

Supply, Installation and commissioning of Hydraulic power packs for Russian HB machine (Model- 2B660) Plan no-3/1-001.

Purpose: In the machine, existing hydraulic system is to be replaced with new one. Circuit diagram of existing hydraulic for all three operations is attached for reference in Annexure- C, D, E, F, G.

Details of the Existing System: In existing hydraulic system, changeover of lubrication from top saddle to bottom saddle and bed guide ways is controlled through a positioning of cock which gets a movement from clamping / unclamping of top and bottom saddle .This system shall be replaced/ interfaced through solenoid in such a way that will fulfill machine motion requirement i.e. when top saddle is in clamped position lubrication between bed and bottom saddle matching guide ways must be activated and when bottom saddle is in clamped position lubrication between bottom saddle top guide ways and top saddle guide ways must be activated.

Quantity of power packs- One (01) SET. One set will consist of the following:

1. Hydraulic system for gear shifting, Clamping of Head stock and Y-axis lubrication.
2. Hydraulic system for clamping of TOP and Bottom Saddle.
3. Lubrication of top & Bottom saddle guide ways and lubrication of X-axis.
4. Spares

Scope of supply and Terms & Conditions for ONE (01) SET-

| SL. NO. | DESCRIPTION | MAKE | Quantity | Vendor's Remark |
|---------|---|-------------------|----------|-----------------|
| 1.0 | HYDRAULIC SYSTEM FOR GEAR SHIFTING AND CLAMPING OF HEADSTOCK AND Y-AXIS LUBRICATION : | | | |
| 1.1 | Gear Pump motor set Pressure: 65 kg/cm ² (Rated.), 20 kg/cm ² (Operating), Flow rate: 20 LPM along with required hydraulic accessories like non-return valves, Digital Pressure gauge with pressure switch, Pressure relief valve, pressure line filter in inlet 100 µm and outlet 30 µm, flow switch, 3-position 4-port directional control valves with manifolds .Pump motor set shall be mounted over the machine inbuilt sump at its existing position with base mounted motor. | Vendor to specify | 01 Set | |
| 1.2 | Oil Seals/ O-rings for 4- Clamping cylinders and 2 gear Shifting cylinders. | Vendor to specify | 01 Set | |
| 1.3 | Electrical terminal box suitably mounted and aesthetically | | 01 No. | |

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| | placed. | | | |
| 1.4 | Seamless steel pipe of 10mm ID , minimum 1 mm thickness , 2000mm length | Hyloc/parker/hydroline/ gates/hydraulics/Jindal | 10 Nos. | |
| 1.5 | Minimess coupling for measuring devices | VENDOR TO SPECIFY | 20 Nos. | |
| 1.6 | Copper tube of dia 2 mm & 8 mm of length 10m each and of dia 4mm, 6mm of length 20 m each | VENDOR TO SPECIFY | 01 set | |
| 1.7 | Distributor as per existing scheme | VENDOR TO SPECIFY | 1 set | |
| 2.0 | HYDRAULIC SYSTEM FOR TOP AND BOTTOM SADDLE CLAMPING | | | |
| 2.1 | Gear Pump motor set Pressure: 65 kg/cm ² (Rated.) ,30 kg/cm ² (Operating), Flow rate: 12 LPM along with required hydraulic accessories like non-return valves, Digital Pressure gauge with pressure switch, Pressure relief valve, flow switch pressure line filter in inlet 100 µm and outlet 30 µm, pressure switch, 3-position 4-port directional control valves with manifolds . | VENDOR TO SPECIFY | 1 set | |
| 2.2 | Hydraulic tank of suitable capacity (Approx.50 ltr. capacity), complete with oil filling cap with filter, vent plug, level indicator, drain plug etc. (i) All the items mentioned at Clause No. (2.1) shall be mounted on this hydraulic tank with suitable manifolds and properly terminated for onward connection to the machine. (ii) Dimensions and positions of placing of the tank shall be decided by party after site visit. | VENDOR TO SPECIFY | 01 No. | |
| 2.3 | Electrical terminal box suitably mounted and aesthetically placed. | VENDOR TO SPECIFY | 1 No. | |
| 2.5 | Seamless M.S. pipe of 24mm ID , 2-3 mm thickness, 2000mm length | Hyloc/parker/hydroline/ gates/hydraulics/Jindal | 05 nos. | |
| 2.6 | Copper pipe OD 15mm of length 30m, | VENDOR TO SPECIFY | 01 no. | |
| 2.7 | Oil Seals/ O-rings of clamping cylinder (for 8 cylinders) | VENDOR TO SPECIFY | 1 set | |
| 2.8 | Flexible Hose pipe 100R2 series X 3 mtr. Size ½ inch | Hyloc/parker/hydroline/ gates/hydraulics | 06 Nos. | |

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|------------|--|-------------------|---------|--|
| 3.0 | Lubrication system for top and Bottom Saddle guide ways & Lubrication of X-axis guide ways | | | |
| 3.1 | Vane Pump motor set Pressure: 64 kg/cm ² (Rated.) , 15 kg/cm ² (Operating), Flow rate: 18 LPM along with required hydraulic accessories like non-return valves, Digital Pressure gauge with pressure switch, Pressure relief valve, flow switch, pressure line filter in inlet 100 µm and outlet 30 µm, pressure switch, , Suction strainer , 3-position 4-port directional control valves with manifolds . | VENDOR TO SPECIFY | 01 set | |
| 3.2 | Hydraulic tank of suitable capacity (Approx. 2000 Ltr.), complete with oil filling cap with filter, vent plug, level indicator, drain plug, inspection cover , Float switch, Drain valve, Tank breather filter etc. (i) All the items mentioned at Clause No. 3.1 shall be mounted on this hydraulic tank with suitable manifolds and properly terminated for onward connection to the machine. (ii) Dimension of the tank shall be decided by party after site visit. | VENDOR TO SPECIFY | 01 No. | |
| 3.3 | Electrical terminal box suitably mounted and aesthetically placed. | VENDOR TO SPECIFY | 01 No. | |
| 3.4 | Minimess coupling for measuring device | VENDOR TO SPECIFY | 20 Nos. | |
| 3.5 | Copper tube of dia 2 mm & 8 mm of length 10m each and of dia 4mm, 5mm, and 6mm of length 20 m each. | | 01 set | |
| 3.6 | Flexible Hose pipe 100R2 series X 30 mtr, Size 1.5 inch with suitable size end connections. | | 01 No. | |
| 4.0 | <i>Drawing of the offered hydraulic system incorporating above mentioned devices shall be submitted along with offer. Before submitting the drawing, vendor shall study the existing hydraulic plan (Refer our Annexure- C, D, E, F, G) and satisfy itself. Vendor shall ensure that machine functionality with the new hydraulic system is maintained. Hydraulic</i> | Vendor to confirm | | |



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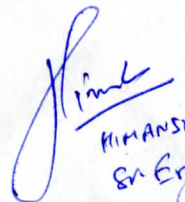
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| | <i>items/components shall be of Hydac/Vickers/Rexroth-Bosch/Hawe/Parker/Yuken make only. Motor should be of ABB/Seimens/CG Make only.</i> | | | |
| 5.0 | SPARES: Following spares shall be supplied along with the order. | | | |
| 5.1 | Directional control valves | Vendor to confirm | 6 Nos. | |
| 5.2 | Solenoid Coils | Vendor to confirm | 10 Nos. | |
| 5.3 | Filter elements 05 nos. of each type. | Vendor to confirm | 01 Set | |
| 5.4 | Vane & Gear Pump one no. of each type | Vendor to confirm | 03 Nos. | |
| 6.0 | General Conditions. | | | |
| 6.1 | Party shall supply any additional required hydraulic tube fittings, Stud end fittings, all clamps, fixtures and fasteners, required to complete the job. | Vendor to confirm | | |
| 6.2 | Any other material not mentioned above but found necessary to complete the job, shall be in party's scope of supply. | Vendor to confirm | | |
| 6.3 | All oil seals, O-rings etc. for the clamping system cylinders and gear shifting cylinders shall be supplied by the party and fitted in the cylinders. | Vendor to confirm | | |
| 6.4 | Vendors are advised to visit the machine before submitting the offer. | Vendor to confirm | | |
| 6.5 | An Electric junction box shall be provided on the hydraulic tank along with phoenix make 6 Amp. Connectors. All the Motors, Solenoids etc. shall be wired up to this junction box. | Vendor to confirm | | |
| 7.0 | Acceptance & commissioning:- | | | |
| 7.1 | Vendor shall deploy the manpower for commissioning of the system within seven days of intimation from BHEL Hardwar. Vendor shall arrange boarding, lodging and transportation for their personnel | Vendor to confirm | | |
| 7.2 | Complete supplied system shall be commissioned by the vendor on the machine and vendor shall ensure leakage free connection in the supplied system . | Vendor to confirm | | |

Parvinder

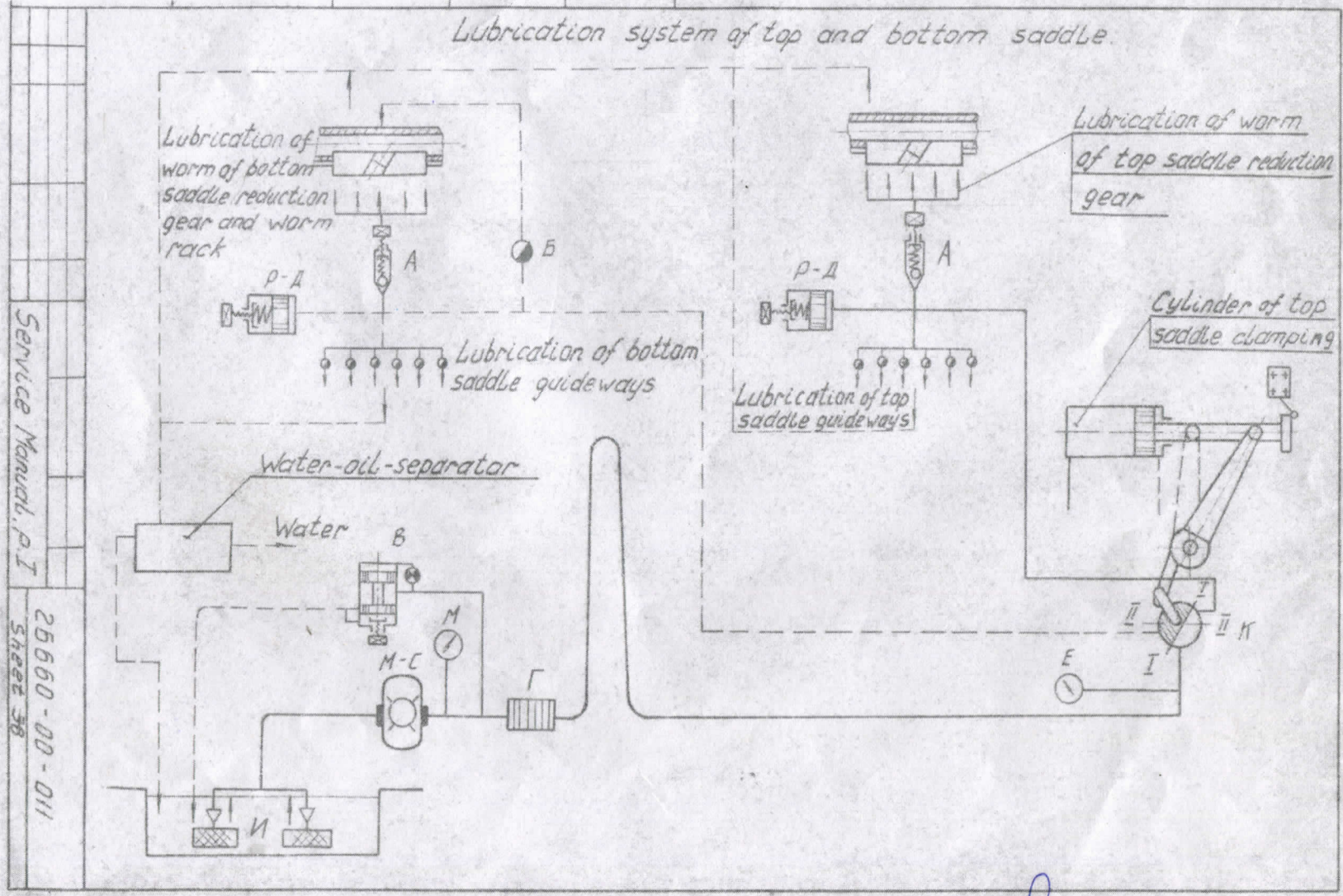
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| 7.3 | Acceptance shall be at BHEL, Hardwar after successful commissioning and testing of the supplied system for all the hydraulic function of the machine. | Vendor to confirm | | |
| 8.0 | Delivery -Delivery of material shall be within 90 days from the placement of purchase order or earlier. | Vendor to confirm | | |
| 9.0 | Pre-dispatch Inspection - Pre-dispatch inspection (PDI) shall be carried out by BHEL at vendor's works. The material shall be dispatched after PDI clearance given by BHEL. | Vendor to confirm | | |


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Lubrication System for Top and Bottom Saddle



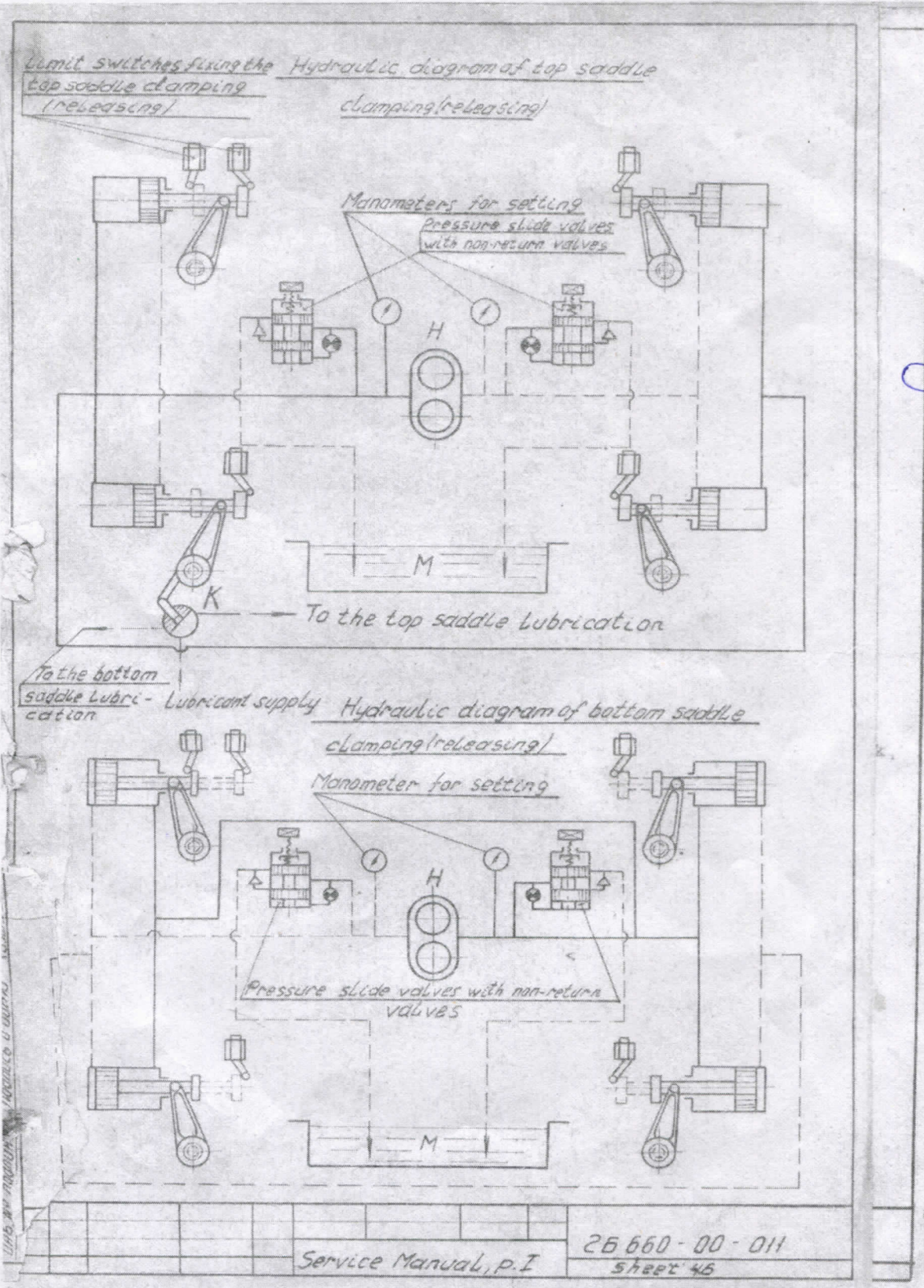
Service Manual, P.I

25660-00-011
Sheet 38

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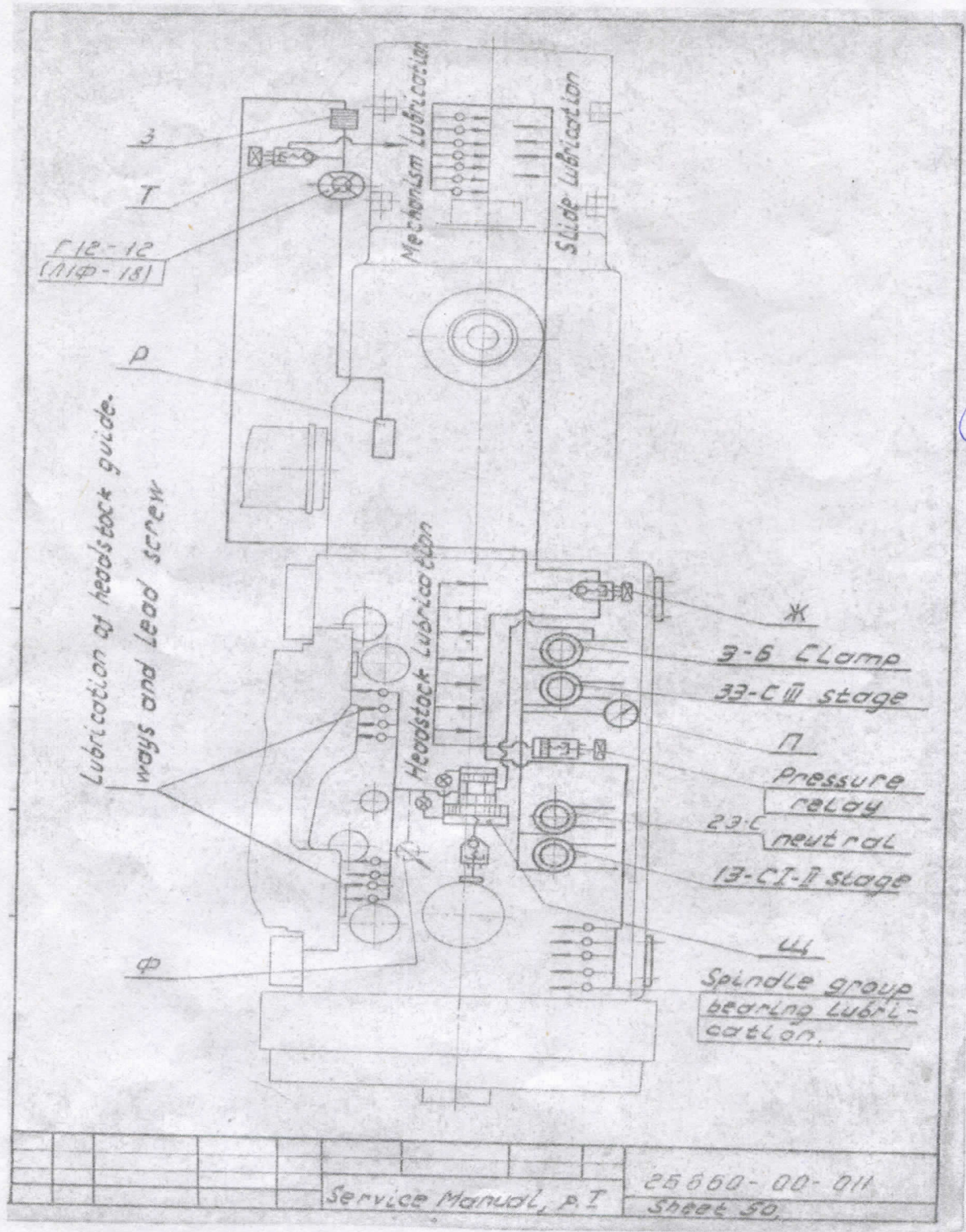
Top and Bottom Saddle Clamping



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Headstock Guideways and LeadScrew Lubrication Circuit



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Annexure-F For Headstock lubrication and hydraulic shifting

Lubrication of headstock guideways and lead screw Lubrication

Headstock is in clamped position 1st stage has been switched on

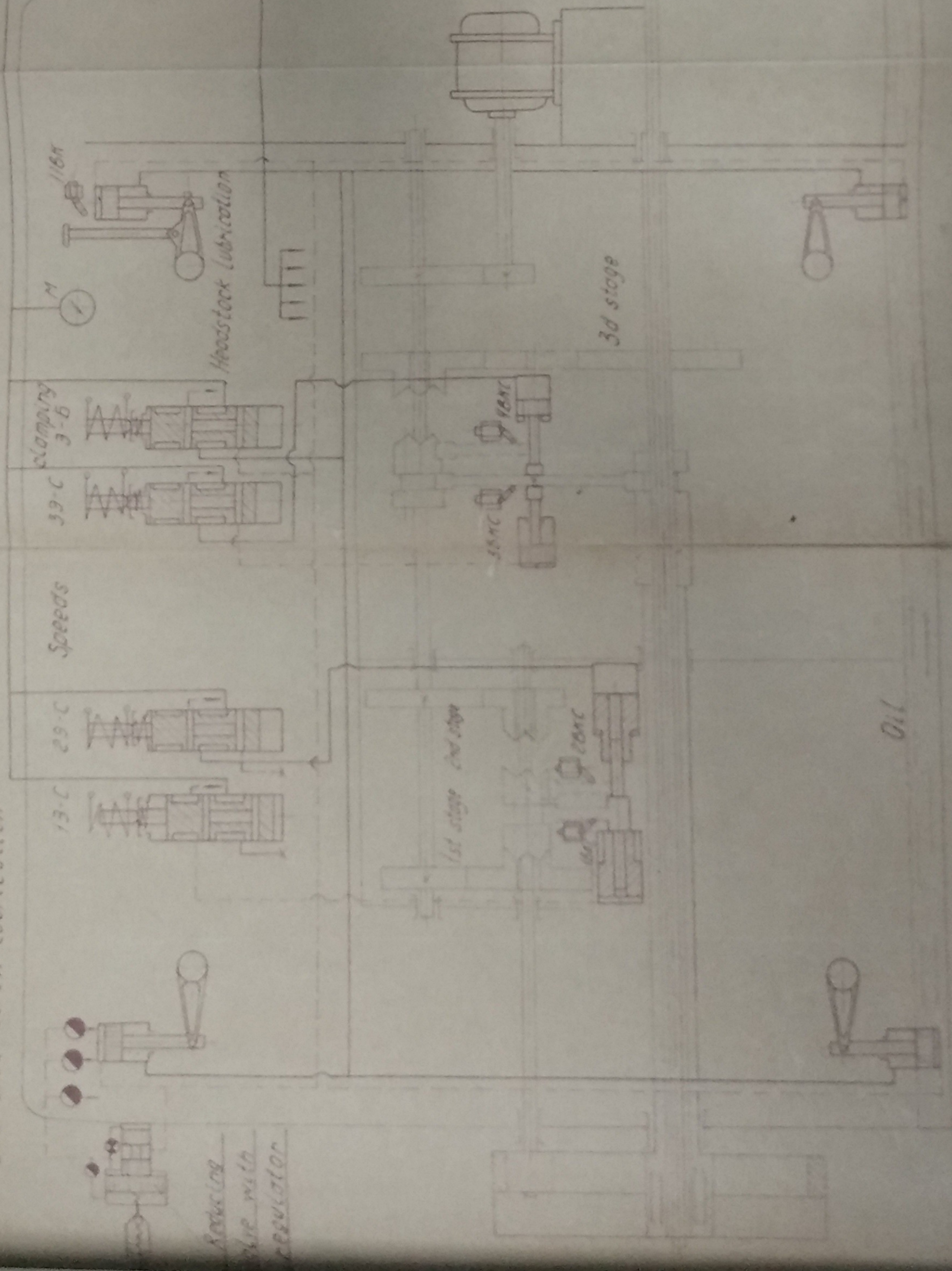


Diagram of operation of main drive

| Stages | 13-C | 29-C | 39-C | M-B |
|-----------|------|------|------|-----|
| 1st stage | X | - | - | X |
| 2nd stage | - | X | - | X |
| 3rd stage | - | - | X | X |

Diagram of operation of slide valves and of pumps of feed drives

| | 3-C | M-C | M-A | M-B |
|---------------------|-----|-----|-----|-----|
| Headstock Clamping | - | - | - | - |
| Headstock Retaining | X | - | - | - |
| Along | - | X | - | 0 |
| Across | - | X | - | 0 |

Lubrication of mechanisms

X energized
 - deenergized
 0 - To be switched for a time of switch following - release

| Case No. | Date | Page No. |
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| | | |

Annexure-G Interfacing b/w Top and Bottom Saddle clamping and Lubrication system

