

# Standard Linear Shift Mechanism

## LSM/HLSM Series



Production-proven linear motion along the port axis (Z) for sample positioning and production applications.

Comprehensive series offering true UHV performance with a vast range of flange sizes, strokes, actuation and encoder options.

### LSM KEY ADVANTAGES

- » 2x flange parallelism compared with conventional designs
- » 2x load-carrying capability compared with conventional units
- » Smooth kinematic motion
- » 10,000 cycle lifetime guarantee
- » Demountable bellows assembly
- » Bakeable to 250°C

Linear Shift Mechanisms (LSMs) provide linear motion along the port axis (Z). Typical applications include the positioning of beamline filters, adjustment of sputter sources and deposition stages through to production style applications.

UHV Design has the largest range of LSMs in the world, ranging from CF35 to CF150 flanges, up to 1m stroke, tilt & X alignment versions with manual, pneumatic and motorisation options, all available with a range of position encoders. Bakeable to 250°C, the range is supplied on CF flanges and provides true UHV performance.

The LSM is the most comprehensive series in the range, offering the largest number of flange, stroke and actuation options. CF38 and CF64 flanges within the series are supplied with tapped bolt holes as standard.

The HLSM series is available as an alternative. This version has clear holes on the mounting flange (fixed) and is available in CF38, CF64, CF100 and CF150 flanges.

### Actuation methods

The series can be actuated via a manual handwheel, pneumatic cylinder, DC motor or stepper motor. Each LSM/HLSM can also be fitted with a digital linear scale, offering visual position indication with 10 micron resolution.

Motorised LSM/HLSMs are fitted with bakeable limit and home switches, pre-wired to a single bakeable connector mounted on the frame ('UP' option must be selected). LSM/HLSMs are compatible with UHV Design's SADC and Stepper motor controller range, details of which can be found in our catalogue.

## LSM38/HL38 Technical Data

| SPECIFICATION                                 | VALUE   |
|---|---|
| Travelling flange size                        | FC38 (2-3/4") metric tapped straddled                                     |
| LSM fixed flange size                         | FC38 (2-3/4") metric tapped straddled                                     |
| HSLM fixed flange size                        | FC38 (2-3/4") clear holes straddled                                       |
| Stroke range                                  | 25 to 300 mm  |
| Clear bore                                    | 38 mm   |
| Leadscrew pitch                               | 2.54mm (0.1")   |
| Max axial load on travelling flange           | 150N and 50N Pneumatic option   |
| Maximum cantilevered moment                   | 10 Nm   |
| Flange alignment under vacuum                 | 2 mrad (eg 2mm at 1m from travelling flange)                              |
| Linear scale option - resolution              | 1mm engraved scale or 0.01mm DLA option                                   |
| Bakeout temperature                           | 250 °C with motor/pneumatic cylinder /DLA/ linear potentiometer removed   |
| Linear encoder option - standard resolution   | Renishaw LM10 with 10 micron resolution                                   |
| Linear encoder option - upgraded resolution   | Upgrade to 1 micron resolution  |
| Linear encoder option - encoder repeatability | Better than unit of resolution in same direction                          |
| Pneumatic option - cylinder bore              | 32 mm   |
| Pneumatic option - cylinder fitting           | 6mm tube push fit   |
| Pneumatic option - cylinder switch            | 5-24V 2 wire reed switch  |
| Pneumatic option - max linear speed           | 25mm / second   |
| Stepper motor option                          | 23 frame 8 wires 3A / phase   |
| Standard stepper option - motor wiring        | Flying leads  |
| Standard stepper motor - switches             | bakeable limit switches only not wired                                    |
| Upgrade stepper motor - motor wiring          | lemo socket to diagram 11-1-25  |
| Upgrade stepper motor option - switches       | bakeable limit and home switches with lemo socket wired to diagram WD-002 |
| Stepper motor maximum linear speed            | 2.54 mm/second  |
| Linear resolution per 1/2 step                | 0.000254 mm   |
| DC motor option                               | 24V dc brushed motor  |
| DC motor option - motor wiring                | 2 pin generic plug to diagram WD-010                                      |
| DC motor switches                             | bakeable limit switches only not wired                                    |
| Upgrade DC motor option - switches            | bakeable limit switches with lemo socket wired to diagram 11-6-03         |
| DC motor maximum linear speed                 | 4 mm/second   |
| Motor gearbox type and ratio                  | spur and 25:1   |
| Motor gearbox backlash                        | 1 degree  |
| Motorised Linear backlash under vacuum        | 0.0071mm  |

## LSM64/HLSM64 Technical Data

| SPECIFICATION                                 | VALUE   |
|---|---|
| Travelling flange size                        | FC64 (4 1/2") metric tapped straddled                                     |
| LSM series fixed flange size                  | FC64 (4 1/2") metric tapped straddled                                     |
| HLSM series fixed flange size                 | FC64 (4 1/2") clear holes straddled                                       |
| Stroke range                                  | 25 to 300 mm  |
| Clear bore                                    | 65 mm   |
| Leadscrew pitch                               | 2.54mm (0.1")   |
| Max axial load on travelling flange           | 245N and 200N Pneumatic option  |
| Maximum cantilevered moment                   | 10 Nm   |
| Flange alignment under vacuum                 | 2 mrad (eg 2mm at 1m from travelling flange)                              |
| Linear scale option - resolution              | 1mm engraved scale or 0.01mm DLA option                                   |
| Bakeout temperature                           | 250 °C with motor/pneumatic cylinder /DLA/ linear potentiometer removed   |
| Linear encoder option - standard resolution   | Renishaw LM10 with 10 micron resolution                                   |
| Linear encoder option - upgraded resolution   | Upgrade to 1 micron resolution  |
| Linear encoder option - encoder repeatability | Better than unit of resolution in same direction                          |
| Pneumatic option - cylinder bore              | 63 mm   |
| Pneumatic option - cylinder fitting           | 6mm tube push fit   |
| Pneumatic option - cylinder switch            | 5-24V 2 wire reed switch  |
| Pneumatic option - max linear speed           | 25mm / second   |
| Stepper motor option                          | 23 frame 8 wires 3.9A / phase   |
| Standard stepper option - motor wiring        | Flying leads  |
| Standard stepper motor - switches             | bakeable limit switches only not wired                                    |
| Upgrade stepper motor - motor wiring          | Built in UTO motor 23HT18C230 (3A / Phase)                                |
| Upgrade stepper motor option - switches       | bakeable limit and home switches with lemo socket wired to diagram WD-002 |
| Stepper motor maximum linear speed            | 1.27 mm/second  |
| Linear resolution per 1/2 step                | 0.000127 mm   |
| DC motor option                               | 24V dc brushed motor  |
| DC motor option - motor wiring                | 2 pin generic plug to diagram WD-010                                      |
| DC motor switches                             | bakeable limit switches only not wired                                    |
| Upgrade DC motor option - switches            | bakeable limit switches with lemo socket wired to diagram 11-6-03         |
| DC motor maximum linear speed                 | 1.95 mm/second  |
| Motor gearbox type and ratio                  | spur and 50:1   |
| Motor gearbox backlash                        | 1 degree  |
| Motorised Linear backlash under vacuum        | 0.0071mm  |

## HLSM100 Technical Data

| SPECIFICATION                                 | VALUE   |
|---|---|
| Travelling flange size                        | FC100 (6") metric tapped straddled  |
| Fixed flange size                             | FC100 (6") clear holes straddled  |
| Stroke range                                  | 25 to 300 mm  |
| Clear bore                                    | 102 mm  |
| Leadscrew pitch                               | 2mm   |
| Internal gearbox - manual option only         | 5:1   |
| Max axial load on travelling flange           | 200N and 150N Pneumatic option  |
| Maximum cantilevered moment                   | 10 Nm   |
| Flange alignment under vacuum                 | 2 mrad (eg 2mm at 1m from travelling flange)                              |
| Linear scale option - resolution              | 1mm engraved scale or 0.01mm DLA option                                   |
| Bakeout temperature                           | 250 °C with motor/pneumatic cylinder /DLA/ linear potentiometer removed   |
| Linear encoder option - standard resolution   | Renishaw LM10 with 10 micron resolution                                   |
| Linear encoder option - upgraded resolution   | Upgrade to 1 micron resolution  |
| Linear encoder option - encoder repeatability | Better than unit of resolution in same direction                          |
| Pneumatic option - cylinder bore              | 80 mm   |
| Pneumatic option - cylinder fitting           | 8mm tube push fit   |
| Pneumatic option - cylinder switch            | 5-24V 2 wire reed switch  |
| Pneumatic option - max linear speed           | 25mm / second   |
| Stepper motor option                          | 23 frame 8 wires 3A / phase   |
| Standard stepper option - motor wiring        | Buit in UTO motor 23HT18C230  |
| Standard stepper motor - switches             | bakeable limit switches only not wired                                    |
| Upgrade stepper motor option - switches       | bakeable limit and home switches with lemo socket wired to diagram WD-002 |
| Stepper motor maximum linear speed            | 1.27 mm/second  |
| Linear resolution per 1/2 step                | 0.000127 mm   |
| DC motor option                               | 24V dc brushed motor  |
| DC motor option - motor wiring                | 2 pin generic plug to diagram WD-010                                      |
| DC motor switches                             | bakeable limit switches only not wired                                    |
| Upgrade DC motor option - switches            | bakeable limit switches with lemo socket wired to diagram 11-6-03         |
| DC motor maximum linear speed                 | 1.86 mm/second  |
| Motor gearbox type and ratio                  | Planetary and 50:1  |
| Motor gearbox backlash                        | 1 degree  |
| Motorised Linear backlash under vacuum        | 0.0071mm  |

## HLSM150 Technical Data

| SPECIFICATION                                 | VALUE   |
|---|---|
| Travelling flange size                        | FC150 (8") metric tapped straddled  |
| Fixed flange size                             | FC150 (8") clear holes straddled  |
| Stroke range                                  | 25 to 300 mm  |
| Clear bore                                    | 150 mm  |
| Leadscrew pitch                               | 2mm   |
| Internal gearbox - manual option only         | 5:1   |
| Max axial load on travelling flange           | 200N and 100N Pneumatic option  |
| Maximum cantilevered moment                   | 10 Nm   |
| Flange alignment under vacuum                 | 2 mrad (eg 2mm at 1m from travelling flange)                              |
| Linear scale option - resolution              | 1mm engraved scale or 0.01mm DLA option                                   |
| Bakeout temperature                           | 250 °C with motor/pneumatic cylinder /DLA/ linear potentiometer removed   |
| Linear encoder option - standard resolution   | Renishaw LM10 with 10 micron resolution                                   |
| Linear encoder option - upgraded resolution   | Upgrade to 1 micron resolution  |
| Linear encoder option - encoder repeatability | Better than unit of resolution in same direction                          |
| Pneumatic option - cylinder bore              | 100 mm  |
| Pneumatic option - cylinder fitting           | 10mm tube push fit  |
| Pneumatic option - cylinder switch            | 5-24V 2 wire reed switch  |
| Pneumatic option - max linear speed           | 25mm / second   |
| Stepper motor option                          | 23 frame 8 wires 3A / phase   |
| Standard stepper option - motor wiring        | Built in UTO motor 23HT18C230   |
| Standard stepper motor - switches             | bakeable limit switches only not wired                                    |
| Upgrade stepper motor option - switches       | bakeable limit and home switches with lemo socket wired to diagram WD-002 |
| Stepper motor maximum linear speed            | 1.27 mm/second  |
| Linear resolution per 1/2 step                | 0.000127 mm   |
| DC motor option                               | 24V dc brushed motor  |
| DC motor option - motor wiring                | 2 pin generic plug to diagram WD-010                                      |
| DC motor switches                             | bakeable limit switches only not wired                                    |
| Upgrade DC motor option - switches            | bakeable limit switches with lemo socket wired to diagram 11-6-03         |
| DC motor maximum linear speed                 | 1.86 mm/second  |
| Motor gearbox type and ratio                  | Planetary and 50:1  |
| Motor gearbox backlash                        | 1 degree  |
| Motorised Linear backlash under vacuum        | 0.0071mm  |

### For more information:

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