ABB highly dynamic motion control packages
e-Series motors
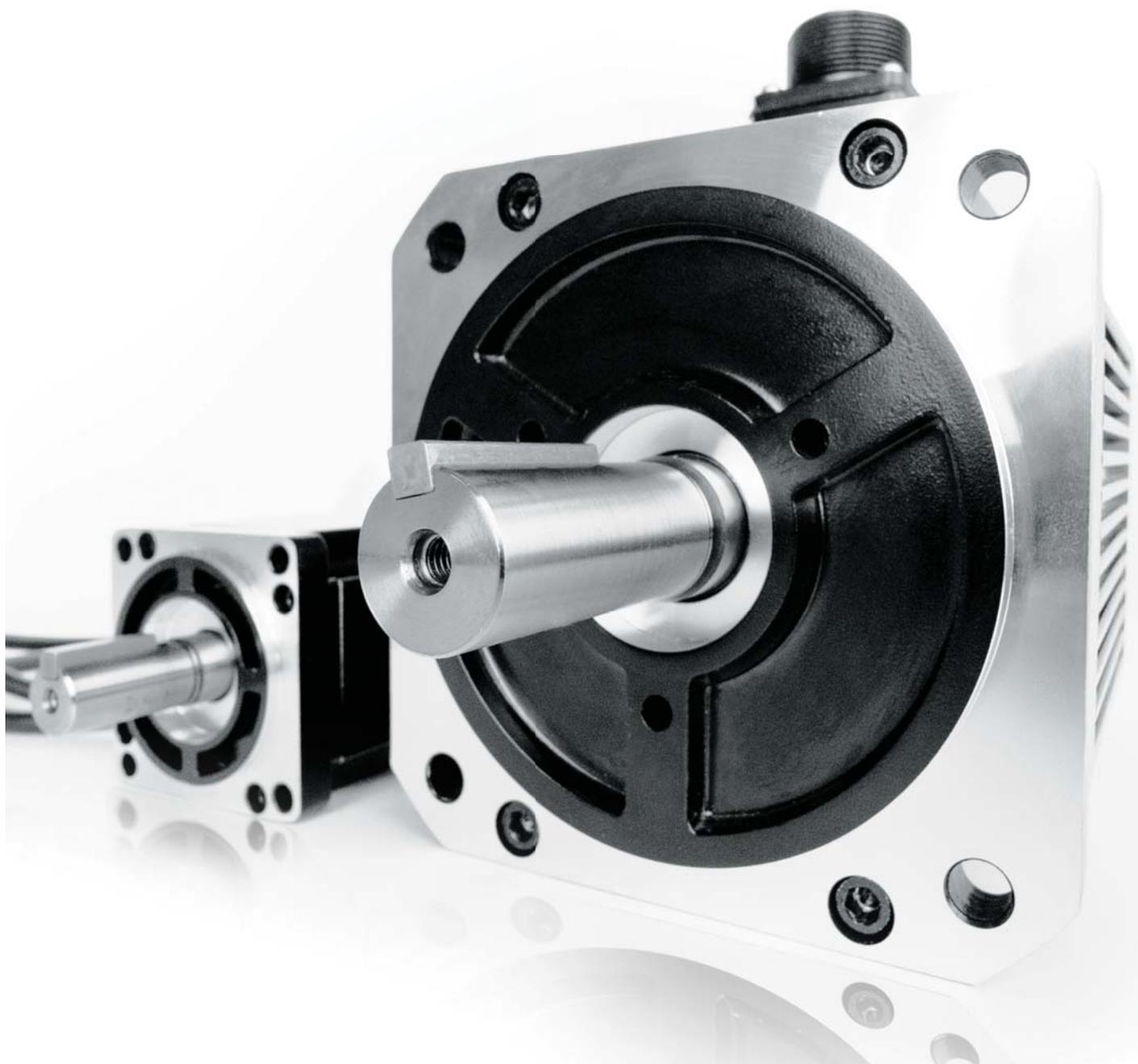
ABB highly dynamic motor and drive packages

ABB highly dynamic motor and drive packages bring together ABB's e-Series servo motors and MicroFlex series servo drives to create cost and performance optimized packages. These provide a flexible choice of input control and feedback options, offering scalable solutions for motion and position synchronization as well as speed and torque control.

The advanced yet simple to use MicroFlex servo drive family with graded functionality and straightforward configuration uses a single intuitive software tool. When combined with the compact and durable e-Series brushless servo motors, continuous torques range from 0.32 to 48N·m. Applications can use step and direction control, ±10 V dc control, standalone MINT programmable motion, or real-time multi-axis Ethernet networked positioning.

Contents

Absolute precision and productivity
e-Series motors

Applications and industries

High throughput with smooth speed and fast settling times are important machine design requirements. ABB highly dynamic servo packages with advanced motor controls are ideal for these applications, providing dynamic acceleration and high torque density. A choice of incremental encoder or high resolution absolute feedback suits precision tasks, whilst resolver feedback offers improved durability.

Choose between simple analog or digital control through to intelligent drives that can fulfill single-axis standalone motion control or tightly synchronized multi-axis motion in combination with ABB's motion controls.

This flexible and adaptable range offers solutions for:
– Cut-to-length
– Infeed control
– Flying shear
– Rotary Shear
– Electronic gearbox
– High speed registration
– Point-to-point positioning
– Synchronized multi-axis motion

Applications include:
– Robotics/Pick and place
– Material handling
– Labeling machines
– Packaging machines
– Winding and unwinding machines
– Printing machines
– Dispensing machines
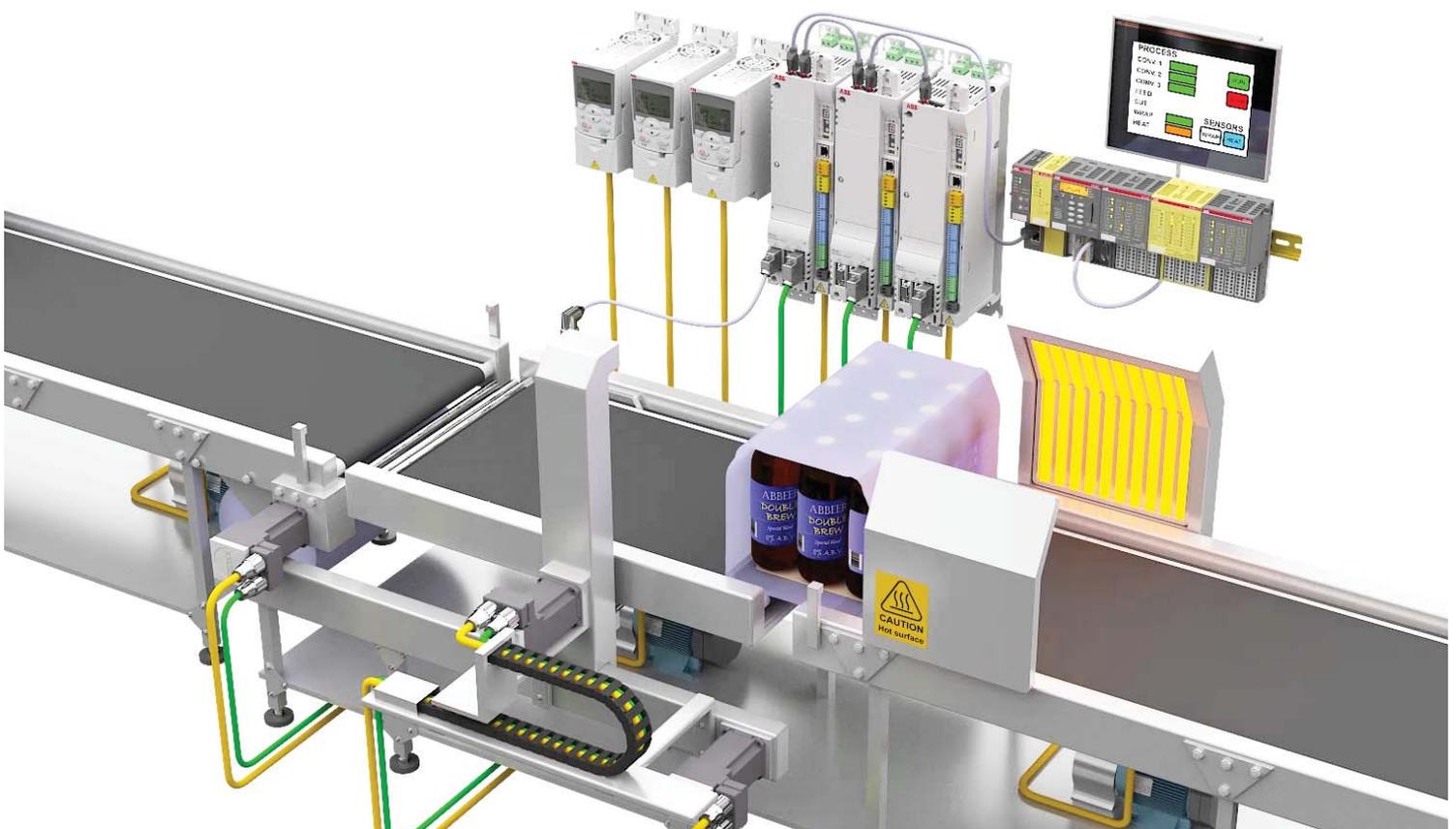
e-Series motors - technology highlights

e-Series servomotors for dynamic precision motion
Thanks to its high torque density, the e-Series servomotor is perfect for highly dynamic, precision motion. A choice of single- and multi-turn high resolution absolute encoder feedback options are available to match application requirements;

The e-Series motor range has power ratings from 100 to 7500 watts, in five nominal square frame sizes from 40 to 180 mm, motors are available with an optional brake and are IP67 rated except for the shaft opening and connectors. Flying leads for 40, 60 and 80 frame motors provide easy connection of both motor power and feedback.

Compact and rugged brushless motors
Available in five square frame sizes, 40, 60, 80,130 mm and 180 mm, with high torque to inertia ratio and rapid acceleration capability.

High reliability and efficiency combined
Servomotors by design are extremely reliable, low maintenance and energy efficient. Combined with drives that absorb and re-use regenerative energy, overall system efficiency is superior to standard AC drives and motors.

Practical installation options
A choice of cables free of drive interface connector provides flexible choice of drive interfacing. Alternative feedback options are available with cable sets to make installation simple.
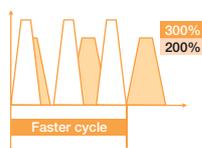
Options and configuration
24 V holding brake is available on ESM06, ESM08, ESM13 and ESM18 frame sizes.

300%
200%

Faster cycle
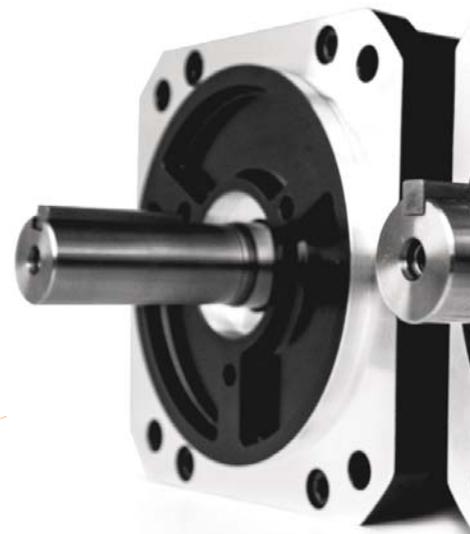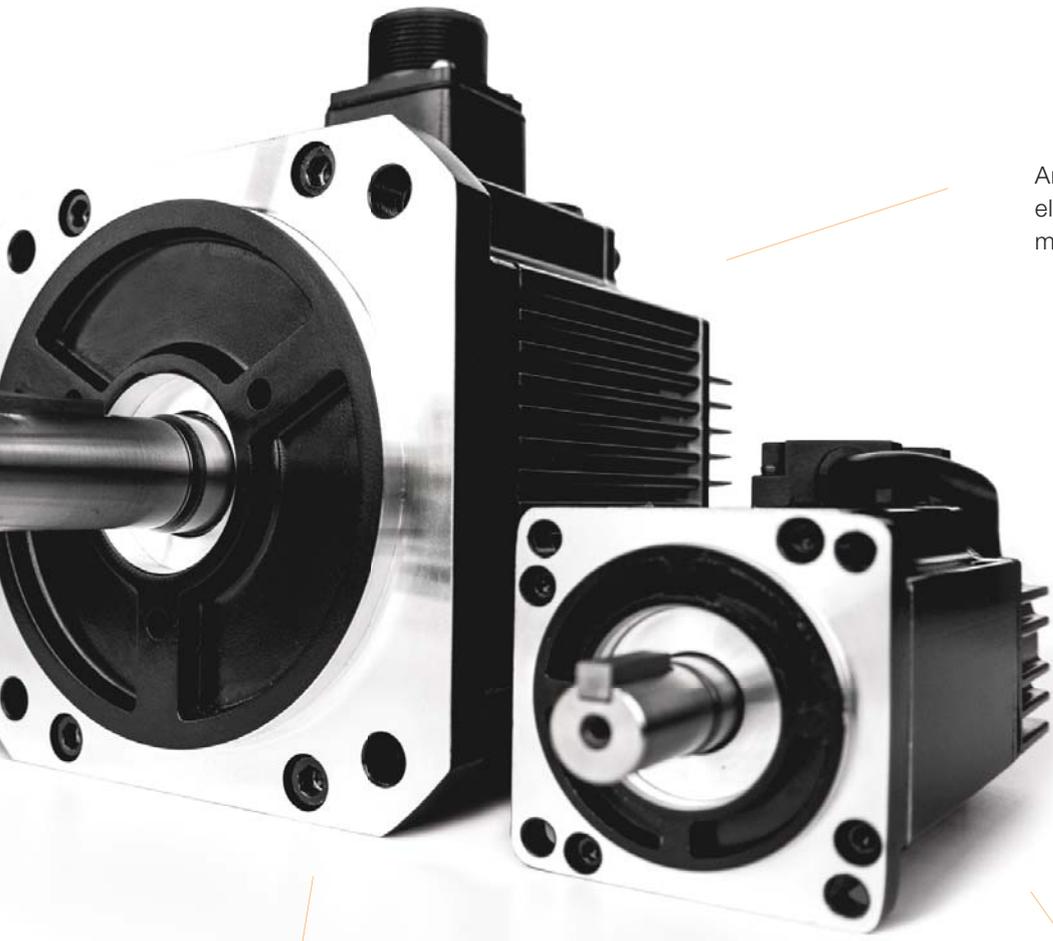
Absolute precision and performance
To meet the demands of higher productivity and product quality, e-Series digital feedback provides precise position information resulting in tighter control and lower settling times in dynamic movement.

An absolute multi-turn option can eliminate homing cycles, reducing machine set-up time.

International standards
e-Series motors have UL, cUL, CE approval

ESM04X-101-302

Motor speed (rpm)
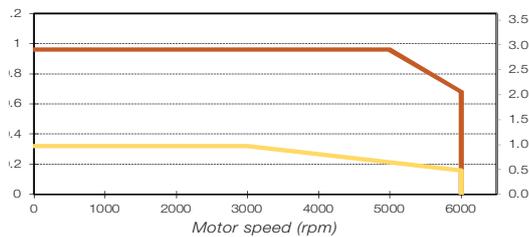
Dynamic performance
With a choice of 100, 200, 400, 750, 1000, 1500, 2000, 3000, 4400, 5000, 7500 watt output and continuous torque from 0.32 to 48N·m.

e-Series motor ordering information

```
E S M □□□ - □□□□□□ - □□□ 0 A 0 0
```

Flange Size

04 = 40mm
06 = 60mm
08 = 80mm
13 = 130mm
18 = 180mm

Variant

X = Low inertia
B = Medium inertia
E = High inertia

Rated Power

101 = 100 W
201 = 200 W
401 = 400 W
751 = 750 W
102 = 1 kW
152 = 1.5 kW
202 = 2.0 kW
292 = 2.9 kW
302 = 3.0 kW
442 = 4.4 kW
502 = 5.0 kW
552 = 5.5 kW
752 = 7.5 kW

Rated Speed

15 = 1500 rpm
20 = 2000 rpm
30 = 3000 rpm

Rated Voltage

2 = 220 Vac
4 = 400 Vac

Feedback

T1 = Absolute, Single-turn (SmartInc), 17 bits per revolution

T2 = Absolute, Multi-turn (SmartAbs), 17 bits per revolution / 16 bits multi-turn

Brake

N = No brake
B = With brake (Brake option not available on 100 W motor)

Connection

0 = Standard connectors for power and feedback conection

Shaft style

A = Shaft end fitted keyway and key, without shaft seal

Cooling

0 = Self-cooling, without thermistor conection

Special Options

0 = Standard design

e-Series motor and drive matched performance

Motor Type and Rating			Drive Type and Ratings				Package Rating		
Type Code	Cont. Current (A)	Peak Current (A)	Drive Type	Mode[1]	Rated Amps (A)	Peak Amps (A)	Cont Torque (N·m)	Peak Torque (N·m)	Rated Power (W)
220V									
ESM04X-101-302-xx0A00	1.1	3.2	MicroFlex 3A	200%	3	6	0.32	0.93	100
ESM06X-201-302-xxx0A00	1.6	4.8	MicroFlex 3A	200%	3	6	0.64	1.91	200
ESM06X-401-302-xxx0A00	2.7	8.1	MicroFlex 3A	200%	3	6	1.27	2.83	400
			MicroFlex 6A	200%	6	12	1.27	3.82	400
ESM08X-751-302-xxx0A00	4.3	14	MicroFlex 6A	300%	5	15	2.39	7.77	750
ESM08B-751-302-xxx0A00	3.8	11.3	MicroFlex 6A	200%	6	12	2.42	7.20	750
ESM13B-102-202-xxx0A00	5.1	15.3	MicroFlex 6A	200%	6	12	4.77	11.22	1000
			MicroFlex 9A	200%	9	18	4.77	14.31	1000
ESM13B-152-302-xxx0A00	6.9	20.7	MicroFlex 6A	200%	6	12	4.15	8.30	1300
			MicroFlex 9A	300%	7.5	22.5	4.77	14.31	1500
ESM13B-202-202-xxx0A00	9	27	MicroFlex 9A	200%	9	18	9.55	19.09	2000
			MicroFlex 9A	300%	7.5	22.5	7.95	23.86	1700
400V									
ESM13B-152-304-xxx0A00	3	9	MotiFlex e180-03A0	200%	3	6	4.81	9.63	1500
			MotiFlex e180-05A0	200%	4	8	4.81	12.84	1500
			MotiFlex e180-07A0	200%	4.7	9.4	4.81	14.44	1500
ESM13B-302-304-xxx0A00	5.9	17.7	MotiFlex e180-07A0	150%	6	9	9.52	14.53	3000
			MotiFlex e180-016A	200%	9	18	9.52	28.57	3000
ESM13B-502-304-xxx0A00	8.7	26.2	MotiFlex e180-016A	200%	9	18	15.97	33.05	5000
			MotiFlex e180-024A	200%	13.5	27	15.97	48.10	5000
ESM18E-292-154-xxx0A00	11.4	34.3	MotiFlex e180-016A	110%	14	15.4	18.43	24.90	2900
			MotiFlex e180-024A	200%	13.5	27	18.43	43.65	2900
			MotiFlex e180-031A	200%	21	42	18.43	55.45	2900
ESM18E-442-154-xxx0A00	17.6	52.9	MotiFlex e180-024A	110%	21.5	23.7	28.37	38.12	4400
			MotiFlex e180-031A	200%	21	42	28.37	67.69	4400
			MotiFlex e180-046A	200%	28	56	28.37	85.26	4400
ESM18E-552-154-xxx0A00	20.5	61.5	MotiFlex e180-024A	110%	21.5	23.7	34.98	40.36	5500
			MotiFlex e180-031A	200%	21	42	34.98	71.67	5500
			MotiFlex e180-046A	200%	28	56	34.98	95.56	5500
			MotiFlex e180-060A	200%	35	70	34.98	104.95	5500
ESM18E-752-154-xxx0A00	27.4	82.2	MotiFlex e180-031A	110%	28	30.8	47.98	53.94	7500
			MotiFlex e180-046A	200%	28	56	47.98	98.07	7500
			MotiFlex e180-060A	200%	35	70	47.98	122.59	7500
			MotiFlex e180-090A	200%	55	110	47.95	143.85	7500

Please note all MotiFlex e180 ratings shown are at 4 kHz switching frequency.

Highlighted rows will provide full peak and continuous torque. If full peak torque is not required then other more cost effective solutions may be offered.

e-Series performance and specification
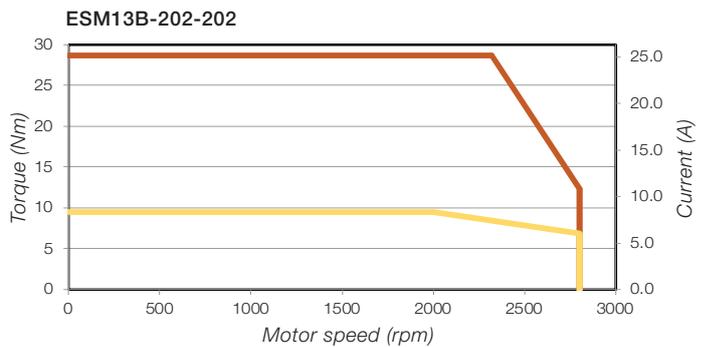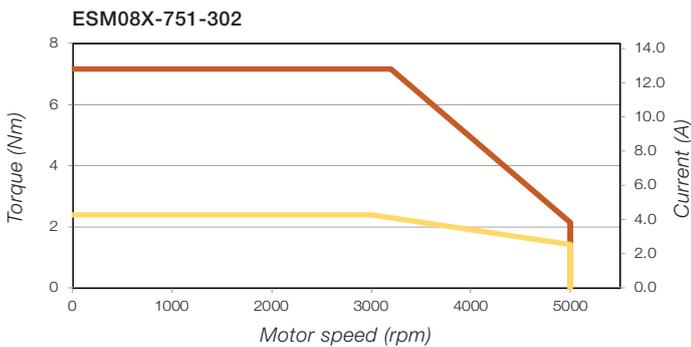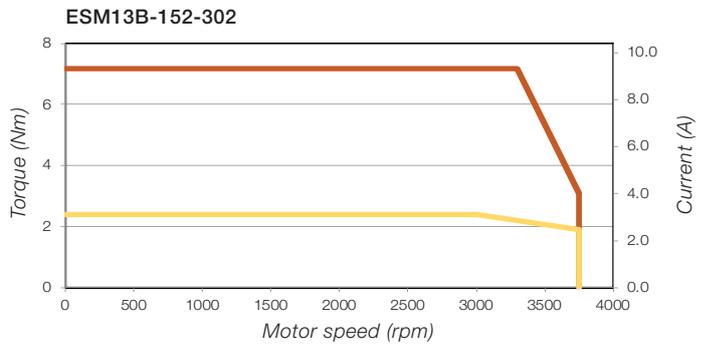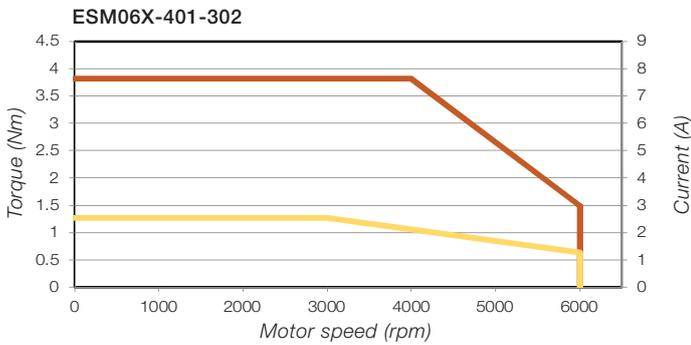## 220V motors

Frame Size		ESM04	ESM06		ESM08		ESM13		
Catalog Number		X-101-302	X-201-302	X-401-302	X-751-302	B-751-302	B-102-202	B-152-302	B-202-202
Rated Power	Watts	100	200	400	750	750	1000	1500	2000
General									
Peak torque	N·m	0.95	1.91	3.81	7.16	7.17	14.31	14.31	28.65
Peak current	A	3.0	4.8	8.1	14.0	11.3	15.3	21.2	27.0
Continuous stall torque	N·m	0.32	0.64	1.27	2.39	2.39	4.78	4.78	9.55
Continuous current	A_{rms}	1.0	1.6	2.6	4.3	3.8	5.1	6.9	9.0
Rated speed	rpm	3000	3000	3000	3000	3000	2000	3000	2000
Rated Voltage	V	220							
Electrical									
Torque constant	N·m/A	0.32	0.46	0.47	0.56	0.77	1.02	0.74	1.14
Voltage constant	V_{rms}/krpm	23.7	28.0	32.8	37.3	42.5	61.7	44.7	68.9
Resistance	ohms	20.50	6.40	3.15	1.48	2.18	1.22	0.65	0.58
Inductance	mH	27.5	16.2	11.0	10.1	7.7	6.7	3.6	3.8
Electrical time constant	ms	1.22	2.53	3.50	5.74	3.53	5.49	5.48	6.52
Mechanical									
Rotor Inertia with brake	kg·cm²	NA	0.23	0.34	1.03	2.39	6.96	6.96	12.84
Rotor Inertia without brake	kg·cm²	0.04	0.17	0.28	0.90	2.26	6.26	6.26	12.14
Max. speed	rpm	6000	6000	6000	5000	3800	2800	4000	2800
Mechanical time constant	ms	1.01	3.36	0.83	0.59	1.64	1.10	1.24	0.86
Number of motor poles	-	8							
Weight with brake	kg	NA	1.4	1.9	3.8	4.0	8.1	8.1	11.8
Weight without brake	kg	0.5	1.0	1.4	2.4	3.2	6.5	6.5	10.2
Brake data									
Rated voltage	VDC ±10%	24							
Current	A	NA	0.26		0.43		0.82		
Input power	W		6.3		10.4		19.5		
Static friction torque	N·m (min)		2		3		20		
Armature release time	ms (max)		17		35		27		
Armature pull-in time	ms (min)		32		25		76		

e-Series performance and specification
400V motors

Frame Size		ESM13			ESM18			
Catalog Number		B-152-304	B-302-304	B-502-304	E-292-154	E-442-154	E-552-154	E-752-154
Rated Power	Watts	**1500**	**3000**	**5000**	**2900**	**4400**	**5500**	**7500**
General								
Peak torque	N·m	14.3	28.7	48.2	45.1	71.1	87.6	119.0
Peak current	A	9.0	18.0	25.8	27.7	44.1	51.3	68.0
Continuous stall torque	N·m	4.8	9.6	16.1	18.6	28.0	35.0	48.0
Continuous current	A_{rms}	3.0	6.0	8.6	11.4	17.6	20.5	27.4
Rated speed	rpm	3000	3000	3000	1500	1500	1500	1500
Rated Voltage	V	400						
Electrical								
Torque constant	N·m/A	1.59	1.59	1.87	1.63	1.61	1.71	1.75
Voltage constant	V_{rms}/krpm	106.7	107.4	122.1	107.5	107.2	113.5	116.5
Resistance	ohms	3.8	1.6	1.1	0.5	0.3	0.2	0.2
Inductance	mH	20.1	9.1	7.5	11.2	7.4	6.2	4.2
Electrical time constant	ms	6.27	6.56	6.13	22.12	23.63	26.3	27.18
Mechanical								
Rotor Inertia with brake	kg·cm²	6.96	12.84	18.62	48.00	67.80	92.40	132.40
Rotor Inertia without brake	kg·cm²	6.26	12.14	17.90	45.60	65.40	89.98	129.80
Max. Speed	rpm	3100	3200	2800	2600	2600	2800	2800
Mechanical time constant	ms	0.86	0.85	0.99	1.2	1.1	1.0	0.9
Number of motor poles	-	8						
Weight with brake	kg	8.1	11.77	15.10	22.5	28	35	45.7
Weight without brake	kg	6.5	10.60	13.87	18.0	23.5	30.5	41.2
Brake data								
Rated voltage	VDC ±10%	24						
Current	A	0.82			1.29		0.79	
Input power	W	19.5			31		19	
Static friction torque	N·m (min)	20			35		50	
Armature release time	ms (max)	27			30		100	
Armature pull-in time	ms (min)	76			120		220	

e-Series 220V torque curves for MicroFlex drives

ESM04X-101-302

ESM08B-751-302

ESM06X-201-302

ESM13B-102-202

ESM06X-401-302

ESM13B-152-302

ESM08X-751-302

ESM13B-202-202
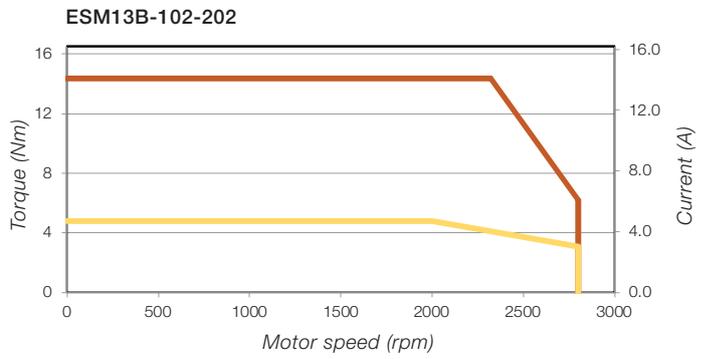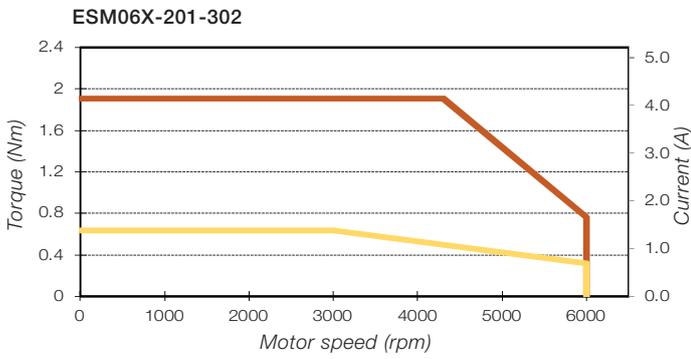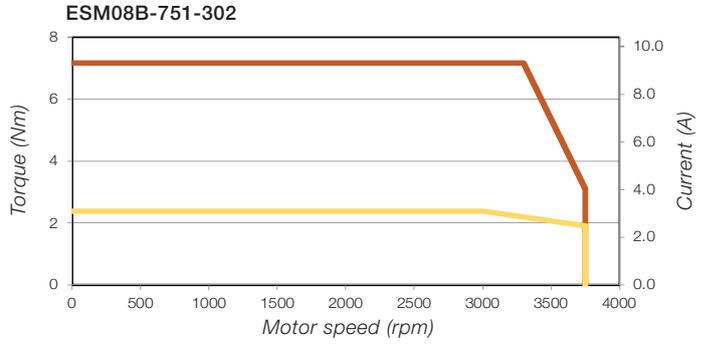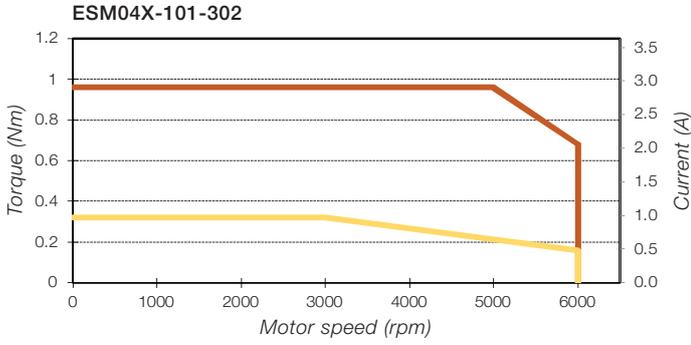
e-Series 400V torque curves for MotiFlex e180

ESM13B-152-304

ESM18E-442-154

ESM13B-302-304

ESM18E-552-154

ESM13B-502-304

ESM18E-752-154

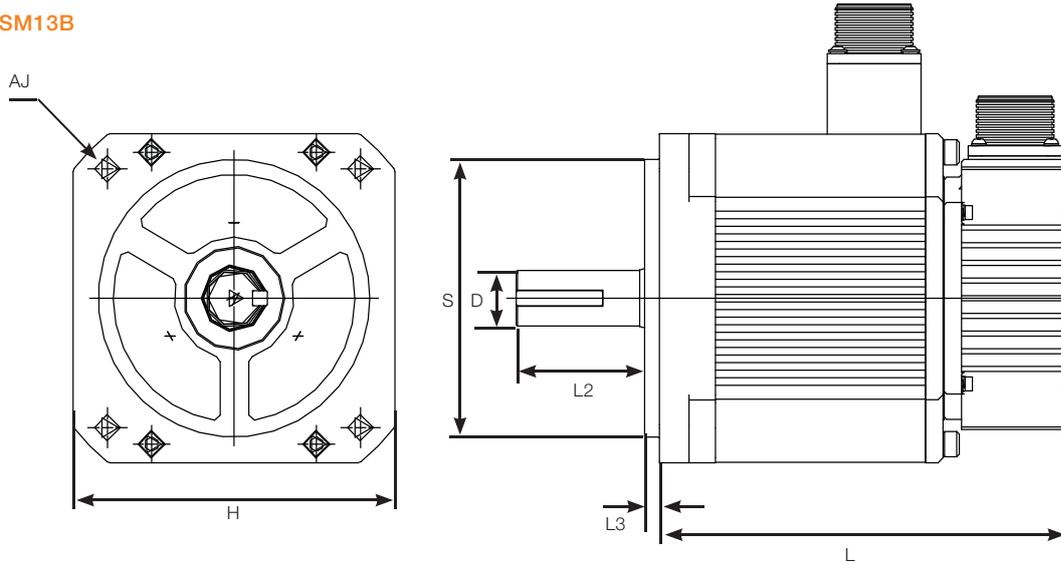### ESM18E-292-154
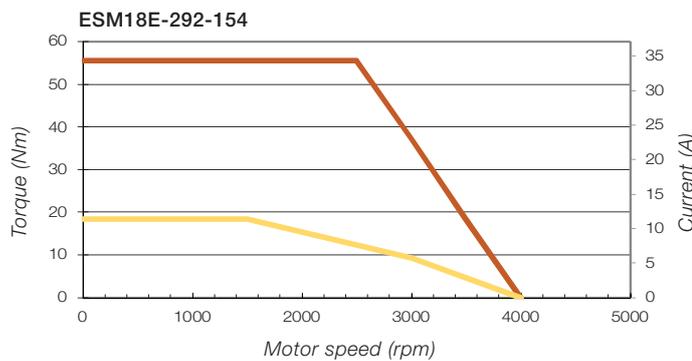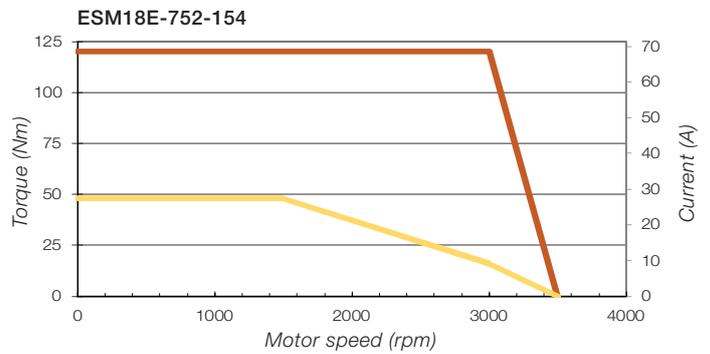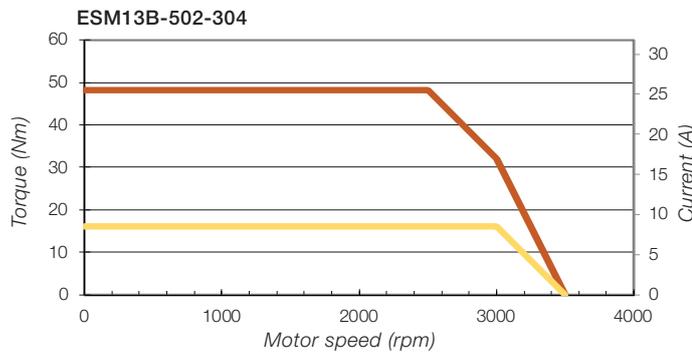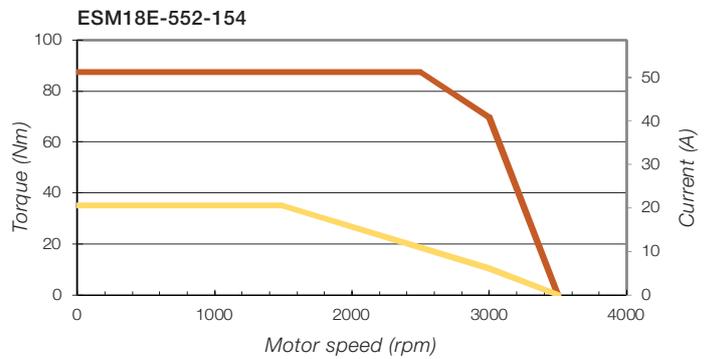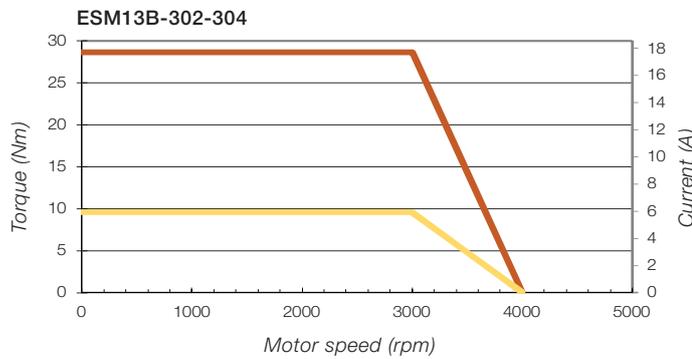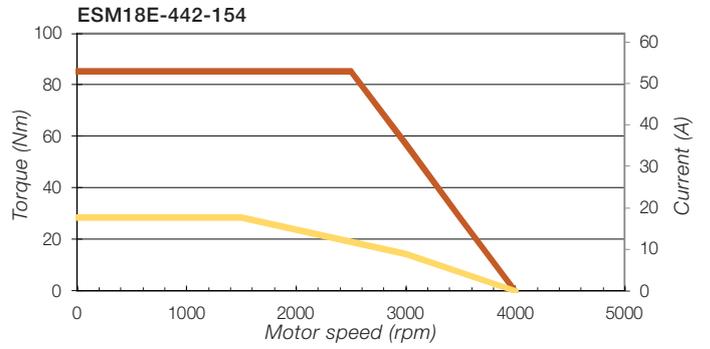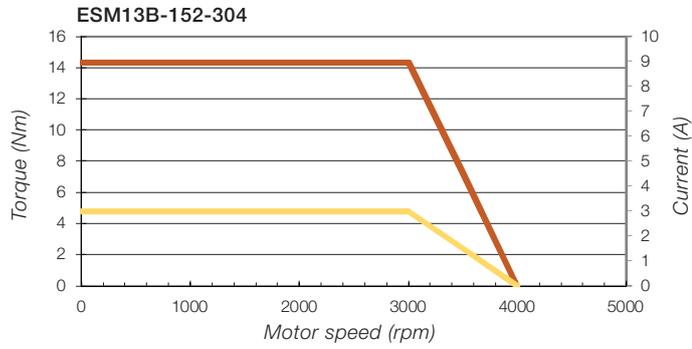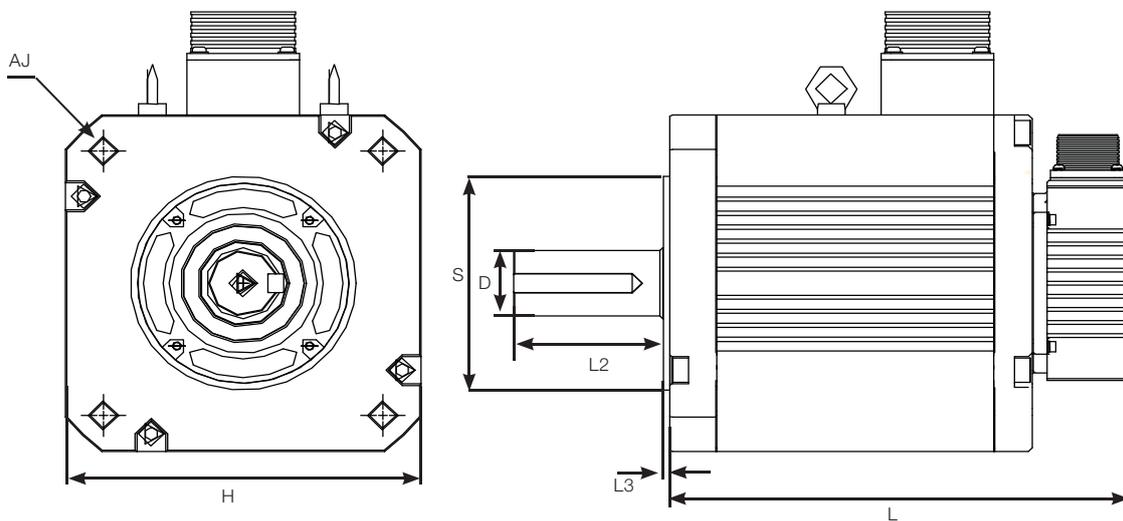
e-Series motor drawings

ESM04X / ESM06X / ESM08X / ESM08B
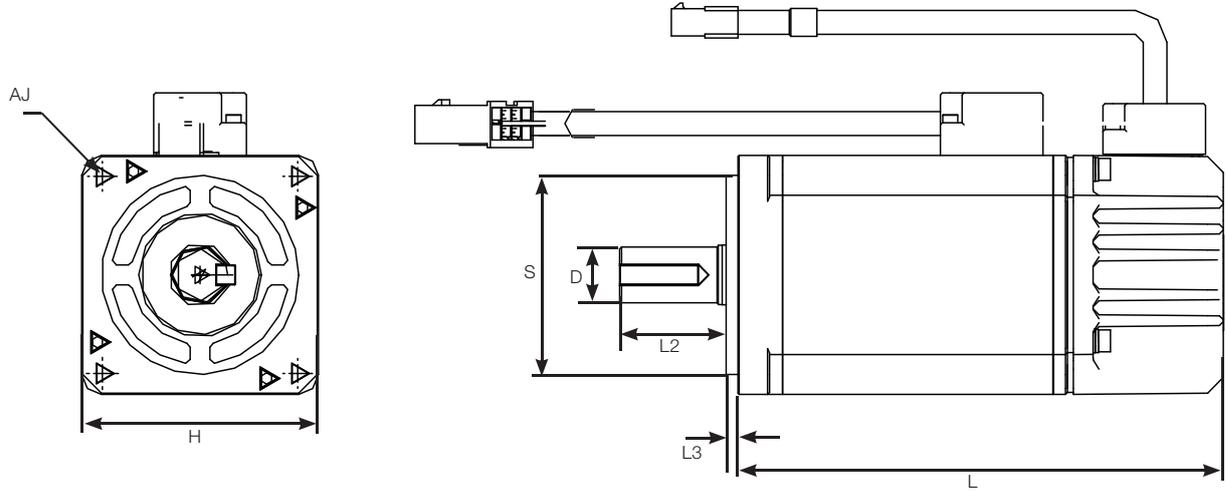
ESM13B

ESM18E

e-Series motor dimensions

Catalog Number	Motor Length (L) mm		Shaft		Frame	Spigot		Mounting Holes	
	W/O brake	W/brake	Length (L2) mm	Diameter (D) mm	Width (H) mm	Depth (L3) mm	Diameter (S) mm	Diameter (AJ) mm	PCD mm
ESM04X-101-302-xx0A00	98.5	NA	25	8	40	2.5	30	4.5	46
ESM06X-201-302-xx0A00	101	139.5	30	14	60	3	50	5.5	70
ESM06X-401-302-xx0A00	123	161.5	30	14	60	3	50	5.5	70
ESM08X-751-302-xx0A00	122.2	160.5	40	19	80	3	70	6.5	90
ESM08B-751-302-xx0A00	147.5	182.7	35	16	86	3	80.4	6.5	100

Catalog Number	Motor Length (L) mm		Shaft		Frame	Spigot		Mounting Holes	
	W/O brake	W/brake	Length (L2) mm	Diameter (D) mm	Width (H) mm	Depth (L3) mm	Diameter (S) mm	Diameter (AJ) mm	PCD mm
ESM13B-102-202-xx0A00	163.8	218.3	58	22	130.4	6	110	9	145
ESM13B-152-302-xx0A00	163.8	218.3	58	22	130.4	6	110	9	145
ESM13B-202-202-xx0A00	213.8	268.3	58	22	130.4	6	110	9	145
ESM13B-152-304-xx0A00	163.8	218.3	58	22	130.4	6	110	9	145
ESM13B-302-304-xx0A00	213.8	268.3	58	22	130.4	6	110	9	145
ESM13B-502-304-xx0A00	263.8	318.3	58	28	130.4	6	110	9	145

Catalog Number	Motor Length (L) mm		Shaft		Frame	Spigot		Mounting Holes	
	W/O brake	W/brake	Length (L2) mm	Diameter (D) mm	Width (H) mm	Depth (L3) mm	Diameter (S) mm	Diameter (AJ) mm	PCD mm
ESM18E-292-154-xx0A00	200.4	252.6	74	35	180	3.2	114.3	13.5	200
ESM18E-442-154-xx0A00	232.4	284.6	74	35	180	3.2	114.3	13.5	200
ESM18E-552-154-xx0A00	268.4	320.6	108	42	180	3.2	114.3	13.5	200
ESM18E-752-154-xx0A00	342.4	394.6	108	42	180	3.2	114.3	13.5	200

e-Series cable ordering information

Cable Length

025 = 2.50 m
050 = 5.00 m
075 = 7.50 m
100 = 10.0 m
150 = 15.0 m
200 = 20.0 m
250 = 25.0 m
300 = 30.0 m

Motor compatibility

EPP = ESM04, ESM06, ESM08 Power & brake cable
EPM = ESM13, ESM18 Power & brake cable
EFP = ESM04, ESM06, ESM08 Feedback cable
EFM = ESM13, ESM18 Feedback cable

Cable function

F2 = Single-turn (SmartInc)
T2 = Absolute, Multi-turn (SmartAbs),
      including battery holder
P = Power only (ESM18 only)
B = Brake only (ESM18 only)
PB = Power and brake

Designation with power cable (cable rating)

06 = 6 Amp motor power cable (ESM04, ESM06, ESM08)
12 = 12 Amp motor power cable (ESM13B)
20 = 20 Amp motor power cable (ESM18E-292, ESM18E-442)
35 = 35 Amp motor power cable (ESM18E-552, ESM18E-752)
2 = Feedback cable with 15 way D Type fitted

CBLxxx-EPP-PB06

Power & brake cable for ESM04, ESM06
and ESM08

Motor	Colour	Function	Motor	Colour	Function
1	Red	U	5	Sheild	Sheild
2	White	V	6	Yellow	Brake 24V
3	Black	W	7	Blue	Brake 0V
4	Green	Ground			

CBLxxx-EFP-F22

Encoder signal cable for ESM04, ESM06
and ESM08, 17bit singleturn absolute encoder

Motor	Colour	Function	Drive
3	Blue	SD+	1
4	Blue / Blk	SD-	9
7	Black	0V	13
10	Red	5V	12
18	Screen	Screen	Shell

CBLxxx-EFP-T22

Encoder signal cable for ESM04, ESM06
and ESM08,17bit multiturn absolute encoder ▲

Motor	Colour	Function	Drive	Motor	Colour	Function	Drive
3	Blue	SD+	1	8	Red	VB-	-
4	Green	SD-	9	9	Brown	VB+	-
7	Black	0V	13	10	White	5V	12
				18	Screen	Screen	Shell

The standard motor power and feedback cables for ESM04, ESM06 and ESM08 motors comply with EN55011 Class A Group 1 (Industrial) standard. To enable compliance with EN55011 Class B Group 1 (Domestic) EMC standards the plastic connectors should be replaced by metallic circular connectors providing complete screening with suitable screen terminations in both the plug and socket of an inline connector.

CBLxxx-EFM-F22

Encoder signal cable for ESM13 or ESM18 2500 ppr encoder and 17 bit single-turn absolute encoder

Motor	Colour	Function	Drive
C	Blue	SD+	1
D	Blue / Blk	SD-	9
G	Black	0V	13
K	Red	5V	12
T	Screen	Screen	Shell
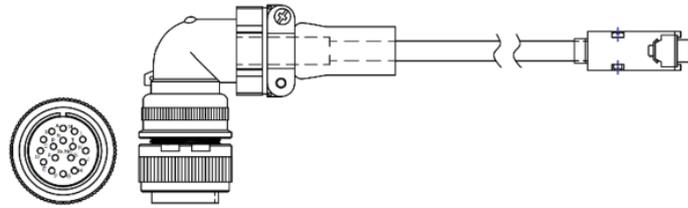
CBLxxx-EFM-T22

Encoder signal cable for ESM13 or ESM18 and 17 bit multi-turn absolute encoder ▲
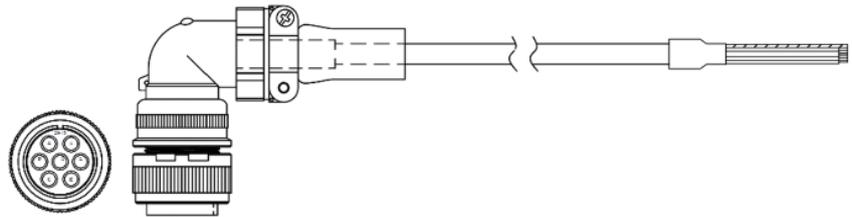
Motor	Colour	Function	Drive
C	Blue	SD+	1
D	Green	SD-	9
G	Black	0V	13
H	Red	VB-	-
J	Brown	VB+	-
K	White	5V	12
T	Screen	Screen	Shell
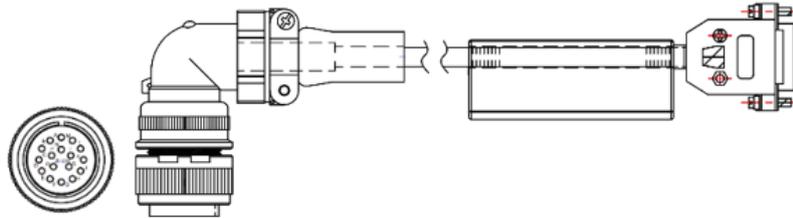
CBLxxx-EPM-PB12

Power & brake cable for ESM13B

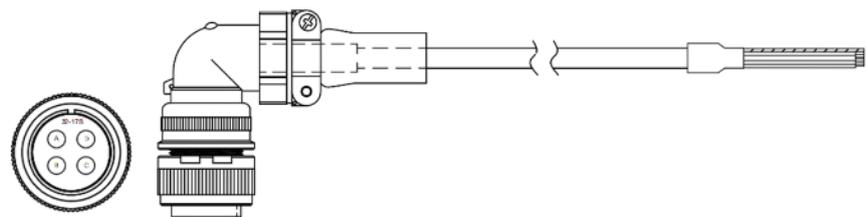| Motor	Colour	Function
B	Red	U
G	White	V
E	Black	W
A	Blue	Brake 0V
F	Yellow	Brake 24V
C	Green	FG

CBLxxx-EPM-P20

Power cable for ESM18E-292 & ESM18E-442
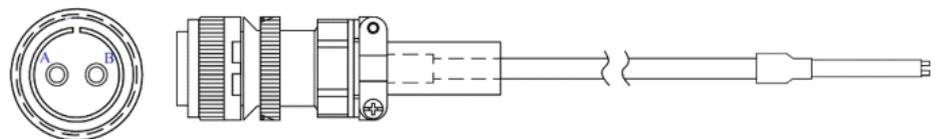
CBLxxx-EPM-P35

Power cable for ESM18E-552 & ESM18E-752

Motor	Colour	Function
B	Red	U
G	White	V
E	Black	W
D	Green	Sheild

CBLxxx-EBM-B02

Brake cable for ESM18

Motor	Colour	Function
A	Red	Brake 24V
B	Black	Brake 0V

▲ Absolute feedback battery data – Please use a 3.6 V Lithium Thionyl Chloride AA non-rechargeable battery, available from electrical suppliers.

MicroFlex e150 servo drives - technology highlights

Perfectly matched for e-Series motors
ABB's MicroFlex family offers a choice of 3, 6 and 9 A rms current ratings from a direct-on-line 105 to 250 V AC supply to suit the e-Series power ratings from 100 to 750 W. The **MicroFlex e150** intelligent drive provides MINT programmable single-axis solutions, can be used in multi-axis EtherCAT networks for advanced motion and machine control, and also features Modbus TCP and Ethernet/IP.

Common drive features
– Direct online single-phase 105-250 Vac or 3 phase 230 Vac
– 3, 6 or 9 Amp continuous with 200% overload for 3 seconds
– Control of both rotary and linear servo motors
– 300% overload mode also available with reduced rms ratings

HMI via Modbus
2-wire RS485 or 4-wire RS422 port with switch selectable termination and featuring Modbus RTU and MINT programed custom ASCII protocols for PLC, HMI or other device communications.

Two high speed registration inputs
Precise registration of print marks or product position achieved with 2 x 24 V fast isolated inputs that can be used to latch feedback device position in hardware and trigger software events locally in MINT.
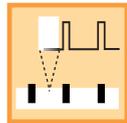
I/O – digital and analog
I/O used for configurable drive functions, such as end limits or home sensor or within MINT programming for typical machine functions such as push buttons.

Dual encoder
Dual encoder input for position and commutation. Provides line shaft following or dual loop control to eliminate mechanical errors. Supports one incremental (no Halls) and one serial encoder or resolver.
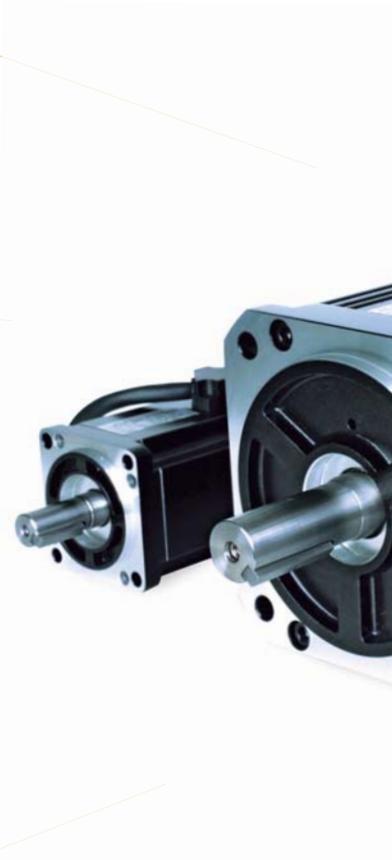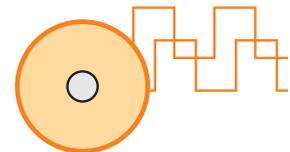
AC500 PLC EtherCAT solutions

Integrated Ethernet interface offers EtherCAT® for real-time control of multi-axis systems. Ethernet/IP™, Modbus TCP and RAW Ethernet are supported on the generic Ethernet port to operate with controllers such as PLC and industrial PCs.

Safety

Safe torque-off (STO) SIL3 PLe is a standard feature. STO prevents rotation for machine safety applications, eliminating the need to remove AC power in most applications, minimizing downtime and maximizing machine utilization.

Advanced motion programming

Intelligent drive, offering MINT programming - a high level multitasking language - tailored for motion applications. This powerful but simple programming language, within MINT WorkBench, provides control of communications, logic, motion and HMI interactions.

Compact and rugged brushless motors

Available in five square frame sizes, 40, 60, 80,130 and 180 mm, with high torque to inertia ratio and rapid acceleration capability.

Dynamic overload

A peak overload of 300 percent of rms current maximizes available torque for dynamic acceleration. 300 percent peak torque delivers faster cycle times and increased productivity.

Universal digital feedback

Motor encoder feedback interfaces are highly integrated and optimized for demanding motion applications.

MicroFlex drives for flexible motion control

ABB's MicroFlex drives share a common drive stage with up to 9 A continuous current rating and operation with single and three-phase supplies to suit global markets. A flexible choice of control and communication options allow the range to be used across a wide variety of applications from simple analog and step/direction Modbus TCP, Ethernet/IP or EtherCAT®

MicroFlex motion drives include common intuitive set-up and programming options for single and multi-axis tasks. They may also be combined with our multi-axis motion controllers and PLC products for system solutions.

MicroFlex series common features

– 1 or 3-phase operation from 105 to 250 V ac
– 3, 6 and 9 A rms
– 200% overload standard (300% on MicroFlex e150)
– IP20 enclosure for cabinet installation (UL open)
– Auto-tuning and anti-resonance digital filters
– Suitable for single drive and multi-axis systems
– Controls rotary and linear AC servo motors
– Closed loop induction motors
– Options
    – Space saving footprint EMC filter
    – Brake unit
    – Regen resistors
    – Cooling fan

MicroFlex e150
(EtherCAT, Ethernet/IP, Modbus TCP/IP, MINT programming)

Input voltage		1/3 phase 105-250 V ac
Bus voltage		160-320 V
Output current amps (rms)		Catalog number *
Continuous	Peak	
3	6	E152A03EIOA
6	12	E152A06EIOA **
9	18	E152A09EIOA **

NOTE: MicroFlex e150 will accept either SmartInc or SmartAbs® feedback. See Microflex Accessories on page 23

* Regen resistor must be ordered separately. Customer must supply +24 Vdc for I/O operation.

** Requires external ventilation. See fan kits.

MicroFlex e150

MicroFlex e150 servo drive

The ABB MicroFlex e150 servo drive combines Ethernet technology, advanced multi-tasking programming and single and three-phase operation in a compact package. Ethernet and motor encoder feedback interfaces are fully integrated and optimized for demanding motion applications, while Safe Torque Off is a standard feature which can help manufacturers meet European machinery directives easily.

ABB MicroFlex e150 is ideally suited to integration with the AC500 PLC range with EtherCAT or Modbus TCP control. The integrated Ethernet interface offers EtherCAT for real-time control of multi-axis systems. In addition, EtherNet/IP™, Modbus TCP and RAW Ethernet are supported to enable control possibilities with a wide range of controllers.

MicroFlex e150
– Ethernet/IP, Modbus TCP and Modbus RTU
– EtherCAT for real time control
– Safe Torque Off (STO) to SIL3 PLe as standard
– 300% overload capability
– I/O compliment: 10 x DI, 7 x DO, 2 x AI and 1 x AO
– Advanced MINT programming
– Resolver adapter
– Encoder splitter for dual encoder or simplified linear motor connection

For further information, see flyer "ABB motion control products, MicroFlex e150 servo drives", code: 3AUA0000097609 EN.

Feature	Advantage	Benefit
Safe Torque Off (STO)	Built in machine safety features to SIL3 PLe.	Able to integrate into safety systems without extra equipment
EtherCAT	Real-time control single Ethernet cable – no need for additional Fieldbus. High-speed real-time communications	Reduced hardware requirements, less cabling, reduced system design requirements and cheaper cabling solutions
MINT motion control	Advanced motion programming	Powerful MINT multi-tasking software. Motion capability including linear motion, indexing, tuning, registration and more
External 24 V logic supply	Support control electronics even when mains power is off	Maintain present positional information in a power outage. Allows immediate restart without the need to datum
Motor feedback - universal encoder	Ability to interface with industry standard feedback devices including resolver with suitable adapter.	Select feedback device of choice to match application demands of precision or higher mechanical resilience
USB and serial communications	USB for configuration and customer PC	Improved application interfaces (supported by free ActiveX components). RS485/RS422 serial comms for PLC, HMI or other device communications

Feature-rich, intelligent drive solutions

MicroFlex e150 MINT - supported motion features

Homing (Referencing / Datuming)
Homing provides a configurable approach to finding a start or reference position for an axis. This can also be avoided altogether on MicroFlex e150 products using absolute encoders.

Registration control / EVENT Handling
Fast inputs provide position LATCH functionality that can automatically trigger software EVENTS to perform calculations, logic checks and even positional corrections at high speed. Useful for registration functions.

JOG (in position or velocity control)
Jogging of an axis while maintaining position control. Combined with JERK control provides a smooth method to adjust an axis or run a conveyor for example.

INCR/A target change on the fly
Final position of an axis can be adjusted 'on the fly' to compensate for some measurement or trigger, for example, cut to length of printed material, accurate product positioning, press feeder applications, etc.

Splines and PVT profiles
Spline and PVT (Position Velocity Time) motion use a series of data points and interpolation to provide smooth path control. Useful for 'record and replay' functions for example (single axis only).

Jerk control (S ramp)
Jerk limitation controls the rate of change of acceleration during motion, to provide a smooth control reducing shock and vibration on the load. This results in 'softer' motion and improves mechanical life of the system.

Electronic gearing with simulated clutch and registration features
Replace mechanical linkages with software gearing that can be dynamically controlled at the touch of a button. Change ratio, advance or retard an axis, simulate mechanical clutch engage / disengage

FLY - Flying shear segments
FLY segments provide a means to create simple or complex motion which is 'geared' to a second axis (master encoder) position. Effectively time is replaced by position of the master axis.

Electronic CAMs
Software CAMs eliminate mechanical wear or 'bounce' issues associated with mechanical systems. CAM data can be changed for different 'recipes' or dynamically varied during operation.

Incremental / Absolute Moves
Simple point to point motion.
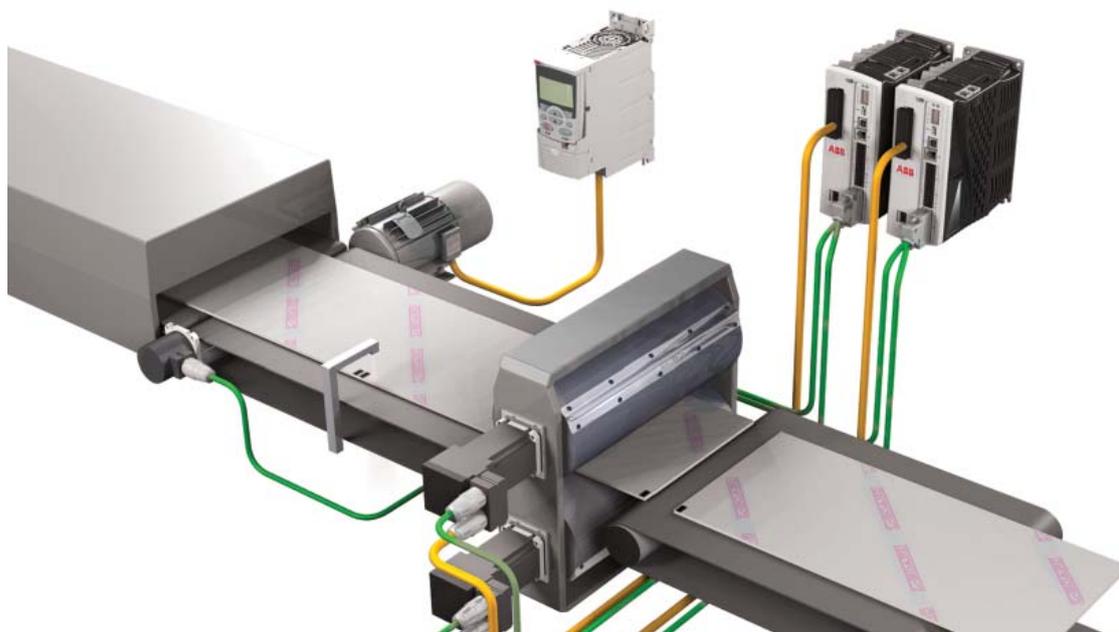
Accessories: MicroFlex e150 series

Accessories (MicroFlex Analog)	
Description	Catalog number
Fan kit, 24 V DC	FAN001-024
MicroFlex resolver connector kit	OPT-ACC001-509
MicroFlex encoder connector kit	OPT-ACC001-507
Mint WorkBench-Programming and Commissioning Tool	See website

Accessories (MicroFlex e150)	
Description	Catalog number
Resolver adapter	OPT-MF-201
Fan kit, 24 V DC	FAN001-024
MicroFlex e150 connector set	OPT-MF-CN-A
MicroFlex e150 encoder breakout*	OPT-MF-200

NOTE: * The breakout splits the necessary encoder signals to provide easy connection of an incremental ABZ encoder and a serial based encoder or resolver at the same time. The purpose is to allow dual encoder support for either dual feedback or master follower. Encoder breakout also provides for convenient connection of encoder and hall feedback cables from linear motors.

Cables-e150 to e150 Ethernet - communication cables	
Description	Catalog number
Ethernet cable: shielded cat5e RJ45 0.2 m/0.7 ft.	CBL002CM-EXS
Ethernet cable: shielded cat5e RJ45 0.5 m/1.6 ft.	CBL005CM-EXS
Ethernet cable: shielded cat5e RJ45 1.0 m/3.2 ft.	CBL010CM-EXS
Ethernet cable: shielded cat5e RJ45 2.0 m/6.5 ft.	CBL020CM-EXS
Ethernet cable: shielded cat5e RJ45 5.0 m/16.3 ft.	CBL050CM-EXS
Ethernet cable: shielded cat5e RJ45 10.0 m/32.6 ft.	CBL100CM-EXS

Performance and capability you can depend on
MotiFlex e180 – Powering machine innovations

MotiFlex e180 delivers versatile motion control performance, capability and dependability to power machine innovations. Flexible connectivity with Ethernet and motor feedback technologies is highly integrated and optimized for demanding motion applications. With the MINT Work-Bench PC tool you can quickly and easily customize the drive to the exact control requirements of your machine.

HMI connection via Ethernet
Profinet IO, Modbus TCP and Ethernet/IP provide support for HMI, PLC or upstream communication network.

Memory unit
The compact memory unit stores drive's settings, parameters and application programs. Prepare drive settings off-site, manage functionality levels or move settings from one drive to another.

I/O – digital and analog
The drive's I/O is used for configurable drive functions, such as end limits or home sensor or within MINT programming for typical machine functions such as push buttons.
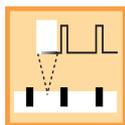
Two high speed registration inputs
2 x 24 V fast isolated inputs that can be used to latch feedback device position in hardware and trigger software events locally in MINT.

EtherCAT

ETHERNET POWERLINK

Flexible Ethernet connectivity
Integrated and flexible Ethernet interface enables real-time connectivity with EtherCAT and POWERLINK protocols. In addition Profinet IO, EtherNet/IP™, Modbus TCP and RAW Ethernet are supported. Simply select the protocol by switches on the drive.

Safety
Safe torque-off (STO) SIL3 PLe is a standard feature. STO prevents rotation for machine safety applications, eliminating the need to remove AC power in most applications, minimizing downtime and maximizing machine utilization.

Advanced motion programming
Intelligent drive, offering MINT programming - a high level multitasking language - tailored for motion applications. This powerful but simple programming language, within MINT WorkBench, provides control of communications, logic, motion and HMI interactions.

Rotary and linear motors
Provides precision motor control of servo motors, both rotary and linear. Universal encoder interface can be simply configured by software to support a wide range of feedback types.

HIPERFACE DSL

Wide range of feedback interfaces
Drive feedback options support different serial encoders (EnDat, SSI, BiSS, SmartAbs, Hiperface), resolver, incremental encoders. In addition DSL encoders are supported to provide a single cable solution.
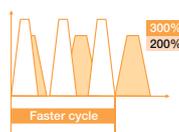
Dynamic overload
A peak overload of 300 percent of rms current maximizes available torque for dynamic acceleration. 300 percent peak torque delivers faster cycle times and increased productivity.

MotiFlex e180

The MotiFlex e180

The ABB MotiFlex e180 delivers versatile motion control performance, capability and dependability to power machine innovations. Flexible connectivity is provided with Ethernet and motor feedback technologies that are highly integrated and optimized for demanding motion applications.

Seamless motion control solutions

From servo motors and drives to complete systems with programmable logic controllers (PLC), motion controllers and safety technology, our offering is designed to scale and integrate seamlessly to different machines, providing dependable performance, high process quality and productivity, year after year.

Technical data

Supply connection	
AC Supply	3-phase 200 to 480 V AC +/-10% 50/60 Hz +/-5%
DC supply	270 to 650 V DC +/-10%
Motor connection	
Voltage	3-phase output voltage
Frequency	0 to +/-500 Hz
Motor control	Vector, v/f
Motor types	Asynchronous motors (standard induction) and synchronous motors (servo, high torque), linear servo motors
Switching frequency / Control	4 - 8 kHz / Space Vector Modulation
Braking power connection	
Braking chopper	As standard in all types
Braking resistor	External resistor connected to drive
Product compliance	
CE	Low Voltage Directive 2006/95/EC, EN 61800-5-1: 2007 Machinery Directive 2006/42/EC, EN 61800-5-2: 2007 EMC Directive 2004/108/EC, EN 61800-3: 2004 + A1: 2012
UL	cUL/UL508C (2010) Power Conversion Equipment.

Environmental limits	
Ambient temperature	
Transport	-40 to +70°C (-40 to +158°F)
Storage	-40 to +70°C (-40 to +158°F)
Operation Temperature	0 to +55°C (32 to 131°F), no frost allowed. Above 40 °C (104 °F) with derating of 2%/1°C
Cooling method	Air cooled Dry clean air
Altitude	0 to 2000 m (6560 ft) above sea level. Derating above 1000 m (3280 ft) 1%/100 m (328 ft)
Relative humidity	Max. 95%, no condensation allowed
Degree of protection	IP20 acc. to EN 60529; Open Type acc. to UL 508C
Contamination levels	No conductive dust allowed
Vibration	Sinusoidal vibration (EN 60068-2-6:2008): 2 to 9 Hz: 3.0 mm (0.12") 9 to 200 Hz: 1g
Shock	Half sine pulse (IEC 60068-2-27:2008): 10g for 11 ms
EMC	Category C3 with optional filter (according to EN 61800-3)
Functional safety	Safe torque off (STO according EN 61800-5-2) EN 61508 ed2: SIL 3, EN 62061: SIL CL 3, EN ISO 13849-1: PL e

MotiFlex e180 drive ratings

Ratings/4 kHz								Size (Type designation)	Frame size
110% 60s		150% 60s		200% 3s		300% 3s			
I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}		
3.00	3.30	3.00	4.50	3.00	6.00	2.00	6.00	-03A0-4	A
5.00	5.50	5.00	7.50	4.00	8.00	2.70	8.10	-05A0-4	A
6.40	7.10	6.00	9.00	4.70	9.40	3.20	9.60	-07A0-4	A
14.00	15.40	11.00	16.50	9.00	18.00	7.00	21.00	-016A-4	B
21.50	23.70	17.00	25.50	13.50	27.00	10.00	30.00	-024A-4	C
28.00	30.80	25.00	37.50	21.00	42.00	16.00	48.00	-031A-4	C
41.00	45.10	35.00	52.50	28.00	56.00	20.00	60.00	-046A-4	C
62.00	68.20	46.00	69.00	35.00	70.00	25.00	75.00	-060A-4	D
90.00	99.00	70.00	105.00	55.00	110.00	40.00	120.00	-090A-4	D

Ratings/8 kHz								Size (Type designation)	Frame size
110% 60s		150% 60s		200% 3s		300% 3s			
I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}	I_{2N}	I_{2max}		
3.00	3.30	3.00	4.50	2.30	4.60	1.60	4.80	-03A0-4	A
4.00	4.40	4.00	6.00	3.00	6.00	2.20	6.60	-05A0-4	A
5.00	5.50	4.00	6.00	4.00	8.00	3.00	9.00	-07A0-4	A
10.00	11.00	9.00	13.50	7.00	14.00	5.00	15.00	-016A-4	B
17.50	19.30	15.00	22.50	12.00	24.00	9.00	27.00	-024A-4	C
25.00	27.50	20.00	30.00	18.00	36.00	13.00	39.00	-031A-4	C
33.00	36.30	31.00	46.50	25.00	50.00	17.00	51.00	-046A-4	C
45.00	49.50	35.00	52.50	28.00	56.00	21.00	63.00	-060A-4	D

Ratings	
MotiFlex e180 has four different overload modes as user selection: 110%, 150%, 200%, 300%	
I_{2N}	Maximum continuous rms current in selected overload mode. Load current duty cycle rms should be lower than this
I_{2max}	Maximum overload current for 60s (110%, 150%), or 3s (200%, 300%)
Note: Mains choke (AC or DC) is mandatory for operation with C and D frame sizes with 110% and 150% overload modes.	

Options & accessories

Frame Size Features	A	B	C	D
Braking chopper	●	●	●	●
Braking resistor	□	□	□	□
AC choke	□	□	□	□
DC choke	—	—	□	□
Mains filter (EMC) / C3	□	□	□	□
Installation features				
Air cooling (fan)	●	●	●	●
Removable connectors Control / Power	● / ●	● / ●	● / —	● / —
Side by side mounting	●	●	●	●
DIN rail mounting	●	●	—	—
Horizontal mounting	●	●	●	●

●   Standard

□   Option, external

—   Not available

ABB automation products

Motion controllers

ABB offers a wide range of motion control products to suit many different applications. Motion controllers are available in PCI format, as standalone units with USB, CANopen, serial and Ethernet interfaces and as intelligent programmable drives for use in single or multiaxis systems.

Servo drives

ABB offers a range of servo drives to cover many different applications. Its drives range from simple analog, fieldbus controlled drives, indexing drives, fully programmable motion drives and real-time Ethernet solutions based on the open standard Ethernet POWERLINK and EtherCAT. ABB motion drives control rotary and linear AC servo motors or closed lood induction motors and are available from 1.6A single phase through to 90A three phase.

Machinery drives

ABB offers machinery builders AC drives from component drives up to high performance machinery drives. Global support and service guarantees lifelong satisfaction. ABB machinery drives provide speed control of diverse applications from spa bath motors to treadmill motors, as well as high precision applications such as positioning and synchronization systems.

Control panels

Our control panels offer a wide range of touchscreen graphical displays from 3.5" up to 15". They are provided with user-friendly configuration software that enables tailor made customized HMI solutions. Rich sets of graphical symbols and the relevant drivers for ABB automation products are provided. Control panels for visualization of AC500 web server applications are available.

Servo motors

ABB's e-Series and BSM servo motors offer a wide range of power outputs, a choice of feedback devices and gearheads to match. All ABB servo motors are designed for durability and ability to handle harsh environments.

AC motors

ABB's low voltage AC motors are designed to save energy, reduce operating costs and enable demanding motor applications to perform reliably and without unscheduled downtime. General performance motors combine convenience and easy handling seamlessly with ABB's engineering expertise. Process performance motors provide the most comprehensive, versatile set of motors for the process industries and heavy-duty applications.

Jokab safety products

ABB Jokab Safety offers an extensive range of innovative products and solutions for machine safety systems. It is represented in standardization organisations for machine safety and works daily with the practical application of safety requirements in combination with production requirements. ABB Jokab Safety delivers everything from a single safety solution to complete safety systems for single machines or entire production lines.

ABB automation products

AC500

ABB's powerful flagship PLC offering a wide range of performance levels and scalability within a single simple concept where most competitors require multiple product ranges to deliver similar functionality. Web server integrated and IEC 60870-5-104 remote control protocol for all Ethernet versions.

AC500-eCo

Meets the cost-effective demands of the small PLC market whilst offering total inter-operability with the core AC500 range. Web server, FTP server and Modbus-TCP for all Ethernet versions. A Pulse Train Output module is available for multi-axis positioning.

AC500-S

A PLC based modular automation solution that makes it easier than before to mix and match standard and safety I/O modules to expertly meet your safety requirements in all functional safety applications. "Extreme conditions" version is also offered.

AC500-XC

"Extreme conditions" modules with extended operating temperature, immunity to vibration and hazardous gases, for use at high altitudes, in humid conditions, etc. It replaces expensive cabinets with its built-in protection against dirt, water, gases and dust.

Programming software

Automation Builder integrates the engineering and maintenance for PLC, drives, motion, HMI and robotics. It complies with the IEC 61131-3 standard offering all five IEC programming languages for PLC and drive configuration. In addition, it includes continuous function chart, C, extensive function block libraries and powerful embedded simulation/visualization features. Automation Builder supports a number of languages (English, German, French, Chinese, Spanish) and comes with new libraries, FTP functions, SMTP, SNTP, smart diagnostics and debugging capabilities.

Robotics

ABB's robotic automation offers cell automation by integrating AC500 PLCs in IRC5 robot controllers. More productivity with robots is achieved by wireless interfaces for sensors and actuators on robot tools. Wireless from ABB is an innovative, proven solution well-suited for robots, presses, rotary tables and gantries.

I/O modules

Centralised I/O expansion of the AC500 line and decentralised modular I/O supporting CS31, CANopen, PROFIBUS© DP, PROFINET® and EtherCAT.

Notes:

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein.
Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

3AUA0000206507 REV A EN 07.12.2016

Power and productivity
for a better world™

ABB