

hydratight[®]

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HIGH LOAD ROPE PULLER

Operation and Maintenance Instructions



www.boltup.com

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1. Introduction

In a world of rapidly increasing technological change, HYDRATIGHT LTD is at the forefront of bolt tightening development. It is only through extensive research together with accumulated experience that a more efficient customer service and a reputation for high quality products can be maintained.

HYDRATIGHT LTD has a policy of continual research and development, which enables us to offer innovative precision equipment that meets the rigorous demands of industry worldwide.

HYDRATIGHT series of flange pullers offer the following benefits:

- | | |
|------------------------------------|---|
| ACCURACY | A method of pulling together large flange assemblies with a known load. There by ensuring no damage occurs to flanges or pipeline. |
| UNIFORMITY | Any number of HYDRATIGHT flange rope pullers can be linked together for simultaneous pulling. This is particularly beneficial on large flange applications where uniform load on the flange is essential in ensuring leak-free connections. |
| TIME SAVING | The length of stroke available in the cylinders reduces the number of times the flange pullers needed to be closed. |
| COMPACT, LIGHT WEIGHT TOOLS | Careful design has enabled the development of an effective yet lightweight and compact equipment. |
| LABOUR SAVING | HYDRATIGHT flange pullers can be used easily by two operators with a minimum of effort. |
| SAFETY | Consistent quality control procedures ensure that HYDRATIGHT tools and equipment are safe in both design and use. |
| SIMPLICITY | A minimum of moving parts leads to trouble free, simple operation and easy maintenance. |
| RELIABILITY | All HYDRATIGHT tools and equipment are safety tested including a full pressure test prior to despatch. |

2. Safety Notes For Use with Flange Pullers

High Pressure Hydraulics should be treated with respect. Please ensure that the following basic rules are followed:

1. **ALWAYS WEAR SAFETY GLASSES** when working near a pressurised hydraulic system. Your eyesight is important - **PROTECT IT.**
2. **ALWAYS** check the following points before pressurising a hydraulic system:
 - (a) Check that the hydraulic harness is fully connected. There should be no loose ends and every male nipple should be connected to its corresponding female coupling.
 - (b) Check that each female coupling is securely locked in position on the corresponding nipple by physically pulling the connection.

IT IS DANGEROUS TO PRESSURISE THE BACK OF AN UNCOUPLED QUICK DISCONNECT NIPPLE OR COUPLING. ALL CONNECTIONS MUST BE CONNECTED OR BLANKED OFF BEFORE PRESSURISING.

3. **NEVER** exceed the maximum working pressure specified for the equipment. (See Data Sheet)
4. **ALWAYS** take care when pressurising a system. Always observe the gauge and be ready. Pressure can rise faster than you think.
5. **NEVER** leave a pressurised system unattended. If you must leave the area release the pressure and ensure that the return to tank valve on the pump unit is fully open.
6. **NEVER** bend the hydraulic hoses less than six times their own diameter. Do not use kinked hoses.
7. **NEVER** stand in line with the draw bar / wire rope axis whilst flange pulling is in progress.
NOTE: Personnel must be aware of this point at all times.
8. When working on site the work area should be roped off and all personnel not connected with the site operation should be kept clear of the working area.
9. High pressure hydraulic equipment can be very dangerous if misused. Keep away from oil leakages at high pressure. Liquid escaping from highly pressurised equipment has sufficient power to penetrate the skin, which can cause blood poisoning. In the case of such an accident **IMMEDIATE** medical attention must be sought.

REMEMBER:

TAKE CARE! HIGH PRESSURE HYDRAULICS ARE PERFECTLY SAFE IF THE BASIC SAFETY RULES ARE FOLLOWED.

PLEASE NOTE:

MODIFICATION TO ANY EQUIPMENT COVERED BY THIS MANUAL SHOULD NOT BE ATTEMPTED BY THE CUSTOMER

IF MODIFICATIONS ARE REQUIRED TO SUIT A SPECIFIC APPLICATION, CONSULT HYDRATIGHT LTD BEFORE MAKING THEM.

INAPPROPRIATE MODIFICATIONS MADE RENDER THE EQUIPMENT DANGEROUS.

3. Operation of Draw Bar Flange Pullers

PREPARATION OF FLANGE PULLER BEFORE SENDING DOWN TO DIVER

(See Fig. 1)

- 1) Select the correct length of draw bar for the flanges being pulled together.
- 2) The flange puller cylinder will be fitted with an adaptor plate. Select the correct size fixed and bull nosed adaptors to suit the holes in the flanges.
- 3) Fit the fixed adaptor to the adaptor plate fitted to the front of the flange puller.
- 4) Fit the ring nut onto the draw bar.
- 5) Pass the end of the draw bar through the flange puller until the ring nut comes into contact with the ram.
- 6) Assemble the bull nosed adaptor to the end of the draw bar.

ASSEMBLY OF FLANGE PULLERS TO THE FLANGE

- 7) Remove the bull nosed adaptor.
- 8) Pass the draw bar through the holes of both flanges and locate the fixed adaptor in a hole in the first flange.
- 9) Screw the bull nosed adaptor onto the draw bar until it makes contact with the second flange.
- 10) Repeat operations 8-10 for other flange pullers to be simultaneously used.

ASSEMBLY OF HYDRAULIC MANIFOLD

High Pressure Manifold (Orange Hose)

(See Fig. 2 & Fig. 3)

- 11) Assemble an interconnecting pipe to each flange puller around the flange and connect to form a closed loop.
- 12) At any convenient flange puller, disconnect the quick disconnect (QD) coupling and insert the high-pressure tee block between the interconnecting pipe and the flange puller.

- 13) Assemble the ORANGE Pipe of the twinned downline to the remaining QD nipple on the tee block.

Low Pressure Manifold to Link Flange pullers (Black Hose)

- 14) The low pressure components are similar to the high pressure components, but all QD nipples have been replaced by QD couplings and visa versa. This is to minimise the possibility of wrong connections. All flexible hose is 3/8" bore. BLACK for low pressure.

DIVER - OPERATION OF FLANGE PULLERS

- 15) With the manifolds connected, the flange pullers are ready for pressurising. Before pressurising make sure all QD couplings are properly connected and that the flange adaptors and flange puller are in contact with the faces of the flanges.
- 16) The pump unit should be set to stall at 5,000 psi with the puller control valves in the centre (Hold Position). By moving the control valve forward or backward, the rams can be extended and retracted as required. The ring nut should be spun down the draw bar after each retract operation. The flange pullers are capable of taking full pressure on their end stops. It is possible to operate the valves on all flange pullers and wait until all rams reach full stroke before retracting.
- 17) Individual flange pullers may be stopped in mid-stroke, operated simultaneously or individually. The diver has total control of the operation.

POST USE MAINTENANCE OF FLANGE PULLERS AND EQUIPMENT

- 18) Connect hoses between flange pullers and pump unit.
- 19) Pressurise the flange puller cylinder to its extended position to 5,000 psi maximum against the built in stop.
- 20) Operate the pump to retract the ram of the flange puller up to the built in stop up to 5,000 psi maximum.
- 21) Release hydraulic pressure, remove hose and remove flange puller from test.
- 22) Thoroughly clean all external surfaces of the flange puller and grease for storage.
- 23) Release pressure in all flexible hoses by forcing an open ended QD nipple into a QD coupling on the hose.
- 24) Make sure all quick disconnects function and give all hoses and connections a thorough cleaning before storage.

4. Operation of Wire Rope Pullers

The following instructions are applicable to the use of the rope pulling flange puller.

Certain aspects of these instructions may not be applicable if the rope puller is used for other pulling operations e.g. fixed adaptors may not be necessary or the rope grip clamp may not be used.

The instructions should, therefore, be used for guidance only. Individual preferences and circumstances may necessitate changes.

PREPARATION OF ROPE PULLER UNIT

- 1) Select two fixed adaptors corresponding to the size of the flange bolt for each rope puller being used.
- 2) Screw one fixed adaptor into the front jaw assembly and screw the other fixed adaptor onto the adaptor plate mounted to the rope grip clamp.
- 3) Pass the wire rope through the rope puller cylinder by inserting the end of the rope through the fixed adaptor front jaw assembly and continue insertion until the rope appears out of the back of the rear jaw assembly. At this stage it should not be possible to pull the rope back through the cylinder since any attempt to do so will result in the jaws gripping the rope.

If positional adjustment of the rope is necessary then the rope must be completely pulled through the cylinder and re-threaded. Alternatively, it is possible to pull the rope back through the cylinder as follows: -

- a) Unscrew the end caps from the back of the front and rear jaw housings several turns.

This will release the tension in the large main springs of the assemblies and enable the smaller secondary springs to push the jaws up the taper and off the rope. With the jaws held off the rope, the puller can be manipulated in both directions along the rope.

- b) When the final position of the puller has been determined, the caps can be re-tightened.
- 4) Make sure that all rams are fully retracted. If not then connect each rope puller individually to the pump unit and carry out the operation.

ASSEMBLY OF ROPE PULLER TO THE FLANGE

- 5) Pass the loose end of the wire rope through a hole in the first flange and then through a corresponding hole in the second flange. Continue threading until the fixed adaptor locates into the flange hole.
- 6) Assemble the rope grip clamp (See Operation of Rope Grip Clamp). Push the rope grip clamp along the rope until the fixed adaptor locates in the flange hole.
- 7) Assemble all other units to the flange by repeating 5 – 6. Where two units are used care must be taken to choose diagonally opposite and corresponding flange holes. Where more than two units are used they should be spaced equally around the flange.

ASSEMBLY OF HYDRAULIC MANIFOLD

High Pressure Manifold (Orange Hose) (See Fig. 2 & Fig. 3)

- 8) Assemble an interconnecting pipe to each unit around the flange and connect to form a closed loop.
- 9) At any convenient rope puller, disconnect the QD coupling and insert the high-pressure tee block between the interconnecting pipe and the rope puller.
- 10) Assemble the ORANGE pipe of the twinned downline to the remaining QD nipple on the tee block.

Low Pressure Manifold to Link Rope Pullers (Black Hose) (See Fig. 2 and Fig. 3)

- 11) The low pressure components are similar to the high pressure components, but all QD nipples have been replaced by QD couplings and visa versa. This is to minimise the possibility of wrong connections.

DIVER - OPERATION OF ROPE PULLER

- 12) With the manifolds connected, the rope pullers are ready for pressurising. Before pressurising make sure all couplings are properly connected and that the adaptors and rope puller are in contact with the faces of the flanges.
- 13) The pump unit should be set to stall at 5,000 psi with the puller control valves in the centre (Hold Position). By moving the control valve forward or backward, the rams can be extended and retracted as required. The rope puller cylinders are capable of taking full pressure on its end stops. It is possible to operate the valves on all rope pullers and wait until all rams reach full stroke before retracting.
- 14) Individual rope pullers may be stopped in mid-stroke, operated simultaneously or individually. The diver has total control of the operation.
- 15) When the flanges are sufficiently closed the flange bolts can be inserted into the flange and hand tightened.
- 16) Hydraulic bolt tensioners can now be fitted and operated.

TO REMOVE THE ROPE PULLER

- 17) De-pressurise the system by closing the air flow valve on the pump and opening the return to tank valve.
- 18) Activate the valves on each rope puller into the ram retract mode.
- 19) Wait around 1-2 minutes for the system to fully de-pressurise.
- 20) Remove the remaining tension (stretch) in the rope by removing the rope grip clamp as instructed under the heading "Operation of Rope Grip Clamp".
- 21) Disconnect the hydraulic manifold.
- 22) Remove the rope puller / wire rope assemblies from the flange.

NOTE: AT THIS STAGE IT WILL NOT BE POSSIBLE TO PULL THE ROPE FROM THE CYLINDER SINCE THE JAWS IN THE FRONT JAW ASSEMBLY WILL STILL BE GRIPPING THE WIRE ROPE.

- 23) Return all components to the surface.

When on the surface it will be necessary to “Crack Off” the jaw sets from the rope before the wire rope can be pulled from the cylinder. This is done by connecting each rope puller in turn direct to the pump unit, extending the ram around 20mm and then retracting it the same amount. This procedure should free the jaws from the rope enabling the rope to be pulled through the rope puller from the ram end.

POST USE MAINTENANCE OF ROPE PULLERS AND EQUIPMENT

- 24) Connect hoses between the rope puller and pump unit.
- 25) Pressurise the rope puller to its extended position to 5,000 psi maximum against the built in stop.
- 26) Operate the pump to retract the ram of the rope puller up to the built in stop up to 5,000 psi maximum.
- 27) Release hydraulic pressure, remove hose and remove rope puller from test.
- 28) Thoroughly clean all external surfaces of the rope puller and grease for storage.
- 29) Release pressure in all flexible hoses by forcing an open ended QD nipple into a QD coupling on the hose.
- 30) Make sure all quick disconnects function and give all hose and connections a thorough cleaning before storage.

5. Operation of Rope Grip Clamp

- 1) The rope grip clamp can be attached to the loose end of the wire rope to provide a reaction for pulling applications. It can be removed even where the rope puller is under full pressure and a high load is in the rope (See Note 4), although for ease of operation it is recommended that the cylinder is de-pressurised before removal of the clamp.
- 2) The clamp consists of a split housing containing jaw sets and springs. When the four screws clamping the two halves are tightened the assembly can only be moved along the rope in one direction as shown by Arrow A in Figure 1. Movement in the opposite direction is resisted, by the jaws gripping the rope. When the four screws are loosened by several turns then the assembly can be moved in both directions along the rope, although to move the clamp back along the rope requires some manipulation.

The adaptor plate is attached by two M6 socket head cap screws located through the two elongated holes.. It is locked onto the front face. The adaptor plate must be free to slide across the front face of the rope grip clamp assembly. After assembly of the adaptor plate a fixed adaptor corresponding to the size of bolt in the flange can be screwed onto the adaptor plate.

TO OPERATE THE ROPE GRIP CLAMP PROCEED AS FOLLOWS:-

- 3) Assemble the rope grip clamp to the wire rope by inserting the loose end of the rope through the front end of the clamp and pushing the clamp along the rope. Push the clamp along the rope until contact is made with the element being pulled. For flange pulling applications the fixed adaptor screwed onto the adaptor plate locates in the flange hole. (as illustrated in the High Load Pulling System Brochure) Make sure that the socket screws in the clamp are readily accessible.
- 4) After completion of the load pulling operation ensure that the system is de-pressurised before attempting the removal of the rope grip clamp. Also ensure that the ram of the cylinder is fully retracted.
- 5) To remove the remaining tension from the wire rope and to remove the rope grip clamp from the rope, the four screws must be released evenly one turn at a time. It should not be necessary to turn the screws more than 4 – 5 complete turns providing the following two points are observed.

- a) The ability of the assembly to move back along the rope depends upon all three jaw segments inside the clamp being able to move off the rope. For this to happen it is important that both halves of the split housing move apart equally relative to the centre of the rope. If the rope is under tension and the front face is in face to face contact with the element being pulled then it is likely that one half will move and the other half remain stationary. If this occurs then the assembly must be centralised by forcefully hitting with a hide or copper hammer.
 - b) For the jaws to shake free from the wire rope as the housing is split, it will require being hit forcefully with a hide or copper hammer as the screws are being released.
- 6) Normally it should not be necessary to completely split the housing to remove the clamp from the rope, however, as the screws are loosened, the jaws move forward relieving the stretch in the rope. If the initial stretch in the rope is too great (i.e. where long length ropes are being pulled) then the jaws will fully compress the front spring without completely relieving the tension (stretch). In such cases the housing must be completely removed before the remaining stretch can be relieved. In such an event care must be taken to retrieve all parts for re-assembly.

6. Wire Rope Pullers with Angular Adaptor

The angular adaptor is only used with the wire rope pulling system.

The rope puller can be offset from the bolt hole axis by 30° which allows the unit to be used in reduced access applications.

The nut on the angular adaptor is used to fit the rope puller to the jaw assembly.

The fixed adaptor fits on the end of the angular adaptor and locates in the bolt hole as normal. See Drawing: HPRTAACA

7. Important Notes

- 1) Make sure that the heads of the cap screws are readily accessible when the clamp is positioned on the rope.
- 2) Even where tension has been completely relieved from the rope and the clamp is central relative to the rope, it may possibly take several forceful hits with a copper or hide hammer to shake the jaws free especially if the front spring is extensively compressed.
- 3) If the rope is oversize at the ends then the screws of the clamp may have to be loosened by one or two turns to enable the clamp to be assembled to the rope.
- 4) Where there is full load in the rope then the torque required to release the screws is very high and an extension will be needed on the socket wrench.

Technical Data.

Cylinder Model	Load Capacity		Maximum Operating Pressure		Use with Wire Rope					Use with Draw Bar		
	tons	kN	psi	bar	Rope dia. mm	Specified Minimum Breaking Load of Rope		Weight		Weight		
						tons	kN	lbs	kg	dia.in	lbs	kg
Standard Model	12.7	127	5500	380	19	30.41	303	84	38	1"UNC	48	22
					25	52.75	525					
45° Angled Adaptor	11.5	115	5000	345	19	30.41	303	84	38			

Figure 1.

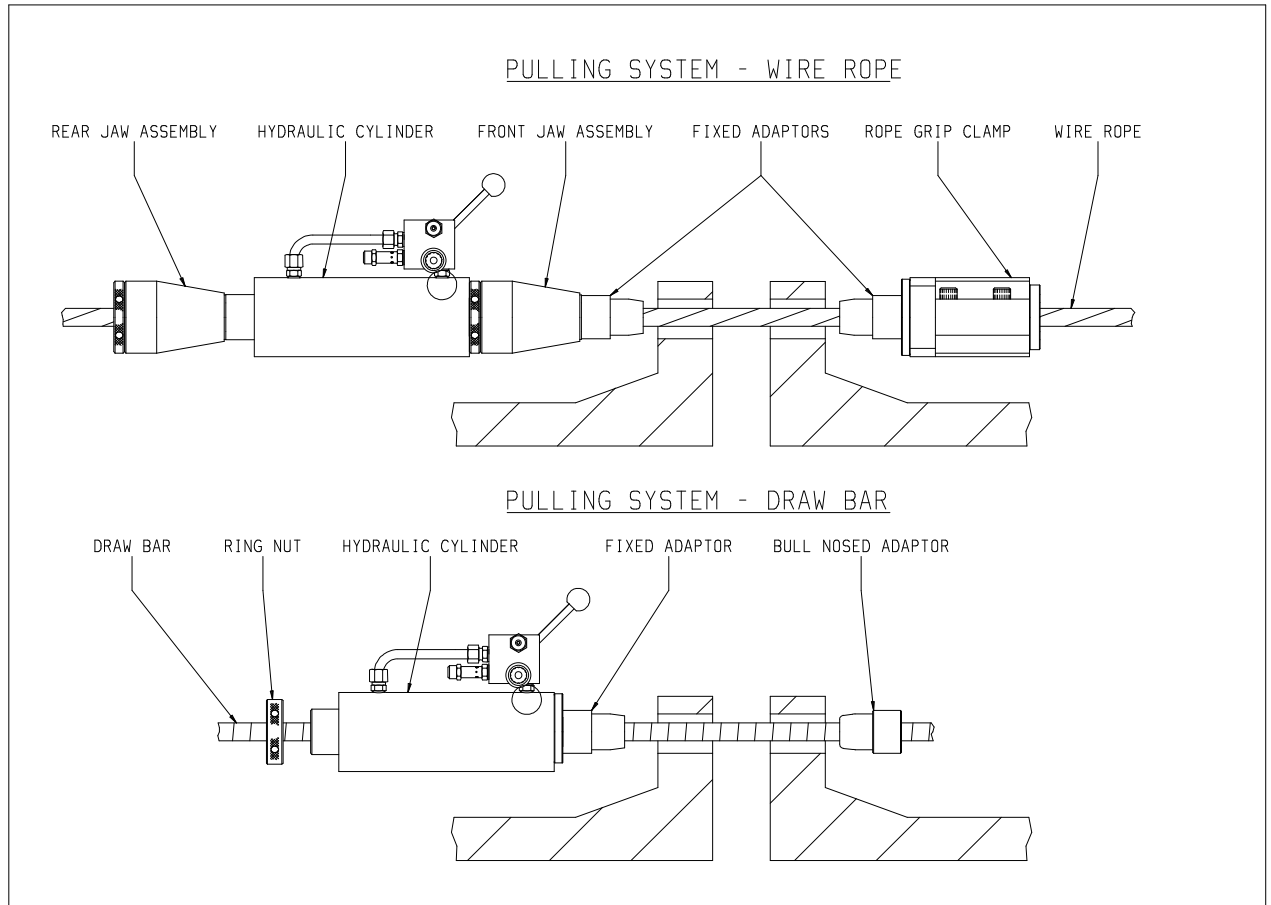


Figure 2.

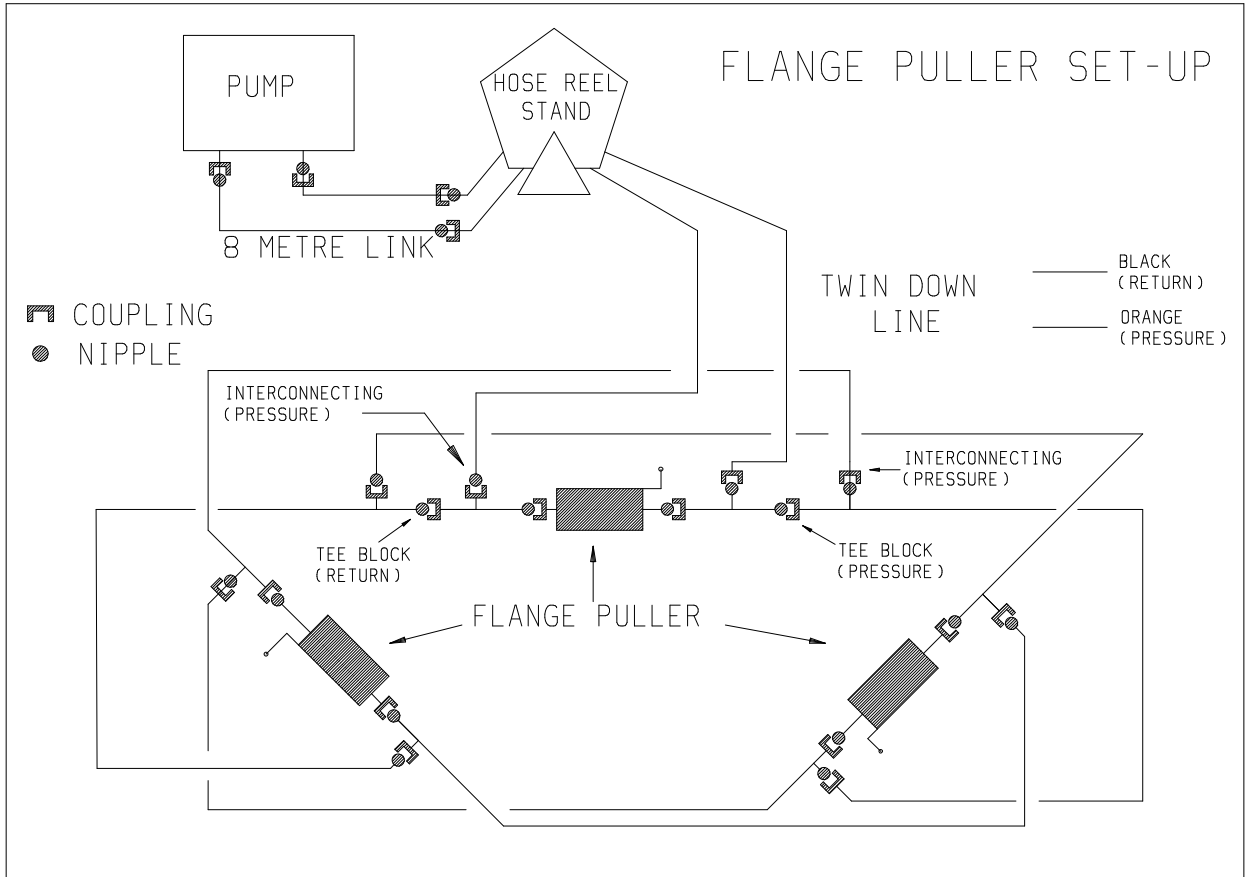
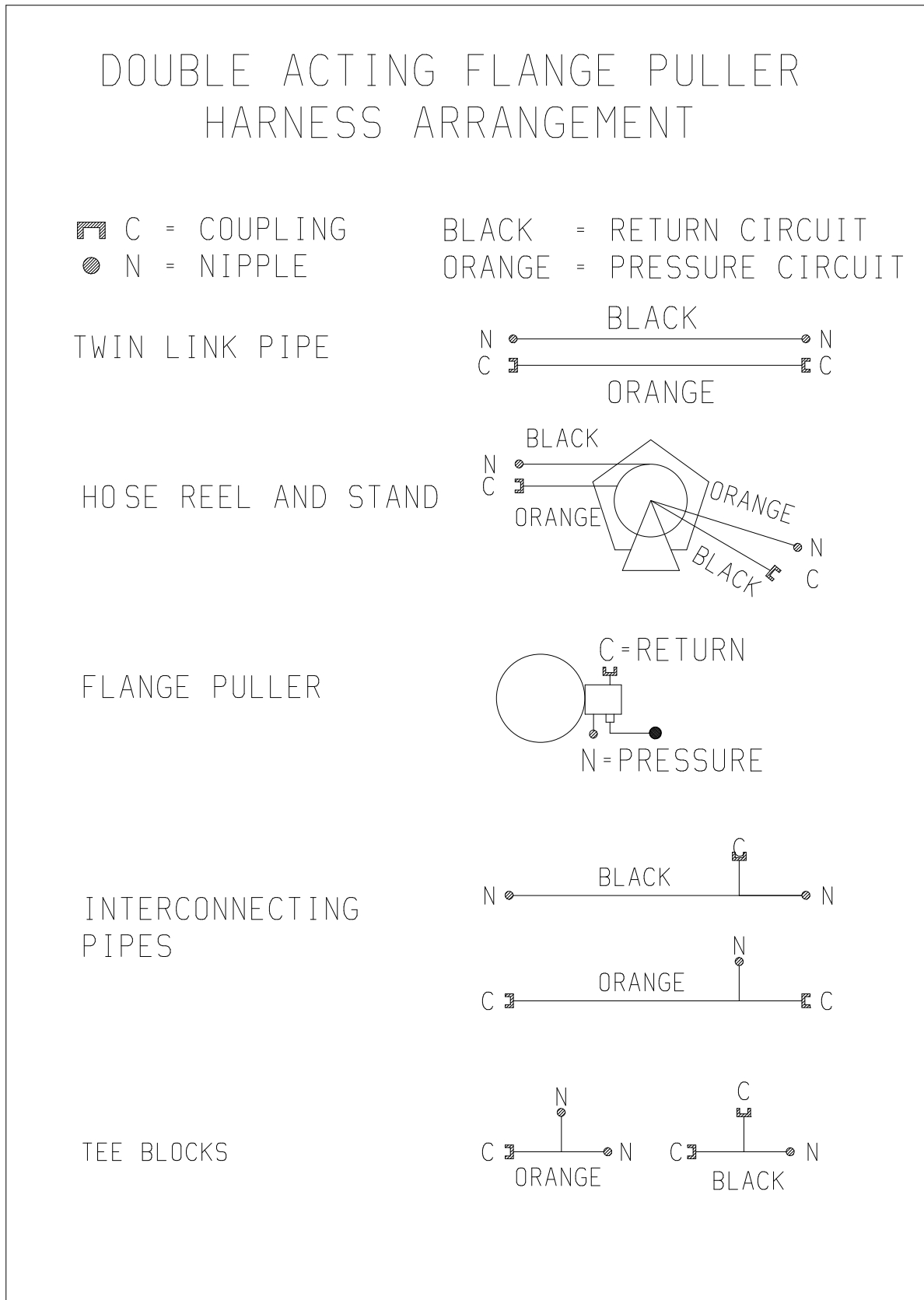
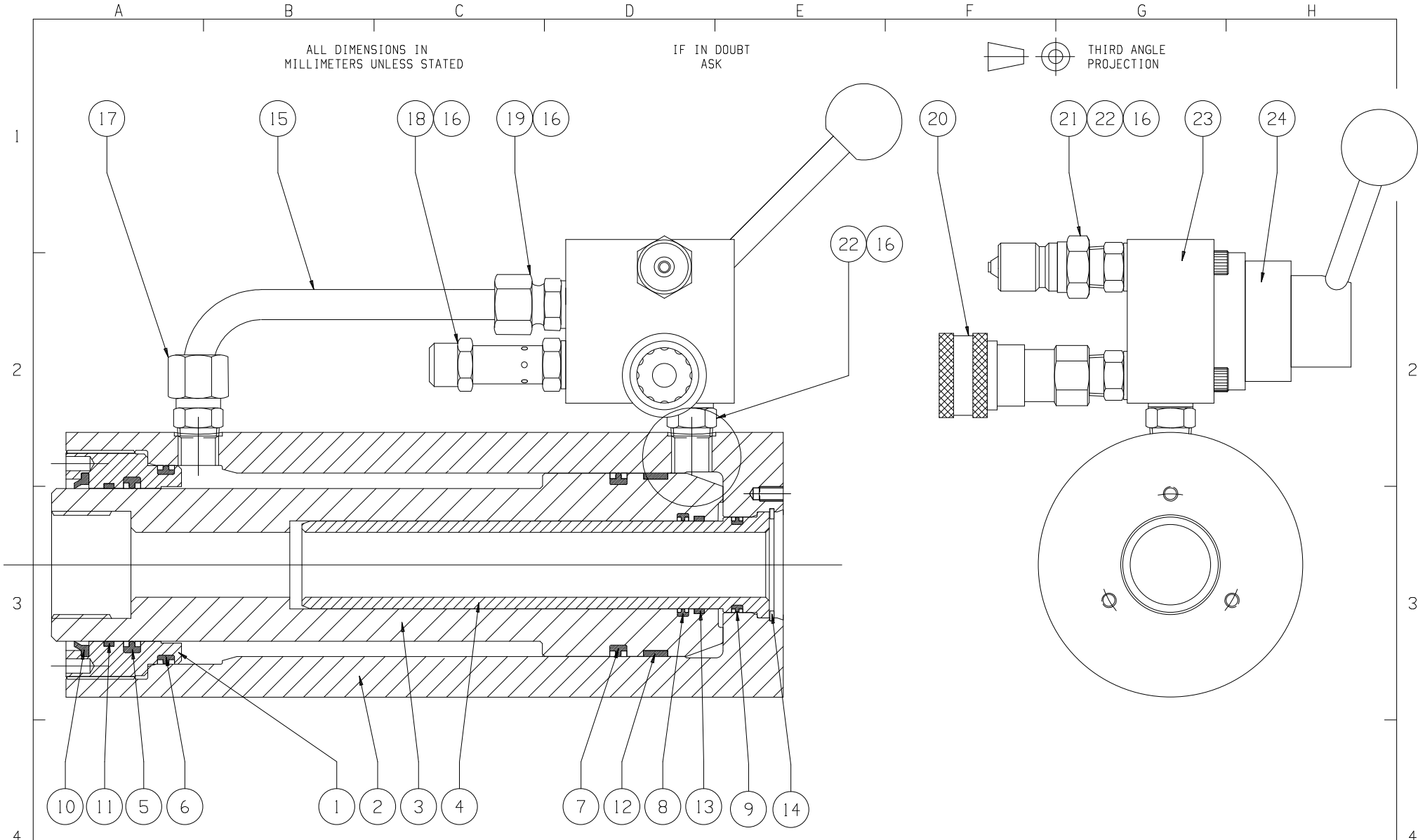


Figure 3.





A2 COMPUTER ORIGINAL ALTERATIONS

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MEGR 14/10/97

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	KDM		
SALES QUOTE No.	SCALE	SURFACE FINISH	HEAT TREATMENT
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FLANGE PULLER CYLINDER ASSEMBLY	

DRAWING No.	ISSUE
HPOODAHCAV	B
SHEET 1 OF 2	

HT HYDRATIGHT

A B C D E F G H

ALL DIMENSIONS IN
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IF IN DOUBT
ASK



ITEM	QTY	PART No.	DESCRIPTION
1	1	HPOODAHCEC	END CAP
2	1	HPOODAHCHB	BODY
3	1	HPOODAHCPT	PISTON TUBE
4	1	HPOODAHCCT	CENTRE TUBE
5	1	SEALTRO31	2-1/2" ROD SEAL
6	1	SEALTP034	3-1/4" PISTON SEAL
7	1	SEALTP032	3" PISTON SEAL
8	1	SEALTRO21	1-7/16" ROD SEAL
9	1	SEALTP020	1-9/16" PISTON SEAL
10	1	SEALRWID2500	2-1/2" ROD WIPER
11	1	SLYDS57244-10	BEARING STRIP
12	1	SLYDS57171-10	BEARING STRIP
13	1	SLYDS57244-10	BEARING STRIP
14	1	CLIPINO440	CIRCLIP
15	1	HPOOHT12X2	12mm OD TUBING
16	5	SLBDBXXX1540	1/4" BONDED SEAL
17	1	ADMTFX120380	3/8" NPT - 12mm TUBE ADAPTOR
18	1	HPOOPRV0100	PRESSURE RELIEF VALVE
19	1	ADMTBX120380	1/4" BSP - 12mm TUBE ADAPTOR
20	1	QDPHCH362380	QD COUPLING
21	1	QDPHNHDH3630	QD NIPPLE
22	3	ADMMFXBX0380	1/8" NPT - 1/4" BSP ADAPTOR
23	1	HPOO127VMB	VALVE MANIFOLD BLOCK
24	1	HPO00000CV00	ROTARY CONTROL VALVE

A2 COMPUTER ORIGINAL ALTERATIONS

B: CN:3222 CHANGE-CIRCLIP MEGR 14/10/97

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SALES QUOTE No.	SCALE 1:1	1.6/ ▽	

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FLANGE PULLER CYLINDER ASSEMBLY

DRAWING No.
HPOODAHCAV
SHEET 2 OF 2

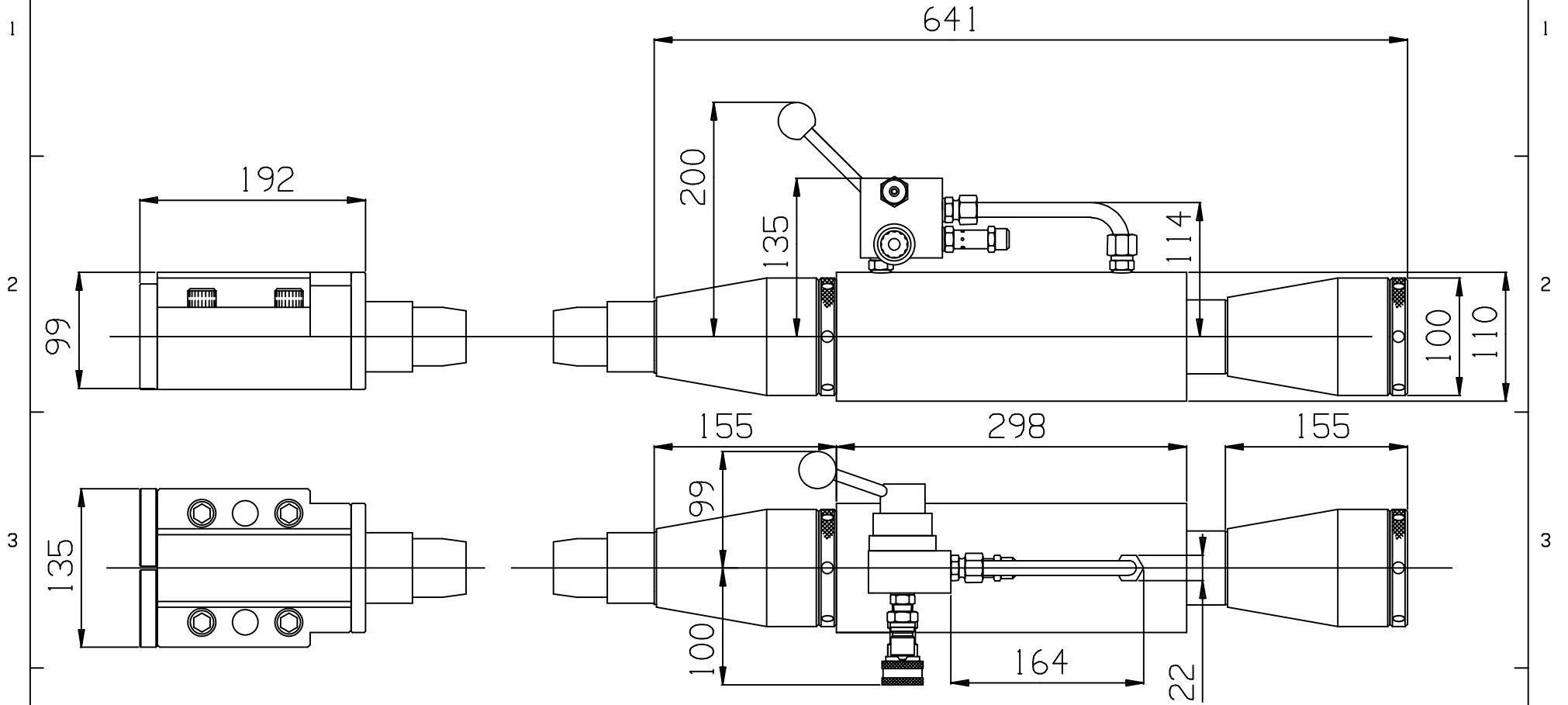
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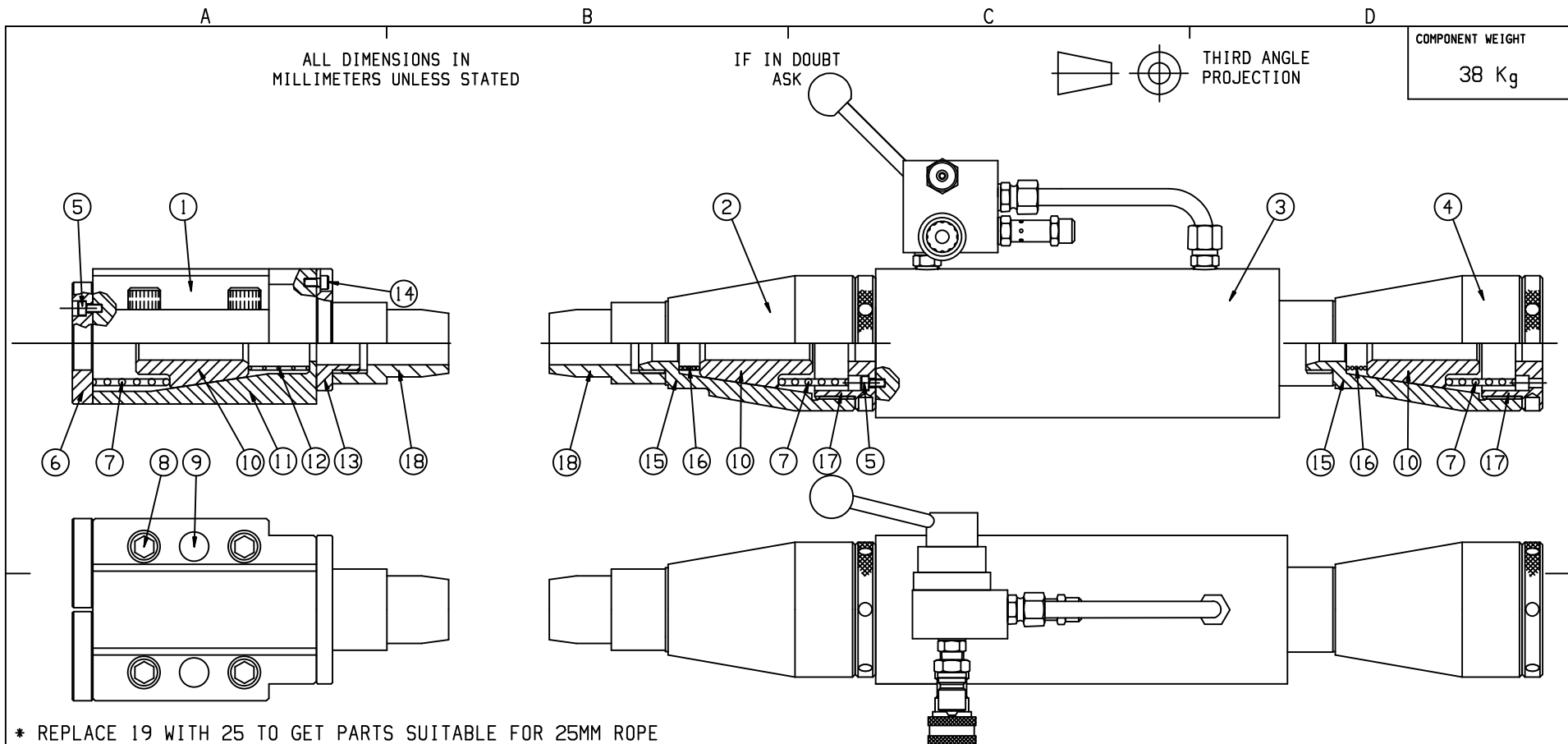
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THIRD ANGLE
PROJECTION



FLANGE PULLER SKETCH DIMENSIONS
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		NTS			ROPE PULLER 25 mm ROPE	HPRT1708B00C
						ISSUE
						A



* REPLACE 19 WITH 25 TO GET PARTS SUITABLE FOR 25MM ROPE

ITEM	QTY	PART No.	DESCRIPTION	ITEM	QTY	PART No.	DESCRIPTION
1	1	HPRTCCA19MM	CABLE CLAMP ASSY 19 MM	10	3	HPRTJSXX19MM	19mm JAW SET
2	1	HPRTJA19MM	FRONT JAW ASSY	11	1	HPRTCCHXXXX	CABLE CLAMP HOUSING
3	1	HPOODAHCAV	CYLINDER ASSY	12	1	HPRTCCRSXXXX	CABLE CLAMP JAW RELEASE SPRING
4	1	HPRTJA19MM	REAR JAW ASSY	13	1	HPO00000UAP0	UNIVERSAL ADAPTOR PLATE
5	7	HPO00000APSS	RETAINING SCREW (M6 x 12)	14	3	HPO00000APRS	ADAPTOR PLATE RETAINING SCREW (M6 x 12)
6	2	HPRTCCEPXXXX	CABLE CLAMP END PLATE	15	2	HPRTJHXXXXXX	JAW HOUSING / HOLDER
7	3	HPRTCSXXXXXX	COMPRESSION SPRING	16	2	HPRTRSXXXXXX	JAW RELEASE SPRING
8	4	HPRTCCMSXXXX	CABLE CLAMP MAIN SCREWS (M16 x 60)	17	2	HPRTJHECXXXX	JAW HOUSING END CAP
9	2	HPRTCCSSXXXX	CABLE CLAMP SEPARATION SPRING	18	2	-----	BOLT HOLE ADAPTORS

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THIRD ANGLE PROJECTION

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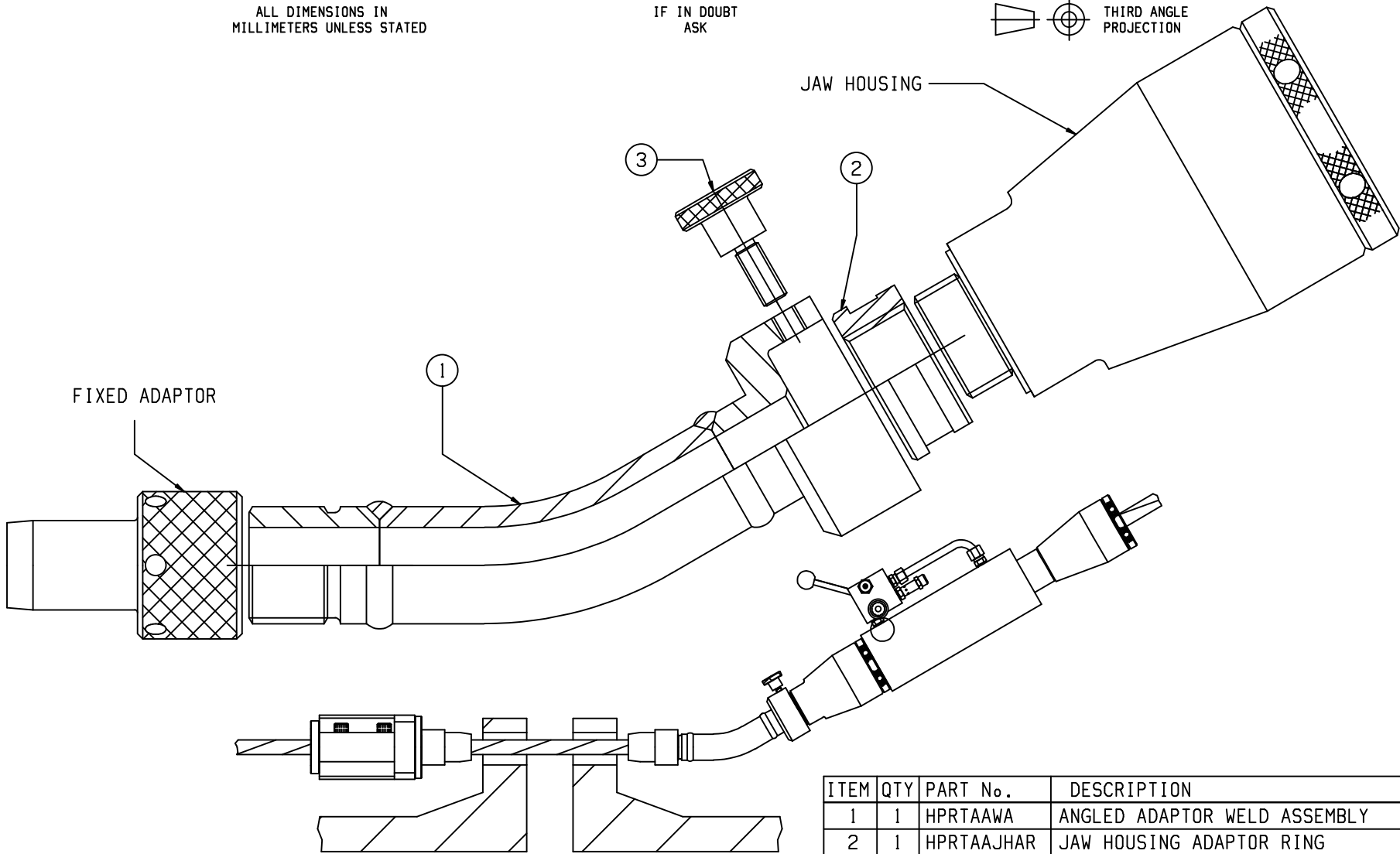
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4



ITEM	QTY	PART No.	DESCRIPTION
1	1	HPRTAAWA	ANGLED ADAPTOR WELD ASSEMBLY
2	1	HPRTAAJHAR	JAW HOUSING ADAPTOR RING
3	1	HPRTAAJHARS	JAW HOUSING ADAPTOR RING SCREW

A2 COMPUTER ORIGINAL ALTERATIONS

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 SALES QUOTE No. SCALE 1:1

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MATERIAL
 HEAT TREATMENT

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 ISSUE A

