



Motion control products

Powering machine innovations MotiFlex e180 motion control drives Catalog

Power and productivity
for a better world™



Powering machine innovations

Time, resources and know how is highly invested in machine innovation and business success. When choosing suppliers you require the same commitment. Like with your machines, performance and dependability over the whole life cycle of the products and services is key.

The 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

We at ABB have designed our motion control solutions to power machine innovations. 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.

Expertise and support at your service

Our engineers have decades of experience working together with machine builders in a broad range of industries, and know what it takes to succeed in this dynamic world of motion control. Wherever the machines are delivered, ABB and our value provider network is there to support your business, globally and just around the corner.

Have you already decided what powers your machine innovation? If not, have a look what MotiFlex e180 and our motion control solutions can offer you.

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Performance and capability
you can depend on



The image shows a close-up of an ABB ET100 controller unit. The unit is white with a red ABB logo. It features a green terminal block labeled 'ET IN' and a black terminal block labeled 'E2:OUT'. A white memory unit is inserted into the front of the unit, with a blue label that includes a QR code and the text '2M11-02', '10015', '1A1000000000010A', and '4260327V5'. The unit is mounted on a white rack with a green ventilation grille in the background.

Versatile drive delivers benefits to a broad range of applications

The MotiFlex e180 is a versatile motion control drive delivering high performance and capability you can depend on in a broad range of demanding motion control applications. Optimizing every move, the MotiFlex e180 and our motion control solutions enable you to improve your machine's productivity and end-product quality.

Metal forming and converting machinery

The metal industry sets high requirements for motion control. In applications such as pressing, bending, laser cutting, drilling or polishing the motion control system must perform well in tight tolerance levels and changing inertia loads. MotiFlex e180 adapts to various roles in different metal forming and converting machinery.

- Dynamic control for rotary and linear servo motors with up to 300% overload modes
- Highly integrated connectivity to various feedback devices as standard and dual feedback to eliminate mechanical errors
- Real-time communication over Ethernet ensures optimal machine performance

Textile machinery

The textile industry requires high dependability, throughput and performance in harsh environments exposed to dust, humidity and high temperatures. Typically textile machines operate 24/7 with high production speeds and big volumes. An unwanted interruption of a machine turns quickly to big losses in production. MotiFlex e180 provides dependable performance, accurate speed and tension control to textile machinery such as winding, reeling, spinning, dyeing, stretching, weaving, knitting, finishing and printing.

- The drive can be used for stand-alone single axis control, in centralized systems for multi-axis control or as the master drive controlling other drives
- Highly integrated and flexible feedback device connectivity as standard, including rugged resolvers and precise encoders

Plastics machinery

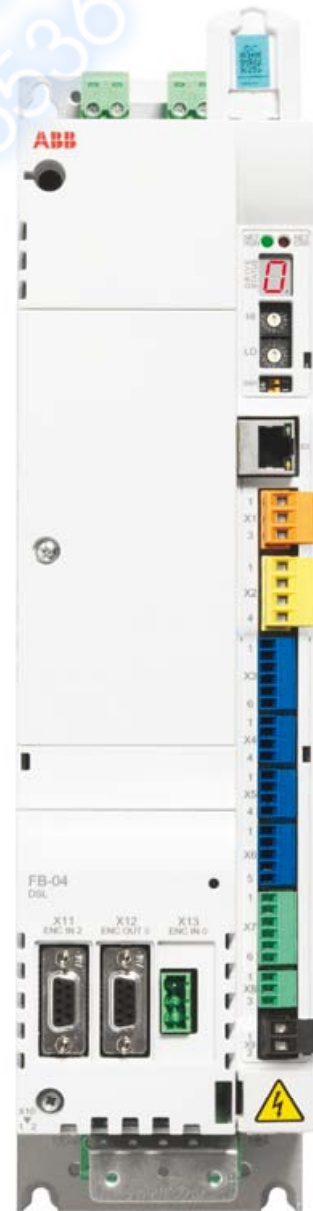
Plastics machinery requires versatility from motion control. From high starting torque in extrusion to high speed and tension control in winding, and high accuracy and dose control in injection and blow molding. Versatility and flexibility are key attributes for MotiFlex e180.

- A broad operation range with continuous currents up to 90 A, and overloads up to 300%
- Real-time Ethernet connectivity enables high precision and quality of end-products
- Highly integrated connectivity to various feedback devices comes as standard, including robust resolvers

Packaging

Packaging applications, such as over wrappers and vertical form fill seal, demand high throughput and repeatable quality of product with minimum downtime. MotiFlex e180 features high performance servo control for dynamic motion, with tightly integrated Ethernet control and feedback devices to match the machine needs of precision and resilience.

- Safe torque off (STO) as standard eliminates costly power cycles, with immediate restart in the event operators open machine guards
- High speed registration inputs provide precise registration of product and label for high speed labeling





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 via Modbus TCP

Modbus TCP and Ethernet/IP™ provide support for HMI, PLC or upstream communication network.



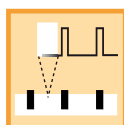
Memory unit

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. 2 x fast latch inputs (1 μ s)



Two high speed registration inputs

2 x 24 V fast (1 μ s) isolated inputs that can be used to latch feedback device position in hardware and trigger software events locally in MINT.



Flexible Ethernet connectivity

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



Safety

Safe torque off (STO) SIL3 PL e 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 utilisation.



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.



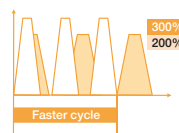
Rotary and linear motors

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.



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.

How to select a drive

Type designation:

MFE180 - 04AN - xxAx - 4 + Lxxx + Nxxx

Product series

MotiFlex e180

Construction

04AN: Air-cooled module

Size

Voltage rating

4 200 to 480 V AC +/-10%

Feedback options

+L517 FB-01: Incremental encoder + Halls

+L518 FB-02: Serial Encoder + SinCos (1v pk-pk)

+L516 FB-03: Resolver

+L530 FB-04: DSL (Stegmann 2 wire solution)

Functionality level options

+N8020 MINT Single axis

Dimensions

| Frames | Height | | Width | | Depth | | Weight | |
|--------|--------|------|-------|------|-------|------|--------|------|
| | mm | in | mm | in | mm | in | kg | lb |
| A | 364 | 14.3 | 90 | 3.54 | 144 | 5.67 | 3 | 6.61 |
| B | 380 | 15 | 100 | 3.94 | 221 | 8.7 | 5 | 11 |
| C | 467 | 18.4 | 165 | 6.5 | 223 | 8.78 | 10 | 22 |
| D | 467 | 18.4 | 220 | 8.66 | 223 | 8.78 | 17 | 37.5 |

Notes

Height is the maximum measure without clamping plates

In depth an additional 50 mm (2 in) should be reserved for feedback cabling



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, U/f |
|----------------------|-------------|

| | |
|--------------------|--|
| Motor types | Asynchronous motors (standard induction, servo) and synchronous motors (servo, high torque), linear servo motors |
|--------------------|--|

| | |
|------------------------------------|------------------------------------|
| Switching frequency/control | 4 to 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 | 0 to +55 °C (32 to 131 °F), no frost allowed. |
| Temperature | 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 |
|--------------------------|--|

Ratings, types and voltages

| Ratings/4 kHz | | | | | | | | Size (Type designation) | Frame size |
|---------------|------------|-----------|------------|----------|------------|----------|------------|----------------------------|------------|
| 110% 60 s | | 150% 60 s | | 200% 3 s | | 300% 3 s | | | |
| 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% 60 s | | 150% 60 s | | 200% 3 s | | 300% 3 s | | | |
| 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 |
| 55.00 | 60.50 | 47.50 | 71.30 | 40.00 | 80.00 | 30.00 | 90.00 | -090A-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 60 s (110%, 150%), or 3 s (200%, 300%) |

Note: Mains choke (AC or DC) is mandatory for operation with C and D frame sizes with 110% and 150% overload modes, further details on page 16

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

See page 16 for the selection list of available accessories

Control connections to the GCU Control Unit



— E3 (Ethernet)

— X1 (3-pole, orange)

— X2 (4-pole, yellow)**

— X3 (6-pole, blue)

— X4 (4-pole, blue)

— X5 (4-pole, blue)

— X6 (5-pole, blue)

— X7 (6-pole, green)

— X8 (3-pole, green)

— X9 (2-pole, black)

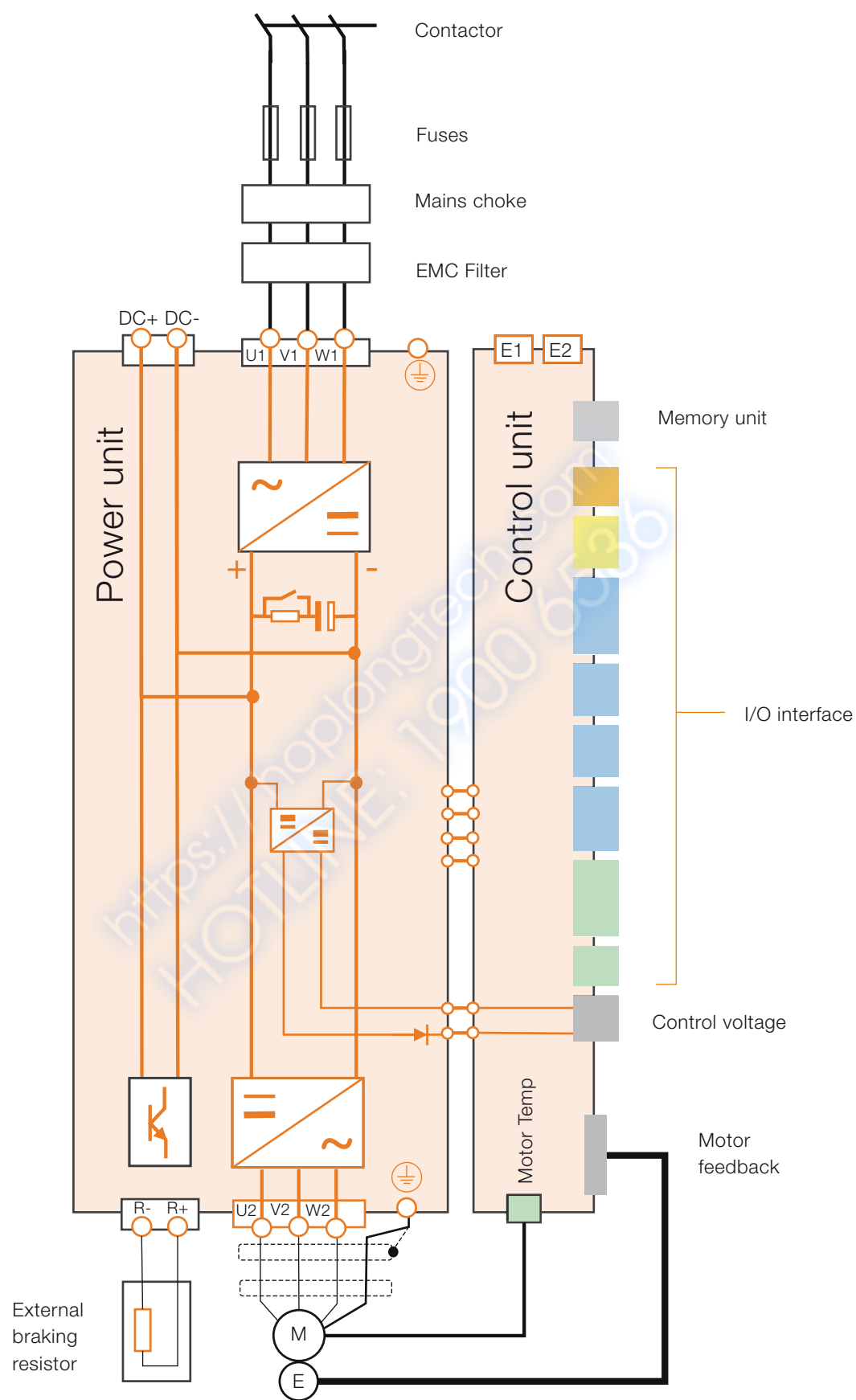
— X10 (2-pole, green)**

| | | | |
|---|-----------|-----|------------|
| | | E3 | To host PC |
| Ethernet | Host | 1 | |
| | | X1 | |
| Relay output 250 V AC/30 V DC 2 A | NC | 1 | |
| | COM | 2 | |
| | NO | 3 | |
| | | X2 | |
| Safe torque off. Both circuits must be closed for the drive to start. | +24 V OUT | 1 | |
| | SGND | 2 | |
| | STO1 IN | 3 | |
| | STO1 IN | 4 | |
| | | X3 | |
| Digital input 1- | DI1- | 1 | |
| Digital input 1+ | DI1+ | 2 | |
| Shield | Shield | 3 | |
| Digital input 2- | DI2- | 4 | |
| Digital input 2+ | DI2+ | 5 | |
| Shield | Shield | 6 | |
| | | X4 | |
| Digital input 0 | DI0 | 1 | |
| Digital input 3 | DI3 | 2 | |
| Digital input 4 | DI4 | 3 | |
| Common reference 0 | CREFO | 4 | |
| | | X5 | |
| Digital input 5 | DI5 | 1 | |
| Digital input 6 | DI6 | 2 | |
| Digital input 7 | DI7 | 3 | |
| Common reference 1 | CREF1 | 4 | |
| | | X6 | |
| User +24 V DC | USR V+ | 1 | |
| Digital output 0* | DO0 | 2 | |
| Digital output 1* | DO1 | 3 | |
| Digital output 2* | DO2 | 4 | |
| Digital output 3* | DO3 | 5 | |
| | | X7 | |
| Analogue input 0+ | AI0+ | 1 | |
| Analogue input 0- | AI0- | 2 | |
| Analogue ground | AGND | 3 | |
| Analogue input 1+ | AI1+ | 4 | |
| Analogue input 1- | AI1- | 5 | |
| Shield | Shield | 6 | |
| | | X8 | |
| Analogue output 0 | AO0 | 1 | |
| AGND | AGND | 2 | |
| Shield | Shield | 3 | |
| | | X9 | |
| External power input, 24 V, 1 A | +24 V IN | 1 | |
| | GND | 2 | |
| | | X10 | |
| Motor thermistor | TH1 | 1 | |
| | TH2 | 2 | |

* Maximum 100 mA per output.

** X2 and X10 connectors are supplied with wires that allow the drive to operate without using the STO or motor thermistor functions.

Main circuit



Easy PC tool for configuration and machine tuning

MINT WorkBench is a Windows tool for ABB's range of motion controllers and servo drives providing simple drive setup, motion programming of intelligent drives and multi-axis motion controllers.

Drive commissioning made easy

Drive commissioning is simplified by a step by step wizard that guides the user through motor selection and application choices and finally an autotuning system that makes light work of system tuning.

Features include:

- Wizards to simplify 'expert' tasks such as configuration of drives and networks
- Full screen editor with color syntax highlighting and debugging capabilities
- Command line interface to interrogate the controller even when the program is running
- Spy window to monitor common motion variables, I/O, communications and more
- 6 channel software oscilloscope
- Watch window for monitoring variables and tasks
- SupportMe function with automatic email generation for rapid technical support
- Web updates of firmware within the MINT WorkBench
- Easy management of firmware files and updates

Intelligent support with one click

If you are using one of our electronic products that requires the use of MINT WorkBench, the SupportMe function will gather important information about your device configuration and environment. This information helps our engineers in assisting you with your enquiry and going straight to the point.

Motion programming made easy

MINT WorkBench offers an easy to use development platform for MINT programming with its color syntax highlighting of keywords. The context sensitive help provides you clear instructions of each command word and gives you tips for using it without the need for a user manual. The Program Navigator makes it a breeze to navigate the source code, no matter how complicated.

MINT motion programming

MINT is the programming language for our range of motion controllers and programmable drives. Designed around Basic, MINT will be familiar to many with its English like keywords and high level functionality.

MINT offers:

- Motion, machine logic, communications and HMI
- Multitasking for streamlined performance
- Functions, procedures, events
- Modular coding approach
- Modern development and debugging environment
- ActiveX support



Feature-rich, intelligent drive solutions

MotiFlex e180 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 MotiFlex e180 products using absolute encoders.



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.



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.



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



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.



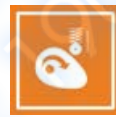
FLY - Flying shear segments

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.



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.



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.



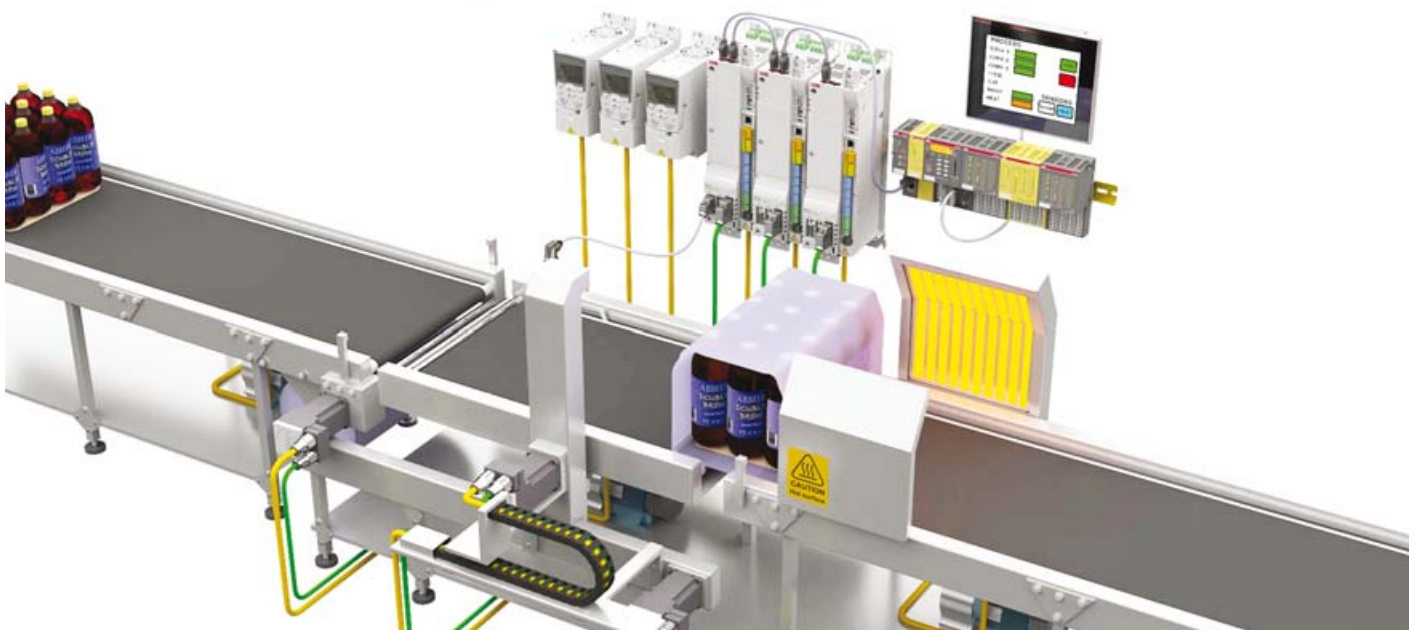
Splines and PVT profiles

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).



Incremental/Absolute moves

Simple point to point motion.



Flexible choice of platform

MotiFlex e180 is a member of ABB's motion control solutions including human-machine interfaces (HMI), programmable logic controllers (PLC), safety technology and extending to multi-axis motion controllers, high performance servo drives, rotary servo motors and linear motors. All of which seamlessly integrate to provide a complete machine control solution.

The versatile performer

MotiFlex e180 can be flexibly used for stand-alone single axis control, in centralized systems for multi-axis control or as the master drive controlling other drives and axis. It provides dynamic control for both rotary servo motors and linear motors. Flexible connectivity over Ethernet and to different motor feedback technologies is highly integrated and optimized for demanding motion control applications.

Stand-alone control

With MINT WorkBench PC tool you can easily configure and program MotiFlex e180 to perform stand-alone single axis control.

Centralized control

Depending of your machine requirements, you can use a PLC and motion controller with MotiFlex e180 drives to control multiple axes in your machine. Our offering includes easily extendable AC500 PLCs and powerful motion controllers. MINT Machine Centre enables you to program the entire system via one Ethernet cable.

Highly integrated and flexible connectivity

Integrated Ethernet

- Highly integrated Ethernet provides optimal performance for real-time motion control applications
- Ability to select from multiple protocols (switch on the drive) as standard, allows the drive to operate with different communications protocols (open connectivity)
- Dual-Ethernet at the top for real-time control. LEDs show visually when a link is active and drive is working
- Ethernet connection service port which can be used for configuration and diagnostics, or HMI and upstream connectivity

Motor feedback

- Supports a wide range of feedback devices, including incremental encoders, single or multi-turn absolute encoders and resolvers
- Supports single cable solution for motor power and feedback
- Dual encoder is supported (incremental encoder input and output) as standard

Memory module (personality module)

- Stores drive's settings, parameters and application programs
- Prepare drive settings off-site, manage functionality levels or move settings from one drive to another

Safety

- Two-channel safe torque off with performance level PL e and safety integrity level SIL 3

I/O

- Digital and analog interfaces for machine control
- Two high-speed registration inputs
- One relay output

24 V external supply

- Keeps the control board and communication on when the mains power is cut off

Motor thermal protection input

- Prevents motor from overheating and damage



Memory module

- Firmware and parameters
- Easy drive swap out

Other features

- 7 segment display alarm/status
- 2 x hex switches for node ID
- 2 x DIP switches comms functions

Ethernet commissioning

- Modbus TCP
- EtherNet/IP™

2 channel STO SIL 3 PL e

I/O features

- 2 x fast latch inputs (1 micro sec)
- 8 x DI (inc fast latch input)
- 4 x DO
- 2 x AI (12 bit, +/-10 V)
- 1 x AO (12 bit, +/-10 V)
- Motor thermal PTC (isolated)
- 1 x Relay out 1 x c/o (240 V 5.0 A)

Realtime Ethernet

Software selectable protocol including:

- EtherCAT®
- PowerLink
- Other protocols supported by generic Ethernet port

Feedback options

- Serial Encoder + SinCos (1Vpp) EnDat, SSI, BiSS, SmartAbs, Hiperface,
- Incremental + Halls
- Resolver
- DSL

Incremental encoder input

- Dual loop or line shaft functions

Simulated encoder output

Motor thermal PTC (isolated)

24 V control supply

- Maintain communications and position with AC power removed

Accessories

System cables

ABB offers a range of high-flex cables, both premade with connectors and without connectors for use with our range of servo motors, drives and motion controllers.

Dynamic braking options

Depending on the application, an external braking resistor may be needed to convert the kinetic energy generated into thermal energy. A selection of resistors is available for different kinds of pulse duty performance. All braking resistors are equipped with a thermal sensor as standard.

| Braking resistors | |
|-------------------|--|
| JBR-01 | Braking resistor, IP20 (145 W/120 ohm) |
| JBR-03 | Braking resistor, IP20 (185 W/80 ohm) |
| JBR-04 | Braking resistor, IP20 (360 W/40 ohm) |
| JBR-05 | Braking resistor, IP20 (570 W/20 ohm) |
| JBR-06 | Braking resistor, IP20 (790 W/13 ohm) |

Mains chokes

The MotiFlex e180 does not necessarily need a mains choke for operation with frame sizes A and B. The mains choke (AC or DC) is required with frame sizes C and D in 110% and 150% overload modes, but not in 200% or 300% overload modes. Each individual case should be checked to ascertain whether a mains choke needs to be installed. Mains chokes are typically used to:

- Reduce harmonics in the mains current
- Achieve a reduction in the rms mains current
- Reduce mains disturbance and low frequency interference
- Increase the allowed DC bus continuous power

| AC chokes | |
|-----------|--------------------------------------|
| CHK-01 | AC Choke/MFE180 size: 03A0-4 |
| CHK-02 | AC Choke/MFE180 size: 05A0-4, 07A0-4 |
| CHK-04 | AC Choke/MFE180 size: 016A-4 |
| CHK-05 | AC Choke/MFE180 size: 024A-4, 031A-4 |
| CHK-06 | AC Choke/MFE180 size: 046A-4 |
| CHK-07 | AC Choke/MFE180 size: 060A-4 |
| CHK-08 | AC Choke/MFE180 size: 090A-4 |
| DC chokes | |
| DCL-01 | DC Choke/MFE180 size: 024A-4, 031A-4 |
| DCL-02 | DC Choke/MFE180 size: 046A-4 |
| DCL-03 | DC Choke/MFE180 size: 060A-4 |
| DCL-04 | DC Choke/MFE180 size: 090A-4 |

EMC – electromagnetic compatibility

The EMC product standard EN 61800-3 covers the specific EMC requirements stated for drives (tested with motor and cable) within the EU. EMC standards such as EN 55011, or EN 61000-6-3/4, apply to industrial and household equipment and systems. Drive units complying with requirements of EN 61800-3 are always compliant with comparable categories in EN 55011 and EN 61000-6-3/4, but not necessarily vice versa. EN 55011 and EN 61000-6-3/4 do not specify cable length nor require a motor to be connected as a load. The emission limits are comparable according to the following table of EMC standards

EMC standards in general

| EN 61800-3 (2004), product standard | EN 55011, product family standard for industrial, scientific and medical (ISM) equipment |
|---|--|
| Category C1 (1 st environment, unrestricted distribution) | Group 1, Class B |
| Category C2 (1 st environment, restricted distribution) | Group 1, Class A |
| Category C3 (2 nd environment, unrestricted distribution) | Group 2, Class A |
| Category C4 (2 nd environment, restricted distribution) | Not applicable |

Mains filters are available to meet category C3 level with the MotiFlex e180 drive installation, including a motor with a max. 50 m cable (30 m for Frame C models).

| EMC filters | |
|-------------|--|
| JFI-02 | EMC filter/MFE180 size: 03A0-4, 05A0-4, 07A0-4 |
| JFI-03 | EMC filter/MFE180 size: 016A-4 |
| JFI-05 | EMC filter/MFE180 size: 024A-4, 031A-4, 046A-4 |
| JFI-07 | EMC filter/MFE180 size: 060A-4, 090A-4 |

Performance and capability
you can depend on



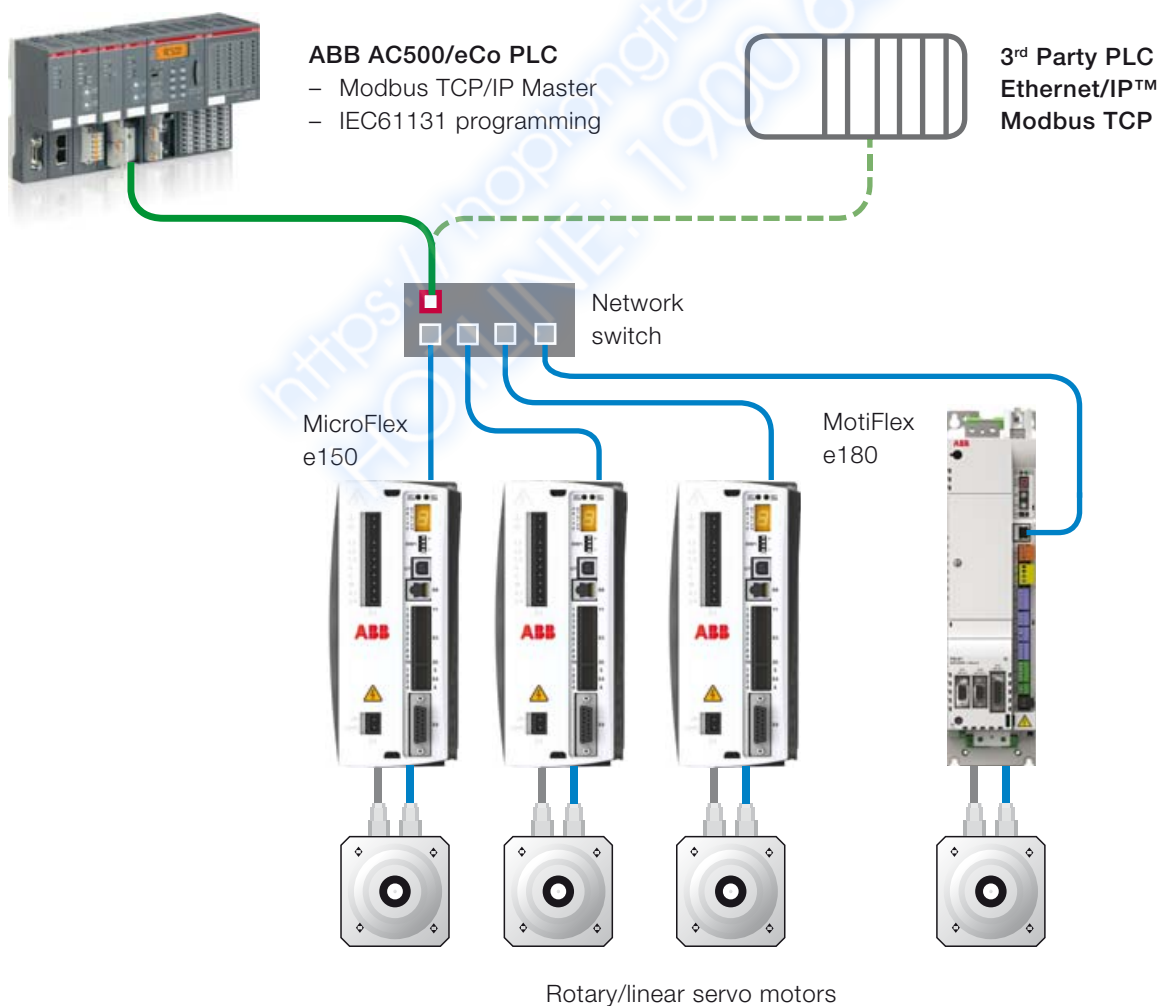
Modbus TCP/IP solutions

Ethernet simple multi-axis motion solutions

- 1 x port RJ45 Ethernet 100 MB
- Generic Drive Interface (GDI)
 - Predefined PLC drive control interface
 - Customization possible through MINT to optimize the solution
 - Prewritten PLC function libraries for AC500 and other PLCs
- Simple wizard drive-based configuration and predefined PLC drive data
 - Up and running in shorter time
 - Making distributed control easy
 - Application note AN204 available at www.abb.com/motion

EtherNet/IP drive control for distributed axes

- 1 x port RJ45 Ethernet 100 MB
- Drives perform the homing and motion functions (home sensor connects to the drive)
- Generic Drive Interface (GDI) can be used or customized
- Function libraries available for RS Logix for easy control of MicroFlex e150 and MotiFlex e180



Generic drive interface

Users of A-B RSLogix5000 family PLCs can now take advantage of our free prewritten motion function library that provides control of ABB motion drives via Ethernet/IP. The Add-On Instructions (AOI) can easily be imported directly into your control project and combined with the Generic Drive Interface (GDI), to directly control and monitor motion axes.

Save time with prewritten functions

The Add-On Instructions comprises a set of prewritten motion functions and data mappings, which directly handle all process data interaction logic, providing commands for most common motion tasks. The function library can easily be imported into your project, reducing code development time and risk in implementing motion control.

Customisable to optimise for your application

The function library makes use of our Generic Drive Interface (GDI), a flexible drive profile for Ethernet based drive control. The GDI can be used without modification, but if you have special requirements to implement at low level for a specific axis task, then the source code is available and can be modified to add your own custom application functions directly in any drive using MINT.

Benefits of Add-On Instructions and a flexible Drive control profile

Prewritten drive control interface, ready to use
Prewritten library of motion control function blocks
Highly flexible/configurable behavior and functions
Extensible - simplify or extend features by customising the provided MINT application
Note: prewritten libraries are also available for ABB AC500 with Modbus TCP

Standard control features

The standard features supported in the GDI are listed below. These can be reduced to a subset or enhanced by adding or customising the functions in the MINT application.

The sample programs included with the application note provide a mechanism for an ABB PLC to:

- Issue a home command
- Issue a relative move
- Issue an absolute move
- Issue an incremental relative move (and optionally stop a programmed distance past a "fast-latch" position)
- Issue an incremental absolute move (and optionally stop a programmed distance past a "fast-latch" position). Effectively a ready-made solution for indexing conveyor applications
- Jog the axis
- Set the axis position
- Issue a speed reference
- Issue a torque reference
- Enable/disable the axis
- Enable/disable hardware limits
- Reset axis errors
- Perform a controlled stop or crash stop on the axis
- Gear the axis to a secondary encoder input
- Set speed, acceleration times, deceleration times and jerk times for all motion
- Control modulo or non-modulo axes
- Standard monitoring functions

At the same time the PLC is able to monitor status information from the drive including:

- | | |
|--|-----------------------------|
| - Enabled state | - Ready to be enabled state |
| - Idle state | - In Position state |
| - Motor brake state | - Homed state |
| - Forward limit state | - Reverse limit state |
| - Fault state | - Stop input state |
| - Indication of missing fast latch interrupt | - Error code |
| - Phase search status | - Measured velocity |
| - Measured position | - Following error |
| - Axis mode of operation | - RMS current |

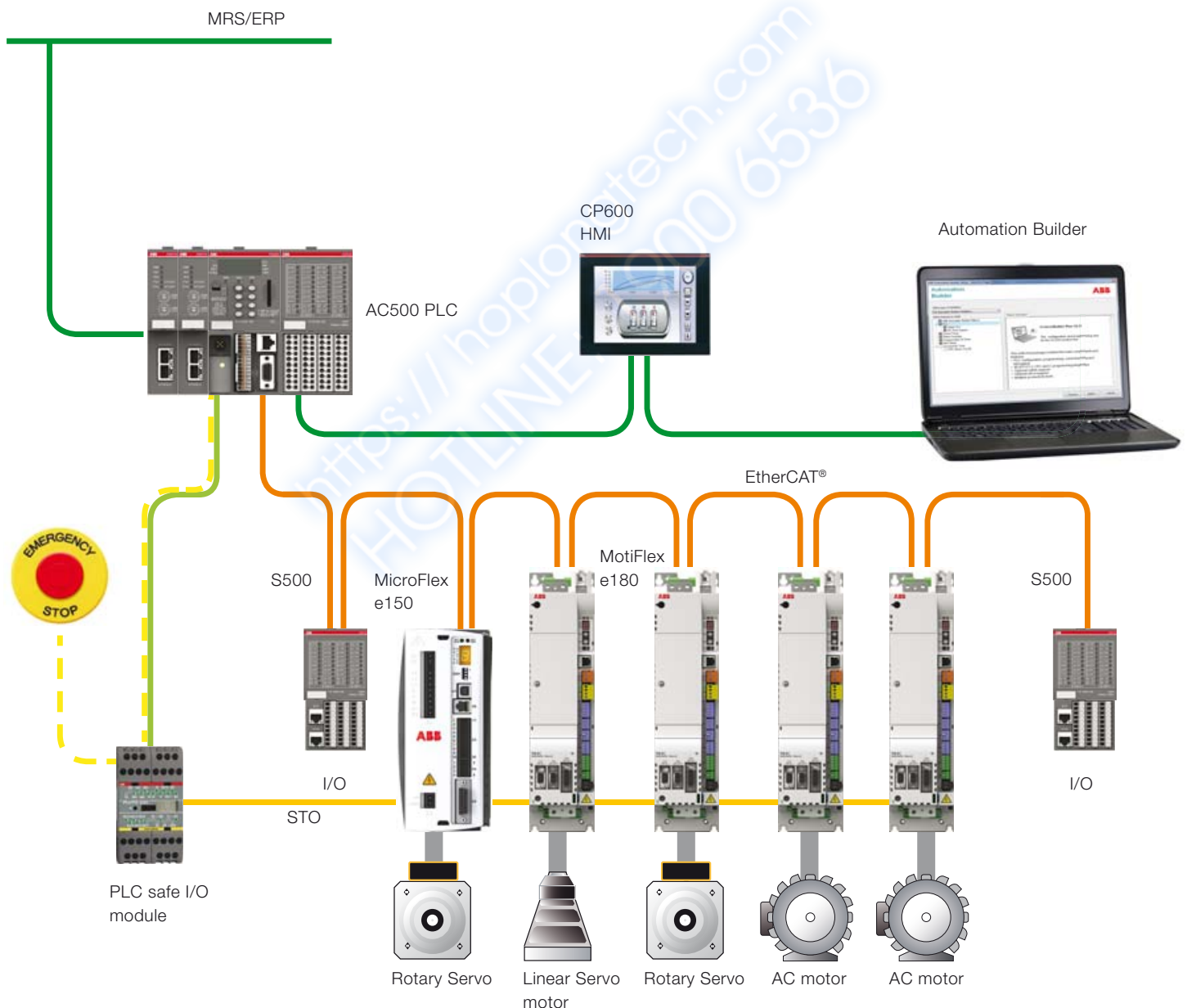


EtherCAT® solutions

EtherCAT® multi-axis coordinated motion

MotiFlex e180 is ideally partnered with ABB's AC500 PLC line with EtherCAT® real-time performance or Modbus TCP control for less demanding applications. It also works with ABB's ACSM1 with FECA-01 EtherCAT® module for higher power axes, along with the ACS355 and ACS850 drives. The AC500 PLC provides an industry solution with IEC 61131 programming and PLCopen motion functions.

EtherCAT's popular high performance motion bus provides simple 'daisy chain' connection. It features two-port RJ45 Ethernet 100 MB and a DS402 drive profile (IEC 61800-7) providing cyclic sync position and velocity, homing and touch probe.



Automation Builder

Discover engineering productivity in your discrete automation solutions.

Automation Builder is ABB's integrated programming and simulation environment for PLCs, safety, robots, motion, drives and control panels.

Automation Builder integrates the proven ABB tools Control Builder Plus, RobotStudio, Drive Manager, MINT WorkBench and Panel Builder.

Minimize your efforts for managing your project code and data with Automation Builder.

Improve your productivity through seamless engineering – common data storage, single project archive, time saving library blocks for device integration, and a common software installer.

Reduce engineering effort and maintenance cost using easy to use libraries for applications in wind, water, solar, drives, motion, robotics and safety.

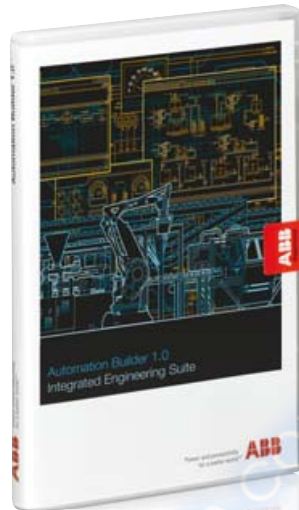
Benefit from the simplicity of IEC 61131-3, PLC open, ANSI C and MINT programming languages.

Speed up your project by the bulk data handling capabilities of Automation Builder.

Reduce downtime by simplified diagnostics and maintenance.

Automation Builder is a single software suite that allows you to configure and program various ABB controller families in a single project.

Secure and restore your applications in a consistent joint backup.



Automation Builder



CP600



AC500
Automation Builder IEC 61131-3
(IL, SFC, CFC, LD, FBD, ST)
ANSI C
AC500-S
Automation Builder IEC 61131-3
(LD, FBD, ST)
ANSI C



ACS880
Automation Builder
IEC 61131-3
(LD, FBD, IL, ST, SFC, CFC)



MotiFlex e180
MINT motion programming



IRB 7600

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, and are available from 1 A single phase through to 65 A 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 pumps to conveyors, 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 BSM series servo motors offer a wide choice of high or low inertia models with winding options, 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 Out-put 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, STMP, 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®.

Contact us

For more information please contact your local ABB representative or visit:

www.abb.com/motion

www.abb.com/drives

www.abb.com/

www.abb.com/drivespartners

www.abb.com/motors&generators

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