

ADDENDUM

Notice Inviting Tender No.: KoPT/KDS/Mech/SP/ADV/519 dated 12.03.2019

Tender for “Thorough Overhauling and Round-the-clock Maintenance Support for 5 years of the Swing Bridge of Kolkata Port Trust”

(Pursuant to the queries raised by the intending bidder in the pre-bid meeting held on 29.03.2019, KoPT’s clarifications /decisions as have been finalised and frozen thereon are given below:-)

A. Points raised by M/s. Hyprecision Hydraulik, in the pre-bid meeting held on 29.03.2019:-

| NIT Clause No. | Submission by the intending tenderer | KoPT’s decision /clarifications |
|-----------------------|--|--|
| 3.2 | Specification of Main Hydraulic Cylinder & piston | |
| | <p><u>Weight and dimensions</u>- Please give the weight and dimensions and drawings of these cylinders and all the power packs. Also give all electrical circuit drawings for the hydraulic power pack and traffic lights.</p> <p>Please give us all the drawings and catalogues.</p> <p>The ENR team who is going may be allowed to see the location, working conditions, status of all the items below and above the water.</p> | Relevant drawings/Circuit Diagrams as available with the Department uploaded with this Addendum as Annexure. |
| 3.6 | Please give us complete hydraulic circuit diagrams of the power pack and cylinders for us to note the working and how pressures are generated. | Relevant drawings/Circuit Diagrams as available with the Department uploaded with this Addendum as Annexure. |
| 4.1 | Thorough Overhauling | |
| (a) | To confirm that the repairs and overhauls has to be done once in 5 years. | There is no schedule of overhauling of the system. The next overhauling of the system will be scheduled after assessing the condition of the system at that point of time after completion of this contract of “Thorough Overhauling and Round-the-clock Maintenance Support for 5 years “ |
| (b) | To let us know the time that will be given to us / which will be given to the successful tenderer for removing of the mechanical, hydraulic and electrical items for overhaul and repairs during which the Swing Bridge will be non-functioning. | As clearly stated in NIT Clause No. 5.3 that Bridge will be non-operative during the period of thorough overhauling as per scope of work of NIT and as mentioned in NIT Clause No. 4.1. |
| (c) | Material handling facilities which can be given by KoPT | KoPT’s Crane Vessel may be provided for handling heavy assemblies/ sub-assemblies as per your |

| | | |
|-------|--|--|
| | <p>specially for removing and fitment of heavy equipments like 2 big cylinders, power pack etc.</p> | <p>prior intimation of requirement of crane from you and also subject to availability of the Crane.</p> |
| (d) | <p>Accessibility to the various items which have to be removed and re-fitment.</p> | <p>The contractor shall arrange all necessary tools, tackles and equipments required for the job. However, KoPT may provide Vessel Crane on your prior requisition as stated above.</p> |
| (e) | <p>Removal of the items underwater, how can KoPT help us and who will remove underwater items. Will KoPT remove the items and give it to us?</p> | <p>In case of any under water job will require to carry out a contractor will provide his own diving team to carry out the work.</p> |
| | <p>All seal kits will be supplied by us. Will KoPT give us the makes of all the seal kits already been used or samples?</p> | <p>Seals are custom made as per the requirement and to be manufactured locally as per sample. MOC of the seal and the dimension of the cylinder and piston is treated in Clause No. 3 of NIT (Operating mechanism and specification of installed components)</p> |
| 4.1.1 | <p>Mechanical and hydraulic unit</p> | |
| i | <p>All seal kits will be supplied by us. Will KoPT give us the makes of all the seal kits already been used or samples?</p> | <p>Already stated clarified at above.</p> |
| ii | <p><u>Removal of 1 damaged cross head assembly from RAM, free issue from KoPT-</u> Please give the drawing and weight of the same for us to look into how to remove and fit new one.</p> <p>Note - Please allow us to take out photographs / videos wherever are people require to take out the same for our records.</p> | <p>Relevant drawing as available with the Department uploaded with this Addendum as Annexure-I</p> |
| iii | <p><u>Replacement of all the pressure pipelines for Jacks</u> - Please give us the material details and the lengths of the pipes to be removed above water and underwater.</p> | <p>MOC and Dimension of the Pipe line will be as per existing.</p> |
| iv | <p>Please let us know whether we have to do thorough cleaning / servicing and lubrication of the slewing mechanism of the bridge Insitu or do we have to remove the same,</p> | <p>Clearly stated in NIT Clause No.4.1.1(iv)</p> |
| v | <p>Please let us know the respective IS no. and we shall do the same as per IS no.</p> | <p>As stated in NIT Clause No. 4.1.1(v) pressure testing of all hydraulic cylinders to be carried out as per IS i.e. 1.5 to 2 times of the operating pressure.</p> |
| 4.1.2 | <p>Electrical Unit</p> | |
| i | <p>Please give us the circuit diagram of the electrical unit along with the BOM for thorough overhauling and servicing.</p> | <p>Relevant drawings/Circuit Diagrams as available with the Department uploaded with this Addendum as Annexure.</p> |
| ii | <p>Please give us the details of the same during pre-bid so that we can design the system.</p> | |
| iii | <p>Please give us the details of the same during pre-bid so that</p> | |

| | | |
|-------|--|---|
| | we can design the system. | |
| 4.1.3 | Please give us the format or the parameters and the sequence of the operation of the Swing Bridge and the timings etc. so that the same can be achievable as we not designing the entire system and we can prove satisfactory working based on the existing system available there. Please give us the trial format | Clearly stated in NIT Clause No. 3 i.e. 'Operating mechanism and specification of installed components'. |
| 4.2 | <p>Kindly clarify that if the job is BER i.e. Beyond Economical Repair, apart from honing and hard chrome plating if the new cylinder or the rod has to be manufactured then it will be done at extra cost. Kindly clarify that if the cylinder tube of the main big cylinder after dismantling the same is found to be heavy scored and by honing the size becomes oversized, then will you accept both cylinders of different bores or we have to hone the other cylinder also to the same bore size to keep uniformity.</p> <p>Also clarify that if the L1 has not quoted for certain activities in this anticipatory work, then will our rates be taken? Kindly ensure that all the L1 rates are based on the work to be done as per the relevant IS specifications for the cylinder and the IS nos. should be quoted by all the tenderers because the cost will be different if no IS no. is mentioned, giving tolerance, finish, hardness of plating, thickness of plating etc. in their offers.</p> | <p>If any work arises during the course of repairing which is not under stated scope of work of the NIT, the same will be dealt separately as extra work.</p> <p>For the job as stated in BOQ Part-C, L1 rates as received will be accepted and operative on the successful contractor.</p> |
| | Part B | |
| 4.3 | Round-the-clock Maintenance Support Contract (RMC) | |
| 4.3.2 | <p>In the Frequency and Work Details you have mentioned at many places checking of various mechanical, hydraulic parts of the Swing Bridge. For eg. checking of the hydraulic oil level. Do you have any standard format which you are following so far or any format given by the OEM, kindly let us know or give the same to us.</p> <p>Spare Parts - After checking if any spare parts have to be replaced, do you have the stocks of all the spares with you or we have to provide the same? Please let us know if you have any format for doing all the weekly, fortnightly, monthly checking of the items that you have mentioned in your scope of work for Round-the-clock Maintenance Contract.</p> | <p>Preventive maintenance will be carried out as per schedule as mentioned in Table under NIT Clause No. 4.3.2 and 4.3.4.</p> <p>The issue of spare parts and consumable will be dealt as per NIT Clause No. 4.3.8 & 4.3.10</p> |

| | | |
|--------|---|--|
| 4.3.5 | You have mentioned that we have to keep two persons round-the-clock. Does this mean that we have to keep the people for 24 hours i.e 4 technical persons for 12 hours duty? Kindly clarify. | Deployment of manpower will be as per NIT Clause 4.3.5. |
| 4.3.7 | While we shall attend to the defects immediately but getting the same into function / working will depend on the nature of the defects and the spares available. | Terms and conditions in connection with the breakdown and in commissioning of the Bridge system will be as per NIT Clause No. 5.2. |
| 4.3.8 | It is impossible to keep all the spares. However, we can give you the list of spares which you must procure and keep with you and certain mandatory spares / consumable will be maintained by us. For eg. if hydraulic pump due to some reasons gets damaged beyond BER, then we will recommend to keep 1 pump with you. We shall make a list of spares which we will ask you to buy and keep, which are long lead items and some spares will be kept by us we are doing a similar arrangement for the contract being executed for the electro hydraulic lock gates. | The issue of spare parts and consumable will be dealt as per NIT Clause No. 4.3.8 & 4.3.10. |
| 4.3.9 | You are requested to kindly give us a proper space either to keep the container or room for us to keep our tools & tackles and spares. | KoPT will provide accommodation for the technical person and a space for store as mentioned in the NIT Clause No. 5.13. |
| 4.3.10 | We shall keep the running spares. However, certain spares of long delivery will be recommended by us and you must purchase the same and keep with you, as mentioned in 4.3.8 above. | The issue of spare parts and consumable will be dealt as per NIT Clause No. 4.3.8 & 4.3.10. |
| 4.3.12 | Please give us a copy of the Dock Safety regulations for us to comply with. | Dock Safety Regulation is available in DG,FASLI website. www.dgfasli.nic.in |
| 4.3.13 | Kindly give us free electrical supply for lighting and for working. | Supply of electric power will be as per NIT Clause No. 5.10. |
| 4.3.14 | Please let us know what is the alternative arrangement available on immediate basis in case of failure of the hydraulic machinery system and the electric power failure | Please refer NIT Clause No. 3i.e. Operating Mechanism and specification of the installed components. |
| 4.3.15 | Certain spares will be ISI marked whereas certain spares which will be proprietary, where there will be no ISI marks for hydraulic components etc. | All spares and materials shall be ISI mark. If the materials / spares is not available with ISI mark then the best quality one available in the market and approved by KoPT to be supplied . |

B. Points raised by M/s. Sea Syst Engineering(I) Pvt. Ltd., in the pre-bid meeting held on 29.03.2019:-

| NIT Clause No. | Submission by the intending tenderer | KoPT's decision /clarifications |
|----------------|---|---|
| 4.2 | In case of any leak is observed during the pressure testing of hydraulic pipe lines to various cylinders, then it will necessitate replacement of pipes. This will involve additional material cost, labour and time. Provision is made to quote for this as optional item in Part "C" the tender BOQ separately. Para 4.2 of Scope of work Part A may also be amended accordingly | The jobs will not come under the scope of work of the tender (NIT Clause No.4) & would be dealt with separately as extra work, if required to execute. |
| | Maintenance frequency of various routine to be kept in line with the maintenance schedule being followed presently/as proposed below. This is based on our experience in AMC of Hydraulic System both at KPT as well as other places. | Preventive maintenance will be carried out as per schedule as mentioned in Table under NIT Clause No. 4.3.2 and 4.3.4. |
| | Operating machinery on as existing operational state is required to be maintained from the contract date till the commencement of shut down. In case of experiencing any major failure / defect on the system, before such a shutdown is planned for Part A work, immediate shut down may become necessary to rectify the defect. In such case LD should not be applicable on Part A as well as Part B works as the contractor has not been given an opportunity to attend to the overhaul of the system. Also, the necessary spares and material to carry out overhaul may not be readily available in such an event if the Overhaul work (Part A) is clubbed with the breakdown rectification period. | Proposal is not acceptable. Terms and Conditions of the tender remain unaltered. |
| 4.3.14 | While contractor is responsible for hydraulic failure, Electrical power failure is not in the control of contractor hence LD should not be applicable for electrical failure | In Clause No. 5.2.4 it is clearly mentioned 'The penalty will be charged for both cases of non-operation of bridge for river traffic and road traffic for the reasons attributable to the contractor other than plant shutdown for specific maintenance with expressed permission of KoPT'. In NIT Clause 4.3.14, 5.2.2 will be read as 5.2. |

| | | |
|-----------|--|--|
| 4.3.15 | The seals, being non-standard – “made to order” type, may not bear ISI mark but will be of good quality meeting the requirements of fluid handled and the operating pressure & temperature parameters | All spares and materials shall be ISI mark. If the material / spare is not available with ISI mark then the best quality one available in the market and approved by KoPT, to be supplied. |
| 4.1.1(ii) | Scope of Work Part A It is assumed that the new cross head assembly is machined to finish dimensions so as to install directly and attach existing pulleys without any need of additional machining. | Accepted and the same will be arranged. |
| | From our past experience we feel that the period of 21 days +07days mobilization given to complete Part A work is too short . We strongly plead KoPT to increase the period at least to 45 days + 07 days mobilisation. It may be noted that the period for Part A was 60 calendar days in the last contract. | Not acceptable. The terms remain unchanged. |
| | LD: It is a standard practice for all Govt contracts that the LD is deducted not exceeding 5% of the contract value. Hence LD for Part A and Part B may please be limited to 5% of the respective contract values | LD clause as stated in NIT Clause No. 5.8 will remain unaltered. |
| | Operation Team - Operation Team from the AMC contractor himself should be appointed separately to ensure operator-maintainer concept and to fix total responsibility on the maintainer in case of operating errors by operator. | As stated in the NIT, operation will be carried out by KoPT. |

All other terms and conditions of the Tender Document including **due date of submission of tender and date of opening of tender** shall remain unaltered. The above Addendum shall be a part of the Tender Document as per terms of the original tender.

Enclo: Relevant drawings uploaded as Annexure – I (18 pages)

Dated:01.04.2019

Chief Mechanical Engineer

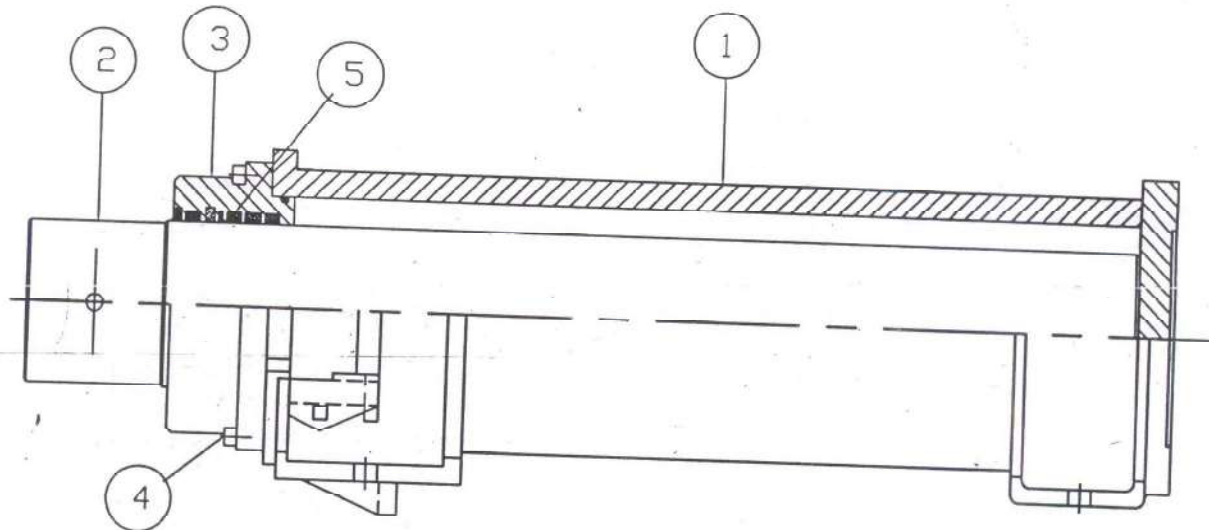
APEX 'FLUIDOMATICS LTD.
SWING BRIDGE KOPT-CALCUTTA
BRIDGE SWING CYL

A.F.L PART NO-W-3474

BRIDGE SWING CYL-QTY-2 NOS

SPECIFICATION:-

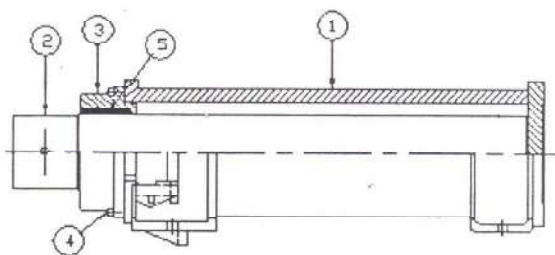
- (1) BORE:- Ø378
 (2) ROD:- Ø370
 (3) STROKE:- 1890
 (4) WORKING PRESSURE:- 100 Kg/Cm²
 (5) TEST PRESSURE:- 160 Kg/Cm²
 (6) TYPE:- SINGLE ACTING RAM TYPE



PART LIST:-

| SR, NO. | ITEM | PART NO. | MATERIAL OF CONSTRUCTION. | REMARKS |
|------------|--|----------|---|---|
| (1) | TUBE WELD ASSLY | W-3474-1 | ST-52 | UNBRAKO MAKE |
| (2) | PISTON ROD | W-3474-2 | EN-19 | |
| (3) | GLAND | W-3474-3 | MILD STEEL | |
| (4) | CAP SCREW | W-3474-4 | HIGH TENSILE | |
| (5) | ROD SEAL, HAVING, (1) WIPPER (2) ROD SEAL (3) WEARING (4) STEP SEAL (5) 'O'-RING | W-3474-5 | NITRILE RUBBER POLY URETHANE PHENDLIC RESIN BRONZE FILLED TEFLON NITRILE RUBBER | |
| | | | | HALLITE HALLITE BUSHAK SHANBAN HALLITE VAKO |

Swing Bridge(main) Cylinder
Drawing No.W – 3474



Maintenance Instructions

Steps to Dismantle Cylinder

- 1) Open Foundation Cap Screw and dismount the Cylinder from foundation.
- 2) Open Cap Screw at Sr. No. 4
- 3) Remove Mounting Flange , sr.no.1
- 4) Remove piston rod from the cylinder tube
- 5) Replace all Gland Seals , sr.no.3 with seal kit at sr. no. 5
- 6) Re assemble the cylinder in reverse cycle.

APEX FLUIDOMATICS LTD.

SWING BRIDGE KOPT-CALCUTTA

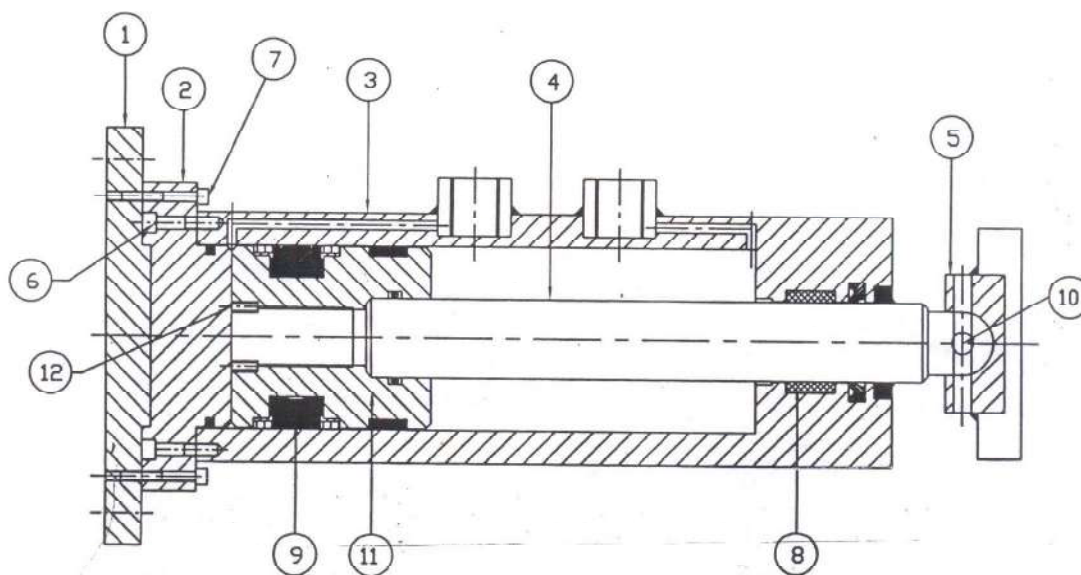
JACK/ SUPPORT CYL.

A.F.L PART NO-W-3472

JACK CYL-QTY-04 NOS

SPECIFICATION:-

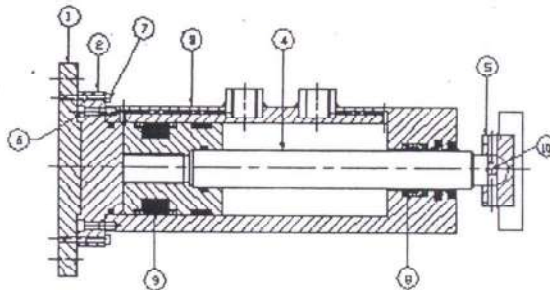
- (1) BORE:- Ø145
 (2) ROD:- Ø100
 (3) STROKE:- 175
 (4) WORKING PRESSURE:- 300 Kg/Cm²
 (5) TEST PRESSURE:- 450 Kg/Cm²



PART LIST:-

| SR. NO. | ITEM | PART NO. | MATERIAL OF CONSTRUCTION | REMARKS. |
|---------|---|-----------|--|---|
| (1) | MOUNTING FLANGE:- | W-3472-1 | MILD STEEL | 'T' CONDITION |
| (2) | BOTTOM COVER:- | W-3472-2 | MILD STEEL | |
| (3) | CYL TUBE:- | W-3472-3 | EN-9 | |
| (4) | PISTON ROD:- | W-3472-4 | S.S-304 | UNBRAKO MAKE UNBRAKO MAKE |
| (5) | SWIVELLING PAD:- | W-3472-5 | EN-8 | |
| (6) | BOTTOM COVER CAP SCREW:- | W-3472-6 | HIGH TENSILE | |
| (7) | MOUNTING FLANGE CAP SCREW:- | W-3472-7 | HIGH TENSILE | VAKO BUSHAK SHANBAN BUSHAK SHANBAN |
| (8) | ROD SEAL KIT:-HAVING (1) M-WIPPER (2) ROD SEAL (3) WEARING | W-3472-8 | NITRILE RUBBER POLY URETHANE PHENOLIC RESIN | |
| (9) | PISTON SEAL KIT:-HAVING (1) PISTON SEAL (2) WEARING (3) 'O'RING (4) 'O'RING | W-3472-9 | NITRILE RUBBER+TEFLONE PHENOLIC RESIN NITRILE RUBBER NITRILE RUBBER | |
| (10) | SWIVELLING PAD CAP SCREW:- | W-3472-10 | HIGH TENSILE | VAKO UNBRAKO MAKE 'T' CONDITION UNBRAKO MAKE |
| (11) | PISTON:- | W-3472-11 | EN-8 | |
| (12) | GUB SCREW | W-3472-12 | HIGH TENSILE | |

Jack Cylinder Drawing No. W - 3472



Maintenance Instructions

Steps to Dismantle Cylinder -

- 1) Open Foundation Cap Screw and remove the Cylinder from foundation.
- 2) Remove Swiveling Pad Cap Screw , at sr.no.10 and remove swivel pad at sr.no.5
- 3) Remove mounting flange Cap Screw at sr. no.7 and open mounting flange
- 4) Remove Bottom Cover cap screw at sr. no. 6 and remove bottom cover, sr. no.2.
- 5) Push piston rod , at sr. no. 4 ,out of Cylinder tube
- 6) Open Grub Screw , sr. no. 12 and remove piston , sr. no. 11
- 7) Replace & refit all seals in piston ,sr. no. 11 and Gland sr .no. 10
- 8) Reassemble Cylinder in Exactly reverse Cycle.

APEX FLUIDOMATICS LTD.

SWING BRIDGE KOPT-CALCUTTA

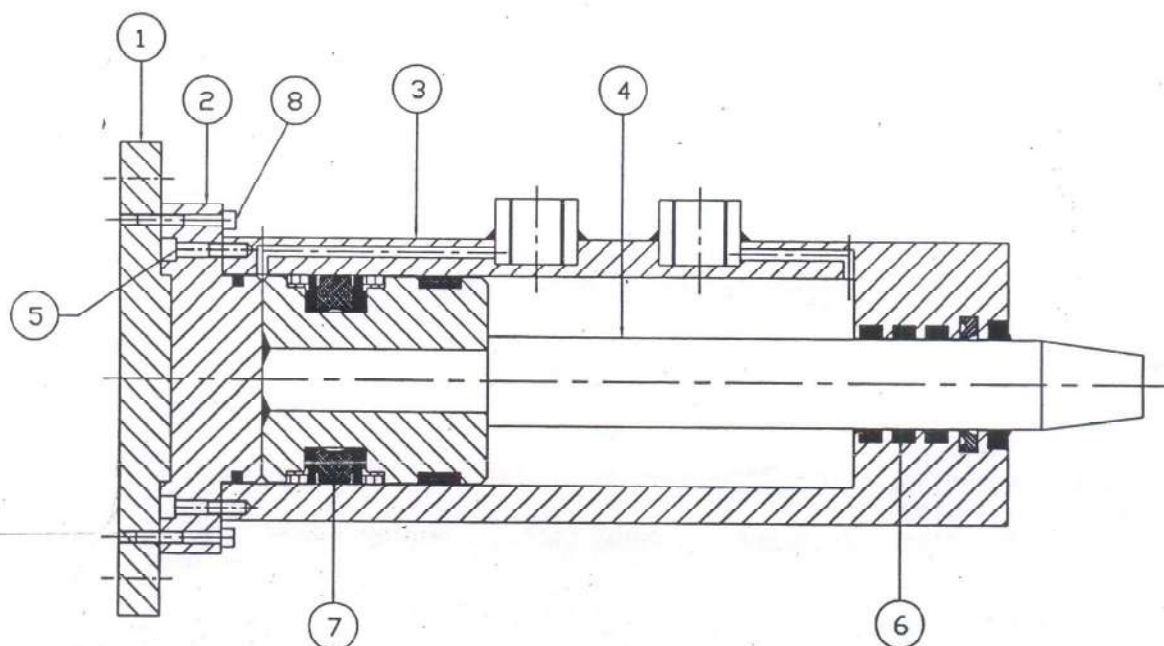
LOCK CYL

A.F.L PART NO-W-3471

LOCK CYL-01 NOS

SPECIFICATION:-

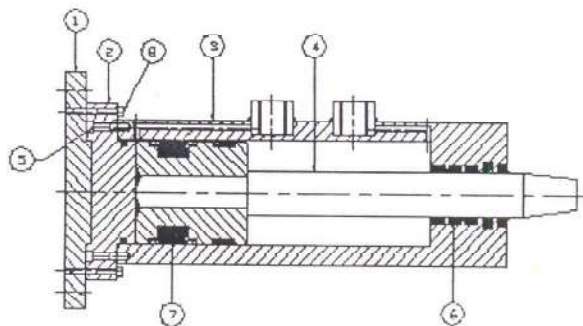
- (1) BORE- $\varnothing 100$
 (2) ROD- $\varnothing 75$
 (3) STROKE- 200
 (4) WORKING PRESSURE- 200 Kg/Cm²
 (5) TEST PRESSURE- 300 Kg/Cm²



PART LIST:-

| SR, NO. | ITEM | PART NO | MATERIAL OF CONSTRUCTION. | REMARKS. |
|---------|-----------------------------|----------|---------------------------|----------------|
| (1) | MOUNTING FLANGE:- | W-3471-1 | MILD STEEL | 'T' CONDITION |
| (2) | BOTTOM COVER:- | W-3471-2 | MILD STEEL | |
| (3) | CYL TUBE:- | W-3471-3 | EN-9 | |
| (4) | PISTON ROD:- | W-3471-4 | S.S-304 | UNBRAKO |
| (5) | BOTTOM COVER CAP SCREW:- | W-3471-5 | HIGH TENSILE | |
| (6) | ROD SEAL KIT:-HAVING | W-3471-6 | | |
| | (1) M-WIPPER | | NITRILE RUBBER | VAKO |
| | (2) ROD SEAL | | POLYURATHANE | BUSHAK SHANBAN |
| | (3) WEARING | | PHENOLIC RESIN | BUSHAK SHANBAN |
| (7) | PISTON SEAL KIT:-HAVING | W-3471-7 | | |
| | (1) PISTON SEAL | | NITRILE + TEFLON | BUSHAK SHANBAN |
| | (2) WEARING | | PHENOLIC RESIN | BUSHAK SHANBAN |
| | (3) 'O'RING | | NITRILE RUBBER | VAKO |
| (8) | MOUNTING FLANGE CAP SCREW:- | W-3471-8 | HIGH TENSILE | UNBRAKO |

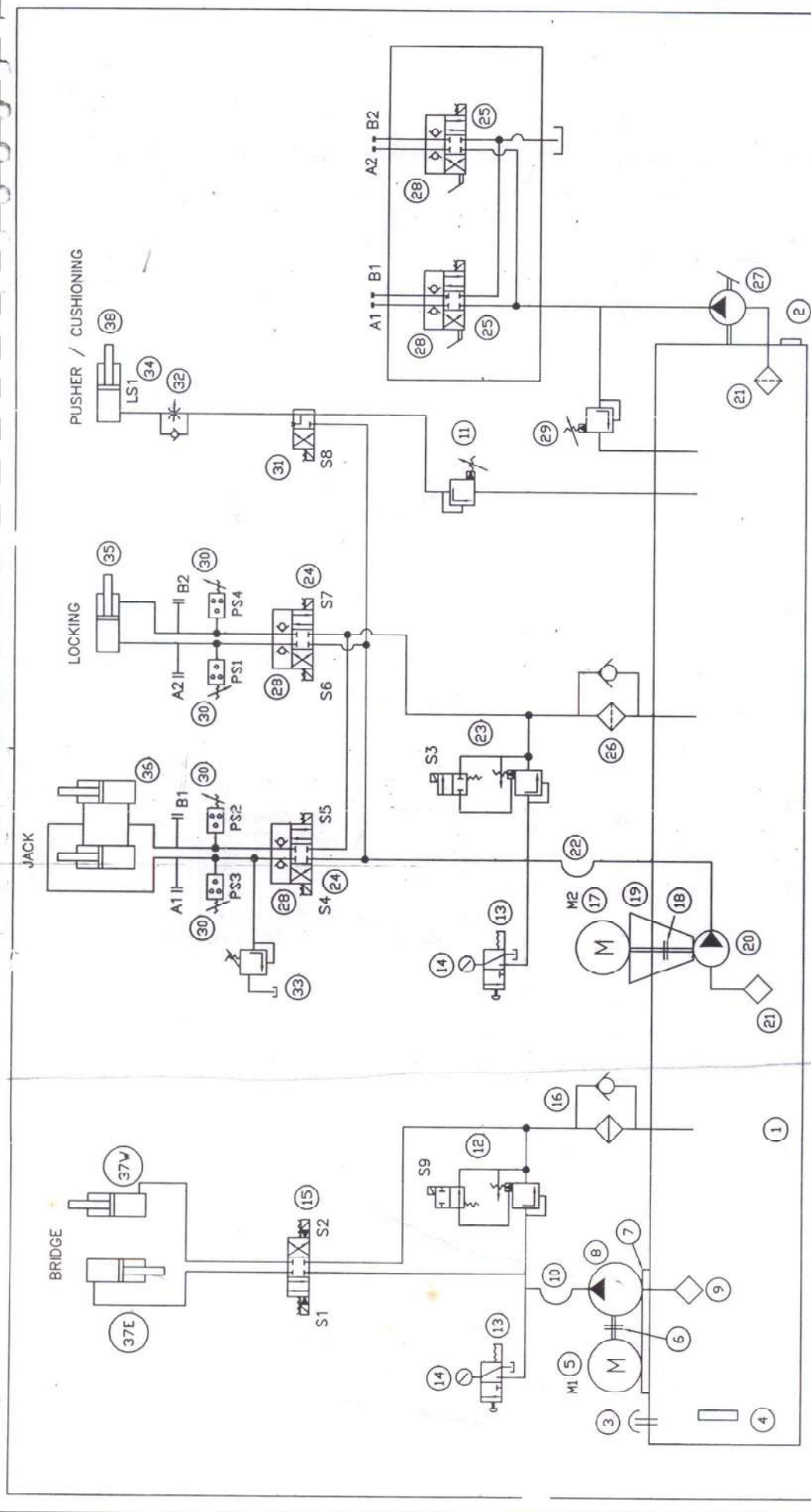
Locking Cylinder Drawing No. W - 3471



Maintenance Instructions

Steps to Dismantle Cylinder

- 1) Open Foundation Cap Screw and dismount the Cylinder from foundation.
- 2) Remove Mounting Flange Cap Screws , sr.no. 8 .
- 3) Remove Mounting Flange , sr.no.1
- 4) Open bottom cover cap screw , sr. no. 5
- 5) Remove Bottom Cover – sr.no. 2
- 6) Push the Piston Rod out from Tube , sr. no. 4
- 7) Replace gland & Piston seals
- 8) Re assemble the cylinder in reverse cycle.



REFER BOM NO:-3002 FOR COMPONENT DETAILS

| | | | |
|--|------|-----------------------------|--|
| APEX FLUIDOMATICS LTD. | | DRG. NO. 1-W-3476 | |
| DRN | | CHD | |
| APPD. | | DATE | |
| TITLE :- HYDRAULIC CIRCUIT | | CUSTOMER:- JESSOP & CO LTD. | |
| REV. | DATE | SIGN | |
| UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM. | | TOLERANCE IN LENGTH ±2 MM. | |
| SCALE:- N.T.S. | | | |

**POWER PACK ON WEST END

BILL OF MATERIAL NO 3002


THIS IS FOR HYDRAULIC CIRCUIT NO. W- 3476, SUPPLY TO M/S. JESSOP & CO.


| SR. NO. | DESCRIPTION | QTY. | MAKE |
|---------|--|-------|---------------|
| 1 | OIL TANK CAPACITY 800 LTRS | 1 | DELTA |
| 2 | DRAIN PLUG 1"BSP | 1 | DELTA |
| 3 | AIR BREATHER FSB 60-HN | 1 | HYDROLINE |
| 4 | OIL LEVEL INDICATOR LG6-05 | 2 | HYDROLINE |
| 5 | ELEC.MOTOR 15 KW,1450 RPM,3 PH FOOT AND LUG MTG. | 1 | BHARAT BIJLEE |
| 6 | FLEXIBLE COUPLING TO SUIT | 1 SET | DELTA |
| 7 | BELL HOUSING TO SUIT | 1 | DELTA |
| 8 | VARIABLE PISTON PUMP A10VO71DR | 1 | REXROTH |
| 9 | SUCTION STRAINER 100 GPM 3" | 1 | DELTA |
| 10 | HIGH PRE.HOSE NW 30,1 1/4" 100R2,500 MM LONG | 1 | ALFA GOMMA |
| 11 | PRE.CONTROL VLV DPRH06T200-04 | 1 | POLYHYDRON |
| 12 | PILOT OPER.PRE.RELIEF VALVE 200 BAR BSG06-2B3B-A240-N | 1 | YUKEN |
| 12.1 | MANIFOLD BLOCK TO SUIT ITEM NO. 12 & 15 | 1 | DELTA |
| 13 | GAUGE ISOLATOR VALVE FG1-010LG 1/4 " BSP | 2 | FENNER/ |
| 14 | GLYCERENE FILLED PRE.GAUGE 100DIA,0-250 BAR,BCPM | 2 | MASS |
| 15 | DOUBLE SOL.D.C.VALVE NG16, 230V AC,SPRING CENTERED P-T CONN. DSHG04-2C2-A240 | 1 | YUKEN |
| 16 | REURN LINE FILTER 25 MICRON PAPER ELEMENT CFR-100-08B-25 | 1 | HYDROLINE |
| 17 | ELEC.MOTOR 1.5 KW,1450RPM,3 PH. VRTICAL MTG. | 1 | NGEF |

Apex Fluidomatics Ltd.,

| SR. NO. | DESCRIPTION | QTY. | MAKE |
|---------|---|-------|------------------------------|
| 18 | FLEXIBLE COUPLING TO SUIT | 1 SET | DELTA |
| 19 | BELL HOUSING TO SUIT | 1 | DELTA |
| 20 | GEAR PUMP OP3013 5.8LPM AT 1450 RPM | 1 | DOWTY |
| 21 | SUCTION STRAINER 10 GPM | 1 | DELTA |
| 22 | HIGH PRE.HOSE NW8,100R2, 500 MM LONG | 1 | ALFA GOMMA |
| 23 | PRE.RELIEF VALVE BSG03-2B3B | 1 | YUKEN |
| 24 | DOUBLE SOL.D.C.VLV NG6,230V AC SPRING CENTERED P-T CONN. DSG01-2C2-A240 | 2 | YUKEN |
| 24.1 | MANIFOLD BLOCK COMPRISING OF ITEM NO.24 & 31 & 28 | 1 | DELTA |
| 25 | LEVER OPER.D.C.VLV,DETENT TYPE. A,B,P,T CLOSED IN CENTER 4DLS6 ED | 2 | POLYHYDRON |
| 25.1 | MANIFOLD BLOCK FOR ITEM NO.25 | 1 | DELTA |
| 26 | RETURN LINE FILTER 50LPM, 25 MICRON PAPER ELEMENT TIF206B-25 | 1 | HYDROLINE |
| 27 | HAND PUMP 13CC/2 STROKE | 1 | DOWTY |
| 28 | MODULAR VALVE CIM06AB | 4 | POLYHYDRON |
| 29 | PRE.CONTROL VLV DPRH06K200 | 1 | POLYHYDRON |
| 30 | PRE.SWITCH 1PS100-30 | 4 | POLYHYDRON |
| 31 | SOL.OPERATED D.C.VLV DSG013C4-A240 | 1 | YUKEN |
| 32 | FLOW CONTROL VALVE 9F600S | 1 | PARKER |
| 33 | MODULAR PRE.CONTROL VLV MBA-01 | 1 | YUKEN |
| 34 | LIMIT SWITCH C | 1 | NOT MOUNTED ON POWER PACK |
| 35 | LOCKING CYLINDER | 1 | W-3471 |
| 36 | JACK CYLINDER | 2 | W-3472 |
| 37 | MAIN SWING CYLINDER 37E ON EAST END 37W ON WEST END | 2 | W-3474 |
| 38 | PUSHER / CUSHION CYLINDER | 1 | W-3473 |

REFER BOM NO:-3001 FOR COMPONENT DETAILS

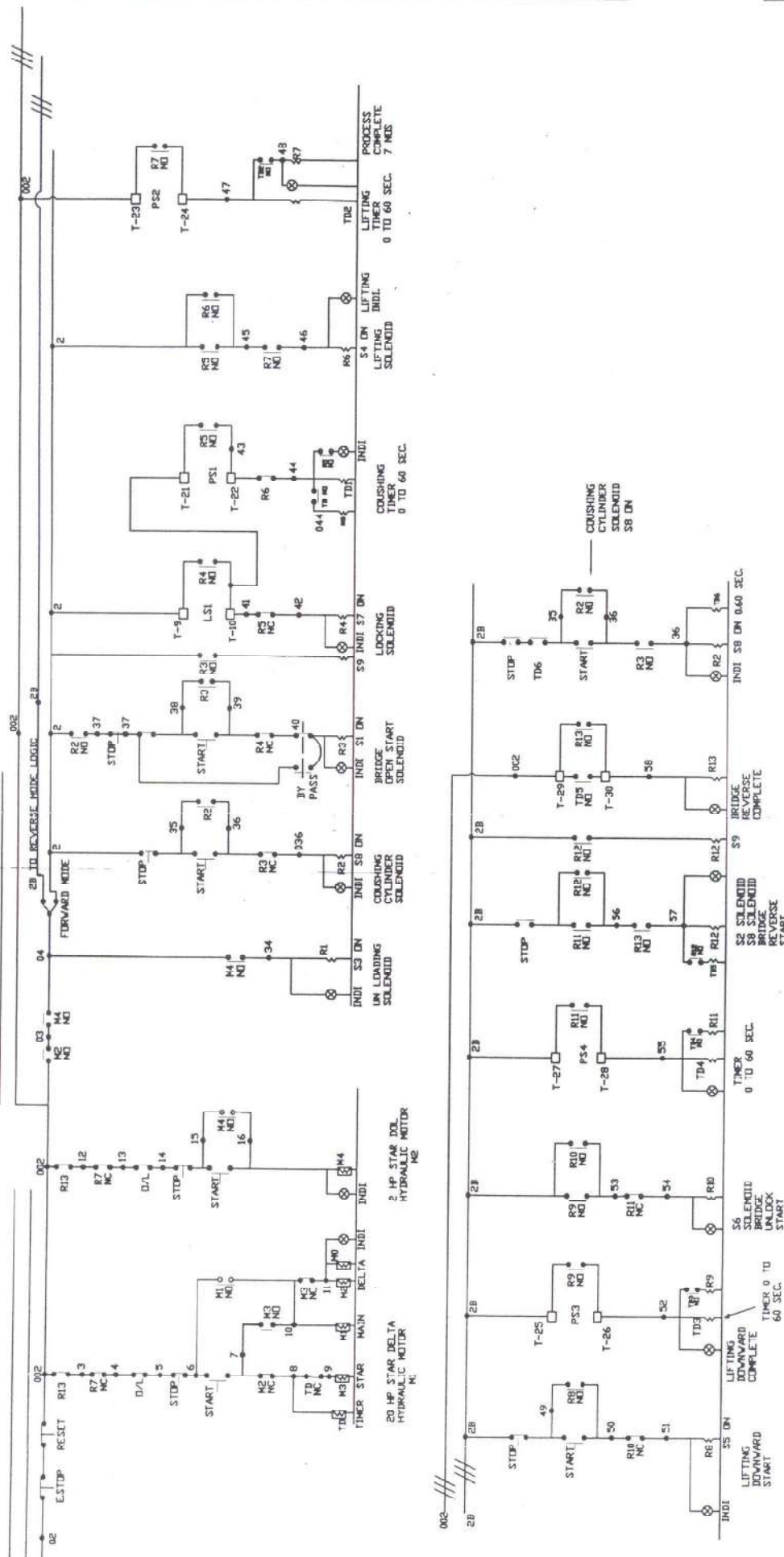
| | | | | | |
|------|------|------|---|-----------|-------------------------------|
| | | |  APEX FLUIDOMATICS LTD. | | |
| | | | DRN | | DRG. NO. :-W-3475 |
| | | | CHD | | TITLE :- HYDRAULIC CIRCUIT |
| | | | APPD. | | |
| | | | | DATE SIGN | CUSTOMER:-JESSOP & CO LTD. |
| | | | UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN M.M. | | |
| REV. | DATE | SIGN | UNSPECIFIED TOLERANCE ± 0.5 M.M. | | |
| R.M. | | | TOLERANCE IN LENGTH ± 2 M.M. | | SCALE:- N.T.S. |



BILL OF MATERIAL NO 3001

THIS IS FOR HYDRAULIC CIRCUIT NO. W-3475 , SUPPLY TO M/S. JESSOP & CO.

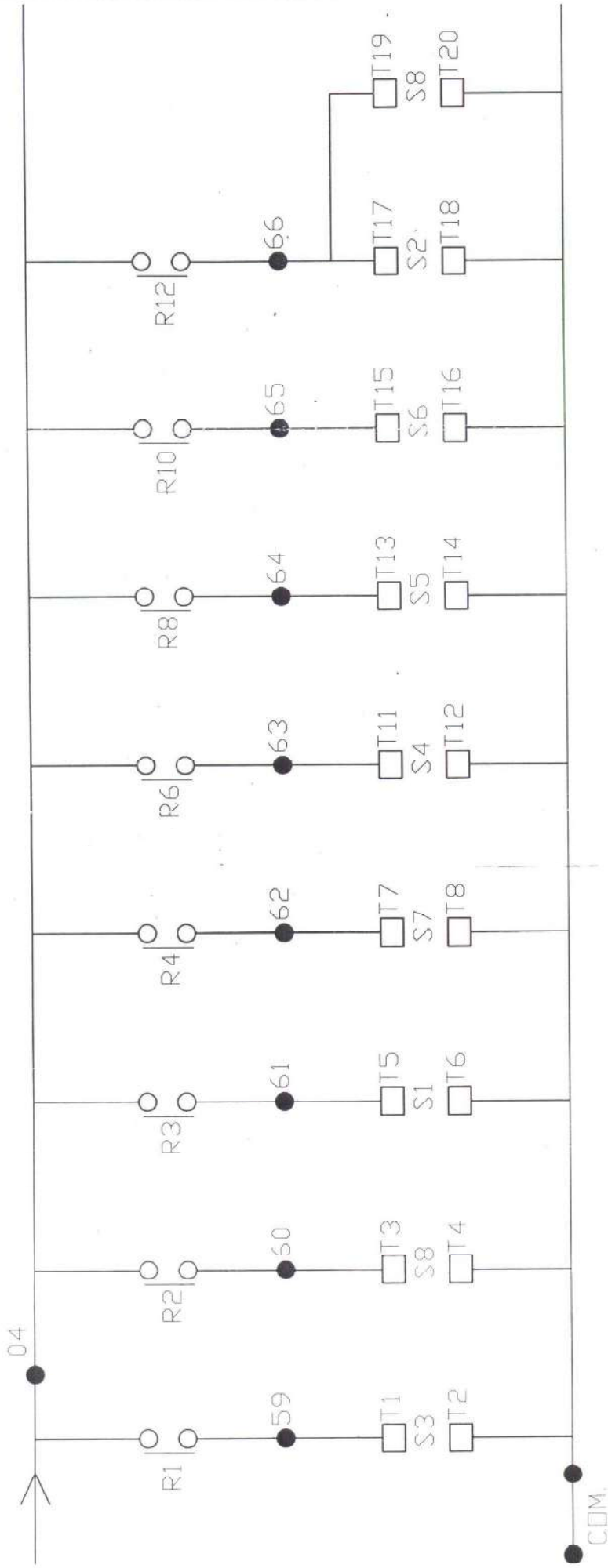
| SR. NO. | DESCRIPTION | QTY | MAKE |
|---------|---|-----|--------------|
| 1 | OIL TANK 50 LTRS | 1 | DELTA |
| 2 | ELECTRICAL MOTOR 1.5 KW | 1 | BHARAT BIJLI |
| 3 | FILLER BREATHER FSB25 | 1 | HYDROLINE |
| 4 | GEAR PUMP OP3013 5.8LPM @ 1450 RPM | 1 | DOWTY |
| 5 | COUPLING TO SUIT | 1 | DELTA |
| 6 | BELL HOUSING TO SUIT | 1 | DELTA |
| 7 | SUCTION STRAINER 10GPM | 2 | DELTA |
| 8 | GAUGE ISOLATER VLV FG1-10LG | 1 | FENNER |
| 9 | PRE.GAUGE, 0-250 BAR, 63 MM DIA | 1 | MASS |
| 10 | SOL.OPERATED D.C.VLV DSG01-3C60-A240 | 1 | YUKEN |
| 10.1 | MANIFOLD BLOCK FOR ITEM NO. 10 | 1 | DELTA |
| 11 | MODULAR VLV CIM 06AB | 2 | YUKEN |
| 12 | LEVER OPERATED VLV 4DLS6ED | 1 | POLYHYDRON |
| 13 | HAND PUMP 13CC/2STROKE | 1 | DOWTY |
| 14 | PRE.CONTROL VLV DPRH06K200 | 2 | POLYHYDRON |
| 15 | PRE.SWITCH 1PS100-30 | 2 | POLYHYDRON |
| 16 | MODULAR PRE.CONTROL VLV MBA-1 | 1 | YUKEN |
| 17 | RETURN LINE FILTER TIF206B-25 | 1 | HYDROLINE |
| 18 | JACK CYLINDER | 2 | W-3475 |



REFER BOM NO 3003

Revised

| | | | |
|------------------------|-------------------|---|---------------------------|
| APEX FLUIDOMATICS LTD. | | | |
| DRN | DRG. NO. 1-W-3479 | TITLE 1- HYDRAULIC CONTROL PANEL WEST END. | |
| CHD | | DATE SIGN CUSTOMER-JESSOP & CO LTD. | |
| APPD. | | UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM | |
| REV. | DATE | SIGN | SCALE- N.T.S. |
| R.M. | | | TOLERANCE IN LENGTH 12 MM |



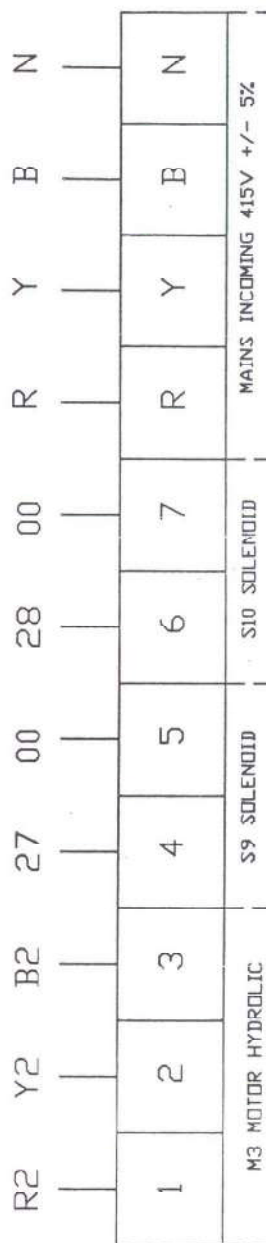
REFER BOM NO 3003

| APEX FLUIDOMATICS LTD. | | | | | | | | | |
|------------------------|--|--|--|--|--|--|--|---|----------------|
| DRN | | | | | | | | DRG. NO. :-W-3481 | |
| CHD | | | | | | | | TITLE :- HYDRAULIC CONTROL- | |
| APPD. | | | | | | | | PANEL WEST END | |
| | | | | | | | | DATE | SIGN |
| | | | | | | | | CUSTOMER:-JESSOP & CO LTD. | |
| | | | | | | | | UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN M.M. | |
| | | | | | | | | UNSPECIFIED TOLERANCE ± 0.5 M.M. | |
| | | | | | | | | TOLERANCE IN LENGTH ± 2 M.M. | SCALE:- N.T.S. |
| REV. | | | | | | | | DATE | SIGN |
| P.M. | | | | | | | | | |



BILL OF MATERIAL NO 3003
THIS IS FOR ELECTRICAL CIRCUIT W 3478, W 3479, W 3480, W 3481.
MOUNTED ON WEST END.

| Sr. No. | Description | Make | Catalogue No | Capacity | Quantity |
|---------|-------------------------------------|----------|---------------------|--------------|----------|
| 1 | MCB 63A 4P | MDS | --- | 63Amp | 1 Nos. |
| 2 | MNX9 1NC Contactor coil 220V AC | L&T | CS94107 | 9 Amp | 16 Nos. |
| 3 | MNX18 1NC Contactor coil 220V AC | L&T | CS94100 | 18 Amp | 3 Nos. |
| 4 | MNX32 1NC Contactor coil 220V AC | L&T | CS94111 | 32 Amp | 2 Nos. |
| 5 | MNX R3 O/L relay | L&T | CS94209 | 3-5 Amp | 1 Nos. |
| 6 | MNX R3 O/L relay | L&T | CS94211 | 14-23 Amp | 1 Nos. |
| 7 | MNX ADD-ON Block 1 No + 1 NC | L&T | CS94118 | --- | A lot |
| 8 | MNX Add-On block 2 NC | L&T | CS94119 | --- | A lot |
| 9 | MNX Add-On block 4 NC | L&T | CS94116 | --- | 1 Nos. |
| 10 | Electronic timer | Seltech | 400SD | --- | A lot |
| 11 | Fuse Base and Top | Standard | AFC | 16/32 Amp | A lot |
| 12 | Fuse Base and Top | Standard | AFC | 63 Amp | 3 Nos. |
| 13 | Fuse link | Standard | SNSA | 4 Amp | A lot |
| 14 | Fuse link | Standard | SNSA | 10 Amp | 3 Nos. |
| 15 | Fuse link | Standard | STISB | 50 Amp | 3 Nos. |
| 16 | Indication 220V AC NO/NC | Technic | 22.5 mm Diameter | --- | A lot |
| 17 | Push Button with Element | Technic | 22.5 mm Diameter | --- | A lot |
| 18 | AVF Meter | AE | 96 x 96 | --- | 1 Nos. |
| 19 | 3 C/O 11 Pin relay with socket | PLA | --- | --- | A lot |
| 20 | Control Transformer | Femina | --- | --- | 1 Nos. |
| 21 | Terminals | Elmax | --- | --- | A lot |
| 22 | Other Panel Accessories | Standard | --- | --- | A lot |



Revised

**BILL OF MATERIAL NO 3004
THIS IS FOR ELECTRICAL CIRCUIT W 3477.
MOUNTED ON EAST END.**

| Sr. No. | Description | Make | Catalogue No | Capacity | Quantity |
|---------|-----------------------------|----------|------------------|-----------|----------|
| 1 | Rotary Switch | Salzer | 3 Pole ON-OFF | 16 Amp | 1 Nos. |
| 2 | MNX9 Contactor | L&T | CS94107 | 9 Amp | 3 Nos. |
| 3 | O/L Relay | L&T | CS94209 | 3-5 Amp | 1 Nos. |
| 4 | 3 C/O relay with Socket | PLA | Pin type | --- | 2 Nos. |
| 5 | Fust Base and Top | Standard | AFC | 16/32 Amp | 3 Nos. |
| 6 | Fuse Link | Standard | SNSA | 10 Amp | 3 Nos. |
| 7 | Control transformer | Femina | --- | --- | 1 Nos. |
| 8 | Luminius Pushbutton 220V AC | Technic | 22.5 mm Diameter | 220V AC | 3 Nos. |