A&A POLYCLUTCH®
A Division of A&A Manufacturing Co. Inc.

DESIGN GUIDE: PRECISION SLIP CLUTCHES

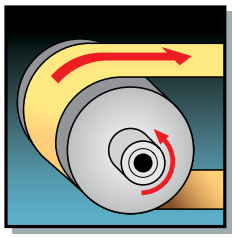
- Continuous Slip Mechanical Clutches
- Pneumatic Slip Clutches
- Jaw Clutches
- One Way Clutches

halltech.com

CONTINUOUS SLIP CLUTCHES

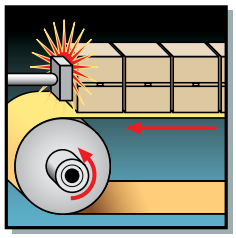
SOLVE MANY DESIGN ENGINEERING PROBLEMS

Polyclutch® slip clutches can slip continuously or intermittently for over 30 million cycles. This opens up many design engineering options including...



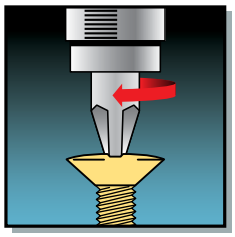
TENSION CONTROL

Maintain constant tension while winding or unwinding wire, paper, film, thread, etc. Slip clutch automatically compensates for changes in speed and diameter. Pneumatic clutch can change tension during operation.



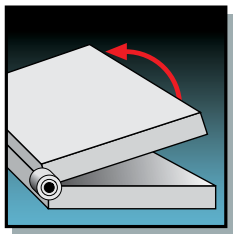
FORCE CONTROL

Push product against gate with constant force. Remove gate and move to next position. No damage to product or conveyor – clutch does all the slipping. Also used for overload protection when jammed and for indexing the conveyor.



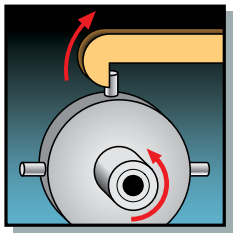
TORQUE CONTROL

Screw bottle caps, screws, controls, etc., to correct torque setting. Combine with one way clutch to slip at rated torque in one direction and freewheel or positive drive in other direction.



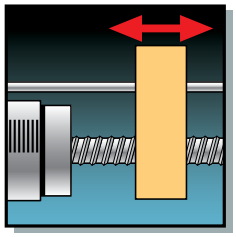
POSITION RETENTION AND BRAKE

Hold lid, cover, door, screen, etc., at any position. Fingertip control. Combine with one way clutch for free movement in one direction.



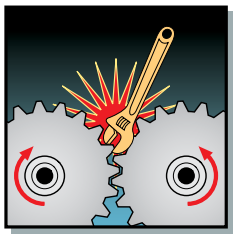
INDEXING

Hold index wheel with solenoid operated pin. Motor runs continuously with clutch slipping. Pin pulls back to index to next station. Can be single or partial revolution. Can index tables, conveyors, vending machines, controls, etc.



SOFT STARTS/CUSHIONED STOPS

Inertia makes clutch slip when starting and/or stopping. Results in less shock throughout the system. Ideal for slip at the end of stroke.



OVERLOAD PROTECTION

Protect machinery and operator. Clutch will slip when mechanism is jammed. Motion will continue when impediment is removed.

ABOUT POLYCLUTCH® PRECISION CLUTCHES

POLYCLUTCH ELIMINATES STICTION

Polyclutch has developed a unique technology and manufacturing process resulting in static friction being lower than dynamic friction. This characteristic generates repeatable torque control and smooth operation while slipping.

- No sudden shock on sensitive paper, film, wire, thread, etc.
- Repeatable cushioned torque for protection during overload
- Ideal for friction hinges when smooth movement of lids, doors, screens, covers, etc., is required
- Smooth, accurate starting/stopping of conveyors, indexing mechanisms, linear actuator, etc.
- Repeatable accurate torque for capping machines, automatic screw driving, valve control, etc.

Our proprietary burn-in process ensures that all Polyclutch slip clutches will perform consistently right out of the box, with no break-in period required.

APPLICATIONS:

- Overload Protection (machine and personnel safety)
- Torque Control (bottle capping, fastener driving)
- Tension Control (printing, stamping, feed and take-up reels)
- Brake – Position retention (covers)

A GREAT ALTERNATIVE TO:

- Servo-Motors: our solution costs less
- Magnetic Clutches: smaller, less expensive
- Ball detent: no clicking, no reset required
- Torque limiters: consistent repeatability, continuous
- Electronic protection only: added mechanical safety in electronically controlled systems

KEY BENEFITS:

- Smooth Breakaway and continuous slip
- Long life of 20 to 30 million cycles in slip condition
- Torque range from 0.5 lb-in to 750 lb-in
- Fixed, adjustable and custom designs
- Clutches are bi-directional
- No lubrication needed
- Made in the USA

LIMITATIONS:

- Maximum 1.25” shaft size on a through-shaft
- Not to be used as a universal joint or a spring coupler
- Does not de-couple at overload
- Cannot be exposed to radiation
- Contact a Polyclutch application specialist if slip clutch would be directly exposed to weather or wash down

APPLICATION EXAMPLES

POLYCLUTCH EXTENDS MACHINERY LIFE

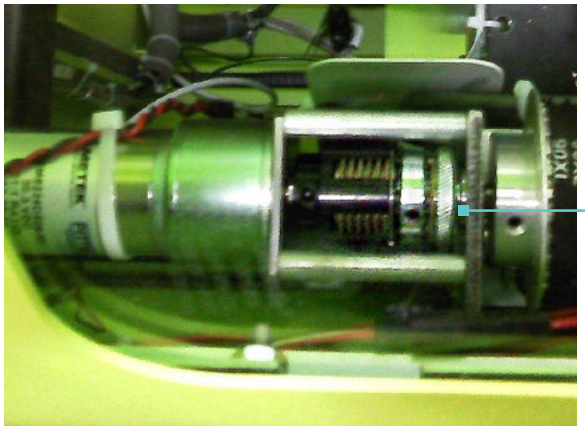
Polyclutch® adjustable slip clutches control the precise amount of torque to tighten bottle caps, without wear or breakage, in this capping line application. All the slippage is in the clutch, with no appreciable wear.

CONSTANT TORQUE GIVES YOU THE SLIP

A slip clutch acts as a continuous drag brake to meet the specific torque requirement for this unwind/rewind system application in a DATAMAX® bar code printer.

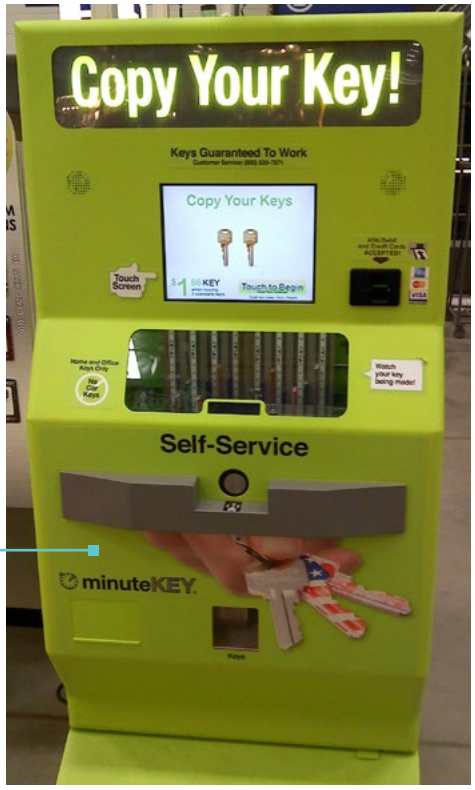
Other applications apply constant tension to film, wire, thread, paper, etc.

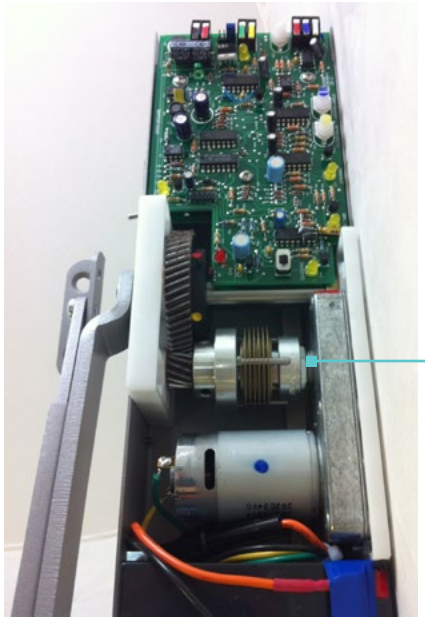
APPLICATION EXAMPLES

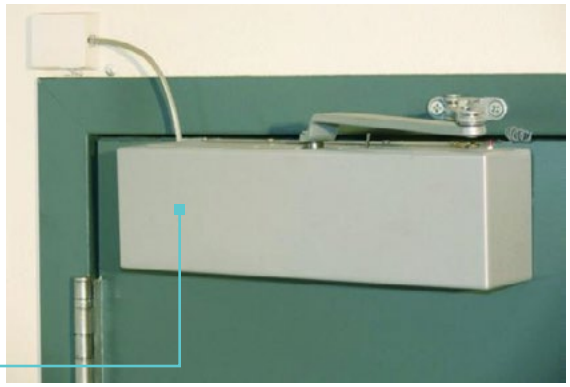


AUTOMATED KIOSKS

Polyclutch® slip clutches are an integral part of many retail kiosks. As shown in this photo, a slip clutch is used to protect the sensitive drive mechanisms of these automated machines.







HANDICAP ACCESSIBILITY EQUIPMENT

A Polyclutch® slip clutch provides safety in many handicap accessibility applications, as seen in this photo, where it is being used for overload protection in an automated door opener.

APPLICATION EXAMPLES

ICE-DISPENSING MACHINES

Hidden deep inside of this ice-making machine, a Polyclutch® slip clutch prevents overload to the drive mechanism during the forming and dispensing of ice cubes.

RETAIL VENDING KIOSKS

A Polyclutch® protects this machine against any type of overload or jamming during the process of dispensing a DVD.

MRI BEDS

Polyclutch® adds a mechanical safety for moving MRI beds as seen in this picture.

APPLICATION EXAMPLES

CONVEYORS

Polyclutch® slip clutches offer an added level of safety and protection to both the machine and its operators.

LABEL PRINTERS

Polyclutch® slip clutches are the perfect solution for adding just the right amount of tension to any reel or spool without having to worry about the tension varying over time or wearing out prematurely.

MILITARY & LAW ENFORCEMENT INSPECTION ROBOTS

The Machine Lab, Inc., an industry leader in defense robotics, uses two Polyclutch slip clutches in each robot arm for overload protection.

SLIP CLUTCH LINE OVERVIEW

HOW TO DETERMINE THE PERFECT CLUTCH FOR YOUR APPLICATION

Three factors in determining the right clutch are: the maximum shaft size, torque capacity of the clutch, and wattage capacity. Maximum wattage capacities are listed for each model in the Series specifications. Please consider the limitations listed below for each type of clutch.

Note: For torque adjustment while clutch is in use (remote torque adjustment), see the **SLIP-AIRE** clutches.

SERIES 16 (MINIATURE SLIPPERS)..... pg. 8

- Most compact model
- Can accommodate shaft sizes up to 0.375 inches
- Torque capacity up to 10 lb-in
- Available in a fixed torque or adjustable torque configuration

Series 16

SLIPPERS..... pg. 9-10

- Our standard-duty clutch
- Can accommodate shaft sizes up to 1 inch
- Torque capacities of up to 100 lb-in
- Available in a fixed torque or adjustable torque configuration

Slipper

V-SERIES SLIPPERS..... NEW pg. 11-12

- Torque control for driving, capping and other applications where thrust loads are applied
- Can accommodate shaft sizes up to 1 inch
- Horizontal and vertical installation without driveshaft modifications
- Integrated ball bearing allows thrust loads of up to 650 pounds without any effect on torque
- Torque capacities of up to 150 lb-in

V-Series Slipper

SLIP-EASE..... pg. 13-14

- For applications where space is at a premium and low backlash is required
- Can accommodate shaft sizes up to 1.25 inches
- Torque capacities of up to 500 lb-in
- Available in a fixed torque or adjustable torque configuration

Slip-Ease

SLIP-AIRE..... pg. 15-16

- Pneumatic slip clutch
- Can be adjusted remotely while the machine is in operation to accomplish quick, repeatable, accurate setup
- Can accommodate shaft sizes up to 0.625”
- Torque capacities of up to 300 lb-in

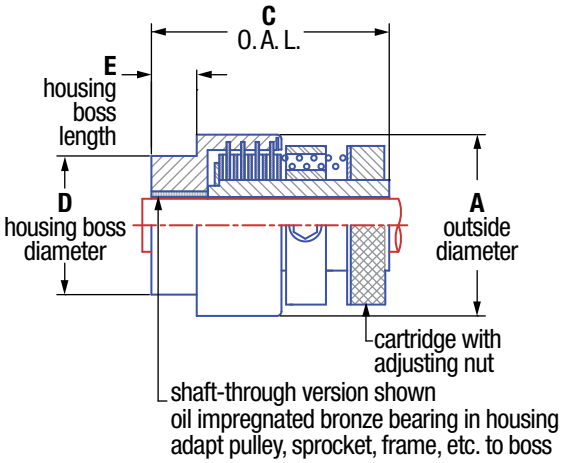
Slip-Aire

MECHANICAL SLIP CLUTCHES

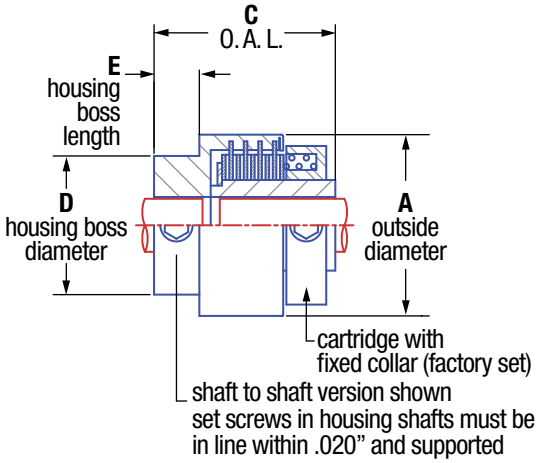
SERIES 16 (MINIATURE SLIPPERS)

Our most compact model features big torque in a small package.

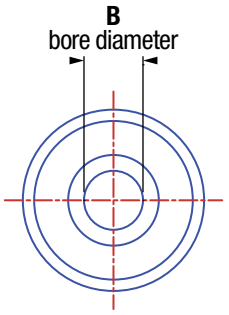
ADJUSTABLE
SAO SAS PAO PAS
SAO SHOWN



FIXED
FACTORY SET - NON ADJUSTABLE
SFO SFS PFO PFS
SFS SHOWN



END VIEW
TYPICAL



See pages 17-18 for slip clutch operation (construction, installation, capacity) and mounting options.

[S.A.E.]		+.002 / -.000 IN					Capacity @ 50 RPM		Friction
Model Number	A	B std.	B max.	C	D	E	lb-in	Watts	Surfaces
SFS 16 & SFO 16 SAS 16 & SAO 16	1.00	.250	.375	1.00 1.31	.760	.25	10	6	8
PFS 16 & PFO 16 PAS 16 & PAO 16	1.00	.250	.375	.78 1.06	.760	.25	2	1	2

[METRIC]		+.05 / -.00 MM					Capacity @ 50 RPM		Friction
Model Number	A	B std.	B max.	C	D	E	Nm	Watts	Surfaces
SFS 16 & SFO 16 SAS 16 & SAO 16	25.40	8	10	25.40 33.27	19.30	6.35	1.2	6	8
PFS 16 & PFO 16 PAS 16 & PAO 16	25.40	8	10	19.81 26.92	19.30	6.35	.3	1	2

PART NUMBER EXAMPLE (see p. 19 for part no. identification)

P F S 16 - 4 T*

1 2 3 4 5

- 5: 4/16 = .250" bore dia. in clutch cartridge and housing
- 4: Size 16 = 16/16 (1" outside dia.)
- 3: Shaft to shaft installation type
- 2: Fixed torque (factory preset)
- 1: Single-Plate Slipper

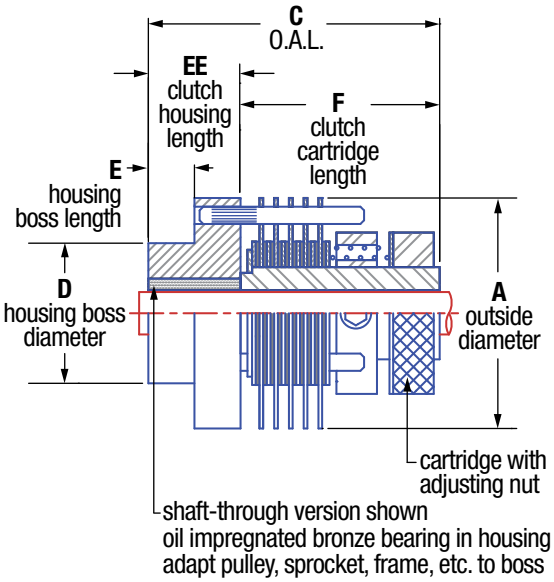
*T= Preset Torque Value

MECHANICAL SLIP CLUTCHES

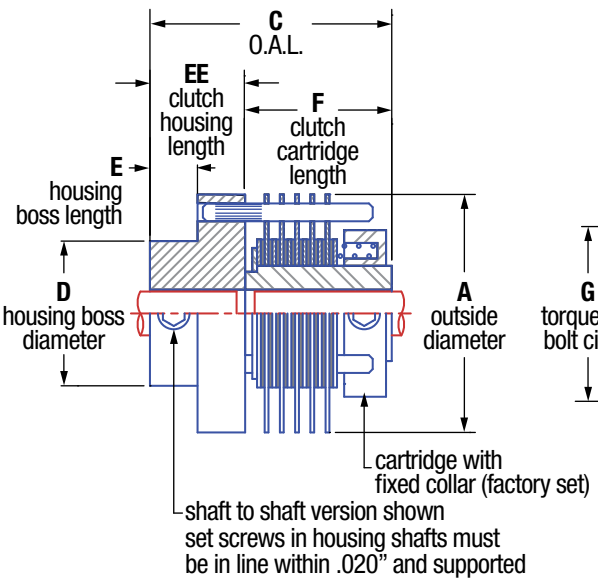
SLIPPER

The Polyclutch® slipper controls torque for intermittent, continuous or overload slip. It contains a number of brass plates interfaced with long life friction material. Soft springs maintain pressure on the friction plates, assuring constant torque. An adjacent component of your mechanism can often be used as the clutch housing reducing overall cost or space concerns. Torque control in one direction can be achieved by combining with our one-way clutch.

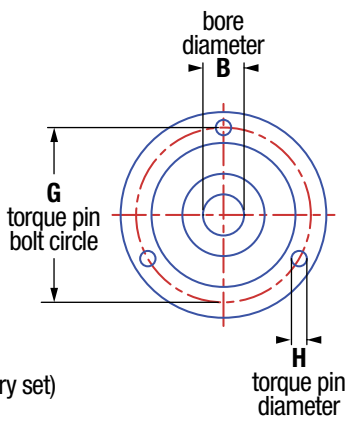
ADJUSTABLE
SAO SAS PAO PAS
SAO SHOWN



FIXED
FACTORY SET - NON ADJUSTABLE
SFO SFS PFO PFS
SFS SHOWN



END VIEW
TYPICAL



NOTE: MULTI-PLATE CLUTCHES SHOWN. SINGLE-PLATE CLUTCH SUPPLIED WITH ONE SET OF FRICTION PLATES AND PADS.

PART NUMBER EXAMPLES (see p. 19 for part no. identification)

S A O 32 - 10

1 2 3 4 5

- 5: $10/16$ = .625" bore dia. in clutch cartridge and housing
- 4: Size 32 = $32/16$ (2" outside dia.)
- 3: Shaft-through installation type
- 2: Adjustable torque
- 1: Multi-Plate Slipper

P F S 44 - 12mm - 14mm* T**

1 2 3 4 5 6

- 6: 14 mm bore dia. in housing
- 5: 12 mm bore dia. in clutch cartridge
- 4: Size 44 = $44/16$ (2.75" outside dia.)
- 3: Shaft to shaft installation type
- 2: Fixed torque (factory preset)
- 1: Single-Plate Slipper

*Housing bore size needed only if different than cartridge bore size.
**T= Preset Torque Value

SLIPPER SPECIFICATIONS

See pages 17-18 for slip clutch operation (construction, installation, capacity) and mounting options.

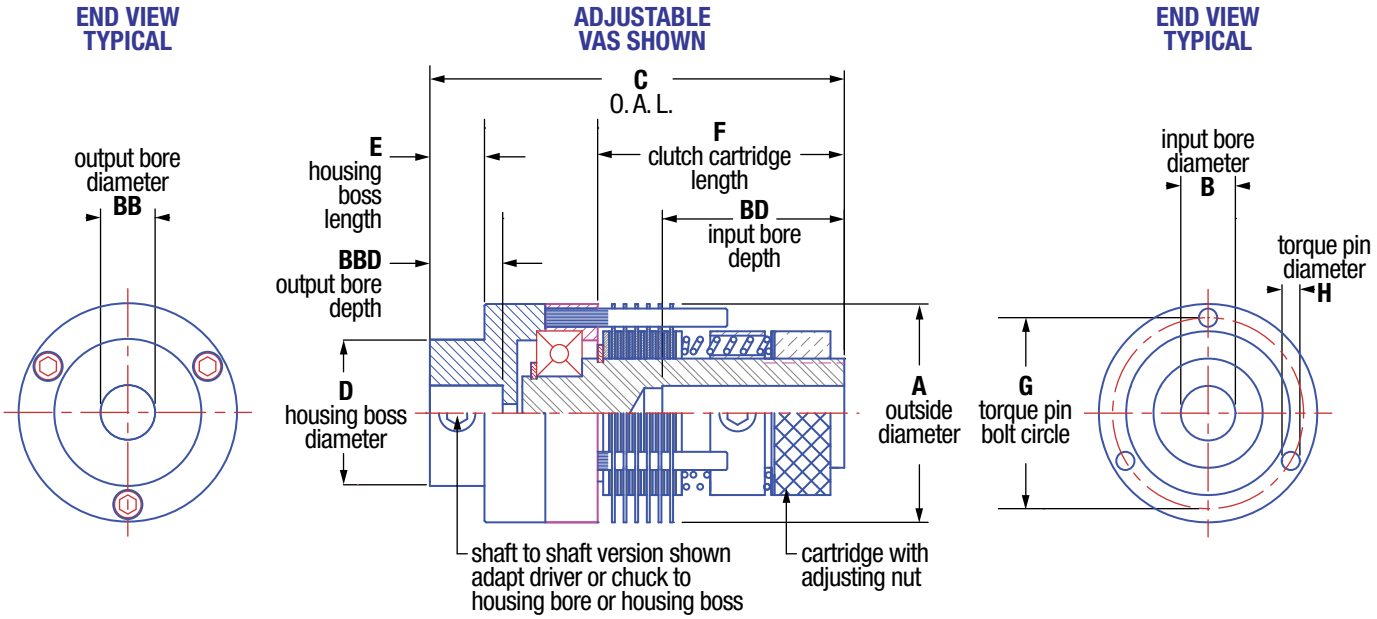
[S.A.E.]		+.002 / -.000 IN									Capacity @ 50 RPM		Friction
Model Number	A	B* std.	B max.	C	D	E	EE	F	G	H	lb-in	Watts	Surfaces
SFS 20 & SFO 20 SAS 20 & SAO 20	1.25	.250	.375	1.19 1.50	.760	.25	.50	.69 1.00	1.062	.094	12	6	8
SFS 24 & SFO 24 SAS 24 & SAO 24	1.50	.375	.500	2.00 2.50	1.010	.38	.75	1.21 1.75	1.312	.125	25	15	12
SFS 32 & SFO 32 SAS 32 & SAO 32	2.00	.500	.625	2.31 2.87	1.385	.50	1.00	1.31 1.88	1.672	.188	50	30	12
SFS 44 & SFO 44 SAS 44 & SAO 44	2.75	.500	.625	2.31 2.87	1.635	.50	1.00	1.31 1.88	2.375	.188	75	43	12
SFS 48 & SFO 48 SAS 48 & SAO 48	3.00	.625	1.00	3.00 3.50	1.760	.50	1.00	2.00 2.50	2.625	.250	100	55	12
PFS 20 & PFO 20 PAS 20 & PAO 20	1.25	.250	.375	.78 1.06	.760	.19	.31	.47 .75	1.062	.094	2.5	1	2
PFS 24 & PFO 24 PAS 24 & PAO 24	1.50	.375	.500	1.07 1.32	1.010	.19	.38	.69 .94	1.312	.125	4	2	2
PFS 32 & PFO 32 PAS 32 & PAO 32	2.00	.500	.625	1.22 1.72	1.385	.25	.50	.72 1.22	1.672	.188	8	5	2
PFS 44 & PFO 44 PAS 44 & PAO 44	2.75	.500	.625	1.22 1.72	1.635	.25	.50	.72 1.22	2.375	.188	12	7	2
PFS 48 & PFO 48 PAS 48 & PAO 48	3.00	.625	1.00	2.25 2.75	1.760	.50	1.0	1.25 1.75	2.625	.250	20	13	2
[METRIC]		+.05 / -.00 MM									Capacity @ 50 RPM		Friction
Model Number	A	B* std.	B max.	C	D	E	EE	F	G	H	Nm	Watts	Surfaces
SFS 20 & SFO 20 SAS 20 & SAO 20	31.75	8	10	30.2 38.1	19.30	6.35	12.70	17.50 25.40	26.97	2.38	1.5	6	8
SFS 24 & SFO 24 SAS 24 & SAO 24	38.10	10	13	50.8 63.5	25.65	9.65	19.05	30.70 44.50	33.32	3.18	3	15	12
SFS 32 & SFO 32 SAS 32 & SAO 32	50.80	12	16	58.7 72.9	35.18	12.70	25.04	33.30 47.80	42.47	4.78	6	30	12
SFS 44 & SFO 44 SAS 44 & SAO 44	69.85	12	16	58.7 72.9	41.53	12.70	25.04	33.30 47.80	60.33	4.78	9	43	12
SFS 48 & SFO 48 SAS 48 & SAO 48	76.20	16	25	76.2 88.9	44.70	12.70	25.40	50.80 63.50	66.80	6.35	11.5	55	12
PFS 20 & PFO 20 PAS 20 & PAO 20	31.75	8	10	19.8 26.9	19.30	4.83	7.87	11.90 19.10	26.97	2.38	.3	1	2
PFS 24 & PFO 24 PAS 24 & PAO 24	38.80	10	13	27.0 33.5	25.65	4.83	9.65	17.50 23.90	33.32	3.18	.5	2	2
PFS 32 & PFO 32 PAS 32 & PAO 32	50.80	12	16	31.0 43.7	35.18	6.35	12.70	18.30 31.00	42.47	4.78	1	5	2
PFS 44 & PFO 44 PAS 44 & PAO 44	69.85	12	16	31.0 43.7	41.53	6.35	12.70	18.30 31.00	60.33	4.78	1.5	7	2
PFS 48 & PFO 48 PAS 48 & PAO 48	76.20	16	25	57.15 69.85	44.70	12.70	25.40	31.75 44.45	66.80	6.35	2.4	13	2

*Bore diameters (Dimension B) other than standards shown are available up to the maximum diameter.
Please note that torque capacities are only guidelines. Higher torques and speeds are possible depending on operating conditions. Consult factory for details.

MECHANICAL SLIP CLUTCHES

V-SERIES SLIPPER

The V-Series Slipper provides torque control for driving, capping and other applications where thrust loads are applied. Its integrated ball bearing allows thrust loads up to 650 pounds without any effect on torque. Self-supporting hub design allows for easy installation; shaft-through support is not required. The V-Series slipper may be used for pulley applications; and its design allows rebuilding, if necessary.



PART NUMBER EXAMPLES (see p. 19 for part no. identification)

V A S 20 - 4

1 2 3 4 5

- 5: $^{4}/_{16}$ = .250" bore dia. in clutch cartridge and housing
- 4: Size 20 = $^{20}/_{16}$ (1.25" outside dia.)
- 3: Shaft to shaft installation type
- 2: Adjustable torque
- 1: V-Series Slipper

V A S 44 - 12mm - 10mm*

1 2 3 4 5 6

- 6: 10 mm bore dia. in housing
- 5: 12 mm bore dia. in clutch cartridge
- 4: Size 44 = $^{44}/_{16}$ (2.75" outside dia.)
- 3: Shaft to shaft installation type
- 2: Adjustable torque
- 1: V-Series Slipper

*Housing bore size needed only if different than cartridge bore size.

V-SERIES SLIPPER SPECIFICATIONS

See pages 17-18 for slip clutch operation (construction, installation, capacity) and mounting options.

[S.A.E.]		+.002 / -.000 IN						+.002 / -.000 IN				
Model Number	A	B* std.	B max.	BD	BB**	BBD	C	D	E	F	G	H
VAS 20	1.25	.250	.375	.750	.250	.500	2.05	.750	.350	.98	1.062	.094
VAS 24	1.50	.375	.500	1.25	.250	.500	2.85	1.000	.375	1.69	1.312	.125
VAS 32	2.00	.500	.625	1.25	.250	.500	3.00	1.375	.500	1.80	1.672	.188
VAS 44	2.75	.500	.625	1.25	.250	.500	3.30	1.625	.500	1.80	2.375	.188
VAS 48	3.00	.625	1.000	1.75	.250	.500	4.00	1.750	.500	2.43	2.625	.250
[METRIC]		+.05 / -.00 MM						+.05 / -.00 MM				
Model Number	A	B* std.	B max.	BD	BB**	BBD	C	D	E	F	G	H
VAS 20	31.75	8	10	19.05	6.35	12.07	52.07	19.05	8.89	24.89	26.97	2.39
VAS 24	38.10	10	13	31.75	6.35	12.07	72.39	25.40	9.53	42.93	33.32	3.18
VAS 32	50.80	12	16	31.75	6.35	12.07	76.20	34.93	12.70	45.72	42.47	4.78
VAS 44	69.85	12	16	31.75	6.35	17.78	83.82	41.28	12.70	45.72	60.33	4.78
VAS 48	76.20	16	25	44.45	6.35	17.78	101.60	44.45	12.70	61.72	66.80	6.35

*Bore diameters (Dimension B): other than standards shown are available up to the maximum diameter.

**Standard output bore (Dimension BB): other diameters (English and Metric), hex sizes or custom configurations are available upon request.

	Thrust Load		Capacity @ 50 RPM			
Model Number	lbs.	N	lb-in	Nm	Watts	Friction Surfaces
VAS 20	165	22.8	12	1.5	6	8
VAS 24	255	35.3	25	3	15	12
VAS 32	300	41.5	50	6	30	12
VAS 44	400	55.3	75	9	43	12
VAS 48	665	91.9	100	11.5	55	12

Please note that torque capacities are only guidelines. Higher torques and speeds are possible depending on operating conditions. Consult factory for details.

Horizontal and vertical installation without driveshaft modifications!

A&A Manufacturing

POLYCLUTCH® CONTINUOUS SLIP CLUTCHES

NEW – SERIES 12 | SLIP-EASE MECHANICAL SLIP CLUTCHES

FOR ULTRA SMALL SPACES

Our smallest available slip clutch for applications where space is at a premium and a robust reliable solution is needed.

EAO 12 Adjustable Clutch

ERFS 12 Fixed Clutch

FEATURES:

- Extremely small, 3/4" outside diameter
- Torque ranges up to 8.5 lb-in
- Durable, proven, low backlash housing design
- Stainless steel options available
- Fixed, adjustable and custom designs
- Smooth, reliable breakaway and continuous slip
- Long life of 20 to 30 million revolutions in slip condition
- Bi-directional
- No lubrication needed
- Made in the USA

APPLICATION EXAMPLES:

- Medical devices – fluid analyzer
- Dental instruments – implant torque wrench
- Robotics – overload protection for cameras
- Automation – miniature drive protection

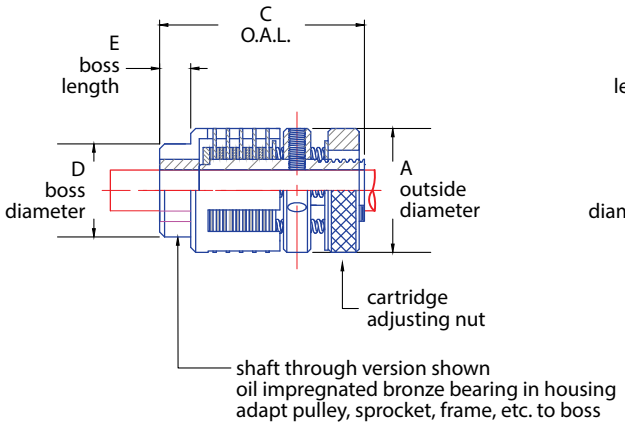
CAD drawings and models available on our website:
www.polyclutch.com/technical-data/cad-drawings

A&A Manufacturing

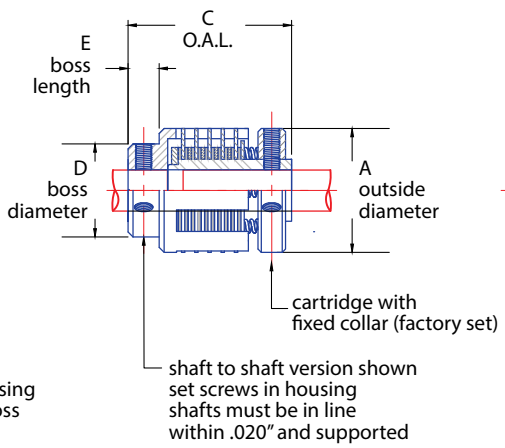
POLYCLUTCH® CONTINUOUS SLIP CLUTCHES

SERIES 12 | DESIGN SPECIFICATIONS

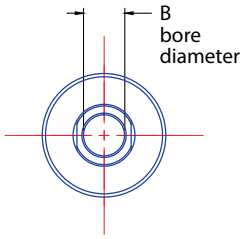
Adjustable
EAO & EAS
EAO shown



Fixed
EFO & EFS
Factory Set - Non Adjustable
EFS shown



End View
Typical



MODEL NUMBER	A inches (mm)	B* std. inches (mm)	B* max. inches (mm)	C inches (mm)	D* inches (mm)	E inches (mm)	Capacity @ 50 RPM lb-in (Nm)	Capacity @ 50 RPM Watts	Friction Surfaces
EA0 12	0.750 (19.05)	0.1875 (5)	0.250 (6)	1.25 (31.75)	0.562 (14.28)	0.188 (4.78)	8.5 (1.0)	4.5	8
EAS 12	0.750 (19.05)	0.1875 (5)	0.250 (6)	1.25 (31.75)	0.562 (14.28)	0.188 (4.78)	8.5 (1.0)	4.5	8
EF0 12	0.750 (19.05)	0.1875 (5)	0.250 (6)	1.00 (25.40)	0.562 (14.28)	0.188 (4.78)	8.5 (1.0)	4.5	8
EFS 12	0.750 (19.05)	0.1875 (5)	0.250 (6)	1.00 (25.40)	0.562 (14.28)	0.188 (4.78)	8.5 (1.0)	4.5	8

* +0.002 / -0.000 inches (+0.05 / -0.00 mm)
Note: Bore diameters other than shown are available up to the maximum diameter.

PART NUMBER EXAMPLE

E A S 12 – 3 – 4*

- 4/16 = 0.250" bore diameter in housing
- 3/16 = 0.1875" bore diameter in cartridge
- Size 12 = 12/16 (0.75" outside diameter)
- Shaft to shaft installation type
- Adjustable torque
- Slip-Ease

*Housing bore size needed only if different than cartridge bore size.

DESIGN NOTES

EAS & EAO models: adjustable torque setting
EFO & EFS models: factory preset (fixed) torque setting
EAS & EFS models: shaft to shaft installation type. Provided with set screws in clutch housing
EAO & EFO models: shaft-through mounting to pulley, gear, sprocket, etc. Provided with oil impregnated bearing in clutch housing

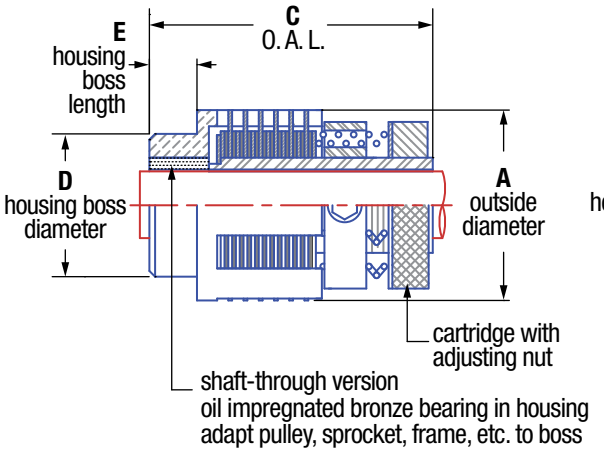
Polyclutch Division | www.polyclutch.com
A&A Manufacturing Co., Inc,
Phone: (262) 786-1500 or (800) 298-2066
Email: sales@aaman.com

MECHANICAL SLIP CLUTCHES

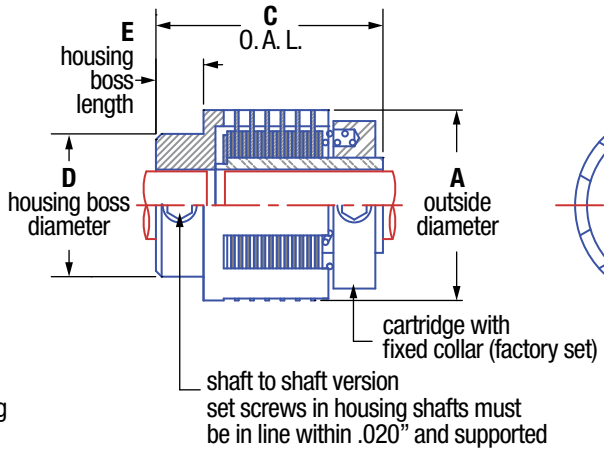
SLIP-EASE

Utilizes an axial loaded multi-plate design. For applications where space is at a premium and low backlash is required.

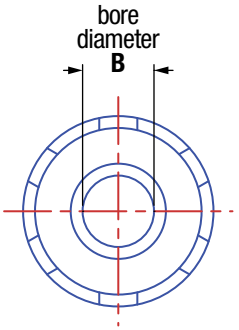
ADJUSTABLE
EAO EAS
EAO SHOWN



FIXED
FACTORY SET - NON ADJUSTABLE
EFO EFS
EFS SHOWN



END VIEW
TYPICAL



PART NUMBER EXAMPLES (see p. 19 for part no. identification)

E A S 32 - 8-10*

1 2 3 4 5 6

- 6: $^{10}/_{16}$ = .625" bore dia. in housing
- 5: $^{8}/_{16}$ = .500" bore dia. in clutch cartridge
- 4: Size 32 (relative size) 1.625" outside dia.
- 3: Shaft to shaft installation type
- 2: Adjustable torque
- 1: Slip-Ease

*Housing bore size needed only if different than cartridge bore size.

E F 0 44 - 12mm

1 2 3 4 5

- 5: 12 mm bore dia. in clutch cartridge and housing
- 4: Size 44 (relative size) 2.25" outside dia.
- 3: Shaft-through installation type
- 2: Fixed torque (factory preset)
- 1: Slip-Ease

SLIP-EASE SPECIFICATIONS

See pages 17-18 for slip clutch operation (construction, installation, capacity) and mounting options.

[S.A.E.]		+.002 / -.000 IN					Capacity @ 50 RPM		Friction
Model Number	A	B* std.	B max.	C	D	E	lb-in	Watts	Surfaces
EFS 16 & EFO 16	1.000	.250	.375	1.19	.750	.25	16	9	12
EAS 16 & EAO 16	1.000	.250	.375	1.50	.750	.25			
EFS 24 & EFO 24	1.375	.375	.500	2.00	1.000	.38	25	15	12
EAS 24 & EAO 24	1.375	.375	.500	2.50	1.000	.38			
EFS 32 & EFO 32	1.625	.500	.625	1.87	1.375	.50	50	30	12
EAS 32 & EAO 32	1.625	.500	.625	2.44	1.375	.50			
EFS 44 & EFO 44	2.250	.500	.625	1.87	1.625	.50	75	43	12
EAS 44 & EAO 44	2.250	.500	.625	2.44	1.625	.50			
EAS 52 & EAO 52	3.250	.750	1.250	4.00	2.000	.50	150**	85	12

[METRIC]		+.05 / -.00 MM					Capacity @ 50 RPM		Friction
Model Number	A	B* std.	B max.	C	D	E	Nm	Watts	Surfaces
EFS 16 & EFO 16	25.40	8	10	30.2	19.05	6.35	2	9	12
EAS 16 & EAO 16	25.40	8	10	38.1	19.05	6.35			
EFS 24 & EFO 24	34.90	10	13	50.8	25.40	9.65	3	15	12
EAS 24 & EAO 24	34.90	10	13	63.5	25.40	9.65			
EFS 32 & EFO 32	41.28	12	16	47.5	34.93	12.70	6	30	12
EAS 32 & EAO 32	41.28	12	16	62.0	34.93	12.70			
EFS 44 & EFO 44	57.15	12	16	47.5	41.28	12.70	9	43	12
EAS 44 & EAO 44	57.15	12	16	62.0	41.28	12.70			
EAS 52 & EAO 52	82.55	20	32	101.6	50.80	12.70	17**	85	12

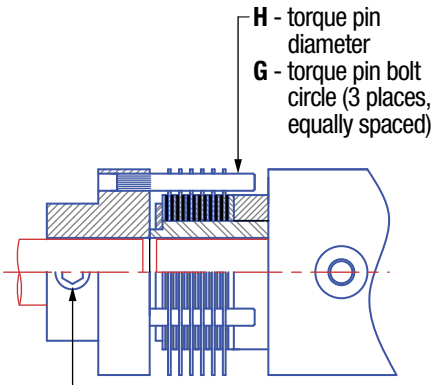
*Bore diameters (Dimension B): other than standards shown are available up to the maximum diameter.

**Maximum capacity is 500 lb-in / 56 Nm. Heat generation should not exceed maximum Watts capacity.
Watts = Torque x RPM x Duty Cycle x 0.011

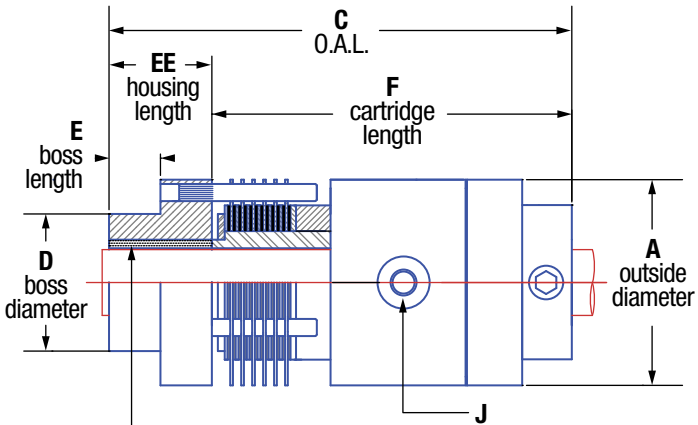
PNEUMATIC SLIP CLUTCHES

SLIP-AIRE

The Polyclutch® Slip-Aire is an air actuated version of the mechanical Polyclutch® slip clutch. It has the same long life friction plates, assuring constant torque or tension. With air actuation it can be used to engage/disengage, to vary the torque during operation, or to adjust the torque remotely at any time. Ideal for servo mechanisms, it transmits higher torque levels than comparably sized mechanical slip clutches.

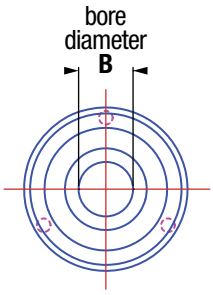


AAS - Shaft-to-Shaft Version
set screws in housing
shafts must be in line
within.020 and supported



AAO - Shaft-Through Version
oil impregnated bronze
bearing in housing
adapt pulley, sprocket, gear,
frame, etc, to housing boss

J
air inlet thread
straight thread - gasket required



END VIEW TYPICAL

PART NUMBER EXAMPLES (see p. 19 for part no. identification)

A A S 32 - 12mm-16mm*

1 2 3 4 5 6

- 6: 16 mm bore dia. in clutch housing
- 5: 12 mm bore dia. in clutch cartridge
- 4: Size 32 = $^{32}/_{16}$ (2"outside dia.)
- 3: Shaft to shaft installation type
- 2: Adjustable torque
- 1: Slip-Aire

*Housing bore size needed only if different than cartridge bore size.

A A 0 20 - 4

1 2 3 4 5

- 5: $^{4}/_{16}$ = .250" bore dia. in clutch cartridge and housing
- 4: Size 20 = $^{20}/_{16}$ (1.25" outside dia.)
- 3: Shaft-through installation type
- 2: Adjustable torque
- 1: Slip-Aire

SLIP-AIRE SPECIFICATIONS

See pages 17-18 for slip clutch operation (construction, installation, capacity) and mounting options.

[S.A.E.]		+.002 / -.000 IN									
Model Number	A	B* std.	B max.	C	D	E	EE	F	G	H	J
AAS 20 & AAO 20	1.25	.250	.375	2.50	.760	.25	.50	2.00	1.062	.094	10-32
AAS 24 & AAO 24	1.50	.375	.500	3.38	1.010	.38	.75	2.63	1.312	.125	10-32
AAS 32 & AAO 32	2.00	.500	.625	3.63	1.385	.50	1.00	2.63	1.672	.188	10-32
AAS 44 & AAO 44	2.75	.500	.625	3.63	1.635	.50	1.00	2.63	2.375	.188	10-32
[METRIC]		+.05 / -.00 MM									
Model Number	A	B* std.	B max.	C	D	E	EE	F	G	H	J
AAS 20 & AAO 20	31.75	8	10	63.50	19.30	6.35	12.70	50.80	26.98	2.39	10-32
AAS 24 & AAO 24	38.10	10	13	85.85	25.65	9.65	19.05	66.80	33.73	3.18	10-32
AAS 32 & AAO 32	50.80	12	16	92.20	35.18	12.70	25.40	66.80	42.47	4.78	10-32
AAS 44 & AAO 44	69.85	12	16	92.20	41.53	12.70	25.40	66.80	60.33	4.78	10-32

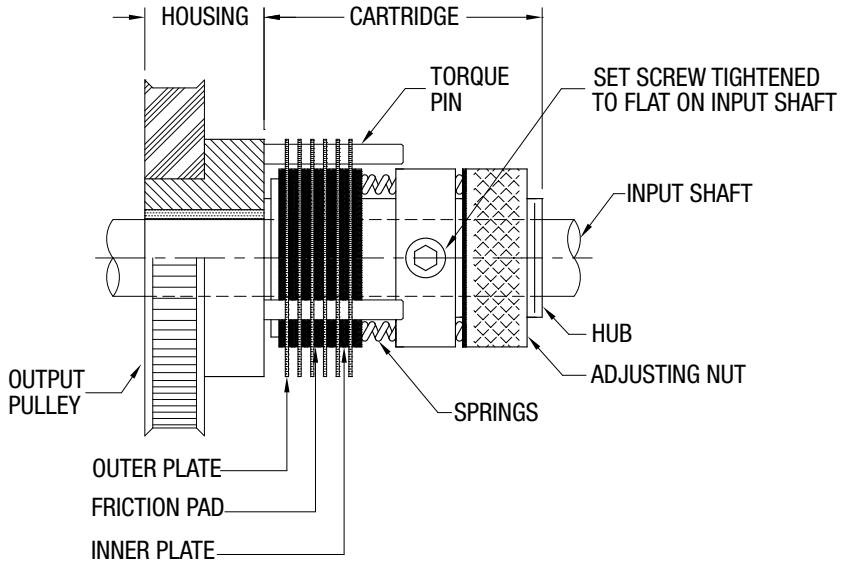
*Bore diameters (Dimension B): other than standards shown are available up to the maximum diameter.

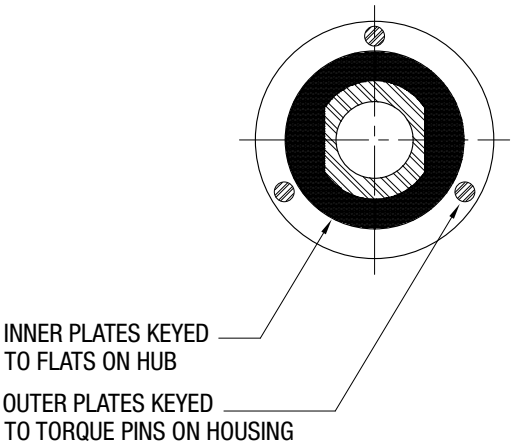
	CAPACITY		CAPACITY			
	continuous @ 50 RPM ①	maximum @ 100 PSI ②	continuous @ 50 RPM ①	maximum @ 100 PSI ②		
Model Number	lb-in	lb-in	Nm	Nm	Watts	Friction Surfaces
AAS 20 & AAO 20	12	20	1.5	2.2	6	8
AAS 24 & AAO 24	25	50	3.0	6.0	15	12
AAS 32 & AAO 32	50	100	6.0	12.0	30	12
AAS 44 & AAO 44	75	300	9.0	34.0	43	12

① Rated torque for continuous operation at 50 RPM. Torque can be higher or lower depending on actual RPM and duty cycle.
② Maximum torque attainable (at 100 PSI).

SLIP CLUTCH OPERATION

CONSTRUCTION, INSTALLATION & CAPACITY





CONSTRUCTION

A Polyclutch® consists of two parts: a cartridge and a housing (see above).

The cartridge is set screwed or keyed to the input shaft.

- The cartridge includes the clutch pack: outer plates, friction pads, inner plates
- Plates are brass with a proprietary finish
- Inner plates are keyed to the cartridge hub
- Outer plates are keyed to the cartridge housing
- Friction pads are a proprietary plastic-based composite (no asbestos)

The housing is either set screwed or keyed to the output shaft, or (as shown), attached to the output gear or pulley, with a bronze bearing to allow relative motion between the input shaft and the output gear/pulley.

Torque is controlled by changing the pressure applied to the clutch pack. In an adjustable style clutch, the torque level is controlled by compressing the springs with the adjusting nut. In a fixed style clutch, a collar is attached to the hub in a fixed position, and the torque level is set by pushing and locking the spring collar to a calibrated position.

All slip clutch torques are calibrated to +/- 20% but can be held to closer tolerances.

Backlash of 6° is standard for Slipper models and 2° for the Slip-Ease models. Slipper models can be held to 2° if required.

Our proprietary burn-in process insures that all Polyclutch® Slippers will perform consistently right out of the box, with no break-in period required.

INSTALLATION (see p. 19 for mounting options)

Shaft-through versions: Insert input shaft into cartridge and tighten set screws. Insert housing around input shaft, with torque pins engaging holes in outer plates. Input shaft will keep the cartridge and housing aligned.

Shaft to Shaft versions: Insert input shaft into cartridge and tighten set screws. Insert output shaft into housing and tighten set screws. Input and output shafts must be properly journaled with centerlines within +/- .010 T.I.R.

Do not lubricate the clutch. Friction materials are designed to run without additional lubrication. Lubrication will cause a change in torque and erratic behavior. The inherent axial loaded design will keep dirt and dust out of the friction surfaces.

CAPACITY

The clutch capacity is based on continuous operation at 50 RPM for over 25 million cycles. Torque, RPM, duty cycle and life are interdependent. A reduction of any of these will allow an increase in any other. (Running at 25 RPM will allow twice the torque, or running for only 10% of the cycle will allow higher RPM, etc.). The limit is based on heat buildup measured in watts per:

Watts = Torque (lb-in) x RPM x Duty Cycle* x 0.011

*Percent of the time the clutch is slipping, expressed as a decimal. For example, 0.5 = 50% of the time the clutch is slipping.

Please consult our factory for high torque, high RPM and rapid cycling applications.

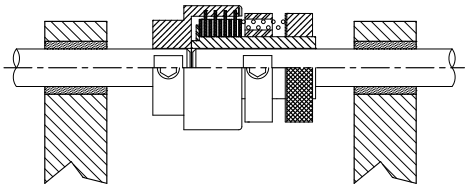
SLIP CLUTCH MOUNTING OPTIONS

TYPICAL MOUNTING FOR MECHANICAL AND PNEUMATIC SLIP CLUTCHES

All Polyclutch® slip clutches perform the basic function of controlling the torque between two elements. They can be supplied as a shaft-to-shaft coupling or a shaft to pulley, gear, or sprocket model. Polyclutch custom slip clutches can be provided with non-standard bore sizes, keyways, low backlash or higher torque, minus housings and with pulley, gear or sprocket.

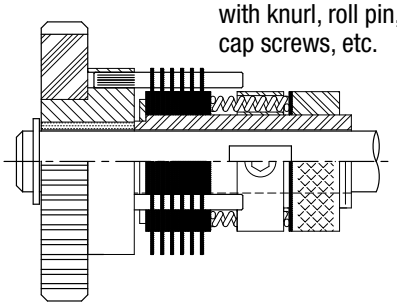
Example 1

Shaft to Shaft
Shafts must be supported and aligned within .010-.015



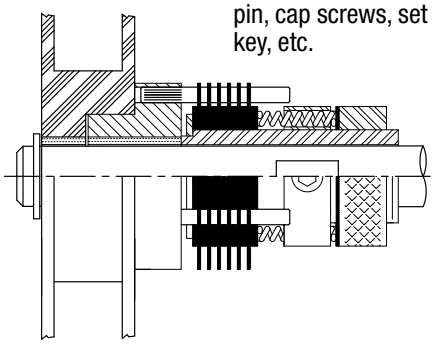
Example 2

Gear/Pulley/Sprocket adapted to housing with knurl, roll pin, cap screws, etc.



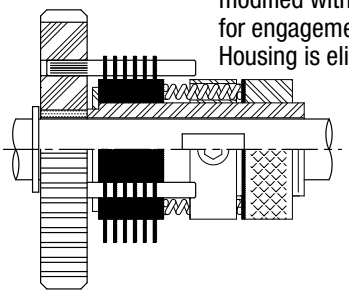
Example 3

Supply or rewind spool adapted to housing with knurl, pin, cap screws, set screw, key, etc.



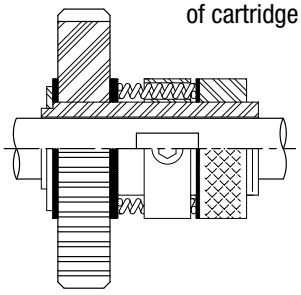
Example 4

Gear/Pulley/Sprocket modified with pins for engagement
Housing is eliminated



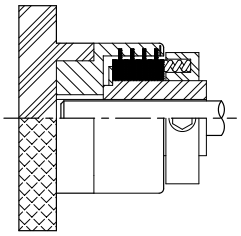
Example 5

Gear/Pulley/Sprocket integrated as part of cartridge



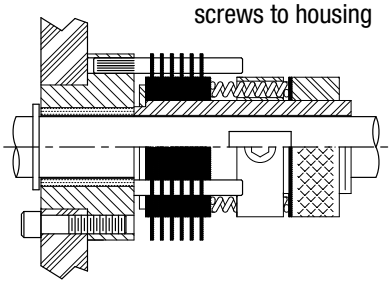
Example 6

Knob adapted to housing knurl, set screw, pin, etc.



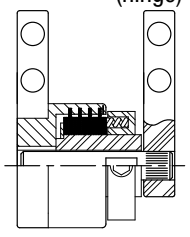
Example 7

Machine frame adapted with cap screws to housing



Example 8

Rotary position holder (hinge)



PART NUMBER IDENTIFICATION

HOW TO CREATE A PART NUMBER

S A S 24 - 4 - 6
❶ ❷ ❸ ❹ ❺ ❻

HOUSING BORE SIZE:
Generally represented in sixteenths of an inch. To be used only if different from cartridge bore. For metric, add MM after bore sizes. (e.g., SAS24-4MM-6MM).

CARTRIDGE BORE SIZE:
Generally represented in sixteenths of an inch. For metric, add MM after bore size (e.g., SAS24-4MM).

OUTER DIAMETER:
Generally represented in sixteenths of an inch, please see specifications for exact dimensions.

INSTALLATION TYPE:
"S" is shaft to shaft
"O" is shaft-through for mounting to pulley, gear, sprocket, etc.
"Y" is cartridge only

TORQUE SETTING:
"A" is adjustable torque
"F" is factory preset (fixed) torque*
**Please indicate torque value if fixed - 'T' = [lb-in], 'Z' = [oz-in]*

TYPE OF SLIP CLUTCH:
S = Multi-Plate Slipper P = Single-Plate Slipper V = V-Series Slipper
E = Slip-Ease A = Slip-Aire (air-actuated)

STANDARD OPTIONS

Polyclutch® Slip Clutches are designed to cover a wide range of solutions. To help better fit the clutch to your specific application, here is a list of standard options:

- Bore size changes – English (inches) and metric (mm)
- High torque option, accomplished by extra springs – "H" part no. suffix
  - Will increase capacity of standard adjustable slip clutches by 50% (note: removing springs will lower capacity, increase sensitivity)
- Keyways – English and metric – "K" part no. suffix
- Low backlash in Slipper clutch – "UL" part no. suffix
- Heavy inner plates for extra cooling – "D" part no. suffix
- 303/304 stainless steel construction – "Q" part no. prefix
- Two-plate Slipper clutch – "R" version (part no. begins with "R")
- Plastic cover for Slipper and Slip-Aire clutches

CUSTOM CLUTCHES

If you are looking for something outside of our standard options, our engineers will work with you to help design a clutch for your specific application.

REQUEST FOR QUOTE

PRECISION SLIP CLUTCHES

A&A POLYCLUTCH®

Date: _____ Address _____

Company Name: _____ City _____ State/Prov. _____

Contact: _____ Country _____ Zip/Postal Code _____

Quantity: _____ Telephone _____ Fax _____

Does your equipment also use protective covers and/or cable/hose carriers? ❑ Yes ❑ No

Email _____

APPLICATION INFORMATION

❑ Overload Protection
❑ Constant Tension/Force
❑ Soft Start/Cushioned Stop
❑ Other: _____

❑ Torque Control *(i.e. bottle capping, screwdriver)*
❑ Brake
❑ Position Retention

Operating Environment: *(list specific requirements, # corrosives, water, etc.)*

_____

Orientation: ❑ Vertical ❑ Horizontal

Temperature Range: _____

Type of Equipment: _____

Other Application Information: _____

CLUTCH INFORMATION

Polyclutch part number: *(if known)* _____

❑ Mechanical Slip Clutch
❑ One-Way Clutch
❑ Combination

❑ Pneumatic Slip Clutch
❑ Jaw Clutch

Torque Range: _____ ❑ lb-in ❑ Nm

Type of Mount: *(select one)*

❑ Shaft/Shaft Mounting
Input Shaft Diameter: _____
Output Shaft Diameter: _____

❑ Shaft Thru Mounting
Input Shaft Diameter: _____
Output Type: *(gear, pulley, frame...)* _____

❑ Other: _____

RPM: *(at the clutch)* _____

Duty Cycle: *(percentage of the time the clutch will be in slip condition)* _____

Maximum Space Limitations: *(envelope size, only if a limitation exists)* _____

Life Requirements: *(number of cycles, only if a specification exists)* _____

NSF Registered to ISO 9001

DESIGNED AND MANUFACTURED IN THE U.S.A.

Please send the completed form to:

⇨ Fax: +49 8122 96 60 167 or Email: info@halltech.de

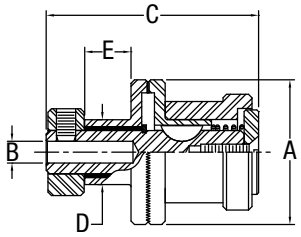
To submit a quote request online, go to: www.halltech.com

JAW CLUTCHES

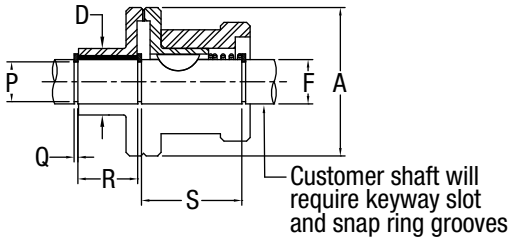
Polyclutch® Jaw Type clutches permit extremely simple reliable phase adjustment, and/or engage-release between a shaft and gear, pulley, roller, etc. The D Series is knob operated, the J Series is lever operated. Clutch teeth are precision machined from solid steel blanks, 3° tooth spacing (120 teeth) is standard. Alternate spacing available. All Polyclutch jaw clutches are stronger than the shaft driving them.

Model Number	A	B	C	D	E	F	P	Q	R	S	KEY
DH 20	1.25	.250	1.87	.562	.39	–	–	–	–	–	–
DK 20	1.25	–	–	.562	.39	.375	.338	.032	.833	.845	#212
DH 32	2.00	.500	2.50	1.252	.75	–	–	–	–	–	–
DK 32	2.00	–	–	1.252	.75	.750	.703	.048	.890	1.470	#606
DJ 20 (Jaws Only)	1.25	.375	1.10	.560	.39	–	–	–	–	–	–
DJ 32 (Jaws Only)	2.00	.750	1.95	1.250	.75	–	–	–	–	–	–

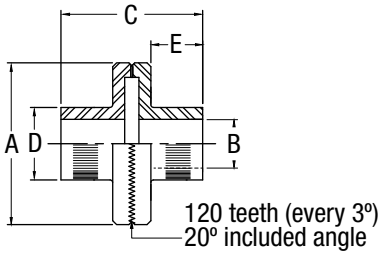
DH CLUTCH – WITH HUB



DK KIT – LESS SHAFT

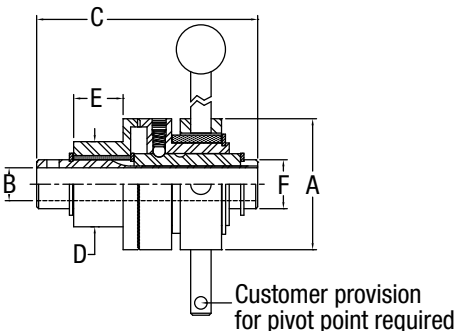


DJ – JAWS ONLY

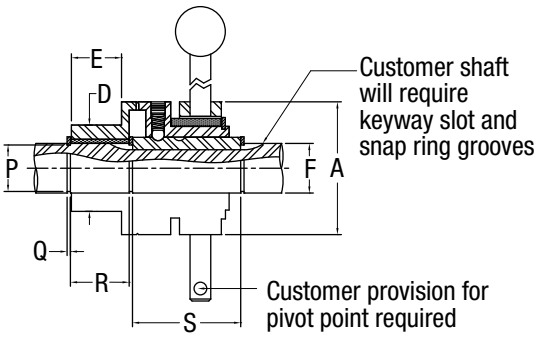


Model Number	A	B	C	D	E	F	P	Q	R	S	KEY
JH 32	2.00	.500	3.37	1.252	.75	.750	–	–	–	–	–
JK 32	2.00	–	–	1.252	.75	.750	.703	.047	.890	1.625	.187 SQ

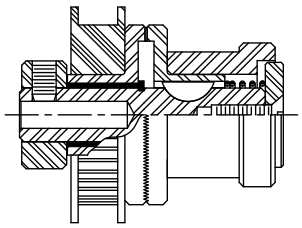
JH CLUTCH – WITH HUB



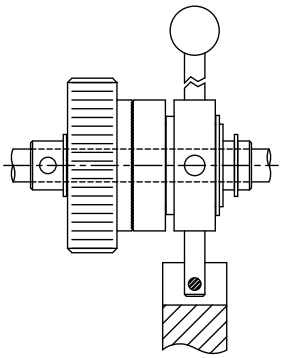
JK KIT – LESS SHAFT



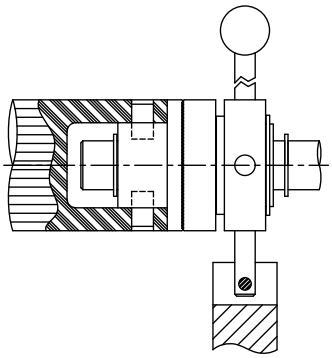
JAW CLUTCH MOUNTING OPTIONS



Phase adjustment shaft to pulley
Pulley pressed onto knurled housing



Prevent reversal gear
Adapted to housing



Engage and disengage mechanism
Drive roll adapted to housing

ONE WAY CLUTCHES

HUB-PAK, STEEL HOUSING & SHELL-PAK

POLYCLUTCH® HUB-PAK

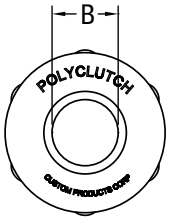
Cartridge Number	Capacity lb-in Max.	Drive Rolls	Use Race Dia.	±.005 A	±.005 AA	+.001 -.000 B	+.03 -.00 B	±.005 C	+.003 -.000 D	±.005 E	±.005 F
G30-4	7	4	.6265/ .6245	.375	n/a	.250	4	.015	n/a	n/a	n/a
E31-4 (L OR R)	12	4	.6265/ .6245	n/a	.500	.250	4	.015	.062	.062	.312
E33-4 (L OR R)	18	4	.6265/ .6245	n/a	.500	.250	4	.015	.062	.062	.312

POLYCLUTCH® HOUSING

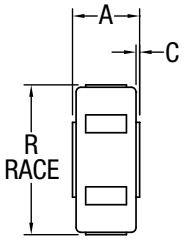
Housing Number	±.005 G	±.005 H	±.005 I	±.005 J	±.005 K	+.000 -.003 L	±.010 M	T.I.R. N	R Race
GQ306-4	.422	.375	.906	.531	.514	.750	.032	.022	.6265/ .6245

G30 Press fit onto shaft. E31 and E33 match drill and pin to shaft. E31 and E33-specify left or right drive.
Right Drive: Hub pak drives housing clockwise when viewed from extension end of cartridge.
Left Drive: Hub pak drives housing counter-clockwise when viewed from extension end of cartridge.

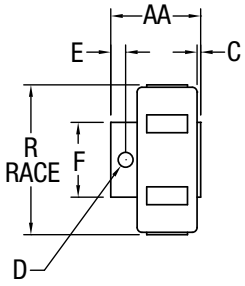
End View Typical



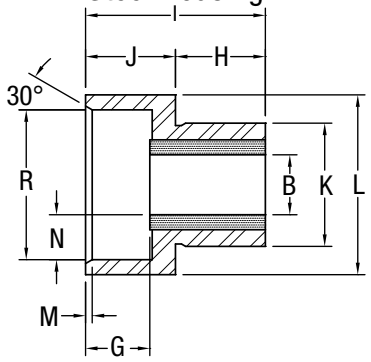
G Type Polyclutch Hub-Pak



E Type Polyclutch Hub-Pak

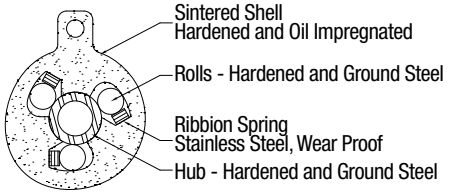


Standard Steel Housing

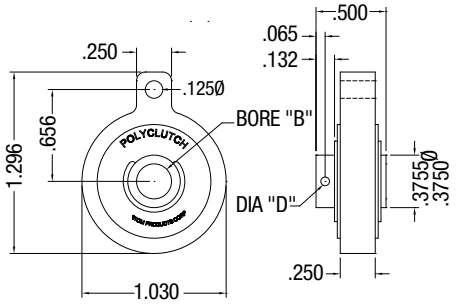


SHELL-PAK SPECIFICATIONS

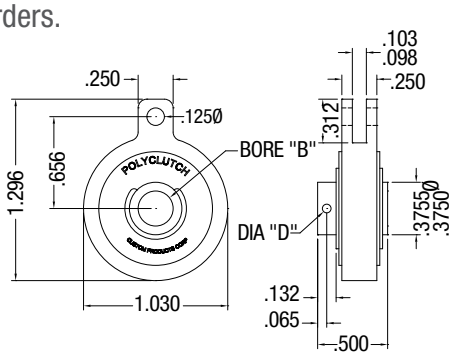
Right Drive: Shell drives hub clockwise when viewed from extension end of hub.
Torque capacity 8 lb-in.
Dimension B = 0.250 (Bore diameter) Dimension D = 0.0625 (Pin diameter)
Additional diameters available for OEM quantity orders.



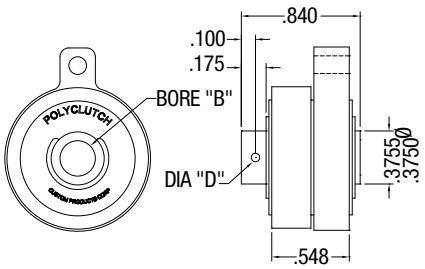
Inside View



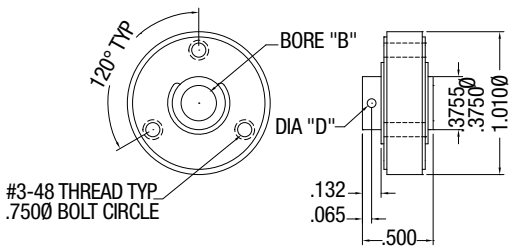
Single Assembly Model HEA Solid Arm



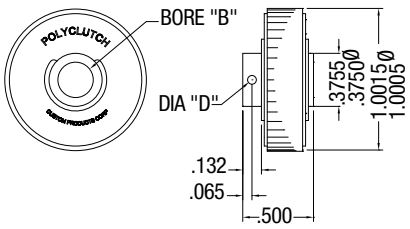
Single Assembly Model HEM Milled Slot in Arm



Duplex Assembly all Combinations Available
Shown with HEO and HEA Single Assemblies Model HEOA



Single Assembly Model HET
3 Tapped Holes



Single Assembly Model HEO
O.D. Ground for Press Fit

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