

CATALOG cylinders

# **Tiny Titan** Series

*Small Bore, Square End Cap Cylinder Line*



# **numatics**

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Air-Oil Systems, Inc. www.airoil.com



The **Tiny Titan Series** is a small bore, square end cap cylinder line that is designed to excel in applications where space limitations are of the utmost importance. Furthermore, a multitude of mounting styles and piston options make the Tiny Titan an extremely accommodating cylinder line.

### Tube

The **tube** is hard coat anodized on the inner diameter. This surface is extremely hard and possesses excellent wear and corrosion resistance, and has a low coefficient of friction. Additionally, profile tubing is standard on all bore sizes.

### End Caps

The **end caps** are accurately machined from (6061-T6) solid aluminum bar stock. They are anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

### Rod Seal and Wiper

The unique **rod seal** and **wiper** combination is standard. The quad ring design ensures proper sealing and long life.

### Tube End Seal

The **tube end seals** are compression type and reusable.

### Ports

Our enhanced **port** design enables the cylinder to work more efficiently. Through the use of precise machining depths and tool shape, we are able to smooth the flow path into and out of the cylinder.

The Tiny Titan Series **piston, piston rod, rod bushing, wear band, and rod seal** is directly correlated to the three different types of pistons that are offered: O Type, P Type, and Q Type.

### O Type Piston

The **O Type piston** (standard) is designed with a U-cup (Block-V) piston seal, a sintered bronze rod bushing, a roller burnished type 303 stainless steel piston rod, and a solid aluminum alloy piston that is strong and durable.

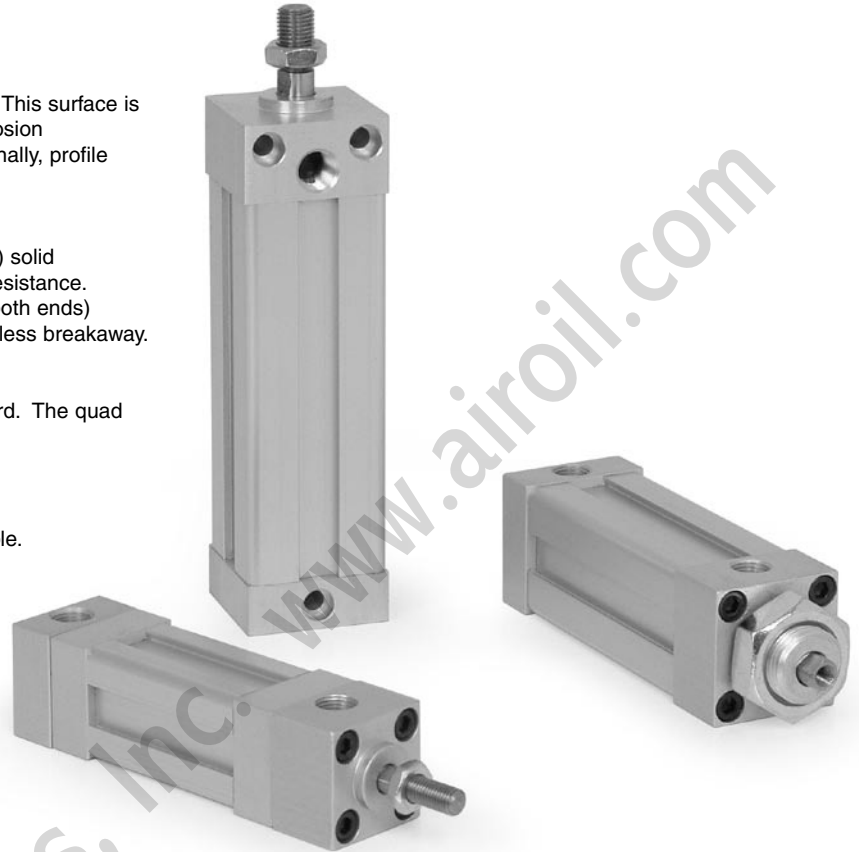
### P Type Piston

The **P Type piston** is a heavy-duty design. The piston seal is carboxylated nitrile with Teflon® compound for self-lubrication. The "T" seal with back-up ring construction prevents rolling and seals at all pressures. Furthermore, this design includes a robust cast iron rod bushing, a high strength chrome plated carbon steel piston rod, a wear band, and a solid aluminum alloy piston that is strong and durable.

### Q Type Piston

The **Q Type piston** is a low profile design. The piston seal is a carboxylated nitrile with Teflon® compound for self-lubricating. The "T" seal with back-up ring construction prevents rolling and seals at all pressures. It also has sintered bronze rod bushing, a roller burnished type 303 stainless steel piston rod, and a solid aluminum alloy piston that is strong and durable. A magnet cannot be added to the Q Type piston. Furthermore, a minimum of .625" of stroke is required.

Teflon® is a registered trademark of DuPont™.



### Standard Specifications:

- Bore sizes include 3/4", 1", 1-1/8"
- Nominal pressure rating is 150 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)
- All aluminum construction
- 1/8" ports
- Flexible port locations
- O Type piston - U-cup
- P Type piston – heavy-duty (Standard)
- Q Type piston – low profile



## Tiny Titan Series Small Bore, Square Cylinder

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### How to Order

**S8 0 C - 04 A 1 B - A AA 0**

#### Mount

- F1 = Front Flange (Pilot)
- F2 = Rear Flange
- F7 = Front Flange
- N1 = Nose Mount
- N2 = Nose Mount (Pilot)
- P3 = Rear Eye Mount
- R1 = Sleeve Nut Mount
- S8\*\* = Through Holes
- S9\*\* = Bottom Tapped
- X0 = No Mount

#### Cylinder Type

- O = U-Cup Piston
- P = Heavy Duty Piston
- Q\* = Low Profile Piston

#### Bore

- C = 3/4"
- E = 1"
- G = 1-1/8"

#### Full Inches of Stroke

- 00 = 0" Stroke
- 01 = 1" Stroke
- 02 = 2" Stroke
- 03 = 3" Stroke
- 10" = 10" Stroke

#### Fractional Inches of Stroke

- |           |            |
|-----------|------------|
| A = 0"    | I = 1/2"   |
| B = 1/16" | J = 9/16"  |
| C = 1/8"  | K = 5/8"   |
| D = 3/16" | L = 11/16" |
| E = 1/4"  | M = 3/4"   |
| F = 5/16" | N = 13/16" |
| G = 3/8"  | O = 7/8"   |
| H = 7/16" | P = 15/16" |

#### Magnetic Piston

- 0 = No Magnet
  - 2 = Magnet
- Magnet not available on Q Type piston.

#### Options

- AA = No Options
- EB\* = Bumper Seal, Both Ends
- KA = Stroke Adjuster (1" Max. Adjustment)
- NA = Nickel Plated
- VA = Viton Seals
- 1A\*\* = Rod Extension
- 2A\*\* = Thread Extension
- 4A\*\* = Stop Tube

\*Requires a minimum of 100 psi for the rod to reach the full end of stroke with the EB option. EB option is not available on Q Type piston.

#### Cushions (1/2" Added Per End)

Position	1	2	3	4
No Cushion	A	A	A	A
Head and Cap	B	C	D	E
Head Only	F	G	H	J
Cap Only	K	L	M	N

NOTE: P type cap cushion not available.

\*\* Must specify length.

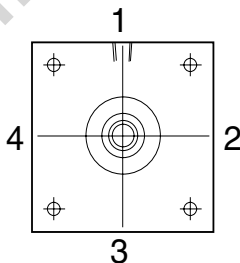
#### Ports

Position		
1 (Std.)	B	= 1/8 NPTF
2	H	= 1/8 NPTF
3	N	= 1/8 NPTF
4	T	= 1/8 NPTF

#### Rod End Code

- 1 = #1 Standard Rod Diameter
- 2 = #2 Standard Rod Diameter
- 3 = #3 Standard Rod Diameter
- 6 = #1 Oversize Rod Diameter
- 7 = #2 Oversize Rod Diameter
- 8 = #3 Oversize Rod Diameter

### Cylinder Orientation



Ports Normally in Position 1

### Cylinder Forces

#### Force Chart

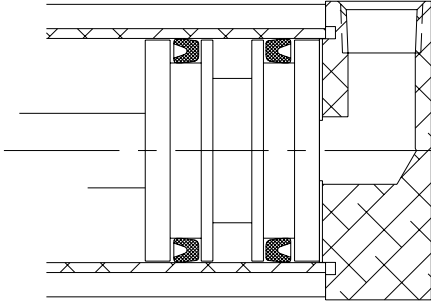
#### Pressure (PSI)

BORE	40	60	80	100	125	150	
3/4"	Extend	17	26	35	44	55	66
	Retract (Std. Rod)	15	23	31	39	49	58
	Retract (Ov. Rod)	14	21	29	36	45	54
1"	Extend	31	47	62	78	98	117
	Retract (Std. Rod)	28	42	56	70	88	106
	Retract (Ov. Rod)	27	40	54	67	84	101
1 1/8"	Extend	39	59	79	99	124	149
	Retract (Std. Rod)	35	53	70	88	110	132
	Retract (Ov. Rod)	31	47	63	79	99	119



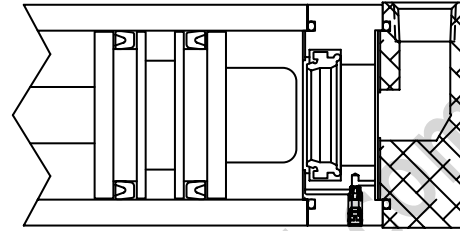
### Optional Features

O Type Piston (Standard)



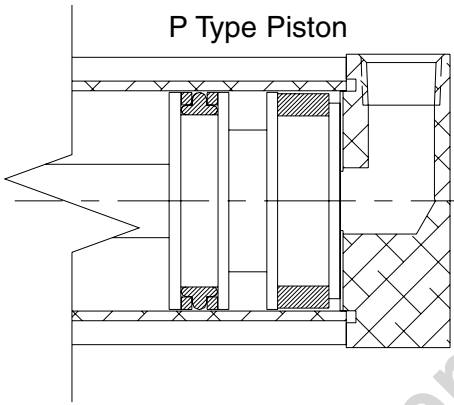
- U-cup (Block-V) piston seals
- Low breakaway
- Groove for optional magnet

O Type Cap Cushion



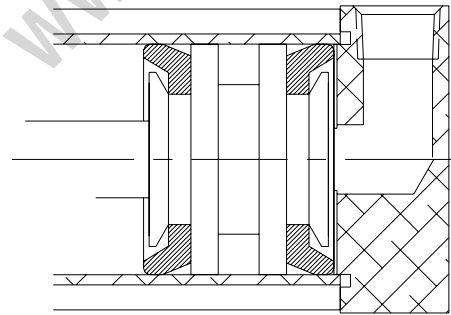
- The cushion seal has a built in check function. It seals in one direction and permits full flow in the opposite direction.
- Captured cushion needle
- Length grows by 1/2" per end

P Type Piston



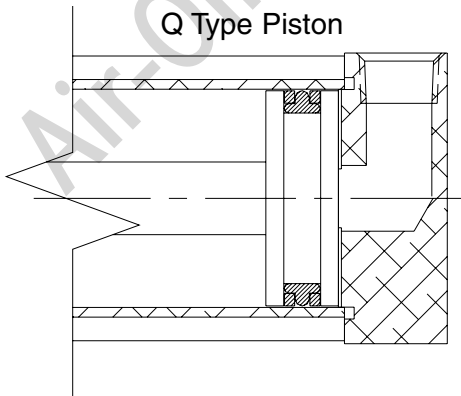
- Heavy duty
- Non-lube service
- T style piston seal
- Wear band
- Groove for optional magnet

Silencer Bumper Seal



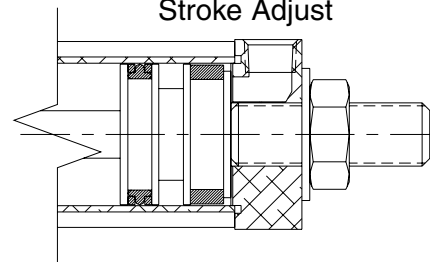
- Reduces end of stroke impact noise
- Bumper seal does not change cylinder overall length
- Cushions not available with this option
- Requires a minimum of 100 psi for the rod to reach the full end of stroke with the EB option.

Q Type Piston



- Low profile design
- T style piston seal

Stroke Adjust



BORE	JA	JB	JC
3/4"	3/8-24	1.44	3/16
1" and 1-1/8"	1/2-20	1.44	1/4

- 1" maximum adjustment

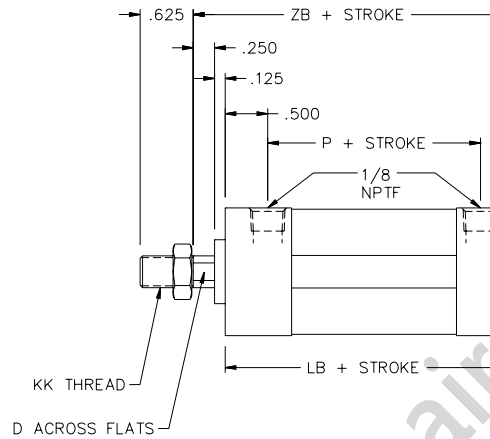
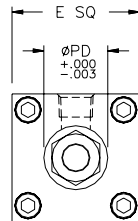


## Tiny Titan Series Small Bore, Square Cylinder

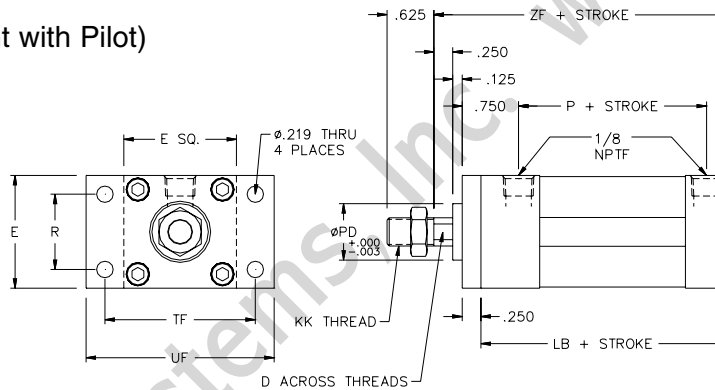
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### Basic and Front Flange Mounts

Mount Code X0  
(Basic No Mount)



Mount Code F1  
(Front Flange Mount with Pilot)



### Dimensions

BORE	E	D	PD	KK**	R	TF	UF
3/4"	1.125	0.188	0.625	1/4-28	0.500	1.500	2.000
1"	1.375	0.250	0.750	5/16-24	0.875	1.875	2.375
1 1/8"	1.500	0.313	0.750	3/8-24	1.000	2.000	2.500

### Stroke Related Dimensions

SERIES	O and P*				Q*			
BORE	LB	P	ZB	ZF	LB	P	ZB	ZF
3/4"	2.250	1.500	2.625	2.875	1.750	1.000	2.125	2.375
1"	2.250	1.500	2.625	2.875	1.750	1.000	2.125	2.375
1 1/8"	2.250	1.500	2.625	2.875	1.750	1.000	2.125	2.375

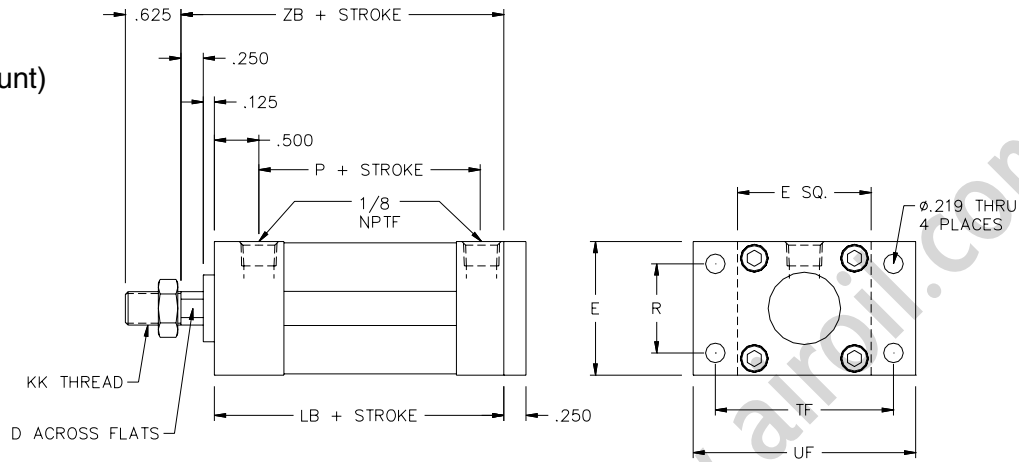
\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

\*\* Rod Ends: See page 12 for rod end options.

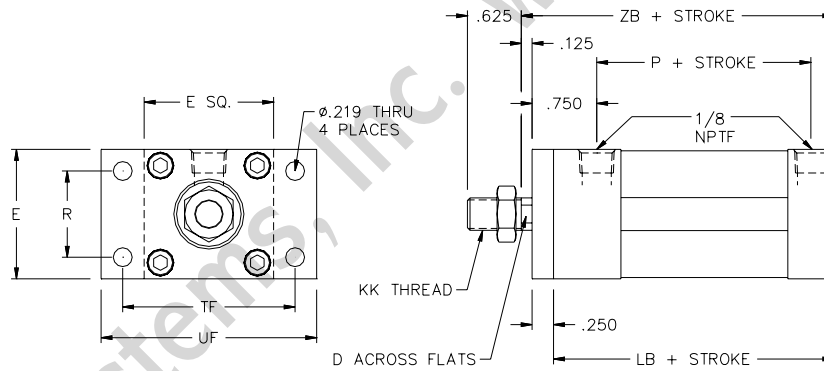


### Front and Rear Flange Mounts

Mount Code F2  
(Rear Flange Mount)



Mount Code F7  
(Front Flange Mount)



### Dimensions

BORE	E	D	KK**	R	TF	UF
3/4"	1.125	0.188	1/4-28	0.500	1.500	2.000
1"	1.375	0.250	5/16-24	0.875	1.875	2.375
1 1/8"	1.500	0.313	3/8-24	1.000	2.000	2.500

### Stroke Related Dimensions

SERIES	O and P*			Q*		
BORE	LB	P	ZB	LB	P	ZB
3/4"	2.250	1.500	2.625	1.750	1.000	2.125
1"	2.250	1.500	2.625	1.750	1.000	2.125
1 1/8"	2.250	1.500	2.625	1.750	1.000	2.125

\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

\*\* Rod Ends: See page 12 for rod end options.

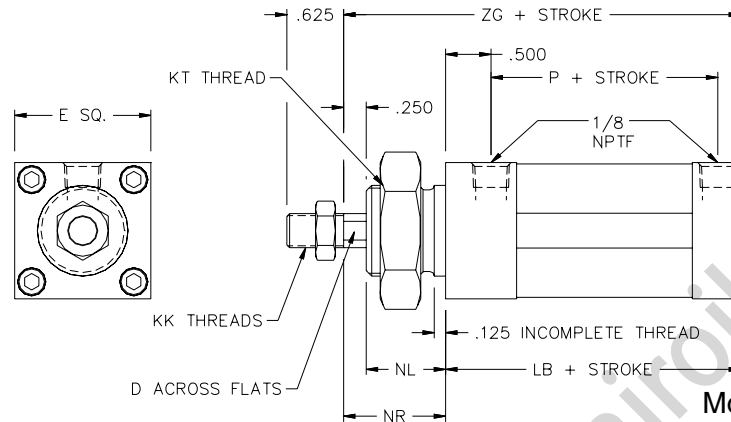


## Tiny Titan Series Small Bore, Square Cylinder

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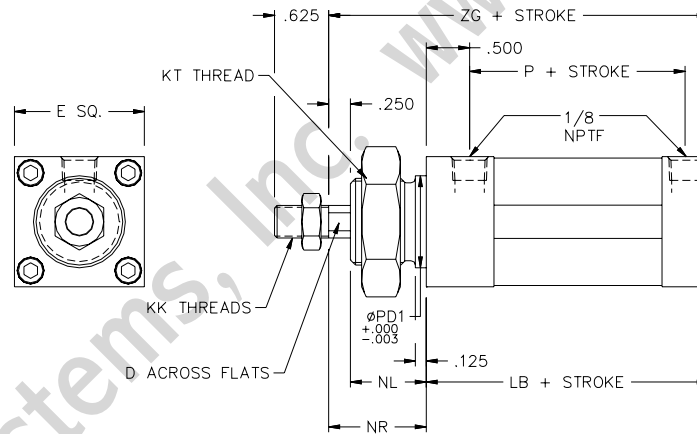
### Nose Mounts

#### Mount Code N1 (Nose Mount)



Mounting Nuts Included

#### Mount Code N2 (Nose Mount with Pilot)



Mounting Nuts Included

### Dimensions

BORE	E	D	PD1	KK**	KT	NL	NR
3/4"	1.125	0.188	0.687	1/4-28	5/8-18	0.625	0.875
1"	1.375	0.250	0.812	5/16-24	3/4-16	0.625	0.875
1 1/8"	1.500	0.313	1.062	3/8-24	1-14	0.875	1.125

### Stroke Related Dimensions

SERIES	O and P*			Q*		
BORE	LB	P	ZG	LB	P	ZG
3/4"	2.250	1.500	3.125	1.750	1.000	2.625
1"	2.250	1.500	3.125	1.750	1.000	2.625
1 1/8"	2.250	1.500	3.125	1.750	1.000	2.875

\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

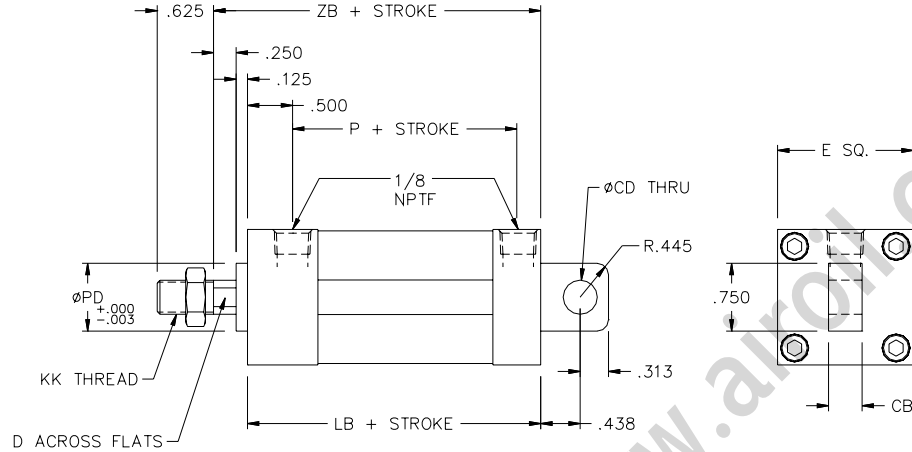
\*\* Rod Ends: See page 12 for rod end options.



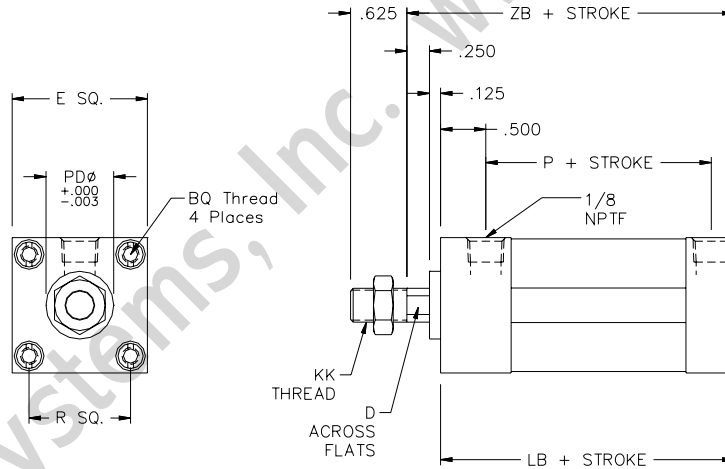


### Fixed Eye and Front Tap Mounts

#### Mount Code P3 (Eye Mount)



#### Mount Code R1 (Front Tapped Mount)



### Dimensions

BORE	E	BQ	CB	CD	D	KK**	PD	R
3/4"	1.125	8-32 X 1/4 DEEP	0.250	0.250	0.188	1/4-28	0.625	0.750
1"	1.375	8-32 X 1/4 DEEP	0.375	0.375	0.250	5/16-24	0.750	1.000
1 1/8"	1.500	10-32 X 1/4 DEEP	0.375	0.375	0.313	3/8-24	0.750	1.125

### Stroke Related Dimensions

SERIES BORE	O and P*			Q*		
	LB	P	ZB	LB	P	ZB
3/4"	2.250	1.500	2.625	1.750	1.000	2.125
1"	2.250	1.500	2.625	1.750	1.000	2.125
1 1/8"	2.250	1.500	2.625	1.750	1.000	2.125

\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

\*\* Rod Ends: See page 12 for rod end options.



## Tiny Titan Series Small Bore, Square Cylinder

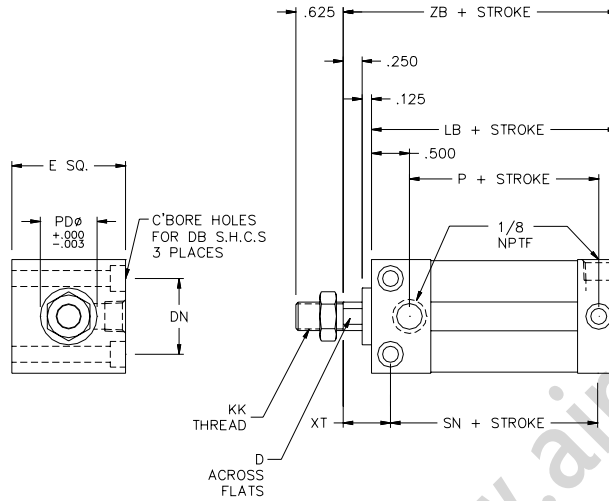
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### Side and Bottom Mount

#### Mount Code S8

(Side Mount)

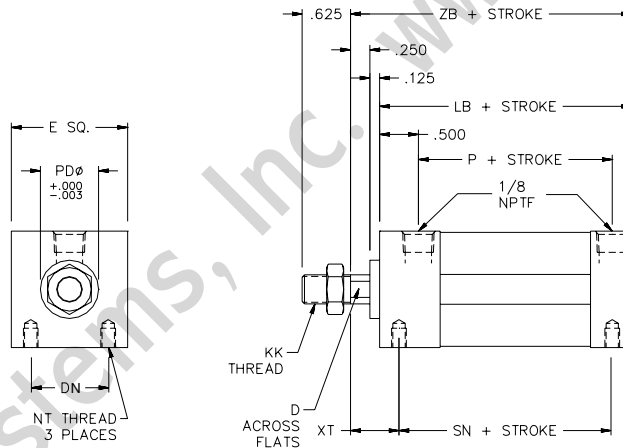
Standard ports in position # 1. Consult factory for details.



#### Mount Code S9

(Bottom Tapped Mount)

Standard ports in position # 1. Consult factory for details.



### Dimensions

BORE	E	D	DB	DN	PD	KK**	NT	XT
3/4"	1.125	0.188	#8	0.625	0.625	1/4-28	8-32 X .18 DEEP	0.563
1"	1.375	0.250	#10	0.875	0.750	5/16-24	10-32 X .25 DEEP	0.625
1 1/8"	1.500	0.313	#10	1.000	0.750	3/8-24	10-32 X .25 DEEP	0.625

### Stroke Related Dimensions

SERIES	O and P*				Q*				
	BORE	LB	P	SN	ZB	LB	P	SN	ZB
3/4"		2.250	1.500	1.812	2.625	1.750	1.000	1.312	2.125
1"		2.250	1.500	1.750	2.625	1.750	1.000	1.250	2.125
1 1/8"		2.250	1.500	1.750	2.625	1.750	1.000	1.250	2.125

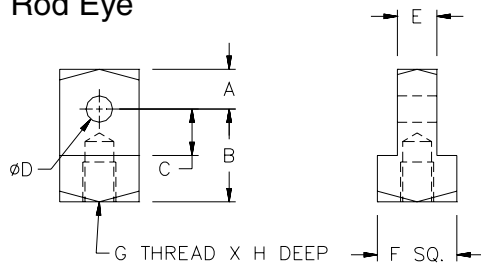
\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

\*\* Rod Ends: See page 12 for rod end options.



### Accessories

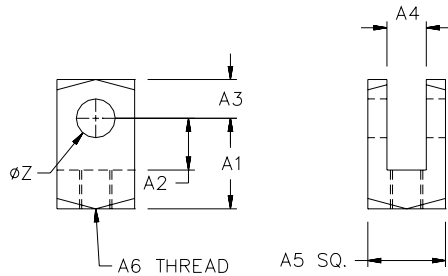
#### Rod Eye



PART #*	A	B	C	D	E	F	G	H
P26-C01	0.250	0.750	0.438	0.250	0.250	0.500	1/4-28	0.280
P26-E01	0.375	0.875	0.438	0.375	0.375	0.750	5/16-24	0.380
P26-E02	0.375	0.875	0.438	0.250	0.375	0.750	5/16-24	0.380
P26-G01	0.375	0.875	0.438	0.375	0.375	0.750	3/8-24	0.310
P26-G02	0.375	0.875	0.438	0.250	0.375	0.750	3/8-24	0.310

\* Parts are zinc plated steel

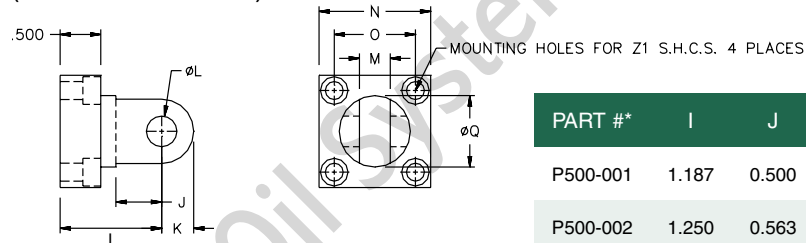
#### Rod Clevis (Pivot Pin Included)



PART #*	Z	A1	A2	A3	A4	A5	A6
P500-301	0.250	0.812	0.500	0.250	0.250	0.500	1/4-28
P500-302	0.375	0.875	0.500	0.375	0.375	0.750	5/16-24
P500-303	0.250	0.875	0.500	0.375	0.375	0.750	5/16-24
P500-304	0.375	0.875	0.500	0.375	0.375	0.750	3/8-24
P500-305	0.250	0.875	0.500	0.375	0.375	0.750	3/8-24

\* Parts are zinc plated steel

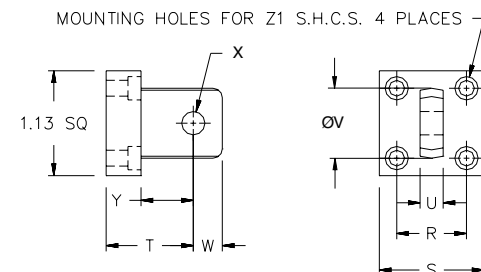
#### Clevis Bracket (Pivot Pin Included)



PART #*	I	J	K	L	M	N	O	Q	Z1
P500-001	1.187	0.500	0.250	0.250	0.250	1.125	0.750	0.750	#6
P500-002	1.250	0.563	0.375	0.375	0.375	1.375	1.000	0.875	#10
P500-003	1.250	0.563	0.375	0.250	0.375	1.375	1.000	0.875	#10

\* Parts are zinc plated steel

#### Eye Bracket



PART #*	R	S	T	U	V	W	X	Y	Z1
P30-C01	0.75	1.125	0.937	0.250	0.750	0.312	0.250	0.56	#6
P30-E01	1.000	1.375	0.937	0.375	0.750	0.312	0.375	0.56	#10
P30-E02	1.000	1.375	0.937	0.375	0.750	0.312	0.250	0.56	#10

\* Parts are zinc plated steel



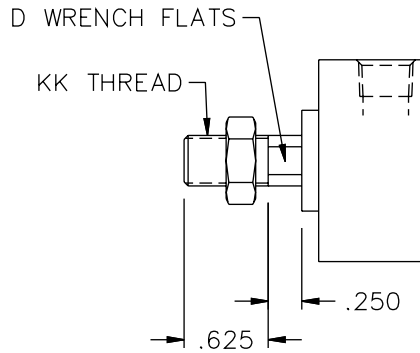
## Tiny Titan Series Small Bore, Square Cylinder

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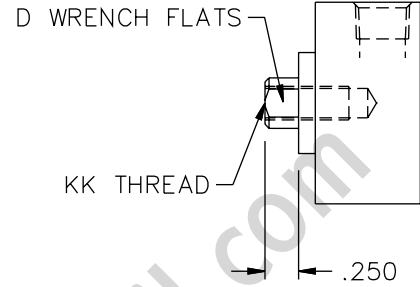
### Rod Ends and Accessories

#### Rod Ends

#### Styles 1 and 2



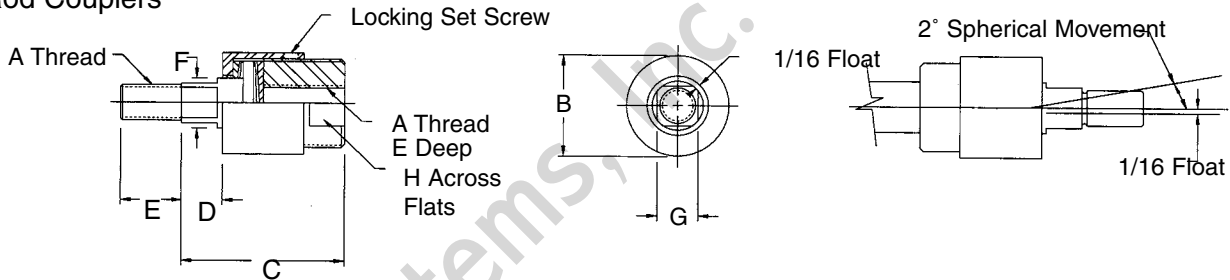
#### Style 3



Jam nuts included with Style 1 and Style 2 rod ends.

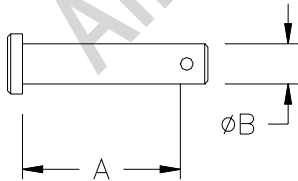
BORE	ROD	STYLE 1	STYLE 2	STYLE 3	D
3/4"	0.250	1/4-28	1/4-20	6-32 X .44 DEEP	0.188
3/4"	0.312	5/16-24	5/16-18	10-32 X .63 DEEP	0.250
1"	0.312	5/16-24	5/16-18	10-32 X .63 DEEP	0.250
1"	0.375	3/8-24	3/8-16	1/4-28 X .63 DEEP	0.312
1 1/8"	0.375	3/8-24	3/8-16	1/4-28 X .63 DEEP	0.312
1 1/8"	0.500	1/2-20	1/2-13	3/8-24 X .63 DEEP	0.438

#### Rod Couplers



PART #	A	B	C	D	E	F	G	H
A500-600	1/4-28	7/8	1-1/4	1/4	5/8	5/16	3/16	3/4
A500-601	5/16-24	7/8	1-1/4	1/4	5/8	5/16	1/4	3/4
A500-602	3/8-24	7/8	1-1/4	1/4	5/8	5/16	5/16	3/4
A500-604	1/2-20	1-1/4	2	1/2	3/4	5/8	1/2	1

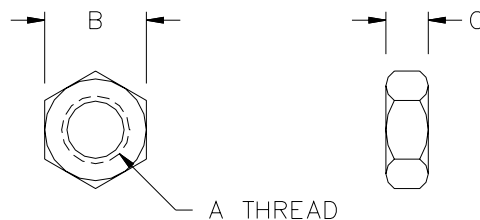
#### Pivot Pin



PART #*	A	B
P500-401	0.984	0.250
P500-403	0.891	0.375

\* Parts are zinc plated steel

#### Hex Nuts



PART#*	A	B	C
N90-1093	1/4-20	0.44	0.16
M190001	1/4-28	0.44	0.16
N90-1094	5/16-18	0.50	0.19
M18-004	5/16-24	0.50	0.19
N90-1062	3/8-16	0.56	0.22
M190002	3/8-24	0.56	0.22
N90-1095	1/2-13	0.75	0.31
M190004	1/2-20	0.75	0.31
M190005	5/8-18	0.94	0.38
M190006	3/4-16	1.12	0.42
M190008	1-14	1.50	0.55

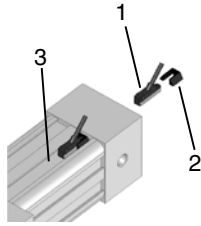
\* Parts are zinc plated steel



### P series Global application Detail

#### Profile Tube Detail

1. Global Switch
2. Included Dovetail adapter
3. Dove Tail extrusion



### Tiny Titan Series World Switch Bracket

Cylinders	Bore	Part Number
Tiny Titan series	All	Direct Fit

### Tiny Titan Series World Switch Hall Effect Part Numbers

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SH6-031	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-021	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-032	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-022	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts

### Hall Effect Switch

