CENTURION DSM DRIVES AND MOTORS

MOTION SOLUTIONS PRODUCT GUIDE

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Version 1.0

Giddings & Lewis

Centurion DSM Drives and Motors
Motion Solutions Product Guide

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Version 1.0

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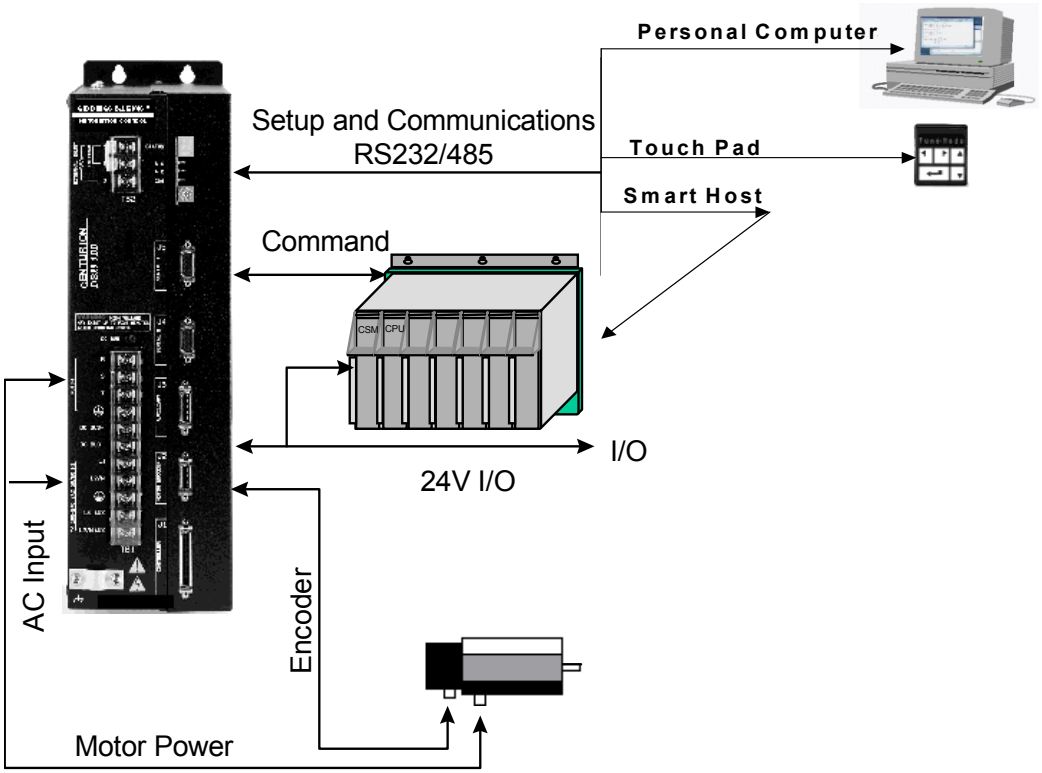
MOTION SOLUTIONS PRODUCT GUIDE

Centurion™ DSM Drives, Motors, and Accessories

DSM100 - Digital Servo Drives

The Giddings & Lewis Centurion DSM line is a family of versatile universal drives. These feature-rich, high performance drives offer flexibility in a wide range of applications. The DSM is called a universal drive because of its ability to run both brushless servo motors and induction motors and because of its ability to act as an analog input velocity servo, variable speed drive, stepper drive replacement or master encoder follower complete with electronic gearing. The Windows based interface, DSMPro, provides you with a powerful configuration and diagnostic tool to improve your productivity when integrating DSM Drives into your machine. The common cabling, functionality and interface throughout the DSM family will drive down your life cycle costs when you standardize on the Centurion DSM drives.



The Centurion DSM100 has the unique flexibility to operate a wide variety of motors so you can optimize the motor/drive system for your application. Through DSMPro or the optional TouchPad, a Giddings & Lewis standard motor file can be selected with the click of the mouse or the push of a button. The drive then automatically configures itself as either an AC brushless servo drive or a high performance vector drive. The majority of the motor families come standard with a 2000 line incremental encoder but also have a 5000 line option. This higher resolution encoder, used in conjunction with a DSM100 drive, provides superior low speed performance for the most demanding applications. And to complement the full functionality and superior performance, the DSM100 drives, cable and motor systems have been third-party tested and certified to the CE EMC requirements.

Universal Drive

- Can be configured for a variety of command sources:
  - Analog velocity input
  - Preset positions, torques, or velocities
  - Step and direction
  - Master encoder following
  - Digital serial commands
- Drives either brushless or induction motors by simple set-up
- The same features, cabling and performance available in a range of both micro drives and standard sized drives

Easy Set-up and Maintenance

- Windows-based DSMPro software provides a complete set of troubleshooting and diagnostic tools.
- All setup and tuning parameters are saved in a non-volatile personality module.
- All drive configuration and tuning parameters can be set up off-line and saved to disk.
- Optional TouchPad MMI provides convenient alternative to DSMPro for the factory floor.

Industry Leading Performance

- Advanced low-speed control algorithm for superior control
- Velocity loop bandwidth up to 400Hz
- High frequency encoder input capability

Reliability

- Tested for vibration, shock, humidity and temperature
- Built in protection circuitry safeguards your system
- Wireless construction
- Highly integrated hardware design with custom ASICS and Intelligent Power Modules (IPM)

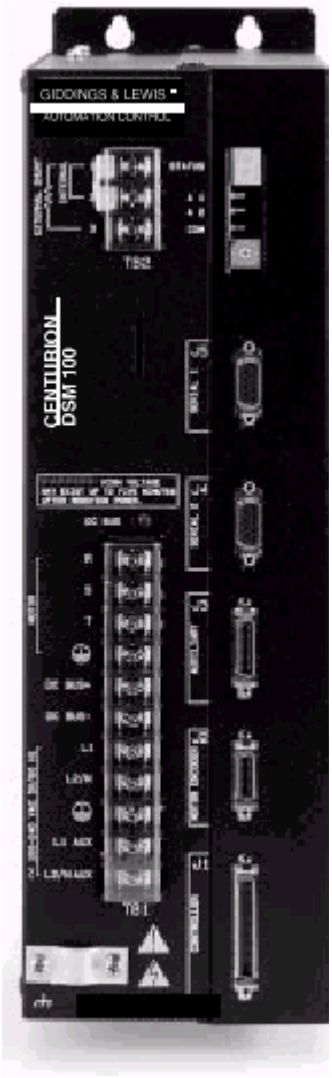
Global Standards

- UL and cUL listed
- CE marked for European requirements for low voltage and electromagnetic compatibility directives
- Designed and manufactured in an ISO9001 certified plant

DSM100 Drive Features

The DSM100 standard sized drives deliver full-featured flexibility and an impressive range of power and performance. Whether you need an analog input velocity servo, a variable speed drive, a stepper drive replacement, or a master encoder follower, the DSM100 is the one drive that can do it all.

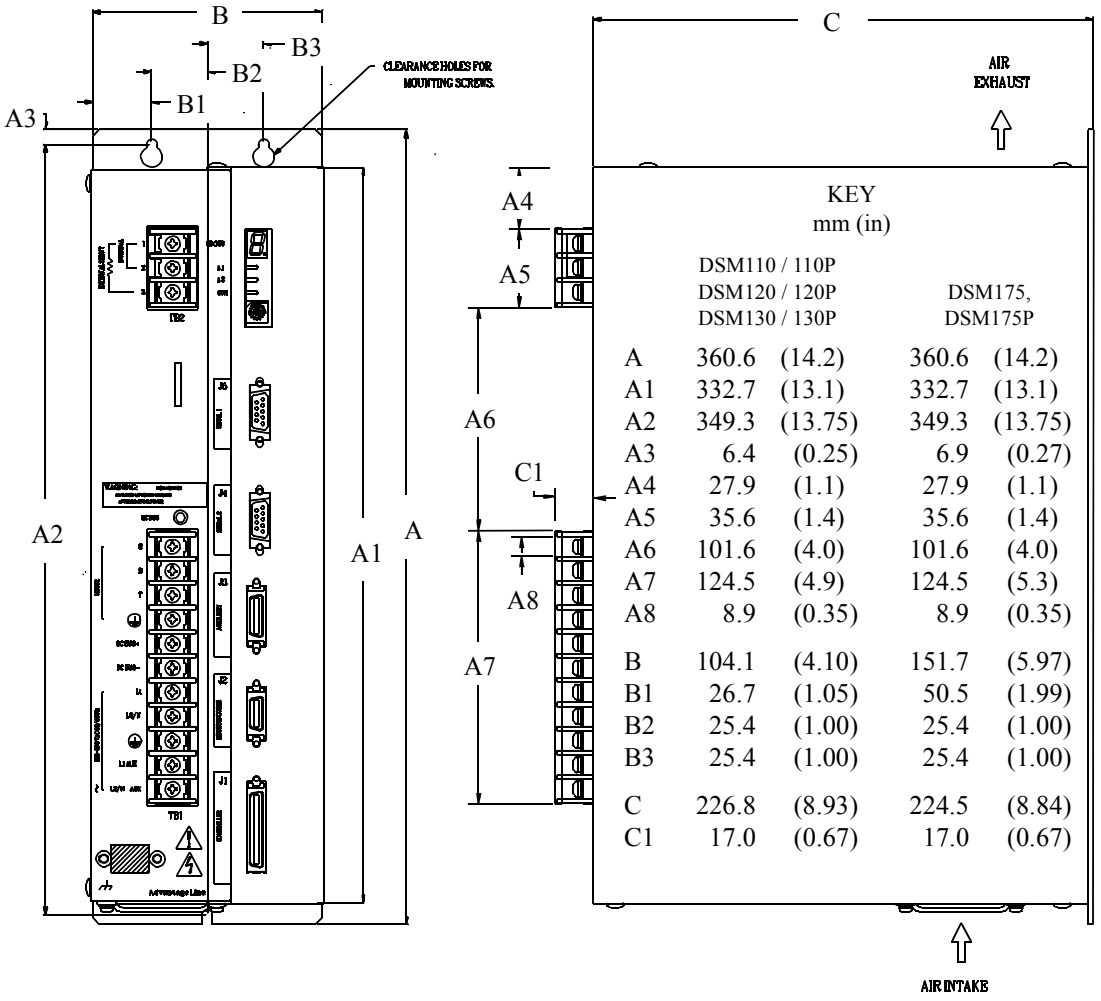
- Available in 1.0, 2.0, 3.0, 7.5 and 15 kW continuous output power ratings
- 100 to 240V AC single phase input (single phase or three phase for the 75 amp version
- Drives either sinusoidal AC brushless or induction motors
- Choice of command source:
  - +/- 10V analog input
  - Step/direction input (also step up/step down) with electronic gearing
  - Auxiliary master encoder input with electronic gearing
  - Eight preset positions/speeds/torques selected via 3 digital input lines
  - RS-232/485 commands
- Phase to phase and phase to ground short circuit protection
- Internal or external resistive shunt
- Auxiliary AC input to power logic only
- Built-in power supplies (including 24V I/O supply) – no external source required except AC line
- DC bus available externally for power leveling or use of shared power supplies
- Advanced multi-processor design for leading edge velocity loop bandwidth, all digital current, velocity and position loops
- Large scale integration with custom ASICs and IPMs for performance and reliability
- Flash memory for simple field upgrades
- Removable personality module to store set-up parameters and simplify drive replacement
- Wireless construction for reliability
- Internally shielded filters for electromagnetic compatibility (EMC)
- 4 dedicated I/O plus 8 user-selectable optically isolated digital inputs and outputs (active high)
- 2 analog inputs for external current limit
- 2 analog outputs for variable monitoring or torque sharing
- 2 serial connectors to simplify RS485 multi-dropping and host communications
- Scalable motor encoder output
- UL, cUL listed and CE marked



NOTE: The use of an external AC line filter and Giddings & Lewis shielded cables are required for CE compliance.

DSM 100 Dimensions

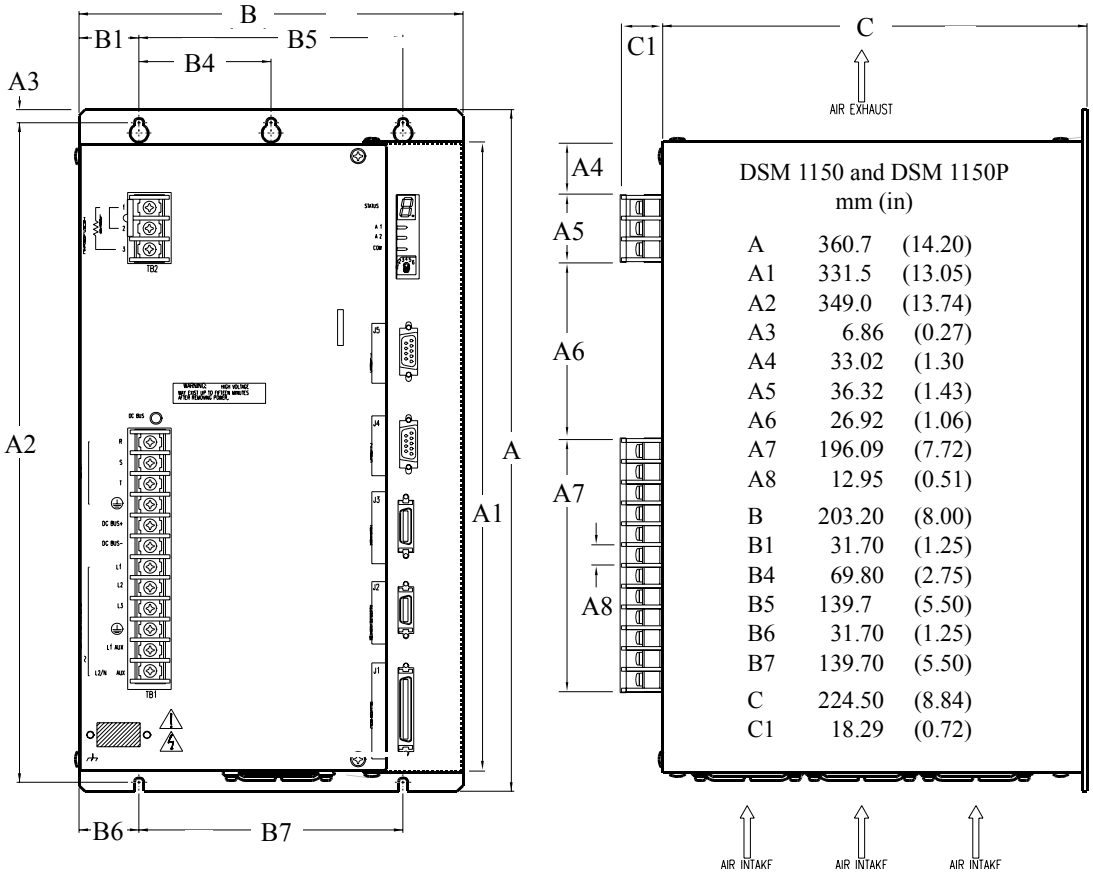
DSM100 Dimensions (Standard Drives)
DSM110, DSM120, DSM130, DSM175



KEY
mm (in)

	DSM110 / 110P DSM120 / 120P DSM130 / 130P		DSM175, DSM175P	
A	360.6	(14.2)	360.6	(14.2)
A1	332.7	(13.1)	332.7	(13.1)
A2	349.3	(13.75)	349.3	(13.75)
A3	6.4	(0.25)	6.9	(0.27)
A4	27.9	(1.1)	27.9	(1.1)
A5	35.6	(1.4)	35.6	(1.4)
A6	101.6	(4.0)	101.6	(4.0)
A7	124.5	(4.9)	124.5	(5.3)
A8	8.9	(0.35)	8.9	(0.35)
B	104.1	(4.10)	151.7	(5.97)
B1	26.7	(1.05)	50.5	(1.99)
B2	25.4	(1.00)	25.4	(1.00)
B3	25.4	(1.00)	25.4	(1.00)
C	226.8	(8.93)	224.5	(8.84)
C1	17.0	(0.67)	17.0	(0.67)

DSM1150



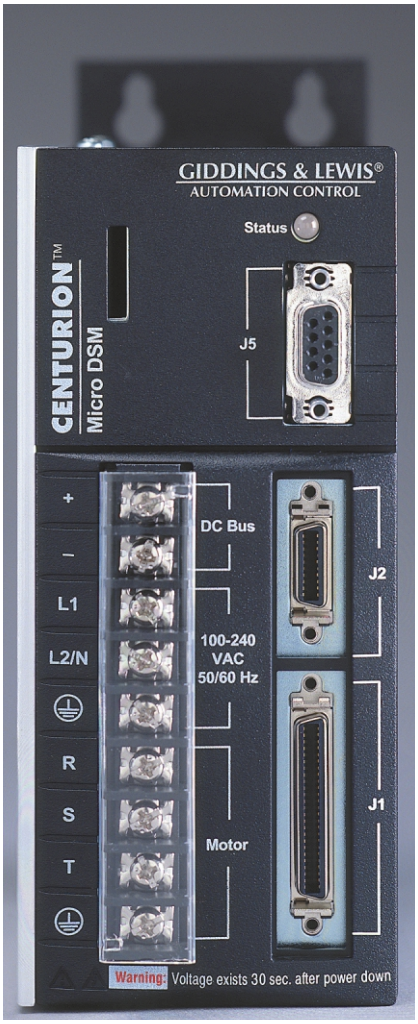
DSM 1150 and DSM 1150P
mm (in)

A	360.7	(14.20)
A1	331.5	(13.05)
A2	349.0	(13.74)
A3	6.86	(0.27)
A4	33.02	(1.30
A5	36.32	(1.43)
A6	26.92	(1.06)
A7	196.09	(7.72)
A8	12.95	(0.51)
B	203.20	(8.00)
B1	31.70	(1.25)
B4	69.80	(2.75)
B5	139.7	(5.50)
B6	31.70	(1.25)
B7	139.70	(5.50)
C	224.50	(8.84)
C1	18.29	(0.72)

Micro DSM Drive Features

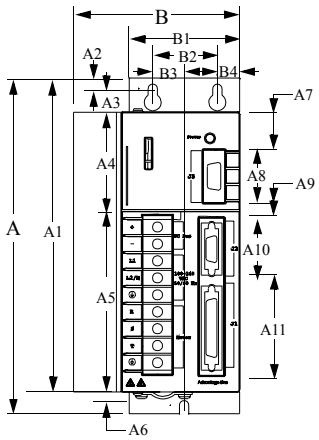
The Micro DSM drives deliver full-featured flexibility and performance in a very compact size. This space-saving drive is also a time saver with its easy to use Windows-based DSMPro software tool. For superior performance in a variety of power ratings and sizes, the Micro DSM is the one drive that can do it all.

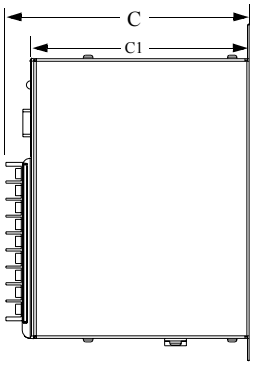
- Available in 0.5 kW, 1.0 kW and 2.0 kW continuous output power ratings
- Superior performance and functionality of larger drives in a package 1/4 of their size
- 100 to 240V AC single phase input
- Choice of command source:
  +/- 10V analog input
  Step/direction input (also step up/step down) with electronic gearing
  Auxiliary master encoder input with electronic gearing
  Eight preset positions/speeds/torques selected via 3 digital input lines
  RS-232/485 commands
- External active shunt available
- Phase to phase and phase to ground short circuit protection
- Drives sinusoidal AC brushless motors
- DC bus available externally for power leveling
- Advanced control algorithms for leading edge velocity loop bandwidth. All current, velocity and position loops are digital
  Speed range 8000:1
  Velocity regulation +/-0.44 RPM with 5000 PPR encoder
- Large scale integration with custom ASICs and IPMs for performance and reliability
- Internally shielded output filter for electromagnetic compatibility (EMC)
- 4 dedicated I/O plus 5 user-selectable optically isolated digital inputs and outputs (sourcing/active high)
- 1 analog input for external current limit
- 1 analog output for variable monitoring or torque sharing
- Serial port for RS232/485 host communications
- Scalable motor encoder output
- UL, cUL listed and CE marked



NOTE: The use of an external AC line filter, and Giddings & Lewis shielded cables are required for CE compliance.

Micro DSM Dimensions
DSM007 Mounting Dimensions

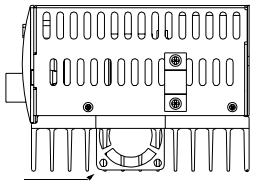




Minimum Unobstructed Surrounding Space

for Cooling and Exhaust Air
Above 50.8 mm (2 inches)
Below 50.8 mm (2 inches)
Sides 12.5 mm (0.5 inches)

for Cable Bend Radius
Front 76.2 mm (3 inches)



NOTE: Fan on DSM-015 only

	Dimension				Dimension	
	mm	inches			mm	inches
A	198.12	7.80		B	97.30	3.83
A1	184.9	7.28		B1	65.02	2.56
A2	6.35	0.25		B2	38.10	1.50
A3	13.0	0.51		B3	18.54	0.73
A4	6.07	2.39		B4	13.21	0.52
A5	94.49	3.72		B5	5.58	0.22
A6[a]	5.0	0.20				
A7	22.10	0.87		C	146.05	5.75
A8	31.75	1.25		C1	129.03	5.08
A9	8.64	0.34				
A10	31.75	1.25				
A11	57.15	2.25				

a. Power Cable bracket extends up to 20mm (0.80 inches)

Optional SERCOS Feature for DSM100 Drives

With the optional SERCOS card, the DSM drives can be configured to operate as a slave device on a SERCOS ring. High-speed fiber optic communication allows up to eight axes per ring. Wiring between the controller and the drive is greatly simplified. Noise problems are eliminated.DSM100 SERCOS Drive Features

The DSM100 SERCOS standard-sized drives deliver full-featured flexibility and an impressive range of power and performance. Whether you need a servo drive, a variable speed drive, or a stepper drive replacement, the DSM100 SERCOS is the one drive that can do it all.

- Available in 1.0, 2.0, 3.0, 7.5, and 15 kW continuous output power ratings
- 100 to 240V AC single phase input (single phase or three phase for the 75 amp version)
- Drives either sinusoidal AC brushless or induction motors
- Auxiliary master encouder input with electronic gearing
- Phase-to-phase and phase-to-ground short circuit protection
- Internal or external resistive shunt
- Auxiliary AC input to power logic only
- Built-in power supplies (including 24V I/O supply); no external source required except AC line
- DC bus available externally for power leveling or use of shared power supplies
- Advanced multi-processor design for leading edge velocity
- Loop bandwidth, all digital current, velocity and position loops
- Large scale integration with custom ASICs and IPMs for performance and reliability
- Flash memory for simple field upgrades
- Removable personality module to store set-up parameters and simplify drive replacement
- Wireless construction for reliability
- Internally shielded filters for electromagnetic compatibility (EMC)
- Scalable motor encoder output
- UL, cUL listed and CE marked

  NOTE: the use of an external AC line filter and Giddings and Lewis shielded cables are required for CE compliance

Other features which can be accessed through SERCOS IDNs:

- Four dedicated optically isolated digital inputs, which include two high-speed inputs for registration or probing
- Four dedicated optically isolated digital outputs
- Two relay outputs
- Three analog inputs for monitoring feedback from dancer, tension, or pressure measuring devices
- Two analog inputs for variable monitoring, torque sharing, or controlling an open loop spindle

Optional Positioning Feature for DSM100 and MicroDSM Drives

With the optional positioning feature, the DSM drives can be configured to act as simple controllers for point-to-point positioning applications. The positioning feature includes:

- Built-in home routine
- Position distance move
- Position absolute move
- Position registered distance move

Applications where this positioning capability could provide the motion control solution include:

Rotary Tables	Feed-to-Length	Pick and Place Machines
Material Feeders	Roll Stock Processors	Wafer Handling Machines
Material Handling	Lane Diverters	Wire-Cutting Operations
Intelligent Conveyors	Punch Press	Clutch-Brake Replacements
Intelligent Setup Axis		Pneumatic Cylinder Replacements

Overview

The positioning drives can be configured to execute up to eight different trapezoidal position moves initiated by the digital I/O, TouchPad, or an unlimited number of positions through the host command language. The position mode does not require a command source from a motion controller or PLC.

The drives are designed to support three different types of position moves:

- Incremental - Distance move executed relative to current position
- Absolute - Position move executed in reference to the home position
- Registration - Distance move executed relative to the registration sensor digital input

The positioning drives are capable of storing up to eight individual position moves. Additionally, a ninth ‘RAM’ position move exists for use with the serial host command language. This allows you to continually download new parameter information. The drives are designed to provide maximum flexibility by allowing you to define the following parameters for each individual position move:

- Position Type - Incremental, Absolute, or Registration
- Distance (Position) - Value indicates the length of travel or position (for absolute position) for the position move
- Batch Count - Determines the number of times the position will automatically execute. A value of zero will execute the move continuously.
- Dwell Time - Sets the length of time the drive will hold position between execution periods.
- Registration Distance - Determines the relative length of travel the drive will execute after the registration sensor digital input is detected. *Registration distance is only active if a registration position type is selected*.
- Velocity - Sets the commanded velocity the drive will use when executing the position move
- Acceleration - Value used as the rate of speed increase during execution of the position move
- Deceleration - Value used as the rate of speed decrease during execution of the position move
- Action When Complete - Allows you to configure the drive to start a different position move when the current move has completed its execution. You can create a series of position moves to execute automatically (or with a Start Index Input), reducing the need to use the Preset Select Inputs.

Home Routine with Positioning Drives

The home routine in the positioning drives allows you to home the axis without the use of a supervisory device. Using DSMPro, you can select a home routine to satisfy your application.

1. Home to Sensor/Then Marker - When the home routine is initiated, the drive will accelerate the motor to the defined homing velocity and look for the sensor/switch assigned to digital input #2. After the switch is seen, the drive defines the next marker (encoder index pulse) as the home position.
2. Home to Marker - When the home routine is initiated, the drive will define the next marker pulse as the home position.
3. Home to Sensor - When the home routine is initiated, the drive will define the input assigned at input #2 as the home position.

For all types of homing, an Offset Move Distance can also be defined which will move the axis the specified distance from the home marker and define that new position as the home position.

You can define the following parameters for the home routine:

- Homing Type - Home to sensor/then marker, home to marker, home to sensor
- Homing Velocity - Velocity at which the home routine will execute
- Homing Accel/Decel - Acceleration and deceleration values used in the home routine
- Offset Move Distance - User specified distance the axis moves relative to the home marker. The final destination then becomes the home position.
- Home Position - Defines the home position to any value
- Auto-Start Homing - If the auto-start homing box is checked in DSMPro, the home routine will execute automatically on the first enable or on a hard reset. You can also initiate the home routine by using the ‘Start Homing’ assignable digital input.

Digital I/O and Positioning Drives

The positioning mode of operation requires the use of the assignable digital I/O or the serial host command language. The DSM drives have the following assignable digital inputs/outputs available.

	Number of assignable optically isolated digital	
	Inputs	**Outputs**
MicroDSM - DSM007, 015, 030	3 (4*)	2
Standard DSM - DSM110, 120, 130, 175, 1150	4 (5*)	4

*The release of positioning redefines the dedicated fault reset digital input to be assignable. This provides you with another available input for positioning.

Host Mode Control with Positioning Drives

The positioning mode of operation, like the other operating modes, is designed to be useful within a serial host control environment. A special 'RAM' position whose parameters are not stored in non-volatile memory may be used for host positioning control when position parameters require continual changing. The 'RAM' position and non-volatile memory position parameters are all configurable through the host command language. The host may also override the digital input controls to force host mode control and initiate all positioning through the host command language.

DSMPro with Positioning Drives

DSMPro version 1.4 or higher is required for use with the positioning drives. Drive parameter files created with non-positioning drives cannot be used with positioning drives and vice versa.

Touch Pad with Positioning Drives

All positioning parameters may be configured through the use of the five-key, eight character TouchPad. A 'Start Index' and a 'Start Homing' capability is also available on the TouchPad.

Additional Drive Features

These features have also been added to the DSM drives.

- Flash EPROM in MicroDSM Drives - provides the ability to field download new firmware revisions in MicroDSM drives as previously provided in the standard DSM drives.
- Reduction in Voltage Required in MicroDSM Drives - The positioning drives require an input voltage of 11 to 28V to operate the digital I/O.
- Analog Position Operation Mode - An analog position mode allows position control of the motor based on an analog ±10V input. This operation mode will be useful in high performance valve applications that require the use of an accurate servo control.

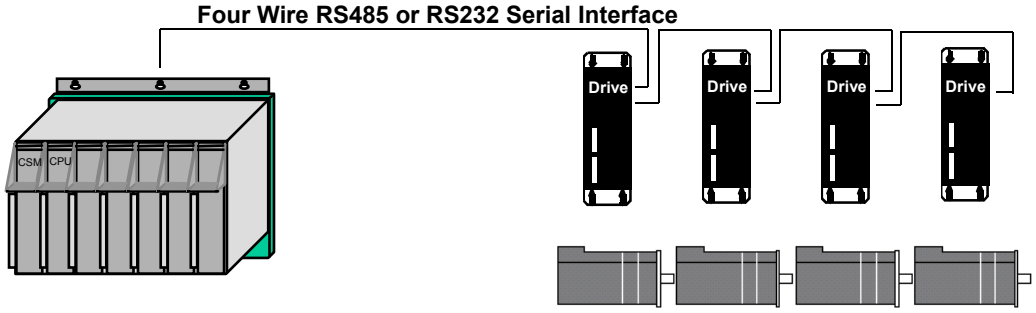
Part Numbers for Positioning Drives

Drive	Part Number
DSM007P	M.1016.1627 (old # 401-56451-50)
DSM015P	M.1016.1629 (old # 401-56452-50)
DSM030P	M.1016.1631 (old # 401-56453-50)
DSM110P	M.1015.7919 (old # 401-34400-50)
DSM120P	M.1015.7921 (old # 401-34401-50)
DSM130P	M.1015.7923 (old # 401-34402-50
DSM175P	M.1015.7925 (old # 401-34403-50)
DSM1150P	M.1015-7927 (old # 401-34404-50)

Host Mode

The DSM100's Host Command protocol provides optional drive configuration using the drive's Serial Communications Interface. This powerful feature allows your controller to access all of the drive's digital controls using sequences of ASCII characters. The protocol includes error checking to ensure the integrity of the transmitted commands.

In installations which have multiple axes, up to 32 DSM100 Drives can be addressed by a host computer. These drives communicate with the host computer using a four wire RS-485 or two wire RS-232 interface. The Host Command protocol includes specific drive addressing which allows the host to communicate with all the connected drives concurrently.



PC Configuration

The minimum PC configuration required for DSMPro software is:

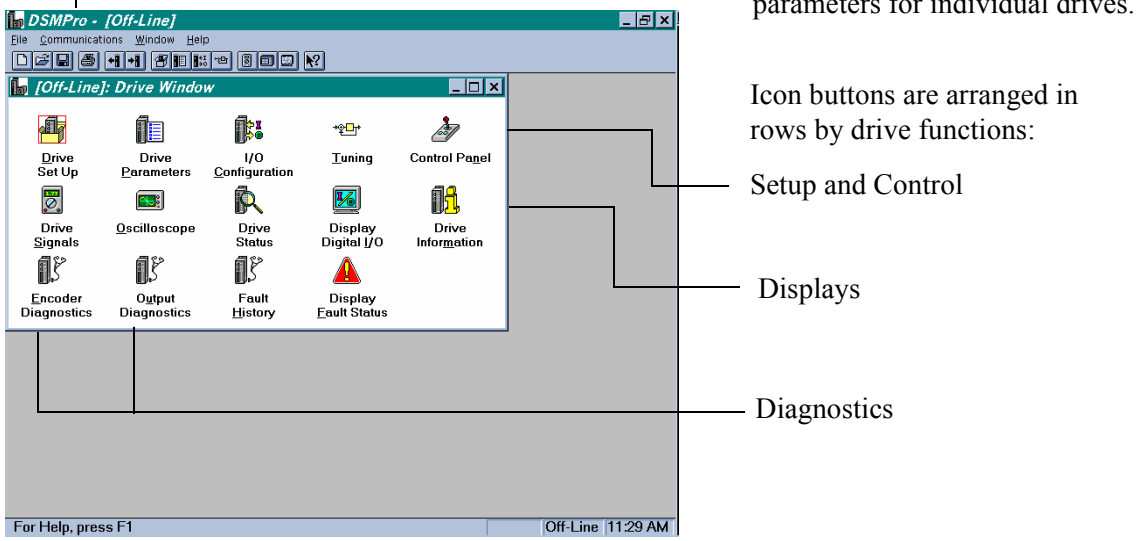
- 386 based IBM compatible PC with hard disk with 2 MB of available hard disk space to load DSMPro
- 4 MB of memory minimum
- Microsoft® Windows™ version 3.1 or higher
- 3.5", 1.44 MB floppy disk drive
- RS -232 serial port
- VGA monitor

DSMPro

DSMPro is a convenient point-and-click software interface for customizing the features in the Centurion DSM100 drives to best fit your application. Suitable for any PC with Windows, it is used to configure, monitor, and troubleshoot a servo system. The on-line help and quick start-up windows will simplify your setup while tools such as the on-screen digital oscilloscope provide simplified tuning and diagnosis. It also provides a full array of on-screen meters and other software tools for rapid debugging and measurement. DSMPro keeps error messages in its own non-volatile message buffer to save time in tracking down a problem. And in systems with multiple drives, DSMPro can simultaneously display status and configuration screens for all drives that are on an RS485 or RS232 link. DSMPro can also be used off-line to configure a drive and save the set-up to disk for later downloading to a drive.

DSMPro Drive Window

The Drive Window becomes active after communications with a drive are established or DSMPro enters the off-line mode.

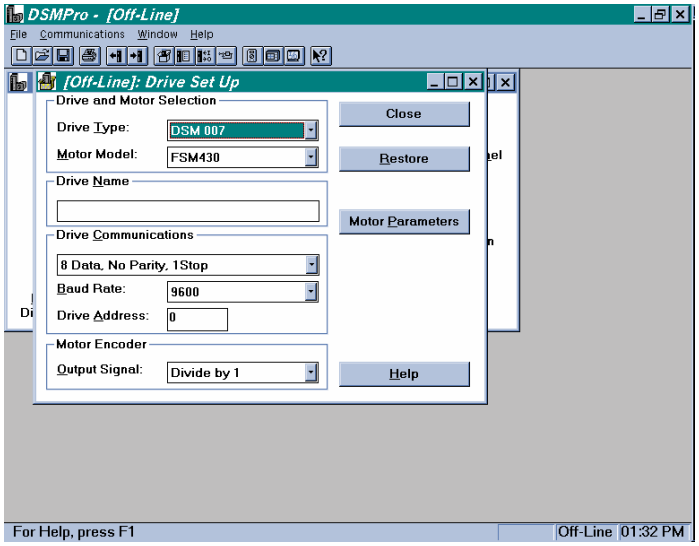


The Drive Window is the main window for performing functions in DSMPro. It is a functionally easy method to visually setup, run, evaluate and diagnose one or more servo systems. The commands available in DSMPro are described on the following pages.

DSMPro Sample Screens

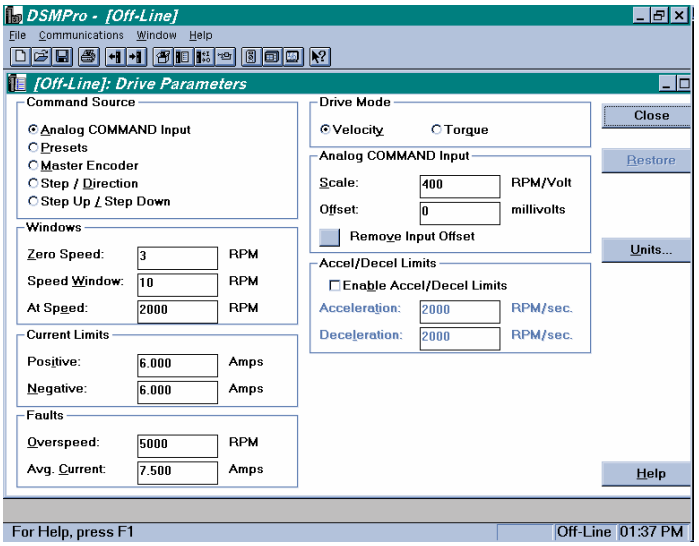
DSMPro has a complete set of easy to understand windows available from its pull down menus. Examples of DSMPro screens are shown below. (The examples shown are using a Centurion DSM100 drive.)

Drive Setup



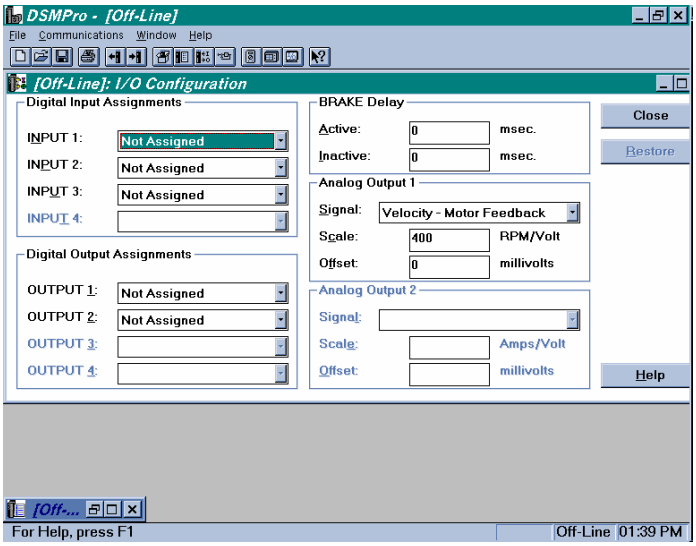
This Drive Set Up dialog box is automatically displayed when DSM-Pro is connected to an uninitialized drive. Usually, the only parameter requiring selection is the motor model number for operation with the drive.

Drive Parameters



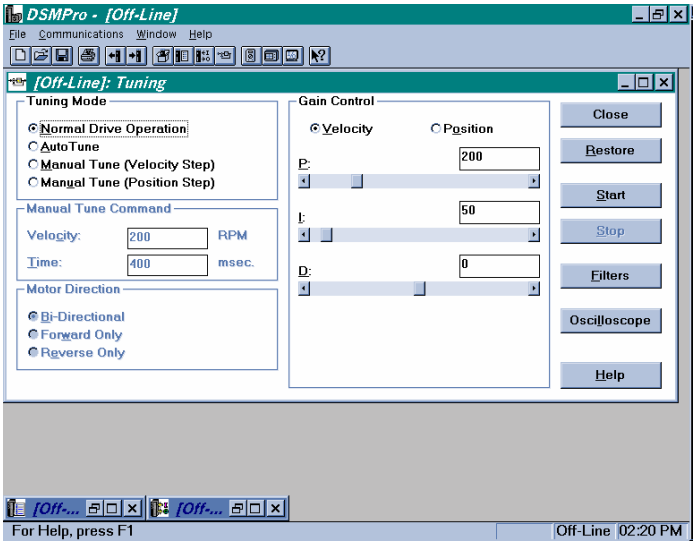
The Drive Parameters window accesses common operating parameters for the drive including the command source, current limits, and fault thresholds. This window, along with the I/O Configuration window, defines the necessary drive parameters for an application.

I/O Configuration



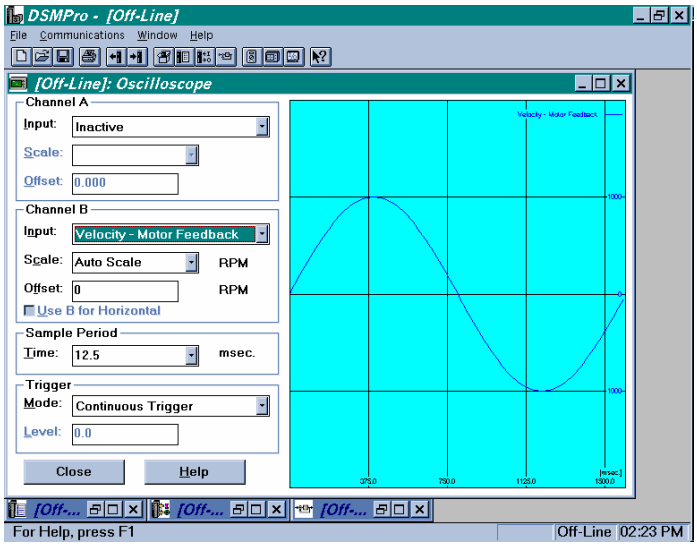
The I/O Configuration window assigns functions to digital inputs, digital outputs, and analog outputs. The active and inactive brake delays are also set on this screen.

Tuning



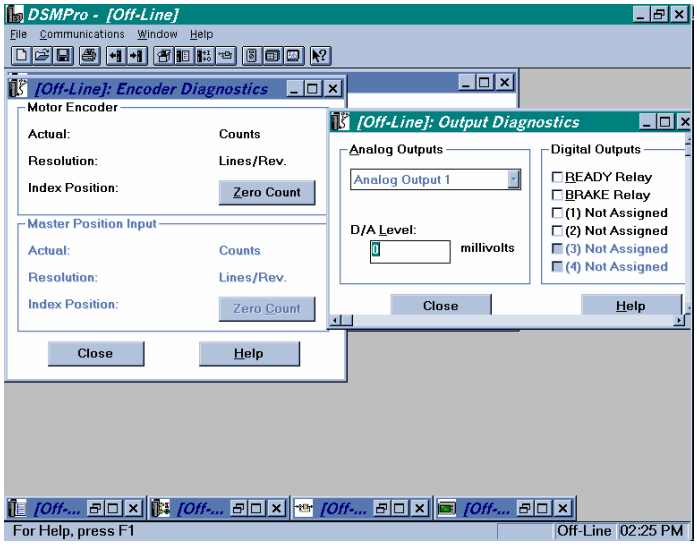
For quick set-ups, DSMPro has one button auto-tuning. For critical tuning requirements, a built-in function generator allows manual adjustment for optimization of the velocity and position loop gains.

Oscilloscope



The digital oscilloscope provides on-line monitoring of any drive parameter. Its functions include positive and negative triggering, continuous tracing, A vs. B display and independent channel scaling and offset.

Diagnostics

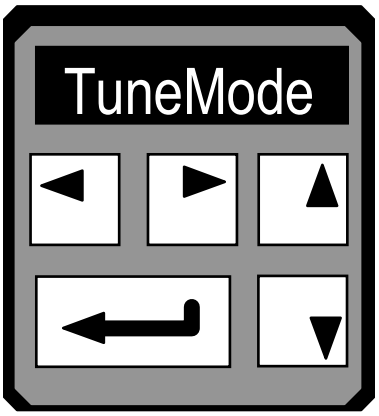


The Diagnostics screens provide fast verification of various I/O conditions and allow you to check functions and machine wiring by exercising the digital outputs.

A fault history provides complete information on past conditions and a fault check screen provides instant status on any error conditions.

Part Number
M.1017.0586 (old # 502-60036-00)
Included on PiCPro for Windows Applications CD

TouchPad



The TouchPad is a convenient alternative to using DSMPro for drive set-up and monitoring. The small TouchPad module plugs directly into the front of the drive where its eight character dot matrix display and five keys provide access to almost all the same functions available in DSMPro.

The TouchPad is an excellent diagnostic and monitoring tool for use on the factory floor. One TouchPad can support several drives because it is independent of the drive and can be quickly attached and removed.

TouchPad Commands

Commands are entered by pressing a single key or combination of keys. Two modes of operation are available. Display mode allows you to move through the TouchPad Command tree to each parameter. Modify mode allows you to monitor and change each parameter. Most parameters can be modified or viewed while the drive is either running or disabled.

Part Number
M.1015.7928 (old # 401-34405-00)

DSM100 Specifications (Standard Drives)

Characteristic	Specifications					
Part Number						
DSM110	M.1015.7918 (old # 401-34400-00)					
DSM120	M.1015.7920 (old # 401-34401-00)					
DSM130	M.1015.7922 (old # 401-34402-00)					
DSM175	M.1015.7924 (old # 401-34403-00)					
DSM1150	M.1015.7926 (old # 401-34404-00)					
General	DSM110	DSM120	DSM130	DSM175 (1ϕ input)	DSM175 (3ϕ input)	DSM1150 (3ϕ input)
Peak Output Current (Amps)	10	20	30	50	75	150
Continuous Output Current (Amps)	5	10	15	15	35	65
Continuous Output Power (kW)	1.0	2.0	3.0	3.0	7.5	15.0
Continuous Shunt Power	50 W	50 W	50 W	50 W	50 W	180W
Peak Shunt Power	4.5 kW	4.5 kW	4.5 kW	10.0 kW	10.0 kW	19.0 kW
Continuous Shunt Power External (max.)	2.4 kW	2.4 kW	2.4 kW	4.0 kW	4.0 kW	8.0 kW
Peak Shunt Power External (max.)	6.0 kW	6.0 kW	6.0 kW	10.0 kW	10.0 kW	19.0 kW
Input						
Continuous Input Current (Amps)	10	19	28	28	28	46
Input Voltage	100 to 240V AC RMS nominal					
Input Frequency	47-63 Hz					
Command Sources						
Analog Velocity Input	+/- 10 Volt					
Presets	8 presets, binary selection by digital inputs					
Step and direction, Step Up/Step Down	1 MHz maximum frequency Differential or single ended line drivers					
Master Encoder Following	1 MHz maximum line frequency Differential or single ended line drivers					
Digital Serial Commands	Via serial port and DSM host language					

Serial Communication Port	
Type	RS-232, four-wire RS-485
Baud Rate	1200 to 19,200 baud
Multiple Drive Addressing	Up to 32 drives, 10 using front panel rotary dip switch
Control Loops	
Modes	Torque, velocity and position control
Type	All loops digital
Velocity Loop bandwidth (maximum)	400 Hz
Inputs and Outputs	
Selectable Digital Inputs	4 optically isolated, 24 Volt, active high User-selectable as: Drive Mode Select, Integrator Inhibit, Follower Enable, Forward Enable, Reverse Enable, Preset Select, Analog Override
Selectable Digital Outputs	2 optically isolated, 24 Volt, active high, short circuit protected User-selectable as: In Position, Within Position Window, Zero Speed, Within Speed Window, At Speed, Current Limit, Drive Enable, Bus Charged, various fault indications
Dedicated Digital Inputs	Enable, Fault Reset (Optically isolated, 24 Volt, active high)
Dedicated Relay Outputs	Ready/Not Faulted, Brake Output
Analog Inputs	1 external analog current limit, 0 to 10 Volt
Analog Outputs	1 user programmable, +/- 10 Volt
Encoder Output	1 MHz maximum line frequency Differential Line Drivers Scalable by 1, 1/2, 1/4, 1/8
Motor Feedback	Incremental encoder

Connector					
Serial	9 pin D-Shell				
Control and Feedback	20 and 50 pin high density Mini D				
Power	Screw terminal block				
Environmental					
Storage Temperature	-40°C to 70°C				
Operating Temperature	-5°C to 55°C				
Humidity	5% to 90%, non-condensing				
Altitude	1500 m/5000ft				
Vibration	10 to 2000 Hz at 2 g				
Shock	15 g 11 msec half sine				
Weight	DSM110	DSM120	DSM130	DSM175	DSM1150
	13.78 lbs (5.80 kg)	14.02 lbs (6.36 kg)	14.28 lbs (6.48 kg)	21.32 lbs (9.67 kg)	30.9 lbs (14.06 kg)

Micro DSM Specifications

Characteristic	Specifications		
Part Number			
DSM007	M.1016.1626 (old # 401-56451-00)		
DSM015	M.1016.1628 (old # 401-56452-00)		
DSM030	M.1016.1630 (old # 401-56453-00)		
General	DSM007	DSM015	DSM030
Peak Output Current (Amps)	7.5	15	30
Continuous Output Current (Amps)	2.5	5	10
Continuous Output Power (kW)	0.5	1.0	2.0
Continuous Shunt Power External (with external shunt kit)[1]	300 W	300 W	300 W
Peak Shunt Power External (with external shunt kit) [1]	2.2 kW	2.2 kW	2.2 kW
Input			
Continuous Input Current (Amps)	5	9	18
Input Voltage	100 to 240V AC RMS nominal		
Input Frequency	47-63 Hz		
Command Sources			
Analog Velocity Input	+/- 10 Volt		
Presets	8 presets, binary selection by digital inputs		
Step and direction, Step Up/Step Down	1 MHz maximum frequency Differential or single ended line drivers		
Master Encoder Following	1 MHz maximum line frequency Differential or single ended line drivers		
Digital Serial Commands	Via serial port and DSM Drive host language		

Serial Communication Port	
Type	RS-232, four-wire RS-485
Baud Rate	1200 to 19,200 baud
Multiple Drive Addressing	Up to 32 drives
Control Loops	
Modes	Torque, velocity and position control
Type	All loops digital
Velocity Loop bandwidth (maximum)	300 Hz
Inputs and Outputs	
Selectable Digital Inputs	3 optically isolated, 24 Volt, active high User-selectable as: Drive Mode Select, Integrator Inhibit, Follower Enable, Forward Enable, Reverse Enable, Preset Select, Analog Override
Selectable Digital Outputs	2 optically isolated, 24 Volt, active high, short circuit protected User-selectable as: In Position, Within Position Window, Zero Speed, Within Speed Window, At Speed, Current Limit, Drive Enable, Bus Charged, various fault indications
Dedicated Digital Inputs	Enable, Fault Reset (Optically isolated, 24 Volt, active high)
Dedicated Relay Outputs	Ready/Not Faulted, Brake Output
Analog Inputs	1 external analog current limit, 0 to 10 Volt
Analog Outputs	1 user programmable, +/- 10 Volt
Encoder Output	1 MHz maximum line frequency Differential Line Drivers Scalable by 1, 1/2, 1/4, 1/8
Motor Feedback	Incremental encoder

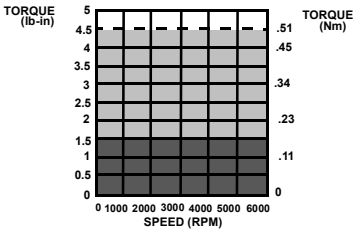
Connectors	
Serial	9 pin D-Shell
Control and Feedback	20 and 50 pin high density Mini D
Power	Screw terminal block
Environmental	
Storage Temperature	-40°C to 70°C
Operating Temperature	-5°C to 55°C
Humidity	5% to 90%, non-condensing
Altitude	1500 m/5000 ft.
Vibration	10 to 2000 Hz at 2g
Shock	15 g 11 msec half sine
Weight	DSM007 DSM015 DSM030 3.7 lbs (1.68 kg) 4.47 lbs (2.03 kg) 4.41 lbs (2.0 kg)

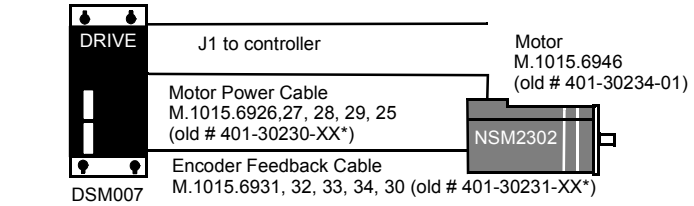
[1]Applications having a combination of fast deceleration rates and an inertia mismatch of greater than 10:1 should consider the external shunt kit. Consult factory with detailed application information.

DSM100 With NSM Series Motors

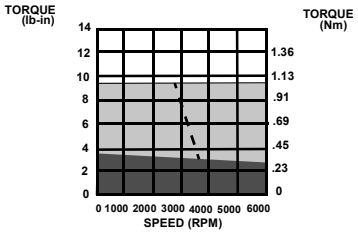
Choose a system with an NSM Series motor when the application requires low cost and medium inertia. Cable part numbers shown are for straight cable. Some connectors are also available in right angle

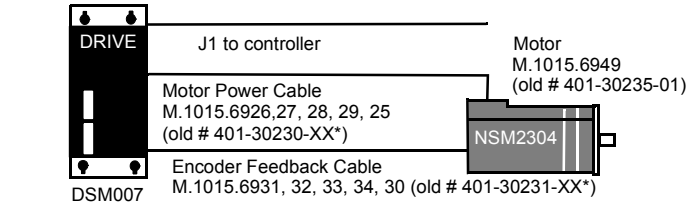
DSM007/NSM2302 @ 115VAC



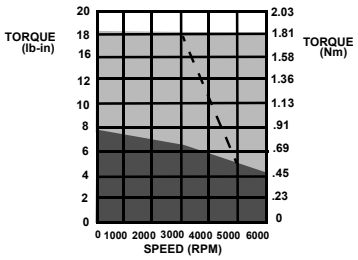


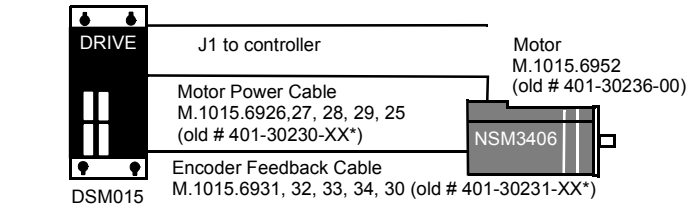
DSM007/NSM2304 @ 115VAC



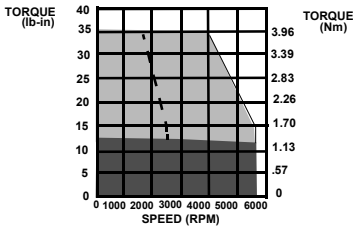


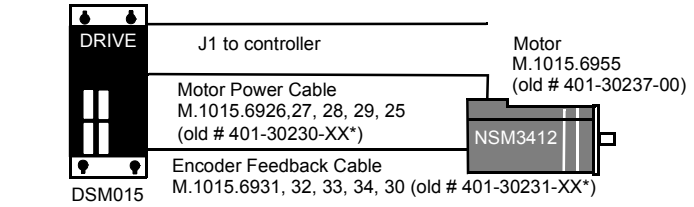
DSM015/NSM3406 @ 230VAC



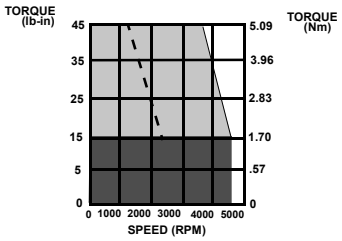


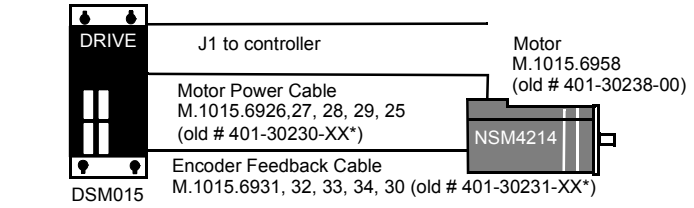
DSM015/NSM3412 @ 230VAC





DSM015/NSM4214 @ 230VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

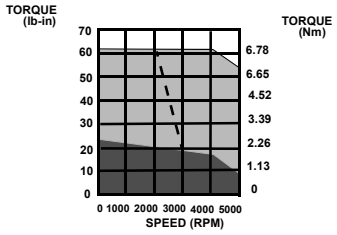
= Continuous Operating Region

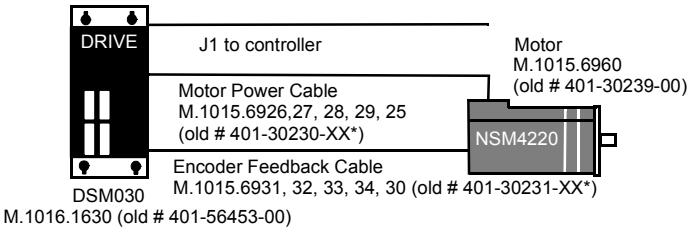
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00

= Drive Operation with 115 VAC RMC Input Voltage

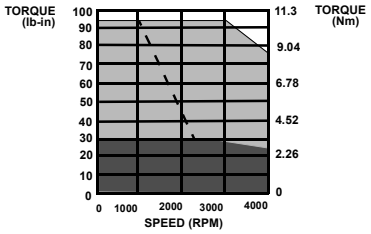
NOTE: Serial interface cables cannot exceed 50 ft.

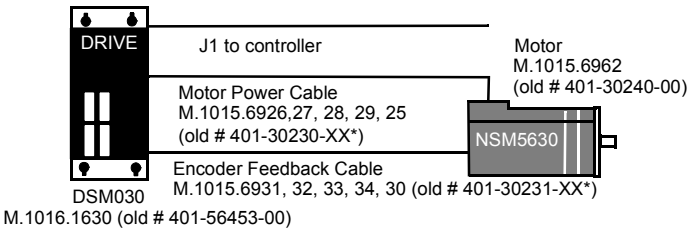
DSM030/NSM4220 @ 230VAC



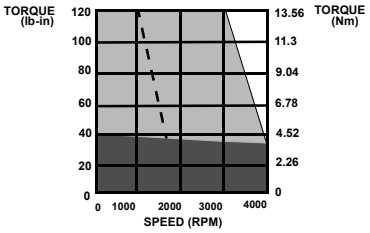


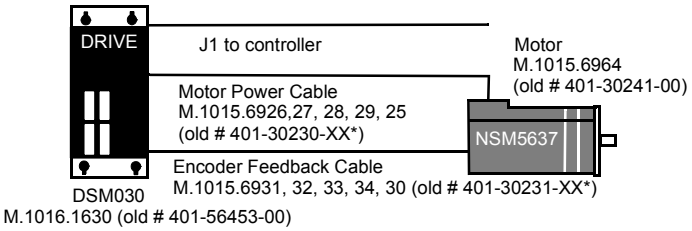
DSM030/NSM5630 @ 230VAC



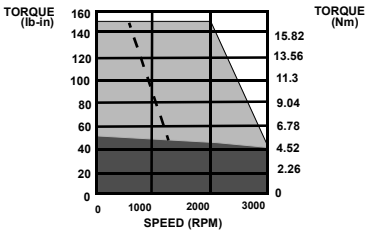


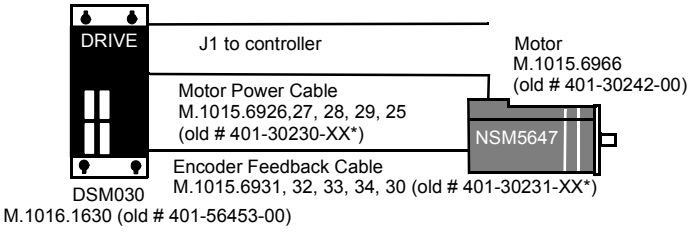
DSM030/NSM5637 @ 230VAC





DSM030/NSM5647 @ 230VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

= Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

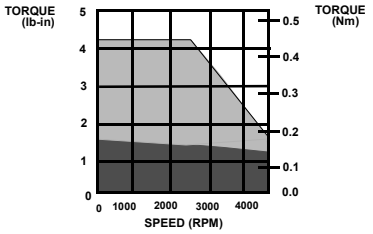
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 010, 25 ft. (7.7m) - 025, 50 ft. (15.0m) - 050, 75 ft. (23.0m) - 075, 100 ft. (31m) - 00

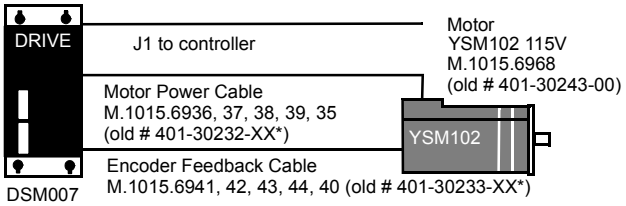
NOTE: Serial interface cables cannot exceed 50 ft.

DSM100 With YSM Series Motors

Choose a system with a YSM Series motor when the application requires small size, low inertia and high acceleration. Cable part numbers shown are for straight cable. Right angle cable is also available

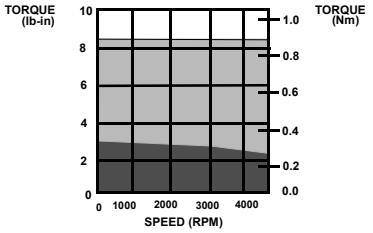
DSM007/YSM102 @ 115VAC

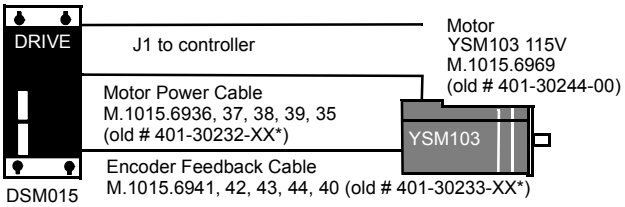




DSM007
M.1016.1626 (old # 401-56451-00)

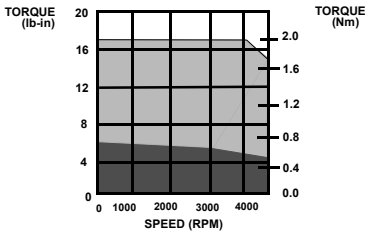
DSM015/YSM103 @ 115VAC

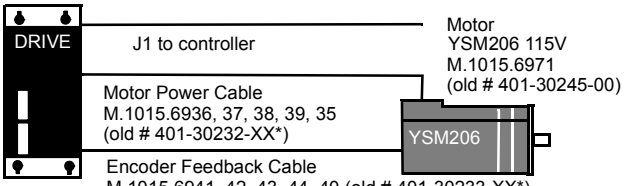




DSM015
M.1016.1628 (old # 401-56452-00)

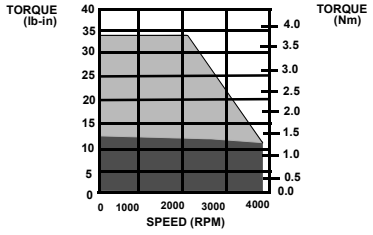
DSM030/YSM206 @ 115VAC

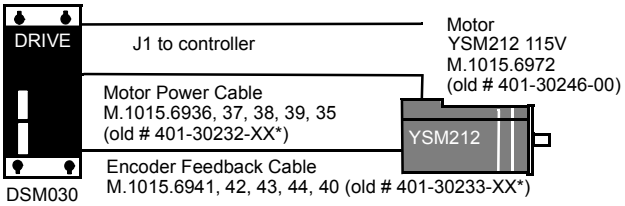




DSM030
M.1016.1630 (old # 401-56453-00)

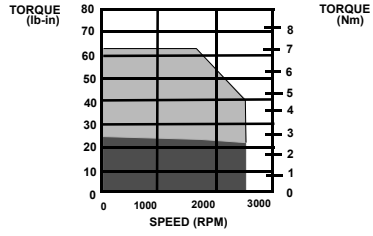
DSM030/YSM212 @ 115VAC

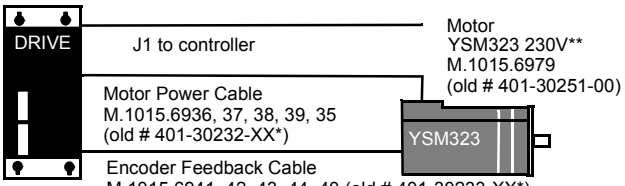




DSM030
M.1016.1630 (old # 401-56453-00)

DSM030/YSM323 @ 115VAC**





DSM030
M.1016.1630 (old # 401-56453-00)

**YSM 230V motor used for this 115V applicaiton.

Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

= Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

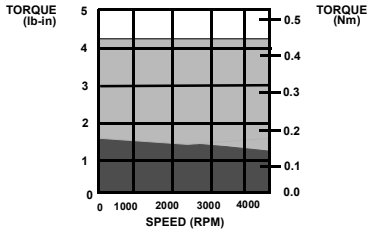
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 010
25 ft. (7.7m) - 025, 50 ft. (15.0m) - 050, 75 ft. (23.0m) - 075, 100 ft. (31m) - 00

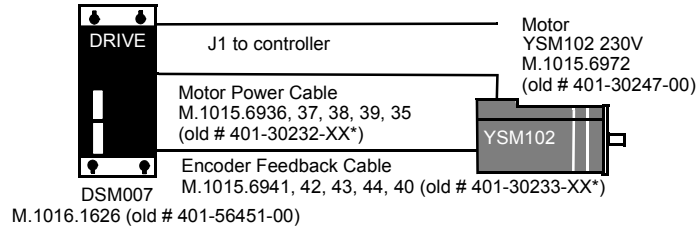
NOTE: Serial interface cables cannot exceed 50 ft.

Centurion DSM100 With 230V YSM Series Motors

Choose a system with a YSM Series motor when the application requires small size, low inertia and high acceleration.

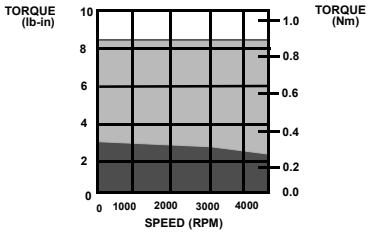
DSM007/YSM102 @ 230VAC

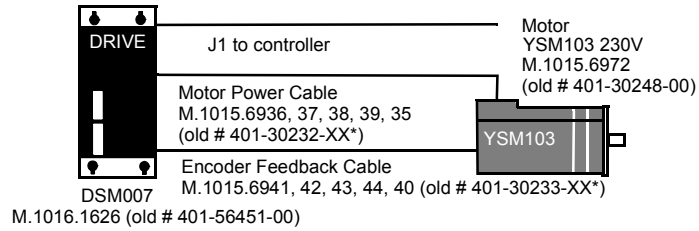




DSM007
M.1016.1626 (old # 401-56451-00)

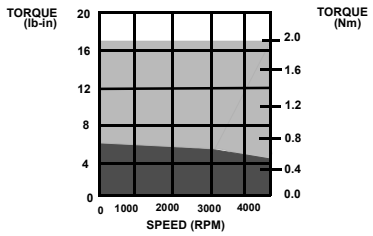
DSM007/YSM103 @ 230VAC

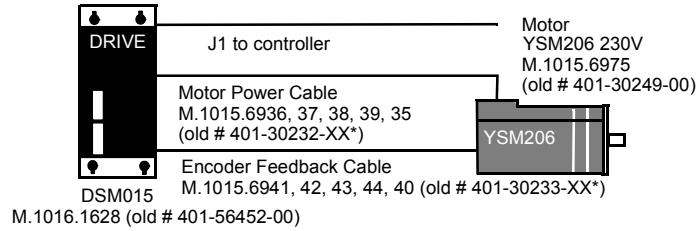




DSM007
M.1016.1626 (old # 401-56451-00)

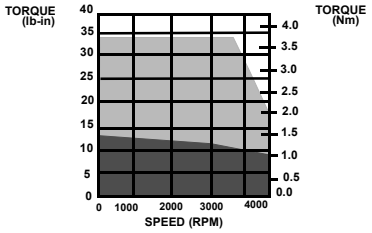
DSM015/YSM206 @ 230VAC

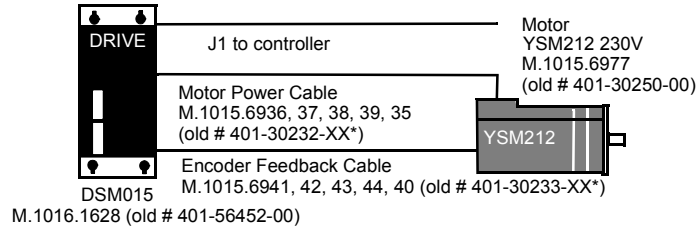




DSM015
M.1016.1628 (old # 401-56452-00)

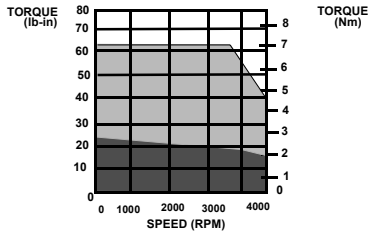
DSM015/YSM212 @ 230VAC

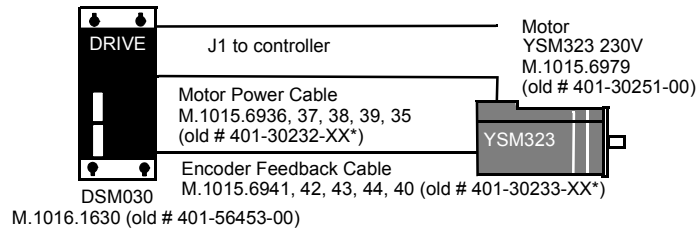




DSM015
M.1016.1628 (old # 401-56452-00)

DSM030/YSM323 @ 230VAC





DSM030
M.1016.1630 (old # 401-56453-00)

Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

= Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

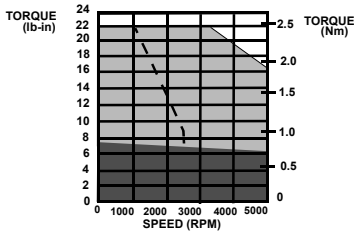
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 010, 25 ft. (7.7m) - 025, 50 ft. (15.0m) - 050, 75 ft. (23.0m) - 075, 100 ft. (31m) - 00

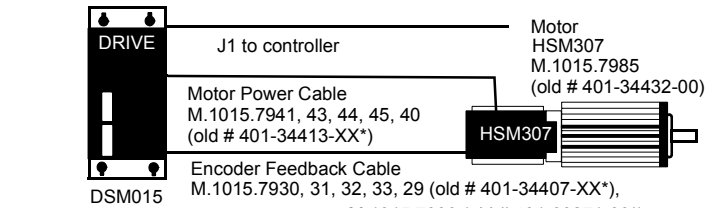
NOTE: Serial interface cables cannot exceed 50 ft.

DSM100 With HSM Series Motors

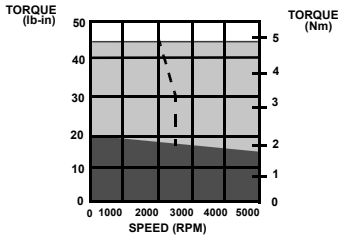
Choose a system with an HSM Series motor when the application requires low inertia, high acceleration and peak torque. Cable part numbers shown are for straight cable. Some connectors are also available in right angle.

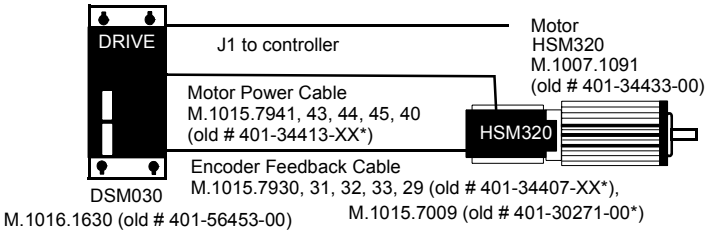
DSM015/HSM307 @ 230VAC



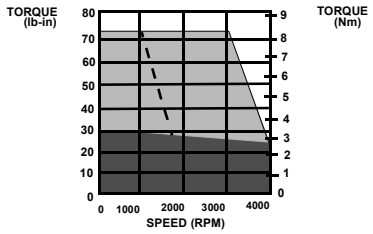


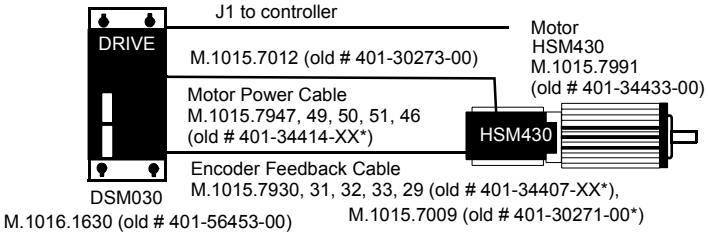
DSM030/HSM320 @ 230VAC



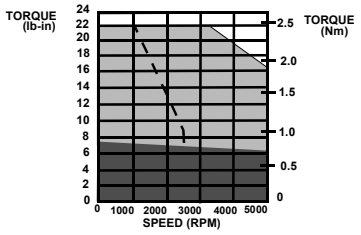


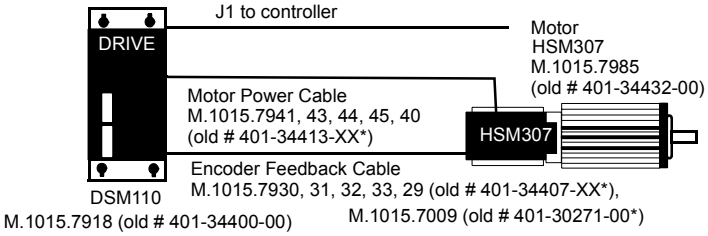
DSM030/HSM430 @ 230VAC



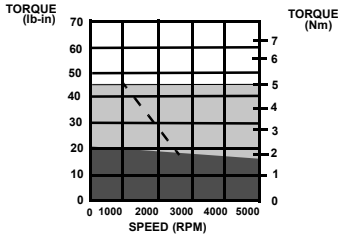


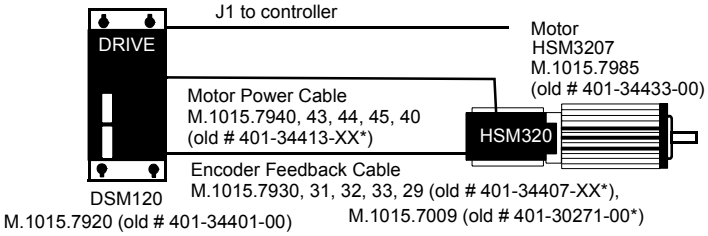
DSM110/HSM307 @ 230VAC





DSM120/HSM320 @ 230VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

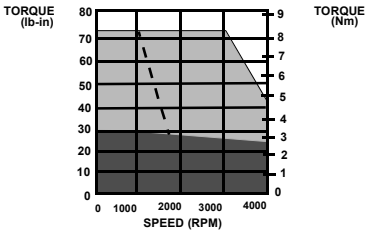
= Continuous Operating Region

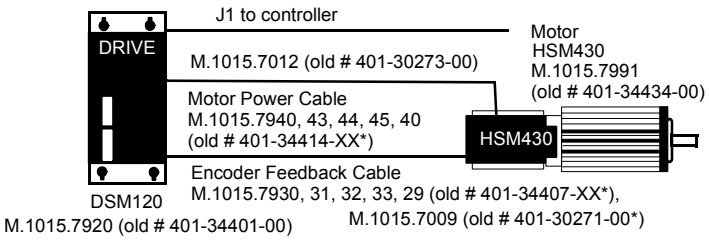
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

= Drive Operation with 115 VAC RMC Input Voltage

NOTE: Serial interface cables cannot exceed 50 ft.

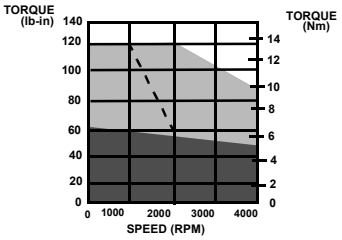
DSM120/HSM430 @ 230VAC

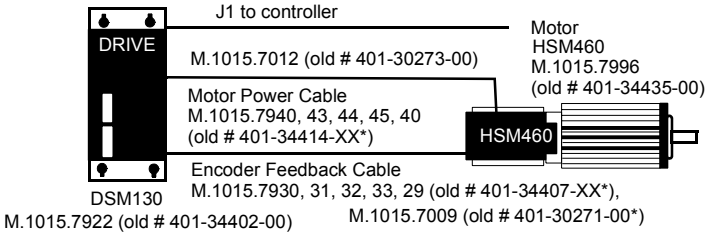




DSM120
M.1015.7920 (old # 401-34401-00)

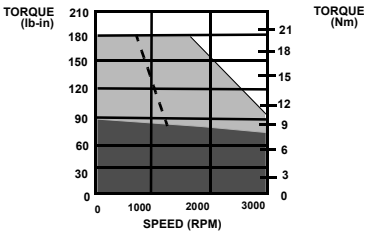
DSM130/HSM460 @ 230VAC

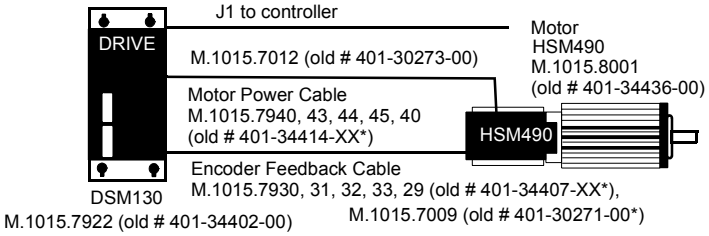




DSM130
M.1015.7922 (old # 401-34402-00)

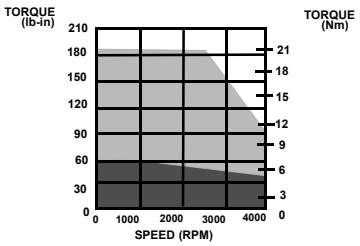
DSM130/HSM490 @ 230VAC

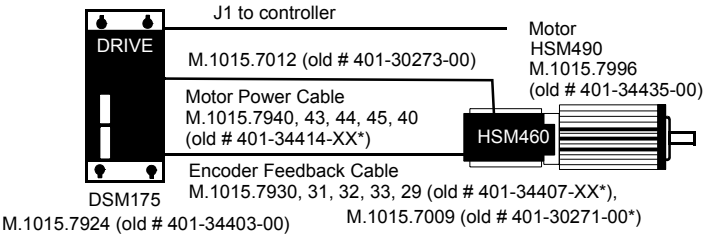




DSM130
M.1015.7922 (old # 401-34402-00)

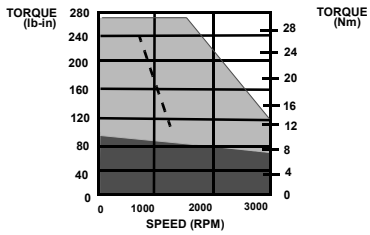
DSM175/HSM460 @ 230VAC

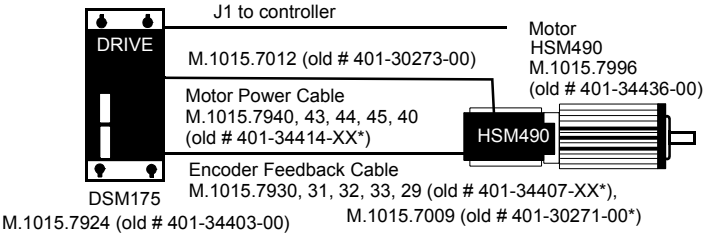




DSM175
M.1015.7924 (old # 401-34403-00)

DSM175/HSM490 @ 230VAC





DSM175
M.1015.7924 (old # 401-34403-00)

Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

= Intermittent Operating Region

*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

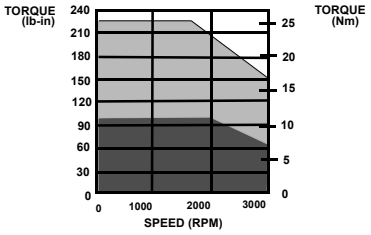
Drive Module Input Voltage = 230 VAC RMS

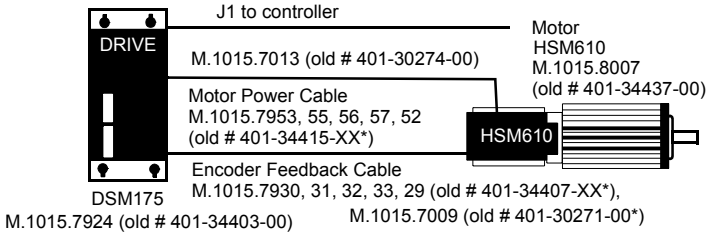
= Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

NOTE: Serial interface cables cannot exceed 50 ft.

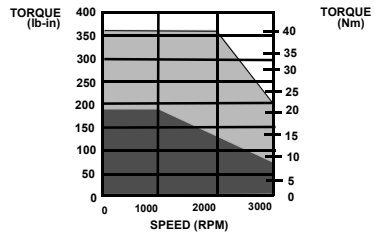
DSM175/HSM610 @ 230VAC

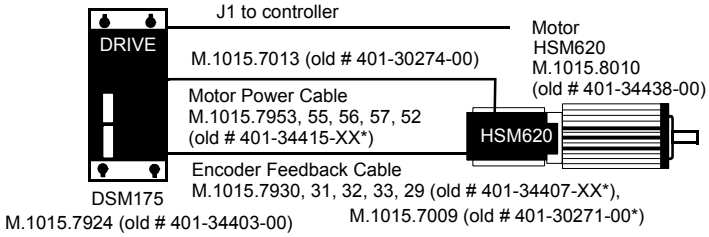




DSM175
M.1015.7924 (old # 401-34403-00)

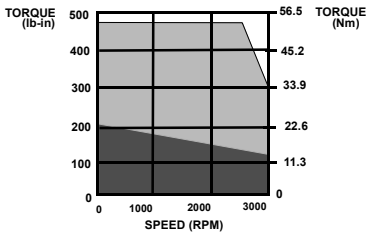
DSM175/HSM620 @ 230VAC

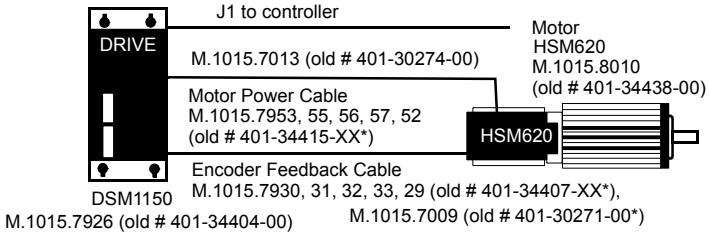




DSM175
M.1015.7924 (old # 401-34403-00)

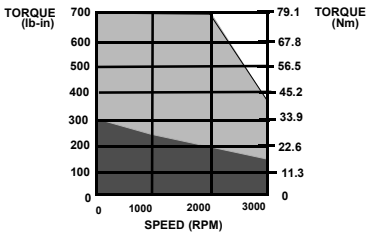
DSM1150/HSM620 @ 230VAC

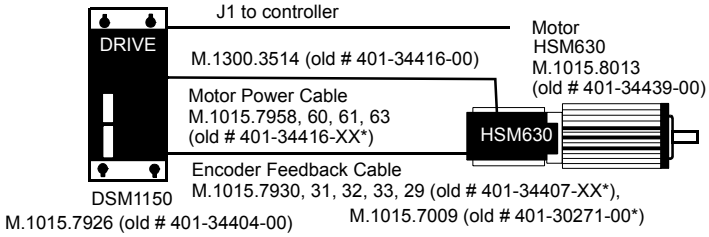




DSM1150
M.1015.7926 (old # 401-34404-00)

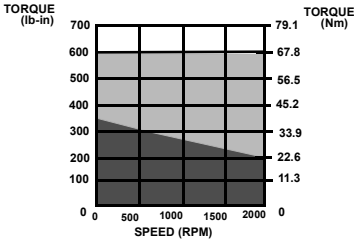
DSM1150/HSM630 @ 230VAC

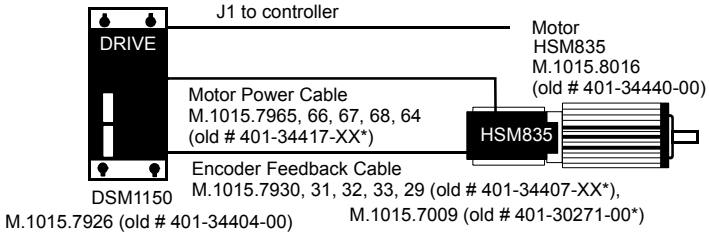




DSM1150
M.1015.7926 (old # 401-34404-00)

DSM1150/HSM835 @ 230VAC





DSM1150
M.1015.7926 (old # 401-34404-00)

Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

= Intermittent Operating Region

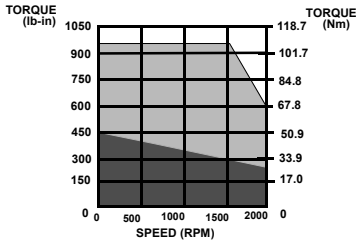
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

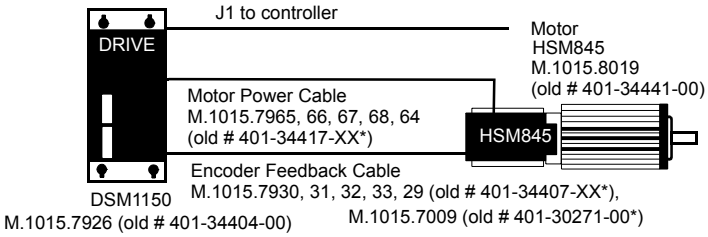
Drive Module Input Voltage = 230 VAC RMS = Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

NOTE: Serial interface cables cannot exceed 50 ft.

DSM1150/HSM845 @ 230VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics = Intermittent Operating Region

Drive Module Input Voltage = 230 VAC RMS = Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

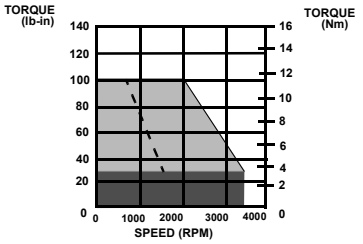
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

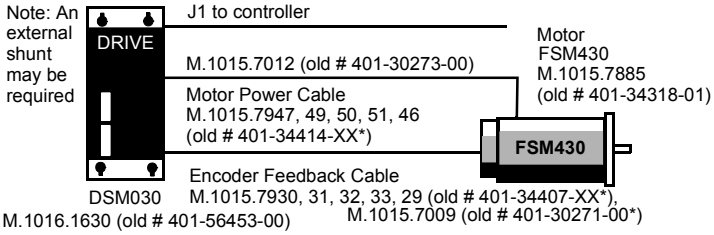
NOTE: Serial interface cables cannot exceed 50 ft.

DSM100 With FSM Series Motors

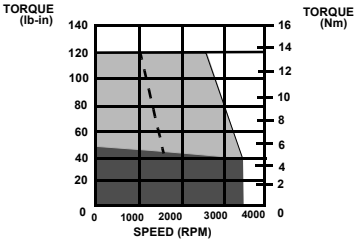
Choose a system with an FSM motor when the application requires medium inertia matching.

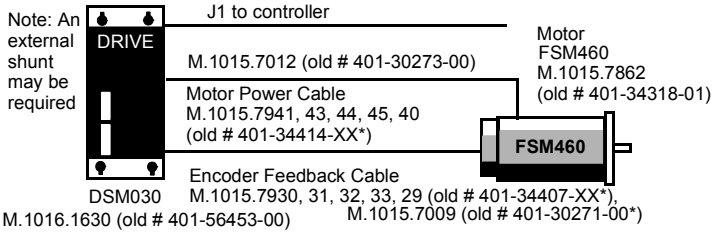
DSM030/FSM430 @ 230 VAC



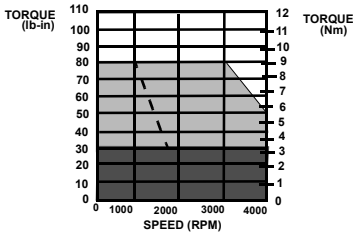


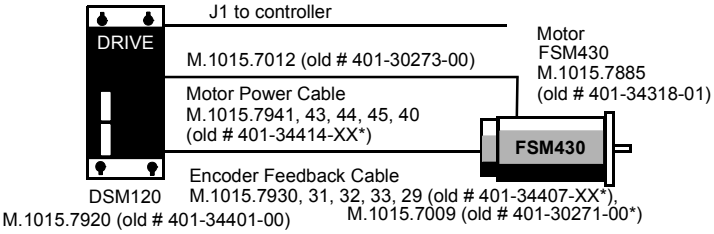
DSM030/FSM460 @ 230 VAC



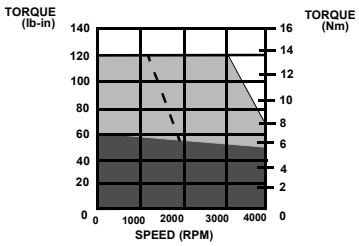


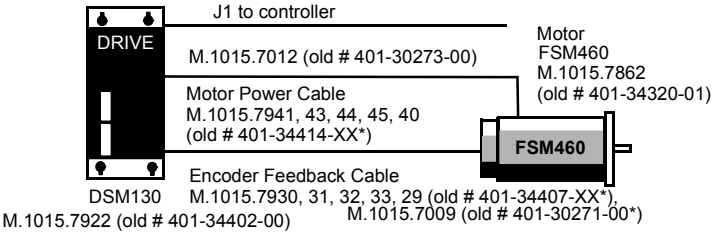
DSM120/FSM430 @ 230 VAC



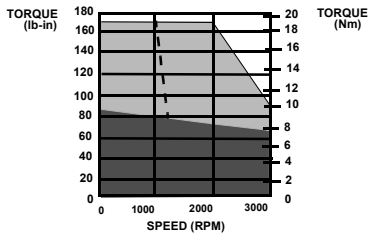


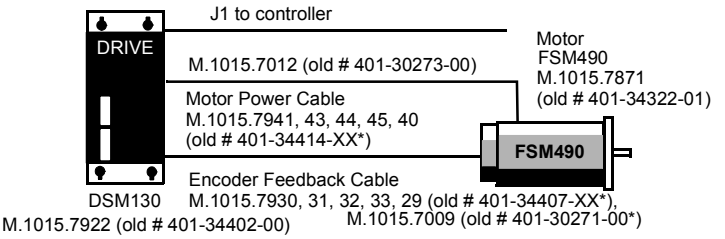
DSM130/FSM460 @ 230 VAC





DSM130/FSM490 @ 230 VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

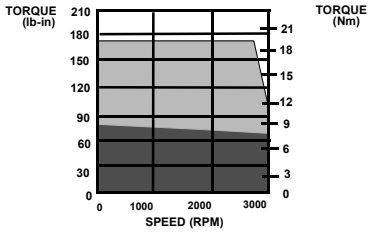
= Continuous Operating Region

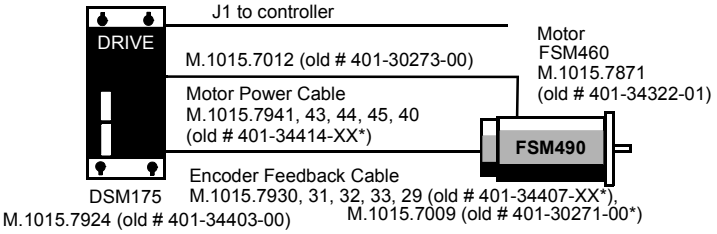
= Drive Operation with 115 VAC RMC Input Voltage

*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

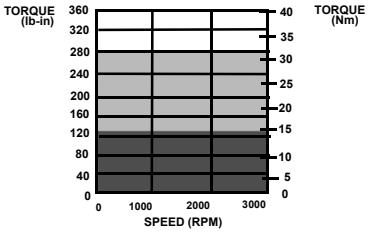
NOTE: Serial interface cables cannot exceed 50 ft.

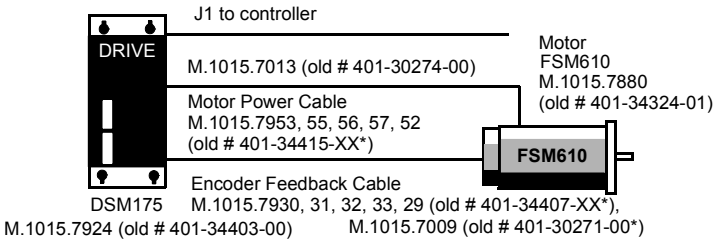
DSM175/FSM490 @ 230 VAC



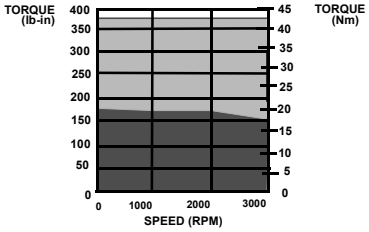


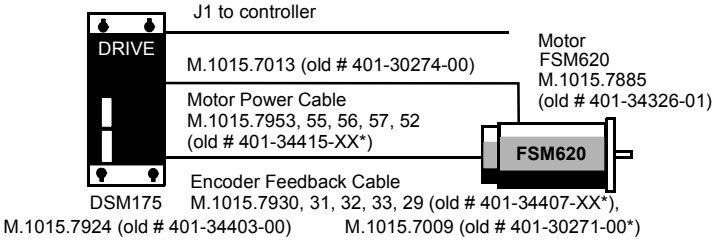
DSM175/FSM610 @ 230 VAC



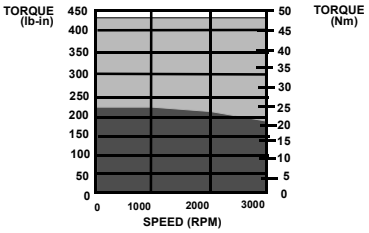


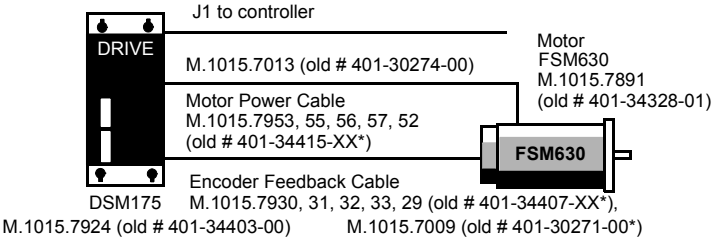
DSM175/FSM620 @ 230 VAC



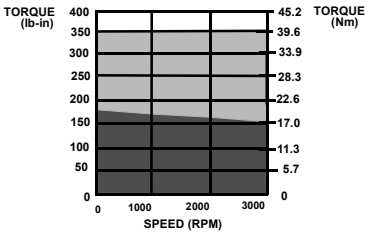


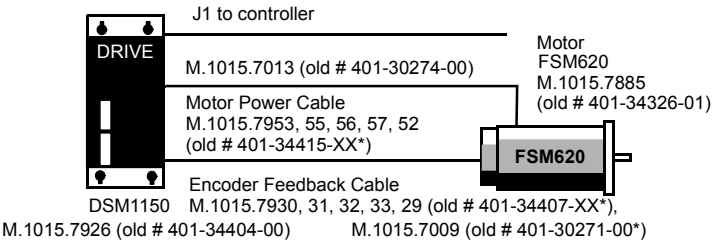
DSM175/FSM630 @ 230 VAC





DSM1150/FSM620 @ 230 VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

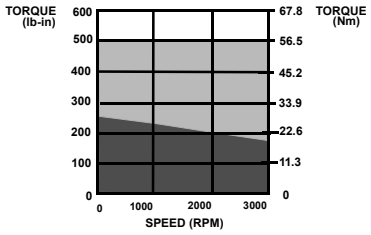
= Continuous Operating Region

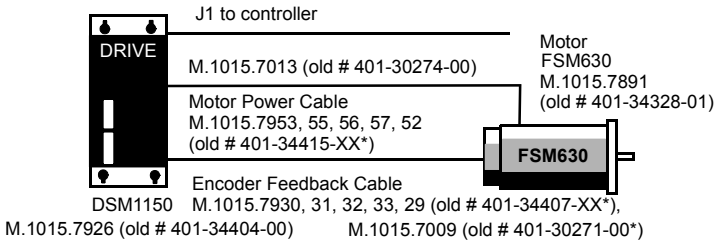
= Drive Operation with 115 VAC RMC Input Voltage

*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

NOTE: Serial interface cables cannot exceed 50 ft.

DSM1150/FSM630 @ 230 VAC





Detailed Motor Information Located in Brushless Motor Section

System Speed Torque Characteristics

Drive Module Input Voltage = 230 VAC RMS

= Intermittent Operating Region

= Continuous Operating Region

= Drive Operation with 115 VAC RMC Input Voltage

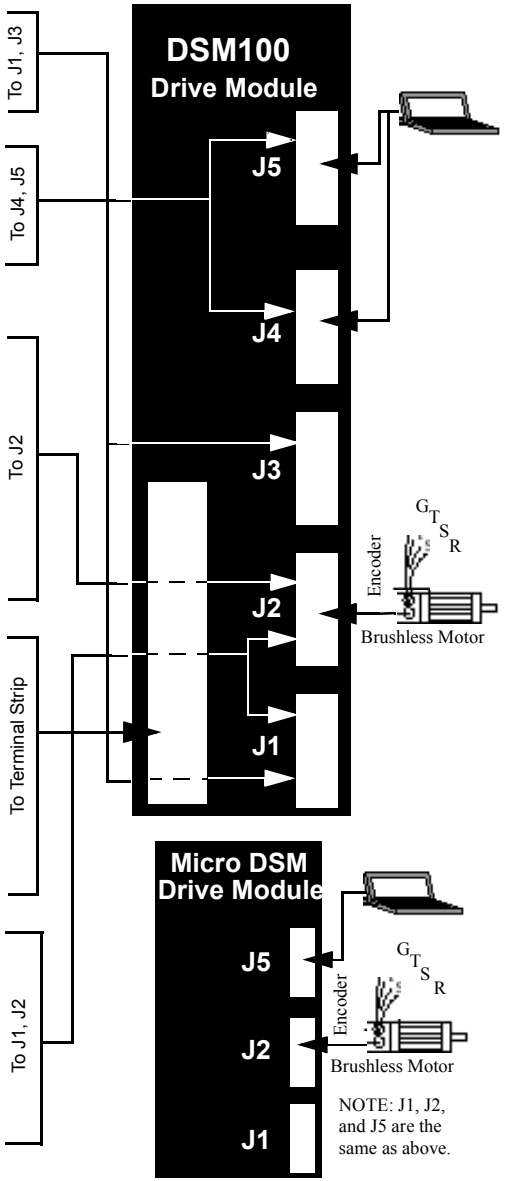
*Last two digits select standard cable lengths of: 10 ft. (3.0m) - 10, 25 ft. (7.7m) - 25, 50 ft. (15.0m) - 50, 75 ft. (23.0m) - 75, 100 ft. (31m) - 00, 150 ft. (45m) 7X-00

NOTE: Serial interface cables cannot exceed 50 ft.

Cables and Accessories

Interface Cables	Part Number(s) Located on Page
J1 to customer supplied connector (pigtail)	39
J3 to cust supp conn (pt)	39
Serial Interface Cables*	
J4 or J5 to PC (RS232 9-pin D connector)	39
J4 or J5 to cust supp conn (pt))	39
J4 or J5 to J4 or J5 (1ft/30cm length) (RS485 multi-drop communications)	39
Encoder Feedback Cables*	
J2 to FSM, HSM Series Motor	40
FSM or HSM to cust supp conn (pt)	40
J2 to YSM Series Motor	40
YSM J3 to cust supp conn (pt))	40
J2 to NSM Series Motor	40
NSM to cust supp conn (pt)	40
J2 to cust supp conn (pt)	40
Motor Power Cables	
Drive to 200/300 HSM Series	41
Drive to 400 FSM, HSM	41
Drive to 600 FSM, HSM	41
Drive to 630 FSM, HSM	41
Drive to 800 HSM, SSM Series	41
Drive to YSM Series	41
Drive to NSM Series	42
Breakout Boards	
J1 to 50 Pin Terminal Strip (includes 3 ft/1m cable and mounting hardware)	42
J2 to 25 Pin Terminal Strip (includes 3 ft/1m cable and mounting hardware)	42

***NOTE:** Serial interface cables and DSM Micro size encoder cables cannot be longer than 50 ft. (15m).



J4/J5 Serial Ports		
1	RCV+	RS485
2	RCV	RS232
3	XMT	RS232
4	XMT+	RS485
5	COM	
6	RSVD	
7	RCV-	RS485
8	XMT-	RS485
9	RSVD	

J3 Auxiliary Port
Same as J1 Pins 1-26

J2 Encoder	
1	Enc Pwr
2	Enc Com
3	Enc Pwr
4	Enc Com
5	Enc Pwr Sense +
6	Enc Pwr Sense -
7	Mot Enc IP Ch A+
8	Mot Enc IP Ch A-
9	Mot Enc IP Ch B+
10	Mot Enc IP Ch B-
11	Mot Enc IP ChI+_
12	Mot Enc IP Ch I-
13	Hall A
14	Hall B
15	Hall C
16	Absolute Position
17	RSVD
18	RSVD
19	Thermal Switch +

J1 Controller			
1	Enc Pwr	26	Isolated +24V DC
2	Enc Com	27	Pos Cur Limit
3	Enc Pwr	28	Analog Com
4	Enc Com	29	Neg Cur Limit
5	Isolated +24V DC	30	Analog OP 1
6	Isolated +24VCom	31	Analog OP 2
7	Mot OP ChA+	32	Select IP 1
8	Mot OP Ch A-	33	Select IP 2
9	Mot OP ChB+	34	Select IP 3
10	Mot OP Ch B-	35	Select IP 4
11	Mot OP Ch I+	36	RSVD
12	Mot OP Ch I-	37	RSVD
13	Isolated 24V Com	38	RSVD
14	Aux Ch A+	39	RSVD
15	Aux Ch A-	40	RSVD
16	Aux Ch B+	41	RSVD
17	Aux Ch B-	42	Select OP 1
18	Aux Ch I+	43	Select OP 2
19	Aux Ch I-	44	Select OP 3
20	Drive Enable	45	Select OP 4
21	Fault Reset	46	RSVD
22	Analog Cmd+	47	RSVD
23	Analog Cmd-	48	RSVD
24	Drive Ready+	49	Brake Enab +
25	Drive Ready-	50	Brake Enab -

DSM Screw Terminal Converters	Part Number on Page
J1 Terminal Converter	42
J2 Terminal Converter	42

DSM 100 Cables and Accessories - Part Numbers

Note: Refer to the Giddings & Lewis Price List for a complete list of part numbers for the various cable lengths including straight and right angle connectors.

Interface Cables		
Description	**Length**	**Part Number**
J1 to customer supplied connector (pigtail)	10’	M.1015.7937 (old # 401-34411-10)
	25’	M.1015.7938 (old 3 401-34411-25)
	50’	M.1300.3513 (old #401-34411-50)
	75’	M.1015.7939 (old # 401-34411-75)
J3 to customer supplied connector (pigtail)	10’	M.1015.7936 (old # 401-34410-10)
	25’	M.1300.3510 (old # 401-34410-25)
	50’	M.1300.3511 (old # 401-34410-50)
	75	M.1300.3512 (old # 401-34410-75)

Serial Interface Cables		
Description	**Length**	**Part Number**
J4 or J5 to PC (RS232 9-pin D connector)	10’	M.1016.9514 (old # 502-04020-10)
	25’	M.1016.9515 (old # 502-04020-25)
	50’	M.1016.9516 (old # 502-04020-50)
J4 or J5 to customer supplied connector (pigtail)	10’	M.1015.7973 (old # 401-34423-10)
	25’	M.1300.3515 (old # 401-34423-25)
	50’	M.1300.3516 (old # 401-34423-50)
J4 or J5 to J4 or J5 (1ft/30cm length) (for RS485 Multi-Drop Communications)	N/A	M.1016.9517 (old # 502-04021-01)

Encoder Feedback Cables		
Description	**Length**	**Part Number**
J2 to FSM or HSM Series Motor	10’	M.1015.7930 (old # 401-34407-10)
	25’	M.1015.7931 (old # 401-34407-250
	50’	M.1015.7932 (old # 401-34407-50)
	75’	M.1015.7933 (old # 401-34407-75)
	100’	M.1015.7929 (old # 401-34407-00)
	150’	M.1015.7009 (old # 401-30271-00)
FSM or HSM to customer supplied connector (pigtail)	10’	M.1015.7980 (old # 401-34425-10)
	25’	M.1015.7981 (old # 401-34425-25)
	50’	M.1015.7982 (old # 401-34425-50)
	75’	M.1015.7983 (old # 401-34425-75)
	100’	M.1015.7979 (old # 401-34425-00)
	150’	M.1015.7011 (old # 401-30272-00)
J2 to YSM Series Motor	10’	M.1015.6941 (old # 401-30233-10)
	25’	M.1015.6942 (old # 401-30233-25)
	50’	M.1015.6943 (old # 401-30233-50)
	75’	M.1015.6944 (old # 401-30233-75)
	100’	M.1015.6940 (old # 401-30233-00)
YSM J3 to customer supplied connector (pigtail)	10’	M.1015.6986 (old # 401-30253-10)
	25’	M.1015.6987 (old # 401-30253-25)
	50’	M.1015.6988 (old # 401-30253-50)
	75’	M.1015.6989 (old # 401-30253-75)
	100’	M.1300.3508 (old # 401-30253-00)
J2 to NSM Series Motor (straight)	10’	M1015.6931 (old # 401-30231-10)
	25’	M1015.6932 (old # 401-30231-25)
	50’	M.1015.6933 (old # 401-30231-50)
	75’	M.1015.6934 (old # 401-30231-75)
	100’	M.1015.6930 (old # 401-30231-00)
NSM Series Motor to customer supplied connector (pigtail)	10’	M.1015.6931 (old # 401-30252-10)
	25’	M1015.6983 (old # 401-30252-25)
	50’	M.1015.6984 (old # 401-30252-50)
	75’	M.1015.6985 (old # 401-30252-75)
	100’	M.1015.6981 (old # 401-30252-00)
J2 to customer supplied connector (pigtail)	10’	M.1015.7975 (old # 401-34424-10)
	25’	M1015.7976 (old # 401-34424-25)
	50’	M.1015.7977 (old # 401-34424-50)
	75’	M.1015.7978 (old # 401-34424-75)
	100’	M.1015.7974 (old # 401-34424-00)

Motor Power Cables		
Description	**Length**	**Part Number**
Drive to 200/300 HSM Series Motor	10’	M.1015.7941 (old # 401-34413-10)
	25’	M.1015.7943 (old # 401-34413-25)
	50’	M.1015.7944 (old # 401-34413-50)
	75’	M.1015.7945 (old # 401-34413-75)
	100’	M.1015.7940 (old # 401-34413-00)
Drive to 400 HSM or FSM Series Motor	10’	M.1015.7947 (old # 401-34414-10)
	25’	M.1015.7949 (old # 401-34414-25)
	50’	M.1015.7950 (old # 401-34414-50)
	75’	M.1015.7951 (old # 401-34414-75)
	100’	M.1015.7946 (old # 401-34414-00)
	150’	M.1015.7012 (old # 401-30273-00)
Drive to 600 HSM or FSM Series Motor	10’	M.1015.7953 (old # 401-34415-10)
	25’	M.1015.7955 (old # 401-34415-25)
	50’	M.1015.7956 (old # 401-34415-50)
	75’	M.1015.7957 (old # 401-34415-75)
	100’	M.1015.7952 (old # 401-34415-00)
	150’	M.1015.7013 (old # 401-30274-00)
Drive to 630 HSM or FSM Series Motor	10’	M.1015.7958 (old # 401-34416-10)
	25’	M.1015.7960 (old # 401-34416-25)
	50’	M.1015.7961 (old # 401-34416-50)
	75’	M.1015.7963 (old # 401-34416-75)
	100’	M.1300.3514 (old # 401-34416-00)
Drive to 800 HSMor SSM Series Motor	10’	M.1015.7965 (old # 401-34417-10)
	25’	M.1015.7966 (old # 401-34417-25)
	50’	M.1015.7967 (old # 401-34417-50)
	75’	M.1015.7968 (old # 401-34417-75)
	100’	M.1300.7964 (old # 401-34417-00)
Drive to YSM Series Motor	10’	M.1015.6936 (old # 401-30232-10)
	25’	M.1015.6937 (old # 401-30232-25)
	50’	M.1015.6938 (old # 401-30232-50)
	75’	M.1015.6939 (old # 401-30232-75)
	100’	M.1015.6935 (old # 401-30232-00)

Drive to NSM Series Motor	10’	M.1015.6926 (old # 401-30230-10)
	25’	M.1015.6927 (old # 401-30230-25)
	50’	M.1015.6928 (old # 401-30230-50)
	75’	M.1015.6929 (old # 401-30230-75)
	100’	M.1015.6925 (old # 401-30230-00)

Breakout Boards	
Description	**Part Number**
J1 to 50 Pin Terminal Strip (includes 3ft/1m cable and mounting hardware)	M.1015.7935 (old # 401-34409-00)
J2 to 25 Pin Terminal Strip (includes 3ft/1m cable and mounting hardware)	M.1015.7934 (old # 401-34408-00)

DSM Screw Terminal Converters	
Description	**Part Number**
J1 Terminal Converter	M.1016.9545 (old # 502-04051-00)
J2 Terminal Convertor	M.1016.9581 (old # 502-04076-00)

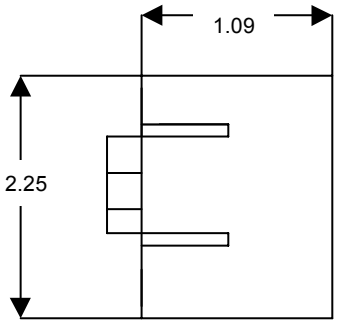
DSM Options and Accessories

Touch Pad

Touch Pad

M.1015.7928 (old # 401-34405-00)

Touch Pad Dimensions



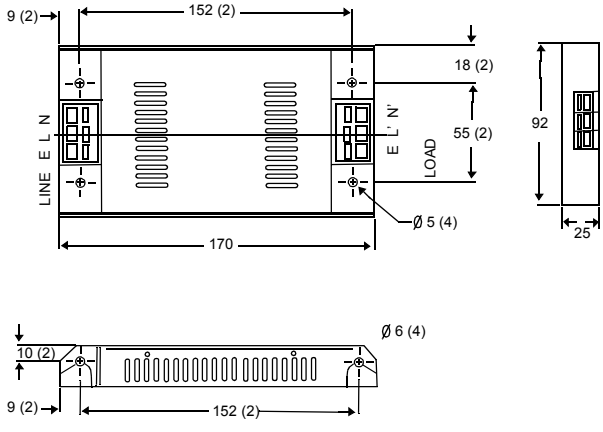
2.00

AC Line Filters

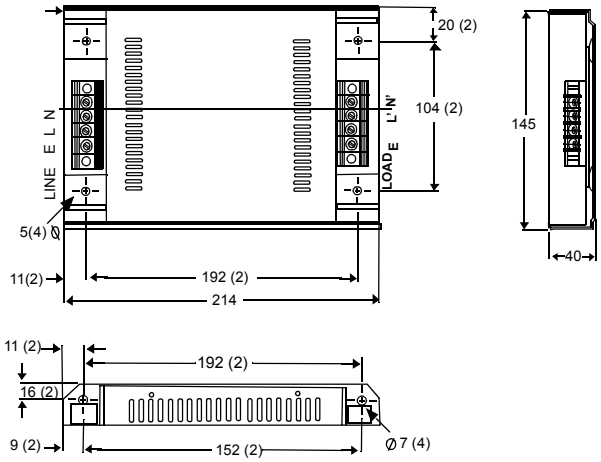
AC Line Filters Specifications

AC Line Filters (Required for EMC Compliance)		
Current	**Model**	**Part Number**
I = 6A 1ϕ	DSM007	M.1015.6922 (old # 401-30222-00)
I = 10A 1ϕ	DSM015, DSM110	M.1015.6917 (old # 401-30216-00)
I = 23A 1ϕ	DSM030, DSM120	M.1015.6918 (old # 401-30217-00)
I = 36A 1ϕ	DSM130, DSM175 1ϕ	M.1015.7969 (old # 401-34418-00)
I = 36A 3ϕ	DSM130, DSM175	M.1015.7970 (old # 401-34419-00)
I = 50A 1ϕ	For multiple drives on one filter. Combined drive input currents may not exceed filter current rating.	M.1015.7971 (old # 401-34420-00)
I = 70A 3ϕ	For multiple DSM175 drives on one filter. Combined drive input currents may not exceed filter current	M.1015.7972 (old # 401-34421-00)

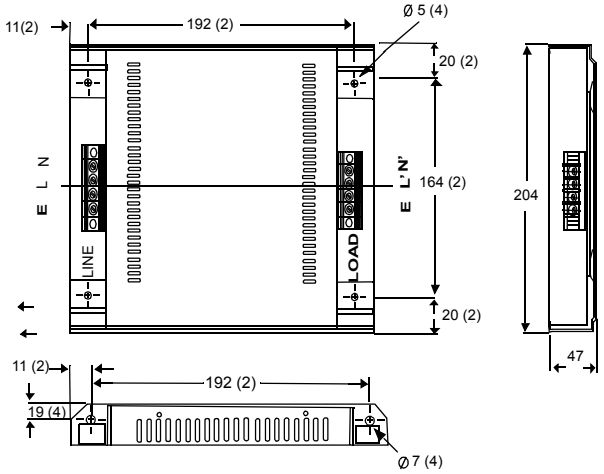
AC Line Filters Dimensions



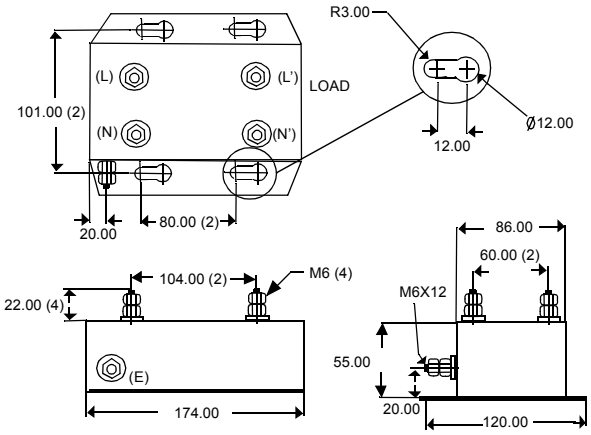
M.1015.6922 (old # 401-30222-00)



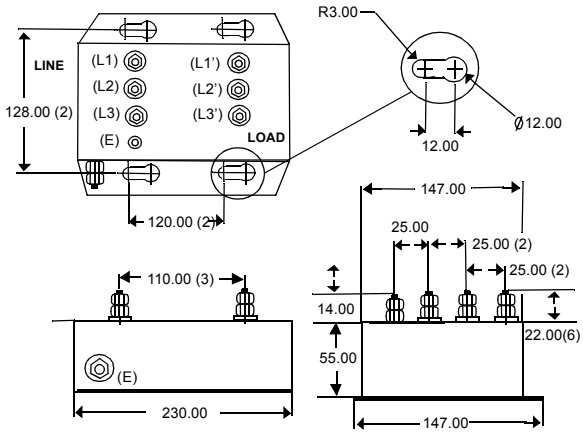
M.1015.6917 (old # 401-30216-00)



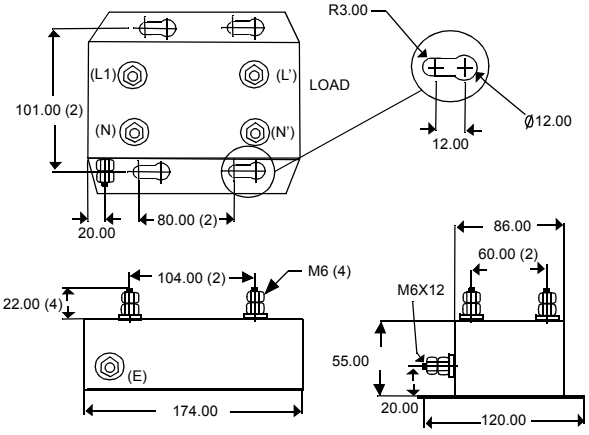
M.1015.6918 (old # 401-30217-00)



M.1015.7971 (old # 401-34420-00)

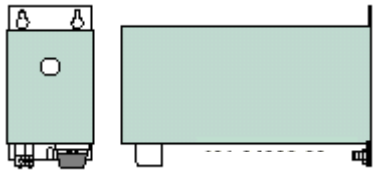


M.1015.7970 (old # 401-34419-00)



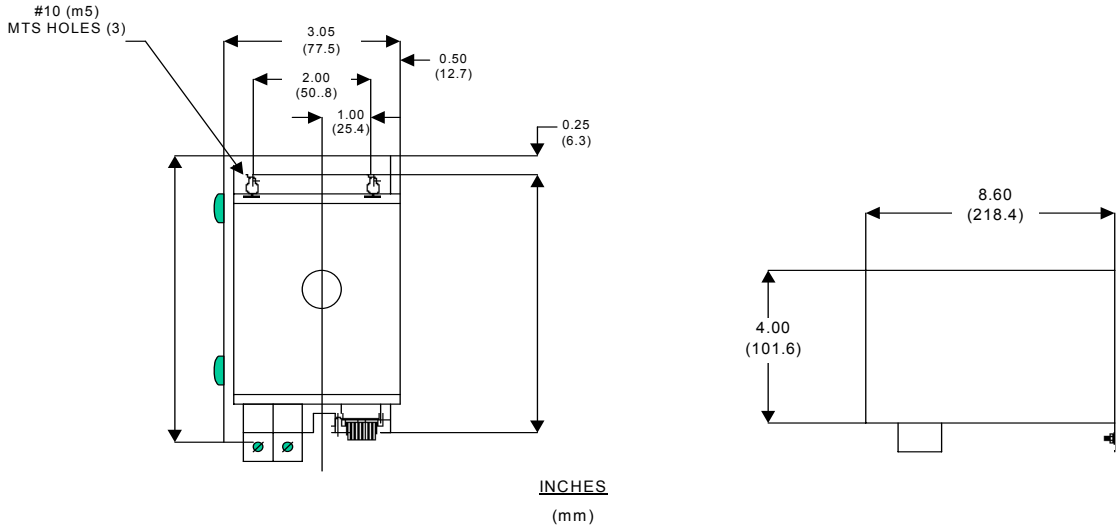
M.1015.7969 (old # 401-34418-00)

External Shunt Resistor Kit for DSM110, 120, and 130



M.1015.7838 (old # 401- 34308-00)

300 Watts Continuous
600 Watts Peak
Includes built-in fuse and hook-up wire



Dimensions for External Shunt Resistor Kit for DSM110, 120 and 130

Shunt Resistor Kit for MicroDSM Drives DSM007, DSM015 and DSM030

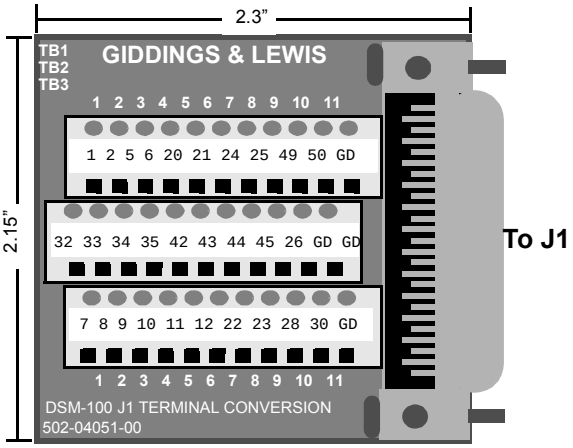
Please contact the factory for details on the Shunt Resistor Kit for MicroDSM Drive Models DSM007, DSM015 and DSM030.

DSM100 Terminal Convertors

There are two screw terminal convertors available that simplify wire termination to the DSM100 or MicroDSM drives. They are described below.

J1 Screw Terminal Convertor

The J1 Screw Terminal Convertor is attached to the J1 connector on the DSM100 or MicroDSM drive. The screw terminal pins have been reassigned for your wire termination convenience. The terminal strips are numbered non-sequentially to match the pin assignments in the manual.



Part No.: M.1016.9545 (old # 502-04051-00)

NOTE

A special screwdriver with a 0.4 x 2.5 mm blade tip must be used to make the connections. When tightening screws, torque to 0.22 - 0.25 Nm.

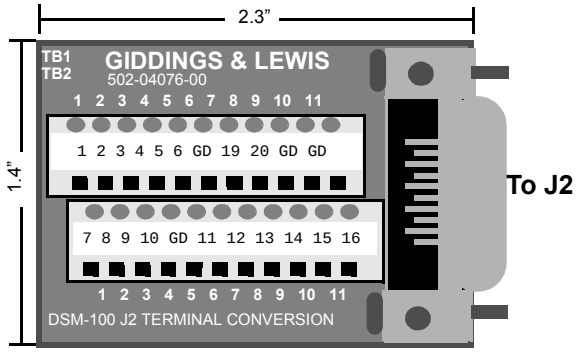
The recommended wire gauge is 30 - 16 AWG UL.

J1 Mini D-Pin Numbers	Terminal Strip Numbers	Signal
Top Connector (TB1)		
1	TB1-1	+5 VDC
2	TB1-2	5 COM/SHIELD
5	TB1-3	isolated 24 VDC
6	TB1-4	isolated 24 COM/SHIELD
20	TB1-5	ENABLE
21	TB1-6	RESET
24	TB1-7	READY+
25	TB1-8	READY-
49	TB1-9	BRAKE+
50	TB1-10	BRAKE-
GD	TB1-11	SHIELD
Middle Connector (TB2)		
32	TB2-1	IN1 24 VDC
33	TB2-2	IN2 24 VDC
34	TB2-3	IN3 24 VDC
35	TB2-4	IN4 24 VDC
42	TB2-5	OUT1 24 VDC
43	TB2-6	OUT2 24 VDC
44	TB2-7	OUT3 24 VDC
45	TB2-8	OUT4 24 VDC
46	TB2-9	isolated 24 VDC
GD	TB2-10	isolated 24 COM/SHIELD
GD	TB2-11	SHIELD
Bottom Connector (TB3)		
7	TB3-1	A
8	TB3-2	A/
9	TB3-3	B
10	TB3-4	B/
11	TB3-5	I
12	TB3-6	I/
22	TB3-7	VCS+
23	TB3-8	VCS-
28	TB3-9	ANLG COM
30*	TB3-10	ANLG OUT A
GD	TB3-11	SHIELD

*Not available on Micro DSM

J2 Screw Terminal Convertor

The J2 Screw Terminal Convertor is attached to the J2 connector on the DSM100 or MicroDSM drive. The screw terminal pins have been reassigned for your wire termination convenience. The terminal strips are numbered non-sequentially to match the pin assignments in the manual.



Part No.: M.1016.9581 (old # 502-04076-00)

NOTE

A special screwdriver with a 0.4 x 2.5 mm blade tip must be used to make the connections. When tightening screws, torque to 0.22 - 0.25 Nm.

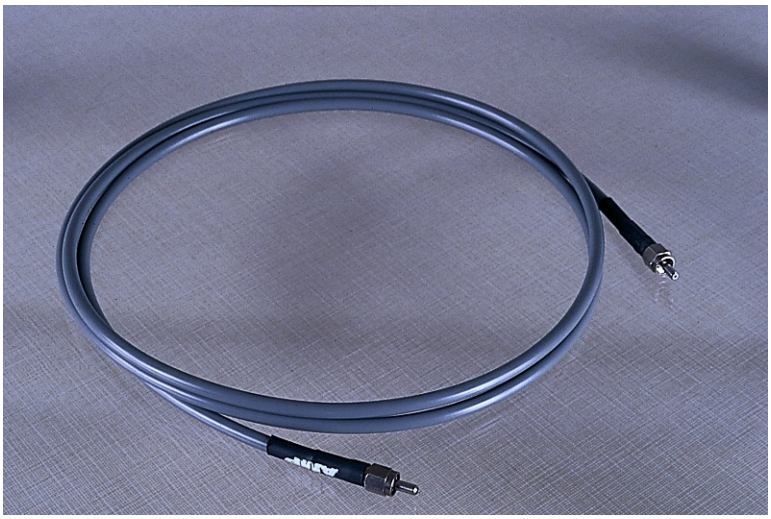
The recommended wire gauge is 30 - 16 AWG UL.

J2 Mini D-Pin Numbers	Terminal Strip Numbers	Signal
Top Connector (TB1)		
1	TB1-1	+5 VDC
2	TB1-2	5 COM
3	TB1-3	+5 VDC
4	TB1-4	5 COM
5	TB1-5	5 VDC SENSE+
6	TB1-6	5 VDC SENSE-
GD	TB1-7	SHIELD
19	TB1-8	TEMP+
20	TB1-9	TEMP-
GD	TB1-10	SHIELD
GD	TB1-11	SHIELD
Bottom Connector (TB2)		
7	TB2-1	A
8	TB2-2	A/
9	TB2-3	B
10	TB2-4	B/
GD	TB2-5	SHIELD
11	TB2-6	I
12	TB2-7	I/
13	TB2-8	U
14	TB2-9	V
15	TB2-10	W
16	TB2-11	ABS

SERCOS Fiber Optic Cables

Description	Length	Part Number
Standard Cable	1’	M.1016.9743 (old # 502-04170-01)
	3’	M.1016.9744 (old # 502-04170-03)
	5’	M.1016.9745 (old # 502-04170-05)
	10’	M.1016.9747 (old # 502-04170-10)
	15’	M.1016.9749 (old # 502-04170-15)
	25’	M.1016.9753 (old # 502-04170-25)
Heavy Duty Cable	.05 Meters (1.5’)	M.0106.9758 (old # 502-04171-01)
	1 Meter (3.3’)	M.0106.9760 (old # 502-04171-03)
	2 Meters (6.6’)	M.0106.9763 (old # 502-04171-06)
	3 Meters (9.9’)	M.0106.9767 (old # 502-04171-10)
	5 Meters (16.5’)	M.0106.9773 (old # 502-04171-16)
	10 Meters (32.5’)	M.0106.9784 (old # 502-04171-32)

FIGURE 1. Heavy Duty SERCOS Fiber Optic Cable

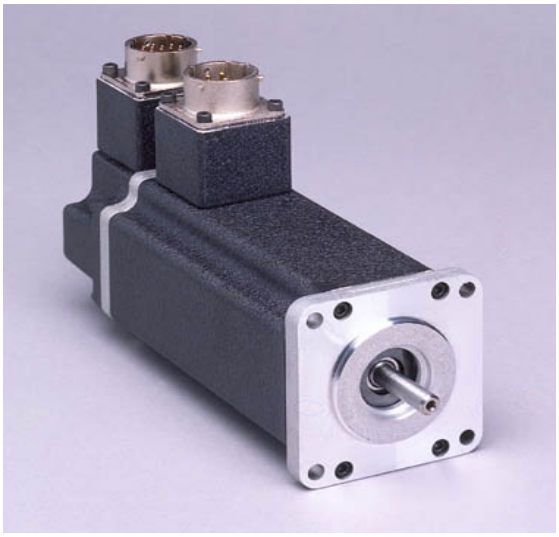


Centurion Brushless Servo Motors - General

Guide to Brushless Motor Section:

Motor Family	Torque Range	Attributes	Page
Light Industrial Applications			
NSM Series	1.6 to 47 lb-in (0.18 to 5.3 Nm)	Compact NEMA mount	51
YSM Series	1.5 to 22 lb-in (0.17 to 2.5 Nm)	Compact, low inertia	51
Factory Automation Applications			
FSM Series	31 to 245 lb-in (3.5 to 28 Nm)	Medium inertia	51
HSM Series	5 to 450 lb-in (0.5 to 50 Nm)	Low inertia	51

NSM Brushless Servo Motors



Typical Applications

- Semi-conductor manufacturing
- Material handling
- Web processing
- Robotics
- Packaging machinery

Standard Features

- Rugged industrial construction
- High torque to size ratio
- High energy ring magnet rotor
- Integral encoder
- Provision for optional shaft seal
- NEMA 23, 34, 42, 56 style mounting frames

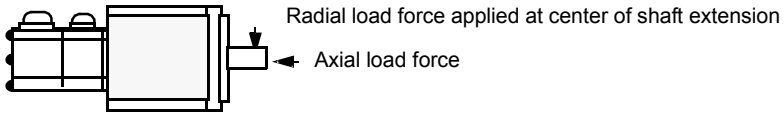
NSM Series Motor And Performance Data

Motor Model	NSM2302		NSM2304		NSM3406		NSM3412		NSM4214		NSM4220		NSM5630		NSM5637		NSM5647	
Mechanical Data																		
Rotor Moment of Inertia	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2
	0.00008	.000009	.00016	0.00002	0.0007	0.00008	0.0013	0.00015	0.0021	0.00024	0.0031	0.00035	0.008	0.0009	0.01	0.0011	0.013	0.0015
Motor Net Weight	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
	2.3	1.0	3.4	1.5	5.7	2.6	7.6	3.5	10.4	4.7	13.0	8.9	20.0	9.1	24.2	11.0	28.7	13.0
Friction Torque	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	0.11	0.012	0.13	0.014	0.19	0.021	0.31	0.035	0.38	0.043	0.406	0.046	0.688	0.078	0.875	0.1	0.938	0.11
Winding Data																		
Sine Wave K_T Torque Constant @ 25°C[1]	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A
	0.73	.08	1.6	0.18	1.5	0.17	3.0	0.34	3.6	0.41	2.5	0.28	3.5	.38	4.4	.50	5.6	.63
Sq Wave K_T Torque Constant @ 25°C[2]	0.80	0.09	1.8	0.20	1.6	0.18	3.3	0.37	4.0	0.45	2.7	0.31	3.7	0.42	4.8	0.54	6.2	0.70
KE Voltage Constant[3]	10 V/kRPM		24 V/kRPM		20 V/kRPM		40 V/kRPM		46 V/kRPM		33 V/kRPM		48 V/kRPM		60 V/kRPM		78 V/kRPM	
Winding Resistance Ph to phase @ 25°C	3.18 ¾		4.9 ¾		2.2 ¾		2.7 ¾		2.8¾		0.77 ¾		0.89 ¾		1.0 ¾		1.23 ¾	
Winding Inductance Phase to phase	4.1 mH		8.1 mH		6.1 mH		8.6 mH		11.0 mH		2.9 mH		4.3 mH		5.2 mH		7.0 mH	
Thermal Resistance[4]	3.0°C/watt		2.2°C/watt		1.6°C/watt		1.2°C/watt		1.1°C/watt		0.83°C/watt		0.81°C/watt		0.76°C/watt		0.70°C/watt	
System Ratings[5]																		
	DSM 007		DSM 007/015		DSM 015		DSM 015		DSM 015		DSM 030		DSM 030		DSM 030		DSM030	
Max. Continuous Operation Speed RPM	6000		6000		6000		5500		4500		5000		4000		4000		3000	
Continuous Stall Torque	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	1.6	0.2	3.5/4.4	0.4/0.5	6.8	0.8	13.8	1.6	15.5	2.0	22.0	2.5	30.0	3.4	40.0	4.5	52.0	2.0
Peak Torque	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	4.6	0.5	10/13	1.1/1.4	18.5	2.1	36.0	4.1	45.0	5.7	63.0	7.1	95.0	10.7	120	13.0	150	17.0
	DSM 110		DSM 110		DSM120		DSM 120		DSM 120		DSM 130		DSM130		DSM 130		DSM 130	
Max. Continuous Operation Speed RPM	6000		6000		6000		5500		5000		5000		4000		4000		3000	
Continuous Stall Torque	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	1.7	0.2	4.4	0.5	6.8	0.8	13.8	1.6	18.0	2.0	26.0	0.4	34.0	0.8	46.0	1.6	53.0	5.9
Peak Torque	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	4.7	0.5	13.0	1.4	18.5	2.1	36.0	4.1	50.0	5.7	63.0	1.4	95.0	2.1	120	4.1	150	5.7

[1]Peak value of per phase sine wave amps [2]Peak value of per phase square wave amps [3]Peak value of sinusoidal phase to phase volt [4]Motor mounted on .5" x 12" x 12" (1.2 x 30 x 30 cm) aluminum heat sink. [5]Motor windings designed for 115V drive input voltage. .

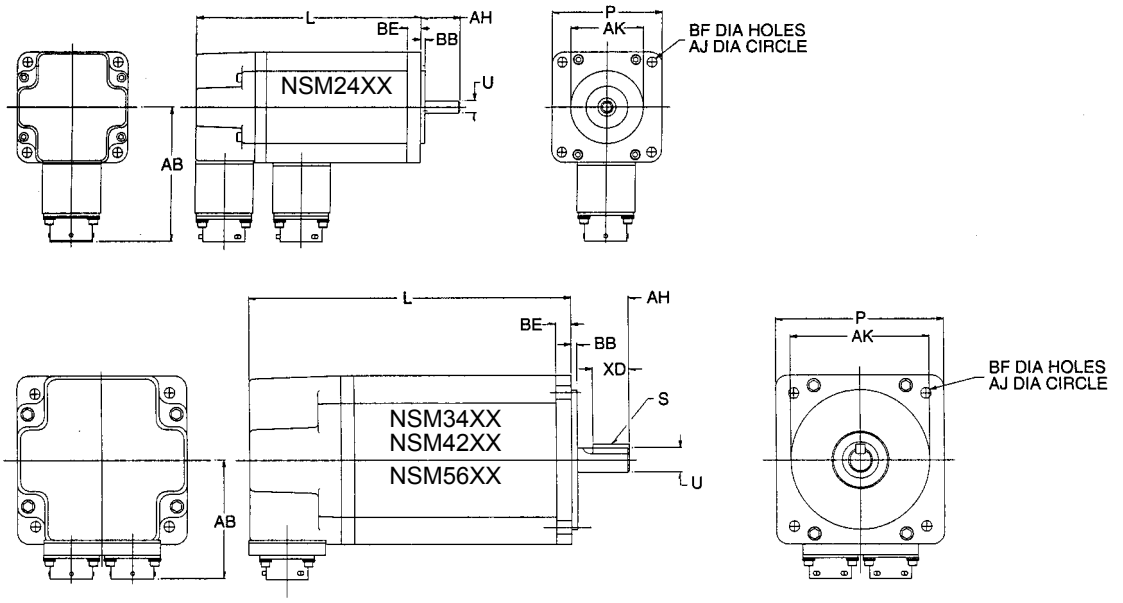
Motors are capable of carrying an axial load in most applications. The following table provides guidelines for 20,000 hour bearing life with a specified radial load applied to the center of the shaft. Please consult with Giddings & Lewis regarding loads, operating speeds and bearing life in your particular application to ensure the proper selection of motors.

STANDARD RADIAL LOAD FORCE RATINGS							
MOTOR	500 rpm lb (kg)	1000 rpm lb (kg)	2000 rpm lb (kg)	3000 rpm lb (kg)	4000 rpm lb (kg)	5000 rpm lb (kg)	6000 rpm lb (kg)
NSM2302	17 (8)	16(7)	14 (6)	12 (6)	11 (5)	9 (4)	8 (3)
NSM2304	19(9)	17 (8)	15 (7)	14 (6)	12 (5)	10 (5)	8 (4)
NSM3406	103 (47)	82 (37)	65 (29)	56 (26)	51 (23)	48 (22)	45 (20)
NSM3412	113 (51)	89 (40)	71 (32)	62 (28)	56 (26)	53 (24)	49 (22)
NSM4214	137 (62)	109 (49)	86 (39)	76 (34)	68 (31)	64 (29)	
NSM4220	146 (66)	116 (52)	92 (41)	80 (36)	73 (33)	68 (31)	
NSM5630	188 (85)	149 (67)	118 (53)	103 (47)	94 (43)		
NSM5637	197 (89)	156 (71)	124 (56)	108 (49)	98 (45)		
NSM5647	203 (92)	161 (73)	128 (58)	112 (51)			



NOTE: When motor shaft has no radial load, axial load rating = 100% of radial load rating above.
When motor shaft has both a radial load and an axial load, axial load rating = 44% of radial load rating above.

NSM Motor Dimensions



Model	AB	AH	AJ	AK	BB	BE	BF	L
	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in
NSM2302	69/2.75	21/.81[1]	67/2.625	38/1.50[2]	2/.09	7/.275	5/.205	118/4.634
NSM2304	69/2.75	21/.81[1]	67/2.625	38/1.50[2]	2/.09	7/.275	5/.205	156/6.134
NSM3406	64/2.48	30/1.19[1]	98/3.875	73/2.875[4]	3/.12	8/.315	6/.220	147/5.67
NSM3412	64/2.48	30/1.19[1]	98/3.875	73/2.875[4]	3/.12	8/.315	6/.220	173/6.67
NSM4214	63/2.45	35/1.38[1]	126/4.95	56/2.187[7]	3/.12	10/.394	7/.280	174/6.845
NSM4220	63/2.45	35/1.38[1]	126/4.95	56/2.187[7]	3/.12	10/.394	7/.280	200/7.845
NSM5630	76/2.96	50/1.97[1]	149/5.875	114/4.50[8]	3/.12	12/.472	9.5/.375 in UNC	199/7.825
NSM5637	76/2.96	50/1.97[1]	149/5.875	114/4.50[8]	3/.12	12/.472	9.5/.375 in UNC	225/8.825
NSM5647	76/2.96	50/1.97[1]	149/5.875	114/4.50[8]	3/.12	12/.472	9.5/.375 in UNC	250/9.825

Model	LA	LB	P	S	U	XD
	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in
NSM2302	62/2.43	106/4.05	58/2.27	N/A	6/.25[3]	N/A
NSM2304	100/3.93	141/5.55	58/2.27	N/A	6/.25[3]	N/A
NSM3406	124/4.87	N/A	89/3.48	3.2 x 3.2/0.125 x 0.125[5]	13/.5[3]	20/.75[6]
NSM3412	149/5.87	N/A	89/3.48	3.2 x 3.2/0.125 x 0.125[5]	13/.5[3]	20/.75[6]
NSM4214	152/5.99	N/A	102/4.0	4.8 x 4.8/0.1875 x 0.1875[5]	16/.625[3]	25/0.94[6]
NSM4220	178/6.99	N/A	102/4.0	4.8 x 4.8/0.1875 x 0.1875[5]	16/.625[3]	25/0.94[6]
NSM5630	178/7.0	N/A	127/5.0	4.8 x 4.8/0.1875 x 0.1875[5]	19/.75[3]	40/1.5[6]
NSM5637	203/8.0	N/A	127/5.0	4.8 x 4.8/0.1875 x 0.1875[5]	19/.75[3]	40/1.5[6]
NSM5647	229/9.0	N/A	127/5.0	4.8 x 4.8/0.1875 x 0.1875[5]	19/.75[3]	40/1.5[6]

[1]Tolerance is ±0.03/0.76, [2]-0.005/0.05, [3]-0.005/0.13 diameter, [4]-0.006/0.15, [5]-0.002/0.005 width -0.014/0.36 depth, [6]-0.06/1.5, [7]-0.001/0.025 diameter, [8]-0.003/0.076

NOTE: Motors are manufactured to inch dimensions. Millimeter dimensions are approximate conversions from inches.

NSM Motor Encoder Data

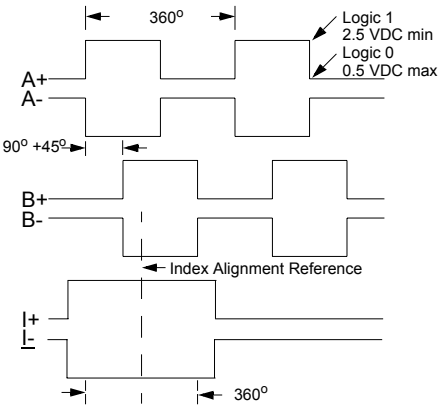
Encoders are factory aligned and must not be adjusted outside the factory.

ENCODER SPECIFICATIONS		
	NSM23XX	NSM34XX, NSM42XX and NSM56XX
Line Count	1000 (1) (2)	2000 (1)
Supply Voltage	5 VDC	5 VDC
Supply Current	175 mA max.	300 mA max.
Line Driver	LM339	26LS31
Line Driver Output	TTL	A, B, I signals: Logic 1 =2.5 VDC min @ 20 mA DC source, Logic 0 = 0.5 VDC max @ 20 mA DC sink. HALL signals: Logic 1 = 3.5 VDC min @ 1mA DC source, Logic 0 = 0.5 VDC max @ 5mA DC sink.
Index Pulse	Refer to diagrams below (No key for physical reference)	When facing the motor, the key is oriented $90^{o}\pm10$ clockwise (mechanical) from connectors

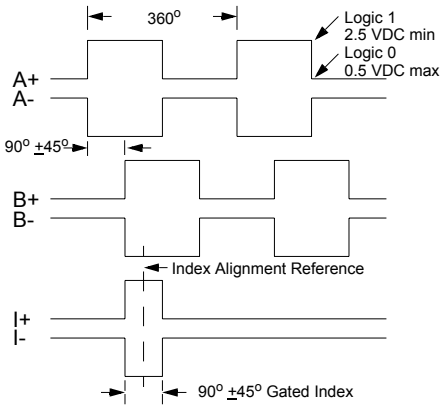
(1) Standard line count before quadrature.
(2) NSM23XX encoder lacks Absolute Signal (ABS)

Encoder Outputs

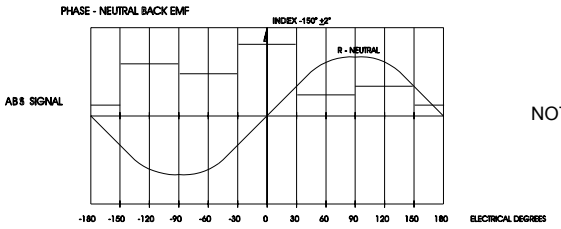
NSM23XX Encoder Output



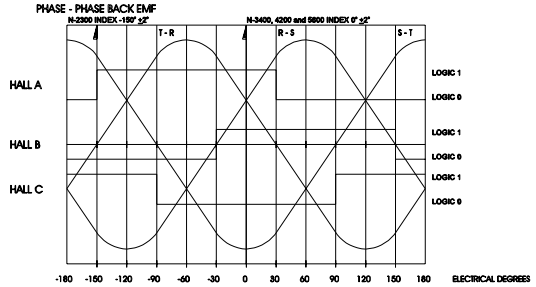
NSM34XX, 42XX and 56XX Encoder Output



Encoder Phase-to-Neutral and Phase-to-Phase Waveforms



NOTE: NSM34XX, NSM42XX and NSM56XX



NOTE: Hall and ABS signals are in electrical degrees.
For 4 pole commutation,
360° mechanical = 720° electrical.

NSM Motor Connector and Ordering Options

Ordering options include the following:

- 24 VDC Brake (Consult factory for brake motor availability)
- Encoder Line Count - 2,000 or 5,000 line
- Motor Winding Voltage - 115 V or 230 V Drive Input Voltage
- Continuous Torque Capability

Consult the factory for information on any of these items.

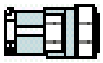
NOTE: Options are not available on all sizes.

Optional configurations or encoder line counts have extended lead times and additional charges.

NOTE: 5000 line count encoder, motor top speed is limited to 3600 RPM due to frequency output limit of encoder-check drive system configuration data for any additional restrictions imposed by drive input.

NSM Connector Data

MOTOR MATING CONNECTORS

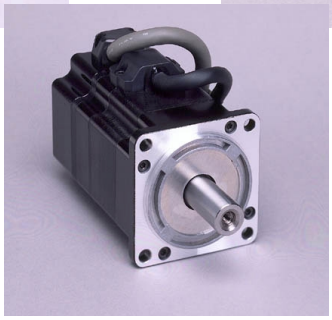


Description	Part Number
Mating Power	M.1016.8056 (old # 401-34508-00)
Mating Encoder	M.1016.8057 (old # 401-34509-00)

NSM MOTOR SHAFT SEAL KITS

Description	Part Number
NSM 2300 Series	M.1300.0422 (old # 401-34510-00)
NSM 3400 Series	M.1015.8058 (old # 401-34511-00)
NSM 4200 Series	M.1015-8059 (old # 401-34512-00)
NSM 5600 Series	M.1300.0003 (old # 401-34513-00)

YSM Brushless Servo Motors



Typical Applications

- Robotics
- Material handling
- Specialty machinery
- Medical and laboratory equipment
- X-Y tables
- Light packaging machines
- Office machinery
- Postal sorting

Standard Features

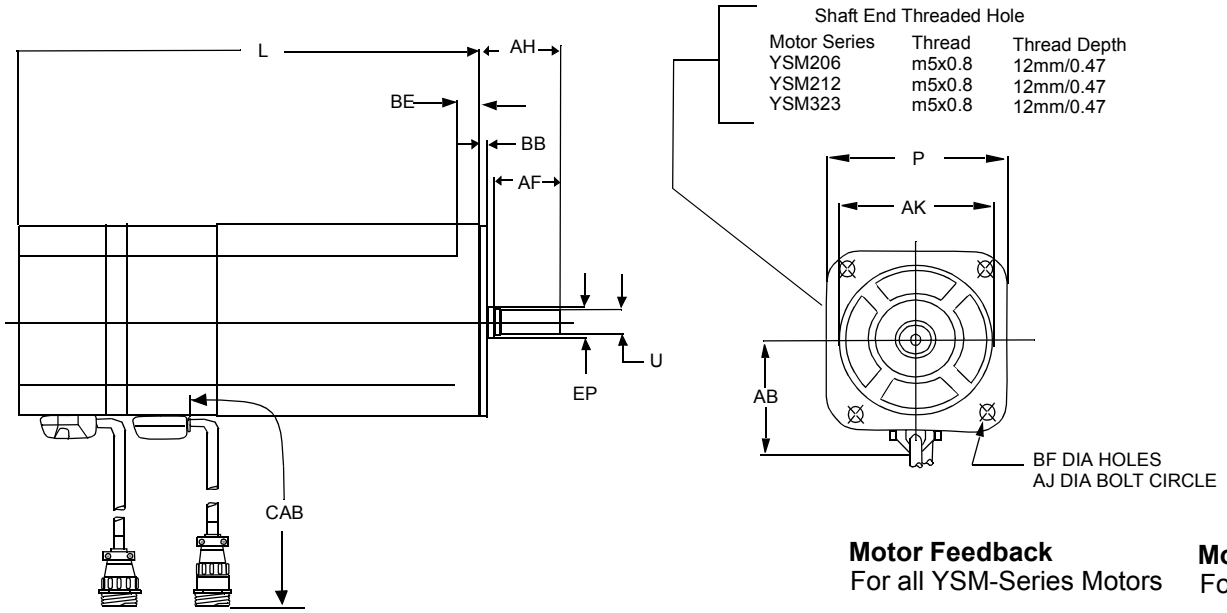
- 115V and 230V windings
- Popular metric mounting dimensions
- Three frame sizes, 10 models
- Torque range 1.5 - 22 lb-in (.17 - 2.5 Nm)
- Motor mounted optical encoder with differential line driver data (2,000 line) and commutation signals
- Low inertia rotor
- High energy neodymium magnets
- 4500 rpm maximum
- Optional internally mounted spring set, magnetic release 24 VDC holding brake
- IP-43 package

YSM Motors And Performance Data

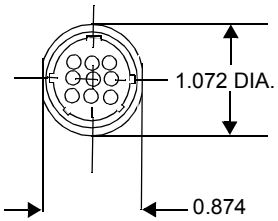
Motor Model	YSM102 115/230				YSM103 115/230				YSM206 115/230				YSM212 115/230				YSM323 115/230			
Mechanical Data																				
Rotor Moment of Inertia	lb-in-s^2 .000027		kg-m^2 .0000031		lb-in-s^2 .000045		kg-m^2 .0000051		lb-in-s^2 .000127		kg-m^2 .000014		lb-in-s^2 .00023		kg-m^2 .000025		lb-in-s^2 .00056		kg-m^2 .000064	
Rotor Moment of Inertia (Brake Motors)	.000034		.0000039		.000052		.0000059		.00018		.000020		.00028		.000032		.00062		.000069	
Motor Net Weight	lb 1.2		kg 0.54		lb 1.5		kg 0.68		lb 3.0		kg 1.36		lb 4.2		kg 1.90		lb 7.8		kg 3.54	
Damping	lb-in/kRPM 0.022		Nm/kRPM 0.002		lb-in/kRPM 0.03		Nm/kRPM 0.003		lb-in/kRPM 0.08		Nm/kRPM 0.009		lb-in/kRPM 0.10		Nm/kRPM 0.01		lb-in/kRPM 0.19		Nm/kRPM 0.021	
Friction Torque	lb-in -		Nm -		lb-in 0.06		Nm 0.007		lb-in 0.20		Nm 0.022		lb-in 0.29		Nm 0.03		lb-in 0.64		Nm 0.072	
Winding Data	**YSM102**				**YSM103**				**YSM206**				**YSM212**				**YSM323**			
	115V		230V		115V		230V		115V		230V		115V		230V		115V and 230V			
Sine Wave K_T Torque Constant @ 25°C (1)	lb-in/A 0.73	Nm/A 0.08	lb-in/A 1.46	Nm/A 0.16	lb-in/A 1.02	Nm/A 1.11	lb-in/A 1.8	Nm/A 0.21	lb-in/A 0.9	Nm/A 0.1	lb-in/A 1.97	Nm/A 0.22	lb-in/A 2.1	Nm/A 0.24	lb-in/A 3.3	Nm/A 0.37	lb-in/A 2.9		Nm/A 3.3	
Square Wave K_T Torque Constant @ 25°C (2)	0.8	0.09	1.6	0.18	1.98	0.22	1.1	0.13	1.0	0.11	2.2	0.24	2.4	0.27	3.6	0.41	3.2		3.6	
KE Voltage Constant (3)	10 V/kRPM		20 V/kRPM		14 V/kRPM		25 V/kRPM		13 V/kRPM		27V/kRPM		29 V/kRPM		45 V/kRPM		40 V/kRPM			
Winding Resistance Ph to phase @ 25°C	4.6 ¾		18.8 ¾		3.2 ¾		8.9 ¾		0.79 ¾		3.2 ¾		1.32 ¾		2.9 ¾		.78 ¾			
Winding Inductance Phase to phase	5.5 mH		22.3 mH		3.8 mH		11.5 mH		2.7 mH		12 mH		5.1 mH		12.4 mH		6 mH			
Thermal Resistance (4)	2.3°C/watt				2.2°C/watt				1.3°C/watt				1.3°C/watt				0.85°C/watt			
Encoder Resolution (P/R)	2000				2000				2000				2000				2000			
System Ratings (5)	**YSM102**				**YSM103**				**YSM206**				**YSM212**				**YSM323**			
enturion Micro DSM Drive Line Sinusoidal Current	115V DSM007		230V DSM007		115V DSM015		230V DSM007		115V DSM030		230V DSM015		115V DSM030		230V DSM015		115V and 230V DSM030		DSM030	
Max. Continuous Operating Speed	4500 RPM				4500 RPM				4500 RPM				3800 RPM		4500 RPM		2500 RPM		4500 RPM	
Continuous Stall Torque	lb-in 1.5	Nm 0.17	lb-in 1.5	Nm 0.17	lb-in 3.1	Nm 0.35	lb-in 3.1	Nm 0.35	lb-in 6.1	Nm 0.69	lb-in 6.1	Nm 0.69	lb-in 12	Nm 1.35	lb-in 12	Nm 1.35	lb-in 22.5	Nm 2.5	lb-in 22.5	Nm 2.5
Peak Torque	4.3	0.48	4.3	0.48	8.6	0.97	8.6	0.97	17	1.92	17	1.92	33.7	3.8	33.7	3.8	63	7.12	63	7.12
Centurion DSM100 Drive Line Sinusoidal Current	DSM110		DSM110		DSM110		DSM110		DSM110		DSM120		DSM120		DSM110		DSM120		DSM120	
Maximum Cont Operating Speed	4500 RPM				4500 RPM				4500 RPM				3800 RPM		4500 RPM		2500 RPM		4500 RPM	
Continuous Stall Torque	lb-in 1.5	Nm 0.17	lb-in 1.5	Nm 0.17	lb-in 3.1	Nm 0.35	lb-in 3.1	Nm 0.35	lb-in 6.1	Nm 0.69	lb-in 6.1	Nm 0.69	lb-in 12	Nm 1.35	lb-in 12	Nm 1.35	lb-in 22.5	Nm 2.5	lb-in 22.5	Nm 2.5
Peak Torque	4.3	0.48	4.3	0.48	8.6	0.97	8.6	0.97	16.6	1.87	17	1.92	30	3.4	33.7	3.8	53	6.0	63	7.12

[1]Peak value of per phase sine wave amps [2]Peak value of per phase square wave amps [3]Peak value of sinusoidal phase to phase Volts [4]At 125° C winding temperature, in a 40° C ambient, with motors mounted on aluminum heat-sinks: Motors 102/103:.125" x 6" x 6", Motors 206/212: .250" x 8" x 8", Motor 323: .25" x 10" x 10" [5]Ambient temperature is 0° C to 40°C for motors and 0° C to 50° C for drives

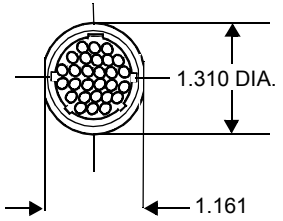
YSM102, YSM103, YSM206, YSM212, YSM323



Motor Feedback
For all YSM-Series Motors



Motor Power
For all YSM-Series Motors



Model	AB	AJ	AK	P	U	EP	AH	BB	BE	BF	AF	CAB	L	with Brake
	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in
YSM102	30/1.18	46/1.81	30/1.18	40/1.57	8/0.31	-	25/0.98	2.5/0.10	5/0.20	4.5/0.18	-	1000/39.37	70/2.75	108/4.25
YSM103	30/1.18	46/1.81	30/1.18	40/1.57	8/0.31	-	25/0.98	2.5/0.10	5/0.20	4.5/0.18	-	1000/39.37	88/3.46	126/4.96
YSM206	41/1.61	70/2.75	50/1.97	60/2.36	14/0.55	-	30/1.18	3/0.12	6/0.24	5.5/0.22	-	1000/39.37	95/3.74	133/5.24
YSM212	41/1.61	70/2.75	50/1.97	60/2.36	14/0.55	-	30/1.18	3/0.12	6/0.24	5.5/0.22	-	1000/39.37	123/4.84	161/6.34
YSM323	52/2.05	90/3.54	70/2.75	80/3.15	16/0.63	19/0.75	40/1.57	3/0.12	8/0.31	6.5/0.25	35/1.38	1000/39.37	140/5.57	180/7.09

Motors are manufactured to millimeter dimensions shown. Inch dimensions shown are approximate conversions from millimeters.
For further motor detail, engineering specification drawings are available upon request.

YSM Motor and Connector Ordering Information

Ordering options include the following:

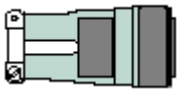
- 24 VDC Brake (Consult factory for brake motor availability)
- Motor Winding Voltage - 115 V or 230 V Drive Input Voltage
- Various NEMA style frame sizes

Consult the factory for information on any of these items.

MOTOR MATING CONNECTORS

CONNECTOR KITS FOR YSM MOTORS

Consult factory to order.



ALL YSM MOTORS

This kit includes connector, pins, and backshell for both the power and encoder connectors.

YSM Connector Data
All YSM

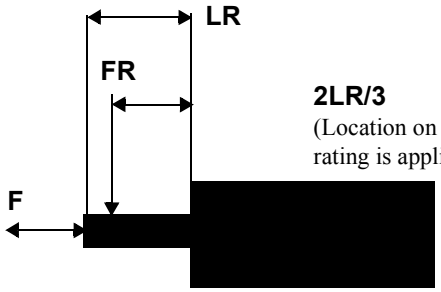
Motor Power Connector	
Pin	**Signal**
1	Phase R
2	Phase S
3	Phase T
4	-
5	Ground
6	-
7	Brake + [1]
8	-
9	Brake + [1]

[1]No connection for nonbrake motors

Motor Feedback	
Pin	**Signal**
1-8	-
9	A+
10	A-
11	B+
12	B-
13	I+
14	I-
15	HALL A+
16	HALL A-
17	HALL B+
18	HALL B-
19	HALL I+
20	HALL I-
21	--
22	+5 VDC
23	Com
24	Encoder Case
25	--
26	--
27	--
28	--

YSM Brake and Shaft Load Data

Motor	Brake Holding Torque	Current at 24 VDC	Shaft Radial Load (FR)	Axial Load (F)
YSM102	0.157 Nm		10 kg	3 kg
YSM103	0.32 Nm	Consult	10 kg	3 kg
YSM206	0.637 Nm	Factory	20 kg	8 kg
YSM212	1.27		25 kg	10 kg
YSM323	2.38 Nm		35 kg	20 kg



2LR/3
(Location on shaft where rating is applied)

NOTE: Above mating connector kit is not CE compliant. Please contact the factory for more information.

FSM Medium Inertia Brushless Servo Motors

Typical Applications

- Web and film processing
- Machine tool/metal cutting
- Textile machinery
- CAM replacements

Characteristics

- Higher inertia matching capability
- Heavy duty continuous operations
- Environmentally rugged

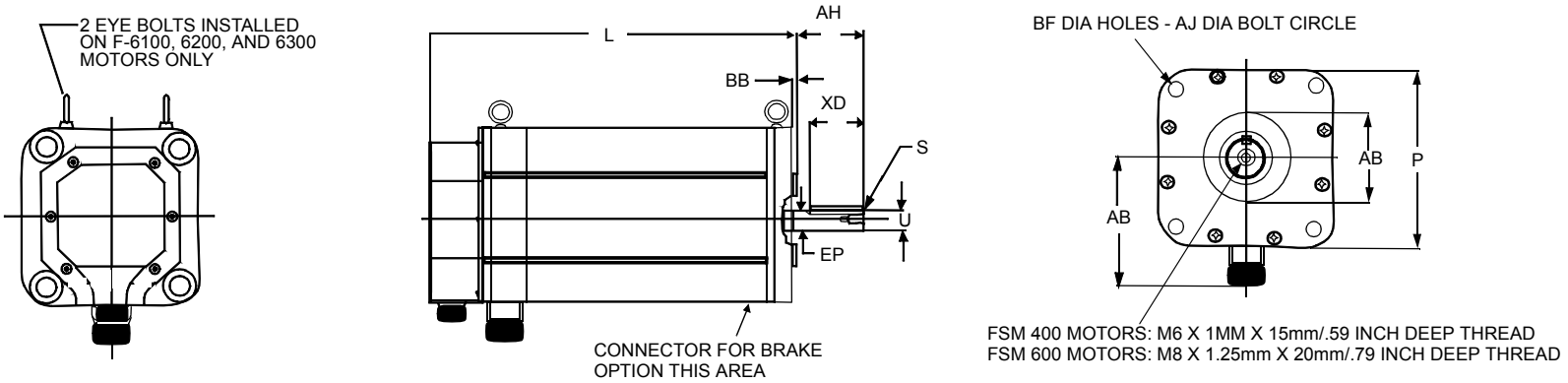
Standard Features

- Compact design is mechanically interchangeable with the HSM family
  Two frame sizes - six models
- Continuous torque from 31 to 245 lb-in (3.5 to 28 Nm)
- Speeds to 4000 RPM
- Ferrite permanent magnet rotors provide approximately four times greater rotor inertia than the HSM family for matching larger load inertias
- Internal thermal switch indicates overheating
- Motor mounted optical encoder includes 2000 quadrature pulses, index pulse and standard commutation channels for trapezoidal drives
- Water tight MS connections are compatible with standard cable assemblies; in addition, the extruded aluminum housing and environmental connectors provide an IP65 package (with the addition of the optional shaft seal kit)
- Economical, compact design ready for harsh environments
- Optional spring-set holding brakes available with 24 VDC or 90 VDC windings
- Axially trapped front bearing in a steel insert for long life at high speeds
- Vibration: 2.5 g peak 30-200 Hz
- Shock: 10.0 g peak 6 msec duration
- UL recognized

FSM Motor And Performance Data

Motor Model		FSM430		FSM460		FSM490		FSM610		FSM620		FSM630	
Mechanical Data													
Rotor Moment of Inertia		lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2	lb-in-s^2	kg-m^2
		.009	.0010	.019	.0021	.029	.0032	.057	.0064	.095	.0107	.144	.0162
Rotor Moment of Inertia (Brake Motors)		.010	.0011	.020	.0022	.030	.0033	.061	.007	.098	.011	.147	.017
Motor Net Weight		lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
		19.6	8.9	31.0	14.1	42.0	14.1	49.2	22.3	68.2	30.9	95.2	43.2
Damping		lb-in/kRPM	Nm/kRPM	lb-in/kRPM	Nm/kRPM	lb-in/kRPM	Nm/kRPM	lb-in/kRPM	Nm/kRPM	lb-in/kRPM	Nm/kRPM	lb-in/kRPM	Nm/kRPM
		.5	.06	.94	.10	1.3	.15	1.4	.16	2.1	.24	3.3	.37
Friction Torque		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
		.56	.063	.94	.11	1.5	.17	1.5	.17	2.1	.24	4.1	.46
Winding Data													
Sine Wave K_T Torque Constant @ 25°C[1]		lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A	lb-in/A	Nm/A
		4.8	.54	4.8	.54	6.5	.73	6.3	.71	6.2	.70	6.5	.73
Sq Wave K_T Torque Constant @ 25°C[2]		5.3	.60	5.3	.60	7.1	.80	6.9	.78	6.8	.80	7.1	.81
KE Voltage Constant[3]		66 V/kRPM		66 V/kRPM		89 V/kRPM		86 V/kRPM		85 V/kRPM		89 V/kRPM	
Winding Resistance - Ph to ph @ 25°C		2.24 ¾		.89 ¾		.98 ¾		.51 ¾		.26 ¾		.16 ¾	
Winding Inductance - Phase to phase		6.8 mH		3.3 mH		3.4 mH		3.3 mH		1.7 mH		1.1 mH	
Thermal Resistance[4]		.63°C/watt		.48°C/watt		.40°C/watt		.45°C/watt		.37°C/watt		.30°C/watt	
System Ratings[8]													
Centurion Micro DSM Drive Line	(Sinusoidal Current)	DSM030		DSM030									
	Max. Cont. Operating Speed[5]	3600 RPM		3500 RPM		N/A		N/A		N/A		N/A	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4]	31	3.5	46	5.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Peak Torque	100	11.3	120	13.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Centurion DSM100 Drive Line	(Sinusoidal Current)	DSM120		DSM130		DSM130/175		DSM175		DSM175/1150		DSM175/1150	
	Max. Cont. Operating Speed[5]	4000 RPM		4000 RPM		3000 RPM		3000 RPM		3000 RPM		3000 RPM	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4]	31	3.5	61	6.9	82/82	9.3/9.3	125	14.1	175/175	19.8/19.8	210/210	23.7/23.7
	Peak Torque	80	9.0	120	13.6	170/19.2	18.6/19.2	280	31.6	350/350	39.5/39.5	440/500	49.7/56.5
Centurion ASM100 Drive Line	(Square Wave Current)	AS120		AS130		AS130		N/A		N/A		N/A	
	Max. Cont. Operating Speed[5]	2000 RPM		1500 RPM		1500 RPM		N/A		N/A		N/A	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4]	29	3.3	58	6.5	78	8.8	N/A	N/A	N/A	N/A	N/A	N/A
	Peak Torque	100	11.3	135	15.3	170	19.2	N/A	N/A	N/A	N/A	N/A	N/A

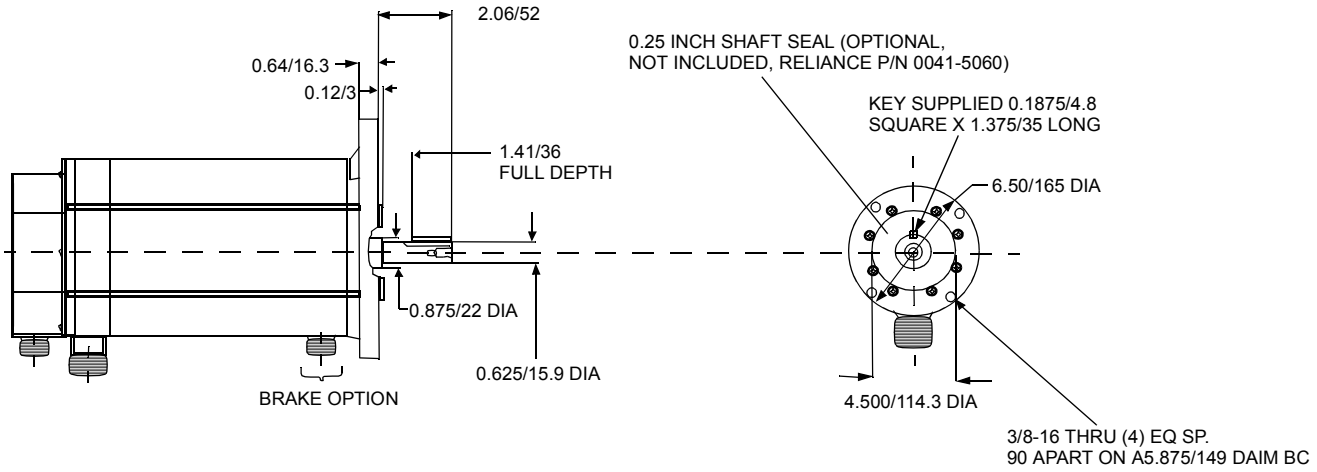
[1]Peak value of per phase sine wave amps [2]Peak value of per phase square wave amps [3]Peak value of sinusoidal phase to phase volts [4]At 125°C winding temperature, in a 40°C ambient, with motor mounted on.5" x 12" x 12" (1.2 x 30 x 30 cm) aluminum heat sink [5]With 230 VAC line voltage input FSM Standard Motor Dimensions



Model	AB	AJ	AK	P	U	EP	AH	BB	BF	XD	S	L	with Brake
	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in
FSM430	102/4.02	145/5.71	110/4.33	127/5.00	19/.75	22.2/8.75	50/1.97	3/.12	10/.39	38/1.49	6X6/.24X.24	194/7.64	257/10.12
FSM460	102/4.02	145/5.71	110/4.33	127/5.00	19/.75	22.2/8.75	50/1.97	3/.12	10/.39	38/1.49	6X6/.24X.24	272/10.71	335/13. 19
FSM490	102/4.02	145/5.71	110/4.33	127/5.00	19/.75	22.2/8.75	50/1.97	3/.12	10/.39	38/1.49	6X6/.24X.24	350/13.78	413/16.26
FSM610	131/5.16	200/7.87	114.3/4.50	173/6.81	35/1.38	36.5/1.438	80/3.15	4.16	13.5/53	60/2.36	10X8/.39X.32	255/10.04	326/12.83
FSM620	131/5.16	200/7.87	114.3/4.50	173/6.81	35/1.38	36.5/1.438	80/3.15	4.16	13.5/53	60/2.36	10X8/.39X.32	320/12.60	390/15.35
FSM630	131/5.16	200/7.87	114.3/4.50	173/6.81	35/1.38	36.5/1.438	80/3.15	4.16	13.5/53	60/2.36	10X8/.39X.32	420/16.53	490/19.29

MOTORS ARE MANUFACTURED TO MILLIMETER DIMENSIONS SHOWN. INCH DIMENSIONS SHOWN ARE APPROXIMATE CONVERSIONS FROM MILLIMETERS.
FOR FURTHER MOTOR DETAIL, ENGINEERING SPECIFICATION DRAWINGS ARE AVAILABLE UPON REQUEST.

NEMA 56C ON FSM400 MOTORS



FSM Motor And Connector Ordering Information

Ordering options include the following:

- 24 or 90 VDC Brake (Consult factory for brake motor availability)
- Encoder Line Count - 1,000, 2,000, 5,000, 500, or 3,000 line
- Special order motor windings available
- Various NEMA style frame sizes

Consult the factory for information on any of these items.
NOTE: Options are not available on all sizes. Optional configurations or encoder line counts have extended lead times and additional charges.

Motor Mating Connectors

MS Conn Kits FSM Motor Power:

	Straight	Right Angle
FSM400	M.1015.7801 (old # 401-34270-00)	M.1015.7802 (old # 401-34270-90)
FSM600	M.1015.7804 (old # 401-34271-00)	M.1015.7805 (old # 401-34271-90)

MS Conn Kit FSM Encoder Feedback:

FSM Encoder Feedback

Straight
M.1015.7808
(old # 401-34273-00)

Right Angle
M.1015.7809
(old # 401-34273-00)

MS Conn Kit FSM Brake Power:

Brake Power

Straight
M.1015.7813
(old # 401-34276-00)

Right Angle
M.1015.7815
(old # 401-34276-90)

FSM Motor Shaft Seal Kits:

FSM400: M.1015.7904 (old # 401-34339-00)
FSM600: M.1015.7905 (old # 401-34340-00)

Shaft seals generally require the presence of a lubricant to reduce premature wear.

NOTE: Above mating connector kits are not CE compliant. Please contact the factory for more information.

FSM Connector Data

FSM400,600

Motor Encoder Connector	
Pin	**Signal**
A	A+
B	A-
C	B+
D	B-
E	I+
F	I-
G	ENCODER CASE
H	ABS
J	+5VDC
K	-5VDC
L	COM
M	COM
N	Hall B
P	Hall C
R	TS+
S	TS-
T	Hall A

ALL FSM

Motor Power Connector	
Pin	**Signal**
A	R
B	S
C	T
D	MOTOR CASE

Motor Brake Connector	
PIN	**SIGNAL**
A	BR+
B	BR-

HSM Low Inertia Brushless Servo Motors

Typical Applications

- "Smart" conveyors
- Packaging machinery
- Punch press/material feeding
- Robotic pick and place
- High duty cycle applications

Characteristics

- High acceleration and peak torques
- High speed point-to-point positioning
- Environmentally rugged

Standard Features

- Compact Design is mechanically interchangeable with the FSM400 and FSM600 motors
- Five frame sizes – twelve models
- Continuous torque from 5 to 450 lb-in (0.5 to 50 Nm)
- Speeds to 6000 RPM
- Neodymium-iron-boron permanent magnet rotors provide low inertias and high accelerations
- Internal thermal switch indicates overheating
- Motor mounted optical encoder includes 2000 quadrature pulses, index pulse and standard commutation channels for trapezoidal drives
- Watertight MS connections are compatible with standard cable assemblies; in addition, the extruded aluminum housing and environmental connectors provide an IP65 package (with the addition of the optional shaft seal kit)
- Economical, compact design ready for harsh environments
- Optional spring-set holding brakes available with 24 VDC or 90 VDC windings
- Axially trapped front bearing (in a steel insert in H-4000, H-6000 and H-8000 series) for long life at high speeds
- Vibration: 2.5 g peak 30-2000 H
- Shock: 10.0 g peak 6 msec duration
- UL recognized

HSM Motor And Performance Data

Motor Model	HSM205		HSM307		HSM320		HSM430		HSM460		HSM490		HSM610		HSM620		HSM630		HSM835		HSM845	
Mechanical Data																						
Rotor Moment of Inertia	lb-in-s^2 .00013	kg-m^2 .000015	lb-in-s^2 .00027	kg-m^2 .000030	lb-in-s^2 .00072	kg-m^2 .000080	lb-in-s^2 .0022	kg-m^2 .00025	lb-in-s^2 .0041	kg-m^2 .00046	lb-in-s^2 .0060	kg-m^2 .00068	lb-in-s^2 .012	kg-m^2 .0014	lb-in-s^2 .021	kg-m^2 .0024	lb-in-s^2 .030	kg-m^2 .0034	lb-in-s^2 .056	kg-m^2 .0063	lb-in-s^2 .083	kg-m^2 .0094
Rot. Mom. of In (Brake Motors)	-	-	.00034	.000038	.00079	.000089	.0029	.00033	.0048	.00054	.0067	.00076	.015	.0017	.024	.0027	.033	.0037	.082	.0093	.109	.012
Motor Net Weight	lb 4.9	kg 2.2	lb 5.8	kg 2.6	lb 8.4	kg 3.8	lb 13.7	kg 6.2	lb 20.1	kg 9.1	lb 26.9	kg 12.2	lb 40.4	kg 18.3	lb 59.4	kg 27.0	lb 76.8	kg 34.8	lb	kg	lb 123.6	kg 56.1
Damping	lb-in/ kRPM .06	Nm/ kRPM .007	lb-in/ kRPM .09	Nm/ kRPM .010	lb-in/ kRPM .12	Nm/ kRPM .014	lb-in/ kRPM .30	Nm/ kRPM .034	lb-in/ kRPM .40	Nm/ kRPM .045	lb-in/kRPM .60	Nm/ kRPM .068	lb-in/kRPM .90	Nm/kRPM .10	lb-in/kRPM 1.4	Nm/kRPM .16	lb-in/kRPM 1.7	Nm/kRPM .19	lb-in/kRPM 3.4	Nm/kRPM .38	lb-in/kRPM 3.8	Nm/kRPM .43
Friction Torque	lb-in .12	Nm .014	lb-in .12	Nm .014	lb-in .25	Nm .028	lb-in .30	Nm .034	lb-in .60	Nm .068	lb-in 1.2	Nm .14	lb-in 1.2	Nm .14	lb-in 2.1	Nm .24	lb-in 3.2	Nm .36	lb-in 2.8	Nm .32	lb-in 3.5	Nm .40
Winding Data																						
Sine Wave K_T Torque Constant @ 25°C[1]	lb-in/A 1.17	Nm/A .13	lb-in/A 2.5	Nm/A .28	lb-in/A 2.5	Nm/A .28	lb-in/A 4.4	Nm/A .50	lb-in/A 4.4	Nm/A .50	lb-in/A 6.6	Nm/A .74	lb-in/A 6.0	Nm/A .68	lb-in/A 5.8	Nm/A .66	lb-in/A 6.2	Nm/A .70	lb-in/A 7.6	Nm/A .86	lb-in/A 8.2	Nm/A .92
Sq Wave K_T Torque Constant @ 25°C[2]	1.3	.14	2.7	.31	2.7	.31	4.8	.54	4.8	.54	7.2	.81	6.6	.74	6.4	.72	6.8	.77	8.3	.94	9.0	1.0
KE Voltage Constant[3]	16 V/kRPM		34 V/kRPM		343 V/kRPM		60 V/kRPM		60 V/kRPM		90 V/kRPM		82 V/kRPM		80 V/kRPM		85 V/kRPM		104 V/kRPM		112 V/kRPM	
Winding Resistance Ph to phase @ 25°C	2.6 ¾		6.6 ¾		1.3 ¾		2 ¾		0.69 ¾		0.90 ¾		0.49 ¾		0.18 ¾		0.12 ¾		0.13 ¾		0.10 ¾	
Winding Inductance Phase to phase	4.1 mH		12 mH		3.4 mH		9 mH		3.3 mH		5.4 mH		4.4 mH		2.2 mH		1.2 mH		2.5 mH		2.4 mH	
Thermal Resistance[4]	1.45°C/watt		1.2°C/watt		0.89°C/watt		0.79°C/watt		0.57°C/watt		0.48°C/watt		0.34°C/watt		0.31°C/watt		0.24°C/watt		0.23°C/watt		0.21°C/watt	

[1]Peak value of per phase sine wave amps

[2]Peak value of per phase square wave amps

[3]Peak value of sinusoidal phase to phase Volts

[4]At 125° C winding temperature, in a 40° C ambient, Motors 307, 320 mounted on .25" x 10" x 10", motors 430, 460, 490 mounted on 0.5" x 12" x 12", Motors 610, 620, 630, 835, 850 mounted on 1" x 12" x 12" aluminum heat sink

[5]With 230 VAC line voltage input

HSM Motor And Performance Data (Continued)

System Ratings[8]		HSM205		HSM307		HSM320		HSM430		HSM460		HSM490		HSM610		HSM620		HSM630		HSM835		HSM845	
Centurion Micro DSM Drive Line	(Sinusoidal Current)			DSM015		DSM030		DSM030															
	Max. Cont. Operating Speed[5]	N/A		5000 RPM		5000 RPM		4000 RPM		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4,]	-	-	7	0.79	20	2.26	30	3.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak Torque[9]	-	-	22	2.49	44	4.97	73	8.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centurion DSM100 Drive Line	(Sinusoidal Current)	DSM110		DSM110		DSM120		DSM120		DSM130/175		DSM130/175		DSM175/ 1150		DSM175		DSM1150		DSM1150		DSM1150	
	Max. Cont. Operating Speed[5]	6000 RPM		5000 RPM		5000 RPM		4000 RPM		4000/4000 RPM		3000/3000 RPM		3000 RPM		3000 RPM		3000 RPM		2000 RPM		2000 RPM	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4,]	5.0	0.56	7.0	0.79	20	2.26	30	3.39	60/60	6.78/ 6.78	88/88	9.9/9.9	100	11.30	190/ 216	21.4/ 24.4	325	36.7	350	39.55	450	50.85
	Peak Torque	11	1.24	22	2.48	44	4.97	73	8.2	120/ 190	13.5/ 21.47	180/270	19.8/ 122.7	225	25.42	360/ 480	40.7/ 54.2	700	79.1	620	70.06	1100	124.3
Centurion ASM100 Drive Line	(Square Wave Current)	AS110		AS110		AS120		AS120		AS130		AS130		N/A		N/A		N/A		N/A		N/A	
	Max. Cont. Operating Speed[5]	6000 RPM		3500 RPM		3500 RPM		2000 RPM		2000 RPM		1500 RPM		N/A		N/A		N/A		N/A		N/A	
		lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
	Continuous Stall Torque[4,]	4.75	.53	6.65	.75	19	2.15	28.5	3.22	57	6.44	85.5	9.66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Peak Torque	16	1.8	26	2.9	60	6.78	100	11.3	120	13.5	175	19.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]Peak value of per phase sine wave amps

[2]Peak value of per phase square wave amps

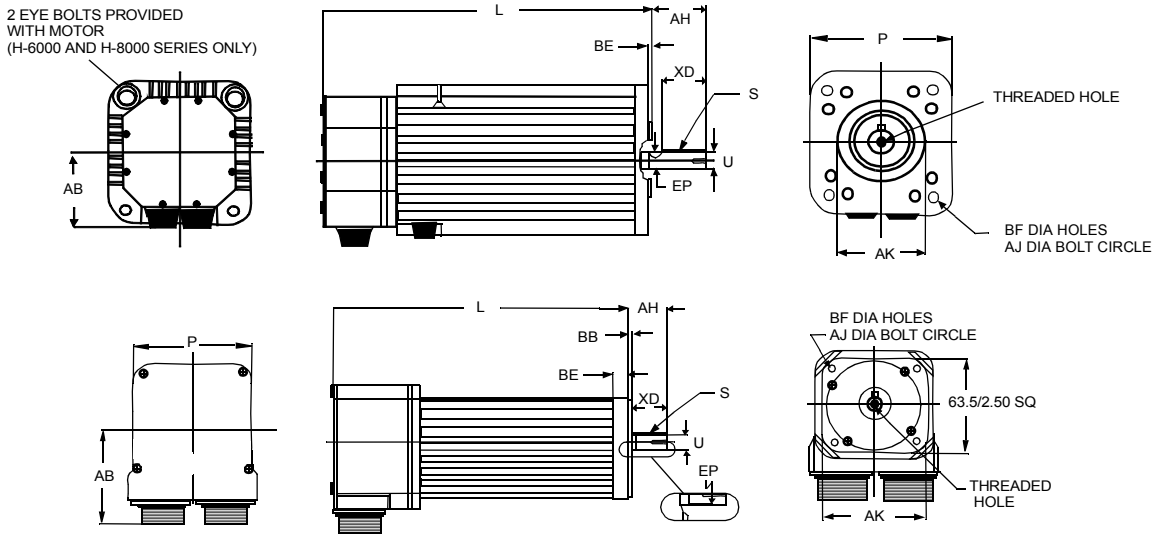
[3]Peak value of sinusoidal phase to phase Volts

[4]At 125° C winding temperature, in a 40° C ambient, Motors 307, 320 mounted on .25” x 10” x 10”, motors 430, 460, 490 mounted on 0.5” x 12” x 12”, Motors 610, 620, 630, 835, 850 mounted on 1” x 12” x 12” aluminum heat sink

[5]With 230 VAC line voltage input

HSM Standard Motor Dimensions

HSM300, HSM400, HSM600, HSM800



Shaft End Threaded Hole

Motor	Thread	Thread Depth
HSM200	M3 x 0.5mm	10mm/.39in
HSM300	M4 x 0.7mm	10mm/.39in
HSM400	M6 x 1.0mm	15mm/.59in
HSM600	M8 x 1.25mm	20mm/.79
HSM800	M8 x 1.25mm	20mm/.79in

NOTE: Motors manufactured to millimeter dimensions.

Model	AB	AH	AJ	AK	BB	BE	BF
	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in	mm/in
HSM205	75/2.95	23/0.93[3]	75/2.95	60/2.36[1]	2.4/0.09[4]	15.2/.60	5.8/0.23
HSM307	75/2.95	30/1.18[3]	100/3.94	80/3.15[1]	3/.12[4]	10.9/.43	7/.28
HSM320	75/2.95	30/1.18[3]	100/3.94	80/3.15[1]	3/.12[4]	10.9/.43	7/.28
HSM430	76/3.00	50/1.97[3]	145/5.71	110/4.33[5]	3/.12[4]	15.5/.61	10/.39
HSM460	76/3.00	50/1.97[3]	145/5.71	110/4.33[5]	3/.12[4]	15.5/.61	10/.39
HSM490	76/3.00	50/1.97[3]	145/5.71	110/4.33[5]	3/.12[4]	15.5/.61	10/.39
HSM610	101/4.00	80/3.15[3]	200/7.87	114.3/4.50[5]	4/.16[4]	21.3/.84	13.5/.53
HSM620	101/4.00	80/3.15[3]	200/7.87	114.3/4.50[5]	4/.16[4]	21.3/.84	13.5/.53
HSM630	101/4.00	80/3.15[3]	200/7.87	114.3/4.50[5]	4/.16[4]	21.3/.84	13.5/.53
HSM835	112/4.41	85/3.35[3]	265/10.43	230/9.06[8]	4/.16[4]	22.4/.88	15/.59
HSM845	112/4.41	85/3.35[3]	265/10.43	230/9.06[8]	4/.16[4]	22.4/.88	15/.59
Model	**EP**	**L**	**L Brake**	**P**	**S**	**U**	**XD**
HSM205	12/0.47	197/7.7	-	80/3.15	4x4/.16x.16	11/0.43[2]	18/0.71
HSM307	15/0.59	172/6.77	211/8.31	89/3.50	5x5/.20x.20	14/0.55[2]	20/0.79
HSM320	15/0.59	223/8.77	262/10.31	89/3.50	5x5/.20x.20	14/0.55[2]	20/0.79
HSM430	20/0.79	213/8.39	266/10.47	121/4.76	6x6/.24x.24	19/075[6]	40/1.57
HSM460	20/0.79	264/10.39	317/12.48	121/4.76	6x6/.24x.24	19/075[6]	40/1.57
HSM490	20/0.79	315/12.40	368/14.49	121/4.76	6x6/.24x.24	19/075[6]	40/1.57
HSM610	38/1.50	277/10.91	330/12.99	178/7.01	10x8/.39x.31	35/1.38[7]	60/2.36
HSM620	38/1.50	353/13.90	406/15.98	178/7.01	10x8/.39x.31	35/1.38[7]	60/2.36
HSM630	38/1.50	429/16.89	482/17.40	178/7.01	10x8/.39x.31	35/1.38[7]	60/2.36
HSM835	45/1.77	375/14.76	478/18.82	241/9.49	12x8/.47x.31	42/1.65[7]	60/2.36
HSM845	45/1.77	426/16.77	529/20.83	241/9.49	12x8/.47x.31	42/1.65[7]	60/2.36

[1]Tolerance is -0.03/-0.0012 [2]Tolerance is -0.01/-0.0004 [3]Tolerance is +/- 0.5/ +/- 0.0196 [4] Tolerance is +/- 0.2 / +/-0.0079 [5]Tolerance is -0.035/-0.0014
[6]Tolerance is -0.013/-0.0051 [7] Tolerance is -0.16/-0.006 [8]Tolerance is -0.46/-0.0181
Motors are manufactured to millimeter dimensions shown. Inch dimensions shown are approximate conversions from millimeters.
For further motor detail, engineering specification drawings are available upon request.

HSM Motor And Connector Ordering Information

Ordering options include the following:

- 24 or 90 VDC Brake (Consult factory for brake motor availability)
- Encoder Line Count* - 1,000, 2,000, or 5,000** line
- Various NEMA style frame sizes

Consult the factory for information on any of these items.

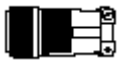
*NOTE: Optional configurations or encoder line counts have extended lead times and additional charges.

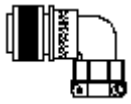
**NOTE: 5000 Line count encoder motor top speed is limited to 3600 RPM due to frequency output limit of encoder. Check drive system configuration data for any additional restrictions imposed by drive input.

NOTE: All options are not available.

NOTE: Above mating connector kits are not CE compliant. Please contact the factory for more information.

Motor Mating Connectors



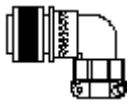


Straight	Motor	Right Angle
M.1015.7798 (old # 401-34269-00)	**HSM200 & HSM300**	M.1015.7799 (old # 401-34269-90)
M.1015.7801 (old # 401-34270-00)	**HSM400**	M.1015.7802 (old # 401-34270-90)
M.1015.7804 (old # 401-34271-00)	**HSM600**	M.1015.7805 (old # 401-34271-90)
M.1015.7807 (old # 401-34272-00)	**HSM800**	M.1300.3509 (old # 401-34272-90)

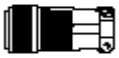
Brake Power Connectors

Straight
M.1015.7813
(old # 401-34276-00)

Right Angle
M.1015.7815
(old # 401-34276-90)

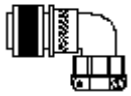


Encoder Feedback Connectors



Straight
M.1015.7808
(old # 401-34273-00)

Right Angle
M.1015.7809
(old # 401-34273-90)



HSM Motor Shaft Seal Kits

HSM200:	M.1300.3484 (old # 401-30225-00)
HSM300:	M.1007.0803 (old # 401-30226-00)
HSM400	M.1015.6923 (old # 401-30227-00)
HSM600	M.1015.6924 (old # 401-30228-00)
HSM800	M.1300.3485 (old # 401-30229-00)

Shaft seals generally require the presence of a lubricant to reduce premature wear.

HSM200, 300, 400, 600, 800 Connector Data

Motor Encoder Connector	
Pin	**Signal**
A	A+
B	A-
C	B+
D	B-
E	I+
F	I-
G	Encoder Case
H	ABS
J	+5VDC
K	-5VDC
L	COM
M	COM
N	Hall B
P	Hall C
R	TS+
S	TS-
T	Hall A

ALL HSM Connector Data

Motor Power Connector	
Pin	**Signal**
A	R
B	S
C	T
D	Motor Case

Motor Brake Connector (Option)	
Pin	**Signal**
A	BR+
B	BR-

SSM REPLACEMENT

Note: HSM motors only are shown in this catalog. For motors interchangeable with the SSM ABS encoder signals, contact our factory.

Application Guidelines For HSM, FSM, YSM, NSM Brake Motors

Brake Operation

The brakes offered as options in Giddings & Lewis motors are designed for holding the motor shaft at 0 RPM, up to the rated brake holding torque. The brakes are spring-set type and release when voltage is applied to the brake coil.

The brakes are not designed for stopping rotation of the motor shaft.

The primary method of stopping motor shaft rotation is to command the servo drive to decelerate the motor to 0 RPM. Servo drive inputs Command, Forward Enable, and Reverse Enable can be used to stop motor shaft rotation per timing and connection examples shown below.

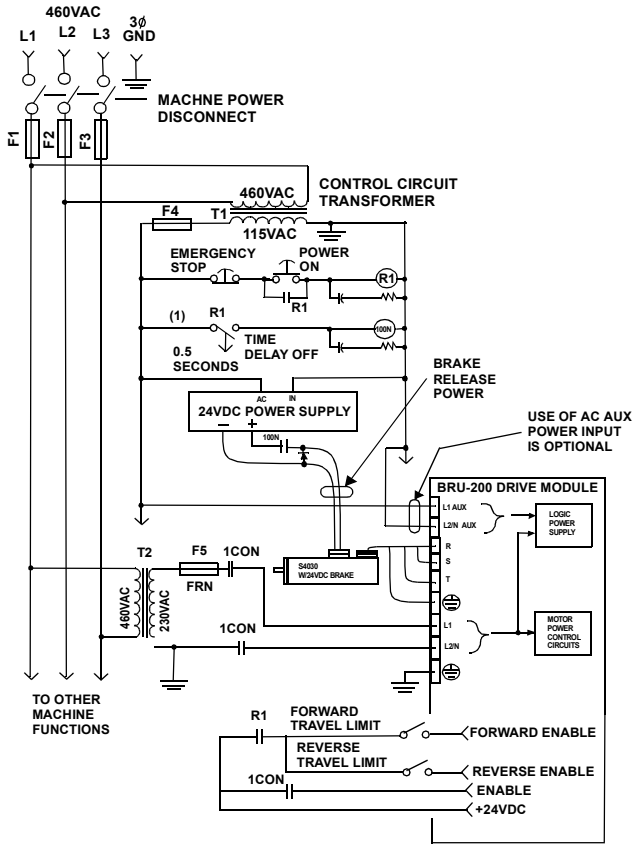
The brakes provided can withstand occasional use as stopping brakes for system main power failures which may occur.

Repeated use of these brakes as stopping brakes will increase brake pad wear, increase rotational mechanical backlash, and reduce brake life.

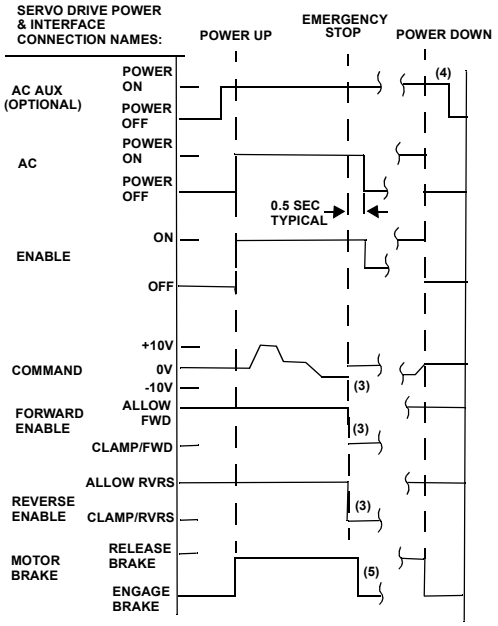
For an Emergency Stop condition, the servo drive should be used to decelerate the motor to 0 RPM before engaging the brake.

The brake should not be engaged until the servo drive has decelerated the motor to 0 RPM for an Emergency Stop condition.

Machine Wiring Example Showing Connections to DSM Drive Module



Power Up/Down Timing Examples of External Connections to DSM Drive Module



This drawing is intended as an example only. It does not show all interlocks required for safe operation of the equipment.

(1) Time delay off contacts allow time for drive module to decelerate motor to 0 RPM before power to motor control circuits is removed.

(2) Relay R1 contacts may be connected to Forward and Reverse Enable interface circuits as shown when no position controller is used. When the BRU-200 is used with a PRO-Series or CNC Position Controller, these R1 contacts would be connected to the position controller emergency stop input.

(3) For emergency stop, Command should be immediately set to 0.0 VDC and/or Forward and Reverse Enable inputs set to clamp, to decelerate motor to 0 RPM before power to drive module is removed.

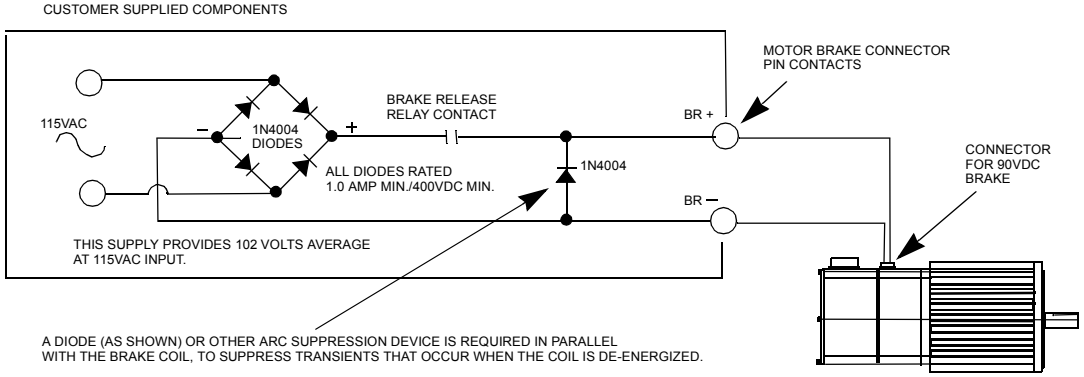
(4) The only requirement for non-emergency power down sequence is to insure that the motor shaft is at 0 RPM before engaging the optional motor brake.

(5) The brake available as an option on H-Series and F-Series motors is a holding brake, and is not rated for repeated use as a stopping brake.

Brake Data For HSM and FSM Motors

Motor	Maximum Back-lash (Brake Engaged)	Holding Torque (LB/IN)	Holding Torque NM	Coil Current at 24VDC	Coil Current at 90VDC
HSM300	1 degree, 30 minutes	20	2.26	0.6 ADC	0.21 ADC
HSM400, FSM400	44 minutes	90	10.2	0.88 ADC	0.26 ADC
HSM600, FSM600	29 minutes	300	22.6	1.13 ADC	0.33 ADC
HSM800	21 minutes	450	50.8	2.2 ADC	0.62 ADC

BRAKE VOLTAGE TOLERANCE: 24 VDC: 21.6 TO 27.6 VDC 90 VDC: 85 TO 115 VDC. DC or rectified AC voltage may be used to energize the brake coil.



Standard Motor Radial Load Force Ratings For HSM and FSM Motors

(Loads applied at center of shaft) For 20,000 HR Bearing Life

	500 RPM		1000 RPM		2000 RPM		3000 RPM		4000 RPM		5000 RPM		6000 RPM	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
NSM2302	17	8	16	7	14	6	12	6	11	5	9	4	8	3
NSM2304	19	9	17	8	15	7	14	6	12	5	10	5	8	4
NSM3406	103	47	82	37	65	29	56	26	51	23	48	22	45	20
HSM205	105	47.7	84	38.2	66	30.0	58	26.4	53	24.1	49	22.3	45	20.5
HSM307	113	51.4	90	40.9	71	32.3	62	28.2	56	25.5	53	24.1		
NSM3412	113	51	89	40	71	32	62	28	56	26	53	24	49	22
HSM320	126	57.3	101	45.9	79	21.6	69	31.4	63	28.6	59	26.8		
NSM4214	137	62	109	49	86	39	76	34	68	31	64	29		
NSM4220	146	66	116	52	92	41	80	36	73	33	68	31		
HSM430	169	76.8	152	69.1	120	54.5	105	47.7	95	43.2				
NSM5630	188	85	149	67	118	53	103	47	94	43				
NSM5637	197	89	156	71	124	56	108	49	98	45				
FSM430	203	92.3	161	73.2	129	58.6	113	51.4	101	45.9				
NSM5647	203	92	161	73	128	58	112	51						
HSM460	205	93.2	164	74.5	129	58.6	113	51.4	103	46.8				
FSM460	229	104.1	184	83.6	144	65.5	126	57.3	116	52.7				
HSM490	215	97.7	173	78.6	137	62.3	118	53.6	108	49.1				
FSM490	244	110.9	194	88.2	154	70.0	133	60.5	121	55.0				
HSM610	435	197.7	345	156.8	274	124.5	240	109.1						
FSM610	428	194.5	341	155.0	268	121.8	236	107.3						
HSM620	469	213.2	375	170.5	296	134.5	259	117.7						
FSM620	465	211.4	368	167.3	293	133.2	255	115.9						
HSM630	495	225.0	390	177.3	311	141.4	270	122.7						
FSM630	495	225.0	390	177.3	311	141.4	270	122.7						
HSM835	495	225.0	394	179.1	311	141.4								
HSM845	518	235.4	413	187.7	326	148.2								

Radial Load Force - lbs (Kg) applied at center

NOTE: Motors are capable of carrying an axial load in most applications per the following general guidelines which should be used only as an approximation. Please consult with Giddings & Lewis to discuss your application loads to ensure the proper selection of motors.

- When motor shaft has no radial load, Axial load rating = 100% of radial load rating from table above.
- When motor shaft has both a radial load and an axial load, axial load rating = 44% of radial load rating from table above.