

Q-flex 100 MRF™ Polishing Machine

PRODUCT SPECIFICATIONS



Q·flex

Q-flex systems bring more capability and efficiency to any optics shop, from volume production to prototype shops.

Q-flex systems offer all of the legendary determinism of MRF finishing, plus increased flexibility and repeatability in modular, production-ready platforms that help you manufacture smarter. Q-flex systems deliver unprecedented manufacturing capabilities—especially for difficult spheres, aspheres, and freeforms.

Flexible Technology

- Modular MRF head design for fast tool-free changeovers.
- Fluid Control Module (FCM) provides improved fluid stability, calibrated and repeatable performance, plus quick fluid changes and easy cleaning.
- QED.NET software with easy to use wizards and Q-polynomials is fully configurable for optimum throughput with any level of operator skill.

Flexible Architecture

The Q-flex systems' heads and FCMs are common across family platforms, and can be shared between Q-flex machines. In minutes, MRF heads can be changed from 10 mm, 20 mm, 50 mm and 150 mm size

Engineered for Excellence

The modularity of Q-flex systems means you can match the machine to your workload, bringing greater efficiency to your precision optics shop. Q-flex systems are designed for a production-oriented environment.

In minutes, MRF heads can be changed from 10 mm, 20 mm, 50 mm and 150 mm size to accommodate your polishing needs.

- Heads can be selected to optimize polishing tool size (spot), concave part radius, freeform geometry and more.
- Heads are quickly and kinematically adjusted for rotational, raster or freeform modes.
- Head realignment is automated via the built-in probing station.
- Head carts are provided for efficient operation and parts storage.
- Faster and easier setup after cleaning, with greater day-to-day and operator-to-operator repeatability.

The Fluid Control Module (FCM) houses the fluid delivery system hardware & controls in one package.

- With multiple FCMs, fluid changeovers can be completed in minutes.
- MRF fluid can be maintained in bypass within or remotely from the base machine.
- Cleanup is easy: the FCM is on wheels and can be moved to a cleaning station.
- Improved fluid strength control with new EFMS fluid monitoring system.



Technical Specifications

Minimum concave radius of curvature**:	150 mm head: 105 mm CCV 50 mm head: 35 mm CCV 20 mm head: 14 mm CCV 10 mm head: 7 mm CCV
Max half angle (using around the wheel capability):	150 mm head: 30 degrees 50 mm head: 45 degrees 20 mm head: 40 degrees 10 mm head: 40 degrees
Maximum workpiece weight*:	2.5 kg (including lens holder)
Workpiece attachment:	Vacuum chuck
Axes:	X, Y, Z, A [†] , B [†] + virtual axis
Human interfaces:	HMI user interface with touchscreen QED.NET software with standard PC running Windows® 10
MRF polishing fluids	Compatible with QED's full family of MR Fluids, including C10+, C12, C30, D10, D11, and D20.
Machine footprint:	1.37 m width x 1.67 m depth
Minimum floor space required:	2.45 m width x 3.57 m depth
Machine height installed:	2.29 m height
Total machine weight:	1,588 kg (est.)
Electrical:	
Option 1:	200-220 VAC, 50/60 Hz, 20A, 3ph+PE (4-wire)
Option 2:	400 VAC, 50/60 Hz, 20A, 3ph+N+PE (5-wire)
Compressed air (min)***:	6 bar, 85 ℓ/min, dried and filtered to 10 μm



“Around the wheel” virtual axis technology for true freeform polishing

Legendary MRF power and precision

Polishing Modes

Choose the polishing modes that best fit your needs!

Rotational and Freeform Rotational Polishing:

- Part sizes up to: ~125 mm Ø *
- Half angles up to: 90°
- Part apertures: round
- **For Rotational Mode**
 - Part shapes: plano, sphere, asphere
- **For Freeform Rotational Mode**
 - Part shapes: toroid, off-axis asphere, freeform

Raster and Freeform Raster Polishing:

- Part sizes up to: ~125x125 mm *
- Part apertures: round, rectangular, hexagonal, elliptical, Custom shapes via bitmap aperture definition
- **For Raster Mode:**
 - Part shapes: plano, prism, cylinder
 - Half angles up to: 90° (cylinders only)
- **For Freeform Raster Mode:**
 - Part shapes: sphere, asphere, toroid, off-axis asphere, freeform
 - Half angles up to: 90° in X-direction, 30-45° in Y-direction (depending on wheel)

Specifications subject to change without notice.

* Please note that workpiece geometry and weight specifications are approximate values to be used as general guidelines. Due to other factors such as workpiece inertia that are difficult to quantify, there are parts outside this range that can indeed be run under certain circumstances, as well as parts within this range that may not run under all circumstances. Please use caution when attempting parts outside these limits, or contact QED for further guidance.

** Radius range dependent on specific part geometry and heads geometry.

*** 3/8" min airline tubing with 1/4 NPT Female (connection to be supplied by customer)

† available axes depends on options purchased.

Typical Capabilities

Form/figure correction

High convergence:	5-10x improvement in 1 iteration
Irregularity:	as low as $\lambda/30$ - $\lambda/40$ (PV) or lower, limited by metrology reproducibility

Roughness improvement

Micro-roughness:	< 1 nm rms on most materials with any MR fluid < 0.5 nm rms on most glasses and single crystals with specific MR fluids
Ultra-low micro-roughness:	0.1-0.2 nm rms achievable on some materials with specific MR fluids

The results listed above are typical values.

Surface quality/integrity improvement

- Increase laser damage resistance
- Remove subsurface damage
- Remove stress
- Remove haze, fine cosmetics on sensitive glasses

Induce specific form/figure for special purposes

- Correct transmitted wavefront error by polishing only 1 surface
- Correct prism angle error
- Correct thickness variation of thin film
- Create “phase plate” or induce other specific aberrated surface error

Get in touch

We would love to hear from you! For more information, please visit us at www.qedmrf.com or contact us directly.



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