gasket for stuffing box Joint boîte de bourrage		1	FA 1400 $\phi$ ext 130	0,020	
						
XX	Nuts and bolts Boulonnerie		set	-	2,500	
XX	Gearbox Mécanisme Including all internal parts mounted Y compris toutes les pièces internes montées		1	302450000	74,000	
52	Sleeve Manchon			2"½ 3" 4"	931020120 931000030 931000040	0,520
53	Guide (½) Guide (½)			2"½ 3" 4"	142414530 142414510 142414690	0,220
54	Riser pipe Colonne montante		*	2"½ 3" 4"	200202102 200200003 200200004	20,000 26,000 37,000
55	Fork Fourche			302452000		
56	Connecting rod Tringle		**	000230000	2,200	