

TENV/IP54 Super-Mod® Clutch-Brake Modules

Imagine a totally-enclosed, non-ventilated clutch-brake ready to work right out of the box, requiring no modifications. And at a price competitive with “open” enclosure clutch-brakes.

TENV Super-Mod will give you extended cycles, enhanced operating efficiency and longer operating life. TENV Super-Mod Modules are well suited for challenging applications where water, moisture, dirt, dust and other airborne pollutants can shorten the life of traditional clutch-brakes.

Examine these key value-added features:

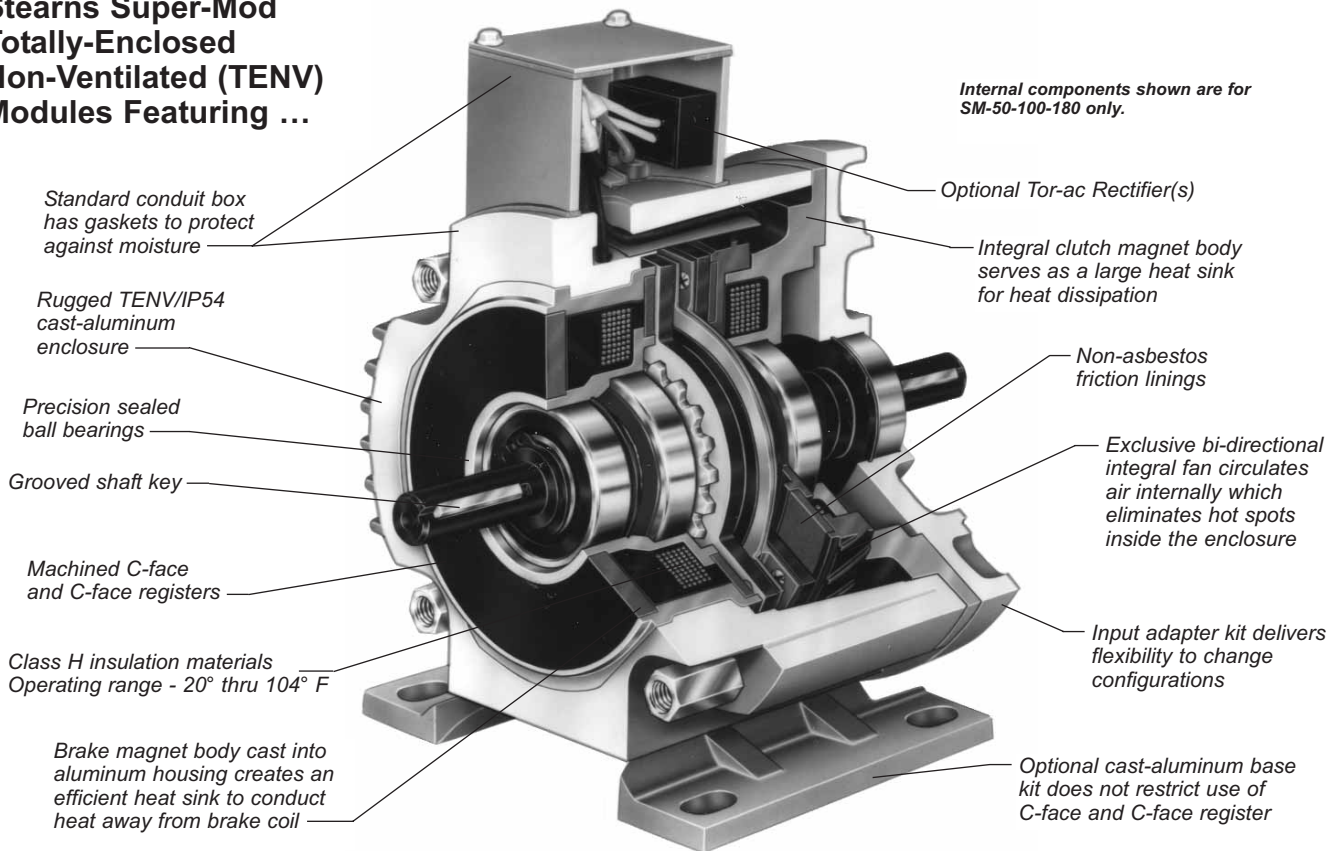
- Cast-aluminum housing that meets IP54 requirements, preventing moisture and dirt from affecting operation of the unit
- Integrally cast, clutch-side magnetic body and endbell provides large heat sink that conducts heat away from coil

- Brake-side magnetic body integrated with cast housing creates a heat exchanger that keeps the brake coil cool
- Unique fan design creates bi-directional air movement within the unit. This stabilizes internal temperatures and eliminates hot spots. The fan is cast into the drive hub and is equally efficient at moving air axially through the housing during motor rotation in either direction
- Depending on the model, between 28 and 60 percent fewer parts than competitive units for enhanced reliability and service life
- Armature assembly features an automatic gap adjustment that maintains a consistent de-energized armature-to-friction-face air gap
- Completely gasketed conduit box resists moisture and spray
- Washdown (IP55) availability in select models

For even better performance, include an optional Tor-ac™ rectifier for 115 or 230 Vac input. Tor-ac rectifiers connect directly to the AC power source for switching on the AC-side. This eliminates contact arcing, improving the life of associated switching components while providing you with mechanical response times comparable to DC-side switching.

The Stearns TENV Super-Mod Module comes in a wide range of popular sizes with nominal static torque ratings from 16 and 145 lb-ft. Each unit is designed as an exact drop-in replacement, so you can upgrade today or at your next regularly scheduled maintenance shutdown.

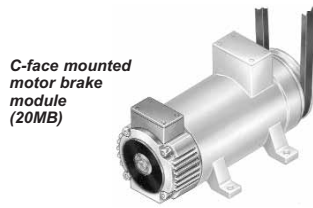
Stearns Super-Mod Totally-Enclosed Non-Ventilated (TENV) Modules Featuring ...



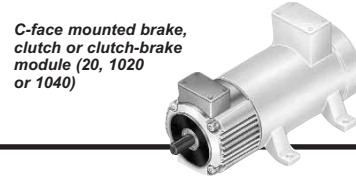
Super-Mod® Clutch-Brake Modules

How To Select The Proper Unit For Your Application

1st Select the appropriate configuration based on the relationship with the motor, gearbox and drive components.

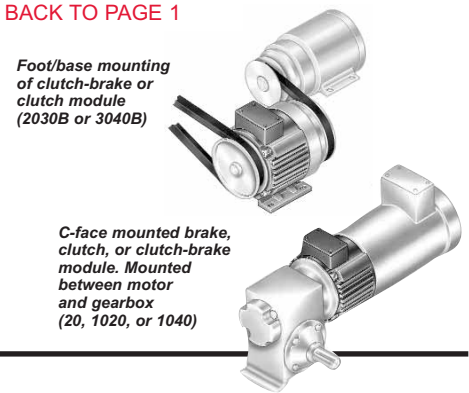


C-face mounted motor brake module (20MB)



C-face mounted brake, clutch or clutch-brake module (20, 1020 or 1040)

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Foot/base mounting of clutch-brake or clutch module (2030B or 3040B)

C-face mounted brake, clutch, or clutch-brake module. Mounted between motor and gearbox (20, 1020, or 1040)

2nd Determine if the application requires clutching only, braking only or a clutch-brake combination.

Clutch Only

Provides a start and/or continuous motion until the control logic disengages (removes the power or voltage from the unit's coil).

NOTE: The load will coast since no braking action is provided.

Brake Only

Provides a stop and hold, typically of a motor shaft, until the control logic disengages (removes the power or voltage from the unit's coil).

Clutch-Brake

Provides a start-stop motion used for cycling, intermediate or random motion and controls a load or machine element. Both the clutch and brake coils are electrically engaged (power on), however, the control logic should not signal both coils to be engaged at the same time.

3rd Select the proper size/torque rating based on horsepower and RPM (speed at the clutch or brake) using the Super-Mod Selection Chart to the right. Based on 2.75 service factor.

For other service factors and speeds, use the formulas shown to the far right.

CAUTION: RPM refers to shaft speed at clutch or brake.

Note: Frame size and shaft diameter may affect selection and should be considered. See manufacturer's dimensional and sizing information.

Super-Mod Selection Chart

RPM \ HP	200	400	600	800	1000	1200	1500	1800	2100	2400
1/8										
1/4										
1/3										
1/2					SM-50					
3/4										
1					SM-100/180					
1 1/2										
2										
3							SM-210			
5										
7 1/2								SM-250		
10										

$$T_d = \frac{5252 \times P}{N} \times SF$$

Where:

T_d = Average dynamic torque, lb-ft

P = Horsepower, HP

N = Shaft speed differential at clutch and/or brake components, RPM

SF = Service factor

5252 = Constant

4th Ensure that the unit can properly dissipate the heat generated by the application. Thermal capacity can be calculated as follows:

$$E = 1.7 \times WR^2 \times \left(\frac{N}{100}\right)^2 \times F$$

Where:

E = Energy (heat) which needs to be dissipated in foot pounds per minute

(ft-lb/min) for the application requirement.

WR² = Total reflected inertia at clutch-brake shaft location. This should include clutch-brake inertia.

Inertia (lb-ft ²)	SM 50, 100, 180	SM 210, 250
Clutch/Brake	0.063	0.144
Clutch Only	0.04	0.08
Brake Only	0.035	0.08

N = Speed differential in revolutions per minute at the clutch-brake shaft.

F = Number of cycles per minute (cycle rate)

The thermal capacity requirements calculated should be compared to the thermal capacity ratings. Exceeding this rating could cause overheating and possible failure.

SM 50-100-180 can accommodate 5,000 ft-lb/min; SM-210 7,000 ft-lb/min; and SM-250 5,600 ft-lb/min.

5th Options Select any other options you may require.

Tor-ac Kit

Single-channel, solid-state, quick-response rectifier circuit can be mounted in any SM unit which allows you to switch on the AC-side with mechanical response times comparable to traditional DC-side switching.

Adapter Kit

An input adapter kit can be stocked which gives you immediate flexibility to modify to double shafted configurations. See page 115 for ordering and dimensional information.

Base Kit

A base kit can be added to clutch only (1040) or clutch-brake (1020) units. See page 16 for ordering and dimensional information.

6th Special Applications

Low Speed

Application of clutches and brakes at speeds of 300 RPM or less may not permit sufficient burnishing or run-in to occur, the result being reduced and erratic torque output. For these applications, we suggest using a unit which has a static torque rating of at least two times the calculated torque requirement.

High Cycle Rates

Applications where high cycle rates are required could result in heat being generated

which is in excess of the unit's capability to dissipate. The thermal capacity requirement equation should be used to size the clutch and/or brake for this type of application. High cycle rates may also require special high-speed controls.

Washdown

For applications requiring regular washdown, such as food processing or other wet, high-humidity environments use the Super-Mod TENV Washdown Clutch-Brake Modules.

• Models in most popular sizes with nominal static torque ratings of 16 and 35 lb-ft.

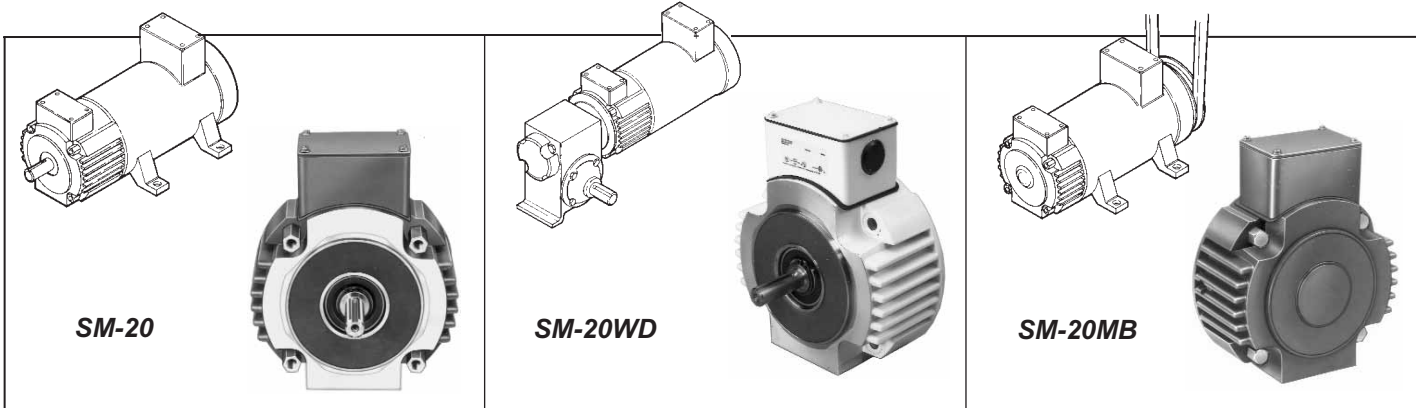
• Fully neoprene gasketed with BISSC approved white epoxy paint.

Soft Starts And/Or Stops

While the Stearns Gap feature is desirable in most applications, there are some situations where it should be disabled, such as very soft starts and/or stops achieved with low voltage energizing of the coil. For applications where the voltage will be varied to below 75% of the coil rating, request that the Stearns Gap feature be disabled.

Super-Mod® Brake Only Modules: SM-20, SM-20WD (Washdown) and SM-20MB

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- 48Y (56C) through 215TC NEMA Frame Sizes
- 16 through 145 lb-ft Static Torque; 2400 Maximum RPM
- TENV – Totally Enclosed (Non-Ventilated) IP-54 Enclosure Protection, (IP-55 for Washdown Units)
- Listed by Underwriters Laboratories, Inc., File E-71115 and CSA Certified, File LR-6254
- Power-On Brake* Engagement
- Maximum overhung load capacity is 85 lbs.

*See Series 56,700 and 87,700 for power-off "fail safe" C-face coupler units

Performance Data, Ordering Information and List Prices (Discount Symbol X-8)

Static Torque lb-ft	Dynamic Torque lb-ft	NEMA Frame	Hub bore and shaft diameter	Model	Part Number ^①	Thermal Capacity (ft-lb/min) ^②	Wt. (lbs)	Maximum Electrical Power (watts)	Dimension Page	List Price ^③
16	10	56C/48Y	5/8 hub bore 5/8 shaft	SM-50-20	2-37-0561-01-A*L	5000	11	19	112	\$ 720.00
16	10	56C/48Y		SM-50-20WD	2-37-0562-01-A*L	5000	11	19	112	878.00
16	10	56C/48Y		SM-50-20MB	2-37-0561-01-X*L	5000	10	19	112	660.00
35	20	56C/48Y		SM-100-20	2-37-0561-02-A*L	5000	11	29	112	916.00
35	20	56C/48Y		SM-100-20WD	2-37-0562-02-A*L	5000	11	29	112	1118.00
35	20	56C/48Y		SM-100-20MB	2-37-0561-02-X*L	5000	10	29	112	892.00
35	20	140TC	7/8 hub bore 7/8 shaft	SM-180-20	2-37-1401-02-A*O	5000	12	29	112	916.00
35	20	140TC		SM-180-20WD	2-37-1402-02-A*O	5000	12	29	112	1118.00
35	20	140TC		SM-180-20MB	2-37-1401-02-X*O	5000	11	29	112	892.00
75	44	180TC	1-1/8 hub bore 1-1/8 shaft	SM-210-20	2-37-1801-03-A*R	7000	15	16	112	1784.00
75	44	180TC		SM-210-20MB	2-37-1801-03-X*R	7000	15	16	112	1714.00
145	86	210TC	1-3/8 hub bore 1-3/8 shaft	SM-250-20	2-37-2101-04-A*U	5600	18	38	112	1986.00
145	86	210TC		SM-250-20MB	2-37-2101-04-X*U	5600	18	38	112	1906.00

②Thermal capacity rating is based on ambient temperature of 70°F at 1750 RPM.

③ List prices subject to change without notice.

①Example of a complete part number:

2-37-0561-01-AJL — 5/8 hub
 90-100 Vdc
 Basic unit
 0=Standard Unit
 2= Without Gap Adjust

Specials available upon request.
 Consult factory for list price adder.

Options - Features Table

Series	Character	Description
SM-20	A	Basic Unit - Coupler
SM-20MB	X	No Shaft (end mount motor brake)
SM-20WB		IP-55 Washdown (available in NEMA frame sizes 56C-145TC)

Voltage Table

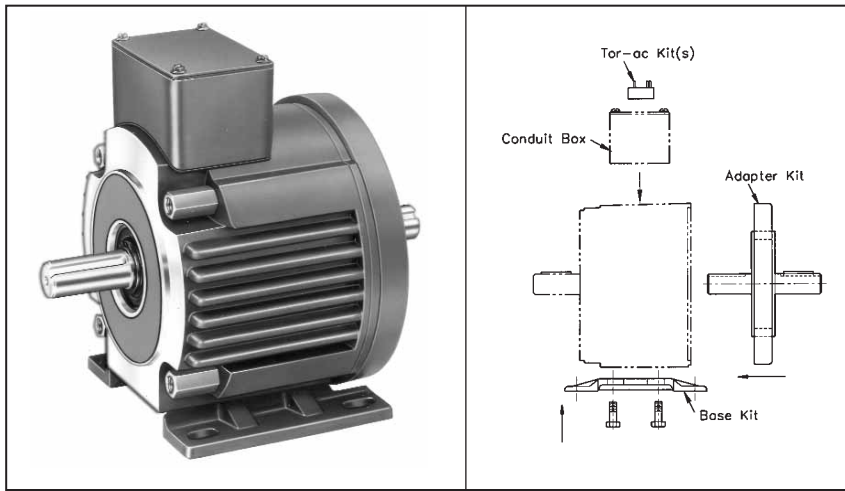
Character	Voltage	List Adder
C	12 Vdc	
E	24-28 Vdc	none
J	90-100 Vdc	
N	115 Vac	\$ 92.00
P	230 Vac	110.00

Hub Size Table for SM-20's

Character	Bore	Keyway
L	5/8	3/16 x 3/32
O	7/8	3/16 x 3/32
R	1 1/8	1/4 x 1/8
U	1 3/8	5/16 x 5/32

Super-Mod® Conversion Kits

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Mechanical Flexibility through Conversion Kits

Super-Mod units are stocked in a wide range of configurations and voltages. Additionally, to keep your inventory down and provide quick shipments, Super-Mod provides the answer with inexpensive, easy to use, stock conversion kits. Stock either the base kit, adapter kit, Tor-ac kit or all of them and you can quickly modify your standard clutch (1040), or clutch-brake (1020) into almost any configuration (2030TB, 3040B for example).

Super-Mod is an innovative product. When combined with your equipment, it provides added value through increased reliability and reduced inventory.

Base Kit Dimensional Data (In Inches)

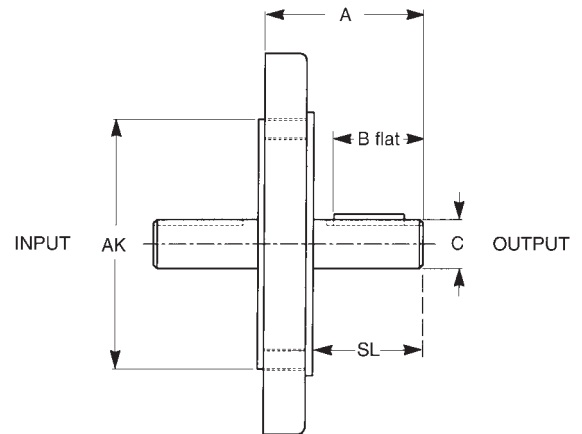
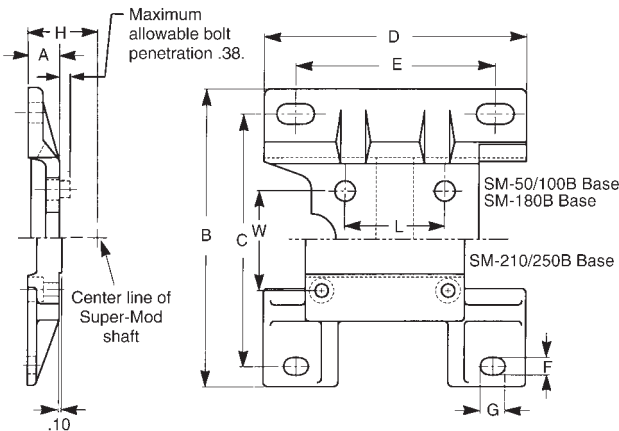
Base Kits Cannot Be Used On Brake Only (20 and 20MB)

Series	A	B	C	D	E	F	G	H	L	W	Bolt Size
SM-50/100B	.54	6.00	5.00	5.25	4.00	.41	.78	3.50	2.02 1.98	1.914 1.910	3/8" - 16x3/4" hex head
SM-180B	1.54	6.00	5.00	5.25	4.00	.41	.78	4.50	2.02 1.98	1.914 1.910	3/8" - 16x3/4" hex head
SM-210/250B	.80	9.00	7.75	8.00	6.00	.54	.78	5.26	3.13 3.12	3.865 3.855	3/8" - 16x1" socket head

Input Adapter Kit (For use with Super-Mod only)

Dimensional Data (In Inches)

Series	AK	A	B	C	Keyway	SL
SM-50/100A	4.50	2.78	1.41	.625/.624	3/16 x 3/32	1.785-2.014
SM-180A	4.50	2.84	1.41	.875/.874	3/16 x 3/16	1.792-2.022
SM-210A	8.50	3.33	1.78	1.125/1.124	1/4 x 1/4	2.439-2.489
SM-250A	8.50	3.87	2.41	1.375/1.374	5/16 x 5/16	2.929-2.979



Ordering Information and List Prices

Catalog Number	Part Number	Option	List Price Adder	Discount Symbol
Base Kits (Base Kits Cannot Be Used On Brake Only - 20 and 20MB)				
SM-50/100B	5-78-1101-01	SM-50 and SM-100 Series	\$ 56.00	X-8
SM-180B	5-78-1101-02	SM-180 Series	79.00	X-8
SM-210B	5-78-0001-30	SM-210 and SM-250 Series	120.00	X-8
Input Adapter Kits				
SM-50/100A	5-78-6100-31	SM-50 and SM-100 Series	174.00	X-8
SM-180A	5-78-6100-32	SM-180 Series	290.00	X-8
SM-210A	5-78-0000-23	SM-210 Series	548.00	X-8
SM-256A	5-78-0000-24	SM-250 Series	692.00	X-8

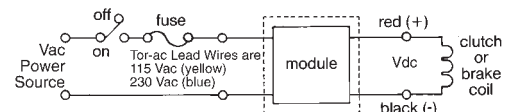
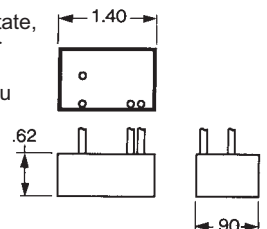
Rectifiers Performance/List Price Data

	Catalog Number	Part Number	AC Input Voltage	Nominal DC Output			List Price ③	Discount Symbol
				Volts	Max. Amps②	Max. Watts		
SM-Tor-ac®	SBC-100-1	4-1-20194-00K	115 50-60 Hz	100	.4	40	\$92.00	X-8
SM-Tor-ac®	SBC-200-1	4-1-20290-00K	230 50-60 Hz	100	.4	80	110.00	X-8

- ① Use with 90-100 Vdc "J" coils only.
- ② Based on ambient temperature of 149°F.
- ③ List prices subject to change without notice.

SM Tor-ac™ Kit

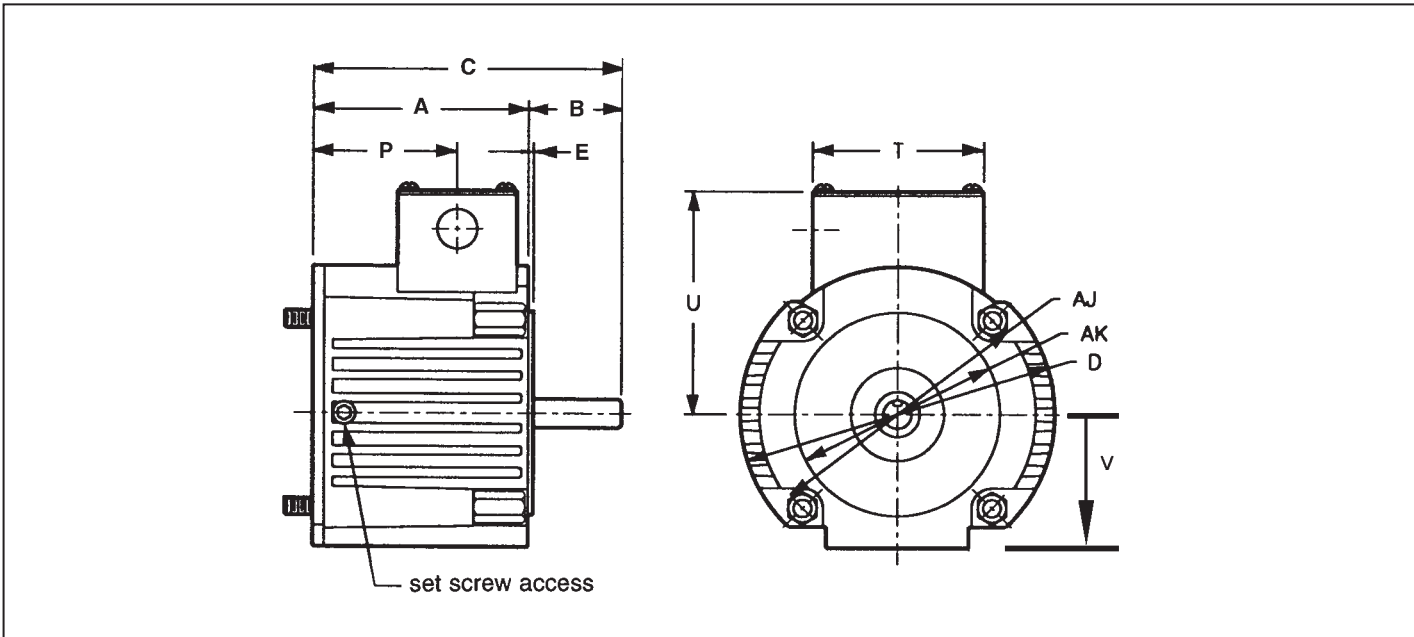
Single channel, solid-state, quick response rectifier circuit can be mounted in any SM unit. Lets you switch on the AC-side, with mechanical response times equal to traditional DC-side switching.



Super-Mod® Dimensional Data

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SM-1020, SM-1040, SM-20 and SM-20MB

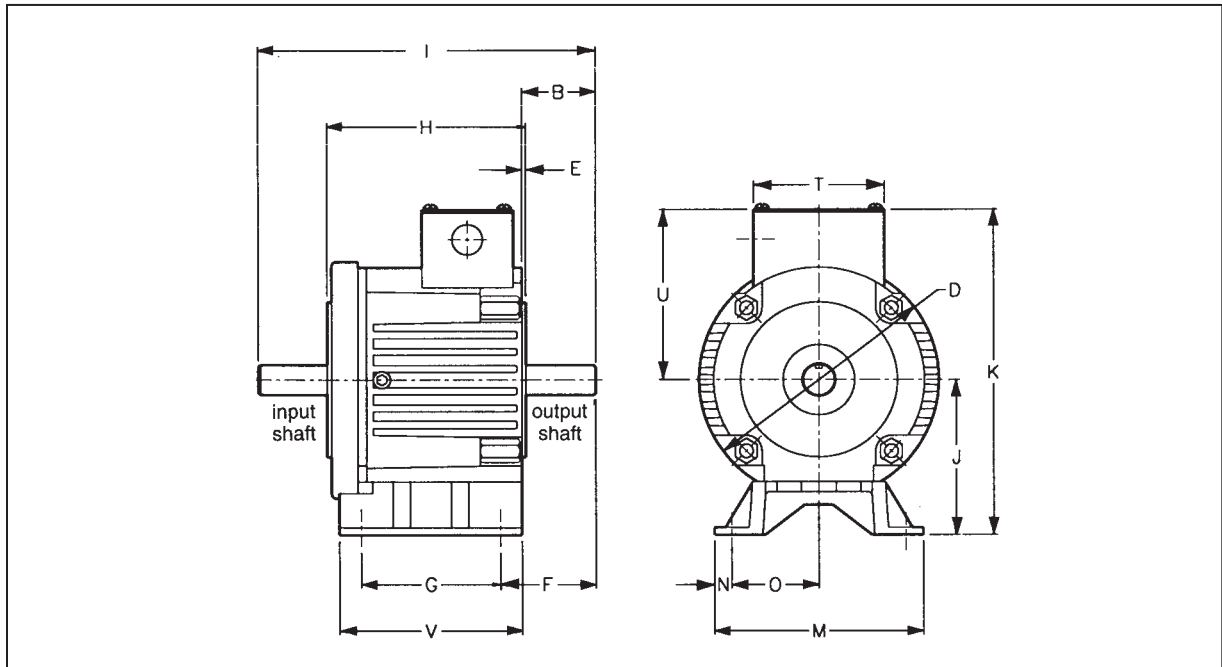


NEMA C-Face Frame Size	Configuration	Basic Module Style	Basic Model Number	AJ	AK	Hub Bore and Shaft Ø	Keyway	A	B	C	D	E	P	T	U	V
SM-50 SM-100 48Y/56C 5/8 hub bore 5/8 shaft	C-Face Clutch/Brake	1020	2-35-056X-0X-A*L	5.875	4.5	5/8	3/16 x 3/32	4.71	2.06	6.77	6.9	.16	3.15	2.8	4.9	3.0
	C-Face Clutch Only	1040	2-36-056X-0X-A*L													
	C-Face Brake Only	20	2-37-056X-0X-A*L					3.14	5.2	2.92						
	C-Face Brake Only without Shaft	20MB	2-37-056X-0X-X*L					-	-	-						
SM-180 145TC 7/8 hub bore 7/8 shaft	C-Face Clutch/Brake	1020	2-35-140X-02-A*O	5.875	4.5	7/8	3/16 x 3/32	4.71	2.12	6.83	6.9	.16	3.15	3.8	4.9	3.0
	C-Face Clutch Only	1040	2-36-140X-02-A*O													
	C-Face Brake Only	20	2-37-140X-02-A*O					3.14	5.25	1.58						
	C-Face Brake Only without Shaft	20MB	2-37-140X-02-X*O					-	-	-						
SM-210 182TC 184TC 1-1/8 hub bore 1-1/8 shaft	C-Face Clutch/Brake	1020	2-35-1801-03-A*R	7.25	8.5	1-1/8	1/4 x 1/8	6.11	2.59	8.7	9	.25	2.83	4	7.4	4.63
	C-Face Clutch Only	1040	2-36-1801-03-A*R													
	C-Face Brake Only	20	2-37-1801-03-A*R					4.61	7.2	2.17						
	C-Face Brake Only without Shaft	20MB	2-37-1801-03-X*R					-	-	-						
SM-250 213TC 215TC 1-3/8 hub bore 1-3/8 shaft	C-Face Clutch/Brake	1020	2-35-2101-04-A*U	7.25	8.5	1-3/8	5/16 x 5/32	6.11	3.03	9.14	9	.25	2.83	4	7.4	4.63
	C-Face Clutch Only	1040	2-36-2101-04-A*U													
	C-Face Brake Only	20	2-37-2101-04-A*U					4.61	7.64	2.17						
	C-Face Brake Only without Shaft	20MB	2-37-2101-04-X*U					-	-	-						

Super-Mod® Dimensional Data

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SM-2030B and SM-3040B



NEMA C-Face Frame Size	Configuration	Basic Module Style	Basic Model Number	Shaft ø	Keyway	B	D	E	F	G	H	I	J	K	M	N	O	T	U	V
SM50 SM100 48Y/56C 5/8 shaft	Base Mount Clutch/Brake- Double Shaft	2030B	2-35-056X-0X-D*L	5/8	3/16 x 3/32	2.06	6.9	.16	2.76	4	5.9	9.55	3.5	8.4	6	0.5	2.5	3.8	4.9	5.25
	Base Mount Clutch Only- Double Shaft	3040B	2-36-056X-0X-D*L	5/8	3/16 x 3/32															
SM-180 143TC 145TC 7/8 shaft	Base Mount Clutch/Brake- Double Shaft	2030B	2-35-140X-0X-D*O	7/8	3/16 x 3/32	2.12	6.9	.16	2.82	4	5.9	9.61	4.5	9.4	6	0.5	2.5	3.8	4.9	5.25
	Base Mount Clutch Only- Double Shaft	3040B	2-36-140X-0X-D*O	7/8	3/16 x 3/32															
SM-210 182TC 184TC 1-1/8 shaft	Base Mount Clutch/Brake- Double Shaft	2030B	2-35-1801-03-D*R	1-1/8	1/4 x 1/8	2.59	9	.25	3.41	6	6.91	12.09	5.25	12.65	9	0.63	3.87	4	7.4	8
	Base Mount Clutch Only- Double Shaft	3040B	2-36-1801-03-D*R	1-1/8	1/4 x 1/8															
SM-250 213TC 215TC 1-3/8 shaft	Base Mount Clutch/Brake- Double Shaft	2030B	2-35-2101-04-D*U	1-3/8	5/16 x 5/32	3.03	9	.25	3.88	6	6.91	12.97	5.25	12.65	9	0.63	3.87	4	7.4	8
	Base Mount Clutch Only- Double Shaft	3040B	2-36-2101-04-D*U	1-3/8	5/16 x 5/32															