

# **TECHRIM**

STANDARDS



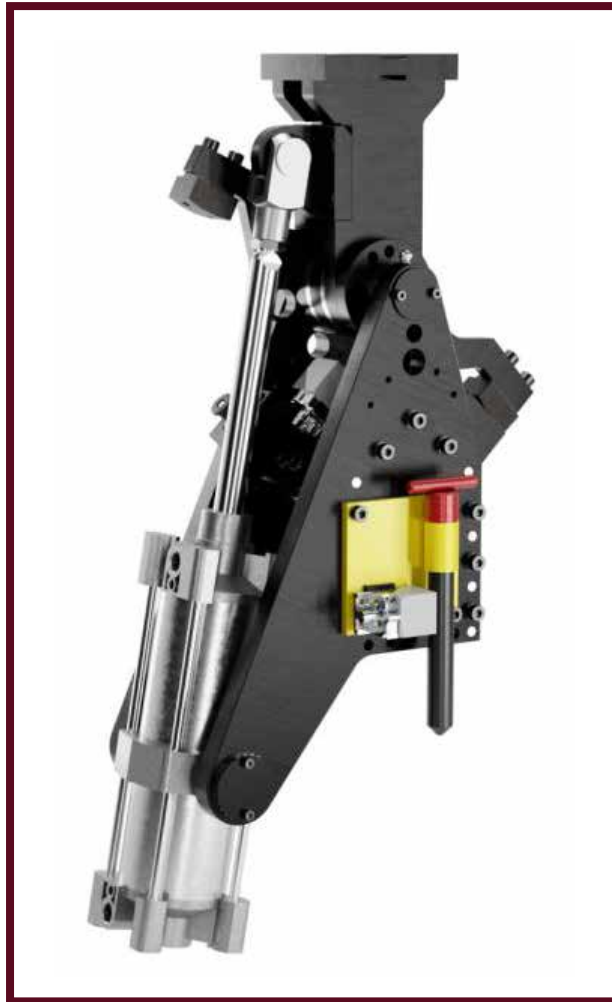
# **TECH-PIVOT®**

**TR80/TR100/TR160**

## **USER & MAINTENANCE MANUAL**

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Our policy is one of continuous research and development. Therefore we reserve the right to amend, without notice, the specifications given in this document.



## GENERAL INFORMATION

The Tech Pivot is a pneumatically driven mechanism which produces rotational motion. This Tech Pivot Maintenance Manual contains Tech Rim Standard's suggested:

- Safety Precautions
- Lockout Precautions
- Maintenance
- Tech Pivot Refurbishing Program

NOTE: Any modification or repair other than that authorized by Tech Rim in writing shall void the Limited Warranty contained on page 11 of this User's and Maintenance Manual.

## ASSISTANCE

If assistance is required during the installation of preventative maintenance or repair procedures, or if you wish to take advantage of the Tech Pivot Refurbishing program, please call the Tech Rim Standards team at 1-248-454-1977.

Please have the model number and serial number available when you call.

## WARNING

Complete the Lockout Procedures **BEFORE** performing any maintenance on the automation.

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## SAFETY PRECAUTIONS

Automation can be extremely hazardous.

There may be rapid, sudden motion anywhere within the normal work area.

It is mandatory that power down and lock out procedures be strictly followed.

Guards and interlocks must be fully operational and in place prior to any use .

- The greatest safety hazard in operating and servicing automation is the pinch/trap/crush potential. Never place yourself in a position where you could be trapped by the automation.
- All equipment should be guarded and interlocked for safe operation. Control panels, disconnects and emergency stops should be located and identified for each of the individual work stations prior to any use or maintenance of automation. Check that all interlocks, overloads (breakers), over travels (limits), and disconnects are fully operational.
- Read and understand all manuals, warning plates, and labels on the automation before operating or maintaining the automation. Replace any worn labels.
- Check all warning lights on the console or other areas of the automation before operating the automation. Contact the maintenance supervisor if necessary.
- If possible, always lower lifts to the lowest possible position, engage manual locking pins, and exhaust all air out of the counterbalance system.
- Disconnect and lock out all main electrical power and turn off and bleed the air supply lines before beginning any maintenance.
- Only trained, qualified, and authorized personnel should operate and maintain the automation.
- Always wear protective glasses and shoes when working around the automation. Do not wear jewelry or loose-fitting or torn clothing when working on the automation.
- Never replace electrical components while the automation's main disconnect switch is on.
- Make sure all shields, clamps, and guards are installed correctly.
- Do not operate the automation if any part of the automation has sustained an impact or collision.
- Support any subassemblies (such as carriage plates, motors, cylinders, etc.) that you are removing from the automated equipment.
- To avoid injury, use a hoist when lifting components weighing 50 lbs. (23 kg) or more.
- Modifications and additions which affect capacity and operation of the automation should not be performed by the customer or user without the manufacturer's prior written approval. Modifying the automation may cause personal injury and will void the warranty.
- Make sure all personnel are clear of the automation area before operating the automation.

## OPERATING & SET-UP SPECIFICATIONS

**FLUID:** Compressed Air

**AIR PRESSURE:** Minimum 2.75 bar (40psi)  
Maximum 10 bar (145psi)

**RECOMMENDED OPERATING PRESSURE:** 60-80psi

**OPERATING TEMPERATURE:** -10°C (14°F) to 70°C (158°F)

**AIR FILTRATION:** 40 Micron

\*Air supply must be dry enough to prevent ice formation at temperatures below 2°C (35°F)

**ACTUATION TIME:** Time to open: 2 seconds  
Time to close: 2 seconds

### CAUTION:

Operating the unit faster than the recommended limits will cause premature wear and may cause failure.

**FLOW CONTROLS:** Required

### CAUTION:

Flow controls are required to regulate the speed of the unit while opening and closing. Flow controls **MUST** be adjusted properly to provide smooth motion within the actuation times indicated above.

**SHOCKS:** Included

### CAUTION:

Shock adjustment is provided on the rear of each shock. Shocks **MUST** be adjusted properly to avoid excessive impact, "slamming", or bouncing when the unit opens and closes.

**SEE PAGE 10 FOR PNEUMATIC CIRCUIT**

## LOCKOUT PRECAUTIONS

The key to safely operating any automated equipment is to use common sense and to adhere to all safety procedures of your plant.

Before maintaining any Tech Rim Standards equipment, perform the following lockout precautions:

- Power down and lock out electrical systems. Check voltage and current gauges to ensure that all power is removed.
- De-pressurize pneumatic systems. Check pressure gauges to ensure that all residual pressure is removed.
- De-pressurize hydraulic systems (if included). Check pressure gauges to ensure that all residual pressure is removed.
- Follow your plant lock out procedures when working on the automation and hang a “Lock Out” tag on the control enclosures main disconnect switch and pneumatic lockout valve.
- Mechanically lock out the automated equipment. Insert Lock Out Pins or bars to prevent lifts and shuttles from moving.
- Engage a Lock-Out Pin through the Lock-Out Hole prior to working on any Tech-Pivot or any other automation using a Tech-Pivot.



**LOCK OUT  
HOLE**

### WARNING

The following procedures are intended to supplement the safety rules of your plant, **NOT** to replace them. Always follow the safety rules of your plant when working on Tech Rim Standards equipment.

## PREVENTATIVE MAINTENANCE SUMMARY

The preventative maintenance intervals listed in this section should be used as a general guide. Your production and plant environment may determine that more frequent preventative maintenance is necessary. Use the following summary table for preventative maintenance scheduling information.

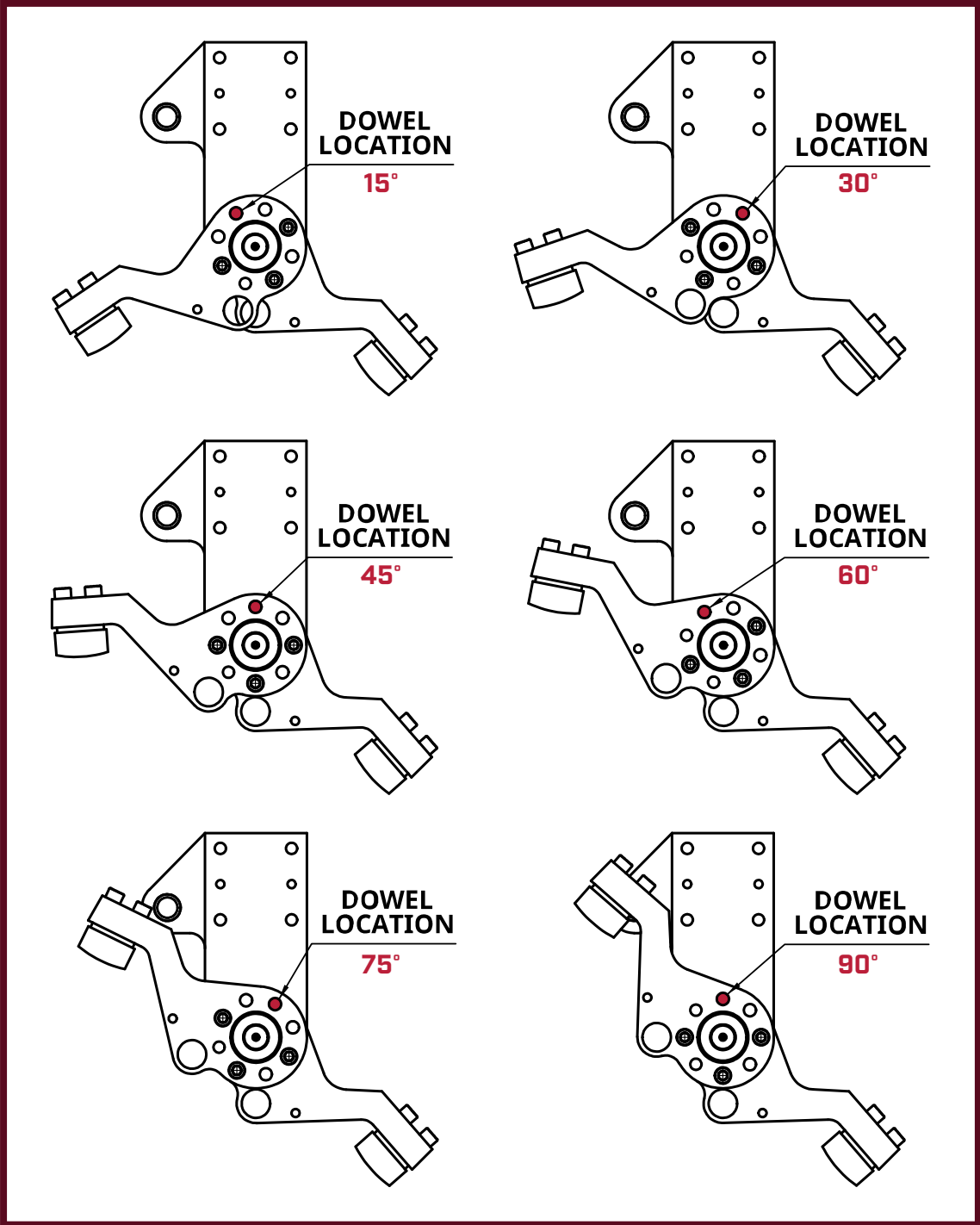
### PREVENTATIVE MAINTENANCE TASKS

NO.	PROCEDURE	TOOL REQUIRED	PREVENTATIVE MAINTENANCE
1	TEST LOCKOUT PROCEDURES		QUARTERLY
2	INSPECT SHOCK ABSORBERS	VISUAL	QUARTERLY
3	CLEAN DEBRIS FROM BRONZE WASHERS AND INSPECT FOR WEAR (REPLACE IF WORN)	CLOTH/ VISUAL	QUARTERLY
4	INSPECT CYLINDER	VISUAL	QUARTERLY
5	TEST UNLOCK PROCEDURE		QUARTERLY

#### WARNING

Complete the Lockout Procedures **BEFORE** performing any maintenance on the automation.

## TECH RIM - TECH-PIVOT 80/100/160



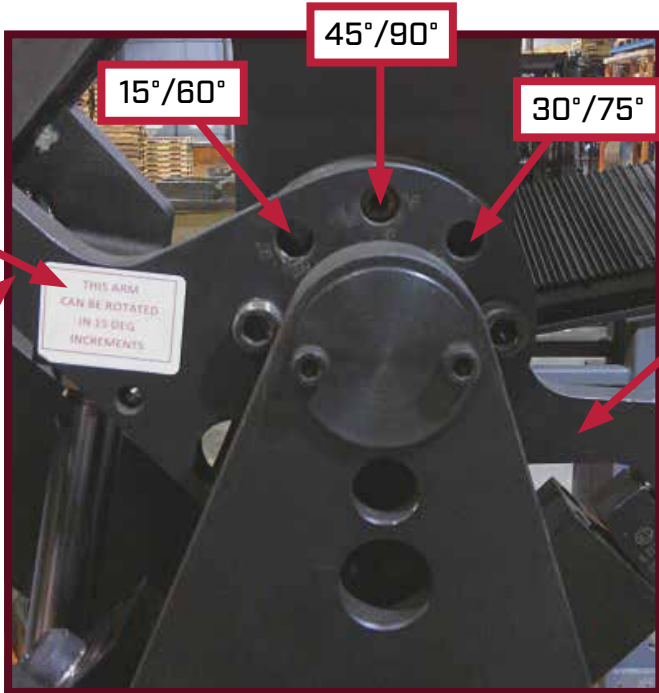
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## ARM OPENING CHANGE PROCEDURE

### STEP 1

Arms have stickers to show which way they are to be rotated.

You are able to position this arm [ADL012] for the different openings shown in chart, **marked on outside face for arm.**



This arm [ADL005] is **stationary** as shown in the chart. **The arm is marked on the outside face for arm positions.**

- Match arm opening positions stamped on arm and paddle.
- Arms are marked with a sticker, which is to be rotated and which is not.

### STEP 2



- Recess dowel enough to be able to rotate arm.
- Remove M10 Bolts (3) (See steps 2 & 3).

### STEP 3



- Rotate arm assembly clock-wise to get access hole to third bolt.

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## STEP 4



- Rotate arm (ADL012) to new position.
- Line up dowel holes in paddle and ADL005 arm.
- Insert dowel flush with arm.
- Insert M10 Bolts (3).
- Add 2 drops of Loctite 242 to bolt thread.
- Torque M10 bolts to 85 N-m
- Apply match mark to bolts

## MIRROR OPTION

Mirrored shock assembly is for pivot order ending with -M  
Mount ADL014 (Shock Block) (2) to ADL001 - Using M8 x 1.25 Bolts



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## TR 80/100/160 CYLINDER PRECAUTIONS

### LOCKING CYLINDER SPECIFICATIONS

#### Lock Specifications

Lock actuation	Spring lock (exhaust lock)
Unlocking pressure	≥0.25MPa
Locking pressure	≥0.20MPa
Max. operating pressure	1.0MPa
Locking direction	2 Two-way

#### Stopping Accuracy

Locking system	Piston speed [mm/s]			
	100	300	500	1000
Spring lock	±0.3	±0.6	±1.0	±2.0

Conditions/Horizontal supply pressure P=0.5MPa  
 Load weight ..... Upper limit of allowable value  
 Solenoid valve for locking mounted on the locking pdr  
 Maximum value of stopping position dispersion from 100 measurements

#### Spring Lock Holding Power (Maximum static Load)

Bore size [mm]	32	40	50	63	80	100
Holding power [N]	552	882	1370	2160	3430	5390

### ADJUSTMENT

#### ⚠ WARNING

- Do not open the cushion valve beyond the stopper. As a retaining mechanism for the cushion valve, a crimped section (ø32 head cover) or retaining ring is installed (ø40 to ø100), and the cushion valve should not be opened beyond that point.

If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

- Be certain to use an air cushion at the end of the cylinder stroke.

If this is not done, the tie-rod or piston assembly will be damaged.

#### ⚠ CAUTION

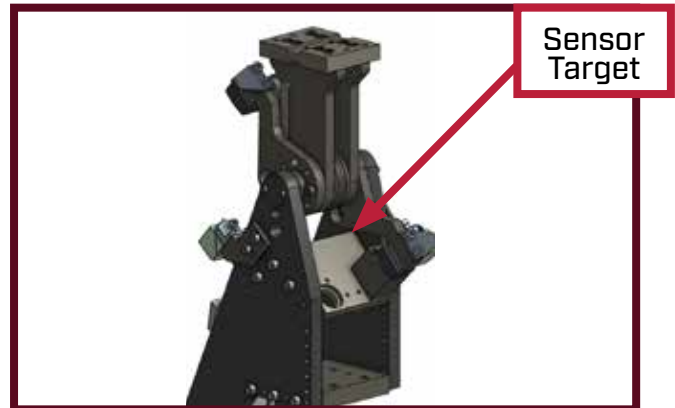
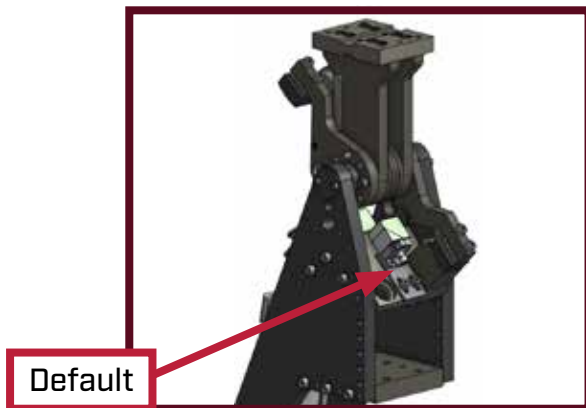
- Adjust the cylinder's air balance.

Balance the load by adjusting the air pressure in the front and rear sides of the cylinder with the load connected to the cylinder and the lock released. Lurching of the cylinder when unlocked can be prevented by carefully adjusting this air balance.

- Adjust the mounting positions of the detectors on auto switches, etc.

When intermediate stops are to be performed, adjust the mounting positions of detectors on auto switches, etc., taking into consideration the overrun amount with respect to the desired stopping positions.

## TR 80/100/160 SENSOR MOUNTING



### GENERAL INFORMATION

- By default, the sensor plate is mounted on the angle plate on pivot [Image 1].
- Sensors are positioned on plate attached to the angle plate on pivot [Image 1].
- Sensor targets [Image 2] on both arms are to be adjusted to be in the sensor range as specified by the sensor manufacturer.

#### WARNING

Other locations for mounting sensors other than the default location is up to the customer, but it is not advised as damage can occur to the sensor as it will be exposed.

## TR 80/100/160 CYLINDER PRECAUTIONS

### PNEUMATIC CIRCUIT

#### ⚠ WARNING

1. Be certain to use an air pressure circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a locked stop, when restarting or when manually unlocking, a circuit should be used which will apply balancing pressure to both sides of the piston, thereby cancelling the force generated by the load in the direction of piston movement.

2. Use a solenoid valve for unlocking which has a large effective sectional area, as a rule 50% or more of the effective sectional area of the cylinder drive solenoid valve.
3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.

The less distance there is from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

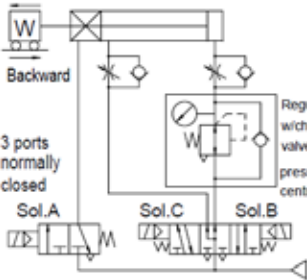
5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

#### 1. Basic Circuits

##### 1. [Horizontal]

Forward

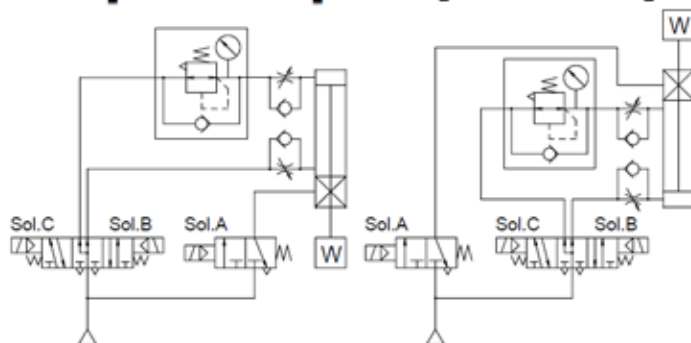


Sol.A	Sol.B	Sol.C	Action	Time
ON	ON	OFF	Forward	0.5s or more
OFF	OFF	OFF	Locked stop	0 to 0.5s
ON	OFF	OFF	Unlocked	0.5s or more
ON	ON	OFF	Forward	0 to 0.5s
ON	OFF	ON	Backward	0.5s or more
OFF	OFF	OFF	Locked stop	0 to 0.5s
ON	OFF	OFF	Unlocked	0.5s or more
ON	OFF	ON	Backward	0 to 0.5s

##### 2. [Vertical]

[ Load in direction of rod extension ]

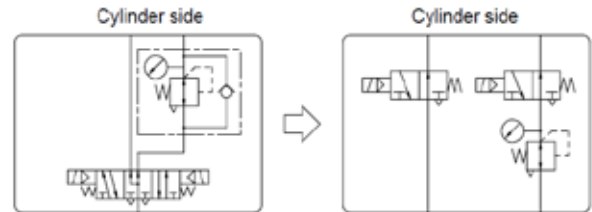
[ Load in direction of rod retraction ]



### PNEUMATIC CIRCUIT

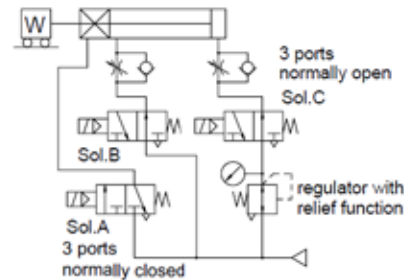
#### ⚠ CAUTION

1. A 3 position pressure centre solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



[Example]

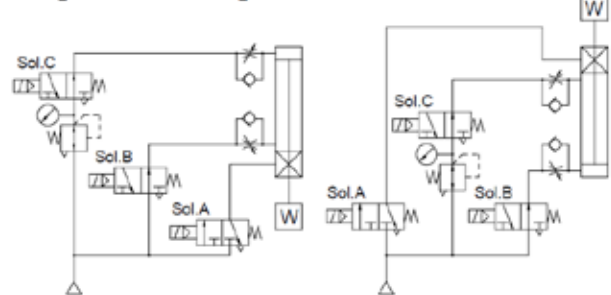
##### 1. [Horizontal]



##### 2. [Vertical]

[ load in direction of rod extension ]

[ Load in direction of rod retraction ]



### OPENING VS. CYLINDER STROKE

OPENING	STROKE (MM)	
	TR80/100	TR160
15°	35	50
30°	70	100
45°	110	160
60°	150	220
75°	190	280
90°	225	325

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**LIMITED WARRANTY.** All product (“Equipment”) manufactured by TechRim Standard’s, LLC (“TechRim”) is warranted against defects in workmanship and materials under normal use and service for 365 days from the date of delivery (the “Limited Warranty”) or at the end of 2,000 hours running, whichever comes earlier. This warranty applies only when installed and operated in accordance with the User’s and Maintenance Manual. If any failure to conform to this Warranty appears during the warranty period, TechRim shall, upon notification and substantiation that the equipment have been used in accordance with the User’s Manual, correct such defects by either suitable repair, replacement, or purchase price refund at TechRim’s option and expense, provided BUYER returns the defective Equipment to TechRim, freight prepaid. Compliance with this provision by the BUYER shall be a condition of this Limited Warranty. Any Equipment modification or repair other than that authorized by TechRim in writing shall void the Limited Warranty. This Limited Warranty does not cover any warranty of components incorporated into the Equipment that is manufactured by third-parties, such as but not limited to pneumatic cylinders.

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