

# TECNOTION<sup>®</sup>

direct drive in motion

## FRAMELESS TORQUE MOTOR SERIES

Increased dynamic performance





# WE DIRECT DRIVE YOUR MOTION TECHNOLOGY

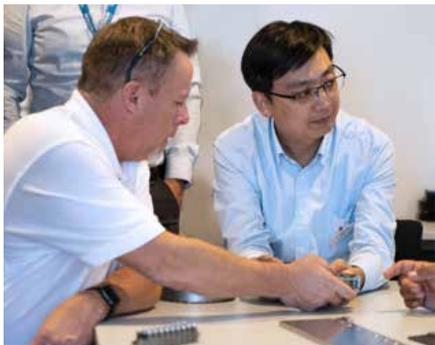
Direct drive motors from Tecnotion are seamlessly integrated into a wide range of applications, including semiconductors, machine tooling, robotics, display applications and printing. As an independent supplier of linear, torque and vacuum motors, we offer specialized motor technology to place in your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

## 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 determined 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 design.

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.



# Frameless torque motor series



See  
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## QTR 65 and 78 series

The QTR 65 and 78 are the smallest motors from our torque range. The largest QTR 78 motor offers an ultimate torque of 10.91 Nm. Compact sizing and low voltage support makes the QTR 65 motor ideal for robotics applications. Small build-space and a large 29 mm inner diameter make the QTR 78 motor a favorite in semiconductor machinery. To provide maximum flexibility and integration the motor is equipped with flying leads instead of a power cable.

These motor series come in two diameters: 65 and 78 mm and four heights.



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## QTR 105 to 160 series

Our medium range motors are available with a range of options. Different winding types are available, optimizing back EMF. A digital Hall sensor can be used as a 'wake and shake' replacement, simplifying the startup of the QTR motor. The largest QTR motor, excels with 245 Nm ultimate torque. Various applications such as in medical, testing equipment, and factory automation benefit from the large inner diameter and the high peak torque of the series.

These motor series comes in three diameters: 105, 133 and 160 mm and six heights.

QTR-A	105	17	N
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QTR/QTL-A = Torque (A = rotor option)  
 105 = Series type/outer diameter  
 17 = Stator height  
 N = Winding type



See  
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## QTL series

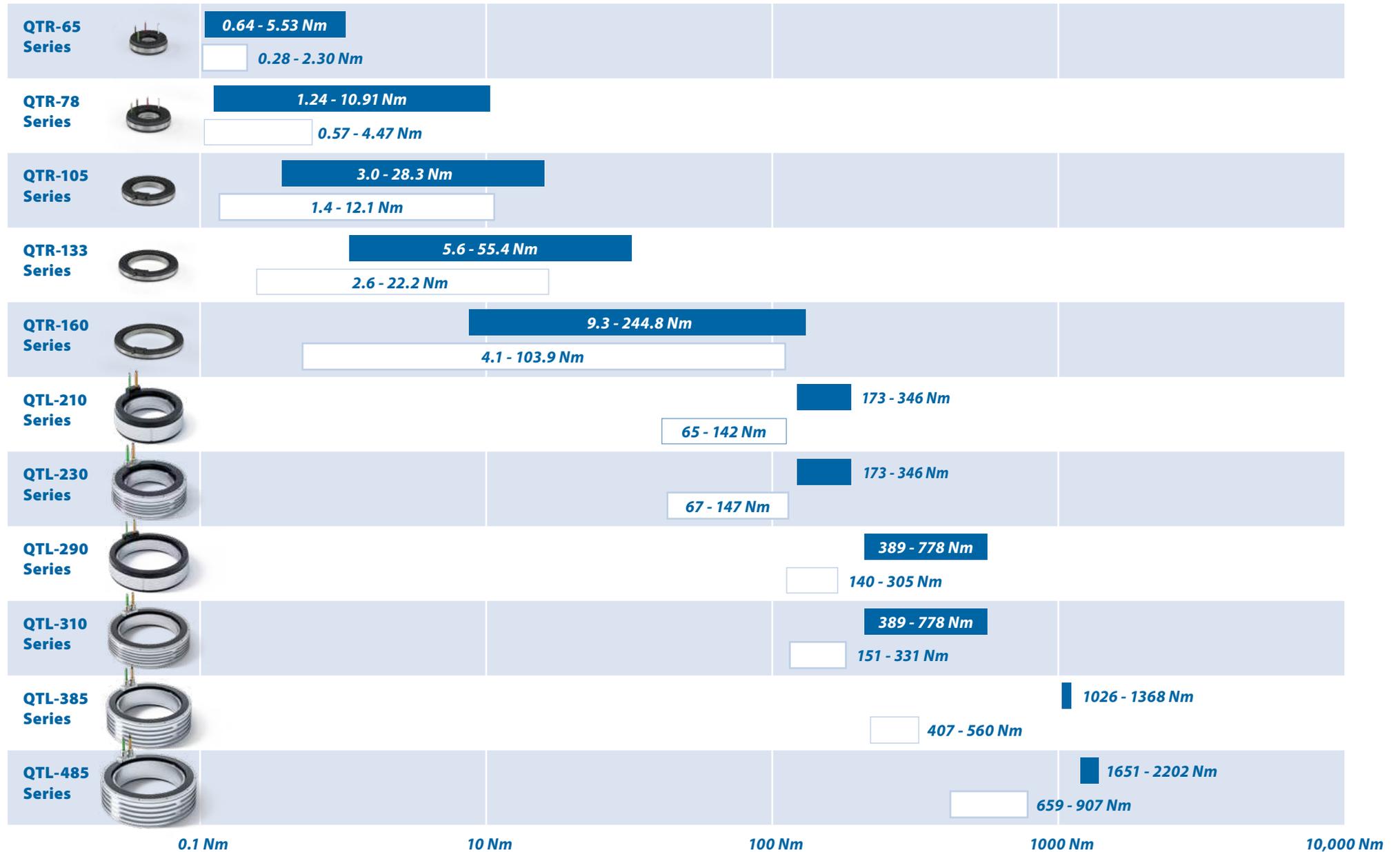
The QTL motor series are our largest torque motors up to date, yet very compact for the generated torque. The QTL is frameless as all our QTR motors and therefore it can be integrated directly into the machine structure, while the spacious open inner diameter enables wire and cable feed through. The series are suitable for a variety of markets including rotary indexing tables, printing machinery and materials handling.

Available with or without cooling ring. The QTL motor series comes in six diameters and three heights.

# Motor torque range

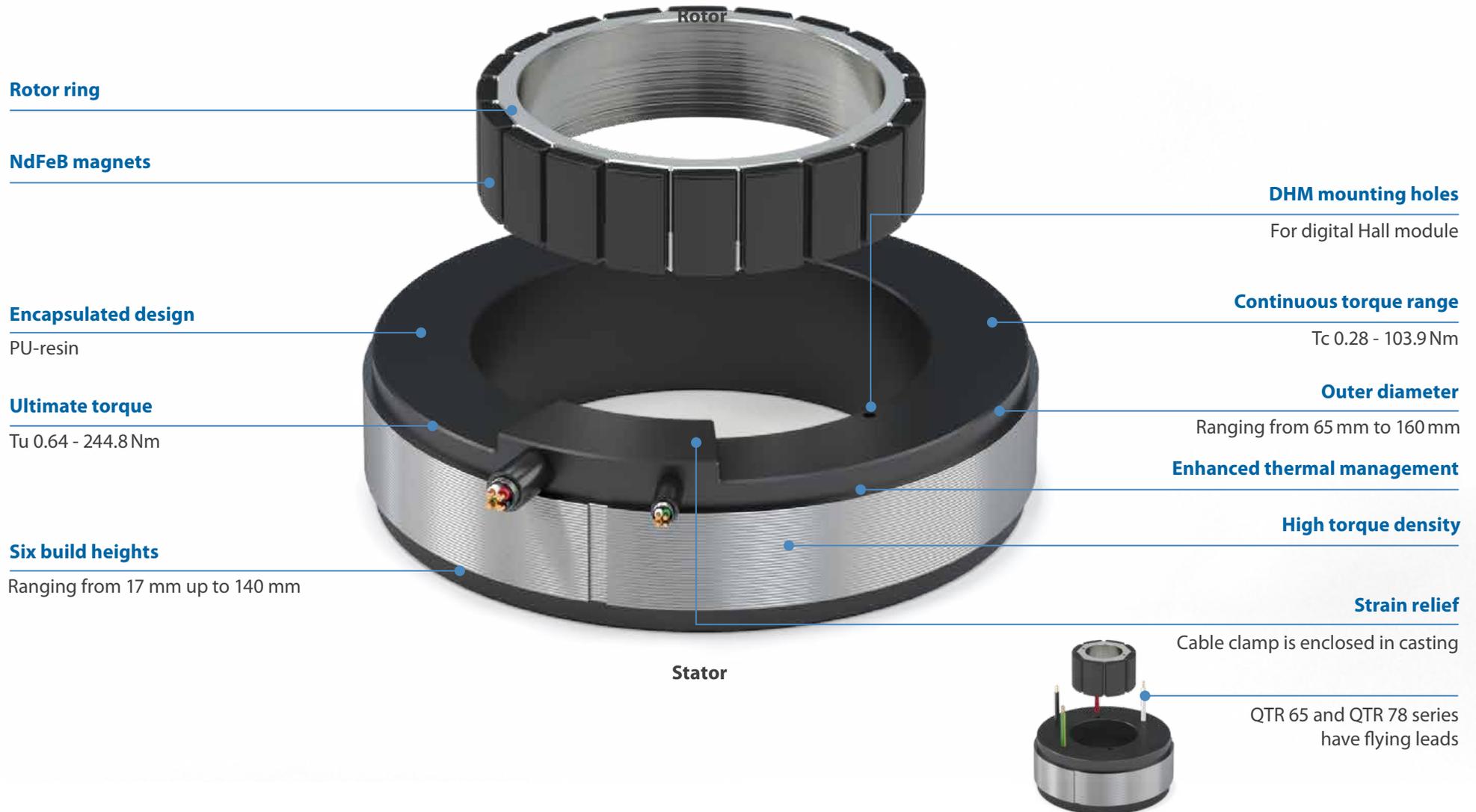
Ultimate torque

Continuous torque



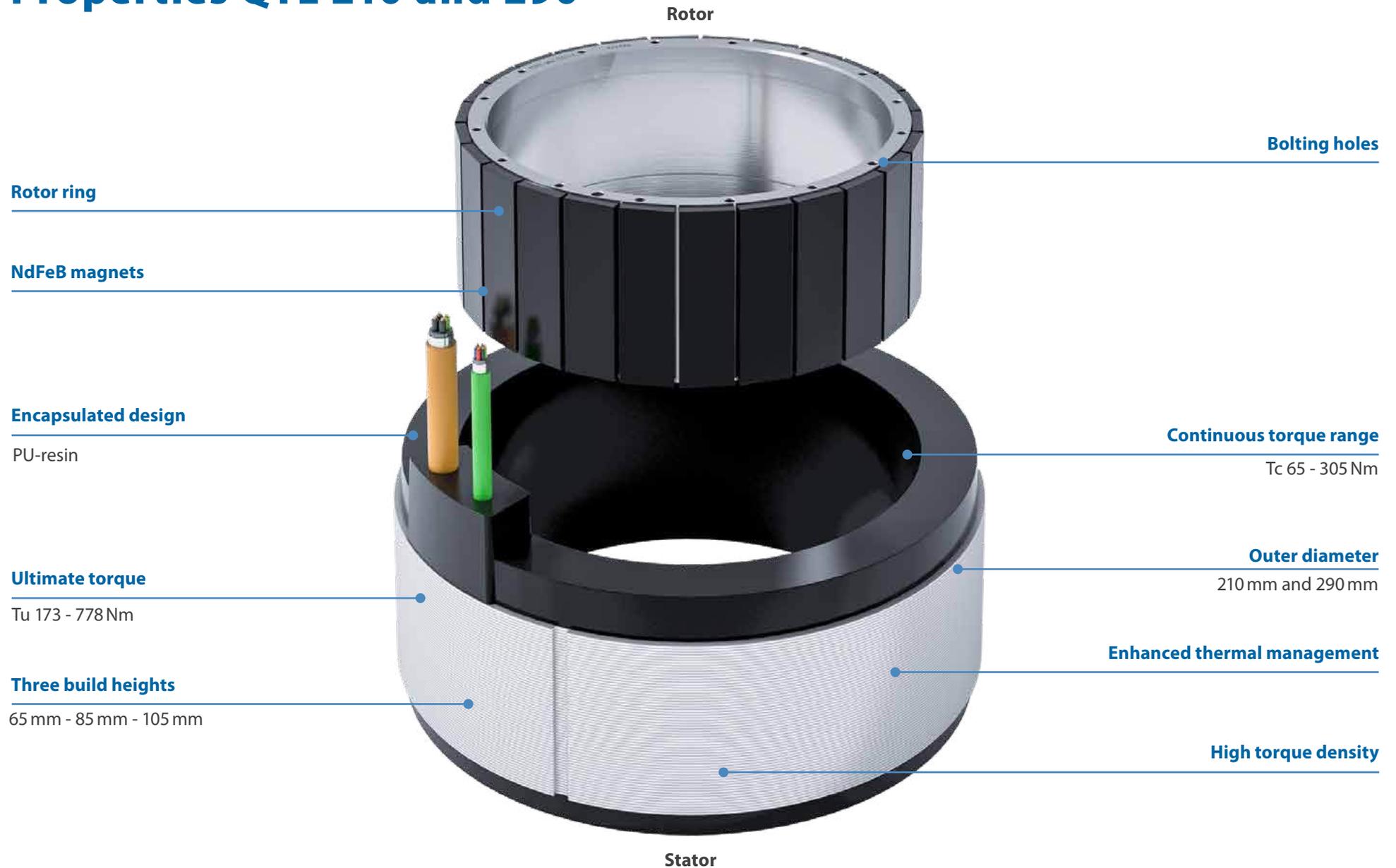
## QTR motor series

# Properties QTR 65, 78, 105, 133 and 160



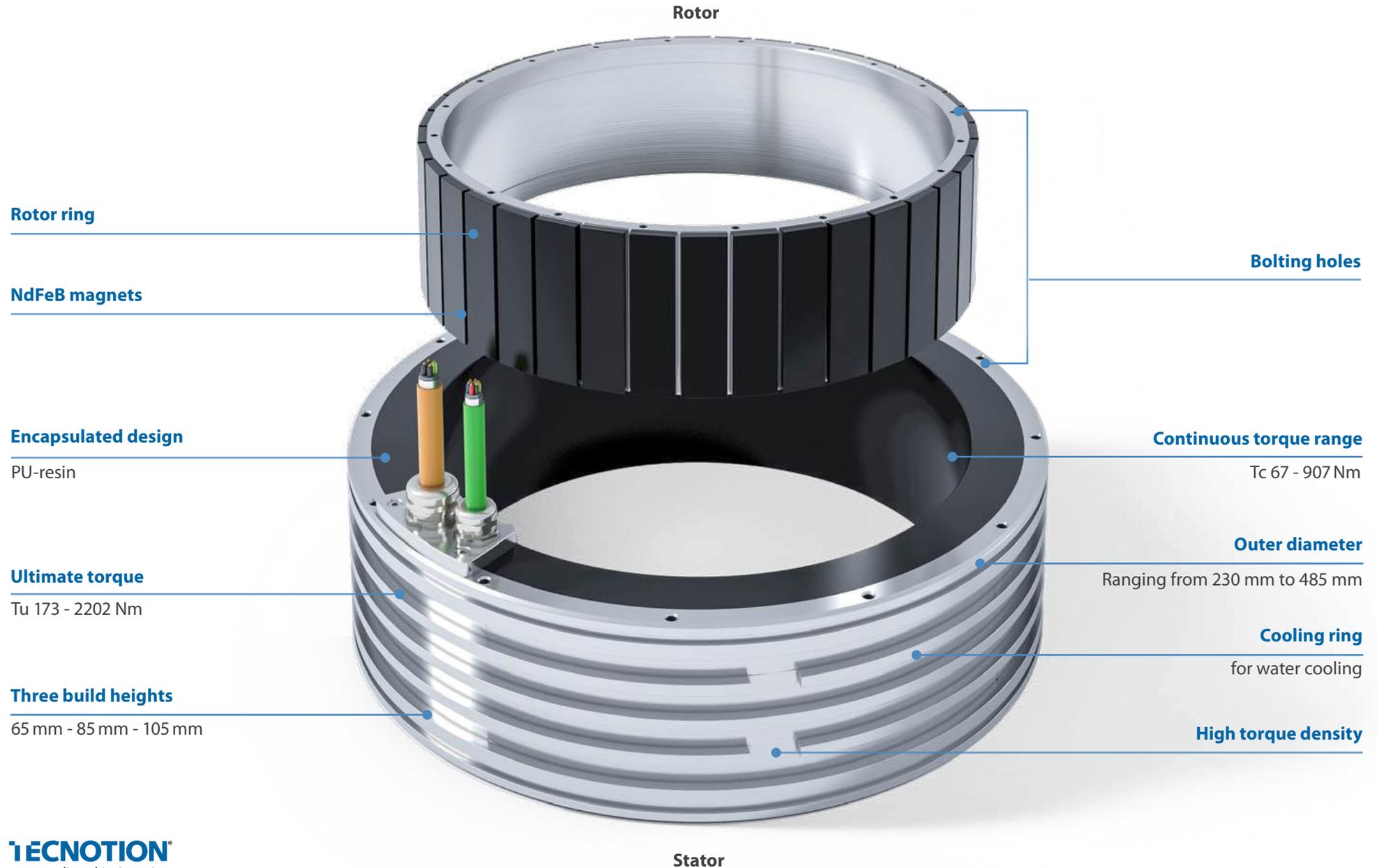
QTL motor series

# Properties QTL 210 and 290



# QTL motor series with cooling ring

## Properties QTL 230, 310, 385 and 485



What more torque motors can Tecnotion offer?

## QMT motors

Where QTL motors are big in peak torque the QMT motors are superior in stall torque.

The QMT torque motor series is specifically designed for the machine tooling market.

Sizes ranging from 230-485 outer diameter, heights between 70-160 mm.



[www.tecnotion.com/qmt](http://www.tecnotion.com/qmt)

### Rotor options

The standard rotor is form fit within machine tooling applications.

The 385-HA and 485-HA series can boost **40%** more power

**T/cm<sup>3</sup>**

Highest torque density in the market



### Water cooling

Increases maximum performance of the motor

### Mechanical design

Conform market standard



Low weight because of aluminium housing



Low thermal resistance for optimal thermal integration

Cable exit possibilities

- axial
- radial
- tangential
- connectors



## Features

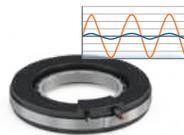
# Tecnotion's torque motor performance advantages

The direct drive technology of brushless torque motors is a perfect way to enhance productivity, accuracy, and dynamic performance of applications. The technology lowers costs, makes designs slimmer, and reduce wear and tear. Torque motors eliminate the need for mechanical transmissions like gearboxes, belts and speed reducers. Between rotor and stator there is no contact, this means no mechanical wear.



### Direct drive

Higher stiffness no backlash.



### Low cogging value, low total harmonic distortion (THD)

For smooth motion and position accuracy in your application.



### Large inner diameter

Allows easy integration of a large number of cables and hoses or allows large shaft fittings.



### Ultra thin design

The lower build height allows to build a flatter axis, resulting in less tipping and settling time. Extraordinary flexibility in designing the motor into small spaces.



### Encapsulated design

No open coil wires which can be damaged or that need to be covered up for safety reasons.



### High voltage insulated, up to 300 VDC/600 VDC bus voltage

Enabling the use of a wide range of servo drives, and power supplies.



### Tecnotion QTR has the highest torque density in the market

More torque in a smaller packing means lowering footprint.



### Shielded cable with strain relief

No shielding EMC issues with loose wires. No risk to damage the motor by accidentally pulling the cable.



### Good product repeatability

All motors have specifications with extremely little variation between them.



### Low thermal resistance

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



### Low stator and rotor mass

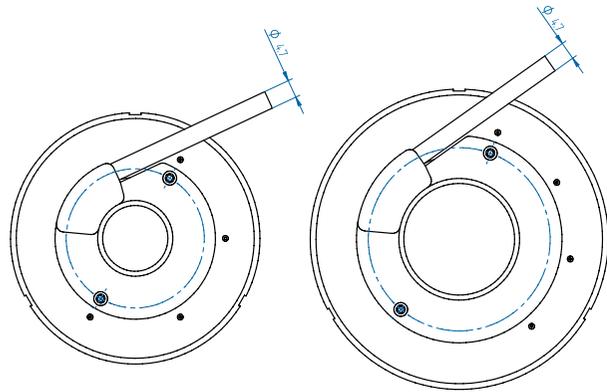
Lower masses increase the dynamics and response of the system by lowering the inertia. It hands the opportunity to improve entire stage designs. And as a result, lowering an applications cost of ownership.



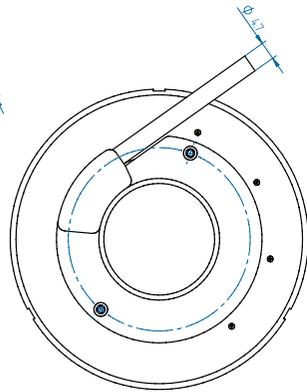
### 100% QC

All products are 100% mechanically and electrically tested.

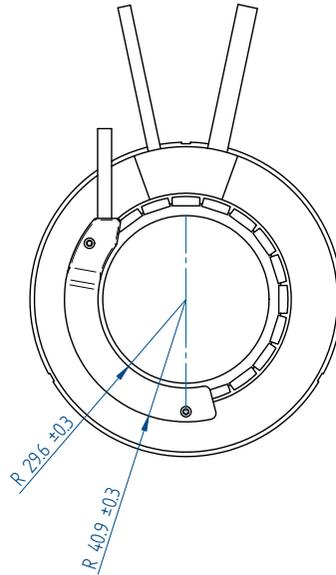
# Torque QTR digital Hall module



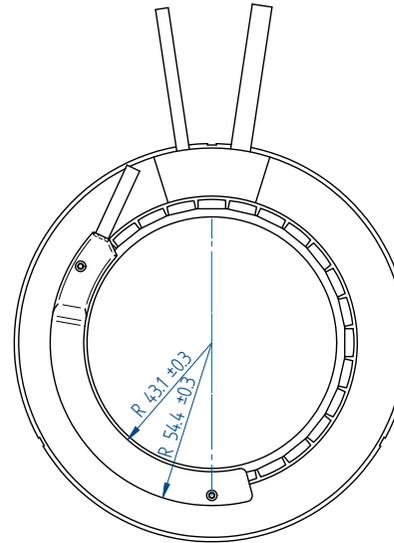
Digital Hall module mounted\*  
on QTR-A 65 series



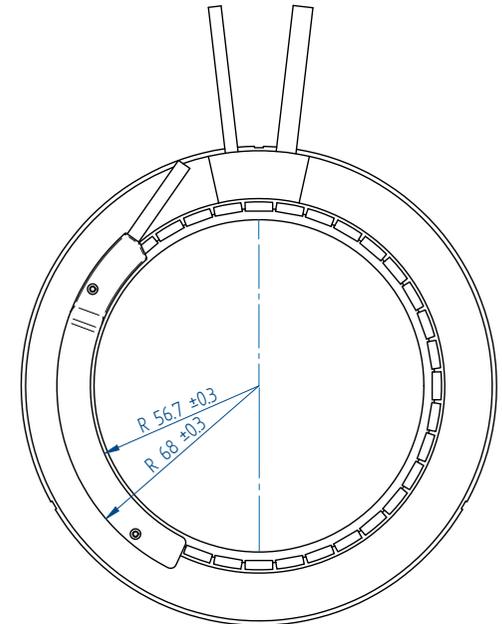
Digital Hall module mounted\*  
on QTR-A 78 series



Digital Hall module mounted\*  
on QTR-A 105 series



Digital Hall module mounted\*  
on QTR-A 133 series



Digital Hall module mounted\*  
on QTR-A 160 series



Tecnotion QTR motors can be equipped with a Tecnotion QTR digital Hall module. The module covers a small portion of the motor and measures just a little over 3 mm in thickness for the largest part. When a QTR stator is not powered the Tecnotion QTR digital Hall module can be used to determine the electrical position of the rotor. It is a 'wake and shake' replacement, simplifying the startup of the QTR motor. Digital Hall sensors are available for the QTR-A 65, 78, 105, 133 and 160 series.

## Specifications

Input voltage: 5V....15Vdc

Output voltage: 3 phase TTL, max 2.5mA, 5Vdc  
AquadB TTL, max 2.5mA, 5Vdc



\*Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

# QTR 65 series



QTR-A-65-17 stator and rotor

1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals



	Parameter	Remarks	Symbol	Unit	QTR-A-65-17	QTR-A-65-25	QTR-A-65-34	QTR-A-65-60
Performance	Winding type				N	N	Y	Y
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{acrms} (V_{dc})$	400 (565)			
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	0.64	1.31	2.27	5.53
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	0.41	0.84	1.44	3.89
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	0.28	0.65	1.04	2.30
	Maximum speed <sup>2</sup>	@ 48V <sub>dc</sub> @ T <sub>c</sub>	$n_{max}$	rpm	5955	2757	3580	951
	Maximum speed <sup>2</sup>	@ U <sub>max</sub> @ T <sub>c</sub>	$n_{max}$	rpm	10000	10000	10000	10000
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	0.059	0.118	0.099	0.271
Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	0.0021	0.0059	0.0111	0.0331	
Electrical	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	13.87	13.87	27.96	24.88
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	7.49	7.49	15.32	15.10
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	4.78	5.50	10.54	8.49
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	5.0	10.1	8.5	23.2
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	3.6	7.1	6.0	16.4
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	0.563	0.781	0.294	0.740
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	1.01	1.61	0.69	2.84
	Electrical time constant		$\tau_e$	ms	1.8	2.1	2.4	3.8
Thermal	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	50	92	128	208
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	1.50	0.82	0.59	0.36
	Thermal time constant		$\tau_{th}$	s	17	13	14	22
	Temperature sensor				none			
Mechanical	Stator OD		OD <sub>s</sub>	mm	65			
	Rotor ID		ID <sub>r</sub>	mm	17			
	Stator height		H <sub>s</sub>	mm	18.3	26.3	34.8	62.3
	Lamination stack height		H <sub>arm</sub>	mm	8	16	24	48
	Poles		N <sub>mgn</sub>		8			
	Rotor inertia		$J_r$	kg m <sup>2</sup>	3.8E-06	7.5E-06	1.1E-05	2.3E-05
	Stator mass	ex. cables	$m_s$	g	149	248	361	717
	Rotor mass		$m_r$	g	27	54	80	160
Total mass	ex. cables	$m$	g	176	302	441	877	
Cable mass	all cables	$m$	g/m	72				
Cable type (power)	length 0.5 m	$d$	mm (AWG)	4x 2.06 (16)				

All specifications ±10%

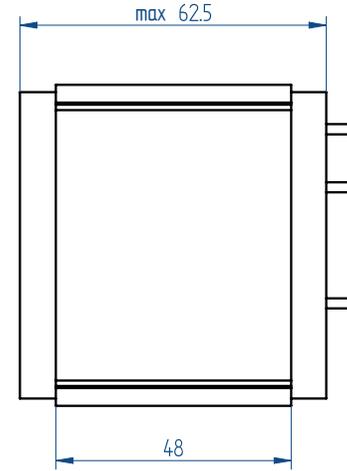
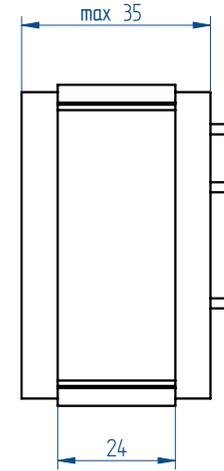
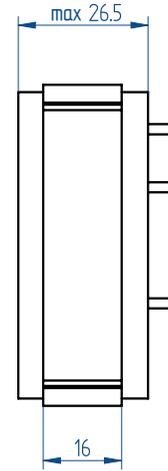
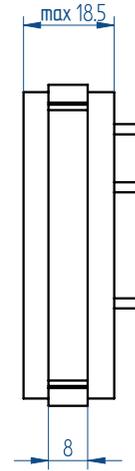
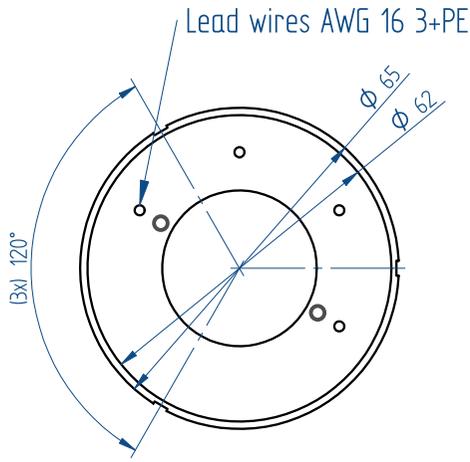
QTR-A-65-17

QTR-A-65-25

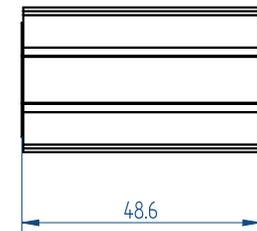
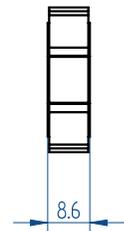
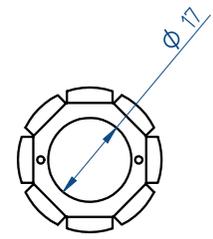
QTR-A-65-34

QTR-A-65-60

**Stator**



**Rotor**



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTR 78 series



QTR-A-78-17 stator and rotor

1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals



Parameter	Remarks	Symbol	Unit	QTR-A-78-17	QTR-A-78-25	QTR-A-78-34	QTR-A-78-60	
<b>Performance</b>	Winding type			N	Y	Y	Y	
Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{acrms} (V_{dc})$	400 (565)				
Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	1.24	2.98	4.57	10.91	
Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	0.84	1.93	2.90	7.67	
Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	0.57	1.34	2.10	4.47	
Maximum speed <sup>2</sup>	@ 48V <sub>dc</sub> @ T <sub>c</sub>	$n_{max}$	rpm	2542	2451	1533	331	
Maximum speed <sup>2</sup>	@ U <sub>max</sub> @ T <sub>c</sub>	$n_{max}$	rpm	9000	9000	9000	7803	
Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	0.119	0.133	0.199	0.535	
Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	0.0056	0.0168	0.0302	0.0861	
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	13.87	27.96	27.96	24.88
Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	7.49	15.32	15.32	15.10	
Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	4.83	10.05	10.54	8.37	
Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	10.1	11.4	17.0	45.7	
Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	7.2	8.0	12.0	32.3	
Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	0.837	0.351	0.438	1.107	
Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	1.55	0.76	1.04	4.19	
Electrical time constant		$\tau_e$	ms	1.9	2.2	2.4	3.8	
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	76	138	190	302
Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.98	0.54	0.40	0.25	
Thermal time constant		$\tau_{th}$	s	17	16	14	23	
Temperature sensor				none				
<b>Mechanical</b>	Stator OD	$OD_s$	mm	78				
Rotor ID		$ID_r$	mm	29				
Stator height		$H_s$	mm	18.3	26.3	34.8	62.3	
Lamination stack height		$H_{arm}$	mm	8	16	24	48	
Poles		$N_{mgn}$		12				
Rotor inertia		$J_r$	kg m <sup>2</sup>	1.3E-05	2.5E-05	3.8E-05	7.6E-05	
Stator mass	ex. cables	$m_s$	g	208	353	501	1003	
Rotor mass		$m_r$	g	42	84	126	243	
Total mass	ex. cables	$m$	g	250	437	627	1246	
Cable mass	all cables	$m$	g/m	72				
Cable type (power)	length 0.5 m	$d$	mm (AWG)	4x 2.06 (16)				

All specifications ±10%

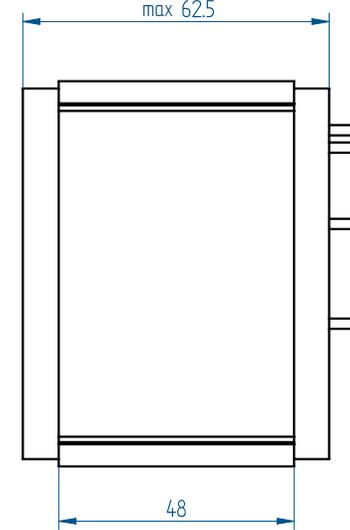
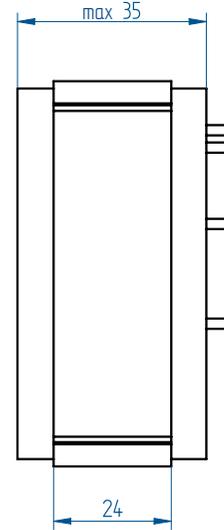
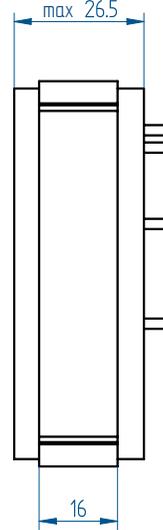
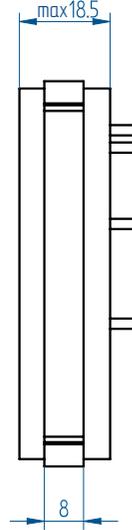
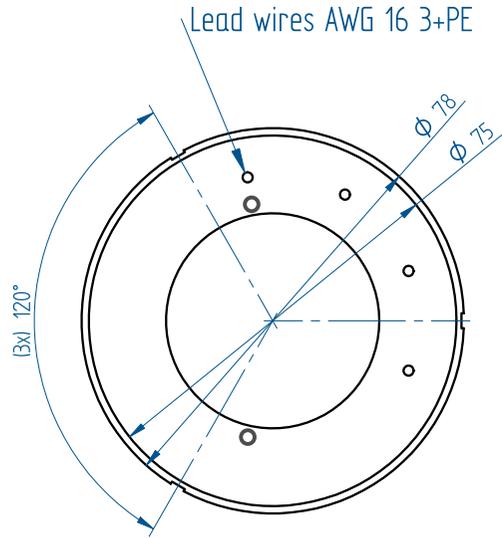
QTR-A-78-17

QTR-A-78-25

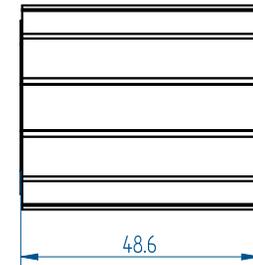
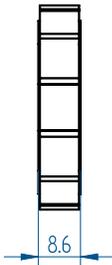
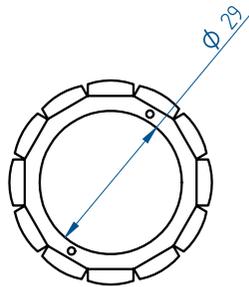
QTR-A-78-34

QTR-A-78-60

**Stator**



**Rotor**



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTR 105 series



QTR-A-105-17 stator and rotor

Parameter	Remarks	Symbol	Unit	QTR-A-105-17			QTR-A-105-25			QTR-A-105-34			QTR-A-105-60	
				N	Y	Z	N	Y	Z	N	Y	Z	N	
<b>Performance</b>	Winding type			N	Y	Z	N	Y	Z	N	Y	Z	N	
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac\ rms} (V_{dc})$										
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	3.0	3.3	3.3	6.0	7.5	6.8	10.4	11.2	10.3	28.3
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	1.9	2.2	2.2	3.8	4.3	4.3	6.7	6.5	6.5	18.0
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	1.4	1.4	1.4	3.2	3.2	3.2	5.3	5.1	5.1	12.1
	Maximum speed <sup>2</sup>	@ 48 $V_{dc}$ @ $T_c$	$n_{max}$	rpm	819	1803	3398	260	812	1679	4	464	1061	217
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	7000	7000	7000	4106	7000	7000	2168	5019	7000	1373
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	0.30	0.17	0.10	0.59	0.33	0.19	1.07	0.50	0.29	2.84
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	0.021	0.022	0.022	0.061	0.063	0.063	0.125	0.114	0.114	0.397
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	13.9	28.3	48.9	13.9	28.3	48.9	13.3	28.3	48.9	13.6
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	7.5	15.3	26.5	7.5	15.3	26.5	7.3	15.3	26.5	7.4
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	4.6	8.4	14.6	5.3	9.7	16.8	5.0	10.2	17.7	4.3
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	25	14	8	51	28	16	91	43	25	243
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	18	10	6	36	20	12	64	30	17	172
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	1.38	0.42	0.14	1.93	0.58	0.19	3.03	0.72	0.24	6.78
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	2.62	0.82	0.27	4.08	1.28	0.43	7.98	1.74	0.58	25.42
	Electrical time constant		$\tau_e$	ms	1.9	2.0	2.0	2.1	2.2	2.2	2.6	2.4	2.4	3.7
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	116			213			295			483
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.65			0.35			0.25			0.16
	Thermal time constant		$\tau_{th}$	s	19	22	22	14	17	17	16	15	15	23
	Temperature sensor				PTC 1kΩ / KTY83-122									
<b>Mechanical</b>	Stator OD		$OD_s$	mm	105									
	Rotor ID		$ID_r$	mm	56									
	Stator height		$H_s$	mm	17			25			34			60
	Lamination stack height		$H_{arm}$	mm	8			16			24			48
	Poles		$N_{mgn}$		20									
	Rotor inertia		$J_r$	kg m <sup>2</sup>	8.0E-05			1.5E-04			2.2E-04			4.3E-04
	Stator mass	ex. cables	$m_s$	g	299			472			746			1476
	Rotor mass		$m_r$	g	79			146			218			433
	Total mass	ex. cables	$m$	g	378			618			964			1909
	Cable mass	all cables	$m$	g/m	126	180	180	126	180	180	126	180	180	190
	Cable type (power)	length 0.5 m	$d$	mm (AWG)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	6.7 (14)	9.6 (18)
	Cable type (sensor)	length 0.5 m	$d$	mm (AWG)	4.5 (26)									

<sup>1</sup> 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.

<sup>2</sup> Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals



\*N-windings approved, full approval pending.

All specifications ±10%

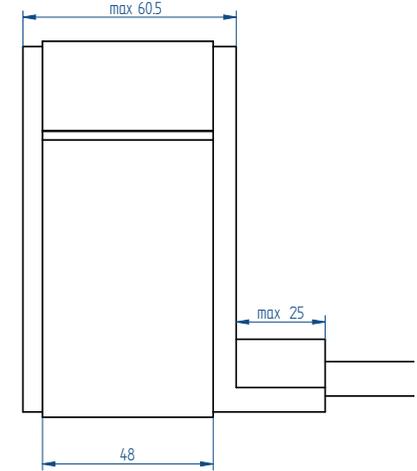
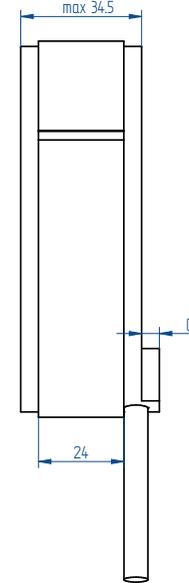
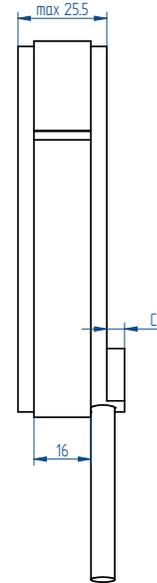
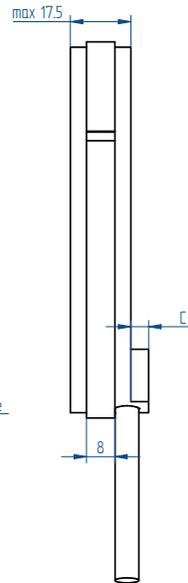
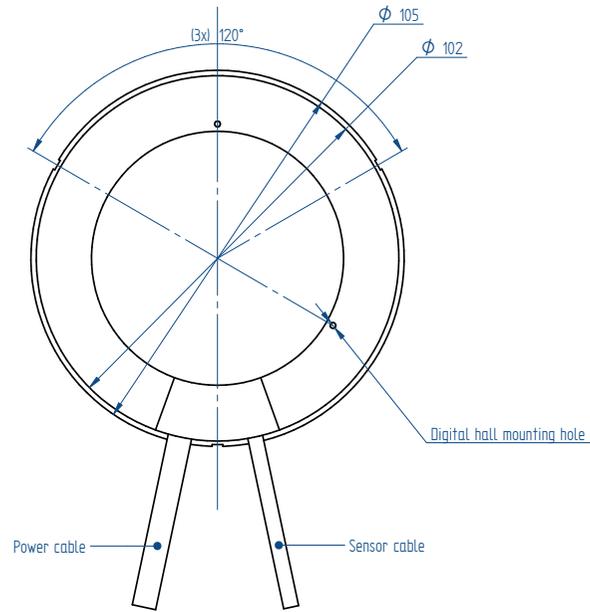
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QTR-A-105-25

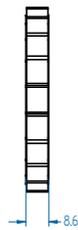
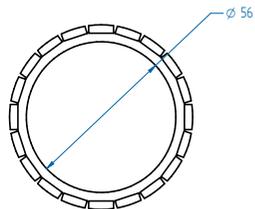
QTR-A-105-34

QTR-A-105-60

**Stator**



**Rotor**



Winding	C (mm)
N	max 3.5
Y+Z	max 5.5

Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTR 133 series



QTR-A-133-17 stator and rotor

Parameter	Remarks	Symbol	Unit	QTR-A-133-17			QTR-A-133-25			QTR-A-133-34		QTR-A-133-60		
				N	Y	Z	N	Y	Z	N	Z	N		
<b>Performance</b>	Winding type			N	Y	Z	N	Y	Z	N	Z	N		
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac\ rms} (V_{dc})$									230 (325)	400 (565)
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	5.6	6.5	6.5	11.9	13.6	13.6	20.5	20.3	55.4	
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	3.7	4.3	4.3	7.4	8.6	8.6	13.0	12.8	35.2	
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	2.6	2.6	2.6	5.8	6.0	6.0	9.8	9.4	22.2	
	Maximum speed <sup>2</sup>	@ 48 $V_{dc}$ @ $T_c$	$n_{max}$	rpm	335	855	1678	44	352	803	123	491	158	
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	4009	5000	5000	2053	3811	5000	1071	4561	681	
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	0.58	0.32	0.19	1.16	0.65	0.37	2.08	0.56	5.55	
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	0.058	0.060	0.060	0.166	0.173	0.173	0.340	0.312	1.082	
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	13.9	28.3	48.9	13.9	28.3	48.9	13.3	48.9	13.6	
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	7.5	15.3	26.5	7.5	15.3	26.5	7.3	26.5	7.4	
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	4.4	8.1	14.0	5.1	9.2	16.0	4.7	16.8	4.0	
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	49	28	16	99	55	32	178	48	475	
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	35	20	11	70	39	23	126	34	336	
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	1.93	0.58	0.19	2.69	0.81	0.27	4.24	0.34	9.49	
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	3.80	1.19	0.40	5.91	1.85	0.62	11.56	0.84	36.75	
	Electrical time constant		$\tau_e$	ms	2.0	2.1	2.1	2.2	2.3	2.3	2.7	2.5	3.9	
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	147			268			368		590	
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.51			0.28			0.20		0.13	
	Thermal time constant		$\tau_{th}$	s	21	24	24	16	19	19	18	17	26	
	Temperature sensor				PTC 1kΩ / KTY83-122									
<b>Mechanical</b>	Stator OD		$OD_s$	mm	133									
	Rotor ID		$ID_r$	mm	84									
	Stator height		$H_s$	mm	17			25			34	60		
	Lamination stack height		$H_{arm}$	mm	8			16			24	48		
	Poles		$N_{mgn}$		28									
	Rotor inertia		$J_r$	kg m <sup>2</sup>	2.1E-04			4.2E-04			6.2E-04		1.2E-03	
	Stator mass	ex. cables	$m_s$	g	414			717			1037		2090	
	Rotor mass		$m_r$	g	106			208			309		613	
	Total mass	ex. cables	$m$	g	520			925			1346		2703	
	Cable mass	all cables	$m$	g/m	126	180	180	126	180	180	126	180	190	
	Cable type (power)	length 0.5 m	$d$	mm (AWG)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	9.6 (18)	
	Cable type (sensor)	length 0.5 m	$d$	mm (AWG)	4.5 (26)									

<sup>1</sup> 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.

<sup>2</sup> Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

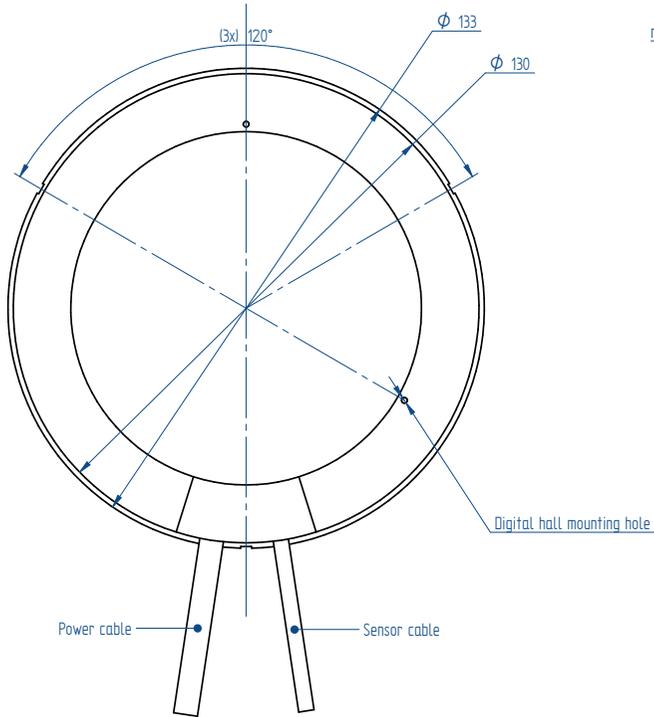
Series approvals



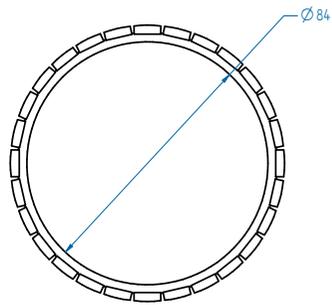
\*N-windings approved, full approval pending.

All specifications ±10%

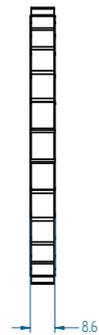
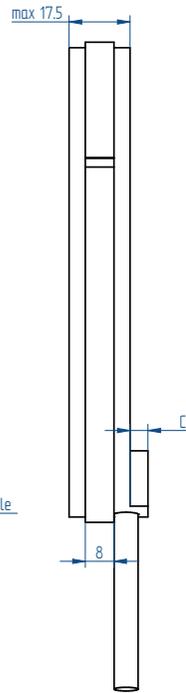
# Stator



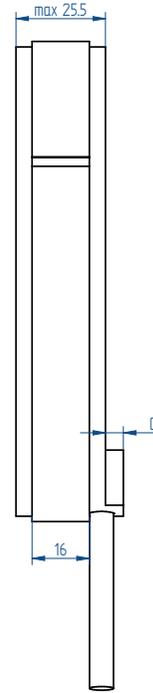
# Rotor



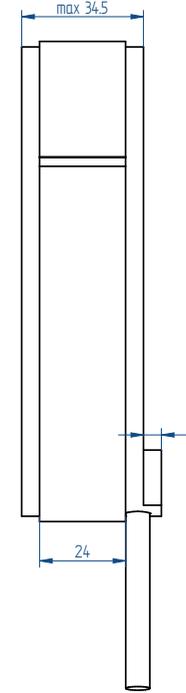
QTR-A-133-17



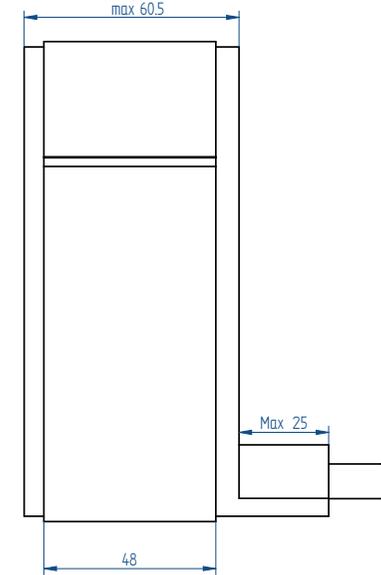
QTR-A-133-25



QTR-A-133-34



QTR-A-133-60



Winding	C (mm)
N	max 3.5
Y+Z	max 5.5

Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTR 160 series



QTR-A-160-17 stator and rotor

Parameter	Remarks	Sym	Unit	QTR-A-160-17			QTR-A-160-25			QTR-A-160-34		QTR-A-160-60	QTR-A-160-114	QTR-X-160-140
				N	Y	Z	N	Y	Z	N	Z	N	N	N
<b>Performance</b>	Winding type			N	Y	Z	N	Y	Z	N	Z	N	N	N
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$ $V_{ac rms}$ (V <sub>dc</sub> )	230 (325)									400 (565)	
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$ Nm	9.3	10.6	10.6	19.5	22.4	22.6	34.2	34.0	92.2	184.4	244.8
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$ Nm	6.2	7.1	7.0	12.4	14.1	14.2	21.9	21.4	58.5	116.9	155.3
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$ Nm	4.1	4.2	4.2	9.4	9.6	9.6	15.9	15.3	36.5	77.4	103.9
	Maximum speed <sup>2</sup>	@ 48 V <sub>dc</sub> @ T <sub>c</sub>	$n_{max}$ rpm	149	480	989	39	170	450	149	260	125	109	111
	Maximum speed <sup>2</sup>	@ U <sub>max</sub> @ T <sub>c</sub>	$n_{max}$ rpm	2419	4000	4000	1215	2287	4000	619	2734	387	641	474
	Motor torque constant	$I \leq I_c$	$K_t$ Nm/A <sub>rms</sub>	0.96	0.54	0.31	1.92	1.08	0.62	3.46	0.93	9.24	6.16	8.18
	Motor constant	coils @ 25°C	$K_m$ (Nm) <sup>2</sup> /W	0.12	0.13	0.13	0.36	0.37	0.37	0.73	0.67	2.33	5.25	7.48
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$ A <sub>rms</sub>	13.9	28.3	48.9	13.9	28.3	48.9	13.3	48.9	13.6	40.7	40.7
	Peak current	magnets @ 25°C	$I_p$ A <sub>rms</sub>	7.5	15.3	26.5	7.5	15.3	26.5	7.3	26.5	7.4	22.1	22.1
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$ A <sub>rms</sub>	4.3	7.8	13.4	4.9	8.9	15.5	4.6	16.4	3.9	12.6	12.7
	Back EMF ph-ph <sub>peak</sub>		$K_e$ V/krpm	82	46	27	165	92	53	296	80	790	527	699
	Back EMF ph-ph <sub>rms</sub>		$K_e$ V/krpm	58	33	19	116	65	38	209	56	559	372	494
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$ Ω	2.48	0.74	0.25	3.46	1.03	0.34	5.45	0.43	12.20	2.41	2.98
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$ mH	4.93	1.55	0.52	7.68	2.41	0.80	15.03	1.09	47.87	10.02	12.57
	Electrical time constant		$\tau_e$ ms	2.0	2.1	2.1	2.2	2.3	2.3	2.8	2.5	3.9	4.2	4.2
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$ W	175			323			450		742	1483	1874
	Thermal resistance	coils to mount. sfc.	$R_{th}$ K/W	0.43			0.23			0.17		0.10	0.05	0.04
	Thermal time constant		$\tau_{th}$ s	22	26	26	17	20	20	19	18	27	24	24
	Temperature sensor			PTC 1kΩ / KTY83-122										
<b>Mechanical</b>	Stator OD		OD <sub>s</sub> mm	160										
	Rotor ID		ID <sub>r</sub> mm	111										
	Stator height		H <sub>s</sub> mm	17			25			34	60	114	140	
	Lamination stack height		H <sub>arm</sub> mm	8			16			24	48	96	122	
	Poles		N <sub>mgn</sub>	36										
	Rotor inertia		$J_r$ kg m <sup>2</sup>	4.7E-04			9.2E-04			1.4E-03	2.6E-03	6.4E-03	8.1E-03	
	Stator mass	ex. cables	$m_s$ g	527			875			1212	2555	4928	6228	
	Rotor mass		$m_r$ g	138			269			401	754	1916	2435	
	Total mass	ex. cables	$m$ g	665			1144			1613	3309	6844	8663	
	Cable mass	all cables	$m$ g/m	126	180	180	126	180	180	126	180	190	36	
	Cable type (power)	length 0.5 m	$d$ mm (AWG)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	6.7 (14)	6.5 (20)	6.7 (14)	9.6 (18)	4x 2.06 (16)	
	Cable type (sensor)	length 0.5 m	$d$ mm (AWG)	4.5 (26)										

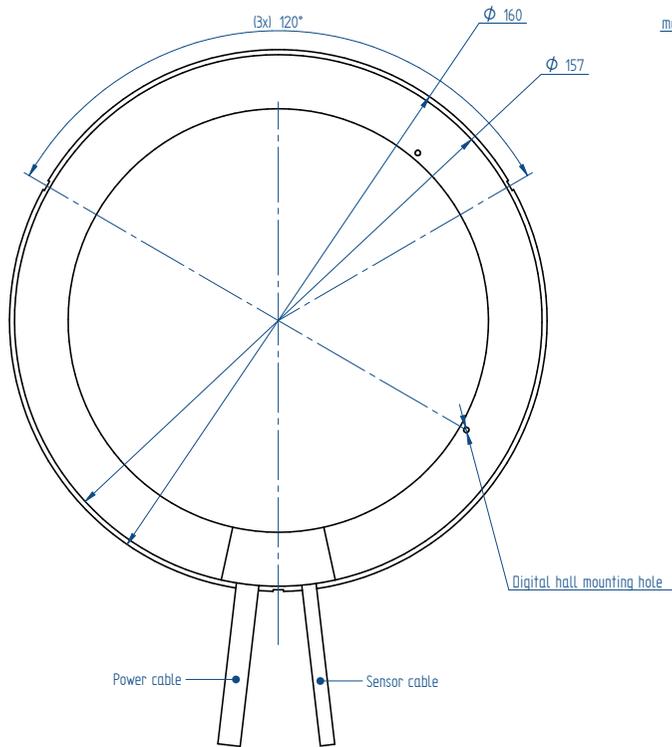
<sup>1</sup> These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.  
<sup>2</sup> Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.



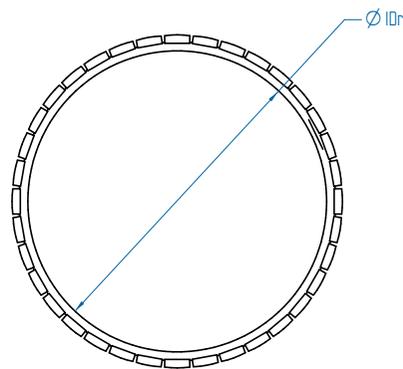
\*N-windings approved, full approval pending.

All specifications ±10%

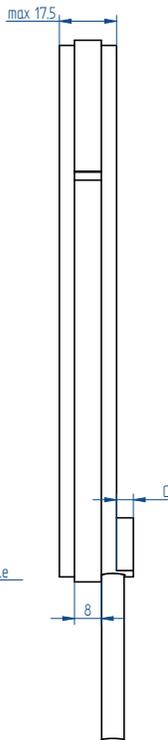
# Stator



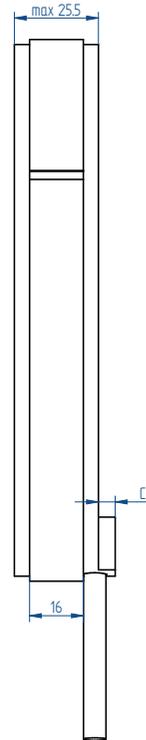
# Rotor



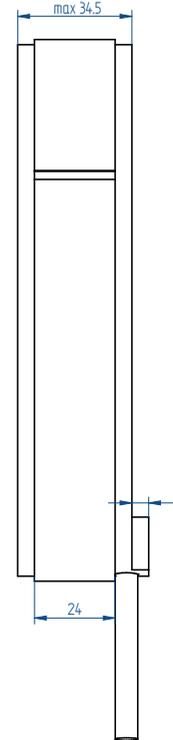
QTR-A-160-17



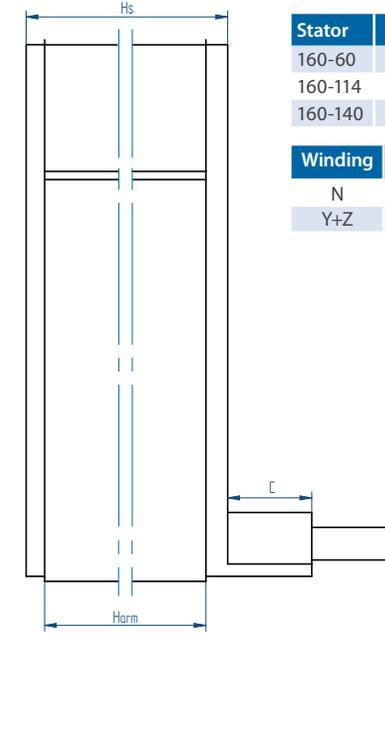
QTR-A160-25



QTR-A-160-34

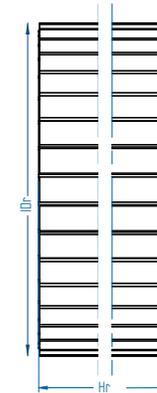
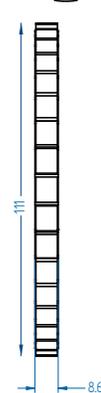


QTR-x-160-60/114/140



Stator	H <sub>s</sub>	H <sub>arm</sub>	C
160-60	60	48	max 25
160-114	114	96	max 18
160-140	140	122	max 10

Winding	C (mm)
N	max 3.5
Y+Z	max 5.5



Rotor	H <sub>r</sub>	ID <sub>r</sub>
160-60	48.6	111
160-114	96.6	108
160-140	122.6	108

Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTL 210 series



QTL-A-210-65 stator and rotor

1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals



Parameter	Remarks	Symbol	Unit	QTL-A-210-65	QTL-A-210-85	QTL-A-210-105
<b>Performance</b>	Winding type			N	N	N
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac,rms} (V_{dc})$	480 (680)	
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	173	259
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	140	211
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	65	103
	Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	46	73
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	716	457
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	8.7	13.1
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	8.0	13.5
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	22.0	22.0
	Peak current	magnets @ 25 °C	$I_p$	A <sub>rms</sub>	16.9	16.9
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	7.45	7.88
	Stall current <sup>1</sup>	coils @ 100°C	$I_s$	A <sub>rms</sub>	5.27	5.57
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	747	1121
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	528	793
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	3.18	4.25
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	16.0	22.3
	Electrical time constant		$\tau_e$	ms	5.0	5.3
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	690	1028
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.116	0.078
	Thermal time constant		$\tau_{th}$	s	53	47
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)	
<b>Mechanical</b>	Stator OD		$OD_s$	mm	210	
	Rotor ID		$ID_r$	mm	140	
	Stator height		$H_s$	mm	65	85
	Lamination stack height		$H_{arm}$	mm	40	60
	Poles		$N_{mgn}$		26	
	Rotor inertia		$J_r$	kg m <sup>2</sup>	0.009	0.014
	Stator mass	ex. cables	$m_s$	kg	4.2	5.9
	Rotor mass		$m_r$	kg	1.6	2.4
	Total mass	ex. cables	$m$	kg	5.8	8.3
	Cable mass	all cables	$m$	g/m	250	
	Cable type (power)	length 2 m	$d$	mm (AWG)	10.6 (13)	
	Cable type (sensor)	length 2 m	$d$	mm (AWG)	6.4 (25)	

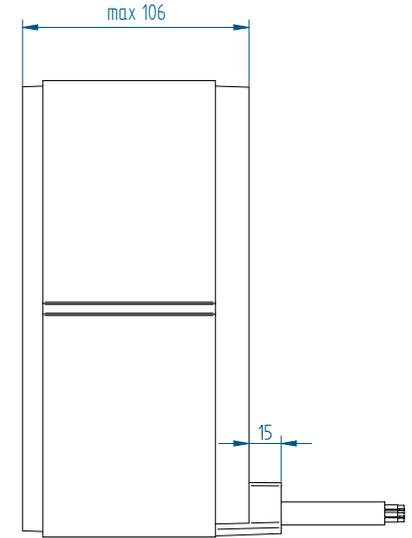
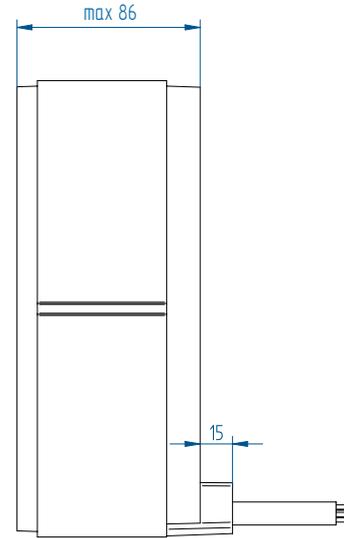
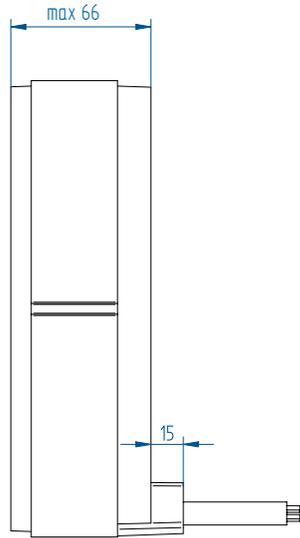
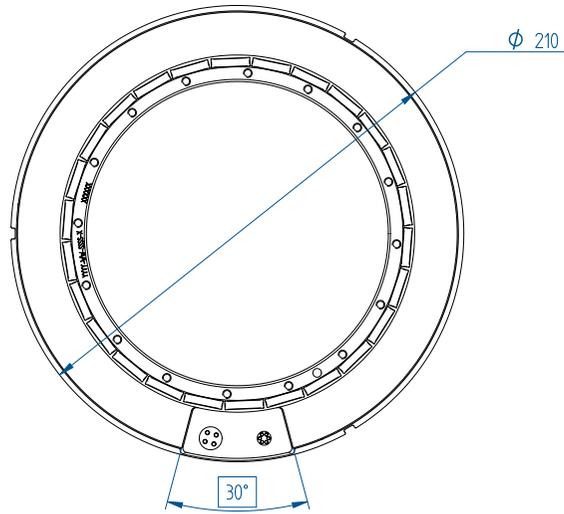
All specifications ±10%

QTL-A-210-65

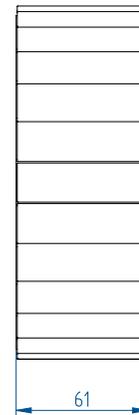
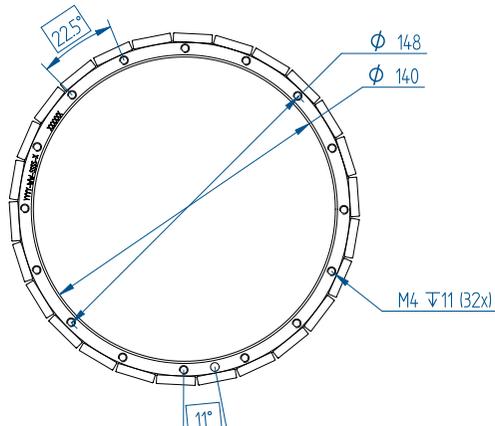
QTL-A-210-85

QTL-A-210-105

Stator



Rotor



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTL 230 series with cooling ring



QTL-A-230-65 stator and rotor

Parameter	Remarks	Symbol	Unit	QTL-A-230-65	QTL-A-230-85	QTL-A-230-105
<b>Performance</b>	Winding type			N	N	N
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac,rms}$ ( $V_{dc}$ )	480 (680)	
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	173	259
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	140	211
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	67	107
	Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	48	76
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	709	451
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	8.7	13.1
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	8.0	13.5
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	22.0	22.0
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	16.9	16.9
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	7.69	8.16
	Stall current <sup>1</sup>	coils @ 100°C	$I_s$	A <sub>rms</sub>	5.44	5.77
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	747	1121
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	528	793
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	3.18	4.25
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	16.0	22.3
	Electrical time constant		$\tau_e$	ms	5.0	5.3
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	735	1102
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.109	0.073
	Thermal time constant		$\tau_{th}$	s	49	44
	Water cooling flow	for $\Delta T=3K$	$\Phi_w$	l/min	3.5	5.3
	Water cooling pressure drop		$\Delta P_w$	bar	0.7	1.0
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)	
<b>Mechanical</b>	Stator OD		$OD_s$	mm		230
	Rotor ID		$ID_r$	mm		140
	Stator height		$H_s$	mm	65	85
	Lamination stack height		$H_{arm}$	mm	40	60
	Poles		$N_{mgn}$			26
	Rotor inertia		$J_r$	kg m <sup>2</sup>	0.009	0.014
	Stator mass	ex. cables	$m_s$	kg	5.2	7.2
	Rotor mass		$m_r$	kg	1.6	2.4
	Total mass	ex. cables	$m$	kg	6.8	9.6
	Cable mass	all cables	$m$	g/m		250
	Cable type (power)	length 2 m	$d$	mm (AWG)		10.6 (13)
	Cable type (sensor)	length 2 m	$d$	mm (AWG)		6.4 (25)

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

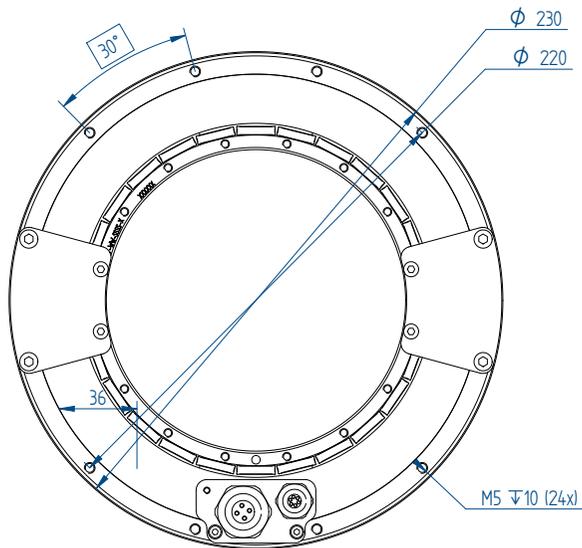
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals

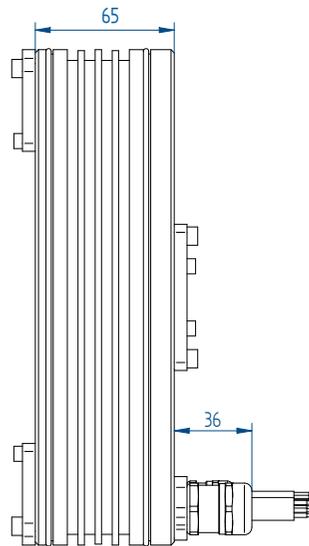


All specifications ±10%

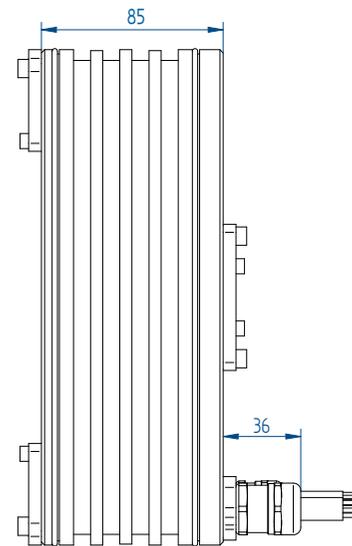
# Stator



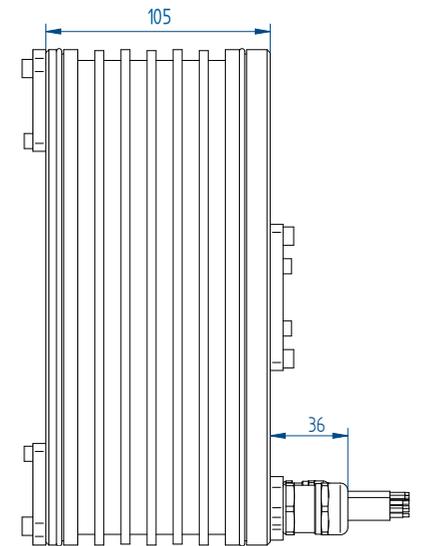
QTL-A-230-65



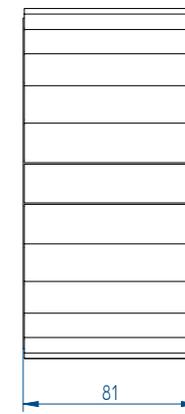
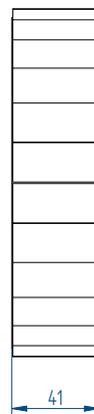
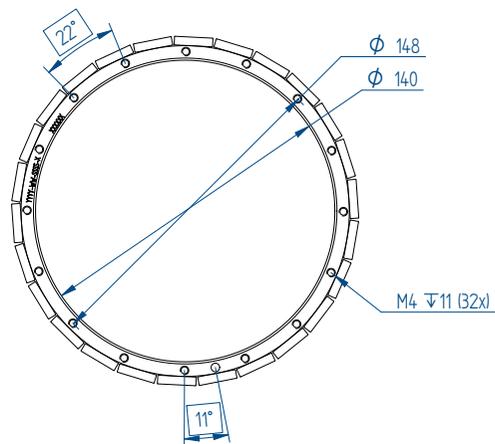
QTL-A-230-85



QTL-A-230-105



# Rotor



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTL 290 series



QTL-A-290-65 stator and rotor

1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

Series approvals



Parameter	Remarks	Symbol	Unit	QTL-A-290-65	QTL-A-290-85	QTL-A-290-105
<b>Performance</b>	Winding type			N	N	N
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac,rms} (V_{dc})$	480 (680)	
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	389	583
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	316	474
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	140	222
	Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	99	157
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	306	189
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	19.7	29.5
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	27.0	45.5
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	22.0	22.0
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	16.9	16.9
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	7.14	7.54
	Stall current <sup>1</sup>	coils @ 100°C	$I_s$	A <sub>rms</sub>	5.05	5.33
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	1681	2521
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	1189	1783
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	4.77	6.37
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	23.9	34.7
	Electrical time constant		$\tau_e$	ms	5.0	5.5
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	948	1410
	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.084	0.057
	Thermal time constant		$\tau_{th}$	s	57	52
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)	
<b>Mechanical</b>	Stator OD		$OD_s$	mm		290
	Rotor ID		$ID_r$	mm		220
	Stator height		$H_s$	mm	65	85
	Lamination stack height		$H_{arm}$	mm	40	60
	Poles		$N_{mgn}$			38
	Rotor inertia		$J_r$	kg m <sup>2</sup>	0.031	0.046
	Stator mass	ex. cables	$m_s$	kg	6.0	8.3
	Rotor mass		$m_r$	kg	2.3	3.5
	Total mass	ex. cables	$m$	kg	8.3	11.8
	Cable mass	all cables	$m$	g/m		250
	Cable type (power)	length 2 m	$d$	mm (AWG)		10.6 (13)
	Cable type (sensor)	length 2 m	$d$	mm (AWG)		6.4 (25)

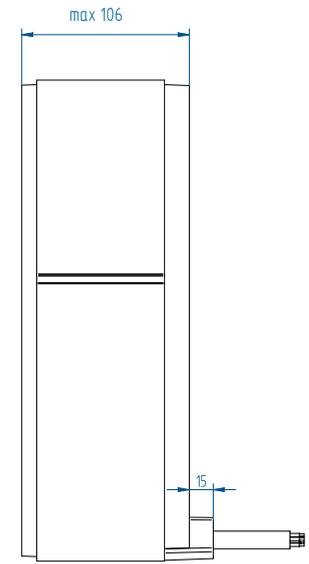
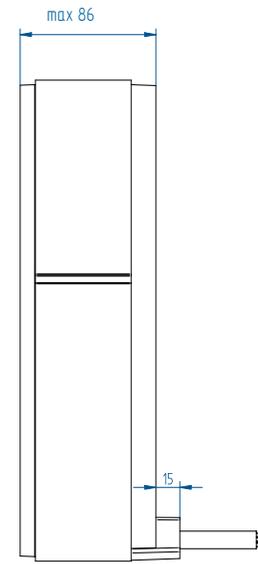
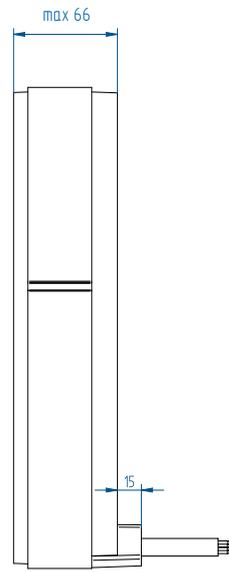
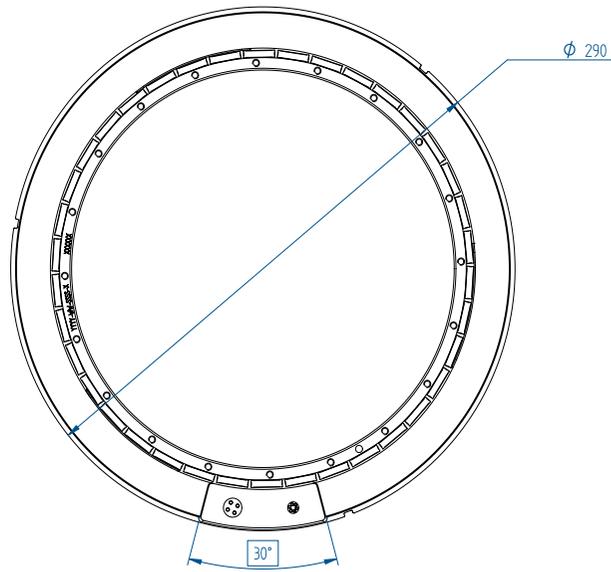
All specifications ±10%

QTL-A-290-65

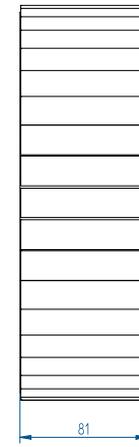
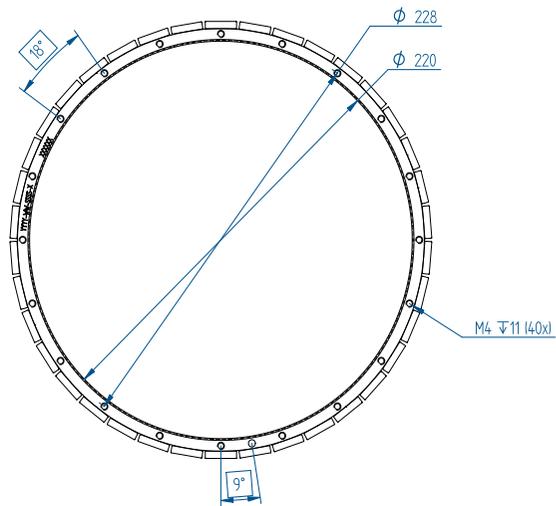
QTL-A-290-85

QTL-A-290-105

Stator



Rotor



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTL 310 series with cooling ring



QTL-A-310-85 stator and rotor

1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

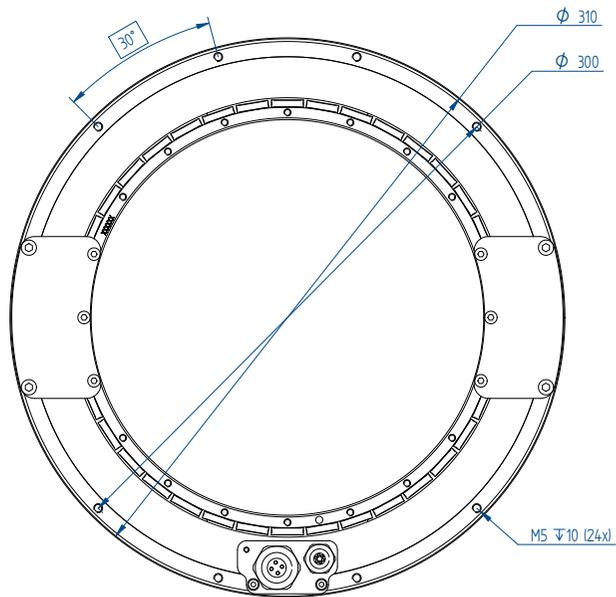
Series approvals



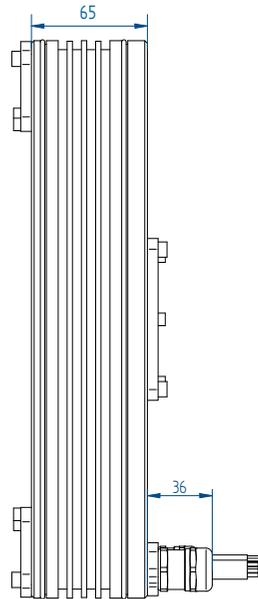
Parameter	Remarks	Symbol	Unit	QTL-A-310-65	QTL-A-310-85	QTL-A-310-105
<b>Performance</b>				N	N	N
Winding type						
Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{acrms} (V_{dc})$		480 (680)	
Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	389	583	778
Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	316	474	632
Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	151	241	331
Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	107	170	234
Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	298	182	124
Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	19.7	29.5	39.3
Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	27.0	45.5	64.7
<b>Electrical</b>						
Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	22.0	22.0	22.0
Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	16.9	16.9	16.9
Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	7.70	8.16	8.42
Stall current <sup>1</sup>	coils @ 100°C	$I_s$	A <sub>rms</sub>	5.44	5.77	5.96
Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	1681	2521	3362
Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	1189	1783	2377
Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	4.77	6.37	7.96
Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	23.9	34.7	45.5
Electrical time constant		$\tau_e$	ms	5.0	5.5	5.7
<b>Thermal</b>						
Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	1102	1653	2204
Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.073	0.048	0.036
Thermal time constant		$\tau_{th}$	s	49	44	41
Water cooling flow	for $\Delta T=3K$	$\Phi_w$	l/min	5.3	7.9	10.6
Water cooling pressure drop		$\Delta P_w$	bar	1.0	1.4	2.0
Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)		
<b>Mechanical</b>						
Stator OD		$OD_s$	mm		310	
Rotor ID		$ID_r$	mm		220	
Stator height		$H_s$	mm	65	85	105
Lamination stack height		$H_{arm}$	mm	40	60	80
Poles		$N_{mgn}$			38	
Rotor inertia		$J_r$	kg m <sup>2</sup>	0.031	0.046	0.061
Stator mass	ex. cables	$m_s$	kg	7.4	10.1	12.9
Rotor mass		$m_r$	kg	2.3	3.5	4.7
Total mass	ex. cables	$m$	kg	9.7	13.6	17.6
Cable mass	all cables	$m$	g/m		250	
Cable type (power)	length 2 m	$d$	mm (AWG)		10.6 (13)	
Cable type (sensor)	length 2 m	$d$	mm (AWG)		6.4 (25)	

All specifications ±10%

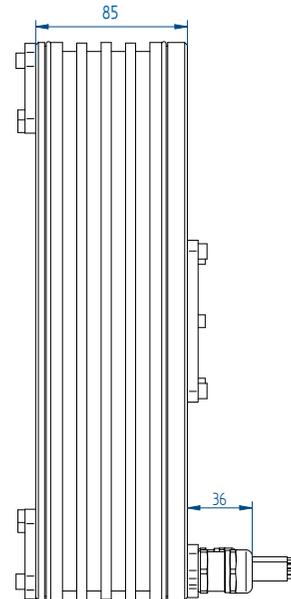
# Stator



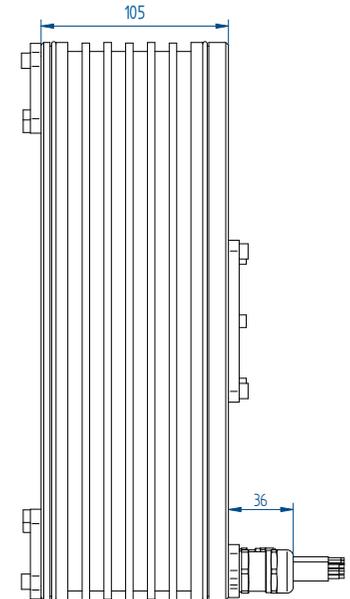
QTL-A-310-65



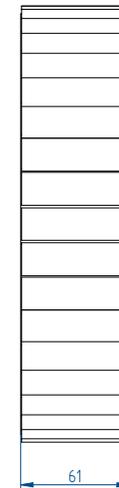
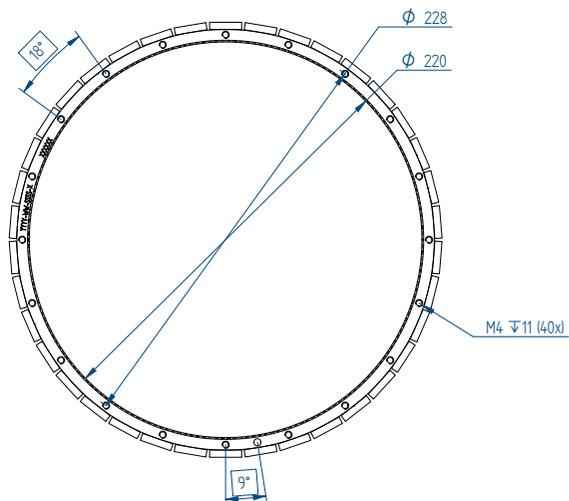
QTL-A-310-85



QTL-A-310-105



# Rotor



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# QTL 385 series with cooling ring



QTL-A-385-85 stator and rotor

Parameter	Remarks	Symbol	Unit	QTL-A-385-85	QTL-A-385-105	
<b>Performance</b>	Winding type			I	I	
Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac,rms} (V_{dc})$	480 (680)		
Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	1026	1368	
Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	833	1111	
Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	407	560	
Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	288	396	
Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	231	164	
Motor torque constant	$I \leq I_c$	$K_t$	Nm/ $A_{rms}$	25.9	34.6	
Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	105.4	149.9	
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	$A_{rms}$	44.0	44.0
Peak current	magnets @ 25°C	$I_p$	$A_{rms}$	33.8	33.8	
Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	$A_{rms}$	15.7	16.2	
Stall current <sup>1</sup>	coils @ 100°C	$I_s$	$A_{rms}$	11.1	11.5	
Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	2217	2956	
Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	1567	2090	
Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	$\Omega$	2.13	2.66	
Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	11.6	15.2	
Electrical time constant		$\tau_e$	ms	5.4	5.7	
<b>Thermal</b>	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	2044	2724
Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.039	0.029	
Thermal time constant		$\tau_{th}$	s	48	45	
Water cooling flow	for $\Delta T=3K$	$\Phi_w$	l/min	9.8	13.1	
Temperature sensor				PTC 1k $\Omega$ (3x)/ Pt1000 (3x)		
<b>Mechanical</b>	Stator OD	$OD_s$	mm	385		
Rotor ID		$ID_r$	mm	280		
Stator height		$H_s$	mm	85	105	
Lamination stack height		$H_{arm}$	mm	60	80	
Poles		$N_{mgn}$		50		
Rotor inertia		$J_r$	kg m <sup>2</sup>	0.146	0.195	
Stator mass	ex. cables	$m_s$	kg	12.75	17	
Rotor mass		$m_r$	kg	6.68	8.9	
Total mass	ex. cables	$m$	kg	19.43	25.9	
Cable mass	all cables	$m$	kg/m	0.25		
Cable type (power)	length 2 m	$d$	mm (AWG)	10.6 (13)		
Cable type (sensor)	length 2 m	$d$	mm (AWG)	6.4 (25)		

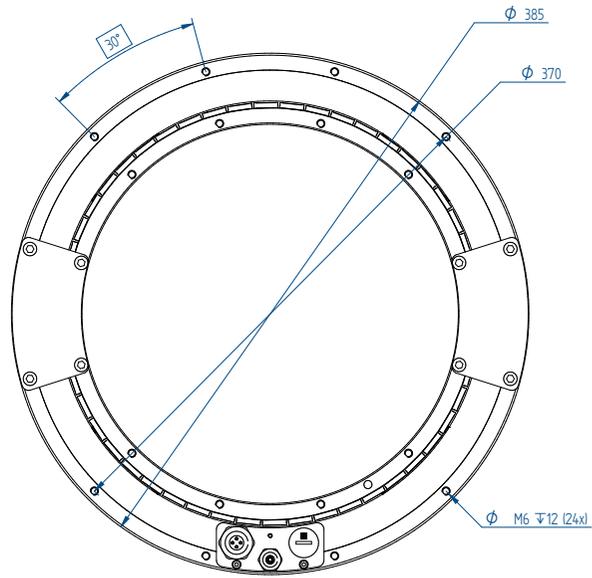
<sup>1</sup> These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.

<sup>2</sup> Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

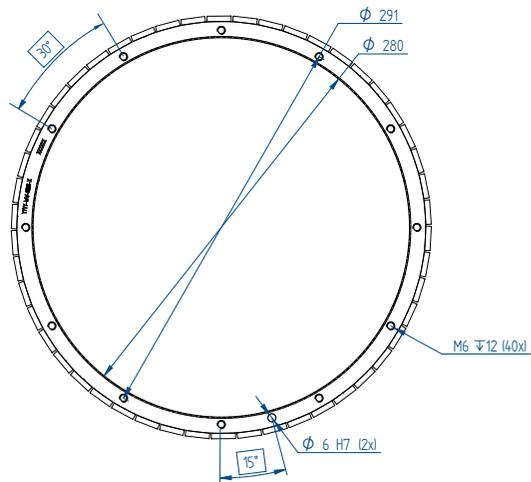
Series approvals



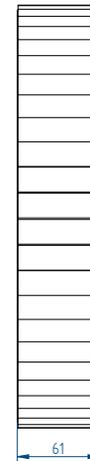
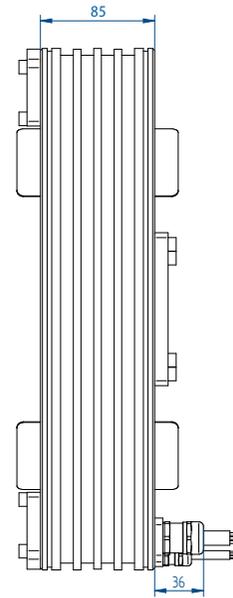
# Stator



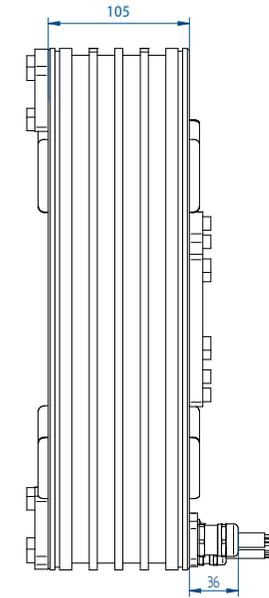
# Rotor



QTL-A-385-85



QTL-A-385-105



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm



QTL-A-485-85 stator and rotor

## QTL 485 series with cooling ring

Parameter	Remarks	Symbol	Unit	QTL-A-485-85	QTL-A-485-105	
<b>Performance</b>	Winding type			I	I	
	Motor type, max voltage ph-ph	3-phase synchronous	$U_{max}$	$V_{ac,rms} (V_{dc})$	480 (680)	
	Ultimate torque @ 20 K/s increase	magnets @ 25°C	$T_u$	Nm	1651	2202
	Peak torque @ 6 K/s increase	magnets @ 25°C	$T_p$	Nm	1342	1789
	Continuous torque <sup>1</sup>	coils @ 100°C	$T_c$	Nm	659	907
	Stall torque <sup>1</sup>	coils @ 100°C	$T_s$	Nm	466	642
	Maximum speed <sup>2</sup>	@ $U_{max}$ @ $T_c$	$n_{max}$	rpm	138	96
	Motor torque constant	$I \leq I_c$	$K_t$	Nm/A <sub>rms</sub>	41.7	55.6
	Motor constant	coils @ 25°C	$K_m$	(Nm) <sup>2</sup> /W	218.5	310.7
<b>Electrical</b>	Ultimate current	magnets @ 25°C	$I_u$	A <sub>rms</sub>	44.0	44.0
	Peak current	magnets @ 25°C	$I_p$	A <sub>rms</sub>	33.8	33.8
	Continuous current <sup>1</sup>	coils @ 100°C	$I_c$	A <sub>rms</sub>	15.8	16.3
	Stall current <sup>1</sup>	coils @ 100°C	$I_s$	A <sub>rms</sub>	11.2	11.5
	Back EMF ph-ph <sub>peak</sub>		$K_e$	V/krpm	3569	4758
	Back EMF ph-ph <sub>rms</sub>		$K_e$	V/krpm	2523	3364
	Resistance per phase	coils @ 25°C ex. cable	$R_{ph}$	Ω	2.66	3.32
	Induction per phase	$I < 0.6 I_p$	$L_{ph}$	mH	14.5	19.0
	Electrical time constant		$\tau_e$	ms	5.4	5.7
	Continuous power loss <sup>1</sup>	coils @ 100°C	$P_c$	W	2584	3444
<b>Thermal</b>	Thermal resistance	coils to mount. sfc.	$R_{th}$	K/W	0.031	0.023
	Thermal time constant		$\tau_{th}$	s	47	44
	Water cooling flow	for $\Delta T=3K$	$\Phi_W$	l/min	12.4	16.5
	Temperature sensor				PTC 1kΩ (3x)/ Pt1000 (3x)	
<b>Mechanical</b>	Stator OD		$OD_s$	mm	485	
	Rotor ID		$ID_r$	mm	366	
	Stator height		$H_s$	mm	85	105
	Lamination stack height		$H_{arm}$	mm	60	80
	Poles		$N_{mgn}$		62	
	Rotor inertia		$J_r$	kg m <sup>2</sup>	0.357	0.476
	Stator mass	ex. cables	$m_s$	kg	18.75	25
	Rotor mass		$m_r$	kg	9.68	12.9
	Total mass	ex. cables	$m$	kg	28.43	37.9
	Cable mass	all cables	$m$	kg/m	0.25	
Cable type (power)	length 2 m	$d$	mm (AWG)	10.6 (13)		
Cable type (sensor)	length 2 m	$d$	mm (AWG)	6.4 (25)		

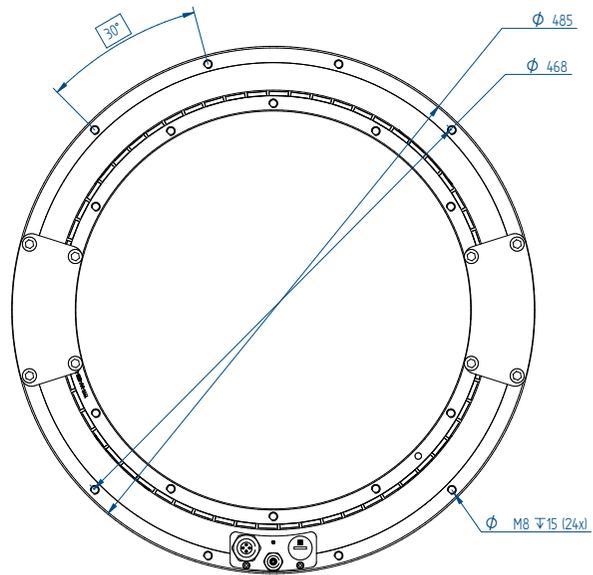
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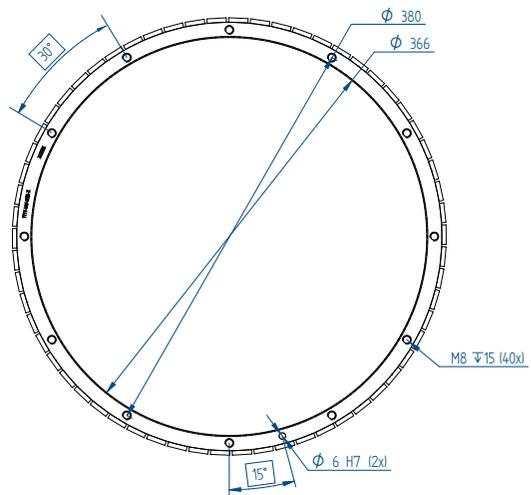
Series approvals



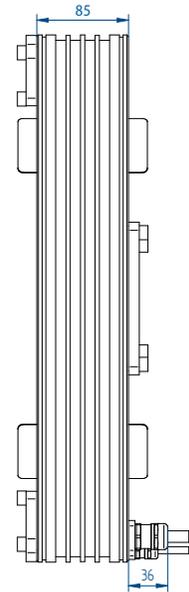
# Stator



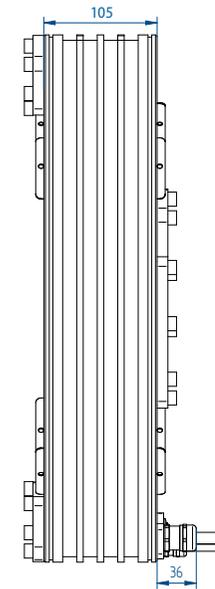
# Rotor



QTL-A-485-85



QTL-A-485-105



Mounting instructions and tolerances can be found in the torque installation manual. Manuals and 3D CAD files can be downloaded from our website.

\* All sizes are in mm

# We direct drive your motion technology



## QMT torque motor series

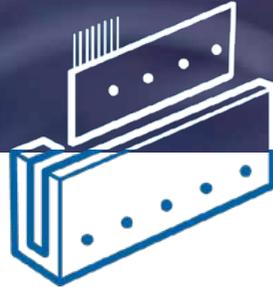
$F_u$  155–4307 Nm  $F_c$  68–2028 Nm

Specifically designed for the machine tooling market

Designed for machine tooling applications, the QMT series delivers higher torque density with full mechanical compatibility. The QMT-LA motors fit seamlessly into existing designs, providing up to 1666 Nm continuous and 3585 Nm ultimate torque.

The QMT-HA series raises the bar even higher! Up to 80 % more performance, reaching 2028 Nm continuous and 4307 Nm ultimate torque. Perfect for milling, grinding, turning, and trunnion applications.

[www.tecnotion.com/QMT](http://www.tecnotion.com/QMT)



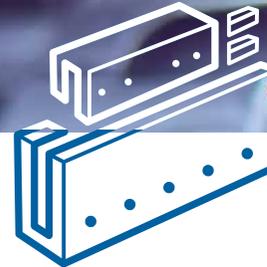
## Vacuum linear motors

$F_p$  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](http://www.tecnotion.com/vacuum)



## Ironless linear motors

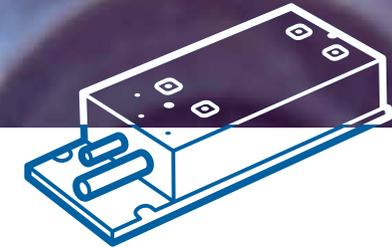
$F_p$  5.1-4200 N  $F_c$  2.6-846 N

Superior precision with accurate force constant and speed

In contrast to iron core motors, these motors feature an ironless coil unit, therefore 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.

Perfect for many industries, such as semiconductor, display, inspection, medical, automation, and optics.

[www.tecnotion.com/ironless](http://www.tecnotion.com/ironless)



## Iron core linear motors

$F_u$  120-7742 N  $F_c$  60-3441 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 3441 N for the water cooled TBW. Peak forces are even higher, reaching up to 7742 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](http://www.tecnotion.com/ironcore)

# Article numbers



## Motor simulation tool

### Analyze your application

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](http://www.tecnotion.com/simtool)

Series	Article	Article code
QTR	TORQUE KIT QTR-A-65-17 N	10 8062
QTR	TORQUE KIT QTR-A-65-25 N	10 8393
QTR	TORQUE KIT QTR-A-65-34 Y	10 8394
QTR	TORQUE KIT QTR-A-65-60 Y	10 8395
QTR	TORQUE KIT QTR-A-78-17 N	10 8397
QTR	TORQUE KIT QTR-A-78-25 Y	10 8399
QTR	TORQUE KIT QTR-A-78-34 Y	10 8400
QTR	TORQUE KIT QTR-A-78-60 Y	10 8401
QTR	TORQUE KIT QTR-A-105-17-N	4022 368 6120
QTR	TORQUE KIT QTR-A-105-17-Y	10 8848
QTR	TORQUE KIT QTR-A-105-17-Z	10 8158
QTR	TORQUE KIT QTR-A-105-25-N	4022 368 6121
QTR	TORQUE KIT QTR-A-105-25-Y	10 9393
QTR	TORQUE KIT QTR-A-105-25-Z	10 9398
QTR	TORQUE KIT QTR-A-105-34-N	4022 368 6122
QTR	TORQUE KIT QTR-A-105-34-Y	10 9394
QTR	TORQUE KIT QTR-A-105-34-Z	10 9399
QTR	TORQUE KIT QTR-A-105-60-N	4022 368 6123
QTR	TORQUE KIT QTR-A-133-17-N	4022 368 6140
QTR	TORQUE KIT QTR-A-133-17-Y	10 9395
QTR	TORQUE KIT QTR-A-133-17-Z	10 9400
QTR	TORQUE KIT QTR-A-133-25-N	4022 368 6141
QTR	TORQUE KIT QTR-A-133-25-Y	10 9396
QTR	TORQUE KIT QTR-A-133-25-Z	10 8159
QTR	TORQUE KIT QTR-A-133-34-N	4022 368 6142
QTR	TORQUE KIT QTR-A-133-34-Z	10 9401
QTR	TORQUE KIT QTR-A-133-60-N	4022 368 6143
QTR	TORQUE KIT QTR-A-160-17-N	4022 368 6160
QTR	TORQUE KIT QTR-A-160-17-Y	4022 368 5589
QTR	TORQUE KIT QTR-A-160-17-Z	10 9402

Series	Article	Article code
QTR	TORQUE KIT QTR-A-160-25-N	4022 368 6161
QTR	TORQUE KIT QTR-A-160-25-Y	10 9397
QTR	TORQUE KIT QTR-A-160-25-Z	10 9403
QTR	TORQUE KIT QTR-A-160-34-N	4022 368 6162
QTR	TORQUE KIT QTR-A-160-34-Z	10 8160
QTR	TORQUE KIT QTR-A-160-60-N	4022 368 6163
QTR	TORQUE KIT QTR-A-160-114-N	11 9309
QTR	TORQUE KIT QTR-X-160-140-N	11 1328
QTR	DIGITAL HALL MODULE QTR 65	10 8781
QTR	DIGITAL HALL MODULE QTR 78	10 8782
QTR	DIGITAL HALL MODULE QTR 105	10 8233
QTR	DIGITAL HALL MODULE QTR 133	10 8234
QTR	DIGITAL HALL MODULE QTR 160	10 8235
QTL	TORQUE KIT QTL-A-210-65-N	11 1171
QTL	TORQUE KIT QTL-A-210-85-N	11 1173
QTL	TORQUE KIT QTL-A-210-105-N	11 1175
QTL	TORQUE KIT QTL-A-230-65-N	11 1127
QTL	TORQUE KIT QTL-A-230-85-N	11 1145
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QTL	TORQUE KIT QTL-A-485-85-I	11 1712
QTL	TORQUE KIT QTL-A-485-105-I	11 1711

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