	BHARAT HEAVY ELECTRICAL LIMITED	Enquiry No.	
	HEAVY ELECTRICAL EQUIPMENT PLANT RANIPUR, HARDWAR - 249403, UTTRANCHAL, INDIA	Due Date	
	CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)	Supplier's Qtn. No.	
	PHONE NO.:	Date	
E-MAIL ID.			
TECHNICAL SPECIFICATION No. - DPT - 0010 CUM COMPLIANCE CERTIFICATE FOR CNC HORIZONTAL BORING MACHINE, SPINDLE DIA. 160 MM WITH ROARY TABLE SIZE 2500x2500 mm - (1 Nos.)			
NOTE:-			
<p>1. Vendor must submit complete information against clause at Sl.No. 25. The offer, complying this clause, would only be considered.</p> <p>2. The vendor should fill the "Offered" Column in compliance to specified requirements and also "Deviations" Column, where there is deviation from the requirement. Duly filled specification cum compliance certificate should be submitted along with the offer. Inadequate, incomplete, ambiguous or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.</p> <p>3. The offer and all documents enclosed with offer should be in English language only.</p>			
NAME & ADDRESS OF THE SUPPLIER :			
TELEPHONE NOS.:			
FAX NOS.:			
E-MAIL ADDRESS :			





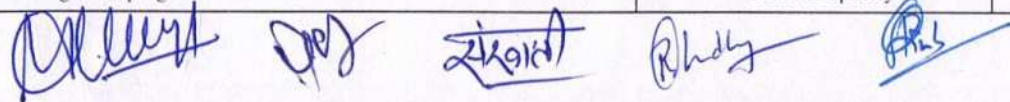



SCOPE: SUPPLY, ERECTION & COMMISSIONING OF FLOOR TYPE CNC HORIZONTAL BORING MACHINE (1 Nos.) COMPLYING WITH SPECIFICATIONS AS BELOW :

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE & WORKPIECE MATERIAL				
1.1	Purpose: Floor Type CNC Horizontal Boring Machine with Special milling head Attachments is required for machining of highly accurate and precision components involving heavy duty Milling, Drilling, Boring, Threading, Tapping, Reverse Counter Boring, Core Drilling, Reaming, etc.on different work piece materials.	Vendor to note and accept			
1.2	Work Piece Material: Work Piece Material shall be Aluminium Alloys, Forged Steel, Carbon Steel, Alloy Steel, Stainless Steel, Titanium, Cast Iron etc. having maximum Hardness 45 HRC.	Vendor to note and accept			
2.00	SPECIFICATIONS:				
2.1	MACHINE CONFIGURATION: The Machine shall be Floor Type CNC Horizontal Boring Machine with a Rotary Table. Automatic Attachments Changer (AAC) is to be suitably located. Linear movement of Rotary Table shall be perpendicular to the X-axis.	Vendor to note and accept			
2.2	HEAD STOCK				
2.2.1	Boring spindle diameter :160 mm	Vendor to confirm			
2.2.2	Milling spindle diameter	Vendor to specify			
2.2.3	Ram Cross section (LxB)	Vendor to specify			
2.2.4	Spindle drive power (AC Continuous Rating - S1): 60 KW or more	Vendor to specify			
2.2.5	Spindle speed (Infinitely variable): 4 or less to 2500 or more RPM.	Vendor to specify			
2.2.6	No. of speed ranges	Vendor to specify			
2.2.7	Max torque on the boring spindle (N-m)	Vendor to specify			
2.2.8	Max torque on the milling spindle (N-m)	Vendor to specify			
2.2.9	Spindle taper: BT50	Vendor to confirm			
2.2.10	Torque-Power-Speed characteristics of the spindle system to be submitted by the vendor.	Vendor to submit			
2.2.11	Oriented Spindle Stop (Any position)	Vendor to confirm			
2.2.12	50 numbers of Pull-Studs for BT50 taper shall be included along with detailed drawing in the standard scope.	Vendor to confirm & submit details			
2.2.13	Spindle Cooling System (Details to be submitted)	Vendor to submit			
2.3	COLUMN:				
2.3.1	Column longitudinal travel (X-Axis) : 4000 mm or more	Vendor to specify			
2.3.2	X-axis feed rate (Infinitely variable) :1 to 10000 mm/m or more	Vendor to specify			
2.3.3	X-axis rapid traverse rate : 10000 mm/m or more	Vendor to specify			
2.3.4	Axis Resolution : 0.001 mm	Vendor to confirm			
2.4	HEADSTOCK TRAVERSE ON COLUMN:				

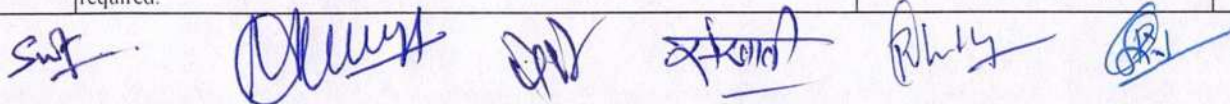
Sl. NO.	DESCRIPTION FOR BIHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
2.4.1	Headstock vertical travel (Y-Axis): 2500 mm or more	Vendor to specify			
2.4.2	Traverse Range (wrt table Top) : 0 to 2500 mm or more (Note: At Y minimum, spindle center should pass through table top.)	Vendor to specify			
2.4.3	Y-axis feed rate (Infinitely variable): 1 to 10000 mm/m or more	Vendor to specify			
2.4.4	Y-axis rapid traverse rate : 10000 mm/m or more	Vendor to specify			
2.4.5	Axis Resolution : 0.001 mm	Vendor to confirm			
2.5 RAM/ SPINDLE TRAVERSE:					
2.5.1	Boring spindle axial travel (W-Axis) : 1000 mm or more	Vendor to specify			
2.5.2	Ram axial travel (Z-Axis): 1000 mm or more	Vendor to specify			
2.5.3	Spindle + Ram travel (W+Z) : 2000 mm or more	Vendor to specify			
2.5.4	Boring Spindle axis feed rate (Infinitely variable): 1 to 10000 mm/m	Vendor to specify			
2.5.5	Boring Spindle axis rapid traverse rate: 10000 mm/m or more	Vendor to specify			
2.5.6	Ram axis feed rate (Infinitely variable): 1 to 10000 mm/m or more	Vendor to specify			
2.5.7	Ram axis rapid traverse rate: 10000 mm/m or more	Vendor to specify			
2.5.8	Axis Resolution: 0.001 mm	Vendor to confirm			
2.5.9	Spindle & Ram Axes should be independently programmable with Independent Drives and Feed back system.	Vendor to confirm			
2.6 FEED AND DRIVE SYSTEMS:					
2.6.1	Feed drives/ motors for X,Y,Z & W axes [AC servo motors] shall be digital type of either Siemens or Fanuc make (Details of make & model to be submitted)	Vendor to confirm & submit			
2.6.2	Maximum feed force for all axes	Vendor to specify			
2.6.3	Feed back system for X, Y & Ram (Z) axes: Linear scales, preferably Heidenhain, with pressurised compressed air cleaning (Details to be submitted by the vendor). The Air supply system shall have suitable drier, if required.	Vendor to confirm & submit			
2.6.4	Feed back system for Spindle (W) axis: Rotary/ Linear Encoders, preferably Heidenhain, Details to be submitted by vendor	Vendor to confirm & submit			
2.6.5	Type of power transmission: 1.Pre-loaded backlash free double pinion & rack drive for X-axis. 2. Backlash free re-circulating ball screw with Pre-loaded double nut for all other axes. (Complete description of the aforesaid, including diameter of Ball Screw for each axis, to be submitted with the offer)	Vendor to submit			
2.6.6	Mechanism for locking X, Y & Z axis	Vendor to specify			
2.6.7	Maximum thrust rating of all axes.	Vendor to specify			
2.7 MACHINE GUIDEWAYS:					
2.7.1	Width of bed guideways, X-axis	Vendor to specify			
2.7.2	Width of column guideways, Y-axis	Vendor to specify			
2.7.3	Details of Guide ways for Ram axis and bearing details of Spindle axis are to be submitted with offer.	Vendor to submit			

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2.7.4	Guide ways for X-axis, Y-axis & Z-axis: Hydrostatic (Details to be submitted). Details of lubrication system provided on Spindle axis are also to be submitted with the offer.	Vendor to confirm and submit			
2.7.5	Hardness of guideways	Vendor to specify			
2.7.6	Metallic Telescopic covers of rust resistant material to be provided with wipers for X & Y axes guide ways. Joints of telescopic covers should be so sealed to avoid mixing of coolant & hydrostatic oil is to be provided. Telescopic covers for X-axis should be with a slant towards Chip conveyor.	Vendor to offer and confirm			
2.8	ROTARY TABLE :				
2.8.1	Table size (LxB): 2500x2500 mm or more	Vendor to specify			
2.8.2	Maximum load carrying capacity :15T or more	Vendor to specify			
2.8.4	Chart/Table showing relation of weight and distance of c.g. from centre of Rotary Table (loading chart of table) to be submitted.	Vendor to confirm & submit.			
2.8.5	Table rotation (Fully programmable B-axis): 360000 indexing positions	Vendor to confirm			
2.8.6	Maximum machining torque on B-axis (N-m): 25000 or more	Vendor to specify			
2.8.7	Maximum clamping torque on B-axis (N-m)	Vendor to specify			
2.8.8	Feed rate for Table Rotary Axis. (Deg/ min Infinitely variable or rpm)	Vendor to specify			
2.8.9	Rapid Traverse Rate for Rotary Axis (Deg/ min. or rpm)	Vendor to specify			
2.8.10	Size of T-slots: Suitable for Studs of M24 size.	Vendor to confirm			
2.8.11	T-slots pitch (as per DIN standard).	Vendor to specify and confirm			
2.8.12	Central slot tolerance	Vendor to specify			
2.8.13	Perpendicular Lateral slot size/ tolerance	Vendor to specify			
2.8.14	Size of bore at the center	Vendor to specify			
2.8.15	Linear traverse : 1500 mm or more	Vendor to specify			
2.8.16	Feed Force on Linear Axis	Vendor to specify			
2.8.17	Feed Rate for Linear axis (mm/ min Infinitely variable): 1 to 10000 mm/m or more	Vendor to specify			
2.8.18	Rapid Traverse rate for Linear axis (mm/ min): 10000 mm/m or more	Vendor to specify			
2.8.19	Minimum distance between ram face and table face.	Vendor to specify.			
2.8.20	Metallic Telescopic Covers of rust resistant material are to be supplied with wipers for Table Linear axis. Joints of telescopic covers should be so sealed to avoid mixing of coolant and Hydrostatic oil.	Vendor to confirm			
2.8.21	Feed back devices :				
2.8.21.1	Rotary encoder, preferably Heidenhain, for B-Axis	Vendor to confirm			
2.8.21.2	Linear Scale, preferably Heidenhain, with pressurised compressed air cleaning system for linear (V)-Axis	Vendor to confirm			
2.8.22	Feed drives : Fanuc/ Siemens digital AC Servo drives. Details of Make & Model to be submitted.	Vendor to confirm & submit.			
2.8.23	Loading chart of the table to be submitted.	Vendor to submit			
2.8.24	Mechanism for locking/ clamping of Table axes	Vendor to specify			

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SI. NO.	DESCRIPTION FOR BIHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
2.8.25	Location of the Table :Suitably positioned in the center of the X axis traverse. Layout of machine to be submitted.	Vendor to confirm and submit			
2.8.26	From Center of Rotary Table, X traverse should be equal on either side.	Vendor to confirm			
2.8.27	Hydrostatic Guideways for Table Rotation.(Details to be submitted)	Vendor to confirm and submit			
2.8.28	Hydrostatic Guideways for Table Linear Traverse, Details to be submitted.	Vendor to confirm.			
2.8.29	4 x 90 deg Precision Positioning (Details to be submitted.)	Vendor to confirm and submit.			
2.8.30	Backlash free re-circulating ball screw with Pre-loaded double nut for Table Linear axis. (Complete description of the same including diameter of Ball Screw, to be submitted with the offer)	Vendor to submit.			
2.8.31	Level of bottom face of Rotating part of table should be at minimum height above floor. The cover plates around the table should be at floor level for safe movement of operator.	Vendor to confirm and inform the minimum height			
2.8.32	The table should freely rotate without interfering with the cover plate	Vendor to confirm.			
2.9 CONSTRUCTION:					
2.9.1	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various Components/ Assemblies like Column, bed, Head Stock, Ram, Spindle, Rotary Table etc. of the machine.	Vendor to submit			
2.9.2	Softcopy and hard copy explaining the technical features/ literature with photographs along with drawings should be enclosed with the offer.	Vendor to submit			
2.9.3	Automatic deflection compensation for ram and column effective at any extension of the ram plus spindle is to be provided taking into consideration weight of all possible cutters/ attachments offered. Details of the offered system should be submitted with offer.	Vendor to confirm and submit			
2.9.4	Head Stock and Column Counterbalancing System. (Details of the offered system to be submitted)	Vendor to submit			
2.10 OPERATOR'S PLATFORM:					
2.10.1	Operator's platform of min 300 kg load carrying capacity for total Vertical Traverse as well as forward stroke of sufficient length . A 5/15 Amp. Plug Point with ON/OFF switch along with wall mounted fan is also to be provided on the Platform. Cabin enclosure should be preferably of toughened glass material.	Vendor to confirm .			
2.10.2	Operator Platform movement should be independent from Head stock along the full stroke of Y axis.	Vendor to confirm			
2.10.3	Horizontal movement of Operator's Platform.	Vendor to specify			
2.10.4	Weight carrying Capacity of the Platform should be Min. 300 Kg.	Vendor to confirm			
2.10.5	Minimum Height of Platform from Shop Floor.	Vendor to specify			
2.10.6	Splash/ Chip guards on operator platform for protection of operator. operator's panel and to avoid spillage of coolant & chips on operator's platform.	Vendor to offer and confirm			

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2.10.7	Operator Platform should be such that operator face towards spindle while looking at control panel.	Vendor to confirm			
2.10.8	Sitting Arrangement as suitable height should be provided for minimum two operators in Operator Cabin.	Vendor to confirm			
2.11	OPERATION AND CONTROL SYSTEM:				
2.11.1	OPERATOR'S PANEL:				
2.11.1.1	Swiveling type operator's panel having complete CNC and machine control system with TFT of required configuration shall be provided on the operators platform. All switches on the Operator's panel, including that for table rotation, should be within reach of operator of average height of 5'6" for convenient, efficient & safe operation. All displays/ indications should also be conveniently placed accordingly. Layout showing complete details of the panel should be submitted.	Vendor to confirm & submit Photographs & Layout.			
2.11.1.2	An auxiliary pendant, which can be taken to the table for job setting and similar other purposes, should be provided.	Vendor to confirm			
2.11.2	CNC SYSTEM & FEATURES :				
2.11.2.1	Make: Siemens or Fanuc	Vendor to specify			
2.11.2.2	Type Version : PC based latest version	Vendor to confirm			
2.11.2.4	The CNC system should have full alphanumeric keyboard, TFT colour display 15" or more, network ready with LAN, RS232C port, electronic hand wheels for all axes, USB Port with minimum 1 GB Pen drive for data input/output to/from CNC system in CNC mode, additional qwerty keyboard & optical mouse etc. and preinstalled & ready to use offered features for CNC system (as mentioned at Sl.Nos. from 2.11.2.1 to 2.11.2.10 of tender specifications). In case of non-availability of RS232-C etc. (if not provided by CNC system manufacturer at the time of supply), suitable separate ports for networking with LAN, data input/output, telediagnosics & USB ports shall be provided. In case, only USB ports (separate port for each function) are provided, suitable hardware/connectors shall be provided to ensure above functionalities.	Vendor to offer and confirm			
2.11.2.5	The CNC System should necessarily have the following features: Access locks on the operator panel, Coordinate System Rotation, Coordinate System Transformation, Look Ahead of Minimum 70 blocks or more, Helical Interpolation, Scaling, Programmable mirror image machining, Process oriented Canned Cycles for Milling, Drilling etc. operations, Rigid Tapping and Tool Management.	Vendor to offer and confirm			
2.11.2.6	The system shall also have DC-UPS Module to ensure automatic unattended shutdown of the system in case of power failure or even in normal machine shutdown, Display of PLC ladder along with online status in realtime on Operator Panel and Display of servo-waveforms on Operator Panel.	Vendor to offer and confirm			
2.11.2.7	Details of Standard features. List to be submitted.	Vendor to specify			
2.11.2.8	Features of CNC System required for identified jobs or envisaged by the vendor as required.	Vendor to specify			



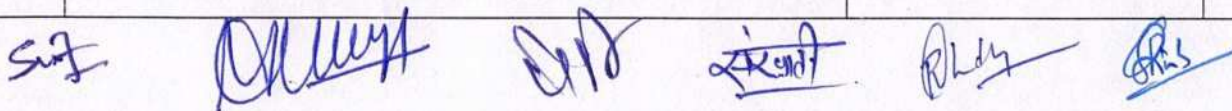
SI. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
2.11.2.9	PLC program/ ladder diagram & all its symbols must be in English language only	Vendor to confirm			
2.11.2.10	All OEM sub-programs & user programs must be in English language only	Vendor to confirm			
2.11.2.11	All OEM Menu must be in English language only	Vendor to confirm			
2.11.3	MANUAL CONTROL :				
2.11.3.1	Complete manual control of machine through or independent of CNC system with required switches/keys shall be provided on the operator panel for selection of required axis, axis direction, RPM, cutting feed, RPM Direction i.e. CW / CCW, cutting feed ON/OFF, display of axis position values etc. for manual machining cuts without using CNC program or MDI mode. Diagram / sketch for switches/keys provided on operator's pendant to be submitted.	Vendor to confirm & submit details			
2.11.4	HAND HELD UNIT:				
2.11.4.1	Vendor to offer Hand held unit with display of CNC system manufacturer along with sufficient length of interfacing cable. The length of the cable should be (minimum 5 meter) sufficient to cover the entire working area of table and bed.	Vendor to offer with details			
2.11.5	UPS FOR CNC SYSTEM:				
2.11.5.1	UPS unit including UPS module with rechargeable battery of sufficient time and having provision for unattended automatic shutdown feature for Windows/Linux operating system & Control circuit.	Vendor to offer & details to be submitted.			
2.12	MACHINE LIGHTS:				
2.12.1	Machine Lights for sufficient illumination of complete working area, on both sides of operator's platform, should be provided for clear visibility.	Vendor to offer & specify details.			
2.12.2	A magnetic base portable spot light with sufficiently long cable (minimum 10 meters) should also be provided.	Vendor to offer & specify details.			
2.12.3	Any lights required in the foundation/ pit area shall also be foreseen and supplied by the vendor.	Vendor to confirm			
2.12.4	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm			
2.12.5	Flashing / rotary type End of Cutting and Program Stop Light.	Vendor to confirm			
2.13	AIR CONDITIONERS:				
2.13.1	Air Conditioners with Dehumidifiers of suitable/ sufficient capacity and proper drainage pipes for condensate, are to be provided for all Electrical/ Electronic Panels/ Cabinets including operator's Panel considering specified ambient conditions. Detailed specifications of the same are to be submitted. The Air Conditioners are not to be mounted on top of the panels.	Vendor to offer and submit details.			



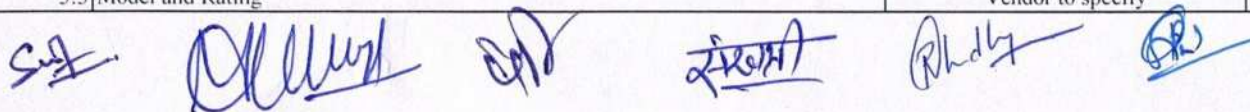
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
2.13.2	In case of order, vendor shall confirm to supply the following information about Air Conditioners and Chiller Unit (s) used in the machine: Type of Refrigeration/ Chiller unit. Capacity of the chiller unit. Type of compressor with complete specifications. Type of Thermostatic Expansion Valve with complete specifications. Fan size and flow in CFM (cubic feet meter) of the Condenser unit. Specifications of the Evaporator Unit (Width Plate type/ Coil type) Functional requirement of temperature of Cooling Oil to be maintained between range T1 to T2. Type of temperature indicator/ controller used in the chiller unit with complete specifications.	Vendor to confirm			
2.14	HYDRAULIC SYSTEM : Details should be Submitted by the Vendor				
2.14.1	The Hydraulic System shall be of Re-circulating Type. Hydraulic Tank should be preferably placed at shop floor.	Vendor to offer and confirm			
2.14.2	Pumps, Valves, Switches (Pressure & Flow) should be of Make : Rexroth / Vickers / Parker / Hawe or equivalent from a reputed manufacturer. (Details to be submitted)	Vendor to offer and confirm			
2.14.3	Filtration System: Sufficient no. of filters (with electric clogging indicator and alarm on PLC) should be used to avoid frequent clogging of the filters and other maintenance related problems. Filter elements should be of Make: EPE / Hydac or equivalent from a reputed manufacturer.	Vendor to offer and confirm			
2.14.4	Failure indication	Vendor to offer			
2.14.5	Automatic shut off provision, Details should be submitted.	Vendor to offer			
2.14.6	Refrigerated type cooling and electric heating (Electric heating, only if required) system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydrostatic oil and gearbox oil, etc. keeping in view the specified ambient conditions to be offered with complete details. The temperature of Hydraulic Oil should not go beyond 40 deg. C.	Vendor to offer & submit			
2.14.7	Hydraulic pump capacity (flow/ pressure) to be intimated.	Vendor to inform			
2.14.8	No Tandem pumps should be used (Preferably). Maximum desired permissible pressure is 100 Kg/sqcm. If anywhere, more than 100 Kg/sqcm pressure is used, then one set of such hose pipes and seal kit of such Hydraulic cylinder should be supplied in spare in addition to other spares.	Vendor to confirm & offer			
2.14.9	First filling of all required Oils & Grease etc. to be supplied by vendor. Indigenous (Indian) source or Indian equivalent and specifications of oils / greases are also to be provided by the vendor.	Vendor to offer & submit			
2.15	COOLANT SYSTEM :				

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
2.15.1	Coolant System with all accessories for following variants shall be provided. Selection of all the variants shall be through program and push buttons provided on the Operator's panel as well.	Vendor to confirm			
	a) Recirculating Type Flood Coolant System with nozzles around spindle.	Vendor to offer & confirm			
	b) Air coolant system	Vendor to offer & confirm			
	c) High Pressure Coolant through Spindle	Vendor to offer & confirm			
2.15.2	All offered attachments, tool holders, boring bars, cassettes, adapters etc. shall have the provision so that coolant is available directly at the tool-cutting tip.	Vendor to confirm			
2.15.3	Coolant collection and recirculation system should be leakproof & perfect to avoid any spillage on shop floor, trenches for cables & foundation pit of the machine etc.	Vendor to confirm			
2.15.4	Coolant Filtration System: Recirculating type coolant system with Vacuum Rotary drum type Filtration System and magnetic separator. Details including model & make with Catalogue pages to be submitted.	Vendor to confirm and submit details.			
2.15.5	Coolant Flow Diagram showing filters, pumps, valves, tanks etc. to be submitted with the offer.	Vendor to submit			
2.15.6	Pressure & rate of flow of coolant for different variants should be furnished in the offer. The Pressure should be sufficient for the coolant to reach the tool tip at full pressure.	Vendor to specify & confirm.			
2.15.7	Coolant Tank Capacity. Coolant Tank may preferably be placed on the Floor Level. The details of the system, including requisite sump, pump etc., should be clearly indicated.	Vendor to specify			
2.15.8	For finer control of Pressure and Coolant Flow Rate, after its activation through program or switches, Rotary/ potentiometer switches shall be provided on the Operator's Panel.	Vendor to confirm			
2.15.9	Coolant pump & motor details for all variants of coolant system are to be submitted with the offer.	Vendor to submit			
2.15.10	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Required.			
2.16 ELECTRICAL SYSTEM :					
2.16.1	415V with fluctuation +10% / -10%, 50HZ with fluctuation +/- 3 %, 3 Phase AC (3 wire system without neutral) Power Supply Source will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/ control cabinets, etc., shall be the responsibility of vendor. Requirement of grounding/ earthing with required material (indian make) details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation. The vendor can take earthing connection from the nearest column of the production shop.	Vendor to confirm & specify			
2.16.2	Tropicalisation: All electrical/ electronic equipment shall be tropicalized.	Vendor to confirm			

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2.16.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to confirm			
2.16.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm			
2.16.5	All electrical and electronic panels including operator's panel should have provision of sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/ receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
2.16.6	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
2.16.7	All cables moving with traversing axes should be installed in Caterpillar/ Drag chain mounted vertically. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to confirm			
2.16.8	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
2.16.9	In-cycle hour counter with reset facility is to be included in the offer.	Vendor to offer			
2.17	SAFETY ARRANGEMENTS:	Vendor to confirm & specify			
	Following safety features in addition to other standard safety features should be provided on the machine:				
2.17.1	Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on CNC display and panels) should be available.	Vendor to confirm			
2.17.2	A detailed list of all alarms / indications provided on machine should be submitted by the supplier.	Vendor to Submit			
2.17.3	All the pipes, cables etc. on the machine should be well supported and protected.	Vendor to confirm			
2.17.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	Vendor to confirm			
2.17.5	Emergency Switches at suitable locations as per International Norms are to be provided.	Vendor to provide			
2.17.6	Oil & water pipe lines should not run with electrical cable in the same tray / trench.	Vendor to confirm			
2.17.7	Safety Lights on moving column (preferably Flashing during X-travel).	Vendor to confirm			
2.18	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:	Vendor to confirm			
	The Machine shall conform to following factors related to environment :				
2.18.1	Maximum noise level shall be 85 dB(A) at normal load condition, 1 M away from the machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required.	Vendor to confirm			



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2.18.2	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm			
2.18.3	There should not be any effluent from the machine. In case there are any effluents from the machine, requisite effluent treatment plant or pollution control device should be built into the machine by the supplier.	Vendor to confirm			
2.18.4	No hazardous chemicals shall be required to be used in the machine.	Vendor to confirm			
2.18.5	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
2.18.6	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm			
3.0	CHIP CONVEYOR :				
3.1	A chip conveyor to carry both short and curly chips efficiently and effectively to the chip bin to be provided on one end of the machine . Two Chips bins of appropriate size of Indian make, with wheels & handle for movement, should also be supplied	Vendor to confirm			
3.2	Type of chip conveyor	Vendor to specify			
3.3	Width of conveyor	Vendor to specify			
3.4	Elevation of chip conveyor for chip bin	Vendor to specify			
3.5	Material of chip conveyor (to be rust resistant)	Vendor to specify			
3.6	Provision for smooth flow of chips to the conveyor.	Vendor to confirm			
3.7	Operation of chip conveyor (forward & reverse) through push buttons on operator's panel.	Vendor to confirm			
3.8	Layout showing location of chip conveyor to be submitted.	Vendor to submit			
3.9	Two nos of chip bins to be supplied.	Vendor to confirm			
4.0	SERVO VOLTAGE STABILIZER:				
4.1	Indian make Oil/ Air Cooled servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, PLC etc. with no undesirable Harmonics in the stabiliser output.	Vendor to offer with details			
4.2	Make : NEEL, Aplab or Auto Electric or equivalent	Vendor to specify			
4.3	Model & Rating	Vendor to specify			
4.4	Following Spares for the Voltage Stabiliser should also be offered. 1.) Control Cards - 01 Set 2.) Monitoring PCBs - 01 Set	Vendor to offer			
4.5	Catalogue of the Voltage Stabiliser shall be submitted with the offer.	Vendor to submit			
5.0	ULTRA ISOLATION TRANSFORMER				
5.1	Indian make Ultra Isolation Transformer suitable for complete machine , its drives, controls, PLC etc. shall be offered with complete details.	Vendor to offer			
5.2	Make : NEEL, Aplab or Auto Electric or equivalent	Vendor to specify			
5.3	Model and Rating	Vendor to specify			



Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
5.4	Spares Package for the Ultra Isolation Transformer for 2 years trouble free working should also be offered with item wise list.	Vendor to specify			
5.5	Catalogue of the Isolation Transformer shall be submitted with the offer.	Vendor to submit			
6.0	PNEUMATIC SYSTEM:				
6.1	AIR COMPRESSOR:				
6.1.1	Independent Air Compressor (of reputed make Elgi, Chicago Pneumatic or Ingersol Rand) with refrigerated type Dryer & Filter of suitable capacity for the total compressed air requirements of the machine & accessories and to suit required air quality should be supplied. The system should be so designed to have additional provision and required accessories before Refrigerated type Air Dryer so that BHEL compressed air supply having pressure 5 Kg/sq.cm with high moisture could be used as and when required. The compressor unit should be suitable for continuous duty operation.	Vendor to offer with details.			
6.1.2	Make & Model of Air Compressor and Refrigerator type Dryer.	Vendor to specify			
6.1.3	Capacity (Flow, Pressure & KW)	Vendor to specify			
6.1.4	Spares Package for the compressor for 2 years trouble free working should also be offered. List to be submitted.	Vendor to offer and submit			
6.2	COMPRESSED AIR POINTS:				
6.2.1	Compressed Air Points in operator cabin as well as near working area with manual ON/ OFF Valve and flexible pipe of suitable length for work piece cleaning.	Vendor to confirm			
7.0	TOOLINGS:				
7.1	Complete Description of Tooling Sytem	Vendor to specify			
7.2	All cutting tools, tool holders, arbors, boring bars, clamping elements etc., required for complete machining of following : a) Drawing No. - 5810 (Attached in annexure 1) Consumables like inserts, screws, solid carbide & HSS cutters, etc. should be separately quoted for machining of 3 more components in addition to the prove-out component.	Vendor to specify and offer.			
7.3	For both special & standard tools, sketches/ copy of catalogue pages should be provided.	Vendor to confirm & submit details			
7.4	Preliminary list of offered tools/ tool holders / accessories are to be submitted with the offer. In case of order, final drawings of special items & copy catalogue pages of standard items shall be submitted to BHEL after placement of PO.	Vendor to confirm			
8.0	OTHER FEATURES:	Vendor to confirm			
8.1	NETWORKING:				

SI. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
8.1.1	Machine control should have necessary hardware & software so that it is ready for interfacing with gigabit Ethernet Local Area Network with 100MB/ sec. Speed available on machine on UTP cables for NC program & other related DATA transfer . This network to be connected to Wide Area Network / Internet. : The following is the details of existing networking in BHEL : a. Base Networking protocol : TCP/IP b. Physical layer connection : 100 Mbps RJ 45 UTP connection. c. Operating system : Windows 10 or latest and different variants of Unix and Linux d. Software for part program transfer : SIN DNC It should cover following features also:	Vendor to offer			
8.1.2	The machine should appear as a node just as any other PC in the entire network (Network Neighbourhood).	Vendor to confirm			
8.1.3	The program transfer should be simple copy & paste method just as it is done in case of PCs.	Vendor to confirm			
8.1.4	The networking should be capable to transfer programs from/to machine across the network in CNC mode.	Vendor to confirm			
8.1.5	The network should be capable to transfer programs with UNIX based stations.	Vendor to confirm			
8.1.6	The above Networking features shall be completely demonstrated and established on the supplied machine by the vendor during pre-acceptance at vendor's works as well as at BHEL, Haridwar during commissioning of the machines.	Vendor to confirm			
8.2	MACHINE MONITORING SYSTEM (MMS) SIGNALS				
	The supplied CNC system shall have OPC-UA compliance with valid licence.	Vendor to confirm			
9.0	DIAGNOSTIC SYSTEM:				
9.1	TELE-DIAGNOSTIC SERVICE :				
9.1.1	Tele-diagnostic service should be provided through Ethernet along with required Hardware / Software package for the supplied CNC system for remote diagnosis and correction of the problems in both CNC System and PLC of the machine. This should be provided free of charge for the guarantee period. Terms and conditions for the service after guarantee period should be informed by vendor. Help guide should be provided for use of the system/service. Subsequently, it should be possible to use other platforms, such as Internet or ISDN, subject to their availability in future. The port should be made available in the electrical panel.	Vendor to offer and submit details.			
9.2	FAULT DIAGNOSTIC SYSTEM:				

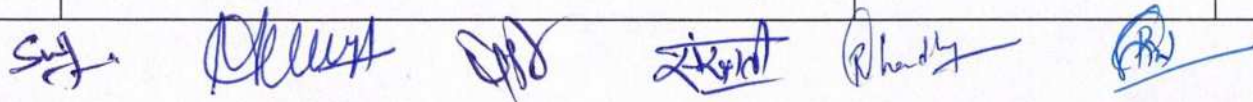







Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
9.2.1	Supplier's own diagnostic system with required Software and Hardware installed on the CNC system, which shows detailed cause and remedy for the fault on the CNC system display with full diagnostics (including images) indicating the element /device causing the fault . Vendor also offer one PC note book/ laptop (latest configuration) along with diagnostic/commissioning software (licensed copy) with necessary cables, PCMCIA card / Adaptor (for communication) for diagnostic purpose. The PC notebook should be loaded with complete electrical schemes, mechanical assembly drawings, Hydraulic circuits diagrams, operating and maintenance manuals, machine alarms list along with help text wiring diagram. On-line display of PLC user should be available on the notebook.	Vendor to offer & submit			
9.2.2	Provision of OEM Screen with soft keys enabling the service personnel to bring back the tool carriers of the ATC/AAC to its initial/nearest position in case of interruption of tool carrier's positioning cycle due to alarm on the machine or power failure. With this OEM screen, service personnel should be able to perform individual steps of Tool carriers positioning cycle manually. Separate Hand Held Pendant should also be provided to retrieve the tool carrier to it's initial position.	Vendor to offer			
9.2.3	Machine should have provision to switchover from position feedback system -2 (direct) to Position feed back system-1 (Motor encoder) through PLC program (for service personnel only).	Vendor to offer			
9.2.4	Help guide should be provided to use both diagnostic systems	Vendor to confirm			
10.0	LEVELING & ANCHORING SYSTEM				
10.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc shall be supplied for the Machine and Rotary Table.	Vendor to offer and submit details.			
11.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :				
11.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc.for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm			
11.2	Test mandrel for checking spindle run-out & alignment should be supplied	Vendor to confirm			
12.0	ACCESSORIES:				
12.1	AUTOMATIC TOOL CHANGER & TOOL MAGAZINE				
12.1.1	Type	Vendor to specify			
12.1.2	No. of storage locations	40 or more			
12.1.3	Suitable for automatic change of tools with shanks as per : BT 50	Vendor to confirm			
12.1.4	Max tool diameter (all pockets filled): 125 mm or more	Vendor to specify			
12.1.5	Max tool diameter (adjacent pockets empty)	Vendor to specify			
12.1.6	Max tool length: 500 mm	Vendor to confirm			



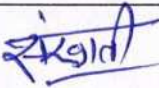
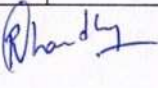

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
12.1.7	Tool change time (tool-to-tool)	Vendor to specify			
12.1.9	Tool selection method: Random with shortest path	Vendor to confirm			
12.1.10	The machine shall have manual Tool loading/ unloading through push button provided on machine head stock/ Auxilliary Hand pendant.	Vendor to confirm			
12.1.11	The spindle taper and tool pocket at changer station will have the provision of cleaning by compressed air blow during ATC cycle. The spindle taper will also have the provision of compressed air blow through push button provided on machine head stock/ Auxilliary Hand pendant during manual tool change.	Vendor to confirm			
12.1.12	Auxiliary Control, with suitable interlocks, for manual insertion / withdrawl of tool from the tool magazine.	Vendor to confirm			
12.1.13	Suitable arrangement, Software based customised screens and manual key based, should be provided to extract a tool trapped in the ATC cycle. Details of both the system to be provided along with the offer.	Vendor to submit			
12.1.14	Tool changing position should be at a convenient height from floor, so that it remains at an approachable position in order to work manually in case of emergency.	Vendor to confirm			
12.1.16	Maximum Permissible Weight on each Pocket. (It should not be less than 25 Kg.)	Vendor to specify			
12.1.17	Maximum Permissible Weight on Complete ATC.	Vendor to specify			
12.1.18	The Machine operation should be possible with or without referencing ATC. A button/softkey should be provided on MCP for updation of tool no on MCP when ATC is not in use. (For manual tool change)	Vendor to confirm			
12.1.19	One set of tool holder retention stud comprising of 50 Nos. (or equal to Tool magazine capacity) shall be provided along with detailed drawing as standard item with the machine.	Vendor to confirm & submit details			
12.1.20	Tool Changer arm working should be explained in details. Full ATC catalogue should be submitted with the offer.	Vendor to confirm & submit			
12.2 AUTOMATIC ATTACHMENT CHANGER (AAC):					
12.2.1	All attachments shall be suitable for loading / unloading through AAC	Vendor to confirm			
12.2.2	No. of storage positions (Matching with number of offered attachments). The storage rack of Attachment changer should be covered from all sides with provision of automatic opening and closing of doors of attachment rack during change of attachment.	Vendor to confirm			
12.2.3	Location of the attachment changer	Vendor to specify			
12.2.4	Mounting plates as required for attachments should be supplied	Vendor to specify			
12.2.5	Maximum Permissible Weight on each Position.	Vendor to specify			
12.2.6	Maximum Permissible Weight on Complete AAC.	Vendor to specify			
12.2.7	Additional Longitudinal Traverse of X-axis required to accommodate and use of AAC beyond the specified X-axis traverse shall be seperately offered by the vendor.	Vendor to offer			



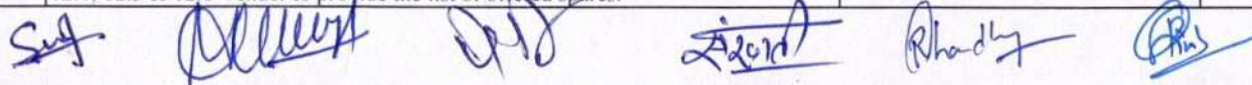
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
12.2.8	Suitable Software based customised screens and manual key based arrangement should be provided to extract an Attachment trapped in the AAC cycle. Details of both the system to be provided along with the offer.	Vendor to offer			
12.3	CNC PROGRAMMABLE ANGULAR MILLING HEAD/ RIGHT ANGLE MILLING HEAD:				
12.3.1	Power :30 KW or more	Vendor to specify			
12.3.2	Max torque	Vendor to inform			
12.3.3	Speed Range (Infinitely Variable)	Vendor to inform			
12.3.4	Speed ratio (1:1 between spindles of Machine and Head)	Vendor to confirm			
12.3.5	Spindle taper: BT50	Vendor to confirm			
12.3.6	Tool clamping : Hydraulic	Vendor to confirm			
12.3.7	Traverse Range of C-axis : 360 deg	Vendor to confirm			
12.3.8	Resolution of C-axis: 1 deg. or less	Vendor to specify			
12.3.9	Power-Torque-Speed characteristic diagram to be submitted	Vendor to submit			
12.3.10	Weight of the head	Vendor to inform			
12.3.11	Suitable arrangement shall be provided for automatic tool change in the offered Head through ATC.	Vendor to confirm			
12.3.12	Coolant system: Internal (through spindle) & External coolant with requisite flexible pipes on its snout is to be provided.	Vendor to confirm			
12.3.13	Pull Stud (4 Sets) for mounting the Head on RAM shall be supplied along with detailed drawing.	Vendor to confirm			
12.3.14	Pull Stud for mounting the Tools in the taper of the Head shall be same as offered in sl no. 2.2.12 by the vendor.	Vendor to confirm			
12.3.15	Make & Model of Head including drawing/sketch/catalogue pages showing major dimensions of the Head to be submitted with the offer.	Vendor to submit			
12.3.16	The offered milling head should be fully programmable in all aspects and should be fully customized to carryout machining (drilling, Boring, Circular interpolation with cutter compensation, Tapping, thread milling etc.) at different angular positions with reference to existing work offset.	Vendor to confirm & submit			
12.4	CNC PROGRAMMABLE INDEXING UNIVERSAL MILLING HEAD:				
12.4.1	Power: 30 KW or more	Vendor to specify			
12.4.2	Max torque	Vendor to inform			
12.4.3	Speed Range (Infinitely Variable)	Vendor to inform			
12.4.4	Speed ratio (1:1 between spindle of Machine and Head)	vendor to confirm			
12.4.5	Spindle taper: BT50	vendor to confirm			
12.4.6	Tool clamping : Hydraulic	Vendor to confirm			
12.4.7	Traverse Range of A-axis : (+/-) 180 deg	vendor to confirm			
12.4.8	Resolution of A-axis : 0.001 deg.	vendor to confirm			
12.4.9	Rotation of C-axis : 360 deg	vendor to confirm			
12.4.10	Resolution of C-axis :0.001 deg.	vendor to confirm			
12.4.11	Torque-Power-Speed chacteristic diagram to be submitted.	Vendor to submit			
12.4.12	Weight of the head	Vendor to inform			

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
12.4.13	Suitable arrangement shall be provided for automatic tool change in the offered Head through ATC.	Vendor to confirm			
12.4.14	Coolant system: Internal (through spindle) & External coolant with requisite flexible pipes on its snout is to be provided.	Vendor to confirm			
12.4.15	Pull Stud (4 Sets) for mounting the Head on RAM shall be supplied along with detailed drawing.	Vendor to confirm			
12.4.16	Pull Stud for mounting the Tools in the taper of the Head shall be same as offered in sl no. 2.2.12 by the vendor.	Vendor to confirm			
12.4.17	Make & Model of Head including drawing/sketch/catalogue pages showing major dimensions of the Head to be submitted with the offer.	Vendor to submit			
12.4.18	Customised cycles to be provided so that programmable Universal Milling Head is suitable for drilling at compound angle and the same should be demonstrated in the proveout component/test piece.	Vendor to confirm & submit			
12.4.19	The offered universal milling head should be fully programmable in all aspects and should be fully customized to carryout machining (drilling, Boring, Circular interpolation with cutter compensation, Tapping, thread milling etc.) at different angular positions with reference to existing work offset.	Vendor to confirm & submit			
12.5	SPECIAL CNC PROGRAMMABLE LONG ANGULAR MILLING HEAD/ RIGHT ANGLE MILLING HEAD AS PER ATTACHED DRAWING IN ANNEXURE 2	As offered & agreed			
12.5.1	Power : 20 KW or more	Vendor to specify			
12.5.2	Max torque	Vendor to inform			
12.5.3	Speed Range (Infinitely Variable) at head spindle : 1000 rpm or more	Vendor to inform			
12.5.4	Speed ratio (1:1 between spindle of Machine and Head)	vendor to confirm			
12.5.5	Spindle taper : BT50	vendor to confirm			
12.5.6	Tool clamping System	Vendor to inform			
12.5.7	Traverse Range of C-axis : 360 deg	vendor to confirm			
12.5.8	Resolution of C-axis : 1 deg. or less	Vendor to specify			
12.5.9	Power-Torque-Speed characteristic diagram to be submitted	Vendor to submit			
12.5.10	Weight of the head	Vendor to inform			
12.5.11	The maximum cross section of Long Milling head should be 160 mm x 270 mm (WXH). Working length of 670 mm or more along Z axis. (As per attached drawing in Annexure-2). Cross-section of Head face (which will be mounted on Ram) can be kept as per OEM design.	Vendor to confirm and specify			
12.5.12	Suitable arrangement shall be provided for automatic/manual tool change in the offered Head through ATC.	Vendor to confirm			
12.5.13	Coolant system: Internal (through spindle) & External coolant with requisite flexible pipes on its snout is to be provided.	Vendor to confirm			
12.5.14	Pull Stud (4 Sets) for mounting the Head on RAM shall be supplied along with detailed drawing.	Vendor to confirm			

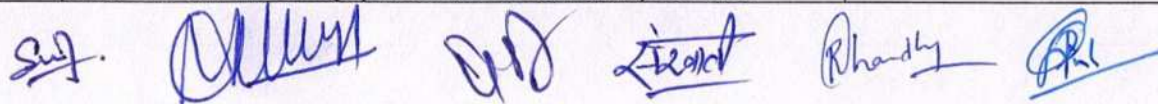
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
12.5.15	Pull Stud for mounting the Tools in the taper of the Head shall be same as offered in sl no. 2.2.12 by the vendor.	Vendor to confirm			
12.5.16	Make & Model of Head including drawing/sketch/catalogue pages showing major dimensions of the Head to be submitted with the offer.	Vendor to submit			
12.5.17	The offered milling head should be fully programmable in all aspects and should be fully customized to carryout machining (drilling, Boring, Circular interpolation with cutter compensation, Tapping, thread milling etc.) at different angular positions with reference to existing work offset.	Vendor to confirm & submit			
12.6	CNC PROGRAMMABLE EXTRA LONG ANGULAR MILLING HEAD/ RIGHT ANGLE MILLING HEAD	As offered & agreed			
12.6.1	Power : 25 KW or more	Vendor to specify			
12.6.2	Max torque	Vendor to inform			
12.6.3	Speed Range (Infinitely Variable) at head spindle : 1000 rpm or more	Vendor to inform			
12.6.4	Speed ratio (1:1 between spindle of Machine and Head)	vendor to confirm			
12.6.5	Spindle taper : BT50	vendor to confirm			
12.6.6	Tool clamping system	Vendor to specify			
12.6.7	Traverse Range of C-axis : 360 deg	vendor to confirm			
12.6.8	Resolution of C-axis : 1 deg. or less	Vendor to specify			
12.6.9	Power-Torque-Speed characteristic diagram to be submitted	Vendor to submit			
12.6.10	Weight of the head	Vendor to inform			
12.6.11	Working Length of Extra Long Milling Head : Atleast 1250 mm or more	Vendor to specify			
12.6.12	Overall Head length	Vendor to specify			
12.6.13	Suitable arrangement shall be provided for automatic/manual tool change in the offered Head through ATC.	Vendor to confirm			
12.6.14	Coolant system: Internal (through spindle) & External coolant with requisite flexible pipes on its snout is to be provided.	Vendor to confirm			
12.6.15	Pull Stud (4 Sets) for mounting the Head on RAM shall be supplied along with detailed drawing.	Vendor to confirm			
12.6.16	Pull Stud for mounting the Tools in the taper of the Head shall be same as offered in sl no. 2.2.12 by the vendor.	Vendor to confirm			
12.6.17	Make & Model of Head including drawing/sketch/catalogue pages showing major dimensions of the Head to be submitted with the offer.	Vendor to submit			
12.6.18	The offered milling head should be fully programmable in all aspects and should be fully customized to carryout machining (drilling, Boring, Circular interpolation with cutter compensation, Tapping, thread milling etc.) at different angular positions with reference to existing work offset.	Vendor to confirm & submit			

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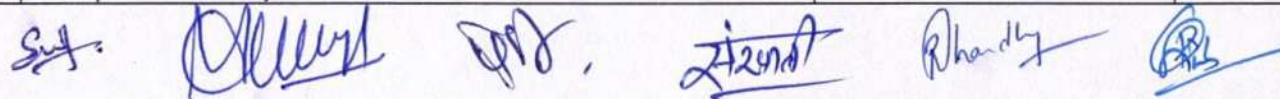
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
13.0	SPARES:				
13.1	Mechanical, Hydraulic, Electrical and Electronic spares used on the machine, with item-wise breakup, are to be recommended and offered by the vendor in sufficient quantity for 2 years trouble free operation of the complete machine including CNC system and its accessories considering three shifts continuous running of the machine. Detailed list is to be submitted. Price of unit quantity of each item is to be quoted. The offered package should include items mentioned below, in addition to other recommended spares. (Unit price of each item of spare should be offered)	Vendor to confirm and offer			
13.1.1	Mechanical & Hydraulic Spares: The following spares (if not covered in 2 year recommended spares) are to be included (as used on machine) .				
13.1.1.1	Pumps used on machine i.e Hydraulic / Hydrostatic, lubrication, coolant and oil cooling - recirculating system (1 no. each type).	Vendor to offer			
13.1.1.2	Pressure control valves, Pressure reducing valves, Flow control valves & Direction control valves used in Hyd / Lub / Pneumatic/ coolant circuit. (1 no. of each type)	Vendor to offer			
13.1.1.3	Pressure switches, Pressure transducer, flow switches used in Hyd / Lub / Pneumatic/ coolant circuit. (1 No. of each type)	Vendor to offer			
13.1.1.4	All types of regenerative type filter inserts (10 No. of each type)	Vendor to offer			
13.1.1.5	All types of Disposable type filter inserts (30 nos. of each type)	Vendor to offer			
13.1.1.6	All types of Accumulators with charging kit. (Booster kit to be provided if Accumulator Pressure is more than 80 Bar) (1 no. of each type)	Vendor to offer			
13.1.1.7	One set of belts (including timing belt) used in the machine.	Vendor to offer			
13.1.1.8	One set of seal kits used in different hydraulic & pneumatic cylinders in the machine.	Vendor to offer			
13.1.1.9	One set of hose pipe with end connection used in the machine.	Vendor to offer			
13.1.1.10	All types of couplings used with different pumps (1 no. of each type) & pressure sleeves used in machine.	Vendor to offer			
13.1.1.11	Rotary Coupling used in Coolant through Spindle.(1 No.)	Vendor to offer			
13.1.1.12	All types of shaft seals (2 no. of each type), O-rings & Piston Rings (2 nos. of each type) used in the machine.	Vendor to offer			
13.1.1.13	One set of pneumatic filtration / condensate drain system.	Vendor to offer			
13.1.1.14	Vendor shall provide all tool and tackles required for maintenance of the machine like Allen keys, Spanners, torque wrench etc.	Vendor to offer			
13.1.1.15	Special Oil/ Grease/ Cooling Agent (if any)- Sufficient qty. for 1 year (operation on	Vendor to offer			
13.1.1.16	Coiled Flexible air/coolant pipes (1 No. each type)	Vendor to offer			
13.1.1.17	Coolant Gun (1 No).	Vendor to offer			
13.1.1.18	Grease Gun (1 No.).	Vendor to offer			
13.1.1.19	Spindle Cone (1No.)	Vendor to offer			
13.1.1.20	5 meter length of Chip Conveyor Chain.	Vendor to offer			
13.1.1.21	Recommended Spares for 2 years for all attachments as mentioned in sl no. 12.3, 12.4, 12.5 & 12.6 Vendor to provide the list of offered spares.	Vendor to offer			




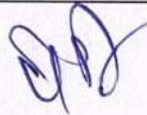
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
13.1.1.22	Recommended Spares for 2 years for ATC as mentioned in sl no. 12.1.Vendor to provide the list of offered spares.	Vendor to offer			
13.1.1.23	Recommended Spares for 2 years for AAC as mentioned in sl no. 12.2.Vendor to provide the list of offered spares.	Vendor to offer			
13.1.2	Electrical/Electronic / CNC Spares : Following Spares (if not covered in 2 year recommended spares)are to be offered (as used on machine) .	Vendor to offer			
13.1.2.1	CNC Controller/NCU (as used in the machine) module- 1 No.	Vendor to offer			
13.1.2.2	PLC CPU, input and output cards- 1 No. each type	Vendor to offer			
13.1.2.3	Machine Control Panel- 1 No.	Vendor to offer			
13.1.2.4	Limit Switches/ Micro Switches (2 Nos each type)	Vendor to offer			
13.1.2.5	Relays and fusable relay boards (2 Nos each type)	Vendor to offer			
13.1.2.6	RTD temperature transmitter (1 No each type)	Vendor to offer			
13.1.2.7	Proximity Switches (5 Nos each type)	Vendor to offer			
13.1.2.8	Semiconductor Fuses (5 Nos each type)	Vendor to offer			
13.1.2.9	Special Fuses (5 Nos each type)	Vendor to offer			
13.1.2.10	Main Power Switch (1 No each type)	Vendor to offer			
13.1.2.11	Secondary Encoders & connecting cables (1 No each type)	Vendor to offer			
13.1.2.12	Scanning Heads for Linear Scales (1 No each type)	Vendor to offer			
13.1.2.13	Wave shape unit/ EXE unit (1 No each type)	Vendor to offer			
13.1.2.14	Operator's panel with Display Unit (01 No. each type)	Vendor to offer			
13.1.2.15	Power Module / Servo amplifier & Control Cards for Main Drive as well as Feed Drives (1 Nos each type)	Vendor to offer			
13.1.2.16	Power cable and encoder cable (01 no. each type)	Vendor to offer			
13.1.2.17	One each of the following items : CNC Power Supply, Interface Modules, Hand Held Unit, Any other auxiliary drive , if used.	Vendor to offer			
13.1.2.18	UPS Module for CNC System safe shutdown-1 No.	Vendor to offer			
13.1.2.19	Line Filter and Line Choke Module-1 No.	Vendor to offer			
13.1.2.20	Proportional Control Valve Controller 2 Nos. each type (if applicable)	Vendor to offer			
13.1.2.21	Push Buttons- 1 No. each type	Vendor to offer			
13.1.2.22	Indicating Lamp- 10 Nos each type	Vendor to offer			
13.1.2.23	Contactors- 2 Nos. each type	Vendor to offer			
13.1.2.24	Overloads/ Automats- 1 No. each type	Vendor to offer			
13.1.2.25	Machine Status Indicating Lamp (Complete unit) - 1 No	Vendor to offer			
13.1.2.26	Any special purpose / non-standard card - 01 No. each type	Vendor to offer			
13.1.2.27	All types of spares for total machine and accessories should be available for atleast ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts/ details of spares & suppliers to enable BHEL to procure these in advance, if required.	Vendor to confirm			
13.1.2.28	Repair service contract with supplier of CNC system for service & spares for motor drives, CNC Unit and Milling Spindle should also be offered by the vendor.	Vendor to offer			




SI. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
13.1.2.29	Vendor to confirm that complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine. Vendor to also confirm that documentation shall include list of all type of parts used along with specifications, type, model, quantity etc.	Vendor to confirm			
13.1.3	Air Conditioning Spares for 2 years (on three shift basis; As applicable on machine) of trouble free operation of the all type of Panel Air Conditioners and refrigerant based Chiller Units.	Vendor to agree			
13.1.3.1	Refrigerant Compressor (1 no. for each type)	Vendor to offer			
13.1.3.2	Digital Temperature Controller (1 no. for each type)	Vendor to offer			
13.1.3.3	Condenser Fan (1 no. for each type)	Vendor to offer			
13.1.3.4	Evaporator Fan for Panel/ Cabinet AC (1 no. for each type)	Vendor to offer			
13.1.3.5	Pumps used in Chiller Unit (1 no. each type).	Vendor to offer			
13.1.3.6	Refrigerant Expansion Valve (1 no. for each type)	Vendor to offer			
14.0	DOCUMENTATION :	Vendor to offer			
14.1	Following manuals/diagrams/ list/ specifications shall be supplied in English language along with the machine documentation (hard copies as mentioned in each clause as well as one set on CD-ROM/ Pen Drive):	Vendor to offer			
14.2	4 hard copies of all Siemens/ Fanuc programming (Basic and Advance), Cycles, Tool management etc. and all operational manuals shall be supplied in English language.	Vendor to offer			
14.3	Basic Machine operation and maintenance/ service manual (in English) - 4 copies	Vendor to offer			
14.4	Electrical schematic & wiring diagram of the machine- 4 copies	Vendor to offer			
14.5	PLC print-out in Operand form with comments in English- 4 copies	Vendor to offer			
14.6	GHOST back up of CNC System hard disk / Memory card on CD	Vendor to offer			
14.7	Complete list of parts used in the machine along with specification, part/ ordering numbers and address of manufacturer in case of purchased item- 4 copies.	Vendor to offer			
14.8	Detailed assembly drawing with clear marking of each component including Assembly drawing of spindle and giving reference of manufacturer of each assembly/sub-assembly- 3 copies.	Vendor to offer			
14.9	Hydraulic, Pneumatic, Lubrication and Coolant circuit diagram along with part list, complete specification and make of each element used – 3 copies.	Vendor to offer			
14.10	Wiring diagram indicating lay out of cables, plugs, junction boxes, terminal strips etc.- 3 sets	Vendor to offer			
14.11	3 sets.	Vendor to offer			
14.12	Alarm list and fault diagnostic manual- 4 sets	Vendor to offer			
14.13	Spare part list along with specification, part number and address of manufacturers- 4 sets.	Vendor to offer			
14.14	Service and user manuals of all bought out items- 4 sets.	Vendor to offer			
14.15	CDs of provided control system documentation.	Vendor to offer			





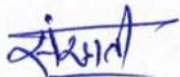
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
14.16	Documents comprising Operating manuals, Signals, Interfacing and diagnostic guide of CNC System 840D or Fanuc equivalent (as offered) - 3 set	Vendor to offer			
14.17	Help guides for tele-diagnostic service systems- 3 sets	Vendor to offer			
14.18	PLC print out with comments in English(Hard copy) of auxiliary systems(if used)-3 sets.	Vendor to offer			
14.19	All O&M manuals including electrical schematic ,wiring diagram, cable layout, junction box details and connector diagrams soft copy on CD- 2 nos.	Vendor to offer			
14.20	O&M manuals shall include complete part list with make & specifications for compressor & refrigeration system.	Vendor to confirm			
14.21	O&M manuals shall include complete part list with make & specifications for stabiliser & isolation transformer.	Vendor to confirm			
14.22	Vendor to submit one set of all documents in best available condition one month prior to training cum pre acceptance of BHEL Engineers.	Vendor to confirm			
15.0 TRAINING:					
15.1	Four BHEL Persons should be trained at vendor's works for the area & period given below: (a) CNC Part Programming for the machine, application of all CNC Features, Programming for Measuring Systems & supplied accessories etc. (Period 2 Weeks) (b) Electrical, Electronic & CNC maintenance for machine & other supplied equipments (Period 2 weeks) (c) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (Period 2 weeks) (d) Operation of the machine & other supplied equipments (Period 2 weeks) Pre-dispatch inspection (ref. Sl.No. 21.1) of the machine shall also be carried out by the team during their stay at vendor's works for the training. Vendor may specify days required for pre-dispatch inspection. BHEL reserves the right to choose no. of persons, field & period of training, out of above, while deputing their engineers for training.	Vendor to offer			
15.2	Vendor shall arrange minm. one week training for two BHEL engineers in commissioning and maintenance of the supplied CNC system, servo drive and PLC at the training centre in India of respective manufacturer.	Vendor to offer			






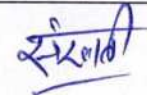
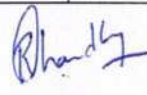


Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
15.3	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to confirm			
15.4	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm			
15.5	Vendor to quote for training per person per week basis	Vendor to quote			
15.6	<p>Training of Hydraulic System: The Vendor shall arrange for the training of two BHEL personnel, at HYDAC/Rexroth/Yuken/Parker authorized training centre in India in area of:</p> <ol style="list-style-type: none"> 1. Basic Hydraulic System. 2. Advance Hydraulic System. 3. Hydraulic Simulation. 4. Maintenance of Hydraulic and Pneumatic Systems. <p>All above areas shall be covered in details precisely related with manufacturing machine tools and Minimum duration of Training shall be one week. Note: Boarding, Lodging & Travel expenditure of BHEL personnel shall be borne by BHEL.</p>	Vendor to confirm			
16.0	FOUNDATION:				
16.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI) / P.O. Final Layout and complete civil drawings for foundation of machine shall be submitted by the supplier within three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, Air compressor, Chip Bin & any other accessories. The civil drawings shall cover complete details of foundation viz. Details of Reinforcement Cement Concrete (RCC) block with its dimension and detailing of reinforcement, grade of concrete, plain Cement Concrete and any other details required as per existing bearing capacity of soil, position and size pockets in top bed of foundation, details of trenches, depression (if any), provision of fixtures, protection mechanism for vibration isolation /settlements. BHEL shall construct complete foundation for the machine under supervision of vendor and at vendor's responsibility. The vendor shall also indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine. Vendor shall arrange required facilities for the testing of foundation at his own cost (if requirement arises).	Vendor to confirm			





SI. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
16.2	Tentative Soil condition data of BHEL, Haridwar as follows: a) Bearing capacity : 10 Ton/M2 (for depth 2, 2.5 and 3 m) 8 Ton/M2 (for depth 4.5 m) b) The dynamic soil parameters : (i) $C_u = 3428 \text{ KN/M}^3$ (ii) $C\Phi = 5930.44 \text{ KN/M}^3$ (iii) $C\Psi = 2571 \text{ KN/M}^3$ (iv) $C\tau = 1714 \text{ KN/M}^3$	Vendor to agree			
17.0	ERECTION & COMMISSIONING				
17.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control system & all types of other supplied equipment, machining of test pieces etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance. The available crane capacity at the proposed location of the machine will be 30 Ton. The vendor will ensure to make requisite arrangement for lifting of heavier consignment/ items/ assembly of the machine not getting covered by this capacity.	Vendor to confirm			
17.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer & Air Compressor shall also be responsibility of the vendor.	Vendor to confirm			
17.3	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at Clause 21 (Machine Acceptance) shall form part of the commissioning activity.	Vendor to confirm			
17.4	Tools, Tackles, Test Mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier.	Vendor to confirm			
17.5	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
17.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit			
17.7	All Cover Plates required for the machine and its peripherals shall be supplied by the vendor.	Vendor to confirm			
17.8	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm and submit details.			

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
17.9	Test mandrel for checking spindle run-out & alignment should be supplied	Vendor to confirm			
17.10	The vendor shall supply sufficient quantity of paint of the machine and carry out touching wherever the paint is damaged during transit or erection of the machine.	Vendor to confirm			
17.11	Charges, duration, terms & conditions for E&C should be furnished in details separately by vendor along with offer.	Vendor to offer			
18.0	ACCURACY TESTS:				
18.1	GEOMETRICAL ACCURACIES :				
18.1.1	Geometrical Accuracy Tests shall be in accordance with ISO 3070 standard or equivalent applicable standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall also be submitted with the offer.	Vendor to confirm and submit			
18.1.2	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance tests at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm			
18.2	MACHINE POSITIONING ACCURACIES & REPEATABILITY : SHOULD BE MEASURED AS PER VDI/DGQ 3441/ ISO 230-2 (LATEST REVISION) USING LASER INTERFEROMETER.	Vendor to confirm			
18.2.1	Positioning Accuracy (Pa per 1000mm) for X,Y,Z,W & V axes : 0.015 mm	Vendor to specify			
18.2.2	Positioning Accuracy Pa for B-axis : 6 secs	Vendor to specify			
18.2.3	Repeatability (Ps per 1000mm) for X,Y,Z,W & V axes : 0.010 mm	Vendor to specify			
18.2.4	Repeatability Ps for B-axis : 6 secs	Vendor to specify			
18.2.5	Total positioning error P for entire travel for X,Y,Z,W & V axes	Vendor to specify			
18.2.6	Total positioning error P for B-axis	Vendor to specify			
18.2.7	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm			
19.0	AMBIENT CONDITIONS & THERMAL STABILITY :				
19.1	Power Supply (AC): Voltage = 415V +10% / -10% of fluctuations , Frequency= 50Hz +/- 3% , No. of phases = 3 phase (3 wire system without neutral). Ambient Operating Conditions: Temperature = 5 to 45 degree Celsius , Relative Humidity = 95% max.	Vendor to take note			
19.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to confirm			
19.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished by Vendor)	Vendor to confirm			

Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
19.4	Vendor to confirm that machine is suitable for successful running with guaranteed accuracies and production of jobs with accuracies as specified in proveout components in the conditions specified above. Details of provisions made on the machine for the same are to be furnished to BHEL.	Vendor to confirm			
19.5	The machine, including Attachments and Accessories etc., should be suitable for 24 hrs. continuous operation to its full capacity for 24 hour a day and 7 days a week throughout. Vendor to ensure and confirm the same.	Vendor to confirm			
20.0	PROVEOUT OF BHEL COMPONENTS :				
20.1	Drg. nos. : 5810,5820 & 5921 - all 3 drgs pertains to single component Slide only (Input condition - It is aluminium AL 5083 fabricated structure having 5 to 10 mm allowance all over the machined surface. Note : - Vertical Boring Operations on Extruded Cylindrical Part is not in vendor's scope) will be proveout component for this machine. Job setting plan, Machining process plan & Requirement of Tools etc. for machining of proveout components shall be discussed and mutually agreed with vendor (Final proveout component drawing no. may change, however, the machining features of the changed components shall be in line with the original component drawing). Complete machining of prove out components shall be done by Vendor at BHEL works to the specified design accuracy and surface finish, using cutting tools and CNC programs to be provided by the vendor to prove the machine after complete erection, tests & test piece machining etc. Material for the proveout components shall be provided by BHEL. Vendor shall submit final job setting plan, machining process plan, tool layout & list with complete description, time study etc. for the proveout machining within two months of placement of order. Vendor shall submit CNC programs prior to start of erection of Machine at BHEL works.	Vendor to offer and confirm			
20.2	Vendor shall be fully responsible for machining of proveout components as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding accuracy requirements of the proveout components, whether specified or not, should be discussed and cleared by vendor during initial technical discussions.	Vendor to confirm			
20.3	Vendor shall be responsible, financially or otherwise, for any deviation/ rejection in proveout component to the extent of its cost, due to wrong machining or malfunctioning of the machine during proveout machining and also for the delay in machining due to improper recommended tooling etc..The cost of such deviation / rejection, if any, shall be refunded by the vendor to BHEL.	Vendor to confirm			
21.0	MACHINE ACCEPTANCE: (Tests/Activities To be Performed by Vendor)				
21.1	Tests/Activities to be carried out at supplier's works on the machine before dispatch :				
21.1.1	Geometrical Accuracy Tests as per test chart.	Vendor to accept and confirm			
21.1.2	Positioning Accuracy Tests as per VDI-DGQ/3441 / ISO 230-2	Vendor to accept and confirm			

SL NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
21.1.3	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.	Vendor to accept and confirm			
21.1.4	Demonstration of all features of the machine, CNC system and all Accessories.	Vendor to accept and confirm			
21.1.5	Machining of NAS Test Piece. Vendor to supply test piece and tooling for it's machining.	Vendor to accept and confirm			
21.2	Test to be carried out at BHEL works while commissioning the machine :	Vendor to accept and confirm			
21.2.1	Geometrical Accuracy Tests as per test chart.	Vendor to accept and confirm			
21.2.2	Positioning Accuracy Tests as per VDI-DGQ/3441 / ISO 230-2	Vendor to accept and confirm			
21.2.3	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.	Vendor to accept and confirm			
21.2.4	Demonstration of all features of the machine, CNC system & all accessories to the satisfaction of BHEL for their efficient and effective use.	Vendor to accept and confirm			
21.2.5	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to accept and confirm			
21.2.6	Machining of NAS Test Piece. Vendor to supply test piece and tooling for it's machining.	Vendor to accept and confirm			
21.2.7	Job prove out.	Vendor to accept and confirm			
21.2.8	Two weeks supervision of independent operation of machine by BHEL after job proveout.	Vendor to accept and confirm			
21.2.9	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works	Vendor to accept and confirm			
22.0	PACKING:	Vendor to accept and confirm			
22.1	Sea worthy & rigid packing for all items of complete machine, CNC System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes	Vendor to confirm			
23.0	GUARANTEE :				
23.1	Guarantee for 2 years of complete machine from date of issuance of final Erection & Commissioning (E&C) certificate issued by BHEL after successful completion of clause no.17 & 21. In case an item installed on offered machine fails during Guarantee period, that part has to be replaced free of cost by the vendor.	Vendor to confirm			
24.00	GENERAL : The vendor should submit the following information:				
24.1	Machine Model	Vendor to specify			
24.2	Total connected load (KVA):	Vendor to specify			
24.3	Floor area required (Length, Width, Height) for complete machine & accessories.	Vendor to specify			

SI. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
24.4	Painting of Machine/ Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to confirm			
24.5	Total weight of the machine	Vendor to specify			
24.6	Weight of heaviest part of machine	Vendor to specify			
24.7	Weight of the heaviest assembly/ subassembly of the Machine	Vendor to specify			
24.8	Dimensions of largest part/ subassembly/ assembly of the machine	Vendor to specify			
24.9	Vendor to submit, along with offer, the reference list of customers where similar machines have been supplied mentioning the customer, Machine Model, major specifications of the supplied machine, CNC System, Year of Supply etc.	Vendor to specify			
24.10	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to specify			
24.11	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to specify			
24.12	Ladder is to be provided to access the machine elements located at the top of the column.	Vendor to offer & confirm			
25.0	PRE-QUALIFYING REQUIREMENT (PQR): -				
25.1	Only those vendors (Original Equipment Manufacturer; OEMs) should quote, who have supplied & commissioned at least three (3) numbers FLOOR TYPE CNC HORIZONTAL BORING MACHINE of Spindle Diameter 160 mm or more , Boring spindle axial travel (W-Axis) 800 mm or more and Ram+Spindle (Z+W) Travel of 1600 mm or more, to two or more different customers for similar applications in the past ten years (on the date of opening of Tender) and referred machines must be operating satisfactorily for more than one year after date of commissioning (on the date of opening of Tender). Vendor to submit PO Copy of the three supplied machines as referred above.	Vendor to accept & submit			
25.2	Out of three supplied machines as referred to in Clause 25.1, at least one should have been supplied in the country other than country of origin or supplied in India. Vendor should submit proof of the same.	Vendor to confirm			
25.3	The following information is to be submitted by the vendor about the companies where similar machine(s) have been supplied. This is required from all the vendors for qualification of their offer.				
25.3.1	Name of the customer(s)/ company(s) where referred machine is installed.	Vendor to inform			
25.3.2	Complete postal address of the customer(s).	Vendor to inform			
25.3.3	Month & Year of commissioning.	Vendor to inform			
25.3.4	Parameters of machine(s) supplied (Spindle Diameter, Ram+Spindle Traverse, XYZWVB axes traverse) and application for which the machine is supplied	Vendor to inform			
25.3.5	Name and designation of the contact person of the customer(s).	Vendor to inform			
25.3.6	Phone, FAX no. and e-mail address of the contact person of the customer(s).	Vendor to inform			



Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
25.4	Performance certificate from at least two (2) customers regarding satisfactory performance of machine supplied to them as per Clause no. 25.1 (Original Certificate or Through E-mail directly from the customer). Performance certificate should clearly mention PO number. The original performance certificate may be returned after verification by BHEL, if required.	Vendor to submit			
25.5	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to accept & confirm			

Smit
08/12/2022
(Smit Kumar
Dy. Mgr./DABG)

Manish Narayan
08/12/2022
MANISH NARAYAN
(Sr. Mgr./DABG)

Sanjay Singh Khatri
08/12/2022
SANJAY SINGH KHATRI
(Mgr./NCT)

Vivek Pal Singh
08/12/22
VIVEK PAL SINGH
(Dy. MGR/DABG)

For spare, PDI and
maintainability part of view.
Rhandhary
08/12/22
(Ronit Chaudhary
Dy. MGR/WEX/MM/BL2 & DABG)

P.C. Sinha
08/12/2022
P.C. SINHA
Mgr. (WEX/CNC - EM, FBH/DABG)

Activity Schedule for CNC HORIZONTAL BORING MACHINE



Indent No. 202222240 ; dated 09.12.2022

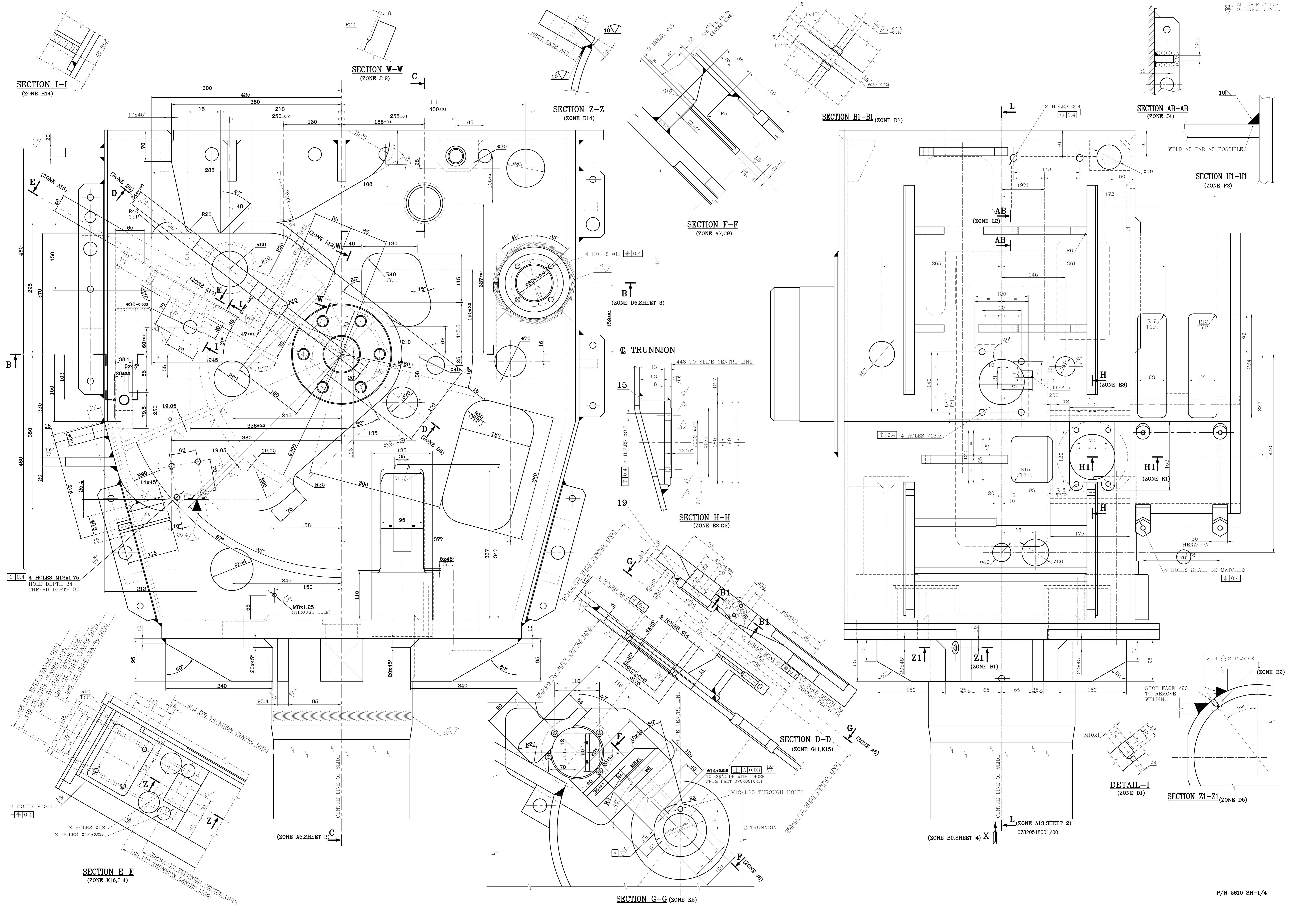
Material code: ZWA020301014

Name/Address & other details of Bidder:-

Sl. No.	Activity	Activity Time in Weeks	Remarks if Any
1	Acceptance of PO		
2	Submission of Documents necessary for getting manufacturing clearance like Civil Drawing, Foundation Drawings and other layouts drawings	4	
3	Comments on Documents from BHEL	2	
4	Final Layout drawings submitted by the vendor		The upper cap limit for activity mentioned in sl no. 4 shall be 12 weeks, however if any bidder wants to quote less than 12 weeks, than he can quote in left column else the activity time given by BHEL as 12 week shalls be final.
5	Manufacturing Time of Machine		
6	Inspection Call by Vendor		At least 45 days before the PDI date
7	Pre- Dispatch Inspection by BHEL and dispatch clearance	2	
8	Machine Dispatch after dispatch clearance		
9	E&C at site		

Rajin Chaurasia


 09/12/22
 MANISH NARAYAN
 Sr. Mgr / DARGA
 Submit by
 Sr. Mgr / DARGA




SECTION I-I
(ZONE H14)

SECTION W-W
(ZONE J12)

SECTION Z-Z
(ZONE B14)

SECTION B1-B1
(ZONE D7)

SECTION AB-AB
(ZONE J4)

SECTION HI-HI
(ZONE F2)

SECTION F-F
(ZONE A7,C9)

C TRUNNION

SECTION H-H
(ZONE E2,G2)

SECTION D-D
(ZONE G11,K15)

SECTION G-G
(ZONE K5)

DETAIL-I
(ZONE D1)

SECTION Z1-Z1
(ZONE B2)

SECTION E-E
(ZONE K16,J14)

B↑

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(ZONE D5, SHEET 3)

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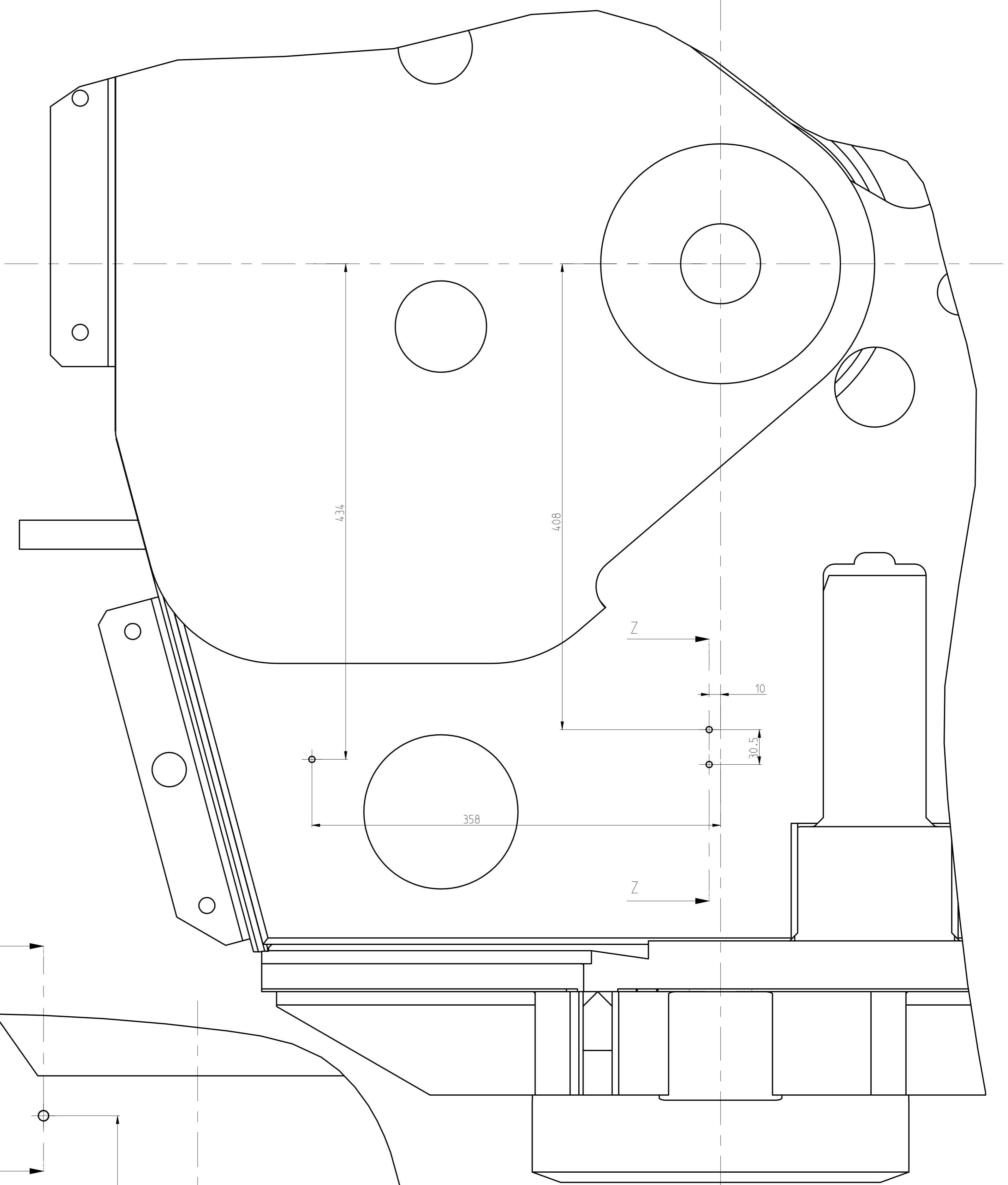
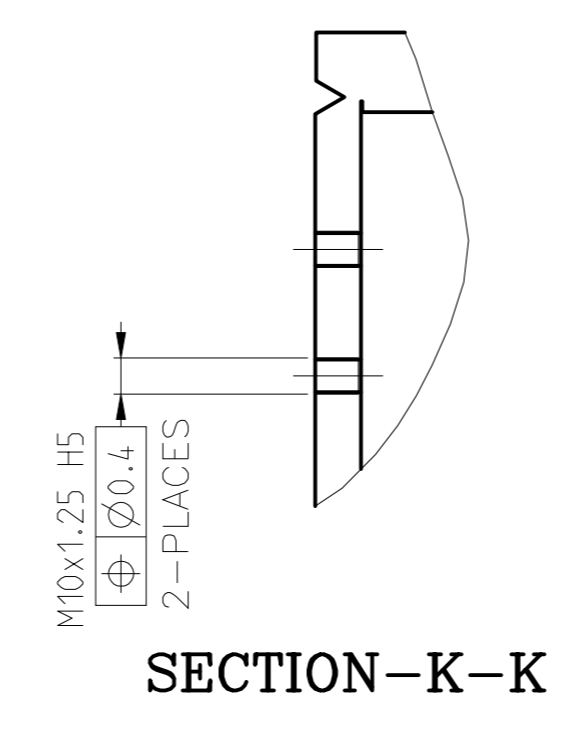
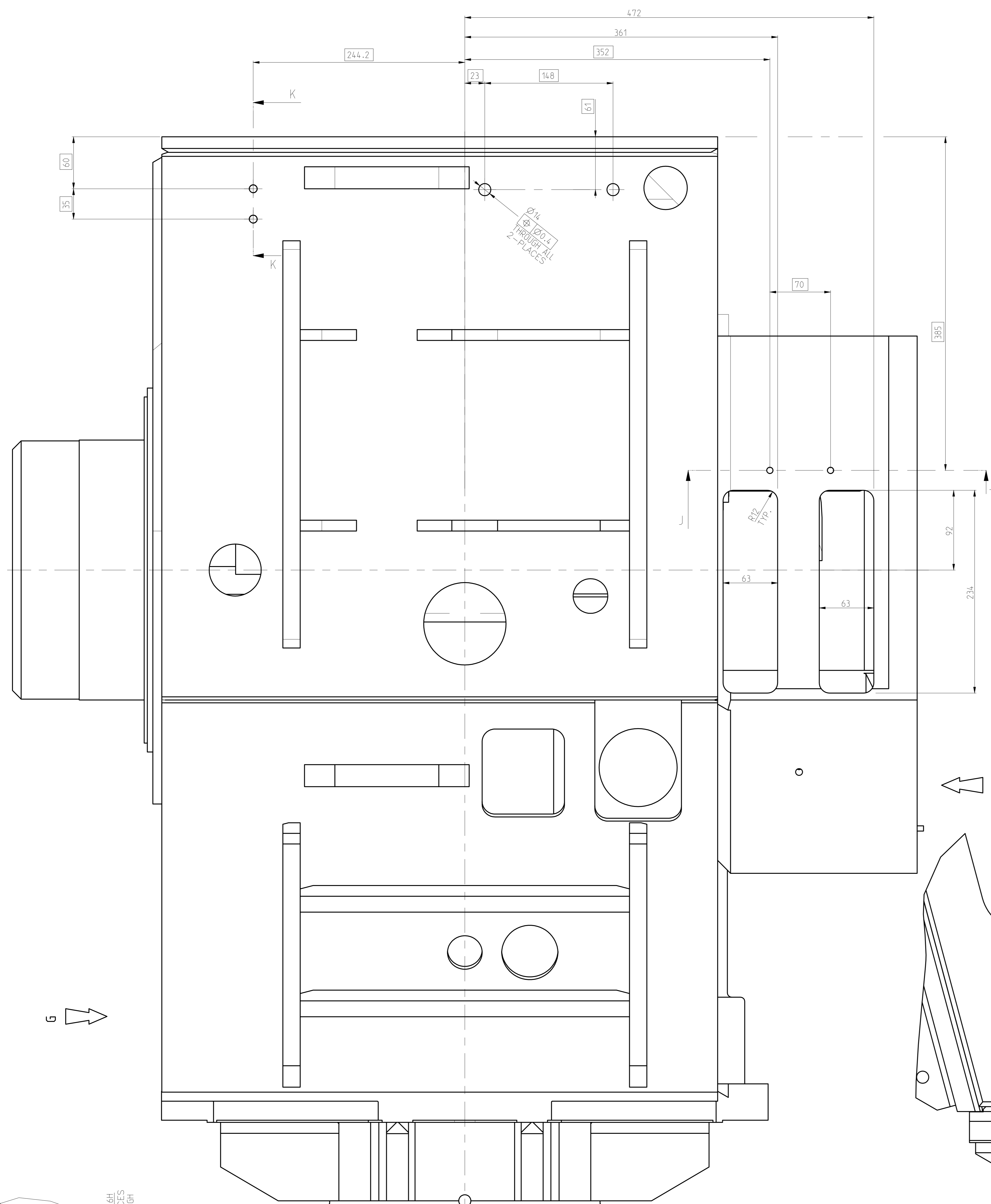
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(ZONE B1)

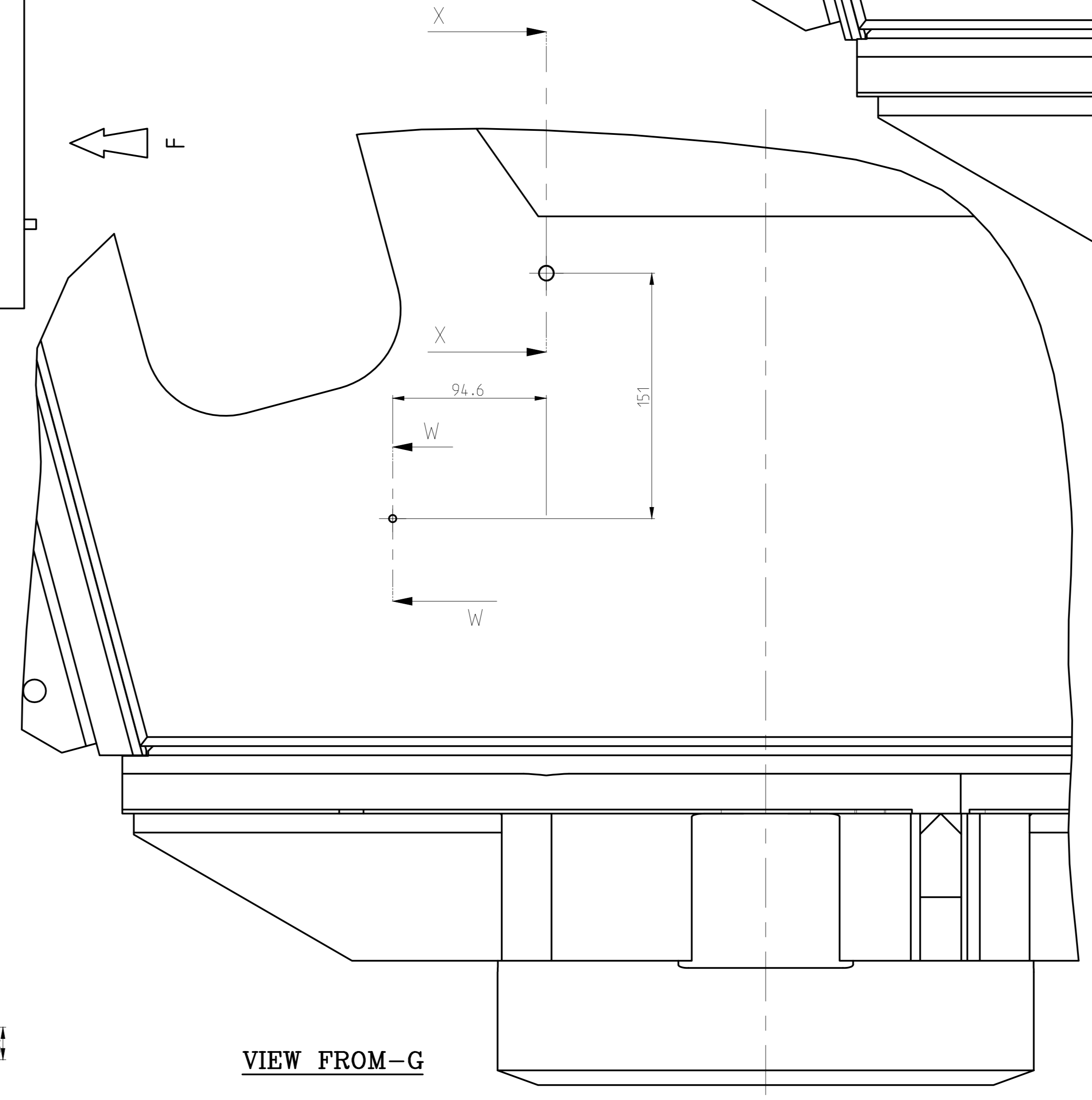
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(ZONE A13, SHEET 2)
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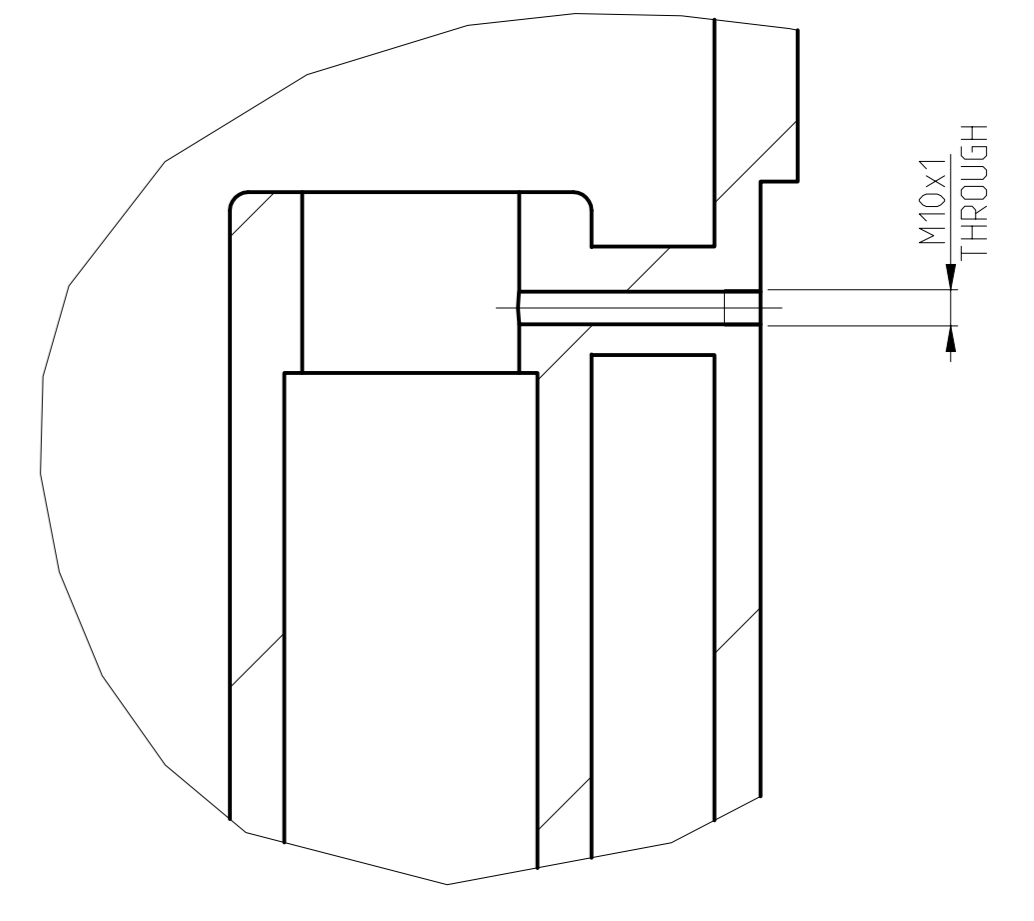
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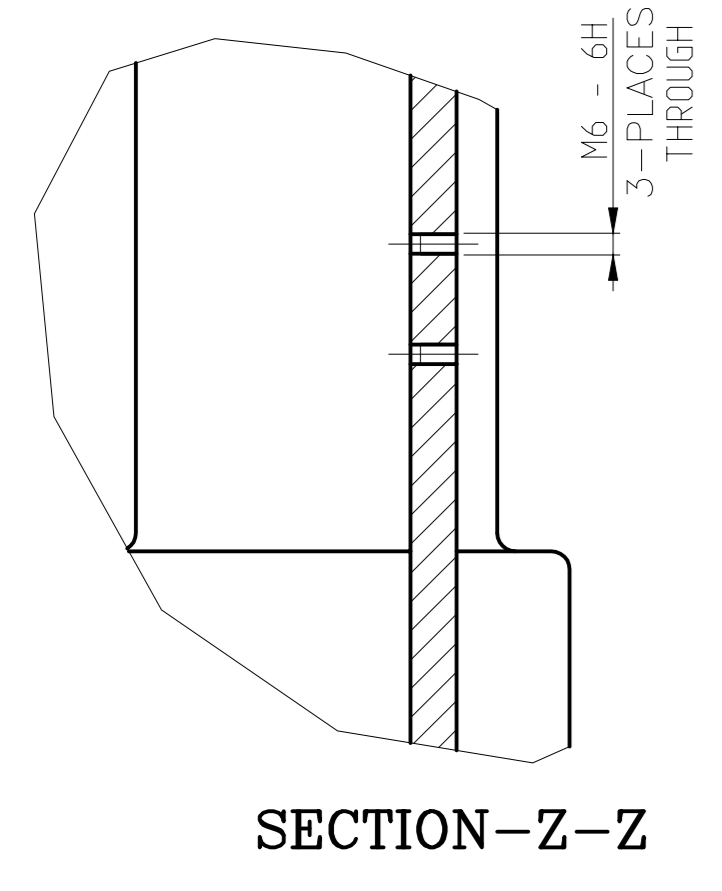
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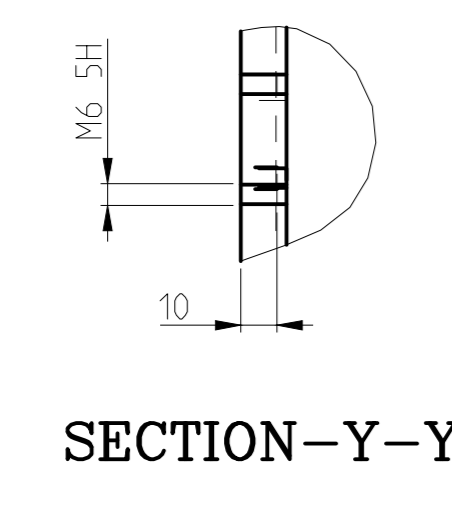
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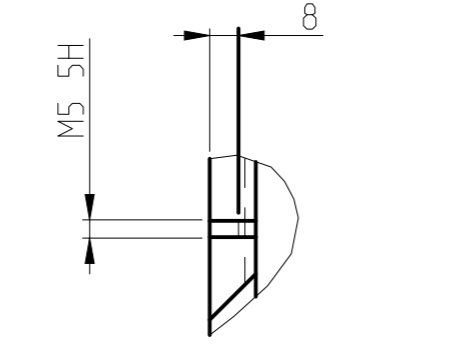
SECTION-X-X



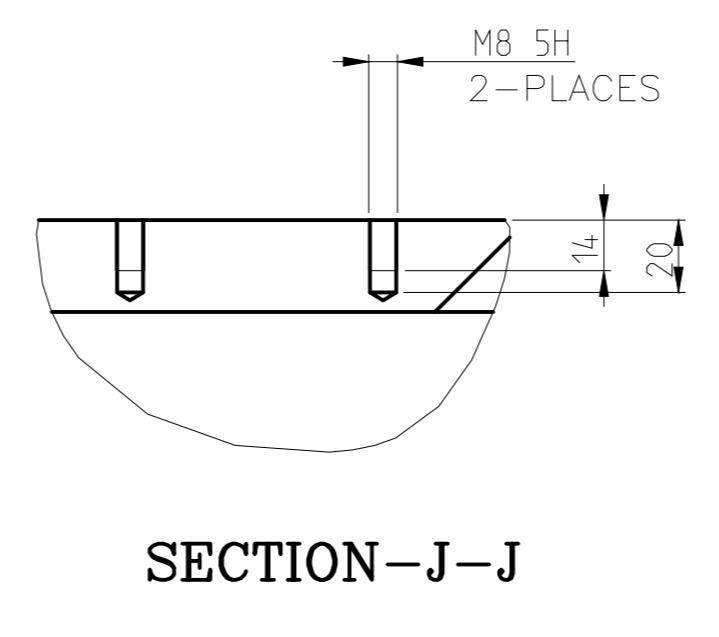
SECTION-Z-Z



SECTION-Y-Y

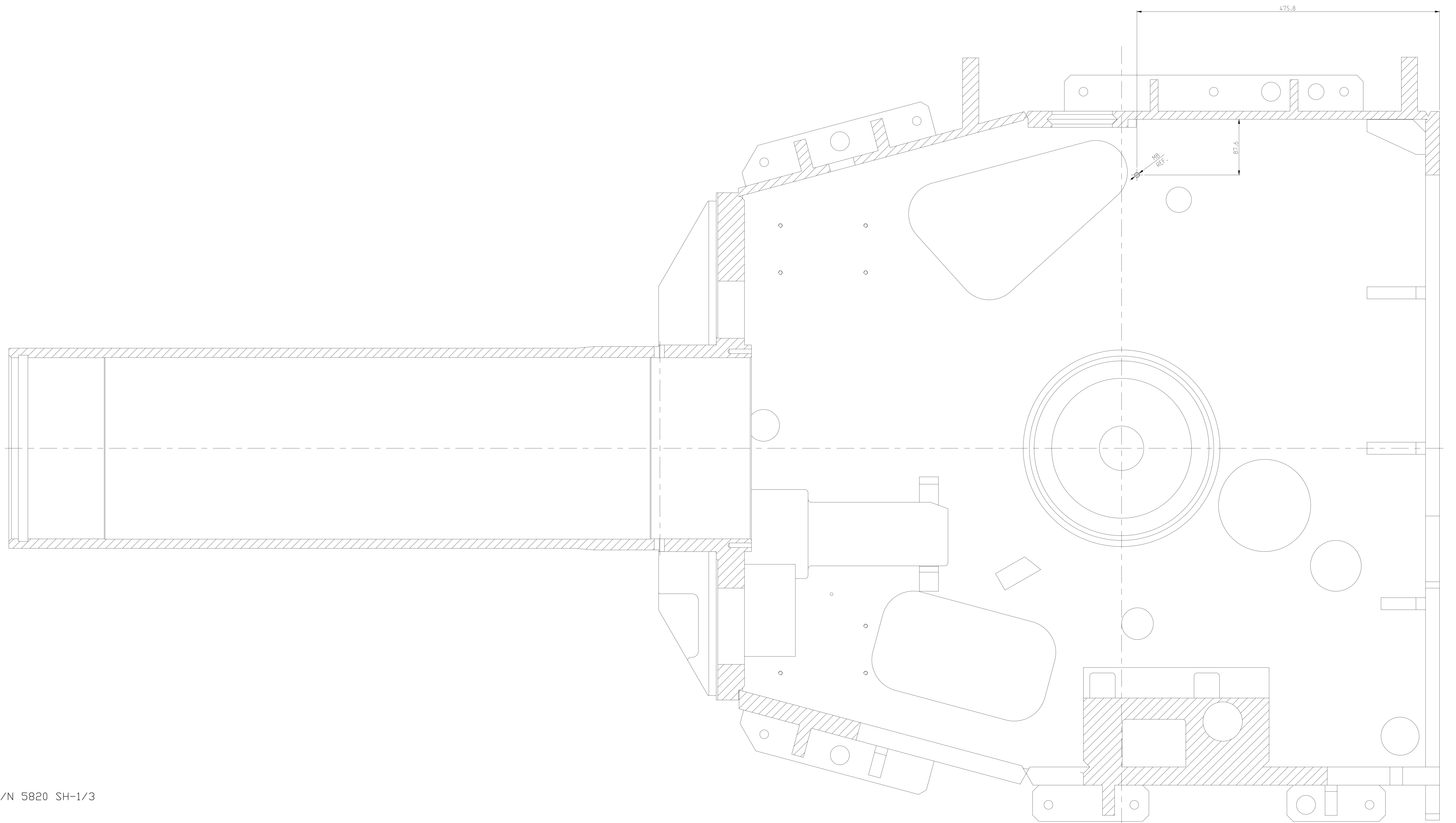


SECTION-W-W



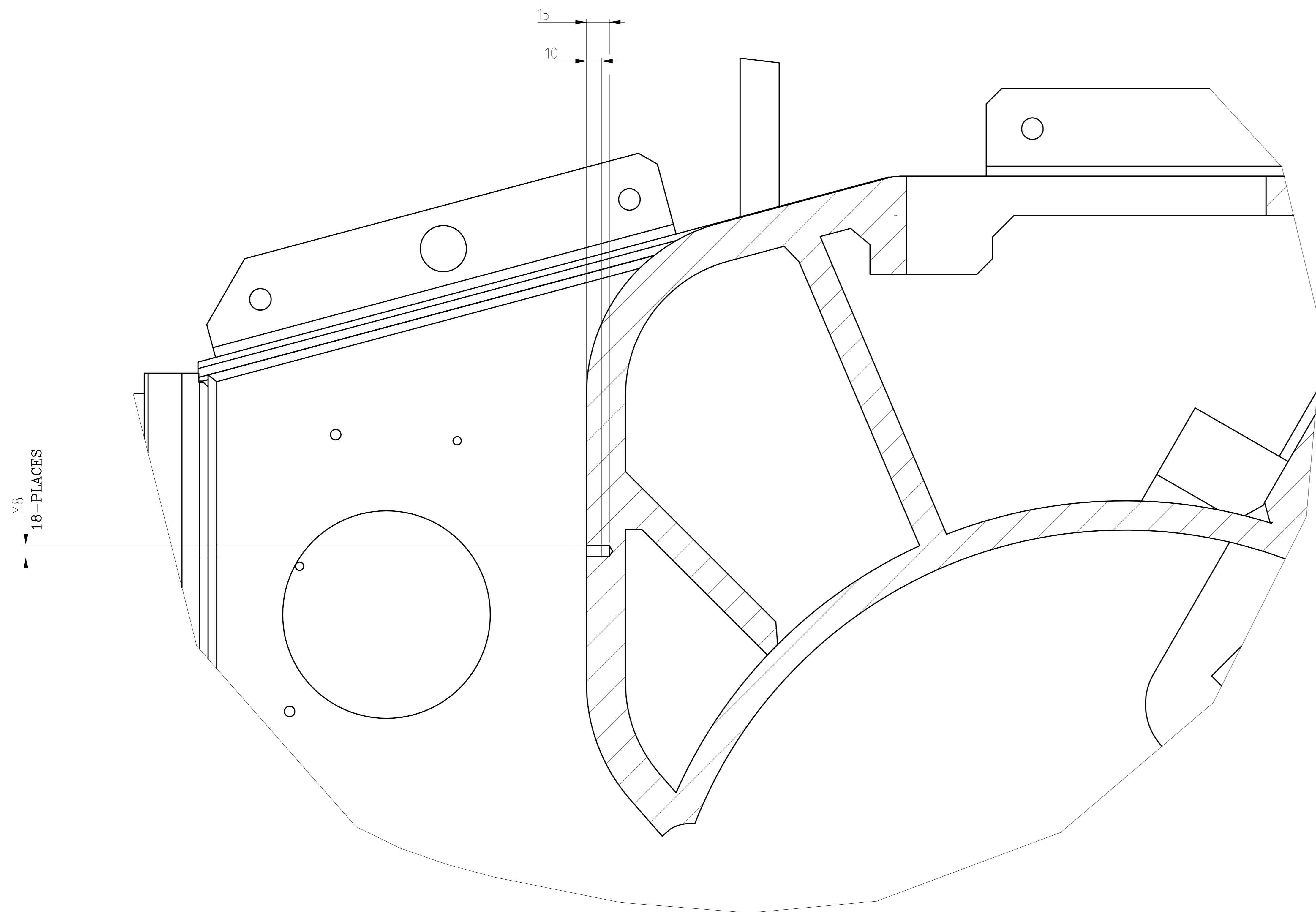
SECTION-J-J

TECHNICAL REQUIREMENTS-
1. IDENTIFICATION SHALL BE DONE AS PER HW0400397.

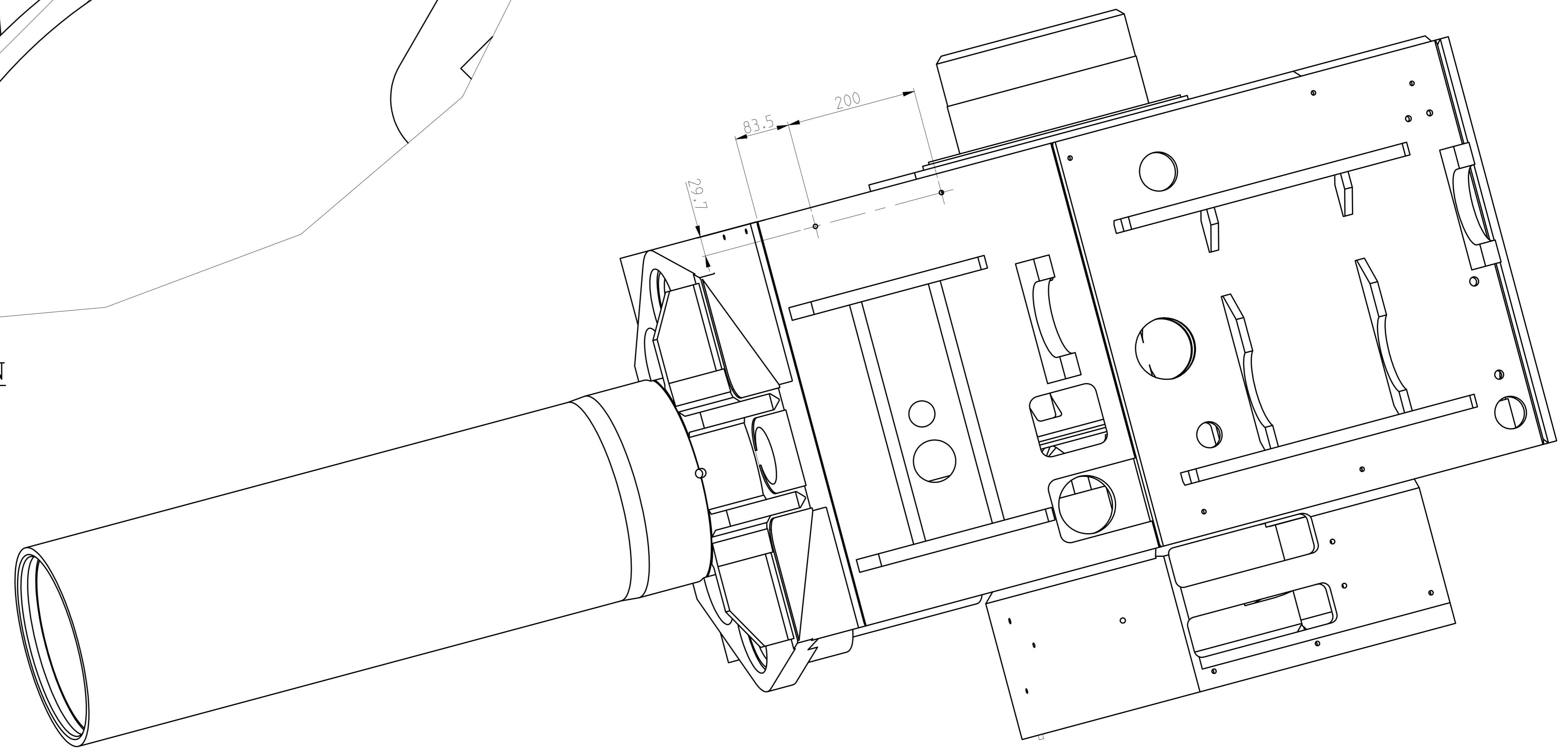


P/N 5820 SH-1/3

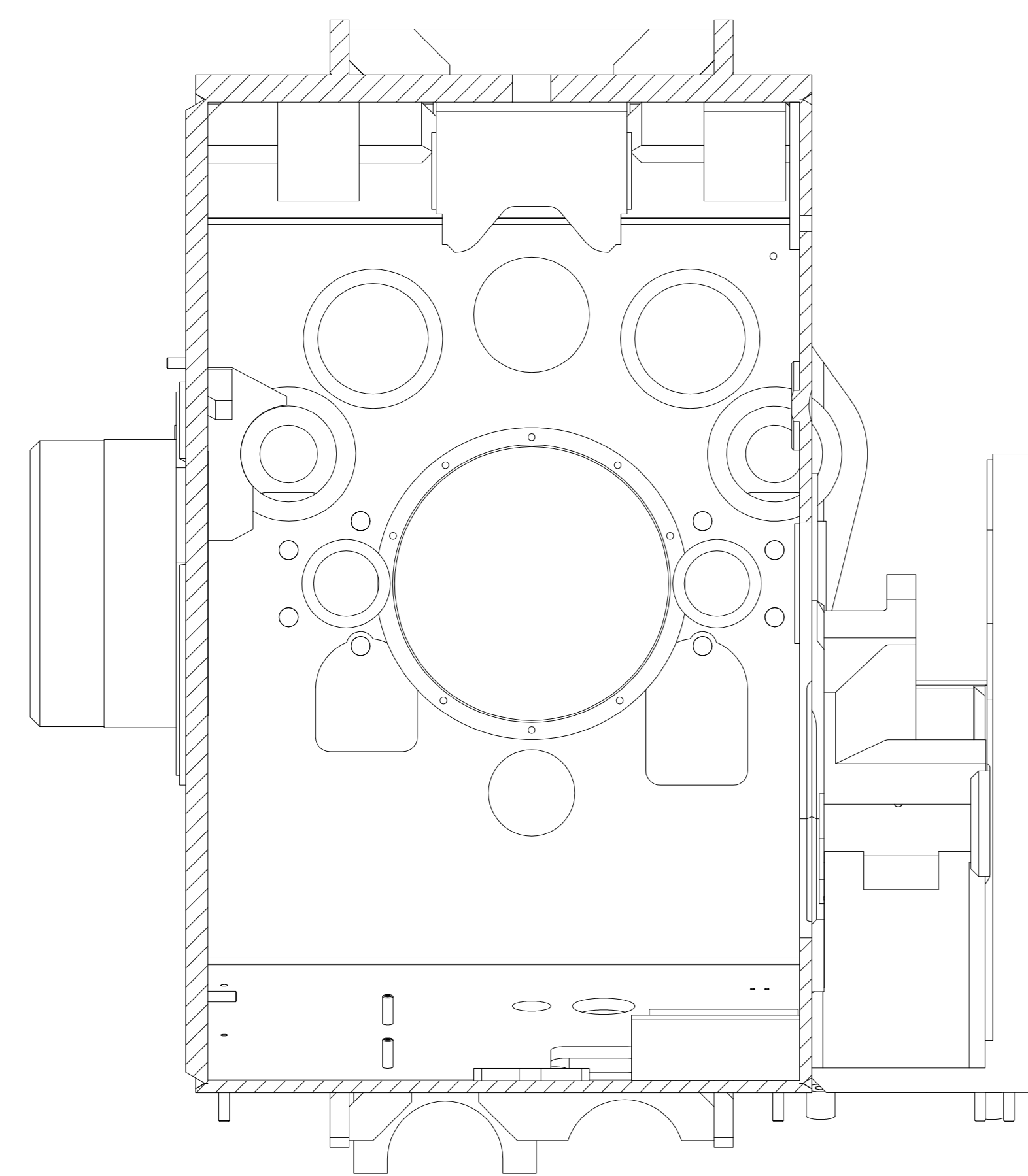
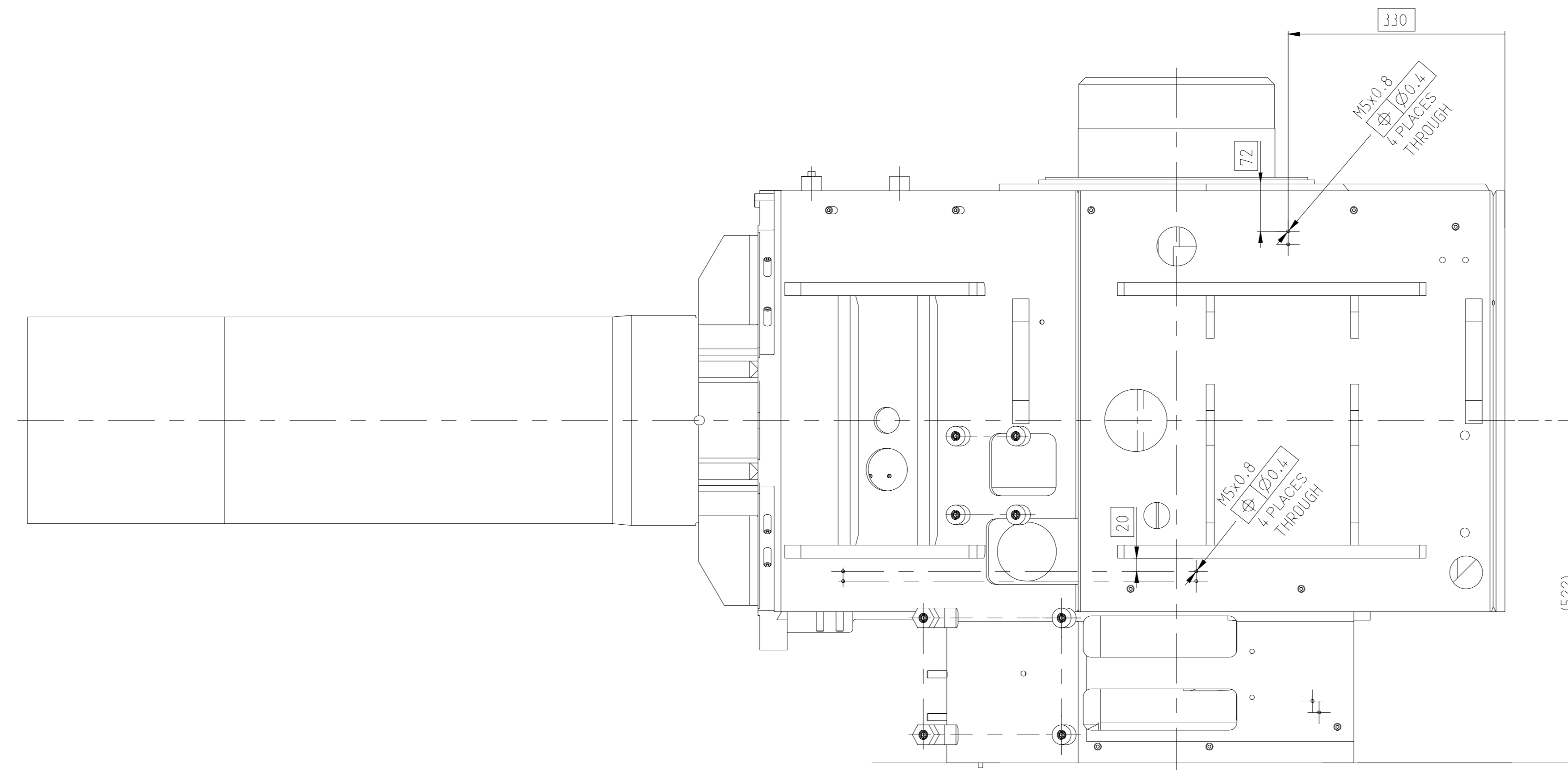
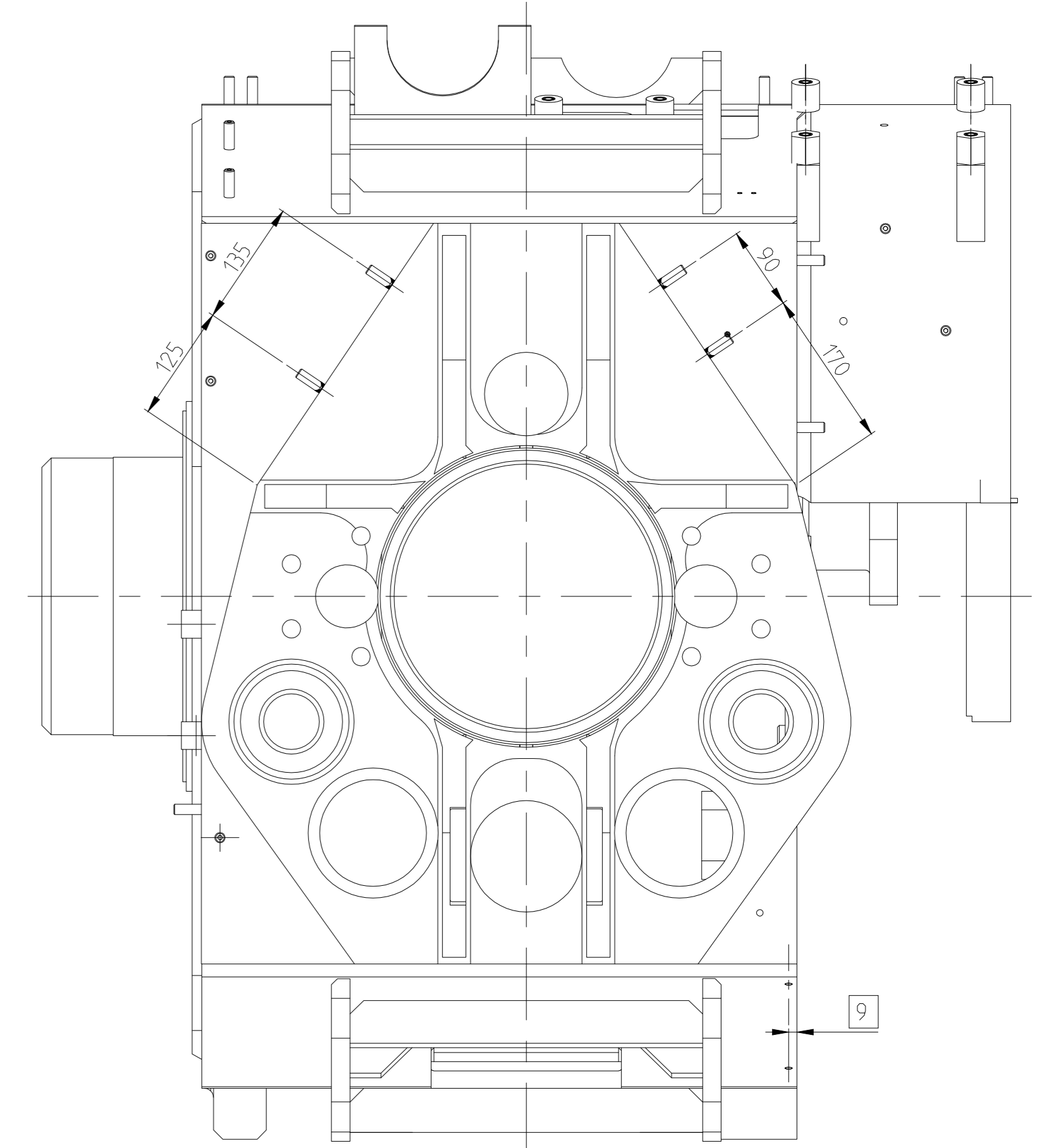
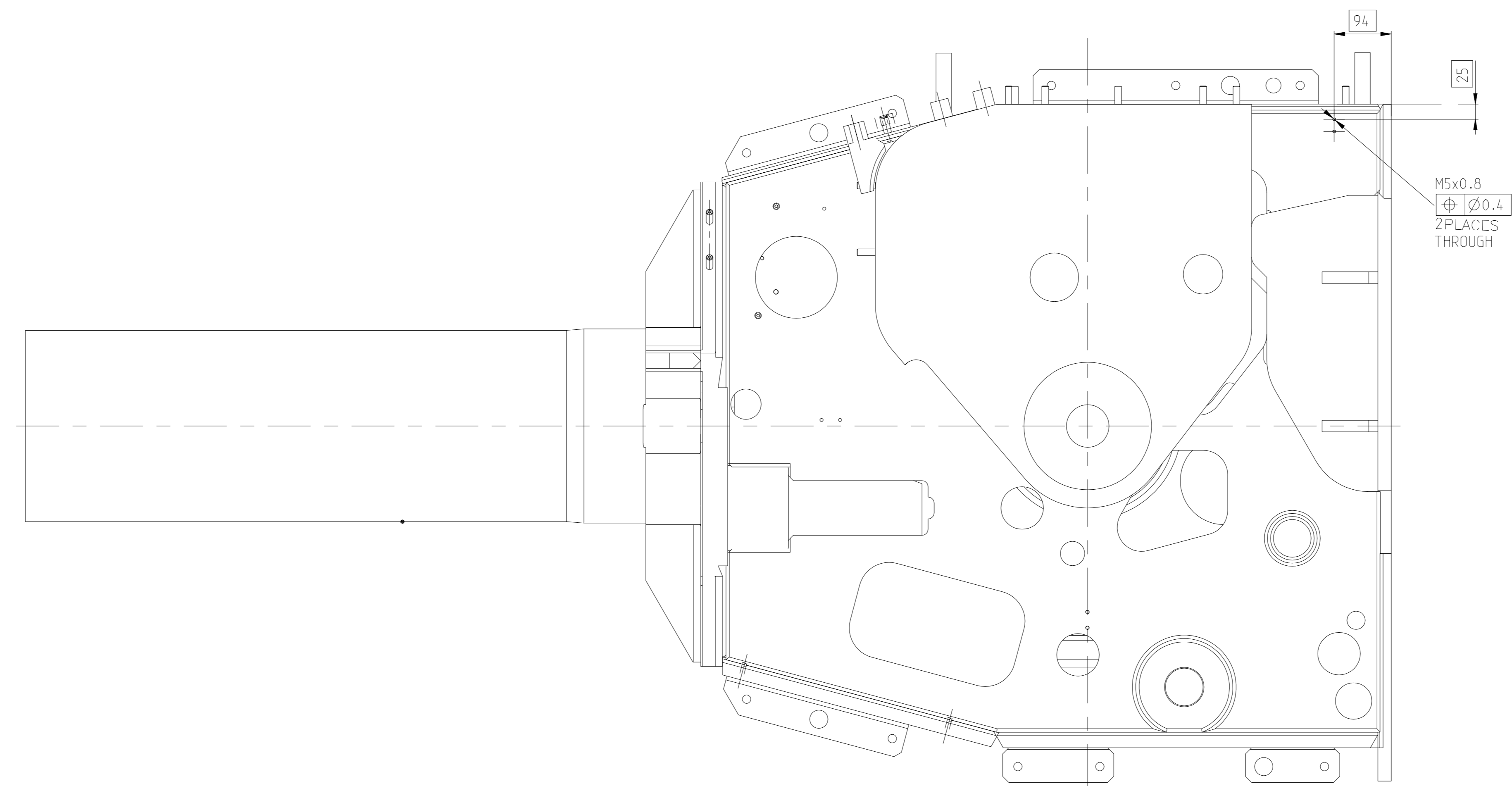
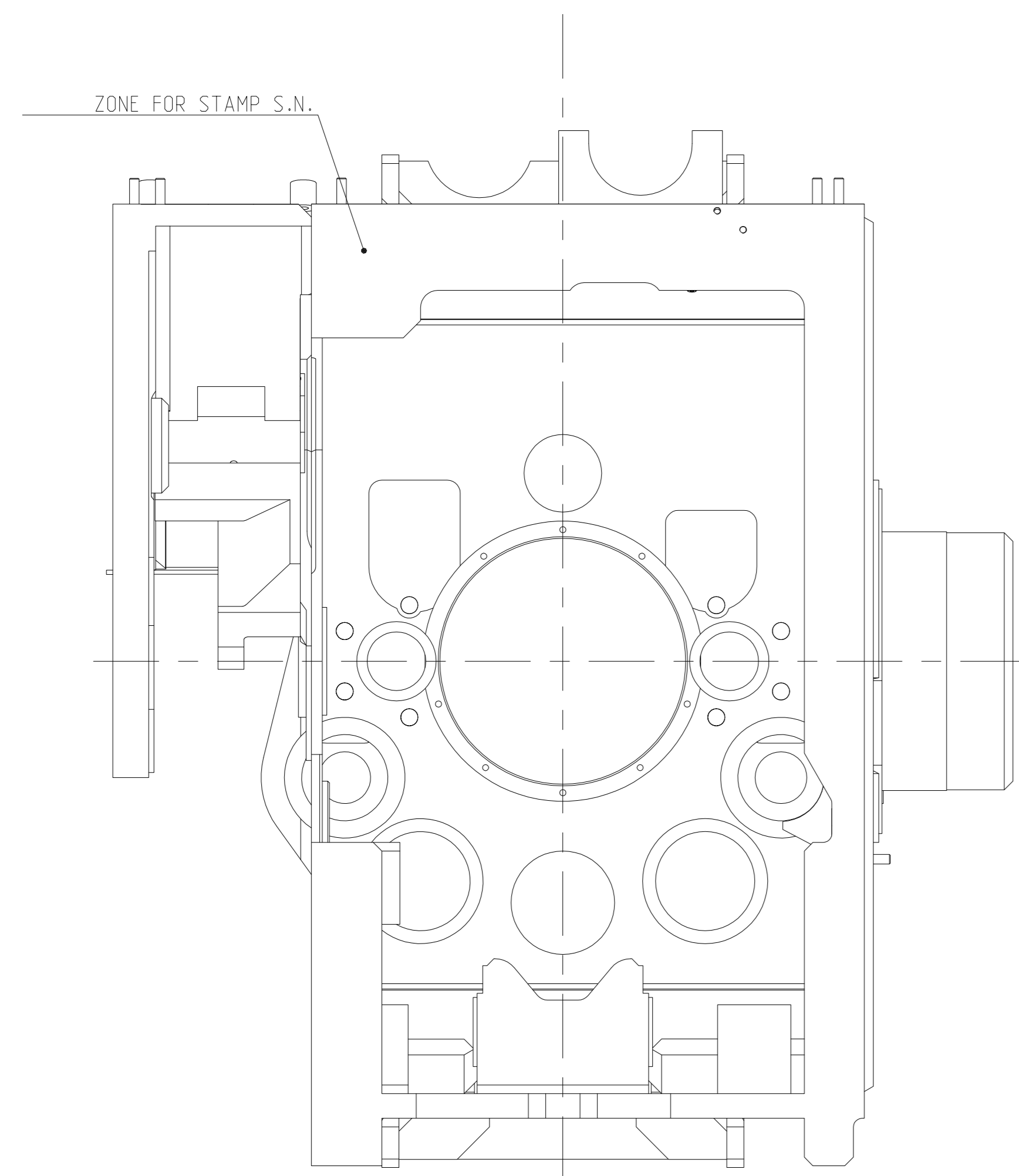
A-A



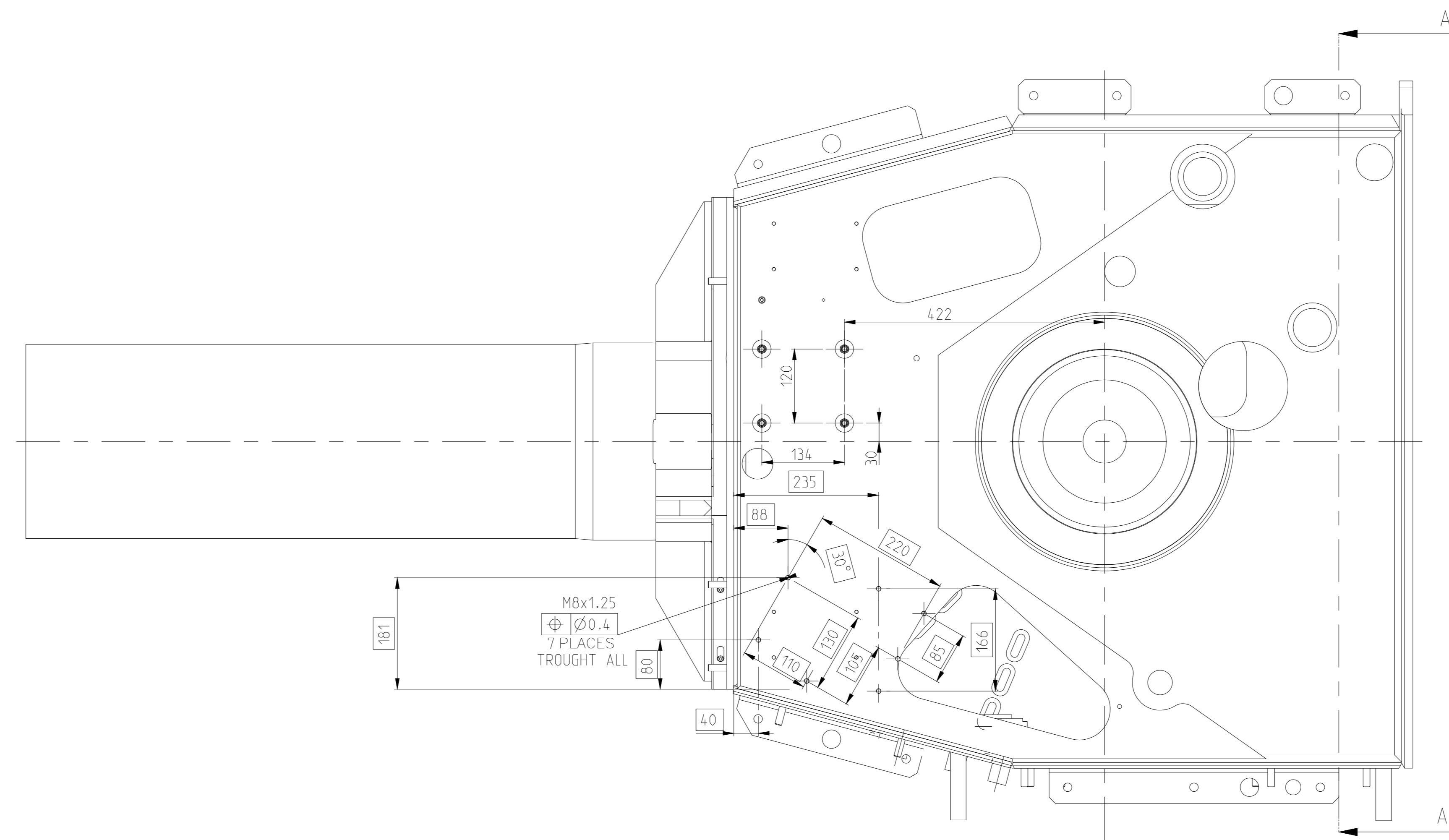
SECTION-N-N



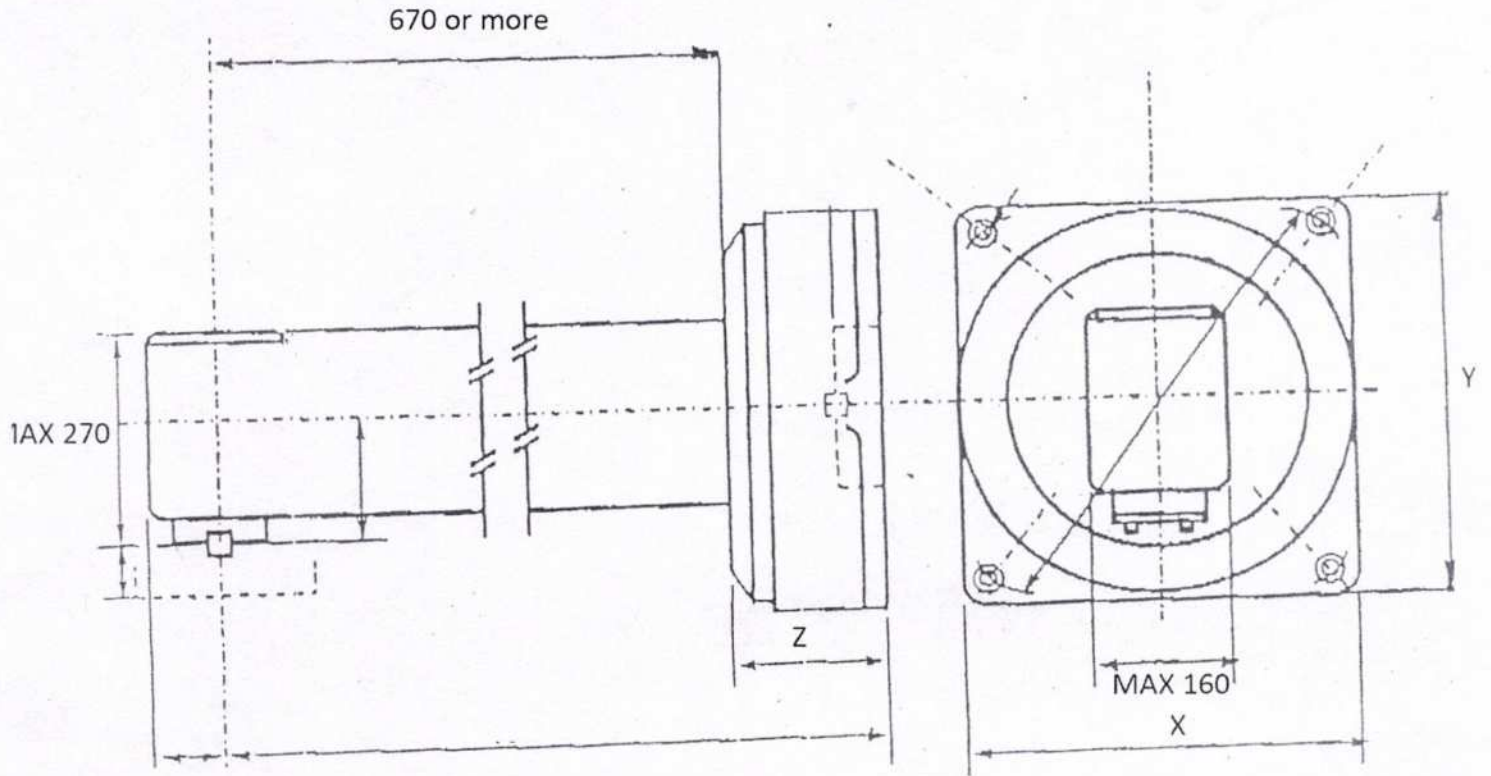
VIEW FROM-X



A-A



SPECIAL MILLING HEAD



All Dimensions are in mm.

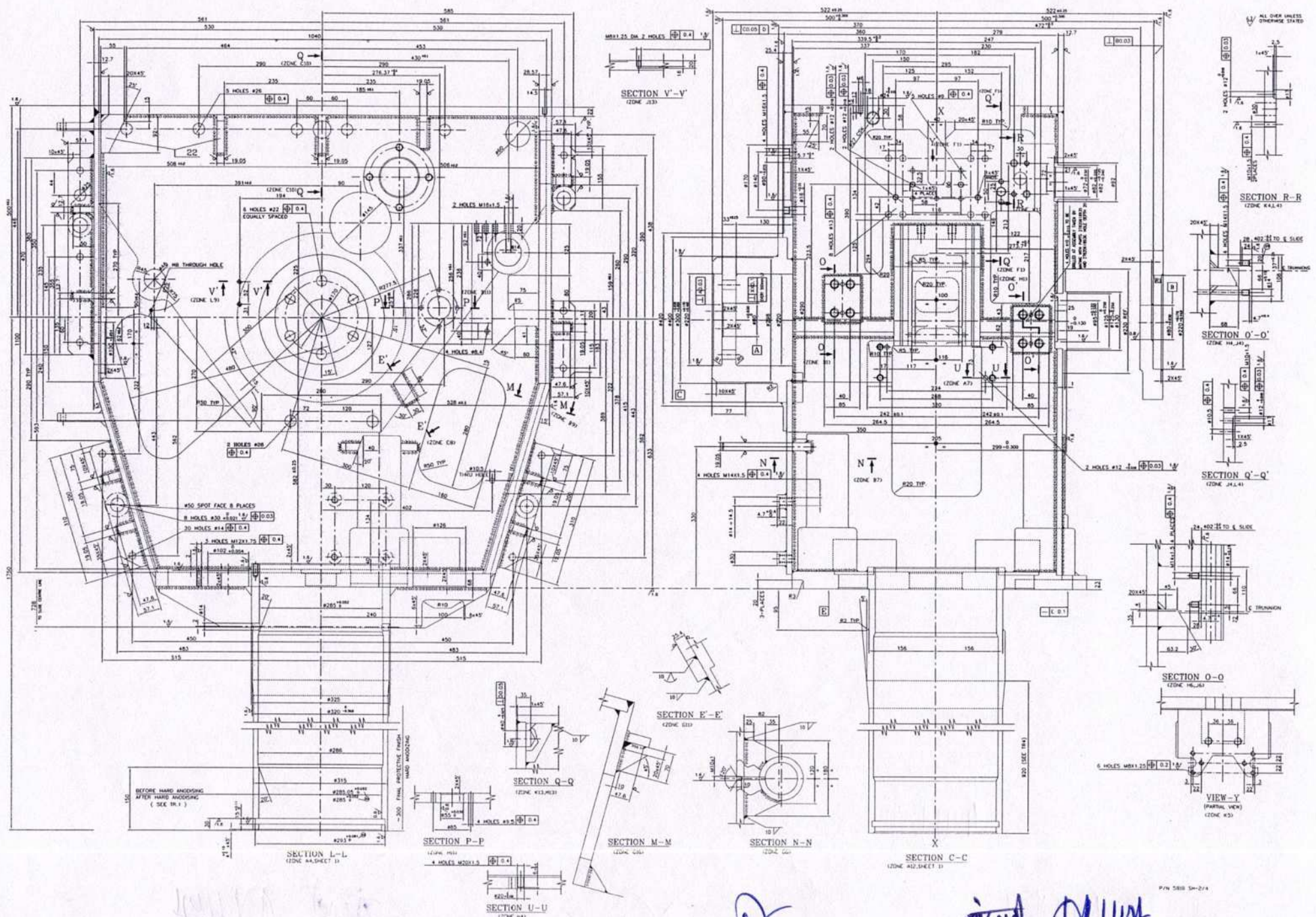
X,Y AND Z - VENDOR TO SPECIFY

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]



ALL DIM UNLESS OTHERWISE STATED

SECTION V-V
(ZONE 233)

SECTION R-R
(ZONE K4.43)

SECTION Q-Q'
(ZONE H4.140)

SECTION Q'-Q'
(ZONE J4.141)

SECTION O-O
(ZONE H6.161)

SECTION E-E'
(ZONE G11)

SECTION M-M
(ZONE C16)

SECTION N-N
(ZONE C1)

SECTION C-C
(ZONE A12 SHEET 1)

SECTION L-L
(ZONE A4 SHEET 1)

SECTION P-P
(ZONE K13.163)

SECTION U-U
(ZONE H4)

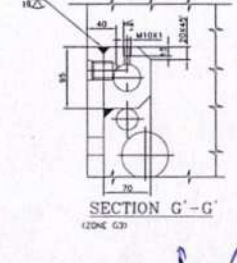
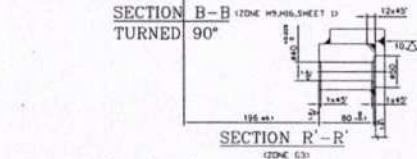
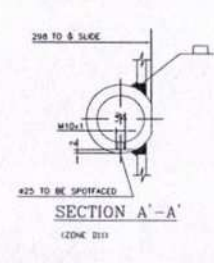
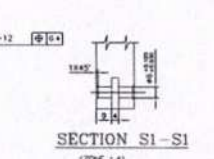
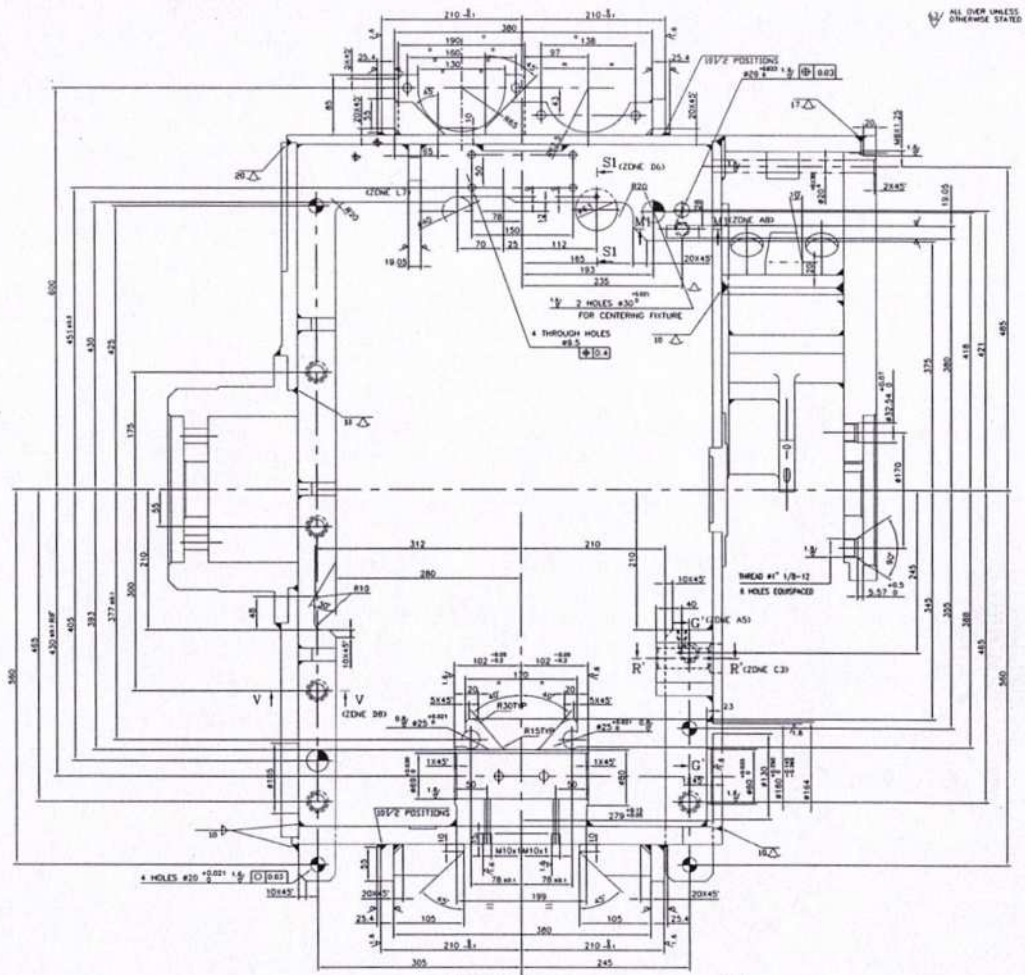
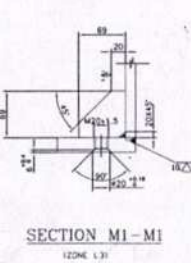
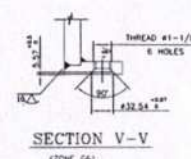
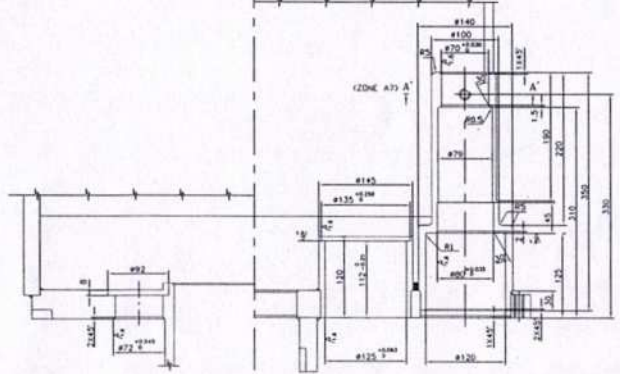
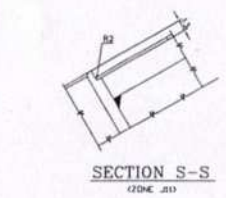
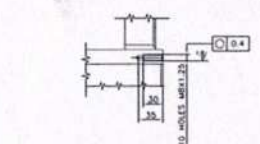
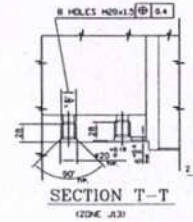
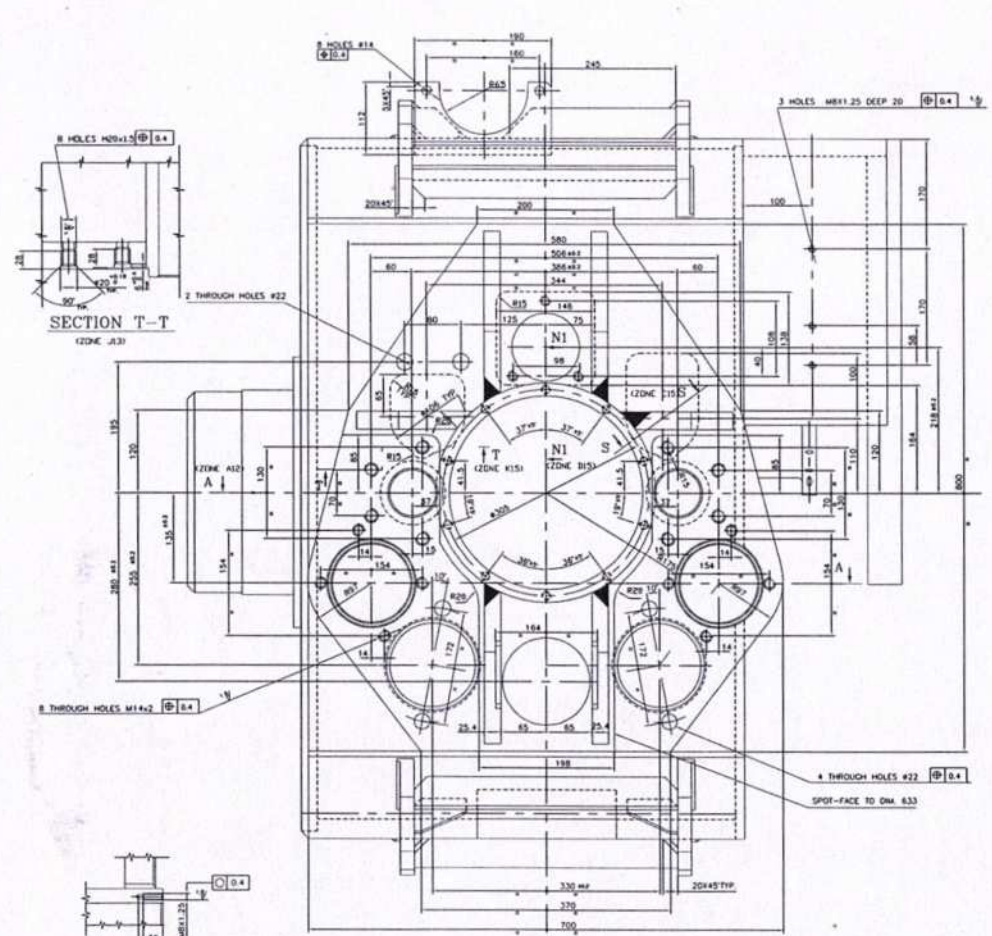
VIEW-Y
(PARTIAL VIEW)
(ZONE K5)

BEFORE HAND ANODIZING
AFTER HAND ANODIZING
(SEE TR. 1)

200 FINAL PROTECTIVE FINISH
HAND ANODIZING

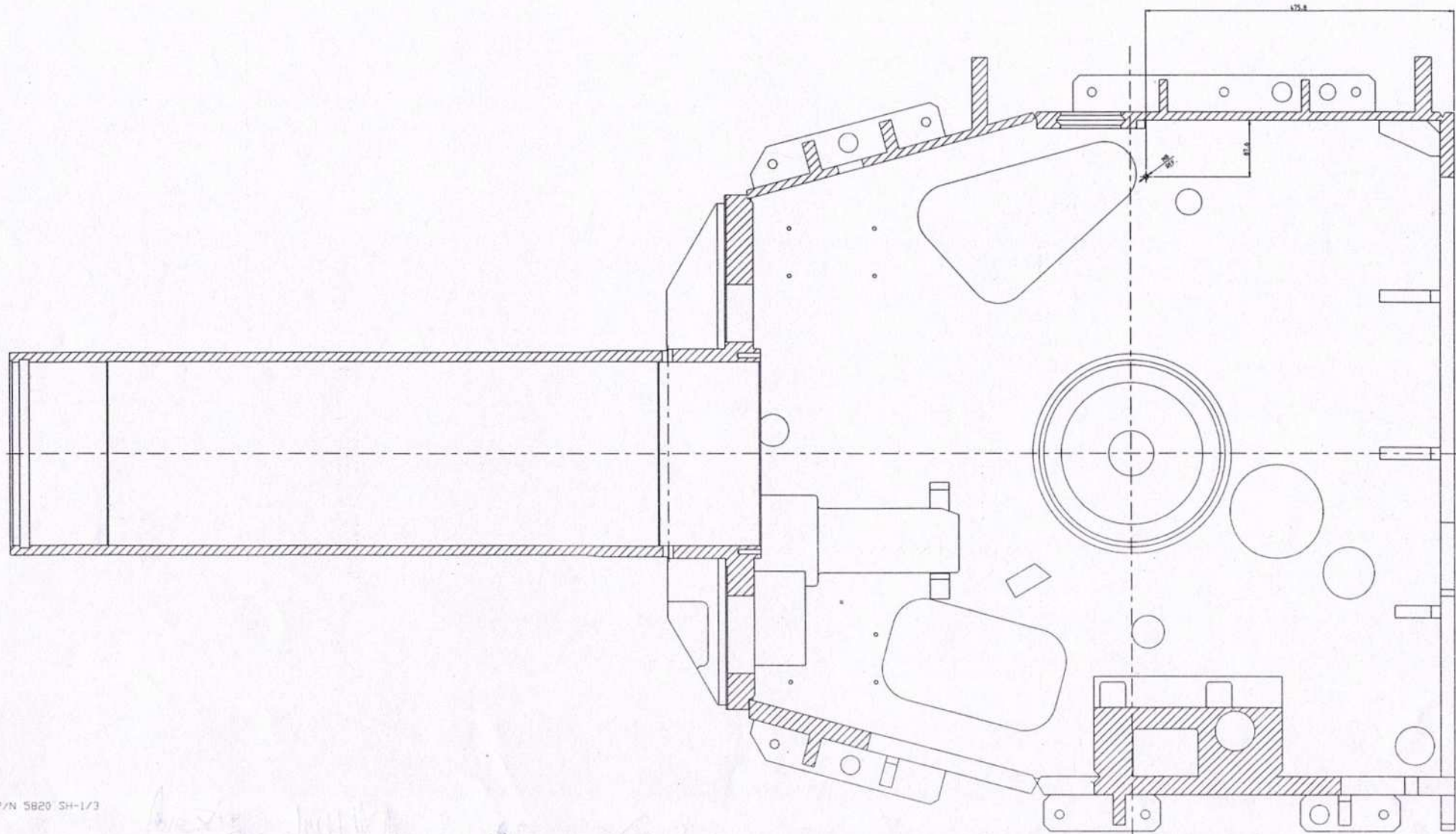
SPD Sut [Signature]

ALL OVER UNLESS OTHERWISE STATED



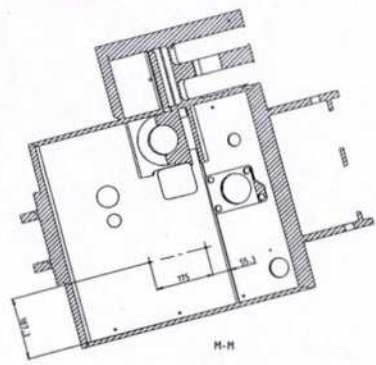
P/N 5810 SH-3/4

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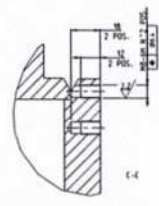
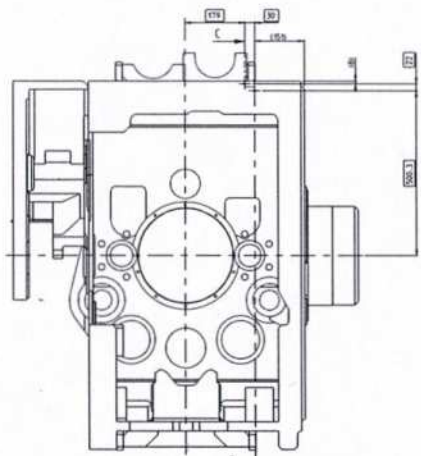


P/N 5820 SH-1/3

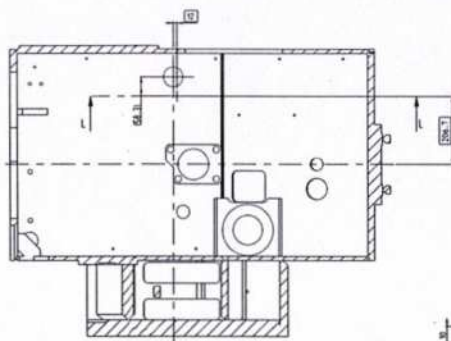
A-A
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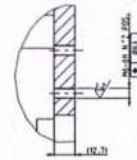
H-H



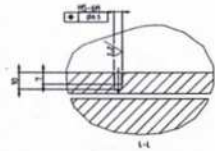
I-I



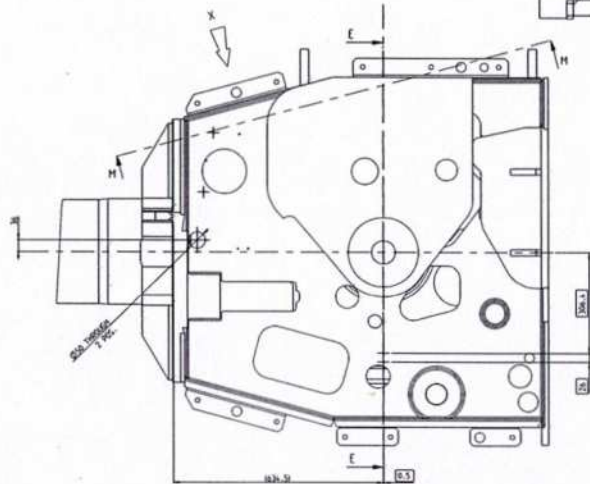
H-H



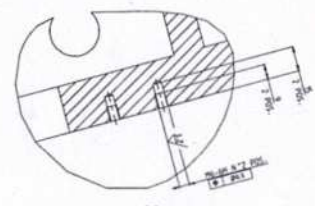
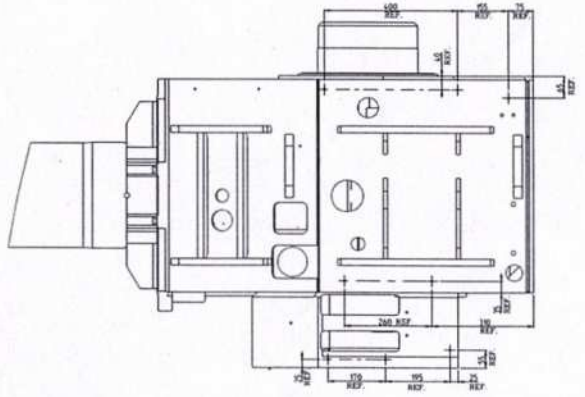
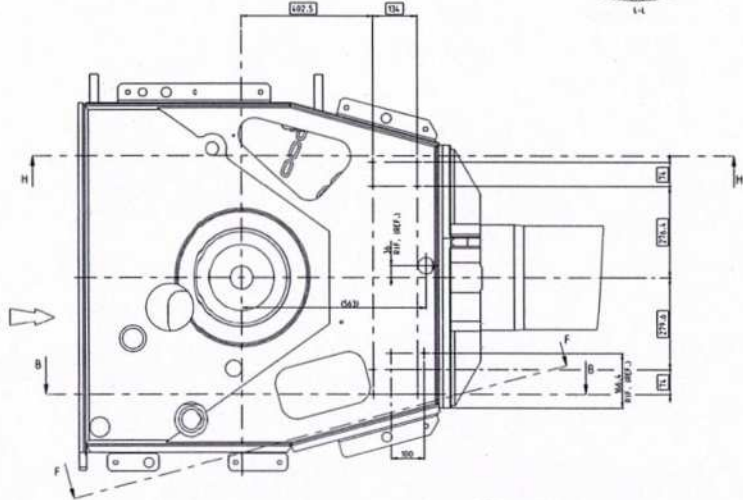
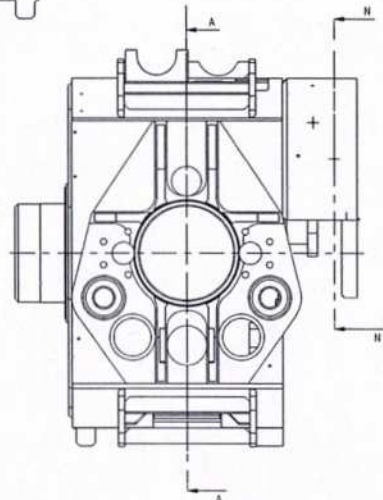
I-I



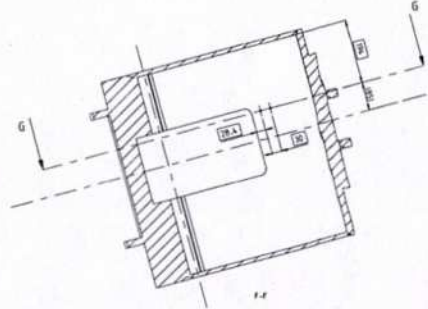
I-I



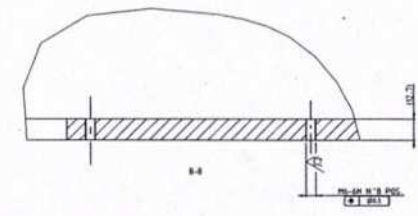
VIEW FROM "X"
SCALE 1:5



G-G



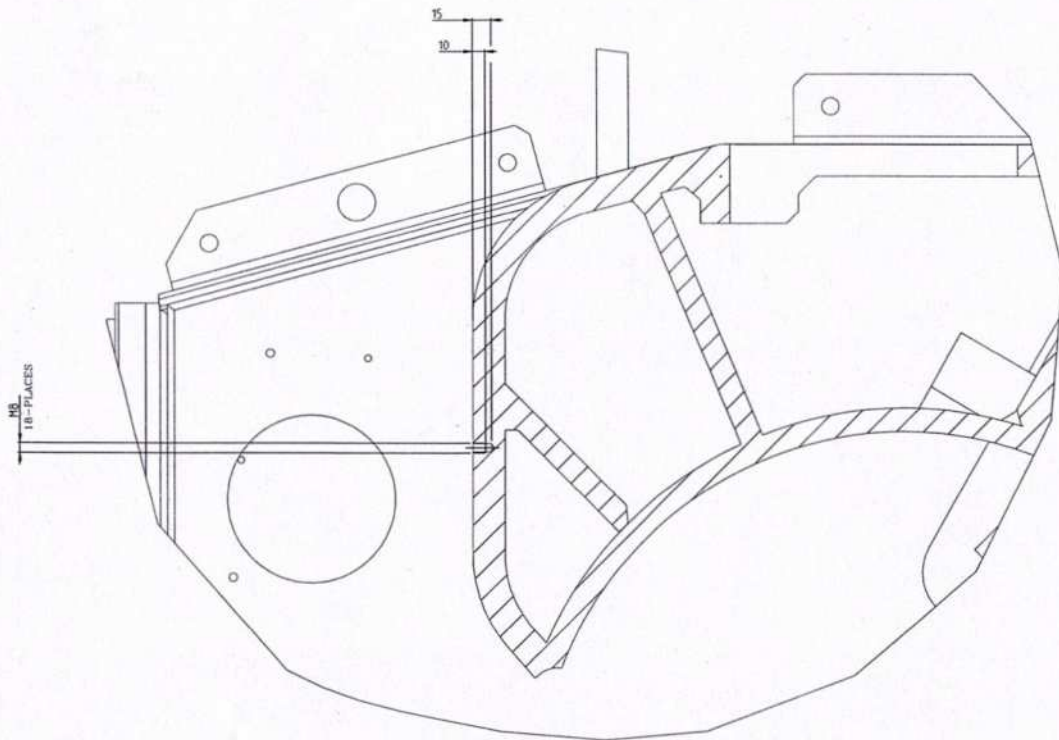
I-I



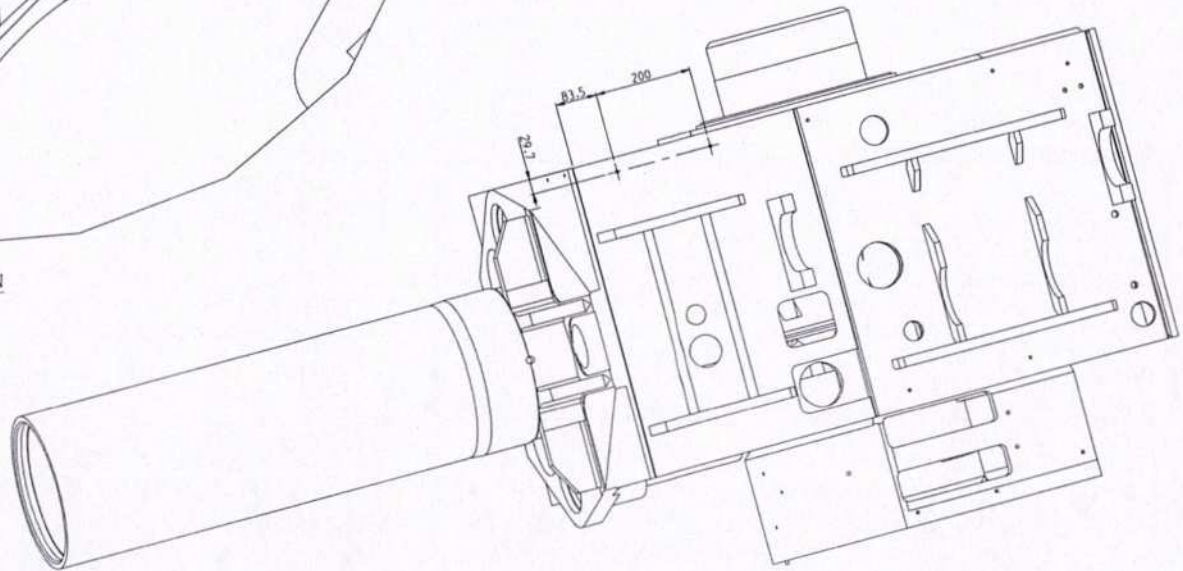
G-G

Handwritten signatures and notes in blue ink:

sf cpd D. M. EXIST



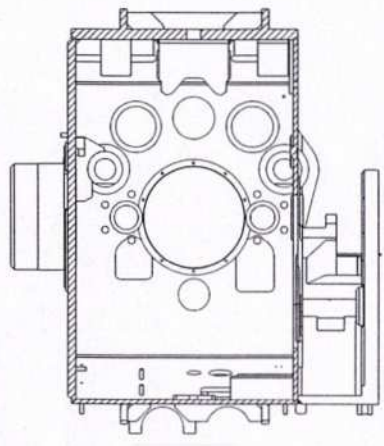
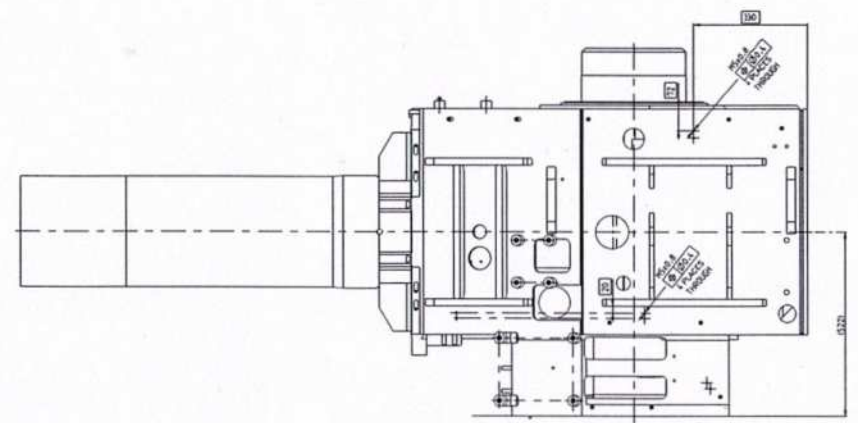
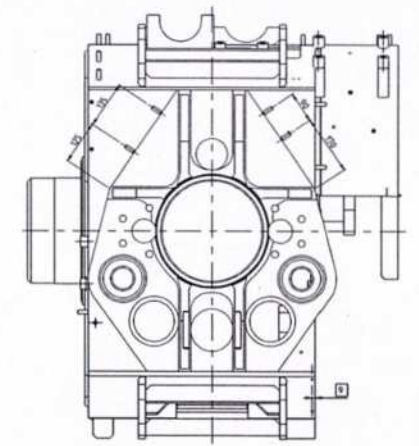
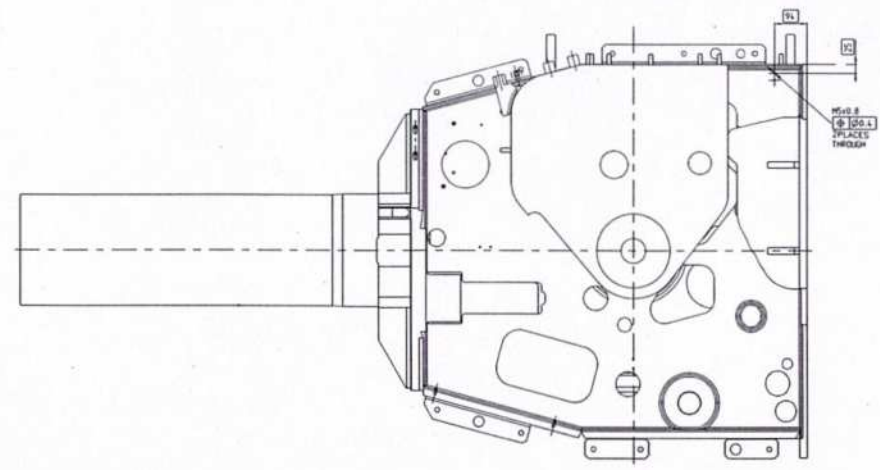
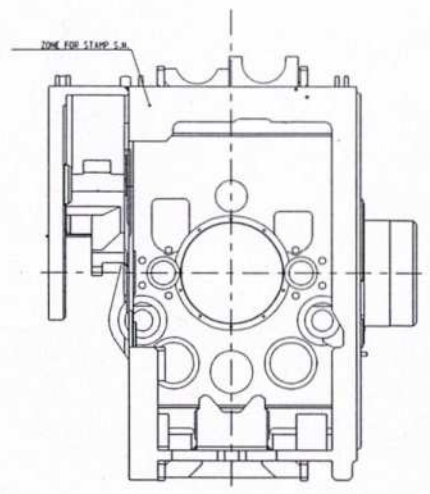
SECTION-N-N



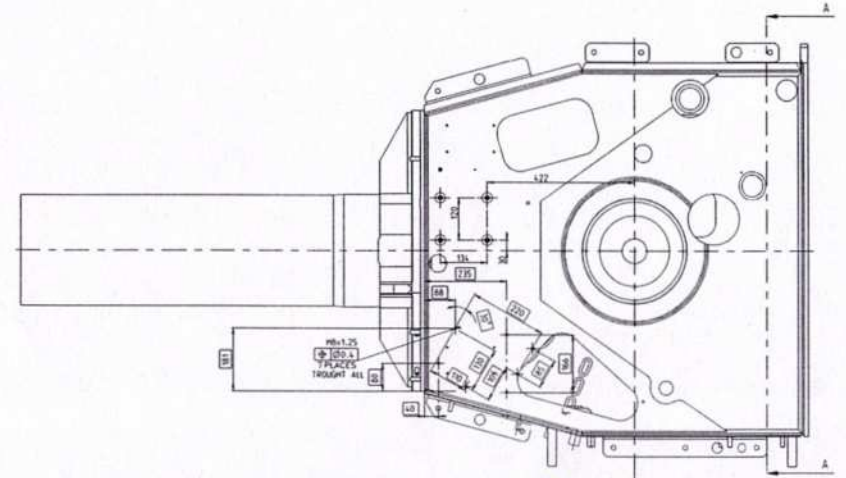
VIEW FROM-X

P/N 5820 SH-3/3

Handwritten signatures and notes in blue ink.



A-A



P/N 5921