



# **T STANDALONE AXIS**

## **ASME-RTMBi1401503##S0000**

Data sheet

Version 2.0

***ETEL***

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1) RTMBi140-150 with connectors  
and AccurET Modular 300VDC

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and AccurET Modular 400/600VDC or third party controller 300/600VDC

3) RTMBi140-150-3RBS with free leads  
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4) RTMBi140-150-3TBS with free leads  
and AccurET Modular 400/600VDC or third party controller 300/600VDC

AXIS DESIGNATION		
Number of controlled axes		1
Axes name		Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD

TESTING CONDITIONS	UNIT	
Position controller	-	AccurET Modular 300 07/15A
Motion controller	-	none
Rated payload	kg	2.3
Rated inertia	kg.m <sup>2</sup>	0.025
Tool point position	mm	centered on the table. 18.4 mm above rotor's interface
Ambient temperature	°C	22±1

DIMENSIONAL DATA	UNIT	
Outside diameter	mm	166
Inside diameter	mm	25
Height	mm	215
Total stroke	°	Unlimited
Total mass (without payload)	kg	20.2
Rotor inertia (without payload)	kg.m <sup>2</sup>	4.64E-03

TORQUE CAPABILITIES (1) (2)	UNIT	RTMBi140-150-3RAS	RTMBi140-150-3RBS	RTMBi140-150-3TBS
Peak torque	Nm	122	115	79.9
Continuous torque (3)	Nm	35.9	35.9	36.9
Standstill torque	Nm	27.0	27.0	27.8
Max. detent torque (average to peak)	Nm	1.4	1.4	1.4
Static friction (maximal value)	Nm	1.00	1.00	1.00
Dynamic friction (maximal value)	Nm/(rad/s)	0.020	0.020	0.020

LOAD CAPACITIES	UNIT	
Maximum moment load (4)	Nm	15
Maximum axial load	N	200
Maximum axial load in upside down configuration	N	200

DYNAMIC PERFORMANCE	UNIT	
Maximum speed (5)	rad/s	64.4
Maximum acceleration	rad/s <sup>2</sup>	10000
Typical position stability at 2kHz (6)	arcsec	±1.5

STAGE ACCURACY	UNIT	
Positioning accuracy (without mapping)	arcsec	±20
Positioning accuracy (with mapping)	arcsec	±6
Unidirectional repeatability	arcsec	±2
Bidirectional repeatability	arcsec	±3
Radial runout	µm	20
Total axial error at 41 [mm] radius	µm	20

ENCODER CHARACTERISTICS	UNIT	
Encoder and signal type	-	Optical - Incremental
Output signal	-	1 Vpp
Line count	period/turn	5000
Reference mark	-	1
Power supply	V	5±10%

WORKING ENVIRONMENT		
IP protection grade		IP40
Standard compliance		SEMI S22

ELECTRICAL SPECIFICATIONS (1) (2)		UNIT			
	Motor type	-	Ironcore	Ironcore	Ironcore
	Motor model	-	TMB0140-150-3RAS	TMB0140-150-3RBS	TMB0140-150-3TBS
	Number of phases	-	3	3	3
Kt	Force constant	Nm/Arms	18.1	9.06	5.96
Ku	Back EMF constant (7)	Vrms/(rad/s)	10.5	5.23	3.44
Km	Motor constant	Nm/√W	2.98	2.98	3.06
R20	Electrical resistance at 20°C (7)	Ohm	24.6	6.15	2.53
Ld/Lq	Electrical inductance (7)	mH	151 / 168	37.8 / 42.0	16.4 / 18.2
Ip	Peak current	Arms	8.1	15.0	15.0
Ic	Continuous current (3)	Arms	2.18	4.36	6.81
Is	Standstill current	Arms	1.65	3.30	5.16
ns	Standstill speed	rad/s	0.0018	0.0018	0.0017
Udc	Nominal input voltage	VDC	326	326	326
Pc	Max. cont. power dissipation (3)	W	229	229	230
2p	Number of poles	-	22	22	22

GUIDING ELEMENTS		
Type		Ball bearing

MATERIAL AND FINISH		
Baseplate		Stainless steel
Shaft		Stainless steel

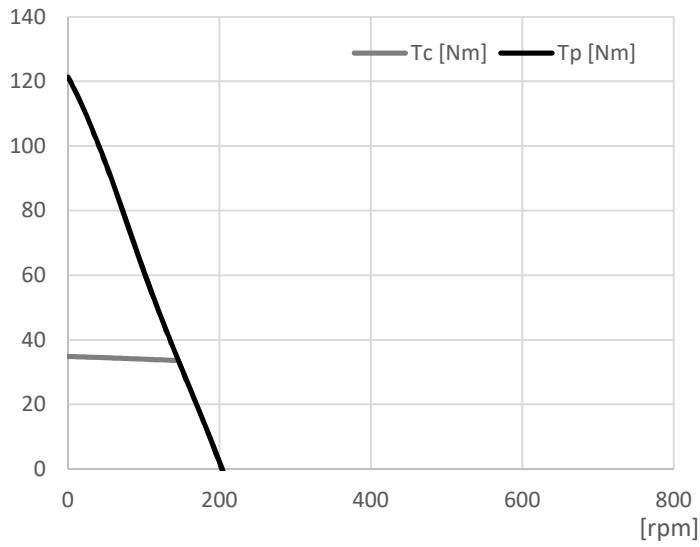
According to the Machinery Directive 2006/42/EC, the system presently described falls into the "partly completed machinery" category and fully complies with it as long as the system is operated according to the working conditions described in the corresponding manual. Customer is responsible for setting safeties/limitations that will keep the motor in its safe operating area. ETEL cannot be held responsible if the system is used in an improper way.

Notes: The specifications given may be mutually exclusive. Unless stated otherwise, all measurements are made within the testing conditions.

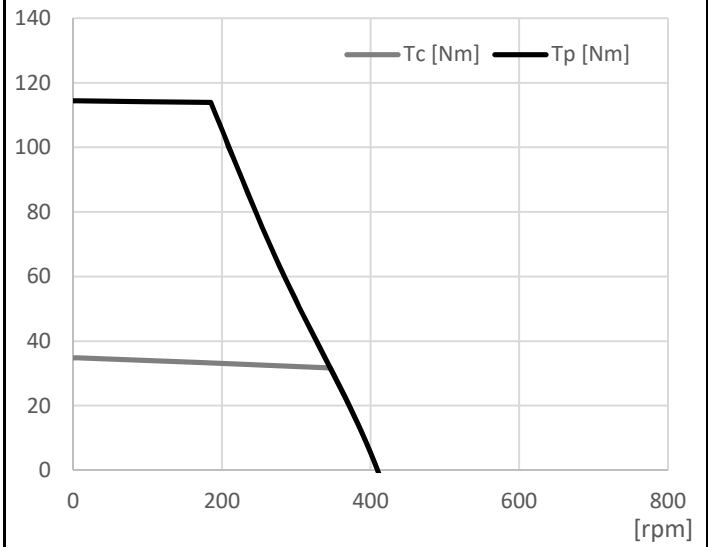
- (1) Tolerances on electrical parameters are available on request
- (2) Considering a PWM frequency at 10kHz
- (3) Coils at 100°C with additional surface of 0.12m<sup>2</sup> fixed on the base and 0.022m<sup>2</sup> on the rotor made of black anodized aluminum.
- (4) At the fastening holes of the rotor.
- (5) See torque vs speed curve to check if the specification can be reached based on selected winding.
- (6) Specification given at encoder level without any additional load fixed to the customer interface. This specification is reduced when an additional mass is fixed to the customer interface.
- (7) Terminal to terminal.

# Torque versus Speed Curves

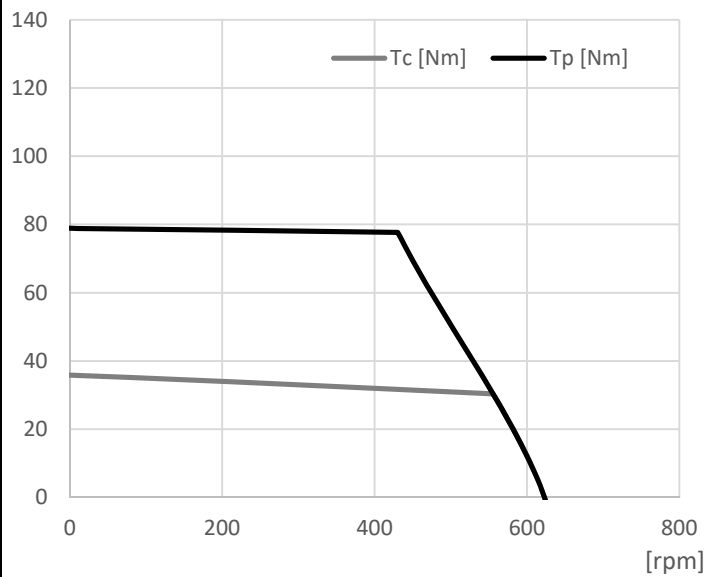
RTMBi140-150-3RAS



RTMBi140-150-3RBS



RTMBi140-150-3TBS



AXIS DESIGNATION		
Number of controlled axes		1
Axes name		Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD

TESTING CONDITIONS	UNIT	AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit
Position controller	-				
Motion controller	-	none			
Rated payload	kg	2.3			
Rated inertia	kg.m <sup>2</sup>	0.025			
Tool point position	mm	centered on the table. 18.4 mm above rotor's interface			
Ambient temperature	°C	22±1			

DIMENSIONAL DATA	UNIT	
Outside diameter	mm	166
Inside diameter	mm	25
Height	mm	215
Total stroke	°	Unlimited
Total mass (without payload)	kg	20.2
Rotor inertia (without payload)	kg.m <sup>2</sup>	4.64E-03

TORQUE CAPABILITIES (1)	UNIT				
Peak torque	Nm	141	179	115	185
Continuous torque (2)	Nm	35.9			
Standstill torque	Nm	27.0			
Max. detent torque (average to peak)	Nm	1.4			
Static friction (maximal value)	Nm	1.00			
Dynamic friction (maximal value)	Nm/(rad/s)	0.020			

LOAD CAPACITIES	UNIT	
Maximum moment load (3)	Nm	15
Maximum axial load	N	200
Maximum axial load in upside down configuration	N	200

DYNAMIC PERFORMANCE	UNIT	
Maximum speed (4)	rad/s	38.6
Maximum acceleration	rad/s <sup>2</sup>	10000
Typical position stability at 2kHz (5)	arcsec	±1.5

STAGE ACCURACY	UNIT	
Positioning accuracy (without mapping)	arcsec	±20
Positioning accuracy (with mapping)	arcsec	±6
Unidirectional repeatability	arcsec	±2
Bidirectional repeatability	arcsec	±3
Radial runout	µm	20
Total axial error at 41 [mm] radius	µm	20

ENCODER CHARACTERISTICS	UNIT	
Encoder and signal type	-	Optical - Incremental
Output signal	-	1 Vpp
Line count	period/turn	5000
Reference mark	-	1
Power supply	V	5±10%

WORKING ENVIRONMENT	
IP protection grade	IP40
Standard compliance	SEMI S22

ELECTRICAL SPECIFICATIONS (1)		UNIT	AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit	
Motor type	-	Ironcore					
Motor model	-	TMB0140-150-3RAS					
Number of phases	-	3					
<b>Kt</b> Force constant	Nm/Arms	18.1	18.1	18.1	18.1		
<b>Ku</b> Back EMF constant (6)	Vrms/(rad/s)	10.5	10.5	10.5	10.5		
<b>Km</b> Motor constant	Nm/√W	2.98	2.98	2.98	2.98		
<b>R20</b> Electrical resistance at 20°C (6)	Ohm	24.6	24.6	24.6	24.6		
<b>Ld/Lq</b> Electrical inductance (6)	mH	151 / 168	151 / 168	151 / 168	151 / 168		
<b>Ip</b> Peak current	Arms	9.79	14	7.43	14.9		
<b>Ic</b> Continuous current (2)	Arms	2.18	2.18	2.18	2.18		
<b>Is</b> Standstill current	Arms	1.65	1.65	1.65	1.65		
<b>ns</b> Standstill speed	rad/s	0.0018	0.0018	0.0018	0.0018		
<b>Udc</b> Nominal input voltage	VDC	395	565	300	600		
<b>Pc</b> Max. cont. power dissipation (2)	W	229	229	229	229		
<b>2p</b> Number of poles	-	22					

GUIDING ELEMENTS	
Type	Ball bearing

MATERIAL AND FINISH	
Baseplate	Stainless steel
Shaft	Stainless steel

According to the Machinery Directive 2006/42/EC, the system presently described falls into the "partly completed machinery" category and fully complies with it as long as the system is operated according to the working conditions described in the corresponding manual. Customer is responsible for setting safeties/limitations that will keep the motor in its safe operating area. ETEL cannot be held responsible if the system is used in an improper way.

**Notes:** The specifications given may be mutually exclusive. Unless stated otherwise, all measurements are made within the testing conditions.

(1) Tolerances on electrical parameters are available on request.

(2) Coils at 100°C with additional surface of 0.12m<sup>2</sup> fixed on the base and 0.022m<sup>2</sup> on the rotor made of black anodized aluminum.

(3) At the fastening holes of the rotor.

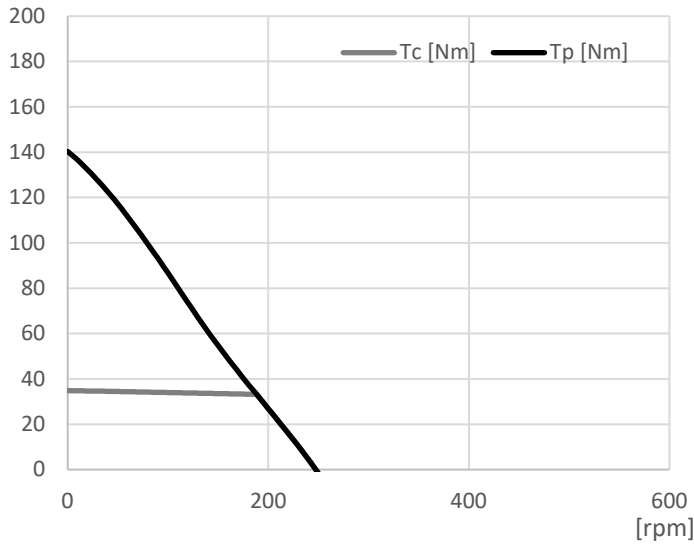
(4) See torque vs speed curve to check if the specification can be reached based on selected DC bus voltage limitation.

(5) Specification given at encoder level without any additional load fixed to the customer interface. This specification is reduced when an additional mass is fixed to the customer interface.

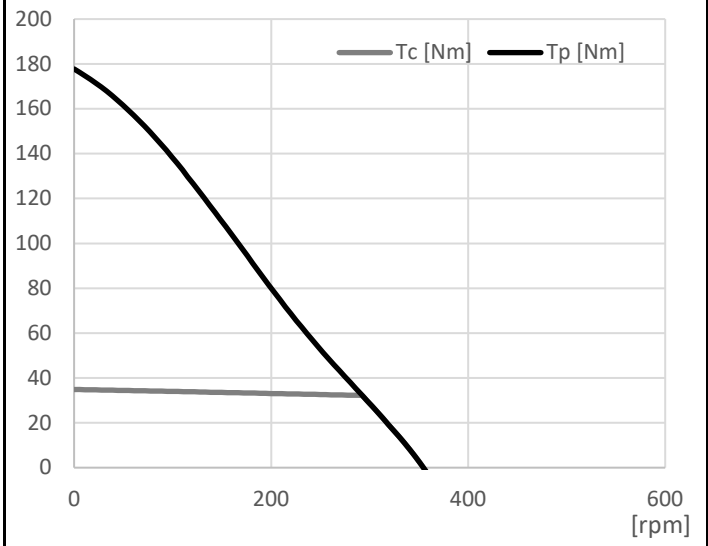
(6) Terminal to terminal.

Torque versus Speed Curves for RTMBi140-150-3RAS

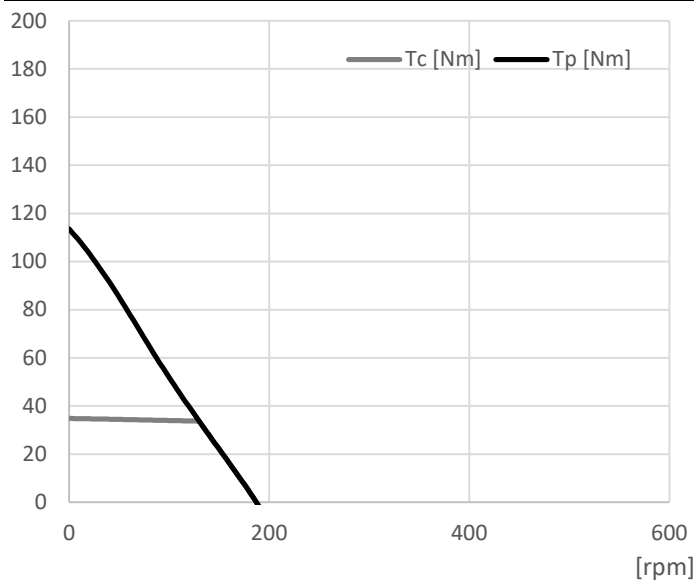
AccurET 400



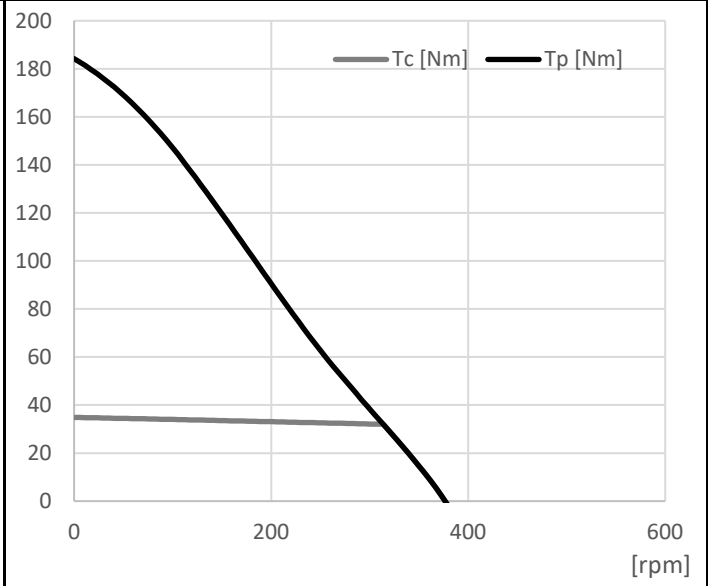
AccurET 600



Third party 300 V



Third party 600 V





AXIS DESIGNATION		
Number of controlled axes		1
Axes name		Theta
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD

TESTING CONDITIONS	UNIT	AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit
Position controller	-				
Motion controller	-	none			
Rated payload	kg	2.3			
Rated inertia	kg.m <sup>2</sup>	0.025			
Tool point position	mm	centered on the table. 18.4 mm above rotor's interface			
Ambient temperature	°C	22±1			

DIMENSIONAL DATA	UNIT	
Outside diameter	mm	166
Inside diameter	mm	25
Height	mm	215
Total stroke	°	Unlimited
Total mass (without payload)	kg	20.2
Rotor inertia (without payload)	kg.m <sup>2</sup>	4.64E-03

TORQUE CAPABILITIES (1)	UNIT				
Peak torque	Nm	197	197	185	197
Continuous torque (2)	Nm	35.9			
Standstill torque	Nm	27.0			
Max. detent torque (average to peak)	Nm	1.4			
Static friction (maximal value)	Nm	1.00			
Dynamic friction (maximal value)	Nm/(rad/s)	0.02			

LOAD CAPACITIES	UNIT	
Maximum moment load (3)	Nm	15
Maximum axial load	N	200
Maximum axial load in upside down configuration	N	200

DYNAMIC PERFORMANCE	UNIT	
Maximum speed (4)	rad/s	78.5
Maximum acceleration	rad/s <sup>2</sup>	10000
Typical position stability at 2kHz (5)	arcsec	±1.5

STAGE ACCURACY	UNIT	
Positioning accuracy (without mapping)	arcsec	±20
Positioning accuracy (with mapping)	arcsec	±6
Unidirectional repeatability	arcsec	±2
Bidirectional repeatability	arcsec	±3
Radial runout	µm	20
Total axial error at 41 [mm] radius	µm	20

ENCODER CHARACTERISTICS	UNIT	
Encoder and signal type	-	Optical - Incremental
Output signal	-	1 Vpp
Line count	period/turn	5000
Reference mark	-	1
Power supply	V	5±10%

WORKING ENVIRONMENT	
IP protection grade	IP40
Standard compliance	SEMI S22

ELECTRICAL SPECIFICATIONS (1)		UNIT	AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit
Motor type	-	Ironcore				
Motor model	-	TMB0140-150-3RBS				
Number of phases	-	3				
<b>Kt</b> Force constant	Nm/Arms	9.06	9.06	9.06	9.06	
<b>Ku</b> Back EMF constant (6)	Vrms/(rad/s)	5.23	5.23	5.23	5.23	
<b>Km</b> Motor constant	Nm/ $\sqrt{W}$	2.98	2.98	2.98	2.98	
<b>R20</b> Electrical resistance at 20°C (6)	Ohm	6.15	6.15	6.15	6.15	
<b>Ld/Lq</b> Electrical inductance (6)	mH	37.8 / 42.0	37.8 / 42.0	37.8 / 42.0	37.8 / 42.0	
<b>Ip</b> Peak current	Arms	33.1	33.1	29.7	33.1	
<b>Ic</b> Continuous current (2)	Arms	4.36	4.36	4.36	4.36	
<b>Is</b> Standstill current	Arms	3.30	3.30	3.30	3.30	
<b>ns</b> Standstill speed	rad/s	0.0018	0.0018	0.0018	0.0018	
<b>Udc</b> Nominal input voltage	VDC	395	565	300	600	
<b>Pc</b> Max. cont. power dissipation (2)	W	229	229	229	229	
<b>2p</b> Number of poles	-	22				

GUIDING ELEMENTS	
Type	Ball bearing

MATERIAL AND FINISH	
Baseplate	Stainless steel
Shaft	Stainless steel

According to the Machinery Directive 2006/42/EC, the system presently described falls into the "partly completed machinery" category and fully complies with it as long as the system is operated according to the working conditions described in the corresponding manual. Customer is responsible for setting safeties/limitations that will keep the motor in its safe operating area. ETEL cannot be held responsible if the system is used in an improper way.

**Notes:** The specifications given may be mutually exclusive. Unless stated otherwise, all measurements are made within the testing conditions.

(1) Tolerances on electrical parameters are available on request.

(2) Coils at 100°C with additional surface of 0.12m<sup>2</sup> fixed on the base and 0.022m<sup>2</sup> on the rotor made of black anodized aluminum.

(3) At the fastening holes of the rotor.

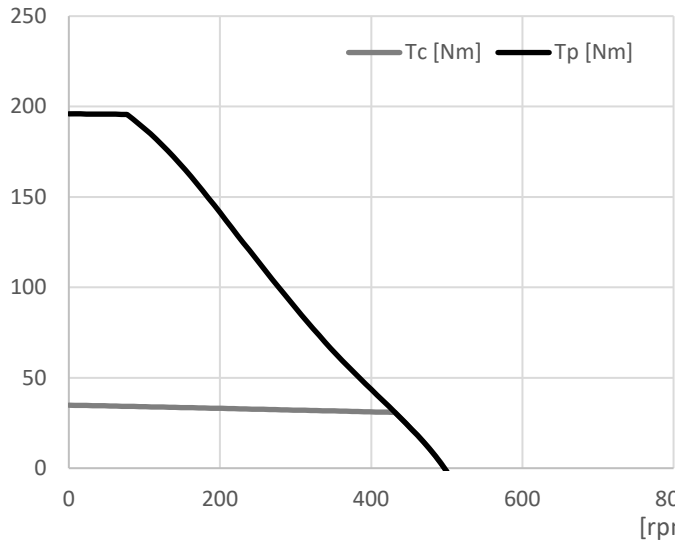
(4) See torque vs speed curve to check if the specification can be reached based on selected DC bus voltage limitation.

(5) Specification given at encoder level without any additional load fixed to the customer interface. This specification is reduced when an additional mass is fixed to the customer interface.

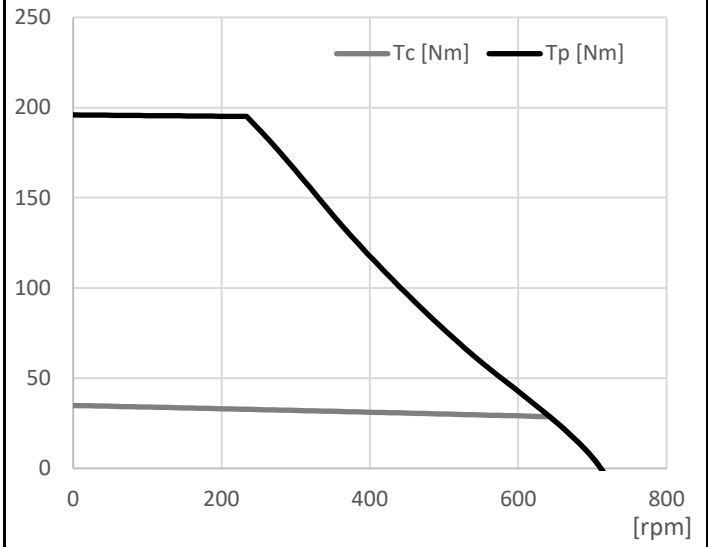
(6) Terminal to terminal.

Torque versus Speed Curves for RTMBi140-150-3RBS

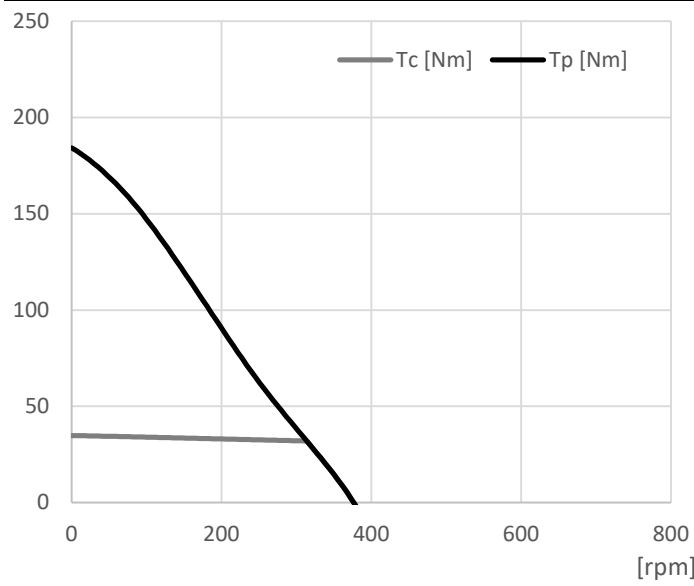
AccurET 400



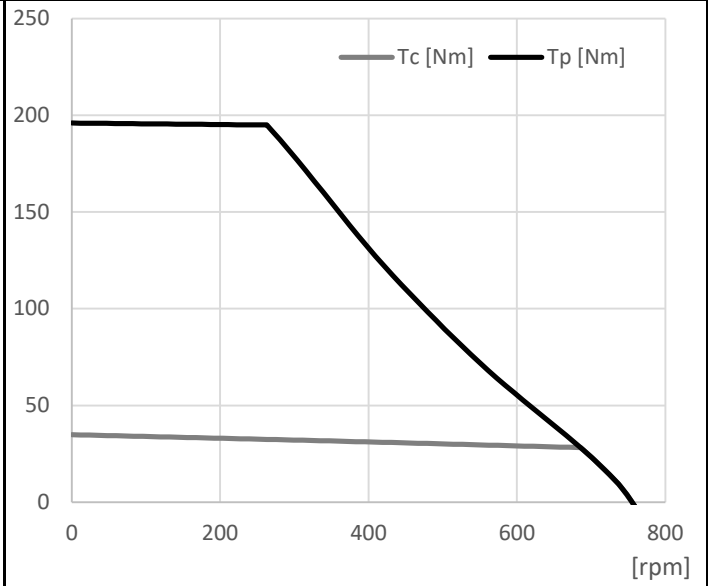
AccurET 600



Third party 300 V



Third party 600 V



AXIS DESIGNATION					
Number of controlled axes		1			
Axes name		Theta			
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD			

TESTING CONDITIONS		UNIT				
Position controller	-		AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit
Motion controller	-		none			
Rated payload	kg		2.3			
Rated inertia	kg.m <sup>2</sup>		0.025			
Tool point position	mm		centered on the table. 18.4 mm above rotor's interface			
Ambient temperature	°C		22±1			

DIMENSIONAL DATA		UNIT				
Outside diameter	mm		166			
Inside diameter	mm		25			
Height	mm		215			
Total stroke	°		Unlimited			
Total mass (without payload)	kg		20.2			
Rotor inertia (without payload)	kg.m <sup>2</sup>		4.64E-03			

TORQUE CAPABILITIES (1)		UNIT				
Peak torque	Nm		172	172	197	197
Continuous torque (2)	Nm		36.9			
Standstill torque	Nm		27.8			
Max. detent torque (average to peak)	Nm		1.4			
Static friction (maximal value)	Nm		1.00			
Dynamic friction (maximal value)	Nm/(rad/s)		0.02			

LOAD CAPACITIES		UNIT				
Maximum moment load (3)	Nm		15			
Maximum axial load	N		200			
Maximum axial load in upside down configuration	N		200			

DYNAMIC PERFORMANCE		UNIT				
Maximum speed (4)	rad/s		119.4			
Maximum acceleration	rad/s <sup>2</sup>		10000			
Typical position stability at 2kHz (5)	arcsec		±1.5			

STAGE ACCURACY		UNIT				
Positioning accuracy (without mapping)	arcsec		±20			
Positioning accuracy (with mapping)	arcsec		±6			
Unidirectional repeatability	arcsec		±2			
Bidirectional repeatability	arcsec		±3			
Radial runout	µm		20			
Total axial error at 41 [mm] radius	µm		20			

ENCODER CHARACTERISTICS		UNIT				
Encoder and signal type	-		Optical - Incremental			
Output signal	-		1 Vpp			
Line count	period/turn		5000			
Reference mark	-		1			
Power supply	V		5±10%			

WORKING ENVIRONMENT					
IP protection grade		IP40			
Standard compliance		SEMI S22			

ELECTRICAL SPECIFICATIONS (1)		UNIT	AccurET Modular 400 15/40A	AccurET Modular 600 15/40A	Third party 300 VDC no current limit	Third party 600 VDC no current limit	
Motor type	-	Ironcore					
Motor model	-	TMB0140-150-3TBS					
Number of phases	-	3					
<b>Kt</b> Force constant	Nm/Arms	5.96	5.96	5.96	5.96		
<b>Ku</b> Back EMF constant (6)	Vrms/(rad/s)	3.44	3.44	3.44	3.44		
<b>Km</b> Motor constant	Nm/√W	3.06	3.06	3.06	3.06		
<b>R20</b> Electrical resistance at 20°C (6)	Ohm	2.53	2.53	2.53	2.53		
<b>Ld/Lq</b> Electrical inductance (6)	mH	16.4 / 18.2	16.4 / 18.2	16.4 / 18.2	16.4 / 18.2		
<b>Ip</b> Peak current	Arms	40.0	40.0	50.3	50.3		
<b>Ic</b> Continuous current (2)	Arms	6.81	6.81	6.81	6.81		
<b>Is</b> Standstill current	Arms	5.16	5.16	5.16	5.16		
<b>ns</b> Standstill speed	rad/s	0.0017	0.0017	0.0017	0.0017		
<b>Udc</b> Nominal input voltage	VDC	395	565	300	600		
<b>Pc</b> Max. cont. power dissipation (2)	W	230	230	230	230		
<b>2p</b> Number of poles	-	22					

GUIDING ELEMENTS	
Type	Ball bearing

MATERIAL AND FINISH	
Baseplate	Stainless steel
Shaft	Stainless steel

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(2) Coils at 100°C with additional surface of 0.12m<sup>2</sup> fixed on the base and 0.022m<sup>2</sup> on the rotor made of black anodized aluminum.

(3) At the fastening holes of the rotor.

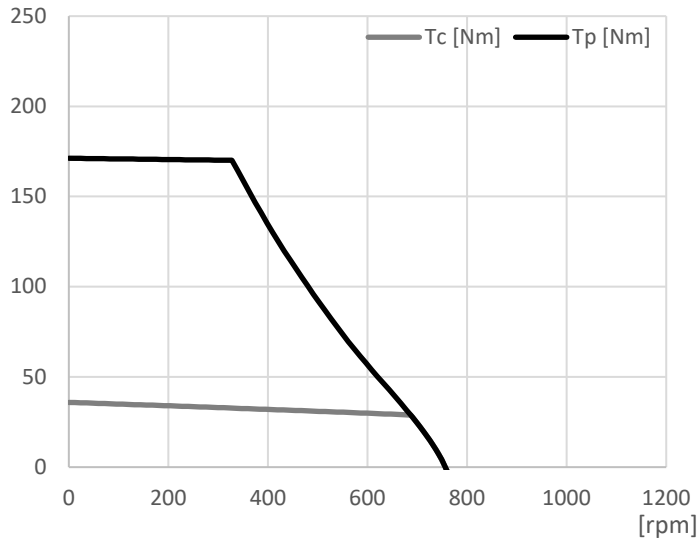
(4) See torque vs speed curve to check if the specification can be reached based on selected DC bus voltage limitation.

(5) Specification given at encoder level without any additional load fixed to the customer interface. This specification is reduced when an additional mass is fixed to the customer interface.

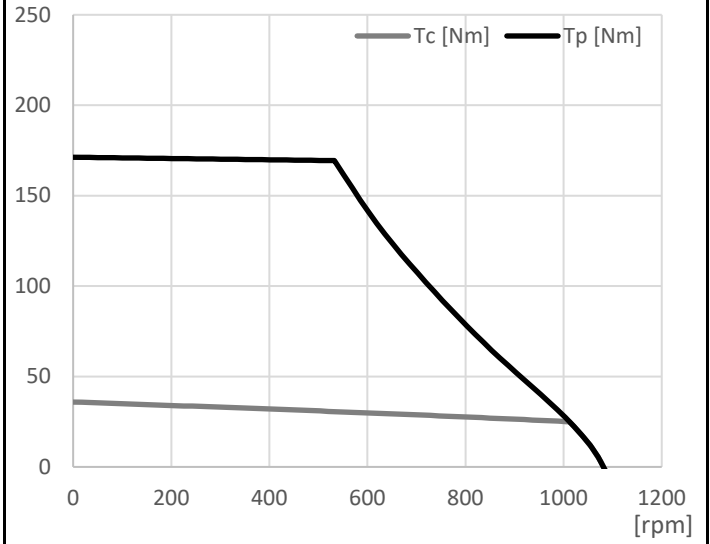
(6) Terminal to terminal.

Torque versus Speed Curves for RTMBi140-150-3TBS

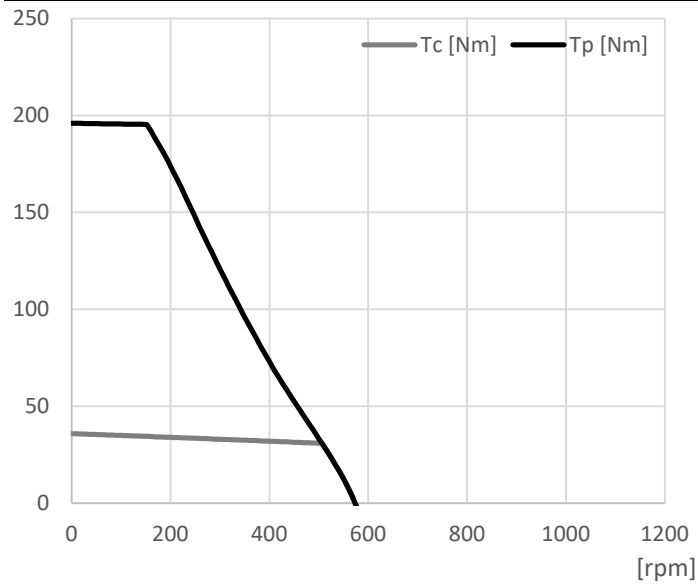
AccurET 400



AccurET 600



Third party 300 V



Third party 600 V

