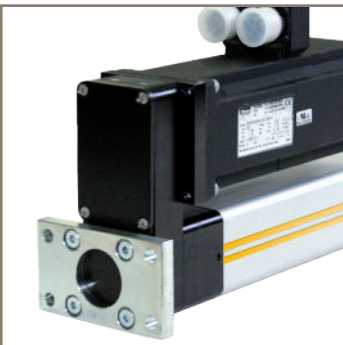




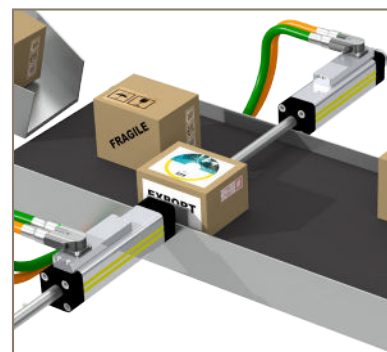
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ETT

Electric Tubular Motors

Direct Thrust Linear Motor Actuators



ENGINEERING YOUR SUCCESS.

ETT Series: Direct Thrust Electric Tubular Motors

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Electric Tubular Motor - ETT

Design Features

- Ultra dynamic linear motion and position control capabilities
- Ideally suited for pneumatic substitution where greater position control capabilities are required
- Four lengths and four sizes meeting the requirements of the pneumatic ISO flange standard (DIN ISO 15552:2005-12) for simplified mechanical integration
- Swivelling electrical connectors and extensive accessory options allow flexible mounting
- Reduced mechanical complexity delivers high energy efficiency and reduces maintenance
- AISI304 stainless steel shaft allows for use in "clean" environments
- High thermal efficiency improves reliability and increases mechanical life
- Wide choice of rod end mounting options, including swivel rod eye, increases flexibility



Market Applications

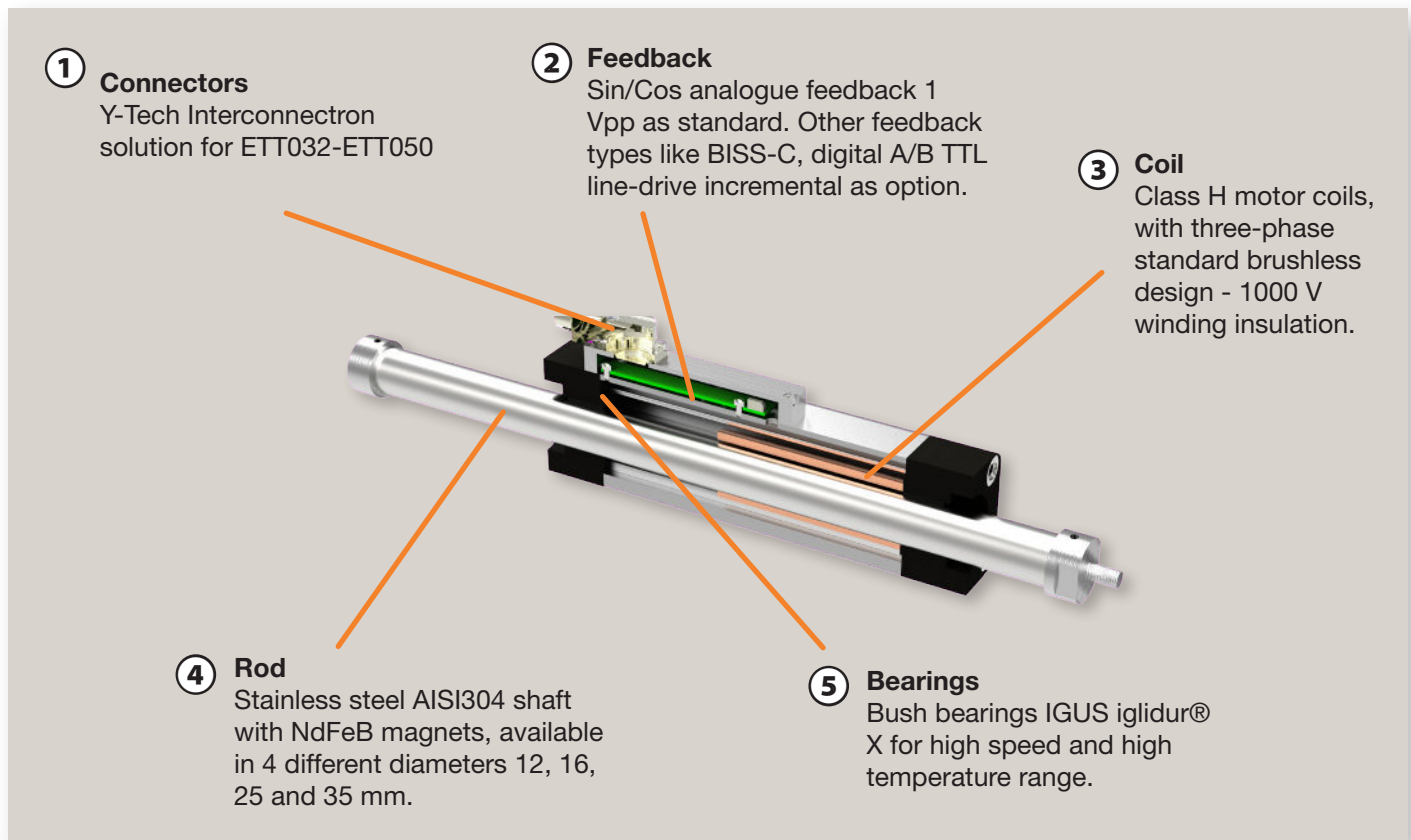
- Food, Pharmaceutical & Beverage
- Packaging Machines
- Material Handling
- Factory Automation

The ETT is a direct thrust linear motor actuator that is ideally suited to all kinds of linear handling and pick and place applications. It is a cost-effective and energy-efficient alternative to pneumatic cylinders in applications that demand greater flexibility and control. The ETT's linear motion is directly generated without the need for mechanical transmission elements like ball screws, toothed belts, and gearboxes.

The tubular motor has two main components; the rod (shaft) and the stator with integrated feedback (body). The shaft is made of a stainless steel tube with built-in high performance neodymium magnets that deliver impressive thrust values up to 2083 N. The main body comprises the stator winding, the feedback electronics, and high performance bearings. A major benefit of the ETT design is that long and/or heavy duty cycles are possible without the need for additional cooling. The IP67 protection class allows the ETT tubular motor to be used in harsh environmental conditions.

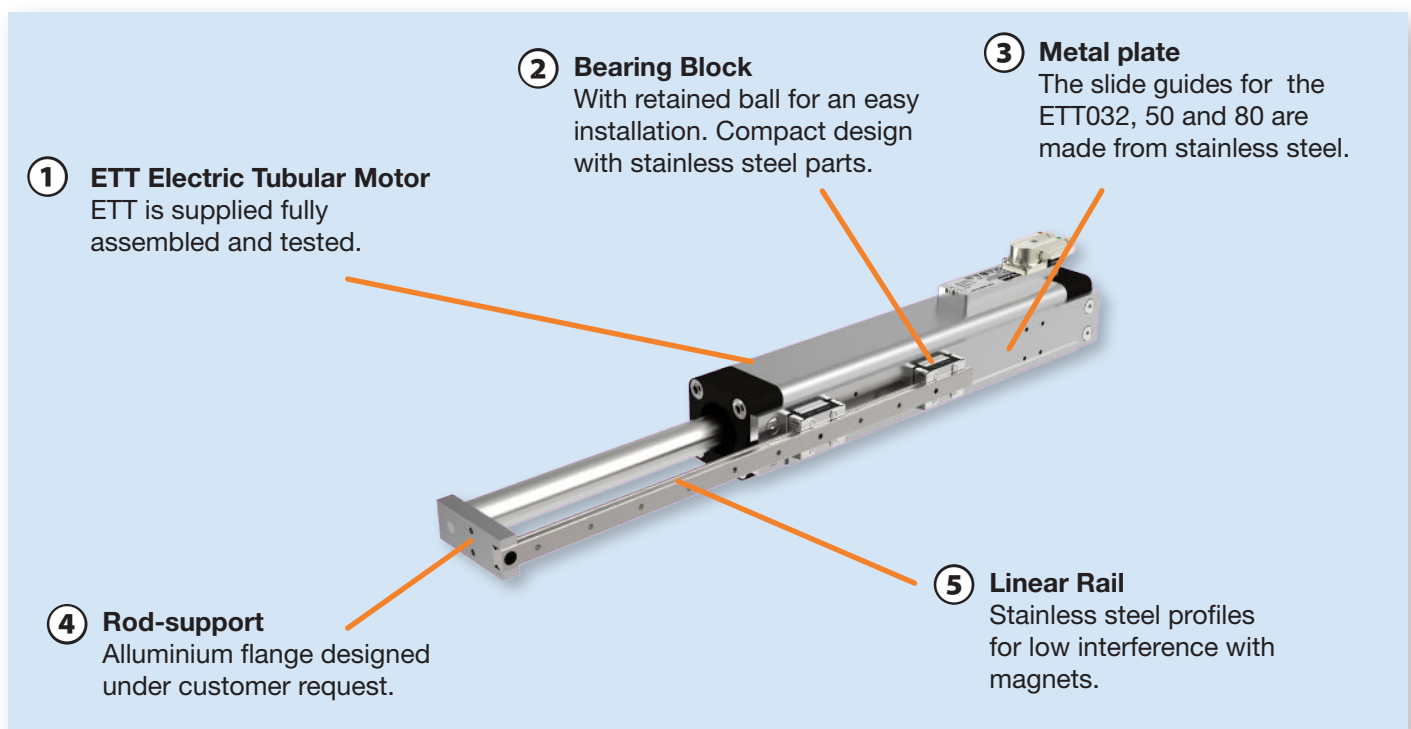
General Specifications

Motor type	Linear tubular servo motor
Rod	AISI304 (stainless steel)
Rated force	8...295 N
Peak force	56...2083 N
Speed range	up to 8 m/s
Acceleration range	up to 350 m/s ²
Mounting	Screw fixed
Shaft end	Front male thread, Rear cap end Other options available
Cooling	Natural ventilation
Protection level (IEC60034-5)	IP67
Feedback sensor	Analog Hall 1Vpp (SinCos 90°) Other feedback on request
Thermal protection	KTY PTC or PT1000 as option
Marking	CE
Voltage supply	230 VAC (all sizes) 400 VAC (only ETT80)
Temperature class	Class F
Connections	Connectors Flying leads as option
Bi-directional accuracy	0.5 mm



Design Advantages: ETT with Slide Guide System

For more information please see page 21.

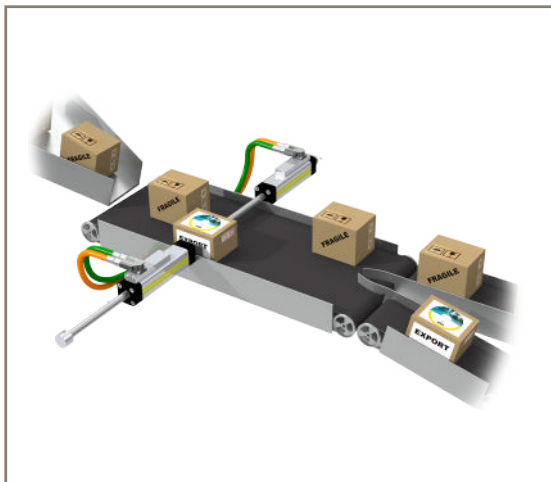


ETT Application Solutions



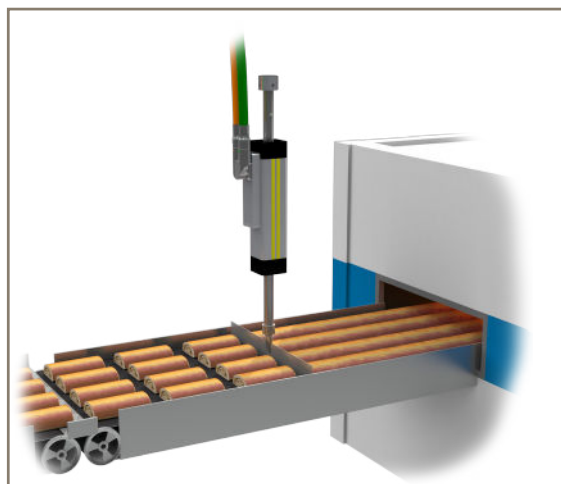
Stacking

The ETT manages the stacking of CD's after the printing section. Thanks to the complete and ready to use direct drive solution, no more time is spent in assembling and aligning different elements (gearbox, belts and pulley, motor, etc).



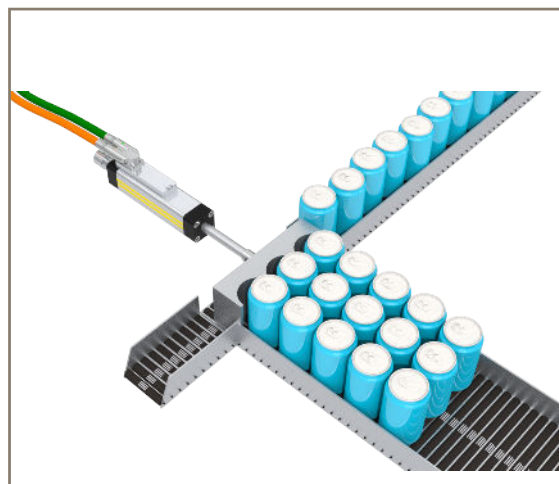
Sorting

A supervision system manages the boxes and moves them onto different conveyors following their layout. Both ETT tubular motors are synchronised and can quickly adapt to the box's dimensions. The quick positioning is the main advantage for system performance.



Cutting

Here the ETT function is to cut the material all to the same length. The ETT high force level and synchronization with the conveyor are key benefits in this application. The level of control offered by the ETT means that it is easy to change the format of the material.



Re-positioning

ETT is used to accurately reposition products on conveyors. The flexible dynamic positioning offered by the electric tubular motor guarantees the perfect alignment for different product formats whilst fewer components improves energy efficiency.

SPECIFICATIONS

SPECIFICATIONS

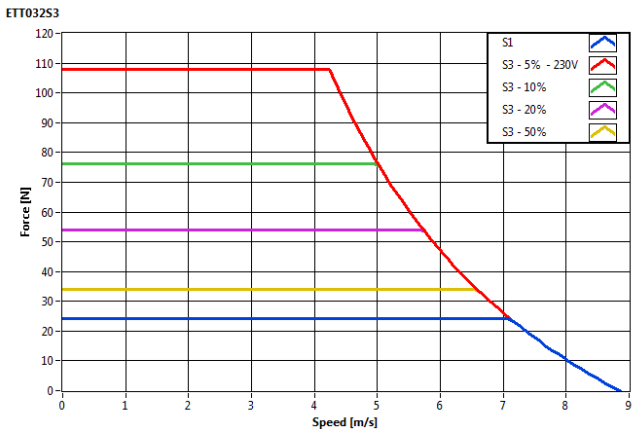
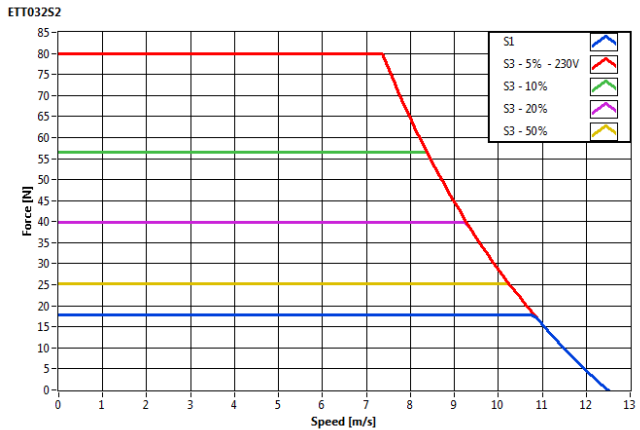
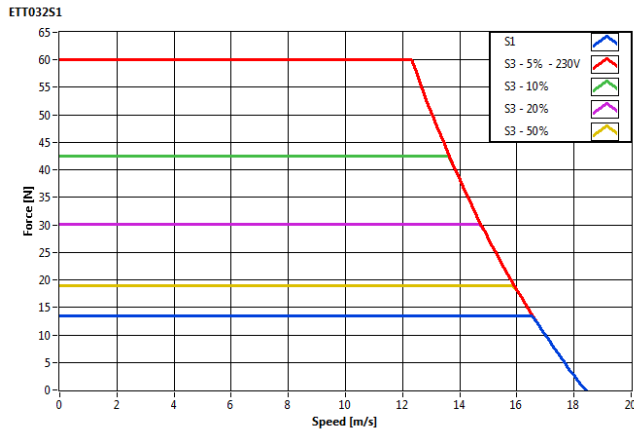
ETT032

	Unit	ETT032S1*	ETT032S2	ETT032S3*
Peak force ^{1) 2) 4)}	[N]	95	126	169
Peak current	[A]	4.4	4.0	3.8
<i>Without heatsink plate</i>				
Continuous stall force duty cycle S1 ¹⁾	[N]	13	18	24
Continuous stall current duty cycle S1 ¹⁾	[A]	0.6	0.6	0.5
Force @ duty cycle S3 5% ¹⁾	[N]	60	80	107
Current @ duty cycle S3 5% ¹⁾	[A]	2.8	2.5	2.4
Force constant	[N/A]	21.67	31.89	45.05
Back EMF (ph-ph,rms)	[V _{rms} /(m/s)]	12.51	18.41	26.01
Phase resistance	[ohm]	31.46	43.84	58.50
Phase inductance	[mH]	14.57	21.75	28.94
Power supply (drive side)	VAC	230	230	230
Max DC bus voltage	VDC	325	325	325
Pole pitch	-	60	60	60
Maximum stroke ⁵⁾	[mm]	660	630	600
Peak acceleration ³⁾	[m/s ²]	224	258	307
Position repeatability	[mm]	0.05	0.05	0.05
Accuracy	[mm]	0.5	0.5	0.5

¹⁾ Data valid at an ambient temperature of 25 °C; ²⁾ Based on triangular move over maximum stroke with normal payload

³⁾ Based on a 100 mm stroke, without payload; ⁴⁾ Considering a duty cycle of S3 2%; ⁵⁾ Other value under request

Manufacturing tolerance ±10%; *Duty cycle S1 and S3 compliant to CEI EN60034-1 with max time 5 minutes.



Curves based on rod movement.

Curves based on a theoretical system without load and without stroke limits. Max. duty cycle 5 min.

These ratings are valid for Parker Hannifin drives. Other drives might not achieve the same ratings.

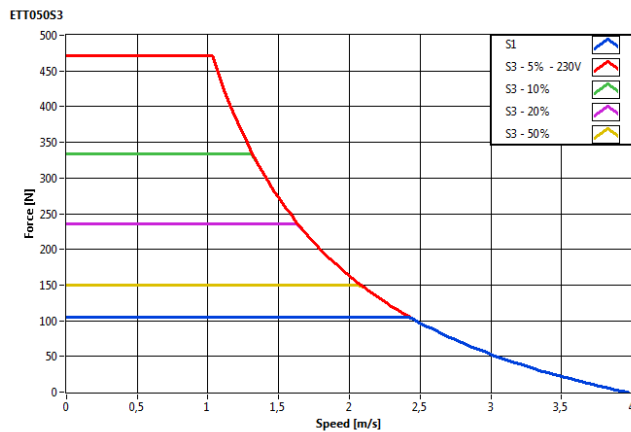
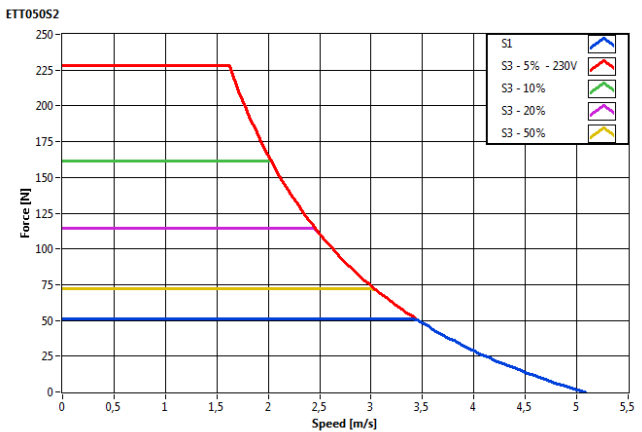
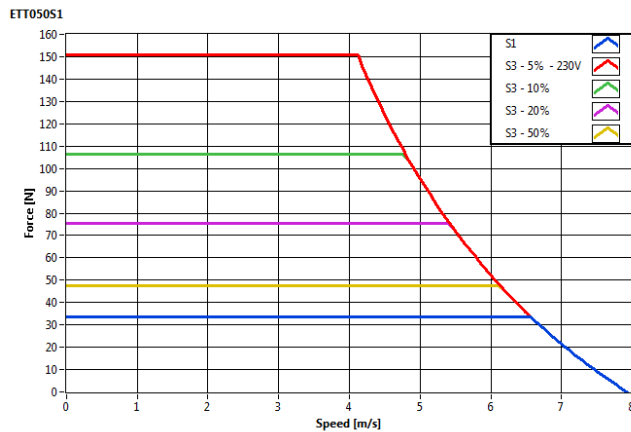
ETT050

	Unit	ETT050S1*	ETT050S2	ETT050S3*
Peak force ^{1) 2) 4)}	[N]	238	361	746
Peak current	[A]	4.7	4.6	7.4
<i>Without heatsink plate</i>				
Continuous stall force duty cycle S1 ¹⁾	[N]	34	51	106
Continuous stall current duty cycle S1 ¹⁾	[A]	0.7	0.7	1.1
Force @ duty cycle S3 5% ¹⁾	[N]	151	228	472
Current @ duty cycle S3 5% ¹⁾	[A]	3.0	2.9	4.7
Force constant	[N/A]	50.30	78.55	100.53
Back EMF (ph-ph,rms)	[V _{rms} /(m/s)]	41.07	64.13	82.08
Phase resistance	[ohm]	42.41	62.70	58.04
Phase inductance	[mH]	23.55	34.70	22.70
Power supply (drive side)	VAC	230	230	230
Max DC bus voltage	VDC	325	325	325
Pole pitch	-	60	60	60
Maximum stroke ⁵⁾	[mm]	720	690	540
Peak acceleration ³⁾	[m/s ²]	199	264	337
Position repeatability	[mm]	0.05	0.05	0.05
Accuracy	[mm]	0.5	0.5	0.5

¹⁾ Data valid at an ambient temperature of 25 °C; ²⁾ Based on triangular move over maximum stroke with normal payload

³⁾ Based on a 100 mm stroke, without payload; ⁴⁾ Considering a duty cycle of S3 2%; ⁵⁾ Other value under request

Manufacturing tolerance ±10%; *Duty cycle S1 and S3 compliant to CEI EN60034-1 with max time 5 minutes.



Curves based on rod movement.

Curves based on a theoretical system without load and without stroke limits. Max. duty cycle 5 min.

These ratings are valid for Parker Hannifin drives. Other drives might not achieve the same ratings.

Standards and Conformance

Low Voltage Directive	• 2006/95/EC
EMC Directive	• 2004/108/EC
Generic standard - Emission standard for industrial environments	• CEI EN 61000-6-4:2007
Generic standard - Immunity for industrial environments	• CEI EN 61000-6-2:2006
Marked 	

Feedback

Internal position sensor-analogue sin/cos

The position sensor outputs analogue, differential sine and cosine signals for providing position feedback. Shown below in the follow table the main features of sin/cos feedback.

	ETT032	ETT050
Pole pitch [mm]	60	60
Output current [mA]	50	50
Supply voltage [VDC]	5 ± 0.25	
Supply current [mA]	40 ± 10%	
Repeatability up to [µm]	± 50	

Internal position sensor-incremental TTL

The incremental position sensor outputs have TTL line drives signals, A and B, /A and /B without track of zero. The resolution is programmable and the default value is 2048 increments.

	ETT032	ETT050
Pole pitch [mm]	60	60
Output signals	A, B, /A, /B	
Supply voltage [VDC]	5 ± 0.25	
Supply current [mA]	100 ± 10%	
Repeatability up to [µm]	± 50	
Resolution with 2048 increments [µm]	29.3	
System accuracy [mm]	± 0.5	
Error of linearity	< 1%	
Max resolution	24 bit	

Internal position sensor-BISS-C

The internal feedback allows to have a BISS-C interface option. The electronic board contains an integrated sensor, interpolation electronics and motor parameters as electronic data sheet (EDS).

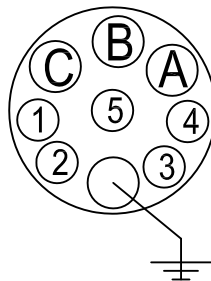
	ETT032	ETT050
Pole pitch [mm]	60	60
Output signals	BISS-C RS485 serial	
Supply voltage [VDC]	5 ± 0.25	
Supply current [mA]	100 ± 10%	
Repeatability up to [µm]	± 50	
Resolution with 2048 increments [µm]	29.3	
System accuracy [mm]	± 0.5	
Error of linearity	< 1%	
Max resolution	8192 increments	

External Linear Encoders

To achieve highest accuracy, the most popular feedback device for linear motor positioning systems is the linear encoder. There are two variants of linear encoders available; magnetic and optical.

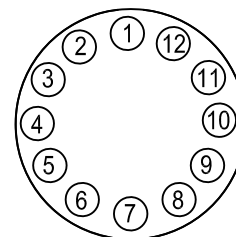
MSK500010KE1	Incremental, digital interface, resolution 1 μm • Magnetic encoder • Max. resolution up to 1 μm • Repeat accuracy $\pm 0.01\text{ mm}$ • Status LED display • Works with magnetic band MB500 • Reading distance up to 2 m
LIC 2117	Absolute, EnDat interface, resolution 0.1 μm • Optical encoder • Max. resolution up to 0.1 μm • Repeat accuracy $\pm 15\text{ }\mu\text{m}$ • EnDat2.2 • Reading distance up to 3 m

Layout and Connectors



Power connector

Pin	Description
A	U
B	W
C	V
PE	PE
1	n.c.
2	n.c.
3	n.c.
4	n.c.
5	n.c.
Type	
CONMOTYF	Female connector



Feedback connector

Pin	Description
1	COS -
2	COS +
3	n.c.
4	KTY84 -
5	KTY84 +
6	n.c.
7	SIN -
8	SIN +
9	n.c.
10	+5 V
11	n.c.
12	GND - shield
Type	
CONRESYF	Female connector

Cables and Connectors

All cable kits are optimally configured for our servo products line. The characteristics of the cables include: low adhesion, halogen free and flame-retardant according to the requirements DIN VDE 0472. Resistant to oil, grease, coolant and lubricants.

Motor connection power cable

TYPE

ETT-CAP

Cable design

Conductor material	Stranded copper
Core structure	(3 + T) x 1.5 mm ²
Core insulation	TEO-Flexene®
Outer sheath	Polyurethane
Colour sheath	Orange RAL2003

Technical data

Rated voltage	Power: 600/1000 V
Dielectric strength	Power: 4000 V
Insulation resistance	Power: > 2500 MOhm x km
Minimum bending radius	7.5 x diam. unsupported chain 10 x diam. long travel
Max. speed	240 m/min.
Max. acceleration	20 m/sec ²
Cycles	10000000
Operating temperature	-30 + 80 °C
Outer diameter	8.5 mm



Motor connection signal cable

TYPE

ETT-CAS

Cable design

Conductor material	Stranded copper
Core structure	[3x(2x0.14 SK)+2x(0.50 SK)] SK
Core insulation	TPE-E
Outer sheath	Polyurethane
Colour sheath	Green RAL6018

Technical data

Rated voltage	30 V
Dielectric strength	1500 V
Insulation resistance	> 10 MOhm x km
Minimum bending radius	90 mm
Max. speed	240 m/min.
Max. acceleration	20 m/sec ²
Cycles	≥ 5000000
Operating temperature	-30 + 80 °C
Outer diameter	8.4 mm

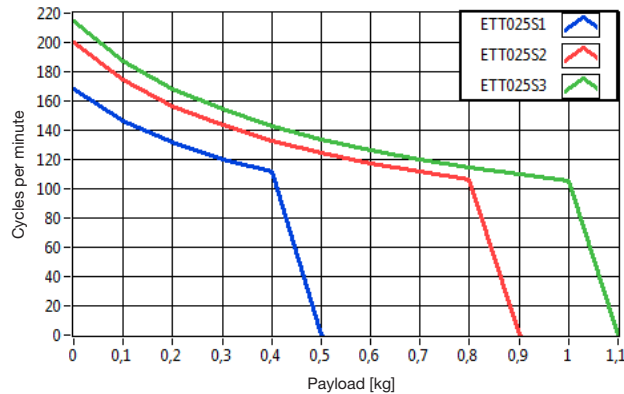


ETT Range Sizing

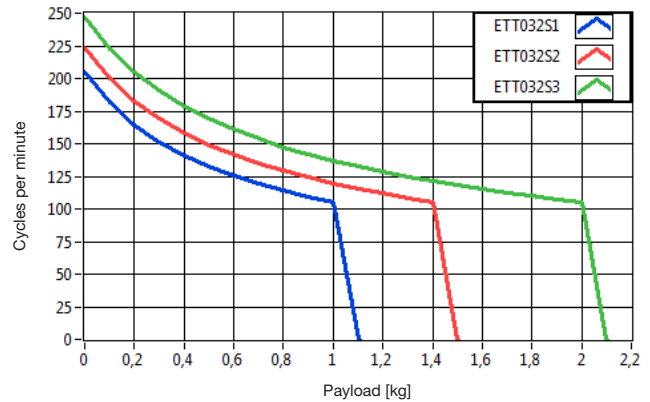
In order to simplify the representation, we assumed boundary conditions which must be adhered to without exception in your application, otherwise the product combinations suggested here might not work. In this case, the application must be dimensioned conventionally.

The following graphs show the combination of the maximum cycles per minute and maximum payload for each size of motor with the assumption of: Stroke 90 mm, Triangular profile, Cycle S3 – 5%, Without thrust force.

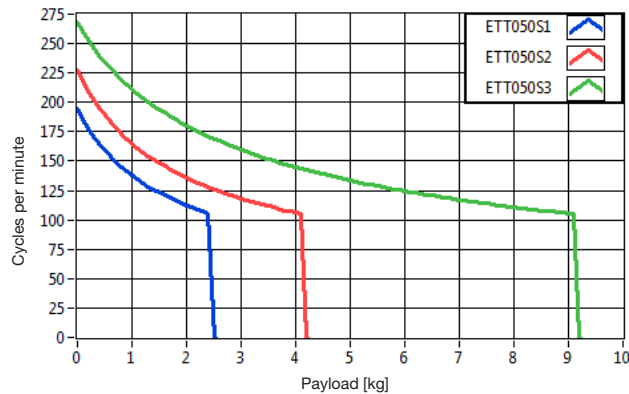
ETT025



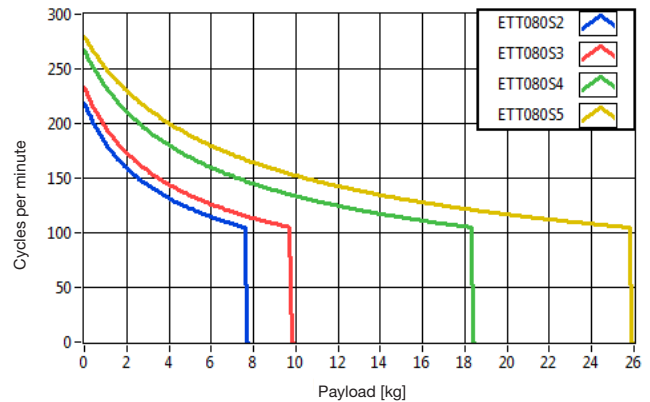
ETT032



ETT050



ETT080



Common Motion Profile Formulas

Triangular Profile 1/2, 1/2

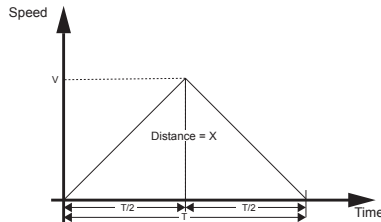
Accelerate to speed and decelerate back to original speed or zero, rest and repeat the process as needed.

This is very simple and is common in applications such as Pick & Place.

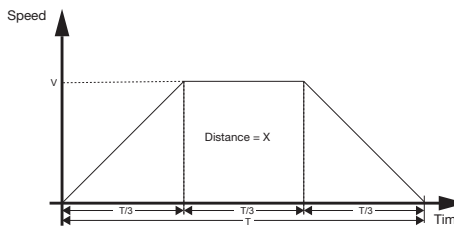
Trapezoidal Profile

Accelerate to constant speed, travel at a constant speed and then decelerate back to original speed or zero. This is common in applications such as scanning inspection. There are two types, the 1/3 Trapezoidal Profile and the Variable Trapezoidal Profile.

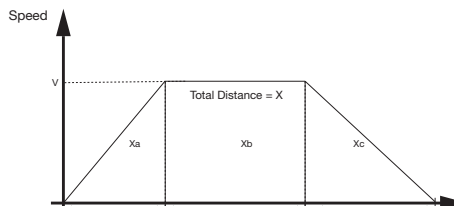
Item	Symbol	Unit
Stroke	X	mm
Velocity	V	m/s
Acceleration time	T _a	s
Continuous time	T _b	s
Deceleration time	T _c	s
Settling time	T _s	s
Waiting time	T _w	s



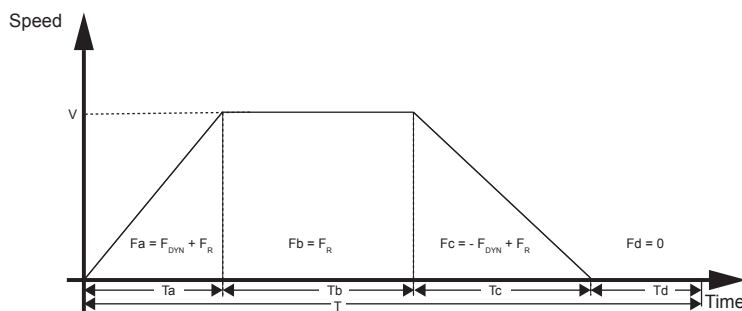
Solve for	Have	X (m) T (sec)	V (m/sec) T (sec)	A (m/sec ²) T (sec)	A (m/sec ²) V (m/sec)
Distance X(m)			$X = (1/2) * V * T$	$X = (1/4) * A * T^2$	$X = (V^2/A)$
Velocity V (m/sec)		$V = 2 * (X/T)$		$V = (A * T)/2$	$V = \sqrt{A * X}$
Acceleration A (m/sec ²)		$A = 4 * (X/T^2)$	$A = 2 * (V/T)$		$A = V^2/X$



Solve for	Have	X (m) T (sec)	V (m/sec) T (sec)	A (m/sec ²) T (sec)	A (m/sec ²) V (m/sec)
Distance X(m)			$X = (2/3) * V * T$	$X = (1/4.5) * A * T^2$	$X = 2 * (V^2/A)$
Velocity V (m/sec)		$V = 1.5 * (X/T)$		$V = (A * T)/3$	$V = \sqrt{A * X/2}$
Acceleration A (m/sec ²)		$A = 4.5 * (X/T^2)$	$A = 3 * (V/T)$		$A = 2 * (V^2/X)$



Solve for	Have	X (m) T (sec)	V (m/sec) T (sec)	A (m/sec ²) T (sec)	A (m/sec ²) V (m/sec)
Distance X(m)			$X = V * T/2$	$X = (A * T^2)/2$	$X = V^2/(2 * A)$
Velocity V (m/sec)		$V = (2 * X)/T$		$V = A * T$	$V = \sqrt{2 * A * X}$
Acceleration A (m/sec ²)		$A = (2 * X)/T^2$	$A = V/T$		$A = V^2/(2 * X)$



$$\text{Peak force } F_{\text{peak}} = \max(F_a, F_b, F_c, F_d)$$

$$\text{RMS Force } F_{\text{RMS}} = \sqrt{\frac{F_a^2 * T_a + F_b^2 * T_b + F_c^2 * T_c + F_d^2 * T_d}{T_a + T_b + T_c + T_d}}$$

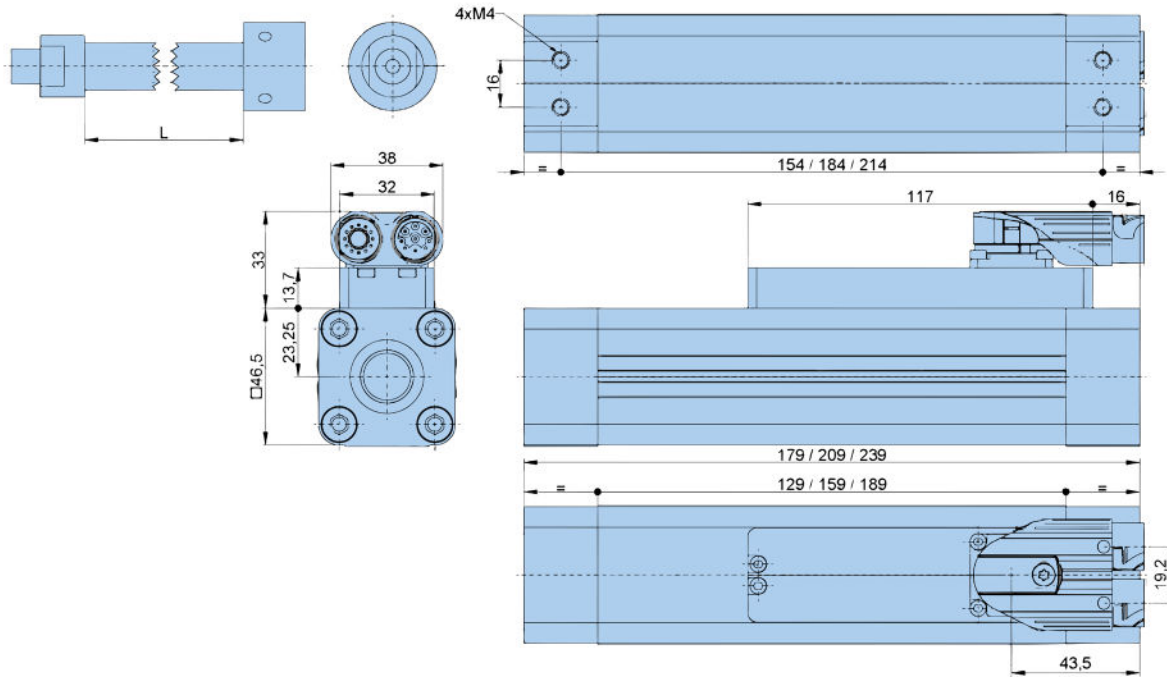
Force Formula

Dynamic force	$F_{\text{DYN}} = m * a$
Friction force	$F_R = \mu * F_N$
Normal force	$F_N = \cos \alpha * F_G$
Gravity force	$F_G = m * g$

Item	Symbol	Unit
Gravity	g	9.81 m/s ²
Friction coefficient	μ	
Moving mass	m	kg
Angle of the inclined surface	α	°
Acceleration time	Ta	s
Constant speed time	Tb	s
Deceleration time	Tc	s
Waiting time	Td	s

DIMENSIONS

ETT032

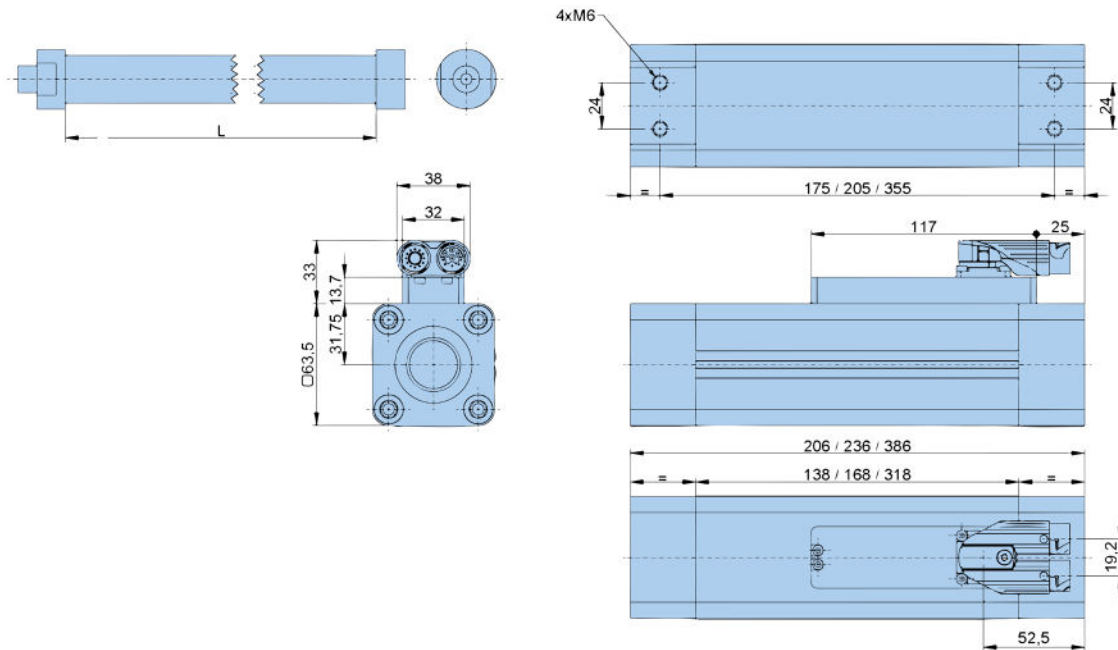


Length of Rod / Table of Stroke

Part Number Codification	Rod "F"		Rod "N"		Rod "M"		Rod "G"		Stroke		
	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	S1 [mm]	S2 [mm]	S3 [mm]
0221	227	0.185	239	0.184	228	0.184	237	0.186	30		
0251	257	0.227	269	0.226	258	0.226	267	0.228	60	30	
0281	287	0.268	299	0.267	288	0.267	297	0.269	90	60	30
0311	317	0.31	329	0.309	318	0.309	327	0.311	120	90	60
0341	347	0.352	359	0.351	348	0.351	357	0.353	150	120	90
0371	377	0.394	389	0.393	378	0.393	387	0.395	180	150	120
0401	407	0.436	419	0.435	408	0.435	417	0.437	210	180	150
0431	437	0.478	449	0.477	438	0.477	447	0.479	240	210	180
0461	467	0.519	479	0.518	468	0.518	477	0.52	270	240	210
0491	497	0.561	509	0.56	498	0.56	507	0.562	300	270	240
0521	527	0.603	539	0.602	528	0.602	537	0.604	330	300	270
0551	557	0.645	569	0.644	558	0.644	567	0.646	360	330	300
0581	587	0.687	599	0.686	588	0.686	597	0.688	390	360	330
0611	617	0.729	629	0.728	618	0.728	627	0.73	420	390	360
0641	647	0.771	659	0.77	648	0.77	657	0.772	450	420	390
0671	677	0.812	689	0.811	678	0.811	687	0.813	480	450	420
0701	707	0.854	719	0.853	708	0.853	717	0.855	510	480	450
0731	737	0.896	749	0.895	738	0.895	747	0.897	540	510	480
0761	767	0.938	779	0.937	768	0.937	777	0.939	570	540	510
0791	797	0.98	809	0.979	798	0.979	807	0.981	600	570	540
0821	827	1.022	839	1.021	828	1.021	837	1.023	630	600	570
0851	857	1.063	869	1.062	858	1.062	867	1.064	660	630	600
Coil weight [kg]									0.89	1.01	1.16

Max rod length allowed 1250 mm.

ETT050



Length of Rod / Table of Stroke

Part Number Codification	Rod "F"		Rod "N"		Rod "M"		Rod "G"		Stroke		
	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	Length [mm]	Weight [kg]	S1 [mm]	S2 [mm]	S3 [mm]
0254	254	0.759	274	0.758	259	0.758	264	0.76	30		
0284	284	0.866	304	0.865	289	0.865	294	0.867	60	30	
0314	314	0.973	334	0.972	319	0.972	324	0.974	90	60	
0344	344	1.08	364	1.079	349	1.079	354	1.081	120	90	
0374	374	1.187	394	1.186	379	1.186	384	1.188	150	120	
0404	404	1.294	424	1.293	409	1.293	414	1.295	180	150	
0434	434	1.401	454	1.4	439	1.4	444	1.402	210	180	30
0464	464	1.508	484	1.507	469	1.507	474	1.509	240	210	60
0494	494	1.614	514	1.613	499	1.613	504	1.615	270	240	90
0524	524	1.721	544	1.72	529	1.72	534	1.722	300	270	120
0554	554	1.828	574	1.827	559	1.827	564	1.829	330	300	150
0584	584	1.935	604	1.934	589	1.934	594	1.936	360	330	180
0614	614	2.042	634	2.041	619	2.041	624	2.043	390	360	210
0644	644	2.149	664	2.148	649	2.148	654	2.15	420	390	240
0674	674	2.256	694	2.255	679	2.255	684	2.257	450	420	270
0704	704	2.363	724	2.362	709	2.362	714	2.364	480	450	300
0734	734	2.47	754	2.469	739	2.469	744	2.471	510	480	330
0764	764	2.576	784	2.575	769	2.575	774	2.577	540	510	360
0794	794	2.683	814	2.682	799	2.682	804	2.684	570	540	390
0824	824	2.79	844	2.789	829	2.789	834	2.791	600	570	420
0854	854	2.897	874	2.896	859	2.896	864	2.898	630	600	450
0884	884	3.004	904	3.003	889	3.003	894	3.005	660	630	480
0914	914	3.111	934	3.11	919	3.11	924	3.112	690	660	510
0944	944	3.218	964	3.217	949	3.217	954	3.219	720	690	540
Coil weight [kg]									1.54	1.765	3.005

Max rod length allowed 1500 mm.

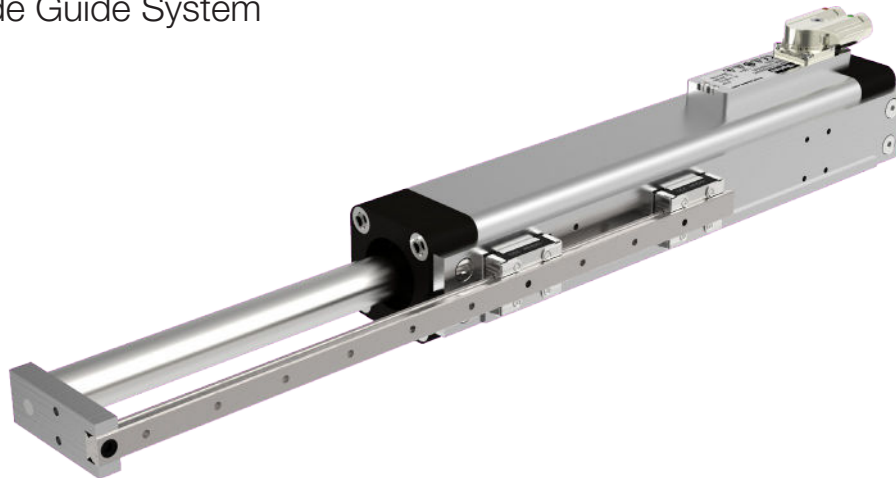
ETT with Slide Guide System

As the system is based on polymer plain bearings, the motor shaft can only sustain limited radial loads; the slide guide system of the ETT motor makes it the ideal solution for applications requiring an anti-rotational device and where lateral force occurs.

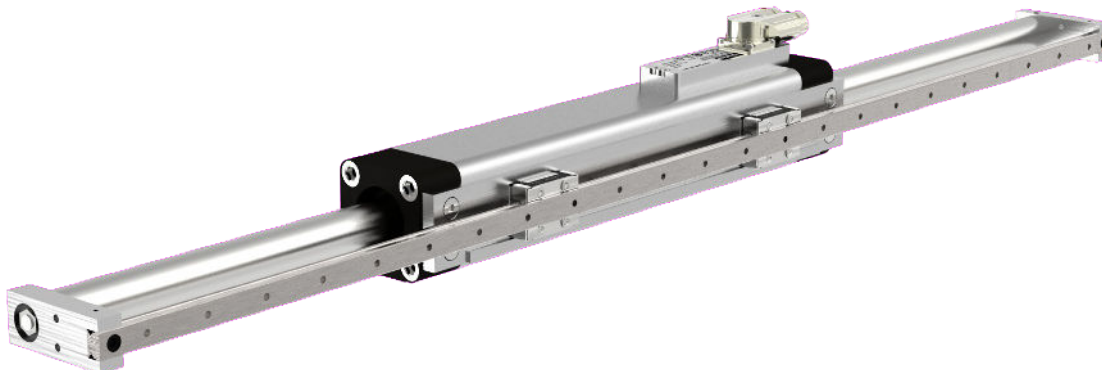
Both solutions use an external system of block bearing, rail and rod-end designed for a specific application. An external linear feedback can be added on the mechanical system to improve the precision and repeatability of the system. With coil movement it's recommended to remove the bush bearing, it's mandatory for long strokes.

Two different configuration layouts are available:

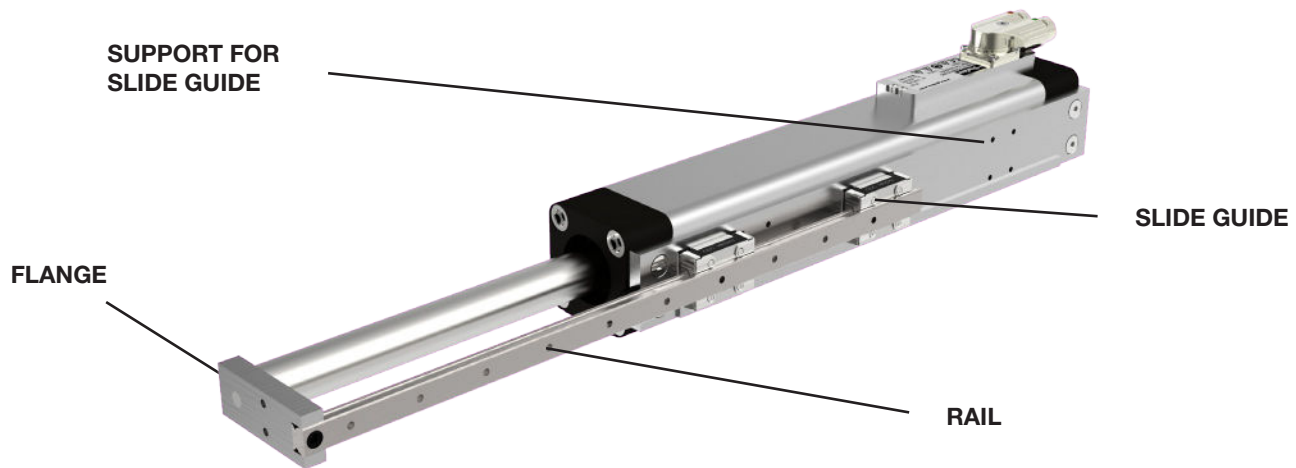
ETT with Slide Guide System



Coil movement for long stroke and heavy load



Structure of the Slide Guide System



RAIL

Series	ETT-LR	Rail option
Rail type	1	Type NB
	032	Designed for motor size 032 - 9 mm size
	050	Designed for motor size 050 - 15 mm size
Length	xxx	*See table of rod length

SLIDE GUIDE

Series	ETT-LC	Slide guide option
Rail type	1	Type NB
	032	Designed for motor size 032 - 9 mm size
	050	Designed for motor size 050 - 15 mm size
ETT motor size		

FLANGE

Series	ETT-LF	Flange option
Side of flange	F	Front flange
	R	Rear flange
ETT motor size	032	Designed for motor size 032 - 9 mm size
	050	Designed for motor size 050 - 15 mm size

SUPPORT FOR SLIDE GUIDE

Series	ETT-LA	Metal support for slide guide option
ETT motor size	032	Designed for motor size 032 - 9 mm size
	050	Designed for motor size 050 - 15 mm size
Length	S1	Winding: Serial, Stack Length 1 - not available for size 080
	S2	Winding: Serial, Stack Length 2
	S3	Winding: Serial, Stack Length 3
	S4	Winding: Serial, Stack Length 4 - only size 080
	S5	Winding: Serial, Stack Length 5 - only size 080

The solution can be ordered as a complete system mounted and tested.

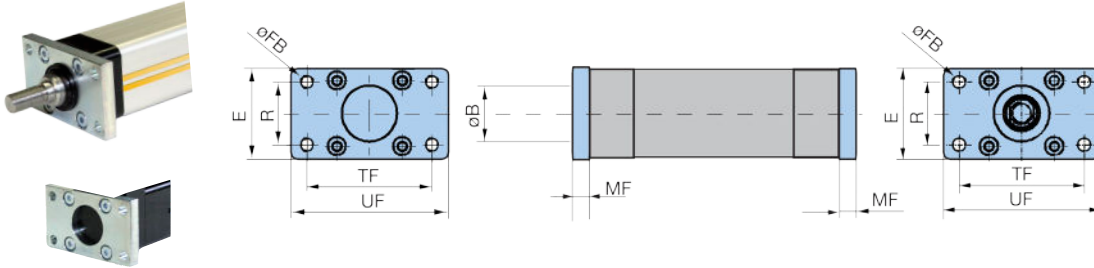
The slide guide system structure results in a reduction of ETT performance due to additional moving mass and friction.

ETT with slide guide system is an ideal solution for easy integration into pick and place gantries and general purpose material handling machines.

OPTIONS & ACCESSORIES

Mounting Methods

Front and Rear Plate



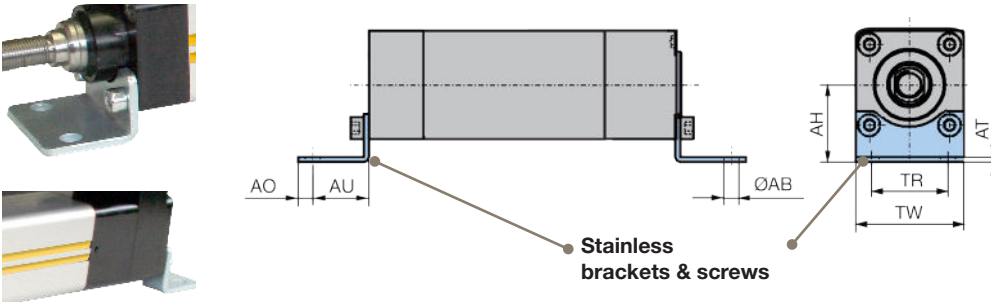
Front and rear plate dimensions

	Order no. (1 piece)	UF	E	TF	ØFB	R	MF	ØB
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETT032	0112.918	80	48	64	7	32	10	30
ETT050	0122.918	110	65	90	9	45	12	40

Spare parts delivery includes screws for mounting.

Please note that front and rear plate as spare parts must be ordered separately.

Mounting Brackets

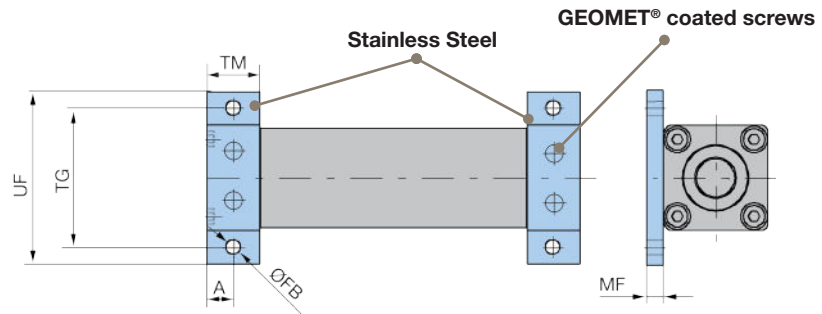
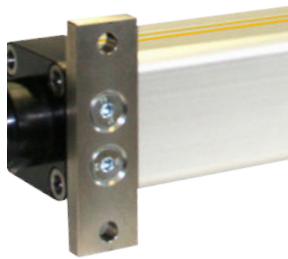


	Order no. Front & Terminal bracket	AH	AT	TR	ØAB (H14)	AO	AU	TW
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETT032	0112.916	32	4	32	7	8	24	46.5
ETT050	0122.916	44	4	45	9	12	32	63.5

Spare parts delivery includes screws for mounting.

* For protection classes, we recommend GEOMET® coated screws (thin layer corrosion protection).

Mounting Flanges



	Order no. (2 piece)	TG	UF	ØFB	TM	MF	A
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETT032	0112.917E	62	78	6.6	25	8	12.5
ETT050	0122.917E	84	104	9	30	10	15

Spare parts delivery includes screws for mounting.

* For protection classes, we recommend GEOMET® coated screws (thin layer corrosion protection).

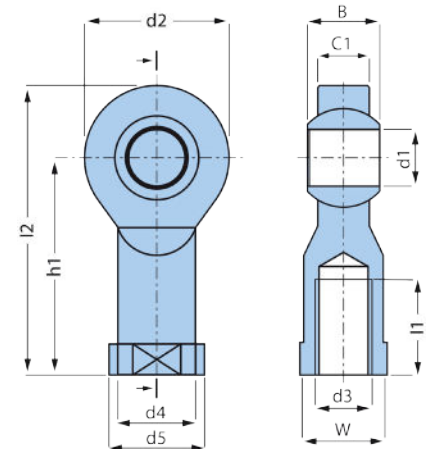
Cylinder Rod Version

Plastic Swivel Rod Eye



manufactured by igus®

KBRM	-06	-08
	ETT032	ETT050
d1 E10	6	8
d2	20	24
d3	M6	M8
d4	10.0	13.0
d5	13.0	16.0
C1	7.0	9.0
B	9	12
h1	30	36
l1	12	16
l2	40	48
W	SW11	SW14
Pitch	29°	25°



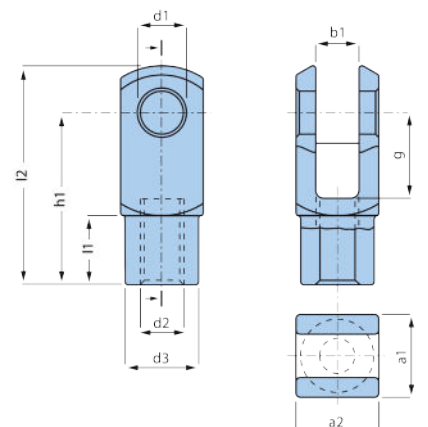
Plastic Rod Clevis



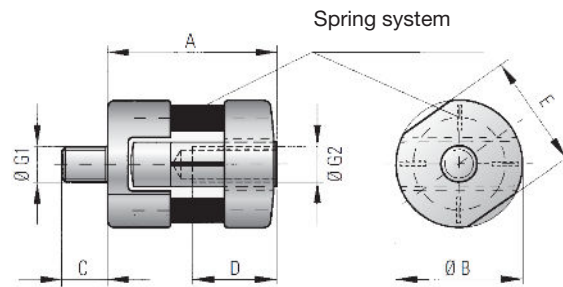
manufactured by igus®

GERM	-06	-08
	ETT032	ETT050
d1 H9	6	8
g h11	12	16
a1 +0.3 / -0.16	12	16
a2 +0.3 / -0.16	12	16
b1 B13	6	8
d2 6H *	M6	M8
d3 +0.3 / -0.3	10.0	14.0
l2 +0.5 / -0.5	31.0	42.0
h1 +0.3 / -0.3	24.0	32.0
l1 +0.2 / -0.2	9.0	12.0

* Thread tolerance



Alignment Coupler



manufactured by R+W®

LK	150	300
	ETT032	ETT050
Pressure force [N]	150	300
A	33	41.5
B	22	30
G1/2	M6	M8
G1/2* [Nm]	7	18
C	8	10
D	12	16
E	20	27
Mass [g]	23	57
Lateral restoring force (max) (N)	18	48
Lateral mov. (max) [mm]	0.5	0.5
Angular mov. (max)	1.5°	1.5°

* Max. tightening torque thread

All alignment coupler sizes are sized on continuous force of ETT. For other force options, please contact Parker

Sealing Rings

ETT motors can be equipped with sealing rings for protecting the coil from contaminants, spray water or excessive grease loss; thus increasing the motor service life.



Sealing rings of special design

Material	Thermoplastic polyurethane elastomer
Colour	Green
Temperature range	From - 30 °C to + 100 °C
Hardness	47 ± Shore D
Ageing resistance	
Light	Very good
Ozone	Good
Media resistance	
Mineral oils, greases	Yes*
Highly blended/synthetic lubricants	No*
Aggressive	No*

Adding sealing rings will change some ETT requirements:

- rod must be lubricated with grease type RHEOSIL 500F
- speed is limited up to 3 m/s max
- temperature range changes to -30 °C... + 100 °C
- stroke of the rod decreases
- rotating movements are not allowed
- rod needs to be kept clean

*Please contact your nearest sales office

Step by Step Selection Process

The following sizing steps help to choose the most suitable electric tubular motor.

1. Select an ETT using estimated application data.
2. Calculate the actually required application data following the dimensioning steps described below.
3. If your application's requirements exceed a maximum value, please choose a larger electro cylinder and recheck the maximum values. Perhaps, a smaller tubular motor can also meet the requirements.

Step	Application data	Selection
1	Accuracy, ambient conditions	Check the basic conditions for the use of the ETT in your application.
2	Required space	Check the space available in your application and choose the motor mounting option: rod movement or coil movement
3	Select stroke	Selection of the desired stroke: Determine required stroke from usable stroke and safety travels select the desired stroke from the list of standard strokes or, if the desired stroke is not listed: Define the length of the usable stroke in steps of one mm. Caution! Please respect the minimum and the maximum possible stroke
4	Maximum force required	Determination of the maximum required axial force (traction and thrust force). With evaluation of duty cycle
5	Select position mounting	Check if the ETT orientation is vertical or horizontal
6	Maximum speed	Selection of the maximum speed required for the application
7	Application cycle	Please check the application cycle
8	Permissible thrust force taking the buckling risk into consideration	Check the maximum thrust force depending on the stroke and the mounting variant. Maybe your application can also be realized with a different mounting variant allowing to attain the maximum thrust force
10	Permissible side load	Determine the lateral forces of your application and compare them to the permissible lateral forces (depending on the stroke)
11	Mounting type	Selection of ETT mounting accessories
12	Rod connection	Selection of the rod mounting type

ETT Electric Tubular Motor (Complete Unit)

Fill in an order code from each of the numbered fields to create a complete model order code.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Order Example:

ETT 032 S1 CS M N C

- | | |
|--|---|
| <p>① Type
ETT Electric Tubular Motor</p> <p>② Size
032 ISO 6432 - Bore 32 mm
150 ISO 6432 - Bore 50 mm</p> <p>③ Winding
S1 Serial, Stack Length 1
S2 Serial, Stack Length 2
S3 Serial, Stack Length 3</p> <p>④ Connection and Feedback Type
CS Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback Analogue SinCos 1 Vpp -
CI Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback Incremental TTL
CB Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback BISS-C</p> <p>⑤ Rod End Mounting - Front / Rear
M Male Thread / Cap End
(M6 ETT032, M8 ETT050)
F Female Thread / Cap End
(M6 ETT032, M8 ETT050)
N Male Thread / Male Thread
(M6 ETT032, M8 ETT050)
G Female Thread / Female Thread
(M6 ETT032, M8 ETT050)
X Special
(Customized version - Please contact Parker)</p> | <p>⑥ Fixed Field
N Fixed field</p> <p>⑦ Stroke
..... Stroke length is in mm, four digits.
..... Example 30cm=0300. See table pages
..... 12,13,14,15 - column "Stroke".</p> <p>⑧ Clean Room Option
C IP67</p> <p>⑨ Customized Options
Blank for standard motors</p> |
|--|---|

ETT Electric Tubular Motor (Rod Only)

Fill in an order code from each of the numbered fields to create a complete model order code.

① ② ③ ④ ⑤

Order Example:

ETT-R 032 M

① Type

ETT-R Electric Tubular Motor - Rod only

② Size

032 ISO 6432 - size 32

050 ISO 6432 - size 50

③ Rod End Mounting - Front / Rear

M Male Thread / Cap End
(M6 ETT032, M8 ETT050)

F Female Thread / Cap End
(M6 ETT032, M8 ETT050)

N Male Thread / Male Thread
(M6 ETT032, M8 ETT050)

G Female Thread / Female Thread
(M6 ETT032, M8 ETT050)

X Special
(Customized version - Please contact Parker)

④ Length

..... Rod length is in mm, four digits.

..... See tables pages 12,13,14,15 - column

..... "Part Number Codification"

⑤ Customized Options

Blank for standard motors

ETT Electric Tubular Motor (Coil Only)

Fill in an order code from each of the numbered fields to create a complete model order code.

① ② ③ ④ ⑤ ⑥ ⑦

Order Example:

ETT-C 032 S1 CS N C

① Type

ETT-C Electric Tubular Motor - Coil only

② Size

032 ISO 6432 - Bore 32 mm

050 ISO 6432 - Bore 50 mm

③ Winding

S1 Serial, Stack Length 1

S2 Serial, Stack Length 2

S3 Serial, Stack Length 3

④ Connection and Feedback Type

CS Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback Analogue SinCos 1 Vpp -

CI Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback Incremental TTL

CB Intercontec Connector
(Springtec EEDA101NN00000002000) -
Feedback BISS-C

⑤ Fixed Field

N Fixed Field

⑥ Protection Class

C IP67

⑦ Customized Options

Blank for standard motors

ETT Motor and Signal Cable

Fill in an order code from each of the numbered fields to create a complete model order code.

① ② ③ ④ ⑤ ⑥ ⑦

Order Example:

ETT-CAP 032 S1 CS N C

① Cable Type

ETT-CAP Power cable for ETT

ETT-CAS Signal cable for ETT

② Fixed Field

X Fixed field

③ Cable Length

001 1 m

003 3 m

005 5 m

007 7 m

010 10 m

015 15 m

020 20 m

④ Application Type

PM High flex cable

⑤ Connector

Y1 Intercontec Y-TECH Connector

X Special Execution

⑥ Drive Type

C3 Compax3

IP IPA Drive (for IPA Power Cable only, use
C3 callout—e.g. CAPX005PMY1C3)

⑦ Option

00 No special option

Special customer drawing

Full Range of Positioning Solutions from Parker



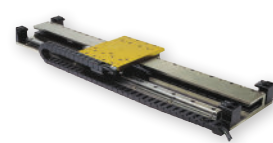
mSR Series

The mSR series positioner is the most accurate standard positioner ever offered by Parker, delivering submicron level precision in two form factors. The mSR offers OEMs high precision motion in an ultra small package.



MX Series

Designed to meet decreasing size requirements, the MX is one of the smallest linear servo motor and screw-driven positioners in the industry. Loaded with high performance features, the MX redefines "high-throughput automation" for 24/7 production demands.



T Series

Delivering high performance with economy, Trilogy positioners offer design flexibility that accommodates customization. Trilogy uses ironless linear motor technology in a pre-engineered, easily integrated, ready-to-run package.



XR Series

The award-winning XR Series is globally recognized for consistent accuracy, reliable performance, high strength, and unmatched versatility. The XR family offers an unrivaled array of features and modularity that easily match any application.



LXR Series

The 400LXR Series linear servo motor tables offer high acceleration, velocity, and precision with quick settling for superior throughput. The 400LXR Series can solve most high-performance applications.



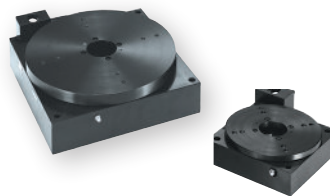
HMR Series

The HMR has enormous moment and payload capacity. Ideal for flexibility and simplified machine integration, the HMR is one of the most user friendly and versatile lines of linear actuators on the market today.



XE Series

Highly accurate and cost-effective, the XE combines versatility and rugged steel body construction for significant force-per-dollar value. The economical XE easily integrates into multi-axis designs.



RT Series

RT Series rotary tables are designed for precise motor-driven rotary positioning and indexing. The rugged main support bearing and precision worm gear assembly deliver smooth flat motion with no backlash.



PM DD Series

P Series direct-drive rotary motors are high performance integrated positioning systems. The combination of high torque, zero backlash and precision bearing structure results in fast settling time and outstanding accuracy.

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1. **Terms and Conditions of Sale:** All descriptions, quotations, proposals, offers acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between, Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. **Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. **Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. **Warranty:** Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 12 months from date of shipment from Parker. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

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6. **Changes, Reschedules and Cancellations:** Buyers may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification of cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. **Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture

and not withstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. **Buyer's Property:** Any designs, tools, patterns, materials, drawings confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. **Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it non infringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Right. If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. **Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. **Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder of this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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