

TAS Series NFPA Steel Cylinders 1.50" to 8.00" Bore

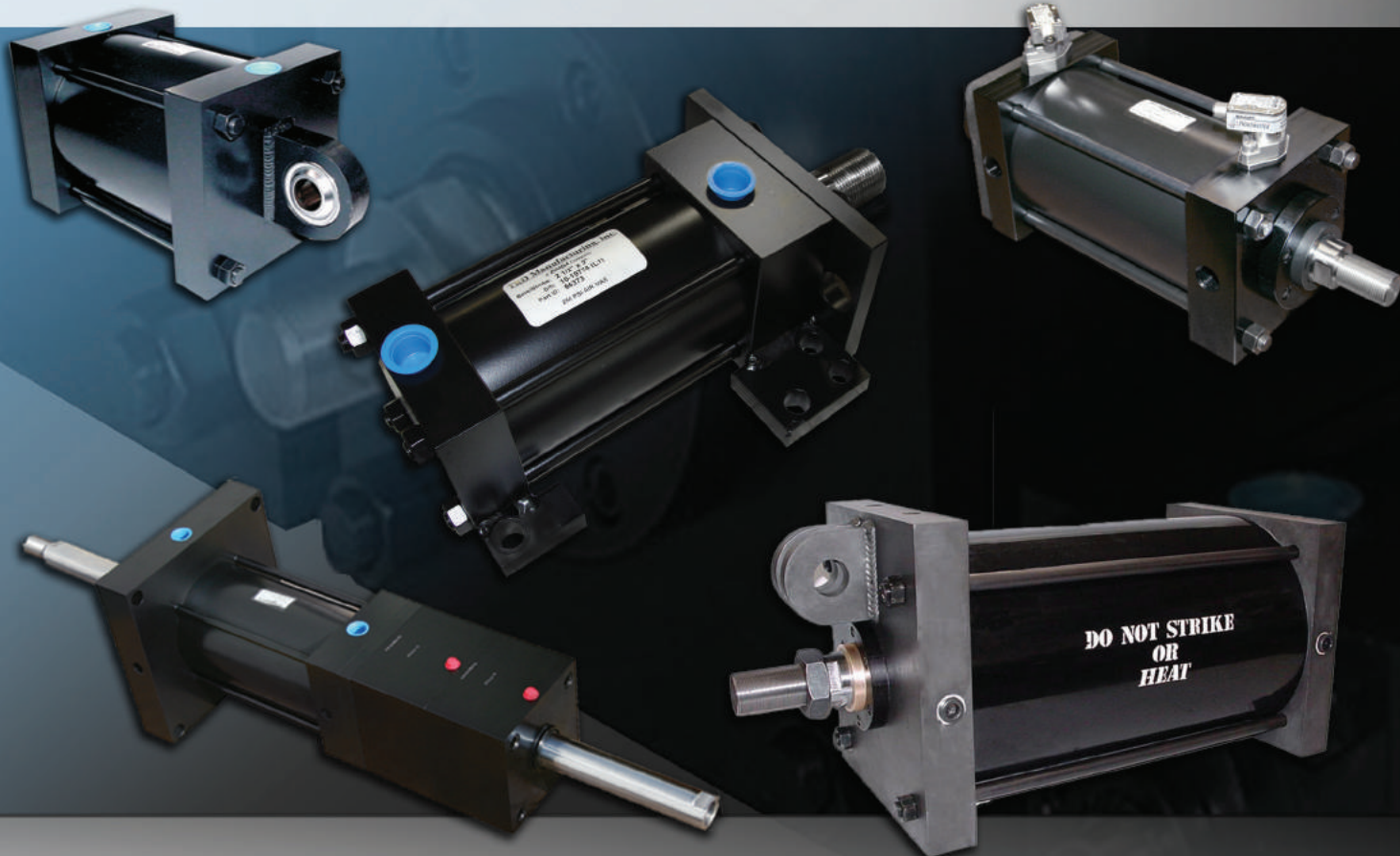
Single Rod End

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Double Rod End

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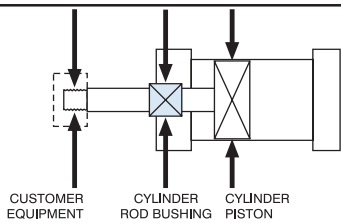
**95% OF OUR CYLINDERS SHIP IN 2-3 DAYS!
ONE DAY RUSH SERVICE AVAILABLE ON ALL CATALOGED CYLINDER MODELS!**

SERIES 'TAS' (NFPA) CYLINDER

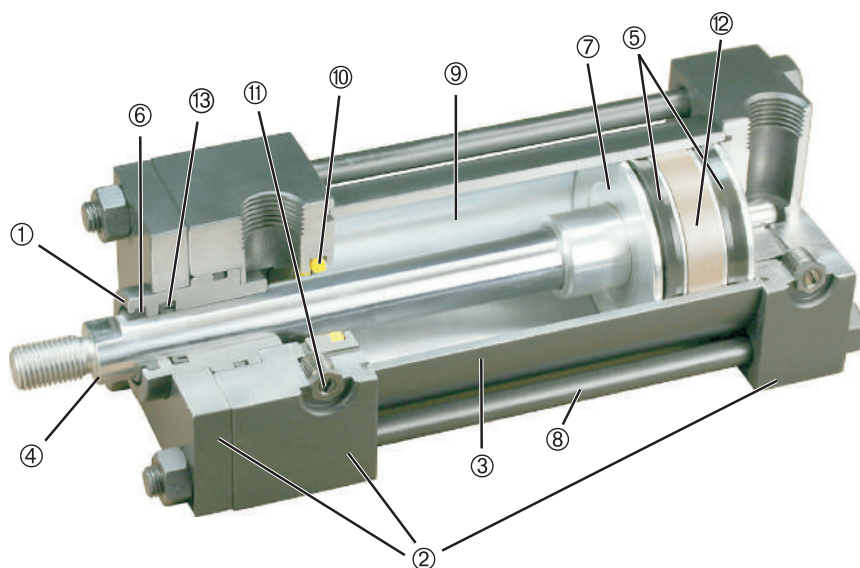
Floating Rod Bushing

SELF ALIGNMENT FEATURE

Rod Bushing is designed to float .002" to improve bearing surface alignment.



- Reduces cylinder drag and erratic operation
- Reduces cylinder wear
- Provides a minimum of 25% longer life than fixed rod bushing designs



HEAVY-DUTY DESIGN FOR RELIABLE, CONSISTENT OPERATION

- FLOATING ROD BUSHING** – Precision machined from 150,000 PSI rated graphite filled cast iron and PTFE coated to reduce friction and extend cycle life. Bushing design traps lubrication in effective bearing area.
 - HEAD, CAP & RETAINER** – Precision machined steel head, cap and retainer are held to close tolerances and ensure accurate alignment for a truly square cylinder.
 - CYLINDER TUBE** – Precision machined steel tube with hard chrome I.D., is honed and micro finished for extended seal life and improved cycle rates.
 - PISTON ROD** – Precision machined from high yield, polished and hard chrome plated steel.
 - PISTON SEALS** – Heavy lip design Carboxilated Nitrile construction. Seals are pressure activated and wear compensating for extended life.
 - ROD WIPER** – Urethane construction on 3.5" rod and under. Flocked Nitrile construction on the other rod diameters. External lip design prevents debris from entering cylinder.
 - PISTON** – Precision machined from 6061-T651 alloy aluminum, provides an excellent bearing surface for extended cylinder life.
 - TIE RODS** – Pre-stressed high carbon steel tie rod construction eliminates axial loading of cylinder tube and maintains compression on tube and end seals.
 - PERMANENT LUBRICATION** – Permanently lubricated with Magnalube-G PTFE based grease on all internal components. This is a non-migratory type high performance grease providing outstanding service life. No additional lubrication is required.
 - CUSHIONS** – (Options H & C) Floating cushion seal designed for maximum cushion performance, quick return stroke break-away and extended life.
 - CUSHION ADJUSTMENT NEEDLE** – Adjustable steel needle design has fine thread metering and is positively captured to prevent needle ejection during adjustment.
 - WEAR BAND** – 90% Virgin PTFE and 10% Polyphenylene Sulfide material provides extended life due to extremely low wear factor.
 - ROD SEAL** – Carboxilated Nitrile construction on 3.5" rod and under. Polyurethane construction on the other rod diameters. Both seals are pressure activated and wear compensating for extended life.
- FINISH** – Black urethane paint.

OPERATING PRESSURE

250 PSI (17 BAR)

OPERATING TEMPERATURE

Standard Seals: -20°F to 200°F (-29°C to 93°C)
Fluorocarbon: 0°F to 400°F (-18°C to 204°C)

Performance Options:

- **ST** – Stop tubes are used to reduce rod bearing and piston stress (refer to pages 201-202 for cylinder design guidance).
- **MA** – Micro-adjust provides a precision adjustment on the cylinder extend stroke, providing quick and accurate cylinder positioning, reducing set-up time.
- **SSA** – Stainless steel piston rod, tie rods, nuts and fasteners provide corrosion resistance. Refer to Series 'SS' for a complete stainless steel solution.
- **LF** – Low friction seals reduce breakaway and running friction. Effective at all operating pressures.

HOW TO ORDER: SERIES 'TAS' (HEAVY-DUTY STEEL CYLINDERS)

TAS - MF1 - 2.50 x 10 - HC - KK3

SERIES	
TAS	250 PSI AIR

NFA MOUNTS	
MF1	FRONT FLANGE (1.50"- 6.00" Bore)
MF2	REAR FLANGE (1.50"- 6.00" Bore)
MF5	FRONT SQUARE FLANGE (1.50"- 6.00" Bore)
MF6	REAR SQUARE FLANGE (1.50"- 6.00" Bore)
ME3	FRONT MOUNTING HOLES (8.00" Bore)
ME4	REAR MOUNTING HOLES (8.00" Bore)
MP1	REAR PIVOT CLEVIS (1.50"- 8.00" Bore)
MP2	REAR PIVOT CLEVIS (1.50"- 6.00" Bore)
MP4	REAR PIVOT EYE (1.50"- 6.00" Bore)
MS1	FRONT & REAR END ANGLE (1.50"- 8.00" Bore)
MS2	SIDE LUG (1.50"- 8.00" Bore)
MS4	BOTTOM TAPPED HOLES (1.50"- 8.00" Bore)
MT1	FRONT TRUNNION (1.50"- 8.00" Bore)
MT2	REAR TRUNNION (1.50"- 8.00" Bore)
MT4	INTERMEDIATE TRUNNION (1.50"- 8.00" Bore)
MX0	NO MOUNT (1.50"- 8.00" Bore)
MX1	EXTENDED TIE RODS - HEAD & CAP (1.50"- 8.00" Bore)
MX2	EXTENDED TIE RODS - CAP (1.50"- 8.00" Bore)
MX3	EXTENDED TIE RODS - HEAD (1.50"- 8.00" Bore)
SB	SPHERICAL BEARING CAP PIVOT (1.50"- 8.00" Bore)

STYLE	
SINGLE ROD (LEAVE BLANK)	
D (DOUBLE ROD END)	

BORE	
1.50	2.00
2.50	3.25
4.00	5.00
6.00	8.00

STROKE	
0" TO 120"	
MADE-TO-ORDER	

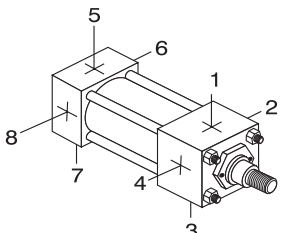
CUSHIONS	
H	HEAD CUSHION POSITION 2 IS STANDARD SPECIFY FOR POSITIONS: 1, 3 & 4
LH	LONG HEAD CUSHION POSITION 2 IS STANDARD SPECIFY FOR POSITIONS: 1, 3 & 4
C	CAP CUSHION POSITION 6 IS STANDARD SPECIFY FOR POSITIONS: 5, 7 & 8
LC	LONG CAP CUSHION POSITION 6 IS STANDARD SPECIFY FOR POSITIONS: 5, 7 & 8
FIXED CUSHIONS	
FCH	FIXED HEAD CUSHION (NON-ADJUSTABLE, NO ADJUSTMENT NEEDLE)
FCC	FIXED CAP CUSHION (NON-ADJUSTABLE, NO ADJUSTMENT NEEDLE)
FC	FIXED HEAD AND CAP CUSHION (NON-ADJUSTABLE, NO ADJUSTMENT NEEDLE)

OPTIONS	
ADDS LENGTH TO CYLINDER - "OPTION LENGTH ADDER" CHART BELOW.	
A=	EXTENDED PISTON ROD THREAD (EXAMPLE: A=2")
AS	ADJUSTABLE STROKE - RETRACT (SPECIFY LENGTH, EXAMPLE: AS=4")
A/O	AIR / OIL PISTON
X B	0.250" URETHANE BUMPER BOTH ENDS
X BC	0.250" URETHANE BUMPER CAP ONLY
X BH	0.250" URETHANE BUMPER HEAD ONLY
BP	BUMPER PISTON SEALS
BSP	BSP OR BSPT PORTS (SPECIFY SIZE, EXAMPLE: BSPP=.25")
C=	EXTENDED PISTON ROD (EXAMPLE: IF C=0.50", THEN 1" ROD EXTENSION IS C=1.50")
CS	CENTER SUPPORT
EK	EXTENDED KEY PLATE
KK2	LARGE MALE ROD THREAD
KK3	FEMALE ROD THREAD
KK3M	FEMALE METRIC ROD THREAD
KK3S	STUDD PISTON ROD (KK3 WITH STUD, LOCTITE IN PLACE)
KK3X	FEMALE SPECIAL THREAD
KK4	FULL DIAMETER MALE ROD THREAD
KK5	BLANK ROD END (NO THREADS, A=0")
KK10	ROD COUPLER END
KKM	MALE METRIC THREAD
KKX	MALE SPECIAL THREAD
LF	LOW FRICTION SEALS
LT	LOW TEMPERATURE SEALS (TEMP RATING: -30°F TO 200°F)
LTE	LOW TEMPERATURE EXTREME SEALS (TEMP RATING: -65°F TO 200°F)
MA	MICRO-ADJUST (12" MAX. STROKE) AVAILABLE ON DOUBLE ROD ENDS
MAB	MICRO-ADJUST WITH SOUND DAMPENING BUMPER (12" MAX. STROKE)
MS	METALLIC ROD SCRAPER (BRASS CONSTRUCTION)
NR	NON-ROTATING
OP	OPTIONAL PORT LOCATION (EXAMPLE: PORTS @ 3 & 7)
OS	OVERSIZE ROD DIAMETER (SPECIFY SIZE, EXAMPLE: OS=1.375")
PLS	PISTON LOCK SCREW
PMC	SOLID CAST IRON PISTON
RBB	ROD BUSHING MATERIAL: BRONZE
SAE	SAE PORTS (SPECIFY SIZE, EXAMPLE: SAE #6)
SE	SPRING EXTEND
SR	SPRING RETRACT
SSA	STAINLESS STEEL PISTON ROD, TIE RODS & NUTS, AND FASTENERS
SSC	STAINLESS STEEL CUSHION NEEDLES
SSF	STAINLESS STEEL FASTENERS
SSN	STAINLESS STEEL TIE ROD NUTS
SSR	STAINLESS STEEL PISTON ROD
SST	STAINLESS STEEL TIE RODS & NUTS
X ST	STOP TUBE NOTE: SPECIFY STOP TUBE LENGTH (IN INCHES) SPECIFY STROKE AS ES (EFFECTIVE STROKE) (EXAMPLE: TAS MS4 2 X 24ES-ST=3")
TH	400 PSI HYD. NON-SHOCK
VS	FLUOROCARBON SEALS
XX	SPECIAL VARIATION (SPECIFY)

OPTION LENGTH ADDER (ADD TO CATALOG BASIC OVERALL LENGTH DIMENSIONS)				
BORE	OPTION			ST* (STOP TUBE) EXAMPLE: ST=2
	B	BC	BH	
1.50	0.500	0.250	0.250	2
2.00	0.500	0.250	0.250	2
2.50	0.500	0.250	0.250	2
3.25	0.500	0.250	0.250	2
4.00	0.500	0.250	0.250	2
5.00	0.500	0.250	0.250	2
6.00	0.500	0.250	0.250	2
8.00	0.500	0.250	0.250	2

MAXIMUM STROKE RECOMMENDATIONS			
BORE	NO CENTER SUPPORT	WITH CENTER SUPPORTS (CS OPTION)	
		ONE SUPPORT	TWO SUPPORTS
1.50", 2.00" & 2.50"	48 INCHES	OVER 48 INCHES	OVER 72 INCHES
3.25", 4.00" & 5.00"	65 INCHES	OVER 65 INCHES	OVER 92 INCHES
6.00"	72 INCHES	OVER 72 INCHES	NOT REQUIRED

- STANDARD PORT AND CUSHION ADJUSTMENT POSITIONS**
- Ports - Positions 1 and 5
 - Cushion Adjustment - Positions 2 and 6
 - Specify Non-Standard Positions When Ordering
 - Port Location 9 is Center of Cap Face.



NFA MOUNTS

1.50"-6.00" Bores	1.50"-6.00" Bores	8.00" Bore	8.00" Bore	1.50"-8.00" Bores	1.50"-6.00" Bores
1.50"-6.00" Bores	1.50"-8.00" Bores	1.50"-8.00" Bores	1.50"-8.00" Bores	1.50"-8.00" Bores	1.50"-8.00" Bores
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TAS - How To Order
 Dimensions
 TAS - Base Mounts
 TAS - Single Rod Mounts
 TAS - Double Rod Mounts
 Options Page 189
 Accessories Page 227
 Switches Page 241
 Technical Data Page 277

SERIES 'TAS' DIMENSIONS: THREADS

TAS - How To Order

TAS - Base Dimensions

TAS - Single Rod Mounts

TAS - Double Rod Mounts

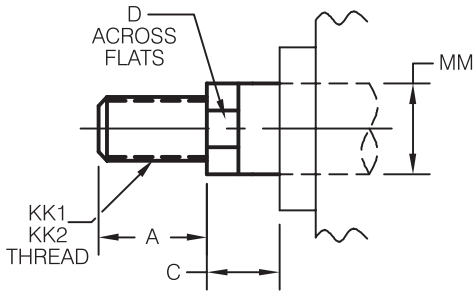
Options Page 189

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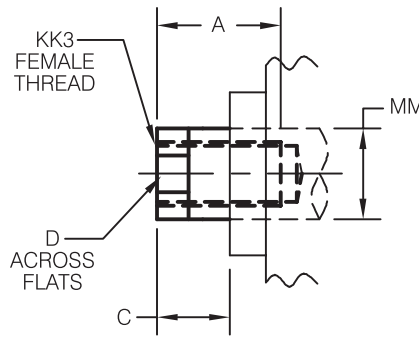
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Technical Data Page 277

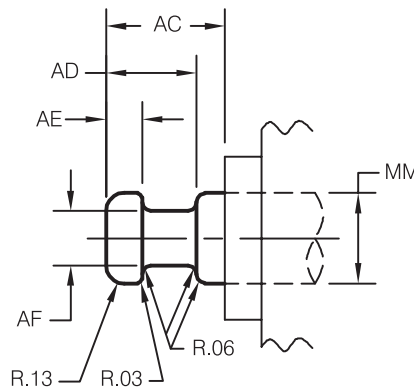
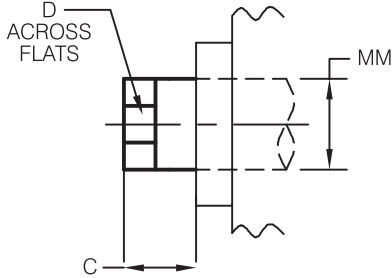
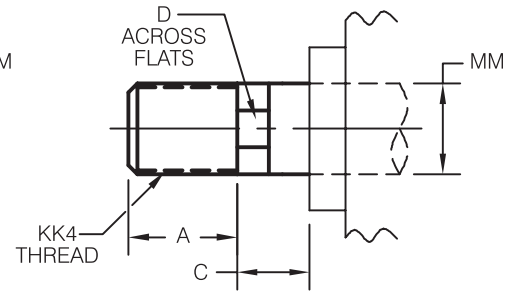
ROD END STYLE:
KK1
KK2



ROD END STYLE:
KK3



ROD END STYLE:
KK4



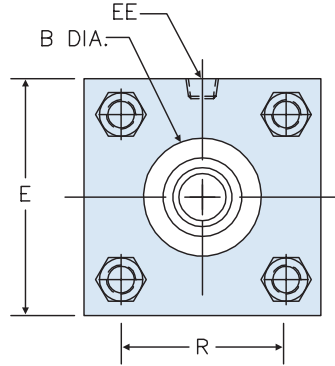
ROD DIA. (MM)	A	C	D	AC	AD	AE	AF	KK1	KK2	KK3	KK4	NA ±.002
0.625	0.750	0.375	0.500	1.125	0.625	0.250	0.375	7/16 - 20	1/2 - 20	7/16 - 20	5/8 - 18	—
1.000	1.125	0.500	0.875	1.625	0.938	0.375	0.688	3/4 - 16	7/8 - 14	3/4 - 16	1 - 14	—
1.375	1.625	0.625	1.125	1.750	1.062	0.375	0.875	1 - 14	1 1/4 - 12	1 - 14	1 3/8 - 12	—
1.750	2.000	0.750	1.500	2.000	1.313	0.500	1.125	1 1/4 - 12	1 1/2 - 12	1 1/4 - 12	1 3/4 - 12	—
2.000	2.250	0.875	1.750	2.625	1.688	0.625	1.375	1 1/2 - 12	1 3/4 - 12	1 1/2 - 12	2 - 12	—
2.500	3.000	1.000	2.250	3.250	1.938	0.750	1.750	1 7/8 - 12	2 1/4 - 12	1 7/8 - 12	2 1/2 - 12	—
3.000	3.500	1.000	2.625	3.625	2.438	0.875	2.250	2 1/4 - 12	2 3/4 - 12	2 1/4 - 12	3 - 12	—
3.500	3.500	1.000	3.000	4.375	2.688	1.000	2.500	2 1/2 - 12	3 1/4 - 12	2 1/2 - 12	3 1/2 - 12	—
4.000	4.000	1.000	—	4.500	2.688	1.000	3.000	3 - 12	3 3/4 - 12	3 - 12	4 - 12	3.875
4.500	4.500	1.000	—	5.250	3.188	1.500	3.500	3 1/4 - 12	4 1/4 - 12	3 1/4 - 12	4 1/2 - 12	4.375
5.000	5.000	1.000	—	5.375	3.188	1.500	3.875	3 1/2 - 12	4 3/4 - 12	3 1/2 - 12	5 - 12	4.875
5.500	5.500	1.000	—	6.250	3.938	1.875	4.375	4 - 12	5 1/4 - 12	4 - 12	5 1/2 - 12	5.375

Four (4) wrench flats is an option.
Rods larger than 3.50" dia. utilize four (4) 0.50" dia. spanner holes 0.50" deep in place of wrench flats and also utilize rod end turn down above.

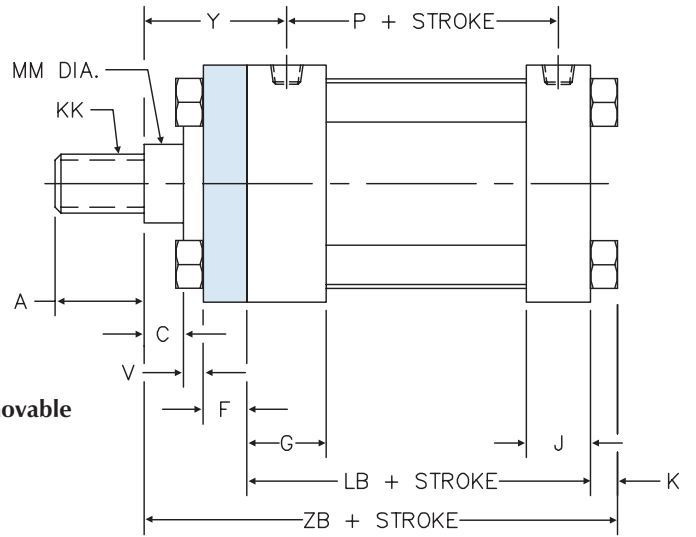
SERIES 'TAS' DIMENSIONS: BASIC CYLINDER (MX0 MOUNT)

SQUARE RETAINER CONSTRUCTION

FULL SQUARE RETAINER USED ON:	
BORE	ROD DIA.
1.50	0.625
	1.000
2.00	0.625
	1.000
2.50	1.375
	1.750
	2.125
3.25	1.000
	1.375
	1.750
	2.125
4.00	1.000
	1.375
	1.750
	2.125
5.00	1.000
	1.375
	1.750
	2.125
	2.500
6.00	1.000
	1.375
	1.750
	2.125
	2.500
	2.875

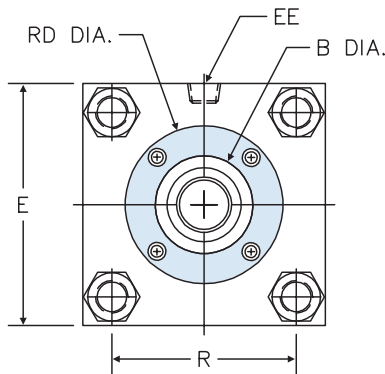


Note: Full square retainer is removable to service rod bushing.

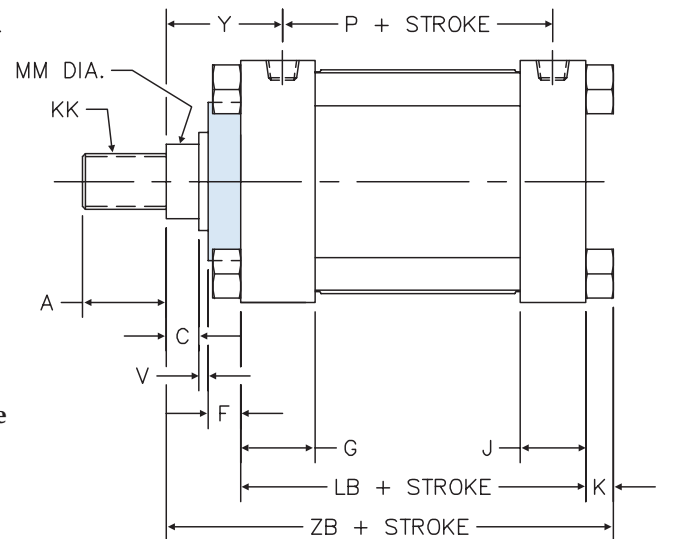


ROUND RETAINER CONSTRUCTION

ROUND RETAINER USED ON:	
BORE	ROD DIA.
8.00	1.375
	1.750
	2.000
	2.500
	3.000
	3.500
	4.000
	5.500

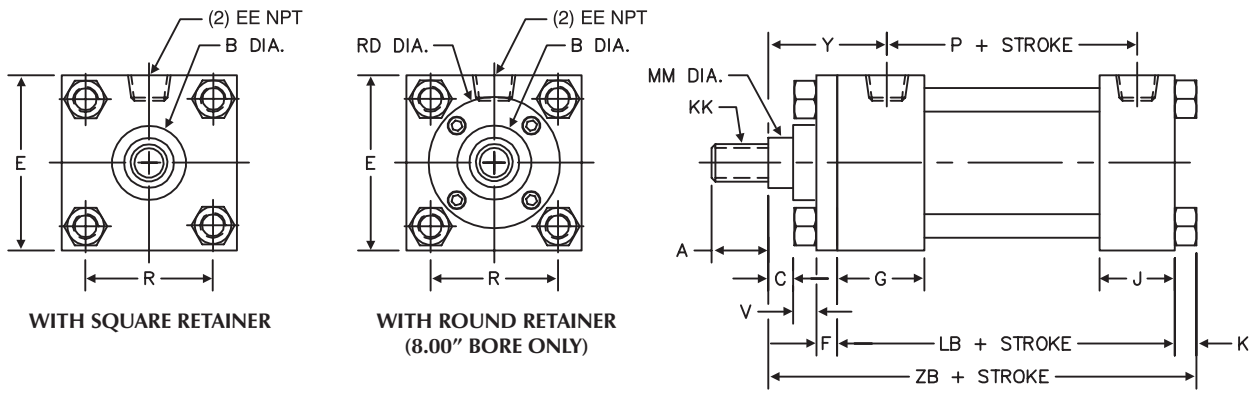


Note: Round retainer is removable to service rod bushing.



SERIES 'TAS' DIMENSIONS: BASIC CYLINDER (MX0 MOUNT)

EASY FLIP OUT PAGE FOR REFERENCE

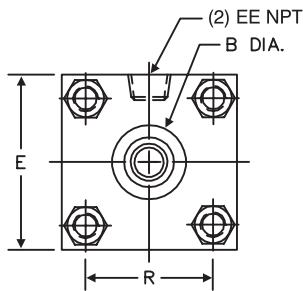


BORE	ROD DIA. (MM)	A	B	C	E	EE NPT	F	G	J	K	KK	LB	P	R	RD	V	Y	ZB	
1.50	0.625	0.750	1.124	0.375	2.000	3/8	0.375	1.500	1.000	0.250		3.625	2.375	1.430	SQ	0.250	1.875	4.875	
	1.000	1.125	1.499	0.500												0.500	2.250	5.250	
2.00	0.625	0.750	1.124	0.375	2.500	3/8	0.375	1.500	1.000	0.313		3.625	2.375	1.840	SQ	0.250	1.875	4.938	
	1.000	1.125	1.499	0.500												0.500	2.250	5.313	
	1.375	1.625	1.999	0.625												0.625	2.500	5.563	
2.50	0.625	0.750	1.124	0.375	3.000	3/8	0.375	1.500	1.000	0.313		3.750	2.500	2.190	SQ	0.250	1.875	5.063	
	1.000	1.125	1.499	0.500												0.500	2.250	5.438	
	1.375	1.625	1.999	0.625												0.625	2.500	5.688	
	1.750	2.000	2.374	0.750												0.750	2.750	5.938	
3.25	1.000	1.125	1.499	0.500	3.750	1/2	0.625	1.750	1.250	0.375		4.250	2.750	2.760	SQ	0.250	2.375	6.000	
	1.375	1.625	1.999	0.625												0.375	2.625	6.250	
	1.750	2.000	2.374	0.750												0.500	2.875	6.500	
	2.000	2.250	2.624	0.875												0.500	3.000	6.625	
4.00	1.000	1.125	1.499	0.500	4.500	1/2	0.625	1.750	1.250	0.375		4.250	2.750	3.320	SQ	0.250	2.375	6.000	
	1.375	1.625	1.999	0.625												0.375	2.625	6.250	
	1.750	2.000	2.374	0.750												0.500	2.875	6.500	
	2.000	2.250	2.624	0.875												0.500	3.000	6.625	
	2.500	3.000	3.124	1.000												0.625	3.250	6.875	
5.00	1.000	1.125	1.499	0.500	5.500	1/2	0.625	1.750	1.250	0.438		4.500	3.000	4.100	SQ	0.250	2.375	6.313	
	1.375	1.625	1.999	0.625												0.375	2.625	6.563	
	1.750	2.000	2.374	0.750												0.500	2.875	6.813	
	2.000	2.250	2.624	0.875												0.500	3.000	6.983	
	2.500	3.000	3.124	1.000												0.625	3.250	7.188	
	3.000	3.500	3.749	1.000												0.625	3.250	7.188	
	3.500	3.500	4.249	1.000												0.625	3.250	7.188	
6.00	1.375	1.625	1.999	0.625	6.500	3/4	0.750	2.000	1.500	0.438		5.000	3.250	4.880	SQ	0.250	2.750	7.063	
	1.750	2.000	2.374	0.750												0.375	3.000	7.313	
	2.000	2.250	2.624	0.875												0.375	3.125	7.438	
	2.500	3.000	3.124	1.000												0.500	3.375	7.688	
	3.000	3.500	3.749	1.000												0.500	3.375	7.688	
	3.500	3.500	4.249	1.000												0.500	3.375	7.688	
	4.000	4.000	4.749	1.000												0.500	3.375	7.688	
8.00	1.375	1.625	1.999	0.625	8.500	3/4	0.625	2.000	1.500	0.563		5.125	3.375	6.440	SQ	3.500	0.375	2.750	7.313
	1.750	2.000	2.374	0.750			0.625									3.500	0.500	3.000	7.563
	2.000	2.250	2.624	0.875			0.625									5.000	0.500	3.125	7.688
	2.500	3.000	3.124	1.000			0.750									5.000	0.500	3.375	7.938
	3.000	3.500	3.749	1.000			0.750									5.250	0.500	3.375	7.938
	3.500	3.500	4.249	1.000			0.750									5.625	0.500	3.375	7.938
	4.000	4.000	4.749	1.000			0.750									6.500	0.500	3.375	7.938
	4.500	4.500	5.249	1.000			0.750									7.250	0.500	3.375	7.938
	5.000	5.000	5.749	1.000			0.750									7.500	0.500	3.375	7.938
	5.500	5.500	6.249	1.000			0.750									7.500	0.500	3.375	7.938

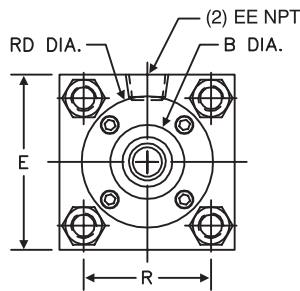
SEE ROD END DETAIL CHART ON PAGE 160

① Where SQ is shown in chart, cylinder utilizes a full square retainer.

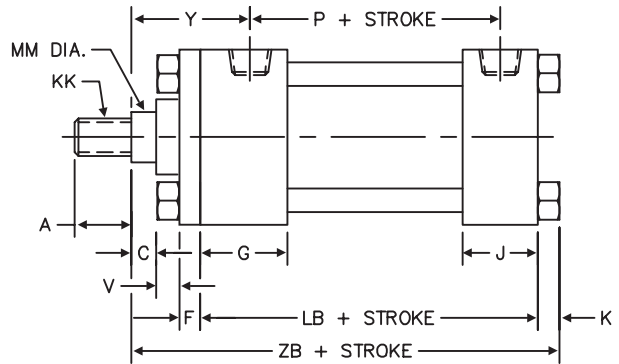
SERIES 'TAS' DIMENSIONS: BASIC CYLINDER (MX0 MOUNT)



WITH SQUARE RETAINER



WITH ROUND RETAINER
(8.00" BORE ONLY)



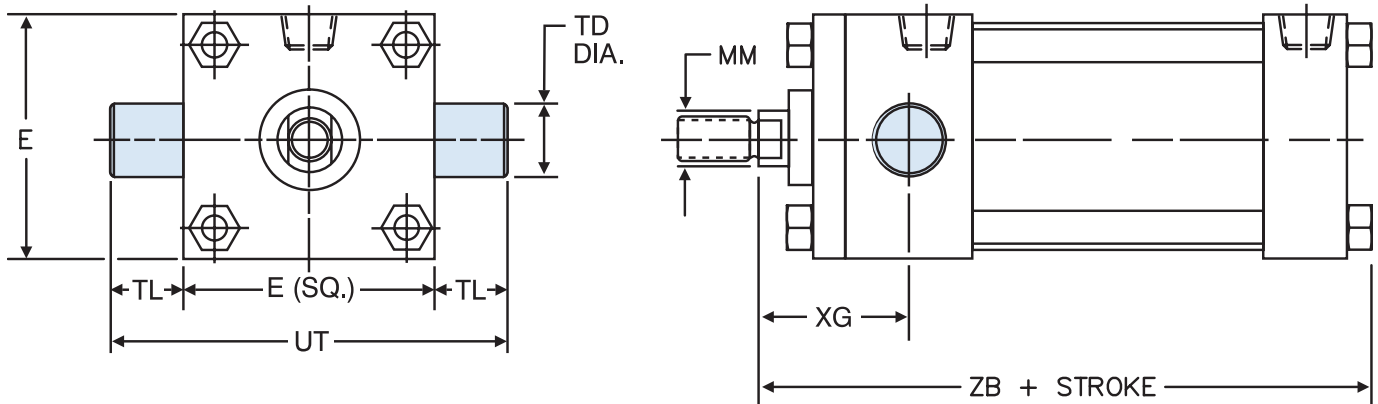
BORE	ROD DIA. (MM)	A	B	C	E	EE NPT	F	G	J	K	KK	LB	P	R	RD	V	Y	ZB	
1.50	0.625	0.750	1.124	0.375	2.000	3/8	0.375	1.500	1.000	0.250		3.625	2.375	1.430	SQ	0.250	1.875	4.875	
	1.000	1.125	1.499	0.500												0.500	2.250	5.250	
2.00	0.625	0.750	1.124	0.375	2.500	3/8	0.375	1.500	1.000	0.313		3.625	2.375	1.840	SQ	0.250	1.875	4.938	
	1.000	1.125	1.499	0.500												0.500	2.250	5.313	
	1.375	1.625	1.999	0.625												0.625	2.500	5.563	
2.50	0.625	0.750	1.124	0.375	3.000	3/8	0.375	1.500	1.000	0.313		3.750	2.500	2.190	SQ	0.250	1.875	5.063	
	1.000	1.125	1.499	0.500												0.500	2.250	5.438	
	1.375	1.625	1.999	0.625												0.625	2.500	5.688	
	1.750	2.000	2.374	0.750												0.750	2.750	5.938	
3.25	1.000	1.125	1.499	0.500	3.750	1/2	0.625	1.750	1.250	0.375		4.250	2.750	2.760	SQ	0.250	2.375	6.000	
	1.375	1.625	1.999	0.625												0.375	2.625	6.250	
	1.750	2.000	2.374	0.750												0.500	2.875	6.500	
	2.000	2.250	2.624	0.875												0.500	3.000	6.625	
4.00	1.000	1.125	1.499	0.500	4.500	1/2	0.625	1.750	1.250	0.375		4.250	2.750	3.320	SQ	0.250	2.375	6.000	
	1.375	1.625	1.999	0.625												0.375	2.625	6.250	
	1.750	2.000	2.374	0.750												0.500	2.875	6.500	
	2.000	2.250	2.624	0.875												0.500	3.000	6.625	
	2.500	3.000	3.124	1.000												0.625	3.250	6.875	
5.00	1.000	1.125	1.499	0.500	5.500	1/2	0.625	1.750	1.250	0.438		4.500	3.000	4.100	SQ	0.250	2.375	6.313	
	1.375	1.625	1.999	0.625												0.375	2.625	6.563	
	1.750	2.000	2.374	0.750												0.500	2.875	6.813	
	2.000	2.250	2.624	0.875												0.500	3.000	6.983	
	2.500	3.000	3.124	1.000												0.625	3.250	7.188	
	3.000	3.500	3.749	1.000												0.625	3.250	7.188	
6.00	1.375	1.625	1.999	0.625	6.500	3/4	0.750	2.000	1.500	0.438		5.000	3.250	4.880	SQ	0.250	2.750	7.063	
	1.750	2.000	2.374	0.750												0.375	3.000	7.313	
	2.000	2.250	2.624	0.875												0.375	3.125	7.438	
	2.500	3.000	3.124	1.000												0.500	3.375	7.688	
	3.000	3.500	3.749	1.000												0.500	3.375	7.688	
	3.500	3.500	4.249	1.000												0.500	3.375	7.688	
	4.000	4.000	4.749	1.000												0.500	3.375	7.688	
8.00	1.375	1.625	1.999	0.625	8.500	3/4	0.625	2.000	1.500	0.563		5.125	3.375	6.440		3.500	0.375	2.750	7.313
	1.750	2.000	2.374	0.750			0.625									3.500	0.500	3.000	7.563
	2.000	2.250	2.624	0.875			0.625									5.000	0.500	3.125	7.688
	2.500	3.000	3.124	1.000			0.750									5.000	0.500	3.375	7.938
	3.000	3.500	3.749	1.000			0.750									5.250	0.500	3.375	7.938
	3.500	3.500	4.249	1.000			0.750									5.625	0.500	3.375	7.938
	4.000	4.000	4.749	1.000			0.750									6.500	0.500	3.375	7.938
	4.500	4.500	5.249	1.000			0.750									7.250	0.500	3.375	7.938
	5.000	5.000	5.749	1.000			0.750									7.500	0.500	3.375	7.938
	5.500	5.500	6.249	1.000			0.750									7.500	0.500	3.375	7.938

SEE ROD END DETAIL CHART ON PAGE 160

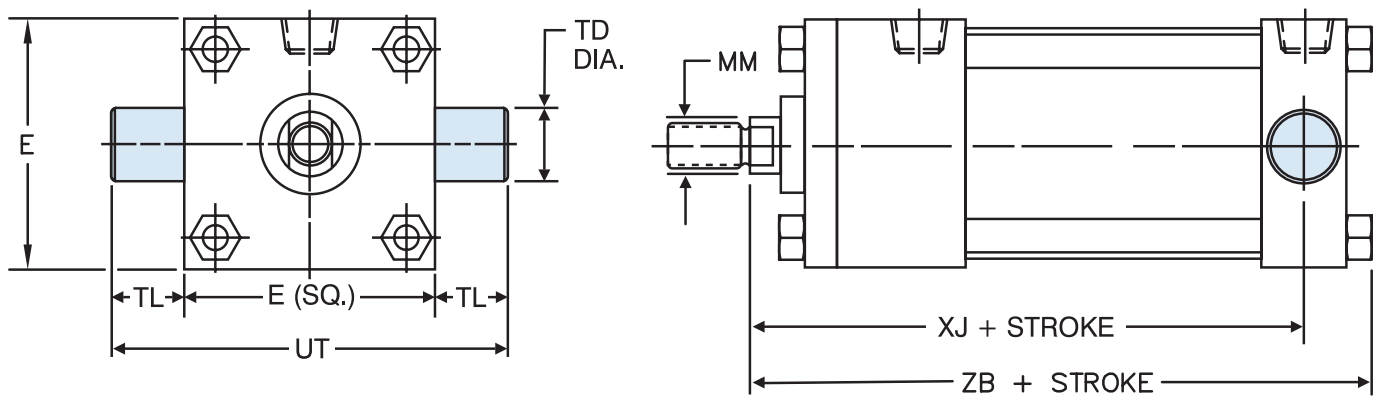
① Where SQ is shown in chart, cylinder utilizes a full square retainer.

SERIES 'TAS' DIMENSIONS: TRUNNION MOUNTS

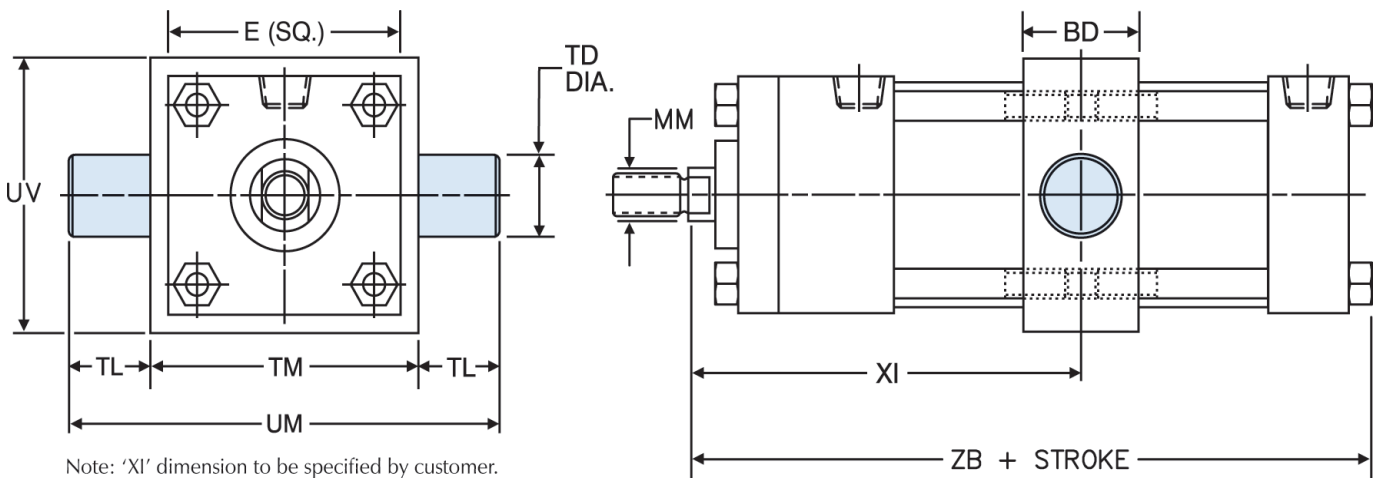
MT1: HEAD TRUNNION



MT2: CAP TRUNNION



MT4: INTERMEDIATE TRUNNION



'MT1', 'MT2', 'MT4' STANDARD CUSHION LOCATIONS		
MOUNT	HEAD CUSHION	CAP CUSHION
MT1	3	6
MT2	2	7
MT4	2	6

Note: Ports or cushions cannot be on same side as MT1 & MT2 trunnions.

SERIES 'TAS' DIMENSIONS: TRUNNION MOUNTS

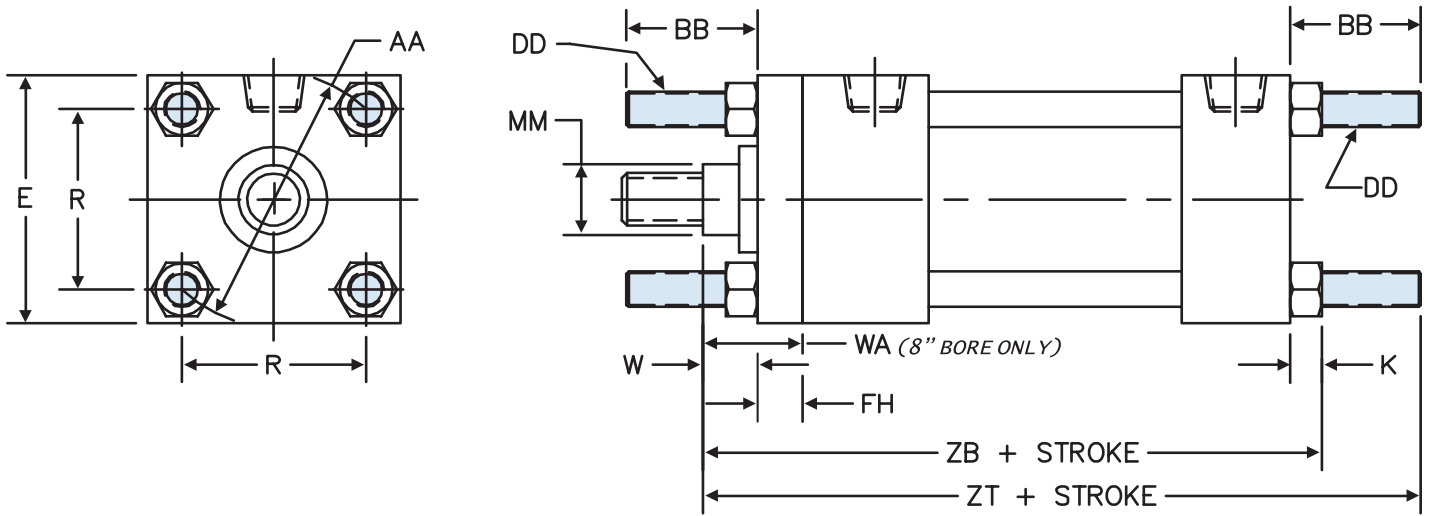
BORE	ROD DIA. (MM)	E	BD	① TD	TL	TM	UM	UT	UV	XG	② XI	MT4 MIN STROKE	ADD TO STROKE	
													XJ	ZB
1.50	0.625	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.250	0.375	4.125	4.875
	1.000												4.500	5.250
2.00	0.625	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.375	0.625	4.125	4.938
	1.000												4.500	5.313
	1.375												4.750	5.563
2.50	0.625	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.375	0.500	4.250	5.063
	1.000												4.625	5.438
	1.375												4.875	5.688
	1.750												5.125	5.938
3.25	1.000	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	4.250	1.000	5.000	6.000
	1.375												5.250	6.250
	1.750												5.500	6.500
	2.000												5.625	6.625
4.00	1.000	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	4.250	1.000	5.000	6.000
	1.375												5.250	6.250
	1.750												5.500	6.500
	2.000												5.625	6.625
	2.500												5.875	6.875
5.00	1.000	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	4.250	0.750	5.250	6.313
	1.375												5.500	6.563
	1.750												5.750	6.813
	2.000												5.875	6.938
	2.500												6.125	7.188
	3.000												6.125	7.188
	3.500												6.125	7.188
6.00	1.375	6.500	2.000	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.750	0.750	5.875	7.063
	1.750												6.125	7.313
	2.000												6.250	7.438
	2.500												6.500	7.688
	3.000												6.500	7.688
	3.500												6.500	7.688
	4.000												6.500	7.688
8.00	1.375	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	5.000	1.125	6.000	7.313
	1.750												6.250	7.563
	2.000												6.375	7.688
	2.500												6.625	7.938
	3.000												6.625	7.938
	3.500												6.625	7.938
	4.000												6.625	7.938
	4.500												6.625	7.938
	5.000												6.625	7.938
	5.500												6.625	7.938

① 'TD' dimension tolerance is + .000 / - .001

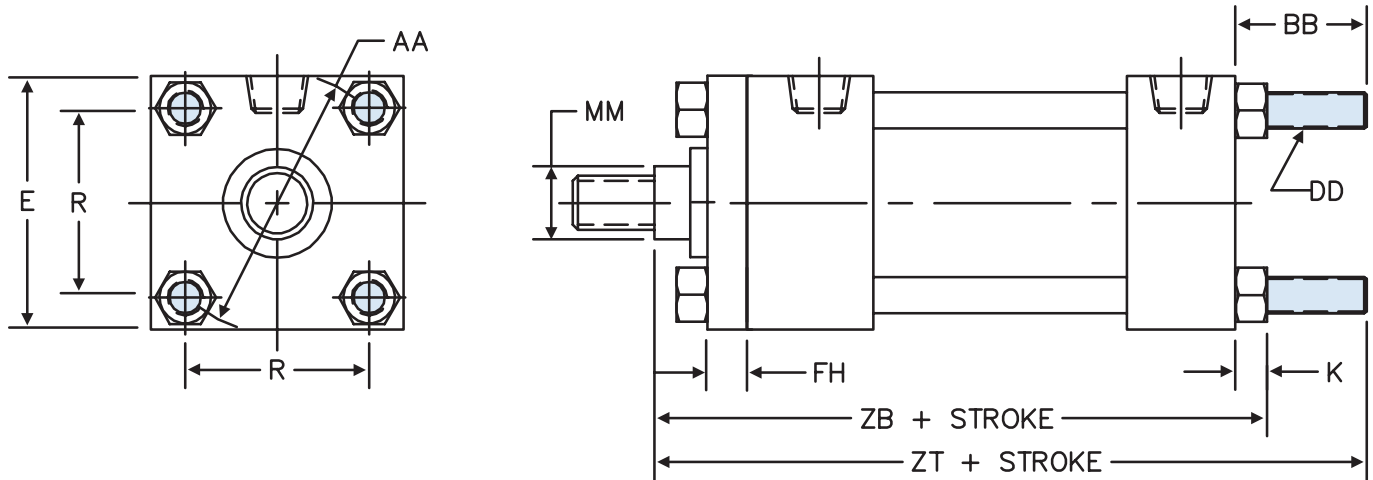
② 'XI' dimension is the minimum that can be supplied and leaves 1/8" gap between head & trunnion block; customer to specify 'XI' dimension.

SERIES 'TAS' DIMENSIONS: EXTENDED TIE ROD MOUNTS

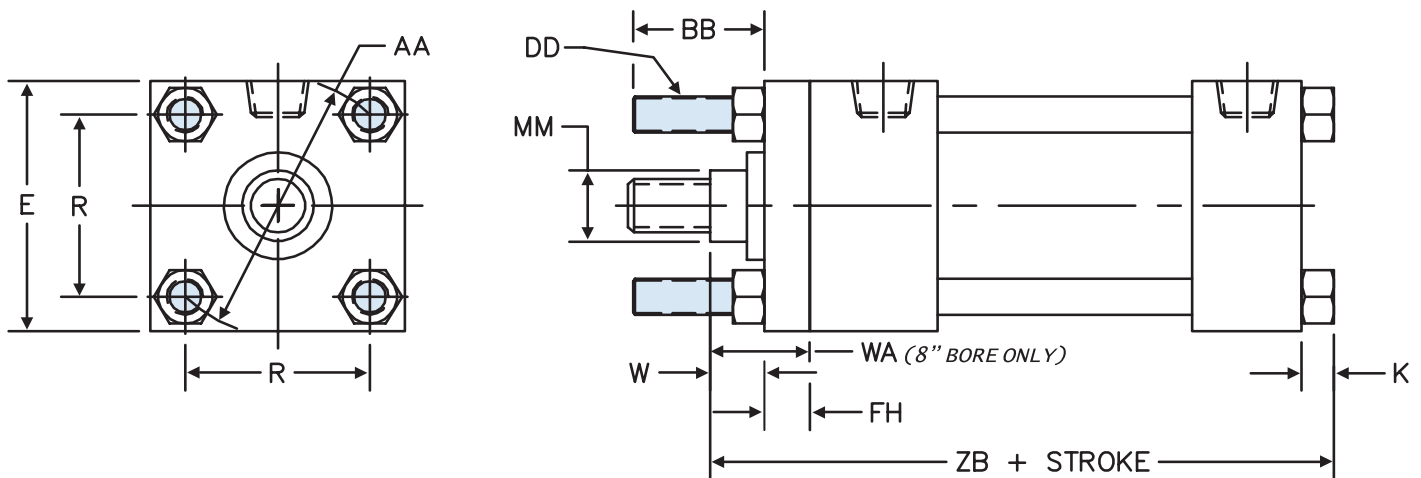
MX1: EXTENDED TIE-RODS - HEAD & CAP



MX2: EXTENDED TIE-RODS - CAP END



MX3: EXTENDED TIE-RODS - HEAD END



SERIES 'TAS' DIMENSIONS: EXTENDED TIE ROD MOUNTS

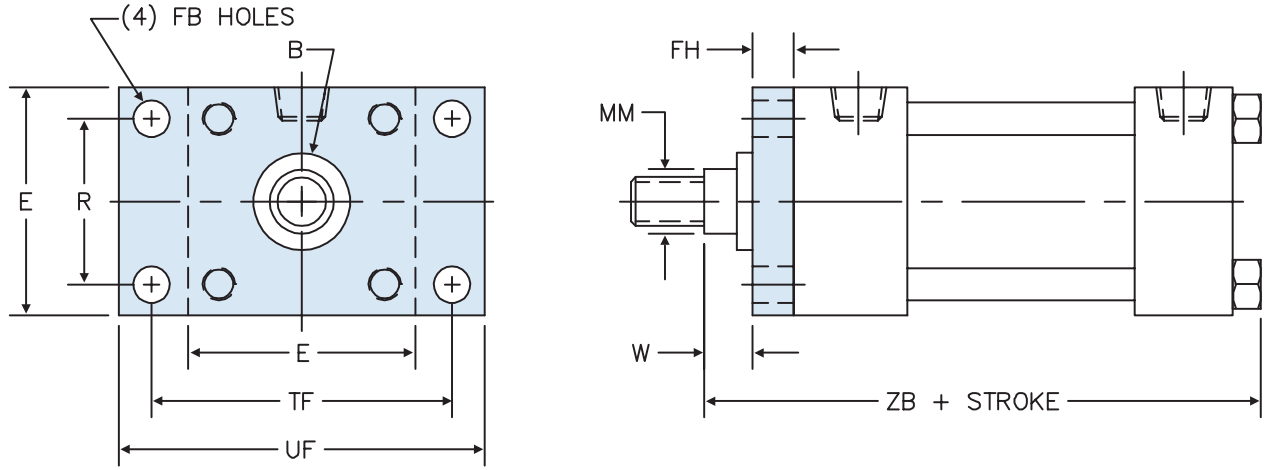
BORE	ROD DIA. (MM)	E	FH	AA	BB	DD	K	R	① RD	W or WA (8")	ADD TO STROKE		
											ZB	ZT	
1.50	0.625	2.000	0.375	2.020	1.000	1/4 - 28	0.250	1.430	SQ	0.625	4.875	5.625	
	1.000									5.250	6.000		
2.00	0.625	2.500	0.375	2.600	1.125	5/16 - 24	0.313	1.840	SQ	0.625	4.938	5.750	
	1.000									5.313	6.125		
	1.375									5.563	6.375		
2.50	0.625	3.000	0.375	3.100	1.125	5/16 - 24	0.313	2.190	SQ	0.625	5.063	5.875	
	1.000									5.438	6.250		
	1.375									5.688	6.500		
	1.750									5.938	6.750		
3.25	1.000	3.750	0.625	3.900	1.375	3/8 - 24	0.375	2.760	SQ	0.750	6.000	7.000	
	1.375									6.250	7.250		
	1.750									6.500	7.500		
	2.000									6.625	7.625		
4.00	1.000	4.500	0.625	4.700	1.375	3/8 - 24	0.375	3.320	SQ	0.750	6.000	7.000	
	1.375									6.250	7.250		
	1.750									6.500	7.500		
	2.000									6.625	7.625		
	2.500									6.875	7.875		
5.00	1.000	5.500	0.625	5.800	1.813	1/2 - 20	0.438	4.100	SQ	0.750	6.313	7.688	
	1.375									6.563	7.938		
	1.750									6.813	8.188		
	2.000									6.938	8.313		
	2.500									7.188	8.563		
	3.000									7.188	8.563		
	3.500									7.188	8.563		
6.00	1.375	6.500	0.750	6.900	1.813	1/2 - 20	0.438	4.880	SQ	0.875	7.063	8.438	
	1.750									7.313	8.688		
	2.000									7.438	8.813		
	2.500									7.688	9.063		
	3.000									7.688	9.063		
	3.500									7.688	9.063		
	4.000									7.688	9.063		
	5.000									7.688	9.063		
8.00	1.375	8.500	0.625	9.100	② 2.313	5/8 - 18	0.563	6.440	SQ	3.500	1.625	7.313	9.063
	1.750		0.625							3.500	1.875	7.563	9.313
	2.000		0.625							5.000	2.000	7.688	9.438
	2.500		0.750							5.000	2.250	7.938	9.688
	3.000		0.750							5.250	2.250	7.938	9.688
	3.500		0.750							5.625	2.250	7.938	9.688
	4.000		0.750							6.500	2.250	7.938	9.688
	4.500		0.750							7.250	2.250	7.938	9.688
	5.000		0.750							7.500	2.250	7.938	9.688
	5.500		0.750							7.500	2.250	7.938	9.688

① Where SQ is shown in chart, cylinder utilizes a full square retainer. ALL MX1 & MX3 MOUNTS USE FULL SQ. RETAINER.

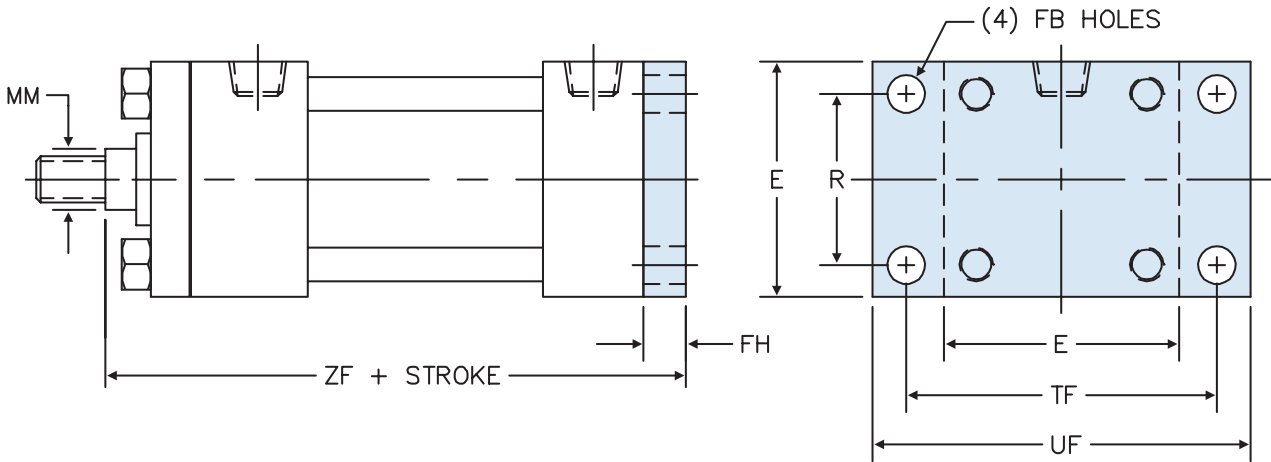
② Round retainer used to retain bushing, not a full front plate as other bores. 'BB' is dimension from head on the 8.00" bore.

SERIES 'TAS' DIMENSIONS: FLANGE MOUNTS

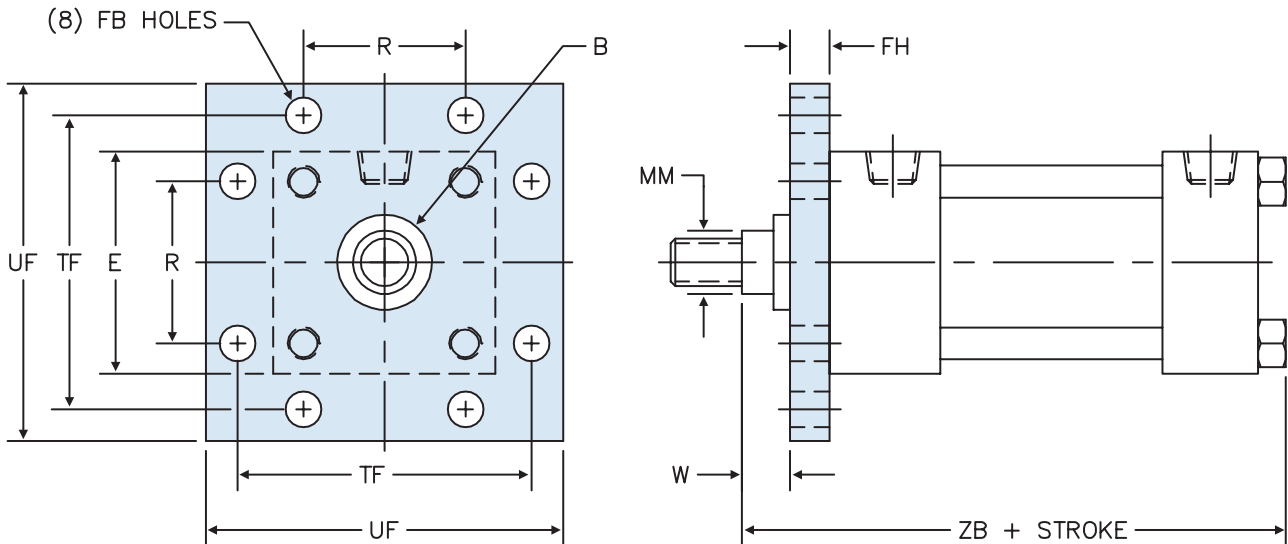
MF1: HEAD FLANGE



MF2: CAP FLANGE

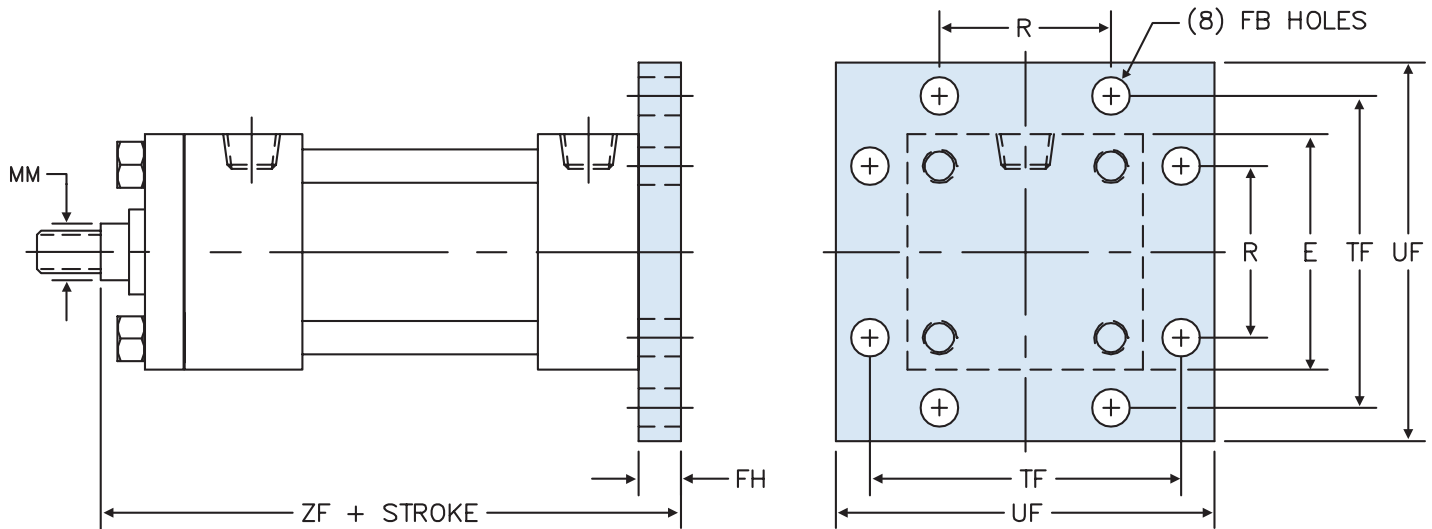


MF5: HEAD SQUARE FLANGE



SERIES 'TAS' DIMENSIONS: FLANGE MOUNTS

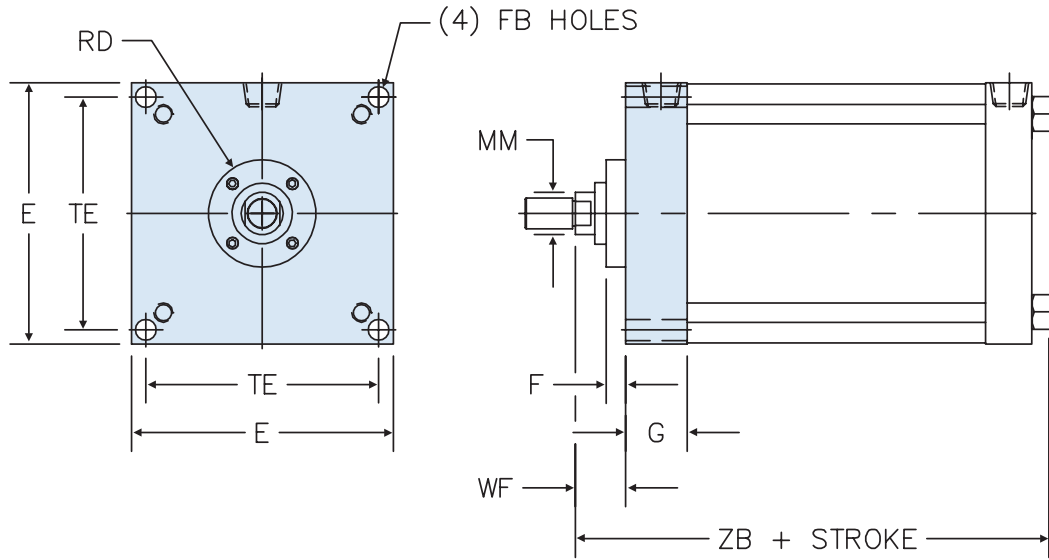
MF6: CAP SQUARE FLANGE



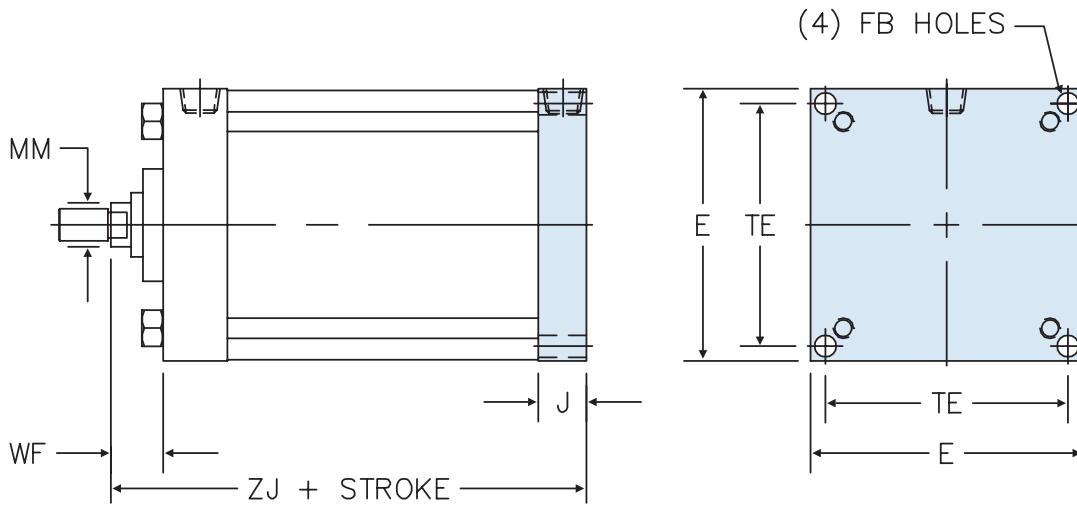
BORE	ROD DIA. (MM)	B	E	FB	FH	R	TF	UF	W	ADD TO STROKE	
										ZB	ZF
1.50	0.625	1.124	2.000	0.313	0.375	1.438	2.750	3.375	0.625	4.875	5.000
	1.000	1.499							1.000	5.250	5.375
2.00	0.625	1.124	2.500	0.375	0.375	1.844	3.375	4.125	0.625	4.938	5.000
	1.000	1.499							1.000	5.313	5.375
	1.375	1.999							1.250	5.563	5.625
2.50	0.625	1.124	3.000	0.375	0.375	2.188	3.875	4.625	0.625	5.063	5.125
	1.000	1.499							1.000	5.438	5.500
	1.375	1.999							1.250	5.688	5.750
	1.750	2.374							1.500	5.938	6.000
3.25	1.000	1.499	3.750	0.438	0.625	2.766	4.688	5.500	0.750	6.000	6.250
	1.375	1.999							1.000	6.250	6.500
	1.750	2.374							1.250	6.500	6.750
	2.000	2.624							1.375	6.625	6.875
4.00	1.000	1.499	4.500	0.438	0.625	3.328	5.438	6.250	0.750	6.000	6.250
	1.375	1.999							1.000	6.250	6.500
	1.750	2.374							1.250	6.500	6.750
	2.000	2.624							1.375	6.625	6.875
	2.500	3.124							1.625	6.875	7.125
5.00	1.000	1.499	5.500	0.563	0.625	4.109	6.625	7.625	0.750	6.313	6.500
	1.375	1.999							1.000	6.563	6.750
	1.750	2.374							1.250	6.813	7.000
	2.000	2.624							1.375	6.938	7.125
	2.500	3.124							1.625	7.188	7.375
	3.000	3.749							1.625	7.188	7.375
6.00	1.375	1.999	6.500	0.563	0.750	4.875	7.625	8.625	0.875	7.063	7.375
	1.750	2.374							1.125	7.313	7.625
	2.000	2.624							1.250	7.438	7.750
	2.500	3.124							1.500	7.688	8.000
	3.000	3.749							1.500	7.688	8.000
	3.500	4.249							1.500	7.688	8.000
	4.000	4.749							1.500	7.688	8.000

SERIES 'TAS' DIMENSIONS: FLANGE MOUNTS

ME3: HEAD SQUARE MOUNTING HOLES



ME4: CAP SQUARE MOUNTING HOLES

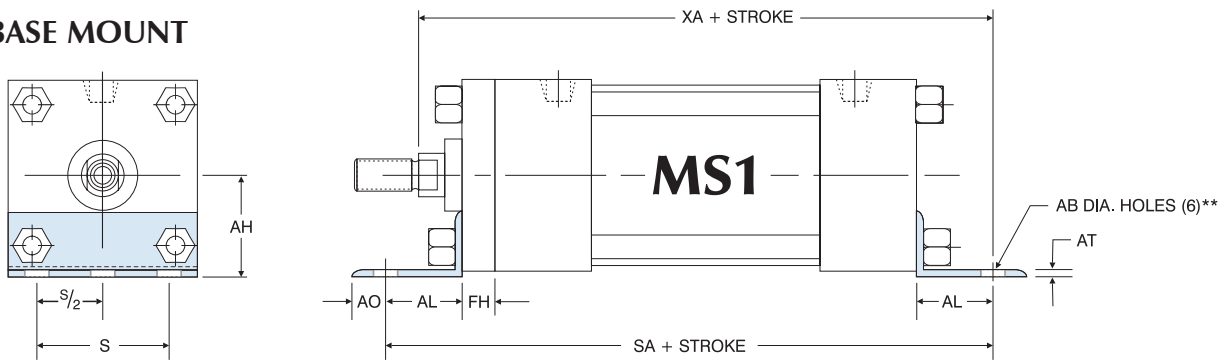


BORE	ROD DIA. (MM)	E	F	FB	G	J	TE	RD	WF	ADD TO STROKE	
										ZB	ZJ
8.00	1.375	8.500	0.625	0.688	2.000	1.500	7.570	3.500	1.625	7.313	6.750
	1.750		0.625					3.500	1.875	7.563	7.000
	2.000		0.625					5.000	2.000	7.688	7.125
	2.500		0.750					5.000	2.250	7.938	7.375
	3.000		0.750					5.250	2.250	7.938	7.375
	3.500		0.750					5.625	2.250	7.938	7.375
	4.000		0.750					6.500	2.250	7.938	7.375
	4.500		0.750					7.250	2.250	7.938	7.375
	5.000		0.750					7.500	2.250	7.938	7.375
	5.500		0.750					7.500	2.250	7.938	7.375

TAS - How To Order
 TAS - Base Dimensions
 TAS - Single Rod Mounts
 TAS - Double Rod Mounts
 Options Page 189
 Accessories Page 227
 Switches Page 241
 Technical Data Page 277

SERIES 'TAS' DIMENSIONS: BASE MOUNTS

MS1: BASE MOUNT

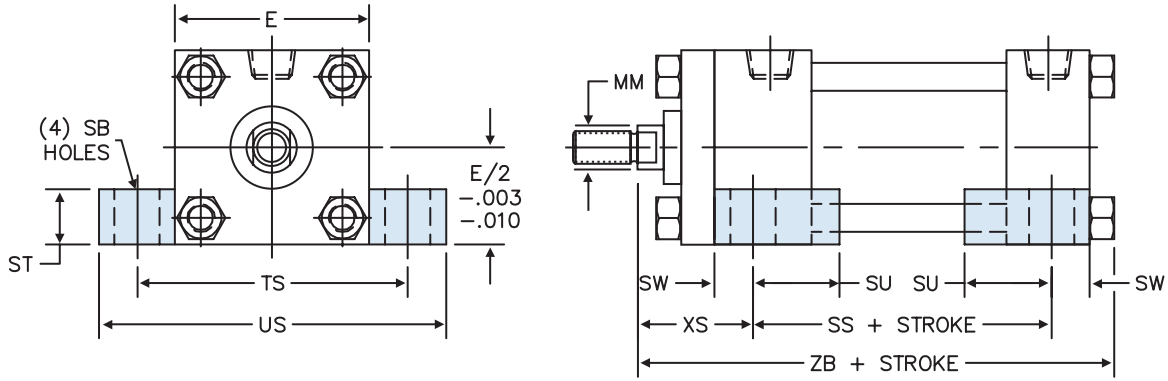


'MS1' ANGLE MOUNT DIMENSIONS										
BORE	ROD DIA. (MM)	AB	AH	AL	AO	AT	FH	S	ADD TO STROKE	
									SA	XA
1.50	0.625	0.438	1.188	1.000	0.375	0.188	0.375	1.250	6.000	5.625
	1.000									6.000
2.00	0.625	0.438	1.438	1.000	0.375	0.188	0.375	1.750	6.000	5.625
	1.000									6.000
	1.375									6.250
2.50	0.625	0.438	1.625	1.000	0.375	0.188	0.375	2.250	6.125	5.750
	1.000									6.125
	1.375									6.375
	1.750									6.625
3.25	1.000	0.563	1.938	1.250	0.500	0.125	0.625	2.750	7.375	6.875
	1.375									7.125
	1.750									7.375
	2.000									7.500
4.00	1.000	0.563	2.250	1.250	0.500	0.125	0.625	3.500	7.375	6.875
	1.375									7.125
	1.750									7.375
	2.000									7.500
	2.500									7.750
5.00	1.000	0.688	2.750	1.375	0.625	0.188	0.625	4.250	7.875	7.250
	1.375									7.500
	1.750									7.750
	2.000									7.875
	2.500									8.125
	3.000									8.125
6.00	1.375	0.813	3.250	1.375	0.625	0.188	0.750	5.250	8.500	8.000
	1.750									8.250
	2.000									8.375
	2.500									8.625
	3.000									8.625
	3.500									8.625
	4.000									8.625
8.00*	1.375	0.813	4.250	1.813	0.688	0.250	0.625	7.125	8.750	8.563
	1.750						0.625			8.813
	2.000						0.625			8.938
	2.500						0.750			9.188
	3.000						0.750			9.188
	3.500						0.750			9.188
	4.000						0.750			9.188
	4.500						0.750			9.188
	5.000						0.750			9.188
	5.500						0.750			9.188

*8.00" bore utilizes a round retainer.
 **1.50" bore has (4) AB diameter holes.

SERIES 'TAS' DIMENSIONS: LUG MOUNTS

MS2: SIDE LUGS

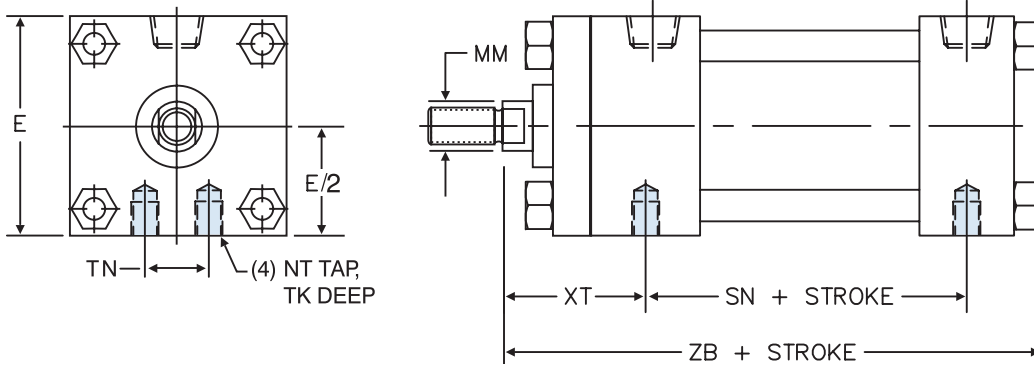


BORE	ROD DIA. (MM)	E	SB	ST	SU	SW	TS	US	XS	ADD TO STROKE	
										SS	ZB
1.50	0.625	2.000	0.438	0.500	1.125	0.375	2.750	3.500	1.375	2.875	4.875
	1.000										5.250
2.00	0.625	2.500	0.438	0.500	1.125	0.375	3.250	4.000	1.375	2.875	4.938
	1.000										5.313
	1.375								2.000		5.563
2.50	0.625	3.000	0.438	0.500	1.125	0.375	3.750	4.500	1.375	3.000	5.063
	1.000								5.438		
	1.375								5.688		
	1.750								5.938		
3.25	1.000	3.750	0.563	0.750	1.250	0.500	4.750	5.750	1.875	3.250	6.000
	1.375								6.250		
	1.750								6.500		
	2.000								6.625		
4.00	1.000	4.500	0.563	0.750	1.250	0.500	5.500	6.500	1.875	3.250	6.000
	1.375								6.250		
	1.750								6.500		
	2.000								6.625		
	2.500								6.875		
5.00	1.000	5.500	0.813	1.000	1.063	0.688	6.875	8.250	2.063	3.125	6.313
	1.375								6.563		
	1.750								6.813		
	2.000								6.938		
	2.500								7.188		
	3.000								7.188		
6.00	1.375	6.500	0.813	1.000	1.313	0.688	7.875	9.250	2.313	3.625	7.063
	1.750								7.313		
	2.000								7.438		
	2.500								7.688		
	3.000								7.688		
	3.500								7.688		
	4.000								7.688		
8.00	1.375	8.500	0.813	1.000	1.313	0.688	9.875	11.250	2.313	3.750	7.313
	1.750								7.563		
	2.000								7.688		
	2.500								7.938		
	3.000								7.938		
	3.500								7.938		
	4.000								7.938		
	4.500								7.938		
	5.000								7.938		
5.500	7.938										

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SERIES 'TAS' DIMENSIONS: BOTTOM MOUNTS

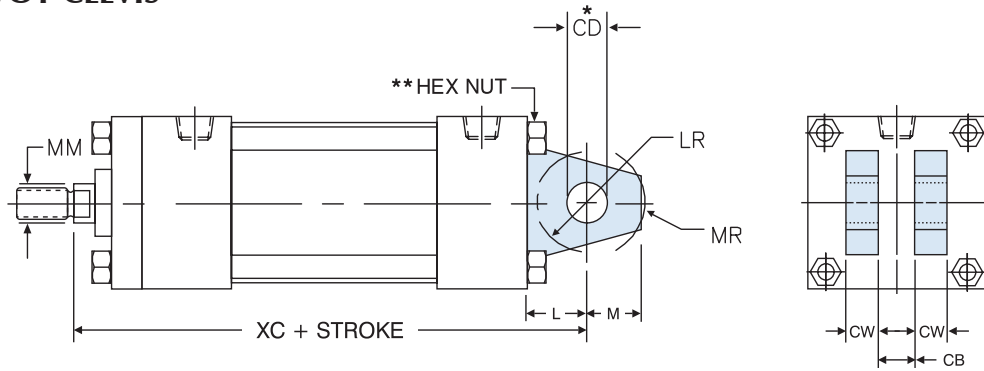
MS4: BOTTOM TAPPED HOLES



BORE	ROD DIA. (MM)	E	NT	TN	TK	XT	ADD TO STROKE	
							SN	ZB
1.50	0.625	2.000	1/4 - 20	0.625	0.375	1.938	2.250	4.875
	1.000					2.313		5.250
2.00	0.625	2.500	5/16 - 18	0.875	0.500	1.938	2.250	4.938
	1.000				0.500	2.313		5.313
	1.375				0.375	2.563		5.563
2.50	0.625	3.000	3/8 - 16	1.250	0.625	1.938	2.375	5.063
	1.000				0.625	2.313		5.438
	1.375				0.438	2.563		5.688
	1.750				0.375	2.813		5.938
3.25	1.000	3.750	1/2 - 13	1.500	0.750	2.438	2.625	6.000
	1.375				0.750	2.688		6.250
	1.750				0.500	2.938		6.500
	2.000				0.500	3.063		6.625
4.00	1.000	4.500	1/2 - 13	2.063	0.750	2.438	2.625	6.000
	1.375				0.750	2.688		6.250
	1.750				0.750	2.938		6.500
	2.000				0.750	3.063		6.625
	2.500				0.625	3.313		6.875
5.00	1.000	5.500	5/8 - 11	2.688	1.000	2.438	2.875	6.313
	1.375				1.000	2.688		6.563
	1.750				1.000	2.938		6.813
	2.000				1.000	3.063		6.938
	2.500				1.000	3.313		7.188
	3.000				0.750	3.313		7.188
	3.500				0.625	3.313		7.188
6.00	1.375	6.500	3/4 - 10	3.250	1.125	2.813	3.125	7.063
	1.750				1.125	3.063		7.313
	2.000				1.125	3.188		7.438
	2.500				1.125	3.438		7.688
	3.000				1.125	3.438		7.688
	3.500				1.125	3.438		7.688
	4.000				1.000	3.438		7.688
8.00	1.375	8.500	3/4 - 10	4.500	1.125	2.813	3.250	7.313
	1.750					3.063		7.563
	2.000					3.188		7.688
	2.500					3.438		7.938
	3.000					3.438		7.938
	3.500					3.438		7.938
	4.000					3.438		7.938
	4.500					3.438		7.938
	5.000					3.438		7.938
	5.500					3.438		7.938

SERIES 'TAS' DIMENSIONS: PIVOT MOUNTS

MP1: REAR PIVOT CLEVIS



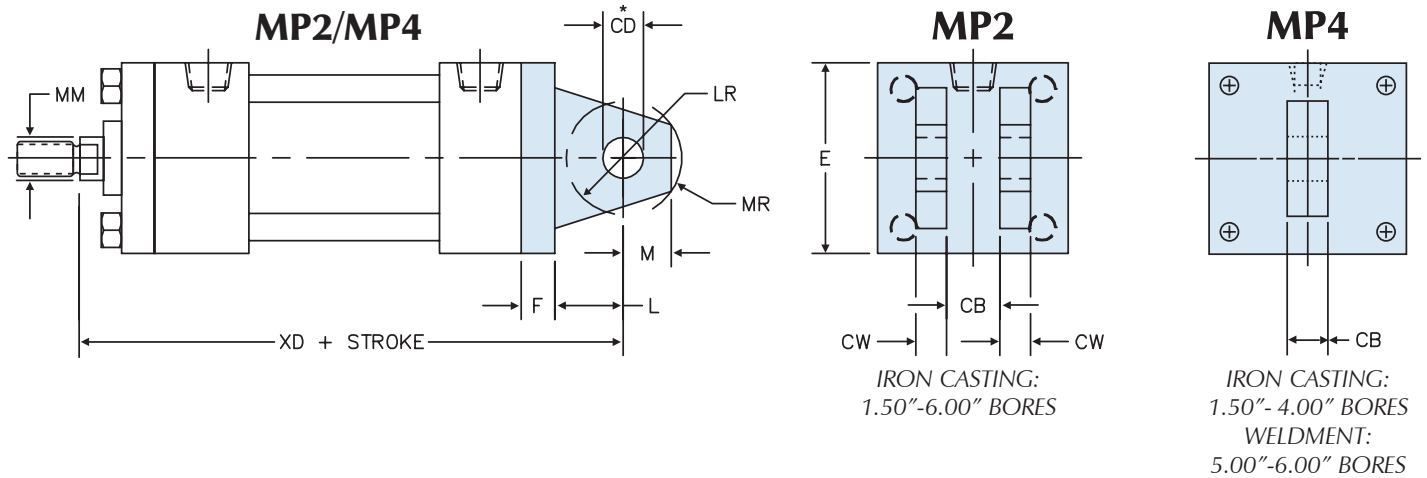
BORE	ROD DIA. (MM)	CB	CD	CW	E	L	LR	M	MR	ADD TO STROKE
										XC
1.50	0.625	0.750	0.500	0.500	2.000	0.750	0.750	0.500	0.625	5.375
	1.000									5.750
2.00	0.625	0.750	0.500	0.500	2.500	0.750	0.750	0.500	0.625	5.375
	1.000									5.750
	1.375									6.000
2.50	0.625	0.750	0.500	0.500	3.000	0.750	0.750	0.500	0.625	5.500
	1.000									5.875
	1.375									6.125
	1.750									6.375
3.25	1.000	1.250	0.750	0.625	3.750	1.250	1.000	0.750	0.938	6.875
	1.375									7.125
	1.750									7.375
	2.000									7.500
4.00	1.000	1.250	0.750	0.625	4.500	1.250	1.000	0.750	0.938	6.875
	1.375									7.125
	1.750									7.375
	2.000									7.500
	2.500									7.750
5.00	1.000	1.250	0.750	0.625	5.500	1.250	1.000	0.750	0.938	7.125
	1.375									7.375
	1.750									7.625
	2.000									7.750
	2.500									8.000
	3.000									8.000
6.00	1.375	1.500	1.000	0.750	6.500	1.500	1.250	1.000	1.188	8.125
	1.750									8.375
	2.000									8.500
	2.500									8.750
	3.000									8.750
	3.500									8.750
8.00	1.375	1.500	1.000	0.750	8.500	1.500	1.250	1.000	1.188	8.250
	1.750									8.500
	2.000									8.625
	2.500									8.875
	3.000									8.875
	3.500									8.875
	4.000									8.875
	4.500									8.875
	5.000									8.875
5.500	8.875									

*Clevis pins are provided with pivot mounts.

**Hex nuts are located on cap end (4.00"-8.00" bores).

SERIES 'TAS' DIMENSIONS: PIVOT MOUNTS

MP2 & MP4: REAR PIVOT DETACHABLE CLEVIS

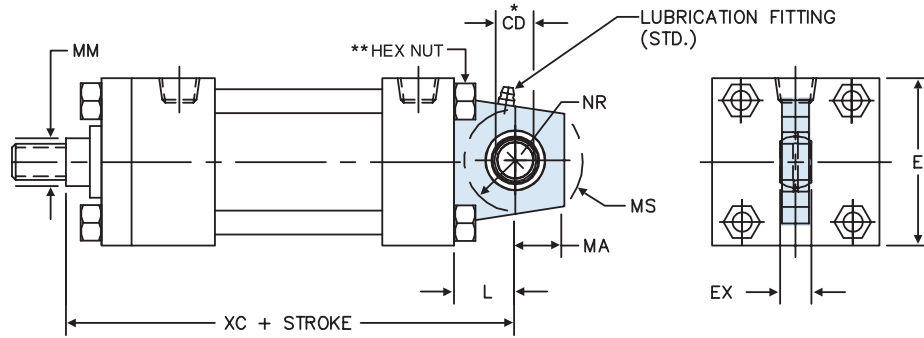


BORE	ROD DIA. (MM)	CB	CD	CW	E	F	L	LR	M	MR	ADD TO STROKE
											XD
1.50	0.625	0.750	0.500	0.500	2.000	0.375	0.750	0.750	0.500	0.625	5.750
	1.000										6.125
2.00	0.625	0.750	0.500	0.500	2.500	0.375	0.750	0.750	0.500	0.625	5.750
	1.000										6.125
	1.375										6.375
2.50	0.625	0.750	0.500	0.500	3.000	0.375	0.750	0.750	0.500	0.625	5.875
	1.000										6.250
	1.375										6.500
	1.750										6.750
3.25	1.000	1.250	0.750	0.625	3.750	0.625	1.250	1.000	0.750	0.938	7.500
	1.375										7.750
	1.750										8.000
	2.000										8.125
4.00	1.000	1.250	0.750	0.625	4.500	0.625	1.250	1.000	0.750	0.938	7.500
	1.375										7.750
	1.750										8.000
	2.000										8.125
	2.500										8.375
5.00	1.000	1.250	0.750	0.625	5.500	0.625	1.250	1.000	0.750	0.938	7.750
	1.375										8.000
	1.750										8.250
	2.000										8.375
	2.500										8.625
	3.000										8.625
6.00	1.375	1.500	1.000	0.750	6.500	0.750	1.500	1.250	1.000	1.188	8.625
	1.750										9.125
	2.000										9.250
	2.500										9.500
	3.000										9.500
	3.500										9.500
	4.000										9.500

*Clevis pins are provided with pivot mounts.

SERIES 'TAS' DIMENSIONS: SPHERICAL BEARING MOUNT

SB: SPHERICAL BEARING



BORE	ROD DIA. (MM)	CD	E	EX	L	MA	MS	NR	ADD TO STROKE
									XC
1.50	0.625	0.500	2.000	0.437	0.750	0.750	0.938	0.625	5.375
	1.000								5.750
2.00	0.625	0.500	2.500	0.437	0.750	0.750	0.938	0.625	5.375
	1.000								5.750
	1.375								6.000
2.50	0.625	0.500	3.000	0.437	0.750	0.750	0.938	0.625	5.500
	1.000								5.875
	1.375								6.125
	1.750								6.375
3.25	1.000	0.750	3.750	0.656	1.250	1.000	1.375	1.000	6.875
	1.375								7.125
	1.750								7.375
	2.000								7.500
4.00	1.000	0.750	4.500	0.656	1.250	1.000	1.375	1.000	6.875
	1.375								7.125
	1.750								7.375
	2.000								7.500
	2.500								7.750
5.00	1.000	0.750	5.500	0.656	1.250	1.000	1.375	1.000	7.125
	1.375								7.375
	1.750								7.625
	2.000								7.750
	2.500								8.000
	3.000								8.000
6.00	1.375	1.000	6.500	0.875	1.500	1.250	1.688	1.250	8.125
	1.750								8.375
	2.000								8.500
	2.500								8.750
	3.000								8.750
	3.500								8.750
	4.000								8.750
8.00	1.375	1.000	8.500	0.875	1.500	1.250	1.688	1.250	8.250
	1.750								8.500
	2.000								8.625
	2.500								8.875
	3.000								8.875
	3.500								8.875
	4.000								8.875
	4.500								8.875
	5.000								8.875
5.500	8.875								

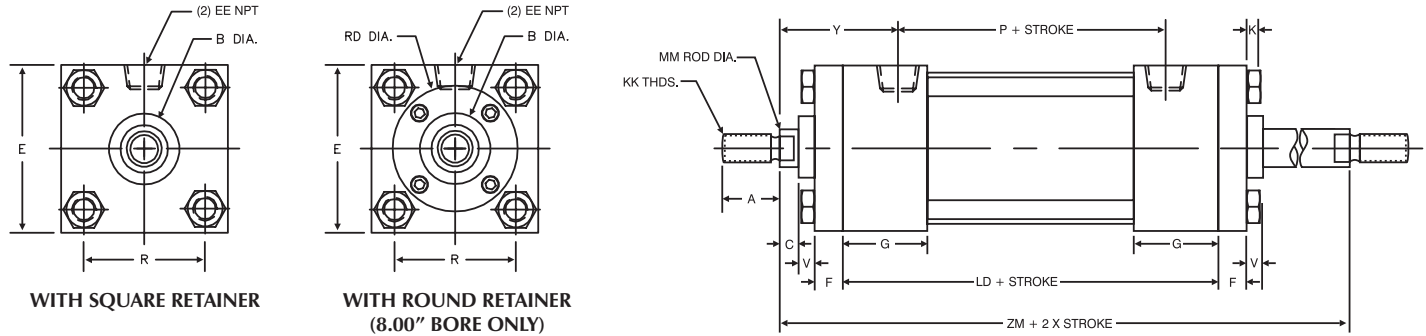
*Clevis pins are provided with pivot mounts.

**Hex nuts are located on cap end (3.25"-8.00" bores).

Note: Must specify KK3 rod end if to be used with 'HH-MSRE' series rod eye.

SERIES 'TAS' DIMENSIONS: BASIC DOUBLE ROD END MOUNTS

MX0D: NO MOUNT



BORE	ROD DIA. (MM)	A	B	C	E	EE NPT	F	G	K	KK	LD	P	R	RD	V	Y	ZM
1.50	0.625	0.750	1.124	0.375	2.000	3/8	0.375	1.500	0.250	SEE ROD END DETAIL CHART ON PAGE 160	4.125	2.375	1.438	SQ	0.250	1.875	6.125
	1.000	1.125	1.499	0.500											0.500	2.250	6.875
2.00	0.625	0.750	1.124	0.375	2.500	3/8	0.375	1.500	0.313		4.125	2.375	1.844	SQ	0.250	1.875	6.125
	1.000	1.125	1.499	0.500											0.500	2.250	6.875
	1.375	1.625	1.999	0.625							0.625	2.500	7.375				
2.50	0.625	0.750	1.124	0.375	3.000	3/8	0.375	1.500	0.313		4.250	2.500	2.188	SQ	0.250	1.875	6.250
	1.000	1.125	1.499	0.500											0.500	2.250	7.000
	1.375	1.625	1.999	0.625											0.625	2.500	7.500
	1.750	2.000	2.374	0.750											0.750	2.750	8.000
3.25	1.000	1.125	1.499	0.500	3.750	1/2	0.625	1.750	0.375		4.750	2.750	2.766	SQ	0.250	2.375	7.500
	1.375	1.625	1.999	0.625											0.375	2.625	8.000
	1.750	2.000	2.374	0.750											0.500	2.875	8.500
	2.000	2.250	2.624	0.875						0.500					3.000	8.750	
4.00	1.000	1.125	1.499	0.500	4.500	1/2	0.625	1.750	0.375	4.750	2.750	3.328	SQ	0.250	2.375	7.500	
	1.375	1.625	1.999	0.625										0.375	2.625	8.000	
	1.750	2.000	2.374	0.750										0.500	2.875	8.500	
	2.000	2.250	2.624	0.875										0.500	3.000	8.750	
	2.500	3.000	3.124	1.000										0.625	3.250	9.250	
5.00	1.000	1.125	1.499	0.500	5.500	1/2	0.625	1.750	0.438	5.000	3.000	4.109	SQ	0.250	2.375	7.750	
	1.375	1.625	1.999	0.625										0.375	2.625	8.250	
	1.750	2.000	2.374	0.750										0.500	2.875	8.750	
	2.000	2.250	2.624	0.875										0.500	3.000	9.000	
	2.500	3.000	3.124	1.000										0.625	3.250	9.500	
	3.000	3.500	3.749	1.000										0.625	3.250	9.500	
	3.500	3.500	4.249	1.000										0.625	3.250	9.500	
6.00	1.375	1.625	1.999	0.625	6.500	3/4	0.750	2.000	0.438	5.500	3.250	4.875	SQ	0.250	2.750	8.750	
	1.750	2.000	2.374	0.750										0.375	3.000	9.250	
	2.000	2.250	2.624	0.875										0.375	3.125	9.500	
	2.500	3.000	3.124	1.000										0.500	3.375	10.000	
	3.000	3.500	3.749	1.000										0.500	3.375	10.000	
	3.500	3.500	4.249	1.000										0.500	3.375	10.000	
	4.000	4.000	4.749	1.000										0.500	3.375	10.000	
	8.00	1.375	1.625	1.999										0.625	8.500	3/4	0.625
1.750		2.000	2.374	0.750	0.625	3.500	0.375	3.000	9.375								
2.000		2.250	2.624	0.875	0.625	5.000	0.375	3.125	9.625								
2.500		3.000	3.124	1.000	0.750	5.000	0.500	3.375	10.125								
3.000		3.500	3.749	1.000	0.750	5.250	0.500	3.375	10.125								
3.500		3.500	4.249	1.000	0.750	5.625	0.500	3.375	10.125								
4.000		4.000	4.749	1.000	0.750	6.500	0.500	3.375	10.125								
4.500		4.500	5.249	1.000	0.750	7.250	0.500	3.375	10.125								
5.000		5.000	5.749	1.000	0.750	7.500	0.500	3.375	10.125								
5.500		5.500	6.249	1.000	0.750	7.500	0.500	3.375	10.125								

① Where SQ is shown in chart, cylinder utilizes a full square retainer.

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

TAS - How To Order

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TAS - Double Rod Mounts

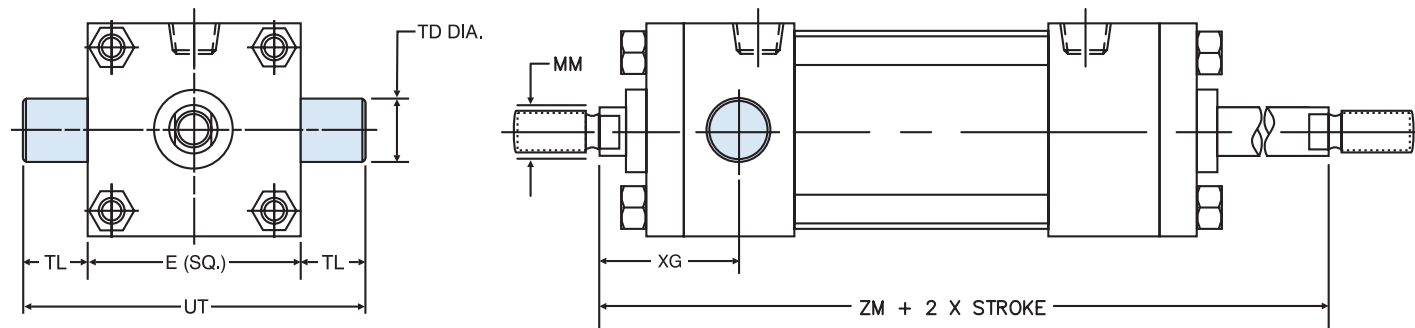
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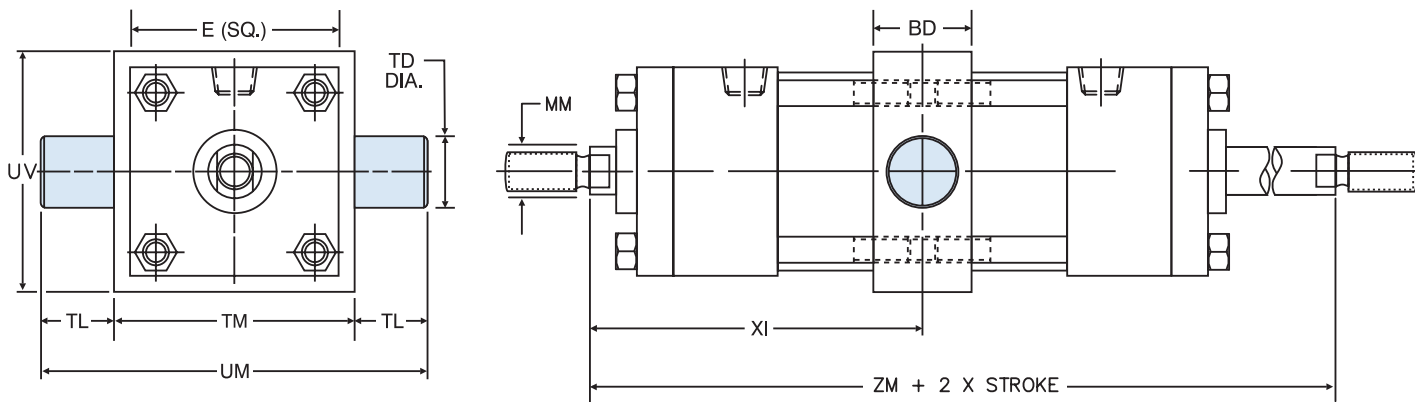
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MT1D: HEAD TRUNNION



MT4D: INTERMEDIATE TRUNNION



Note: 'XI' dimensions to be specified by customer.

'MT1D', 'MT4D' STANDARD CUSHION LOCATIONS		
MOUNT	HEAD CUSHION	CAP CUSHION
MT1D	3	6
MT4D	2	6

Note: Ports or cushions cannot be on same side as MT1D trunnions.

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

BORE	ROD DIA. (MM)	E	BD	① TD	TL	TM	UM	UT	UV	XG	② XI	MT4D MIN STROKE	ADD 2X STROKE
													ZM
1.50	0.625	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.250	0.375	6.125
	1.000									2.125	3.625		6.875
2.00	0.625	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.375	0.625	6.125
	1.000									2.125	3.750		6.875
	1.375									2.375	4.000		7.375
2.50	0.625	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.375	0.500	6.250
	1.000									2.125	3.750		7.000
	1.375									2.375	4.000		7.500
	1.750									2.625	4.250		8.000
	2.000									2.875	4.500		8.500
3.25	1.000	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	4.250	1.000	7.500
	1.375									2.500	4.500		8.000
	1.750									2.750	4.750		8.500
	2.000									2.875	4.875		8.750
4.00	1.000	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	4.250	1.000	7.500
	1.375									2.500	4.500		8.000
	1.750									2.750	4.750		8.500
	2.000									2.875	4.875		8.750
	2.500									3.125	5.125		9.250
5.00	1.000	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	4.250	0.750	7.750
	1.375									2.500	4.500		8.250
	1.750									2.750	4.750		8.750
	2.000									2.875	4.875		9.000
	2.500									3.125	5.125		9.500
	3.000									3.125	5.125		9.500
	3.500									3.125	5.125		9.500
6.00	1.375	6.500	2.000	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.750	0.750	8.750
	1.750									2.875	5.000		9.250
	2.000									3.000	5.125		9.500
	2.500									3.250	5.375		10.000
	3.000									3.250	5.375		10.000
	3.500									3.250	5.375		10.000
	4.000									3.250	5.375		10.000
8.00	1.375	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	5.000	1.125	8.875
	1.750									2.875	5.250		9.375
	2.000									3.000	5.375		9.625
	2.500									3.250	5.625		10.125
	3.000									3.250	5.625		10.125
	3.500									3.250	5.625		10.125
	4.000									3.250	5.625		10.125
	4.500									3.250	5.625		10.125
	5.000									3.250	5.625		10.125
	5.500									3.250	5.625		10.125

① 'TD' dimension tolerance is + .000 / - .001

② 'XI' dimension is the minimum that can be supplied and leaves 1/8" gap between head & trunnion block (customer to specify 'XI' dimension).

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

TAS - How To Order

TAS - Base Dimensions

TAS - Single Rod Mounts

TAS - Double Rod Mounts

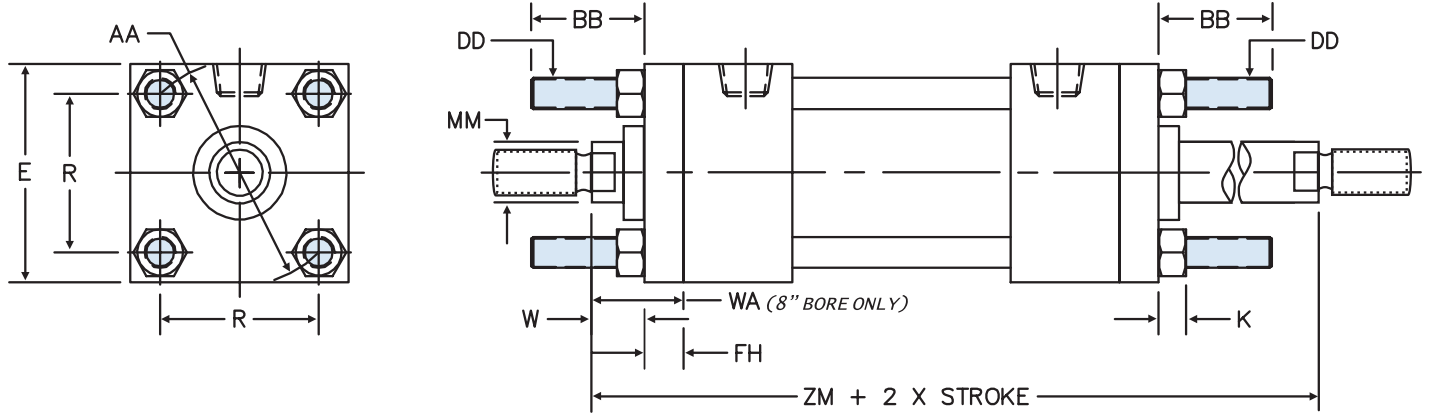
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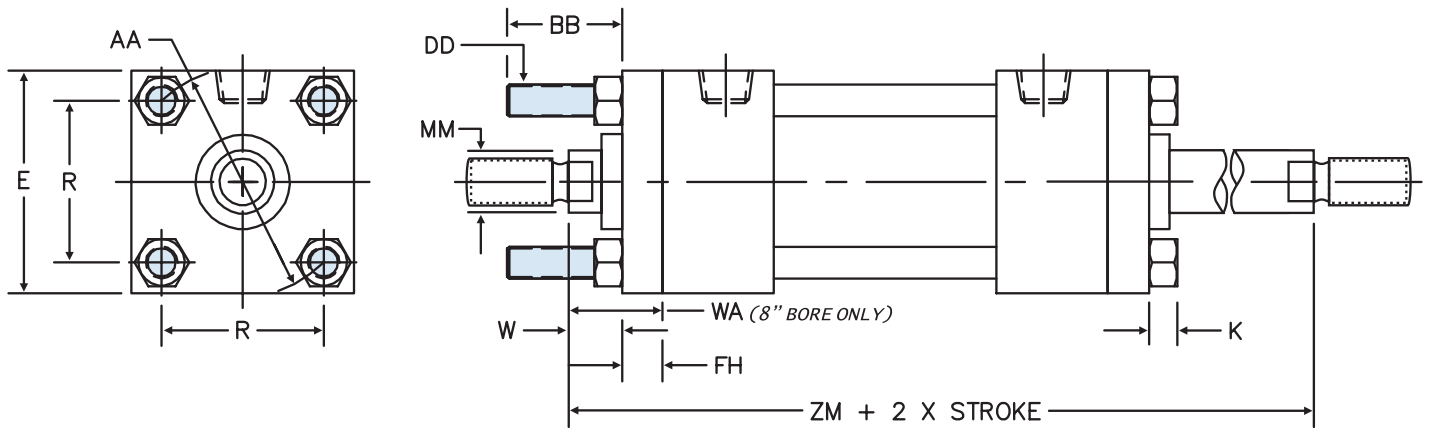
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MX1D: EXTENDED TIE RODS - HEAD & CAP



MX3D: EXTENDED TIE RODS - HEAD END



SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

BORE	ROD DIA. (MM)	E	FH	AA	BB	DD	K	R	① RD	W or WA (8")	ADD 2X STROKE
										ZM	ZM
1.50	0.625	2.000	0.375	2.020	1.000	1/4 - 28	0.250	1.430	SQ	0.625	6.125
	1.000									6.875	
2.00	0.625	2.500	0.375	2.600	1.125	5/16 - 24	0.313	1.840	SQ	0.625	6.125
	1.000									6.875	
	1.375									7.375	
2.50	0.625	3.000	0.375	3.100	1.125	5/16 - 24	0.313	2.190	SQ	0.625	6.250
	1.000									7.000	
	1.375									7.500	
	1.750									8.000	
3.25	1.000	3.750	0.625	3.900	1.375	3/8 - 24	0.375	2.760	SQ	0.750	7.500
	1.375									8.000	
	1.750									8.500	
	2.000									8.750	
4.00	1.000	4.500	0.625	4.700	1.375	3/8 - 24	0.375	3.320	SQ	0.750	7.500
	1.375									8.000	
	1.750									8.500	
	2.000									8.750	
	2.500									9.250	
5.00	1.000	5.500	0.625	5.800	1.813	1/2 - 20	0.438	4.100	SQ	0.750	7.750
	1.375									8.250	
	1.750									8.750	
	2.000									9.000	
	2.500									9.500	
	3.000									9.500	
	3.500									9.500	
6.00	1.375	6.500	0.750	6.900	1.813	1/2 - 20	0.438	4.880	SQ	0.875	8.750
	1.750									9.250	
	2.000									9.500	
	2.500									10.000	
	3.000									10.000	
	3.500									10.000	
	4.000									10.000	
8.00	1.375	8.500	0.625	9.100	② 2.313	5/8 - 18	0.563	6.440	3.500	1.500	8.875
	1.750		0.625						3.500	1.750	9.375
	2.000		0.625						5.000	1.875	9.625
	2.500		0.750						5.000	2.125	10.125
	3.000		0.750						5.250	2.125	10.125
	3.500		0.750						5.625	2.125	10.125
	4.000		0.750						6.500	2.125	10.125
	4.500		0.750						7.250	2.125	10.125
	5.000		0.750						7.500	2.125	10.125
	5.500		0.750						7.500	2.125	10.125

① Where SQ is shown in chart, cylinder utilizes a full square retainer.

② Round retainer used to retain bushing, not a full front plate as other bores. 'BB' is dimension from head on the 8.00" bore.

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

TAS - How To Order

TAS - Base Dimensions

TAS - Single Rod Mounts

TAS - Double Rod Mounts

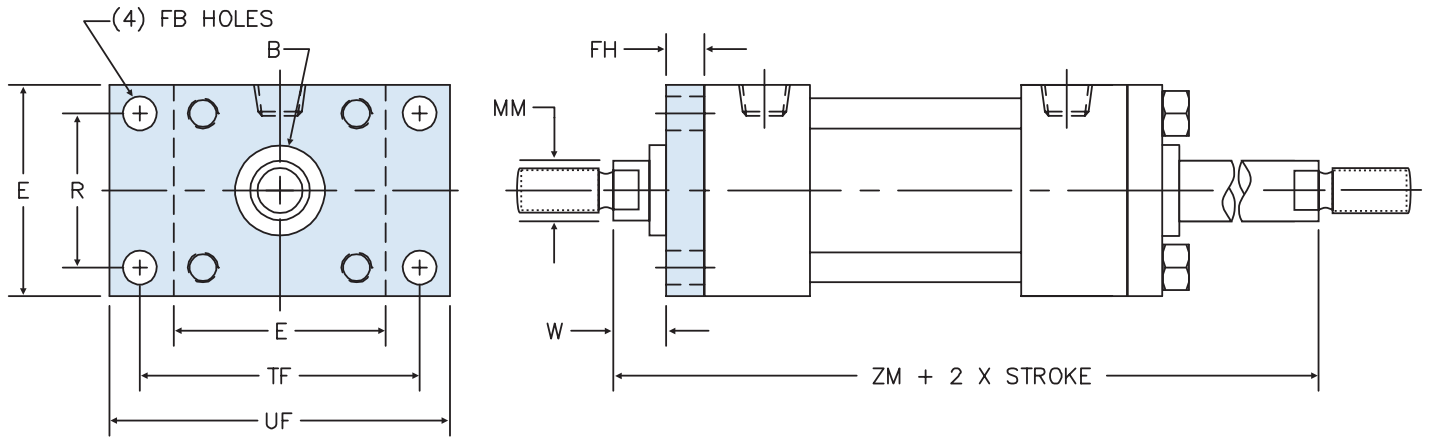
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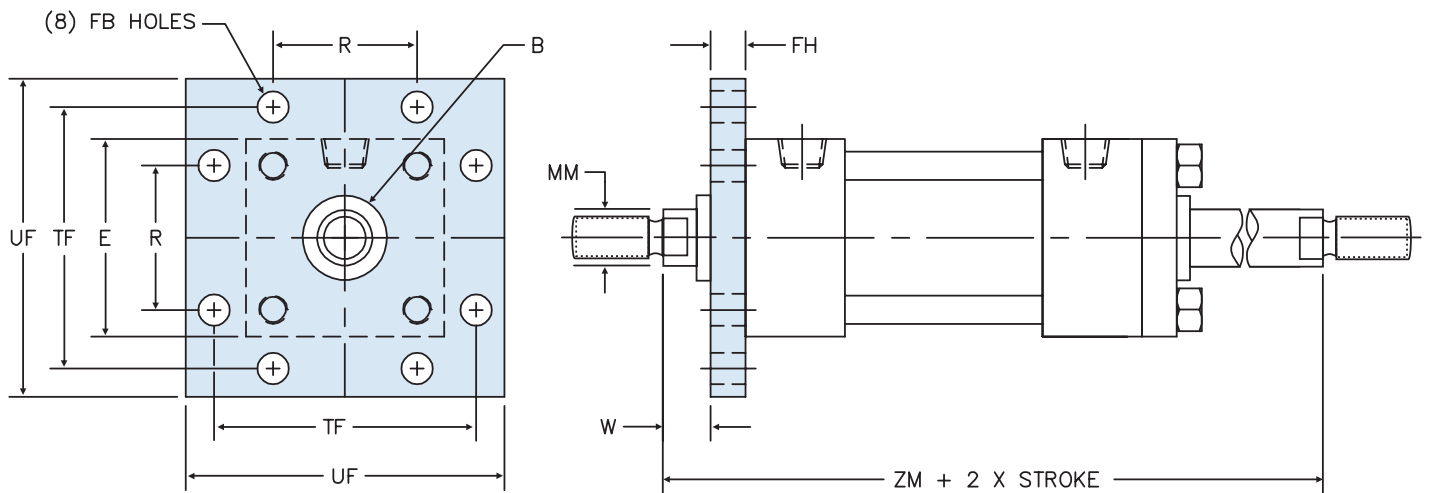
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MF1D: HEAD FLANGE



MF5D: HEAD SQUARE FLANGE



SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

BORE	ROD DIA. (MM)	B	E	FB	FH	R	TF	UF	W	ADD 2X STROKE
										ZM
1.50	0.625	1.124	2.000	0.313	0.375	1.430	2.750	3.375	0.625	6.125
	1.000	1.499							1.000	6.875
2.00	0.625	1.124	2.500	0.375	0.375	1.840	3.375	4.125	0.625	6.125
	1.000	1.499							1.000	6.875
	1.375	1.999							1.250	7.375
2.50	0.625	1.124	3.000	0.375	0.375	2.190	3.875	4.625	0.625	6.250
	1.000	1.499							1.000	7.000
	1.375	1.999							1.250	7.500
	1.750	2.374							1.500	8.000
3.25	1.000	1.499	3.750	0.438	0.625	2.760	4.688	5.500	0.750	7.500
	1.375	1.999							1.000	8.000
	1.750	2.374							1.250	8.500
	2.000	2.624							1.375	8.750
4.00	1.000	1.499	4.500	0.438	0.625	3.320	5.438	6.250	0.750	7.500
	1.375	1.999							1.000	8.000
	1.750	2.374							1.250	8.500
	2.000	2.624							1.375	8.750
	2.500	3.124							1.625	9.250
5.00	1.000	1.499	5.500	0.563	0.625	4.100	6.625	7.625	0.750	7.750
	1.375	1.999							1.000	8.250
	1.750	2.374							1.250	8.750
	2.000	2.624							1.375	9.000
	2.500	3.124							1.625	9.500
	3.000	3.749							1.625	9.500
6.00	1.375	1.999	6.500	0.563	0.750	4.880	7.625	8.625	0.875	8.750
	1.750	2.374							1.125	9.250
	2.000	2.624							1.250	9.500
	2.500	3.124							1.500	10.000
	3.000	3.749							1.500	10.000
	3.500	4.249							1.500	10.000
	4.000	4.749							1.500	10.000

TAS - How To
Order

TAS - Base
Dimensions

TAS - Single Rod
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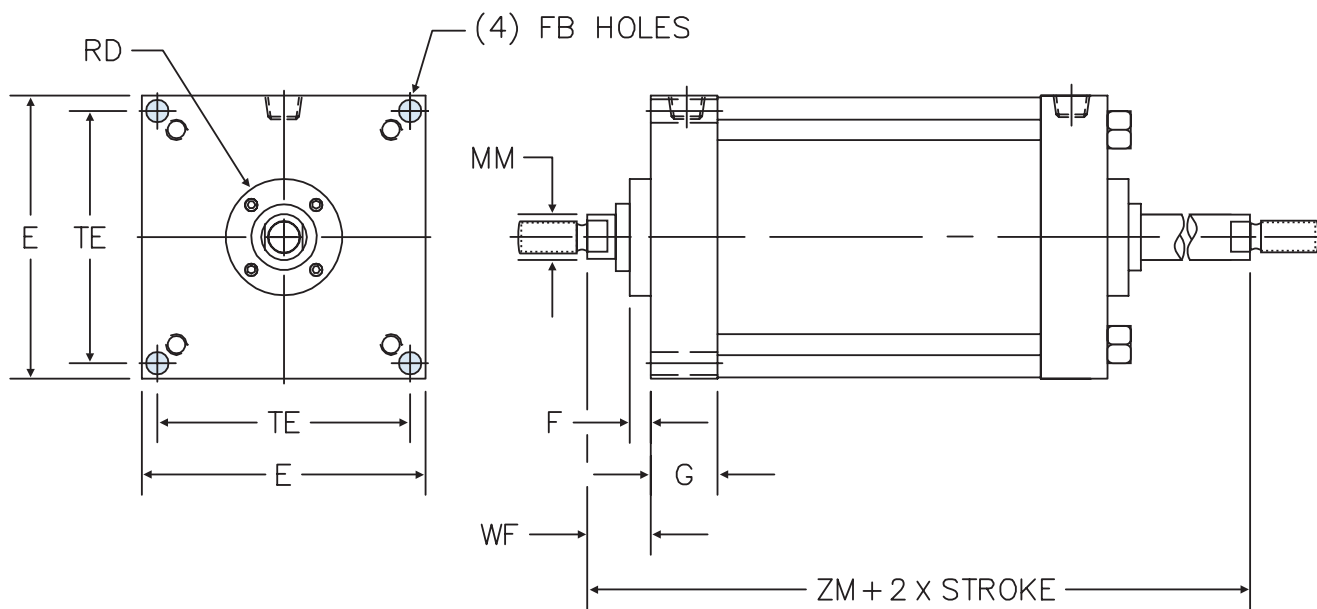
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SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

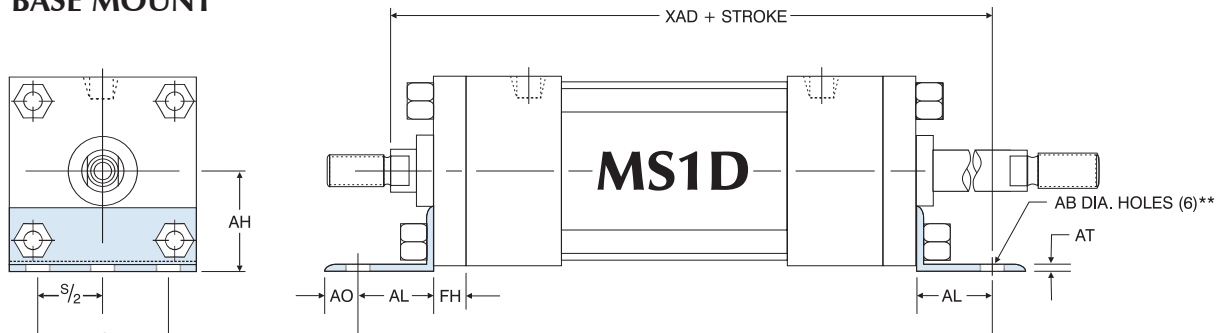
ME3D: HEAD SQUARE MOUNTING HOLES



BORE	ROD DIA. (MM)	E	F	FB	G	TE	RD	WF	ADD 2X STROKE
									ZM
8.00	1.375	8.500	0.625	0.688	2.000	7.570	3.500	1.625	8.875
	1.750		0.625				3.500	1.875	9.375
	2.000		0.625				5.000	2.000	9.625
	2.500		0.750				5.000	2.250	10.125
	3.000		0.750				5.250	2.250	10.125
	3.500		0.750				5.625	2.250	10.125
	4.000		0.750				6.500	2.250	10.125
	4.500		0.750				7.250	2.250	10.125
	5.000		0.750				7.500	2.250	10.125
	5.500		0.750				7.500	2.250	10.125

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

MS1D: BASE MOUNT



'MS1D' ANGLE MOUNT DIMENSIONS

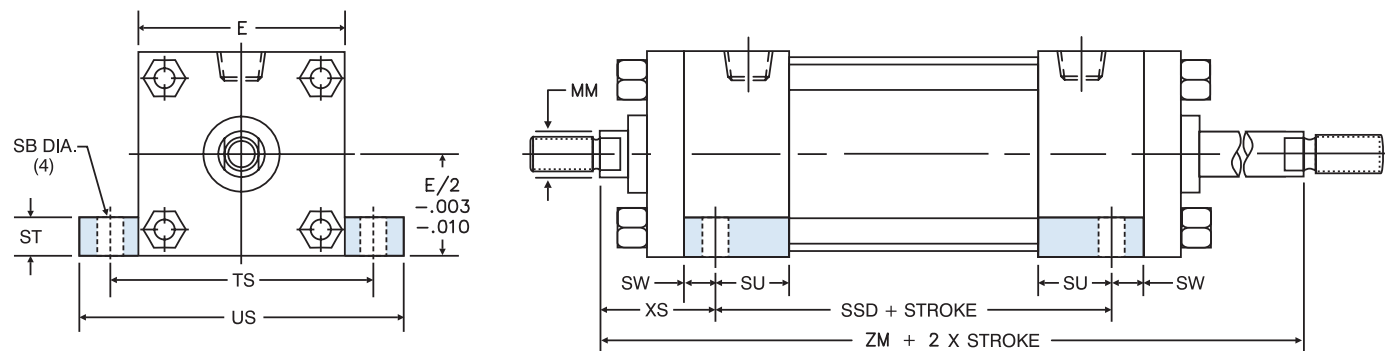
BORE	ROD DIA. (MM)	AB	AH	AL	AO	AT	FH	S	ADD TO STROKE	
									SAD	XAD
1.50	0.625	0.438	1.188	1.000	0.375	0.188	0.375	1.250	6.875	6.500
	1.000									6.875
2.00	0.625	0.438	1.438	1.000	0.375	0.188	0.375	1.750	6.875	6.500
	1.000									6.875
	1.375									7.125
2.50	0.625	0.438	1.625	1.000	0.375	0.188	0.375	2.250	7.000	6.625
	1.000									7.000
	1.375									7.250
	1.750									7.500
3.25	1.000	0.563	1.938	1.250	0.500	0.125	0.625	2.750	8.500	8.000
	1.375									8.250
	1.750									8.500
	2.000									8.625
4.00	1.000	0.563	2.250	1.250	0.500	0.125	0.625	3.500	8.500	8.000
	1.375									8.250
	1.750									8.500
	2.000									8.625
	2.500									8.875
5.00	1.000	0.688	2.750	1.375	0.625	0.188	0.625	4.250	9.000	8.375
	1.375									8.625
	1.750									8.875
	2.000									9.000
	2.500									9.250
	3.000									9.250
6.00	1.375	0.813	3.250	1.375	0.625	0.188	0.750	5.250	9.750	9.250
	1.750									9.500
	2.000									9.625
	2.500									9.875
	3.000									9.875
	3.500									9.875
8.00*	1.375	0.813	4.250	1.813	0.688	0.250	0.625	7.125	9.250	9.063
	1.750						0.625			9.313
	2.000						0.625			9.438
	2.500						0.750			9.688
	3.000						0.750			9.688
	3.500						0.750			9.688
	4.000						0.750			9.688
	4.500						0.750			9.688
	5.000						0.750			9.688
5.500	0.750	9.688								

*8.00" bore utilizes round retainer.

**1.50" bore uses (4) "AB" holes.

SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

MS2D: SIDE LUGS

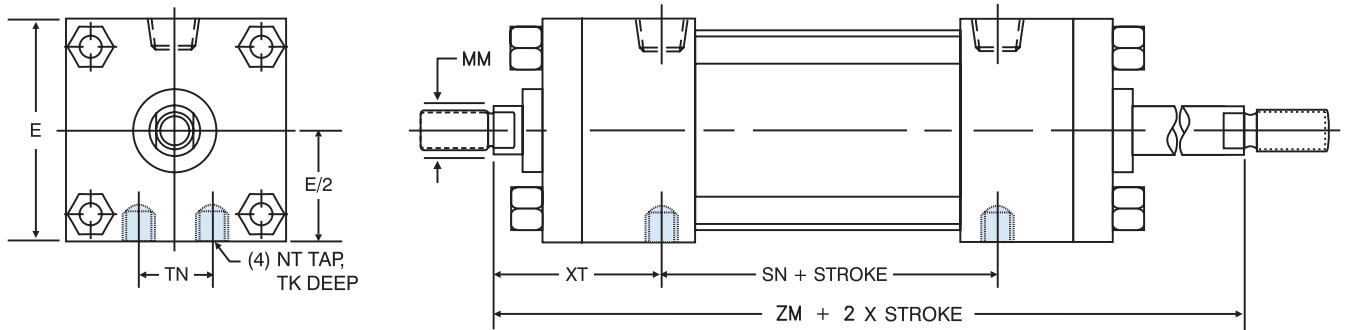


BORE	ROD DIA. (MM)	E	SB	ST	SU	SW	TS	US	XS	ADD TO STROKE	ADD 2X STROKE
										SSD	ZM
1.50	0.625	2.000	0.438	0.500	1.125	0.375	2.750	3.500	1.375	3.375	6.125
	1.000								6.875		
2.00	0.625	2.500	0.438	0.500	1.125	0.375	3.250	4.000	1.375	3.375	6.125
	1.000								6.875		
	1.375								7.375		
2.50	0.625	3.000	0.438	0.500	1.125	0.375	3.750	4.500	1.375	3.500	6.250
	1.000								7.000		
	1.375								7.500		
	1.750								8.000		
3.25	1.000	3.750	0.563	0.750	1.250	0.500	4.75	5.750	1.875	3.750	7.500
	1.375								8.000		
	1.750								8.500		
	2.000								8.750		
4.00	1.000	4.500	0.563	0.750	1.250	0.500	5.500	6.500	1.875	3.750	7.500
	1.375								8.000		
	1.750								8.500		
	2.000								8.750		
	2.500								9.250		
5.00	1.000	5.500	0.813	1.000	1.063	0.688	6.875	8.250	2.063	3.625	7.750
	1.375								8.250		
	1.750								8.750		
	2.000								9.000		
	2.500								9.500		
	3.000								9.500		
	3.500								9.500		
	2.938								9.500		
2.938	9.500										
6.00	1.375	6.500	0.813	1.000	1.313	0.688	7.875	9.250	2.313	4.125	8.750
	1.750								9.250		
	2.000								9.500		
	2.500								10.000		
	3.000								10.000		
	3.500								10.000		
	4.000								10.000		
8.00	1.375	8.500	0.813	1.000	1.313	0.688	9.875	11.250	2.313	4.250	8.875
	1.750								9.375		
	2.000								9.625		
	2.500								10.125		
	3.000								10.125		
	3.500								10.125		
	4.000								10.125		
	4.500								10.125		
	5.000								10.125		
	5.500								10.125		

TAS - How To Order
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SERIES 'TAS' DIMENSIONS: DOUBLE ROD END MOUNTS

MS4D: BOTTOM TAPPED HOLES



BORE	ROD DIA. (MM)	E	NT	TN	TK	XT	ADD TO	ADD 2X
							STROKE	STROKE
							SN	ZM
1.50	0.625	2.000	1/4 - 20	0.625	0.375	1.938	2.250	6.125
	2.313							
2.00	0.625	2.500	5/16 - 18	0.875	0.500	1.938	2.250	6.125
	1.000				2.313	6.875		
	1.375				2.563	7.375		
2.50	0.625	3.000	3/8 - 16	1.250	0.625	1.938	2.375	6.250
	1.000				2.313	7.000		
	1.375				2.563	7.500		
	1.750				2.813	8.000		
3.25	1.000	3.750	1/2 - 13	1.500	0.750	2.438	2.625	7.500
	1.375				2.688	8.000		
	1.750				2.938	8.500		
	2.000				3.063	8.750		
4.00	1.000	4.500	1/2 - 13	2.063	0.750	2.438	2.625	7.500
	1.375				2.688	8.000		
	1.750				2.938	8.500		
	2.000				3.063	8.750		
	2.500				3.313	9.250		
5.00	1.000	5.500	5/8 - 11	2.688	1.000	2.438	2.875	7.750
	1.375				2.688	8.250		
	1.750				2.938	8.750		
	2.000				3.063	9.000		
	2.500				3.313	9.500		
	3.000				3.313	9.500		
	3.500				3.313	9.500		
6.00	1.375	6.500	3/4 - 10	3.250	1.125	2.813	3.125	8.750
	1.750				3.063	9.250		
	2.000				3.188	9.500		
	2.500				3.438	10.000		
	3.000				3.438	10.000		
	3.500				3.438	10.000		
	4.000				3.438	10.000		
8.00	1.375	8.500	3/4 - 10	4.500	1.125	2.813	3.250	8.875
	1.750					3.063		9.375
	2.000					3.188		9.625
	2.500					3.438		10.125
	3.000					3.438		10.125
	3.500					3.438		10.125
	4.000					3.438		10.125
	4.500					3.438		10.125
	5.000					3.438		10.125
5.500	3.438	10.125						