

**BHARAT HEAVY ELECTRICALS LIMITED: BHOPAL**

Specification No.

Covering item(s) ---

Location ----- LEM Division

Issued by EM- TDM

**Specifications of the “Magnetic Putty” Pressing device :LEM**

**1. Introduction :**

The putting pressing device is meant for pressing of magnetic putty with the slot of the stator capsules of the electrical motors

**2. Construction / Configuration :-**

Unit should consists of a base , vertical column , horizontal beam and hydraulics

The base of the V block stand should be able to move near and away from the base of the unit

The vertical column should be fixed to the base

The hor. Beam should be able to slide up and down on vertical column by means of hand wheel arrangement

The hor beam is to be swivel able on it's own axis

The hor beam should be able to close & open by means of double acting hydraulic cylinder to suit for various sizes of stator core bores

**V Block**

The V Block is required for keeping the wound stator cores of various sizes of AC induction motor in various radial positions

The V stand should consists of trolley type table onto which the V blocks are mounted.

The V stand should be suitable for supporting maximum of 20 ton weight

The V blocks should be two in number and it should be possible to set the distance between the two of them (to suit the core length of the capsule ). The front one is fixed and rear one is adjustable manually to suit the core length.

The V block stand is having a motor driven system for axial movement towards the pressing unit.

(also manual system should be provided) . To prevent damage to the stator capsule, brass pads are to be provided on the 'V' Block.

The arms assembly is mounted on a swivel able type of axis with suitable automatic indexing arrangement to ensure correct slot to slot indexing after each indexing cycle.(the drive motor should have clutch as well as brake arrangement) . Indexing motion and pressing cycle should be interlinked suitably.

The vertical movement of the arm support in the column and rotation along its own axis are motorized with provision for manual operation

The arm support is counterbalanced by weights so that the vertical movement is effortless.

The arm support position and can be adjusted about the vertical axis and horizontal axis to take care of any skewing in the slots.

### **3. Operation :**

Since the ID of the stator capsule shall vary, hence it is necessary to keep adjustment & cater to this need of variation .

The putty is pressed by two bars in diametrically opposite slots . These bars are actuated by an array of tiny cylinders 20-25 in numbers. These tiny cylinders are mounted on a bar and all are connected hydraulically.

To take the reaction between the two bars a tool is sandwiched in between.

The two bars are adjustable by sliding it over a slide using left hand and right hand screw.

This slide which is vertical is in turn sliding on a column to adjust to the centre of the motor capsule.

Initially the pressing bars are away and can be brought into the stator capsule ID by either moving the pressing arm column or by moving the V block table. Once the desired position is achieved, the device is locked length wise.

After this the putty pressing operation Starts. This operation can be done by manual push button control or by automatic Controller.

The pressing cylinders are imported from M/s Romheld Germany or equivalent to be used.

Note : The configuration is job stationery and arms indexing type.

#### 4. **Technical Specifications** (See the enclosed sketch for details & configuration)

##### **A. Job Details**

Max job dia (Capsule OD) - 2400 mm  
Min job dia ( Capsule OD) - 600 mm  
Max job ID ( Capsule ID) - 2000 mm  
Min job ID ( Capsule ID) - 500 mm  
Max Core Length - 1700 mm  
Min Core Length - 400 mm  
No of slots (min/ Max. ) -  
Stator Weight – Maximum : 20 Tones.  
width of stator core slot max/min - 25 mm/8 mm  
stator winding over hang beyond core – 500 mm max

##### **B. Machine Specifications**

- (a) Max length – to be specified by the supplier
- (b) Max width – to be specified by the supplier
- (c ) max height - to be specified by the supplier
- (d) vertical stroke on main column – to take difference of the max/ min OD plus allowance 100 mm (approx. 1100 mm)
- (e) Adjustment of the arms – to take difference of the job ID's plus allowance 100 mm (approx 1000 mm i.e each direction 500 mm)
- (f) V block table length – Approx 1700 mm
- (g) longitudinal adjustment for entry of the arms into the job – 2300
- (h) Pressing in one go - 1000 mm long min
- (i) Center height of the small capsule from floor/rail- 1400 mm approx
- (k) center height of the big capsule from floor / rail – 2450 approx.
- (l) travel of the job trolley – 2200 mm min
- (m) max length of pressing arm – 2250 approx
- (n) pressing bar length – approx 1150 mm
- (o) no of cylinders per arm - 20 to 25 Nos (total – double the number )
- (p) max coil overhang- 500 to 800 mm
- (q) arm length- approx 2020 mm
- (r) arm mount slider length – 500 approx.
- (s) arm stroke- 750 each (to suit the max. / min. ID)
- (t) width of arm guideways – Approx 450 to 500 wide
- (u) main column dimensions- approx 650 x 460 mm
- (v) width of main column guideways- 460 mm approx.
- (w) vertical stroke of main column - vertical adjustment of main slider – 1200 mm
- (x)length of the main column guideways = 1200 + 500 = 1700 mm
- (y) column height – to suit the configuration

- (z) indexing of the arms – through electronic controller
- (aa) specific pressure to be exerted for pressing of the putty – 7 bars
- (bb) hyd power pack – 250 bars
- (cc) actual operating pressure – to suit the application
- (dd) cylinder dia x stroke – 36 mm x 10 mm
- (ee) control as per control specs given below- through PLC
- (ff) pendant – as per controls given below
- (gg) total weight of the equipment – should be specified by Supplier

Note : The dimensions are slightly alterable to suit the job dimensions specified.

## 5. CONTROLLER

The indexing of the pressing arms & pressing in devices electrics should be inter linked to achieve proper putty pressing into the slots.

The equipment works on automatic cycle of pressing, indexing and again pressing.  
The auto-cycle can be cut off and individual operations can be carried out manually

The indexing and positioning is by rotation of the arm support about its own axis and is controlled by a proximity switch.

There are four timers in the circuit, while the equipment is on auto-cycle, with the following function :

- T1 – This controls the total cycle times from slot to slot in minutes.
- T2 - This gives the initial momentum required to rotate the arm support after which proximity switch will take over.
- T3 - Actual pressing time within cycle time (T1) in seconds.
- T4 - Duration of press returning

Due to the built-in interlocking arrangement, spindle Brake Drum and Hydraulic valve will not operate simultaneously ( The electrical circuit will not become on ).

Proximity switch or suitable sensor to be provided for sensing the slot indexing .

Following manual controls are to be provided for different states

- (a) mains on/off
- (b) hyd on/off
- (c) indexing motor on/off
- (d) controller on/off
- (e) manual / auto selector
- (f) single cycle / continuous cycle
- (g) interlocks/(on or off) – (inside the control panel for maintenance purpose)
- (h) operation should be possible from main control panel as well as pendant
- (i) piston push forward/ retract

- (j) index one slot
- (k) selector for inputting no of slots
- (l) selector for cumulative indexing / single stator indexing
- (m) direction selector
- (n) setting of various timers

Following status displays are to be provided.

- (1) power indicator
- (2) indicator for selection of various cycles
- (3) indicator for various processes (whichever on)
- (4) Hyd. Pressure indicator/ Tonnage Indicator
- (5) Index position counter

Controls need to be discussed in details.

#### 6. Safety :

All safety provisions for the safety of the operator as well as safety of various elements should be included in the system. The safety interlock should be provided for mal-operation of the different units of the equipment.

#### 7. Electric supply :

Electric supply available is 415 VAC +/- 10 %, 3 phase & 50 Hz +/- 3% . For control voltage , suitable step down transformer as well as rectifiers are to be included. Proper ferruling and numbering is to be done. Power and control section to be separated in the electric panel. No neutral is provided in the system. System shall be 3 wire type.

#### 8. Scope of supply :

- (a) complete machine comprising of V table, column, arms , hyd power pack, control panel, control pendant etc.....One number
- (b) tools for various IDs..... 10 Nos.
- (c) Foundation bolts, leveling plates, anchoring material, embedded material etc- one full set as required
- (d) operations and maintenance manuals ..... 4 sets
- (e) set of mechanical and electronic spares..... 1 set (supplier to list the spares)
- (f) predespatch inspection
- (g) civil foundation design
- (h) erection of machine
- (i) commissioning of the machine
- (j) job prove out on at least 3 jobs in BHEL Bhopal works

**9. Transport :**

Supplier to arrange the transport on door delivery basis to BHEL Bhopal works.

**10. Incoming inspection at BHEL Bhopal :**

Supplier to depute their representative for doing incoming inspection at BHEL Bhopal works.

**11. Erection and commissioning :**

Erection and commissioning of the equipment has to be done by the Supplier. Civil work shall be done by BHEL. Civil foundation design has to be given by supplier. Complete Layout drawing should be given by supplier. Facilities like crane, water etc will be provided by BHEL. Any special tools , tackles etc. needed during erection will have to be arranged by the party.

12. **Performance :** The equipment will be proved before dispatch of its basic functions. At the time of commissioning, an actual jobs will have to be proved by the party. The equipment should be able to give consistent performance over its specified ranges. The testing and calibration of the each unit should conform to the relevant standards. The test and inspection of the equipment will be witnessed by our Engineer at the firms works before dispatch .

13. **Spares :** The minimum necessary spares for the equipment should be part of the offer, giving item-wise details

14. **Painting :** The equipment should be given two coats of red oxide primer and finished with two coats of GREEN PAINT to DIN RAL 6011 to relevant IS or BS.

**15. Details to be included in the offers :**

- 1) General arrangement drawing of the equipment showing the following details :

1.1) Constructional features.

1.2) Overall dimensions of major parts showing capacities, rating etc.

- 2) A list of customers to whom similar/special purpose equipment have been supplied, covering type of equipments, dates of supply etc.

16. Tech. literature and Drgs. To be supplied along with the equipments.

4 copies of the following :

- 1.) General arrangement drawing as per 11.1 above.

- 2.) Descriptive leaflets/technical literature.
- 3.) Operating & service manual
- 4.) Electrical wiring diagram.
- 5.) Instructions for maintenance/repairs of bought out components supplied with the equipment.
- 6.) Details of spare-parts with item wise details .
- 7.) Test & inspection certificates.

17. The attached sketch gives the general arrangement of the equipment.

18. **Experience :**

The supplier should have made automatic indexing type of equipment including electronics and hydraulics and such equipment should be working satisfactorily in the field for the period of one year from commissioning. (six months in case of BHEL)