

MULTI-ACT

FEATURES:

Heavy duty
outboard plate
with bushing
for large load
capacity.

Exclusive extruded
aluminum side
frames with four
full length tee
slots provide
convenient mounting

Fully adjustable
rotary stops

Fully adjustable
linear stops
with urethane
bumpers

Transition
plate

Optional rotary
switches with
position adjustment

TURN-ACT linear
actuator

Large diameter
output shaft

Unique bar clamp provides a
strong, zero backlash shaft
connection to the Multi-Act.
Output shaft is easily removed
for convenient attachment
to load.*

Linear glide system
for smooth motion

TURN-ACT patented
rotary vane actuator
featuring zero
backlash motion

Optional linear
switches with
position adjustment

MULTI-ACT

DESCRIPTION:

MULTI-ACT's Integrated Motion Actuators have an output shaft which produces both linear and rotary motions. The linear and rotary motions may be operated independently and simultaneously.

MULTI-ACT's exclusive use of Turn-Act's patented rotary vane actuators, linear glide system and large bore linear actuators provides smooth, virtually zero backlash motion...a first in multi-motion systems.

MULTI-ACTs are available in three family sizes. The MAO series are compact units for limited space applications. They are available in three stroke lengths and torques to 50 inch•pounds. The MA1 series are heavy duty units available in five stroke lengths and torques to 600 inch•pounds. The MA-2 produces up to 3600 inch•pounds and is available with strokes up to 8 inches.

MULTI-ACTs are available with optional linear and rotary switches that are fully position adjustable.

MULTI-ACTs feature linear and rotary stroke controls to permit fine tuning and repeatable motion.

Another exclusive MULTI-ACT benefit is the straight-forward model numbering system. Model numbers are virtually self explanatory.

The MULTI-ACT featured at the left is an MA1-201-601-00 Heavy Duty Series. The linear acuator housing is secured between the two side frames. The linear actuator's shaft moves the rotary acuator along the glide system. The MAO Miniature Series differs in that the linear actuator's housing is attached to the rotary actuator. The linear actuator's shaft is attached to a base plate secured between the lower ends of the side frames. Both actuators travel in the glide system.

Please feel free to contact your authorized Turn-Act distributor for additional information.

TABLE OF CONTENTS:

	Page
MULTI-ACT APPLICATIONS	2
MULTI-ACT MAO MINIATURE SERIES	6
LINEAR	Strokes 1, 2 and 4 inches Force 100 pounds at 100 psi
ROTARY	Rotations 0° to 90° and 0° to 270° Torques 25 to 50 inch•pounds at 100 psi
MULTI-ACT MA1 HEAVY DUTY SERIES	8
LINEAR	Strokes 2,4,6,9, and 12 inches Force 440 pounds at 100 psi
ROTARY	Rotations 0° to 90° and 0° to 270° Torques 150 to 600 inch•pounds at 100 psi
MULTI-ACT MA2 BRUTE FORCE SERIES	10
LINEAR	Strokes 4 and 8 inches Force 1900 pounds at 100 psi
ROTARY	Rotations 0° to 110° and 0° to 290° Torques 1800 to 3600 inch•pounds at 100 psi
OPTIONS: SWITCHES AND TRANTORQUE	12
HOW TO ORDER	13

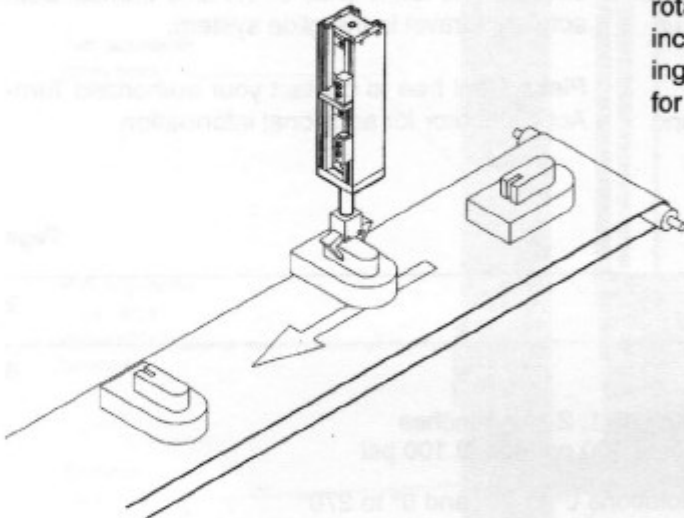
MULTI-ACT

MULTI-ACT actuators uncomplacates automation by providing two axis motion. Multi-Act's extend and rotate shaft output is ideal for applications requiring lifting and repositioning, parts transferring and clamping. The addition of slides or nonrotating rod cylinders provides a reach axis and when equipped with actuators, grippers or vacuum cups creates reliable; low cost robotics.

The following illustrations demonstrate only a few application possibilities. We encourage you to consult your Turn-Act distributor with your specific needs.

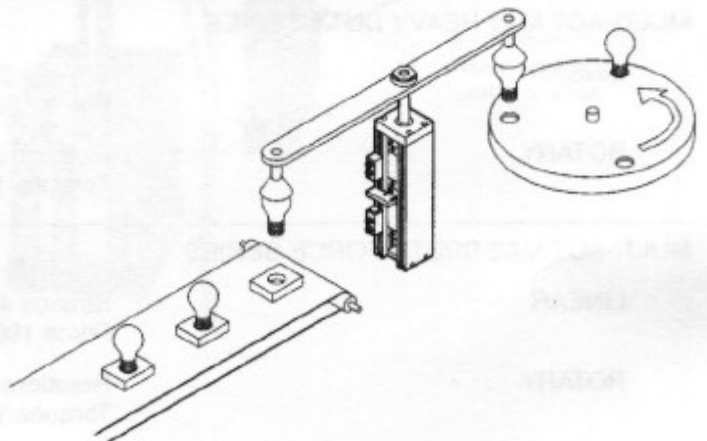
PARTS TURN AROUND

The MULTI-ACT in this system picks up a part, rotates it and sets it back in place. Applications include repositioning parts between machining or fabrication operations and orienting parts for packaging.



TRANSFER

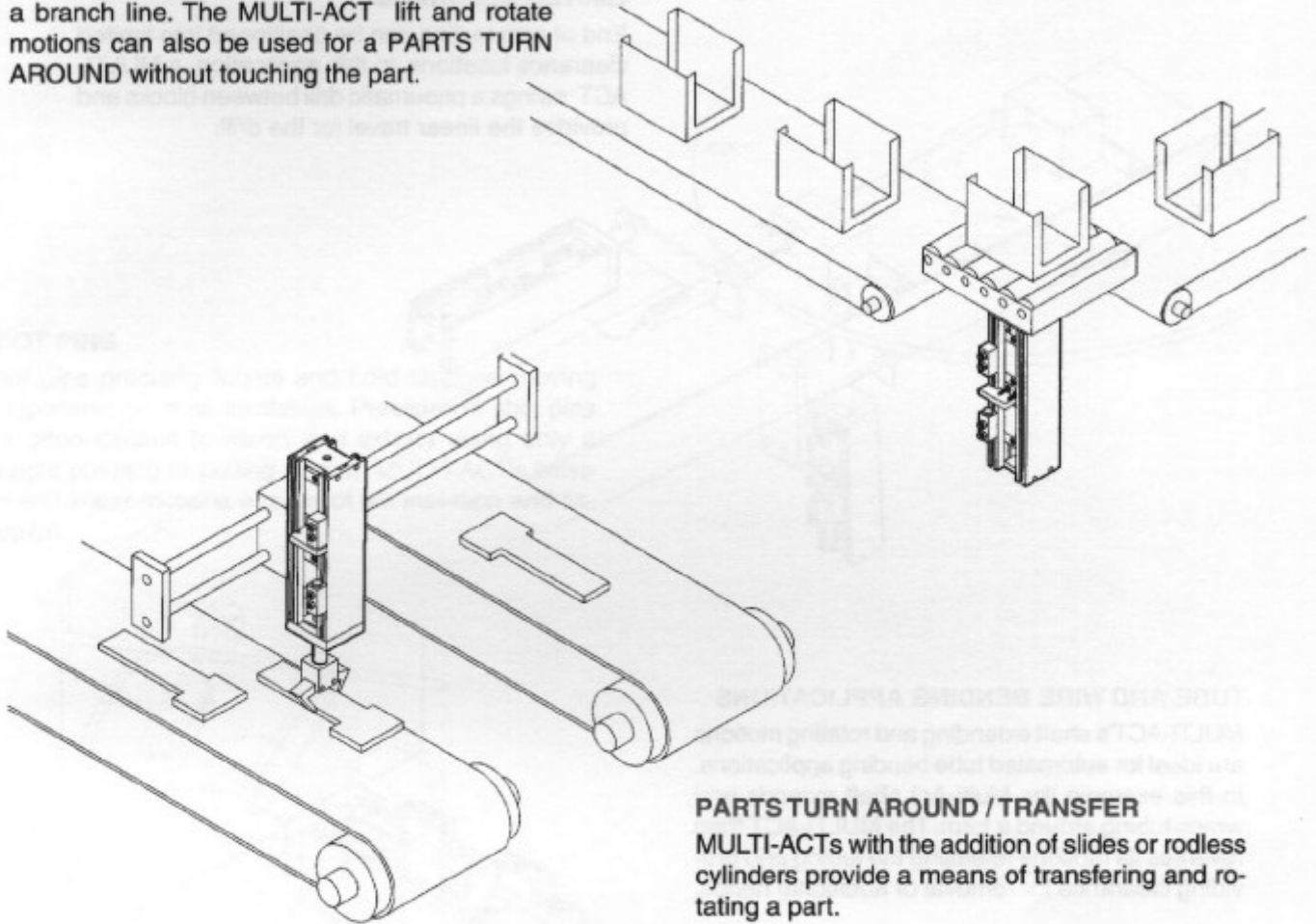
An application demonstrating the ability of a MULTI-ACT actuator to transfer lamps from a process station to a conveyor. The zero backlash and precise repeatability of MULTI-ACT permits exact pick up and exact placement the first time and every time.



APPLICATIONS

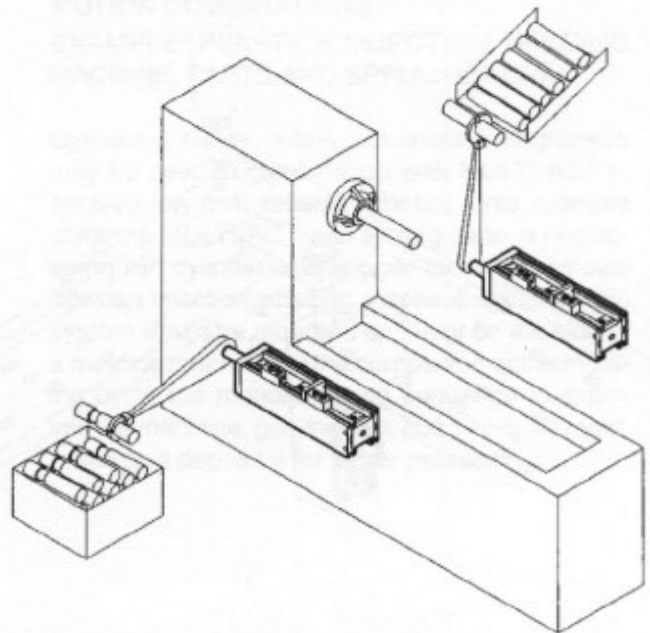
PARTS TURN AROUND / TRANSFER

In this application a MULTI-ACT lifts, rotates and lowers a section of conveyor to transfer parts to a branch line. The MULTI-ACT lift and rotate motions can also be used for a PARTS TURN AROUND without touching the part.



PARTS TURN AROUND / TRANSFER

MULTI-ACTs with the addition of slides or rodless cylinders provide a means of transferring and rotating a part.



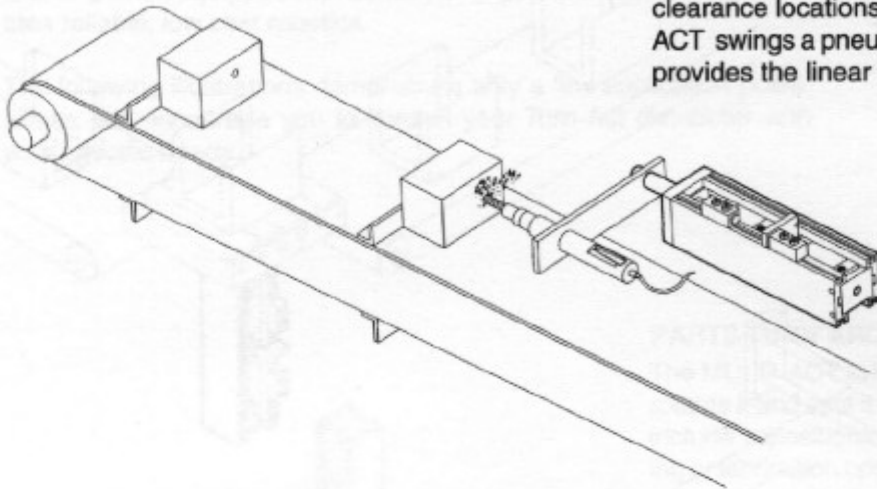
LOAD AND UNLOAD

Two MULTI-ACTs applied to a machining center provides complete parts loading and unloading automation. In the first operation a MULTI-ACT positions an unmachined part in a lathe chuck and then retracts and rotates back to the parts hopper. After machining a second MULTI-ACT withdraws the part from the lathe chuck and deposits it in a bin or possibly on a conveyor or into another machining operation.

MULTI-ACT

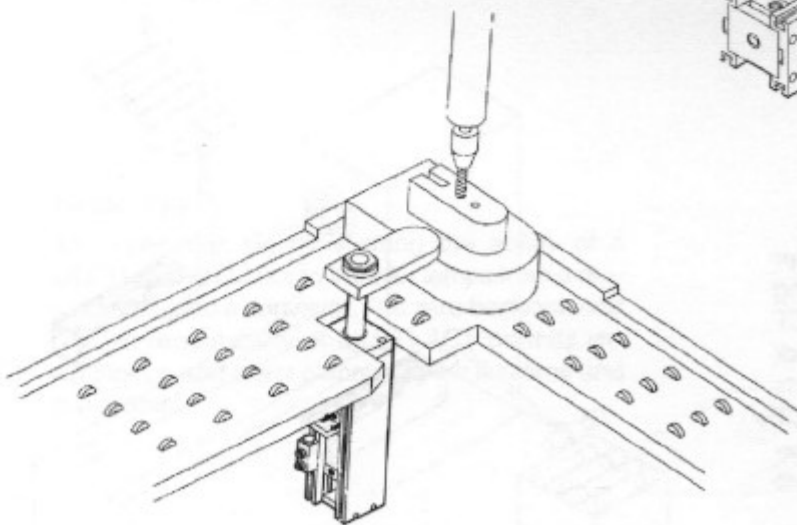
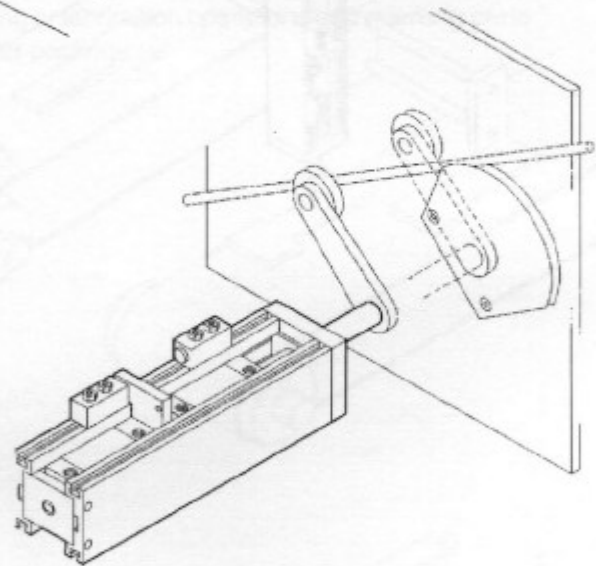
LIMITED CLEARANCE

End of arm tooling can be positioned into limited clearance locations. In this application, a MULTI-ACT swings a pneumatic drill between blocks and provides the linear travel for the drill.



TUBE AND WIRE BENDING APPLICATIONS

MULTI-ACT's shaft extending and rotating motions are ideal for automated tube bending applications. In this example the Multi-Act shaft extends and wraps tubing around a form. The MULTI-ACT then reverses its motions releasing the tubing and providing clearance for removal or additional bends.



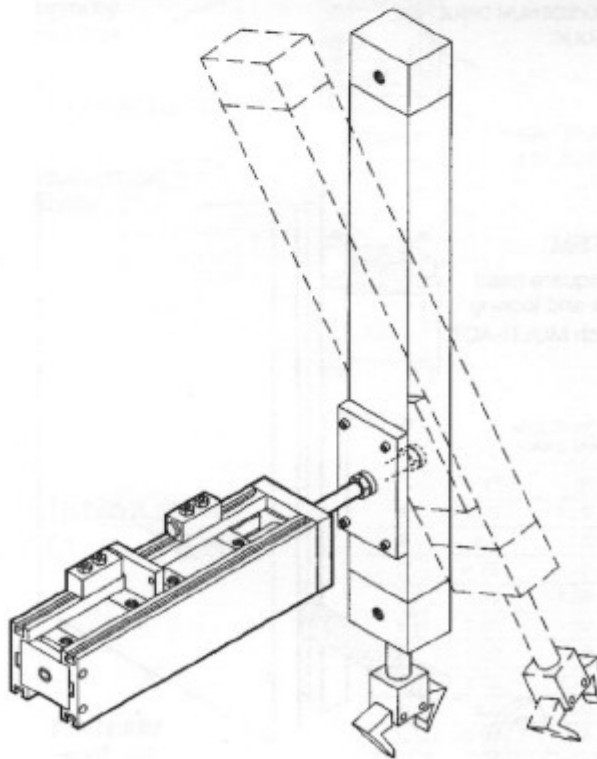
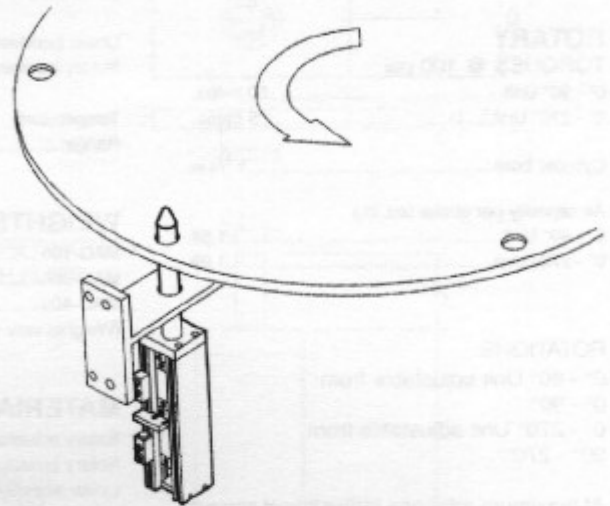
CLAMPING

MULTI-ACT actuators make an ideal automatic clamp for holding heavy loads. Up to 1800 pounds of clamping force is available with only 100 psi air pressure. MULTI-ACT's large diameter shaft and large bearings accommodate full clamping force without concern for shaft side loading or need for shaft guiding. In this example, the clamp retracts out of the way below the conveyor.

APPLICATIONS

SHOT PINS

Shot pins precisely locate and hold stopped moving components such as turntables. Precision fit shot pins are often difficult to insert and extract using only a straight pushing or pulling motion. MULTI-ACT's twisting and linear motions ease shot pin insertion and extraction.



MOTION COMBINATIONS

EXAMPLE: PLASTICS INJECTION MOLDING MACHINE, PARTS AND SPRUE REMOVAL.

Cylinders, slides, rotary actuators and grippers may be used in combination with MULTI-ACT to achieve low cost reliable robotics. This example utilizes a MULTI-ACT with tooling plate, a non-rotating rod cylinder and gripper for parts removal from an injection molding machine. Typically this system would be mounted on top or on the side of a molding machine. At the completion of the molding cycle the motions would sequence to reach into the machine, grip the part, pull it from the mold, rotate and deposit it for further processing.

MULTI-ACT^{T.M.} MAO MINIATURE SERIES

SPECIFICATIONS:

PNEUMATIC

Inlets linear and rotary actuators..... $\frac{1}{8}$ " FNPT
 Pressure range.....35 to 200 psi
 Filtration required.....25-50 Micron

ROTARY

TORQUES @ 100 psi

0° - 90° Unit.....50 in•lbs.
 0° - 270° Unit.....25 in•lbs.

Cylinder bore.....1 $\frac{1}{4}$ in.

Air capacity per stroke (cu. in.)

0° - 90° Unit.....1.68
 0° - 270° Unit.....1.99

ROTATIONS

0° - 90° Unit adjustable from 0° - 90°
 0° - 270° Unit adjustable from 90° - 270°

At maximum rotations (adjustment screws fully backed out) internal bumpers provide a cushioned stop. Stop position may increase 2° maximum at each end of stroke due to compression of bumpers and size and speed of load.

LINEAR

Forces at 100 psi.

Extend 110 lbs.
 Retract 100 lbs.

Cylinder bore 1 $\frac{1}{4}$ in.

Air capacity per stroke (cu. in.)

1" Extend 1.2	Retract 1.1
2" Extend 2.4	Retract 2.2
4" Extend 4.9	Retract 2.2

ADJUSTMENTS: Stroke lengths fully adjustable from zero inches to maximum. Linear travel stops against urethane bumpers.

PERFORMANCE

Travel speeds¹

ROTARY: Maximum 90 degrees per second.

LINEAR: Maximum 200 inches per minute.

Linear backlash.....0"
 Rotary backlash0.25° max.

Temperature

Range:.....-20°F to 180°F

WEIGHTS

MAO-100.....7 lbs.
 MAO-200.....8 lbs.
 MAO-400.....12 lbs.
 (Weights vary with specific models)

MATERIALS

Rotary actuator sealsURETHANE²
 Rotary actuator bearings..... NEEDLE
 Linear actuator sealBUNA
 Linear actuator bearingsDELFIN³
 Output shaft303 STAINLESS
 Output bearing.....MOLYBDENUM DISULFIDE IMPREGNATED PHENOLIC.
 MULTI-ACT frame, transition plate, linear and rotary actuator housing.....HARD ANODIZED ALUMINUM
 Linear glide.....MOLYBDENUM DISULFIDE IMPREGNATED PHENOLIC.

LUBRICATION

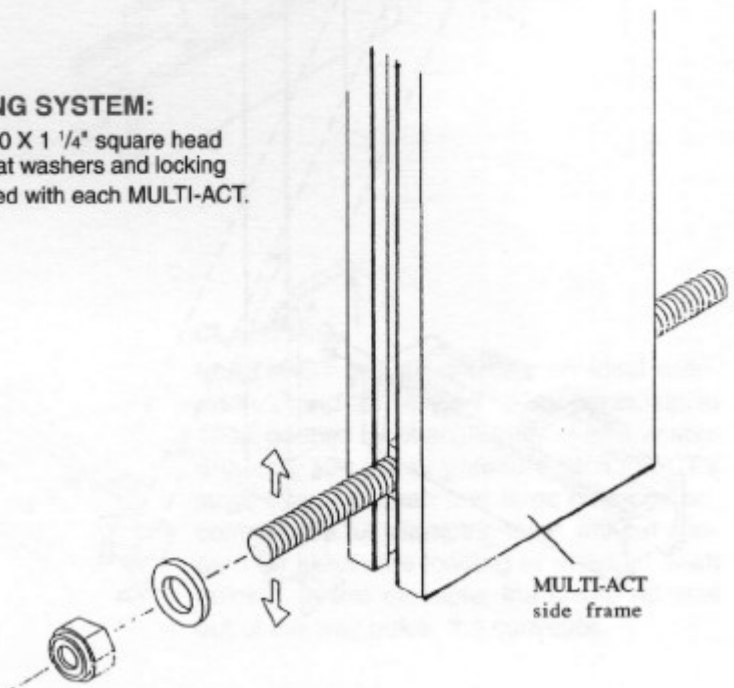
Factory prelubricated. Air line lubrication not required on cycle rates to 10 CPM.

NOTES

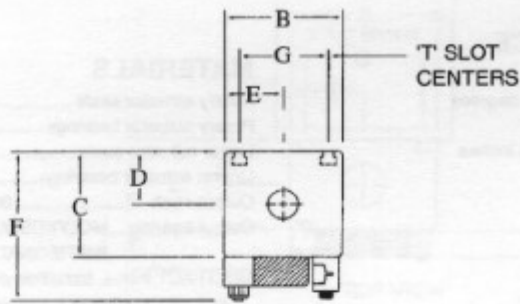
1. **WARNING:** Maximum speeds depend on air pressure, flow and size and shape of loads. Damage potential exists from high speed and large rotational loads being abruptly stopped internally. Customer is responsible for proper application and circuit design that will decelerate loads.
2. Patented Turn-Act, Inc.
3. T.M. E. I. Dupont.
4. Shaft provided without keyway. Specify Trantorque. Refer to page 12.

MOUNTING SYSTEM:

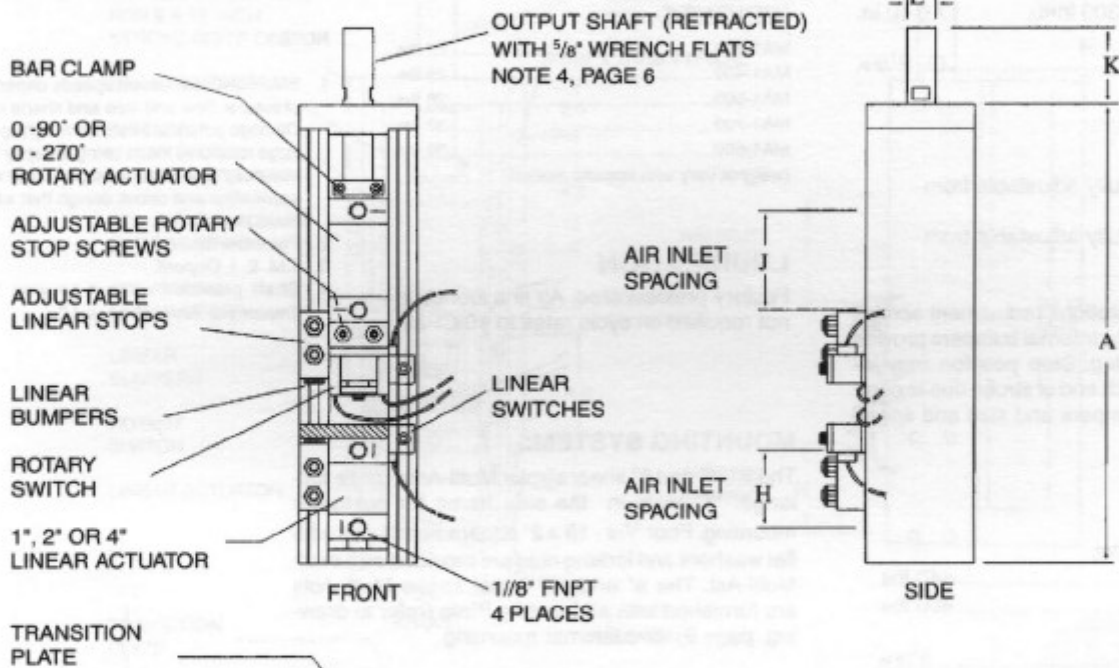
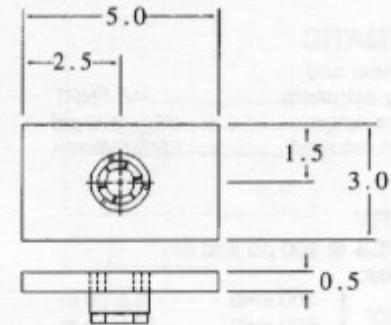
Four # $\frac{1}{4}$ "-20 X 1 $\frac{1}{4}$ " square head bolts with flat washers and locking nuts provided with each MULTI-ACT.



DIMENSIONS:



OPTIONAL TOOLING PLATE WITH TRANTORQUE



BOTTOM

DIMENSIONAL DATA (INCHES):

	MULTI-ACT with rotary switches			MULTI-ACT without rotary switches		
	1"	2"	4"	1"	2"	4"
A	11.9	13.9	17.9	9.9	11.9	15.9
B	3.0	3.0	3.0	3.0	3.0	3.0
C	2.75	2.75	2.75	2.75	2.75	2.75
D	1.38	1.38	1.38	1.38	1.38	1.38
E	1.50	1.50	1.50	1.50	1.50	1.50
F	3.9	3.9	3.9	3.9	3.9	3.9
G	2.25	2.25	2.25	2.25	2.25	2.25
H	2.0	3.0	5.0	2.0	3.0	5.0
J	2.58	2.58	2.58	2.58	2.58	2.58
K	OUTPUT SHAFT RETRACTED			2.0		
L	OUTPUT SHAFT DIAMETER			.75		

MULTI-ACTTM MA1 HEAVY DUTY SERIES

SPECIFICATIONS:

PNEUMATIC

Inlets linear and rotary actuators.....1/4" FNPT
 Pressure range.....35 to 200 psi
 Filtration required.....25-50 Micron

ROTARY

TORQUES @ 100 psi and air capacities:

0° - 90° { 300 in•lb. 5.5 cu.in.
 600 in•lb. 11.0 cu.in.

0° - 270° { 150 in•lb. 8.5 cu.in.
 300 in•lb. 17.0 cu.in.

Cylinder bore 2 1/2 in.

ROTATIONS

0° - 90° Unit fully adjustable from 0° - 90°
 0° - 270° Unit fully adjustable from 90° - 270°

At maximum rotations (adjustment screws fully backed out.) Internal bumpers provide a cushioned stop. Stop position may increase 2" at each end of stroke due to compression of bumpers and size and speed of load.

LINEAR

Forces at 100 psi.
 Extend 440 lbs.
 Retract 400 lbs.

Cylinder bore 2 1/2 in.

Air capacity per stroke (cu. in.)

2" Extended 9.8	Retract 8.9
4" Extended 19.6	Retract 17.8
6" Extended 29.4	Retract 26.8
8" Extended 36.6	Retract 40.2
12" Extended 48.8	Retract 53.6

ADJUSTMENTS: Stroke lengths fully adjustable from zero inches. to maximum. Linear travel stops against urethane bumpers.

PERFORMANCE

Travel speeds¹
 ROTARY: Maximum 90 degrees per second.
 LINEAR: Maximum 200 inches per minute.

Linear backlash.....0"
 Rotary backlash0.25° max.

Temperature Range.....-20°F to 180°F

WEIGHTS....

MA1-200.....	22 lbs.
MA1-400.....	25 lbs.
MA1-600.....	28 lbs.
MA1-700.....	32 lbs.
MA1-800.....	36 lbs.

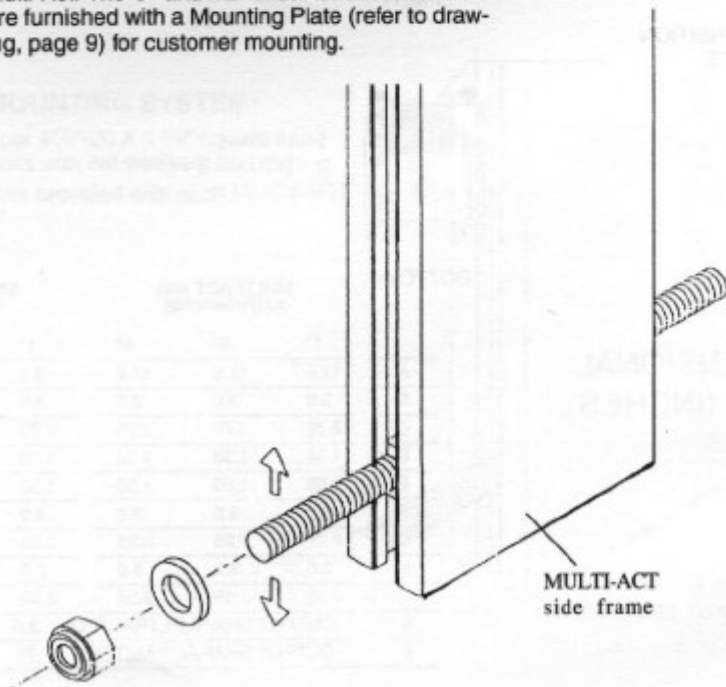
(weights vary with specific models)

LUBRICATION

Factory prelubricated. Air line lubrication not required on cycle rates to 10 CPM.

MOUNTING SYSTEM:

The 2", 4" and 6" linear stroke Multi-Acts utilize full-length "T" slots in the side frame for customer mounting. Four 5/16" - 18 x 2" square head bolts with flat washers and locking nuts are provided with each Multi-Act. The 9" and 12" linear stroke Multi-Acts are furnished with a Mounting Plate (refer to drawing, page 9) for customer mounting.



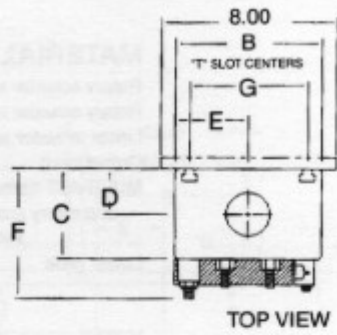
MATERIALS

Rotary actuator seals URETHANE²
 Rotary actuator bearings NEEDLE
 Linear actuator seals BUNA
 Linear actuator bearings.....DELFIN³
 Output shaft 303 STAINLESS
 Output bearing.....MOLYBDENUM DISULFIDE
 IMPREGNATED PHENOLIC
 MULTI-ACT frame, transition plate, linear and rotary actuator housingsHARD ANODIZED ALUMINUM
 Linear glide.....MOLYBDENUM DISULFIDE
 IMPREGNATED PHENOLIC

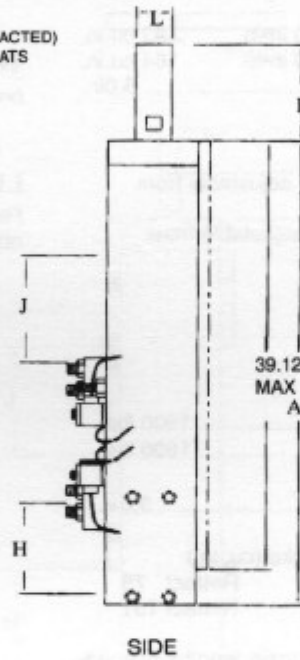
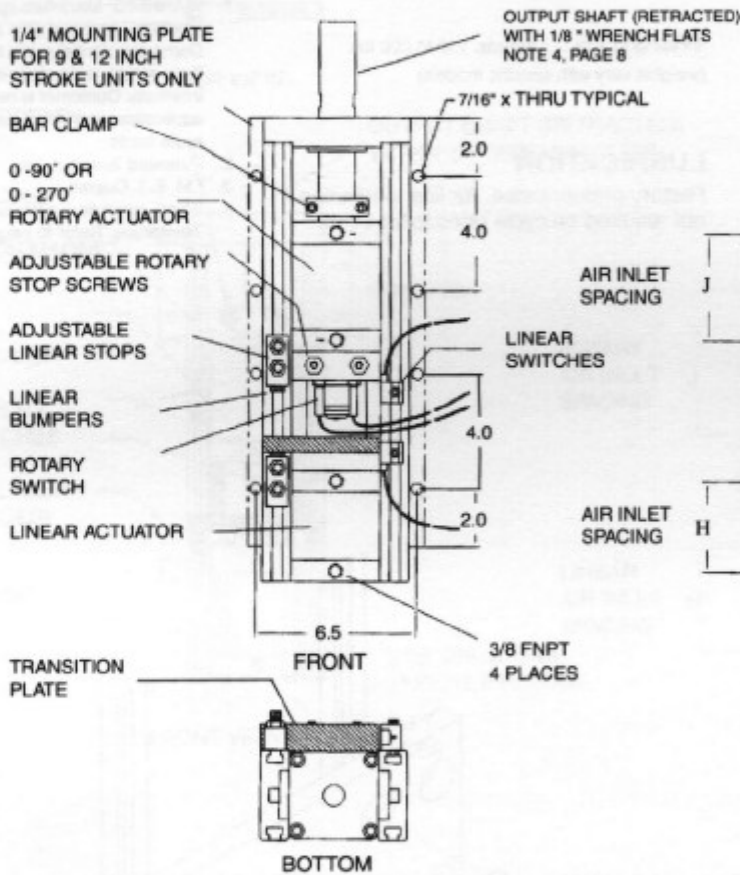
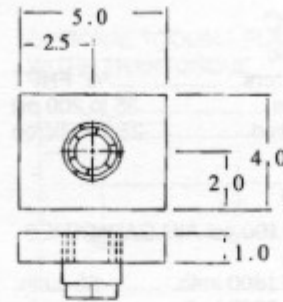
NOTES

1. WARNING: Maximum speeds depend on air pressure, flow and size and shape of loads. Damage potential exists from high speed and large rotational loads being abruptly stopped internally. Customer is responsible for proper application and circuit design that will decelerate loads.
2. Patented Turn-Act, Inc.
3. T.M. E. I. DuPont.
4. Shaft provided without keyway. Specify Trantorque. Refer to page 12.

DIMENSIONS:



OPTIONAL TOOLING PLATE WITH TRANSTORQUE



DIMENSIONAL DATA (INCHES):

	90°/300 in•lb AND 270°/150 in•lb MULTI-ACT					
	MULTI-ACT with rotary switches			MULTI-ACT without rotary switches		
	2"	4"	6"	2"	4"	6"
A	16.09	20.09	24.09	14.09	18.09	22.09
B	5.0	5.0	5.0	5.0	5.0	5.0
C	3.13	3.13	3.13	3.13	3.13	3.13
D	1.56	1.56	1.56	1.56	1.56	1.56
E	2.5	2.5	2.5	2.5	2.5	2.5
F	4.4	4.4	4.4	4.4	4.4	4.4
G	4.0	4.0	4.0	4.0	4.0	4.0
H	3.24	5.24	7.24	3.24	5.24	7.24
J	3.65	3.65	3.65	3.65	3.65	3.65
K	OUTPUT SHAFT RETRACTED					3.0
L	OUTPUT SHAFT DIAMETER					1.25

	90°/600 in•lb AND 270°/300 in•lb MULTI-ACT									
	MULTI-ACT with rotary switches					MULTI-ACT without rotary switches				
	2"	4"	6"	9"	12"	2"	4"	6"	9"	12"
A	19.12	23.12	27.12	33.12	39.12	17.12	21.12	25.12	31.12	37.12
B	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
C	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
D	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
E	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
F	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
G	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
H	3.24	5.24	7.24	10.24	13.24	3.24	5.24	7.24	10.24	13.24
J	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67
K	OUTPUT SHAFT RETRACTED					3.0				
L	OUTPUT SHAFT DIAMETER					1.25				

MULTI-ACTTM MA2 BRUTE FORCE SERIES

SPECIFICATIONS:

PNEUMATIC

Inlets linear and rotary actuators.....^{3/8}" FNPT
 Pressure range.....35 to 200 psi
 Filtration required.....25-50 Micron

ROTARY

TORQUES @ 100 psi AIR CAPACITIES

0° - 110°	{	1800 in•lb.	66 cu.in.
		3600 in•lb.	132 cu.in.
0° - 290°	{	900 in•lb.	82 cu.in.
		1800 in•lb.	164 cu.in.
Cylinder bore.....		5.0in.	

ROTATIONS

0° - 110° Unit fully adjustable from 0° - 110°
 0° - 290° Unit fully adjustable from 90° - 290°

LINEAR

Forces at 100 psi.
 Extend 1900 lbs.
 Retract 1800 lbs.

Cylinder bore 5.0 in.

Air capacity per stroke (cu. in.)

4" Extended	79	Retract	75
8" Extended	157	Retract	151

ADJUSTMENTS: Stroke lengths fully adjustable from zero inches. to maximum. Linear travel stops against urethane bumpers.

MOUNTING SYSTEM:

MA2 Multi-Acts are provided with two moveable mounting plates. Each plate attaches to the rear of the Multi-Act with four bolts. Loosening the bolts permits the sliding of the mounting plates to the desired positions. Four corner holes are provided in the corners of each mounting plate for customer use.

PERFORMANCE

Travel speeds¹
 ROTARY: Maximum 45 degrees per second.
 LINEAR: Maximum 100 inches per minute.

Linear backlash.....0°
 Rotary backlash0.50° max.

Temperature
 Range:.....-20°F to 180°F

WEIGHTS.... Approx. 150 to 200 lbs.
 (weights vary with specific models)

LUBRICATION

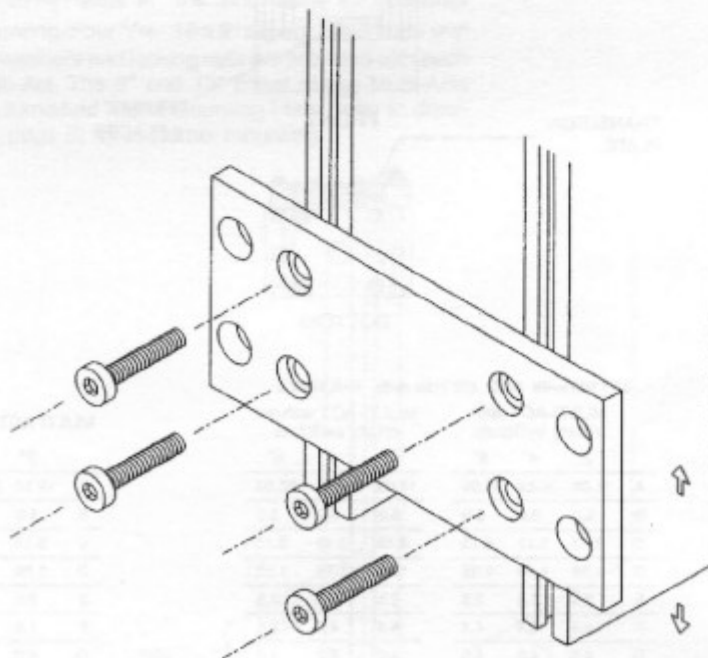
Factory prelubricated. Air line lubrication not required on cycle rates to 10 CPM.

MATERIALS

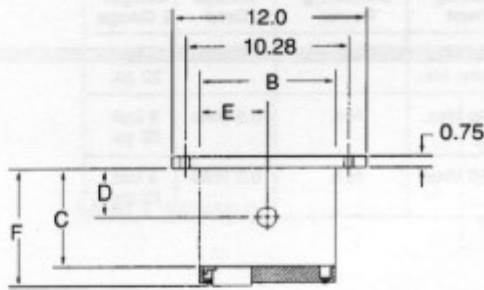
Rotary actuator seals URETHANE²
 Rotary actuator bearings..... BALL
 Linear actuator seals BUNA
 Output shaft 303 STAINLESS
 MULTI-ACT frame, transition plate, linear and rotary actuator housings HARD ANODIZED ALUMINUM
 Linear glide.....MOLYBDENUM DISULFIDE IMPREGNATED PHENOLIC.

NOTES

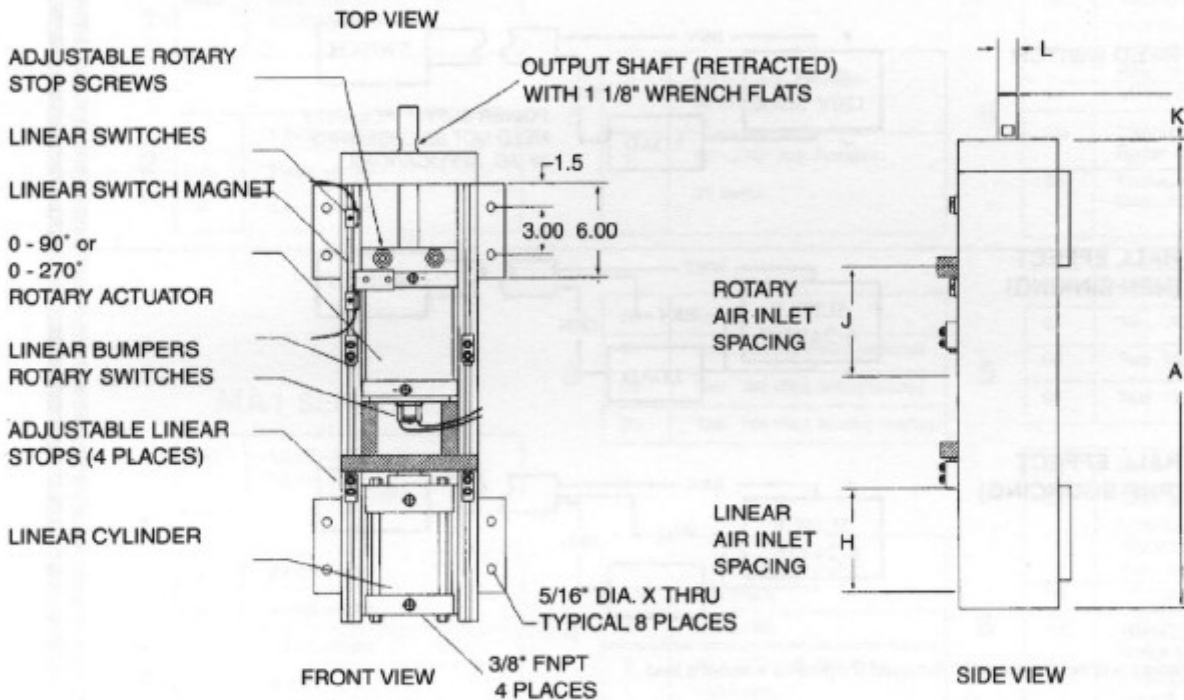
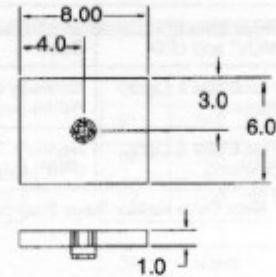
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2. Patented Turn-Act, Inc.
3. T.M. E. I. Dupont.
4. Shaft provided without keyway. Specify Trantorque. Refer to page 14.



DIMENSIONS:



OPTIONAL TOOLING PLATE WITH TRANSTORQUE

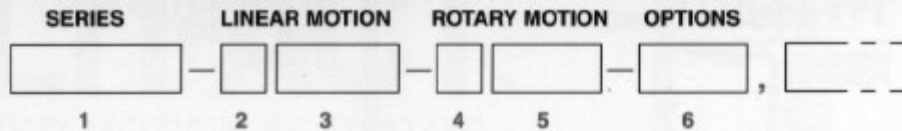


DIMENSIONAL DATA (INCHES):

	110°/1800 in•lbs AND 290°/900 in•lbs MULTI-ACT				110°/3600 in•lbs AND 290°/1800 in•lbs MULTI-ACT			
	MULTI-ACT with rotary switches		MULTI-ACT without rotary switches		MULTI-ACT with rotary switches		MULTI-ACT without rotary switches	
	4"	8"	4"	8"	4"	8"	4"	8"
A	29.7	37.7	26.7	34.7	35.7	43.7	32.7	40.7
B	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
C	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
D	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88
E	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
F	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
H	6.63	10.63	6.63	10.63	6.63	10.63	6.63	10.63
J	7.05	7.05	7.05	7.05	13.05	13.05	13.05	13.05
K	OUTPUT SHAFT RETRACTED		3.0		OUTPUT SHAFT RETRACTED		3.0	
L	OUTPUT SHAFT DIAMETER		1.25		OUTPUT SHAFT DIAMETER		1.25	

MULTI-ACT HOW TO ORDER

TABLES



MA0 SERIES

1	MA0	MULTI-ACT SERIES 0
2		
	1	1 inch stroke
	2	2 inch stroke
	4	4 inch stroke

3			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 5%;">00</td><td>NONE</td></tr> <tr><td>01</td><td>Two AC/DC Reed switches</td></tr> <tr><td>02</td><td>Two Hall effect, sinking switches</td></tr> <tr><td>03</td><td>Two Hall effect, sourcing switches</td></tr> </table>	00	NONE	01	Two AC/DC Reed switches	02	Two Hall effect, sinking switches	03	Two Hall effect, sourcing switches
00	NONE										
01	Two AC/DC Reed switches										
02	Two Hall effect, sinking switches										
03	Two Hall effect, sourcing switches										

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MA1 SERIES

1	MA1	MULTI-ACT SERIES 1
2		
	2	2 inch stroke
	4	4 inch stroke
	6	6 inch stroke
	7	9 inch *
	8	12 inch *

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* 9 and 12 inch stroke requires numbers 3 or 6 in table 4

MA2 SERIES

1	MA2	MULTI-ACT BRUTE FORCE SERIES
2		
	4	4 inch stroke
	8	8 inch stroke

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