W.C. BRANHAM INC.

SOLUTIONS IN MOTION

ABOUT THE COVER Used in the corrugated and paper industries, W.C. Branham caliper disc brakes maintain web tension control to minimize material run off as well as emergency stopping material rolls due to loss of hydraulic service. These seven different series of W.C. Branham caliper disc brakes featured represent over 150 different model configurations available. Simply stated, W.C. Branham has a wide range of sizes covering a wide range of applications that create a wide range of solutions. It's a good bet that W.C. Branham has the right caliper disc brakes for your industrial or vehicular needs.

As a leader in the industry for over 17 years, you will be partnering with an innovative company that continues to set itself apart from the competition. Our "solutions plus" program is an example of our value added services. With "solutions plus" we offer no charge samples to OEMs, toll free pre & post sales technical support, engineering staff for custom requirements, product upgrade information as well as DXF, DWG and IGES CAD dimensional drawings and exploded views for quick insertion into your design or parts manual. Call today, **1.800.428.1974**, for immediate attention.

Providing solutions to your braking needs

VEHICULAR APPLICATIONS

Utility trucks
Road construction
Commercial turf vehicles
Lift trucks
Aircraft ground support equipment
Railroad service cars
Agricultural machinery

INDUSTRIAL APPLICATIONS

Manipulator arms
Hose reels
Web tensioning machinery
Packaging machinery
Printing presses
CNC machinery
Conveyer belts
Tire buffing equipment
Food processing
Paper converting machinery
Material handling

WHAT'S INSIDE

Sizing caliper disc brakes can be an easy process.

The goal is to determine how much braking torque is required and finding the most cost effective and efficient brake and disc diameter package. Go to the appropriate formulas for either industrial or vehicular applications and begin. Confirm your selection by faxing the sizing worksheet, page 20, to our customer service group.

INDUSTRIAL FORMULA - STOPPING

i. Calculate braking torque for application involving stopping in a specified period of time.

$$T = \frac{WK^2N}{308t}$$

Where:
- T = Torque, ft.-lb
- W = Weight of rotating member, lb.
- K^2 = Radius of gyration of rotating member, ft. (see graphics below)
- N = RPM
- t = Stopping time required, seconds.

i_a. Determine heat generation and dissipation by calculating Btu's per stop.

$$\text{Btu/stop} = \frac{WK^2N^2}{4{,}570{,}000} \quad \text{or} \quad \frac{\pi TNt}{46{,}680}$$

i_b. Determine Btu's per hour.

$$\text{Btu/hour} = (\text{Btu/stop})(\text{stops/hr})$$

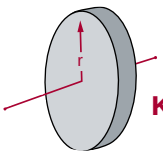
i_c. Determine square feet of exposed disc area sufficient enough to dissipate heat.

$$\text{Sq. ft. of disc area} = \frac{\text{BTU/hr}}{660}$$

i_d. See Table 1 above to select correct disc diameter.

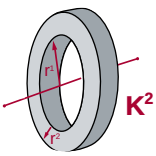
i_e. See helpful guidelines section on next page.

Solid cylinder about its own axis



$$K^2 = \frac{r^2}{2}$$

Hollow cylinder about its own axis



$$K^2 = \frac{r^1 + r^2}{2}$$

Radius of gyration for geometrical forms references an axis at which the entire mass of the body may be considered as concentrated.

If your application involves other geometric forms consult a reference guide such as Machinery's Handbook.

TABLE 1.

Exposed areas, weights and BTU/hr of commonly used discs.

DISC DIA.	EXPOSED AREA		WEIGHT LBS.	MAX. BTU/HR @ 300° F
	SQ. IN.	SQ. FT.		
6 5/16	62.58	.43	1.37	283.8
8	100.53	.70	3.52	462.0
10	157.08	1.09	5.46	719.4
12	226.20	1.57	7.91	1036.0
16	402.12	2.79	14.07	1841.4

INDUSTRIAL FORMULA -TENSIONING

ii. Calculate braking torque for application involving tensioning or constant drag.

$$T = (L)\,(F)\,(R), \text{ inch lbs.}$$

Where:
- L = Web width, in.
- F = Tension, lb. per in. of web width
- R = Maximum roll radius, in.

ii_a. Find Btu's per hour.

$$\text{Btu/hour} = \frac{(T)\,(rpm)}{24.75}$$

rpm can be found by converting web velocity usually given in feet per minute (fpm).

$$rpm = \frac{fpm}{C}$$

Where C = Circumference at maximum roll diameter, ft.

ii_b. Calculate heat dissipation for tensioning application by determining square feet of exposed disc area required.

$$\text{Sq. ft. of disc area} = \frac{\text{Btu/hr}}{660^*}$$

* The constant of 660 is for a maximum disc temperature of 300°.

ii_c. See Table 1 above to select correct disc diameter.

ii_d. See Helpful Guidelines section on next page.

VEHICULAR FORMULA

i. Calculate braking torque (Dynamic).

$$T = \frac{WR\left[\frac{a}{g} + \frac{b}{100}\right]}{D}$$

Where:

T	=	Torque, ft.-lb./Axle, vehicle or wheel
W	=	Weight on axle including weight transfer, if any, vehicle or wheel.
R	=	Loaded tire radius, ft.
g	=	32.2
b	=	% of grade
D	=	Gear reduction, if drive line mounted
a	=	Deceleration rate, ft/sec^2.

If a is not known solve:

$$a = \frac{V}{t} = \frac{V^2}{2S}$$

Where:

V	=	Velocity of vehicle, ft./sec. at moment of applying brake.
t	=	Stopping time required, seconds.
S	=	Stopping distance of vehicle, ft.

or

i. Calculate braking torque (Parking).

$$T = \frac{WR\left[\frac{b}{100}\right]}{D}$$

i_a. Determine heat generation and dissipation.

$$E = \frac{WV^2}{2g}$$

Where:

E	=	Kinetic Energy, ft. ib.
W	=	Weight of axle, vehicle or wheel, lb.
V	=	Speed of vehicle, ft./sec.

i_b. Calculate Btu's per hour generated.

$$\text{Btu/hr. generated} = \frac{(E)\ (\text{stopping frequency/hr.})}{778}$$

i_c. Determine square feet of exposed disc area sufficient enough to dissipate heat.

$$\text{Sq. ft. of disc area} = \frac{\text{Btu/hr}}{660}$$

i_d. See Table 1 on previous page to determine disc diameter.

i_e. See Helpful Guidelines section.

i_f. After determining the caliper disc brake and disc diameter necessary for your application, please contact W.C. Branham for confirmation. All vehicular applications must be approved by W.C. Branham in writing.

Helpful guidelines

1. For best service life do not exceed disc temperature of 300° F.
2. Formulas for heat dissipation are based on 220° F temperature rise and 80° F ambient.
3. Since the amount of heat dissipated per hour by the disc at a given temperature above ambient is considered as being directly proportional to the exposed area of the disc, disc thickness should be kept small. Standard thicknesses are 5/32" and 1/4".

FRICTION MATERIAL LIFE EXPECTANCY

Figure 1, at right, depicts friction material life per cubic inch in horsepower hours. To determine life in hours of a brake or brakes, see below.

i. Find life in hours of brake or brakes (most commonly used in tensioning or dragging applications)

$$\text{Ft. lb/hr} = (\text{Btu/hr})\ (778)$$

i_a. Determine horsepower hours per hour.

$$\text{Hp hrs/hr} = \frac{\text{Ft. lb./hr}}{1{,}980{,}00}$$

i_b. Locate Table 2 below, and find the cubic inches of wearable material for various WCB caliper disc brakes. Calculate life in hours.

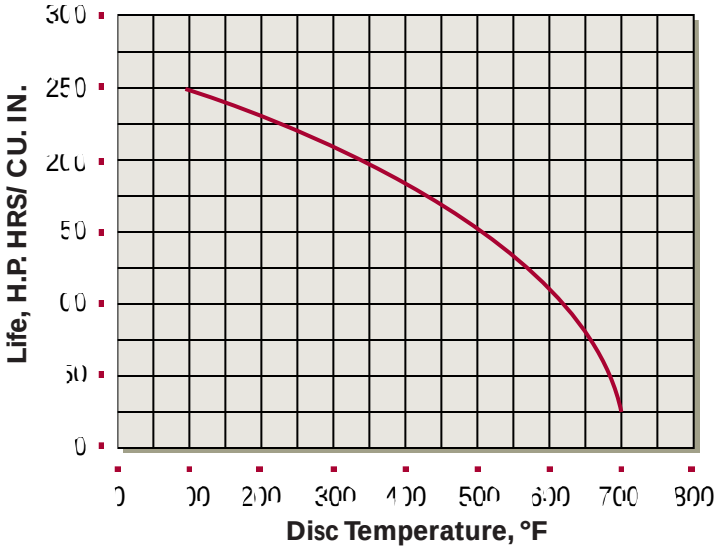
$$\text{Life in hours} = \frac{(\#\ \text{of brakes})\ (M)\ (\text{HP hrs/in}^3)}{\text{HP hrs/hr}}$$

Where:
M = Cubic inches of wearable material taken from Table 2 for desired caliper disc brake.

TABLE 2.
Wearable friction material of WCB brakes

38 Series	.46 Cubic inches
47 Series	.83 Cubic inches
47 Series (retractable)	.48 Cubic inches
200 Series	1.66 Cubic inches
200 Series (retractable)	.95 Cubic inches
493 Series	3.45 Cubic inches
962 Series	19.0 Cubic inches

Figure 1.
General Industrial Molded Friction Material



FRICTION MATERIAL LIFE EXPECTANCY

If necessary, find the amount of life in stops of a brake or brakes. Kinetic energy can be removed from a rotating mass brought to rest. Calculate as follows:

$$E_{\text{ft. lb}} = \frac{(\pi)\ (T)\ (N)\ (t)}{60} \quad \textbf{or} \quad E_{\text{ft. lb}} = \frac{(WK^2)\ (N^2)}{5872}$$

i. Calculate Horsepower hours per stop.

$$\text{Hp hrs/stop} = \frac{E}{1{,}980{,}000}$$

i_a. Find life in stops

$$\text{Life in stops} = \frac{(\#\ \text{of brakes})\ (M)\ (\text{HP hrs/in}^3)}{\text{HP hrs/stop}}$$

Where:
M = Cubic inches of wearable material taken from Table 2 for desired caliper disc brake.

*Note: Friction material life expectancies are **calculated estimates** and do not take into consideration of any foreign contaminants which may reduce wear life. It is suggested that when life must be known accurately, field tests should be conducted.*

TABLE 3.

Cam travel data for WCB mechanical disc brakes.

M38 AND M47 SERIES BRAKES

a. 15° maximum travel when friction pads are new and with 1/32" gap on each side of disc.

b. Periodic tightening of lock nut will reduce travel of level and will allow 1/4" wear on each friction pad.

c. 90° maximum travel after 3/16" wear on each friction pad and without intermediate tightening of lock nut.

M200 SERIES BRAKES

a. Gap between friction pad faces and disc when new = .048" total.

b. Angular movement of lever required to actuate brake when new = 7° 30’

c. Maximum axial movement without intermediate adjustment = .387".

d. .208" total wear allowed before adjustment of each side.

PRESSURE RATINGS

38 Series	1000 PSI Maximum
47 Series	1000 PSI Maximum
200 Series	1500 PSI Maximum
493 Series	1500 PSI Maximum
962 Series	1000 PSI Maximum

MECHANICAL BRAKE LEVER FORCES

38 Series	450 lb. Maximum
47 Series	450 lb. Maximum
200 Series	580 lb. Maximum

Braking torque (inch/lb)

H/P 38 SERIES

Dynamic: 70 lb. of force per 100 PSI x Braking Radius (inches)

Parking/Static: 35 lb. of force per 100 PSI x Braking Radius (inches)

H/P 47 SERIES

Dynamic: 144 lb. of force per 100 PSI x Braking Radius (inches)

Parking/Static: 72 lb. of force per 100 PSI x Braking Radius (inches)

H/P 200 SERIES

Dynamic: 288 lb. of force per 100 PSI x Braking Radius (inches)

Parking/Static: 144 lb. of force per 100 PSI x Braking Radius (inches)

H 493 SERIES

Dynamic: 353 lb. of force per 100 PSI x Braking Radius (inches)

Parking/Static: 211 lb. of force per 100 PSI x Braking Radius (inches)

H/P 962 SERIES

Dynamic: 693 lb. of force per 100 PSI x Braking Radius (inches)

Parking/Static: 347 lb. of force per 100 PSI x Braking Radius (inches)

M38/M47 SERIES

Dynamic: 2.69 x Lever Force (lb.) x Braking Radius (inches).

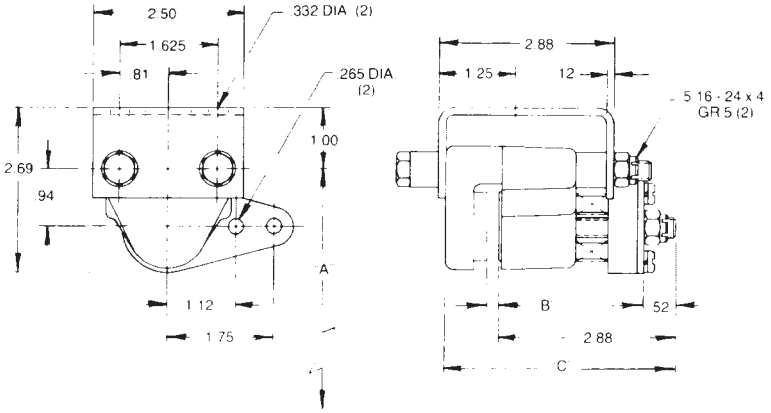
Parking/Static: 1.75 x Lever Force (lb.) x Braking Radius (inches).

M200 SERIES

Dynamic: 7.45 x Lever Force (lb.) x Braking Radius (inches).

Parking/Static: 3.73 x Lever Force (lb.) x Braking Radius (inches).

Model M38F



Standard features

- Cast aluminum construction
- Hardcoated housings
- 2.0 in.^{2} M38/4.0 in.^{2} M47 total friction pad area
- Unlimited disc diameter
- Replaceable friction pads
- Zinc plated steel floating bracket
- Spring retractable piston
- Machined lever and cam
- Non-asbestos friction material
- Adjustment nut for pad wear

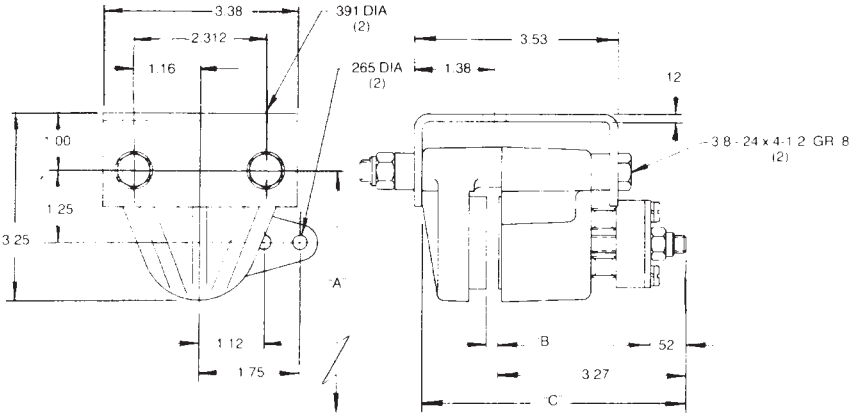
Model M38F

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	M38 TORQUE	
							DYNAMIC	STATIC
6 5/16	2.53	3.47	A	5/32	.250	3.82	680.57	442.75
8	3.38	4.31	A	5/32	.250	3.82	909.22	591.50
10	4.38	5.31	A	5/32	.250	3.82	1178.22	766.50
12	5.38	6.31	A	5/32	.250	3.82	1447.22	766.50
16	7.38	8.31	B	1/4	.344	3.91	1985.22	1291.50
–	–	–	L	3/8	.469	4.04	AT 100 LB. LEVER FORCE, IN. LBS.	
–	–	–	E	1/2	.594	4.16	450 LB. MAXIMUM LEVER FORCE	

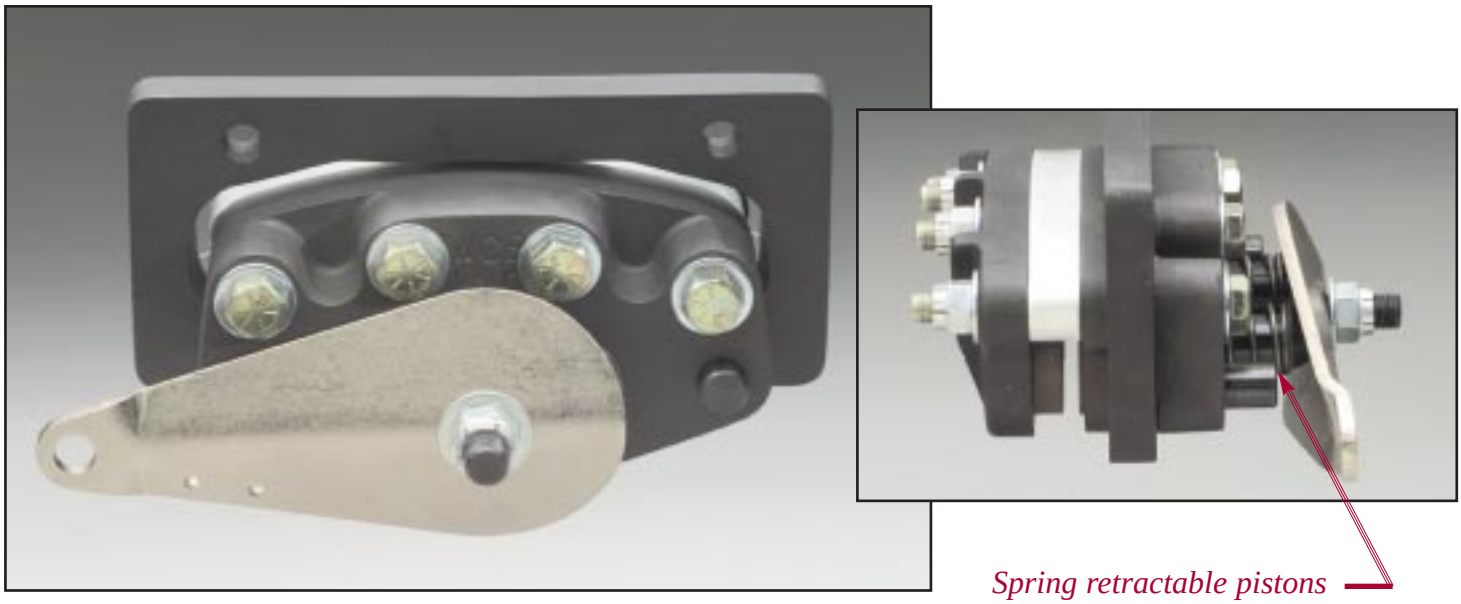
Model M47F

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	M47 TORQUE	
							DYNAMIC	STATIC
6 5/16	2.28	3.53	A	5/32	.190	4.60	613.32	399.0
8	3.12	4.38	A	5/32	.190	4.60	839.28	546.0
10	4.12	5.38	A	5/32	.190	4.60	1108.28	721.0
12	5.12	6.38	A	5/32	.190	4.60	1377.28	896.0
16	7.12	8.38	B	1/4	.280	4.69	1915.28	1246.0
–	–	–	L	3/8	.410	4.81	AT 100 LB. LEVER FORCE, IN. LBS.	
–	–	–	E	1/2	.530	4.94	450 LB. MAXIMUM LEVER FORCE	

Model M47F



Refer to page 19 for disc specifications.

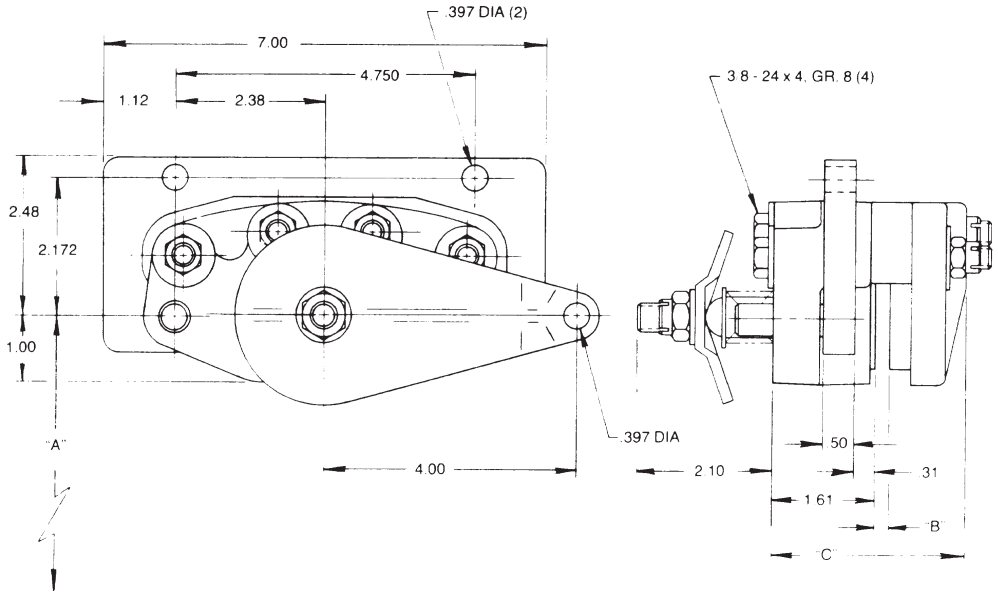


Spring retractable pistons

Model M200F

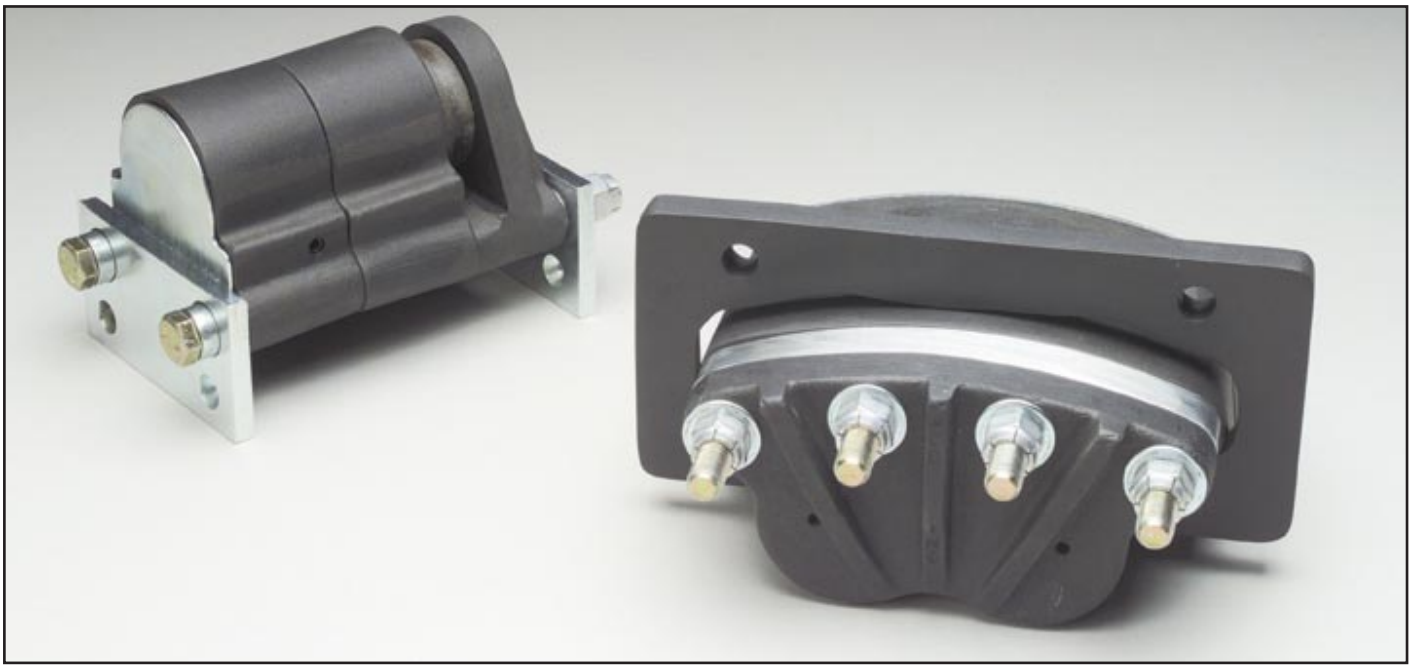
Standard features

- Stamped, heat treated one piece lever arm and cam
- Cast aluminum construction
- Hardcoated housings
- 8.00 in^2 total friction pad area
- 6” to 16” disc diameter
- Replaceable friction pads
- Spring retractable pistons
- Non-asbestos friction material
- Adjustment nut for friction pad wear
- Ductile iron floating bracket
- Grade 8 bolts plated
- 31,154 in. lb. maximum torque



DISC DIAMETER	BRAKING RADIUS	“A” DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	“B”	“C”	M200 TORQUE	
							DYNAMIC	STATIC
$6\frac{5}{16}$	2.28	2.13	A	5/32	.190	3.02	1698.60	850.44
8	3.15	3.00	A	5/32	.190	3.02	2346.75	1174.95
10	4.11	4.00	A	5/32	.190	3.02	3061.95	1533.04
12	5.08	5.00	A	5/32	.190	3.02	3784.60	1894.84
16	7.21	7.09	B	1/4	.280	3.11	5371.45	2689.33
–	–	–	L	3/8	.410	3.24	AT 100 LB. LEVER FORCE, IN. LBS.	
–	–	–	E	1/2	.530	3.36	580 LB. MAXIMUM LEVER FORCE	

Refer to page 21 for available models.



Model FS47 & FS200

Spring Applied - Hydraulic Released

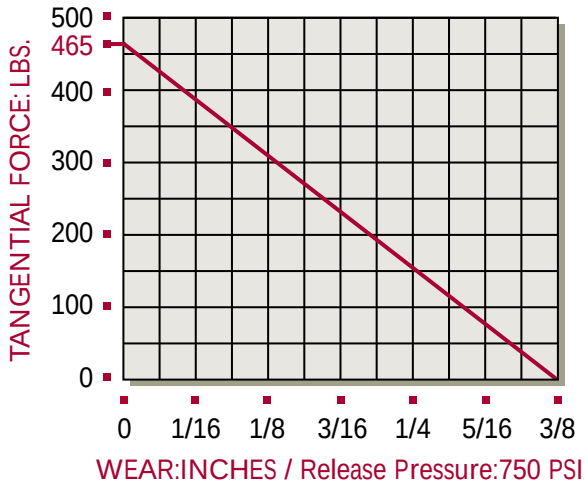
Spring Applied caliper disc brakes from W.C. Branham Inc. function opposite of all other hydraulic brakes shown in this catalog. Normal brake operation requires active pressure to brake and pressure removed to release. Used for emergency stopping, the FS47 & FS200 models require an active minimum hydraulic pressure of 750 psi to release. At a loss of hydraulic pressure, energy stored in the Bellville disc spring stack(s) takes over and stops the rotating mass. These brakes are ideal for emergency stopping and holding of industrial machinery and vehicles. Hydraulic use only.

As pad wear effects brake torque, FS series calipers should **not** be used for tensioning or high cyclic stop applications.

Brakes include either Zinc plated steel floating mount plates (FS47) or Ductile iron floating bracket (FS200).

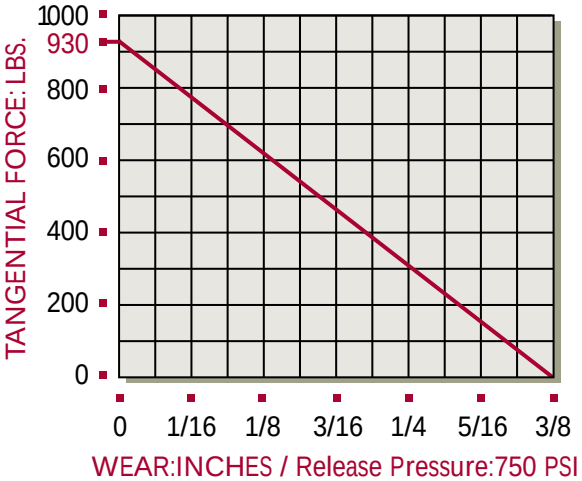
FS47

Parking Brake Tangential Force Versus Total Puck Wear



FS200

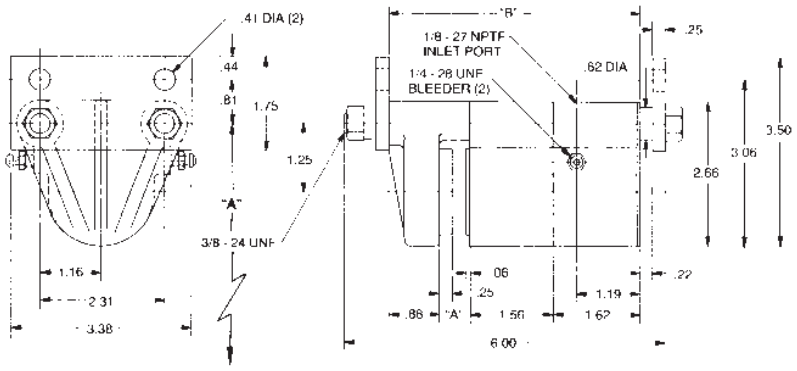
Parking Brake Tangential Force Versus Total Puck Wear



Refer to page 19 for disc specifications.

Model FS47F

750 psi to retract piston



Standard features

- Cast aluminum construction
- Hardcoated housings
- 4.0 $in.^2$ FS47/ 8.0 $in.^2$ FS200 total friction pad area
- Unlimited disc diameter, FS47
- To 16 inch disc diameter, FS200
- Replaceable friction pads
- Belleville disc spring stack
- Non-asbestos friction material
- Buna-N seals, EPR seals optional (G)

Model FS47F

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSION TO DISC C/L	SPACER OPTION	DISC THK	"A"	"B"	FS47 TORQUE MAXIMUM, IN. LBS.
6 5/16	2.28	3.53	A	5/32	.500	4.78	1060.20
8	3.12	4.38	A	5/32	.500	4.78	1450.80
10	4.12	5.38	A	5/32	.500	4.78	1915.80
12	5.12	6.38	A	5/32	.500	4.78	2380.80
16	7.12	8.38	B	1/4	.593	4.88	3310.00
–	–	–	L	3/8	.719	5.01	AT MAXIMUM 465 LB. TANGENTIAL FORCE
–	–	–	E	1/2	.843	5.14	

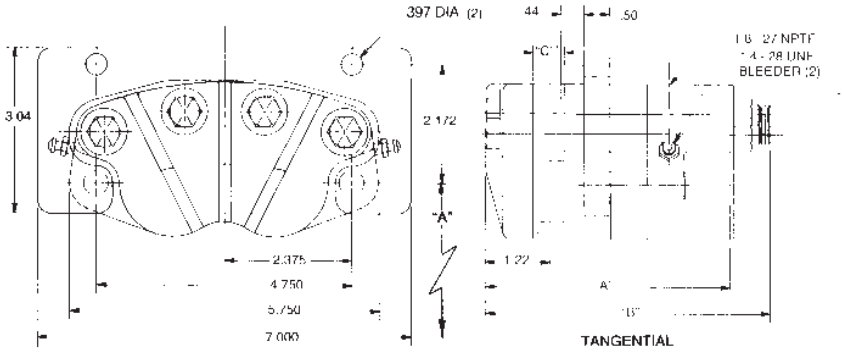
Model FS200F

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSION TO DISC C/L	SPACER OPTION	DISC THK	"A"	"B"	"C"	FS200 MAX TORQUE, INLBS.
6 5/16	2.38	2.13	A	5/32	4.56	5.31	.580	2213.40
8	3.15	3.00	A	5/32	4.56	5.31	.580	2929.50
10	4.11	4.00	A	5/32	4.56	5.31	.580	3822.30
12	5.08	5.00	A	5/32	4.56	5.31	.580	4724.40
16	7.21	7.09	B	1/4	4.65	5.31	.670	6705.30
–	–	–	L	3/8	4.78	5.81	.795	AT MAXIMUM 930 LB. TANGENTIAL FORCE
–	–	–	E	1/2	4.90	5.81	.920	

Parking Torque (In. lbs.) = Tangential Force (lbs.) x Braking Radius (In.)

Model FS200F

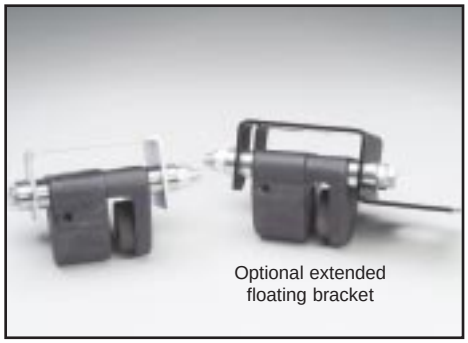
750 psi to retract pistons

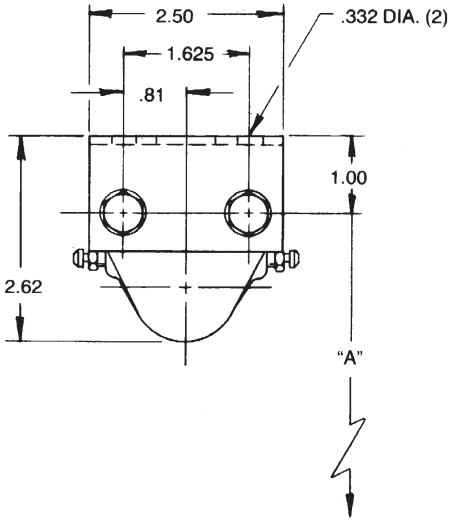


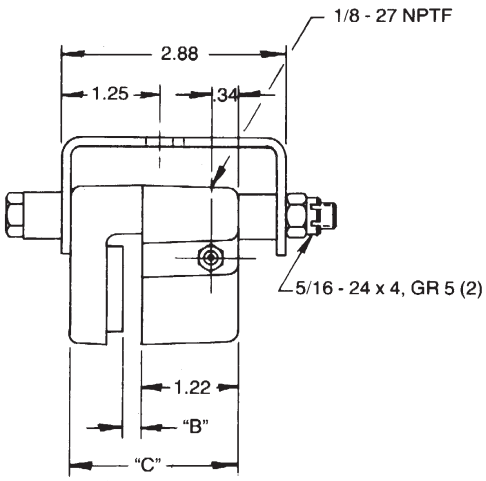
Refer to page 21 for available models.

Models P38SF and H38SF

Bleeder screws for hydraulic models only.







Model P38SF

Unique features

- 100 psi maximum pneumatic
- Extended floating bracket optional

Model H38SF

Unique features

- EPR Seals for automotive brake fluid (G)
- 1000 psi maximum hydraulic

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 2.0 $in.^2$ total friction pad area
- Unlimited disc diameter
- Replaceable friction pads
- Zinc plated steel floating bracket
- Buna-N seals
- Single acting
- Non-asbestos friction material

Popular Models

MODEL	ASSY NO.	DISC THK.
P38SAF	4004-0701	.156
P38SBF	4004-0700	.250
P38SA	4004-0714	.156
P38SB	4004-0720	.250
H38SAF	4004-0704	.156
H38SBF	4004-0705	.250
H38SA	4004-0715	.156
H38SB	4004-0725	.250

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P38 TORQUE		H38 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
6 5/16	2.53	3.47	A	5/32	.250	2.16	173.72	86.86	1737.23	868.60
8	3.38	4.31	A	5/32	.250	2.16	232.75	116.38	2327.5	1163.8
10	4.38	5.31	A	5/32	.250	2.16	302.75	151.38	3027.5	1513.8
12	5.38	6.31	A	5/32	.250	2.16	372.75	186.38	3727.5	1863.8
16	7.38	8.31	B	1/4	.344	2.25	512.75	256.38	5127.5	2563.8
–	–	–	L	3/8	.469	2.38	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.594	2.5				

Refer to page 19 for disc specifications.

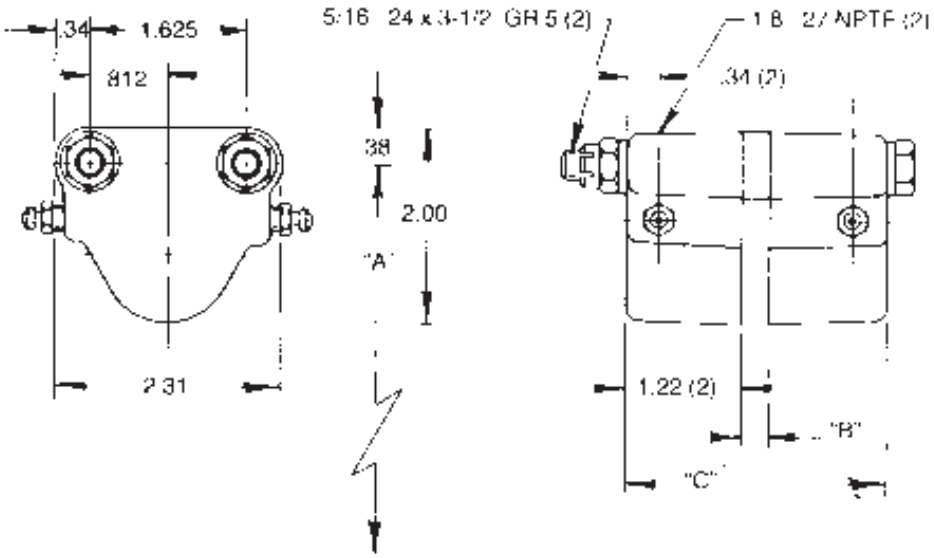
Models P38D and H38D

Bleeder screws for hydraulic models only.

Model P38D

Unique feature

- 100 psi maximum pneumatic



Model H38D

Unique features

- EPR seals for automotive brake fluid (G)
- 1000 psi maximum hydraulic

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 2.0 $in.^2$ total friction pad area
- Unlimited disc diameter
- Replaceable friction pads
- Buna-N seals
- 1.125 inch friction pad diameter
- Double acting, fix mount
- Internal cross over porting
- Non-asbestos friction material

Popular Models

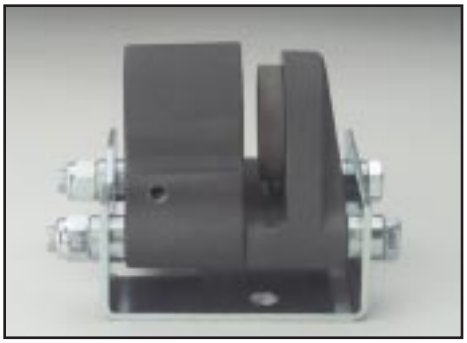
MODEL	ASSY NO.	DISC THK.
P38DA	4004-0706	.156
P38DB	4004-0707	.250
P38DL	4004-0723	.375
P38DE	4004-0724	.500
H38DA	4004-0710	.156
H38DB	4004-0711	.250
H38DL	4004-0728	.375
H38DE	4004-0729	.500

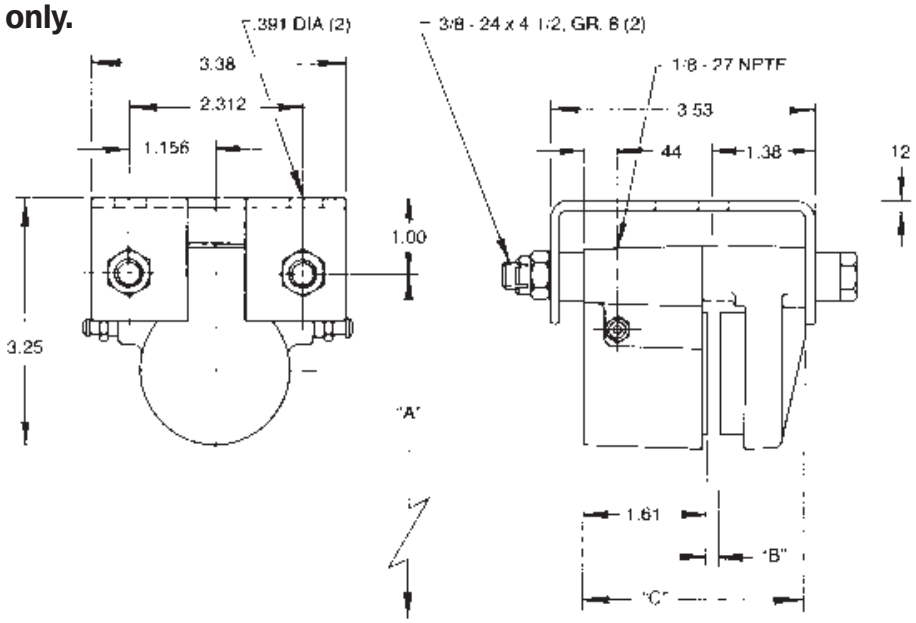
DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P38 TORQUE		H38 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
$6\frac{5}{16}$	2.53	3.47	A	5/32	.250	2.16	173.72	86.86	1737.23	868.60
8	3.38	4.31	A	5/32	.250	2.16	232.75	116.38	2327.5	1163.8
10	4.38	5.31	A	5/32	.250	2.16	302.75	151.38	3027.5	1513.8
12	5.38	6.31	A	5/32	.250	2.16	372.75	186.38	3727.5	1863.8
16	7.38	8.31	B	1/4	.344	2.25	512.75	256.38	5127.5	2563.8
–	–	–	L	3/8	.469	2.38	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.594	2.5				

Refer to page 21 for available models.

Models P47SF and H47SF

Bleeder screws for hydraulic models only.





Model P47SF

Unique features

- 100 psi maximum pneumatic
- Retractable piston option (R)

Model H47SF

Unique features

- EPR seals for automotive brake fluid (G)
- 1000 psi maximum hydraulic
- Retractable piston option (R)

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 4.0 $in.^2$ total friction pad area
- Unlimited disc diameter
- Replaceable friction pads
- Zinc plated steel floating bracket
- Buna-N seals
- 1.625 inch friction pad diameter
- Single acting
- Non-asbestos friction material

Popular Models

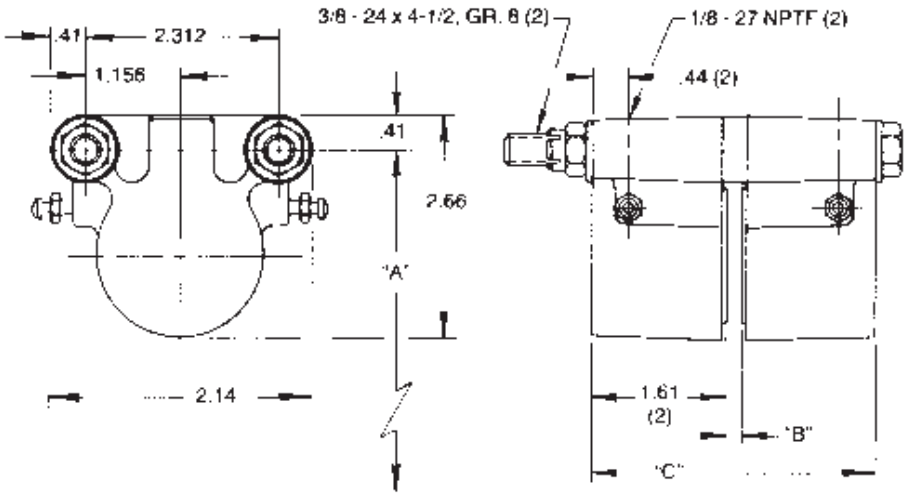
MODEL	ASSY NO.	DISC THK.
P47SAF	4004-0040	.156
P47SBF	4004-0041	.250
P47SA	4004-0036	.156
P47SB	4004-0037	.250
H47SAF	4004-0048	.156
H47SBF	4004-0049	.250
H47SA	4004-0045	.156
H47SB	4004-0044	.250

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P47 TORQUE		H47 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
6 5/16	2.28	3.53	A	5/32	.190	2.94	328.57	164.29	3285.7	1642.9
8	3.12	4.38	A	5/32	.190	2.94	478.8	239.40	4788.0	2394.0
10	4.12	5.38	A	5/32	.190	2.94	594.0	297.0	5940.0	2970.0
12	5.12	6.38	A	5/32	.190	2.94	738.0	369.0	7380.0	3690.0
16	7.12	8.38	B	1/4	.280	3.03	1026.0	513.0	10260.0	5130.0
–	–	–	L	3/8	.410	3.15	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.530	3.28				

Refer to page 19 for disc specifications.

Models P47D and H47D

Bleeder screws for hydraulic models only.



Model P47D

Unique features

- 100 psi maximum pneumatic
- Retractable pistons option (R)

Model H47D

Unique features

- EPR seals for automotive brake fluid (G)
- 1000 psi maximum hydraulic
- Retractable pistons optional (R)
- Electro-nickel plating option, as shown

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 4.0 $in.^2$ total friction pad area
- Unlimited disc diameter
- Replaceable friction pads
- Retractable pistons option
- Buna-N seals
- Internal cross over porting
- Double acting, fixed mount
- Non-asbestos friction material

Popular Models

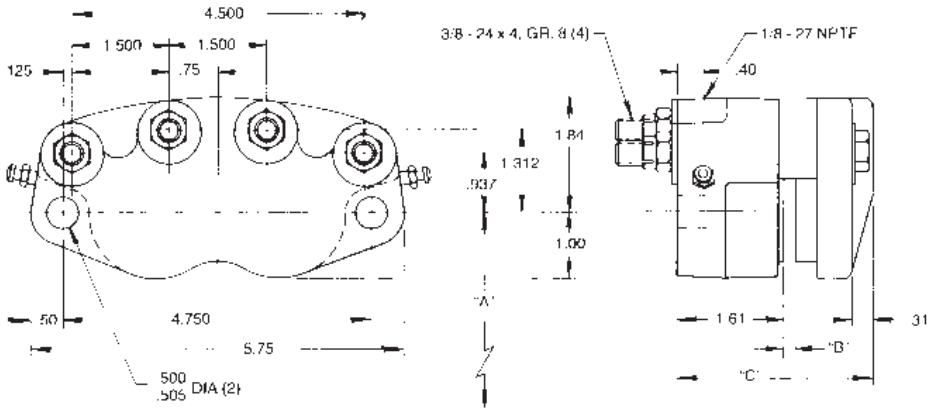
MODEL	ASSY NO.	DISC THK.
P47DA	4004-0025	.156
P47DB	4004-0026	.250
P47DL	4004-0030	.375
P47DE	4004-0031	.500
H47DA	4004-0032	.156
H47DB	4004-0033	.250
H47DL	4004-0034	.375
H47DE	4004-0035	.500

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P47 TORQUE		H47 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
$6\frac{5}{16}$	2.28	3.53	A	5/32	.190	3.41	328.57	164.29	3285.7	1642.9
8	3.12	4.38	A	5/32	.190	3.41	478.8	239.40	4788.0	2394.0
10	4.12	5.38	A	5/32	.190	3.41	594.0	297.0	5940.0	2970.0
12	5.12	6.38	A	5/32	.190	3.41	738.0	369.0	7380.0	3690.0
16	7.12	8.38	B	1/4	.280	3.50	1026.0	513.0	10260.0	5130.0
–	–	–	L	3/8	.410	3.63	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.530	3.75				

Refer to page 21 for available models.

Models P200S and H200S

Bleeder screws for hydraulic models only.



Model P200S

Unique features

- 100 psi maximum pneumatic
- Retractable pistons option (R)

Model H200S

Unique features

- EPR seals for automotive brake fluid (G)
- 1500 psi maximum hydraulic
- Retractable pistons option (R)

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 8.0 $in.^2$ total friction pad area
- 16 inch disc diameter maximum
- Replaceable friction pads
- Buna-N seals
- Non-asbestos friction material
- Single acting: brake or disc must float

Popular Models

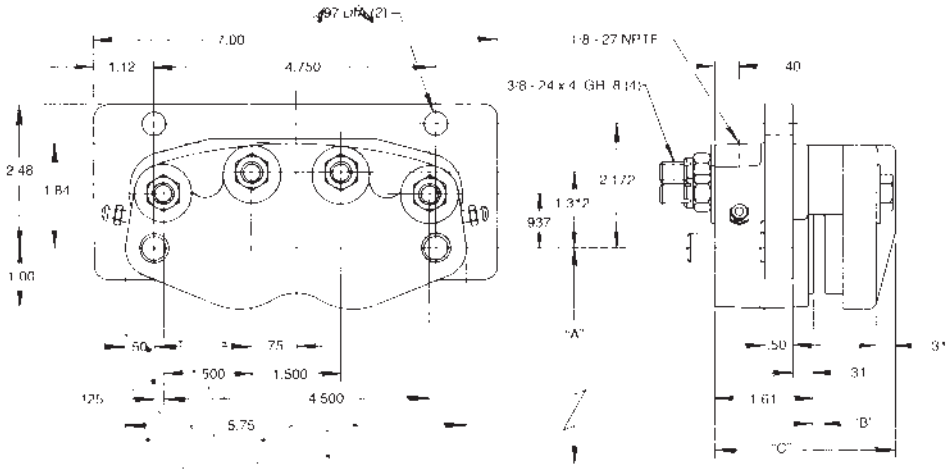
MODEL	ASSY NO.	DISC THK.
P200SA	4004-0009	.156
P200SB	4004-0010	.250
P200SL	4004-0011	.375
P200SE	4004-0012	.500
H200SA	4004-0000	.156
H200SB	4004-0001	.250
H200SL	4004-0206	.375
H200SE	4004-0004	.500

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P200 TORQUE		H200 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
$6\frac{5}{16}$	2.38	2.13	A	5/32	.190	3.02	685.40	342.70	6854.4	3427.2
8	3.15	3.00	A	5/32	.190	3.02	907.20	453.60	9072.0	4536.0
10	4.11	4.00	A	5/32	.190	3.02	1183.68	591.84	11836.8	5918.4
12	5.08	5.00	A	5/32	.190	3.02	1463.04	731.52	14630.4	7315.2
16	7.21	7.09	B	1/4	.280	3.11	2076.48	1038.24	20764.8	10382.4
–	–	–	L	3/8	.410	3.24	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.530	3.36				

Refer to page 19 for disc specifications

Models P200SF and H200SF

Bleeder screws for hydraulic models only.



Model P200SF

Unique features

- 100 psi maximum pneumatic
- Retractable pistons option (R)

Model H200SF

Unique features

- 1500 psi maximum hydraulic
- EPR seals for automotive brake fluid (G)
- Retractable pistons option (R)

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 8.0 $in.^2$ total friction pad area
- 16 inch disc diameter maximum
- Replaceable friction pads
- Single acting
- Buna-N seals
- Floating bracket
- Non-asbestos friction material

Popular Models

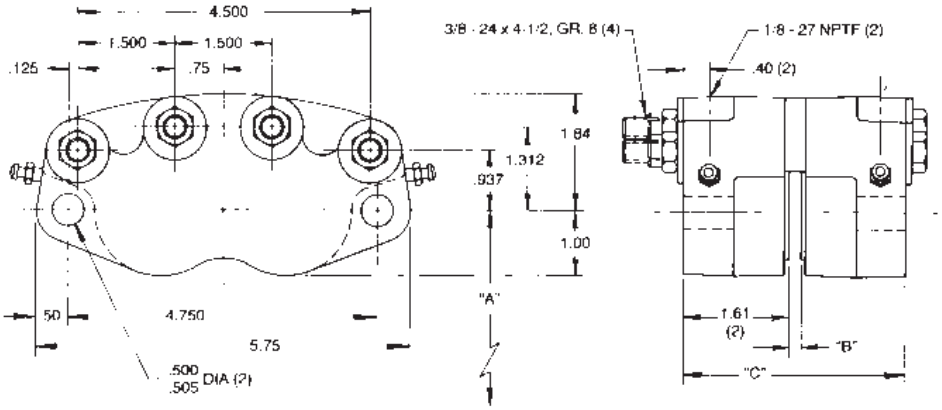
MODEL	ASSY NO.	DISC THK.
P200SAF	4004-0052	.156
P200SBF	4004-0053	.250
P200SLF	4004-0054	.375
P200SEF	4004-0055	.500
H200SAF	4004-0056	.156
H200SBF	4004-0057	.250
H200SLF	4004-0058	.375
H200SEF	4004-0059	.500

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P200 TORQUE		H200 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
$6\frac{5}{16}$	2.38	2.13	A	5/32	.190	3.02	685.40	342.70	6854.40	3427.2
8	3.15	3.00	A	5/32	.190	3.02	907.20	453.60	9072.0	4536.0
10	4.11	4.00	A	5/32	.190	3.02	1183.68	591.84	11836.8	5918.4
12	5.08	5.00	A	5/32	.190	3.02	1463.04	731.52	14630.4	7315.2
16	7.21	7.09	B	1/4	.280	3.11	2076.48	1038.24	20764.8	10382.4
–	–	–	L	3/8	.410	3.24	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.530	3.36				

Refer to page 21 for available models.

Models P200D and H200D

Bleeder screws for hydraulic models only.



Model P200D

Unique features

- 100 psi maximum pressure
- Retractable piston option (R)

Model H200D

Unique features

- EPR seals for automotive brake fluid (G)
- 1500 psi maximum hydraulic
- Retractable piston option (R)
- Electro-nickel plating option, as shown

Standard Features

- Cast aluminum construction
- Hardcoated housings
- 8.0 in^2 total friction pad area
- Double acting, fixed mount
- Buna-N seals
- Internal cross over porting
- 16 inch disc diameter maximum
- Replaceable friction pads
- Non-asbestos friction material

Popular Models

MODEL	ASSY NO.	DISC THK.
P200DA	4004-0017	.156
P200DB	4004-0018	.250
P200DL	4004-0019	.375
P200DE	4004-0020	.500
H200DA	4004-0013	.156
H200DB	4004-0015	.250
H200DL	4004-0021	.375
H200DE	4004-0022	.500

DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	SPACER OPTION	DISC THK	"B"	"C"	P200 TORQUE		H200 TORQUE	
							DYNAMIC	STATIC	DYNAMIC	STATIC
6 5/16	2.38	2.13	A	5/32	.190	3.41	685.40	342.70	6854.4	3427.2
8	3.15	3.00	A	5/32	.190	3.41	907.20	453.60	9072.0	4536.0
10	4.11	4.00	A	5/32	.190	3.41	1183.68	591.84	11836.8	5918.4
12	5.08	5.00	A	5/32	.190	3.41	1463.04	731.52	14630.4	7315.2
16	7.21	7.09	B	1/4	.250	3.50	2076.48	1038.24	20764.8	10382.4
–	–	–	L	3/8	.410	3.63	AT 100 PSI, INCH LBS.		AT 1000 PSI, INCH LBS.	
–	–	–	E	1/2	.530	3.75				

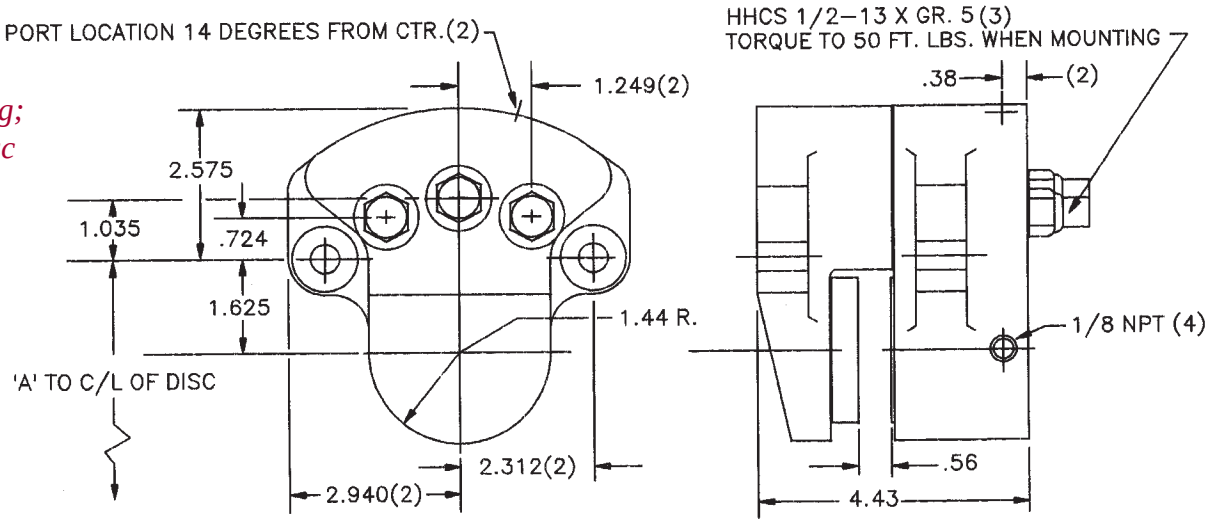
Refer to page 19 for disc specifications.

Model H493S

Standard features

- Maximum 1500 psi hydraulic
- Ductile iron housings
- 2.5 in. piston dia.
- Unlimited disc diameter
- EPR seals optional, (G)
- Non-asbestos friction material
- 9.14 $in.^2$ total pad area
- 3.80 $in.^3$ wearable volume
- 4.91 $in.^2$ piston area
- Designed for 1/2 inch thick disc

Single acting; brake or disc must float



DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	H493 TORQUE	
			DYNAMIC	STATIC
10	3.69	5.375	13025.7	7785.9
12	4.69	6.375	1655.7	9895.9
16	6.69	8.375	23615.7	14115.9
20	8.69	10.375	30675.7	18335.9
24	10.69	12.375	37735.7	22555.9
			AT 1000 PSI, IN. LBS. 1500 PSI MAXIMUM PRESSURE	

Braking Radius (in.) = [Disc Diameter /2] - 1.31

Note:

This model requires customer furnished 1/2" thick disc.

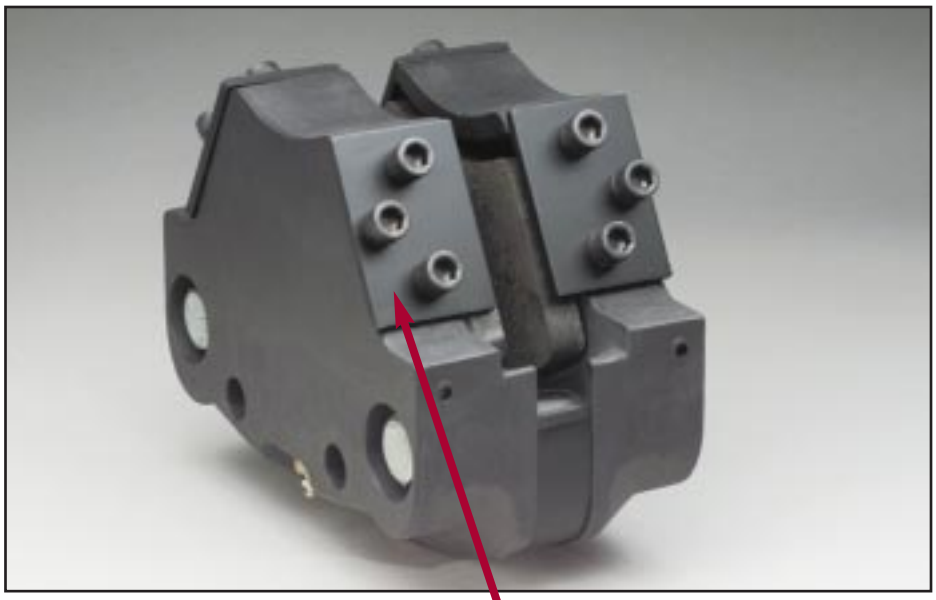
Refer to page 21 for available models

Model H962

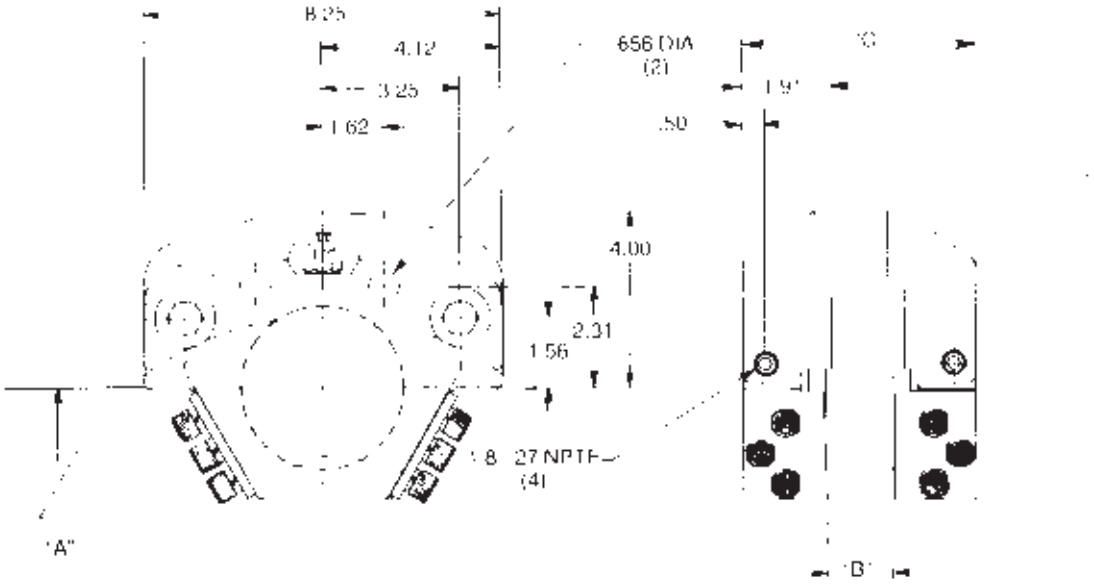
with quick change pads

Standard features

- Cast aluminum housings
- Replace friction pads without dismounting brake
- 12 -18 inch disc dia.
- 3.5 inch piston dia.
- Double acting, fix mount
- Maximum 1000 psi hydraulic
- Non-asbestos friction material
- 21.96 $in.^2$ total pad area
- 12.3 $in.^3$ wearable volume
- 9.62 $in.^2$ piston area
- EPR seals optional, (G)



Remove plates for quick access



DISC DIAMETER	BRAKING RADIUS	"A" DIMENSIONAL TO DISC CL	H962 TORQUE	
			DYNAMIC	STATIC
12	4.32	4.375	29937.6	14990.4
14	5.32	5.375	36867.6	18460.4
16	6.32	6.375	43797.6	21930.4
18	7.32	7.375	50727.6	25400.4
-	-	-	-	-
			AT 1000 PSI, IN. LBS. 1000 PSI MAXIMUM PRESSURE	

Braking Radius (in.) = [Disc Diameter /2] - 1.68

DISC THK	"B"	"C"
1/2	.63	4.45
3/4	.88	4.70
1 1/8	1.26	5.08

Note:

This model requires customer furnished discs.

Refer to page 21 for available models

Sizing worksheet

for industrial applications only, consult factory on vehicular applications.

Complete the following. Keep this page as an original by copying before proceeding.

Your Name: _____

Company: _____ Title: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone (_____) _____ Fax (_____) _____

Describe the application:

_____

_____

_____

_____

Application data:

Weight of rotating member, lb. . . . . _____
Radius of gyration of rotating member, ft. . . . . _____
RPM . . . . . _____
Stopping time required, seconds. . . . . _____
# of stops / minute . . . . . _____
Maximum allowable disc diameter. in. . . . . _____
Disc thickness, in. . . . . _____
Actuation: Mechanical • Pneumatic • Hydraulic • Spring Applied
Amount of pressure available, psi. . . . . _____
Back pressure, if any, psi. . . . . _____
Type of fluid . . . . . _____
Ambient temperature . . . . . _____
Desired friction pad life . . . . . _____
Tensioning or dragging application:
Web width, in. . . . . _____
Amount of tension per inch of web width, lb. . . . . _____
Maximum roll radius, in. . . . . _____
Web velocity, feet per minute . . . . . _____

Please submit this form via fax 715.426.1400. Attention: Customer Service Group.
We will acknowledge receipt of your criteria promptly. Our recommendation is based on information supplied by the customer. Final acceptance and approval is the responsibility of the customer. Each application should be prototyped and tested.

Caliper Disc Brakes

H/P/M/FS 200 SERIES

MODEL	ASSY NO.
P200SA	4004-0009
P200SB	4004-0010
P200SL	4004-0011
P200SE	4004-0012
P200SAF	4004-0052
P200SBF	4004-0053
P200SLF	4004-0054
P200SEF	4004-0055
H200SA	4004-0000
H200SB	4004-0001
H200SE	4004-0004
H200SAF	4004-0056
H200SBF	4004-0057
H200SLF	4004-0058
H200SEF	4004-0059
H200SAG	4004-0002
H200SBG	4004-0003
H200SEG	4004-0005
H200SAFG	4004-0096
H200SBFG	4004-0097
H200SLFG	4004-0098
H200SEFG	4004-0099
P200DA	4004-0017
P200DB	4004-0018
P200DL	4004-0019
P200DE	4004-0020
P200DAR	4004-0100
P200DBR	4004-0101
P200DLR	4004-0102
P200DER	4004-0103
H200DA	4004-0013
H200DB	4004-0015
H200DE	4004-0022
H200DL	4004-0021
H200DAG	4004-0014
H200DBG	4004-0016
H200DEG	4004-0024
H200DLG	4004-0023
H200DAR	4004-0104
H200DBR	4004-0105
H200DLR	4004-0106
H200DER	4004-0107
H200DARG	4004-0108
H200DBRG	4004-0109
H200DLRG	4004-0110
H200DERG	4004-0111
M200A	4004-0400
M200B	4004-0101
M200L	4004-0403
M200E	4004-0402
M200AF	4004-0404
M200BF	4004-0405
M200LF	4004-0407
M200EF	4004-0406
FS200A	4004-0167
FS200AF	4004-0164
FS200B	4004-0168
FS200BF	4004-0165
FS200E	4004-0180
FS200EF	4004-0166

H/P/M/FS 47 SERIES

MODEL	ASSY NO.
P47DA	4004-0025
P47DB	4004-0026
P47DL	4004-0030
P47DE	4004-0031
P47DAR	4004-0060
P47DBR	4004-0061
P47DLR	4004-0062
P47DER	4004-0063
P47SA	4004-0036
P47SB	4004-0037
P47SL	4004-0038
P47SE	4004-0039
P47SAF	4004-0040
P47SBF	4004-0041
P47SLF	4004-0042
P47SEF	4004-0043
H47DA	4004-0032
H47DB	4004-0033
H47DL	4004-0034
H47DE	4004-0035
H47DAG	4004-0072
H47DBG	4004-0073
H47DLG	4004-0074
H47DEG	4004-0075
H47DAR	4004-0076
H47DBR	4004-0077
H47DLR	4004-0078
H47DER	4004-0079
H47DARG	4004-0080
H47DBRG	4004-0081
H47DLRG	4004-0082
H47DERG	4004-0083
H47SB	4004-0044
H47SA	4004-0045
H47SL	4004-0046
H47SE	4004-0047
H47SAG	4004-0084
H47SBG	4004-0085
H47SEG	4004-0087
H47SLG	4004-0086
H47SAF	4004-0048
H47SBF	4004-0049
H47SLF	4004-0050
H47SEF	4004-0051
H47SAFG	4004-0088
H47SBFG	4004-0089
H47SLFG	4004-0090
H47SEFG	4004-0091
M47MA	4004-0134
M47MAF	4004-0138
M47MB	4004-0135
M47MBF	4004-0139
FS47AF	4004-0160
FS47BF	4004-0161
FS47EF	4004-0169
FS47A	4004-0181
FS47B	4004-0176
FS47E	4004-0182

H/P/M 38 SERIES

MODEL	ASSY NO.
P38SA	4004-0714
P38SB	4004-0720
P38SL	4004-0721
P38SE	4004-0722
P38SAF	4004-0701
P38SBF	4004-0700
P38DA	4004-0706
P38DB	4004-0707
P38DL	4004-0723
P38DE	4004-0724
H38SA	4004-0715
H38SB	4004-0725
H38SAF	4004-0704
H38SBF	4004-0705
H38SAG	4004-0726
H38SBG	4004-0727
H38SAFG	4004-0708
H38SBFG	4004-0709
H38DA	4004-0710
H38DB	4004-0711
H38DL	4004-0728
H38DE	4004-0729
H38DAG	4004-0712
H38DBG	4004-0713
H38DLG	4004-0730
H38DEG	4004-0716
M38MA	4004-0802
M38MAF	4004-0800
M38MB	4004-0803
M38MBF	4004-0801

962 SERIES

P962DE	4355-0004
H962DT	4355-0002
H962DQ	4355-0000
H962DQG	4355-0001

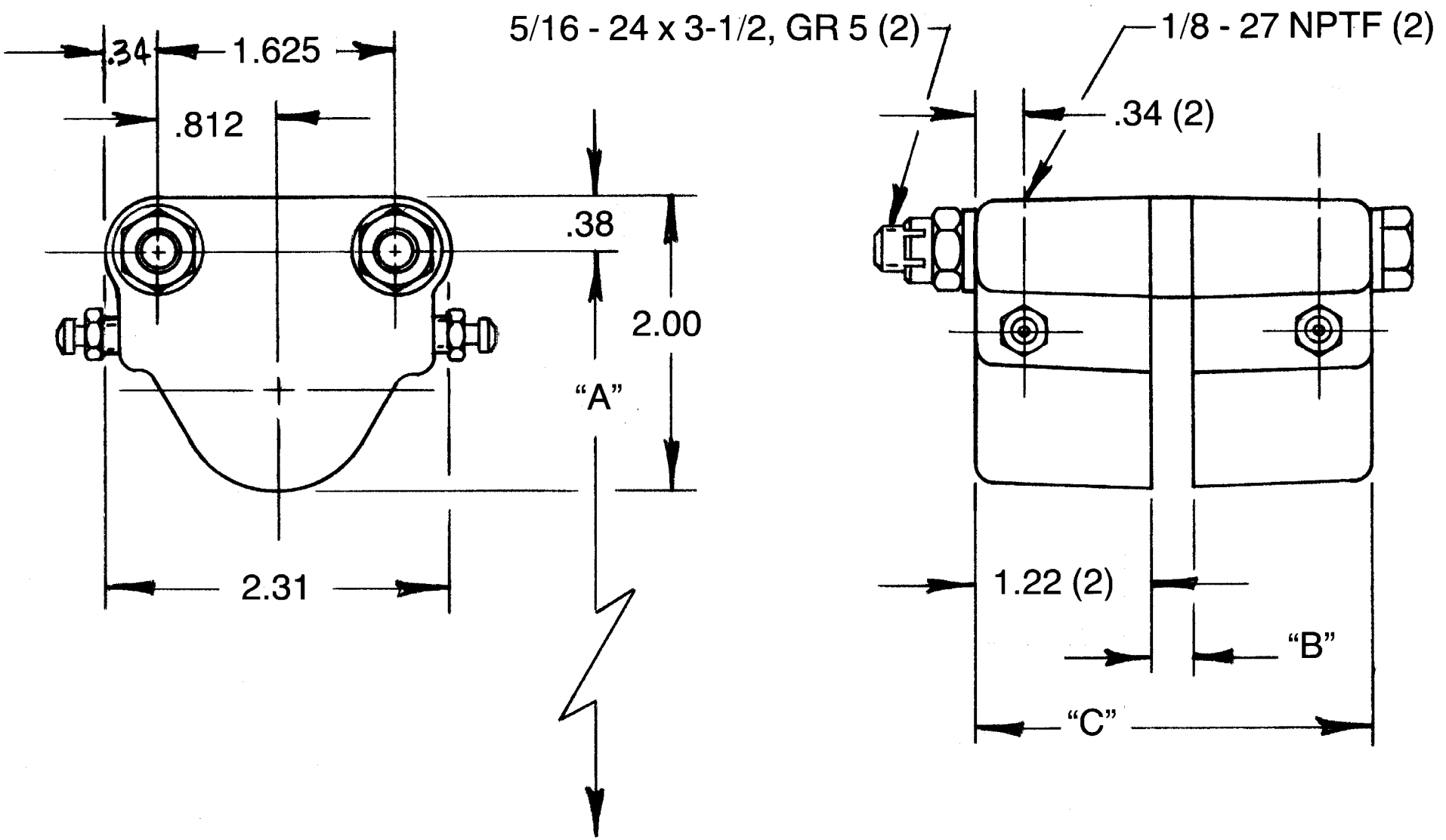
493 SERIES

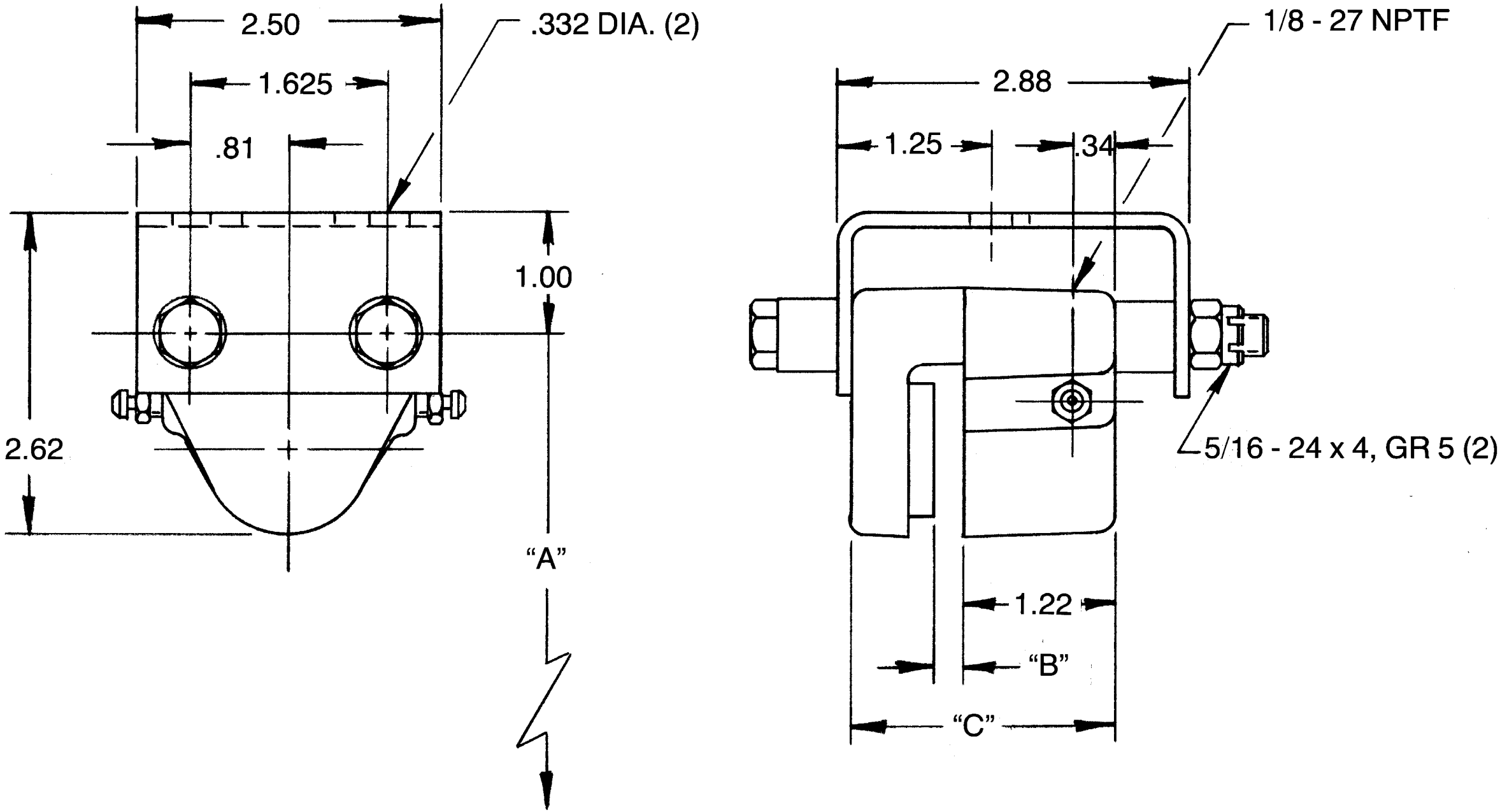
H493SE	4255-0006
H493SEG	4255-0007

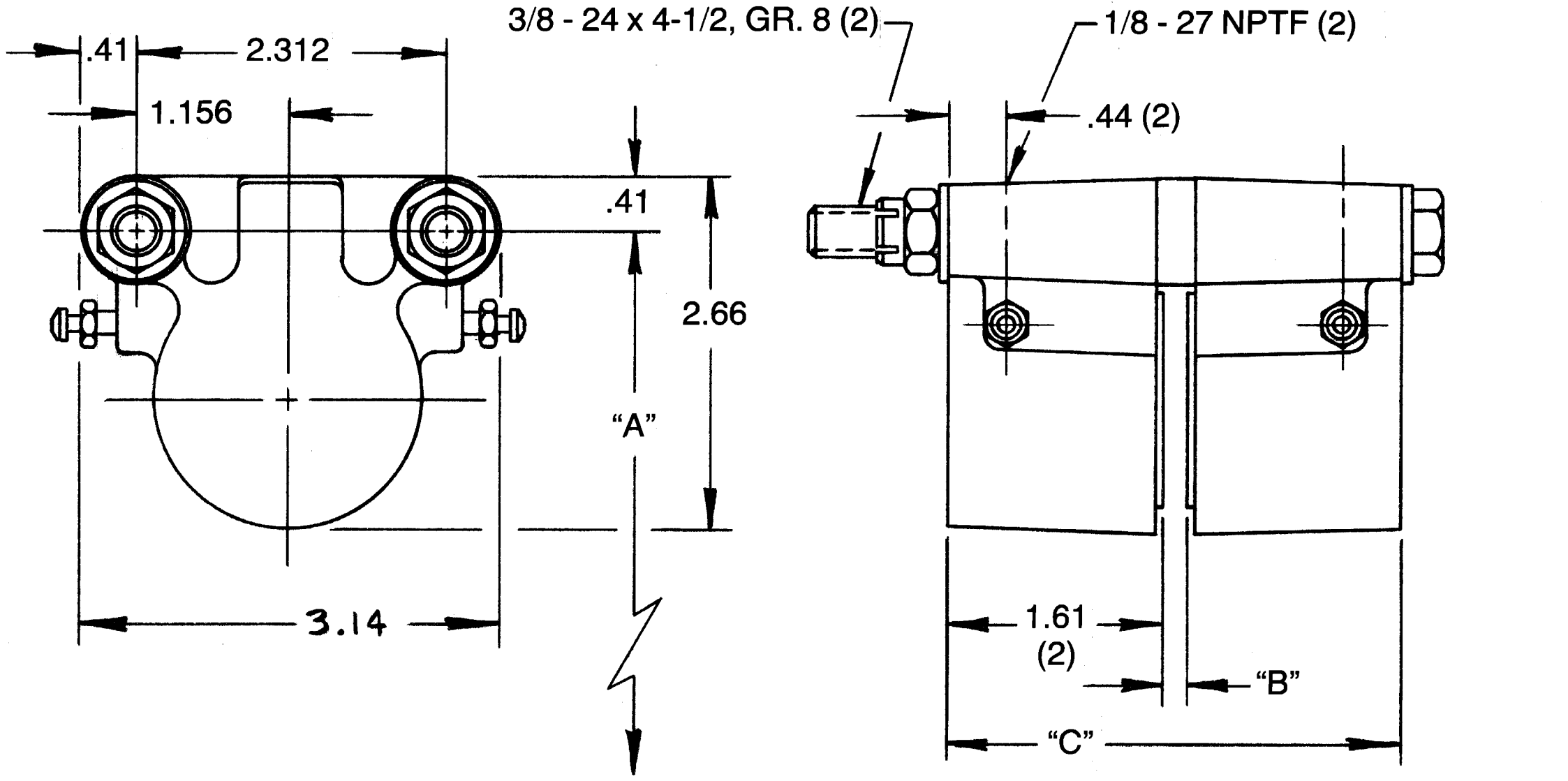
OPTION DESIGNATOR

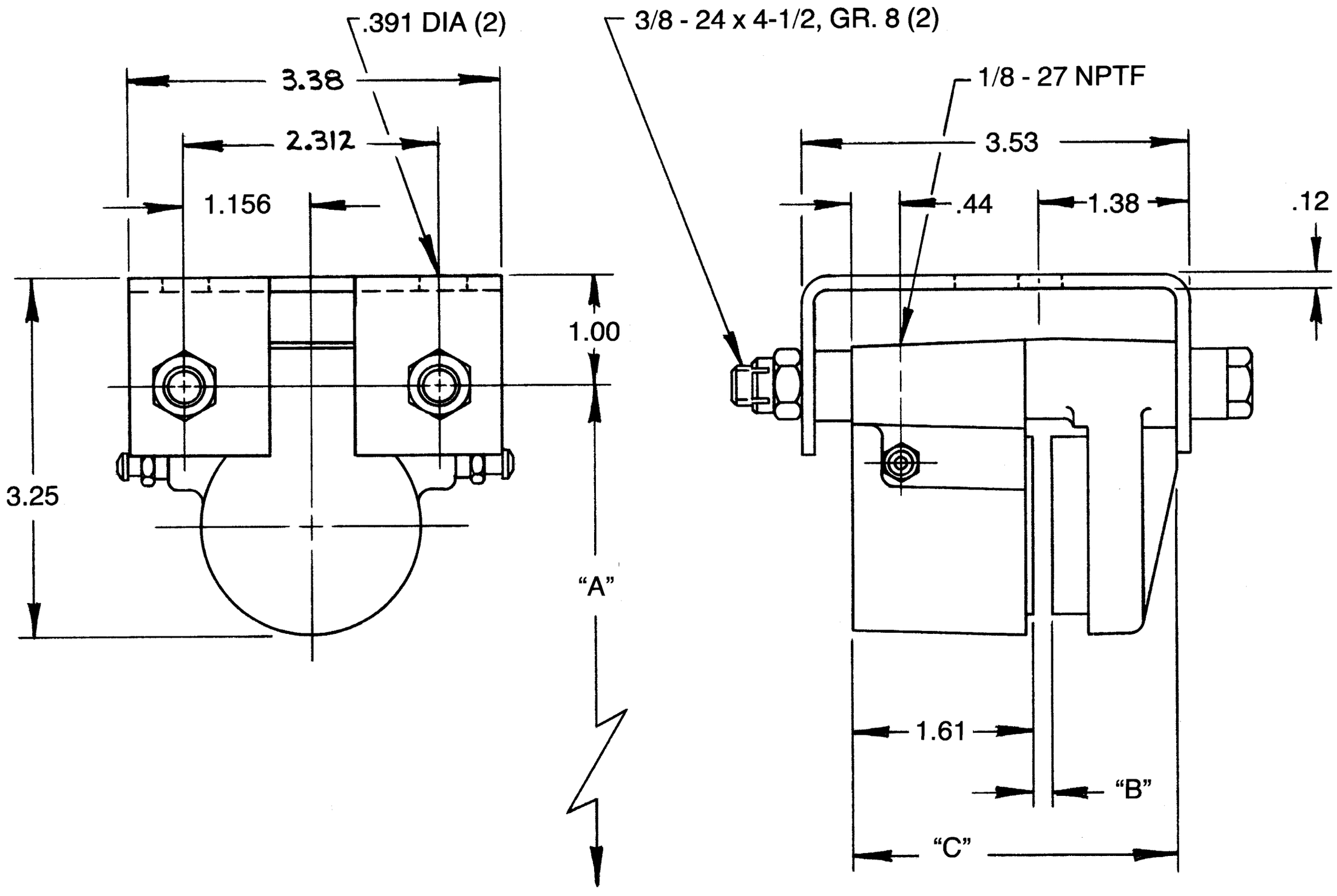
P = PNEUMATIC ACTUATED
H = HYDRAULIC ACTUATED
F = FLOATING BRACKET
G = SEALS FOR AUTOMATIC BRAKE FLUID
D = DOUBLE LIVE SIDE CALIPER
S = SINGLE LIVE SIDE CALIPER
R = RETRACTABLE PISTONS (47/200 series only)
A = SPACER FOR 9/32" THICK DISC
B = SPACER FOR 1/4" THICK DISC
L = SPACER FOR 3/8" THICK DISC
E = SPACER FOR 1/2" THICK DISC
FS = SPRING APPLIED
M = MECHANICAL
Q = SPACER FOR 1 1/8" THICK DISC
O = SPACER FOR 1" THICK DISC
T = SPACER FOR 3/4" THICK DISC

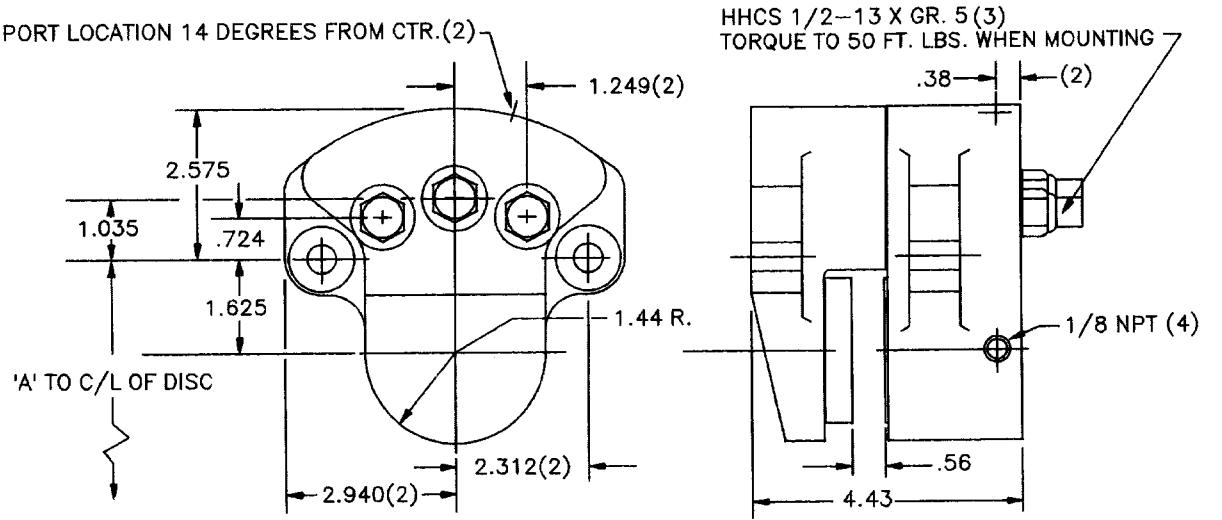
NOT ALL OPTIONS AVAILABLE FOR ALL MODELS

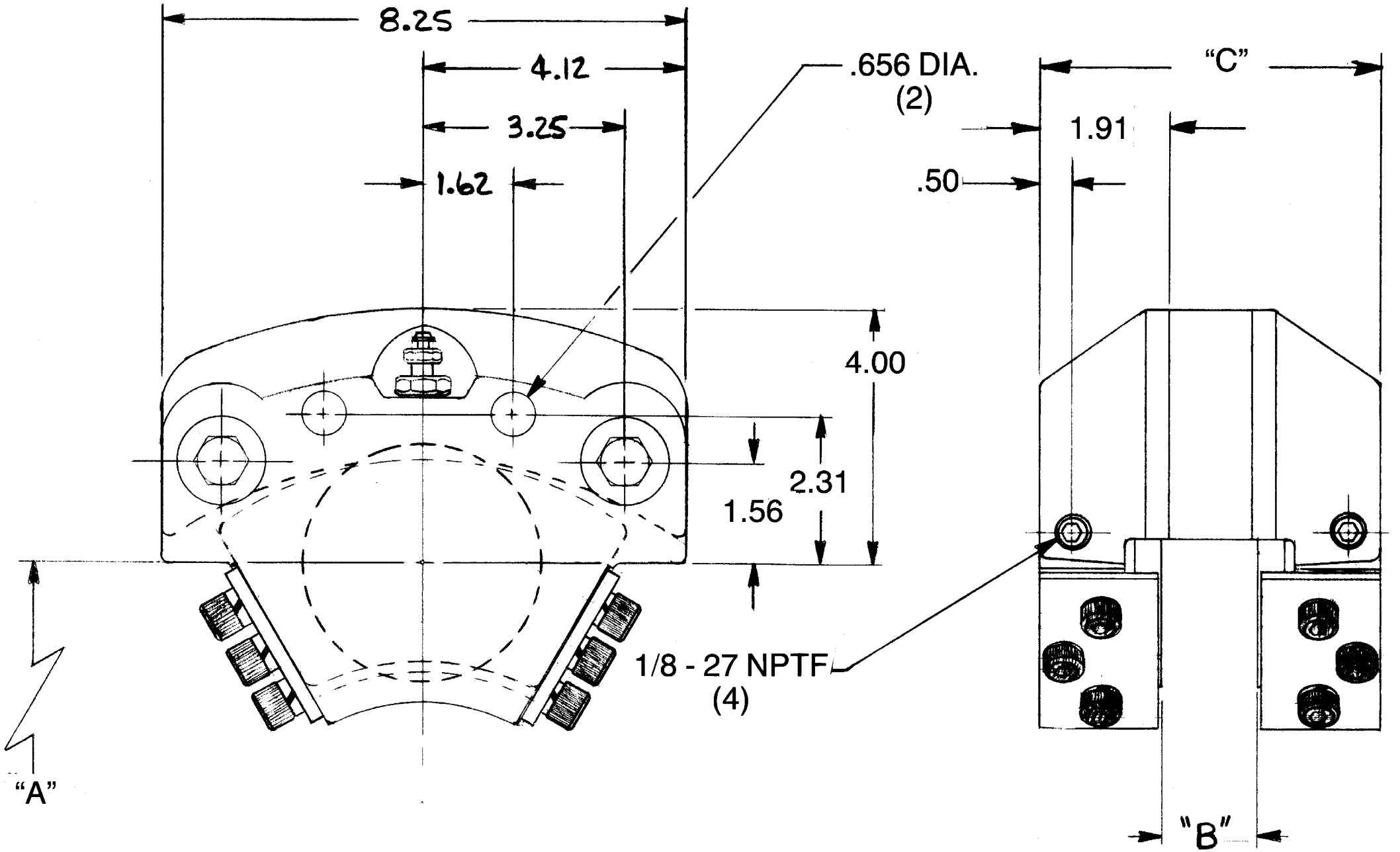

5/16 - 24 x 3-1/2, GR 5 (2)
1/8 - 27 NPTF (2)
.34
1.625
.812
.38
2.00
"A"
2.31
.34 (2)
1.22 (2)
"B"
"C"

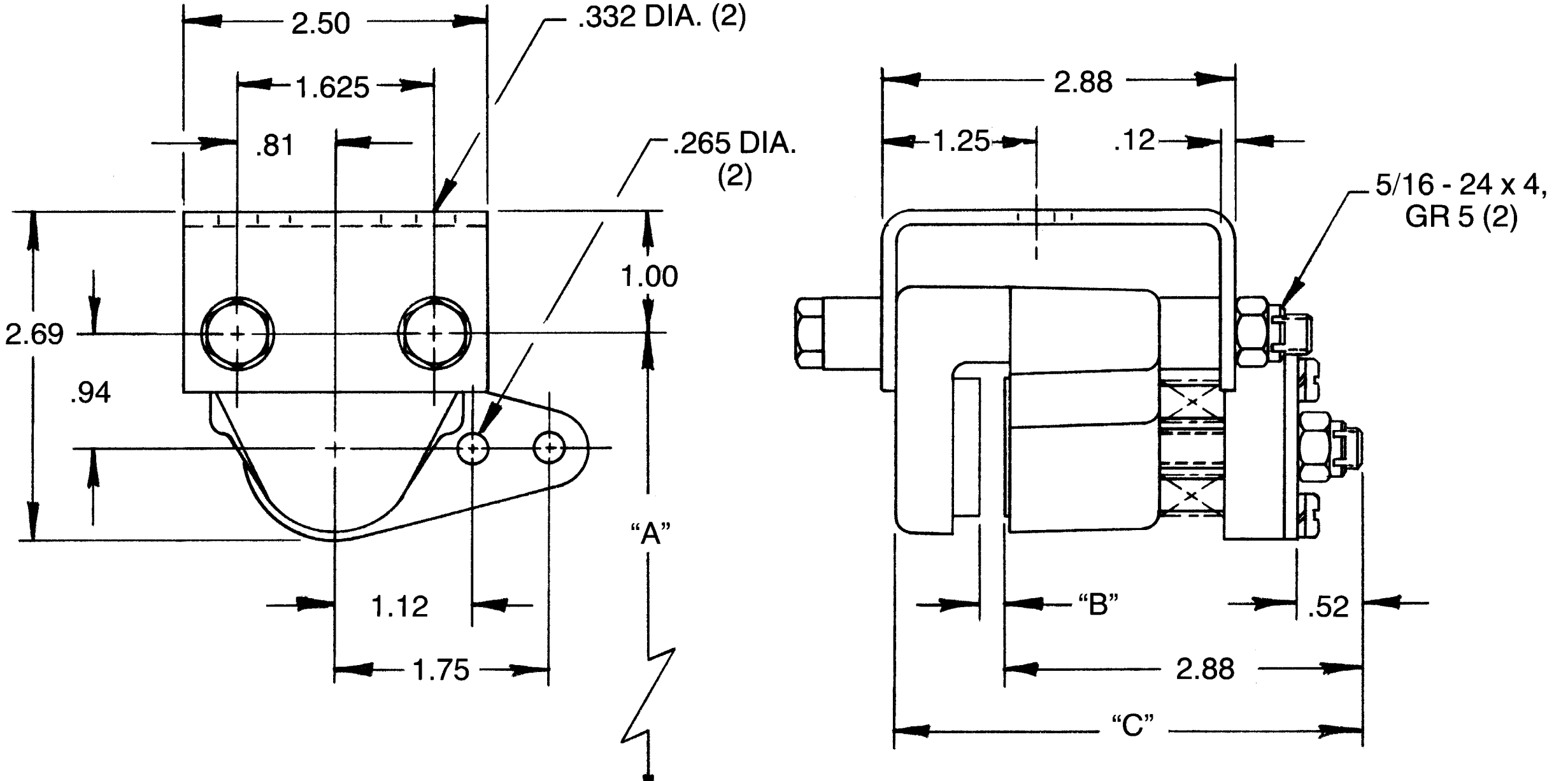

2.50
.332 DIA. (2)
1.625
.81
1.00
2.62
"A"
1/8 - 27 NPTF
2.88
1.25
.34
5/16 - 24 x 4, GR 5 (2)
1.22
"B"
"C"

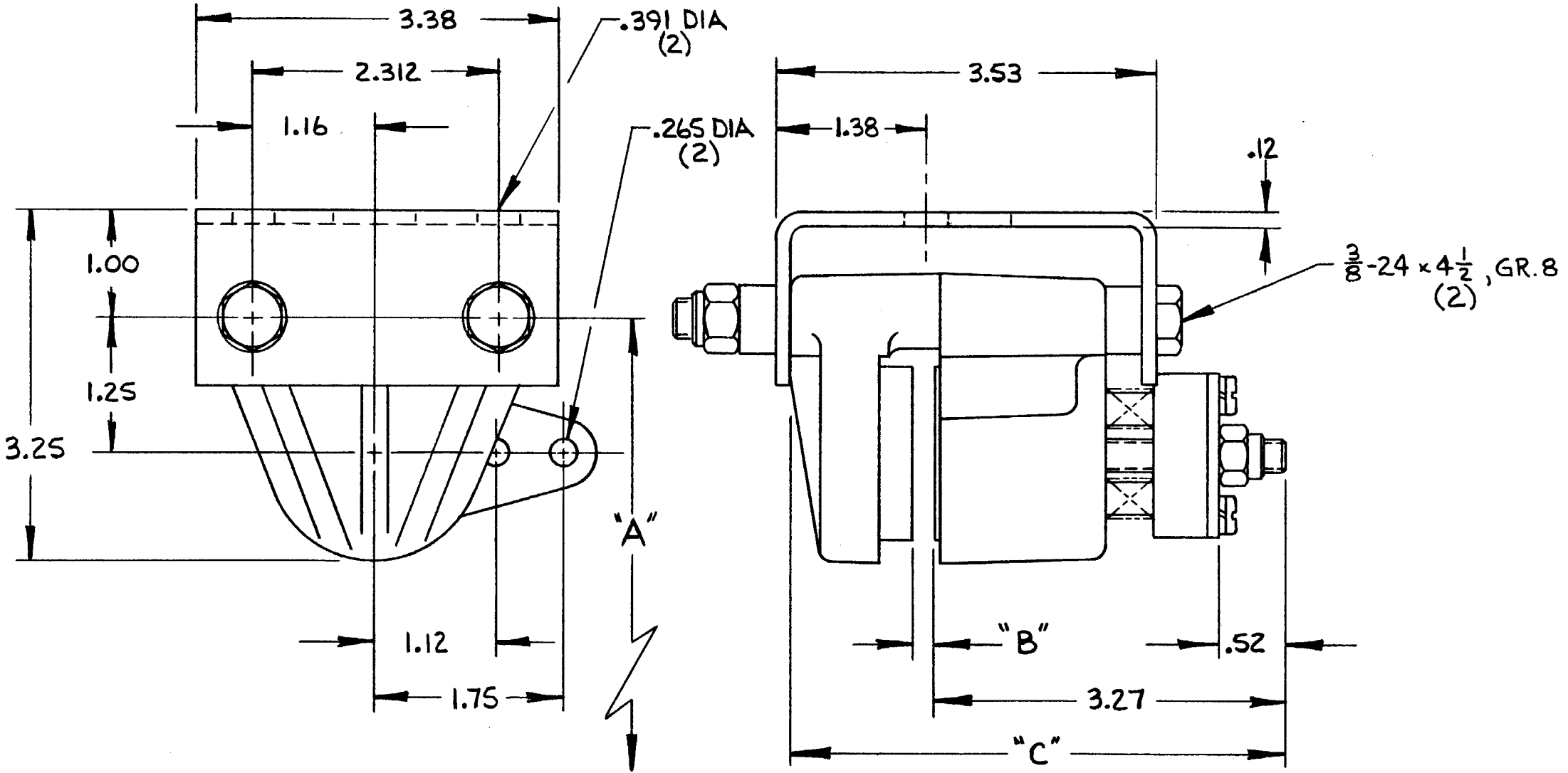

3/8 - 24 x 4-1/2, GR. 8 (2)
1/8 - 27 NPTF (2)
.41
2.312
1.156
.41
.44 (2)
2.66
"A"
3.14
1.61
(2)
"B"
"C"

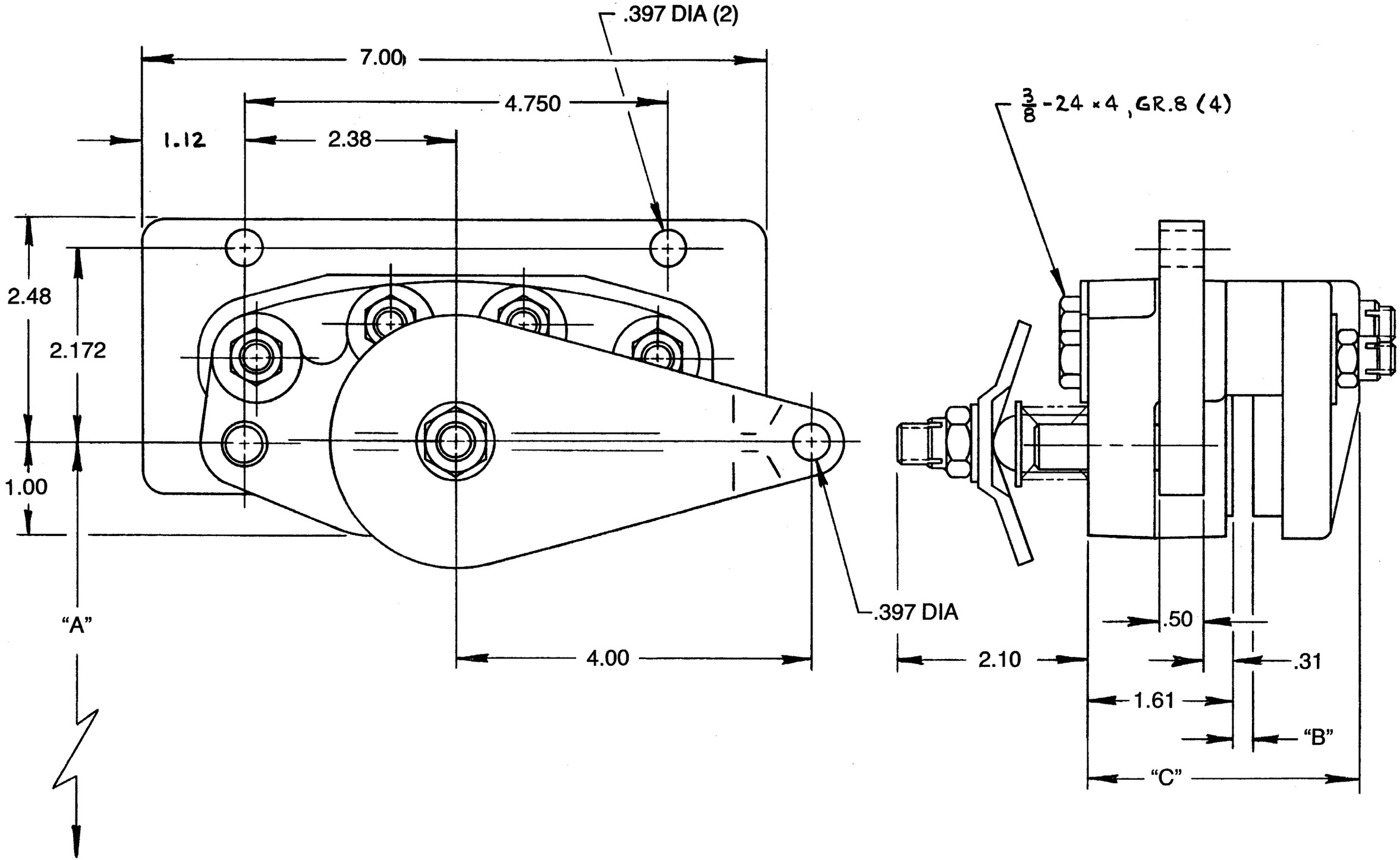

.391 DIA (2)
3/8 - 24 x 4-1/2, GR. 8 (2)
1/8 - 27 NPTF
3.38
2.312
1.156
3.53
.44
1.38
.12
1.00
3.25
"A"
1.61
"B"
"C"

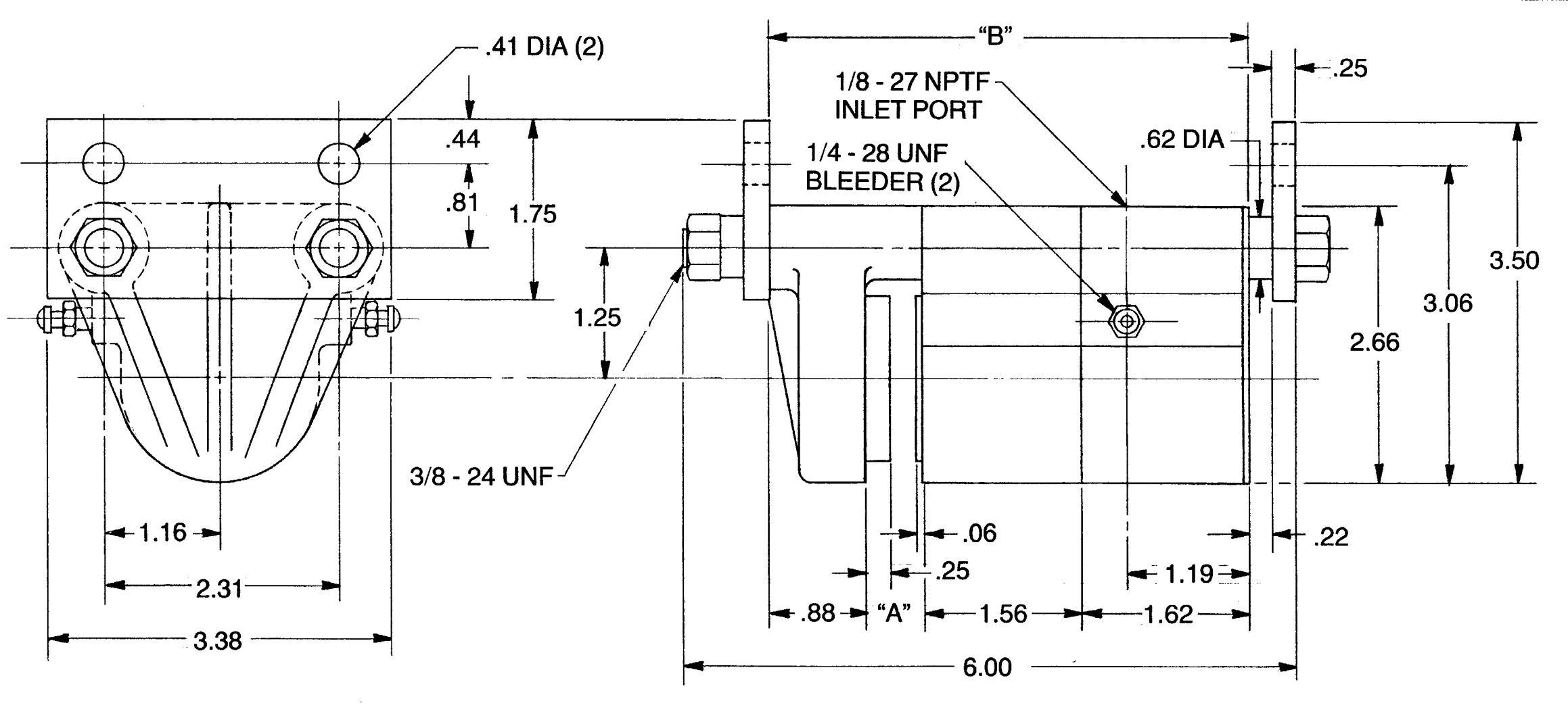

PORT LOCATION 14 DEGREES FROM CTR.(2)
1.249(2)
2.575
1.035
.724
1.625
1.44 R.
'A' TO C/L OF DISC
2.312(2)
2.940(2)
HHCS 1/2–13 X GR. 5 (3)
TORQUE TO 50 FT. LBS. WHEN MOUNTING
.38
(2)
1/8 NPT (4)
.56
4.43

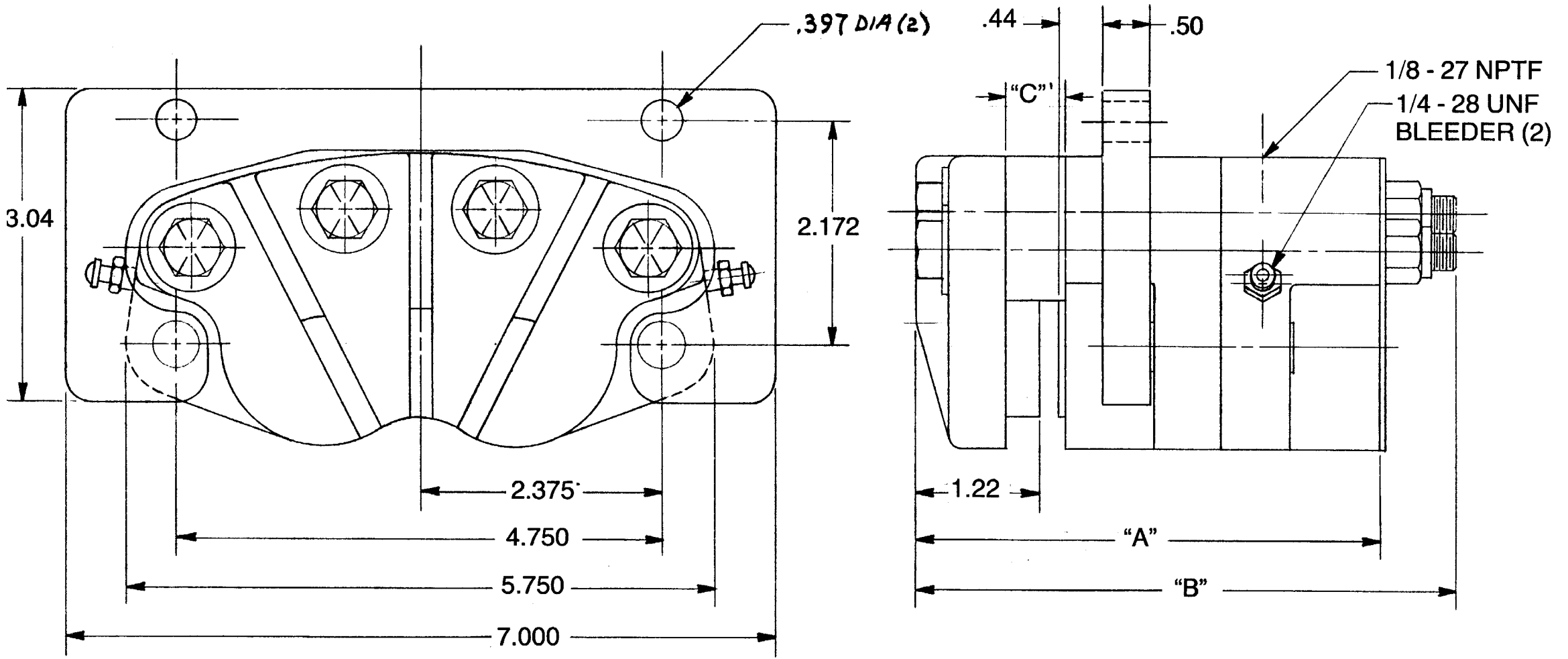

8.25
4.12
3.25
1.62
.656 DIA.
(2)
"C"
1.91
.50
4.00
2.31
1.56
1/8 - 27 NPTF
(4)
"A"
"B"

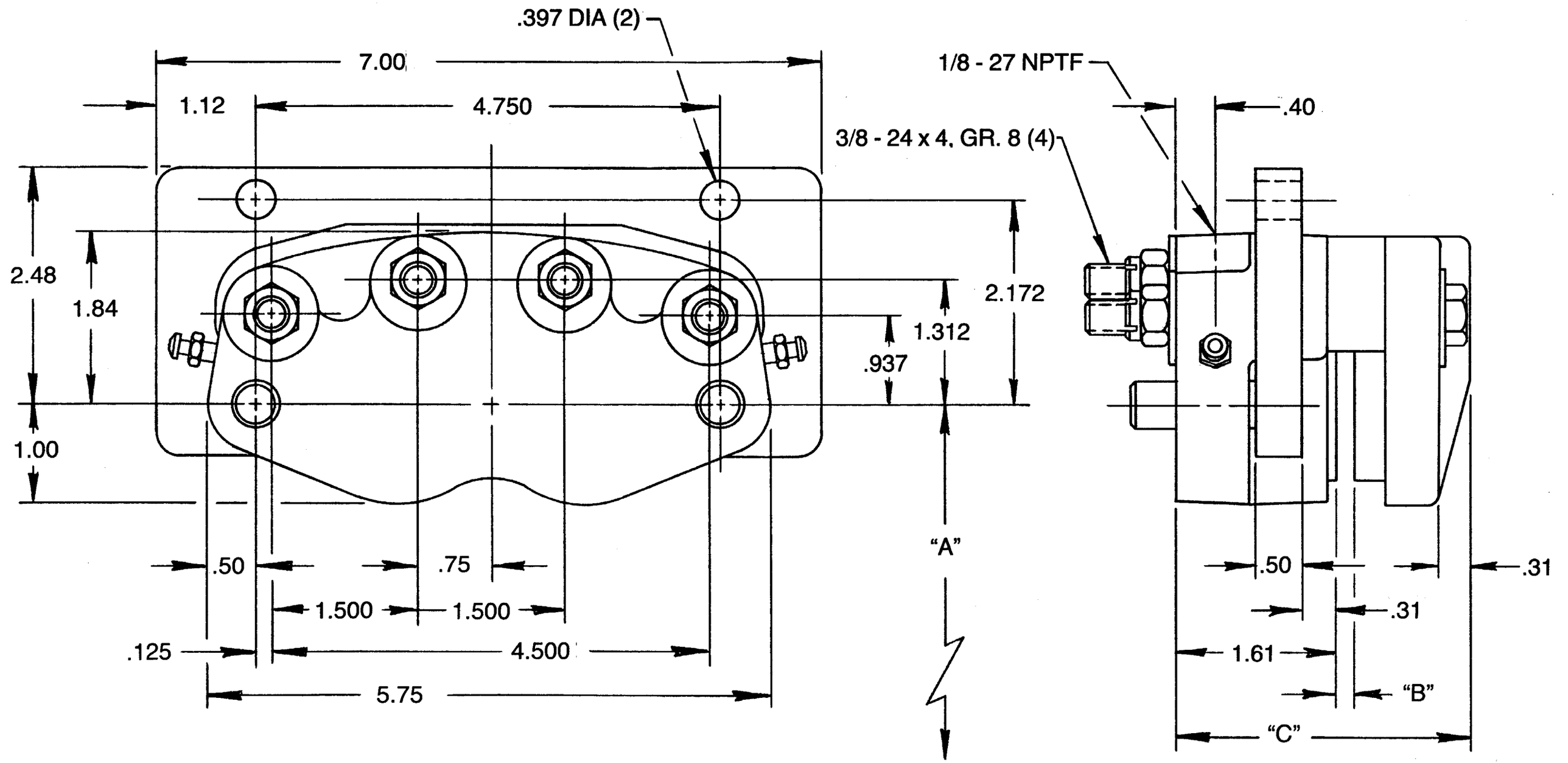

2.50
.332 DIA. (2)
1.625
.81
.265 DIA.
(2)
1.00
2.69
.94
"A"
1.12
1.75
2.88
1.25
.12
5/16 - 24 x 4,
GR 5 (2)
"B"
.52
2.88
"C"

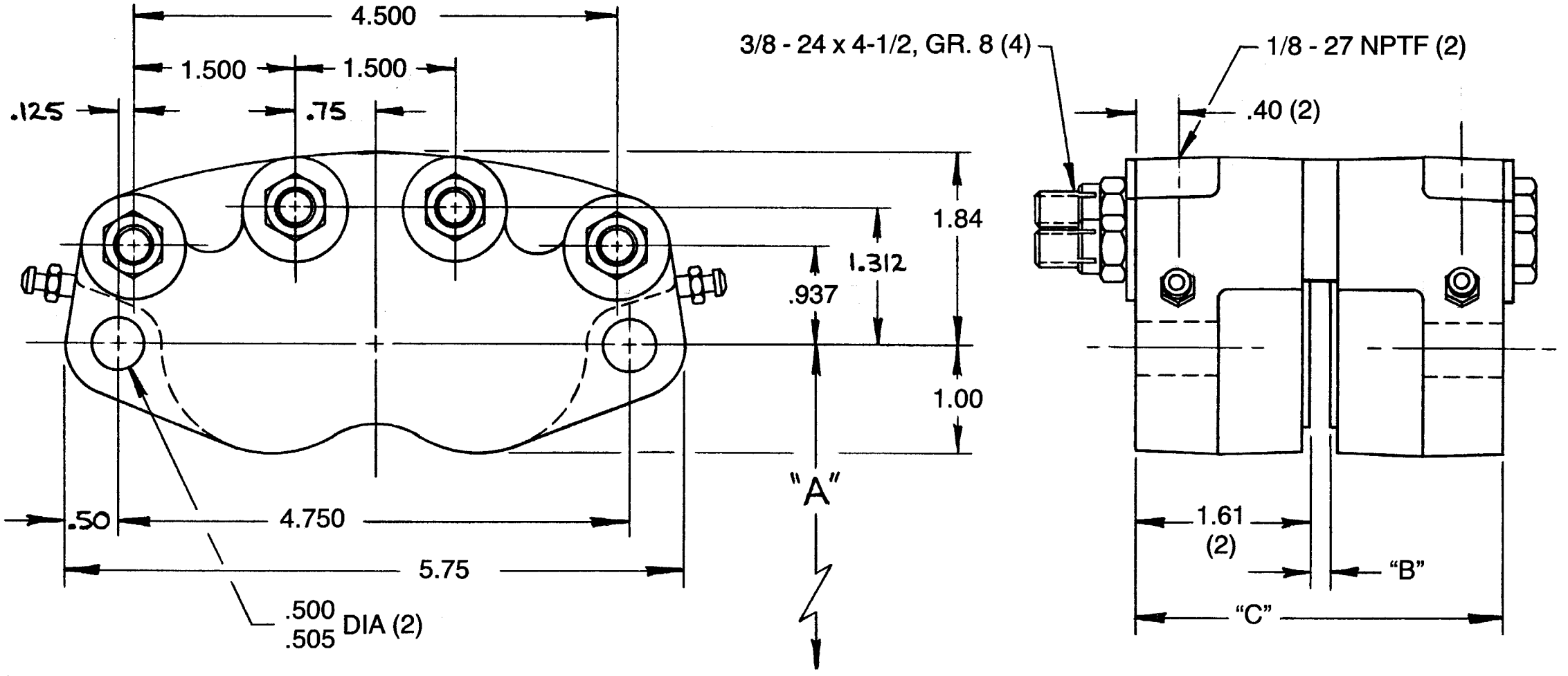

3.38
2.312
1.16
.391 DIA
(2)
.265 DIA
(2)
1.00
1.25
3.25
"A"
1.12
1.75
3.53
1.38
.12
$\frac{3}{8}$-24 x 4$\frac{1}{2}$, GR.8
(2)
"B"
.52
3.27
"C"

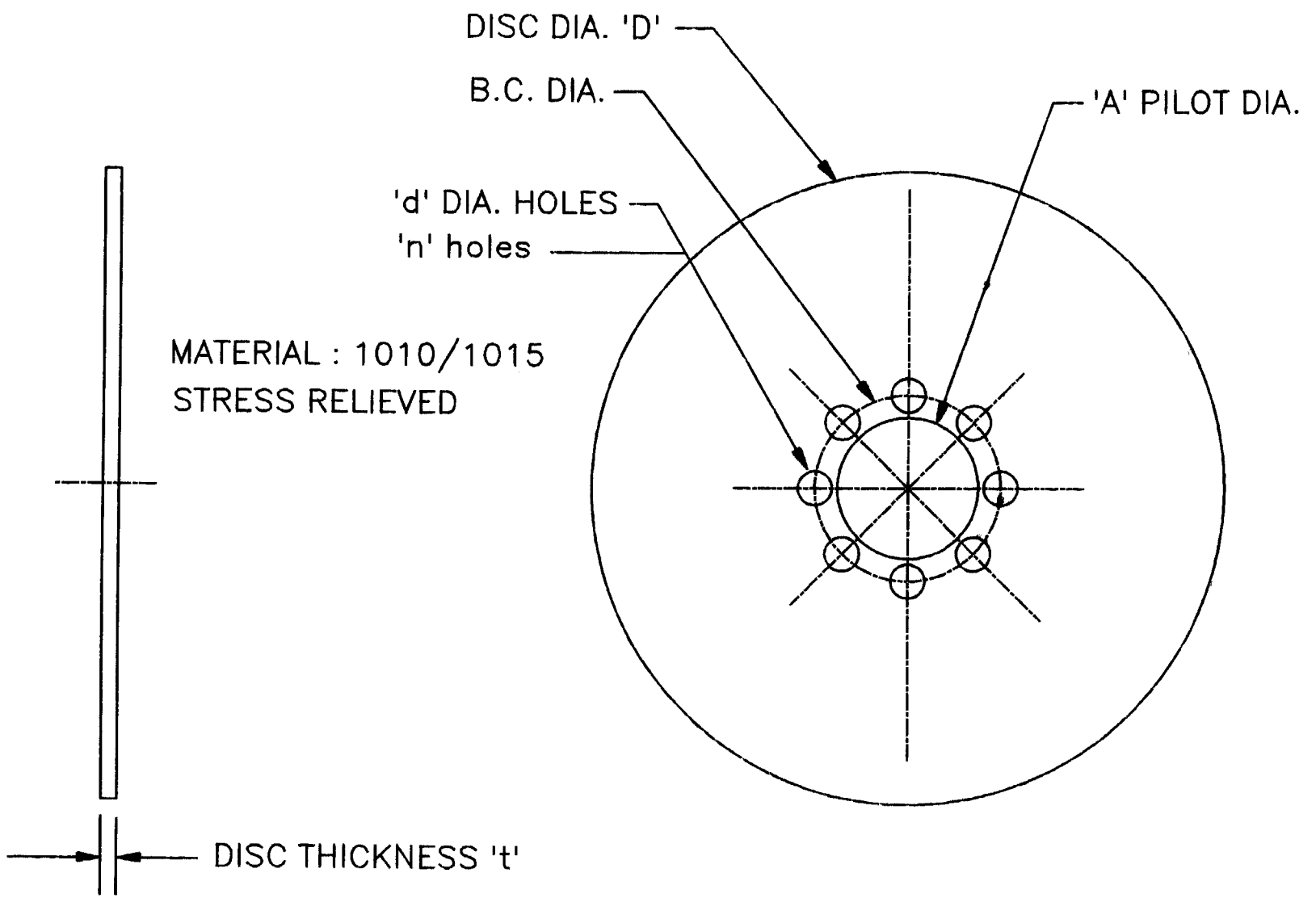

.397 DIA (2)
7.00
4.750
1.12
2.38
2.48
2.172
1.00
"A"
4.00
.397 DIA
3/8-24 x 4, GR.8 (4)
.50
.31
2.10
1.61
"B"
"C"

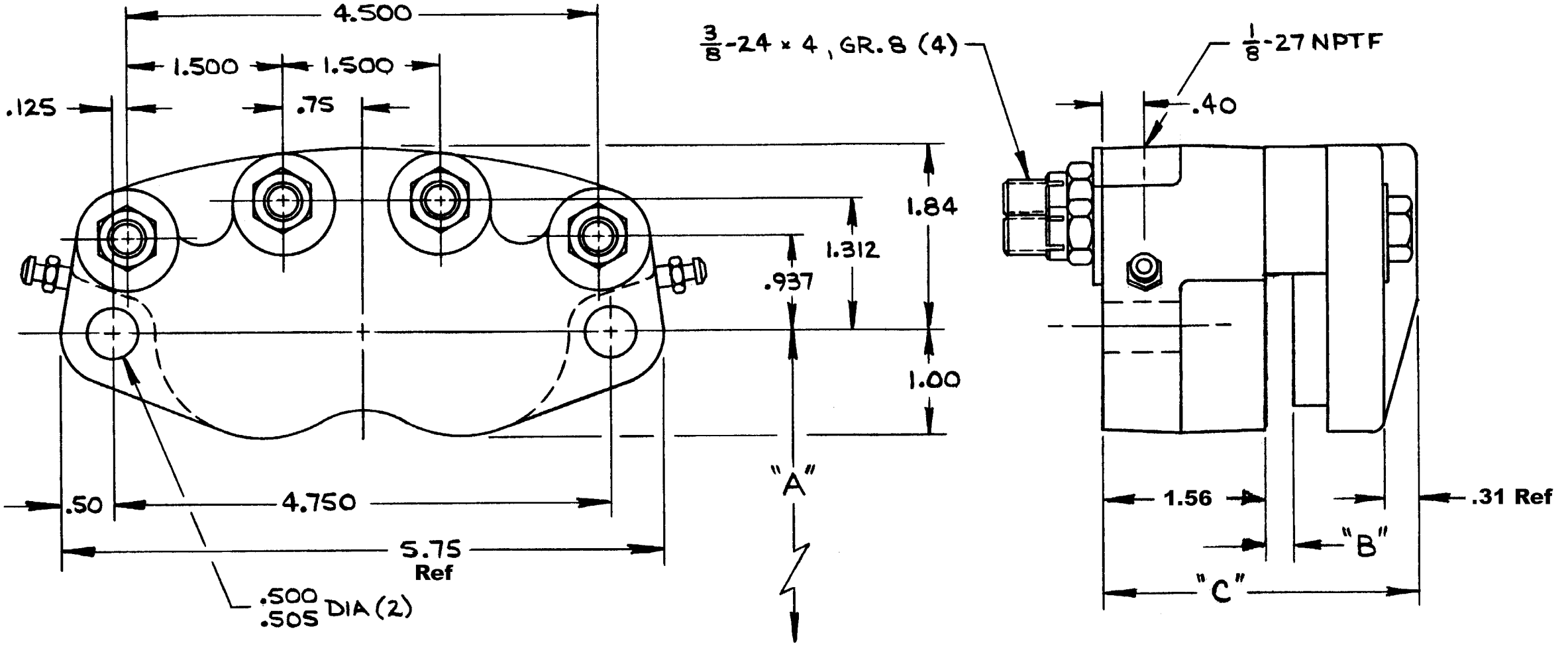

.41 DIA (2)
.44
.81
1.75
1.25
3/8 - 24 UNF
1.16
2.31
3.38
"B"
1/8 - 27 NPTF
INLET PORT
1/4 - 28 UNF
BLEEDER (2)
.25
.62 DIA
3.50
3.06
2.66
.06
.25
.88
"A"
1.56
1.19
1.62
.22
6.00


.397 DIA (2)
3.04
2.172
2.375
4.750
5.750
7.000
.44
.50
"C"
1/8 - 27 NPTF
1/4 - 28 UNF
BLEEDER (2)
1.22
"A"
"B"


.397 DIA (2)
7.00
1.12
4.750
2.48
1.84
1.00
.937
1.312
2.172
"A"
.50
.75
1.500
1.500
.125
4.500
5.75
1/8 - 27 NPTF
.40
3/8 - 24 x 4, GR. 8 (4)
.50
.31
.31
1.61
"B"
"C"


4.500
1.500
1.500
.125
.75
1.84
1.312
.937
1.00
"A"
.50
4.750
5.75
.500
.505
DIA (2)
3/8 - 24 x 4-1/2, GR. 8 (4)
1/8 - 27 NPTF (2)
.40 (2)
1.61
(2)
"B"
"C"


DISC DIA. 'D'
B.C. DIA.
'A' PILOT DIA.
'd' DIA. HOLES
'n' holes
MATERIAL : 1010/1015
STRESS RELIEVED
DISC THICKNESS 't'


4.500
1.500
1.500
.125
.75
1.84
1.312
.937
1.00
"A"
.50
4.750
5.75
Ref
.500
.505 DIA (2)
3/8-24 x 4, GR. 8 (4)
1/8-27 NPTF
.40
1.56
"B"
.31 Ref
"C"