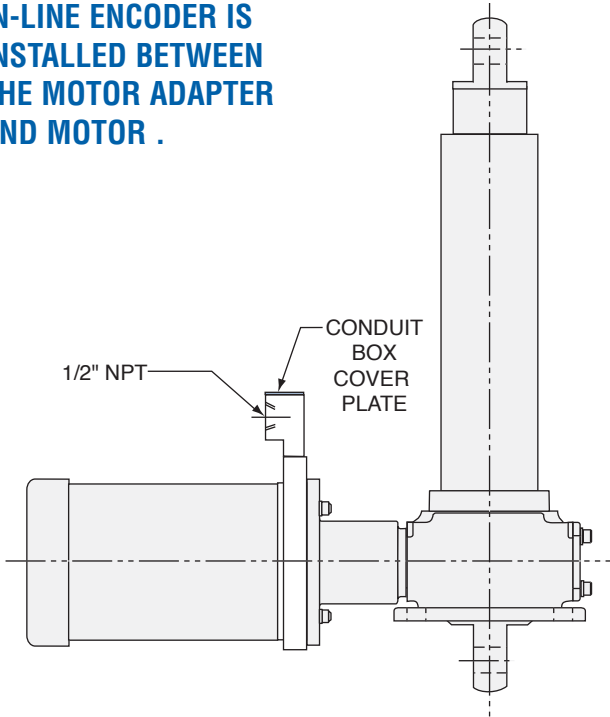


**IN-LINE ENCODER IS
INSTALLED BETWEEN
THE MOTOR ADAPTER
AND MOTOR .**



For position sensing at the input shaft, the 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. When used with worm gear type cylinders, it leaves the extension shaft side of the cylinder free for clearance, for a rotary limit switch, or for coupling to another cylinder .

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

The ActionJac™ in-line encoder option mounts to a motor and therefore requires an optional motor mount or right-angle reducer.

- Sensing speed range: 0 -10,000 rpm
- Pulse Output: 60 pulses/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

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.

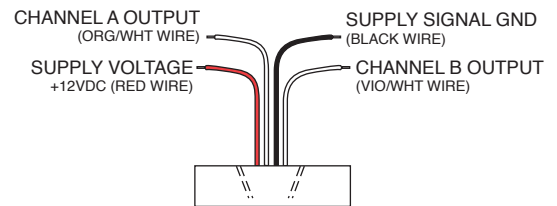
HOW TO ORDER AN IN-LINE ENCODER:

Specify the Cylinder reference number, using the system described on page 389.

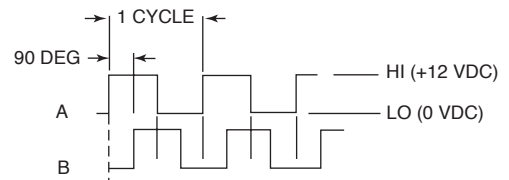
EXAMPLE:

DD-1008-HD / 10BT-2 / 000-1 / CC / 24.0 / **SE**

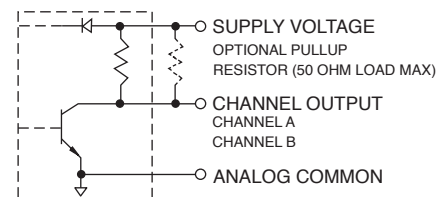
“E” anywhere in this field indicates Encoder



ELECTRICAL CONNECTIONS



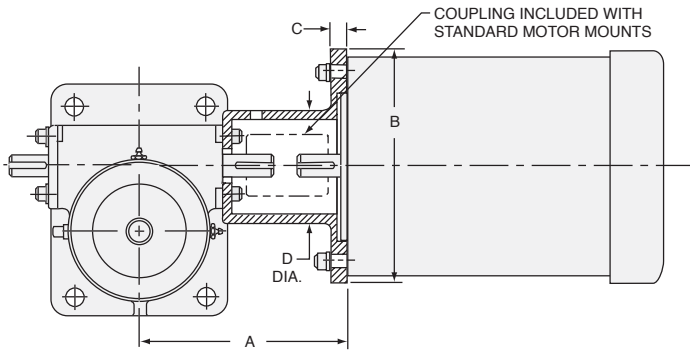
OUTPUT CHANNEL WAVEFORMS



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

MOTOR MOUNTS WITH AND WITHOUT BRAKEMOTORS

ELECTRIC CYLINDER ACCESSORIES



ActionJac™ motor mount assemblies are designed for standard motors and include jaw type couplings. These assemblies are stocked for DD-25, DD-50, DD-100 and DD-200 and are available for the cylinder 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, contact Nook Industries for additional information.

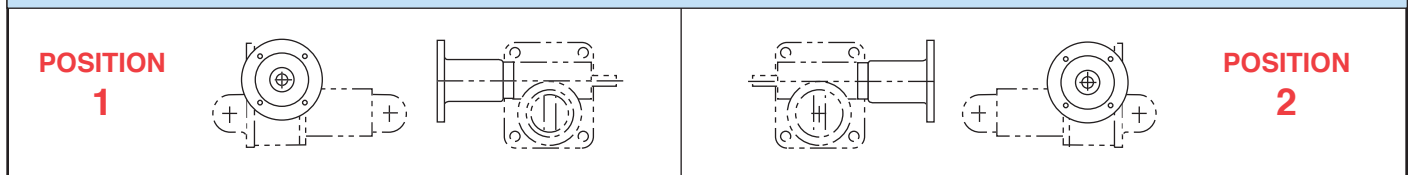
| STANDARD MOTOR MOUNT SIZES & DIMENSIONS | | | | | | |
|---|-----------------|--------------------------|------------|------|-----|------|
| CYLINDER SERIES | NEMA FRAME SIZE | ORDER CODE WITHOUT MOTOR | DIMENSIONS | | | |
| | | | A | B | C | D |
| DD-5 | 42 | X02 | 4.48 | 4.63 | .50 | 2.69 |
| | 48 | X04 | 4.48 | 4.63 | .50 | 3.12 |
| DD-10 | 56C | X05 | 5.71 | 6.63 | .49 | 3.12 |
| DD-25 | 56C | X05 | 6.25 | 6.63 | .63 | 3.50 |
| | 140TC | X14 | 6.25 | 6.63 | .63 | 3.50 |
| DD-50 | 56C | X05 | 7.25 | 6.75 | .56 | 3.75 |
| | 140TC | X14 | 7.25 | 6.75 | .56 | 3.75 |
| | 180TC | X18 | 8.00 | 9.25 | .75 | 3.75 |
| DD-100 | 56C | X05 | 8.25 | 6.75 | .50 | 4.38 |
| | 140TC | X14 | 8.25 | 6.75 | .50 | 4.38 |
| | 180TC | X18 | 9.00 | 9.25 | .75 | 4.38 |
| DD-200 | 56C | X05 | 8.66 | 6.75 | .50 | 3.75 |
| | 140TC | X14 | 8.66 | 6.75 | .50 | 3.75 |
| | 180TC | X18 | 9.00 | 9.25 | .63 | 5.19 |
| | 213TC | X21 | 9.68 | 8.88 | .88 | 5.69 |

ActionJac™ electric cylinders can be ordered with industrial quality induction motors. Motors with internally and externally wired brake motors are available. Brake motors utilize an integral, spring actuated brake. 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, as wash down extended duty, may be supplied upon request.

See charts on page 377 for order codes.

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

MOTOR MOUNT POSITIONS



HOW TO ORDER A MOTOR ADAPTER WITH OR WITHOUT A BRAKEMOTOR

EXAMPLE:

DD-1008-HD / **10BT-1** / 000-1 / CC / 24.0 / S

————— Mounting Position (see above & for Right Angle Reducer see page 378)

————— Order Code for No Motor (see chart above)

See page 377 for Order Code with Motor

ActionJac Electric Cylinders can be supplied with industrial quality brake motors. Brake motors include a spring actuated, electrically released braking mechanism which will hold a load when the power is off. In normal operation, power is applied and removed to the motor windings and brake release simultaneously.

If it is desired to operate the brake separately, as when used with a speed control, the brake needs to be wired

externally. Standard for Reliance motors, special order for Baldor motors.

Standard motors are: 3 phase, 208-230 / 460 VAC, 60 Hz. 1725 rpm. Also available are single phase motors at: 115 / 230 VAC, 60 Hz. 1725 rpm. All motors are rated for continuous duty. Note: for inverter duty motors or additional options, contact Nook Industries.

BALDOR: INTERNALLY WIRED BRAKE MOTOR ORDER CODE

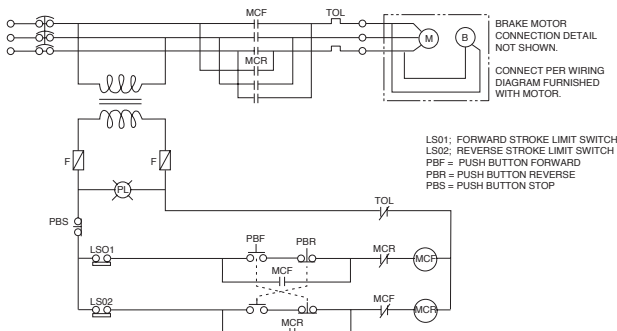
| MOTOR HP | STD. MOTOR 208-230/460 3PH | SINGLE PHASE 115/230 1PH | XT EXTRA TUFF 208-230/460 3PH | WASH DOWN MOTOR IP55 208-230/460 3PH | EXPLOSION PROOF • DIVISION 1 • CLASS 1,2 • GROUP F & G • 208/230/460 • 3PH |
|----------|-------------------------------|-----------------------------|----------------------------------|--|---|
| 1/4 | 02BT | 02BS | 02BX | 02BW | 02BE |
| 1/3 | 03BT | 03BS | 03BX | 03BW | 03BE |
| 1/2 | 05BT | 05BS | 05BX | 05BW | 05BE |
| 3/4 | 07BT | 07BS | 07BX | 07BW | 07BE |
| 1 | 10BT | 10BS | 10BX | 10BW | 10BE |
| 1-1/2 | 15BT | - | 15BX | 15BW | 15BE |
| 2 | 20BT | - | 20BX | 20BW | 20BE |
| 3 | 30BT | - | 30BX | 30BW | 30BE |
| 5 | 50BT | - | 50BX | 50BW | 50BE |
| 7-1/2 | 75BT | - | 75BX | 75BW | - |

RELIANCE: EXTERNALLY WIRED BRAKE MOTOR ORDER CODE

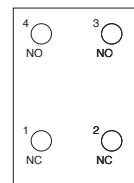
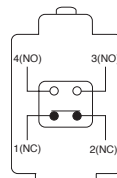
| MOTOR HP | STD. MOTOR 208-230/460 3PH | SINGLE PHASE 115/230 1PH | XT EXTRA TUFF 208-230/460 3PH | WASH DOWN MOTOR IP55 208-230/460 3PH | EXPLOSION PROOF • DIVISION 1 • CLASS 1,2 • GROUP F & G • 208/230/460 • 3PH |
|----------|-------------------------------|-----------------------------|----------------------------------|--|---|
| 1/4 | 02RT | 02RS | 02RX* | 02RW* | 02RE* |
| 1/3 | 03RT | 03RS | 03RX* | 03RW* | 03RE* |
| 1/2 | 05RT | 05RS | 05RX* | 05RW | 05RE |
| 3/4 | 07RT | 07RS | 07RX* | 07RW | 07RE |
| 1 | 10RT | 10RS | 10RX* | 10RW | 10RE |
| 1-1/2 | 15RT | - | 15RX* | 15RW | 15RE |
| 2 | 20RT | - | 20RX* | 20RW | 20RE |
| 3 | 30RT | - | 30RX* | 30RW* | 30RE |
| 5 | 50RT | - | 50RX* | 50RW* | 50RE |
| 7-1/2 | 75RT* | - | 75RX* | 75RW* | 75RE* |

*specify minimum quantity required

BRAKE MOTOR WIRING

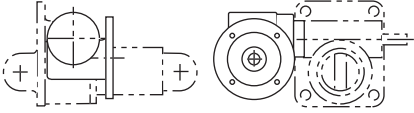
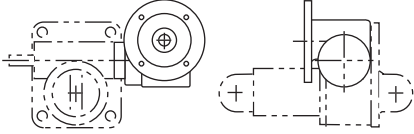
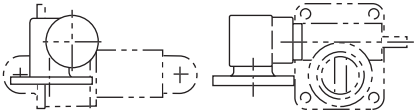
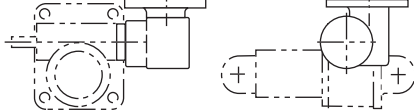
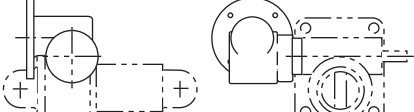
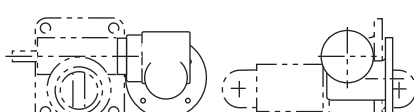
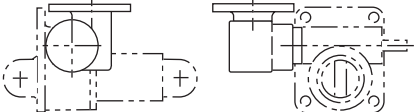
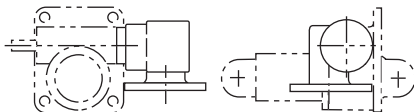


A typical wiring drawing is shown here, for a three-phase brake motor. This example is for reference only, the correct wiring will vary for each application.



CONTACT CONFIGURATION

TERMINAL ARRANGEMENT

| RIGHT-ANGLE REDUCER POSITIONS | | | |
|-------------------------------|---|--|-------------------|
| POSITION 1 |  |  | POSITION 2 |
| POSITION 3 |  |  | POSITION 4 |
| POSITION 5 |  |  | POSITION 6 |
| POSITION 7 |  |  | POSITION 8 |

Download Accurate Moveable Assembly 3D Models and 2D Drawings For ActionJac™ Worm Gear Screw Jacks and Electric Cylinders:

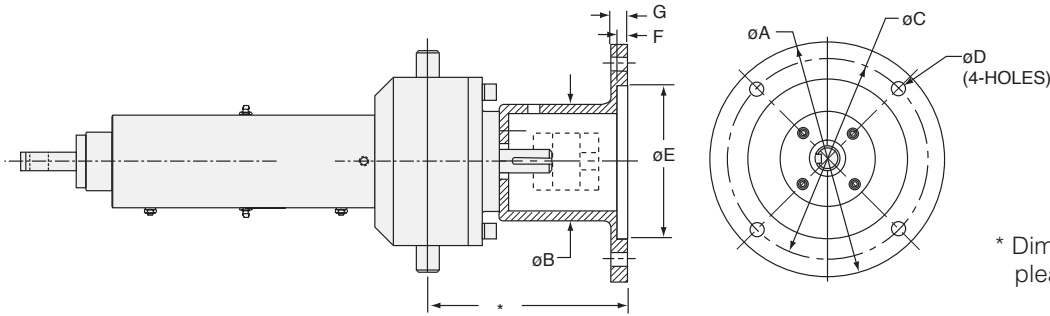
- **Configure** specific requirements for your worm gear screw jack or electric cylinder application in a simple interface, including motor adapter, right angle reducer, bellows boots and limit switch accessories.
- **View** complete assemblies on-line with zoom, pan and rotate capabilities.
- **Download** true assembly models with full range of motion in native AutoCAD®, SolidWorks®, Pro/E®, CATIA®, ParaSolids®, SAT® and many other formats.
- **Order** complete jack assemblies with generated part number.

ActionJac™
WORM GEAR SCREW JACKS
& ELECTRIC CYLINDERS



www.nookindustries.com





* Dimension is application dependent, please contact factory.

Actionjac™ ILA Series cylinders can be supplied with motor mounts. The sizes listed in the chart are mounts designed to match up to common motor faces. Application torque requirements and coupling size, style and attachment method will affect the size of the motor mount. See reference number page 376-377 for motor mount/cylinder model availability. A custom motor mount can be manufactured to your specifications, please contact Nook Industries.

| MODEL | NEMA FRAME MOTOR SIZE | øA | øB | øC | øD | øE | F | G |
|---------|-----------------------|------|------|------|-----|------|-----|-----|
| ILA-5 | 48 | 4.63 | 3.12 | 3.75 | .28 | 3.00 | .16 | .50 |
| | 48 | 4.63 | 3.12 | 3.75 | .28 | 3.00 | .16 | .50 |
| ILA-10 | 56C | 6.75 | 3.50 | 5.88 | .41 | 4.50 | .16 | .50 |
| ILA-25 | 56C | 6.75 | 3.75 | 5.88 | .41 | 4.50 | .16 | .50 |
| | 140TC | 6.75 | 3.75 | 5.88 | .41 | 4.50 | .16 | .50 |
| | 180TC | 9.25 | 3.75 | 7.25 | .56 | 8.50 | .28 | .75 |
| ILA-100 | 56TC | 6.75 | 4.38 | 5.88 | .41 | 4.50 | .16 | .50 |
| | 140TC | 6.75 | 4.38 | 5.88 | .41 | 4.50 | .16 | .50 |
| | 180TC | 9.25 | 4.38 | 7.25 | .56 | 8.50 | .28 | .75 |
| ILA-200 | 180TC | 9.25 | 5.19 | 7.25 | .56 | 8.50 | .28 | .75 |
| | 213TC | 8.88 | 5.69 | 7.25 | .56 | 8.50 | .28 | .88 |

Dimensions in inches

Other NEMA and Custom Frame Motor Sizes available upon request.

| MODEL | IEC FRAME MOTOR SIZE | øA | øB | øC | øD | øE | F | G |
|---------|----------------------|-----|-----|-----|-----|-----|-----|----|
| ILA-5 | 56B5 | 120 | 64 | 100 | 8.5 | 80 | 3.5 | 7 |
| | 56B14 | 80 | 64 | 65 | 6 | 50 | 3.0 | 6 |
| ILA-10 | 63B5 | 140 | 70 | 115 | 9 | 95 | 4 | 8 |
| | 63B14 | 90 | 70 | 75 | 6 | 60 | 3.5 | 8 |
| | 71B5 | 160 | 85 | 130 | 9 | 110 | 4.5 | 10 |
| | 71B14 | 105 | 85 | 85 | 7 | 70 | 4 | 10 |
| ILA-25 | 71B5 | 160 | 85 | 130 | 9 | 110 | 4.5 | 10 |
| | 71B14 | 105 | 85 | 85 | 7 | 70 | 4 | 10 |
| | 80B5 | 200 | 85 | 165 | 11 | 130 | 4.5 | 12 |
| | 80B14 | 120 | 85 | 100 | 7 | 80 | 4 | 12 |
| ILA-100 | 80B5 | 200 | 96 | 165 | 11 | 130 | 4.5 | 12 |
| | 80B14 | 120 | 96 | 100 | 7 | 80 | 4 | 12 |
| | 90B5 | 200 | 116 | 165 | 11 | 130 | 4.5 | 12 |
| | 90B14 | 140 | 116 | 115 | 9 | 95 | 4.5 | 12 |
| | 100B5 | 250 | 116 | 215 | 13 | 180 | 5 | 14 |
| | 100B14 | 160 | 116 | 130 | 9 | 110 | 5 | 14 |
| ILA-200 | 100B5 | 250 | 134 | 215 | 13 | 180 | 5 | 14 |
| | 100B14 | 160 | 134 | 130 | 9 | 110 | 5 | 14 |

Dimensions in mm
Other IEC Motor Sizes
available upon request.

Every motorized Electric Cylinder 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 cylinder.

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.

A 2-circuit switch assembly is useful for limiting the maximum and minimum extension. A 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 cylinder 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.

An ActionJac™ Rotary Limit Switch assembly is mounted to the extension shaft side of the ActionJac™ Worm Gear Screw Cylinder opposite the motor.



A rotary limit switch is available for ActionJac™ Electric Cylinder Series DD-25 and RAD-25 and larger. Most cylinder models have close and extended mounts for the switches to provide clearance around the switch housing. See the charts below 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 after installation.**

HOW TO ORDER ROTARY LIMIT SWITCH:

SPECIFY:

- 2-circuits, 4-circuits, or 2-circuits with potentiometer
- SPDT or DPDT
- Mounting Position

Insert the correct designation in the ActionJac™ Electric Cylinder reference number (see page 000 for more information on jack reference numbers).

EXAMPLE: RAD-10086-HD / 10BT-1 / **2CA-4C** / CC / 24.5 / S

Extension shaft designation

Examples of rotary limit switch designations:

2CA-4 = Rotary Limit Switch, 2-circuit, SPDT, position 4

4CE-1 = Rotary Limit Switch, 4-circuit, DPDT, position 1

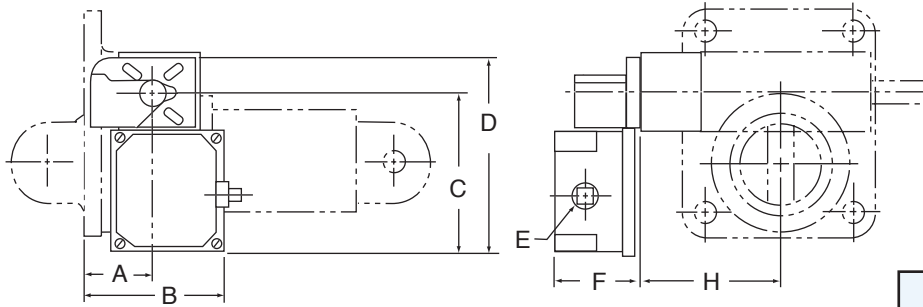
PTA-8 = Rotary Limit Switch with potentiometer, 2 SPDT's, position 8

“dash” number designates mounting position (see following page)

| ORDER 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 cylinder. If you are ordering a replacement switch assembly, complete information on the cylinder is required.

ROTARY LIMIT SWITCH



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

| SERIES | DIMENSION "H" | |
|--------------|---------------|------------|
| | CLOSE MOUNT | EXT. MOUNT |
| DD & RAD 25 | 2.75 | 3.56 |
| DD & RAD 30 | 2.75 | 3.56 |
| DD & RAD 50 | 3.56 | 4.56 |
| DD & RAD 100 | 3.88 | 5.56 |
| DD & RAD 200 | 4.41 | 5.81 |

ELECTRIC CYLINDER ACCESSORIES

| ROTARY LIMIT SWITCH POSITIONS | | | | | |
|-------------------------------|--|--|--|--|-------------------|
| POSITION 1 | | | | | POSITION 2 |
| POSITION 3 | | | | | POSITION 4 |
| POSITION 5 | | | | | POSITION 6 |
| POSITION 7 | | | | | POSITION 8 |

ELECTRICAL RATINGS:

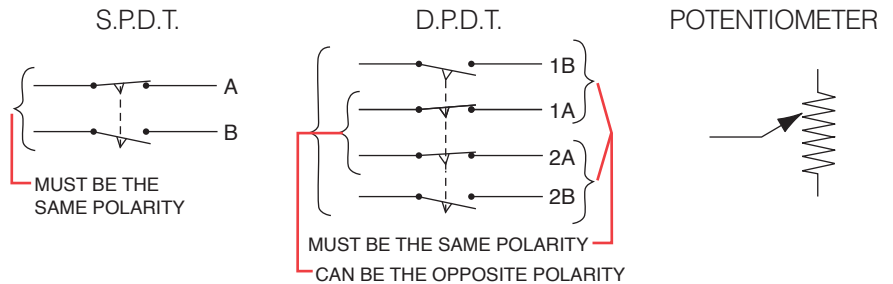
SWITCHES:

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 cylinder 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.

The Rod-Type Limit Switch provides two SPDT switches used to limit the maximum and minimum cylinder extension. The switch assembly mounts to the cylinder tubes for convenient access and leaves the extension shaft free for other purposes. The simple design permits easy installation and maintenance. Independent adjustment allows for quick and easy fine tuning of the travel limits.

Every ActionJac™ Electric Cylinder should be installed so that electrical power to the motor is turned off and the brake engaged before the travel limits are reached, or damage to the cylinder can result.

Minimum travel is 6" and maximum travel is 72" for all ACTIONJAC™ ELECTRIC CYLINDERS equipped with rod-type limit switches.

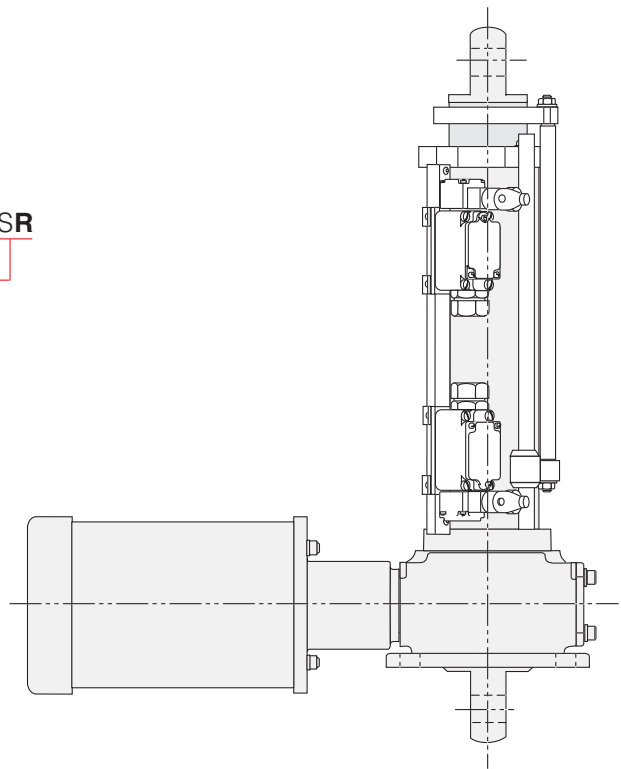
HOW TO ORDER A ROD-TYPE LIMIT SWITCH:

Specify the Electric Cylinder reference number, using the system described on page 389.

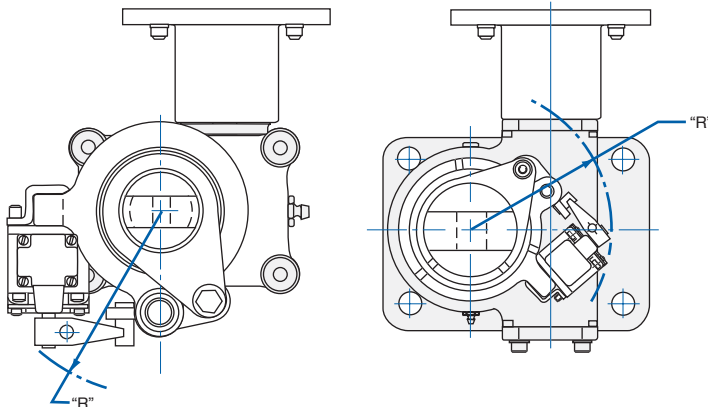
EXAMPLE: DD-1008-HD / 10BT-2 / 000-1 / CC / 24.0 / **SR**

“R” anywhere in this field _____ indicates Rod-Type Limit Switch Assembly

| SWITCH ENCLOSURE RATINGS | |
|--------------------------|----------------------|
| NEMA | 1,2,3,3R,4,5,6,12,13 |
| IEC | IP67 |



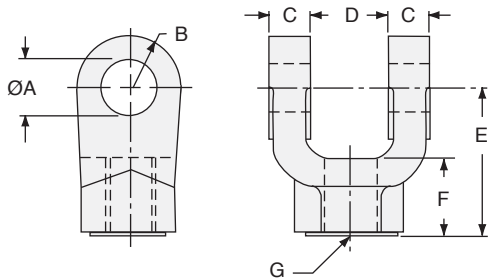
ROD-TYPE LIMIT SWITCH DIMENSIONS



| SERIES | CLEARANCE RADIUS “R” |
|--------------|----------------------|
| DD-5 | 4.00 |
| DD-10 | 3.66 |
| DD & RAD-25 | 4.00 |
| DD & RAD-30 | 4.20 |
| DD & RAD-50 | 4.66 |
| DD & RAD-100 | 4.60 |
| DD & RAD-200 | 5.40 |

DD & RAD ACCESSORIES

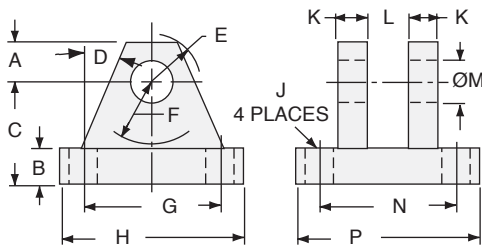
FEMALE ROD CLEVIS



| CYLINDER SERIES | PART NUMBER | DIMENSIONS | | | | | | |
|-------------------------|-------------|-------------|----------|-------|-------|---------|-------|----------|
| | | ØA | B radius | C | D | E | F | G thread |
| SERIES 5 | B9012-5 | .3145/.3165 | 19/64 | 13/64 | 11/32 | 2 1/4 | 13/16 | 5/16-24 |
| SERIES 10 | B-9012-8 | .504/.502 | 1/2 | 1/2 | 3/4 | 1 1/2 | 3/4 | 7/16-20 |
| SERIES 25 SERIES 30 | B-9012-12 | .752/.754 | 3/4 | 5/8 | 1 1/4 | 2 1/8 | 1 1/8 | 3/4-16 |
| SERIES 50 SERIES 100 | B-9012-16 | 1.002/1.004 | 1 | 3/4 | 1 1/2 | 2 15/16 | 1 5/8 | 1-14 |
| SERIES 200 | B-9012-22 | 1.377/1.379 | 1 3/8 | 1 | 2 | 3 3/4 | 2 | 1 1/4-12 |

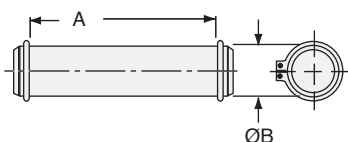
Note: Rod Clevis' with swivel bearings can be supplied. Contact Nook Engineering.

CLEVIS BRACKET



| CLEVIS BRACKET FOR KNUCKLE | | | | | | | | | | | | | | | |
|----------------------------|-------------|------------|-----|-------|-----|---------|-------|------|-------|-------|-----|-------|-------------|------|-------|
| CYLINDER SERIES | PART NUMBER | DIMENSIONS | | | | | | | | | | | | | |
| | | A | B | C | D | E | F | G | H | ØJ | K | L | ØM | N | P |
| SERIES 5 | B-9013-7 | 3/8 | 3/8 | 1 | 25° | 1/2 | 5/8 | 1.75 | 2 1/4 | 17/64 | 3/8 | 15/32 | .4395/.4415 | 1.75 | 2 1/4 |
| SERIES 10 | B-9013-8 | 1/2 | 1/2 | 1 1/2 | 25° | 5/8 | 3/4 | 2.55 | 3 1/2 | 13/32 | 1/2 | 3/4 | .504/.502 | 2.55 | 3 1/2 |
| SERIES 25 SERIES 30 | B-9013-12 | 3/4 | 5/8 | 1 7/8 | 25° | 29/32 | 3/4 | 3.82 | 5 | 17/32 | 5/8 | 1 1/4 | .752/.754 | 3.82 | 5 |
| SERIES 50 SERIES 100 | B-9013-16 | 1 | 3/4 | 2 1/4 | 25° | 1 1/4 | 1 1/2 | 4.95 | 6 1/2 | 21/32 | 3/4 | 1 1/2 | 1.002/1.004 | 4.95 | 6 1/2 |
| SERIES 200 | B-9013-22 | 1 3/8 | 7/8 | 3 | 25° | 1 21/32 | 2 | 5.73 | 7 1/2 | 21/32 | 1 | 2 | 1.377/1.379 | 5.73 | 7 1/2 |

PIVOT PIN



| PIVOT PIN | | | |
|-------------------------|-------------|------------|-------------|
| CYLINDER SERIES | PART NUMBER | DIMENSIONS | |
| | | A | ØB |
| SERIES 5 | B9014-7 | 1 15/16 | .4385/.4355 |
| SERIES 10 | B-9014-8 | 1 7/8 | .501/.498 |
| SERIES 25 SERIES 30 | B-9014-12 | 2 5/8 | .751/.748 |
| SERIES 50 SERIES 100 | B-9014-16 | 3 1/8 | 1.001/0.999 |
| SERIES 200 | B-9014-22 | 4 1/8 | 1.376/1.373 |