

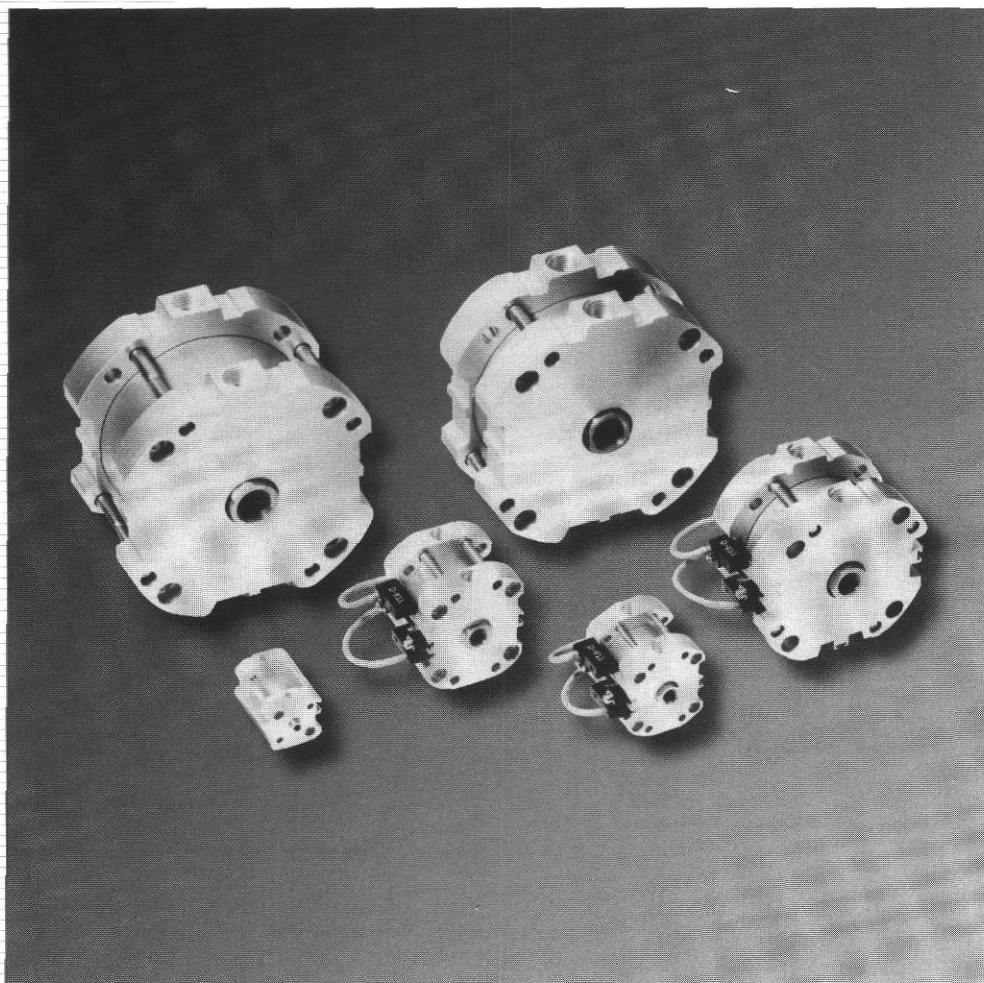


N321

Air Cylinder

NCCQ7 Series

Compact Cylinder



Compact Design

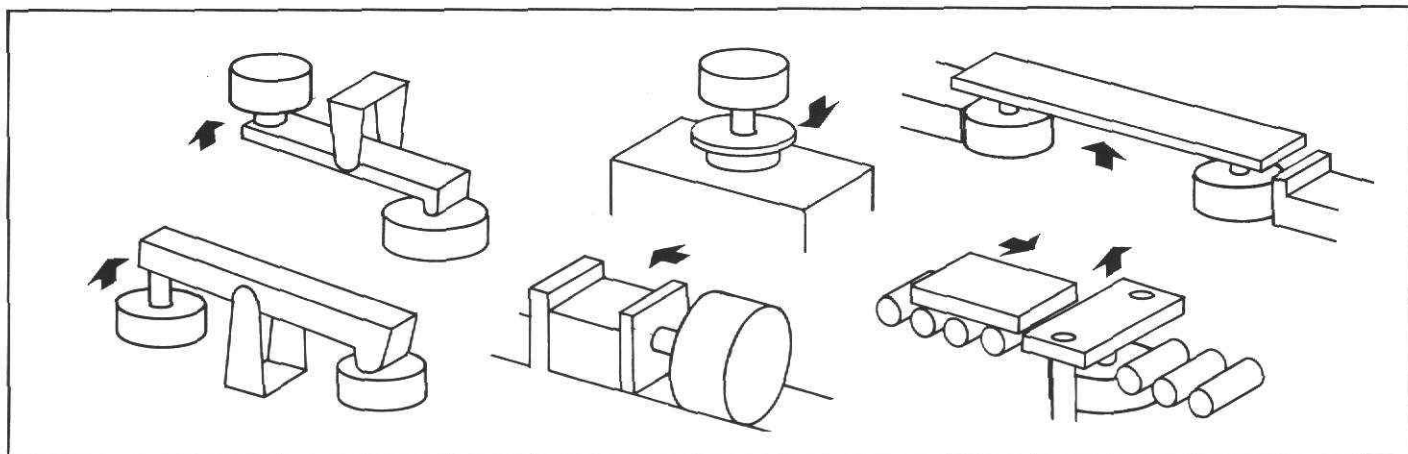
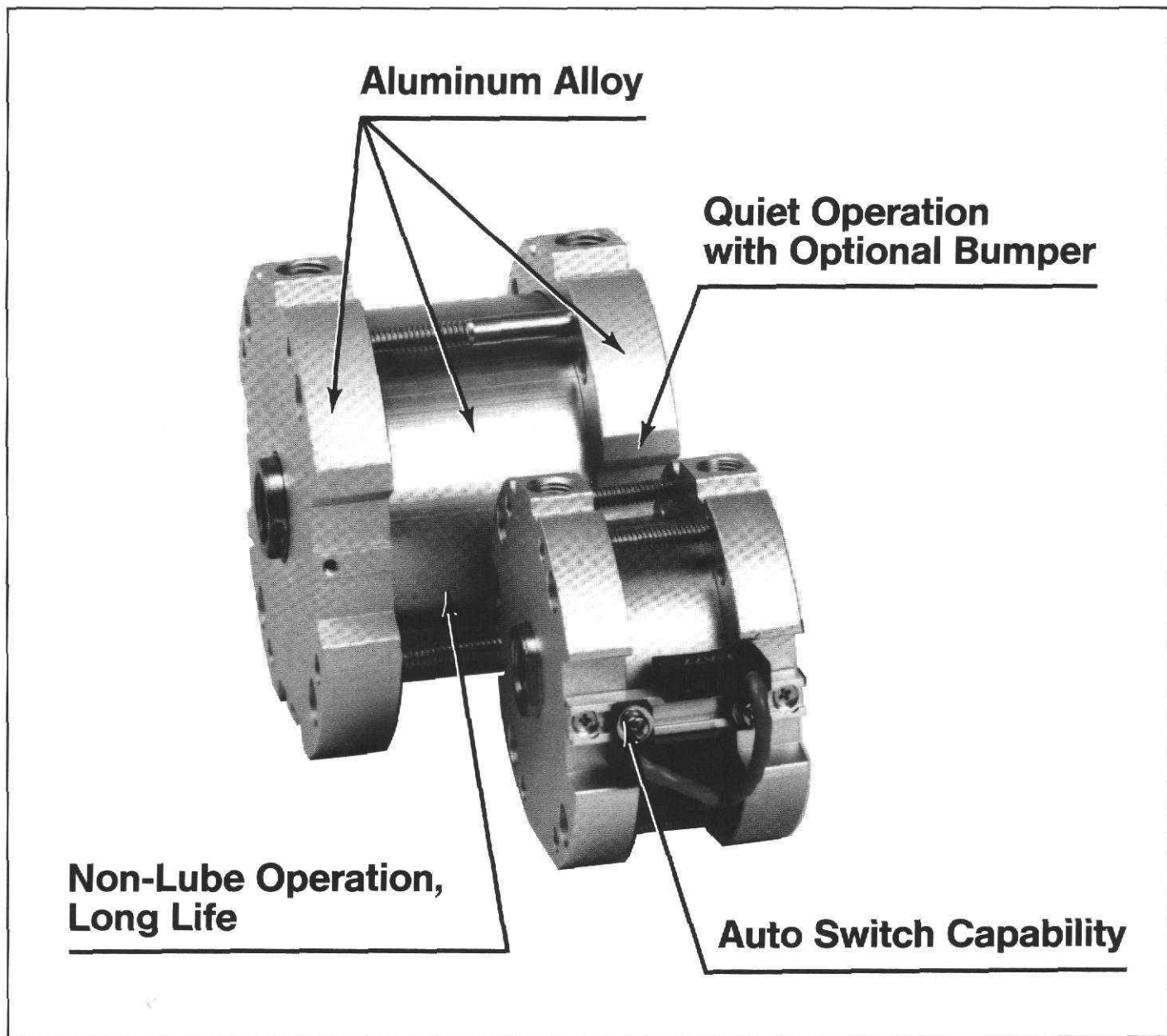
8 Bore Sizes

Aluminum Alloy Body

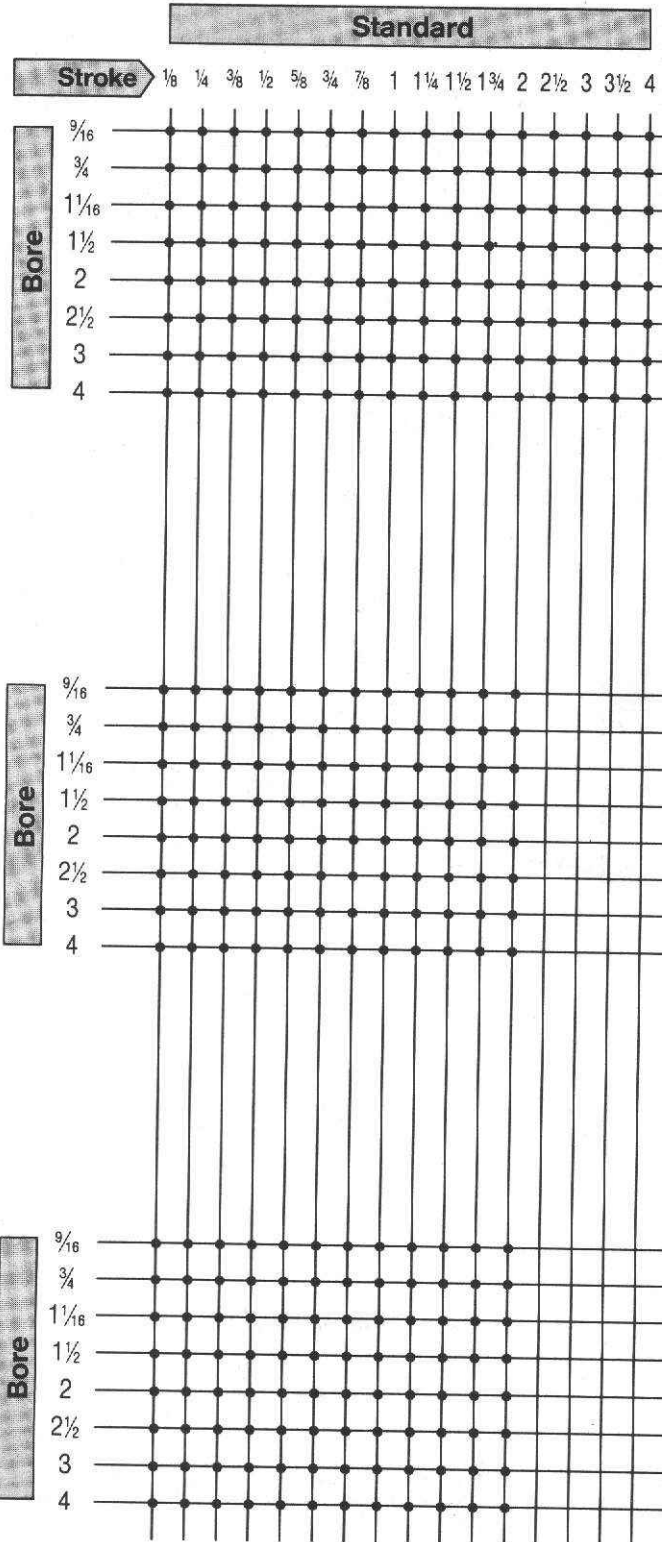
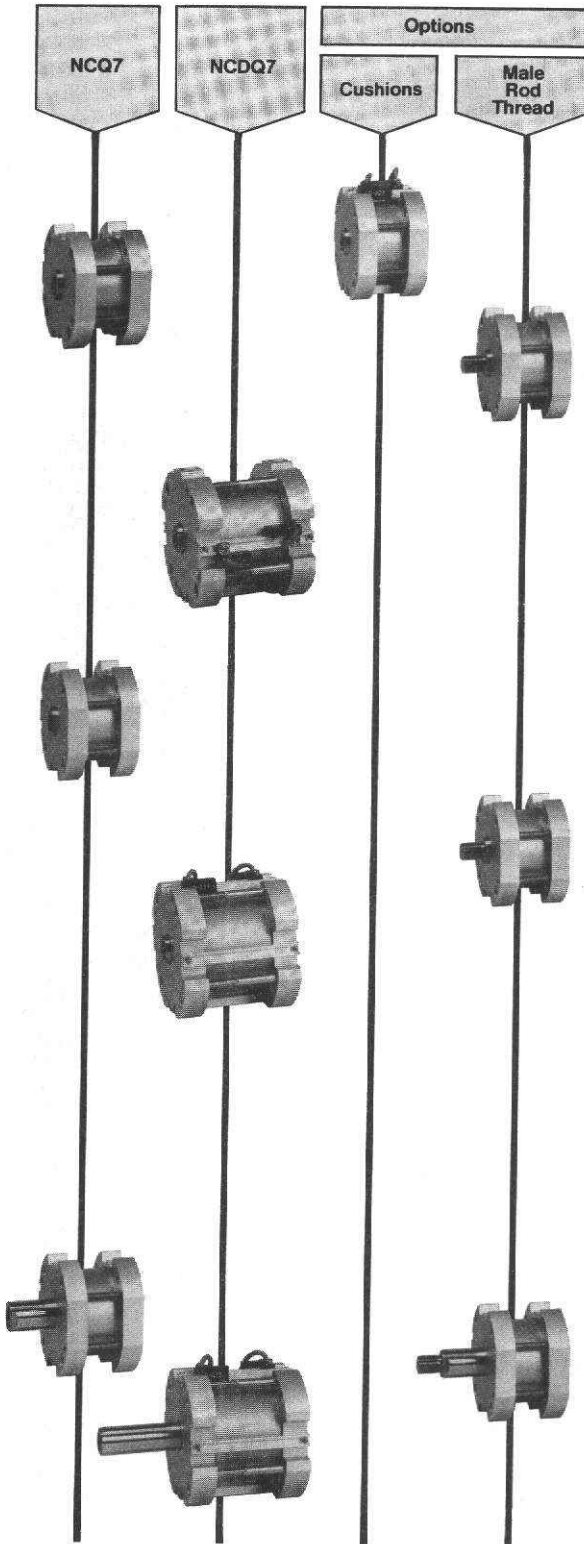
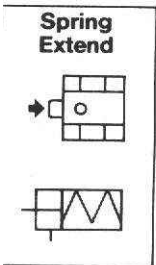
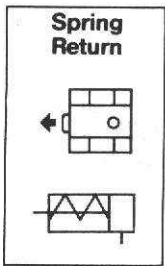
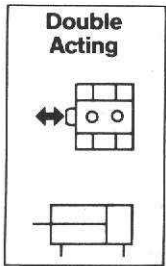
Non-Lube Operation

Auto Switch Capability

Shorter, Lighter, Compact Style Cylinder

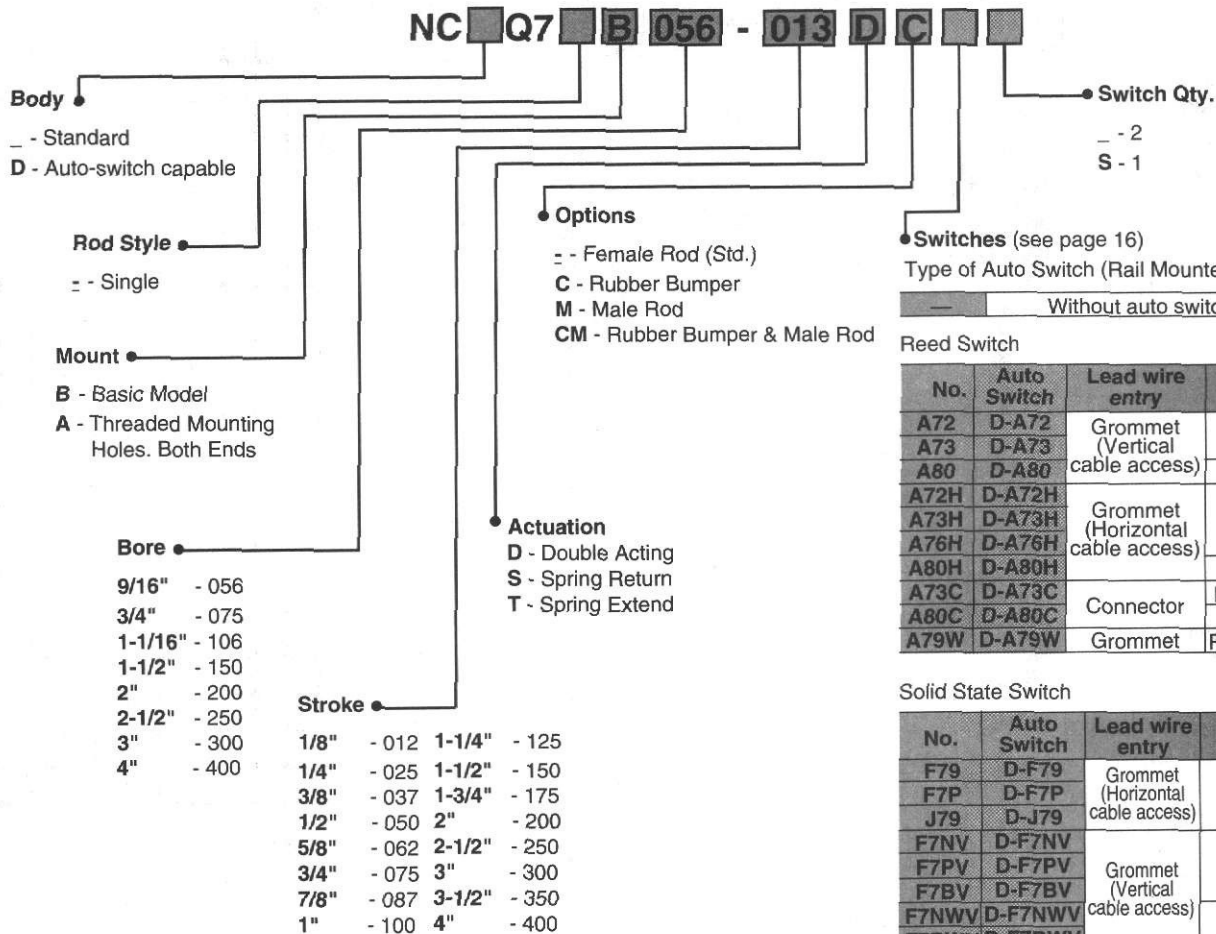


Series NCQ7



Series NCQ7

How to Order



Switches (see page 16)

Type of Auto Switch (Rail Mounted)

Without auto switch

Reed Switch

No.	Auto Switch	Lead wire entry	Indicator lamp
A72	D-A72	Grommet (Vertical cable access)	Provided (One color)
A73	D-A73		Not provided
A80	D-A80		
A72H	D-A72H	Grommet (Horizontal cable access)	Provided (One color)
A73H	D-A73H		
A76H	D-A76H		Not provided
A80H	D-A80H		
A73C	D-A73C	Connector	Provided (One color)
A80C	D-A80C		Not provided
A79W	D-A79W	Grommet	Provided (Two colors)

Solid State Switch

No.	Auto Switch	Lead wire entry	Features of indicator lamp
F79	D-F79	Grommet (Horizontal cable access)	One color
F7P	D-F7P		
J79	D-J79	Grommet (Vertical cable access)	One color
F7NV	D-F7NV		
F7PV	D-F7PV		
F7BV	D-F7BV		
F7NWW	D-F7NWW	Grommet (Horizontal cable access)	Two colors
F7BWV	D-F7BWV		
F79W	D-F79W		
F7PW	D-F7PW		
J79W	D-J79W		
F79F	D-F79F	Grommet (Horizontal cable access)	Two colors, w/diagnostic output
F7LF	D-F7LF		Two colors, holding type with diagnostic output
J79C	D-J79C	Connector	One color
F7NTL	D-F7NTL	Grommet	

The standard lead wire length is 0.5m. "L" is added for 3m. long lead wire. (Applicable to all models)
(Ex.) A73L D-A73L

Accessories/Parts List

Accessory	Part No.							
	056 (9/16")	075 (3/4")	106 (1-1/16")	150 (1-1/2")	200 (2")	250 (2-1/2")	300 (3")	400 (4")
Jam Nut	JM-01	JM-02	JM-03	JM-04	JM-05	JM-05	JM-08	JM-10
Single Rod Clevis	RCS-015	RCS-02	RCS-03	RCS-04	RCS-05	RCS-05	RCS-08	RCS-10
Double Rod Clevis	RDS-015	RDS-02	RDS-03	RDS-04	RDS-05	RDS-05	RDS-08	RDS-10
Single Rod Clevis w/ pin(1), retaining rings(2)	RCSK-015	RCSK-02	RCSK-03	RCSK-04	RCSK-05	RCSK-05	RCSK-08	RCSK-10
Double Rod Clevis w/ pin(1), retaining rings(2)	RCDK-015	RCDK-02	RCDK-03	RCDK-04	RCDK-05	RCDK-05	RCDK-08	RCDK-10

*Jam nut sold separately

*For accessory part dimensions see cat. N4-18 NCQ2.

Specifications

Fluid	Air
Max. Operating pressure	200 PSI (14 kgf/cm ²)
Ambient and fluid temperature	-20 ~ 150°F (-25 ~ 65°C)
Stroke Speed	2 ~ 20 inch/sec (50 ~ 500mm/sec)
Shock absorbers	Rubber Bumper Optional
Lubricant	Not Required
Thread End	Female Standard
Stroke Tolerances	+0.04 in. (+1.0 mm) -0

FEATURES

The NCQ7 Series cylinder gives a shorter, lighter and more compact package for a given stroke.

The unique shape enables the use of rail-mounted switches without significantly increasing the overall length.

- This convenient feature can be adapted for many applications where reed or solid state switches are desirable.
- Many styles of switches from which to choose, including the new two color switch for optimum autoswitch placement.

The NCQ7 results in low maintenance cost with its non-lube operation, long life and low initial cost.

CAUTION:

Be sure all tubing and fittings are clean and clear.

Piston rod load should always be parallel with cylinder axis.

A) Mount cylinder after checking alignment.

B) When using a cylinder as a stop, use a guide to prevent side loads directly on piston rod.

Do not damage exposed piston rod. Such damage as scratching or excessive scoring of exposed piston rod may damage cylinder packing and cause air leakage.

Theoretical Cylinder Forces

(lbs)

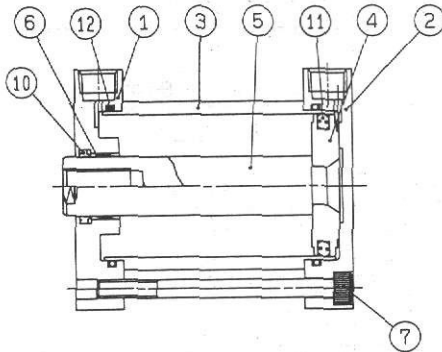
Bore	Rod Dia.	Action	Operating Pressures (PSI)							
			25	50	75	100	125	150	175	200
056 ($\frac{9}{16}$ "	0.25	IN	5.0	10.0	15.0	19.9	24.9	29.9	34.9	39.9
		OUT	6.2	12.4	18.6	24.9	31.1	37.3	43.5	49.7
075 ($\frac{3}{4}$ "	0.313	IN	9.1	18.2	27.4	36.5	45.6	54.7	63.8	73.0
		OUT	11.0	22.1	33.1	44.2	55.2	66.3	77.3	88.4
106 ($1\frac{1}{16}$ "	0.5	IN	17.3	34.5	51.8	69.0	86.3	103.5	120.8	138.1
		OUT	22.2	44.3	66.5	88.7	110.8	133.0	155.2	177.3
150 ($1\frac{1}{2}$ "	0.625	IN	36.5	73.0	110	146	183	219	256	292
		OUT	44.2	88.4	133	177	221	265	309	353
200 (2"	0.75	IN	67.5	135	202	270	337	405	472	540
		OUT	78.5	157	236	314	393	471	550	628
250 ($2\frac{1}{2}$ "	0.75	IN	112	223	335	447	558	670	782	893
		OUT	123	245	368	491	614	736	859	982
300 (3"	0.875	IN	162	323	485	647	808	970	1132	1293
		OUT	177	353	530	707	884	1060	1237	1414
400 (4"	1	IN	295	589	884	1178	1473	1767	2062	2356
		OUT	314	628	942	1257	1571	1885	2199	2513

Enclosed Spring Forces

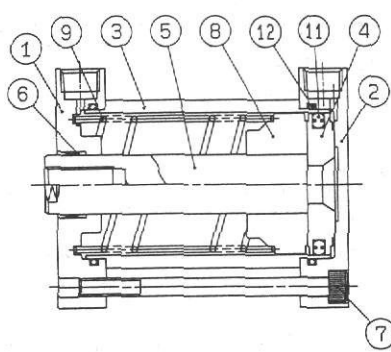
Bore	Maximum Force	Spring Rate	
		$\frac{1}{8}$ " to 1" Stroke	Over 1" to 2" Stroke
056 ($\frac{9}{16}$ "	5 lb	3.5 lb/in	1.75 lb/in
075 ($\frac{3}{4}$ "	6.5 lb	4 lb/in	2 lb/in
106 ($1\frac{1}{16}$ "	7.75 lb	4 lb/in	2 lb/in
150 ($1\frac{1}{2}$ "	8 lb	3.4 lb/in	1.7 lb/in
200 (2"	12 lb	8 lb/in	3 lb/in
250 ($2\frac{1}{2}$ "	18.75 lb	8.25 lb/in	3.5 lb/in
300 (3"	23 lb	10.5 lb/in	3.75 lb/in
400 (4"	26.5 lb	8.5 lb/in	3.5 lb/in

Construction

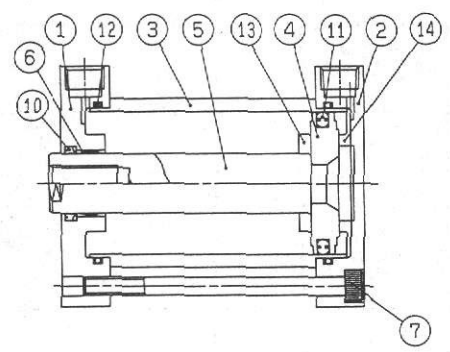
Double Acting



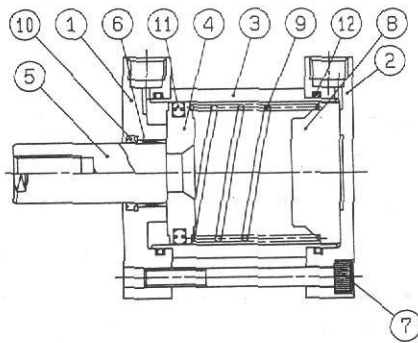
Spring Return



Rubber Bumper



Spring Extend



No.	Description	Material	Qty.
14	Bumper B	Urethane	1
13	Bumper A	Urethane	1

No.	Description	Material	Qty.	Remarks
9	Return Spring	Steel	1	Zinc Chromate
8	Spring Guide	Aluminum Alloy	1	Chromate
7	Bolt	Stainless Steel	2	Bore Ø 9/16"
			4	Bore Ø 3/4"
		Alloy Steel	4	Nickel Plating Bore Ø 1 1/16"~4"
6	Bushing	Oil Impregnated Bronze	1	Bore Ø 9/16"~1 1/16"
		Bronze Casting	1	Bore Ø 1 1/2"~4"
5	Piston Rod	Stainless Steel	1	Bore Ø 9/16"~1 1/16"
		Carbon Steel	1	Bore Ø 1 1/2"~4"
4	Piston	Aluminum Alloy	1	Chromate
3	Cylinder Tube	Aluminum Alloy	1	Hard Alumite
2	Head Cover	Aluminum Alloy	1	White Alumite
1	Rod Cover	Aluminum Alloy	1	White Alumite

Seal Kits

Part No.	Use With	Included in Kit (Qty.)
NCQ7○*-DPS	NCQ7○○-OD NCDQ7○○-OD	Piston Packing (1)
	NCQ7○○-OS NCDQ7○○-OS	Rod Packing (1)
	NCQ7○○-OT NCDQ7○○-OT	O-Ring (2)

*Specify Bore Size.

Seal List

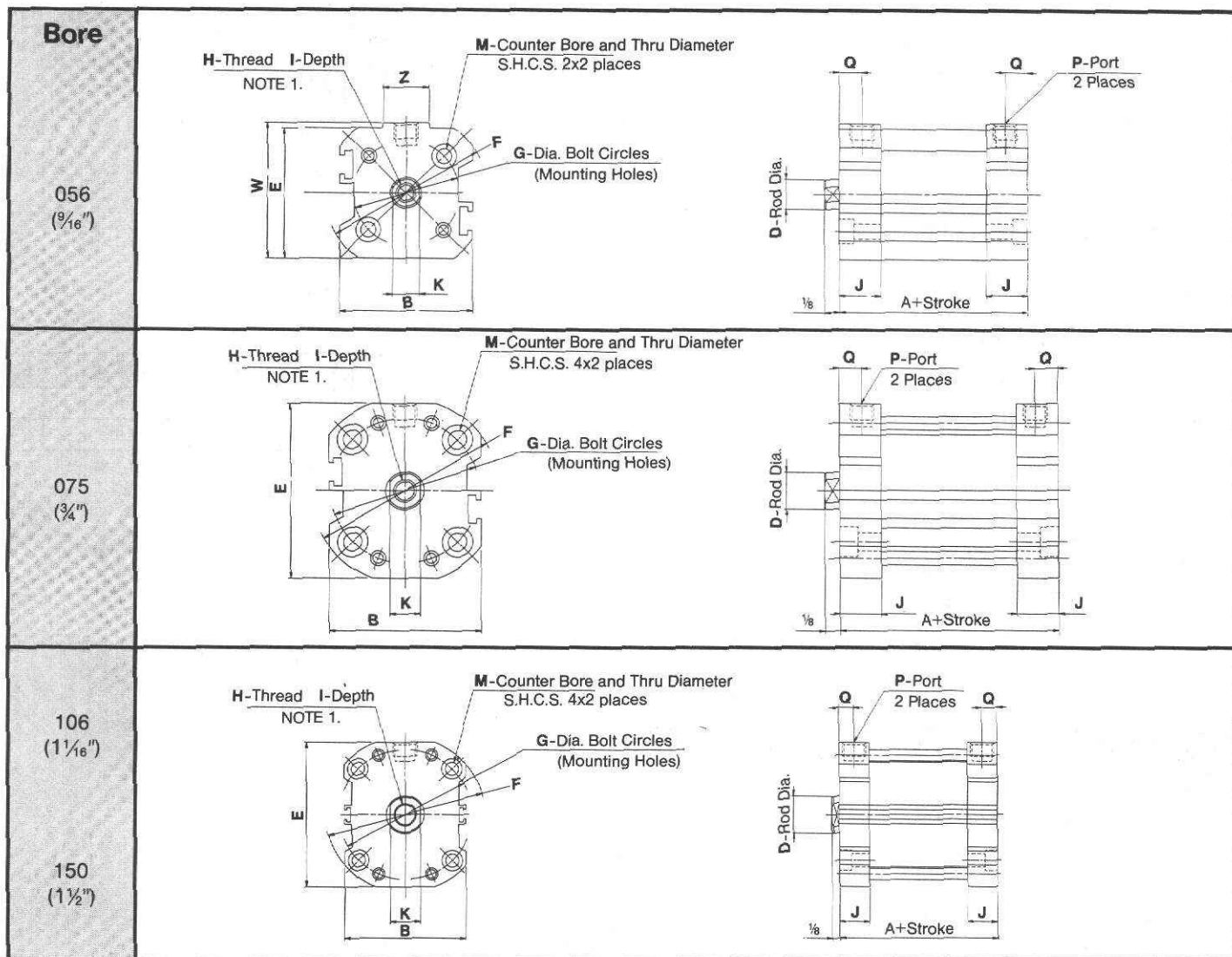
No.	Description	Material	Qty.	Part Number							
				Ø 9/16	Ø 3/4	Ø 1 1/16	Ø 1 1/2	Ø 2	Ø 2 1/2	Ø 3	Ø 4
10	Rod Seal	NBR	1	NYH-B025	NYH-B031	NYH-B050	NYH-B063	NYH-B075	PDU-B075	PDU-B088	PDU-100A
11	Piston Seal	NBR	1	NLP-B056	NLP-B075	NLP-B106	PLP-B150	PLP-B200	PLP-B250	NLP-B300	NLP-B400
12	Gasket	NBR	2	15X1	CA100-1610	C29	C40	55X2	68X2	82.55X2.03	107.62X2.62

See page 4 for Seal Kit part numbers.

Series NCQ7

Dimensions

Double Acting NCQ7B○ - ○D D Type
 Spring Return NCQ7B○ - ○S S Type
 Rubber Bumper NCQ7B○ - ○DC DC Type



	A													
Bore	D Type	S Type		DC Type	B	D	E	F	G	H	I	J	K	M
		1/8"-1" Stroke	1 1/4"-2" Stroke											
056 (9/16")	9/16	13/16	1 3/8	13/16	1 3/32	1/4	1 3/32	1 11/32	7/8	#8-32	0.46	11/32	7/32	#4
075 (3/4")	9/16	13/16	1 3/8	13/16	1 1/4	5/16	1 15/32	1 9/16	17/32	#10-32	0.46	11/32	1/4	#6
106 (1 1/16")	7/8	7/8	1 1/2	1 1/8	1 9/16	1/2	1 7/8	2 1/32	1 11/16	5/16-24	0.7	1/2	7/16	#6
150 (1 1/2")	7/8	7/8	1 1/2	1 1/8	2	5/8	2 7/16	2 5/8	2 3/16	3/8-24	0.7	1/2	7/16	#10

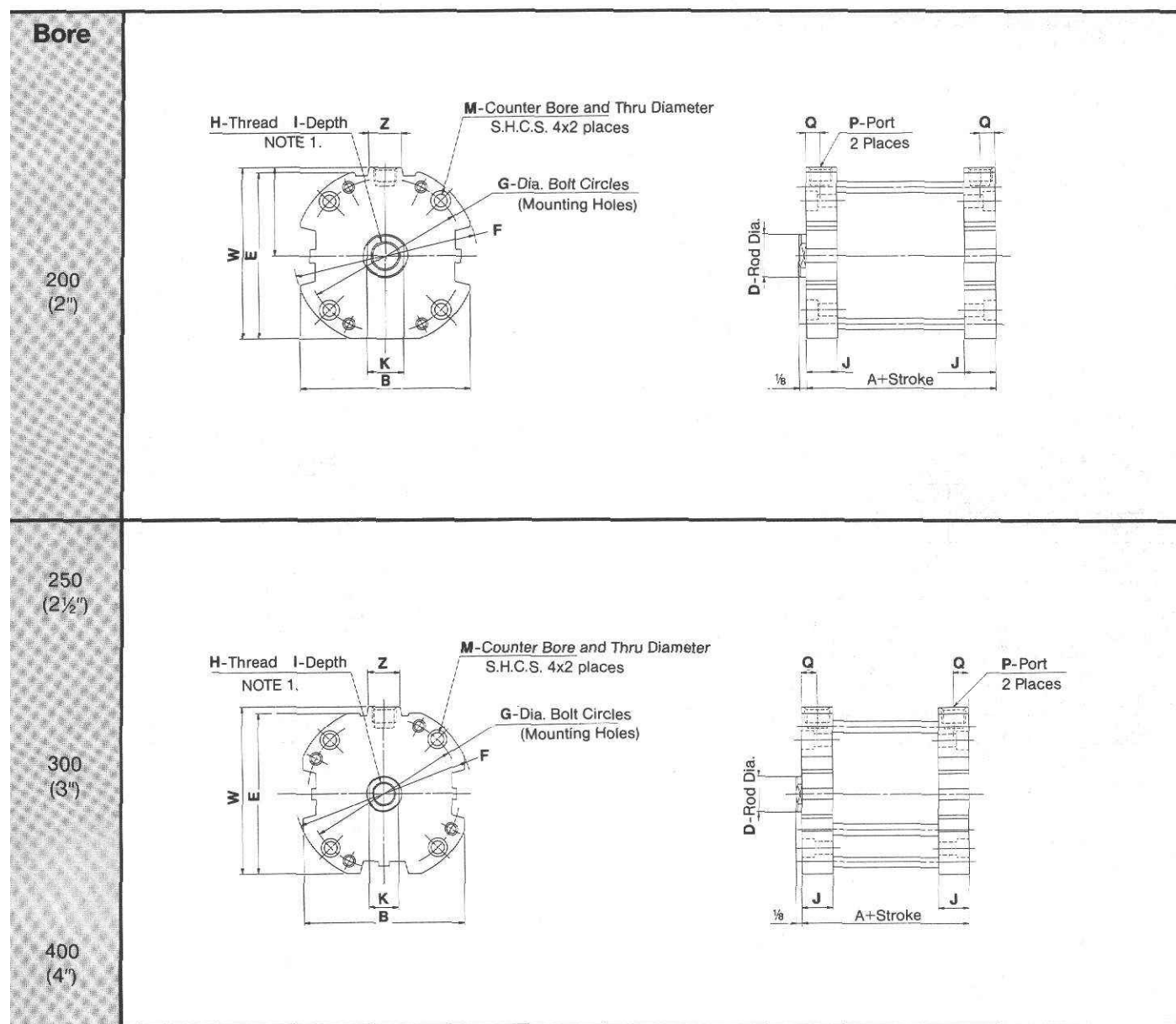
Note: Angular dimensions for mounting holes same as "A" type on page 11.

Bore	P	Q	W	Z
056 (9/16")	10-32UNF	3/16	1 9/64	1 3/8
075 (3/4")	10-32UNF	3/16	—	—
106 (1 1/16")	1 1/8 NPT	1/4	—	—
150 (1 1/2")	1 1/8 NPT	1/4	—	—

NOTE 1) Female thread length ("I") is shorter for the following .

Bore	D Type	S Type	DC Type	I
056 (9/16")	1/8 st.			I=0.36
075 (3/4")	1/8 st.			I=0.36
106 (1 1/16")	1/8 & 1/4 st.	1/8 & 1/4 st.	1/8 st.	I=0.52
150 (1 1/2")	1/8 & 1/4 st.	1/8 & 1/4 st.	1/8 st.	I=0.5

Dimensions



Bore	D Type	A		DC Type	B	D	E	F	G	H	I	J	K	M
		S Type												
		1/8"-1" Stroke	1 1/4"-2" Stroke											
200 (2")	15/16	15/16	1 9/16	15/16	2 57/64	3/4	2 57/64	3 1/8	2 11/16	1/2-20	0.7	17/32	5/8	#10
250 (2 1/2")	1 3/16	1 3/16	2 1/16	1 3/16	3 7/16	3/4	3 7/16	3 25/32	3 1/4	1/2-20	0.7	2 1/32	5/8	1/4
300 (3")	1 1/4	1 1/4	2 1/8	1 1/4	3 31/32	7/8	3 31/32	4 11/32	3 25/32	5/8-18	0.73	1 1/16	3/4	1/4
400 (4")	1 9/16	1 9/16	2 7/16	1 9/16	5	1	5	5 19/32	4 15/16	3/4-16	0.8	2 7/32	7/8	5/16

ote: Angular dimensions for mounting holes same as "A" type on page 11.

Bore	P	Q	W	Z
200 (2")	1/8 NPT	1/4	2 63/64	9/16
250 (2 1/2")	1/4 NPT	2 1/64	3 37/64	1 1/16
300 (3")	1/4 NPT	2 1/64	4 1/8	1 1/16
400 (4")	3/8 NPT	2 7/64	5 1/4	1

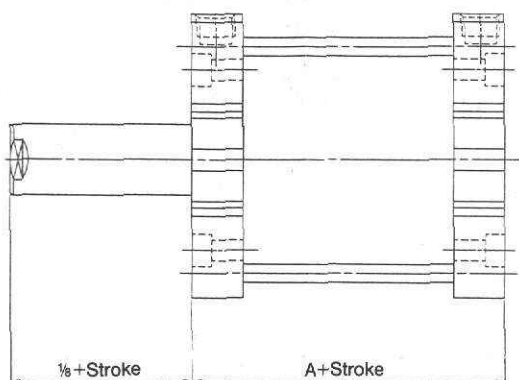
NOTE 1) Female thread length ("I") is shorter for the following .

Bore	D Type	S Type	DC Type	I=
200 (2")	1/8 & 1/4 st.	1/8 & 1/4 st.	1/8 & 1/4 st.	I=0.44
250 (2 1/2")	1/8 st.	1/8 st.	1/8 st.	I=0.44
300 (3")	1/8 & 1/4 st.	1/8 & 1/4 st.	1/8 & 1/4 st.	I=0.55
400 (4")	1/8 & 1/4 st.	1/8 & 1/4 st.	1/8 & 1/4 st.	I=0.65

Series NCQ7

Dimensions

Spring Extend NCQ7B○-○T T Type



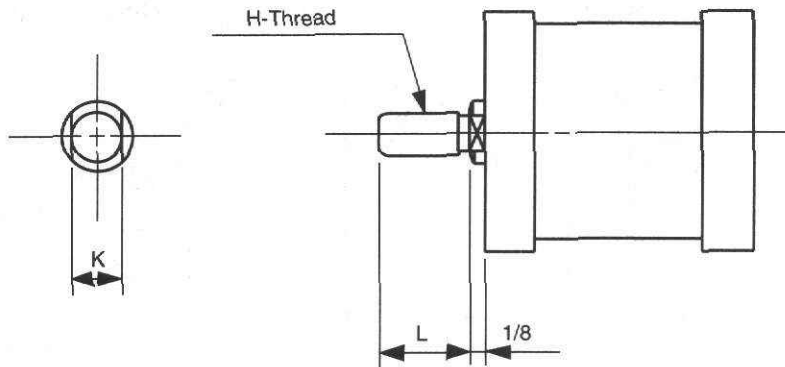
Bore	A	
	1/8"-1" Stroke	1 1/4"-2" Stroke
056 (9/16")	1 1/8	1 5/8
075 (3/4")	1 1/8	1 5/8
106 (1 1/8")	1 3/8	2
150 (1 1/2")	1 3/8	2
200 (2")	1 7/8	2 1/8
250 (2 1/2")	1 15/16	2 13/16
300 (3")	2	2 7/8
400 (4")	2 5/8	3 3/8

Bore	Stroke	I
056 (9/16")	1/8	I=0.36
075 (3/4")	1/8	I=0.36
106 (1 1/8")	1/8, 1/4	I=0.52
150 (1 1/2")	1/8, 1/4	I=0.5
200 (2")	1/8, 1/4	I=0.44
250 (2 1/2")	1/8	I=0.44
300 (3")	1/8, 1/4	I=0.55
400 (4")	1/8, 1/4	I=0.65

NOTE 1) Female thread length ("I") is shorter for the above listed strokes.

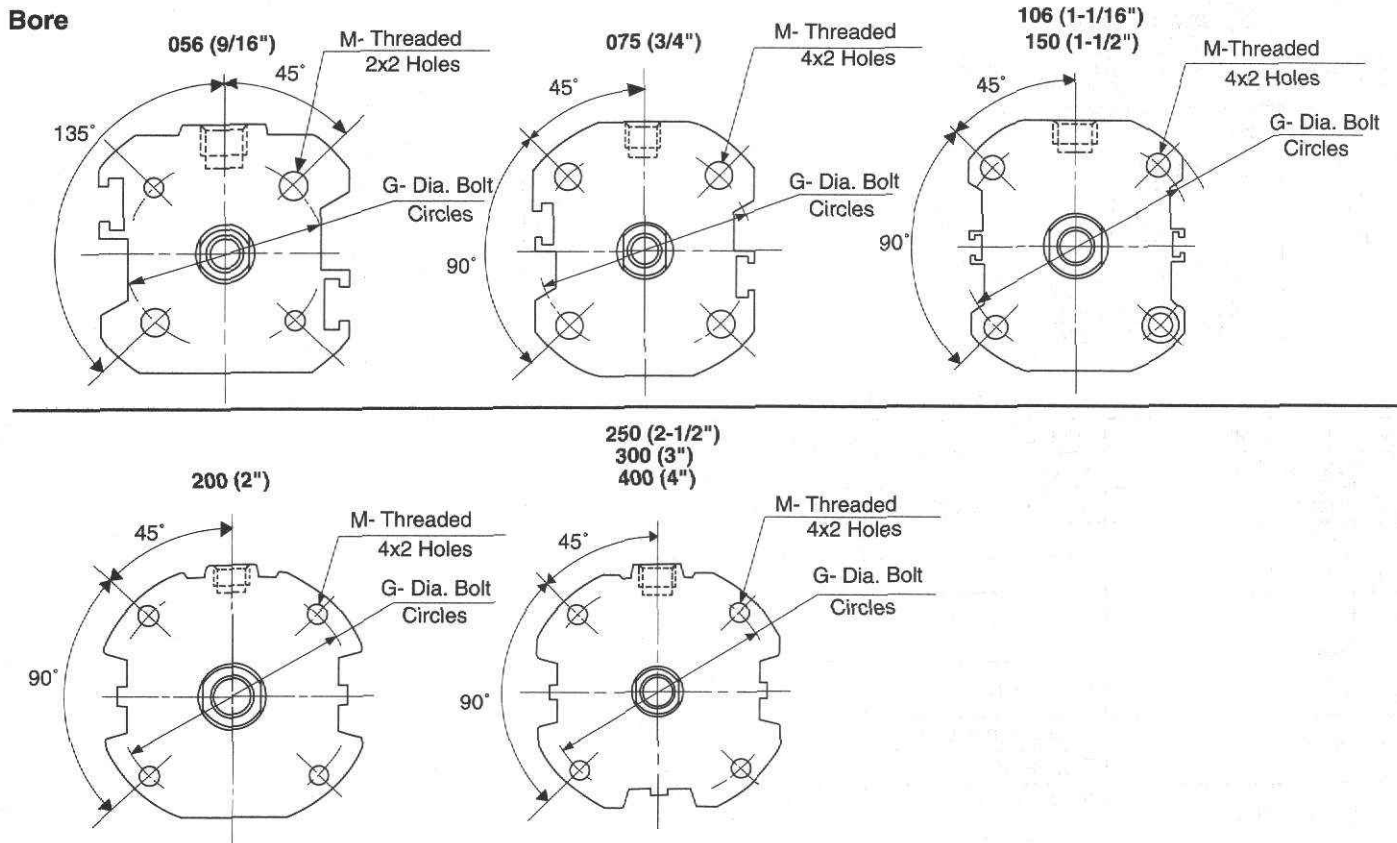
Dimensions

Male Rod End NCOQ7000-OOM



Bore	H	L	K
056 (9/16")	#8-32	3/8	7/32
075 (3/4")	#10-32	3/8	1/4
106 (1 1/16")	5/16-24	1/2	7/16
150 (1 1/2")	3/8-24	1/2	7/16
200 (2")	1/2-20	5/8	5/8
250 (2 1/2")	1/2-20	5/8	5/8
300 (3")	5/8-18	3/4	3/4
400 (4")	3/4-16	3/4	7/8

Threaded Mounting Holes (Both Ends) NCOQ70AO-000

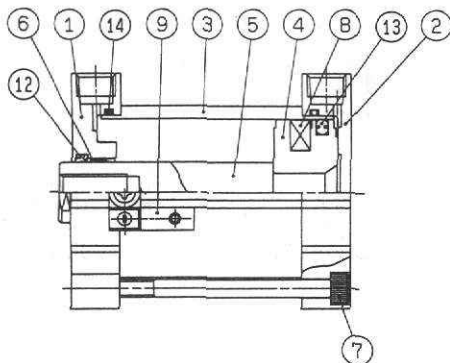


Bore	G	M
056 (9/16")	7/8	#4-40
075 (3/4")	17/32	#6-32
106 (1 1/16")	1 11/16	#6-32
150 (1 1/2")	2 3/16	#10-24
200 (2")	2 11/16	#10-24
250 (2 1/2")	3 1/4	1/4-20
300 (3")	3 25/32	1/4-20
400 (4")	4 15/16	5/16-18

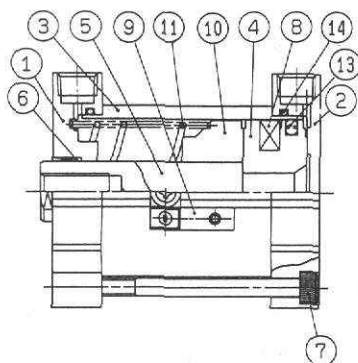
Series NCDQ7

Construction / Auto Switch Capable

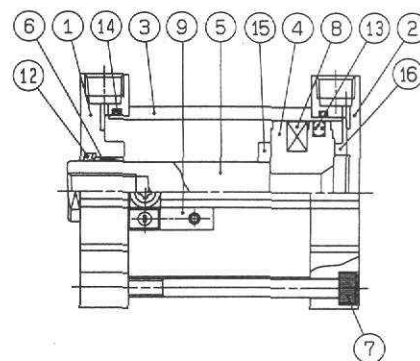
Double Acting



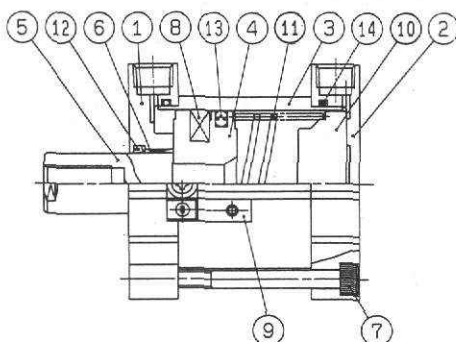
Spring Return



Rubber Bumper



Spring Extend



No.	Description	Material	Qty	Remarks
11	Return Spring	Steel	1	Zinc Chromate
10	Spring Guide	Aluminum Alloy	1	Chromate
9	Auto Switch			
8	Magnet		1	
7	Bolt	Stainless Steel	2	Bore $\varnothing \frac{9}{16}$ "
			4	Bore $\varnothing \frac{3}{4}$ "
		Alloy Steel	4	Nickel Plating Bore $\varnothing 1\frac{1}{16}$ " ~ 4"
6	Bushing	Oil Impregnated Bronze	1	Bore $\varnothing \frac{9}{16}$ " ~ 1 $\frac{1}{16}$ "
		Bronze Casting	1	Bore $\varnothing 1\frac{1}{2}$ " ~ 4"
5	Piston Rod	Stainless Steel	1	Bore $\varnothing \frac{9}{16}$ " ~ 1 $\frac{1}{16}$ "
		Carbon Steel	1	Bore $\varnothing 1\frac{1}{2}$ " ~ 4"
4	Piston	Aluminum Alloy	1	Chromate
3	Cylinder Tube	Aluminum Alloy	1	Hard Alumite
2	Head Cover	Aluminum Alloy	1	White Alumite
1	Rod Cover	Aluminum Alloy	1	White Alumite

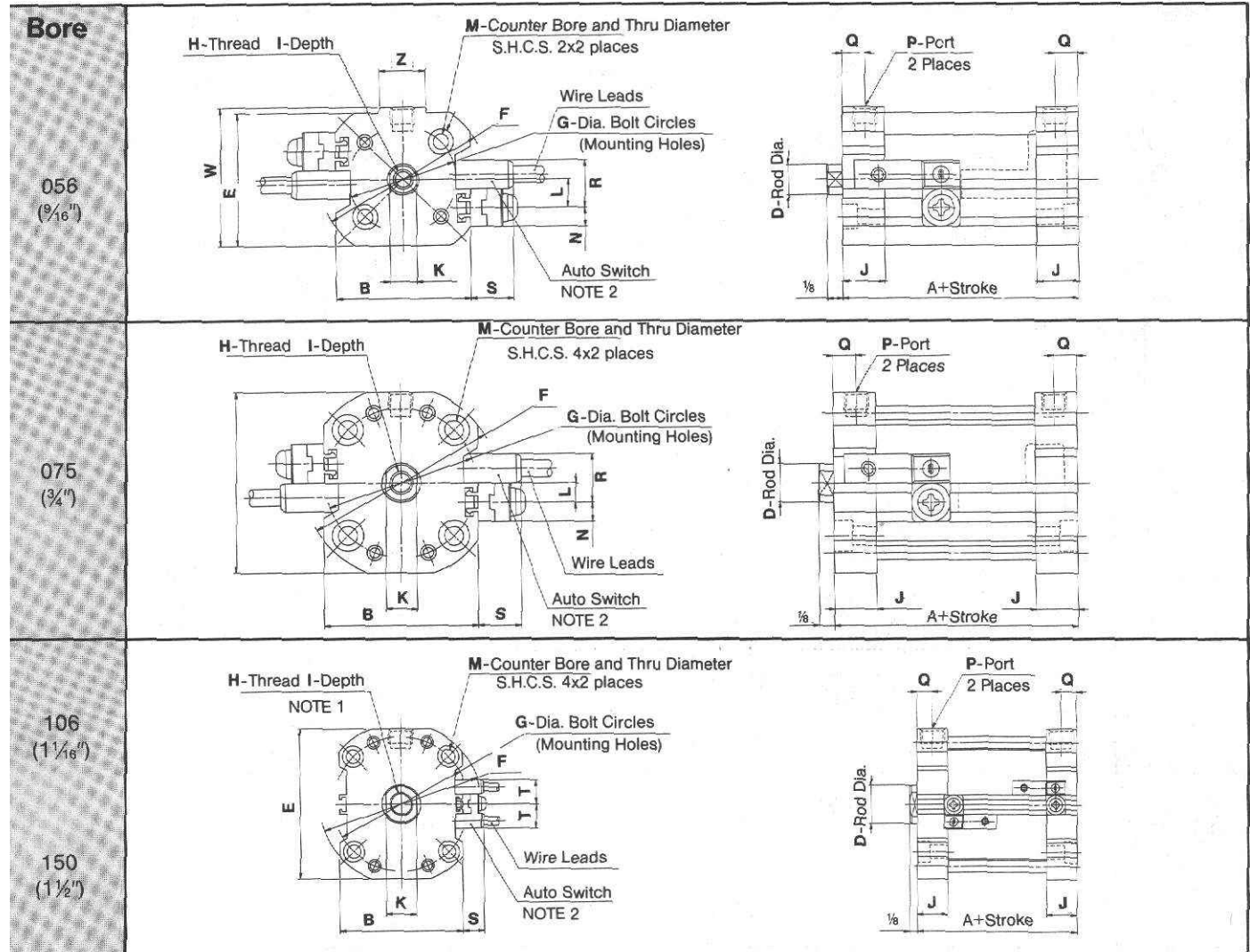
No.	Description	Material	Qty
16	Bumper B	Urethane	1
15	Bumper A	Urethane	1

Seal List

No.	Description	Material	Qty	Remarks
12	Rod Seal	NBR	1	See Page 7.
13	Piston Seal	NBR	1	
14	Gasket	NBR	2	

Dimensions With Auto-Switch

Double Acting NCDQ7B○-○D D Type
 Spring Return NCDQ7B○-○S S Type
 Rubber Bumper NCDQ7B○-○DC DC Type



Bore	A																	
	D Type	S Type		DC Type	B	D	E	F	G	H	I	J	K	L	M	N	P	Q
		1/8"-1"Stroke	1 1/4"-2"Stroke															
56 (9/16")	1 1/16	13/16	13/4	13/16	13/32	1/4	13/32	11 1/32	7/8	#8-32	0.46	11/32	7/32	0.24	#4	0.16	10-32UNF	3/16
75 (3/4")	1 1/16	13/16	13/4	13/16	1 1/4	5/16	115/32	19/16	17/32	#10-32	0.46	11/32	1/4	0.24	#6	0.16	10-32UNF	3/16
06 (1 1/16")	1 1/4	1 1/4	17/8	1 1/2	19/16	1/2	115/16	21/32	11 1/16	5/16-24	0.7	1/2	7/16	—	#6	—	1/8NPT	1/4
50 (1 1/2")	1 1/4	1 1/4	17/8	1 1/2	2	5/8	27/16	25/8	23/16	3/8-24	0.7	1/2	1/2	—	#10	—	1/8NPT	1/4

OTE 2) Applicable Auto-Switch D-A7 D-A80

OTE: Angular dimensions same as "A" type on page 11.

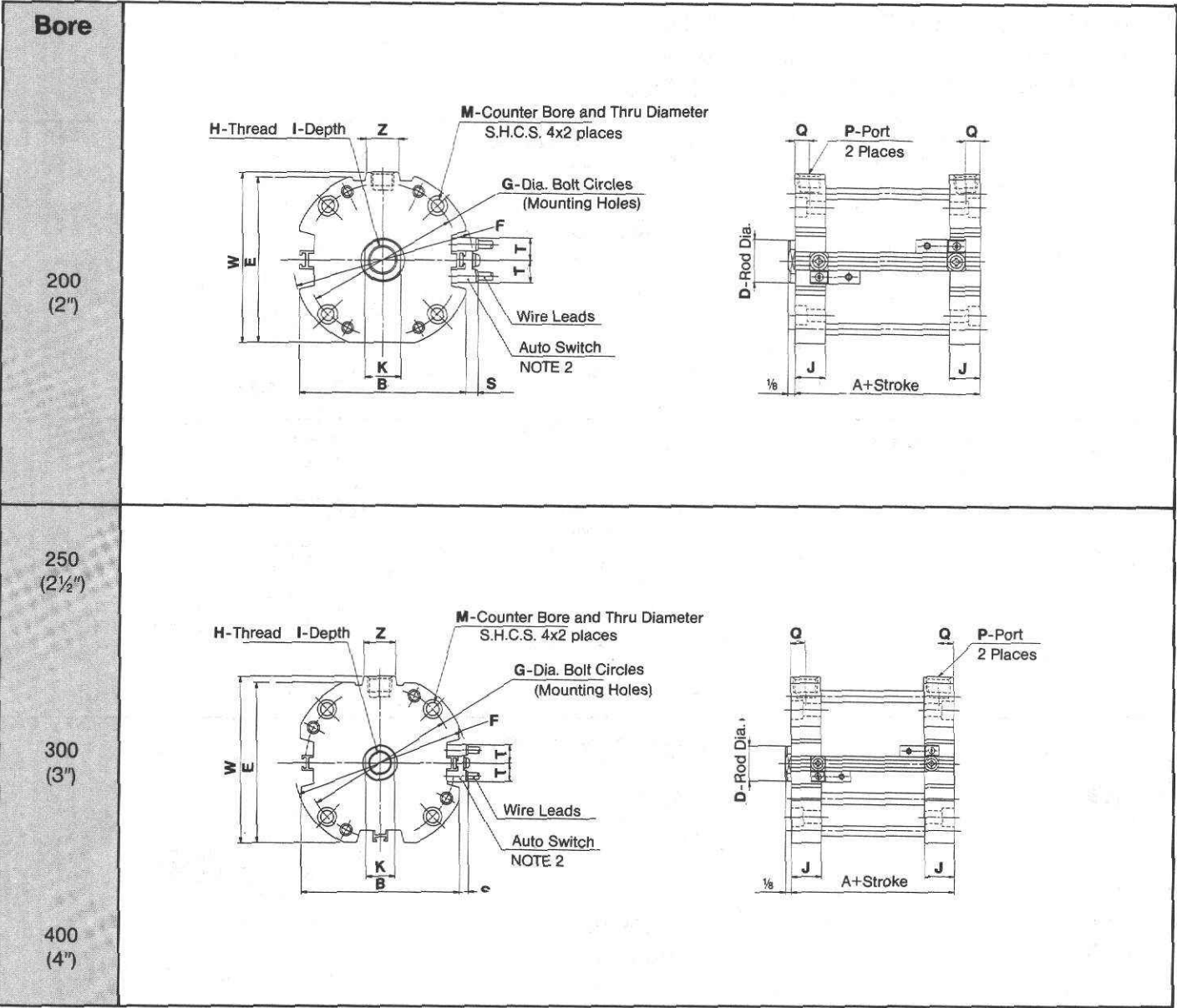
NOTE 1) Female thread length ("I") is shorter for the following strokes.

Bore	R	S	T	W	Z
056 (9/16")	0.4	0.35	—	19/64	3/8
075 (3/4")	0.4	0.35	—	—	—
106 (1 1/16")	—	0.35	0.4	—	—
150 (1 1/2")	—	0.35	0.4	—	—

Bore	D Type	S Type	I=
106 (1 1/16")	1/4 st.	1/4 st.	I=0.52
150 (1 1/2")	1/4 st.	1/4 st.	I=0.5

Series NCDQ7

Dimensions With Auto-Switch



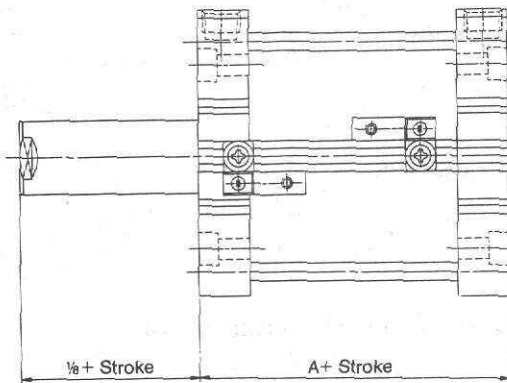
A																
Bore	D Type	S Type		DC Type	B	D	E	F	G	H	I	J	K	M	P	Q
		1/8"-1"Stroke	1 1/4"-2"Stroke													
200 (2")	13/16	13/16	13/16	13/16	257/64	3/4	257/64	3 1/8	2 11/16	1/2-20	0.7	17/32	5/8	#10	1/8NPT	1/4
250 (2 1/2")	17/16	17/16	25/16	17/16	37/16	3/4	37/16	325/32	3 1/4	1/2-20	0.7	21/32	5/8	1/4	1/4NPT	21/64
300 (3")	1 1/2	1 1/2	2 3/8	1 1/2	3 31/32	7/8	3 31/32	4 11/32	3 25/32	5/8-18	0.73	11/16	3/4	1/4	1/4NPT	21/64
400 (4")	1 13/16	1 13/16	2 11/16	1 13/16	5	1	5	5 19/32	4 15/16	3/4-16	0.8	27/32	7/8	5/16	3/8NPT	27/64

NOTE 2) Applicable Auto-Switch D-A7 D-A80
NOTE: Angular dimensions same as "A" type on page 11.

Bore	S	T	W	Z
200 (2")	0.21	0.4	2 63/64	9/16
250 (2 1/2")	0.19	0.4	3 37/64	1 1/16
300 (3")	0.21	0.4	4 1/8	1 1/16
400 (4")	0.21	0.4	5 1/4	1

Dimensions With Auto-Switch

Spring Extend NCDQ7B○-○T T Type



Bore	A	
	1/8"-1" Stroke	1 1/4"-2" Stroke
56 (9/16")	1 9/16	2 1/8
75 (3/4")	1 9/16	2 1/8
106 (1 1/16")	1 3/4	2 3/8
150 (1 1/2")	1 3/4	2 3/8
200 (2")	1 11/16	2 7/16
250 (2 1/2")	2 3/16	3 1/16
300 (3")	2 1/4	3 1/8
400 (4")	2 9/16	3 7/16

Bore	Stroke	l
106 (1 1/16")	1/4	l=0.52
150 (1 1/2")	1/4	l=0.5

NOTE 1) Female thread length ("l") is shorter for the above listed strokes.

Auto-Switch Specifications

Applicable Auto-Switch Model

Auto Switch model		Lead Wire Entry (feature)
Reed Switch	D-A7,A8	Grommet (Vertical cable access)
	D-A7 □H, A80H	Grommet (Horizontal cable access)
	D-A73C, A80C	Connector
	D-A79W	Grommet (two colors)
Solid State Switch	D-F7, J7	Grommet (Horizontal cable access)
	D-F7 □V	Grommet (Vertical cable access)
	D-J79C	Connector
	D-F7 □W, J79W	Grommet (Two colors/horizontal cable access)
	D-F7 □WV	Grommet (Two colors/vertical cable access)
	D-F7 □F	Grommet (Two colors/with diagnostic output/horizontal cable access)
	D-F7BA	Grommet (Two colors/waterproof/horizontal cable access)

Reed Switch Specifications / Rail Mounted

Auto-Switch Model	D-A72 D-A72H	D-A73 D-A73H		D-A76H	D-A80 D-A80H			D-A73C	D-A80C	D-A79W
Application	Relay Sequence controller			IC	Relay, Sequence controller, IC			Relay, Sequence controller	Relay, Sequence controller, IC	Relay, Sequence controller
Load voltage	200VAC	24VDC	100VAC	4~8VDC	Max. 24VAC, DC	48VAC, DC	100VAC, DC	24VDC	Max. 24VAC, DC	24VDC
Max. load current and load current range	5~10mA	5~40mA	5~20mA	20mA	50mA	40mA	20mA	5~40mA	50mA	5~40mA
Internal voltage drop	Max. 2.4V			Max. 0.8V	0			Max. 2.4V	0	Max. 4V
Indicator lamp	ON: Red light emitting diode				—			ON: Red light emitting diode	—	Two colors Response position-Red light emitting diode Best Response position-Green light emitting diode
Protection circuit for contact breaker point	—									

- Leak current - None
- Response time - 1.2ms
- Lead wire - Oil proof vinyl, $\phi 3.4$, 0.2mm², 2-wire (red, black), 0.5m*
- Impact resistance - 300m/s² {30.6G}
- Insulation resistance - 50M Ω or more under test voltage 500VDC (between case and cable)

- Withstand voltage - 1500VAC 1 min (between case and cable)
- Ambient temperature - 50-140°F (10-60°C)
- Protection structure - IEC529 spec.IP67, waterproof (JISC0920), oilproof
- Suffix L for the model with a 3m-long lead wire.
(Example) D-A73L

Solid State Switch Specifications / Rail Mounted Type

Auto-Switch Model	D-F7NTL	D-F79 D-F7NV	D-F7P D-F7PV	D-J79 D-F7BV	D-J79C	D-F79W D-F7NWW	D-F7PW	D-J79W	D-F7BWV	D-F79F (with diagnostic output)	D-F7LF (Holding with diagnostic output)
Wiring	3-wire			2-wire		3-wire		2-wire		4-wire	
Output	NPN	NPN	PNP	—		NPN	PNP	—		NPN	
Application	Relay, IC, Sequence controller			24VDC relay, Sequence controller		Relay Sequence controller	Relay, IC, Sequence controller	24VDC relay, Sequence controller		Relay, IC, Sequence controller	Relay, Sequence controller
Power voltage	4.5-28VDC	5-24VDC	5-24VDC	—		12-24VDC	5-24VDC	—		5-24VDC	24VDC
Current consumption	Max. 10mA	Max. 12mA	Max. 15mA	—		Max. 10mA	Max. 12mA	—		Max. 10mA	Max. 20mA
Load voltage	28VDC or less	Max.28VDC	—	10-28VDC		Max. 28VDC	—	10-28VDC		Max. 28VDC	
Load current	80mA or less	Max. 150mA	Max. 100mA	5-100mA		Max. 80mA	Max. 40mA	5-40mA	6-40mA	Max. 40mA	
Internal voltage drop (when load voltage is 10mA)	Max. 2V	Max. 0.8V		Max. 3V		Max. 0.8V		Max. 4V		Max. 0.8V	
Leak current	Max. 10μA			Max. 1mA		Max. 10μA		Max. 1mA		Max. 10μA	
Indicator lamp	ON: Red light emitting diode					Response position - Red light emitting diode Best response position - Green light emitting diode					

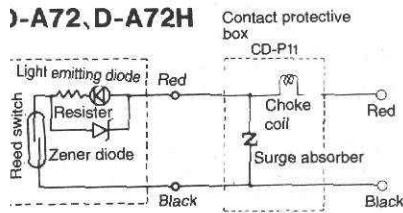
- Response time - 1.2ms
- Lead wire - Oil proof vinyl, $\phi 3.4$, 0.2mm², 2-wire (red, black), 3-wire (red, white, black), 0.5m*
- Impact resistance - 300m/s² {30.6G}, 1000m/s² {102G}
- Insulation resistance - 50M Ω or more under test voltage 500VDC (between case and cable)

- Withstand voltage - 1500VAC 1 min (between case and cable)
- Ambient temperature - 50-140°F (10-60°C)
- Protection structure - IEC529 spec.IP67, waterproof (JISC0920), oilproof
- Suffix L for the model with a 3m-long lead wire.
(Example) D-F79L

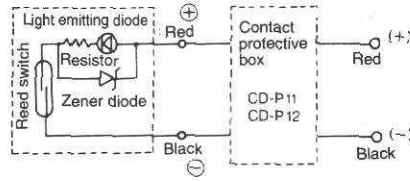
Auto-Switch / Internal Circuit

Reed Switches

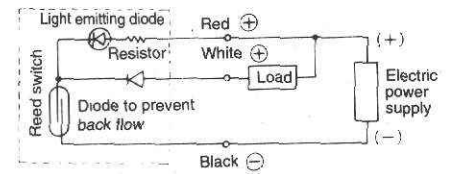
D-A72, D-A72H



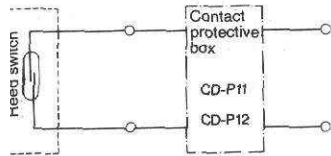
D-A73, D-A73H



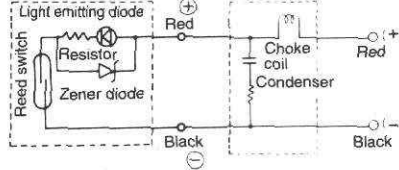
D-A76H



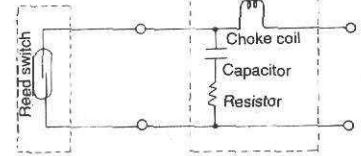
D-A80, D-A80H



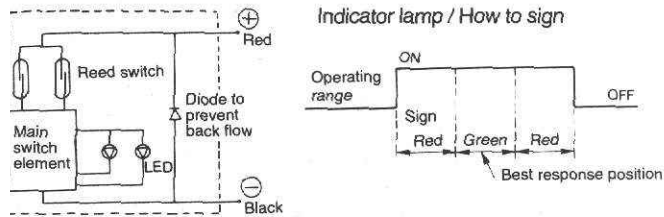
D-A73C



D-A80C

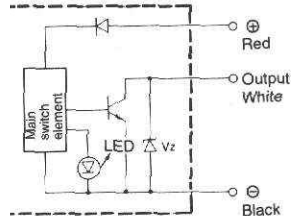


D-A79W / two colors

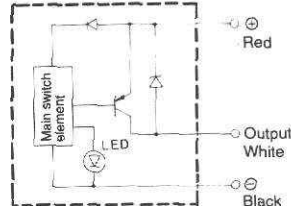


Solid State Switches

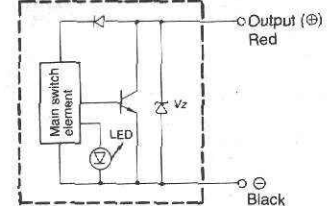
D-F79, D-F7NV



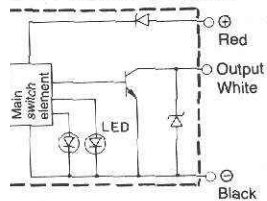
D-F7P, D-F7PV



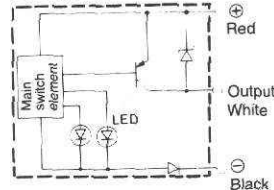
D-J79, D-J79C, D-F7BV



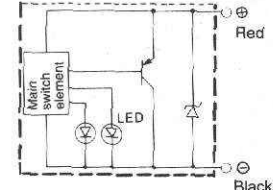
D-F79W, D-F7NWV



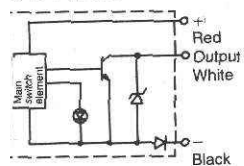
D-F7PW



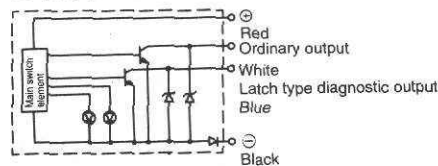
D-J79W, D-F7BWV



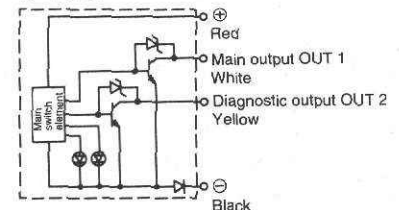
D-F7NTL



D-F7LF

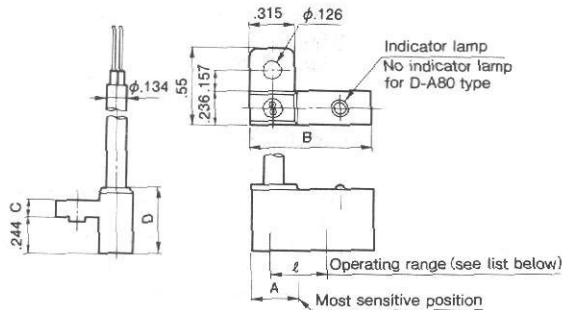


D-F79F

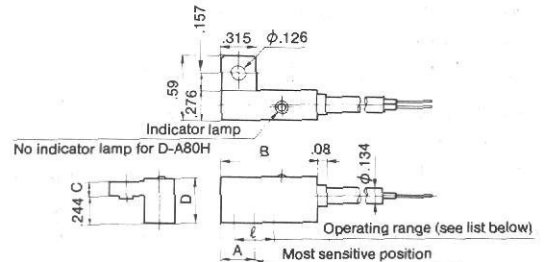


Auto-Switch / Operating Range

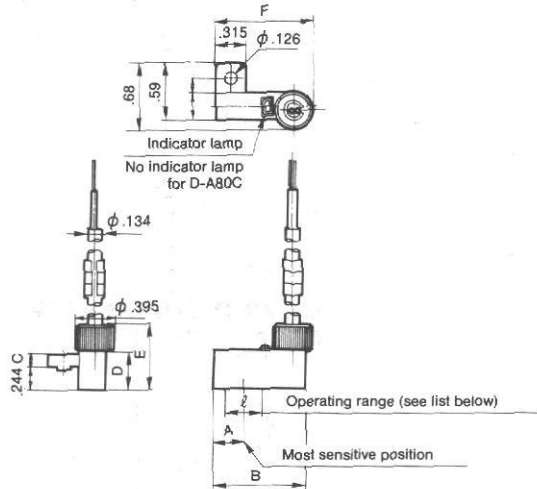
D-A72, D-A73, D-A80



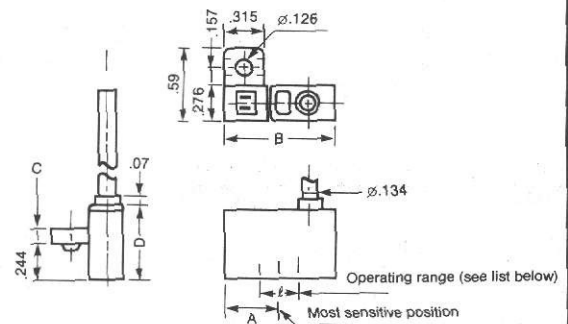
D-A72H, D-A73H, D-A76H, D-A80H, D-F7NTL, D-F7P, D-F79, D-F79W, D-J79, D-J79W



D-A73C, D-A80C, D-J79C



D-F7□ WV, D-F7□ V



Auto Switch Model	A	B	C	D	E	F
D-A72, D-A73, D-A80	0.335	0.866	0.118	0.460	—	—
D-A72H, D-A73H, D-A76H, D-A80H	0.335	0.866	0.130	0.402	—	—
D-F79, D-J79, D-F7P, D-F7NTL	0.335	0.945	0.118	0.374	—	—
D-F79W, D-J79W, D-F7PW	0.315	0.984	0.118	0.550	—	—
D-A73C, D-A80C	0.335	0.906	0.118	0.433	0.732	0.945
D-J79C	0.335	0.945	0.118	0.402	0.669	1.024
D-A79W, D-F7□ WV, D-F7□ V	0.453	0.925	0.118	0.550	—	—

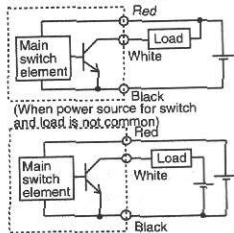
l Dimension / Operating Range

Auto Switch Model	Cylinder Bore							
	056	075	106	150	200	250	300	400
D-A72, D-A73, D-A80	0.453	0.472	0.492	0.472	0.472	0.512	0.590	0.492
D-A72H, D-A73H, D-A76H, D-A80H	0.453	0.472	0.492	0.472	0.472	0.512	0.590	0.492
D-F79, D-J79, D-F7P, D-F7NTL	0.417	0.402	0.343	0.417	0.354	0.492	0.535	0.409
D-F79W, D-J79W, D-F7PW	0.236	0.256	0.264	0.276	0.150	0.248	0.303	0.236
D-A73C, D-A80C	0.453	0.472	0.492	0.472	0.472	0.512	0.590	0.492
D-J79C	0.417	0.402	0.343	0.417	0.354	0.492	0.535	0.409
D-A79W, D-F7□ WV, D-F7□ V	0.660	0.700	0.626	0.657	0.638	0.705	0.756	0.606

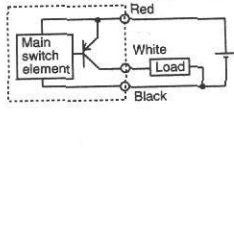
Solid State Switch/ Connection Method and Connection Example

Basic Wiring

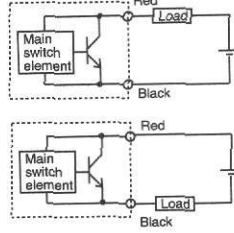
3 wire system NPN



3 wire system PNP

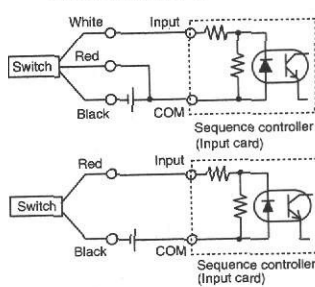


2 wire system

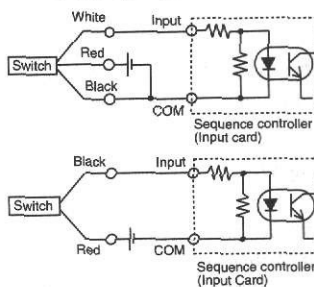


Typical sequence controller connection circuits

3 wire system NPN



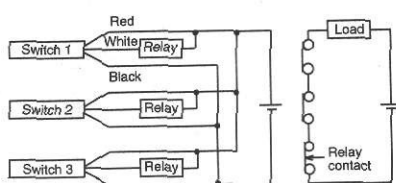
3 wire system PNP



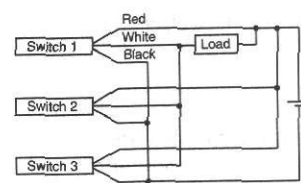
The connection method varies with the input specifications of the sequence controller. Therefore, connect according to the input specifications.

AND (Serial), OR (Parallel) connection example

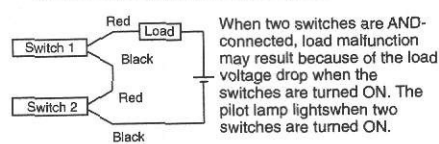
AND connection for 3-wire system NPN output



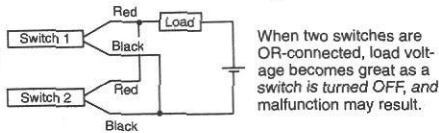
OR connection for 3-wire system NPN output



2 AND connections for 2-wire system



2 OR connections for 2-wire system



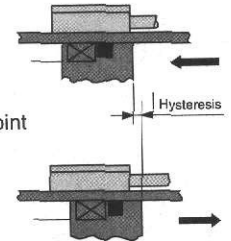
Example: Power voltage is 24VDC and residual switch voltage is 4V. Load voltage when switch is ON.
 $= \text{Power voltage} - \text{Residual voltage} \times 2$
 $= 24\text{V} - 4\text{V} \times 2$
 $= 16\text{V}$

Example: Load impedance is $3\text{k}\Omega$ and switch leakage current is 1mA . Load voltage when switch is OFF.
 $= \text{Leakage current} \times 2 \times \text{Load impedance}$
 $= 1\text{mA} \times 2 \times 3\text{k}\Omega$
 $= 6\text{V}$

Auto-Switch Hysteresis

Switch contact point (ON)

Switch resistor point (OFF)



The difference between the switch contact point (ON) and reed switch resistor point (OFF) is normally 2mm max. for reed switches and 1mm max. for solid state switches. Contact SMC if hysteresis is a problem.

Contact Protection Box

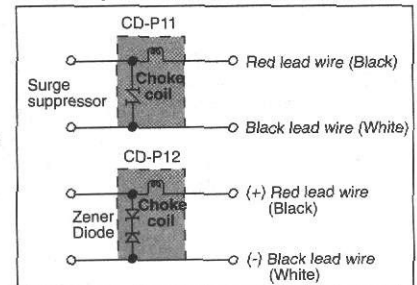
D-A7 and D-A8 switches have no built-in contact protection circuit. Use this box for inductive loads, 5 meters or more of lead wires, or 100, 200VAC applications.

Model	Voltage	Lead wire length
CD-P11	100, 200VAC	0.5m
CD-P12	24VDC	

*D-A8 switch is used for 100VAC or less. Since there is no voltage limitation, you can select a suitable model for your needs.



Contact protection box/Internal circuit



Auto-Switch Positioning

1. Locating Best Switch Position

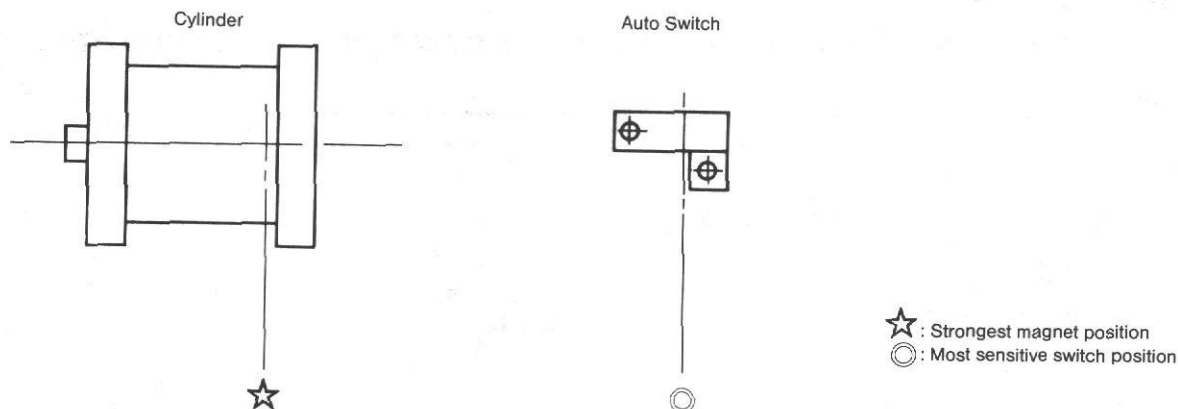


Figure 1

For best response and operation, place the switch in the position where the two lines match up.

For magnet position, see page 22.

For most sensitive switch position, see page 18.

1-1). Bore 056 ($\frac{9}{16}$ "), 075 ($\frac{3}{4}$ ") Auto switch installation
Since the auto switches can be mounted on only one side of the switch rail for these bore sizes (See figure 2-1), there is the possibility of the switch extending past the cover when it is in its most appropriate sensing position. To eliminate this we recommend using the following switches: D-A71, D-A72, D-A77, D-A79, D-A80.

There are three possible switch arrangements (see figures: 2-2, 2-3, 2-4) that can be utilized depending on cylinder stroke.

Figure 2-1

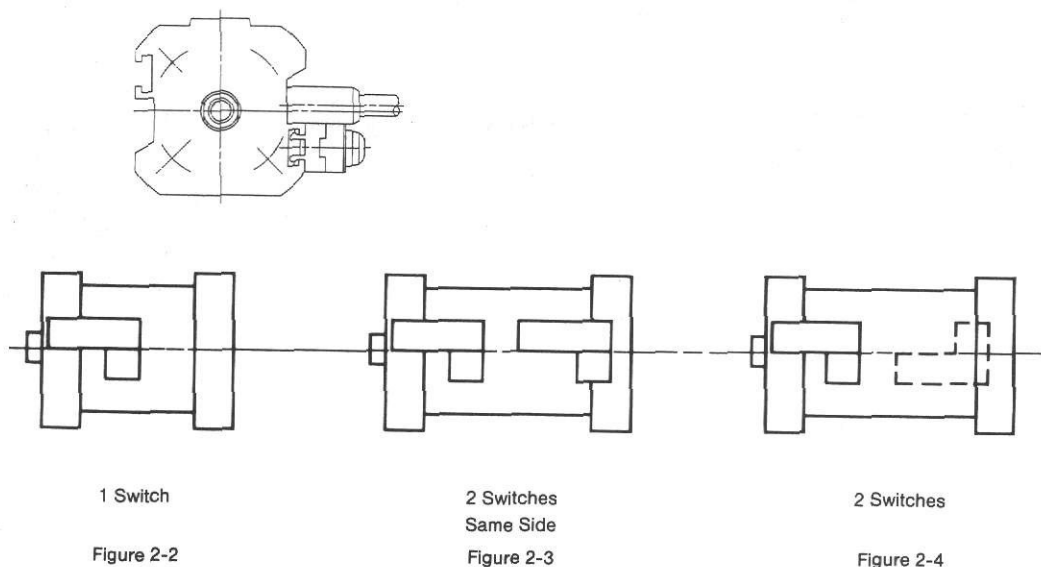


Figure 2-2

Figure 2-3

Figure 2-4

Minimum Auto-Switch Mountable Stroke

[Stroke]

Auto-Switch Model	1 Switch	2 Switches
D-F7 □ V	1/4	1/4
D-J79C		
D-A7		
D-A8	1/4	3/8
D-A73C		
D-A80C		
D-F7 □ WV	3/8	5/8
D-A7 □ H		
D-A80H	5/8	5/8
D-F7		
D-J79		
D-A79W	5/8	7/8
D-F7 □ W		
D-J79W	7/8	7/8
D-F79F		
D-F7LF	1 1/8	1 1/8

1-2). Bore 106 (1 1/16") ~ 400 (4") Auto switch installation. Since the rail is centered on these bore sized, the switches can be mounted on either side of the rail (see Figure 3), eliminating any chance that the switch may extend past the cover when it is in its most appropriate sensing position.

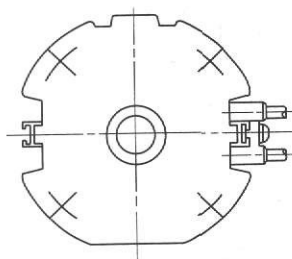
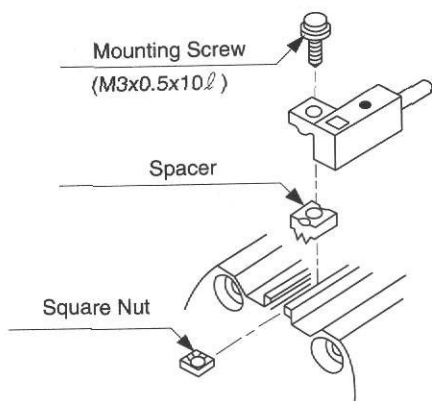


Figure 3

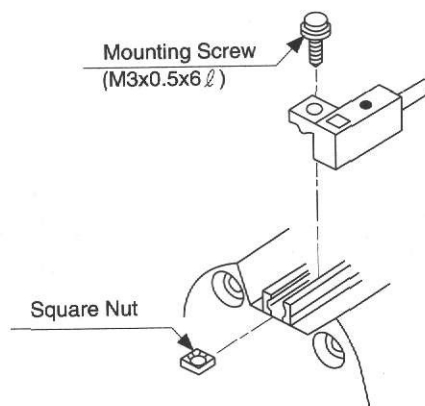
Attaching Auto-Switches

Please follow the order shown in the following chart.

Bore 056 (9/16") ~ 150 (1 1/2")

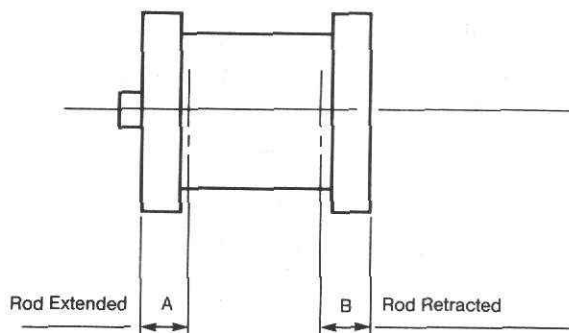


200 (2") ~ 400 (4")

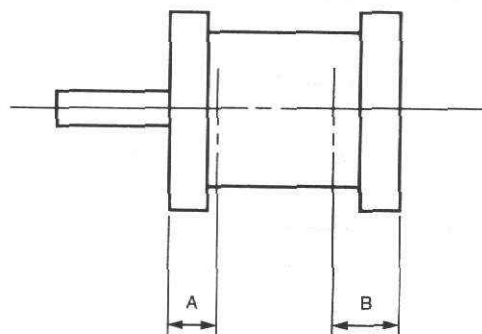


Series NCDQ7

Magnet Center



D, S, DC Type



T Type

Bore	D Type		S Type				DC Type		T Type			
	A	B	1/8" ~ 1" St.		1 1/4" ~ 2" St.		A	B	1/8" ~ 1" St.		1 1/4" ~ 2" St.	
			A	B	A	B			A	B	A	B
056 (9/16")	0.630	0.430	0.755	0.430	1.318	0.430	0.631	0.556	0.630	0.930	0.630	1.493
075 (3/4")	0.617	0.444	0.741	0.444	1.304	0.444	0.617	0.570	0.617	0.895	0.617	1.507
106 (1 1/16")	0.772	0.476	0.772	0.476	1.398	0.476	0.898	0.602	0.772	0.976	0.772	1.602
150 (1 1/2")	0.724	0.524	0.724	0.524	1.350	0.524	0.850	0.650	0.724	1.024	0.724	1.650
200 (2")	0.594	0.590	0.594	0.590	1.220	0.590	0.594	0.590	0.594	1.090	0.594	1.783
250 (2 1/2")	0.767	0.668	0.767	0.668	1.641	0.668	0.767	0.668	0.767	1.418	0.767	2.294
300 (3")	0.762	0.735	0.762	0.735	1.636	0.735	0.762	0.735	0.762	1.485	0.762	2.361
400 (4")	0.879	0.930	0.879	0.930	1.749	0.930	0.879	0.930	0.879	1.680	0.879	2.556

Weight Basic type (NCQ7○○-○D)

(lbs)

Bore	St.	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4
056		0.066	0.071	0.077	0.084	0.090	0.097	0.101	0.108	0.121	0.132	0.146	0.152	0.176	0.198	0.223	0.245
075		0.093	0.099	0.106	0.112	0.119	0.126	0.134	0.141	0.154	0.170	0.183	0.229	0.251	0.287	0.322	0.357
106		0.229	0.245	0.258	0.273	0.289	0.304	0.320	0.335	0.366	0.397	0.428	0.518	0.584	0.653	0.721	0.787
150		0.381	0.406	0.423	0.445	0.467	0.489	0.511	0.534	0.578	0.622	0.688	0.712	0.800	1.01	1.11	1.21
200		0.655	0.681	0.694	0.721	0.747	0.774	0.798	0.825	0.875	0.928	0.979	1.03	1.08	1.30	1.42	1.54
250		1.12	1.16	1.18	1.21	1.24	1.27	1.30	1.33	1.40	1.46	1.53	1.59	1.72	1.84	2.09	2.22
300		1.58	1.63	1.66	1.70	1.74	1.78	1.82	1.86	1.95	2.03	2.12	2.21	2.38	2.55	2.84	3.01
400		3.10	3.16	3.20	3.26	3.32	3.38	3.44	3.50	3.61	3.73	3.85	3.97	4.20	4.44	4.67	5.19

Series NCDQ7

Weight SW, D type

(lbs)

Bore	St.	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4
056		0.099	0.104	0.110	0.117	0.123	0.130	0.134	0.141	0.154	0.163	0.172	0.185	0.209	0.231	0.256	0.278
075		0.139	0.146	0.152	0.159	0.165	0.172	0.181	0.187	0.201	0.240	0.258	0.276	0.311	0.346	0.381	0.417
106		0.295	0.311	0.324	0.340	0.355	0.370	0.386	0.401	0.432	0.505	0.538	0.571	0.639	0.708	0.774	0.842
150		0.494	0.518	0.534	0.558	0.580	0.602	0.624	0.646	0.690	0.736	0.780	0.825	1.04	1.14	1.24	1.34
200		0.800	0.827	0.842	0.869	0.895	0.922	0.948	0.972	1.03	1.08	1.13	1.18	1.29	1.52	1.62	1.74
250		1.51	1.55	1.57	1.60	1.63	1.66	1.70	1.73	1.79	1.86	1.92	1.98	2.11	2.24	2.50	2.63
300		2.17	2.21	2.24	2.29	2.33	2.37	2.42	2.46	2.55	2.63	2.72	2.81	2.98	3.15	3.46	3.64
400		4.18	4.24	4.28	4.34	4.40	4.46	4.52	4.58	4.70	4.81	4.93	5.05	5.29	5.53	5.77	5.94

Weight

(lbs)

Auto Switch Model	Leadwire Length	
	1.5 ft.	10 ft.
D-A7, D-A7□H, D-A80, D-A80H, D-A76H	0.024	0.112
D-A73C, D-A80C, D-A79W	0.026	0.114
D-F79, D-J79	0.024	0.112
D-J79C	0.026	0.114

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