

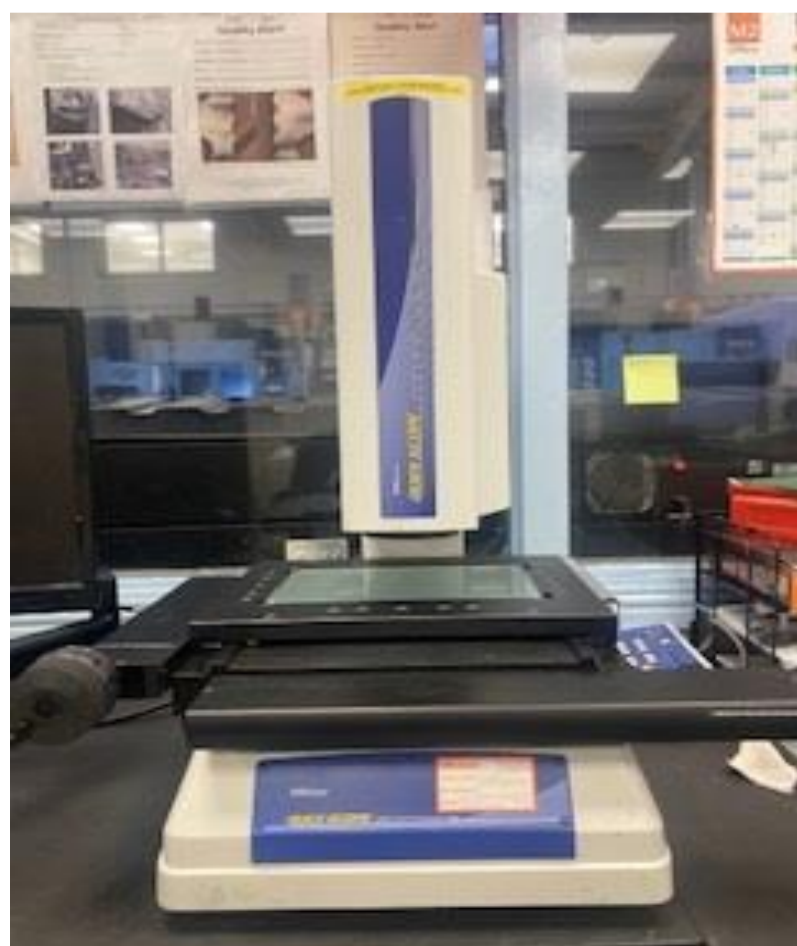
Aim of the Project

This dissertation aims to explore the installation and validation processes for a microscope in Takumi Precision Engineering showing the importance of precision, accuracy, and reproducibility. The study will cover the key components involved in the installation Qualification, such as equipment installation qualification, linearity and bias study and that it operates consistently in production. It will also incorporate a working structure on how to use the machine and the different icons.

Project Objectives

- Install the Microscope in the Quality Office
- Working Instruction
- Installation Qualification (IQ)
- Operation Qualification (OQ)
- Production Qualification (PQ)

Setting up of Microscope



Installation Qualification

The document is an Equipment Installation Qualification Plan for the Mitutoyo Quick Scope Vision Measuring Machine QS-L2010Z/AFB microscope. It covers purpose, scope, qualification, background, procedure, acceptance criteria, equipment and software identification, applicable documents, checklists, qualification issues, conclusion, and appendices. It ensures adherence to OEM specifications for installation, safety, calibration, maintenance, and software/hardware installation. The plan confirms compliance for production use. Appendices include the QSPAK software guide and risk assessment. Overall, it assures proper installation and compliance for production.

Specifications

Fixed lens system	Model	QS-L2010/AFB	QS-L3017/AFB	QS-L4020/AFB
	Order No.	359-700*	359-701*	359-702*
Zoom lens system	Model	QS-L2010Z/AFB	QS-L3017Z/AFB	QS-L4020Z/AFB
	Order No.	359-703*	359-704*	359-705*
Feed mechanism		XY-axis: manual / Z-axis: motor-driven with auto-focus		
Range (X×Y×Z)		200×100×150mm	300×170×150mm	400×200×150mm
Resolution / Length standard		0.1µm / Linear encoder		
Image detecting unit		1/3" color CCD camera		
Measuring accuracy*1	XY	(2.5+20L/1000)µm		
	Z	(5+6L/1000)µm		
Stage glass size (mm)		250×150 (10"×6")	370×240mm	440×240mm
Maximum stage loading		10kg (22lbs.)	20kg (44lbs.)	15kg (33lbs.)
Illumination		Contour illumination: 12V/30W Halogen Reflected illumination: 12V/50W Halogen Fiber-optic ring light: 12V/100W Halogen		
Dimensions*2 (W×D×H)	Main Unit	624×705×722mm	682×852×837mm	757×867×837mm
	Power Unit	186×452×381mm		
Mass	Main Unit	66kg (147lbs.)	134kg (298lbs.)	140kg (311lbs.)
	Power Unit	14kg (31lbs.)		
Power consumption		400W at max.		

*1 Company standard (fixed lens system: 2.5X, zoom lens system: 2.5X at the time of zooming in) under an installation environment of 20°C and during use of the standard lens

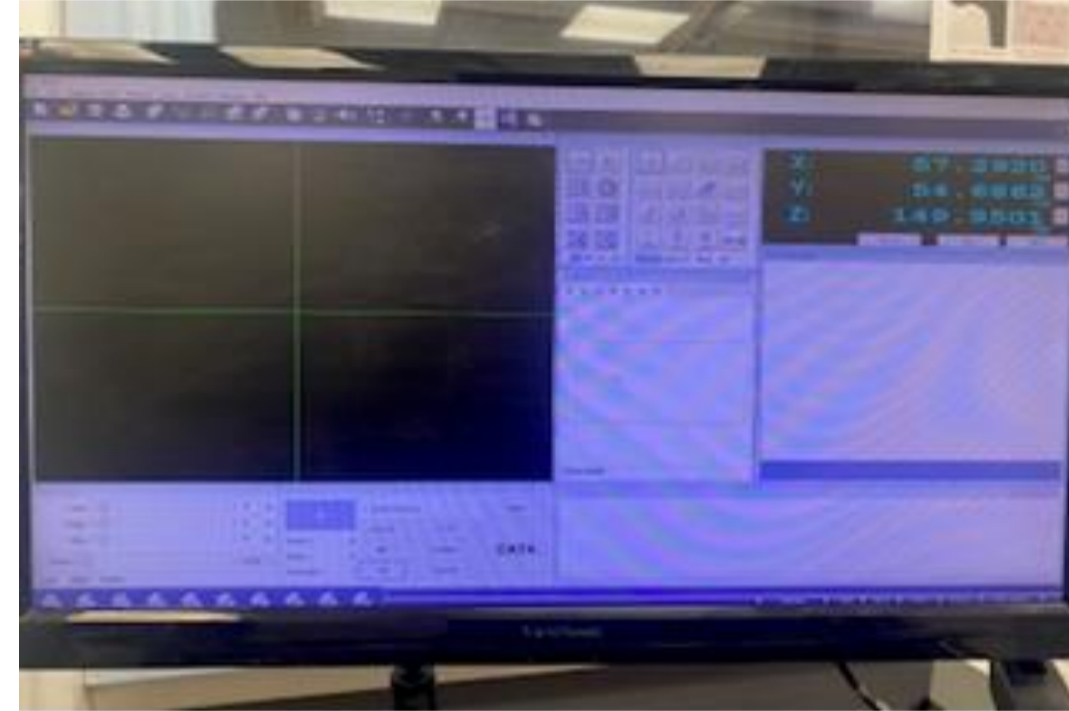
*2 The width and height increase by a maximum of X-axis stroke and Z-axis stroke, respectively. The depth increases by one half of the Y-axis stroke at most.

*3 Suffix code according to AC line voltage: C for 110V AC, A for 120V AC, D for 120V AC, E for 240V AC, no suffix for 100V AC

Work Instruction

The document outlines guidelines for operating the Mitutoyo Quick Scope Vision Measuring Machine QS-L2010Z/AFB microscope at Takumi Precision Engineering. It ensures consistency, accuracy, and safety during tasks. It covers authorized personnel, setup, operation, and shutdown procedures.

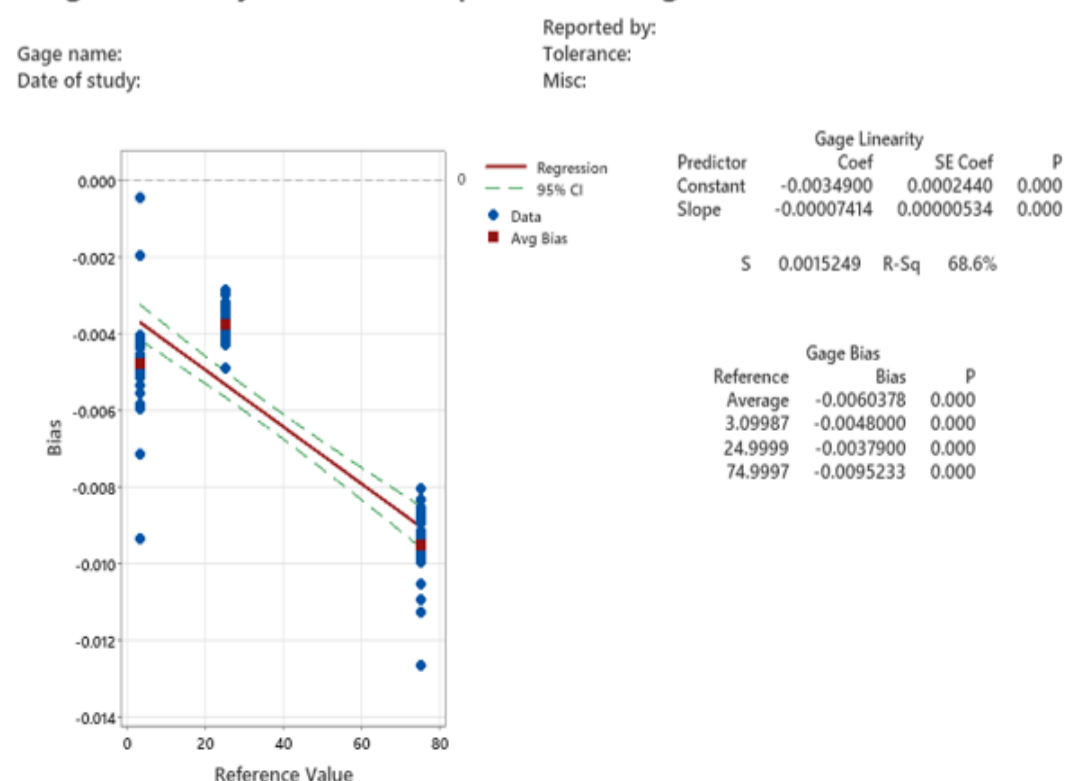
Responsibilities are assigned to operators, supervisors/managers, and the quality department for compliance, training, audits, and documentation. Overall, it aims to ensure proper operation and adherence to safety and quality standards.



Operational Qualification

OQ ensures VMM operates effectively. It includes accuracy testing, software verification, user training, and documentation review. Acceptance criteria cover accuracy, repeatability, software functionality, and operator competency. Testing involves calibrated standards and artifacts. Documentation is essential. Requalification ensures ongoing compliance. OQ ensures VMM reliability for operational use.

Gage Linearity and Bias Report for Gauge



Production Qualification

Production Qualification (PQ) ensures the Vision Measuring Machine (VMM) operates consistently in production. It covers setup, functionality testing, measurement verification, sample inspection, software validation, and user training. Acceptance criteria include functionality, accuracy, repeatability, and operator competency. Results are documented, and approval is obtained. Requalification is scheduled periodically to maintain compliance. PQ ensures the VMM's suitability for production, ensuring consistent quality and dimensional accuracy.

Conclusion/Recommendations

The project at Takumi Precision Engineering aims to install and validate the Mitutoyo Quick Scope Vision Measuring Machine QS-L2010Z/AFB microscope, focusing on IQ, OQ, and PQ. IQ ensures correct installation and safety standards, while OQ validates effectiveness through testing and verification. However, PQ remains incomplete, crucial for confirming consistent production operation.

Acknowledgement

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