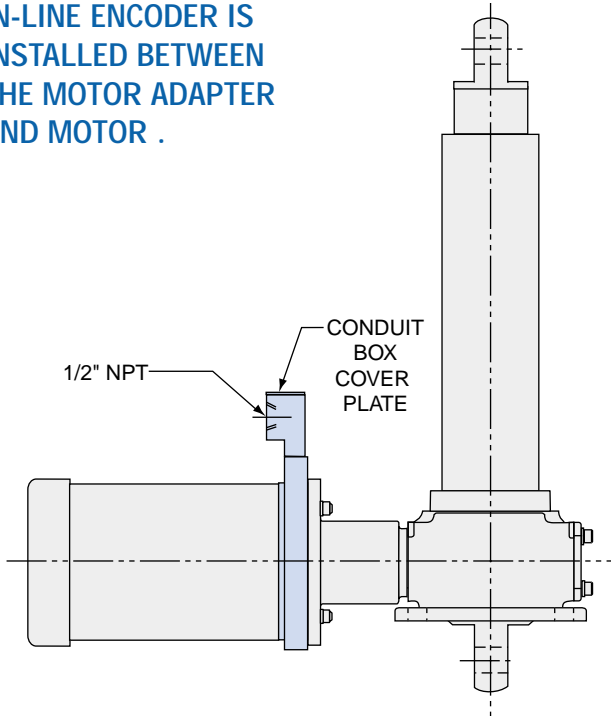


IN-LINE ENCODER IS INSTALLED BETWEEN THE MOTOR ADAPTER AND MOTOR .



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 362.

EXAMPLE:
DD-1008-HD / 103-2 / 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 REFERENCE

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

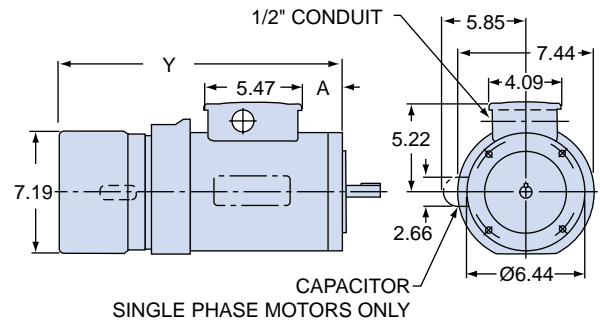
NOTE: Specifications apply to Series 25 through 200 worm gear cylinders only. For all other cylinders, contact Nook Industries.

See charts for order codes and motor mount dimensions.

See the Reference Number System, Input Shaft designation, on page 362.

CLEARANCE DIMENSIONS: BRAKE MOTORS 1/4 – 2 hp

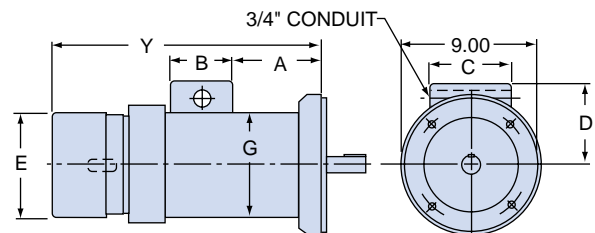
HORSEPOWER	CODE		A	Y	WEIGHT (LBS.)
	3Ø (Standard)	1Ø (Optional)			
1/4	023	021	2.05	13.78	30
1/3	033	031	2.05	13.78	30
1/2	053	051	2.05	13.78	38
3/4	073	071	2.05	14.78	40
1	103	101	2.05	14.78	40
1 1/2	153	N/A	3.05	15.78	44
2	203	N/A	3.49	16.22	50



(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)

ORDERING A CYLINDER WITHOUT A MOTOR

These charts show input shaft codes that will accept your NEMA motor. Preferred designations are highlighted in blue. See the Reference Number System, Input Shaft designation, on page 362.

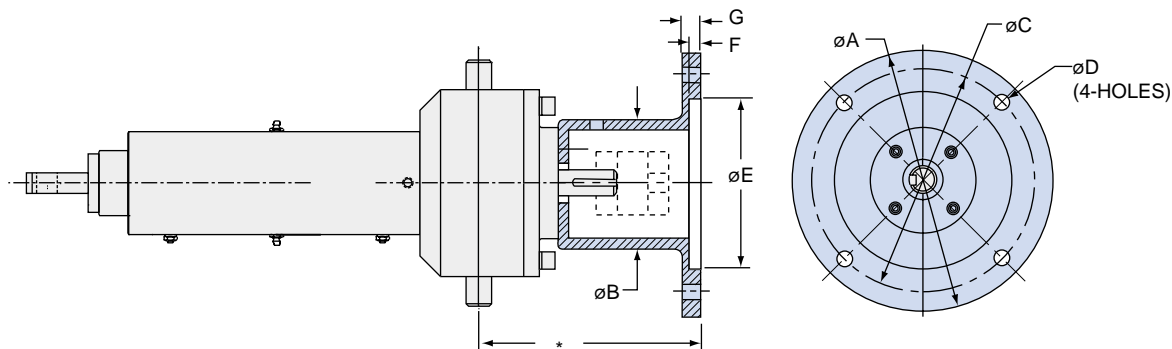
SERIES	CODE			
	56C	140TC	180TC	210TC
DD-25	X05	X14	—	—
DD-30	X05	X14	—	—
DD-50	X05	X14	X18	—
DD-100	X05	X14	X18	—
DD-200	X05	X14	X18	X21

SERIES	CODE			
	56C	140TC	180TC	210TC
RAD-25	X05	X14	—	—
RAD-30	X05	X14	—	—
RAD-50	X05	X14	X18	—
RAD-100	X05	X14	X18	—
RAD-200	X05	X14	X18	X21

HOW TO ORDER A MOTOR:

EXAMPLE: RAD-10086-HL / **103**-1 / 2CA-4 / CC / 24.5 / 2 / SRE

103 = 1 hp, 3 phase
X05 = No motor, accepts NEMA 56C



* Dimension is application dependent, please contact factory.

Actionjac™ ILA Series cylinders may 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 349 for motor mount/cylinder model availability. A custom motor mount can be manufactured to your specifications, please contact Nook Industries.

NEMA FRAME MOTOR SIZE	øA	øB	øC	øD	øE	F	G
48	4.63	3.12	3.75	.28	3.00	.16	.50
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
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.

IEC FRAME MOTOR SIZE	øA	øB	øC	øD	øE	F	G	
56B5	120	64	100	8.5	80	3.5	7	
56B14	80	64	65	6	50	3.0	6	
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	
80B5	200	85	96	165	11	130	4.5	12
80B14	120	85	96	100	7	80	4	12
90B5	200	96	116	165	11	130	4.5	12
90B14	140	96	116	115	9	95	4.5	12
100B5	250	116	134	215	13	180	5	14
100B14	160	116	134	130	9	110	5	14

Dimensions in mm
Other IEC Motor Sizes available upon request.

ROTARY LIMIT SWITCH

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 must be set after installation. CAUTION: Limit switches are not adjusted at the factory. Switches should be set during 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 / 103-1 / **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

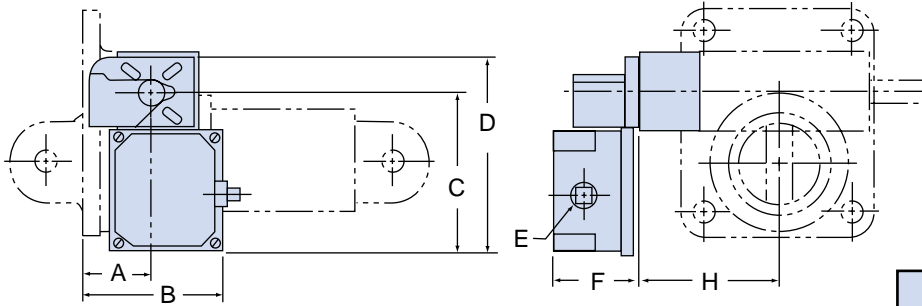
4CE-1 = Rotary Limit Switch, 4-circuit, DPDT, position 1

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

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

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

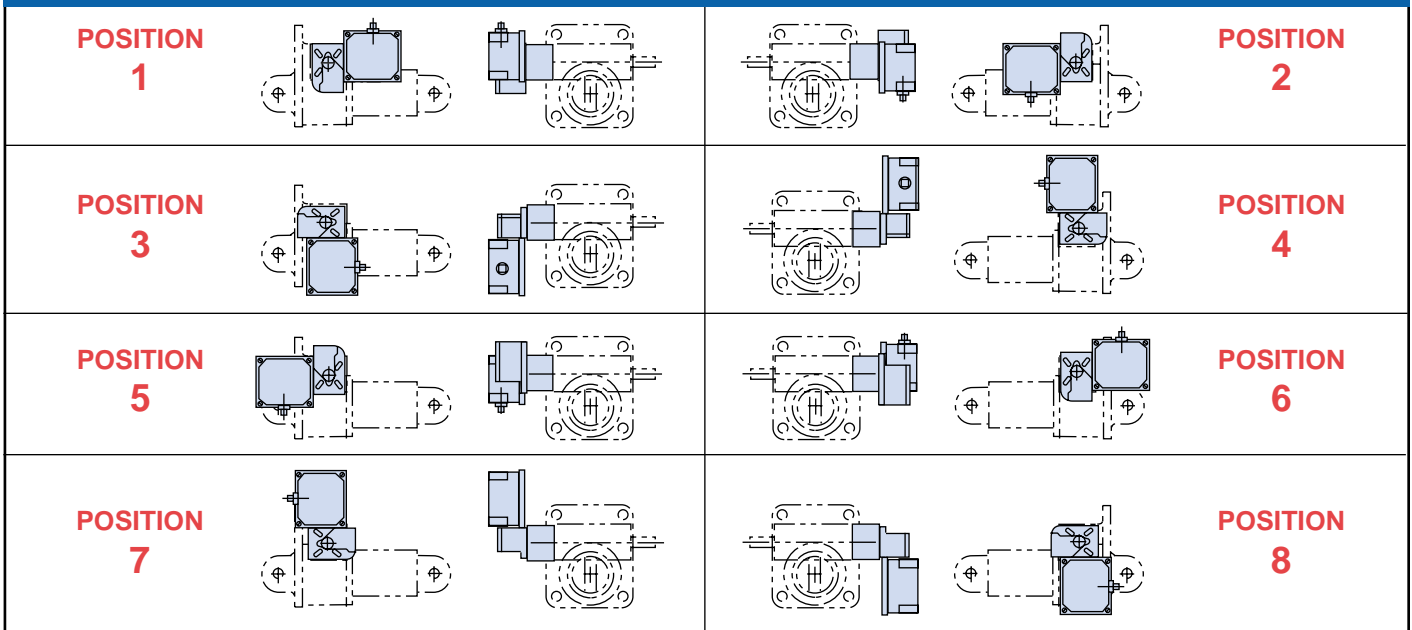
IMPORTANT: These designation numbers are not complete part numbers. These assemblies contain gear reducers with ratios that vary according to the model and travel of the cylinder. If you are ordering a replacement switch assembly, complete information on the cylinder is required.



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	DIMENSION "H" 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	3.38	5.56
DD & RAD 200	4.41	5.81

ROTARY LIMIT SWITCH POSITIONS



ELECTRICAL RATINGS:

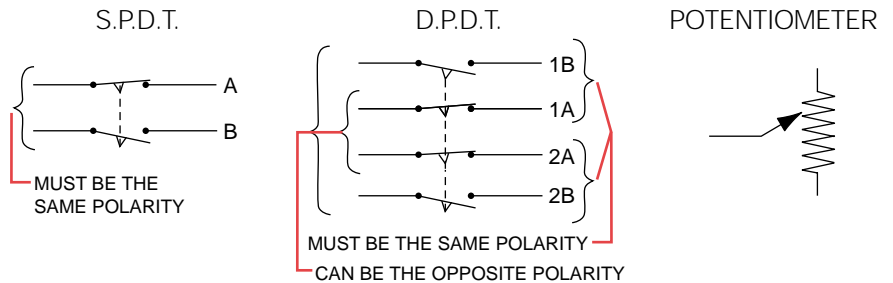
SWITCHES:

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

10-TURN POTENTIOMETER:

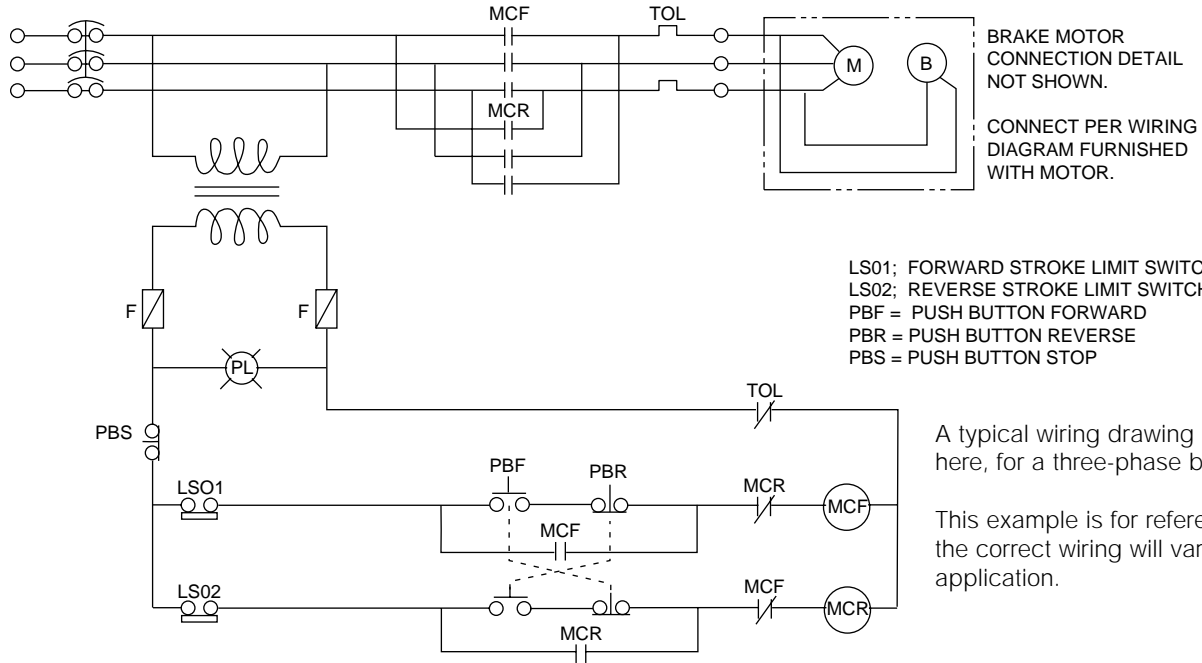
0-500 OHM, 2 Watt

WIRING DIAGRAMS:



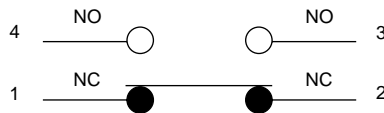
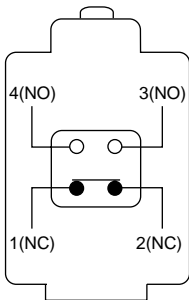
NOTE: While the 10-turn potentiometer is rated for 0-500 Ohms, as implemented in the rotary limit switch assembly, it can not and should not operate over its full range. Minimum and maximum resistance values can not be known until the cylinder is installed and final travel limit adjustments have been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

BRAKE MOTOR WIRING

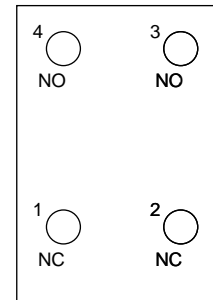


ELECTRIC CYLINDER ACCESSORIES

CONTACT CONFIGURATION:



TERMINAL ARRANGEMENT:



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.

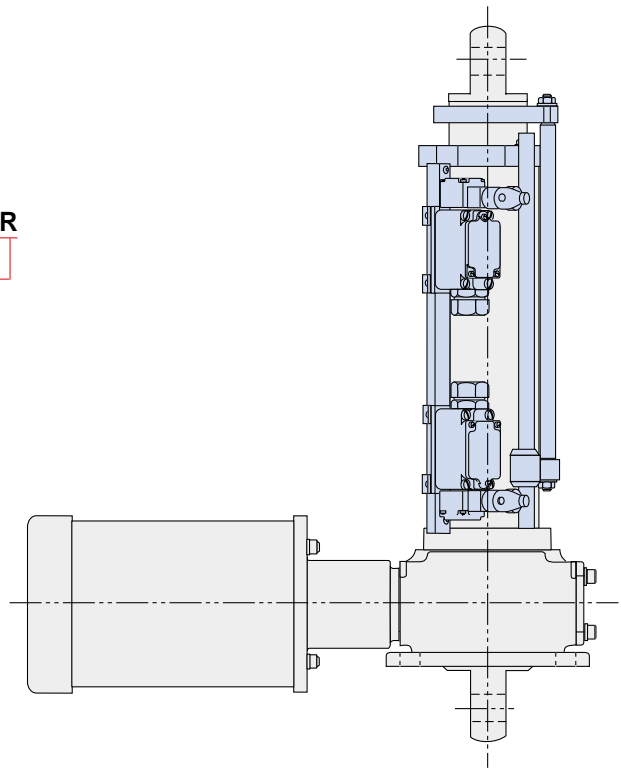
Minimum travel is 6" for all ACTIONJAC™ ELECTRIC CYLINDERS equipped with rod-type limit switches.

HOW TO ORDER A ROD-TYPE LIMIT SWITCH:

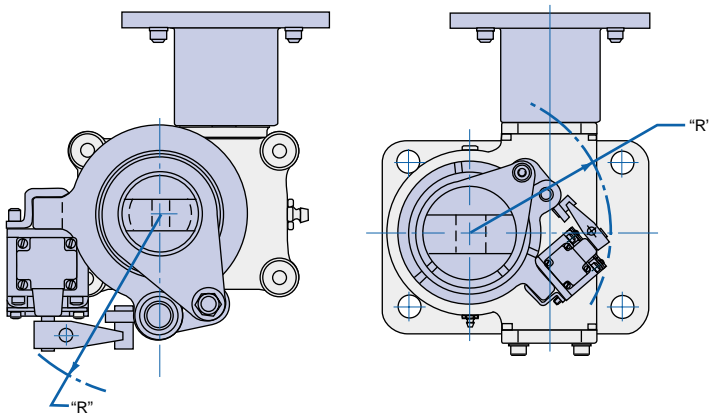
Specify the Electric Cylinder reference number, using the system described on page 362.

EXAMPLE: DD-1008-HD / 103-2 / 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



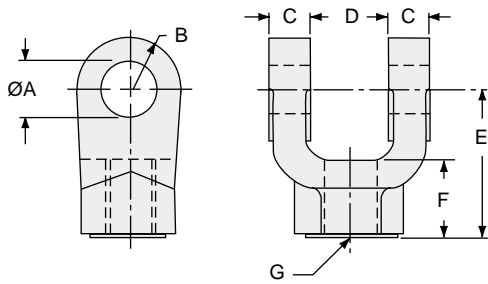
ROD-TYPE LIMIT SWITCH DIMENSIONS



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

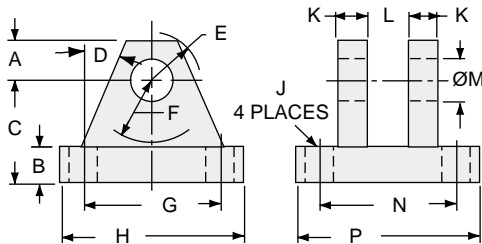
FEMALE ROD CLEVIS



FEMALE ROD CLEVIS

CYLINDER SERIES	PART NUMBER	DIMENSIONS						
		$\varnothing A$	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

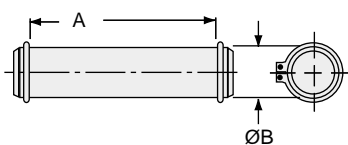
CLEVIS BRACKET



CLEVIS BRACKET FOR KNUCKLE

CYLINDER SERIES	PART NUMBER	DIMENSIONS													
		A	B	C	D	E	F	G	H	$\varnothing J$	K	L	$\varnothing M$	N	P
SERIES 5	B9013-7	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	$\varnothing B$
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

ELECTRIC CYLINDER SUMMARY