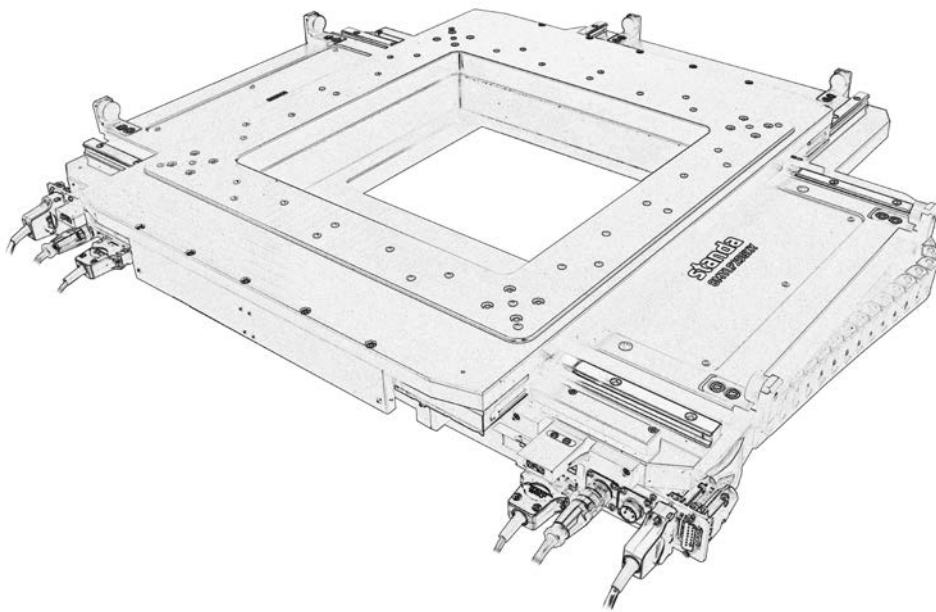


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Motion Control

For Science & Industry



2022
Volume #3

Company

STANDA FACTS

- > In the photonics business since 1987
- > Factory located in Vilnius, Lithuania
- > Employs 200 people and growing
- > More than 10 000 m² of factory space
- > Represented by 30 distributors
- > Sales to 80 countries across the globe

FIELDS OF ACTIVITY

- > Vibration isolation
- > Precise adjustment of optics
- > Opto-mechanics
- > Motion control
- > Automation
- > Solid state micro lasers
- > Light measurement equipment
- > OEM solutions for science and industry

OUR MISSION

- > Facilitate scientific research
- > Increase productivity of our partners
- > Create value for customers via innovation
- > Rock`n`Roll Motion Control



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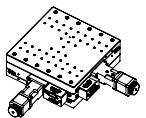
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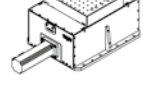
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ACS SPiiPlusCM 72
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With 1, 2, or 3 Integrated Universal
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ACS NPMpm 75
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NanoPWM Drive Module



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Universal Micromachining

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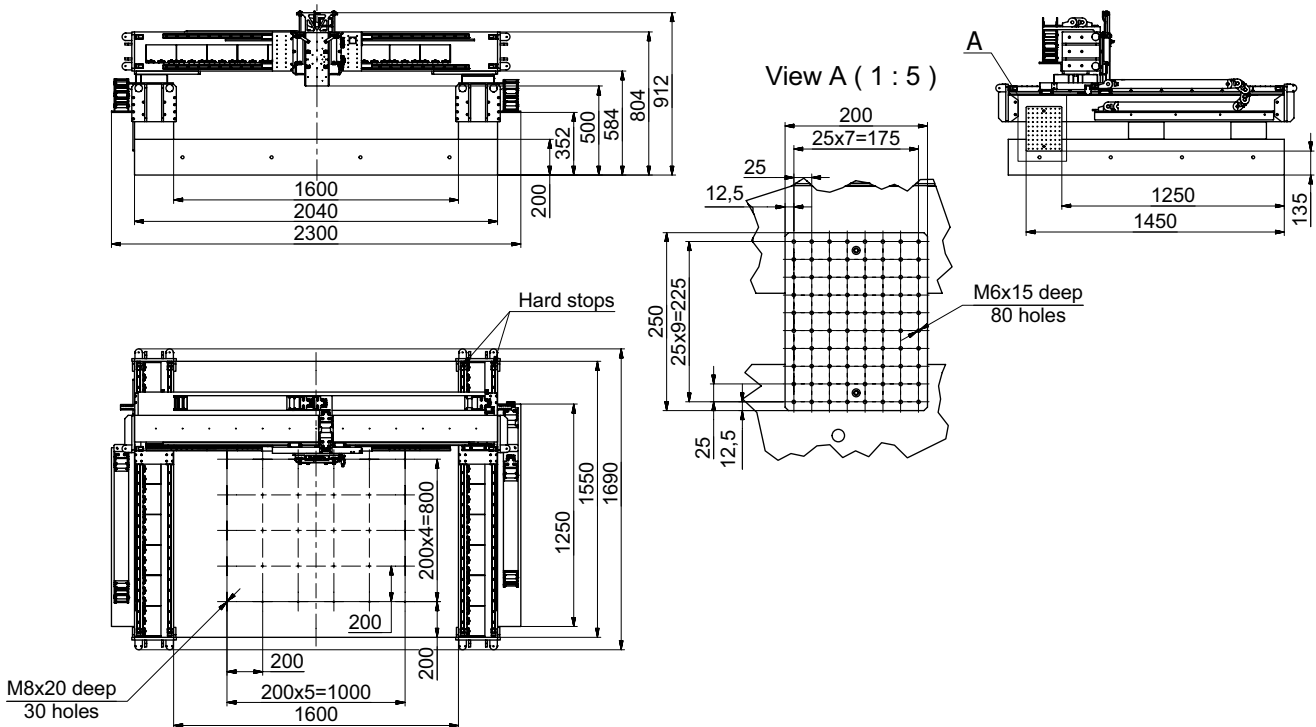
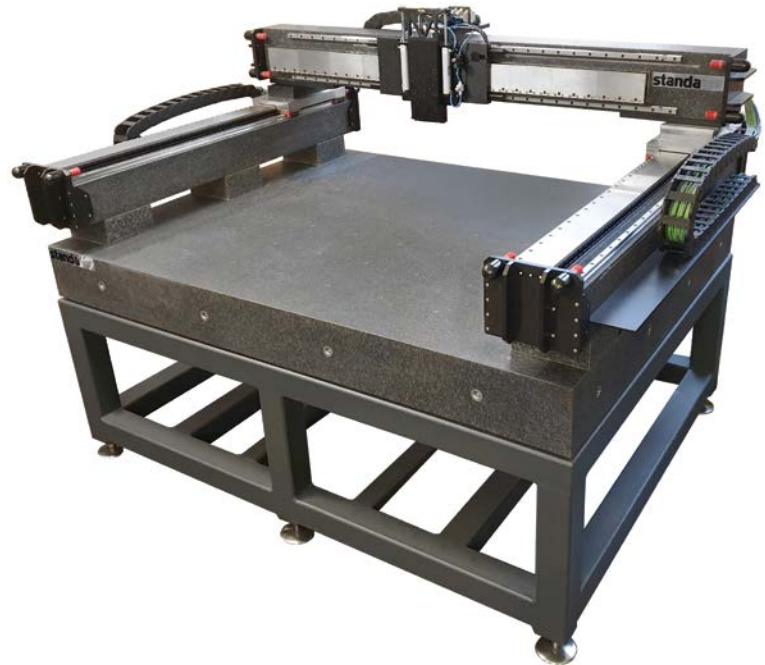


8-0240

Automated Precision Gantry Assemblies

FEATURES

- > Positioning range:
XY – 1000×1300 mm, Y – 90 mm
- > ±0.5 µm or better bi-directional repeatability RMS
- > ±1.5 µm or better calibrated absolute accuracy
- > 1000 m/s velocity, 15 000 mm/s² acceleration
- > Flexible modular design could be customized for any ultra-precise application requirements
- > System size and travel range customization available



Model	Units	8-0240		
KINEMATICS & FEEDBACK INFORMATION				
Active axes		X	Y	Z
Travel range (X, Y, Z)	mm	1000	1300	100
Encoder type		Optical		
Encoder model		Len1		
Encoder resolution	nm	down to 0.3 nm		
Encoder interface		1Vpp or Differential RS422		
Internal multiplier		YES		
Multiplication factor ¹⁾		up to x65536		
Encoder grating period	µm	20		
Reference mark (index)		YES		
Absolute accuracy (after calibration)	µm	±2	±2	±0.5
Bi-directional repeatability (RMS) ²⁾	µm	±0.5	±0.5	±0.1
Pitch ³⁾	µrad / arcsec	±15 / ±3.1	±42 / ±8.66	±55 / ±11.34
Yaw ³⁾	µrad / arcsec	±7.5 / ±1.55	±42 / ±8.66	±55 / ±11.34
Roll	µrad / arcsec	±7.5 / ±1.55	±42 / ±8.66	±55 / ±11.34
Maximum velocity (no load; 4 motors) ⁴⁾	mm/s	>1000		
Maximum acceleration (no load; 4 motors) ⁵⁾	mm/s ²	>10000		
Limits switches type (safety)		Hall sensors		
Limit switch polarity (safety)		Positive end of run		
Limit switch voltage	V	5 ... 24		
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type		Real gantry	Traverse axis	Vertical linear motor axis
Linear motor model		LM12	LM13	LM3
Linear motor design type		Ironless BLDC motor		
Maximum bus voltage	V _{DC}	325		
Maximal continues current	A _{PK}	3.4	2.27	2.2
Maximal peak current	A _{PK}	16.9	11.3	13.6
Maximal continues force	N _N	423	282	28.4
Maximal peak force	N _{PK}	2100	1400	175.4
Pole pitch NN	mm	57	57	30
Quantity of motors		2	1	1
Load capacity (centrally placed) ⁶⁾	kg	30		
Moving mass ⁷⁾	kg	265	35	2.2
Guiding system		Recirculating linear rails and carriages units with caged balls		Recirculating linear rails and carriages units
MATERIAL AND ENVIRONMENT CONDITIONS				
Housing material		Granite		
Housing coating (finish)		N/A		
Environment pressure		Normal Atmosphere		
Operating temperature	°C	20±2		
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾		CMXA		
Recommended drivers ⁹⁾		CMXA/DUMXA		
Recommended power supply ⁹⁾		1 phase 220 VAC ~ 50 Hz supply		
Recommended communication interface ¹²⁾		EtherCAT / RS232 / TCP-IP		
Cable length	m	up to 5		
Differential outputs ¹⁰⁾		can be requested separately		
ACCESSORIES INFORMATION				
Base for mechanical interface		1TS08-12-05-AP-1000		
Cable management		Included for 3 axes. May be developed for application requirements		
ADDITIONAL DETAILS				
Dimensions of moving platform (W × L)	mm	2300 × 1690 × 912		
Stage dimensions (W × L × H)	mm	295 × 130		
Measurement system		Metric/Imperial		
Orthogonality ¹¹⁾	µrad / arcsec	48.48 / 10		
Aperture (center placed) (W × L)	mm	can be requested separately		
Weight	kg	TBD		

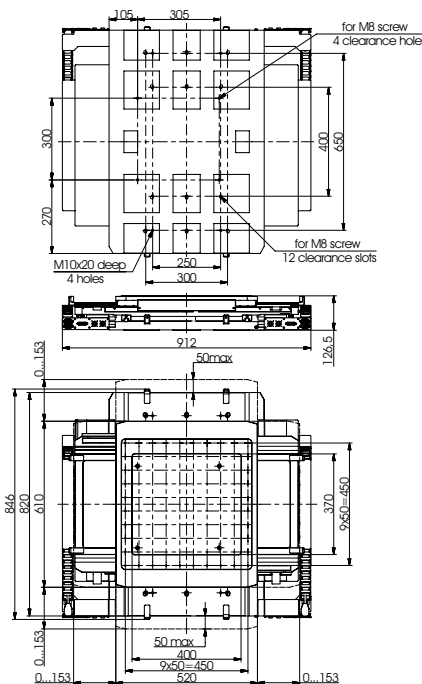
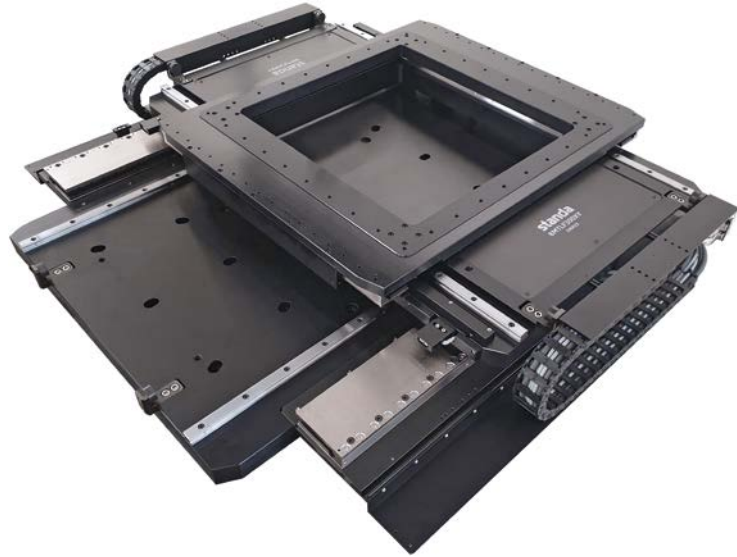
8MTFL300XY

Open Frame XY Linear Motor Stage

Perfect for microscopy, wafer inspection, FPD applications

FEATURES

- Travel range: 300 × 300 mm
- Compact Design
- Resolution: up to <math><0.31\text{ nm}</math>
- Direct drive zero backlash system
- High resolution non-contact optical incremental encoder
- Bidirectional repeatability: $\pm 0.15\text{ }\mu\text{m}$
- Maximum velocity: 2000 mm/s
- Maximum Acceleration: 20000 mm/s²
- High accuracy linear guide and carriage system with caged balls
- Accuracy: $\pm 1.00\text{ }\mu\text{m}$
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- Default 5 arcsec orthogonality
- Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- Aperture: 400 × 370 mm
- Solid Integrated Planar Design or MIMO Gantry design is available (2, 3, 4 motors)
- All measurement reports are included by default!



- ¹⁾ With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- ²⁾ Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- ³⁾ Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad . Environment error: 1 μrad .
- ⁴⁾ Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- ⁵⁾ Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- ⁶⁾ Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- ⁷⁾ Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system. In real gantry system, final moving mass will depend on quantity of motors.
- ⁸⁾ Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- ⁹⁾ Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- ¹⁰⁾ Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- ¹¹⁾ Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- ¹²⁾ Stages can be assembled with required orthogonality by request.

Model	Units	8MTFL300XY-2L-2U-4LEn1	8MTFL300XY-1L-2U-3LEn1	8MTFL300XY-2L-1U-3LEn1	8MTFL300XY-1L-1U-2LEn1
KINEMATICS & FEEDBACK INFORMATION					
Active axes		X, Y			
Travel range	mm	300 × 300			
Encoder type		Optical			
Encoder model		Len1			
Encoder resolution	nm	down to 0.3			
Encoder interface		1Vpp or differential RS422			
Internal multiplier		YES			
Multiplication factor ¹⁾		up to ×65536			
Encoder grating period	µm	20			
Reference mark (index)		YES			
Absolute accuracy (before calibration) ²⁾	µm	±6.0			±8.0
Absolute accuracy (after calibration)	µm	± 1.0			± 1.5
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.25			±0.50
Bi-directional repeatability (rms) ²⁾	µm	±0.15			±0.30
Pitch ³⁾	µrad/arcsec	±40.00 / ±7.00			±40.00 / ±7.00
Yaw ³⁾	µrad/arcsec	±40.00 / ±7.00			±40.00 / ±7.00
Roll	µrad/arcsec	±25.00 / ±5.00			±40.00 / ±7.00
Maximum velocity (no load; 4 motors) ⁴⁾	mm/s	<2000			
Maximum acceleration (no load; 4 motors) ⁵⁾	mm/s ²	<30000			
Limits switches type (safety)		Hall sensors			
Limit switch polarity (safety)		Pushed is closed			
Limit switch voltage	V	5 ... 24			

LOAD, GUIDING & TRANSMISSION INFORMATION

Design type		Real gantry (mimo)	Half gantry half planar	Planar
Linear motor model		LM5		
Linear motor design type		Ironless BLDC motor		
Maximum bus voltage	V _{DC}	>300		
Maximal continues current X/Y	A _{PK}	3.1/ 2.4		
Maximal peak current X/Y	A _{PK}	10.5/8.3		
Maximal continues force X/Y	N _N	210/_87		
Maximal peak force X/Y	N _{PK}	720/_300		
Pole pitch X/Y	mm	21/_15		
Quantity of motors		4	3	2
Load capacity (centrally placed) ⁶⁾	kg	30		
Moving mass X (bottom) ⁷⁾	kg	TBD		
Moving mass Y (upper) ⁷⁾	kg	TBD		
Guiding system	-	Recirculating linear rails and carriages units with caged balls		

MATERIAL AND ENVIRONMENT CONDITIONS

Housing material		Aluminum alloy			
Housing coating (finish)		Black anodizing			
Environment pressure		Normal atmosphere			
Operating temperature	°C	20±2			

CONTROL, COMMUNICATION AND CABLING

Recommended controllers ⁸⁾		CMXA			
Recommended drivers ⁸⁾		CMXA/DUMXA			
Recommended power supply ⁹⁾		1 phase 220 VAC ~ 50 Hz supply			
Recommended communication interface ¹⁰⁾		EtherCAT/ RS232 / USB / TCP-IP			
Cable length	m	TBD			
Differential outputs ¹¹⁾		On request			

ACCESSORIES INFORMATION

Base plate for mechanical interface		Granite recommended			
Cable management		Included for both axes. May be redesigned by request			

ADDITIONAL DETAILS

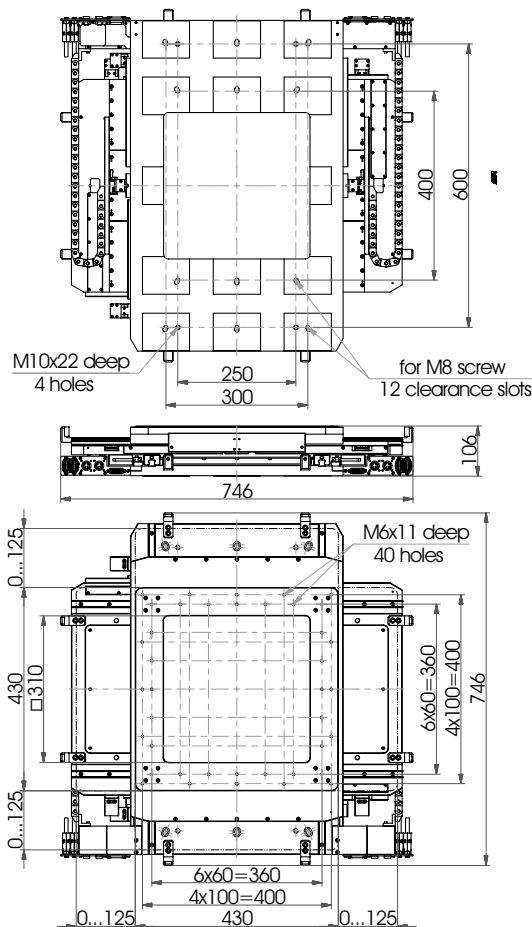
Dimensions of moving platform	(W × L) mm	610 × 520			
Stage dimensions	(W × L × H) mm	912 × 846 × 126.5			
Measurement system		Metric / Imperial			
Orthogonality ¹²⁾	µrad/arcsec	24 / 5			
Aperture (center placed)	(W × L) mm	310 × 310			
Weight	kg	TBD			

8MTLF250XY

Open Frame XY Linear Motor Stages (Planar/Gantry, Direct Drive Motors, Mechanical Bearings)

FEATURES

- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Integrated, low-profile, XY, linear motor stage
- > High accuracy linear guide with crossed roller bearings, anti-creep
- > Easy integration with metric/imperial opto-mechanical systems



- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μ rad. Environment error: 1 μ rad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for support.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- 10) Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 11) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 12) Stages can be assembled with better orthogonality by request.

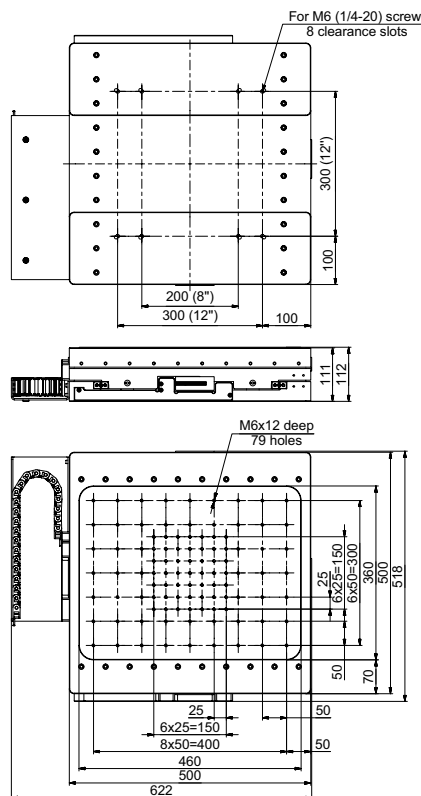
Model	8MTLF250XY -2L-2U-4LEn1	8MTLF250XY -1L-2U-3LEn1	8MTLF250XY -2L-1U-3LEn1	8MTLF250XY -1L-1U-2LEn1
KINEMATICS & FEEDBACK INFORMATION				
Travel range	250 × 250 mm			
Encoder type	Optical			
Encoder model	LEN1			
Encoder resolution	Any of the range: 25 nm to 5 µm (on demand)			
Encoder interface	Differential RS422			
Internal multiplier	Yes			
Multiplication factor ¹⁾	4 – 200 (on demand)			
Encoder grating period	20 µm			
Reference mark (index)	Yes			
Absolute accuracy ²⁾				
Before calibration	±5 µm			±6 µm
After calibration	±1.5 µm			±2 µm
Bi-directional repeatability (peak to peak) ²⁾	±0.25 µm			±0.5 µm
Bi-directional repeatability (RMS) ²⁾	±0.15 µm			±0.3 µm
Pitch ³⁾	±30 µrad / ±6.2 arcsec			
Yaw ³⁾	±30 µrad / ±6.2 arcsec			
Maximum velocity (with load 4 kg) ⁴⁾	<1500 mm/s			
Maximum acceleration (with load 4 kg) ⁵⁾	<20000 mm/s ²			
Limits switches type (safety)	Hall sensors			
Limit switch polarity (safety)	Pushed is closed			
Limit switch voltage	5 ... 24 V			
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type	Real gantry (mimo)	Planar-gantry hybrid		Planar
Linear motor model	LM5			
Linear motor design type	Ironless BLDC motor			
Maximum bus voltage	>300 VDC			
Quantity of motors	4	3		2
Load capacity (centrally placed) ⁶⁾				
Horizontal	30 kg			
Moving mass ⁷⁾				
X (bottom)	39.1 kg	37.8 kg	34.4 kg	33.9 kg
Y (upper)	7.5 kg	7.1 kg	7.5 kg	7.1 kg
Guiding system	Recirculating linear rails and carriages units with caged balls			
MATERIAL & ENVIRONMENT CONDITIONS				
Housing material	Aluminum alloy			
Housing coating (finish)	Black anodizing			
Environment pressure	Normal atmosphere			
Operating temperature	20±2 °C			
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended power supply ⁹⁾	2 phase / 3 phase source			
Recommended communication interface ¹⁰⁾	EtherCAT / RS232 / USB / TCP-IP			
Cable length	2 m (other by request)			
Differential outputs ¹¹⁾	On request			
ACCESSORIES INFORMATION				
Base plate for mechanical interface	Granite is recommended			
Z configuration	Not available (choose from other Standa stages series)			
ADDITIONAL DETAILS				
Dimensions of moving platform (W × L)	430 × 430 mm			
Overall linear stage dimensions (W × L × H)	746 × 746 × 106 mm			
Measurement system	Metric / Imperial			
Orthogonality ¹²⁾	24 µrad / 5 arcsec			
Protection level	Request Standa support			
RoHS	Compliant			
Weight	~68 kg			

8MTL300XY

Planar XY Linear Motor Stages

FEATURES

- Travel range: 300 × 300 mm
- Resolution: up to 1 nm
- Direct drive zero backlash XY planar system
- High resolution non-contact optical incremental encoder
- Absolute bidirectional repeatability: $\pm 0.15 \mu\text{m}$ ($\pm 0.10 \mu\text{m}$ RMS)
- Maximum velocity (no load, upper axis): 2500 mm/s
- Maximum acceleration (no load, upper axis): 25000 mm/s²
- High accuracy linear guide with crossed roller bearings with anti cage creep system
- Accuracy: $\pm 1.00 \mu\text{m}$
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- Default 5 arcsec orthogonality
- Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- Solid integrated planar design
- All measurement reports are included by default!
- Vacuum up to 10^{-3} torr available "off-the-shelf"



- 1) System can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad . Environment error: 1 μrad .
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with required orthogonality by request.
- 12) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Protection of guiding system is limited and not supposed to be used in wet and dusty environment.

Model	Units	8MTL300XY-LEnX-XXX
KINEMATICS & FEEDBACK INFORMATION		
Active axes		X,Y
Travel range	mm	300
Encoder type		Optical
Encoder model		Len1
Encoder resolution ¹⁾	nm	<5
Encoder interface ¹⁾		RS422 or 1Vpp
Encoder grating period	µm	20
Reference mark (index)		YES
Absolute accuracy (before calibration) ²⁾	µm	±5
Absolute accuracy (after calibration)	µm	± 1
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.15
Bi-directional repeatability (RMS) ²⁾	µm	±0.10
Pitch ³⁾	µrad/arcsec	±48.0 / ±10
Yaw ³⁾	µrad/arcsec	±39 / ±8
Roll	µrad/arcsec	±48 / ±10
Maximum velocity (no load upper axis) ⁴⁾	mm/s	<2 500
Maximum acceleration (no load upper axis) ⁵⁾	mm/s ²	<25 000
Limits switches type (safety)		Hall sensors
Limit switch polarity (safety)		Negative end of run
Limit switch voltage	V	5 ... 24
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Linear Motor Stage; Planar Design
Linear motor model		LM11
Linear motor design type		Ironless BLDC motor
Maximum bus voltage	V _{DC}	>320
Maximal continues current	A _{PK}	2.1
Maximal peak current	A _{PK}	7
Maximal continues force	N _N	140
Maximal peak force	N _{PK}	480
Pole pitch N to S / N to N	mm	21 / 42
Load capacity (centrally placed) ⁶⁾	kg	30
Moving mass X ⁷⁾	kg	45
Moving mass Y ⁷⁾	kg	16.5
Guiding system		Crossed roller bearings with cage drift protection
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		CMHP/CMNT series
Recommended drivers ⁸⁾		CMHP/CMNT series
Recommended power supply ⁹⁾		1 phase wall socket source 220 VAC ~ 50 Hz
Recommended communication interface ¹²⁾		EtherCAT
Cable length	m	TBA
Differential outputs ¹⁰⁾		On request
ADDITIONAL DETAILS		
Dimensions of moving platform	(W × L) mm	500 × 500
Stage dimensions	(L × W × H) mm	518 × 622 × 112
Measurement system		Metric / Imperial
Orthogonality ¹¹⁾	µrad/arcsec	24 / 5
Protection level ¹³⁾		Basic
RoHS		Compliant
Weight	kg	54

8MTL120XY

Planar XY Linear Motor Stages (Direct Drive Motors, Mechanical Bearings)



FEATURES

- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Integrated, low-profile, XY, linear motor stage
- > High accuracy linear guide with crossed roller bearings, anti-creep
- > Easy integration with metric/imperial opto-mechanical systems
- > Default ≤ 5 arcsec orthogonality
- > All measurement reports are included by default

Direct Drive Linear Translation Stage of series 8MTL120XY are based on pair of 3 phase ironless linear brushless servo motor technology. Direct drive technology allow user to reach zero backlash motion with high accuracy, repeatability and low friction. Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MT120XY instruments and excellent long period kinematics without drift of guide system. Small special linear rails with crossed roller bearings for higher stiffness.

Translation stages of series 8MTL120XY can be prepared for clean rooms and vacuum up to 10^{-3} Torr. For higher vacuum please contact Standa support. Additional requirement of cleanliness can be supported on demand.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stage is directly assembled to PLANAR like design, without using any connecting plates. Extremely high orthogonality is available by default.

Motion control of 8MTL120XY series translation stages is available with Standa or ACS motion Controllers & Drivers in exposed or housed configurations.

For industry applications 8MTL120XY stages can be supplied mounted on standard optical table or extremely flat granite plate fully sealed from spray and dust to ensure performance of kinematic pairs.

Model	8MTL120XY
KINEMATICS & FEEDBACK INFORMATION	
Active axes	X, Y
Travel range	120 × 120 mm
Encoder type	Optical
Encoder model	Len1
Encoder resolution	any of the range: 25 nm to 5 μm (on demand)
Encoder interface	Differential RS422
Internal multiplier	Yes
Multiplication factor ¹⁾	4 – 200 (on demand)
Encoder grating period	20 μm
Reference mark (index)	Yes
Absolute accuracy ²⁾	
Before calibration	± 4 μm
After calibration	± 0.5 μm
Bi-directional repeatability (peak to peak) ²⁾	± 0.15 μm
Bi-directional repeatability (RMS) ²⁾	± 0.1 μm
Pitch ³⁾	±30 μrad / ±6.2 arcsec
Yaw ³⁾	±30 μrad / ±6.2 arcsec
Maximum velocity (load 4 kg) ⁴⁾	<1000 mm/s
Maximum acceleration (load 4 kg) ⁵⁾	<20000 mm/s ²
Limits switches type (safety)	Optical (optrons)
Limit switch polarity (safety)	Pushed is closed
Limit switch voltage	5 ... 24 V

LOAD, GUIDING & TRANSMISSION INFORMATION

Design type	Linear Motor Stage; Planar Design
Linear motor model	LM3
Linear motor design type	Ironless BLDC motor
Maximum bus voltage	>300 V DC
Load capacity (centrally placed) ⁶⁾	30 kg
Moving mass X ⁷⁾	3 kg
Moving mass Y ⁷⁾	8.5 kg
Guiding system	Crossed roller bearings with cage drift protection

MATERIAL AND ENVIRONMENT CONDITIONS

Housing material	Aluminum alloy
Housing coating (finish)	Black anodizing
Environment pressure	Normal atmosphere
Operating temperature	20±2 °C

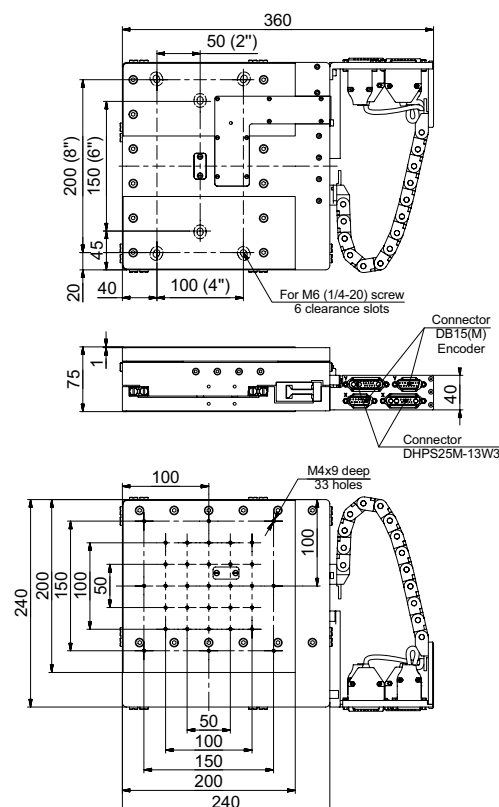
CONTROL, COMMUNICATION & CABLING

Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended power supply ⁹⁾	2 phase / 3 phase source
Recommended communication interface ¹⁰⁾	EtherCAT / RS232 / USB / TCP-IP
Cable length	2 m (other by request)
Differential outputs ¹¹⁾	Optionally available by request

ADDITIONAL DETAILS

Dimensions of moving platform (W × L)	240 × 240 mm
Stage dimensions (W × L × H)	240 × 360 × 75 mm
Measurement system	Metric / Imperial
Orthogonality ¹²⁾	24 μrad / 5 arcsec
Protection level ¹³⁾	Basic
RoHS	Compliant
Weight	12.5 kg

- With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- Absolute accuracy & Bi-directional repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- Pitch & yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad. Environment error: 1 μrad.
- Maximum velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- Maximum acceleration is limited by drivers' peak current, motors' peak current and external load (inertia). Please contact Standa for support.
- Load capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- Moving mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- Recommended controllers & recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.
- Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- Scalar control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- Differential outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- Stages can be assembled with better orthogonality by request.
- Protection of guiding system is limited and not supposed to be used in wet and dusty environment.

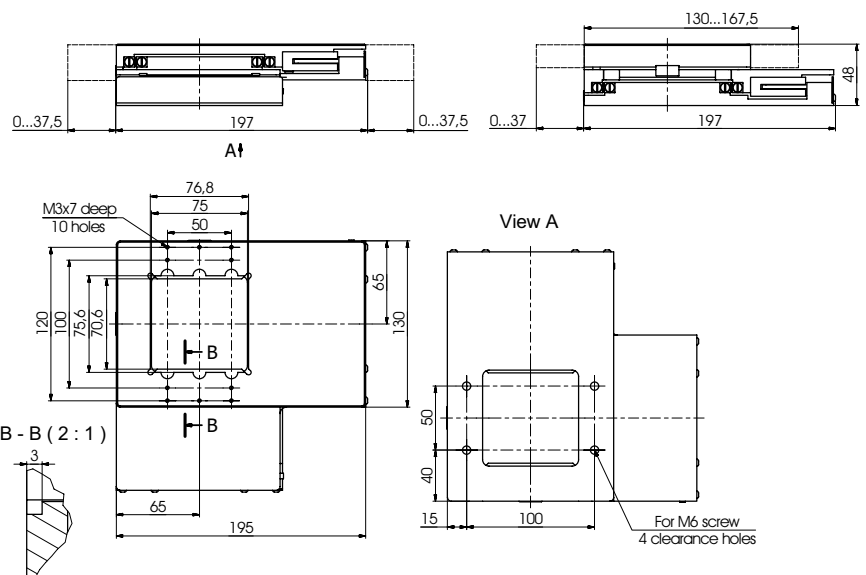


8MTLF75XY

Open Frame XY Linear Motor Microscopy Stages

FEATURES

- Travel range: 75 × 75 mm
- Extremely compact direct drive design
- Resolution: up to <math><240\text{ nm}</math>
- Direct drive zero backlash system
- High resolution non-contact magnetic incremental encoder
- RMS Bidirectional repeatability: $\pm 0.2\ \mu\text{m}$
- Maximum velocity: 150 mm/s
- Maximum acceleration: $7000\ \text{mm/s}^2$
- High accuracy linear guide and carriage system with caged balls
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- Can be applied to industry applications like: metrology, microscopy, micromachining
- Clear aperture: 75 × 70.6 mm
- Available for OEM integration in high volumes
- All measurement reports are included by default!



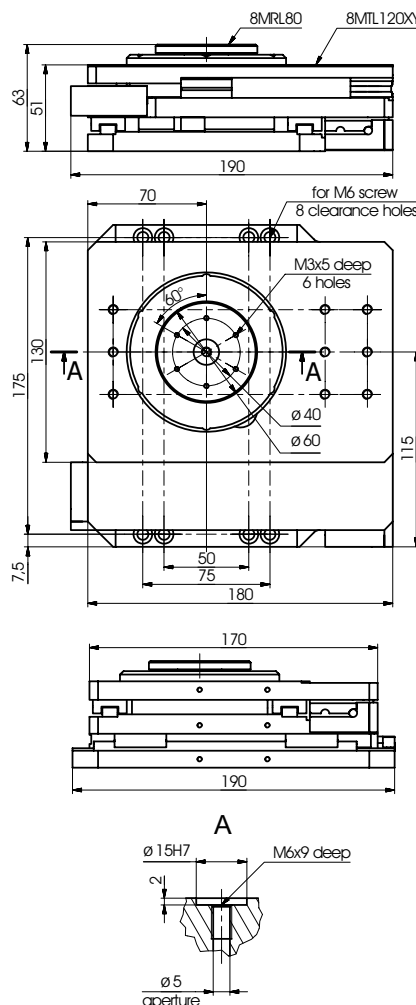
Model	Units	8MTLF75XY
KINEMATICS & FEEDBACK INFORMATION		
Active axes		X, Y
Travel range	mm	75 × 75
Encoder type		Magnetic encoder
Encoder model		LEnM1
Encoder resolution	µm	0.244
Encoder interface ¹⁾		RS-422
Internal multiplier		YES
Multiplication factor ²⁾		8192
Encoder grating period	mm	2
Reference mark (index)		YES
Absolute accuracy (before calibration) ³⁾	µm	±3
Absolute accuracy (after calibration)	µm	To be confirmed
Uni-directional repeatability	µm	<0.25
Bi-directional repeatability (peak to peak) ³⁾	µm	±0.3
Bi-directional repeatability (RMS) ³⁾	µm	<0.2
Pitch ⁴⁾	µrad/arcsec	< ±32.5 / ±6.7
Yaw ⁴⁾	µrad/arcsec	< ±32.5 / ±6.7
Roll	µrad/arcsec	< ±32.5 / ±6.7
Maximum velocity ⁵⁾	mm/s	150
Maximum acceleration ⁶⁾	mm/s ²	7000
Limits switches type (safety)		Hall
Limit switch polarity (safety)		Positive end of run
Limit switch voltage	V	5 ... 24
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Linear motor stage planar design
Linear motor model		LM10
Linear motor design type		Ironless BLDC motor
Maximum bus voltage	VDC	>60
Maximum motor speed	m/s	5
Continuous force	N	10
Maximum continuous current	A	0.87
Peak current	A	3.1
Load capacity (centrally placed) ⁷⁾	kg	4
Moving mass X ⁸⁾	kg	2.26
Moving mass Y ⁸⁾	kg	0.93
Guiding system		Crossed roller bearing with cage drift protection
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁹⁾		ACS Products Line or 8SMC5-USB series
Recommended drivers ⁹⁾		ACS Products Line or 8SMC5-USB series
Recommended BUS power supply ¹⁰⁾		1 phase (splinted from 3 phase source)
Built-in communication Interface		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	0.5
Differential outputs ¹¹⁾		Optionally available by request
ADDITIONAL DETAILS		
Dimensions of moving platform	(W × L) mm	195 × 130 mm
Stage dimensions (home position)	(W × L × H) mm	197 × 197 × 50 mm
Measurement system		Metric
Orthogonality ¹²⁾	µrad/arcsec	TBD
Protection level		Basic
RoHS		Compliant
Weight	kg	2.6

8MTL20XY

Planar XY Linear Motor Stages

FEATURES

- Travel range: 20×20 mm (planar)
- Resolution: <1 nm
- Accuracy: <±0.15 μm (calibrated to load)
- Bidirectional repeatability (RMS): ±0.075 μm
- Maximum velocity: >500 mm/s
- Maximum Acceleration: >45000 mm/s²
- Direct drive zero backlash system
- High resolution non-contact optical incremental encoder
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- PLANAR assembly with 5 arcsec orthogonality
- High accuracy linear guide and carriage system
- Can be applied applications like: laser cutting, scribing, drilling, marking
- Cables Can be customized for different OEM electronics
- All measurement reports are included by default!



- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for interpolation by external drive (e.g.: UDMHP series).
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad. Environment error: 1 μrad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 11) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 12) Stages can be assembled with required orthogonality by request.
- 13) Protection of guiding system is limited and not supposed to be used in wet and dusty environment.

Parameters	Units	8MTL20XY-LEn1
KINEMATICS & FEEDBACK INFORMATION		
Active axes		X, Y
Travel range	mm	20
Encoder type		Optical
Encoder model		Len1
Encoder resolution ¹⁾	nm	25 nm (integrated interpolator); <1 nm (interpolated by driver)
Encoder interface		Differential RS422 or Analog Sin/Cos
Internal multiplier		YES
Multiplication factor ¹⁾		up to x200 (if integrated interpolator); up to x65536 (if interpolated by driver)
Encoder grating period	µm	20
Reference mark (index)		YES (in center of travel)
Absolute accuracy (before calibration) ²⁾	µm	±2.5
Absolute accuracy (after calibration)	µm	± 0.15
Uni-directional repeatability	µm	± 0.025
Bi-directional repeatability(peak to peak) ²⁾	µm	±0.1
Bi-directional repeatability(rms) ²⁾	µm	±0.075
Pitch ³⁾	µrad/arcsec	±25 / ±5
Yaw ³⁾	µrad/arcsec	±13 / ±3
Roll	µrad/arcsec	±25 / ±5
Maximum velocity (load 4kg) ⁴⁾	mm/s	>500
Maximum acceleration (load 4kg) ⁵⁾	mm/s ²	>45 000
Limits switches type (safety)		Optical (optrons)
Limit switch polarity (safety)		Pushed is closed
Limit switch voltage	V	5 ... 24
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Linear motor stage; Planar design
Linear motor model		LM9
Linear motor design type		Ironless BLDC motor
Maximum bus voltage	V _{DC}	>80 VDC
Maximal continues current	A _{PK}	1.8
Maximal peak current	A _{PK}	10
Maximal continues force	N _N	13.3
Maximal peak force	N _{PK}	74
Pole pitch N to S/ N to N	mm	7.5 / 15.0
Load capacity (centrally placed) ⁶⁾	kg	15
Moving mass X ⁷⁾	kg	1.1
Moving mass Y ⁷⁾	kg	0.45
Guiding system		Linear rails with carriages
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20 ± 2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended power supply ⁹⁾		1 phase / 3 phase source
Recommended communication interface ¹⁰⁾		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (can be requested)
Differential outputs ¹¹⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Not mandatory
XY stack		Planar
Z configuration		On request
ADDITIONAL DETAILS		
Dimensions of moving platform	(W × L) mm	133 × 142
Stage dimensions	(L × W × H) mm	180 × 170
Aperture	d, mm	80
Measurement system		Metric / Imperial
Orthogonality ¹²⁾	µrad/arcsec	24 / 5
Protection level ¹³⁾		Basic
RoHS		Compliant
Weight	kg	1.8

8MTF-200

Open Frame XY Linear Microscopy Stages



8MTF-200



8MTF200XY

FEATURES

- > Travel range: 200×200 mm
- > Clear aperture: 205×205 mm
- > Resolution: up to <math><0.31\text{ nm}</math>
- > Ultra high precision ball screw
- > High resolution non-contact optical incremental encoder (dual loop mode)
- > Bidirectional repeatability: $\pm 0.5\ \mu\text{m}$ (0.45 μm RMS)
- > Accuracy: up to $\pm 1.5\ \mu\text{m}$
- > Maximum velocity: 50 mm/s
- > Maximum Acceleration: 250 mm/s²
- > Ultra high precision linear guide with recirculating balls
- > Cables Can be customized for different OEM electronics
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Default <math><15\text{ arcsec}</math> orthogonality
- > Can be applied to applications like: microscopy, metrology laser cutting, scribing, drilling, marking
- > Solid Integrated Planar Design available with or w/o aperture
- > All measurement reports are included by default!

Ball screw linear translation stage of series 8MTF200XY and 8MTF-200 is based on pair of stepper (optionally with rotary encoders) or 3 phase BLDC servo motor technology. High precision ball screw & servo motor combination allow achieve high precision and self-locking system through extremely cost effective way.

Optionally available non-contact optical encoder as a feedback system integrated directly on the moving load, guarantees sub-nanometer resolution of positioning with high precision.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTF200XY instruments and excellent long period kinematics without drift of guide system. Miniature ultra-high precision linear recirculating guiding system guarantees minimal friction and excellent motion stability.

Positioning table of series 8MTF200XY can be optionally prepared for clean rooms and vacuum up to 10^{-3} Torr .For higher vacuum please contact Standa support. Additional requirement of cleanliness or sealing of the stage can be supported on demand.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stage is directly assembled to PLANAR three-piece like design, without using any connecting plates. Extremely high straightness, flatness and orthogonality is available by default.

Motion control of 8MTF series translation stages is available with Standa or ACS motion Controllers & Drivers in exposed or housed configurations.

For industry applications 8MTF200XY linear positioning stages can be supplied mounted on aluminum breadboard 1B-AI, honeycomb breadboard 1HB, standard optical table 1HT or extremely flat granite plate 1GB fully sealed from spray and dust to ensure long and reliable performance of kinematic pairs.

Model	8MT200XY -4247	8MT200XY -4247-MEN1	8MT200XY -B43-MEN4	8MT200XY-B43- MEN4-LEN1-025
KINEMATICS & FEEDBACK INFORMATION				
Travel range (X × Y), mm	200 × 200			
Min. Incremental motion, μm	0.625		0.1	
Rotary encoder type	–	Optical		
Rotary encoder model	–	MEN1	MEN4	
Rotary encoder resolution, μm	–	0.5	0.1	
Rotary encoder interface	–	TTL	Differential RS422	
Rotary encoder internal multiplier	–	NO		
Rotary encoder grating period, deg	–	0.09	0.018	
Rotary encoder reference mark (index)	–	Yes		
Linear encoder type	–	–	Optical	
Linear encoder model	–	–	LEn1	
Linear encoder resolution, nm	–	–	25	
Linear encoder interface	–	–	Differential, RS422 ¹⁾	
Linear encoder internal multiplier	–	–	YES	
Linear encoder multiplication factor ¹⁾	–	–	×200	
Linear encoder grating period, μm	–	–	20	
Linear encoder reference mark (index)	–	–	YES (center)	
Absolute accuracy ²⁾				
Before calibration, μm/mm	±8 / 100			
After calibration, μm	request	±3	±2	±1.5
Uni-directional repeatability, μm	±0.50			
Bi-directional repeatability (peak to peak) ²⁾ , μm	±2		±1	±0.5
Bi-directional repeatability (RMS) ²⁾ , μm	±1.5		±1	±0.45
Pitch ³⁾ , μrad / arcsec	±100 / ±20.63			
Yaw ³⁾ , μrad / arcsec	±30 / ±6.19			
Roll, μrad / arcsec	±30 / ±6.19			
Maximum velocity (with load 4 kg) ⁴⁾ , mm/s	30		50	
Maximum acceleration (with load 4 kg) ⁵⁾ , mm/s ²	150		250	
Limits switches type (safety)	Digital Hall sensors			
Limit switch polarity (safety)	Pushed is open			
Limit switch voltage, VDC	5 ... 24			
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type	Motorized ball screw XY planar stage			
Ball screw pitch, mm	2			
Motor model	4247		B43	
Motor design type	Bipolar stepper motor		3 phase BLDC motor	
Maximum bus voltage, VDC	48			
Load capacity (centrally placed) ⁶⁾				
Horizontal, kg	8			
Vertical, kg	N/A			
Moving mass ⁷⁾ , kg	9.5			
Guiding system	Ultra-precise recirculating linear rails and carriages units			
MATERIAL & ENVIRONMENT CONDITIONS				
Housing material	Aluminum alloy			
Housing coating (finish)	Black anodizing			
Environment pressure	Normal atmosphere			
Operating temperature, °C	20 ± 2			
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended power supply ⁹⁾	PS36-4.4-4			
Recommended communication interface ¹⁰⁾	EtherCAT / RS232 / USB / TCP-IP			
Cable length, m	2 (other by request)			
Differential outputs ¹¹⁾	N/A			On request

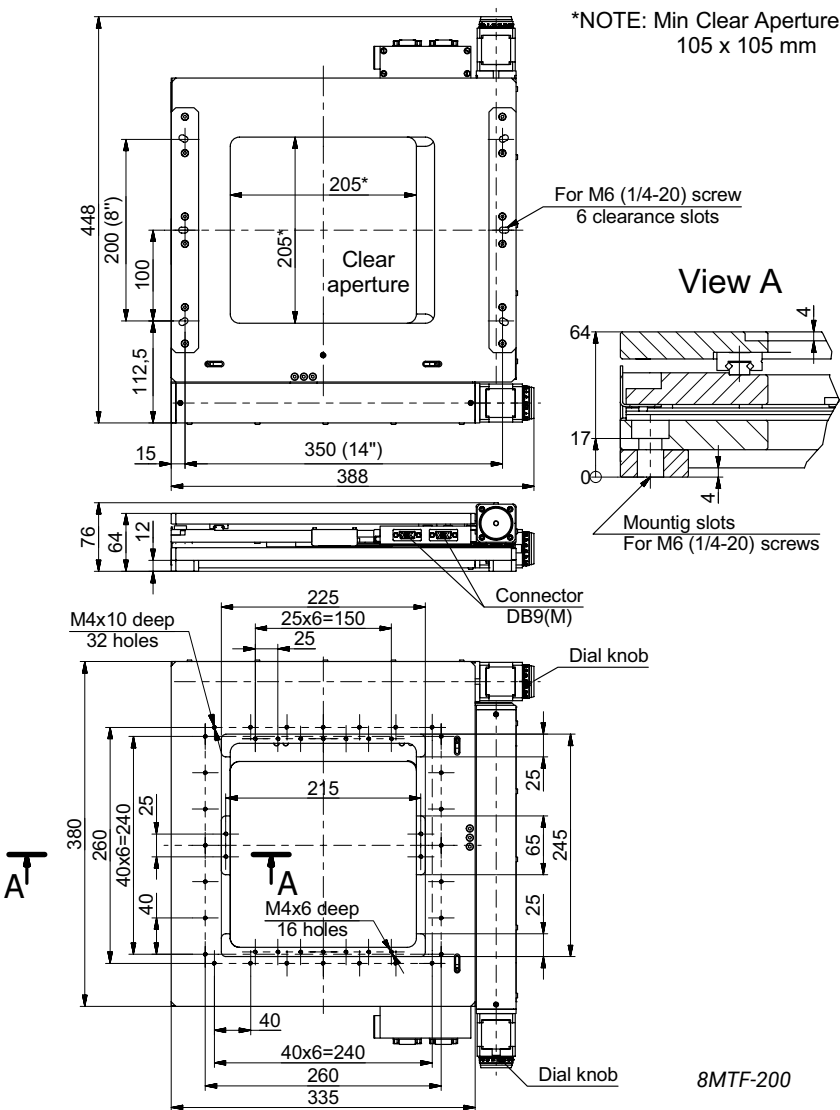
Model	8MT200XY -4247	8MT200XY -4247-MEN1	8MT200XY -B43-MEN4	8MT200XY-B43- MEN4-LEN1-025
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ACCESSORIES INFORMATION

Base plate for mechanical interface	Not required
Z configuration	Not available (choose from other Standa stages series)

ADDITIONAL DETAILS

Dimensions of moving platform (W × L), mm	335 × 380
Overall linear stage dimensions (W × L × H), mm	402 × 450 × 76
Measurement system	Metric / Imperial
Orthogonality ¹²⁾ , μrad / arcsec	73 / 15
Protection level ¹³⁾	Optionally can be supplied with special cover (with air purge & dust protection)
RoHS	Compliant
Weight, kg	Request



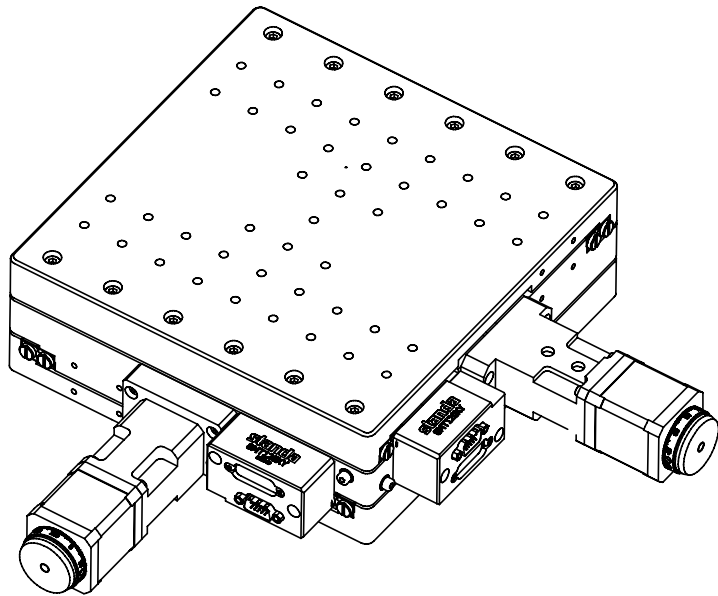
- ¹⁾ With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- ²⁾ Absolute Accuracy & Bi-Directional Repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- ³⁾ Pitch & Yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad. Environment error: 1 μrad.
- ⁴⁾ Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- ⁵⁾ Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for support.
- ⁶⁾ Load Capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- ⁷⁾ Moving Mass is constant parameter of system which characterize m0 or inertia of unloaded system.
- ⁸⁾ Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.
- ⁹⁾ Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- ¹⁰⁾ Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- ¹¹⁾ Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- ¹²⁾ Stages can be assembled with better orthogonality by request.
- ¹³⁾ Protection of guiding system is limited and not supposed to be used in wet and dusty environment.

8MT120XY

Planar XY Stages

FEATURES

- > Travel range: 120×120 mm (planar)
- > Resolution: <0.31 nm
- > Accuracy: <±1.00 μm (calibrated to load)
- > Bidirectional repeatability (RMS): ±0.40 μm
- > Maximum velocity: >150 mm/s
- > Maximum acceleration: >250 mm/s²
- > Low friction ball screw transmission
- > High resolution non-contact optical encoder
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > PLANAR assembly with 5 arcsec orthogonality
- > Ultra precise crossed roller linear bearings with anti creep cages
- > Cost efficient solution
- > Can be applied applications like: metrology, microscopy, micromachining
- > Cables can be customized for different OEM electronics



Stage of series 8MT120XY is based on pair of rotary motor technology. Ball screw technology enables user to reach low friction along with good accuracy and repeatability.

Linear non-contact optical encoder as an optional feedback system guarantees direct control of position with sub-nanometer resolution of motion and DUAL LOOP control architecture.

Naturally aged aluminum alloy guarantees high temperature stability, softness of 8MT120XY instruments and excellent long period kinematics without drift of guide system. Special linear rails with crossed roller bearings and cage drift protection enable high stiffness, while dynamic response guarantees high bandwidth of control loop.

Translation stages of series 8MTL120XY can be prepared for clean rooms and vacuum up to 10⁻³ torr with small changes. For higher vacuum please contact Standa.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stage is directly assembled to PLANAR like design, without using any connecting plates. Extremely high orthogonality is available by default, however for low static errors it is recommended to use the granite plate.

Motion control of 8MT120XY series translation stages is available with Standa or ACS motion Controllers & Drivers in exposed or housed configurations. It is recommended to driver the stage with the step motor by 8SMC5-USB series scalar driver.

For industry applications 8MT120XY stages can be supplied mounted on standard optical table or extremely flat granite plate fully sealed from spray and dust to ensure performance of kinematic pairs.

Model	Units	8MT120XY -BS2-4149	8MT120XY-BS2 -4149-MEN4	8MT120XY -BS2-B43	8MT120XY-BS2 -B43-LEN1
KINEMATICS & FEEDBACK INFORMATION					
Active axes	-	X, Y			
Travel range	mm	120×120			
Calculated open loop resolution (full step; 1/8 step; 1/16 step)	µm	10.000; 1.250; 0.625			-
Rotary encoder type		-	Optical		
Rotary encoder model		-	MEn4		
Rotary encoder encoder resolution	nm	-	100		
Rotary encoder interface		-	Differential RS422		
Rotary encoder internal multiplier		-	NO		
Rotary encoder grating period	CPR/PPR	-	5000 / 20000		
Rotary encoder reference mark (index)		-	YES		
Linear encoder type			-	Optical	
Linear encoder model			-	LEn1	
Linear encoder encoder resolution	nm		-	<0.31	
Linear encoder interface			-	RS422 / 1Vpp	
Linear encoder internal multiplier			-	Available	
Linear encoder multiplication factor ¹⁾			-	up to 65536	
Linear encoder grating period	µm		-	20	
Linear encoder reference mark (index)			-	YES (center)	
Absolute accuracy (before calibration) ²⁾	µm		± 4		
Absolute accuracy (after calibration)	µm	-	±2.0	±1.5	± 1.0
Uni-directional repeatability	µm	± 0.50	± 0.20		± 0.15
Bi-directional repeatability (peak to peak) ²⁾	µm		± 2.0	± 1.0	± 0.5
Bi-directional repeatability (RMS) ²⁾	µm		± 1.5	± 1.0	± 0.4
Pitch ³⁾	µrad/ arcsec		±30.0 / ±6.2		
Yaw ³⁾	µrad/ arcsec		±30.0 / ±6.2		
Roll	µrad/ arcsec		±30.0 / ±6.2		
Maximum velocity (load 4 kg) ⁴⁾	mm/s		30	50	
Maximum acceleration (load 4 kg) ⁵⁾	mm/s ²		150	250	
Limits switches type (safety)			Mechanical switch		
Limit switch polarity (safety)			Negative end of run		
Limit switch voltage	VDC		5 ... 24		
LOAD, GUIDING & TRANSMISSION INFORMATION					
Design type		Ball screw planar stage			
Ball screw pitch	mm	2.00			
Rotary motor model		4149	4149	B43	B43
Rotary motor design type		Bipolar step motor		3 phase BLDC motor	
Maximum bus voltage	V _{DC}	48			
Maximal continues current	A _n	1.4		3.3	
Maximal peak current	A _{PK}	1.4		11.0	
Number of poles (N to N)		100		6	
Load capacity (centrally placed) ⁶⁾	kg	30			
Load capacity (vertical) ⁶⁾		TBD			
Guiding system		Crossed roller bearings with cage drift protection			
MATERIAL AND ENVIRONMENT CONDITIONS					
Housing material	-	Aluminum alloy			
Housing coating (finish)	-	Black anodizing			
Environment pressure	-	Normal atmosphere			
Operating temperature	°C	20 ± 2			
CONTROL, COMMUNICATION AND CABLING					
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line			
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line			
Recommended power supply ⁹⁾		PS36-4.4-4			
Recommended communication interface ¹²⁾		EtherCAT / RS232 / USB / TCP-IP			
Cable length	m	2 (cab be requested)			
Differential outputs ¹⁰⁾		On request			

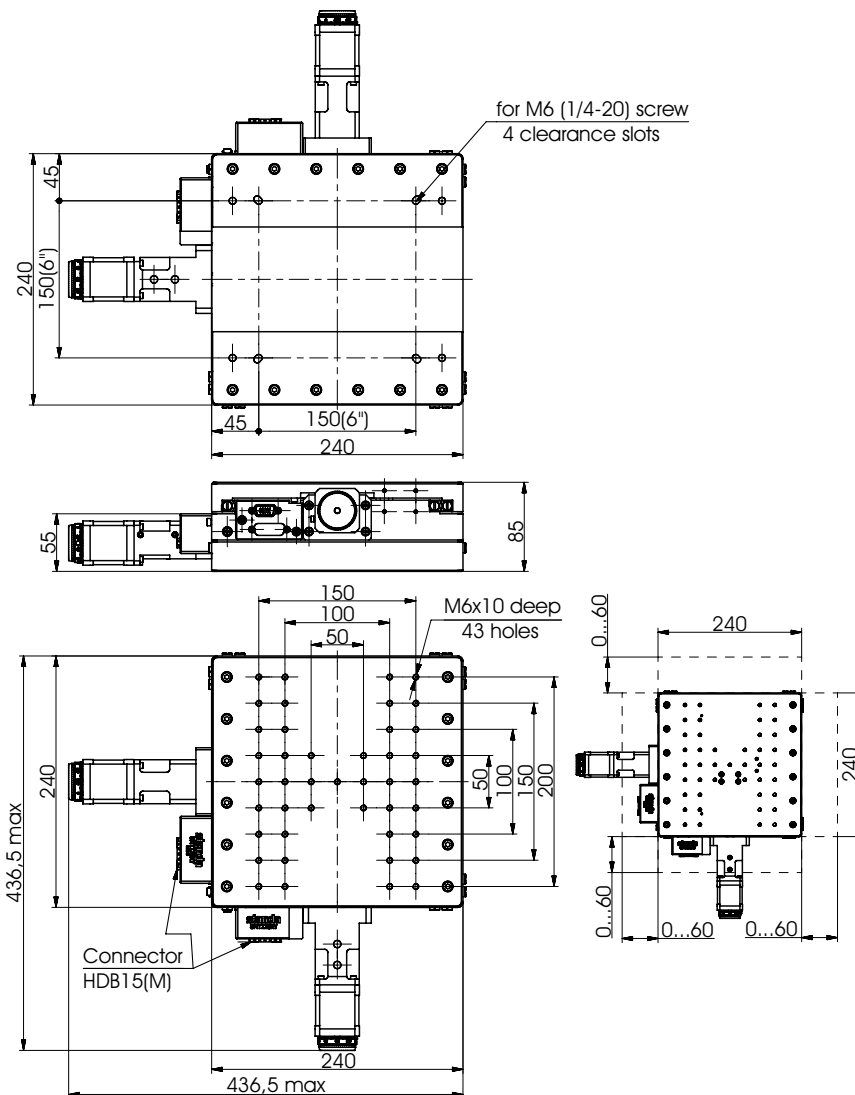
Model	Units	8MT120XY -BS2-4149	8MT120XY-BS2 -4149-MEN4	8MT120XY -BS2-B43	8MT120XY-BS2 -B43-LEN1
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ACCESSORIES INFORMATION

Base plate for mechanical interface		Granite is recommended			
XY stack		-			
Z configuration		Available			

ADDITIONAL DETAILS

Open aperture (W × L)	mm	N/A			
Dimensions of moving platform (W × L)	mm	240 × 240			
Overall linear stage dimensions (W × L × H)	mm	436.50 × 436.50 × 85.00			
Measurement system		Metric / Imperial			
Orthogonality ¹¹⁾	µrad/ arcsec	24 / 5			
Protection level		Can be supplied with special cover			
RoHS		Compliant			
Weight	kg	13.5			



- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 µrad. Environment error: 1 µrad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with required orthogonality by request.
- 12) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Protection of guiding system is limited and not supposed to be used in wet and dusty environment.

8MTL300

Direct Drive Linear Translation Stage



FEATURES

- > Travel range: 400 mm
- > High width of the carriage guarantee the stability in multi axes configuration
- > Resolution: up to <1 nm
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: $< \pm 0.50 \mu\text{m}$ ($\pm 0.26 \mu\text{m}$ RMS)
- > Maximum velocity: 2000 mm/s
- > Maximum Acceleration: 20000 mm/s²
- > High accuracy linear guide and carriage system with caged balls
- > Accuracy: $< \pm 1.00 \mu\text{m}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multi axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > Systems is equipped with protection from dust and spray
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics

Direct Drive Linear Translation Stage of series 8MTL300 are based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allow user to reach zero backlash motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer).

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTL300 instruments and excellent long period kinematics without drift of guide system. Moving rotor design allows taking maximum efficiency from the ironless motor and generating rapid and smooth motion profiles. Special guiding system with caged recirculating balls ensures long last precision of stage. High width of 8MTL300 allows using system as the stable & reliable option of X stage in multi axes fabrication systems.

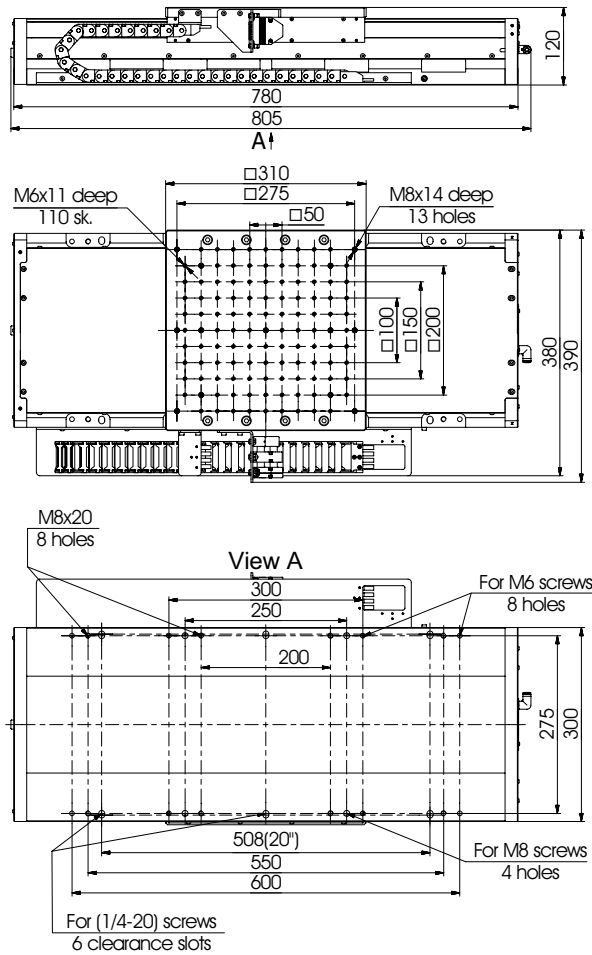
Translation stages of series 8MTL300 can be prepared for clean rooms and vacuum up to 10⁻³ torr with small changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. For extreme orthogonality please contact Standa separately.

Motion control of 8MT300 series translation stages is available with Standa or ACS motion Controllers & Drivers.

For light industry applications 8MTL300 stages can be supplied mounted on standard optical table or extremely flat granite plate. 8MTL300 have passive (belt protection) and active (compressed air channels) protection from spray and dusts, which allows stage to be applied in fabrication processes.

Model	Units	8MTL300 -400-LEn1	8MTL300 -500-LEn1	8MTL300 -600-LEn1	8MTL300 -800-LEn1
KINEMATICS & FEEDBACK INFORMATION					
Travel range	mm	400	500	600	800
Encoder type		Optical			
Encoder model		Len1			
Encoder resolution	nm	<0.31			
Encoder interface		Differential RS422 or Analog 1Vpp			
Internal multiplier		YES			
Multiplication factor ¹⁾		x65536			
Encoder grating period	µm	20.00			
Reference mark (index)		YES			
Absolute accuracy (before calibration) ²⁾	µm	±12	±14	±15.5	±17
Absolute accuracy (after calibration)	µm	±1			
Uni-directional repeatability	µm	N/A			
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.5			
Bi-directional repeatability (RMS) ²⁾	µm	±0.26			
Pitch ³⁾	µrad/arcsec	±30 / ±6.2	±35 / ±7.22	±40 / ±8.25	±45 / ±9.28
Yaw ³⁾	µrad/arcsec	±30 / ±6.2	±35 / ±7.22	±40 / ±8.25	±45 / ±9.28
Roll	µrad/arcsec	±30 / ±6.2	±35 / ±7.22	±40 / ±8.25	±45 / ±9.28
Maximum velocity (load 4 kg) ⁴⁾	mm/s	<2000			
Maximum acceleration (load 4 kg) ⁵⁾	mm/s ²	<20000			
Limits switches type (safety)		Optical (optrons)			
Limit switch polarity (safety)		Positive end of run			
Limit switch voltage	V	5 ... 24			
LOAD, GUIDING & TRANSMISSION INFORMATION					
Design type		Linear motor stage			
Linear motor model		LM6			
Linear motor design type		Ironless BLDC motor			
Maximum bus voltage	V _{DC}	>320			
Maximal continues current	A _{PK}	2.27			
Maximal peak current	A _{PK}	11.3			
Maximal continues force	N _N	282			
Maximal peak force	N _{PK}	1400			
Pole oitch N to S/ N to N	mm	28.5 / 57.0			
Load capacity (centrally placed) ⁶⁾	kg	150			
Moving mass ⁷⁾	kg	16			
Guiding system		Recirculating linear rails and carriages units with caged balls			
MATERIAL AND ENVIRONMENT CONDITIONS					
Housing Material		Aluminum alloy			
Housing Coating (Finish)		Black anodizing			
Environment pressure		Normal atmosphere			
Operating Temperature	°C	20.00±2			
CONTROL, COMMUNICATION AND CABLING					
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line			
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line			
Recommended power supply ⁹⁾		2 phase / 3 phase source			
Recommended communication interface ¹²⁾		EtherCAT / RS232 / USB / TCP-IP			
Cable length	m	2 (cab be requested)			
Differential outputs ¹⁰⁾		On request			
ACCESSORIES INFORMATION					
Base plate for mechanical interface		Not required; granite recommended			
XY stack		Directly stackable			
Z configuration		Not available			
ADDITIONAL DETAILS					
Dimensions of moving platform (W × L)	mm	310×310			
Stage dimensions (W × L × H)	mm	805×390×120	905×390×120	1005×390×120	1205×390×120
Measurement system		Metric			
Orthogonality ¹¹⁾	µrad/arcsec	24 / 5			
Protection level ¹³⁾		From solid particles and spray			
RoHS		Compliant			
Weight	kg	45.5	50.5	55.5	60.5



- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μ rad. Environment error: 1 μ rad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with required orthogonality by request.
- 12) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Stage have special covers which allows to use stage in dusty and partially wet environment.

8MTL220

Direct Drive Linear Translation Stage



8MTL220



8MTL220 XY

FEATURES

- > Travel ranges: 400, 500, 600, 1000 mm
- > Resolution: up to <0.31 nm
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: $<\pm 0.5$ μm (± 0.25 μm RMS)
- > Maximum velocity: 2000 mm/s
- > Maximum acceleration: 20000 mm/s²
- > High accuracy linear guide and carriage system with caged balls
- > Accuracy: $<\pm 1.00$ μm
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multi axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > Systems is equipped with protection from dust and spray
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics

Direct Drive Linear Translation Stage of series 8MTL220 are based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allow user to reach zero backlash motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer). Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTL220 instruments and excellent long period kinematics without drift of guide system. Moving rotor design allows taking maximum efficiency from the ironless motor and generating rapid and smooth motion profiles. Special guiding system with caged recirculating balls ensures long last precision of stage.

Translation stages of series 8MTL220 can be prepared for clean rooms and vacuum up to 10^{-3} torr with small changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. For extreme orthogonality please contact Standa separately.

Motion control of 8MTL220 series translation stages is available with Standa or ACS motion Controllers & Drivers.

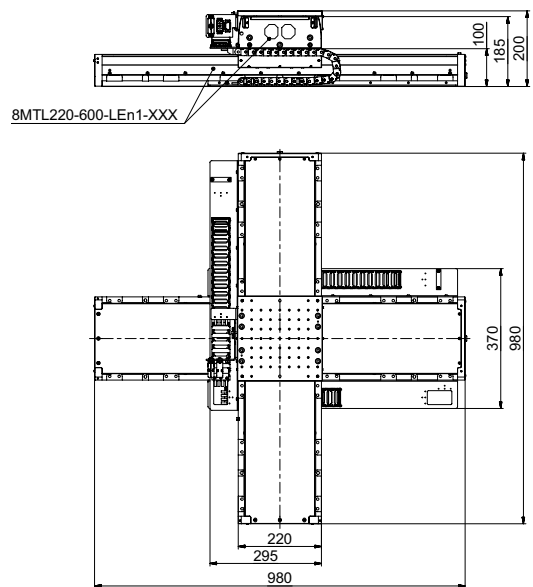
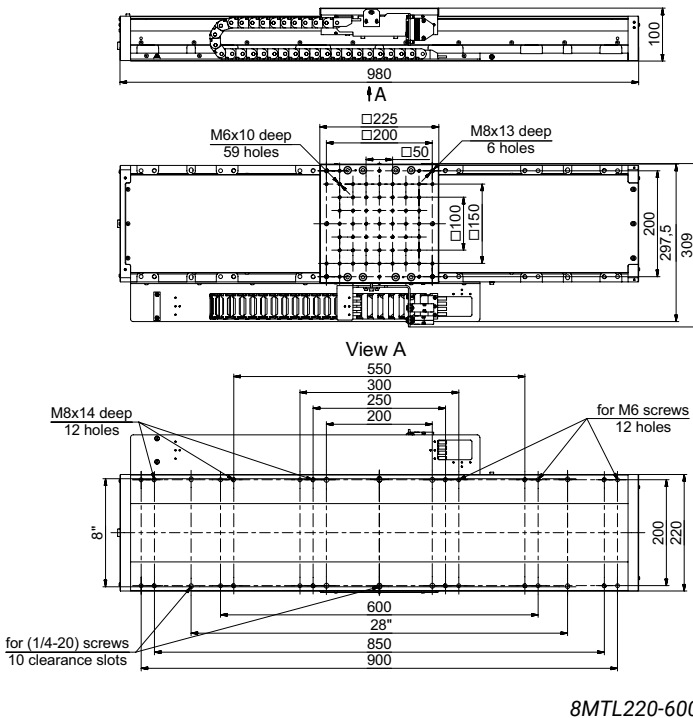
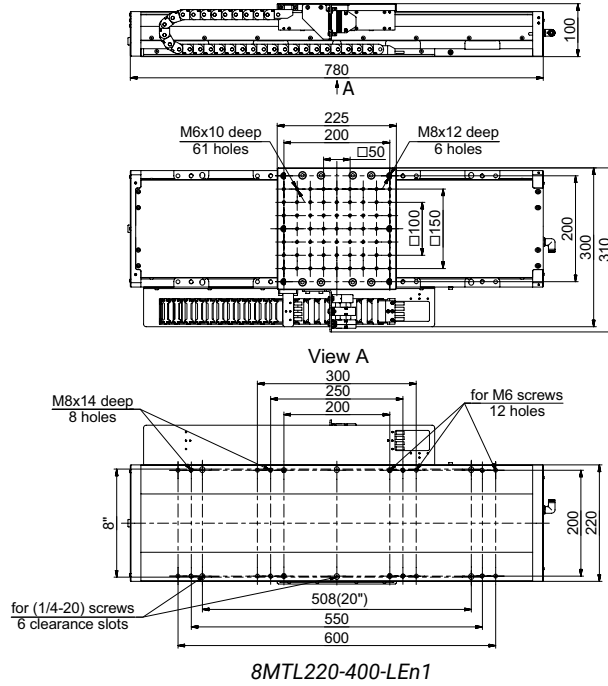
For light industry applications 8MTL220 stages can be supplied mounted on standard optical table or extremely flat granite plate. 8MTL220 have passive (belt protection) and active (compressed air channels) protection from spray and dusts, which allows stage to be applied in fabrication processes.

Model	8MTL220 -400-LEn1	8MTL220 -500-LEn1	8MTL220 -600-LEn1	8MTL220 -1000-LEn1
KINEMATICS & FEEDBACK INFORMATION				
Travel range, mm	400	500	600	1000
Encoder type	Optical			
Encoder model	LEN1			
Encoder resolution	≥25 nm (if interpolator is integrated) or <.031 nm (if interpolated by driver)			
Encoder interface	Differential RS422 or Analog Sin/Cos			
Internal multiplier	YES			
Multiplication factor ¹⁾	up to x200 (if interpolator is integrated); up to x65536 (if interpolated by driver)			
Encoder grating period, μm	20			
Reference mark (index)	YES (in the center of travel range)			
Absolute accuracy ²⁾				
Before calibration, μm	±10	±11	±12	±16
After calibration, μm	±1			
Uni-directional repeatability, μm	N/A			
Bi-directional repeatability (peak to peak) ²⁾ , μm	±0.5			
Bi-directional repeatability (RMS) ²⁾ , μm	±0.26			
Pitch ³⁾ , μrad / arcsec	±30 / ±6.2			±55 / ±11.34
Yaw ³⁾ , μrad / arcsec	±30 / ±6.2			±55 / ±11.34
Roll, μrad / arcsec	±30 / ±6.2			±55 / ±11.34
Maximum velocity (with load 4 kg) ⁴⁾ , mm/s	<2000			
Maximum acceleration (with load 4 kg) ⁵⁾ , mm/s ²	<20000			
Limits switches type (safety)	Optical (optrons)			
Limit switch polarity (safety)	Pushed is closed			
Limit switch voltage, V	5 ... 24			
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type	Linear motor stage			
Linear motor model	LM4			
Linear motor design type	Ironless BLDC motor			
Maximum bus voltage, VDC	320			
Load capacity (centrally placed) ⁶⁾				
Horizontal, kg	≤100			
Vertical, kg	N/A			
Moving mass ⁷⁾ , kg	9.5			
Guiding system	Recirculating linear rails and carriages units with caged balls			
MATERIAL & ENVIRONMENT CONDITIONS				
Housing material	Aluminum alloy			
Housing coating (finish)	Black anodizing			
Environment pressure	Normal atmosphere			
Operating temperature, °C	20±2			
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series			
Recommended power supply ⁹⁾	1 phase / 3 phase source			
Recommended communication interface ¹²⁾	EtherCAT / RS232 / USB / TCP-IP			
Cable length, m	2 (customized cable length could be requested (optionally))			
Differential outputs ¹⁰⁾	On request			
ACCESSORIES INFORMATION				
Base plate for mechanical interface	Not required			
XY stack	Directly			
Z configuration	Not available			
ADDITIONAL DETAILS				
Dimensions of moving platform (L×W), mm	225×225			
Overall linear stage dimensions (L×W×H), mm	780×297.5×100	880×297.5×100	980×297.5×100	1317×297.5×100
Measurement system	Metric / Imperial			
Orthogonality (XY configuration) ¹¹⁾ , μrad / arcsec	24 / 5			
Protection level	From solid particles and spray			
RoHS	Compliant			
Weight, kg	37	41.5	46	64

- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μ rad. Environment error: 1 μ rad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.

- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for support.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.

- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with better orthogonality by request.
- 12) Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.



8MTL165-300

Direct Drive Linear Translation Stage

FEATURES

- > Travel range: 200, 300, 400 mm
- > Resolution: up to <0.31 nm
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: ± 0.50 μm ($<\pm 0.25$ μm RMS)
- > Maximum velocity: 2000 mm/s
- > Maximum Acceleration: 20000 mm/s²
- > High accuracy linear guide and carriage system with recirculating balls
- > Accuracy: $<\pm 1.00$ μm
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multy axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > Systems is equipped with protection from dust and spray
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics



Direct Drive Linear Translation Stage of series 8MTL165 is based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allow user to reach zero backlash motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer tested as a system).

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion. Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTL165 instruments and excellent long period kinematics without drift of guide system. Moving rotor design allows taking maximum efficiency from the ironless motor and generating rapid and smooth motion profiles.

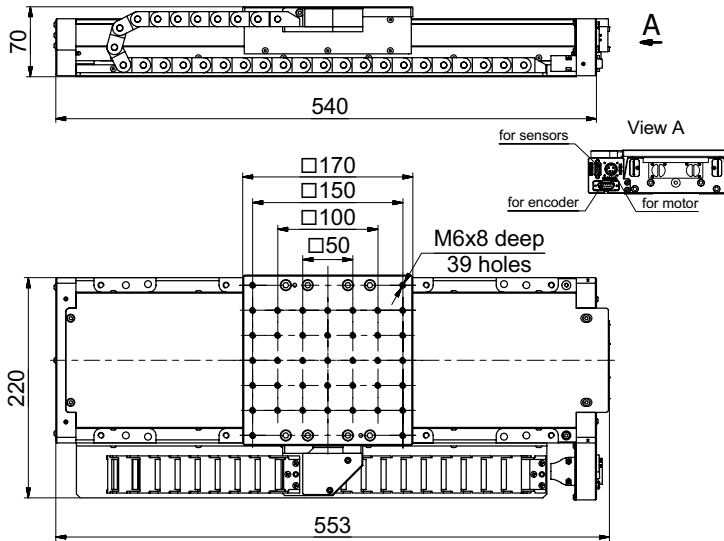
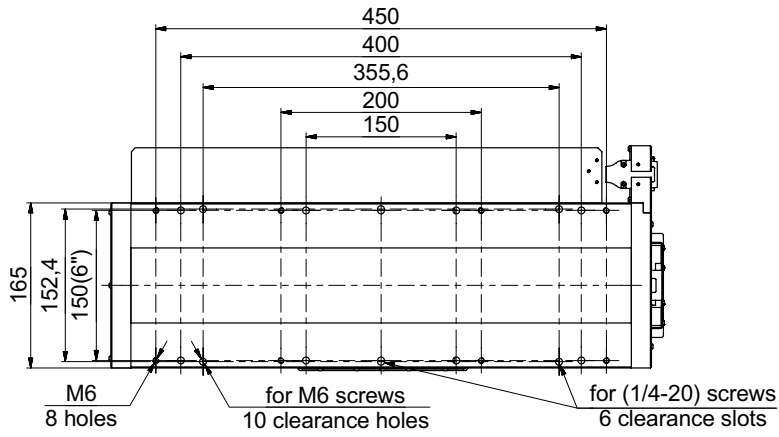
Translation stages of series 8MTL165 can be prepared for clean rooms and vacuum up to 10⁻³ torr with small changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. For extreme orthogonality please contact Standa separately.

Motion control of 8MTL165 series translation stages is available with Standa or ACS motion Controllers & Drivers.

For light industry applications 8MTL165 stages can be supplied mounted on standard optical table or extremely flat granite plate. 8MTL165 have passive (belt protection) protection from spray and dusts, which allows stage to be applied in fabrication processes.

Model	Units	8MTL165-200-LEn1	8MTL165-300-LEn1	8MTL165-400-LEn1
KINEMATICS & FEEDBACK INFORMATION				
Travel range	mm	200	300	400
Encoder type		Optical		
Encoder model		Len1		
Encoder resolution	nm	<0.31		
Encoder interface		RS422 or 1Vpp		
Internal multiplier		YES		
Multiplication factor ¹⁾		x65536		
Encoder grating period	µm	20		
Reference mark (index)		YES		
Absolute accuracy (before calibration) ²⁾	µm	±8	±10	±12
Absolute accuracy (after calibration)	µm	± 1		
Uni-directional repeatability	µm	TBD		
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.5		
Bi-directional repeatability (RMS) ²⁾	µm	±0.24		
Pitch ³⁾	µrad/arcsec	±20 / ±4.13	±30 / ±6.2	±35 / ±7.22
Yaw ³⁾	µrad/arcsec	±20 / ±4.13	±30 / ±6.2	±35 / ±7.22
Roll	µrad/arcsec	±20 / ±4.13	±30 / ±6.2	±35 / ±7.22
Maximum velocity (load 4 kg) ⁴⁾	mm/s	<2000		
Maximum acceleration (load 4 kg) ⁵⁾	mm/s ²	<20000		
Limits switches type (safety)		Optical (optrons)		
Limit switch polarity (safety)		Pushed is closed		
Limit switch voltage	V	5 ... 24		
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type		Linear motor stage		
Linear motor model		LM3		
Linear motor design type		Ironless BLDC motor		
Maximum bus voltage	V _{DC}	>320.00		
Maximal continues current	A _{PK}	2.20		
Maximal peak current	A _{PK}	8.80		
Maximal continues force	N _N	28.40		
Maximal peak force	N _{PK}	113.50		
Pole pitch N to S/ N to N	mm	15 / 30		
Load capacity (centrally placed) ⁶⁾	kg	45		
Moving mass ⁷⁾	kg	2.6		
Guiding system		Recirculating linear rails and carriages units		
MATERIAL AND ENVIRONMENT CONDITIONS				
Housing material		Aluminum Alloy		
Housing coating (finish)		Black Anodizing		
Environment pressure		Normal Atmosphere		
Operating temperature	°C	20 ± 2		
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line		
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line		
Recommended power supply ⁹⁾		1 phase / 3 phase source		
Recommended communication interface ¹²⁾		EtherCAT/RS232/USB/TCP-IP		
Cable length	m	2 (cab be requested)		
Differential outputs ¹⁰⁾		On request		
ACCESSORIES INFORMATION				
Base plate for mechanical interface		Not required		
XY stack		Directly Stackable		
Z configuration		Not Available		
ADDITIONAL DETAILS				
Dimensions of moving platform (W × L)	mm	170 × 170		
Stage dimensions (W × L × H)	mm	453 × 220 × 70	553 × 220 × 70	653 × 220 × 70
Measurement system		Metric / Imperial		
Orthogonality ¹¹⁾	µrad/arcsec	24 / 5		
Protection level ¹³⁾		From solid particles and spray		
RoHS		Compliant		
Weight	kg	11.5	13.5	15.5



- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μ rad. Environment error: 1 μ rad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with required orthogonality by request.
- 12) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Stage have special covers which allows to use stage in dusty and partially wet environment.

8MTL1401-300

Direct Drive Linear Translation Stage



8MTL1401-300



8MTL1401-300 XY

FEATURES

- > Ultra precise motion
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > High accuracy linear guide and carriage system
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Integrated Cable management for ergonomics
- > XY configuration has ≤ 5 arcsec orthogonality
- > All measurement reports are included by default
- > Best choice in market for optical delay line application

Motorized Translation Stages of 8MTL series are based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allows users to reach zero backlash motion with high accuracy, repeatability and low friction.

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTL instruments and excellent long period kinematics without drift of guide system. Small footprint of the stage allows to integrate it into very high density machines and tight space applications.

8MTL series translation stages can be prepared for clean room and vacuum (up to 10^{-3} Torr) applications by request. For higher vacuum please contact Standa support. Special requirements for cleanliness should be requested additionally (Please, indicate that in products request).

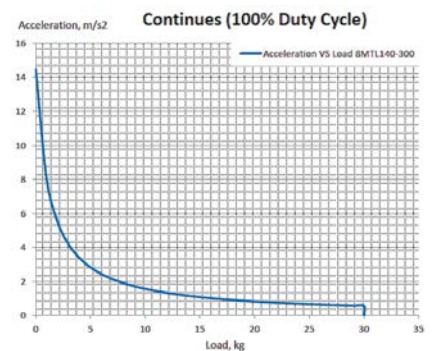
Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. Extreme orthogonality requirements could be additionally requested from Standa support.

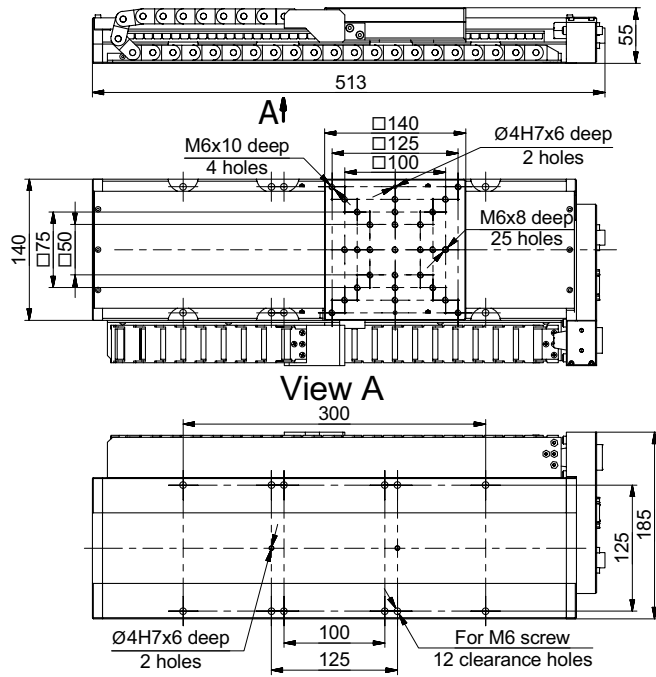
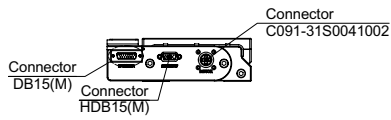
Motion control of 8MTL series translation stages is available with Standa or ACS motion Controllers & Drivers.

For light industry applications 8MTL stages can be supplied mounted on standard optical table or extremely flat granite plate.

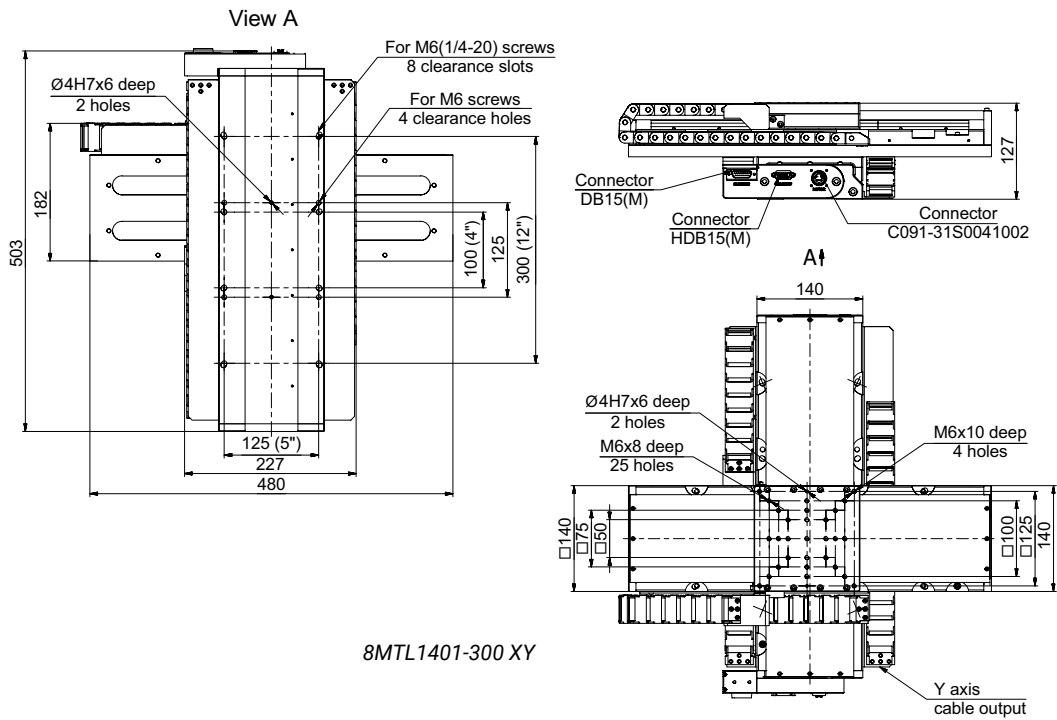
Model	8MTL1401-300
KINEMATICS & FEEDBACK INFORMATION	
Travel range	300 mm
Encoder type	Optical Encoder
Encoder model	LEn1
Encoder resolution	any of the range: 25 nm to 5 μ m (on demand)
Encoder interface	Differential RS422
Internal multiplier	Yes
Multiplication factor ¹⁾	4 – 200 (on demand)
Encoder grating period	20 μ m
Reference mark (index)	Yes
Absolute accuracy ²⁾	
Before calibration	$\pm 5.00 \mu$ m
After calibration	$\pm 1 \mu$ m
Bi-directional repeatability (peak to peak) ²⁾	$\pm 0.15 \mu$ m or better
Bi-directional repeatability (RMS) ²⁾	$\pm 0.08 \mu$ m
Pitch ³⁾	$\pm 30 \mu$ rad / ± 6.20 arcsec
Yaw ³⁾	$\pm 30 \mu$ rad / ± 6.20 arcsec
Maximum velocity (load 4 kg) ⁴⁾	<2000 mm/s
Maximum acceleration (load 4 kg) ⁵⁾	<20000 mm/s ²
Limits switches type (safety)	Optical (optrons)
Limit switch polarity (safety)	Pushed is closed
Limit switch voltage	5...24 V
LOAD, GUIDING & TRANSMISSION INFORMATION	
Design type	Linear motor stage
Linear motor model	LM3
Linear motor design type	Ironless BLDC motor
Maximum bus voltage	>300 VDC
Load capacity (centrally placed) ⁶⁾	30 kg
Moving mass ⁷⁾	1.2 kg
Guiding system	Recirculating linear rails and carriages units
MATERIAL AND ENVIRONMENT CONDITIONS	
Housing material	Aluminum alloy
Housing coating (finish)	Black anodizing
Environment pressure	Normal atmosphere
Operating temperature	20 \pm 2, $^{\circ}$ C
CONTROL, COMMUNICATION AND CABLING	
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended power supply ⁹⁾	2 phase / 3 phase source
Recommended communication interface ¹²⁾	EtherCAT / RS232 / USB / TCP-IP
Cable length	2 m (other by request)
Differential outputs ¹⁰⁾	Optionally available by request
ACCESSORIES INFORMATION	
Base plate for mechanical interface	Not required
XY stack	Directly
Z configuration	Not available (choose from other Standa stages series)
ADDITIONAL DETAILS	
Dimensions of moving platform (W \times L)	140 \times 140 mm
Stage dimensions (W \times L \times H)	185 \times 513 \times 55 mm
Measurement system	Metric / Imperial
Orthogonality ¹¹⁾	24 μ rad / 5 arcsec
Protection level ¹³⁾	Basic
RoHS	Compliant
Weight	6.75 kg

- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μ rad. Environment error: 1 μ rad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for support.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with better orthogonality by request.
- 12) Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Protection of guiding system is limited and not supposed to be used in wet and dusty environment.





8MTL1401-300



8MTL1401-300 XY

8MTL1301-170

Direct Drive Linear Translation Stage



8MTL1301-170



8MTL1301-170 XY

FEATURES

- Small footprint; low-profile
- Resolution up to 1 nm
- Direct drive zero backlash system
- High resolution non-contact optical incremental encoder
- High accuracy linear guide and carriage system
- Maximum velocity: 1200 mm/s
- High resolution non-contact optical incremental encoder
- Direct drive zero backlash system
- High accuracy linear guide and carriage system
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- All measurement reports are included by default

Motorized Translation Stages of 8MTL series are based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allows users to reach zero backlash motion with high accuracy, repeatability and low friction.

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guarantees high temperature stability, softness of 8MTL instruments and excellent long period kinematics without drift of guide system. Small footprint of the stage allows to integrate it into very high density machines and tight space applications.

8MTL series translation stages can be prepared for clean room and vacuum (up to 10^{-3} Torr) applications by request. For higher vacuum please contact Standa support. Special requirements for cleanliness should be requested additionally (Please, indicate that in products request).

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. Extreme orthogonality requirements could be additionally requested from Standa support.

Motion control of 8MTL series translation stages is available with Standa or ACS motion Controllers & Drivers.

For light industry applications 8MTL stages can be supplied mounted on standard optical table or extremely flat granite plate.

Model	8MTL1301-170
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KINEMATICS & FEEDBACK INFORMATION

Travel range	170 mm
Encoder type	Optical Encoder
Encoder model	LEn1
Encoder resolution	any of the range: 25 nm to 5 µm (on demand)
Encoder interface	Differential RS422
Internal multiplier	Yes
Multiplication factor ¹⁾	4 – 200 (on demand)
Encoder grating period	20 µm
Reference mark (index)	Yes
Absolute accuracy ²⁾	
Before calibration	±5 µm
After calibration	±1 µm
Bi-directional repeatability (peak to peak) ²⁾	±0.15 µm
Bi-directional repeatability (RMS) ²⁾	±0.10 µm
Pitch ³⁾	±55 µrad / ±11.34 arcsec
Yaw ³⁾	±55 µrad / ±11.34 arcsec
Maximum velocity (load 4 kg) ⁴⁾	<2000 mm/s
Maximum acceleration (load 4 kg) ⁵⁾	<20000 mm/s ²
Limits switches type (safety)	Optical (optrons)
Limit switch polarity (safety)	Pushed is closed
Limit switch voltage	5...24 V

LOAD, GUIDING & TRANSMISSION INFORMATION

Design type	Linear motor stage
Linear motor model	LM3
Linear motor design type	Ironless BLDC motor
Maximum bus voltage	>300 VDC
Load capacity (centrally placed) ⁶⁾	30 kg
Moving mass ⁷⁾	2.2 kg
Guiding system	Recirculating linear rails and carriages units

MATERIAL AND ENVIRONMENT CONDITIONS

Housing material	Aluminum alloy
Housing coating (finish)	Black anodizing
Environment pressure	Normal atmosphere
Operating temperature	20±2, °C
Control, communication and cabling	
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended drivers ⁸⁾	ACS Product Line or 8SMC5-USB series
Recommended power supply ⁹⁾	2 phase / 3 phase source
Recommended communication interface ¹²⁾	EtherCAT / RS232 / USB / TCP-IP
Cable length	2 m (other by request)
Differential outputs ¹⁰⁾	Optionally available by request

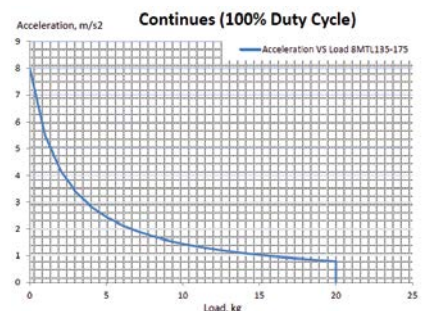
ACCESSORIES INFORMATION

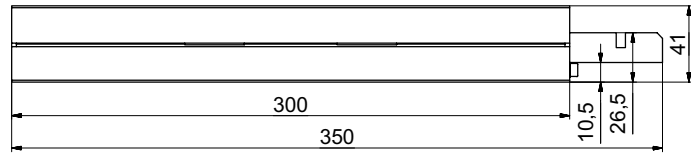
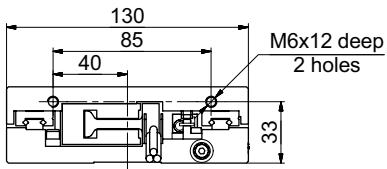
Base plate for mechanical interface	Not required
XY stack	Directly
Z configuration	Available (on request)

ADDITIONAL DETAILS

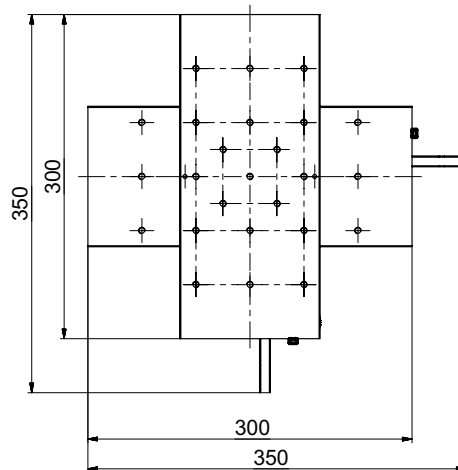
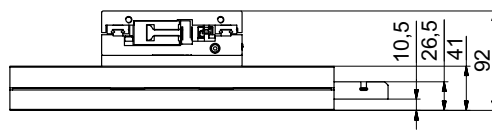
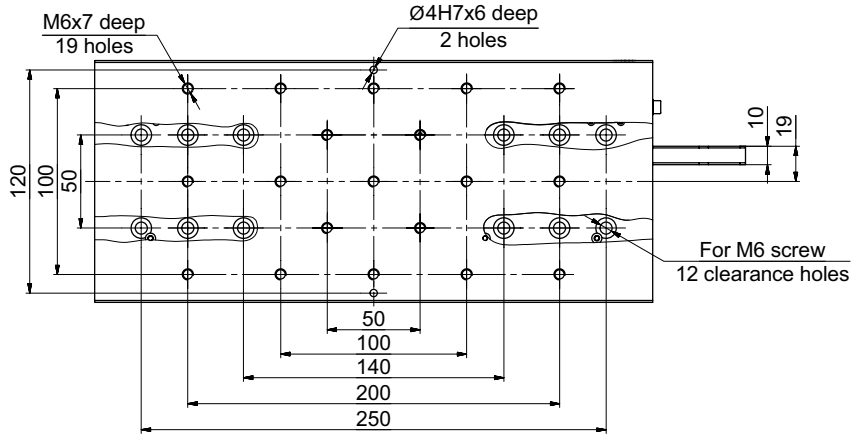
Dimensions of moving platform (W × L)	130 × 295 mm
Stage dimensions (W × L × H)	130 × 345 × 40 mm
Measurement system	Metric / Imperial
Orthogonality ¹¹⁾	24 µrad / 5 arcsec
Protection level ¹³⁾	Basic
RoHS	Compliant
Weight	4.1 kg

- 1) With x4 evaluation; system can be delivered with standard analog SIN/COS encoder interface for personal interpolation.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements are processed with Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed with 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 µrad. Environment error: 1 µrad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.
- 5) Maximum Acceleration is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for support.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa support for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa support for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa support for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with better orthogonality by request.
- 12) Scalar Control can be implemented with USB / TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Protection of guiding system is limited and not supposed to be used in wet and dusty environment.





8MTL1301-170



8MTL1301-170 XY

8MTHP200

Ball Screw Translation Stage

FEATURES

- > Travel range: 100, 200, 300 mm
- > Resolution: up to <0.31 nm
- > Precise Ball Screw Design with preloaded low backlash screw pair
- > High resolution non-contact optical linear encoder
- > Bidirectional repeatability (RMS): $\pm 0.25 \mu\text{m}$
- > Maximum velocity: <200 mm/s
- > High vertical load capacity up to: 50 kg.
- > High accuracy linear guide and carriage system with recirculating caged balls
- > Accuracy: $\pm 1.00 \mu\text{m}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multy axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > Systems is equiped with protection from dust and spray
- > Can be suplied with different type of gears, brakes
- > Perfect suitable for vertical focusing-like applications
- > All measurement reports are included by default!



8MTHP200-200

Ball Screw Based Linear Translation Stage of series 8MTHP200 are based on 3 phase rotary brushless servo motor technology. BLDC technology allow user to reach motion with high accuracy, repeatability and low wear.

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTHP200 instruments and excellent long period kinematics without drift of guide system. Industrial guiding system with recirculating caged balls ensures long last precision of stage.

Translation stages of series 8MTHP200 can be prepared for clean rooms and vacuum up to 10^{-3} torr with minor changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. For extreme orthogonality please contact Standa separately.

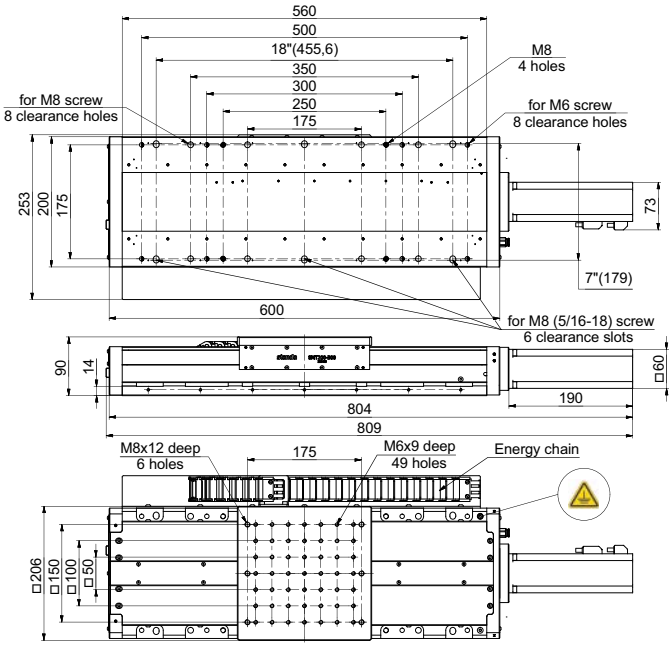
Motion control of 8MTHP200 series translation stages is available with Standa or ACS motion Controllers & Drivers in exposed or housed configurations.

For industry applications 8MTHP200 stages can be supplied mounted on standard optical table or extremely flat granite plate/bridge fully sealed from spray and dust to ensure performance of kinematic pairs. Stage perfectly suitable for lifting 50kg in vertical direction.

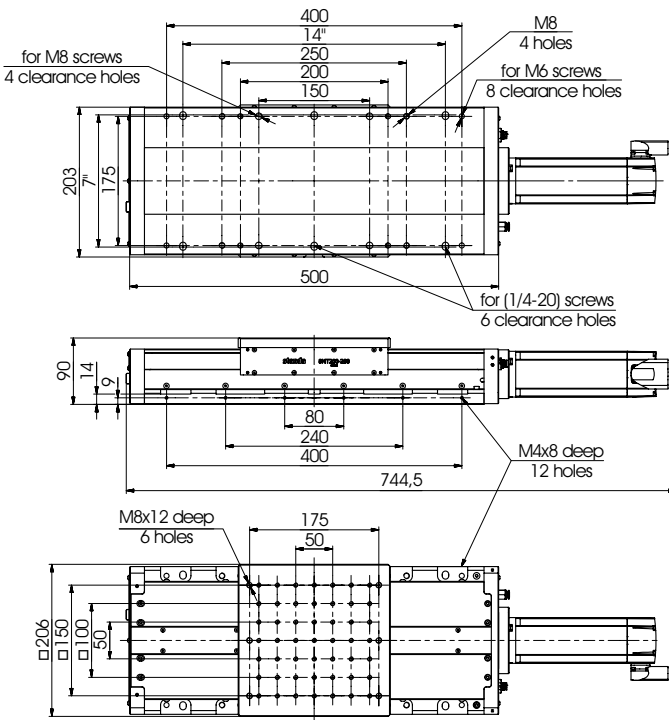
Model	Units	8MTHP200-100 -B60-LEN1	8MTHP200-200 -B60-LEN1	8MTHP200-300 -B60-LEN1
KINEMATICS & FEEDBACK INFORMATION				
Travel range	mm	100	200	300
Rotary encoder type			Optical	
Rotary encoder model			MEN5	
Rotary encoder encoder resolution	nm		250	
Rotary encoder interface			RS422	
Rotary encoder grating period	CPR/PPR		2500 / 10000	
Rotary encoder reference mark (index)			YES	
Linear encoder type			Optical	
Linear encoder model			LEN1	
Linear encoder encoder resolution	nm		<0.31	
Linear encoder interface			RS422 or 1Vpp	
Linear encoder internal multiplier			Available	
Linear encoder multiplication factor ¹⁾			up to ×65536	
Linear encoder grating period	μm		20	
Linear encoder reference mark (index)			YES	
Absolute accuracy (before calibration) ²⁾	μm	± 4	± 8	± 10
Absolute accuracy (after calibration)	μm		± 1	
Uni-directional repeatability	μm		TBD	
Bi-directional repeatability (peak to peak) ²⁾	μm		±0.5	
Bi-directional repeatability (RMS) ²⁾	μm		±0.35	
Pitch ³⁾	μrad/ arcsec	±15 / 3.1	±20 / 4.13	±25 / 5.16
Yaw ³⁾	μrad/ arcsec	±15 / 3.1	±20 / 4.13	±25 / 5.16
Roll	μrad/ arcsec	±15 / 3.1	±20 / 4.13	±25 / 5.16
Maximum velocity ⁴⁾	mm/s		200	
Maximum acceleration ⁵⁾	mm/s ²		1000	
Limits switches type (safety)			Optron	
Limit switch polarity (safety)			Negative end of run	
Limit switch voltage	VDC		24 VDC	
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type			Ball screw lifting stage	
Ball screw pitch	mm		2.5	
Rotary motor model			B60	
Rotary motor design type			3 phase BLDC motor	
Maximum bus voltage	V _{DC}		320	
Maximal continues current	A _n		3.1	
Maximal peak current	A _{PK}		9.3	
Number of poles (N to N)			3	
Load capacity (centrally placed) ⁶⁾	kg		100	
Load capacity (vertical) ⁶⁾			50	
Guiding system		Recirculating linear rails and carriages units with caged balls		
MATERIAL AND ENVIRONMENT CONDITIONS				
Housing material			Aluminum alloy	
Housing coating (finish)			Black anodizing	
Environment pressure			Normal atmosphere	
Operating temperature	°C		20±2	
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾			ACS Products Line or 8SMC5-USB series	
Recommended drivers ⁸⁾			ACS Products Line or 8SMC5-USB series	
Recommended power supply ⁹⁾			1 phase / 3 phase source	
Recommended communication interface ¹²⁾			EtherCAT / RS232 / USB / TCP-IP	
Cable length	m	2 (customized cable length could be requested (optionally))		
Differential outputs ¹⁰⁾			On request	
ACCESSORIES INFORMATION				
Base plate for mechanical interface			Not required	
XY stack			Directly	
Z configuration			YES	
Magnetic brake			YES	

Model	Units	8MTHP200-100 -B60-LEN1	8MTHP200-200 -B60-LEN1	8MTHP200-300 -B60-LEN1
Dimensions of moving platform (W × L)	mm	206×206		
Overall linear stage dimensions (W × L × H)	mm	644.5×206×90	744.5×206×90	844.5×206×90
Measurement system		Metric		
Orthogonality ¹¹⁾	μrad/ arcsec	TBD		
Protection level		Protection from dust and spray		
RoHS		YES		
Weight	kg	25	27	29

ADDITIONAL DETAILS



8MTHP200-300-B60-LEN1



8MTHP200-200-B60



8MTHP200-200

8MT165-200

Ball Screw Translation Stage

FEATURES

- > Travel range: 200, 300, 400 mm
- > Resolution: up to <math><0.31\text{ nm}</math>
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: $\pm 0.50\text{ }\mu\text{m}$ ($<\pm 0.25\text{ }\mu\text{m RMS}$)
- > Maximum velocity: 2000 mm/s
- > Maximum Acceleration: 20000 mm/s²
- > High accuracy linear guide and carriage system with recirculating balls
- > Accuracy: $<\pm 1.00\text{ }\mu\text{m}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multi axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > Systems is equipped with protection from dust and spray
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics



8MT165-200

Direct Drive Linear Translation Stage of series 8MTL165 is based on 3 phase ironless linear brushless servo motor technology. Direct drive technology allow user to reach zero backlash motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer tested as a system).

Linear non-contact optical encoder as a feedback system guarantees direct control of position with sub-nanometer resolution of motion.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8MTL165 instruments and excellent long period kinematics without drift of guide system. Moving rotor design allows taking maximum efficiency from the ironless motor and generating rapid and smooth motion profiles.

Translation stages of series 8MTL165 can be prepared for clean rooms and vacuum up to 10^{-3} torr with small changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Motorized translation stage can be easily connected to standard imperial/metric optical table directly. XY scanning stages can be directly assembled without using any connecting plates. For extreme orthogonality please contact Standa separately.

Motion control of 8MTL165 series translation stages is available with Standa or ACS motion Controllers & Drivers.

For light industry applications 8MTL165 stages can be supplied mounted on standard optical table or extremely flat granite plate. 8MTL165 have passive (belt protection) protection from spray and dusts, which allows stage to be applied in fabrication processes.

Model	Units	8MT165-100 -B43-LEN1	8MT165-200 -B43-LEN1	8MT165-300 -B43-LEN1
KINEMATICS & FEEDBACK INFORMATION				
Travel range	mm	100	200	300
Rotary encoder type		Optical		
Rotary encoder model		MEN4		
Rotary encoder number of gratings	CPR / PPR	5000 / 20000		
Rotary encoder interface		Differential RS422		
Rotary encoder internal multiplier		N/A		
Rotary encoder multiplication factor		N/A		
Rotary encoder reference mark (index)		YES		
Linear encoder type		Optical		
Linear encoder model		LEN1		
Linear encoder grating period	µm	20		
Linear encoder interface		Differential RS422 or 1Vpp		
Linear encoder internal multiplier		Available		
Linear encoder multiplication factor		internal multiplier up to ×200; by driver up to ×65456		
Linear encoder reference mark (index)		YES		
Absolute accuracy (before calibration) ²⁾	µm	±4	±8	±10
Absolute accuracy (after calibration)	µm	± 1	± 1.5	± 1.5
Uni-directional repeatability	µm	TBD		
Bi-directional repeatability(peak to peak) ²⁾	µm	±0.5		
Bi-directional repeatability(RMS) ²⁾	µm	±0.35		
Pitch ³⁾	µrad / arcsec	±15 / ±3.09	±20 / ±4.13	±30 / ±6.2
Yaw ³⁾	µrad / arcsec	±15 / ±3.09	±20 / ±4.13	±30 / ±6.2
Roll	µrad / arcsec	±15 / ±3.09	±20 / ±4.13	±30 / ±6.2
Maximum velocity (no load) ⁴⁾	mm/s	<150		
Maximum acceleration (no load) ⁵⁾	mm/s ²	<750		
Limits switches type (safety)	-	Optical (optrons)		
Limit switch polarity (safety)	-	Negative end of rum		
Limit switch voltage	V	24		
LOAD, GUIDING & TRANSMISSION INFORMATION				
Design type		Ball Screw driven Stage		
Motor model		B43		
Motor design type		Internal Rotor BLDC Motors (3 phase)		
Ball screw pitch	mm	3		
Maximum bus voltage	V _{DC}	48		
Maximal continues current	A _{PK}	3.66		
Maximal peak current	A _{PK}	11		
Maximal continues torque	Ncm	44		
Maximal peak torque	Ncm	132		
Number of poles (N to N)		3		
Load capacity (central) ⁶⁾	kg	20		
Load capacity (vertical) ⁶⁾	kg	20		
Moving mass ⁷⁾	kg	1.2		
Guiding system		Recirculating linear rails and carriages units		
MATERIAL AND ENVIRONMENT CONDITIONS				
Housing material		Aluminum alloy		
Housing coating (finish)		Black anodizing		
Environment pressure		Normal atmosphere		
Operating temperature	°C	20±2		
CONTROL, COMMUNICATION AND CABLING				
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line		
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line		
Recommended power supply ⁹⁾		1 phase / 3 phase source		
Built-in communication interface		EtherCAT / RS232 / USB / TCP-IP		
Cable length	m	2 (cab be requested on request)		
Differential outputs ¹⁰⁾		Available		

Model	Units	8MT165-100 -B43-LEN1	8MT165-200 -B43-LEN1	8MT165-300 -B43-LEN1
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ACCESSORIES INFORMATION

Base plate for mechanical interface		Granite is recommended		
XY stack		Directly Stackable		
Z configuration		YES		

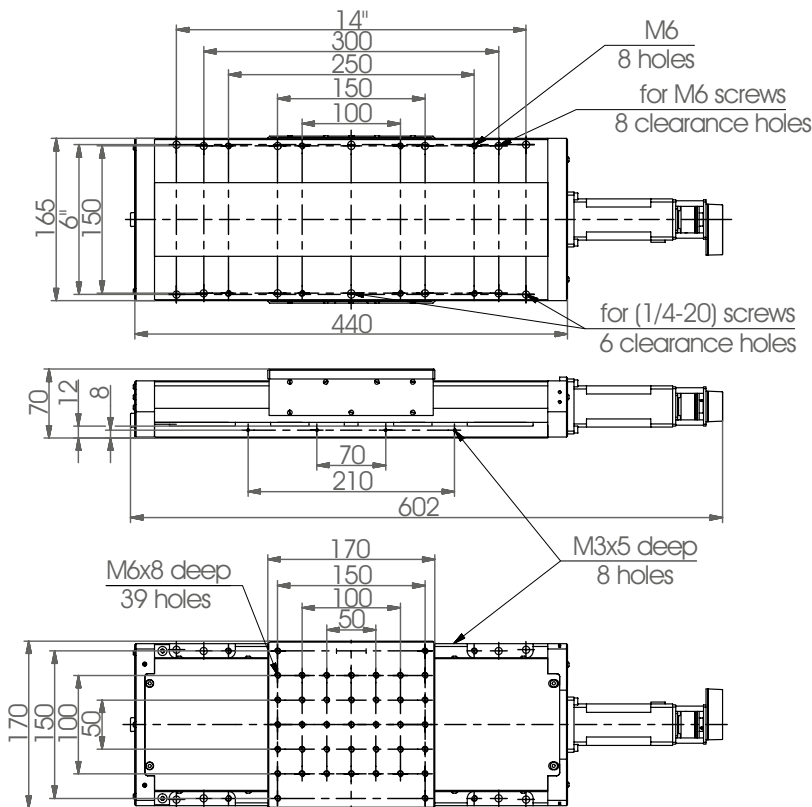
ADDITIONAL DETAILS

Dimensions of moving platform (W × L)	mm	140×140		
Stage dimensions (W × L × H)	mm	413×185×55	513×185×55	613×185×55
Measurement system		Metric / Imperial		
Orthogonality ¹¹⁾	μrad / arcsec	-		
Protection level ¹³⁾		From solid particles and spray		
Weight	kg	8	9	10

- 1) CPR – encoder periods or counts per revolution; with default x4 evaluation PPR – pulses per revolution.
- 2) Absolute Accuracy & Bi-Directional Repeatability measurements processed by Zygo ZMI 501 Michelson laser interferometer.
- 3) Pitch & Yaw measurements are processed by 11D-ALI-COL electronic autocollimator. Resolution of 11D-ALI-COL: 1 μrad. Environment error: 1 μrad.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency; maximum velocity is also limited by guiding system.

- 5) Maximum Acceleration is limited by Drivers` Peak Current, Motors` Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load and integrated guiding system. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m₀ or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.

- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Stages can be assembled with required orthogonality by request.
- 12) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.
- 13) Stage have special covers which allows to use stage in dusty and partially wet environment



8MT165-200



8MT165-200 in vertical position on angle bracket

8MRL184

Torque Motor Rotary Stage

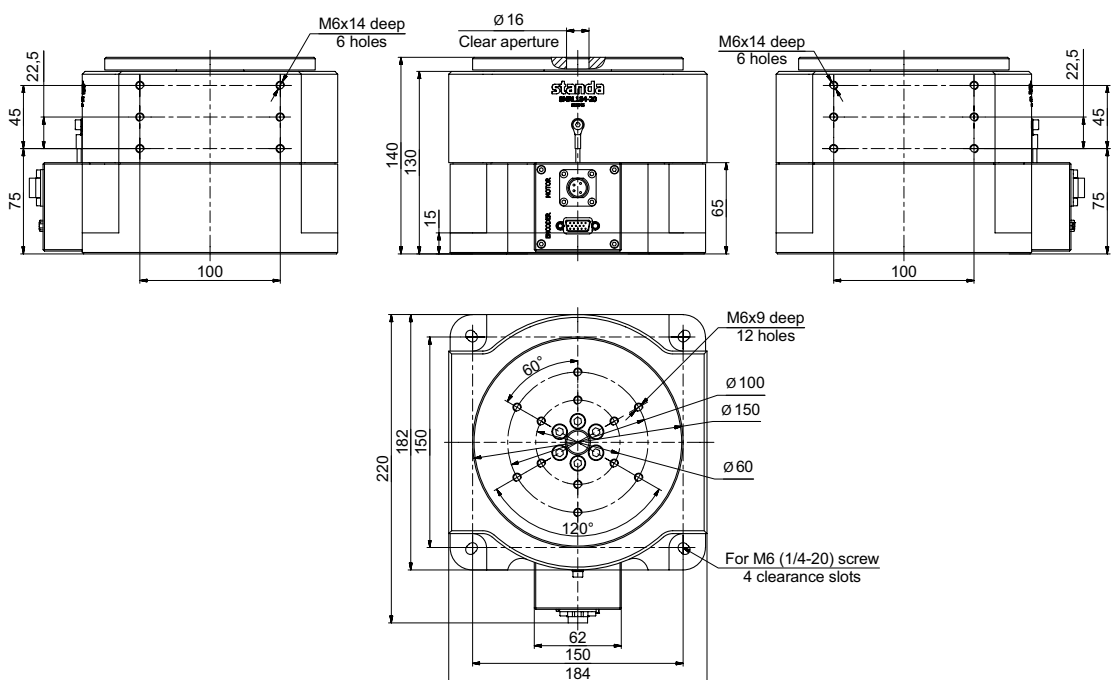
FEATURES

- Direct-Drive (Torque) Motor Rotation Stage
- Rotation velocity up to: 555 rpm
- Radial load up to 25 kg
- Non-contact optical encoder
- Resolution up to: 0.0024 arcsec
- High position accuracy: ± 1.50 arcsec
- Ultra-high bi-directional repeatability: 0.26 arcsec RMS
- Low eccentricity: ± 2.5 μm
- Available with ultrahigh precision cam Chuck up to $\text{d}150$ mm
- Available with ER25 collet holder
- Compact design



The 8MRL184 series rotary stage is based on 3 phase servo/BLDC torque frameless ultra thin motor. Direct drive design enables: backlash less motion control, low friction, ultrahigh bandwidth, smooth velocity, exceptional accuracy, and ultrahigh precision. Unique torque motor technology ensures low cogging, low total harmonic distortion and smooth motion with low position error. $\text{D}150$ mm CAM chuck holder is available, while precision collet holder ER25 can be fit as well.

Disc type optical encoder located directly on the moving part, allows reading angular position with down to 0.0000067055° angular resolution. Ultra-precise crossed roller bearing system ensures 0.26 arcsec RMS bi-directional repeatability, while calibrated absolute angular accuracy is ± 1.50 arcsec.



Model	Units	8MRL182-20
KINEMATICS & FEEDBACK INFORMATION		
Travel range	deg	±360
Encoder type		Optical
Encoder model		LEn5
Encoder resolution ¹⁾	deg	0.0000006705523
Encoder interface		1Vpp analog or RS422 digital
Internal multiplier		Optional
Multiplication factor		×4 to ×65536
Encoder grating period	µm	40
Reference mark (index)		YES
Absolute accuracy (before calibration) ²⁾	µrad / arcsec	±267 / ±55
Absolute accuracy (after calibration)	µrad / arcsec	±7.27 / ±1.5
Uni-directional repeatability	µrad / arcsec	TBD
Bi-directional repeatability (peak to peak) ²⁾	µrad / arcsec	±2.42 / ±0.5
Bi-directional repeatability(RMS) ²⁾	µrad / arcsec	1.26 / 0.26
Excentricity ³⁾	µm	±5
Wooble ³⁾	µrad / arcsec	±12.12 / ±2.5
Maximum velocity (no load @ 300 VDC) ⁴⁾	deg/s / RPM	3330 / 555
Maximum acceleration (no load) ⁵⁾	sdeg/s ²	250000
Limits switches type (safety)		N/A
Limit switch polarity (safety)		N/A
Limit switch voltage	V	N/A
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Torque motor stage (Direct drive)
Motor model		TM5
Motor design type		Torque motor
Maximum bus voltage	V _{DC}	320
Maximal continues current	A _{PK}	4.6
Maximal peak current	A _{PK}	7.3
Maximal continues torque	Nm	15.7
Maximal peak torque	Nm	21.7
Number of poles		36
Load capacity (central) ⁶⁾	kg	50
Load capacity (radial) ⁶⁾	kg	>25
Moving mass ⁷⁾	kg	0.6
Guiding system		2 × Crossed roller bearings; 2 × radial bearings
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended power supply ⁹⁾		1 phase / 3 phase source
Built-in communication interface		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (cab be requested)
Differential outputs ¹⁰⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Not required
OxOy stack		Angle bracket required
Z configuration		N/A
ADDITIONAL DETAILS		
Precision cam chuck		Available up to ø150 mm
Precision collet holder		Available ER25
Dimensions of moving platform (D)	mm	ø180
Stage dimensions (W × L × H)	mm	218 × 180 × 75
Measurement system		Metric / Imperial
Weight	kg	TBD

8MRL182

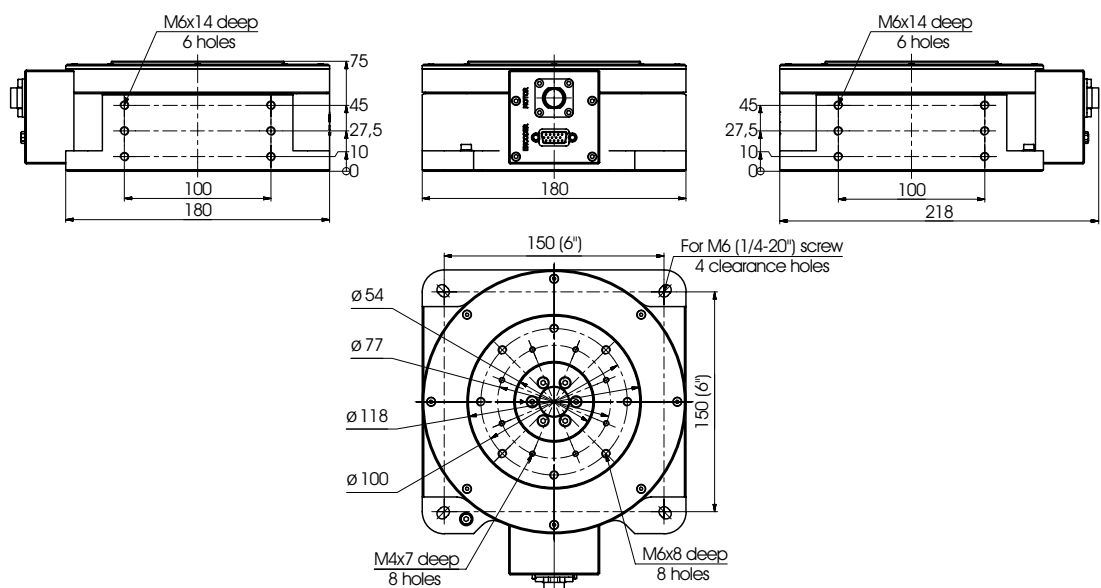
Torque Motor Rotary Stage

FEATURES

- > Direct-Drive (Torque) Motor Rotation Stage
- > Rotation velocity up to: 555 rpm
- > Non-contact optical encoder
- > Resolution up to: 0.0024 arcsec
- > High position accuracy: ± 1.50 arcsec
- > Ultra-high bi-directional repeatability: 0.26 arcsec RMS
- > Low excentricity: $\pm 2.5 \mu\text{m}$
- > Available with ER25 collet holder
- > Compact design



The 8MRL182 series rotary stage is based on 3 phase servo/BLDC torque frameless ultra thin motor. Direct drive design enables: backlash less motion control, low friction, ultrahigh bandwidth, smooth velocity, exceptional accuracy, and ultrahigh precision. Unique torque motor technology ensures low cogging, low total harmonic distortion and smooth motion with low position error. Disc type optical encoder located directly on the moving part, allows reading angular position with down to 0.00000067055° angular resolution. Ultra-precise crossed roller bearing system ensures 0.26 arcsec RMS bi-directional repeatability, while calibrated absolute angular accuracy is ± 1.50 arcsec. The rotary stage can be operated in raster scan mode by commanding small increment steps or continues rotation as a trajectory component.



Model	Units	8MRL182-20
KINEMATICS & FEEDBACK INFORMATION		
Travel range	deg	±360
Encoder type		Optical
Encoder model		LEn5
Encoder resolution ¹⁾	deg	0.0000006705523
Encoder interface		1Vpp analog or RS422 digital
Internal multiplier		Optional
Multiplication factor		×4 to ×65536
Encoder grating period	µm	40
Reference mark (index)		YES
Absolute accuracy (before calibration) ²⁾	µrad / arcsec	±267. / ±55
Absolute accuracy (after calibration)	µrad / arcsec	±7.27 / ±1.5
Uni-directional repeatability	µrad / arcsec	TBD
Bi-directional repeatability (peak to peak) ²⁾	µrad / arcsec	±2.42 / ±0.5
Bi-directional repeatability (RMS) ²⁾	µrad / arcsec	1.26 / 0.26
Excentricity ³⁾	µm	±5
Wooble ³⁾	µrad/arcsec	±12.12 / ±2.5
Maximum velocity (no load @ 300 VDC) ⁴⁾	deg/s / RPM	3330 / 555
Maximum acceleration (no load) ⁵⁾	sdeg/s ²	250000
Limits Switches Type (Safety)		N/A
Limit switch polarity (safety)		N/A
Limit switch voltage	V	N/A
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Torque motor stage (Direct drive)
Motor model		TM5
Motor design type		Torque motor
Maximum bus voltage	V _{DC}	320
Maximal continues current	A _{PK}	4.6
Maximal peak current	A _{PK}	7.3
Maximal continues torque	Nm	15.7
Maximal peak torque	Nm	21.7
Number of poles		36
Load capacity (central) ⁶⁾	kg	50
Load capacity (radial) ⁶⁾	kg	10
Moving mass ⁷⁾	kg	0.6
Guiding system		2× Crossed roller bearings
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended power supply ⁹⁾		1 phase / 3 phase source
Built-in communication interface		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (cab be requested)
Differential outputs ¹⁰⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Not required
OxOy stack		Angle bracket required
Z configuration		na
ADDITIONAL DETAILS		
Precision cam chuck		Available with 8MRL184 version
Precision collet holder		Available ER25
Dimensions of moving platform (D)	mm	ø180.00
Stage dimensions (W × L × H)	mm	218 × 180 × 75.00
Measurement system		Metric / Imperial
Weight	kg	TBD

8MRL122

Torque Motor Rotary Stage

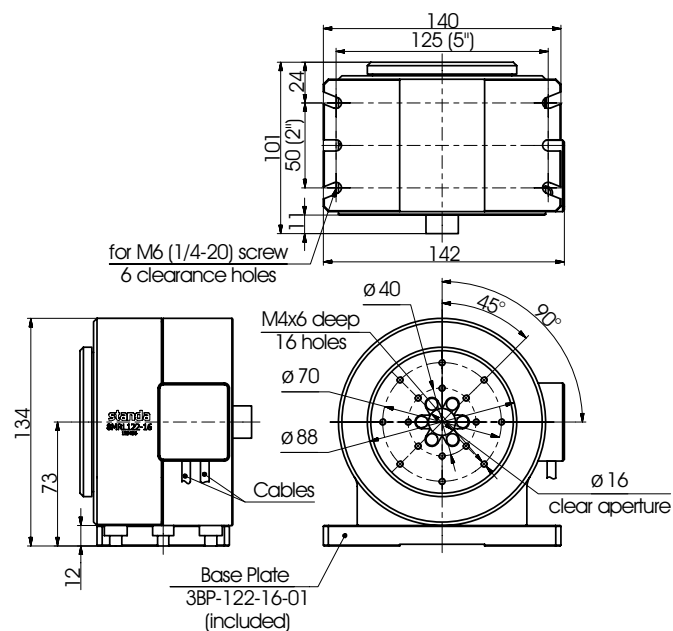
FEATURES

- > Travel range: ± 360 deg
- > Low Excentricity & Wooble
- > Resolution: up to 26.632 nrad
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: $\pm 7.3 \mu\text{rad}$ ($< \pm 2.9 \mu\text{rad}$ RMS)
- > Maximum velocity: 1500 rpm
- > Maximum Acceleration: 18 krpm/s
- > 2x High accuracy crossed roller bearings
- > Accuracy: $< \pm 15.00 \mu\text{rad}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multy axes system in 8-0165 gymbal implementation available
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics
- > Optimized for vertical orientation
- > Can be delivered with variable chcuk system (variable diameter sample holder)



Torque Motor Based Rotary Stage of series 8MRL122 are based on 3 phase rotary brushless servo motor technology. BLDC technology allow user to reach motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer).

Rotary non-contact optical encoder as a feedback system guarantees direct control of position with sub nanoradian resolution.



Model	Units	8MRL122-16
KINEMATICS & FEEDBACK INFORMATION		
Travel range	deg	±360
Encoder type		Optical
Encoder model		LEn4
Encoder resolution ¹⁾	deg	0.00000109863281
Encoder interface		Differential RS422 or 1Vpp
Internal multiplier		YES (optionally analog SIN/COS)
Multiplication factor		up to ×200 (if integrated interpolator) up to ×65536 (if interpolated by driver)
Encoder grating period	µm	40
Reference mark (index)	-	YES
Absolute accuracy (before calibration) ²⁾	µrad / arcsec	±218 / ±45
Absolute accuracy (after calibration)	µrad / arcsec	±14.54 / ±3
Bi-directional repeatability (peak to peak) ²⁾	µrad / arcsec	±7.3 / ±1.5
Bi-directional repeatability (RMS) ²⁾	µrad / arcsec	±2.9 / ±0.6
Excentricity ³⁾	µm	±5.
Wooble ³⁾	µrad / arcsec	±19.4 / ±4
Maximum velocity (no load @ 300 VDC) ⁴⁾	deg/s / RPM	11196 / 1868
Maximum acceleration (no load) ⁵⁾	sdeg/s ² / kRPM/s	1080000 / 180
Limits switches type (safety)		N/A
Limit switch polarity (safety)		N/A
Limit switch voltage	V	N/A
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Torque motor stage (Direct drive)
Motor model		TM1
Motor design type		Torque motor
Maximum bus voltage	V _{DC}	300
Maximal continues current	A _{PK}	5.1
Maximal peak current	A _{PK}	7.3
Maximal continues torque	Nm	5.4
Maximal peak torque	Nm	6.7
Number of poles		20
Load capacity (central) ⁶⁾	kg	20
Load capacity (radial) ⁶⁾	kg	5
Moving mass ⁷⁾	kg	0.2
Guiding system		2× Crossed roller bearings
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum alloy
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line
Recommended power supply ⁹⁾		2 phase / 3 phase source
Built-in communication interface		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (can be requested)
Differential outputs ¹⁰⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Not required
OxOy stack		Angle bracket required
Z configuration		na
Cam holder		available
Collet holder		available
ADDITIONAL DETAILS		
Dimensions of moving platform (D)	mm	ø90.00
Stage dimensions (W × L × H)	mm	151×122×62
Measurement system		Metric / Imperial
Orthogonality ¹¹⁾	µrad / arcsec	N/A
Weight	kg	TBD

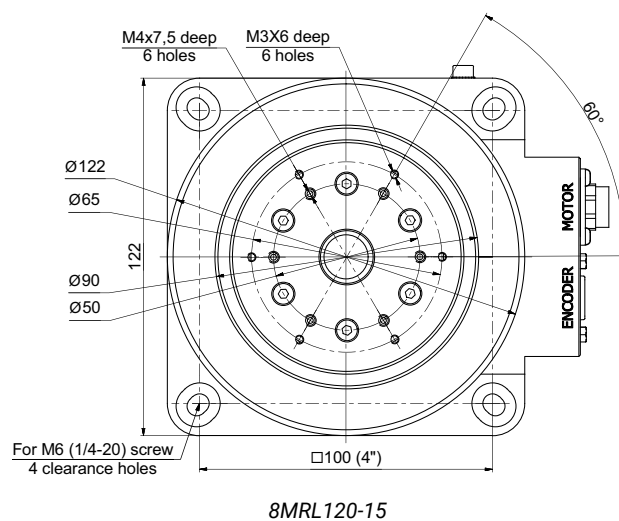
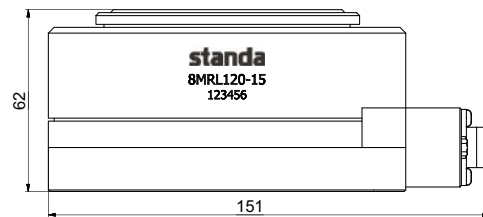
8MRL120-15

Torque Motor Rotary Stage



FEATURES

- > Travel range: ± 360 deg
- > Low Excentricity & Wooble
- > Resolution: up to 0.000000762939453125 deh
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability: $\pm 7.30 \mu\text{rad}$ ($< \pm 2.9 \mu\text{rad RMS}$)
- > Maximum velocity: 1500 rpm
- > Maximum Acceleration: 18 krpm/s
- > High accuracy crossed roller bearings
- > Accuracy: $< \pm 15 \mu\text{rad}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > ER20 collet holder available
- > Multy axes system in 8-0165 or 8-0143 gymbal implementation available
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics



Model	8MRL120-15-MEn
KINEMATICS & FEEDBACK INFORMATION	
Angular range	360 Deg
Encoder type	Optical
Encoder model	Len3
Encoder resolution ¹⁾	0.0000625 Deg
Encoder interface	Differential rs422
Internal multiplier	Yes (optionally analog sin/cos)
Multiplication factor	200
Encoder grating period	0.05 deg
Reference mark (index)	Yes
Absolute accuracy ²⁾	
Before calibration	±218 Mrad / ±45.00 Arcsec
After calibration	Request
Bi-directional repeatability (peak to peak) ²⁾	±7.30 Mrad / ±1.50 Arcsec
Bi-directional repeatability (RMSs) ²⁾	±2.90 Mrad / ±0.60 Arcsec
Eccentricity ³⁾	±5.00 Mm
Wooble ³⁾	±19.40 Mrad / ±4.00 Arcsec
Maximum velocity (no load, @ 300 VDC) ⁴⁾	<9000 Deg/s / 1500 rpm
Maximum acceleration (no load) ⁵⁾	1080000 Deg/s ² / 180 krpm/s ²
Maximum torque (continuous) ⁵⁾	5.4 Nm
Limits switches	N/a
LOAD, GUIDING & TRANSMISSION INFORMATION	
Design type	Torque motor (Direct-Drive) rotation stage
Linear motor model	TM 105.34N
Linear motor design type	Torque motor
Maximum bus voltage	>300 VDC
Load capacity (centrally placed) ⁶⁾	
Horizontal	40 kg
Vertical	20 kg
Moving mass ⁷⁾	request
Guiding system	Crossed roller bearings
MATERIAL & ENVIRONMENT CONDITIONS	
Housing material	Aluminum alloy
Housing coating (finish)	Black anodizing
Environment pressure	Normal atmosphere
Operating temperature	20±2 °C
CONTROL, COMMUNICATION AND CABLING	
Recommended controllers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended drivers ⁸⁾	ACS Products Line or 8SMC5-USB series
Recommended power supply ⁹⁾	2 phase / 3 phase source
Recommended communication interface ¹²⁾	EtherCAT / RS232 / USB / TCP-IP
Cable length	2 m (other by request)
Differential outputs ¹⁰⁾	On request
ACCESSORIES INFORMATION	
Base plate for mechanical interface	Not required
Ox, Oy stack	Through angle bracket
ADDITIONAL DETAILS	
Dimensions of moving platform	Ø 90 mm
Central aperture	Ø 15, mm
Overall linear stage dimensions (W × L × H)	151 × 122 × 62 mm
Measurement system	Metric / Imperial (Base)
RoHS	Compliant
Weight	2.6 kg

8MRL80

Torque Motor Rotary Stage

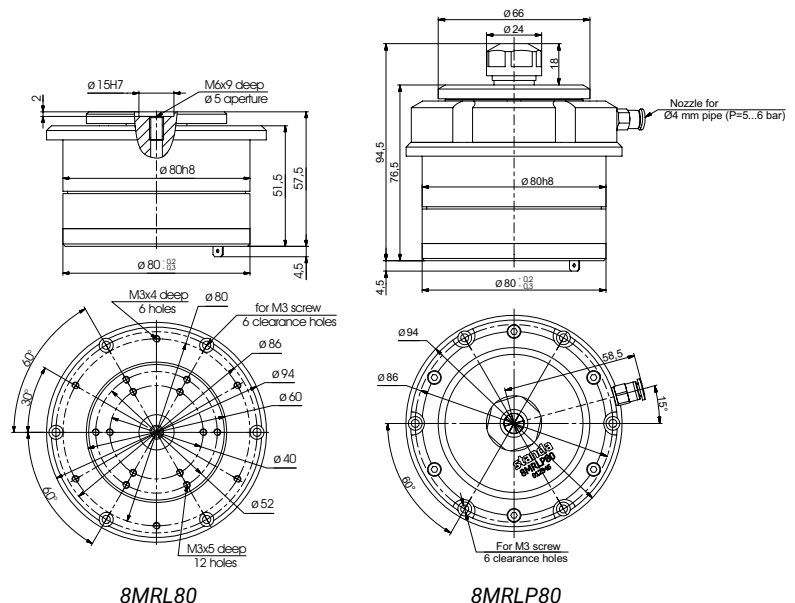
FEATURES

- > Dedicated pneumatic ER collet chuck (diameter of 0.2 to 7 mm) see 8MRLP80-5
- > Travel range: $\pm 360^\circ$ (infinite)
- > Resolution: up to 0.000000762939453125 deg
- > Direct drive zero backlash ultra high precision system
- > High resolution non-contact optical incremental encoder with index marker
- > Bidirectional repeatability: $< \pm 1.5$ arcsec (± 0.6 arcsec RMS)
- > Maximum velocity: > 4000 rpm
- > High precision crossed roller bearings guarantees $< \pm 5.00$ μm eccentricity & $< \pm 4.00$ arcsec wobble
- > Accuracy: $< \pm 3$ arcsec
- > Clear aperture: 5 mm
- > Long life performance guaranteed
- > Multi axes AB Stage (gimbal) is available in short delivery time
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking, turning, stent cutting, metrology, positioning
- > All measurement reports are included by default! System is tested as a system
- > Cables Can be customized for different OEM electronics for direct integration into a machine!



Direct drive torque motor technology allow user to reach highly dynamic motion featured with: high positioning accuracy, bi-directional repeatability, motion stability and low friction. Rotary stages 8MRL80 have clear aperture of 5 mm while 8MRLP80 have dedicated pneumatic collet holder dedicated for ER11 collets. Within variety of acceptable diameters (0.2 to 7 mm) 8MRLP80 is perfect for high precision laser turning applications, like: laser cutting, scribing, marking, stent cutting etc.

Rotary non-contact optical encoder as a feedback system guarantees direct control of position with nanoradian resolution. Naturally aged aluminum alloy guaranties high temperature stability, lightweight of 8MRL80 stage and excellent long period kinematics without drift of its performance. Compact crossed roller bearing provide perfect resistance to load in vertical direction. Rotary Stage of series 8MRL80 can be prepared for clean rooms and vacuum up to 10^{-3} torr with minor changes.



Model	Units	8MRL80
COLLET HOLDER		
Pneumatic collet holder		Yes
Acceptable collet size		ER11
Minimal internal diameter	mm	0.2
Minimal internal diameter	mm	7.0
Option name		P
KINEMATICS & FEEDBACK INFORMATION		
Travel range	deg	±360
Encoder type		Optical
Encoder model		LEN3
Encoder resolution (drive mult. ×4096) ¹⁾	arcsec	0.00000076294
Encoder interface		RS422 / 1Vpp
Encoder grating period	µm	20
Reference mark (index)		YES
Absolute accuracy (before calibration) ²⁾	µrad / arcsec	±218 / ±45
Absolute accuracy (after calibration)	µrad / arcsec	±14.54 / ±3
Bi-directional repeatability (peak to peak) ²⁾	µrad / arcsec	±7.3 / ±1.5
Bi-directional repeatability (RMS) ²⁾	µrad / arcsec	±2.9 / ±0.6
Excentricity ³⁾	µm	±5
Wobble ³⁾	µrad / arcsec	±19.4 / ±4
Maximum velocity (no load @ 300 VDC) ⁴⁾	deg/s / RPM	>4100
Maximum acceleration (no load) ⁵⁾	sdeg/s ² / kRPM/s	-
Limits switches type (safety)		-
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design type		Toruq motor (direct drive) rotary stage
Motor model		TM3
Motor design type		Torque motor (iron core)
Maximum bus voltage	V _{DC}	<600 VDC
Maximal continues current	A _{PK}	4.64
Maximal peak current	A _{PK}	7.56
Maximal continues torque	Nm	0.27
Maximal peak torque	Nm	0.39
Number of poles		8
Load capacity (central) ⁶⁾	kg	15
Load capacity (radial) ⁶⁾	kg	8
Guiding system		Crossed Roller Bearing
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	+5 ... +30
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		CMNT / CMHP
Recommended drivers ⁸⁾		CMNT / CMHP
Recommended power supply ⁹⁾		1 phase / 3 phase source
Built-in communication Interface		-
Cable length	m	0.2
Differential outputs ¹⁰⁾		-
ACCESSORIES INFORMATION		
Collet holder ¹⁾		YES. -P version ER11
Base plate for mechanical interface		Not required
OxOy stack		Angle bracket required
ADDITIONAL DETAILS		
Central aperture (D)	mm	5.00
Stage dimensions (D × H)	mm	94 × 62
Measurement system		
Weight	kg	1.4

8MRL180, 8MRL250

Torque Motor Rotary Stage



8MRL180



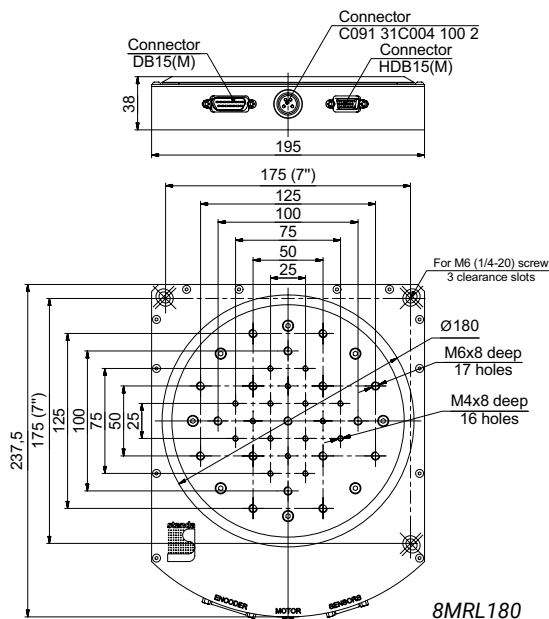
8MRL250

FEATURES

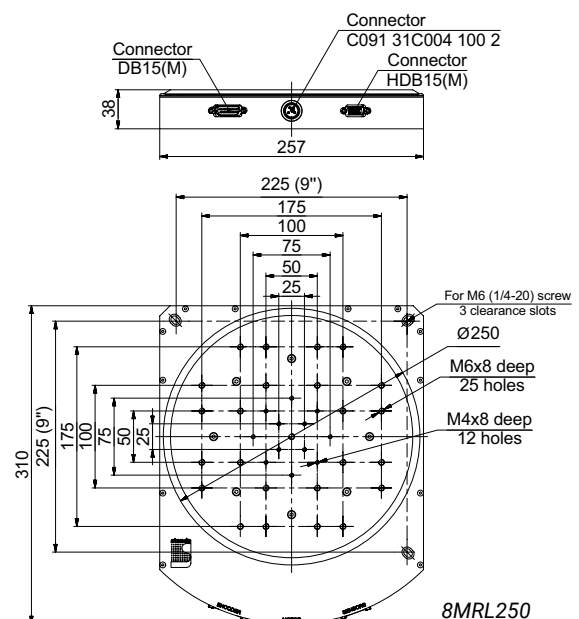
- > High angular velocity up to 6600 deg/s
- > High angular acceleration
- > High bi-directional repeatability up to <5 arcsec
- > Sophisticated control & drive systems
- > Analog encoder interface and wide range of RS422 interpolation factors
- > Perfectly fits with 8MTL series linear motor high resolution stages

Standa 8MRL series rotation stages are based on direct drive torque motors in order to avoid mechanical inaccuracies (e.g. backlash) and reach high dynamical response of rotation system. Ironless design of motor allows high acceleration and high velocity and it perfectly suits for a start-stop application which is especially important in: 3D printing, laser fabrication, wafer scanning or PCB etching applications.

High quality bearings and feedback system allows user to reach high positioning accuracy. Mechanical accuracy of stages is personally mapped using laser autocollimator in order to avoid constant inaccuracy. User is allowed to choose up to $\times 200$ interpolation using Standa external interpolation system or fit necessary servo controller with internal interpolation circuit for higher resolution of stage. 8MRL series stages are capable to operate with <4 arcsec bi-directional repeatability.



8MRL180



8MRL250

Model	8MRL180	8MRL250
MOTION CONTROL		
Travel range (coarse/fine)	360/360 deg	
Encoder type ¹⁾	1Vpp Analoge inductance	
Encoder resolution ²⁾	2 arcsec	1 arcsec
Bidirectional repeatability	5 arcsec	4 arcsec
Unidirectional repeatability	On request	
Accuracy (before calibration)	50 arcsec	40 arcsec
Axial runout	30 µm	30 µm
Radial runout	30 µm	20 µm
Backlash	0 arcsec	
Maximal speed	6600 deg/s	3300 deg/s
Limit switches / reference mark	Reference mark	
Switch polarity / reference mark interface	RS422	
LOAD AND TRANSMISION INFORMATION		
Horizontal load capacity	12 kg	20 kg
Vertical load capacity	12 kg	15 kg
Transmission type	direct drive	
Motor type	3-phase brushless motor	
Nominal torque	6.4 Nm	6.9 Nm
Peak torque	21.6 Nm	22.9 Nm
Bearing type	4 contact ball bearings	
CONTROL AND COMMUNICATION		
Recommended controllers	SPiiPlusEC	
Recommended driver	UDMlc series	
Recommended power supply	PS36-4.4-4	
Connector	on request	
Cable length	on request	
MATERIAL AND ENVIROMENT CONDITIONS		
Base material	Aluminum	
Finish	Black anodized	
Environment pressure	up to 10 ⁻³ Torr	
Ambient temperature	on request	
ACCESSORIES		
Base plate	3BP8MRL180	3BP8MRL250
Connecting plate	on request	
ADDITIONAL DETAILS		
Rotating platform diameter	180 mm	250 mm
Measurement system	metric	
Weight	5 kg	9 kg
Central aperture	on request	

¹⁾ Encoder can be equipped with external interpolation circuit which will result differential RS422 encoder interface.

²⁾ Resolution is indicated using analog encoder interface. While increasing the factor of external interpolation circuit the higher resolution can be adjusted for specific applications.

8-0143

Torque Motor Gimbal Stage



FEATURES

- > Travel range:
±360 deg (infinite) of Yaw axis;
±130 deg of Tilt axis
- > Low Excentricity & Wooble
- > Resolution: up to 13.316 nrad
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Bidirectional repeatability:
±7.30 μ rad (< ±2.9 μ rad RMS)
- > Maximum velocity: 1500rpm
- > Maximum Acceleration:
180 krpm/s
- > High accuracy crossed roller bearings
- > Accuracy: < ±15.00 μ rad
- > Integrated magnetic brake for safe operation
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Can be supplied with customized counterweight
- > Can be applied to light industry applications like: laser cutting, scribing, drilling
- > All measurement reports are included by default!
- > Cables Can be customized for different OEM electronics

Torque Motor Based Gimbal Stage of series 8-0143 are based on 3 phase rotary brushless servo motor technology. BLDC technology allow user to reach motion with high accuracy, repeatability, motion stability and low friction. In order to proof precision of stage and imitate working condition, Standa provides measurement reports in both: disassembled and assembled conditions (if required with load of customer).

Rotary non-contact optical encoder as a feedback system guarantees direct control of position with sub nanoradian resolution.

Naturally aged aluminum alloy guaranties high temperature stability, softness of 8-0143 instruments and excellent long period kinematics without drift of bearing. Compact crossed roller bearing provides perfect resistance to load in any direction.

Gimbal Stage of series 8-0143 can be prepared for clean rooms and vacuum up to 10^{-3} torr with small changes. For higher vacuum please contact Standa. Additional requirement of cleanliness could be requested separately.

Gimbal Stage can be easily connected to standard imperial/metric optical table directly. Stages also can be combined with the linear axes to supply entire 4 axes fabrication setup. 8-0143 can be equipped with pneumatic COLLET HOLDER 8MRLP120 for fabrication application. 15 mm clear aperture is available in default configuration.

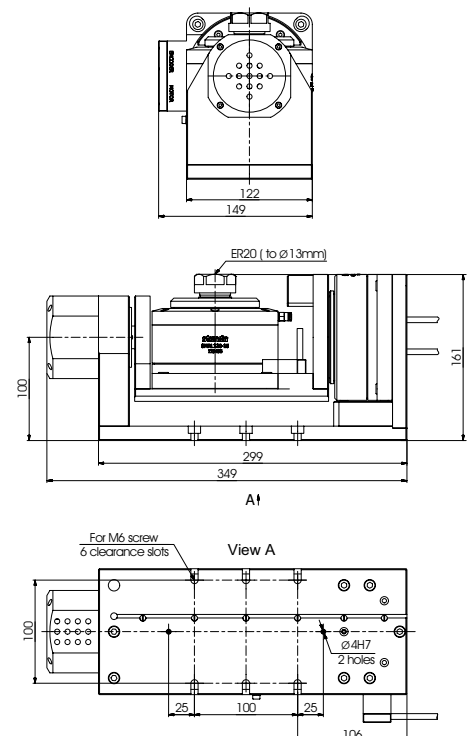
Motion control of 8-0143 series translation stages is available with Standa or ACS motion Controllers & Drivers in exposed or housed configurations.

For industry applications 8-0143 stages can be supplied mounted on standard optical table, horizontal XY stage or extremely flat granite plate. 8-0143 stages have no active or passive protection from dust, therefore external dust protection must be applied in dusty environment.

SPECIFICATIONS

Model	8-0143	
	Tilt (A) Axis	Yaw (B) Axis
KINEMATICS & FEEDBACK INFORMATION		
Travel range	±130 deg	±360 deg (infinite)
Encoder type	Optical	
Encoder model	LEn2	
Encoder resolution ¹⁾	0.023 to 0.184 arcsec	
Encoder interface	Differential RS422 or analog Sin/Cos	
Internal multiplier	Yes (optionally analog SIN/COS)	
Multiplication factor	x4 – 200	
Encoder grating period	20 µm	
Reference mark (index)	Yes	
Absolute accuracy (before calibration) ²⁾	±218 µrad / ±45 arcsec	
Absolute accuracy (after calibration)	±14.54 µrad / ±3 arcsec	
Bi-directional repeatability (peak to peak) ²⁾	±7.3 µrad / ±1.5 arcsec	
Bi-directional repeatability (RMS) ²⁾	±2.9 µrad / ±0.6 arcsec	
Eccentricity ³⁾	±5 µm	
Wooble ³⁾	±19.4 µrad / ±4 arcsec	
Maximum velocity (no load @ 300 VDC) ⁴⁾	< 9000 deg/s / 1500 RPM	
Maximum acceleration (no load) ⁵⁾	1080000 sDeg/s ² / 180 kRPM/s	
LOAD, GUIDING & TRANSMISSION INFORMATION		
Design Type	Torque Motor Gymbal Stage	
Motor Model	TM1	
Motor Design Type	Torque Motor	
Maximum Bus Voltage	<320 V _{DC}	
Maximal Continues Current	5.1 A _{PK}	
Maximal Peak Current	7.3 A _{PK}	
Maximal Peak Current with Heatsink	13.3 A _{PK}	
Maximal Continues Torque	5.4 Nm	
Maximal Peak Torque	6.7 Nm	
Maximal Peak Torque with Heatsink	10.6 Nm	
Number of Poles	20	
Load Capacity (central) ⁶⁾	1 kg	
Load Capacity (radial) ⁶⁾	1 kg	
Moving Mass ⁷⁾	6.6 kg	1.55 kg
Guiding System	Crossed roller bearings	
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing Material	Aluminum Alloy	
Housing Coating (Finish)	Black Anodizing	
Environment pressure	Normal Atmosphere	
Operating Temperature	20±2 °C	
Control, Communication and Cabling		
Recommended controllers ⁸⁾	8SMC5-USB or ACS Product Line	
Recommended drivers ⁹⁾	8SMC5-USB or ACS Product Line	
Recommended power supply ⁹⁾	2 phase / 3 phase source	
Recommended Communication Interface ¹¹⁾	EtherCAT / RS232 / USB / TCP-IP	
Cable Length	2 m (cab be requested)	
Differential Outputs ¹⁰⁾	On Request	
ACCESSORIES INFORMATION		
Base plate for mechanical interface	Gymbal type	
ADDITIONAL DETAILS		
Magnetic Brake	Yes	No
Dimensions of Moving Platform (D)	Ø90 mm	
Central Aperture (D)	NA	Ø15 mm
Stage Dimensions (W × L × H)	349 × 149 × 161 mm	
Measurement System	Metric / Imperial	
ROHS	Compliant	
Weight	12.3 kg	

- System can be delivered with standard analog SIN/COS encoder interface for personal interpolation or with integrated external interpolator (up to x200).
- Absolute accuracy & Bi-Directional Repeatability, Wobble measurements processed by 11DALI-COL electronic autocollimator. Stages can be assembled with additional precision. Please contact Standa for more information.
- Eccentricity is measured by Zygo Michelson interferometer.
- Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency (125kHz in analog interface; 50MHZ in RS422 digital interface); maximum velocity is also limited by bearing.
- Maximum Torque is limited by Drivers` Peak Current, Motors` Peak Current and External Load (inertia). Please contact Standa for explanation.
- Load Capacity is limited by position of load. Please contact Standa for loading calculation.
- Moving Mass is constant parameter of system which characterize m₀ or inertia of unloaded system.
- Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.

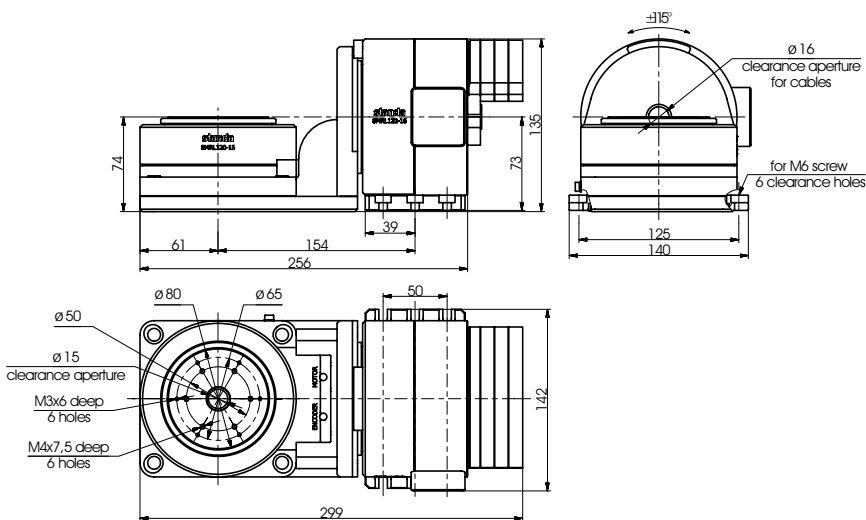


8-0165

Torque Motor Gimbal Stage

FEATURES

- > Accuracy $\lt; \pm 15.00 \mu\text{rad}$
- > Resolution: up to 13.316 μrad
- > Maximum velocity: 1500 rpm
- > Direct drive zero backlash system
- > High resolution non-contact optical incremental encoder
- > Optional magnetic brake for safe operation
- > Long life performance guaranteed
- > All measurement reports are included by default!
- > Pneumatic ER20 COLLET HOLDER
- > Cables can be customized for different OEM electronics
- > Adjustable Counter Balance for different weights
- > Continuous rotation



- 1) System can be delivered with standard analog SIN/COS encoder interface for personal interpolation or with integrated external interpolator (up to x200).
- 2) Absolute accuracy & Bi-Directional Repeatability, Wobble measurements processed by 11D-ALI-COL electronic autocollimator. Stages can be assembled with additional precision Please contact Standa for more information.
- 3) Eccentricity is measured by Zygo Michelson interferometer.
- 4) Maximum Velocity is electrically limited by encoder and driver CUT-OFF frequency (125 kHz in analog interface; 50 MHz in RS422 digital interface); maximum velocity is also limited by bearing.
- 5) Maximum Torque is limited by Drivers' Peak Current, Motors' Peak Current and External Load (inertia). Please contact Standa for explanation.
- 6) Load Capacity is limited by position of load. Please contact Standa for loading calculation.
- 7) Moving Mass is constant parameter of system which characterize m_0 or inertia of unloaded system.
- 8) Recommended controllers & Recommended drivers can be optimized for a certain application. Please contact Standa for recommendation.
- 9) Recommended power supply depends on required duty cycle and load. Please contact Standa for recommendation.
- 10) Differential Outputs are available in passive (buffered) or active (modulated) way with LCMv2.
- 11) Scalar Control can be implemented with USB/ TCP-IP / RS-232 communication interface; for vector control we recommend to use EtherCAT.

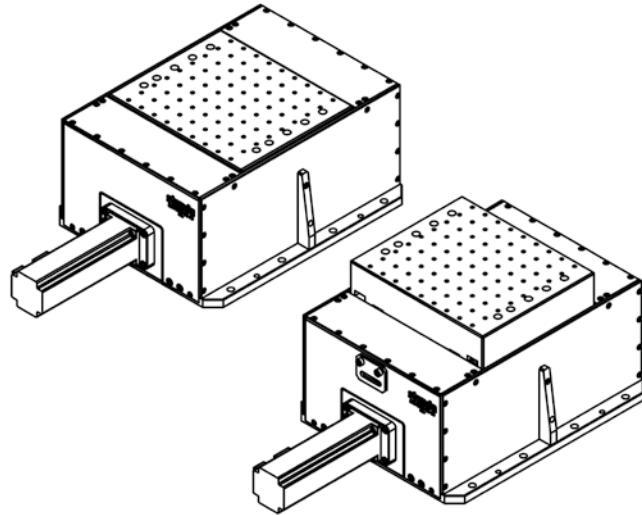
Model	Units	8-0165	
		Tilt (A) Axis	Yaw (B) Axis
KINEMATICS & FEEDBACK INFORMATION			
Travel range	deg	±110	±360 (infinite)
Encoder type		Optical	
Encoder model		LEn3	LEn2
Encoder resolution ¹⁾	arcsec	up to 0.003955078125	up to 0.00274658203125
Encoder interface		Differential RS422 or 1Vpp	
Internal multiplier		Yes (external or by driver)	
Multiplication factor		up to ×200 by external; up to ×65536	
Encoder grating period	CPR	5000	7200
Reference mark (index)		YES	
Absolute accuracy (before calibration) ²⁾	μrad / arcsec	±218 / ±45	
Absolute accuracy (after calibration)	μrad / arcsec	±14.54 / ±3	
Bi-directional repeatability (peak to peak) ²⁾	μrad / arcsec	±7.3 / ±1.5	
Bi-directional repeatability (RMS) ²⁾	μrad / arcsec	±2.9 / ±0.6	
Excentricity ³⁾	μm	±5	
Wooble ³⁾	μrad / arcsec	±19.4 / ±4	
Maximum velocity (no load @ 300 VDC) ⁴⁾	deg/s / RPM	< 9000 / 1500	
Maximum acceleration (no load) ⁵⁾	sdeg/s ² / kRPM/s	108000 / 18	
Limits switches type (safety)	-	NA	
LOAD, GUIDING & TRANSMISSION INFORMATION			
Design type		Torque motor gymbal stage	
Motor model		TM1	
Motor design type		Torque motor	
Maximum bus voltage	V _{DC}	<320	
Maximal continues current	A _{PK}	5.1	
Maximal peak current	A _{PK}	7.3	
Maximal continues torque	Nm	5.4	
Maximal peak torque	Nm	6.7	
Number of poles		20	
Load capacity (central) ⁶⁾	kg	1	
Load capacity (radial) ⁶⁾	kg	1	
Moving mass ⁷⁾	kg	3	
Guiding system		Double crossed roller bearings	Crossed roller bearings
MATERIAL AND ENVIRONMENT CONDITIONS			
Housing material	-	Aluminum alloy	
Housing coating (finish)	-	Black anodizing	
Environment pressure	-	Normal atmosphere	
Operating temperature	°C	20±2	
CONTROL, COMMUNICATION AND CABLING			
Recommended controllers ⁸⁾		8SMC5-USB or ACS Product Line	
Recommended drivers ⁸⁾		8SMC5-USB or ACS Product Line	
Recommended power supply ⁹⁾		1 phase / 3 phase source	
Recommended communication interface ¹¹⁾		EtherCAT / RS232 / USB / TCP-IP	
Cable length	m	2 (cab be requested)	
Differential outputs ¹⁰⁾		On request	
ACCESSORIES INFORMATION			
Base plate for mechanical interface		Gymbal type	
Pneumatic collet holder		Yes, available ER20	
ADDITIONAL DETAILS			
Counter weight options		Yes, available	
Magnetic brake		Yes, available	
Dimensions of moving platform (D)	mm	ø90	
Central aperture (D)	mm	ø15	
Stage dimensions (W × L × H)	mm	299×142×135	
Measurement system		Metric/Imperial	
ROHS		Complian	
Weight	kg	9.3	

8MVT390-50

Vertical Lift Stage

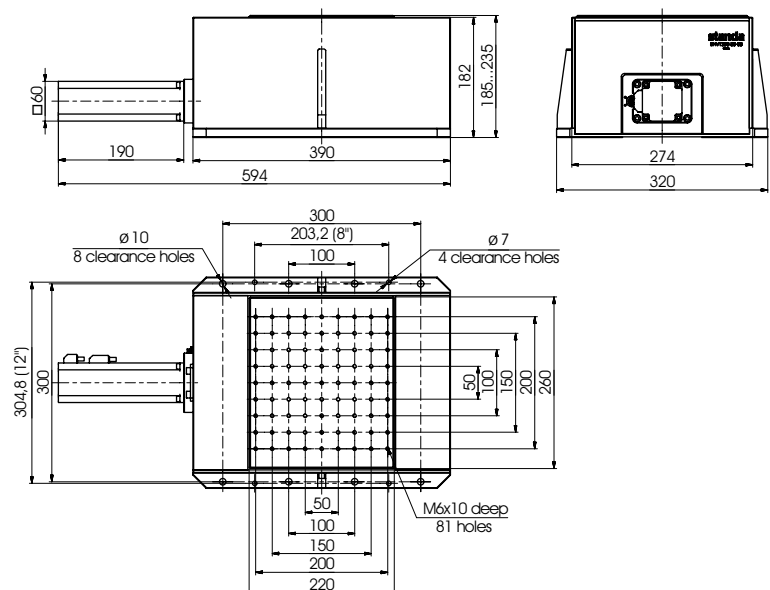
FEATURES

- > Travel range: 50 mm
- > Resolution: up to <math><0.31\text{ nm}</math>
- > Precise Ball Screw Design with preloaded low backlash screw pair
- > High resolution non-contact optical linear encoder
- > Bidirectional repeatability (RMS): $\pm 0.25\text{ }\mu\text{m}$
- > Maximum velocity: <math><200\text{ mm/s}</math>
- > High vertical load capacity up to: 100 kg.
- > High accuracy linear guide and carriage system with recirculating balls
- > Accuracy: $\pm 1.00\text{ }\mu\text{m}$
- > Long life performance guaranteed
- > Easy integration with metric/imperial opto-mechanical systems
- > Multy axes system with 5 arcsec orthogonality is available
- > Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- > All measurement reports are included by default!



Premium Vertical lift translation stage of series 8MVT390 is based on pair of stepper (optionally with rotary encoders) or 3 phase BLDC servo motor technology. High precision ball screw & step motor combination allow user to apply high precision, stable and self-locking fine positioning system through extremely cost effective way. High precision ball screw & BLDC motor combination allow user to apply high precision in trajectory mode. "Wedge-type" design guarantees long life reliable performance of the vertical stage.

Optionally available non-contact optical encoder as a feedback system integrated directly on the moving load, guarantees sub-nanometer resolution of positioning with ultra-high precision and reference mark in the center of the travel.



Model	Units	8MVT390-50-B60-LEN1
KINEMATICS & FEEDBACK INFORMATION		
Travel range	mm	50
Min. incremental motion	µm	0.05
Rotary encoder type		Optical
Rotary encoder model		MEN5
Rotary encoder resolution ¹⁾	CPR/PPR	2500/10000
Rotary encoder interface		RS422
Rotary internal multiplier		N/A
Rotary reference mark (index)		YES
Linear encoder model		LEN1
Linear encoder resolution	nm	<0.31
Linear encoder interface		RS422 or 1Vpp
Linear encoder external multiplier		Available
Linear encoder external multiplication factor		up to ×65536 by driver
Absolute accuracy (before calibration) ²⁾	µm	±25
Absolute accuracy (after calibration)	µm	±1
Uni-directional repeatability	µm	±0.35
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.5
Bi-directional repeatability (RMS) ²⁾	µm	±0.35
Pitch ³⁾	µrad / arcsec	±30 / 6.19
Yaw ³⁾	µrad / arcsec	±15 / 3.09
Roll	µrad / arcsec	±30 / 6.19
Maximum velocity (no load) ⁴⁾	mm/s	10
Maximum acceleration (no load) ⁵⁾	mm/s ²	100
Limits switches type (safety)		Hall sensor
Limit switch polarity (safety)		Positive end of run
Limit switch voltage	VDC	5 ... 24 V
LOAD, GUIDING & TRANSMISSION INFORMATION		
Stage dimensions		Ball screw lifting stage
Ball screw pitch	mm	2
Design type		Wedge type
Wedge ratio		1:2
Motor model		B60
Motor design type		3 phase BLDC motor
Maximum bus voltage	V _{DC}	320
Maximal continues current	A _{PK}	3.1
Maximal peak current	A _{PK}	9.3
Number of poles (N to N)		3
Load capacity	kg	100
Guiding system		Recirculating linear rails and carriages units
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		ACS Products Line or 8SMC5-USB series
Recommended drivers ⁹⁾		ACS Products Line or 8SMC5-USB series
Recommended power supply ⁹⁾		1 phase / 3 phase source
Built-in communication interface ¹²⁾		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (other by request)
Differential outputs ¹⁰⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Granite recommended
Z configuration		YES
ADDITIONAL DETAILS		
Handle for manual motion	-	Available
Dimensions of moving platform (W × L)	mm	220×260
Stage dimensions (W × L × H)	mm	594×320×185
Measurement system	-	Metric / Imperial
Orthogonality ¹¹⁾	µrad / arcsec	On request
Protection level ¹³⁾	-	limited
RoHS	-	Compliant
Weight	kg	TBD

8MVT400-20

Vertical Lift Stage

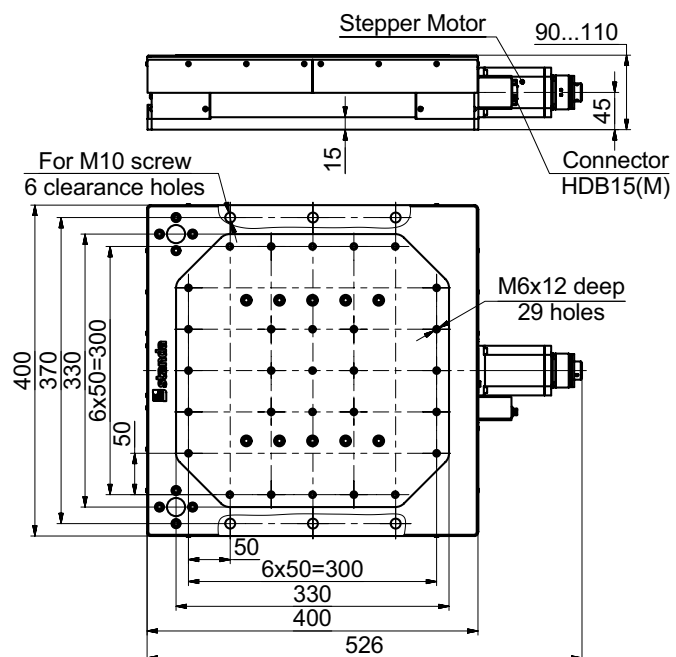
FEATURES

- Travel range: 20 mm
- Resolution: up to <math><0.31\text{ nm}</math>
- Precise Ball Screw Design with preloaded low backlash screw pair
- High resolution non-contact optical linear encoder
- Bidirectional repeatability (RMS): $\pm 0.25\text{ }\mu\text{m}$
- Maximum velocity: <math><200\text{ mm/s}</math>
- High vertical load capacity up to: 200 kg.
- High accuracy linear guide and carriage system with recirculating balls
- Accuracy: $\pm 1.00\text{ }\mu\text{m}$
- Long life performance guaranteed
- Easy integration with metric/imperial opto-mechanical systems
- Multi axes system with 5 arcsec orthogonality is available
- Can be applied to industry applications like: laser cutting, scribing, drilling, marking
- All measurement reports are included by default!



Premium Vertical lift translation stage of series 8MVT400 is based on pair of stepper (optionally with rotary encoders) or 3 phase BLDC servo motor technology. High precision ball screw & step motor combination allow user to apply high precision, stable and self-locking fine positioning system through extremely cost effective way. High precision ball screw & BLDC motor combination allow user to apply high precision in trajectory mode. "Wedge-type" design guarantees long life reliable performance of the vertical stage.

Optionally available non-contact optical encoder as a feedback system integrated directly on the moving load, guarantees sub-nanometer resolution of positioning with ultra-high precision and reference mark in the center of the travel.



Model	Units	8MVT400-20-B60-LEN1
KINEMATICS & FEEDBACK INFORMATION		
Travel range	mm	20
Min. incremental motion	µm	0.05
Rotary encoder type		Optical
Rotary encoder model		MEN5
Rotary encoder resolution ¹⁾	CPR/PPR	2500/10000
Rotary encoder interface		RS422
Rotary internal multiplier		N/A
Rotary reference mark (index)		YES
Linear encoder model		LEN1
Linear encoder resolution	nm	<0.31
Linear encoder interface		RS422 or 1Vpp
Linear encoder external multiplier		Available
Linear encoder external multiplication factor		up to x65536 by driver
Absolute accuracy (before calibration) ²⁾	µm	±5
Absolute accuracy (after calibration)	µm	±1
Uni-directional repeatability	µm	±0.35
Bi-directional repeatability (peak to peak) ²⁾	µm	±0.5
Bi-directional repeatability (RMS) ²⁾	µm	±0.35
Pitch ³⁾	µrad / arcsec	±30 / 6.19
Yaw ³⁾	µrad / arcsec	±15 / 3.09
Roll	µrad / arcsec	±30 / 6.19
Maximum velocity(no load) ⁴⁾	mm/s	4
Maximum acceleration(no load) ⁵⁾	mm/s ²	40
Limits switches type (safety)		Hall sensor
Limit switch polarity (safety)		Positive end of run
Limit switch voltage	VDC	5 ... 24 V
LOAD, GUIDING & TRANSMISSION INFORMATION		
Stage dimensions		Ball screw lifting stage
Ball screw pitch	mm	2
Design type		Wedge type
Wedge ratio		1:5
Motor model		B60
Motor design type		3 phase BLDC motor
Maximum bus voltage	V _{DC}	320
Maximal continues current	A _{PK}	3.1
Maximal peak current	A _{PK}	9.3
Number of poles (N to N)		3
Load capacity	kg	200
Guiding system		Recirculating linear rails and carriages units
MATERIAL AND ENVIRONMENT CONDITIONS		
Housing material		Aluminum
Housing coating (finish)		Black anodizing
Environment pressure		Normal atmosphere
Operating temperature	°C	20±2
CONTROL, COMMUNICATION AND CABLING		
Recommended controllers ⁸⁾		ACS Products Line or 8SMC5-USB series
Recommended drivers ⁹⁾		ACS Products Line or 8SMC5-USB series
Recommended power supply ⁹⁾		1 phase / 3 phase source
Built-in communication interface ¹²⁾		EtherCAT / RS232 / USB / TCP-IP
Cable length	m	2 (other by request)
Differential outputs ¹⁰⁾		On request
ACCESSORIES INFORMATION		
Base plate for mechanical interface		Granite recommended
Z configuration		YES
ADDITIONAL DETAILS		
Handle for manual motion		Available
Dimensions of moving platform (W × L)	mm	400 × 400
Stage dimensions (W × L × H)	mm	526 × 400 × 90
Measurement system		Metric / Imperial
Orthogonality ¹¹⁾	µrad / arcsec	On request
Protection level ¹³⁾		Limited
RoHS		Compliant
Weight	kg	45

8MVT-120

Vertical Lift Stage



8MVT120-12



8MVT120-25

FEATURES

- > True vertical elevation of the platform
- > Compact design
- > Long life time
- > Vacuum version available

Precision vertical positioner provides high-precision positioning and smooth travel for loads up to 10 kg. The wedge design, driven by precision rolled leadscrew, converts horizontal motion into vertical. Together with high quality linear bearing guide the system ensures rigid and smooth movement across all range of travel and long lifetime. Precision bearings provide platform stiffness and stability while the screw mechanism assures positioning accuracy. For protection of mechanics, optical limit switches are installed. Based on specifics of application other stepper motors or servos can be used. Stepper motor can be equipped with linear encoder and brake.



Vacuum version

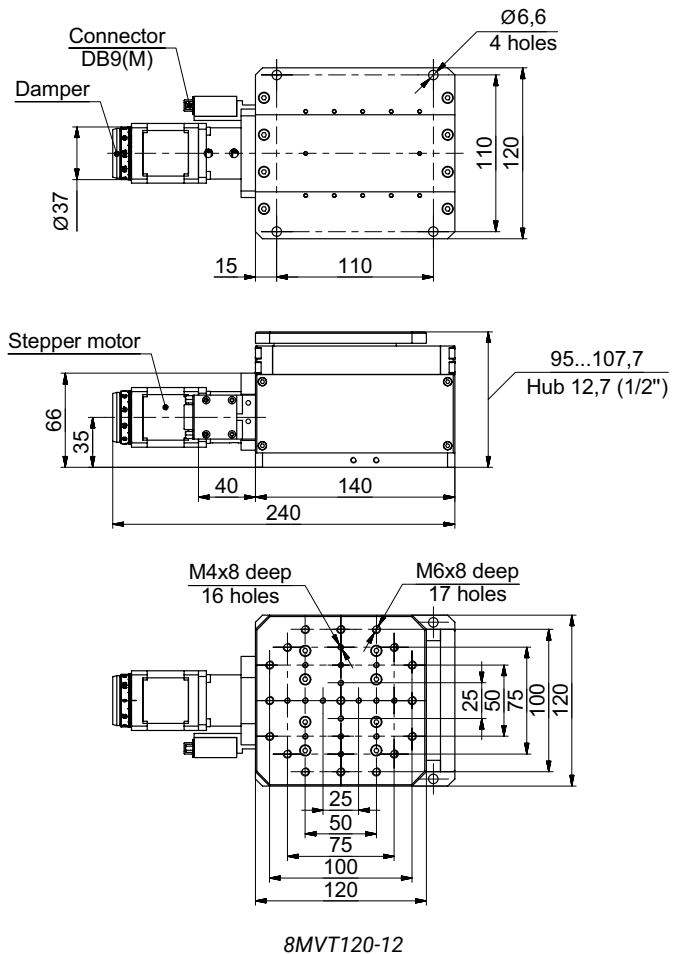
SPECIFICATIONS

Model	8MVT120-12-4247	8MVT120-25-4247	8MVT120-25-42C01 ¹⁾
Travel range	12.7 mm (0.5 inch)	25.4 mm (1 inch)	25.4 mm (1 inch)
Resolution in full step	2.5 µm	5 µm	-
Resolution in 1/256 step	0.018 µm ²⁾	0.019 µm ²⁾	-
Encoder pulses per revolution	by request		4000
Travel per 1 pulse	-		0.36 µm
Lead screw pitch	1 mm		1.44 mm ³⁾
Wedge reduction rate	2:1	1:1	
Unidirectional repeatability	1.5 µm		
Bidirectional repeatability	3 µm		
Accuracy	10 µm		
Lift parallelism (to the base)	35 µm (by request up to 15 µm)		
Maximum speed	10 mm/s	20 mm/s	25 mm/s
Maximum load capacity	10 kg (20 kg by request)	10 kg (15 kg by request)	10 kg
Stepper motor	4247		
Brushless DC motor	-		
Brake	by request		DB42-100
Optocoupler end limit switches	2		3
Switch polarity	Pushed is open		
Motor connector	DB9(M)		By request
Material	Aluminium		
Finish	Black anodize hard cover		
Weight	3.5 kg	4.05 kg	4.5 kg
Recommended Controller	8SMC5-USB		8SMC5-USB, SPiiPlusCMnt

¹⁾ 8MVT120-12-42C01 model constructed for operating in clean room, with cleanliness class up to 100. This model also equipped with vacuum sleeve for dust removal from inside the stage, which accumulates during stage operation.

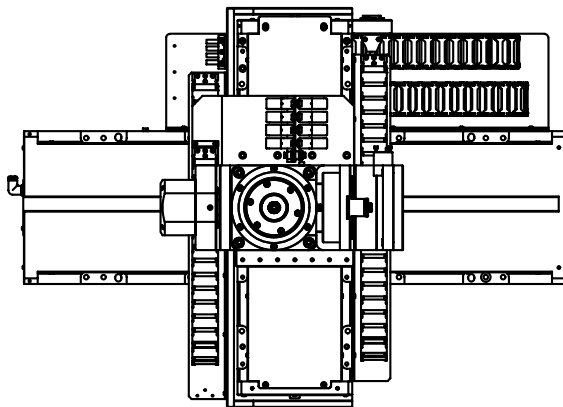
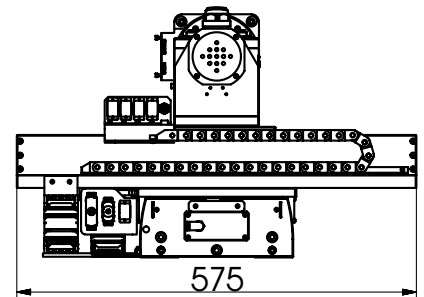
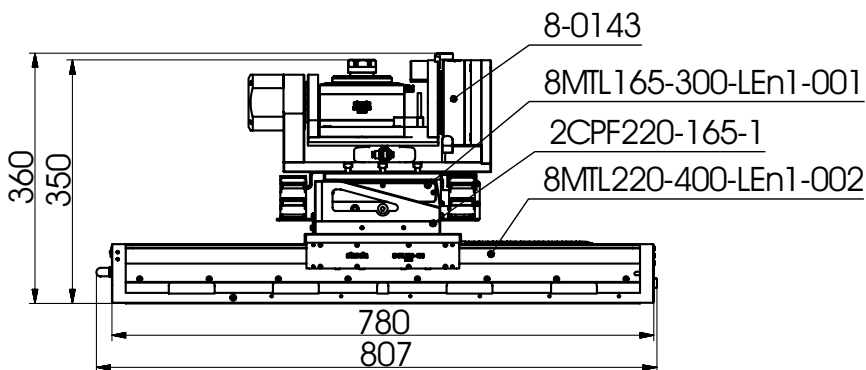
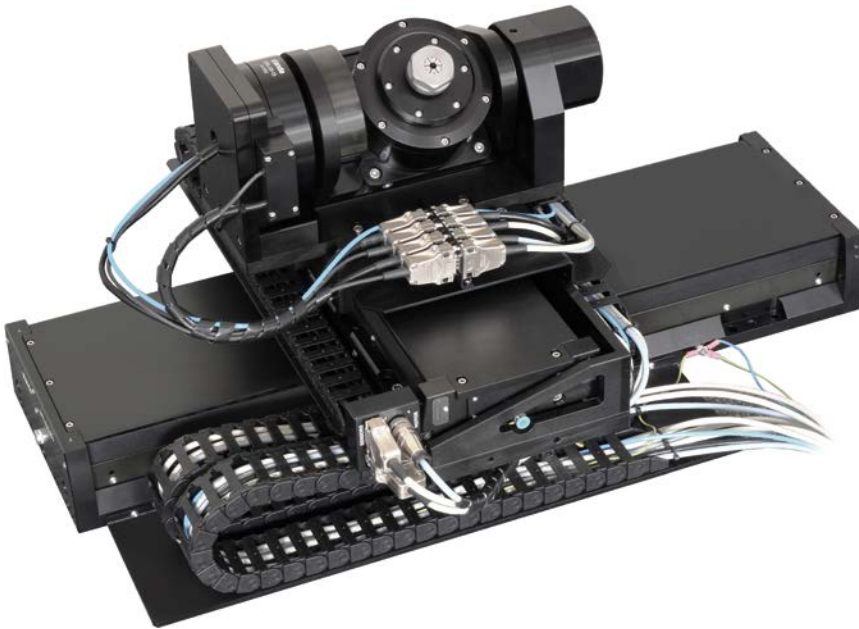
²⁾ With Standa 8SMC5-USB controller.

³⁾ Screw coated with BlackIce TFE coating and equipped with plastic anti-backlash self-lubricating nut, which provide up time equal to 7 million cycles.



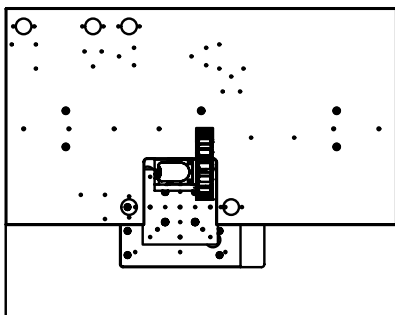
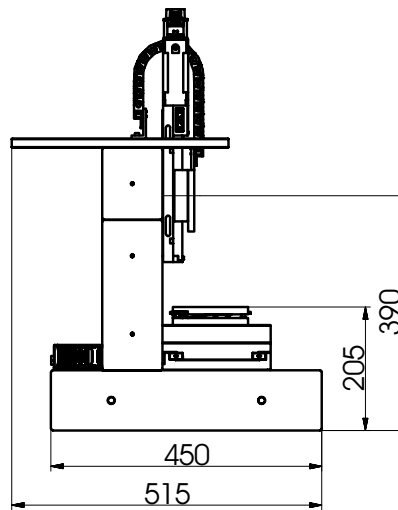
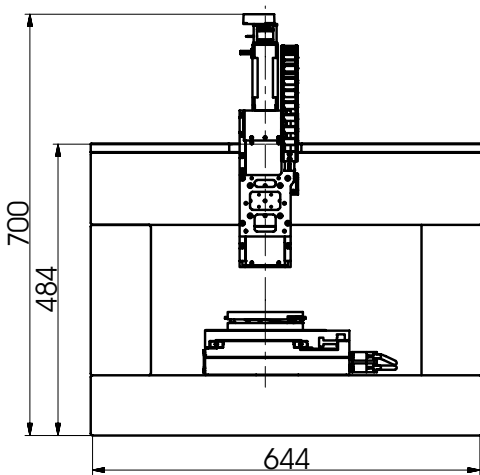
8-0146

4 Axis Motorized Assemblies



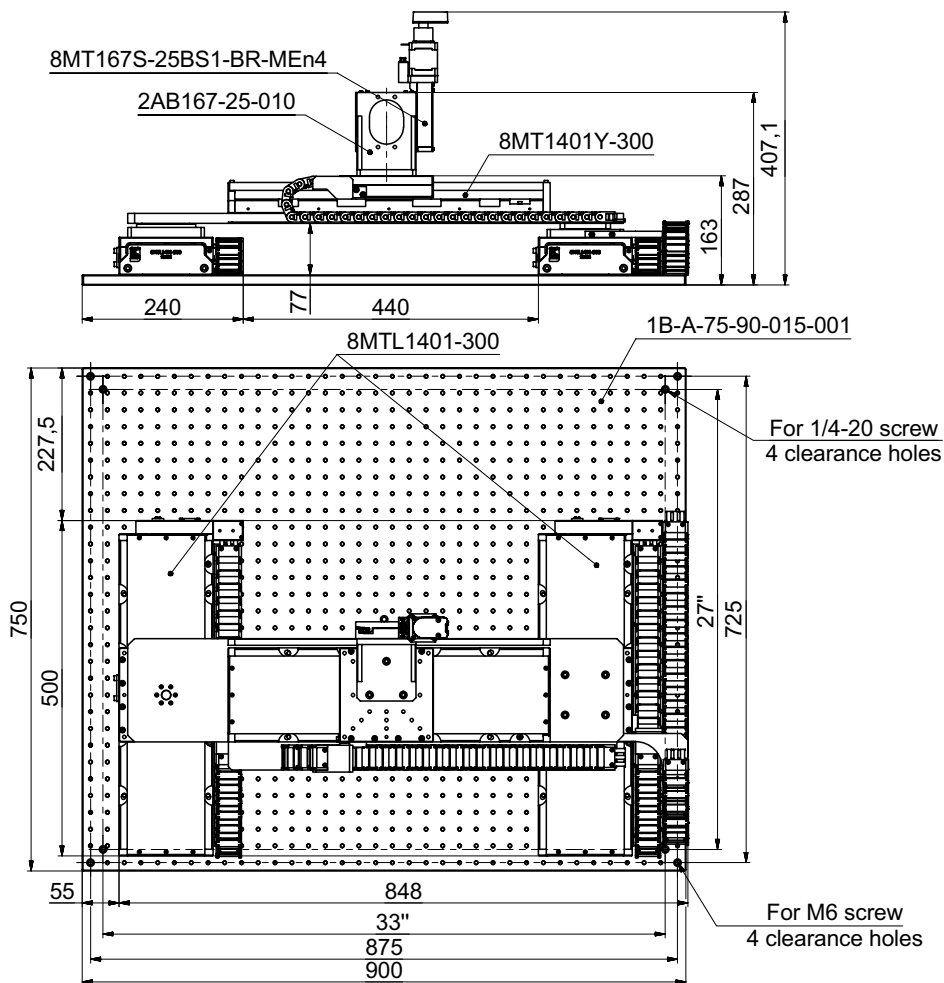
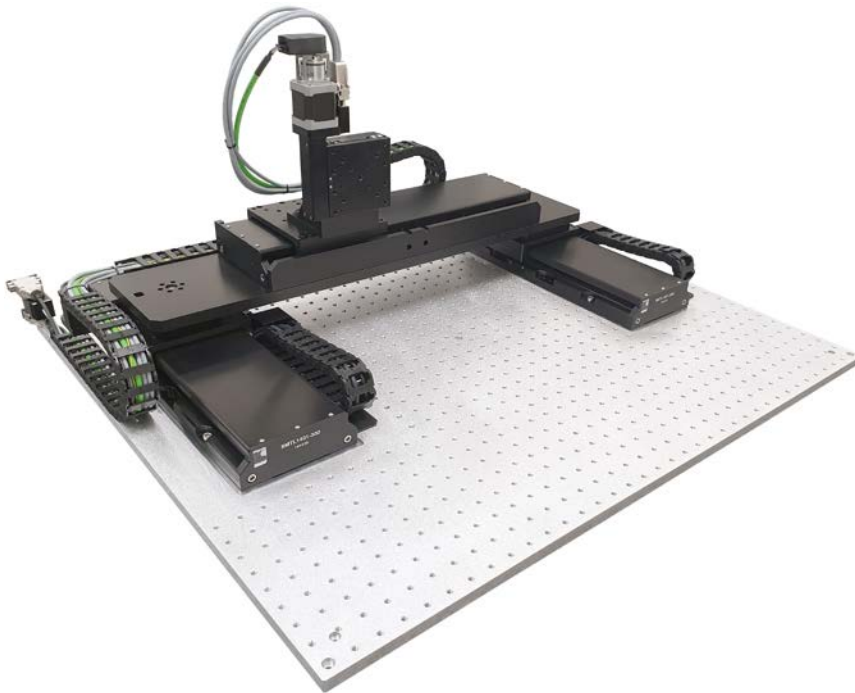
8-0238

Modular Granite Assemblies



8-0230

Gantry Assemblies



8-0xxx

Multi Axes Complex Product Sub-Assemblies



8MT165-200, 8MRL120,
8MTL120XY



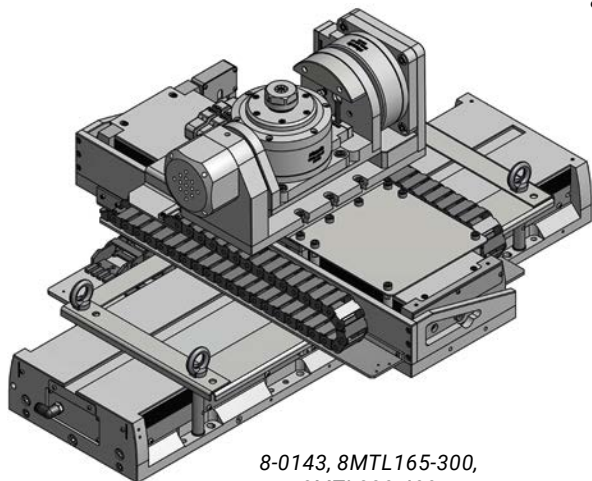
8MTL401-300-8MT165-200



8MTL220-600XY, 8MT165-200



8MTL120XY, 8MRL120-15



8-0143, 8MTL165-300,
8MTL220-400



8MTL120XY, 8MT200-100-B43,
8MRL120-15



YOUR CUSTOM
SOLUTION...

ACS SPiiPlusCM

EtherCAT® Master Control Module

With 1, 2, or 3 Integrated Universal Motor Drives

FEATURES

- Supports up to 64 axes and thousands of I/O
- Advanced Profile Generation and Servo Control Algorithms for
- Maximum Motion Performance
 - ServoBoost
 - LearningBoost
 - MotionBoost
 - Multi-axis Lookahead and Corner Rounding
 - SmoothPath
 - MIMO Gantry Control
 - Cascaded Dual Loop Control
 - Customized Algorithms (Contact ACS)
- Universal Motor and Encoder Support for Maximum Flexibility
- Max Drive Current: 15/30 A Per Axis
- Drive Supply Input: 85 – 265 Vac
- Built-In 4-Axis Pulse/Direction (PDMnt) Interface
- Functional Safety: STO, SS1
- 12 or 16 bit SinCos and Analog Input Resolution
- Feedback Channels: 4 (AqB, SinCos, or Absolute)
- Digital I/O
 - 4 High-Speed Position Capture (MARK) Inputs
 - 8 Limit Sensor Inputs
 - 3 Brake Outputs
 - 3 High-Speed Position Event Generation (PEG) Engines with up to 10 Configurable Outputs
 - 8 General Purpose Digital Inputs
 - 8 General Purpose Digital Outputs
- Analog I/O
 - 6 General Purpose Analog Inputs (shared with SinCos)
 - 2 General Purpose Analog Outputs



The SPiiPlusCM_xa is a member of ACS Motion Control's SPiiPlus series of products and is designed to meet the needs of OEMs with demanding multi-axis motion control applications. Its unique multi-processor architecture leverages powerful profile generation and servo control algorithms to maximize motion performance, while its universal motor and encoder technology provides the system designer flexibility to control most any type of motor or stage. As an EtherCAT master it can control ACS products within the SPiiPlus Motion Control Platform as well as 3rd party EtherCAT products.

The SPiiPlusCM_xa is highly configurable and supported by many advanced servo tuning and application development tools available in MMI Application Studio. Users can control and generate motion profiles for up to 64 axes. Configure the SPiiPlusCM_xa to include 1, 2, or 3 built in drives with one of three current levels: 5/10A, 10/20A, or 15/30A.

* The SPiiPlusCM_xa is a drop-in replacement for the SPiiPlusCM_ba or SPiiPlusCM_hp offering improved jitter and noise performance and STO and SS1 functional safety features.

COMMUNICATION CHANNELS

- > Serial: One RS-232. Up to 115,200 bps
- > Ethernet: One, TCP/IP, 10/100/1000 Mbs
- > Simultaneous communication through all channels is fully supported.
- > Modbus as client or server is supported over Ethernet and serial channels.
- > Ethernet/IP protocol as adapter is supported over Ethernet channel.

PROGRAMMING

- > ACSPL+ powerful motion language
- > Real-time program(s) execution
- > Up to 64 simultaneously running programs
- > NC programs (G-code)
- > C/C++, .NET and other high-level languages via host programming libraries

MOTION TYPES

- > Multi-axis point-to-point, jog, tracking and sequential multi-point motion
- > Multi-axis segmented motion with look-ahead
- > Arbitrary path with PVT cubic interpolation
- > Third order profiles (S-curve)
- > Smooth on-the-fly change of target position or velocity
- > Inverse/Forward kinematics and coordinate transformations (at application level)
- > Master-slave with position and velocity locking (electronic gear/cam)

MOTION PROCESSOR UNIT (MPU)

- > Processor Type: Multi-core Intel Atom CPU (model depends on controller configuration)
- > RAM: 1 GB
- > Flash: 2 GB

ETHERCAT PORTS

- > Two ports, Primary and Secondary
- > Protocols: CoE and FoE
- > NetworkBoost (optional) - Automatic network failure detection and recovery using ring topology and redundancy

MPU/ETHERCAT CYCLE RATE

- > The following options are available for MPU Cycle Rate:
 - For Maximum Number of Axes = 2, 4, or 8: 2 kHz (default), 4 kHz, 5 kHz
 - For Maximum Number of Axes = 16 or 32: 2 kHz (default), 4 kHz
 - For Maximum Number of Axes = 64: 1 kHz (default), 2 kHz
- > NetworkBoost and Segmented Motion (XSEG) features functionality can be limited as a function of MPU Cycle Rate and Number of Axes. Please refer to Software Documentation or contact ACS for more details.

- > MotionBoost, 2-axis SmoothPath, and 2-axis NURBS are included with 4 kHz or 5 kHz (MPU cycle). For MotionBoost BPTP profile generation at 20 kHz (SP cycle), ServoBoost must be ordered in addition to MotionBoost. Contact your ACS sales representative for a quote for 3+ axis SmoothPath or 3+ axis NURBS feature.

SUPPORTED ETHERCAT SLAVES

- > All ACS SPiiPlus Platform EtherCAT slave products are supported. 3rd party EtherCAT drives can be controlled via DS402 CoE protocol in Cyclic Synchronous Position (CSP) mode.
- > ACS recommends qualification of 3rd party EtherCAT drives and I/O devices. Refer to ACS website for latest list of qualified devices and contact an ACS representative to discuss qualification

SERVO

A standard comprehensive set of powerful algorithms to enhance accuracy, move & settle time, smooth velocity, stability and robustness.

- Servo Sampling and Update Rate: 20 kHz position, 20 kHz velocity, 20 kHz current
- Advanced PIV cascaded structure
- Loop shaping filters
- Gain Scheduling
- Gantry MIMO control
- Dual feedback / loop control
- Disturbance rejection control
- > ServoBoost algorithm

MOTOR TYPES

Two- and three-phase permanent magnet synchronous (DC brushless/AC servo), DC brush, Voice coil, Two- and three-phase stepper (micro-stepping open or closed loop, AC induction *.

* Consult Standa.

DRIVES

- > Type: digital current control with field oriented control and space vector modulation.
- > Current ripple frequency: 40 kHz
- > Current loop sampling rate: 20 kHz
- > Programmable Current loop bandwidth: up to 5 kHz
- > Commutation type: sinusoidal. Initiation with and without hall sensors
- > Switching method: advanced unipolar PWM
- > Protection: Over voltage, Phase-to-phase short circuit, Short to ground, Over current, Over temperature, motor over temperature
- > Feedback
- > Incremental Digital Encoder: Four, A&B,I; Clk/Dir,I; Electrical
- > Interface: RS-422. Max. rate: 50 million encoder counts/sec.,
- > Protection:
 - Encoder error
 - Not connected
- > Sin-Cos Analog Encoder (optional): Three.1Vptp, differential.

- > Max. Multiplication factor: x4096 (12 bit), x65536 (16 bit)
- > Maximum frequency: 500kHz
- > Automatic compensation of Offset, Phase and Amplitude
- > Protection:
 - Encoder error
 - Not connected.
- > Hall inputs: Three sets of three per axis. Single-ended, 5 V, source, opto-isolated. Input current: <7 mA.
- > Absolute encoders (optional): Three, EnDat 2.1(Digital)/2.2, Smart-ABS, Panasonic, Biss-A/B/C, SSI. 5 V feedback supply: Total current available for feedback devices: 1A

PULSE/DIRECTION (PDMNT) INTERFACE

- > Number of P/D Command Axes: 4
- > Type: RS-422. Up to 5 million pulse/sec.
- > Programmable pulse width
- > Range: 0.08 to 80 microseconds

DIGITAL I/O

- > Limit Inputs: Eight. Left + right limit per axis
- > E-stop Inputs: One, software-level input
- > Registration Mark inputs: Four. RS422
- > Motor Brake Outputs: Three. 24 V, 1 A, optoisolated. Powered by the 24 V Brake Supply.
- > General Purpose Outputs: Eight. Single-ended, 5 Vdc ($\pm 10\%$) or 24 Vdc ($\pm 20\%$), opto-isolated, sink/source, 100 mA
- > General Purpose Inputs: 8 Single-ended, 5Vdc ($\pm 10\%$) or 24Vdc ($\pm 20\%$), opto-isolated, sink/source
- > Position Event Generator outputs (PEG): 10, RS-422, max rate 10 MHz (incremental). Outputs are configurable for up to 3 PEG engines.

ANALOG I/O

- > Inputs: Six $\pm 10V$, differential, 20 kHz sampling rate. 2 inputs are consumed per connected SinCos encoder. If all 3 SinCos encoders are connected, no analog inputs are available.

- > Resolution: 12 bit, 16 bit optional
- > Outputs: Two, Single-end, $\pm 10 V \pm 5\%$, 10 bit resolution

FUNCTIONAL SAFETY I/O

- > Safe Torque Off (STO) Input
- > Electrical Interface: Dual-channel 24 V isolated
- > Safe Stop 1 (SS1) Feature
- > Deceleration time till STO activation: 110 – 230 ms. Exact deceleration time value is fixed (SS1-t functionality) and depends on product configuration (see user manual for more details)

POWER SUPPLIES

The module is fed by three power sources.

A motor AC supply, a 24 Vdc control supply and 24 Vdc motor brake supply.

During emergency conditions there is no need to remove the 24VDC control supply.

- > Drive Supply: 85 to 265 Vac, single or three phase, or 120 – 375 Vdc
- > Control Supply: 24 Vdc $\pm 10\%$, 4 A
- > Motor Brake Supply: 24 Vdc $\pm 20\%$, 3 A

PHYSICAL ENVIRONMENT

Operating: 0 to $+40^{\circ}C$. Storage : -25 to $+60^{\circ}C$ Humidity: 5% to 90% noncondensing

STANDARDS AND CERTIFICATIONS (PENDING)

- > CE Electrical Safety: IEC 61800-5-1
- > CE EMC: IEC 61326-3-1, IEC 61800-3, EN 61500-5-2
- > UL Electrical Safety: UL 61800-5-1
- > TUV STO & SS1 Functional Safety: IEC 61800-5-1, IEC 61800-5-2

ACCESSORY PRODUCTS

- > CMUDMxa-ACC1: Mating connector kit
- > STO-ACC1: STO Breakout Cable

Product (y - number of axes)	CMxayA...	CMxayB...	CMxayC...
Number of built-in drives	1,2,3		
Drive Supply voltage input [V]	85 - 265VAC, single or 3 phase or 120 - 375VDC		
Control voltage input [Vdc]	24 $\pm 10\%$		
Phase current Cont./Peak Sine amplitude [A]	5 / 10	10/20	15/30
Phase current Cont./Peak RMS [A]	3.6 / 7.1	7/14	10.6/21.2
Peak current time [sec]	1		
Max. output voltage [Vdc]	(Vac in) x1.41 x 97%		
Max. RMS input current 1-phase supply [A] 3-phase supply[A]	18A for 1-phase supply 15A for 3-phase supply	18	24
Min. load Inductance, at max. motor voltage [mH]	1		
Max. Heat dissipation per axis [W]	33	67	102
Weight [gram]	5750		
Dimensions [mm ³]	324x249x120		

ACS NPMpm

EtherCAT® Single/Dual Axis NanoPWM Drive Module

FEATURES

- > Powerful & Smart EtherCAT Drive Module
 - Two drives per module for Gantry control
 - Voltage: 12 Vdc – 100 Vdc
 - Current: Up to 13.3 A / 40 A (cont./peak)
- > The Ultimate Drive for Demanding Positioning Applications
 - Sub-nanometer standstill jitter
 - Nanometer tracking error and optimal velocity smoothness
- > A Lower Cost of Ownership Alternative to Linear Drives
 - Lower heat dissipation
 - Better reliability
 - Significantly smaller
 - Simpler supply requirements
 - Digitally controlled and easy setup
- > Uncompromised speed and resolution
 - Up to 4 Analog Sin-Cos 1Vpt encoders with frequency up to 10 MHz
 - Encoder multiplication of 4 to 65,536
 - Automatic encoder compensation and error detection
 - Dual feedback support
 - Two squared Sin-Cos
 - Position feed forward for active vibration isolation systems
 - Optional internal relays for dynamic braking (shorting motor phases)
- > Smart Motion related I/O
 - Digital I/O
 - Inputs: 4 encoder registration MARK / general purpose
 - Outputs: 2 Position Event Generators, 2 motor brake / general purpose
- > Analog I/O
 - Inputs: 4, 12 bit resolution, ±10 V
 - Outputs: 4, 16 bit resolution, ±10 V



The NPMPM is a line of the most advanced servo drives available today.

It is specifically designed to address the most demanding applications with regards to move and settle times, standstill jitter, and velocity smoothness, such as wafer metrology and inspection, FPD inspection, and ultra-precision machining for processing of optical components.

It is based on the proprietary and unique technology that exceeds stand still jitter and tracking error performance that until now has been achieved only with linear drives, with reduced cost of ownership.

With the optional combination of a 10MHz laser encoder interface and the powerful algorithm, demanding sub-nanometer resolution positioning systems can achieve ultimate throughput and accuracy with minimal sensitivity to disturbances and stage to stage manufacturing differences.

The NPMPM is a slave that runs under any ACS EtherCAT masters. A comprehensive set of software support tools are provided for module configuration, setup and tuning.

DRIVES

- > Type: digital current control with field oriented control and space vector modulation.
- > Current ripple frequency: 40 kHz.
- > Current loop sampling rate: 20 kHz.
- > Programmable Current loop bandwidth: up to 4 kHz, will vary with tuning & load parameters.
- > Commutation type: sinusoidal. Initialization with or without hall sensors.
- > Switching method: advanced unipolar PWM.
- > Built-in motor phases shortening relays.
- > Protection: Over & under voltage, Over current, Over temperature, Phase to phase and phase to ground short (short circuit on one of the motor phases might damage the drive).

SUPPLIES

- > The module is fed by two power sources. A motor supply and a 24 Vdc control supply.
- > During emergency conditions there is no need to remove the 24 Vdc control supply.

MOTOR DRIVE SUPPLY

- > Range: 12 Vdc – 100 Vdc, recommended: 12 Vdc – 96 Vdc.
- > Current rating should be calculated based on actual load.
- > If regen resistor is required, it should be added in parallel to motor supply with 102 V shunt activation.

CONTROL SUPPLY

- > Range: 24 Vdc \pm 10%
- > Maximum input current / power: 0.9 A @ 21.6 V / 20 W Without motor brakes.
- > With 2 motor brakes: 1.9 A @ 21.6 Vdc / 42 W
- > Built-in motor phases shortening relays.
- > Protection: reverse polarity. A 4 A external fuse must be used.

MOTOR TYPE

- > Two- and three-phase permanent magnet synchronous (DC brushless/AC servo), DC brush, Voice coil, Two- and three-phase stepper (micro-stepping open or closed loop).

FEEDBACK

- > Types: Incremental digital encoders (AqB), Hall inputs, analog Sin-Cos (optional), absolute encoders (optional).
- > Incremental Digital Encoder: Two per axis. A&B,I and Clk/Dir
- > Type: Differential RS-422
- > Max. rate: 50 million quad counts/sec.
- > Protection: Encoder error, not connected

- > Sin-Cos Analog Encoder: Up to two per axis.
- > Type: 1Vptp, differential.
- > Programmable multiplication factor: x4 to x65,536.
- > Maximum frequency: 500 kHz or 10 MHz.
- > Maximum acceleration with Sin-Cos encoder: 108 sine periods/second².
- > Squared Sin-Cos output: Two, differential RS422.
- > Absolute encoders (optional): Up to two. Smart-Abs, Panasonic, BiSS-A/B/C, SSI, Sanyo Denki.
- > Hall inputs: A set of three per axis.
- > Type: single-ended, 5 V, source, open cathode. Input current: <7 mA.
- > Feedback supplies: For all digital feedback devices: 5 V, 0.5 A.
- > For all analog feedback devices: 5 V, 1.5 A.

DIGITAL I/O

- > For different I/O configurations see ordering options
- > Safety Inputs: Left and right limit inputs per axis
- > Type: 24 V/ source (default), single ended, opto-isolated. Input current 4 – 14 mA.
- > STO: Two inputs, 24 V \pm 20%. Input current: <50 mA
- > Registration MARK Inputs (High Speed Position Capture): Four. Fast, 24 V \pm 20%, opto-isolated, two terminals.
- > Input current 4 – 14 mA.
- > Can be used as general purpose inputs.
- > General purpose output, Motor Mechanical Brake output: Two, 24 V/source (default), single ended, opto-isolated, 0.1 A
- > External Motor relay control: Two, 24 V \pm 20%, source, 0.5 A.
- > These outputs are used to shorten the phases of the motors by external
- > relays (if the optional internal relays are not present).
- > PEG (Position Event Generator): Two, Pulse or State, Differential, RS422.
- > Pulse width: 26nSec to 1.75mSec. Maximum rate: 10 MHz.
- > Can be used as general purpose output.

ANALOG I/O

- > Analog Inputs: Four, \pm 10 V, differential, 12 bit resolution.
- > Max. input frequency: 1 KHz. Offset: < 30 mV
- > Analog Outputs: Four, \pm 10 V, differential, 16 bit resolution.
- > Offset: \pm 50 mV, Bandwidth: 5 KHz. Max. output load: 10 K Ω ,
- > Noise / Ripple: <40 mV.

ETHERCAT® COMMUNICATION

- > Two ports, In and Out, RJ45 connector

ENVIRONMENT

- > Operating range: 0 to + 40 °C
- > Storage and transportation range: -25 to +60 °C
- > Humidity (operating range): 5% to 90% non-condensing

DIMENSIONS

- > 257 x 154.9 x 50.9 mm³

ACCESSORIES

- > NPXpm-ACC1: Mating connectors kit
- > UDMmc&NPXpm-ACC2: (J1) mating 2m flying lead cable
- > STO-ACC1: 2 meter cable with flying leads

CE, UL (PENDING)

- > EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

SPECIFICATIONS

Per Axis	A	B	C	D
Continuous/Peak current Sine amplitude	3.3 / 10 A	6.63 / 20 A	103 / 30 A	13.33 / 40 A
Continuous/Peak current	2.3 / 7 Arms	4.6 / 14.1 Arms	7 / 21.2 Arms	9.4 / 28.2 Arms
Maximum cont. Input current	2.6 Arms	5.3 Arms	8 Arms	10.6 Arms
Maximum heat dissipation, W	7 + 0.9 × (no. of drives)	7 + 2.1 × (no. of drives)	7 + 3.7 × (no. of drives)	7 + 5.6 × (no. of drives)
Maximum cont./peak output power @ 100 Vdc	260 / 780 W	520 / 1560 W	790 / 2340 W	1050 / 3120 W
Peak current time	1 sec			
Minimum load inductance @100 Vdc. Can be derated linearly for lower voltages	0.05 mH			

PER MODULE

Control voltage input	24 ±10% Vdc			
Drive voltage input range	12 – 100 Vdc (96 Vdc recommended)			
Maximum output voltage	(V _{in motor}) × 88% Vdc			
Maximum cont. input current	5.2 Arms	10.6 Arms	16 Arms	21.2 Arms



LCI

Laser Control Interface

FEATURES

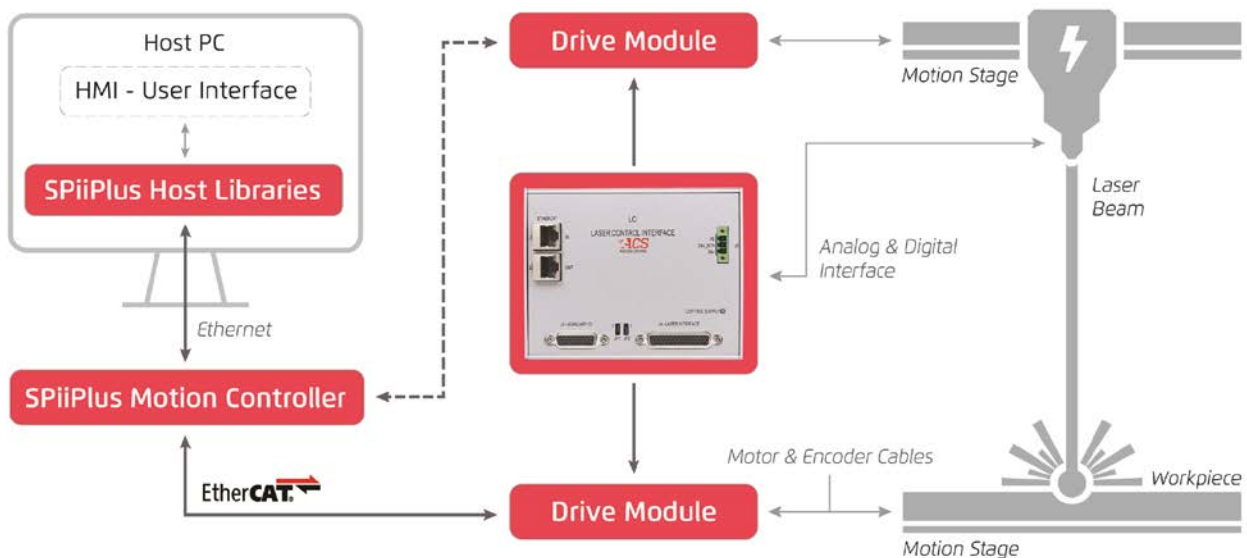
- > Sub-micron accuracy position-based laser triggering
- > Flexible laser power control options
- > Synchronize laser control with up to 5 coordinated motion axes
- > > Analog and high-speed digital interfaces
- > > Compact DIN rail mount footprint

APPLICATIONS

- > > OLED and Micro-LED display panel processing
- > Semiconductor wafer processing
- > Glass, PCB, FPC cutting and drilling for electronics manufacturing
- > Sheet metal and tube cutting for automotive, aerospace, biomedical
- > Biomedical device and electric vehicle battery welding

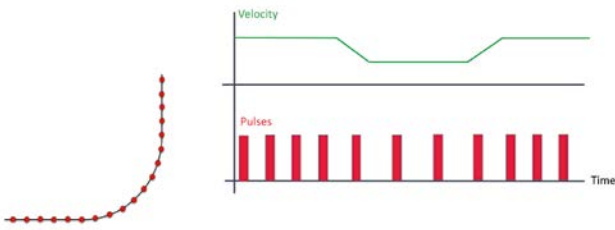


The LCI is designed to meet the needs of the most demanding laser processing applications. Working as part of a SPiiPlus EtherCAT motion control system, the LCI tightly synchronizes laser control with high-precision multi-axis motion to enable the highest laser processing accuracy and throughput.

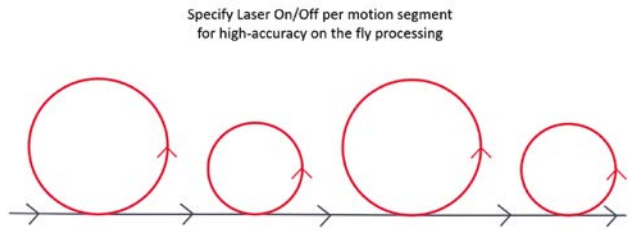


POSITION BASED TRIGGERING MODES

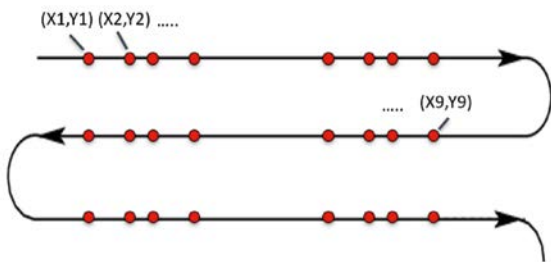
Fixed Distance Pulsing



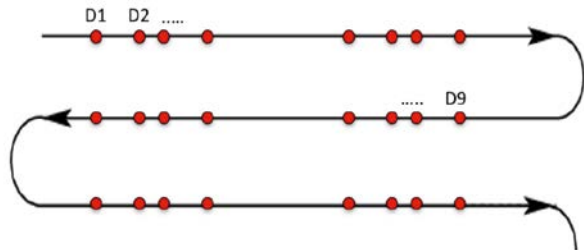
Segment-Based Gating



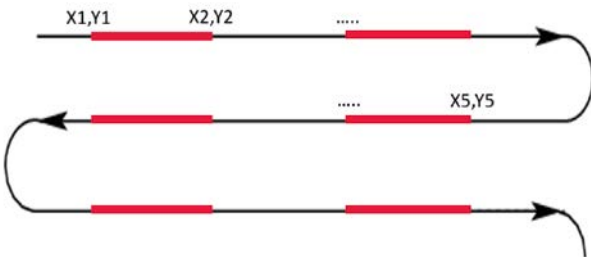
Coordinate Array Pulsing



Distance Array Pulsing



Coordinate Array Gating

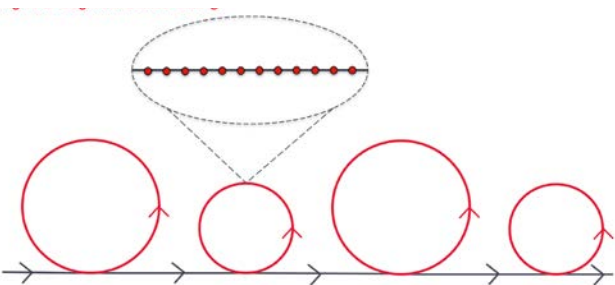


Distance Array Gating

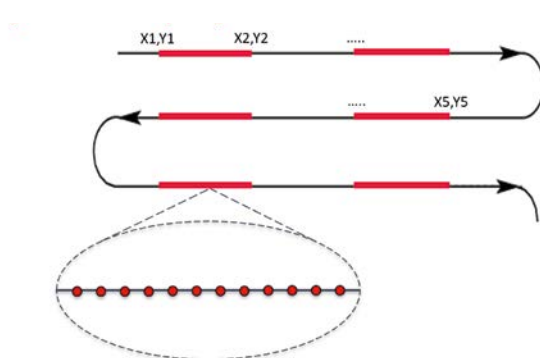


POSITION BASED TRIGGERING MODE COMBINATIONS

Fixed Distance Pulsing AND Segment-Based Gating

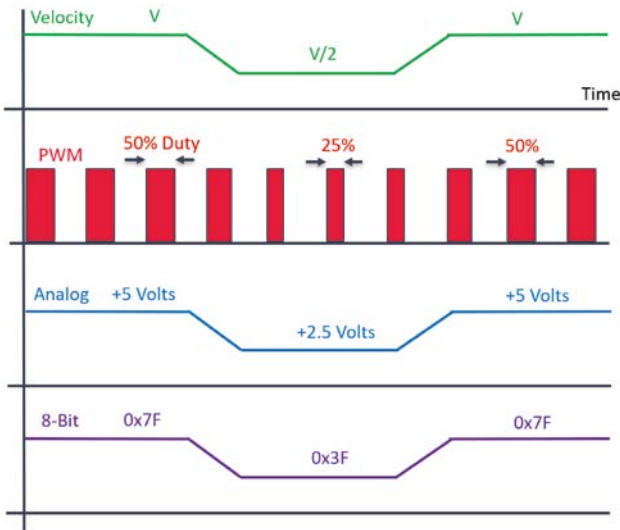


Fixed Distance Pulsing AND Coordinate Array Gating



VELOCITY BASED POWER CONTROL

Power control output(s) and laser triggering output can be activated simultaneously



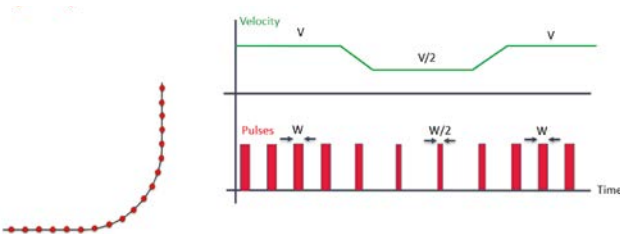
Power Control Outputs

- > PWM
- > Analog
- > 8-bit Port
- > Standard vector or user-defined velocity calculation
- > Analog inputs for power monitoring

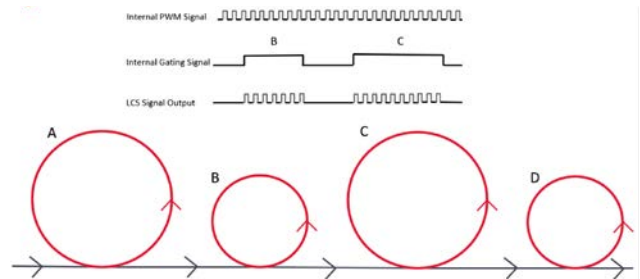
INTEGRATED TRIGGERING AND POWER CONTROL

Use mode combinations to control laser triggering and power from a single high-speed LCS trigger output

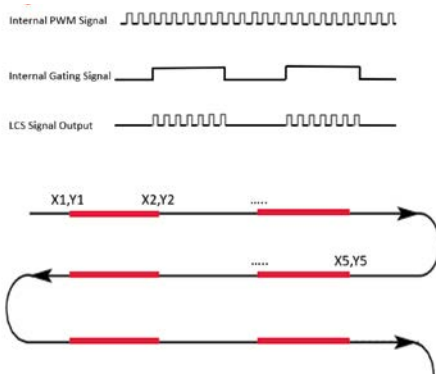
Fixed Distance Pulsing with Dynamic Pulse Width



Segment Based Gating AND PWM Power Control



Coordinate Array Based Gating AND PWM Power Control



LASER CONTROL SIGNAL (LCS) HIGH-SPEED TRIGGER OUTPUT

- > Interface: RS422 differential OR 5 or 24V single-ended
- > Output Modes:
 - Fixed Distance Pulsing
 - Segment-Based Gating
 - Coordinate Array Pulsing
 - Distance Array Pulsing
 - Coordinate Array Gating
 - Distance Array Gating
 - Fixed Distance Pulsing AND Segment-Based Gating
 - Fixed Distance Pulsing AND Coordinate Array Gating
 - Fixed Distance Pulsing with Dynamic Pulse Width
 - Segment Based Gating AND PWM Power Control
 - Coordinate Array Based Gating AND PWM Power
 - Control
 - Other Possibilities
- > Max. Frequency:
 - Fixed Distance Pulse Mode: 1 MHz / 10 MHz (Single Ended / Differential)
 - Segment-Based or Array-Based Pulse/Gate Mode: 16 kHz (Differential or Single Ended)
- > Latency & Jitter: 1ms

LASER POWER CONTROL PWM OUTPUT:

- > Interface: 5 or 24V single-ended
- > Max Modulation Frequency: 100 kHz
- > Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

LASER POWER CONTROL ANALOG OUTPUT

- > Interface: 0-10V, Single Ended, 12 bit resolution
- > Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

LASER POWER CONTROL 8-BIT OUTPUT

- > Interface: 5 or 24V single-ended
- > Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

OTHER DEDICATED LASER INTERFACE DIGITAL I/O

- > Laser On Output – For lasers with dedicated “On” input that is separate from trigger input
- > Laser Fault Input – When this input changes state (representing a fault condition), the Laser On Output is set low)
- > Laser Enable Input – For lasers with dedicated “Enabled” status output
- > Interface: 5 or 24V single-ended

GENERAL PURPOSE ANALOG OUTPUTS

- > Quantity: 1
- > Interface: 0-10V, Single Ended, 12 bit resolution
- > Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

GENERAL PURPOSE ANALOG INPUTS

- > Quantity: 2
- > Interface: 0-10V, Single Ended, 12 bit resolution
- > Max Update Frequency: 5kHz (equal to EtherCAT network cycle rate)

DIGITAL I/O

- > Digital Inputs: Eight general purpose inputs. Single ended, optoisolated, 5Vdc or 24Vdc, sink or source, automatic voltage detection. Maximum input frequency: 5kHz (equal to EtherCAT network cycle rate)
- > Digital Outputs: Eight general purpose outputs. Single ended, optoisolated, 5Vdc or 24Vdc, sink or source (default). Output current: 50mA each.

EXTERNAL SYNCHRONIZATION INPUT CLOCK

- > Quantity: One
- > Interface: RS 422 differential
- > Maximum Input Frequency: 10 MHz

CONFIGURABLE HIGH-SPEED OUTPUTS

- > Configurable as virtual encoder outputs
- > Quantity: Eight
- > Interface: RS 422 differential
- > Maximum Output Frequency: 10 MHz

COMMUNICATION

- > Two EtherCAT ports, In and Out, RJ45 connector.
- > Supported Network Cycle Rates: 1, 2, 4, 5 kHz

ENVIRONMENT

- > Operating range: 0 to + 50°C.
- > Storage and transportation range: -25 to +60°C.
- > Humidity (operating range): 5% to 90% non-condensing.

PHYSICAL

- > Dimensions: 134 x 75.4 x 31 (mm³)
- > Weight <300g

ADDITIONAL FEATURES

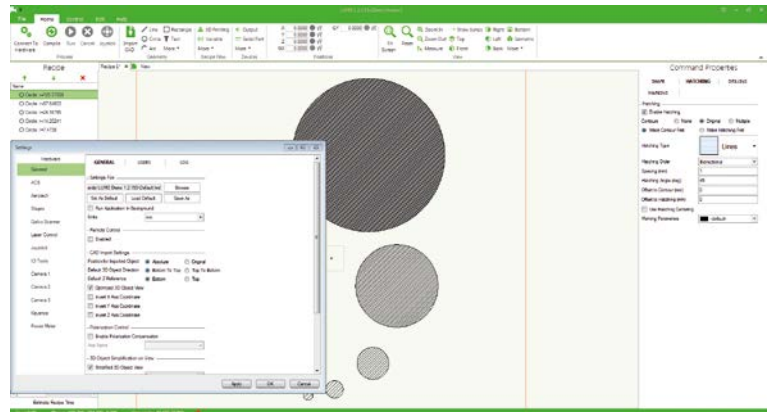
- > Laser On and Laser Off delay compensation
- > Pierce mode – longer pulse width for initial pulses
- > Tickle mode – short pulses to keep laser “warm” when not processing
- > Virtual Encoder (AqB) Output(s) for Subsystem Synchronization
- > Skywriting compensation

LUMS

Laser Machining Software: Universal Micromachining

FEATURES

- In LUMS trajectories can be generated by importing CAD files (DXF, DWG, STL, Gerber, NC Drill, etc.) or by drawing them with built in tools.
- Stitching feature to split large objects to machine with galvo scanners
- Advanced slicing and hatching algorithms allows to slice 300 MB file with 4 million triangles in less than a minute
- Formulas and Variables can be used and interpreted in text as well using {}
- LUMS controls all of the hardware directly
- LUMS laser machining software controls positioning stages directly using manufacturer's .dll files
- LUMS laser machining software controls many hardware of the machine directly: stages, galvo, lasers, sensors, I/O interfaces
- LUMS supports several cameras: one camera for general view and one camera for high resolution view
- Fully compatible with ACS products
- Key Applications
 - Laser Additive Manufacturing
 - PCB Laser Processing and fabrication
 - Laser Engraving
 - Laser Drilling
 - 3D printing



DOT. LINE. PLANE. SHAPE

LUMS software imports DXF, DWG, Gerber files to prepare for laser cutting, etching, ablation and other 2D, 2.5D applications. All objects are imported as lines and arcs for efficient machining. Set size and position of the object or simply drag it where it should be machined.

Use Hatching to fill the volume of the object. Use Stitching feature to split large objects to machine with galvo scanners.

Using 64-bit architecture, LUMS not only supports large and complex STL files, but handles them really fast. Our advanced slicing and hatching algorithms allows to slice 300 MB file with 4 million triangles in less than a minute. Faulty STL models can be fixed using LUMS Slice Repair tool.

LUMS allows NC Drill file import for laser drilling processes. Adjust via hole size by offsets to compensate beam spot diameter. Use either helical or layer by layer drilling. In Helical drilling mode, Z axis moves constantly, while XY axes draws circles. In Layer mode a set number of repeats are done before moving Z axis by a specified step size to increase drilling depth. Use Stitching tool to center each hole at the center of galvo scanners. Combine NC Drill file with Gerber files to do both PCB etching and drilling.

Simple shapes like lines, circles, arcs and rectangles are easy to draw in LUMS software. You can draw them by hand and/or add precise parameters for size and position. You can even draw poly-lines and polygon shapes with a special easy to use tool. All closed shapes can be hatched with one of the hatching types (lines, cross-hatching, dots, contours). Select motion speed and laser parameters either for each shape, groups of shapes or the whole

SPECIFICATIONS

Version	LUMS	LUMS PRO	LUMS Ultimate
MOTION CONTROL			
Galvanometric scanner control	+	+	+
Positioning stages control	+	+	+
Up to 3 axes control	+	+	+
Unlimited number of axes	-	+	+
Galvo+Stages Stitching	-	+	+
Virtual Joystick	+	+	+
FILE IMPORT			
DXF, DWG	+	+	+
STL	Up on request	+	+
STP, IGES	-	+	+
Gerber, NC Drill/Excellon	Up on request	+	+
TXT, CSV	+	+	+
TOOLS / COMMANDS			
Drawing tools	+	+	+
Hatching (lines, cross-hatching)	+	+	+
Advanced hatching (stripes, chess pattern)	-	+	+
Measuring	-	+	+
Logical Commands (Loop, If)	+	+	+
Variables	-	+	+
Math functions	+	+	+
Logging, Data Export	-	+	+
Sample surface height mapping	-	+	+
3D Printing tool	Up on request	+	+
Support generation for 3D models	-	+	+
3D model fixing	Up on request	+	+
DEVICE CONTROL			
IO	+	+	+
Serial Port control	+	+	+
Wait For IO Trigger	-	+	+
SECURITY FEATURES			
User access levels	-	+	+
Process Parameter locking	-	+	+
CUSTOM FEATURES			
APIs to add new hardware and features	-	+	+
Development of custom features and hardware support (up to 16 hours)	-	+	+
Development of custom features, hardware support and user interface	-	-	+
TRAINING AND SUPPORT			
Personal online training session	+	+	+
Online assistance with configuration	-	+	+
Training for recipe creation for your application	-	+	+
Installation, configuration and testing on your machine at your site	-	-	+
Training on your machine at your site	-	-	+
Follow-up online training	-	+	+
SYSTEM			
64 bit support	+	+	+
Multicore processing	+	+	+
CAMERAS AND VISION			
Webcam support	Up on request	Up on request	+
Industrial camera support	Up on request	Up on request	+
Camera view calibration with positioning system	Up on request	Up on request	+
Autofocus feature (to find laser focus position)	Up on request	Up on request	+
Perspective distortion correction	Up on request	Up on request	+
Manual alignment	Up on request	Up on request	+
Automatic feature recognition	Up on request	Up on request	+

recipe. Use Stitching tool to split large shapes or to center them in galvo scanner field.

To add a text in the machining recipe, simply click on Text tool and click where it should appear. LUMS supports fonts supported by Windows, bold, italic, underline, and strikethrough functions.

Formulas and Variables can be used and interpreted in text as well using {}. E.g. a line "speed = {v} mm/s", where "v" is a variable with value 50, will return a result "speed = 50 mm/s". This function is especially useful in R&D as process parameters can be marked near object for future reference.

Any imported or drawn object with a closed contour can be hatched in LUMS laser machining software. LUMS has several different hatching modes: Line, Cross-Hatching (up to 5 angles), Dots and Contours.

AUTOMATION. SYNCHRONIZATION. LOOPS

Complex laser machining recipes can be created and automated with LUMS software. LUMS laser machining software has a Stitching tool to combine motion of galvo scanners and stand linear stages. It makes use of fast speed of galvo scanners and the field size of linear stages. And all of it is controlled with an easy function in a single window. Stitching allows to divide large object or recipe to tiles or center each object in the galvo field e.g. for laser drilling. LUMS controls all of the hardware directly, so all the motions are coordinated with an available feedback from controllers.

Any part of the laser machining recipe can be looped in LUMS. Loops inside loops are also allowed. LUMS allows recipe start or restart loop by digital inputs. When sample is tilted or has an uneven surface, distance to it can be acquired via sensor focus function. That data is generated to a height map and is used to compensate beam focus position. User can select which area should be mapped and device to do it. A map can be imported as a CSV file.

Additive laser manufacturing or 3D laser printing processes like SLS, SLM or stereolithography may use additional level of automation.

ONE INTERFACE FOR ALL HARDWARE

LUMS laser machining software controls many hardware of the machine directly:

- > Positioning stages;
- > Joysticks;
- > Galvanometric scanners;
- > Laser sources;
- > Serial ports;
- > I/O control;
- > Sensors and cameras.

LUMS laser machining software controls positioning stages directly using manufacturer's .dll files. Therefore, control is always precise and does not need additional post processing, proofing and upload. Just click run and motion is executed.

LUMS controls XY or XYZ galvo scanners.

Functionality such as galvo delays tables and skywriting is implemented and easily accessible in LUMS. Combined motion by galvo scanners and stages is possible by using Stitching function.

Laser sources can be triggered through motion controller outputs. Triggering can be done at a set frequency or position based. For laser sources supporting the function, power can be controlled via analog output from LUMS.

Peripheral devices can be controlled by LUMS Laser machining software via Serial Port tool.

A selection of various sensors is supported in LUMS. They are mostly used for: distance, height detection. Power meters can be used to automatically set required laser power via analog output or direct laser control.

MACHINE VISION AND CAMERA

LUMS software seamlessly integrates machine vision for laser machining processes. Use it to see machining results or position your fabrication trajectories on the sample precisely. Camera view is displayed in the Recipe Preview window in LUMS. It is calibrated to match coordinate system of positioning stages and galvo scanners.

LUMS supports several cameras: one camera for general view and one camera for high resolution view. Camera view can be calibrated to be coaxial to laser beam or off-axis.

LUMS Machine Vision module has an Autofocus function for the camera(s) used in the system. Focus can be found by scanning whole set range continuously or by small steps looking for focus improvement.

Built-in LUMS's Machine Vision module provides alignment functionality for laser machining processes. There are several alignment modes:

- > Manual, when machining trajectories are dragged to match sample view.
- > Manual, when fiducials are selected in camera view by operator.
- > Simple, when Machine Vision finds a position of a user set image.
- > Advanced, when Machine Vision searches for a set pattern e.g. cross, edge, etc.

Alignment can be done using one or two alignment marks. After alignment all recipe is rotated and translated automatically to match sample displacement error.

Brief Ordering Information

- Prices** All prices are EXW (Incoterms 2010) Vilnius, Lithuania and do not include any taxes. Quantity discounts as well as research application discount are available on request.
- Payment** 30 days net by bank wire transfer. Money Orders, Bank and Company Checks are accepted – in this case please add 1% to lump sum of invoice to cover cashing charges. Credit cards – VISA, MASTERCARD are accepted.
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