



Series **CHL** & **CHH**

Compact Hydraulic Cylinders

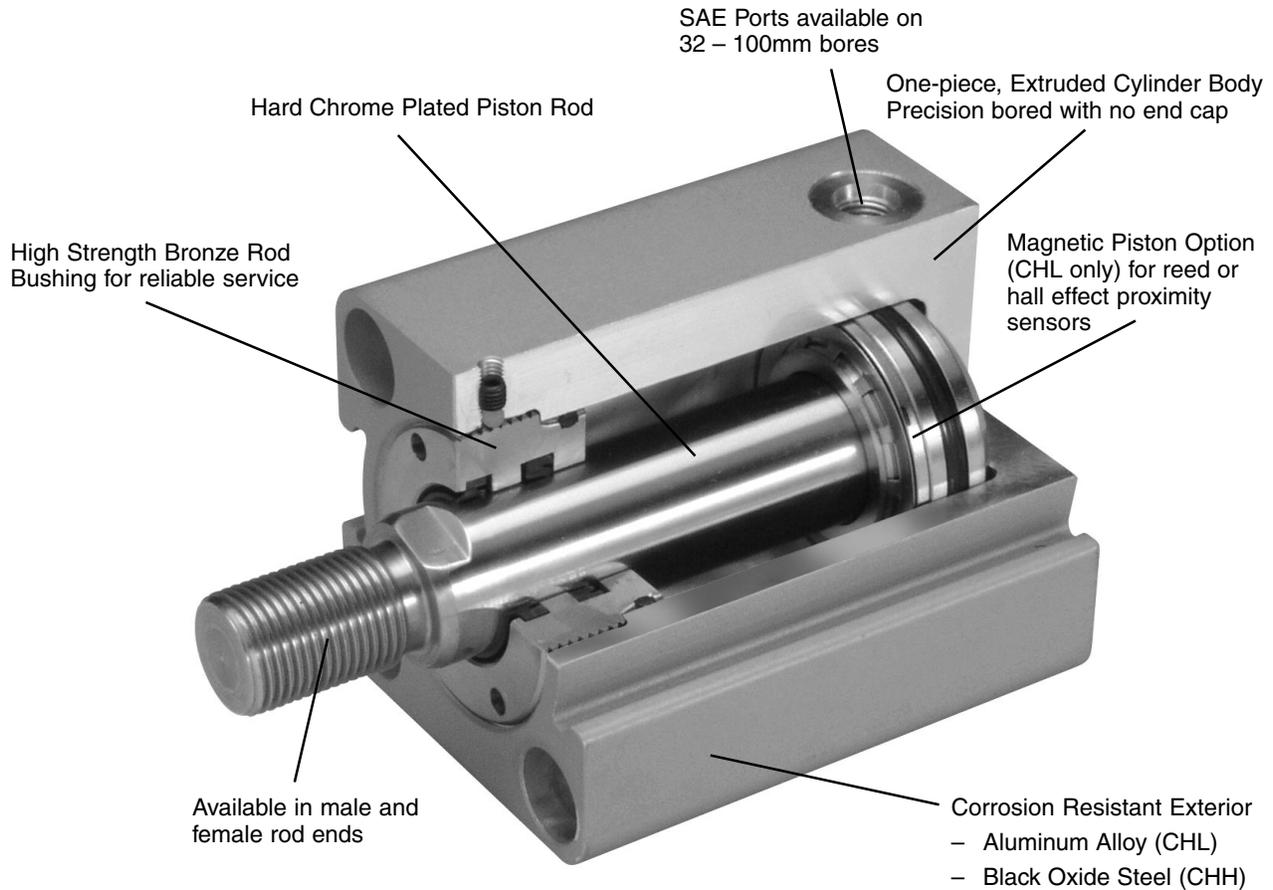
Catalog HY08-1136-2/NA
June, 2004

Series CHL
100 bar
20 to 100mm Bores
Proximity Sensor Available



Series CHH
160 bar
20 to 80mm Bores





Cut-away View



Double Rod Available

- Easy maintenance design
- Basic mount CHH & CHL are dimensionally interchangeable

⚠ Warning

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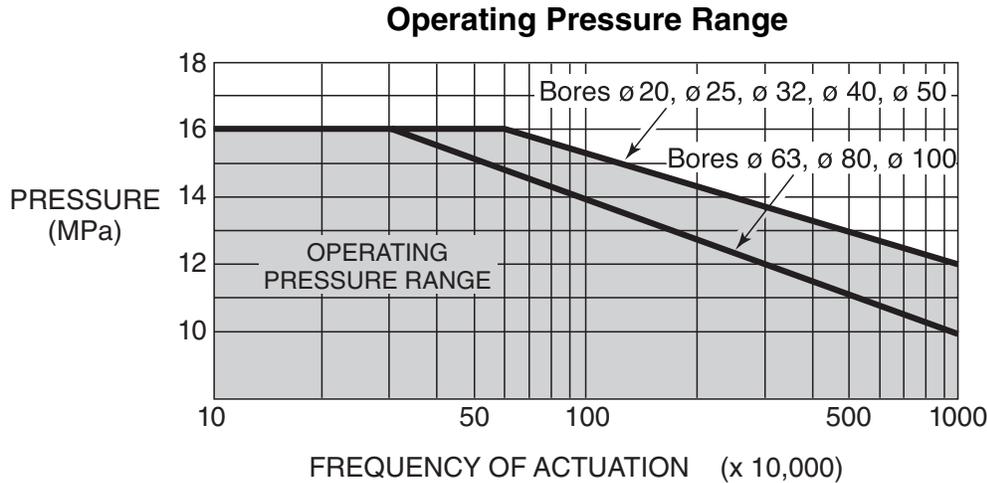
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Standard Specifications

	CHL	CHH
Nominal Operating Pressure	100 bar (1500 psi)*	160 bar (2300 psi)
Minimum Operating Pressure	3.4 bar (50 psi)	3.4 bar (50 psi)
Available Bores	20, 25, 32, 40, 50, 63, 80, 100 mm	20, 25, 32, 40, 50, 63, 80 mm
Magnetic Piston for Sensors	Standard	Not Available
Cylinder Body Material	Aluminum Alloy	Black Oxide Steel
Available Mounting Styles	4: Style T, CA, J, and H	5: Styles T, C, CA, J and H
Single and Double Rod Construction	Yes	Yes
Operating Temperature	-10 to +70°C (14 to 158°F)	-10 to +120°C (14 to 248°F)
Recommended Fluid	Petroleum based hydraulic oil**	Petroleum based hydraulic oil**
Stroke Tolerance	+8 mm (.01 in.)	+8 mm (.01 in.)

* Refer to the Operating Pressure Range graph for the CHL cylinder below. The life of the cylinder is impacted as the pressure increases above nominal. Please review your application, pressure ratings, and frequency of actuation.

**Special seals are offered for other fluid mediums or high temperature use. Please refer to the table below.



Cylinder Operating Temperatures with Various Fluids and Seal Materials

Fluid Medium	Seal Material	Temperature Range
Petroleum-based fluid	Fluorocarbon	0 to +100° C (14 to 212° F)
	Hydrogenated nitrile	-10 to 120° C (14°F to 248°F)
Water-glycol fluid	Hydrogenated nitrile	-10 to +100° C (14 to 212° F)
Phosphate ester fluid	Fluorocarbon	0 to +100° C (14 to 212° F)

Stock Cylinder Stroke List

Series	Type	Mounting Style	Bore	5	10	15	20	25	30	40	50	60	70	80	90	100	Bore
CHH	Single rod	T	20										NA				20
			25														25
			32														32
			40	S													40
		50										S				50	
		63														63	
		80														80	
		32	S ¹									NA				32	
	40														40		
	50	S ²													50		
	63														63		
	Double rod	T	20										NA				20
			25														25
			32														32
			40	S									NS				40
		50														50	
63															63		
80															80		
32		S ¹									NA				32		
40														40			
50	S ²													50			
63														63			

Series	Type	Mounting Style	Bore	5	10	15	20	25	30	40	50	60	70	80	90	100	Bore
CHL	Single rod	T	20										NA				20
			25														25
			32														32
			40	S													40
			50										S				50
			63														63
			80														80
	100														100		
	Double rod	T	20									NA				20	
			25													25	
			32													32	
			40	S								NS				40	
			50													50	
			63													63	
80															80		
100													100				

Stroke in mm S=Stocked, NS=Not Stocked – Lead times will be longer than standard
 NA=Not Available

! IMPORTANT:

20 and 25 mm bore cylinders are not available with SAE ports.
¹ 32 and 40 mm bore “C” Mount cylinders with SAE ports are not available.
² 50 and 63 mm bore “C” Mount cylinders with SAE ports are made-to-order.

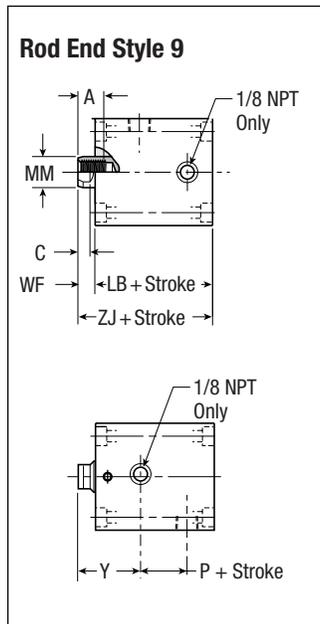
Non-standard strokes and strokes over 100mm are a special request. Consult factory for pricing and dimensional information. Lead times will be longer than standard.

Consult the table below for minimum stroke lengths when choosing a cylinder with switches.

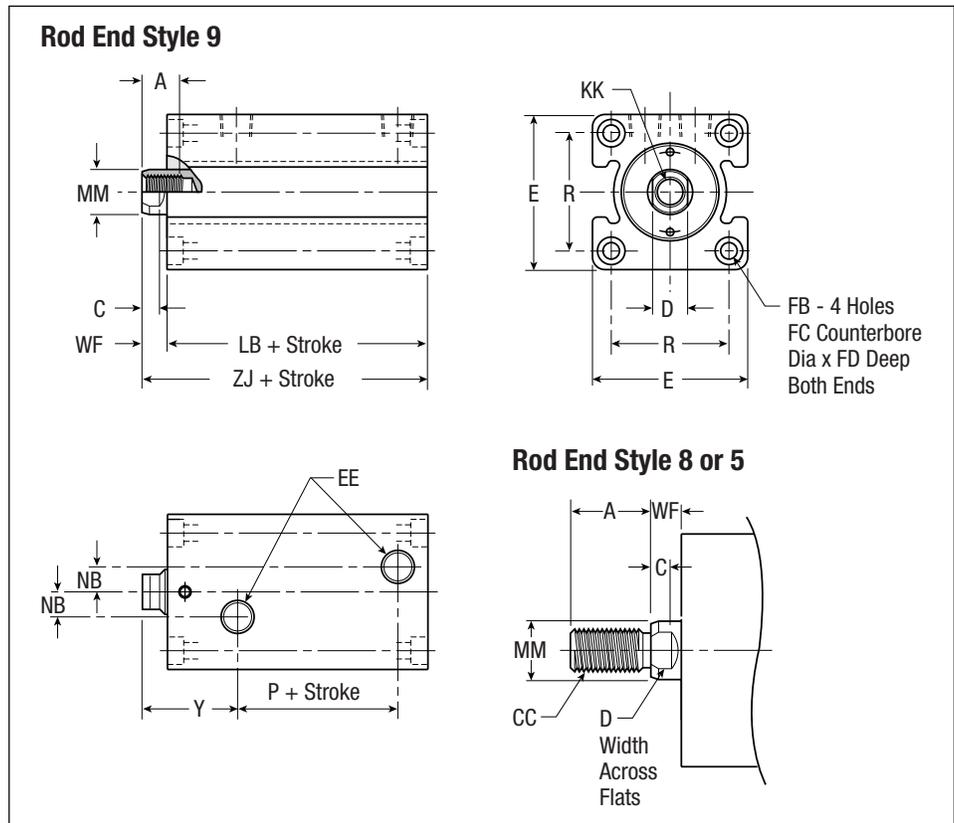
Minimum Cylinder Stroke with Switch

All Bores	Install 1 Switch	Install 2 Switches
	5mm	10mm

20 through 100mm Bore



20 and 25mm Bore
Series CHH Port Detail
5 and 10mm strokes only



32 through 100mm Bore – Series CHL with Switch Grooves

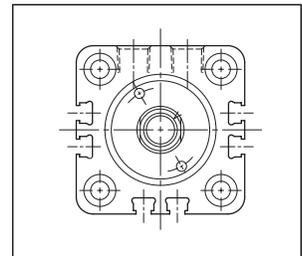
T Mount Single Rod End

Rod Dimensions									
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	WF
		Style 8 or 5 CC	Style 9 KK						
20	12	7/16-20	1/4-20	15	30	10	6	10	8
25	14	1/2-20	3/8-24	18	35	12	6	12	8
32	18	9/16-18	7/16-20	25	40	15	7	14	10
40	22	3/4-16	5/8-18	30	48	20	7	19	10
50	28	7/8-14	3/4-16	35	55	24	8	24	11
63	36	1 1/8-12	1-14	45	65	33	9	30	13
80	45	1 3/8-12	1 1/4-12	60	80	36	14	41	17
100	56	1 1/2-12	1 7/8-12	75	95	45	22	50	26

Notes: Style 5 is the recommended thread length of a Style 8 Rod End when used with a lock nut.

Dimensions other than threads are in millimeters.

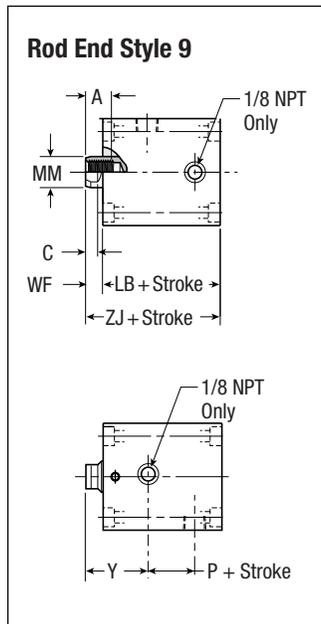
100mm bore is in CHL series only.



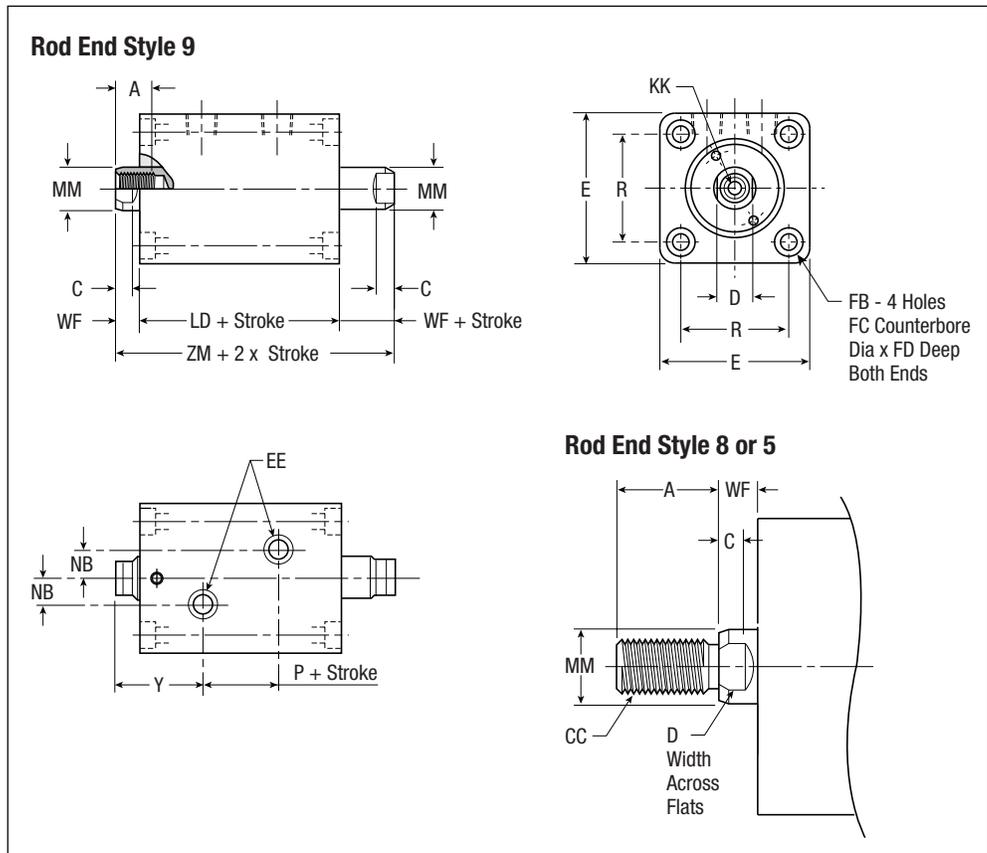
20 and 25mm Groove Detail
(CHH has no grooves.)

Envelope and Mounting Dimensions																
Bore	Y	EE		NB (CHH)		NB (CHL)		E	R	FB	FC	FD	Add Stroke			
		NPT	SAE	NPT	SAE	NPT	SAE						P (NPT)	P (SAE)	LB	ZJ
20	28.5	1/8	-	-	-	3	-	44	30	5.5	9.5	5.4	10.5	-	43	51
25	28.5	1/8	-	-	-	6	-	50	36	5.5	9.5	5.4	12.5	-	45	53
32	38	1/4	4	10	12	10	12	62	47	6.6	11	6.5	14	12	54	64
40	37	1/4	4	10	12	10	12	70	52	9	14	8.6	16	13.5	55	65
50	39	1/4	4	10	13	10	13	80	58	11	17.5	10.8	19	16	60	71
63	43	1/4	4	10	14	10	14	94	69	14	20	13	24	23	67	80
80	52	3/8	6	15	20	15	20	114	86	16	23	15.2	25	25	78	95
100	68	3/8	6	-	-	15	15	138	106	18	26	17.5	26	26	96	122

20 through 100mm Bore



**20 and 25mm Bore
Series CHH Port Detail
5 and 10mm strokes only**



Depiction of Series CHH cylinder. Series CHL cylinders will have switch grooves.

T Mount Double Rod End

Rod Dimensions									
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	WF
		Style 8 CC	Style 9 KK						
20	12	7/16-20	1/4-20	15	30	10	6	10	8
25	14	1/2-20	3/8-24	18	35	12	6	12	8
32	18	9/16-18	7/16-20	25	40	15	7	14	10
40	22	3/4-16	5/8-18	30	48	20	7	19	10
50	28	7/8-14	3/4-16	35	55	24	8	24	11
63	36	1 1/8-12	1-14	45	65	33	9	30	13
80	45	1 3/8-12	1 1/4-12	60	80	36	14	41	17
100	56	1 1/2-12	1 7/8-12	75	95	45	22	50	26

Notes: Style 5 is the recommended thread length of a Style 8 Rod End when used with a lock nut.

Dimensions other than threads are in millimeters.

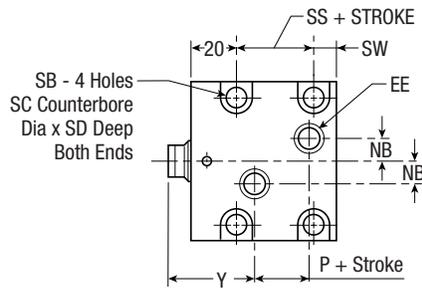
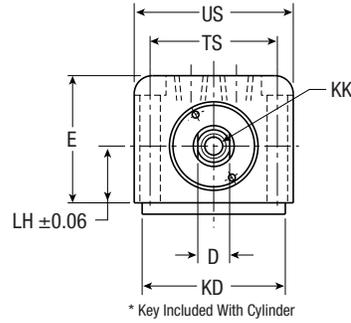
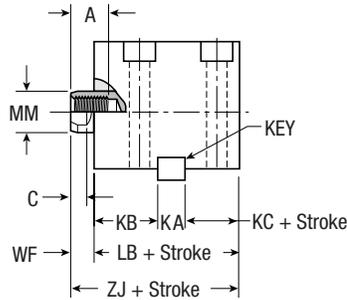
100mm bore is in CHL series only.

Envelope and Mounting Dimensions																
Bore	Y	EE		NB (CHH)		NB (CHL)		E	R	FB	FC	FD	Add Stroke			
		NPT	SAE	NPT	SAE	NPT	SAE						P (NPT)	P (SAE)	LD	ZM
20	28.5	1/8	-	-	-	3	-	44	30	5.5	9.5	5.4	13	-	54	70
25	28.5	1/8	-	-	-	6	-	50	36	5.5	9.5	5.4	15	-	56	72
32	38	1/4	4	10	12	10	12	62	47	6.6	11	6.5	16	16	72	92
40	37	1/4	4	10	12	10	12	70	52	9	14	8.6	18	18	72	92
50	39	1/4	4	10	13	10	13	80	58	11	17.5	10.8	19	19	75	97
63	43	1/4	4	10	14	10	14	94	69	14	20	13	22	22	82	108
80	52	3/8	6	15	20	15	20	114	86	16	23	15.2	25	25	95	129
100	68	3/8	6	-	-	15	15	138	106	18	26	17.5	24	24	108	160

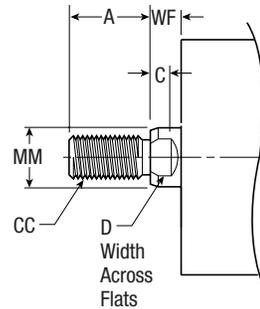


32 through 63mm Bore

Rod End Style 9



Rod End Style 8 or 5



C Mount Single Rod End													
Rod Dimensions													
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	WF	Ports			
		Style 8 or 5 CC	Style 9 KK							EE		NB	
										NPT	SAE	NPT	SAE
32	18	9/16 - 18	7/16 - 20	25	40	15	7	14	10	1/4	—	10	—
40	22	3/4 - 16	5/8 - 18	30	48	20	7	19	10	1/4	—	10	—
50	28	7/8 - 14	3/4 - 16	35	55	24	8	24	11	1/4	4	10	13
63	36	1-1/8 - 12	1 - 14	45	65	33	9	30	13	1/4	4	10	14

NOTE: Style 5 is the recommended thread when a lock nut is used. Dimensions, other than threads, are in millimeters.

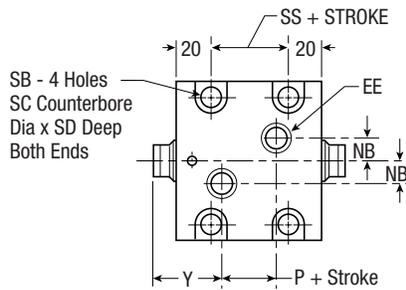
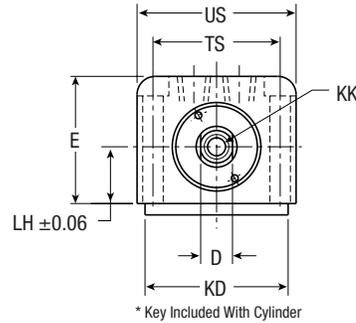
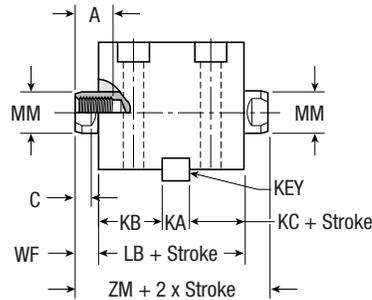
Envelope and Mounting Dimensions												Add Stroke			
Bore	E	LH	KA	KB	KC	KD	SS	SW	TS	US	Y	P (NPT)	P (SAE)	LB	ZJ
32	56	25	12	28	14	63	24	10	56	70	38	14	—	54	64
40	64	29	12	28	15	70	23	12	62	80	37	16	—	55	65
50	74	34	14	29	17	80	27	13	74	94	39	19	16	60	71
63	89	42	16	31	20	100	32	15	90	114	43	24	23	67	80

NOTE: The LH dimension has a tolerance of ± .06mm

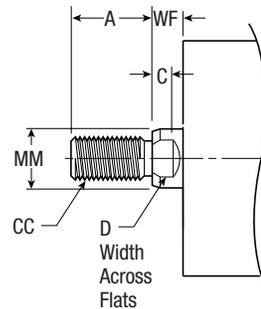
Mounting Hole Dimensions			
Bore	SB	SC	SD
32	9	14	8
40	11	17.5	10.8
50	14	20	13
63	16	23	15.2

32 through 63mm Bore

Rod End Style 9



Rod End Style 8 or 5



C Mount Double Rod End													
Rod Dimensions													
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	WF	Ports			
		Style 8 or 5 CC	Style 9 KK							EE		NB	
										NPT	SAE	NPT	SAE
32	18	9/16 - 18	7/16 - 20	25	40	15	7	14	10	1/4	—	10	—
40	22	3/4 - 16	5/8 - 18	30	48	20	7	19	10	1/4	—	10	—
50	28	7/8 - 14	3/4 - 16	35	55	24	8	24	11	1/4	4	10	13
63	36	1-1/8 - 12	1 - 14	45	65	33	9	30	13	1/4	4	10	14

NOTE: Style 5 is the recommended thread when a lock nut is used. Dimensions, other than threads, are in millimeters.

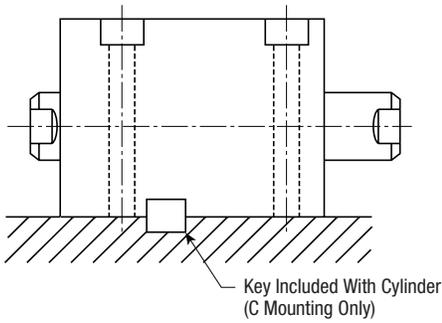
Envelope and Mounting Dimensions														
Bore	E	Y	LH	KA	KB	KC	KD	SS	TS	US	Add Stroke			
											P (NPT)	P (SAE)	LB	ZM
32	56	38	25	12	28	32	63	32	56	70	16	—	72	92
40	64	37	29	12	28	32	70	32	62	80	18	—	72	92
50	74	39	34	14	29	32	80	35	74	94	19	19	75	97
63	89	43	42	16	31	35	100	42	90	114	22	22	82	108

NOTE: The LH dimension has a tolerance of ± .06mm

Mounting Hole Dimensions			
Bore	SB	SC	SD
32	9	14	8
40	11	17.5	10.8
50	14	20	13
63	16	23	15.2



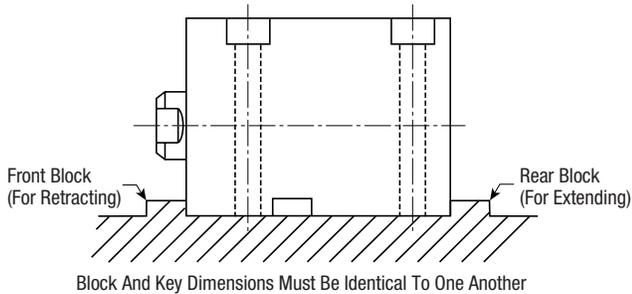
Installation With a Key



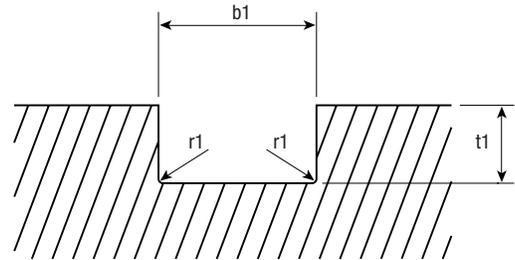
Bore	Key Nominal Dimension	Key Groove Dimension		
	b x h x l	b1	t1	r1
φ32	12 x 8 x 63	12 ⁻⁰ _{0.043}	5.0 ^{+0.2} ₀	0.25 ~0.40
φ40	12 x 8 x 70	12 ⁻⁰ _{0.043}	5.0 ^{+0.2} ₀	
φ50	14 x 9 x 80	14 ⁻⁰ _{0.043}	5.5 ^{+0.2} ₀	
φ63	16 x 10 x 100	16 ⁻⁰ _{0.043}	6.0 ^{+0.2} ₀	

When installing a foot Mount (C Mount) cylinder, refer to the dimensional table for the correct key and machined groove dimensions.

Installation Without a Key

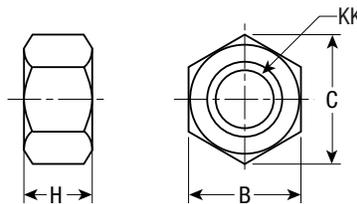


Recommended Key Groove Dimension



When installing a cylinder without a key, be sure to place blocks at each end. Bolts alone may not support the cylinder's force, which could result in damage to the bolts.

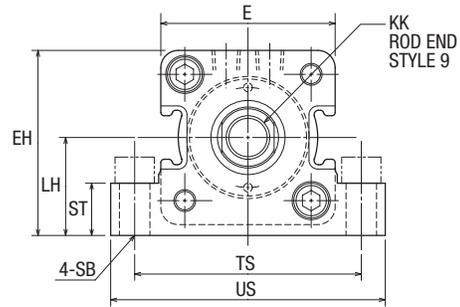
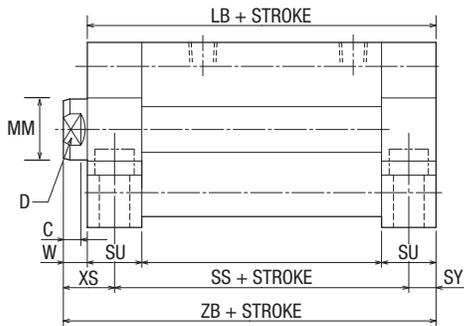
Lock Nuts



Lock Nut Parts Number	B	C	H	KK
LN-20	11/16	0.794	3/8	7/16 – 20 UNF
LN-25	3/4	0.866	7/16	1/2 – 20 UNF
LN-01	7/8	1.010	31/64	9/16 – 18 UNF
LN-02	1-1/8	1.299	41/64	3/4 – 16 UNF
LN-03	1-5/16	1.516	3/4	7/8 – 14 UNF
LN-04	1-11/16	1.949	31/32	1-1/8 – 12 UNF
LN-05	2-1/16	2.382	1-11/64	1-3/8 – 12 UNF
LN-06	2-15/16	3.392	1-27/32	1-7/8 – 12 UNF

Dimensions are in inches.

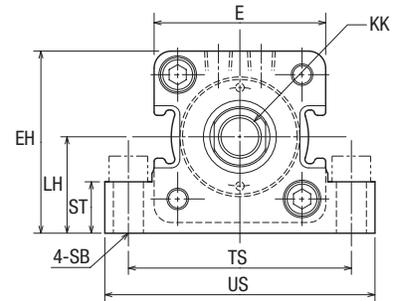
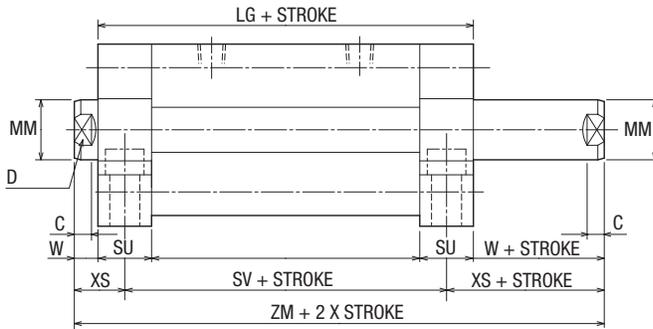
CA Mount Single Rod End



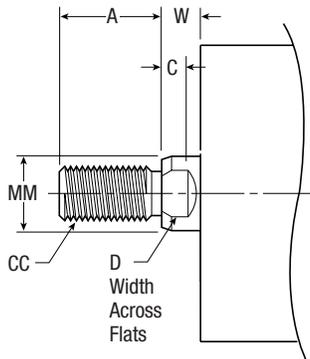
CA Mount Single Rod End & Double Rod End

Envelope and Mounting Dimensions											Single Rod End			Double Rod End		
Bore	E	EH	LH	SB	ST	SU	SY	TS	US	XS	Add Stroke			Add Stroke		Add
											SS	LB	ZB	SV	LG	ZM
20	44	46	24±0.15	6.6	12	15	7.5	58	70	15.5	58	73	81	69	84	100
25	50	52	27±0.15	6.6	12	15	7.5	64	76	15.5	60	75	83	71	86	102
32	62	66	35±0.15	9	16	20	10	79	94	20	74	94	104	92	112	132
40	70	72.5	37.5±0.15	11	20	20	10	90	108	20	75	95	105	92	112	132
50	80	85	45±0.15	14	24	25	12.5	104	126	23.5	85	110	121	100	125	147
63	94	97	50±0.15	16	30	25	12.5	121	146	23.5	92	117	130	107	132	158
80	114	117	60±0.25	18	35	30	15	144	172	32	108	138	155	125	155	189
100	138	140	71±0.25	22	43	35	17.5	174	208	43.5	131	166	192	143	178	230

CA Mount Double Rod End



Rod End Style 8 or 5



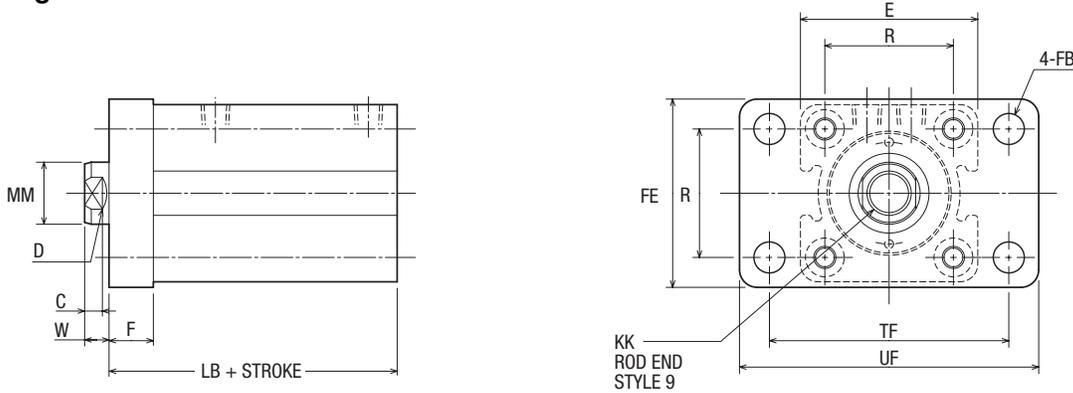
Rod Dimensions									
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	W
		Style 8 or 5 CC	Style 9 KK						
20	12	7/16-20	1/4-20	15	30	10	6	10	8
25	14	1/2-20	3/8-24	18	35	12	6	12	8
32	18	9/16-18	7/16-20	25	40	15	7	14	10
40	22	3/4-16	5/8-18	30	48	20	7	19	10
50	28	7/8-14	3/4-16	35	55	24	8	24	11
63	36	1 1/8-12	1-14	45	65	33	9	30	13
80	45	1 3/8-12	1 1/4-12	60	80	36	14	41	17
100	56	1 1/2-12	1 7/8-12	75	95	45	22	50	26

Notes: Style 5 is the recommended thread length of a Style 8 Rod End when used with a lock nut.

Dimensions other than threads are in millimeters.

100mm bore is in CHL series only.

J Mount Single Rod End

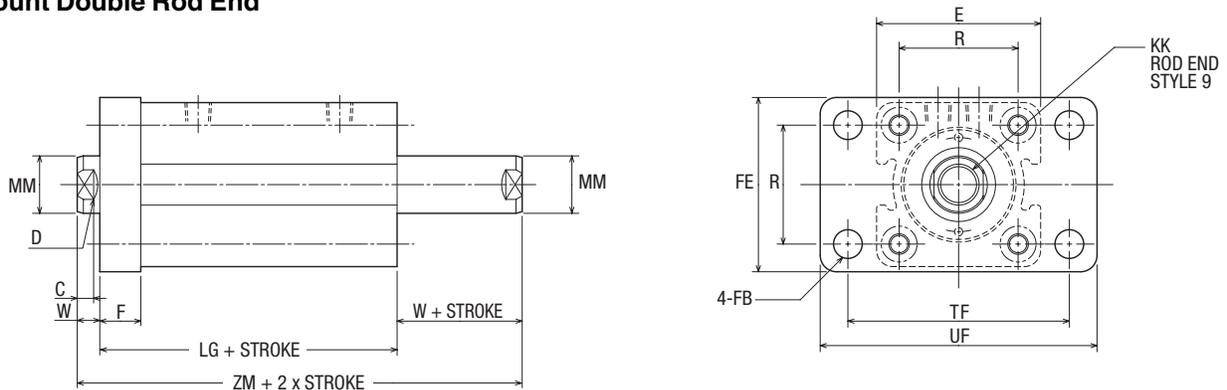


J Mount Single Rod End

Envelope and Mounting Dimensions									
Bore	W	E	F	FB	FE	R	TF	UF	ADD STROKE
									LB
20	8	44	10	5.5	46	30	60	75	53
25	8	50	10	5.5	52	36	66	80	55
32	10	62	15	6.6	62	40	80	95	69
40	10	70	20	11	70	46	96	118	75
50	11	80	20	14	85	58	108	135	80
63	13	94	20	16	98	65	124	150	87
80	17	114	25	18	118	87	154	185	103
100	26	138	30	22	150	109	190	230	126

See opposite page for rod dimensions.

J Mount Double Rod End

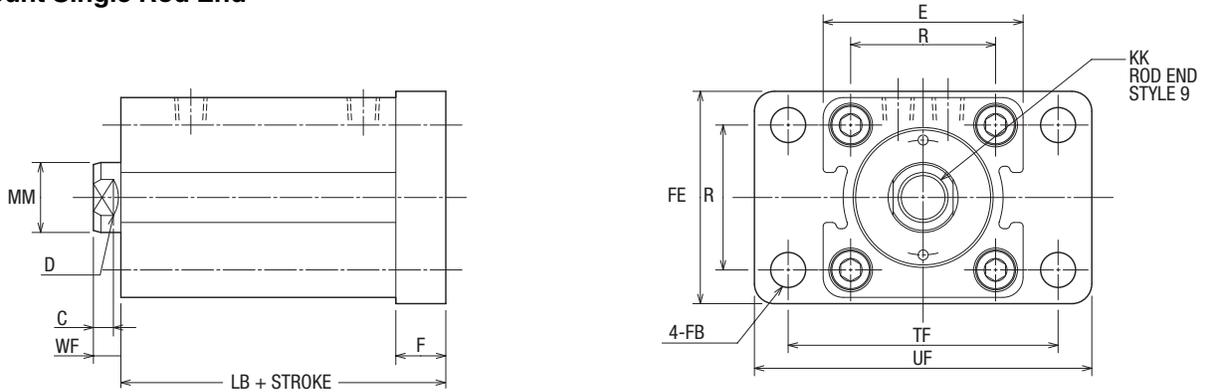


J Mount Double Rod End

Envelope and Mounting Dimensions										
Bore	W	E	F	FB	FE	R	TF	UF	ADD STROKE	ADD 2X STROKE
									LG	ZM
20	8	44	10	5.5	46	30	60	75	64	80
25	8	50	10	5.5	52	36	66	80	66	82
32	10	62	15	6.6	62	40	80	95	87	107
40	10	70	20	11	70	46	96	118	92	112
50	11	80	20	14	85	58	108	135	95	117
63	13	94	20	16	98	65	124	150	102	128
80	17	114	25	18	118	87	154	185	120	154
100	26	138	30	22	150	109	190	230	138	190

See opposite page for rod dimensions.

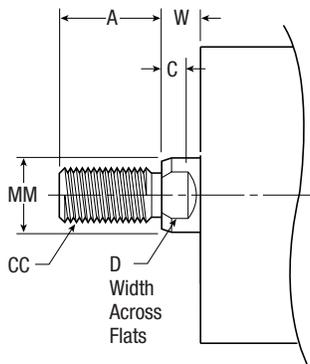
H Mount Single Rod End



H Mount Single Rod End

Envelope and Mounting Dimensions									
Bore	WF	E	F	FB	FE	R	TF	UF	ADD STROKE
									LB
20	8	44	10	5.5	46	30	60	75	53
25	8	50	10	5.5	52	36	66	80	55
32	10	62	15	6.6	62	40	80	95	69
40	10	70	20	11	70	46	96	118	75
50	11	80	20	14	85	58	108	135	80
63	13	94	20	16	98	65	124	150	87
80	17	114	25	18	118	87	154	185	103
100	26	138	30	22	150	109	190	230	126

Rod End Style 8 or 5



Rod Dimensions									
Bore	Rod Dia. MM	Thread		Style 8 A	Style 5 A	Style 9 A	C	D	W
		Style 8 or 5 CC	Style 9 KK						
20	12	7/16-20	1/4-20	15	30	10	6	10	8
25	14	1/2-20	3/8-24	18	35	12	6	12	8
32	18	9/16-18	7/16-20	25	40	15	7	14	10
40	22	3/4-16	5/8-18	30	48	20	7	19	10
50	28	7/8-14	3/4-16	35	55	24	8	24	11
63	36	1 1/8-12	1-14	45	65	33	9	30	13
80	45	1 3/8-12	1 1/4-12	60	80	36	14	41	17
100	56	1 1/2-12	1 7/8-12	75	95	45	22	50	26

Notes: Style 5 is the recommended thread length of a Style 8 Rod End when used with a lock nut.

Dimensions other than threads are in millimeters.

100mm bore is in CHL series only.

Standard Cylinder Weight Table

Unit: kg

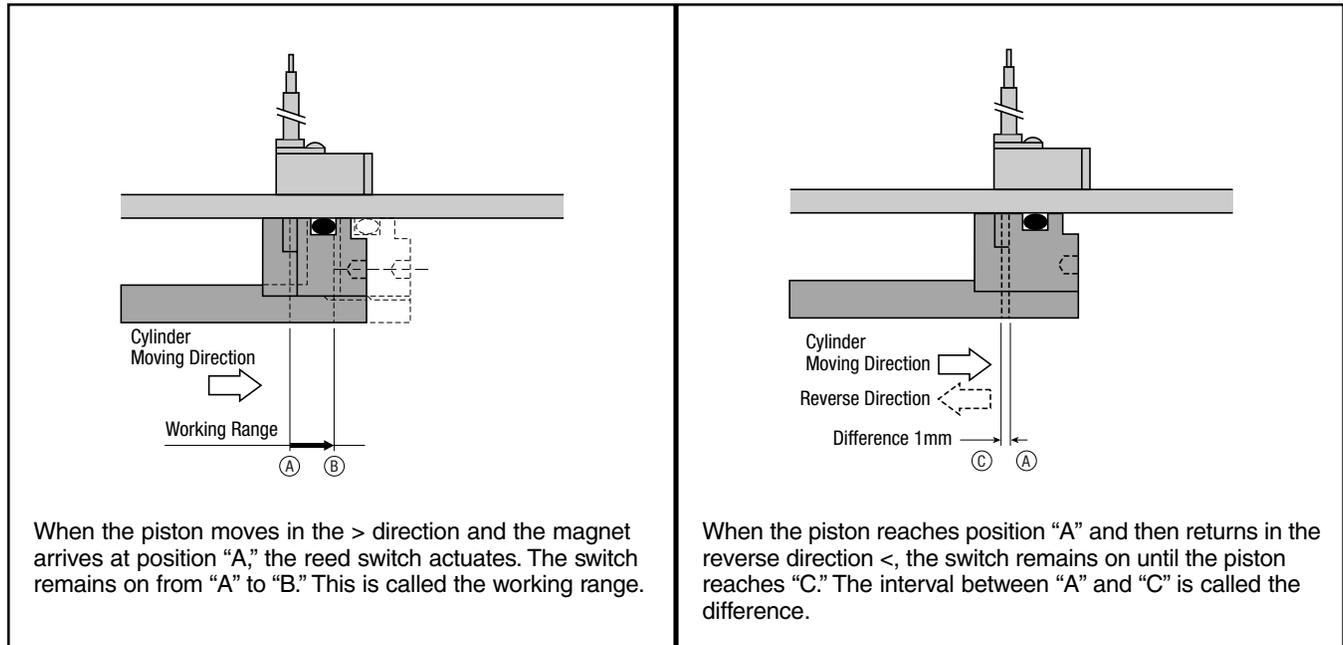
Series	Type	Mounting Style	Bore	5	10	15	20	25	30	40	50	CA Mounting	J and H Mounting	
CHH	Single rod	T	20	0.59	0.65	0.72	0.78	0.85	0.91	1.04	1.17	0.46	0.25	
			25	0.81	0.89	0.97	1.05	1.13	1.21	1.37	1.53	0.58	0.3	
			32	1.51	1.63	1.76	1.88	2.01	2.13	2.38	2.63	1.09	0.62	
			40	1.87	2.02	2.17	2.32	2.47	2.62	2.92	3.22	1.42	1.16	
			50	2.62	2.80	2.99	3.17	3.36	3.54	3.91	4.28	2.43	1.6	
			63	3.97	4.20	4.44	4.67	4.91	5.14	5.61	6.08	3.3	2.02	
			80	6.89	7.22	7.56	7.89	8.23	8.56	9.23	9.90	5.86	3.77	
		C	32	1.49	1.62	1.76	1.89	2.03	2.16	2.43	2.70			
			40	1.92	2.09	2.26	2.43	2.60	2.77	3.11	3.45			
			50	2.78	3.00	3.22	3.44	3.60	3.88	4.32	4.76			
	Double rod	T	20	0.74	0.81	0.88	0.95	1.02	1.09	1.23	1.37	0.46	0.25	
			25	1.01	1.09	1.18	1.26	1.35	1.43	1.60	1.77	0.58	0.3	
			32	1.71	1.95	1.95	2.07	2.19	2.31	2.55	2.79	1.09	0.62	
			40	2.20	2.36	2.52	2.68	2.84	3.00	3.32	3.64	1.42	1.16	
			50	2.87	3.05	3.23	3.41	3.59	3.77	4.13	4.49	2.43	1.6	
			63	4.23	4.43	4.64	4.84	5.05	5.25	5.66	6.07	3.3	2.02	
			80	7.99	8.40	8.82	9.23	9.65	10.06	10.89	11.72	5.86	3.77	
		C	32	1.95	2.09	2.23	2.37	2.51	2.65	2.93	3.21			
			40	2.56	2.74	2.92	3.10	3.28	3.46	3.82	4.18			
			50	3.48	3.72	3.96	4.20	4.44	4.68	5.16	5.64			
			63	5.33	5.67	6.01	6.35	6.69	7.03	7.71	8.39			

Series	Type	Mounting Style	Bore	5	10	15	20	25	30	40	50	CA Mounting	J and H Mounting	
CHL	Single rod	T	20	0.30	0.29	0.31	0.33	0.36	0.38	0.42	0.46	0.46	0.25	
			25	0.42	0.41	0.44	0.46	0.49	0.52	0.57	0.63	0.58	0.30	
			32	0.70	0.75	0.80	0.84	0.89	0.93	1.02	1.11	1.09	0.62	
			40	0.93	0.99	1.05	1.11	1.16	1.22	1.33	1.45	1.42	1.16	
			50	1.14	1.49	1.57	1.64	1.72	1.79	1.94	2.09	2.43	1.60	
			63	2.20	2.30	2.40	2.51	2.61	2.72	2.93	3.14	3.30	2.02	
			80	3.98	4.13	4.28	4.44	4.60	4.75	5.07	5.38	5.86	3.77	
			100	7.38	7.61	7.84	8.07	8.30	8.53	8.98	9.44	9.99	7.23	
	Double rod	T	20	0.40	0.41	0.44	0.46	0.48	0.51				0.46	0.25
			25	0.58	0.56	0.60	0.63	0.66	0.69				0.58	0.30
			32	1.09	1.14	1.19	1.25	1.30	1.36	1.47	1.58	1.09	0.62	
			40	1.39	1.46	1.53	1.60	1.67	1.74	1.88	2.02	1.42	1.16	
			50	2.02	2.12	2.22	2.32	2.42	2.52	2.71	2.91	2.43	1.60	
			63	3.05	3.20	3.34	3.49	3.63	3.78	4.07	4.35	3.30	2.02	
			80	5.60	5.82	6.03	6.25	6.47	6.69	7.12	7.55	5.86	3.77	
			100	10.27	10.59	10.92	11.24	11.57	11.89	12.54	13.19	9.99	7.23	

Switch Weight: AX115 and AX215 = 0.16 kg
 T0H3 and T2H3 = 0.05 kg

Working Description

The reed switch and indicating lamp is mounted on the cylinder body. When the magnet-equipped piston passes, the reed switch actuates and the cylinder stroke position is detected.

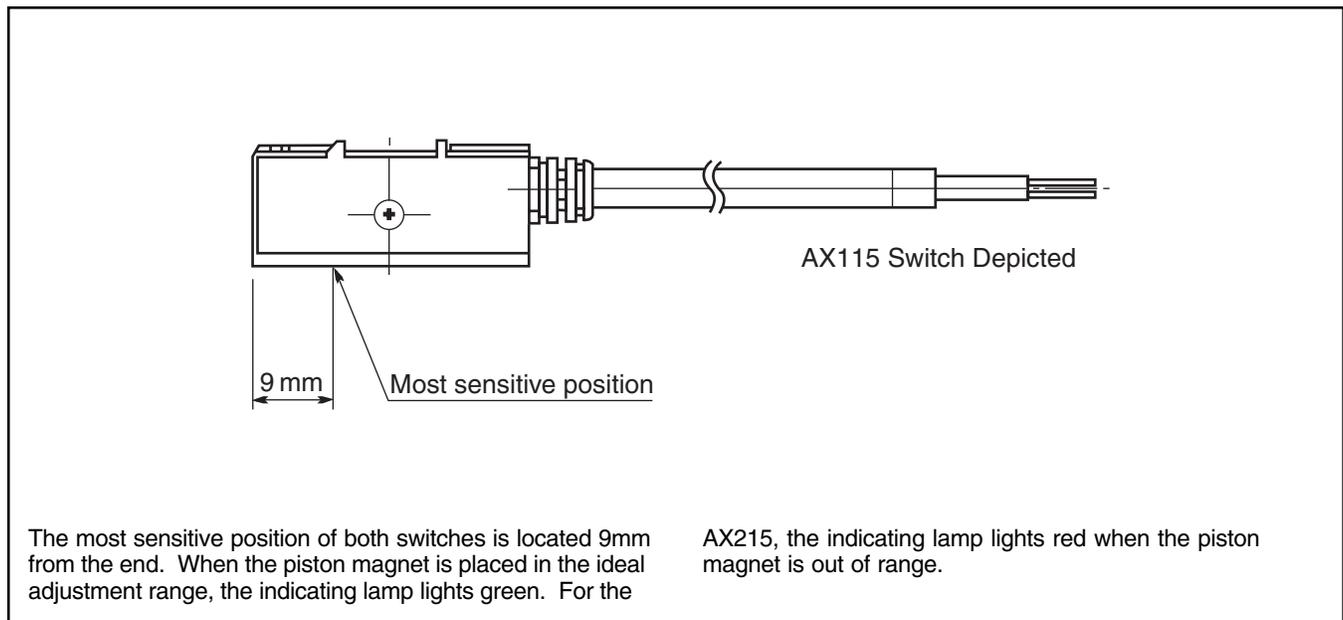


Working Range and Difference

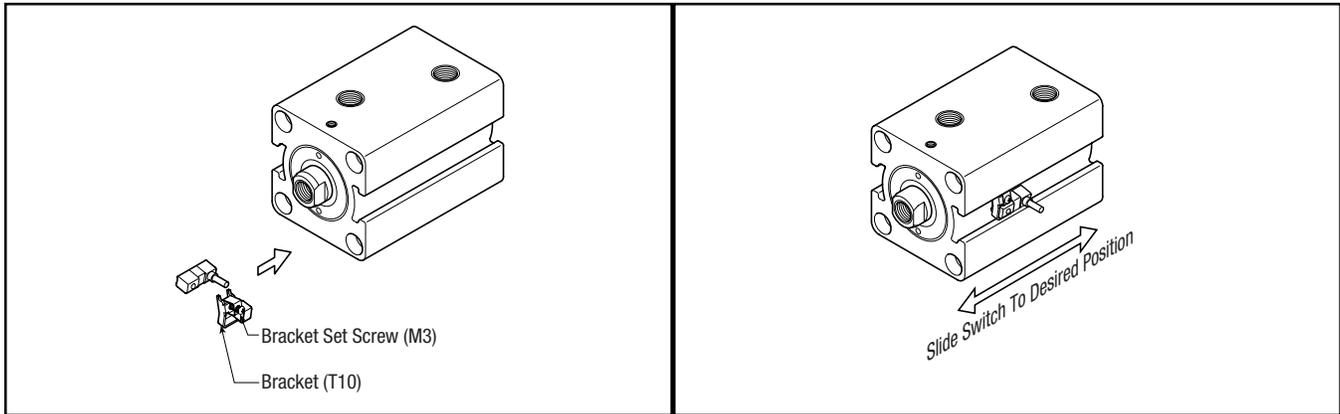
Units: mm

Bore (mm)	T0H3		T2H3		AX115		AX215	
	Working Range	Difference	Working Range	Difference	Working Range	Difference	Working Range	Difference
20	3 - 10 mm	1 - 2 mm	3 - 8 mm	1mm and less	-	-	-	-
25								
32	-	-	-	-	10 - 17 mm	1 - 2 mm	4 - 8 mm	1mm and less
40								
50								
63								
80								
100					6 - 14 mm	6 - 9 mm		

Switch Most Sensitive Position



How to Adjust Switch Positions

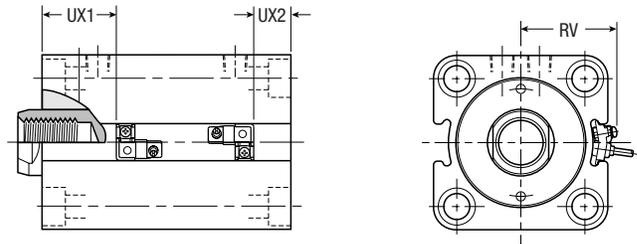


1. Loosen the bracket set screw and place the bracket in the center of the switch.
2. With the switch and bracket assembled, insert it into the switch installation area of the cylinder body.
3. Slide the switch to the desired position. The center is the most stable position.
4. When the cylinder stroke end is selected, install the switch at dimension UX (best position setting).
5. After sliding the switch to the desired position, tighten the bracket set screw to approximately 0.4 N•m.

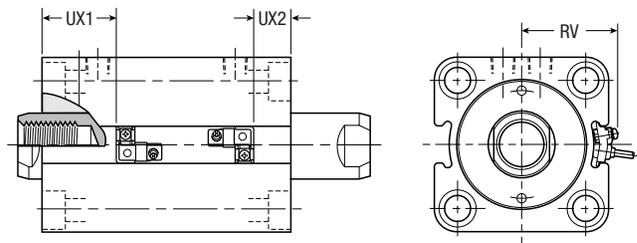
NOTE: If the clamp is not torqued properly, the position of the switch may shift or the switch itself may become damaged.

Switch Installation Dimensions (both stroke ends)

CHL Single Rod Type					Unit:mm
Switch Type	Bore	UX1	UX2	RV	
T0H3	20	13	12	22	
T2H3	25	14	13	25	
AX115 AX215	32	19	17	37	
	40	20	17	41	
	50	22	20	46	
	63	24	25	54	
	80	30	30	63	
	100	36	42	75	

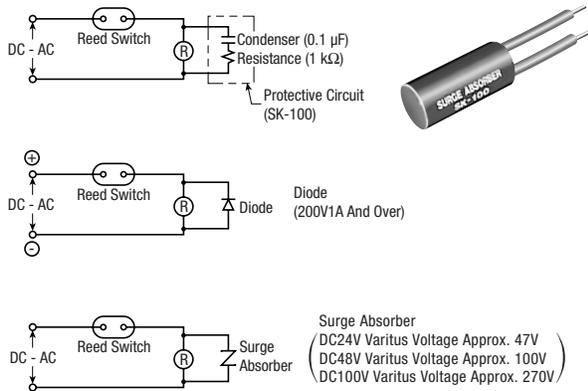


CHL Double Rod Type					Unit:mm
Switch Type	Bore	UX1	UX2	RV	
T0H3	20	13	23	22	
T2H3	25	14	24	25	
AX115 AX215	32	19	35	37	
	40	20	34	41	
	50	22	35	46	
	63	24	40	54	
	80	30	47	63	
	100	36	53	75	



Precautions for Use

1. Do not apply the reed switch to loads which exceed the rated voltage / current and load capacity.
2. Do not connect the reed switch directly with the power supply. Always connect with a specific load such as a relay or sequencer.
3. Provide a protective circuit parallel to the load for switch protection for high surge voltages generated near the power supply or when coils generate high surge voltages (relay approx. 4VA or more).



4. If the working voltage / current of the switch is insufficient, the operation check lamp may not light up.

Wiring

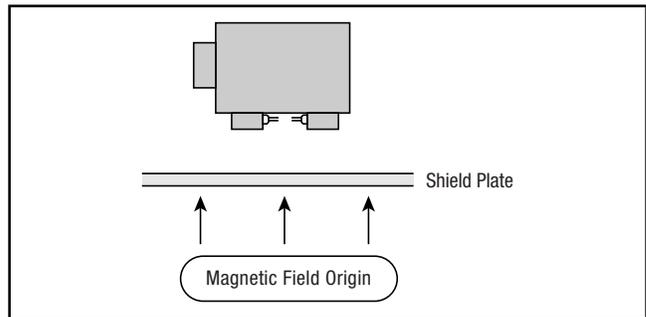
- Do not connect switches in series. The operation check lamp may not light up or loads may not work due to the voltage drop of the switch.
- Do not connect switches in parallel that have an indicating light. Signals output normally, but the lamp may not light up.
- Keep the switch cord away from the power supply of other electric appliances. Switches and loads are affected by the induction current if it is bundled or wired near the power supply
- Connect the white cord with ⊕ side and the black cord with ⊖ side if the switch with indicating lamp is used with direct current.
- In the case of capacitance loads (condensers, etc.) or switch cords of 10m or more, inrush currents may be generated that cause the switch to fail. Provide the greatest resistor in series that the circuit will allow as close to the switch as possible. **If the resistance is too high, the load device may not work.**
- Never use incandescent light bulbs in the circuit with the reed switches. High inrush loads will cause switch failure.

Switch Temperature Range -10 to 70°C (-14 to 158°F)

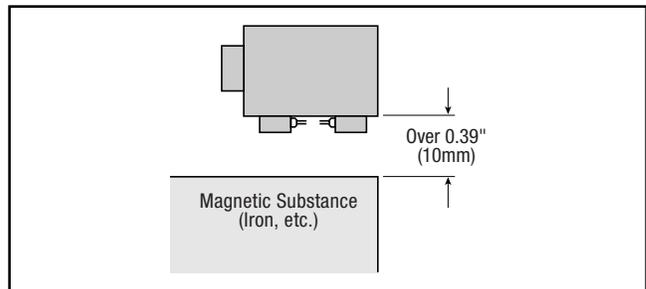
Switch	Switch Type	Load Voltage Range	Load Current Range	Power Rating	LED	Cord Length	CHL Cylinder Bore
AX115	Reed	5-30VDC 5-120VAC	5-40 mA DC 5-20 mA AC	1.5W DC 2VA AC	ON: Red	5 m	32-100
AX215	Hall Effect, NPN Only	5-30VDC	5-40 mA DC	-	Red & Green	5 m	32-100
T0H3	Reed	12-24VDC 100VAC	5-50 mA DC 7-20 mA AC	1.5W DC 2VA AC	ON: Red	3 m	20, 25
T2H3	Hall Effect, NPN Only	10-30VDC	5-20 mA DC	-	Red & Green	3 m	20, 25

Installing Location

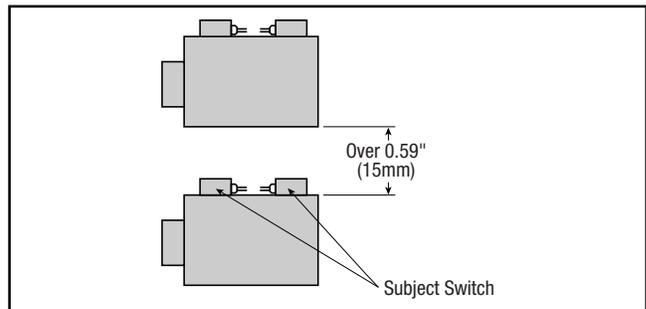
1. Use iron plate as magnetic shielding in locations with the strong ambient magnetic field.



2. Do not bring the strong magnetic bodies (iron, etc.) near the cylinder body and switch. As a rule, such materials shall be kept over 10mm from the switch.



3. The interval shall be kept over 15mm when multiple switch-set cylinders are used adjacently. Switches may perceive the magnet of the above cylinder inadvertently.



Installation and Maintenance

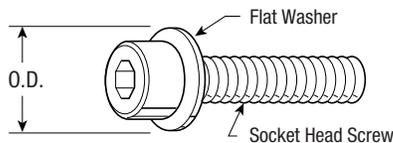
- Fully torque machine components to the piston rod shoulder so that no force is applied to the piston rod thread on push applications.
- During installation, make adjustments carefully because a lateral or eccentric load cannot be applied to the piston rod.
- When operating the cylinder for the first time, be sure to bleed the air from the piping. After bleeding the air, operate the cylinder at low pressure, and gradually increase the pressure to reach operating pressure.

NOTE: The CHL and CHH series cylinders are not provided with air vents. Therefore, bleed the air via the piping.

- To install the cylinder, 4 socket head screws (JIS B1176, strength classification of 10.9 or more) shall be used.
- When using the mounting bolts, screw 80% or more of the threaded portion of bolts into the material to be mounted. The material to be mounted must have the strength that is equivalent to the SS400 material quality.
- To tighten the mounting bolts with nuts, use steel nuts with the strength classification of 6 or more. (However, do not use type 3.)
- When threading mounting bolts through the cylinders, be sure to tighten them using the torque values indicated in the table below.

	Bore	Mounting Bolt Size		Tightening Torque
		Inch	Metric	N-m (ft-lbs)
T Mount	20	10 – 24	M5 X 0.8	4.8 (3.54)
	25	10 – 24	M5 X 0.8	4.8 (3.54)
	32	1/4 – 20	M6 X 1	8.1 (5.97)
	40	5/16 – 18	M8 X 1.25	20 (14.75)
	50	3/8 – 16	M10 X 1.5	40 (29.50)
	63	1/2 – 13	M12 X 1.75	67 (49.42)
	80	1/2 – 13*	M14 X 2	110 (81.14)
C Mount	32	5/16 – 18	M8 X 1.25	20 (14.75)
	40	3/8 – 16	M10 X 1.5	40 (29.50)
	50	1/2 – 13	M12 X 1.75	67 (49.42)
	63	1/2 – 13*	M14 X 2	110 (81.14)

*When using socket head screws, flat washers are required. Flat washer dimensions: OD must be 0.846" (21.5mm) ~0.886" (22.5mm).

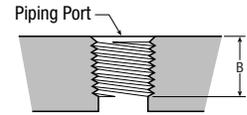


- To tighten the piston rod end threads of the double acting, double rod type, make sure to use the width across flats of the rod to be tightened. Because the double rod is joined by threads, caution shall be taken so that rotational force is not applied to the rod.

- The compact design of the piping port allows for fittings (B) with threads in the sizes listed below. An improper fit may damage the cylinder, resulting in poor performance.

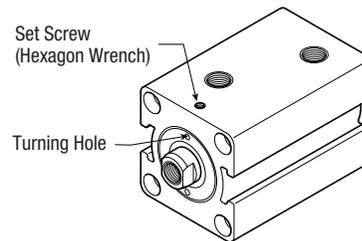
Unit: mm (inch)

Cylinder Bore Size	Port Size	B
20	NPT 1/8	6.3 (0.25)
25	NPT 1/8	6.3 (0.25)
32	NPT 1/4	9.5 (0.374)
40	NPT 1/4	9.5 (0.374)
50	NPT 1/4	9.5 (0.374)
63	NPT 1/4	9.5 (0.374)
80	NPT 3/8	10.5 (0.413)



Disassembly and Reassembly Precautions

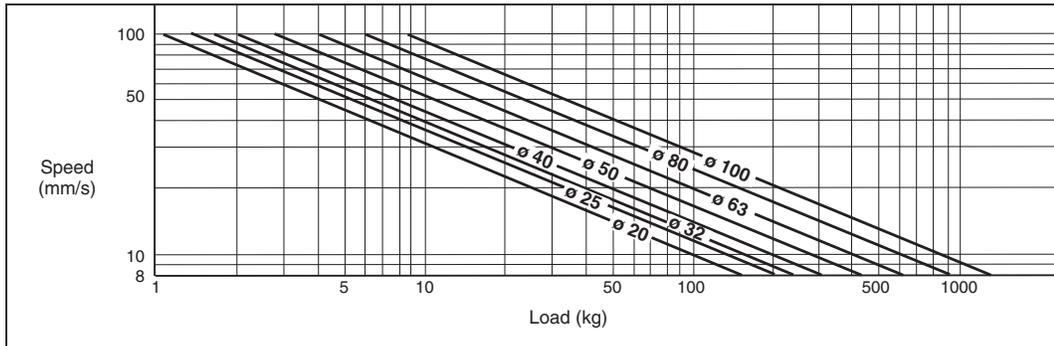
Cylinders, as shipped from the factory, are not to be disassembled and/or modified. If cylinders require modifications, these modifications must be done at Parker locations or by Parker-certified facilities. It is allowed to disassemble cylinders for the purpose of replacing seals or seal assemblies. However, this work must be done by strictly following all the instructions provided with the seal kits.



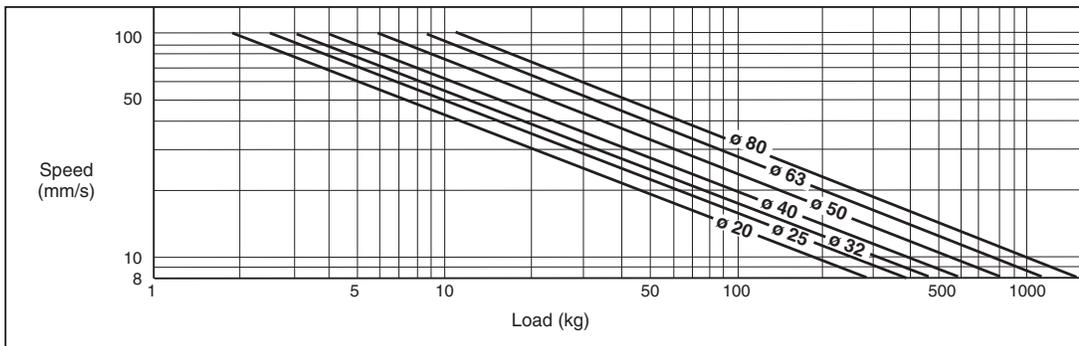
- After removing the set screw, utilize the turning hole of the rod gland to remove the rod gland from the cylinder body. When removing a jig from the rod end threads, burrs may be created on the width across flats of the rod. In that case, use a file to remove the burrs; then, remove the rod gland.
- The piston rod and piston cannot be disassembled.
- If the cylinder has been disassembled, make sure to replace all sealing materials (seals and gaskets).
- During the reassembly of the cylinder, make sure that no dust or debris such as metal particles enter the cylinder.
- A brass plug for protecting the threads of the rod gland is located below the set screw. This plug must be removed before tightening the rod gland.
- After tightening the rod gland, install the brass plug that is included in the seal set and tighten the set screw.
- The general-purpose piston seal, rod seal, dust wiper, and rod gland o-ring can be replaced.

Permissible piston impact speed is limited due to the size of the load attached to the rod end. That speed should be below the bold lines on the chart.

CHL



CHH



Theoretical Push and Pull Forces

General Formula

The cylinder output forces are derived from the formula:

$$F = \frac{P \times A}{10000}$$

Where F = Force in kN.

P = Pressure at the cylinder in bar.

A = Effective area of cylinder piston in square mm.

If the piston rod is in compression, use the 'Push Force' table below, as follows:

1. Identify the operating pressure closest to that required.
2. In the same column, identify the force required to move the load (always rounding up).
3. In the same row, look along to the cylinder bore required.

If the cylinder envelope dimensions are too large for the application, increase the operating pressure, if possible, and repeat the exercise.

If the piston rod is in tension, use the 'Deduction for Pull Force' table. The procedure is the same but, due to the reduced area caused by the piston rod, the force available on the 'pull' stroke will be smaller. To determine the pull force:

1. Follow the procedure for 'push' applications as described above.
2. Using the 'pull' table, identify the force indicated according to the rod and pressure selected.
3. Deduct this from the original 'push' force. The resultant is the net force available to move the load.

If this force is not large enough, repeat the process and increase the system operating pressure or cylinder diameter if possible. For assistance, contact your local authorized distributor.

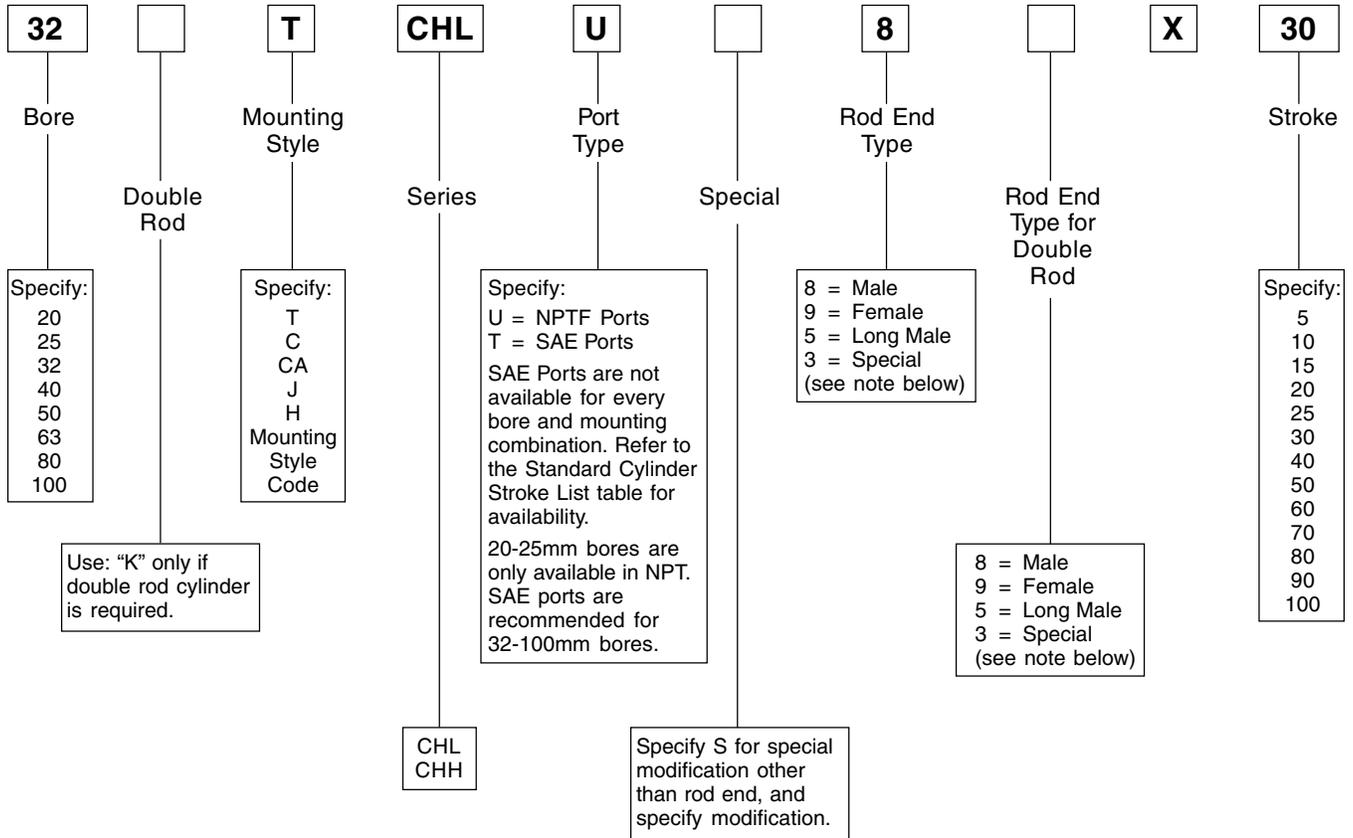
Push Force

Bore ø mm	Bore Area sq. mm	Cylinder Push Force in kN					
		10 bar	40 bar	63 bar	100 bar	125 bar	160 bar
20	314	0.3	1.3	2.0	3.1	3.9	5.0
25	491	0.5	2.0	3.1	4.9	6.1	7.9
32	804	0.8	3.2	5.1	8.0	10.1	12.9
40	1257	1.3	5.0	7.9	12.6	15.7	20.1
50	1964	2.0	7.9	12.4	19.6	24.6	31.4
63	3118	3.1	12.5	19.6	31.2	39.0	49.9
80	5027	5.0	20.1	31.7	50.3	62.8	80.4
100	7854	7.9	31.4	49.5	78.5	98.2	125.7

Deduction for Pull Force

Piston Rod ø mm	Piston Rod Area sq. mm	Reduction in Force in kN					
		10 bar	40 bar	63 bar	100 bar	125 bar	160 bar
12	113	0.1	0.5	0.7	1.1	1.4	1.8
14	154	0.2	0.6	1.0	1.5	1.9	2.5
18	255	0.3	1.0	1.6	2.6	3.2	4.1
22	380	0.4	1.5	2.4	3.8	4.8	6.1
28	616	0.6	2.5	3.9	6.2	7.7	9.9
36	1018	1.0	4.1	6.4	10.2	12.7	16.3
45	1591	1.6	6.4	10.0	15.9	19.9	25.5
56	2463	2.5	9.9	15.5	24.6	30.8	39.4

Model Ordering Code for CHH & CHL



1. Check the Standard Cylinder Stroke List table for standard bore sizes and stroke fabrication ranges. Consult factory for special modifications and alternate seal material.
2. Strokes over 100mm are a special request. Consult factory for dimensional information.
3. Order the AX115 (Reed Type) switch, the AX215 (Hall Effect) switch, the T0H3 (Reed Type) switch, the T2H3 (Hall Effect) switch, or surge absorber for a CHL cylinder as another item. List quantities.
4. To order thread style 3, specify "3" and give desired dimensions for CC or KK, A, and WF or furnish dimensional sketch.
5. Order the lock nuts as another item.

Ordering Example: 32TCHLU8 X 30 with two AX115 switches
 -represents a 32mm bore CHL, T Mount, NPT ports, male rod end, 30mm stroke, and two reed type switches

Safety Guide for Selecting and Using Hydraulic, Pneumatic Cylinders and Their Accessories

WARNING: ⚠ FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF CYLINDERS AND THEIR RELATED ACCESSORIES CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

Before selecting or using Parker (The Company) cylinders or related accessories, it is important that you read, understand and follow the following safety information.

User Responsibility

Due to very wide variety of cylinder applications and cylinder operating conditions, The Company does not warrant that any particular cylinder is suitable for any specific application. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The hydraulic and pneumatic cylinders outlined in this catalog are designed to The Company's design guide lines and do not necessarily meet the design guide lines of other agencies such as American Bureau of Shipping, ASME Pressure Vessel Code etc. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the cylinders and related accessories.
- Determining if the cylinders are required to meet specific design requirements as required by the Agency(s) or industry standards covering the design of the user's equipment.
- Assuring that the user's requirements are met, OSHA requirements are met, and safety guidelines from the applicable agencies such as but not limited to ANSI are followed and that the use presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the cylinders are used.

Seals

Part of the process of selecting a cylinder is the selection of seal compounds. Before making this selection, consult the "seal information page(s)" of the publication for the series of cylinders of interest.

The application of cylinders may allow fluids such as cutting fluids, wash down fluids etc. to come in contact with the external area of the cylinder. These fluids may attack the piston rod wiper and or the primary seal and must be taken into account when selecting and specifying seal compounds.

Dynamic seals will wear. The rate of wear will depend on many operating factors. Wear can be rapid if a cylinder is mis-aligned or if the cylinder has been improperly serviced. The user must take seal wear into consideration in the application of cylinders.

Piston Rods

Possible consequences of piston rod failure or separation of the piston rod from the piston include, but are not limited to are:

- Piston rod and or attached load thrown off at high speed.
- High velocity fluid discharge.
- Piston rod extending when pressure is applied in the piston retract mode.

Piston rods or machine members attached to the piston rod may move suddenly and without warning as a consequence of other conditions occurring to the machine such as, but not limited to:

- Unexpected detachment of the machine member from the piston rod.
- Failure of the pressurized fluid delivery system (hoses, fittings, valves, pumps, compressors) which maintain cylinder position.
- Catastrophic cylinder seal failure leading to sudden loss of pressurized fluid.
- Failure of the machine control system.

Follow the recommendations of the "Piston Rod Selection Chart and Data" in the publication for the series of cylinders of interest. The suggested piston rod diameter in these charts must be followed in order to avoid piston rod buckling.

Piston rods are not normally designed to absorb bending moments or loads which are perpendicular to the axis of piston rod motion. These additional loads can cause the piston rod to fail. If these types of additional loads are expected to be imposed on the piston rod, their magnitude should be made known to our engineering department.

The cylinder user should always make sure that the piston rod is securely attached to the machine member.

On occasion cylinders are ordered with double rods (a piston rod extended from both ends of the cylinder). In some cases a stop is threaded on to one of the piston rods and used as an external stroke adjuster. On occasions spacers are attached to the machine member connected to the piston rod and also used as a stroke adjuster. In both cases the stops will create a pinch point and the user should consider appropriate use of guards. If these external stops are not perpendicular to the mating contact surface, or if debris is trapped between the contact surfaces, a bending moment will be placed on the piston rod, which can lead to piston rod failure. An external stop will also negate the effect of cushioning and will subject the piston rod to impact loading. Those two (2) conditions can cause piston rod failure. Internal stroke adjusters are available with and without cushions. The use of external stroke adjusters should be reviewed with our engineering department.

The piston rod to piston and the stud to piston rod threaded connections are secured with an anaerobic adhesive. The strength of the adhesive decreases with increasing temperature. Cylinders which can be exposed to temperatures above +250°F (+121°C) are to be ordered with a non studded piston rod and a pinned piston to rod joint.

Cushions

Cushions should be considered for cylinder applications when the piston velocity is expected to be over 4 inches/second.

Cylinder cushions are normally designed to absorb the energy of a linear applied load. A rotating mass has considerably more energy than the same mass moving in a linear mode. Cushioning for a rotating mass application should be review by our engineering department.

Cylinder Mountings

Some cylinder mounting configurations may have certain limitations such as but not limited to minimum stroke for side or foot mounting cylinders or pressure de-ratings for certain flange mounts. Carefully review the catalog for these types of restrictions.

Always mount cylinders using the largest possible high tensile alloy steel socket head cap screws that can fit in the cylinder mounting holes and torque them to the manufacturer's recommendations for their size.

Port Fittings

Hydraulic cylinders applied with meter out or deceleration circuits are subject to intensified pressure at piston rod end.

The rod end pressure is approximately equal to:

$$\frac{\text{operating pressure} \times \text{effective cap end area}}{\text{effective rod end piston area}}$$

Contact your connector supplier for the pressure rating of individual connectors.

Cylinder Modifications or Repairs

Cylinders as shipped from the factory are not to be disassembled and or modified. If cylinders require modifications, these modifications must be done at company locations or by The Company's certified facilities. It is allowed to disassemble cylinders for the purpose of replacing seals or seal assemblies. However, this work must be done by strictly following all the instructions provided with the seal kits.

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7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by

Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgements resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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