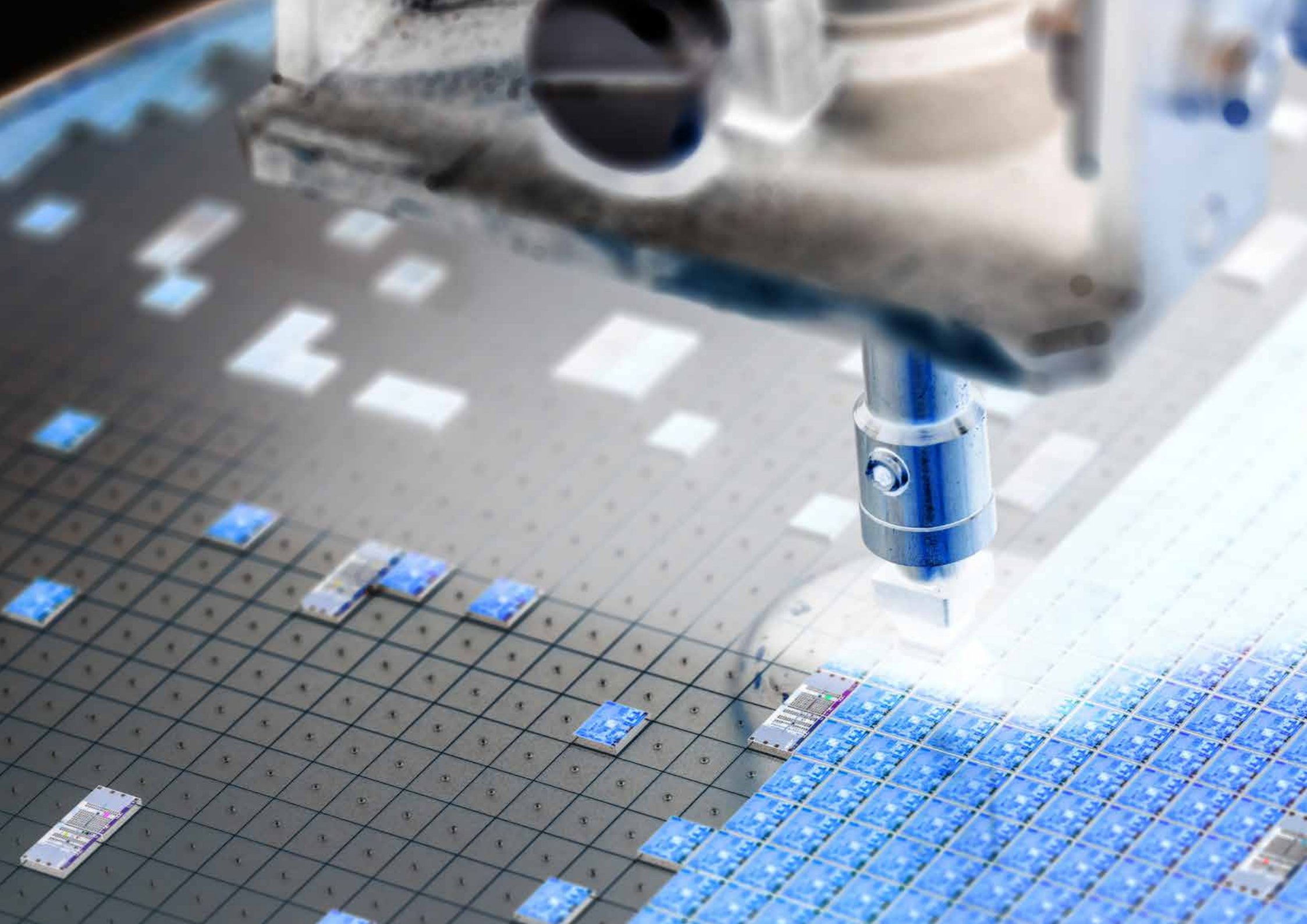
TECNOTION®

direct drive in motion

IRONLESS LINEAR MOTOR SERIES

Superior precision



WE DIRECT DRIVE YOUR MOTION TECHNOLOGY

Direct drive motors from Tecnotion are seamlessly integrated into a wide range of applications, including semiconductors, machine tooling, robotics, display applications and printing. As an independent supplier of linear-, torque and vacuum motors, we offer specialized motor technology to place in your motion solutions.

We have distinguished ourselves for almost 30 years with the exclusive development and production of direct drive linear and torque motors. As a result, we succeed in providing the best motor solution for your motion needs, whether it is a catalogue or a custom motor. Thanks to our extensive experience we are used to designing and building any motion requirement with unmatched quality & performance.

Ironless motors

UXX / UXA series

F_p 615-4200 N F_c 120-846 N

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

F_p 240-1200 N F_c 70-350 N

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

F_p 100-400 N F_c 29-116 N

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.

U	L M	6 12	S N

U = Ironless
L M = Series type
6 12 = Number of coils
S N = Winding type

UF series

F_p 42.5-85 N F_c 19.5-39 N

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

F_p 36-72 N F_c 10-20 N

The UC is small but ready to do its job. Weighing in at just a few grams, this versatile, compact and affordable motor is still able to sustain a continuous force of 10 or 20 N. Due to its low weight it is also suited to operate in a vertical application environment.

Unano series

F_p 5.1-15.3 N F_c 2.6-7.8 N

The Unano ironless linear motors deliver reliable, smooth and powerful performance. Designed for when every millimeter matters these motors have a ultra- compact design at just 12.5 mm width. Their micrometer precision makes them ideal for highly accurate applications.

Features

Ironless linear motor series

F/cm³

High force density

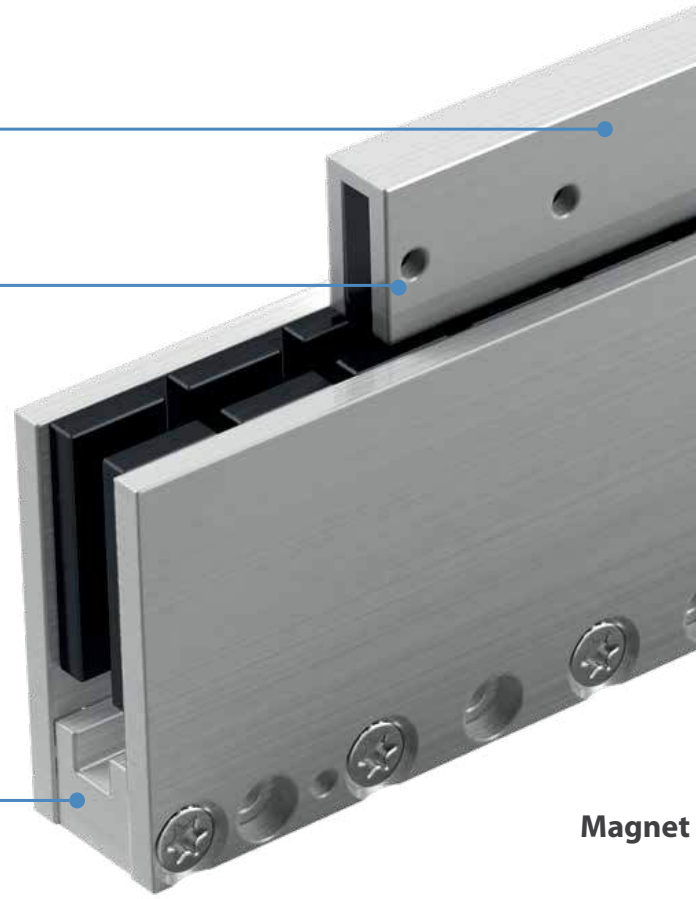
More force in a small design means lowering footprint and it fits better in tight spaces.

High acceleration and dynamics

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

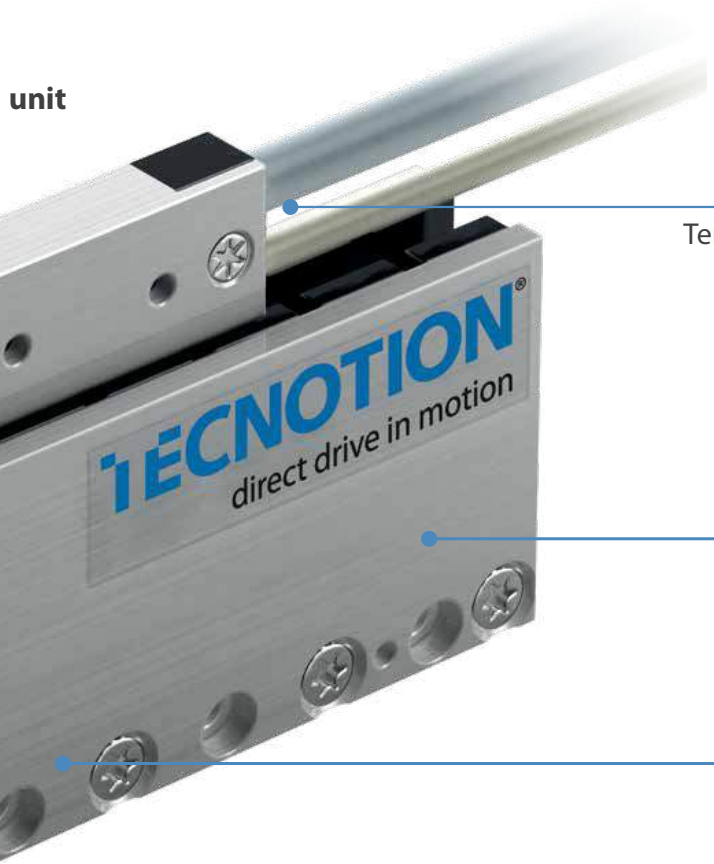
Low thermal resistance

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



TECNOTION direct drive in motion

unit



yoke

Power and sensor cable

Temperature measurement and cut-off sensor

Lifetime

Proven quality due to in-house testing

Manufacturing

Produced under high quality standards

Approved for CSA, CE, UKCA, REACH and RoHS

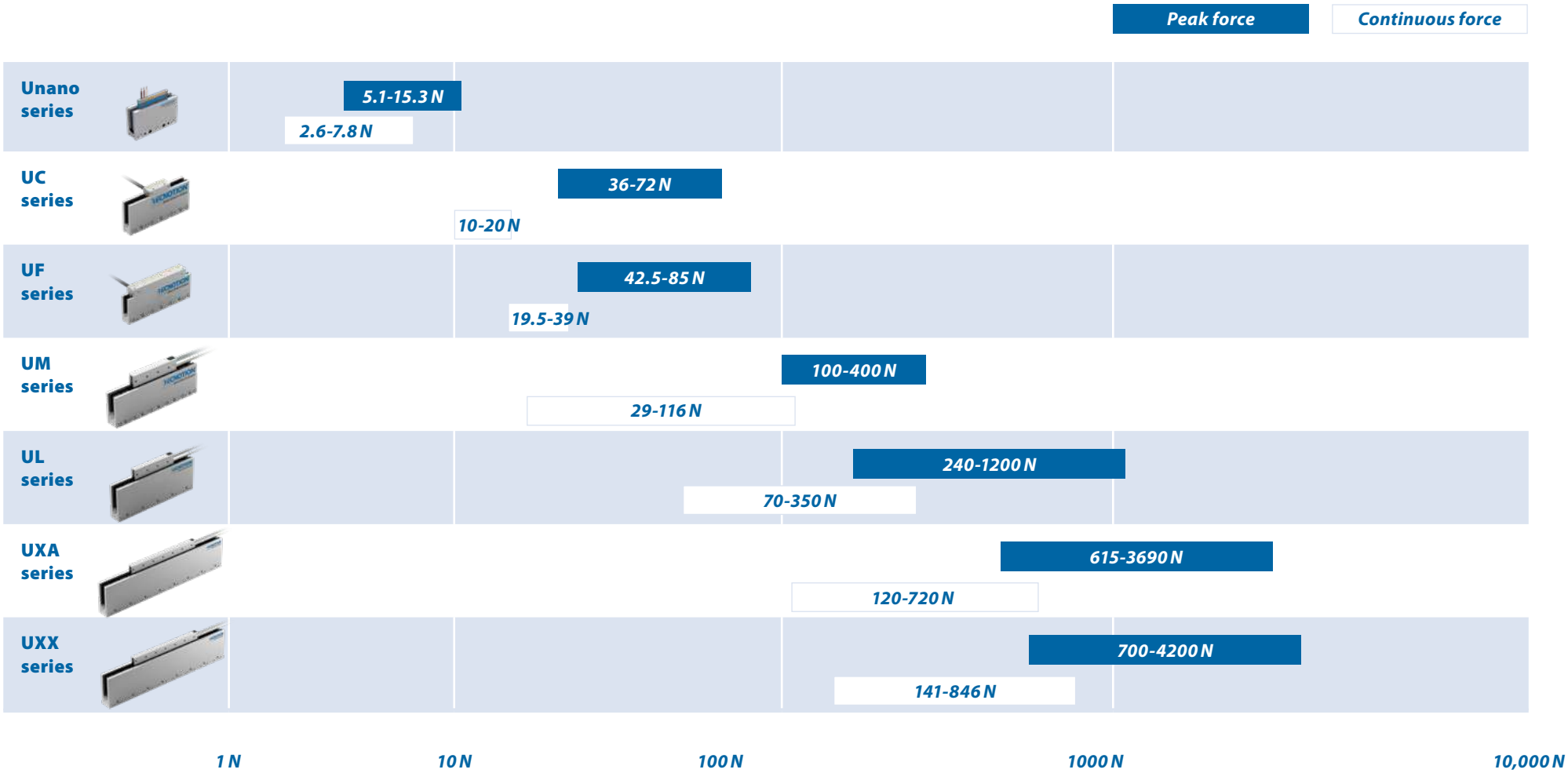
Ironless motors from Tecnotion are approved for CE, CSA, UKCA, REACH, and RoHS (UC and UF series are approved for CE, UKCA,REACH and RoHS, Unano for CE, REACH and RoHs).

No cogging, extremely low force ripple

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

Accurate force constant and speed

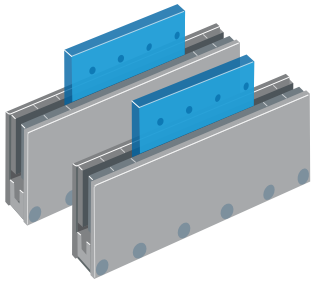
Ironless motor force range



TECNOTION direct drive in motion

Modular

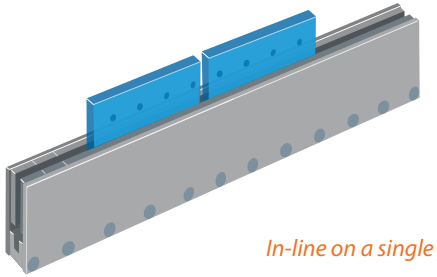
Motor configurations



Parallel coupled coil

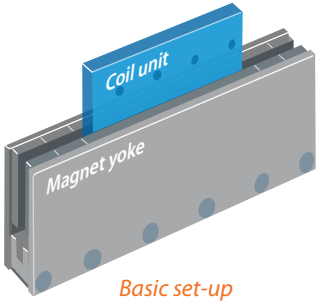
The direct drive technology of ironless linear motors is a perfect way to enhance productivity. There is no attraction force or cogging between the coil unit and the magnet track. This gives ironless motors their light weight, superior precision, a linear force constant, and extremely dynamic velocity, acceleration, and deceleration.

Motors can be mechanically aligned in series or parallel. This allows motors to move on different tracks, distributing even force to a large gantry, or on the same yoke track, enhancing power along a single line. In both cases, the total force of all motors adds up. Standardizing coil assemblies across multiple machines and applications reduces expenses and simplifies field support.

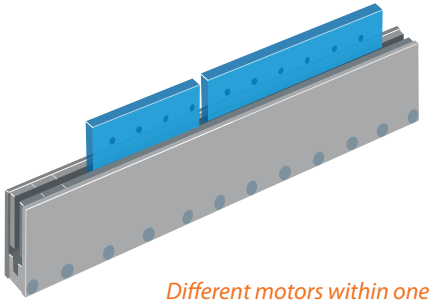


In-line on a single yoke

MODULAR SYSTEM All motors can be used in various configurations



Basic set-up



Different motors within one series

Motor simulation tool

Size your application with the motor selection and simulation tool

Online motor simulation 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 motor sizing simulation tool helps to select the right torque or linear motor, using your application characteristics. The tool will provide you with diagrams for position, velocity, acceleration, jerk, torque, power, voltage, current, temperature and torque vs. velocity. **www.tecnotion.com/simtool**

Unano series ironless

Unano 3 in 34 mm magnet yoke shown

Magnet yoke dimensions		
Le (mm)	34	51
M3 bolts	1	2
Mass (kg/m)	1.91	
Magnet yokes can be butted together.		

Approvals

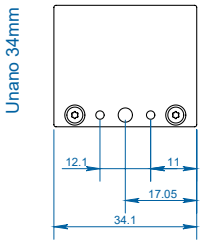
	Parameter	Remarks	Symbol	Unit	UnanoA3	UnanoA6	UnanoA9
Performance	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac,rms}$ (V_{dc})		48 (68)	
	Peak force @ 25 K/s increase	magnets @ 25°C	F_p	N	5.1	10.2	15.3
	Continuous force[1]	coils @ 100°C	F_c	N	2.6	5.2	7.8
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	57.1	26.5	16.3
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	1.15	2.3	3.45
	Motor constant	coils @ 25°C	S	N^2/W	0.76	1.55	2.34
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}		4.44	
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}		2.24	
	Back EMF ph-ph$_{peak}$		K_e	V_{dc}/m/s	0.94	1.88	2.82
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	0.58	1.14	1.70
	Induction per phase		L_{ph}	µH	66.7	133.3	200.1
	Electrical time constant		τ_e	ms		0.12	
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	11.2	22.4	33.6
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	6.70	3.35	2.23
	Thermal time constant		τ_{th}	s		16.1	
	Temperature sensor					None	
Mechanical	Coil unit mass	ex. cables	m	g	4.7	10	15
	Coil unit length	ex. cables	L	mm	17.5	34.3	51.1
	Motor attraction force	rms @ 0 A	F_a	N		0	
	Magnet pitch NN		τ	mm		8.4	
	Cable mass	all cables		g/m		3	
	Cable type	length 0.3 m	d	mm (AWG)		1.3 (26)	
	Bending radius static	minimum	r	mm		13	

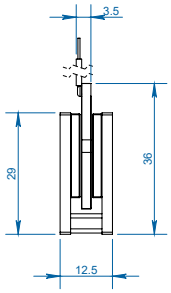
All specifications ±10%

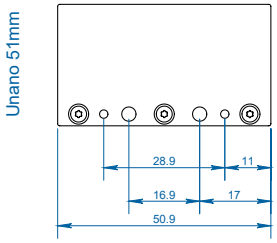
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*

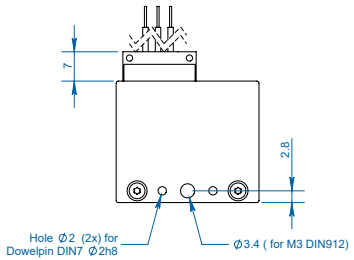
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our manual or online simulation tool. Please contact Tecnotion when speed higher than 10 m/s is required.*

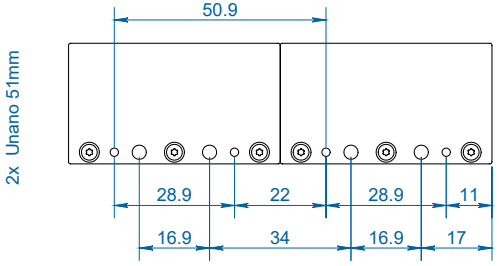
Magnet yokes



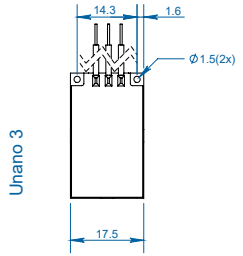


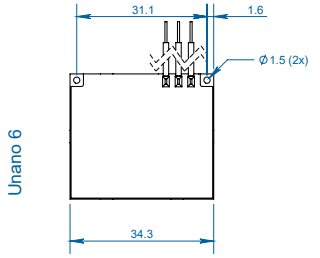


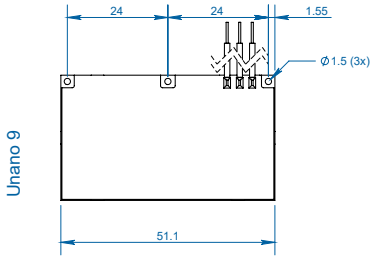




Coil units







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.

** All sizes are in mm*

UC3 in 99mm magnet yoke shown

UC series ironless

	Parameter	Remarks	Symbol	Unit	UC3 + UC3 inline	UC6
Performance	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac,rms}$ (V_{dc})	45 (60)	
	Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	36	72
	Continuous force[1]	coils @ 80°C	F_c	N	10	20
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	5.0	
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	11.4	
	Motor constant	coils @ 25°C	S	N^2/W	9.2	18.1
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	3.1	6.2
	Continuous current[1]	coils @ 80°C	I_c	A_{rms}	0.87	1.75
	Back EMF ph-ph$_{peak}$		K_e	V_{dc}/m/s	9.3	
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	4.7	2.4
	Induction per phase		L_{ph}	mH	0.75	0.38
	Electrical time constant		τ_e	ms	0.16	
Thermal	Continuous power loss[1]	coils @ 80°C	P_c	W	13	26
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	3.6	1.8
	Thermal time constant		τ_{th}	s	25	
	Temperature sensor				none	
Mechanical	Coil unit mass	ex. cables	m	kg	0.031	0.062
	Coil unit length	ex. cables	L	mm	34	67
	Motor attraction force	rms @ 0 A	F_a	N	0	
	Magnet pitch NN		τ	mm	16.5	
	Cable mass	all cables		kg/m	0.07	
	Cable type (power)	length 1 m	d	mm (AWG)	4.3 (24)	
	Cable type (sensor)		d	mm (AWG)	none	
	Cable life (power FLEX)[3]	minimum		cycles	15,000,000	
	Bending radius static (power FLEX)	minimum			5x cable diameter	
	Bending radius dynamic (power FLEX)	minimum			8x cable diameter	

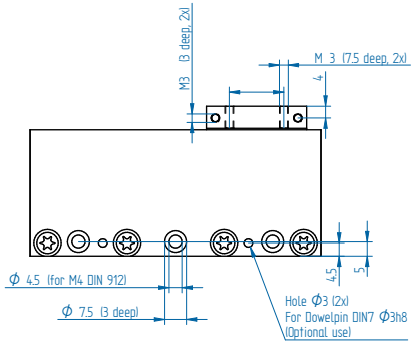
All specifications ±10%

[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.*
[3] *Depending on bending radius, velocity and acceleration.*

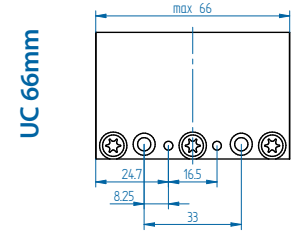
Magnet yoke dimensions			
Le (mm)	66	99	264
M4 bolts	2	3	8
Mass (kg/m)		3.2	
Magnet yokes can be butted together.			

Approvals

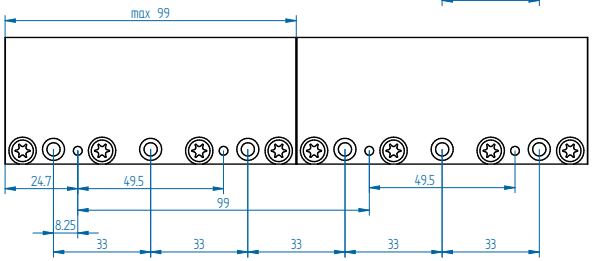
Magnet yokes



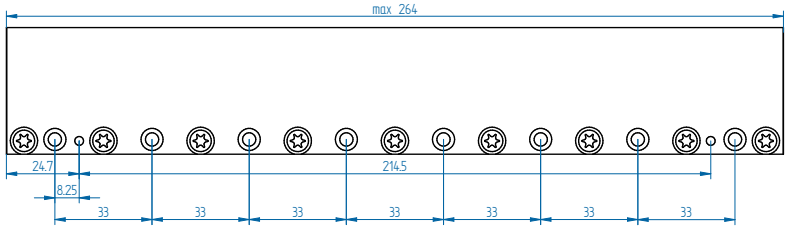
UC 66mm



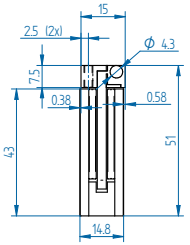
2x UC 99mm



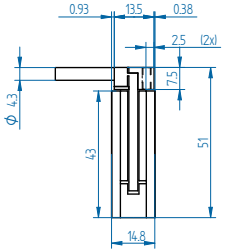
UC 264mm



Coil units

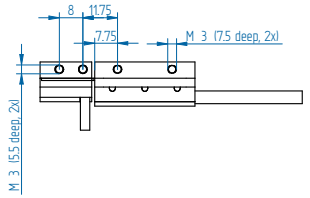


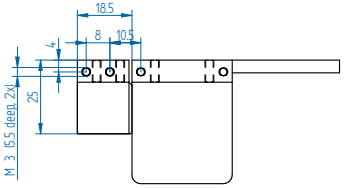
UC 3 inline



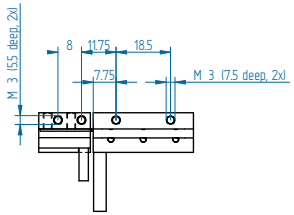
UC 3/UC 6

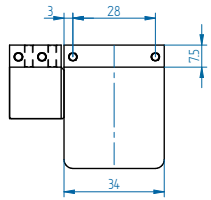
UC 3 inline



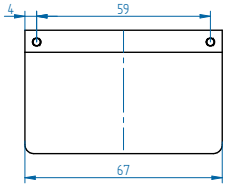


UC 3





UC 6



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.

** All sizes are in mm*

UF series ironless

UF6 in 120mm magnet yoke shown

Parameter	Remarks	Symbol	Unit	UF3	UF6
Performance					
Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac,rms}$ (V_{dc})	45 (60)	
Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	42.5	85
Continuous force[1]	coils @ 110°C	F_c	N	19.5	39
Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	5.1	
Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	12.3	
Motor constant	coils @ 25°C	S	N^2/W	14.4	28.0
Electrical					
Peak current	magnets @ 25°C	I_p	A_{rms}	3.5	6.9
Continuous current[1]	coils @ 110°C	I_c	A_{rms}	1.58	3.17
Back EMF ph-ph $_{peak}$		K_e	V_{dc}/m/s	10.1	
Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	3.5	1.8
Induction per phase		L_{ph}	mH	1.24	0.62
Electrical time constant		τ_e	ms	0.36	
Thermal					
Continuous power loss[1]	coils @ 110°C	P_c	W	35	70
Thermal resistance	coils to mount. sfc.	R_{th}	K/W	2.4	1.2
Thermal time constant		τ_{th}	s	34	
Temperature sensor				NTC	
Mechanical					
Coil unit mass	ex. cables	m	kg	0.045	0.087
Coil unit length	ex. cables	L	mm	49	97
Motor attraction force	rms @ 0 A	F_a	N	0	
Magnet pitch NN		τ	mm	24	
Cable mass	all cables		kg/m	0.07	
Cable type (power and sensor)	length 1 m	d	mm (AWG)	4.3 (24)	
Cable life (FLEX)[3]	minimum		cycles	15,000,000	
Bending radius static	minimum			5x cable diameter	
Bending radius dynamic	minimum			8x cable diameter	

All specifications ±10%

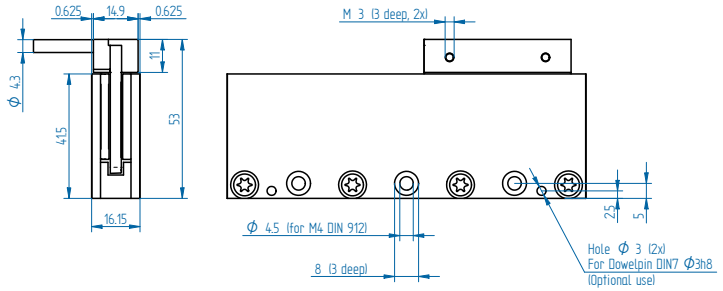
Magnet yoke dimensions		
Le (mm)	72	120
M4 bolts	2	3
Mass (kg/m)	3.2	
Magnet yokes can be butted together.		

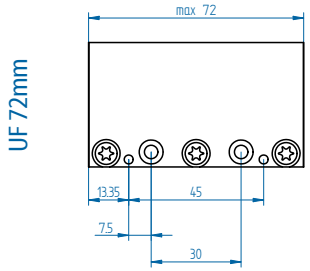
Approvals

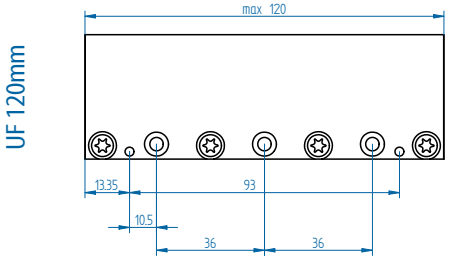
CE UKCA RoHS REACH

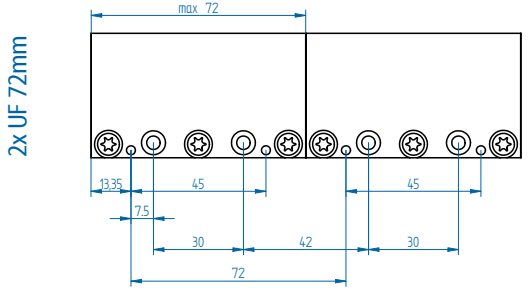
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.*
[3] *Depending on bending radius, velocity and acceleration.*

Magnet yokes

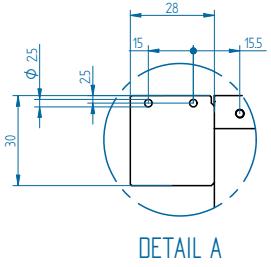


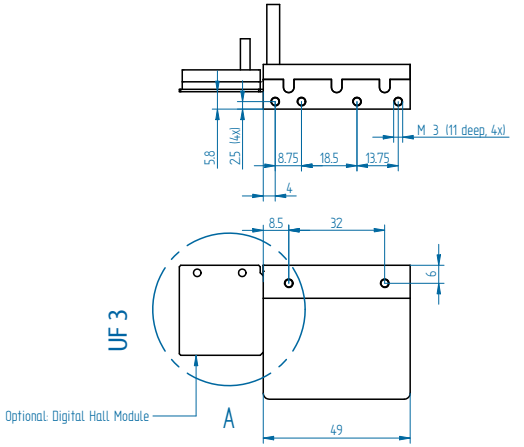


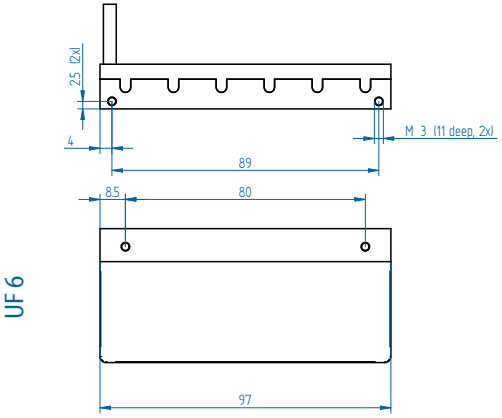




Coil units







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.

** All sizes are in mm*

UM3 in 150mm magnet yoke shown

UM series ironless

	Parameter	Remarks	Symbol	Unit	UM3		UM6		UM9		UM12	
Performance	Winding type				N	S	N	S	N	S	N	S
	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac,rms}$ (V_{dc})	230 (325)							
	Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	100		200		300		400	
	Continuous force[1]	coils @ 110°C	F_c	N	29		58		87		116	
	Continuous force[1,3]	coils @ 105°C	F_c	N	28		57		85		113	
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	10	18	10	18	10	18	10	18
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	36.3	19.9	36.3	19.9	36.3	19.9	36.3	19.9
	Motor constant	coils @ 25°C	S	N^2/W	24	24	47	47	71	73	95	94
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	2.8	5.0	5.5	10	8.3	15	11	20
	Continuous current[1]	coils @ 110°C	I_c	A_{rms}	0.8	1.5	1.6	2.9	2.4	4.4	3.2	5.8
	Continuous current[1,3]	coils @ 105°C	I_c	A_{rms}	0.8	1.4	1.6	2.8	2.3	4.2	3.1	5.7
	Back EMF ph-ph $_{peak}$		K_e	V_{dc}/m/s	30	16	30	16	30	16	30	16
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	18.5	5.5	9.3	2.8	6.2	1.8	4.6	1.4
	Induction per phase		L_{ph}	mH	6.5	1.8	3.3	0.9	2.2	0.6	1.5	0.4
	Electrical time constant		τ_e	ms	0.35							
Thermal	Continuous power loss[1]	coils @ 110°C	P_c	W	47		95		142		190	
	Continuous power loss[1,3]	coils @ 105°C	P_c	W	44		89		133		178	
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	1.8		0.9		0.6		0.45	
	Thermal time constant		τ_{th}	s	36							
	Temperature sensor				PTC 1kΩ / NTC							
Mechanical	Coil unit mass	ex. cables	m	kg	0.100		0.162		0.240		0.318	
	Coil unit length	ex. cables	L	mm	78		138		198		258	
	Motor attraction force	rms @ 0 A	F_a	N	0							
	Magnet pitch NN		τ	mm	30							
	Cable mass	all cables		kg/m	0.08							
	Cable type (power)	length 1 m	d	mm (AWG)	5.5 (22)							
	Cable type (sensor)	length 1 m	d	mm (AWG)	3.2 (26)							

All specifications ±10%

Magnet yoke dimensions				
Le (mm)	90	120	150	390
M4 bolts	3	4	5	13
Mass (kg/m)	4.8			
Magnet yokes can be butted together.				

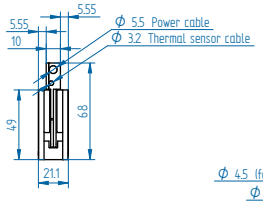
Approvals

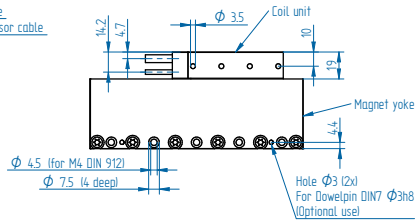
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*

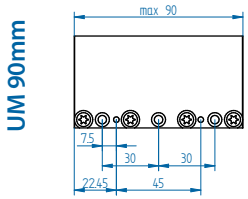
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.*

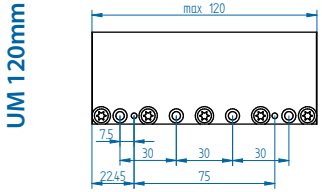
[3] *The maximum coil temperature for CSA certification is 105°C. The maximum coil temperature without CSA certification is 110°C.*

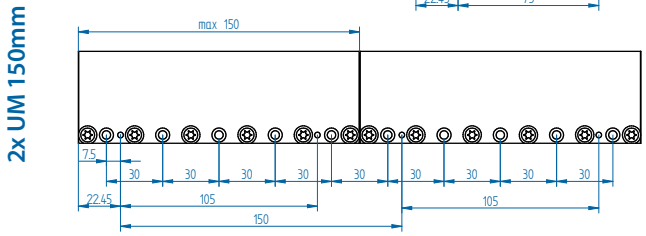
Magnet yokes

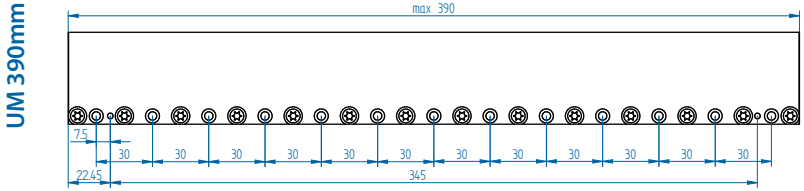




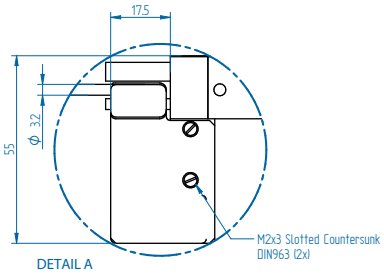


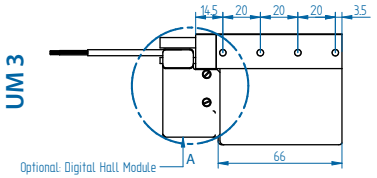


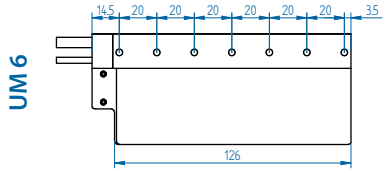


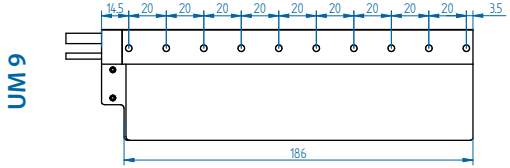


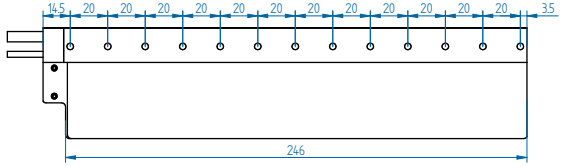
Coil units





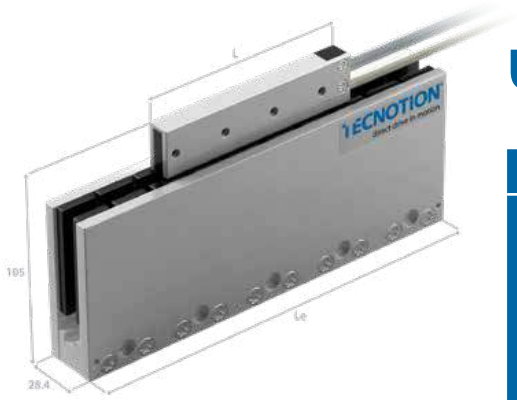






Mounting instructions and flatness or parallelism requirements can be found in the ironless installation manual. CAD files and 3D models can be downloaded from our website.

** All sizes are in mm*



UL3 in 210mm magnet yoke shown

UL series ironless

	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	U_{max}	$V_{ac,rms}$ (V_{dc})	230 (325)									
	Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	240		480		720		960		1200	
	Continuous force[1]	coils @ 110°C	F_c	N	70		140		210		280		350	
	Continuous force[1,3]	coils @ 105°C	F_c	N	67		137		201		269		336	
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	5.0	12	5.0	12	5.0	12	5.0	12	5.0	12
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	68	27.5	68	27.5	68	27.5	68	27.5	68	27.5
	Motor constant	coils @ 25°C	S	N^2/W	97	97	193	197	291	297	385	394	460	476
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	3.5	8.7	7.1	17.5	10.6	26.2	14.1	35	17.8	44
	Continuous current[1]	coils @ 110°C	I_c	A_{rms}	1.0	2.6	2.1	5.1	3.1	7.6	4.2	10.2	5.2	12.9
	Continuous current[1,3]	coils @ 105°C	I_c	A_{rms}	1.0	2.5	2.0	4.9	3.0	7.4	4.0	9.9	4.9	12.3
	Back EMF ph-ph $_{peak}$		K_e	$V_{dc}/m/s$	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_{ph}	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_{ph}	mH	13	2.1	6.5	1.02	4.2	0.68	3.2	0.51	2.7	0.42
	Electrical time constant		τ_e	ms	0.8									
Thermal	Continuous power loss[1]	coils @ 110°C	P_c	W	67		134		200		270		335	
	Continuous power loss[1,3]	coils @ 105°C	P_c	W	62		123		185		246		308	
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	1.3		0.65		0.43		0.32		0.26	
	Thermal time constant		τ_{th}	s	72									
	Temperature sensor				PTC 1kΩ / NTC									
Mechanical	Coil unit mass	ex. cables	m	kg	0.27		0.49		0.69		0.91		1.13	
	Coil unit length	ex. cables	L	mm	106		190		274		358		442	
	Motor attraction force	rms @ 0 A	F_a	N	0									
	Magnet pitch NN		τ	mm	42									
	Cable mass	all cables		kg/m	0.09						0.105			
	Cable type (power)	length 1 m	d	mm (AWG)	5.9 (20)						6.4 (18)			
	Cable type (sensor)	length 1 m	d	mm (AWG)	4.7 (26)									

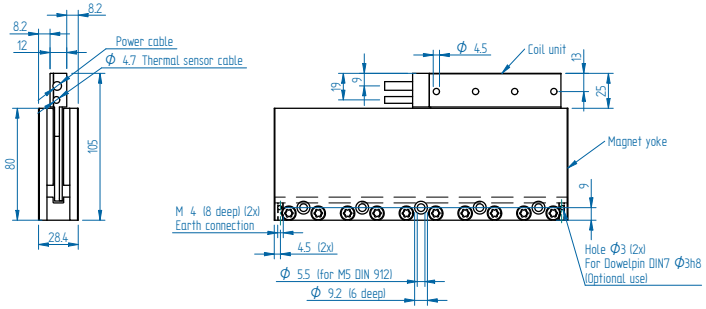
All specifications ±10%

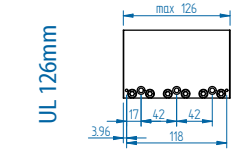
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.*
[3] *The maximum coil temperature for CSA certification is 105°C. The maximum coil temperature without CSA certification is 110°C.*

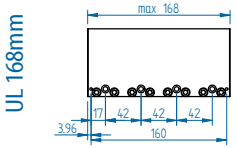
Magnet yoke dimensions				
Le (mm)	126	168	210	546
M5 bolts	3	4	5	13
Mass (kg/m)	11.2			
Magnet yokes can be butted together.				

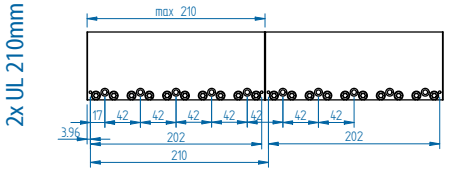
Approvals

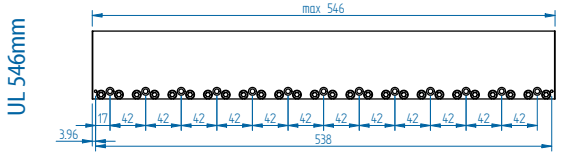
Magnet yokes



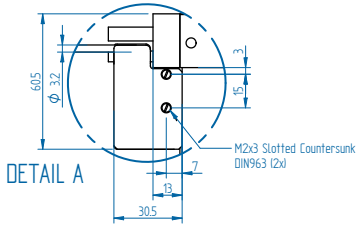


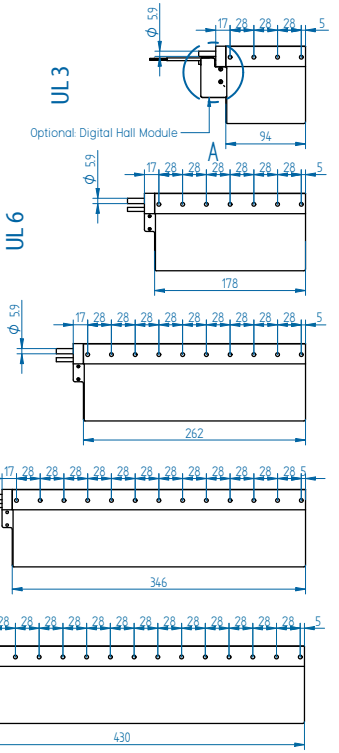






Coil units

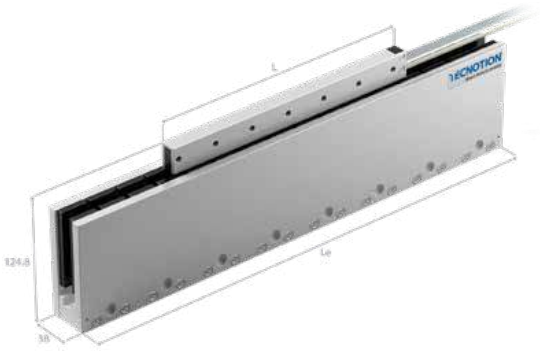




Mounting instructions and flatness or parallelism requirements can be found in the ironless installation manual. CAD files and 3D models can be downloaded from our website.

** All sizes are in mm*

UXA series ironless



UXA6 in 456mm magnet yoke shown

UXA3S power cable (FLEX cable of 3m)	
Cable type	8.5 mm (21 AWG)
Cable life[5]	5,000,000 cycles
Bending radius static	4x cable diameter
Bending radius dynamic	10x cable diameter

[5] *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.			

Approvals

	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	U_{max}	$V_{ac,rms}$ (V_{dc})	230 (325)								
	Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	615		1230		1845		2460		3690
	Continuous force[1]	coils @ 110°C	F_c	N	120		240		360		480		720
	Continuous force[1,3]	coils @ 105°C	F_c	N	119		239		358		477		716
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	2.9	7.2	2.9	7.2	2.9	7.2	2.9	7.2	2.9
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	107	43.4	107	43.4	107	43.4	107	43.4	107
	Motor constant	coils @ 25°C	S	N^2/W	242	241	483	487	720	730	954	966	1468
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	5.6	13.9	11.3	28	16.9	42	22.6	56	34
	Continuous current[1]	coils @ 110°C	I_c	A_{rms}	1.1	2.8	2.3	5.6	3.4	8.4	4.5	11.2	6.8
	Continuous current[1,3]	coils @ 105°C	I_c	A_{rms}	1.1	2.7	2.2	5.5	3.3	8.2	4.5	10.9	6.7
	Back EMF ph-ph $_{peak}$		K_e	V_{dc}/m/s	87	35	87	35	87	35	87	35	87
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	15.8	2.6	7.9	1.29	5.3	0.86	4.0	0.65	2.6
	Induction per phase		L_{ph}	mH	28	4.6	14	2.3	9.5	1.5	7.1	1.2	4.7
	Electrical time constant		τ_e	ms	1.8								
Thermal	Continuous power loss[1]	coils @ 110°C	P_c	W	82		165		247		330		494
	Continuous power loss[1,3]	coils @ 105°C	P_c	W	77		154		231		308		462
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	1.04		0.52		0.35		0.26		0.17
	Thermal time constant		τ_{th}	s	156								
	Temperature sensor				PTC 1kΩ / NTC								
Mechanical	Coil unit mass	ex. cables	m	kg	0.55		1.06		1.55		2.06		3.02
	Coil unit length	ex. cables	L	mm	134		248		362		476		704
	Motor attraction force	rms @ 0 A	F_a	N	0								
	Magnet pitch NN		τ	mm	57								
	Cable mass	all cables		kg/m	0.105								
	Cable type (power)[4]	length 1 m	d	mm (AWG)	6.5 (18)								
	Cable type (sensor)	length 1 m	d	mm (AWG)	4.7 (26)								

All specifications ±10%

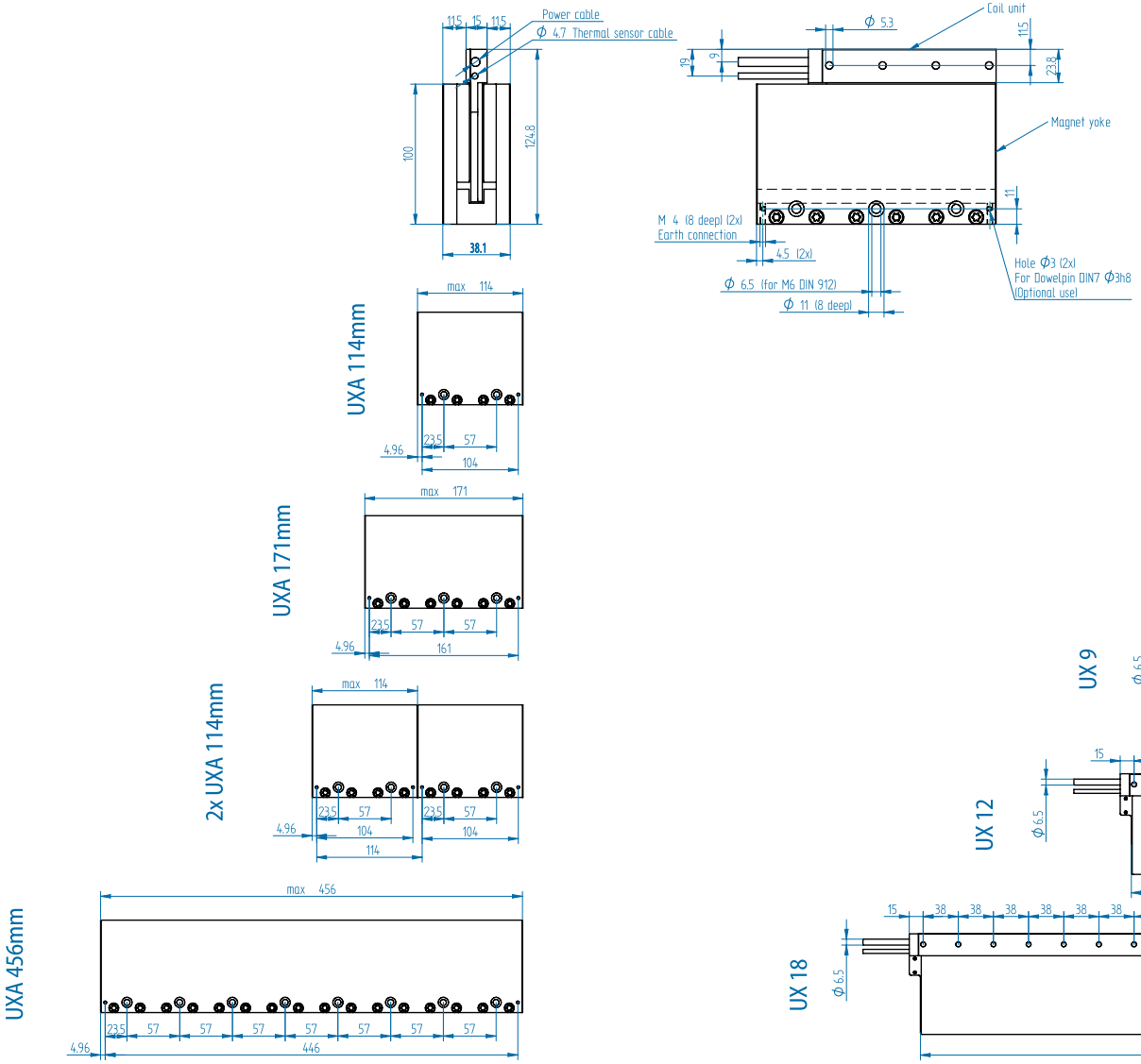
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*

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

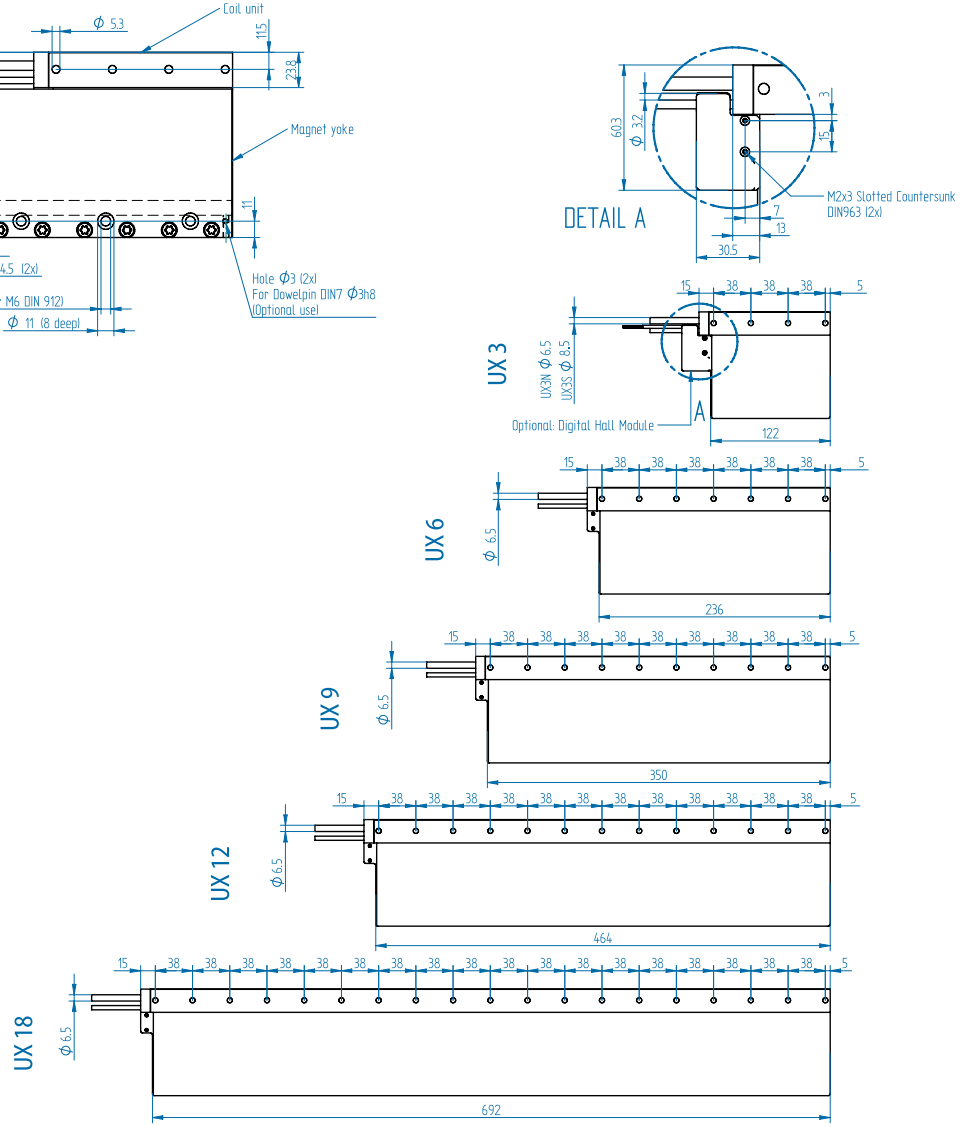
[3] *The maximum coil temperature for CSA certification is 105°C. The maximum coil temperature without CSA certification is 110°C.*

[4] *The UXA3S is only available with a FLEX power cable.*

Magnet yokes



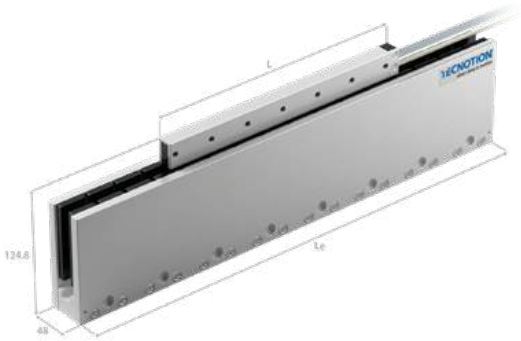
Coil units



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.

** All sizes are in mm*

UXX series ironless



UXX6 in 456mm magnet yoke shown

UXX3S power cable (FLEX cable of 3m)	
Cable type	8.5 mm (21 AWG)
Cable life[5]	5,000,000 cycles
Bending radius static	4x cable diameter
Bending radius dynamic	10x cable diameter

[5] *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.

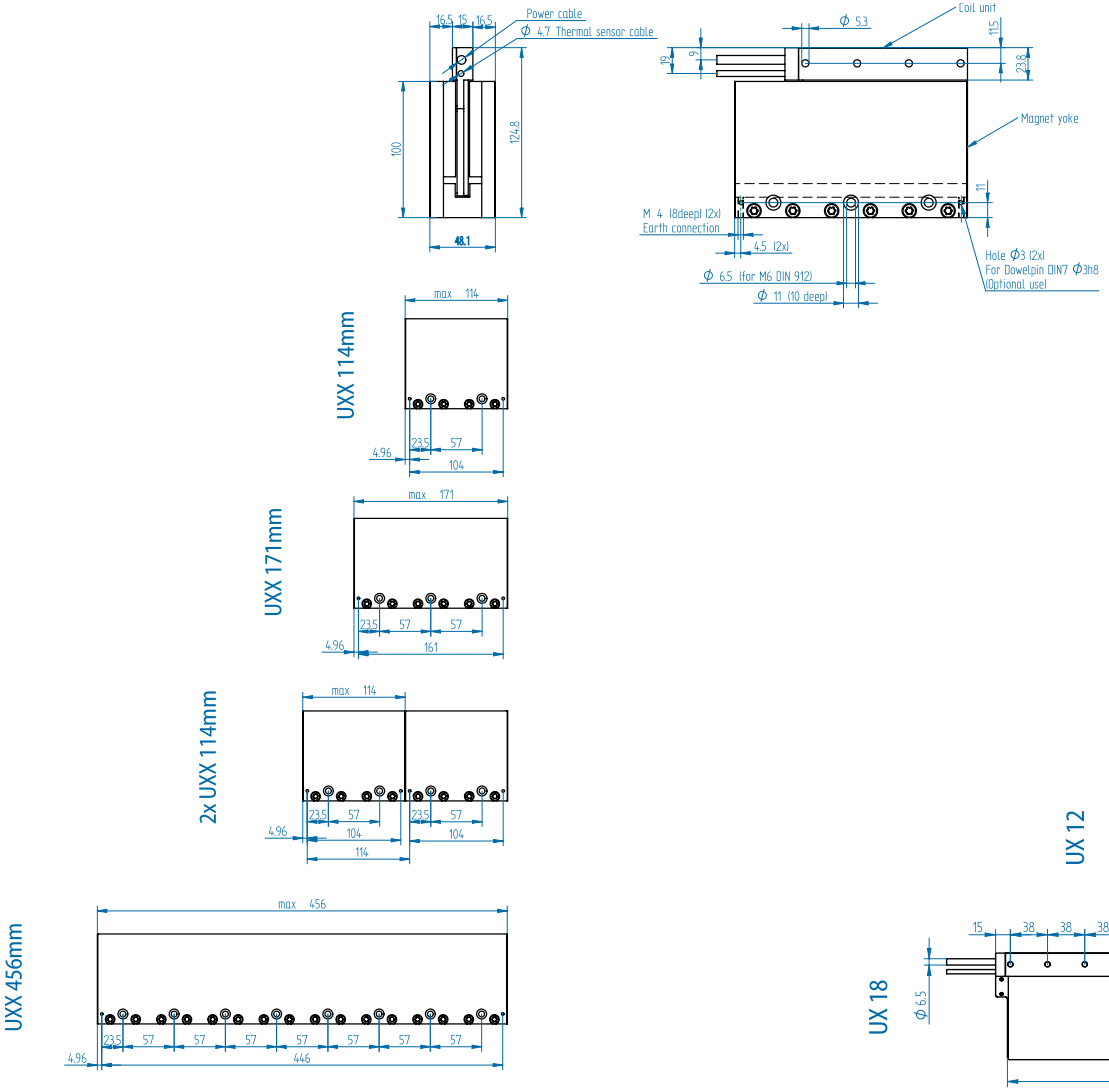
Approvals

	Parameter	Remarks	Symbol	Unit	UXX3		UXX6		UXX9		UXX12		UXX18
Performance	Winding type				N	S	N	S	N	S	N	S	N
	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac,rms}$ (V_{dc})	230 (325)								
	Peak force @ 20 K/s increase	magnets @ 25°C	F_p	N	700		1400		2100		2800		4200
	Continuous force[1]	coils @ 110°C	F_c	N	141		282		423		564		846
	Continuous force[1,3]	coils @ 105°C	F_c	N	138		277		415		553		830
	Maximum speed[2]	@ U_{max} @ F_c	v_{max}	m/s	2.7	6.6	2.7	6.6	2.7	6.6	2.7	6.6	2.7
	Motor force constant	$I \leq I_c$	K_f	N/A_{rms}	124	50.3	124	50.3	124	50.3	124	50.3	124
	Motor constant	coils @ 25°C	S	N^2/W	324	324	649	654	967	981	1281	1297	1971
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	5.6	13.9	11.3	28	16.9	42	22.6	56	34
	Continuous current[1]	coils @ 110°C	I_c	A_{rms}	1.1	2.8	2.3	5.6	3.4	8.4	4.5	11.2	6.8
	Continuous current[1,3]	coils @ 105°C	I_c	A_{rms}	1.1	2.7	2.2	5.5	3.3	8.2	4.5	10.9	6.7
	Back EMF ph-ph $_{peak}$		K_e	V_{dc}/m/s	101	41	101	41	101	41	101	41	101
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	15.8	2.6	7.9	1.29	5.3	0.86	4.0	0.65	2.6
	Induction per phase		L_{ph}	mH	28	4.6	14	2.3	9.5	1.5	7.1	1.2	4.7
	Electrical time constant		τ_e	ms	1.8								
Thermal	Continuous power loss[1]	coils @ 110°C	P_c	W	82		165		247		330		494
	Continuous power loss[1,3]	coils @ 105°C	P_c	W	77		154		231		308		462
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	1.04		0.52		0.35		0.26		0.17
	Thermal time constant		τ_{th}	s	156								
	Temperature sensor				PTC 1kΩ / NTC								
Mechanical	Coil unit mass	ex. cables	m	kg	0.55		1.06		1.55		2.06		3.02
	Coil unit length	ex. cables	L	mm	134		248		362		476		704
	Motor attraction force	rms @ 0 A	F_a	N	0								
	Magnet pitch NN		τ	mm	57								
	Cable mass			kg/m	0.105								
	Cable type (power)[4]	length 1 m	d	mm (AWG)	6.5 (18)								
	Cable type (sensor)	length 1 m	d	mm (AWG)	4.7 (26)								

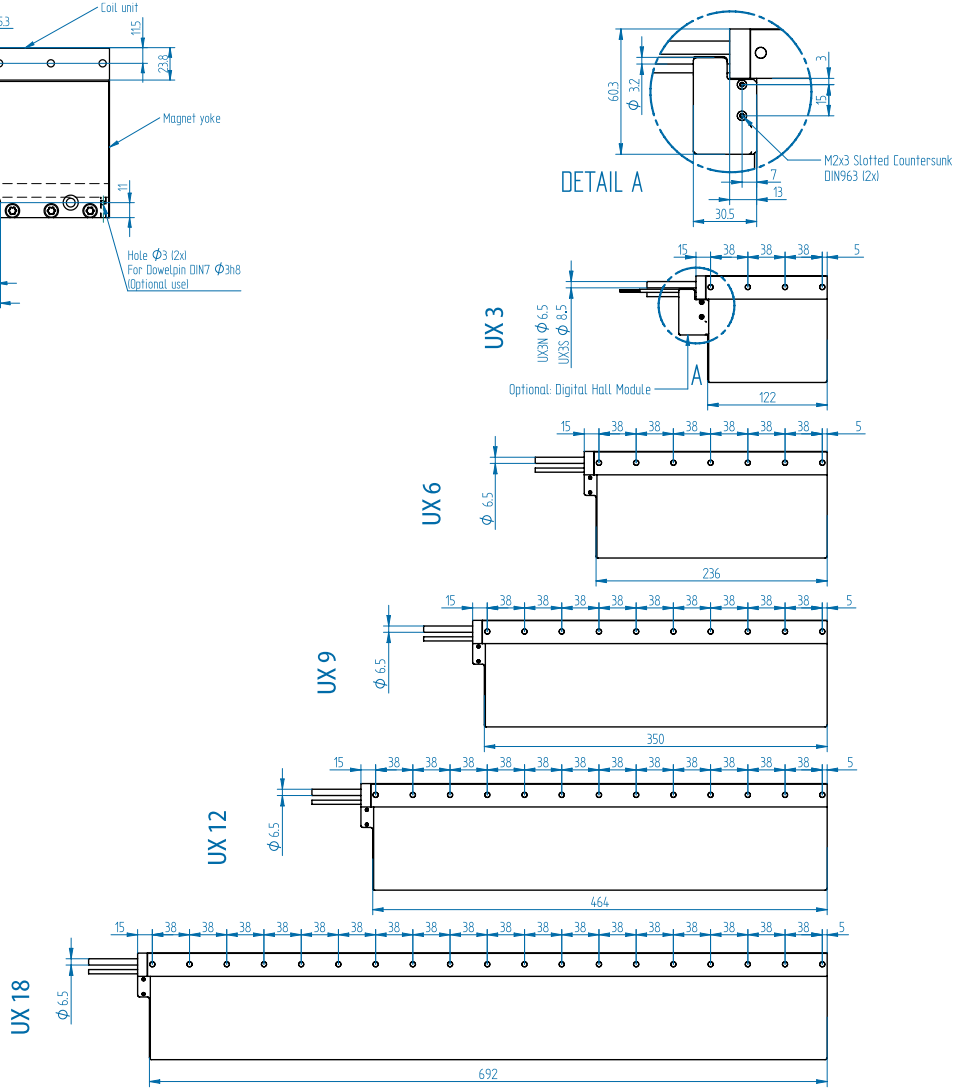
All specifications ±10%

[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*
[2] *Actual values depend on bus voltage. Please check the F/v diagram in our simulation tool.*
[3] *The maximum coil temperature for CSA certification is 105°C. The maximum coil temperature without CSA certification is 110°C.*
[4] *The UXX3S is only available with a FLEX power cable.*

Magnet yokes



Coil units



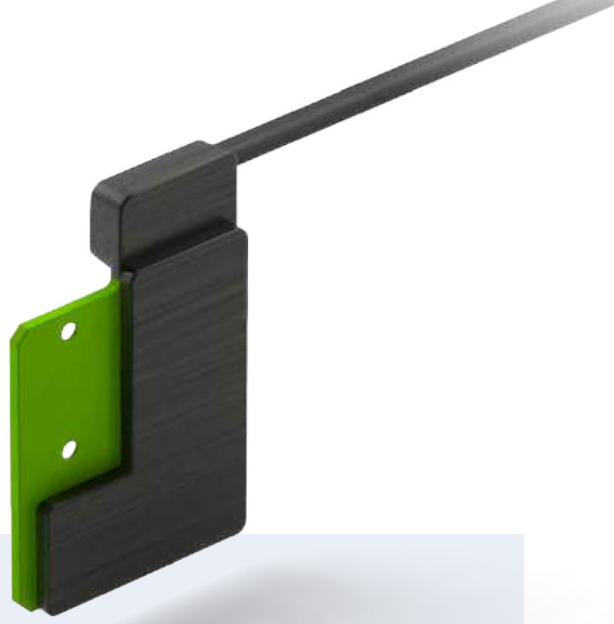
Mounting instructions and flatness or parallelism requirements can be found in the ironless installation manual. CAD files and 3D models can be downloaded from our website.

** All sizes are in mm*

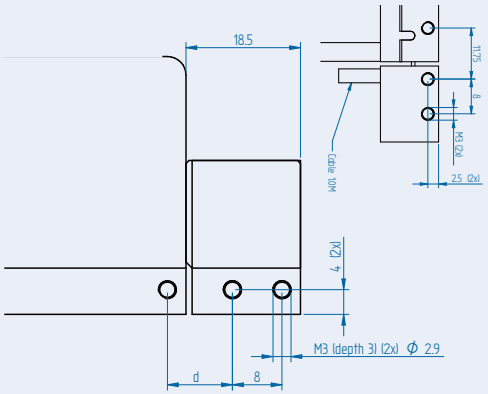
Digital Hall module for commutation

Digital Hall sensors can be used to determine the position of the coil unit within the magnetic field for a controller to correctly commutate the phases. If you do not use a controller that allows you to commutate within the servo drive, this module can be a cost-effective alternative.

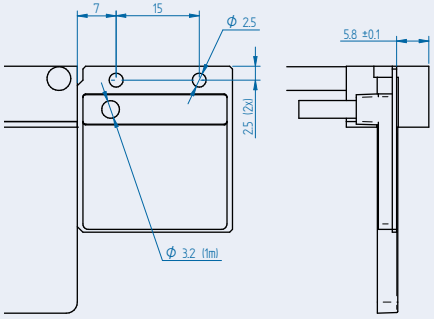
The UC, UF, UL, UM and UX series has its own additional digital Hall module. Resolutions of the digital Hall modules are: UC: 2.75 mm; UF: 4 mm; UM: 5 mm; UL: 7 mm; UXA/UXX: 9.5 mm.



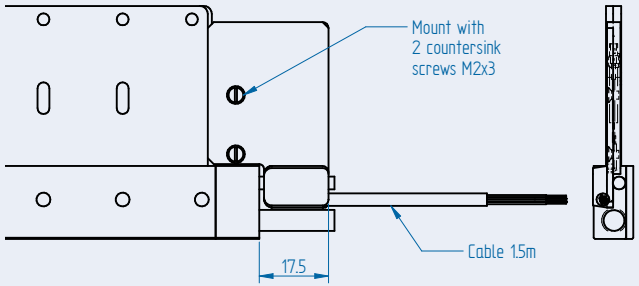
UC SERIES



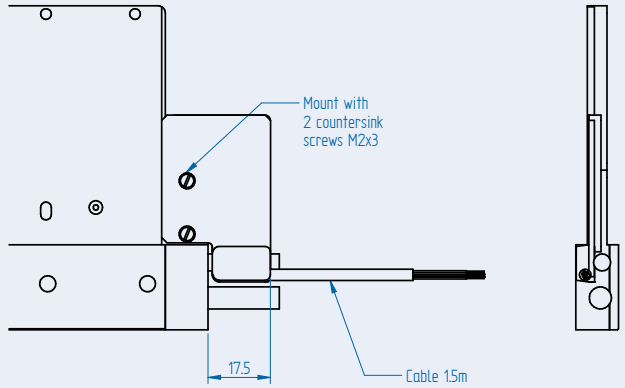
UF SERIES



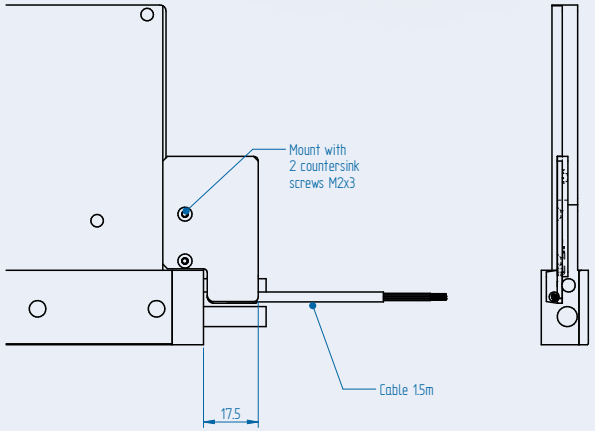
UM SERIES



UL SERIES



UXA/UXX 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.

Support

At Tecnotion, we recognize that every use of our motors presents unique circumstances with different needs and challenges. Our team of Sales and Application Engineers have extensive experience in different application scenarios and work closely with our customers to find solutions that perfectly align with their requirements and objectives.

With our commitment to excellence and innovation, we remain steadfast in our mission to provide our customers with solutions that lead them to success in an ever-changing landscape.

Continuous innovation

At the heart of our company is an internal Research and Development (R&D) department that serves as an engine for innovation. This dedication to innovation not only fuels our deep knowledge of manufacturing processes, but also drives our commitment to excel in product design and performance, helping our customers meet the changing needs and expectations of their customers.

In addition to our extensive range of off-the-shelf standard motors, we custom design motors for applications that have more unique requirements. Our team works closely with customers to understand their specific challenges and objectives.

Modern manufacturing

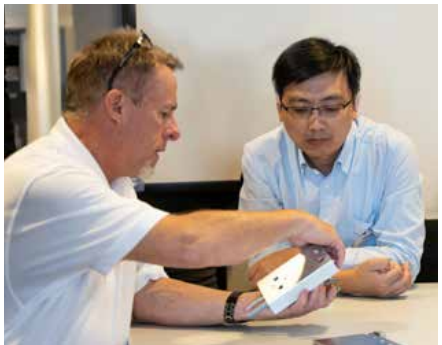
Our manufacturing capabilities are strategically distributed between our facilities in China, Vietnam and the Netherlands, each of which plays a vital role in delivering first-class products to our customers worldwide. This distribution enables us to meet the demands of mass production.

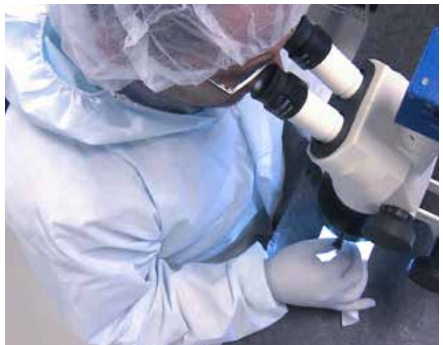
Our competence centre and headquarters in the Netherlands are dedicated to advanced motor technology and are the epicentre of innovation and precision engineering. Custom motors are also built here in our special state-of-the-art clean room environment, with extreme precision and an eye for quality. Tecnotion prides itself on maintaining the strictest quality standards in all facets of our operations. Our plants are ISO 9001 certified.

Global logistics

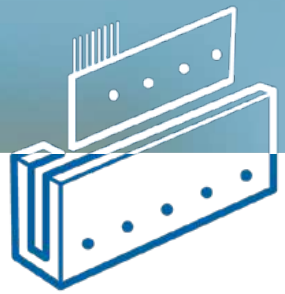
We ensure that our most popular products are in stock in our warehouses. This setup gives us quick access to our stock, regardless of your location. Whether you are near our European headquarters or on the other side of the world, our efficient shipping network ensures that your orders are processed quickly.

Even during periods of increased market activity, our flexible supply chain allows us to maintain fast delivery times, so your products reach you quickly and reliably. With our unwavering commitment to customer satisfaction and operational excellence, we strive to provide seamless and efficient service throughout the supply chain.





We direct drive your motion technology



Vacuum linear motors

F_p 100-4020 N F_c 22-698 N

Vacuum Generation 2 motors for powerful and precise processes

Generation 2 vacuum ironless linear motor series is designed with the unique challenges of vacuum applications in mind and based on years of collaboration with high-end semiconductor manufacturers.

Optimal thermal properties, added safety, excellent RGA performance, lower outgassing and flexibility to install, make the Generation 2 vacuum motor series the benchmark for motion in vacuum applications.

www.tecnotion.com/vacuum

Torque motors

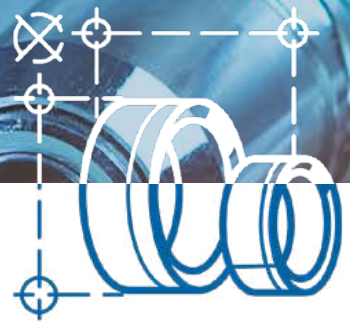
T_u 0.64-2202 Nm T_c 0.29-907 Nm

Increased accuracy and dynamic performance of your application

Tecnotion torque motor series features superior force density, low thermal resistance, low cogging and housed design. Motors can be very slim in height but large in diameter (for large axles and turntables) or have a 'height' close to their diameter, resulting in a compact but high-torque motor.

The torque series consists of different outer diameters ranging from 65mm to 485mm for the largest motor and various building heights ranging from 17mm up to 140mm.

www.tecnotion.com/torque



Custom motors

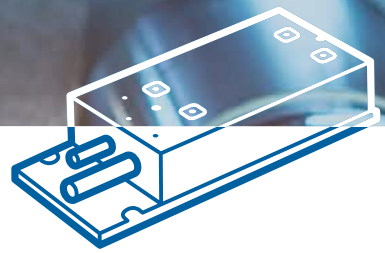
Motor solutions

Adapt standard motor series to meet your needs

In case the standard motor series are not sufficient for your application, it is also possible to have these motors customized in a variety of ways. Customization can range from simple modifications, like adding a connector, to fully tailor-made motors designed from scratch.

Some examples: custom windings, cable confection, additional sensors, additional certifications and customization for vacuum applications. For more information please contact Tecnotion.

www.tecnotion.com/custom



Iron core linear motors

F_u 120-6750 N F_c 60-3000 N

Extremely high force in a modular compact design

Designed and constructed with an iron core, these series offer an extremely high continuous force for their size, starting at 60 N for the small TM, up to 3000 N for the water cooled TBW. Peak forces are even higher, reaching up to 6000 N.

A small footprint, modular design, and high force density enable very flexible application designs, using iron core linear motors. Suitable for many applications such as printing, digital cutting, and machine tooling.

www.tecnotion.com/ironcore

TECNOTION® direct drive in motion

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Article numbers

Series	Article	Article code
Unano series		
UA	Coil unit UnanoA 3N	122187
UA	Coil unit UnanoA 6N	122188
UA	Coil unit UnanoA 9N	122189
UA	Magnet yoke UnanoA 34 mm	122321
UA	Magnet yoke UnanoA 51 mm	122267
UC series		
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
UF series		
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
UM series		
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

Series	Article	Article code
UL series		
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
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
UXA/UXX series		
UXA/UXX	Coil unit UX 3N	4022 368 5105
UXA/UXX	Coil unit UX 3S FLEX	4022 368 5235
UXA/UXX	Coil unit UX 6N	4022 368 5106
UXA/UXX	Coil unit UX 6S	4022 368 5101
UXA/UXX	Coil unit UX 9N	4022 368 5107
UXA/UXX	Coil unit UX 9S	4022 368 5102
UXA/UXX	Coil unit UX 12N	4022 368 5108
UXA/UXX	Coil unit UX 12S	4022 368 5103
UXA/UXX	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
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
UXA/UXX	Digital Hall Module UX	4022 368 5154

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