Ordnance Factory Kanpur (OFC)
Unit of Advanced Weapons & Equipment India Ltd.
Govt. of India Enterprises, Ministry of Defence

Interested Vendors are invited for carry out following maintenance work.

Description of the Machine:

Horizontal Machining Centre (04 Axis)
Model: HMC-LH55
Mfg. Sr. No.- H2-00011
Make: Lakshmi Machine Works Ltd

Work to be carried out.

1. Dismantling of torque motor stator 1FW6130-140 from stator housing of B axis rotary table.
2. Remove the old YRTM 200 bearing from stator housing and change it with new bearing. New bearing will be provided by OFC.
3. Reassemble of stator motor 1FW6130-140 with stator housing of B axis rotary table.
4. Reassembled the other demented parts of B axis rotary table.
5. Re-fixing of B axis rotary table into Machine and set the geometry accuracy as per Geometrical accuracy test chart of OEM.
6. After completion of geometry accuracy work of B axis rotary table, production section will verify it.

Note: Lifting tackles/forklift/hydra cranes/overhead crane etc. if required will be provided by OFC. Two unskilled manpower will be provided by OFC to assist in above work.

For More detail please contact to MM section on Phone 0512-2295161-68-70, Email: ofc.ofb@nic.in or visit to http\\www.

Yogendra Kumar
General manger
For Executive Director
Ordnance Factory Kanpur

Bearing change and Geometrical accuracy work of B- axis of HMC CNC machine Model LH-55 of M/s LMW make at GS-III section

Specification No. 039/MM/8556/01/2023 Dt.31/10/2023

1. **Objective:** The objective of these specifications is to guide Firm in submitting a quotation which shall fulfill all the technical and commercial requirements of purchaser and also to act on the conditions of supply regarding all such technical and other aspects about which a Firm remains silent in his quotation.

2. **Description of the Machine:**

2.1. Machine Type: Horizontal Machining Centre

2.2. Model no: HMC-LH55

2.3. Machine make: M/s Lakshmi Machine Works Ltd

2.4. Manufacturer's Machine serial no: H2-00011

2.5. Machine Regd no: OFC No. 8556

3. **Details of work required:** Dismantling of B axis rotary table assembly, replace its bearing YRTM-200 and refitted into machine and maintain its geometrical accuracy as per Geometrical accuracy test chart of OEM (copy attached in annexure-A).

4. **Scope of work**: Specifications cover repair of machines as per following detailed scope of work:

4.1 Dismantling of integrated type servo torque motor assembly 1FW6130-140 from B axis housing of rotary table which is in working condition.

4.2 Remove the old YRTM 200 bearing from stator housing and change it with new bearing. New bearing will be provided by OFC.

4.3 Reassemble of integrated type servo torque motor assembly 1FW6130-140 with B axis Housing rotary table.

4.4 Reassembled the other dismantled parts of B axis rotary table.

4.5 Re-fixing of B axis rotary table into Machine, set the positional accuracy of B axis Table at different angles within (+/-0.001Degree) and geometrical accuracy as per Geometrical accuracy test chart of OEM (copy attached in annexure-A) and After completion work of B axis rotary table, production section will verify both positional accuracy and geometrical accuracy.

5. **Terms & Conditions:**

5.1 Special & standard tools and instruments required for repairing of the machine shall be brought by firm's engineers. General tools available at OFC will be provided.

5.2 Assembly drawing of B-axis rotary table (without dimension) and manual of the machine is available at OFC.

5.3 Lifting tackles/forklift/hydra cranes/overhead crane etc. if required will be provided by OFC.

5.4 Two unskilled manpower will be provided by OFC to assist in above work.

5.5 Firm will intimate in advance the condition of machine required by them to start the repair work. OFC will ensure readiness of machine in advance to start the repair work without delay.

5.6 Firm to submit the details of their engineer, supervisor and workmen 02 days prior before attending the work through e-mail for necessary gate pass.

5.7 On receipt of purchase order, firm will start the repair activity at the earliest.

5.8 The machines shall be handed-over to the Firm on same day of their visit. However The firm will inspect the site of machine, if considered necessary, to ascertain site conditions and shall collect all information, which may require, before submitting the tender, Claims and objection due to ignorance of site conditions will not be considered after submission of the tender.

5.9 If any defective part is required to be taken outside the factory by the firm for repairs, the firm will be allowed to do so, on returnable basis after meeting all formalities of factory.

5.10 A detailed Service Report shall have to be provided by firm after completion of the work.

5.11 The machines shall be handed over to the factory in good running / operative condition after completion of work.

5.12 Firm to arrange all the safety equipments, PPE's, masks etc. for their engineer, supervisor and workmen.

6. **Safety:** During execution of the work at consignee's site, firm will be responsible for safety of their workmen and engineers. Therefore firm should adhere to the safety norms of Ordnance Factory Kanpur.

7. **Security:** Firm will adhere to the security requirements at consignee's site. Firm will be responsible for discipline of their workmen.

8. **Working hours:** Normal working hours on working days at consignee's premises will be from 0900 hrs to 1800 hrs with one hour lunch break. If the firm wants to work in extended hours or on holidays/Sundays, firm should submit written request for the same at least one day in advance.

9. **Inspection:**

Work will be carried under the instructions and supervision of OFC representatives appointed for the purpose on behalf of the GM/OFC. Based upon completion of the work, OFC representative will issue a Job Completion Certificate.

10. **Acceptance:**

10.1 After completion of work from their end, firm will offer the machine for verification of work done , positional accuracy of B axis Table at different angles (+/-0.001Degree)and geometrical accuracy achieved of B axis rotary table as per geometrical accuracy test chart of annexure-A. Rotary table position in stationary position should not deviated more than (+/-)10 Micron while clamping/unclamping.

10.2 Fresh geometrical accuracy test chart will be prepared by firm and signed jointly by firm reps and OFC reps consisting of production and maintenance section.

10.3 If any observations are made during verification of work the same will be resolved by firm to meet the requirements given in geometrical accuracy test chart.

HOS/EM HOS/MM JWM/EM JWM/MM/GS-III

WM/E & S

Jt.GM/Maint.

Approved/Not approved

GM/YK 09/11

For LAKSHMI MACHINE WORKS LTD

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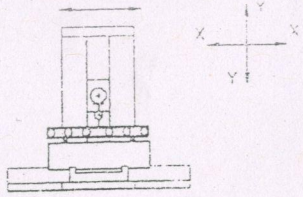
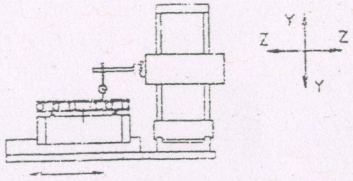
No.		Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
1	Checking of straightness of the X axis motion	In the vertical XY plane / 1. Straight edge 2. dial gauge	Place a straight edge on the pallet as close to the centre of table as possible. Bring the test indicator (fixed to spindle head) into contact with straight edge. Travel the column along X axis. The maximum difference in the readings of the test indicator shall be the Test results. Measuring line should pass as close to the centre of the table as possible.		0.015	0.010
2	Checking of straightness of the Z axis motion	In the vertical YZ plane / 1. Straight edge 2. dial gauge	Place a straight edge on the pallet as close to the centre of table as possible. Bring the test indicator (fixed to spindle head) into contact with straight edge. Travel the table along Z axis. The maximum difference in the readings of the test indicator shall be the Test results. Measuring line should pass as close to the centre of the table as possible.		0.015	0.010

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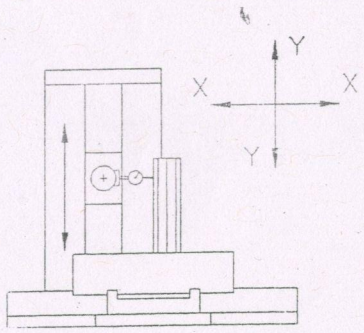
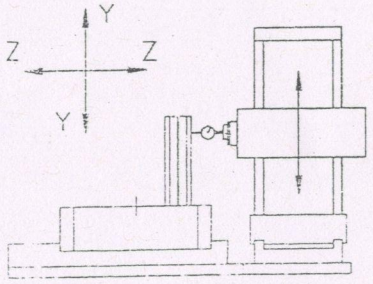
	No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
Checking of straightness of the Y axis motion	3	In the vertical XY plane / 1. Square 2. Dial gauge	Place a square on the pallet as close to the centre of table as possible. Bring the test indicator (fixed to spindle head) into contact with straight edge. Travel the column along Y axis. The maximum difference in the readings of the test indicator shall be the Test results. Measuring line should pass as close to the centre of the table as possible.		0.015	0.004
	4	In the horizontal YZ plane / 1. Square 2. Dial gauge				0.002

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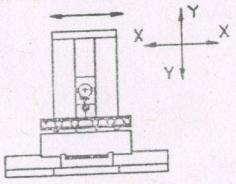
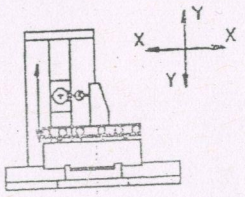
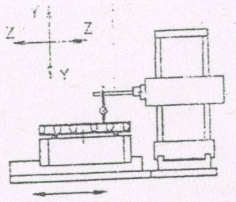
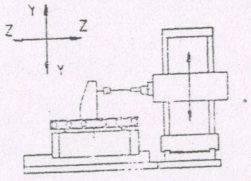
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
5	Checking of squareness between the Y axis motion and the X axis motion / 1. Straight edge or 2. Surface plate 3. Square 4. Dial gauge or 5. Optical instrument	The straight edge or the surface plate shall be set parallel to the X axis. The Y axis shall then be checked by means of a square standing on the straight edge or on the surface plate. The dial gauge shall be placed on the spindle head. The value of angle α being less than, equal to or greater than 90°, should be noted for information and possible corrections.	 	+10 0 0 +10 0.02 / 300	A 0.002
			 	+2 0 0 10	B 0.008
6	Checking of squareness between the Y axis motion and the Z axis motion / 1. Straight edge or 2. Surface plate 3. Square 4.Dial gauge or 5. Optical instrument	The straight edge or the surface plate shall be set parallel to the Z axis. The Y axis shall then be checked by means of a square standing on the straight edge or on the surface plate. The dial gauge shall be placed on the spindle head. The value of angle α being less than, equal to or greater than 90°, should be noted for information and possible corrections.	 	0 -7 +4 0.02 / 300	A 0.008
			 	0 -6 +6	B 0.002

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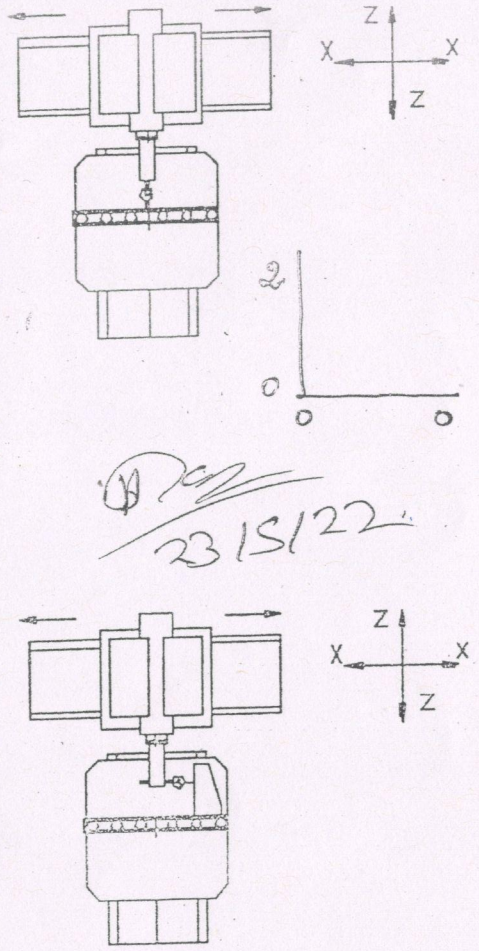
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
7	Checking of squareness between the Z axis motion and the X axis motion / 1. Straight edge or 2. Surface plate 3. Square 4. Dial gauge or 5. optical instrument	The straight edge or the surface plate shall be set parallel to the X (or Z) axis. The Z (or X) axis shall then be checked by means of a square placed on the table with one side against the straight edge. The test can also be performed without straight edge, aligning one arm of the square along one axis and checking the second axis on the other arm of the square. The dial gauge shall be placed on the spindle head. The value of angle α being less than, equal to or greater than 90°, should be noted for information and possible corrections.		0.02 / 300	0.002

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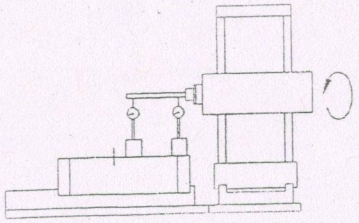
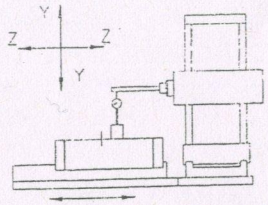
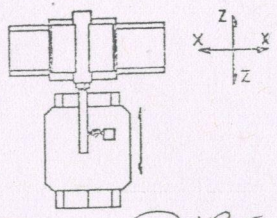
No.		Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
8	Checking of parallelism b/w the spindle axis and Z axis motion. Checking of run-out of internal taper of the spindle	At the spindle nose / 1. Test Mandrel 2. Dial gauge	Fit in a test mandrel into the spindle bore. Set a dial indicator to mandrel and rotate spindle nose & rotate the spindle. Note the difference between maximum & minimum readings.		0.007	0.006
		At a distance of 300mm from the spindle nose / 1. Test mandrel and 2. Dial gauge			0.015	0.006
9		In the vertical YZ plane / 1. Test Mandrel 2. Dial gauge	Position the column to the centre of X-axis. Fit in test mandrel in to spindle bore. Set a dial indicator on the table, against the test mandrel & move the table. The test result is the difference between maximum & minium readings obtained.		0.015 per 300	0.012
		In the horizontal ZX plane / 1. Test mandrel 2. Dial gauge			0.015 per 300	0.008

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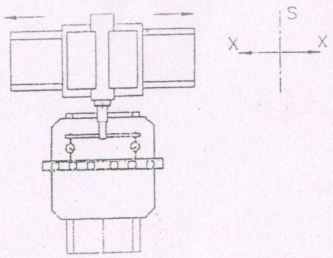
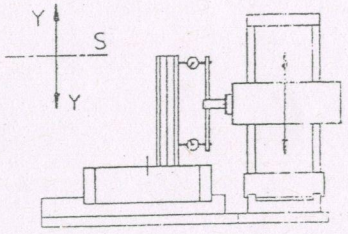
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
10	Checking of squareness between the spindle axis and the X axis motion / 1.Straight edge 2.Special arm 3. Dial gauge	Y and Z axes to be locked. The straight edge shall be set parallel to the X axis. The squareness deviation can also be derived from test 7 and 9.b		0.015 / 300	0.006
11	Checking of squareness between the spindle axis and the Y axis motion / 1. Square 2. Special arm 3. Dial gauge	X and Z axes to be locked. The measurement side of the square should be set parallel to the Y axis or the lack of parallelism shall be considered in the measurement. The squareness deviation can also be derived from test 6 and 9.a		0.015 / 300	0.012

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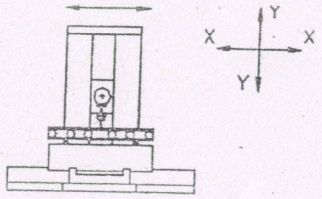
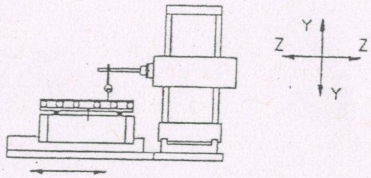
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm	
12	Checking of parallelism between the table surface, in the four rotary posititon at 90° from each other, and the X axis motion. / 1. Straight edge 2. Gauge block 3. Dial gauge	The stylus of the dial gauge is to be placed approximately at the working position of the tool. The measurement may be made on a straight edge laid parallel to the table surface. The dial gauge shall be placed on the spindle haed of the machine.		0.025	A 0.016	0° = 12 90° = 8 180° = 16 270° = 12
					B 0.014	0° = 10 90° = 4 180° = 14 270° = 4
13	Checking of parallelism between the table surface, in the four rotary positions at 90° from each other, and the Z axis motion. / 1. Straight edge 2. Gauge block 3. Dial gauge	The stylus of the dial gauge is to be placed approximately at the working position of the tool. The measurement may be made on a straight edge laid parallel to the table surface. The dial gauge shall be placed on the spindle haed of the machine.		0.025	A 0.018	0° = 10 90° = 10 180° = 10 270° = 18
					B 0.018	0° = 12 90° = 2 180° = 18 270° = 6

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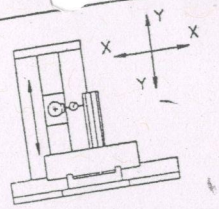
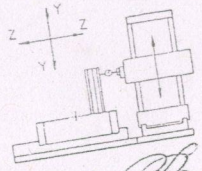
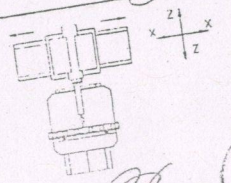
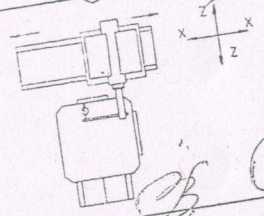
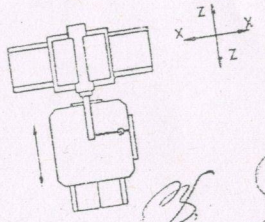
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm		mm
14	Checking of squareness between the table surface and the Y axis motion, in the four rotary positions at 90° from each other a. In the vertical XY plane perpendicular to the spindle axis. b. In the vertical YZ plane parallel to the spindle axis. 1. Surface plate 2. Square or 3. Cylindrical square 4. Dial gauge	The square or cylindrical square should be in the centre of the table. The dial gauge shall be placed on the spindle head of the machine. This squareness deviation can also be derived : for a) from tests 5 and 12 for b) from tests 6 and 13.		0.015 / 300	A 0.010 B 0.012	180° = 8 270° = 10 0° = 6 90° = 8 180° = 8 270° = 12
				0.015 / 300	A 0.010 B 0.010	0° = 4 90° = 8 180° = 10 270° = 8 0° = 8 90° = 8 180° = 4 270° = 10
				0.015 / 300	A 0.015 B 0.012	
15	Checking of parallelism between The longitudinal median or reference T-slot 1. Dial gauge, 2. if necessary, straightedge 3. Master pins	Z axis to be locked, if possible. The dial gauge shall be placed on the spindle head of the machine. When the alignment holes exists, two master pins which fit in the holes and have proturding parts of the same diameter shall be used, and a straight edge shall be placed against them.	a 	0.015 / 300	A 0.012 B 0.006	
	Checking of parallelism between a. the longitudinal edge locator of the table in 0° Position and the X-axis motion 1. Dial gauge, 2. if necessary, straightedge 3. Master pins		b 	0.015 / 300	A 0.008 B 0.010	
16	Checking of parallelism between b. the transverse edge locator of the table in the 0°. Position and the Z axis motion. 1. Dial gauge 2. if necessary, straightedge 3. Master pins					

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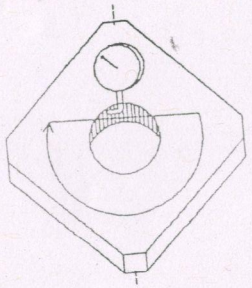
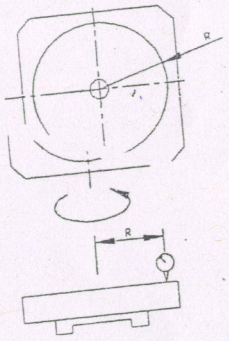
No.	Test Object / Measuring Instruments	Measuring method	Diagram	Tolerance mm	Test Results mm
	Checking of a) run-out of the centre hole of the table (when the centre hole is used for locating purposes) / 1. Dial gauge	a) X & Z are to be locked, if possible. The dial gauge may be placed on the spindle head of the machine.		0.025	A — B —
17	Checking of b) Camming of the table surface 1. Guage blocks 2. Dial gauge	b). Y axis to be locked, if possible. The radius R Shall be as large as possible. These tests shall be performed on all work holding tables, rotaing around vertical or horizontal axes, changing nomenclature of the axes accordingly. L is the length of the shorter side of the table or pallet.		0.03	A 0°=0 90°=+4 180°=+4 270°=-10 0.014 B 0°=0 90°=2 180°=0 270°=-8 0.010

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