

## ACSI ACTUATOR CONTROL SOLUTIONS INTEGRATED SERVO MOTOR/DRIVE/CONTROLLER



# ACSI – Motor/Drive/Controller

## WHAT IS THE ACSI?

The ACSI is an extremely easy-to-use integrated servo motor / drive / controller developed specifically to be used with electric actuators. Simply select the configured Tolomatic actuator in the software to automatically set-up most of the necessary parameters to create motion in the desired linear units (mm or inch) or revs.



## BASIC CAPABILITIES:

- Operation Modes
  - » 4 configurable move commands (absolute, incremental, jog, velocity or home move types) with motion commanded via digital inputs.
  - » Analog input positioning mode (0-10Vdc or 4-20mA)
  - » Analog output echoing actuator position
  - » Pneumatic mode replaces pneumatic valve operation for simple motion
- Adjustable motion profile parameters. Position, velocity, accel, decel, force parameters are independently configurable for all moves.
- Force limiting
- Zone output based on position
- Configurable digital I/O (24Vdc Opto-Isolated, sourcing or sinking)
- USB configuration port

## ETHERNET OPTION: EtherNet/IP, PROFINET, EtherCAT & Modbus TCP protocols

- Dual port with internal switch for daisy chaining
- Infinite positioning

### EtherNet/IP™

- Rockwell Automation Add-On-Profiles & Add-On-Instructions
- ODVA conformant - Plugfest certified
- CIP I/O commands (assembly object)
- Device level ring (DLR) compatible



- Siemens Data Blocks & Function Blocks
- GSDML file
- PI certified

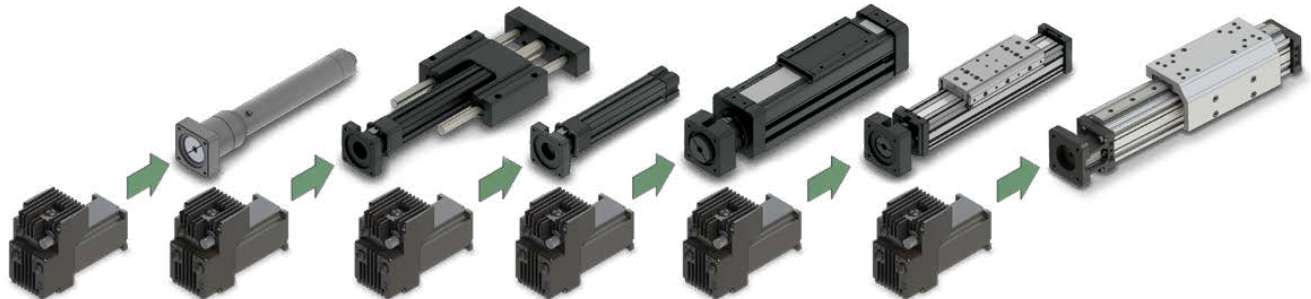


### EtherCAT®

- Beckhoff TwinCAT 3.1 Library
- Beckhoff TwinCAT Sample code
- I/O commands



## SMART ACTUATION SOLUTIONS COST EFFECTIVELY AUTOMATE ADDITIONAL AXES OF MOTION



- Single Source – assembled, configured, tuned and tested as a complete motion axis
- Easy integration reduces commissioning and start-up time
- Flexible Ethernet control for most PLCs/Controllers
- Integrated technology provides compact design & minimizes cabinet space requirements
- Saves cost by reducing cabling, wiring & installation time
- Compatible 10-60 Vdc power input utilizes existing machine power supplies

# ACSI – Features

## DIGITAL I/O

- 24 VDC Digital I/O control for flexible easy operating modes
- Opto-isolated

## ANALOG IN/OUT

- 0-10VDC or
- 4-20 mA

## DUAL ETHERNET PORTS

- Supports Star, Daisy Chain and Ring Topologies



## ETHERNET/IP

- AOP: Add on profile
- AOI: Add on Instructions
- DLR: Device Level Ring

## PROFINET



## MODBUS TCP



## INPUT SUPPLY

- 10 VDC to 60 VDC
- Logic & Drive Power

## M12 CONNECTORS

- Industry standard connectors

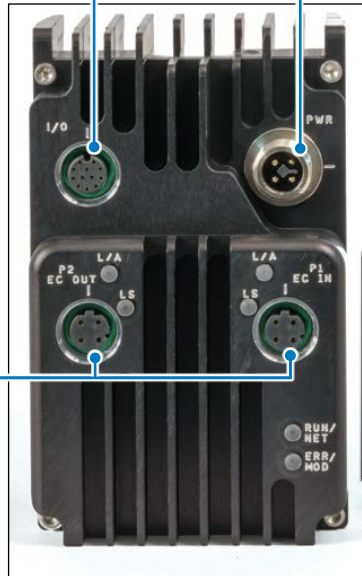
## USB CONFIGURATION PORT

## QUALITY TESTED

- Each ACSI is performance tested at Tolomatic before shipping
- Mounted, configured and tested on Tolomatic electric actuators

## IP65

Protected against dust and low pressure water jets, limited ingress



## VIBRATION & SHOCK TESTED

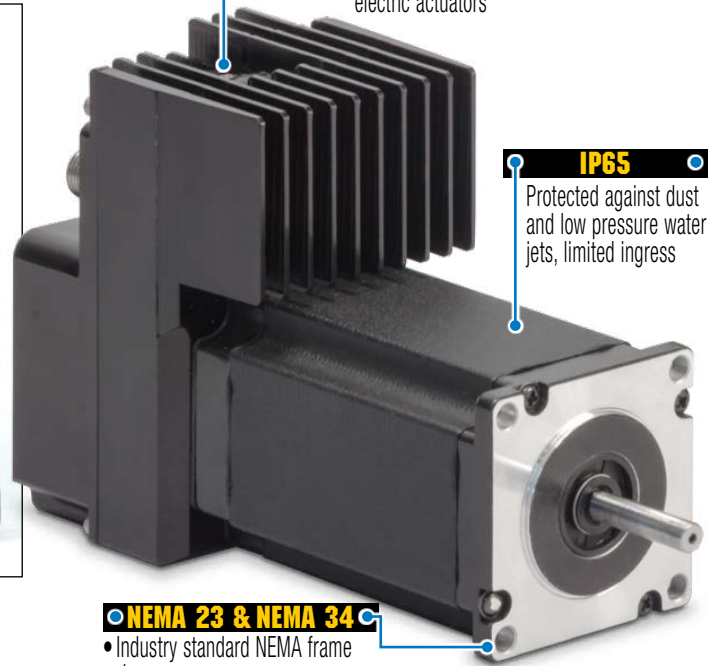
- 2 brms, 5- 500 Hz, 2 G, 3-axis, 1 hr
- 20 bpeak, half sine, 11 ms, 3-axis

## ETHERCAT



## NEMA 23 & NEMA 34

- Industry standard NEMA frame sizes



## EASY TO USE CONFIGURATION SOFTWARE

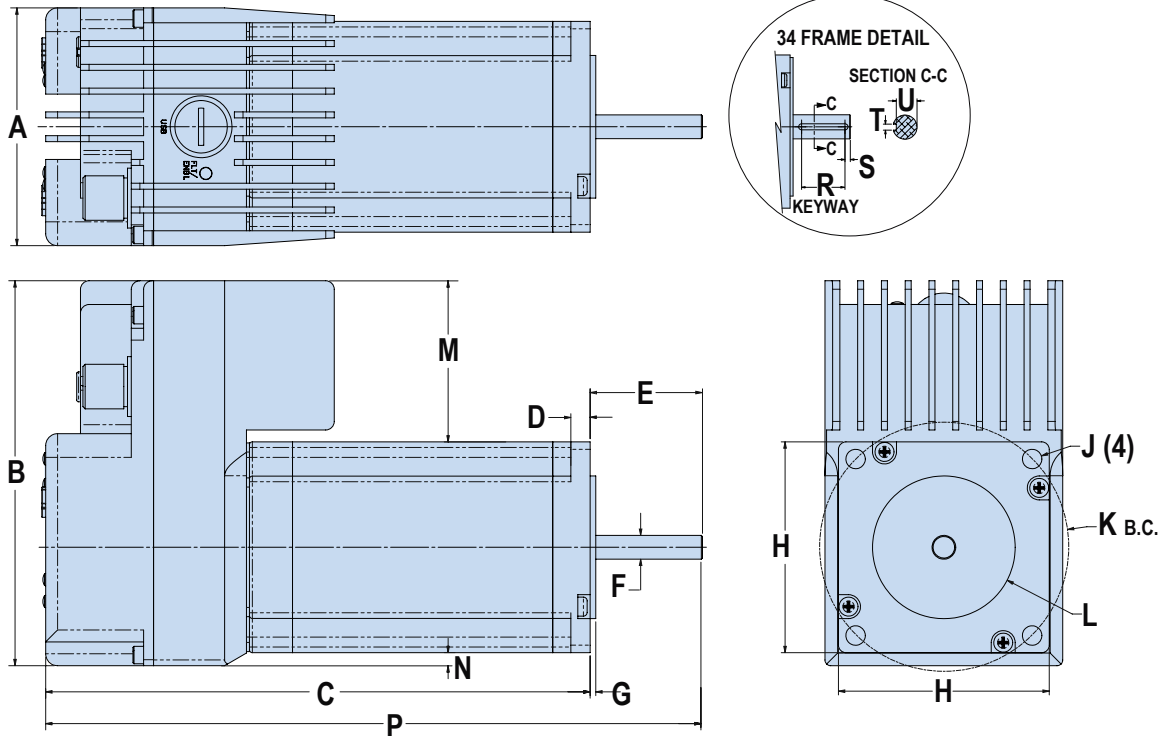
Windows® compliant

Label	Move Type	Position (in)	Velocity (in/sec)	Accel (in/sec <sup>2</sup> )	Decel (in/sec <sup>2</sup> )	Force (%)
1 MOVE1	Absolute	1.000	1.00	100.0	100.0	100.0
2 MOVE2	Absolute	2.000	2.00	90.0	90.0	90.0
3 MOVE3	Absolute	3.000	3.00	80.0	80.0	80.0
4 MOVE4	Absolute	4.000	4.00	70.0	70.0	70.0
5	IncPos	0.250	1.00	100.0	100.0	100.0
6	IncPos	0.500	1.00	100.0	100.0	100.0
7	IncNeg	0.250	1.00	100.0	100.0	100.0
8	IncNeg	0.500	1.00	100.0	100.0	100.0
9 FASTJOGPOS	JogPos	0.000	4.00	100.0	100.0	100.0
10 SLOWJOGPOS	JogPos	0.000	1.00	100.0	100.0	100.0
11 FASTJOGNEG	JogNeg	0.000	4.00	100.0	100.0	100.0
12 SLOWJOGNEG	JogNeg	0.000	1.00	100.0	100.0	100.0
13	Absolute	1.500	1.00	110.0	110.0	70.0
14	Absolute	2.500	2.00	120.0	120.0	90.0
15	Absolute	3.500	3.00	130.0	130.0	80.0
16	Absolute	4.500	4.00	140.0	140.0	70.0

# ACSI – Motor/Drive/Controller

**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

## ACSI SERVO MOTOR / DRIVE / CONTROLLER DIMENSIONS



	23 (C1)	23 (C2)	34 (D1)	34 (D2)
A	63.5	63.5	63.5	63.5
B	102.8	102.8	113.9	113.9
C	145.4	145.4	150.4	180.4
D	5.2	5.2	10	10
E	22.86	22.86	31.8	31.8
F	6.35	6.35	12.7	12.7
G	1.5	1.5	1.6	1.6
H	56.3	56.3	85.8	85.8
J	5.2	5.2	5.5	5.5
K	66.68	66.68	98.43	98.43
L	38.1	38.1	73.03	73.03
M	43.1	43.1	28.3	28.3
N	3.5	3.5	0	0
P	168.26	168.26	182.2	182.2
R	-	-	22.9	22.9
S	-	-	2.79	2.79
T	-	-	3.18 (+0.05, -0.00)	3.18 (+0.05, -0.00)
U	-	-	10.92 (+0.00, -0.38)	10.92 (+0.00, -0.38)

Dimensions in millimeters

	23 (C1)	23 (C2)	34 (D1)	34 (D2)
A	2.5	2.5	2.5	2.5
B	4.05	4.05	4.49	4.49
C	5.73	5.73	5.92	7.1
D	0.2	0.2	0.39	0.39
E	0.9	0.9	1.25	1.25
F	0.25	0.25	0.5	0.5
G	0.059	0.059	0.063	0.063
H	2.22	2.22	3.38	3.38
J	0.2	0.2	0.22	0.22
K	2.625	2.625	3.875	3.875
L	1.5	1.5	2.875	2.875
M	1.7	1.7	1.11	1.11
N	0.14	0.14	0	0
P	6.63	6.63	7.17	7.17
R	-	-	0.9	0.9
S	-	-	0.11	0.11
T	-	-	0.125 (+0.002, -0.00)	0.125 (+0.002, -0.00)
U	-	-	0.430 (+0.00, -0.38)	0.430 (+0.00, -0.38)

Dimensions in Inches

# ACSI – Motor/Drive/Controller

## ACSI SPECIFICATIONS

OPERATING POWER	
Voltage Nominal	10V - 60V
Over Voltage	65V
Under Voltage	9V
Absolute Maximum Voltage	70V
Logic Current Draw (24V)	<200 mA

OPERATING CONDITIONS	
Ambient Temperature	25°C, 77°F Nominal
Operating Temperature	0 - 40°C, 32 - 104°F
Storage Temperature	0-70°C, 32-158°F
Humidity	0 - 90% non-condensing

See ACSI Hardware and Installation Guide (#3604-4185) for more details.

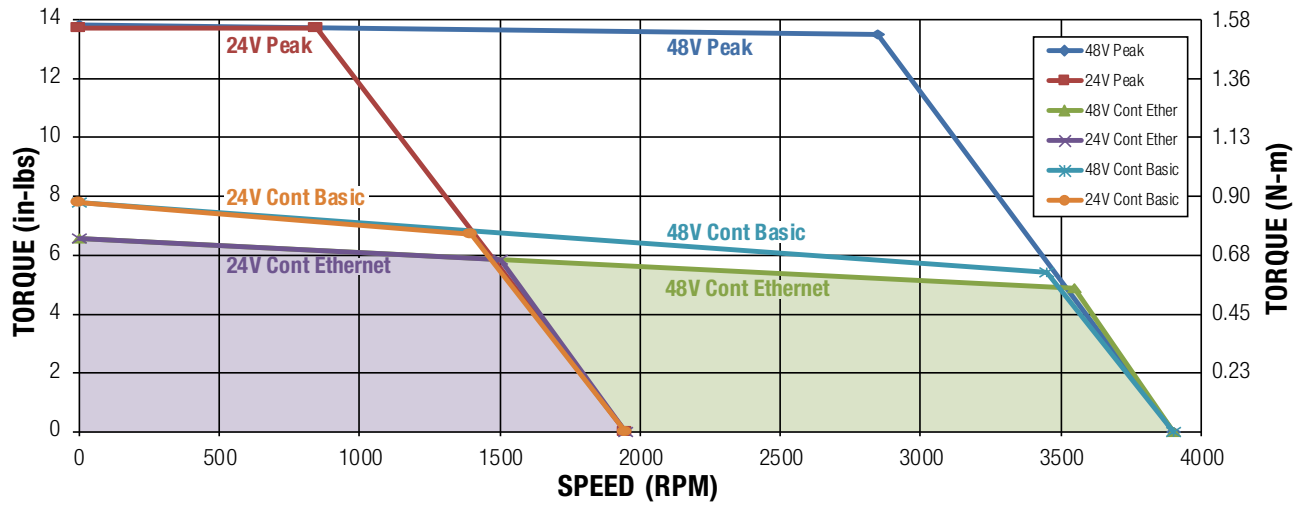
	NEMA 23 (C1)		NEMA 23 (C2)		NEMA 34 (D1)		NEMA 34 (D2)	
	Basic	Ethernet	Basic	Ethernet	Basic	Ethernet	Basic	Ethernet
<b>Cont. Torque</b>	0.61 N-m (5.4 in-lbs)	0.55 N-m (4.9 in-lbs)	0.38 N-m (3.375 in-lbs)	0.34 N-m (3.0 in-lbs)	1.53 N-m (13.6 in-lbs)	1.32 N-m (12.0 in-lbs)	3.28 N-m (29.0 in-lbs)	2.82 N-m (25 in-lbs)
<b>Max. Cont. Current</b>	11.46 Amps	9.6 Amps	7.7 Amps	7.0 Amps	12.7 Amps	11.37 Amps	7.0 Amps	6.2 Amps
<b>Peak Torque</b>	1.56 N-m (13.8 in-lbs)		0.99 N-m (8.75 in-lbs)		2.82 N-m (25.0 in-lbs)		5.88 N-m (52 in-lbs)	
<b>Max. Peak Current</b>	20 Amps		20 Amps		20 Amps		12.72 Amps	
<b>Rated Speed*</b>	3500 RPM		5800 RPM		1750 RPM		450 RPM	
<b>Max. Speed*</b>	3850 RPM		6350 RPM		2050 RPM		650 RPM	
<b>KT</b>	0.09 N-m/Arms (0.836 in-lbs/Arms)		0.07 N-m/Arms (0.59 in-lbs/Arms)		0.16 N-m/Arms (1.39 in-lbs/Arms)		0.573 N-m/Arms (5.07 in-lbs/Arms)	
<b>KE</b>	10 V/kRPM		7.059 V/kRPM		16.55 V/kRPM		60 V/kRPM	
<b>Rotor Inertia</b>	0.220 kg-cm <sup>2</sup> (0.075 lb-in <sup>2</sup> )		0.220 kg-cm <sup>2</sup> (0.075 lb-in <sup>2</sup> )		1.600 kg-cm <sup>2</sup> (0.546 lb-in <sup>2</sup> )		2.4 kg-cm <sup>2</sup> (0.820 lb-in <sup>2</sup> )	
<b>Shaft Max. Radial Load**</b>	115 N (25.85 lb)		116 N (25.85 lb)		220 N (49.46 lb)		221 N (49.46 lb)	
<b>Shaft Max. Axial Load**</b>	45 N (10.12 lb)		46 N (10.12 lb)		60 N (13.49 lb)		61 N (13.49 lb)	
<b>Unit Weight</b>	1.72 kg (3.8 lb)		1.72 kg (3.8 lb)		3.27 kg (7.2 lb)		4.47 kg (9.85 lb)	
<b>Motor Poles</b>	8							
<b>Max Case Temp</b>	85°C (185°F)							
<b>Encoder</b>	Differential 1024 lines/rev (4096 counts per rev)							
<b>Shock</b>	20 gpeak, half sine, 11 ms, 3-axis, IEC 60068-2-27							
<b>Vibration</b>	2 grms, 5-500 Hz, 3-axis, 1hr, IEC 60068-2-64							

\* @48VDC      \*\* @L10 - 20,000 Hours

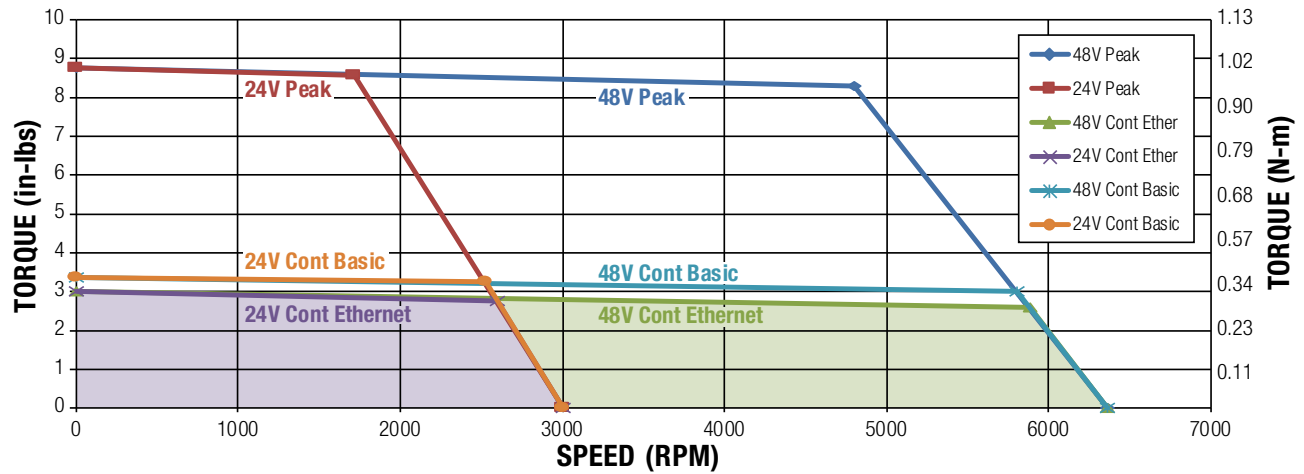
# ACSI – Motor/Drive/Controller

## PERFORMANCE DATA

### SPEED vs TORQUE - ACSI23 (C1)



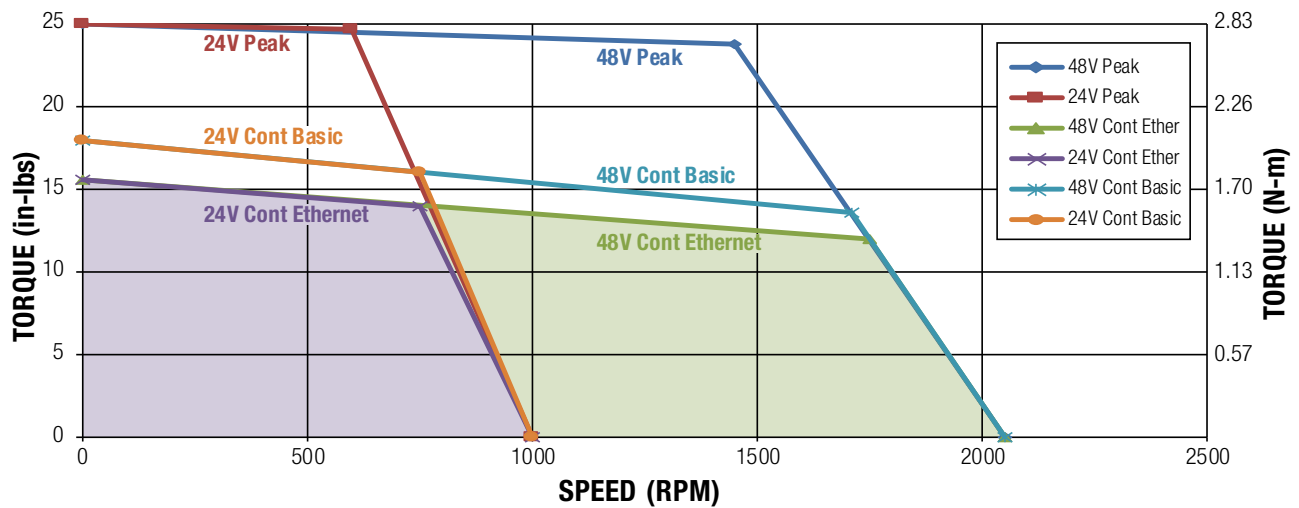
### SPEED vs TORQUE - ACSI23 (C2)



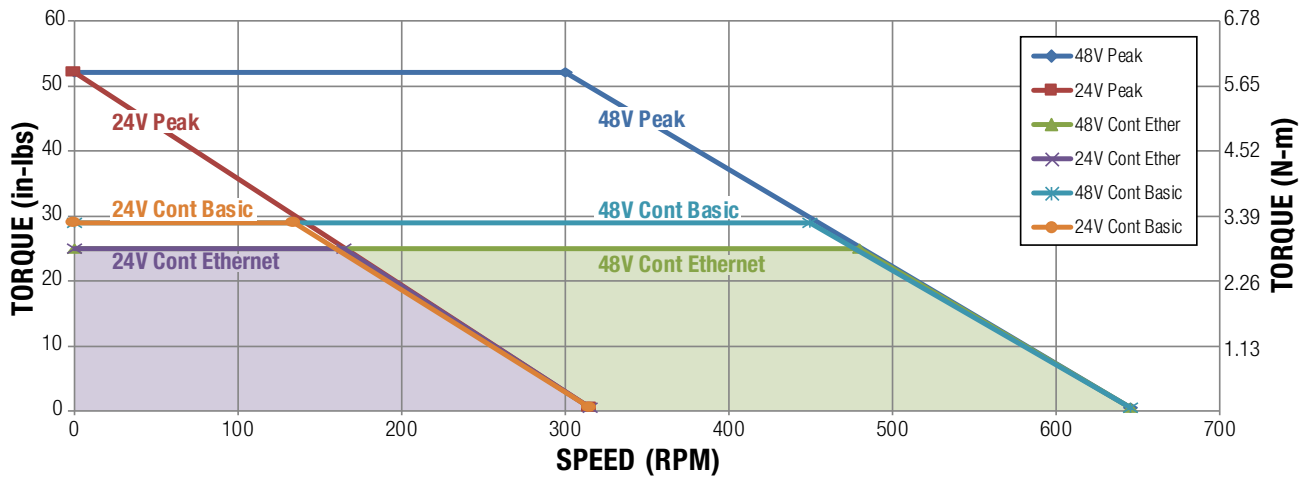
# ACSI – Motor/Drive/Controller

## PERFORMANCE DATA

### SPEED vs TORQUE - ACSI34 (D1)



### SPEED vs TORQUE - ACSI34 (D2)



# Electronic Motor Brake

## SPECIFICATIONS

The Electronic Motor Brake is available in NEMA 23 & 34 frame sizes.

It fits on 23 & 34 frame stepper, servo and ACSI motors see dimensional drawings to confirm shaft size and other dimensions.

The brake is recommended for vertical or inclined applications where there can be no backdrive during power off.

When 24 VDC is connected, the brake will be deactivated and the motor can turn freely. It is recommended to use the brake only as a holding brake and not as an emergency brake.

Cables for the Electronic Motor Brake are available and are included when CR\_ is added to the ordering configuration. The connector on the brake is M8.



NEMA FRAME SIZE	HOLDING TORQUE	INPUT SHAFT DIA.	OUTPUT SHAFT DIA.	CONNECTION	CURRENT @24VDC	WEIGHT (W/O CABLE)	IP RATING
	Nm	mm	mm		Amp	kg	
	(in-lbs)	(inch)	(inch)			(lb)	
23	1.5	6.35	6.35	M8	0.45 Amp	0.45	IP55
	(13.28)	(0.250)	(0.250)			(0.99)	
34	1.7	12.7	12.7	M8	0.23 Amp	1.42	IP55
	(15.05)	(0.500)	(0.500)			(3.13)	

Recommended torque clamping Screw 2.5 ft-lbs [3.4 Nm]

Electronic Motor Brakes are primarily sold as part of a complete assembly including actuator and motor. Tolomatic will install and test the completed actuator, Electronic Motor Brake, and motor assembly before shipping. **Call Tolomatic if you wish to install an Electronic Motor Brake on an existing actuator.**

Contact Tolomatic for other motor mounting options.

**⚠** Tolomatic assumes no responsibility that an electronic motor brake will fit or perform with your motor or actuator if sold separately.)

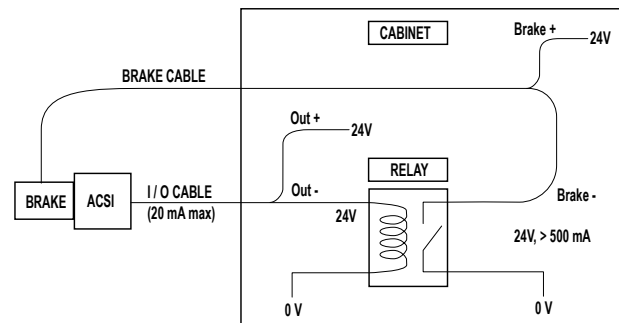
## BRAKE OUTPUT

The brake output is a 20mA low current output with braking logic controlled by the drive. It obeys the timing configured using Tolomatic Motion Interface Software. The brake output requires hardware to interface it to the higher currents required to operate a brake.

### BRAKE OUTPUT SPECIFICATIONS

Parameter	Value	Units
Input Voltage	24	V
Continuous Current (max.)	20	mA
Output Voltage Drop (20 mA)	2	V

### BRAKE OUTPUT WIRING DIAGRAM



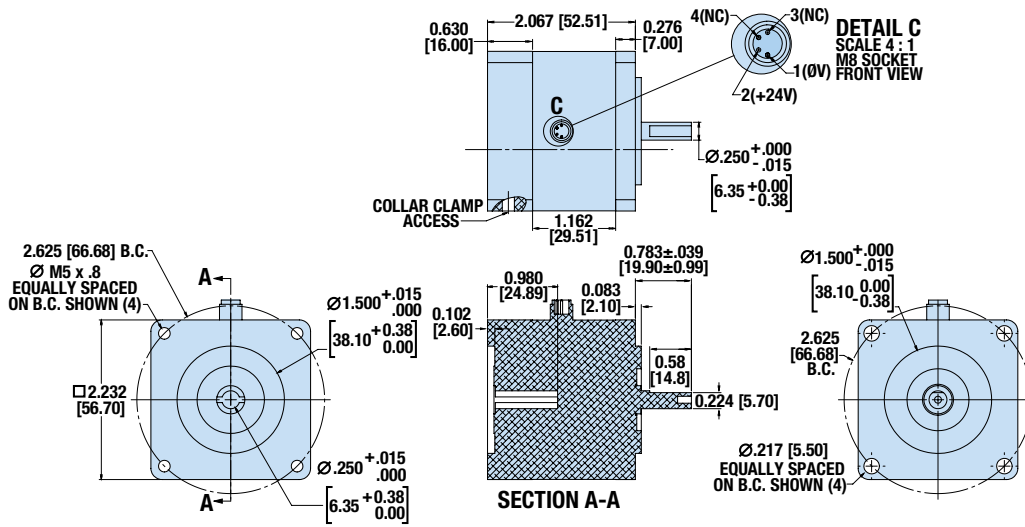


# Electronic Motor Brake

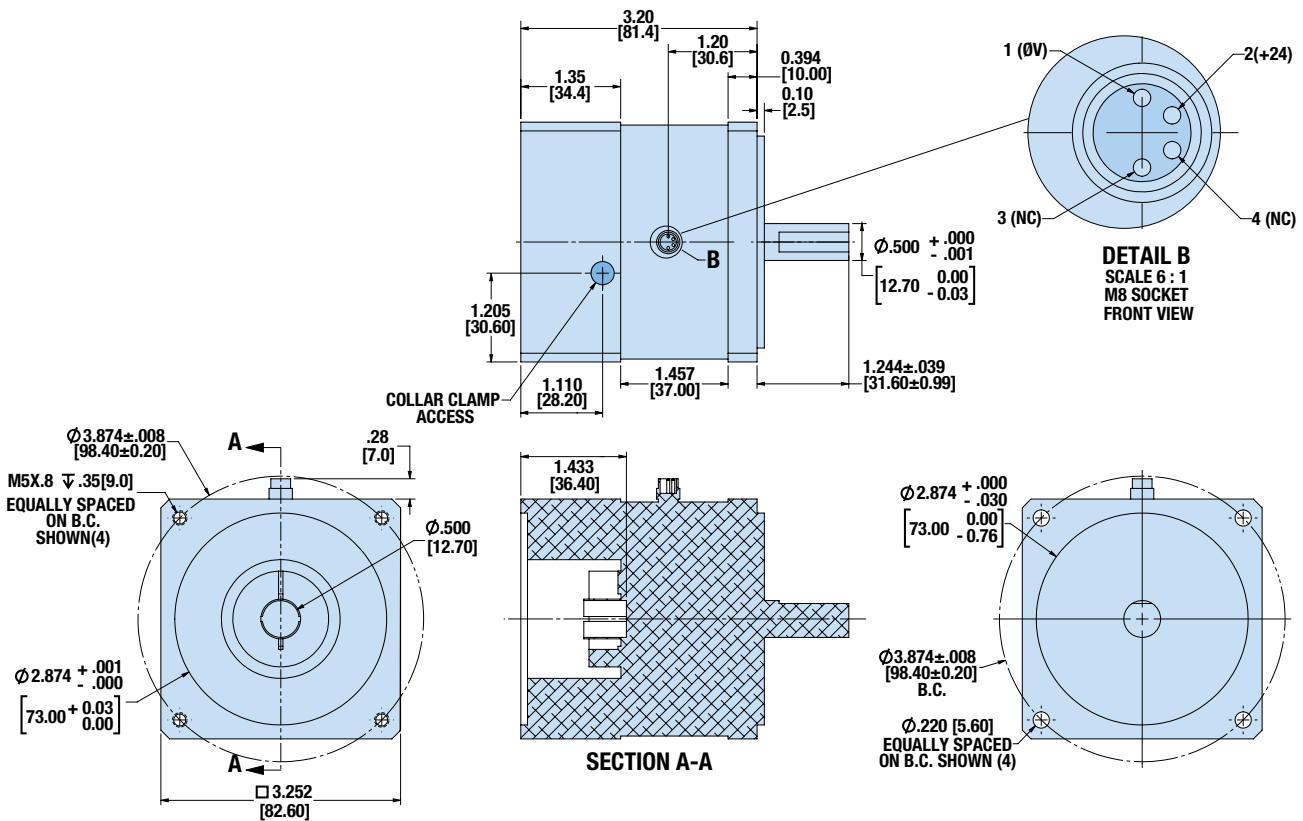
SIZE: ALL

**DIMENSIONS**  3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

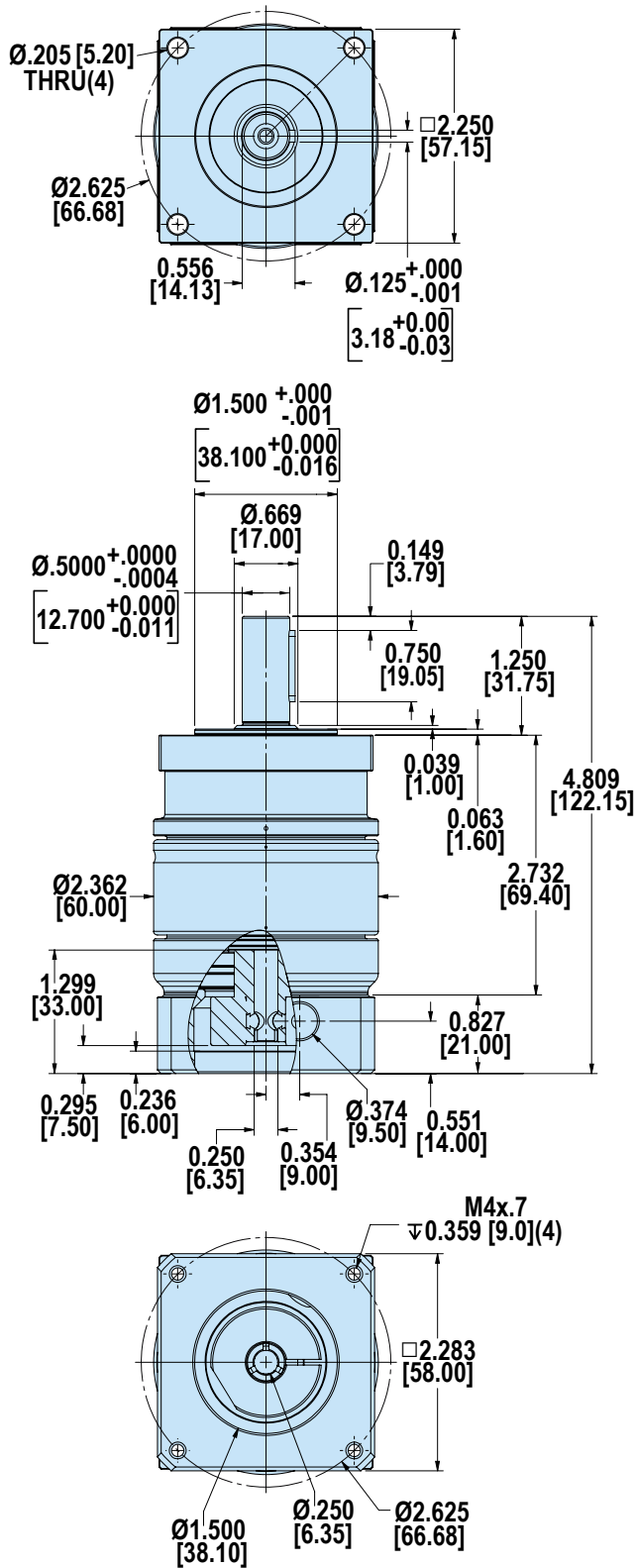
## NEMA23 DIMENSIONS



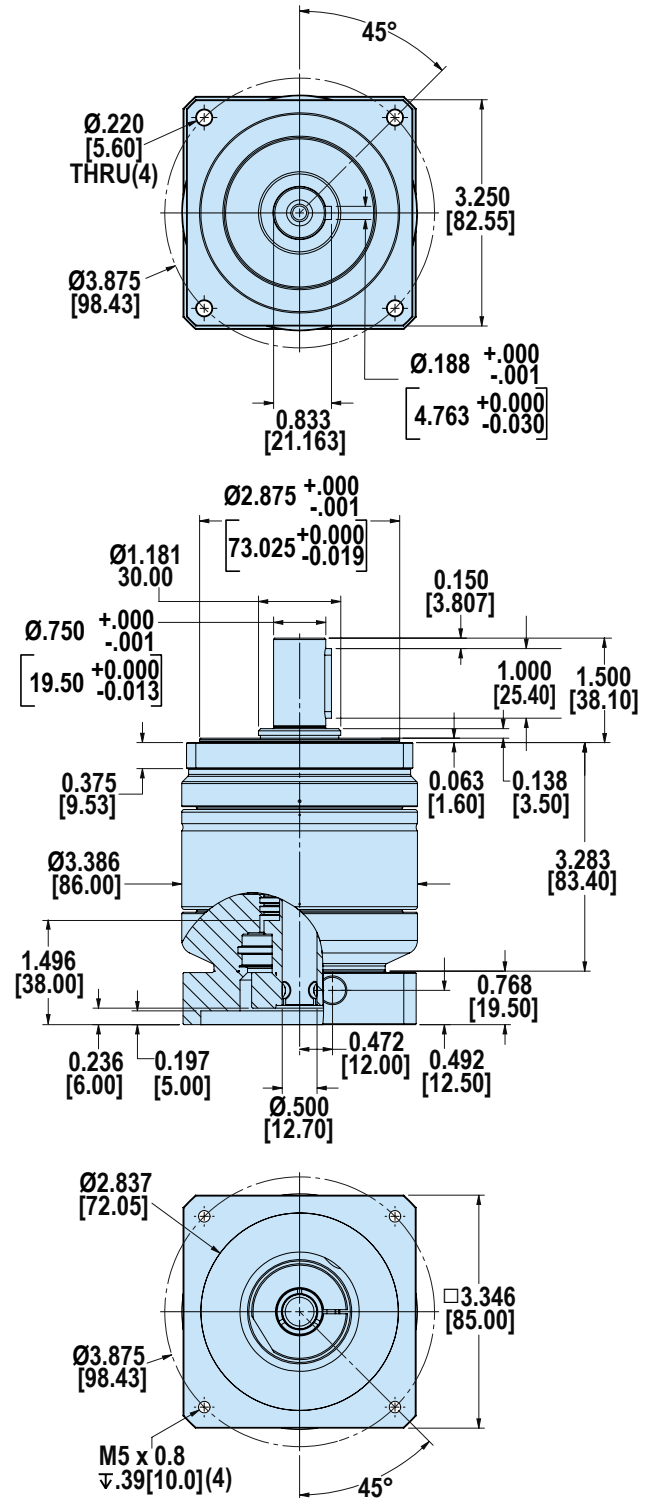
## NEMA34 DIMENSIONS



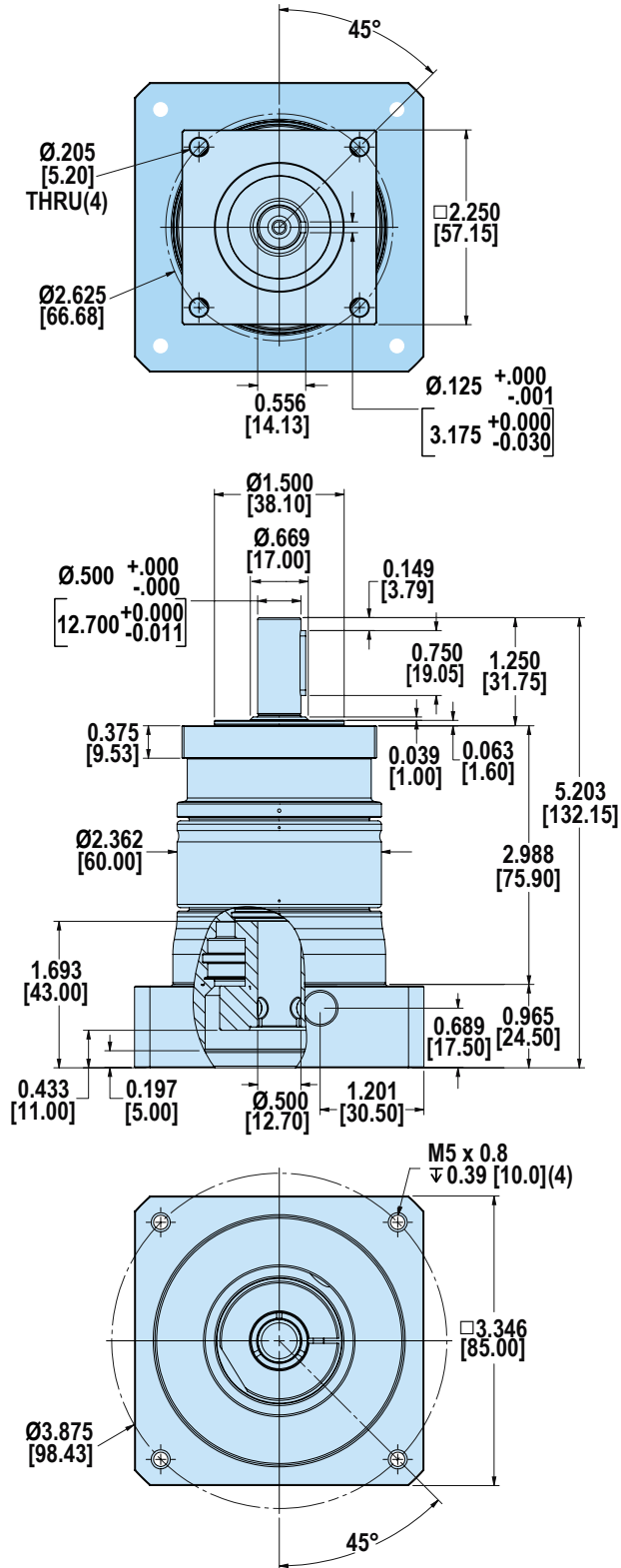
### NEMA23 DIMENSIONS



### NEMA34 DIMENSIONS



### NEMA23/34 DIMENSIONS



# ACSI – Service Parts Ordering

## ACSI MOTOR/DRIVE/CONTROLLER, CABLES & REPLACEMENT PARTS

### Accessory Parts

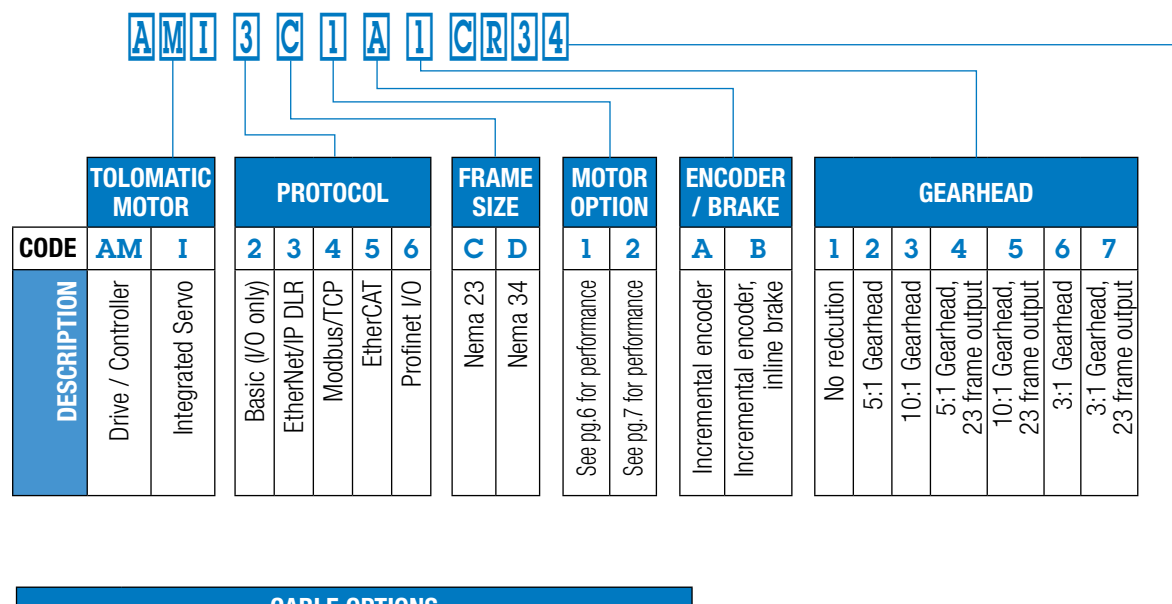
Tolomatic ACSI Cables				
PART NUMBER	DESCRIPTION	LENGTH	CONNECTOR 1	CONNECTOR 2
3604-2089	CABLE, 3M, M12 A Code 12P/M, Digital I/O	3 Meter	M12, 12 Pin	Flying leads
3604-2090	CABLE, 5M, M12 A Code 12P/M, Digital I/O	5 Meter	M12, 12 Pin	Flying leads
3604-2091	CABLE, 10M, M12 A Code 12P/M, Digital I/O	10 Meter	M12, 12 Pin	Flying leads
3604-2092	CABLE, 3M, M12 D Code 4P/M TO ETHERNET RJ45	3 Meter	M12, Ethernet	RJ45, Ethernet
3604-2093	CABLE, 5M, M12 D Code 4P/M TO ETHERNET RJ45	5 Meter	M12, Ethernet	RJ45, Ethernet
3604-2094	CABLE, 10M, M12 D Code 4P/M TO ETHERNET RJ45	10 Meter	M12, Ethernet	RJ45, Ethernet
3604-2109	CABLE, 1M, M12 D Code 4P/M TO ETHERNET M12	1 Meter	M12, Ethernet	M12, Ethernet
3604-2095	CABLE, 3M, M12 D Code 4P/M TO ETHERNET M12	3 Meter	M12, Ethernet	M12, Ethernet
3604-2096	CABLE, 5M, M12 D Code 4P/M TO ETHERNET M12	5 Meter	M12, Ethernet	M12, Ethernet
3604-2097	CABLE, 10M, M12 D Code 4P/M TO ETHERNET M12	10 Meter	M12, Ethernet	M12, Ethernet
3604-2100	CABLE, 3M, M12 T Code 4P/F, POWER	3 Meter	M12, 4 Pin	Flying leads
3604-2101	CABLE, 5M, M12 T Code 4P/F, POWER	5 Meter	M12, 4 Pin	Flying leads
3604-2102	CABLE, 10M, M12 T Code 4P/F, POWER	10 Meter	M12, 4 Pin	Flying leads

ACSI Power Supplies		
PART NUMBER	DESCRIPTION	VOLTAGE
3604-2147	POWER SUPPLY,48VDC,120W,2.5A	48VDC
3604-2148	POWER SUPPLY,48VDC,240W,5A	48VDC
3604-2149	POWER SUPPLY,48VDC,480W,10A	48VDC

ACSI Accessories	
PART NUMBER	DESCRIPTION
2180-1163	SHUNT REGULATOR 50W, 24-80VDC
3604-2157	10 M BRAKE CABLE
3604-2145	CABLE,USB,2M,A MALE-MICRO B MALE

Tolomatic Gearheads	
PART NUMBER	DESCRIPTION
3604-2219	GEARHEAD 23F, 3:1
3604-2220	GEARHEAD 23F, 5:1
3604-2221	GEARHEAD 23F, 10:1
3604-2222	GEARHEAD 34F, 3:1
3604-2223	GEARHEAD 34F, 5:1
3604-2224	GEARHEAD 34F, 10:1
3604-2225	GEARHEAD 23F/34F, 3:1
3604-2226	GEARHEAD 23F/34F, 5:1
3604-2227	GEARHEAD 23F/34F, 10:1

# ACSI Ordering



CABLE OPTIONS	
CODE	DESCRIPTION
CR31	CR31: Power cable, 3m
CR34	CR34: Power & I/O cables, 3m
CR35	CR35: I/O cable, 3m
CR36	CR36: Power & M12/RJ45 Ethernet cables, 3m
CR37	CR37: Power, M12/RJ45 Ethernet & I/O cables, 3m
CR51	CR51: Power cable, 5m
CR55	CR55: I/O cable, 5m
CR56	CR56: Power & M12/RJ45 Ethernet cables, 5m
CR57	CR57: Power, M12/RJ45 Ethernet & I/O cables, 5m
CR58	CR58: Power & I/O cables, 5m
CR101	CR101: Power cable, 10m
CR105	CR105: I/O cable, 10m
CR106	CR106: Power & M12/RJ45 Ethernet cables, 10m
CR107	CR107: Power, M12/RJ45 Ethernet & I/O cables, 10m
CR108	CR108: Power & I/O cables, 10m

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany. <http://www.beckhoff.com>

All product names are trademarks or registered trademarks of their respective owners

# The Tolomatic Difference Expect More From the Industry Leader:



## INNOVATIVE PRODUCTS

Unique linear actuator solutions with Endurance Technology<sup>SM</sup> to solve your challenging application requirements.



## FAST DELIVERY

The fastest delivery of catalog products... Built-to-order with configurable stroke lengths and flexible mounting options.



## ACTUATOR SIZING

Online sizing that is easy to use, accurate and always up-to-date. Find a Tolomatic electric actuator to meet your requirements.



## YOUR MOTOR HERE

Match your motor with compatible mounting plates that ship with any Tolomatic electric actuator.



## LIBRARY

Easy to access CAD files available in the most popular formats to place directly into your assembly.



## TECHNICAL SUPPORT

Extensive motion control knowledge: Expect prompt, courteous replies to any application and product questions from Tolomatic's industry experts.

## Also Consider These Other Tolomatic Products:

### Electric Products

Rod & Guided Rod Style Actuators, High Force Actuators, Screw & Belt Drive Rodless Actuators, Motors, Drives and Controllers

"Foldout" Brochure #9900-9074



### Pneumatic Products

Rodless Cylinders: Band Cylinders, Cable Cylinders, Magnetically Coupled Cylinders/Slides; Guided Rod Cylinder Slides

"Foldout" Brochure #9900-9075



### Power Transmission Products

Gearboxes: Float-A-Shaft®, Slide-Rite®, Caliper Disc Brakes; Planetary Roller Screws

"Foldout" Brochure #9900-9076

# Tolomatic

EXCELLENCE IN MOTION®

COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001 =  
Certified site: Hamel, MN

### USA

#### Tolomatic Inc.

3800 County Road 116  
Hamel, MN 55340, USA

**Phone:** (763) 478-8000

**Fax:** (763) 478-8080

Toll-Free: **1-800-328-2174**

sales@tolomatic.com

[www.tolomatic.com](http://www.tolomatic.com)

### CHINA

#### Tolomatic Automation Products (Suzhou) Co. Ltd.

(ServoWeld® inquiries only)

No. 60 Chuangye Street, Building 2  
Huqiu District, SND Suzhou  
Jiangsu 215011 - P.R. China

**Phone:** +86 (512) 6750-8506

**Fax:** +86 (512) 6750-8507

ServoWeldChina@tolomatic.com

### EUROPE

#### Tolomatic Europe GmbH

Elisabethenstr. 20  
65428 Rüsselsheim  
Germany

**Phone:** +49 6142 17604-0

help@tolomatic.eu

All brand and product names are trademarks or registered trademarks of their respective owners. Information in this document is believed accurate at time of printing. However, Tolomatic assumes no responsibility for its use or for any errors

that may appear in this document. Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

Visit [www.tolomatic.com](http://www.tolomatic.com) for the most up-to-date technical information