

# TECNOTION<sup>®</sup>

THE LINEAR MOTOR COMPANY

*Iron Core & Ironless Linear Motor Series*



# QUALITY AND SERVICE DELIVERED WORLDWIDE

## [ TECNOTION ]

Tecnotion is *the* global authority on direct drive motor technology. We are the world's only unbundled manufacturer of linear and torque motors. A former part of Philips, we specialize solely in the development and production of linear and torque motors. Because of this, our expertise, customer service and product quality are unmatched.

We have a global presence, with production plants in The Netherlands and China and local representation around the world. This ensures short delivery times and high quality support, wherever you are located.

When you do business with Tecnotion, you have a team of highly skilled sales and application engineers at your disposal. They help you from your initial prototype all the way to the application of our products and beyond.

Whatever your needs, you can rely on Tecnotion as a solid, reliable partner.





## [ SALES SUPPORT ]

At Tecnotion we understand that each application of our linear motors is a unique case with specific requirements and demands.

Our sales and application engineers have extensive experience with a wide range of application types and collaborate on a high level with our customers to make sure you get the solution that best fits your requirements.

Additionally our specialized Simulation Tool is available to help you find your way through our wide range of linear motors and analyze/test out different motor types within your application specifications.

## [ INNOVATION ]

We have an in-house R&D department, which is continuously pushing the boundaries of technology and taking our products to the next level. This translates directly to our high level of understanding of manufacturing processes.

Apart from our “off-the-shelf” range of standard linear motors, we can also design and manufacture custom made motors for high profile projects or OEM applications that require a tailor-made solution.

All our custom motors are built to the same high standards that characterize our standard range of products.

## [ MANUFACTURING ]

Manufacturing of our standard range of motors takes place at our modern plant in China, where we are able to produce in high volume at very competitive rates.

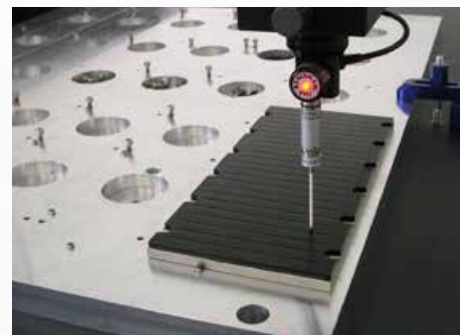
At our competence centre and headquarters in The Netherlands we specialize in advanced technology. This is where we do our research and development and where custom motors are built with extreme accuracy in our special state of the art cleanroom environment.

Tecnotion is committed to excellence. Both of our plants are ISO 9001 certified and comply to the highest quality standards possible.

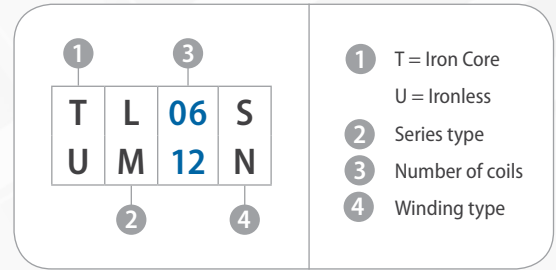
## [ GLOBAL LOGISTICS ]

We always have our most popular products in stock in our warehouses in both The Netherlands and China.

Our logistics department can ship to you from both locations, making short delivery times possible across the globe, even when markets are ramping.



# Iron Core Motors



## TBW Series

*Fu 2700-6750N Fc 1140-2850N*

The TBW series is the water cooled variant of the TB series. It features a fully integrated, highly efficient cooling system which enables the TBW to reach even higher continuous forces than the standard version and sustain extreme accelerations while maintaining its sub micron position accuracy. Since heat is not dissipated into the machine's construction, it is especially suited for applications where thermal management is an issue.

## TB Series

*Fu 1800-4500N Fc 760-1900N*

The high-end TB motors are heavy duty workhorses that combine high acceleration and speed, sub micron positioning accuracy and low power consumption with a superb force density. They excel in applications where high loads and long duty cycles are the order of the day. When you require a motor that takes your application to new levels, the TB more than delivers.

## TL Series

*Fu 450-1800N Fc 200-800N*

The mid-range TL is our most popular iron core motor. It features an extremely low attraction force between the coils and the magnets and stands out for its small size, high acceleration, high speed and accuracy. The TL is also available in long versions, which makes this all-rounder suited for nearly any application, including those with long travel lengths, like printers for large digital formats.

## TM Series

*Fu 120-720N Fc 60-360N*

For applications that do not require high forces, it is often more effective to use a smaller and less costly motor. Over the years, the TM series has proven to be a very versatile, reliable and efficient motor for a wide range of applications. To enhance its effectiveness, the TM linear motor is equipped with a long flexible servo cable which makes the use of additional connectors superfluous and reduces total cost of ownership even further.



# Ironless Motors



## UXX / UXA Series

*Fp 615-4200N Fc 120-846N*

The UXX is the most powerful standard ironless motor we have to offer. It is ideal for heavy duty industrial applications that demand ultra precision and maximum force output. The UXA is the economical alternative to the UXX. It's slightly less powerful, but makes up for this with a smaller footprint and an attractive price tag.

## UL Series

*Fp 240-1200N Fc 70-350N*

The high-end UL ironless motors are available in various configurations that can easily be adapted to application specific requirements. Because of their high speed, positioning accuracy, zero cogging and attraction force, many UL motors are successfully applied throughout the semiconductor industry.

## UM Series

*Fp 100-400N Fc 29-116N*

The mid-range UM ironless motors stand out for their extremely high speed and exceptional thermal characteristics which are the result of our unique production techniques. This makes the compact UM motors especially suited for applications in which highly accurate measuring is required.

## UF Series

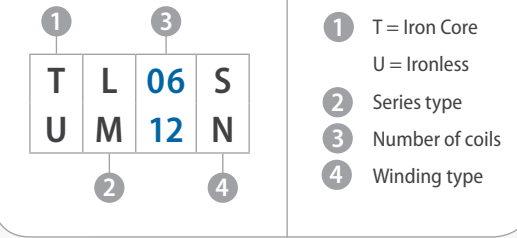
*Fp 42.5-85N Fc 19.5-39N*

The UF Series is built specifically to sustain very high continuous forces for its footprint, which is only marginally larger than that of the UC. It is exceptionally suited for applications with high duty cycles, for instance in the medical and semiconductor markets or for pick & place systems.

## UC Series

*Fp 36-72N Fc 10-20N*

The UC is our smallest "off the shelf" motor. Weighing in at just a few grams, this versatile, compact and affordable motor is still able to sustain a continuous force of 10 or 20N. Due to its low weight it is also suited to operate in a vertical application environment.

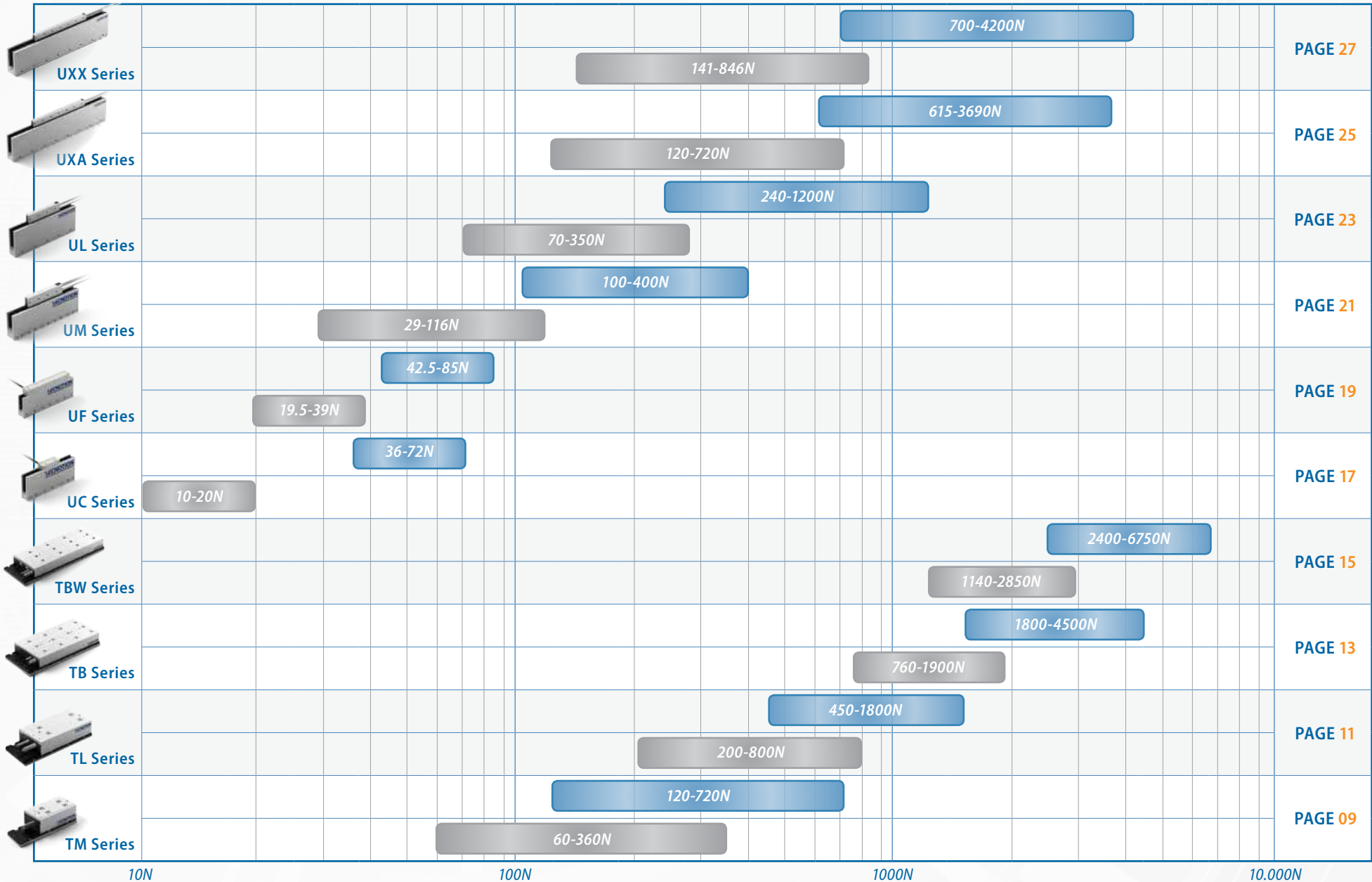


# Content

## Tecnotion's linear motor power range

 Peak force

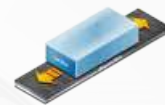
 Continuous force



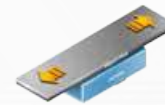
### [ DIRECT DRIVE ADVANTAGES ]

The direct drive technology of linear motors is a perfect way to enhance productivity, accuracy, and dynamic performance. Linear motors eliminate the need for mechanical transmissions like rack and pinion, belts and speed reducers. Between coil unit and magnets there is no contact, this means no mechanical wear. The technology makes designs slimmer, modular and reduces costs.

**Modular system.** All motors can be used in various configurations:



1. single moving coil



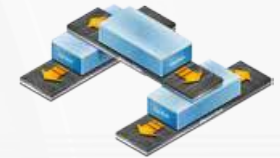
2. moving magnet



3. parallel coupled coil



4. in-line on a single track



5. crosstable or gantry

#### High force density

More force in a smaller packing means lowering footprint and fits better in small(er) spaces.

$F/cm^3$

#### Low cogging

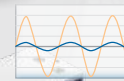
Optimized iron core motor design, for smooth motion and position accuracy in your application.

#### Approved for CSA and CE, ROHS

Iron core motors are approved for CE, CSA and ROHS.

#### Aluminium housed design

Housed design with integrated water cooling for TBW- and TL series.



#### High acceleration and dynamics

The outstanding force to mass ratio of the ironless coils enables unmatched system dynamics.

#### No cogging, extremely low force ripple

Ironless motors have no cogging effects. Offering smooth motion and position accuracy in your application.

#### Approved for CE and ROHS

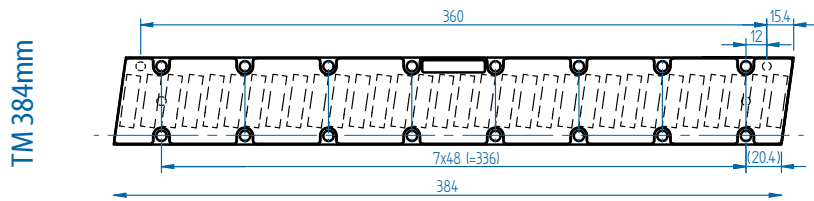
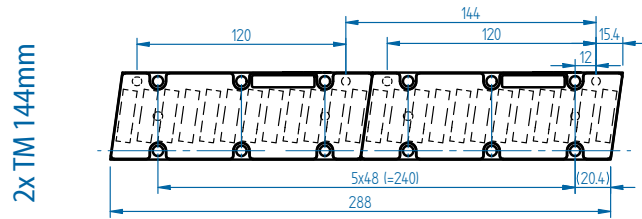
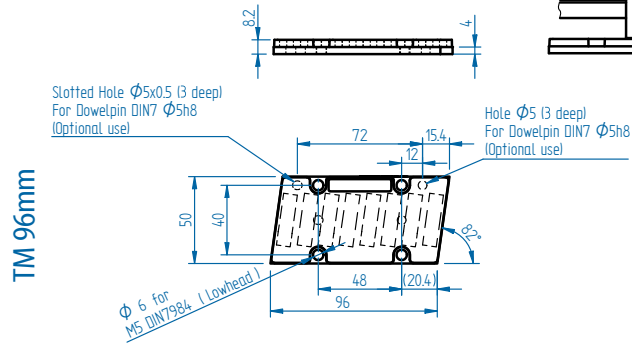
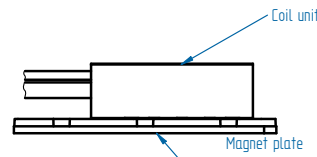
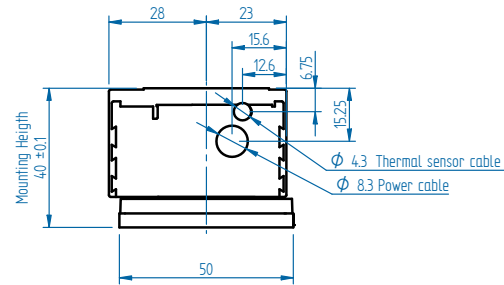
Ironless motors are CE and RoHS approved.

#### Low thermal resistance

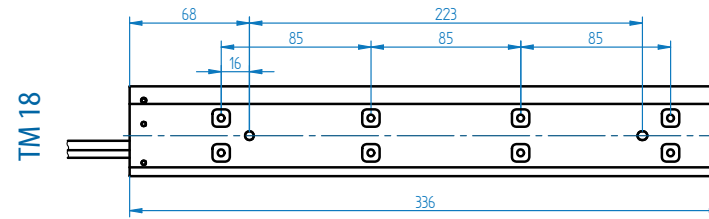
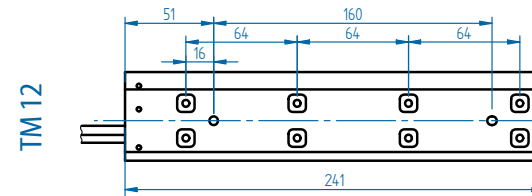
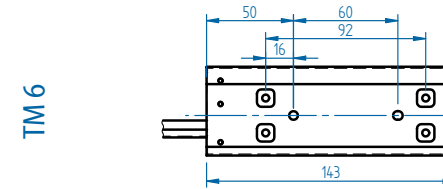
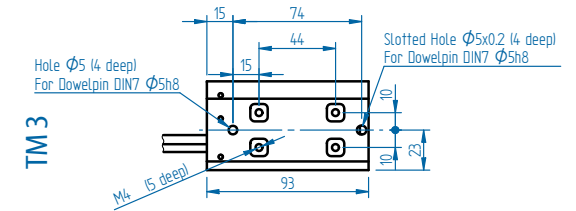
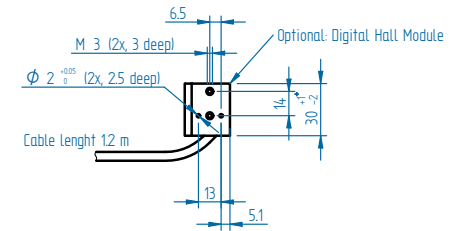
Allowing good heat transfer, achieving an extremely high continuous force for all motors when using a descent size heatsink or active cooling.

Mounting instructions and flatness or parallelism requirements can be found in the Iron Core installation manual. CAD files, 3D models and the manual can be downloaded from our website.

## MAGNET PLATES

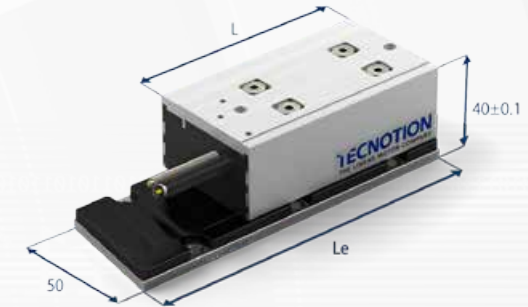


## COIL UNITS





Parameter	Remarks	Sym	Unit	TM3	TM6	TM12	TM18			
Winding type				S	Z	S	Z	S	N	S
Motor type, max voltage ph-ph	3-phase synchronous Iron core, 400V <sub>ac,rms</sub> (600V <sub>dc</sub> )									
Ultimate Force @ 10°C/s increase	magnet @ 25°C	F <sub>u</sub>	N	120	120	240	240	480	720	
Peak Force @ 6°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	105	105	210	210	420	630	
Continuous Force*	coils @ 100°C	F <sub>c</sub>	N	60	60	120	120	240	360	
Maximum Speed**	@ 600 V	v <sub>max</sub>	m/s	12	36.6	12	36.5	12	4.5	10.0
Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	39	12.9	39	12.9	39	79	39
Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	95	95	190	190	380	570	
Ultimate Current	magnet @ 25°C	I <sub>u</sub>	A <sub>rms</sub>	4.1	12.6	8.2	25.1	16.4	12.3	25.1
Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	3.1	9.5	6.2	18.9	12.4	9.2	18.9
Maximum Continuous Current*	coils @ 100°C	I <sub>c</sub>	A <sub>rms</sub>	1.5	4.7	3	9.3	6	4.5	9.3
Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	32	11	32	11	32	65	32
Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	5.4	0.56	2.7	0.28	1.35	3.6	0.85
Induction per Phase	I < 0.6 I <sub>p</sub>	L <sub>ph</sub>	mH	35	3.65	17	1.83	9	23	5.5
Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	6.5	6.5	6.5	6.5	6.5	6.5	
Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	49	49	99	99	197	296	
Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	1.5	1.5	0.75	0.75	0.38	0.25	
Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	75	75	75	75	75	75	
Temperature Cut-off / Sensor				PTC 1kΩ / KTY 83-122						
Coil Unit Weight	ex. cables	W	kg	0.6	0.6	0.9	0.9	1.6	2.3	
Coil Unit Length	ex. cables	L	mm	93	93	143	143	241	336	
Motor Attraction Force	rms @ 0 A	F <sub>a</sub>	N	300	300	500	500	900	1300	
Magnet Pitch NN		τ	mm	24	24	24	24	24	24	
Cable Mass		m	kg/m	0.18	0.18	0.18	0.18	0.18	0.18	
Cable Type (Power FLEX)	length 3 m	d	mm (AWG)	8.3 (≥18)						
Cable Type (Sensor)	length 3 m	d	mm (AWG)	4.3 (26)						
Cable Life (Power FLEX)***	minimum			5,000,000 cycles						
Bending Radius Static	minimum			4x cable diameter						
Bending Radius Dynamic	minimum			10x cable diameter						



TM3 on 144mm magnet plate shown

#### Approvals



See page 28 for Analog hall

#### FLEX Cable

The TM series comes standard with a 3m long FLEX power cable.

#### Magnet plate dimensions

Le (mm)	96	144	384
M5 bolts	4	6	16
Mass (kg/m)	2.1		

Magnet plates can be butted together.

All specifications ±10%

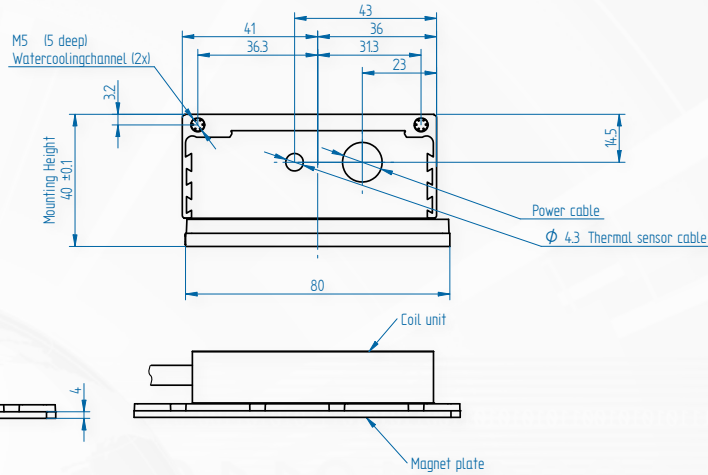
\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

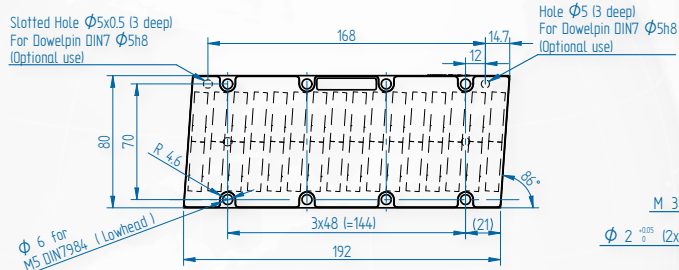
\*\*\* Depending on Bending Radius, Velocity and Acceleration.

Mounting instructions and flatness or parallelism requirements can be found in the Iron Core installation manual. CAD files, 3D models and the manual can be downloaded from our website.

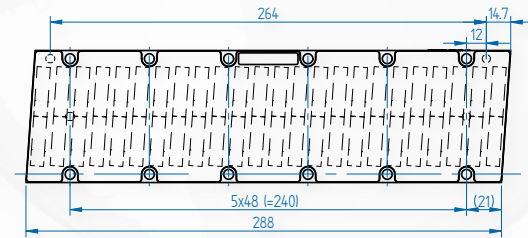
## MAGNET PLATES



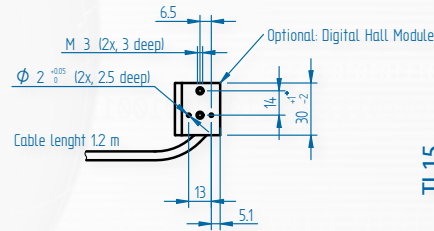
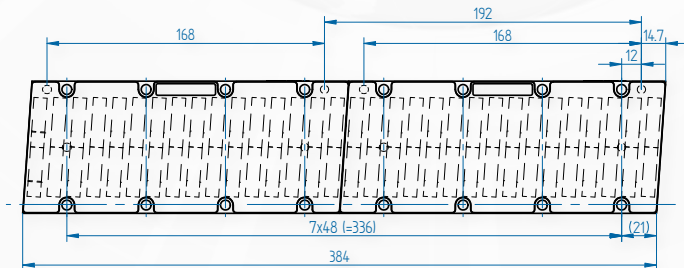
TL 192mm



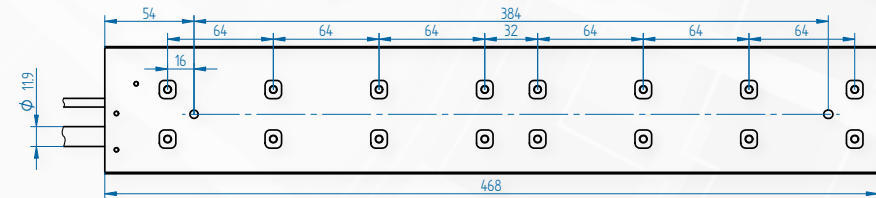
TL 288mm



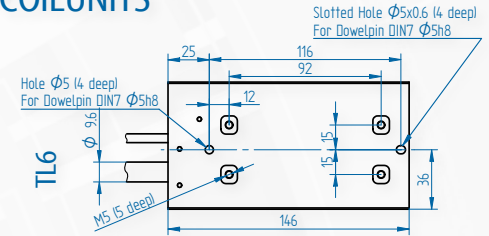
2x TL 192mm



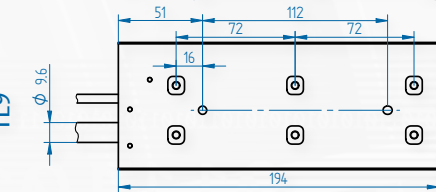
TL24



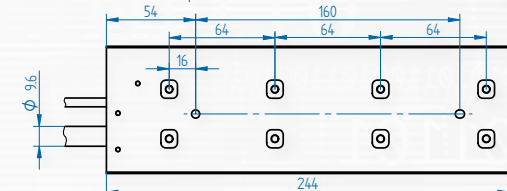
## COIL UNITS



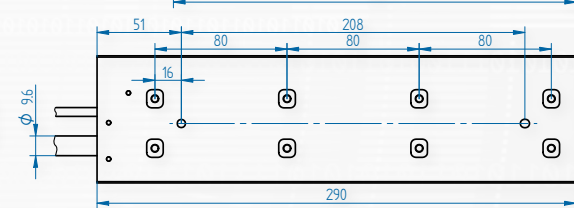
TL9



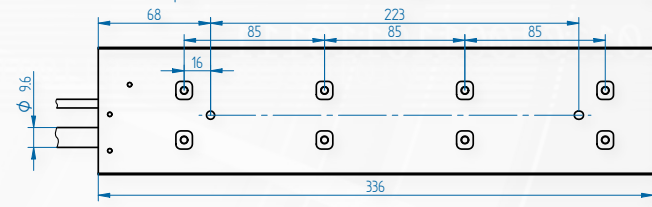
TL12



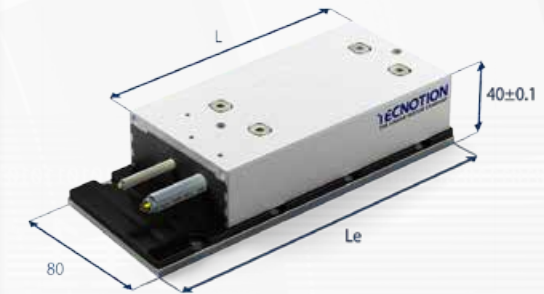
TL15



TL18



	Parameter	Remarks	Sym	Unit	TL6		TL9		TL12		TL15		TL18		TL24	
					N	S	N	S	N	S	N	S	N	S	N	S
Performance	Winding type				N	S	N	S	N	S	N	S	N	S	N	S
	Motortype, max voltage ph-ph				3-phase synchronous Iron core, 400V <sub>ac rms</sub> (600V <sub>dc</sub> )											
	Ultimate Force @ 10°C/s increase	magnet @ 25°C	F <sub>u</sub>	N	450	675	900	1125	1350	1800						
	Peak Force @ 6°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	400	600	800	1000	1200	1600						
	Continuous Force Watercooled*	coils @ 100°C	F <sub>cw</sub>	N	210	315	420	525	630	840						
	Continuous Force	coils @ 100°C	F <sub>c</sub>	N	200	300	400	500	600	800						
	Maximum Speed**	@ 560 V	v <sub>max</sub>	m/s	3.5	7	2,5	7	3.5	7	3.5	7	3.5	7	3.5	7
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	93	46.5	140	46.5	93	46.5	112	46.5	93	44.9	93	46.5
Electrical	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	380	570	760	950	1140	1520						
	Ultimate Current	magnet @ 25°C	I <sub>u</sub>	A <sub>rms</sub>	6.5	13.1	6.5	19.6	13.1	26.2	13.5	32.7	19.6	41	26.2	52
	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	5.0	10.0	5.0	15.0	10.0	20.0	10.4	25.0	15.0	31.0	20.0	40.0
	Continuous Current Watercooled*	coils @ 100°C	I <sub>cw</sub>	A <sub>rms</sub>	2.26	4.5	2.26	6.8	4.5	9.0	4.7	11.3	6.8	14.0	9.0	18.1
	Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	76	38	114	38	76	38	92	38	76	38	76	38
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	7.2	1.80	10.8	1.21	3.6	0.90	4.3	0.72	2.41	0.59	1.81	0.46
	Induction per Phase	l < 0.6 lp	L <sub>ph</sub>	mH	54	14	81	9.0	27	7.0	32	5.4	18	4.4	14	3.4
	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	150	225	300	375	450	600						
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	0.48	0.32	0.24	0.19	0.16	0.12						
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	77	77	77	77	77	77						
	Watercooling Flow	for ΔT=3K	Φ <sub>w</sub>	l/min	0.7	1.1	1.4	1.8	2.2	2.9						
	Watercooling Pressure-drop	order of magnitude	ΔP <sub>w</sub>	bar	1	1	2	2	2	3						
	Temperature Cut-off / Sensor				PTC 1kΩ / KTY 83-122											
Mechanical	Coil Unit Weight	ex. cables	W	kg	1.5	2.0	2.6	3.2	3.8	5.2						
	Coil Unit Length	ex. cables	L	mm	146	194	244	290	336	468						
	Motor Attraction Force	rms @ 0 A	F <sub>a</sub>	N	950	1325	1700	2075	2450	3400						
	Magnet Pitch NN		τ	mm	24	24	24	24	24	24						
	Cable Mass		m	kg/m	0.18	0.18	0.18	0.18	0.18	0.30						
	Cable Type (Power)	length 1 m	d	mm (AWG)					9.6 (18)					11.9 (14)		
Cable Type (Sensor)	length 1 m	d	mm (AWG)					4.3 (26)					4.3 (26)			



TL6 on 192mm magnet plate shown

Approvals



See page 28 for Analog hall

### Water cooling

All TL motors feature integrated cooling channels that allow for the easy setup of a liquid cooled system, at no additional cost.

### Magnet plate dimensions

Le (mm)	192	288
M5 bolts	8	12
Mass (kg/m)	3.8	

Magnet plates can be butted together.

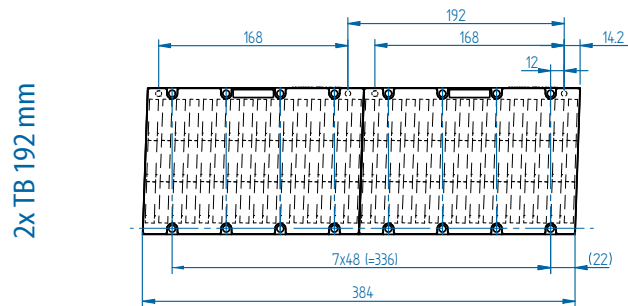
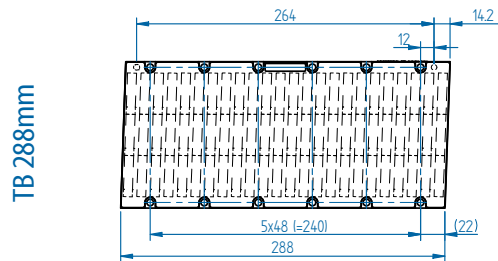
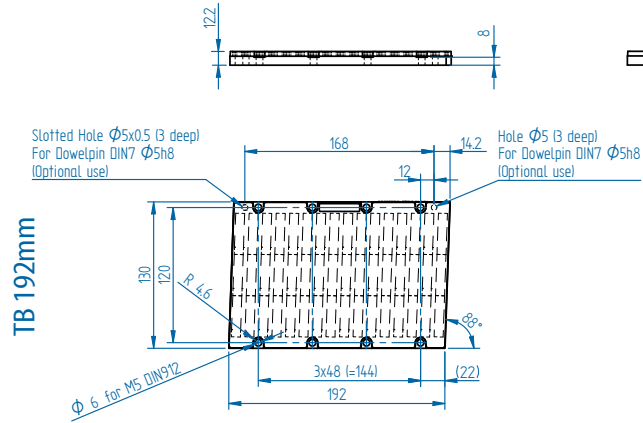
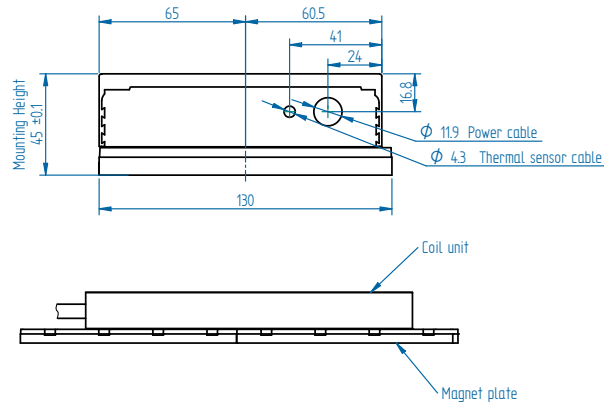
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

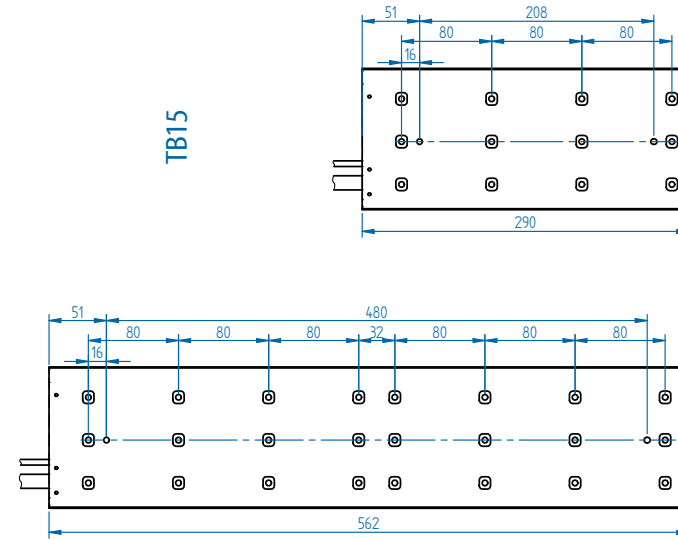
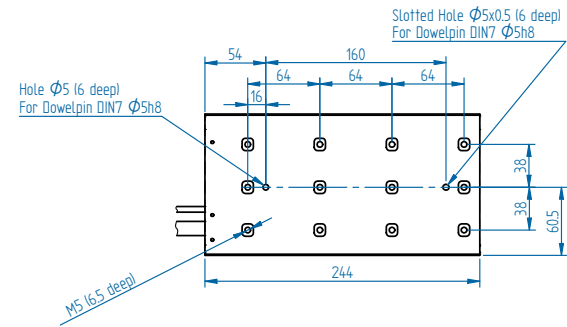
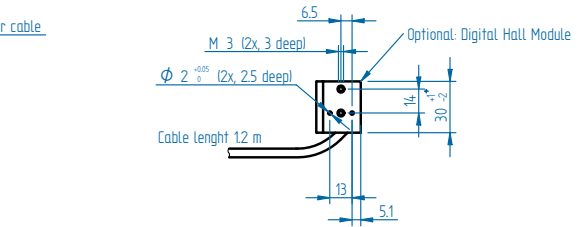
\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

Mounting instructions and flatness or parallelism requirements can be found in the Iron Core installation manual. CAD files, 3D models and the manual can be downloaded from our website.

## MAGNET PLATES

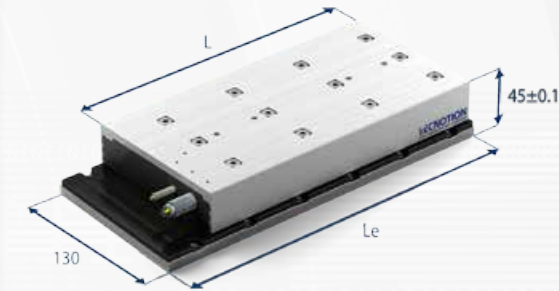


## COIL UNITS





Parameter	Remarks	Symbol	Unit	TB12		TB15		TB30	
Winding type				N	S	N	S	N	S
Motor type, max voltage ph-ph				3-phase synchronous Iron core, 400V <sub>ac rms</sub> (600V <sub>dc</sub> )					
Ultimate Force @ 10°C/s increase	magnet @ 25°C	F <sub>u</sub>	N	1800		2250		4500	
Peak Force @ 6°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	1600		2000		4000	
Continuous Force*	coils @ 100°C	F <sub>c</sub>	N	760		950		1900	
Maximum Speed**	@ 560 V	v <sub>max</sub>	m/s	3	6	2.5	6	2.5	6
Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	186	93	225	93	225	93
Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	1750		2150		4300	
Ultimate Current	magnet @ 25°C	I <sub>u</sub>	A <sub>rms</sub>	13.0	26	13.5	33	27	66
Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	10.0	20	10.0	25	20	50
Maximum Continuous Current	coils @ 100°C	I <sub>c</sub>	A <sub>rms</sub>	4.1	8.2	4.2	10.2	8.5	20.5
Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	152	76	183	76	183	76
Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	6.3	1.6	7.6	1.3	3.8	0.65
Induction per Phase	I < 0.6 I <sub>p</sub>	L <sub>ph</sub>	mH	51	13	60	10	30	5
Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	8		8		8	
Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	430		530		1060	
Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	0.15		0.12		0.06	
Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	90		90		90	
Temperature Cut-off / Sensor				PTC 1kΩ / KTY 83-122					
Coil Unit Weight	ex. cables	W	kg	4.9		5.9		11.6	
Coil Unit Length	ex. cables	L	mm	244		290		562	
Motor Attraction Force	rms @ 0 A	F <sub>a</sub>	N	3400		4150		8300	
Magnet Pitch NN		τ	mm	24		24		24	
Cable Mass		m	kg/m	0.3		0.3		0.3	
Cable Type (Power)	length 1 m	d	mm (AWG)	11.9 (14)					
Cable Type (Sensor)	length 1 m	d	mm (AWG)	4.3 (26)					



TB12 on 288mm magnet plate shown

Approvals



See page 28 for Analog hall

### Magnet plate dimensions

Le (mm)	192	288
M5 bolts	8	12
Mass (kg/m)	10.5	

Magnet plates can be butted together.

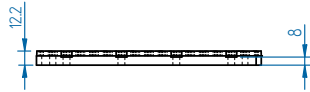
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

Mounting instructions and flatness or parallelism requirements can be found in the Iron Core installation manual. CAD files, 3D models and the manual can be downloaded from our website.

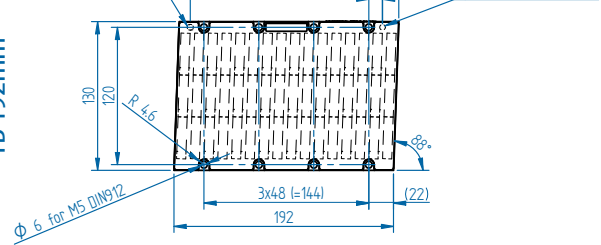
## MAGNET PLATES



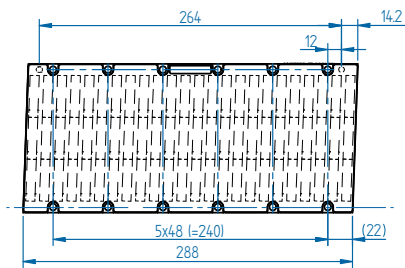
Slotted Hole  $\Phi 5 \times 0.5$  (3 deep)  
For Dowelpin DIN7  $\Phi 5 \times 8$   
(Optional use)

Hole  $\Phi 5$  (3 deep)  
For Dowelpin DIN7  $\Phi 5 \times 8$   
(Optional use)

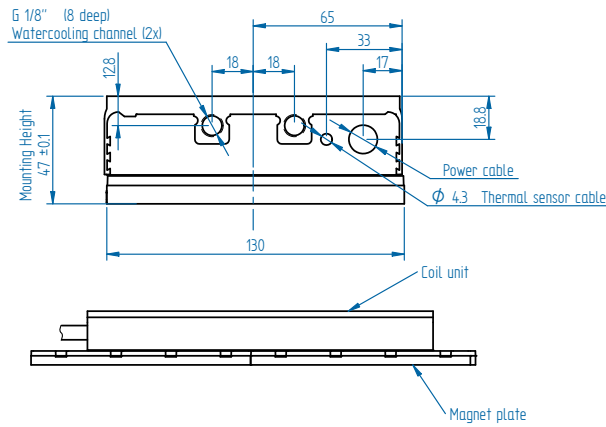
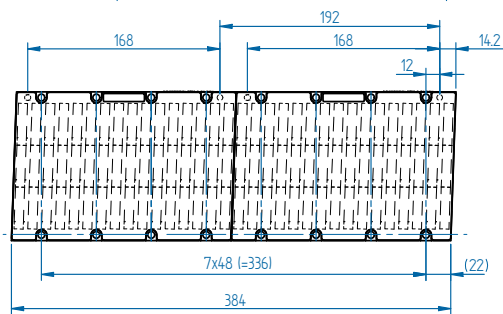
TB 192mm



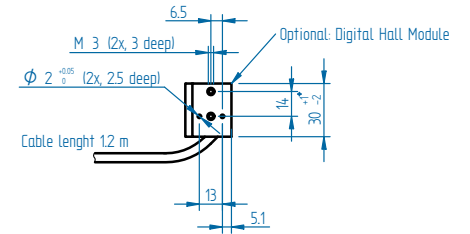
TB 288mm



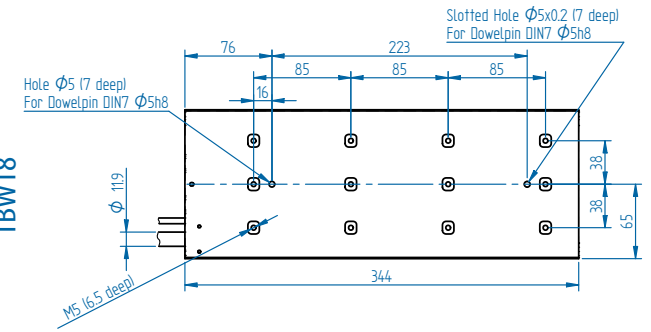
2x TB 192 mm



## COIL UNITS

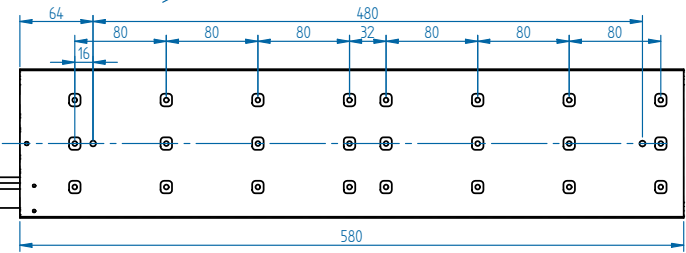


TBW18

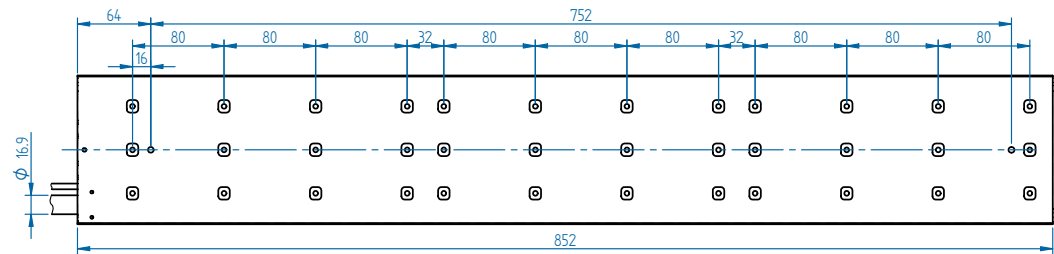


TBW30

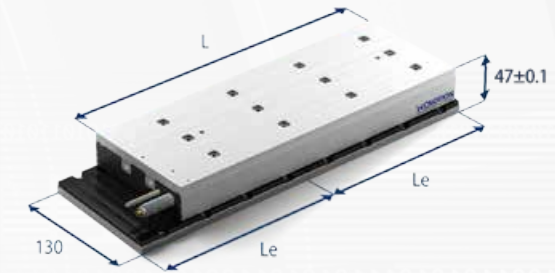
TBW30N  $\Phi 11.9$   
TBW30S  $\Phi 16.9$



TBW45



	Parameter	Remarks	Symbol	Unit	TBW18		TBW30		TBW45	
Performance	Winding type				N	S	N	S	N	S
	Motortype, max voltage ph-ph				3-phase synchronous Iron core, 400V <sub>ac rms</sub> (600V <sub>dc</sub> )					
	Ultimate Force @ 10°C/s increase	magnet @ 25°C	F <sub>u</sub>	N	2700		4500		6750	
	Peak Force @ 6°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	2400		4000		6000	
	Continuous Force Watercooled*	coils @ 100°C	F <sub>cw</sub>	N	1200		2000		3000	
	Continuous Force Aircooled*	coils @ 100°C	F <sub>c</sub>	N	1140		1900		2850	
	Maximum Speed**	@ 560 V	v <sub>max</sub>	m/s	3	6	2.5	6	2.5	6
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	186	90	225	93	225	93
	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	2580		4300		6450	
	Electrical	Ultimate Current	magnet @ 25°C	I <sub>u</sub>	A <sub>rms</sub>	19.6	41	27	65	41
Peak Current		magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	15.0	31.1	20.7	50	31	75
Continuous Current Watercooled*		coils @ 100°C	I <sub>cw</sub>	A <sub>rms</sub>	6.5	13.4	8.9	21.5	13.4	32.3
Back EMF Phase-Phase <sub>peak</sub>			B <sub>emf</sub>	V/m/s	152	76	183	76	183	76
Resistance per Phase*		coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	4.4	1.0	3.9	0.66	2.6	0.44
Induction per Phase		I < 0.6 I <sub>p</sub>	L <sub>ph</sub>	mH	35	8	31	5	21	3
Electrical Time Constant*		coils @ 25°C	τ <sub>e</sub>	ms	8		8		8	
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	726		1209		1804	
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	0.10		0.06		0.04	
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	87		87		87	
	Watercooling Flow	for ΔT=3K	Φ <sub>w</sub>	l/min	3.1		5.2		7.8	
	Watercooling Pressure-drop	order of magnitude	ΔP <sub>w</sub>	bar	1.0		1.5		2.5	
Temperature Cut-off / Sensor					PTC 1kΩ / KTY 83-122					
Mechanical	Coil Unit Weight	ex. cables	W	kg	7.3		12.3		18.2	
	Coil Unit Length	ex. cables	L	mm	344		580		852	
	Motor Attraction Force	rms @ 0 A	F <sub>a</sub>	N	4900		8300		12450	
	Magnet Pitch NN		τ	mm	24		24		24	
	Cable Mass		m	kg/m	0.3		0.6			
	Cable Type (Power)	length 1 m	d	mm (AWG)	11.9 (14)		16.9 (10)			
Cable Type (Sensor)	length 1 m	d	mm (AWG)	4.3 (26)						



TBW18 on 2x192mm magnet plate shown

#### Approvals



See page 28 for Analog hall

#### Water cooling

All TBW motors feature integrated cooling channels that allow for the easy setup of a liquid cooled system, at no additional cost.

#### Magnet plate dimensions

Le (mm)	192	288
M5 bolts	8	12
Mass (kg/m)	10.5	

Magnet plates can be butted together.

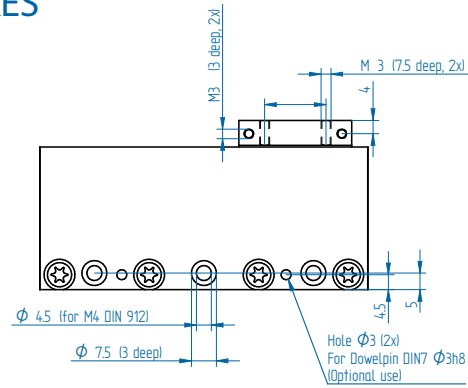
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

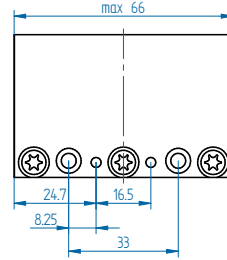
\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

Mounting instructions and flatness or parallelism requirements can be found in the Ironless installation manual. CAD files and 3D models can be downloaded from our website.

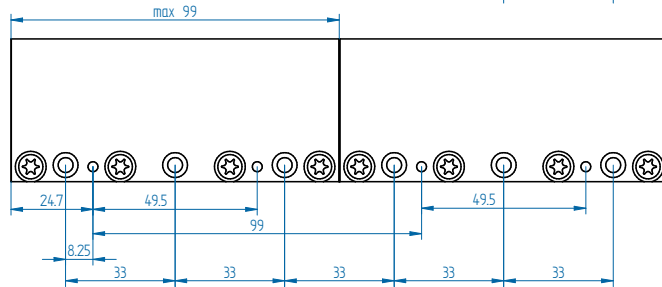
## MAGNET YOKES



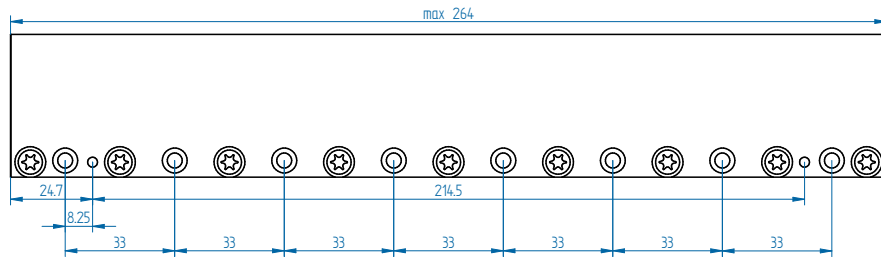
UC 66mm



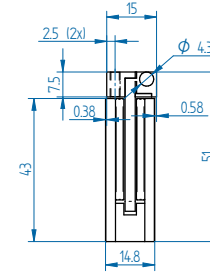
2x UC 99mm



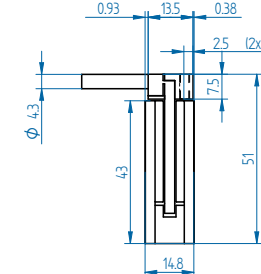
UC 264mm



## COIL UNITS

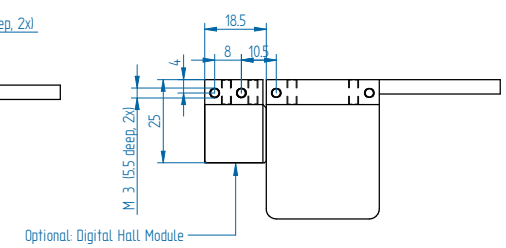
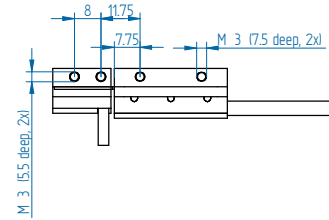


UC 3 inline

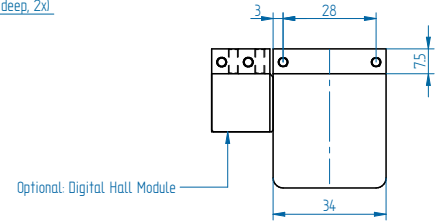
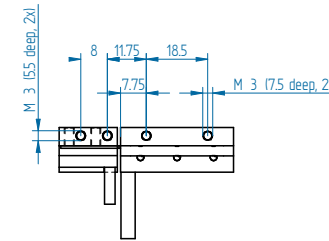


UC 3/UC 6

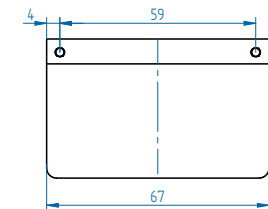
UC 3 inline



UC 3

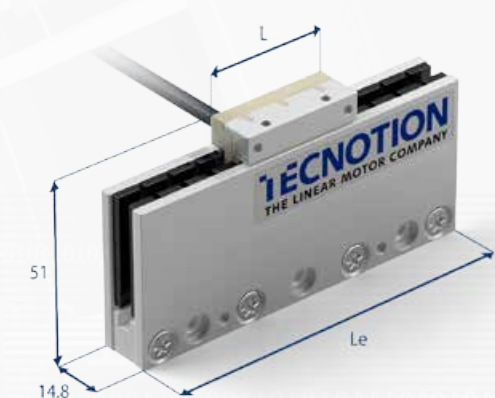


UC 6





	Parameter	Remarks	Symbol	Unit	UC3 + UC3 inline	UC6
Performance	Motortype, max voltage ph-ph				3-phase synchronous Ironless, 45V <sub>ac rms</sub> (60V <sub>dc</sub> )	
	Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	36	72
	Continuous Force*	coils @ 80°C	F <sub>c</sub>	N	10	20
	Maximum Speed**	@ 60 V	v <sub>max</sub>	m/s	5	5
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	11.4	11.4
	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	9.2	18.3
Electrical	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	3.1	6.2
	Maximum Continuous Current	coils @ 80°C	I <sub>c</sub>	A <sub>rms</sub>	0.87	1.75
	Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	9.3	9.3
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	4.7	2.4
	Induction per Phase		L <sub>ph</sub>	mH	0.75	0.38
	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	0.16	0.16
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	13	26
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	3.6	1.8
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	25	25
	Temperature Sensors				none	none
Mechanical	Coil Unit Weight	ex. cables	W	kg	0.031	0.062
	Coil Unit Length	ex. cables	L	mm	34	67
	Motor Attraction Force		F <sub>a</sub>	N	0	0
	Magnet Pitch NN		τ	mm	16.5	16.5
	Cable Mass		m	kg/m	0.07	0.07
	Cable Type (Power)	length 1 m	d	mm (AWG)	4.3 (24)	
	Cable Type (Sensor)				N/A	
	Cable Life (Power FLEX)***	minimum			15,000,000 cycles	
	Bending Radius Static	minimum			5x cable diameter	
	Bending Radius Dynamic	minimum			8x cable diameter	



UC3 in 99mm magnet yoke shown

Approvals  
**CE** **RoHS**

Magnet yoke dimensions			
Le (mm)	66	99	264
M4 bolts	2	3	8
Mass (kg/m)	3.2		

Magnet yokes can be butted together.

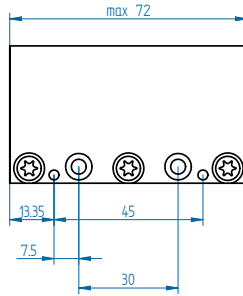
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.  
 \*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.  
 \*\*\* Depending on Bending Radius, Velocity and Acceleration.

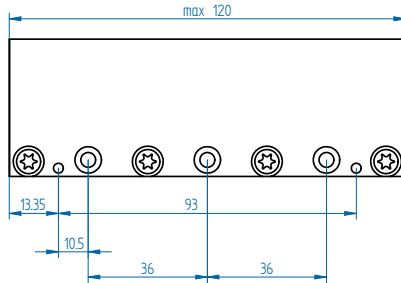
Mounting instructions and flatness or parallelism requirements can be found in the Ironless installation manual. CAD files and 3D models can be downloaded from our website.

## MAGNET YOKES

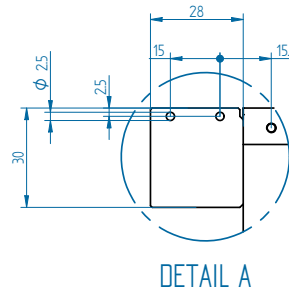
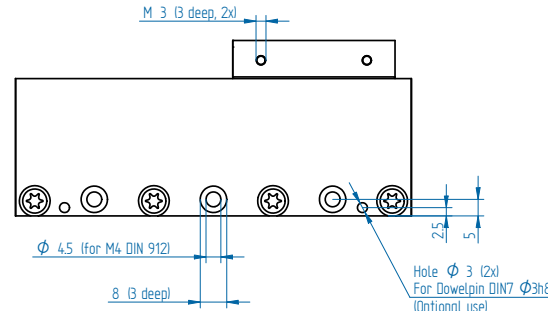
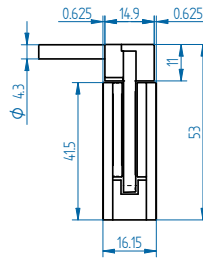
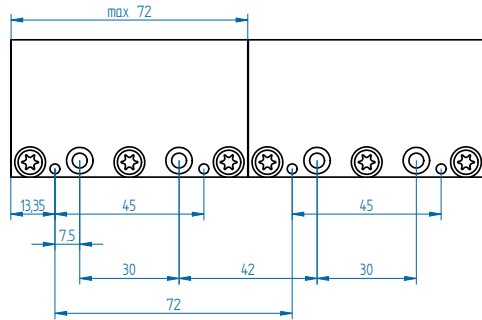
UF 72mm



UF 120mm

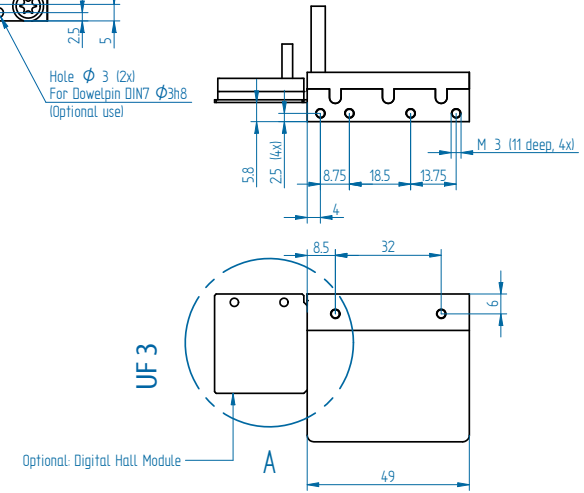


2x UF 72mm



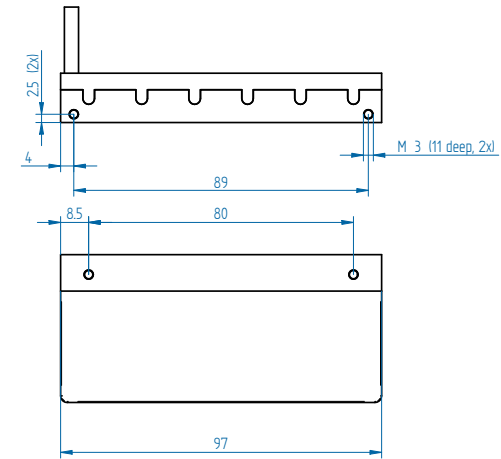
## COIL UNITS

UF 3

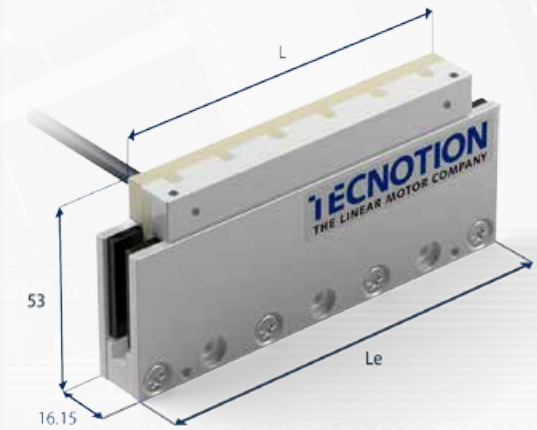


Optional: Digital Hall Module

UF 6



	Parameter	Remarks	Symbol	Unit	UF3	UF6
Performance	Motortype, max voltage ph-ph				3-phase synchronous Ironless, 45V <sub>ac rms</sub> (60V <sub>dc</sub> )	
	Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	42.5	85
	Continuous Force*	coils @ 110°C	F <sub>c</sub>	N	19.5	39
	Maximum Speed**	@ 60 V	v <sub>max</sub>	m/s	5.1	5.1
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	12.3	12.3
	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	14.6	29.2
Electrical	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	3.5	6.9
	Maximum Continuous Current	coils @ 110°C	I <sub>c</sub>	A <sub>rms</sub>	1.58	3.17
	Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	10.1	10.1
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	3.5	1.8
	Induction per Phase		L <sub>ph</sub>	mH	1.24	0.62
	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	0.36	0.36
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	35	70
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	2.4	1.2
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	34	34
	Temperature Sensor				NTC	NTC
Mechanical	Coil Unit Weight	ex. cables	W	kg	0.045	0.087
	Coil Unit Length	ex. cables	L	mm	49	97
	Motor Attraction Force		F <sub>a</sub>	N	0	0
	Magnet Pitch NN		τ	mm	24	24
	Cable Mass		m	kg/m	0.07	0.07
	Cable Type (Power and Sensor)	length 1 m	d	mm (AWG)	4.3 (24)	
	Cable Life (FLEX)***	minimum			15,000,000 cycles	
	Bending Radius Static	minimum			5x cable diameter	
	Bending Radius Dynamic	minimum			8x cable diameter	



UF6 in 120mm magnet yoke shown

Approvals



#### Magnet yoke dimensions

Le (mm)	72	120
M4 bolts	2	3
Mass (kg/m)	3.2	

Magnet yokes can be butted together.

All specifications ±10%

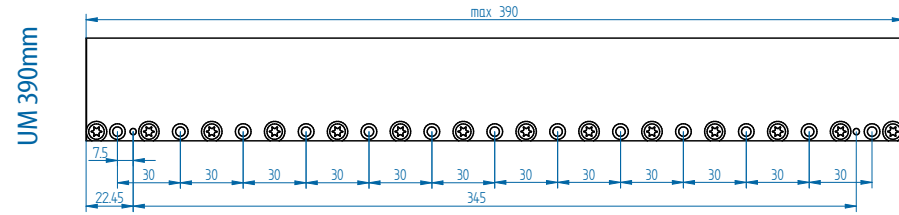
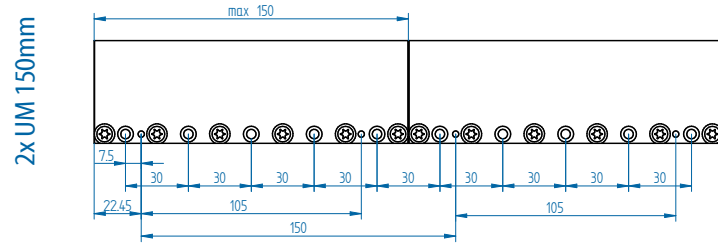
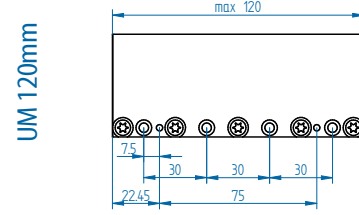
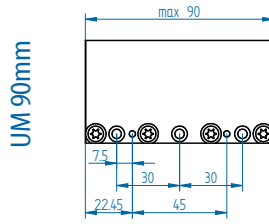
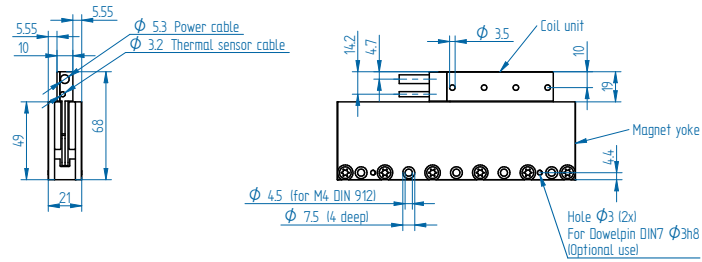
\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

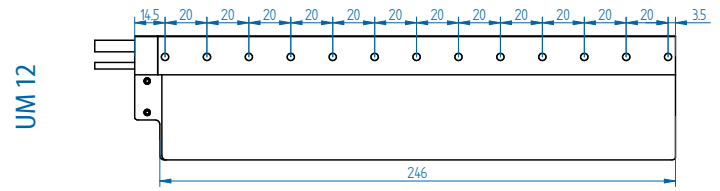
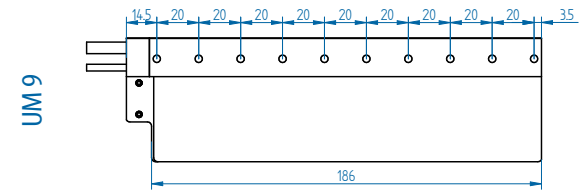
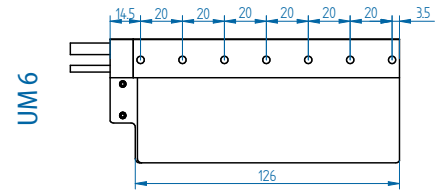
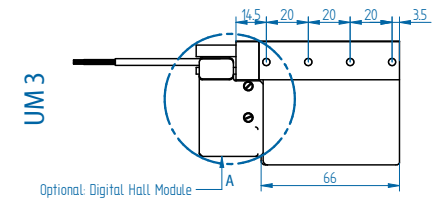
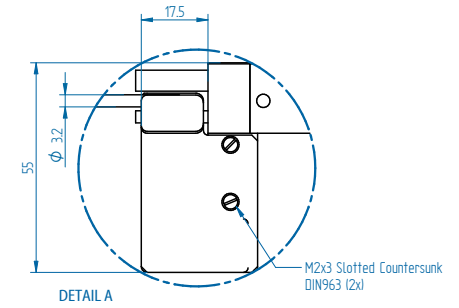
\*\*\* Depending on radius, velocity and acceleration.

Mounting instructions and flatness or parallelism requirements can be found in the Ironless installation manual. CAD files and 3D models can be downloaded from our website.

## MAGNET YOKES

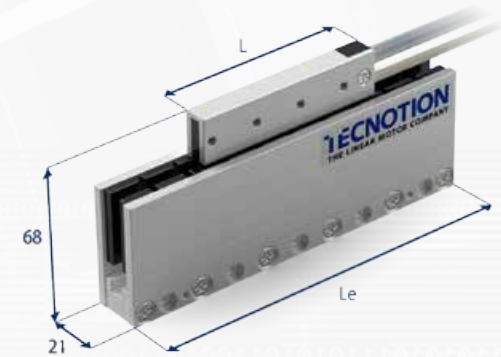


## COIL UNITS





Parameter	Remarks	Symbol	Unit	UM3		UM6		UM9		UM12	
Winding type				N	S	N	S	N	S	N	S
Motor type, max voltage ph-ph				3-phase synchronous Ironless, 230V <sub>ac rms</sub> (300V <sub>dc</sub> )							
Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	100		200		300		400	
Continuous Force*	coils @ 110°C	F <sub>c</sub>	N	29		58		87		116	
Maximum Speed**	@ 300 V	v <sub>max</sub>	m/s	10	18	10	18	10	17	10	16
Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	36.3	19.9	36.3	19.9	36.3	19.9	36.3	19.9
Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	24		48		71		95	
Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	2.8	5.0	5.5	10.0	8.3	15.0	11.0	20.0
Maximum Continuous Current	coils @ 110°C	I <sub>c</sub>	A <sub>rms</sub>	0.8	1.5	1.6	2.9	2.4	4.4	3.2	5.8
Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	30	16	30	16	30	16	30	16
Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	18.5	5.5	9.3	2.8	6.2	1.8	4.6	1.4
Induction per Phase		L <sub>ph</sub>	mH	6	1.8	3	0.9	2	0.6	1.5	0.4
Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	0.35		0.35		0.35		0.35	
Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	47		95		142		190	
Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	1.8		0.9		0.6		0.45	
Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	36		36		36		36	
Temperature Cut-off / Sensor				PTC 1kΩ / NTC							
Coil Unit Weight	ex. cables	W	kg	0.084		0.162		0.240		0.318	
Coil Unit Length	ex. cables	L	mm	78		138		198		258	
Motor Attraction Force		F <sub>a</sub>	N	0		0		0		0	
Magnet Pitch NN		τ	mm	30		30		30		30	
Cable Mass		m	kg/m	0.08		0.08		0.08		0.08	
Cable Type (Power)	length 1 m	d	mm (AWG)	5.3 (22)							
Cable Type (Sensor)	length 1 m	d	mm (AWG)	3.2 (26)							



UM3 in 150mm magnet yoke shown

Approvals



### Magnet yoke dimensions

Le (mm)	90	120	150	390
M4 bolts	3	4	6	13
Mass (kg/m)	4.8			

Magnet yokes can be butted together.

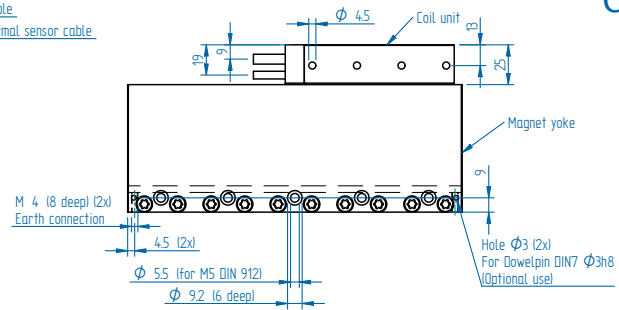
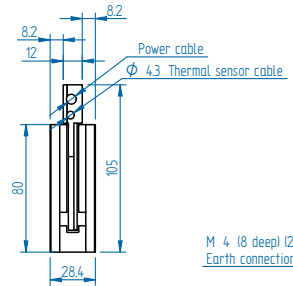
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

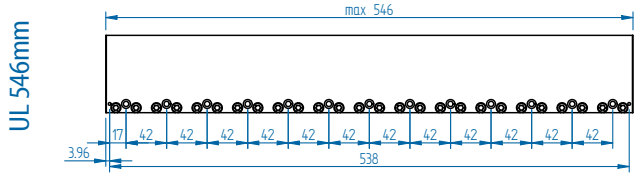
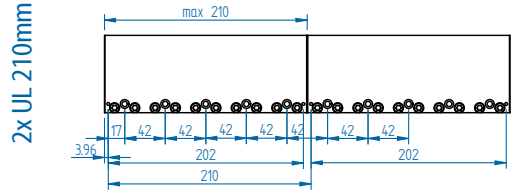
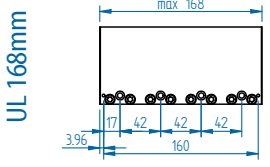
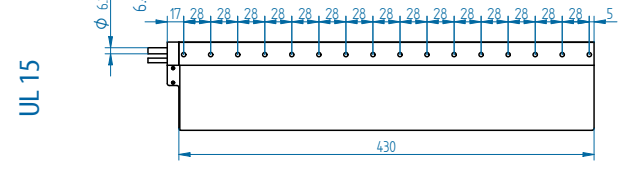
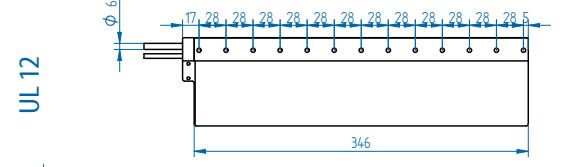
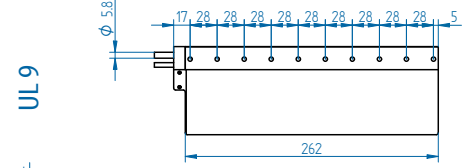
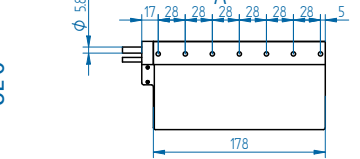
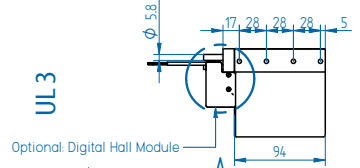
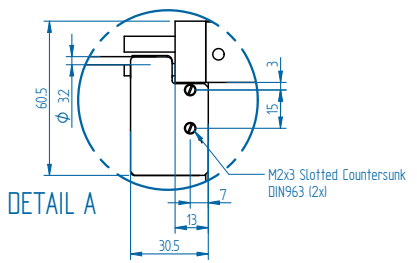
\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

Mounting instructions and flatness or parallelism requirements can be found in the Ironless installation manual. CAD files and 3D models can be downloaded from our website.

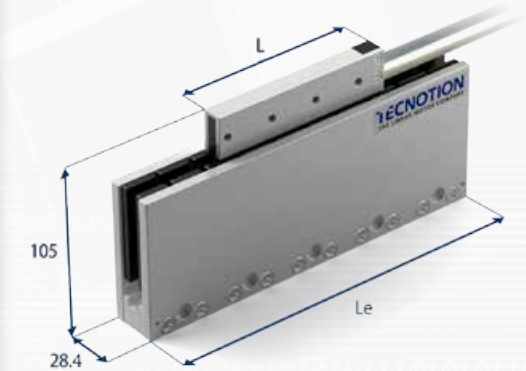
MAGNET YOKES



COIL UNITS



Parameter		Remarks	Symbol	Unit	UL3		UL6		UL9		UL12		UL15			
Performance	Winding type				N	S	N	S	N	S	N	S	N	S		
	Motor type, max voltage ph-ph				3-phase synchronous Ironless, 230V <sub>ac rms</sub> (300V <sub>dc</sub> )											
	Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	240		480		720		960		1200			
	Continuous Force*	coils @ 110°C	F <sub>c</sub>	N	70		140		210		280		350			
	Maximum Speed**	@ 300 V	v <sub>max</sub>	m/s	5	12	5	12	5	12	5	12	5	12		
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	68	27.5	68	27.5	68	27.5	68	27.5	67.5	27.5		
	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	97		195		290		390		485			
Electrical	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	3.5	8.7	7	17.5	10.5	26.2	14.1	35	17.8	44		
	Maximum Continuous Current	coils @ 110°C	I <sub>c</sub>	A <sub>rms</sub>	1.03	2.6	2.1	5.1	3.1	7.6	4.2	10.2	5.2	12.9		
	Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	55.5	22.5	55.5	22.5	55.5	22.5	55.5	22.5	55.5	22.5		
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	15.9	2.6	8.0	1.28	5.3	0.85	4.0	0.64	3.3	0.53		
	Induction per Phase		L <sub>ph</sub>	mH	13	2.0	6.5	1.0	4.2	0.7	3.2	0.5	3	0.4		
	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	0.8		0.8		0.8		0.8		0.8			
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	67		134		200		270		335			
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	1.3		0.65		0.43		0.32		0.26			
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	72		72		72		72		72			
	Temperature Cut-off / Sensor				PTC 1kΩ / NTC											
Mechanical	Coil Unit Weight	ex. cables	W	kg	0.25		0.47		0.69		0.91		1.13			
	Coil Unit Length	ex. cables	L	mm	106		190		274		358		442			
	Motor Attraction Force		F <sub>a</sub>	N	0		0		0		0		0			
	Magnet Pitch NN		τ	mm	42		42		42		42		42			
	Cable Mass		m	kg/m	0.09		0.09		0.09		0.105		0.105			
	Cable Type (Power)	length 1 m	d	mm (AWG)					5.8 (20)				6.4 (18)			
	Cable Type (Sensor)	length 1 m	d	mm (AWG)					4.3 (26)				4.3 (26)			



UL3 in 210mm magnet yoke shown

Approvals



### Magnet yoke dimensions

Le (mm)	126	168	210	546
M5 bolts	3	4	5	13
Mass (kg/m)	11.2			

Magnet yokes can be butted together.

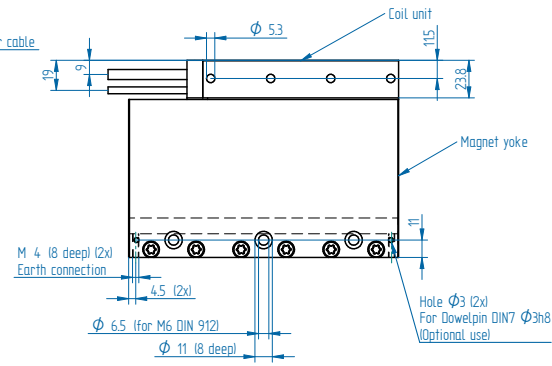
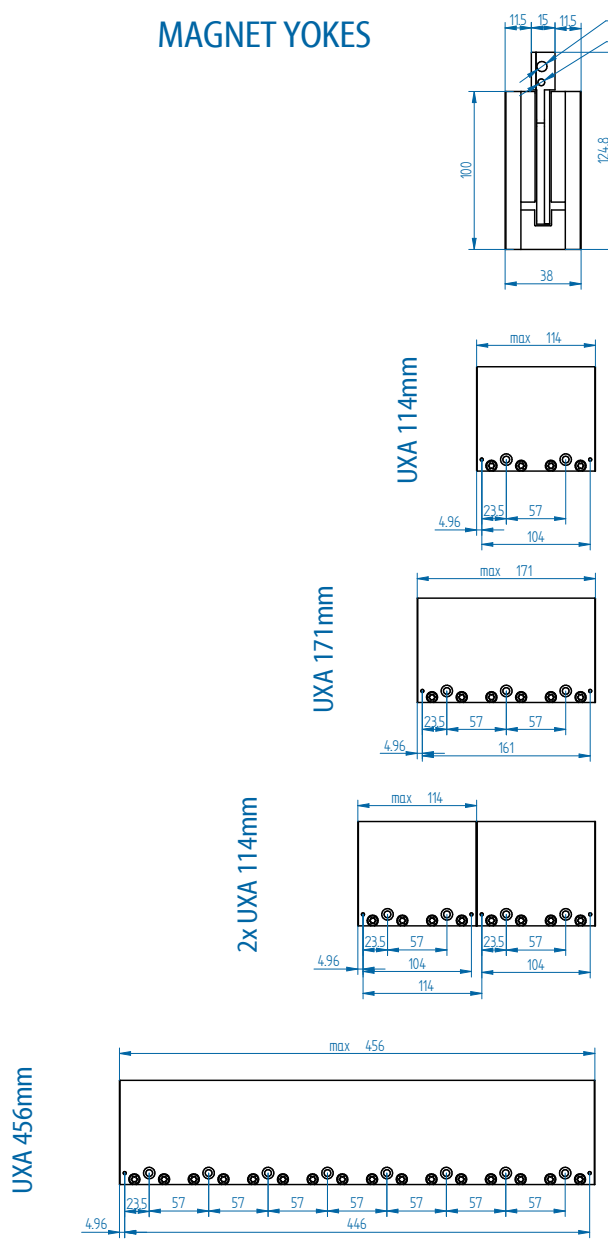
All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

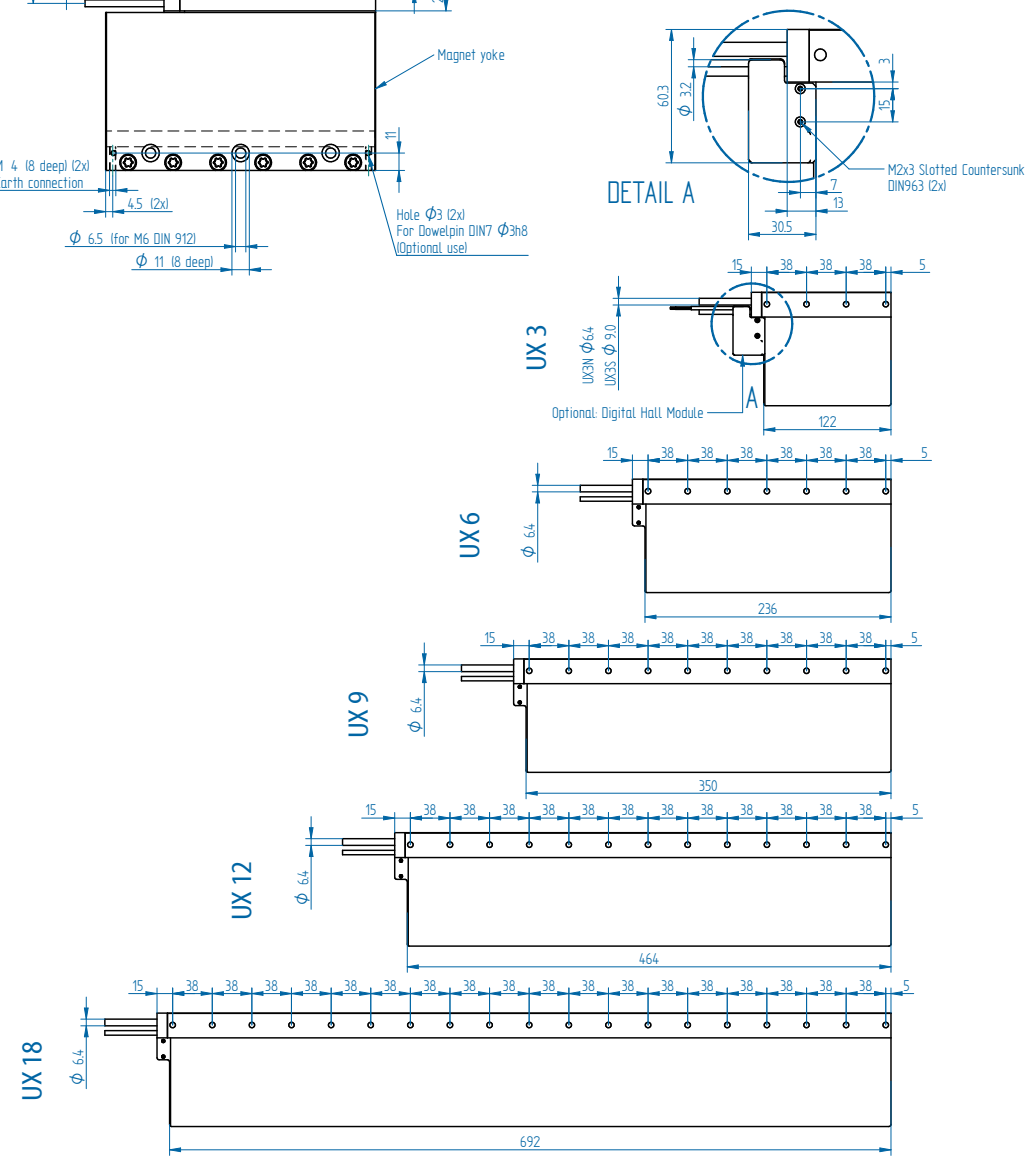
\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

Mounting instructions and flatness or parallelism requirements can be found in the Ironless installation manual. CAD files and 3D models can be downloaded from our website.

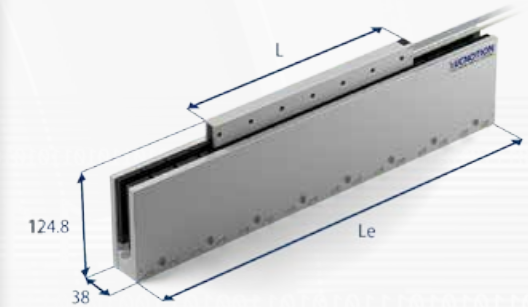
## MAGNET YOKES



## COIL UNITS



Parameter		Remarks	Symbol	Unit	UXA3		UXA6		UXA9		UXA12		UXA18
Performance	Winding type				N	S	N	S	N	S	N	S	N
	Motor type, max voltage ph-ph				3-phase synchronous Ironless, 230V <sub>ac rms</sub> (300V <sub>dc</sub> )								
	Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	615		1230		1845		2460		3690
	Continuous Force*	coils @ 110°C	F <sub>c</sub>	N	120		240		360		480		720
	Maximum Speed**	@ 300 V	v <sub>max</sub>	m/s	2.9	7.2	2.9	7.2	2.9	7.2	2.9	7.2	2.9
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	107	43.4	107	43.4	107	43.4	107	43.4	107
	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	244		488		732		976		1464
Electrical	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	5.6	13.9	11.3	28	16.9	42	22.6	56	34
	Maximum Continuous Current	coils @ 110°C	I <sub>c</sub>	A <sub>rms</sub>	1.14	2.80	2.27	5.6	3.4	8.4	4.5	11.2	6.8
	Back EMF Phase-Phase Peak		B <sub>emf</sub>	V/m/s	87	35	87	35	87	35	87	35	87
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	15.8	2.6	7.9	1.29	5.3	0.86	4.0	0.65	2.6
	Induction per Phase		L <sub>ph</sub>	mH	28	4.6	14	2.3	9	1.5	7	1.2	4.7
	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	1.8		1.8		1.8		1.8		1.8
Thermal	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	82		165		247		330		494
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	1.04		0.52		0.35		0.26		0.17
	Thermal Time Constant	up to 63% max. coiltemp.	τ <sub>th</sub>	s	156		156		156		156		156
	Temperature Cut-off / Sensor*				PTC 1kΩ / NTC								
Mechanical	Coil Unit Weight	ex. cables	W	kg	0.55		0.95		1.35		1.75		2.55
	Coil Unit Length	ex. cables	L	mm	134		248		362		476		704
	Motor Attraction Force		F <sub>a</sub>	N	0		0		0		0		0
	Magnet Pitch NN		τ	mm	57		57		57		57		57
	Cable Mass		m	kg/m	0.18		0.18		0.18		0.18		0.18
	Cable Type (Power)	length 1 m	d	mm (AWG)	6.4 (18) except UXA3S***								
	Cable Type (Sensor)	length 1 m	d	mm (AWG)	4.3 (26)								



UXA6 in 456mm magnet yoke shown

### Approvals



### UXA3S Power Cable (FLEX cable of 3m)

Cable Type	9.0 (21) mm (AWG)
Cable Life****	5,000,000 cycles
Bending Radius Static	4x cable diameter
Bending Radius Dynamic	10x cable diameter

\*\*\*\* Depending on Bending Radius, Velocity and Acceleration.

### Magnet yoke dimensions

Le (mm)	114	171	456
M6 bolts	2	3	8
Mass (kg/m)	19		

Magnet yokes can be butted together.

All specifications ±10%

\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

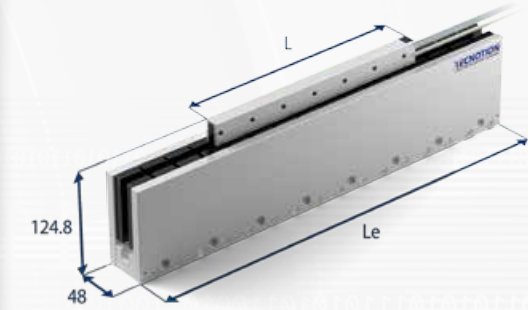
\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

\*\*\* The UXA3S is only available with a FLEX power cable. The specifications for this cable can be found in the table on the right side of this page.





	Parameter	Remarks	Symbol	Unit	UXX3		UXX6		UXX9		UXX12		UXX18
					N	S	N	S	N	S	N	S	N
Performance	Winding type				N	S	N	S	N	S	N	S	N
	Motor type, max voltage ph-ph				3-phase synchronous Ironless, 230V <sub>ac rms</sub> (300V <sub>dc</sub> )								
	Peak Force @ 20°C/s increase	magnet @ 25°C	F <sub>p</sub>	N	700		1400		2100		2800		4200
	Continuous Force*	coils @ 110°C	F <sub>c</sub>	N	141		282		423		564		846
	Maximum Speed**	@ 300 V	v <sub>max</sub>	m/s	2.7	6.6	2.7	6.6	2.7	6.6	2.7	6.6	2.7
	Motor Force Constant	mount. sfc. @ 20°C	K	N/A <sub>rms</sub>	124	50.3	124	50.3	124	50.3	124	50.3	124
Electrical	Motor Constant	coils @ 25°C	S	N <sup>2</sup> /W	323		647		970		1293		1940
	Peak Current	magnet @ 25°C	I <sub>p</sub>	A <sub>rms</sub>	5.6	13.9	11.3	28	16.9	42	22.6	56	34
	Maximum Continuous Current	coils @ 110°C	I <sub>c</sub>	A <sub>rms</sub>	1.14	2.80	2.27	5.6	3.4	8.4	4.5	11.2	6.8
	Back EMF Phase-Phase <sub>peak</sub>		B <sub>emf</sub>	V/m/s	101	41	101	41	101	41	101	41	101
	Resistance per Phase*	coils @ 25°C ex. cable	R <sub>ph</sub>	Ω	15.8	2.6	7.9	1.29	5.3	0.86	4.0	0.65	2.6
	Induction per Phase		L <sub>ph</sub>	mH	28	4.6	14	2.3	9	1.5	7	1.2	4.7
Thermal	Electrical Time Constant*	coils @ 25°C	τ <sub>e</sub>	ms	1.8		1.8		1.8		1.8		1.8
	Maximum Continuous Power Loss	all coils	P <sub>c</sub>	W	82		165		247		330		494
	Thermal Resistance	coils to mount. sfc.	R <sub>th</sub>	°C/W	1.04		0.52		0.35		0.26		0.17
	Thermal Time Constant*	up to 63% max. coiltemp.	τ <sub>th</sub>	s	156		156		156		156		156
Mechanical	Temperature Cut-off / Sensor				PTC 1kΩ / NTC								
	Coil Unit Weight	ex. cables	W	kg	0.55		0.95		1.35		1.75		2.55
	Coil Unit Length	ex. cables	L	mm	134		248		362		476		704
	Motor Attraction Force		F <sub>a</sub>	N	0		0		0		0		0
	Magnet Pitch NN		τ	mm	57		57		57		57		57
	Cable Mass		m	kg/m	0.18		0.18		0.18		0.18		0.18
	Cable Type (Power)	length 1 m	d	mm (AWG)	6.4 (18) except UXX3S***								
	Cable Type (Sensor)	length 1 m	d	mm (AWG)	4.3 (26)								



UXX6 in 456mm magnet yoke shown

Approvals



UXX3S Power Cable (FLEX cable of 3m)

Cable Type	9.0 (21) mm (AWG)
Cable Life****	5,000,000 cycles
Bending Radius Static	4x cable diameter
Bending Radius Dynamic	10x cable diameter

\*\*\*\*Depending on Bending Radius, Velocity and Acceleration.

Magnet yoke dimensions

Le (mm)	114	171	456
M6 bolts	2	3	8
Mass (kg/m)	25		

Magnet yokes can be butted together.

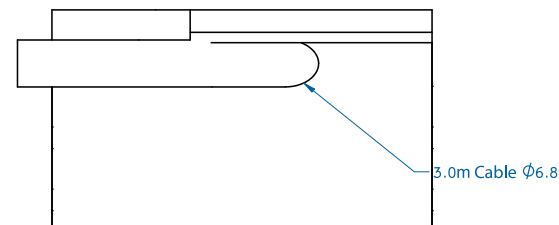
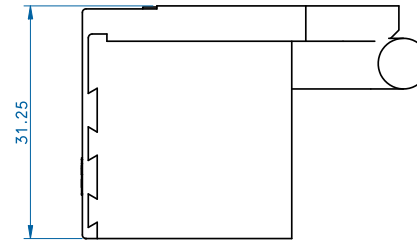
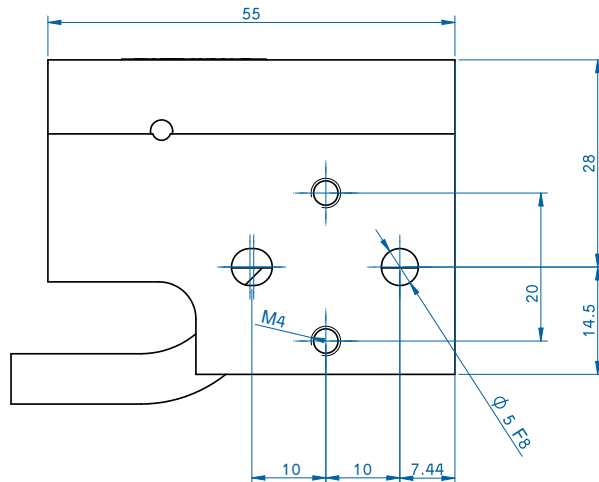
\* These values are only applicable when the mounting surface is at 20°C and the motor is driven at maximum continuous current. If these values differ in your application, please check our simulation tool.

\*\* Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.

\*\*\* The UXX3S is only available with a FLEX power cable. The specifications for this cable can be found in the table on the right side of this page.

## Analog Hall Module for T-series

Mounting instructions and flatness or parallelism requirements can be found in the Iron Core installation manual. CAD files and 3D models can be downloaded from our website.



### Analog Hall Module

*Cost efficient positioning*

Linear motors can be positioned extremely accurately by using optical encoders and rulers. If this is not required, this expensive setup can be replaced by an analog Hall module. This module uses the magnet track, as opposed to the ruler, as the linear scale. It can be easily mounted on our iron core motors and communicates with practically all standard servo controllers. The analog Hall module requires a standard 5V<sub>dc</sub> power supply.

<b>Absolute accuracy</b>	± 100 µm
<b>Repeatable accuracy</b>	± 30 µm
<b>Resolution</b>	± 10 µm
<b>Signal</b>	1 Vpp SinCos
<b>Signal Period</b>	24 mm

## Additional products



### Torque

*T<sub>p</sub> 1.9 - 58.3Nm T<sub>c</sub> 1.4 - 36.3Nm*

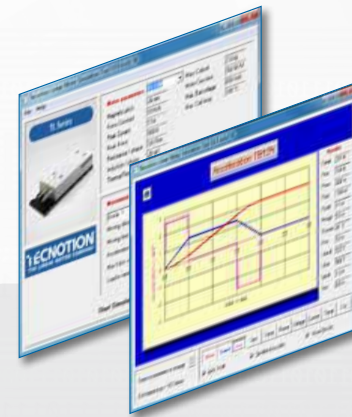
Due to the extensive motor design knowledge within Tecnotion, we have developed a torque motor series that is characterized, among others, by an superior force density, low thermal resistance, low cogging and housed design. The torque series consists of three different outer diameters ranging from 105 via 133 to 160mm for the largest motor and five building heights ranging from 17 mm up to 92 mm.



### Digital Hall Module

*For commutation*

For commutation, we have an optional digital hall module that can be used with our entire range of linear motors. Its sensors provide 3 digital outputs, each phase shifted 120 degrees, to determine the electrical angle between coils and magnets. If you do not use a controller that allows you to commutate within the servo drive, this module can be a cost-effective alternative. The digital hall module requires a 4.5 to 28V<sub>dc</sub> power supply.



### Simulation Tool

*Analyze your application*

Save precious time by using our FREE linear motor simulation tool. Our specialized software helps you find the best motor for the application and generate reports within seconds, without having to make time consuming calculations by hand. The tool will provide you with diagrams for position, velocity, acceleration, jerk, force, power, voltage, current, temperature, force vs. velocity and more.

To download our linear motor simulation tool, 3D & CAD files, installation manuals, product specifications and more, visit our website at:

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### Custom Linear Motors

*Motor solutions*

Besides the standard catalogue items we offer custom linear motor solutions. Some examples: custom windings, cable confection and vacuum motors for transport and positioning in vacuum. Besides this Tecnotion offers moving magnet motors and linear actuators, completely designed toward needs. For more information please contact Tecnotion.

# Article numbers

Series	Article	Art. Code
<b>TM Series</b>		
TM	Coil unit TM 3 FLEX	4022 368 5075
TM	Coil unit TM 3Z FLEX	4022 368 5533
TM	Coil unit TM 6 FLEX	4022 368 5076
TM	Coil unit TM 6Z FLEX	4022 368 5300
TM	Coil unit TM 12 FLEX	4022 368 5078
TM	Coil unit TM 18N FLEX	4022 368 5500
TM	Coil unit TM 18S FLEX	4022 368 5519
TM	Magnet plate TM 96 mm	4022 368 5225
TM	Magnet plate TM 144 mm	4022 368 5226
TM	Magnet plate TM 384 mm	4022 368 5227
TM	Analog Hall Module	4022 368 5139
TM	Digital Hall Module T-Serie	4022 368 5418

Series	Article	Art. Code
<b>TL Series</b>		
TL	Coil unit TL 6N	4022 369 7458
TL	Coil unit TL 6S	4022 368 5032
TL	Coil unit TL 9N	4022 368 5311
TL	Coil unit TL 9S	4022 368 5312
TL	Coil unit TL 12N	4022 369 7459
TL	Coil unit TL 12S	4022 368 5033
TL	Coil unit TL 15N	4022 369 7460
TL	Coil unit TL 15S	4022 368 5034
TL	Coil unit TL 18N	4022 368 5223
TL	Coil unit TL 18S	4022 368 5224
TL	Coil unit TL 24N	4022 368 5014
TL	Coil unit TL 24S	4022 368 5035
TL	Magnet plate TL 192 mm	4022 368 5193
TL	Magnet plate TL 288 mm	4022 368 5194
TL	Analog Hall Module	4022 368 5139
TL	Digital Hall Module T-Serie	4022 368 5418

Series	Article	Art. Code
<b>TB Series</b>		
TB	Coil unit TB 12N	4022 368 5155
TB	Coil unit TB 12S	4022 368 5157
TB	Coil unit TB 15N	4022 368 5122
TB	Coil unit TB 15S	4022 368 5120
TB	Coil unit TB 30N	4022 368 5123
TB	Coil unit TB 30S	4022 368 5121
TB	Magnet plate TB 192 mm	4022 368 5221
TB	Magnet plate TB 288 mm	4022 368 5222
TB	Analog Hall Module	4022 368 5139
TB	Digital Hall Module T-Serie	4022 368 5418

Series	Article	Art. Code
<b>TBW Series</b>		
TBW	Coil unit TBW 18N	4022 368 5263
TBW	Coil unit TBW 18S	4022 368 5264
TBW	Coil unit TBW 30N	4022 368 5242
TBW	Coil unit TBW 30S	4022 368 5243
TBW	Coil unit TBW 45N	4022 368 5244
TBW	Coil unit TBW 45S	4022 368 5245
TBW	Magnet plate TB 192 mm	4022 368 5221
TBW	Magnet plate TB 288 mm	4022 368 5222
TBW	Analog Hall Module	4022 368 5139
TBW	Digital Hall Module T-Serie	4022 368 5418

Series	Article	Art. Code
<b>UC Series</b>		
UC	Coil unit UC 3	4022 368 5067
UC	Coil unit UC 3 inline	4022 368 5516
UC	Coil unit UC 6	4022 368 5068
UC	Magnet yoke UC 66 mm	4022 368 5064
UC	Magnet yoke UC 99 mm	4022 368 5065
UC	Magnet yoke UC 264 mm	4022 368 5066
UC	Digital Hall Module UC	4022 368 5130

Series	Article	Art. Code
<b>UF Series</b>		
UF	Coil unit UF 3	4022 368 5298
UF	Coil unit UF 6	4022 368 5372
UF	Magnet yoke UF 72 mm	4022 368 5382
UF	Magnet yoke UF 120 mm	4022 368 5383
UF	Digital Hall Module UF	4022 368 5391

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<b>UM Series</b>		
UM	Coil unit UM 3N	4022 368 5055
UM	Coil unit UM 3S	4022 368 5051
UM	Coil unit UM 6N	4022 368 5056
UM	Coil unit UM 6S	4022 368 5052
UM	Coil unit UM 9N	4022 368 5057
UM	Coil unit UM 9S	4022 368 5053
UM	Coil unit UM 12N	4022 368 5058
UM	Coil unit UM 12S	4022 368 5054
UM	Magnet yoke UM 90 mm	4022 368 5040
UM	Magnet yoke UM 120 mm	4022 368 5041
UM	Magnet yoke UM 150 mm	4022 368 5042
UM	Magnet yoke UM 390 mm	4022 368 5043
UM	Digital Hall Module UM	4022 368 5144

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<b>UL Series</b>		
UL	Coil unit UL 3N	4022 368 5025
UL	Coil unit UL 3S	4022 368 5045
UL	Coil unit UL 6N	4022 368 5026
UL	Coil unit UL 6S	4022 368 5046
UL	Coil unit UL 9N	4022 368 5027
UL	Coil unit UL 9S	4022 368 5047
UL	Coil unit UL 12N	4022 368 5028
UL	Coil unit UL 12S	4022 368 5048
UL	Coil unit UL 15N	4022 368 5029
UL	Coil unit UL 15S	4022 368 5049
UL	Magnet yoke UL 126 mm	4022 368 5021

Series	Article	Art. Code
UL	Magnet yoke UL 168 mm	4022 368 5022
UL	Magnet yoke UL 210 mm	4022 368 5023
UL	Magnet yoke UL 546 mm	4022 368 5024
UL	Digital Hall Module UL	4022 368 5145

Series	Article	Art. Code
<b>UXA Series</b>		
UXA	Coil unit UX 3N	4022 368 5105
UXA	Coil unit UX 3S FLEX	4022 368 5235
UXA	Coil unit UX 6N	4022 368 5106
UXA	Coil unit UX 6S	4022 368 5101
UXA	Coil unit UX 9N	4022 368 5107
UXA	Coil unit UX 9S	4022 368 5102
UXA	Coil unit UX 12N	4022 368 5108
UXA	Coil unit UX 12S	4022 368 5103
UXA	Coil unit UX 18N	4022 368 5111
UXA	Magnet yoke UX-A 114 mm	4022 368 5098
UXA	Magnet yoke UX-A 171 mm	4022 368 5093
UXA	Magnet yoke UX-A 456 mm	4022 368 5099
UXA	Digital Hall Module UXX	4022 368 5154

Series	Article	Art. Code
<b>UXX Series</b>		
UXX	Coil unit UX 3N	4022 368 5105
UXX	Coil unit UX 3S FLEX	4022 368 5235
UXX	Coil unit UX 6N	4022 368 5106
UXX	Coil unit UX 6S	4022 368 5101
UXX	Coil unit UX 9N	4022 368 5107
UXX	Coil unit UX 9S	4022 368 5102
UXX	Coil unit UX 12N	4022 368 5108
UXX	Coil unit UX 12S	4022 368 5103
UXX	Coil unit UX 18N	4022 368 5111
UXX	Magnet yoke UXX 114 mm	4022 368 5215
UXX	Magnet yoke UXX 171 mm	4022 368 5216
UXX	Magnet yoke UXX 456 mm	4022 368 5217
UXX	Digital Hall Module UXX	4022 368 5154





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