



Drives and controls

Powering machine innovations MicroFlex e150 motion control drives

Compact programmable servo drive with integrated Ethernet

The MicroFlex e150 servo drive provides precision control of rotary and linear servo motors in a wide range of motion applications such as labelling heads, flying shears and indexing axes.

Single axis motion applications benefit from a powerful programming option that combines with the Ethernet interface, Modbus RTU, digital and analog I/O and dual encoder input to create a single device solution. Multi-axis tightly coupled systems are powered by EtherCAT. As such, programmable intelligent drives and EtherCAT slave servo drives are provided in the same package.

The MicroFlex e150 operates from 105 to 250 V AC single- or three-phase and is available in multiple current and power ratings. Through a 300 percent overload, high dynamic torque can be achieved to help maximize productivity.

Ethernet and motor feedback interfaces are fully integrated and optimized for demanding motion applications.

The award winning MicroFlex e150, with integrated EtherCAT technology, is ideally suited to centralized motion applications using a machine automation controller such as the AC500 PLC to coordinate axes.

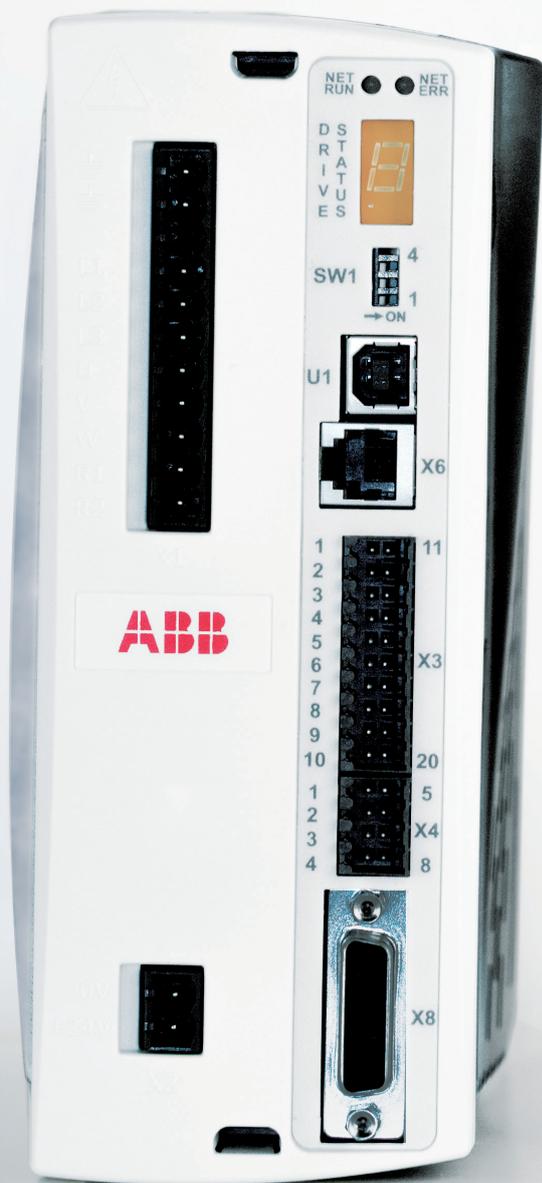
Control Engineering: Engineers' Choice Award 2013

The 26th annual Control Engineering Engineers' Choice Awards shines a light on 29 categories of control, instrumentation and automation products, revealing the best of those introduced in 2012 as chosen by Control Engineering's print and digital audience. "This new feature-rich ABB servo drive with powerful embedded programming intelligence, offers built-in EtherCAT, Modbus/TCP and EtherNet/IP at 20 times the speed of existing smart drives for high speed applications".

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The award winning
MicroFlex e150



Dynamic performance for demanding applications

The MicroFlex e150 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 MicroFlex e150 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 operate to tight tolerances and respond to changing inertial loads.

MicroFlex e150 flexibly 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
- Trapezoidal- and S-shaped velocity profiles allow machine throughput to be maximized by optimizing parameters such as acceleration, deceleration and velocity forming
- Highly integrated connectivity to various feedback devices as standard
- Real-time communication over Ethernet ensures the machine performs smoothly without delays

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 large volumes. An unwanted interruption of a machine turns quickly to big losses in production. MicroFlex e150 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

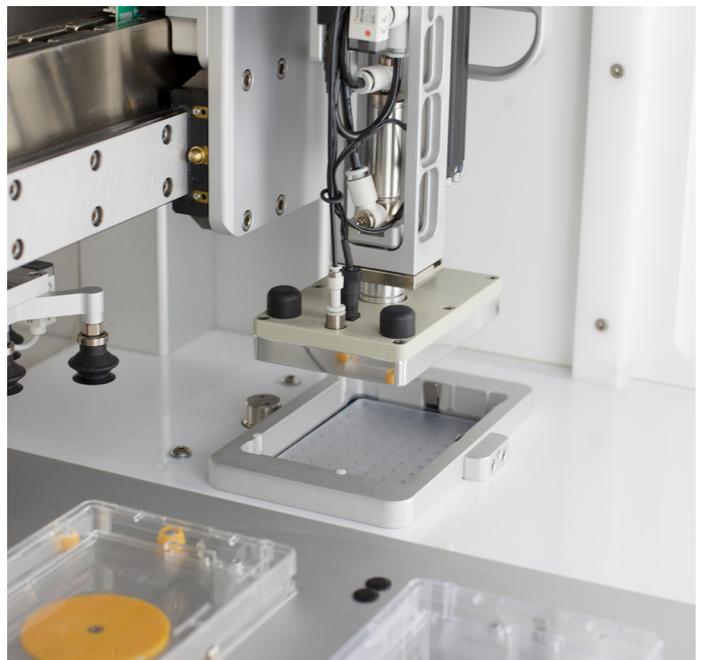
Plastics machinery requires versatility from motion control. From high starting torque in extrusion to high speed and tension control in winding, and high accuracy and dose control in injection and blow molding. Versatility and flexibility are key attributes for MicroFlex e150.

- A broad operation range with nominal currents up to 9 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. MicroFlex e150 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 labelling



One drive. Many possibilities

Machinery original equipment manufacturers (OEMs) need versatile products, and the MicroFlex e150 drives have versatility in abundance - without needing to add hardware or choose configuration options. The multi-protocol Ethernet capability and local intelligence mean

that the applications potential is truly broad. The processing performance is spectacular too - offering some 20 times the speed of existing generations of smart drives - making it ideal for performance intensive applications such as high-speed labelling.

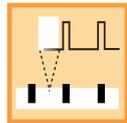
HMI via Modbus

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



Two high speed registration inputs

Precise registration of print marks or product position achieved with 2 x 24V fast isolated inputs that can be used to latch feedback device position in hardware and trigger software events locally in MINT.



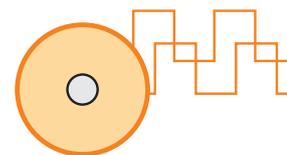
I/O – digital and analog

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) or serial encoder or resolver and one serial encoder simultaneously.





Ethernet connectivity

Integrated Ethernet interface offers EtherCAT® for real-time control of multi-axis systems. Ethernet/IP™, Modbus TCP and RAW Ethernet are supported 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.



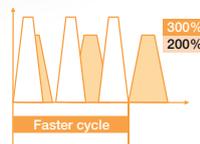
Linear and rotary motors

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.



Universal digital feedback

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

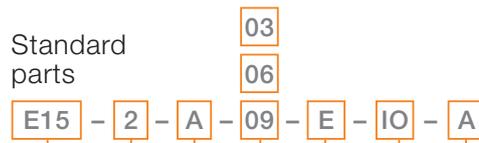


Dynamic overload

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



Prefix model type 'e150' series

2 = 105 – 250 V AC

Separator for Amp rating

0x = Rated current (A rms)

E = Universal encoder

Build option

O = MINT programmable
N = No MINT support

Revision

Dimensions and weights

Frame Size	H mm	W mm	D mm	Weight kg	H inches	W inches	D inches	Weight pounds	Type designation
IP20*	180	82	157	1.45 - 1.55	7.7	3.23	6.2	3.2-3.4	E152A03ExxA
IP20*	180	82	157	1.45 - 1.55	7.7	3.23	6.2	3.2-3.4	E152A06ExxA
IP20*	180	82	157	1.45 - 1.55	7.7	3.23	6.2	3.2-3.4	E152A09ExxA

*Cabinet installation



Technical data

Mains connection	E152A03ExxA	E152A06ExxA	E152A09ExxA
Voltage/Frequency	Single- or three-phase 105-250 V AC/ 48-63 Hz		
Current (200%)	3 A (6 A peak)	6 A (12 A peak)	9 A (18 A peak)
Current (300%)	2.5 A (7.5 A peak)	5.25 A (15.75 A peak)	7.5 A (22.5 A peak)
Nominal output power (W)	1195	2390	3585
Efficiency	>95%		
PWM switching frequency / control	8 kHz / Space Vector Modulation		
Motor types	Asynchronous motors (standard induction, servo) and synchronous motors (servo, high torque), linear servo motors		
Braking resistor (external)	0.25 kW nominal/ 2.7 kW peak 10% duty with 57 W nominal (min 39 W max 100 W)		
Product compliance			
Approvals	CE, cUL	CE, cUR	
EMC	EN61800-3C2 emissions with external filter (30m motor cable limit)		
Environmental Limits			
Operating temperature	0-55°C (de-rating applies to 45 to 55°C max)		
Altitude	Rated 1000 m / 3300 ft De-rate 1.1% / 100 m (330 ft) > 1000 m (3300 ft)		
Degree of Protection	IP20 cabinet installation		
Safety			
Safe torque-off (STO) as standard	Two-channel STO to IEC 61800-5-2, SIL3 PLc		
I/O			
10 x digital inputs	Opto-isolated 24 V 2 inputs can be programmed as fast position latch inputs 1 µs (feedback device dependent)		
7 x digital outputs	Opto-isolated 24 V PNP. 50 mA per channel		
2 x ±10 V analog inputs 1 x ±10 V analog output			
7 segment status display with sequenced error codes	For error and communications notification to quickly identify problems and minimize downtime		
NET RUN & NET ERR LEDs	Indicate EtherCAT status of operation in accordance with EtherCAT Technology Group (ETG) guidelines		

Communications	
EtherCat (E2=IN E1=Out)	2 x RJ45 for daisy chain connection LED indication built into RJ45 sockets Drive profile: DS402/ IEC61800-7-1
EtherNet/IP (E1 port only)	Note: CIP™ sync not supported Drive operation can be customized with a MINT program
Modbus (E1 port only)	Communication with PLCs / Industrial PCs Drive operation can be customized with a MINT program
RAW Ethernet (custom data exchange method)	MINT PC support tools for host PC interfacing in Visual Basic, Visual C.
Serial communications	2 or 4 wire RS485 port with switch selectable termination Modbus RTU as standard (57.6 kBd default) AC500 PLC and CP600 HMI supported on Modbus RTU Alternative serial communications – HCP (MINT proprietary serial protocol) – User programmable in MINT to create / interpret serial protocols – Send and receive ASCII strings / characters to create any simple ASCII protocol – DF1 and other examples available
USB interface	USB for MINT WorkBench – Provides high speed connection for configuration and diagnostics – Up/download parameters in seconds – Update firmware in < 1 minute via USB speed PC developer tools for Windows PC based customer applications – Supported in Visual Basic, C, Labview and more – Supports Ethernet or USB connection – Implement customer specific PC tools or machine interface HMI
Motor feedback	
Universal digital feedback	Incremental encoder + Halls, SSI (Synchronous Serial Interface), BiSS, EnDat 2.1/2.2, 1 V pk-pk Sin/Cos, SmartAbs
Dual encoder input	For line shaft following or dual loop control (position / velocity and commutation) to eliminate mechanical errors
Ethernet and motor encoder feedback interfaces	Highly integrated and optimized for demanding motion applications
Resolver	Support by option OPT-MF-201



Highly integrated and flexible connectivity

EtherNet/IP - EtherCAT® real-time technology

- EtherCAT® interface - 2 port with LED network activity
- EtherNet/IP™ and Modbus TCP
- TCP/IP mode of operation (non real-time) with ActiveX support or RAW Ethernet

AC servo - 1- or 3-phase

- 105 to 250 V AC 50/60 Hz
- AC servo motors, rotary and linear
- 1, 3, 6 and 9 A rms with 200% for 3 s
- One IP20 frame size: 180 x 80 x 157 mm (H x W x D)/1.5 kg
- Fanless operation < 4 A rms @40 °C
- Footprint EMC filter to IEC 61800-3 category 2

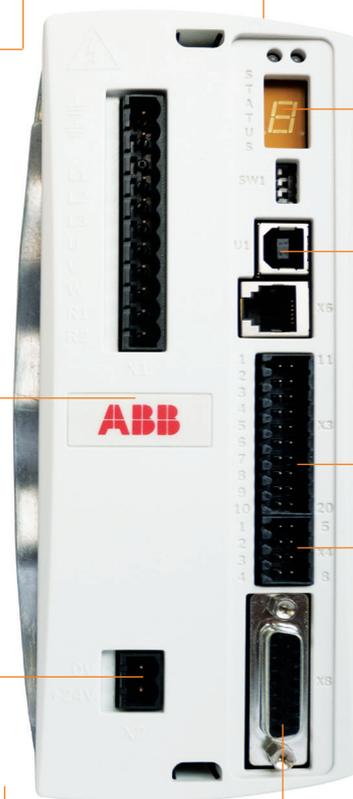
24 V DC supply to maintain communications / position

Motor feedback - universal encoder

- Support for incremental + Halls, 1V SInCos, SSI, BiSS, EnDat 2.1/2.2, SmartAbs
- Dual encoder function supports one incremental (no Halls) serial encoder or resolver and one serial encoder simultaneously for 'Dual loop' or line shaft encoder functions
- Standard 15-pin connection, software selected operation

MINT motion - advanced motion programming

- Powerful MINT multitasking software
- Motion capability including linear motion, indexing, flying shears, software CAM profiler and more
- HMI, communications and logic handling



Additional digital I/O

- 6 x digital inputs (10 in total)
- 4 x digital outputs (7 in total)

USB and serial - communications

- USB for configuration and customer PC application interfaces (supported by free ActiveX components)
- RS485 serial for PLC, HMI or other device communications

I/O - digital and analog

- 4 x digital inputs (10 in total)
- 2 x latch inputs 1 µs latency for registration
- 3 x digital outputs (7 in total)
- 2 x analog inputs +/-10 V 12 bit
- 1 x analog output +/-10 V 12 bit

Safety - safe torque-off (STO)

- Dedicated 2 channel safe torque-off in accordance to IEC 61800-5-2, SIL3 PLe

Control connections

OPT1: Input / Output

14 Shield	7 DIN4
13 CREF1	6 DIN5
12 DIN8	5 DIN6
11 DIN9	4 DIN7
10 USRV+	3 CREF0
9 DOUT5	2 DOUT3
8 DOUT6	1 DOUT4

E1 / E2 EtherCAT

E2	EtherCAT IN
E1	EtherCAT OUT

1	TX+
2	TX-
3	RX+
4	(NC)
5	(NC)
6	RX-
7	(NC)
8	(NC)

E1 is also used for standard Ethernet if DIP switch 4 is in the ON position

LEDs

The seven-segment display and the two EtherCAT LEDs

DIP switches

These switches select the Ethernet mode and RS485 settings

U1 USB

1	+5 V
2	Data-
3	Data+
4	GND

X6 RS485 serial port

	2-wire	4-wire
1	TXA(+)/RXA(+)	TXA(+)
2	TXB(-)/RXB(-)	TXB(-)
3	GND	GND
4	7 V out	7 V out
5	(NC)	RXA(+)
6	(NC)	RXB(-)

X3 Input / Output

1	Status-	11	Status+
2	DOUT2-	12	DOUT2+
3	DOUT1-	13	DOUT1+
4	DIN2-	14	DIN2+
5	DIN3-	15	DIN3+
6	DIN1-	16	DIN1+
7	DIN0-	17	DIN0+
8	SREF	18	STO1
9	SREF	19	STO2
10	Shield	20	Shield

X4 Input / Output

1	AOUT0	5	AGND
2	AIN1+	6	AIN1-
3	AIN0+	7	AIN0-
4	Shield	8	Shield

X1 Power

Ⓧ	Earth/Ground
Ⓧ	Earth/Ground (NC)
L1	AC Phase 1/L
L2	AC Phase 2 / N
L3	AC Phase 3
U	Motor U
V	Motor V
W	Motor W
R1	Brake
R2	Brake

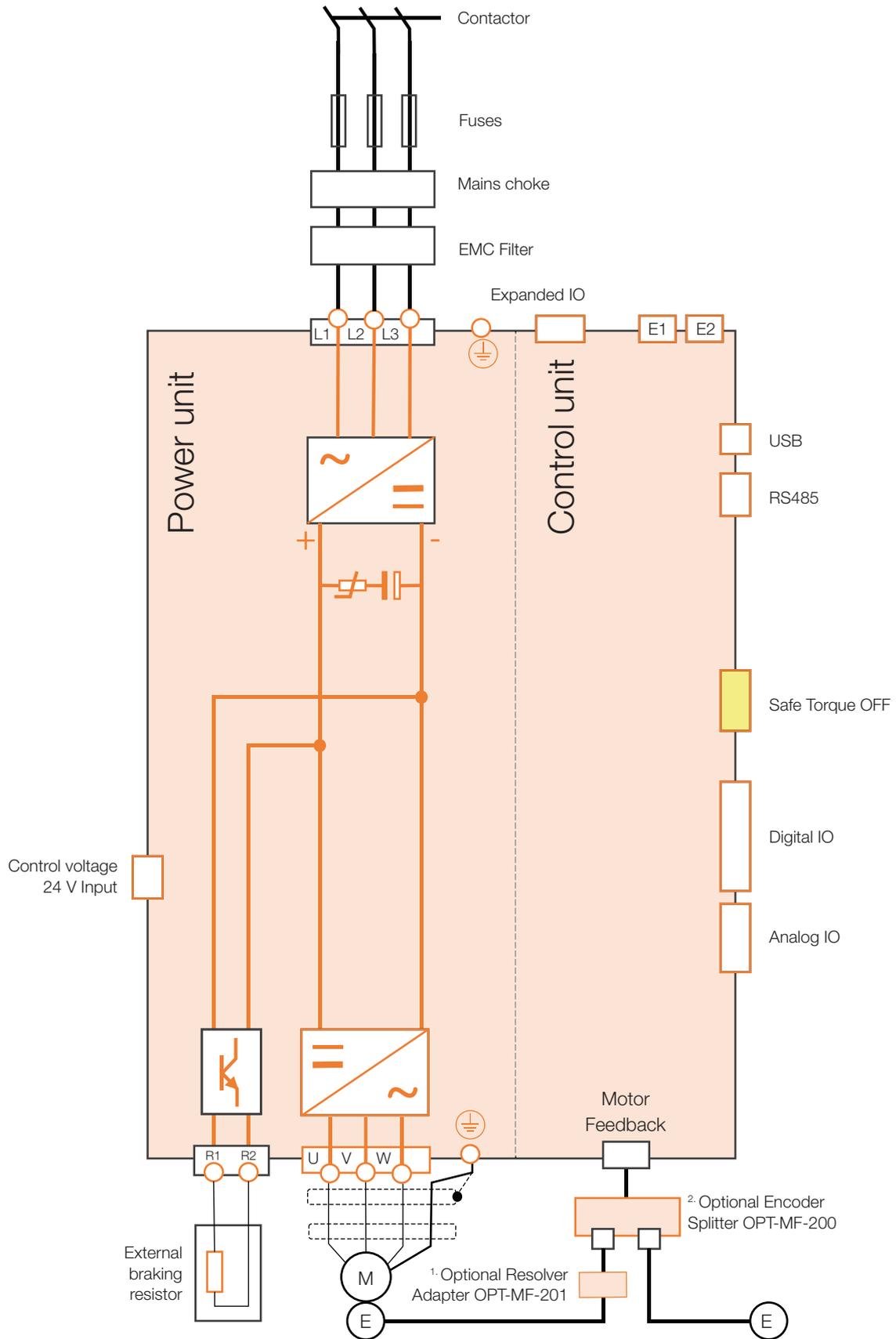
X2 Control circuit power

0 V
+24 V

X8 Feedback in

Pin	Incremental	BiSS/SSI / Smart EnDat 2.2	Smart Abs	EnDat 2.1	SinCos
1	CHA+	Data+	Data+	Data+	(NC)
2	CHB+	Clock+	(NC)	Clock+	(NC)
3	CHZ+	(NC)	(NC)	(NC)	(NC)
4	(NC)	(NC)	(NC)	(NC)	(NC)
5	Hall U-	(NC)	(NC)	Sin*	Sin-
6	Hall U+	(NC)	(NC)	Sin*	Sin+
7	Hall V-	(NC)	(NC)	Cos*	Cos-
8	Hall V+	(NC)	(NC)	Cos*	Cos+
9	CHA-	Data-	Data-	Data-	(NC)
10	CHB-	Clock-	(NC)	Clock-	(NC)
11	CHZ-	(NC)	(NC)	(NC)	(NC)
12	+5 V out	+5 V out	+5 V out	+5 V out	+5 V out
13	DGND	DGND	DGND	DGND	DGND
14	Hall W-	(NC)	(NC)	(NC)	(NC)
15	Hall W+	(NC)	(NC)	(NC)	(NC)
Shell	Shield	Shield	Shield	Shield	Shield

Main circuit

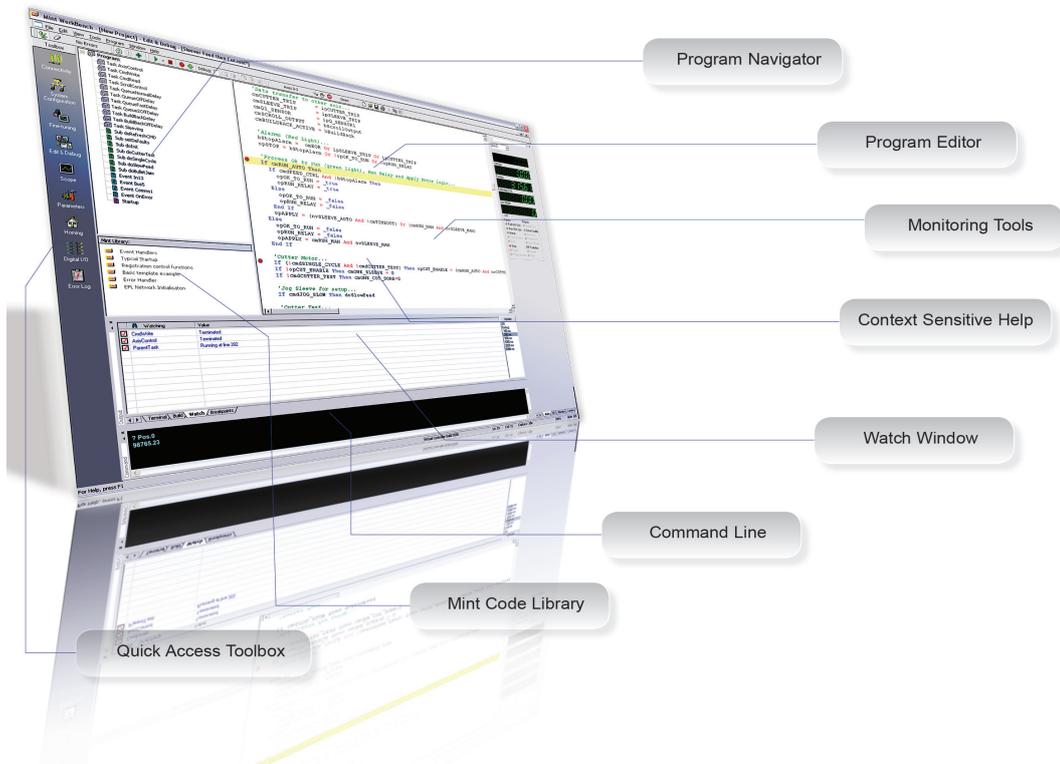


¹ Resolver adapter can be used with the optional Encoder Splitter or plugged directly into X8

² Encoder Splitter can be used to simplify connection of two encoder cables into X8

Easy PC tool for configuring and machine tuning

Why make it complicated?



The MINT WorkBench is a Windows tool for ABB's range of motion controllers and servo drives. MINT WorkBench offers an easy to use development platform for MINT programming with its colour 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.

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.

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

MicroFlex e150 MINT - supported motion features



Homing (Referencing / Dauting)

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 multi-turn 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 'trapezoidal' based 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.



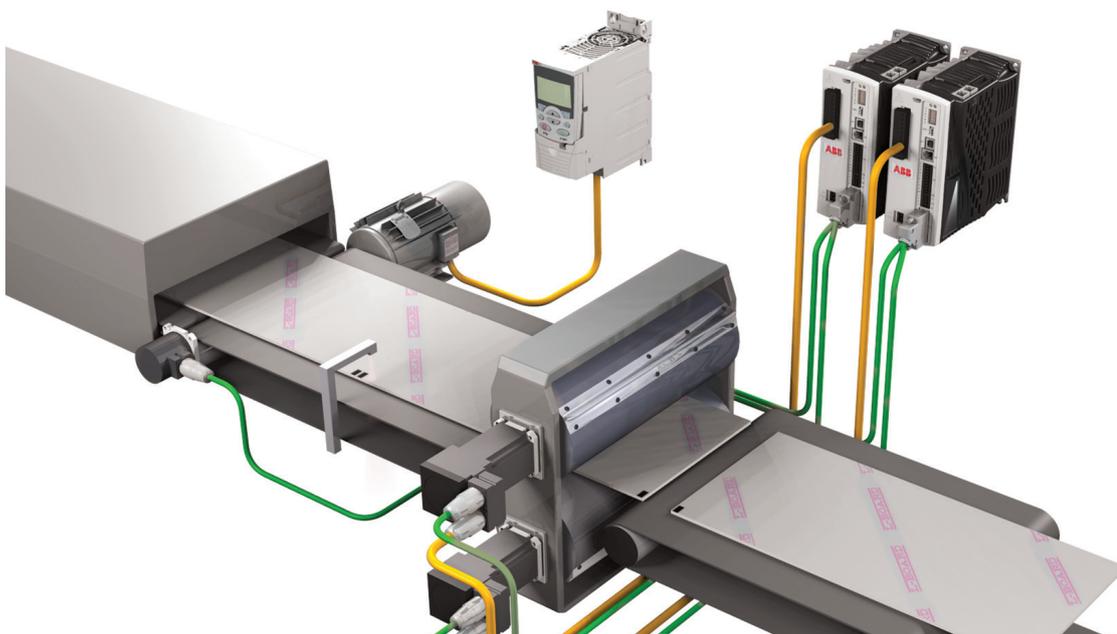
Splines and PVT profiles

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.



MicroFlex e150 resolver adapter

The MicroFlex e150 resolver adapter provides an in-cable solution for resolver feedback support for MicroFlex e150 servo drives.

The resolver adapter can be used with any standard MicroFlex e150 in combination with ABB's servo motor ranges to address applications where the benefits of resolvers are favoured.

Resolvers typically offer higher temperature tolerance and resilience in high vibration and shock application conditions.

Highlights

- In-line connector housing
- Compact size
- Easy connection with screw terminals
- Compatible with MicroFlex e150

Applications

- Cutting and forming
- Packaging (form-fill-seal, labelling etc.)
- Laser-jet, water-jet, textile cutting machines



Simple in-cable solution

The MicroFlex e150 resolver adapter provides a simple and convenient solution for support of resolver feedback for servo motors.

Robust feedback choice

Resolver feedback offers a proven resilient solution in applications where temperature, vibration and shock are concerns for more traditional feedback devices. It is also one of the most cost optimal solutions for a drive and motor package.

Resolver adapter

- In-line cable solution
- Compatible with MicroFlex e150
- Converts resolver to encoder
- Marker pulse generated once per revolution

Resolver nominal specification

- 2:1 Transformation ratio
- Single speed
- Excitation frequency 10 kHz
- Speed range 0 - 10,000 rpm

Encoder output emulation

- Increment encoder ABZ with complements
- 12 bit per turn of a single speed resolver
- 1 Marker pulse per revolution



Universal Encoder Interface (UEI) With dual encoder support



Dual mode connection	
Data+	Data-
Clock+	Clock-
-	-
Sense	+5V
ChA-	DGND
ChA+	ChZ-
ChB-	ChZ+
ChB+	

- Serial Encoder Connections
- Incremental Encoder Connections

Dual encoder mode

- For position and commutation provides line shaft following or dual loop control to eliminate mechanical errors
- 1 x resolver via optional adapter
- 1 x incremental ABZ (no Halls)

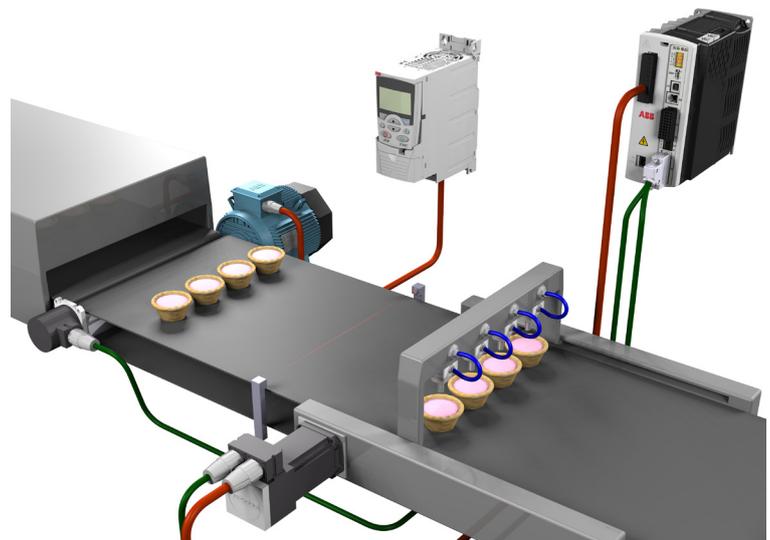
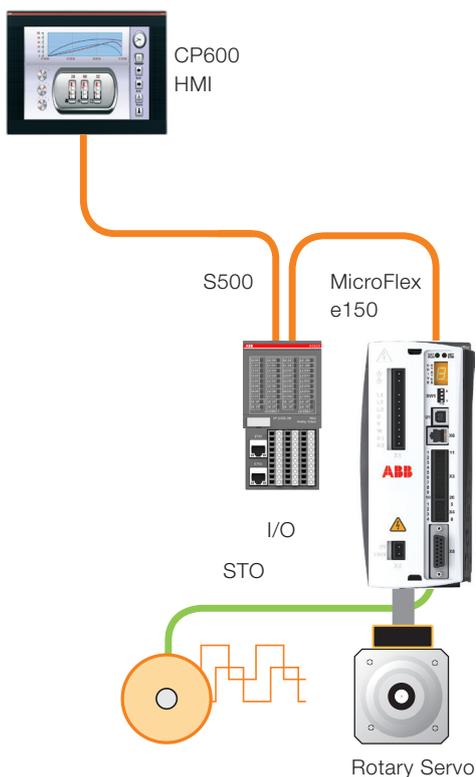
Use Cases

- Dual feedback - position and commutation
- 'Master' / 'Line Shaft' following
- Halls are not supported in this mode
- EnDat 2.1 can not be used in this mode (must be 2.2)

Single Encoder Mode (Motor Feedback)

- BiSS, SSI, EnDat 2.1 and 2.2
- SmartAbs®
- Incremental with or without Halls
- 1 V pk-pk Sin Cos encoders (with or without Halls)
- Resolver via optional adapter

Use case for dual feedback encoder Line shaft following



MINT electronically geared motion

- Includes Cams and Flying shears
- Dual high speed latch inputs for registration, e.g. product or print
- Dual encoder for line-shaft following or lay-on roller
- Ethernet and RS485 communications
- HMI, PC, PLC comms

Accessories

Accessories (MicroFlex e150)	
Description	Catalog number
Resolver adapter	OPT-MF-201
Encoder splitter	OPT-MF-200
Fan kit, 24 V DC	FAN001-024
Mint WorkBench-Programming and Commissioning	See website - abb.com/motion
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 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

A large selection of resolver and encoder motor feedback cables is also available - please see website <http://www.abbmotion.com/products/accessories/cables>

Regen resistors	
Description	Catalog number
100 W regen resistor 39 Ohms	RGJ139
100 W regen resistor 60 Ohms	RGJ160
200 W regen resistor 60 Ohms	RGJ260
300 W regen resistor 60 Ohms	RGJ360

EMC Filters for CE	
Description	Catalog number
Foot-mount filter, suitable for all ratings.	F10029A00
Filter for 3 A single phase input	F10015A00
Filter for 3 A three phase input	F10018A00
Filter for 6 A single phase input	F10015A02
Filter for 6 A three phase input	F10018A00
Filter for 9 A single phase input	F10029A00
Filter for 9 A three phase input	F10018A03
Filter for 24 V supply	F10014A00



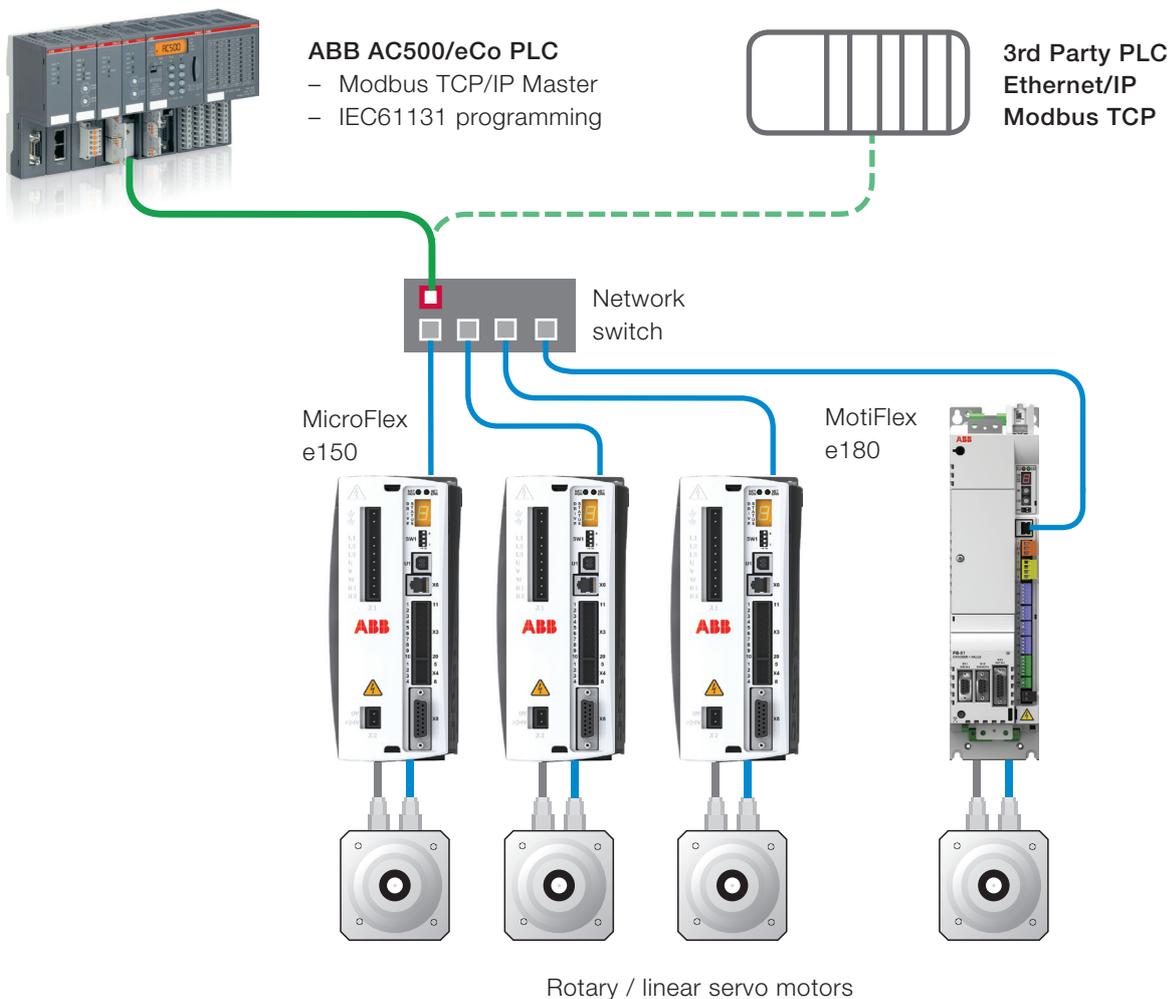
EtherNet/IP & Modbus TCP/IP solutions

Ethernet simple multi-axis motion solutions

- 1 x port RJ45 Ethernet 100Mbit
- Generic Drive Interface (GDI)
 - Pre-defined PLC drive control interface
 - Customization possible through MINT to optimize the solution
 - Pre-written PLC function libraries for AC500 and other PLCs
- Simple wizard drive-based configuration and pre-defined 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 100Mbit
- 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 pre-written 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 pre-written functions

The Add-On Instructions comprises a set of pre-written 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.

Customize to optimize for your axis operations

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

- Pre-written drive control interface, ready to use
- Pre-written library of motion control function blocks
- Highly flexible / configurable behavior and functions
- Extensible - simplify or extend features by customizing the provided MINT application
- Note: pre-written 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 customizing 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:

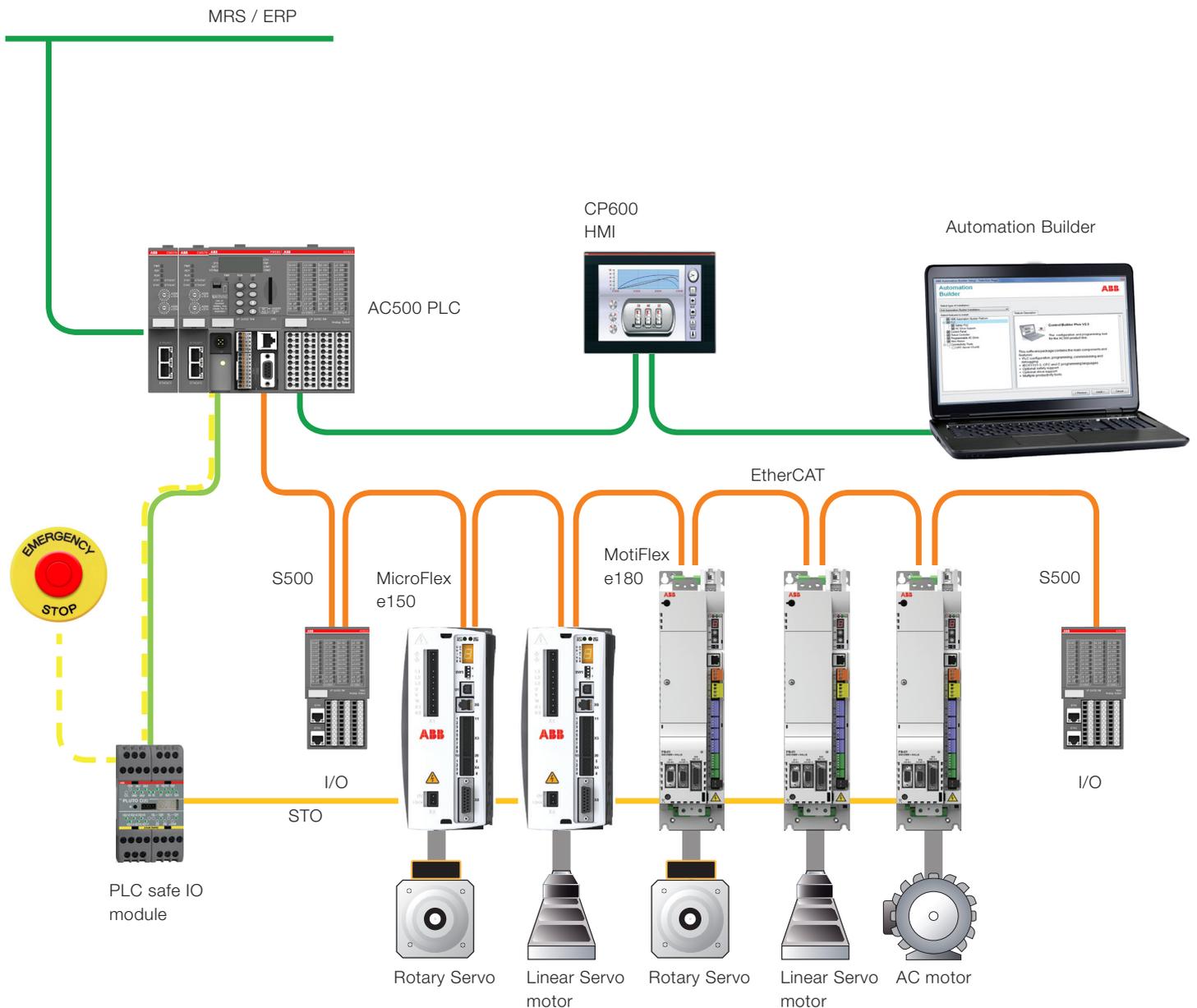
- Enabled state
- Idle state
- Motor brake state
- Forward limit state
- Fault state
- Indication of missing fast latch interrupt
- Phase search status
- Measured position
- Axis mode of operation
- Ready to be enabled state
- In Position state
- Homed state
- Reverse limit state
- Stop input state
-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

EtherCAT solutions

EtherCAT multi-axis coordinated motion

MicroFlex e150 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.

This popular high performance motion bus provides simple 'daisy chain' connection. It features two-port RJ45 Ethernet 100Mbit and a DS402 drive profile (IEC 61800-7) providing cyclic sync position and velocity, homing and touch probe. The MicroFlex e150 can be combined with the ABB AC500 PLC.



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.

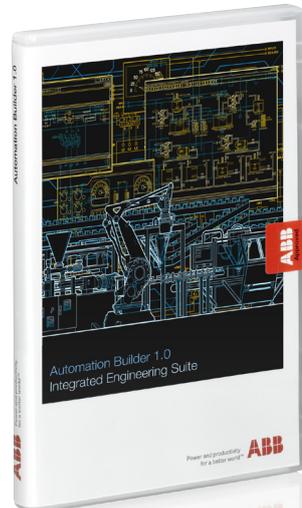
Benefit from the simplicity of IEC 61131-3, PLC open, ANSI C and MINT programming languages.

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)



MicroFlex e150
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 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 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 organizations 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, SNMP, 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

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

Contact us

For more information contact your local ABB representative or visit:

www.abb.com/motion

www.abb.com/plc

www.abb.com/safety

www.abb.com/drives

www.abb.com/drivespartners

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