

# HYDRAULIC DISC BRAKES LB, LBS, LBV - Wet



## APPLICATION

- » Heavy Duty machinery
- » Wheel drives
- » Material handling
- » Mining
- » Agricultural machines
- » Conveyors
- » Door openers and swing drives etc.



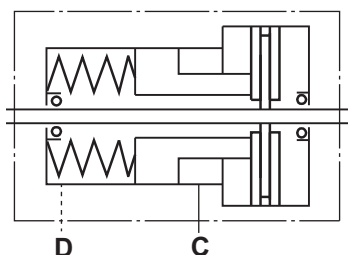
## GENERAL

|                                     |                                                                |
|-------------------------------------|----------------------------------------------------------------|
| <b>Fluid type</b>                   | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)                |
| <b>Temperature range, °F [°C]</b>   | -40÷284 [-430÷140]                                             |
| <b>Viscosity range, SUS [mm²/s]</b> | 98÷347 [20÷75]                                                 |
| <b>Filtration</b>                   | ISO code 20/16 (nominal filtration of 25 microns)              |
| <b>Maintenance</b>                  | Changed after the first 50-100 h, then after every 500-1500 h. |

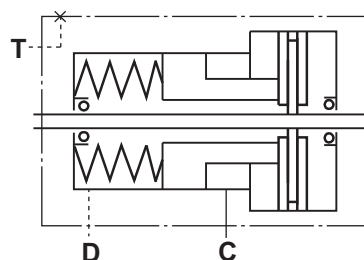
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### LB, LBS

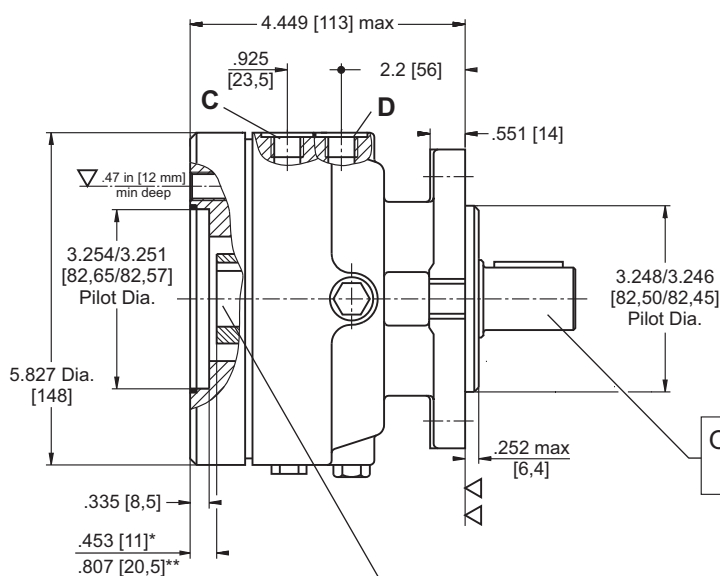


### LBV



## HYDRAULIC DISC BRAKE TYPE LB../288...

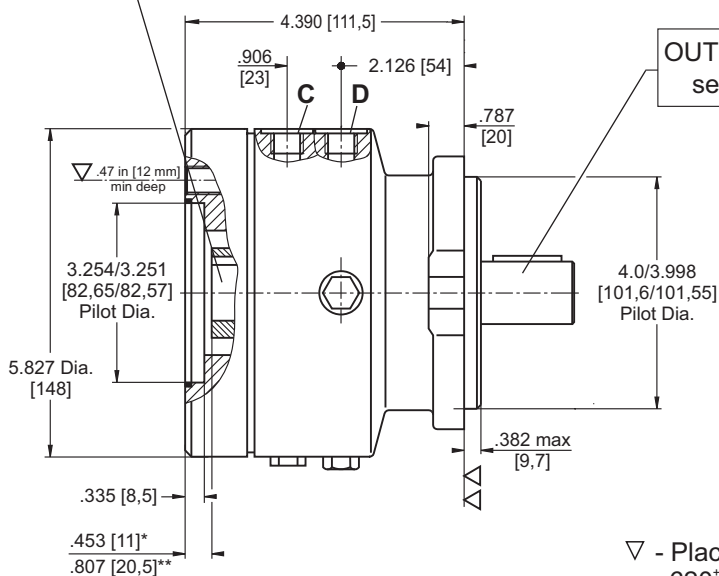
### FOR FLANGE ATTACHMENT TO MLHP, MLHR AND MLHS HYDRAULIC MOTORS



**INPUT SHAFT**  
see page 5

**C** : Brake release Port- 7/16 - 20UNF, deep .47 [12]  
**D** : Drainage tap- 9/16 - 18UNF, deep .51 [13]

**OUTPUT SHAFT**  
see page 5

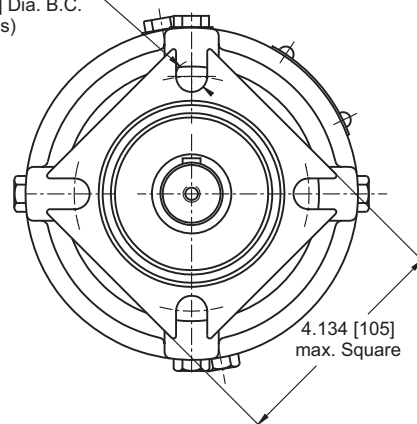


**OUTPUT SHAFT**  
see page 5

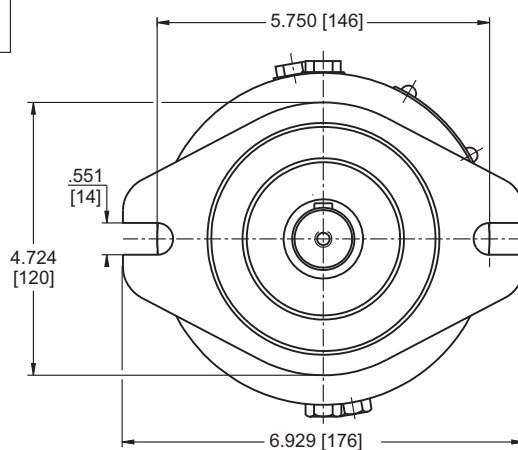
**OUTPUT FACE**

**A SAE A Mount**

.551 [14] Dia. Mounting Hole  
on 4.188 [106,4] Dia. B.C.  
(4 places)



**B SAE B Mount**



▽ - Place for attachment (tightening torque for screw 1/2" - 13 UNC:  
620<sup>+44</sup> lb-in [7<sup>+0,5</sup> daNm])

▽▽ - Place for attachment

\* - for Input Shaft Hole Versions "C"

\*\* - for Input Shaft Hole Versions "S" and "G"

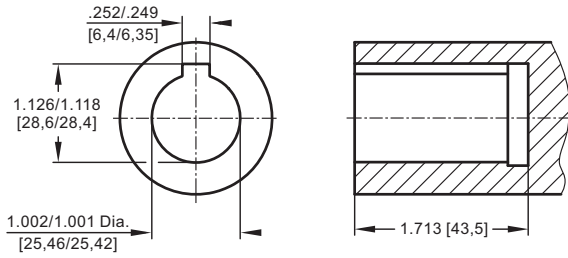
### SPECIFICATION DATA

| Description LB../288...                                                      | 7                     | 14                   | 21                   | 32                   | 43                   | 63                   |
|------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| *** Min. Static Torque,<br>lb-in [daNm]                                      | 531-708<br>[6-8]      | 1150-1327<br>[13-15] | 1770-1947<br>[20-22] | 2743-3009<br>[31-34] | 3628-3982<br>[41-45] | 5399-5665<br>[61-64] |
| Opening Pressure, min<br>PSI [bar]                                           | 58-73 [4-5]           | 116-130 [8-9]        | 174-188 [12-13]      | 260-290 [18-20]      | 348-377 [24-26]      | 550-565 [38-39]      |
| PSI [bar] max                                                                | 4350 [300]            |                      |                      |                      |                      |                      |
| Min. oil quantity for brake<br>releasing, in <sup>3</sup> [cm <sup>3</sup> ] | .427 - .488 [7 - 8]   |                      |                      |                      |                      |                      |
| Oil volume, in <sup>3</sup> [cm <sup>3</sup> ]                               | 3.5 - 7.35 [50 - 120] |                      |                      |                      |                      |                      |
| Max. Pressure in<br>drain space, PSI [bar]                                   | 7.25 [0,5]            |                      |                      |                      |                      |                      |
| Weight lb [kg]                                                               | 19.8 [9]              |                      |                      |                      |                      |                      |

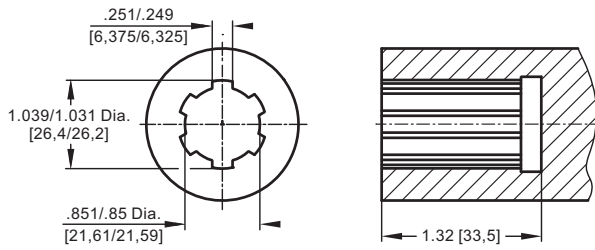
\*\*\* Static torque is obtained at working pressure - 0 PSI [0 bar].

**INPUT SHAFT HOLES for LB.../288**

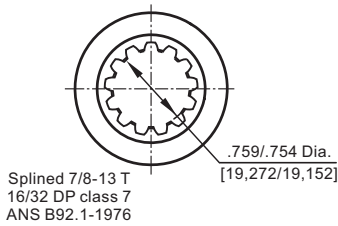
**C**



**G**



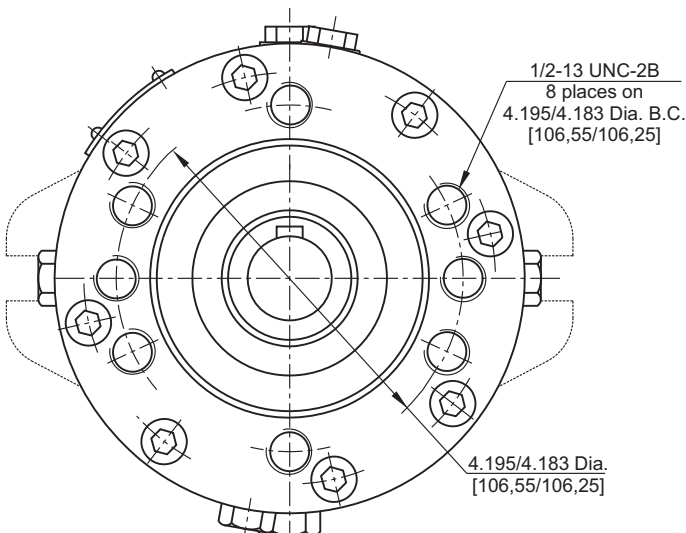
**S**



▽ - Disc Brake Mounting Surface

| X               | LBA/...           | LBB/...           |
|-----------------|-------------------|-------------------|
| For LB/288...-C | 1.95 in [49,5 mm] | 2.03 in [51,5 mm] |
| For LB/288...-S | 1.65 in [42,0 mm] | 1.73 in [44,0 mm] |
| For LB/288...-G | 1.95 in [49,5 mm] | 2.03 in [51,5 mm] |

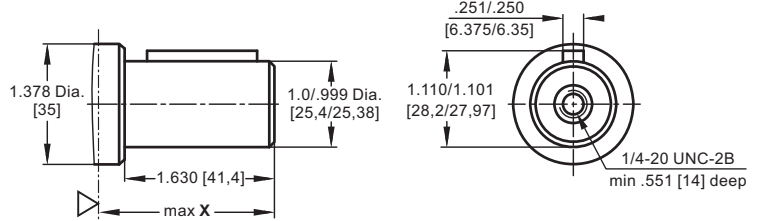
**INPUT FACE**



**OUTPUT SHAFT EXTENSIONS for LB.../288**

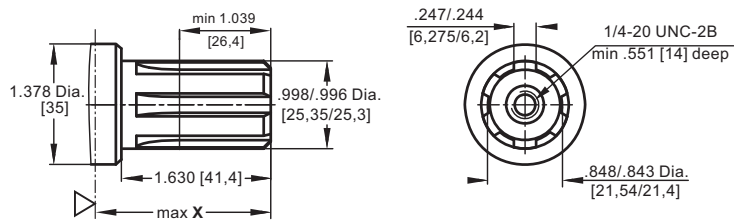
**C**

1"[25,4] straight, Parallel key 1/4"x1/4"x1 1/4" BS 46  
Max. Torque 3900 lb-in [44 daNm]



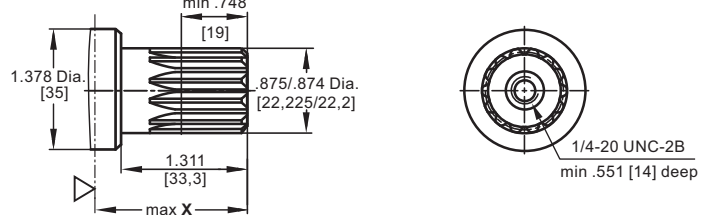
**G**

1"[25,4], SAE 6B Splined  
Max. Torque 3900 lb-in [44 daNm]

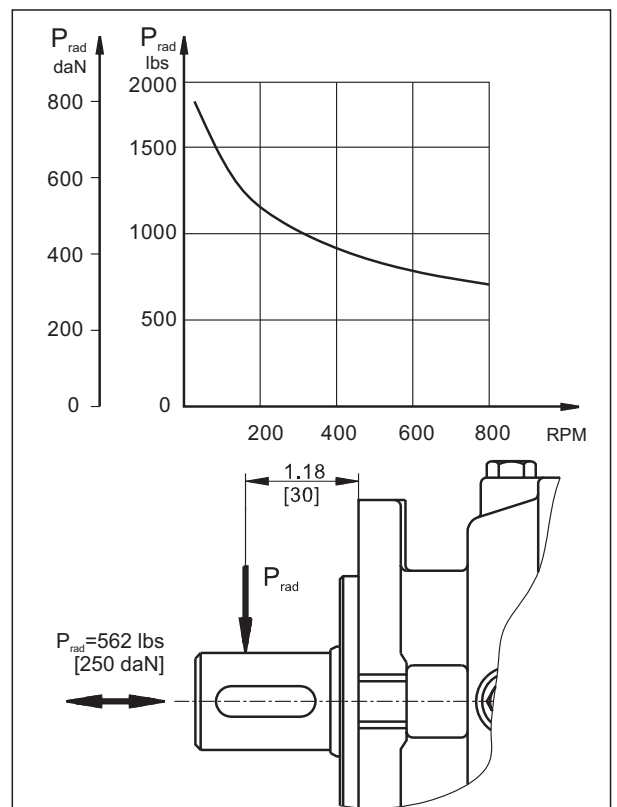


**S**

13T Splined 7/8"[22,22], ANS B92.1-1976  
Max. Torque 3200 lb-in [36 daNm]



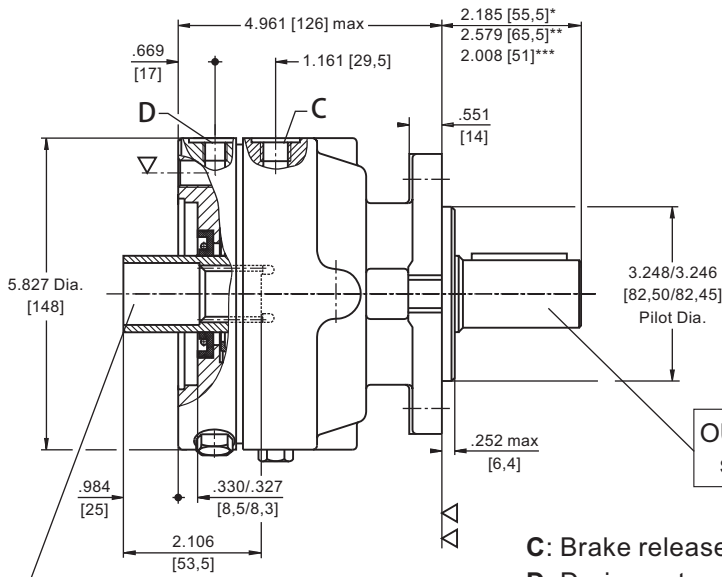
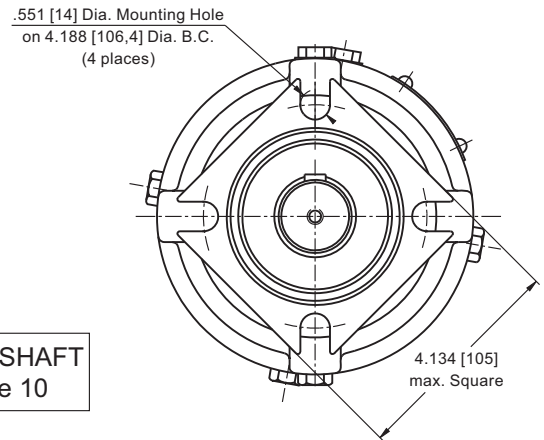
**LOAD CURVE**



**HYDRAULIC DISC BRAKE TYPE LBS.../289...  
FOR FLANGE ATTACHMENT TO MLHSS HYDRAULIC MOTORS**

**OUTPUT FACE**

**A SAE A Mount**



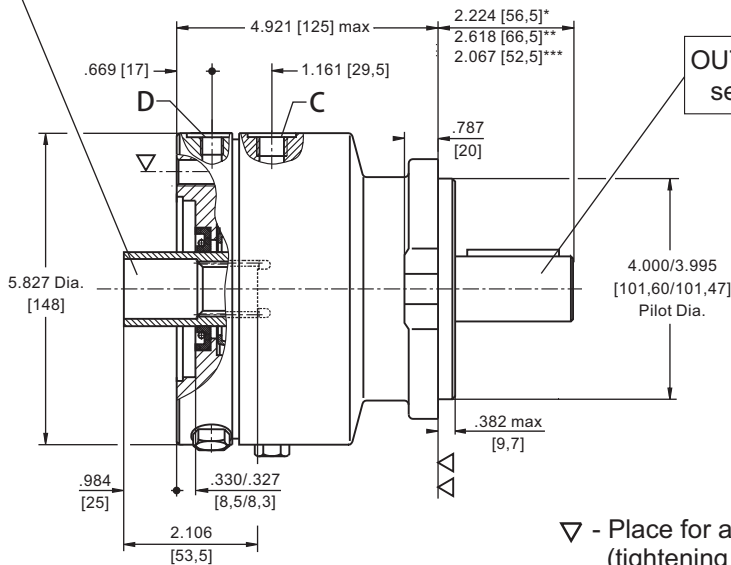
**OUTPUT SHAFT**  
see page 10

**C:** Brake release Port - 7/16 - 20 UNF, .47 [12] depth  
**D:** Drainage tap - 9/16 - 18 UNF, .51 [13] depth

\* For Output Shaft Version **C,G**  
\*\* For Output Shaft Version **T**  
\*\*\* For Output Shaft Version **S**

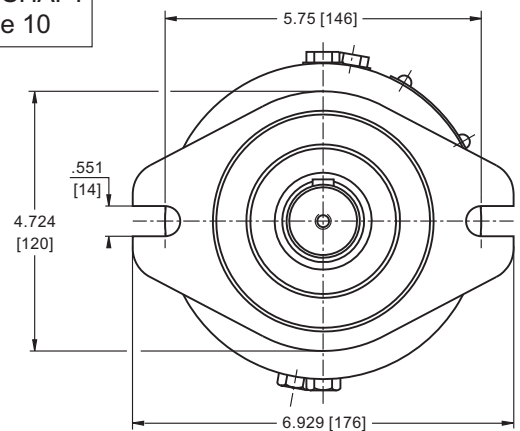


**INPUT SHAFT**  
see page 16



**OUTPUT SHAFT**  
see page 10

**B SAE B Mount**



▽ - Place for attachment  
(tightening torque for screws 4x1/2" - 13 UNC,  
1 1/4 in [31,8 mm] long, ANSI B 18.3-76: 710<sup>+44</sup> lb-in [8<sup>+0,5</sup> daNm])

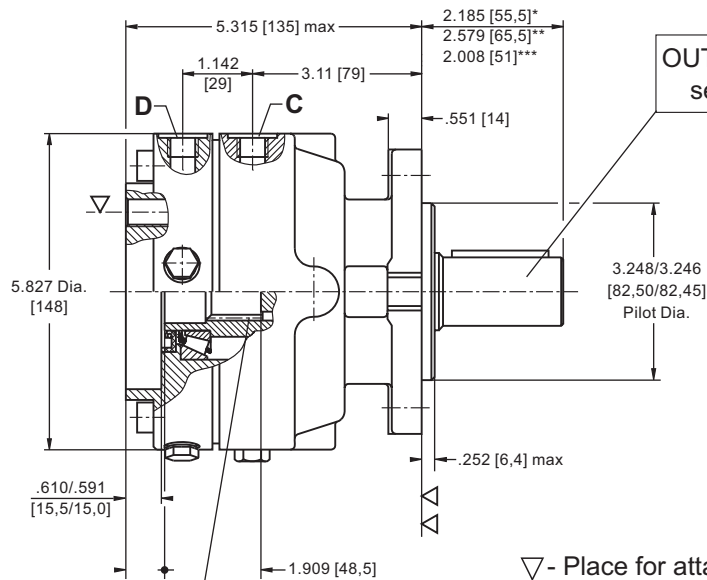
▽▽ - Place for attachment

**SPECIFICATION DATA**

| Description<br>LBS(LBV).../289(290)                                         | 21                   | 32               | 43               | 63               | L43              | L63              |
|-----------------------------------------------------------------------------|----------------------|------------------|------------------|------------------|------------------|------------------|
| *Min. Static Torque lb-in [daNm]                                            | 1770-1947[20-22]     | 2743-3009[31-34] | 3628-3982[41-45] | 5399-5665[61-64] | 3628-3982[41-45] | 5399-5665[61-64] |
| Opening Pressure min<br>PSI [bar]                                           | 174-188 [12-13]      | 260-290 [18-20]  | 348-377 [24-26]  | 540-565 [37-39]  | 290-320 [20-22]  | 305-333 [21-23]  |
|                                                                             | max 4350 [300]       |                  |                  |                  |                  |                  |
| Min. oil quantity for<br>brake releasing in <sup>3</sup> [cm <sup>3</sup> ] | .427- .488 [7- 8]    |                  |                  |                  |                  |                  |
| Oil volume in <sup>3</sup> [cm <sup>3</sup> ]                               | 3.05-7.32 [50-120]   |                  |                  |                  |                  |                  |
| Max. Pressure in<br>drain space PSI<br>[bar]                                | 72 [5]               |                  |                  |                  |                  |                  |
| Weight for .../289<br>.../290 lb [kg]                                       | 22 [10]<br>24.2 [11] |                  |                  |                  |                  |                  |

\*Static torque is obtained at working pressure - 0 PSI [0 bar].

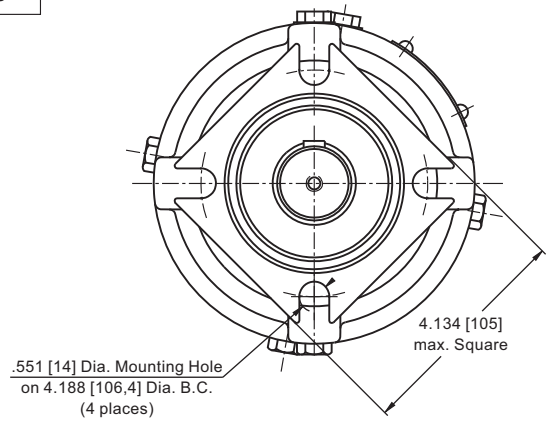
# HYDRAULIC DISC BRAKE TYPE LBV.../289... FOR FLANGE ATTACHMENT TO MLHSV HYDRAULIC MOTORS



OUTPUT SHAFT  
see page 10

## OUTPUT FACE

### A SAE A Mount

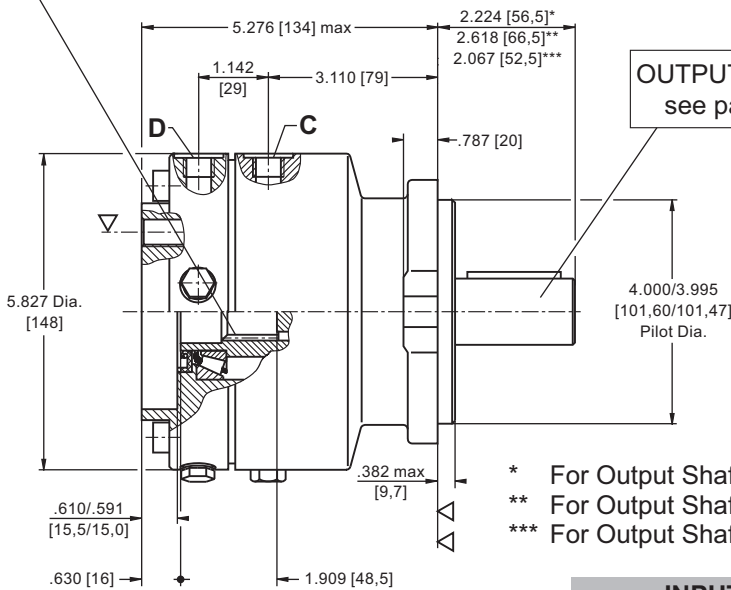


- ▽ - Place for attachment  
(tightening torque for screws 4xM10 DIN 912 - 575<sup>+44</sup> lb-in [6,5<sup>+0,5</sup> daNm])  
▽▽ - Place for attachment

C: Brake release Port - 7/16 - 20 UNF, .47 [12] depth

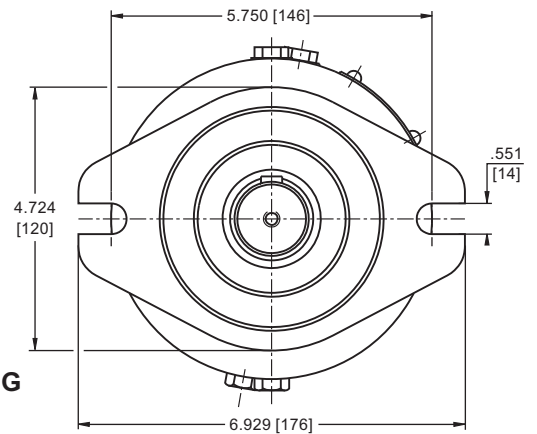
D: Drainage tap - 9/16 - 18 UNF, .51 [13] depth

INPUT SHAFT  
see page 16



OUTPUT SHAFT  
see page 10

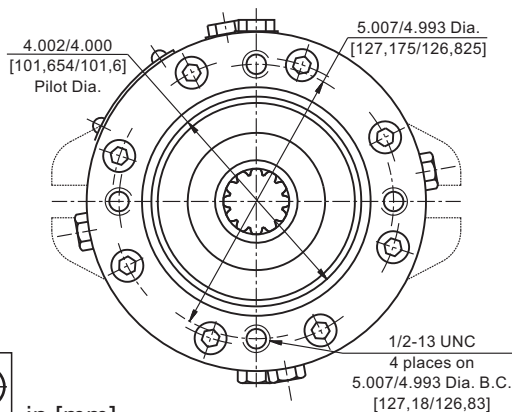
### B SAE B Mount



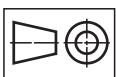
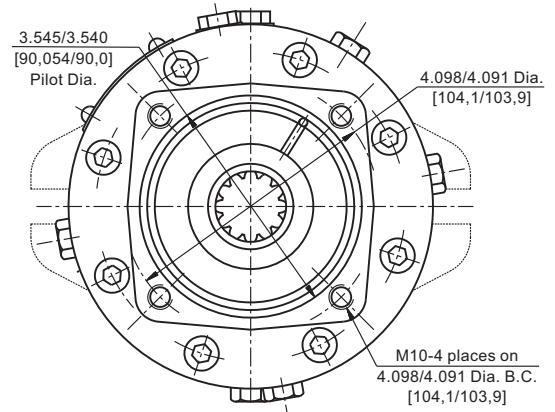
- \* For Output Shaft Version C,G  
\*\* For Output Shaft Version T  
\*\*\* For Output Shaft Version S

## INPUT FACE For Versions 289 and 290

### TYPE LBS.../...



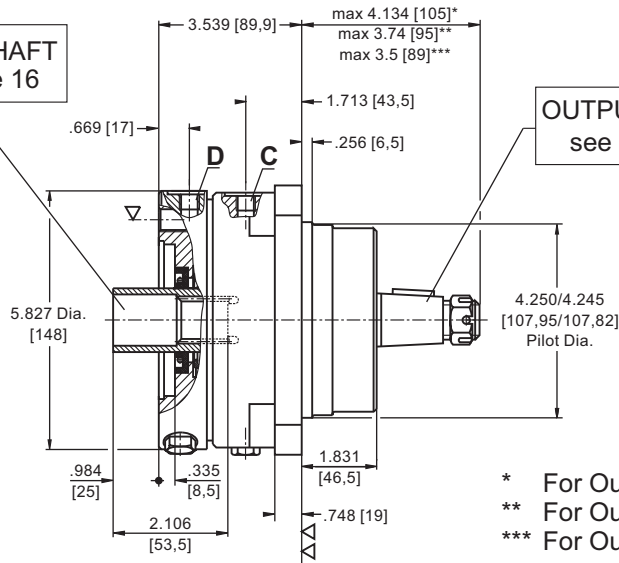
### TYPE LBV.../...



in [mm]

# HYDRAULIC DISC BRAKE TYPE LBS.../290... FOR FLANGE ATTACHMENT TO MLHSS HYDRAULIC MOTORS

INPUT SHAFT  
see page 16

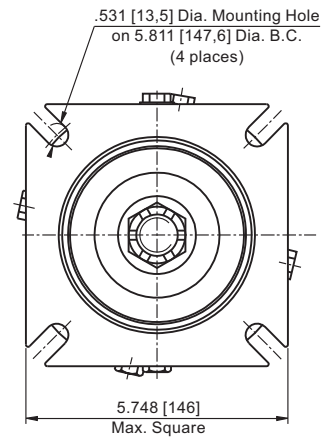


OUTPUT SHAFT  
see page 10

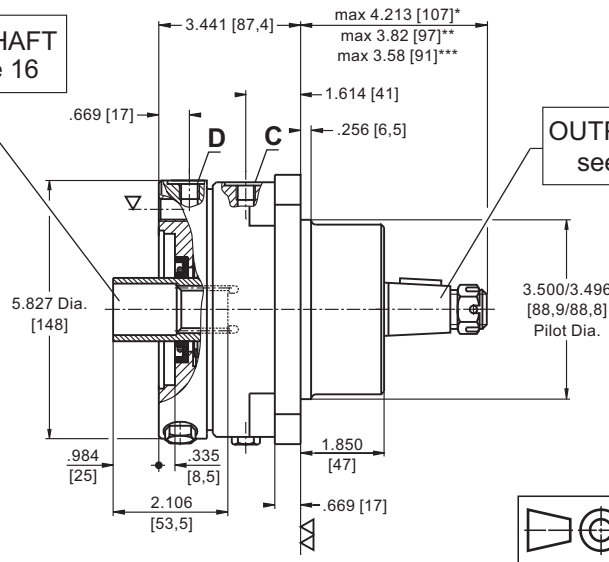
\* For Output Shaft Version T  
\*\* For Output Shaft Version C,G  
\*\*\* For Output Shaft Version S

## OUTPUT FACE

### E Wheel Mount

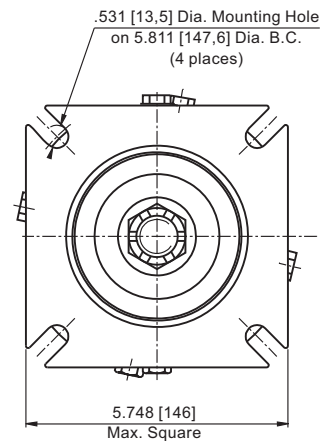


INPUT SHAFT  
see page 16



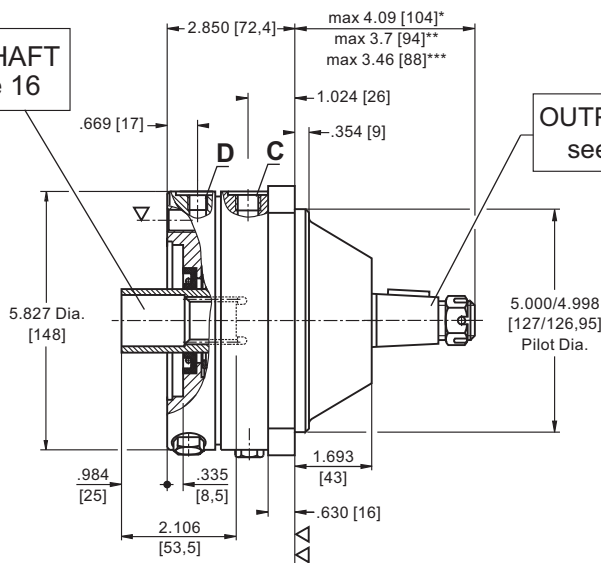
OUTPUT SHAFT  
see page 10

### R Wheel Mount



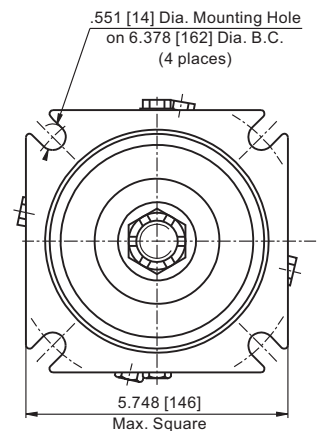
in [mm]

INPUT SHAFT  
see page 16



OUTPUT SHAFT  
see page 10

### W SAE C Wheel Mount

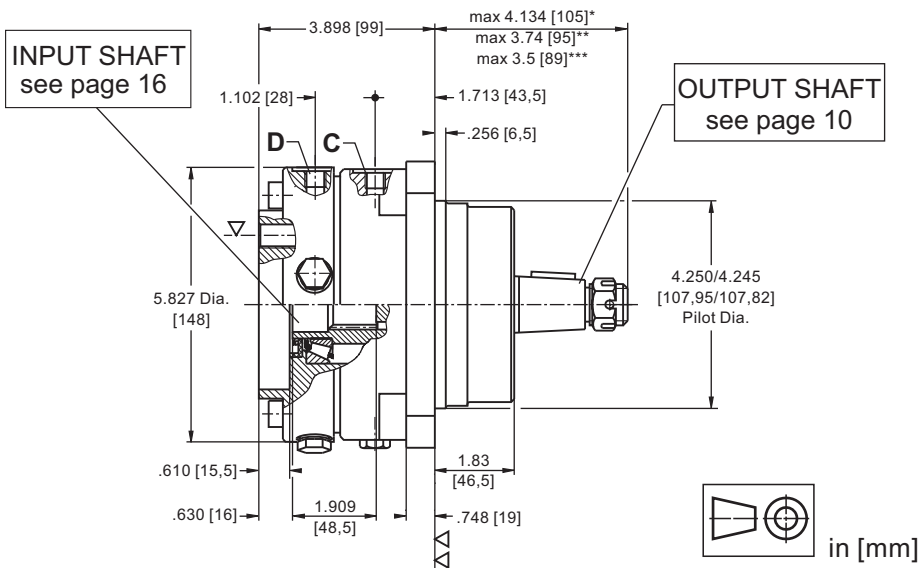


C: Brake release Port - 7/16 - 20 UNF, .47 [12] depth  
D: Drain plug for the Brake - 9/16 - 18 UNF, .51 [13] depth  
T: Drain plug for the Motor - 9/16-18 UNF, .51 [13] depth

▽ - Place for attachment (tightening torque for screws  
4x1/2" - 13 UNC, 1 1/4 in [31,8 mm] long,  
ANSI B 18.3-76: 710<sup>+44</sup> lb-in [8<sup>+0,5</sup> daNm])  
▽▽ - Place for attachment

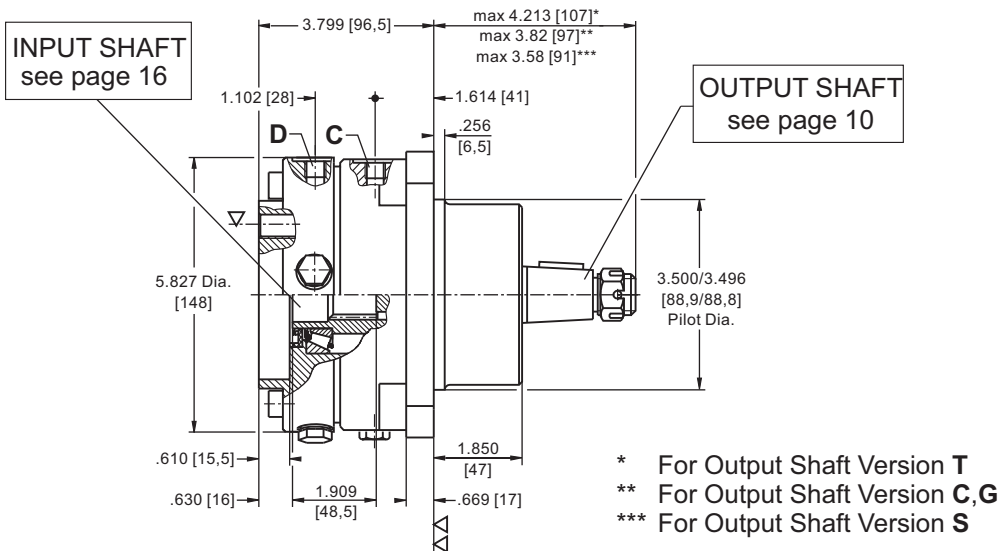
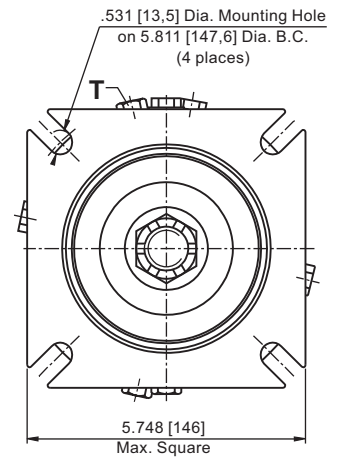


**HYDRAULIC DISC BRAKE TYPE LBV.../290...  
FOR FLANGE ATTACHMENT TO MLHSV HYDRAULIC MOTORS**

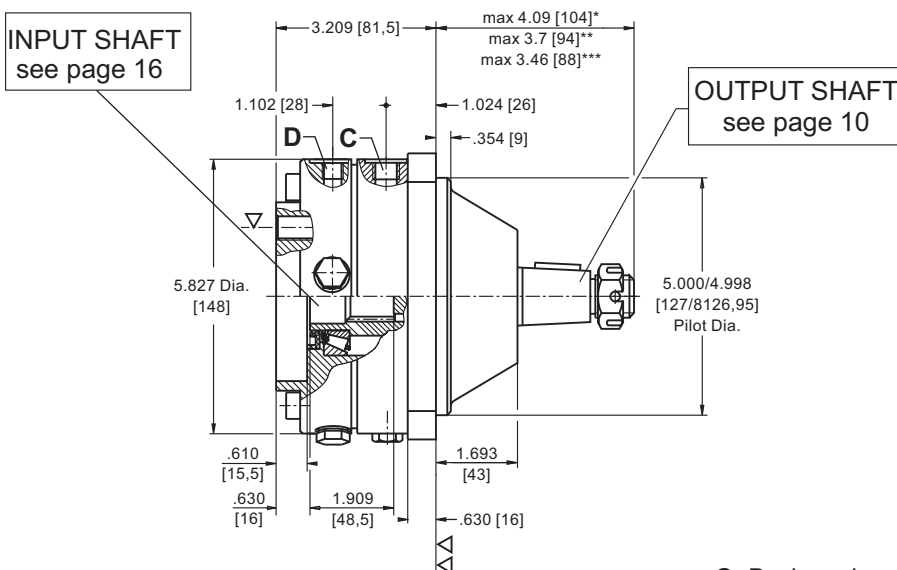
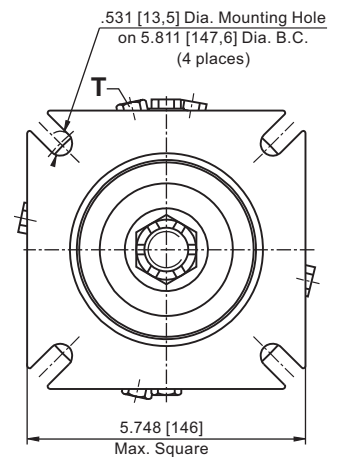


**OUTPUT FACE**

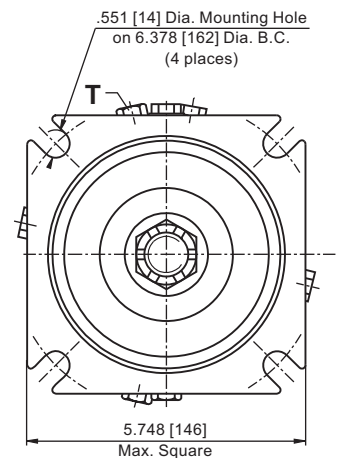
**E Wheel Mount**



**R Wheel Mount**



**W SAE C Wheel Mount**



▽ - Place for attachment (tightening torque for screws  
4xM10 DIN 912 - 575<sup>+44</sup> lb-in [6,5<sup>+0,5</sup> daNm])

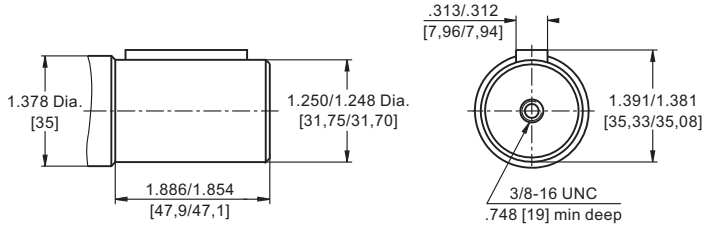
▽▽ - Place for attachment

**C:** Brake release Port - 7/16 - 20 UNF, .47 [12] depth  
**D:** Drain plug for the Brake - 9/16 - 18 UNF, .51 [13] depth  
**T:** Drain plug for the Motor - 9/16-18 UNF, .51 [13] depth

## OUTPUT SHAFT EXTENSIONS for LB.../289, 290

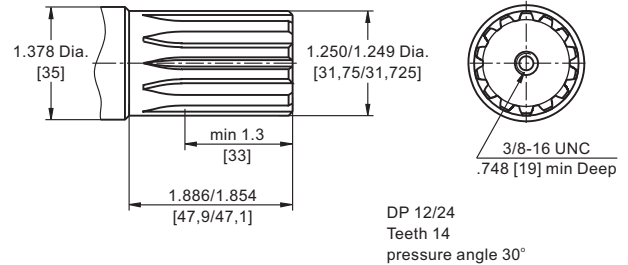
**C**

1 1/4" [31,75] straight, Parallel key 5/16" x 5/16" x 1 1/4" BS 46  
Max. Torque 6815 lb-in [77 daNm]



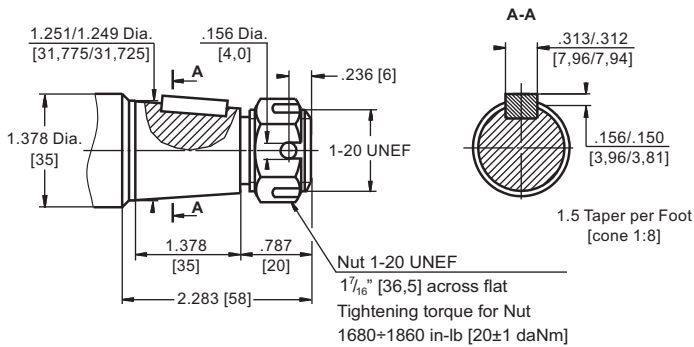
**G**

14T Splined, 1 1/4" [31,75], ANS B92.1-1976  
Max. Torque 6815 lb-in [77 daNm]



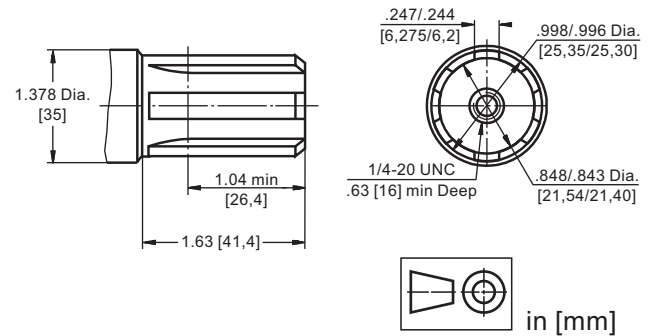
**T**

1 1/4" [31,75], SAE J501 Tapered  
Parallel key 5/16" x 5/16" x 1" BS46  
Max. Torque 6815 lb-in [77 daNm]



**S**

1" [25,4], SAE 6B Splined  
Max. Torque 3900 lb-in [44 daNm]

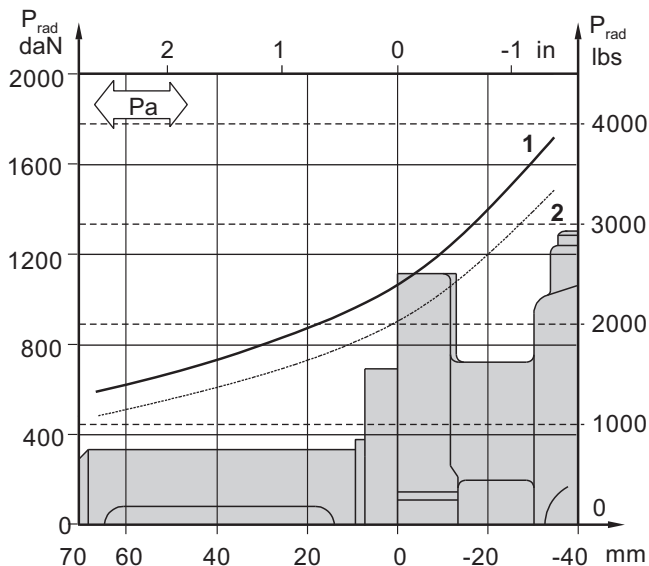


## LOAD CURVE

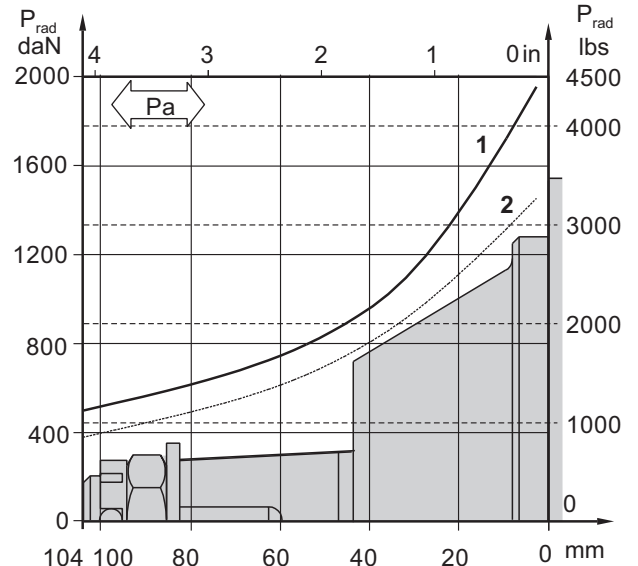
The curve applies to a B10 bearing life of 3000 hours at 200 RPM

- 1: Pa < 350 daN [787 lbs]
- 2: Pa = 500 daN [1125 lbs]

### LBS(V).../289



### LBS(V).../290





### ORDER CODE for LB/288

|            | 1 | 2           | 3 | 4        | 5 | 6 |
|------------|---|-------------|---|----------|---|---|
| <b>L B</b> |   | <b>/288</b> |   | <b>-</b> |   |   |

**Pos.1 - Output Face**

- A** - SAE A Mount  
**B** - SAE B Mount

**Pos.2 - Input Shaft Holes** [see slots of page 5 left]

**C, G, S**

**Pos.3 - Static Torque Code** [see Specification Data]

7, 14, 21, 32, 43, 63

**Pos.2 - Output Shaft Extensions\*** [see page 5]

- C** - 1" [25,4] straight, Parallel key  
**G** - 1" [25,4] SAE 6B Splined  
**S** -  $\frac{7}{8}$ " [22,2] 13T Splined

**Pos.5 - Option\*\*** [Paint]

- omit - no Paint  
**P** - Paint  
**PC** - Corrosion Protected Paint

**Pos.6 - Design Series**

- omit - Factory specified

Notes: \* For Max. Torque values [see data on page 5](#).

The permissible output torque for shafts must not be exceeded!

\*\* Color at customer's request.

### ORDER CODE for LBS(LBV)/289 and 290

|            | 1 | 2 | 3        | 4 | 5        | 6 | 7 |
|------------|---|---|----------|---|----------|---|---|
| <b>L B</b> |   |   | <b>/</b> |   | <b>-</b> |   |   |

**Pos.1 - Type**

- S** - Disc Brake for short motor S- MLHSS  
**V** - Disc Brake for very short motor V- MLHSV

**Pos.2 - Output Face**

- A** - SAE A Mount  
**B** - SAE B Mount  
**E** - Wheel Mount  
**R** - Wheel Mount  
**W** - SAE C Wheel Mount

**Pos.3 - Design Code**

- 289** - for MLHSS and MLHSV Motors  
**290** - for MLHSS and MLHSV Motors  
 [Wheel Mounting Motors]

**Pos.4 - Static Torque Code** [see Specification Data]

21, 32, 43, 63, L43, L63

**Pos.5 - Output Shaft Extensions\*** [see page 10]

- C** - 1 $\frac{1}{4}$ " [31,75] straight, Parallel key  
**G** - 1 $\frac{1}{4}$ " [31,75] 14T Splined  
**S** - 1" [25,4] SAE 6B Splined  
**T** - 1 $\frac{1}{4}$ " [31,75] SAE J501 Tapered

**Pos.6 - Option** [Paint]\*\*

- omit - no Paint  
**P** - Painted  
**PC** - Corrosion Protected Paint

**Pos.7 - Design Series**

- omit - Factory specified

Notes: \* For Max. Torque values [see data on page 10](#). The permissible output torque for shafts must not be exceeded!

\*\* Color at customer's request.

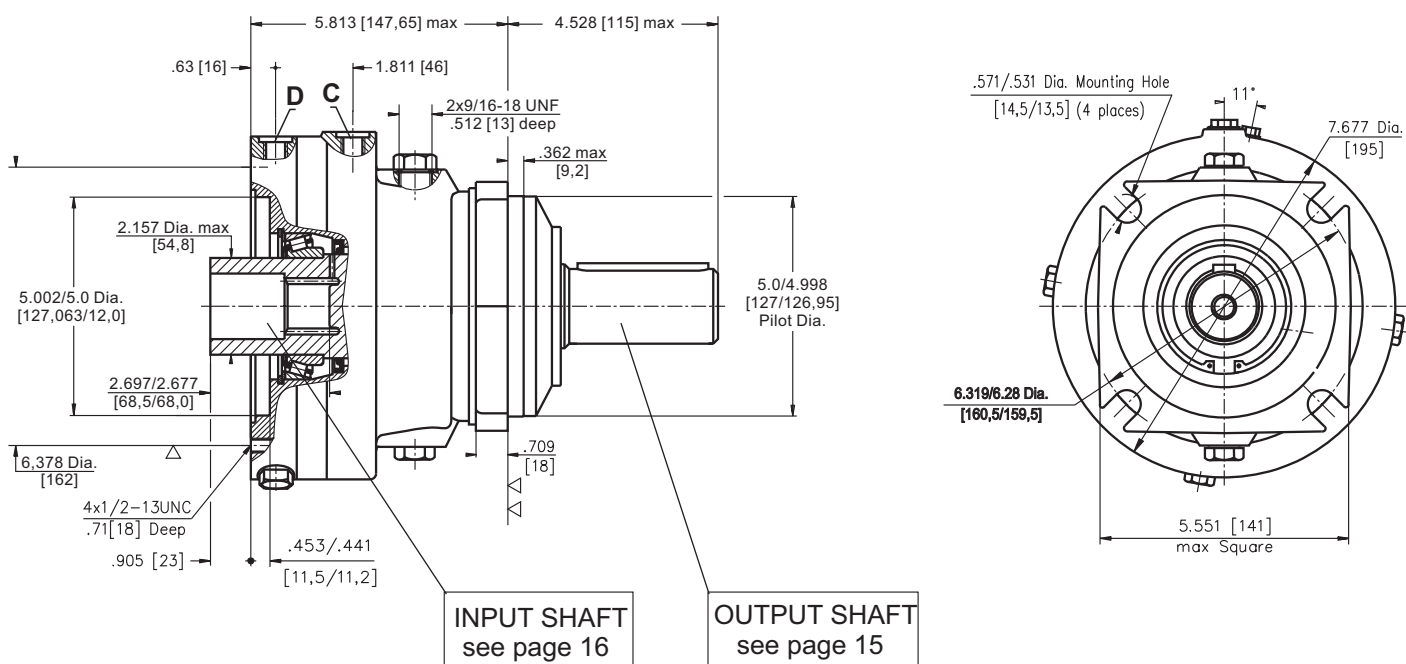
The Disc Brakes are mangano phosphatized as standard.

**ATTENTION:**

- Hydraulic brake is delivered without oil (it is lubricated only).
- Hydraulic brake is filled through the drain port **D**. Space is filled with 3.05 ÷ 7.32 in<sup>3</sup> [50 ÷ 120 cm<sup>3</sup>] mineral oil HLP (DIN 51524) or HM (ISO 6743/4). For LB/288 fill oil after hydraulic motor assembly.
- In all brakes, friction discs and separators should be lubricated.

## HYDRAULIC DISC BRAKE TYPE LBS/314 FOR FLANGE ATTACHMENT TO MLHTS HYDRAULIC MOTORS

### C Square Mount



**C:** Brake release Port - 7/16-20UNF, deep .47 [12]

**D:** Drainage tap - 9/16-18UNF, deep .51 [13]

▽ - Place for attachment

(tightening torque for screws 4x1/2" - 13 UNC, 1 1/4 in [31,8 mm] long, ANSI B 18.3-76: 710<sup>+44</sup> lb-in [8<sup>+0,5</sup> daNm])

▽▽ - Place for attachment



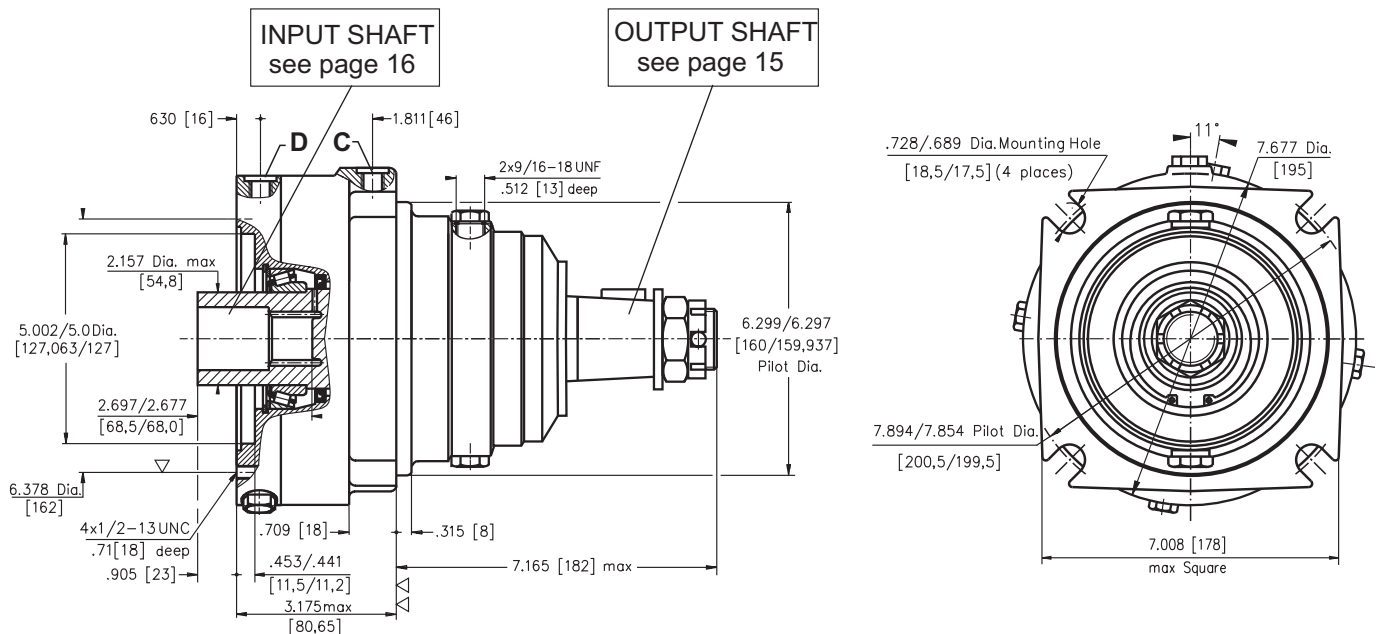
### SPECIFICATION DATA

| Description LBS/314(315) -...<br>LBV/314(315)-... |                                       | 21                       | 29                   | 43                   | 65                   | 85                   | 110                     | 130                      |
|---------------------------------------------------|---------------------------------------|--------------------------|----------------------|----------------------|----------------------|----------------------|-------------------------|--------------------------|
| *Min. Static Torque                               | lb-in<br>[daNm]                       | 1593-2036<br>[18-23]     | 2478-2921<br>[28-33] | 3717-4071<br>[42-46] | 5399-6196<br>[61-70] | 7346-8143<br>[83-92] | 9559-10444<br>[108-118] | 11152-12037<br>[126-136] |
| Opening Pressure                                  | min                                   | 58-72<br>[4-5]           | 87-101<br>[6-7]      | 130-145<br>[9-10]    | 188-217<br>[13-15]   | 261-290<br>[18-20]   | 333-362<br>[23-25]      | 391-420<br>[27-29]       |
|                                                   | max                                   | 4350 [300]               |                      |                      |                      |                      |                         |                          |
| Min. oil quantity for<br>brake releasing          | in <sup>3</sup><br>[cm <sup>3</sup> ] | .488 - .549<br>[8-9]     |                      |                      |                      |                      |                         |                          |
| Oil quantity                                      | in <sup>3</sup><br>[cm <sup>3</sup> ] | 9.15 - 18.3<br>[150-300] |                      |                      |                      |                      |                         |                          |
| Max. Pressure in<br>drain space                   | PSI<br>[bar]                          | 72<br>[5]                |                      |                      |                      |                      |                         |                          |
| Weight for .../314<br>for .../315                 | lb [kg]                               | 52.9 [24]<br>55.1 [25]   |                      |                      |                      |                      |                         |                          |

\*Static torque is obtained at working pressure - 0 PSI [0 bar].

## HYDRAULIC DISC BRAKE TYPE LBS/315 FOR FLANGE ATTACHMENT TO MLHTS HYDRAULIC MOTORS

### W Wheel Mount



▽ - Place for attachment  
(tightening torque 710<sup>+44</sup> lb-in [8<sup>+0.5</sup> daNm] for  
screws 1/2" - 13 UNC,  
1 1/4 in [31,8 mm] long, ANSI B 18.3-76)

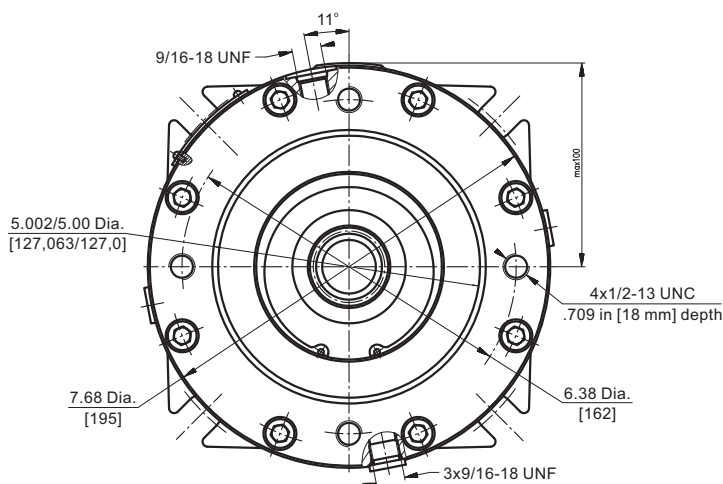
C: Brake release Port - 7/16-20UNF, deep .472 [12]  
D: Drainage tap - 9/16-18UNF, deep .512 [13]

▽▽ - Place for attachment

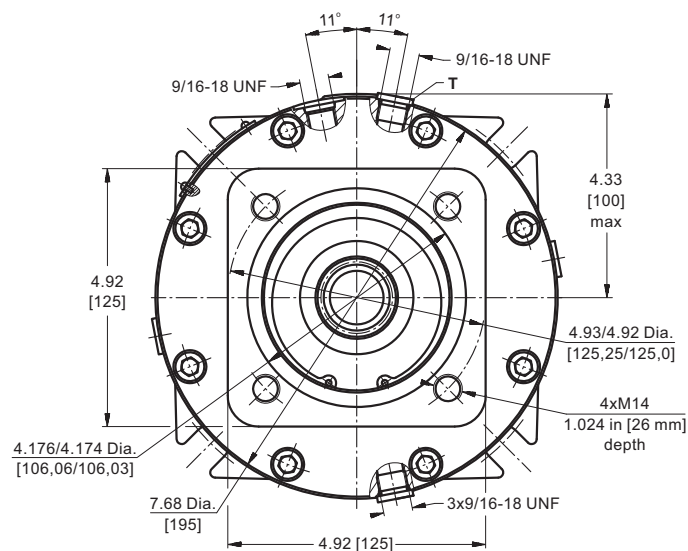


### INPUT FACE

**TYPE**  
**LBS W/315-C**  
**LBS C/314-C**

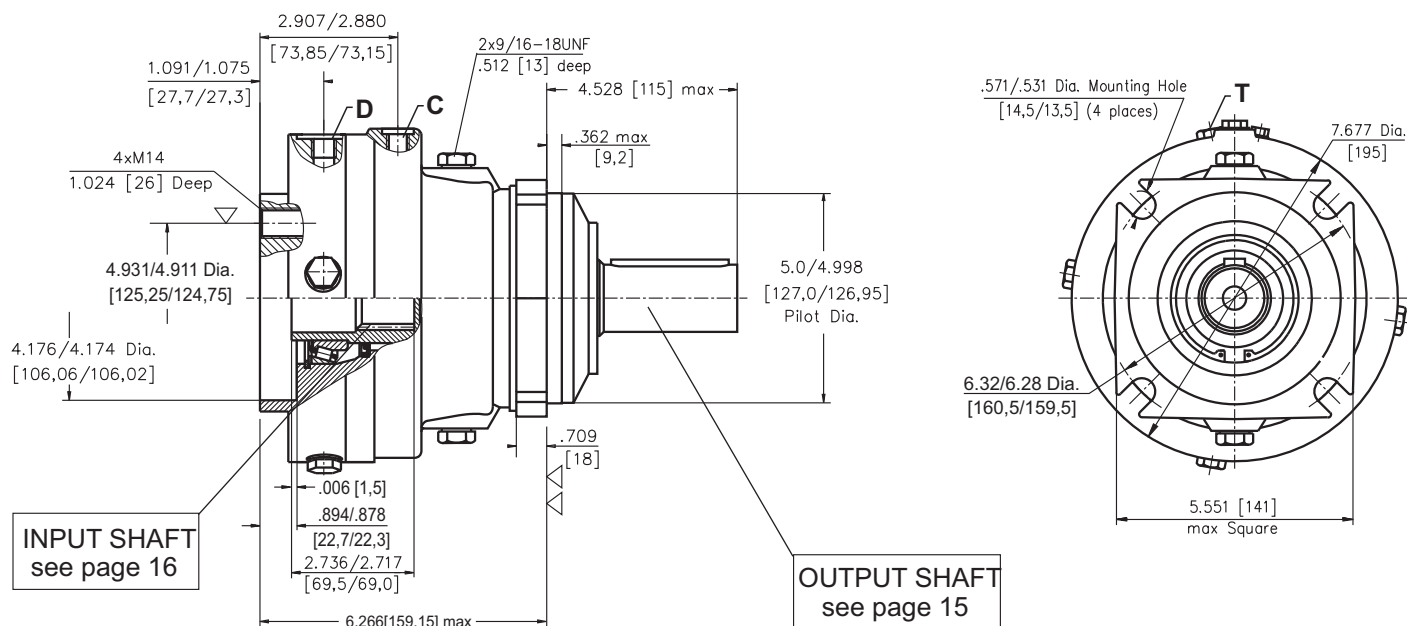


**TYPE**  
**LBV W/315-C**  
**LBV C/314-C**



# HYDRAULIC DISC BRAKE TYPE LBV/314 FOR FLANGE ATTACHMENT TO MLHTV HYDRAULIC MOTORS

## C Square Mount



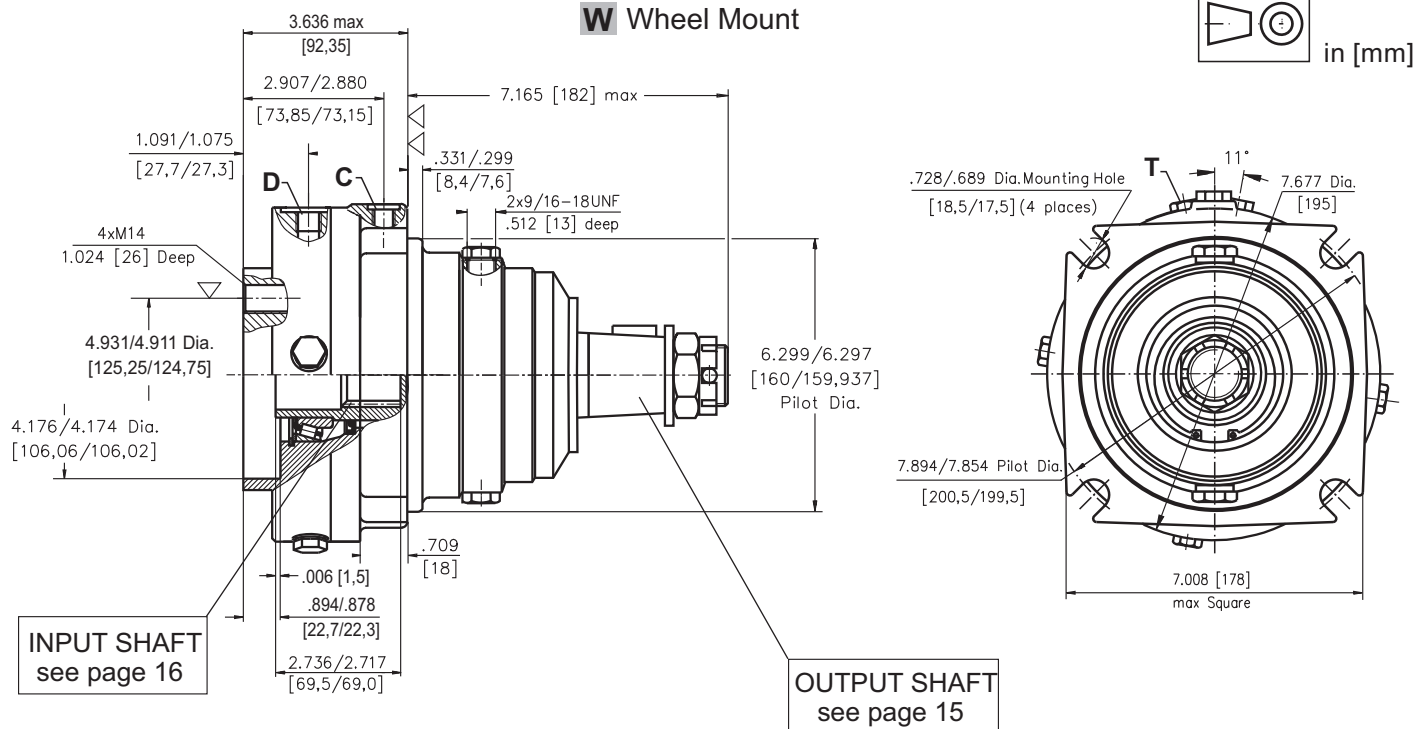
▽ - Place for attachment  
(tightening torque for screws 4xM14 DIN 912:  
1150<sup>+44</sup> lb-in [13<sup>+0,5</sup> daNm])

▽▽ - Place for attachment

C : Brake release Port- 7/16 - 20UNF, .47 [12] depth  
D : Drain plug for the Brake - 9/16-18UNF, .51 [13] depth  
T : Drain plug for the Motor - 9/16-18UNF, .51 [13] depth

# HYDRAULIC DISC BRAKE TYPE LBV/315 FOR FLANGE ATTACHMENT TO MLHTV HYDRAULIC MOTORS

## W Wheel Mount



▽ - Place for attachment  
(tightening torque for screws 4xM14 DIN 912:  
1150<sup>+44</sup> in-lb [13<sup>+0,5</sup> daNm])

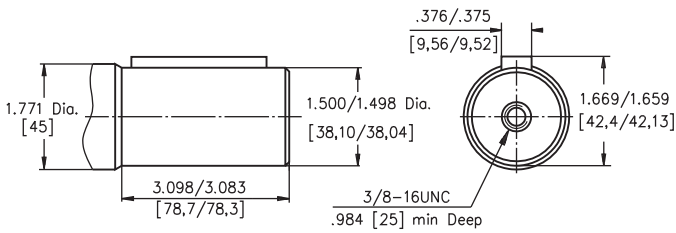
▽▽ - Place for attachment

C : Brake release Port- 7/16 - 20UNF, .47 [12] depth  
D : Drain plug for the Brake - 9/16-18UNF, .51 [13] depth  
T : Drain plug for the Motor - 9/16-18UNF, .51 [13] depth

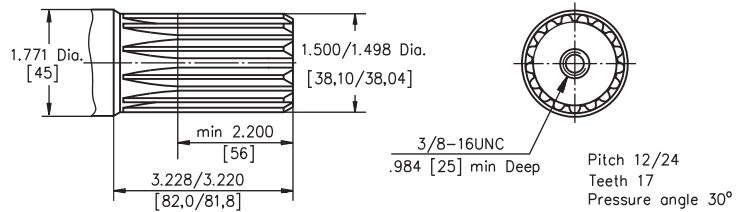
# **OUTPUT SHAFT EXTENSIONS for LB.../314, 315**

**C**

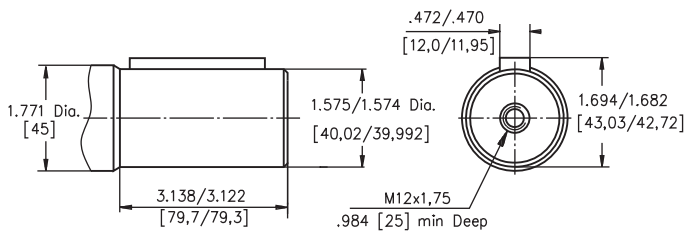
1½"[38,1] straight, Parallel key  $\frac{3}{8}$ " $\times$  $\frac{3}{8}$ " $\times$  2¼" BS46  
Max. Torque 11750 lb-in [133 daNm]


**G**

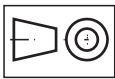
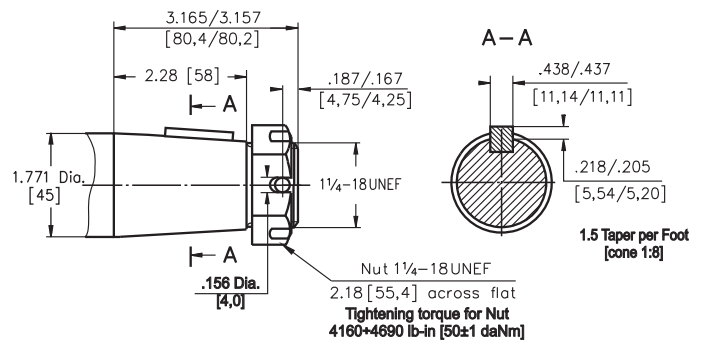
17T Splined, 1½" [38,1] ANS B92.1-1976  
Max. Torque 11750 lb-in [133 daNm]


**M**

ø40 straight, Parallel key A12x8x70 DIN 6885  
Max. Torque 11750 lb-in [133 daNm]


**T**

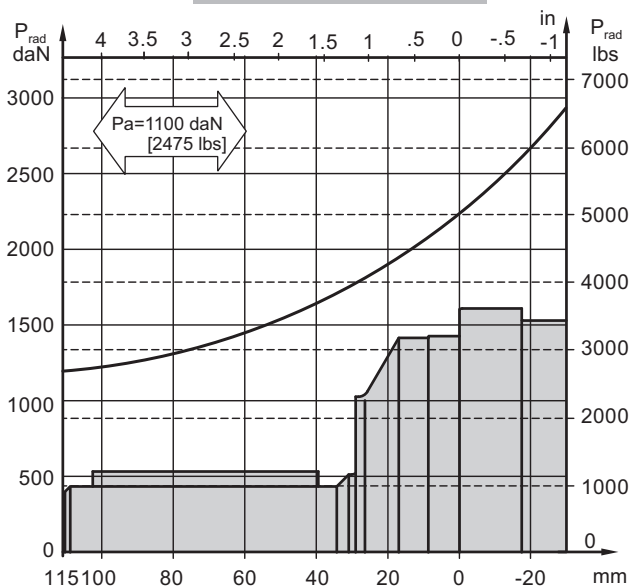
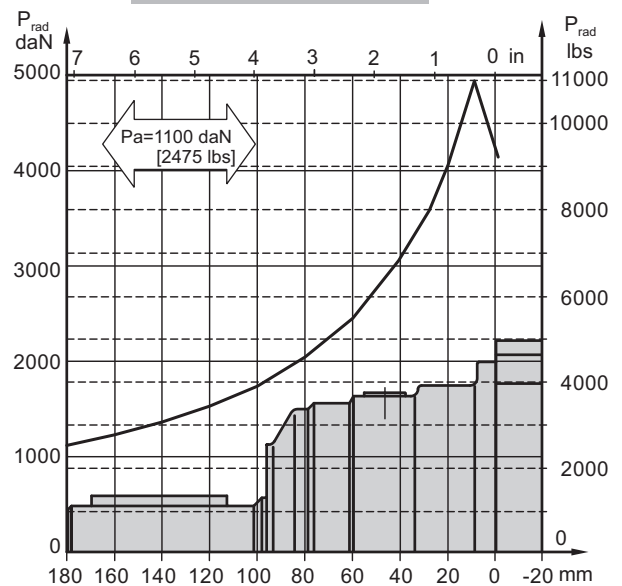
SAE J501 Tapered 1:8  
Parallel key  $\frac{7}{16}$ " $\times$  $\frac{7}{16}$ " $\times$  1¼" BS46  
Max. Torque 18650 lb-in [210 daNm]



in [mm]

## **LOAD CURVE**

The output shaft runs in tapered bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as function of the distance from the mounting flange to the point of load application. The curves apply to a B10 bearing life of 2000 hours at 100 RPM.

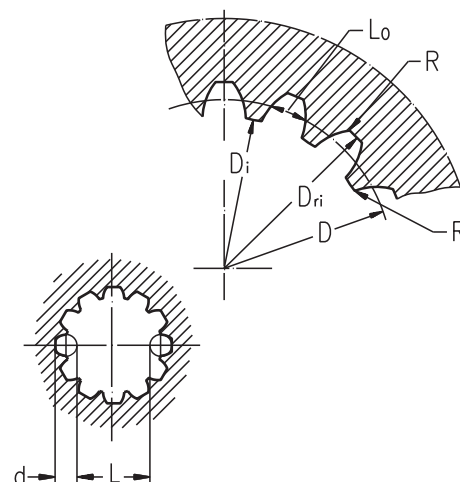
**Version LB... /314**

**Version LB... /315**


## INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANS B92.1-1970, class 5

 $[m=2.1166]$ 

| Fillet Root Side Fit          | LBS(V)/289<br>LBS(V)/290 |                 | LBS(V)/314<br>LBS(V)/315 |                        |
|-------------------------------|--------------------------|-----------------|--------------------------|------------------------|
|                               | inch                     | mm              | inch                     | mm                     |
| Number of Teeth               | z                        | 12              | 12                       | 16                     |
| Diametral Pitch               | DP                       | 12/24           | 12/24                    | 12/24                  |
| Pressure Angle                |                          | 30°             | 30°                      | 30°                    |
| Pitch Dia.                    | D                        | 1               | 1.3333                   | 33,8656                |
| Major Dia.                    | D <sub>ri</sub>          | 1.1 ÷ 1.098     | 1.5275 ÷ 1.5118          | 38,4 <sup>+0,4</sup>   |
| Minor Dia.                    | D <sub>i</sub>           | .9068 ÷ .9055   | 1.2673 ÷ 1.2657          | 32,15 <sup>+0,06</sup> |
| Space Width [Circular]        | Lo                       | .1704 ÷ .1688   | .1763 ÷ .1792            | 4,516 ± 0,037          |
| Fillet Radius                 | R                        | .008            | .02                      | 0,5                    |
| Max. Measurement between Pins | L                        | .699 ÷ .694     | 1.063 ÷ 1.059            | 26,9 <sup>+0,10</sup>  |
| Pin Dia.                      | d                        | .19039 ÷ .19031 | .19026 ÷ .19034          | 4,835 ± 0,001          |
| Corrected                     | x.m                      | +0,31           | +0,39                    | +1,0                   |



## ORDER CODE for LBS(LBV)/314 and 315

|            |   |   |   |   |   |   |   |
|------------|---|---|---|---|---|---|---|
|            | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>L B</b> |   |   | / | - |   |   |   |

## Pos.1 - Type

- S** - Disc Brake for short motor **S** - MLHTS  
**V** - Disc Brake for very short motor **V** - MLHTV

## Pos.2 - Output Face

- C** - Square Mount [for LBS(LBV)/314 only]  
**W** - Wheel Mount [for LBS(LBV)/315 only]

## Pos.3 - Design Code

- 314** - for MLHTS and MLHTV Motors  
**315** - for MLHTS and MLHTV Motors  
 [Wheel Mounting Motors]

## Pos.4 - Static Torque Code [see Specification Data]

21, 29, 43, 65, 85, 110, 130

## Pos.5 - Output Shaft Extensions\*

- C** - 1½" [38,10] straight, Parallel key  
**G** - 1½" [38,10] 17T Splined  
**M** - 40 mm straight, Parallel key  
**T** - 1¼" [44,50] SAE J501 Tapered

## Pos.6 - Option [Paint]\*\*

- omit - no Paint  
**P** - Painted  
**PC** - Corrosion Protected Paint

## Pos.7 - Design Series

- omit - Factory specified

**Notes:** \* For Max. Torque values see data on page 15. The permissible output torque for shafts must not be exceeded!

\*\* Color at customer's request.

The Disc Brakes are mangano phosphatized as standard.

## ATTENTION:

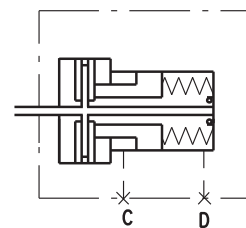
- Hydraulic brake is delivered without oil (it is lubricated only).
- Fill the brake through the drain port **D** with 50 ÷ 120 cm<sup>3</sup> [3.05 ÷ 7.32 in<sup>3</sup>] mineral oil HLP (DIN 51524) or HM (ISO 6743/4). LB/288 must be filled after the motor is assembled on the brake.
- In all brakes, friction discs and separators should be lubricated.



# HYDRAULIC DISC BRAKES B...R- Wet

B...R brake is designed to be mounted to the wheels of low-speed agricultural and construction vehicles.

The advantage of these brakes is that despite the smallest possible dimensions they preserve long-term life of the bearings at high radial shaft load.



## SPECIFICATION DATA

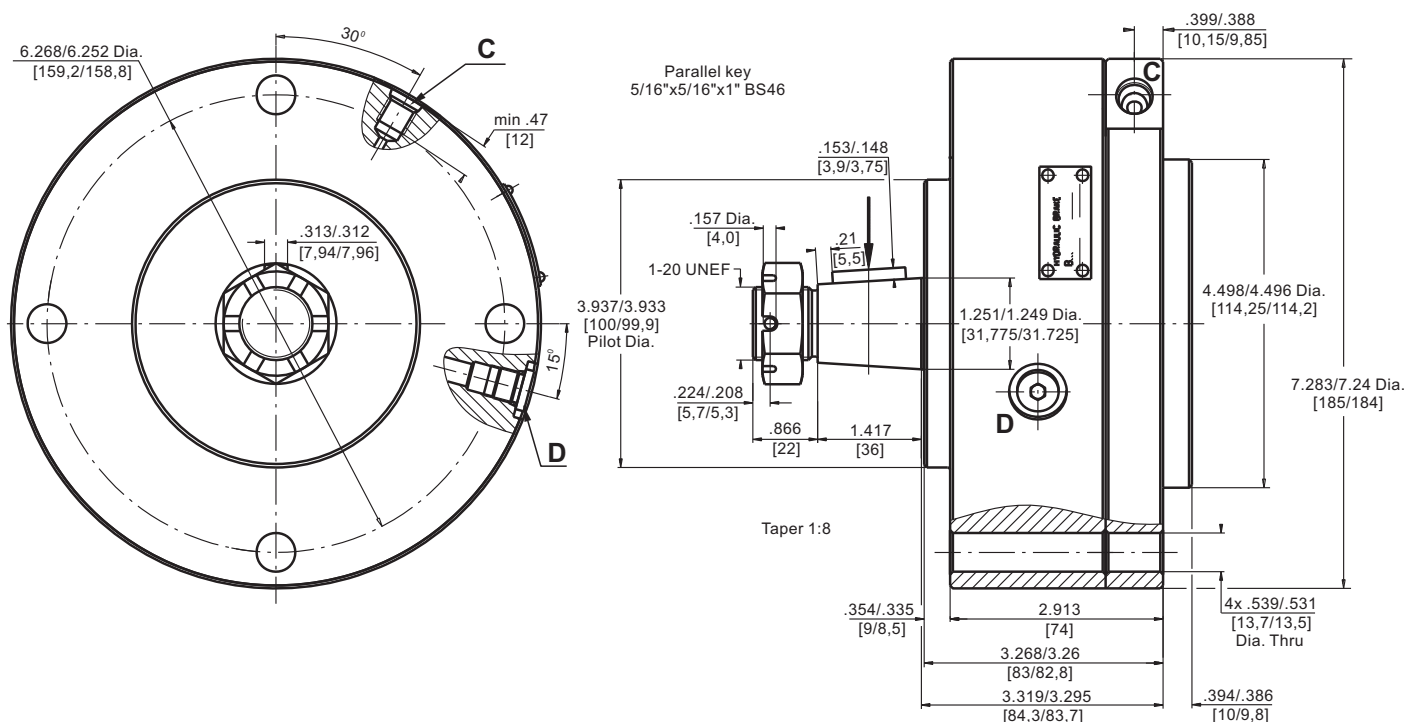
| Type                                  | B35R       | B55R       |
|---------------------------------------|------------|------------|
| Static Torque of Brake, lb-in [daNm]* | 3100 [35]  | 4870 [55]  |
| Initial Release Pressure, PSI [bar]   | 232 [16]   | 232 [16]   |
| Full Release Pressure, PSI [bar]      | 275 [19]   | 275 [19]   |
| Max. Operating Pressure, PSI [bar]    | 3480 [240] | 3480 [240] |
| Max. Speed, RPM                       | 90         | 90         |
| Cont. Radial Shaft Load lbs [daN]**   | 1125 [500] | 1125 [500] |
| Max. Radial Shaft Load lbs [daN]***   | 1575 [700] | 2030 [900] |

\* At 0 PSI [0 bar] back pressure

\*\* At radial shaft load of 1125 lbs [500 daN], applied at center-line of the key and speed of rotation 90 RPM, the bearing life is 1000 hours.

\*\*\* The permissible values of radial shaft load may occur for max. 10% of every minute

## DIMENSIONS AND MOUNTING DATA



**C** : Brake Release Port -7/16-20 UNF  
SAE J1926-1/ISO 11926-1

**D** : Drainage Tap - 7/16-20 UNF



## MOTOR-BRAKE ADDITIONAL OPTIONS

| Additional Options Description | Order Code | Motor type |     |    |    |
|--------------------------------|------------|------------|-----|----|----|
|                                |            | B/HR       | RWB | SW | TW |
| Low Leakage                    | LL         | O          | O   | -  | -  |
| Low Speed Valving              | LSV        | O          | O   | -  | -  |
| Free Running                   | FR         | -          | -   |    | -  |
| Reverse Rotation               | R          | O          | O   | -  | -  |
| Paint*                         | P          | O          | O   | O  | O  |
| Corrosion Protected Paint*     | PC         | O          | O   | O  | O  |
| Special Paint**                | PS         | O          | O   | O  | O  |
|                                | PCS        |            |     |    |    |
| Check Valves                   |            | -          | O   | S  | S  |

|          |                |
|----------|----------------|
| <b>O</b> | Optional       |
| <b>-</b> | Not applicable |
| <b>S</b> | Standard       |

\* Colour at customer's request.

\*\* Non painted feeding surfaces, colour at customer's request.

# APPLICATION CALCULATION

## VEHICLE DRIVE CALCULATIONS

### 1. Motor speed: $n$ , RPM

$$n = \frac{168 \times v_{mi} \times i}{R_m} \quad n = \frac{2,65 \times v_{km} \times i}{R_m}$$

$v_{km}$ - vehicle speed, km/h;  
 $v_{mi}$ - vehicle speed, mile/h;  
 $R_m$ - wheel rolling radius, m;  
 $R_{in}$ - wheel rolling radius, in;  
 $i$ - gear ratio between motor and wheels.  
 If no gearbox, use  $i=1$ .

### 2. Rolling resistance: $RR$ , lbs [daN]

The resistance force resulted in wheels contact with different surfaces:

$$RR = G \times \rho$$

$G$ - total weight loaded on vehicle, lbs [daN];  
 $\rho$ - rolling resistance coefficient (Table 1).

Table 1

| Rolling resistance coefficient<br>In case of rubber tire rolling on different surfaces |             |
|----------------------------------------------------------------------------------------|-------------|
| Surface                                                                                | $\rho$      |
| Concrete- faultless                                                                    | 0.010       |
| Concrete- good                                                                         | 0.015       |
| Concrete- bad                                                                          | 0.020       |
| Asphalt- faultless                                                                     | 0.012       |
| Asphalt- good                                                                          | 0.017       |
| Asphalt- bad                                                                           | 0.022       |
| Macadam- faultless                                                                     | 0.015       |
| Macadam- good                                                                          | 0.022       |
| Macadam- bad                                                                           | 0.037       |
| Snow- 5 cm                                                                             | 0.025       |
| Snow- 10 cm                                                                            | 0.037       |
| Polluted covering- smooth                                                              | 0.025       |
| Polluted covering- sandy                                                               | 0.040       |
| Mud                                                                                    | 0.037÷0.150 |
| Sand- Gravel                                                                           | 0.060÷0.150 |
| Sand- loose                                                                            | 0.160÷0.300 |

### 3. Grade resistance: $GR$ , lbs [daN]

$$GR = G \times (\sin \alpha + \rho \times \cos \alpha)$$

$\alpha$ - gradient negotiation angle (Table 2)

Table 2

| Grade % | $\alpha$ Degrees | Grade % | $\alpha$ Degrees |
|---------|------------------|---------|------------------|
| 1%      | 0° 35'           | 12%     | 6° 5'            |
| 2%      | 1° 9'            | 15%     | 8° 31'           |
| 5%      | 2° 51'           | 20%     | 11° 19'          |
| 6%      | 3° 26'           | 25%     | 14° 3'           |
| 8%      | 4° 35'           | 32%     | 18°              |
| 10%     | 5° 43'           | 60%     | 31°              |

### 4. Acceleration force: $FA$ , lbs [daN]

Force  $FA$  necessary for acceleration from 0 to maximum speed  $v$  and time  $t$  can be calculated with a formula:

$$FA = \frac{v_{mi} \times G}{22 \times t}, [\text{lbs}]; \quad FA = \frac{v_{km} \times G}{36 \times t}, [\text{daN}]$$

$FA$ - acceleration force, lbs [daN];  
 $t$ - time, [s].

### 5. Tractive effort: $DP$ , lbs [daN]

Tractive effort  $DP$  is the additional force of trailer. This value will be established as follows:

-acc.to constructor's assessment;  
 -as calculating forces in items 2, 3 and 4 of trailer; the calculated sum corresponds to the tractive effort requested.

### 6. Total tractive effort: $TE$ , lbs [daN]

Total tractive effort  $TE$  is total effort necessary for vehicle motion; that the sum of forces calculated in items from 2 to 5 and increased with 10 % because of air resistance.

$$TE = 1,1 \times (RR + GR + FA + DP)$$

$RR$ - force acquired to overcome the rolling resistance;  
 $GR$ - force acquired to slope upwards;  
 $FA$ - force acquired to accelerate (acceleration force);  
 $DP$ - additional tractive effort (trailer).

### 7. Motor Torque moment: $M$ , lb-in [daNm]

Necessary torque moment for every hydraulic motor:

$$M = \frac{TE \times R_{in} [R_m]}{N \times i \times \eta_M}$$

$N$ - motor numbers;  
 $\eta_M$ -mechanical gear efficiency (if it is available).

### 8. Cohesion between tire and road covering: $M_w$ , lb-in [daNm]

$$M_w = \frac{G_w \times f \times R_{in} [R_m]}{i \times \eta_M}$$

To avoid wheel slipping, the following condition should be observed  $M_w > M$

$f$  - frictional factor;

$G_w$ - total weight over the wheels, lbs [daN].

Table 3

| Surface                         | Frictional factor $f$ |
|---------------------------------|-----------------------|
| Steel on steel                  | 0.15 ÷ 0.20           |
| Rubber tire on polluted surface | 0.5 ÷ 0.7             |
| Rubber tire on asphalt          | 0.8 ÷ 1.0             |
| Rubber tire on concrete         | 0.8 ÷ 1.0             |
| Rubber tire on grass            | 0.4                   |

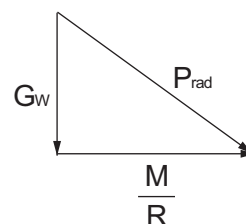
### 9.Radial motor loading: $P_{rad}$ , lbs [daN]

When motor is used for vehicle motion with wheels mounted directly on motor shaft, the total radial loading of motor shaft  $P_{rad}$  is a sum of motion force and weight force acting on one wheel.

$G_w$  - Weight held by wheel;

$P_{rad}$  - Total radial loading of motor shaft;

$M/R$ - Motion force.



$$P_{rad} = \sqrt{G_w^2 + \left(\frac{M}{R}\right)^2}$$

In accordance with calculated loadings the suitable motor from the catalogue is selected.

## DRAINAGE SPACE AND DRAINAGE PRESSURE

Advantages in oil drainage from drain space: Cleaning; Cooling and Seal lifetime prolonging.

