

ADJUSTABLE SPEED DRIVES

“AS” Drives 1 through 40 HP Models AS-14 Through AS-27



Description

AS Drives are a combination of an air-cooled, adjustable speed clutch and an integrally mounted NEMA B, AC induction motor. The Drive transmits constant torque at variable speeds. There is no physical contact between input and output members. This results in smooth response, thereby eliminating shock loading and extending equipment life. All drives have a C-Face endbell on both ends, TEFC Construction and an internal tachometer generator mounted around the output shaft to provide a feedback signal to the drive's controller. The controller provides the DC excitation for the clutch coil. The feedback signal from the tachometer generator is compared to a reference signal within the controller to maintain accurate speed regulation.

Features & Benefits

- AC power input. Drives and controllers are available to run on virtually any 3-phase voltage input. They are compatible with existing wiring and plant power.
- Approximately 250% motor torque available at clutch output. This accelerates high inertia loads quickly and handles intermittent overloads without having to increase the horsepower rating.
- Simple design. Drive consists of a clutch, AC induction motor and separate controller. They are easy to understand, install, operate and maintain.
- Fewer wearing parts. All drives have four bearings, no slip rings or brushes. Minimum downtime and maximum production from initial startup.
- 0.5% speed regulation is standard. Provides a consistent, high-quality customer product under changing load and environmental conditions.
- Easy to retrofit in industrial environments.
- Controller circuits are transformer isolated from power lines. Electronic controller is immune to line noise.
- Stationary clutch coil design is standard and suitable for harsh industrial environments.
- Controller operates on less than 2% of input power. No need for costly, full power conversion units.

Torque control provides constant voltage to the clutch coil. Since clutch torque is a function of this current or voltage, the magnitude of clutch torque is then dependent on the operator's setting of the Torque potentiometer. Speed control is entirely absent with this modification. A special operator's station is required. Added braking options are available. Consult factory for details.

ADJUSTABLE SPEED DRIVES

Specifications for AS-14 Through AS-27 Drives

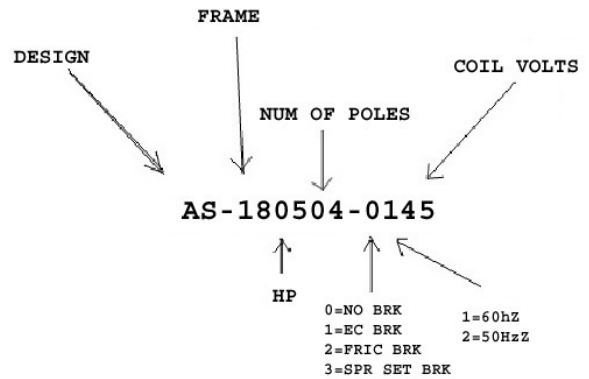
Motor	HP and RPM Totally Enclosed Fan Cooled NEMA design B Class F insulation, class B rise 1.15 service factor Frame type Input Power Options	See selection table on next page Standard; ODP - Optional Standard Standard Standard Common housing - Standard 208/220 through 380V, 3 phase, 50 Hz 230 through 460V, 3 phase, 60 Hz 575V, 3 phase, 60 Hz
Clutch	Coil voltages Rated for constant torque Starting torque Intermittent torque AC tachometer generator Cooling	45 and 90 VDC - Standard; 110, 220 VDC - Optional Standard Approximately 250% Approximately 250% Standard 100% self ventilated at all times -Standard
Controllers (Sold separately)	Model 3000 and Model 4000 (Solid State) Model 4050, DSI-700 and Mark III (Solid State) EC-2000 and PDC-2000 (Digital) Closed loop speed control Speed regulation Regulated speed range Input power Enclosure Panel mount, open construction Output voltage, to clutch coil	Can be used with AS-14 through AS-25 Can be used with AS-14 through AS-27 Can be used with AS-14 through AS-27 Standard 0.5% standard; 0.1% optional (EC-2000 only) 34 to 1 available 115 VAC Motor transformer winding (Standard Models only) – Standard; Line transformer – Optional NEMA 1 - Standard; NEMA 12 - Optional; NEMA 13 for 4000 & 4050 - Standard Optional 45 VDC or 90 VDC standard; 220 VDC optional (EC-2000 only)
Status Indication	Speed indicating signal	0-60 VAC from tachometer generator for optional meter.
Environmental Ratings	Storage temperature Operating temperature Maximum operating temperature Altitude	-4° to 149° F (-20° to 65° C) Standard 32° to 104° F (0° to 40° C) Standard 65° C - Optional 3300 Ft. (1000m) Standard
Codes and Standards	Mechanical NEMA, as applicable	Standard
Reliability Testing	Mechanical 100% dynamometer tested Controllers (sold separately) Pre-tested components Computer test and pre-calibrated PCBs	Standard Standard Standard

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“AS” Drives Ordering Information

Selection Table – 60 Hz, 45V & 90V Coils

HP	Speed Range (RPM)	Model Number
1	1730-0	AS-140104-01*
	1095-0	AS-140106-01*
1.5	1695-0	AS-140154-01*
	1130-0	AS-180156-01*
2	1640-0	AS-140204-01*
	1120-0	AS-180206-01*
3	1710-0	AS-180304-01*
	1105-0	AS-180306-01*
5	1670-0	AS-180504-01*
	1115-0	AS-210506-01*
7.5	1670-0	AS-210754-01*
	1140-0	AS-250756-01*
10	1650-175	AS-211004-01*
	1120-0	AS-251006-01*
15	1660-0	AS-251504-01*
	1110-0	AS-271506-01*
20	1660-440	AS-252004-01*
	1710-0	AS-272004-01*
	1080-100	AS-272006-01*
25	1690-0	AS-272504-01*
	1090-320	AS-272506-01*
30	1665-150	AS-273004-01*
0	1665-560	AS-274004-01*



*The last two digits of the model code represent the 0145 and 0190 coils.

ADJUSTABLE SPEED DRIVES

“AS” Drives Engineering Data

Adjustable Speed Drive Data

Model	Clutch Torque Lb. Ft. at Slip RPM of ¹					Rated Dissipation HP at Input RPM of ²					Inertia Lb. Ft. Sq. Output Member
	50	75	100	150	1750	900	1000	1200	1500	1800	
AS-14	4.0	5.5	7.0	9.0	25.0	1.0	1.0	1.1	1.6	2.0	.86
AS-18	10.0	14.0	16.0	21.0	46.0	2.5	2.6	3.1	4.1	5.0	1.96
AS-21	19.0	25.0	32.0	40.0	74.0	4.5	4.8	5.8	7.5	9.0	3.59
AS-25	42.0	56.0	68.0	82.0	120.0	7.5	8.0	9.6	12.4	15.0	6.22
AS-27 ⁴	50.0	75.0	88.0	110.0	215.0	13.7	15.2	18.3	22.8	27.4	16.00

Adjustable Speed Drive Data

Model	Overhung Load Lbs. at Output RPM of ³			45V Clutch Coil Current (Hot Amps)	Weight Lbs.
	900	1200	1800		
AS-14	390	390	380	3.40	157
AS-18	600	550	470	3.90	277
AS-21	725	675	560	3.88	412
AS-25	1125	1020	880	4.18	610
AS-27 ⁴	1510	1350	1155	7.20	1080
AS-27 ⁵	1465	980	805	7.20	1090

¹ Values are for four-pole motor speeds

² Indicates maximum HP that can be safely dissipated at a given input speed. Dissipation should be de-rated 10% for each 10° F above 100° F ambient, to 150° F maximum ambient.

³ Values are based on B-10 bearing life of 15,000 hours. For 20,000 hours use 91% of the values shown. The figures are the maximum weights at the center of a standard output shaft keyway perpendicular to the axis. Ratings are for ball bearings unless otherwise noted.

⁴ AS-27 with 1.875" shaft diameter

⁵ AS-27 with 2.125" shaft diameter.

AS DRIVE MODIFICATIONS

- **Base, Slide** - Adjustable slide bases are available for the horizontal mounting of an AS drive.
- **Brake, Adjustable Torque** - An adjustable torque brake is flange mounted to the drive for stopping purposes or for use with the Mutuatrol® controller modification. Brakes require a brake circuit in the controller. Factory mounted on motor end standard.
- **Brake, Friction** - An electromagnetic friction brake is flange mounted to the drive for stopping or holding purposes. Brakes require a brake circuit in the controller. Factory mounted on motor end standard.
- **Brake, Friction, with Thru Shaft** - For cases where the motor end is already being used, the friction brake is mounted on the clutch end with a "thru" shaft arrangement (NOTE: "thru" shaft arrangement is factory installed only).
- **Brake, Spring-Set** - A spring engaged, electrically released friction brake is flange mounted to the drive. These brakes are suitable for holding purposes. Brakes require a brake circuit in the controller (not for use with the model 3000 controller). The standard voltage supplied will be 115 VAC; other voltages are available by consulting the factory; with other voltages, the customer must supply relay and interfacing. Factory mounted on motor end standard.
- **Cover, Vertical Drip** - A kit will be installed or provided with a sheet metal drip cover to prevent water from falling into the unit. Available as a ship loose item only.

ADJUSTABLE SPEED DRIVES

“AS” Drives Brake Engineering Data

Adjustable Torque (Eddy Current) Brake Data

Model	Brake Torque in Lb. Ft. at Output RPM of			Brake Dissipation HP at Brake RPM of					Brake Inertia Lb. Ft.	Brake Coil 45V Current (Hot Amps)	*Approx. Weight
	900	1200	1800	300	600	900	1200	1800			
AS-14	5.4	6.0	6.6	.15	.3	.5	.7	1.0	.13	1.84	177
AS-18	26.0	28.0	30.0	.50	1.0	1.5	2.0	3.0	.60	2.49	322
AS-21	30.0	32.0	34.0	.50	1.0	1.5	2.0	3.0	.60	2.49	457
AS-25	40.0	60.0	60.0	.80	1.7	2.5	3.3	5.0	1.96	3.47	690
AS-27	65.0	70.0	100.0	1.90	3.2	3.7	4.9	7.3	1.75	3.51	1180

Friction Brake Data

Model	Electrically Engaged		*Approx. Weight
	Static Torque Lb. Ft.	Inertia Lb. Ft.	
AS-14	40	.054	177
AS-18	40	.054	322
AS-21	80	.371	457
AS-25	80	.371	690
AS-27	240	.967	1180

Spring Set Brake Data

Model	Spring Set Electrically Released Static Torque Lb. Ft.	*Approx. Weight
AS-14	15	177
AS-18	25	322
AS-21	35	457
AS-25	70	690
AS-27	175	1180

Adjustable Torque & Friction Brake Data

Model	Overhung Load in Lbs. At Output RPM of 1800 Std.	*Approx. Weight
AS-14	235	197
AS-18	310	367
AS-21	550	502
AS-25	565	770
AS-27	700	1280

*Approximate weight includes the weight of the drive.

ADJUSTABLE SPEED DRIVES

“AS” Drives Engineering Data

Induction Type, 3 Phase AC Motors, 4 Pole, Squirrel Cage NEMA Design B

The full load motor currents shown in the table below are typical values for AS-14 through AS-27, 4 pole drives. This table is intended for use as an aid in sizing motor branch circuit components.

For full load motor currents of and 208-volt motors, increase the corresponding 230-volt motor full load current by 15% and 10% respectively.

Full Load Currents

HP	Full Load Amperes		
	230 Volt	460 Volt	575 Volt
1	5.4	2.7	2.2
1.5	6.0	3.0	2.5
2	7.0	3.5	2.8
3	9.4	4.7	3.8
5	14.6	7.3	5.8
7.5	20.4	10.2	8.2
10	28.4	14.2	11.7
15	41.0	20.5	16.4
20	55.0	27.5	22.0
25	68.0	34.0	27.2
30	74.0	37.0	29.6

Noise Levels, Drives Model AS Drives

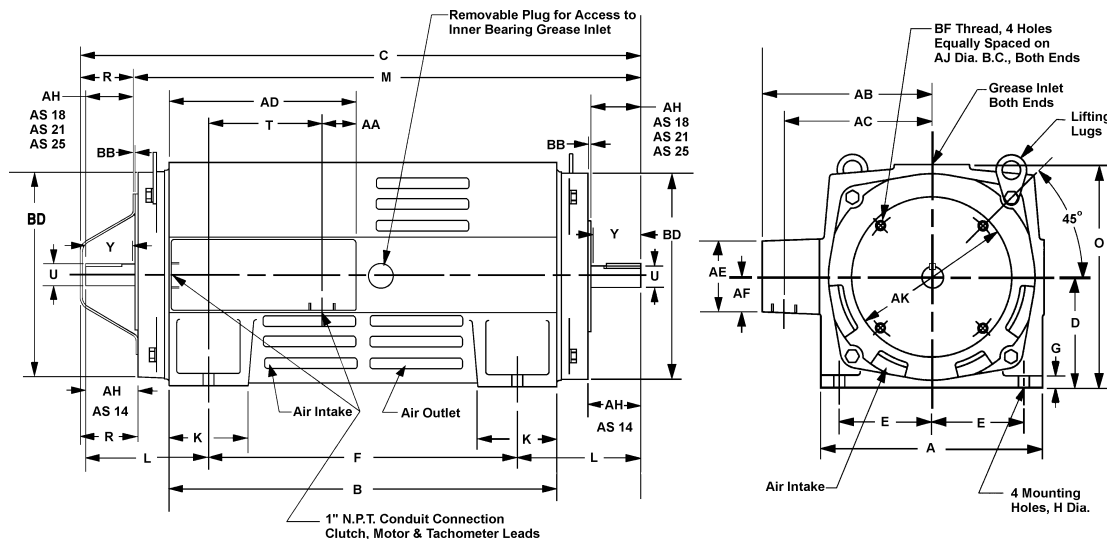
These sound pressure levels are **typical** values given for engineering information only, and it is **not guaranteed** that any particular production unit will not exceed these values. Microphone 3 feet from side of drive, tested in a semi-anechoic chamber above reflecting plane per IEEE-85 spec. All readings are sound pressure level, dB; reference 20 micro-Newton's per square meter. Average sound pressure in a 3-foot radius hemispherical free field. Noise level for 1200 RPM drives will be 8 dB less than 1800-RPM values shown, and for 3600 RPM the noise level will be 15 dB greater.

Noise Levels

Model	Sound Pressure dB			
	RPM	A Scale	B Scale	C Scale
AS-14	1800	66.3	-	70.0
AS-18	1800	70.2	-	74.5
AS-21	1800	75.3	-	79.1
AS-25	1800	80.5	-	83.9
AS-27	1800	82.0	-	85.1

ADJUSTABLE SPEED DRIVES

“AS” Drives Outline Drawings “C” Flange - AS-14 through AS-25



AS	A	B	C	D ¹	E	F	G	H	K	L	M	O	R	T
14	9.00	15.72	22.72	4.50	3.75	12.52	.50	.50	3.20	5.00	20.38	9.06	2.34	4.67
18	10.50	17.60	27.90	5.25	4.25	13.75	.50	.50	3.75	6.25	23.60	10.75	4.05	4.43
21	12.50	18.60	30.27	6.25	5.00	14.12	.62	.62	3.56	7.62	26.22	12.62	4.05	5.58
25	14.00	17.75	32.84	7.00	5.50	15.06	.62	.62	3.30	8.75	28.79	14.38	4.05	6.20

AS	AA	AB	AC	AD	AE	AF	AH	AJ	AK ⁴	BB	BD	BF	WT
14	1.32	7.06	6.00	7.50	2.88	1.48	2.12	5.88	4.499	.12	8.38	3/8-16	157
18	2.06	7.80	6.74	8.32	2.88	1.48	2.62	7.25	8.499	.25	10.06	1/2-13	277
21	1.38	8.87	7.57	8.81	3.76	1.92	3.12	7.25	8.499	.27	11.88	1/2-13	412
25	1.62	9.87	8.57	8.81	3.76	1.92	3.75	7.25	8.499	.27	13.32	1/2-13	610

AS	Shaft Extensions		
	U ²	Y ³	Key
14	.8750	1.94	.18 Sq. x 1.38 Lg.
18	1.1250	2.50	.25 Sq. x 1.75 Lg.
21	1.3750	3.00	.31 Sq. x 2.38 Lg..
25	1.6250	3.62	.38 Sq. x 2.88 Lg.

Overall dimension on units with modifications will be the total of **M** dimension plus **R** dimension. Unit may be operated vertically (prefer motor end output shaft up).

¹ **D** dimension will never be exceeded. When exact dimension is needed shims up to .03 inch may be required.

² **U** shaft diameter tolerance 1.50 inches and smaller: +.0000/-.0005 inch, over 1.50 inches: +000/-.001 inch.

³ **Y** dimension is maximum usable shaft length.

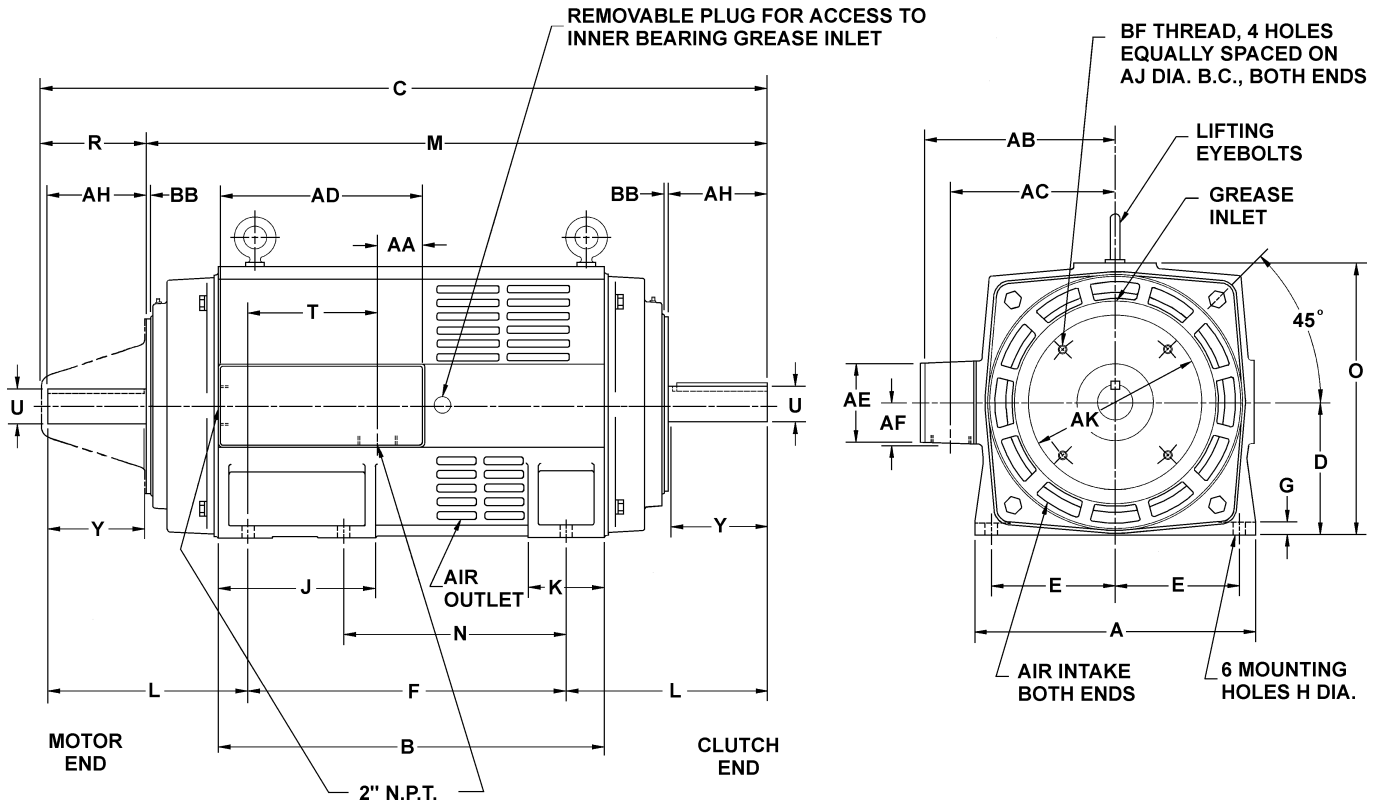
⁴ **AK**, pilot diameter tolerance +.000/-.002 inch.

AJ, **AK** and **KEY** dimension are the same for both ends.

DIMENSIONS ARE IN INCHES

ADJUSTABLE SPEED DRIVES

“AS” Drives Outline Drawings “C” Flange - AS-27



AS	A	B	C	D ¹	E	F	G	H	J	K	L	M	N	O	R
27	17.00	23.38	39.60	8.00	7.50	19.26	.75	.75	9.50	4.63	10.00	35.43	13.50	16.41	4.17
27 ^{5E}	17.00	23.38	43.94	8.00	7.50	19.26	.75	.75	9.50	4.63	12.17	37.60	13.50	16.41	6.34

AS	Shaft Extensions			AB	AC	AD	AE	AF	AH	AJ	AK ⁴	BB	BF	WT
	U ²	Y ³	Key											
27	1.875	3.83	.50 Sq. x 3.50 Lg..	12.73	10.72	12.25	4.75	2.46	3.83	9.00	10.499	.25	½ -13	1080
27 ⁵	2.125	6.00	.50 Sq. x 5.50 Lg..	12.73	10.72	12.25	4.75	2.46	6.00	9.00	10.499	.25	½ -13	1090

Overall dimension on units with modifications will be the total of **M** dimension plus **R** dimension. Unit may be operated vertically (prefer motor end output shaft up).

¹ **D** dimension will never be exceeded. When exact dimension is needed shims up to .03 inch (.76 mm) may be required.

² **U** Shaft diameter tolerance +.000/-.001 inch.

³ **Y** dimension is maximum usable shaft length.

⁴ **AK**, pilot diameter tolerance +.000/-.002 inch. **AJ**, **AK** and **KEY** dimension are the same for both ends.

⁵ These dimensions with the large shaft diameter and length are standard only on Model AS-274004-01. All other AS-27 units will be supplied with the smaller shaft unless specifically ordered.

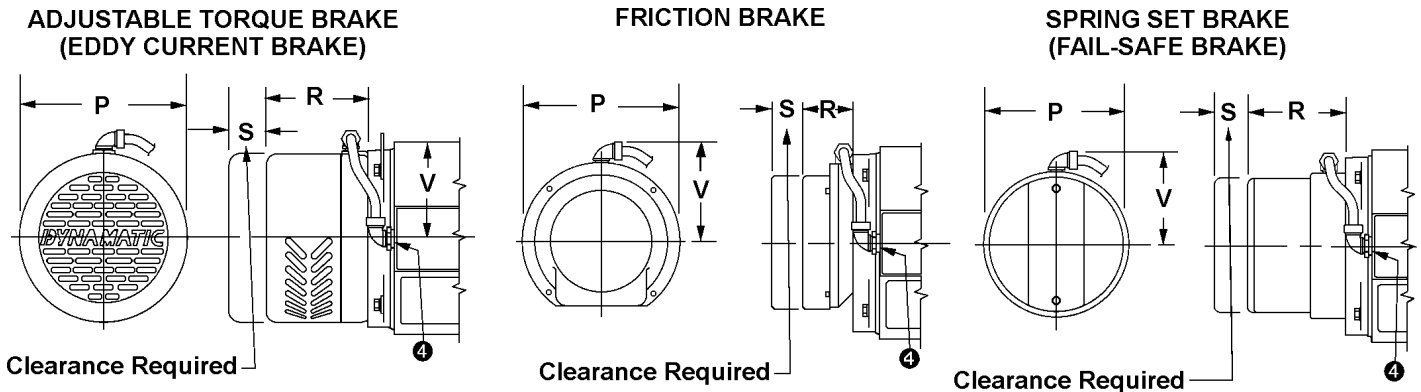
All units below 40 HP will have 1.875 inch diameter shaft extension unless special ordered.

All units 40 HP and above will have 2.125 inch diameter shaft extension unless special ordered.

DIMENSIONS ARE IN INCHES

ADJUSTABLE SPEED DRIVES

“AS” Drives Modification Drawings - AS-14 through AS-27



AS	Brakes												Vert. AG	Labyr. Seal FY ³
	Adjustable Torque				Friction				Spring Set					
	P	R ¹	S ²	V	P	R ¹	S ²	V	P	R ¹	S ²	V		
14	7.38	4.69	2.92	5.19	7.42	2.46	1.10	4.96	6.82	4.62	3.12	4.50	15.75	1.48
18	9.50	5.84	4.56	6.19	7.42	3.11	1.10	4.96	9.00	6.62	4.00	5.75	18.88	2.18
21	9.50	5.84	4.56	6.19	11.52	4.45	2.68	6.00	9.00	6.62	4.00	5.75	18.88	2.68
25	10.88	7.31	6.06	6.88	11.52	4.45	2.68	6.00	9.00	7.87	4.00	5.75	18.88	3.34
27	15.68	5.81	1.50	9.12	12.16	4.72	2.25	6.08	11.00	8.50	4.00	6.75	22.00	3.39
27 ⁵	15.68	8.00	3.67	9.12	12.16	-	-	-	11.00	-	-	6.75	22.00	5.56

¹Overall dimension with modifications will be the total of **M** (previous page) dimension plus **R** dimension of the modification.

²**S** dimension is clearance to remove the cover.

³**FY** dimension is the maximum usable shaft length. Seal shortens the usable shaft length, **Y**.

⁴**1 N.P.T** conduit connection for clutch, motor, brake and tachometer leads at bottom of junction box.

⁵See **NOTE 5** on AS-27 dimensions, Page 19.

Overall dimensions are subject to change.
DIMENSIONS ARE IN INCHES