

Gas Springs *and* Hydraulic Dampers



Enertrols[®]

WORLDWIDE SPECIALISTS IN ADVANCED
LINEAR DECELERATION TECHNOLOGY

Gas Springs

Enertrols gas spring models include: push type, pull type (traction) and lockables. These rugged units are designed to handle the demanding needs of the industrial market. They are maintenance free and self-contained.

Body diameter models are available from 15 mm to 40 mm with forces ranging from 10 N to 5,000 N (40 mm model).

Enertrols gas springs offer a high service life with a hard Ceram-Pro coating on the piston rod. In addition, these durable models offer an integrated low friction bearing with a grease chamber which provides a very low break away force. These unique features make the Enertrols gas springs superior to conventional gas springs.

They can be mounted in any orientation, although mounting with the rod in the downward position is preferred. The internal valve allows the force to be adjusted to your specific requirements.

A wide variety of end fittings make installation easy and versatile.

Enertrols gas springs remove the need for muscle power and provide controlled motion for lids, hoods, machine guards, panels and more.



Hydraulic Dampers

EHB hydraulic dampers from Enertrols are maintenance free, self-contained and sealed units. They are available with body diameters from 15 to 40 mm and with stroke lengths of up to 800 mm (40 mm model only).

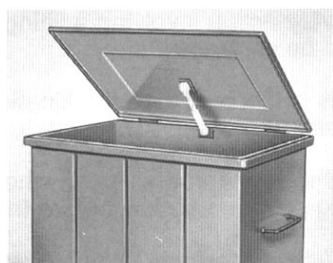
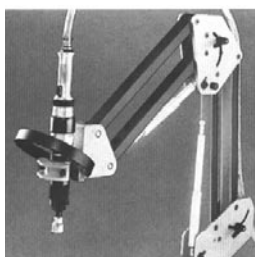
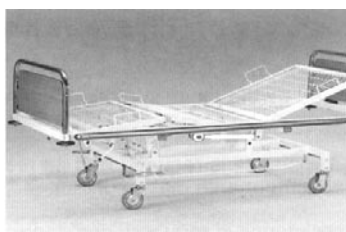
Enertrols hydraulic dampers are versatile and feature single or double-acting designs. The travel speed is adjustable and remains constant throughout the stroke. The single acting version is controllable in one direction only, with free flow in the opposite direction.

Adjustment is easily achieved by pulling out fully and turning the rod until the desired damping speed is attained.

As with the Enertrols gas springs, a variety of end fittings are available for ease of operation and installation.

EHB dampers can be mounted in any position. The piston rod is Ceram-Pro coated and provides excellent protection in highly corrosive environments.

Selected applications for these versatile dampers include: drilling and tapping equipment, pick and place automation, swinging loads, tooling fixtures, lids and slides.



Additional Gas Spring Applications Include:

Computers
Photocopiers
Aircraft Overhead Compartments
Aircraft Galley Equipment
Truck Engine Covers
Truck Side Panels
Electrical Enclosure Cabinets

Boat Engine Hatches
Bus/Coach Engine Covers
Bus/Coach Courier Seats
Fork Lifts
Conveyor Belt Tensioning
Roof Ventilation Hatches
Manhole/Access Covers

Molding Machines
Executive Desks
Smoke Vents
Stair Lifts
Security Cabinets
Washing Machine Lids
Automatic Cash Dispensers

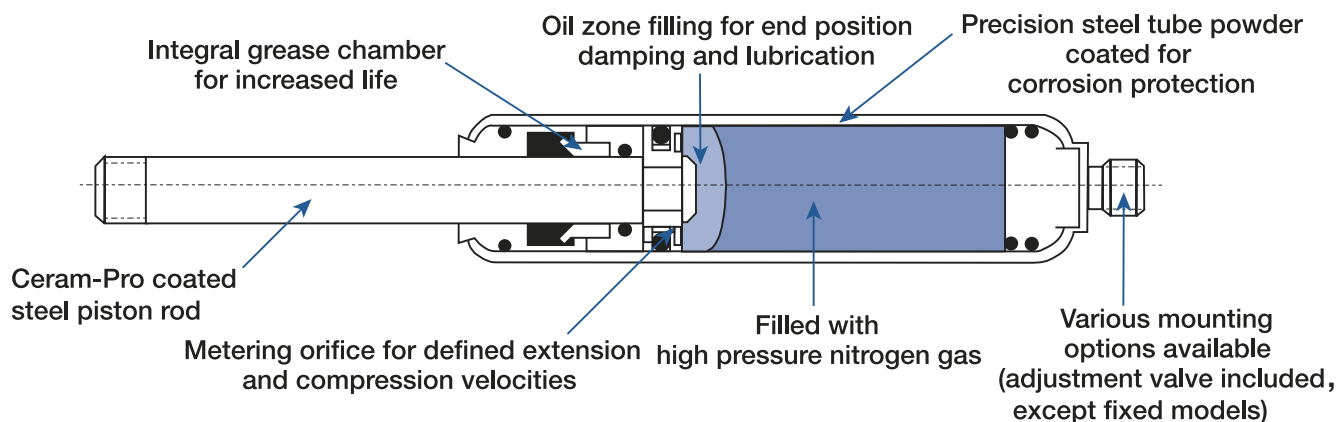
Function

In every action involving a lifting or lowering motion, e.g. when opening a hatch lid, there are masses in movement which must be controlled.

If this is ignored, then the kinetic energy caused by the mass in motion can result in considerable damage. There are several ways that Enertrols offers to control this motion.

- a) **Shock absorbers** - used when no return assistance is required and no restriction of the velocity is required. Control is provided shortly before the mechanical components make contact.
- b) **Velocity controls** - used when no return assistance is required, and control of velocity throughout the motion is required.
- c) **Gas springs** - used when return assistance or load support (counterbalance) is required throughout the motion.

Gas springs can be provided in a wide range of body sizes, stroke lengths and the force provided can be specified to suit the specific application. The extension and compression velocities can also be customized on request.



Construction and Operation

Enertrols gas springs are maintenance free self-contained systems which are filled with high pressure nitrogen gas to a defined pressure. They also contain a small quantity of oil to provide end position damping.

During operation, the nitrogen gas flows through the metering orifice and allows the load to be lowered in a controlled manner. The force of the gas spring works against the weight and prevents it from accelerating and damaging mechanical components on closure.

Upon reversal, the nitrogen flows back through the piston orifice and the gas spring force assists the action, reducing the effort required to reset the mechanism.

The opening and closing speeds can be varied by altering the size of the metering orifice.

For cushioning on the extension stroke, mount with the rod down. For cushioning on the compression stroke, mount with the rod up.

An integral grease chamber behind the rod seals ensures lasting lubrication which can increase the life of Enertrols gas springs by at least 100% compared to other products on the market.

The Ceram-Pro coated steel piston rod and powder coated precision steel body ensure excellent corrosion protection and provide a long maintenance free working life.

The wide variety of available mounting accessories provide mounting versatility and options.

Calculations

In order to save time we recommend that the calculation and selection of the most suitable gas spring be completed by Enertrols.

With our sophisticated selection software we can quickly determine the resultant opening or closing forces throughout the complete movement and recommend the optimum mounting points, gas spring model and nominal force.

Please fax the completed Application Data form on page 10 to 734-595-6410.

Use the following application parameters to calculate a suitable Enertrols gas spring:

1. Weight of the lid or flap lbs (kg)
2. Position of the center of gravity in (mm)
3. Sketch of the application layout

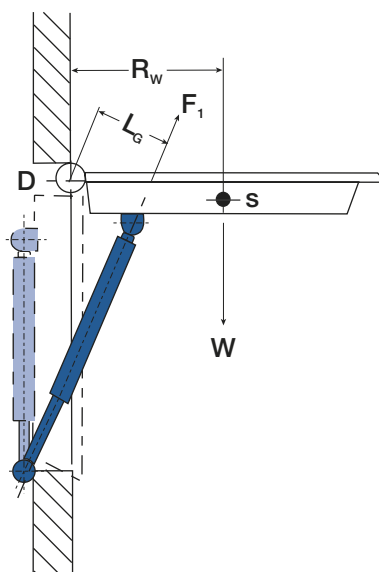
Symbols used:

W	Force due to weight of the lid	lbs (kg)
R _w	Radius of center of gravity	in (mm)
L _G	Number of gas springs in parallel	in (mm)
s	Center of gravity	-
D	Pivot point	-

Basic formula for calculating required extension force:

$$F_1 = \frac{W \cdot R_w}{L_G \cdot n} \text{ lbs (N)}$$

The basic formula given enables an approximate calculation of the required gas spring force for one mounting position geometry.



Example

W = 90 lbs (41 kg)
R_w = 30 in (762 mm)
L_G = 6 in (152.4 mm)
n = 2
 $F_1 = \frac{90 \cdot 30}{6 \cdot 2}$
F₁ = 225 lbs (1000 N)

Chosen force:

F₁ = 225 lbs (1000 N)
Chosen gas spring:
EGS-22-200-AA-1000

Mounting Instructions

Enertrols gas springs are self contained, maintenance free devices and are supplied ready for installation.

The following points should be noted to ensure the longest possible working life:

Gas spring force F₁: Gas springs are filled with nitrogen at very high pressures and under no circumstances should they be opened or subjected to excessive tensile loads.

External force F_H: for example manual (hand) force to close the flap.

Weight force W: due to mass acting at center of gravity.

Gas spring orientation as desired:
With piston rod downwards – damping effective at end of extension stroke.
With piston rod upwards – damping effective at end of compression stroke.

Choose a standard available gas spring from the Enertrols range featured in this catalog before determining the mounting position coordinates, or preferably allow Enertrols to do the calculations and provide a printout suggesting the most suitable model and mounting positions.

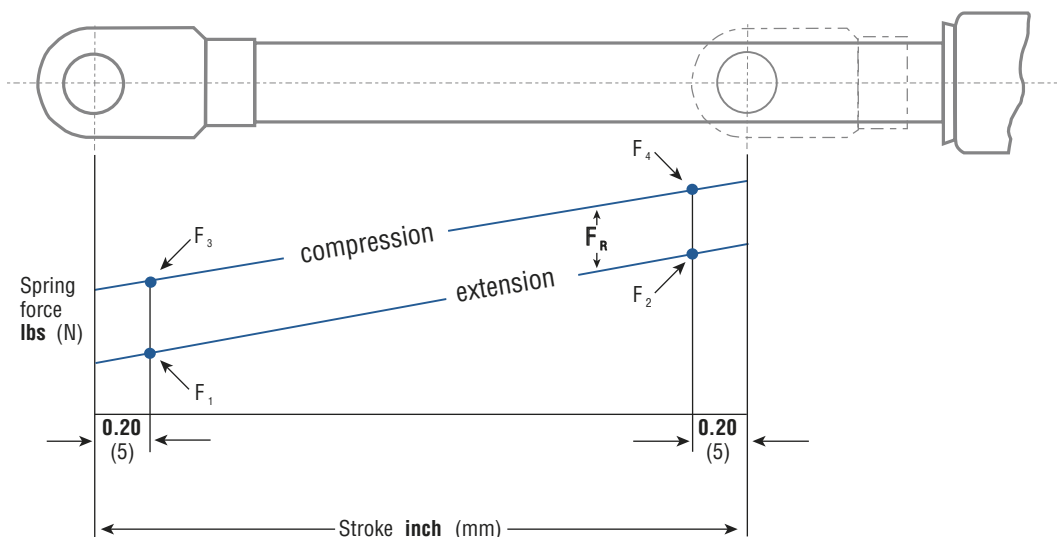
Where possible arrange the mounting positions so that the effective torque provided by the gas spring positively holds the flap in its closed position.

Protect the piston rod from impact damage, scratches, dirt or paint contamination. The gas spring barrel must not be deformed or damaged.

The gas spring must not be exposed to bending forces or side loads. If using eyelet fittings support the eye on both sides and allow some float. We recommend using ball joints on most applications as these help to eliminate any misalignment.

Gas Spring Force - Stroke Characteristics

Gas Springs – Push Type



F_1 = Nominal Force at 68° F (20° C) (this figure is normally used when specifying gas springs)

F_1 to F_2 = Force on extension stroke

F_3 to F_4 = Force on compression stroke

Model	Progression* approximate %	Friction F_R approximate lbs (N)
EGS-15	27	4 (20)
EGS-19	33	7 (30)
EGS-22	38	7 (30)
EGS-28	52	9 (40)

*The progression (slope of the force line in the characteristic diagram above) is due to the reduction of the internal gas volume as the piston rod moves from its initial position to its fully stroked position. The approximate progression values given above for standard springs can be altered upon request.

Effect of temperature: The nominal F_1 force figure is given at 68° F (20° C).

An increase in temperature of 18° F or 10° C will result in approximately a 3.4% increase in the force.

General extension force tolerance for fixed force gas springs is (+40N/-20N). General extension force tolerance for adjustable gas springs is plus or minus 5-7%.

Note: Initial breakaway force may be higher if units are stored for a long period without use.

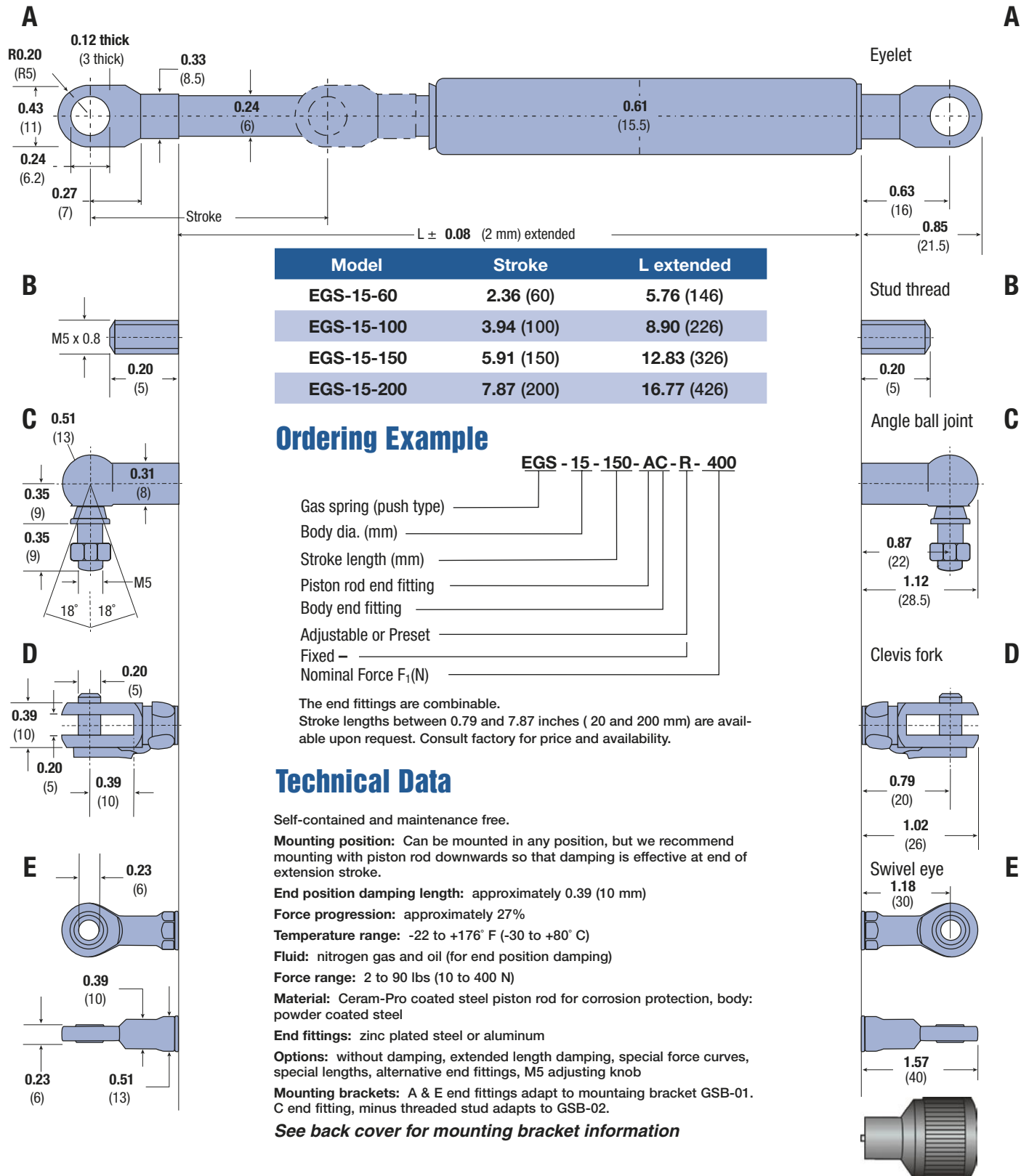
Additional Gas Spring Available Options

1. Lockable gas springs: EGBF & EGBS-22, 28, & 40 models
2. Gas spring (push type): EGS-40
3. Gas springs (pull type): EGZ-19, EGZ-28 (EGZ models are a special order)

Note: EGS-15 to 40 and EGZ-19 & 28 gas springs are available as fixed force options with optional lengths.

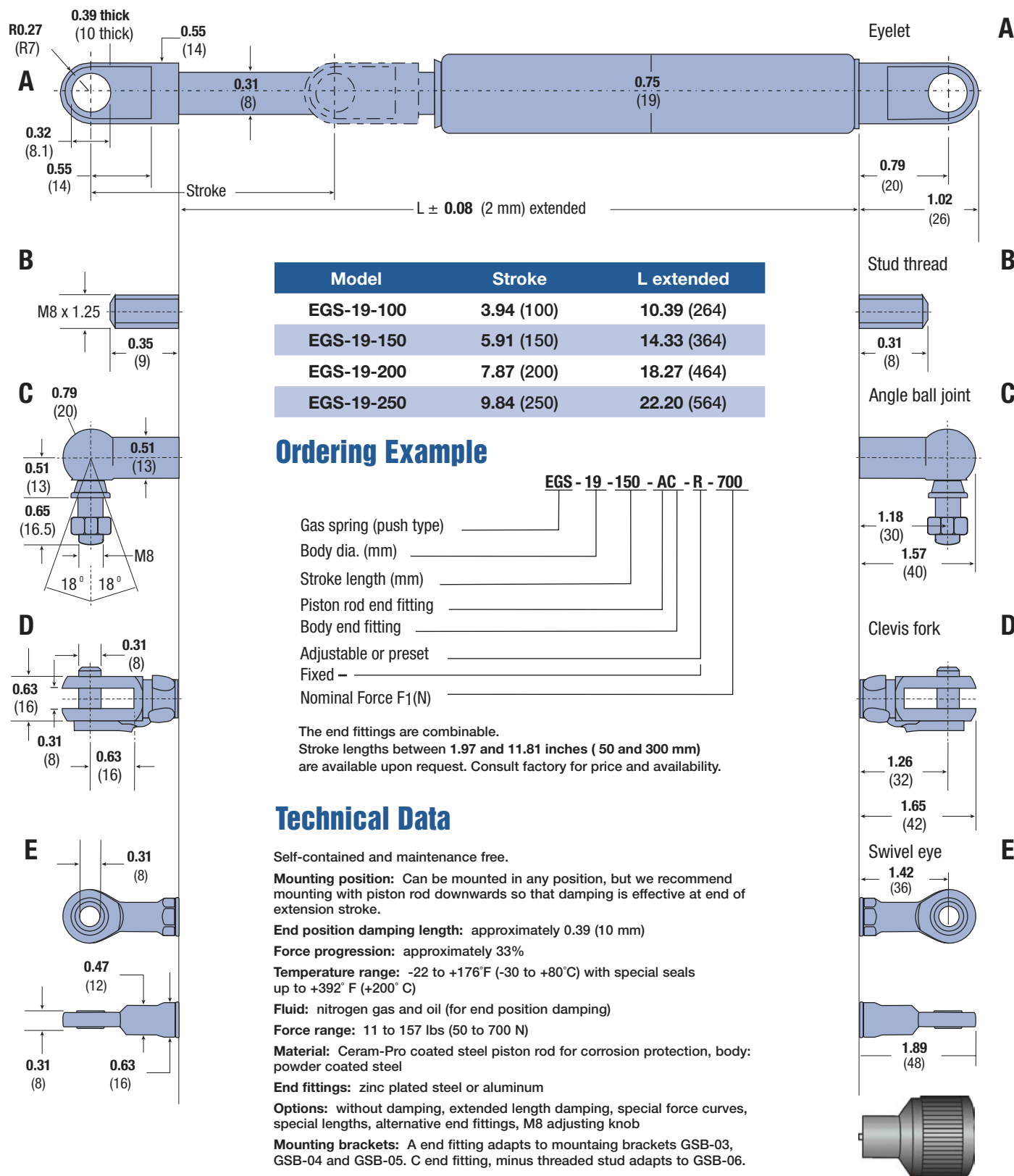
Dimensions in inches and (mm)

Extension force range 2 to 90 lbs (10 to 400 N)



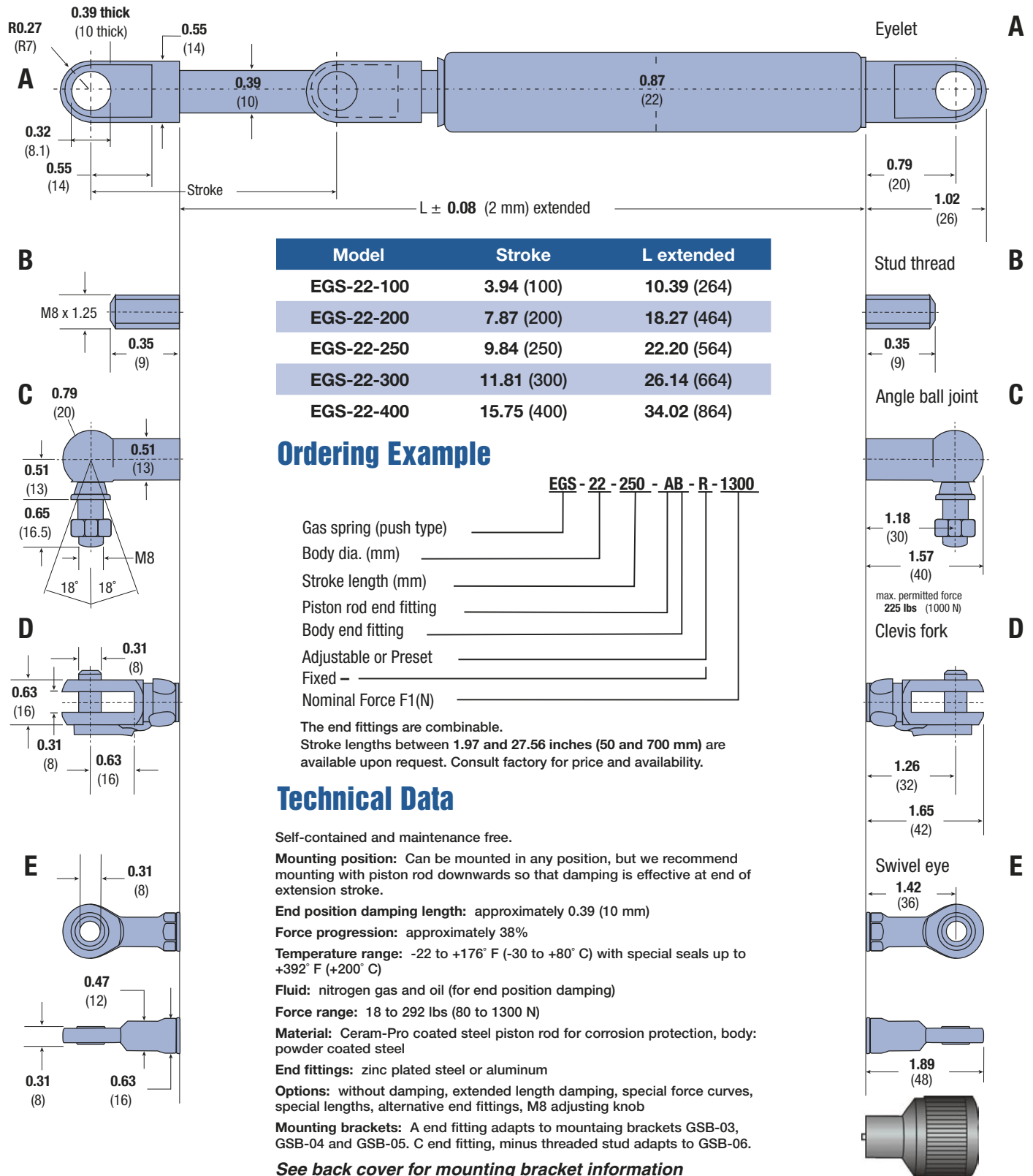
Extension force range 11 to 157 lbs (50 to 700 N)

Dimensions in inches and (mm)



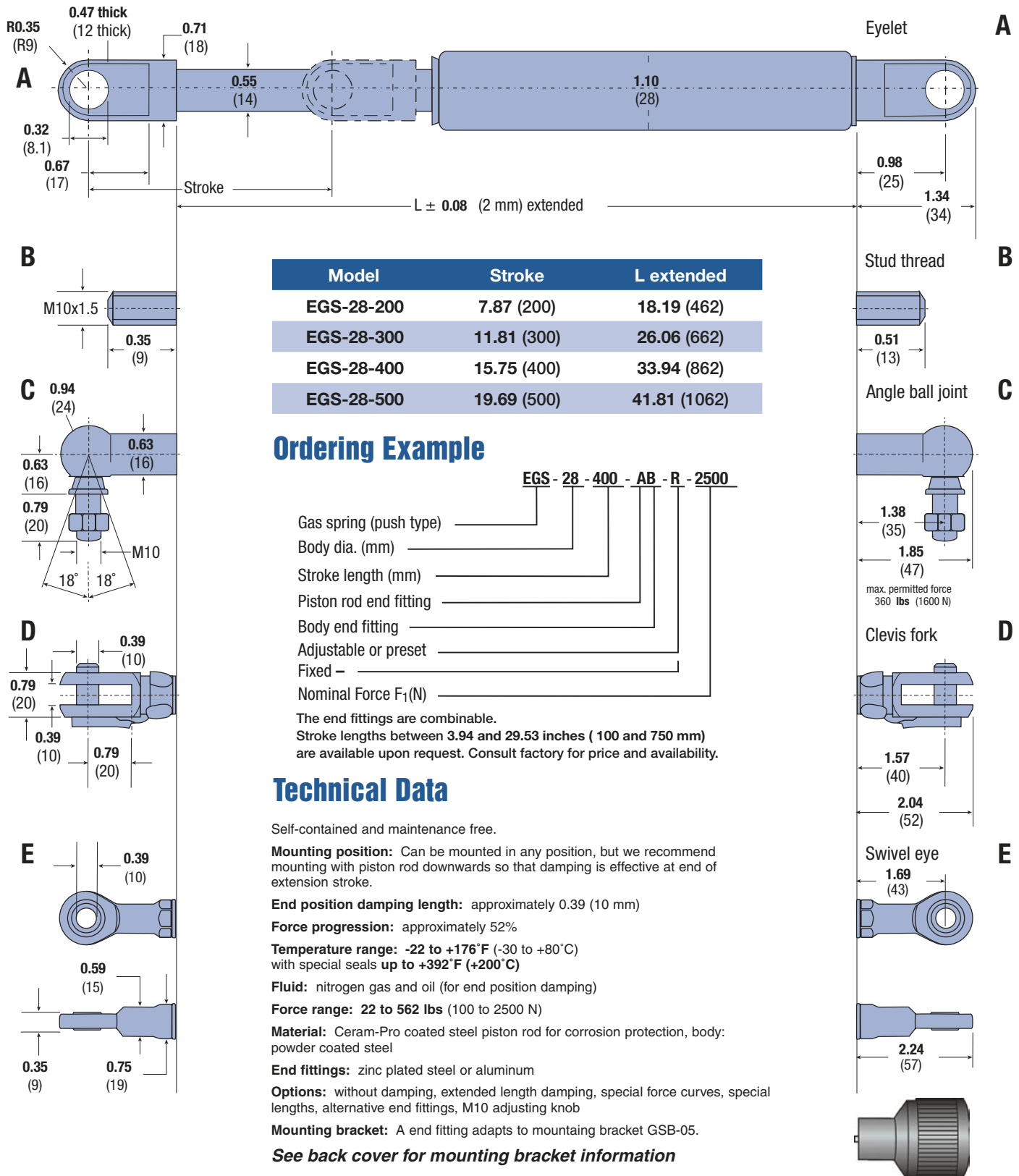
Dimensions in inches and (mm)

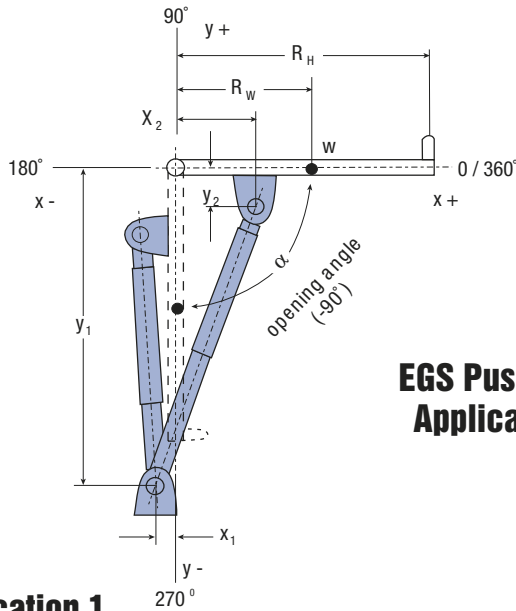
Extension force range 18 to 292 lbs (80 to 1,300 N)



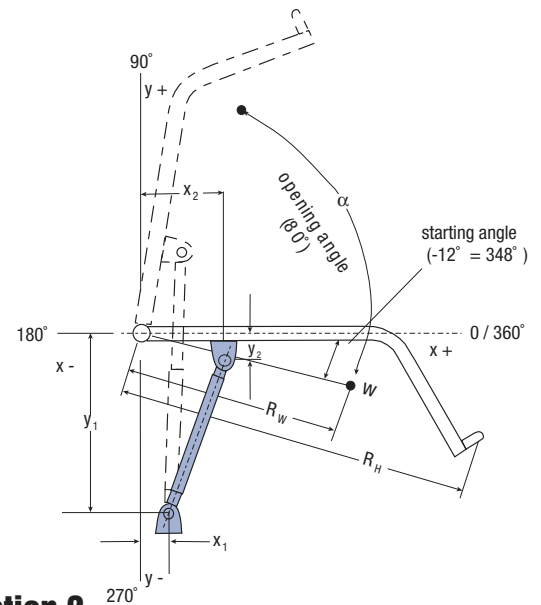
Extension force range 22 to 562 lbs (100 to 2,500 N)

Dimensions in inches and (mm)





EGS Push Type Applications



Application 1

Application 2

Requirement per year _____

Name _____

Company _____

Address _____

Telephone _____

Fax _____

E-mail _____

Comments _____

Gas Spring Type

Input Data

Radius of center of gravity R_w _____ in (mm)

Moving weight w _____ lbs (kg)

Radius of hand force R_h _____ in (mm)

Desired max. handforce F_h _____ lbs (N)

Number of gas springs in parallel n _____ pcs

Starting angle (0 to 360°) _____ °

Opening angle (-360 to +360°) α _____ °

Gas spring fixing points (complete if desired)

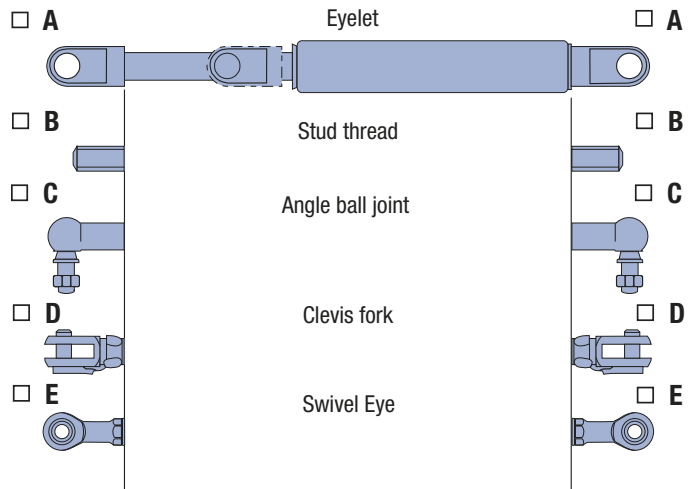
Fixed point (x-coord.) x_1 _____ in (mm)

Fixed point (y-coord.) y_1 _____ in (mm)

Moving point (x-coord.) x_2 _____ in (mm)

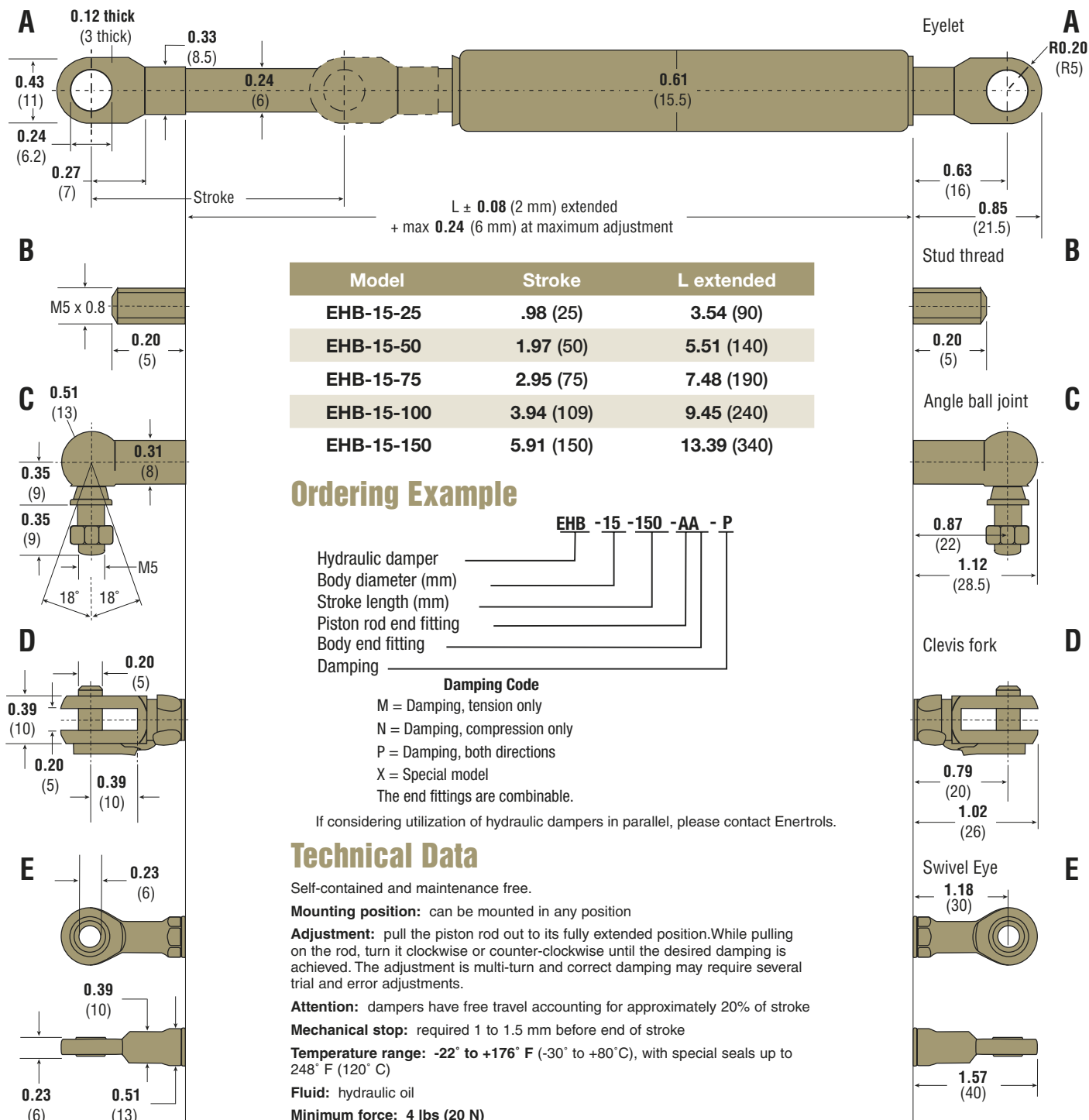
Moving point (y-coord.) y_2 _____ in (mm)

Desired End Fittings



**For application assistance please
fill out and fax to Enertrols at
734-595-6410**

Dimensions in inches and (mm)



Ordering Example

EHB -15 -150 -AA - P

Hydraulic damper
Body diameter (mm)
Stroke length (mm)
Piston rod end fitting
Body end fitting
Damping

Damping Code

M = Damping, tension only
N = Damping, compression only
P = Damping, both directions
X = Special model
The end fittings are combinable.

If considering utilization of hydraulic dampers in parallel, please contact Enertrols.

Technical Data

Self-contained and maintenance free.

Mounting position: can be mounted in any position

Adjustment: pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments.

Attention: dampers have free travel accounting for approximately 20% of stroke

Mechanical stop: required 1 to 1.5 mm before end of stroke

Temperature range: -22° to +176° F (-30° to +80° C), with special seals up to 248° F (120° C)

Fluid: hydraulic oil

Minimum force: 4 lbs (20 N)

Maximum force: 180 lbs (800 N)

Material: Ceram-Pro coated steel piston rod for corrosion protection, body: powder coated steel

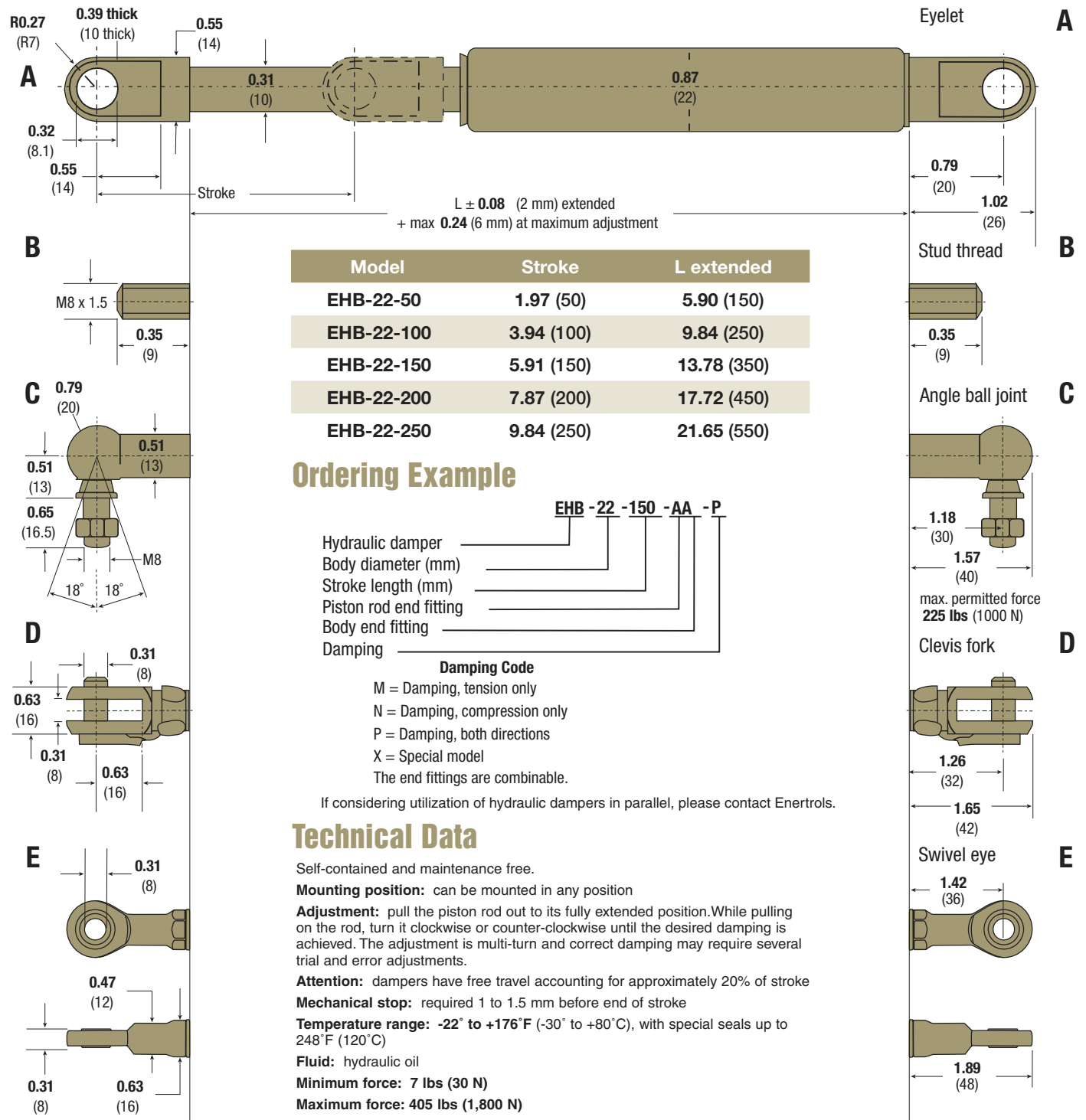
End fittings: zinc plated steel or aluminum

Options: units with other damping characteristics, other stroke lengths, special seal materials, alternative end fittings and protective rod sleeves

Mounting brackets: A & E end fittings adapt to mounting bracket GSB-01. C end fitting, minus threaded stud adapts to GSB-02.

See back cover for mounting bracket information

Dimensions in inches and (mm)



Ordering Example

EHB - 22 - 150 - AA - P

Hydraulic damper
Body diameter (mm)
Stroke length (mm)
Piston rod end fitting
Body end fitting
Damping

Damping Code
M = Damping, tension only
N = Damping, compression only
P = Damping, both directions
X = Special model
The end fittings are combinable.

If considering utilization of hydraulic dampers in parallel, please contact Enertrols.

Technical Data

Self-contained and maintenance free.

Mounting position: can be mounted in any position

Adjustment: pull the piston rod out to its fully extended position. While pulling on the rod, turn it clockwise or counter-clockwise until the desired damping is achieved. The adjustment is multi-turn and correct damping may require several trial and error adjustments.

Attention: dampers have free travel accounting for approximately 20% of stroke

Mechanical stop: required 1 to 1.5 mm before end of stroke

Temperature range: -22° to +176°F (-30° to +80°C), with special seals up to 248°F (120°C)

Fluid: hydraulic oil

Minimum force: 7 lbs (30 N)

Maximum force: 405 lbs (1,800 N)

Material: Ceram-Pro coated steel piston rod for corrosion protection, body: powder coated steel

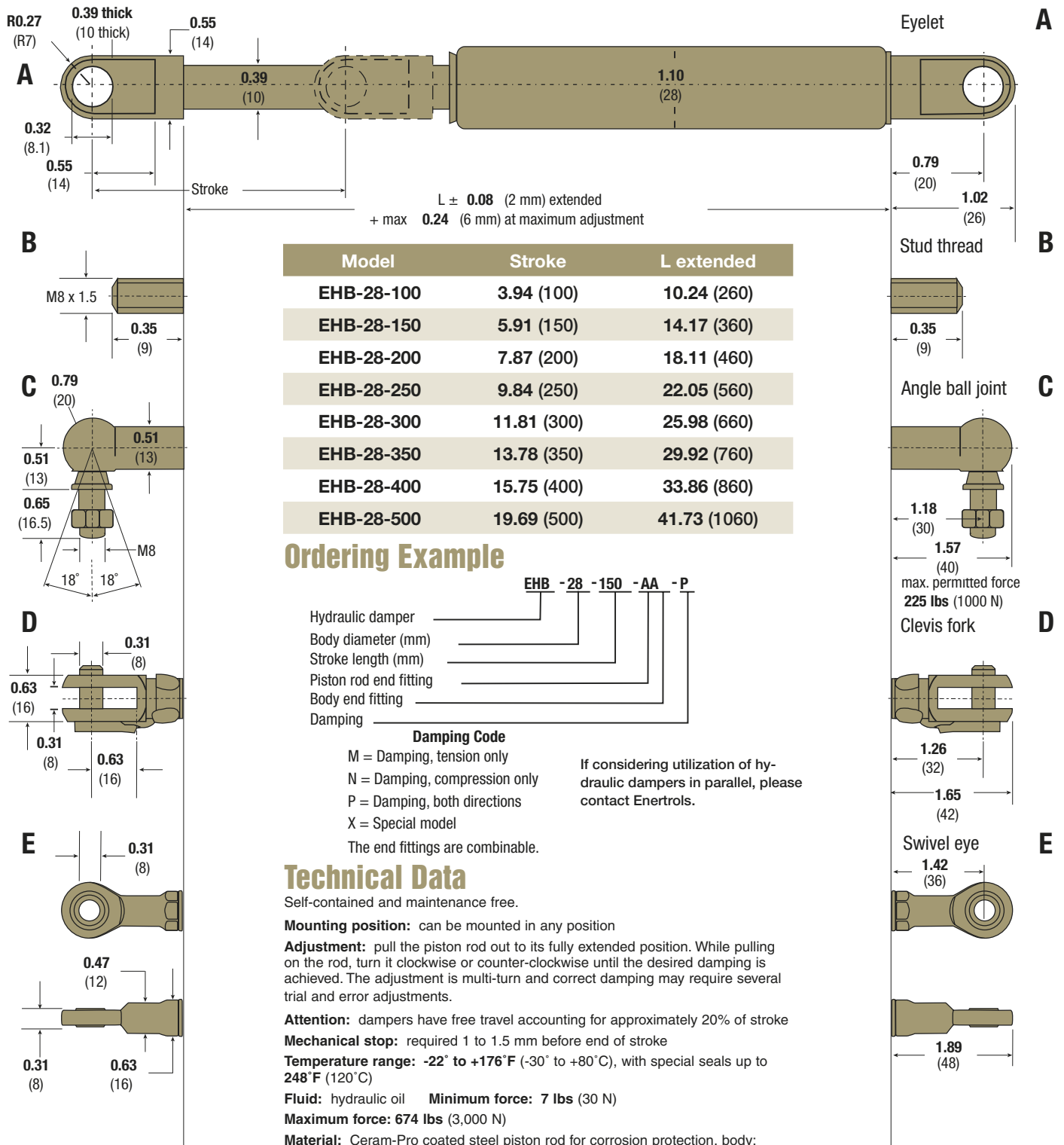
End fittings: zinc plated steel or aluminum

Options: units with other damping characteristics, other stroke lengths, special seal materials, alternative end fittings and protective rod sleeves

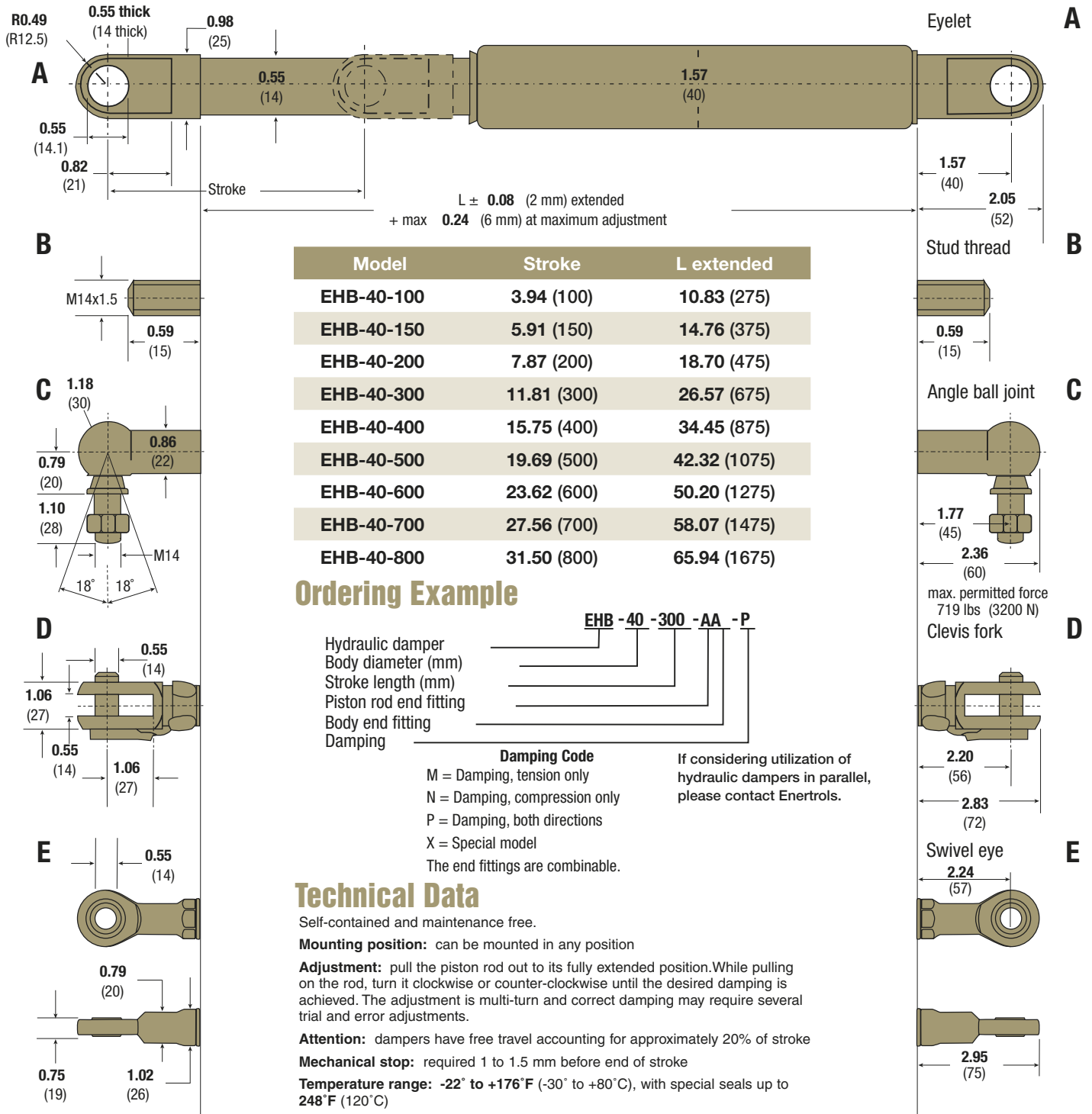
Mounting brackets: A end fitting adapts to mounting brackets GSB-03, GSB-04 and GSB-05. C end fitting, minus threaded stud adapts to GSB-06.

See back cover for mounting bracket information

Dimensions in inches and (mm)



Dimensions in inches and (mm)



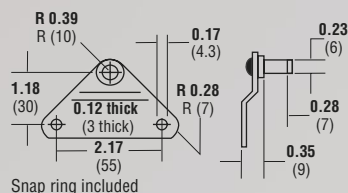
Mounting Brackets for Gas Springs & Hydraulic Dampers

Dimensions in inches and (mm)

Material: zinc plated steel

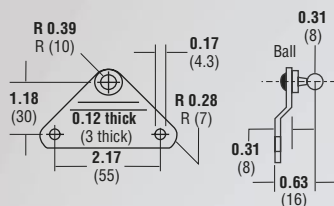
GSB-01

max. force **112 lbs** (500 N)



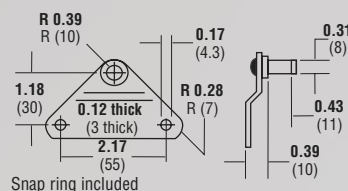
GSB-02

max. force **112 lbs** (500 N)



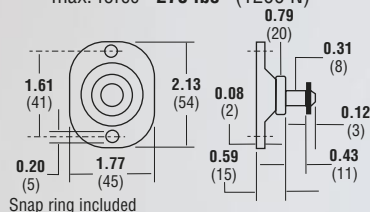
GSB-03

max. force **270 lbs** (1200 N)



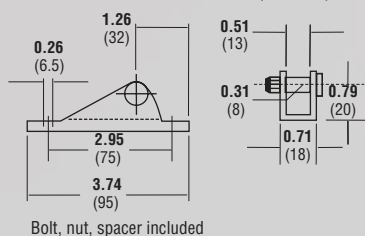
GSB-04

max. force **270 lbs** (1200 N)



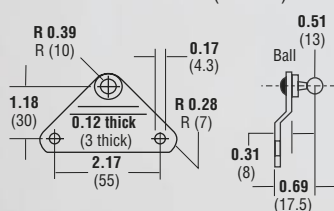
GSB-05

max. force **405 lbs** (1800 N)



GSB-06

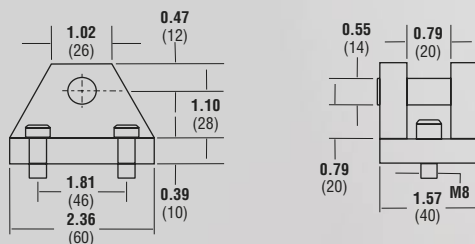
max. force **270 lbs** (1200 N)



Note: Rising force curve on compression for gas springs.

ME14

max. force **2,248 lbs** (10,000 N)



See individual model pages for specific information on the correct end fittings for each mounting bracket.

Enertrols reserves the right to change models, dimensions or specifications without notice or obligation.

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