
Torque, Linear and Custom Motors

Stepper, Servo and Traction Motors

Drive Electronics and Controllers

Actuators and Sensors

CAE Tools and Engineering

Motion Control Systems

HIGH POWER TRACTION MOTORS

for E-Mobility Applications



Left: housed motor with water cooling channels; right: hub, outer rotor motor

MACCON designs and supplies customised traction motors of high power density in the power range of 3 to 250kW. We can design for supply voltages between 24 and 600Vdc, depending on the available power source and output power requirement.

Typically these motors are PM-DC 3- phase, 8-pole, brushless designs with inner rotors and water cooled stators, which are operated with gear reduction ratios in the range of 4 to 6:1. However we also supply direct drive and hub outer rotor designs.

The following tables list the standard, frameless (inner rotor, IPM) models and windings currently available:

RMF-ACI3-0160-080-600- , operation at 600Vdc with water cooling

Back-EMF	Nom. Power	Continuous Torque	Phase Current	Peak stall Torque	Phase Current	Stator OD	Stator Length	Total Length	Rotor ID	Weight
V/1,000rpm	kW	Nm	Arms	Nm	Arms	mm	mm	mm	mm	kg
40	10,5	20Nm/6,500rpm	42	60Nm	177	160**	80	116	80	8,5
		10Nm/10,000rpm	31							

RMF-ACI3-0160-120-400- , operation at 400Vdc with water cooling

Back-EMF	Nom. Power	Continuous Torque	Phase Current	Peak stall Torque	Phase Current	Stator OD	Stator Length	Total Length	Rotor ID	Weight
V/1,000rpm	kW	Nm	Arms	Nm	Arms	mm	mm	mm	mm	kg
44	10,5	40Nm/2,500rpm	69	100Nm	190	160**	120	150	80	12,5
		10Nm/10,000rpm	31							

RMF-ACI3-0230-120-400- , operation at 400Vdc with water cooling

Back-EMF	Nom. Power	Continuous Torque	Phase Current	Peak stall Torque	Phase Current	Stator OD	Stator Length	Total Length	Rotor ID	Weight
V/1,000rpm	kW	Nm	Arms	Nm	A	mm	mm	mm	mm	kg
61	30*	115Nm/2,500rpm	137	300Nm	375	230**	120	163	120	25,3
		29Nm/10,000rpm	95							
44	60*	120Nm/5,000rpm	190	300Nm	520	230**	120	163	120	25,3
		60Nm/10,000rpm	132							

RMF-ACI3-0230-215-400- , operation at 400Vdc with water cooling

Back-EMF	Nom. Power	Continuous Torque	Phase Current	Peak stall Torque	Phase Current	Stator OD	Stator Length	Total Length	Rotor ID	Weight
V/1,000rpm	kW	Nm	Arms	Nm	Arms	mm	mm	mm	mm	kg
61	63*	240Nm/2,500rpm	274	600Nm	720	230**	215	262	120	31,5
		60Nm/10,000rpm	87							
41	131*	250Nm/5,000rpm	396	600Nm	1,000	230**	215	262	120	31,5

		125Nm/10,000rpm	270							
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RMF-ACI3-0290-153-400- , operation at 400Vdc with water cooling

Back-EMF	Nom. Power	Continuous Torque	Phase Current	Peak stall Torque	Phase Current	Stator OD	Stator Length	Total length	Rotor ID	Weight
V/1,000rpm	kW	Nm	A	Nm	A	mm	mm	mm	mm	kg
43	131*	250Nm/5,000rpm	460	600Nm	1,200	290**	153	210	178	28
		125Nm/10,000rpm	367							

* less cooling needed (forced-air also feasible)

** + ca. 20mm with water cooling jacket

Important characteristics:

Optimised designs for high power density with minimum water cooling requirements.

Efficiency at maximum power >96%.

Field weakening range of up to 4:1 possible, however we recommend a constant power range over a 2:1 speed range only as this avoids uncontrolled regeneration braking in the case of the power electronics being disabled at high motor speed.

These motors can also be used as generators or starter/generators.

Wheel-rim motors:

MACCON can further offer wheel-rim motors with outer rotors for direct propulsion at the wheel. These can be of any diameter and power rating. So far six models are available:

RMF-ACO3-0400-080-300-TH-KN, with HE-sensors (see photo above right)

Natural convection

Continuous: 200 Nm, 750 rpm (15 kW, 300V @61Arms, no field weakening)

400mm OD, 250mm ID, 80mm stack length (total 115 mm), mass 41.8kg

duty cycle dependent on cooling conditions

RMF-ACO3-0439-050-350-TH-KN, with HE-sensors

Water cooling

Continuous: 300 Nm, 330 rpm (10 kW, 350V @55Arms)

100 Nm, 1,050 rpm (11 kW with field weakening @30Arms)

439mm OD, 270mm ID, 50mm stack length (total 90 mm), mass 40.8kg

duty cycle dependent on cooling conditions

RMF-ACO3-0100-100-300-TH-KN, with HE-sensors

Water cooling

Continuous: 6,0 Nm, 1000 rpm (0,628 kW, 300V @2,5 Arms)

100 mm OD, 60mm ID, 100mm stack length (total 130 mm), mass 3.2 kg

duty cycle dependent on cooling conditions

RMF-ACO3-0200-100-300-TH-KN, with HE-sensors

Water cooling

Continuous: 45,0 Nm, 1000 rpm (4,7 kW, 300V @12,0 Arms)

200 mm OD, 120mm ID, 100 mm stack length (total 135 mm), mass 12.7 kg

duty cycle dependent on cooling conditions

RMF-ACO3-0300-100-300-TH-KN, with HE-sensors

Water cooling

Continuous: 145,0 Nm, 1000 rpm (15,2 kW, 300V @40,0 Arms)

300 mm OD, 185 mm ID, 100 mm stack length (total 140 mm), mass 28.9 kg

duty cycle dependent on cooling conditions

RMF-ACO3-0400-100-300-TH-KN, with HE-sensors

Water cooling

Continuous: 330,0 Nm, 1000 rpm (34,6 kW, 300V @95,0 Arms)

400 mm OD, 248 mm ID, 100 mm stack length (total 145 mm), mass 52.0 kg

duty cycle dependent on cooling conditions

Modifications to these standard designs can be easily implemented