# LF-X

## Large Format Expanded Platform


## Get More From Your Microscope

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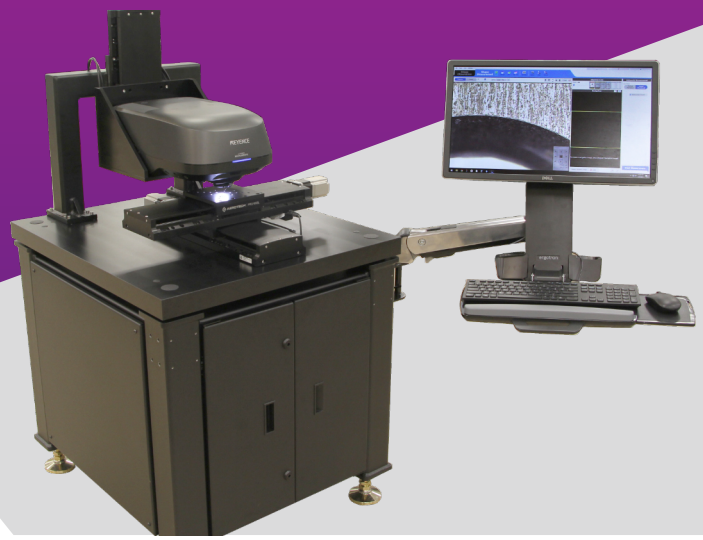
# LF-X

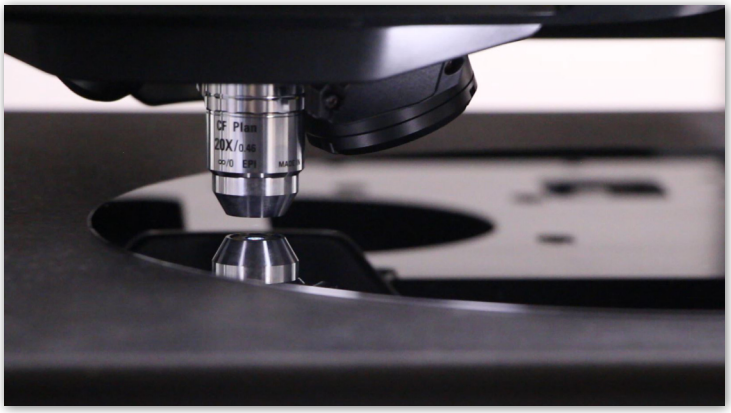
## Large Format Expanded Platform




600 x 600 mm Inspection Area System

## Expand Your Capabilities

Larger stages increase the measuring area and sample payload capacity. XpansionUI software enables control of both the microscope and motion controller - leveraging advanced features from each to unlock brand new features, such as: rotary motion, part alignment, external height sensors, and more!



Wafer scanning with the VK-X microscope

## Many Standard Options to Choose From

A variety of accessories are available to meet the needs of customers in environments spanning from R&D to production. Configure a system that works best for your application.

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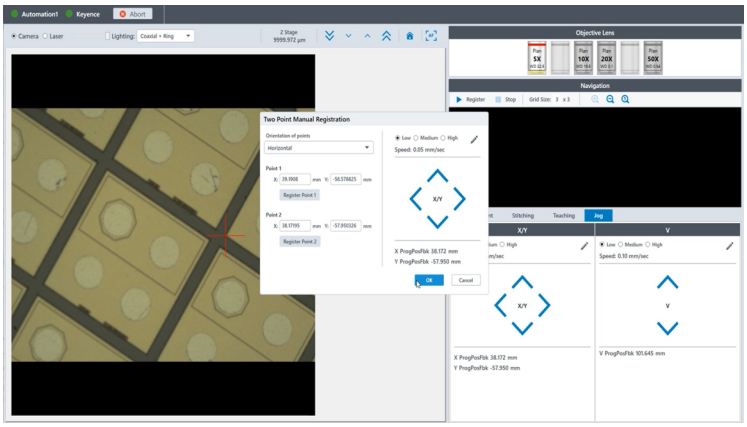
# How it Works

## Hardware + Software

LF-X

XpansionUI


LF-X-300-GR for wafer inspection



XpansionUI interface

## A Powerful Combination

LF-X hardware is constructed with world-leading, precision motion stages with a support structure designed specifically to maximize VK-X measurement performance. Configure the LF-X hardware to meet your needs, then operate the entire system out of the XpansionUI software. Utilizing one of the most powerful motion controllers in the world, XpansionUI replicates standard VK-X software functionality while also offering access to a full set of advanced features.

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# Specs

| LF-X Specifications | | |
|---|---|---|
| Travel | 300 x 300 mm | 600 x 600 mm |
| **XY Performance** | | |
| Accuracy | ± 10 µm | ± 15 µm |
| Calibrated Accuracy (Optional) | ± 2.5 µm | ± 2 µm |
| Repeatability | ± 1 µm | |
| Max Jog Speed | 25 mm/sec | |
| **Z-Axis (Optional) Performance** | | |
| Travel | 200 mm | |
| Accuracy | ± 8 µm | |
| Repeatability | ± 1 µm | |
| Minimum Incremental Motion | 1.0 µm | |
| Max Jog Speed | 25 mm/sec | |
| **Mechanical Specifications** | | |
| Payload Capacity | 35 kg | 45 kg |
| MTBF (Mean Time Before Failure) | 20,000 Hours | |

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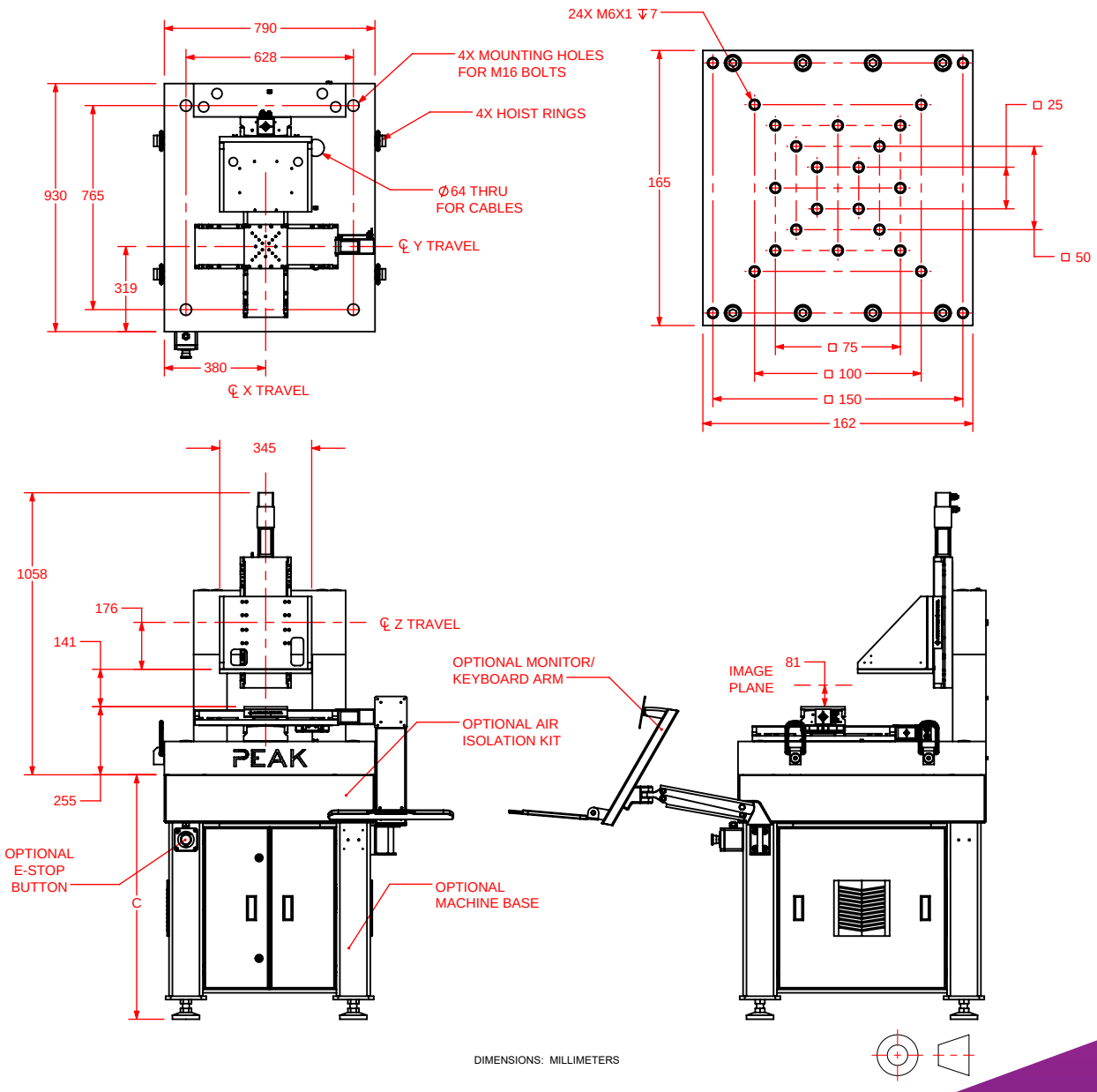
# Dimensions

TRAVEL: (-300) 300 X 300mm
BASE/BRIDGE: (-GR) GRANITE

| AXIS | NOMINAL TRAVEL |
|---|---|
| X | 300 |
| Y | 300 |
| Z | 200 |

| ISOLATION TYPE | C |
|---|---|
| (-ISO1) E-A-R | 772 |
| (-ISO2) AIR | 916 |

CUSTOMER MOUNTING HOLES



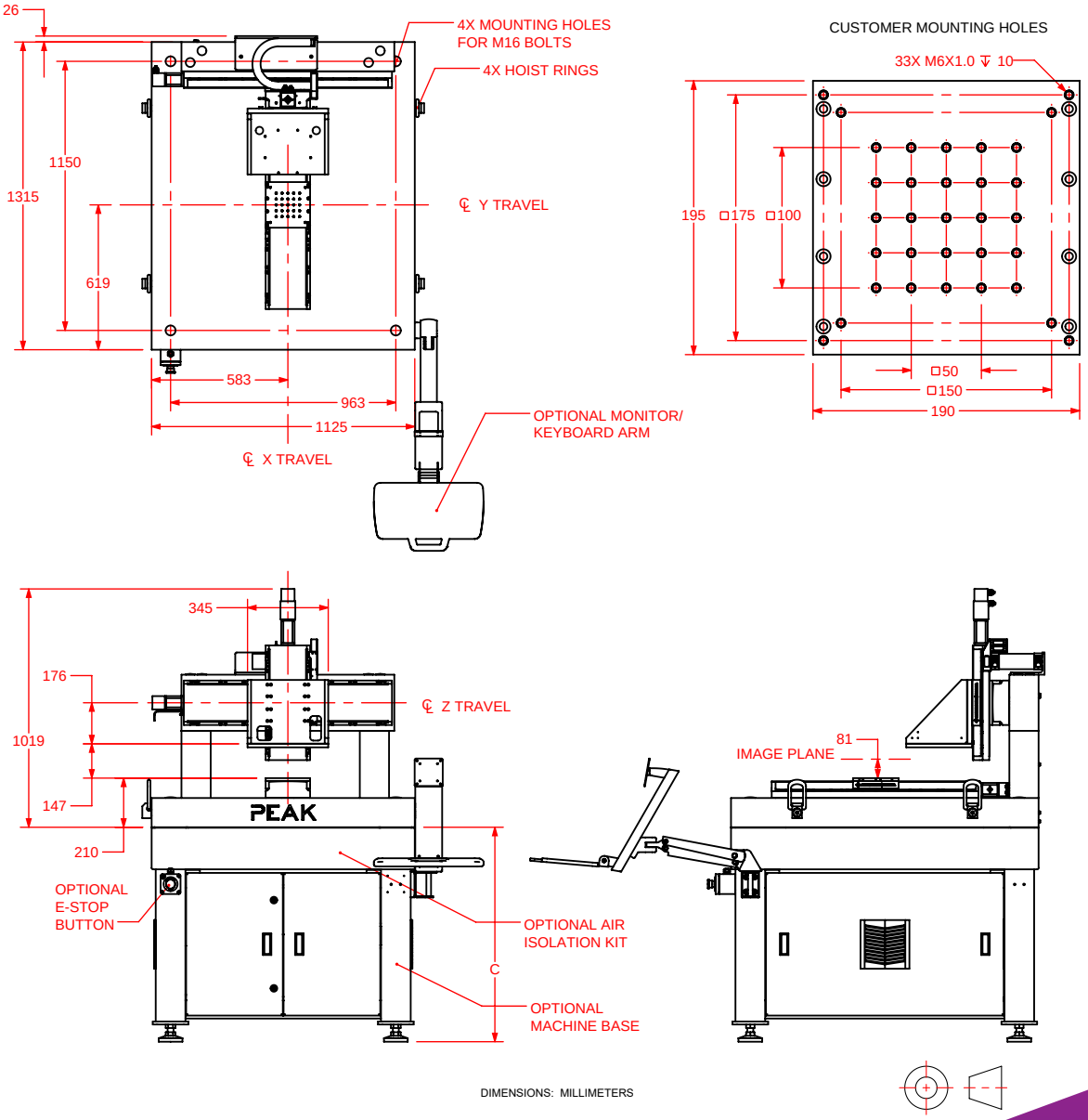

DIMENSIONS: MILLIMETERS

# Dimensions

TRAVEL: (-600) 600 X 600mm
BASE/BRIDGE: (-GR) GRANITE

| AXIS | NOMINAL TRAVEL |
|---|---|
| X | 600 |
| Y | 600 |
| Z | 200 |

| ISOLATION TYPE | C |
|---|---|
| (-ISO1) E-A-R | 772 |
| (-ISO2) AIR | 916 |




DIMENSIONS: MILLIMETERS

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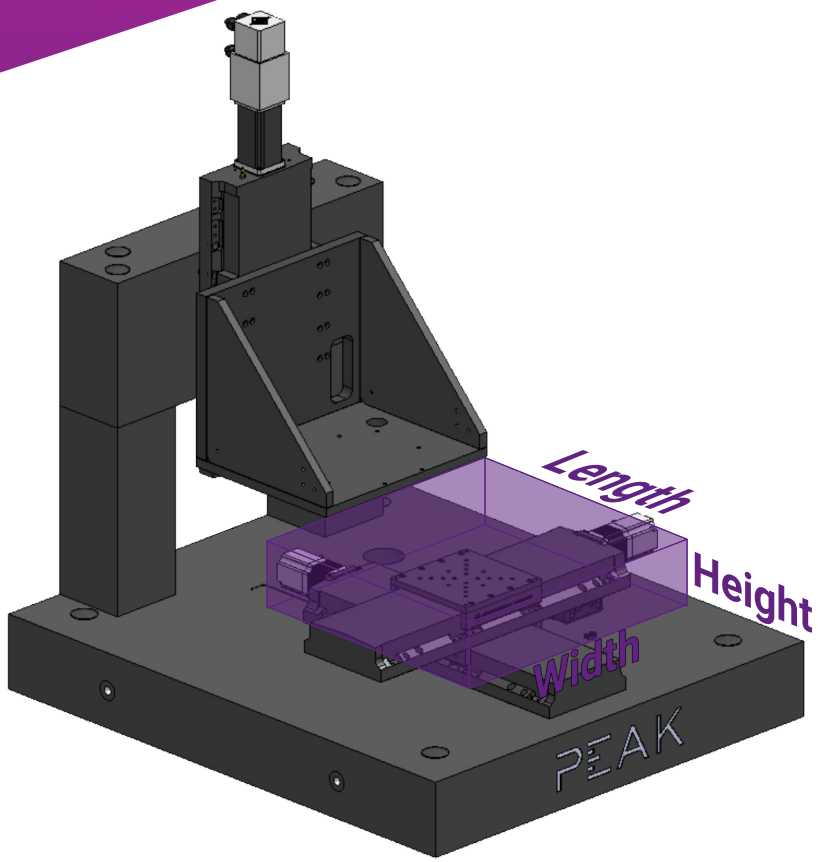
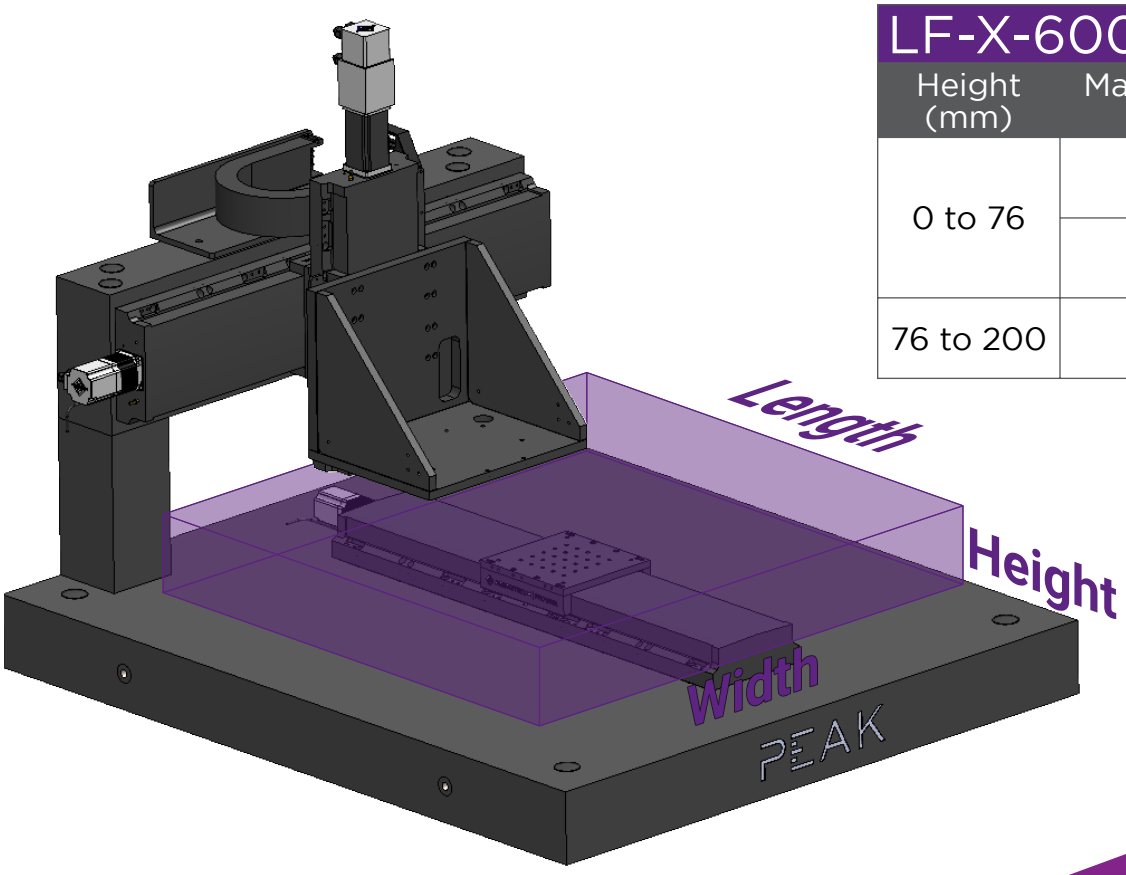
# Part Sizes

| LF-X-300 | | |
|---|---|---|
| Height (mm) | Max Width (mm) | Max Length (mm) |
| 0 to 70 | 434 | 312[1] (640) |
| 70 to 194 | 434 | 312[1] (500) |




| LF-X-600 | | |
|---|---|---|
| Height (mm) | Max Width (mm) | Max Length (mm) |
| 0 to 76 | 637 | 613[1] (765) |
| | 1085 | 515 |
| 76 to 200 | 1085 | 312[1] (500) |




* All dimensions assume part is centered on travel. Consult Peak about non-symmetric parts.

[1] Parts exceeding this size will extend beyond front edge of base when Y-axis reaches extent of travel. See parentheses for max size with overhang.

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# Ordering

| | |
|---|---|
| **Step 1 - Select your travel** | |
| **-300** (300 x 300 mm) | Stacked XY axes, with 300 mm of square travel |
| **-600** (600 x 600 mm) | Lower axis mounted to base, upper axis mounted to the bridge |
| **Step 2 - Select your base material** | |
| **-MT** (Aluminum/Steel)[1] | Lightweight, aluminum base with welded steel bridge |
| **-GR** (Granite) | Granite used for vibration isolation concerns |
| **Step 3 - Choose your options** | |
| **Machine Base (Optional)** | |
| **-MB** (Machine Base) | Steel weldment with leveling feet, doors, and mounting features for electronics |
| **Isolation (Required)** | |
| **-ISO1** (Elastomer) | Vibration reduction via elastomer pads designed to provide high damping |
| **-ISO2** (Passive Air)[2] | Increased isolation of environmental vibrations with self-leveling air isolators |
| **-ISO3** (Active)[2] | Highest level of isolation from environmental vibrations with active isolation |
| **Monitor Arm and Keyboard Tray (Optional)** | |
| **-OS** (Operator Station)[2,3] | Adjustable, ergonomic arm for sitting/standing workstation |
| **Emergency Stop (Optional)** | |
| **-ESTOP** (Emergency Stop) | Mushroom button to cut power to stage motors |
| **Line Cord (Required)** | |
| **-LC0** (None) | No line cord |
| **-LC1** (US115VAC) | US (115VAC) compatible line cord |
| **-LC2** (US230VAC) | US (230VAC) compatible line cord |
| **-LC3** (German) | Germany compatible line cord |
| **-LC4** (UK) | UK compatible line cord |

[1] Only Available with “300 x 300 mm” Travel option

[2] Requires “Machine Base” option

[3] Does not include monitor and keyboard (available from Keyence)

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# Ordering

## Required

LF-X | -300 | -GR | -MB | -ISO1 | -OS | -ESTOP | -LC1

**Product**

**Travel**
- **-300:** 300 x 300 mm
- **-600:** 600 x 600 mm

**Base Material**
- **-MT:** Aluminum/Steel[1]
- **-GR:** Granite

**Machine Base***
- **-MB:** Machine Base

**Isolation**
- **-ISO1:** Elastomer
- **-ISO2:** Passive Air[2]
- **-ISO3:** Active[2]

**Monitor Arm***
- **-OS:** Operator Station[2,3]

**Emergency Stop***
- **-ESTOP:** Emergency Stop

**Line Cord**
- **-LC0:** None
- **-LC1:** US115VAC
- **-LC2:** US230VAC
- **-LC3:** German
- **-LC4:** UK

* Optional - omit if not desired

[1] Only Available with “300 x 300 mm” Travel option

[2] Requires “Machine Base” option

[3] Does not include monitor and keyboard (available from Keyence)

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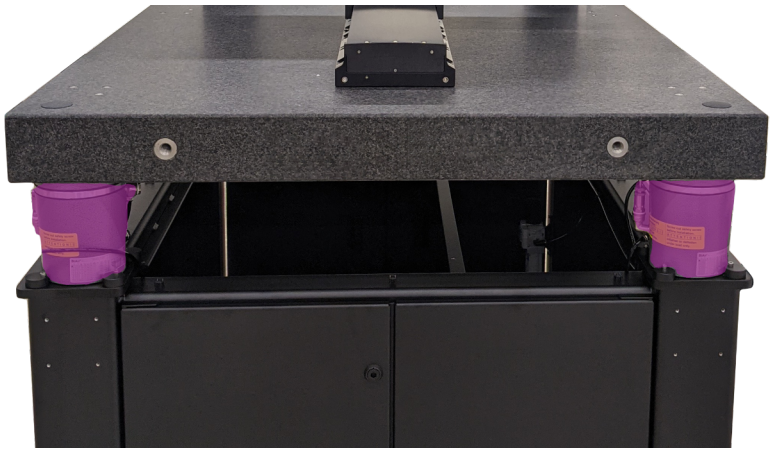
# Ordering

## Travel

Choose from two standard sizes:
- 300 x 300 mm (shown left)
- 600 x 600 mm (shown right)


LF-X-300 vs LF-X-600 Comparison



Showing -ISO2 (Passive Air) Option

## Finishing touches

Choose from available ordering options to get exactly what you need.

The optional machine base provides storage for all PCs and control electronics - all within the envelope of the machine.

Complete with the optional monitor arm to create a complete user workstation.

## Control for your environment

We'll work with you to characterize your floor vibrations and identify any necessary isolation measures to preserve measurement performance. Our standard air and active isolation systems are available to make sure your measurements are rock solid. See our white paper for full details.


Showing -OS Option

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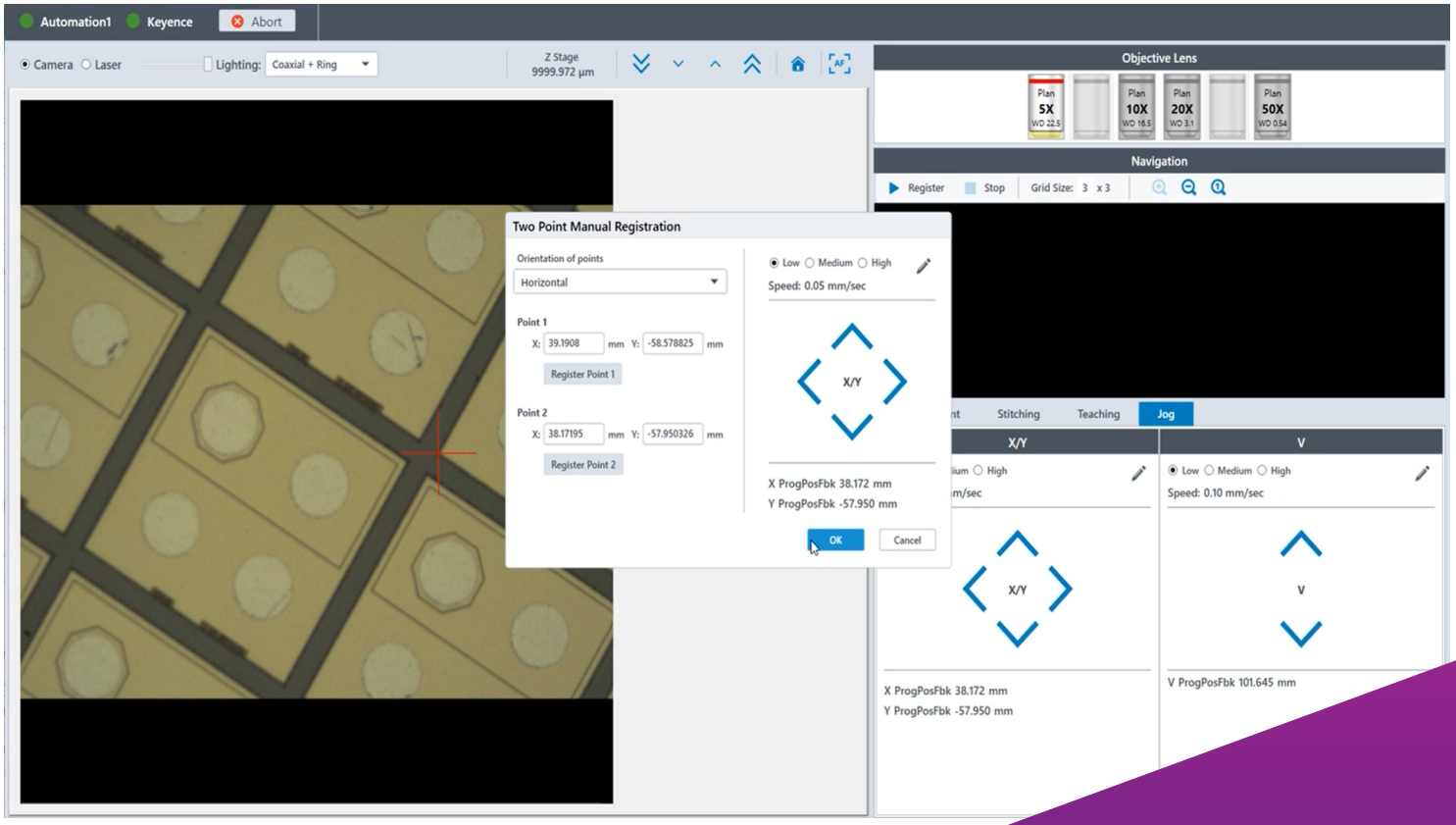
# XpansionUI

## Go further

XpansionUI software replicates all of the core functions from the standard VK Viewer software interface while also leveraging one of the world's most advanced motion controllers to seamlessly add enhanced features to tackle the most challenging applications. With the ability to align parts, optimize sensor height, detect possible lens collisions, rotate parts, and more... XpansionUI is sure to bring your inspection process to the next level. Easily take advantage of all XpansionUI has to offer through its modern and easy-to-use interface.

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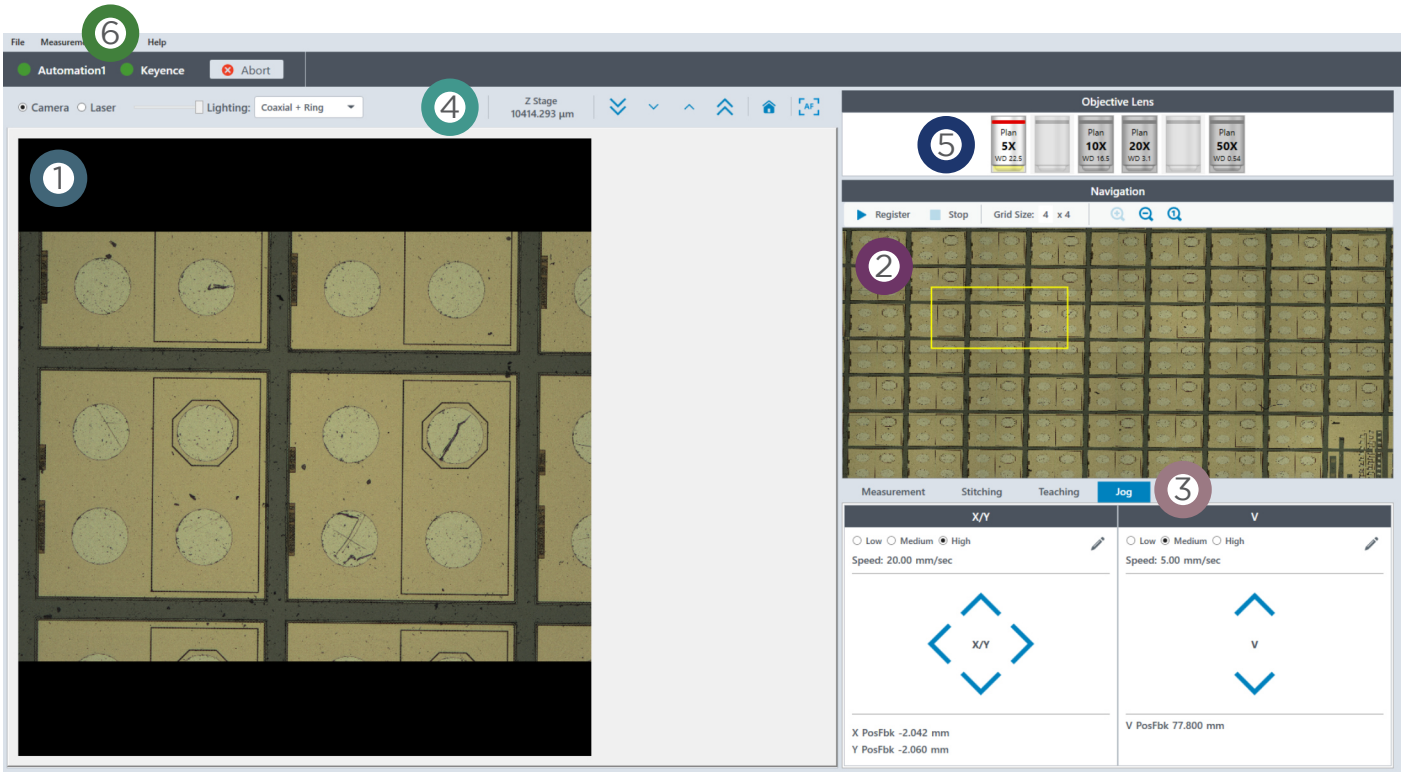
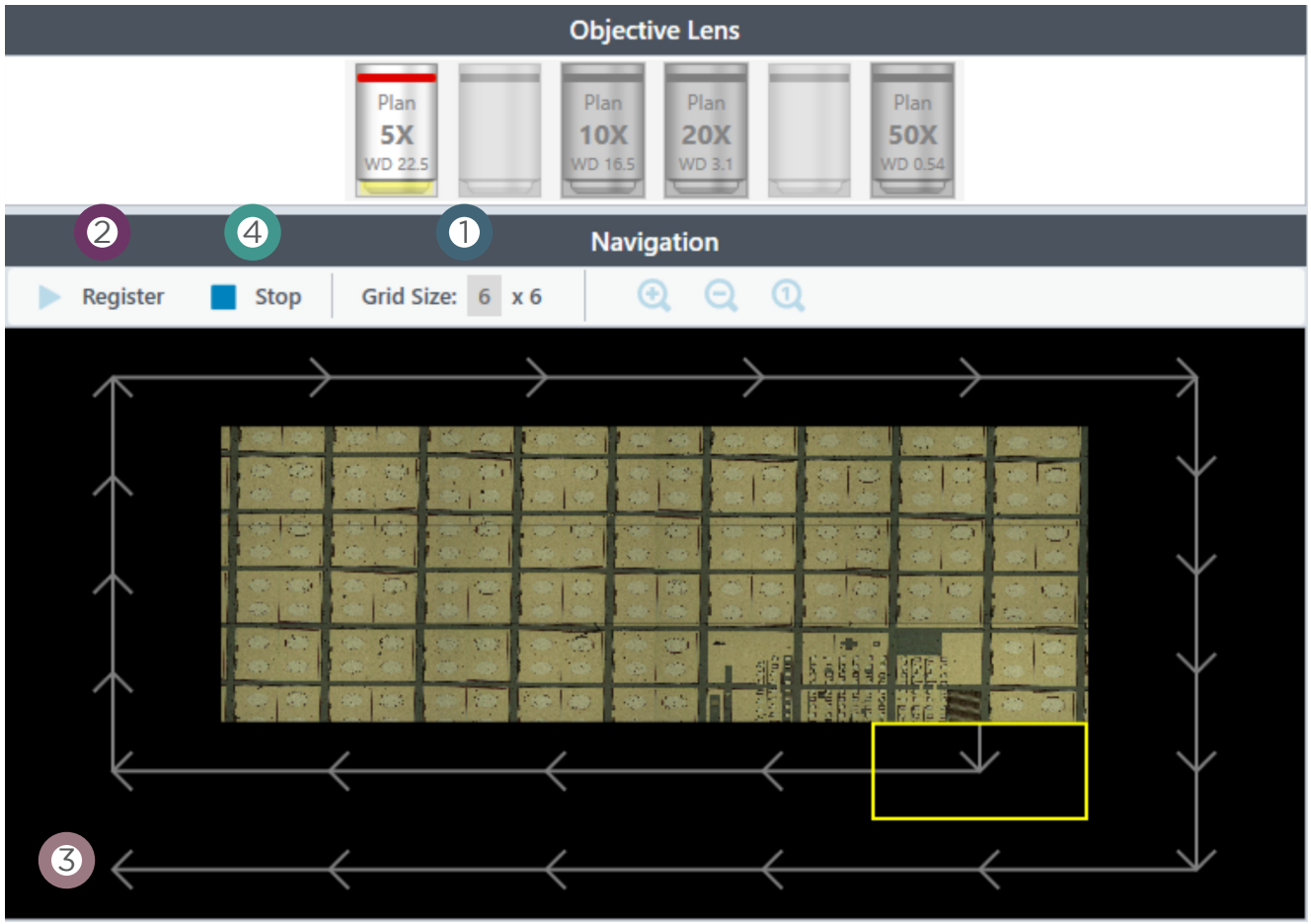
# Overview



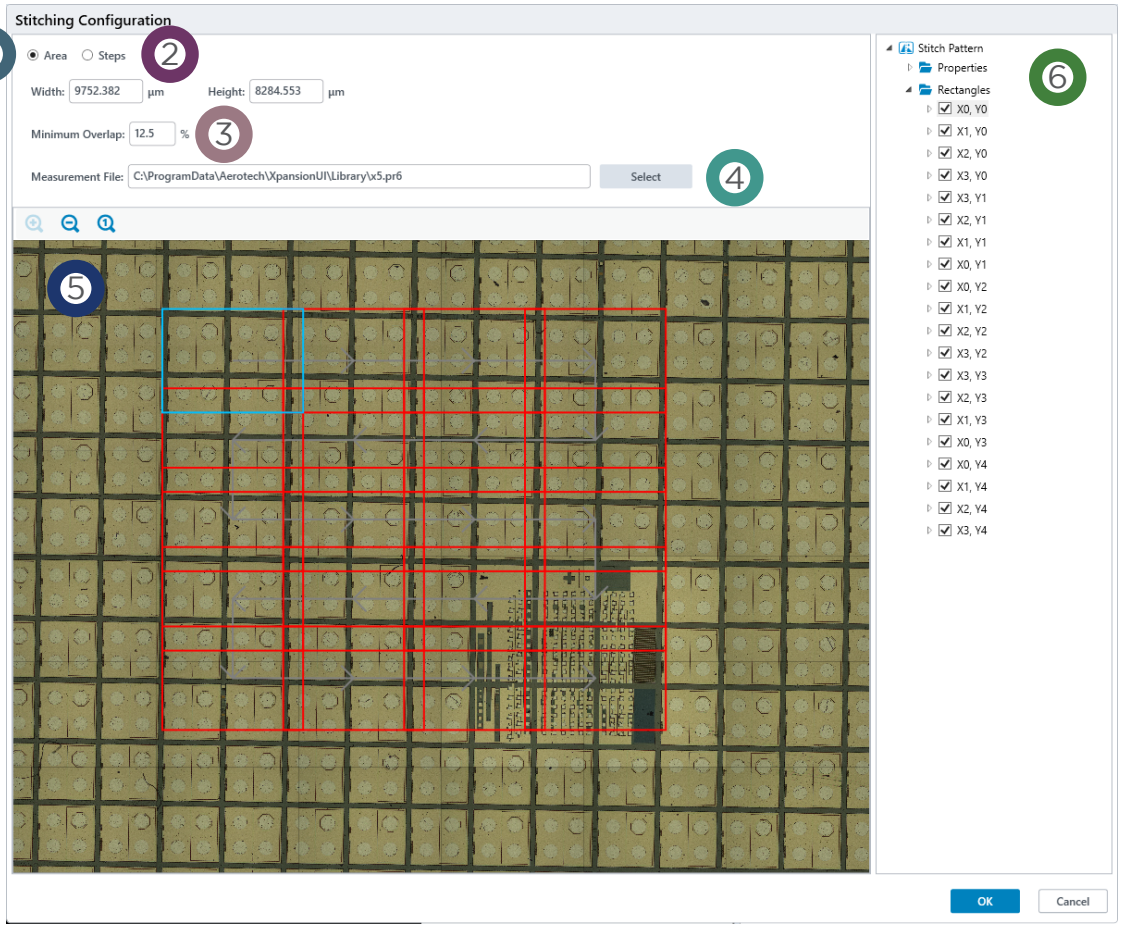

1. **Live View** - real-time visual image as taken from the VK-X microscope
2. **Navigation View** - static image, registered by the user to quickly navigate over area of interest
3. **Jog/Teach/Stitch Controls** - quick access to tools to move the Field of View, both automation and jogging
4. **Microscope Controls** - microscope focus, lighting, and measurement modes easily accessible
5. **Lens Selection** - easily change installed lenses with a click of the mouse
6. **Connection Status** - confirm status of both the microscope and motion controllers

# Navigation



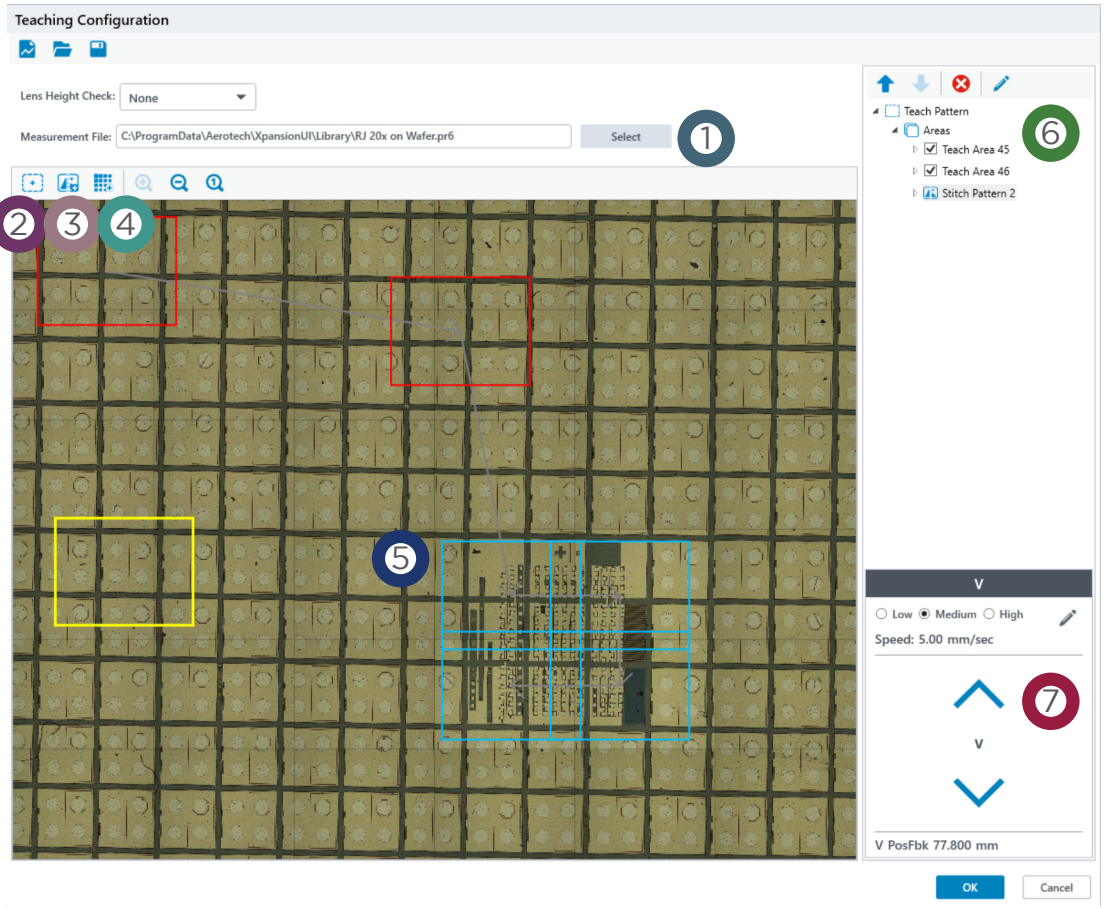

1. **Specify Grid Size** - choose the size of your navigation image
2. **Begin Image Registration** - one click to begin capturing images
3. **Live Path Overlay** - real-time visualization of the capturing progress
4. **End Registration** - stop capturing at any time when displayed image is sufficient

# Stitching




1. **Draw or Specify Area** - enter Height/Width or drag FOV corner to draw stitch area
2. **Specify by Rows/Columns** - alternatively enter number of FOV to capture in X and Y
3. **Customize Overlap Percentage** - control amount of overlap between each measurement
4. **Measurement Parameter Library** - easy access to all of your measurement condition files
5. **Navigation Image with Path Overlay** - quickly confirm area of interest will be captured
6. **Stitch Properties** - view properties and exclude sub-areas with the tree view

# Teaching




1. **Measurement Parameter Library** - optionally specify new parameters for every location
2. **Add Single Measurement** - add FOV at current position to the measurement routine
3. **Add Stitched Area** - add multiple stitched areas to the routine, if needed
4. **Add Grid Pattern** - repeat measurement with even grid spacing (X and Y specified separately)
5. **Drag-n-Drop Tools** - intuitive methods to position measurement areas and preview path
6. **Teach Routine Properties** - reorder, delete, or edit parts of the routine in the tree view
7. **Specify V Position** - jog coarse vertical axis to new height on a per-location basis, if needed

Or write your own Teach Routine with our fully-documented file format!

# HeightCheck: None

| Name | X Stage Coordinate(um) | Y Stage Coordinate(um) | V Stage Coordinate(um) | Width(um) | Height(um) | IsStitchArea | IsExcluded | MeasurementFilePath | LensMicro |
|---|---|---|---|---|---|---|---|---|---|
| Teach Area 1 | 85776.57 | -9674.11 | 78241.5 | 1401.259847 | 1050.944885 | FALSE | FALSE | C:\ProgramData\Aerotech\XpansionUI\Library\ | |
| Teach Area 2 | 73946.93 | -9888.28 | 79241.5 | 1401.259847 | 1050.944885 | FALSE | FALSE | C:\ProgramData\Aerotech\XpansionUI\ | |
| Teach Area 3 | 85746.81 | -7660.9 | 77741.5 | 1401.259847 | 1050.944885 | FALSE | FALSE | C:\ProgramData\Aerotech\Xpans | |
| Stitch Pattern 1 | 76506.3 | -2963.42 | 78241.5 | 1401.259847 | 1050.944885 | TRUE | FALSE | C:\ProgramData\Aerotec | |
| Stitch Pattern 1 | 75280.19763 | -2963.42 | 78241.5 | 1401.259847 | 1050.944885 | TRUE | FALSE | C:\ProgramDat | |
| Stitch Pattern 1 | 75280.19763 | -2043.843225 | 78241.5 | 1401.259847 | 1050.944885 | TRUE | FALSE | C:\Pro | |
| Stitch Pattern 1 | 76506.3 | -2043.843225 | 78241.5 | 1401.259847 | 1050.944885 | TRUE | FALSE | | |
| Stitch Pattern 1 | 76506.3 | -1124.266451 | 78241.5 | 1401.259847 | 1050.944885 | TRUE | | | |
| Stitch Pattern 1 | 75280.19763 | -1124.266451 | 78241.5 | 1401.259847 | 1050.944885 | TRU | | | |
| Teach Area 9 | 83336.24 | -3049.09 | 78241.5 | 702.5214731 | 526.8911048 | | | | |
| Teach Area 10 | 80509.03 | -3049.09 | 78241.5 | 702.5214731 | 52 | | | | |

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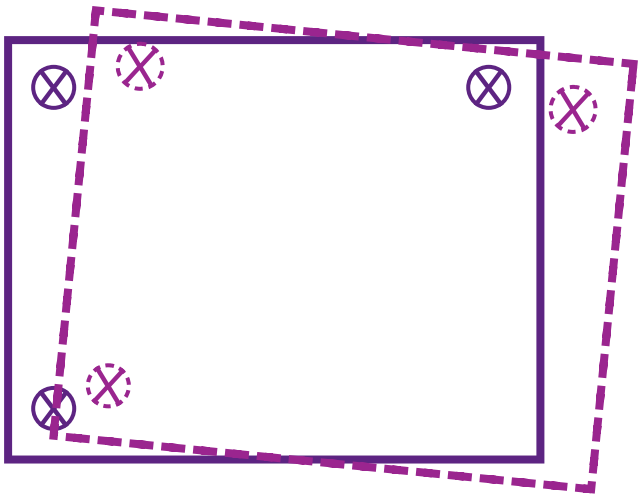
# Features

## Motion. Unleashed.

XpansionUI leverages one of the most powerful motion controllers in the world. No matter what challenges your part presents, we've got a solution for you. Size, payload, shape, etc... you name it, XpansionUI has you covered!

Flexible configurations coupled with a simple, modern, easy-to-use interface makes even the most complicated inspection a breeze!



## Heightened Senses

Protect your parts and your microscope objectives with XpansionUI's support of external height sensors. Allow XpansionUI to check your parts for you - inspecting every measurement location for potential crash conditions before proceeding with the full measurement routine.

Increase your throughput with XpansionUI's Height Optimization feature. Center the measurement range of the microscope's focusing axis for every location of your inspection routine. Doing so allows you to apply a common measurement range across all of your points without having to include buffer to account for part flatness. The end result is a narrower measurement range for all of your measurements, reducing individual measurement time, which can drastically reduce cycle time on those long routines.

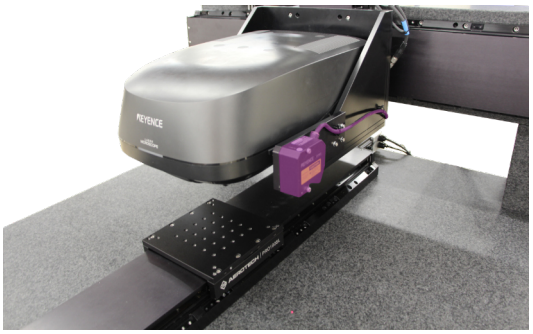
## And More!

Vertical retraction hops between moves, customizable load/unload positions, specify cleanroom-safe turret rotation coordinates, and more... contact Peak Metrology now to find out what XpansionUI can do for you!

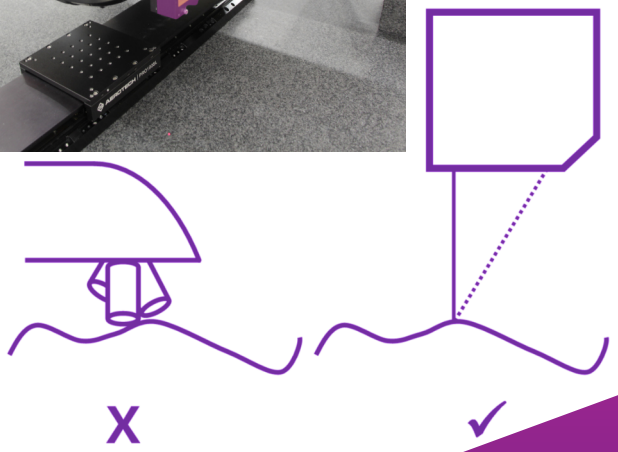

LF-X-600-GR-MB-ISO1-ESTOP

## "X" Marks the Spot

Overcome part-to-part misalignment by utilizing XpansionUI's fiducial registration. After part load, use the Live View crosshairs to locate pre-specified registration marks - XpansionUI will automatically calculate and compensate for part misalignment. When a rotary axis is present, your part will automatically be rotated into alignment. Else, XpansionUI will apply coordinate transformations to your inspection routine, ensuring your ability to apply a single routine to all of your parts, even without repeatable fixturing!



LF-X with Height Sensor

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# Customize

Cleanroom Facility

## Have it your way

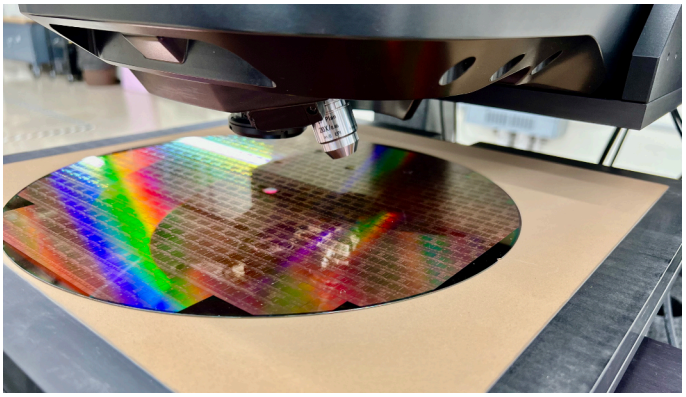
Don't see exactly what you need? Don't compromise, customize. At Peak, nearly half of our machines are customized per our customers' requirements - so don't hesitate to contact us to find out how we can deliver exactly what you need.

Are your parts difficult to hold? We'll work with you to design custom part fixturing to make sure your inspections are reliable and repeatable.

Need even more travel? We've got you covered! With options up to 2.5 meters, we can find a solution for even your largest parts.

## Squeaky clean

We offer various levels of clean room preparation. From material selection and design to component cleaning and assembling/bagging in our own clean room - no matter your room's requirements, we have a solution for you.



300 mm wafer on porous wafer chuck

2.4 m travel length for measuring log parts

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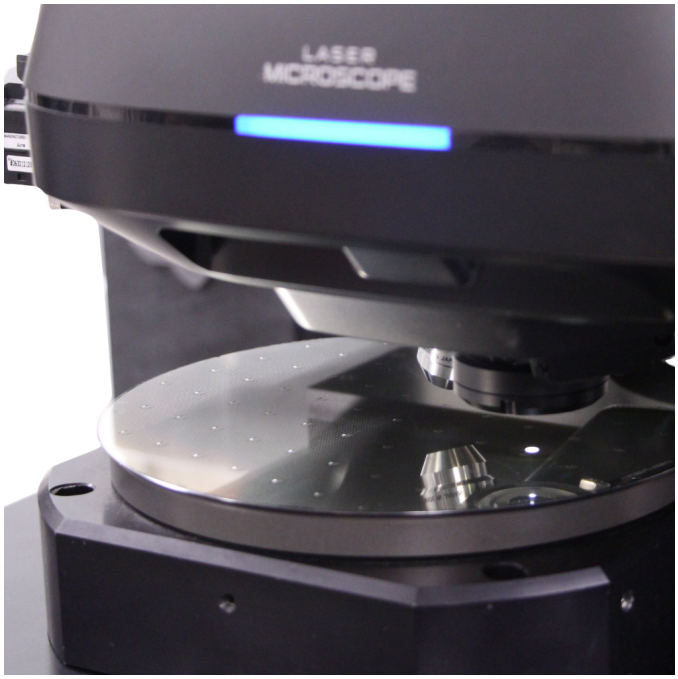
# Customize




Rotary stage under VK-X Microscope

## Take a spin

We offer full support for rotary axes on LF-X systems. A rotary stage can easily be added to any LF-X system with standard support in XpansionUI.

Rotary jog controls allow for quick and easy adjustments to part orientation. Both freerun and fixed step angle modes supported with user-selectable speeds.

Correct angular misalignment via fiducial registration to ensure identical teach routine locations from part to part.

XpansionUI's teach routines also support theta-axis coordinates, allowing you to program different rotary orientations throughout your teach routines.

## Above and beyond

Parts still too big to move? We've still got you covered! With our overhead gantry design, extra-large parts or parts too delicate to move can still be inspected. Load parts onto the flat granite base (available with customer-specified mounting patterns and features) and move the microscope overhead. All the same, great XpansionUI features are still available with this design.

We're here to make your measurements easy. Leverage our decades of experience building custom motion platforms to make sure you get exactly what you need.

Overhead gantry system

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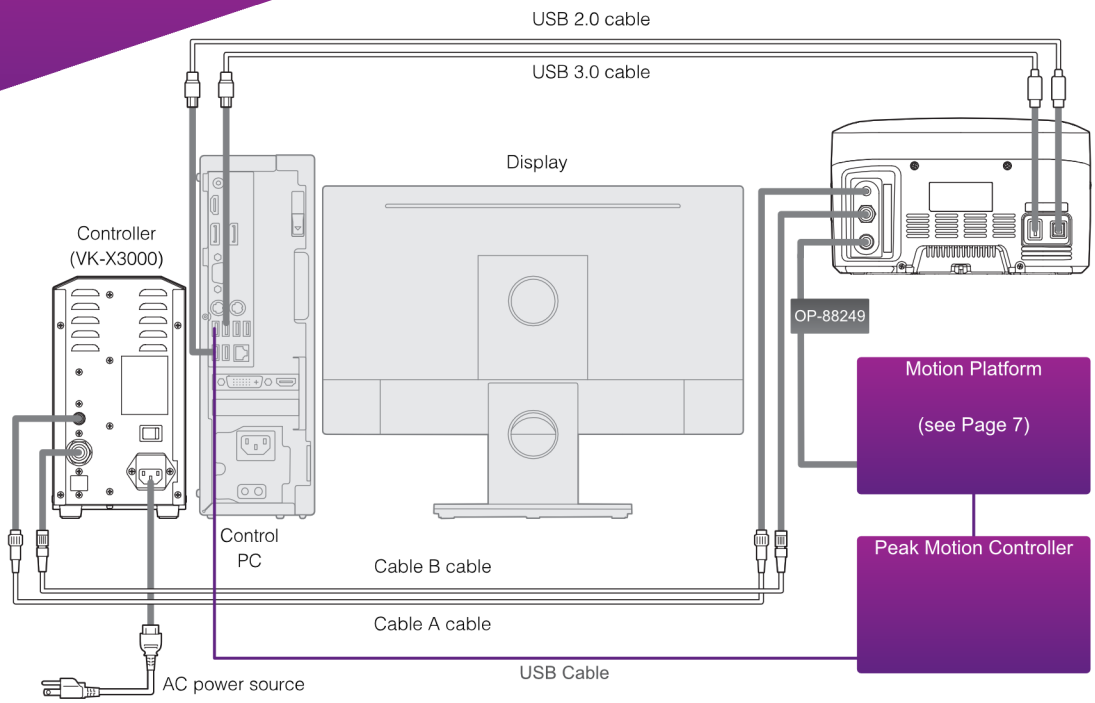
# Keyence Kit




## Complete the system

Peak provides all the motion equipment you need to be up and running in no time. The Keyence equipment listed below is required to complete the system. Have questions? Don't hesitate to contact us for answers on what is required.

### Microscope Head

VK-X1050, VK-X1100, VK-X3050, or VK-X3100[1]

### Controller

VK-X1000 or VK-X3000

### Software

VK-A3 Viewer and Analyzer (comes standard)

VK-H3J Image Stitching Module (as needed)

VK-H3CA CAD Comparison Module (as needed)

### Cables

Cable A and Cable B in 2 m lengths

OP-88249 5 meter Extended Length Cable Set[2]

USB2.0 Type B Male to USB Type A Male in 2 m length[3]

USB3.0 Type Micro B Male to USB Type A Male in 2 m length[3]

### Control PC

Provided by Keyence (optional)

[1] WLI Measurements on VK-X3000 systems are not supported by standard systems
[2] Required for -600 systems, optional for -300 systems
[3] USB3.0 extension cables provided by Peak

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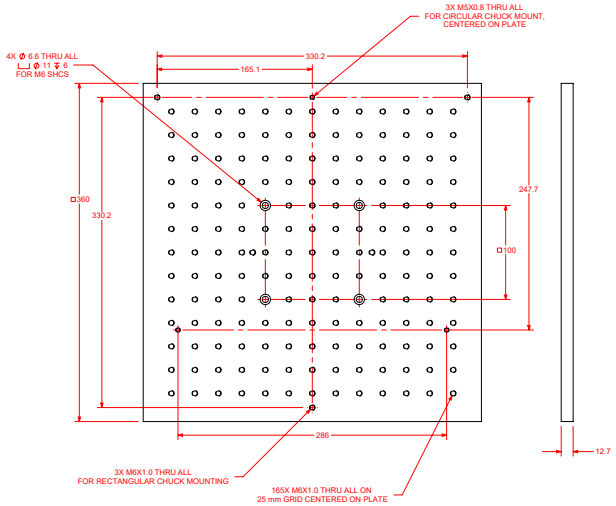
# Fixtures

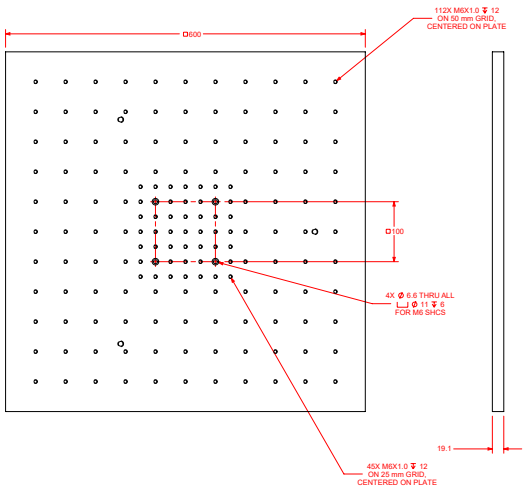
## PM-FP-P360

360 mm Square Tooling Plate



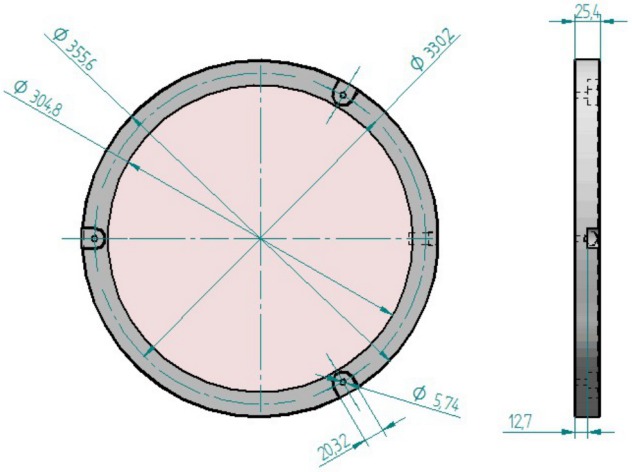

## PM-FP-P600

600 mm Square Tooling Plate



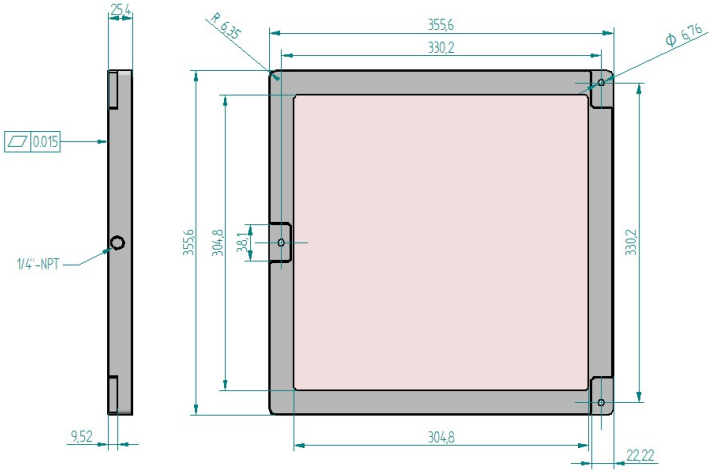

## PM-FP-VPR

300 mm Diameter Porous Vacuum Chuck




## PM-FP-VPS

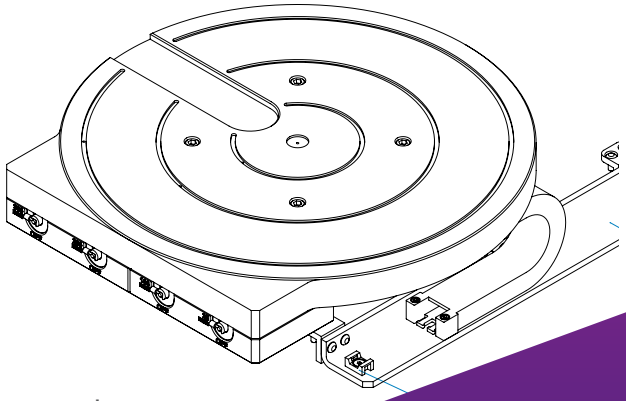
300 mm Square Porous Vacuum Chuck




## PM-FP-VZR

300 mm Diameter Zone-Selectable Vacuum Chuck

Zones: 25 mm, 100 mm, 200 mm, and 300 mm Diameters





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