

# numatics®

## Tiny Titan Series

Small Bore, Square End Cap Cylinder Line



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## Tiny Titan Series

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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** are 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 PTFE 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 PTFE 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.



### Standard Specifications:

- Bore sizes include 3/4", 1", 1-1/8"
- Maximum 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

## 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
- 99 = 99" 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 = FKM 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.
- \*\* Must specify length.

### 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.

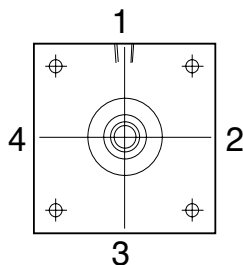
### Ports

- |          |              |
|----------|--------------|
| 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

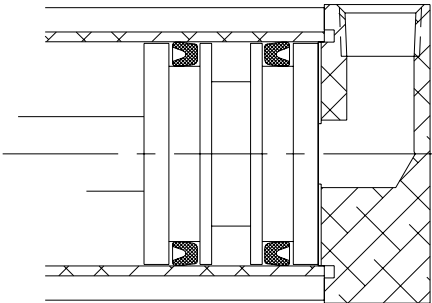
### Force Chart

### 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

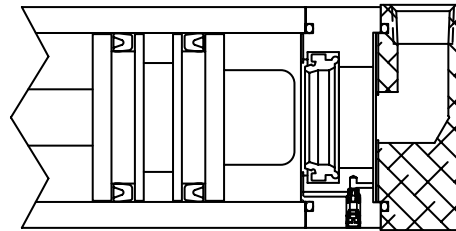
### Optional Features

**O Type Piston (Standard)**



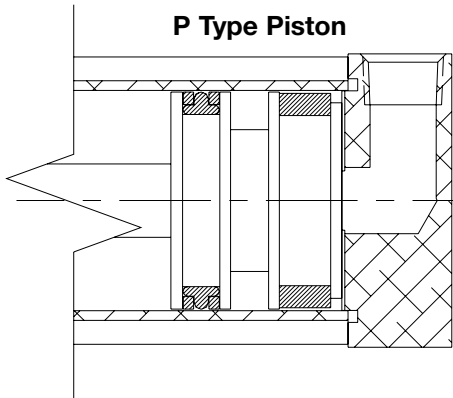
- U-cup (Block-V) piston seals
- Low breakaway
- Groove for optional magnet

**O Type Cap Cushion**



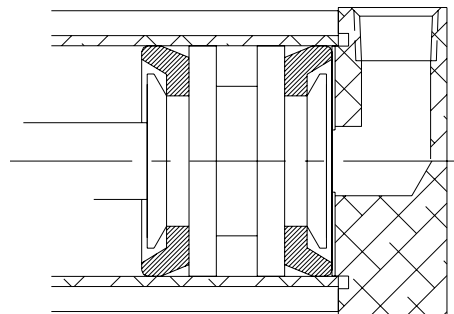
- The cushion seal has a built in check function. It seals in one direction and permits full flow in the opposite direction.
- Captured cushion needle
- Length grows by 1/2" per end

**P Type Piston**



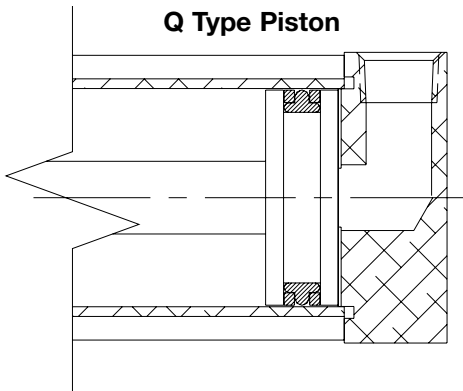
- Heavy duty
- Non-lube service
- T-seal piston
- Wear band
- Groove for optional magnet

**Silencer Bumper Seal**



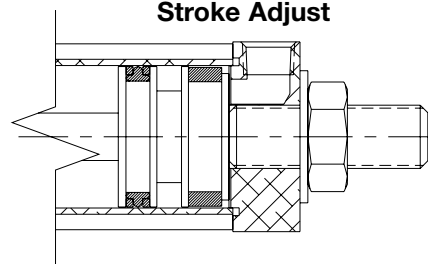
- Reduces end of stroke impact noise
- Bumper seal does not change cylinder overall length
- Cushions not available with this option
- Requires a minimum of 100 psi for the rod to reach the full end of stroke with the EB option.

**Q Type Piston**



- Low profile design
- T-seal piston

**Stroke Adjust**



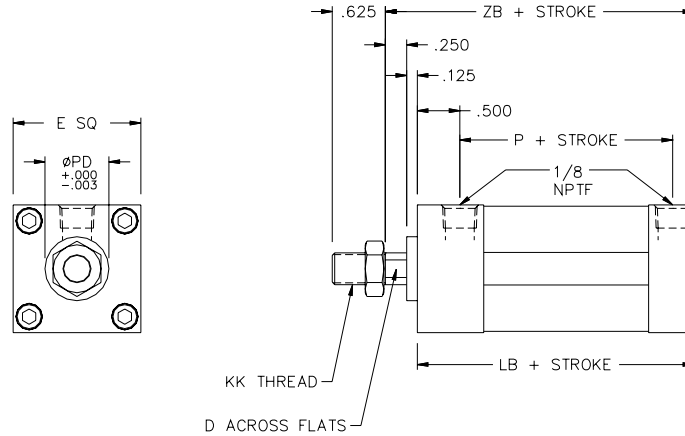
Bore	JA	JB	JC
3/4"	3/8-24	1.44	3/16
1" and 1-1/8"	1/2-20	1.44	1/4

- 1" maximum adjustment

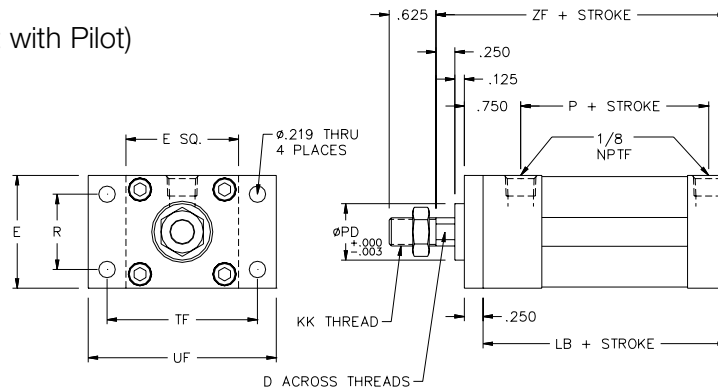
**Dimensions: Inches**

**Basic and Front Flange Mounts**

Mount Code X0  
(Basic No Mount)



Mount Code F1  
(Front Flange Mount with Pilot)



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

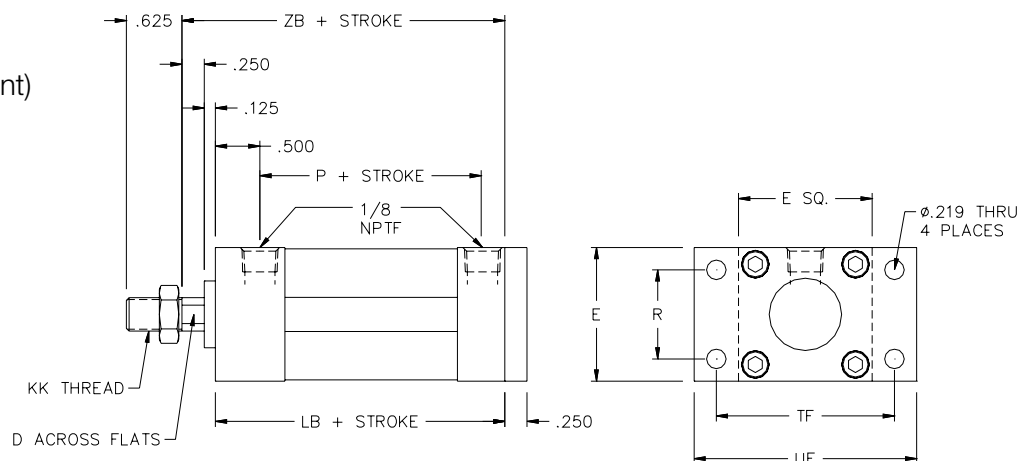
\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

\*\* Rod Ends: See next spread for rod end options.

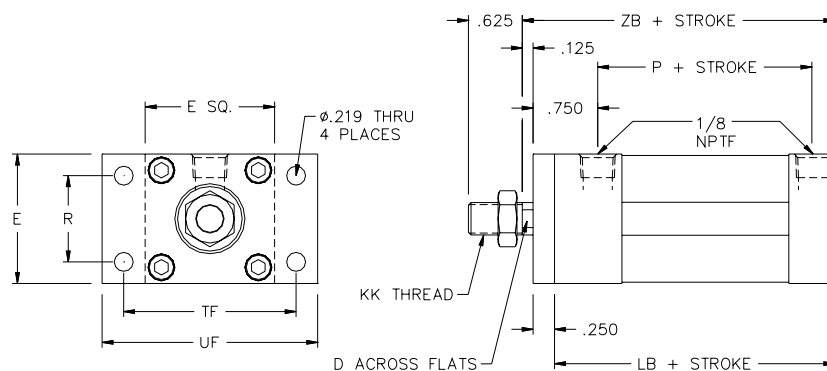
#### Dimensions: Inches

#### Front and Rear Flange Mounts

Mount Code F2  
(Rear Flange Mount)



Mount Code F7  
(Front Flange Mount)



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

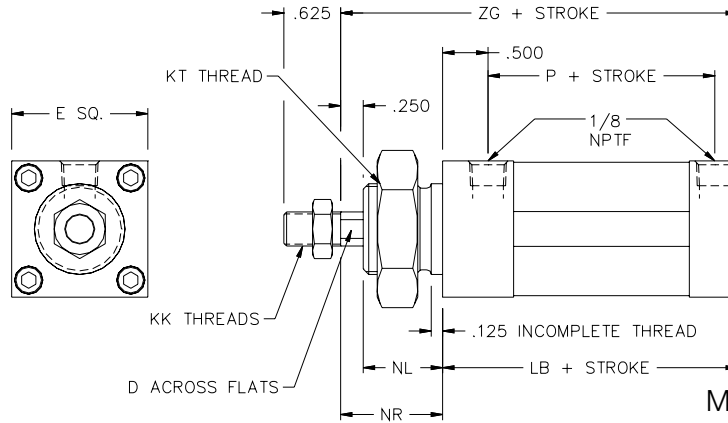
\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

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

**Dimensions: Inches**

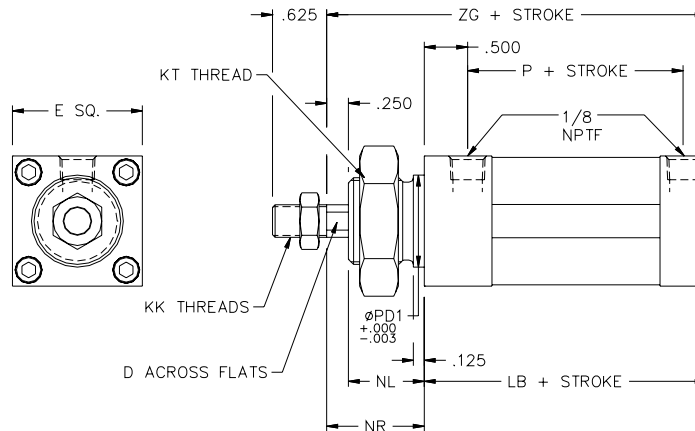
**Nose Mounts**

Mount Code N1  
(Nose Mount)



Mounting Nuts Included

Mount Code N2  
(Nose Mount with Pilot)



Mounting Nuts Included

Bore	E	D	PD1	KK**	KT	NL	NR
3/4"	1.125	0.188	0.625	1/4-28	5/8-18	0.625	0.875
1"	1.375	0.250	0.750	5/16-24	3/4-16	0.625	0.875
1 1/8"	1.500	0.313	0.750	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	2.125
1"	2.250	1.500	3.125	1.750	1.000	2.125
1 1/8"	2.250	1.500	3.375	1.750	1.000	2.125

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

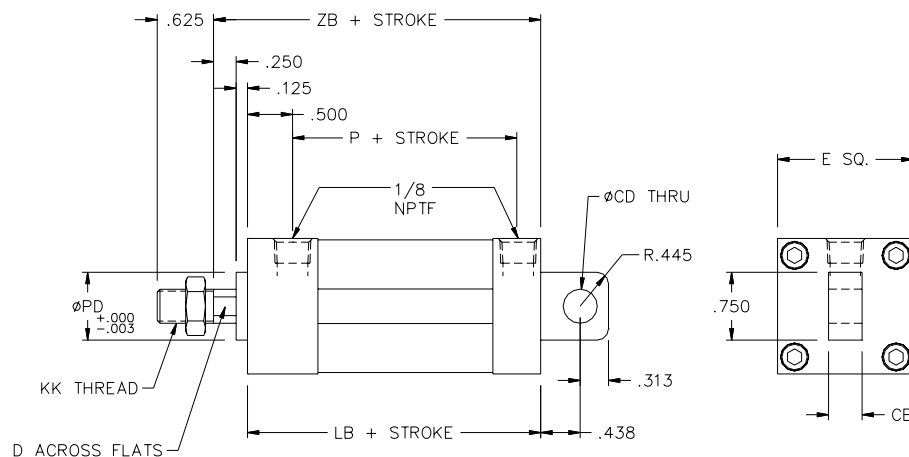
\*\* Rod Ends: See page 12 for rod end options.



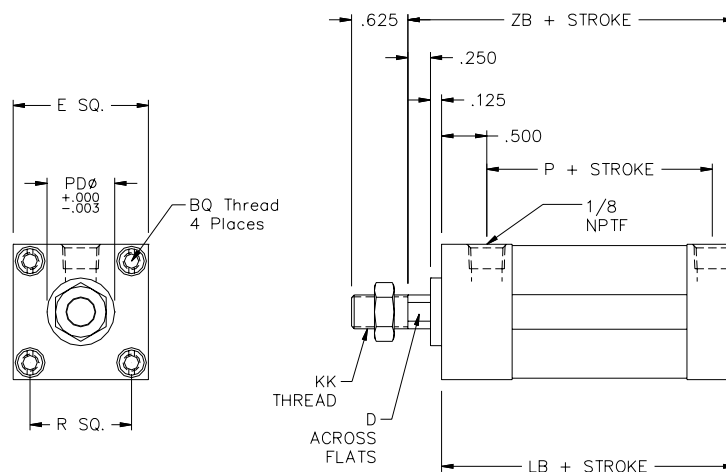
#### Dimensions: Inches

#### Fixed Eye and Front Tap Mounts

Mount Code P3  
(Eye Mount)



Mount Code R1  
(Front Tapped Mount)



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	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

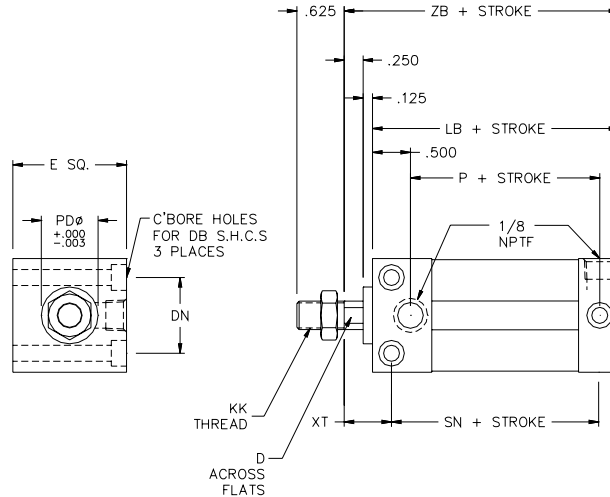
\* Cushions: Adds 1/2" per end to the OAL of the cylinder.

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

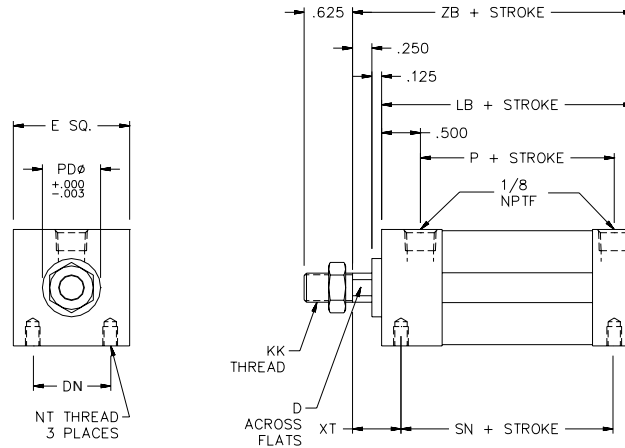
**Dimensions: Inches**

**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.



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**

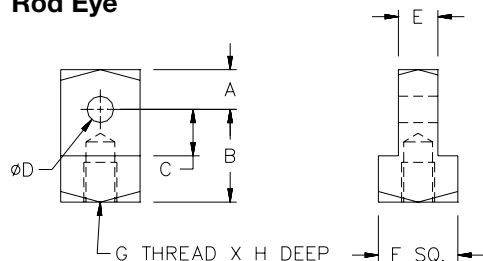
Series	O and P*				Q*			
Bore	LB	P	SN	ZB	LB	P	SN	ZB
3/4"	2.250	1.500	1.812	2.625	1.750	1.000	1.312	2.125
1"	2.250	1.500	1.750	2.625	1.750	1.000	1.250	2.125
1 1/8"	2.250	1.500	1.750	2.625	1.750	1.000	1.250	2.125

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

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

### Accessories

#### Rod Eye

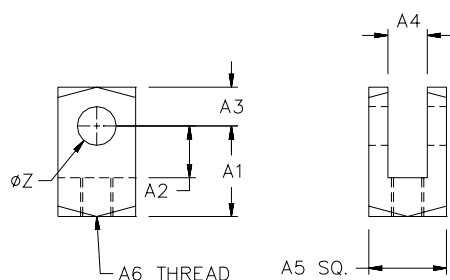


Part No.	A	B	C	D	E	F		H
P26-C01	0.250	0.750	0.438	0.250	0.250	0.500	1/4-28	0.280
P26-E01	0.375	0.875	0.438	0.375	0.375	0.750	5/16-24	0.380
P26-E02	0.375	0.875	0.438	0.250	0.375	0.750	5/16-24	0.380
P26-G01	0.375	0.875	0.438	0.375	0.375	0.750	3/8-24	0.310
P26-G02	0.375	0.875	0.438	0.250	0.375	0.750	3/8-24	0.310

\* Parts are zinc plated steel

#### Rod Clevis

(Pivot Pin Included)

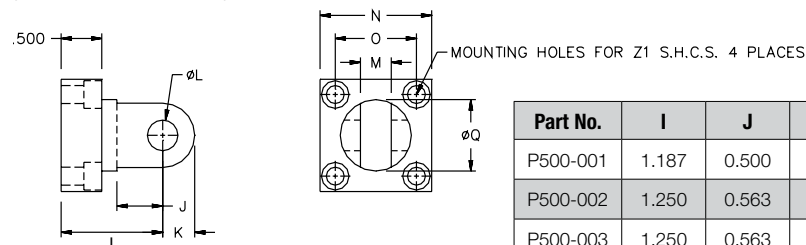


Part No.	Z	A1	A2	A3	A4	A5	A6
P500-301	0.250	0.812	0.500	0.250	0.250	0.500	1/4-28
P500-302	0.375	0.875	0.500	0.375	0.375	0.750	5/16-24
P500-303	0.250	0.875	0.500	0.375	0.375	0.750	5/16-24
P500-304	0.375	0.875	0.500	0.375	0.375	0.750	3/8-24
P500-305	0.250	0.875	0.500	0.375	0.375	0.750	3/8-24

\* Parts are zinc plated steel

#### Clevis Bracket

(Pivot Pin Included)

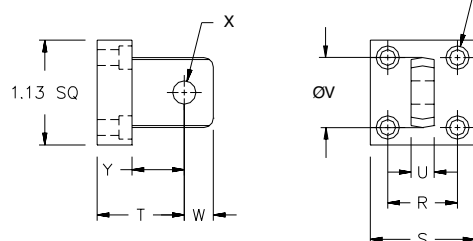


Part No.	I	J	K	L	M	N	O	Q	Z1
P500-001	1.187	0.500	0.250	0.250	0.250	1.125	0.750	0.750	#6
P500-002	1.250	0.563	0.375	0.375	0.375	1.375	1.000	0.875	#10
P500-003	1.250	0.563	0.375	0.250	0.375	1.375	1.000	0.875	#10

\* Parts are zinc plated steel

#### Eye Bracket

MOUNTING HOLES FOR Z1 S.H.C.S. 4 PLACES



Part No.	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

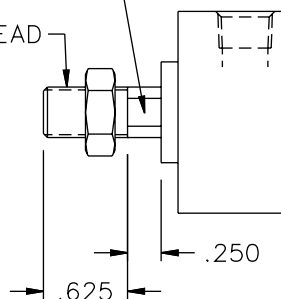
## Rod Ends and Accessories

### Rod Ends

Styles 1 and 2

D WRENCH FLATS

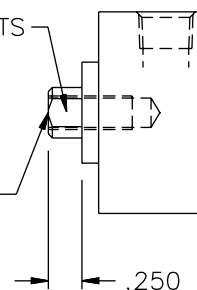
KK THREAD



Style 3

D WRENCH FLATS

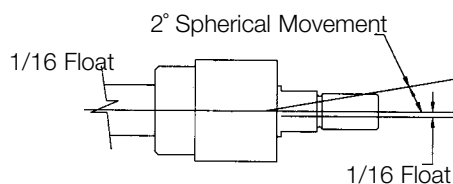
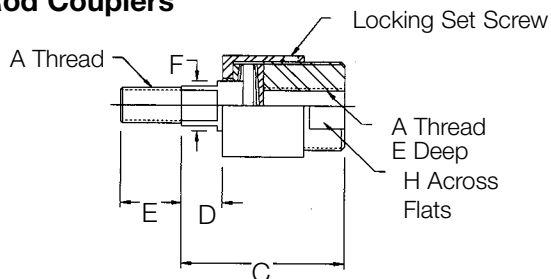
KK THREAD



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

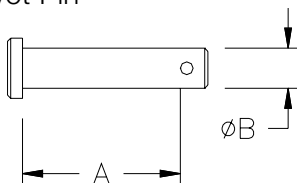
Bore	Rod	Style 1	Style 2	Style 3	D
3/4"	0.250	1/4-28	1/4-20	6-32 X .44 DEEP	0.188
3/4"	0.312	5/16-24	5/16-18	10-32 X .63 DEEP	0.250
1"	0.312	5/16-24	5/16-18	10-32 X .63 DEEP	0.250
1"	0.375	3/8-24	3/8-16	1/4-28 X .63 DEEP	0.312
1 1/8"	0.375	3/8-24	3/8-16	1/4-28 X .63 DEEP	0.312
1 1/8"	0.500	1/2-20	1/2-13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

### Rod Couplers



Part No.	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

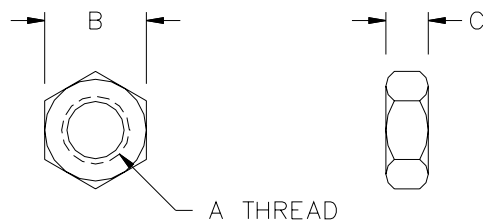
### Pivot Pin



Part No.	A	B
P500-401	0.984	0.250
P500-403	0.891	0.375

\* Parts are zinc plated steel

### Hex Nuts



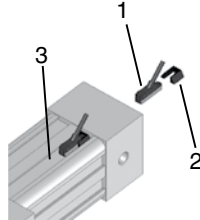
Part No.	A	B	C
N90-1093	1/4-20	0.44	0.16
M190001	1/4-28	0.44	0.16
N90-1094	5/16-18	0.50	0.19
M18-004	5/16-24	0.50	0.19
N90-1062	3/8-16	0.56	0.22
M190002	3/8-24	0.56	0.22
N90-1095	1/2-13	0.75	0.31
M190004	1/2-20	0.75	0.31
M190005	5/8-18	0.94	0.38
M190006	3/4-16	1.12	0.42
M190008	1-14	1.50	0.55

\* Parts are zinc plated steel

### Tiny Titan series Global application Detail

#### Profile Tube Detail

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



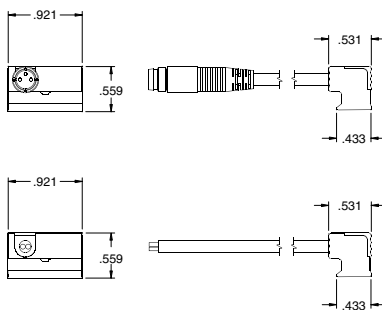
#### Tiny Titan Series World Switch Bracket

Cylinders	Bore	Part Number
Tiny Titan series	All	Direct Fit

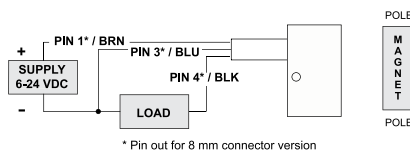
#### Tiny Titan Series World Switch Hall Effect Part Numbers

P/N	Switch Style	Electrical Design	Output	Operating Voltage	Current Rating	Switching Power	Voltage Drop	NEMA IP Rating	Temperature Rating
SH6-031	Flying Lead	DC PNP	Normally Open	6-24 VDC	0.3 Amps Max.	7.2 Watts Max.	.5 Volts	NEMA 6	-25° to +75° C
SH6-032	Flying Lead	DC PNP	Normally Open	6-24 VDC	0.3 Amps Max.	7.2 Watts Max.	.5 Volts	NEMA 6	-25° to +75° C
SH6-021	M8 Connector	DC NPN	Normally Open	6-24 VDC	0.3 Amps Max.	7.2 Watts Max.	.5 Volts	NEMA 6	-25° to +75° C
SH6-022	M8 Connector	DC NPN	Normally Open	6-24 VDC	0.3 Amps Max.	7.2 Watts Max.	.5 Volts	NEMA 6	-25° to +75° C

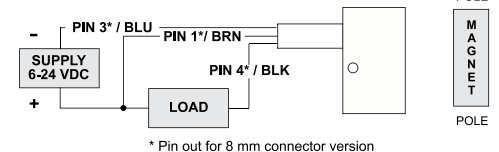
### Hall Effect Switch



#### PNP Sourcing



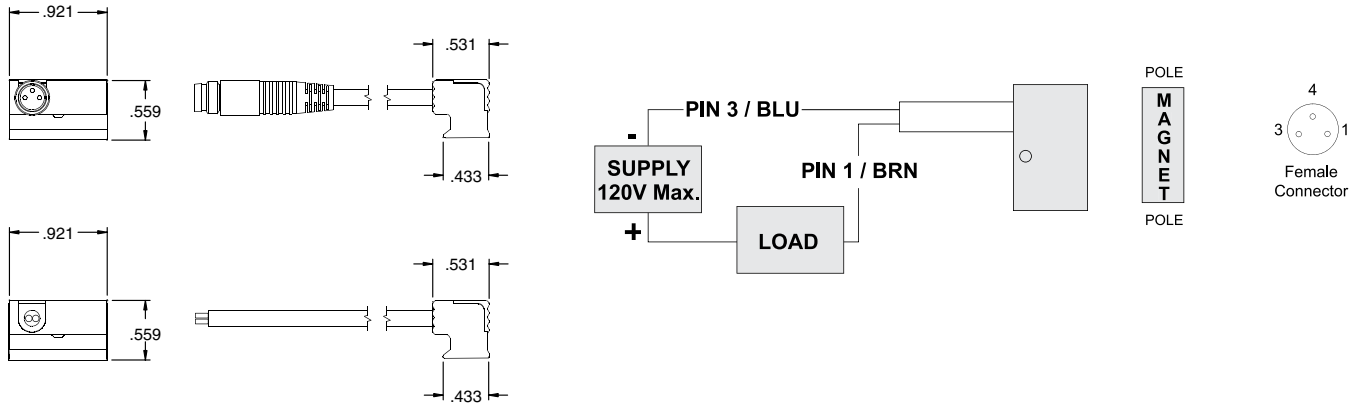
#### NPN Sinking



**Tiny Titan Series World Switch Reed Switch Part Numbers**

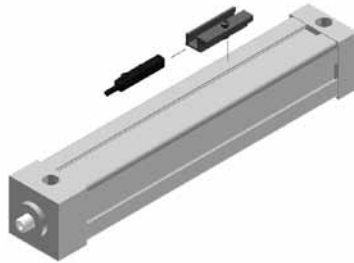
P/N	Switch Style	Electrical Design	Output	Operating Voltage	Current Rating	Switching Power	Voltage Drop	NEMA IP Rating	Temperature Rating
SR6-002	Flying Lead	AC/DC REED	Normally Open	5-120 VAC/DC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	3.5 Volts	NEMA 6	-25° to +75° C
SR6-004	Flying Lead	AC/DC REED	Normally Open	5-120 VAC/DC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts	NEMA 6	-25° to +75° C
SR6-022	M8 Connector	AC/DC REED	Normally Open	5-50 VAC 5-60 VDC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	.5 Volts	NEMA 6	-25° to +75° C
SR6-024	M8 Connector	AC/DC REED	Normally Open	5-50 VAC 5-60 VDC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts	NEMA 6	-25° to +75° C

**Reed Switch - Normally Open Type SR6**



**Tiny Titan Series (Profile)**

Bore	Bracket P/N
3/4"	N99-1185
1"	N99-1185
1 1/8"	N99-1185

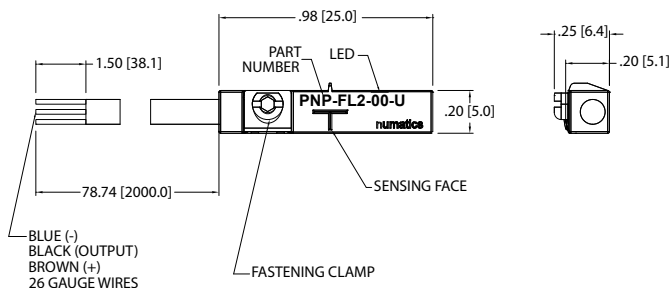


Sensor Description	Standard Cord Set	Quick Disconnect
Reed Switch	REED-FL2-00	REED-QDS-M8U
Hall PNP	PNP-FL2-00-U	PNP-QDS-M8-U
Hall NPN	NPN-FL2-00-U	NPN-QDS-M8-U

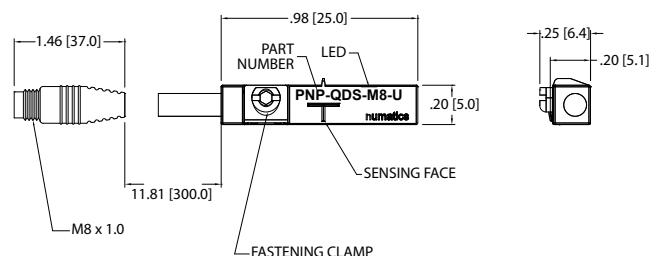
See page 15, 16, & 17 for sensor specifications

### Sensing Part Numbers

#### PNP-FL2-00-U



#### PNP-QDS-M8-U

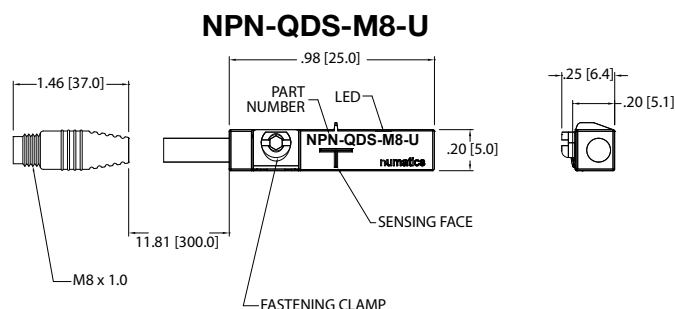
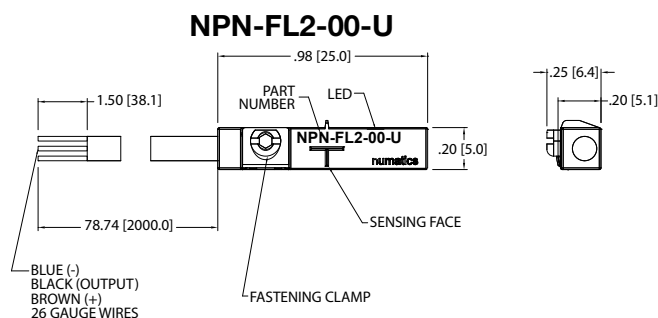


ELECTRICAL DESIGN	DC PNP
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-25°C to 85°C
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	Flying Leads, Pur Cable (2m Long, 3 x26 Gauge Wire)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	CE cULus RoHS

ELECTRICAL DESIGN	DC PNP
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-25°C to 85°C
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	M8 Connector (Snap Fit) , Pur Cable (.3 m)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	CE cULus RoHS

\*Switches are not designed for wet environments. Please see your distributor for additional information.

## Sensing Part Numbers



ELECTRICAL DESIGN	DC NPN
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-25°C to 85°C
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	Flying Leads, Pur Cable (2m Long, 3 x26 Gauge Wire)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	

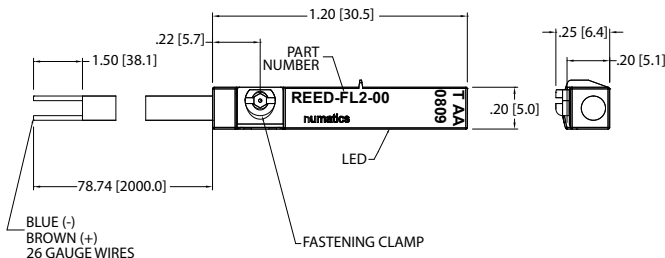
ELECTRICAL DESIGN	DC NPN
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-25°C to 85°C
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	M8 Connector (Snap Fit) , Pur Cable (.3 m)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	

\*Switches are not designed for wet environments. Please see your distributor for additional information.



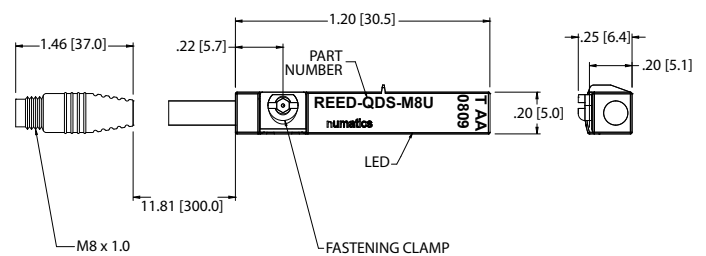
### Sensing Part Numbers

#### REED-FL2-00



ELECTRICAL DESIGN	AC/DC REED
OUTPUT	Normally Open
OPERATING VOLTAGE	5-120 VAC/DC
CURRENT RATING	100 mA*
SHORT-CIRCUIT PROTECTION	No
OVERLOAD PROTECTION	No
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 5 V
REPEATABILITY	± .2mm
MAKETIME INCLUDING BOUNCE	< .6 ms
BREAKTIME	< .1 ms
SWITCHING POWER (MAX)	5 W
SWITCH FREQUENCY	1000 Hz
AMBIENT TEMPERATURE	-25°C to 70°C
PROTECTION	IP 67, II
HYSTERESIS	.9mm
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	Flying Leads, Pur Cable (2m Long, 2 x26 Gauge Wire)
REMARKS	<p>*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary. Conforms to 2008 NEC Section 725 III, Class 2 Circuits</p> <p>Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.</p> <p>No LED Function in case of Polarity in DC Operation</p>
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	<b>CE RoHS</b>

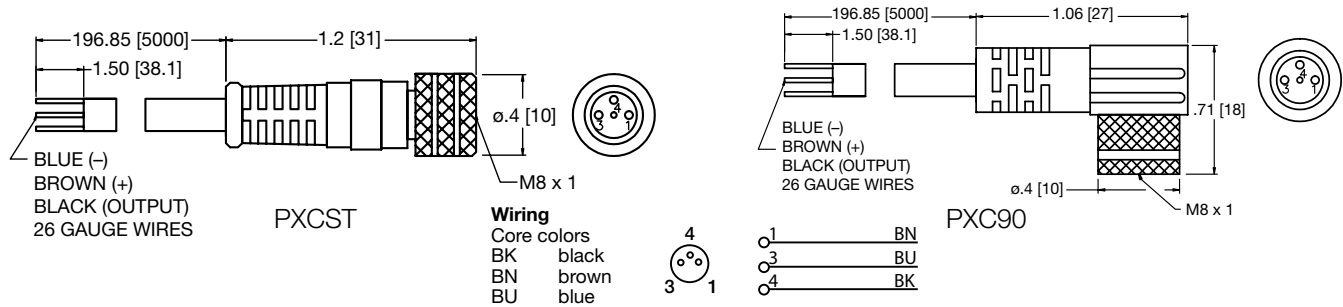
#### REED-QDS-M8U



ELECTRICAL DESIGN	AC/DC REED
OUTPUT	Normally Open
OPERATING VOLTAGE	*5-60 VDC / 5-50 VAC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	No
OVERLOAD PROTECTION	No
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 5 V
REPEATABILITY	± .2mm
MAKETIME INCLUDING BOUNCE	< .6 ms
BREAKTIME	< .1 ms
SWITCHING POWER (MAX)	5 W
SWITCH FREQUENCY	1000 Hz
AMBIENT TEMPERATURE	-25°C to 70°C
PROTECTION	IP 67, II
HYSTERESIS	.9mm
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	M8 Connector (Snap Fit), Pur Cable (.3m)
REMARKS	<p>*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary. Conforms to 2008 NEC Section 725 III, Class 2 Circuits</p> <p>M8 Connector voltage limited to 5-60 vdc / 5-50 vac to conform with 2008 IEC 61076-2-104</p> <p>Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.</p> <p>No LED Function in case of Polarity in DC Operation</p>
ACCESSORIES	Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch
AGENCY APPROVALS	<b>CE RoHS</b>

\*Switches are not designed for wet environments. Please see your distributor for additional information.

Quick Disconnect Cables



Order Code	Type	Operating Voltage	Current Rating	Cable Material	Protection	Connector
PXCST	Straight 5 m Cable (3 x 26 Gauge wire)	60 AC/75 DC	3 A	PUR	IP 68, III	M8
PXC90	90° 5 m Cable (3 x 26 Gauge wire)	60 AC/75 DC	3 A	PUR	IP 68, III	M8

### How to Order - Tiny Titan Series Piston Rod Assembly

**P92 - G 1 1 N 0 - 01 A - AA**

**Type**

O92 = U-Cup Piston Rod Assembly  
P92 = Heavy Duty Piston Rod Assembly  
Q92 = Low Profile Piston Rod Assembly

**Bore**

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

**Rod Code**

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

**Mount**

1 = All Mounts Except F1, N1, and N2  
2 = F1 Mount  
3 = N1 and N2 Mount

**Cushion**

N = No Cushion  
B = Both Ends Cushioned  
H = Head End Cushioned  
C = Cap End Cushioned

**Magnet**

0 = No Magnet  
2 = Reed Magnet

**Option**

AA = No Option  
EB = Silencer Bumpers  
KA = Stroke Adjuster  
NA = Nickel Plated  
1A\* = Rod Extension  
2A\* = Thread Extension  
4A\* = Stop Tube  
\* Specify Length

**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"

Note: 1/8" minimum stroke.

**Full Inch of Stroke**

00 = 0" Stroke  
01 = 1" Stroke  
02 = 2" Stroke  
03 = 3" Stroke  
04 = 4" Stroke  
10 = 10" Stroke

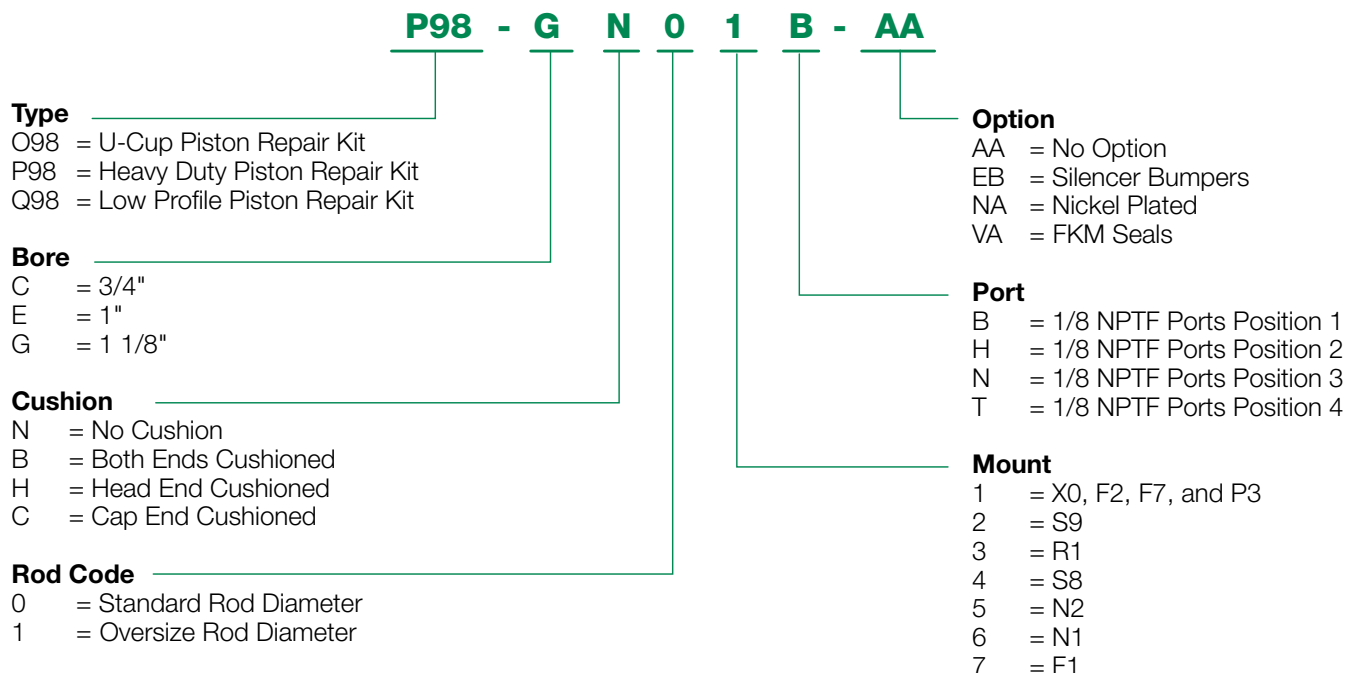
Note: Options listed are ones that apply to a piston rod assembly only.  
Model number is set up to use option code supplied with original cylinder or with any above.

### Rod End Styles, Diameters and Threads

Bore	Rod	Style 1	Style 2	Style 3
3/4"	0.250	1/4-28	1/4-20	6-32 X .44
3/4"	0.312	5/16-24	5/16-18	10-32 X .63
1"	0.312	5/16-24	5/16-18	10-32 X .63
1"	0.375	3/8-24	3/8-16	1/4-28 X .63
1-1/8"	0.375	3/8-24	3/8-16	1/4-28 X .63
1-1/8"	0.500	1/2-20	1/2-13	3/8-24 X .63

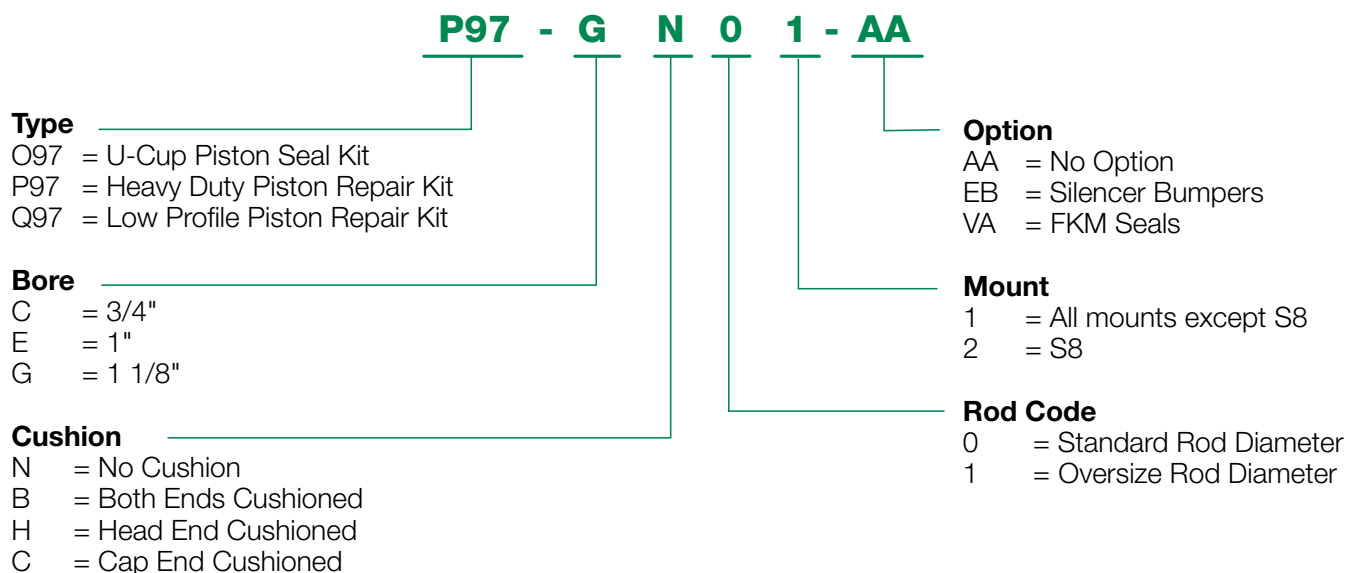
Jam nuts included with Style 1 and Style 2 rod ends.

## How to Order - Tiny Titan Series Repair Kit



Note: Options listed are ones that apply to a repair kit only.  
Model number is set up to use option code supplied with original cylinder or with any above.

## How to Order - Tiny Titan Series Seal Kit

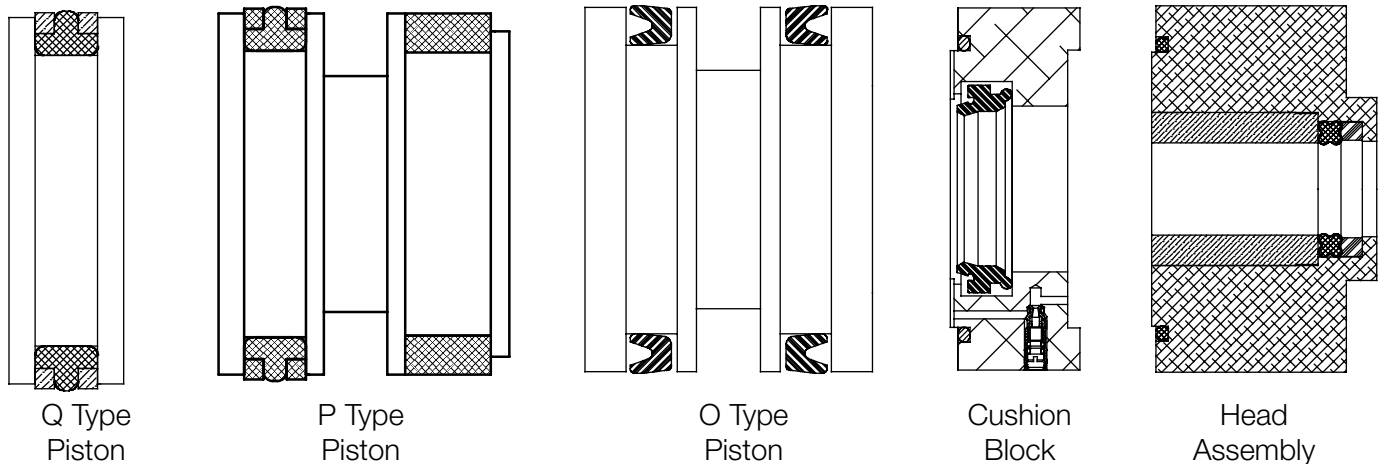


Note: Options listed are ones that apply to a seal kit only.  
Model number is set up to use option code supplied with original cylinder or with any above.

### Piston Rod Assembly Kit Removal/Installation Instructions

1. Loosen 8 Socket Head Cap Screws (SHCS) (Part #16) to remove Head (Part #1), Piston/Rod Assembly (Part #9 & #10), and Cushion Block (Part #6) if cylinder is cushioned.
2. Carefully remove old seals and wearband (Part #2, #11, #14). Depending on the cylinder type, piston seal(s) and wearband will vary. Any damage to the seal grooves may result in leakage.
3. Lubricate new seals and Wearband (Part #14) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
4. Install Piston Seal(s) (Part #11). Depending on the cylinder type, piston seal(s) will vary. Make sure the piston seal is not twisted inside groove. If cylinder type is P or Q, install back-up rings (Part #12). See Seal Installation Guide.
5. Install lubricated wearbands onto piston/rod assembly if cylinder type is P. Sink piston assembly into sinker tube. See Sinker Tube Part Numbers Chart.
6. Apply lube inside the cylinder tube.
7. Sink piston/rod assembly into cylinder tube.
8. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
9. Place Tube End Seals (Part #2) into head seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
10. Lightly grease Rod Seal (Part #4) in the head before reassembling the cylinder. This will ease the installation of the head over the rod.
11. Carefully place head over the rod until getting interference. With a twisting motion, slide the loaded head down over the rod.
12. Loosely torque head end SHCS to allow head to rotate slightly.
13. Before final torque, place cylinder on level surface to square head and cap. Torque SHCS in a crisscross pattern. Use the following chart for torque tolerances.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 11-14.

### Seal Installation Guide



### Screw Torque Tolerances (lbs-ft) Part #16

Bore	Min.	Max.
3/4	1	1.5
1	1	2
1 1/8	1	2

### Sinker Tube Part Numbers

Bore	Part #
3/4	C06-C91
1	R06-E91
1 1/8	C06-G91

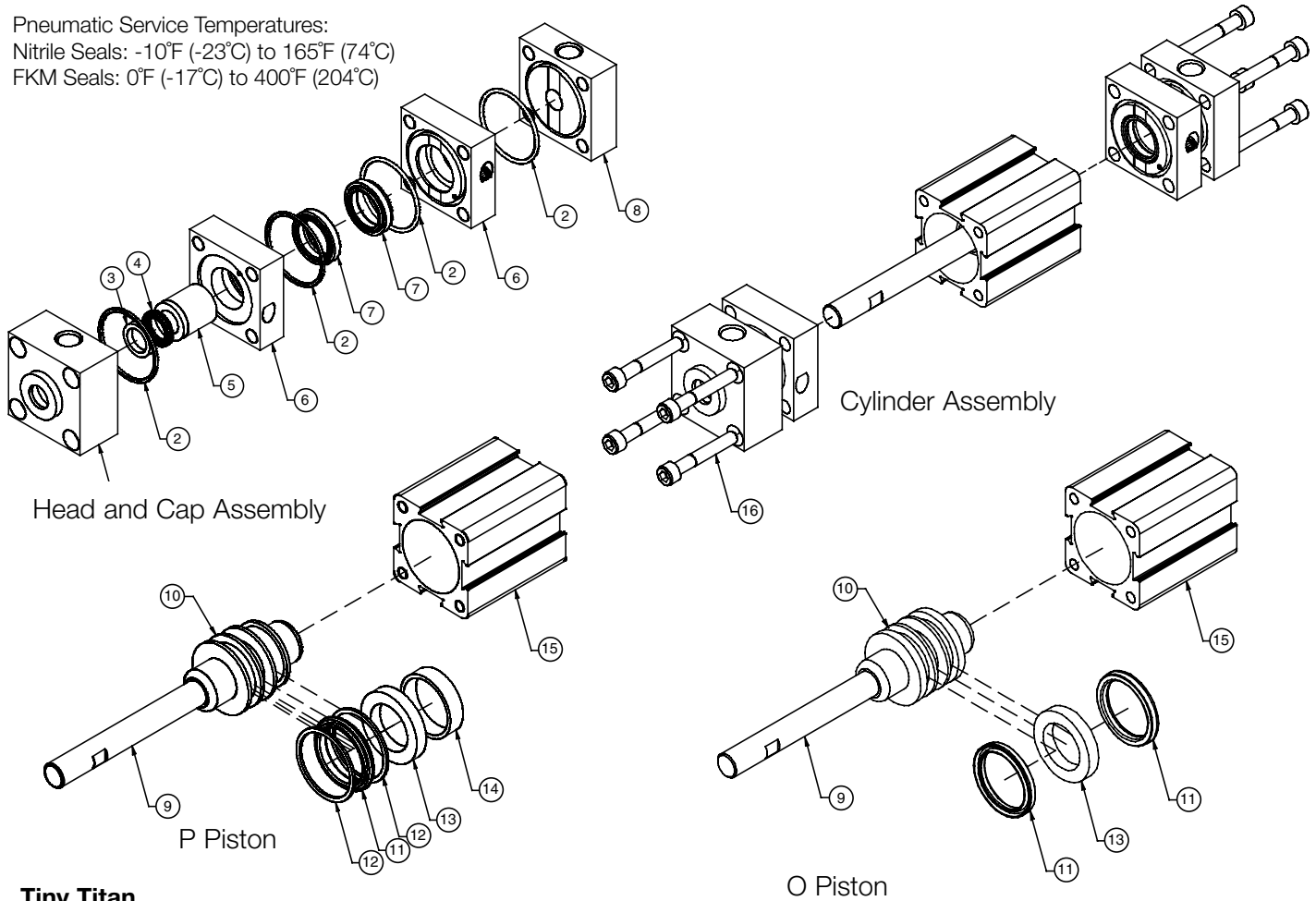
**Note:** Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

## Diagrams

Pneumatic Service Temperatures:

Nitrile Seals: -10°F (-23°C) to 165°F (74°C)

FKM Seals: 0°F (-17°C) to 400°F (204°C)



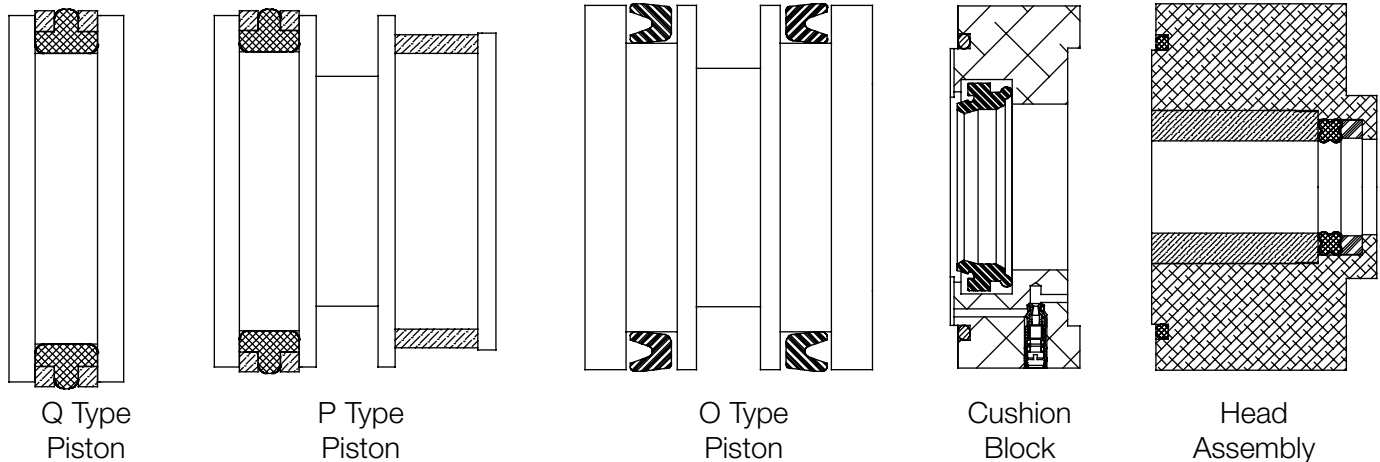
## Tiny Titan

Part #	Description	Parts included in:		
		Seal Kit	Repair Kit	Piston/Rod Assembly
1	Head		X	
2	Tube End Seals	X	X	
3	Rod Wiper	X	X	
4	Rod Seal	X	X	
5	Bushing		X	
6	Cushion Block			
7	Cushion Seal	X	X	
8	Cap			
9	Rod			X
10	Piston			X
11	Piston Seal	X	X	
12	Back-up Rings	X	X	
13	Magnet			X
14	Wearband	X	X	
15	Tube			
16	Socket Head Cap Screws (SHCS)			

### Repair Kit Removal/Installation Instructions

1. Loosen 8 Socket Head Cap Screws (SHCS) (Part #16) to remove Head (Part #1), Cap (Part #8), Piston/Rod Assembly (Part #9 & #10), and Cushion Block(s) (Part #6) if cylinder is cushioned.
2. Carefully remove old seals and wearband (Part #2, #7\*, #11, #14). Depending on the cylinder type, piston seal(s) and wearband will vary. Any damage to the seal grooves may result in leakage.
3. Lubricate new seals and Wearband (Part #14) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
4. Install Piston Seal(s) (Part #11). Depending on the cylinder type, piston seal(s) will vary. Make sure the piston seal is not twisted inside groove. If cylinder type is P or Q, install back-up rings (Part #12). See Seal Installation Guide.
5. Install lubricated wearbands onto piston/rod assembly if cylinder type is P. Sink piston assembly into sinker tube. See Sinker Tube Part Numbers Chart.
6. Apply lube inside the cylinder tube.
7. Sink piston/rod assembly into cylinder tube.
8. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
9. Place Tube End Seals (Part #2) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
10. Lightly grease Rod Seal (Part #4) in the supplied loaded head before reassembling the cylinder. This will ease the installation of the head over the rod.
11. Reassemble cylinder except for the loaded head. Loosely torque cap end SHCS to allow cap to rotate slightly. Carefully place loaded head over the rod until getting interference. With a twisting motion, slide the loaded head down over the rod.
12. Loosely torque head end SHCS to allow head to rotate slightly.
13. Before final torque, place cylinder on level surface to square head and cap. Torque SHCS in a crisscross pattern. Use the following chart for torque tolerances.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 11-14.

### Seal Installation Guide



### Screw Torque Tolerances (lbs-ft) Part #16

Bore	Min.	Max.
3/4	1	1.5
1	1	2
1 1/8	1	2

### Sinker Tube Part Numbers

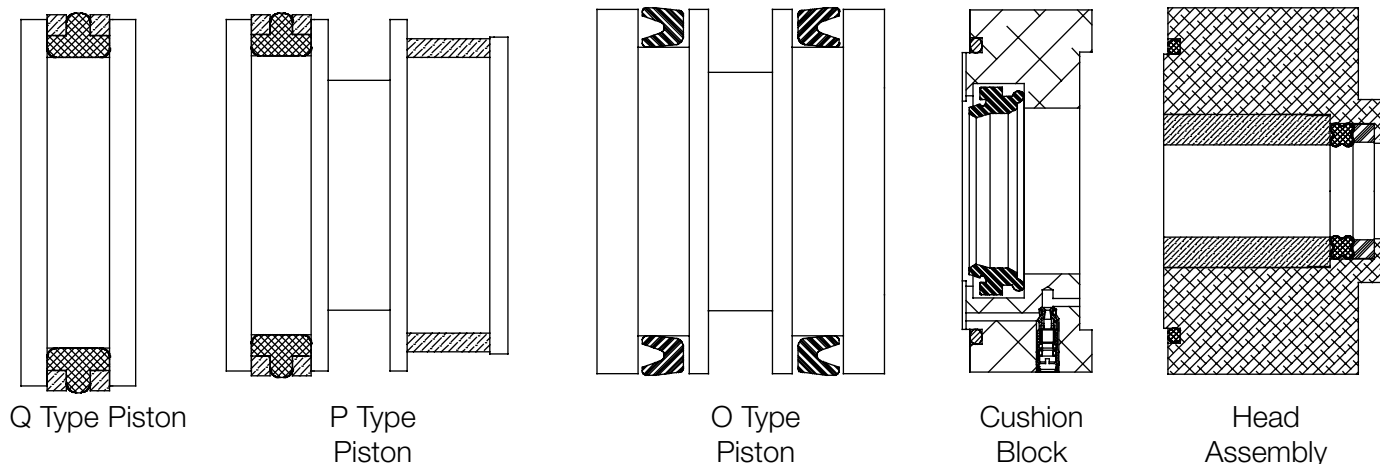
Bore	Part #
3/4	C06-C91
1	R06-E91
1 1/8	C06-G91

**Note:** Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

## Seal Kit Removal/Installation Instructions

1. Loosen 8 Socket Head Cap Screws (SHCS) (Part #16) to remove Head (Part #1), Cap (Part #8), Piston/Rod Assembly (Part #9 & #10), and Cushion Block(s) (Part #6) if cylinder is cushioned.
2. Carefully remove old seals and wearband (Part #2, #3, #4, #7, #11, #14). Depending on the cylinder type, piston seal(s) and wearband will vary. Any damage to the seal grooves may result in leakage.
3. Lubricate new seals and Wearband (Part #14) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
4. Install Piston Seal(s) (Part #11). Depending on the cylinder type, piston seal(s) will vary. Make sure the piston seal is not twisted inside groove. If cylinder type is P or Q, install back-up rings (Part #12). See Seal Installation Guide.
5. Install lubricated wearbands onto piston/rod assembly if cylinder type is P. Sink piston assembly into sinker tube. See Sinker Tube Part Numbers Chart.
6. Apply lube inside the cylinder tube.
7. Sink piston/rod assembly into cylinder tube.
8. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
9. Place Tube End Seals (Part #2) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
10. Install Rod Wiper (Part #3) and Rod Seal (Part #4) into Head (Part #1). See Seal Installation Guide. Lightly grease rod seal after installation. This will ease the installation of the head over the rod.
11. Reassemble cylinder except for the head. Loosely torque cap end SHCS to allow cap to rotate slightly. Carefully place head over the rod until getting interference. With a twisting motion, slide the head down over the rod.
12. Loosely torque head end SHCS to allow head to rotate slightly.
13. Before final torque, place cylinder on level surface to square head and cap. Torque SHCS in a crisscross pattern. Use the following chart for torque tolerances.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 11-14.

## Seal Installation Guide



### Screw Torque Tolerances (lbs-ft) Part #16

Bore	Min.	Max.
3/4	1	1.5
1	1	2
1 1/8	1	2

### Sinker Tube Part Numbers

Bore	Part #
3/4	C06-C91
1	R06-E91
1 1/8	C06-G91

**Note:** Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.





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