

Technical specifications for Optical/Vision measuring machine

The measuring machine must be capable of:-

- Non-contact High precision measurement using Vision/ Optical principle for metallic templates having different complex profiles and geometrical shapes without any fixturing
- The system should be USB based with direct interface with desktop PC without any added electronics like controllers or video cards or dongles.

c.It should be user friendly and quick to operate on print and click principle.

Vendor to offer all specified requirements and confirm compliance in their offer

		Technical Specifications
1	Technology	Non contact(semi-automatic but fully programmable) high precision vision measurement machine
2	Volume /Size	
	Measurment Area /volume	Length (X)=300mm or more , Width(Y)=300mm or more,Height (Z) =150mm or more
3	Accuracy:	
3a	X,Y &Z Axes Resolution:	$\pm 1 \mu\text{m}$ or better
3b	XY Accuracy	$6 \mu\text{m}$ or better(across full length)
3c	Z accuracy	$5 \mu\text{m}$ or better
4	Optical Zoom:	Automatic motorized zooming must be possible
4a	Optical Zoom:	variable upto 6x or more
4b	Digital Zoom:	Minimum of 2X
4c	Zoom range	15 or more:1
5	Magnification:	
	Magnification	Magnification should be software controlled and should be variable upto 300X or more
6	Weight Capacity of machine table	Work piece weight 10 Kg or more
7	Machine Structure:	To ensure high precision it is must have stable body structure.Base & column should have rugged structure.Material of base to be informed.
8	Mode of operation/stage movement	Mode of operation should be semi automatic, calibration should be possible through software guidance and it should be possible to do non-linear calibration. Movement of axes may be manual using wheels/joystick with provision of very precise movement
8	Guideways & Bearings	Guideways & Bearings should be high precision linear ways with recirculating precision ball bearings and dust shields of reputed makes like INA/Bosch Rexroth/NSK etc. makes only
9	Optics and Illumination:	LED lighting system must have surface profile and axial multi-ring lights. (no halogen should be provided) Inbuilt cooling provision of LED lights should be there. No external fan should be there.
9a	Axial illumination	Axial ring should be LED illuminated.It should be possible to switch on/off for accurate detection of the edges.
9b	Advance Lighting :	It should be possible to have full control to enhance edges using light.
9c	Light calibration	Light calibration should be software driven Light and Optics Calibration Tool must be offered (mandatory)
9d	Top Multi-Ringlight	Multi Ringlight should have sufficient LED's (only monochromatic) for better edge detection divided in multiple quadrants (external lighting is not acceptable)
9e	Lighting angles	25 degree or less to 90 degree or more
10	CCD Camera specifications	CCD camera should be inbuilt and should be high resolution color camera . Camera pixels to be specified. Camera should have active window which should be capable of taking 30 frames/sec or better creating faster image capture and processing.

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11a	Software requirements	Machine should be equipped with High end full version measurement software with minimum following modules:- a. Basic linear/angular dimension measurement b. Complex profile for arcs, circles,ellipse ,spline combination profiles etc c. Complex feature module d. Self-calibration module e. Administrator and user customization module f. Advance measurement module(if any)
11b	Software requirements	1. Life time upgradation of software should be offered. 2.Report Generation-it should be possible to generate measurment report in customisable format with nominal drawing values of dimensions being measured, measured values & deviations etc. 3. Software should be able to generate the measurement program using Autocad drg file of job to be measured. 4. Reinstallable CD of the complete software to be provided.
11c	Data Import/Export	DXF format Import & Export and 2D & 3D Data Point Export. Advance Edge Reduction Technology with Sub- pixel accuracy and repeatability
11d	Part Programming:	Machine must be programmable using Part programs
11e	System must have following automated inhouse calibrations	Non Linear Stage correction,Stage Verification, Optics Calibration, Zoom Calibration, Lights Calibration, Rotary Calibration, Z scale Calibration.
11f	Feature Type	Point, Line, Arc, Circle, Angle, Distance, Plane, Ellipse, Gap, Rectangle, Slot, Open spline, Closed Spline, O-Ring, Sphere, Cylinder, Cone, Composite, Calculator, Text, Prompt, Part Separator,dynamic Sub Pixel Image Processing, Point edge detection tools, Multiple Point edge detection tools,On-screen scale,Advanced Dimensioning and Tolerancing,Image capture and Export to JPG or BMP and also feature properties like parallelism,perpendicularity,angularity etc.
11g	Software screen shots	In a single screenshot it should be possible to visualize camera view, chart of best fit, part programming, schematic, LED's setting (intensity & no. of LED's to be illuminated) Machine should operate only with single Monitor.
12	Compensation	Provision for non-linear stage compensation and non-linear optics compensation should be offered to ensure required measurment accuracy
13	Operating conditions	a.Machine to be kept in a room having one installed Window Ac of 1.5T b.Power supply conditions:-220V AC +/-10%,50Hz or 415V +/- 10%,50Hz (no neutral)
14	Desktop/PC	Vendor to specify the configuration of PC required suitable to their machine and specify any other requirements.Desktop PC of required configuration , color monitor ,keyboard and mouse shall be provided by BHEL. Single power supply connection shall be provided by BHEL. Any other item required for installation and commissioning of machine shall be provided by vendor.
14.1	Desktop/PC	Vendor to offer complete set of hardware (PC,MONITOR,KEYBOARD ETC.) in case it is not provided by BHEL(refer sno. 14) for making the machine complete in all aspects for ready to use for application Decision shall be taken by BHEL prior to ordering.
15	Documents required	Set of documents to be provided (3 no. of printed copies and 1 soft copy) of operation,installation,commisioning,troubleshooting and service manual,list with specification and source of consumables , internal assembly & circuit diagrams,details of any bought out items, programming manual and software user manual.The vendor should also provide the hard copy of PLC program/logic diagram if applicable.The manual should also contain the detailed spare part list along with specification, part number and address of manufacturers. Complete backup(including PLC program,machine parameters/programs,auxiliary system backup,HMi backup,GHOST backup of hard disk etc. whichever applicable) on USB harddisk of 500GB or more.
16	WARRANTY	Warranty for 2 years against any manufacturing defect and trouble free operation(including any replament of part if required) from date of successful commisioning and acceptance at BHEL HARIDWAR shall be offered by vendor. Also vendor to provide mandatory comprehensive calibration of machine at the end of warranty period and also calibration to be provided as and when required by BHEL during the warranty period. Vendor to provide service support (free of cost) during warranty period with deployment of their service engineer as & when required by BHEL.

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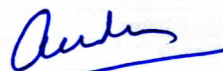
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17	Annual Maintenance Contract(AMC)	Vendor to offer comprehensive AMC (with material) for 3 years after completion of warranty period.
18	Commissioning, Final acceptance and Training	It shall cover the following activities:- a. Installation of machine at site provided by BHEL Haridwar b. Electrical connections with power supply provided by BHEL c. Installation of software on PC and other interface of PC with machine d. Demonstration of complete functioning of machine including all features of software. e. Demonstration and verification of measurement on 4 BHEL templates/jobs f. Proper training at BHEL haridwar (as required by BHEL) of BHEL deputed engineers shall be done in proper operation of machine , different software usage and features, maintenance and calibration. g. Customization of software to comply as per BHEL's requirement (as recommended by vendor) h. Verification of supplies as per PO
19	Predispatch Inspection	Predispatch inspection fo supplies shall be done by BHEL at vendor works for mutually agreed period to ensure compliance to technical specifications, supplies and functioning of machine prior to dispatch. The vendor to inform atleast 15 days before start date of PDI to BHEL. BHEL may bring actual job for measurement in PDI to check the machine's capability.
20	Tools for installation, operation and maintenance	Tools and equipment required for installation of machine shall be brought by vendor. Necessary tools required for maintenance and operation of the machine should be supplied by the vendor.


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