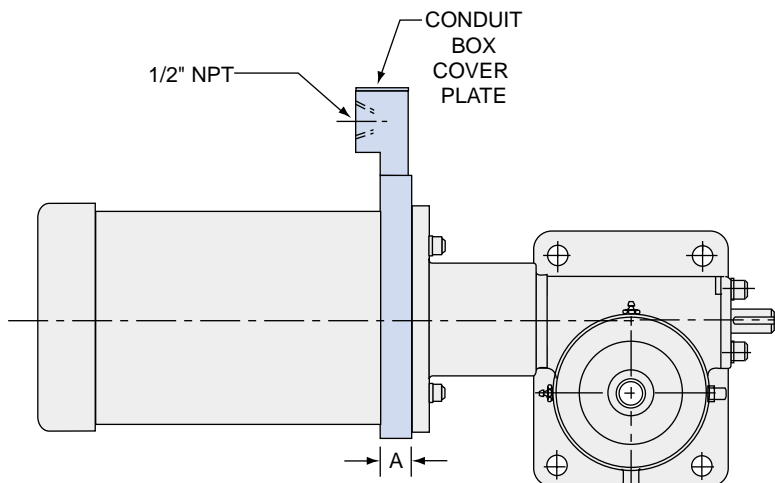


**IN-LINE ENCODER IS INSTALLED BETWEEN THE MOTOR ADAPTER AND MOTOR .**



WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

For precise position sensing at the input shaft, an ActionJac™ in-line encoder option may be factory installed between the motor and motor adapter or Right-Angle Reducer. This low-cost option requires minimal space, leaving the extension shaft side of the jack free for clearance, for a rotary limit switch, or for coupling to another jack.

The in-line encoder's quadrature output design allows detection of both speed and direction of shaft rotation.

The ActionJac™ in-line encoder option requires an optional motor mount or Right-Angle Reducer.

- Sensing speed range: 0 -10,000 rpm
- Pulse Output: 60 Pulses per revolution
- Supply voltage: +12 Volts DC +/-5%
- Supply current: 60 mA typical, 115 mA maximum
- Output drive capability: 250 mA per channel continuous
- Maximum load: 50 ohms per channel

The encoder is face mounted between the motor and motor mount and will offset the length of the motor .61 inches for NEMA 56 and 140 frames and .88 inches for NEMA 180 and 210 frames.

FRAME SIZE	56C/140TC	180TC/210TC
OFFSET A	.61	.88

**HOW TO ORDER AN IN-LINE ENCODER:**

Specify the Worm Gear Screw Jack reference number, using the system described on page 268, 289, 308, 320 and 330.

**EXAMPLE:**

2.5 MSJ-U 6:1 / 103-1 2CA-4E / FS / 24.5 / 2 / **SE**

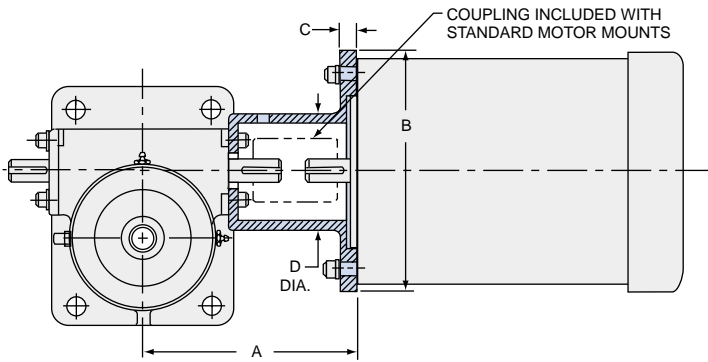
**“E” anywhere in this field indicates Encoder**

**ELECTRICAL CONNECTIONS**

**OUTPUT CHANNEL WAVEFORMS**

**OUTPUT CHANNEL SCHEMATIC (CHANNELS A & B)**

MOTOR MOUNTS WITH AND WITHOUT BRAKEMOTORS



ActionJac™ motor mount assemblies are designed for standard motors and include jaw type couplings. These assemblies are stocked for jack sizes 2.5, 5, 10, 15 and 20 and are available for the jack sizes listed in the table. Non-standard motor mounts can be designed for special requirements including, special couplings, small NEMA frame motors, DIN standard motors, stepper motor and servomotor designs. See page 261 for Servo Jack motor mount examples, contact Nook Industries for additional information.

Actionjac™ Worm Gear Screw Jacks can be ordered with industrial quality induction motors. All motors have internally wired, integral, spring actuated brakes. Standard motors are 3-phase, 230-460 VAC, 60hz, 1725 rpm. Single-phase motors are 115-130 VAC, 60hz, 1725 rpm. All motors are rated for continuous duty. Specific duty motors may be supplied upon request.

See charts for order codes and motor mount dimensions. For MOTOR REFERENCE DIMENSIONS see page 347.

**CAUTION:** Ball Screw Jacks are self-lowering. A brake of sufficient torque is required to hold the load with a ball screw jack. Be sure to verify that the brakemotor selected has sufficient brake torque for your application.

ORDER CODES FOR MOTORS & MOUNTS				
BRAKE MOTOR HP	NEMA FRAME SIZE	ORDER CODE		
		W/1-HP MOTOR	W/3-HP MOTOR	WITHOUT MOTOR
1/4	56C	021	023	X05
1/3	56C	031	033	X05
1/2	56C	051	053	X05
3/4	56C	071	073	X05
1	56C	101	103	X05
1	143TC	N/S	N/S	X14
1 1/2	56C	N/A	153	X05
1 1/2	145TC		N/A	X14
2	56C		203	X05
2	142TC		N/S	X14
3	182TC		303	X18
5	184TC		503	X18
7 1/2	213TC		703	X21

STANDARD MOTOR MOUNT SIZES & DIMENSIONS					
JACK SIZE (TONS)	NEMA FRAME SIZE	DIMENSIONS			
		A	B	C	D
2.5	56C	6.25	6.63	.50	3.50
	140TC	6.25	6.63	.50	3.50
5	56C	7.25	6.75	.50	3.75
	140TC	7.25	6.75	.50	3.75
	180TC	8.00	9.25	.75	3.75
10, 15	56C	8.25	6.75	.50	4.38
	140TC	8.25	6.75	.50	4.38
	180TC	9.00	9.25	.75	4.38
20	56C	8.66	6.75	.50	3.75
	140TC	8.66	6.75	.50	3.75
	180TC	9.00	9.25	.63	5.19
	213TC	9.68	8.88	.88	5.69

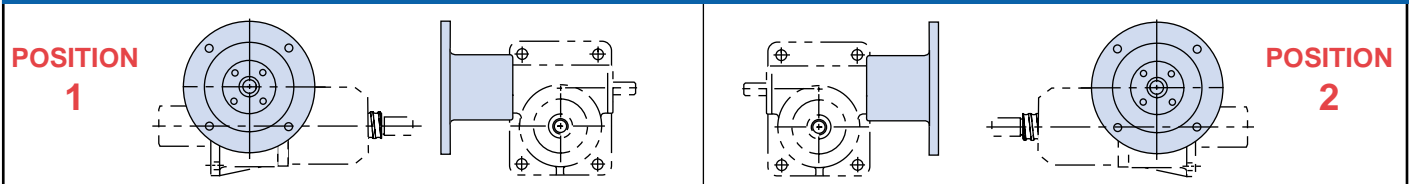
HOW TO ORDER A MOTOR ADAPTER WITH OR WITHOUT A BRAKEMOTOR

EXAMPLE:

2.5 BSJ-U 6:1 / **103-1** / SSE-2 / FS / 12.0 / 2 / S

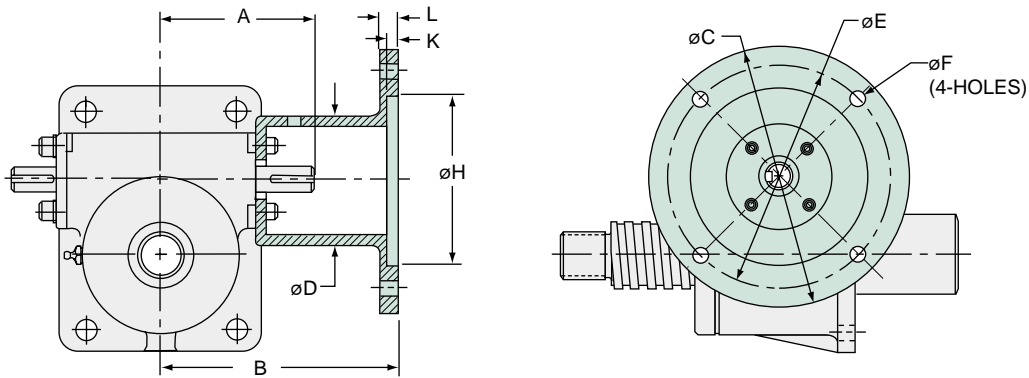


MOTOR MOUNT POSITIONS



METRIC MOTOR MOUNTS

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA



Other IEC Frame Motor Sizes available upon request, please contact factory

MODEL	IEC FRAME MOTOR SIZE	PART NUMBER	A REF	B	øC	øD	øE	øF	øH	K	L
EM05-BSJ EM05-MSJ	56B5	8026-01-00	57.5	100	120	64	100	8.5	80	3.5	7
	56B14	8020-01-00	57.5	100	80	64	65	6	50	3.0	6
EM1-BSJ EM1-MSJ	63B5	7825-01-00	76	114	140	70	115	9	95	4	8
	63B14	7826-01-00	76	144	90	70	75	6	60	3.5	8
	71B5	7821-01-00	76	120	160	85	130	9	110	4.5	10
	71B14	7822-01-00	76	120	105	85	85	7	70	4	10
EM2.5-BSJ EM2.5-MSJ	71B5	7785-00-00	90	135	160	85	130	9	110	4.5	10
	71B14	7773-01-00	90	135	105	85	85	7	70	4	10
	80B5	7787-01-00	90	145	200	85	165	11	130	4.5	12
	80B14	7774-01-00	90	145	120	85	100	7	80	4	12
EM5-BSJ EM5-MSJ	80B5	7795-01-00	115	180	200	96	165	11	130	4.5	12
	80B14	7791-01-00	115	170	120	96	100	7	80	4	12
	90B5	7790-01-00	115	180	200	96	165	11	130	4.5	12
	90B14	7796-01-00	115	180	140	96	115	9	95	4.5	12
EM10-BSJ EM10-MSJ	90B5	7798-01-00	140	207	200	116	165	11	130	4.5	12
	90B14	7799-01-00	140	207	140	116	115	9	95	4.5	12
	100B5	7802-01-00	140	217	250	116	215	13	180	5	14
	100B14	7803-01-00	140	217	160	116	130	9	110	5	14
EM20-BSJ EM-20-MSJ	100B5	7809-01-00	150	230	250	134	215	13	180	5	14
	100B14	7811-01-00	150	230	250	134	130	9	110	5	14

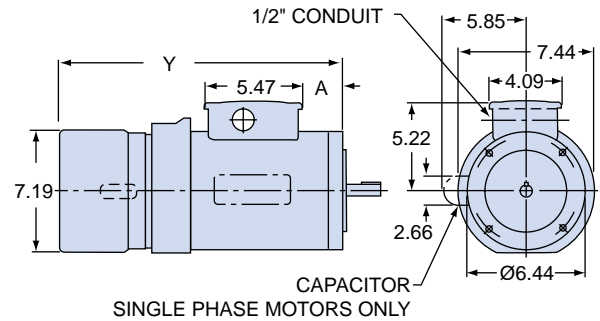
When desired, Actionjac™ Worm Gear Screw Jacks may be supplied with industrial quality, U.S.A-made motors. All motors have internally wired, integral brakes. Brake may be wired externally on request. When the motor power is off, the brake is spring actuated on.

Standard motors are 3-phase, 230-460 VAC, 60hz, 1725 rpm. Single-phase motors are 115-130 VAC, 60hz, 1725 rpm. All motors are rated for continuous duty. Note: For additional options, contact Nook Industries.

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

**CLEARANCE DIMENSIONS: BRAKE MOTORS 1/4 – 2 hp**

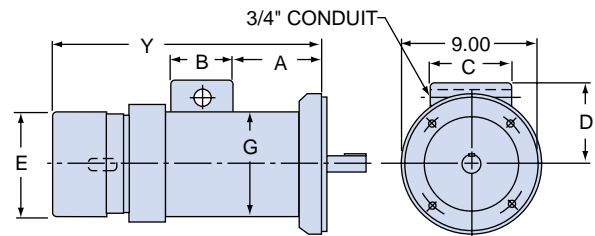
HORSEPOWER	CODE		A	Y	WEIGHT (LBS.)
	3Ø (Standard)	1Ø (Optional)			
1/4	023	021	2.05	13.78	30
1/3	033	031	2.05	13.78	30
1/2	053	051	2.05	13.78	38
3/4	073	071	2.05	14.78	40
1	103	011	2.05	14.78	40
1 1/2	153	N/A	3.05	15.78	44
2	203	N/A	3.49	16.22	50



(NOTE: All clearances dimensions in the chart shown above are approximate)

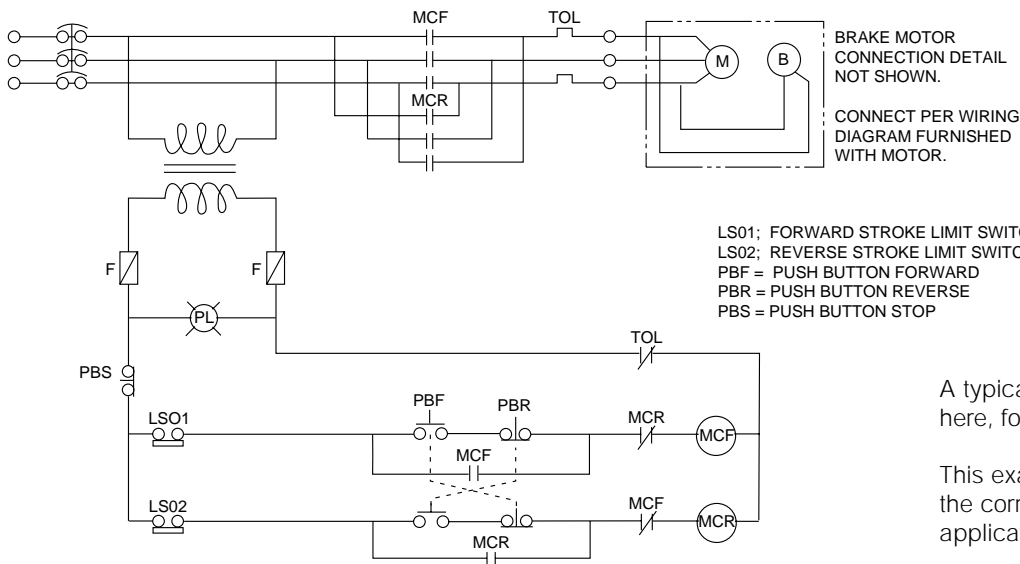
**CLEARANCE DIMENSIONS: BRAKE MOTORS 3 – 7 1/2 hp**

HP	CODE	A	B	C	D	E DIA.	G DIA.	Y	WT. (LBS.)
	3Ø								
3	303	5.98	4.00	5.38	5.97	7.16	7.89	17.72	75
5	503	6.98	4.00	5.38	5.97	10.18	7.89	21.95	110
7 1/2	703	8.88	3.25	4.00	7.46	10.19	9.56	23.81	155



(NOTE: All clearances dimensions in the chart shown above are approximate)

**BRAKE MOTOR WIRING**



A typical wiring drawing is shown here, for a three-phase brake motor.

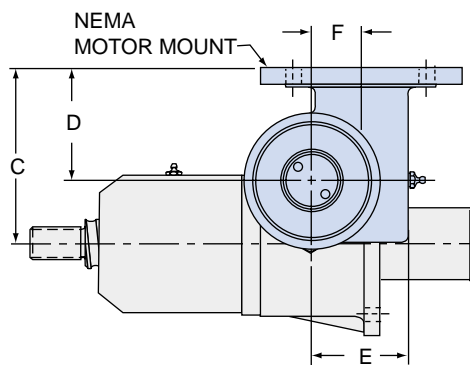
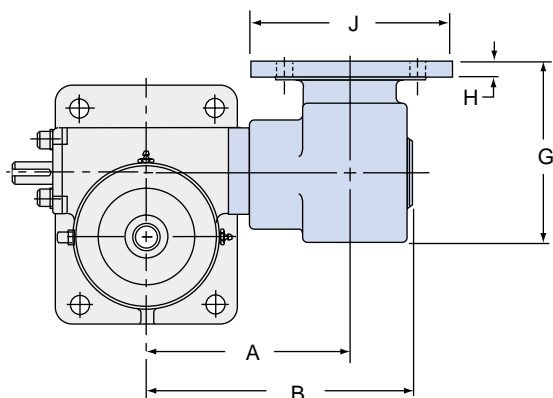
This example is for reference only, the correct wiring will vary for each application.

The Right-Angle Reducer is a compact, high quality worm gear reducer enclosed in a ductile iron housing. The reducer mounts directly to the input side of the jack. Motors mount quill-style to a standard NEMA C-face.

The right angle reducer is a secondary worm gear reducer that reduces speed and increases torque to the input of the jack. If motor clearance is an issue, a right angle reducer may be added to most jacks to optimize motor orientation.

Right Angle Reducers may be ordered installed on the standard ActionJac™ Machine Screw and Ball Screw Jacks listed below and are available with or without brakemotors.

Consult the data charts for jack capacity when a Right-Angle Reducer is used. Ratings given on the chart may differ when a Right-Angle Reducer is installed on Keyed or Anti-Backlash Machine Screw Jack models. Special consideration must be given when installing onto a Double-Clevis Jack due to the additional weight of the reducer.



## RIGHT-ANGLE REDUCER POSITIONS

<p><b>POSITION 1</b></p>	<p><b>POSITION 2</b></p>
<p><b>POSITION 3</b></p>	<p><b>POSITION 4</b></p>
<p><b>POSITION 5</b></p>	<p><b>POSITION 6</b></p>
<p><b>POSITION 7</b></p>	<p><b>POSITION 8</b></p>



## STANDARD AND SPECIAL BELLOWS BOOTS

Bellows boots are available for all sizes and configurations of ActionJac™ Worm Gear Screw Jacks. A boot protects the lift screw from contamination and helps retain lubricant to ensure long jack life.

Standard boots are sewn from black neoprene-covered nylon fabric for oil, water and weather resistance and are acceptable for use in -60° to +220° F environments. Optional materials are available for specific operating conditions (see chart).

Guides are recommended for all horizontal applications where travel exceeds 24 inches or if the boot needs to remain centered around the screw. The recommended number of guides is one guide for each 24 inches of travel length.

**EXAMPLES:** 12 inches of travel = no guides, 24 inches of travel = one guide, 47 inches of travel = one guide, 48 inches of travel = two guides, etc.).

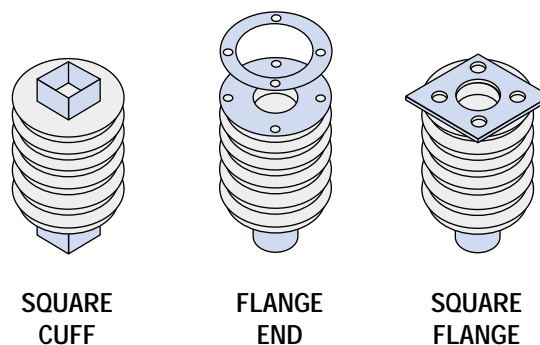
Standard boots are furnished with tie straps for jacks with greater than 65 inches travel. Tie straps are attached from convolution to convolution and help the boot extend uniformly.

## SPECIAL BOOT MATERIALS

DESCRIPTION	TEMPERATURE RANGE	APPLICATION COMMENTS
HYPALON-COATED NYLON	-60° TO +300° F	CHEMICAL RESISTANCE, WASH DOWN
SILICONE COATED FIBERGLASS	-100° TO +550° F	HIGH TEMPERATURE
ALUMINUM-COATED FIBERGLASS	-100° TO +550° F	HIGH TEMPERATURE, HOT CHIPS, WELDING SPLATTER

Note: Retracted boot length may increase with some special materials.

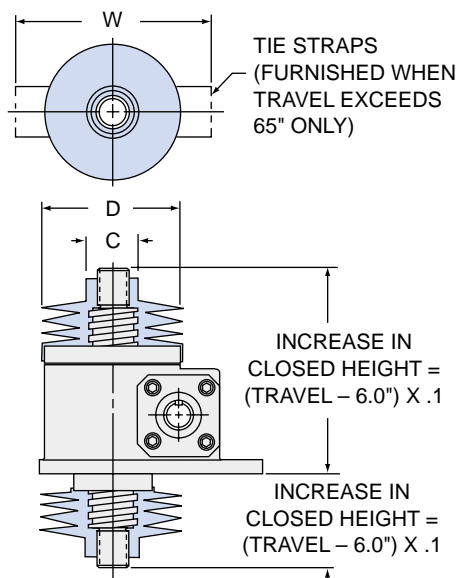
## SPECIAL END CONFIGURATIONS



## BELLOWS BOOTS TRANSLATING SCREW JACKS

The end cuff is designed to fit standard end fittings, the top plate and the clevis end. When jack travel is greater than 6 inches, lift screw closed height increases to accommodate the length of the

collapsed boot convolutions. For standard boots the increase in closed height is calculated using the formula shown.

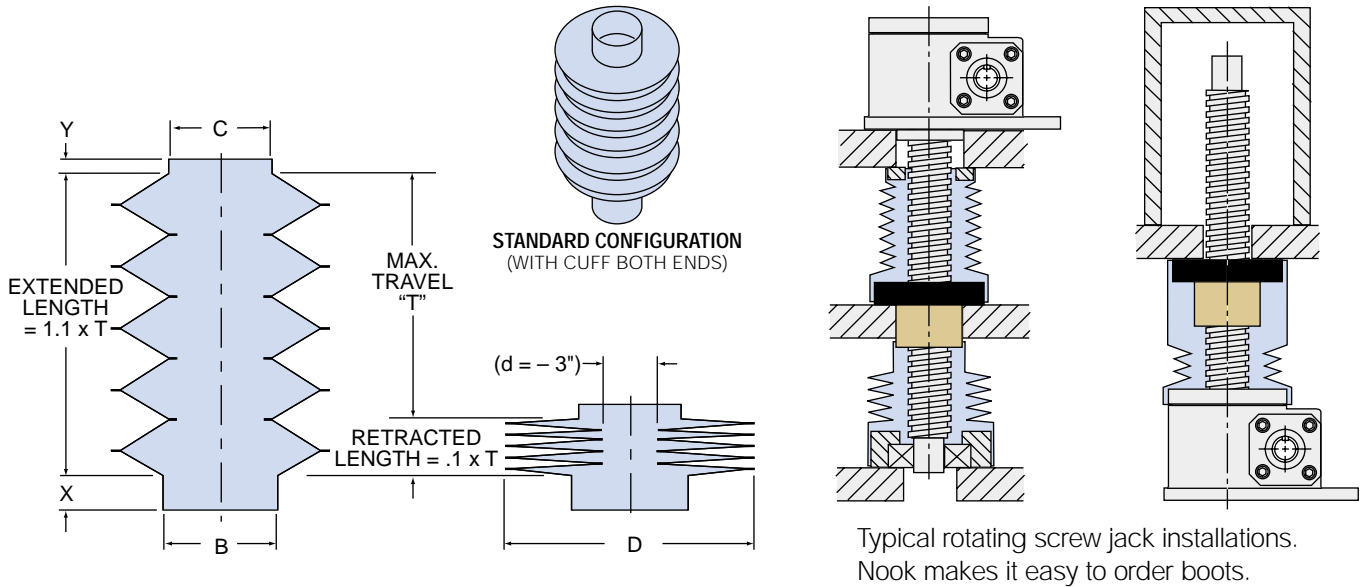


JACK MODEL		C DIA	D DIA	W	MAX. SCREW DIA (REF.)
BALL SCREW	MACHINE SCREW				
0.5-BSJ	ALL MJ	1.25	4.00	5.50	0.625
1-BSJ	1-MSJ	1.25	4.25	5.75	0.750
2.5-BSJ	2, 2.5-MSJ	1.50	4.50	6.00	1.000
3-BSJ	—	1.50	4.50	6.00	1.160
5, 10-BSJ	5-MSJ	1.75	5.00	6.50	1.500
—	10-MSJ	2.00	5.50	7.00	2.000
—	15-MSJ	2.50	5.75	7.25	2.250
20-BSJ	20-MSJ	2.75	6.00	7.50	2.500
30-BSJ	30-MSJ	3.50	7.50	8.00	3.375
—	35-MSJ	4.00	8.00	9.50	3.750
50-BSJ	50-MSJ	5.00	9.50	10.00	4.500
75-BSJ	75-MSJ	6.00	10.00	11.50	5.000
100-BSJ	100-MSJ	6.00	11.50	12.50	6.000

**BELLOWS BOOTS FOR ROTATING SCREW JACK**

Installation arrangements for rotating worm gear screw jacks vary, therefore boots for rotating jacks must be specified by the customer. The following

figures show typical installations for rotating screw jacks, standard dimensions and custom end configurations.



WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

**HOW TO ORDER BOOTS FOR A TRANSLATING AND ROTATING SCREW JACK**

Boots may be ordered using the reference number system as shown on pages 268, 289, 308, 320 and 330. For special material boots add "M" to the reference number and add the description.

**EXAMPLE:**

5 MSJ-U 6:1 / SSE-1 / SSE-2 / FST / 36.0 / **BGS**  
**B = Standard Boot**  
**G = with Optional Guide(s)**

Boots for upright rotating and inverted rotating jacks are ordered as separate line items.

Typical rotating jack applications require two boots, one between the housing and the travel nut and one from the travel nut to the end of the lift shaft. Each boot for a rotating screw jack is ordered as a separate line item. To order boots for a rotating screw jack, select the outside diameter "D" from the chart on the facing page and specify cuff dimensions and travel per the diagram using the reference number as shown below.

**EXAMPLE:**

**Bellows Boot** BB / 7.50 / 4.00 x 2.0 / 3.00 x 1.50 / 72.00 / G  
**Outside Diameter "D"** 7.50  
**1st Cuff = 4.00" I.D. x 2.0" long** 4.00 x 2.0  
**2nd Cuff = 3.00" I.D. x 1.5" long** 3.00 x 1.50  
**Maximum Travel = 72"** 72.00  
**With Guides** G

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

Every motorized Worm Gear Screw Jack must be controlled so that power to the motor is turned off and the brake engaged before the limits of mechanical travel are reached.

The ActionJac™ rotary limit switch senses extension shaft rotation and provides switch contact closures that can be used to control motors.

This sturdy, durable assembly is available with two or four circuits or two circuits and a potentiometer. Each circuit has a separate rotating cam that actuates a high quality switch. The switch actuation may be individually and infinitely adjusted anywhere within the travel of the jack.

These assemblies contain gear reducers with ratios that vary according to the model and travel of the jack. Nook selects ratios that result in maximum cam rotation for best accuracy, repeatability and minimum hysteresis. In most cases, with full travel of the actuator, the cam will rotate 3/8 to 7/8 of a revolution to actuate a switch. In the event that the cam continues to rotate, the switch returns to its original state after approximately 25° of rotation, with no damage to the limit switch assembly.

The 2-circuit switch assembly is useful for limiting the maximum and minimum extension. The 4-circuit assembly gives the possibility of additional signals for other user purposes. The potentiometer version is used to provide an analog signal for sensing jack position.

Single Pole Double Throw (SPDT) switches are standard and Double Pole Double Throw (DPDT) switches are



optional. These assemblies are dust protected and meet NEMA 4 and 5 standards for oil and water tightness.

The ActionJac™ rotary limit switch assembly is mounted to the extension shaft side of the ActionJac™ Worm Gear Screw Jack opposite the input.

The rotary limit switch is available for ActionJac™ Worm Gear Screw Jack sizes 2 tons and larger. Most jack models have close and extended mounts to provide clearance around the switch housing. See the following chart for dimensions.

Switches are factory installed to assure proper assembly in the correct orientation for the specified mounting position.

**CAUTION:** Limit switches are not adjusted at the factory. Switches should be set during installation.

**HOW TO ORDER ROTARY LIMIT SWITCH:**

- SPECIFY:**
- Limit Switch code (see table to right)
  - Mounting Position (1 through 8 see page 256)
  - Close or Extended Mount (C or E)

Insert the correct designation in the ActionJac™ Worm Gear Screw Jack reference number (see page 268 and 289 for more information on jack reference numbers).

**EXAMPLE:** 2.5-MSJ-U 6:1 / 103-1 / **2CA-4E** / FS / 24.5 / 2 / S

└─ Extension shaft designation

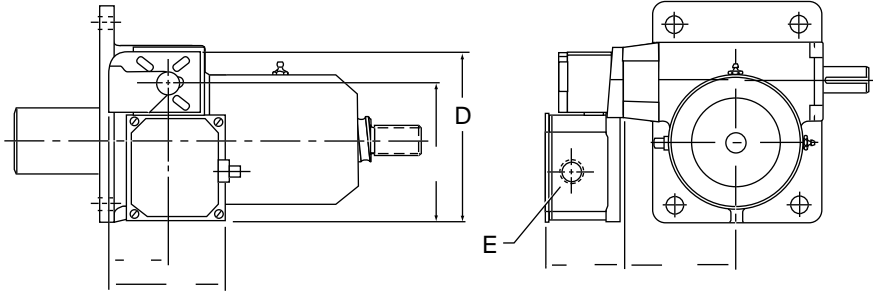
Examples of rotary limit switch designations:

- 2CA-4C** = Rotary Limit Switch, 2-circuit, SPDT, position 4, close mount
- 4CE-1E** = Rotary Limit Switch, 4-circuit, DPDT, position 1, extended mount
- PTA-8C** = Rotary Limit Switch with potentiometer, 2 SPDT's, position 8, close mount

**C = Close mount on E = Extended mount (see following page)**  
**"dash" number designates mounting position**

CODE	NUMBER OF CIRCUITS	SWITCH TYPE	POTENTIOMETER
2CA	2	SPDT	NO
2CC	2	DPDT	NO
4CA	4	SPDT	NO
4CE	4	DPDT	NO
PTA	2	SPDT	YES
PTC	2	DPDT	YES

**IMPORTANT:** These designation numbers are not complete part numbers. These assemblies contain gear reducers with ratios that vary according to the model and travel of the jack. If you are ordering a replacement switch assembly, complete information on the jack is required.

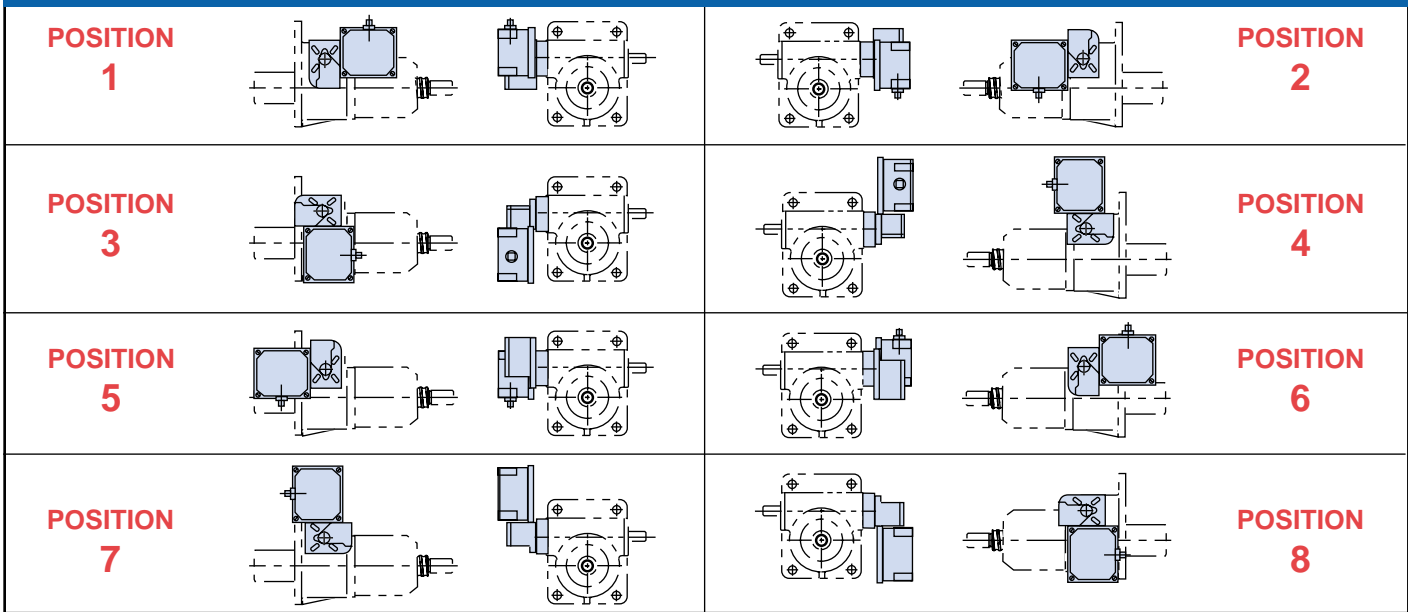


CIRCUITS	DIMENSIONS					
	A	B	C	D	E	F
LS-2C 2 CIRCUIT	2.46	5.25	6.24	7.62	3/4-NPT	3.25
LS-4C 4 CIRCUIT	2.46	5.25	8.24	9.62	1-NPT	3.88
LS-2PT 2 CIRCUIT WITH POTENTIOMETER	2.46	5.25	8.24	9.62	1-NPT	3.88

MODEL	DIM.H CLOSE MOUNT	DIM.H EXT. MOUNT	CLOSE MOUNT POSITIONS
2-BSJ & MSJ	N/A	3.56	ALL
2R, 2.5-BSJ & MSJ	2.75	3.56	ALL
3-BSJ	N/A	3.56	ALL
5-BSJ & MSJ	3.56	4.56	ALL
5R-BSJ & MSJ	4	5.06	ALL
10, 15-BSJ & MSJ	3.88	5.56	ALL
20-BSJ & MSJ	4.41	5.81	ALL
30, 35-MSJ	5.25	7.06	ALL
50-BSJ & MSJ	6.25	11.06	1,2,4,7
75-BSJ & MSJ	7.25	12.06	ALL
100-BSJ & MSJ	8.25	12	1,2,4,7

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

**ROTARY LIMIT SWITCH POSITIONS**



**ELECTRICAL RATINGS:**

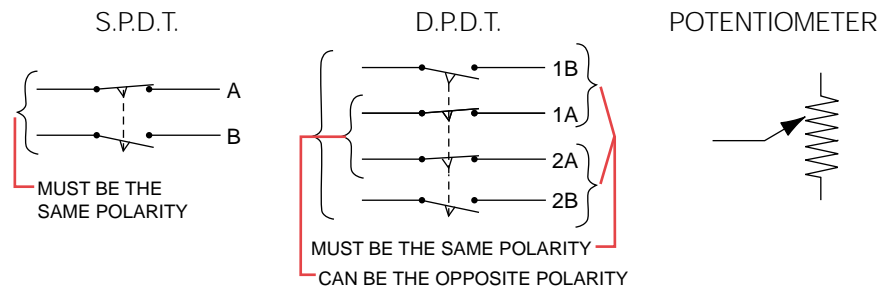
**SWITCHES:**

DC Current — 115 Volts SPDT, .50 amps  
 DPDT, .80 amps  
 AC Current — 115 Volts SPDT, 15 amps  
 DPDT, 10 amps

**10-TURN POTENTIOMETER:**

0-500 OHM, 2 Watt

**WIRING DIAGRAMS:**

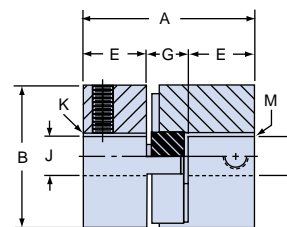


**NOTE:** While the 10-turn potentiometer is rated for 0-500 Ohms, as implemented in the rotary limit switch assembly, it can not and should not operate over its full range. Minimum and maximum resistance values can not be known until the unit is installed and final travel limit adjustments have been made, therefore, the device connected to the potentiometer should include provisions for trimming to compensate for these values.

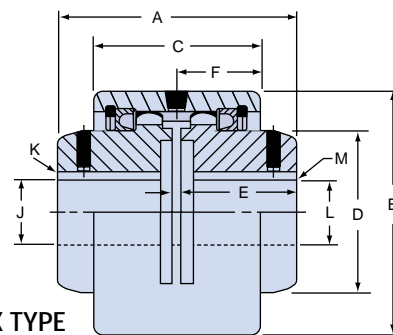
Jacks used alone or in multiple arrangements require couplings to transmit power to the input shaft. Nook Industries provides jaw type and flex type couplings for use with jacks. The selection process for couplings includes the following steps:

- 1) Refer to the jack specification tables to determine torque requirements per jack for your application.
- 2) Determine total coupling capacity required by multiplying the torque required per jack by the number of jacks to be driven by the coupling.
- 3) Check the torque required against maximum torque rating as shown in the table. Select a coupling with a maximum torque greater than the application torque.
- 4) If using flex type couplings, full-flex couplings should be used for close coupled arrangements. For floating shaft applications, use two Flex-Rigid couplings. The rigid half should be mounted on the floating shaft.

All jacks, shafts, couplings and motor should be carefully aligned for maximum performance. Couplings with bores other than those specified are available upon request.



JAW TYPE



FLEX TYPE

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

JACK PART NO.	MAX. TORQUE RATING IN.-LBS.	APPROX. WT. LBS.	COUPLING DIMENSIONS							BORE SIZES			
			A	B	C	D	E	F	G	J	KEYWAY K	L	KEYWAY M
C-2020-01	38.5	.25	1.66	1.06	—	—	.56	—	.53	.376	—	.376	—
C-2025-01	126	.75	25/32	1.75	—	—	13/16	—	.53	.5005 .5000	1/8 X 1/16	.5005 .5000	1/8 X 1/16
C-2025-05	126	.75	25/32	1.75	—	—	13/16	—	.53	.5005 .5000	1/8 X 1/16	.6255 .6250	1/8 X 1/16
C-2025-02	126	.75	25/32	1.75	—	—	13/16	—	.53	.5005 .5000	1/8 X 1/16	.7505 .7500	3/16 X 3/32
C-2025-03	126	.75	25/32	1.75	—	—	13/16	—	.53	.6255 .6250	1/8 X 1/16	.6255 .6250	1/8 X 1/16
C-2025-04	126	.75	25/32	1.75	—	—	13/16	—	.53	.6255 .6250	1/8 X 1/16	.7505 .7500	3/16 X 3/32
C-2025-06	126	.75	25/32	1.75	—	—	13/16	—	.53	.7505 .7500	3/16 X 3/32	.7505 .7500	3/16 X 3/32

JACK PART NO.		MAX. TORQUE RATING IN.-LBS.	APPROX. WT. LBS.	COUPLING DIMENSIONS							BORE SIZES			
FULL FLEX	FLEX-RIGID			A	B	C	D	E	F	G	J	KEYWAY K	L	KEYWAY M
C-1800-04	C-1805-04	2500	5	31/8	35/16	2	2	11/2	1	1/8	.4995 .4990	1/8 X 1/16	.7495 .7490	3/16 X 3/32
C-1800-01	C-1805-01	2500	5	31/8	35/16	2	2	11/2	1	1/8	.4995 .4990	1/8 X 1/16	.9995 .9990	1/4 X 1/8
C-1800-05	C-1805-05	2500	5	31/8	35/16	2	2	11/2	1	1/8	.7495 .7490	3/16 X 3/32	.7495 .7490	3/16 X 3/32
C-1800-02	C-1805-02	2500	5	31/8	35/16	2	2	11/2	1	1/8	.7495 .7490	3/16 X 3/32	.9995 .9990	1/4 X 1/8
C-1800-03	C-1805-03	2500	5	31/8	35/16	2	2	11/2	1	1/8	.9995 .9990	1/4 X 1/8	.9995 .9990	1/4 X 1/8
C-1810-01	C-1815-01	7500	8	33/4	33/4	217/32	23/8	113/16	117/64	1/8	1.2495 1.2490	1/4 X 1/8	1.2495 1.2490	1/4 X 1/8
C-1810-02	C-1815-02	7500	8	33/4	33/4	217/32	23/8	113/16	117/64	1/8	1.3745 1.3740	5/16 X 5/32	1.2495 1.2490	1/4 X 1/8
C-1810-03	C-1815-03	7500	8	33/4	33/4	217/32	23/8	113/16	117/64	1/8	1.4995 1.4990	3/8 X 3/16	1.2495 1.2490	1/4 X 1/8

## POWERSHAFT™ LINK SHAFTING

ActionJac™ LinkJac™ Line Shafting is used to interconnect the input shafts of ActionJac™ Worm Gear Screw Jacks used in a multiple arrangement. The shafts transfer the torque from the motor to the jack or from jack to jack.

Nook Industries LinkJac™ Line Shafting is made from steel and is available in standard lengths up to 144". Custom end machining and other diameters are available, contact Nook Industries for information.

### SELECTION:

There are two major concerns when selecting interconnect shaft:

- Critical Speed: How fast will the shaft be turning?
- Torque: How much load will the shafts be carrying?

The two characteristics of a LinkJac™ Line Shaft which can be varied to accommodate these requirements are:

- Length of the shaft
- Diameter of the shaft

When selecting a LinkJac™ Line Shaft, use the largest diameter or shortest length which satisfies both of the following equations.

If you know length and operating speed of the shaft:

$$\frac{L^2 \times N}{4.76 \times 10^6} = \text{Minimum Diameter of the LinkJac™ Shaft in inches}$$

WHERE:

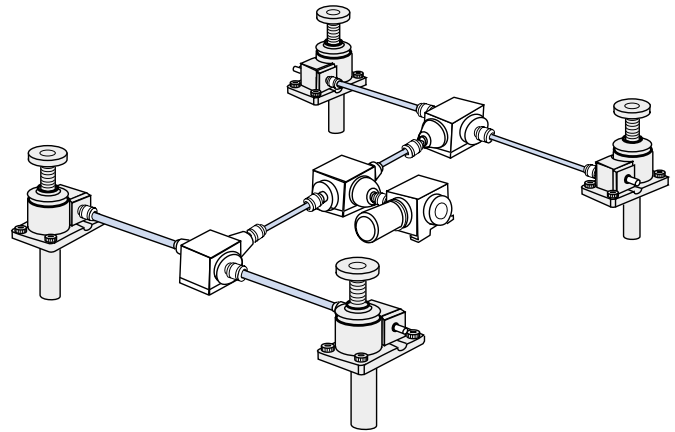
- L = length of unsupported shaft in inches
- N = operating speed in revolutions per minute

If you know the torque to be transmitted and the length of the shaft:

$$(T \times L \times 51 \times 10^{-6})^{.25} = \text{Minimum Diameter of the LinkJac™ Shaft in inches}$$

WHERE:

- T = torque in inch-pounds
- L = total length of shaft in inches



### DESIGN INFORMATION:

- The length used in the Speed-Length-Diameter Calculation is the supported length of the shaft. If support bearings are used on the shaft, the length is the longest unsupported length between bearings.
- The formulas above give a theoretical value of critical speed. Alignment, straightness and stiffness of the system all contribute to determining the actual value.
- The formula used for finding minimum diameter when torque and length are known is based on an allowable twist of 1°. Restricting the twist allows for better synchronization of ActionJac™ motion.
- The torque in the system is also limited by the torque capacity of the coupling.
- Allow 1/8 inch spacing between the jack input shaft and the LinkJac™ shaft inside the coupling.
- For some combinations of couplings and jacks, the radius of the suggested coupling is larger than the distance from the center of the worm shaft to the base.
- Nook Industries offers a range of couplings for use with LinkJac™ and ActionJac™ products in both floating shaft and supported shaft applications. See page 256 for more information.

LINKJAC™ SHAFT PART NUMBER	NOMINAL DIAMETER	KEYWAY	COUPLING SERIES	
			C-1800 / C-1805	C-1810 / 1815
LJ-8	1/2	1/8 x 1/16	●	
LJ-12	3/4	3/16 x 3/32	●	
LJ-16	1	1/4 x 1/8	●	
LJ-24	1 1/2	3/8 x 3/16		●

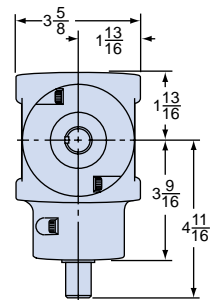
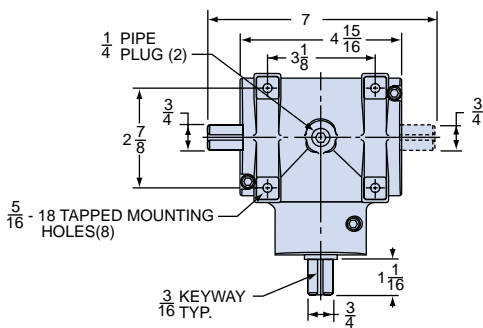
Jacks may be used in multiple arrangements by connecting shafting, couplings and gear boxes to simultaneously transmit power to the input shafts of the jacks. Nook Industries provides gearboxes for use with jacks. Make certain that the total torque and horsepower required by the

arrangement does not exceed the ratings of the box. Miter gear boxes can be operated up to 900 rpm. Higher speeds are permissible at lower torque ratings. Noise levels may increase at higher speeds. The operating efficiency of a miter gear box is 90%.

WORM GEAR SCREW JACK ACCESSORIES TECHNICAL DATA

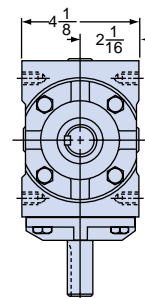
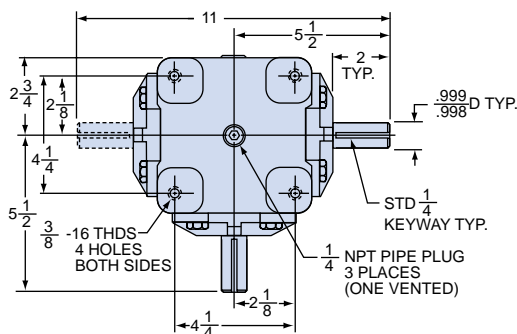
MODEL	RATED LOAD AT 900 RPM	ESTIMATED WT.
GB210	666 IN. LBS. @ 900 (9.52 H.P.)	6 <sup>1</sup> / <sub>4</sub> LBS.

LUBRICATION:  
GB 210  
Filled with EP-90  
Gear lubricant at  
time of shipment



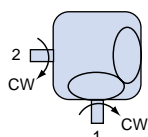
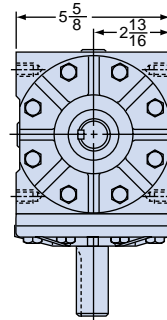
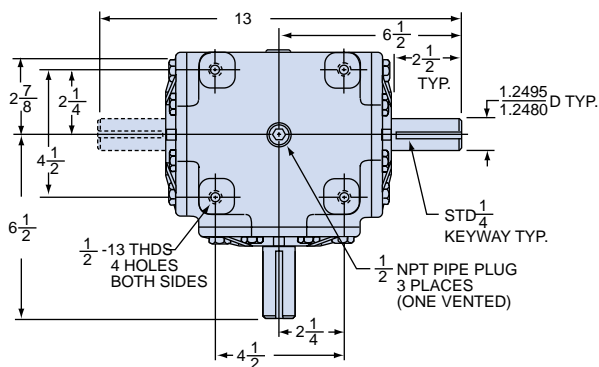
MODEL	RATED LOAD AT 900 RPM	ESTIMATED WT.
GB15	1094 IN. LBS. @ 900 (15.62 H.P.)	26 LBS.

LUBRICATION:  
GB 15  
Shipped dry  
Fill with EP-90  
Gear lubricant  
Capacity 1 qt.

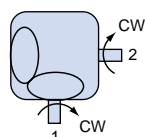


MODEL	RATED LOAD AT 900 RPM	ESTIMATED WT.
GB12	2712 IN. LBS. @ 900 (38.72 H.P.)	39 LBS.

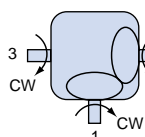
LUBRICATION:  
GB 12  
Shipped dry  
Fill with EP-90  
Gear lubricant  
Capacity 1 qt.



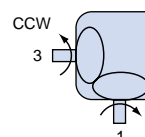
TYPE B



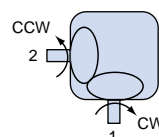
TYPE C



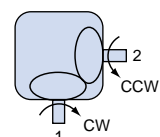
TYPE D



TYPE E



TYPE F



TYPE G

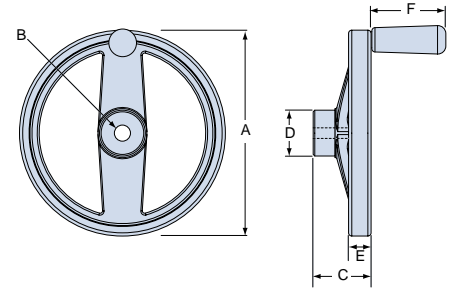
Gears are forged alloy steel. Shafts are stressproof steel ground and polished. Clockwise (CW) and counterclockwise (CCW) notations indicate direction of shaft rotation when facing outer end of shaft. All shaft arrangements will operate opposite direction for that shown. To order specify model number and desired shaft arrangement.



### HAND WHEELS

A handwheel is a convenient solution for manually operating a jack when using machine screw jacks in intermittent positioning applications. Handwheels are available in a range of diameters from 4 to 10 inches and can be adapted for use on jacks from the MJ series up to the 20 ton capacity model. These handwheels are made from cast aluminum and include a removable freewheeling handle.

**NOTE:** Handwheels do not include a brake. Handwheels are not recommended for use with ball screw jacks. When using handwheels with a jack that can back-drive (12:1 and lower) an additional locking mechanism may be required to prevent "creep".



HANDWHEEL SPECIFICATIONS							measurements in inches
JACK SIZE	A	B	C	D	E	F	PART #
MJ	4	.375	1 1/2	1 3/16	1 5/8	5/8	H043
1-MSJ	4	.50	1 1/2	1 3/16	1 5/8	5/8	H044
	6	.50	2	1 9/16	2 9/16	3/4	H064
2-MSJ	4	.50	1 1/2	1 3/16	1 5/8	5/8	H044
	6	.50	2	1 9/16	2 9/16	3/4	H064
	8	.50	2 1/4	1 25/32	2 15/16	7/8	H084
2.5-MSJ	4	.50	1 1/2	1 3/16	1 5/8	5/8	H044
	6	.50	2	1 9/16	2 9/16	3/4	H064
	8	.50	2 1/4	1 25/32	2 15/16	7/8	H084
5-MSJ	6	.75	2	1 9/16	2 9/16	3/4	H066
	8	.75	2 1/4	1 25/32	2 15/16	7/8	H086
	10	.75	3	2 1/4	3 15/16	1	H106
10-MSJ	8	1	2 1/4	1 25/32	2 15/16	7/8	H088
	10	1	3	2 1/4	3 15/16	1	H108
15-MSJ	8	1	2 1/4	1 25/32	2 15/16	7/8	H088
	10	1	3	2 1/4	3 15/16	1	H108
20-MSJ	8	1	2 1/4	1 25/32	2 15/16	7/8	H088
	10	1	3	2 1/4	3 15/16	1	H108



### COUNTERS

For precise position display, a range of digital position indicators are available for use with ActionJac™ Worm Gear Screw Jacks. These indicators measure the rotation of the input shaft and display a corresponding position in a counter window. The display value per input shaft revolution is variable and is achieved through a series of gear reductions configured to accommodate different jack ratios, lift shaft leads and travel distances. Contact Nook Industries to determine actual readout scaling available for your application.



Nook ActionJac™ Trunnion adapter plates allow for easy installation in applications where the jack moves through an arc during operation. These jacks are typically configured with motor mounts or right angle reducers.

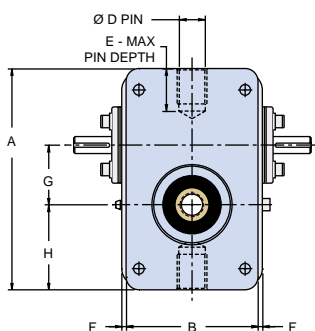
Trunnion adapter plates bolt to the jack flange and have precision bores for trunnion pins.

**Design Information**

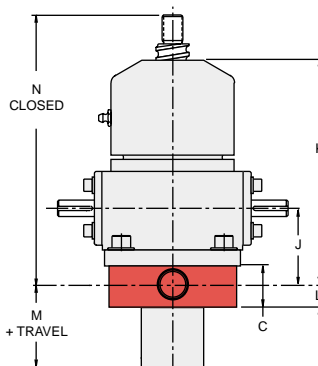
The trunnion pins should be supported to within 1/16 inch of the trunnion adapter plate. See the "A" dimension in the table for the width of the mounting plate. The maximum distance between the trunnion pin support mounting surfaces should be less than or equal to the "A" dimension plus 0.13 inches.

The trunnion pins should be ground to the "D" diameters shown in the table. The trunnion pins should be made from steel with a hardness greater than 30 HRC and a yield strength greater than 60,000 psi.

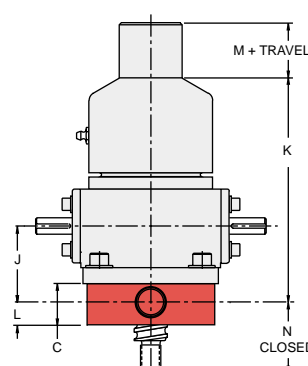
**BSJ and MSJ Trunnion Bottom View**



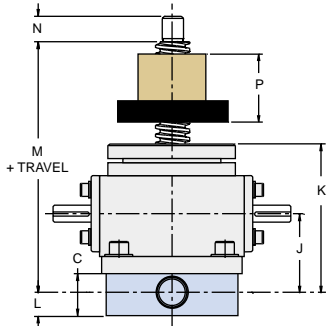
**BSJ-U**  
(Ball Screw Upright)



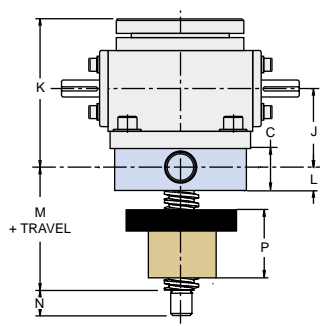
**BSJ-I**  
(Ball Screw Inverted)



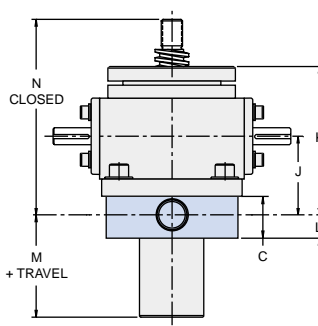
**BSJ-UR and MSJ-UR**  
(Ball and Machine Screw Upright Rotating)



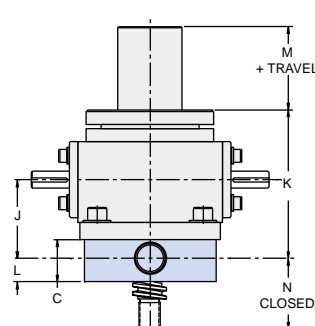
**BSJ-IR and MSJ-IR**  
(Ball and Machine Screw Inverted Rotating)



**MSJ-U**  
(Machine Screw Upright)



**MSJ-I**  
(Machine Screw Inverted)

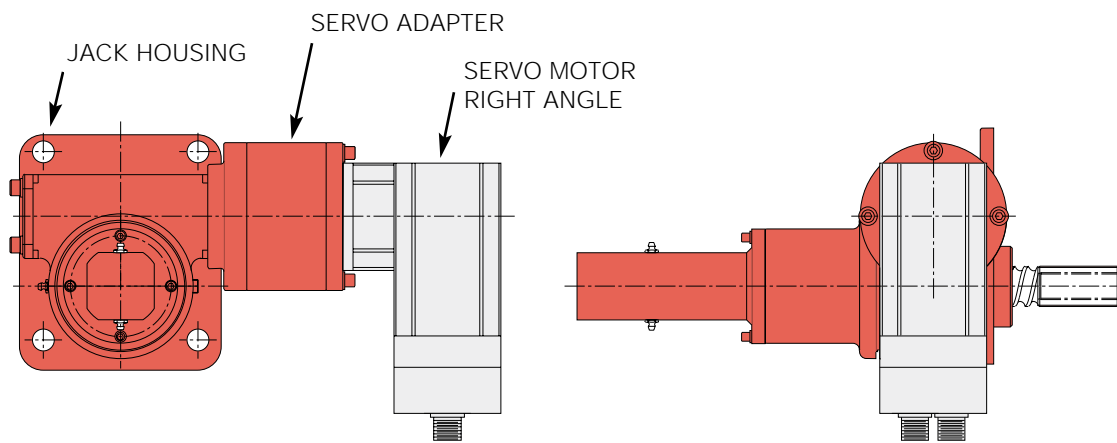


JACK MODEL TRUNNION PART #	COMMON DIMENSIONS FOR U, I, UR & IR										UPRIGHT		INVERTED			UPRIGHT ROTATING			INVERTED ROTATING					
	A	B	C	D	E	F	G	H	J	L	K	M	N	K	M	N	K	M	N	P	K	M	N	P
2.5-MSJ TA-0025	6.50	3.88	1.25	.7491 .7479	1.25	.13	1.750	2.50	2.32	.69	4.38	1.38	5.75	4.38	.69	2.06	4.38	7.38	.75	2.00	4.38	3.69	.75	2.00
5-MSJ TA-0050	8.25	5.75	1.50	.9991 .9979	1.50	.13	2.188	3.13	2.94	.81	5.44	1.44	7.69	5.44	.63	3.06	5.44	9.44	1.00	3.00	5.44	4.81	1.00	3.00
10-MSJ TA-0100	9.00	7.25	2.00	1.2488 1.2472	1.50	.13	2.600	3.00	3.13	1.12	5.75	1.75	7.75	5.75	.63	3.12	5.75	9.75	2.00	3.00	5.75	5.12	2.00	3.00
20-MSJ TA-0200	11.25	8.00	2.25	1.4988 1.4972	1.75	.13	2.875	4.25	4.25	1.25	7.75	1.88	10.25	7.75	.63	3.75	7.75	12.25	2.50	3.50	7.75	5.75	2.50	3.50
2.5-BSJ TA-0025	6.50	3.88	1.25	.7491 .7479	1.25	.13	1.750	2.50	2.32	.69	6.81	2.31	8.19	6.81	1.63	2.06	4.38	7.75	1.13	2.38	4.38	4.06	1.13	2.38
5-BSJ TA-0050	8.25	5.75	1.50	.9991 .9979	1.50	.13	2.188	3.13	2.94	.81	10.00	2.31	11.88	10.00	1.75	3.06	5.44	10.75	1.50	4.31	5.44	6.13	1.50	4.31
10-BSJ TA-0100	9.00	7.25	2.00	1.2488 1.2472	1.50	.13	2.600	3.00	3.13	1.12	10.00	2.75	12.25	10.00	1.63	3.37	5.75	11.06	1.50	4.31	5.75	6.44	1.50	4.31
20-BSJ TA-0200	11.25	8.00	2.25	1.4988 1.4972	1.75	.13	2.875	4.25	4.25	1.25	15.75	3.63	18.25	15.75	2.38	3.75	7.75	15.50	2.75	6.75	7.75	9.00	2.75	6.75

ActionJac™ Servo Jacks offer the ability to attach a servo motor to a ball screw or machine screw jack. Using an ActionJac™ Worm Gear Screw Jack with a servo motor increases control of acceleration, de-acceleration, travel rate and positioning accuracy compared with standard NEMA framed motors.

Illustrated below are two examples of jacks with servo motor adaptors manufactured by Nook Industries. Custom Servo Motor Adaptors are designed to accommodate any specified coupling and servo motor. Servo Jacks can be delivered as a complete assembly, including a vendor specified servo motor. Contact Nook Industries for further assistance with jack applications requiring servo motors.

**KEYED INVERTED BALL SCREW SERVO JACK**



**INVERTED ROTATING BALL SCREW SERVO JACK**

