TECNOTION®

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

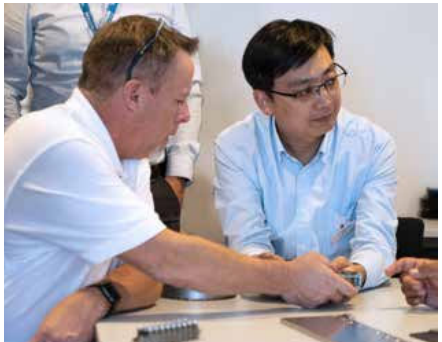
Our manufacturing capabilities are strategically distributed between our facilities in China, Vietnam and the Netherlands, each of which plays a vital role in delivering first-class products to our customers worldwide. This distribution enables us to meet the demands of mass production.

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

QTR-A	105	17	N

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

See P.12

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.

See P.16

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.

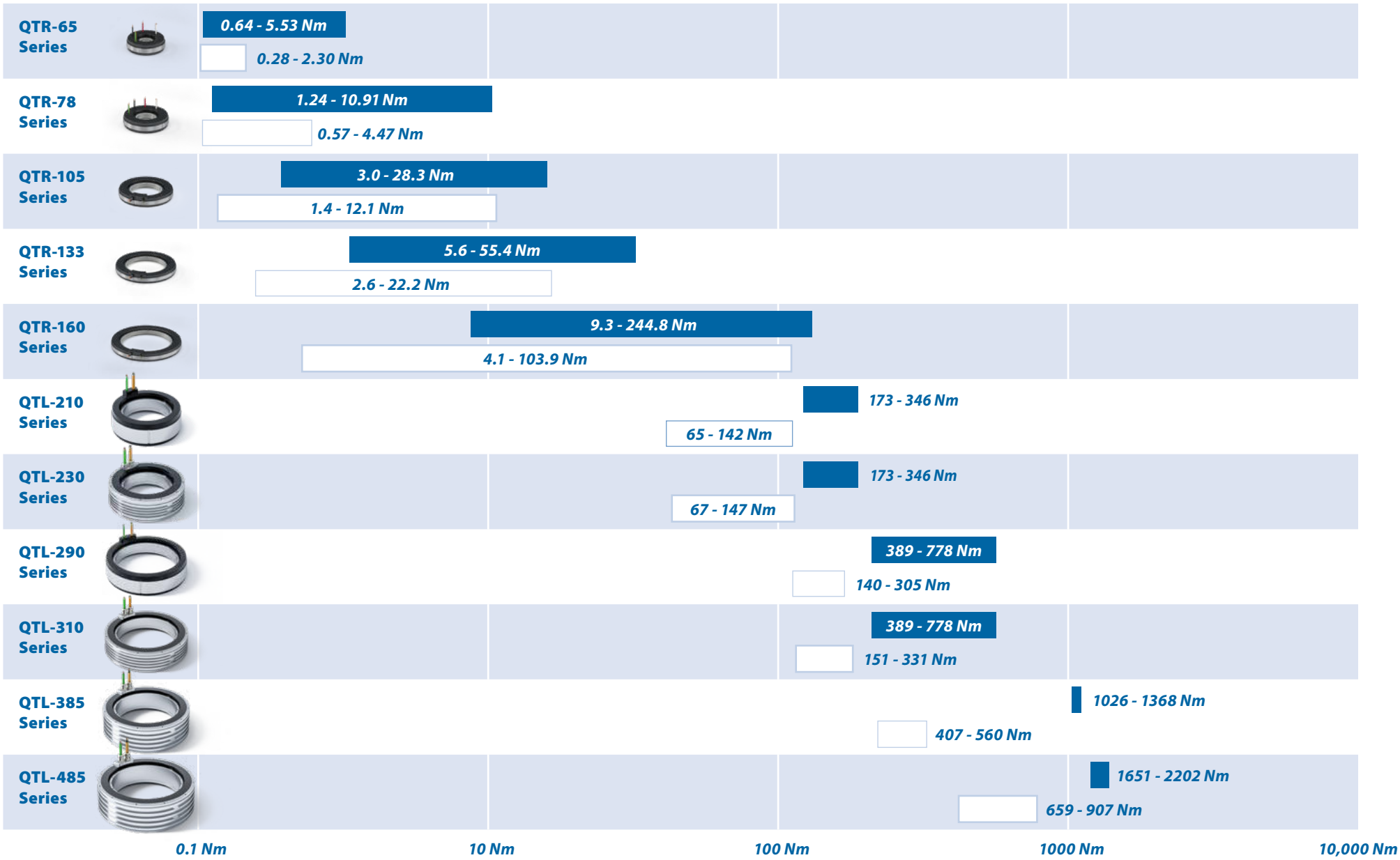
See P.22

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.

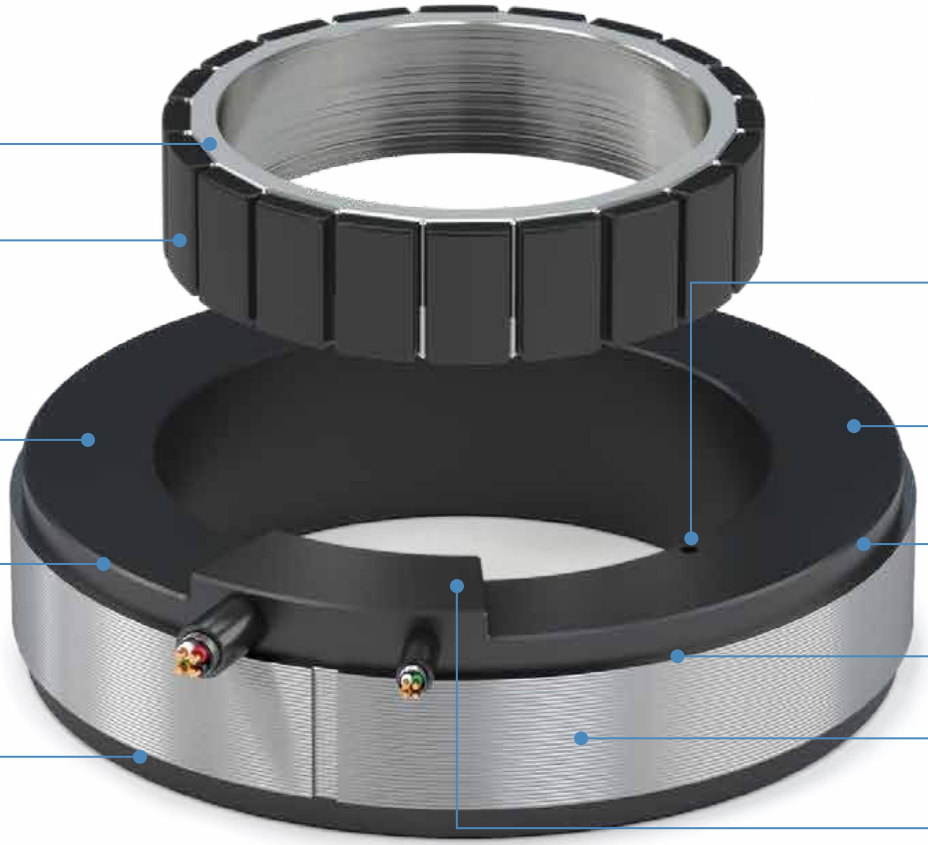
Available with or without cooling ring. The QTL motor series comes in six diameters and three heights.

Motor torque range



QTR motor series

Properties QTR 65, 78, 105, 133 and 160



Rotor ring

NdFeB magnets

Encapsulated design

PU-resin

Ultimate torque

Tu 0.64 - 244.8 Nm

Six build heights

Ranging from 17 mm up to 140 mm

DHM mounting holes

For digital Hall module

Continuous torque range

Tc 0.28 - 103.9 Nm

Outer diameter

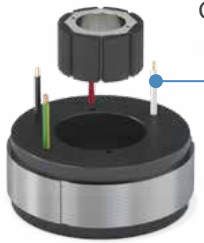
Ranging from 65 mm to 160 mm

Enhanced thermal management

High torque density

Strain relief

Cable clamp is enclosed in casting

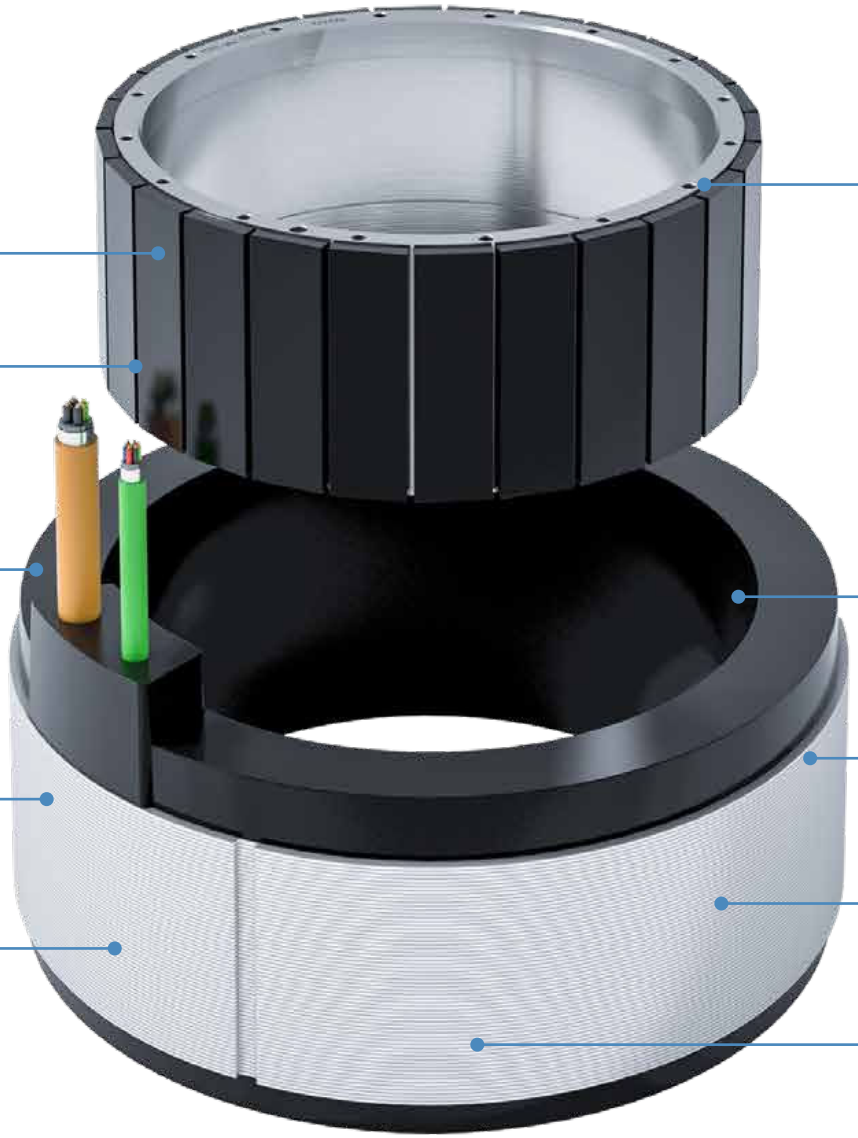


QTR 65 and QTR 78 series have flying leads

TECNOTION® direct drive in motion

QTL motor series

Properties QTL 210 and 290



Rotor ring

NdFeB magnets

Encapsulated design

PU-resin

Ultimate torque

Tu 173 - 778 Nm

Three build heights

65 mm - 85 mm - 105 mm

Bolting holes

Continuous torque range

Tc 65 - 305 Nm

Outer diameter

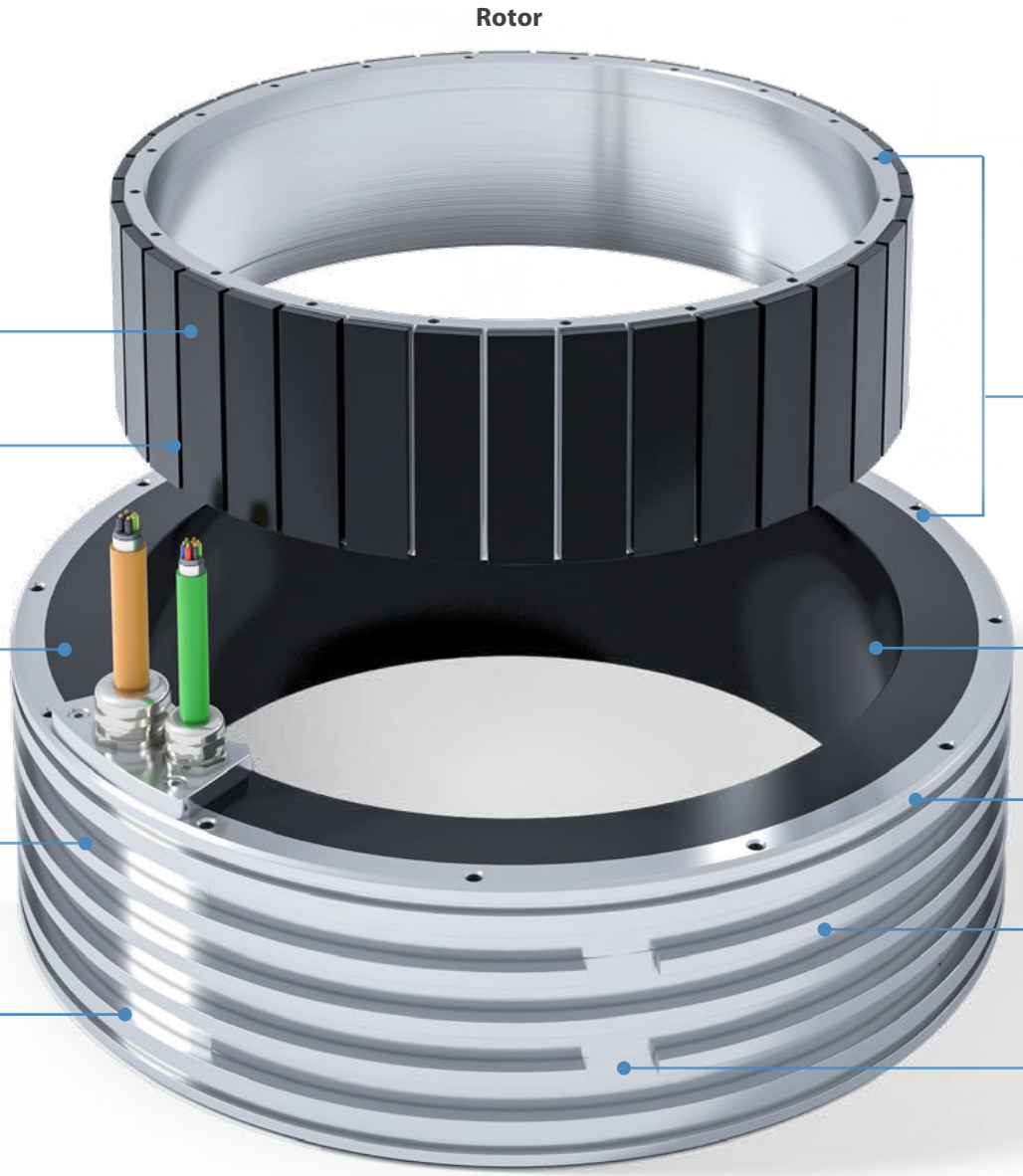
210 mm and 290 mm

Enhanced thermal management

High torque density

QTL motor series with cooling ring

Properties QTL 230, 310, 385 and 485



Rotor ring

NdFeB magnets

Encapsulated design

PU-resin

Ultimate torque

Tu 173 - 2202 Nm

Three build heights

65 mm - 85 mm - 105 mm

Bolting holes

Continuous torque range

Tc 67 - 907 Nm

Outer diameter

Ranging from 230 mm to 485 mm

Cooling ring

for water cooling

High torque density

TECNOTION® direct drive in motion

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.

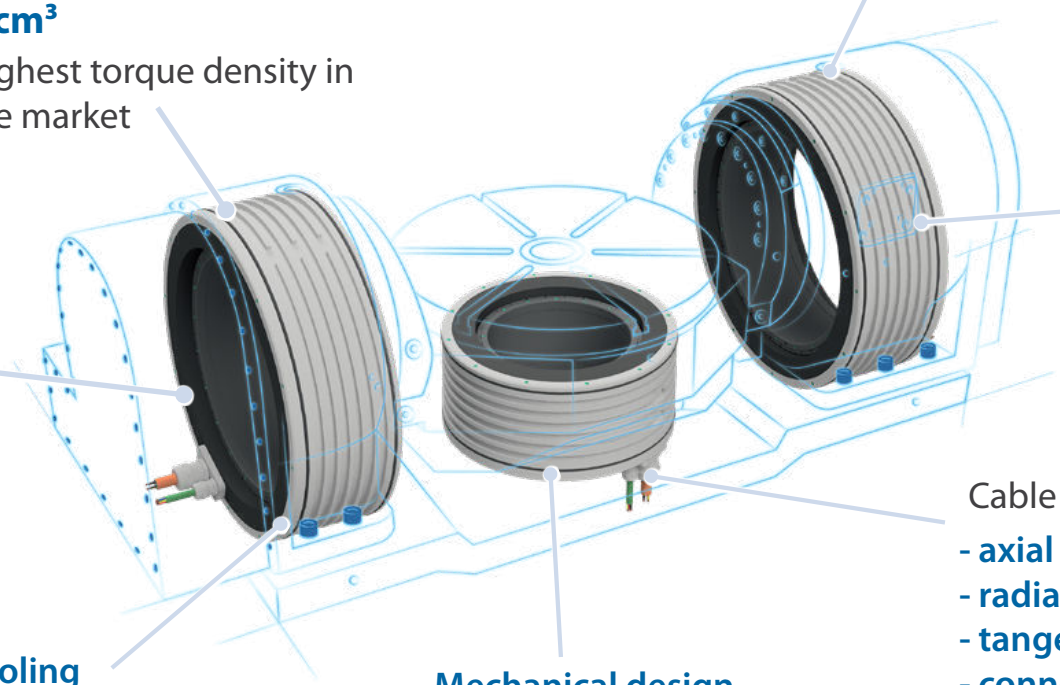
www.tecnotion.com/QMT

Low weight because of aluminium housing

T/cm³
Highest torque density in the market

Rotor options
The standard rotor is form fit within machine tooling applications.

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



Low thermal resistance for optimal thermal integration

Cable exit possibilities
- **axial**
- **radial**
- **tangential**
- **connectors**

Water cooling
Increases maximum performance of the motor

Mechanical design
Conform market standard

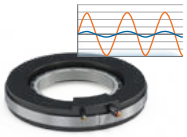
Features

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.

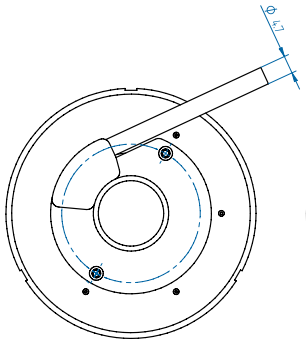
Low stator and rotor mass

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.

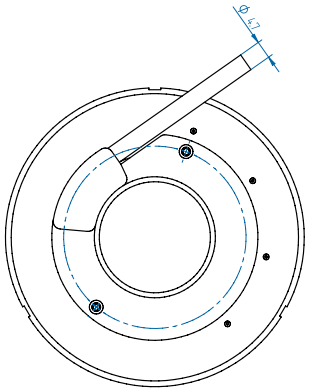
100% QC

All products are 100% mechanically and electrically tested.

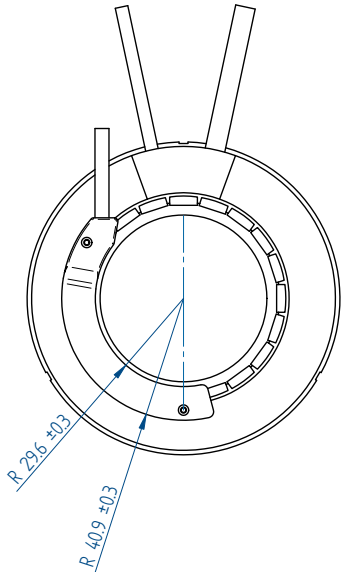
Torque QTR digital Hall module



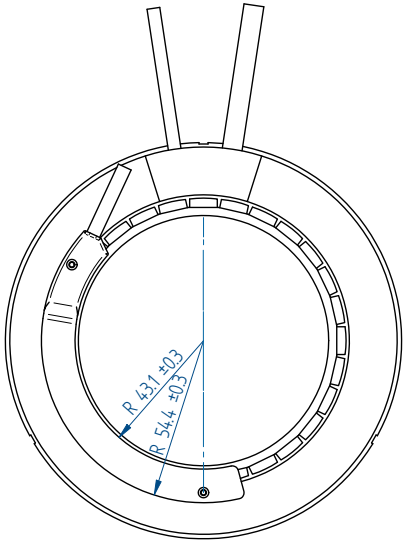
Digital Hall module mounted on QTR-A 65 series*



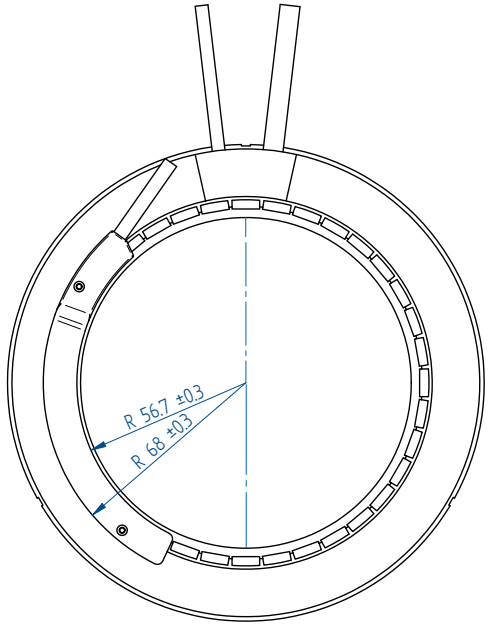
Digital Hall module mounted on QTR-A 78 series*



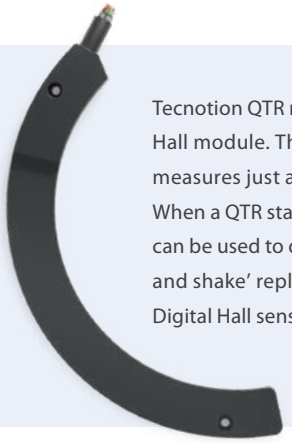
Digital Hall module mounted on QTR-A 105 series*



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

	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}	$V_{ac\ rms}$ (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[1]	coils @ 100°C	T_c	Nm	0.28	0.65	1.04	2.30
	Maximum speed[2]	@ 48 V_{dc} @ T_c	n_{max}	rpm	5955	2757	3580	951
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	10000	10000	10000	10000
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	0.059	0.118	0.099	0.271
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	0.0021	0.0059	0.0111	0.0331
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	13.87	13.87	27.96	24.88
	Peak current	magnets @ 25°C	I_p	A_{rms}	7.49	7.49	15.32	15.10
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	4.78	5.50	10.54	8.49
	Back EMF ph-ph_{peak}		K_e	V/krpm	5.0	10.1	8.5	23.2
	Back EMF ph-ph_{rms}		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		τ_e	ms	1.8	2.1	2.4	3.8
Thermal	Continuous power loss[1]	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		τ_{th}	s	17	13	14	22
	Temperature sensor				none			
Mechanical	Stator OD		OD_s	mm	65			
	Rotor ID		ID_r	mm	17			
	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}		8			
	Rotor inertia		J_r	kg m^2	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)			

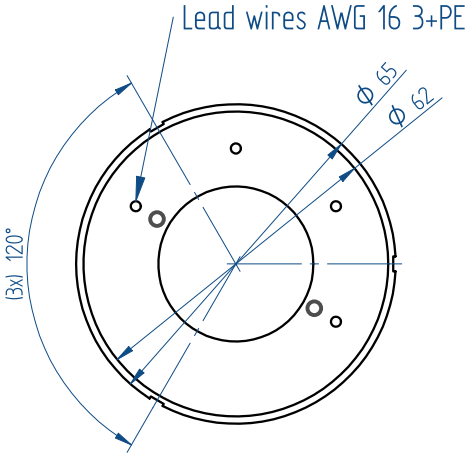
All specifications ±10%

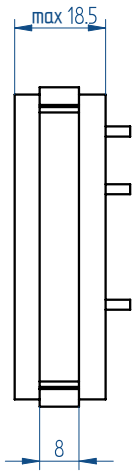
1. *These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.*
2. *Actual values depend on bus voltage. Please check the T/n diagram in our manual or online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

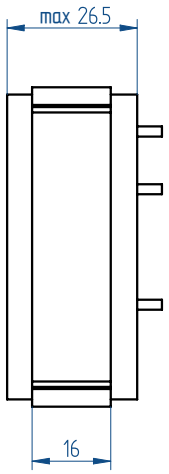
Series approvals

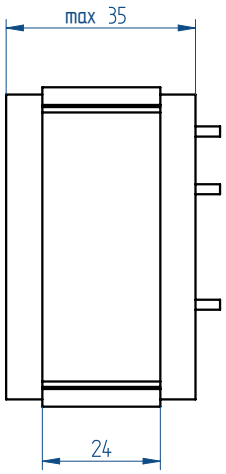
	QTR-A- 65-17	QTR-A-65-25	QTR-A-65-34	QTR-A-65-60

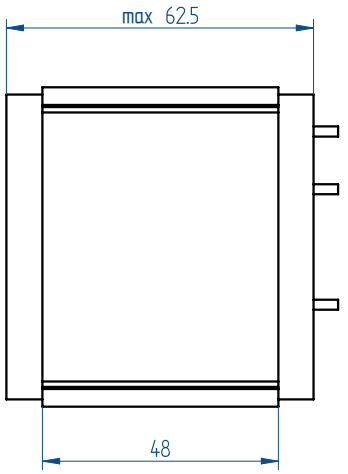
Stator



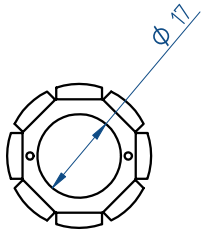


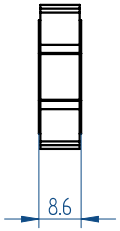


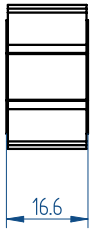


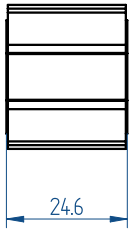


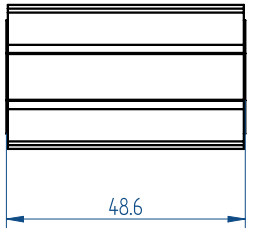
Rotor











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

	Parameter	Remarks	Symbol	Unit	QTR-A-78-17	QTR-A-78-25	QTR-A-78-34	QTR-A-78-60
Performance	Winding type				N	Y	Y	Y
	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac\ rms}$ (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[1]	coils @ 100°C	T_c	Nm	0.57	1.34	2.10	4.47
	Maximum speed[2]	@ 48 V_{dc} @ T_c	n_{max}	rpm	2542	2451	1533	331
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	9000	9000	9000	7803
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	0.119	0.133	0.199	0.535
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	0.0056	0.0168	0.0302	0.0861
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	13.87	27.96	27.96	24.88
	Peak current	magnets @ 25°C	I_p	A_{rms}	7.49	15.32	15.32	15.10
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	4.83	10.05	10.54	8.37
	Back EMF ph-ph_{peak}		K_e	V/krpm	10.1	11.4	17.0	45.7
	Back EMF ph-ph_{rms}		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		τ_e	ms	1.9	2.2	2.4	3.8
Thermal	Continuous power loss[1]	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		τ_{th}	s	17	16	14	23
	Temperature sensor				none			
Mechanical	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^2	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%

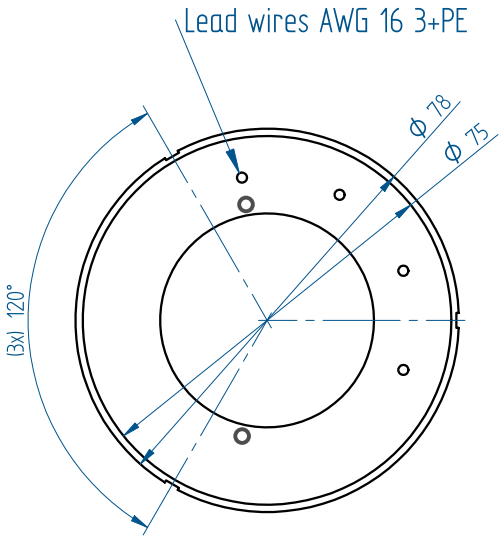
1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.

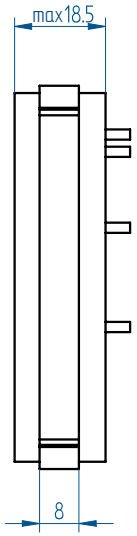
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

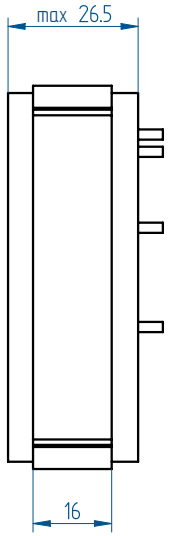
Series approvals

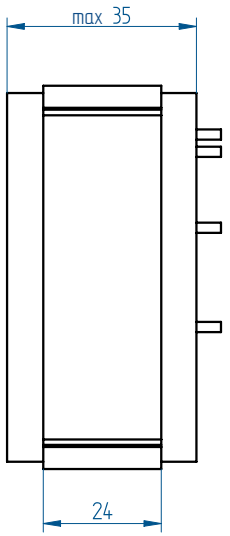
	QTR-A-78-17	QTR-A-78-25	QTR-A-78-34	QTR-A-78-60

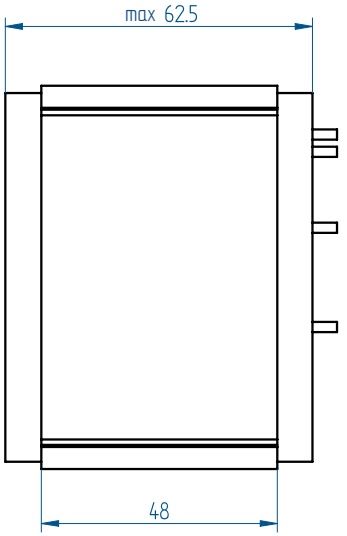
Stator



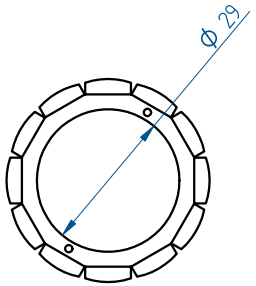


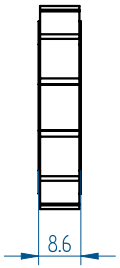


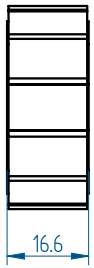


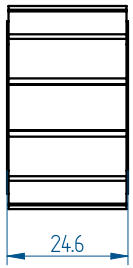


Rotor









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
	Winding type				N	Y	Z	N	Y	Z	N	Y	Z	N
Performance	Motor type, max voltage ph-ph	3-phase synchronous	U_{max}	$V_{ac\,rms}$ (V_{dc})	230 (325)									400 (565)
Performance	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
Performance	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
Performance	Continuous torque[1]	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
Performance	Maximum speed[2]	@ 48 V_{dc} @ T_c	n_{max}	rpm	819	1803	3398	260	812	1679	4	464	1061	217
Performance	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	7000	7000	7000	4106	7000	7000	2168	5019	7000	1373
Performance	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	0.30	0.17	0.10	0.59	0.33	0.19	1.07	0.50	0.29	2.84
Performance	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	0.021	0.022	0.022	0.061	0.063	0.063	0.125	0.114	0.114	0.397
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	13.9	28.3	48.9	13.9	28.3	48.9	13.3	28.3	48.9	13.6
Electrical	Peak current	magnets @ 25°C	I_p	A_{rms}	7.5	15.3	26.5	7.5	15.3	26.5	7.3	15.3	26.5	7.4
Electrical	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	4.6	8.4	14.6	5.3	9.7	16.8	5.0	10.2	17.7	4.3
Electrical	Back EMF ph-ph$_{peak}$		K_e	V/krpm	25	14	8	51	28	16	91	43	25	243
Electrical	Back EMF ph-ph$_{rms}$		K_e	V/krpm	18	10	6	36	20	12	64	30	17	172
Electrical	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
Electrical	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	Electrical time constant		τ_e	ms	1.9	2.0	2.0	2.1	2.2	2.2	2.6	2.4	2.4	3.7
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	116			213			295			483
Thermal	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	0.65			0.35			0.25			0.16
Thermal	Thermal time constant		τ_{th}	s	19	22	22	14	17	17	16	15	15	23
Thermal	Temperature sensor				PTC 1kΩ / KTY83-122									
Mechanical	Stator OD		OD_s	mm	105									
Mechanical	Rotor ID		ID_r	mm	56									
Mechanical	Stator height		H_s	mm	17			25			34			60
Mechanical	Lamination stack height		H_{arm}	mm	8			16			24			48
Mechanical	Poles		N_{mgn}		20									
Mechanical	Rotor inertia		J_r	kg m^2	8.0E-05			1.5E-04			2.2E-04			4.3E-04
Mechanical	Stator mass	ex. cables	m_s	g	299			472			746			1476
Mechanical	Rotor mass		m_r	g	79			146			218			433
Mechanical	Total mass	ex. cables	m	g	378			618			964			1909
Mechanical	Cable mass	all cables	m	g/m	126	180	180	126	180	180	126	180	180	190
Mechanical	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)
Mechanical	Cable type (sensor)	length 0.5 m	d	mm (AWG)	4.5 (26)									

[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 T/n diagram in our manual or online simulation tool.*

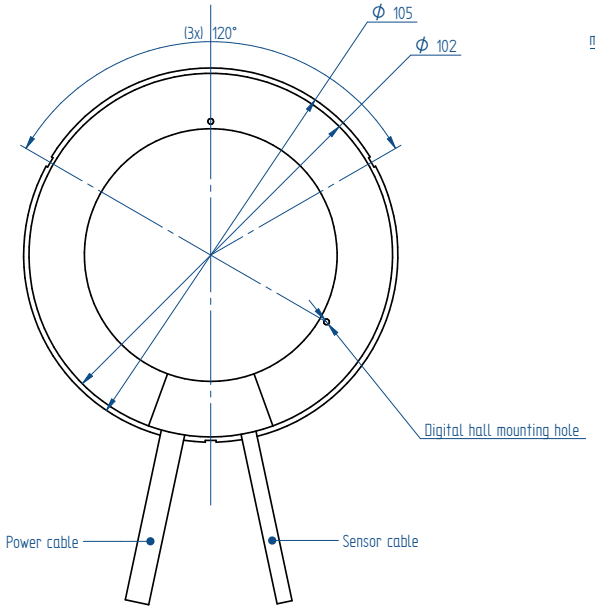
Series approvals

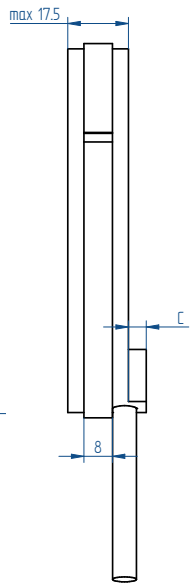
*N-windings approved, full approval pending.

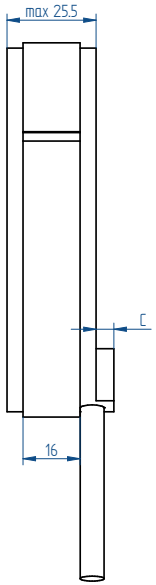
All specifications ±10%

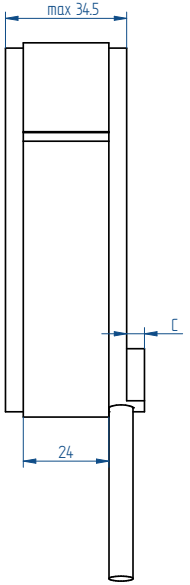
	QTR-A-105-17	QTR-A-105-25	QTR-A-105-34	QTR-A-105-60

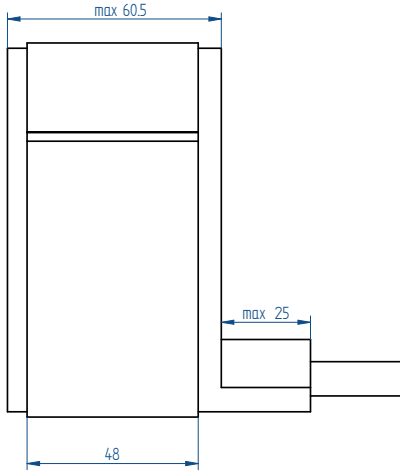
Stator



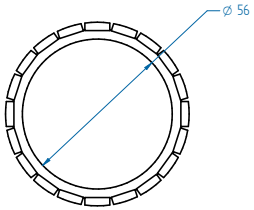


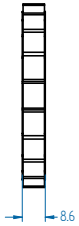


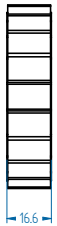


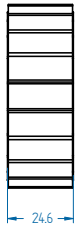


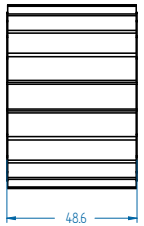
Rotor











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
Performance	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[1]	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[2]	@ 48 V_{dc} @ T_c	n_{max}	rpm	335	855	1678	44	352	803	123	491	158
	Maximum speed[2]	@ 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_{rms}	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	$(Nm)^2/W$	0.058	0.060	0.060	0.166	0.173	0.173	0.340	0.312	1.082
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	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_{rms}	7.5	15.3	26.5	7.5	15.3	26.5	7.3	26.5	7.4
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	4.4	8.1	14.0	5.1	9.2	16.0	4.7	16.8	4.0
	Back EMF ph-ph$_{peak}$		K_e	V/krpm	49	28	16	99	55	32	178	48	475
	Back EMF ph-ph$_{rms}$		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		τ_e	ms	2.0	2.1	2.1	2.2	2.3	2.3	2.7	2.5	3.9
Thermal	Continuous power loss[1]	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		τ_{th}	s	21	24	24	16	19	19	18	17	26
	Temperature sensor				PTC 1kΩ / KTY83-122								
Mechanical	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^2	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)								

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.*

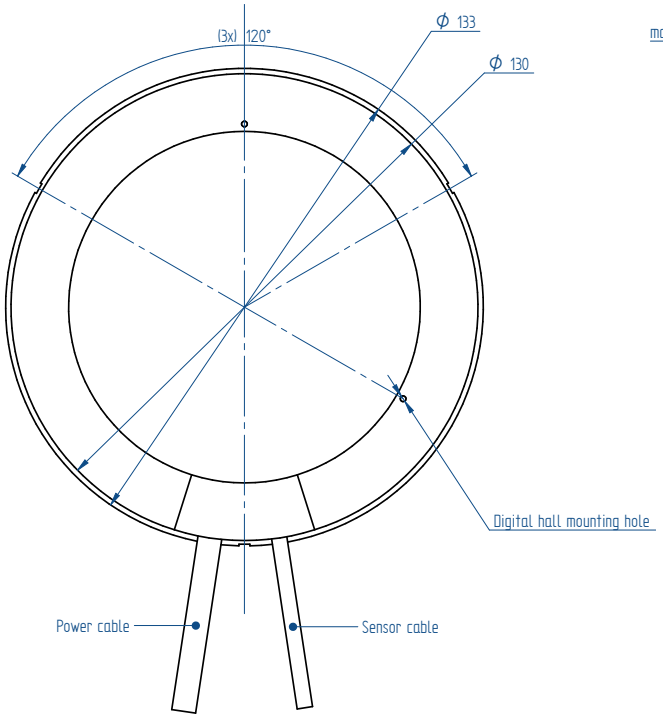
[2] *Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.*

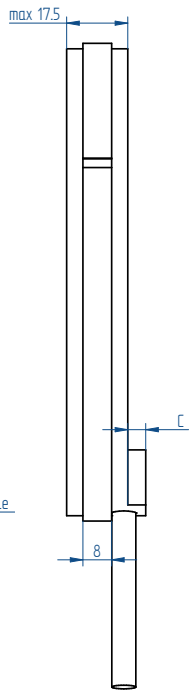
Series approvals

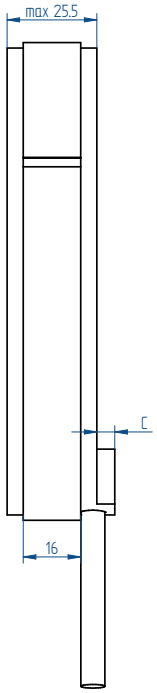
*N-windings approved, full approval pending.

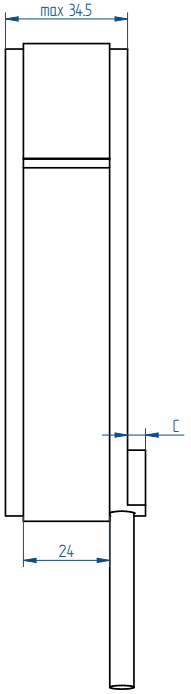
	QTR-A-133-17	QTR-A-133-25	QTR-A-133-34	QTR-A-133-60

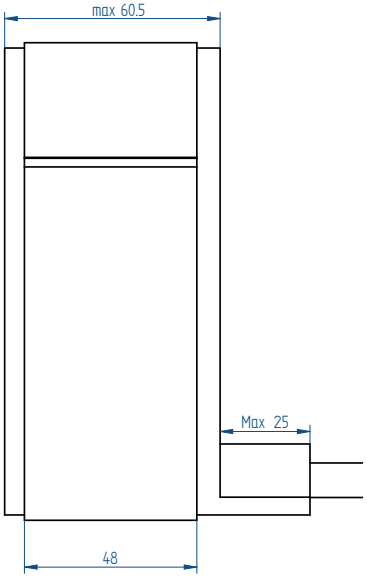
Stator



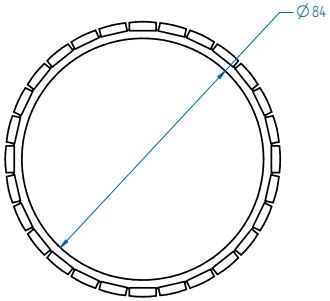


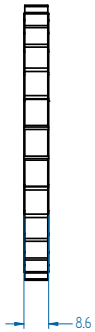


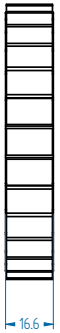


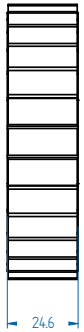


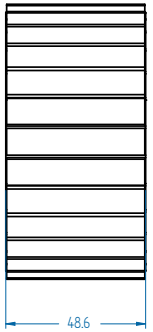
Rotor











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 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
Performance	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_{dc})	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[1]	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[2]	@ 48 V_{dc} @ T_c	n_{max}	rpm	149	480	989	39	170	450	149	260	125	109	111
	Maximum speed[2]	@ U_{max} @ T_c	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_{rms}	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	$(Nm)^2/W$	0.12	0.13	0.13	0.36	0.37	0.37	0.73	0.67	2.33	5.25	7.48
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	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_{rms}	7.5	15.3	26.5	7.5	15.3	26.5	7.3	26.5	7.4	22.1	22.1
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	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$_{peak}$		K_e	V/krpm	82	46	27	165	92	53	296	80	790	527	699
	Back EMF ph-ph$_{rms}$		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		τ_e	ms	2.0	2.1	2.1	2.2	2.3	2.3	2.8	2.5	3.9	4.2	4.2
Thermal	Continuous power loss[1]	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		τ_{th}	s	22	26	26	17	20	20	19	18	27	24	24
	Temperature sensor				PTC 1kΩ / KTY83-122										
Mechanical	Stator OD		OD_s	mm	160										
	Rotor ID		ID_r	mm	111									108	
	Stator height		H_s	mm	17			25			34		60	114	140
	Lamination stack height		H_{arm}	mm	8			16			24		48	96	122
	Poles		N_{mgn}		36										
	Rotor inertia		J_r	kg m^2	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)										

All specifications ±10%

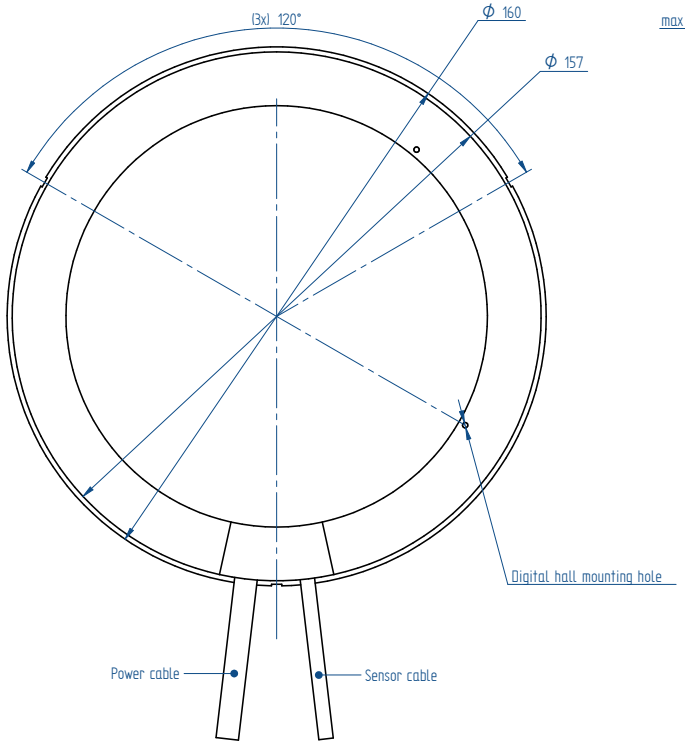
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*

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

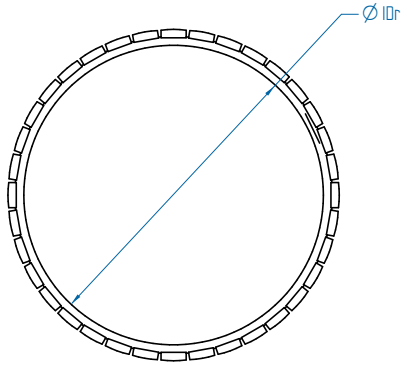
Series approvals

*N-windings approved, full approval pending.

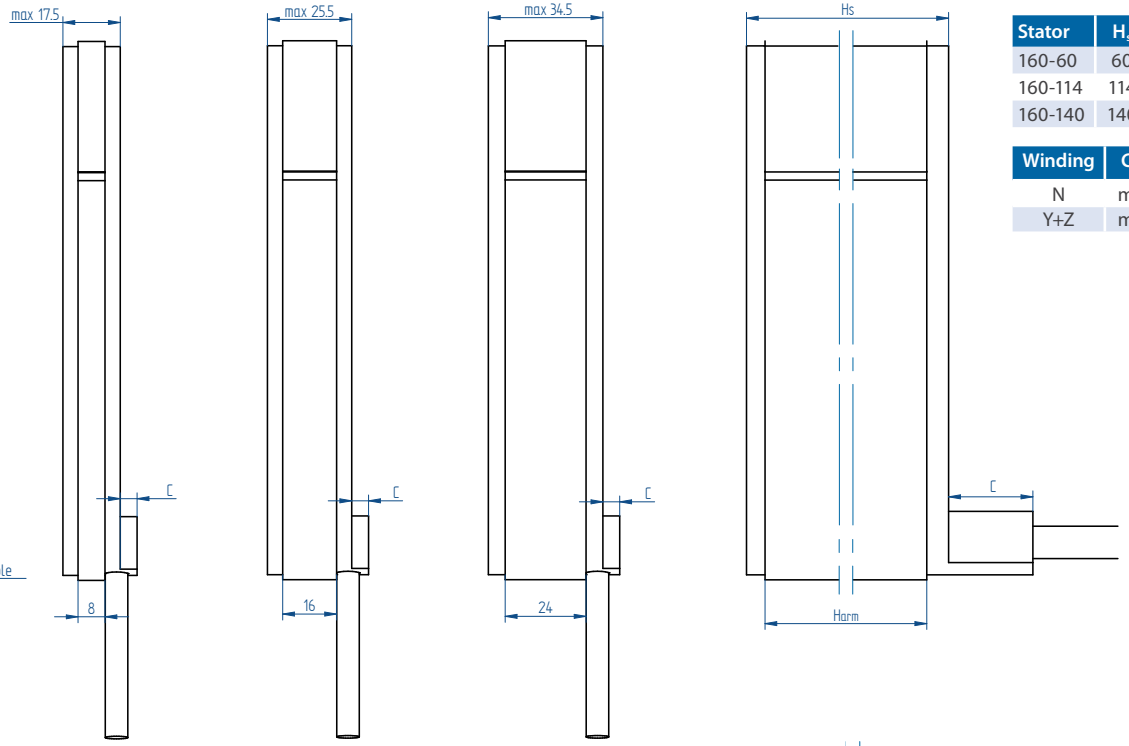
Stator



Rotor

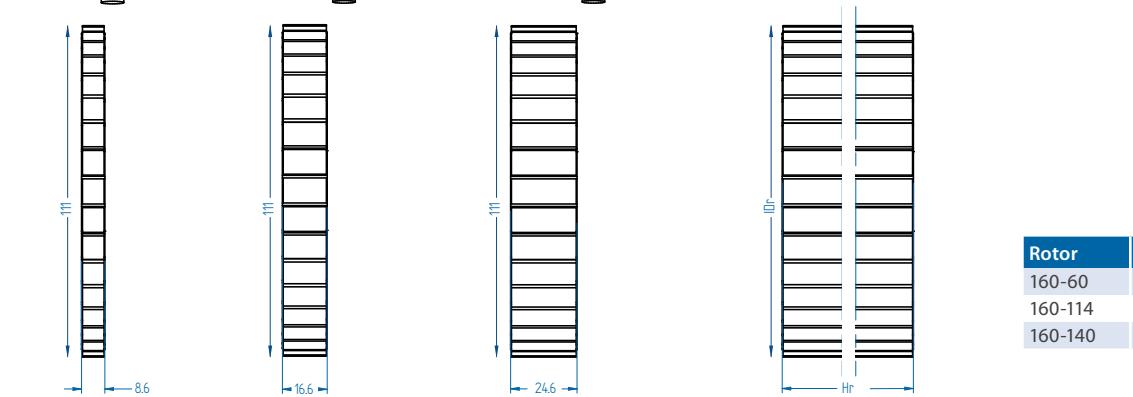


QTR-A-160-17	QTR-A160-25	QTR-A-160-34	QTR-x-160-60/114/140



Stator	H_s	H_{arm}	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_r	ID_r
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

	Parameter	Remarks	Symbol	Unit	QTL-A-210-65	QTL-A-210-85	QTL-A-210-105
Performance	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	346
	Peak torque @ 6 K/s increase	magnets @ 25°C	T_p	Nm	140	211	281
	Continuous torque[1]	coils @ 100°C	T_c	Nm	65	103	142
	Stall torque[1]	coils @ 100°C	T_s	Nm	46	73	100
	Maximum speed[2]	@ Umax @ T_c	n_{max}	rpm	716	457	326
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	8.7	13.1	17.5
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	8.0	13.5	19.2
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	22.0	22.0	22.0
	Peak current	magnets @ 25 °C	I_p	A_{rms}	16.9	16.9	16.9
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	7.45	7.88	8.11
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	5.27	5.57	5.74
	Back EMF ph-ph_{peak}		K_e	V/krpm	747	1121	1494
	Back EMF ph-ph_{rms}		K_e	V/krpm	528	793	1057
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	3.18	4.25	5.31
	Induction per phase	$I < 0.6\ I_p$	L_{ph}	mH	16.0	22.3	28.7
	Electrical time constant		τ_e	ms	5.0	5.3	5.4
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	690	1028	1363
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	0.116	0.078	0.059
	Thermal time constant		τ_{th}	s	53	47	45
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)		
Mechanical	Stator OD		OD_s	mm	210		
	Rotor ID		ID_r	mm	140		
	Stator height		H_s	mm	65	85	105
	Lamination stack height		H_{arm}	mm	40	60	80
	Poles		N_{mgn}		26		
	Rotor inertia		J_r	kg m^2	0.009	0.014	0.019
	Stator mass	ex. cables	m_s	kg	4.2	5.9	7.5
	Rotor mass		m_r	kg	1.6	2.4	3.2
	Total mass	ex. cables	m	kg	5.8	8.3	10.7
	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%

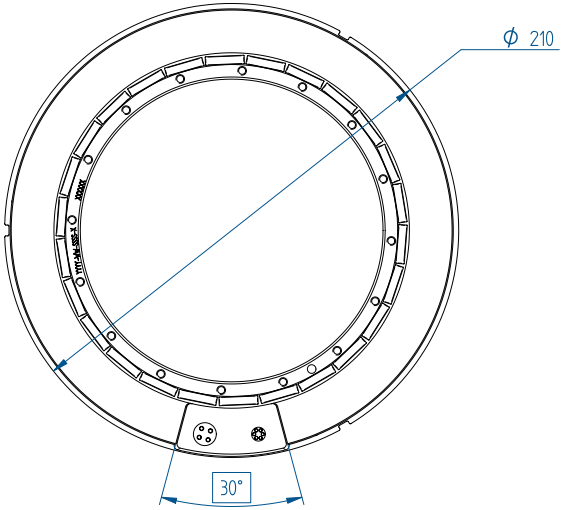
1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.

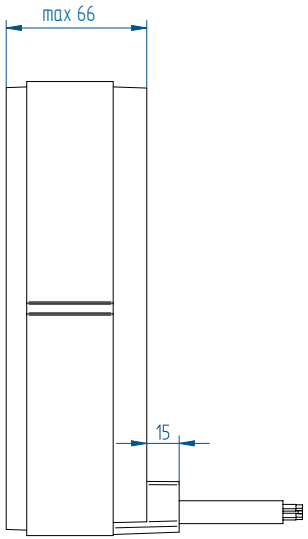
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

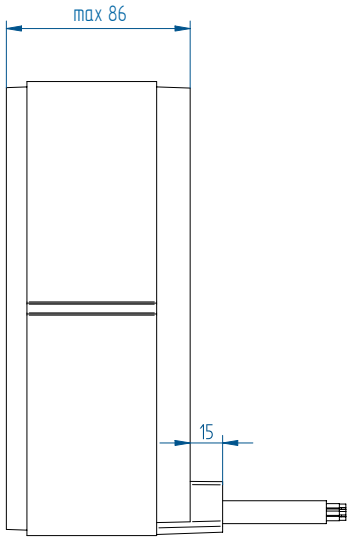
Series approvals

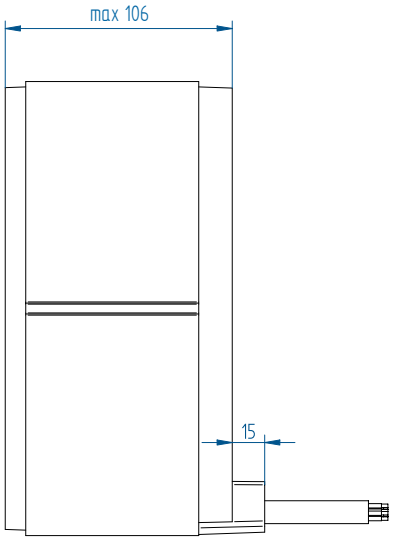
	QTL-A-210-65	QTL-A-210-85	QTL-A-210-105

Stator

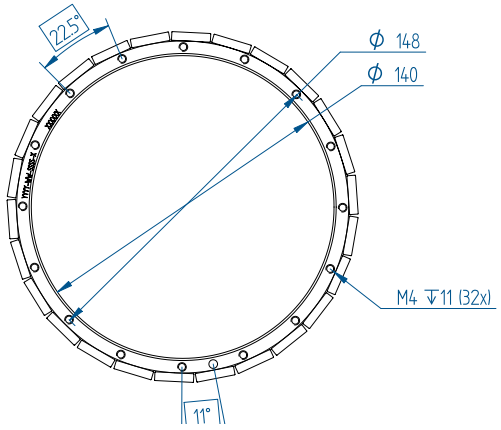


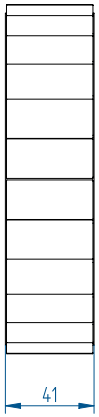


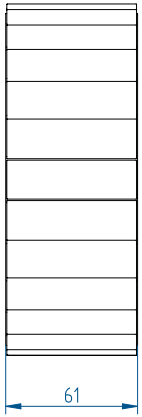


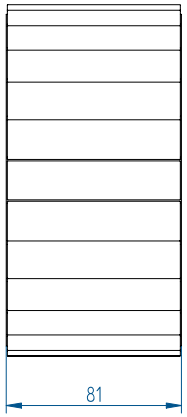


Rotor









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
Performance	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	346
	Peak torque @ 6 K/s increase	magnets @ 25°C	T_p	Nm	140	211	281
	Continuous torque[1]	coils @ 100°C	T_c	Nm	67	107	147
	Stall torque[1]	coils @ 100°C	T_s	Nm	48	76	104
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	709	451	321
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	8.7	13.1	17.5
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	8.0	13.5	19.2
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	22.0	22.0	22.0
	Peak current	magnets @ 25 °C	I_p	A_{rms}	16.9	16.9	16.9
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	7.69	8.16	8.42
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	5.44	5.77	5.95
	Back EMF ph-ph$_{peak}$		K_e	V/krpm	747	1121	1494
	Back EMF ph-ph$_{rms}$		K_e	V/krpm	528	793	1057
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	3.18	4.25	5.31
	Induction per phase	$I < 0.6\ I_p$	L_{ph}	mH	16.0	22.3	28.7
	Electrical time constant		τ_e	ms	5.0	5.3	5.4
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	735	1102	1469
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	0.109	0.073	0.054
	Thermal time constant		τ_{th}	s	49	44	41
	Water cooling flow	for ΔT=3K	Φ_W	l/min	3.5	5.3	7.0
	Water cooling pressure drop		ΔP_w	bar	0.7	1.0	1.5
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)		
Mechanical	Stator OD		OD_s	mm	230		
	Rotor ID		ID_r	mm	140		
	Stator height		H_s	mm	65	85	105
	Lamination stack height		H_{arm}	mm	40	60	80
	Poles		N_{mgn}		26		
	Rotor inertia		J_r	kg m^2	0.009	0.014	0.019
	Stator mass	ex. cables	m_s	kg	5.2	7.2	9.0
	Rotor mass		m_r	kg	1.6	2.4	3.2
	Total mass	ex. cables	m	kg	6.8	9.6	12.2
	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%

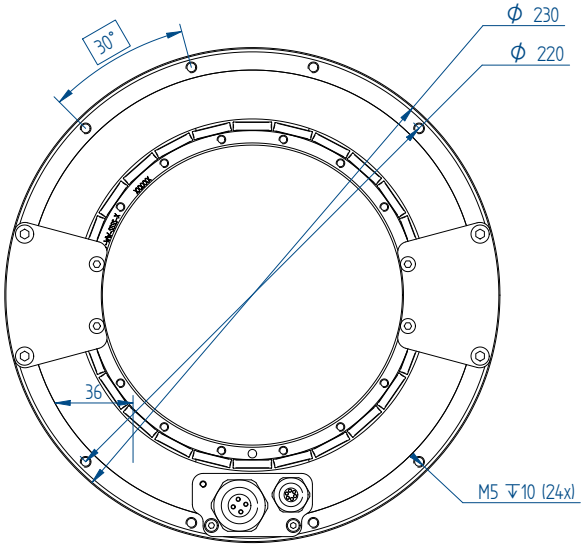
1. These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.

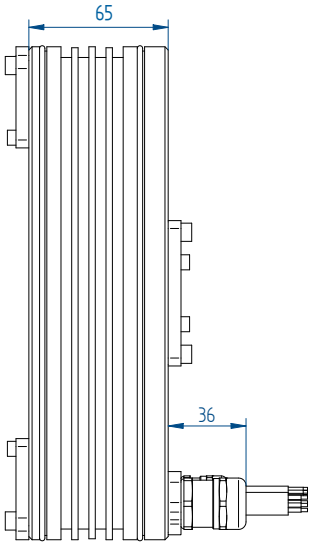
2. Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

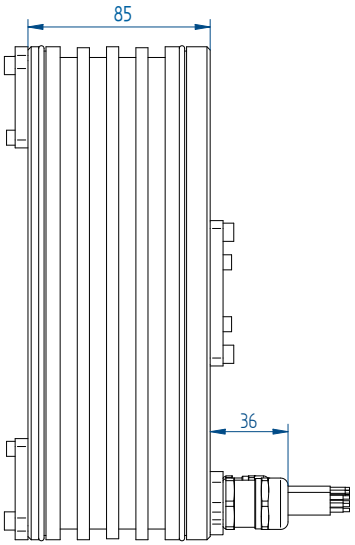
Series approvals

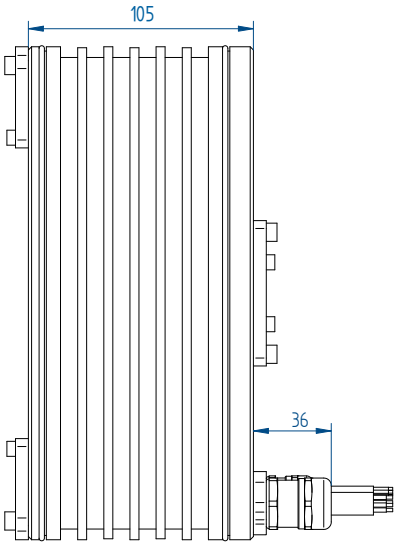
	QTL-A-230-65	QTL-A-230-85	QTL-A-230-105

Stator

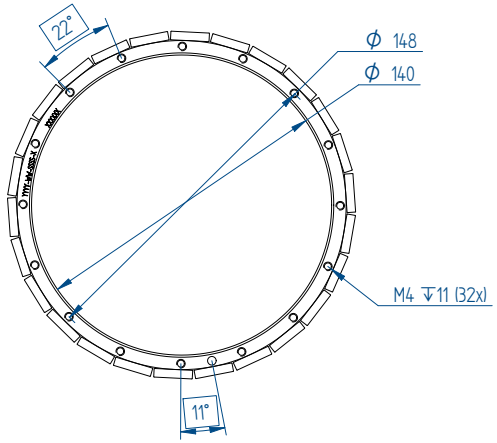


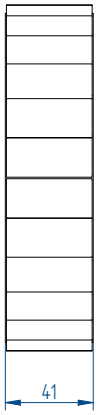


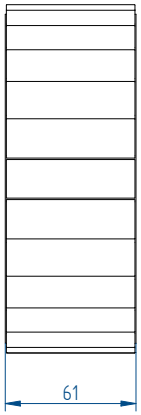


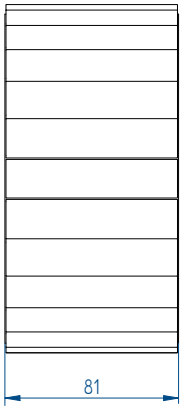


Rotor









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 290 series

QTL-A-290-65 stator and rotor

	Parameter	Remarks	Symbol	Unit	QTL-A-290-65	QTL-A-290-85	QTL-A-290-105
Performance	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	778
	Peak torque @ 6 K/s increase	magnets @ 25°C	T_p	Nm	316	474	632
	Continuous torque[1]	coils @ 100°C	T_c	Nm	140	222	305
	Stall torque[1]	coils @ 100°C	T_s	Nm	99	157	215
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	306	189	130
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	19.7	29.5	39.3
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	27.0	45.5	64.7
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	22.0	22.0	22.0
	Peak current	magnets @ 25°C	I_p	A_{rms}	16.9	16.9	16.9
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	7.14	7.54	7.75
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	5.05	5.33	5.48
	Back EMF ph-ph_{peak}		K_e	V/krpm	1681	2521	3362
	Back EMF ph-ph_{rms}		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		τ_e	ms	5.0	5.5	5.7
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	948	1410	1864
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	0.084	0.057	0.043
	Thermal time constant		τ_{th}	s	57	52	49
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)		
Mechanical	Stator OD		OD_s	mm		290	
	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^2	0.031	0.046	0.061
	Stator mass	ex. cables	m_s	kg	6.0	8.3	10.8
	Rotor mass		m_r	kg	2.3	3.5	4.7
	Total mass	ex. cables	m	kg	8.3	11.8	15.5
	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)	

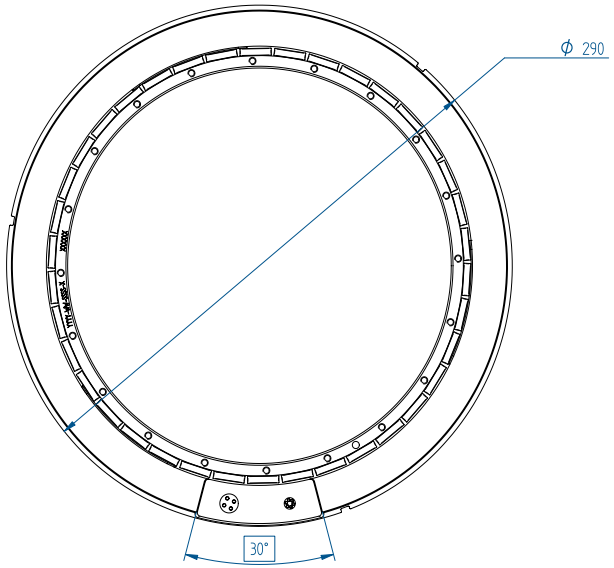
All specifications ±10%

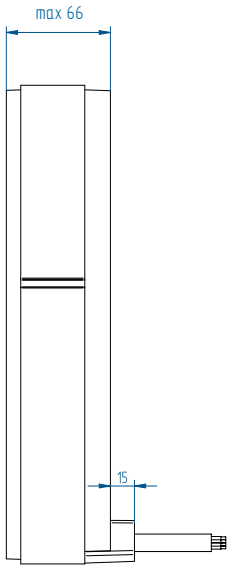
1. *These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.*
2. *Actual values depend on bus voltage. Please check the T/n diagram in our manual or online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

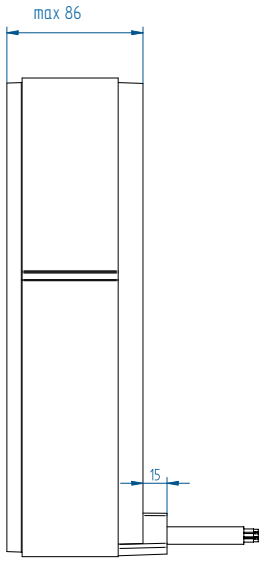
Series approvals

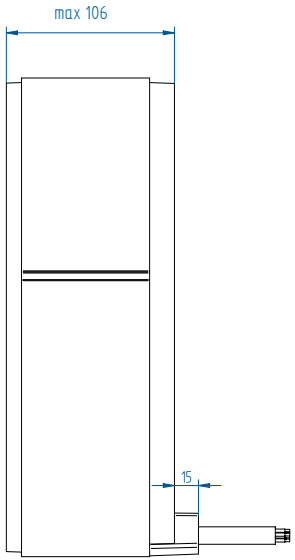
	QTL-A-290-65	QTL-A-290-85	QTL-A-290-105

Stator

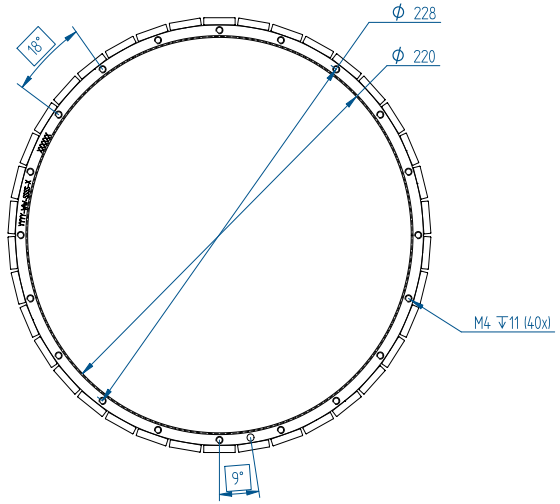


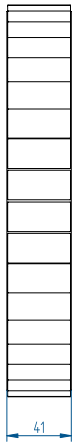


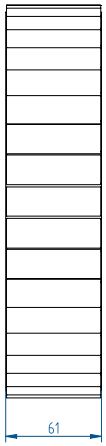


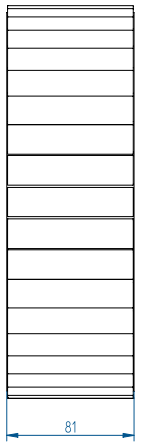


Rotor









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

	Parameter	Remarks	Symbol	Unit	QTL-A-310-65	QTL-A-310-85	QTL-A-310-105
Performance	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	778
	Peak torque @ 6 K/s increase	magnets @ 25°C	T_p	Nm	316	474	632
	Continuous torque[1]	coils @ 100°C	T_c	Nm	151	241	331
	Stall torque[1]	coils @ 100°C	T_s	Nm	107	170	234
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	298	182	124
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	19.7	29.5	39.3
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	27.0	45.5	64.7
Electrical	Ultimate current	magnets @ 25°C	I_u	A_{rms}	22.0	22.0	22.0
	Peak current	magnets @ 25°C	I_p	A_{rms}	16.9	16.9	16.9
	Continuous current[1]	coils @ 100°C	I_c	A_{rms}	7.70	8.16	8.42
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	5.44	5.77	5.96
	Back EMF ph-ph$_{peak}$		K_e	V/krpm	1681	2521	3362
	Back EMF ph-ph$_{rms}$		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		τ_e	ms	5.0	5.5	5.7
Thermal	Continuous power loss[1]	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		τ_{th}	s	49	44	41
	Water cooling flow	for ΔT=3K	Φ_W	l/min	5.3	7.9	10.6
	Water cooling pressure drop		ΔP_w	bar	1.0	1.4	2.0
	Temperature sensor				PTC 1kΩ (3x) / Pt1000 (3x)		
Mechanical	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	$kg\ m^2$	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)		

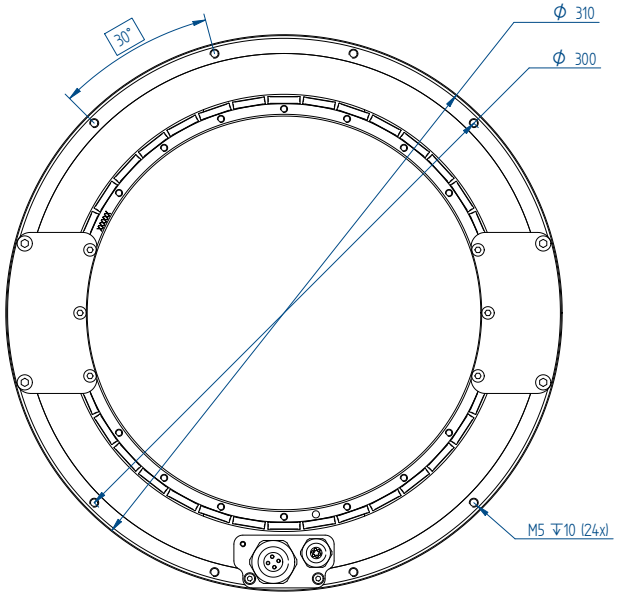
All specifications ±10%

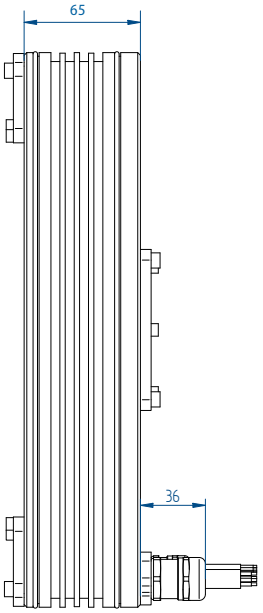
1. *These values are only applicable when the mounting surface is at 20°C and the motor is driven at stall or continuous current. If these values differ in your application, please check our simulation tool.*
2. *Actual values depend on bus voltage. Please check the T/n diagram in our manual or online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

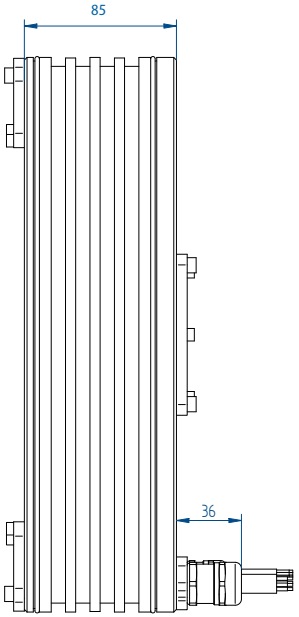
Series approvals

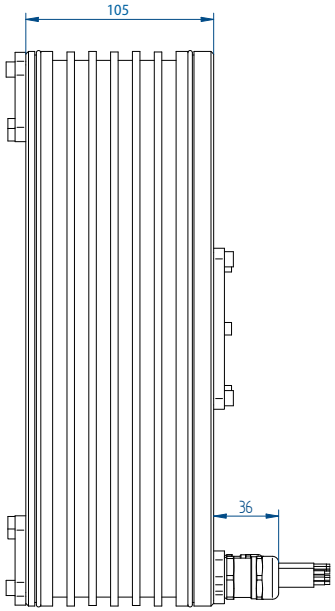
	QTL-A-310-65	QTL-A-310-85	QTL-A-310-105

Stator

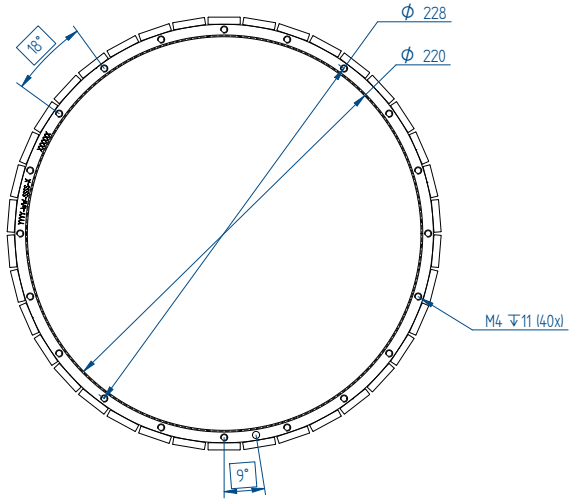


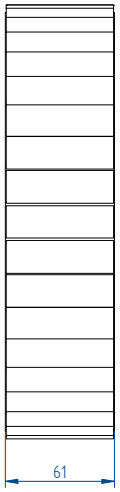


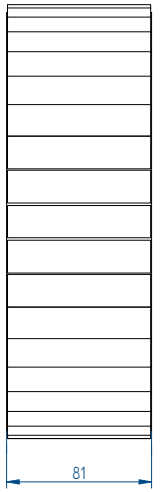




Rotor







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 385 series with cooling ring

QTL-A-385-85 stator and rotor

	Parameter	Remarks	Symbol	Unit	QTL-A-385-85	QTL-A-385-105
Performance	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[1]	coils @ 100°C	T_c	Nm	407	560
	Stall torque[1]	coils @ 100°C	T_s	Nm	288	396
	Maximum speed[2]	@ 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	$(Nm)^2/W$	105.4	149.9
Electrical	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[1]	coils @ 100°C	I_c	A_{rms}	15.7	16.2
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	11.1	11.5
	Back EMF ph-ph_{peak}		K_e	V/krpm	2217	2956
	Back EMF ph-ph_{rms}		K_e	V/krpm	1567	2090
	Resistance per phase	coils @ 25°C ex. cable	R_{ph}	Ω	2.13	2.66
	Induction per phase	I < 0.6 Ip	L_{ph}	mH	11.6	15.2
	Electrical time constant		τ_e	ms	5.4	5.7
Thermal	Continuous power loss[1]	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		τ_{th}	s	48	45
	Water cooling flow	for ΔT=3K	Φ_W	l/min	9.8	13.1
	Temperature sensor				PTC 1kΩ (3x)/ Pt1000 (3x)	
Mechanical	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	$kg\ m^2$	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)	

All specifications ±10%

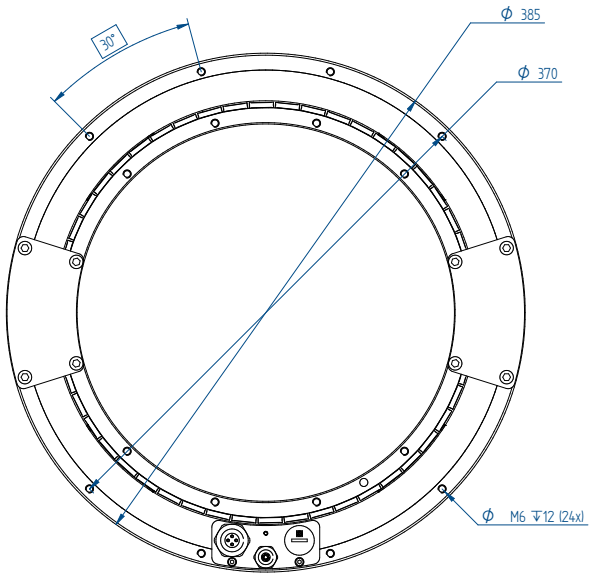
[1] These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.

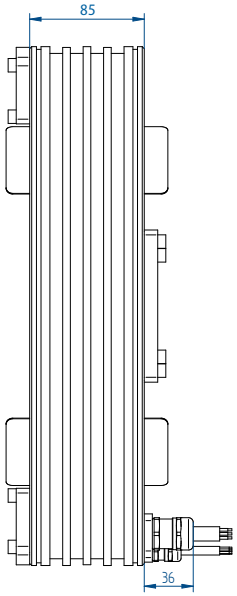
[2] Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.

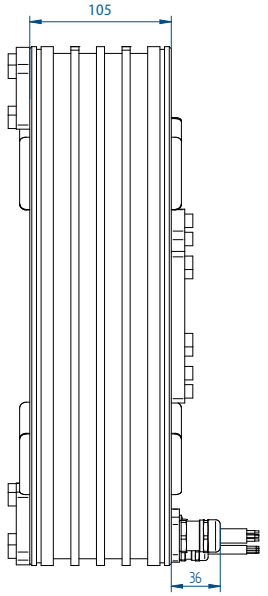
Series approvals

	QTL-A-385-85	QTL-A-385-105

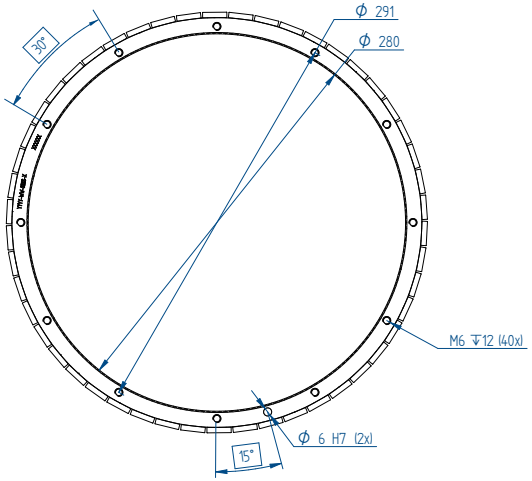
Stator

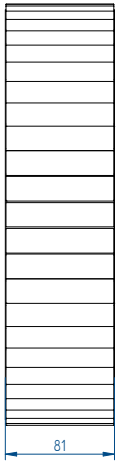






Rotor





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-A-485-85 stator and rotor

QTL 485 series with cooling ring

	Parameter	Remarks	Symbol	Unit	QTL-A-485-85	QTL-A-485-105
Performance	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[1]	coils @ 100°C	T_c	Nm	659	907
	Stall torque[1]	coils @ 100°C	T_s	Nm	466	642
	Maximum speed[2]	@ U_{max} @ T_c	n_{max}	rpm	138	96
	Motor torque constant	$I \leq I_c$	K_t	Nm/A_{rms}	41.7	55.6
	Motor constant	coils @ 25°C	K_m	$(Nm)^2/W$	218.5	310.7
Electrical	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[1]	coils @ 100°C	I_c	A_{rms}	15.8	16.3
	Stall current[1]	coils @ 100°C	I_s	A_{rms}	11.2	11.5
	Back EMF ph-ph$_{peak}$		K_e	V/krpm	3569	4758
	Back EMF ph-ph$_{rms}$		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		τ_e	ms	5.4	5.7
Thermal	Continuous power loss[1]	coils @ 100°C	P_c	W	2584	3444
	Thermal resistance	coils to mount. sfc.	R_{th}	K/W	0.031	0.023
	Thermal time constant		τ_{th}	s	47	44
	Water cooling flow	for ΔT=3K	Φ_W	l/min	12.4	16.5
	Temperature sensor				PTC 1kΩ (3x)/ Pt1000 (3x)	
Mechanical	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	$kg\ m^2$	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)	

All specifications ±10%

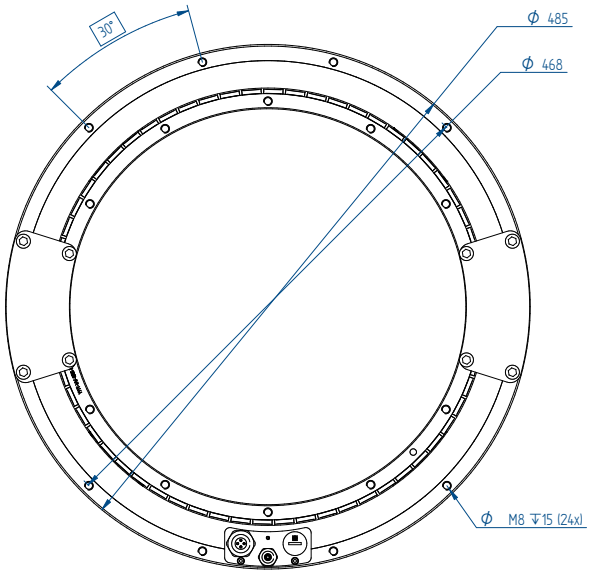
[1] *These values are only applicable when the mounting surface is at 20°C and the motor is driven at continuous current. If these values differ in your application, please check our simulation tool.*

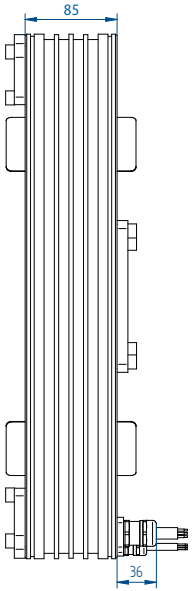
[2] *Actual values depend on bus voltage. Please check the T/n diagram in our manual or online simulation tool.*

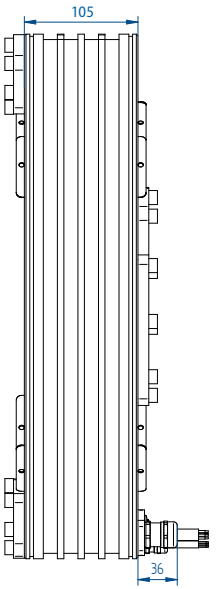
Series approvals

	QTL-A-485-85	QTL-A-485-105

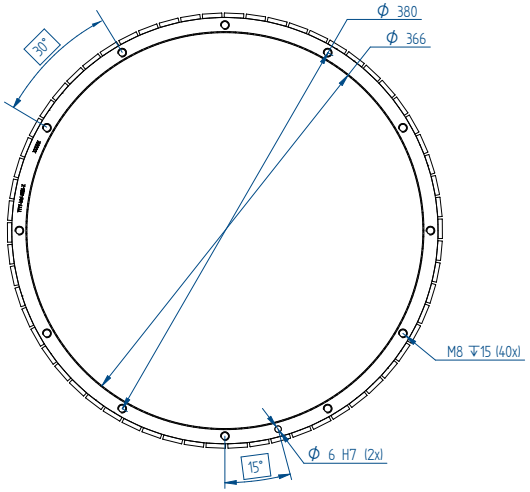
Stator

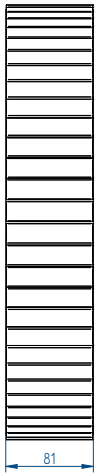






Rotor





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*

We direct drive your motion technology

QMT torque motor series

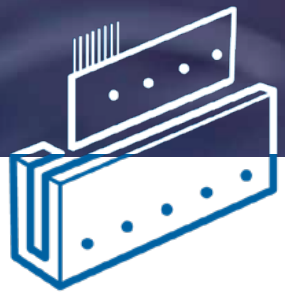
F_u 155–4307 Nm F_c 68–2028 Nm

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 to1666 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



Vacuum linear motors

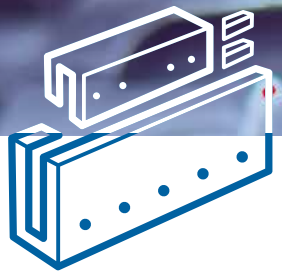
F_p 100-4020 N F_c 22-698 N

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



Ironless linear motors

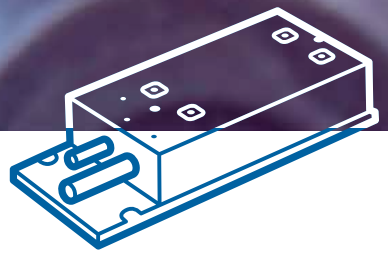
F_p 2.7-4200 N F_c 1.4-846 N

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



Iron core linear motors

F_u 89-7742 N F_c 40-3441 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

TECNOTION® direct drive in motion

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

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
QTL	TORQUE KIT QTL-A-230-105-N	11 1153
QTL	TORQUE KIT QTL-A-290-65-N	11 1177
QTL	TORQUE KIT QTL-A-290-85-N	11 1180
QTL	TORQUE KIT QTL-A-290-105-N	11 1182
QTL	TORQUE KIT QTL-A-310-65-N	11 1078
QTL	TORQUE KIT QTL-A-310-85-N	11 1061
QTL	TORQUE KIT QTL-A-310-105-N	11 1100
QTL	TORQUE KIT QTL-A-385-85-I	11 1733
QTL	TORQUE KIT QTL-A-385-105-I	11 1732
QTL	TORQUE KIT QTL-A-485-85-I	11 1712
QTL	TORQUE KIT QTL-A-485-105-I	11 1711

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