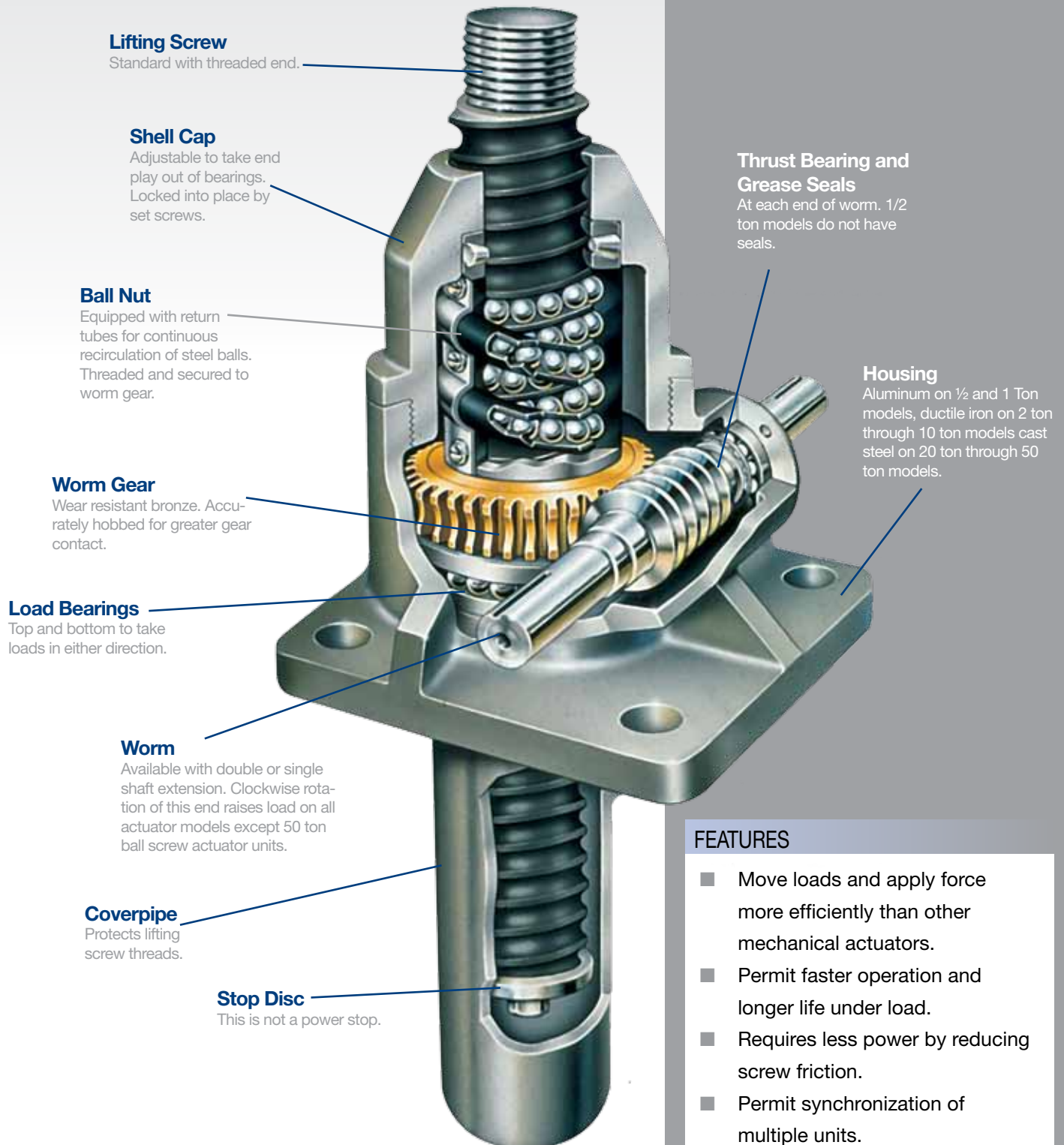


BALL SCREW ACTUATORS

1/2 to 50 TONS



FEATURES

- Move loads and apply force more efficiently than other mechanical actuators.
- Permit faster operation and longer life under load.
- Requires less power by reducing screw friction.
- Permit synchronization of multiple units.
- Capacity from 1/2 to 50 Tons.
- Handles full load in tension or compression.
- 40 models available.

BALL SCREW ACTUATORS

MODEL NUMBERING SYSTEM

FL - TKM - 9802 - 6 - 1R

Model Prefix

R - Reducer
F - C-face Adapter
L - Limit Switch
E - Encoder
J - Rotary Counter

Screw End & Configuration

T - Threaded End
C - Clevis End
M - Top Plate
P - Plain End
K - Anti-rotation Screw
CC - Double Clevis
D - Inverted Rotating
U - Upright Rotating

Series & Capacity No.

Series:

Ball Screw (98xx, 28xx, 78xx)
Special BS (108xx, 38xx, 88xx)

(2800 series base configurations are available only on 1/2, 1, 2, 3 and 50 Ton models)

Capacities:

Upright model suffixes end with the capacity number.
Inverted model suffixes lower the capacity number by one digit. Rotating model suffixes raise the capacity number by one digit.

1/2 & 1 Ton models use ball screw lead measurement in place of capacity information. These numbers change as described above based on actuator configuration.

M - Base Model

Travel

1" increment travels are always represented using the exact travel amount.

Travels with fractional lengths are quoted using that length, but are serialized when the order is processed.

Serialized digits in this position may also be used for other models containing special features

Model Suffix

B - Boot
L - Single End Worm Ext. Left
R - Single End Worm Ext. Right
1 - Optional Ratio #1
2 - Optional Ratio #2
X - Supplied without cover pipe

B9863A TV - 10.50 - LX2 - BFL

Capacity

B9863 - 1000 Lbs

Screw End

C - Clevis End Screw
CC - Double Clevis Ends
M - Top Plate Screw
P - Plain End Screw
T - Threaded End Screw

Travel

1" Incremental travels are always represented using the exact travel amount. Fractional lengths are represented and processed to the nearest 100ths.

Base Model

None - Upright Translating
D - Inverted Rotating
K - Keyed, anti-rotation
U - Upright Rotating
V - Inverted Translating

Key Accessories

B - Boot
E - Encoder
F - C-face Adapter
H - Hand Wheel
J - Rotary Counter
L - Limit Switch
R - Reducer

Model Suffix

L - Single End Worm Extension Left
N - Numeric Gear Ratio - 100 turns/inch
R - Single End Worm Extension Right
X - Supplied without Cover Pipe
1 - Alternate Gear Ratio #1
2 - Alternate Gear Ratio #2

Alphabet characters representing features and suffixes should always be used in alphabetic order to avoid questions of hierarchy.

Models for actuators with specialized features will have a serialized suffix such as B9225T-0001.

BALL SCREW ACTUATORS

PERFORMANCE TABLE

Specifications - Ball Screw Actuator														
Capacity (Tons)		1/2	1	2 (HL)	2	3	5 (HL)	5	10 (HL)	10	20 (HL)	20	25	50†
Max. Speed Cface Driven (in/min)** Pg. 118		—	—	287.5	72.0	118.5	287.5	136.5	215.5	102.0	215.5	108.0	81.0	—
Max. Speed Red. Driven (in/min)** Pg. 110		—	—	57.51	14.4	23.7	57.4	27.2	43	20.4	43.1	21.6	20.1	33.4
Dimensional Information Pg. 115		52	53	54-59	54-59	60-61	62	63	64	65	66	66	67	68-69
Lifting Screw	Diameter (in)	5/8	3/4	1	1	1-11/64	1-1/2	1-1/2	1-1/2	1-1/2	2-1/4	2-1/4	3	4
	Lead (in)	0.200	0.200	1.000	0.250	0.413	1.000	0.474	1.000	0.474	1.000	0.5000	0.660	1.000
Worm Gear Ratios	Standard	5:1	5:1	6:1	6:1	6:1	6:1	6:1	8:1	8:1	8:1	8:1	10-2/3:1	10-2/3:1
	Optional No. 1	20:1	20:1	24:1	24:1	24:1	24:1	24:1	24:1	24:1	24:1	24:1	32:1	32:1
	Optional No. 2	—	—	12:1	12:1	12:1	12:1	12:1	—	—	—	—	—	—
Turns of Worm for 1 inch Stroke	Standard	25	25	6	24	14.526	6	12.667	8	16.889	8	16	16.16	10.67
	Optional No. 1	100	100	24	96	58.106	24	50.667	24	50.667	24	48	48.48	32
	Optional No. 2	—	—	12	48	29.053	12	25.334	—	—	—	—	—	—
Worm Torque at No Load (in-lb)	Standard	0.5	2	10	3	5	20	10	20	15	50	40	40	40
	Optional No. 1	0.5	2	10	3	5	20	10	20	15	50	40	40	40
	Optional No. 2	—	—	10	3	5	20	10	—	—	—	—	—	—
Maximum Horsepower per Actuator	Standard	1/3	1/2	2	2	2	4	4	5	5	5	5	8	15
	Optional No. 1	1/6	1/4	1/2	1/2	1/2	3/4	3/4	1-1/2	1-1/2	1-1/2	1-1/2	2-1/2	6
	Optional No. 2	—	—	3/4	3/4	3/4	2	2	—	—	—	—	—	—
Starting Worm Torque at Full Load (in-lb)	Standard	10.5	22	180	50	110	500	220	800	350	1375	700	925	2700
	Optional No. 1	5.0	11	80	25	50	206	90	400	175	625	325	475	1500
	Optional No. 2	—	—	110	30	68	300	145	—	—	—	—	—	—
Running Worm Torque at Full Load (in-lb)	Standard	9.5	21	160	45	100	410	180	700	300	1270	650	825	2200
	Optional No. 1	4.0	10	70	20	45	183	80	290	150	570	300	425	1200
	Optional No. 2	—	—	100	25	60	270	125	—	—	—	—	—	—
Efficiency Rating (%)	Standard	67.0	60.6	66.3	58.9	65.7	64.7	69.8	56.8	62.8	62.7	61.2	59.7	67.8
	Optional No. 1	39.8	31.8	37.9	33.2	36.5	36.2	39.3	45.7	41.9	46.5	44.2	38.6	41.4
	Optional No. 2	—	—	53.0	53.1	54.8	49.1	50.3	—	—	—	—	—	—
Weight with 6 inch Stroke (Raise) (lb)		2.8	5	20	20	21	40	40	50	50	115	115	235	520
Weight per Additional 1 inch Stroke (Raise) (lb)		0.1	0.3	0.3	0.3	0.4	0.9	0.9	0.9	0.9	1.5	1.5	2.9	5.0
Hold Back Torque at Rated Load (ft-lb)	Standard	1	1	2	2	7	8	8	24	11	24	24	24	92
	Optional No. 1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	2	2	33
	Optional No. 2	—	—	1	1	2	2	2	—	—	—	—	—	—
Key Torque (in-lb)		35	70	100	175	440	1800	850	3500	1700	7000	3500	6000	17700
Max Worm Speed at Full Load (rpm)	Standard	2001	1432	700	2521	1146	504	1146	394	900	229	450	545	350
	Optional No. 1	2101	1432	394	1261	630	229	252	236	540	151	291	332	252
	Optional No. 2	—	—	430	5875	695	420	869	—	—	—	—	—	—
Maximum Load at Full Horsepower and 170 rpm (lb)	Standard	1150	1601	1459	5875	3830	2585	6384	4104	9855	3927	8489	14018	17250
	Optional No. 1	1223	1556	458	2729	1734	377	2126	1791	4878	280	1968	5751	8942
	Optional No. 2	—	—	680	3557	2096	1858	4595	—	—	—	—	—	—

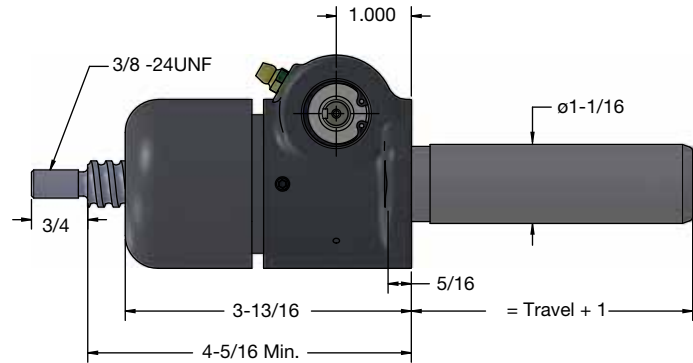
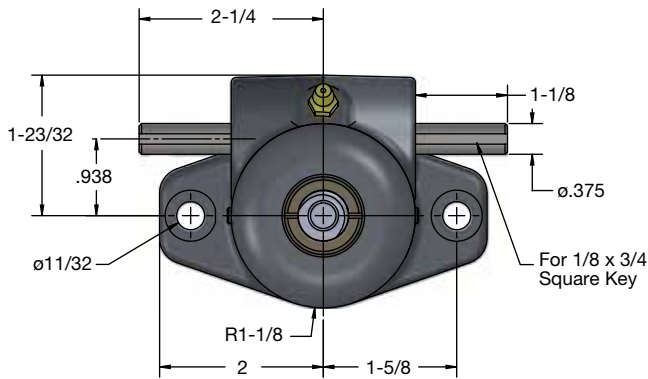
Notes:

- Hold Back Torque is restraining torque at the worm shaft to keep load from running down.
- Lifting torques are proportional to load, down to 25% of rated load.
- See page 107 for Ball Screw and Nut Life Expectancy.
- All actuator units can be supplied with standard raises up to 24 inches. Special raises up to 20 feet are available upon request. Closed height dimensions may increase for actuators supplied with bellows boots. See page 148-149.

[†] Does your ball screw application require more than 50 tons? Please contact our Customer Service group to explore our specialty options for higher load ratings up to 100 tons.

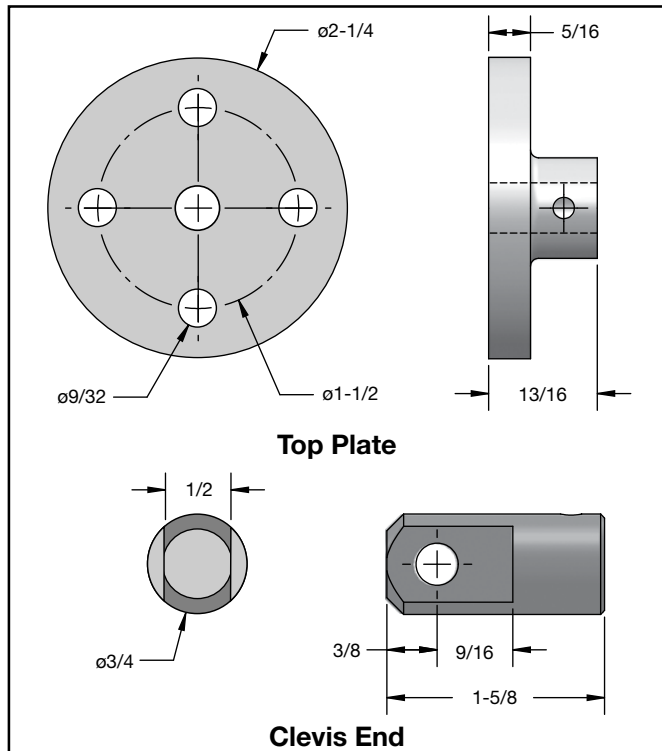
BALL SCREW ACTUATORS

1/2 TON CAPACITY



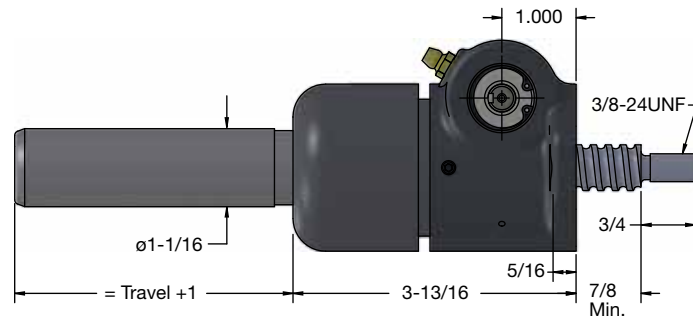
Upright: B9863T

.631 Diameter x .200 Lead Lifting Screws

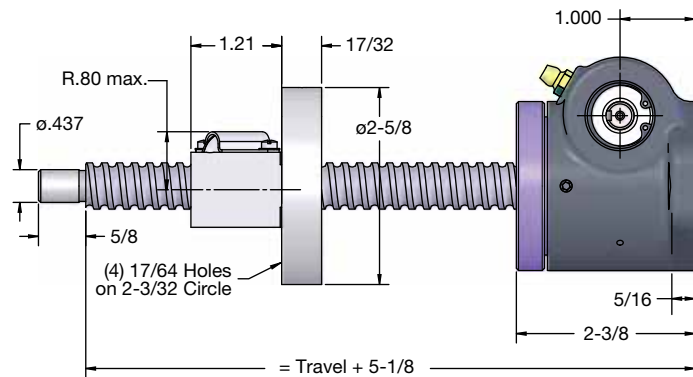


Top Plate

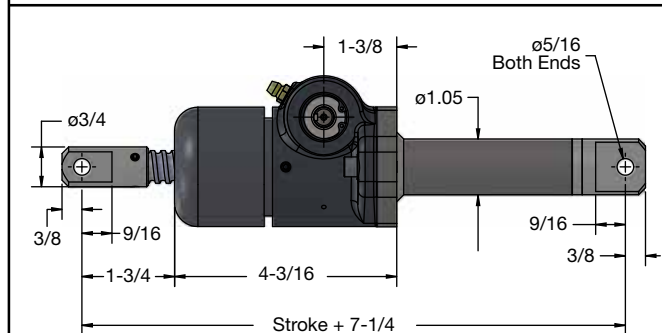
Clevis End



Inverted: B9863TV

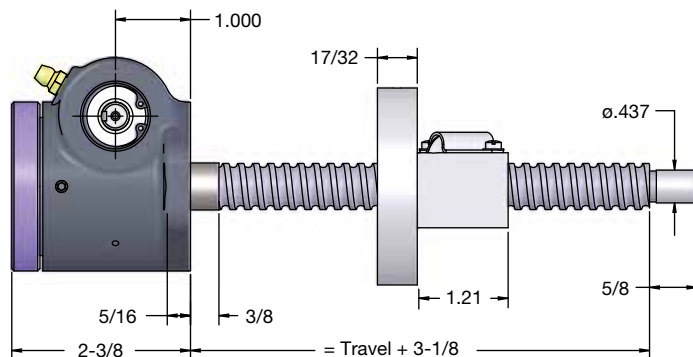


Upright Rotating: B9863U



Double Clevis: B9863CC

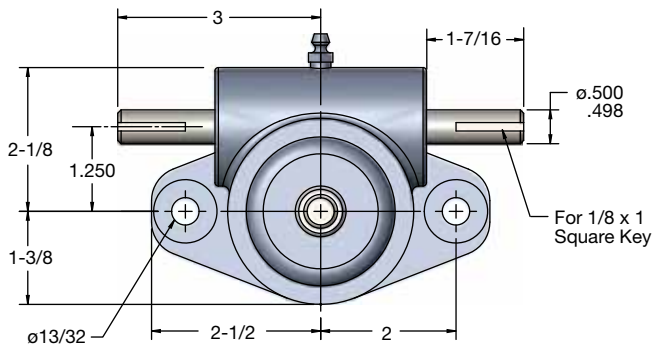
Maximum Allowable Raise in Compression 8" - Rating 1,000 Lbs.



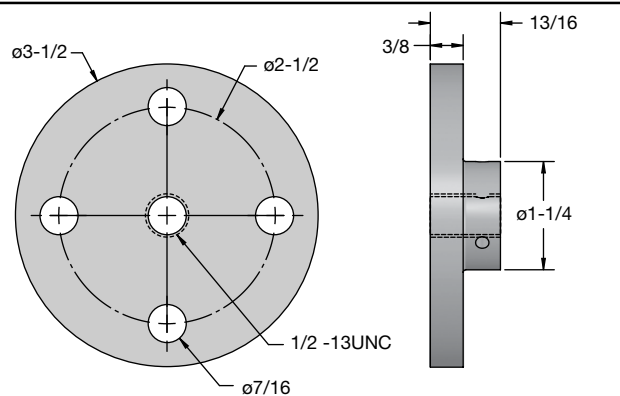
Inverted Rotating: B9863D

Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

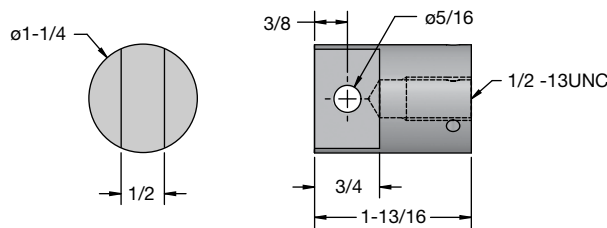
BALL SCREW ACTUATORS 1 TON CAPACITY



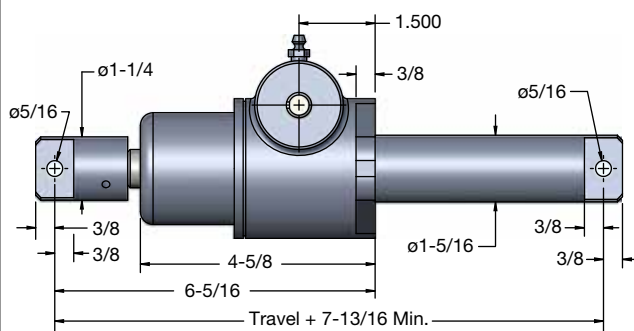
3/4" Diameter x .200 Lead Lifting Screws



Top Plate



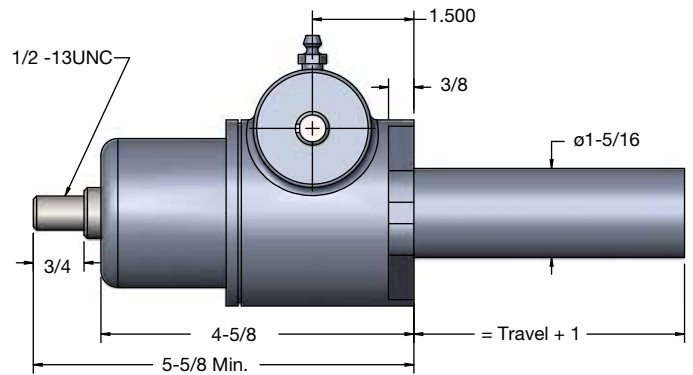
Clevis End



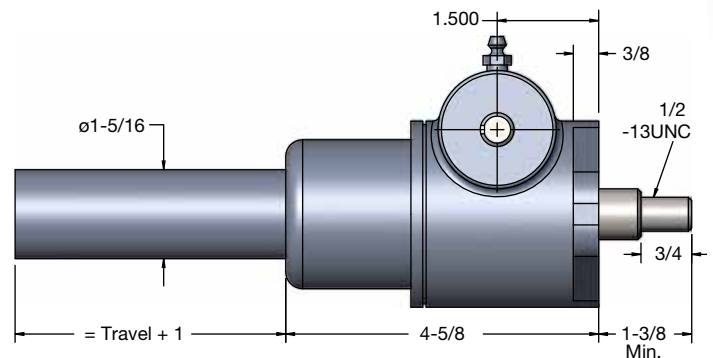
Double Clevis: CCM-28750

Maximum Allowable Raise in Compression 12" - Rating 2000 Lbs.

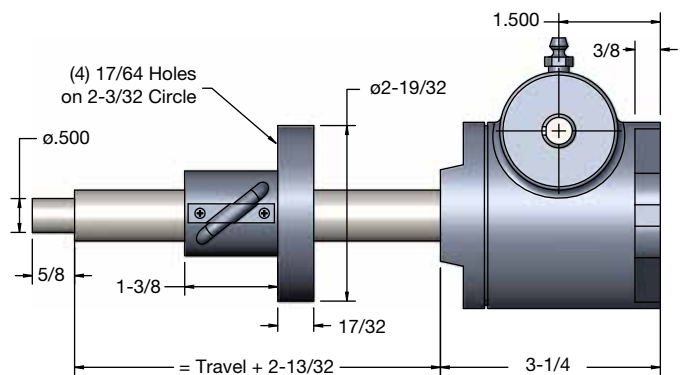
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



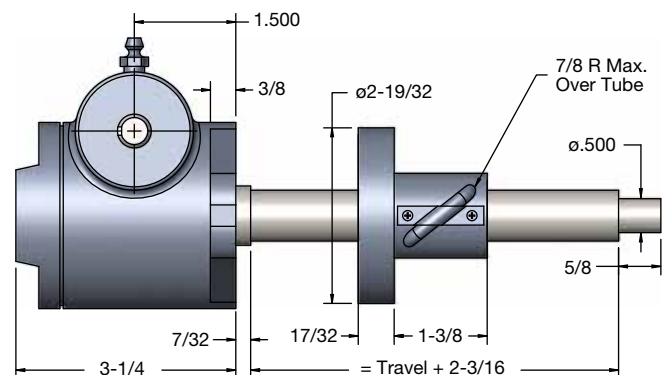
Upright: M-28750



Inverted: M-28749



Upright Rotating: UM-28751

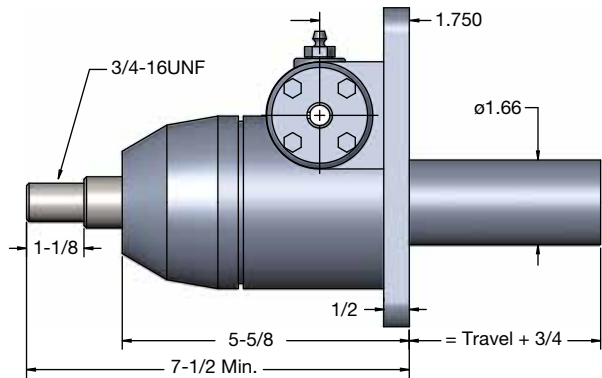
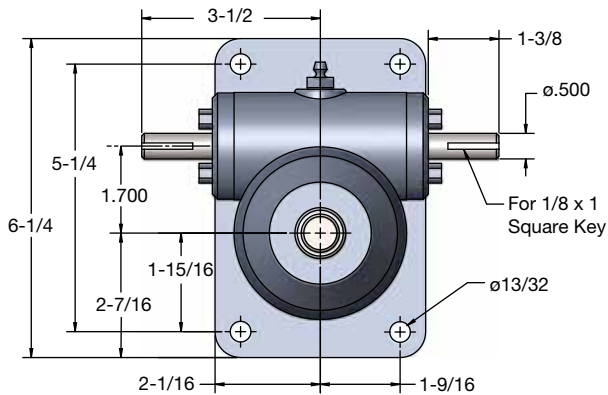


Inverted Rotating: DM-28751

BALL SCREW

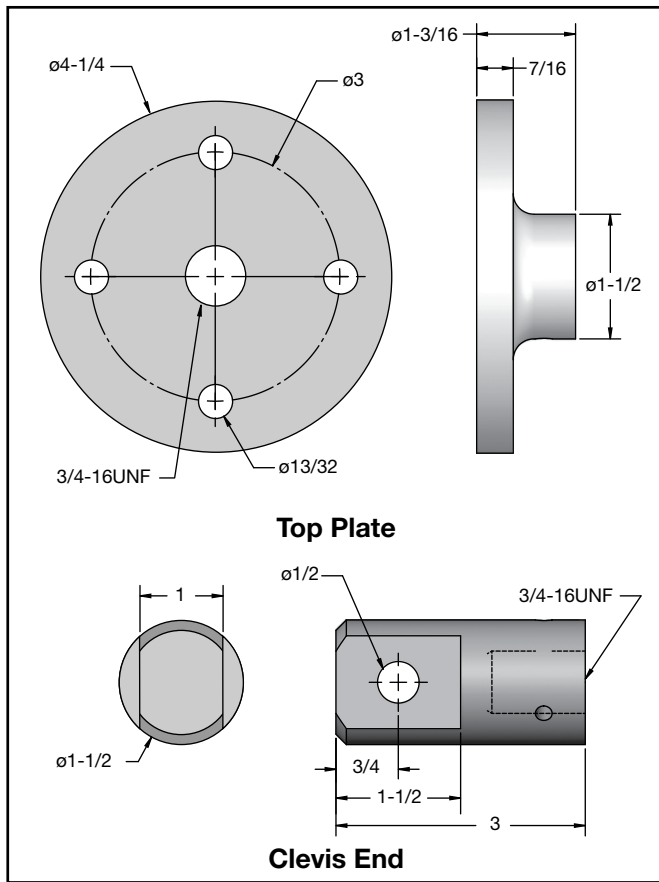
ACTUATORS

2 TON CAPACITY - 1 INCH LEAD — 9800 SERIES

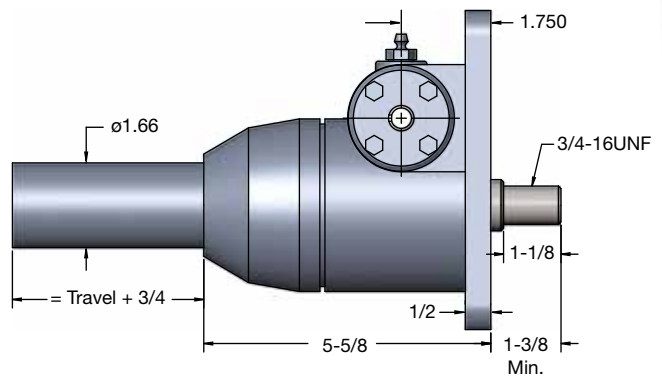


Upright: M-98021

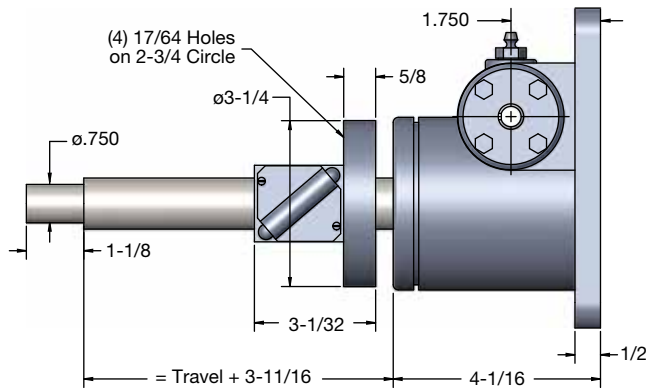
1" Diameter x 1.00 Lead Lifting Screws



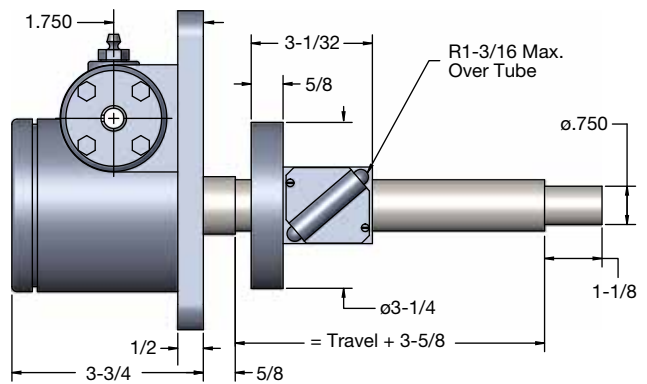
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



Inverted: M-98011

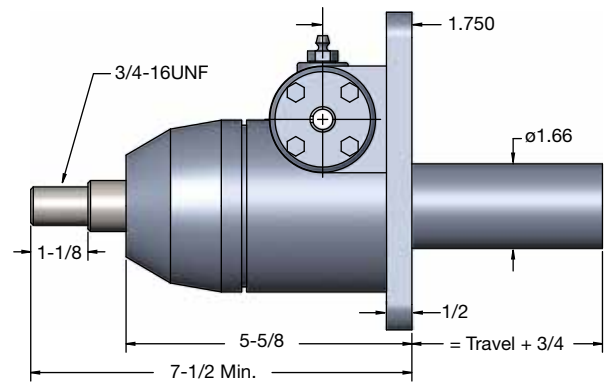


Upright Rotating: UM-98031

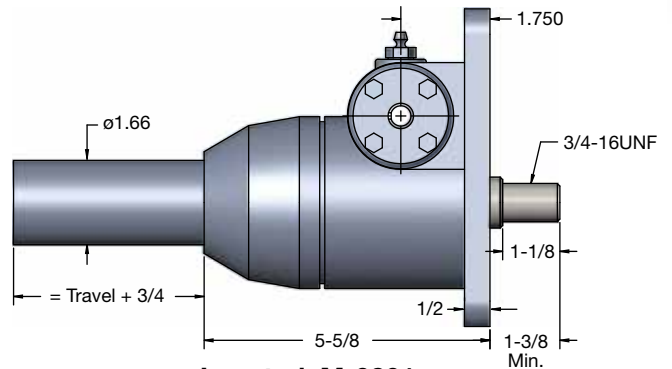


Inverted Rotating: DM-98031

2 TON CAPACITY — 9800 SERIES



1" Diameter x .250 Lead Lifting Screws



(4) 17/64 Holes on 2-3/4 Circle

0.750

1-1/8

2-3/8

5/8

0.750

4-1/16

1.750

1/2

= Travel + 3-1/16

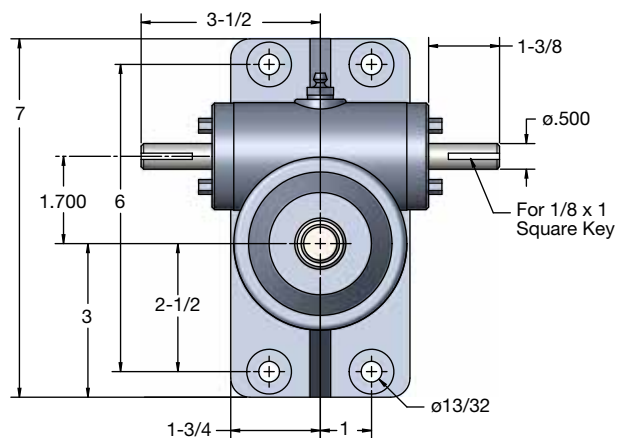
Technical drawing of a valve assembly. The drawing shows a side view of the valve with a handle on the left and a stem on the right. Key dimensions and features include:

- Overall width: 1.750
- Distance from handle center to stem center: 2-3/8
- Distance from handle center to stem center (alternative dimension): 5/8
- Stem diameter: $\phi 3-1/4$
- Stem end diameter: $\phi .750$
- Stem end length: 1/8
- Stem end chamfer: R 1-3/16 Max. Over Tube
- Distance from handle center to stem center (alternative dimension): 3-3/4
- Distance from handle center to stem center (alternative dimension): 1/2
- Distance from handle center to stem center (alternative dimension): 5/8
- Distance from handle center to stem center (alternative dimension): = Travel + 3

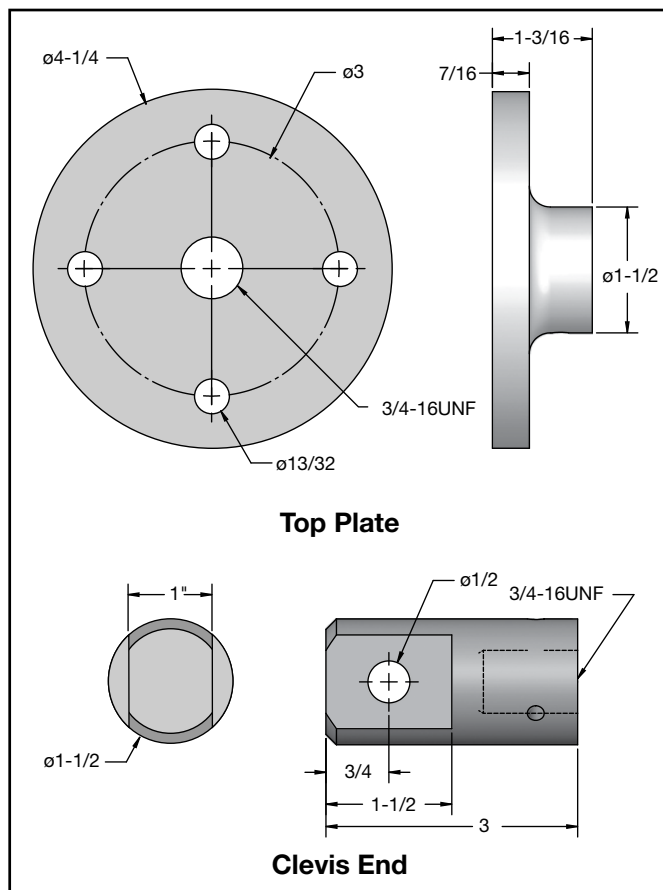
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

BALL SCREW ACTUATORS

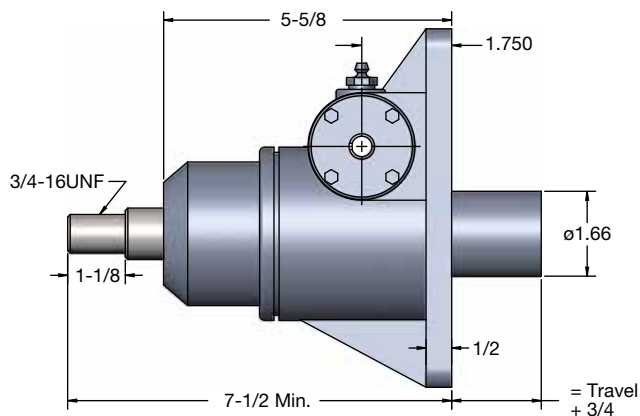
2 TON CAPACITY - 1 INCH LEAD — 7800 SERIES



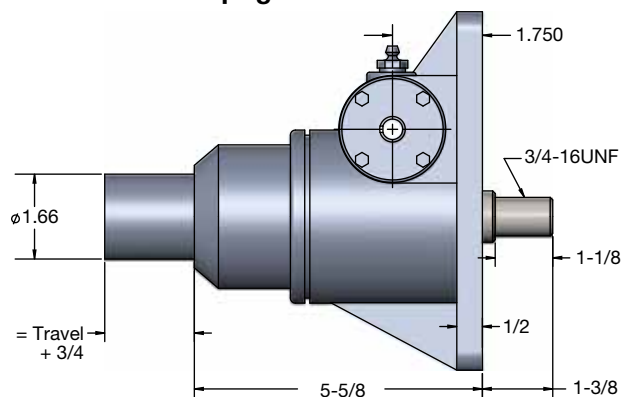
1" Diameter x 1.000 Lead Lifting Screws



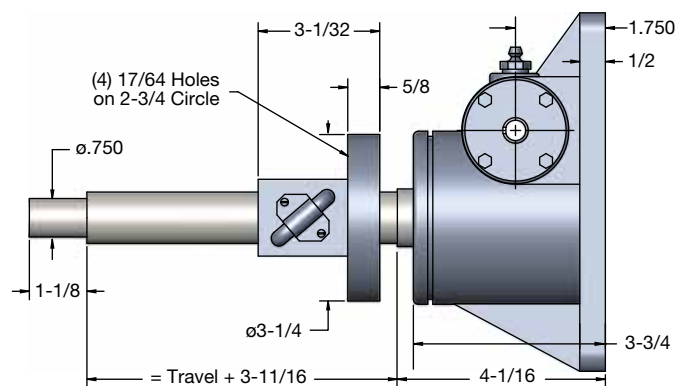
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



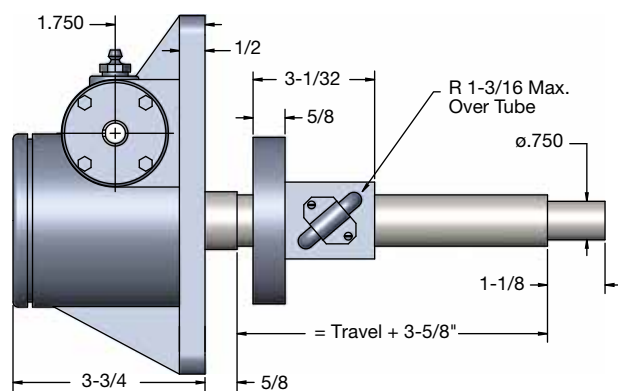
Upright: M-78021



Inverted: M-78011

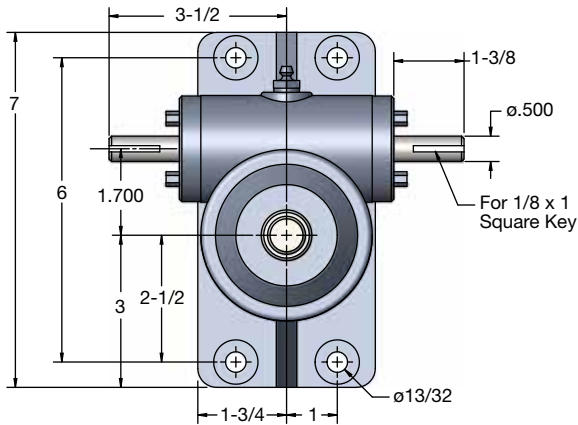


Upright Rotating: UM-78031

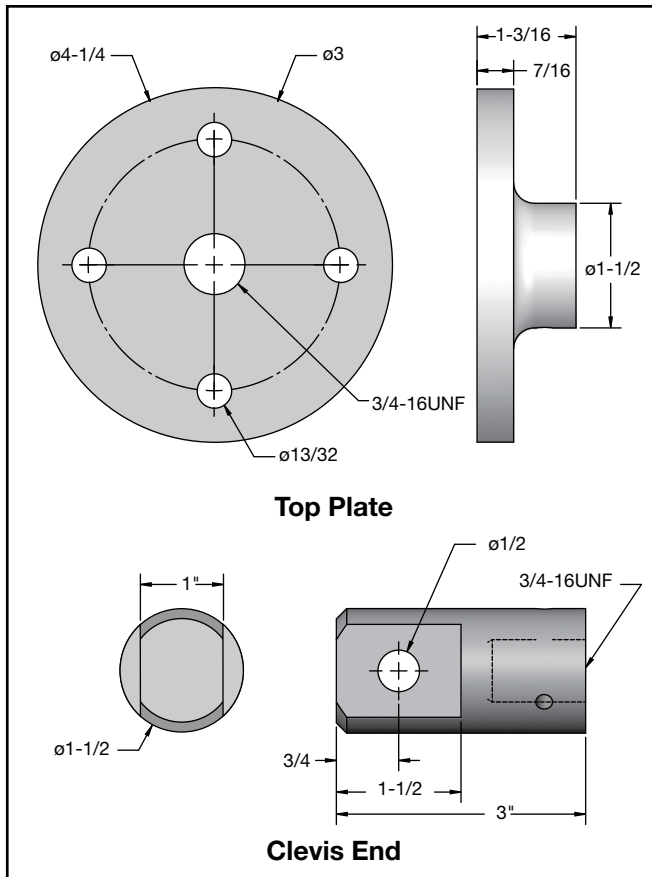


Inverted Rotating: DM-78031

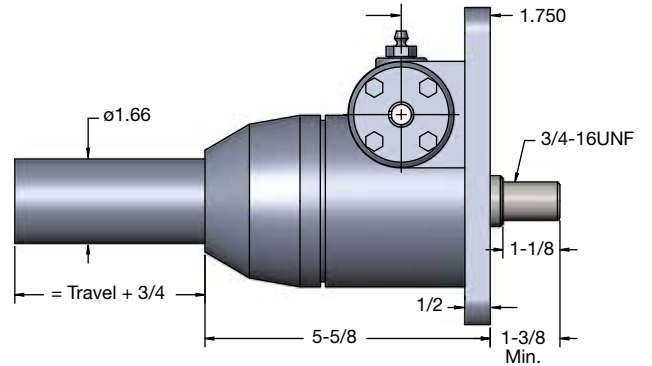
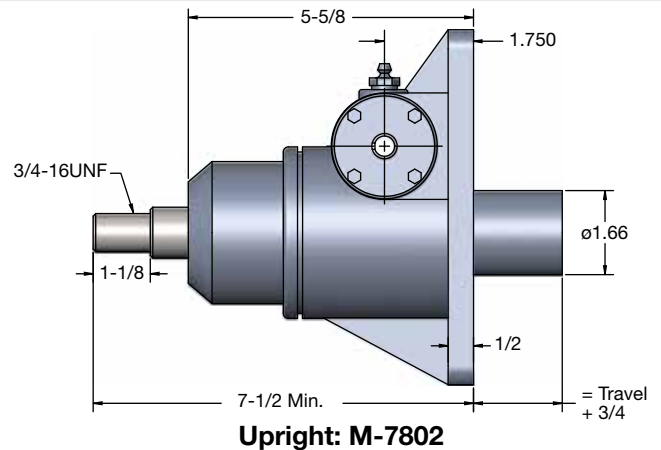
2 TON CAPACITY — 7800 SERIES



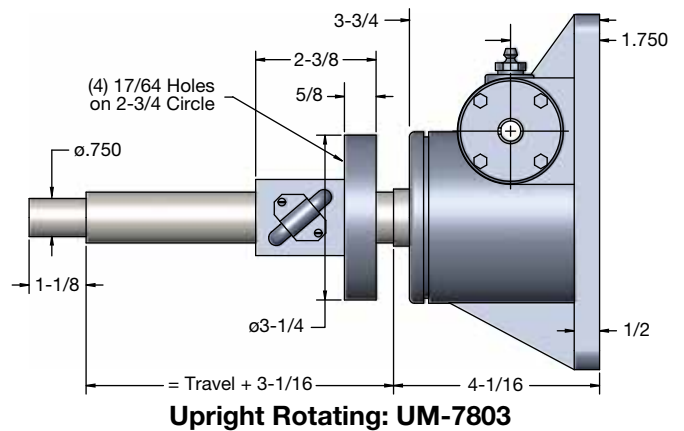
1" Diameter x .250 Lead Lifting Screws



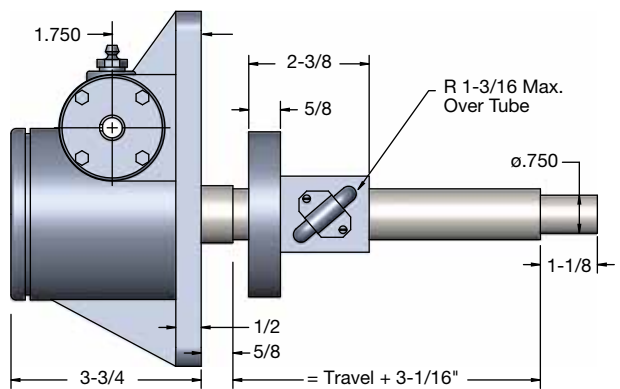
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



Inverted: M-7801



Upright Rotating: UM-7803

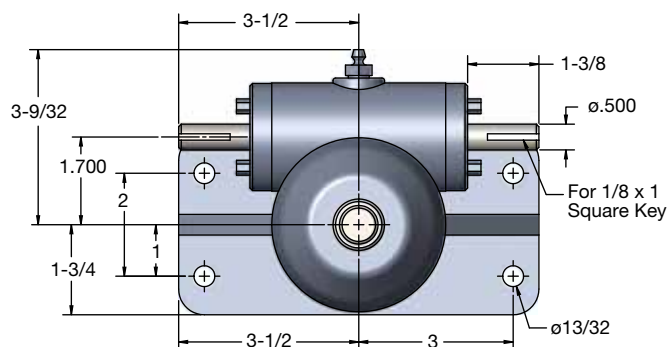


Inverted Rotating: DM-7803

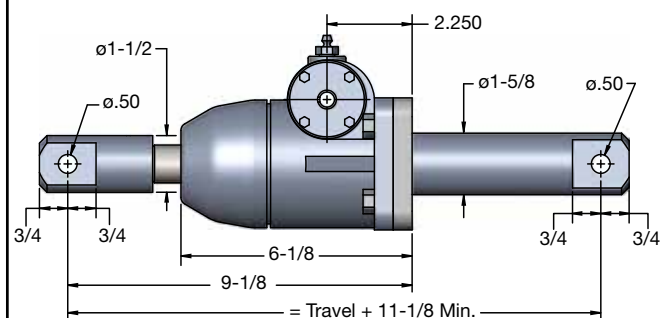
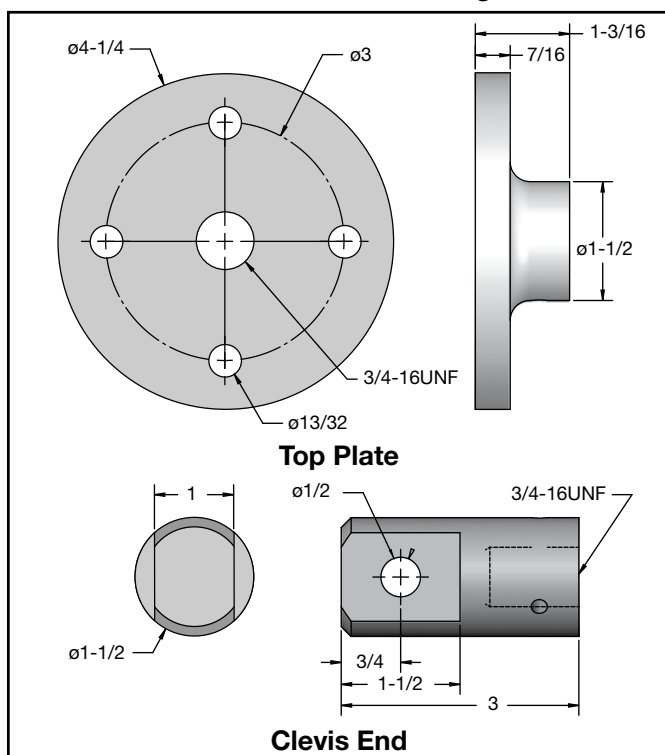
BALL SCREW

ACTUATORS

2 TON CAPACITY - 1 INCH LEAD — 2800 SERIES



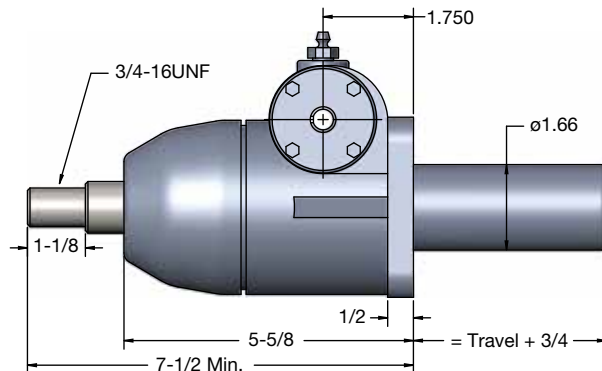
1" Diameter x 1.000 Lead Lifting Screws



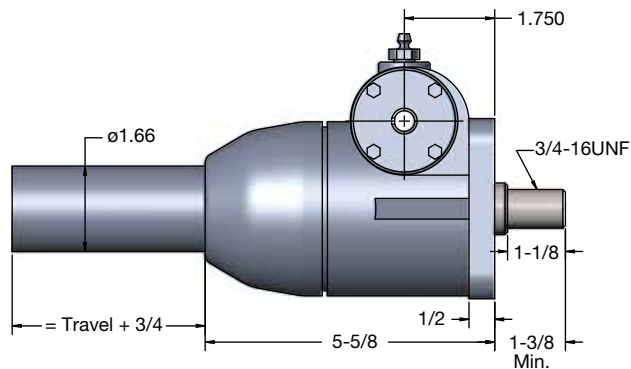
Double Clevis: CCM2802

Maximum Allowable Raise in Compression 15" - Rating 3800 Lbs.
Maximum Raise at Rated Load in Compression 14"

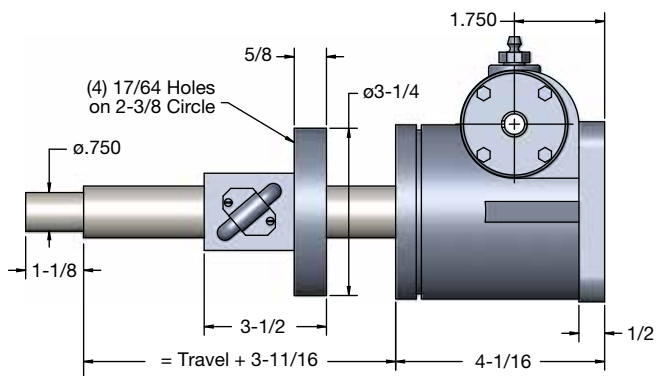
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



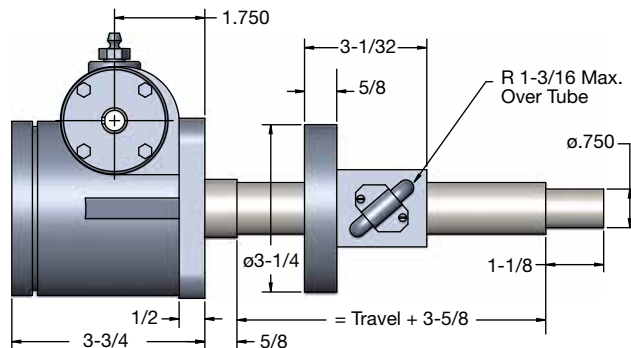
Upright: M-28021



Inverted: M-28011



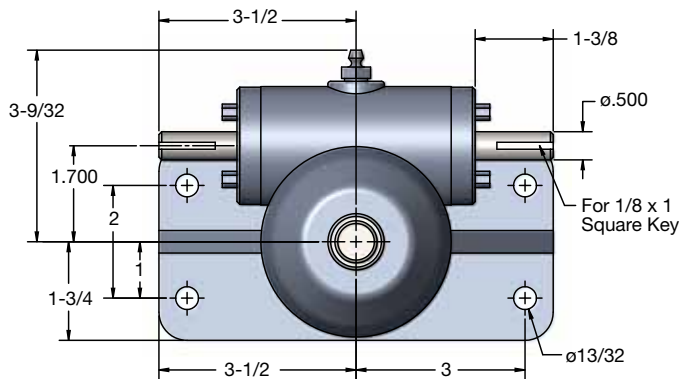
Upright Rotating: KUM-28031



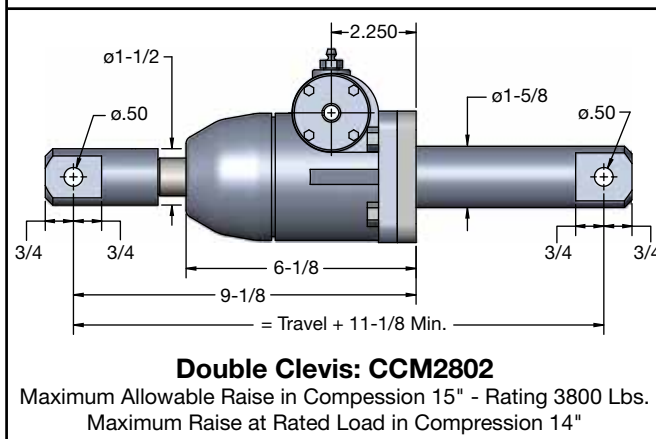
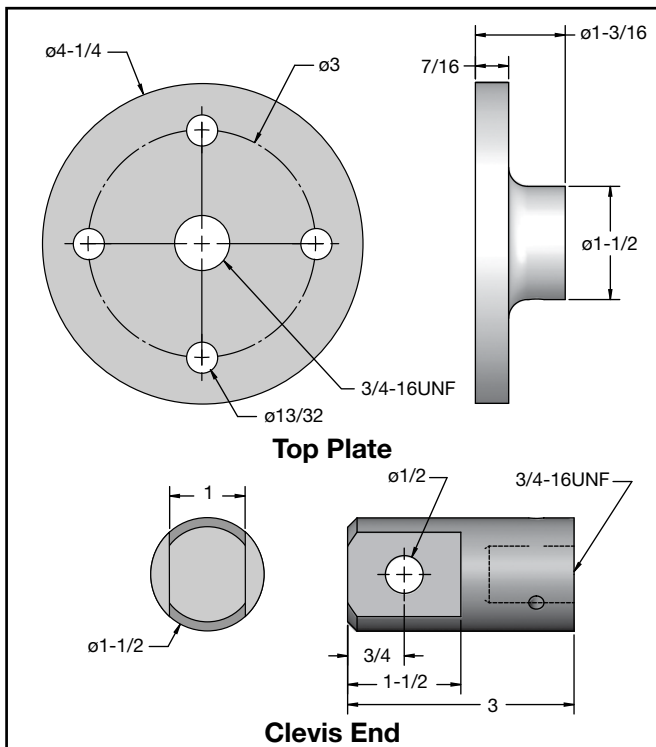
Inverted Rotating: KDM-28031

BALL SCREW ACTUATORS

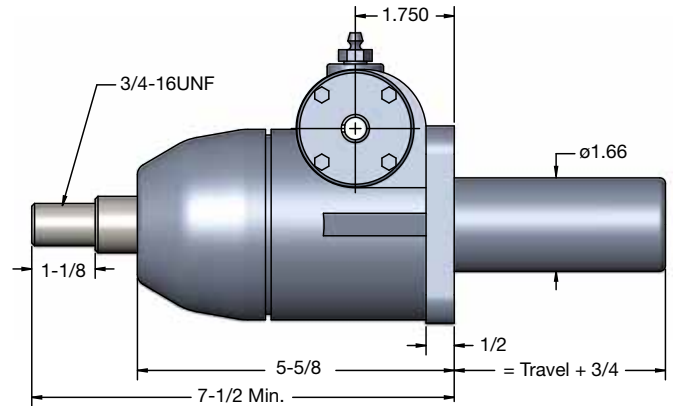
2 TON CAPACITY — 2800 SERIES



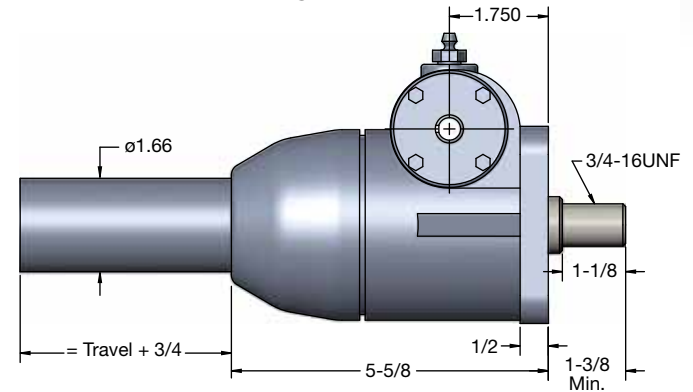
1" Diameter x .250 Lead Lifting Screws



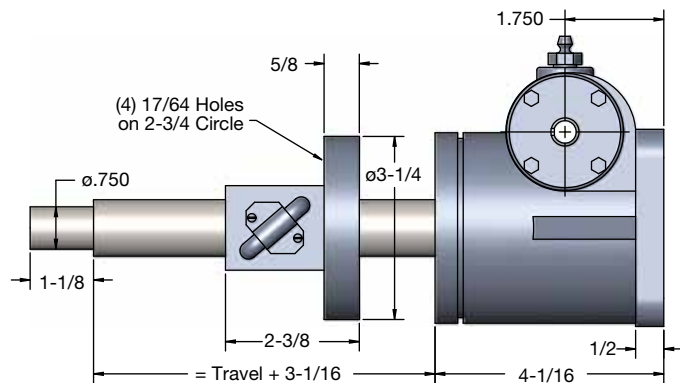
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



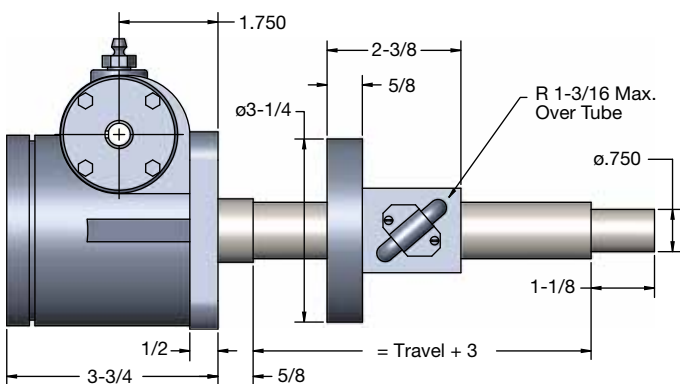
Upright: M-2802



Inverted: M-2801



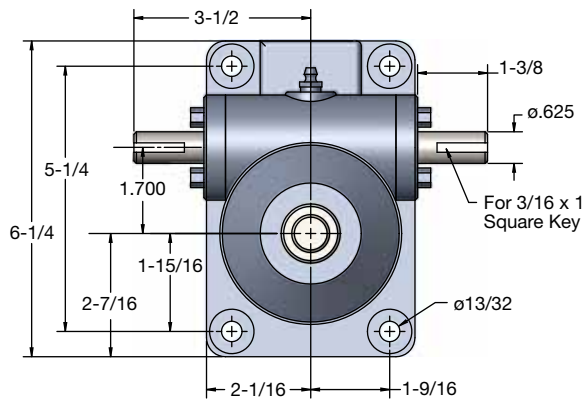
Upright Rotating: KUM-2803



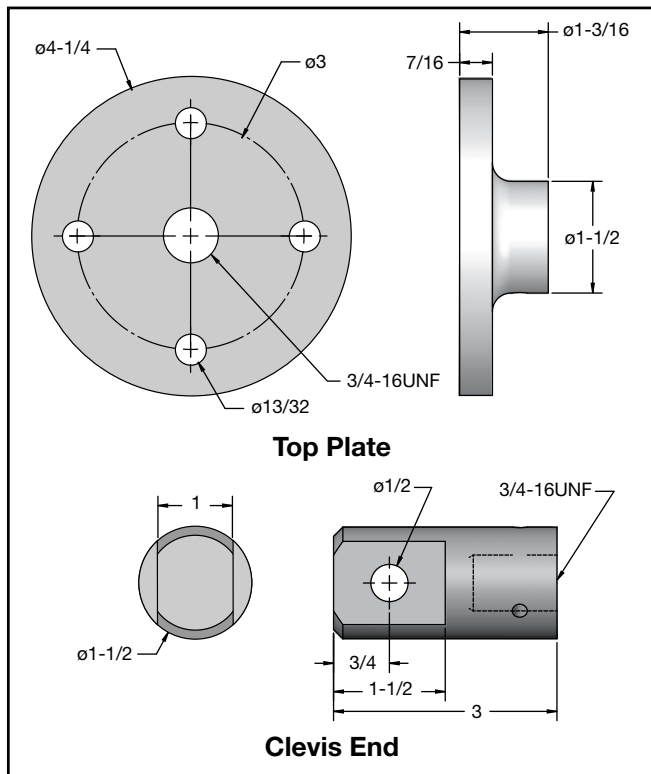
Inverted Rotating: KDM-2803

BALL SCREW ACTUATORS

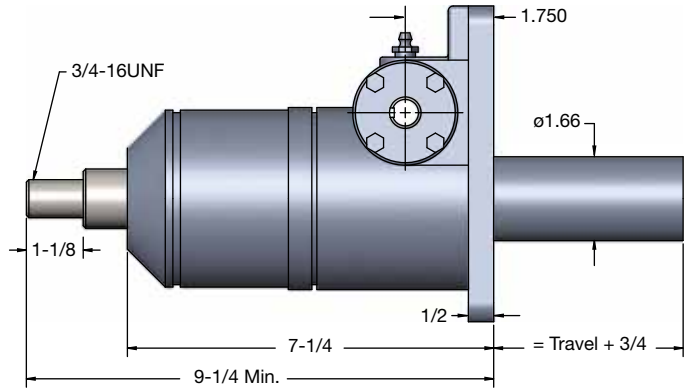
3 TON CAPACITY — 9800 SERIES



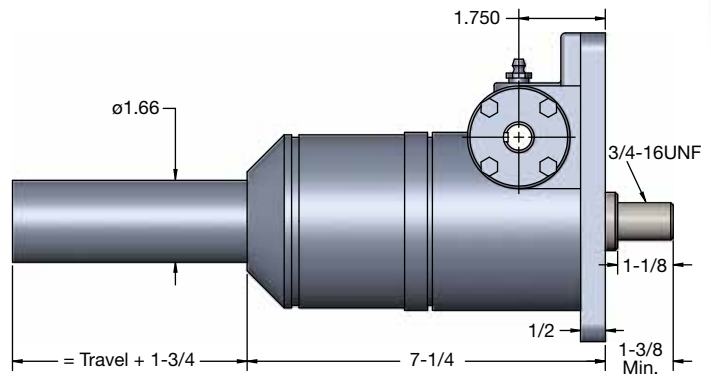
1-11/64" Diameter x .413 Lead Lifting Screws



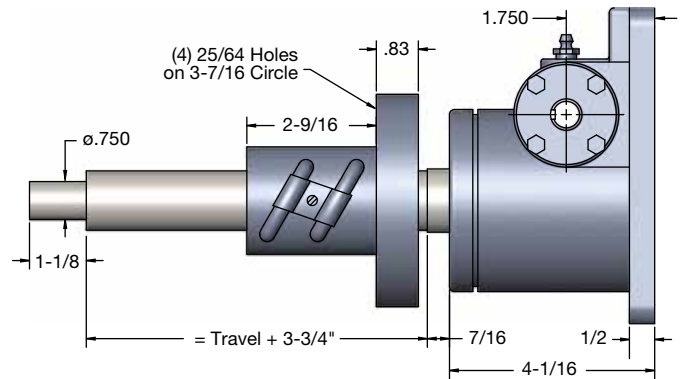
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



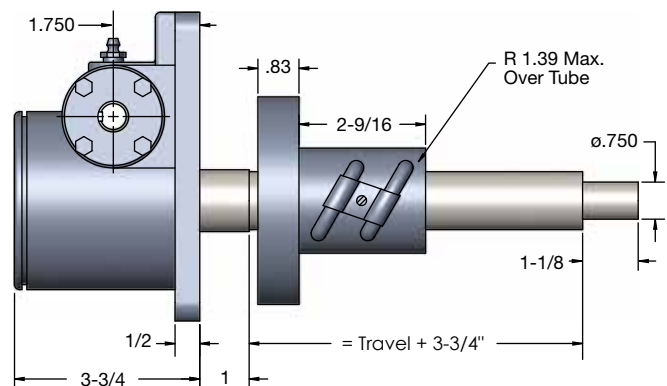
Upright: M-98003



Inverted: M-98002



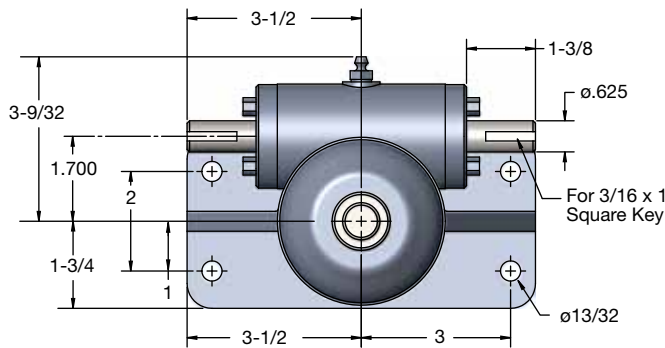
Upright Rotating: UM-98004



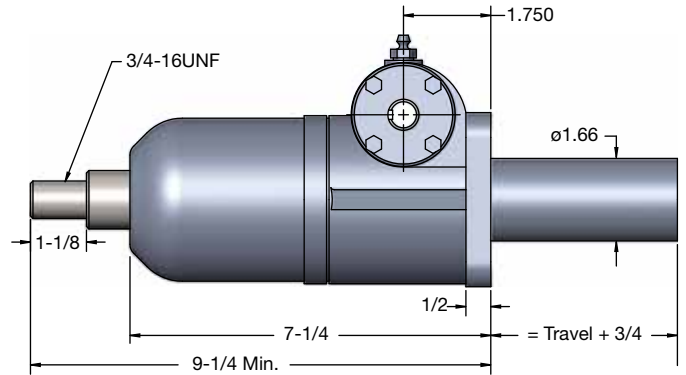
Inverted Rotating: DM-98004

BALL SCREW ACTUATORS

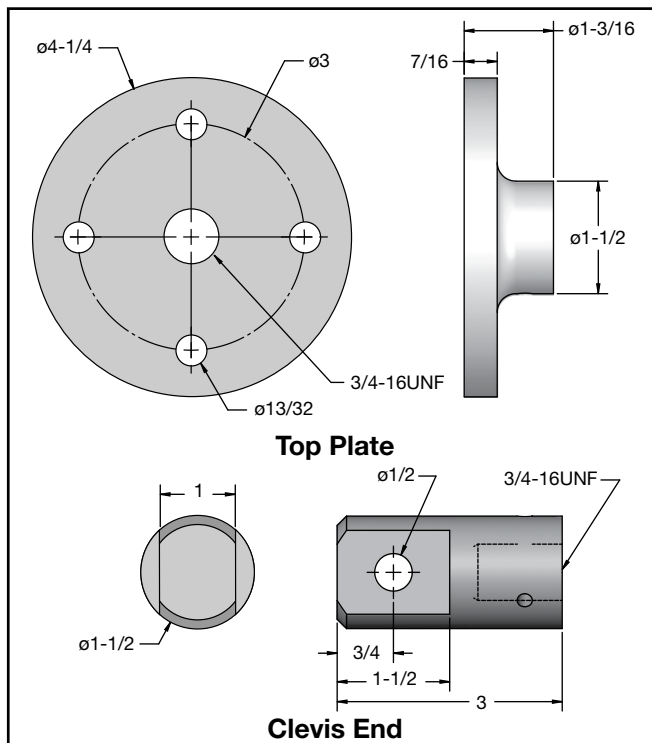
3 TON CAPACITY — 2800 SERIES



1-11/64" Diameter x .413 Lead Lifting Screws

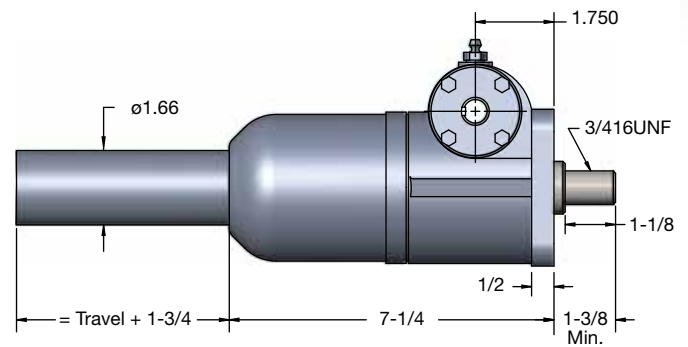


Upright: M-28003

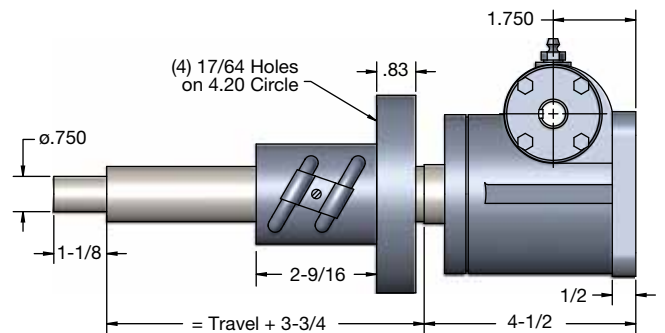


Top Plate

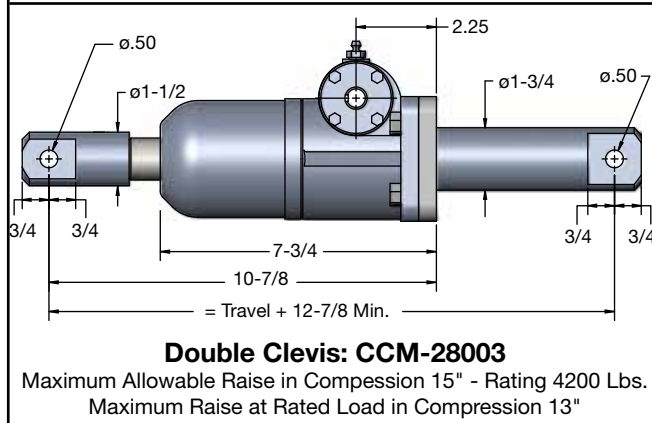
Clevis End



Inverted: M-28002

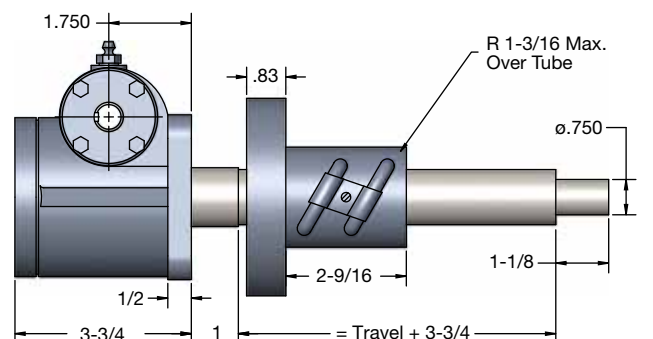


Upright Rotating: KUM-28004



Double Clevis: CCM-28003

Maximum Allowable Raise in Compression 15" - Rating 4200 Lbs.
Maximum Raise at Rated Load in Compression 13"

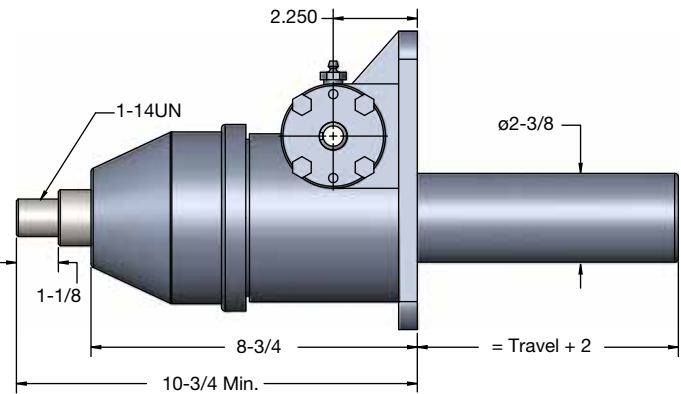
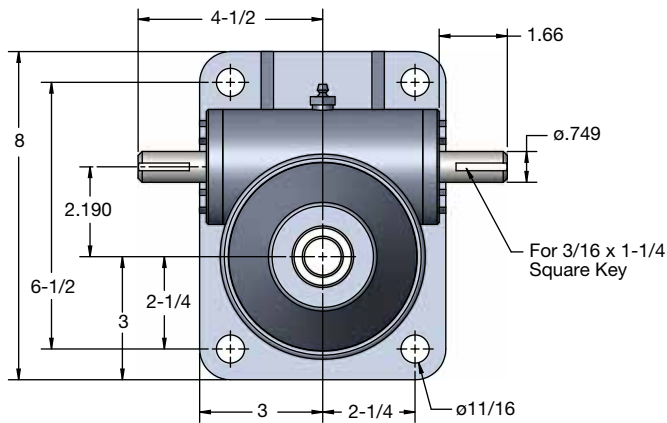


Inverted Rotating: KDM-28004

Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

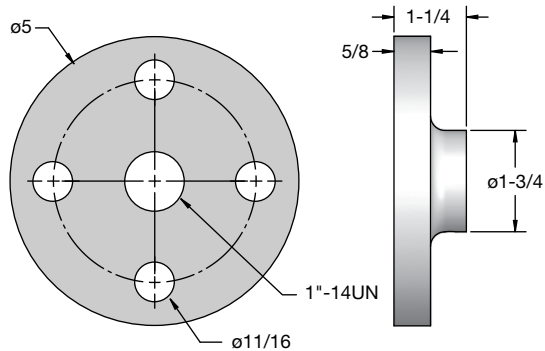
BALL SCREW ACTUATORS

5 TON CAPACITY - 1 INCH LEAD

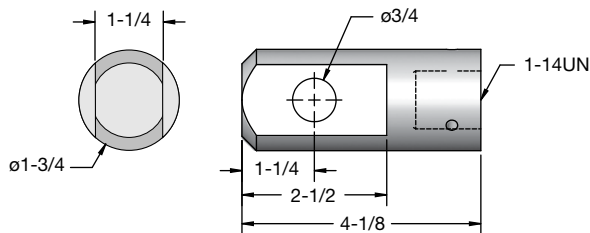


Upright: M-98051

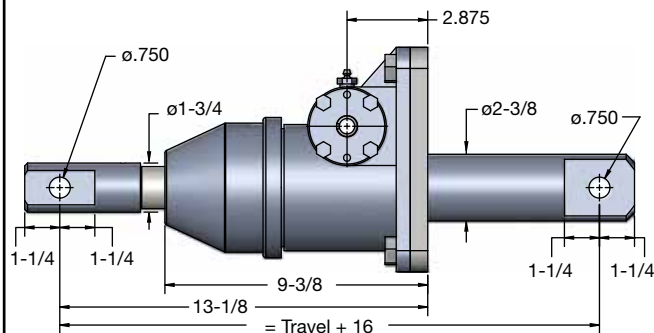
1-1/2" Diameter x 1.000 Lead Lifting Screws



Top Plate



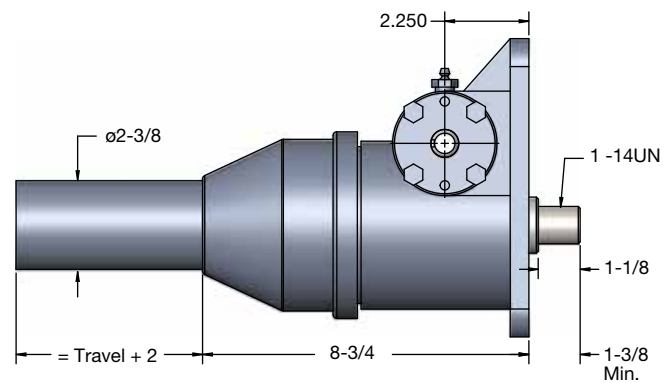
Clevis End



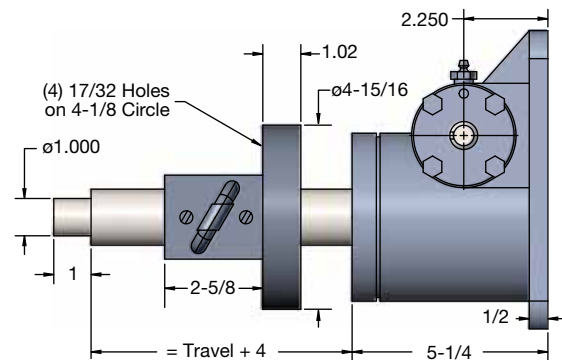
Double Clevis: CCM-9805

Maximum Allowable Raise in Compression 20" - Rating 7300 Lbs.
Maximum Raise at Rated Load in Compression 16"

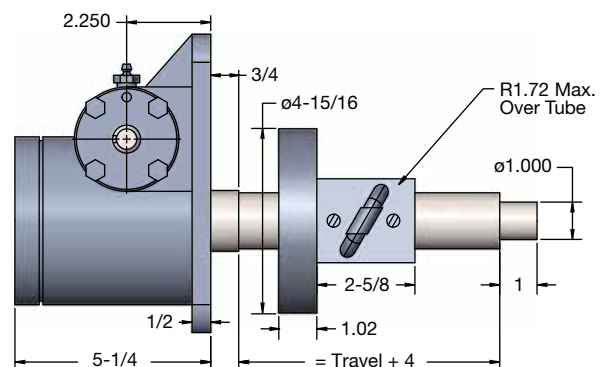
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



Inverted: M-98041

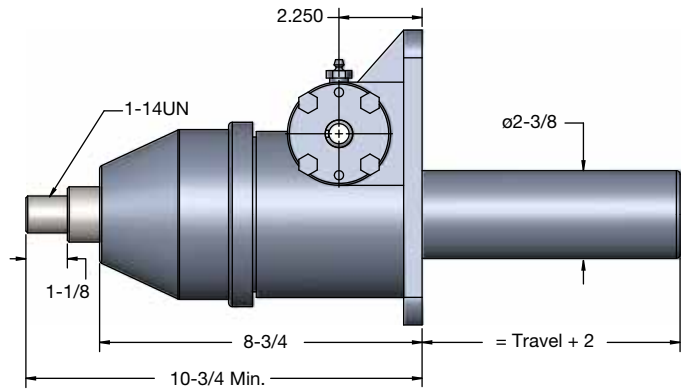
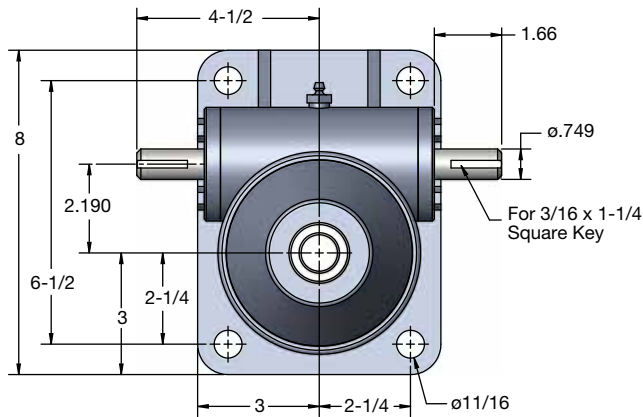


Upright Rotating: UM-98061



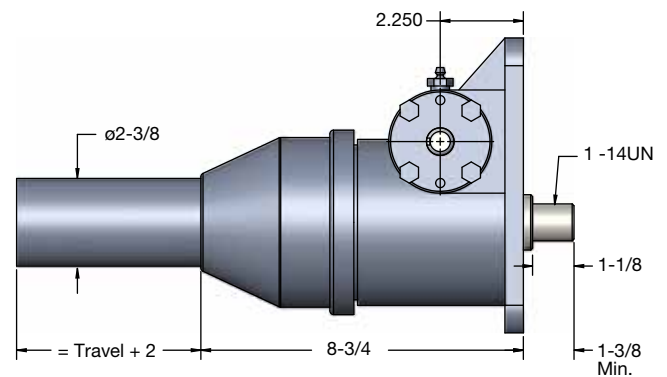
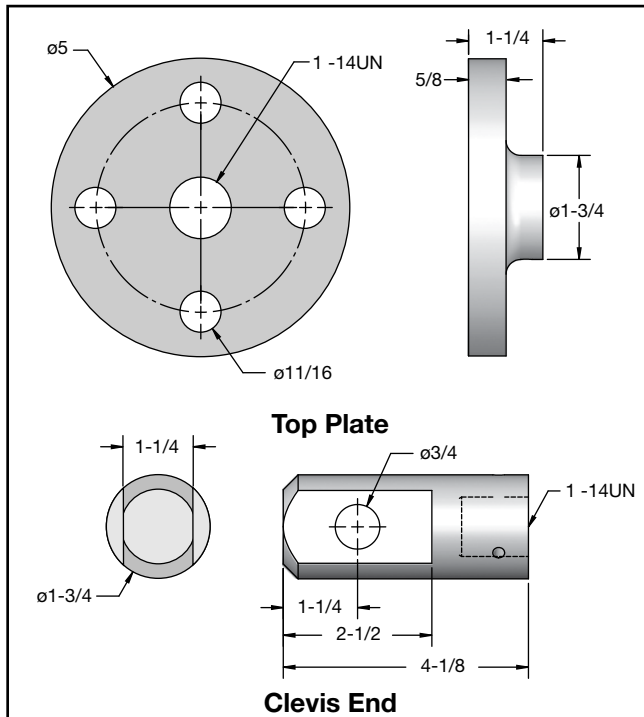
Inverted Rotating: DM-98061

BALL SCREW ACTUATORS 5 TON CAPACITY

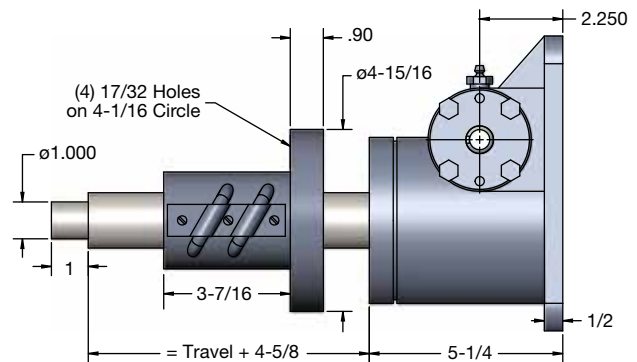


Upright: M-9805

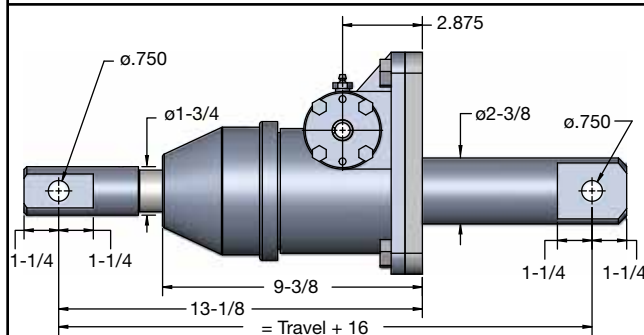
1-1/2" Diameter x .474 Lead Lifting Screws



Inverted: M-9804



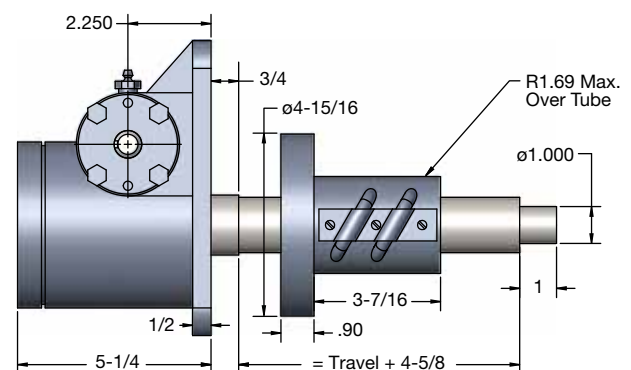
Upright Rotating: UM-9806



Double Clevis: CCM-9805

Maximum Allowable Raise in Compression 20" - Rating 7,300 Lbs.
Maximum Raise at Rated Load in Compression 16"

Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

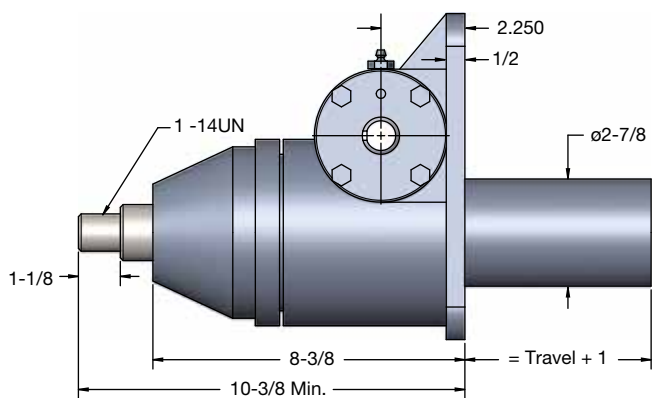
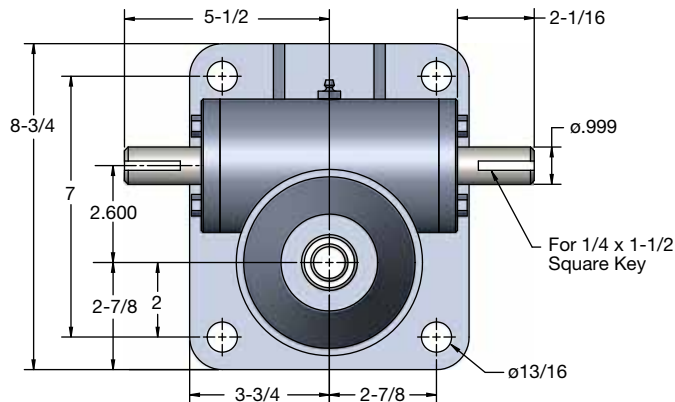


Inverted Rotating: DM-9806

BALL SCREW

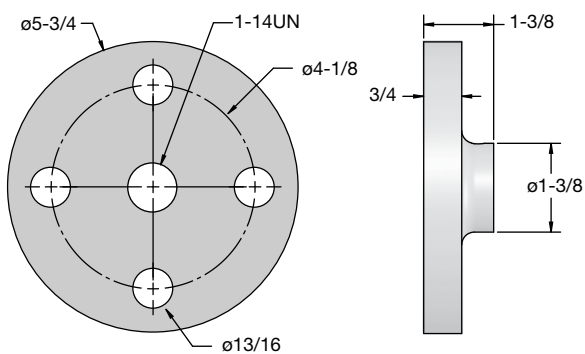
ACTUATORS

10 TON CAPACITY - 1 INCH LEAD

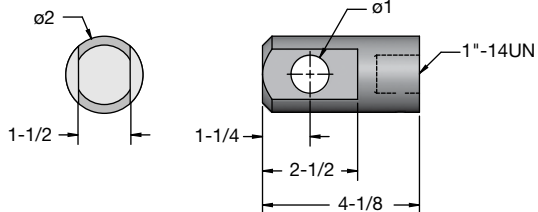


Upright: M-98101

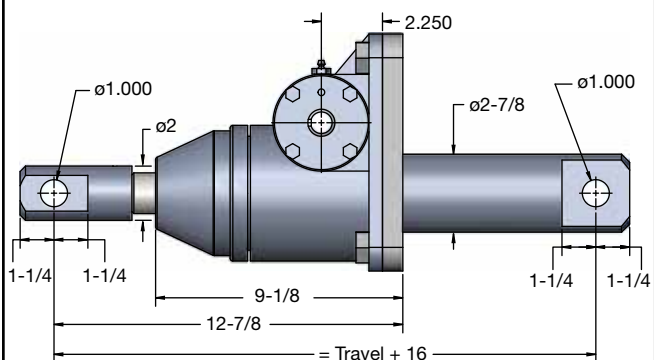
1-1/2" Diameter x 1.000 Lead Lifting Screws



Top Plate

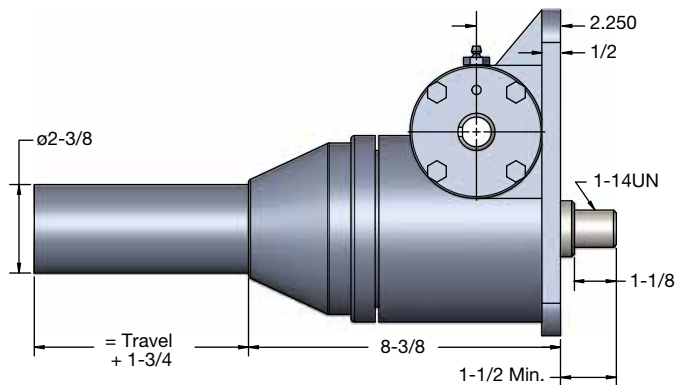


Cleviss End

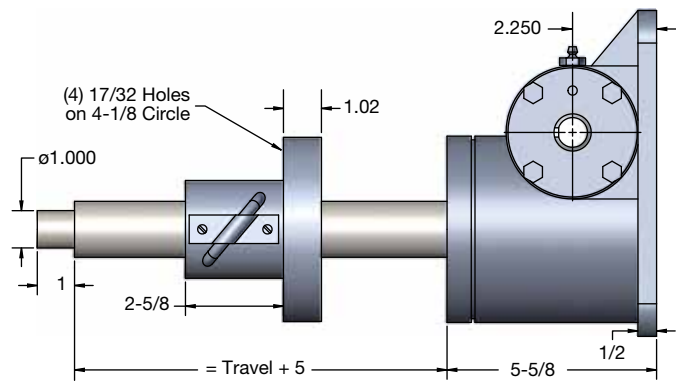


Double Clevis: CCM-9810

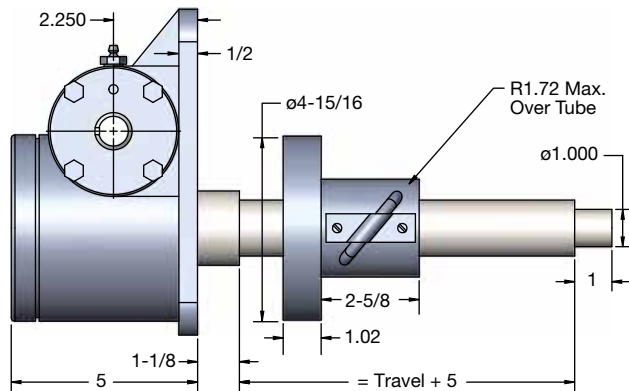
Maximum Allowable Raise in Compression 20" - Rating 7300 Lbs.
Maximum Raise at Rated Load in Compression 9"



Inverted: M-98091



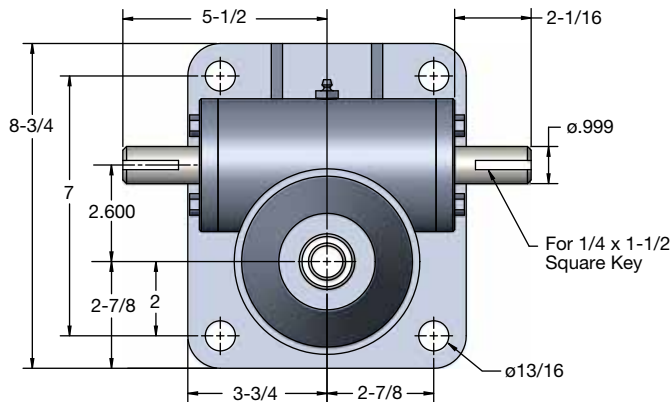
Upright Rotating: UM-98111



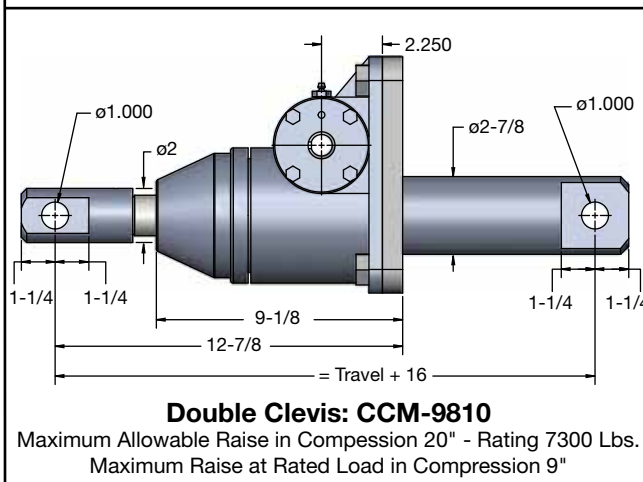
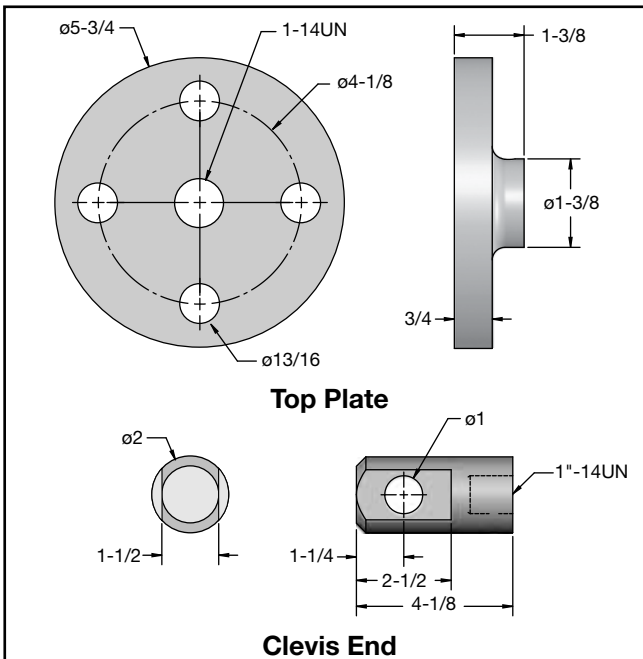
Inverted Rotating: DM-98111

Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

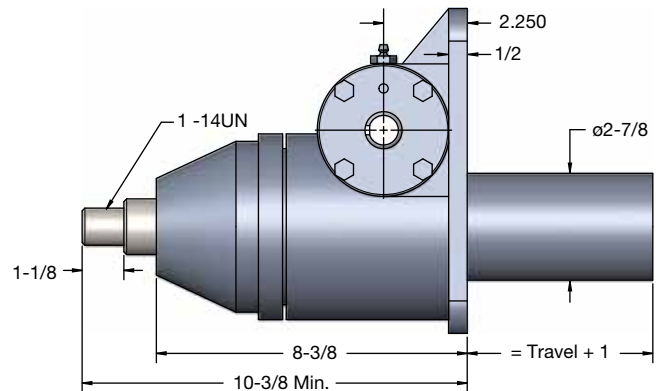
BALL SCREW ACTUATORS 10 TON CAPACITY



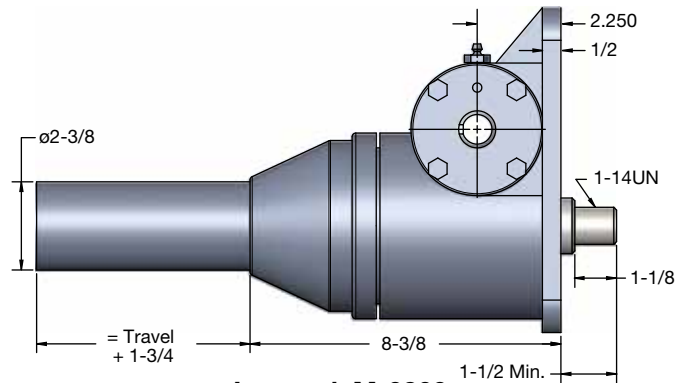
1-1/2" Diameter x .474 Lead Lifting Screws



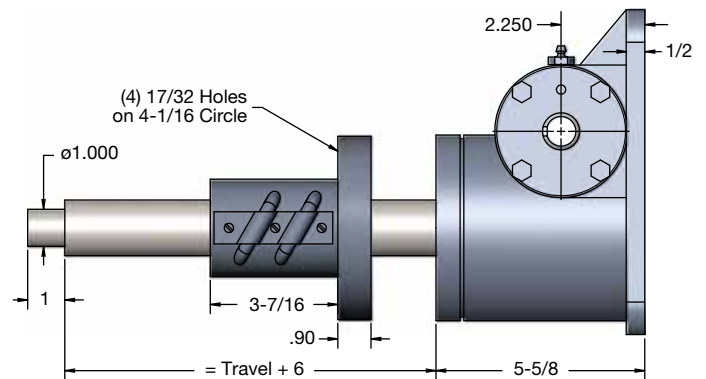
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



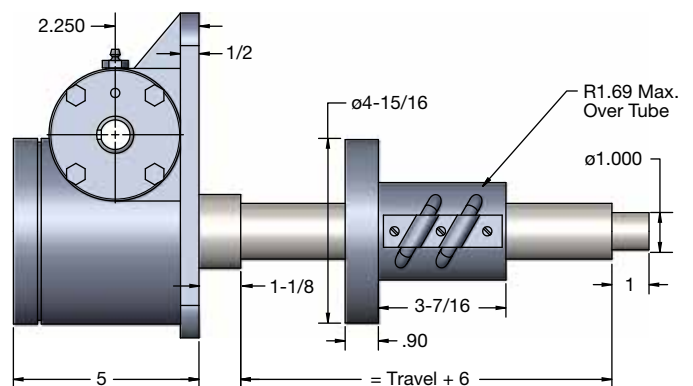
Upright: M-9810



Inverted: M-9809



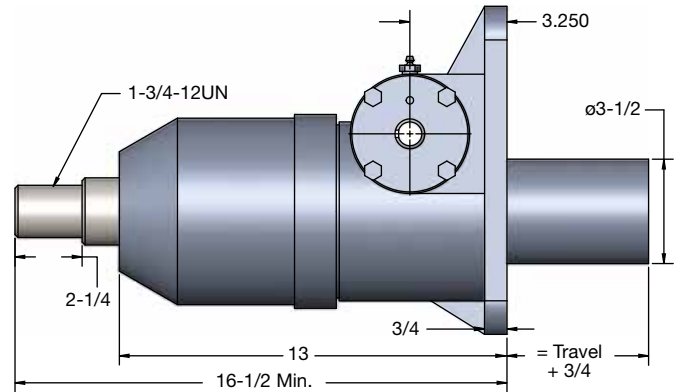
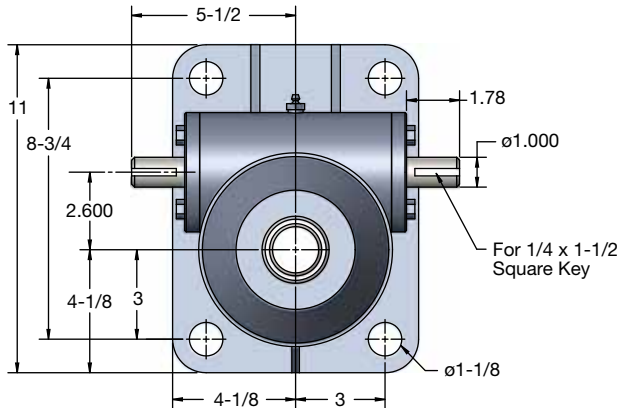
Upright Rotating: UM-9811



Inverted Rotating: DM-9811

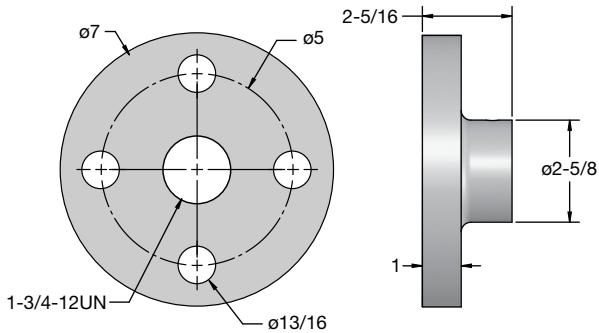
BALL SCREW ACTUATORS

20 TON CAPACITY STANDARD AND 1 INCH LEAD

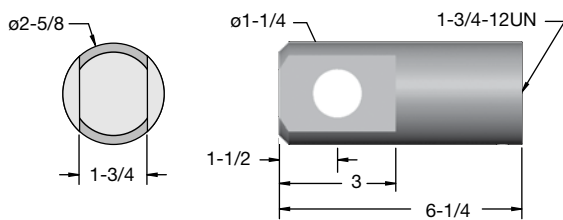


Upright: M-9820 or M-98201

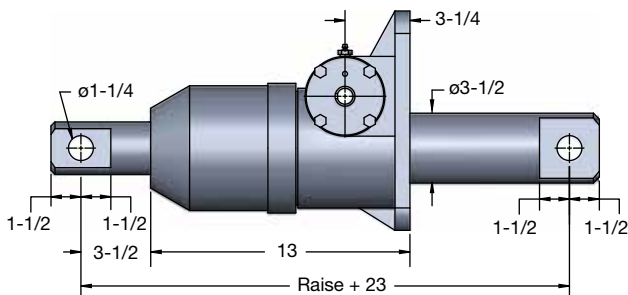
**2-1/4" Diameter x .500 Lead Lifting Screws
2-1/4" Diameter x 1.00 Lead Lifting Screws**



Top Plate



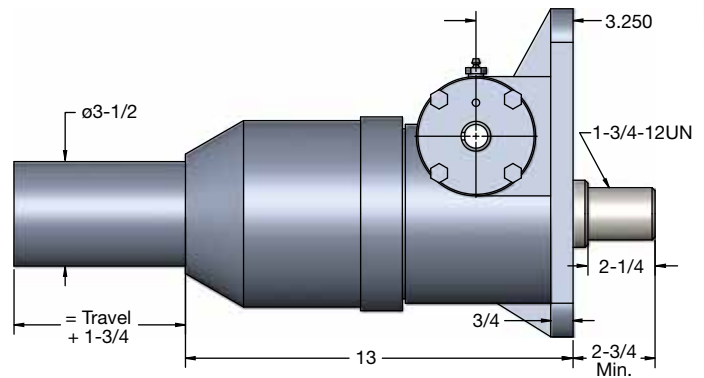
Clevis End



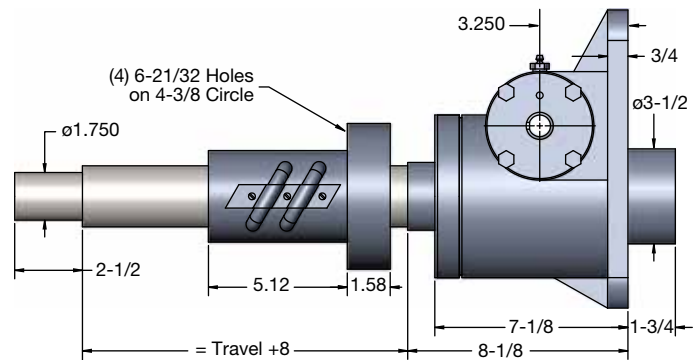
Double Clevis: CCM-9820

Maximum Allowable Raise in Compression 93" - Rating 94,000 Lbs.
Maximum Raise at Rated Load in Compression 90"

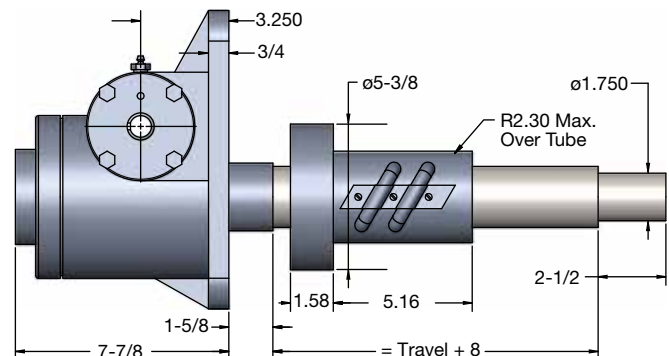
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



Inverted: M-9819 or M-98191

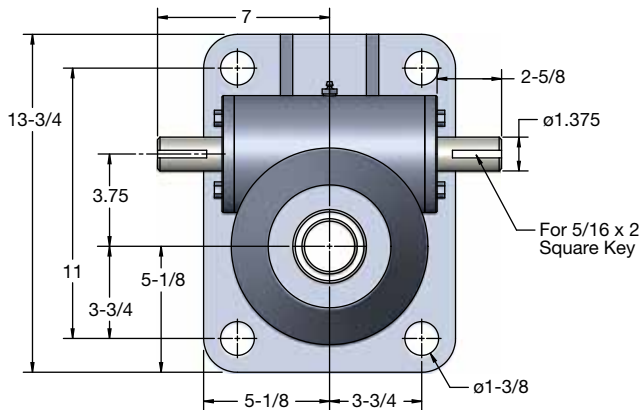


Upright Rotating: AUM-9821 or AUM-98211

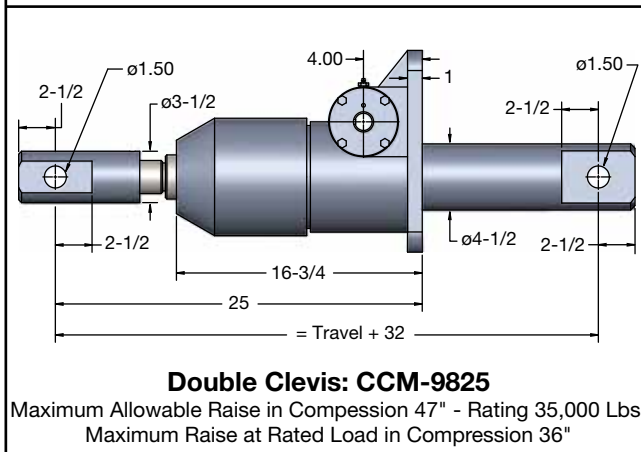
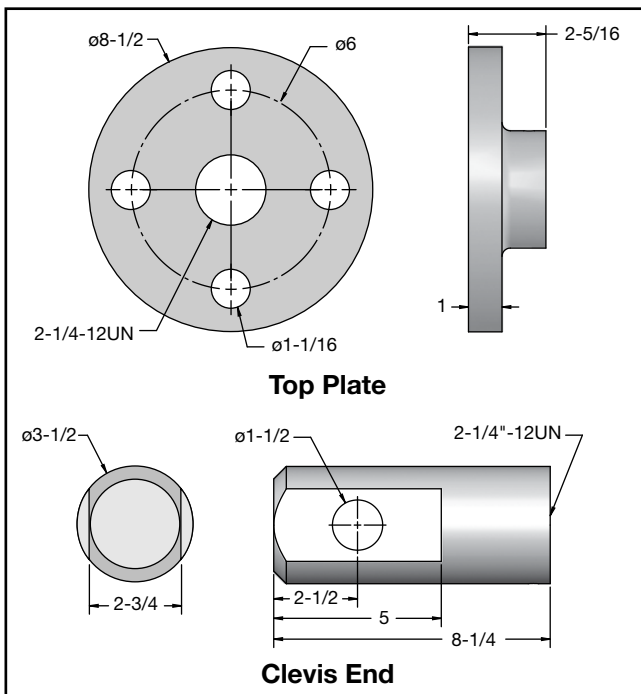


Inverted Rotating: ADM-9821 or ADM-98211

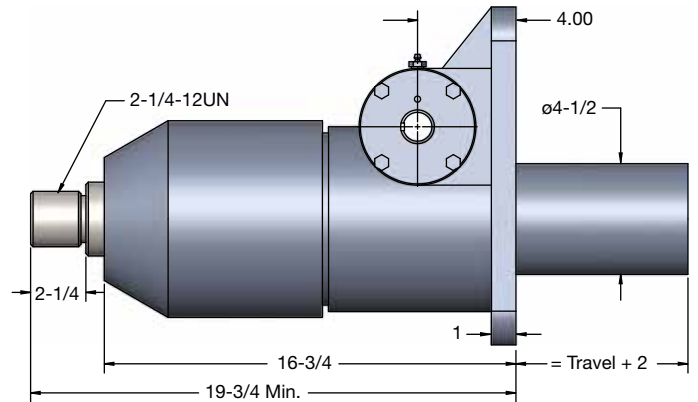
BALL SCREW ACTUATORS 25 TON CAPACITY



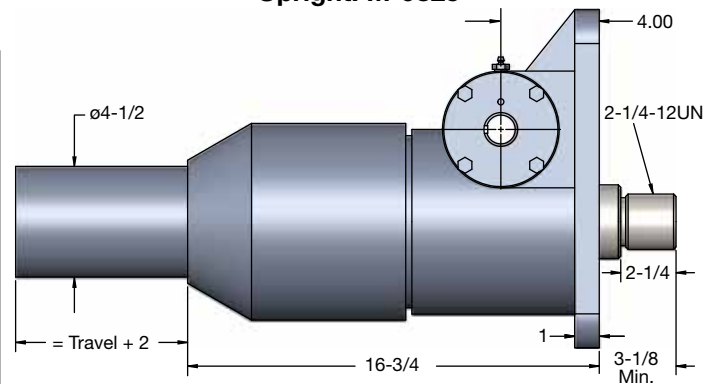
3" Diameter x .660 Lead Lifting Screws



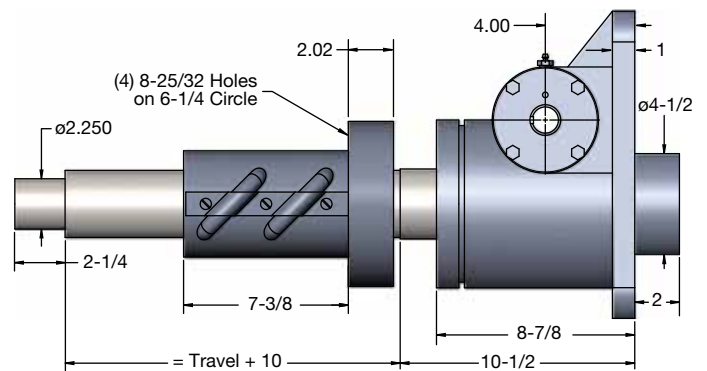
Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.



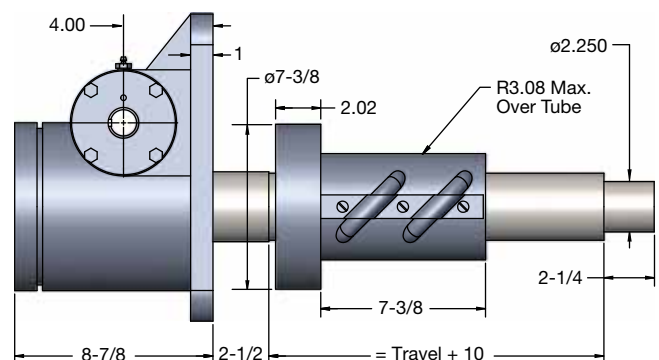
Upright: M-9825



Inverted: M-9824

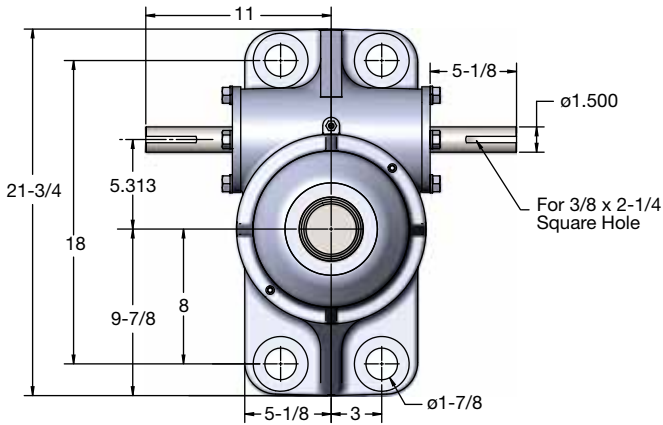


Upright Rotating: UM-9826

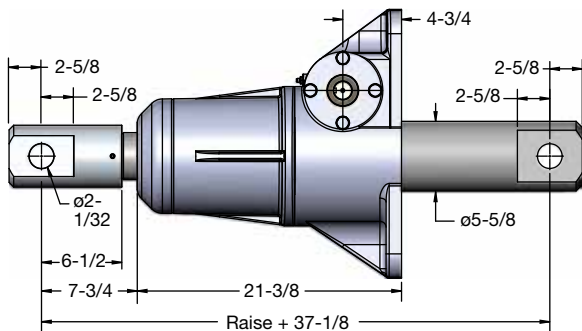
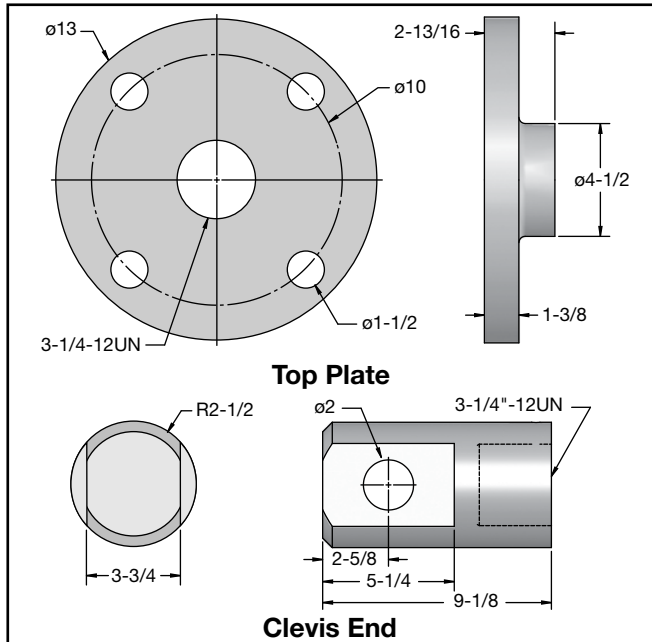


Inverted Rotating: DM-9826

50 TON CAPACITY[†] — 9800 SERIES



4" Diameter x 1.000 Lead Lifting Screws

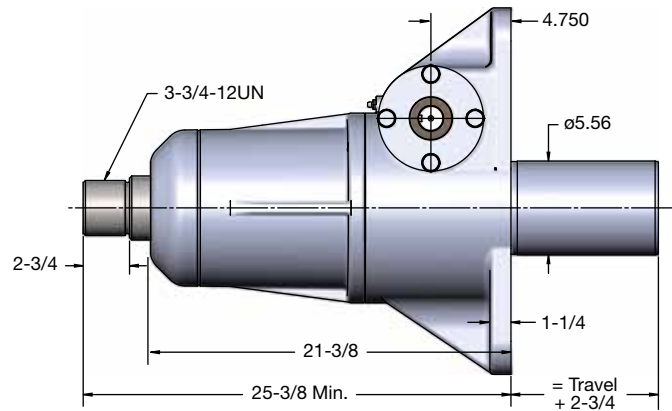


Double Clevis: CCM-9860

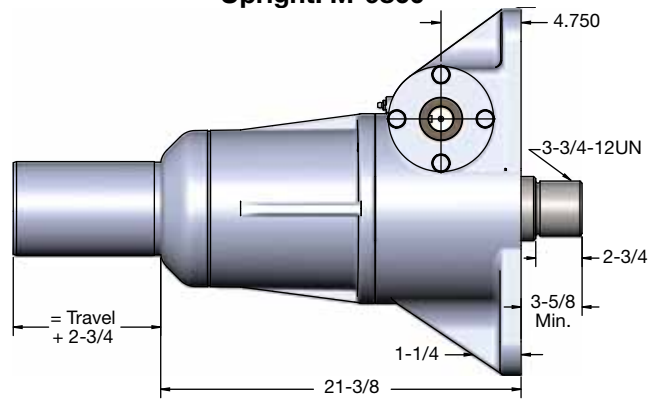
Maximum Allowable Raise in Compression 65" - Rating 62,000 Lbs.
Maximum Raise at Rated Load in Compression 47"

Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

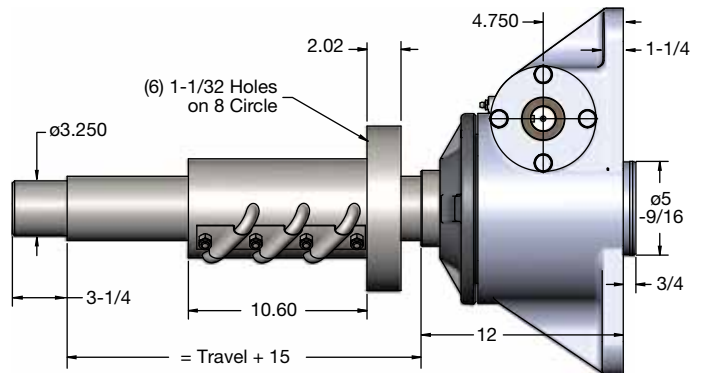
†Does your ball screw application require more than 50 tons? Please contact our Customer Service group to explore our specialty options for higher load ratings up to 100 tons.



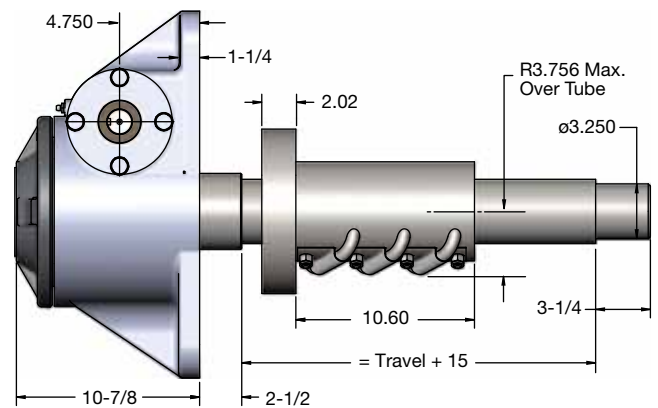
Upright: M-9860



Inverted: M-9859



Upright Rotating: UM-9861



Inverted Rotating: DM-9861

50 TON CAPACITY[†] — 2800 SERIES



Note: Lifting screw is not keyed. Top should be secured to a lifting member to prevent rotation. When a Bellows Boot is required, see pages 148-149. Dimensions are subject to change without notice.

Inverted: M-2859

