ACT Series

Direct-Drive Linear Actuator

High performance, cost-effective actuator

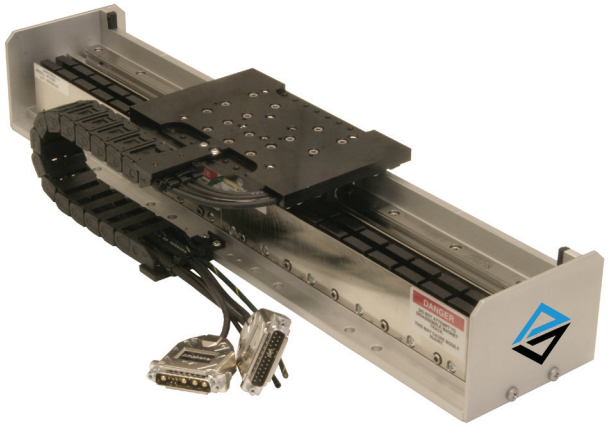
Travel range from 100 mm to 1.5 m

Acceleration capability up to 5 g

Velocity capability up to 5 m/s

Maximum continuous force output up to 270.7 N

Maintenance free, direct drive, zero-cogging motor and noncontact optical linear encoder



The ACT Series linear motor actuator is faster and more accurate than a ball-screw or belt-drive.

The ACT is a high performance, cost-effective linear-servomotor-driven actuator that is faster and more accurate than a ball screw or belt-drive without the costly, time-consuming maintenance required. Since the ACT is an integrated, assembled mechanical system, it eliminates the design complexity and guesswork in choosing and assembling individual components. The ACT is ideal for applications including assembly, pick and place machines, electronic assembly and qualification, packaging, vision inspection, dispensing, life sciences, image scanning and processing, and inkjet printing.

Linear Motor Drive

Aerotech's high-power, cog-free, linear motors drive the ACT series in no load conditions to accelerations of 5 g and a top speed of 5 m/s, enabling the ideal solution to increase throughput. The stiff mechanical structure of the actuator allows for excellent dynamic performance and reduced settling times. The non-magnetic forcer coil provides high force with zero cogging for super-smooth velocity and position control. This zero cogging design is ideal for applications requiring outstanding contour accuracy and smooth velocity profiling. As with all Aerotech linear motor stages, the linear motor has zero backlash, no windup, zero friction, and outstanding system responsiveness. The magnetic field of the linear motor is totally self-contained within the U-channel design. Many high-performance applications cannot tolerate the stray magnetic fields generated by flat motor magnet tracks.

High Performance

Noncontact linear optical encoders with micron-level repeatabilities are standard on all ACT series actuators. Either a line-driver output or amplified sine-wave output encoder is available for maximized flexibility. The optional factory calibration further increases standard accuracy and repeatability. Aerotech manufactures a wide range of matching drives and controls to provide a fully integrated and optimized motion solution.

High Reliability

The ACT actuators consist of noncontact linear motors and encoders, making the actuators virtually maintenance-free. As a result, there is no backlash, windup, wear, or maintenance that is normally associated with contacting-type systems such as ball screws or belt drives.

Adjustable Options Maximize Application Flexibility

Multiple cable management options allow flexibility in design. For applications requiring a complete solution, a cable management chain is provided. For OEM or applications requiring user-defined cable management, simple connectorized pigtails are available. Moveable limits allow easy adjustment of usable travel for varying application requirements.

ACT115DL Series SPECIFICATIONS

ACT115DL					
Mechanical Specifications		**-0100**	**-0200**	**-0300**	**-0500**
Travel		100 mm	200 mm	300 mm	500 mm
Accuracy	**Uncalibrated**	±7 µm	±13 µm	±19 µm	±31 µm
	Calibrated	±2 µm	±2 µm	±2 µm	±3 µm
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		3 g			
Maximum Force (Continuous)	**20 psi**(3)	105.5 N			
	No Air	68.2 N			
Load Capacity(4)	**Horizontal**	20 kg			
	Side	10 kg			
Moving Mass		1.4 kg			
Stage Mass		7.3 kg	9.1 kg	10.9 kg	14.5 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

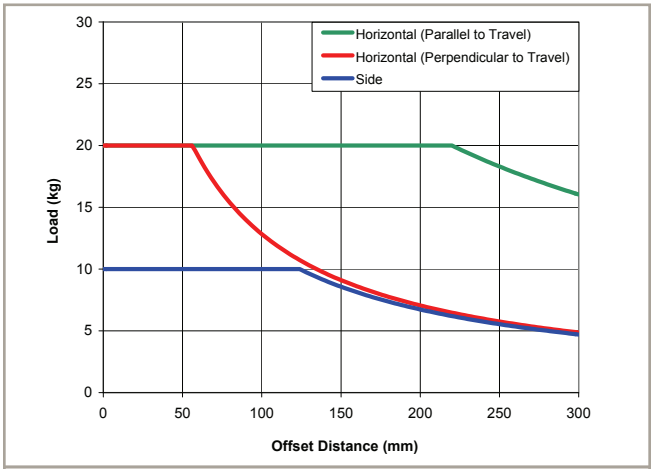
ACT115DL					
Mechanical Specifications		**-0800**	**-1000**	**-1200**	**-1500**
Travel		800 mm	1000 mm	1200 mm	1500 mm
Accuracy	**Uncalibrated**	±44 µm	±50 µm	±55 µm	±60 µm
	Calibrated	±3 µm	±5 µm	±5 µm	±5 µm
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		3 g			
Maximum Force (Continuous)	**20 psi**(3)	105.5 N			
	No Air	68.2 N			
Load Capacity(4)	**Horizontal**	20 kg			
	Side	10 kg			
Moving Mass		1.4 kg			
Stage Mass		20.0 kg	23.6 kg	27.2 kg	32.7 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

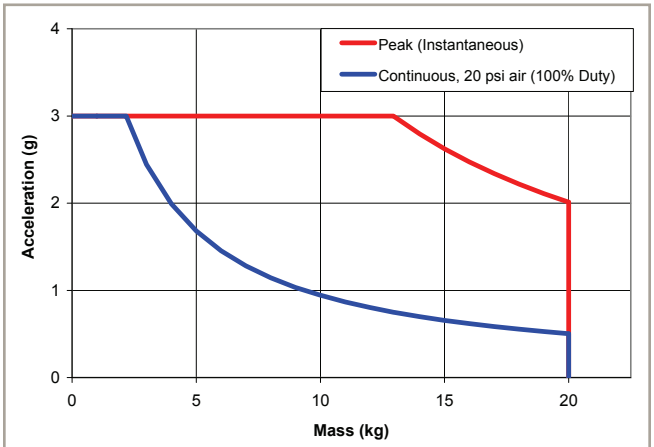
ACT115DL Series SPECIFICATIONS

Electrical Specifications	ACT115DL
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Linear Encoder
Maximum Bus Voltage	320 VDC
Limit Switches	5 V, Normally Closed
Home Switch	Near Center

Recommended Controller		
Multi-Axis	A3200	Ndrive CP/ Ndrive HPe/Npaq
	Ensemble	Ensemble CP/Ensemble HPe
Single Axis	Soloist	Soloist CP/Soloist HPe



Cantilever load performance for the ACT115DL.



Acceleration versus mass for the ACT115DL.

ACT140DL Series SPECIFICATIONS

ACT140DL					
Mechanical Specifications		**-0100**	**-0200**	**-0300**	**-0500**
Travel		100 mm	200 mm	300 mm	500 mm
Accuracy	**Uncalibrated**	±7 µm	±13 µm	±19 µm	±31 µm
	Calibrated	±2 µm	±2 µm	±2 µm	±3 µm
Resolution		0.005 - 1 µm			
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		5 g			
Maximum Force (Continuous)	**20 psi**(3)	173.2 N			
	No Air	110.5 N			
Load Capacity(4)	**Horizontal**				
	Side	20 kg			
Moving Mass		2.5 kg			
Stage Mass		17.0 kg	19.5 kg	22.7 kg	25.3 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

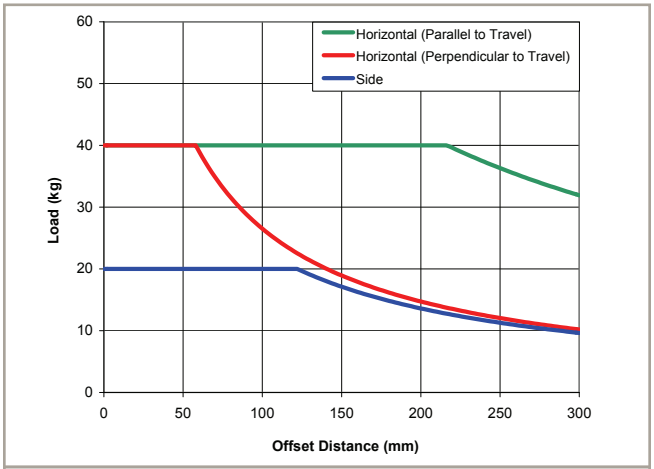
ACT140DL					
Mechanical Specifications		**-0800**	**-1000**	**-1200**	**-1500**
Travel		800 mm	1000 mm	1200 mm	1500 mm
Accuracy	**Uncalibrated**	±44 µm	±50 µm	±55 µm	±60 µm
	Calibrated	±3 µm	±5 µm	±5 µm	±5 µm
Resolution		0.005 - 1 µm			
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		5 g			
Maximum Force (Continuous)	**20 psi**(3)	173.2 N			
	No Air	110.5 N			
Load Capacity(4)	**Horizontal**	40 kg			
	Side	20 kg			
Moving Mass		2.5 kg			
Stage Mass		34.3 kg	40.7 kg	46.4 kg	55.4 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

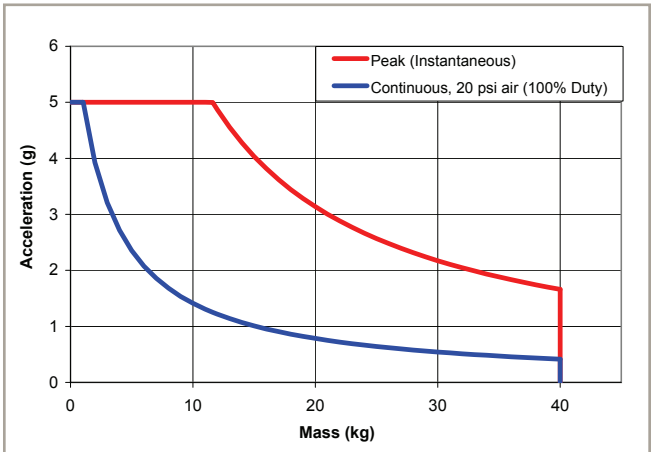
ACT140DL Series SPECIFICATIONS

Electrical Specifications	ACT140DL
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Linear Encoder
Maximum Bus Voltage	320 VDC
Limit Switches	5 V, Normally Closed
Home Switch	Near Center

Recommended Controller		
Multi-Axis	A3200	Ndrive CP/ Ndrive HPe/Npaq
	Ensemble	Ensemble CP/Ensemble HPe
Single Axis	Soloist	Soloist CP/Soloist HPe



Cantilever load performance for the ACT140DL.



Acceleration versus mass for the ACT140DL.

ACT165DL Series SPECIFICATIONS

ACT165DL					
Mechanical Specifications		**-0100**	**-0200**	**-0300**	**-0500**
Travel		100 mm	200 mm	300 mm	500 mm
Accuracy	**Uncalibrated**	±7 µm	±13 µm	±19 µm	±31 µm
	Calibrated	±2 µm	±2 µm	±2 µm	±3 µm
Resolution		0.005 - 1 µm			
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		5 g			
Maximum Force (Continuous)	**20 psi**(3)	270.7 N			
	No Air	150.0 N			
Load Capacity (4)	**Horizontal**	60 kg			
	Side	30 kg			
Moving Mass		3.0 kg			
Stage Mass		23.4 kg	29.1 kg	33.4 kg	44.7 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

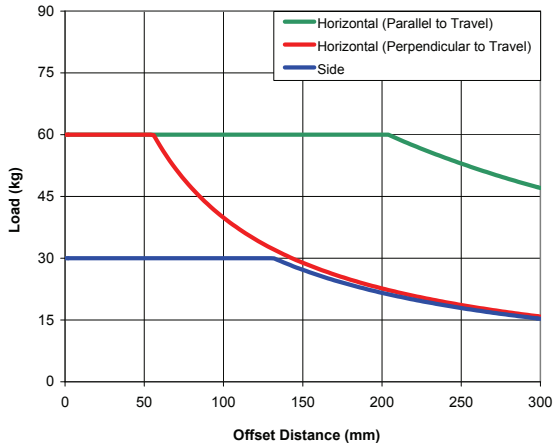
ACT165DL					
Mechanical Specifications		**-0800**	**-1000**	**-1200**	**-1500**
Travel		800 mm	1000 mm	1200 mm	1500 mm
Accuracy	**Uncalibrated**	±44 µm	±50 µm	±55 µm	±60 µm
	Calibrated	±3 µm	±5 µm	±5 µm	±5 µm
Resolution		0.005 - 1 µm			
Repeatability (Bi-Directional)(1)		±1 µm			
Maximum Speed(2)		5 m/s			
Maximum Acceleration (Continuous)(2)		5 g			
Maximum Force (Continuous)	**20 psi**(3)	270.7 N			
	No Air	150.0 N			
Load Capacity (4)	**Horizontal**	60 kg			
	Side	30 kg			
Moving Mass		3.0 kg			
Stage Mass		60.3 kg	70.2 kg	80.1 kg	95.7 kg
Material		Aluminum (Clear Anodize Base/Black Anodize Tabletop)			
MTBF (Mean Time Between Failure)		20,000 Hours			

Notes:
1. Bi-directional repeatability specification listed requires resolution of 0.1 µm or finer. Specification is ±2 µm with resolution of 0.5 µm. Coarser resolutions will result in reduced bidirectional repeatability performance.
2. Maximum velocity and acceleration specifications assume a small payload. As payload increases, the maximum attainable velocity and acceleration will decrease. Maximum application velocity may be limited by system data rate and resolution.
3. Requires -AC1 air cooling option.
4. Axis orientation for on-axis loading is listed.
5. Specifications are for single-axis systems measured 25 mm above the tabletop. Consult factory for non-standard applications.

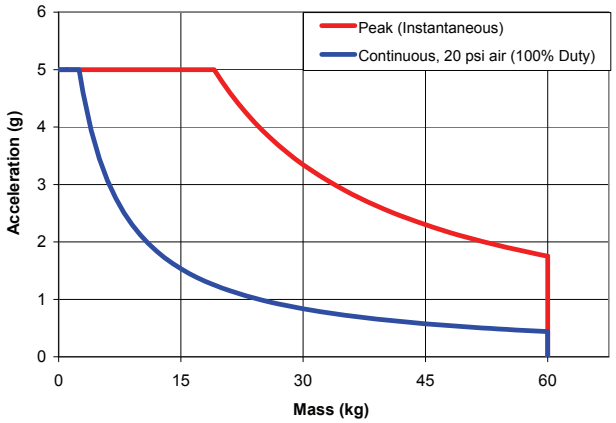
ACT165DL Series SPECIFICATIONS

Electrical Specifications	ACT165DL
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Linear Encoder
Maximum Bus Voltage	320 VDC
Limit Switches	5 V, Normally Closed
Home Switch	Near Center

Recommended Controller		
Multi-Axis	A3200	Ndrive CP/ Ndrive HPe/Npaq
	Ensemble	Ensemble CP/Ensemble HPe
Single Axis	Soloist	Soloist CP/Soloist HPe

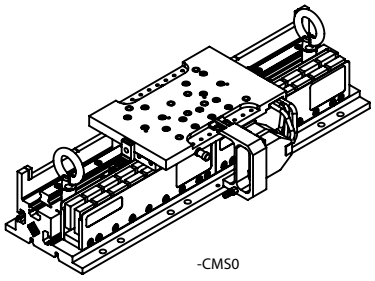


Cantilever load performance for the ACT165DL.

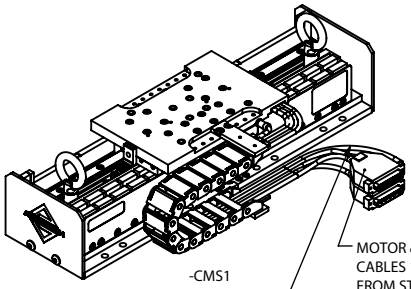


Acceleration versus mass for the ACT165DL.

ACT115DL Series DIMENSIONS



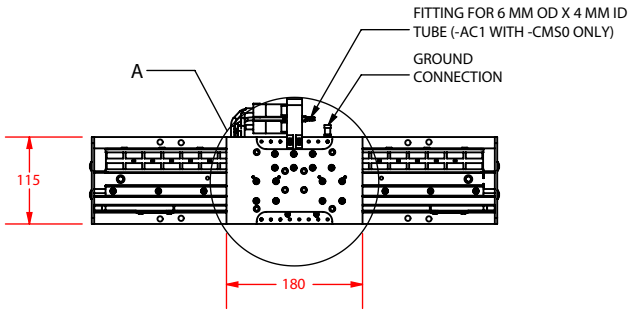
-CMS0

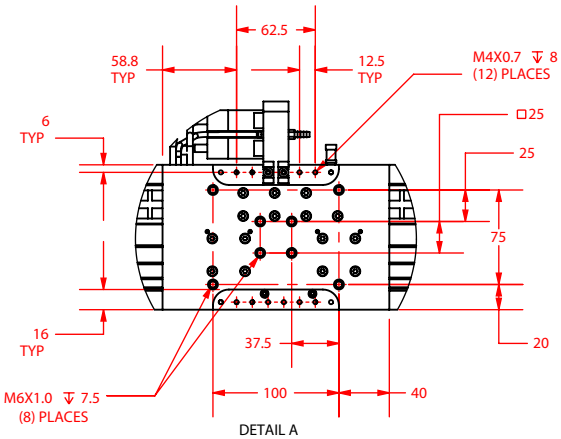


-CMS1

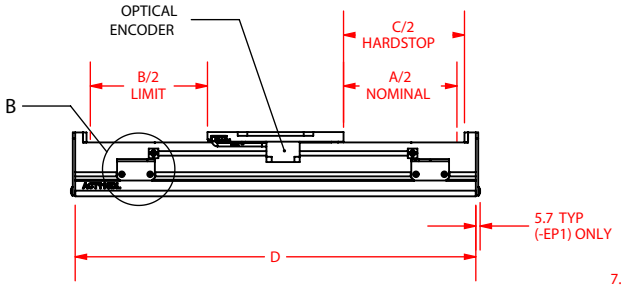
MOTOR & FEEDBACK CABLES 150[6] LENGTH FROM STAGE

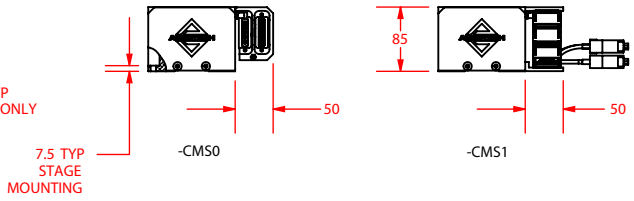
4 MM OD X 2.5 MM ID TUBE (-AC1 WITH -CMS1 ONLY)

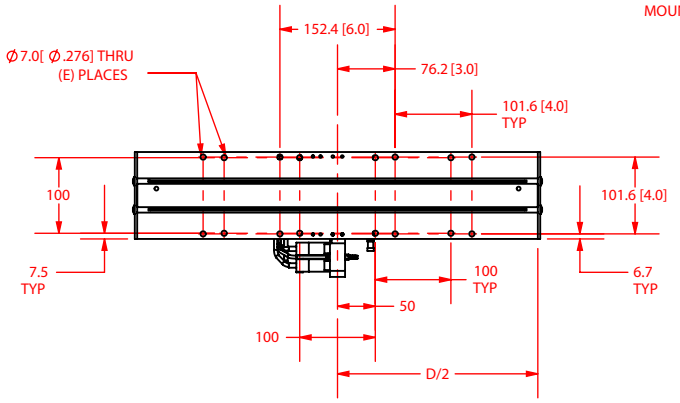


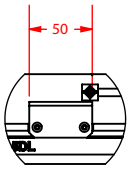


DETAIL A







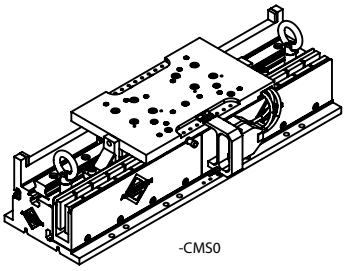


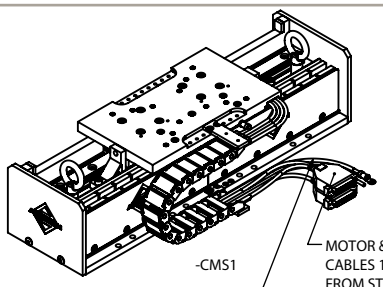
DETAIL B
-LI2 ONLY

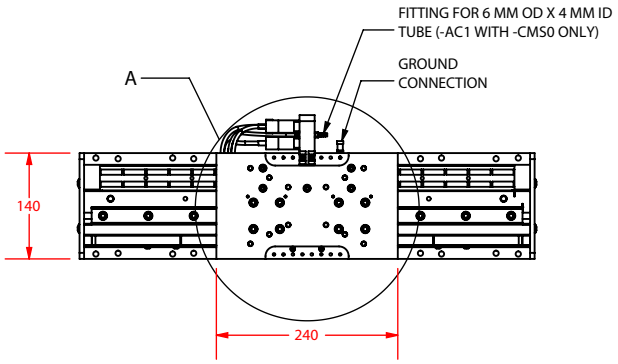
MODEL #	A = NOMINAL	B = LIMIT	C = HARDSTOP	D = STAGE LENGTH	E = MOUNTING
ACT115DL-0100	100	110	120	330	8
ACT115DL-0200	200	210	220	430	16
ACT115DL-0300	300	310	320	530	16
ACT115DL-0500	500	510	520	730	24
ACT115DL-0800	800	810	820	1030	40
ACT115DL-1000	1000	1010	1020	1230	48
ACT115DL-1200	1200	1210	1220	1430	56
ACT115DL-1500	1500	1510	1520	1730	64

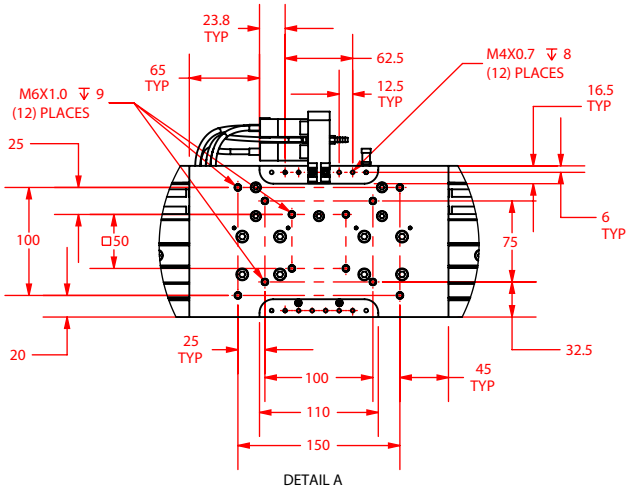
DIMENSIONS: MILLIMETERS[INCHES]

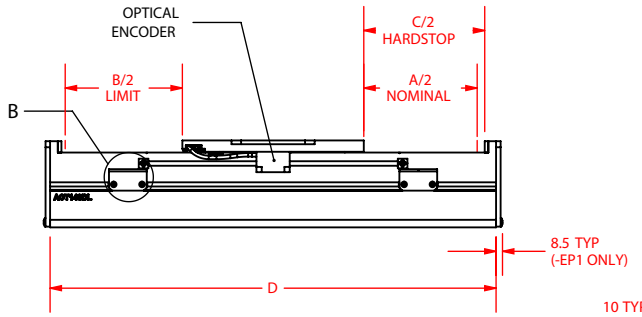
ACT140DL Series DIMENSIONS

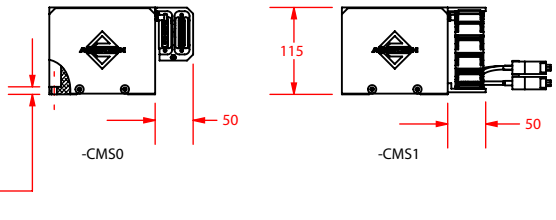


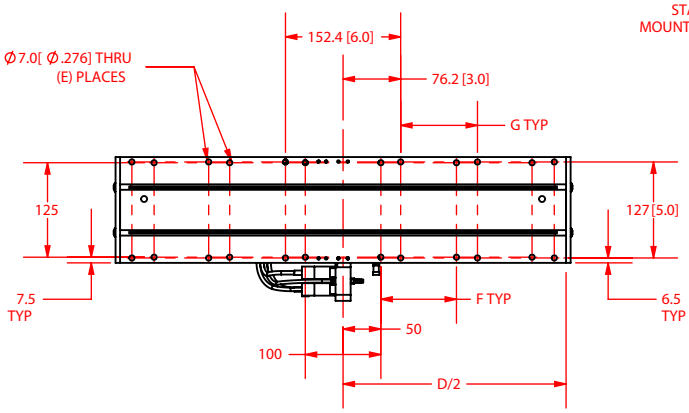


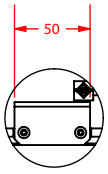








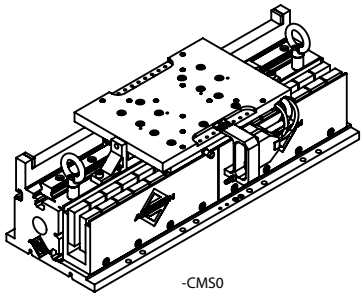


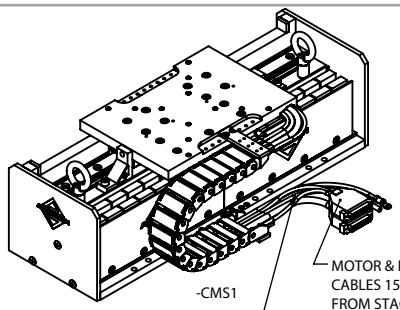


MODEL #	A = NOMINAL	B = LIMIT	C = HARDSTOP	D = STAGE LENGTH	E = MOUNTING	F = SPACING	G = SPACING
ACT140DL-0100	100	105	120	390	16	75	76.2[3.0]
ACT140DL-0200	200	205	220	490	16	100	101.6[4.0]
ACT140DL-0300	300	305	320	590	24	100	101.6[4.0]
ACT140DL-0500	500	505	520	790	32	100	101.6[4.0]
ACT140DL-0800	800	805	820	1090	40	100	101.6[4.0]
ACT140DL-1000	1000	1005	1020	1290	48	100	101.6[4.0]
ACT140DL-1200	1200	1205	1220	1490	56	100	101.6[4.0]
ACT140DL-1500	1500	1505	1520	1790	64	100	101.6[4.0]

DIMENSIONS: MILLIMETERS[INCHES]

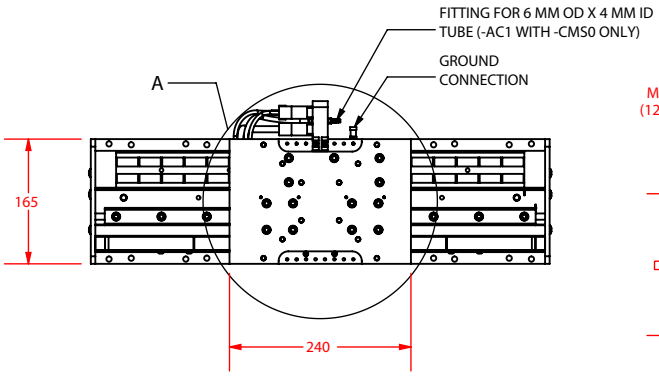
ACT165DL Series DIMENSIONS

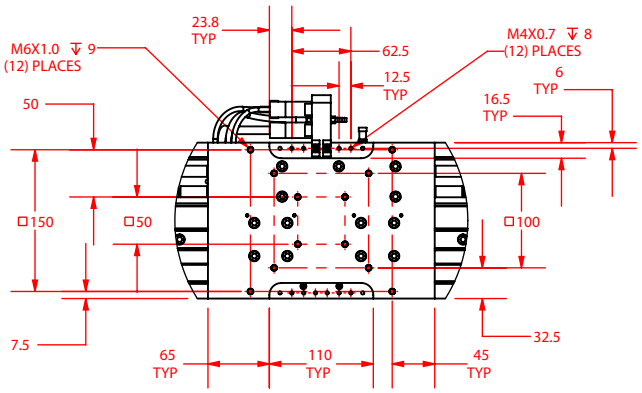

-CMS0


-CMS1

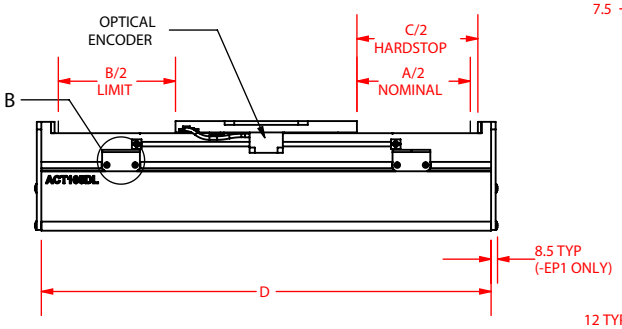
MOTOR & FEEDBACK CABLES 150[6] LENGTH FROM STAGE

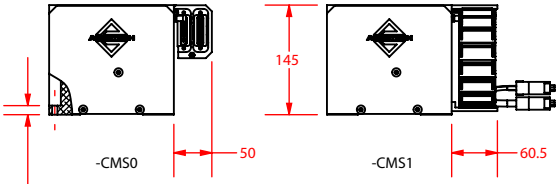
4 MM OD X 2.5 MM ID TUBE (-AC1 WITH -CMS1 ONLY)



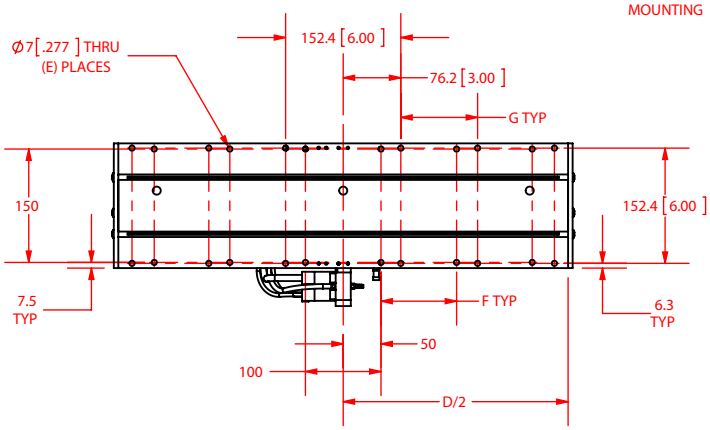


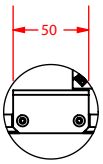
DETAIL A





12 TYP STAGE MOUNTING





DETAIL B
-LI2 ONLY

MODEL #	A = NOMINAL	B = LIMIT	C = HARDSTOP	D = STAGE LENGTH	E = MOUNTING	F = SPACING	G = SPACING
ACT165DL-0100	100	105	120	395	16	75	76.2[3.00]
ACT165DL-0200	200	205	220	495	16	100	101.6[4.00]
ACT165DL-0300	300	305	320	595	24	100	101.6[4.00]
ACT165DL-0500	500	505	520	795	32	100	101.6[4.00]
ACT165DL-0800	800	805	820	1095	40	100	101.6[4.00]
ACT165DL-1000	1000	1005	1020	1295	48	100	101.6[4.00]
ACT165DL-1200	1200	1205	1220	1495	56	100	101.6[4.00]
ACT165DL-1500	1500	1505	1520	1795	64	100	101.6[4.00]

DIMENSIONS: MILLIMETERS [INCHES]

ACT Series ORDERING INFORMATION

ACT-DL Series Direct-Drive Linear Actuator

Model (Required)

ACT115DL	Direct-drive linear actuator
ACT140DL	Direct-drive linear actuator
ACT165DL	Direct-drive linear actuator

Travel (Required)

-0100	100 mm travel
-0200	200 mm travel
-0300	300 mm travel
-0500	500 mm travel
-0800	800 mm travel
-1000	1000 mm travel
-1200	1200 mm travel
-1500	1500 mm travel

Feedback (Required)

-E1	20 µm linear encoder, amplified sine (1 Vpp) output
-E2	0.1 µm linear encoder, line driver (digital TTL) output
-E3	0.5 µm linear encoder, line driver (digital TTL) output

Limits (Required)

-LI1	Normally-closed limit switches, fixed locations
-LI2	Normally-closed limit switches, adjustable locations

Cable Management (Required)

-CMS0	No cable management system
-CMS1	Single axis cable management system

Air Cooling (Optional)

-AC1	Forced air cooling for motor

End Plates (Optional)

-EP1	End plates mounted to ends of actuator bas

Metrology (Required)

-PL0	No metrology performance plots
-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (HALAR) with performance plots

Integration (Required)

Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire custom integration support with your system.

-TAS	Integration - Test as system Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.
-TAC	Integration - Test as components Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.