



DISASSEMBLY PRESS.



GREASE PURGING MACHINE.



GREASE LOOSENING MACHINE.



CONE CLEANING MACHINE.



CUP CLEANING MACHINE.



AQUABLASTING MACHINE.



BEARING PULLER.



3-STAGE GREASE PURGING MACHINE.

CTRB OVERHAULING PLANT WITH LAYOUT.
TECHANEL SPECIFICATION FOR CTRB OF 'D', 'E', 'F', 'K' & UCI130 & SPACIAL PURPOSE MACHINE.

DESIGNED & MANUFACTURED BY

INVOTECH ENGINEERS PVT. LTD.

20 B, Chanditala Main road.

Kolkata.- 700 053

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AUTO RE-ASSEMBLY PRESS.



BEP MACHINE.



4-STAGE CONE WASHING MACHINE



JET CLEANING MACHINE



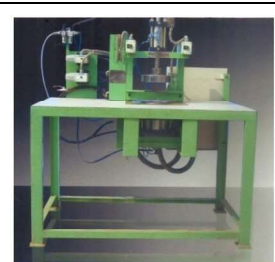
CONE CAGE CKD: FIXTURE



MOTORIZED LATERAL END PLAY FIXTURE.



RE-ASSEMBLY PRESS.



AUTO GREASING MACHINE

Introduction:

Invotech Engineers was established in the Year 2000, to cater to the growing need of Pressed Steel radiators in the Transformer Industry. Later it diversified into Transformer Tank manufacturing, Structural Steel Fabrication also.

Apart from Radiators and Fabrication work it also manufactures special purpose machines for Indian Railways and other private undertakings including MNCs like TIMKEN, FAG, and NE etc.

We have two factories at,

1. 20B, Chanditala Main Road, Kolkata -700053 (Near New Alipur Petrol Pump)
2. Palan Industrial estate (Near Maheshtala).

At Palan Unit we have covered area of 21000 Sq. feet with 15 MT Hydra, 5 nos EOT crane, CNC Plasma/Gas cutting machine, Plate Bending m/c up to 25 mm thick plate and Hydraulic shearing m/c. The manufacturing in the Palan Unit started from 2007-08 mainly to focus into Fabrication work. We have our own High Tension Electrical Connection.

In the year 2011 Invotech Engineers was converted to a Private Limited organization when Mr. Arpan Das and Mr. Anandamoy Das became directors.

Promoter:

The promoter Mr. Anandamoy Das is a mechanical engineer from Jadavpur University (1984 batch) & M. Tech from Allahabad University (1989)

During:1984-1995

Worked in various Plants in India at Senior Managerial Positions in the Multi national Company M/S GEC ALSTHOM INDIA LTD/ Areva. Worked as In-Charge of Pressed Steel Radiator Plant of GEC from 1990 to 1993 and improved the productivity more than 10 times during that period.

Worked as Transformer Designer for the 1st three years in GEC and Quality has become a part of his system. Worked as in charge of ISO 9000 and WC Q and WCM of Switchgear dept. also.

During1995-2000

Successfully promoted the Company M/s, PSR Private Limited for manufacturing of Pressed Steel Radiators as a Managing Director.

From 2000

Promoted M/s. Invotech Engineers till July'2011 and later became M/s. Invotech Engineers Private Limited, and is now working as one of the Directors. The Promoter actively participates in many humanitarian activities and is an active Rotarian.

Our Vision

We at Invotech Engineers Private Limited continuously strive to cater to the country's industrial development. We have also established ourselves as a reliable organization with quality product and service with our accumulated combined experience.

- **People:** Be a great place to work where people are inspired to be the best they can be.
- **Portfolio:** Bring to the world a portfolio of quality products that satisfy industry desires and needs.
- **Planet:** Be a responsible citizen that makes a difference by helping build and support sustainable communities.
- **Profit:** Maximize long-term return to share owners while being mindful of our overall responsibilities.
- **Productivity:** Be a highly effective, lean and fast-moving organization.

UNIT- I

Address: 20B, Chanditala Main Road, Kolkata-700053

CAPITAL EQUIPMENTS:

It is spread over approx 10,000 Sqft. Area and is equipped with

- 1) 2Nos. Seam Welding Machines
- 2) 1No. Single Spot Welding Machine
- 3) 1No. Multi Spot Welding Machine
- 4) 2Nos. Forming Machines
- 5) 5Nos. Power Press.
- 6) 1No. EOT Crane (1MT-Capacity)
- 7) 6 nos MIG welding machines

UNIT- II

Address: Palan Industrial Estate. Raipur, Maheshtala, 24PGS(S), West Bengal-700 141.

We have approx 50,000 of Sq ft. land at Palan Industrial Area. On 21,000 Sqr ft. (appx.) area shed is constructed and the remaining area is vacant land used for fabrication work. This unit is equipped with

	<u>Capacity</u>
1) CNC Plasma Cutting Machine	S.S.: up to 6mm thickness
2) Plate Bending Machine	M.S.: up to 250 mm thickness
3) Pneumatic Clutch Operated Power Press Machine	M.S.: upto 25 mm thick X 2.5m Wide
4) 5nos EOT Crane in 21,000 Sqrft. Covered Shed	150 MT
5) Radial Drill-1no.	10 MT
6) H.T. Connection	Up-to mm
7) Hydra-1no	250 KVA Transformer
8) MIG Welding Machine-20Nos.	14 MT
9) Rectifier Set-10Nos.	400 amps
10) Magnetic Drill/Core Drill-15Nos.	400 amps
11) Shot Blasting Equipment-1 set	upto 60mm hole
12) Sand Blasting Arrangement-2set	Up to 4mX4mX4m job can be shot blasted
13) Paint by Flow Coating Arrangement and spray paint	
14) Pressed Steel Radiator manufacturing machines including Dual head	Any size
Seam Welding Machine-1No, Multi spot Welding Machine -2Nos., Single wheel Seam Welding Machine-1No, Profile forming line-1set.	

UNIT-III

Address: Budge Budge Industrial Area, Subhas Udyan, Kolkata-700 137

5 bighas (103 Katthas) of walled up area for large fabrication purpose with Electricity.

PRODUCT PROFILE

Pressed Steel Radiators and Transformer Tanks: We manufacture different sizes of Pressed Steel Radiators and large size Transformer Tanks required by Electrical Transformer Industry in India, Nepal & Bangladesh.

Special Purpose Machines: We regularly manufacture various types of special machines. To name a few,

- **100 M/T capacity Hydraulic CTRB (Cartridge Taper Roller Bearing) bearing pusher/puller for Indian Railways & private customers e.g. TIMKEN, NEI and FAG.**
- **Greasing Machine for CTRB Bearing**
- **Aqua blasting Machine.**
- **BEP Checking Machine for CTRB Bearing etc.**
- **CTRB overhauling plant.**

Fabrication Work: We have acquired the expertise and experience and infrastructures for heavy structural fabrication. We have expertise in the following categories.

- Successfully completed 3000 MT structural fabrication (columns, Beams, Trestles, Ground Modules, Conveyor galleries etc.) of Long Distance Belt Conveyor Project of Utkal Alumina Limited for their Tikri, Orissa project.
- Manufactured ducts (Square to round, elbow type ducts etc) for Adani Power (main client of entire projects L&T).
- Regularly Manufacture Transformer Tanks (pressure vessel).
- Manufactured flow controlling equipment (Knife Gates, Slide gates) for Power Plants.
- Manufactured Industrial Fan casing and Impeller for M/S, Andrew Yule & Co. Ltd. (Engineering Division) and M/s, Sonar Airo tech Private Ltd.

Project Work: We have completed a project for constructing factory shed, erection & commissioning of 70 MT Goliath Crane etc. at Butibori Industrial Area, Nagpur.

CUSTOMER PROFILE

We are catering some big names in India, some of them are:

- 1) Simplex Infrastructures Limited(For Fabrication Works) Simplex House27, Shakespeare Sarani.Kolkata-700017
- 2) JMS Mining Services Pvt.Ltd. (For Project Work) ASYST PARK 2nd Floor, GN-37/1,Salt Lake, Sector-V,Kolkata-700091.
- 3) Schneider Electric Ltd. (For Radiators) P.O-Naini, Allahabad UttarPradesh-211008
- 4) National Engineering Industries Ltd. (For Special Purpose Machines) Khatipura Road, Jaipur Rajasthan- 302006
- 5) North Central Railway (Aqua Blasting Plant) Jhansi
- 6) South Central Railway (Greasing Machines)Mill Wright Shop Rayanapadu, WorkShop, GuntuPalli, AndhraPradesh-521241
- 7) South Eastern Railway (BEP Measuring Machine) New Wagon Shop Kharagpur.
- 8) Garuda Engineering Services. Kazipet. Telengana. (CTRB Overhauling plant, Bearing puller/pusher).
- 9) Hindustan Engineering & Industries Limited. Kolkata. (Bearing Puller/pusher).
- 10) Boyd Smith Pvt. Ltd. (G+1, G+2 walkway structure for Train 18- TWL, Kolkata, Manipulator- Wagon shop, Jhansi. Diplory- Modern coach factory, Kanpur).
- 11) Bhardwas Infracon Pvt. Ltd. Jamshedpur(Aqua blasting machine- Vendor of Timken India Limited)



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CTRB OVERHAULING PLANT WITH LAYOUT.

1. General the scope covers supply, installation, testing and commissioning of Cartridge Taper Roller Bearing (CTRB) overhauling/maintenance system along with dismantling, cleaning, greasing, assembly, inspection and measuring equipment, maintenance table and other standard accessories & items to make the system functional for complete overhauling of Cartridge Taper Roller Bearing Class: 'D','E','F','K' & UCI 130 (Separately)
2. Scope
 - a) The scope covers supply of the following items along with the system.

Hydraulic press 10Ton along with MS fabricated table of size.- 1.0 x 0.9 x 0.9m with MS top and other accessories.	1set.
Pre-wash table, MS fabricated frame of size 1.5 x 0.9 x 0.9m with 0.6 m depth sink with drain outlet for dipping of cones in Kerosene.	1no.
Double ended grease purging machine along with accessories and items for Cones.	1set.
Grease loosening machine with accessories	1set.
Two station semi-automatic cone cleaning machine	1set.
Cup cleaning machine with accessories	1set.
Dip tank with wire tray for loosening grease of components before jet cleaning operation.	1no.
Jet cleaning machine for component cleaning	1set.
Table with cavity sink mesh of size 1.5 x 0.9 x 0.9 m	1set.
Motorized cone cage fixture complete with fixture, inspection stand, magnifying glass and a lamp holder	1set.
Out of roundness checking fixture for cone bore complete with fixture, Dial gauge.	1no.
Cup OD. roundness checking fixture complete with base plate and stand for mounting 2 nos. Dial gauges.	1no.
Seal lip wear ring groove checking fixture consists of an inclined vertical stand with 'V' block and a Dial gauges.	1no.
Comparator for checking spacer width consisting of Dial stand, base plate, diameter gauge and master gauge.	1no.
Motorized lateral end play checking fixture consists of a fabricated table on which the fixture is mounted	1no.
Cone bore diameter and ovality measurement component - Dial bore gauge, Range 50-150 mm, Least Count- 0.01 mm (Mitutoyo)	1no.
Micrometer for setting cone bore comparator gauge - Range 125-150 mm (Mitutoyo), Least Count 0.01 mm	1no.
Cup counter bore checking gauge - Dial bore gauge - Range 160-250 mm	1no.

Works : Unit- I - 20 B Chanditala Main Road , Kolkata -700 053
Unit – II- Palan Industrial Estate, Raipur, Maheshtala, Kolkata-700 141



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Micrometer for setting Cup counter bore checking gauge - Range 200-225 mm (Mitutoyo)	1no.
A set of feeler gauge for checking gaps between rollers and cage.	2sets.
Electronic digital weighing machine capacity 25 kg mounted on a MS fabricated table of size 1.5 x 0.6 x 0.9 m	1set.
Manually operated hydraulic press capacity 10 Ton mounted on a MS fabricated table of size 1.5 x 1 x 0.9 m with 5mm thick MS top.	1set.
Fixtures consisting of adopter ring for pressing grease seals in to bearing.	1set.
Seal wear ring pressing stand with 1" thick round plate with support block.	1no.
Electric operated metal scribing tool	2nos.
Table of size 1.5(L)x 0.9(W)x 0.9M(H) with SS top	34nos.
Table of size 2.0 (L)x 0.9(W)x 0.9 M(H) with SS top	3nos.
Storage racks of size 800mm((width)x350mm(Depth)x1500mm (height), three shelves, made of MS angel, with 3mm SS top	4nos.
Cage pallet of size 650mm(W)x650mm(D) x650mm(H)	10nos.
Flat pallet 650mmx650mm with leg	5nos.
Set of maintenance tool for different components	1set.
Maintenance spares	1set.



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b) The scope also covers supply of the following list of spares along with the system

Hydraulic press 10Ton.

1. High pressure hose. 2nos.

Grease loosening machine.

1. Head mounted bearing. 2nos.

2. Pneumatic cylinder. 2nos.

3. Nylon gear. 4nos.

4. Nylon bristle brushes. 4nos.

Grease purging machine

1. Brake liners. 4nos.

2. Solenoid brake. 1no.

Automatic cone cleaning machine

1. Solenoid valve. 2nos.

2. High pressure hose. 2nos.

Cup Cleaning machine.

1. Nylon cone brushes. 4nos.

2. Cylindrical steel brushes. 2nos.

3. Solenoid valve. 2nos.

Jet cleaning machine

1. Nozzles. 40nos.

Automatic greasing machine.

1. Solenoid operated spring return DC valve. 1no.

2. Solenoid valve 5/2. 1no.

3. Flow control valve. 1no.

4. FRL unit. 1no.

5. Seal kit for grease cylinder. 1set.

6. Seal kit for pneumatic cylinder. 1set.



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3. DESIGN FEATURES.

A.	Manually operated 10Ton Capacity Hydraulic Press for Disassembly. The hydraulic press 10Ton capacity shall be mounted on top plate and shall have three legs which shall be mounted on bottom Plate. The complete hydraulic press shall be mounted on MS fabricated table of size 1 x 0.9 x 0.9m made of 50 x 50 x 6mm Angle and 5mm thick Table Top. The press shall meet the following broad technical parameters- 10Ton capacity, 150mm stroke, complete with pump, operating handle and other standard accessories and items.	
B.	Pre-wash table: Pre wash table of size 1.5 x 0.9 x 0.9m with 0.6m depth sink with suitable drain outlet for dipping of cones in Kerosene oil. Table shall be fabricated from minimum 50 x 50 x 6mm angle structure with adequate stiffener on all sides of the table.	
C.	Double Ended Grease Purging Machine::The scope covers design, supply and testing of the machine to remove loose grease from the cones soaked in kerosene by centrifugal force. The machine shall consist of a fabricated vertical stand with a table top on which the double ended electric motor shall mount. There are two fixtures fitted one at each end of the Double ended motor. A solenoid brake shall be provided to stop the rotation of motor shaft instantly when the motor is switched off. Two hoods shall be provided one over the RH side one over the LH side to arrest the thrown out grease from the cones by centrifugal force. The waste grease is finally collected in two trolleys placed under the hoods. The equipment shall meet the following broad technical parameter Power- 3HP, 1440rpm, 415V AC, A.C. Solenoid Operated Brake with Drum, Coil Voltage.- 415 Volt.	
D.	Automatic Grease Loosening Machine (Media-Kerosene): The machine shall able to loosen the residual grease still persists in between the rollers and cage of the cones after purging operation with the help of pneumatic actuator and rotate the cones in immersed kerosene with the help of a Gear driven motor to remove the residual grease. The machine shall able to remove 90 to 95% grease from the cones by this operation. The machine shall consist of a steel tank filled with kerosene and a top plate on which motor and Gear Box shall be mounted. The top plate shall have a tilting shaft at one end which shall mount on two Plummer blocks. The one end of tilting shaft shall connect with the pneumatic actuator with the help of a lever. The Gear Box shall have one input shaft coupled with motor and two output shafts on which two cones are mounted with the help of cone holding fixtures. The pneumatic actuator shall able to tilt the top plate up to 90 to dip two cones in kerosene and the Gear Box shall help to rotate two cones at a time. The operation shall be timer based control. The cones are to be mounted manually on the cone holding fixtures, however the balance operations shall be automatic as per logic. cones shall rotate in Kerosene at a speed 915rpm for a period of about 1.5 minute (Pre-set washing time) After a delay of around 1-3 seconds the Pneumatic actuator shall get retracted and shall move up the top plate to its initial position automatically. The equipment shall meet the following broad- Electric Motor-0.75hp, 960rpm, 415V, foot mounted type. Pneumatic Actuator: Pneumatic Double Acting Cylinder, Bore diameter 4", Stroke 14".	



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E.	<p>Automatic Cone Cleaning Machine: The machine shall be able to inject Kerosene on two rotating cones to remove last traces of grease still remains hidden in between rollers and cone cage after grease purging and loosening operation. The machine shall consist of a fabricated structure with a washing tray on its top. The three sides of the washing tray shall be covered and in the front there shall be a window for placing the cones on the cone holding fixture which shall also get closed by a sliding door at the time of washing. The washing tray shall have two driving shafts which shall have two output shafts of a Gear Box mounted under washing tray. The Gear Box shall have an input shaft by which it is driven with the help of a motor and a reduction gear box to rotate the cones at required speed. The fabricated structure shall have a vertical column on which a pneumatic actuator shall be mounted. The pneumatic actuator carries a Jig which slides on two pillars with the two nozzle holders which are exactly above the two cone holding fixtures. Each nozzle holder should have 8 nozzles. The nozzle Holders shall bring down at pre-set height at the time of washing and lifted up when washing are completed with help of the pneumatic actuator. A high pressure boiler feed pump shall be provided which is mounted on the bottom frame of the structure. The delivery pipe of the pump shall be connected with the two nozzle holders and suction pipe shall be connected with the Kerosene tank located separately adjacent to the machine. The used Kerosene shall be re-circulated after getting filtered by the 3 stage gravity filter above the tank. The complete operation shall be automatic and shall be timer based through based electric control panel. The equipment shall meet the following broad- Electric Motor 0.75 hp, 960rpm, 415V, foot mounted, Boiler Feed Pump (3 Stage) 2 hp, motor, 1440 rpm.</p>	
F.	<p>Cup Cleaning Machine: The machine shall be able to clean both ends, both bores and OD of the Cup with help of power driven rotating brushes while spraying Kerosene oil with the help of a pump. The cup shall rotate on two rotating drums powered by geared motor. The feeding of the brushes shall be done with the help of the pneumatic actuators. The machine shall consist of a fabricated structure with a table top. There shall be a front slide on which the cup slides and stops by the pneumatic stopper on two rotating drums powered by geared motor. Pneumatic stopper shall be provided on the front. The cup between two stoppers while cleaning. Two sets of side brushes each consists one circular brush made of SS bristles and one nylon taper brush made of Nylon bristles shall be provided and shall rotate with the help of electric motors. A cylindrical brush made of SS bristles mounted on the top above the cup shall also be provided and shall rotate with help of electric motor. The feeding of the two sets side brushes one from each side and one from the top above the cup are done at a time with the help of the pneumatic actuators. The fabricated M.S. Kerosene tank connected with the Pump for spraying kerosene on the spots of cleaning. After cleaning all the pneumatic actuators shall be retracted and the cup shall slide over the rear slide out of the machine. The equipment shall meet the following broad- Electric Motors: 1HP, 1440 RPM.- 3nos, Geared-motor.- 1HP, 960 RPM.- 1no, Pneumatic cylinder: Diameter bore (38 mm) x 4" Stroke - 2nos. Diameter bore (38 mm) x 2" Stroke - 4nos. & Diameter bore (38 mm) x 1.5" Stroke - 2nos. Pump: 1 H.P. Centrifugal Pump.</p>	
G.	<p>Dip Tank with wire tray: A suitable dip Tank of size 1.5x0.9x0.9M size made of 50x50x6mm Angle, tank depth 0.6m with wire tray for loosening grease of components before jet cleaning operation</p>	



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H.	<p>Jet Cleaning Machine: The Jet Cleaning machine shall be provided to clean multiple components like Seal wear Ring, Backing Ring, End Cap, and Spacer of CTRB at a time. In this machine the components shall be hooked on the revolving holders which are mounted on two rotating wheels and kerosene shall be injected on the components through multiple jet nozzles from all sides to remove the stain, grease and dirt from the components. The machine shall consist of M.S. Fabricated Structure, driving shaft which rotates with low rpm with Reduction Gear box coupled with the motor. Two wheels shall be welded on the driving shaft at a required distance on which the revolving holders are mounted equally spaced. The components which are to be cleaned shall be hooked on the revolving holders. The three sides of the cleaning area of the machine shall be covered with M.S. Sheet and in the front side, shall be provided with a door for feeding the components. The door shall keep close while cleaning to avoid flushing of kerosene. A fabricated M.S. Kerosene tank connected with the centrifugal pump shall be provided for injecting kerosene on the components through the Jet Nozzles. An Electrical control panel shall be provided to perform the operation as per sequence of operation. The equipment shall meet the following broad- Motor: foot mounted, 3hp, 1400 rpm, 415V, Centrifugal Boiler Feed Pump.</p>	
I.	<p>Mesh Table with Cavity sink: A Mesh Table with Cavity sink of size 1.5 x 0.9 x 0.8 m made of 50 x 50 x 6 mm Angle having 400mm deep cavity sink occupying 60% of the total area shall be designed and supplied. Cones, Cup and other components shall be dipped in lubricating oil in the sink for preventing rust. After dipping the components are placed on the mesh table to flow out the excess oil into the bottom tray.</p>	
J.	<p>Motorized Fixture for Cone Cage and Roller Damage inspection Fixture: The device shall be designed to rotate the cone slowly at a speed of 10 rpm by the Reduction Geared Motor to check the Roller with the help of the lamp and magnifying glass mounted on the vertical stand. The stand shall be provided with a slot to direct light at the rollers from behind. The cage of the cone assembly and the roller pocket of the cage are checked using 0.09" (2.286 mm) & 0.06" (1.52 mm) feeler gauges which are also in the scope of supply. The equipment shall meet the following broad: Geared Motor: 5hp, 20rpm, 415VAC</p>	
K.	<p>Out of Roundness Checking Fixture of the Cone Bore: The fixture shall consist of a base plate having a diameter indicator mounted on the spring loaded lever and three guide rollers for locating the cone. To check the roundness of the cone bore the master ring gauge is placed over the guide rollers and the diameter indicator is set Zero. Now the master ring gauge is removed and the diameter indicator is pulled back with the help of the spring loaded lever and the cone is placed over the guide roller. The cone is now rotated to check the roundness. The Diameter Indicator shall be MITUTOYO make with least count of 0.001mm.</p>	
L.	<p>Cup Cup OD Roundness Checking Fixture: The Fixture shall consist of a base plate and a vertical plate 90° with each other. There are two ribs hardened and ground clamped on the base plate having two side stoppers. There are two dial indicators mounted on the top of the vertical plate. The diameters are set zero with the help of the master setting gauge. The Cup is placed on the ribs of the base plate against the vertical plate inside two side stoppers. Now the cup is rotated on the ribs against the vertical in between two sides stopper to check the roundness of the cup with the help of two dial indicators. The Dial Indicator shall MITUTOYO make with Least Count of 0.001mm plate clamped.</p>	



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M.	<p>Seal Lip Wear Checking Fixture: The fixture shall be capable of measuring depth on the lip contact path on the seal wear ring with the help of a diameter indicator. The fixture shall consist of an inclined plate mounted on a base. There is a 'V'- block clamped in the middle of the inclined plate on which the seal wearing is rotated. The diameter indicator of 0.01 mm. LC of Mitutoyo make shall be mounted on the top of inclined plate. To check the seal wearing shall be placed on the 'V' block and the diameter indicator shall be set to '0' on the lip contact path. Now rotate the seal wear ring. Read the diameter indicator to get the depth of wear on lip contact path.</p>	
N.	<p>Comparator Equipment for spacer width Measurement: The Fixture shall consist of a base plate having two guide supports against which the spacer is rotated. A diameter indicator shall be mounted on the vertical plate for checking the spacer width. The diameter indicator is to set zero with the help of the master setting gauge. Now the spacer is to be placed on the base plate and to be rotated against the guide support to check the spacer width. Diameter Indicator shall be Least Count of 0.001 mm, MITUTOYO make.</p>	
O.	<p>Motorized Lateral End Play Checking Fixture with table: This is a power driven device to check the Lateral End Play of the cones with respect to the Cup. The equipment shall consist of a fabricated table on which the lateral end play checking fixture is mounted. The fixture consists of a vertical plate having a top plate mounted on the upper end and a bottom plate mounted on the lower end at 90 Deg. with vertical stand and in the same direction. The bottom plate is clamped on the table. The sleeve for holding the cone is mounted on the top of the bottom plate and the pneumatic cylinder is mounted on the top of the top plate maintaining the axis of the cylinder piston and the sleeve in one line. The gauge plate is mounted on the upper spindle and the pressure pad is mounted on the lower spindle of the pneumatic cylinder. The diameter indicator is mounted on a vertical stand the base of which is clamped on the top of the top plate. The geared motor is mounted on the vertical stand the base of which is mounted on the table. A wheel having rubber lining is mounted on the output shaft of the Geared Motor used to rotate the cup while gauging. The equipment shall achieve Bench Lateral End Play of 0.58-0.74mm. The equipment shall consist of a geared motor, Double Ended Double Acting Pneumatic Cylinder, of bore 100 mm, Stroke 100 mm and hand operated Valve -1/4" BSP Detent Type.</p>	



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<p>P.</p>	<p>Double Ended Automatic Greasing Machine: The scope covers supply of Double Ended Automatic Greasing Machine for automatic rapid and secure greasing of 2 Cones, one at each end, at a time of the Cartridge Taper Roller Bearing (CTRB). The total amount of grease discharged by the machine per cycle of operation shall be 450 + 20 gm 'Switch' should pass into two Cones equally (i.e. 225 + 10 gm per Cone). The Machine shall consist of a fabricated MS frame having a working table with SS top. The rapid and automatic greasing of Cones shall be done with the help of 2nos. solenoid operated Spring Return Directional Control Valves.- 2nos. Greasing Cylinders.- 2nos. Pneumatic Cylinders.- 2nos. Greasing Fixtures which shall be mounted on the machine frame. The grease is supplied to the in port of DC valves with the help of suitable Grease Pump. The scope also covers provision of Electrical Control Panel, Limit Switches and Solenoids as per the logic to perform the cycle of operation automatically. The equipment shall meet the following broad technical parameter.</p> <p>The machine shall comprise of following component.</p> <ol style="list-style-type: none"> 1. 4 way Solenoid operated DC Valve.- 2nos. 2. Solenoid operated spring return DC valve. 3. Solenoid valve 5/2 4. Flow control valve. 5. FRL unit. 6. Solenoid Valve 5/2 (for Upper Pneumatic Cylinder): Single Coil, 7. Pneumatic grease pump .- ELGE-A4-200 8. Greasing Cylinder.- 2nos. 9. Pneumatic cylinder.- 2nos. 10. Electro- Pneumatic panel. 11. Working Pressure 5kg/ CM2 12. Electro Digital Weighing Machine- 100 Grams To 30kg with least count: 10gm. 	
<p>Q.</p>	<p><u>HAND PUMP OPERATED REASSEMBLY PRESS.</u></p> <p>Manually operated 10Ton Capacity Hydraulic Press for Reassembly. The Hydraulic Press 10Ton capacity shall be mounted on top plate and shall have three legs which shall be mounted on bottom Plate. The complete Hydraulic press shall be mounted on MS fabricated table of size: 1 x 0.9 x 0.9m made of 50 x 50 x 6mm Angle and 5mm thick Table Top. The press shall meet the following broad technical parameters- 10Ton capacity, 150mm stroke, complete with pump, operating handle and other standard accessories and items</p>	



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Q/1	<p style="text-align: center;"><u>POWER OPERATED REASSEMBLY PRESS.</u></p> <ol style="list-style-type: none">1. General: The scope covers design , supply, testing and commissioning of Hydraulic Seal Press for Class 'D', 'F' & 'K' CTRB with all concomitant accessories.2. Design Parameters:<ol style="list-style-type: none">a) The equipment shall meet the following broad technical parameters. The power operated Hydraulic Seal press should be equipped with necessary tooling and fixture to make equipment fully function when installed and put into operation for pressing the grease seal for Class 'D', 'F' & 'K' CTRB used with Bogies of Railway Wagons & Loco Wheels.b) The machine should be capable of rapid and correct securing of grease seal after greasing of CTRB assembly and is should be hydraulic operated.c) The machine should have the facility of Automatic cut off provision after proper insertion of the grease seal into is place.d) Hydraulic cylinder should be Double acting (down stroke type hydraulic press 20Ton capacity) Hydraulic system shall comprise of a 3HP. Motor, with hydraulic pump, directional control valve, release valve, pressure gauge, air breather, filter strainer, oil level gauge , oil reservoir of adequate capacity, oil drain plug etc. All hydraulic brought out items should be from reputed manufacturing. Electric control panel should enable auto and inching movement of piston. The seal press should be mounted on an aesthetically designed MS table matching the height of CTRB inspection linee) Suitable fixture for seal pressing for both Class 'D', 'F' & 'K' CTRB should be provided as accessories with seal press.3. Scope: The supply shall include design, supply, installation and commissioning of Hydraulic Seal Press Class 'D', 'F' & 'K' CTRB with all standard equipment and accessories to make the machine functional to enable hock bolting in railway wagons; Supply fixture for seal pressing in Class 'D', 'F' & 'K' category CTRB along with properly designed MS table.	
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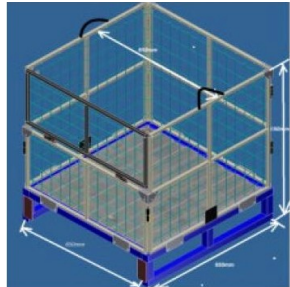
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R.	Specifications of Table: Table mentioned in the specification shall be fabricated with minimum 50 x 50 x 6mm angle structure with adequate stiffener on all sides of the table. top of the table shall be provided minimum 3mm thick SS sheet with adequate support on below of the sheet. The sizes of the table mentioned above are indicative. The scope should cover supply of any size of table combining above sizes.	
S.	Bearing storage racks: Slated angle steel rack overall dimension 800mm ((width)x350mm (Depth) x1500mm(height), 4 shelves making 3 compartment, made of MS angle of suitable size, be durable, robust. Top of each shelf shall be provided with 3mm SS sheet with adequate support. Clear gap between two shelves shall be at least 450mm. The rake shall be suitable for overall loading of at least 1000kg.	
T.	Cage pallet for bearing: Caged steel pallets shall be 650mm (W) x 650mm (D) x 650mm(H) including 150mm leg height. The load carrying capacity of the pallet shall be 500kg payload excluding pallet self-weight. The cage pallets shall payload excluding pallet self-weight. The cage pallets shall have metal with tubular/angle/channel frame structure. A corrugated metal surface shall be welded on the base frame structure. The pallet shall be with front to back runners, with 4-way type design which will facilitate storage by forklift forks. The superstructure of the pallet shall consist of weld mesh frames on all 4 sides having grid size of 30mm x 30mm and wire thickness of maximum 4 mm. Suitable provisions for lifting of the loaded cage with hook shall also be provided.	
U.	Flat pallet: Flat pallet 650mmx650mm with leg height of 150mm. The load carrying capacity of the pallet shall be 500kg.payload excluding pallet self weight. The flat pallets shall have metal with tubular/angle/channel frame structure. A corrugated metal surface shall be welded on the base frame structure. The pallet shall be with front to back runners, with 4-way type design, which will facilitate storage by fork lift forks.	
V.	The successful bidder shall submit a general arrangement drawing of the CTRB overhauling section indicating all equipment and tables required for complete overhauling of cartridge type taper roller bearing of "E" class. Layout plan of the CTRB overhauling plant is enclosed for guidance	



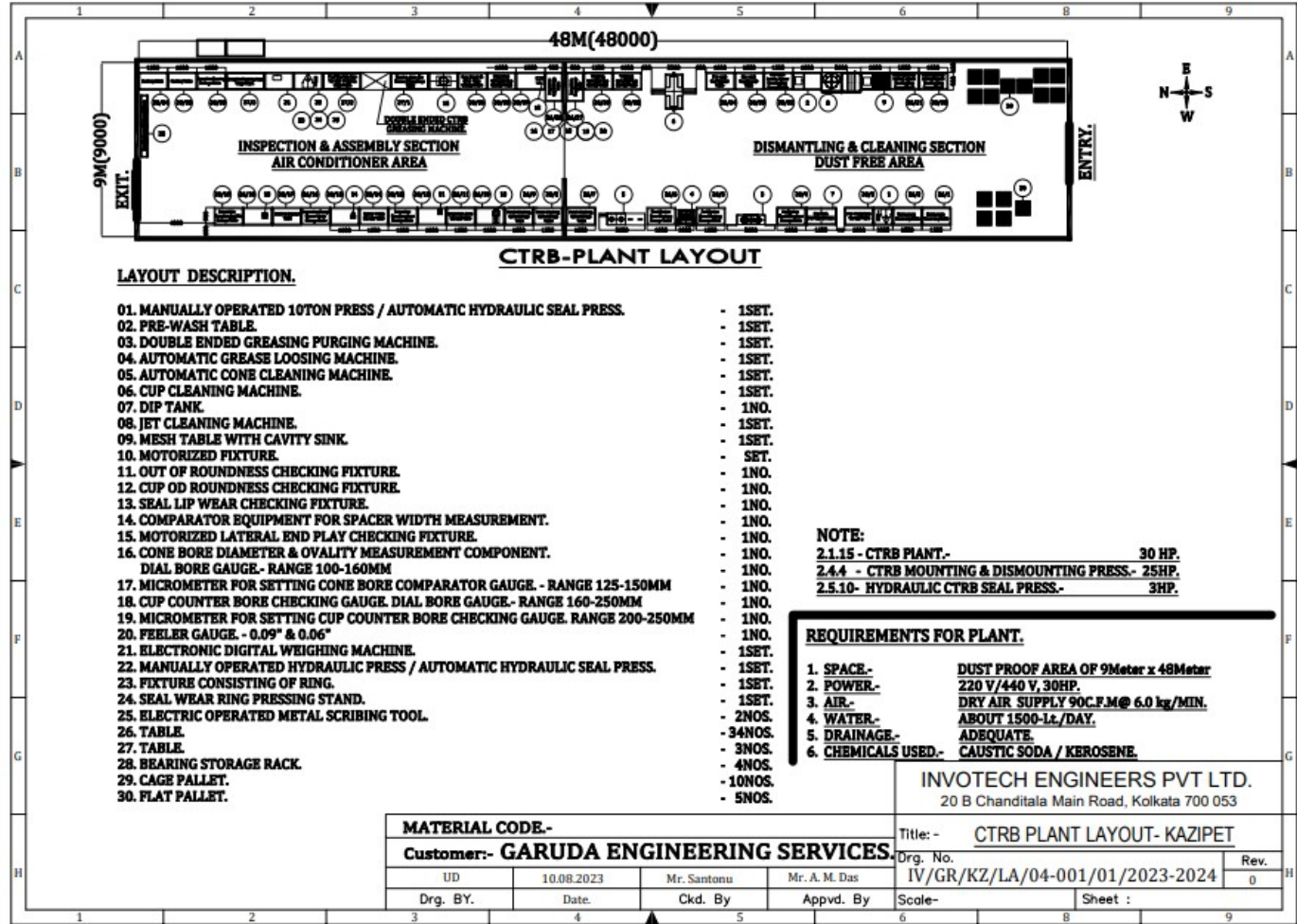
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CONTROL PANEL & PENDANT OPERATED HYDRAULIC TROLLEY MOUNTED CLASS 'D', 'E', 'F', 'K' & UIC130 CTRB PULLER/PUSHER.

SPECIFICATION:- CTRB MOUNTING AND DISMOUNTING PRESS.

1. **General:** The scope covers supply, installation, testing and commissioning of Hydraulic Trolley Mounted Puller / Installer for Mounting & Dismounting of cartridge tapered roller bearing (CTRB) of D,E,F,K & UCI130 class along with standard accessories and items required to make the equipment fully functional. The equipment shall be operated by Hydraulic power pack unit equipped with all attachments and accessories.

2. Broad Technical Parameters

2.1. The equipment shall meet the following broad technical parameters:

Hydraulic Cylinder

Type of cylinder hydraulic unit.	Horizontal double acting
Ram stroke.	400 mm \pm 5 mm
Capacity for Bearing Pulling.	100T
Capacity for Bearing Installing.	70T (Auto cut at 50 \pm 5 Ton)

Piston Speed

Speed of advancement of Ram in idle condition.	700mm / min. (\pm 10%)(Approx:)
Speed of Pulling the Bearing.	80 mm/min. (\pm 10%)(Approx:)
Speed of Installation of the Bearing.	110 mm/min. (\pm 10%)(Approx:)

Hydraulic Power Pack

Hydraulic Pump.	Radial piston & Gear pump
Working Pressure.	350 Kg/cm ²
Motor capacity.	3PH, 1430RPM, 440V, 50Hz
Starter.	L&T / Siemens make
Oil tank capacity.	40 liters. (Approx:)
Load Gauge.	Digital display for mounting & dismounting force up to 100Ton.



Working Height of Hydraulic Ram, Assembly for Alignment with the journal

Adjustable From 375 mm to 700 mm(Approx:)

Controlled: Hydraulically by push button in Pendant.

- 2.2. The equipment shall be provided / fitted with Non-return valve, Pressure Relief valve, Directional control valve, Pressure gauge, filters, Air breather, etc. on Power pack. System should generate audio visual alarm at preset pressure, digital load display in control panel.

3. Scope

3.1 The scope covers supply of the following accessories and items along with the machine for making it fully functional.

I. Complete Set of Bearing mounting attachment as under:

Installing tube.	01 No.
Ram end sleeve.	01 No.
Installing tube adopter.	01 No.
Guide tube assembly.	01 No.
Guide tube adopter.	01 No.
Locking Pin.	01 No.

II. Set of Bearing pulling attachment as under:

Pulling shoe.	01 No.
Pulling shoe adopter.	01 No.
Cylinder front flange.	01 No.
Tie Rod.	04 Nos.
Lock Nut.	04 Nos.
Nut.	04 Nos.
Hydraulic high pressure rubber hoses.	01 set.
Power Pack with Trolley.	01 set.



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DIRECTION CONTROL VALVE OPERATED HYDRAULIC TROLLEY MOUNTED CLASS 'D', 'E', 'F', 'K' & UIC130 CTRB PULLER/PUSHER.

SPECIFICATION:- CTRB MOUNTING AND DISMOUNTING PRESS.

2. **General:** The scope covers supply, installation, testing and commissioning of Hydraulic Trolley Mounted Puller / Installer for Mounting & Dismounting of cartridge tapered roller bearing (CTRB) (CTRB) of D,E,F,K & UCI130 class along with standard accessories and items required to make the equipment fully functional. The equipment shall be operated by Hydraulic power pack unit equipped with all attachments and accessories.

2. Broad Technical Parameters

2.1. The equipment shall meet the following broad technical parameters:

Hydraulic Cylinder

Type of cylinder hydraulic unit.	Horizontal double acting
Ram stroke.	400 mm \pm 5 mm
Capacity for Bearing Pulling.	100T
Capacity for Bearing Installing.	70T

Piston Speed

Speed of advancement of Ram in idle condition.	700mm / min. (\pm 10%)(Approx:)
Speed of Pulling the Bearing.	80 mm/min. (\pm 10%)(Approx:)
Speed of Installation of the Bearing.	110 mm/min. (\pm 10%)(Approx:)

Hydraulic Power Pack

Hydraulic Pump.	Radial piston & Gear pump
Working Pressure.	350 Kg/cm ²
Motor capacity.	3PH, 1430RPM, 440V, 50Hz
Starter.	L&T / Siemens make
Oil tank capacity.	40 liters. (Approx:)

Working Height of Hydraulic Ram, Assembly for Alignment with the journal

Adjustable From 375 mm to 700 mm.(Approx:)

Controlled: Direction control valve.- Three position 4-way hand operated open centre valve.

- 2.2. The equipment shall be provided / fitted with Non-return valve, Pressure Relief valve, Directional control valve, Pressure gauge, filters, Air breather etc. on Power pack.

3. Scope

3.1 The scope covers supply of the following accessories and items along with the machine for making it fully functional.

I. Complete Set of Bearing mounting attachment as under:

Installing tube.	01 no.
Ram end sleeve.	01 no.
Installing tube adopter.	01 no.
Guide tube assembly.	01 no.
Guide tube adopter.	01 no.
Locking Pin.	01 no.

II. Set of Bearing pulling attachment as under:

Pulling shoe.	01 no.
Pulling shoe adopter.	01 no.
Cylinder front flange.	01 no.
Tie Rod.	04 nos.
Lock nut.	04 nos.
Nut.	04 nos.
Hydraulic high pressure rubber hoses.	01 set.
Power Pack with Trolley.	01 set.



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3-STAGE GREASE PURGING SPECIAL POURPOSE MACHINE.



GENERAL:

This is a special purpose machine used for cleaning CTRB bearings cone assemblies. After the bearings have been dismantled the excess grease can be removed from the Cone assemblies with the help of centrifugal force in this machine.

To minimize the time required for cleaning bearings and to increase the life of Cleaning solutions in subsequent machines the grease may be purged from the cone assemblies by using this machine.

The machine has been designed keeping in mind to remove grease with the help of Centrifugal force.

The machine comprises following items:

- | | |
|-------------------------------------------------|-------|
| 1. Double ended Motor.- | 3nos. |
| 2. Fixtures.- | 6nos. |
| 2. Magnetic clutch brake - AC. solenoid brake.- | 3nos. |
| 3. Flange mounted bearing. | 6nos. |
| 5. Control panel with on delay timer logic.- | 1set. |

Works : Unit- I - 20 B Chanditala Main Road , Kolkata -700 053
Unit – II- Palan Industrial Estate, Raipur, Maheshtala, Kolkata-700 141



Nozzle Manifold.

OSCILLATING NON-SYNCHRONOUS.

Angle of Oscillation.	-	35 degrees.
Frequency of Oscillation.	-	4 per minute.
Number Of Wash Nozzle.	-	24
Type Of Nozzle.	-	Flat Tapered V-Jet.
Nozzle Material.	-	316 Stainless.
Nozzle Spray Pattern.	-	25 degrees.

Removal of Residual Grease.

Disk Type Skimmer	-	SS 304; disk dia- 380 mm
Weir Skimmer	-	Floating type; capacity- 50 LPM

Heat System (Thermal System)

OPERATING TEMPERATURE.	-	65 – 70 degrees C
Initial Heat-Up Time.	-	90 – 120 minutes.
Electric Heat Element Size STD.	-	30 kW.

Base Machine Work Area Dimension

Turntable Diameter.	-	960 mm
Cleaning Work Height.	-	1000 mm
Turntable Height Above Floor	-	750 mm
Table Load capacity.	-	500 Kg.
Heavy Duty Load Capacity.	-	700 Kg.

Base Machine Overall Diameter

Tank Width.	-	1700 mm
Tank Length.	-	2500 mm
Tank Depth.	-	400 mm
Total Machine Height.	-	2000 mm
Tank Capacity.(Max:)	-	1500 liters.
Reservoir Capacity.(Max:)	-	450 liters.

Pump System & Performance :

		Option.		
		Standard	V1	V2
Total System Flow	-	62 m ³ /hr.	62 m ³ /hr	40 m ³ /hr
Flow per Nozzle	-	2.6 m ³ /hr.	2.6 m ³ /hr.	1.7 m ³ /hr.
System Pressure	-	6 kg/cm ²	9 kg/cm ²	9 kg/cm ²

AQUABLAST 1000
Specifications and Features

- Non-synchronous Oscillating manifold containing SS V-jet nozzles blast hot cleaning chemical to components hung from turn table made up of hollow SS 304 section. The cleaning solution flows from the bottom of manifold to reduce the pressure loss of Pump.
- Swinging door mounted turntable for maximum access for loading and un-loading of component.
- 5mm/8mm thick M.S. plate constructed cabinet for environment friendly closed loop operation and repeated use of chemical for cleaning.
- Electrical heating element for heating the cleaning chemical. The temperature can be controlled by thermostat with adjustable Digital Temperature panel can be set as desired.
- For effortless cycle of operation the system contains electronic water level sensor, interlock door system, low chemical level cut off to prevent pump dry run and protect heating elements, automatic steam exhaust to facilitate quick component drying.
- Easy access solution tank for trouble free and periodic maintenance.
- Two types for skimming options i.e: disc type, weir type, are incorporated to ensure the concentration level of chemical. According to the requirements of customer skimming options can be used.
- In line filter in the delivery line ensures no movement of foreign material to manifold which may choke nozzles.
- Debris screen in the chamber provided to capture any foreign material from mixing with the chemical.
- Hot air delivery for flash drying (optional).





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4-STAGE CONE WASHING SPECIAL POURPOSE MACHINE.



A. Cone Washing Machine.

This is a special purpose machine used for cleaning CTRB bearings cone assemblies. After the bearings have been taken out from aqua blasting machine residual grease can be removed from the cone assemblies with the help of water jet force.

After refurbishment of CTRB is complete measured quantity of grease is filled inside CTRB with the help Auto-greasing machine.

Before applying grease to roller bearings every possible precaution must be taken to remove contaminants from getting into the lubrication. So this machine is exclusively designed to prevent contaminants of residual grease up to 99.99%. The machine comprises following items.-

1. Motor and gear box to drive the cone assembly. - 2nos.
2. Gear box.- 2nos.
3. Pump with motor.- 2nos.
4. Pneumatic cylinder.- 2nos.
5. Aluminum gear box- (Sealed type) - 2nos.
6. Control Panel.- 1no.
7. Cleaning solvent tank- 1no.

Works : Unit- I- 20 B Chanditala Main Road , Kolkata -700 053
Unit – II- Palan Industrial Estate, Raipur, Maheshtala, Kolkata-700 141



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AUTOMATIC LATERAL END PLAY(BEP) MACHINE.

The equipment display Bench End Play of 0.58-0.74mm

And helps to choose the correct spacer.

Specification:

- | | |
|-------------------------------------|-------|
| 1. Main machine body with cabinet.- | 1set. |
| 2. D/Cup clamping arrangement.- | 1set. |
| 3. Lifting arrangement.- | 1set. |
| 4. Rotating arrangement.- | 1set. |
| 5. Control panel with PLC.- | 1set. |
| 6. BEP display.- | 1set. |

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Unit – II- Palan Industrial Estate, Raipur, Maheshtala, Kolkata-700 141