

## EtherCAT Master module

MC

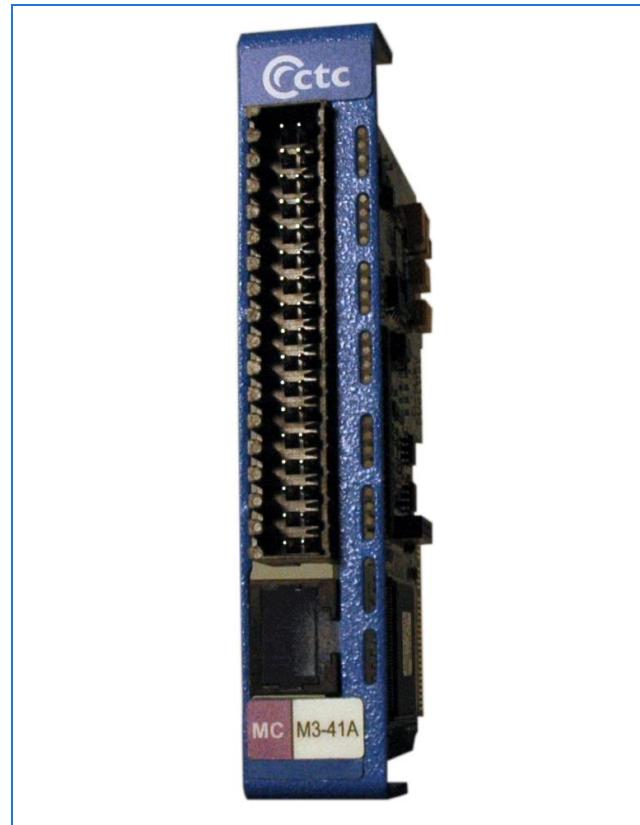
M3-41A

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- ▶ Advanced floating point position loop
  - ▶ Up to 16 axes per network
  - ▶ Virtual axis/master support
  - ▶ Up to 2000 I/O points using remote I/O
  - ▶ 1 mS updates on all axes
  - ▶ Any axis can track/gear/cam off any other
  - ▶ Registration Capability
  - ▶ Commands: linear, S-curve, Cam, Spline, Gear, Move on a gear, Segmented moves
  - ▶ Syncs master to slaves - provides simultaneous motions
- ▶ EtherCAT motion modes:
    - Cyclic Sync Position
    - Interpolated Position
    - Profile Position
    - Profile Velocity
  - ▶ Network auto configuration
  - ▶ Support for absolute encoding
  - ▶ Link software counters to any input
  - ▶ Link PWM outputs to any output

## General specifications

Axes per network	1-16
Axis type	Servo and Stepper
Digital inputs per network	Up to 1000
Digital outputs per network	Up to 1000
Analog inputs per network	Up to 256
Analog outputs per network	Up to 256
Connection type	RJ-45
Drives supported	ABB MicroFlex e150™ AMC DigiFlex® Performance™ Copley Accelnet and Xenus Emerson Unidrive SP/Digitax ST Servo Drive IAI America Intelligent Actuators Kollmorgen AKD LinMot USA Sanyo Denki SANMOTION R Servo Drive Yaskawa Sigma-5
I/O blocks supported	Beckhoff SMC Valve Stacks and I/O Numatics Turck I/O Turck RFID WAGO



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Minimum hardware revision	B
Minimum firmware revision	1.55
Minimum operating system revision	5009069_84
Documentation number:	950-534101-000

## Performance specifications

Parameter	Value
Position range	64-bit
Position resolution	$\pm 1$ count
Velocity resolution	$\pm 1$ count/sec
Accel decel resolution	$\pm 1$ count/sec
Synchronization	Simultaneous
Loop update rate	1 mS*

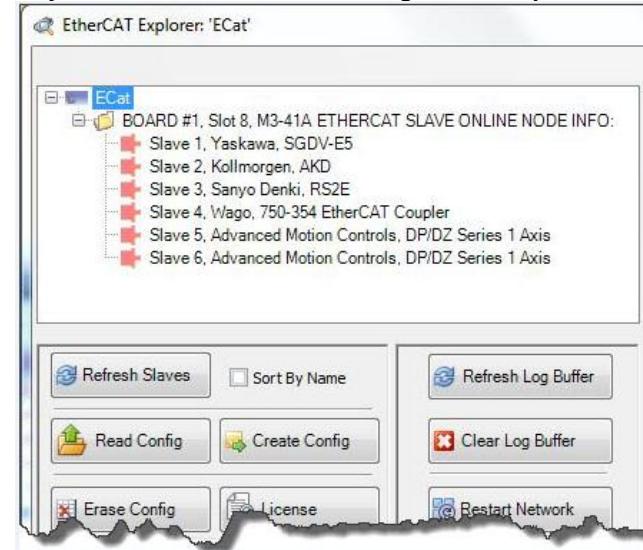
\*May be set to 500 ns up to four (4) axes

## Electrical specifications

Parameter	Value
Max encoder input voltage	6 VDC
Encoder Turn ON/OFF threshold	$\pm 200$ mV
Encoder termination resistor	100 $\Omega$ (10%)
Input type	VDC sourcing
Registration Input response	<1 $\mu$ sec
Input Turn ON threshold	0.53 * VS
Input Turn OFF threshold	0.32 * VS
Max voltage	VS
Max ON current	2.6 mA DC
Input resistance to VDC RTN	12 K $\Omega$ (+/-5%)
Output current: per channel	$\pm 0.5$ A
Output voltage: $V_{OL}$ (sinking) @ 100 mA $V_{OL}$ (sinking) @ 0.5 A $V_{OH}$ (sourcing) @ 100 mA $V_{OH}$ (sourcing) @ 0.5 A	0.4 VDC 2 VDC VS – 0.4 VDC VS – 2 VDC
Output overload protection	Non-Protected

## Additional features

The 5300 controller auto configures EtherCAT devices on your network. No manual configuration required.



## Log Buffer

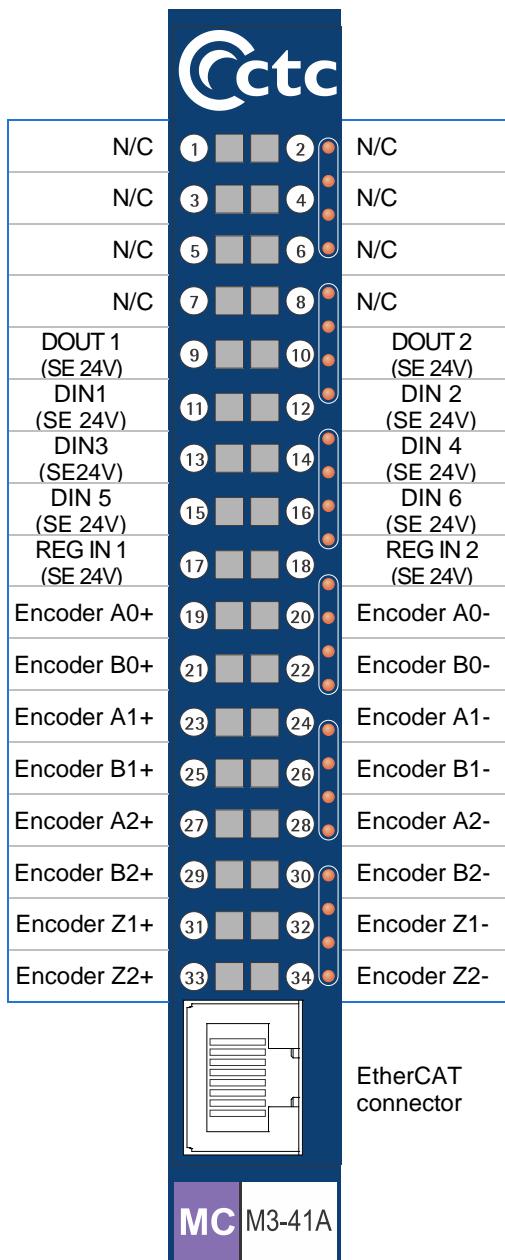
Name	Value
Manuf	Yaskawa
Grp	Drive
Name	SIGMA 5 Rotary
Out	192 bits (24 bytes)
In	240 bits (30 bytes)
Axis #	2
pstate	RUNNING (1)
tracking_pstate	COMPLETE (2)
inpos	0
fpos	29.554688
tpos	29.843200
perr	0.282863
vel	9.179771
DRV MODE	Cyclic Sync Position (8)
PDO STATUS	0x1237
PDO CNTLWORD	0x000F
PDO ACT VEL	0x0092E058
PDO ACT TORQ	0x0000000A
PDO ACT ERR	0x000450FF
PDO HOME PWRUP	0x000AE4B4
PDO ACT POS	0x01E3C4B4
PDO TARG POS	0x01E86273
PDO TARG VEL	0x00000000
PDO DIG INP	0x00000006
State	8 (OPERATIONAL)
Delay	925 ns
Name	SIGMA 5 Rotary
INFO Time:	1643 281, PDO Init done, now Map all PDOs from slaves to IO map.
INFO Time:	1643 421, Configure DC options for each slave with distributed clocks.
INFO Time:	1644 14, Install IO drivers based on slave type.
INFO Time:	1644 614, Install LINMOT Controller.
INFO Time:	1644 615, Install Yaskawa Sigma 5 Drive.
INFO Time:	1644 617, Install Yaskawa Sigma 5 Drive.
INFO Time:	1644 619, Install Yaskawa Sigma 5 Drive.
INFO Time:	1644 621, Install Virtual Drive.

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## Terminal block connections



## Special I/O Functions

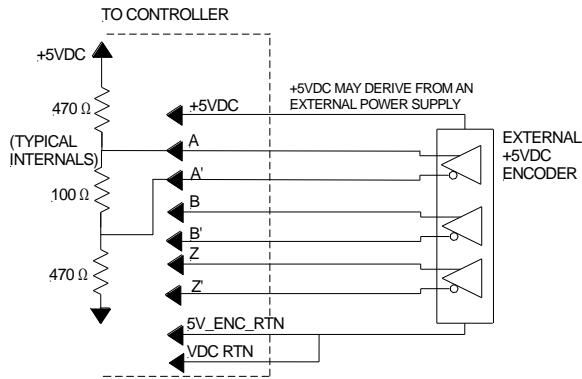
- **Three encoder inputs.** May be used as a master to any EtherCAT axis or as a general encoder
- **Six digital inputs**
- **Two digital outputs**
- **Two registration inputs**
- **Software counters**
- **PWM outputs**
- **Up to 16 RFID channels**

For more information refer to the  
[CTC EtherCAT Applications Guide](#)

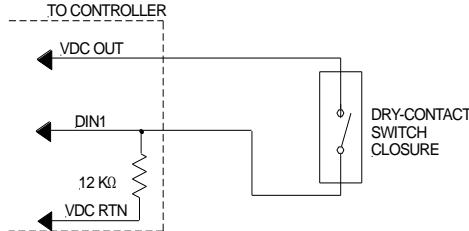
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## Application Information

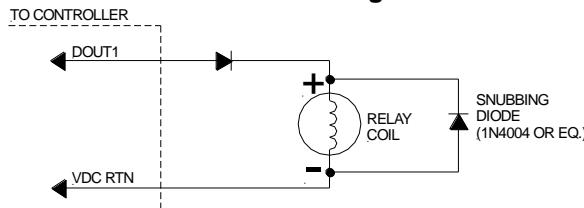
### Differential Encoder/Counter Application



### All Single-ended Inputs Application



### Digital Output Applications Sourcing



### Notes

1. Shields must be terminated on the controller side of the cable.
2. VS refers to the voltage supply of the controller. VDC OUT = VS(DC voltage supplied to controller's power supply).
3. If an external 5V power supply is used for the encoder, the external power supply's VDC RTN must be tied to 5V\_ENC\_RTN.
4. For single-ended counter or encoder input signals, tie A', B', and Z' to 5V\_ENC\_RTN.
5. Insertion and/or removal of I/O modules should be done with all power removed. Failure to do so may lead to damaged electronics and/or incorrect I/O states.
6. Incorrect I/O connections may lead to damaged electronics and/or incorrect I/O states.
7. The information and illustrations contained herein are the property of Control Technology Corporation and are subject to change without notice. Data based on VS = 24 VDC @ 25°C unless otherwise noted. For additional information and/or updates, visit [www.ctc-control.com](http://www.ctc-control.com). Copyright ©2013 Control Technology Corporation. All Rights Reserved.