

ANNEXURE - II			
UPGRADATION & RETROFITTING OF CNC SYSTEM AND HYDRAULIC SYSTEM IN 340 TON PRESS BRAKE MACHINE			
	<u>SPECIFICATION & SCOPE OF WORK</u>		
S. No	Description	Vendor to Specify deviation if any	BHEL Remarks
1	The scope of work involves UPGRADATION & RETROFITTING OF CNC SYSTEM and HYDRAULIC SYSTEM in 340 TON PRESS BRAKE MACHINE AND PROVE OUT.	Vendor to note	
2	DETAILS OF THE EXISTING MACHINE AND ITS SYSTEMS		
2.1	MACHINE SPECIFICATIONS: Machine Name: Hydraulic Press Brake Type: EHP 340.31/25 Capacity: 3400 KN Power Input: 30KW, 3 Phase, 380V, 50C/S, Stroke Length/Stroke adjustment: 250 mm Fast Approach speed: 80 mm/s Pressing Speed : 6.5 mm/s Return Speed : 70 mm/s	Vendor to note	
	Hydraulic Pump capacity: 70 LPM and Pressure 285 Bar, 1500RPM Hydraulic oil tank capacity: 410 Litre, Hydraulic oil used : Servo System 68 (SS-68) Maximum opening Table - Press Beam: 500mm Additional details: Machine length: 3220mm Machine width: 1680mm Machine height: 2850mm Machine weight: 23500kg (Hydraulic circuit of the existing system Annex-A)	Vendor to note	
2.2	CNC SYSTEM: Machine mounted Electrical control panel consists of Delem DA 69 controller (CNC) , Allen -Bradley PLC (Micro logix 1000), servo drive for backgaging, Amplifier PCB for proportional valves I/O Modules, relays, contactors, switches, drives etc Panel Air conditioner for the electrical cabinet. Floor mounted operator pendant consist of foot switches, operating push buttons and emergency stop. Overhanging operator pendant consist of CNC display, keypad, programming switches and emergency stop. Linear Scales on both sides of the RAM and Limit switches for avoiding tilting of RAM. Job spotting Laser Light Model Z10-24E, Make Z Laser, Germany	Vendor to note	
2.3	Hydraulic System consists of Hydraulic powerpack (410 litres) with suitable capacity of pump and motor (mounted on the top of the pressbrake) Hydraulic valves (DC valves, proportional DC valves, pressure relief valves, pre-fill valves etc.) electrical solenoids, hydraulic cylinders, strainers, gauges, hoses, fitting etc.	Vendor to note	
2.4	BACK GAUGING ASSEMBLY (X-axis): consists of 2.16kW, BALDOR make AC Servomotor(with inbuilt encoder) as prime mover, Timing pulleys and Timing belts, Ball screw & ball nut and guide bar, BALDOR drive for AC Servomotor etc.	Vendor to note	
2.5	Two sets of vertical arrangement, each one consist of screw rod, box nut and Two guide shaft of both sides of screw rod mounted over the back gauging arrangement. This box nut is fitted with the finger type lever for sensing the job and a hand wheel mounted on the top to move the screw rod up/down manually. (R-axis and the detail drawing is enclosed as Annex: B)	Vendor to note	
2.6	Infrared source and sensor are mounted on both the sides on a fixture for safety purpose.	Vendor to note	
2.7	Machine Supplier: Hindustan Hydraulics Pvt. Ltd Punjab.	Vendor to note	

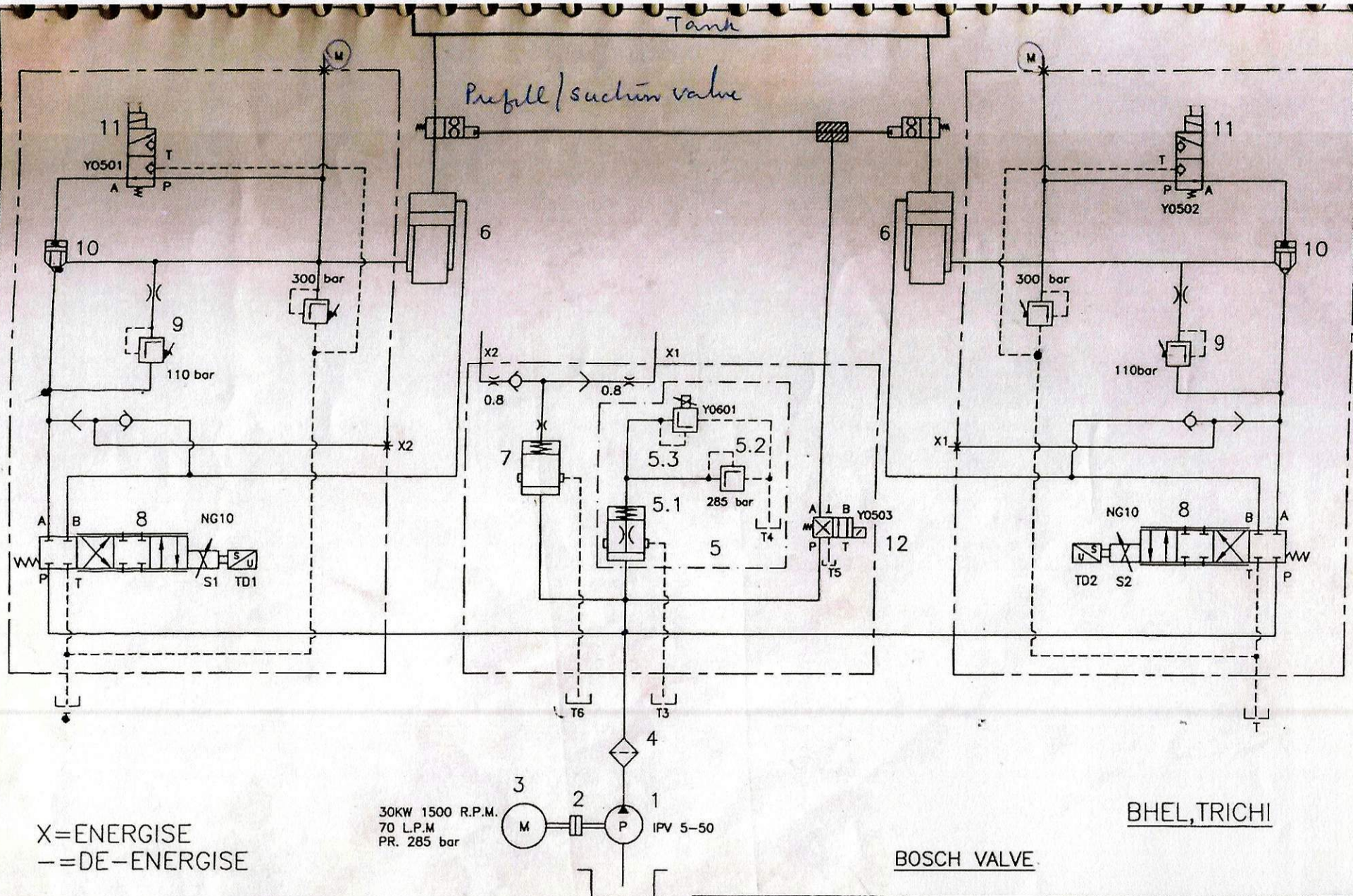
3	FUNCTION OF THE MACHINE		
3.1	The 340 Ton capacity CNC Hydraulic Press brake machine is being used to bend the plate from the thickness 1.5mm to 26mm. The machine having a Punch and Die. The punch is fixed in the ram and the up & down movement of ram is obtained and controlled by two hydraulic cylinders which is fixed in the machine frame. The die is fixed in the machine frame. The punch & die size varies depends upon the size of plate to be bend. In operation, the upper arm comes down with the fast approach speed and pressing the plate against the die and return back. All three speeds of punch (i.e. fast approach, pressing & return) are as mentioned in the machine specification Sl. No.2.1). The sophisticated hydraulic circuit (having major component of Pump with motor, Proportional flow control valves, Proportional pressure control valve, Two double acting cylinder, Pressure relief valves, etc) is used to perform the press operation with its fullest capacity in a safe and controlled manner. The Delem DA 69 controller which is control the entire machine function.	Vendor to note	
4	SCOPE OF SUPPLY (Electrical)		
4.1	CNC Controller		
4.2	Latest CNC system functionally equivalent to the existing CNC system (Delem DA 69) & suitable for Press brake application. The make of the CNC system shall be Delem (up-graded version), Siemens, Fanuc, Fagor, Yaskawa, Fuji Electric or any other CNC acceptable to BHEL and suitable for Press brake application. Note: 1. The CNC system being offered shall be available in the market for next 10 years and spares/service support shall be available for the next 15 years. 2. All features available in the old CNC system of the machine shall be made available in the new CNC being offered. 3. Service support shall be available in India. Details of the service centre facility available in India to be indicated.	Vendor to confirm	
4.3	Latest PLC system in place of the existing PLC system mentioned in Clause 2.2. The make of the PLC system shall be Mitsubishi / ABB / Siemens / Yaskawa / Delta / Allen Bradley	Vendor to confirm	
4.4	Supply of suitable of AC servo motors with inbuilt encoder & drives and with all the back gauging arrangements (X-axis) including fixers, Timing belts, Ball screw rods & ball nut, Timing pulleys etc. The make of the A.C servo motor with inbuilt encoder should be of any standard make like Baldor and it should be able to communicate/receive the signals from the offered CNC.	Vendor to confirm	
4.5	Safety measure : Infrared source and sensor for detecting and preventing the ram movement if any obstruction / intrusion is found.	Vendor to confirm	
5	ELECTRICAL CONTROL PANEL		
5.1	The electrical control panel can be of machine / column mounted type supported through machine frame.	Vendor to confirm	
5.2	The height of the panel in wall mounted option to be limited to / less than 2000mm due to machine frame size limitation. The supplier can visit our site for proper estimation of proposed height.	Vendor to confirm	
5.3	The electrical control panel shall have a main MCCB for mains control, necessary switchgear, protection elements, switches, contactors, MCBS, control relays, necessary control transformer, 24V dc supply and other control elements shall be provided in the power panel with necessary interconnection and wiring.	Vendor to confirm	
5.4	All the controllers like CNC, PLC, drives and other are to be mounted inside the control panel.	Vendor to confirm	
5.5	All the elements like Amplifier PCB for proportional valves, I/O Modules, relays, contactors, switches, drives etc are to be mounted inside the control panel.	Vendor to confirm	

5.6	The control panel shall have following annunciations:- Hydraulic motor on/off, Chiller unit On/Off, CNC Power supply On/Off, Auto/manual, Emergency Off,	Vendor to confirm	
5.7	The control panel door must be have provision for emergency off the whole system by suitable switch.	Vendor to confirm	
5.8	Two push buttons for hydraulic pump on/off with light indications.	Vendor to confirm	
5.9	Two push buttons for start / stop functions in auto mode with light indications.	Vendor to confirm	
5.10	One selector switch of retaining type for auto / manual mode selection.	Vendor to confirm	
5.11	Control panels shall be provided with air conditioner of suitable capacity.	Vendor to confirm	
6	OPERATOR PANEL		
6.1	CNC Display unit, keypads, and programming switches, should be mounted in the overhanging operator pendant (cantilever type). If required the supplier may house the CNC controller inside the operator pendant.	Vendor to confirm	
6.2	Foot switch : A separate floor mounted operator switch to be provided with the following specification: Operating switches, Operating push buttons, emergency push button and foot switches for inching and continual operation.	Vendor to confirm	
6.3	Safety measure : Infrared source and sensor for detecting and preventing the ram movement if any obstruction / intrusion is found.	Vendor to confirm	
6.4	Infrared light for jobs spotting.	Vendor to confirm	
7	SCOPE OF SUPPLY (MECHANICAL)		
7.1	HYDRAULICS SYSTEM		
7.2	The vendor shall use the existing hydraulic tank available in machine top side (Tank capacity: 410 litres). No new hydraulic tank is required. (Ref: Annex: C)	Vendor to confirm	
7.3	Design, supply and installation of all Hydraulic components like pump, Radiator unit(if required),Cylinders, all type of hydraulic valves, solenoids, gauges, strainers, hoses, distributors, pipe fittings, electrical motor for driving the pump etc.	Vendor to confirm	
8	Cylinders		
8.1	Cylinders shall be designed and/or selected with the following characteristic.	Vendor to confirm	
8.2	Resistance to buckling: Attention shall be given to stroke length, loading and cylinder mountings in order to avoid bending or buckling of the cylinder piston rod.	Vendor to confirm	
8.3	Mounting fasteners for cylinders and attachments shall be designed and installed to accommodate all predictable forces. As far as possible the fasteners should be free from shear forces.	Vendor to confirm	
8.4	Cylinder bore shall be hard chrome plated to 55HRC (MIN) and 40 MICRONS THICK (MIN). Cylinder bore to be honed to a surface finish not less than 20 micron, Piston rod should be hard chrome plated to 40 micron thick (MIN) and 55 HRC min hardness. The supplier should produce test certificate for the hardness and chrome plating thickness from an authorised certifying agency.	Vendor to confirm	
8.5	Latest standard wear resistant sealing arrangement with bearing guided strip cylinder shall be used. Only standard makes of seals like PARKER / MERKEL / BUSHAK AND SHAMBAN / HUNGER / HALLITE / JAMES WALKER / SIMRIT FREUDENBERG are only acceptable.	Vendor to confirm	

9	VALVES		
9.1	Valve types shall be selected to take into account correct function, leak tightness, and resistance against foreseeable mechanical and environmental influence. Surface mounted and/or cartridge valves are preferred wherever practicable.	Vendor to confirm	
9.2	Make of the valves: HOEIRBIGGER/REXROTH/VICKERS only acceptable. Other makes are liable for rejection.	Vendor to confirm	
9.3	R-axis: Vendor shall retain the R-axis arrangement (Clause 2.5) as it is after refurbishing or the same can be replaced with the new one. Suppliers are advised to assess the arrangement before quoting for the offer.	Vendor to confirm	
10	SCOPE OF WORK:		
10.1	Dismantling of all the old items such as Hydraulic pump, valves, cylinders, pipelines, hoses, electric motors, servo motors, drives, machine control panel, pendants, etc. to install the newly supplied items as mentioned in Scope of supply.	Vendor to confirm	
10.2	Erection & Commissioning of new CNC & PLC system.	Vendor to confirm	
10.3	Erection & Commissioning of back gauge system with new ball screw rods, Timing pulleys, Timer belts, Servo motors / servo drives.	Vendor to confirm	
10.4	Erection & Commissioning of new Hydraulic system	Vendor to confirm	
10.5	Erection & commissioning of all the field elements such as linear scales, job spotting infra red light, limit switches, etc.	Vendor to confirm	
10.6	Erection & Commissioning of Infra red source and detector for sensing ram movement	Vendor to confirm	
10.7	Erection & Commissioning of Machine control panel, Main and mini operator pendants.	Vendor to confirm	
10.8	Laying & termination of all the power, control & communication cables.	Vendor to confirm	
10.9	Interconnection of all the electrical / mechanical / hydraulic system.	Vendor to confirm	
10.10	Performance prove out of the machine after retrofitting:	Vendor to confirm	
11	GENERAL FEATURES AND CONDITIONS		
11.1	The selection of the hydraulic Pumps, valves, cylinders and other accessories shall be based on the flow and pressure applicable to that part of the circuit. The latest version of pumps, valves, accessories, etc., should be used with Hoeirbigger/Rexroth /Vickers make only. The seals used in cylinders shall be of parker/merkel/bushak and shamban/hunger/hallite/james walker/simrit freudenberg only.	Vendor to confirm	
11.2	Energy efficient motors are required in all applicable areas.	Vendor to confirm	
11.3	The operator panel should be of self standing type supported through roller movement.	Vendor to confirm	
11.4	The electric hydraulic motor with 1440 rpm shall be of kirloskar / abb / hindustan/ siemens make conforming to S1 - continuous duty with IP-55 protection.	Vendor to confirm	
11.5	All electrical components in control panel / operating panel should be of reputed makes of siemens / L&T / telematic only.	Vendor to confirm	
11.6	All proximity sensors should be of reputed makes like technic / omron/P&F	Vendor to confirm	
11.7	The operating panel should have sufficient aesthetic appearance and ergonomic to normal operation.	Vendor to confirm	
11.8	All electrical terminations to be provided with suitably sized cable glands.	Vendor to confirm	
11.9	Limit switches shall be of omron/siemens/cutler hammer only acceptable	Vendor to confirm	

11.10	Separate provisions for electrical, electronic and body earthing to be present.	Vendor to confirm	
11.11	Input power supply of 415v, 3 ph, 3 wire, 50 hz with isolator will be provided by BHEL.	Vendor to confirm	
12	GENERAL POINTS		
12.1	Supplier shall visit the site and see the existing facility for complete understanding of our system requirements before submission of offer.	Vendor to Note	
12.2	It is the responsibility of vendor to erect and commission the above system with sufficient manpower, tools & tackles and required fasteners, fittings.	Vendor to confirm	
12.3	Bhel shall provide all the civil work if required, necessary power, water, compressed air, welding set & cutting set with consumables like electrodes and gases and any machining required at site will be provided by bhel free of cost.	Information	
12.4	Supplier shall quote for materials supply and erection work separately.	Vendor to confirm	
12.5	The vendor to submit the suitably designed hydraulic & electrical circuit with bom for technical evaluation.	Vendor to confirm	
12.6	The following documents to be provided along with offer for technical evaluation. In the absence of all the required documents, the offer will not be considered.	Vendor to confirm	
12.7	Hydraulic circuit with bill of materials giving complete purchase specifications and make of each item.	Vendor to confirm	
12.8	Technical catalogues of pump, seals, valves, fittings in hardcopy along with the offer.	Vendor to confirm	
12.9	Cross sectional assembly drawing of cylinder with major and mounting dimensions.	Vendor to confirm	
12.10	Details of sealing arrangement and proposed seal make and part no.	Vendor to confirm	
12.11	Electrical schematic and control circuit diagram with complete bill of materials including makes of each components in it.	Vendor to confirm	
13	In case of ordering, the following drawings to be submitted for BHEL approval:-	Vendor to confirm	
13.1	Layout of hydraulic and electrical system	Vendor to confirm	
13.2	Hydraulic circuit with bill of materials giving complete purchase specifications and make of each item.	Vendor to confirm	
13.3	Cross sectional assembly drawing of cylinder with its complete dimensions, material of construction and standard wear resistant sealing arrangements.	Vendor to confirm	
13.4	Electrical schematic and control circuit diagram with complete bill of materials including makes of each components in it.	Vendor to confirm	
13.5	Electrical wiring diagram with ferrule numbers.	Vendor to confirm	
14	DOCUMENTS TO BE SUPPLIED ALONG WITH MATERIAL SUPPLY		
14.1	Three sets of the following documents are to be provided along with material (both hard copy and soft copy-cd):	Vendor to confirm	
14.2	Hydraulic circuit in accordance with iso 1219-2 (preferably with standard coloring) with bill of materials giving purchase specifications for each item. General arrangement drawing; a) piping and connector layout; b) time and/or sequence and function descriptions; c) installation drawings and instructions; d) other drawings, as necessary; e) maintenance and operating data and manuals ; f) performance test results;	Vendor to confirm	

14.3	Function diagram for the entire operations of the system giving solenoid sequences, interlocks and pressure & flow parameters for each operation.	Vendor to confirm	
14.4	List of rubber items like o-rings, piston / rod seals, wipers, etc. with complete purchase specification.	Vendor to confirm	
14.5	Pump lay out and piping lay out giving sizes of each pipe line.	Vendor to confirm	
14.6	Cross sectional assembly drawing for the cylinders giving major dimensions, seal details, mounting details, pressure ratings, etc.	Vendor to confirm	
14.7	Detailed technical catalogues in original for all components in the system.	Vendor to confirm	
14.8	Electrical schematic/ control circuit diagram with bill of materials giving complete purchase specification of all bought out components.	Vendor to confirm	
15	WARRANTY		
15.1	Warranty for products against defective materials and workmanship for a period of 12 months from the date of commissioning or 18 months from the date of despatch whichever is earlier.	Vendor to confirm	
15.2	Scope of Supply		
15.3	CNC, PLC, back gauging arrangement, Hydraulic system and its accessories including hydraulic cylinders, valves, radiator unit, piping, hoses & minimess coupling, infra red source and detector, operator panel and electrical control panel. Qty: one set.	Vendor to confirm	
16	Spares:		
16.1	Complete seal kit for the above hydraulic cylinders- qty: 2 sets.	Vendor to confirm	
16.2	Hydraulic hoses - qty: 1 set	Vendor to confirm	
16.3	Hydraulic valves - qty: 1 set (1 set consists of one number in each type).	Vendor to confirm	
16.4	DELIVERY - The bidder shall quote the best possible delivery. However the delivery period shall not exceed 16weeks from the date of Purchase Order.	Vendor to confirm	
17	PERFORMANCE GUARANTEE AND PROVE OUT:		
17.1	The Performance of the Total Equipment and/or the Components / Sub-Assemblies /Bought-Out-Items shall be guaranteed for a minimum period of twenty- four months from the date of performance acceptance at BHEL Works.After retrofit the output of the machine should be increased from the existing condition.	Vendor to confirm	



S NO	SEQUENCE	S1	S2	Y0501	Y0502	Y0503	Y0601
1	FAST CLOSING	X	X	X	X	-	X
2	PRESSING	X	X	-	-	X	X
3	RETRACTION	X	X	-	-	-	X

HINDUSTAN HYDRAULICS	TYPE EHP-340	DATE 20-02-01	DRN BY Harjinder CKD BY Subhash	APPD.
	NAME HYDRAULIC CKT. DIAGRAM	D302600/1		

ANNEX - A

ANNEX - B



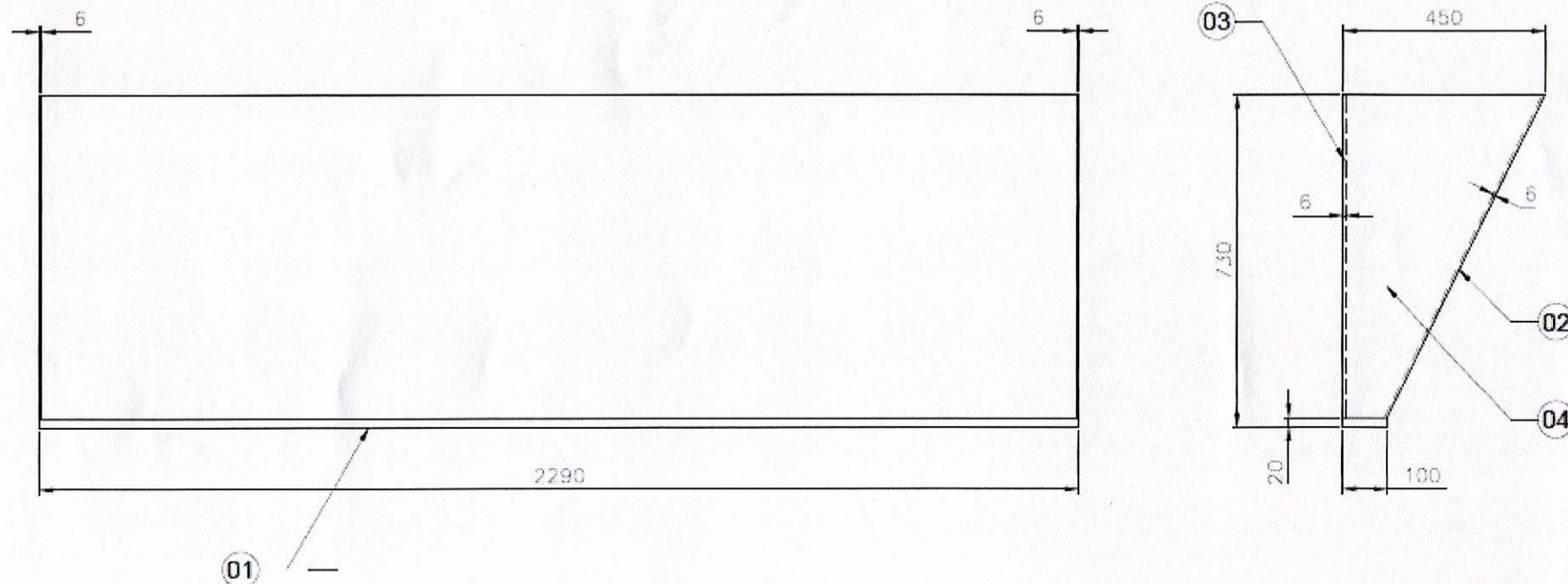
ALL DIMENSIONS ARE IN MILLIMETRES

60191-11091-W-3

DRAWING NO.

ANNEX - C

3.2/



NOTE:—

01. ALL JOINTS ARE WELDED

02. SHARP EDGES TO BE REMOVED.

REV	DATE	ALTERED
		CHECKED
		APPROVED
ZONE		

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04	PL 6t x 450 x 730	—	IS 2062	9.20
			E 250 A	2
03	PL 6t x 730 x 2290	—	IS 2062	78.73
			E 250 A	1
02	PL 6t x 800 x 2290	—	IS 2062	86.28
			E 250 A	1
01	PL 20t x 100 x 2290	—	IS 2062	36.00
			E 250 A	1
ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT
			MATL SPEC	QTY
EQPT: CNC HYD PRESS BREAK - EHP340				
BHARAT HEAVY ELECTRICALS LTD		DRN	N. MADURAIKESAN	SIGNATURE
HIGH PRESSURE BOILER PLANT		CHKD	A. DANASEKAR	A. Danasekar
TIRUCHIRAPALLI - 620014		APPRD	A. DANASEKAR	A. Danasekar
DEPT	GRADE OF UNTIL DIV	SCALE	WEIGHT (Kg)	REF TO ASSY DWG NO
CODE	2597	1:10	219.40	REF TO OLD DWG NO
TITLE		DRAWING NO :		ITEM
POWER PACK TANK		3-M-16C11-16109		00
(PRESS BRAKE / EHP340)		U 01		REV

A3-SIZE