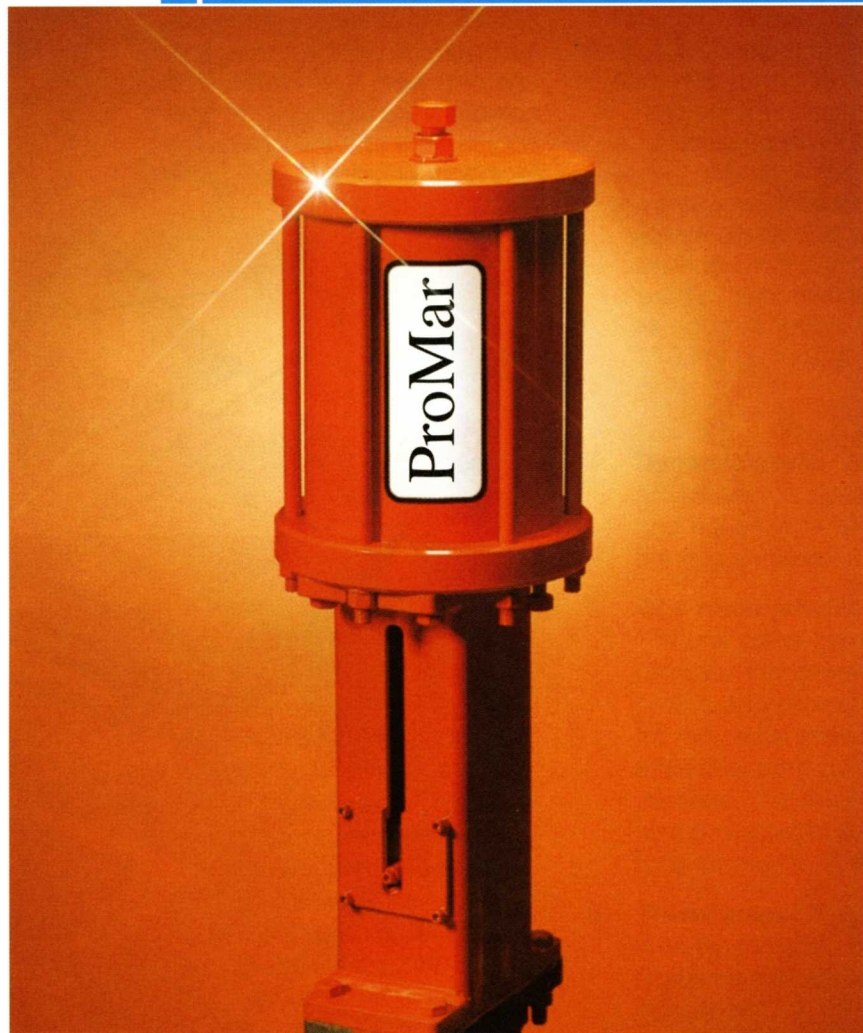




**PROMAR International L.C.**

**Linear  
Pneumatic  
Actuators**



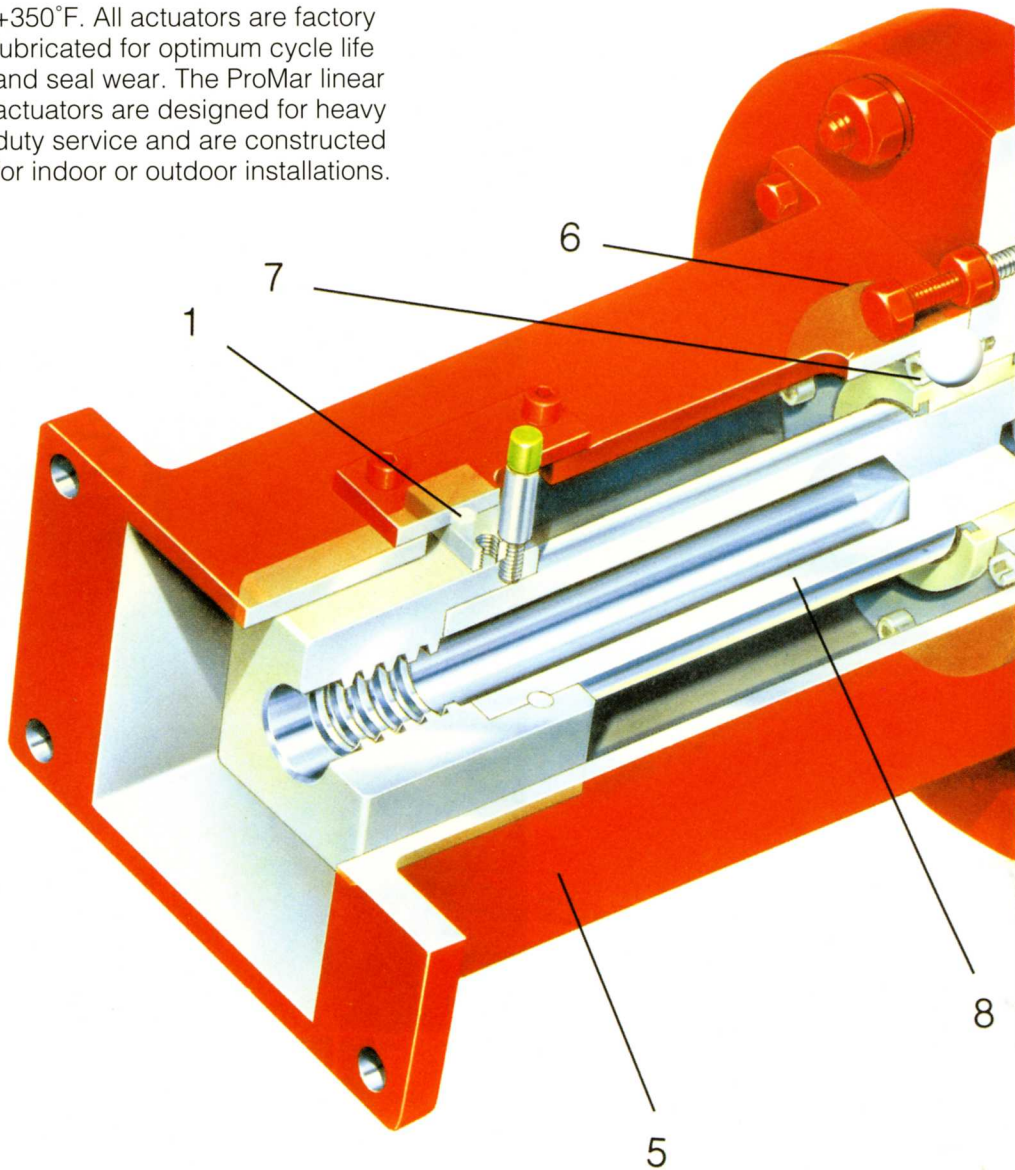
# Design and Construction

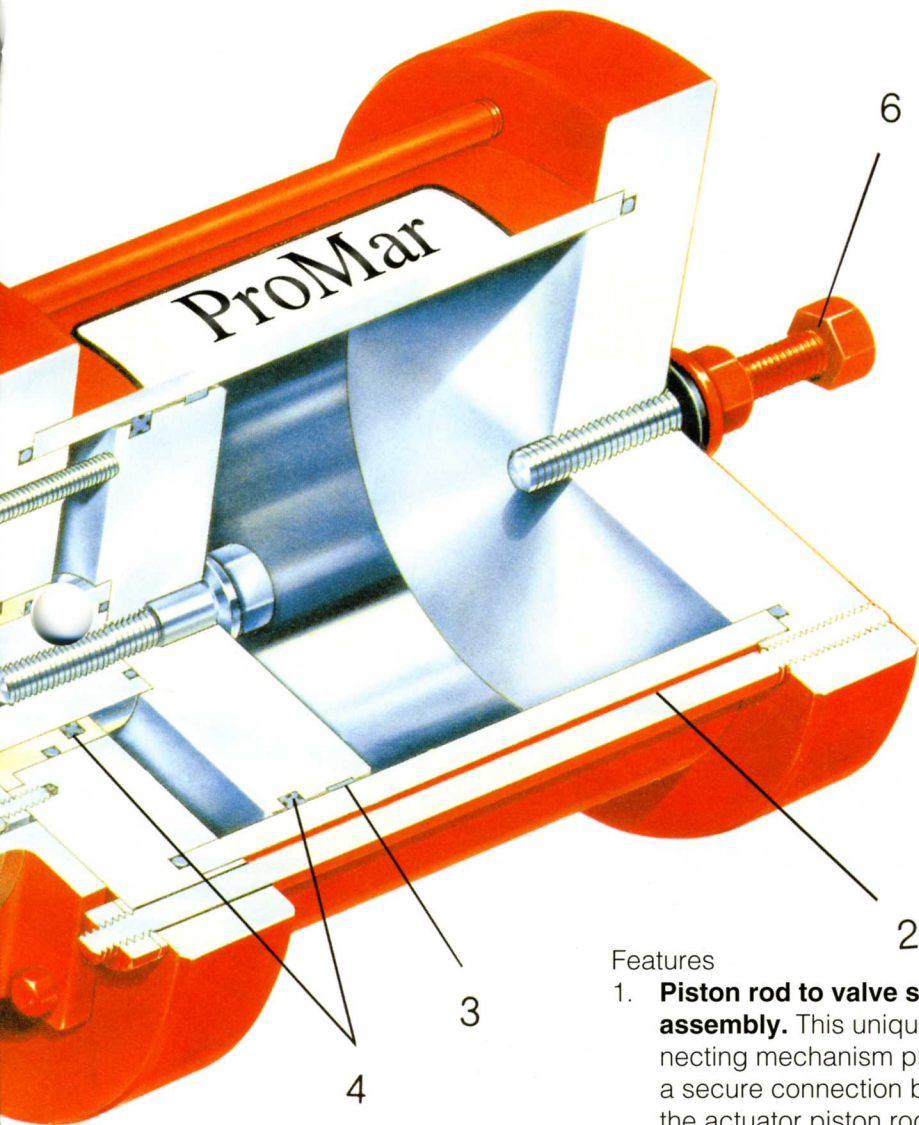
## Double-Acting Linear

The ProMar pneumatic linear double-acting actuators are specifically designed mechanisms for the automation and operation of gate, globe, pinch, diaphragm, linear rotating ball, and linear rotating plug valves or dampers. These unique linear actuators are also suited for automating linear stop check valves and other mechanisms requiring linear motion. These actuators are engineered per application and are manufactured to provide the utmost in quality, reliability, efficiency and safe powered actuation for the customer's specific application requirements.

The double-acting models are designed for pneumatic supply pressures to 125 PSIG and are available, as standard, in bore sizes from 2 inches through 44 inches with strokes up to 60

inches. Thrust, from 200 lbs. to 186,285 lbs., is available at various supply pressures. Other supply pressures, thrust requirements, bore sizes and strokes are available on application. The operating media may be dry or lubricated instrument air or non-corrosive gas. Standard operating temperatures range from -20°F to +200°F, optional high temperature trim is available from -20°F to +350°F. All actuators are factory lubricated for optimum cycle life and seal wear. The ProMar linear actuators are designed for heavy duty service and are constructed for indoor or outdoor installations.





Features

1. **Piston rod to valve stem pin assembly.** This unique connecting mechanism provides a secure connection between the actuator piston rod and the valve stem while allowing easy installation or removal of the actuator without special tool requirements.
2. **Cylinders inside diameter** are bored and honed to mirror, micro finish and coated to protect against corrosive environments.
3. **Wear rings are standard.** They are provided on all actuators to prevent cylinder scarring and to promote seal life.
4. **Dynamic seals.** Quad rings are utilized as dynamic seals, and will provide years of trouble-free service.
5. **One piece adaption spool.** The one piece construction provides the lowest possible profile, and protects the actuator rod, valve stem and pin assembly from corrosion and damage. The adaption spool also provides an excellent surface for mounting accessories.
6. **Travel stops.** They are provided in the open and close positions and are fully field adjustable.
7. **Oversized rod bearing.** The oversized rod bearing is externally removable with simple hand tools.
8. **Chrome plated piston rod.** The piston rod is alloy steel. It is ground to a micro finish and hard chrome plated.

# Design and Construction

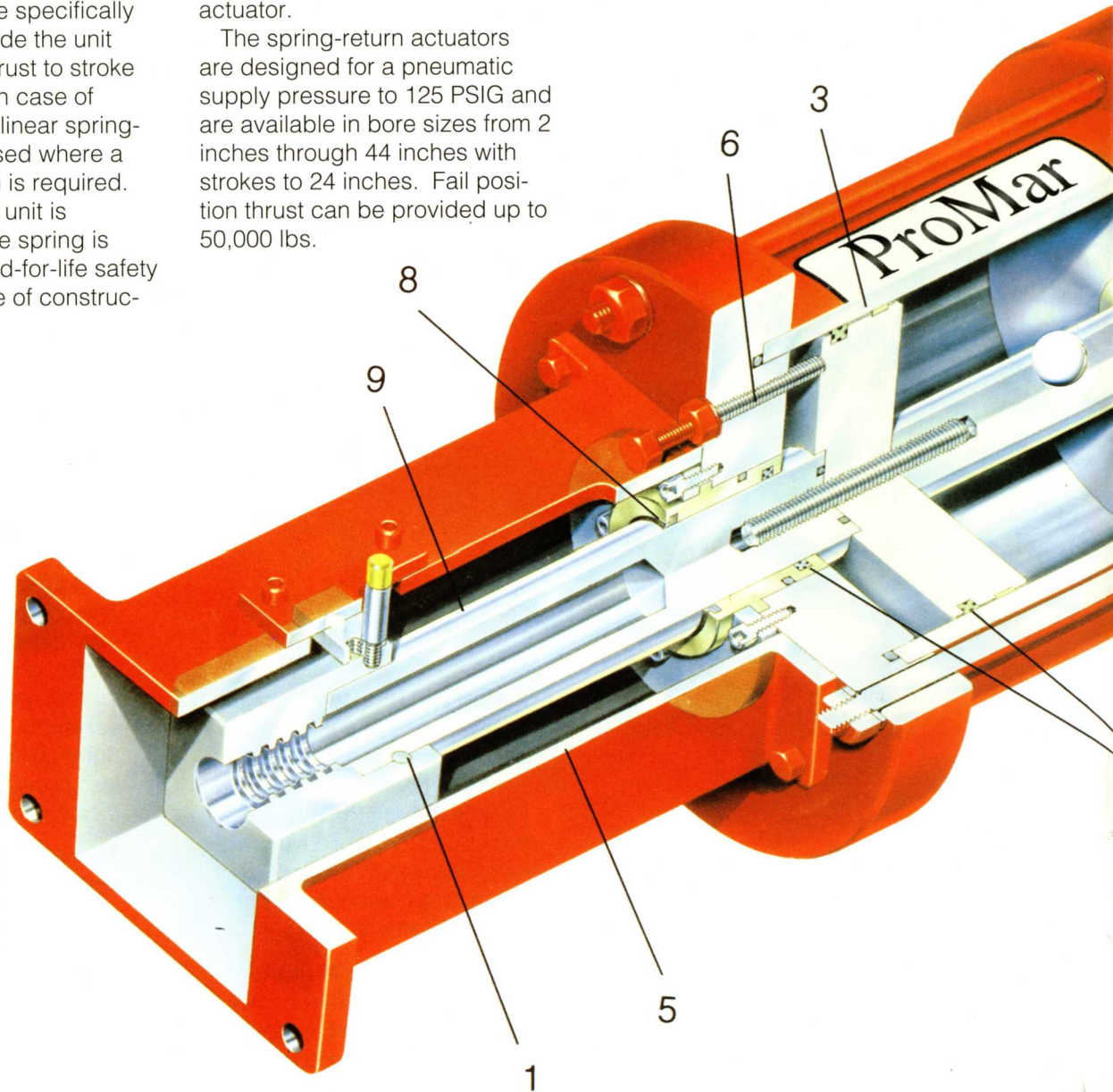
## Spring-Return Linear

The ProMar pneumatic linear spring-return actuators are specifically designed for fail-safe operation of those same valve types described in the double-acting portion of this bulletin. These spring-return models are used in applications where the fail-safe mode is desirable or required. The actuator functions by means of a spring cartridge specifically engineered to provide the unit with the required thrust to stroke the valve one lime in case of power failure. This linear spring-return actuator is used where a positive fail position is required.

The spring-return unit is designed so that the spring is enclosed in a sealed-for-life safety cartridge. This type of construc-

tion provides an extremely safe; method of protection for any personnel required to work on the complete unit. All internal parts of the complete actuator are coated for corrosion protection. The spring cartridge is field removable without special tool requirements and without the necessity of disassembling the actuator.

The spring-return actuators are designed for a pneumatic supply pressure to 125 PSIG and are available in bore sizes from 2 inches through 44 inches with strokes to 24 inches. Fail position thrust can be provided up to 50,000 lbs.





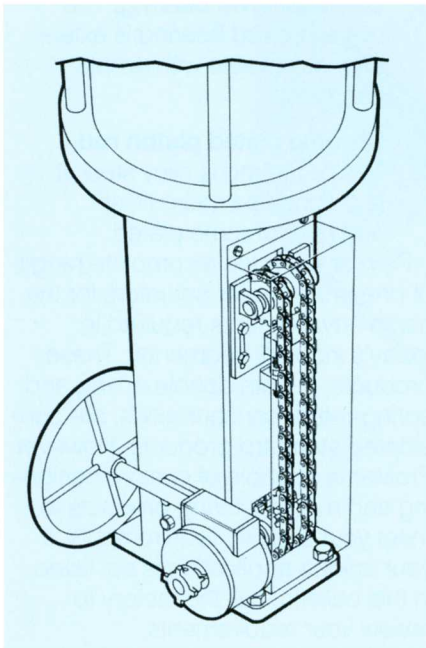
# Manual Overrides

ProMar provides a complete selection of manual overrides for customer usage on the linear product lines. These overrides are specifically engineered to function on the linear pneumatic actuator and provide maximum efficiency in the override mode. The following overrides are available for your use on, any of the linear product lines.

## Declutchable Manual Override

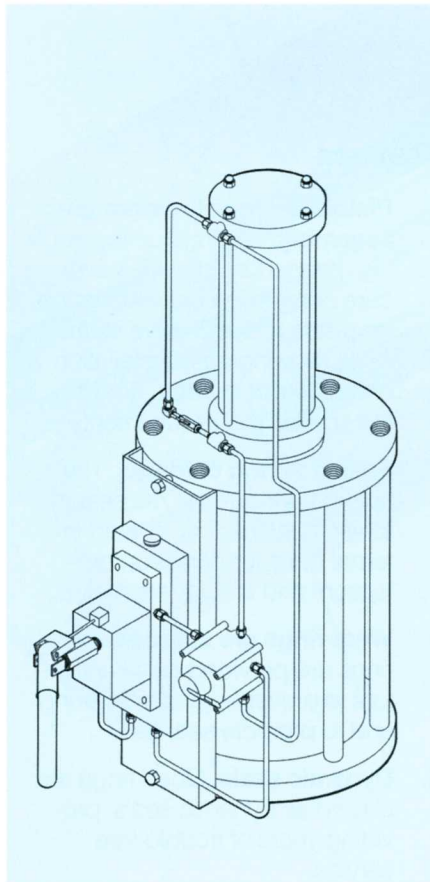
The Declutchable Manual Override is designed to provide manual operation of the actuator/valve assembly when a supply media is not available. The override is engaged by simply pushing in the engage knob and pulling the same knob to disengage. When the override is engaged, the actuator and the valve assembly can be positioned anywhere between full open and full closed by the operation of a handwheel. A unique feature of this override allows the removal of the actuator, while providing full operation of the valve.

U.S. Pat # 5,052,430



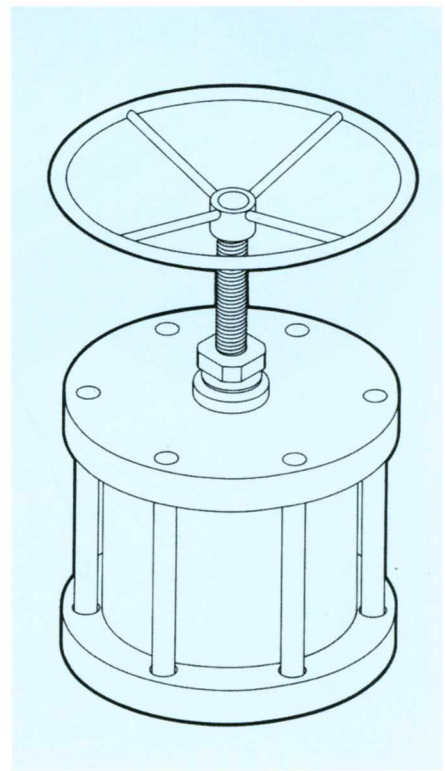
## Hydraulic Manual Override

This override is designed to provide manual operation of the actuator and valve assembly when supply media is not available. The override is operational by means of a control valve position knob and a hand-pump. The override is a complete hydraulic system and is independent of the pneumatic actuator.



## Jackscrew Manual Override

This unit is designed to provide manual operation of the actuator and valve assembly when the supply media is not available. This override is capable of providing the required override capabilities on an infrequent basis. If frequent override capabilities are expected to be required, then one of the previously described systems should be selected. This Jackscrew Override can be fitted with a handwheel if required.



# Typical Specification's

The following information may be used as a guide to compile specifications for linear pneumatic actuators. ProMar supplies actuators that meet or exceed all of the specifications stated below.

## 1.0 Promar Linear Pneumatic Actuators

- 1.1 The pneumatic linear actuator shall be of the type that will allow installing or removing the actuator piston rod from the valve stem by adding or removing a dowel pin assembly.
- 1.2 The actuator piston rod shall be bored to accept the valve stem in order to provide close coupling without cutting or machining the valve stem.
- 1.3 The actuator shall be rated for continuous operation using dry lubricated instrument air or non-corrosive gas and suitable for mounting in any position.
- 1.4 The actuator shall have field adjustable stops in the open and close position.
- 1.5 Ambient temperature range shall be -20°F to +200°F. For high temperature service, the actuator shall be rated from -20°F to +350°F.

## 2.0 Construction

- 2.1 The actuator cylinder shall be steel inside with the inside diameter coated for corrosion protection.
- 2.2 The actuator heads shall be steel.
- 2.3 The actuator piston shall be steel, fitted with a wear ring.
- 2.4 The actuator piston rod shall be alloy steel with the outside diameter ground to a micro finish and hard chrome plated.
- 2.5 The actuator bearing shall be oversized and externally removable without special tools.
- 2.6 The adaption shall be of the rectangular tubing spool type and made of steel.
- 2.7 The spring shall be secured in a welded steel cartridge.

## 3.0 Design

- 3.1 Double-acting and spring-return models shall be offered and shall be field convertible by replacement of the upper head and addition of a spring cartridge assembly.
- 3.2 All spring cartridge assemblies must be of self-contained, field service safe design.

- 3.3 No special tools shall be required to adjust or field convert operation of the actuator.
- 3.4 Adaption spool shall be of the rectangular tubing type.
- 3.5 The actuator piston rod shall be of the bored rod type with a pin assembly connecting the piston rod to the valve stem.

## 4.0 Materials

- 4.1 Heads: Carbon steel, precision machined cylinder, seal groove
- 4.2 Piston: Carbon steel, precision machined, fitted with teflon wear ring.
- 4.3 Cylinder: Alloy steel, honed to a micro finish and corrosion resistant coated.
- 4.4 Bearing: Bronze, oversized precision machined.
- 4.5 Tie-bolts: High strength steel with prevailing torque-type tie rod nuts.
- 4.6 Piston Rod: Alloy steel ground to a micro finish and hard chrome plated.
- 4.7 Seals: Buna-N (Nitrile) standard, Viton optional.
- 4.8 Springs: Carbon steel, corrosion protected, oil dipped.

# Ordering Information

The alpha and numeric digits used in the linear actuator model number have a specific meaning when ordering. The following is an example of the information contained in the description of a typical model number. When ordering refer to the thrust chart for sizing information and specify actuator by model number. Provide a complete description of the device to be automated.

**NOTE:** Spring-return actuators must be sized at the factory.

### Example:

The following example model number depicts an actuator having a 12" cylinder bore, 2 1/2" O.D. piston rod, 10" stroke (travel), low pressure series to 125 PSI Max W.P., in the double-acting configuration.

12 25 10 L DA

- Omitted on DA.
- Supply Pressure (SR Only).
- DA = Double-Acting.
- SRC = Spring-Return Closed.
- SRO = Spring-Return Opened.
- Pressure Rating.
- "L" series to -125 PSI Max. W.P.
- Stroke (inches)
- Piston Rod Code
- Cylinder Bore Code

# Engineering Data

## Thrust Ratings Double-Acting Pneumatic

Model No.	Max. Valve Stem DIA	Thrust (Lbs.) at Operating Pressure (PSIG)												
		40		60		80		100		125		Manual Overrides		
		Close	Open	Close	Open	Close	Open	Close	Open	Close	Open	Jackscrew	Declutchable	Hydraulic
315* LDA	1	266	200	399	300	532	400	665	498	832	750	JS1*	N/A	N/A
415* LDA	1	473	385	710	575	946	765	1182	956	1478	1195	JS1*	MD020*	N/A
515* LDA	1	738	648	1110	975	1478	1296	1845	1620	2310	2025	JS1*	MD020*	N/A
615* LDA	1	1075	985	1625	1475	2150	1966	2686	2458	3360	3075	JS1*	MD020*	N/A
72* LDA	1¼	1465	1345	2195	2016	2925	2690	3656	3360	4575	4200	JS1*	MD020*	N/A
82* LDA	1¼	1915	1795	2870	2688	3825	3585	4775	4480	5970	5600	JS2*	MD030*	N/A
1025* LDA	1¾	2985	2800	4478	4200	5970	5600	7642	7000	9330	8750	JS2*	MD030*	N/A
1225* LDA	1¾	4345	4156	6525	6235	8690	8315	10858	10390	13575	12990	JS2*	MD030*	N/A
1425* LDA	1¾	5912	5725	8870	8590	11825	11450	14778	14310	18475	17890	JS3*	MD050*	MH05*
163* LDA	2	7725	7450	11585	11175	15445	14900	19302	18625	24130	23285	JS3*	MD080*	MH05*
183* LDA	2	9775	9505	14255	14255	19550	19005	24430	23755	30540	29695	N/A	MD080*	MH06*
203* LDA	2	12065	11795	18100	17695	24130	23590	30160	29485	37700	36860	N/A	MD080*	MH06*
2235* LDA	2½	14750	14380	22125	21565	29500	28755	36875	35940	46095	44925	N/A	N/A	MH07*
2435* LDA	2½	17555	17180	26330	25775	35105	34365	43882	42950	54855	53688	N/A	N/A	MH08*
2635* LDA	2½	20600	20230	30900	30345	41200	40460	51500	50570	64375	63215	N/A	N/A	MH08*
2835* LDA	2½	23895	23520	35840	35280	47785	47040	59730	58795	74665	73495	N/A	N/A	MH010*
304* LDA	2¾	27430	26945	41140	40415	54855	53885	68566	67350	85710	84190	N/A	N/A	MH010*
324* LDA	2¾	31530	31035	47300	46550	64060	62070	78825	77585	98535	96985	N/A	N/A	MH010*
344* LDA	2¾	35595	35100	53390	52650	71185	70200	88980	87745	111225	109685	N/A	N/A	MH010*
364* LDA	2¾	39905	39415	59855	59115	79805	78825	99755	98525	124695	123155	N/A	N/A	MH012*
3845* LDA	3¼	44460	43835	66690	65750	88925	87670	111150	109585	138940	136985	N/A	N/A	MH012*
4045* LDA	3¼	49265	48640	73895	72960	98525	97280	123155	121595	153945	151995	N/A	N/A	MH012*
4245* LDA	3¼	54310	53690	81465	80530	108625	107375	135775	134215	169725	167770	N/A	N/A	MH013*
4445* LDA	3¼	59610	58985	89415	88475	119220	117965	149025	147455	186285	184325	N/A	N/A	MH013*

NOTES: 1. Consult factory for supply pressure under 40 psi and over 125 psi  
2. Jackscrew overrides have a maximum allowable stroke, consult factory for determination of the stroke amount.

\*Denotes Actuator Stroke

## Spring-Return Pneumatic

ProMar offers a complete range of spring-return pneumatic actuators. These actuators are provided at the same supply pres-

ures as those defined for the double-acting models. However, due to the wide range of design characteristics required to set the

proper thrust requirements for the spring-return units, the factory should be consulted in order to obtain the specific requirements for your spring-return application.

## Sizing Linear Actuators

The following information must be accurately provided to ProMar for proper sizing of a linear actuator for a particular valve application.

1. Valve size (i.e. valve nominal bore).
2. Pressure rating (i.e. 150 ANSI 125 lbs, etc.).
3. Type of valve (i.e. gate, globe etc.).
4. Valve manufacturer.
5. Valve stem diameter.

6. Maximum operating differential pressure (PSIG).
7. Minimum and maximum supply media available to actuator (PSIG).
8. Type of supply media (i.e. instrument air, gas, etc.).
9. Operating temperature range (minimum and maximum).
10. Speed of operation (Standard equals 1 inch per second).

11. Required "thrust" at operating differential pressure (lbs).
12. Fail-safe position (if spring or fail-safe system required).

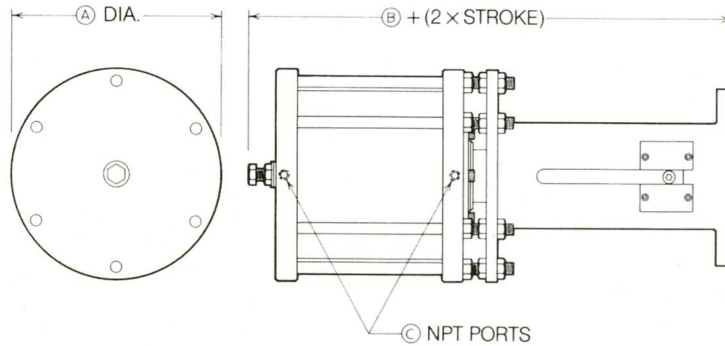
NOTE: ProMar will determine the required thrust (item 11) if all other information is given (item 1 thru Item 10).



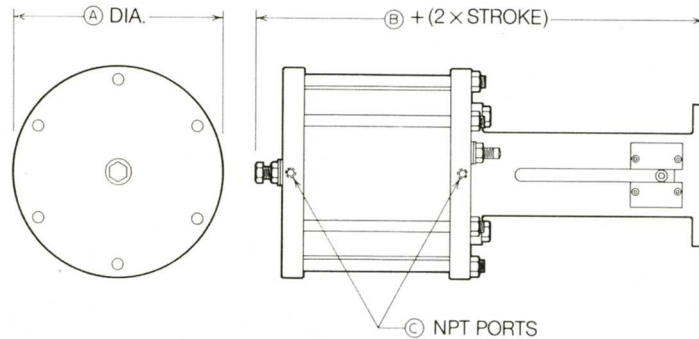
# Engineering Data

## General Dimensions

Style A



Style B



Model No.	A (In.)	B (In.)	C	Approximate Weight of Actuator		
				Basic Weight (Lbs.)	Added Wt. (Lbs.) Per Inch of Stroke	Style
315*LDA	5¼	11½	¾ NPT	20	2.02	A
415*LDA	6⅞	11½	¾ NPT	34	2.35	A
515*LDA	7⅞	10¼	¾ NPT	38	2.57	B
615*LDA	8⅞	10¼	¾ NPT	49	2.79	B
72*LDA	9⅞	11¾	¾ NPT	79	4.00	B
82*LDA	10⅞	11¾	¾ NPT	91	4.21	B
1025*LDA	12½	12¼	½ NPT	166	5.26	B
1225*LDA	14½	13	½ NPT	210	5.67	B
1425*LDA	16⅞	13	½ NPT	285	6.29	B
163*LDA	19⅜	15½	½ NPT	428	9.86	B
183*LDA	21⅜	16¼	¾ NPT	598	10.76	B
203*LDA	23⅝	17½	¾ NPT	732	13.62	B
2235*LDA	25⅝	20¼	¾ NPT	954	19.18	B
2435*LDA	28¼	21	¾ NPT	1178	26.97	B
2635*LDA	30⅝	21¼	¾ NPT	1413	28.91	B
2835*LDA	32⅝	22	1 NPT	1737	31.21	B
304*LDA	34⅝	23	1 NPT	2131	32.58	B
324*LDA	36¾	23	1 NPT	2362	33.84	B
344*LDA	38¾	22¼	1 NPT	2778	35.15	B
364*LDA	40¾	22¼	1 NPT	3048	36.53	B
3845*LDA	42¾	24	1 NPT	3581	40.88	B
4045*LDA	45	27¾	1 NPT	4228	43.41	B
4245*LDA	47	27¾	1 NPT	4675	44.74	B
4445*LDA	49¼	27¾	1 NPT	4991	47.41	B

\* Denotes Actuator Stroke

**NOTE:** Engineering and dimensional data shown on pages 8 and 9 are approximations and shown for information purposes only and may vary per application. Please consult ProMar for specific engineering and dimensional information.

# Valve Mounting

Standard of top works dimensions for globe gate and linear does not exist in the United States. Therefore, there are numerous possibilities for providing the mounting adaption for ProMar linear pneumatic actuators. Each manufacturer of these valves requires a unique mounting adaption for each model and size. ProMar will engineer and manufacture a custom mounting program based on the requirements of each valve. Once the adaption has been engineered, it will become a standard for that particular valve model and family.

To accomplish the mounting adaption, the customer has two methods of having this work completed.

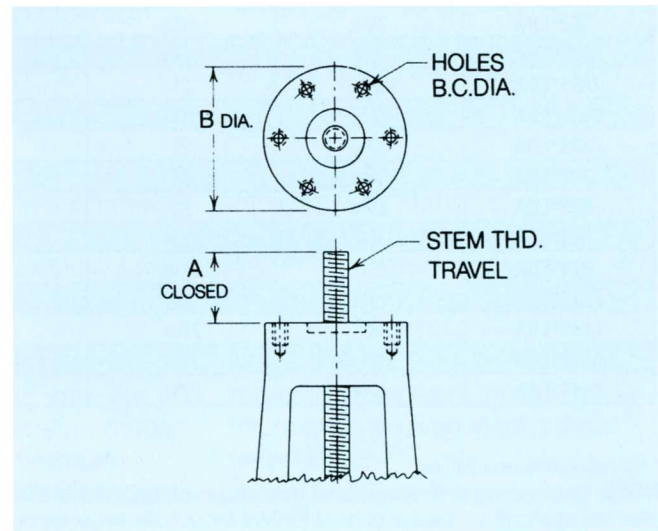
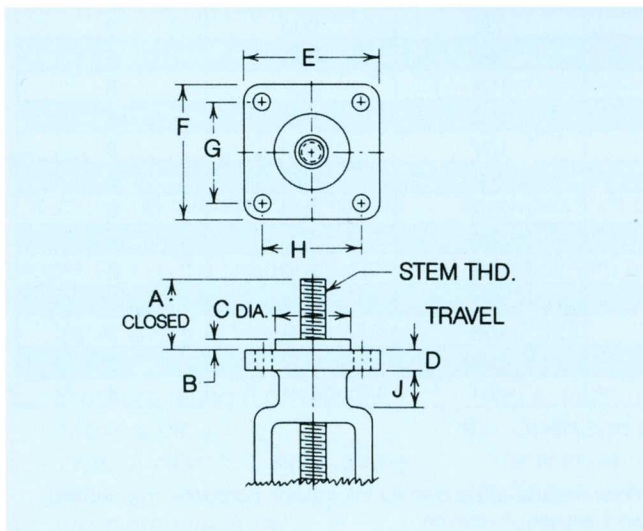
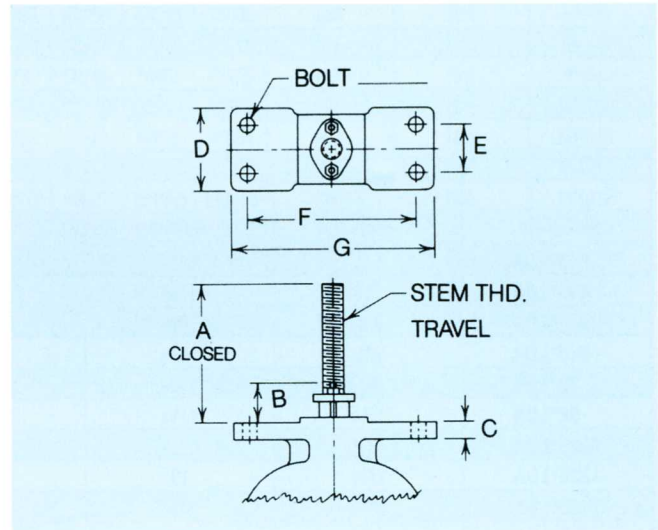
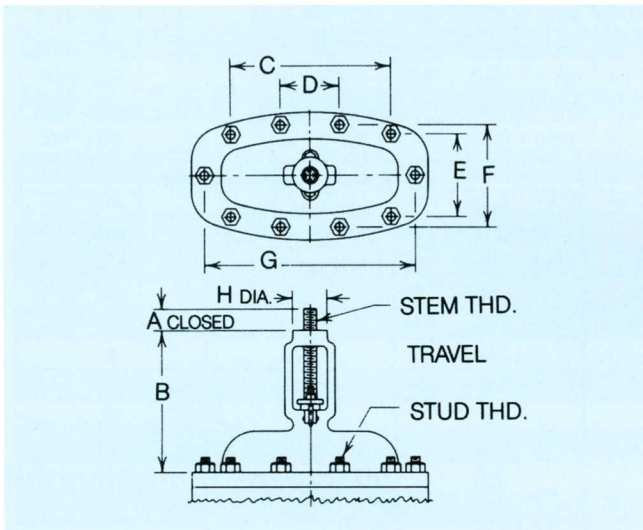
1. ProMar will require an accurate set of "top works" drawings from which the appropriate mounting hardware can be engineered and manufactured.

2. The actual valve to be automated may be shipped directly to ProMar. If this method is selected,

then all quotation information and valve/actuator dimensional data must be considered preliminary or used for estimation purposes only. When the mounting adaption is finalized the exact information can be provided.

The design of the mounting adaption will provide the lowest possible profile for both valve and actuator assembly. The adaption will be designed to mount to either the yoke or the bonnet depending on valve type. If limit switches are required at both ends of stroke, then it must be noted that this requirement will usually result in a longer mounting adaption system. Specific switch designs can be mounted when the overall length becomes prohibitive.

Typical top works for several valve types are illustrated below.

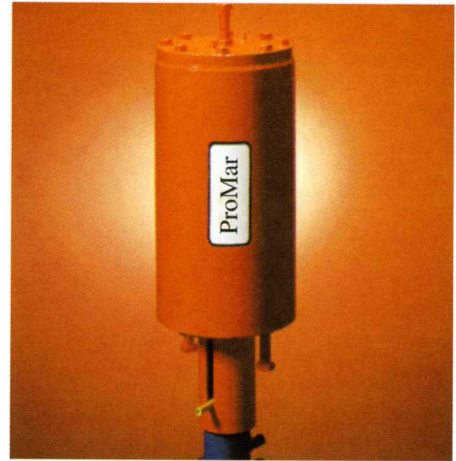


# Other Products

## Hydraulic Linear Actuators

In addition to the complete line of pneumatic linear actuators, ProMar can provide a selection of hydraulic linear actuators for your automation requirements. These specially designed hydraulic actuators provide the same heavy duty service construction features found in the pneumatic models.

ProMar's hydraulic linear actuators are available in both double-acting or spring-return configurations. For more information on this unique product line, please call your ProMar sales representative or contact the factory.



## Accessories

### 1. Tail-Rod

All ProMar linear actuators can be fitted with a tail-rod assembly. Standard construction is stainless steel. Tail rods provide excellent position indication when the complete assembly is viewed from a distance.

### 2. Shear Pin Assembly.

The shear pin assembly is a unique device for holding the valve/actuator in the open position while work is being performed. If the pin is inadvertently left in place, introduction of supply pressure will shear pin and close the valve.

### 3. 90% Open Stop

This device, when installed, will allow cycling of the actuator from full open to 90% open, while preventing any accidental closing of the actuator. This device is used to periodically energize the seals when an actuator's service conditions are infrequent.

### 4. Close Position Lock

This option locks the actuator in the closed position and will prevent the actuator from opening until released.

### 5. Limit Switches

All ProMar linear actuators can be fitted with a variety of industrial rated limit switches. Practically any

customer requirement can be accomplished.

### 6. Positioners

All ProMar linear actuators can be fitted with a positioner supplying a wide range of input signals.

### 7. Transducers

All ProMar actuators can be fitted with a transducer per customers' specifications.

### 8. Control Valves and Accessories

All ProMar linear actuators can be fitted with a wide range of controls designed per the customer's specification. All control components are specified in accordance with available, quality, maintenance and service of the component manufacturer. ProMar takes extreme care to ensure the components selected are compatible with the customer's specification, while providing a compact and easily maintained actuator/control package.

### 9 Fail-Safe Systems

ProMar offers two standard fail-safe systems, the "LS" Series, which fails the actuator/valve upon loss of pressure and the "LSE" series, which fails the actuator/valve upon loss of supply pressure and/or electrical power. The "LS" and "LSE" fail-safe systems offer an economical approach to fail-safe operation

when compared to an alternate spring-return actuator. Other fail-safe systems are available per customers' specifications.

### 10. Hi-Lo Pilot Control

All ProMar linear actuators can be fitted with Hi-Lo pilot devices to fail the actuator at predetermined set pressures. The HI-LO pilot component is selected based on the particular application.

### 11. Line Break System

All ProMar linear actuators can be fitted with a Line Break control device that will close the actuator/valve package when a line break occurs. There are several line break pilots available, the particular unit may be specified by application.

### 12. Nitrogen Power System

ProMar can provide an independent supply pressure system for use where a supply source is not readily available. The nitrogen bottles are rechargeable and are provided skid mounted. Optional construction with a sun shade or weather proof enclosure may be specified. The nitrogen power system can be fitted with a variety of alarm devices for manual or automatic operation. ProMar will size the number of bottles required on application.

## LATEST ADVANCEMENT IN LINEAR ACTUATOR TECHNOLOGY

In addition to the "Standard" PROMAR BTS Linear Pneumatic Series Actuators, PROMAR now offer the latest in Linear Actuator Technology, the new Model "GL" Series Linear.

### Standard Features

- Dramatic reduction in overall height of up to 40% vs. standard series Actuators.
- Significantly reduced total weight of 20% to 40% vs. standard series Actuators.
- Spring Return Models are provided with a specially designed spring assembly which is installed inside the cylinder body, eliminating the need for a longer, heavier, external spring cartridge assembly.
- Internal tie bars are utilized which enhance alignment , reliability and aesthetics.
- Cylinder bores are precision honed and Teflon coated providing corrosion protection, reduced friction, smoother operation and increased life.
- Stroke lengths are standardized in 4" increments offering greater versatility per standard bore size.
- A unique split coupling assembly, fitted with a constant position indicator pin, is used for Valve Stem to Actuator Piston Rod attachment.
- GL Model Actuators are supplied with a one piece adaptation spool for lowest possible profile.
- Piston rods and internal tie bars are manufactured from High Strength Alloy steel and are provided with a specialized coating process for reduced friction, increased life and smoother operation.
- Adjustable Travel Stops are provided as a standard in GL Model Actuators in both the open and closed positions.
- Override assemblies are available as an option for GL units.
- Latest seal technology is utilized in GL Series Actuators.
- GL Series Actuators are available in 8" thru 24" bore sizes in both DA & SR Models..
- No special tools are required to field adjust, or service GL Series Linear Actuators.



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